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Footprints of porphyry Cu deposits: Vectors to the hydrothermal center using mineral mapping and lithogeochemistry

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Summary

This research was conducted collaboratively by Richard Tosdal and students of the University of British Columbia, by Scott Halley of MinMap (Perth, Australia, and by John Dilles and students from Oregon State University. The project was funded collaboratively by six international mining and minerals exploration companies and the USGS with the objective of collecting mineralogic and geochemical data from the hydrothermally altered rocks that lie above and lateral to porphyry copper type ore deposits. These hydrothermally altered distal zones are commonly poorly mineralized, and extend hundreds of meters to up to 10 km from the mineable ores. The goals were twofold: 1) to obtain data on the 3-D distribution of minerals and geochemically anomalous elements around large porphyry copper deposits to better understand the nature of hydrothermal alteration processes, metal deposition, and permeable pathways for hydrothermal fluids; and 2) to build a 3-D model that includes mineralogic zonation as well as anomalous geochemical gradients that may prove useful for prospecting for mineral deposits concealed at depth or under post-mineral rock cover. Simple exploration tools were employed so as to be exportable to industry, and these include portable field ASD and PIMA shortwave infrared spectrometers for rapid identification of hydrous minerals and commercially available ICP-AES and ICP-MS analysis of rock samples dissolved by the 4 acid method (hydrochloric-nitric-perchloric-hydrofluoric) to obtain low detection levels (<0.1 to 1 ppb, typical) for 48 elements. We did selective analytical work in the laboratory to confirm the mineralogy and compositions of micas and chlorites (i.e., X-ray diffraction, electron microprobe, laser ablation-ICP-MS)

In the broader study, samples were collected from several field sites including Yerington, Nevada, Butte, Montana, Christmas, Arizona, Highland Valley, British Columbia, and Red Chris, British Columbia. Results in all these locations were broadly similar, and suggest that all porphyry copper deposits, despite different tectonic settings, magma compositions, ages, and ore mineral suites produce a relatively consistent mineralogic and geochemical zonation. (Note that the minerals are not identical, and the magnitude of trace metal anomalies varies significantly).

In the mineralogic studies, we focused on white mica and clays (muscovite, illite, pyrophyllite, etc) and chlorite. Near the copper ore bodies, white mica is dominated by muscovite that formed at relatively high temperature (~400-500°C) on the basis of slightly elevated paragonite (Na) and phengite (Fe, Mg) components. Most feldspars not replaced by muscovite were dusted by fine-grained white mica with an illite composition during a late stage when the hydrothermal system had cooled below 300°C. In the upper and outer parts of the hydrothermal system, muscovite dominates and ranges in composition from low-Na-Fe-Mg mica along main fluid pathways characterized by strong alteration to phengitic muscovite (Fe-, Mg-rich) in weakly altered zones that include relic feldspars. Illite is also present in many feldspar-bearing samples, and here also is interpreted to form at lower temperatures than muscovite. All illite is phengitic (Mg-, Fe-bearing). Phengitic illites and muscovites are indistinguishable via shortwave infrared spectral analyses because illites and muscovite compositions are distinguished via the K content and tetrahedral Al/Si ratio, and variations of these parameters produce no spectral shifts. Rather, the 2200 nm absorption shifts to longer wavelength as phengite content (Mg, Fe) increases in both muscovite and illite. Mica compositions largely are controlled by the pH conditions, where Al-rich muscovites form in relatively acidic conditions (low pH) and phengitic (Mg,Fe) muscovites and illites form in more neutral conditions

(moderate pH), consistent with mineral exchange reactions. Chlorite compositions were also studied, and their Al content also reflects pH conditions, but more weakly than mica.

Whole rock lithogeochemistry allows tracking of the path of the magmatic hydrothermal fluid above (and lateral to) the ore zone within rocks containing sulfides and affected by hydrolytic alteration (i.e., muscovite, illite, pyrophyllite, alunite). Weak hydrolytical alteration characterized by “sericite” (white mica), chorite, and relc feldspar shows similar, but weaker anomalies. Mo, W, and Sn extend a short distance (<1 km), whereas Se, Te, Bi, Sb, and As extend into the subvolcanic environment (>1 km upward), and Li, Cs, Rb, Ba and Tl extend to shallow environment and outward as a halo in the chlorite-bearing rocks. Tl, Li, Cu, Zn, and Pb are found in trace amounts in hydrothermal micas, chlorite, and clays, but the other metals are largely present as trace amounts in pyrite (e.g., As) or as minute sulfides that have not been examined in this study. In the ore zone, many transition metals and trace metals are depleted (Zn, Mn, Co, Ni, Sr, Pb, As, Tl, Cs, Rb, and Li) in part as a result of alteration of primary hornblende, biotite, and plagioclase. Zn, Mn, Sr, Co, Ni, and Li anomalies in distal and shallow parts of the hydrothermal system therefore in part reflect the redistribution of these elements by interior leaching and distal precipitation. The positions of the metal anomalies and gradients in metal ratios may be promising exploration tools.

The research was supported by the U.S. Geological Survey (USGS), Department of the Interior, under USGS award number G10AP00052. *The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. Government.*

Products

The final report for this project is the Geology MS Thesis of Julia F. Cohen from Oregon State University, defended on September 9, 2011, and completed by October 1, 2011. The full thesis and appendices are saved in Adobe Acrobat “pdf” digital format, and presented to the USGS on a CD and in an attachment to an e-mail. The MS thesis is the promised deliverable for the MRERP award.

The publications resulting from this work are:

Cohen, J.F., 2011, Mineralogy and geochemistry of hydrothermal alteration at the Ann-Mason porphyry copper deposit, Nevada: Comparison of large-scale ore exploration techniques to mineral chemistry: [MS thesis], Oregon State University, 111 pages (plus appendices, p. 112-580).

Cohen, J.F., Dilles, John H.; Tosdal, Richard M.; Halley, Scott:, 2011,Compositional variations in hydrothermal white micas and chlorites in a porphyry Cu system at Yerington: Abstracts with Programs - Geological Society of America, May, 2011, Vol. 43, Issue 4, pp.63-64.

[note, we plan to submit chapters 2 and 3 of Ms. Cohen’s MS thesis for peer-reviewed journal publication in late 2012].

AN ABSTRACT OF THE THESIS OF

Julia F. Cohen for the degree of Master of Science in Geology presented on September 9, 2011.

Title: Mineralogy and geochemistry of hydrothermal alteration at the Ann-Mason porphyry copper deposit, Nevada: Comparison of large-scale ore exploration techniques to mineral chemistry

Abstract approved:

John H. Dilles

The detection of subtle variations in mineral chemistry in zoned hydrothermal alteration associated with the formation of porphyry copper deposits by short-wave infrared (SWIR) spectroscopy and rock chemistry are potentially valuable vectoring tools for mineral exploration. In order to correctly interpret the data collected by these methods, results must be calibrated by mineral data. Hydrothermal white mica, illite and chlorite grains were sampled from the Ann-Mason deposit in the Yerington district, Nevada, a Middle Jurassic porphyry copper system extended and tilted ~ 90° to the west. Mineral compositions vary spatially and record interactions with chemically distinct hydrothermal fluids over a vertical distance of ~3.5 km and a lateral distance of ~2 km from the ore center. Data suggest SWIR spectroscopy and bulk rock geochemical sampling can detect changes in mineral chemistry related to ore deposit formation but both methods have limitations.

To relate SWIR spectroscopy to mineral compositions, spectra from rock samples were measured and characteristic features commonly used to identify white mica, illite and chlorite were compared to chemical compositions of mineral grains determined by electron microprobe analysis (EMPA). Results demonstrate SWIR spectroscopy can be used to detect changes in the aluminum content of micas using the wavelength of the 2200 nm feature and may be used to map fluid pH gradients in rocks with muscovite or illite-bearing assemblages. The following compositional characteristics determined by

EMPA for white mica/illite were observed in the SWIR spectra: (1) an increase in the wavelength of the Al-OH absorption at ca. 2200 nm that is positively correlated with Fe+Mg+Mn (apfu) content and negatively correlated with total Al (apfu) corresponding to Tschermak substitution in both muscovite and illite, and (2) a decrease the wavelength of the ca. 2200 nm absorption to values below 2193 nm attributed to an increase in Na content (apfu) from paragonitic substitution in muscovite. For this sample set, illite cannot be distinguished from muscovite using SWIR spectroscopy. Chlorite compositional variations could not be identified in SWIR spectra of rocks and were likely obscured by coexisting highly reflective clays and micas.

To compare trace metal gradients in rocks and minerals, trace metal concentrations in altered rock collected in a broad geochemical sampling campaign were measured using inductively coupled plasma-mass spectrometry and inductively coupled plasma-atomic emission spectroscopy (ICP-MS/AES) and compared to trace metal contents of hydrothermal white mica, illite and chlorite as determined by laser ablation-inductively coupled plasma-mass spectrometry (LA-ICP-MS). Cu, Mo, Te, Se, Bi, Sb, As, W, Sn, Li and Tl are enriched rocks from the zone of potassic, sericitic and shallow-level advanced argillic alteration that represents the near-vertical pathway of the ore fluid from the mineralized zone (3.5 km depth) to the paleosurface. Of these elements, W, Sn and Tl enrichment in rock can be attributed, at least partially, to increased concentrations in muscovite and illite. Li enrichment can be attributed to increased concentrations in chlorite and differences in wall-rock lithology above 1 km depth. Zn, Mn, Co, Ni, V and Sc are depleted in altered rock above the ore zone and redistributed laterally by circulating sedimentary brines as verified by gradients in chlorite chemistry from propylitic alteration. Chalcophile elements Mo, Te, Se, Bi are rarely detected in white mica/illite or chlorite in concentrations greater than 1 ppm and, in more than 50% of analyses, levels are below detection.

Mineralogy and geochemistry of hydrothermal alteration at the Ann-Mason porphyry copper deposit, Nevada: Comparison of large-scale ore exploration techniques to mineral chemistry

by
Julia F. Cohen

A THESIS

submitted to

Oregon State University

in partial fulfillment of
the requirements for the
degree of

Master of Science

Presented September 9, 2011
Commencement June 2012

Master of Science thesis of Julia F. Cohen presented on September 9, 2011

APPROVED:

Major Professor, representing Geology

Chair of the Department of Geoscience

Dean of the Graduate School

I understand that my dissertation will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my dissertation to any reader upon request.

Julia F. Cohen, Author

ACKNOWLEDGEMENTS

I would like to thank my advisor, Dr. John Dilles, for presenting me this research opportunity and for his support, and patience, in the lab and in the field. I have learned and grown exponentially as scientist under his guidance and, without him, this project would not have been possible. I would also like to thank my committee members Dr. Adam Kent and Dr. Richard Tosdal for their time and advice, and my graduate school representative Dr. Kevin Gable, for his time and effort and for volunteering to be a part of this process. In addition, I am grateful to Scott Halley for his help interpreting the spectral data and for his general feedback and advice.

I would like to thank Barrick Gold, Teck, Imperial Minerals, BHP and Freeport for their financial support. Additional financial support for this research was provided by the USGS and SEG. I am thankful to Dr. Frank Tepley and Dale Burns for their help using the electron microprobe and to Dr. Adam Kent, Alison Koleszar and Matt Loewen for their help on the laser. I would like to thank Tatiana Alva at UBC for her collaboration on this project and for her assistance using the TerraSpec.

I would like to thank Federico Cernuschi and Stephanie Grocke for reading drafts and giving feedback and, to all the VIPERs, for being such a great group of scientists and friends. I would like to give a special thanks to my parents, Chuck and Kathryn Cohen, for their love and encouragement and for acting as outside editors. Last but not least, I would like to thank Adam Billings, my fiancée and best friend, for taking a leap and following me on this adventure and, hopefully, on many more to come.

CONTRIBUTION OF AUTHORS

Dr. John Dilles, Dr. Richard Tosdal and Dr. Scott Halley collected and described the set of samples analyzed for rock chemistry presented in Chapter 2. Scott Halley wrote a preliminary report on the findings from this sampling effort that was the basis for the rock chemistry section in Chapter 2.

LIST OF FIGURES

LIST OF FIGURES (continued)

LIST OF FIGURES (continued)

LIST OF TABLES

LIST OF APPENDICES

LIST OF APPENDIX FIGURES

LIST OF APPENDIX TABLES

TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

TABLE OF CONTENTS (continued)

Mineralogy and geochemistry of hydrothermal alteration at the Ann-Mason porphyry copper deposit, Nevada: Comparison of large-scale ore exploration techniques to mineral chemistry

Chapter 1: Introduction and Geologic setting of the Yerington district, Nevada

1.1 Introduction

Porphyry-type deposits contribute greatly to the global economy, primarily in the metals Cu, Mo, and Au (Seedorff et al., 2005). Due to extensive exploration and the rarity of these deposits, most well exposed porphyry-copper (Cu) deposits have been discovered. To find new deposits, exploration methods must be extended to regions with poor-exposure and to areas of rugged terrain. The overall goal of this project and other related research is to develop an exploration method to detect porphyry-Cu mineralization kilometers from an ore body using short-wave infrared spectroscopy and trace element gradients in rock chemistry as evidence for the pathway of ore-forming fluids. The goal of this thesis is to access the effectiveness of these larger scale methods by comparing them to mineral data collected through microanalytical techniques.

This thesis focuses on variations in the major and trace element compositions of white mica (muscovite, mixed muscovite-paragonite and pyrophyllite), illite and chlorite from hydrothermal alteration surrounding the Ann-Mason porphyry-Cu(Mo) deposit at in the Yerington district, Nevada. Due to Miocene to present tilting and extension, the Middle Jurassic Yerington batholith and the Ann-Mason deposit have been exposed in cross-section from the paleosurface to approximately 7 km depth (Proffett, 1977). The resulting exposures provide an ideal location to study the spatial distribution of trace elements and phyllosilicate chemistry surrounding a porphyry-Cu system. In addition, the petrology of the Yerington batholith (Dilles, 1987) and the nature of wall-rock alteration at the Ann-Mason deposit (Carten, 1986; Dilles and Einaudi, 1992; Lipske, 2002) have been studied in detail and a model for the origin and sequence of observed alteration assemblages has been developed based on field mapping, petrology, fluid inclusion data and stable isotopes (Dilles et al., 2000a).

The content of this thesis is divided into four chapters: (1) introduction and geologic setting of the Yerington district, Nevada, (2) comparison of compositional

variations in white mica, illite and chlorite to short-wave infrared spectra, (3) comparison of altered wall-rock chemistry to trace element contents in white mica, illite and chlorite and (4) conclusion.

1.2 Geologic setting of the Yerington district, Nevada

1.2.1 Location

The Yerington district and the town of Yerington are located in western-central Nevada, approx. 80 miles to the southeast of Reno, Nevada (Figure 1.1). The Yerington district lies in the western Great Basin portion of the Basin and Range province, which extends from the Sierra Nevada east to the Columbia Plateau and south from southern Idaho to northern Arizona Within the Yerington district is the Yerington batholith, a Middle Jurassic pluton that hosts at least four porphyry copper deposits, including Ann-Mason, and is associated with nearby copper skarn and iron oxide-copper-gold mineralization (Dilles and Proffett, 1995).

1.2.2 Geologic history

The oldest rocks that outcrop in the Yerington district are the Middle to early Late Triassic McConnell Canyon volcanics, a group of calc-alkaline andesites and rhyolites. These are overlain by a Late Triassic to Middle Jurassic regressive sedimentary sequence of carbonates, volcanoclastics and argillites with uppermost units of evaporate gypsum and eolian quartzite (Dilles and Wright, 1988). Arc magmatism developed along the edge of the continent in the Middle Jurassic (165 – 170 Ma), leading to the deposition of the Artesia Lake volcanics and virtually simultaneous emplacement of the Yerington batholith (168 – 169 Ma). The Fulstone volcanics (167 Ma), overlie the Artesia Lake volcanics and are intruded by the later Shamrock batholith (165 – 166 Ma) (Dilles, 1987; Dilles and Wright, 1988; Proffett and Dilles, 1984). Additional research regarding the Mesozoic geology is reported in Dilles (1987) and Dilles and Wright (1988).

A major erosional unconformity separates the Mesozoic arc-related volcanic, sedimentary and intrusive rocks from the overlying Tertiary, Oligocene and Miocene, volcanics and intrusives (Proffett and Dilles, 1984). The Tertiary deposits are uncomfortably overlain by Quaternary alluvium and landside sediments, which are the

youngest deposits in the region (Proffett and Dilles, 1984). Detailed description of the Cenozoic units and structure can be found in Proffett (1977) and Dilles and Gans (1995).

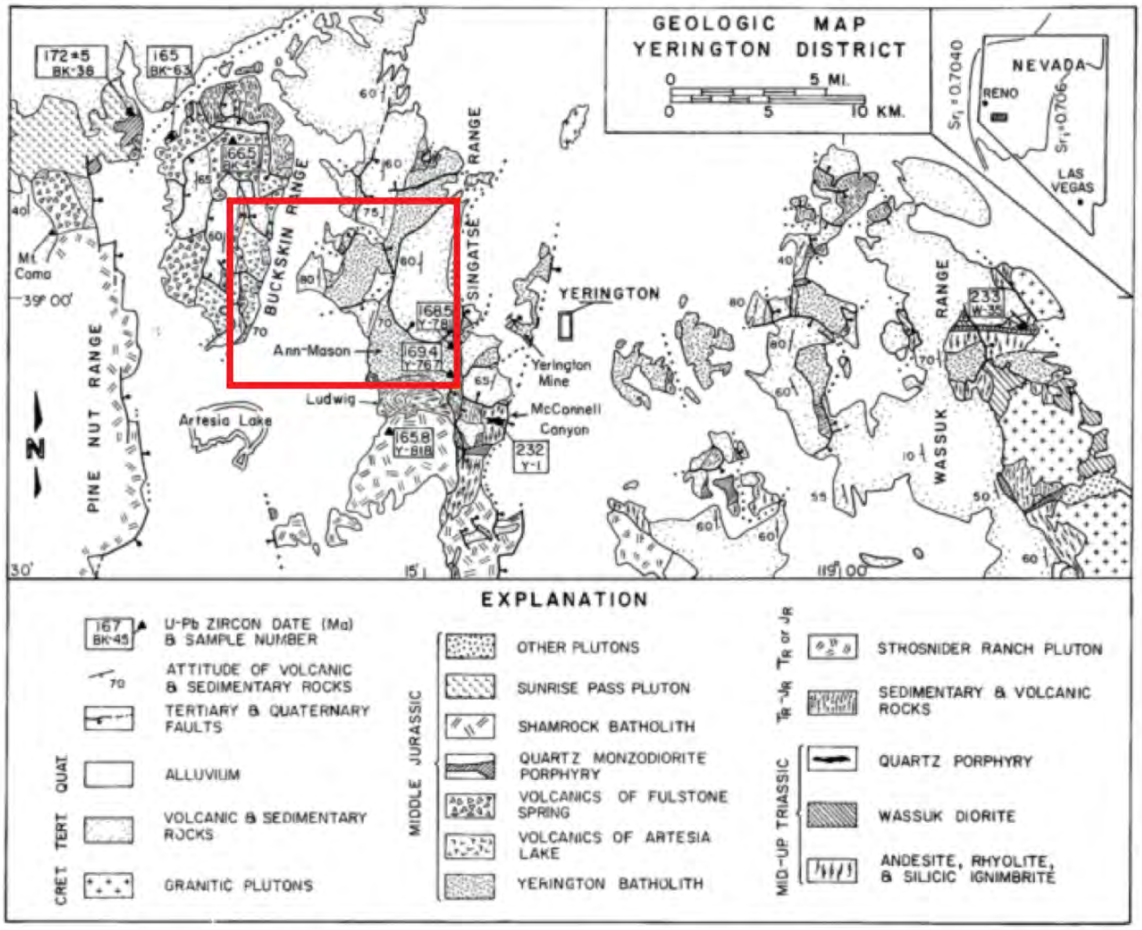

Figure 1.1. Location and simplified geologic map of the Yerington district, Nevada. (from Dilles and Gans (1988), based on Proffett and Dilles, 1984). Red rectangle outlines study area.

<u>1.2.3 Structure</u>

The Yerington district underwent significant tilting as a result of Basin and Range extension along steeply dipping normal faults, beginning in the Miocene and continuing through the present. Movement along faults accommodated more than 100 percent east-west extension and tilted fault blocks 60-90° W (Proffett, 1977; Proffett and Dilles, 1984). As a result, a structural cross section through the Yerington batholith and overlying volcanics is preserved and exposed from the surface to 1 km paleodepth in the western Buckskin Range and from 1 to 7 km paleodepth in the eastern Singatse Range.

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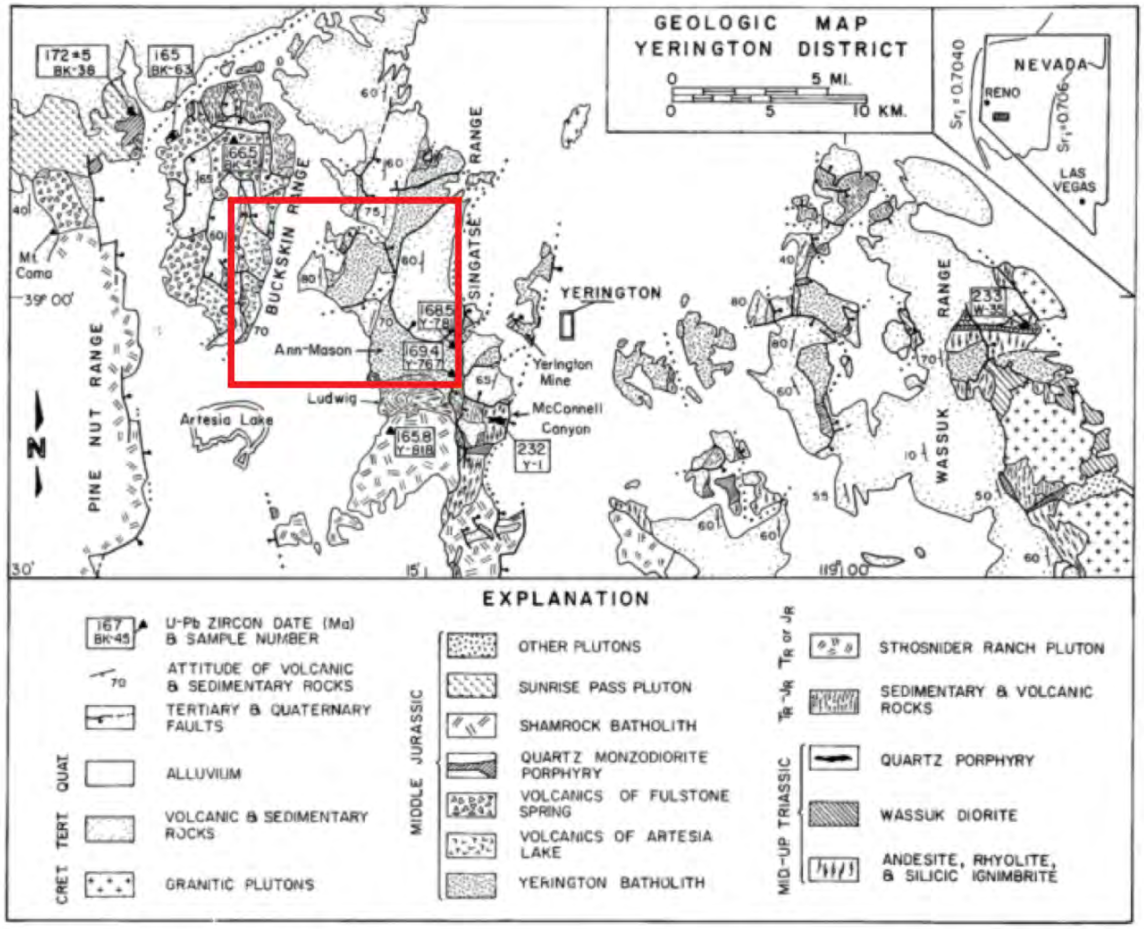

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The structural history of the region is documented in Proffett (1977) and geologic map of the region has been published in Proffett and Dilles (1984).

1.2.4 Rock units

Two major units host the majority of the hydrothermal alteration associated with the formation of the Ann-Mason porphyry Cu(Mo) deposit, the Yerington batholith and the overlying Artesia Lake volcanics. The Yerington batholith is a shallowly emplaced (top at ~ 4 km) composite pluton with three main intrusive units whose volumes decrease and lithologies become more siliceous with time. Details regarding the petrology of the Yerington batholith are published in Dilles (1987). All the intrusive lithologies have alkali-calcic chemistry and consist of the same general group of minerals: plagioclase, K-feldspar, quartz, hornblende, biotite, magnetite, sphene, apatite and zircon in varying proportions. Lithologies grade from the McLeod Hill hornblende quartz monzodiorite, which is intruded by the Bear pluton, a compositionally zoned intrusion from hornblende quartz monzonite to border granite. The Luhr Hill porphyritic granite intrudes the older units of the batholith and, at the Ann-Mason deposit, forms a cupola at approximately 3.5 km beneath the paleosurface (Dilles, 1987). A granite porphyry dike swarm centered on the cupola stems upward toward the paleosurface. The ore zone at Ann-Mason is positioned on the dike swarm at the top of the cupola. Hydrothermal alteration is also focused along the dikes which act as permeable zones for fluid flow (Dilles, 1987).

The Yerington batholith is directly overlain by the Artesia Lake volcanics, an approximately 1500 m thick group of andesite, dacite and minor basalt flows, breccias, rhyolite tuffs, tuffaceous sediments and shallow intrusions, which are similar in composition and age to the batholith and likely cogenetic (Dilles, 1987). The Artesia Lake volcanics are overlain by the Fulstone Springs volcanics, a subaerial volcanic sequence consisting of latitic to dacitic lava flows and silicic to dacitic ignimbrites and breccias, which outcrop in the Buckskin Range. Deposition of the Fulstone Spring volcanics postdates the period of pervasive hydrothermal alteration associated with the emplacement of the Yerington batholith but these rocks are weakly altered to a feldspar-stable sericite-hematite-chlorite assemblage typical of propylitic alteration in Buckskin Range and likely formed by late low temperature sedimentary brines (Lipske, 2002).

1.2.5 Model for observed sequence of hydrothermal alteration and mineralization

In the Yerington district and at the Ann-Mason deposit there is evidence for two main types of coexisting hydrothermal fluids, one with magmatic origin and one derived from formation waters trapped within the Triassic-Jurassic sedimentary sequence intruded by the Yerington batholith. Wall-rock alteration in the Ann-Mason fault block is described in detail in Dilles and Einaudi (1992). A model for the observed sequence of alteration and mineralization in the Yerington district is proposed in Dilles et al. (2000) and summarized below.

Magmatic hydrothermal fluids, formed during the crystallization of the Luhr Hill granite, are responsible for the deposition of the Ann-Mason Cu(Mo) sulfide deposit and potassic, sericitic and advanced argillic alteration in the overlying intrusive and volcanic units. The Luhr granite was water-rich (5 wt. %) and strongly oxidized (NNO buffer + 2 to 3 log units) with abundant sulfate (>1000 ppm) and reached water saturation at approximately 50% crystallization according to petrologic evidence (Dilles, 1987; Dilles and Proffett, 1995; Streck and Dilles, 1998). The resultant magmatic fluid phase, containing abundant Cl, K, Na, Fe, S and Cu (Dilles and Proffett, 1995), was released along with porphyry dikes due to tectonic fracturing or overpressurazation of the overlying wall rock. Based on the orientation of the dikes, position of the ore body, and distribution of related hydrothermal alteration, the ore-forming fluid traveled along a near vertical path toward the paleosurface (Dilles et al., 2000).

Potassic, sericitic and advanced argillic alteration types were formed by interactions between wall rock and fluids with a magmatic component based on mineral assemblages, fluid inclusions, stable isotope data. Near the origin, these fluids were high salinity (30-60 wt % NaCl equivalent) and high water to rock ratios and temperatures (<400 - 700° C) resulted in potassic alteration (biotite±K-feldspar) and mineralization (bornite±chalcopyrite±magnetite) focused along the central dike swarm (Dilles and Einaudi, 1992).

Advanced argillic alteration (pyrophyllite-quartz-alunite-pyrite) formed contemporaneously with potassic alteration near the paleosurface and predates some episodes of sericitic alteration as indicated by cross-cutting relationships (Lipske, 2002). Advanced argillic alteration could be a result of low-density vapor phase that separated

from the early high temperature magmatic brine due to depressurization of the fluid phase and brine-vapor immiscibility during ascent (Bodnar et al, 1985). Alternatively, the magmatic fluid phase may not have separated and, instead, ascended as a volatile-rich fluid phase toward the paleosurface. This vapor or low-density fluid phase mixed with local ground water to form low temperature, high H^+/K^+ fluids responsible for the observed advanced argillic assemblages (Lipske, 2002).

Sericitic alteration forms as selvages on quartz-pyrite±chalcopyrite D-veins (Gustafson and Hunt, 1975) and ranges in intensity from proximal pervasive quartz-muscovite-pyrite±chalcopyrite assemblage (strong sericitic alteration) laterally to feldspar stable chlorite-muscovite±pyrite±hematite assemblage (sericitic-chloritic alteration). Sericitic alteration forms a funnel-shaped halo extending from the top of the batholith cupola toward the paleosurface along the axis of the granite porphyry dike swarm and cuts potassic alteration in and above the ore zone indicating some episodes must postdate potassic alteration and ore deposition. Data from oxygen, hydrogen and sulfur isotopes indicate the formation fluid for sericitic alteration is about half magmatically-derived and sulfides (pyrite±chalcopyrite) have a magmatic source (Dilles et al., 1992; Streck and Dilles, 1998). In the model by Dilles et al. (2000), sericitic alteration may have initially formed in an intermediate position between potassic and advanced argillic alteration and become more pervasive as the Luhr Hill granite crystallized and cooled producing lower temperature fluids which did not cross the brine-vapor immiscibility field. These fluids mixed with groundwater to form low salinity, low temperature fluids with high H^+/K^+ ratios as seen in fluid inclusions (Dilles and Einaudi, 1992).

Abundant sodic-calcic alteration in the Yerington district is characterized by the conversion of K-feldspar to albite or epidote and the addition of actinolite, epidote and sphene. Numerous studies suggest this alteration was caused by a high salinity (30 – 40 wt % NaCl equivalent), moderate temperature (250 to >400 C), fluid derived from trapped pore waters within the sedimentary section (Carten, 1987; Dilles and Einaudi, 1992). The Yerington batholith intruded a Triassic-Jurassic regressive sedimentary sequence with an evaporate layer that would have contained large volumes of high salinity pore fluids (Dilles et al., 2000). These fluids were heated by the intrusion and

traveled from the contact aureole at 2 - 6 km paleodepth, through the batholith laterally for several kilometers and then upward outside the main flow path of the magmatic plume. As the magmatic fluids waned, non-magmatic fluids moved inward and, in many places, superimposed sodic-calcic alteration atop magmatic hydrothermal alteration. This cycle repeated at least five times as recorded by geologists in the Yerington mine (Proffett, 1979). In the late stages, the non-magmatic fluids cooled or mixed with a small proportion of magmatic fluid to cause sodic alteration (albite-chlorite±sericite) that overprints the ore zone and occurs with sericitic alteration at intermediate depths (1-3 km) (Dilles and Einaudi, 1992; Dilles et al., 2000).

Propylitic alteration (actinolite-epidote-chlorite), caused by lower temperature (~300 C) circulating sedimentary brines, is found near the periphery of the system at intermediate depths ~ 2.5 to 4 km (Dilles et al., 2000). Chloritic alteration characterized by the addition of chlorite, hematite, K-felspar and magnetite with relict feldspar is also attributed to the sedimentary brines. This alteration is associated with Fe-oxide-Cu-Au mineralization and is common in the Buckskin Range where is cuts earlier sericitic and advanced argillic alteration (Lipske, 2002).

1.2.6 Summary

In summary, the Yerington district in western Nevada contains several porphyry centers including the Ann-Mason porphyry Cu(Mo) deposit, Cu skarn deposits and Fe-oxide-Cu-Au vein and lode deposits associated with the emplacement of the Yerington batholith. Miocene to present day faulting and extension has exposed the batholith system from paleosurface to ~ 7 km paleodepth and tilted the section ~90 W. The resulting exposures provide an ideal location to study the spatial distribution of trace elements and phyllosilicate chemistry surrounding a porphyry-copper system. Alteration in the district can be attributed to two fluids of different origins: (1) a magmatic fluid phase responsible for Cu(Mo) sulfide mineralization that decreases in temperature and salinity over time forming a vertical zone of potassic, sericitic alteration and shallow advanced argillic alteration and (2) a circulating saline brine derived from trapped formation waters that caused for sodic-calcic, propylitic, sodic and chloritic alteration and Fe-oxide-Cu-Au deposits.

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Chapter 2: Comparison of short-wave infrared spectra to white mica, illite and chlorite compositions from hydrothermal alteration at the Ann-Mason porphyry copper deposit, Nevada

2.1 Abstract

The detection of subtle compositional variations within hydrothermal phyllosilicates from zoned alteration associated with the formation of porphyry-type ore deposits by short wave infrared spectroscopy may be a valuable vectoring tool for mineral exploration. Short wave infrared (SWIR) spectra from rock samples were compared with chemical compositions of mineral grains determined by electron microprobe analysis (EMPA) in order to correlate spectral characteristics with variations in mineral composition. These results demonstrate SWIR spectroscopy can be used to detect changes in the aluminum content of micas using the wavelength of the 2200 nm feature and may be used to map fluid pH gradients in rocks with muscovite or illite-bearing assemblages.

Samples of muscovite, illite, paragonite, pyrophyllite and chlorite were collected from hydrothermal alteration types ranging from advanced argillic, to sericitic (muscovite, muscovite-chlorite±feldspar, muscovite±illite-feldspar), illitic, intermediate argillic, and propylitic (chlorite-epidote-actinolite) associated with the formation of the Ann-Mason porphyry Cu(Mo) deposit in the Yerington district, Nevada. The following compositional characteristics determined by EMPA for white mica/illite were observed in the short wave infrared spectra: (1) an increase in the wavelength of the Al-OH absorption at ca. 2200 nm that is positively correlated with Fe+Mg+Mn content corresponding to Tschermak substitution in both muscovite and illite, and (2) a decrease the wavelength of the ca. 2200 nm absorption to values below 2193 nm attributed to an increase in Na concentration from paragonitic substitution in muscovite. For this sample set, illite cannot be distinguished from muscovite using SWIR spectroscopy. Chlorite compositional variations could not be identified in short wave infrared spectra of rocks and were likely obscured by coexisting highly reflective clays and micas.

2.2 Introduction

This study compares major element compositions of muscovite, illite, mixed muscovite-paragonite, pyrophyllite and chlorite from hydrothermal alteration surrounding the Ann-Mason porphyry copper deposit in the Yerington district, Nevada, to corresponding SWIR spectra to determine if SWIR spectroscopy can be used to map compositional variations in hydrothermal white mica and chlorite. The results of this demonstrate SWIR spectroscopy can be used to identify variations in white mica compositions and map fluid pH gradients by using the wavelength of the 2200 nm feature to detect increases in the aluminum content of micas caused by alteration with acidic fluids (addition of H^+).

An increase in the wavelength of the Al-OH absorption band at ~2200 nm in muscovite and illite can be attributed to the Tschermak substitution $[(Al^{3+})^{vi} + (Al^{3+})^{iv} <\!-\!> (Fe^{2+} \text{ or } Mg^{2+})^{vi} + (Si^{4+})^{iv}]$ and a decrease in the wavelength of the Al-OH absorption band to values below 2193 nm is caused by the presence of paragonite. Illite has been previously identified (Hauff et al., 1989) by a deep H_2O absorption at ~1900 nm but our study finds this feature is not unique to illite and >50% of samples with muscovite also have a similar feature. Chlorite compositional variations could not be identified in short wave infrared spectra of rocks and were likely obscured by coexisting highly reflective clays and micas. This study strengthens work done by previous researchers (e.g. Duke, 1994; Yang et al., 2000) and may assist field geologists using SWIR spectroscopy in identifying zoned hydrothermal alteration, which, in combination with other exploration techniques, can be used as a vector for ore deposit exploration.

2.2.1 Background

Hydrothermal alteration associated with the formation of porphyry-type ore deposits is zoned with respect to the ore body. Numerous studies have documented the geochemical and mineralogical features of these zones and noted their importance as both indicators of the physicochemical environment of formation and potential vectors for ore exploration (Dilles and Einaudi, 1992; Gustafson and Hunt, 1975; Lowell and Guilbert, 1970; Meyer and Hemley, 1967; Rose, 1970)) . Hydrothermal phyllosilicates such as

muscovite, illite and chlorite are essential minerals for identifying and understanding alteration zones. Since the stability of individual minerals and mineral assemblages is based on physiochemical parameters, such as temperature, pressure, and pH, the presence and composition of phyllosilicate and clay species in hydrothermal mineral assemblages can be used to hypothesize boundary conditions of formation.

Identifying hydrothermal white mica and clay species in hand sample using common field tools, such as a hand lens, is extremely difficult. The term "sericite" is commonly used as field term to refer to fine-grained white mica minerals (Meyer and Hemley, 1967), but most field studies cannot identify individual species. Although the chlorite group of minerals can be identified by hand lens, specific chlorite compositional end-members that might distinguish alteration types cannot be determined by common field methods.

Short-wave infrared (SWIR) spectroscopy is used to record the infrared absorption spectrum that corresponds to cation-OH bond energies characteristic of mineral structures. The spectra can be used to identify hydrous minerals, including white mica and chlorite (Thompson et al., 1999). The development of portable SWIR spectrometers has made field mapping of white mica, clay and chlorite species inexpensive and efficient. This has led to renewed interest in the phyllosilicate and clay minerals as indicator minerals for alteration zones.

Infrared (IR) spectroscopy was developed in the early 1950's when commercial spectrometers became available. The importance of the technique in identifying the energies/wavelengths of the OH fundamental modes of vibration was apparent early on. Significant research was dedicated to understanding the crystalline structure and cationic composition of phyllosilicates (Serratosa and Bradley, 1958; Stubican and Rustum, 1961; Tuddenham and Lyon, 1960). In 1963, Vedder and McDonald identified the combination OH stretch and OH in-plane bend absorption band in phyllosilicates occurring near 2200 nm. Later, Vedder (1964) related this combination band to the Al-OH bond. This band is significant to remote sensing because it lies in the SWIR (1300 – 2500 nm) portion of the electromagnetic spectrum not absorbed by atmospheric gases and, therefore, useful in remote sensing and field applications (Martinez-Alonso, 2000).

Several authors recognized the importance of IR spectroscopy in the identification of alteration related to ore deposits (Hunt and Ashley, 1979). A pioneering study by Swayze (1997) demonstrated IR spectral data, including the location of the ca. 2200 nm band, could be used to detect compositional variations in muscovite in alteration at Cuprite, Nevada. Post and Noble (1993), in a study comparing near infrared (NIR) spectra of micas to x-ray florescence (XRF) analyses of muscovite, saw a direct correlation between Al_2O_3 (wt %) in muscovite and the position of the ca. 2200 absorption band. Duke (1994) confirmed this correlation using electron microprobe analyses (EMPA) of mica compositions and recognized the potential importance of SWIR spectrometry in mapping the Tschermak component in metamorphic terrains. The Tschermak component is the coupled substitution in the octahedral (vi) site of Al^{3+} by Fe^{2+} and/or Mg^{2+}, and in the tetrahedral (iv) site, of Al^{3+} by Si^{4+}. First described in chlorite (Tschermak, 1890, 1891)), it has since been recognized in muscovite/illite, biotite, amphibole, talc and clinopyroxene (Deer et al., 1993).

The development of the portable SWIR spectrometer provided a tool for identifying variations in hydrous mineral compositions in the field and its potential for mapping alteration was quickly recognized (Merry and Pontual, 1999; Pontual et al., 1995). Portable SWIR spectrometers have been used to help define alteration zones in a variety of ore deposit environments (Hauff, 2002; Herrmann et al., 2001; Herrmann et al., 2009; Jones et al., 2005; Lipske, 2002; Lipske and Dilles, 2000; Sun et al., 2001; Yang et al., 2001). Although SWIR spectroscopy has been used to study alteration related to epithermal, Carlin-type gold and volcanogenic massive sulfide deposits, alteration related to porphyry-type deposits has been sparsely studied (Changyun et al., 2005; Di Tommaso and Rubinstein, 2007).

Most of studies that have used SWIR spectroscopy to identify hydrothermal minerals and alteration zones related to ore deposits have calibrated their results with x-ray diffraction (XRD) or x-ray fluorescence (XRF) (Martinez-Alonso, 2000; Sun et al., 2001). Both methods require monomineralic separates, which are difficult to obtain from samples with fine-grained white micas mixed with quartz. In addition, XRD does not determine quantitative mineral compositions but measures the D-spacing to define the crystal structure. In order to derive mineral compositions, D-spacing values must be

independently calibrated to chemical composition. These methods are less reliable in mineral identification than electron microprobe analysis (EMPA). Alternatively, EMPA determines quantitative chemical composition of minerals in situ and is a commonly used and well-calibrated method. Few studies since Duke (1994) have used more accurate, but more expensive, EMPA (Paulick and Bach, 2006).

2.2.2 Study area

The region surrounding the Ann-Mason deposit in the Yerington district, Nevada, was chosen as a field site for this study. At Yerington, a middle Jurassic batholith hosting several porphyry copper centers has been tilted ~ 90° to the west by Basin and Range extension exposing a crustal cross section from ~ 1 - 7 km paleodepth (Proffett, 1977a; Proffett and Dilles, 1984). The Ann-Mason porphyry copper system at Yerington, NV has good exposure and has been well-studied (see Chap. 1), ideal for detailed research.

The oldest rocks that outcrop in the Yerington district are Middle to Early Late Triassic calc-alkaline andesites and rhyolites of the McConnell Canyon volcanics. These are overlain by a sedimentary sequence of carbonates, volcanoclastics, and argillites with uppermost units of evaporate gypsum and eolian quartzite deposited during the Late Triassic to Early Jurassic (Dilles and Wright, 1988). Arc magmatism developed along the edge of the continent in the Middle Jurassic (165 – 170 Ma) leading to the deposition of the Artesia Lake volcanics and virtually simultaneous emplacement of the Yerington batholith (168 – 169 Ma) and the subsequent deposition of the Fulstone volcanics (167 Ma) and the intrusion of the Shamrock batholith (165 – 166 Ma) (Dilles and Wright, 1988). A major unconformity separates the Mesozoic arc-related volcanics and the younger sedimentary and intrusive rocks from the Tertiary, Oligocene and Miocene (Proffett and Dilles, 1984). Detailed description regarding the Cenozoic units and structure can be found in (Proffett, 1977b) and (Dilles and Gans, 1995). The Tertiary deposits are uncomfortably overlain by Quaternary alluvium and landside sediments, the youngest deposits in the region (Proffett and Dilles, 1984).

The lithologies sampled for this study include all phases of the Yerington batholith and several samples from the Artesia volcanics. The Yerington batholith is a

composite pluton with three main intrusive lithologies whose volumes decrease, grain-sizes increase, and compositions become more siliceous with time. These units grade from the McLeod Hill quartz monzodiorite (oldest), to the Bear quartz monzonite, to the Luhr Hill granite (youngest) (Dilles, 1987). Sampling focused on the granite porphyry dikes, associated with ore deposition, that originate at ~3 – 6 km paleodepth and stem upward from the Luhr Hill granite intrusion. The mineralogy [plag-Ksp-qtz-biot-hbl-(mgt)-(sph)] is similar in all units although the proportions, textures and grain sizes vary (Dilles, 1987). The Artesia Lake volcanics is a series of andesitic lava flows, ignimbrites, breccias, and sandstones thought to be the cogenetic extrusive equivalent of the Yerington batholith due to chemical, isotopic and hydrothermal alteration evidence (Dilles,1987; Dilles and Wright, 1988). These rocks are commonly altered to pyrophyllite or muscovite, alunite, quartz-rich assemblages that once contained abundant pyrite, suggested by limonite minerals and boxwork structures on weathered surfaces. Primary textures in these rocks have been mostly obliterated by alteration in northern Blue Hill and central Buckskin exposures (Lipske, 2002).

Table 2.1. Mineral abbreviations

Ab	albite	Dick	dickite	Musc	muscovite
Act	actinolite	Ep	epidote	Olg	oligoclase
Alun	alunite	Fsp	feldspar	Py	pyrite
Ans	andesine	Hbi	hydrothermal biotite	Pyroph	pyrophyllite
And	andalusite	Hem	hematite	Rt	rutile
Ba	barite	Ill	illite	Smec	smectite
Biot	biotite	Kaol	kaolinite	Ser	sericite
Calc	calcite	Ksp	potassium feldspar	Sph	sphene
Chl	chlorite	Mgt	magnetite	Tp	topaz

2.3 Methods

2.3.1 Geologic mapping and sampling

Thirty-four surface samples and five drill core samples were selected for analysis from the Yerington District, Nevada. Sample locations are shown in Figure 2.1 and a table of sample coordinates, lithologies and mineral assemblages is available in Appendix A. Mineral abbreviations are given in Table 2.1. Sample selection focused on the Blue

Hill fault block where the portion of the hydrothermal system from directly above the Ann-Mason porphyry copper ore body upward to the subvolcanic environment is exposed. A wide variety of alteration types and assemblages are found in this region and include "D" veins with 1 cm to 1 m wide sericitic (quartz-muscovite to muscovite-feldspar) selvages, chlorite-muscovite-hematite alteration and advanced argillic index minerals, such as pyrophyllite and alunite, associated with the upper portions of the system. The northern regions of the Blue Hill fault block and the southwestern part of the Ann-Mason fault block have abundant propylitic (actinolite-epidote-chlorite) and sodic-calcic (albite-actinolite-epidote) alteration formed by circulating saline brines of sedimentary origin (Dilles and Einaudi, 1992).

Trenches were mapped in the Blue Hill fault block to document spatial and temporal relationships in hydrothermal alteration and mineralization and record the orientation of veins, contacts and faults. Trench mapping in the Blue Hill fault block was done by Anaconda method (Einaudi, 1977) at approximately 1:500 scale. Selected trenches were positioned along an E-W traverse along the strike of several porphyry dikes in the center of the main dike swarm in the Blue Hill fault block. This traverse was selected to record variations in alteration, veins and mineralization moving vertically east to west through the Ann-Mason porphyry copper system. Trenches were oriented approximately perpendicular to dikes, veins and other structures (approx. N30°E). A digitalized example of trench mapping is available in Appendix C. Hydrothermal alteration, mineralization and veins were mapped on a large scale (1:4,800) at Ann-Mason (Dilles and Einaudi, 1992), the Blue Hill fault block (1:12,000, J.H. Dilles, unpub.) and Buckskin Range by Lipske (2002) using the Anaconda method.

2.3.2 Petrography

31 polished thin sections (30 – 100 μm thick) and eight chip samples in resin mounts were examined using an Olympus BX-60 petrographic microscope to document mineralogy and alteration assemblages. Photomicrographs of alteration assemblages and textures were taken using a microscope-mounted Nixon digital camera (DXM1200) and ACT-1 image software.

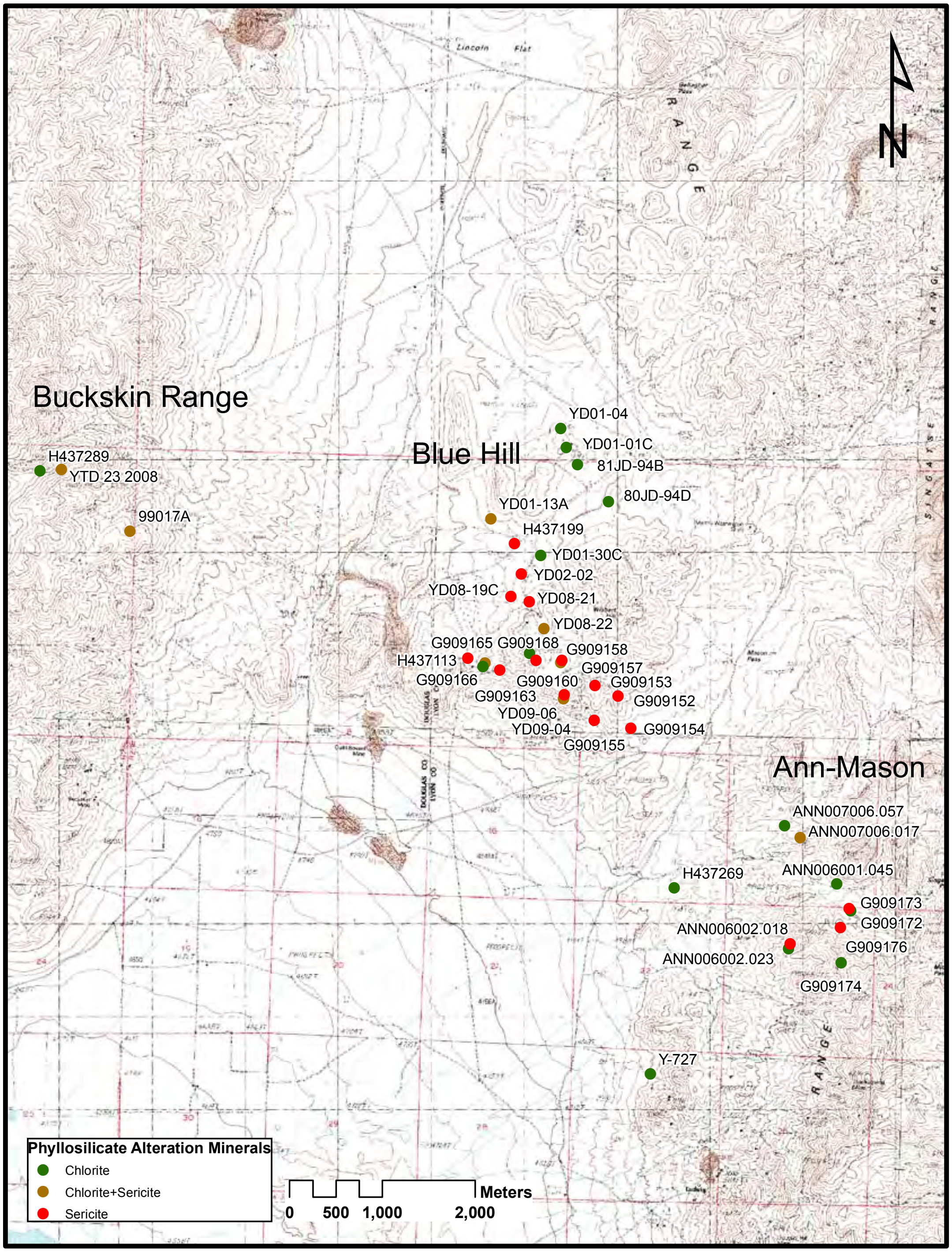

Figure 2.1. Sample location map. Colors represent the combination of phyllosilicate alteration minerals from each sample. General regions (Buckskin Range, Blue Hill fault block and Ann-Mason fault block) are labeled.

2.3.3 Electron microprobe analysis

Major element geochemistry of muscovite, illite, paragonite, pyrophyllite and chlorite from a suite of 39 samples was collected using a CAMECA SX-100 electron microprobe at Oregon State University. Analyses were conducted using a 15 kV accelerating voltage, 30 nA beam current and 5 μm beam diameter with counting times between 10 – 30 seconds. Raw data were corrected using a stoichiometric PAP correction model (Pouchou and Pichoir, 1984) to a suite of natural and synthetic standards by microprobe software, which also provides estimates of lower limit of detection for each element. Details on standards and limits of detection can be found in Appendix B. In addition, high-resolution backscatter electron images of minerals were taken. The names and compositions of the white micas and clays investigated in this study are shown in Table 2.2 and the names and compositional ranges for chlorite end members are given in Table 2.3.

Table 2.2. White mica and clay names and general formulas

Mineral	**Formula**[1]
Muscovite	$KAl_2^{vi}Al^{ivS:}i_3O_{10}(OH)_2$
Paragonite	$NaAl_2^{vi}Al^{ivS:}i_3O_{10}(OH)_2$
Illite	$K_{0.6-0.8}Al_2^{vi}Al_{0.6-0.8}{}^{ivS:}i_{3.4-3.2}O_{10}(OH)_2$
Pyrophyllite	$Al_2Si_4O_{10}(OH)_2$
Kaolinite	$Al_2Si_2O_5(OH)_4$

[1] formulae are half-unit from Deer et al. (1992) and Bailey (1984)

Table 2.3. Chlorite mineral group names and stoichiometry

General Chlorite Formula: $(R^{3+}R^{2+})_6{}^{vi}(Si_{4-x}Al_x)^{iv}O_{10}(OH)_8$; $R^{3+}=Al,Fe^{3+}$, $R^{2+}=Fe^{2+},Mg,Mn$

Chlorite Group Mineral [1]	**Fe/(Fe+Mg+Mn)**	**Si (apfu)**[2]
Sheridanite	0.0-0.25	2.40-2.75
Clinochlore	0.0-0.25	2.75-3.10
Penninite	<0.25	3.10-4.0
Ripidolite	0.26-0.75	2.40-2.75
Brunsvigite	0.26-0.75	2.75-3.10
Diabanite	0.26-0.75	3.10-4.0
Thuringite	0.76-1.0	2.40-2.75
Chamosite	0.76-1.0	2.75-4.0

[1] division from Foster (1960)
[2] apfu = atoms per formula unit

2.3.4 Short-wave infrared spectroscopy

Short wave infrared (SWIR) spectra record the vibrational energy of molecular bonds within the 1300 – 2500 nm region of the electromagnetic spectrum and are plotted as reflection (percent) versus wavelength (nm). SWIR spectroscopy is particularly sensitive to -OH, $-NH_4$, $-CO_3$ radicals, H_2O molecules and cation-OH bonds such as Al-OH, Mg-OH and Fe-OH, which are present in phyllosilicates and clays. Careful analysis of the position and shape of absorption features of molecular bonds in SWIR spectra can be used to identify most mineral species and compositional variations in phyllosilicates (Thompson et al., 1999).

Spectroscopic data were collected for all samples using an Analytical Spectral Devices, Inc. TerraSpec™ short-wave infrared (SWIR) spectroscopic mineral analyzer. Sample spectra were measured by placing hand samples of rocks on a ~1 cm diameter glass window above a light source for approx. 30-60 s. The light source was calibrated with a white plate standard approximately every 20 samples. Raw spectra were imported into The Spectral Geologist V.7.0.1 software™ for viewing and extraction of numeric parameters such as the wavelength, width and depth of specific absorption features. Spectra were interpreted by comparing the unknown spectra to reference spectra from The Spectral Geologist™ viewer software and the USGS spectral library (Clark et al., 2007).

For white micas and clays, the Al-OH absorption at ca. 2200 nm and the molecular H_2O absorption at ca. 1910 nm are critical features for identification. For chlorites, the position of the ca. 2250 nm (Fe-OH) and ca. 2350 nm (Mg-OH) absorptions and the spectral slope from 1400 to 1900 nm have been used to identify the Fe:Mg content of chlorite species (Thompson et al., 1999). Table 2.4 outlines the characteristic features for white mica, clay, and chlorite minerals common to this study and the approximate position of their Al-OH absorption. Examples of reference spectra for white micas/clays and chlorites are shown in Figure 2.2 and Figure 2.3, respectively. Characteristic SWIR features and reference spectra are from Clark et al. (2007) and Merry and Pontual (1999). Additional details on SWIR spectroscopy and analysis can be found in Thompson et al. (1999). Spectral data used in this study is presented in Appendix E.

Table 2.4. Characteristic SWIR spectral features for phyllosilicate minerals

Mineral	Characteristic SWIR absorption features	Wavelength of Al-OH absorption (ca. 2200 nm)
Muscovite	sharp features at 1408, 1910, 2200, 2348 and 2442 nm	2198-2208
Paragonite	similar to muscovite	2185-2193
Phengitic Muscovite	similar to muscovite, slight shoulder on right side of 2200 nm feature	2208-2215
Illite	similar to muscovite except might have deeper 1910 nm absorption	2206-2210
Pyrophyllite	very sharp absorptions at 2168, 1388 nm	2168
Kaolinite	doublet centered at 1400, 2200 nm	2206-2209
Chamosite (Fe-rich chlorite)	major features at 2260 nm (symmetric), 2350 nm (asymmetric); steeply ascending hull from 1400 – 1900 nm	-
Clinochlore (Mg-rich chlorite)	similar to chamosite except major features at 2250 nm and 2330-2340 nm; gently ascending or flat hull from 1400-1900 nm	-

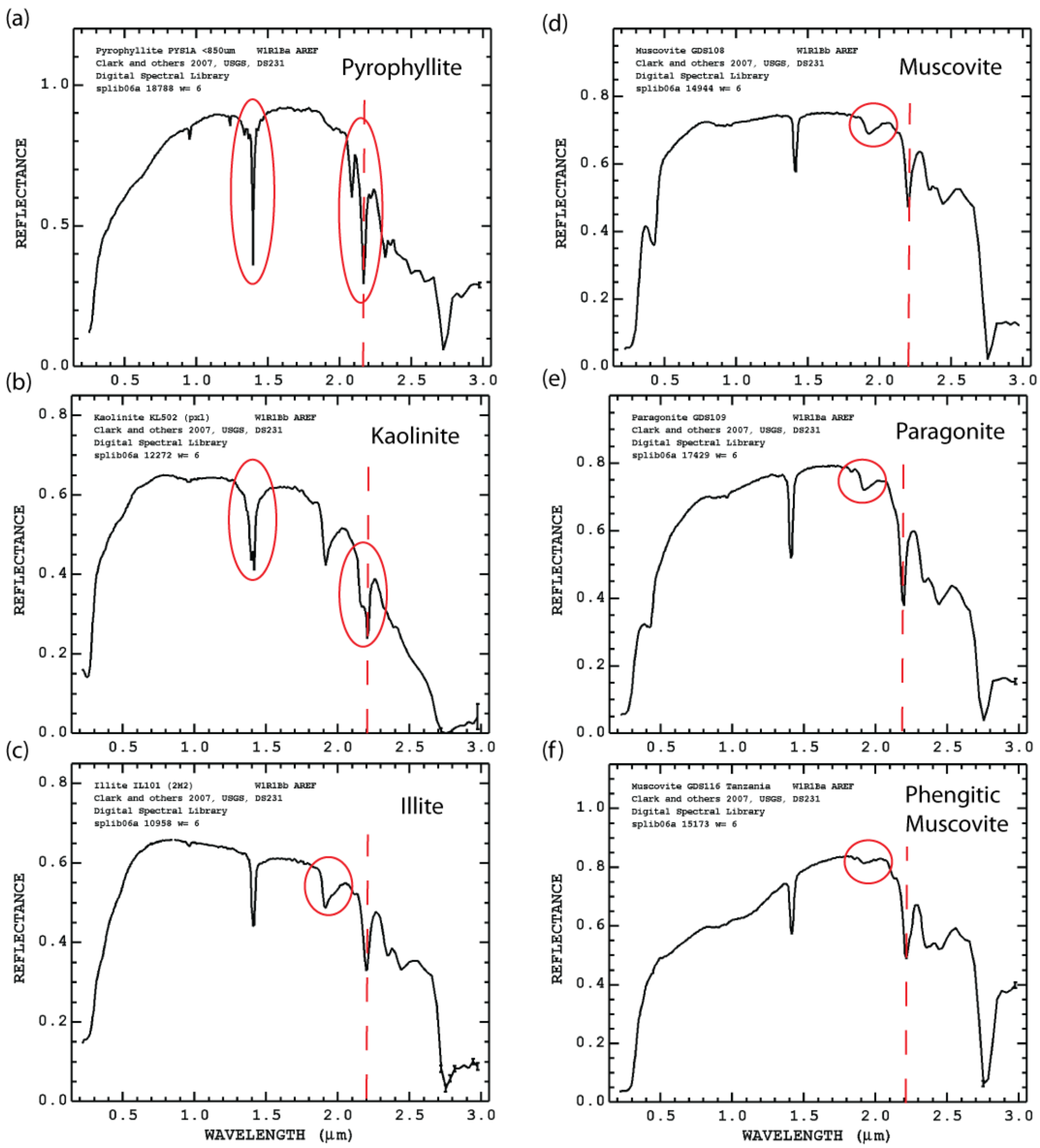

Figure 2.2. SWIR reference spectra for white mica, illite and kaolinite from USGS spectral library (Clark et al., 2007): (a) pyrophyllite, (b) kaolinite, (c) illite, (d) muscovite, (e) paragonite and (f) phengitic muscovite. Red circles highlight the characteristic features in pyrophyllite and kaolinite and the H_2O absorption feature (ca. 1900 nm) in illite, muscovite, paragonite and phengitic muscovite. Red dashed lines mark the position of the Al-OH absorption feature (ca. 2200 nm) in each spectrum, which subtly shifts from shorter wavelength in pyrophyllite and paragonite to intermediate wavelengths in muscovite and longer wavelengths in illite and phengitic muscovite (see Table 4).

2.4 Results

2.4.1 Hydrothermal alteration

The identification of hydrothermal alteration assemblages in porphyry systems aids in the interpretation of the physiochemical conditions of hydrothermal alteration including pressure, temperature, pH and fluid geochemistry (e.g. Meyer and Hemley, 1967). In this study, alteration types are used as framework for interpreting compositional variations in hydrothermal minerals. Nomenclature for hydrothermal alteration types is based on Meyer and Hemley (1967), Dilles and Einaudi (1992) and Seedorff et al. (2005).

Five general groups of alteration are identified; advanced argillic (moderate temperature), sericitic, illitic, intermediate argillic, and propylitic. The sericitic group is further subdivided into sericitic, weak sericitic and sericitic-chloritic (Table 2.5). Representative photomicrographs of hydrothermal alteration mineral assemblages can be found in Figure 2.3. Alteration minerals (e.g. epidote) and mineral groups (e.g. sericite) were initially identified by hand lens in the field and lab. Sample mineralogy was refined with petrography, SWIR spectroscopy, XRD and EMPA. Petrographic observations, specifically textural evidence in transmitted and reflected light of thin sections and rock chips in polished mounts, are used to argue the groups of alteration minerals in Table 2.5 formed synchronously and likely in equilibrium. Measured SWIR and XRD spectra were used to identify certain unique mineral phases such as pyrophyllite and topaz. EMPA compositions were used to differentiate muscovite, illite and pyrophyllite.

Table 2.5. Hydrothermal alteration mineral assemblages

Alteration Type	**Alteration Subtype**	**Key Minerals**	**Added or Re-crystallized Minerals**	**Relict Minerals[1]**
Advanced Argillic	-	Pyroph or Alun	Qtz+Pyroph or Alun±Musc (+Rt+Py±Tp±Ba)[2]	
Sericitic	Strong Sericitic	Musc	Ser+Qtz (+Py or Hem+Rt+Tm±Cp)	
	Sericitic-Chloritic	Chl+Musc ±[Fsp][4]	Chl+Musc (+Hem[a] or Py[b]+Rt±Calc)	Ab±Ksp±Biot (+Mgt+Sph)
	Weak Sericitic	Musc+[Fsp]	Musc±Ill (+Py+Rt±Cp)	Ab±Ksp(±Sph)
Illitic	-	Ill+[Fsp]	Ill(+Py+Rt)	Ab+Ksp(+Sph)
Intermediate Argillic	-	Chl+Ill +[Fsp]	Chl+Ill(+Py+Rt)	Ab+Ksp+Ep +Hbi(+Sph)
Propylitic	-	Chl+[Fsp]	Chl±Act±Ep±Ab (±Calc±Ser±Hem+Rt±Cp)	Olg/Ans+Ksp ±Hbl±Biot (+Mgt+Sph)

[1] igneous quartz and accessory apatite and zircon are present as relict minerals in all assemblages
[2] ( ) indicates trace phase
[3] a or b letter indicates iron trace phase (a=hematite; b=pyrite)
[4] [ ] indicate relict minerals useful in identifying and interpreting certain alteration types

Although the hypogene sulfide is presented in Table 2.5, only samples from drill core contain hypogene sulfides (pyrite and chalcopyrite). In surface samples, sulfides have been oxidized and replaced by supergene phases such as goethite, jarosite, glassy limonite or other amorphous limonite, local earthy red hematite and various Mn±Cu oxides (pyrolusite, tenorite and “copper wad”).

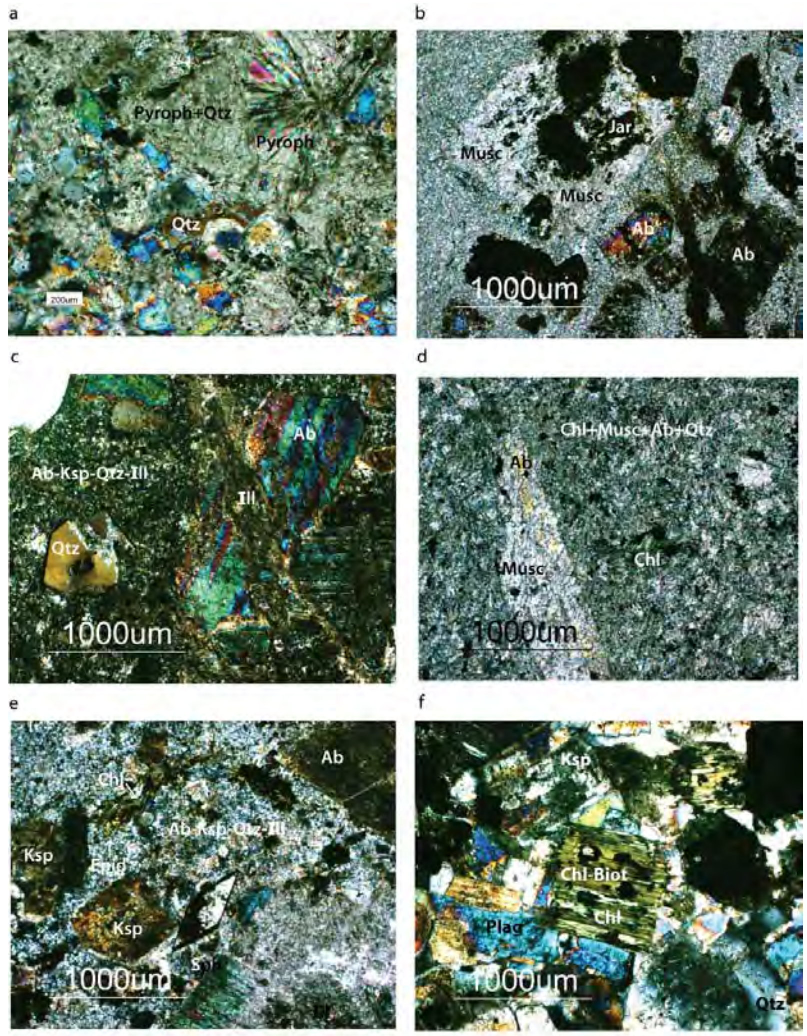

Figure 2.3. Photomicrographs of hydrothermal alteration assemblages in cross-polarized light from thin sections: a, b, c, e, f are 100 µm thick, d is 30 µm thick. (a) Advanced argillic alteration (H437113), radiating sheaves of pyrophyllite with quartz. (b) Weak sericitic alteration (G909152), muscovite pseudomorphs of hydrothermal biotite (replacing hornblende), groundmass replaced by muscovite and quartz, relict albite phenocrysts. (c) Illitic alteration (G909163), illite veinlet cutting partially altered igneous plagioclase phenocryst. (d) Sericitic-chloritic alteration (YD08-22), muscovite replacing plagioclase phenocryst (5 vol.% remaining), fine-grained muscovite and chlorite in groundmass. (e) Intermediate argillic (G909158), illite replacing plagioclase phenocryst (20 vol.% remaining), chlorite and epidote replacing biotite, relict albite and K-feldspar. (f) Propylitic (G909172), chlorite partially replacing igneous “book” biotite, feldspar stable.

2.4.1.1 Advanced argillic

Advanced argillic alteration in the Blue Hill fault block is similar to the advanced argillic assemblages found in the Buckskin Range and defined by Lipske (2002). As in the Buckskin Range, advanced argillic alteration is defined by the presence of pyrophyllite or alunite and is texturally destructive, commonly composed of subhedral medium to coarse-grained (10-100 µm dia.) quartz (10-90 vol. %); euhedral coarse-grained (50 – 1000 µm long) muscovite (10-75 vol. %) and coarse-grained (100-1000 µm long) pyrophyllite (Figure 2.3a). Mica often forms sheaves of intergrown radiating crystals. Lipske (2002) demonstrated that mica of this texture is typically muscovite pseudomorphs of earlier pyrophyllite. Other minerals identified in advanced argillic alteration include topaz, barite, alunite, huangite [$Ca_{0.5}Al_3(SO_4)_2(OH)_6$ or Ca-alunite], rutile, specular hematite and clays (dickite, halloysite). Although the surface exposures have been oxidized and weathered, disseminated pyrite (up to 10 vol. %) with rare chalcopyrite (>50:1 py:cp) is inferred based on Fe-oxide pseudomorphs of sulfides, goethite-lined boxwork cavities and supergene goethite, jarosite, chrysocolla and turquoise.

Advanced argillic alteration primarily occurs along steeply to gently dipping faults, joints and permeable rock units in the Artesia Lake volcanics in the upper kilometer of the hydrothermal system. Exposures of this environment occur in the Buckskin Range and western portions of the Blue Hill fault block. Advanced argillic alteration did not affect the middle Jurassic Fulstone Springs volcanics that overlie the Artesia Lake volcanics (Lipske, 2002; Lipske and Dilles, 2000). Advanced argillic alteration occurs as cm- to m-scale inner selvages along “D” veins (i.e. Gustafson and Hunt, 1975) or forms massive dm-scale quartz-alunite±pyrophyllite zones. In all cases, advanced argillic alteration is enclosed within outer selvages of sericitic alteration.

2.4.1.2 Sericitic

Sericitic alteration occurs throughout the upper parts of the hydrothermal system in the Yerington District and has been mapped in the Buckskin Range (Lipske, 2002), in the central and western portions of the Blue Hill fault block and in the western portion of Ann-Mason (Dilles and Einaudi, 1992; Dilles et al., 2000b). In this study, sericitic

alteration is subdivided based on the stability of feldspar and the presence of chlorite. These subdivisions are described below and their spatial relationships documented in trench maps (Appendix C).

2.4.1.2.1 Strong sericitic

Strong sericitic alteration is texturally destructive. All igneous phases are replaced by subhedral granular medium to coarse-grained (10-100 μm dia.) quartz (~ 50-75 vol %), euhedral coarse-grained (100-500 μm long) muscovite (~ 25-50 vol %), pyrite (~5 vol %, >50:1 py:cp), often tourmaline (3-5 vol %) and minor rutile. This alteration occurs proximal to “D” veins (Gustafson and Hunt, 1972) in 1 cm to 1 m wide selvages. At Blue Hill, as noted at Ann-Mason in Dilles and Einaudi (1992) and illustrated in Dilles et al. (2000), “D” veins and selvage widths increase from narrow (1-2 mm) to wide (1-2 m) moving upward or westward, away from the ore zone.

2.4.1.2.2 Weak sericitic

The distinction between strong and weak sericitic alteration is based on the stability of feldspar. In strong sericitic alteration, all feldspar has been converted to muscovite but in weak sericitic alteration, some plagioclase and k-feldspar remains (30-70 vol. %). In weak sericitic alteration, rock texture is preserved but all mafic phases have been altered to medium to coarse-grained muscovite, pyrite and rutile, as seen in Figure 2.3b. Calcic plagioclase feldspar and, often k-feldspar, have been converted to albite, as a result of sodic alteration (Carten, 1986; Dilles and Einaudi, 1992). Feldspar phenocrysts have been partially altered to muscovite and quartz, and the groundmass of granite porphyries has been altered to muscovite, quartz, pyrite and rutile. Texturally, muscovite pseudomorphs igneous “book” or hydrothermal “shreddy” biotite or occurs as randomly oriented sheaves (10-100 μm long), often with a radiating texture with intergrown anhedral quartz and rutile. Goethite and jarosite occur in fractures and supergene veinlets and as fracture coating, primarily on relic feldspar phenocrysts.

Weak sericitic alteration is often found as a outer selvage on “D” veins (0.5 – 5 m) with inner strong sericitic selvages (Dilles et al., 2000b). Figure 2.4 is a photograph of thin section #G909173 from the “Discovery Trench” at Ann-Mason (Dilles et al.,

2000, Figure 12) showing an example of the spatial relationship between a thin (~ 2 mm) “D” vein with a narrow inner strong sericitic selvage and outer weak sericitic selvage. Weak sericitic alteration is common in the central portion of the Blue Hill fault block. At Ann-Mason, the high level albite-sericite (A-2) alteration mapped by Dilles and Einaudi (1992) includes chlorite-poor zones that would be termed weak sericitic here.

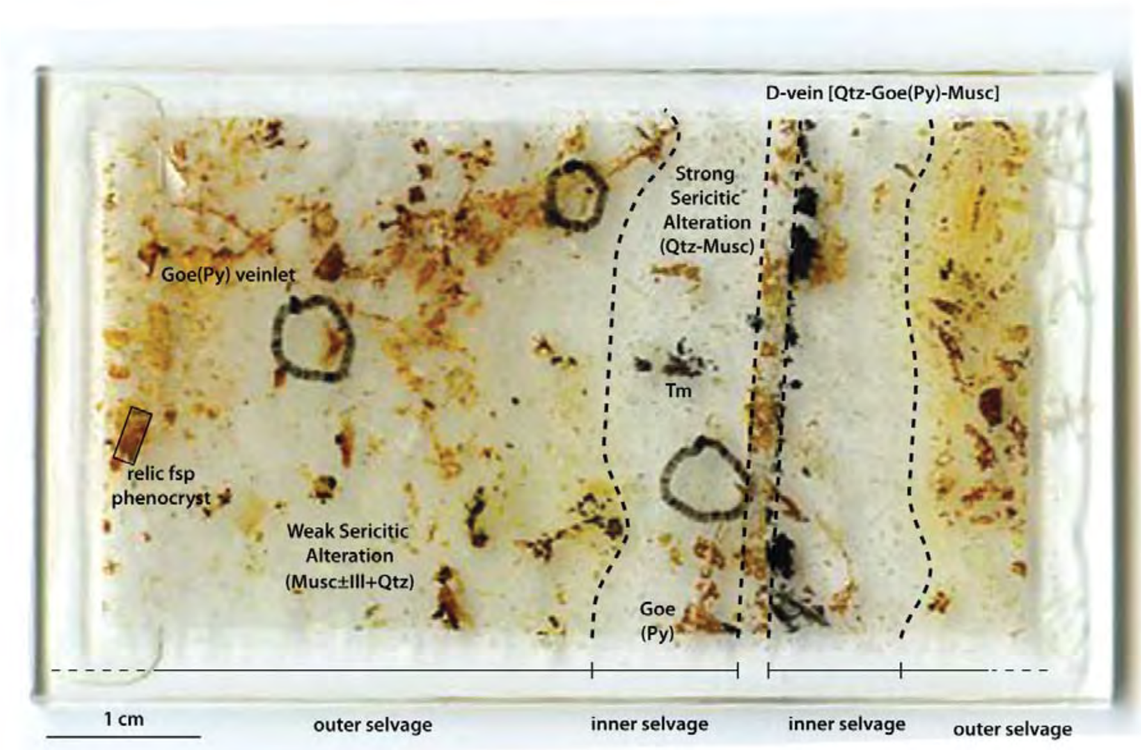

Figure 2.4. Photograph of a thin section from sample G909173 from the Ann-Mason “Discovery Trench” (Dilles et al., 2000) showing the spatial relationship between “D” veins and strong and weak sericitic selvages. This is a thin (~ 2 mm) D-vein typical of the D-vein morphology found near the ore zone.

2.4.1.2.3 Sericitic-chloritic

In sericitic-chloritic alteration, rock texture is preserved but mafic phases have been altered to chlorite, muscovite, quartz, minor rutile and hematite or locally pyrite. Chlorite (15-40 vol %) and muscovite (20-30 vol %) are fine to medium-grained (10-200 µm long) and often occur as intergrown sheaves with interstitial anhedral quartz (20-30 vol %), as shown in Figure 2.3d. In some samples, hematite (5-10 vol %) occurs as specular hematite either in veins with quartz or disseminated in the groundmass.

Plagioclase is commonly dusted by <25% sericite (musc ± illite). Feldspar is stable in all but one sample (YD01-13A) in which all feldspar has been replaced by quartz and muscovite.

At Blue Hill, sericitic-chloritic alteration with hematite predominantly occurs in the Artesia Lake andesite lavas as an outer selvage on "D" veins and enveloping sericitic and locally advanced argillic alteration inner selvages. Lipske (2002) described similar alteration with in the Buckskin Range as "sericite-hematite-chlorite alteration". Sericitic-chloritic alteration with pyrite is found in granite porphyry samples from Ann-Mason drill core. At Ann Mason, Dilles and Einaudi (1992) described similar "albite-chlorite±sericite" (A2) alteration.

2.4.1.3 Illitic

Illitic alteration is similar to weak sericitic alteration except all white micas are illite, as identified by EMPA. In addition, feldspar stability is greater than in sericitic alteration with 50 – 90 vol% feldspar relict in thin section. Illite occurs as randomly oriented sheaves replacing feldspar and, locally, biotite and is often finer-grained (10-50 μm) than muscovite (Figure 2.8). Illite also occurs as inner selvages on very thin (0.1-0.2 mm wide) pyrite + minor quartz veinlets or very thin (0.1-0.2 mm wide) veinlets (Figure 2.3c).

2.4.1.4 Intermediate argillic

In intermediate argillic alteration, rock texture is preserved. Hornblende and biotite have been partially or fully altered to chlorite, rutile and minor pyrite, as shown in Figure 2.3e. Calcic plagioclase has been converted to albite and partially replaced (~70% relict) by fine-grained (5-50 μm dia.) illite. K-feldspar is stable or partially altered to albite. The groundmass of granite porphyries contains relic feldspar and is partially altered to either illite or muscovite and quartz. Epidote (5-10 %), related to a separate propylitic or sodic-calcic hydrothermal event, replaces plagioclase phenocrysts or groundmass in porphyry dikes.

Intermediate argillic alteration is relatively weak and has not been previously documented at Yerington and its origin in porphyry Cu systems is poorly understood

(Dilles, in press). At Blue Hill and Ann-Mason, intermediate argillic alteration occurs proximal to illitic alteration along the flanks of main mineralized porphyry dike zones and illitic zone. Both the illitic and intermediate argillic alteration zones likely post-date muscovite-bearing sericitic alteration, but this relationship can only be inferred and has not been demonstrated via cross-cutting age relationships.

2.4.1.5 Propylitic

Propylitic alteration refers to weakly altered rocks with added actinolite, epidote, calcite, and chlorite and relict plagioclase, K-feldspar, and magnetite. Rock texture is preserved and mafic phases are partially to fully replaced by chlorite (3-20 vol %) and/or actinolite (0-20 vol %), trace rutile, magnetite, hematite and locally pyrite (Figure 2.3f). Plagioclase is commonly dusted by sericite of unknown composition or partially replaced by epidote (up to 10 vol %) or calcite and is partially converted to albite. K-feldspar is generally fresh, or rarely dusted with sericite.

Propylitic alteration is concentrated in the northwestern part of Blue Hill and in the southwestern part of Ann-Mason and primarily found in lithologies of the Yerington batholith. Propylitic alteration corresponds to propylitic (PA) alteration of Dilles and Einaudi (1992) and follows the broad definition of Meyer and Hemley (1967). Previous studies have demonstrated that propylitic and sodic-calcic alteration are closely associated and the result of alteration by hypersaline sedimentary brines that circulated through the Yerington batholith during porphyry copper deposit formation (Carten, 1986; Dilles and Einaudi, 1992; Dilles et al., 1992, 2000; Lipske, 2002) (see Chapter 1 for more detail).

2.4.2 Mineral composition

2.4.2.1 White mica and Illite

White micas and clay mineral compositions analyzed by EMPA include pyrophyllite, muscovite and phengitic muscovite, paragonite, and illite according to definitions by Deer et al. (1992) A summary of mineral compositions by EMPA is displayed in Table 6 and all EMPA data is presented in Appendix D. Illite is a potassium-deficient clay compared to muscovite, and defined by interlayer cation

(K+Na+2Ca) site occupancy of between 0.6-0.8 atoms per formula unit (apfu) (Bailey, 1984). EMPA data in percent oxide for micas and clays were recalculated to atoms per formula unit on the basis of a sum cationic charge of 22 equivalent to $O_{10}(OH,F,Cl)_2$ anions. All iron was calculated as Fe^{2+} (Newman, 1987). The observed compositional range is $(K_{0.03-1.05}Na_{0.01-0.88})(Fe_{0.0-0.56}\ Mg_{0.0-0.44}\ Al_{1.52-2.09})(Si_{2.92-3.38}Al_{0.62-1.09})O_{10}(OH)_2$. The interlayer cation site occupancy (K+Na+2Ca) ranges from 0.59 to 1.06 apfu. In the octahedral site, Fe+Mg+Mn content ranges from 0.0 to 0.68 apfu.

Compositional variations in white mica and illite can be described by four substitution mechanisms illustrated by arrows in Figure 2.5; (1) phengitic or Tschermak substitution $[(Al^{3+})^{vi} + (Al^{3+})^{iv} <-> (Fe^{2+}$ or $Mg^{2+})^{vi} + (Si^{4+})^{iv}]$, (2) direct $(Fe^{3+})^{vi} <-> (Al^{3+})^{vi}$ substitution, (3) illitic substitution $[(K^{+})^{\text{interlayer cation site}} + (Al^{3+})^{iv} <-> (Si^{4+})^{iv} + [\ ]^{\text{interlayer cation site}}]$, (4) $Na^{+} <-> K^{+}$ exchange in the interlayer cation site.

The two arrows Figure 2.5a illustrate the slope of two substitutions; (1) phengitic substitution and (2) direct $Fe^{3+} <-> Al^{3+}$ substitution. Data lie between these two trends suggesting a contribution by both Fe^{2+} and Fe^{3+} and the ratio of Fe^{3+}/(Fe+Mg+Mn) can be estimated using the slope of the data (Figure 2.5a). Using a least-squares regression method with a y-intercept at zero, as shown by the dashed line on Figure 2.5a, the data can be represented by the equation:

$$(5) \qquad y = -0.6981x;\ R^2 = 0.86$$

If $Fe^{3+}/(Fe^{TOT}+Mg+Mn) = 1$, then the slope (m) = -1.0; if $Fe^{3+}/(Fe^{TOT}+Mg+Mn) = 0$, then m = -0.5. Therefore if m = -0.6981, $Fe^{3+}/(Fe^{TOT}+Mg+Mn) = 0.3962$ and indicates ~40% contribution of Fe^{3+} to measured Fe+Mg+Mn (apfu) contents.

Minerals where Al^{vi} and Al^{iv} have been replaced by $Fe(Mg)^{vi}$ and Si^{iv} are termed phengitic. For this study, micas termed "phengitic muscovite" have greater than 0.2 apfu Fe+Mg+Mn. Both muscovite from sericitic-chloritic and illite from illitic and intermediate argillic alteration are more phengitic than muscovite from sericitic and advanced argillic alteration. Muscovite in alteration with chlorite present has the highest $Fe^{3+}/(Fe^{TOT}+Mg^{2+}+Mn^{2+})$ ratios (Figure 2.5a).

Table 2.7. Representative analyses of muscovite, illite, paragonite-muscovite and pyrophyllite by EMPA

Mineral	Muscovite	Paragonite-Muscovite	Muscovite	Illite	Illite	Muscovite	Muscovite	Pyrophyllite
Alteration Type	Strong Sericitic	Strong Sericitic	Weak Sericitic	Illitic	Intermediate Argillic	Sericitic-Chloritic	Sericitic-Chloritic	Advanced Argillic
Lithology	Granite porphyry	Artesia Lake andesite	Granite porphyry	Granite porphyry	Granite porphyry	Granite porphyry	Artesia Lake andesite	Granite porphyry
Sample #	ANN006002.018	H437199	G909160	G909163	G909158	ANN007006.017	YD01-13A	H437113
# of grains (# of analyses)	3(15)	4(22)	2(9)	2(10)	1(6)	2(8)	3(16)	2(9)
Region	Ann-Mason Drill Core	Western Blue Hill	Western Blue Hill	Western Blue Hill	Central Blue Hill	Ann-Mason Drill Core	Western Blue Hill	Western Blue Hill
SiO2	47.48	47.81	47.56	49.12	50.17	45.39	46.32	66.78
TiO2	0.51	<0.02	0.15	0.14	0.08	0.06	0.05	<0.02
Al2O3	35.91	40.60	34.15	29.88	29.86	31.06	33.92	26.91
FeO	0.66	<0.07	0.68	3.11	2.59	4.59	3.43	<0.07
MnO	0.01	<0.06	<0.06	<0.06	<0.06	<0.06	<0.07	<0.06
MgO	1.52	0.05	2.00	2.62	2.69	2.20	1.13	<0.03
CaO	0.01	<0.02	<0.02	<0.02	<0.02	<0.02	0.00	0.12
Na2O	0.27	5.02	0.35	0.12	0.14	0.15	0.46	0.11
K2O	10.94	1.72	9.00	8.68	7.85	11.42	10.00	<0.06
F	0.21	0.19	<0.13	0.47	0.18	<0.13	0.36	<0.13
Cl	0.01	<0.03	<0.03	<0.03	<0.03	<0.03	<0.04	<0.05
Total	97.58	95.53	94.15	94.35	93.72	95.19	95.77	94.29
H2O	4.52	4.63	4.44	4.25	4.39	4.30	4.31	4.92
Total	102.01	100.08	98.54	98.40	98.02	99.42	99.93	99.19
Structural Formulas - based on 11 O equivalents								
Si	3.078	3.026	3.160	3.287	3.346	3.106	3.203	3.095
Al(iv)	0.922	0.974	0.840	0.713	0.654	0.894	0.797	0.905
Al(vi)	1.822	2.055	1.834	1.643	1.693	1.613	1.689	1.764
Fe	0.036	0.000	0.038	0.174	0.144	0.265	0.207	0.192
Mn	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mg	0.147	0.005	0.199	0.261	0.267	0.224	0.162	0.113
Na	0.034	0.616	0.045	0.015	0.018	0.020	0.016	0.060
K	0.904	0.139	0.763	0.741	0.668	0.998	0.904	0.852
Al(total)	2.743	3.028	2.674	2.357	2.347	2.507	2.486	2.669
Fe+Mg+Mn	0.183	0.005	0.236	0.436	0.412	0.489	0.371	0.305
K+Na+Ca	0.939	0.756	0.808	0.757	0.687	1.018	0.924	0.913
K/(K+Na+Ca)	0.963	0.184	0.944	0.979	0.973	0.980	0.978	0.933
Mg/(Mg+Fe+Mn)	0.802	1.000	0.840	0.600	0.649	0.458	0.438	0.370

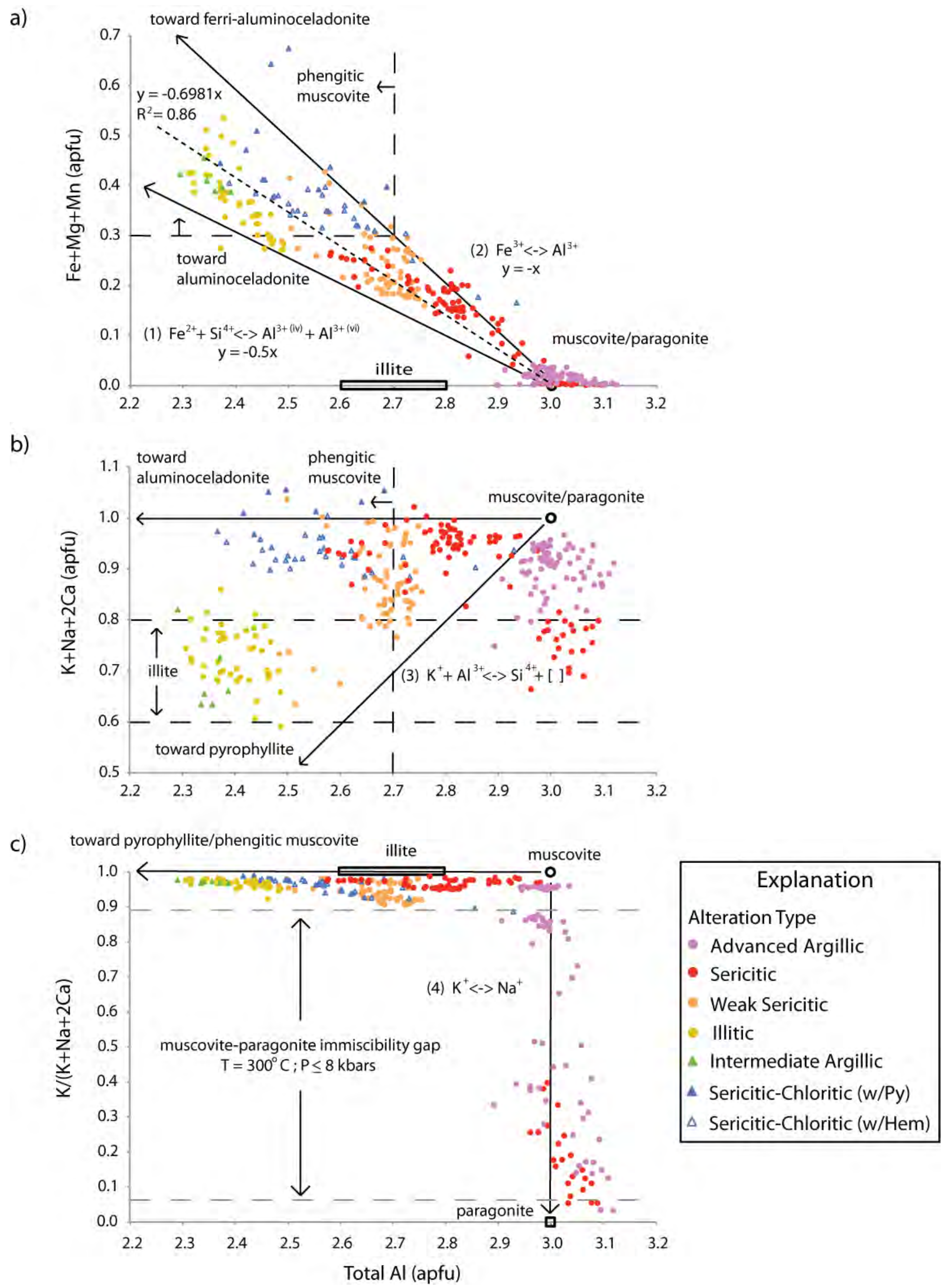

Figure 2.5. Compositional variations in white mica: A) Al (apfu) vs. Fe+Mg+Mn (apfu), B) Al (apfu) vs. K+Na+2Ca (apfu) and C) Al (apfu) vs. atomic K/(K+Na+2Ca). The colors and shapes represent hydrothermal alteration mineral types and subtypes outlined in Table 2.5. Open symbols represent samples with hematite as the primary Fe trace phase. Arrows represent compositional vectors for main substitution mechanisms and black open symbols represent end-member compositions.

In phengitic muscovite and illite, the proportion of Fe:Mg in the octahedral site [Mg/(Mg+Fe+Mn)] varies. Hematite-bearing samples (open triangles) generally have a greater proportion of iron [Mg/(Mg+Fe+Mn) < 0.5] than sulfide-bearing samples, as shown in Figure 2.6. This is likely the result of hematite buffering the iron oxide (FeO) activity at a higher level during this alteration compared to sulfide-bearing samples.

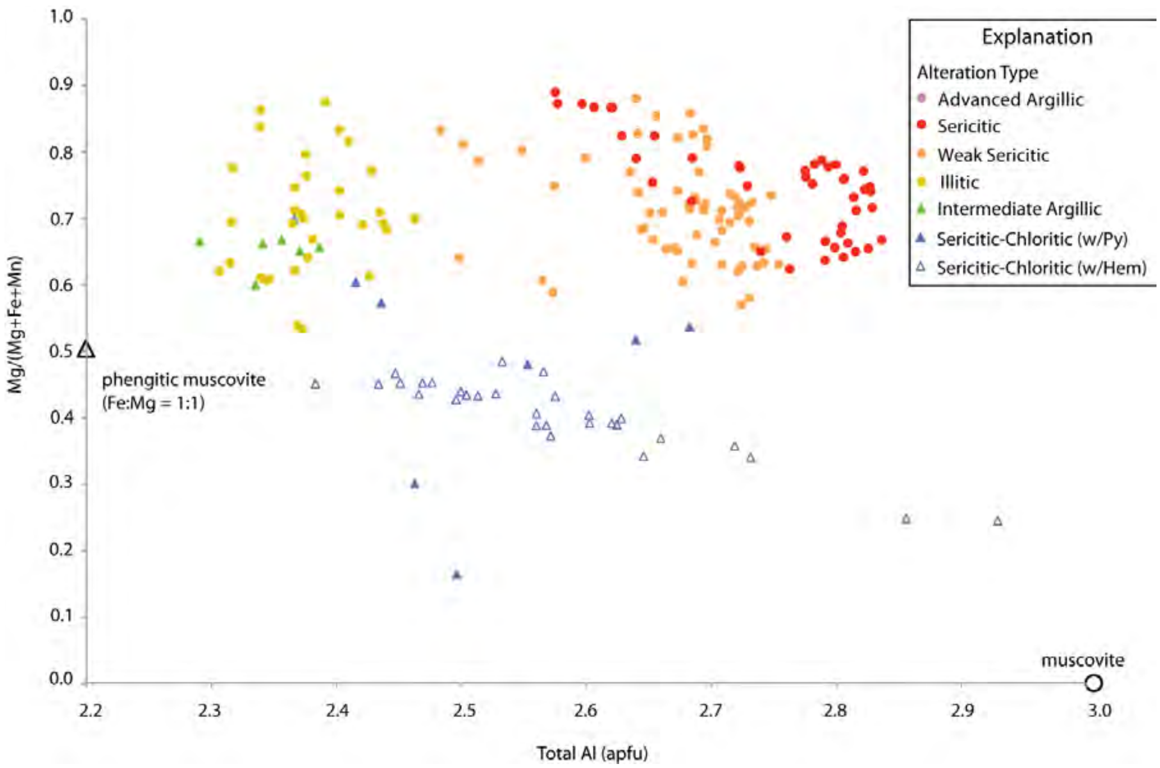

Figure 2.6. Total Al (apfu) vs. atomic Mg/(Mg+Fe+Mn) plot for muscovite and illite analyses with >0.1 apfu Fe+Mg+Mn.

Figure 2.5b allows comparison between (3) illitic substitution and (1) phengitic substitution. Illitic substitution will decrease the K+Na+2Ca and total Al content in a 1:1 atomic ratio, as illustrated by the arrow extending from muscovite towards pyrophyllite. Phengitic substitution, illustrated by the horizontal arrow, will decrease the total Al but does not affect the K+Na+2Ca content.

Illite is found in samples from illitic, intermediate argillic alteration and in several samples from weak sericitic alteration that also contain muscovite. In most cases, coarser-grained muscovite or chlorite replaces hornblende or hydrothermal biotite

whereas finer-grained illite replaces plagioclase and K-feldspar. Notably, illite and muscovite are present in several samples without any discernable difference in their morphology or grain size (G909152). As shown in Figure 2.7, although the mean grain size for muscovite is greater than that of illite there is substantial overlap and grain size cannot be used to distinguish the two minerals. None of the hydrothermal illite measured correspond to the <5 um definition of illite commonly used for diagenetic clays in sedimentary rocks (Bailey, 1984).

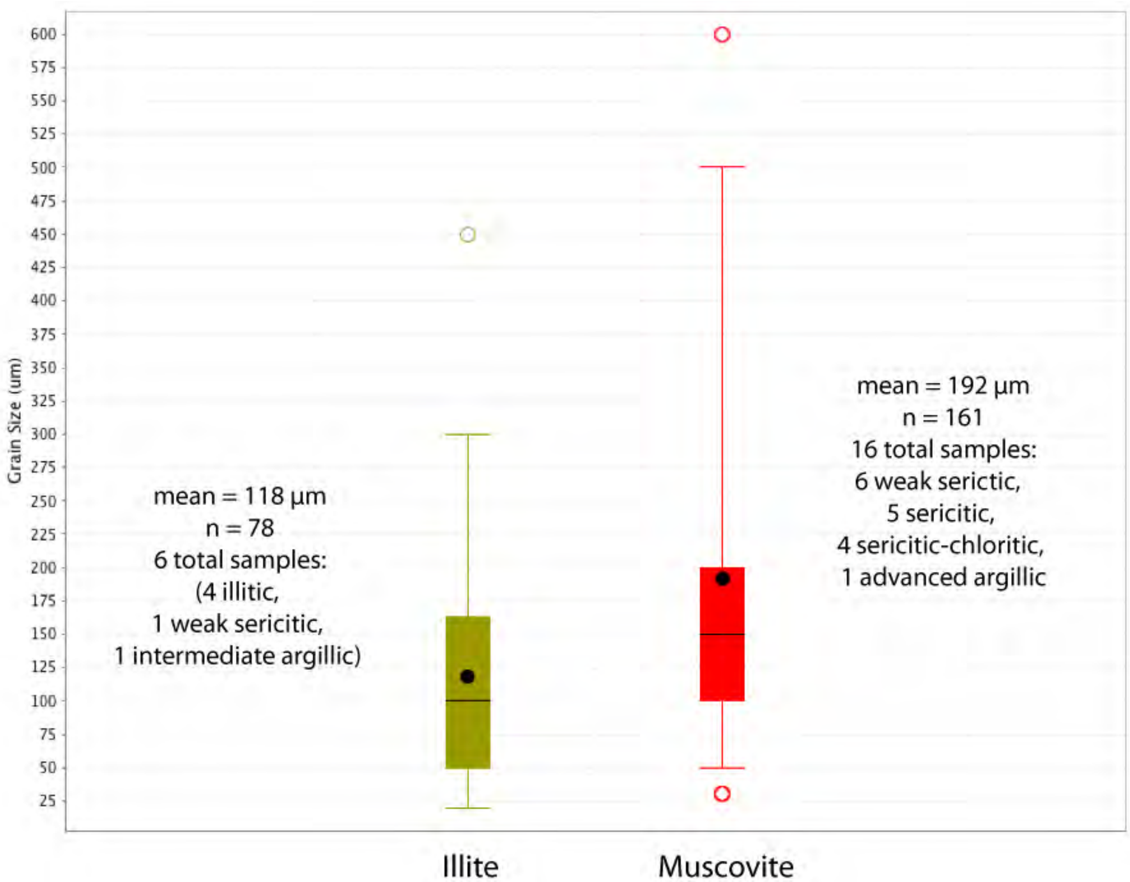

Figure 2.7. Box and whisker (Turkey) plots of grain sizes (μm) for illite and muscovite. The black dots are the mean values. The box represents the middle 50% of the data, which is split by a line that represents the median. The whiskers are the 5% and 95% values and open circles represent outliers.

In (3) Na-K substitution, Na^+ substitutes for K^+ in the interlayer cation site and the proportion of potassium in the interlayer cation site [K/(K+Na+2Ca)] can be used as a

measure of Na-K substitution, as in Figure 2.5c. Although the K/(K+Na+Ca) ranges from 0.0 – 0.99, the majority of the variation comes from two samples of Artesia Lake andesite lavas (YD02-02 and H437199) with intense advanced argillic or sericitic alteration in northern portion of the Blue Hill fault block. In sample YD02-02, the BSE image shows darker, Na-rich mica that appears to be replacing the lighter more K-rich mica along grain boundaries as shown in Figure 2.8a. Sample H437199 does not show the same replacement textures (Figure 2.8b). There is an immiscibility gap between muscovite and paragonite that widens as temperature decreases. Guidotti et al. (1994) measured the composition of natural muscovite-paragonite pairs using EMPA to determine the P-T-X limits of the binary muscovite-paragonite solvus. According to their model, at T = 300° C and P ! 8 kbars, muscovite can contain up to ~ 11 mol % paragonite while paragonite can contain up to 6 mol % muscovite (Guidotti et al., 1994, Fig. 2). Intermediate compositions from K/(K+Na+2Ca) = 0.15 to 0.68, found by EMPA (Figure 2.8) and illustrated in Figure 2.5c, are more likely physical mixtures rather than a true solid-solution of paragonite and muscovite components in mica.

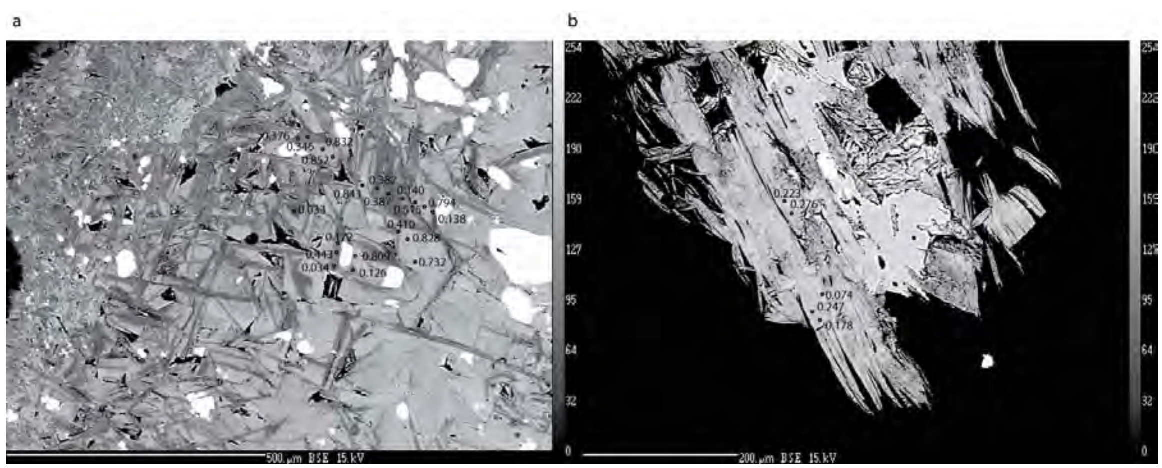

Figure 2.8. BSE images of samples with paragonite and muscovite. Dots represent EMPA spots and numbers are K/(K+Na+2Ca) proportion at spot. (a) YD02-02, Na-rich mica (dark colored elongate crystals) appears to be have replaced the dominate sheets of coarse K-rich mica (lighter color) along cleavages, fractures and grain boundaries. (a) H43199, coarse tabular white mica has composition by EMPA between paragonite and muscovite [0.01 – 0.3 K/(K+Na+2Ca)].

2.4.2.2 Chlorite

Most chlorites compositions are brunsvigite or ripidolite whereas a few fall into the sheridanite and clinochlore fields based on the compositional divisions outlines in Foster (1962) (Figure 2.9a). Chlorite analyses have been recalculated on an atomic basis to a cation charge of 28 or $O_{10}(OH)_8$ anions. All iron was assumed to be Fe^{2+} (Foster, 1962; (Newman, 1987). The chlorite compositional range is $(Al_{0.94\text{-}1.62}Fe_{0.78\text{-}2.47}Mg_{2.0\text{-}4.02})(Si_{2.48\text{-}3.02}Al_{0.98\text{-}1.52})O_{10}(OH)_8$. Tetrahedral cation composition ranges from $(Si_{3..02}Al_{0.98})$ to $(Si_{2.48}Al_{1.52})$. The sum of the octahedral sites (sum oct) ranges from 5.60 to 6.06 apfu. Mg/(Mg+Fe+Mn) content ranges from 0.45 to 0.84 and octahedral Al ranges from Al^{vi}/(sum oct) = 0.16 to 0.28 apfu. A summary of chlorite compositions is presented in Table 2.7 and all chlorite EMP analyses can be found in Appendix C.

Chlorite compositional variations can be described by two types of substitution: 1) phengitic or Tschermak substitution $[Al^{3+,vi} + Al^{3+,iv} <-> (Fe^{2+} \text{ or } Mg^{2+})^{vi} + (Si^{4+})^{iv}]$ (Figure 2.9b), and 2) octahedral $Fe^{2+} <-> Mg^{2+}(Mn^{2+})$ substitution (Figure 2.9a). Ideal chlorite has no K, Na or Ca in the interlayer cation site, but minor amounts of K+Na+2Ca (apfu) in chlorite were observed. K+Na+2Ca (apfu) content is likely due to <1 μm-scale interlayering of white mica (K and/or Na) or actinolite (Ca) within the dominantly chlorite sheet structure, similar to the 10 Å mica packets found randomly interlayered with stacks of chlorite described in Carrillo-Rosua et al., (2009). Chlorites with K+Na+2Ca > 0.02 apfu were considered to be mixed with muscovite or actinolite and are excluded from the chlorite analyses.

Generally, chlorites from muscovite- or illite-bearing assemblages have higher Al contents and a greater proportion of octahedral Al (>0.20 Al^{vi}/sum oct) than chlorites from propylitic alteration (Figure 2.9b), although there are exceptions to this trend. Chlorites from sericitic-chloritic alteration with pyrite as the dominant Fe trace phase have lower atomic Al^{vi}/sum oct values than chlorite from sericitic-chloritic alteration with hematite. The Fe/(Fe+Mg+Mn) content of chlorites should be correlated with the presence of hematite as shown for white mica/illite data in the previous section. The data in Figure 2.9a do not show this trend. Although most Fe-rich chlorites come from samples that also contain hematite, Mg-rich chlorites are also associated with samples that are hematite-bearing.

Table 2.7. Representative analyses of chlorite by EMPA

Alteration type	Intermediate Argilic	Intermediate Argilic	Sericitic-Chloritic (+Py)	Sericitic-Chloritic (+Hem)	Propylitic	Propylitic	Propylitic	Propylitic
Lithology	Granite porphyry	Granite porphyry	Granite porphyry	Artesia Lake andesite	McLeod quartz monzodiorite	Granite porphyry	McLeod quartz monzodiorite	Bear quartz monzonite
Sample #	G909158	YD09-04	ANN007006.017	YD01-13A	ANN006001.045	G909168	G909174	YD01-04
# of grains (# of analyses)	2(11)	3(17)	3(12)	3(25)	3(16)	3(13)	2(15)	3(27)
Region	Central Blue Hill	Central Blue Hill	Ann-Mason Drill Core	Northern Blue Hill	Ann-Mason Drill Core	Western Blue Hill	Ann-Mason	Northern Blue Hill
SiO2	28.97	32.43	28.03	24.23	28.23	27.77	27.53	28.137
TiO2	0.04	0.03	0.05	0.02	0.04	0.05	<0.02	<0.02
Al2O3	20.34	20.28	19.49	24.02	20.74	19.64	19.84	20.194
FeO	16.90	13.35	15.44	26.04	14.92	20.62	21.05	18.924
MnO	0.38	0.26	0.06	0.23	0.06	0.45	0.20	0.175
MgO	20.91	22.10	23.73	13.75	24.32	19.11	19.91	21.876
CaO	0.04	0.36	<0.02	<0.02	<0.02	<0.02	0.03	<0.02
Na2O	<0.05	0.21	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
K2O	0.27	0.32	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
F	<0.13	0.29	0.27	<0.13	<0.13	<0.13	<0.13	0.016
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	88.07	89.66	87.25	88.47	88.70	87.87	88.85	89.452
H2O	11.93	12.39	11.80	11.41	12.11	11.67	11.76	12.006
Total	99.96	101.93	98.93	99.87	100.74	99.53	100.58	101.426
Structural Formulas - based on 14 O equilvalents								
Si	2.897	3.098	2.815	2.541	2.778	2.848	2.797	2.737
Al(iv)	1.103	0.902	1.185	1.459	1.222	1.152	1.203	1.263
Al(vi)	1.295	1.383	1.122	1.510	1.183	1.221	1.173	1.052
Fe	1.415	1.070	1.297	2.285	1.228	1.769	1.789	1.539
Mn	0.032	0.021	0.007	0.021	0.006	0.039	0.018	0.014
Mg	3.119	3.158	3.552	2.150	3.567	2.920	3.016	3.172
K	0.035	0.039	-	-	-	-	-	-
Al(total)	2.398	2.285	2.307	2.969	2.406	2.373	2.375	2.315
Fe+Mg+Mn	4.566	4.249	4.856	4.455	4.801	4.728	4.822	4.726
Mg/(Mg+Fe+Mn)	0.683	0.743	0.732	0.483	0.743	0.618	0.625	0.671
Al(vi)/(sum Oct)	0.219	0.241	0.188	0.253	0.197	0.205	0.195	0.182

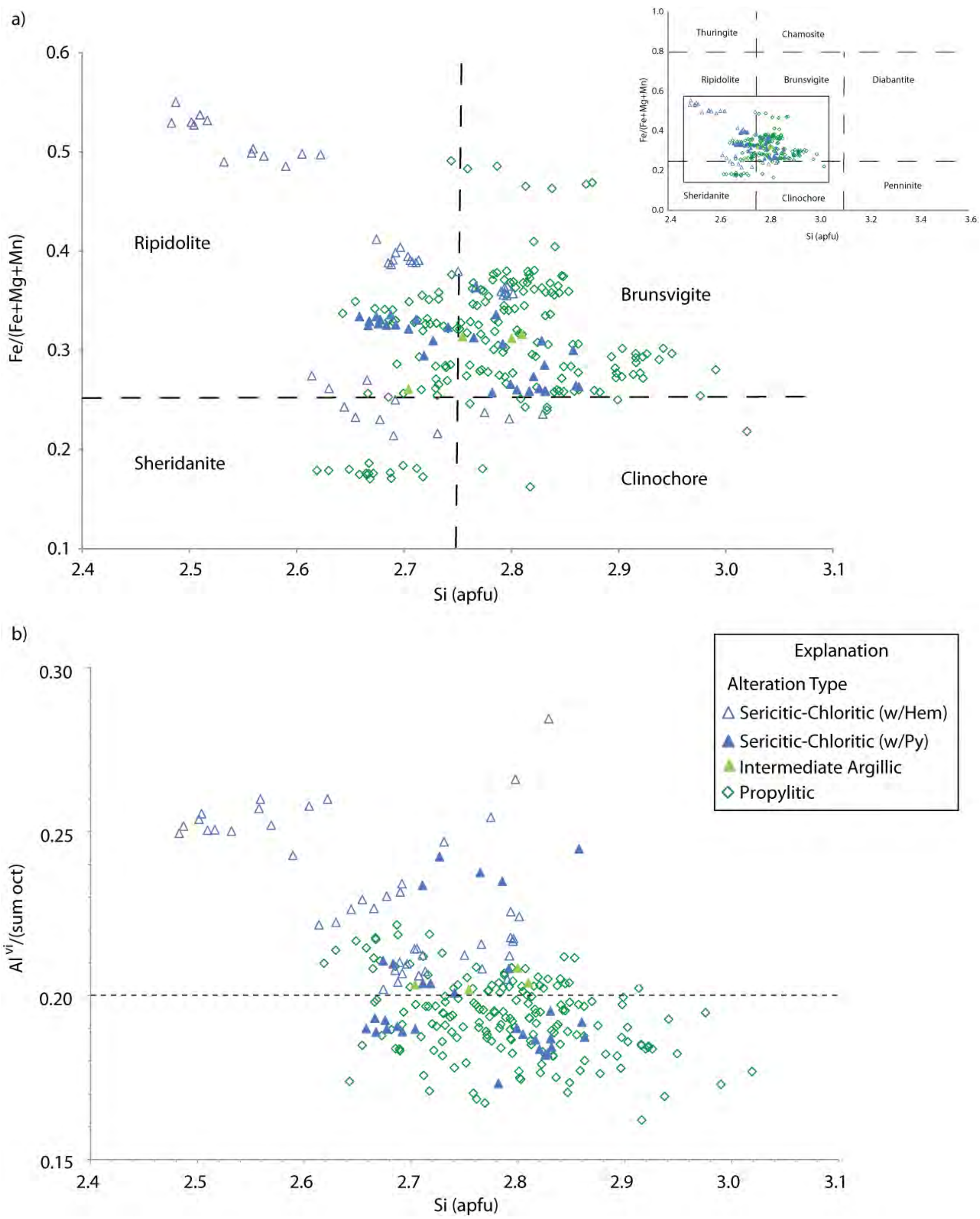

Figure 2.9. Compositional variation in chlorites: a) Si (apfu) vs. atomic Fe/(Fe+Mg+Mn), inset shows full range of possible chlorite compositions. Dashed lines represent chlorite species divisions according to Foster (1967). b) Si (apfu) vs. atomic Al^{vi}/(sum oct). The colors and shapes in represent hydrothermal alteration assemblages as in Table 2.5.

2.4.3 Short-wave infrared spectroscopy

The wide range of white mica species (muscovite, phengitic muscovite, illite, paragonite and pyrophyllite) detected by EMPA is reflected in the SWIR spectral data. Figure 2.10 shows spectra from samples containing white mica compositional end-members: muscovite, pyrophyllite, paragonite and illite. There is a significant difference in the scale of sampling by EMPA compared to SWIR spectroscopy. While each EMPA spot represents a ~5 µm diameter and deep spot on one mineral grain in a thin section or mounted rock chip, whereas the TerraSpec™ instrument analyses an ~1 cm diameter on the surface of a hand sample and inevitably contains multiple mineral phases not necessarily sampled by EMPA.

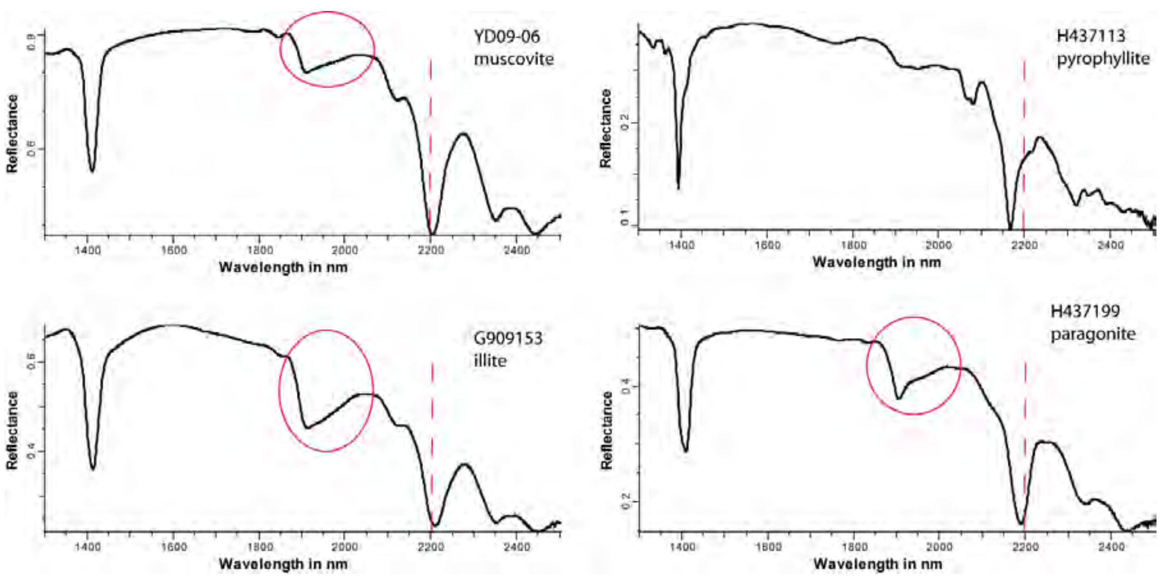

Figure 2.10. SWIR spectra from samples with end-member white mica/clay compositions as determined by analysis with EMPA: a) muscovite, b) pyrophyllite, c) ilite and d) paragonite. Red dashed lines mark position of ca. 2200 nm and red circles highlight ca. 1900 nm absorption feature.

Only samples identified as "sericite" or "pyrophyllite", without any distinct kaolinite mineral SWIR features, are presented. The term "sericite" was used as a blanket term for white mica and illite in initial mineral determinations using TerraSpec software. The presence of minor amounts of clay minerals at Yerington, such as kaolinite

and montmorillonite of very low temperature hydrothermal or supergene origin, complicate the interpretation of SWIR spectra. These clay minerals are present in many samples and have strong IR absorptions that obscure the hypogene white mica signature. Samples where kaolinite was identified by the doublets centered near ca. 1400 nm and ca. 2200 nm are excluded from the discussion section since the presence of kaolinite shifts the ca. 2200 nm absorption to the typical kaolinite value between 2206-2209 nm. Samples with deep ca. 1900 nm absorptions but no doublets were considered as “sericite” and included. Of the 25 samples analyzed, six (~ 25%) were identified by SWIR as “kaolinite”, “sericite-kaolinite”, or “epidote-kaolinite” and excluded from the data set.

Spectra from chlorite-bearing samples are shown in Figure 2.11. Due to the low-reflectivity of chlorite and its relatively low abundance relative to other alteration minerals (such as sericite, epidote and actinolite), chlorite-only spectra are rare (5% of samples). Chlorite was detected by SWIR spectroscopy in eight of twenty chlorite-bearing samples (40%) and almost always in combination with more reflective minerals such as sericite and kaolinite that obscure chlorite spectra.

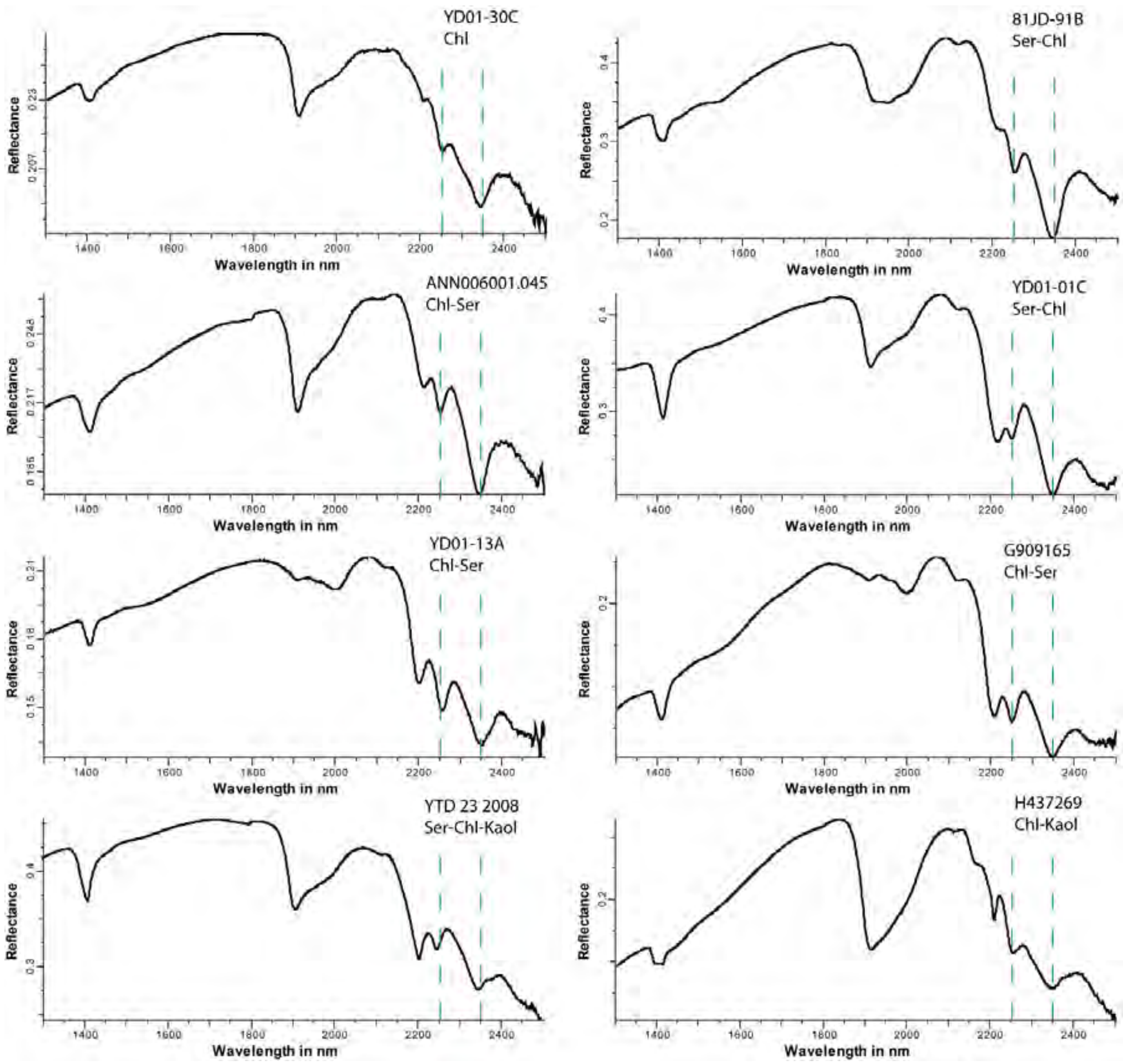

Figure 2.11. SWIR spectra from chlorite-bearing samples. Due to the low reflectivity of chlorite, most spectra are mixtures with sericite and/or kaolinite. Green dashed lines illustrate position of ca. 2250 nm and ca. 2350 nm.

2.5 Discussion

2.5.1 Comparison of SWIR spectra and mineral composition

2.5.1.2 White Mica and Illite

Fe+Mg+Mn (apfu) content in muscovite and illite, an indictor of phengitic substitution, is positively correlated (R^2=0.76) with wavelength of the c.a. 2200 nm absorption in the SWIR spectra of samples identified as “sericite” (Figure 2.12). The

increase is linear and can be described using a least-squares regression method by the equation (2):

$$(2) \qquad y = 0.0172x - 37.6; R^2=0.76$$

where y = Fe+Mg+Mn (apfu), x = wavelength of the 2200 feature (nm).

For pure Al-muscovite, 2193 nm is the lowest wavelength commonly observed for the w2200 absorption (S. Halley, per. comm., 2011). When this value is set for the x-axis intercept, the equation for the correlation of phengite component with the w2200 absorption changes slightly to:

$$(3) \qquad y = 0.0223x - 49; R^2=0.69$$

Using equation (3), the approximate phengitic component of a white mica can be estimated using the measured wavelength of the 2200 nm feature.

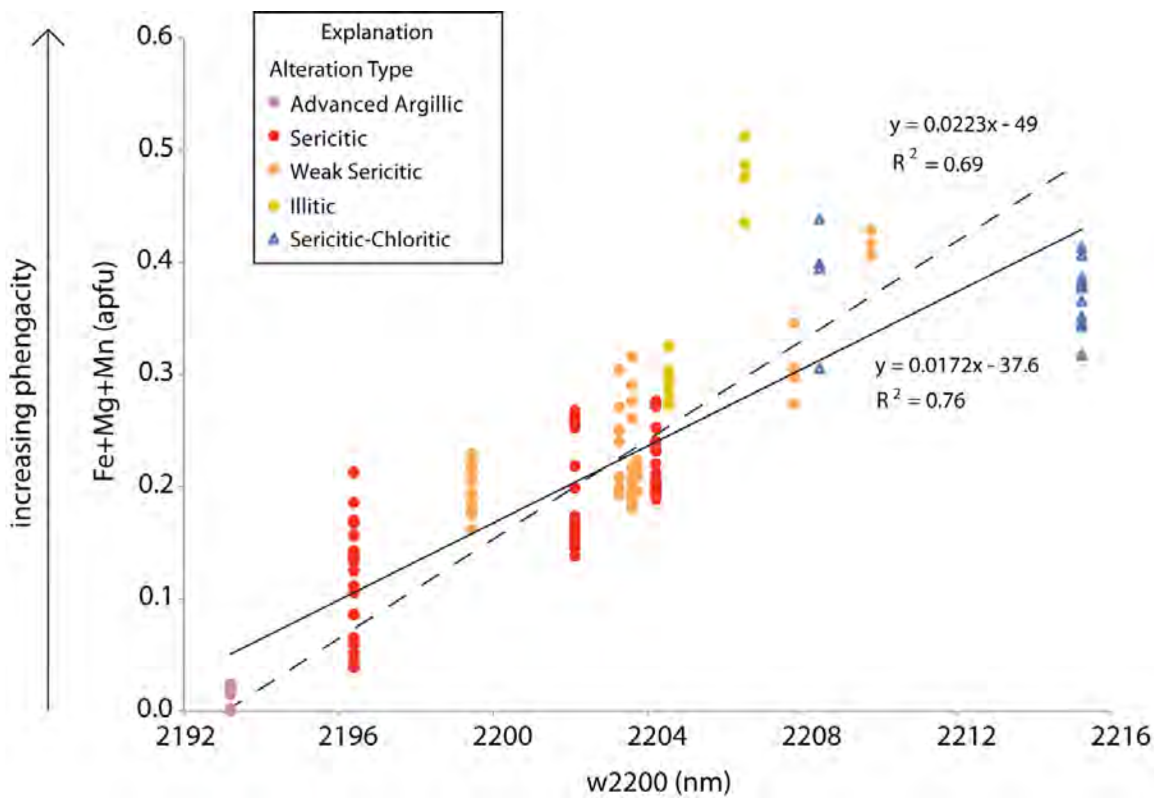

Figure 2.12. Fe+Mg+Mn (apfu) of muscovite and illite ("sericite") plotted against the wavelength of the ca. 2200 absorption (nm). The solid line represents the equation (eq. 2) derived by least squares linear regression. The dashed line represents linear regression equation adjusted to intersect the x-axis at s 2193 nm (eq. 3), the lowest common value for muscovite.

The relationship between atomic Fe+Mg+Mn and wavelength of the 2200 feature is also shown schematically in Figure 2.13. SWIR spectra are stacked according to the average atoms of Fe+Mg+Mn (apfu) in the white mica or illite ("sericite") in the sample.

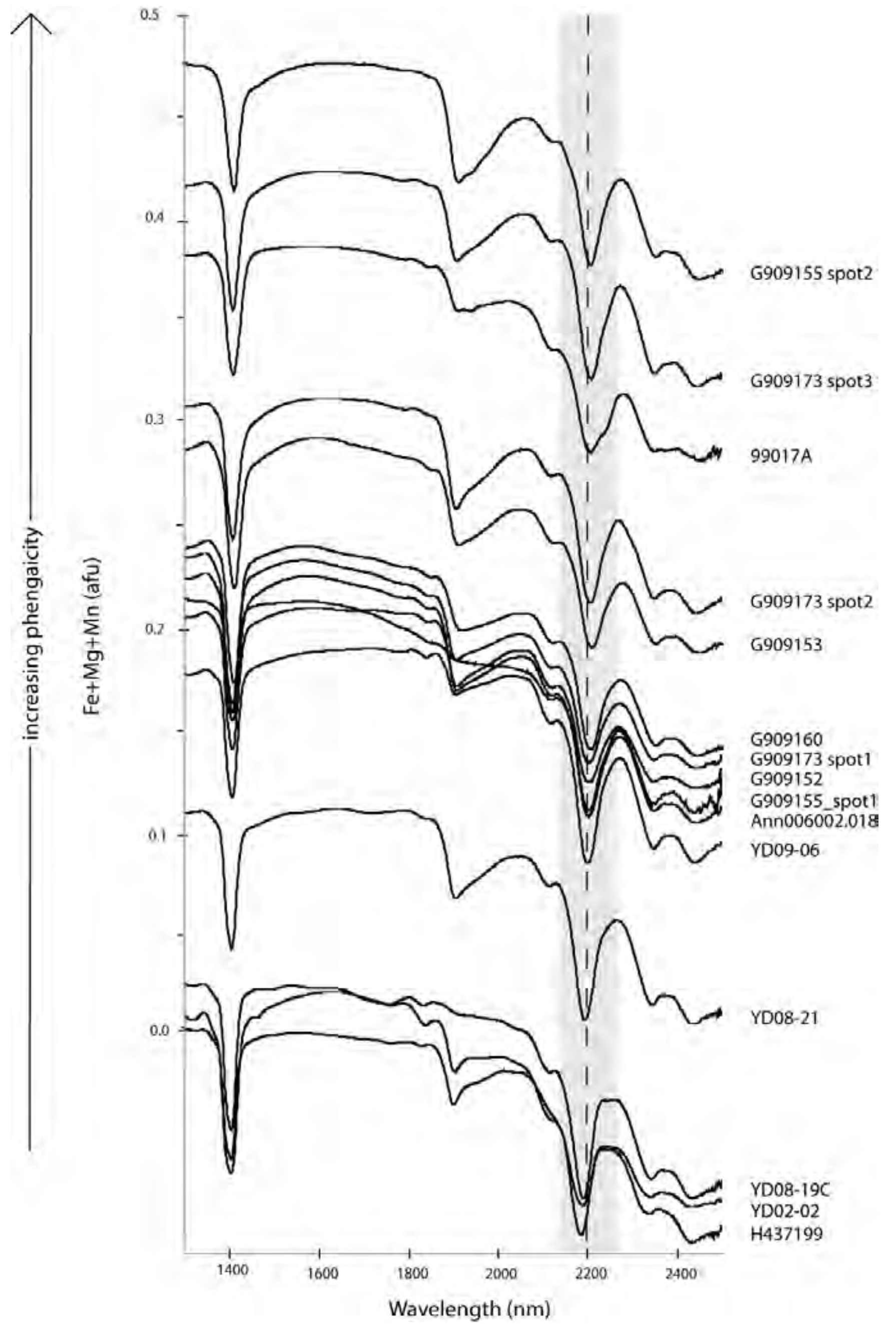

Figure 2.13. SWIR spectra from samples identified as "sericite" arranged by Fe+Mg+Mn (apfu) content demonstrating the shift in the wavelength of the ca. 2200 nm absorption feature with increasing phengitic component.

There is also a shift in the wavelength of the Al-OH absorption (ca. 2200 nm) associated with Na for K substitution in mica as shown in Figure 2.14a. End member paragonite has a w2200 value at ca. 2187 nm. As the proportion of muscovite in the sample decreases from X_{musc}=1.0 to X_{musc}=0.0, the wavelength of the ca. 2200 nm absorption feature decreases from 2193 to 2187 nm.

For this data set, illite and muscovite cannot be readily distinguished by SWIR spectroscopy. Illite has been identified as having a deeper H_2O absorption at ca. 1900 nm (Hauff et al., 1989; Davies, 2003). In Figure 2.14b, K+Na+2Ca (apfu) content is plotted against the depth of the ca. 1900 nm absorption (hqd1900). There is a very poor correlation between K+Na+2Ca (apfu) content and the depth of the H_2O absorption (R^2= 0.10). Although all samples with illite have deep absorptions at ca.1900 nm and more than 50% of the samples identified as muscovite have the same depth at the ca.1900 feature. This observation suggests the depth of the ca. 1900 nm absorption is not diagnostic of illite.

The absorption band at ca. 1900 nm, in combination with a sharp band at ca. 1400 nm, has been attributed to the presence of "undissociated water molecules in the mineral structure (i.e. water of hydration or water trapped in the lattice)" (Hunt and Salisbury, 1970). By definition, illite has no structural water and is a non-expandable clay (Deer et al., 1992). For this reason, a deeper absorption at ca. 1900 nm would not necessarily be predicted. Illite is often found with interlayered smectite, which is expandable and contains structural water. The presence of smectite in illite samples may account for the empirical derivation correlating a deeper ca. 1900 nm peak with illite (Hauff et al., 1989).

Due to the difference in sampling scale by EMPA and SWIR, the deep absorptions ca.1900 nm seen in samples with muscovite or illite is likely due to the presence of late low-temperature clay phases such as montmorillinite, smectite or halloysite clays. Although SWIR spectra were carefully screened to exclude samples with kaolinite, there is still the possibility of contamination by inconspicuous clay minerals. All clay minerals are highly reflective and can be detected in minute amounts by SWIR spectroscopy. Since these are natural samples from weathered exposures at the earth' surface, the possible contamination of samples by clay species provides an example of realistic field sample variability.

There is a weak positive correlation between the width of the ca. 2200 nm absorption feature and the interlayer cation site occupancy in atoms of K+Na+2Ca (Figure 2.14c). In previous studies, sharper absorption features at ca. 1400 and ca. 2200 nm are attributed to minerals with more ordered crystal structures (Kruse and Hauff, 1991; Pontual et al., 1995). Muscovite is generally slightly coarser-grained (Figure 2.7) and forms at higher temperature than illite (Figure 2.17). Therefore, the narrower peak would be hypothesized for muscovite. Our data show the opposite, although weak, trend.

Figure 2.15 shows the SWIR spectra of "sericite" samples in a stacked plot arranged according to their K+Na+2Ca (apfu) content with muscovite at the top and illite at the bottom. Although all of the illite spectra have deep ca. 1900 nm absorptions, more than 50% of the muscovite spectra, as determined by EMPA, also have deep 1900 nm absorptions.

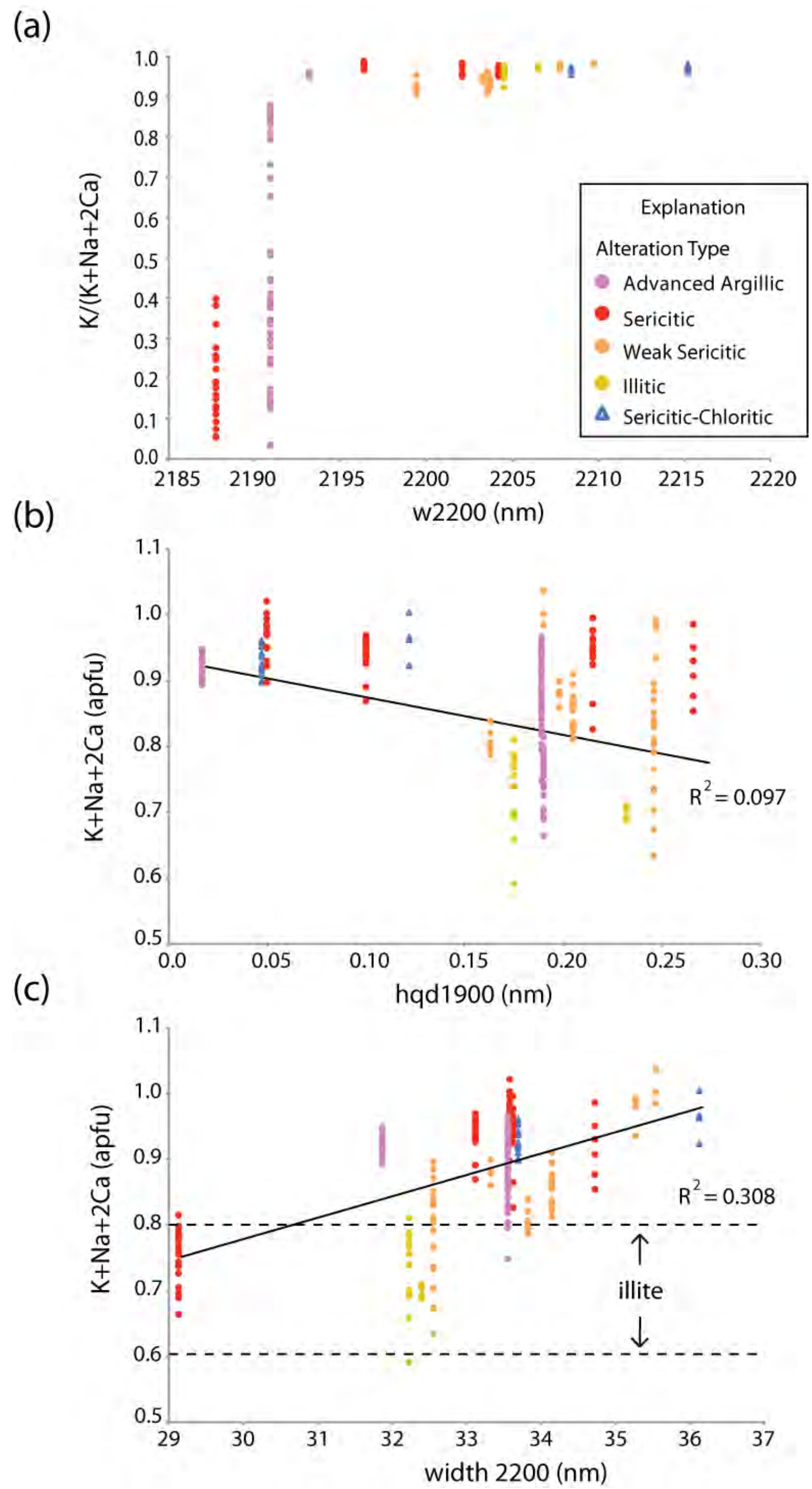

Figure 2.14. Compositional variations in white mica plotted against SWIR spectra absorption features: (a) w2200 vs. atomic K/(K+Na+2Ca), (b) hqd1900 vs. K+Na+2Ca (apfu) and (c) width 2200 vs. K+Na+2Ca (apfu).

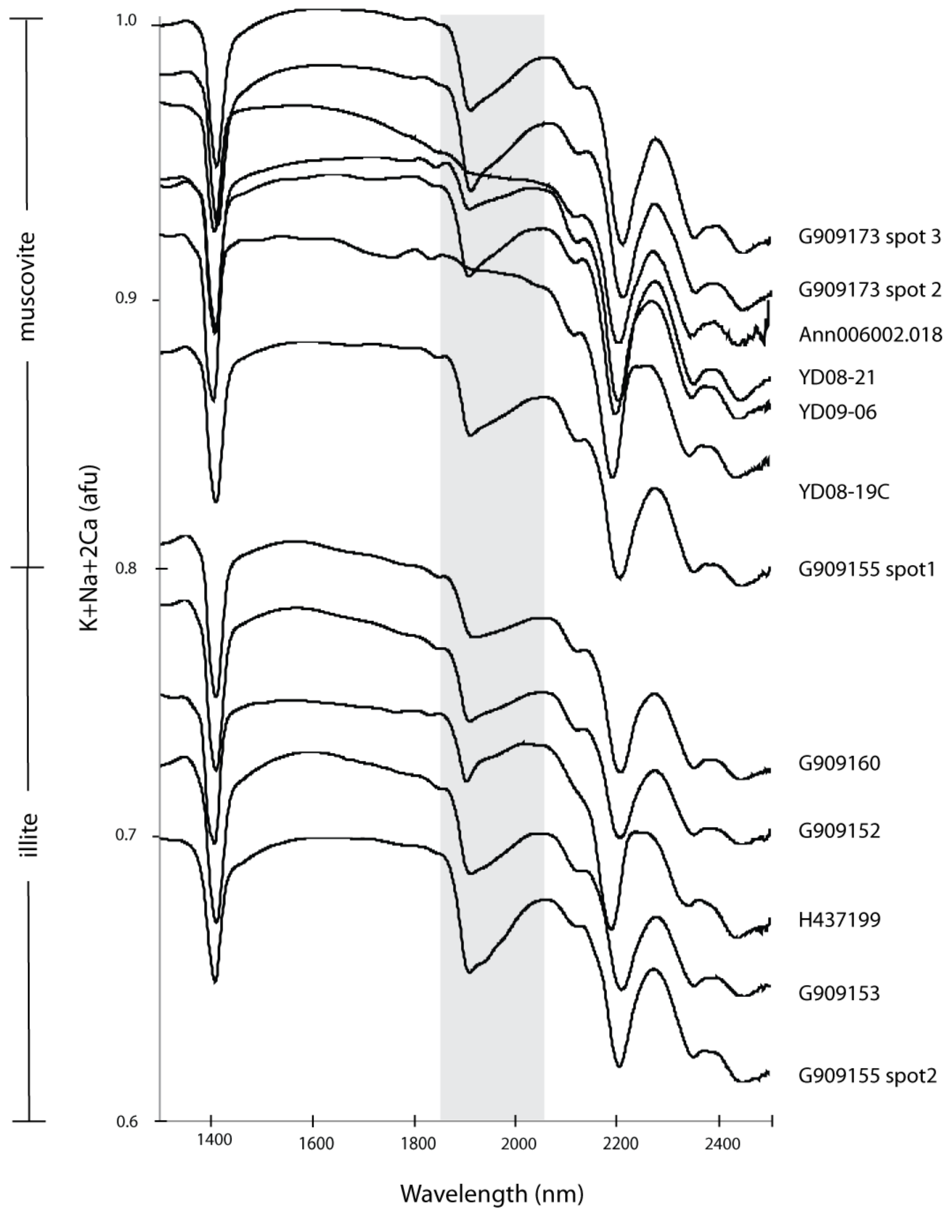

Figure 2.15. SWIR spectra from samples identified as "sericite" plotted according to the K+Na+2Ca (apfu) content. Samples with < 0.8 apfu are classified as illite. The depth of the ca. 1900 nm feature is an unreliable indicator of K+Na+2Ca (apfu) content.

2.5.1.2 Chlorite

The position of the ca. 2350 nm wavelength in the SWIR spectra of chlorite samples has been shown to decrease with increasing Fe content (Thompson et al., 1999). In this data set, there is poor linear correlation between in the wavelength of the ca. 2350

nm feature and the atomic Fe/(Fe+Mg+Mn) content (R^2=0.04). This is likely because most of spectra are mixtures of chlorite with sericite and/or kaolinite. Since chlorite is a dark mineral with low reflectivity, it is difficult to detect in low volumes (50-30 vol %) by SWIR spectroscopy. Sericite is highly reflective and has an absorption feature at ca. 2348 nm similar in size and shape to the Fe-OH and Mg-OH absorption features in chlorite (Table 2.4). It is likely the presence of sericite obscures the position of the ca. 2350 nm absorption related to chlorite composition.

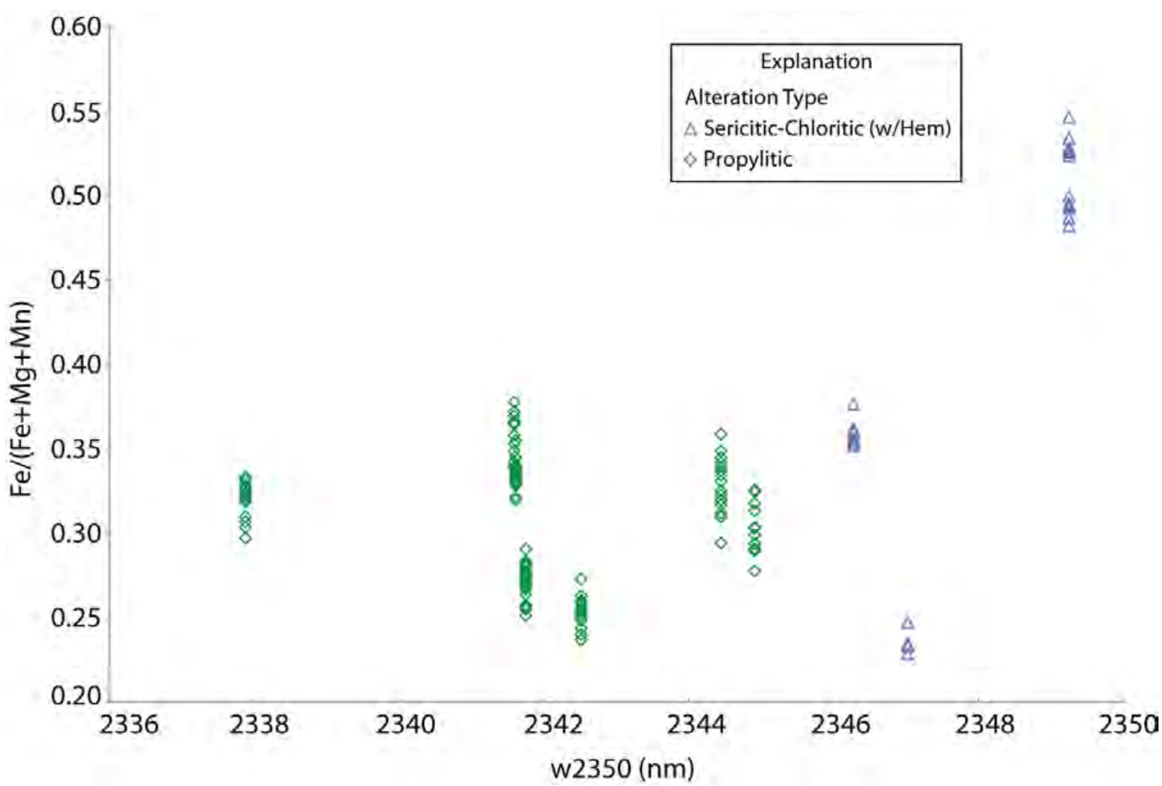

Figure 2.16. Mg/(Mg+Mn+Fe) plotted versus the wavelength of the 2350 feature (w2350) in chlorite spectra. There is no correlation (R^2=0.04) between the wavelength of the 2350 nm feature and atomic Mg/(Mg+Mn+Fe).

2.5.2 Conditions of Formation

Hydrothermal alteration assemblages identified in this study are plotted on the phase diagram for the K2O-Al2O3-SiO2-KCl-HCl-H2O system at 1.0 kb pressure with quartz present (Figure 2.17). Assemblages are plotted according to key alteration minerals in the system (Table 2.4) and, using this diagram, approximate temperatures and

pH ($mKCl+K^+/mHCl+H^+$) conditions of formation are estimated (Figure 2.17). The inferences regarding formation conditions presented below are intentionally broad since they are based on only the stability of minerals containing both potassium and aluminum. There are many other factors that influence the stability of alteration minerals not considered here including changes in pressure and fluid geochemistry.

Based on the occurrence of pyrophyllite and the mixed pyrophyllite-muscovite assemblages, advanced argillic alteration from the western to northwestern portion of the Blue Hill fault block likely formed at moderate temperature between 280-400 °C at low activity ratio of K^+/H^+ activity, i.e. at acidic conditions. Muscovite is stable at similar temperatures but higher K^+/H^+ values than pyrophyllite, which indicates less acidic formation conditions for sericitic alteration (Figure 2.17).

Weak sericitic alteration and sericitic-chloritic alteration where feldspar is relic may form at the same time and temperature as strong sericitic alteration with pervasive quartz-muscovite replacement but further from main fluid flow paths represented by "D" veins based on the field observations. The fluid to rock ratio is lower further from the vein allowing a higher buffering capacity by plagioclase and K-feldspar and, therefore, higher K^+/H^+ conditions (Dilles et al., 2000). The sample of sericitic-chloritic alteration without relic feldspar (YD01-13A, Appendix A) is hosted in the Artesia Lake andesite. This is a more mafic unit (~51 wt% SiO2 in Artesia Lake basalt) than the rocks of the Yerington batholith (~58 – 69 wt% SiO2) (Dilles, 1987) with higher proportions of mafic minerals more likely to alter to chlorite-muscovite mixtures by alteration by acidic fluids.

According to Reyes (1990), illite is stable 220 to 310° C. Based on the lower temperature stability of illite compared to muscovite, illitic and intermediate argillic alteration events where illite is the primary alteration mineral must represent cooler younger hydrothermal alteration events than the adjacent sericitic alteration. Illitic and intermediate argillic alteration have assemblages with illite and relict K-feldspar that plot along the border between the illite and K-feldspar stability fields (Figure 2.17). These alteration types form at a lower fluid to rock ratio (higher K^+/H^+) and occur at lower temperatures than neighboring sericitic alteration.

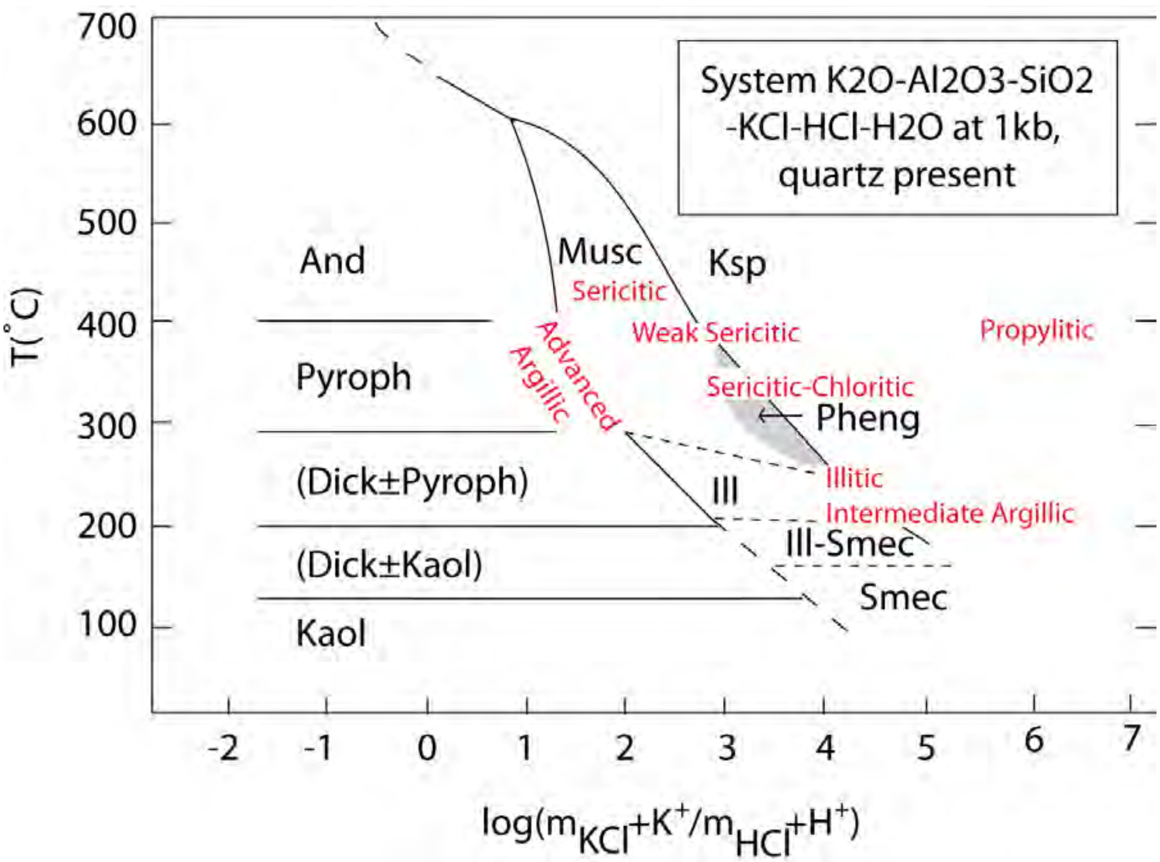

Figure 2.17. Phase diagram for the K2O-Al2O3-SiO2-KCl-HCl-H2O system at 1.0 kbar with quartz present with hydrothermal alteration assemblages plotted as a function of K^+/H^+ versus temperature (°C). Modified from Hemley (1959) and Dilles et al., (in press).

Chlorite from sericitic-chloritic alteration with hematite (muscovite-chlorite-hematite) is generally more aluminous than similarly altered samples with pyrite or chlorite from propylitic alteration (Figure 2.9). Samples from muscovite -chlorite-hematite assemblage were collected from exposures of the upper portion of the hydrothermal system above ~ 1 km paleodepth while samples with muscovite -chlorite-pyrite were collected from deeper portions of the system in drill core and western Ann-Mason, closer to the ore body and the path of the magmatic hydrothermal plume (Dilles et al., 2000). The aluminum content of chlorite increases with alteration by low pH fluids (addition of H^+) as shown by the reaction of clinochlore (Mg-rich chlorite) to sudoite (Al-rich chlorite) in equation (4).

(4) $2Mg_5Al^{vi}(Al^{iv}Si_3)O_{10}(OH)_8$ (clinochlore) + $16H^+$ <-> $Mg_2Al_3^{vi}(Al^{iv}Si_3)O_{10}(OH)_8$ (sudoite) + SiO_2 + $8Mg^{2+}$ + $12H_2O$

Chlorites with higher aluminum contents from the muscovite-chlorite-hematite assemblage likely formed by interaction of late-stage lower temperature and lower pH fluids of similar composition but higher pH do the presence of phengitic muscovite that formed nearby sericitic alteration. This is further evidence for a magmatic-hydrothermal origin for sericite-chlorite-hematite alteration as proposed in Dilles et al. (2000) and Lipske (2002). The lower Al content of samples from sericitic-chloritic alteration with pyrite may be related to their position relative to the ore body and the pathway of magmatic-hydrothermal fluids. The presence of phengitic muscovite and pyrite in these samples suggest they were also formed by interaction with magmatically-derived fluids but the lower Al content suggests these fluids were higher temperature and, therefore, slightly higher pH. This may relate to the relative position of these samples since fluids closer to the ore body would be higher temperature.

2.5.3 Mapping of pH gradients using SWIR

White mica and chlorite mineral compositions become more aluminous through alteration with acidic fluids (addition of H^+) also shown in Figure 2.17 where the proportion of Al in the mineral structure increases with decreasing K^+/H^+ ratios and as illustrated by the reaction of phengitic muscovite to muscovite (5):

(5) $2K(Fe,Mg)_{0.5}Al_{1.5}{}^{vi}Al_{0.5}{}^{iv}Si_{3.5}O_{10}(OH)_2$ (phengitic muscovite) + 8H+ + Al_2O_3 <-> $2KAl_2{}^{vi}Al^{iv}Si_3O_{10}(OH)_2$ (muscovite) + $(Fe,Mg)^{2+}$ + SiO_2 + $5H_2O$

Results from this study demonstrate SWIR spectroscopy can be used to identify changes in the total Al (apfu) content of muscovite, which correlates to increasing Fe+Mg+Mn (apfu) through to the Tschermak substitution, using the wavelength of the 2200 nm feature. Since aluminum content can be related to the pH of formation fluids,

SWIR spectroscopy can be used to map fluid pH gradients in rocks from sericitic alteration (muscovite-bearing assemblages).

2.6 Conclusion

Muscovite, illite, paragonite, pyrophyllite and chlorite from the Yerington district, Nevada were analyzed for major element compositions using EMPA and compared to corresponding SWIR spectra to determine if SWIR spectroscopy can be used to map compositional variations in hydrothermal white mica and chlorite. Results show the increase in the wavelength of the Al-OH absorption band at ~2200 nm in muscovite and illite attributed to the Tschermak substitution and a decrease in the wavelength of the Al-OH absorption band to values below 2193 nm caused by the presence of paragonite. Although illite has been previously identified by a deep H_2O absorption at ~1900 nm, our study finds this feature is not unique to illite and >50% of samples with muscovite also have a similar feature. Since neither illite nor muscovite contain structural water, the deep absorption at ca. 1900 nm seen in the SWIR spectra likely indicates the presence another clay mineral, such a smectite or montmorillonite. Chlorite compositional variations could not be identified in short wave infrared spectra of rocks and were likely obscured by coexisting highly reflective clays and micas. The results of this demonstrate SWIR spectroscopy can be used to identify fluid pH gradients in rocks from sericitic alteration (muscovite-bearing assemblages) by using the wavelength of the 2200 nm feature to detect increases in the aluminum content of micas caused by alteration with acidic fluids (addition of H^+). This study strengthens work done by previous researchers (e.g. Duke, 1994; Yang et al., 2000) and may assist field geologists using SWIR spectroscopy in identifying zoned hydrothermal alteration, which, in combination with other exploration techniques, can be used as a vector for ore deposit exploration.

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Chapter 3: Trace metal zonation at the Ann-Mason porphyry copper deposit, Nevada

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3.1 Abstract

Trace metal zonation patterns in wall-rock alteration related to the formation of porphyry-copper (Cu) deposits have been used in ore exploration for almost a century. Due to recent advances in analytical technology, concentrations of less abundant trace metals (e.g. Te, Se, Bi) can be easily detected at levels below crustal abundance (<0.1 ppm) and subtle changes in wall-rock chemistry can now be mapped.

In order to verify trace metal gradients measured in altered rock are related to ore fluids, mineral hosts must be determined. Trace metal concentrations in altered rock from exposures surrounding the Ann-Mason porphyry-Cu deposit in the Yerington district, Nevada are measured using inductively coupled plasma-mass spectrometry and atomic emission spectroscopy (ICP-MS/AES) with 4-acid digest. Results are compared to trace element contents of hydrothermal white mica, illite and chlorite determined by laser ablation-inductively coupled plasma-mass spectrometry (LA-ICP-MS). This is an ideal location for this study since the vertical and lateral position relative to the ore center is easily constrained as the Yerington district has been tilted ~90°W by Basin and Range extension exposing a cross-section through a porphyry-Cu deposit from the volcanic surface environment to 7 km paleodepth.

Cu, Mo, Te, Se, Bi, Sb, As, W, Sn, Li and Tl are enriched rocks from the zone of potassic, sericitic and shallow-level advanced argillic alteration that represents the near-vertical pathway of magmatic fluid from the ore zone (3.5 km depth) to the paleosurface.

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Of these elements, W, Sn and Tl enrichment can be attributed, at least partially, to increased concentrations in muscovite and illite. Li enrichment can be attributed to increased concentrations in chlorite and differences in wall-rock lithology above 1 km depth. Zn, Mn, Co, Ni, V and Sc are depleted in altered rock above the ore zone and redistributed by circulating sedimentary brines to distal alteration zones as verified by gradients in chlorite chemistry. Chlorite compositions from propylitic alteration confirm this gradient is related to hydrothermal alteration by non-magmatic fluids. Chalcophile elements Mo, Te, Se, Bi are rarely detected in white mica/illite or chlorite in concentrations greater than 1 ppm and more than 50% of analyses are commonly below detection.

3.2 Introduction

Ore deposit exploration has used the zonation of metals (e.g. Cu, Au, Ag) and closely associated trace elements (e.g. Hg, As) in buck rock chemistry to vector for mineralization since the 1920s. Emmons (1918) identified a common sequence of metal distribution observed in hydrothermal ore deposits that was refined by Guilbert and Park (1986) where Mo, W and Sn precipitate at deeper levels followed the sequence by Cu, As, Sb, Zn, Pb, Mn, Ag moving toward the paleosurface and volatile metals Au, Sb and Hg enriched in the shallow epithermal environment. This model applies best at deposits where metals are transported in the hydrothermal fluid as metal-sulfide complexes. If transport occurs by metal-chloride complexes, as in porphyry-type deposits (Holland, 1972), then the sequence Cu, Ag, Pb, Zn is often observed (Barnes, 1975). Although these patterns apply as broad generalizations, factors controlling metal precipitation are complex and vary depending on many factors including the metal content and composition of fluids, fluid temperature and redox conditions.

In the last decade, analytical techniques for measuring trace element concentrations in bulk rock samples have dramatically improved prompting researchers to reexamine classic zonation patterns. Until recently, the measurement of trace metal contents in rock chemistry at quantities below, or near, crustal abundances of elements that occur in low concentrations in the earth's crust (Te, Se, Bi, Sb, Tl <0.5 ppm) was nearly impossible and prohibitively expensive on a district scale. Due to advances in

analytical technology, most trace elements can now be detected at concentrations less than crustal abundances (<0.1 ppm) allowing for study of subtle changes in wall-rock trace metal chemistry associated with ore deposit formation.

In order to correctly interpret changes in the trace element chemistry of rocks that have seen multiple alteration events, mineral hosts must be determined. Hydrothermal phyllosilicates such as biotite, muscovite and chlorite are common alteration minerals associated with porphyry-type deposits and essential for identifying and interpreting alteration. Biotite is a common igneous mineral and hydrobiotite is an index mineral for potassic alteration that often occurs in zones of Cu(Mo)-sulfide enrichment. Due to its association with ore, variations in the trace metal contents (Cu, Zn, Ni, Co, Pb) of biotite have been studied at several porphyry copper centers (Ford, 1978) including the Ann-Mason porphyry-Cu(Mo) deposit at Yerington, Nevada (Dilles and Proffett, 1995). Trace element analyses of chlorite and white mica from the literature on porphyry-type deposits are rare (Ford, 1978) and there are no publications focused solely on the trace element contents of these minerals.

Trace element contents of muscovite and chlorite have been studied in other ore systems. Variations in the trace element composition of muscovite have been determined in research on rare earth element mineralization in pegmatites (Van Lichtervelde et al., 2008) and chlorite and interstratified clay minerals have been identified as trace metal hosts in the regolith of massive sulfide deposits (Le Gleuher et al., 2008).

This research contributes to the existing literature by studying gradients in the trace metal chemistry in altered rocks and common hydrothermal alteration minerals (muscovite, illite and chlorite) to link trace element anomalies to alteration formed by the magmatic plume surrounding the Ann-Mason porphyry-Cu(Mo) deposit in the Yerington district, Nevada. The Yerington district, Nevada, provides a natural laboratory to examine trace element zonation associated with porphyry-Cu systems since Basin and Range extension and tilting has exposed a crustal cross section from ~ 1 - 7 km paleodepth (Proffett, 1977a; Proffett and Dilles, 1984). In addition, wall-rock alteration and the hydrothermal system at have been well-studied (Dilles, 1987; Dilles and Einaudi, 1992; Dilles et al., 2000) and a model for the origin and sequence of observed alteration assemblages has been developed based on field mapping, petrology, fluid inclusion data

and stable isotopes (Dilles et al., 2000). The purpose of this study is to (1) determine and compare the distribution of trace elements in altered rock and minerals (muscovite, illite, pyrophyllite and chlorite) from samples surrounding the Ann-Mason porphyry-Cu(Mo) deposit, (2) evaluate contributions from muscovite and chlorite to rock chemistry using a simplified mass balance method and (3) compare trace elements gradients in rock and minerals to confirm anomalous elements in rock chemistry track the magmatic plume. This study is an extension of preliminary research conducted by coauthors John Dilles[1], Richard Tosdal[2] and Scott Halley[3].

3.3 Methods

3.3.1 Sample collection

568 surface samples and 50 drill core chip samples were collected from exposures surrounding the Ann-Mason porphyry-Cu(Mo) deposit and from drill core provided by PacMag Metals Ltd and the Anaconda Mining Company. Thirty-four surface samples and five drill core samples were selected for mineral analysis. Sample collection focused on alteration throughout the exposed crustal column. Samples were described and assigned lithologies in the field based on Proffett and Dilles (1984) and Dilles (1987). All samples are igneous rocks of similar composition (SiO_2 = 54 to 68 wt.%) taken from the Middle Jurassic Yerington batholith and closely related Artesia Lake and Fulstone Spring Volcanics (Dilles, 1987).

Sample locations are plotted on a simplified geology map in Figure 3.1 and on a reconstructed Jurassic cross-section in Figure 3.2. Data from previous reconstructions by Proffett (1977), Proffett and Dilles, (1984) and Dilles et al., (2000) were used to restore sample locations to their relative position in the Jurassic cross section (Figure 3.2). In summary, each fault block was tilted 70-90° W and sample coordinates in the Blue Hill fault block were adjusted according to approximate movement along the Singatse fault. The section in the Buckskin Range was shortened to ~ 1 km thick and placed arbitrarily on top of the Blue Hill fault block.

Samples were collected from the Ann-Mason, Blue Hill and Buckskin Range fault blocks. The Ann-Mason fault block hosts exposures representing ~1 to 5 km paleodepth and most of the Ann-Mason Cu(Mo) deposit. At Ann-Mason deposit, the ore zone is

concealed beneath 200 m of Tertiary volcanic rocks that lie in the hanging wall of the Singatse Fault and can only be sampled in drill core. Exposures in the Blue Hill fault block represent ~0.5 to 3 km paleodepth. Samples from the Buckskin Range represent the shallow epithermal environment from the surface to 1 km paleodepth. It is important to note that exposures in the Buckskin Range are 1-2 km further west than the predicted location of the epithermal environment related to the Ann-Mason porphyry center and must represent the upper ~ 1km of a different porphyry center in the Yerington district.

The same mineral sample set was analyzed by electron microprobe analysis (EMPA) and LA-ICP-MS. Sample locations for mineral analyses are shown as yellow circles on the simplified geologic map in Figure 3.1 and in the reconstructed paleocross-section in Figure 3.2. In some cases, one mineral grain was used for both analytical techniques. In other examples, due to the fine-grain nature of the hydrothermal micas, different mineral grains from the same hand sample were analyzed by each technique. Samples with white mica were selected from D-vein selvages (Gustafson and Hunt, 1976) in the zone of sericitic alteration that records the pathway of magmatic fluids. Samples with chlorite were selected from sericitic-chloritic alteration (chl-musc-hem and chl-musc-py assemblages) attributed to alteration by fluids with a magmatic component. Distal to the ore zone, chlorite samples were selected from propylitic alteration with assemblages where actinolite and epidote are added.

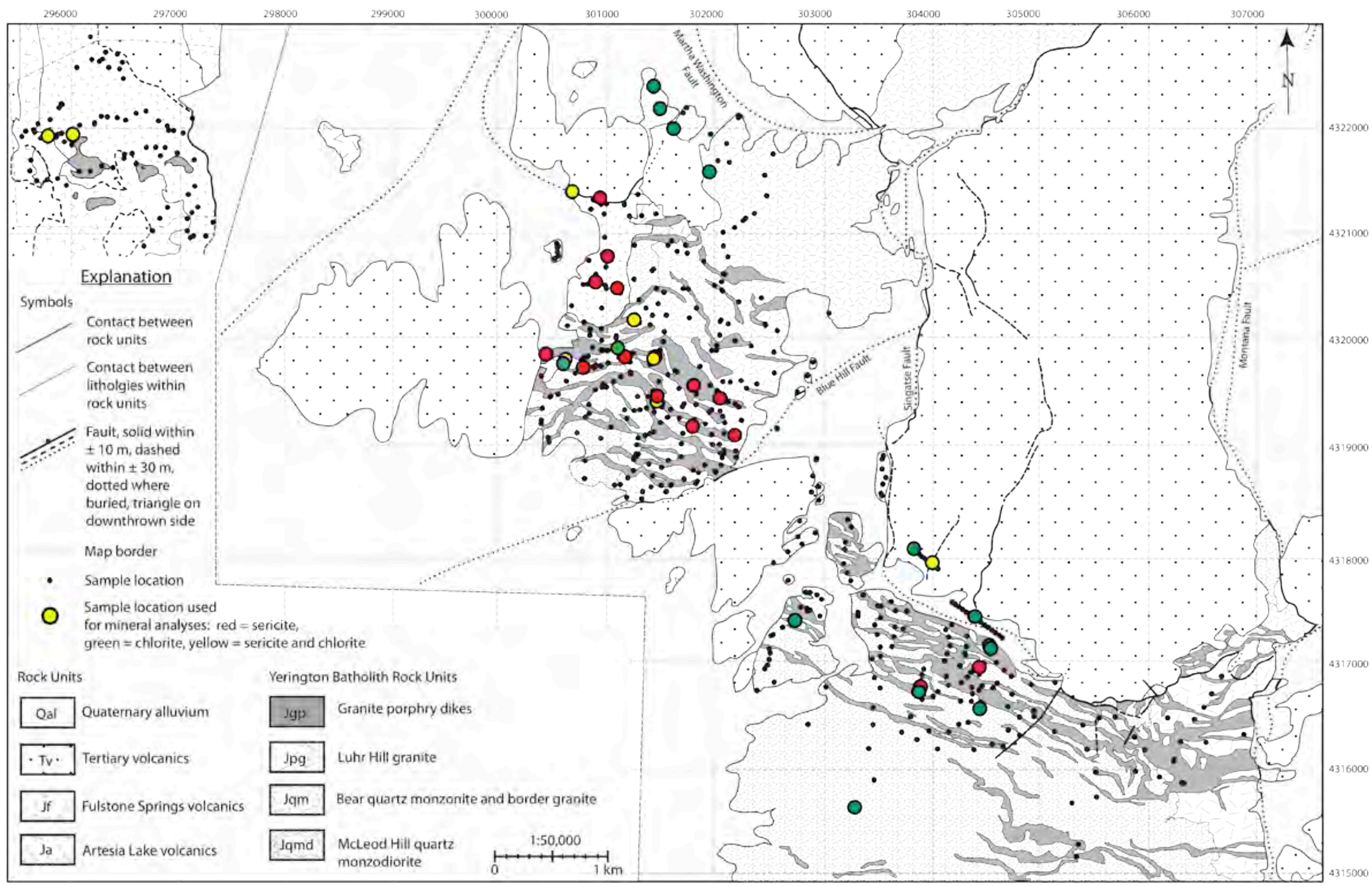

Figure 3.1. Simplified geologic map of the study area modified from Proffett and Dilles (1984) and Lipske (2002). Sample locations are shown as circles, colored circles represent samples used in mineral analyses.

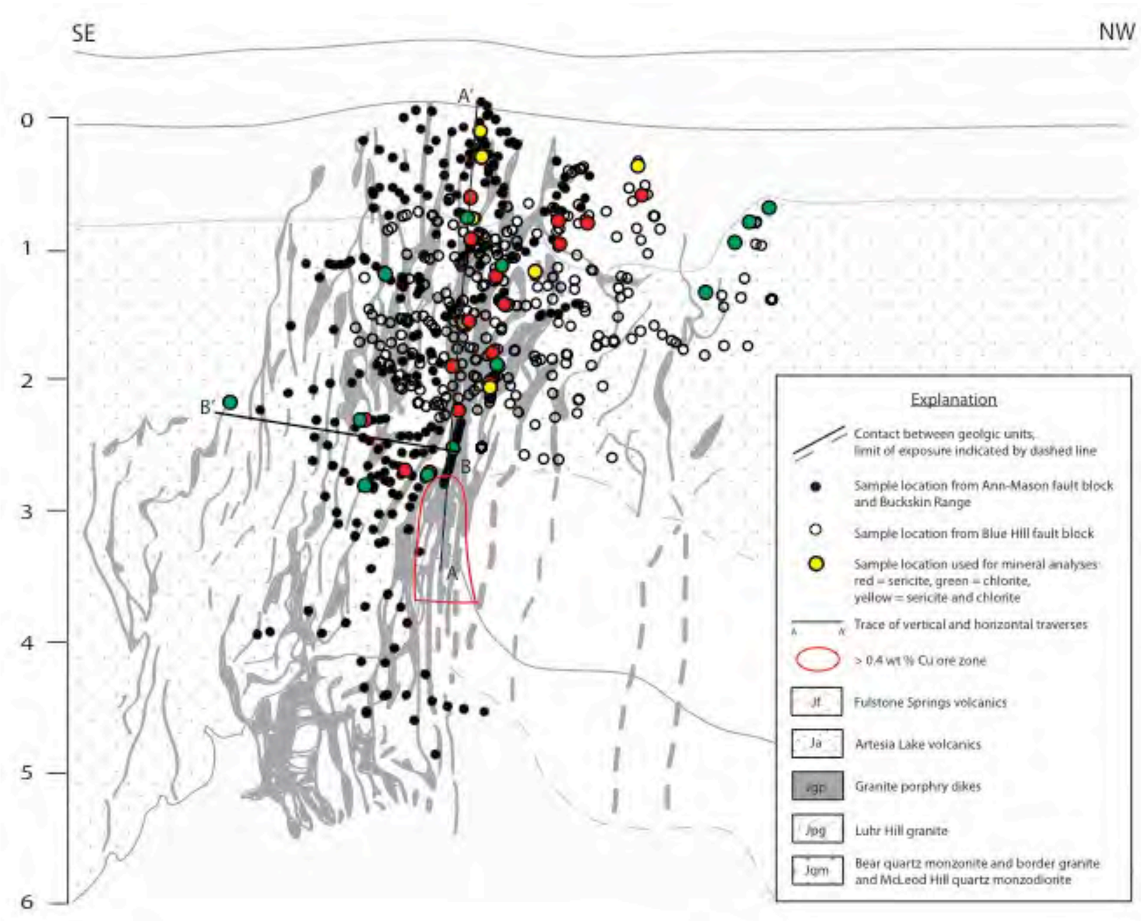

Figure 3.2. Cartoon Jurassic cross-section through Ann-Mason porphyry-Cu deposit modified from Dilles (1987). Sample locations (black and hollow circles) are shifted to approximate position within the paleo cross-section. Colored circles represent samples used in mineral analyses. The red outlined region represents boundary of 0.4 wt % Cu sulfide ore. Lines from A to A' and B to B' show the trace of horizontal and vertical traverses used to describe mineral trace element spatial gradients.

3.3.2 Inductively coupled plasma-mass spectrometry and inductively coupled plasma-atomic emission spectroscopy

Major and trace element concentrations of 48 elements (9 major, 39 trace) for 38 whole rock samples were determined using inductively coupled plasma-mass spectrometry (ICP-MS) and inductively coupled plasma-atomic emission spectroscopy (ICP-AES) with 4-acid digest (ME-MS61) by ALS Chemex in Reno, Nevada. This

method analyzes the resulting solution by both methods for major, minor and selected trace elements and ICP-MS for remaining trace elements. This technique was used because it returns data for a wide range of trace elements at low limits of detection including Li (< 0.2 ppm), which was of interest in this study. Zirconium concentrations are low (average 32 ppm) in this data set compared to previously published data from Dilles (1987) using x-ray fluorescence (average 143 ppm) suggesting 4-acid digest is incomplete for zircon and other refractory phases and elements such are hafnium (Hf) are underreported in this data set. Lower and upper limits of detection for ICP-MS/AES can be found in Appendix B.

3.3.3 Laser ablation-inductively coupled plasma-mass spectrometry

Trace element concentrations in minerals were obtained at the W.M. Keck Collaboratory for Plasma Spectrometry at Oregon State University using A NewWave DUV 193 nm ArF Excimer laser on a VG PQ ExCell quadrupole ICP-MS. A summary of the analytical technique is described in Kent et al. (2004). Trace element concentrations of 26 elements were measured for 39 samples. 10-15 mineral grains were analyzed per sample for a total of 370 analyses. An 100 μm diameter laser spot sizes with 40-45 s dwell time was used for analysis. NIST-610, NIST-612 and GSE-1G served as calibration standards and GSD-1G as a secondary standard. Data were processed using in-house LaserTRAM software. Silica was used as an internal standard in combination with measured SiO_2 wt % from electron microprobe analysis (EMPA). Details on limits of detection can found in Appendix B.

During LA-ICP-MS analysis and data reduction, each LA-ICP-MS spot was assessed for data quality and assigned a value of 0, 1.0, 1.5, 2.0, 2.5 or 3.0, depending on the likelihood of contamination by inclusions and the overall data quality as determined by the number of elements with low standard errors (<5%). Only analyses with a data quality value ! 2.0 are presented in this study. A total of 181 LA-ICP-MS analyses with data quality ! 2.0 were obtained for white mica/illite. A total of 186 LA-ICP-MS analyses with data quality ! 2.0 were obtained for chlorite. All data can be found in Appendix F. For data presentation and interpretation, one isotope was selected as

representative for elements where more than one isotope was measured (Cu^{63}, Zn^{66}, Ba^{138}, Se^{77}).

3.3.4 Contribution of inclusions to LA-ICP-MS data

To achieve low limits of detection, a 100 μm beam diameter was used in LA-ICP-MS analysis, which is often larger than the grain size of hydrothermal white mica and chlorite (~10-100 μm) in the sample. In addition, the conversion of biotite to muscovite or chlorite results in the formation of rutile, which often occurs as inclusions with, or interstitial between, fine-grained mica sheaves. Other fine-grained accessory minerals such as apatite, zircon, tourmaline, hematite, goethite or jarosite also occur as inclusions within hydrothermal phyllosilicates. Elements common in inclusions are Ti (rutile), P (apatite), Cu (chalcopyrite or glassy limonite), other chalcophile elements which substitute into sulfides and will be present in Fe oxide or hydroxide weathering products such as Mo, As, Se, Bi and Pb. Data were screened for spikes in these elements to identify analytical spots that may contain more than one mineral. This data was given a low data quality value (<2.0) and discarded. Ti, P and B were plotted against all trace elements to identify correlations with inclusion phases such as rutile, apatite and tourmaline that could confuse data interpretation. No correlations were found.

In order to account for the effect of inclusions and heterogeneities in the remaining data, high and low outliers were determined by Turkey or box and whisker plots and excluded from the results. Turkey outliers are determined by calculating the median and dividing data into quartiles. High and low outliers are identified as analyses that are greater than 1.5 times the value of the upper or lower quartile range. For Ti and Mn, which were analyzed by both EMPA and LA-ICP-MS and present in micas in concentrations greater than the limit of detection in EMPA (~100 ppm), data collected by each method were plotted against each other to show the effects of inclusions on the data (Figure 3.3). For Mn, the EMPA and LA-ICP-MS give similar concentrations and most points lie near a 1:1 line despite the difference in spatial resolution. For Ti, ~30% of analyses from LA-ICP-MS lie off the 1:1 and indicate contamination by rutile inclusions. Using ioGAS™ software, Ti data were selected that lie near or below the 1:1 line and only these data are included in the results section.

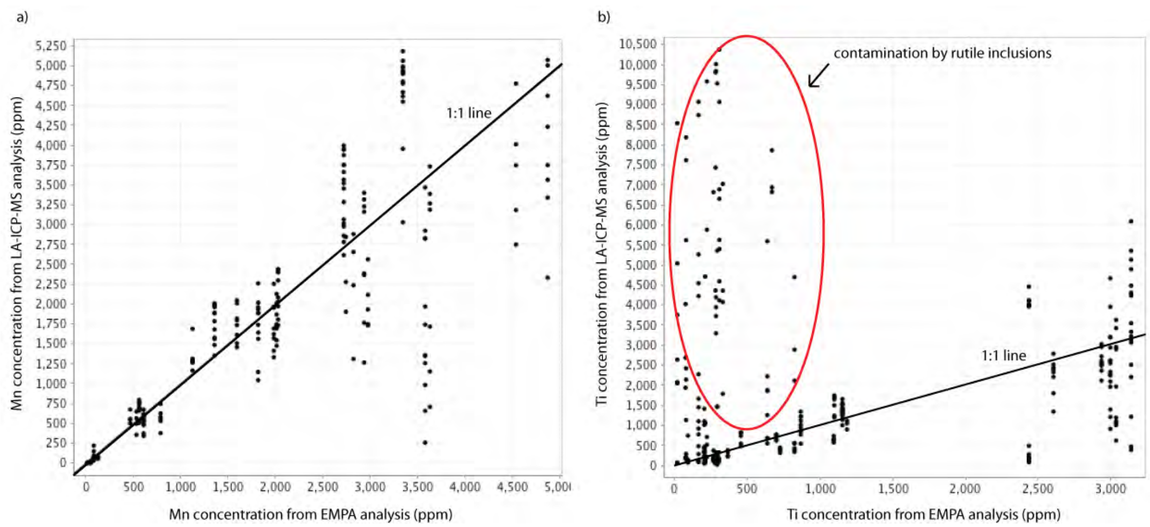

Figure 3.3. Mineral trace element concentrations (ppm) determined by LA-ICP-MS plotted against average concentrations determined by EMPA: a) Mn, b) Ti.

3.3.5 Estimation of alteration types using rock chemistry

Using the lithogeochemical data, samples were assigned estimated mineralogy by comparing the molar proportions of alkali, alkaline earth elements and aluminum (Figure 3.4b) in samples to molar ratios (K/Al, Na/Al, Ca/Al) of ideal mineral compositions in order to estimate general proportions of alkali and alkali-earth silicate and aluminous minerals within each sample (feldspars, sheet silicates) (Figure 3.4a). Major element oxide data and molar ratios used to divide samples can be found in Appendix X. The estimated mineralogy of a sample corresponds to a predicted hydrothermal alteration type from Chapter 2 or other published literature (Dilles and Einaudi, 1992; Lipske, 2002) and, henceforth, in this study, is referred to by alteration type. The estimated mineralogy of each sample was plotted spatially and crosschecked against published hydrothermal alteration maps of the region (Dilles and Einaudi, 1992). Petrography (Chapter 2) was also used to verify the mineralogy of classifications for samples within the mineral analysis data set. Figure 3.5 is an illustration of the positions of alteration types relative to the ore body in cartoon cross-section at the Ann-Mason deposit.

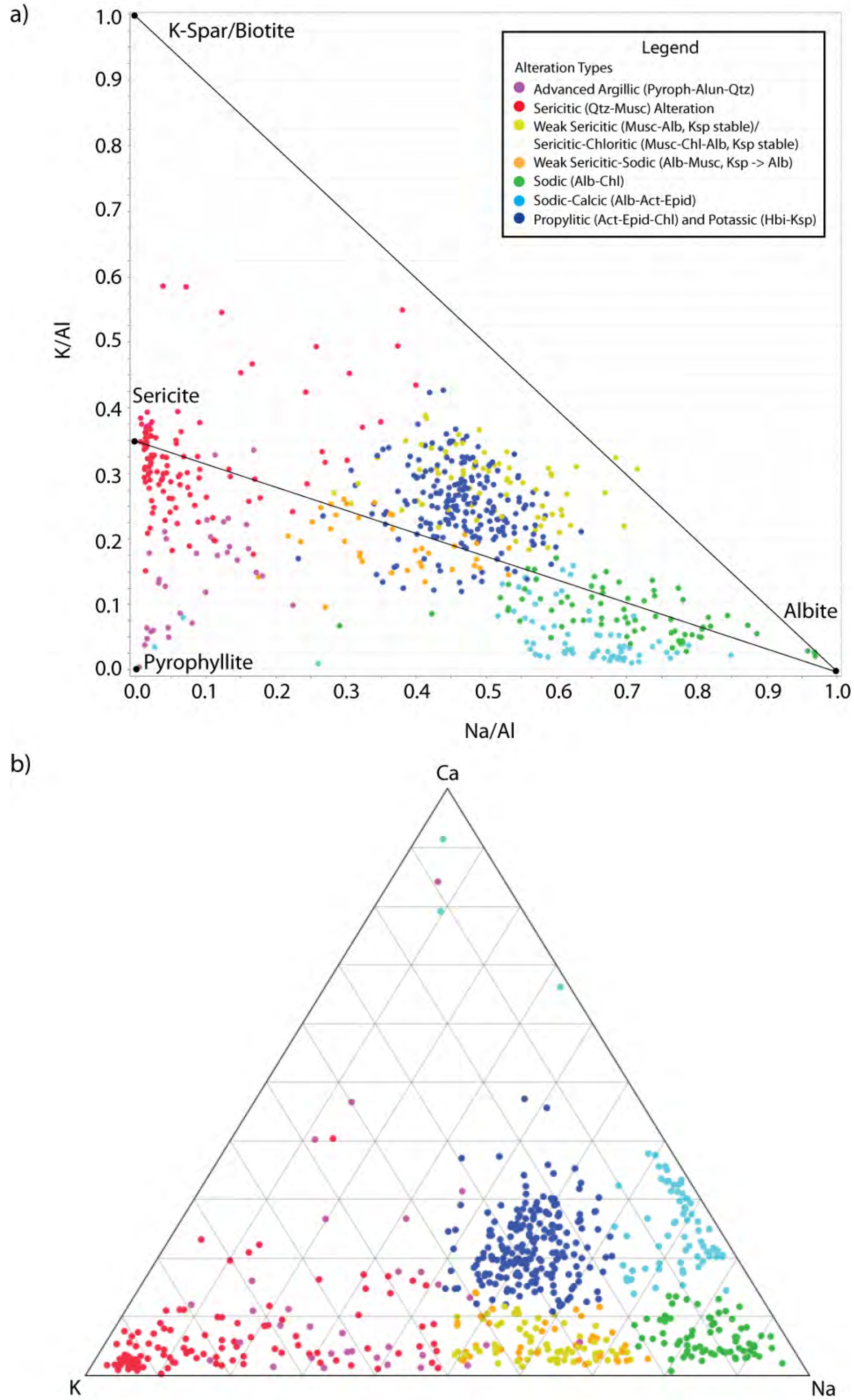

Figure 3.4. Plots used to designate alteration types. a) K/Al versus Na/Al, b) Ca-Na-K ternary diagram. Colors indicate alteration types from Chapter 2 or Dilles and Einaudi (1992).

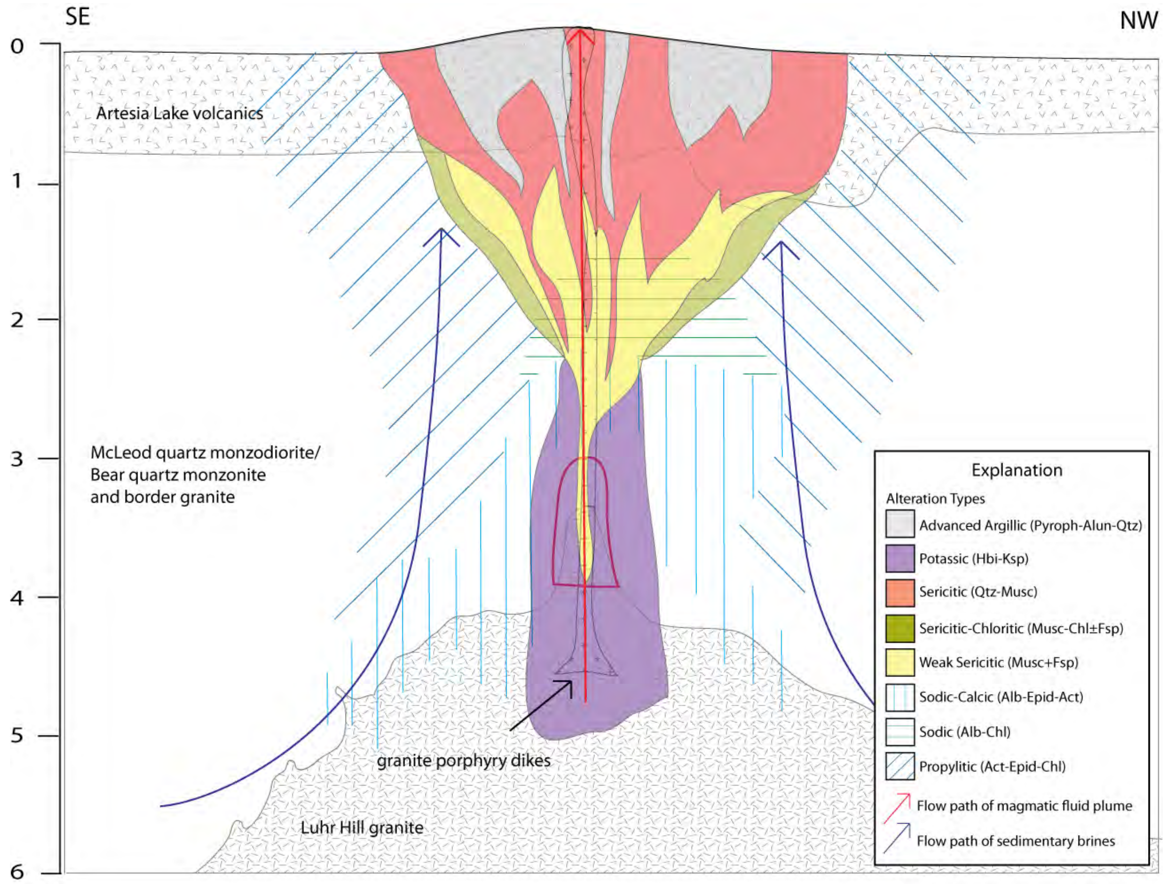

Figure 3.5. Illustration of zoned alteration types and their position relative to the ore body in a cartoon cross-section of the Ann-Mason deposit, Yerington, Nevada (modified from Dilles et al., 2000). Colors and patterns indicate alteration types and arrow show general flow path of magmatic and non-magmatic fluids. The ore zone is outlined in red.

3.4 Results

3.4.1 Rock composition

A summary of data from ICP-MS/AES analyses organized by alteration type is presented in Table 3.1. Rock chemistry of different alteration types are compared using probability plots. To create a probability plot, the assay value of an element (X) is plotted against the N score for each sample. The N score is defined as:

$$N = (concentration\text{-}mean)/standard\ deviation$$

Each alteration type plots as a line on the probability plot, which allows the viewer to see, at a glance, in which alteration type each trace element is most abundant (Figure 3.6).

In the following discussion, elements are considered anomalous if their concentration in the top 10% of values (90-100%) is more than 500% greater than unaltered rocks and enriched if values are 200-500% greater (Table 3.2). To compare altered to fresh rock, average unaltered rock values from units of the Yerington batholith were compiled from previously published data (Dilles, 1987; Dilles and Proffett, 1995).

Trace elements are divided into three groups: (1) chalcophile elements (Cu, Mo, As, Sb, Se, Te, Bi), (2) lithophile elements (Li, Rb, Sr, Cs, Ba, Sn, W, Tl) and (3) transition metals (Cr, Mn, Co, Zn, Sc, V, Ti). These are modified groupings based on general geochemical behavior of elements within this system as determined by rock and mineral analyses and combine the affinities defined by Goldschmidt (1937) and groupings of elements within the periodic table. For example, Zn and Cu are both a transition metals and chalcophile. During the crystallization of the Yerington batholith, however, Zn behaves compatibly and is incorporated into amphibole and biotite. Cu behaves incompatibly and is enriched in the melt, incorporated in the magmatic volatile phase and, eventually, deposited by the ore fluid in sulfide minerals (bornite and chalcopyrite) (Dilles and Proffett, 1995). It is the chalcophile behavior that defines the distribution of Cu and, since Zn behaves as a lithophile, its distribution is better described by its position in the periodic table as a transition metal. These modified groupings will not apply to all porphyry-Cu environments since the geochemical affinity of an element varies depending on a number of variables including the initial melt composition, depth of magma emplacement, volatile content of the magma and the composition of the magmatic volatile phase including fluid salinity and composition, redox conditions and pH.

Table 3.1. Summary of rock trace element concentration by ICP-MS/AES organized by alteration type*.

	Advanced Argillic (Pyroph-Qtz-Alun) (n=33)			Sericitic (Qtz-Musc) (n=111)			Weak Sericitic (Musc-Ab-Ksp) (n=70)			Sodic Alteration (Ab-Chl) (n=71)			Sodic-Calcic (Act-Epid-Ab) (n=71)			Propylitic (Act-Epid-Chl) (n=104)		
Element	Median	Mean	!	Median	Mean	!	Median	Mean	Std Dev	Median	Mean	!	Median	Mean	!	Median	Mean	!
As	6.4	11	13	6.20	11	16	6	9	10	4.5	6.3	7.9	1.7	3.7	8.3	3.0	3.3	2.4
Ba	260	434	437	930	1155	998	1760	1788	632	320	460	359	240	350	357	1310	1401	442
Bi	0.49	0.85	1.0	0.53	0.99	1.4	0.38	0.51	0.78	0.24	0.35	0.34	0.11	0.31	0.77	0.12	0.18	0.17
Co	0.50	2.0	5.5	0.90	2.5	4.9	1.3	2.8	3.9	1.3	3.8	4.8	2.2	4.0	3.7	6.0	7.9	5.7
Cr	22	27	18	10	18	17	9.0	11	10	10	12	9.6	12	13	4.6	12	14	11
Cs	0.16	0.28	0.33	1.4	1.6	1.1	1.0	1.2	0.59	0.68	0.77	0.58	0.52	0.63	0.44	0.90	1.13	0.77
Cu	16	21	17	36	202	787	59	319	1036	85	596	1241	81	1968	11291	75	162	258
Li	1.0	6.9	16	5.4	7.1	7.8	3.6	4.7	3.6	4.7	5.6	3.8	3.3	4.0	2.6	4.3	4.5	2.3
Mn	22	50	95	51	96	120	60	97	97	53	92	111	113	181	250	233	327	220
Mo	2.3	4.3	5.5	2.4	4.7	6.7	2.2	6.4	20	1.7	4.3	11	0.97	4.6	14	1.2	1.4	0.8
Na	0.44	0.46	0.36	0.23	0.46	0.56	3.0	3.1	0.52	4.15	4.12	0.70	3.9	3.7	0.86	3.0	3.0	0.3
Ni	1.7	3.4	5.5	2.4	5.8	10	2.8	4.9	4.86	5.8	8.1	11	8.4	9.2	6.5	11	12	9.4
P	1280	1492	1174	550	679	503	455	578	442	570	640	334	830	992	783	905	1040	390
Pb	26	38	34	5.4	12	30	5.4	5.9	3.4	3.2	4.8	7.4	4.1	4.5	2.6	6.2	7.1	3.8
Rb	7.6	19	22	111	111	42	86	86	21	30	32	14	9.3	17	16	69	72	25
Sb	2.7	3.90	3.2	1.9	3.3	3.4	0.80	1.3	2.1	0.60	1.1	2.0	0.57	1.1	1.9	0.93	1.3	1.1
Sc	4.4	5.09	3.8	6.8	7.1	4.0	4.8	5.4	2.2	5.0	5.6	2.8	6.0	7.6	7.3	6.6	7.8	3.1
Se	3.0	3.36	2.1	2.0	3.4	3.1	2.0	2.6	1.8	2.0	2.6	2.8	2.0	2.8	8.3	1.0	1.4	0.7
Sn	1.0	1.08	0.53	1.1	1.5	1.4	0.70	0.96	0.65	0.90	1.0	0.69	1.0	1.2	0.64	1.0	1.0	0.4
Sr	1050	1199	914	128	307	469	477	501	208	398	466	240	1030	1033	253	939	932	188
Te	0.41	0.53	0.45	0.31	0.75	1.10	0.20	0.47	1.1	0.19	0.29	0.41	0.06	0.14	0.31	0.05	0.06	0.14
Th	5.8	6.9	5.0	7.4	8.6	5.9	7.8	9.6	6.7	7.2	8.2	4.1	8.4	10	7.9	7.8	9.3	4.2
Ti	0.27	0.30	0.14	0.23	0.24	0.10	0.22	0.23	0.08	0.20	0.21	0.09	0.26	0.27	0.10	0.29	0.32	0.09
Tl	0.29	0.55	0.81	0.74	1.1	1.3	0.46	0.48	0.19	0.13	0.17	0.17	0.07	0.09	0.07	0.28	0.30	0.11
U	1.9	2.2	2.0	2.8	3.2	1.9	3.7	4.1	2.2	2.9	3.3	1.8	2.9	4.6	12	3.2	3.5	1.2
V	116	119	62	89	92	50	50	60	32	53	61	34	56	69	44	67	84	37
W	1.1	1.5	1.5	1.8	2.5	2.4	1.60	2.21	1.86	2.0	2.9	2.4	0.80	2.5	5.7	0.95	1.3	2.1
Zn	1.0	11	49	6.0	13	20	7.00	11.4	12.0	5.0	13	24	10	14	12	18	28	24

* Data from weak sericitic-sodic (Musc-Ab) and potassic (Hbi-Ksp) alteration available in Appendix X.

Table 3.2**.** Summary of rock trace element concentrations from ICP-MS/AES divided into lower 50%, 50-75%, 75-90%, 90-95% and 95-100% of values and compared to unaltered rocks from the Yerington batholith and average crustal abundance.

Element (ppm)	Percentage of values					Range of average content in Yerington batholith rocks **	Average crustal abundance ***
	<50%	50 – 75%	75 – 90%	90 – 95%	95 – 100%		
Cu	<100	100-200	200-1000	1000-5000	5000-15000	5-80	55
Mo	<2	2-3	3-7	7-20	20-900	<0.2-1.1	1.5
As	<4	4-7	7-14	14-20	20-150	0.3-0.9	1.8
Ba	<1000	1000-1500	1500-2000	2000-2400	2400-6000	1300-1750	425
Bi	<0.2	0.2-0.5	0.5-1.0	1.0-1.8	1.8-10	0.02-0.1	0.17
Co	<2	2-6	6-12	12-15	15-50	7-55	25
Cs	<1	1.0-1.5	1.5-2.0	2.0-2.8	2.8-6.6	1.5-4.2	3
Li*	<5	5-7	7-10	10-15	15-80	3.2-5.7	20
Mn	<100	100-200	200-400	400-500	500-1500	230-650	1000
Pb	<5	5-8	8-15	15-30	30-900	1.5-7	12.5
Rb	<70	70-95	95-120	120-140	140-230	80-150	90
Sb	<1	1-2	2-4	4-6	6-18	0.1-0.4	0.2
Sc	<6	6-9	9-12	12-13	13-65	5-9	22
Se	<1	1-2	2-4	4-6	6-70	<0.05-3.0	0.05
Sn*	<0.9	0.9-1.3	1.3-1.8	1.8-2.5	2.5-10	0.6-1.2	2
Sr	<725	725-1000	1000-1150	1150-1300	1300-4500	700-1200	375
Te*	<0.1	0.1-0.4	0.4-0.8	0.8-1.3	1.3-8.8	<0.05	0.002
Ti	<2500	2500-3200	3200-4300	4300-4650	4650-6600	3300-5150	4400
Tl*	<0.3	0.3-0.5	0.5-0.9	0.9-1.5	1.5-12	0.2-0.3	0.45
V	<60	60-110	110-135	135-160	160-450	50-140	135
W*	<1	1-2	2-5	5-7	7-200	0.2-1.2	1.5
Zn	<10	10-20	20-40	40-65	65-280	18-40	70

*Data was unavailable for these elements and concentrations from least-altered rock in current data set were used.
**Compositions from unaltered rocks of the Yerington batholith compiled from Dilles (1987) and Dilles and Proffett (1995).
***Average crustal abundances (1:1 basalt to rhyolite) from Taylor (1964).

3.4.1.1 Trace elements gradients in altered rocks

3.4.1.1.1 Chalcophile elements

Copper is enriched in altered rock relative to fresh rock in drill holes that sample the > 0.2 wt % Cu ore zone and enriched in potassic alteration above the ore zone from 2.5 – 2.0 km paleodepth (Figure 3.6a/3.7a). Above ~ 2.0 km, Cu is not enriched in altered rocks with the exception sporadic anomalous Cu values. Anomalous Mo values (> 2 ppm) form a broad halo with significant enrichment in rocks from drill core that samples the ore zone and nearby exposures (~2.3 to 2.5 km) and erratic anomalous values extending from ~ 1 to 2.5 km paleodepth and laterally ~ 1 km (Figure 3.6b/3.7b). Te, Bi,

Sb, and As are anomalous in rocks from sericitic and advanced argillic alteration and Se is enriched compared to fresh rock compositions. Se forms a long narrow anomaly (>4 ppm) from just below the paleosurface (~0.3 km) to 2.5 km depth that runs along the axis of magmatic hydrothermal fluid flow and is enriched in drill core that samples the ore zone. Te has a slightly broader enrichment pattern (> 0.8 ppm) than Se that begins above the ore zone at ~2.5 km and extends to just below the paleosurface (~0.3 km). Te is barely anomalous in drill core (>0.1 ppm). Anomalous Bi values (> 1 ppm) are concentrated from ~ 2 km paleodepth, above the zone of potassic alteration, to the paleosurface. The Sb anomaly (>4 ppm) forms a broad lateral halo at shallow depths from ~ 1km to the paleosurface. As enrichment forms a funnel-shaped anomaly (>14 ppm) that extends from the ore zone at ~ 3.5 km depth to 0.5 km from the paleosurface. As is not enriched in samples from drill core. Pb is enriched in advanced argillic alteration only and forms a weak anomaly (>28 ppm) near the paleosurface above ~ 1km.

3.4.1.1.2 Lithophile elements

Neither Cs nor Rb is enriched in altered rocks compared to fresh rock values and Rb is depleted in rocks affected by sodic or sodic-calcic alteration. Ba forms a broad, weak enrichment (>2400 ppm) from ~ 1 – 2 km paleodepth (Figure 3.6c) in sericitic alteration and weak sericitic alteration where K-feldspar is preserved. Li is relatively evenly distributed throughout alteration types but slightly higher in sericitic alteration. Anomalous Li values (>15 ppm) are concentrated in the upper ~ 1 km and form a broad halo at shallow depths (Figure 3.6d/3.7c). Tl and Sn are enriched in samples from sericitic alteration relative to fresh rock values. Tl enrichment (>1.5 ppm) is virtually restricted to rocks from the Artesia Lake volcanic unit and is focused in laterally broad but vertically narrow zone from ~ 0.8 km to the paleosurface (Figure 3.6e/3.7d). Sn enrichment (>2.5 ppm) is relatively weak (2x average fresh rock) and forms a cross-shaped anomaly centered on the porphyry dike swarm and narrow (<0.5 km) from the ore zone to the paleosurface and with a broader zone (~ 1 km wide) from ~1.5 to 2.0 km depth. Anomalous W values (> 5 ppm) occur in rocks affected by sericitic and sodic alteration and form a wedge-shaped anomaly above the ore body from ~2 – 2.5 km with sporadic anomalous values at ~ 1km paleodepth (Figure 3.6f/3.7e). Sr is depleted in

rocks from sericitic and advanced argillic alteration and weakly enriched (>1500 ppm) in zones of sodic-calcic alteration from ~ 2.5 – 4 km paleodepth compared to fresh rock values (~ 1000 ppm).

3.4.1.1.3 Transition metals

Zn, Mn, Ni, Co and Sc are depleted from the ore zone and the surrounding region of hydrothermal alteration and are most abundant in the least altered rocks (Figure 3.6g/3.7f). V is also depleted in altered rocks but appears in anomalous values (>200 ppm) near the paleosurface above ~ 1km. Ti is relatively immobile with highest concentrations of Ti in the least-altered rocks and Ti depletion in zones of sodic alteration.

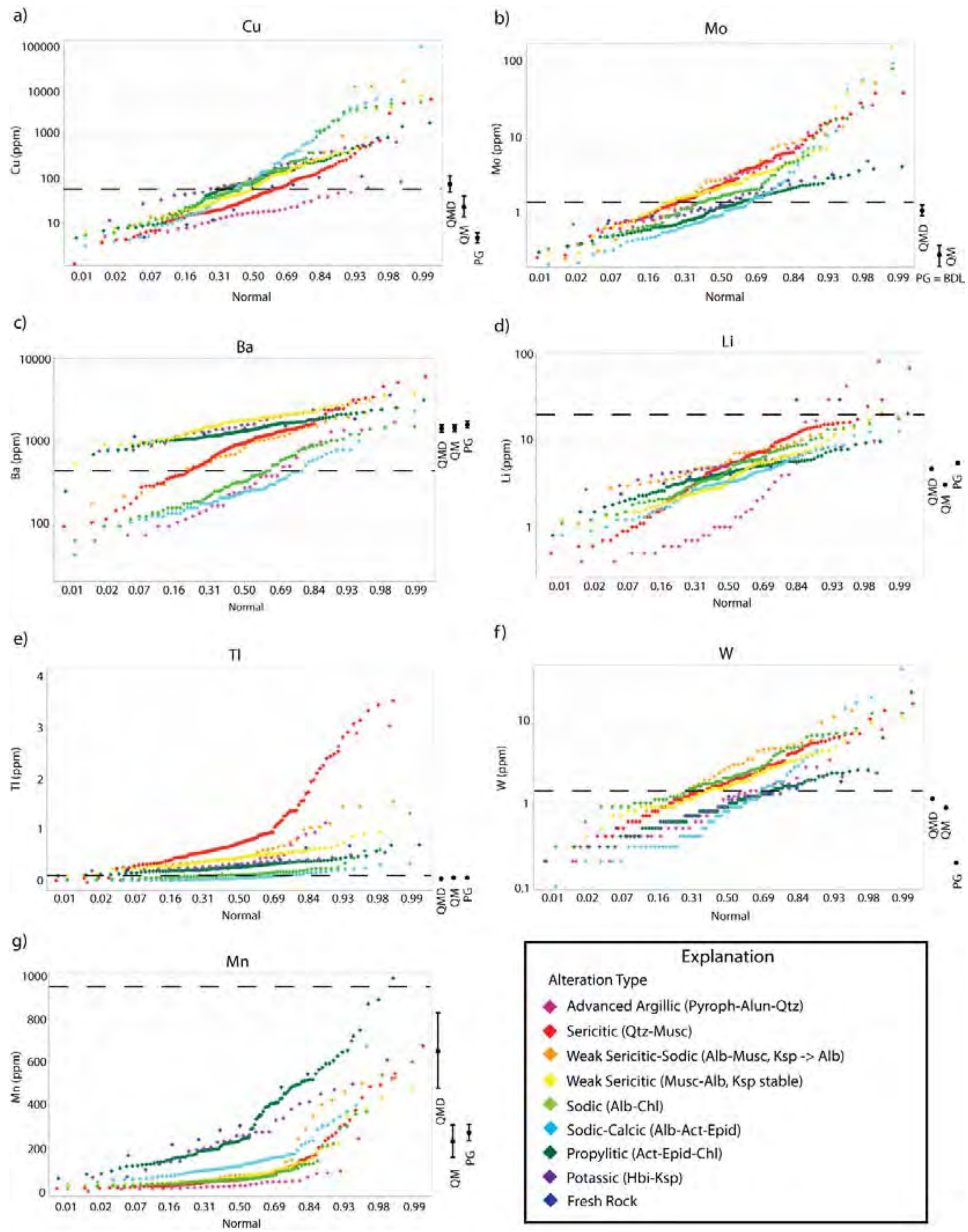

Figure 3.6. Probability plots of trace element concentrations (ppm) from lithogeochemistry for selected elements: a) Cu, b) Mo, c) Mn, d) Tl, e) W, f) Li and g) Ba. Colors represent alteration types. Dashed line is the average crystal abundance (Taylor, 1964). On the right side of each plot, mean (dot) and standard deviation (error bars) from unaltered McLeod quartz monzodiorite (QMD), Bear quartz monzonite (QM) and Luhr Hill granite (GP) samples are shown for reference.

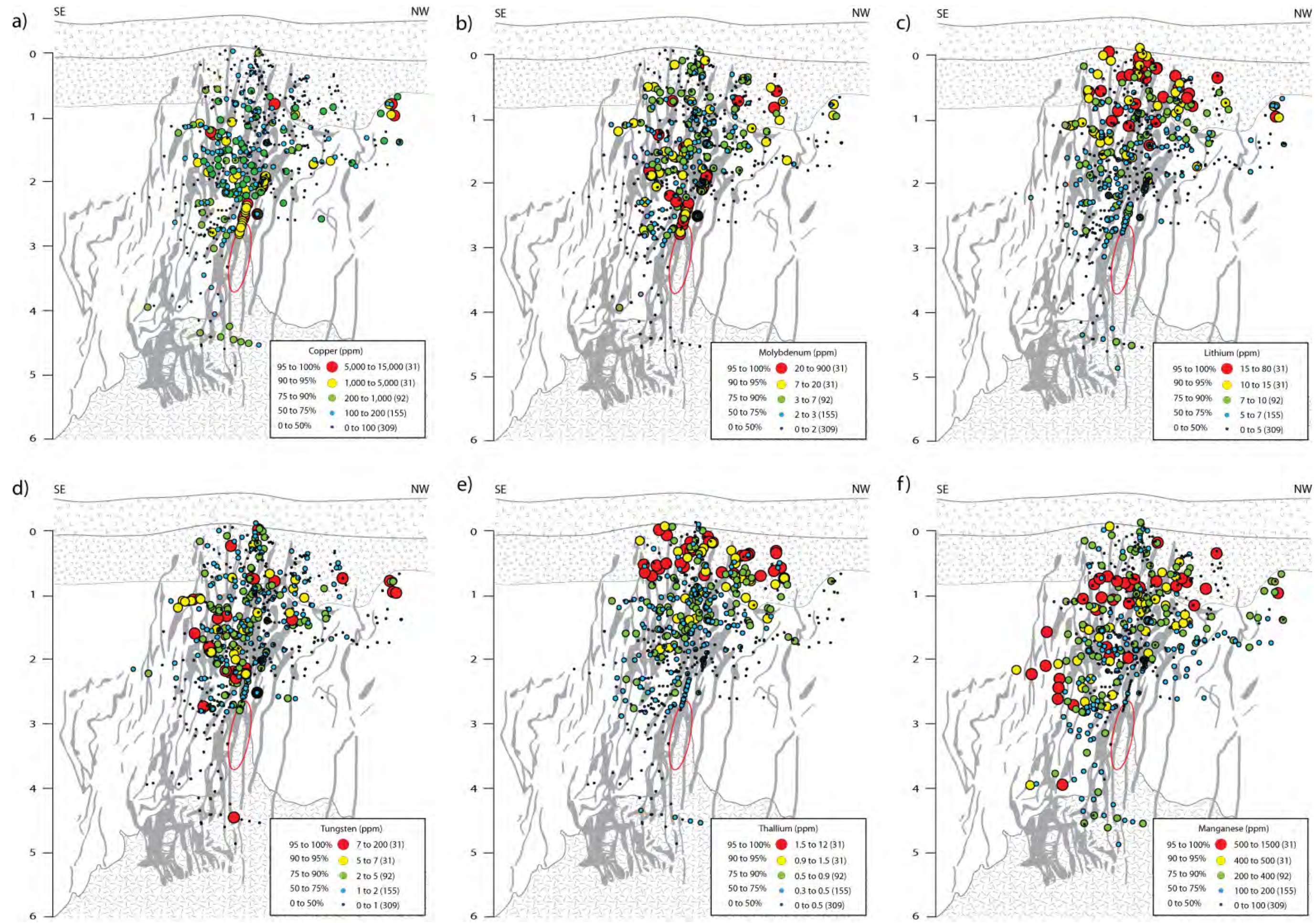

Figure 3.7. Trace element gradients in rock chemistry presented on cartoon Jurassic paleo-cross section (Figure 3.2) where each circle represents a sample and the size and color represents the relative concentration of the specified element (ppm) as shown by the scale on the right: a) Cu, b) Mo, c) W, d) Mn, e) Li, f) Tl.

Table 3.3. Summary of trace element concentrations in analyzed minerals by LA-ICP-MS.

	Chlorite (n=168)			Muscovite and Illite (n=149)			Muscovite-Paragonite (n=20)			Pyrophyllite (n=11)		
Element	Median	Mean	!	Median	Mean	!	Median	Mean	!	Median	Mean	!
Li	48	47	13	7.4	7.9	3.5	15	15	10	1.4	1.9	1.6
B	2.0	2.5	1.5	47	52	33	27	27	4.4	8.7	7.3	3.2
P*	44	65	51	105	151	121	81	81	25	797	784	350
Sc	3.4	5.0	3.9	10	13	8.9	2.6	2.6	0.93	5.3	4.9	1.4
Ti	144	284	611	1268	1616	1200	46	143	139	18	52	65
V	154	208	134	197	220	149	81	94	32	117	111	14
Cr	32	43	37	16	29	29	32	32	20	7.3	7.5	1.2
Mn	1932	2175	1313	38	51	43	0.92	2.0	1.9	6.1	6.3	3.4
Co	21	31	27	0.47	0.58	0.41	0.14	0.14	0.08	0.21	0.26	0.16
Cu	235	276	251	4.5	10.0	11	2.4	2.3	1.0	6.1	8.2	6.3
Zn	218	215	93	7.8	8.7	5.2	1.7	1.9	0.95	3.2	4.2	2.8
As**	0.55	0.71	0.49	0.52	0.57	0.37	1.5	1.5	0.82	4.6	4.6	2.7
Se***	0.73	0.85	0.48	1.4	1.53	0.81	1.1	1.1	0.34	1.9	2.3	0.95
Rb	3.0	8.2	11	287	286	107	41.23	86	71	0.97	0.88	0.37
Sr	4.9	11	14	28	35	23	1.2	2.6	3.9	85	78	75
Mo**	0.17	0.21	0.16	0.30	0.66	0.76	0.95	4.1	7.1	14	16	15
Sn*	0.27	0.33	0.21	3.2	4.7	4.2	0.81	0.87	0.39	0.25	0.26	0.12
Te***	0.10	0.16	0.17	0.23	0.31	0.25	0.32	0.51	0.52	0.30	0.47	0.43
Cs	0.56	0.81	0.81	2.4	2.4	1.1	0.68	0.97	0.72	0.15	0.18	0.06
Ba	7.0	20	29	1257	1452	1014	3.7	16	18	17	20	17
W*	0.26	0.72	1.0	1.8	2.9	2.7	0.03	0.05	0.04	0.20	0.23	0.17
Pb*	1.0	1.8	1.9	0.44	0.65	0.52	1.2	6.9	10	1.5	2.4	2.3
Bi**	0.03	0.06	0.07	0.05	0.09	0.09	0.05	0.08	0.09	0.06	0.06	0.05
Th**	0.15	0.32	0.38	0.12	0.41	0.57	BDL	BDL	BDL	3.2	4.6	4.6
U**	0.14	0.47	0.63	0.15	0.26	0.29	0.01	0.02	0.02	0.17	0.17	0.09
Tl	0.03	0.13	0.17	1.51	1.6	0.80	1.6	2.0	1.1	BDL	BDL	BDL

* 5 – 20% of analyses are below the limit of detection
** 20 – 50% of analyses are below the limit of detection
*** 50 - 90% of analyses are below the limit of detection

Table 3.4. Summary of trace element concentrations in muscovite and illite by LA-ICP-MS grouped by alteration type.

	Muscovite from sericitic alteration (n=87)			Muscovite from sericitic-chloritic alteration (n=14)			Illite from illitic alteration (n=44)			Illite from intermediate argillic alteration (n=5)		
Element	Median	Mean	!	Median	Mean	!	Median	Mean	!	Median	Mean	!
Li	7.3	7.5	2.5	6.8	7.0	4.5	7.4	8.0	3.9	16.0	17.1	2.9
B	45	53	30	44	61	48	34	47	33	67	65	3.2
P	89	128	102	37	38	6.4	201	214	118	36	38	4.9
Sc	9.0	11.1	7.2	9.0	15	12	17	18	11	11	11	0.8
Ti	2161	2105	1212	352	453	325	1073	913	522	739	682	159
V	154	182	114	238	303	263	328	279	197	278	283	31
Cr	13	20	18	6.9	14	19	43	46	33	7.5	8.5	1.5
Mn	28	28	18	82	108	54	57	52	28	160	165	25
Co**	0.5	0.49	0.30	3.2	2.2	1.5	0.36	0.50	0.31	1.2	1.3	0.3
Cu	4.3	9.1	9.3	1.7	1.6	0.77	5.1	12	12	17	43	52
Zn	7.1	7.0	4.3	15	21	13	8.9	9.3	4.5	24	29	12
As***	0.6	1.0	1.6	0.30	4.2	9.1	0.63	2.3	4.5	0.40	0.36	0.18
Se***	1.5	1.4	0.70	4.0	18	33	1.3	1.6	0.83	1.2	1.2	0.0
Rb	283	271	64	266	221	93	242	254	139	539	550	35
Sr	29	29	12	28	127	165	27	50	48	51	49	22
Mo***	0.24	0.66	0.80	0.14	0.14	0.001	0.35	0.71	0.74	0.35	0.35	0.20
Sn	4.1	6.3	5.1	1.1	1.7	1.3	2.8	3.5	2.6	1.1	1.1	0.1
Te***	0.27	0.32	0.22	NaN	NaN	NaN	0.21	0.31	0.33	0.10	0.10	0.0
Cs	2.3	2.2	1.0	3.2	3.6	1.8	2.3	2.1	0.91	5.0	4.9	0.5
Ba	1301	1533	1150	1543	1634	1196	1302	1360	765	649	645	19
W	2.3	3.9	3.3	0.81	1.1	1.2	1.5	1.7	1.2	3.1	3.1	0.33
Pb**	0.39	0.46	0.28	1.2	1.2	0.51	0.41	0.64	0.55	0.43	0.52	0.32
Bi***	0.05	0.08	0.07	0.08	0.08	0.05	0.06	0.12	0.16	0.02	0.02	0.01
Th***	0.15	0.38	0.47	0.08	0.36	0.59	0.11	0.82	1.3	BDL	BDL	BDL
U**	0.16	0.29	0.29	0.05	0.07	0.04	0.18	0.56	0.73	0.11	0.20	0.18
Tl	1.5	1.6	0.5	1.2	1.8	1.3	1.2	1.5	1.1	2.9	3.0	0.16

* 5 – 20% of analyses are below the limit of detection
** 20 – 50% of analyses are below the limit of detection
*** 50 - 90% of analyses are below the limit of detection

Table 3.5. Summary of trace element concentrations in chlorite grouped by alteration type.

	Chlorite from propylitic alteration (n=109)			Chlorite from intermediate argillic alteration (n=16)			Chlorite from sericitic-chloritic alteration (n=44)		
Element	Median	Mean	!	Median	Mean	!	Median	Mean	!
Li	45	45	12	53	53	11	56	68	30
B	1.8	1.9	0.90	2.7	4.6	3.6	3.9	4.1	2.5
P*	37	54	40	96	292	383	62	89	75
Sc*	2.6	3.5	2.1	2.2	2.4	0.78	7.0	14	15
Ti**	113	180	242	170	202	141	159	425	1018
V	217	225	127	91	97	22	142	256	232
Cr	31	37	27	54	250	373	66	65	45
Mn	2030	2443	1325	1960	2168	743	1274	1401	887
Co	20	25	20	15	12	8.2	23	33	29
Cu	222	234	186	461	439	106	37	331	549
Zn	207	208	83	251	260	45	245	329	232
As**	0.54	0.80	0.91	1.1	1.6	1.1	1.1	3.3	5.2
Se***	0.71	0.82	0.46	0.79	0.89	0.26	0.71	0.91	0.60
Rb	2.5	7.0	11	20	20	2.4	3.1	11	15
Sr	9.7	23	32	7.0	7.9	4.2	3.4	5.6	5.8
Mo**	0.13	0.14	0.09	0.34	0.45	0.32	0.24	0.32	0.21
Sn**	0.25	0.28	0.14	0.26	0.27	0.14	0.34	0.47	0.44
Te***	0.10	0.10	0.05	2.5	2.8	1.0	0.26	0.37	0.32
Cs	0.41	0.70	0.77	0.86	1.1	0.90	1.1	1.2	0.93
Ba	5.3	29	46	8.5	9.0	5.0	11	24	38
W*	0.25	0.69	0.98	0.22	0.46	0.55	0.29	0.79	1.0
Pb	1.7	2.5	2.3	0.56	0.70	0.56	0.60	0.89	0.93
Bi**	0.03	0.07	0.07	0.02	0.04	0.05	0.03	0.08	0.11
Th**	0.14	0.31	0.37	0.05	0.49	0.88	0.29	0.39	0.35
U**	0.14	0.47	0.62	0.12	0.54	0.75	0.52	1.5	2.0
Tl	0.03	0.15	0.21	0.11	0.11	0.02	0.09	0.15	0.16

* 5 – 20% of analyses are below the limit of detection
** 20 – 50% of analyses are below the limit of detection
*** 50 - 90% of analyses are below the limit of detection

3.4.2 Mineral composition

Generally, muscovite and illite are enriched in lithophile elements while chlorites are enriched in transition metals (Figure 3.8). Chalcophile elements are rarely detected in concentrations greater than 1 ppm. Mineral trace element concentrations are presented in Table 3.3-3.5.

3.4.2.1 Muscovite and illite

The most abundant trace elements in muscovite and illite are Ti (average 1600 ppm), Ba (average 1450 ppm), Rb (average 300 ppm) and V (average 200 ppm) and P (average 100 ppm) (Table 3.3). B, Mn, Sr and Cr are detected in muscovite and illite at 20-50 ppm, Sc, Cu, Zn and Li at 5 – 20 ppm and Sn, W, Cs, Tl and Se at concentrations between 1 – 5 ppm. Co, As, Mo, Te, Pb, Bi, Th and U are detected at less than 1 ppm levels and are often below detection limits. Compared to chlorite and pyrophyllite, muscovite and illite have the highest concentrations of lithophile elements (B, Rb, Ba, Cs, Tl, W, Sn) and the transition metals Sc and Ti (Figure 3.8/3.10).

Muscovite and illite occur in several alteration assemblages and trace element contents vary slightly by alteration type (Table 3.4). Muscovite from sericitic alteration has the highest concentrations of W, Sn and Ti (Figure 3.9a). Muscovite and illite from assemblages with chlorite have higher concentrations of Mn, Zn and V (Figure 3.9a), likely related to their higher Fe+Mg (apfu) contents described in Chapter 2.

3.4.2.2 Mixed muscovite-paragonite

Muscovite is found intergrown with paragonite in one sample from advanced argillic (musc-qtz-alun assemblage) and one from sericitic alteration (qtz-musc assemblage) (see Chap. 2 for more detail). The same set of trace elements are most abundant in the muscovite-paragonite mixture as in muscovite and illite (V, P, Ti, Rb) with the exception of Ba (average 16 ppm) and the overall concentrations are ~50 – 90% lower (Table 3.3). Pb concentrations (average 1.2 ppm) are highest in mixed muscovite-paragonite samples and, compared to other white micas, Li (average 15 ppm) is more abundant (Figure 3.8).

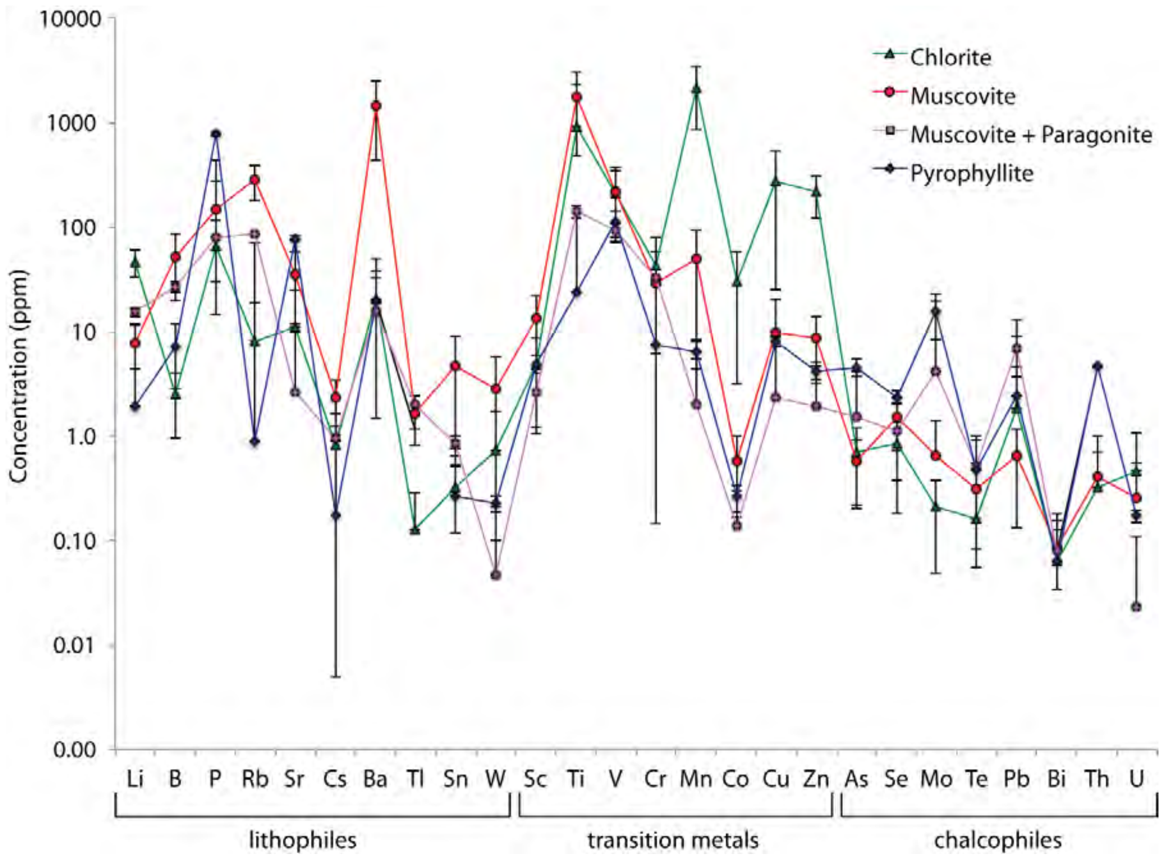

Figure 3.8. Comparison of chlorite, muscovite and illite, mixed muscovite-paragonite, pyrophyllite trace element compositions.

3.4.2.3 Pyrophyllite

Pyrophyllite from one sample of advanced argillic (pyroph-qtz assemblage) alteration was analyzed. Trace element concentrations are generally lower in pyrophyllite compared to muscovite except for P (average 780 ppm), Sr (average 78 ppm), Mo (average 16 ppm), As (average 5 ppm), Th (average 5 ppm) and Se (average 2 ppm), which are most abundant in pyrophyllite (Figure 3.8/3.10, Table 3.3).

3.4.2.4 Chlorite

The most abundant trace elements in chlorite are Mn (average 2200 ppm), Cu (average 280 ppm), Zn (average 220 ppm), V (average 210 ppm) and Ti (average 280 ppm). Trace elements in concentrations from 20-50 ppm include P, Li, Cr and Co. Overall, chlorites have the highest concentrations of Li and transition metals (Mn, Cu,

Zn, Co, Cr) (Figure 3.8/3.10, Table 3.3). A comparison of chlorite from different alteration types (Figure 3.9b and Table 3.5) shows chlorite from propylitic alteration has the highest concentrations of Sr and Pb while chlorite from sericitic-chloritic alteration, has the highest Li, Co, Sc and Zn contents. Chlorite from intermediate argillic alteration has higher P, Rb, Cr and Cu.

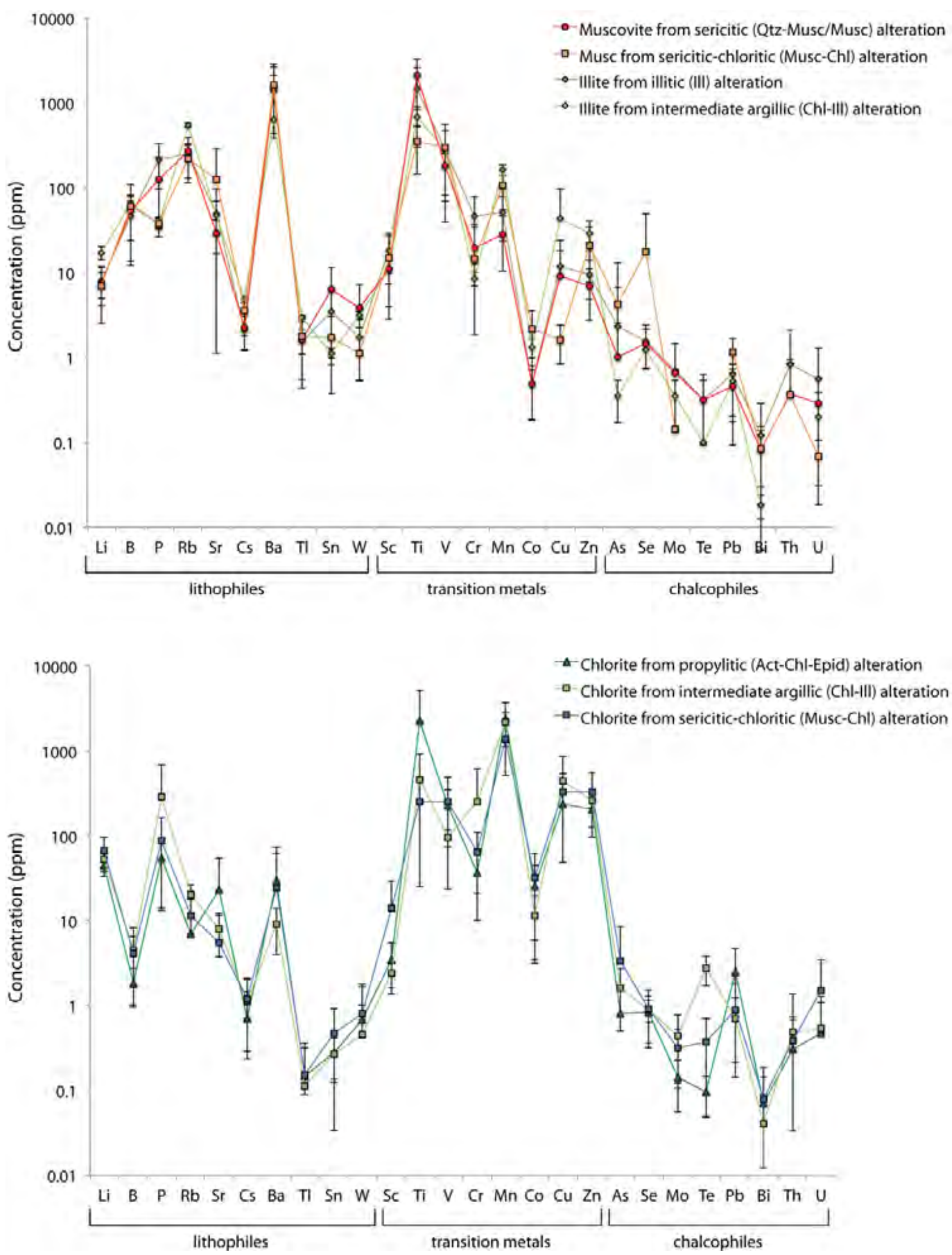

Figure 3.9. Comparison of mineral trace element compositions from different alteration assemblages: a) muscovite and illite alteration types, b) chlorite alteration types.

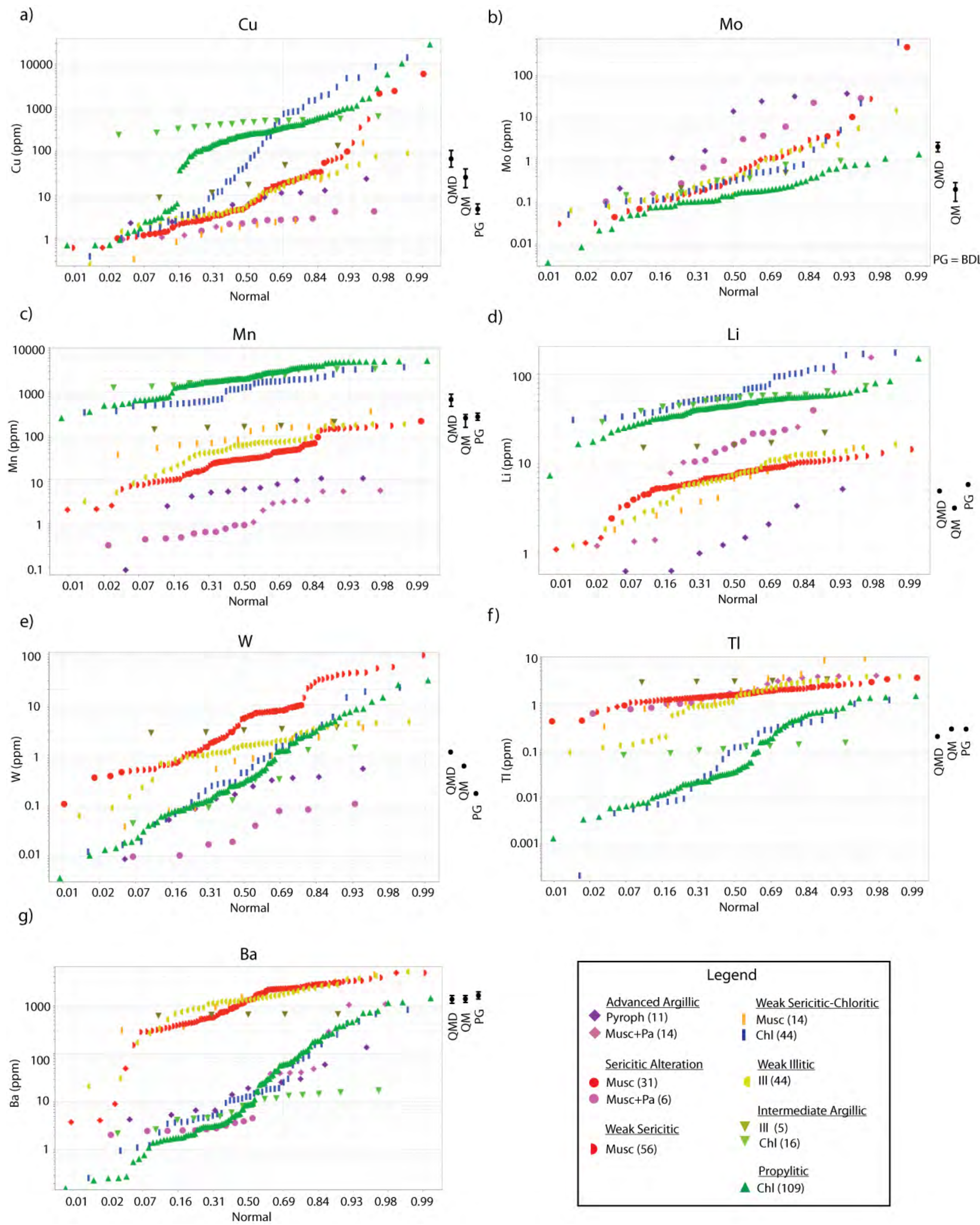

Figure 3.10. Probability plots of trace element concentrations (ppm) in micas and chlorite for selected elements: a) Cu, b) Mo, c) Mn, d) Tl, e) W, f) Li and g) Ba. Colors represent mineral type and shapes represent mineral assemblages. On the right side of each plot, mean (dot) and standard deviation (error bars) from unaltered McLeod quartz monzodiorite (QMD), Bear quartz monzonite (QM) and Luhr Hill granite (GP) samples are shown for reference.

3.4.3 Comparison between mineral and rock trace element gradients

Cu, Mo, Te, Se, Bi, Sb, W, Sn, Li and Tl occur in anomalous concentrations in altered rock from the zone of potassic, sericitic and shallow-level advanced argillic alteration that represents the near-vertical pathway or plume of magmatic-hydrothermal fluids as identified by previous geologic, rock alteration, and geochemical studies (Dilles and Einaudi, 1992; Dilles et al., 2000a; Lipske and Dilles, 2000). Of these elements, W, Sn and Tl are found in concentrations of 1-5 ppm in most muscovite/illite grains analyzed and Li is enriched in chlorite (average 50 pm). Cu is also detected in chlorites but at levels (average 280 ppm) that are too low to contribute significantly to the observed Cu anomaly in rock (>1000 ppm). Chalcophile elements Mo, Te, Se, Bi are rarely detected in white mica/illite or chlorite in concentrations greater than 1 ppm and commonly greater than 50% of analyses are below the detection limit.

Trace element gradients in altered rocks generally mimic gradients in mineral trace element compositions. Traverse plots were constructed by plotting the estimated sample depth versus the trace element content of minerals and corresponding rock analyses (Figure 3.11-3.13). Paleodepth was estimated using the relative position samples within the reconstructed cross section (Figure 3.2). Two traverses are plotted, a vertical traverse moving ~N70° W from above the ore zone at ~ 3 km depth to 0.2 km below the approximate paleosurface and a lateral traverse at ~ 2.5 km paleodepth moving ~S20° W from the ore zone to outlying exposures ~ 2 km away. The approximate trace of both traverses is shown on Figure 3.2.

3.4.3.1 Trace element gradients in muscovite and illite

Rb and Cs are detected in muscovite and illite throughout the system but do not show strong spatial gradients in mineral or rock chemistry. Ba in muscovite and illite does not have a strong spatial gradient but is slightly enriched in muscovite and illite from ~ 2.5 to 2 km and in muscovite at < 1 km paleodepth. In rock samples, Ba is enriched from 1.5 – 0.5 km paleodepth. Tl is present in muscovite and illite throughout the system but enriched in only one sample from the mineral and rock data set from the top of the section at < 0.3 km paleodepth. W and Sn are strongly enriched in muscovite

from 1.8 – 2.2 and 1.5 – 2.0 km paleodepth, respectively and corresponding rock samples reflect this pattern (Figure 3.11).

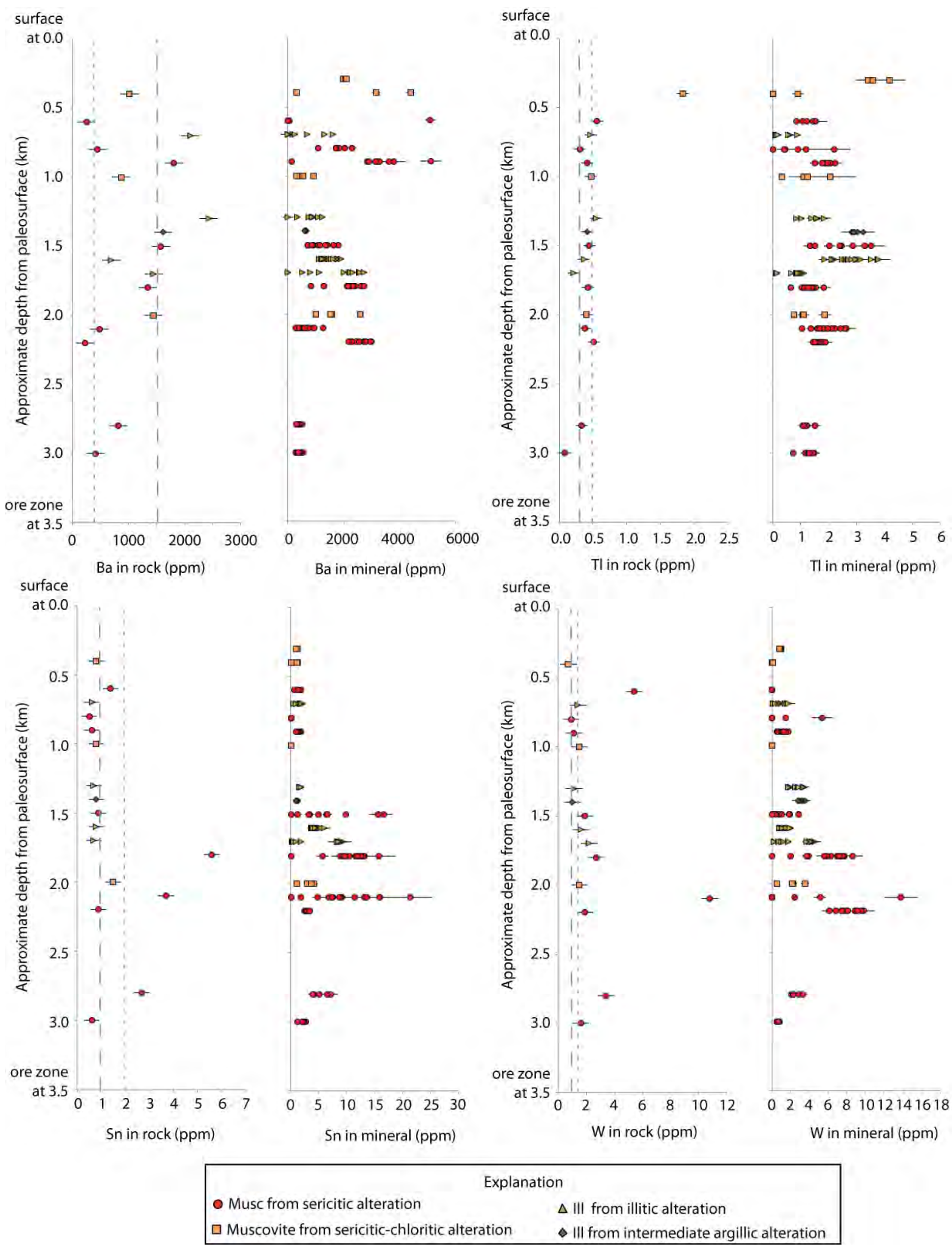

Figure 3.11. Vertical traverse plots of rock and muscovite and illite trace element contents (ppm) from ore zone at 3.5 km (A) to paleosurface (A') along the pathway of the

magmatic fluid plume (Figure 3.2). Colors and symbols represent alteration type; error bars show standard error for ICP-MS/AES and standard error including uncertainty in calibration standard from LA-ICP-MS.

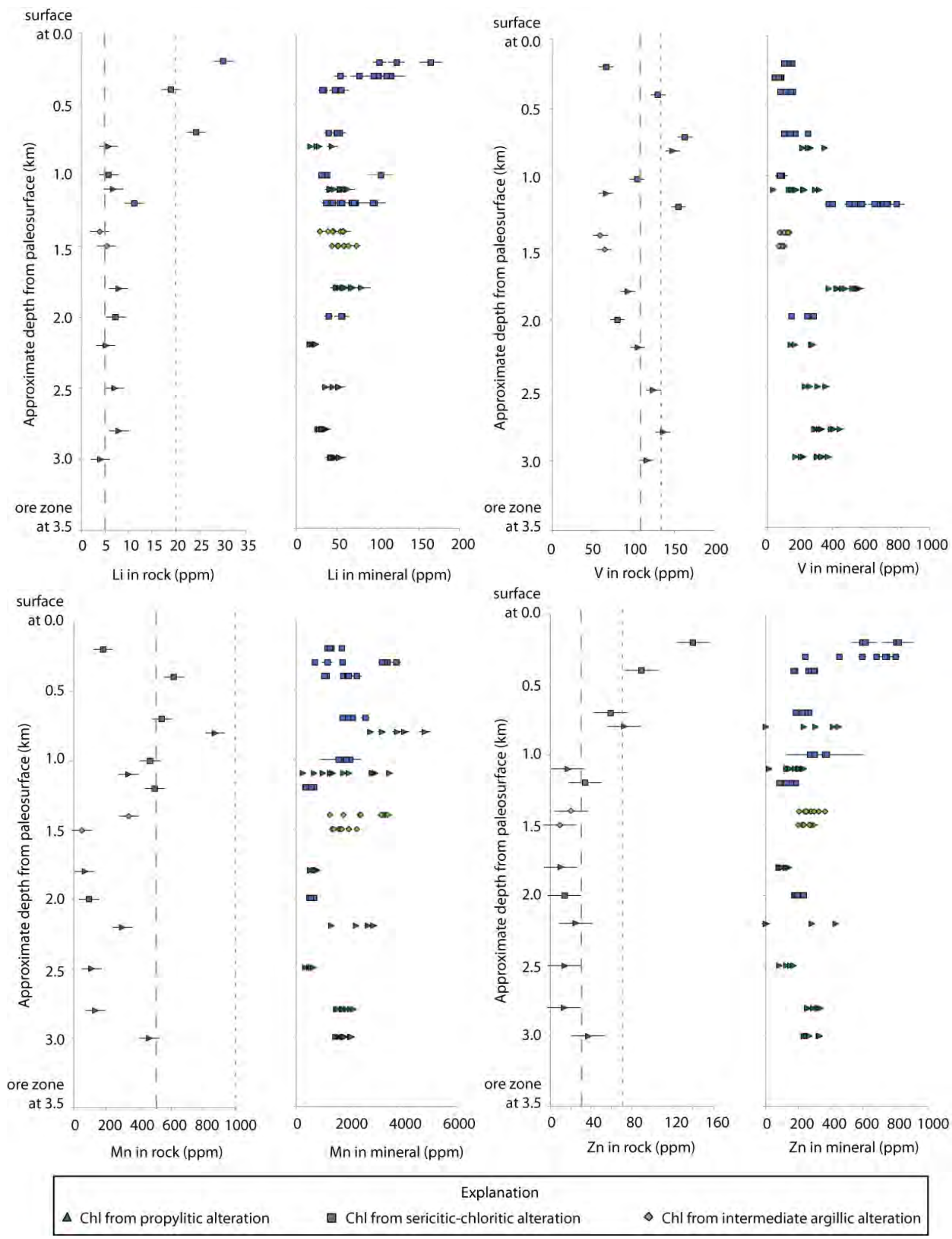

Figure 3.12. Vertical traverse plots of rock and chlorite trace element contents (ppm) from ore zone at 3.5 km (A) to paleosurface (A') along the pathway of the magmatic

fluid plume (Figure 3.2). Colors and symbols represent alteration type; error bars show standard error for ICP-MS/AES and standard error including uncertainty in calibration standard from LA-ICP-MS.

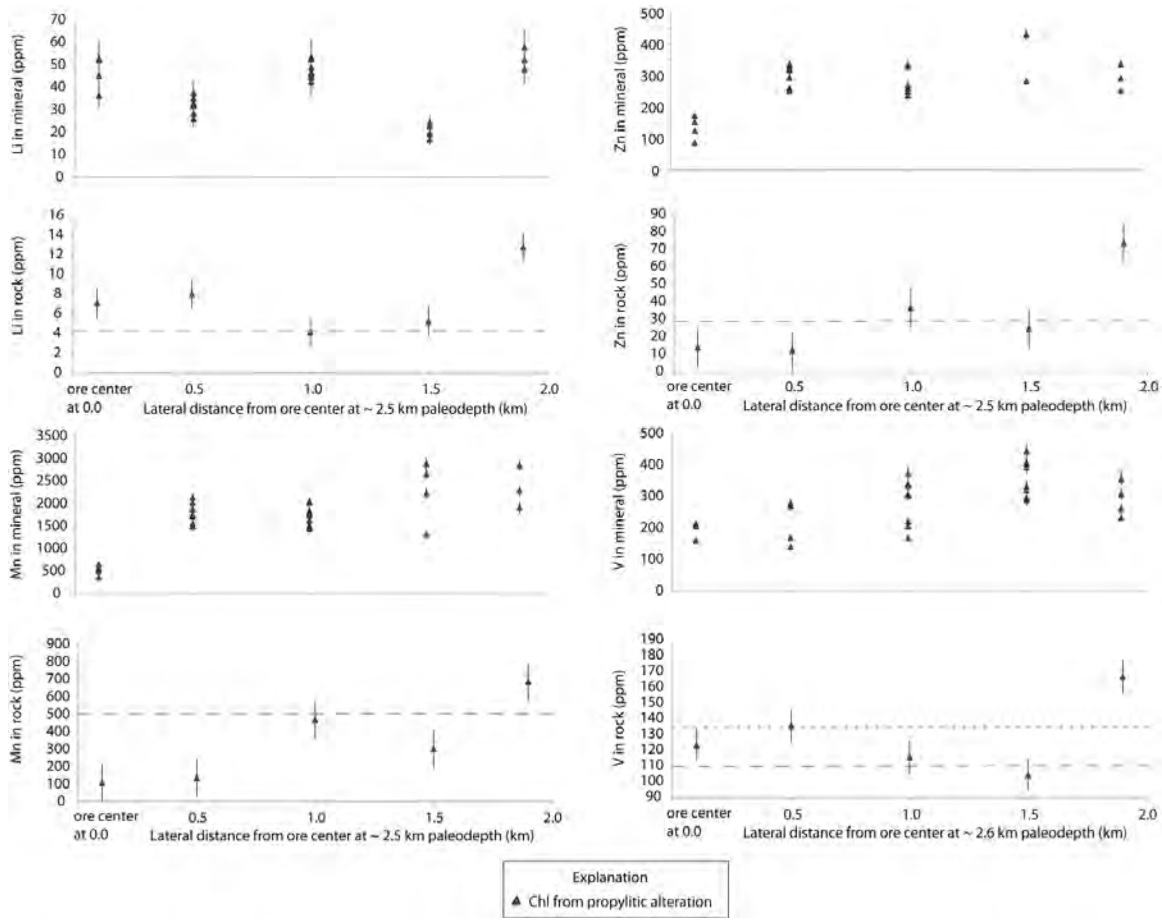

Figure 3.13. Lateral traverse plots of rock and chlorite trace element contents (ppm) at 2.5 km paleodepth from ore zone (B) to 2.0 km away (B') (Figure 3.2). All samples are from propylitic alteration, error bars show standard error for ICP-MS/AES and standard error including uncertainty in calibration standard from LA-ICP-MS.

3.4.3.2 Trace element gradients in chlorite

Moving vertically away from the ore zone along the path of the magmatic fluid plume, Li and Zn are enriched in chlorites and corresponding samples at <1 km paleodepth compared to samples from deeper exposures, average unaltered rock concentrations from the Yerington batholith and average crustal abundance (Table 3.2). Mn is slightly higher in chlorite and rocks from samples located above ~1.5 km and

several chlorite and rock samples between 1-2 km are enriched in V (Figure 3.12). Moving laterally away from the ore center at ~ 2.5 km paleodepth, V, Zn and Mn increase in chlorite and corresponding rock samples and are lowest in the sample from drill core. Li content equal in distal and proximal samples (Figure 3.13).

3.4.4 Mass balance

A simplified mass balance method is used to quantitatively compare mineral trace element concentrations to whole rock composition. Three samples are used, one from sericitic (qtz-musc) alteration (YD08-21), one from propylitic (chl-act-epid) alteration (YD01-04) and one from sericitic-chloritic (chl-musc-hem) alteration (YD01-13A). Relative mineral proportions by volume (vol $frac_{min}$) were estimated by petrography (Chapter 2). Mineral mass fractions (mass $frac_{min}$) for each sample were determined by multiplying mineral volume fraction by mineral density ($!_{min}$) (Deer et al., 1992) and renormalizing to the total calculated mass. For sericitic alteration, where muscovite is the only aluminum-bearing phase, proportions were crosschecked by comparing the Al_2O_3 content (wt. %) in the whole rock to the average Al_2O_3 content of muscovite determined by EMPA multiplied by the estimated muscovite mass fraction.

Once mineral mass fractions of each mineral were calculated, average trace element concentrations from LA-ICP-MS analyses for muscovite or chlorite were multiplied by the mineral mass fraction to calculate the contribution by muscovite or chlorite of each trace element to the whole rock composition as shown in equation (1). For example, a sample containing 50% muscovite by mass (mass $frac_{musc} = 0.5$) and an average concentration of Ba in muscovite of 1000 ppm ($[Ba]_{musc} = 1000$ ppm), yields a predicted contribution of Ba by muscovite to the whole rock composition of 500 ppm ($[Ba]_{rock} = 500$ ppm).

$$(1) \qquad [X_{rock},ppm] = [X_{mineral},ppm]\bullet[MassFrac_{mineral\ in\ rock}]$$

Mineral mass fractions multiplied by mineral trace element concentrations are plotted versus whole rock trace element concentrations in Figure 3.14. These plots show relative trace element abundances within a sample, the estimated amount of a given trace element contributed by muscovite or chlorite and the estimated contribution of trace elements by other minerals within a sample (Figure 3.14).

There are several significant sources of error in this analysis including the accuracy of the estimated volume fractions by petrographic analysis and sampling error due to the difference in scale between rock and mineral analyses. Other sources of error include analytical error from LA-ICP-MS analyses of the minerals and ICP-MS/AES analyses of the whole rock. Taking these errors into account, mass balance plots can be used to approximate the contribution by muscovite and/or chlorite to the whole rock trace element chemistry.

In the sample from strong sericitic alteration (YD08-21), muscovite contribution (0.26 mass fraction$_{musc}$) can account for all of Rb, V and Ba and greater than 50% of the Tl and Sc measured in the whole rock chemistry (Figure 3.14a). Ti, Cu, P concentrations in the whole rock analysis cannot be attributed to muscovite. Ti is likely contributed by rutile, P by apatite, which is a common trace phase, and the anomalous Cu values may be due to chrysocolla, a supergene Cu-silicate noted in hand sample. Approximately 25% of W, Cs, Co and Li contents and less than 10% of Mn, Zn, Cr, Co and Sr concentrations detected in rock analyses can be attributed to muscovite and these elements must also substitute into another mineral such as one of the trace phases mentioned above. Elements below detection levels in muscovite but above the detection limit in the rock analysis include the chalcophile and ore metals As, Se, Mo, Pb, Bi and Sn that were most likely originally contained in hypogene sulfides and are sequestered in oxide phases in the supergene environment. U and Th in muscovite were not measured for this sample.

For the sample from propylitic alteration (YD01-04), chlorite (0.10 mass fraction) contribution can account for all the Zn, Mn, Li and Cs in the sample and greater than 50% of the Co and Cu. Approximately 25% of V, Cr, Rb and Tl concentrations from the rock analyses can be attributed to chlorite. All other trace elements (Ti, P, Ba, Pb, Cr, As, Th, U, W, Sn, Mo, Bi, Te) lie between the 1:10 and 1:100 lines indicating less than 10% of their whole rock concentrations can be accounted for by chlorite (Figure 3.14b). Ti, P, Pb, Th, U, Cr, As, Te, Bi, W, Sn and Mo are likely contained in similar trace phases as in YD01-21 (rutile, apatite and Fe-oxides). Ba and Sr are probably hosted in feldspars or calcic phases actinolite or epidote.

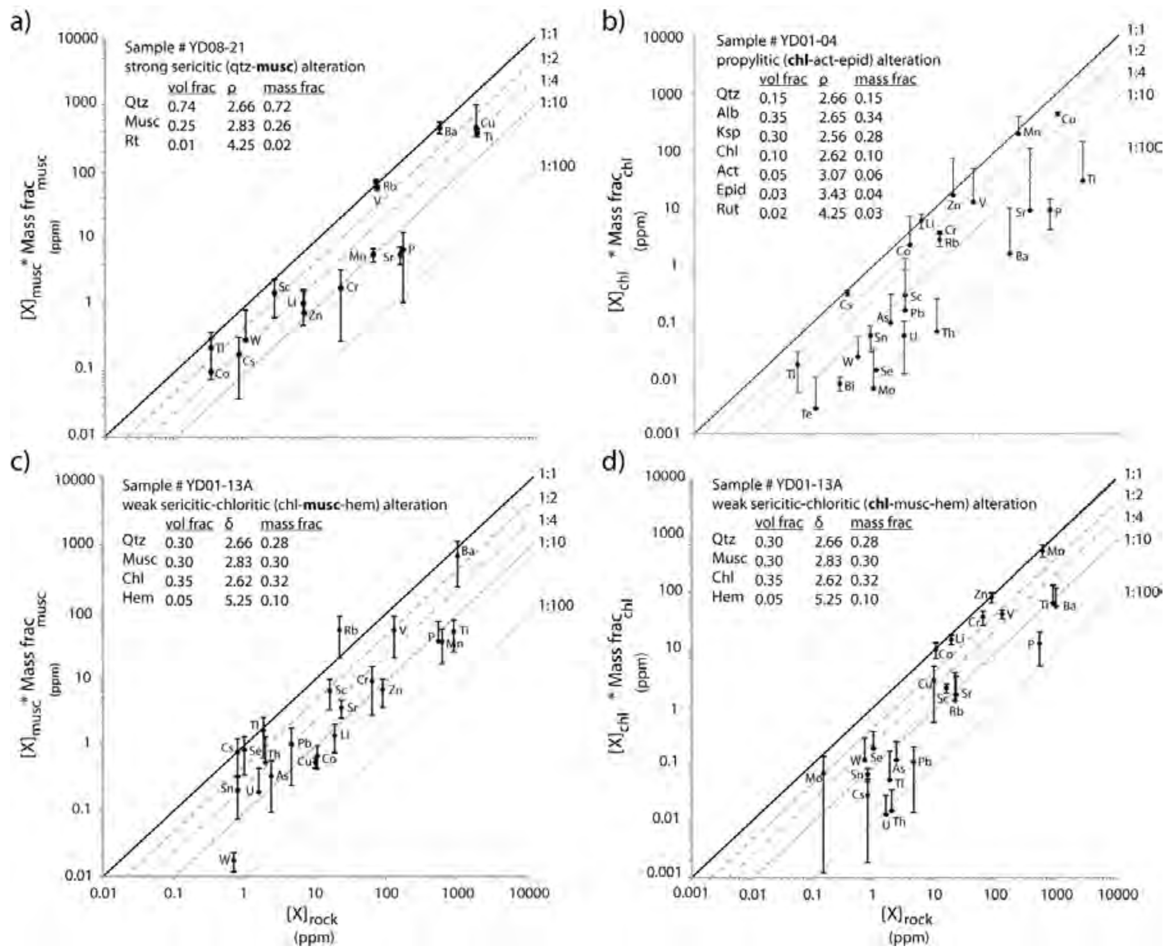

Figure 3.14. Mass balance plots for selected samples: a) muscovite from YD08-21, b) chlorite from YD01-04, c) muscovite from YD01-13A and d) chlorite from YD01-13A. Dots represent mean values and error bar lengths are equal to ± 1 standard deviation of all spots analyzed for each samples with data quality " 2.0. The solid line represents the 1:1 ratio where the mineral contribution accounts for all (100%) of the trace element concentration measured in the rock. The dashed lines represent decreasing ratios [1:2 (50%), 1:4(25%), 1:10(10%), 1:100 (1%)].

The simplified mass balance results for muscovite from the sample with sericitic-chloritic alteration (YD01-13A) are similar to the results for muscovite from strong sericitic alteration. Muscovite contribution (0.30 mass $fraction_{musc}$) can account for all Ba, Tl, Se and Cs and greater than 50% of the V, Sn and Sc measured in the whole rock geochemistry (Figure 3.14c). Rb for this sample lies above the 1:1 ratio line and is disregarded due to error. Te and Bi concentration are below the limit of detection in the

whole rock and muscovite analyses. Trace element concentration in chlorite from the sample with sericitic-chloritic alteration (0.32 mass fraction) can account for all measured Zn, Mn, Co and >80% of Li in the sample and greater than 50% Cr. Between 25 – 50 % of Mo, Cu and V concentrations in rock can be accounted for by the mass fraction of chlorite (Figure 3.14d).

To compare the contributions of muscovite to chlorite within the sample from sericitic-chloritic alteration, the trace element concentration in muscovite multiplied by the mass contributions of muscovite and chlorite for each trace element are normalized to the whole rock concentration of the element for sample YD01-13A (Figure 3.15). Figure 3.15 illustrates which elements prefer muscovite to chlorite, vice versa or another phase in the sample. Chlorite dominates contributions (>80%) of Li, Mn, Zn and Co whereas muscovite contributes > 80% of Cs, Tl, Se and ~ 65% of Ba. Muscovite and chlorite contribute equal fractions of V (~40%). Sc, Cr, Cu and Mo concentrations can be partly attributed to muscovite and/or chlorite but must also be hosted in another phase such as hematite in order to account for their concentration in the rock analysis. Elements that lie close to origin are present in low amounts (< 20 %) in muscovite and chlorite and must primarily be hosted in other minerals such as rutile, apatite, hematite or supergene oxides. Bi and Te are below detection in both mineral and rock analyses.

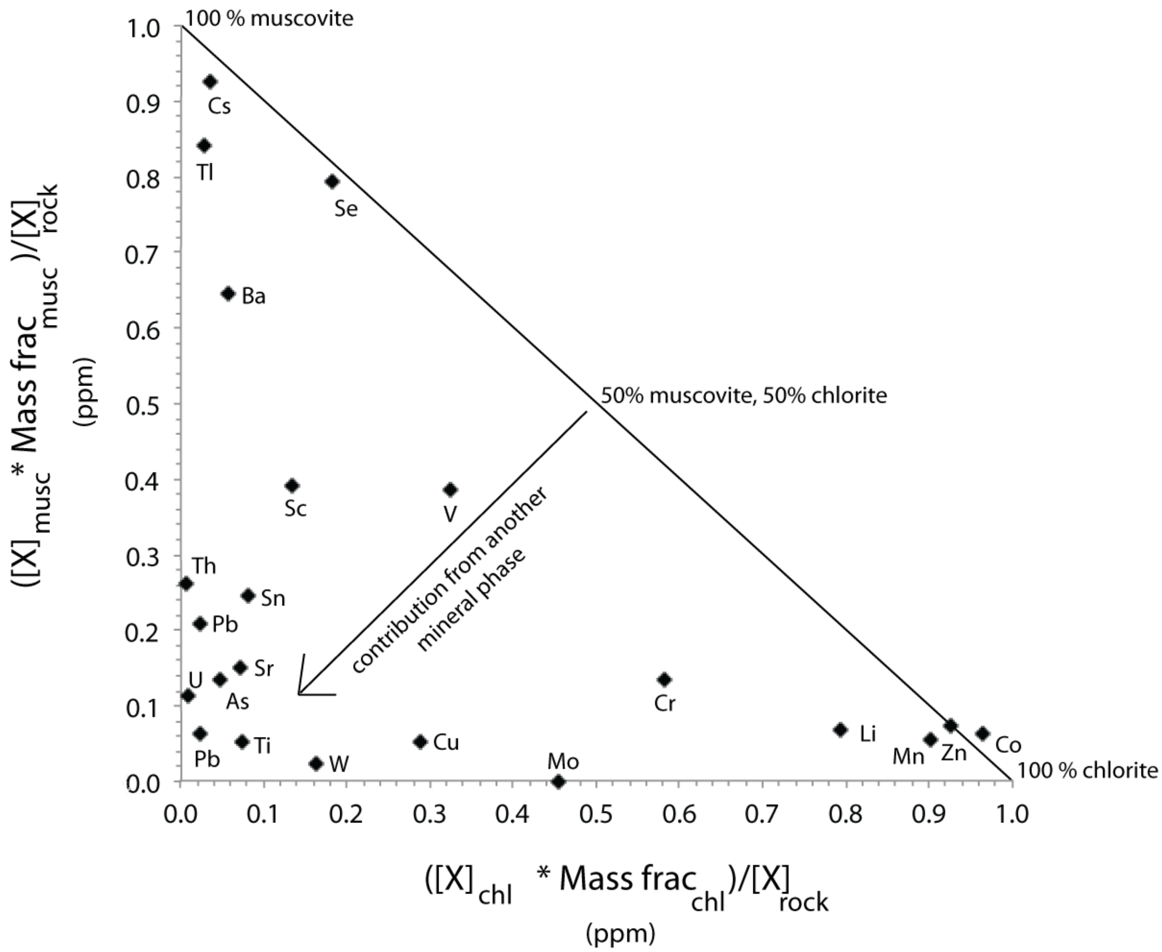

Figure 3.15. Mass balance plot comparing the contributions of muscovite and chlorite to whole rock trace element content of sample YD01-13A. Symbols represent mean values.

3.5 Discussion

3.5.1 Summary of trace element gradients in rocks and minerals

Cu, Mo, W, Sn, Se, Te, Bi, Sb, Li and Tl are enriched in rock sampled along the zone of potassic, sericitic and advanced argillic alteration that represents the near-vertical pathway of the magmatic hydrothermal plume extending from above the ore zone at ~3.5 km depth upward to the surface environment (Figure 3.16). Of these elements, W, Sn and Tl are found in muscovite and Li in chlorite from samples of sericitic alteration. In addition, mineral and rock concentrations vary along similar gradients confirming W, Sn, Tl and Li anomalies in rock chemistry record the pathway of the magmatic fluid plume (Figure 3.17).

Mn, Co, Ni, V and Sc are depleted in altered rock near the ore zone and redistributed to distal alteration zones outside the studied area (Figure 3.15). Zn is also depleted from alteration near the ore zone (<40 ppm) but is enriched (80-140 ppm) in samples from less than 1 km paleodepth. This relative enrichment of Zn is likely redistributed Zn removed from biotite and hornblende during alteration.

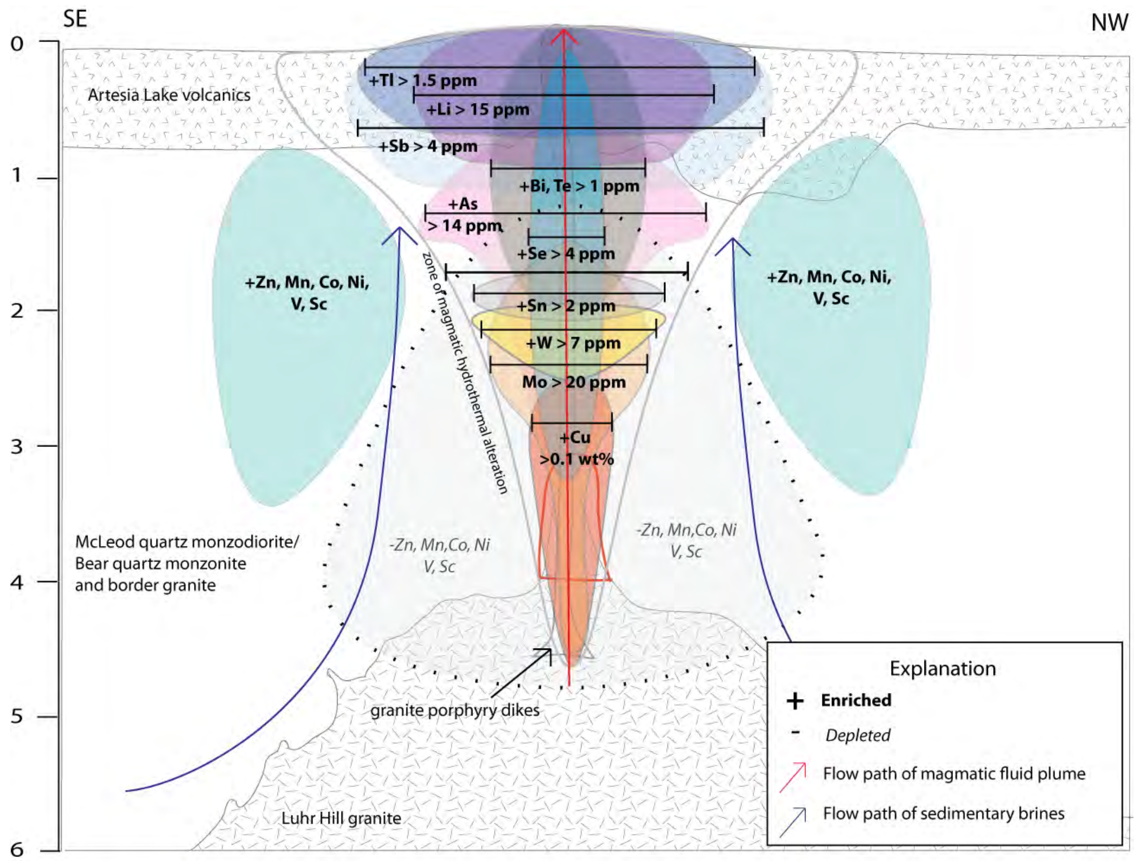

Figure 3.16. Summary figure showing distribution of trace elements as measured in rock chemistry on a cartoon cross-section through the Ann-Mason porphyry copper deposit. Colored shapes represent the spatial extent of trace element anomalies (Table 3.2). The red arrow indicates the path of the magmatic fluid plume while the blue arrow indicates the path of circulating sedimentary brines.

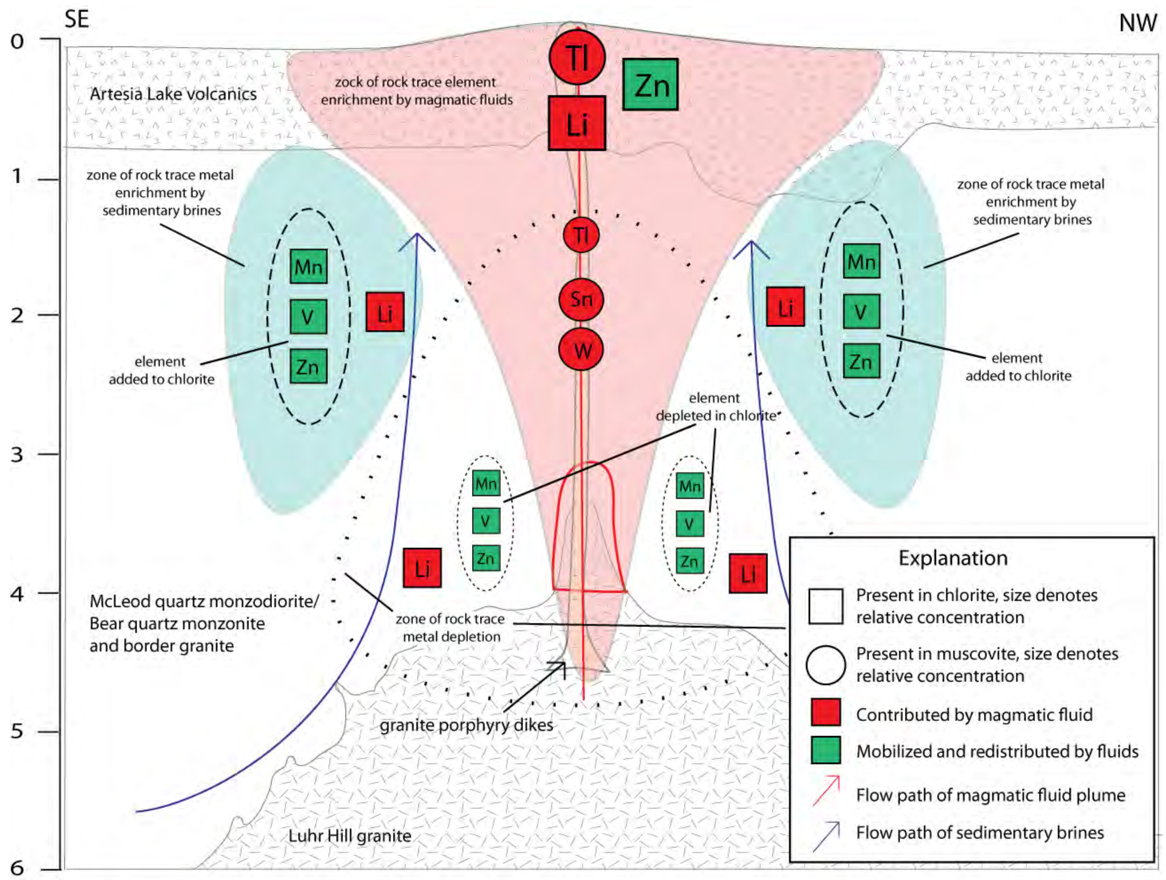

Figure 3.17. Summary of trace element gradients in minerals overlain on a cartoon paleo cross-section of Ann-Mason porphyry copper deposit. Elements enclosed in squares are detected in chlorite while elements encircled are found in muscovite. The size of the symbol indicates the relative abundance and the color distinguishes elements added by magmatic fluids from elements mobilized and redistributed by sedimentary brines. Shaded areas outline zones of magmatic and non-magmatic hydrothermal alteration. Arrows indicate fluid flow paths.

In the simplified mass balance calculations previously described, Tl contents in muscovite can account for all Tl measured in the rock chemistry for both samples containing muscovite. Thallium, as a +1 cation (Tl^{+}), has a similar atomic radius in 12-fold coordination (1.70 Å) to K^{+} (1.64 Å) (Shannon, 1976) and can substitute into the interlayer cation site in muscovite. The positive correlation of Tl and Rb concentrations in muscovite and illite is evidence for this type of substitution since previous research

(e.g. Armbrust et al, 1977) has demonstrated Rb substitutes for K in muscovite and K-feldspar (Figure 3.18).

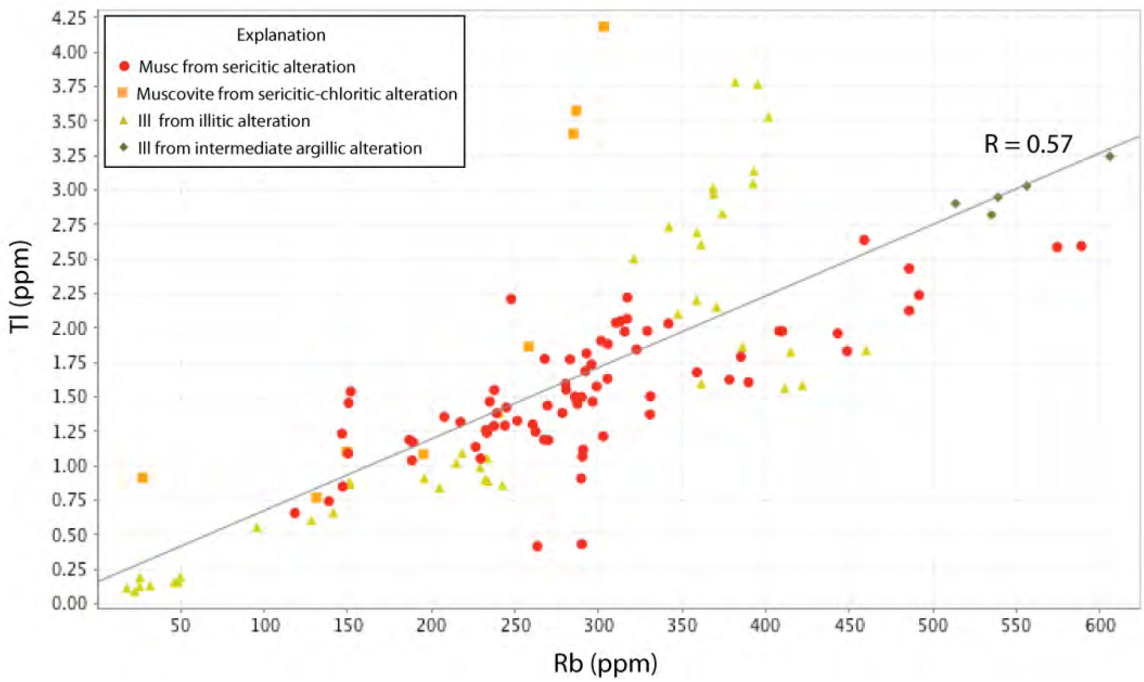

Figure 3.18. Plot of Tl concentrations (ppm) versus Rb concentations (ppm) in muscovite and illite determined by LA-ICP-MS.

Although chalcophile behavior for Tl is commonly observed in the partitioning of Tl into sulfide melts and Tl enrichment in sulfide minerals from magmatic and hydrothermal environments (Heinrichs et al., 1980; Shaw, 1952), lithophile behavior and the substitution of Tl^{+} into K-bearing minerals has also been recently documented in sericitic and argillic alteration from porphyry-Cu deposits in the Collahuasi Formation in Northern Chile (Baker et al., 2010) and historically documented in muscovite from ore deposits of the Caucasus region in Eastern Europe (Wedepohl, 1978). Tl is found in all muscovite and illite analyzed and, in the samples used for the mass balance, at concentrations that can account for all of the Tl in the rock. This suggests the Tl anomaly in the upper 1 km of the hydrothermal system at Yerington, Nevada could be explained entirely by Tl enrichment in muscovite. This does not exclude the possibility that Tl is

also enriched in pyrite. Pyrite was not analyzed and neither of the samples from the mass balance calculations contained relic sulfide or abundant goethite.

W and Sn concentrations in rocks could only partially be attributed to muscovite in the samples analyzed by the mass balance method suggesting W and Sn distributions are complicated and not hosted solely in muscovite. W is commonly found in trace amounts in micas (5 - 50 ppm) and is present in muscovites in altered granites near tungsten deposits in concentrations as high as 500 ppm (Wedepohl, 1978). Tetrahedral-coordinated $W^{6+(iv)}$(0.42 Å) could substitute into the muscovite structure and replace $Al^{(iv)}$ (0.39 Å) or octahedral-coordinated $W^{6+(vi)}$ (0.60 Å), a slightly larger ion, may replace $Al^{(vi)}$ (0.54 Å) (Shannon, 1976). Either substitution would likely be coupled to maintain neutral charge within the mineral. $Sn^{4+(vi)}$ (0.71 Å) preferentially substitutes for $Ti^{4+(vi)}$ (0.68 Å) or $Fe^{3+(vi)}$ (0.64 Å) in rutile, biotite and hornblende (Ahrens, 1952). Fine-grained muscovite replacing biotite in in rare metal deposits in granite massifs of central Kazakstan was found to have higher Sn (1240 ppm) than coarse-grained igneous muscovite (580 ppm) (Ganeev et al., 1961). These Sn concentrations are two orders of magnitude higher than those found in muscovite from our study (1-5 ppm) but muscovite replaces biotite and hydrobiotite in sericitic alteration so the mechanism for Sn enrichment may be similar.

Lithium, as octahedral-coordinated $Li^{+(vi)}$ (0.76 Å), substitutes for $Mg^{2+(vi)}$ (0.72 Å) (Shannon. 1976) in chlorite via a coupled substitution with Al^{3+} ($Li^{+} + Al^{3+} <-> 2Mg^{2+}$). All minerals, including chlorites, become more aluminous through alteration with acidic fluids as demonstrated in Chapter 2. Therefore, it was hypothesize Li concentrations would increase with the Al content of chlorites and would be highest in chlorites from sericitic-chloritic alteration. Although Li concentrations are slightly higher (~20 ppm) in chlorite from sericitic-chloritic alteration than chlorite from propylitic alteration (Table 3.4), Li is present in all chlorite analyzed at concentrations greater than 40 ppm.

The relative enrichment of Li in rock chemistry (up to 90 ppm) at the paleosurface may be due to an increase in the chlorite proportion in alteration assemblages as a result of changes in wall-rock lithology. The primary rock unit in the upper portion of Blue Hill and in the Buckskin Range is the Artesia Lake volcanics, a suite of extrusive

volcanic and volcanoclastic rocks, that are more mafic (~51 wt% SiO2 in Artesia Lake basalt) than the rocks of the Yerington batholith (~58 – 69 wt% SiO2) (Dilles, 1987) with higher modal abundances of mafic minerals. These rocks alter to a chlorite-muscovite-hematite assemblage during sericitic alteration with ~ 35 vol % chlorite. This is significantly greater than the 5-20 vol % chlorite typical of propylitic alteration. Therefore, the pattern of Li enrichment could be due to a combination of higher Li concentrations in more aluminous chlorites and an overall increase the abundance of chlorite due to differences in wall-rock lithology.

3.5.2 Controls on trace element gradients in altered rocks and minerals

Research has demonstrated metals (e.g. Cu, Mo, Zn, Mn) are transported as metal chloride complexes in porphyry copper ore fluids and the ability of an element to segregate into the magmatic volatile phase is largely based on Cl^- affinity (Candela and Holland, 1986; Holland, 1972). Trace element gradients in the zone of magmatic hydrothermal alteration may be partially explained by changes in the Cl^- concentration of the magmatic plume due to vapor-brine seperation during fluid ascent. Elements such as Sn^{4+} and W^{6+} form polyatomic chloride complexes and require high Cl^- activities for efficient transport. These elements are likely transported in high salinity magmatic brines. Volatile elements such as Li^+ and Tl^+ can form Cl-complexes at lower Cl^- activities and could be transported in a low salinity vapor phase. In one scenario, the magmatic volatile phase released from the top of the Luhr Hill granite cupola at 3.5 km paleodepth (~1.2 kbars) and 700°C ascends, crosses the critical curve (Bodnar et al., 1985) and undergoes vapor-brine separation. Volatile elements (e.g. Li, Tl) are segregated into the vapor phase while highly charged cations (e.g. W, Sn) remain in the brine. This could be one explanation for the observed enrichment of W and Sn in alteration 1-2 km away from the ore zone (~1.5 – 2 km) and the Li and Tl anomalies greater 2.5 km from the top of the granite cupola and confined near the paleosurface at <1 km depth.

3.6 Conclusion

Trace metal contents of white mica, illite and chlorite from magmatic-hydrothermal alteration can be use to link gradients in rock chemistry to the pathway of ore-forming fluids. In this study, the compositions of altered wall-rock surrounding the Ann-Mason porphyry-Cu(Mo) deposit at Yerington, Nevada were determined by ICP-MS/AES and trace element concentrations in muscovite, illite, mixed muscovite-paragonite, pyrophyllite and chlorite were measured in situ by LA-ICP-MS. Cu, Mo, Te, Se, Bi, Sb, As, W, Sn, Li and Tl are enriched rocks from the zone of potassic, sericitic and/or shallow-level advanced argillic alteration that represents the near-vertical pathway of magmatic fluid from the ore zone (3.5 km depth) to the paleosurface. Zn, Mn, Co, Ni, V and Sc are depleted in altered rock above the ore zone and redistributed to distal alteration zones formed by circulating sedimentary brines.

Mineral trace element concentrations are quantitatively compared to whole rock compositions using a simplified mass balance method. Findings show chlorite contributes Li, Mn, Zn and Co while muscovite contributes Ba, Rb and Tl. Of the elements anomalous in rock affected by sericitic and advanced argillic alteration, W, Sn and Tl enrichment can be attributed, at least partially, to muscovite and illite. The enrichment of Li in rock chemistry near the paleosurface (< 1 km depth) may be due to a combination of increased Li content in chlorite and an increase in the proportion of chlorite in alteration due to differences in wall-rock lithology. Chalcophile elements Mo, Te, Se, Bi are rarely detected in white mica/illite or chlorite in concentrations greater than 1 ppm and commonly more than 50% of analyses are below detection.

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Chapter 4: Conclusion

The goal of this research is to improve understanding in the relationship between results from large-scale ore deposit exploration techniques and the expression in wall-rock of ore deposit formation in order to improve these methods and identify their limitations. Two broad sampling techniques are explored, (1) short wave infrared (SWIR) spectroscopy and (2) bulk rock sampling to identify geochemical anomalies. The Ann-Mason porphyry copper deposit at Yerington, NV was chosen as a study location because it is easy to determine the position of sample locations relative to the ore body due to the exposure, in cross-section, of a porphyry copper center from the batholith to the volcanic environment.

SWIR spectra from rock samples are compared to the composition of white mica, illite and chlorite from magmatic hydrothermal alteration zones. The results of this study show SWIR spectroscopy can be used to identify variations in the aluminum content of white micas, which may be used as to map fluid pH gradients. Chlorite compositional variations could not be identified in SWIR and were likely obscured by coexisting highly reflective clays and micas.

Trace metal enrichments measured in rock chemistry and white mica, illite and chlorite are compared to test if rock anomalies can be linked to ore fluids. Enrichments of W, Sn and Tl and Li in altered rock from magmatic hydrothermal alteration zones were confirmed in white mica, illite and chlorite, respectively. Chalcophile elements Mo, Se, Te, Bi, Sb and As anomalies were also detected in rock chemistry but not in white mica, illite or chlorite.

Several next steps in research relating to these two methods are identified. For SWIR spectroscopy, illite overprint on high temperature muscovite complicates identification of hydrothermal mineral assemblages. A method to distinguish illite from muscovite must be determined in order to use SWIR to approximate temperature gradients. For rock anomalies, mineral hosts for chalcophile elements must be confirmed. Trace metal gradients in pyrite, another common alteration mineral deposited by ore fluids, should be determined to verify the relationship between the rock chemistry and ore deposit formation.

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Appendices

Appendix A. Sample coordinates, lithology and mineralogy

Table A1. Sample locations, lithologies and mineral assemblages

Sample #	N (NAD 83 11N)	E (NAD 83 11N)	Fault Block	Lithology	Alteration Type
H437113	300315	4320066	Blue Hill	Granite Porphyry	advanced argillic
YD02-02	300891	4320971	Blue Hill	Artesia Lake Andesite Lava	advanced argillic
YD08-19C	300777	4320734	Blue Hill	Artesia Lake Andesite Lava	advanced argillic
H437199	300818	4321301	Blue Hill	Artesia Lake Andesite Lava	sericitic
YD08-21	300978	4320672	Blue Hill	Artesia Lake Andesite Lava	sericitic
ANN006002.018	303783	4316991	Ann Mason	Granite Porphyry	sericitic
G909173_spot1 (qtz-musc-py vein)	304420	4317368	Ann Mason	Granite Porphyry	sericitic
YD09-06	301352	4319674	Blue Hill	Granite Porphyry	sericitic
ANN007006.017	303894	4318135	Ann Mason	Granite Porphyry	sericitic-chloritic
99017 (Bu-647)	296680	4321435	Central Buckskin	Granite Porphyry	sericitic-chloritic
G909165	300499	4320017	Blue Hill	Artesia Lake Andesite Lava	sericitic-chloritic
YD01-13A	300564	4321569	Blue Hill	Artesia Lake Andesite Lava	sericitic-chloritic
YD08-22	301133	4320383	Blue Hill	Mafic Dike	sericitic-chloritic
YTD 23 2008	295940	4322101	Central Buckskin	Granite Porphyry	sericitic-chloritic
H437269	302537	4317593	Ann Mason	McLeod Quartz Monzodiorite	sericitic-chloritic
G909152	301931	4319654	Blue Hill	Granite Porphyry	weak sericitic
G909154	302069	4319314	Blue Hill	Granite Porphyry	weak sericitic
G909155_spot1	301675	4319397	Blue Hill	Granite Porphyry	weak sericitic
G909160	301050	4320041	Blue Hill	Granite Porphyry	weak sericitic
G909173_spot2 (vein selvage)	304420	4317368	Ann Mason	Granite Porphyry	weak sericitic
G909173_spot3 (outside vein selvage)	304420	4317368	Ann Mason	Granite Porphyry	weak sericitic
G909176	304326	4317165	Ann Mason	Granite Porphyry	weak sericitic
G909153	301685	4319773	Blue Hill	Granite Porphyry	illitic
G909155_spot2 (illite veinlet)	301675	4319397	Blue Hill	Granite Porphyry	illitic
G909157	301328	4320041	Blue Hill	Granite Porphyry	illitic
G909163	300660	4319941	Blue Hill	Granite Porphyry	illitic
G909158	301314	4320019	Blue Hill	Granite Porphyry	intermediate argillic
YD09-04	301347	4319629	Blue Hill	Granite Porphyry	intermediate argillic
80JD-94D	301829	4321752	Blue Hill	Granite Porphyry	propylitic
81JD-94B	301497	4322150	Blue Hill	Bear Quartz Monzonite	propylitic
ANN006001.045	304289	4317634	Ann Mason	McLeod Quartz Monzodiorite	propylitic
ANN006002.023	303769	4316936	Ann Mason	McLeod Quartz Monzodiorite	propylitic
ANN007006.057	303727	4318264	Ann Mason	McLeod Quartz Monzodiorite	propylitic
G909166	300478	4319976	Blue Hill	McLeod Quartz Monzodiorite	propylitic
G909168	300982	4320120	Blue Hill	Granite Porphyry	propylitic
G909172	304437	4317344	Ann Mason	McLeod Quartz Monzodiorite	propylitic
G909174	304333	4316786	Ann Mason	McLeod Quartz Monzodiorite	propylitic
Y-727	302279	4315589	Ann Mason	McLeod Quartz Monzodiorite	propylitic
YD01-01C	301375	4322336	Blue Hill	Bear Quartz Monzonite	propylitic
YD01-04	301316	4322544	Blue Hill	Bear Quartz Monzonite	propylitic

Table A1. Sample locations, lithologies and mineral assemblages (continued)

Sample #	Added Minerals*	Relic Minerals	Minerals Analyzed	White mica classification	Main Fe trace phase
H437113	Pyroph+Qtz(+Py)		Ser	pyrophyllite	Py
YD02-02	Musc+Pa+Alun+Qtz(+Rt+Py)		Ser	muscovite-paragonite	Py
YD08-19C	Musc+Qtz+Pyroph(+Rt+Py)		Ser	muscovite	Py
H437199	Musc+Pa+Qtz(+Py+Rt)		Ser	Na-illite	Py
YD08-21	Qtz+Musc(+Rt+Py)		Ser	muscovite	Py
ANN006002.018	Musc+Qtz(+Tm+Py+Cp+Rt)		Ser	muscovite	Py(+Cp)
G909173_spot1 (qtz-musc-py vein)	Qtz+Musc(+Tm+Py+Rt)		Ser	muscovite	Py(+Cp)
YD09-06	Qtz+Musc(+Tm+Py+Rt)		Ser	muscovite	Py(+Cp)
ANN007006.017	Chl+Musc+Qtz+Calc(+Py+Rt)	Ab+Ksp+Biot(+Sph)	Chl+Ser	phengitic muscovite	Py
99017 (Bu-647)	Chl+Musc+Qtz(+Hem+Rt)	Ab+Ksp+Biot(+Mgt+Sph)	Chl+Ser	phengitic muscovite	Spec Hem
G909165	Chl+Ser+Qtz(+Hem+Rt)	(+Mgt+Sph)	Chl	-	trace Hem+Mag
YD01-13A	Chl+Musc+Qtz(+Hem+Rt)	(+Mgt+Sph)	Chl+Ser	phengitic muscovite	Spec Hem
YD08-22	Chl+Musc+Calc(+Hem+Py+Rt)	Ab(+Mgt+Sph)	Chl+Ser	phengitic muscovite	trace Hem+Mag
YTD 23 2008	Qtz+Chl+Ser(+Hem+Rt)	Ab+Ksp+Biot(+Mgt+Sph)	Chl	-	Spec Hem
H437269	Chl+Ab+Ser(+Hem+Py)	Olg/And+Ksp(+Sph+Mgt)	Chl	-	trace Hem+Py
G909152	Musc+Ill(+Py+Rt)	Ab+Ksp	Ser	illite	Py
G909154	Musc(+Py+Rt+Cp)	Ab+Ksp	Ser	low-K muscovite	Py(+Cp)
G909155_spot1	Musc(+Py+Rt)	Ab+Ksp	Ser	low-K muscovite	Py
G909160	Musc(+Py+Rt)	Ab	Ser	low-K muscovite	Py
G909173_spot2 (vein selvage)	Musc(+Py+Tm+Rt)	Ab+Ksp	Ser	muscovite	Py
G909173_spot3 (outside vein selvage)	Musc(+Py+Rt)	Ab+Ksp	Ser	phengitic muscovite	Py
G909176	Musc(+Py+Rt)	Ab+Ksp(+Sph)	Ser	muscovite	Py
G909153	Ill(+Py+Rt)	Ab+Ksp	Ser	illite	Py
G909155_spot2 (illite veinlet)	Ill(+Py+Rt)	Ab+Ksp	Ser	illite	Py
G909157	Ill(+Py+Rt)	Ab+Ksp(+Sph)	Ser	illite	Py
G909163	Ill(+Py+Rt)	Ab+Ksp(+Sph)	Ser	illite	Py
G909158	Chl+Ill(+Py+Rt)	Ab+Ksp+Epid(+Sph)	Chl+Ser	illite	Py
YD09-04	Chl+Ser(+Py+Rt)	Ab+Ksp+Epid+Hbi(+Sph)	Chl	-	Py
80JD-94D	Chl+Epid(+Ser+Rt)	Olg/And+Ksp+Biot(+Sph+Mgt)	Chl	-	trace Hem+Mag
81JD-94B	Chl+Epid(+Hem+Ser+Rt)	Olg/And+Ksp(+Sph+Mgt)	Chl	-	trace Hem+Mag
ANN006001.045	Chl(+Py+Cp+Rt)	Olg/And+Ksp+Hbi+Biot(+Sph+Mgt)	Chl	-	Py(+Cp)
ANN006002.023	Act+Chl(+Ser+Py+Rt)	Olg/And+Ksp+Biot(+Sph+Mgt)	Chl	-	Mag
ANN007006.057	Act+Chl(+Ser+Py+Cp+Rt)	Olg/And+Ksp+Biot(+Sph+Mgt)	Chl	-	Py(+Cp)
G909166	Act+Chl(+Ser+Rt+Py)	Olg/And+Ksp(+Sph+Mgt)	Chl	-	Mag
G909168	Epid+Chl(+Py+Rt)	Olg/And+Ksp+Hbi+Biot(+Sph+Mgt)	Chl	-	trace Hem+Mag
G909172	Act+Chl+Epid(+Rt+Hem)	Olg/And+Ksp+Biot(+Sph+Mgt)	Chl	-	Mag
G909174	Act+Epid+Chl+Ab(+Hem+Rt)	Ab+Biot(+Mgt+Sph)	Chl	-	Mag
Y-727	Act+Chl(+Hem)	Olg/And+Ksp+Biot(+Sph+Mgt)	Chl	-	Mag
YD01-01C	Chl+Ab+Epid(+Ser+Rt+Py+Hem)	Olg/And+Ksp(+Sph+Mgt)	Chl	-	trace Hem+Mag
YD01-04	Chl+Epid+Act+Ab(+Hem+Py)	Olg/And+Ksp+Biot(+Sph+Mgt)	Chl	-	trace Hem+Mag

*Mineral abbreviations are available in Table 2.1 *The term sericite (Ser) refers to white mica or clay of unknown composition

Appendix B. Methods

Table B1. Limits of Detection (LOD) and Standards for EMP analysis

Major Oxide	Standard*	LOD** (ppm)	LOD (% oxide)
SiO2	Flourophlogopite (FLOG-1)	210	0.04
TiO2	Basalt glass (BASL)	140	0.02
Al2O3	Labradorite (LABR)	190	0.07
FeO	Olivine (FO83)	520	0.07
MnO	Pyroxmangite (PYMN)	450	0.06
MgO	Augite (KAUG)	160	0.03
V2O3	Vanadanite (VANA)	260	0.08
CaO	Augite (KAUG)	150	0.02
Na2O	Labradorite (LABR)	180	0.05
K2O	Flourophlogopite (FLOG-1)	240	0.06
P2O5	Apatite (FLAP)	140	0.13
SO2	Chalcopyrite (CHAL)	160	0.02
F	Flourophlogopite (FLOG-1)	1300	0.06
Cl	Tugtupite (TUGT)	150	0.03

*standards from Smithsonian (USMN) and Astimec
**average limit of detection calculated by EMP anlaysis software (n=781)

Table B2. EMP Analytical Accuracy and Precision measured using FLOG-1 standard

Major Oxide	Flourophlogopite (FLOG-1) standard	Overall Mean (n=33)	1 standard deviation (σ) (%)	Accuracy (%)
SiO_2	42.79	42.85	1.13	0.13
TiO_2		BDL		
Al_2O_3	12.1	12.31	6.04	1.75
FeO		BDL		
MnO		BDL		
MgO	28.7	28.91	3.51	0.75
V_2O_3		BDL		
CaO		BDL		
Na_2O		BDL		
K_2O	11.18	11.08	0.94	0.92
P_2O_5		BDL		
SO_2		BDL		
F	9.02	8.91	4.53	1.21
Cl		BDL		

Table B3. Limits of detection for standards used in LA-ICP-MS calculated using method by Perkins and Pearce (1995).

Isotope (ppm)	GSE-1G-5 (n=10)		GSD-1G-2(n=2)		NIST-610-2 (n=4)		NIST-612-7 (n=6)	
	mean	**1σ**	**mean**	**1σ**	**mean**	**1σ**	**mean**	**1σ**
7Li	0.20	0.08	0.193	0.02	0.24	0.02	0.17	0.05
11B	0.26	0.16	0.24	0.03	0.41	0.04	0.28	0.10
29Si	43	22	37.21	8.07	53	1.3	35	16
31P	1.35	0.65	0.85	0.09	1.85	0.05	0.89	0.45
45Sc	0.17	0.12	0.15	0.01	0.20	0.008	0.13	0.07
47Ti	0.63	0.35	0.53	0.02	0.56	0.14	0.53	0.25
51V	0.05	0.04	0.03	0.01	0.05	0.01	0.03	0.02
52Cr	0.42	0.38	0.21	0.01	0.69	0.02	0.24	0.14
55Mn	0.12	0.09	0.08	0.009	0.18	0.01	0.10	0.06
59Co	0.09	0.06	0.05	0.005	0.12	0.01	0.07	0.04
63Cu	0.26	0.21	0.22	0.09	0.39	0.03	0.19	0.14
65Cu	0.26	0.17	0.29	0.12	0.31	0.03	0.18	0.11
66Zn	0.14	0.14	0.11	0.01	0.23	0.03	0.12	0.07
68Zn	0.31	0.28	0.22	0.03	0.48	0.05	0.24	0.15
75As	0.17	0.12	0.11	0.01	0.33	0.03	0.20	0.10
76Se	0.10	0.02	0.01	0.0003	0.66	0.005	-	-
77Se	0.58	0.38	0.18	0.002	0.91	0.02	-	-
85Rb	0.06	0.04	0.04	0.005	0.07	0.01	0.04	0.02
88Sr	0.04	0.05	0.04	0.02	0.05	0.01	0.03	0.02
95Mo	0.10	0.11	0.05	0.008	0.16	0.02	0.08	0.05
118Sn	0.07	0.07	0.05	0.004	0.12	0.004	0.08	0.05
125Te	0.17	0.24	0.06	0.002	0.31	0.13	0.11	0.09
133Cs	0.04	0.03	0.03	0.003	0.05	0.008	0.04	0.02
137Ba	0.16	0.15	0.10	0.01	0.22	0.04	0.15	0.11
138Ba	0.03	0.04	0.02	0.008	0.04	0.02	0.02	0.01
182W	0.05	0.08	0.02	0.001	0.07	0.02	0.03	0.02
208Pb	0.03	0.06	0.01	0.0004	0.06	0.02	0.02	0.02
209Bi	0.02	0.03	0.005	0.001	0.03	0.01	0.01	0.01
232Th	0.91	1.81	0.008	0.0005	0.14	0.05	0.02	0.02
238U	0.005	0.002	0.006	0.002	-	-	0.005	0.002
205Tl	0.004	0.002	0.004	0.0004	-	-	0.003	0.001

Table B4. Upper and lower limits of detection (LOD) for ICP-MS/AES (ALS Chemex method ME-MS61).

Element	lower LOD	upper LOD	Element	lower LOD	upper LOD
Ag (ppm)	0.01	100	Na (%)	0.01	10
Al (%)	0.01	50	Nb (ppm)	0.1	500
As (ppm)	0.2	10000	Ni (ppm)	0.2	10000
Ba (ppm)	10	10000	P (ppm)	10	10000
Be (ppm)	0.05	1000	Pb (ppm)	0.5	10000
Bi (ppm)	0.01	10000	Rb (ppm)	0.1	10000
Ca (%)	0.01	50	Re (ppm)	0.002	50
Cd (ppm)	0.02	1000	S (%)	0.01	10
Ce (ppm)	0.01	500	Sb (ppm)	0.05	10000
Co (ppm)	0.1	10000	Sc (ppm)	0.1	10000
Cr (ppm)	1	10000	Se (ppm)	1	1000
Cs (ppm)	0.05	500	Sn (ppm)	0.2	500
Cu (ppm)	0.2	10000	Sr (ppm)	0.2	10000
Fe (%)	0.01	50	Ta (ppm)	0.05	100
Ga (ppm)	0.05	10000	Te (ppm)	0.05	500
Ge (ppm)	0.05	500	Th (ppm)	0.2	10000
Hf (ppm)	0.1	500	Ti (%)	0.005	10
In (ppm)	0.005	500	Tl (ppm)	0.02	10000
K (%)	0.01	10	U (ppm)	0.1	10000
La (ppm)	0.5	10000	V (ppm)	1	10000
Li (ppm)	0.2	10000	W (ppm)	0.1	10000
Mg (%)	0.01	50	Y (ppm)	0.1	500
Mn (ppm)	5	100000	Zn (ppm)	2	10000
Mo (ppm)	0.05	10000	Zr (ppm)	0.5	500

Appendix C. Example of Trench Mapping

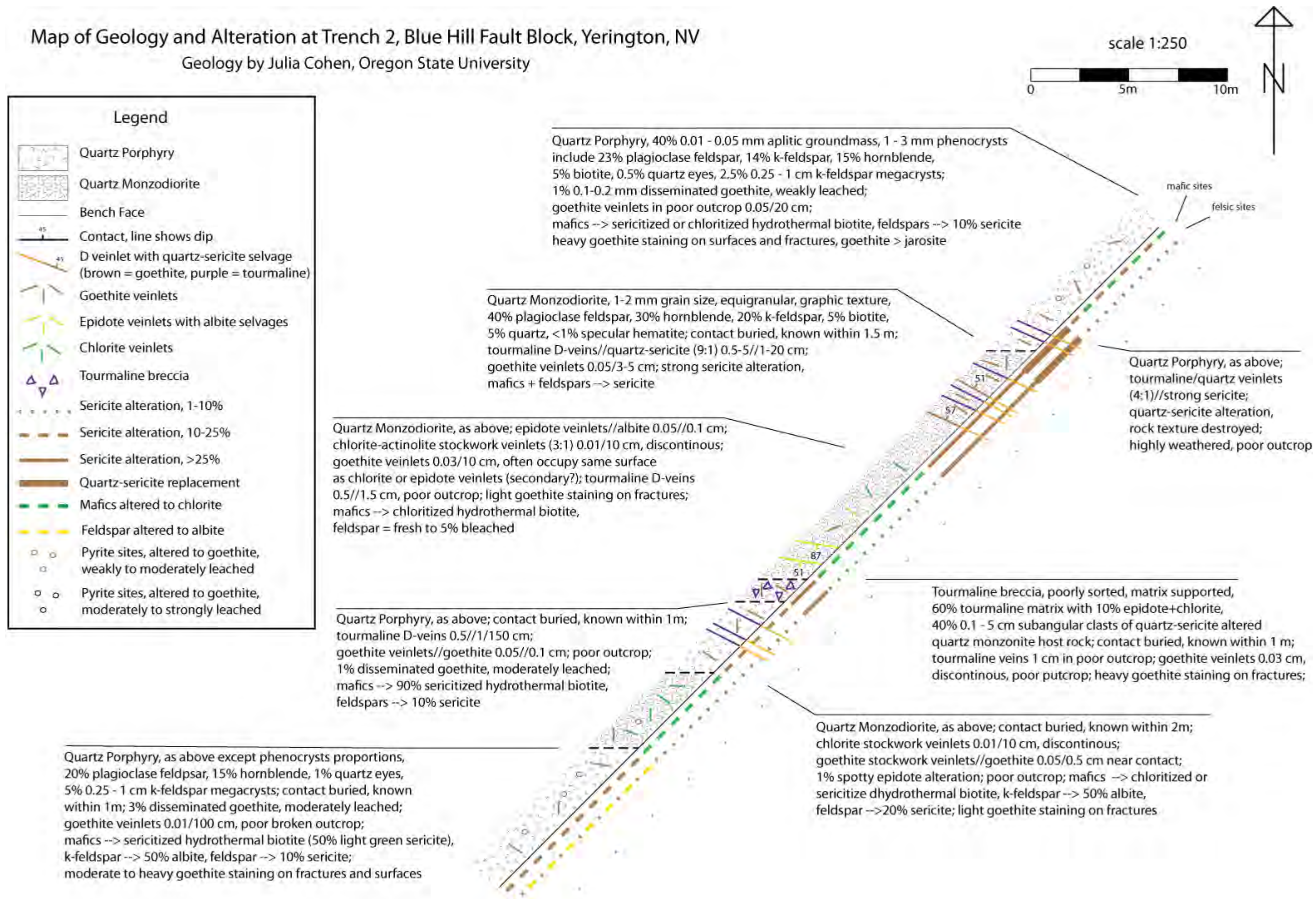

Figure C1. Digitalized trench map. Trench mapping was done using the Anaconda method (Einaudi, 1977).

Appendix D. Electron microprobe data

Table D1. Electron microprobe analyses of white mica, illite and chlorite

Sample#-spot#	YD09-04-area1	YD09-04-area1	YD09-04-area1	YD09-04-area1	YD09-04-area1	YD09-04-area1	YD09-04-area1	YD09-04-area3	YD09-04-area3
Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl
SiO2	33.31	34.57	35.03	37.89	37.43	31.06	31.96	31.13	31.13
TiO2	0.07	<0.02	<0.02	<0.02	0.03	<0.02	0.04	0.03	0.03
Al2O3	20.61	18.96	20.23	23.18	21.13	21.15	20.56	20.69	19.93
FeO	12.96	12.48	12.24	11.49	11.27	14.41	13.81	13.34	13.39
MnO	0.25	0.26	0.23	0.18	0.19	0.27	0.26	0.24	0.23
MgO	22.12	22.07	21.22	16.98	19.06	24.05	23.19	22.85	23.22
V2O3	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CaO	0.60	0.82	0.74	0.46	0.66	0.20	0.41	0.17	0.27
Na2O	0.25	0.47	0.40	0.27	0.36	0.06	0.20	0.12	0.18
K2O	0.07	0.11	0.17	0.31	0.30	0.15	0.11	0.43	0.36
F	0.32	0.41	0.27	0.31	0.39	0.42	0.31	0.08	0.31
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	90.58	90.18	90.56	91.12	90.85	91.85	90.91	89.10	89.04
H2O	12.57	12.50	12.68	12.97	12.84	12.53	12.51	12.37	12.24
Total	103.02	102.51	103.13	103.96	103.52	104.20	103.29	101.43	101.15
Structural Formulas – based on 14 oxygen equivalents for chlorite and 11 for mica									
Si	3.137	3.263	3.278	3.460	3.444	2.923	3.025	3.005	3.012
Al(iv)	0.863	0.737	0.722	0.540	0.556	1.077	0.975	0.995	0.988
Al(vi)	1.425	1.372	1.508	1.954	1.735	1.269	1.318	1.360	1.284
Ti	0.005	0.002	0.001	0.001	0.002	0.001	0.003	0.002	0.002
Fe	1.021	0.985	0.957	0.877	0.867	1.134	1.093	1.077	1.083
Mn	0.020	0.021	0.018	0.014	0.015	0.021	0.020	0.020	0.019
Mg	3.106	3.106	2.959	2.311	2.615	3.375	3.272	3.289	3.349
V	0.001	0.001	0.001	0.002	0.002	0.003	0.004	-0.001	0.000
Ca	0.061	0.082	0.074	0.045	0.065	0.021	0.041	0.018	0.028
Na	0.045	0.085	0.072	0.048	0.064	0.010	0.037	0.022	0.033
K	0.008	0.013	0.020	0.036	0.036	0.018	0.014	0.053	0.045
F	0.095	0.121	0.080	0.090	0.114	0.124	0.092	0.025	0.095
Cl	0.001	0.001	0.001	0.002	0.001	0.003	0.002	0.002	0.001
OH	7.904	7.878	7.919	7.908	7.884	7.873	7.906	7.973	7.904
K/(K+Na+Ca)	0.070	0.071	0.122	0.281	0.217	0.375	0.148	0.570	0.424
Mg/(Mg+Fe+Mn)	0.749	0.755	0.752	0.722	0.748	0.745	0.746	0.750	0.752
Al(vi)/(sum Oct)	0.250	0.242	0.269	0.369	0.321	0.217	0.227	0.233	0.220
F/(F+Cl+OH)	0.012	0.015	0.010	0.011	0.014	0.016	0.012	0.003	0.012

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	YD09-04-area3	YD09-04-area3	YD09-04-area3	YD09-04-area3	YD09-04-area3	YD09-04-area3	YD09-04-area3	YD09-04-area3	YD09-04-area3	YD08-22-area1
Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl
SiO2	30.28	27.55	35.10	29.60	31.91	30.36	30.75	33.31	30.00	27.16
TiO2	0.02	0.05	0.02	0.04	0.04	0.03	<0.02	0.06	0.05	0.02
Al2O3	20.20	21.73	22.17	19.41	17.90	19.89	19.13	18.92	20.13	19.70
FeO	14.07	15.17	12.34	15.33	13.65	13.67	13.88	13.05	14.80	20.69
MnO	0.28	0.33	0.23	0.27	0.25	0.27	0.31	0.27	0.31	0.29
MgO	23.64	23.89	18.49	23.19	22.82	23.10	23.19	22.94	23.77	19.21
V2O3	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CaO	0.23	0.04	0.31	0.11	0.22	0.24	0.31	0.36	0.08	0.16
Na2O	0.14	<0.05	0.20	0.08	0.17	0.16	0.28	0.25	0.06	<0.05
K2O	0.27	<0.06	0.58	0.49	0.80	0.28	0.27	0.51	0.34	<0.06
F	0.31	0.23	0.39	0.12	0.32	0.30	0.27	0.37	0.29	<0.06
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	89.48	89.09	89.84	88.68	88.13	88.32	88.45	90.08	89.88	87.29
H2O	12.23	12.10	12.57	12.09	12.05	12.10	12.11	12.41	12.24	11.60
Total	101.58	101.09	102.24	100.72	100.04	100.29	100.45	102.33	102.00	98.89
Structural Formulas										
Si	2.931	2.704	3.298	2.920	3.132	2.970	3.010	3.171	2.904	2.805
Al(iv)	1.069	1.296	0.702	1.080	0.868	1.030	0.990	0.829	1.096	1.195
Al(vi)	1.236	1.217	1.752	1.176	1.202	1.263	1.217	1.294	1.201	1.202
Ti	0.002	0.004	0.001	0.003	0.003	0.002	0.001	0.004	0.004	0.002
Fe	1.139	1.245	0.969	1.264	1.120	1.118	1.136	1.039	1.198	1.786
Mn	0.023	0.027	0.018	0.022	0.021	0.022	0.026	0.022	0.026	0.025
Mg	3.412	3.495	2.589	3.409	3.340	3.369	3.384	3.256	3.430	2.958
V	0.000	0.002	0.001	0.003	0.002	0.001	0.003	0.002	0.003	0.000
Ca	0.024	0.004	0.031	0.012	0.023	0.025	0.032	0.037	0.009	0.018
Na	0.027	0.005	0.036	0.015	0.032	0.031	0.053	0.045	0.011	0.002
K	0.034	0.002	0.069	0.061	0.101	0.036	0.034	0.062	0.041	0.005
F	0.094	0.073	0.116	0.037	0.098	0.092	0.084	0.110	0.089	0.000
Cl	0.003	0.002	0.003	0.002	0.003	0.002	0.002	0.002	0.003	0.002
OH	7.903	7.926	7.881	7.961	7.899	7.906	7.914	7.887	7.908	7.998
K/(K+Na+Ca)	0.399	0.142	0.508	0.694	0.643	0.389	0.286	0.431	0.678	0.206
Mg/(Mg+Fe+Mn)	0.746	0.733	0.724	0.726	0.745	0.747	0.744	0.754	0.737	0.620
Al(vi)/(sum Oct)	0.210	0.203	0.320	0.197	0.206	0.215	0.207	0.225	0.203	0.200
F/(F+Cl+OH)	0.012	0.009	0.015	0.005	0.012	0.011	0.011	0.014	0.011	0.000

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	YD08-22-area1	YD08-22-area1	YD08-22-area1	YD08-22-area1	YD08-22-area2	YD08-22-area2	YD08-22-area2	YD08-22-area2	YD08-22-area2	YD08-22-area3
Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl
SiO2	26.78	25.59	26.14	30.45	26.31	26.30	26.43	26.19	26.53	26.17
TiO2	0.04	0.12	0.04	0.04	0.03	0.03	0.04	0.05	0.06	0.05
Al2O3	20.99	20.72	21.04	23.05	21.11	21.13	21.30	21.12	21.49	21.18
FeO	21.01	22.33	20.90	18.08	21.67	22.14	22.41	23.15	21.78	21.48
MnO	0.24	0.25	0.25	0.21	0.26	0.24	0.23	0.24	0.22	0.24
MgO	18.84	18.33	18.56	15.40	19.16	18.64	18.44	18.42	18.64	18.87
V2O3	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CaO	0.24	0.15	0.32	0.07	0.04	0.03	0.03	0.04	0.04	0.04
Na2O	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
K2O	0.11	<0.06	<0.06	2.22	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
F	0.19	0.17	<0.06	0.07	<0.06	0.13	0.12	0.13	<0.06	0.14
Cl	<0.03	<0.03	0.04	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	88.50	87.77	87.35	89.65	88.69	88.68	89.01	89.40	88.80	88.21
H2O	11.66	11.44	11.57	12.09	11.71	11.64	11.68	11.67	11.76	11.61
Total	100.07	99.13	98.91	101.71	100.38	100.27	100.64	101.01	100.56	99.76
Structural Formulas*										
Si	2.731	2.659	2.705	3.010	2.688	2.692	2.696	2.674	2.703	2.685
Al(iv)	1.269	1.341	1.295	0.990	1.312	1.308	1.304	1.326	1.297	1.315
Al(vi)	1.254	1.197	1.270	1.695	1.228	1.241	1.257	1.215	1.283	1.246
Ti	0.003	0.009	0.003	0.003	0.002	0.002	0.003	0.004	0.004	0.004
Fe	1.791	1.941	1.808	1.494	1.851	1.895	1.911	1.976	1.856	1.843
Mn	0.021	0.022	0.021	0.017	0.022	0.021	0.020	0.020	0.019	0.021
Mg	2.865	2.839	2.862	2.270	2.917	2.844	2.804	2.804	2.831	2.886
V	0.003	0.003	0.002	0.004	0.003	0.002	0.001	0.000	0.002	0.002
Ca	0.026	0.017	0.036	0.007	0.005	0.003	0.003	0.004	0.005	0.004
Na	0.001	0.002	0.004	0.001	0.003	0.001	0.000	0.005	0.001	0.000
K	0.014	0.004	0.002	0.280	0.003	0.000	0.000	0.004	0.000	0.000
F	0.060	0.056	0.000	0.021	0.012	0.040	0.040	0.043	0.000	0.046
Cl	0.004	0.005	0.007	0.000	0.003	0.004	0.002	0.003	0.002	0.001
OH	7.936	7.939	7.993	7.978	7.985	7.956	7.958	7.954	7.998	7.953
K/(K+Na+Ca)	0.345	0.179	0.036	0.971	0.290	0.000	0.000	0.278	0.058	0.000
Mg/(Mg+Fe+Mn)	0.612	0.591	0.610	0.600	0.609	0.597	0.592	0.584	0.602	0.608
Al(vi)/(sum Oct)	0.210	0.198	0.211	0.294	0.204	0.206	0.209	0.201	0.214	0.207
F/(F+Cl+OH)	0.008	0.007	0.000	0.003	0.001	0.005	0.005	0.005	0.000	0.006

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	YD08-22-area3	YD08-22-area3	YD08-22-area3	YD08-22-area3	YD08-22-area3	YTD-23-2008_area2	YTD-23-2008_area2	YTD-23-2008_area2
Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl
SiO2	26.26	26.40	26.47	26.06	26.37	30.12	27.85	32.53
TiO2	0.05	0.08	0.05	0.05	0.04	0.04	0.03	0.05
Al2O3	21.06	20.95	21.37	21.12	20.83	23.91	23.20	25.38
FeO	21.22	21.64	21.42	21.42	21.49	12.10	13.33	11.12
MnO	0.20	0.26	0.25	0.26	0.25	0.15	0.17	0.14
MgO	18.64	18.94	18.62	18.57	18.67	20.18	22.73	17.90
V2O3	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CaO	0.04	<0.02	0.09	0.10	0.08	0.19	0.04	0.13
Na2O	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
K2O	<0.06	<0.06	<0.06	<0.06	<0.06	0.69	0.15	1.73
F	<0.06	<0.06	0.12	0.10	0.18	0.51	0.25	0.18
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	87.55	88.35	88.42	87.74	87.98	87.93	87.79	89.27
H2O	11.60	11.69	11.67	11.56	11.56	12.12	12.08	12.56
Total	99.14	100.03	100.04	99.26	99.46	99.83	99.76	101.75
Structural Formulas*								
Si	2.711	2.707	2.705	2.689	2.713	2.920	2.736	3.083
Al(iv)	1.289	1.293	1.295	1.311	1.287	1.080	1.264	0.917
Al(vi)	1.271	1.239	1.279	1.258	1.238	1.652	1.422	1.917
Ti	0.004	0.006	0.004	0.004	0.003	0.003	0.003	0.003
Fe	1.832	1.856	1.831	1.848	1.849	0.981	1.095	0.881
Mn	0.018	0.023	0.022	0.023	0.022	0.012	0.014	0.011
Mg	2.867	2.896	2.836	2.856	2.864	2.917	3.328	2.528
V	0.003	0.000	0.001	0.002	0.003	0.002	0.002	0.004
Ca	0.004	0.000	0.010	0.011	0.009	0.020	0.004	0.014
Na	0.000	0.000	0.000	0.003	0.004	0.006	0.001	0.009
K	0.002	0.000	0.000	0.001	0.001	0.085	0.019	0.209
F	0.006	0.000	0.038	0.032	0.057	0.157	0.078	0.055
Cl	0.002	0.001	0.003	0.002	0.003	0.001	0.001	0.001
OH	7.992	7.999	7.959	7.966	7.940	7.842	7.921	7.944
K/(K+Na+Ca)	0.264	0.000	0.000	0.078	0.038	0.764	0.789	0.902
Mg/(Mg+Fe+Mn)	0.608	0.607	0.605	0.604	0.605	0.746	0.750	0.739
Al(vi)/(sum Oct)	0.212	0.206	0.214	0.209	0.207	0.291	0.242	0.344
F/(F+Cl+OH)	0.001	0.000	0.005	0.004	0.007	0.020	0.010	0.007

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	YTD-23-2008_area2	YTD-23-2008_area2	YTD-23-2008_area2	YTD-23-2008_area2	YTD-23-2008_area2	YTD-23-2008_area2	YTD-23-2008_area2
Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
SiO2	29.86	28.63	27.75	27.63	31.23	29.74	27.96
TiO2	0.06	0.17	0.06	0.06	0.05	0.03	0.05
Al2O3	25.07	23.89	23.59	24.19	25.39	24.18	24.11
FeO	12.68	13.58	14.00	13.49	12.15	12.98	13.76
MnO	0.18	0.15	0.18	0.19	0.15	0.17	0.16
MgO	19.82	20.89	23.43	21.55	19.29	22.05	22.77
V2O3	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CaO	0.07	0.18	<0.02	0.02	0.03	0.05	0.06
Na2O	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
K2O	0.72	0.35	0.07	0.15	1.41	0.59	0.28
F	0.29	0.20	0.11	0.17	0.09	<0.06	0.17
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	88.82	88.08	89.26	87.49	89.89	89.92	89.37
H2O	12.32	12.16	12.30	12.08	12.59	12.54	12.31
Total	101.01	100.15	101.51	99.50	102.45	102.44	101.61
Structural Formulas*							
Si	2.873	2.800	2.691	2.722	2.961	2.838	2.704
Al(iv)	1.127	1.200	1.309	1.278	1.039	1.162	1.296
Al(vi)	1.717	1.554	1.387	1.530	1.798	1.557	1.452
Ti	0.004	0.012	0.004	0.005	0.004	0.002	0.004
Fe	1.020	1.110	1.136	1.111	0.963	1.035	1.112
Mn	0.015	0.013	0.015	0.016	0.012	0.013	0.013
Mg	2.843	3.046	3.387	3.165	2.727	3.136	3.283
V	0.002	0.003	0.002	0.002	0.004	0.004	0.002
Ca	0.007	0.019	0.001	0.003	0.003	0.005	0.006
Na	0.006	0.000	0.003	0.001	0.007	0.006	0.004
K	0.089	0.044	0.008	0.019	0.171	0.071	0.034
F	0.088	0.061	0.034	0.053	0.027	0.014	0.053
Cl	0.000	0.000	0.002	0.001	0.001	0.001	0.001
OH	7.911	7.938	7.964	7.946	7.972	7.986	7.946
K/(K+Na+Ca)	0.877	0.700	0.663	0.829	0.946	0.861	0.773
Mg/(Mg+Fe+Mn)	0.733	0.731	0.746	0.737	0.737	0.749	0.745
Al(vi)/(sum Oct)	0.301	0.268	0.233	0.261	0.316	0.267	0.246
F/(F+Cl+OH)	0.011	0.008	0.004	0.007	0.003	0.002	0.007

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	YTD-23-2008_area1	YTD-23-2008_area1	YTD-23-2008_area1	YTD-23-2008_area1	YTD-23-2008_area1	YTD-23-2008_area1	YTD-23-2008_area1
Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
SiO2	28.93	29.58	29.24	30.62	30.73	31.70	32.60
TiO2	0.03	0.03	0.03	0.02	0.03	<0.02	<0.02
Al2O3	23.91	24.76	24.25	25.99	25.81	26.68	26.83
FeO	12.83	12.03	12.23	10.67	11.22	10.80	10.53
MnO	0.18	0.14	0.15	0.10	0.12	0.11	0.10
MgO	22.98	21.75	22.70	20.21	20.78	19.86	19.34
V2O3	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CaO	0.07	0.11	0.10	0.20	0.16	0.15	0.27
Na2O	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
K2O	<0.06	<0.06	<0.06	<0.06	0.08	0.21	0.08
F	0.33	0.40	0.38	0.32	0.39	0.34	0.29
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	89.34	88.85	89.12	88.21	89.36	89.89	90.12
H2O	12.33	12.34	12.35	12.44	12.52	12.69	12.81
Total	101.52	101.03	101.31	100.51	101.72	102.44	102.81
Structural Formulas*							
Si	2.775	2.829	2.798	2.913	2.898	2.955	3.018
Al(iv)	1.225	1.171	1.202	1.087	1.102	1.045	0.982
Al(vi)	1.477	1.620	1.532	1.828	1.766	1.886	1.944
Ti	0.002	0.002	0.002	0.002	0.002	0.001	0.001
Fe	1.029	0.962	0.979	0.849	0.885	0.842	0.815
Mn	0.014	0.012	0.012	0.008	0.010	0.009	0.008
Mg	3.285	3.101	3.238	2.867	2.921	2.761	2.669
V	0.002	0.003	0.001	0.001	0.001	0.002	0.002
Ca	0.008	0.011	0.010	0.020	0.017	0.015	0.027
Na	0.001	0.002	0.000	0.002	0.000	-0.001	0.004
K	0.004	0.002	0.004	0.005	0.010	0.025	0.009
F	0.101	0.121	0.114	0.098	0.115	0.100	0.085
Cl	0.003	0.000	0.000	0.002	0.001	0.002	0.002
OH	7.896	7.879	7.886	7.900	7.884	7.898	7.913
K/(K+Na+Ca)	0.298	0.112	0.296	0.196	0.379	0.653	0.228
Mg/(Mg+Fe+Mn)	0.759	0.761	0.766	0.770	0.766	0.764	0.764
Al(vi)/(sum Oct)	0.254	0.283	0.265	0.327	0.315	0.341	0.355
F/(F+Cl+OH)	0.013	0.015	0.014	0.012	0.014	0.013	0.011

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	YTD-23-2008_area1	YTD-23-2008_area1	Bu-647_area1	Bu-647_area1	Bu-647_area1	Bu-647_area1	Bu-647_area1	Bu-647_area1	Bu-647_area1	Bu-647_area1
Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl
SiO2	31.87	32.34	25.07	25.67	24.74	25.21	25.12	25.25	26.43	27.05
TiO2	0.03	0.05	0.03	0.03	0.03	0.02	0.03	0.03	0.03	0.02
Al2O3	26.84	27.56	23.67	24.58	22.20	23.60	23.20	23.36	22.42	22.83
FeO	11.23	9.64	24.07	19.13	20.19	24.31	24.52	23.11	20.76	21.46
MnO	0.11	0.10	0.40	0.53	0.46	0.50	0.41	0.41	0.60	0.54
MgO	20.73	16.61	14.83	18.77	14.54	15.14	15.30	15.46	17.24	15.80
V2O3	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CaO	0.21	0.24	<0.02	<0.02	0.10	<0.02	<0.02	0.05	0.03	0.13
Na2O	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
K2O	0.08	0.44	<0.06	<0.06	0.33	<0.06	<0.06	0.18	0.27	0.60
F	0.25	0.23	<0.06	0.24	<0.06	<0.06	0.14	<0.06	0.12	0.14
Cl	<0.03	<0.03	<0.03	<0.03	0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	91.37	87.26	88.13	88.99	82.66	88.96	88.77	87.91	87.95	88.59
H2O	12.92	12.50	11.53	11.84	10.96	11.59	11.50	11.53	11.63	11.67
Total	104.18	99.66	99.66	100.73	93.61	100.53	100.21	99.44	99.53	100.20
Structural Formulas*										
Si	2.929	3.073	2.606	2.573	2.704	2.601	2.601	2.622	2.710	2.760
Al(iv)	1.071	0.927	1.394	1.427	1.296	1.399	1.399	1.378	1.290	1.240
Al(vi)	1.837	2.159	1.506	1.476	1.563	1.470	1.431	1.482	1.419	1.505
Ti	0.002	0.003	0.002	0.002	0.002	0.002	0.002	0.003	0.002	0.002
Fe	0.863	0.766	2.093	1.603	1.845	2.098	2.123	2.007	1.780	1.831
Mn	0.008	0.008	0.035	0.045	0.043	0.044	0.036	0.036	0.052	0.047
Mg	2.841	2.354	2.298	2.805	2.369	2.329	2.361	2.394	2.635	2.403
V	0.000	0.001	0.003	0.002	0.002	0.003	0.001	0.003	0.003	0.000
Ca	0.021	0.024	0.001	0.001	0.012	0.002	0.000	0.005	0.004	0.014
Na	0.002	0.008	0.001	0.000	0.001	0.004	0.001	0.001	0.000	0.000
K	0.010	0.053	0.003	0.000	0.046	0.006	0.003	0.024	0.035	0.078
F	0.072	0.069	0.000	0.075	0.000	0.014	0.047	0.000	0.038	0.047
Cl	0.002	0.001	0.000	0.001	0.006	0.001	0.001	0.003	0.001	0.002
OH	7.927	7.929	8.000	7.924	7.994	7.984	7.952	7.997	7.961	7.952
K/(K+Na+Ca)	0.306	0.622	0.654	0.252	0.778	0.488	0.695	0.782	0.902	0.850
Mg/(Mg+Fe+Mn)	0.765	0.753	0.519	0.630	0.557	0.521	0.522	0.539	0.590	0.561
Al(vi)/(sum Oct)	0.329	0.402	0.253	0.249	0.266	0.247	0.240	0.249	0.239	0.256
F/(F+Cl+OH)	0.009	0.009	0.000	0.009	0.000	0.002	0.006	0.000	0.005	0.006

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	Bu-647_area1	G909166 spot1	G909166 spot1	G909166 spot1	G909166 spot1	G909166 spot1	G909166 spot2	G909166 spot2	G909166 spot3	G909166 spot3
Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl
SiO2	25.41	31.39	30.63	33.06	30.93	32.04	29.38	29.42	28.70	28.69
TiO2	0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.03	0.03
Al2O3	23.12	18.42	17.45	16.34	17.03	16.86	19.68	19.62	19.93	19.89
FeO	24.39	13.81	12.92	12.68	12.84	12.78	14.45	16.10	15.11	15.03
MnO	0.37	0.62	0.56	0.55	0.51	0.62	0.65	0.51	0.60	0.65
MgO	14.88	23.99	25.59	25.02	25.38	25.16	23.91	23.25	23.73	23.73
V2O3	<0.08	0.09	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	0.09	<0.08
CaO	<0.02	0.81	0.11	0.98	0.20	0.29	0.06	0.04	0.06	0.06
Na2O	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
K2O	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
F	0.11	<0.06	0.18	0.20	<0.06	0.30	<0.06	<0.06	<0.06	<0.06
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	88.41	89.23	87.59	88.99	87.15	88.21	88.38	89.18	88.31	88.28
H2O	11.50	12.34	12.07	12.30	12.08	12.13	12.14	12.16	12.10	12.09
Total	99.86	101.56	99.58	101.19	99.23	100.21	100.51	101.34	100.41	100.37
Structural Formulas*										
Si	2.637	3.048	3.019	3.195	3.067	3.129	2.899	2.897	2.842	2.844
Al(iv)	1.363	0.952	0.981	0.805	0.933	0.871	1.101	1.103	1.158	1.156
Al(vi)	1.465	1.157	1.047	1.056	1.056	1.069	1.187	1.175	1.168	1.168
Ti	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.002
Fe	2.117	1.122	1.065	1.025	1.065	1.043	1.192	1.326	1.251	1.246
Mn	0.033	0.051	0.047	0.045	0.043	0.051	0.054	0.043	0.050	0.054
Mg	2.302	3.472	3.760	3.605	3.751	3.662	3.516	3.414	3.503	3.506
V	0.003	0.007	0.006	0.006	0.000	0.000	0.000	0.000	0.008	0.006
Ca	0.000	0.084	0.011	0.102	0.021	0.030	0.006	0.004	0.007	0.007
Na	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
K	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
F	0.035	0.000	0.057	0.062	0.000	0.093	0.000	0.000	0.000	0.000
Cl	0.001	0.003	0.000	0.004	0.003	0.000	0.003	0.003	0.000	0.000
OH	7.964	7.997	7.943	7.935	7.997	7.907	7.997	7.997	8.000	8.000
K/(K+Na+Ca)	0.542	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mg/(Mg+Fe+Mn)	0.517	0.748	0.772	0.771	0.772	0.770	0.738	0.714	0.729	0.729
Al(vi)/(sum Oct)	0.247	0.199	0.177	0.184	0.179	0.183	0.199	0.197	0.195	0.195
F/(F+Cl+OH)	0.004	0.000	0.007	0.008	0.000	0.012	0.000	0.000	0.000	0.000

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	G909168 spot1	G909168 spot1	G909168 spot1	G909168 spot1	G909168 spot2	G909168 spot2	G909168 spot2	G909168 spot3	G909168 spot3	G909168 spot3
Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl
SiO2	27.94	28.32	26.78	28.23	28.00	28.02	27.96	27.56	27.40	27.74
TiO2	0.07	0.07	0.05	0.06	0.05	0.06	0.07	0.05	0.03	0.02
Al2O3	20.00	20.22	19.87	19.52	19.88	19.95	20.15	19.81	19.32	19.61
FeO	20.71	19.92	20.25	20.49	20.10	19.88	20.08	20.05	20.42	19.81
MnO	0.38	0.60	0.51	0.46	0.63	0.66	0.47	0.47	0.43	0.22
MgO	17.95	19.59	18.98	19.26	19.85	19.82	19.34	19.48	18.90	19.82
V2O3	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CaO	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	0.02
Na2O	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
K2O	0.15	0.09	<0.06	0.20	<0.06	<0.06	<0.06	<0.06	0.08	<0.06
F	<0.06	<0.06	0.18	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Cl	0.06	0.04	0.04	<0.03	<0.03	<0.03	<0.03	0.03	0.04	0.04
Total	87.32	88.89	86.74	88.35	88.66	88.58	88.20	87.65	86.81	87.51
H2O	11.62	11.88	11.43	11.76	11.82	11.82	11.78	11.67	11.52	11.68
Total	98.92	100.77	98.09	100.10	100.48	100.40	99.98	99.31	98.32	99.18
Structural Formulas*										
Si	2.878	2.853	2.782	2.876	2.837	2.840	2.843	2.828	2.848	2.844
Al(iv)	1.122	1.147	1.218	1.124	1.163	1.160	1.157	1.172	1.152	1.156
Al(vi)	1.306	1.253	1.215	1.219	1.211	1.223	1.258	1.223	1.214	1.214
Ti	0.005	0.006	0.004	0.004	0.004	0.005	0.005	0.004	0.002	0.002
Fe	1.784	1.679	1.759	1.745	1.703	1.685	1.707	1.720	1.775	1.699
Mn	0.033	0.051	0.045	0.040	0.054	0.057	0.040	0.041	0.038	0.019
Mg	2.756	2.943	2.939	2.924	2.998	2.995	2.931	2.980	2.928	3.030
V	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Ca	0.003	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.002
Na	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
K	0.020	0.012	0.000	0.026	0.000	0.000	0.000	0.000	0.011	0.000
F	0.000	0.000	0.061	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Cl	0.010	0.006	0.008	0.003	0.002	0.000	0.000	0.006	0.007	0.006
OH	7.990	7.994	7.932	7.997	7.998	8.000	8.000	7.994	7.993	7.994
K/(K+Na+Ca)	0.885	1.000	0.000	1.000	0.000	0.000	0.000	0.000	1.000	0.000
Mg/(Mg+Fe+Mn)	0.603	0.630	0.620	0.621	0.630	0.632	0.626	0.629	0.618	0.638
Al(vi)/(sum Oct)	0.222	0.211	0.204	0.205	0.203	0.205	0.212	0.205	0.204	0.204
F/(F+Cl+OH)	0.000	0.000	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	G909168 spot3	G909168 spot3	G909168 spot3	G909158 spot1	G909158 spot1	G909158 spot1	G909158 spot1	G909158 spot1	G909158 spot1	G909158 spot1
Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl
SiO2	28.56	27.18	27.34	30.44	29.01	31.47	28.75	28.47	27.61	27.20
TiO2	<0.02	0.04	0.04	0.05	0.04	0.03	0.04	0.04	0.03	<0.02
Al2O3	18.29	19.57	19.10	20.25	20.85	22.04	20.37	20.50	20.44	20.61
FeO	21.52	22.46	22.34	16.32	17.21	15.00	16.71	17.45	17.37	17.79
MnO	0.29	0.36	0.37	0.42	0.43	0.37	0.39	0.39	0.35	0.38
MgO	19.16	17.97	18.26	21.36	21.02	17.85	20.10	21.01	21.29	21.60
V2O3	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CaO	<0.02	0.03	0.04	0.08	0.04	0.07	0.07	0.04	0.04	0.02
Na2O	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
K2O	0.27	<0.06	<0.06	0.70	0.14	0.28	0.18	0.38	0.10	<0.06
F	<0.06	<0.06	<0.06	0.18	<0.06	0.21	<0.06	0.24	<0.06	<0.06
Cl	<0.03	<0.03	<0.03	<0.03	0.04	<0.03	<0.03	<0.03	<0.03	<0.03
Total	88.29	87.71	87.60	89.88	88.95	87.39	86.76	88.61	87.42	87.78
H2O	11.68	11.55	11.53	12.19	12.08	12.05	11.81	11.88	11.81	11.83
Total	99.97	99.25	99.14	101.99	101.02	99.35	98.56	100.39	99.23	99.60
Structural Formulas										
Si	2.931	2.820	2.840	2.971	2.877	3.102	2.916	2.844	2.800	2.754
Al(iv)	1.069	1.180	1.160	1.029	1.123	0.898	1.084	1.156	1.200	1.246
Al(vi)	1.143	1.213	1.179	1.301	1.314	1.662	1.351	1.258	1.243	1.214
Ti	0.000	0.003	0.003	0.004	0.003	0.002	0.003	0.003	0.002	0.000
Fe	1.847	1.949	1.941	1.332	1.427	1.236	1.417	1.458	1.473	1.506
Mn	0.025	0.031	0.032	0.035	0.036	0.031	0.033	0.033	0.030	0.033
Mg	2.931	2.780	2.828	3.108	3.107	2.623	3.039	3.129	3.218	3.259
V	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Ca	0.000	0.003	0.004	0.008	0.004	0.008	0.008	0.004	0.004	0.003
Na	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
K	0.035	0.000	0.000	0.087	0.017	0.035	0.023	0.048	0.012	0.000
F	0.000	0.000	0.000	0.055	0.000	0.067	0.000	0.075	0.000	0.000
Cl	0.000	0.002	0.000	0.003	0.006	0.003	0.004	0.000	0.002	0.004
OH	8.000	7.998	8.000	7.942	7.994	7.930	7.996	7.925	7.998	7.996
K/(K+Na+Ca)	1.000	0.000	0.000	0.913	0.815	0.818	0.752	0.923	0.766	0.000
Mg/(Mg+Fe+Mn)	0.610	0.584	0.589	0.694	0.680	0.674	0.677	0.677	0.682	0.679
Al(vi)/(sum Oct)	0.192	0.203	0.197	0.225	0.223	0.299	0.231	0.214	0.208	0.202
F/(F+Cl+OH)	0.000	0.000	0.000	0.007	0.000	0.008	0.000	0.009	0.000	0.000

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	G909158 spot3	G909158 spot3	G909158 spot3	G909158 spot3	G909165 spot1	G909165 spot1	G909165 spot1	G909165 spot1	G909165 spot1	G909165 spot1
Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl
SiO2	28.02	28.74	29.99	28.93	27.23	27.10	27.34	27.43	27.26	27.48
TiO2	0.04	0.06	0.04	0.04	0.03	0.04	0.04	0.04	0.03	0.04
Al2O3	20.38	20.10	18.80	19.39	20.70	20.94	20.50	21.20	20.64	21.03
FeO	17.92	17.24	16.35	16.57	19.46	19.88	19.48	19.57	19.30	19.26
MnO	0.36	0.38	0.31	0.39	0.41	0.33	0.32	0.31	0.42	0.32
MgO	21.56	21.36	21.88	20.98	19.29	19.37	19.61	19.08	19.44	19.27
V2O3	<0.08	<0.08	<0.08	<0.08	<0.08	0.09	<0.08	<0.08	<0.08	<0.08
CaO	<0.02	0.03	0.03	0.06	<0.02	<0.02	<0.02	<0.02	0.02	<0.02
Na2O	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
K2O	0.07	0.28	0.76	0.18	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
F	<0.06	<0.06	0.17	0.19	<0.06	<0.06	0.20	<0.06	<0.06	<0.06
Cl	<0.03	<0.03	<0.03	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	88.48	88.31	88.39	86.84	87.29	87.88	87.55	87.87	87.22	87.66
H2O	11.95	11.97	11.96	11.73	11.68	11.74	11.64	11.77	11.69	11.75
Total	100.43	100.28	100.27	98.47	98.96	99.62	99.11	99.63	98.91	99.41
Structural Formulas*										
Si	2.810	2.876	2.985	2.931	2.793	2.766	2.792	2.793	2.795	2.801
Al(iv)	1.190	1.124	1.015	1.069	1.207	1.234	1.208	1.207	1.205	1.199
Al(vi)	1.218	1.247	1.191	1.246	1.295	1.285	1.259	1.337	1.289	1.328
Ti	0.003	0.004	0.003	0.003	0.003	0.003	0.003	0.003	0.002	0.003
Fe	1.503	1.443	1.362	1.404	1.669	1.697	1.664	1.667	1.655	1.642
Mn	0.031	0.032	0.026	0.033	0.036	0.029	0.028	0.027	0.036	0.028
Mg	3.223	3.186	3.247	3.169	2.949	2.947	2.985	2.896	2.971	2.929
V	0.000	0.000	0.000	0.000	0.000	0.007	0.000	0.000	0.000	0.000
Ca	0.000	0.003	0.004	0.007	0.000	0.000	0.000	0.000	0.003	0.000
Na	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
K	0.009	0.035	0.096	0.023	0.000	0.000	0.000	0.000	0.000	0.000
F	0.000	0.000	0.054	0.060	0.000	0.000	0.064	0.000	0.000	0.000
Cl	0.000	0.003	0.000	0.009	0.004	0.000	0.000	0.002	0.000	0.003
OH	8.000	7.997	7.946	7.931	7.996	8.000	7.936	7.998	8.000	7.997
K/(K+Na+Ca)	1.000	0.910	0.965	0.775	0.000	0.000	0.000	0.000	0.000	0.000
Mg/(Mg+Fe+Mn)	0.677	0.684	0.701	0.688	0.634	0.631	0.638	0.631	0.637	0.637
Al(vi)/(sum Oct)	0.204	0.211	0.204	0.213	0.218	0.215	0.212	0.225	0.217	0.224
F/(F+Cl+OH)	0.000	0.000	0.007	0.008	0.000	0.000	0.008	0.000	0.000	0.000

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	G909165 spot2	G909165 spot2	G909165 spot2	G909165 spot2	80JD-94D spot1	80JD-94D spot1	80JD-94D spot1	80JD-94D spot1	80JD-94D spot1
Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl
SiO2	27.20	26.29	27.55	27.51	28.11	27.73	27.82	27.29	28.05
TiO2	0.04	0.04	0.04	0.04	0.04	0.04	0.02	<0.02	0.03
Al2O3	20.63	20.45	20.84	20.39	20.39	20.66	20.72	20.38	20.11
FeO	20.19	20.44	19.92	20.16	16.74	17.24	17.06	17.43	17.45
MnO	0.46	0.52	0.35	0.39	0.35	0.41	0.42	0.26	0.27
MgO	19.50	18.46	19.27	19.94	22.14	21.79	21.78	21.61	21.84
V2O3	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CaO	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Na2O	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
K2O	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
F	0.24	<0.06	0.19	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	88.35	86.40	88.26	88.61	87.90	88.01	87.95	87.18	87.91
H2O	11.67	11.45	11.72	11.82	11.95	11.92	11.93	11.77	11.90
Total	99.92	97.84	99.90	100.43	99.85	99.93	99.88	98.95	99.80
Structural Formulas*									
Si	2.766	2.750	2.796	2.790	2.819	2.787	2.794	2.775	2.824
Al(iv)	1.234	1.250	1.204	1.210	1.181	1.213	1.206	1.225	1.176
Al(vi)	1.239	1.270	1.287	1.227	1.228	1.234	1.246	1.219	1.209
Ti	0.003	0.003	0.003	0.003	0.003	0.003	0.002	0.000	0.002
Fe	1.717	1.788	1.690	1.710	1.404	1.449	1.432	1.483	1.469
Mn	0.040	0.046	0.030	0.034	0.030	0.035	0.036	0.022	0.023
Mg	2.956	2.878	2.914	3.015	3.309	3.265	3.261	3.276	3.277
V	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Ca	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Na	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
K	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
F	0.077	0.000	0.062	0.000	0.000	0.000	0.000	0.000	0.000
Cl	0.000	0.004	0.000	0.000	0.000	0.002	0.002	0.004	0.004
OH	7.923	7.996	7.938	8.000	8.000	7.998	7.998	7.996	7.996
K/(K+Na+Ca)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mg/(Mg+Fe+Mn)	0.627	0.611	0.629	0.634	0.698	0.688	0.690	0.685	0.687
Al(vi)/(sum Oct)	0.208	0.212	0.217	0.205	0.206	0.206	0.208	0.203	0.202
F/(F+Cl+OH)	0.010	0.000	0.008	0.000	0.000	0.000	0.000	0.000	0.000

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	80JD-94D spot1	80JD-94D spot2	80JD-94D spot2	80JD-94D spot2	80JD-94D spot2	80JD-94D spot3	80JD-94D spot3	80JD-94D spot3	80JD-94D spot3
Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl
SiO2	27.70	28.58	28.40	29.48	29.23	27.68	27.70	29.18	29.24
TiO2	<0.02	0.04	<0.02	0.03	0.02	0.02	0.02	<0.02	<0.02
Al2O3	20.40	19.27	19.07	18.68	18.49	20.44	20.40	18.53	19.01
FeO	17.66	16.48	16.08	16.01	16.16	17.16	16.90	16.72	15.95
MnO	0.23	0.27	0.18	0.19	0.20	0.31	0.25	0.21	0.24
MgO	21.26	23.16	23.35	23.93	23.51	22.19	22.18	23.73	23.74
V2O3	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CaO	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	0.09	0.03
Na2O	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
K2O	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
F	<0.06	0.19	<0.06	<0.06	0.17	<0.06	<0.06	0.20	0.16
Cl	0.04	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	87.44	88.06	87.19	88.52	87.82	87.87	87.52	88.70	88.42
H2O	11.81	11.91	11.89	12.09	11.92	11.91	11.89	11.98	12.02
Total	99.24	99.89	99.08	100.61	99.67	99.78	99.40	100.59	100.37
Structural Formulas*									
Si	2.807	2.855	2.862	2.922	2.919	2.783	2.792	2.896	2.897
Al(iv)	1.193	1.145	1.138	1.078	1.081	1.217	1.208	1.104	1.103
Al(vi)	1.243	1.123	1.127	1.104	1.096	1.205	1.215	1.063	1.117
Ti	0.000	0.003	0.000	0.002	0.002	0.002	0.002	0.000	0.000
Fe	1.497	1.377	1.355	1.327	1.349	1.443	1.425	1.388	1.322
Mn	0.020	0.023	0.016	0.016	0.017	0.026	0.021	0.017	0.020
Mg	3.211	3.449	3.507	3.535	3.501	3.326	3.332	3.511	3.506
V	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Ca	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.009	0.003
Na	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
K	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
F	0.000	0.060	0.000	0.000	0.052	0.000	0.000	0.063	0.050
Cl	0.007	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000
OH	7.993	7.940	8.000	8.000	7.948	7.997	8.000	7.937	7.950
K/(K+Na+Ca)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mg/(Mg+Fe+Mn)	0.679	0.711	0.719	0.725	0.719	0.694	0.697	0.714	0.723
Al(vi)/(sum Oct)	0.208	0.188	0.188	0.185	0.184	0.201	0.203	0.178	0.187
F/(F+Cl+OH)	0.000	0.008	0.000	0.000	0.007	0.000	0.000	0.008	0.006

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	80JD-94D spot3	80JD-94D spot3	YD01-01C spot1	YD01-01C spot1	YD01-01C spot1	YD01-01C spot1	YD01-01C spot1	YD01-01C spot2	YD01-01C spot2
Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl
SiO2	28.37	29.33	29.07	29.23	29.29	27.77	27.23	28.90	29.42
TiO2	0.03	0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.04
Al2O3	19.74	19.16	18.51	18.39	18.04	20.72	20.82	18.59	18.70
FeO	16.20	15.99	17.16	17.24	17.24	18.58	18.46	17.17	17.12
MnO	0.22	0.19	0.31	0.34	0.35	0.38	0.41	0.35	0.36
MgO	22.82	23.71	22.07	22.75	22.71	21.10	21.03	22.96	23.01
V2O3	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CaO	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Na2O	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
K2O	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
F	<0.06	<0.06	<0.06	0.17	<0.06	<0.06	<0.06	0.21	0.18
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	87.45	88.49	87.30	88.21	87.86	88.69	88.17	88.31	88.95
H2O	11.94	12.11	11.84	11.89	11.90	11.94	11.85	11.88	12.00
Total	99.39	100.60	99.14	100.03	99.77	100.63	100.02	100.10	100.88
Structural Formulas*									
Si	2.848	2.902	2.941	2.926	2.949	2.787	2.752	2.893	2.915
Al(iv)	1.152	1.098	1.059	1.074	1.051	1.213	1.248	1.107	1.085
Al(vi)	1.183	1.137	1.148	1.095	1.090	1.238	1.233	1.085	1.099
Ti	0.002	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.003
Fe	1.360	1.323	1.452	1.443	1.452	1.560	1.561	1.437	1.419
Mn	0.018	0.016	0.027	0.029	0.030	0.032	0.035	0.030	0.031
Mg	3.415	3.498	3.329	3.394	3.409	3.157	3.169	3.426	3.400
V	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.000	0.006
Ca	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Na	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
K	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
F	0.000	0.000	0.000	0.055	0.000	0.000	0.000	0.065	0.055
Cl	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004
OH	8.000	8.000	8.000	7.945	8.000	8.000	8.000	7.935	7.941
K/(K+Na+Ca)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mg/(Mg+Fe+Mn)	0.712	0.723	0.692	0.698	0.697	0.665	0.665	0.700	0.701
Al(vi)/(sum Oct)	0.198	0.190	0.193	0.184	0.182	0.207	0.205	0.182	0.185
F/(F+Cl+OH)	0.000	0.000	0.000	0.007	0.000	0.000	0.000	0.008	0.007

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	YD01-01C spot2	YD01-01C spot2	YD01-01C spot2	YD01-01C spot2	YD01-01C spot3	YD01-01C spot3	YD01-01C spot3	YD01-01C spot3	YD01-01C spot3
Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl
SiO2	28.67	28.04	29.24	29.07	28.93	27.42	28.12	27.80	29.87
TiO2	<0.02	<0.02	0.05	0.03	0.20	0.14	0.09	0.04	0.03
Al2O3	19.43	19.26	18.61	18.74	18.21	19.61	19.38	20.19	17.26
FeO	17.62	17.56	17.26	17.55	16.77	17.63	17.25	18.17	16.45
MnO	0.38	0.36	0.32	0.33	0.31	0.34	0.38	0.35	0.36
MgO	23.52	22.15	22.76	22.56	22.47	21.20	21.73	21.40	23.46
V2O3	<0.08	<0.08	<0.08	<0.08	0.08	<0.08	<0.08	<0.08	<0.08
CaO	<0.02	<0.02	0.04	0.02	0.07	0.05	0.02	<0.02	0.02
Na2O	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
K2O	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
F	0.25	0.19	0.19	0.17	0.18	0.15	<0.06	<0.06	0.25
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	89.97	87.66	88.54	88.56	87.30	86.62	87.16	88.08	87.79
H2O	12.05	11.77	11.93	11.92	11.78	11.62	11.79	11.88	11.85
Total	101.91	99.35	100.38	100.41	99.00	98.17	98.95	99.95	99.54
Structural Formulas*									
Si	2.822	2.834	2.915	2.903	2.922	2.809	2.857	2.805	2.990
Al(iv)	1.178	1.166	1.085	1.097	1.078	1.191	1.143	1.195	1.010
Al(vi)	1.076	1.128	1.101	1.108	1.090	1.177	1.177	1.206	1.026
Ti	0.000	0.000	0.003	0.002	0.015	0.011	0.007	0.003	0.003
Fe	1.450	1.484	1.439	1.465	1.417	1.510	1.466	1.534	1.378
Mn	0.032	0.030	0.027	0.028	0.027	0.029	0.032	0.030	0.030
Mg	3.452	3.337	3.383	3.359	3.383	3.237	3.291	3.219	3.501
V	0.000	0.006	0.000	0.000	0.007	0.000	0.000	0.000	0.006
Ca	0.000	0.000	0.004	0.003	0.008	0.006	0.003	0.000	0.002
Na	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
K	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
F	0.078	0.059	0.059	0.054	0.057	0.047	0.000	0.000	0.080
Cl	0.002	0.000	0.003	0.000	0.002	0.005	0.000	0.000	0.000
OH	7.919	7.941	7.938	7.946	7.940	7.948	8.000	8.000	7.920
K/(K+Na+Ca)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mg/(Mg+Fe+Mn)	0.700	0.688	0.698	0.692	0.701	0.678	0.687	0.673	0.713
Al(vi)/(sum Oct)	0.179	0.188	0.185	0.186	0.184	0.197	0.197	0.201	0.173
F/(F+Cl+OH)	0.010	0.007	0.007	0.007	0.007	0.006	0.000	0.000	0.010

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	YD01-01C spot3	H437269 Spot1	H437269 Spot1	H437269 Spot1	H437269 Spot1	H437269 Spot1	H437269 Spot2	H437269 Spot2	H437269 Spot2
Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl
SiO2	28.26	28.42	28.29	28.03	28.70	29.37	27.42	27.33	27.51
TiO2	0.03	-	-	-	-	-	-	-	-
Al2O3	19.39	22.97	22.70	23.80	21.35	22.58	21.21	21.28	21.33
FeO	17.37	17.26	17.52	17.32	17.74	16.46	19.11	19.22	18.89
MnO	0.34	0.09	0.08	<0.06	0.08	<0.06	0.09	0.10	0.10
MgO	21.86	21.22	20.52	21.62	22.47	21.50	21.78	21.44	21.76
V2O3	<0.08	-	-	-	-	-	-	-	-
CaO	<0.02	<0.02	0.42	<0.02	<0.02	0.04	<0.02	<0.02	<0.02
Na2O	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
K2O	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
F	<0.06	0.20	0.19	0.24	0.22	0.31	0.30	0.18	0.15
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	87.39	90.21	89.74	91.15	90.56	90.36	89.92	89.58	89.76
H2O	11.83	12.22	12.13	12.32	12.21	12.27	11.96	11.96	12.02
Total	99.22	102.34	101.79	103.36	102.67	102.50	101.75	101.46	101.72
Structural Formulas*									
Si	2.862	2.765	2.752	2.727	2.791	2.857	2.667	2.658	2.676
Al(iv)	1.138	1.235	1.248	1.273	1.209	1.143	1.333	1.342	1.324
Al(vi)	1.176	1.398	1.354	1.455	1.238	1.446	1.099	1.097	1.120
Ti	0.002								
Fe	1.472	1.404	1.425	1.409	1.443	1.339	1.554	1.564	1.537
Mn	0.029	0.008	0.007	0.005	0.006	0.005	0.008	0.008	0.008
Mg	3.301	3.077	2.975	3.136	3.259	3.118	3.158	3.109	3.156
V	0.000								
Ca	0.000	0.000	0.044	0.002	0.000	0.004	0.000	0.000	0.000
Na	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
K	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
F	0.000	0.063	0.057	0.074	0.069	0.095	0.091	0.057	0.046
Cl	0.000	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.000
OH	8.000	7.937	7.943	7.921	7.931	7.905	7.909	7.943	7.954
K/(K+Na+Ca)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mg/(Mg+Fe+Mn)	0.687	0.685	0.675	0.689	0.692	0.699	0.669	0.664	0.671
Al(vi)/(sum Oct)	0.197	0.237	0.235	0.242	0.208	0.245	0.189	0.190	0.192
F/(F+Cl+OH)	0.000	0.008	0.007	0.009	0.009	0.012	0.011	0.007	0.006

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	H437269 Spot2	H437269 Spot2	H437269 Spot2	H437269 Spot2	H437269 Spot2	H437269 Spot2	H437269 Spot3	H437269 Spot3	H437269 Spot3	H437269 Spot3
Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl
SiO2	28.17	27.80	27.67	27.63	27.87	27.52	27.58	27.87	27.49	27.41
TiO2	-	-	-	-	-	-	-	-	-	-
Al2O3	21.26	20.96	20.95	21.03	21.65	21.07	22.23	22.87	22.10	21.08
FeO	18.62	18.68	18.77	19.25	18.98	18.98	18.58	17.76	18.58	18.07
MnO	0.09	0.08	0.10	0.07	<0.06	0.08	0.07	0.08	0.07	0.07
MgO	21.82	22.06	21.76	21.31	21.50	21.47	21.56	20.13	20.73	21.01
V2O3	-	-	-	-	-	-	-	-	-	-
CaO	<0.02	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Na2O	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
K2O	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
F	0.33	0.26	0.25	0.30	0.21	0.30	0.25	0.21	0.24	0.33
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	90.31	89.86	89.54	89.62	90.27	89.45	90.31	88.95	89.25	87.97
H2O	12.05	12.00	11.95	11.92	12.08	11.91	12.09	12.01	11.95	11.75
Total	102.23	101.75	101.39	101.41	102.26	101.23	102.30	100.87	101.10	99.59
Structural Formulas*										
Si	2.741	2.704	2.692	2.687	2.711	2.677	2.683	2.711	2.674	2.666
Al(iv)	1.259	1.296	1.308	1.313	1.289	1.323	1.317	1.289	1.326	1.334
Al(vi)	1.178	1.107	1.093	1.098	1.193	1.093	1.232	1.332	1.207	1.082
Ti										
Fe	1.515	1.520	1.527	1.566	1.544	1.544	1.511	1.444	1.512	1.470
Mn	0.008	0.006	0.008	0.006	0.005	0.007	0.006	0.007	0.006	0.006
Mg	3.164	3.198	3.156	3.091	3.118	3.114	3.126	2.919	3.006	3.046
V										
Ca	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Na	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
K	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
F	0.101	0.080	0.077	0.092	0.064	0.092	0.076	0.064	0.075	0.101
Cl	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
OH	7.899	7.920	7.923	7.908	7.936	7.908	7.924	7.936	7.925	7.899
K/(K+Na+Ca)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mg/(Mg+Fe+Mn)	0.675	0.677	0.673	0.663	0.668	0.667	0.673	0.668	0.665	0.674
Al(vi)/(sum Oct)	0.201	0.190	0.189	0.191	0.204	0.190	0.210	0.234	0.211	0.193
F/(F+Cl+OH)	0.013	0.010	0.010	0.011	0.008	0.011	0.010	0.008	0.009	0.013

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	H437269 Spot3	H437269 Spot3	H437289 Spot1	H437289 Spot1	H437289 Spot1	H437289 Spot1	H437289 Spot1	H437289 Spot2	H437289 Spot2	H437289 Spot2
Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl
SiO2	29.07	28.63	30.18	28.80	27.75	30.91	28.81	28.87	29.08	28.62
TiO2	-	-	-	-	-	-	-	-	-	-
Al2O3	19.50	22.26	19.52	19.99	20.81	18.41	20.65	20.90	20.89	21.02
FeO	18.13	18.00	18.09	19.07	19.59	17.29	19.42	18.50	18.47	18.69
MnO	0.10	<0.06	0.08	0.10	0.10	0.10	0.09	0.10	0.09	0.10
MgO	22.61	19.92	22.27	20.71	20.56	22.88	20.89	21.75	21.68	21.42
V2O3	-	-	-	-	-	-	-	-	-	-
CaO	<0.02	0.03	0.08	0.11	0.09	0.17	0.16	0.04	0.03	0.04
Na2O	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
K2O	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
F	0.55	0.24	0.26	0.23	0.17	0.45	0.21	0.23	0.16	0.22
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	89.99	89.13	90.50	89.03	89.14	90.24	90.28	90.39	90.44	90.16
H2O	11.93	12.03	12.18	11.90	11.88	12.10	12.06	12.14	12.18	12.09
Total	101.69	101.06	102.57	100.84	100.96	102.15	102.25	102.43	102.56	102.16
Structural Formulas*										
Si	2.828	2.785	2.936	2.801	2.699	3.007	2.802	2.808	2.828	2.784
Al(iv)	1.172	1.215	1.064	1.199	1.301	0.993	1.198	1.192	1.172	1.216
Al(vi)	1.063	1.337	1.173	1.093	1.084	1.117	1.170	1.204	1.224	1.194
Ti										
Fe	1.475	1.464	1.472	1.552	1.593	1.407	1.580	1.505	1.503	1.521
Mn	0.008	0.004	0.006	0.008	0.008	0.008	0.007	0.008	0.007	0.008
Mg	3.278	2.888	3.230	3.004	2.981	3.317	3.029	3.154	3.144	3.106
V										
Ca	0.000	0.003	0.008	0.011	0.009	0.017	0.016	0.004	0.004	0.005
Na	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
K	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
F	0.171	0.073	0.079	0.071	0.052	0.140	0.064	0.072	0.049	0.069
Cl	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
OH	7.829	7.927	7.921	7.929	7.948	7.860	7.936	7.928	7.951	7.931
K/(K+Na+Ca)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mg/(Mg+Fe+Mn)	0.689	0.663	0.686	0.658	0.651	0.701	0.656	0.676	0.676	0.670
Al(vi)/(sum Oct)	0.182	0.235	0.199	0.193	0.191	0.191	0.202	0.205	0.208	0.205
F/(F+Cl+OH)	0.021	0.009	0.010	0.009	0.006	0.017	0.008	0.009	0.006	0.009

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	H437289 Spot2	H437289 Spot2	H437289 Spot3	H437289 Spot3	H437289 Spot3	H437289 Spot3	H437289 Spot3	H437289 Spot3	H437289 Spot3	H437289 Spot3
Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl
SiO2	27.58	29.42	30.45	30.02	27.35	28.42	28.68	29.06	28.03	27.47
TiO2	-	-	-	-	-	-	-	-	-	-
Al2O3	22.30	20.18	20.41	19.53	21.69	20.77	21.13	20.21	21.84	21.77
FeO	19.31	18.37	17.65	18.10	20.41	18.62	18.37	17.69	19.22	19.76
MnO	0.10	0.09	0.10	<0.06	0.15	0.17	0.10	0.08	0.07	0.09
MgO	20.56	21.86	20.86	22.07	20.13	21.54	21.60	21.74	21.15	20.40
V2O3	-	-	-	-	-	-	-	-	-	-
CaO	0.04	0.09	0.10	0.14	<0.02	<0.02	0.02	0.08	0.03	<0.02
Na2O	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
K2O	<0.06	<0.06	0.49	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
F	0.18	0.29	0.28	0.38	0.19	0.32	0.28	0.23	0.15	0.15
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.03	<0.03	<0.03
Total	90.09	90.31	90.34	90.36	89.94	89.89	90.22	89.13	90.49	89.66
H2O	12.05	12.11	12.17	12.09	11.94	11.99	12.10	12.00	12.14	11.97
Total	102.07	102.30	102.40	102.29	101.81	101.74	102.20	101.02	102.57	101.57
Structural Formulas*										
Si	2.683	2.862	2.962	2.920	2.660	2.764	2.790	2.826	2.726	2.672
Al(iv)	1.317	1.138	1.038	1.080	1.340	1.236	1.210	1.174	1.274	1.328
Al(vi)	1.239	1.175	1.302	1.159	1.147	1.144	1.212	1.143	1.230	1.167
Ti										
Fe	1.571	1.494	1.436	1.473	1.661	1.515	1.495	1.439	1.564	1.607
Mn	0.008	0.007	0.008	0.005	0.013	0.014	0.008	0.006	0.005	0.008
Mg	2.981	3.170	3.025	3.200	2.919	3.124	3.132	3.152	3.067	2.958
V										
Ca	0.004	0.010	0.010	0.014	0.000	0.000	0.003	0.008	0.003	0.002
Na	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
K	0.000	0.000	0.061	0.000	0.000	0.000	0.000	0.000	0.000	0.000
F	0.055	0.090	0.086	0.118	0.058	0.100	0.086	0.072	0.045	0.046
Cl	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.000
OH	7.945	7.910	7.914	7.882	7.942	7.900	7.914	7.923	7.955	7.954
K/(K+Na+Ca)	0.000	0.000	0.855	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mg/(Mg+Fe+Mn)	0.654	0.679	0.677	0.684	0.636	0.671	0.676	0.686	0.662	0.647
Al(vi)/(sum Oct)	0.214	0.201	0.226	0.199	0.200	0.197	0.207	0.199	0.210	0.203
F/(F+Cl+OH)	0.007	0.011	0.011	0.015	0.007	0.012	0.011	0.009	0.006	0.006

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	H437289 Spot3	81JD-94B Spot1	81JD-94B Spot1	81JD-94B Spot1	81JD-94B Spot1	81JD-94B Spot1	81JD-94B Spot1	81JD-94B Spot1	81JD-94B Spot1
Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl
SiO2	27.90	27.69	28.17	27.90	28.35	28.48	28.38	28.56	28.50
TiO2	-	-	-	-	-	-	-	-	-
Al2O3	21.59	21.36	21.45	21.24	21.31	20.40	20.79	20.78	21.30
FeO	18.97	16.59	15.68	16.92	15.99	16.32	16.34	16.35	16.59
MnO	0.13	0.47	0.55	0.49	0.44	0.41	0.44	0.43	0.45
MgO	21.19	22.93	23.51	22.57	23.44	23.40	22.72	23.54	23.60
V2O3	-	-	-	-	-	-	-	-	-
CaO	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	0.03
Na2O	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
K2O	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
F	<0.06	0.15	0.15	0.14	0.15	0.16	0.13	0.12	0.13
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	89.95	89.19	89.51	89.27	89.69	89.19	88.83	89.84	90.62
H2O	12.12	12.07	12.18	12.07	12.20	12.09	12.06	12.20	12.29
Total	102.07	101.20	101.63	101.28	101.83	101.22	100.83	101.98	102.86
Structural Formulas*									
Si	2.714	2.693	2.740	2.714	2.758	2.770	2.761	2.778	2.772
Al(iv)	1.286	1.307	1.260	1.286	1.242	1.230	1.239	1.222	1.228
Al(vi)	1.189	1.141	1.199	1.149	1.200	1.109	1.144	1.160	1.213
Ti									
Fe	1.543	1.349	1.276	1.376	1.301	1.328	1.329	1.330	1.350
Mn	0.011	0.039	0.045	0.041	0.036	0.033	0.036	0.035	0.037
Mg	3.072	3.325	3.409	3.272	3.399	3.393	3.294	3.413	3.422
V									
Ca	0.002	0.000	0.000	0.000	0.000	0.000	0.002	0.003	0.003
Na	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
K	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
F	0.000	0.045	0.045	0.043	0.045	0.049	0.041	0.038	0.041
Cl	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
OH	8.000	7.955	7.955	7.957	7.955	7.951	7.959	7.962	7.959
K/(K+Na+Ca)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mg/(Mg+Fe+Mn)	0.664	0.705	0.721	0.698	0.718	0.714	0.707	0.714	0.712
Al(vi)/(sum Oct)	0.204	0.195	0.202	0.197	0.202	0.189	0.197	0.195	0.201
F/(F+Cl+OH)	0.000	0.006	0.006	0.005	0.006	0.006	0.005	0.005	0.005

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	81JD-94B Spot2	81JD-94B Spot2	81JD-94B Spot2	81JD-94B Spot2	81JD-94B Spot2	81JD-94B Spot2	81JD-94B Spot2	81JD-94B Spot3	81JD-94B Spot3
Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl
SiO2	28.20	28.16	28.79	28.15	28.06	29.26	29.58	29.63	29.43
TiO2	-	-	-	-	-	-	-	-	-
Al2O3	20.52	20.98	19.40	20.75	20.57	19.88	18.91	19.08	19.20
FeO	16.70	16.52	16.26	16.78	16.61	16.14	15.60	15.23	15.48
MnO	0.39	0.47	0.45	0.43	0.44	0.44	0.40	0.38	0.42
MgO	23.19	23.22	23.50	23.41	23.23	23.99	24.70	24.35	24.44
V2O3	-	-	-	-	-	-	-	-	-
CaO	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02
Na2O	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
K2O	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
F	0.15	<0.06	0.28	0.15	0.22	0.18	0.22	0.32	0.27
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.03	<0.03
Total	89.18	89.46	88.73	89.68	89.15	89.93	89.44	89.04	89.28
H2O	12.07	12.17	11.97	12.13	12.03	12.21	12.15	12.07	12.11
Total	101.18	101.64	100.58	101.74	101.08	102.06	101.50	100.97	101.28
Structural Formulas*									
Si	2.743	2.739	2.801	2.738	2.729	2.846	2.877	2.882	2.862
Al(iv)	1.257	1.261	1.199	1.262	1.271	1.154	1.123	1.118	1.138
Al(vi)	1.095	1.144	1.025	1.116	1.087	1.125	1.045	1.069	1.063
Ti									
Fe	1.358	1.344	1.322	1.365	1.352	1.313	1.269	1.239	1.260
Mn	0.032	0.038	0.037	0.035	0.036	0.036	0.033	0.031	0.035
Mg	3.363	3.368	3.408	3.394	3.369	3.478	3.582	3.530	3.545
V									
Ca	0.002	0.000	0.002	0.000	0.000	0.002	0.002	0.002	0.002
Na	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
K	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
F	0.047	0.000	0.088	0.047	0.068	0.056	0.069	0.097	0.083
Cl	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.000
OH	7.953	8.000	7.912	7.953	7.932	7.944	7.931	7.897	7.917
K/(K+Na+Ca)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mg/(Mg+Fe+Mn)	0.708	0.709	0.715	0.708	0.708	0.721	0.733	0.735	0.733
Al(vi)/(sum Oct)	0.187	0.194	0.177	0.189	0.186	0.189	0.176	0.182	0.180
F/(F+Cl+OH)	0.006	0.000	0.011	0.006	0.009	0.007	0.009	0.012	0.010

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	81JD-94B Spot3	81JD-94B Spot3	81JD-94B Spot3	81JD-94B Spot3	81JD-94B Spot3	81JD-94B Spot3	81JD-94B Spot3	YD01-04 Spot1	YD01-04 Spot1
Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl
SiO2	30.59	29.38	28.73	29.28	28.72	28.67	28.06	27.64	28.28
TiO2	-	-	-	-	-	-	-	-	-
Al2O3	19.11	19.16	19.91	18.89	20.01	20.37	20.19	20.63	19.92
FeO	15.08	15.61	15.84	15.36	15.95	15.86	15.68	19.62	18.70
MnO	0.41	0.39	0.45	0.39	0.43	0.38	0.41	0.20	0.16
MgO	24.56	24.83	24.16	24.48	23.52	23.23	23.41	21.18	22.04
V2O3	-	-	-	-	-	-	-	-	-
CaO	0.04	<0.02	<0.02	0.04	0.03	0.05	0.06	<0.02	<0.02
Na2O	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
K2O	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
F	0.34	0.24	0.19	0.23	0.18	0.18	<0.06	<0.06	0.12
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	90.18	89.66	89.31	88.71	88.86	88.81	87.93	89.38	89.25
H2O	12.26	12.16	12.12	12.05	12.06	12.06	12.00	11.98	11.98
Total	102.30	101.72	101.35	100.67	100.84	100.79	99.94	101.36	101.18
Structural Formulas*									
Si	2.975	2.858	2.795	2.848	2.794	2.788	2.729	2.689	2.751
Al(iv)	1.025	1.142	1.205	1.152	1.206	1.212	1.271	1.311	1.249
Al(vi)	1.167	1.055	1.077	1.014	1.088	1.124	1.044	1.054	1.034
Ti									
Fe	1.227	1.270	1.289	1.249	1.297	1.291	1.276	1.596	1.521
Mn	0.034	0.032	0.037	0.032	0.035	0.032	0.034	0.017	0.013
Mg	3.562	3.600	3.503	3.550	3.410	3.369	3.395	3.071	3.196
V									
Ca	0.004	0.000	0.000	0.004	0.003	0.006	0.007	0.000	0.000
Na	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
K	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
F	0.103	0.074	0.058	0.070	0.055	0.056	0.000	0.000	0.038
Cl	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
OH	7.897	7.926	7.942	7.930	7.945	7.944	8.000	8.000	7.962
K/(K+Na+Ca)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mg/(Mg+Fe+Mn)	0.739	0.734	0.725	0.735	0.719	0.718	0.722	0.656	0.676
Al(vi)/(sum Oct)	0.195	0.177	0.182	0.173	0.187	0.193	0.182	0.184	0.179
F/(F+Cl+OH)	0.013	0.009	0.007	0.009	0.007	0.007	0.000	0.000	0.005

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	YD01-04 Spot1	YD01-04 Spot1	YD01-04 Spot1	YD01-04 Spot1	YD01-04 Spot1	YD01-04 Spot1	YD01-04 Spot2	YD01-04 Spot2	YD01-04 Spot2	YD01-04 Spot2
Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl
SiO2	28.17	27.88	27.57	28.62	30.20	29.98	28.13	27.96	28.26	28.00
TiO2	-	-	-	-	-	-	-	-	-	-
Al2O3	19.96	20.03	21.03	20.41	17.92	17.66	20.97	20.93	20.66	20.75
FeO	18.80	19.21	19.59	18.66	17.39	17.21	18.97	18.98	18.79	18.79
MnO	0.18	0.17	0.17	0.15	0.16	0.16	0.16	0.21	0.21	0.14
MgO	22.10	21.74	21.12	22.24	23.70	23.79	22.07	21.83	22.09	21.64
V2O3	-	-	-	-	-	-	-	-	-	-
CaO	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Na2O	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
K2O	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
F	0.14	0.18	<0.06	<0.06	0.16	0.19	0.22	0.19	<0.06	<0.06
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.03	<0.03	<0.03
Total	89.39	89.23	89.57	90.19	89.56	89.04	90.52	90.17	90.15	89.42
H2O	11.98	11.91	12.01	12.17	12.11	12.02	12.10	12.04	12.14	12.05
Total	101.30	101.06	101.58	102.36	101.59	100.98	102.53	102.13	102.29	101.47
Structural Formulas*										
Si	2.740	2.712	2.681	2.784	2.937	2.916	2.736	2.720	2.749	2.724
Al(iv)	1.260	1.288	1.319	1.216	1.063	1.084	1.264	1.280	1.251	1.276
Al(vi)	1.028	1.008	1.093	1.124	0.991	0.941	1.141	1.119	1.117	1.102
Ti										
Fe	1.529	1.563	1.594	1.518	1.415	1.400	1.543	1.544	1.529	1.529
Mn	0.014	0.014	0.014	0.012	0.013	0.013	0.013	0.018	0.017	0.012
Mg	3.205	3.153	3.062	3.226	3.437	3.450	3.200	3.165	3.203	3.138
V										
Ca	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Na	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
K	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
F	0.043	0.056	0.000	0.000	0.050	0.059	0.066	0.058	0.000	0.000
Cl	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.000	0.000
OH	7.957	7.944	8.000	8.000	7.950	7.941	7.934	7.937	8.000	8.000
K/(K+Na+Ca)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mg/(Mg+Fe+Mn)	0.675	0.667	0.656	0.678	0.706	0.709	0.673	0.670	0.674	0.671
Al(vi)/(sum Oct)	0.178	0.176	0.190	0.191	0.169	0.162	0.193	0.191	0.190	0.191
F/(F+Cl+OH)	0.005	0.007	0.000	0.000	0.006	0.007	0.008	0.007	0.000	0.000

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	YD01-04 Spot2	YD01-04 Spot2	YD01-04 Spot2	YD01-04 Spot2	YD01-04 Spot2	YD01-04 Spot3	YD01-04 Spot3	YD01-04 Spot3	YD01-04 Spot3	YD01-04 Spot3
Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl
SiO2	27.67	27.85	27.65	27.17	28.06	28.39	27.29	28.36	27.47	28.47
TiO2	-	-	-	-	-	-	-	-	-	-
Al2O3	21.02	20.77	20.71	20.46	21.06	19.25	20.95	19.30	21.00	19.01
FeO	18.91	19.06	19.17	19.45	19.04	19.31	19.98	18.47	19.64	18.91
MnO	0.14	0.19	0.20	0.17	0.17	0.18	0.15	0.17	0.18	0.16
MgO	21.45	21.78	21.84	21.36	21.85	22.01	20.80	22.15	21.08	21.87
V2O3	-	-	-	-	-	-	-	-	-	-
CaO	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Na2O	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
K2O	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
F	0.12	0.16	<0.06	<0.06	0.12	<0.06	<0.06	<0.06	0.11	0.17
Cl	<0.03	<0.03	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	89.34	89.85	89.72	88.69	90.33	89.28	89.27	88.56	89.50	88.62
H2O	11.98	12.02	12.03	11.88	12.12	11.98	11.94	11.94	11.95	11.85
Total	101.27	101.80	101.74	100.57	102.39	101.25	101.20	100.49	101.41	100.39
Structural Formulas*										
Si	2.692	2.709	2.689	2.642	2.730	2.761	2.654	2.758	2.672	2.769
Al(iv)	1.308	1.291	1.311	1.358	1.270	1.239	1.346	1.242	1.328	1.231
Al(vi)	1.102	1.090	1.064	0.987	1.144	0.968	1.055	0.970	1.080	0.948
Ti										
Fe	1.538	1.550	1.559	1.582	1.549	1.571	1.625	1.503	1.597	1.538
Mn	0.012	0.016	0.016	0.014	0.014	0.015	0.013	0.014	0.015	0.013
Mg	3.110	3.159	3.168	3.097	3.169	3.192	3.016	3.212	3.057	3.172
V										
Ca	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Na	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
K	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
F	0.036	0.048	0.000	0.000	0.035	0.000	0.000	0.000	0.034	0.054
Cl	0.000	0.000	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000
OH	7.964	7.952	7.992	8.000	7.965	8.000	8.000	8.000	7.966	7.946
K/(K+Na+Ca)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mg/(Mg+Fe+Mn)	0.667	0.669	0.668	0.660	0.670	0.668	0.648	0.679	0.655	0.672
Al(vi)/(sum Oct)	0.191	0.187	0.183	0.174	0.195	0.168	0.185	0.170	0.188	0.167
F/(F+Cl+OH)	0.004	0.006	0.000	0.000	0.004	0.000	0.000	0.000	0.004	0.007

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	YD01-04 Spot3	YD01-04 Spot3	YD01-04 Spot3	YD01-04 Spot3	YD01-04 Spot3	G909174_spot1	G909174_spot1	G909174_spot1	G909174_spot1	G909174_spot1
Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl
SiO2	27.97	28.62	28.49	27.93	27.61	27.52	27.06	27.71	27.07	28.20
TiO2	-	-	-	-	-	0.03	0.03	<0.02	0.06	<0.02
Al2O3	20.35	19.67	20.37	19.68	20.78	19.01	19.17	19.63	19.78	18.86
FeO	19.16	18.75	18.58	18.56	19.25	20.28	21.05	20.49	20.63	19.97
MnO	0.18	0.16	0.20	0.20	0.20	0.26	0.25	0.18	0.22	0.22
MgO	21.53	21.15	22.41	22.04	21.77	20.22	19.88	20.39	20.27	20.80
V2O3	-	-	-	-	-	<0.08	<0.08	<0.08	<0.08	<0.08
CaO	<0.02	0.05	<0.02	<0.02	<0.02	0.06	0.06	<0.02	0.03	0.04
Na2O	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
K2O	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	0.07	<0.06	<0.06	0.21
F	<0.06	<0.06	0.12	<0.06	<0.06	<0.06	<0.06	0.14	0.17	0.18
Cl	<0.03	<0.03	0.04	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	89.26	88.53	90.23	88.51	89.66	87.54	87.74	88.64	88.33	88.53
H2O	12.00	11.93	12.12	11.92	12.04	11.65	11.60	11.75	11.66	11.74
Total	101.26	100.46	102.29	100.43	101.70	99.19	99.34	100.33	99.92	100.19
Structural Formulas*										
Si	2.721	2.784	2.771	2.717	2.685	2.831	2.793	2.811	2.763	2.859
Al(iv)	1.279	1.216	1.229	1.283	1.315	1.169	1.207	1.189	1.237	1.141
Al(vi)	1.054	1.039	1.107	0.973	1.068	1.137	1.126	1.157	1.143	1.112
Ti						0.002	0.002	0.000	0.005	0.000
Fe	1.559	1.526	1.512	1.510	1.566	1.745	1.817	1.738	1.761	1.693
Mn	0.015	0.013	0.016	0.017	0.016	0.022	0.021	0.016	0.019	0.019
Mg	3.121	3.066	3.250	3.196	3.157	3.101	3.059	3.083	3.085	3.144
V						0.000	0.000	0.000	0.000	0.000
Ca	0.000	0.005	0.000	0.000	0.000	0.007	0.006	0.000	0.004	0.005
Na	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
K	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.000	0.000	0.027
F	0.000	0.000	0.038	0.000	0.000	0.000	0.000	0.044	0.054	0.057
Cl	0.000	0.000	0.006	0.000	0.000	0.000	0.003	0.000	0.000	0.000
OH	8.000	8.000	7.956	8.000	8.000	8.000	7.997	7.956	7.946	7.943
K/(K+Na+Ca)	0.000	0.000	0.000	0.000	0.000	0.000	0.603	0.000	0.000	0.851
Mg/(Mg+Fe+Mn)	0.665	0.666	0.680	0.677	0.666	0.637	0.625	0.637	0.634	0.648
Al(vi)/(sum Oct)	0.183	0.184	0.188	0.171	0.184	0.189	0.187	0.193	0.190	0.186
F/(F+Cl+OH)	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.005	0.007	0.007

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	G909174_spot1	G909174_spot1	G909174_spot1	G909174_spot1	G909174_spot2	G909174_spot2	G909174_spot2	G909174_spot2	G909174_spot2	G909174_spot2
Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl
SiO2	27.22	27.44	27.45	27.80	27.70	27.39	27.46	27.53	27.68	27.74
TiO2	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02
Al2O3	20.67	20.31	20.33	20.12	20.41	19.75	20.29	19.90	19.67	19.66
FeO	21.54	21.07	21.96	20.92	21.40	21.66	21.29	21.13	21.34	20.99
MnO	0.19	0.21	0.14	0.20	0.21	0.18	0.27	0.18	0.17	0.19
MgO	19.93	20.19	18.79	20.03	19.49	20.02	19.50	19.29	19.74	20.12
V2O3	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CaO	<0.02	0.05	0.05	0.03	0.06	<0.02	0.04	0.04	0.02	<0.02
Na2O	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
K2O	<0.06	0.08	0.12	<0.06	0.06	<0.06	0.07	0.08	0.07	0.07
F	<0.06	0.13	<0.06	0.21	<0.06	<0.06	<0.06	<0.06	<0.06	0.13
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	89.74	89.57	89.05	89.46	89.60	89.20	89.10	88.31	88.91	88.99
H2O	11.89	11.83	11.77	11.81	11.88	11.79	11.81	11.72	11.78	11.77
Total	101.62	101.34	100.83	101.18	101.47	100.99	100.91	100.03	100.69	100.70
Structural Formulas*										
Si	2.744	2.764	2.794	2.798	2.795	2.783	2.786	2.815	2.816	2.810
Al(iv)	1.256	1.236	1.206	1.202	1.205	1.217	1.214	1.185	1.184	1.190
Al(vi)	1.200	1.175	1.232	1.185	1.222	1.147	1.213	1.213	1.174	1.157
Ti	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000
Fe	1.816	1.775	1.869	1.761	1.805	1.841	1.807	1.808	1.815	1.778
Mn	0.016	0.018	0.012	0.017	0.018	0.016	0.023	0.016	0.014	0.016
Mg	2.996	3.031	2.851	3.005	2.932	3.032	2.949	2.941	2.994	3.038
V	0.000	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Ca	0.000	0.006	0.006	0.003	0.006	0.000	0.004	0.004	0.003	0.000
Na	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
K	0.000	0.010	0.016	0.008	0.008	0.000	0.009	0.011	0.009	0.009
F	0.000	0.041	0.000	0.066	0.000	0.000	0.000	0.000	0.000	0.043
Cl	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
OH	8.000	7.956	8.000	7.934	8.000	8.000	8.000	8.000	8.000	7.957
K/(K+Na+Ca)	0.000	0.632	0.740	0.722	0.561	0.000	0.688	0.707	0.771	1.000
Mg/(Mg+Fe+Mn)	0.620	0.628	0.602	0.628	0.617	0.620	0.617	0.617	0.621	0.629
Al(vi)/(sum Oct)	0.199	0.196	0.206	0.199	0.204	0.190	0.202	0.203	0.196	0.193
F/(F+Cl+OH)	0.000	0.005	0.000	0.008	0.000	0.000	0.000	0.000	0.000	0.005

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	G909172 spot1	G909172 spot1	G909172 spot1	G909172 spot1	G909172 spot1	G909172 spot1	G909172 spot1	G909172 spot1	G909172 spot1	G909172 spot1
Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl
SiO2	26.75	26.96	27.49	27.63	26.91	26.69	27.63	27.61	27.31	27.37
TiO2	0.03	0.04	0.11	0.11	0.07	0.07	0.04	0.05	0.03	0.04
Al2O3	20.84	20.71	20.07	19.70	20.57	20.60	19.50	20.13	20.18	20.00
FeO	19.94	20.15	20.61	19.61	20.38	20.23	20.40	20.38	19.70	20.19
MnO	0.26	0.27	0.26	0.25	0.22	0.25	0.21	0.28	0.29	0.32
MgO	20.73	20.74	20.41	21.16	20.36	20.45	20.09	19.89	20.82	20.45
V2O3	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CaO	<0.02	0.02	0.05	0.04	0.03	0.03	0.05	0.04	0.04	0.03
Na2O	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
K2O	<0.06	<0.06	<0.06	0.10	<0.06	<0.06	<0.06	<0.06	0.08	<0.06
F	0.18	<0.06	0.12	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	88.83	89.04	89.22	88.67	88.71	88.45	88.20	88.62	88.55	88.58
H2O	11.77	11.86	11.82	11.86	11.81	11.77	11.74	11.80	11.83	11.80
Total	100.52	100.91	100.99	100.52	100.52	100.22	99.94	100.42	100.38	100.38
Structural Formulas*										
Si	2.704	2.723	2.773	2.793	2.732	2.716	2.821	2.803	2.768	2.778
Al(iv)	1.296	1.277	1.227	1.207	1.268	1.284	1.179	1.197	1.232	1.222
Al(vi)	1.188	1.188	1.160	1.139	1.193	1.187	1.167	1.212	1.177	1.171
Ti	0.002	0.003	0.008	0.009	0.006	0.005	0.003	0.004	0.002	0.003
Fe	1.686	1.702	1.739	1.658	1.730	1.722	1.742	1.730	1.669	1.714
Mn	0.022	0.023	0.022	0.021	0.019	0.022	0.018	0.024	0.025	0.028
Mg	3.124	3.123	3.070	3.189	3.081	3.104	3.058	3.010	3.144	3.095
V	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.000	0.000	0.006
Ca	0.000	0.003	0.006	0.004	0.003	0.003	0.005	0.005	0.004	0.003
Na	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
K	0.000	0.000	0.000	0.013	0.000	0.000	0.000	0.007	0.010	0.000
F	0.059	0.000	0.040	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Cl	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
OH	7.941	8.000	7.960	8.000	8.000	8.000	8.000	8.000	8.000	8.000
K/(K+Na+Ca)	0.000	0.000	0.000	0.756	0.000	0.000	0.000	0.605	0.717	0.000
Mg/(Mg+Fe+Mn)	0.647	0.644	0.635	0.655	0.638	0.640	0.635	0.632	0.650	0.640
Al(vi)/(sum Oct)	0.197	0.197	0.193	0.189	0.198	0.197	0.195	0.203	0.196	0.195
F/(F+Cl+OH)	0.007	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	G909172 spot2	G909172 spot2	G909172 spot2	G909172 spot2	G909172 spot2	G909172 spot2	YD01-13A spot1	YD01-13A spot1	YD01-13A spot1
Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl
SiO2	27.57	27.95	28.15	27.41	27.82	27.69	23.99	24.08	23.33
TiO2	0.05	0.04	0.06	0.04	0.04	0.03	0.03	<0.02	<0.02
Al2O3	19.75	19.00	19.39	20.10	19.79	19.88	24.58	24.61	24.07
FeO	20.24	19.37	19.29	19.95	19.65	19.76	26.84	27.13	27.67
MnO	0.26	0.23	0.29	0.25	0.30	0.26	0.22	0.20	0.25
MgO	21.06	21.45	21.19	20.97	21.21	20.91	13.42	13.42	12.59
V2O3	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CaO	<0.02	0.04	0.02	0.05	0.03	0.04	<0.02	<0.02	<0.02
Na2O	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
K2O	<0.06	0.07	0.10	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
F	0.21	0.13	0.16	0.13	0.14	0.16	<0.06	0.14	<0.06
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	89.25	88.33	88.75	89.00	89.07	88.84	89.25	89.71	87.99
H2O	11.80	11.77	11.82	11.82	11.85	11.80	11.48	11.46	11.24
Total	100.97	100.05	100.50	100.75	100.86	100.57	100.72	101.10	99.22
Structural Formulas*									
Si	2.775	2.831	2.836	2.764	2.797	2.793	2.504	2.501	2.487
Al(iv)	1.225	1.169	1.164	1.236	1.203	1.207	1.496	1.499	1.513
Al(vi)	1.118	1.100	1.138	1.152	1.142	1.156	1.527	1.514	1.510
Ti	0.004	0.003	0.005	0.003	0.003	0.002	0.002	0.000	0.000
Fe	1.704	1.641	1.625	1.683	1.652	1.667	2.343	2.357	2.466
Mn	0.022	0.020	0.024	0.021	0.025	0.022	0.020	0.018	0.023
Mg	3.160	3.239	3.182	3.152	3.180	3.144	2.087	2.078	2.001
V	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Ca	0.000	0.004	0.003	0.005	0.003	0.005	0.000	0.000	0.000
Na	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
K	0.000	0.009	0.013	0.000	0.000	0.000	0.000	0.000	0.000
F	0.068	0.041	0.051	0.041	0.046	0.052	0.000	0.047	0.000
Cl	0.000	0.000	0.000	0.004	0.000	0.000	0.005	0.004	0.003
OH	7.932	7.959	7.949	7.955	7.954	7.948	7.995	7.949	7.997
K/(K+Na+Ca)	0.000	0.711	0.830	0.000	0.000	0.000	0.000	0.000	0.000
Mg/(Mg+Fe+Mn)	0.647	0.661	0.659	0.649	0.655	0.650	0.469	0.467	0.446
Al(vi)/(sum Oct)	0.186	0.183	0.190	0.192	0.190	0.193	0.255	0.254	0.252
F/(F+Cl+OH)	0.009	0.005	0.006	0.005	0.006	0.007	0.000	0.006	0.000

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	YD01-13A spot1	YD01-13A spot1	YD01-13A spot1	YD01-13A spot2	YD01-13A spot2	YD01-13A spot2	YD01-13A spot2	YD01-13A spot2	YD01-13A spot3
Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl
SiO2	23.77	23.94	23.65	24.81	24.86	24.32	24.37	25.10	24.33
TiO2	<0.02	<0.02	0.03	0.03	<0.02	0.17	0.02	0.03	<0.02
Al2O3	24.04	24.10	24.37	23.21	23.69	24.12	23.61	23.68	23.99
FeO	27.31	27.12	27.13	25.04	24.98	25.13	25.05	24.87	25.07
MnO	0.26	0.25	0.19	0.23	0.26	0.26	0.26	0.22	0.24
MgO	13.08	13.30	13.47	14.79	14.02	14.56	14.18	14.03	14.03
V2O3	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CaO	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	0.04	<0.02
Na2O	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
K2O	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
F	<0.06	<0.06	<0.06	0.17	<0.06	<0.06	<0.06	<0.06	<0.06
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	88.66	88.82	88.99	88.36	88.04	88.69	87.59	88.11	87.76
H2O	11.35	11.40	11.41	11.40	11.44	11.51	11.37	11.47	11.39
Total	100.01	100.22	100.40	99.69	99.48	100.20	98.96	99.58	99.15
Structural Formulas*									
Si	2.509	2.516	2.483	2.589	2.605	2.532	2.569	2.622	2.558
Al(iv)	1.491	1.484	1.517	1.411	1.395	1.468	1.431	1.378	1.442
Al(vi)	1.501	1.501	1.498	1.444	1.529	1.491	1.502	1.537	1.531
Ti	0.000	0.000	0.002	0.002	0.000	0.013	0.002	0.002	0.000
Fe	2.411	2.384	2.382	2.185	2.189	2.188	2.208	2.172	2.204
Mn	0.023	0.022	0.017	0.020	0.023	0.023	0.023	0.019	0.021
Mg	2.059	2.084	2.108	2.301	2.189	2.260	2.228	2.184	2.199
V	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Ca	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.004	0.000
Na	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
K	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
F	0.000	0.000	0.000	0.056	0.000	0.000	0.000	0.000	0.000
Cl	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004
OH	8.000	8.000	8.000	7.944	8.000	8.000	8.000	8.000	7.996
K/(K+Na+Ca)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mg/(Mg+Fe+Mn)	0.458	0.464	0.468	0.511	0.497	0.505	0.500	0.499	0.497
Al(vi)/(sum Oct)	0.250	0.251	0.249	0.243	0.258	0.250	0.252	0.260	0.257
F/(F+Cl+OH)	0.000	0.000	0.000	0.007	0.000	0.000	0.000	0.000	0.000

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	YD01-13A spot3	YD01-30C spot1	YD01-30C spot1	YD01-30C spot1	YD01-30C spot1	YD01-30C spot1	YD01-30C spot1	YD01-30C spot1	YD01-30C spot2
Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl
SiO2	24.43	27.39	27.48	28.49	27.17	27.70	27.11	27.49	27.94
TiO2	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01
Al2O3	24.18	19.97	19.93	21.00	20.31	19.75	20.21	19.76	19.39
FeO	25.22	18.93	18.82	18.49	19.45	18.72	18.81	19.72	19.05
MnO	0.21	0.63	0.63	0.61	0.65	0.61	0.69	0.66	0.59
MgO	13.89	20.97	20.92	19.49	21.06	21.70	21.58	21.07	20.77
V2O3	<0.08	0.13	0.14	0.12	0.12	0.10	0.10	0.17	0.10
CaO	0.02	<0.02	0.02	0.03	<0.02	0.02	0.03	<0.02	0.05
Na2O	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
K2O	<0.06	<0.06	<0.06	0.08	<0.06	<0.06	<0.06	<0.06	0.20
F	<0.06	0.18	0.22	0.19	0.23	0.29	0.19	0.26	0.24
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	88.13	88.31	88.23	88.53	89.06	88.95	88.77	89.17	88.40
H2O	11.44	11.74	11.72	11.87	11.78	11.80	11.80	11.77	11.72
Total	99.57	99.97	99.86	100.31	100.75	100.63	100.49	100.83	100.02
Structural Formulas*									
Si	2.559	2.776	2.784	2.856	2.737	2.782	2.732	2.769	2.829
Al(iv)	1.441	1.224	1.216	1.144	1.263	1.218	1.268	1.231	1.171
Al(vi)	1.544	1.161	1.164	1.336	1.148	1.118	1.134	1.115	1.143
Ti	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
Fe	2.209	1.604	1.594	1.550	1.639	1.572	1.585	1.661	1.613
Mn	0.019	0.054	0.054	0.052	0.056	0.051	0.059	0.056	0.051
Mg	2.168	3.168	3.159	2.913	3.163	3.248	3.243	3.164	3.136
V	0.000	0.010	0.011	0.010	0.010	0.008	0.008	0.014	0.008
Ca	0.002	0.000	0.003	0.003	0.000	0.003	0.004	0.000	0.005
Na	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
K	0.000	0.000	0.000	0.010	0.000	0.000	0.000	0.000	0.026
F	0.000	0.057	0.070	0.059	0.074	0.092	0.060	0.082	0.077
Cl	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
OH	8.000	7.943	7.930	7.941	7.926	7.908	7.940	7.918	7.923
K/(K+Na+Ca)	0.000	0.000	0.000	0.773	0.000	0.000	0.000	0.000	0.838
Mg/(Mg+Fe+Mn)	0.493	0.656	0.657	0.645	0.651	0.667	0.664	0.648	0.653
Al(vi)/(sum Oct)	0.260	0.194	0.194	0.228	0.191	0.186	0.188	0.185	0.192
F/(F+Cl+OH)	0.000	0.007	0.009	0.007	0.009	0.011	0.007	0.010	0.010

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	YD01-30C spot2	YD01-30C spot2	YD01-30C spot2	YD01-30C spot2	YD01-30C spot2	YD01-30C spot2	YD01-30C spot2	YD01-30C spot2	YD01-30C spot2
Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl
SiO2	27.50	26.94	26.91	27.19	26.75	27.30	26.89	27.01	28.02
TiO2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.03	0.04	<0.02
Al2O3	19.58	20.19	19.94	20.60	20.09	20.12	21.37	21.13	19.65
FeO	19.37	19.28	19.60	18.79	19.43	19.38	19.86	19.19	18.83
MnO	0.65	0.61	0.60	0.59	0.64	0.69	0.58	0.66	0.68
MgO	20.99	20.44	20.68	20.64	20.94	21.31	19.66	20.41	20.83
V2O3	0.09	0.09	0.09	0.12	0.09	0.12	0.08	0.11	0.13
CaO	<0.02	<0.02	0.03	0.03	0.04	0.03	0.04	0.02	<0.02
Na2O	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
K2O	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
F	0.37	0.19	0.36	0.27	0.23	0.33	0.22	0.19	0.27
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	88.65	87.82	88.28	88.30	88.29	89.31	88.78	88.82	88.50
H2O	11.67	11.64	11.60	11.72	11.66	11.78	11.75	11.80	11.75
Total	100.16	99.38	99.74	99.91	99.86	100.95	100.43	100.54	100.14
Structural Formulas*									
Si	2.782	2.751	2.740	2.751	2.723	2.741	2.718	2.722	2.827
Al(iv)	1.218	1.249	1.260	1.249	1.277	1.259	1.282	1.278	1.173
Al(vi)	1.118	1.181	1.133	1.207	1.133	1.123	1.264	1.232	1.164
Ti	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.003	0.000
Fe	1.639	1.646	1.669	1.590	1.654	1.627	1.679	1.618	1.589
Mn	0.056	0.053	0.052	0.051	0.055	0.058	0.050	0.056	0.058
Mg	3.166	3.112	3.139	3.113	3.177	3.190	2.962	3.067	3.133
V	0.007	0.007	0.007	0.009	0.007	0.010	0.007	0.009	0.011
Ca	0.000	0.000	0.003	0.004	0.004	0.003	0.005	0.003	0.000
Na	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
K	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
F	0.118	0.063	0.115	0.086	0.074	0.105	0.071	0.059	0.087
Cl	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
OH	7.882	7.937	7.885	7.914	7.926	7.895	7.929	7.941	7.913
K/(K+Na+Ca)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mg/(Mg+Fe+Mn)	0.651	0.647	0.646	0.655	0.650	0.654	0.632	0.647	0.655
Al(vi)/(sum Oct)	0.187	0.197	0.189	0.202	0.188	0.187	0.212	0.206	0.195
F/(F+Cl+OH)	0.015	0.008	0.014	0.011	0.009	0.013	0.009	0.007	0.011

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	YD01-30C spot2	YD01-30C spot2	YD01-30C spot3	YD01-30C spot3	YD01-30C spot3	YD01-30C spot3	99017A grain 7	99017A grain 7	99017A grain 7
Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl
SiO2	27.54	27.06	27.22	27.46	27.42	28.00	26.98	27.32	28.27
TiO2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.04	0.05	0.04
Al2O3	20.80	20.22	20.72	20.21	20.30	20.18	21.85	23.30	23.87
FeO	19.06	19.42	19.19	18.91	18.76	18.52	13.20	12.87	11.84
MnO	0.61	0.66	0.57	0.60	0.56	0.65	0.35	0.34	0.26
MgO	19.67	20.04	20.66	20.60	20.63	20.59	21.85	23.88	23.88
V2O3	0.08	0.13	<0.08	0.08	<0.08	0.08	<0.08	<0.08	<0.08
CaO	0.03	<0.02	<0.02	0.05	0.04	<0.02	0.03	<0.02	0.03
Na2O	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.06	<0.05	<0.05
K2O	<0.06	<0.06	<0.06	<0.06	<0.06	0.11	0.71	0.12	0.11
F	0.23	0.24	0.31	0.18	0.25	0.30	0.14	0.14	0.19
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	88.09	87.85	88.80	88.20	88.16	88.51	85.31	88.12	88.61
H2O	11.72	11.62	11.75	11.73	11.70	11.76	11.68	12.16	12.31
Total	99.71	99.37	100.42	99.85	99.75	100.15	96.92	100.21	100.84
Structural Formulas*									
Si	2.792	2.764	2.742	2.783	2.779	2.819	2.750	2.677	2.731
Al(iv)	1.208	1.236	1.258	1.217	1.221	1.181	1.250	1.323	1.269
Al(vi)	1.276	1.198	1.202	1.197	1.205	1.214	1.375	1.368	1.448
Ti	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.003	0.003
Fe	1.616	1.658	1.616	1.603	1.590	1.559	1.125	1.055	0.957
Mn	0.052	0.057	0.048	0.051	0.048	0.055	0.031	0.028	0.021
Mg	2.972	3.051	3.103	3.113	3.118	3.091	3.319	3.489	3.438
V	0.007	0.010	0.006	0.007	0.000	0.006	0.000	0.000	0.000
Ca	0.003	0.000	0.000	0.005	0.005	0.000	0.004	0.000	0.003
Na	0.000	0.000	0.000	0.000	0.000	0.000	0.011	0.000	0.000
K	0.000	0.000	0.000	0.000	0.000	0.014	0.093	0.015	0.014
F	0.074	0.079	0.099	0.059	0.080	0.095	0.044	0.044	0.058
Cl	0.000	0.000	0.000	0.003	0.003	0.000	0.006	0.003	0.002
OH	7.926	7.921	7.901	7.938	7.916	7.905	7.950	7.954	7.940
K/(K+Na+Ca)	0.000	0.000	0.000	0.000	0.000	1.000	0.862	1.000	0.802
Mg/(Mg+Fe+Mn)	0.641	0.640	0.651	0.653	0.656	0.657	0.742	0.763	0.779
Al(vi)/(sum Oct)	0.215	0.200	0.201	0.201	0.202	0.205	0.235	0.230	0.247
F/(F+Cl+OH)	0.009	0.010	0.012	0.007	0.010	0.012	0.005	0.005	0.007

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	99017A grain 8	99017A grain 8	99017A grain 8	99017A grain 9	99017A grain 9	99017A grain 9	99017A grain 9	99017A grain 9	99017A grain 9	99017A grain 9
Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl
SiO2	28.06	26.92	26.22	27.40	26.16	26.74	27.26	26.81	26.39	27.51
TiO2	0.06	0.03	0.05	0.06	0.04	0.05	0.04	0.04	0.04	0.07
Al2O3	21.26	23.56	23.12	22.82	22.30	22.90	23.64	23.01	22.98	23.25
FeO	11.38	15.68	15.39	14.62	15.93	14.99	13.14	16.27	14.59	11.91
MnO	0.31	0.71	0.58	0.47	0.53	0.54	0.34	0.69	0.51	0.25
MgO	21.61	21.98	22.47	21.76	21.38	22.40	24.10	21.17	22.79	24.33
V2O3	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CaO	0.03	0.03	<0.02	<0.02	0.05	<0.02	<0.02	<0.02	<0.02	0.02
Na2O	0.07	0.08	<0.05	<0.05	0.08	<0.05	<0.05	<0.05	<0.05	<0.05
K2O	1.28	0.23	<0.06	0.22	0.31	0.08	<0.06	0.23	<0.06	0.13
F	0.27	<0.06	0.13	0.20	<0.06	<0.06	0.13	0.14	0.27	0.26
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	84.46	89.44	88.05	87.63	86.93	87.81	88.76	88.42	87.69	87.80
H2O	11.59	12.17	11.96	11.95	11.79	12.02	12.24	11.96	11.90	12.13
Total	95.92	101.59	99.95	99.50	98.71	99.83	100.94	100.32	99.47	99.82
Structural Formulas*										
Si	2.863	2.648	2.614	2.725	2.658	2.665	2.654	2.672	2.630	2.690
Al(iv)	1.137	1.352	1.386	1.275	1.342	1.335	1.346	1.328	1.370	1.310
Al(vi)	1.420	1.379	1.330	1.401	1.329	1.355	1.367	1.375	1.328	1.369
Ti	0.005	0.002	0.004	0.004	0.003	0.003	0.003	0.003	0.003	0.005
Fe	0.971	1.290	1.283	1.217	1.353	1.249	1.070	1.356	1.216	0.974
Mn	0.027	0.059	0.049	0.039	0.046	0.046	0.028	0.058	0.043	0.021
Mg	3.287	3.223	3.339	3.227	3.238	3.329	3.497	3.145	3.385	3.547
V	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Ca	0.003	0.003	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.002
Na	0.014	0.015	0.000	0.000	0.015	0.000	0.000	0.000	0.000	0.000
K	0.166	0.028	0.000	0.028	0.040	0.010	0.000	0.029	0.000	0.016
F	0.088	0.000	0.040	0.062	0.000	0.000	0.040	0.043	0.086	0.081
Cl	0.014	0.010	0.000	0.000	0.005	0.000	0.002	0.000	0.000	0.000
OH	7.898	7.990	7.960	7.938	7.995	8.000	7.958	7.957	7.914	7.919
K/(K+Na+Ca)	0.909	0.610	0.000	1.000	0.664	1.000	0.000	1.000	0.000	0.872
Mg/(Mg+Fe+Mn)	0.767	0.705	0.715	0.720	0.698	0.720	0.761	0.690	0.729	0.781
Al(vi)/(sum Oct)	0.249	0.232	0.221	0.238	0.223	0.226	0.229	0.232	0.222	0.231
F/(F+Cl+OH)	0.011	0.000	0.005	0.008	0.000	0.000	0.005	0.005	0.011	0.010

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	99017A grain 9	Y-727 grain 17	Y-727 grain 17	Y-727 grain 17	Y-727 grain 17	Y-727 grain 17	Y-727 grain 18	Y-727 grain 18	Y-727 grain 18	Y-727 grain 18
Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl	Chl
SiO2	26.48	26.70	26.83	27.36	25.07	28.53	27.06	27.07	25.88	26.75
TiO2	0.05	0.05	0.05	0.13	0.08	0.41	0.28	0.15	0.10	0.05
Al2O3	23.05	17.86	18.53	18.69	18.51	18.43	18.64	19.42	19.33	19.38
FeO	13.51	25.16	25.37	25.39	25.04	24.76	25.67	25.54	26.06	25.74
MnO	0.37	0.34	0.36	0.36	0.35	0.36	0.36	0.38	0.40	0.44
MgO	23.36	15.82	16.32	16.06	15.45	13.75	15.17	16.28	15.46	15.73
V2O3	<0.08	<0.08	<0.08	<0.08	<0.08	0.09	<0.08	<0.08	<0.08	<0.08
CaO	<0.02	0.03	0.03	0.06	0.03	0.12	0.08	0.06	<0.02	0.03
Na2O	<0.05	<0.05	<0.05	<0.05	<0.05	0.07	<0.05	<0.05	<0.05	<0.05
K2O	<0.06	<0.06	<0.06	<0.06	<0.06	2.35	1.00	<0.06	0.08	0.24
F	<0.06	<0.06	<0.06	<0.06	<0.06	0.14	<0.06	<0.06	<0.06	<0.06
Cl	<0.03	<0.03	<0.03	<0.03	0.04	0.07	0.03	<0.03	<0.03	<0.03
Total	87.00	86.14	87.67	88.27	84.75	89.10	88.44	89.09	87.40	88.45
H2O	12.00	11.12	11.33	11.43	10.89	11.37	11.35	11.53	11.24	11.41
Total	99.00	97.26	99.00	99.70	95.63	100.40	99.79	100.62	98.63	99.85
Structural Formulas*										
Si	2.644	2.875	2.837	2.869	2.757	2.984	2.854	2.813	2.759	2.808
Al(iv)	1.356	1.125	1.163	1.131	1.243	1.016	1.146	1.187	1.241	1.192
Al(vi)	1.356	1.141	1.146	1.179	1.155	1.256	1.172	1.191	1.188	1.206
Ti	0.004	0.004	0.004	0.010	0.007	0.033	0.023	0.011	0.008	0.004
Fe	1.128	2.266	2.244	2.227	2.303	2.166	2.264	2.219	2.324	2.259
Mn	0.032	0.031	0.033	0.032	0.033	0.032	0.032	0.033	0.036	0.039
Mg	3.477	2.540	2.573	2.511	2.533	2.144	2.386	2.521	2.457	2.460
V	0.000	0.000	0.000	0.000	0.000	0.008	0.006	0.000	0.000	0.000
Ca	0.000	0.004	0.004	0.006	0.003	0.014	0.009	0.007	0.000	0.004
Na	0.000	0.000	0.000	0.000	0.000	0.014	0.000	0.000	0.000	0.000
K	0.000	0.000	0.000	0.000	0.000	0.314	0.135	0.008	0.011	0.032
F	0.000	0.000	0.000	0.000	0.000	0.046	0.000	0.000	0.000	0.000
Cl	0.000	0.003	0.000	0.000	0.007	0.012	0.006	0.000	0.003	0.003
OH	8.000	7.997	8.000	8.000	7.993	7.943	7.994	8.000	7.997	7.997
K/(K+Na+Ca)	0.000	0.000	0.000	0.000	0.000	0.919	0.938	0.521	1.000	0.892
Mg/(Mg+Fe+Mn)	0.750	0.525	0.531	0.526	0.520	0.494	0.510	0.528	0.510	0.517
Al(vi)/(sum Oct)	0.226	0.191	0.191	0.198	0.192	0.223	0.199	0.199	0.198	0.202
F/(F+Cl+OH)	0.000	0.000	0.000	0.000	0.000	0.006	0.000	0.000	0.000	0.000

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	Y-727 grain 19	Y-727 grain 19	Y-727 grain 19	Ann007006.017 grain 23a	Ann007006.017 grain 23a	Ann007006.017 grain 23a	Ann007006.017 grain 24
Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
SiO2	26.25	25.96	25.71	28.57	27.38	27.95	28.58
TiO2	0.21	0.18	0.15	0.12	0.04	0.05	0.04
Al2O3	19.46	19.85	18.65	19.31	18.62	18.67	19.97
FeO	26.52	26.45	25.80	15.14	14.87	14.92	16.48
MnO	0.36	0.36	0.35	<0.06	<0.06	0.10	0.10
MgO	14.84	15.21	15.16	23.60	23.54	23.30	23.11
V2O3	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CaO	0.09	0.08	0.06	0.03	0.04	0.03	0.02
Na2O	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
K2O	0.11	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
F	<0.06	<0.06	<0.06	0.34	0.21	0.25	0.32
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	88.00	88.22	86.04	87.27	84.85	85.35	88.68
H2O	11.29	11.33	11.05	11.81	11.51	11.58	11.95
Total	99.29	99.55	97.08	98.94	96.27	96.83	100.50
Structural Formulas*							
Si	2.784	2.744	2.786	2.860	2.825	2.862	2.830
Al(iv)	1.216	1.256	1.214	1.140	1.175	1.138	1.170
Al(vi)	1.216	1.216	1.168	1.137	1.090	1.116	1.161
Ti	0.017	0.014	0.012	0.009	0.003	0.004	0.003
Fe	2.352	2.337	2.338	1.267	1.284	1.278	1.365
Mn	0.033	0.032	0.032	0.000	0.000	0.008	0.009
Mg	2.347	2.396	2.450	3.521	3.621	3.557	3.412
V	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Ca	0.011	0.009	0.007	0.003	0.005	0.004	0.003
Na	0.000	0.000	0.000	0.000	0.000	0.000	0.000
K	0.015	0.000	0.000	0.000	0.000	0.000	0.000
F	0.000	0.000	0.000	0.107	0.070	0.081	0.100
Cl	0.004	0.004	0.005	0.003	0.003	0.000	0.000
OH	7.996	7.996	7.995	7.890	7.927	7.919	7.900
K/(K+Na+Ca)	0.582	0.000	0.000	0.000	0.000	0.000	0.000
Mg/(Mg+Fe+Mn)	0.496	0.503	0.508	0.735	0.738	0.734	0.713
Al(vi)/(sum Oct)	0.204	0.203	0.195	0.192	0.182	0.187	0.195
F/(F+Cl+OH)	0.000	0.000	0.000	0.013	0.009	0.010	0.012

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	Ann007006.017 grain 24	Ann007006.017 grain 25	Ann007006.017 grain 25	Ann007006.017 grain 25	Ann007006.017 grain 25	Ann007006.017 grain 28
Mineral	Chl	Chl	Chl	Chl	Chl	Chl
SiO2	26.70	28.68	28.40	28.12	28.00	27.40
TiO2	0.08	<0.02	<0.02	0.04	<0.02	0.13
Al2O3	20.86	19.49	19.68	19.30	19.87	18.89
FeO	16.52	15.27	15.22	15.98	15.46	15.09
MnO	0.15	0.09	0.07	<0.06	0.14	0.10
MgO	22.09	24.45	24.36	23.78	23.84	24.32
V2O3	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CaO	<0.02	0.02	<0.02	0.03	<0.02	0.03
Na2O	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
K2O	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
F	0.15	0.42	0.27	0.22	0.22	0.31
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	0.04
Total	86.70	88.54	88.16	87.64	87.68	86.44
H2O	11.69	11.94	11.95	11.84	11.88	11.65
Total	98.33	100.30	100.00	99.39	99.47	97.95
Structural Formulas*						
Si	2.718	2.831	2.816	2.820	2.799	2.782
Al(iv)	1.282	1.169	1.184	1.180	1.201	1.218
Al(vi)	1.220	1.100	1.117	1.101	1.139	1.041
Ti	0.006	0.000	0.002	0.003	0.000	0.010
Fe	1.406	1.261	1.262	1.340	1.292	1.281
Mn	0.013	0.007	0.006	0.000	0.012	0.009
Mg	3.352	3.599	3.602	3.554	3.552	3.681
V	0.000	0.000	0.000	0.000	0.000	0.000
Ca	0.000	0.002	0.000	0.003	0.000	0.004
Na	0.000	0.000	0.000	0.000	0.000	0.000
K	0.000	0.000	0.000	0.000	0.000	0.000
F	0.049	0.132	0.086	0.069	0.069	0.100
Cl	0.004	0.000	0.000	0.003	0.003	0.006
OH	7.947	7.868	7.914	7.927	7.928	7.893
K/(K+Na+Ca)	0.000	0.000	0.000	0.000	0.000	0.000
Mg/(Mg+Fe+Mn)	0.703	0.739	0.740	0.726	0.732	0.741
Al(vi)/(sum Oct)	0.203	0.184	0.186	0.184	0.190	0.173
F/(F+Cl+OH)	0.006	0.016	0.011	0.009	0.009	0.013

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	Ann007006.017 grain 28	Ann007006.017 grain 28	Ann006001.045 grain 1	Ann006001.045 grain 1	Ann006001.045 grain 1	Ann006001.045 grain 1
Mineral	Chl	Chl	Chl	Chl	Chl	Chl
SiO2	28.25	28.31	29.22	28.81	28.77	29.51
TiO2	0.08	0.03	<0.02	<0.03	<0.04	0.13
Al2O3	19.84	19.41	19.97	19.46	19.46	19.57
FeO	15.24	15.08	15.96	14.48	14.32	15.70
MnO	0.08	0.10	0.08	<0.06	0.08	<0.06
MgO	24.22	24.10	25.04	25.33	25.40	23.11
V2O3	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CaO	<0.02	<0.02	0.02	<0.02	0.03	0.08
Na2O	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
K2O	<0.06	<0.06	<0.06	<0.06	<0.06	0.09
F	0.25	0.26	0.24	0.30	0.19	0.15
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	0.06
Total	88.18	87.44	90.65	88.58	88.36	88.55
H2O	11.94	11.86	12.29	12.04	12.08	12.05
Total	100.01	99.18	102.84	100.49	100.36	100.53
Structural Formulas*						
Si	2.805	2.831	2.823	2.833	2.833	2.913
Al(iv)	1.195	1.169	1.177	1.167	1.167	1.087
Al(vi)	1.126	1.118	1.097	1.088	1.091	1.190
Ti	0.006	0.002	0.000	0.000	0.000	0.010
Fe	1.265	1.261	1.290	1.191	1.179	1.296
Mn	0.006	0.009	0.007	0.000	0.007	0.000
Mg	3.584	3.593	3.607	3.713	3.728	3.400
V	0.000	0.000	0.000	0.000	0.000	0.000
Ca	0.000	0.000	0.003	0.000	0.004	0.009
Na	0.000	0.000	0.000	0.000	0.000	0.000
K	0.000	0.000	0.000	0.000	0.000	0.011
F	0.079	0.083	0.073	0.095	0.060	0.046
Cl	0.005	0.000	0.000	0.000	0.000	0.010
OH	7.916	7.917	7.927	7.905	7.940	7.944
K/(K+Na+Ca)	0.000	0.000	0.000	0.000	0.000	0.566
Mg/(Mg+Fe+Mn)	0.738	0.739	0.736	0.757	0.759	0.724
Al(vi)/(sum Oct)	0.188	0.187	0.183	0.182	0.182	0.202
F/(F+Cl+OH)	0.010	0.010	0.009	0.012	0.008	0.006

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	Ann006001.045 grain 1	Ann006001.045 grain 6	Ann006001.045 grain 6	Ann006001.045 grain 6	Ann006001.045 grain 6	Ann006001.045 grain 6
Mineral	Chl	Chl	Chl	Chl	Chl	Chl
SiO2	28.48	28.65	27.62	27.25	26.68	26.81
TiO2	0.03	<0.02	0.02	<0.02	0.05	0.05
Al2O3	19.31	21.92	22.46	20.71	21.51	21.14
FeO	15.11	14.51	14.84	14.81	14.92	14.67
MnO	0.08	0.15	0.08	0.10	0.10	0.08
MgO	24.29	24.78	24.51	24.23	24.16	23.30
V2O3	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CaO	0.03	0.02	<0.02	<0.02	0.04	0.04
Na2O	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
K2O	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
F	0.22	<0.06	<0.06	<0.06	<0.06	<0.06
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	87.64	90.20	89.75	87.33	87.68	86.28
H2O	11.91	12.43	12.32	11.95	11.99	11.82
Total	99.46	102.63	102.07	99.28	99.66	98.10
Structural Formulas*						
Si	2.839	2.761	2.685	2.730	2.666	2.716
Al(iv)	1.161	1.239	1.315	1.270	1.334	1.284
Al(vi)	1.108	1.251	1.258	1.176	1.199	1.240
Ti	0.002	0.000	0.002	0.000	0.004	0.004
Fe	1.259	1.169	1.206	1.241	1.246	1.243
Mn	0.007	0.012	0.006	0.008	0.009	0.007
Mg	3.609	3.560	3.552	3.620	3.599	3.519
V	0.000	0.000	0.000	0.000	0.000	0.000
Ca	0.004	0.002	0.000	0.000	0.004	0.004
Na	0.000	0.000	0.000	0.000	0.000	0.000
K	0.000	0.000	0.000	0.000	0.000	0.000
F	0.068	0.000	0.000	0.000	0.000	0.000
Cl	0.003	0.000	0.003	0.003	0.004	0.003
OH	7.929	8.000	7.997	7.997	7.996	7.997
K/(K+Na+Ca)	0.000	0.000	0.000	0.000	0.000	0.000
Mg/(Mg+Fe+Mn)	0.740	0.751	0.745	0.743	0.741	0.738
Al(vi)/(sum Oct)	0.185	0.209	0.209	0.195	0.198	0.206
F/(F+Cl+OH)	0.009	0.000	0.000	0.000	0.000	0.000

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	Ann006001.045 grain 6	Ann006001.045 grain 7	Ann006001.045 grain 7	Ann006001.045 grain 7	Ann006001.045 grain 7	Ann006001.045 grain 7
Mineral	Chl	Chl	Chl	Chl	Chl	Chl
SiO2	27.79	27.38	27.68	29.00	28.97	29.01
TiO2	0.07	0.07	0.04	<0.02	0.26	<0.02
Al2O3	21.94	20.96	21.92	20.16	20.44	20.93
FeO	14.95	15.27	15.09	14.74	14.51	14.84
MnO	<0.06	0.09	0.10	0.08	0.09	0.07
MgO	23.63	23.60	24.44	25.70	22.79	24.75
V2O3	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CaO	0.04	0.03	<0.02	<0.02	<0.02	<0.02
Na2O	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
K2O	<0.06	<0.06	<0.06	<0.06	0.75	<0.06
F	0.18	0.21	0.17	<0.06	0.35	0.14
Cl	0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	88.76	87.69	89.55	89.91	88.29	89.91
H2O	12.11	11.91	12.21	12.35	11.96	12.31
Total	100.79	99.51	101.68	102.26	100.10	102.15
Structural Formulas*						
Si	2.729	2.732	2.699	2.812	2.862	2.808
Al(iv)	1.271	1.268	1.301	1.188	1.138	1.192
Al(vi)	1.268	1.196	1.218	1.117	1.242	1.196
Ti	0.005	0.005	0.003	0.000	0.020	0.000
Fe	1.228	1.274	1.231	1.196	1.199	1.201
Mn	0.000	0.008	0.008	0.007	0.007	0.006
Mg	3.459	3.509	3.553	3.716	3.357	3.572
V	0.000	0.000	0.000	0.000	0.000	0.000
Ca	0.005	0.003	0.000	0.000	0.000	0.000
Na	0.000	0.000	0.000	0.000	0.000	0.000
K	0.000	0.000	0.000	0.000	0.095	0.000
F	0.056	0.067	0.053	0.000	0.109	0.041
Cl	0.005	0.003	0.000	0.000	0.004	0.003
OH	7.939	7.930	7.947	8.000	7.887	7.956
K/(K+Na+Ca)	0.000	0.000	0.000	0.000	1.000	0.000
Mg/(Mg+Fe+Mn)	0.738	0.732	0.741	0.756	0.736	0.747
Al(vi)/(sum Oct)	0.213	0.200	0.203	0.185	0.213	0.200
F/(F+Cl+OH)	0.007	0.008	0.007	0.000	0.014	0.005

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	Ann006002.023 grain 15	Ann006002.023 grain 15	Ann006002.023 grain 15	Ann006002.023 grain 16	Ann006002.023 grain 16	Ann006002.023 grain 16
Mineral	Chl	Chl	Chl	Chl	Chl	Chl
SiO2	28.15	27.29	27.28	27.55	27.47	27.40
TiO2	0.17	0.05	0.05	0.05	0.04	0.08
Al2O3	18.50	18.10	17.77	19.16	19.66	18.65
FeO	20.20	20.98	21.56	19.72	20.25	19.87
MnO	0.37	0.41	0.45	0.35	0.41	0.36
MgO	19.76	20.02	19.90	20.81	20.33	21.26
V2O3	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CaO	0.07	0.04	0.04	0.04	0.03	0.07
Na2O	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
K2O	0.73	0.06	<0.06	<0.06	<0.06	<0.06
F	0.15	0.13	<0.06	0.17	0.13	0.18
Cl	<0.03	0.04	0.03	<0.03	0.04	<0.03
Total	88.24	87.21	87.27	88.00	88.49	88.00
H2O	11.63	11.46	11.48	11.66	11.71	11.62
Total	99.80	98.60	98.74	99.58	100.14	99.54
Structural Formulas*						
Si	2.882	2.836	2.846	2.812	2.795	2.803
Al(iv)	1.118	1.164	1.154	1.188	1.205	1.197
Al(vi)	1.115	1.052	1.031	1.116	1.152	1.051
Ti	0.013	0.004	0.004	0.004	0.003	0.006
Fe	1.730	1.824	1.881	1.683	1.723	1.700
Mn	0.032	0.036	0.040	0.030	0.035	0.031
Mg	3.016	3.102	3.095	3.165	3.083	3.241
V	0.000	0.000	0.000	0.000	0.000	0.000
Ca	0.008	0.005	0.004	0.004	0.004	0.008
Na	0.000	0.000	0.000	0.000	0.000	0.000
K	0.095	0.008	0.000	0.000	0.000	0.000
F	0.048	0.044	0.000	0.056	0.042	0.058
Cl	0.005	0.008	0.006	0.004	0.007	0.005
OH	7.947	7.948	7.994	7.940	7.952	7.937
K/(K+Na+Ca)	0.922	0.628	0.000	0.000	0.000	0.000
Mg/(Mg+Fe+Mn)	0.631	0.625	0.617	0.649	0.637	0.652
Al(vi)/(sum Oct)	0.189	0.175	0.170	0.186	0.192	0.174
F/(F+Cl+OH)	0.006	0.005	0.000	0.007	0.005	0.007

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	Ann006002.023 grain 16	Ann006002.023 grain 18	Ann006002.023 grain 18	Ann006002.023 grain 18	Ann006002.023 grain 18	Ann006002.023 grain 18
Mineral	Chl	Chl	Chl	Chl	Chl	Chl
SiO2	26.28	27.52	27.25	27.53	26.25	27.62
TiO2	0.07	0.04	0.06	0.08	0.08	0.06
Al2O3	19.72	18.78	19.04	19.49	17.83	18.62
FeO	19.66	21.57	20.80	21.01	20.24	22.08
MnO	0.41	0.33	0.34	0.35	0.28	0.35
MgO	20.12	20.51	19.85	19.66	19.46	19.96
V2O3	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CaO	0.05	<0.02	0.04	0.03	0.04	0.02
Na2O	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
K2O	0.07	<0.06	<0.06	<0.06	<0.06	<0.06
F	0.16	0.21	<0.06	<0.06	<0.06	0.19
Cl	0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	86.69	89.05	87.56	88.37	84.35	88.99
H2O	11.45	11.67	11.60	11.71	11.15	11.64
Total	98.06	100.63	99.16	100.08	95.50	100.55
Structural Formulas*						
Si	2.732	2.801	2.814	2.817	2.819	2.821
Al(iv)	1.268	1.199	1.186	1.183	1.181	1.179
Al(vi)	1.148	1.055	1.131	1.167	1.076	1.061
Ti	0.005	0.003	0.004	0.006	0.006	0.005
Fe	1.709	1.836	1.797	1.798	1.818	1.885
Mn	0.036	0.028	0.029	0.030	0.025	0.030
Mg	3.117	3.113	3.055	2.999	3.115	3.039
V	0.000	0.000	0.000	0.000	0.000	0.000
Ca	0.006	0.000	0.004	0.003	0.004	0.003
Na	0.000	0.000	0.000	0.000	0.000	0.000
K	0.009	0.000	0.000	0.000	0.000	0.000
F	0.051	0.067	0.000	0.000	0.000	0.062
Cl	0.005	0.000	0.003	0.000	0.005	0.000
OH	7.944	7.933	7.997	8.000	7.995	7.938
K/(K+Na+Ca)	0.611	0.000	0.000	0.000	0.000	0.000
Mg/(Mg+Fe+Mn)	0.641	0.625	0.626	0.621	0.628	0.613
Al(vi)/(sum Oct)	0.191	0.175	0.188	0.194	0.178	0.176
F/(F+Cl+OH)	0.006	0.008	0.000	0.000	0.000	0.008

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	Ann006002.023 grain 18	Ann007006.057 grain 21	Ann007006.057 grain 21	Ann007006.057 grain 21	Ann007006.057 grain 21	Ann007006.057 grain 21
Mineral	Chl	Chl	Chl	Chl	Chl	Chl
SiO2	26.97	27.78	27.17	27.33	27.00	26.22
TiO2	0.06	0.06	0.06	0.06	0.05	0.06
Al2O3	19.42	23.22	23.29	23.19	22.40	22.44
FeO	20.48	10.21	10.48	10.45	9.83	10.19
MnO	0.37	0.08	<0.06	0.10	0.11	0.08
MgO	20.14	26.74	26.89	26.54	25.55	26.10
V2O3	<0.08	<0.08	<0.08	<0.08	0.08	0.08
CaO	0.04	<0.02	<0.02	<0.02	0.05	0.04
Na2O	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
K2O	0.09	<0.06	<0.06	<0.06	<0.06	<0.06
F	0.21	0.36	0.14	0.16	0.26	0.20
Cl	<0.03	<0.03	<0.03	<0.03	0.06	0.03
Total	87.89	88.56	88.14	87.91	85.50	85.52
H2O	11.56	12.31	12.32	12.29	11.90	11.90
Total	99.35	100.72	100.40	100.13	97.28	97.33
Structural Formulas*						
Si	2.771	2.667	2.629	2.648	2.687	2.618
Al(iv)	1.229	1.333	1.371	1.352	1.313	1.382
Al(vi)	1.122	1.294	1.286	1.297	1.314	1.260
Ti	0.004	0.005	0.004	0.004	0.004	0.005
Fe	1.760	0.820	0.848	0.847	0.818	0.851
Mn	0.032	0.006	0.000	0.008	0.009	0.006
Mg	3.084	3.827	3.879	3.834	3.790	3.885
V	0.000	0.005	0.000	0.006	0.007	0.007
Ca	0.004	0.000	0.000	0.000	0.005	0.005
Na	0.000	0.000	0.000	0.000	0.000	0.000
K	0.012	0.000	0.000	0.000	0.000	0.000
F	0.070	0.111	0.041	0.050	0.081	0.063
Cl	0.004	0.000	0.000	0.000	0.011	0.006
OH	7.927	7.889	7.959	7.950	7.909	7.932
K/(K+Na+Ca)	0.738	0.000	0.000	0.000	0.000	0.000
Mg/(Mg+Fe+Mn)	0.633	0.822	0.821	0.818	0.821	0.819
Al(vi)/(sum Oct)	0.187	0.217	0.214	0.216	0.221	0.209
F/(F+Cl+OH)	0.009	0.014	0.005	0.006	0.010	0.008

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	Ann007006.057 grain 21	Ann007006.057 grain 21	Ann007006.057 grain 21	Ann007006.057 grain 21	Ann007006.057 grain 22	Ann007006.057 grain 23
Mineral	Chl	Chl	Chl	Chl	Chl	Chl
SiO2	27.49	26.68	27.68	27.57	28.72	27.75
TiO2	0.04	0.04	0.04	0.04	0.03	0.07
Al2O3	22.63	21.93	22.23	23.06	20.08	23.23
FeO	9.72	9.95	10.68	10.78	9.55	10.27
MnO	0.09	0.10	0.09	0.10	0.08	0.12
MgO	26.28	25.96	26.47	26.29	27.47	26.99
V2O3	0.08	<0.08	0.09	0.12	<0.08	0.08
CaO	0.06	0.03	<0.02	<0.02	0.07	0.03
Na2O	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
K2O	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
F	0.35	0.26	0.20	0.21	0.41	0.27
Cl	0.05	0.03	<0.03	<0.03	<0.03	<0.03
Total	86.85	85.12	87.53	88.22	86.57	88.91
H2O	12.08	11.84	12.20	12.29	12.02	12.38
Total	98.77	96.84	99.65	100.41	98.40	101.17
Structural Formulas*						
Si	2.688	2.671	2.699	2.667	2.817	2.658
Al(iv)	1.312	1.329	1.301	1.333	1.183	1.342
Al(vi)	1.296	1.258	1.253	1.296	1.139	1.280
Ti	0.003	0.003	0.003	0.003	0.002	0.005
Fe	0.795	0.833	0.871	0.872	0.783	0.822
Mn	0.008	0.009	0.008	0.008	0.006	0.010
Mg	3.830	3.874	3.846	3.791	4.017	3.854
V	0.007	0.006	0.007	0.009	0.000	0.006
Ca	0.006	0.003	0.000	0.000	0.007	0.003
Na	0.000	0.000	0.000	0.000	0.000	0.000
K	0.000	0.000	0.000	0.000	0.000	0.000
F	0.108	0.082	0.061	0.065	0.128	0.081
Cl	0.008	0.005	0.000	0.000	0.004	0.003
OH	7.884	7.913	7.939	7.935	7.868	7.915
K/(K+Na+Ca)	0.000	0.000	0.000	0.000	0.000	0.000
Mg/(Mg+Fe+Mn)	0.827	0.822	0.814	0.812	0.836	0.822
Al(vi)/(sum Oct)	0.218	0.210	0.209	0.217	0.191	0.214
F/(F+Cl+OH)	0.014	0.010	0.008	0.008	0.016	0.010

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	Ann007006.057 grain 23	Ann007006.057 grain 23	Ann007006.057 grain 23	Ann007006.057 grain 26	Ann007006.057 grain 26	Ann007006.057 grain 26	YD09-06-area4
Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Musc
SiO2	26.66	28.12	29.32	27.20	26.59	27.63	46.07
TiO2	0.04	0.07	0.04	0.05	0.05	0.04	0.23
Al2O3	21.44	22.45	21.73	22.38	22.03	22.23	35.54
FeO	9.85	10.57	10.84	10.22	9.86	9.73	0.60
MnO	0.09	0.07	<0.06	0.10	0.08	0.07	<0.06
MgO	26.76	26.68	27.49	26.69	26.03	26.04	1.22
V2O3	<0.08	0.09	0.15	<0.08	<0.08	<0.08	<0.08
CaO	0.03	<0.02	<0.02	0.02	0.04	<0.02	<0.02
Na2O	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.10
K2O	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	10.27
F	0.23	0.24	0.44	0.28	0.21	0.40	0.13
Cl	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	85.30	88.32	90.10	87.11	85.01	86.36	94.21
H2O	11.86	12.32	12.46	12.10	11.85	11.99	4.42
Total	97.05	100.54	102.38	99.09	96.77	98.17	98.57
Structural Formulas*							
Si	2.668	2.711	2.773	2.664	2.665	2.717	3.080
Al(iv)	1.332	1.289	1.227	1.336	1.335	1.283	0.920
Al(vi)	1.196	1.262	1.195	1.247	1.266	1.295	1.880
Ti	0.003	0.005	0.003	0.004	0.003	0.003	0.012
Fe	0.825	0.852	0.857	0.837	0.827	0.800	0.033
Mn	0.008	0.006	0.000	0.008	0.007	0.006	0.001
Mg	3.991	3.835	3.876	3.897	3.888	3.819	0.121
V	0.000	0.007	0.011	0.000	0.000	0.000	0.001
Ca	0.003	0.000	0.000	0.003	0.005	0.000	0.001
Na	0.000	0.000	0.000	0.000	0.000	0.000	0.013
K	0.000	0.000	0.000	0.000	0.000	0.007	0.876
F	0.073	0.073	0.132	0.087	0.068	0.125	0.028
Cl	0.006	0.000	0.000	0.000	0.002	0.005	0.000
OH	7.921	7.927	7.868	7.913	7.930	7.871	1.971
K/(K+Na+Ca)	0.000	0.000	0.000	0.000	0.000	1.000	0.984
Mg/(Mg+Fe+Mn)	0.827	0.817	0.819	0.822	0.823	0.826	0.781
Al(vi)/(sum Oct)	0.199	0.212	0.201	0.208	0.211	0.219	0.918
F/(F+Cl+OH)	0.009	0.009	0.016	0.011	0.008	0.016	0.014

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	YD09-06-area4	YD09-06-area4	YD09-06-area4	YD09-06-area4	YD09-06-area4	YD09-06-area4	YD09-06-area2	YD09-06-area2	YD09-06-area2	YD09-06-area2
Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc
SiO2	46.81	47.06	47.85	47.71	47.78	46.71	48.10	48.77	48.38	49.04
TiO2	0.39	0.86	0.42	0.48	0.37	0.61	0.19	0.18	0.21	0.21
Al2O3	37.02	36.32	37.84	37.60	37.56	36.98	33.46	33.58	34.16	33.86
FeO	0.72	0.61	0.81	0.69	0.77	0.72	0.58	0.56	0.61	0.62
MnO	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
MgO	1.16	1.17	1.24	1.18	1.14	1.02	2.30	2.40	2.26	2.43
V2O3	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CaO	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	0.03	<0.02	<0.02
Na2O	0.33	0.34	0.37	0.36	0.36	0.30	0.16	0.16	0.14	0.14
K2O	11.09	10.77	10.96	11.00	11.10	10.97	10.79	10.98	11.25	11.13
F	0.17	0.31	0.22	0.16	0.31	0.15	0.20	0.36	0.19	0.37
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.04	<0.03	<0.03	<0.03
Total	97.75	97.50	99.77	99.27	99.50	97.54	95.91	97.07	97.28	97.88
H2O	4.54	4.47	4.62	4.63	4.56	4.55	4.45	4.43	4.52	4.46
Total	102.21	101.84	104.30	103.84	103.93	102.02	100.27	101.35	101.71	102.18
Structural Formulas*										
Si	3.034	3.052	3.033	3.040	3.040	3.032	3.168	3.174	3.148	3.168
Al(iv)	0.966	0.948	0.967	0.960	0.960	0.968	0.832	0.826	0.852	0.832
Al(vi)	1.862	1.827	1.860	1.863	1.856	1.861	1.764	1.750	1.768	1.745
Ti	0.019	0.042	0.020	0.023	0.018	0.030	0.010	0.009	0.010	0.010
Fe	0.039	0.033	0.043	0.037	0.041	0.039	0.032	0.030	0.033	0.034
Mn	0.000	0.000	0.000	0.002	0.003	0.000	0.001	-0.001	0.000	0.000
Mg	0.112	0.113	0.118	0.112	0.108	0.099	0.225	0.233	0.219	0.234
V	0.003	0.003	0.002	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Ca	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.002	0.001	0.001
Na	0.041	0.043	0.046	0.045	0.045	0.038	0.020	0.020	0.018	0.017
K	0.917	0.891	0.886	0.894	0.901	0.909	0.907	0.911	0.934	0.917
F	0.036	0.063	0.045	0.032	0.062	0.030	0.042	0.074	0.038	0.075
Cl	0.001	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.000
OH	1.964	1.937	1.955	1.968	1.937	1.970	1.954	1.926	1.961	1.925
K/(K+Na+Ca)	0.957	0.954	0.951	0.952	0.953	0.959	0.976	0.977	0.980	0.981
Mg/(Mg+Fe+Mn)	0.741	0.772	0.730	0.744	0.712	0.716	0.873	0.890	0.867	0.873
Al(vi)/(sum Oct)	0.915	0.905	0.910	0.913	0.915	0.916	0.867	0.865	0.869	0.861
F/(F+Cl+OH)	0.018	0.032	0.022	0.016	0.031	0.015	0.021	0.037	0.019	0.038

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	YD09-06-area2	YD09-06-area2	YD09-06-area2	YD09-06-area2	YD09-06-area2	YD09-06-area2	YD09-06-area2	YD09-06-area3	YD09-06-area3	YD09-06-area3
Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc
SiO2	48.59	46.69	47.07	47.01	47.00	48.12	46.87	47.20	47.72	47.33
TiO2	0.24	0.72	0.73	0.42	0.58	0.16	0.84	0.82	0.74	0.77
Al2O3	34.09	36.99	37.03	37.29	36.71	33.62	36.56	36.55	37.06	36.92
FeO	0.62	0.66	0.65	0.73	0.69	0.53	0.66	0.68	0.67	0.65
MnO	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
MgO	2.29	1.26	1.20	1.24	1.22	1.92	1.41	1.16	1.39	1.33
V2O3	<0.08	<0.08	0.08	<0.08	<0.08	<0.08	0.08	<0.08	<0.08	0.09
CaO	0.03	<0.02	<0.02	<0.02	<0.02	0.04	<0.02	<0.02	<0.02	<0.02
Na2O	0.14	0.36	0.32	0.34	0.34	0.12	0.34	0.35	0.38	0.36
K2O	10.93	11.11	11.24	11.26	11.01	10.05	11.00	11.01	10.93	11.20
F	0.37	<0.06	0.25	0.23	<0.06	0.27	0.34	0.23	0.11	<0.06
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	0.03	<0.03	<0.03	<0.03	<0.03
Total	97.37	97.93	98.59	98.59	97.63	94.90	98.15	98.07	99.07	98.75
H2O	4.44	4.60	4.54	4.55	4.61	4.39	4.48	4.53	4.64	4.64
Total	101.66	102.51	103.02	103.04	102.23	99.18	102.49	102.50	103.67	103.36
Structural Formulas*										
Si	3.153	3.023	3.028	3.025	3.048	3.183	3.027	3.048	3.047	3.038
Al(iv)	0.847	0.977	0.972	0.975	0.952	0.817	0.973	0.952	0.953	0.962
Al(vi)	1.759	1.845	1.834	1.852	1.854	1.804	1.810	1.829	1.835	1.832
Ti	0.012	0.035	0.035	0.020	0.028	0.008	0.041	0.040	0.035	0.037
Fe	0.034	0.036	0.035	0.039	0.037	0.029	0.035	0.037	0.036	0.035
Mn	0.000	0.000	0.001	0.001	0.000	0.000	0.002	0.000	0.000	0.002
Mg	0.221	0.122	0.115	0.119	0.118	0.190	0.136	0.112	0.133	0.127
V	0.004	0.004	0.004	0.002	0.003	0.002	0.004	0.003	0.003	0.005
Ca	0.002	0.000	0.000	0.001	0.000	0.003	0.000	0.000	0.000	0.000
Na	0.018	0.046	0.039	0.043	0.043	0.015	0.043	0.044	0.047	0.044
K	0.904	0.918	0.923	0.924	0.911	0.848	0.906	0.907	0.890	0.917
F	0.075	0.011	0.051	0.047	0.004	0.056	0.068	0.047	0.022	0.012
Cl	0.001	0.000	0.000	0.001	0.000	0.004	0.001	0.000	0.000	0.001
OH	1.924	1.989	1.949	1.952	1.996	1.940	1.930	1.953	1.978	1.987
K/(K+Na+Ca)	0.978	0.952	0.959	0.955	0.955	0.979	0.955	0.953	0.950	0.954
Mg/(Mg+Fe+Mn)	0.868	0.772	0.760	0.748	0.759	0.867	0.782	0.752	0.788	0.778
Al(vi)/(sum Oct)	0.867	0.904	0.906	0.911	0.909	0.887	0.892	0.905	0.899	0.899
F/(F+Cl+OH)	0.038	0.005	0.026	0.024	0.002	0.028	0.034	0.024	0.011	0.006

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	YD09-06-area3	YD09-06-area3	YD09-06-area3	YD02-02-area1	YD02-02-area1	YD02-02-area1	YD02-02-area1	YD02-02-area1	YD02-02-area1	YD02-02-area1
Mineral	Musc	Musc	Musc	Musc	Musc	Musc + Pa	Pa	Musc + Pa	Musc + Pa	Musc
SiO2	46.36	47.45	48.22	46.36	46.43	48.38	48.18	47.86	48.56	46.33
TiO2	0.54	0.87	0.48	<0.02	0.05	0.02	<0.02	<0.02	<0.02	0.08
Al2O3	36.38	36.57	34.14	41.25	38.88	40.12	41.82	39.16	40.39	39.36
FeO	0.75	0.70	0.64	0.10	0.18	<0.07	<0.07	<0.07	<0.07	0.21
MnO	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
MgO	1.18	1.31	1.69	<0.03	0.20	0.05	0.12	0.04	0.06	0.17
V2O3	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CaO	0.02	<0.02	<0.02	0.54	<0.02	<0.02	0.06	0.13	0.05	<0.02
Na2O	0.33	0.34	0.16	6.05	1.54	3.42	5.85	3.78	4.11	1.18
K2O	10.68	10.96	10.84	1.62	9.13	5.56	1.47	3.77	3.92	9.67
F	0.08	<0.06	0.41	0.23	0.29	0.22	0.37	0.10	0.33	<0.06
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	96.40	98.29	96.68	96.21	96.76	97.88	97.96	94.90	97.49	97.09
H2O	4.52	4.65	4.38	4.62	4.49	4.66	4.66	4.62	4.63	4.61
Total	100.88	102.94	100.88	100.73	101.13	102.45	102.47	99.47	101.98	101.69
Structural Formulas*										
Si	3.043	3.056	3.150	2.937	3.005	3.039	2.981	3.071	3.039	2.994
Al(iv)	0.957	0.944	0.850	1.063	0.995	0.961	1.019	0.929	0.961	1.006
Al(vi)	1.857	1.831	1.778	2.016	1.971	2.009	2.029	2.033	2.019	1.992
Ti	0.027	0.042	0.024	0.001	0.002	0.001	0.000	0.001	0.001	0.004
Fe	0.041	0.037	0.035	0.005	0.010	0.003	0.003	0.002	0.002	0.011
Mn	0.001	0.001	0.000	0.000	0.001	0.000	0.000	-0.001	0.001	0.002
Mg	0.115	0.126	0.164	0.003	0.019	0.005	0.011	0.004	0.005	0.016
V	0.002	0.003	0.003	0.001	0.002	0.002	0.001	0.000	0.001	0.001
Ca	0.002	0.001	0.001	0.036	0.001	0.001	0.004	0.009	0.003	0.000
Na	0.042	0.042	0.021	0.743	0.193	0.417	0.701	0.470	0.499	0.148
K	0.894	0.900	0.903	0.131	0.754	0.445	0.116	0.308	0.313	0.797
F	0.017	0.000	0.086	0.047	0.059	0.045	0.073	0.021	0.065	0.009
Cl	0.001	0.001	0.003	0.001	0.001	0.000	0.001	0.000	0.000	0.000
OH	1.982	1.999	1.912	1.952	1.940	1.955	1.926	1.979	1.935	1.991
K/(K+Na+Ca)	0.953	0.955	0.977	0.144	0.795	0.516	0.141	0.392	0.384	0.843
Mg/(Mg+Fe+Mn)	0.732	0.763	0.824	0.335	0.646	0.634	0.782	0.734	0.695	0.554
Al(vi)/(sum Oct)	0.909	0.897	0.887	0.995	0.983	0.995	0.993	0.997	0.995	0.983
F/(F+Cl+OH)	0.009	0.000	0.043	0.023	0.029	0.022	0.036	0.011	0.032	0.005

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	YD02-02-area1	YD02-02-area1	YD02-02-area1	YD02-02-area1	YD02-02-area1	YD02-02-area1	YD02-02-area1	YD02-02-area1	YD02-02-area1	YD02-02-area1
Mineral	Musc + Pa	Musc	Musc	Musc	Pa	Pa	Musc + Pa	Pa	Musc + Pa	Musc + Pa
SiO2	47.29	46.55	46.43	46.12	47.68	47.20	47.44	47.31	47.82	48.21
TiO2	0.03	0.04	0.04	0.04	<0.02	<0.02	<0.02	0.02	0.02	<0.02
Al2O3	41.94	40.34	40.70	40.06	42.94	42.20	40.15	41.29	39.26	40.40
FeO	0.15	0.18	0.21	0.21	0.10	<0.07	0.08	<0.07	<0.07	<0.07
MnO	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
MgO	0.04	0.16	0.10	0.11	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
V2O3	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CaO	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	0.05	0.03	<0.02
Na2O	4.46	1.30	2.00	1.45	6.51	6.97	3.89	5.49	4.24	4.50
K2O	4.72	9.56	8.31	9.36	1.42	0.38	4.72	1.75	3.91	3.63
F	0.19	0.28	0.28	0.18	0.22	0.41	0.24	0.20	<0.06	0.29
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	98.90	98.43	98.10	97.61	98.93	97.23	96.63	96.16	95.41	97.15
H2O	4.72	4.57	4.58	4.58	4.77	4.62	4.60	4.66	4.66	4.63
Total	103.53	102.88	102.56	102.12	103.61	101.67	101.13	100.74	100.06	101.65
Structural Formulas*										
Si	2.944	2.965	2.954	2.963	2.930	2.938	3.013	2.982	3.061	3.028
Al(iv)	1.056	1.035	1.046	1.037	1.070	1.062	0.987	1.018	0.939	0.972
Al(vi)	2.022	1.993	2.005	1.997	2.040	2.033	2.018	2.049	2.022	2.020
Ti	0.001	0.002	0.002	0.002	0.001	0.000	0.001	0.001	0.001	0.001
Fe	0.008	0.009	0.011	0.011	0.005	0.001	0.004	0.002	0.003	0.002
Mn	0.002	0.000	0.000	0.002	0.000	0.000	0.001	0.000	0.000	0.001
Mg	0.004	0.015	0.009	0.011	0.002	0.001	0.001	0.002	0.001	0.001
V	0.001	0.002	0.001	0.002	0.000	0.001	0.001	0.000	0.001	0.001
Ca	0.001	0.000	0.000	0.000	0.001	0.000	0.001	0.003	0.002	0.001
Na	0.539	0.161	0.247	0.180	0.776	0.841	0.479	0.670	0.527	0.548
K	0.375	0.777	0.674	0.767	0.112	0.030	0.383	0.141	0.319	0.291
F	0.038	0.057	0.057	0.036	0.044	0.081	0.049	0.039	0.006	0.059
Cl	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.000
OH	1.961	1.943	1.943	1.963	1.956	1.919	1.951	1.960	1.992	1.941
K/(K+Na+Ca)	0.410	0.828	0.732	0.809	0.126	0.034	0.443	0.173	0.377	0.346
Mg/(Mg+Fe+Mn)	0.287	0.607	0.455	0.461	0.250	0.403	0.209	0.462	0.248	0.260
Al(vi)/(sum Oct)	0.992	0.986	0.988	0.986	0.996	0.998	0.996	0.998	0.997	0.998
F/(F+Cl+OH)	0.019	0.029	0.028	0.018	0.022	0.040	0.024	0.020	0.003	0.029

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	YD02-02-area1	YD02-02-area1	YD02-02-area1	YD02-02-area2	YD02-02-area2	YD02-02-area2	YD02-02-area2	YD02-02-area2	YD02-02-area2	YD02-02-area2
Mineral	Musc	Musc	Musc	Pa	Musc + Pa	Musc + Pa	Pa	Musc	Musc	Musc
SiO2	45.57	46.27	46.97	47.04	47.04	47.25	47.66	46.29	46.40	46.68
TiO2	0.06	0.05	<0.02	<0.02	<0.02	<0.02	<0.02	0.05	0.06	0.06
Al2O3	38.95	39.31	42.65	41.93	41.93	41.44	42.11	39.17	38.99	39.13
FeO	0.18	0.15	<0.07	<0.07	<0.07	0.07	<0.07	0.18	0.21	0.20
MnO	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
MgO	0.25	0.30	<0.03	<0.03	<0.03	<0.03	<0.03	0.15	0.28	0.25
V2O3	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CaO	<0.02	<0.02	<0.02	0.04	<0.02	0.02	<0.02	<0.02	<0.02	<0.02
Na2O	1.26	1.09	7.32	6.03	5.58	5.08	5.98	1.16	0.90	1.01
K2O	9.56	9.77	0.38	1.61	2.62	3.27	1.87	9.49	10.05	9.92
F	0.30	0.20	0.32	0.17	0.22	0.31	0.17	0.29	<0.06	0.36
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	96.16	97.18	97.71	96.94	97.51	97.52	97.91	96.83	96.97	97.62
H2O	4.45	4.54	4.68	4.70	4.68	4.63	4.74	4.49	4.62	4.49
Total	100.48	101.63	102.25	101.57	102.10	102.02	102.58	101.20	101.58	101.95
Structural Formulas*										
Si	2.976	2.988	2.915	2.948	2.944	2.962	2.960	2.996	3.006	3.002
Al(iv)	1.024	1.012	1.085	1.052	1.056	1.038	1.040	1.004	0.994	0.998
Al(vi)	1.974	1.981	2.034	2.045	2.037	2.025	2.041	1.983	1.983	1.968
Ti	0.003	0.003	0.000	0.001	0.001	0.001	0.000	0.003	0.003	0.003
Fe	0.010	0.008	0.002	0.003	0.003	0.004	0.003	0.010	0.011	0.011
Mn	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000
Mg	0.024	0.029	0.001	0.003	0.002	0.002	0.001	0.015	0.027	0.024
V	0.001	0.000	0.000	0.001	0.001	0.001	0.002	0.003	0.003	0.000
Ca	0.001	0.001	0.000	0.002	0.001	0.002	0.000	0.000	0.001	0.000
Na	0.159	0.137	0.880	0.732	0.677	0.618	0.720	0.145	0.113	0.126
K	0.796	0.805	0.030	0.128	0.209	0.262	0.148	0.784	0.830	0.813
F	0.062	0.040	0.063	0.033	0.044	0.062	0.034	0.059	0.002	0.072
Cl	0.001	0.001	0.000	0.001	0.001	0.001	0.001	0.001	0.000	0.000
OH	1.938	1.959	1.937	1.967	1.956	1.937	1.966	1.940	1.997	1.927
K/(K+Na+Ca)	0.833	0.854	0.033	0.149	0.236	0.297	0.170	0.844	0.879	0.866
Mg/(Mg+Fe+Mn)	0.702	0.780	0.339	0.453	0.357	0.394	0.221	0.604	0.692	0.688
Al(vi)/(sum Oct)	0.981	0.980	0.998	0.996	0.997	0.996	0.997	0.985	0.978	0.981
F/(F+Cl+OH)	0.031	0.020	0.032	0.016	0.022	0.031	0.017	0.029	0.001	0.036

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	YD02-02-area2	YD02-02-area2	YD02-02-area2	YD02-02-area2	YD02-02-area2	YD02-02-area2	YD02-02-area2	YD02-02-area3	YD02-02-area3	YD02-02-area3
Mineral	Musc	Musc + Pa	Musc	Musc	Musc	Pa	Musc + Pa	Musc	Musc	Musc
SiO2	46.63	46.58	47.33	46.70	47.05	48.22	45.43	44.87	46.44	46.74
TiO2	0.06	0.04	0.05	0.07	0.05	<0.02	<0.02	0.08	0.09	0.05
Al2O3	39.59	40.99	38.12	39.16	38.91	42.01	40.12	39.04	38.83	39.32
FeO	0.26	0.11	0.17	0.20	0.18	0.08	0.07	0.23	0.18	0.14
MnO	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
MgO	0.21	0.04	0.25	0.13	0.16	<0.03	0.04	0.26	0.22	0.37
V2O3	<0.08	<0.08	0.09	0.17	0.15	<0.08	<0.08	<0.08	<0.08	<0.08
CaO	<0.02	0.03	0.07	0.06	0.03	0.06	0.04	<0.02	<0.02	<0.02
Na2O	1.06	3.73	0.90	0.89	0.95	5.96	4.87	1.07	0.95	0.96
K2O	10.03	5.86	9.17	9.26	9.33	1.75	3.41	9.89	9.90	9.80
F	0.34	0.29	0.27	0.47	0.26	0.29	0.24	0.32	0.08	0.76
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	98.21	97.70	96.44	97.11	97.08	98.44	94.28	95.81	96.76	98.17
H2O	4.52	4.59	4.50	4.43	4.53	4.72	4.49	4.41	4.58	4.33
Total	102.59	102.17	100.82	101.34	101.50	103.04	98.67	100.08	101.30	102.17
Structural Formulas*										
Si	2.984	2.950	3.063	3.006	3.029	2.975	2.952	2.949	3.013	2.986
Al(iv)	1.016	1.050	0.937	0.994	0.971	1.025	1.048	1.051	0.987	1.014
Al(vi)	1.970	2.009	1.970	1.978	1.982	2.030	2.025	1.973	1.981	1.947
Ti	0.003	0.002	0.003	0.003	0.002	0.001	0.000	0.004	0.004	0.002
Fe	0.014	0.006	0.009	0.011	0.010	0.004	0.004	0.013	0.010	0.007
Mn	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000
Mg	0.020	0.003	0.024	0.012	0.015	0.003	0.003	0.025	0.022	0.035
V	0.002	0.002	0.004	0.009	0.008	0.000	0.001	0.002	0.003	0.002
Ca	0.000	0.002	0.005	0.004	0.002	0.004	0.003	0.000	0.001	0.000
Na	0.132	0.458	0.113	0.112	0.119	0.713	0.614	0.136	0.119	0.119
K	0.819	0.473	0.757	0.760	0.766	0.137	0.283	0.829	0.819	0.799
F	0.069	0.058	0.055	0.096	0.052	0.057	0.049	0.067	0.016	0.154
Cl	0.000	0.000	0.002	0.000	0.001	0.000	0.002	0.000	0.001	0.001
OH	1.931	1.942	1.943	1.904	1.947	1.943	1.949	1.933	1.983	1.846
K/(K+Na+Ca)	0.862	0.507	0.865	0.868	0.864	0.161	0.314	0.858	0.872	0.870
Mg/(Mg+Fe+Mn)	0.590	0.364	0.717	0.533	0.607	0.351	0.434	0.662	0.691	0.828
Al(vi)/(sum Oct)	0.981	0.994	0.980	0.983	0.983	0.996	0.995	0.978	0.981	0.977
F/(F+Cl+OH)	0.034	0.029	0.027	0.048	0.026	0.028	0.024	0.033	0.008	0.077

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	YD02-02-area3	YD02-02-area3	YD02-02-area3	YD02-02-area3	YD02-02-area3	YD02-02-area3	YD02-02-area3	YD02-02-area3	YD02-02-area3	YD02-02-area3
Mineral	Musc	Musc + Pa	Musc	Musc	Musc + Pa	Musc + Pa	Musc + Pa	Musc + Pa	Musc + Pa	Musc + Pa
SiO2	46.89	46.47	46.37	45.51	47.42	47.26	47.95	46.03	50.30	47.67
TiO2	0.06	0.06	0.06	0.05	<0.02	0.03	0.02	0.04	<0.02	0.02
Al2O3	39.65	39.96	39.32	38.76	41.58	40.59	41.51	40.17	39.43	39.92
FeO	0.17	0.18	0.19	0.14	0.09	0.13	<0.07	0.19	<0.07	<0.08
MnO	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
MgO	0.32	0.18	0.28	0.31	0.06	0.06	0.10	0.13	<0.03	0.08
V2O3	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CaO	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	0.03	<0.02	0.03	<0.02
Na2O	1.15	2.58	0.99	1.01	4.86	3.95	5.44	2.29	4.09	3.38
K2O	9.58	7.37	9.92	9.32	3.82	4.88	2.76	8.00	3.15	5.38
F	0.48	0.27	0.38	0.21	0.38	0.09	0.15	0.27	0.18	0.33
Cl	<0.03	<0.03	<0.03	0.04	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	98.31	97.10	97.54	95.38	98.25	97.06	98.06	97.13	97.31	96.86
H2O	4.47	4.55	4.47	4.45	4.62	4.68	4.74	4.54	4.72	4.56
Total	102.58	101.54	101.85	99.73	102.72	101.71	102.73	101.55	101.95	101.28
Structural Formulas*										
Si	2.989	2.976	2.985	2.989	2.958	2.993	2.982	2.957	3.131	3.025
Al(iv)	1.011	1.024	1.015	1.011	1.042	1.007	1.018	1.043	0.869	0.975
Al(vi)	1.967	1.992	1.969	1.988	2.016	2.022	2.025	1.998	2.023	2.009
Ti	0.003	0.003	0.003	0.002	0.001	0.002	0.001	0.002	0.000	0.001
Fe	0.009	0.010	0.010	0.008	0.005	0.007	0.003	0.010	0.001	0.001
Mn	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000
Mg	0.030	0.017	0.027	0.030	0.005	0.006	0.010	0.012	0.002	0.008
V	0.000	0.001	0.001	0.001	0.000	0.002	0.001	0.000	0.002	0.002
Ca	0.000	0.000	0.000	0.000	0.001	0.002	0.002	0.000	0.002	0.001
Na	0.142	0.320	0.124	0.129	0.588	0.485	0.656	0.285	0.494	0.415
K	0.779	0.602	0.815	0.781	0.304	0.394	0.219	0.656	0.250	0.436
F	0.096	0.055	0.078	0.043	0.074	0.019	0.030	0.054	0.036	0.066
Cl	0.000	0.000	0.001	0.004	0.000	0.000	0.001	0.000	0.002	0.001
OH	1.903	1.945	1.921	1.953	1.926	1.981	1.969	1.946	1.962	1.933
K/(K+Na+Ca)	0.846	0.653	0.868	0.859	0.341	0.448	0.249	0.697	0.336	0.511
Mg/(Mg+Fe+Mn)	0.771	0.643	0.728	0.797	0.490	0.452	0.756	0.534	0.593	0.877
Al(vi)/(sum Oct)	0.979	0.985	0.980	0.979	0.994	0.992	0.993	0.988	0.997	0.994
F/(F+Cl+OH)	0.048	0.027	0.039	0.021	0.037	0.009	0.015	0.027	0.018	0.033

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	YD02-02-area3	YD02-02-area3	YD08-22-area1	YD08-22-area1	YD08-22-area1	YD08-22-area2	YD08-22-area2	YD08-22-area2	YD08-22-area2	YD08-22-area2
Mineral	Musc + Pa	Musc + Pa	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc
SiO2	48.84	49.03	49.00	47.77	47.94	48.83	48.36	48.65	48.70	48.70
TiO2	<0.02	<0.02	0.12	0.19	0.14	0.13	0.14	0.12	0.10	0.15
Al2O3	40.82	39.61	30.53	33.04	32.91	31.67	31.94	32.28	32.79	31.89
FeO	<0.09	<0.10	4.03	3.87	3.50	3.86	3.72	3.61	3.55	3.76
MnO	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
MgO	0.03	0.03	1.86	1.39	1.26	1.67	1.58	1.56	1.54	1.76
V2O3	<0.08	<0.08	0.25	<0.08	0.09	<0.08	<0.08	<0.08	0.10	<0.08
CaO	<0.02	<0.02	0.11	0.13	0.08	0.03	0.03	0.04	0.04	0.06
Na2O	4.96	3.98	0.09	0.14	0.14	0.11	0.13	0.14	0.11	0.12
K2O	2.93	3.95	10.95	10.74	11.07	10.43	10.59	10.45	10.80	10.65
F	0.27	0.22	0.18	<0.06	0.10	<0.06	<0.06	0.19	0.13	0.06
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	97.97	96.90	97.12	97.38	97.25	96.82	96.62	97.11	97.88	97.24
H2O	4.69	4.66	4.44	4.54	4.49	4.53	4.52	4.46	4.52	4.52
Total	102.55	101.47	101.48	101.92	101.69	101.35	101.14	101.49	102.34	101.73
Structural Formulas*										
Si	3.033	3.083	3.246	3.151	3.165	3.227	3.206	3.202	3.186	3.209
Al(iv)	0.967	0.917	0.754	0.849	0.835	0.773	0.794	0.798	0.814	0.791
Al(vi)	2.021	2.018	1.629	1.719	1.725	1.693	1.702	1.707	1.714	1.686
Ti	0.000	0.000	0.006	0.009	0.007	0.007	0.007	0.006	0.005	0.007
Fe	0.002	0.001	0.223	0.214	0.193	0.213	0.207	0.199	0.194	0.207
Mn	0.001	0.000	0.000	0.001	0.001	0.000	0.003	0.000	0.000	0.002
Mg	0.003	0.003	0.184	0.137	0.124	0.165	0.156	0.153	0.151	0.173
V	0.002	0.001	0.013	0.004	0.005	0.004	0.004	0.004	0.005	0.003
Ca	0.001	0.001	0.008	0.009	0.006	0.002	0.002	0.003	0.002	0.004
Na	0.597	0.485	0.012	0.018	0.017	0.014	0.017	0.017	0.014	0.015
K	0.233	0.317	0.925	0.904	0.932	0.879	0.895	0.878	0.901	0.895
F	0.054	0.044	0.037	0.000	0.020	0.000	0.000	0.039	0.027	0.013
Cl	0.001	0.000	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.001
OH	1.946	1.955	1.962	1.999	1.978	2.000	2.000	1.961	1.973	1.986
K/(K+Na+Ca)	0.280	0.395	0.979	0.971	0.976	0.982	0.979	0.978	0.982	0.979
Mg/(Mg+Fe+Mn)	0.461	0.650	0.451	0.389	0.388	0.436	0.428	0.435	0.436	0.453
Al(vi)/(sum Oct)	0.996	0.997	0.793	0.825	0.840	0.813	0.819	0.825	0.828	0.811
F/(F+Cl+OH)	0.027	0.022	0.018	0.000	0.010	0.000	0.000	0.020	0.013	0.007

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	YD08-22-area3	YD08-22-area3	YD08-22-area3	YD08-22-area3	YD08-22-area3	YD08-22-area3	YD08-21_area1	YD08-21_area1	YD08-21_area1	YD08-21_area1
Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc
SiO2	48.72	48.67	48.50	48.03	48.05	48.26	46.91	46.98	46.41	48.72
TiO2	0.07	0.09	0.08	0.10	0.07	0.19	0.25	0.25	0.23	0.26
Al2O3	31.06	31.80	32.11	31.18	31.99	31.35	37.42	36.78	37.66	34.74
FeO	3.82	3.74	3.48	4.03	3.57	3.95	0.88	0.96	1.01	1.43
MnO	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
MgO	1.76	1.75	1.53	1.88	1.53	1.96	1.13	1.19	0.83	1.96
V2O3	<0.08	<0.08	0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	0.08
CaO	0.05	0.02	0.05	0.04	0.07	0.03	<0.02	<0.02	<0.02	<0.02
Na2O	0.12	0.12	0.11	0.10	0.17	0.15	0.17	0.18	0.18	0.11
K2O	10.45	10.99	10.73	10.78	10.43	11.05	11.31	11.53	11.22	12.06
F	0.17	0.17	0.20	0.16	<0.06	0.18	0.14	0.16	<0.06	0.23
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	96.28	97.47	96.88	96.40	95.94	97.20	98.28	98.09	97.67	99.59
H2O	4.42	4.47	4.44	4.41	4.49	4.44	4.57	4.55	4.59	4.56
Total	100.62	101.86	101.24	100.74	100.43	101.56	102.80	102.57	102.24	104.06
Structural Formulas*										
Si	3.240	3.206	3.204	3.204	3.204	3.197	3.027	3.044	3.015	3.123
Al(iv)	0.760	0.794	0.796	0.796	0.796	0.803	0.973	0.956	0.985	0.877
Al(vi)	1.674	1.676	1.704	1.656	1.717	1.645	1.873	1.852	1.899	1.747
Ti	0.004	0.005	0.004	0.005	0.004	0.009	0.012	0.012	0.011	0.013
Fe	0.212	0.206	0.192	0.225	0.199	0.219	0.048	0.052	0.055	0.076
Mn	0.000	0.002	0.000	0.001	0.000	0.002	0.000	0.000	0.001	0.000
Mg	0.174	0.172	0.151	0.187	0.152	0.193	0.109	0.115	0.080	0.187
V	0.002	0.004	0.004	0.003	0.002	0.003	0.003	0.002	0.004	0.004
Ca	0.004	0.002	0.004	0.003	0.005	0.002	0.000	0.001	0.000	0.000
Na	0.016	0.015	0.014	0.013	0.022	0.020	0.021	0.023	0.022	0.013
K	0.886	0.923	0.904	0.917	0.887	0.934	0.931	0.953	0.930	0.986
F	0.036	0.035	0.042	0.034	0.000	0.037	0.029	0.033	0.008	0.047
Cl	0.001	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.001	0.000
OH	1.963	1.964	1.958	1.966	1.999	1.963	1.971	1.967	1.990	1.953
K/(K+Na+Ca)	0.979	0.982	0.981	0.983	0.970	0.977	0.978	0.976	0.977	0.987
Mg/(Mg+Fe+Mn)	0.451	0.453	0.440	0.453	0.433	0.467	0.693	0.687	0.589	0.710
Al(vi)/(sum Oct)	0.810	0.812	0.829	0.797	0.828	0.794	0.916	0.911	0.927	0.862
F/(F+Cl+OH)	0.018	0.018	0.021	0.017	0.000	0.019	0.014	0.017	0.004	0.023

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	YD08-21_area1	YD08-21_area1	YD08-21_area1	YD08-21_area1	YD08-21_area1	YD08-21_area1	YD08-21_area1	YD08-21_area1	YD08-21_area1
Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc
SiO2	47.70	46.87	46.44	46.56	47.05	47.39	48.53	47.41	47.69
TiO2	0.18	0.07	0.07	0.11	0.14	0.10	0.07	0.25	0.27
Al2O3	36.55	38.68	39.07	39.47	38.49	38.51	37.46	37.29	37.35
FeO	0.98	0.28	0.20	0.26	0.38	0.25	0.31	1.14	0.71
MnO	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
MgO	1.39	0.53	0.30	0.40	0.41	0.32	0.44	1.14	1.06
V2O3	0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CaO	<0.02	<0.02	<0.02	<0.02	0.07	0.04	0.08	<0.02	<0.02
Na2O	0.09	0.12	0.23	0.22	0.15	0.13	0.08	0.17	0.18
K2O	11.74	11.54	11.00	11.15	10.91	10.26	9.81	11.31	11.68
F	0.10	0.10	0.24	0.24	<0.06	0.26	0.17	0.18	0.12
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	98.83	98.24	97.57	98.47	97.68	97.31	97.05	98.94	99.13
H2O	4.61	4.61	4.52	4.56	4.63	4.53	4.58	4.59	4.63
Total	103.40	102.81	101.99	102.93	102.30	101.73	101.55	103.45	103.70
Structural Formulas*									
Si	3.068	3.016	2.999	2.984	3.034	3.051	3.120	3.041	3.052
Al(iv)	0.932	0.984	1.001	1.016	0.966	0.949	0.880	0.959	0.948
Al(vi)	1.839	1.949	1.973	1.965	1.959	1.973	1.958	1.860	1.869
Ti	0.009	0.003	0.003	0.005	0.007	0.005	0.003	0.012	0.013
Fe	0.053	0.015	0.011	0.014	0.020	0.013	0.017	0.061	0.038
Mn	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000
Mg	0.134	0.051	0.029	0.038	0.039	0.031	0.043	0.109	0.101
V	0.004	0.003	0.002	0.003	0.003	0.002	0.003	0.003	0.003
Ca	0.000	0.000	0.001	0.001	0.005	0.003	0.006	0.000	0.000
Na	0.012	0.015	0.028	0.027	0.019	0.016	0.010	0.021	0.023
K	0.964	0.947	0.906	0.911	0.897	0.843	0.804	0.926	0.953
F	0.019	0.019	0.050	0.049	0.006	0.053	0.035	0.036	0.024
Cl	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.000
OH	1.981	1.980	1.950	1.951	1.994	1.947	1.964	1.964	1.976
K/(K+Na+Ca)	0.988	0.984	0.969	0.970	0.975	0.978	0.980	0.978	0.977
Mg/(Mg+Fe+Mn)	0.717	0.775	0.729	0.732	0.659	0.695	0.707	0.640	0.727
Al(vi)/(sum Oct)	0.902	0.964	0.978	0.970	0.966	0.975	0.967	0.910	0.923
F/(F+Cl+OH)	0.010	0.010	0.025	0.024	0.003	0.026	0.017	0.018	0.012

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	YD08-21_area2	YD08-21_area2	YD08-21_area2	YD08-21_area2	YD08-21_area2	YD08-21_area2	YD08-21_area2	YD08-21_area2	YD08-21_area2
Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc
SiO2	47.24	46.99	46.37	47.30	46.88	46.69	48.29	46.96	47.71
TiO2	0.15	0.18	0.19	0.24	0.19	0.19	0.56	0.09	0.44
Al2O3	38.45	37.98	37.65	37.92	38.55	38.02	35.24	38.99	35.96
FeO	0.55	0.60	0.47	0.85	0.90	0.76	1.58	0.38	1.11
MnO	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
MgO	0.87	0.77	0.61	1.03	0.90	0.86	1.87	0.68	1.58
V2O3	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	0.09
CaO	<0.02	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Na2O	0.12	0.25	0.16	0.17	0.23	0.21	0.13	0.15	0.15
K2O	11.65	11.32	10.78	11.55	11.46	11.25	11.66	11.59	11.90
F	0.09	0.13	0.14	0.29	0.21	<0.06	0.22	<0.06	0.16
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	99.19	98.29	96.48	99.44	99.39	98.09	99.61	98.91	99.13
H2O	4.65	4.59	4.51	4.56	4.59	4.62	4.57	4.68	4.58
Total	103.79	102.82	100.93	103.88	103.89	102.69	104.09	103.59	103.64
Structural Formulas*									
Si	3.018	3.026	3.032	3.019	2.994	3.016	3.092	3.005	3.068
Al(iv)	0.982	0.974	0.968	0.981	1.006	0.984	0.908	0.995	0.932
Al(vi)	1.912	1.909	1.933	1.872	1.896	1.910	1.751	1.945	1.793
Ti	0.007	0.009	0.009	0.012	0.009	0.009	0.027	0.005	0.021
Fe	0.029	0.032	0.026	0.045	0.048	0.041	0.084	0.020	0.060
Mn	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.001	0.001
Mg	0.082	0.074	0.060	0.098	0.086	0.083	0.178	0.065	0.152
V	0.003	0.003	0.002	0.004	0.004	0.002	0.003	0.002	0.005
Ca	0.000	0.001	0.002	0.001	0.000	0.000	0.000	0.000	0.000
Na	0.015	0.031	0.020	0.021	0.028	0.027	0.016	0.019	0.018
K	0.950	0.930	0.899	0.940	0.934	0.927	0.952	0.946	0.976
F	0.018	0.027	0.028	0.058	0.042	0.008	0.045	0.000	0.032
Cl	0.000	0.000	0.002	0.000	0.001	0.000	0.001	0.000	0.000
OH	1.981	1.972	1.970	1.942	1.957	1.992	1.954	2.000	1.968
K/(K+Na+Ca)	0.984	0.967	0.975	0.978	0.971	0.972	0.983	0.980	0.981
Mg/(Mg+Fe+Mn)	0.736	0.694	0.693	0.681	0.641	0.660	0.679	0.749	0.714
Al(vi)/(sum Oct)	0.940	0.942	0.952	0.922	0.928	0.933	0.857	0.954	0.883
F/(F+Cl+OH)	0.009	0.014	0.014	0.029	0.021	0.004	0.022	0.000	0.016

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	Bu-647_area2	Bu-647_area2	Bu-647_area2	Bu-647_area2	Bu-647_area2	Bu-647_area2	Bu-647_area2	Bu-647_area1	Bu-647_area1	Bu-647_area1	Bu-647_area1
Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc
SiO2	45.71	47.03	45.98	46.90	47.81	47.71	47.93	45.57	46.17	44.60	45.70
TiO2	0.11	0.13	1.03	0.16	0.10	0.12	0.21	0.18	0.15	0.09	0.15
Al2O3	36.27	34.78	31.55	33.48	33.12	33.90	32.67	36.40	37.05	33.08	37.35
FeO	0.80	1.20	2.53	1.91	2.15	2.24	2.24	2.62	2.22	2.33	2.53
MnO	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
MgO	0.56	0.79	1.52	1.03	1.35	1.12	1.31	0.40	0.52	0.58	0.42
V2O3	<0.08	<0.08	0.13	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CaO	0.05	0.10	0.08	0.08	0.04	0.09	0.06	<0.02	<0.02	0.02	<0.02
Na2O	0.11	0.22	0.25	0.28	0.32	0.38	0.32	0.64	0.64	0.34	0.72
K2O	3.34	6.44	8.67	8.86	9.33	9.59	9.37	9.99	10.19	9.00	10.27
F	0.19	0.23	0.34	0.13	0.21	0.20	0.31	<0.06	0.30	0.31	<0.06
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	87.18	90.99	92.11	92.92	94.48	95.44	94.48	95.91	97.29	90.41	97.20
H2O	4.26	4.32	4.20	4.37	4.39	4.43	4.34	4.49	4.44	4.13	4.56
Total	91.36	95.21	96.16	97.23	98.78	99.79	98.69	100.38	101.61	94.40	101.75
Structural Formulas*											
Si	3.146	3.178	3.156	3.172	3.191	3.160	3.202	3.025	3.017	3.120	2.997
Al(iv)	0.854	0.822	0.844	0.828	0.809	0.840	0.798	0.975	0.983	0.880	1.003
Al(vi)	2.087	1.947	1.709	1.840	1.796	1.806	1.773	1.873	1.870	1.846	1.884
Ti	0.006	0.007	0.053	0.008	0.005	0.006	0.011	0.009	0.007	0.005	0.008
Fe	0.046	0.068	0.145	0.108	0.120	0.124	0.125	0.145	0.121	0.136	0.139
Mn	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.000
Mg	0.058	0.080	0.156	0.104	0.134	0.111	0.130	0.040	0.050	0.060	0.041
V	0.001	0.003	0.007	0.003	0.002	0.004	0.004	0.003	0.002	0.002	0.002
Ca	0.003	0.007	0.006	0.006	0.003	0.006	0.004	0.001	0.001	0.002	0.000
Na	0.015	0.028	0.034	0.037	0.041	0.049	0.041	0.082	0.081	0.047	0.092
K	0.293	0.555	0.759	0.764	0.795	0.810	0.798	0.846	0.849	0.803	0.859
F	0.040	0.050	0.075	0.028	0.044	0.042	0.065	0.009	0.062	0.069	0.003
Cl	0.002	0.002	0.002	0.001	0.001	0.000	0.000	0.001	0.000	0.002	0.000
OH	1.958	1.948	1.924	1.971	1.955	1.958	1.935	1.990	1.938	1.929	1.996
K/(K+Na+Ca)	0.941	0.940	0.950	0.947	0.947	0.936	0.946	0.911	0.913	0.943	0.903
Mg/(Mg+Fe+Mn)	0.556	0.541	0.518	0.490	0.527	0.470	0.510	0.215	0.292	0.307	0.229
Al(vi)/(sum Oct)	0.949	0.925	0.825	0.891	0.873	0.880	0.868	0.905	0.912	0.901	0.909
F/(F+Cl+OH)	0.020	0.025	0.037	0.014	0.022	0.021	0.033	0.004	0.031	0.035	0.002

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	Bu-647_area1	Bu-647_area1	Bu-647_area1	Bu-647_area1	YD08-19C_area1	YD08-19C_area1	YD08-19C_area1	YD08-19C_area1	YD08-19C_area1
Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc
SiO2	46.90	46.61	46.33	46.32	47.14	46.53	46.87	46.62	46.10
TiO2	0.20	0.20	0.20	0.19	0.13	0.06	0.06	0.07	0.08
Al2O3	36.16	36.61	36.86	37.05	40.28	39.66	39.49	39.38	39.10
FeO	2.86	2.73	2.66	2.60	<0.07	<0.07	<0.07	<0.07	<0.07
MnO	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
MgO	0.82	0.74	0.58	0.59	0.17	0.22	0.20	0.20	0.18
V2O3	0.10	0.10	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CaO	0.08	0.02	0.07	0.02	<0.02	<0.02	<0.02	<0.02	0.02
Na2O	0.38	0.45	0.50	0.56	0.33	0.31	0.33	0.30	0.30
K2O	10.08	10.30	10.14	10.23	10.82	10.70	10.49	10.70	10.44
F	0.14	<0.06	0.24	0.16	0.51	0.36	0.42	0.43	0.27
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	97.73	97.77	97.64	97.79	99.45	97.91	97.96	97.75	96.54
H2O	4.53	4.60	4.48	4.52	4.50	4.50	4.48	4.46	4.48
Total	102.20	102.36	102.02	102.24	103.73	102.26	102.26	102.03	100.90
Structural Formulas*									
Si	3.055	3.038	3.021	3.017	2.980	2.987	3.002	2.997	2.998
Al(iv)	0.945	0.962	0.979	0.983	1.020	1.013	0.998	1.003	1.002
Al(vi)	1.831	1.850	1.853	1.860	1.980	1.987	1.984	1.980	1.995
Ti	0.010	0.010	0.010	0.010	0.006	0.003	0.003	0.004	0.004
Fe	0.156	0.149	0.145	0.141	0.001	0.000	0.001	0.001	0.000
Mn	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000
Mg	0.079	0.072	0.056	0.057	0.016	0.021	0.019	0.020	0.017
V	0.005	0.005	0.004	0.004	0.001	0.002	0.003	0.002	0.002
Ca	0.005	0.001	0.005	0.002	0.001	0.000	0.001	0.000	0.001
Na	0.048	0.057	0.063	0.070	0.040	0.039	0.041	0.037	0.038
K	0.838	0.856	0.843	0.850	0.872	0.876	0.857	0.878	0.866
F	0.029	0.000	0.050	0.033	0.102	0.073	0.086	0.086	0.055
Cl	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.001
OH	1.971	2.000	1.950	1.966	1.897	1.927	1.914	1.913	1.945
K/(K+Na+Ca)	0.941	0.936	0.925	0.922	0.955	0.957	0.954	0.959	0.957
Mg/(Mg+Fe+Mn)	0.336	0.325	0.279	0.288	0.912	0.944	0.928	0.955	1.000
Al(vi)/(sum Oct)	0.880	0.887	0.896	0.898	0.987	0.987	0.987	0.987	0.988
F/(F+Cl+OH)	0.015	0.000	0.025	0.017	0.051	0.037	0.043	0.043	0.027

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	YD08-19C_area1	YD08-19C_area1	YD08-19C_area1	YD08-19C_area1	YD08-19C_area1	YD08-19C_area1	YD08-19C_area2	YD08-19C_area2	YD08-19C_area2
Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc
SiO2	46.58	45.84	45.55	45.93	46.64	45.90	47.29	46.16	47.32
TiO2	0.06	0.17	0.14	0.07	0.09	0.12	0.10	0.10	0.11
Al2O3	39.81	39.88	39.15	38.94	39.62	39.27	38.86	39.36	39.36
FeO	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07
MnO	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
MgO	0.21	0.15	0.16	0.20	0.18	0.18	0.22	0.16	0.20
V2O3	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CaO	<0.02	0.02	0.03	0.02	<0.02	0.03	<0.02	<0.02	<0.02
Na2O	0.31	0.27	0.26	0.32	0.30	0.29	0.36	0.37	0.31
K2O	10.57	10.61	10.68	10.55	10.72	10.50	10.34	10.69	10.50
F	0.37	0.34	0.22	0.42	0.34	0.21	0.14	0.56	0.44
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	98.03	97.35	96.33	96.54	97.98	96.56	97.43	97.48	98.36
H2O	4.50	4.48	4.48	4.40	4.51	4.50	4.59	4.38	4.48
Total	102.37	101.68	100.71	100.77	102.35	100.97	101.96	101.61	102.66
Structural Formulas*									
Si	2.984	2.961	2.976	2.991	2.992	2.986	3.041	2.979	3.017
Al(iv)	1.016	1.039	1.024	1.009	1.008	1.014	0.959	1.021	0.983
Al(vi)	1.990	1.996	1.991	1.979	1.987	1.997	1.987	1.973	1.975
Ti	0.003	0.008	0.007	0.004	0.004	0.006	0.005	0.005	0.005
Fe	0.002	0.001	0.003	0.002	0.002	0.000	0.003	0.002	0.002
Mn	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mg	0.020	0.014	0.016	0.020	0.017	0.018	0.021	0.016	0.019
V	0.003	0.002	0.004	0.003	0.003	0.002	0.003	0.002	0.003
Ca	0.001	0.002	0.002	0.002	0.000	0.002	0.001	0.000	0.001
Na	0.038	0.033	0.033	0.040	0.037	0.037	0.045	0.046	0.038
K	0.864	0.874	0.890	0.876	0.877	0.872	0.848	0.880	0.854
F	0.075	0.069	0.046	0.086	0.068	0.043	0.029	0.114	0.090
Cl	0.000	0.001	0.001	0.000	0.000	0.001	0.001	0.000	0.002
OH	1.924	1.930	1.953	1.914	1.932	1.956	1.971	1.885	1.909
K/(K+Na+Ca)	0.957	0.962	0.962	0.955	0.960	0.958	0.949	0.950	0.956
Mg/(Mg+Fe+Mn)	0.909	0.949	0.851	0.911	0.918	0.983	0.880	0.907	0.910
Al(vi)/(sum Oct)	0.986	0.987	0.985	0.986	0.987	0.987	0.984	0.988	0.986
F/(F+Cl+OH)	0.038	0.035	0.023	0.043	0.034	0.021	0.014	0.057	0.045

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	YD08-19C_area2	YD08-19C_area2	YD08-19C_area2	YD08-19C_area2	YD08-19C_area2	YD08-19C_area2	YD08-19C_area2	G909153 spot 1	G909153 spot 1
Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc
SiO2	46.73	43.61	46.78	46.99	46.58	46.77	47.73	50.00	50.28
TiO2	0.10	0.13	0.11	0.15	0.12	0.19	0.29	0.24	0.21
Al2O3	39.75	37.09	39.68	39.27	39.32	38.71	39.48	31.61	32.09
FeO	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	1.10	0.97
MnO	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
MgO	0.19	0.20	0.13	0.17	0.17	0.19	0.22	2.47	2.24
V2O3	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CaO	<0.02	0.06	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Na2O	0.35	0.30	0.37	0.31	0.34	0.28	0.31	0.19	0.29
K2O	10.62	10.33	10.82	10.96	10.99	10.64	10.84	9.08	7.90
F	0.48	0.38	0.25	0.18	0.38	0.26	0.38	<0.06	0.24
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	98.29	92.21	98.22	98.12	98.01	97.13	99.30	94.97	94.36
H2O	4.46	4.20	4.56	4.59	4.48	4.51	4.55	4.54	4.45
Total	102.54	96.24	102.67	102.64	102.33	101.54	103.69	99.52	98.70
Structural Formulas*									
Si	2.987	2.981	2.995	3.013	2.994	3.025	3.019	3.297	3.301
Al(iv)	1.013	1.019	1.005	0.987	1.006	0.975	0.981	0.703	0.699
Al(vi)	1.981	1.969	1.989	1.981	1.972	1.974	1.962	1.753	1.783
Ti	0.005	0.006	0.005	0.007	0.006	0.009	0.014	0.012	0.010
Fe	0.001	0.003	0.000	0.002	0.003	0.001	0.000	0.061	0.053
Mn	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mg	0.018	0.020	0.012	0.016	0.017	0.018	0.021	0.243	0.220
V	0.003	0.002	0.003	0.003	0.002	0.003	0.002	0.000	0.004
Ca	0.000	0.004	0.001	0.000	0.000	0.001	0.000	0.000	0.000
Na	0.043	0.039	0.046	0.039	0.042	0.035	0.038	0.024	0.037
K	0.866	0.901	0.884	0.896	0.901	0.878	0.874	0.764	0.662
F	0.097	0.082	0.050	0.036	0.078	0.053	0.077	0.000	0.049
Cl	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001
OH	1.903	1.916	1.950	1.964	1.922	1.947	1.923	2.000	1.949
K/(K+Na+Ca)	0.952	0.954	0.950	0.958	0.955	0.961	0.958	0.970	0.946
Mg/(Mg+Fe+Mn)	0.964	0.862	0.977	0.886	0.848	0.928	1.000	0.800	0.805
Al(vi)/(sum Oct)	0.987	0.984	0.990	0.986	0.986	0.984	0.982	0.847	0.861
F/(F+Cl+OH)	0.049	0.041	0.025	0.018	0.039	0.026	0.038	0.000	0.025

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	G909153 spot 1	G909153 spot 2	G909153 spot 2	G909153 spot 2	G909153 spot 2	G909153 spot 3	G909153 spot 3	G909153 spot 3	G909153 spot 4	G909153 spot 4
Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc
SiO2	50.13	49.75	51.14	49.97	49.96	50.95	50.01	50.02	49.91	50.16
TiO2	0.20	0.28	0.17	0.18	0.18	0.16	0.11	0.14	0.18	0.20
Al2O3	31.44	31.37	32.34	31.70	31.44	30.24	31.23	31.37	31.75	31.52
FeO	0.97	1.28	1.12	1.08	1.21	1.27	1.20	1.30	1.07	1.23
MnO	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
MgO	2.25	2.15	2.30	2.16	2.34	2.08	2.39	2.58	2.37	2.30
V2O3	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CaO	<0.02	<0.02	<0.02	<0.02	0.23	<0.02	<0.02	<0.02	0.04	<0.02
Na2O	0.23	0.21	0.22	0.25	0.16	0.19	0.14	0.15	0.21	0.25
K2O	8.42	7.82	6.76	7.37	7.59	8.86	9.37	8.90	8.61	7.91
F	0.21	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	0.19	0.28	<0.06
Cl	<0.03	0.06	<0.03	<0.03	0.03	0.04	<0.03	<0.03	<0.03	<0.03
Total	94.01	93.12	94.25	92.96	93.64	93.89	94.65	94.72	94.48	93.79
H2O	4.43	4.48	4.59	4.50	4.50	4.50	4.52	4.45	4.41	4.52
Total	98.35	97.59	98.84	97.46	98.13	98.38	99.17	99.09	98.77	98.31
Structural Formulas*										
Si	3.315	3.317	3.336	3.325	3.320	3.384	3.312	3.300	3.291	3.322
Al(iv)	0.685	0.683	0.664	0.675	0.680	0.616	0.688	0.700	0.709	0.678
Al(vi)	1.766	1.782	1.823	1.810	1.782	1.751	1.750	1.738	1.758	1.782
Ti	0.010	0.014	0.008	0.009	0.009	0.008	0.005	0.007	0.009	0.010
Fe	0.054	0.072	0.061	0.060	0.067	0.071	0.067	0.072	0.059	0.068
Mn	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mg	0.222	0.214	0.224	0.214	0.232	0.206	0.236	0.254	0.233	0.227
V	0.004	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Ca	0.000	0.000	0.000	0.000	0.016	0.000	0.000	0.000	0.003	0.000
Na	0.029	0.027	0.028	0.032	0.021	0.025	0.019	0.019	0.027	0.032
K	0.710	0.665	0.563	0.626	0.643	0.750	0.792	0.749	0.724	0.668
F	0.043	0.000	0.000	0.000	0.000	0.000	0.000	0.039	0.058	0.000
Cl	0.002	0.007	0.002	0.001	0.004	0.005	0.000	0.000	0.000	0.001
OH	1.955	1.993	1.998	1.999	1.996	1.995	2.000	1.961	1.942	1.999
K/(K+Na+Ca)	0.961	0.961	0.953	0.951	0.945	0.968	0.977	0.975	0.961	0.954
Mg/(Mg+Fe+Mn)	0.806	0.749	0.785	0.781	0.776	0.745	0.780	0.780	0.797	0.769
Al(vi)/(sum Oct)	0.859	0.855	0.861	0.865	0.853	0.860	0.850	0.839	0.854	0.854
F/(F+Cl+OH)	0.022	0.000	0.000	0.000	0.000	0.000	0.000	0.019	0.029	0.000

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	G909153 spot 4	G909154 spot 1	G909154 spot 1	G909154 spot 1	G909154 spot 1	G909154 spot 1	G909154 spot 2	G909154 spot 2	G909154 spot 2	G909154 spot 2
Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc
SiO2	49.72	47.36	47.75	47.47	48.35	46.98	46.70	46.93	46.98	46.46
TiO2	0.25	0.45	0.18	0.25	0.43	0.68	0.57	0.51	0.44	0.26
Al2O3	31.23	35.23	34.43	34.43	34.62	34.88	34.59	34.63	35.28	34.81
FeO	1.46	1.15	1.55	1.47	1.18	1.45	1.31	1.44	1.09	1.28
MnO	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
MgO	2.48	1.24	1.33	1.42	1.24	1.08	1.58	1.39	1.16	1.24
V2O3	<0.08	<0.08	0.14	0.17	0.14	0.17	0.12	0.11	0.08	0.09
CaO	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	0.02	<0.02	<0.02	<0.02
Na2O	0.26	0.59	0.61	0.63	0.52	0.59	0.50	0.51	0.54	0.54
K2O	8.91	9.34	9.48	9.29	9.11	8.96	9.45	9.39	9.45	9.67
F	0.26	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	0.25	<0.06
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	94.63	95.58	95.61	95.29	95.72	95.00	95.05	95.08	95.30	94.45
H2O	4.41	4.55	4.54	4.53	4.57	4.52	4.51	4.51	4.42	4.48
Total	98.92	100.13	100.15	99.81	100.28	99.52	99.56	99.60	99.61	98.93
Structural Formulas*										
Si	3.289	3.120	3.150	3.140	3.168	3.114	3.103	3.115	3.100	3.105
Al(iv)	0.711	0.880	0.850	0.860	0.832	0.886	0.897	0.885	0.900	0.895
Al(vi)	1.724	1.854	1.828	1.825	1.841	1.838	1.812	1.824	1.844	1.848
Ti	0.012	0.022	0.009	0.013	0.021	0.034	0.029	0.025	0.022	0.013
Fe	0.081	0.063	0.085	0.082	0.065	0.080	0.073	0.080	0.060	0.071
Mn	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mg	0.245	0.121	0.131	0.140	0.121	0.107	0.157	0.137	0.114	0.124
V	0.000	0.000	0.008	0.009	0.007	0.009	0.006	0.006	0.004	0.005
Ca	0.000	0.000	0.000	0.000	0.000	0.002	0.002	0.000	0.000	0.000
Na	0.033	0.075	0.077	0.081	0.066	0.076	0.065	0.066	0.069	0.069
K	0.752	0.785	0.798	0.784	0.761	0.758	0.801	0.795	0.795	0.825
F	0.054	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.053	0.000
Cl	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.002
OH	1.946	2.000	2.000	2.000	1.998	2.000	2.000	2.000	1.947	1.998
K/(K+Na+Ca)	0.958	0.913	0.912	0.907	0.920	0.907	0.923	0.923	0.920	0.922
Mg/(Mg+Fe+Mn)	0.752	0.657	0.605	0.633	0.652	0.571	0.682	0.631	0.654	0.634
Al(vi)/(sum Oct)	0.836	0.900	0.887	0.882	0.896	0.889	0.873	0.880	0.902	0.897
F/(F+Cl+OH)	0.027	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.027	0.000

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	G909154 spot 2	G909154 spot 2	G909154 spot 3	G909154 spot 3	G909154 spot 3	G909154 spot 3	G909154 spot 3	G909157 spot1	G909157 spot1	G909157 spot1
Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc
SiO2	46.92	47.25	46.99	46.96	47.21	47.03	45.99	49.79	49.81	49.77
TiO2	<0.02	0.42	0.81	0.78	0.81	0.72	1.08	0.07	0.07	0.07
Al2O3	34.60	34.20	35.02	34.99	35.42	35.51	33.77	31.47	30.96	31.05
FeO	1.56	1.20	1.20	1.23	1.20	1.09	1.02	1.86	1.94	1.80
MnO	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
MgO	1.21	1.40	1.14	1.13	1.14	1.04	1.20	2.43	2.36	2.46
V2O3	<0.08	0.10	0.12	0.09	0.10	<0.08	0.09	<0.08	<0.08	<0.08
CaO	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	1.98	<0.02	<0.02	0.02
Na2O	0.29	0.45	0.62	0.64	0.56	0.53	0.51	0.15	0.16	0.20
K2O	9.17	8.85	9.45	9.84	9.09	9.37	8.16	7.86	7.25	8.43
F	<0.06	<0.06	<0.06	<0.06	0.23	0.19	<0.06	<0.06	<0.06	<0.06
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	93.90	94.03	95.47	95.75	95.83	95.57	94.23	93.84	92.82	94.06
H2O	4.47	4.49	4.54	4.54	4.46	4.46	4.46	4.51	4.48	4.50
Total	98.37	98.51	100.01	100.29	100.20	99.95	98.68	98.35	97.30	98.56
Structural Formulas*										
Si	3.142	3.152	3.103	3.100	3.095	3.094	3.087	3.306	3.331	3.312
Al(iv)	0.858	0.848	0.897	0.900	0.905	0.906	0.913	0.694	0.669	0.688
Al(vi)	1.873	1.841	1.828	1.821	1.832	1.848	1.758	1.769	1.771	1.747
Ti	0.000	0.021	0.040	0.039	0.040	0.036	0.055	0.003	0.003	0.004
Fe	0.087	0.067	0.066	0.068	0.066	0.060	0.057	0.103	0.109	0.100
Mn	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mg	0.121	0.139	0.113	0.111	0.112	0.102	0.120	0.241	0.235	0.244
V	0.000	0.005	0.006	0.005	0.005	0.000	0.005	0.000	0.004	0.000
Ca	0.000	0.000	0.000	0.000	0.000	0.000	0.143	0.000	0.000	0.002
Na	0.038	0.059	0.080	0.081	0.071	0.068	0.066	0.020	0.021	0.025
K	0.784	0.753	0.796	0.829	0.760	0.787	0.698	0.666	0.618	0.716
F	0.000	0.000	0.000	0.000	0.047	0.039	0.000	0.000	0.000	0.000
Cl	0.002	0.002	0.000	0.000	0.000	0.000	0.002	0.000	0.002	0.000
OH	1.998	1.998	2.000	2.000	1.953	1.961	1.998	2.000	1.998	2.000
K/(K+Na+Ca)	0.954	0.928	0.909	0.911	0.915	0.920	0.770	0.971	0.967	0.964
Mg/(Mg+Fe+Mn)	0.581	0.676	0.629	0.621	0.629	0.631	0.677	0.700	0.684	0.710
Al(vi)/(sum Oct)	0.900	0.888	0.890	0.891	0.892	0.903	0.881	0.836	0.835	0.834
F/(F+Cl+OH)	0.000	0.000	0.000	0.000	0.024	0.020	0.000	0.000	0.000	0.000

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	G909157 spot1	G909157 spot1	G909157 spot2	G909157 spot2	G909157 spot2	G909157 spot3	G909157 spot3	G909157 spot3	G909157 spot3	G909157 spot4
Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc
SiO2	50.00	50.03	50.46	50.22	49.99	49.92	49.83	49.09	50.05	49.51
TiO2	0.07	0.09	0.16	0.17	0.14	0.10	0.15	0.15	0.14	0.10
Al2O3	30.84	30.06	30.40	30.44	31.09	30.99	29.94	29.82	30.11	30.85
FeO	1.95	2.01	1.73	1.58	1.40	1.87	2.18	2.07	2.00	2.05
MnO	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	0.06	<0.06	<0.06	<0.06
MgO	2.62	2.80	2.86	2.88	2.66	2.38	2.83	2.71	2.72	2.56
V2O3	0.08	<0.08	0.09	0.11	0.10	<0.08	0.09	0.09	0.11	0.09
CaO	<0.02	<0.02	0.03	0.03	0.05	0.03	0.04	<0.02	<0.02	0.02
Na2O	0.17	0.14	0.13	0.10	0.13	0.18	0.13	0.15	0.12	0.15
K2O	8.84	8.20	8.27	8.95	8.51	6.80	7.74	8.96	7.99	8.90
F	0.21	<0.06	0.23	<0.06	<0.06	0.19	<0.06	<0.06	<0.06	<0.06
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.04	<0.03	<0.03
Total	94.84	93.64	94.43	94.70	94.20	92.62	93.18	93.21	93.48	94.40
H2O	4.43	4.48	4.43	4.52	4.52	4.40	4.47	4.43	4.48	4.50
Total	99.18	98.12	98.77	99.23	98.72	96.94	97.64	97.63	97.97	98.90
Structural Formulas*										
Si	3.305	3.342	3.333	3.326	3.312	3.332	3.340	3.315	3.344	3.297
Al(iv)	0.695	0.658	0.667	0.674	0.688	0.668	0.660	0.685	0.656	0.703
Al(vi)	1.708	1.709	1.700	1.702	1.741	1.769	1.705	1.689	1.716	1.718
Ti	0.003	0.005	0.008	0.008	0.007	0.005	0.008	0.007	0.007	0.005
Fe	0.108	0.112	0.096	0.088	0.077	0.105	0.122	0.117	0.112	0.114
Mn	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000
Mg	0.258	0.279	0.282	0.284	0.263	0.237	0.283	0.273	0.271	0.254
V	0.004	0.004	0.005	0.006	0.005	0.004	0.005	0.005	0.006	0.005
Ca	0.000	0.000	0.002	0.002	0.003	0.002	0.003	0.000	0.000	0.002
Na	0.022	0.018	0.017	0.013	0.017	0.024	0.016	0.019	0.016	0.019
K	0.745	0.699	0.697	0.756	0.719	0.579	0.662	0.772	0.681	0.756
F	0.043	0.000	0.047	0.000	0.000	0.039	0.000	0.000	0.000	0.000
Cl	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.000
OH	1.955	2.000	1.953	2.000	2.000	1.961	2.000	1.996	2.000	2.000
K/(K+Na+Ca)	0.971	0.975	0.973	0.980	0.972	0.958	0.972	0.976	0.977	0.974
Mg/(Mg+Fe+Mn)	0.705	0.712	0.747	0.764	0.772	0.693	0.693	0.701	0.708	0.691
Al(vi)/(sum Oct)	0.820	0.810	0.813	0.815	0.832	0.835	0.802	0.808	0.813	0.820
F/(F+Cl+OH)	0.022	0.000	0.024	0.000	0.000	0.020	0.000	0.000	0.000	0.000

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	G909157 spot4	G909157 spot4	G909157 spot4	G909157 spot4	G909157 spot4	G909157 spot4	G909158 spot4	G909158 spot4	G909158 spot4	G909158 spot4
Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc
SiO2	49.53	50.13	50.42	50.80	50.53	50.49	50.34	49.87	49.30	50.37
TiO2	0.13	0.08	0.11	0.08	0.10	0.07	0.09	0.06	0.07	0.10
Al2O3	30.26	29.29	30.76	31.14	29.52	30.45	30.57	30.19	28.63	29.85
FeO	2.30	2.21	1.69	1.09	1.56	1.24	2.41	2.49	2.50	3.29
MnO	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
MgO	2.61	2.82	2.72	2.73	3.04	2.74	2.59	2.61	2.79	2.77
V2O3	<0.08	<0.08	<0.08	0.11	0.09	0.09	<0.08	<0.08	<0.08	<0.08
CaO	<0.02	<0.02	0.03	0.02	<0.02	<0.02	0.03	0.03	0.02	<0.02
Na2O	0.20	0.19	0.23	0.20	0.13	0.17	0.13	0.14	0.12	0.16
K2O	8.66	8.17	7.65	7.86	8.25	8.79	7.56	8.27	9.25	7.25
F	0.25	0.22	<0.06	0.27	0.27	0.18	0.21	0.29	0.24	0.25
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.09	<0.03
Total	94.08	93.22	93.80	94.34	93.54	94.23	93.97	94.02	93.09	94.16
H2O	4.36	4.36	4.52	4.43	4.37	4.44	4.42	4.36	4.28	4.39
Total	98.33	97.48	98.32	98.66	97.80	98.60	98.30	98.25	97.25	98.44
Structural Formulas*										
Si	3.307	3.363	3.341	3.335	3.365	3.342	3.335	3.323	3.346	3.343
Al(iv)	0.693	0.637	0.659	0.665	0.635	0.658	0.665	0.677	0.654	0.657
Al(vi)	1.688	1.679	1.744	1.745	1.683	1.718	1.721	1.694	1.637	1.679
Ti	0.006	0.004	0.005	0.004	0.005	0.003	0.005	0.003	0.003	0.005
Fe	0.128	0.124	0.093	0.060	0.087	0.069	0.133	0.139	0.142	0.183
Mn	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mg	0.260	0.282	0.269	0.267	0.302	0.270	0.256	0.259	0.282	0.274
V	0.003	0.000	0.000	0.006	0.005	0.005	0.000	0.000	0.000	0.000
Ca	0.000	0.000	0.002	0.001	0.000	0.000	0.002	0.002	0.002	0.000
Na	0.026	0.025	0.029	0.026	0.017	0.022	0.017	0.019	0.016	0.020
K	0.737	0.700	0.647	0.659	0.701	0.743	0.639	0.703	0.801	0.614
F	0.052	0.047	0.000	0.056	0.058	0.037	0.045	0.060	0.051	0.053
Cl	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.010	0.000
OH	1.946	1.953	2.000	1.944	1.942	1.963	1.955	1.938	1.939	1.947
K/(K+Na+Ca)	0.966	0.965	0.954	0.960	0.977	0.972	0.971	0.972	0.979	0.968
Mg/(Mg+Fe+Mn)	0.669	0.695	0.742	0.816	0.777	0.797	0.657	0.651	0.665	0.600
Al(vi)/(sum Oct)	0.809	0.804	0.826	0.838	0.809	0.832	0.814	0.809	0.793	0.784
F/(F+Cl+OH)	0.026	0.023	0.000	0.028	0.029	0.018	0.022	0.030	0.025	0.026

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	G909158 spot4	G909158 spot4	G909155 spot1	G909155 spot1	G909155 spot1	G909155 spot1	G909155 spot1	G909155 spot2	G909155 spot2	G909155 spot2
Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc
SiO2	50.68	50.47	46.92	46.76	46.97	47.10	47.48	49.54	48.94	49.24
TiO2	0.07	0.07	0.75	0.45	0.83	0.95	0.56	0.04	<0.02	0.06
Al2O3	30.18	29.75	33.41	33.68	33.57	34.01	33.94	29.67	30.35	29.73
FeO	2.34	2.49	1.17	1.25	1.27	1.22	1.28	1.38	1.09	1.25
MnO	<0.06	<0.06	<0.06	0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
MgO	2.64	2.74	1.43	1.40	1.53	1.29	1.45	4.00	4.28	4.45
V2O3	<0.08	<0.08	0.10	<0.08	0.08	0.12	<0.08	<0.08	<0.08	<0.08
CaO	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Na2O	0.13	0.14	0.36	0.48	0.50	0.46	0.53	0.13	0.17	0.14
K2O	7.29	7.47	9.48	9.50	9.60	9.71	9.82	7.87	7.87	8.11
F	0.29	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	0.38	0.34	0.39
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	93.73	93.38	93.75	93.80	94.42	95.01	95.20	93.03	93.09	93.42
H2O	4.38	4.48	4.46	4.45	4.48	4.51	4.52	4.30	4.32	4.30
Total	97.99	97.86	98.21	98.25	98.90	99.51	99.72	97.17	97.27	97.56
Structural Formulas*										
Si	3.358	3.371	3.154	3.147	3.139	3.131	3.150	3.314	3.272	3.288
Al(iv)	0.642	0.629	0.846	0.853	0.861	0.869	0.850	0.686	0.728	0.712
Al(vi)	1.714	1.712	1.800	1.818	1.784	1.795	1.804	1.653	1.663	1.628
Ti	0.003	0.004	0.038	0.023	0.042	0.048	0.028	0.002	0.000	0.003
Fe	0.130	0.139	0.066	0.070	0.071	0.068	0.071	0.077	0.061	0.070
Mn	0.000	0.000	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000
Mg	0.261	0.273	0.143	0.141	0.153	0.128	0.143	0.399	0.426	0.443
V	0.004	0.000	0.006	0.000	0.004	0.006	0.000	0.000	0.000	0.000
Ca	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Na	0.017	0.018	0.047	0.063	0.064	0.059	0.068	0.017	0.021	0.018
K	0.616	0.636	0.813	0.815	0.818	0.824	0.831	0.672	0.671	0.691
F	0.061	0.000	0.000	0.000	0.000	0.000	0.000	0.080	0.072	0.082
Cl	0.000	0.001	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000
OH	1.939	1.999	2.000	1.998	2.000	2.000	2.000	1.920	1.928	1.918
K/(K+Na+Ca)	0.974	0.972	0.945	0.929	0.927	0.933	0.925	0.976	0.969	0.974
Mg/(Mg+Fe+Mn)	0.668	0.662	0.686	0.656	0.684	0.654	0.669	0.838	0.875	0.864
Al(vi)/(sum Oct)	0.812	0.805	0.877	0.884	0.869	0.878	0.882	0.776	0.773	0.759
F/(F+Cl+OH)	0.031	0.000	0.000	0.000	0.000	0.000	0.000	0.040	0.036	0.041

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	G909155 spot2	G909152 spot1	G909152 spot1	G909152 spot1	G909152 spot1	G909152 spot1	G909152 spot2	G909152 spot2	G909152 spot2	G909152 spot2
Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc
SiO2	49.24	46.90	46.26	46.91	47.02	47.00	49.46	48.96	49.06	47.15
TiO2	0.04	0.49	0.51	0.56	0.73	0.71	0.32	0.36	0.35	0.53
Al2O3	30.67	34.01	34.35	34.73	34.30	33.99	31.85	31.98	32.62	34.88
FeO	1.30	1.02	1.05	0.98	1.01	0.95	0.88	1.07	0.93	1.05
MnO	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
MgO	3.67	1.49	1.34	1.40	1.31	1.33	2.45	2.59	2.12	1.35
V2O3	<0.08	0.09	<0.08	<0.08	<0.08	0.11	0.11	0.09	<0.08	<0.08
CaO	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Na2O	0.14	0.50	0.58	0.52	0.45	0.45	0.22	0.26	0.26	0.50
K2O	8.08	8.76	8.83	8.65	8.28	9.03	8.35	8.30	7.91	8.58
F	0.56	0.31	<0.06	<0.06	<0.06	<0.06	0.31	0.21	0.23	<0.06
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	93.74	93.57	93.01	94.00	93.39	93.74	93.98	93.86	93.56	94.30
H2O	4.24	4.33	4.44	4.50	4.47	4.47	4.38	4.41	4.41	4.51
Total	97.74	97.76	97.45	98.50	97.86	98.21	98.23	98.18	97.88	98.81
Structural Formulas*										
Si	3.273	3.138	3.120	3.126	3.148	3.147	3.273	3.249	3.253	3.132
Al(iv)	0.727	0.862	0.880	0.874	0.852	0.853	0.727	0.751	0.747	0.868
Al(vi)	1.675	1.820	1.851	1.853	1.855	1.830	1.756	1.751	1.801	1.862
Ti	0.002	0.025	0.026	0.028	0.037	0.036	0.016	0.018	0.017	0.026
Fe	0.072	0.057	0.059	0.055	0.056	0.053	0.049	0.059	0.051	0.058
Mn	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mg	0.364	0.148	0.135	0.139	0.131	0.133	0.242	0.257	0.210	0.134
V	0.000	0.005	0.000	0.004	0.000	0.006	0.006	0.005	0.000	0.000
Ca	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Na	0.018	0.064	0.076	0.068	0.058	0.058	0.028	0.033	0.034	0.065
K	0.685	0.747	0.760	0.735	0.707	0.771	0.705	0.703	0.669	0.727
F	0.117	0.066	0.000	0.000	0.000	0.000	0.064	0.044	0.048	0.000
Cl	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
OH	1.883	1.934	2.000	2.000	2.000	2.000	1.936	1.956	1.952	2.000
K/(K+Na+Ca)	0.974	0.921	0.910	0.916	0.924	0.930	0.961	0.955	0.952	0.918
Mg/(Mg+Fe+Mn)	0.834	0.722	0.696	0.718	0.699	0.715	0.833	0.812	0.803	0.697
Al(vi)/(sum Oct)	0.793	0.886	0.894	0.891	0.892	0.890	0.849	0.838	0.866	0.895
F/(F+Cl+OH)	0.059	0.033	0.000	0.000	0.000	0.000	0.032	0.022	0.024	0.000

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	G909152 spot2	G909152 spot2	G909152 spot3	G909152 spot3	G909152 spot3	G909152 spot3	G909152 spot3	G909160 spot1	G909160 spot1	G909160 spot1
Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc
SiO2	49.12	48.59	46.69	46.60	46.95	46.89	47.32	46.91	47.18	47.82
TiO2	0.11	0.13	0.60	0.58	0.70	0.71	0.61	0.24	0.13	0.12
Al2O3	31.77	33.01	34.03	33.95	34.66	34.52	34.39	34.21	33.18	34.23
FeO	1.05	0.81	0.98	1.01	1.00	1.02	0.96	0.71	0.76	0.62
MnO	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
MgO	2.17	1.73	1.50	1.52	1.27	1.41	1.33	1.70	2.06	1.66
V2O3	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CaO	0.03	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Na2O	0.22	0.25	0.48	0.49	0.48	0.54	0.49	0.33	0.33	0.35
K2O	7.02	7.48	9.73	9.57	9.53	9.20	9.15	9.33	8.80	8.73
F	0.27	0.36	<0.06	<0.06	<0.06	<0.06	<0.06	0.26	<0.06	<0.06
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	91.81	92.43	94.23	93.94	94.75	94.51	94.47	93.78	92.69	93.74
H2O	4.33	4.31	4.47	4.46	4.51	4.50	4.51	4.35	4.44	4.50
Total	96.02	96.58	98.70	98.40	99.26	99.01	98.97	98.02	97.13	98.24
Structural Formulas*										
Si	3.298	3.247	3.128	3.130	3.120	3.122	3.146	3.137	3.187	3.183
Al(iv)	0.702	0.753	0.872	0.870	0.880	0.878	0.854	0.863	0.813	0.817
Al(vi)	1.812	1.846	1.816	1.818	1.835	1.831	1.840	1.834	1.828	1.869
Ti	0.005	0.007	0.030	0.029	0.035	0.036	0.031	0.012	0.007	0.006
Fe	0.059	0.045	0.055	0.057	0.055	0.057	0.053	0.040	0.043	0.035
Mn	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mg	0.217	0.173	0.150	0.152	0.126	0.140	0.132	0.169	0.208	0.164
V	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Ca	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Na	0.028	0.033	0.063	0.064	0.062	0.069	0.063	0.042	0.043	0.046
K	0.601	0.638	0.832	0.820	0.808	0.781	0.776	0.796	0.758	0.742
F	0.057	0.076	0.000	0.000	0.000	0.000	0.000	0.056	0.000	0.000
Cl	0.003	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
OH	1.941	1.921	2.000	2.000	2.000	2.000	2.000	1.944	2.000	2.000
K/(K+Na+Ca)	0.952	0.949	0.930	0.928	0.928	0.919	0.925	0.949	0.946	0.942
Mg/(Mg+Fe+Mn)	0.786	0.792	0.732	0.728	0.694	0.712	0.713	0.809	0.828	0.827
Al(vi)/(sum Oct)	0.866	0.892	0.885	0.884	0.895	0.887	0.895	0.892	0.877	0.901
F/(F+Cl+OH)	0.028	0.038	0.000	0.000	0.000	0.000	0.000	0.028	0.000	0.000

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	G909160 spot2	G909160 spot2	G909160 spot2	G909160 spot2	G909160 spot2	G909160 spot2	G909163 spot1	G909163 spot1	G909163 spot1	G909163 spot2
Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc
SiO2	47.55	47.87	47.84	47.20	47.23	48.42	48.18	47.44	49.23	49.46
TiO2	0.19	0.12	0.14	0.13	0.11	0.12	0.08	0.12	0.07	0.15
Al2O3	34.67	34.04	34.76	33.69	34.17	34.39	29.77	29.79	29.82	30.14
FeO	0.72	0.71	0.68	0.65	0.63	0.62	4.08	4.43	3.25	2.49
MnO	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
MgO	2.04	2.35	1.74	2.71	2.16	1.62	2.68	2.84	2.82	2.49
V2O3	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	0.22	0.27	0.22	0.14
CaO	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.03
Na2O	0.34	0.31	0.36	0.39	0.36	0.37	0.10	0.16	0.13	0.09
K2O	8.97	8.85	9.23	8.91	9.32	8.88	8.65	9.72	8.99	8.01
F	0.31	<0.06	0.23	0.41	<0.06	<0.06	0.32	0.27	0.33	0.46
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	94.82	94.44	95.02	94.14	94.18	94.59	94.13	95.05	94.89	93.49
H2O	4.40	4.52	4.44	4.31	4.50	4.54	4.28	4.30	4.33	4.26
Total	99.09	98.97	99.36	98.27	98.68	99.13	98.28	99.24	99.08	97.56
Structural Formulas*										
Si	3.134	3.170	3.149	3.138	3.147	3.193	3.253	3.206	3.285	3.310
Al(iv)	0.866	0.830	0.851	0.862	0.853	0.807	0.747	0.794	0.715	0.690
Al(vi)	1.828	1.826	1.846	1.778	1.830	1.867	1.622	1.579	1.630	1.688
Ti	0.010	0.006	0.007	0.006	0.006	0.006	0.004	0.006	0.003	0.008
Fe	0.040	0.039	0.037	0.036	0.035	0.034	0.231	0.251	0.182	0.139
Mn	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mg	0.201	0.232	0.171	0.268	0.215	0.159	0.270	0.286	0.281	0.249
V	0.000	0.000	0.000	0.000	0.000	0.000	0.012	0.015	0.012	0.008
Ca	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
Na	0.043	0.040	0.046	0.050	0.047	0.047	0.014	0.021	0.016	0.011
K	0.754	0.747	0.775	0.756	0.792	0.748	0.745	0.838	0.766	0.684
F	0.064	0.000	0.049	0.087	0.000	0.000	0.069	0.058	0.069	0.097
Cl	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000
OH	1.936	2.000	1.951	1.913	2.000	2.000	1.931	1.942	1.929	1.903
K/(K+Na+Ca)	0.946	0.949	0.944	0.938	0.944	0.941	0.982	0.976	0.979	0.981
Mg/(Mg+Fe+Mn)	0.835	0.855	0.820	0.881	0.859	0.822	0.539	0.533	0.607	0.641
Al(vi)/(sum Oct)	0.880	0.868	0.896	0.851	0.877	0.903	0.758	0.739	0.773	0.807
F/(F+Cl+OH)	0.032	0.000	0.024	0.043	0.000	0.000	0.034	0.029	0.034	0.048

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	G909163 spot2	G909163 spot2	G909163 spot2	G909163 spot2	G909163 spot2	G909163 spot2	H437113 spot1	H437113 spot1	H437113 spot1	H437113 spot1
Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Pyr	Pyr	Pyr	Pyr
SiO2	49.21	49.48	49.27	49.67	49.15	50.09	65.69	67.16	67.03	66.68
TiO2	0.13	0.17	0.15	0.14	0.21	0.16	<0.02	<0.02	<0.02	<0.02
Al2O3	30.83	29.80	29.76	29.51	29.87	29.51	26.00	27.03	27.21	26.84
FeO	2.56	2.96	2.67	2.81	2.96	2.92	<0.07	<0.07	<0.07	<0.07
MnO	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
MgO	2.28	2.60	2.47	2.73	2.59	2.68	<0.03	<0.03	<0.03	<0.03
V2O3	0.10	0.14	0.12	0.11	0.13	0.14	<0.08	<0.08	<0.08	<0.08
CaO	0.04	0.02	0.02	<0.02	<0.02	0.02	0.44	<0.02	<0.02	<0.02
Na2O	0.10	0.12	0.11	0.12	0.12	0.11	0.06	<0.05	0.13	0.23
K2O	7.79	8.75	7.69	9.25	9.38	8.58	<0.06	<0.06	<0.06	<0.06
F	0.53	0.61	0.32	0.61	0.64	0.66	<0.06	<0.06	<0.06	<0.06
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.05	<0.03	<0.03	<0.03
Total	93.60	94.70	92.66	95.00	95.11	94.91	92.74	94.32	94.60	94.02
H2O	4.23	4.20	4.28	4.21	4.19	4.20	4.83	4.96	4.96	4.93
Total	97.60	98.64	96.79	98.96	99.03	98.84	97.56	99.27	99.56	98.95
Structural Formulas*										
Si	3.286	3.296	3.325	3.306	3.276	3.323	4.061	4.057	4.045	4.052
Al(iv)	0.714	0.704	0.675	0.694	0.724	0.677	-0.061	-0.057	-0.045	-0.052
Al(vi)	1.713	1.636	1.692	1.621	1.623	1.629	1.956	1.981	1.980	1.974
Ti	0.006	0.009	0.007	0.007	0.010	0.008	0.000	0.000	0.000	0.000
Fe	0.143	0.165	0.151	0.157	0.165	0.162	0.000	0.000	0.000	0.000
Mn	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mg	0.227	0.259	0.249	0.271	0.257	0.265	0.000	0.000	0.000	0.000
V	0.005	0.008	0.007	0.006	0.007	0.007	0.000	0.000	0.000	0.000
Ca	0.003	0.002	0.002	0.000	0.000	0.001	0.029	0.000	0.000	0.000
Na	0.012	0.015	0.015	0.015	0.016	0.014	0.007	0.000	0.015	0.027
K	0.664	0.743	0.662	0.785	0.798	0.726	0.000	0.000	0.000	0.000
F	0.113	0.128	0.069	0.128	0.135	0.139	0.000	0.000	0.000	0.000
Cl	0.000	0.002	0.003	0.000	0.000	0.000	0.006	0.000	0.000	0.000
OH	1.887	1.870	1.928	1.872	1.865	1.861	1.994	2.000	2.000	2.000
K/(K+Na+Ca)	0.978	0.978	0.976	0.981	0.980	0.978	0.000	0.000	0.000	0.000
Mg/(Mg+Fe+Mn)	0.613	0.611	0.622	0.634	0.609	0.621	0.000	0.000	0.000	0.000
Al(vi)/(sum Oct)	0.818	0.788	0.804	0.786	0.787	0.787	1.000	1.000	1.000	1.000
F/(F+Cl+OH)	0.056	0.064	0.034	0.064	0.067	0.070	0.000	0.000	0.000	0.000

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	H437113 spot1	H437113 spot1	H437113 spot2	H437113 spot2	H437113 spot2	G909153 spot 1	G909173_spot1	G909173_spot1	G909173_spot1	G909173_spot1
Mineral	Pyr	Pyr	Pyr	Pyr	Pyr	Musc	Musc	Musc	Musc	Musc
SiO2	67.29	67.04	66.69	67.23	66.21	49.96	47.84	48.45	47.63	48.23
TiO2	<0.02	<0.02	<0.02	<0.02	<0.02	0.24	0.22	0.10	0.10	0.10
Al2O3	26.85	26.62	26.98	27.73	26.94	31.07	35.31	36.05	35.34	35.62
FeO	<0.07	<0.07	<0.07	<0.07	<0.07	1.10	1.38	0.92	0.89	0.84
MnO	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
MgO	<0.03	<0.03	<0.03	<0.03	<0.03	2.47	2.05	1.79	1.49	1.66
V2O3	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CaO	<0.02	<0.02	<0.02	<0.02	0.78	<0.02	0.03	<0.02	0.03	0.03
Na2O	<0.05	0.06	0.17	0.22	0.19	0.19	0.17	0.22	0.24	0.21
K2O	<0.06	<0.06	<0.06	<0.06	<0.06	9.02	11.24	10.76	10.07	9.94
F	0.18	<0.06	0.18	<0.06	<0.06	<0.06	0.31	0.19	0.22	0.18
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	94.47	93.92	94.18	95.44	94.91	94.34	98.68	98.64	96.12	96.92
H2O	4.88	4.94	4.86	5.00	4.93	4.51	4.50	4.58	4.47	4.53
Total	99.27	98.86	98.96	100.44	99.84	98.85	103.04	103.14	100.49	101.37
Structural Formulas*										
Si	4.060	4.069	4.041	4.025	4.022	3.315	3.086	3.106	3.120	3.127
Al(iv)	-0.060	-0.069	-0.041	-0.025	-0.022	0.685	0.914	0.894	0.880	0.873
Al(vi)	1.969	1.974	1.967	1.982	1.951	1.745	1.771	1.829	1.850	1.850
Ti	0.000	0.000	0.000	0.000	0.000	0.012	0.011	0.005	0.005	0.005
Fe	0.000	0.000	0.000	0.000	0.000	0.061	0.074	0.049	0.049	0.045
Mn	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mg	0.000	0.001	0.001	0.002	0.000	0.245	0.197	0.171	0.146	0.161
V	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Ca	0.000	0.000	0.000	0.000	0.051	0.000	0.002	0.000	0.002	0.002
Na	0.000	0.007	0.020	0.026	0.022	0.024	0.022	0.028	0.030	0.027
K	0.000	0.000	0.000	0.000	0.000	0.763	0.925	0.880	0.842	0.823
F	0.034	0.000	0.035	0.000	0.000	0.000	0.064	0.039	0.046	0.037
Cl	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
OH	1.966	2.000	1.965	2.000	2.000	2.000	1.936	1.961	1.954	1.963
K/(K+Na+Ca)	0.000	0.000	0.000	0.000	0.000	0.970	0.975	0.970	0.963	0.966
Mg/(Mg+Fe+Mn)	0.000	1.000	1.000	1.000	0.000	0.800	0.726	0.776	0.749	0.780
Al(vi)/(sum Oct)	1.000	0.999	0.999	0.999	1.000	0.846	0.862	0.890	0.903	0.898
F/(F+Cl+OH)	0.017	0.000	0.017	0.000	0.000	0.000	0.032	0.019	0.023	0.019

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	G909173_spot1	G909173_spot1	G909173_spot2	G909173_spot2	G909173_spot2	G909173_spot2	G909173_spot3	G909173_spot3	G909173_spot3	G909176 spot1
Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc
SiO2	48.79	48.02	47.29	48.72	47.26	46.75	48.10	47.23	47.01	45.52
TiO2	0.06	0.06	0.45	0.34	0.46	0.56	<0.02	<0.02	<0.02	0.48
Al2O3	34.99	35.25	34.76	33.99	34.82	35.21	32.50	33.24	33.00	34.35
FeO	0.77	0.93	1.60	1.61	1.64	1.69	2.74	3.04	3.06	1.28
MnO	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
MgO	2.01	1.98	2.19	2.71	2.25	1.87	2.74	2.44	2.65	1.98
V2O3	<0.08	<0.08	0.12	0.09	0.10	0.10	<0.08	<0.08	<0.08	0.15
CaO	<0.02	<0.02	0.03	<0.02	0.03	0.05	<0.02	<0.02	<0.02	0.05
Na2O	0.18	0.20	0.18	0.15	0.16	0.19	0.17	0.15	0.15	0.18
K2O	11.06	11.65	11.68	11.18	11.72	11.42	12.20	11.52	11.68	10.70
F	0.29	0.26	0.54	0.23	0.24	0.27	0.42	0.34	0.20	<0.06
Cl	<0.03	<0.03	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	98.22	98.49	98.91	99.09	98.69	98.16	98.92	98.05	97.81	94.84
H2O	4.52	4.51	4.36	4.55	4.51	4.47	4.39	4.40	4.45	4.46
Total	102.62	102.89	103.03	103.54	103.10	102.50	103.14	102.30	102.17	99.30
Structural Formulas*										
Si	3.141	3.104	3.060	3.131	3.064	3.045	3.137	3.103	3.101	3.058
Al(iv)	0.859	0.896	0.940	0.869	0.936	0.955	0.863	0.897	0.899	0.942
Al(vi)	1.796	1.789	1.711	1.705	1.726	1.748	1.636	1.676	1.666	1.777
Ti	0.003	0.003	0.022	0.016	0.023	0.027	0.000	0.000	0.000	0.024
Fe	0.041	0.050	0.087	0.087	0.089	0.092	0.150	0.167	0.169	0.072
Mn	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mg	0.193	0.190	0.211	0.259	0.217	0.182	0.267	0.239	0.260	0.198
V	0.000	0.000	0.006	0.004	0.005	0.005	0.000	0.000	0.000	0.008
Ca	0.000	0.000	0.002	0.000	0.002	0.003	0.000	0.000	0.000	0.004
Na	0.022	0.026	0.022	0.018	0.019	0.024	0.021	0.019	0.019	0.023
K	0.908	0.960	0.964	0.917	0.969	0.949	1.016	0.966	0.983	0.917
F	0.058	0.052	0.110	0.047	0.048	0.056	0.086	0.071	0.042	0.000
Cl	0.000	0.000	0.005	0.000	0.000	0.002	0.000	0.000	0.000	0.000
OH	1.942	1.948	1.885	1.953	1.952	1.942	1.914	1.929	1.958	2.000
K/(K+Na+Ca)	0.976	0.974	0.975	0.980	0.978	0.972	0.980	0.981	0.981	0.972
Mg/(Mg+Fe+Mn)	0.824	0.791	0.709	0.749	0.710	0.665	0.641	0.589	0.607	0.733
Al(vi)/(sum Oct)	0.883	0.880	0.840	0.823	0.838	0.851	0.797	0.805	0.795	0.854
F/(F+Cl+OH)	0.029	0.026	0.055	0.024	0.024	0.028	0.043	0.036	0.021	0.000

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	G909176 spot1	G909176 spot1	G909176 spot1	G909176 spot1	G909176 spot1	G909176 spot1	G909176 spot1	G909176 spot2	G909176 spot2	G909176 spot2
Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc
SiO2	46.53	46.56	46.79	46.62	46.81	46.06	46.33	46.99	46.32	46.79
TiO2	0.38	0.44	0.32	0.49	0.47	0.46	0.33	0.29	0.47	0.35
Al2O3	34.77	34.69	34.79	35.09	33.81	33.64	35.00	33.99	35.14	35.06
FeO	1.22	1.39	1.54	1.29	1.31	1.18	1.38	1.52	1.60	1.35
MnO	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
MgO	1.93	2.02	2.17	1.83	2.09	1.90	2.02	2.85	2.14	2.54
V2O3	0.18	0.15	0.11	0.12	0.17	0.14	0.15	0.09	<0.08	0.13
CaO	0.03	0.04	0.04	0.05	0.11	0.05	0.08	0.03	<0.02	0.03
Na2O	0.18	0.14	0.21	0.18	0.15	0.17	0.17	0.17	0.18	0.19
K2O	10.35	10.99	10.89	10.99	10.72	10.41	11.02	10.79	11.16	11.41
F	<0.06	0.14	<0.06	<0.06	0.15	<0.06	<0.06	<0.06	<0.06	0.19
Cl	<0.03	<0.03	<0.03	<0.03	0.06	<0.03	<0.03	<0.03	<0.03	<0.03
Total	95.74	96.62	96.89	96.79	95.90	94.08	96.68	96.88	97.18	98.06
H2O	4.52	4.48	4.56	4.55	4.43	4.44	4.54	4.55	4.56	4.51
Total	100.26	101.04	101.45	101.34	100.26	98.52	101.22	101.44	101.73	102.49
Structural Formulas*										
Si	3.083	3.069	3.074	3.067	3.103	3.106	3.058	3.091	3.044	3.046
Al(iv)	0.917	0.931	0.926	0.933	0.897	0.894	0.942	0.909	0.956	0.954
Al(vi)	1.798	1.764	1.768	1.788	1.745	1.779	1.781	1.726	1.766	1.736
Ti	0.019	0.022	0.016	0.024	0.024	0.023	0.016	0.014	0.023	0.017
Fe	0.068	0.076	0.084	0.071	0.073	0.067	0.076	0.083	0.088	0.074
Mn	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mg	0.190	0.199	0.213	0.179	0.207	0.191	0.199	0.280	0.209	0.246
V	0.010	0.008	0.006	0.006	0.009	0.008	0.008	0.005	0.004	0.007
Ca	0.002	0.003	0.003	0.003	0.008	0.004	0.006	0.002	0.000	0.002
Na	0.024	0.018	0.027	0.023	0.020	0.022	0.022	0.022	0.023	0.024
K	0.875	0.925	0.913	0.923	0.907	0.895	0.928	0.906	0.935	0.948
F	0.000	0.029	0.000	0.000	0.032	0.000	0.000	0.000	0.000	0.040
Cl	0.000	0.000	0.000	0.000	0.007	0.000	0.000	0.000	0.000	0.000
OH	2.000	1.971	2.000	2.000	1.961	2.000	2.000	2.000	2.000	1.960
K/(K+Na+Ca)	0.971	0.978	0.969	0.972	0.971	0.972	0.971	0.974	0.976	0.973
Mg/(Mg+Fe+Mn)	0.738	0.722	0.716	0.717	0.739	0.742	0.723	0.770	0.705	0.770
Al(vi)/(sum Oct)	0.863	0.853	0.847	0.864	0.848	0.861	0.856	0.819	0.845	0.835
F/(F+Cl+OH)	0.000	0.015	0.000	0.000	0.016	0.000	0.000	0.000	0.000	0.020

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	G909176 spot2	G909176 spot2	G909176 spot2	YD01-13A spot2	YD01-13A spot2	YD01-13A spot2	YD01-13A spot2	YD01-13A spot3	YD01-13A spot3
Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc
SiO2	46.51	46.25	46.60	46.21	46.49	45.92	46.03	46.77	46.62
TiO2	0.60	0.54	0.47	0.02	0.04	0.10	0.03	0.04	0.04
Al2O3	35.41	35.07	35.81	33.54	33.25	36.77	33.17	33.44	33.40
FeO	1.33	1.39	1.23	3.49	3.66	2.43	3.70	3.54	3.46
MnO	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
MgO	1.95	1.94	1.92	1.15	1.32	0.45	1.08	1.27	1.29
V2O3	0.16	0.13	0.23	<0.08	<0.08	0.10	<0.08	<0.08	<0.08
CaO	0.07	0.05	<0.02	<0.02	0.03	<0.02	0.04	<0.02	<0.02
Na2O	0.13	0.15	0.16	0.51	0.42	0.73	0.45	0.42	0.39
K2O	11.06	11.22	11.60	9.63	10.28	9.62	9.51	10.23	10.22
F	<0.06	<0.06	<0.06	0.30	0.40	0.16	0.33	0.44	0.44
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	97.33	96.91	98.15	94.92	95.96	96.34	94.41	96.23	95.96
H2O	4.58	4.55	4.60	4.31	4.29	4.47	4.26	4.29	4.28
Total	101.91	101.45	102.75	99.10	100.08	100.74	98.53	100.33	100.05
Structural Formulas*									
Si	3.046	3.048	3.035	3.109	3.109	3.026	3.115	3.114	3.112
Al(iv)	0.954	0.952	0.965	0.891	0.891	0.974	0.885	0.886	0.888
Al(vi)	1.778	1.773	1.783	1.769	1.730	1.882	1.761	1.739	1.741
Ti	0.029	0.027	0.023	0.001	0.002	0.005	0.001	0.002	0.002
Fe	0.073	0.077	0.067	0.196	0.205	0.134	0.209	0.197	0.193
Mn	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mg	0.191	0.191	0.186	0.115	0.132	0.044	0.109	0.126	0.128
V	0.008	0.007	0.012	0.000	0.000	0.005	0.000	0.000	0.000
Ca	0.005	0.004	0.000	0.000	0.002	0.000	0.003	0.000	0.000
Na	0.017	0.019	0.020	0.066	0.054	0.093	0.058	0.055	0.051
K	0.924	0.944	0.964	0.827	0.877	0.809	0.821	0.869	0.871
F	0.000	0.000	0.000	0.063	0.085	0.034	0.070	0.092	0.093
Cl	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000
OH	2.000	2.000	2.000	1.937	1.915	1.966	1.927	1.908	1.907
K/(K+Na+Ca)	0.977	0.976	0.980	0.926	0.940	0.897	0.930	0.941	0.945
Mg/(Mg+Fe+Mn)	0.724	0.713	0.735	0.369	0.392	0.249	0.342	0.390	0.399
Al(vi)/(sum Oct)	0.855	0.855	0.861	0.850	0.836	0.909	0.846	0.843	0.843
F/(F+Cl+OH)	0.000	0.000	0.000	0.032	0.043	0.017	0.035	0.046	0.047

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	YD01-13A spot3	YD01-13A spot3	YD01-13A spot3	YD01-13A spot3	YD01-13A spot3	YD01-13A spot3	99017A grain 7	99017A grain 7	99017A grain 7
Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc	Musc
SiO2	46.66	46.68	46.17	45.10	46.43	46.80	46.87	46.18	46.53
TiO2	0.04	0.03	0.03	0.09	0.07	0.05	0.16	0.23	0.17
Al2O3	32.44	33.03	32.79	37.81	34.84	32.52	32.13	32.87	32.56
FeO	4.06	3.75	3.91	2.30	2.99	3.91	3.63	4.48	3.78
MnO	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
MgO	1.56	1.43	1.42	0.42	0.87	1.31	1.92	1.92	1.88
V2O3	<0.08	<0.08	<0.08	0.10	<0.08	<0.08	0.08	0.10	<0.08
CaO	<0.02	0.03	<0.02	<0.02	0.02	0.04	<0.02	<0.02	<0.02
Na2O	0.25	0.32	0.39	0.83	0.49	0.38	0.19	0.26	0.20
K2O	10.56	10.11	10.16	9.90	9.63	10.15	11.03	11.44	10.98
F	0.53	0.44	0.47	0.24	0.22	0.41	0.29	0.24	0.24
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	96.18	95.87	95.39	96.81	95.62	95.62	96.39	97.77	96.43
H2O	4.22	4.27	4.22	4.44	4.40	4.27	4.34	4.39	4.37
Total	100.18	99.96	99.41	101.15	99.92	99.72	100.61	102.06	100.69
Structural Formulas*									
Si	3.125	3.121	3.110	2.965	3.089	3.141	3.135	3.070	3.112
Al(iv)	0.875	0.879	0.890	1.035	0.911	0.859	0.865	0.930	0.888
Al(vi)	1.685	1.723	1.712	1.894	1.821	1.712	1.668	1.645	1.678
Ti	0.002	0.001	0.001	0.004	0.004	0.003	0.008	0.012	0.008
Fe	0.227	0.210	0.220	0.126	0.166	0.219	0.203	0.249	0.211
Mn	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mg	0.156	0.142	0.142	0.041	0.086	0.131	0.191	0.190	0.187
V	0.000	0.000	0.000	0.005	0.000	0.000	0.004	0.005	0.004
Ca	0.000	0.002	0.000	0.000	0.002	0.003	0.000	0.000	0.000
Na	0.033	0.041	0.050	0.106	0.064	0.049	0.025	0.034	0.025
K	0.902	0.863	0.873	0.830	0.817	0.869	0.941	0.970	0.937
F	0.112	0.093	0.100	0.049	0.047	0.086	0.062	0.051	0.051
Cl	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000
OH	1.888	1.907	1.900	1.951	1.953	1.912	1.938	1.949	1.949
K/(K+Na+Ca)	0.965	0.953	0.946	0.887	0.926	0.944	0.974	0.966	0.974
Mg/(Mg+Fe+Mn)	0.406	0.404	0.392	0.245	0.341	0.373	0.485	0.433	0.470
Al(vi)/(sum Oct)	0.814	0.830	0.825	0.915	0.877	0.829	0.804	0.783	0.803
F/(F+Cl+OH)	0.056	0.046	0.050	0.025	0.024	0.043	0.031	0.026	0.025

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	99017A grain 12	Ann007006.017 grain 24	Ann007006.017 grain 24	Ann007006.017 grain 24	Ann007006.017 grain 24	Ann007006.017 grain 24
Mineral	Musc	Musc	Musc	Musc	Musc	Musc
SiO2	45.44	43.82	42.46	48.49	46.36	46.58
TiO2	0.23	0.03	<0.02	0.07	0.12	0.05
Al2O3	34.24	29.96	29.79	30.05	30.45	32.32
FeO	3.49	7.73	9.50	2.41	3.84	3.65
MnO	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
MgO	1.09	1.87	1.05	3.13	2.89	1.89
V2O3	<0.08	0.21	0.16	<0.08	0.09	<0.08
CaO	<0.02	<0.02	<0.02	0.05	<0.02	<0.02
Na2O	0.31	0.14	0.17	0.08	0.07	0.29
K2O	10.27	11.59	11.37	11.21	11.06	11.40
F	<0.06	<0.06	<0.06	0.29	0.33	0.19
Cl	0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	95.36	95.46	94.65	95.84	95.28	96.43
H2O	4.44	4.29	4.21	4.35	4.26	4.38
Total	99.79	99.74	98.86	100.07	99.39	100.73
Structural Formulas*						
Si	3.062	3.056	3.019	3.240	3.147	3.123
Al(iv)	0.938	0.944	0.981	0.760	0.853	0.877
Al(vi)	1.781	1.519	1.515	1.607	1.584	1.676
Ti	0.012	0.002	0.000	0.003	0.006	0.003
Fe	0.196	0.451	0.565	0.135	0.218	0.205
Mn	0.000	0.000	0.000	0.000	0.000	0.000
Mg	0.109	0.194	0.111	0.312	0.293	0.189
V	0.004	0.012	0.009	0.000	0.005	0.000
Ca	0.000	0.000	0.000	0.004	0.000	0.000
Na	0.041	0.019	0.023	0.010	0.010	0.037
K	0.882	1.032	1.031	0.956	0.958	0.975
F	0.000	0.000	0.000	0.061	0.071	0.039
Cl	0.004	0.002	0.000	0.000	0.000	0.000
OH	1.996	1.998	2.000	1.939	1.929	1.961
K/(K+Na+Ca)	0.956	0.982	0.978	0.986	0.990	0.963
Mg/(Mg+Fe+Mn)	0.358	0.301	0.165	0.699	0.573	0.480
Al(vi)/(sum Oct)	0.847	0.698	0.689	0.781	0.752	0.809
F/(F+Cl+OH)	0.000	0.000	0.000	0.030	0.036	0.020

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	Ann007006.017 grain 24	Ann007006.017 grain 25	Ann007006.017 grain 25	Ann006002.018 grain 8	Ann006002.018 grain 8	Ann006002.018 grain 8
Mineral	Musc	Musc	Musc	Musc	Musc	Musc
SiO2	46.92	45.22	43.24	46.80	45.52	46.03
TiO2	0.11	0.08	0.05	0.47	0.48	0.31
Al2O3	30.25	32.95	32.69	35.90	36.21	35.86
FeO	3.31	3.14	3.17	1.19	1.23	1.25
MnO	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
MgO	2.83	1.89	2.06	1.37	1.29	1.23
V2O3	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CaO	<0.02	0.02	<0.02	<0.02	0.02	<0.02
Na2O	0.09	0.18	0.16	0.35	0.36	0.36
K2O	11.54	11.58	11.62	11.14	11.24	11.16
F	0.26	<0.06	0.19	0.21	0.29	0.18
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	95.38	95.18	93.32	97.51	96.72	96.48
H2O	4.29	4.41	4.21	4.49	4.40	4.45
Total	99.56	99.59	97.44	101.92	100.99	100.85
Structural Formulas*						
Si	3.179	3.073	3.011	3.054	3.003	3.040
Al(iv)	0.821	0.927	0.989	0.946	0.997	0.960
Al(vi)	1.595	1.713	1.694	1.814	1.819	1.831
Ti	0.005	0.004	0.003	0.023	0.024	0.015
Fe	0.187	0.178	0.185	0.065	0.068	0.069
Mn	0.000	0.000	0.000	0.000	0.000	0.000
Mg	0.286	0.191	0.214	0.133	0.127	0.122
V	0.000	0.000	0.000	0.000	0.000	0.000
Ca	0.000	0.002	0.000	0.000	0.001	0.000
Na	0.012	0.024	0.021	0.044	0.046	0.046
K	0.998	1.004	1.033	0.927	0.946	0.940
F	0.056	0.000	0.042	0.043	0.061	0.037
Cl	0.002	0.000	0.002	0.000	0.000	0.000
OH	1.943	2.000	1.956	1.957	1.939	1.963
K/(K+Na+Ca)	0.988	0.975	0.980	0.955	0.952	0.953
Mg/(Mg+Fe+Mn)	0.604	0.518	0.537	0.673	0.650	0.637
Al(vi)/(sum Oct)	0.769	0.821	0.808	0.891	0.893	0.899
F/(F+Cl+OH)	0.028	0.000	0.021	0.022	0.031	0.019

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	Ann006002.018 grain 8	Ann006002.018 grain 8	Ann006002.018 grain 9	Ann006002.018 grain 9	Ann006002.018 grain 9	Ann006002.018 grain 9
Mineral	Musc	Musc	Musc	Musc	Musc	Musc
SiO2	47.86	45.96	45.26	45.48	45.54	45.75
TiO2	0.22	0.52	0.59	0.72	0.90	0.56
Al2O3	34.24	35.93	36.26	36.14	34.84	35.22
FeO	0.97	1.18	1.27	1.21	1.33	1.30
MnO	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
MgO	2.05	1.26	1.35	1.34	1.39	1.21
V2O3	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CaO	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Na2O	0.16	0.35	0.36	0.37	0.35	0.33
K2O	11.15	10.98	10.94	11.06	11.46	11.31
F	0.27	<0.06	0.27	0.26	<0.06	0.15
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	96.98	96.30	96.41	96.70	96.00	95.89
H2O	4.45	4.53	4.40	4.42	4.49	4.43
Total	101.32	100.83	100.69	101.01	100.49	100.26
Structural Formulas*						
Si	3.131	3.038	2.993	3.000	3.038	3.045
Al(iv)	0.869	0.962	1.007	1.000	0.962	0.955
Al(vi)	1.771	1.837	1.819	1.809	1.778	1.808
Ti	0.011	0.026	0.029	0.035	0.045	0.028
Fe	0.053	0.065	0.070	0.067	0.074	0.072
Mn	0.000	0.000	0.000	0.000	0.000	0.000
Mg	0.200	0.124	0.133	0.131	0.138	0.120
V	0.000	0.000	0.000	0.000	0.000	0.000
Ca	0.000	0.000	0.000	0.000	0.000	0.000
Na	0.021	0.045	0.047	0.048	0.046	0.042
K	0.930	0.926	0.923	0.931	0.976	0.961
F	0.057	0.000	0.056	0.054	0.000	0.031
Cl	0.000	0.000	0.002	0.002	0.000	0.000
OH	1.943	2.000	1.942	1.944	2.000	1.969
K/(K+Na+Ca)	0.978	0.954	0.952	0.951	0.955	0.958
Mg/(Mg+Fe+Mn)	0.791	0.657	0.655	0.663	0.650	0.624
Al(vi)/(sum Oct)	0.870	0.895	0.887	0.886	0.874	0.891
F/(F+Cl+OH)	0.028	0.000	0.028	0.027	0.000	0.016

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	Ann006002.018 grain 11	Ann006002.018 grain 11	Ann006002.018 grain 11	Ann006002.018 grain 11	Ann006002.018 grain 11	Ann006002.018 grain 11
Mineral	Musc	Musc	Musc	Musc	Musc	Musc
SiO2	45.58	45.82	46.04	45.80	46.18	47.81
TiO2	0.73	0.47	0.43	0.54	0.29	0.11
Al2O3	35.84	36.11	36.49	36.76	35.85	34.44
FeO	1.20	1.16	1.37	1.22	1.19	1.24
MnO	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
MgO	1.26	1.44	1.62	1.38	1.33	2.14
V2O3	0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CaO	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Na2O	0.31	0.29	0.31	0.29	0.31	0.21
K2O	10.42	10.85	11.36	10.70	11.09	10.44
F	<0.06	0.26	0.23	0.26	<0.06	0.33
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	95.62	96.47	97.92	97.05	96.47	96.78
H2O	4.51	4.42	4.49	4.45	4.53	4.43
Total	100.13	100.78	102.31	101.39	101.01	101.06
Structural Formulas*						
Si	3.028	3.020	3.002	2.999	3.050	3.125
Al(iv)	0.972	0.980	0.998	1.001	0.950	0.875
Al(vi)	1.834	1.825	1.806	1.836	1.842	1.778
Ti	0.036	0.023	0.021	0.027	0.014	0.006
Fe	0.067	0.064	0.074	0.067	0.066	0.068
Mn	0.003	0.000	0.000	0.000	0.000	0.000
Mg	0.125	0.141	0.157	0.135	0.131	0.209
V	0.004	0.000	0.000	0.000	0.000	0.000
Ca	0.000	0.000	0.000	0.000	0.000	0.000
Na	0.040	0.037	0.039	0.036	0.039	0.027
K	0.883	0.912	0.945	0.894	0.934	0.871
F	0.000	0.054	0.047	0.053	0.000	0.069
Cl	0.000	0.000	0.000	0.000	0.000	0.000
OH	2.000	1.946	1.953	1.947	2.000	1.931
K/(K+Na+Ca)	0.957	0.961	0.960	0.961	0.960	0.970
Mg/(Mg+Fe+Mn)	0.642	0.689	0.679	0.668	0.666	0.754
Al(vi)/(sum Oct)	0.886	0.889	0.877	0.889	0.897	0.863
F/(F+Cl+OH)	0.000	0.027	0.024	0.027	0.000	0.034

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	H437119_grain1	H437119_grain1	H437119_grain1	H437119_grain1	H437119_grain1	H437119_grain1	H437119_grain1	H437119_grain1	H437119_grain1
Mineral	Pa	Pa	Pa	Pa	Pa	Pa	Pa	Pa	Pa
SiO2	48.99	49.60	48.20	48.46	48.00	47.38	47.74	47.77	48.84
TiO2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Al2O3	41.50	40.27	40.36	39.99	41.43	41.42	41.82	40.79	41.04
FeO	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07
MnO	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
MgO	0.04	0.05	0.05	0.06	0.03	0.04	0.05	0.07	0.05
V2O3	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CaO	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.06	0.03
Na2O	5.47	4.08	4.88	4.63	5.18	5.84	5.78	4.81	5.27
K2O	0.47	2.14	1.59	2.43	1.37	0.52	1.09	1.74	1.52
F	0.21	0.30	0.31	0.24	0.20	0.27	0.19	0.26	0.19
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.03	0.04	<0.03
Total	96.73	96.51	95.57	95.92	96.33	95.57	96.84	95.63	97.04
H2O	4.73	4.66	4.59	4.63	4.69	4.62	4.70	4.60	4.72
Total	101.37	101.04	100.02	100.44	100.94	100.07	101.45	100.11	101.67
Structural Formulas*									
Si	3.039	3.095	3.046	3.061	3.009	2.987	2.982	3.019	3.040
Al(iv)	0.961	0.905	0.954	0.939	0.991	1.013	1.018	0.981	0.960
Al(vi)	2.072	2.057	2.051	2.038	2.069	2.065	2.060	2.058	2.050
Ti	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Fe	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mn	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mg	0.003	0.005	0.005	0.006	0.003	0.004	0.005	0.006	0.004
V	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Ca	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.002
Na	0.658	0.494	0.598	0.567	0.629	0.714	0.700	0.589	0.636
K	0.037	0.170	0.128	0.196	0.110	0.042	0.087	0.140	0.121
F	0.041	0.059	0.061	0.047	0.039	0.053	0.038	0.053	0.038
Cl	0.000	0.002	0.002	0.002	0.000	0.002	0.003	0.004	0.003
OH	1.959	1.939	1.936	1.950	1.961	1.945	1.958	1.943	1.959
K/(K+Na+Ca)	0.054	0.256	0.177	0.257	0.149	0.055	0.110	0.191	0.159
Mg/(Mg+Fe+Mn)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Al(vi)/(sum Oct)	0.998	0.998	0.998	0.997	0.999	0.998	0.998	0.997	0.998
F/(F+Cl+OH)	0.021	0.029	0.031	0.024	0.019	0.027	0.019	0.026	0.019

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	H437119_grain4	H437119_grain4	H437119_grain4	H437119_grain4	H437119_grain4	H437119_grain5	H437119_grain5	H437119_grain5	H437119_grain5
Mineral	Pa	Pa	Pa	Pa	Pa	Pa	Pa	Pa	Pa
SiO2	47.03	47.73	47.49	46.99	47.67	47.22	47.65	48.10	47.59
TiO2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Al2O3	39.14	39.58	40.00	40.31	40.42	40.21	40.38	41.14	40.34
FeO	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07
MnO	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
MgO	0.06	0.07	0.06	0.05	0.06	0.06	0.05	0.06	0.07
V2O3	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
CaO	0.03	<0.02	0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02
Na2O	3.78	3.87	3.97	4.98	5.08	4.85	5.14	6.02	5.15
K2O	3.82	3.62	3.05	0.77	0.96	2.42	1.69	0.73	2.25
F	<0.06	0.13	0.27	<0.06	0.19	0.26	0.27	0.14	0.28
Cl	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total	94.03	95.09	94.98	93.35	94.50	95.09	95.26	96.27	95.79
H2O	4.62	4.62	4.56	4.64	4.61	4.57	4.59	4.71	4.59
Total	98.64	99.65	99.42	97.99	99.03	99.55	99.74	100.93	100.27
Structural Formulas*									
Si	3.053	3.056	3.037	3.029	3.036	3.015	3.025	3.014	3.018
Al(iv)	0.947	0.944	0.963	0.971	0.964	0.985	0.975	0.986	0.982
Al(vi)	2.047	2.042	2.051	2.090	2.069	2.041	2.048	2.052	2.033
Ti	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Fe	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mn	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mg	0.006	0.007	0.006	0.005	0.006	0.006	0.004	0.005	0.006
V	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Ca	0.002	0.000	0.002	0.002	0.000	0.000	0.000	0.000	0.000
Na	0.475	0.481	0.492	0.622	0.627	0.601	0.633	0.732	0.633
K	0.317	0.296	0.249	0.063	0.078	0.197	0.137	0.058	0.182
F	0.000	0.027	0.055	0.000	0.039	0.053	0.053	0.029	0.056
Cl	0.000	0.000	0.000	0.002	0.001	0.000	0.000	0.000	0.000
OH	2.000	1.973	1.945	1.998	1.960	1.947	1.947	1.971	1.944
K/(K+Na+Ca)	0.399	0.381	0.335	0.092	0.110	0.247	0.178	0.074	0.223
Mg/(Mg+Fe+Mn)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Al(vi)/(sum Oct)	0.997	0.997	0.997	0.998	0.997	0.997	0.998	0.997	0.997
F/(F+Cl+OH)	0.000	0.013	0.028	0.000	0.020	0.026	0.027	0.014	0.028

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Table D1. Electron microprobe analyses of white mica, illite and chlorite (continued)

Sample#-spot#	H437119_grain5	H437119_grain6	H437119_grain6	H437119_grain6
Mineral	Pa	Pa	Pa	Pa
SiO2	48.05	46.99	47.23	47.17
TiO2	<0.02	<0.02	<0.02	<0.02
Al2O3	40.05	40.88	41.63	40.46
FeO	<0.07	<0.07	<0.07	<0.07
MnO	<0.06	<0.06	<0.06	<0.06
MgO	0.07	0.04	0.04	0.06
V2O3	<0.08	<0.08	<0.08	<0.08
CaO	<0.02	<0.02	<0.02	0.03
Na2O	4.59	5.55	6.18	5.44
K2O	2.66	1.20	0.54	1.24
F	0.18	0.24	0.15	0.22
Cl	<0.03	<0.03	<0.03	<0.03
Total	95.70	94.96	95.86	94.73
H2O	4.64	4.59	4.69	4.59
Total	100.26	99.45	100.48	99.22
Structural Formulas*				
Si	3.048	2.991	2.974	3.009
Al(iv)	0.952	1.009	1.026	0.991
Al(vi)	2.042	2.057	2.064	2.051
Ti	0.000	0.000	0.000	0.000
Fe	0.000	0.000	0.000	0.000
Mn	0.000	0.000	0.000	0.000
Mg	0.006	0.004	0.004	0.006
V	0.000	0.000	0.000	0.000
Ca	0.000	0.000	0.000	0.002
Na	0.564	0.685	0.755	0.673
K	0.215	0.097	0.043	0.101
F	0.035	0.049	0.030	0.045
Cl	0.000	0.000	0.000	0.002
OH	1.965	1.951	1.970	1.954
K/(K+Na+Ca)	0.276	0.124	0.054	0.130
Mg/(Mg+Fe+Mn)	1.000	1.000	1.000	1.000
Al(vi)/(sum Oct)	0.997	0.998	0.998	0.997
F/(F+Cl+OH)	0.018	0.025	0.015	0.022

* based on 14 oxygens for chlorite and 11 oxygens for white mica

Appendix E. SWIR data for samples from mineral analyses

Table E1. Characteristics of SWIR spectra determined by TerraSpec spectrometer and The Spectral Geologist software

Sample #	80JD-94D	81JD-94B	99017A	ANN006001.045	ANN006002.023	G909168
Mineral	Chl	Chl	Chl	Chl	Chl	Chl
Sample Type	TS billet	TS billet	chip	chip	chip	TS billet
ASD Sample#	Yer_00041.asd.sco	Yer_00037.asd.sco	Yer_00002.asd.sco	Yer_00010.asd.sco	Yer_00007.asd.sco	Yer_00032.asd.sco
w2200	2216.99	2210.57	2208.44	2210.16	2204.24	2207.82
hqd2200	0.173	0.17	0.449	0.105	0.0779	0.112
width2200	36.289	37.711	36.125	32.635	32.59	21.156
w2250	2254.61	2252.09	NULL	2250.76	2252.27	2252.25
hqd2250	0.364	0.265	NULL	0.117	0.0966	0.0767
w2350	2343.21	2342.45	2351.59	2342.47	2341.54	2340.72
hqd2350	0.572	0.416	0.268	0.199	0.203	0.188
width2350	42.281	39.414	39.219	39.128	38.609	36.351
hqd1900	0.242	0.184	0.122	0.186	0.116	0.233

Sample #	ANN007006.017	ANN007006.057	G909158	G909165	G909166	YD01-01C
Mineral	Chl	Chl	Chl	Chl	Chl	Chl
Sample Type	chip	chip	chip	chip	chip	TS billet
ASD Sample#	Yer_00015.asd.sco	ANN007006.057	YER.027	YER.035	Yer_00027.asd.sco	Yer_00039.asd.sco
w2200	2209.18	2203.08	2206.11	2206.04	2212.99	2212.39
hqd2200	0.196	0.272	0.16	0.317	0.0817	0.26
width2200	27.875	33.818	21.455	35.151	34.603	35.68
w2250	NULL	2242.87	2249.97	2249.44	2248.59	2248.15
hqd2250	NULL	0.124	0.0903	0.288	0.0577	0.208
w2350	2345.28	2345.17	2339.21	2346.25	2342.86	2344.59
hqd2350	0.113	0.212	0.242	0.311	0.144	0.273
width2350	37.159	39.324	38.631	38.686	38.379	39.447
hqd1900	0.18	0.173	0.273	0.0922	0.0859	0.175

Table E1. Characteristics of SWIR spectra determined by TerraSpec spectrometer and The Spectral Geologist software (continued)

Sample #	G909172	G909174	H437269	H437289	YD09-04	YTD 23 2008
Mineral	Chl	Chl	Chl	Chl	Chl	Chl
Sample Type	TS billet	TS billet	TS billet	chip	chip	chip
ASD Sample#	Yer_00045.asd.sco	Yer_00052.asd.sco	Yer_00043.asd.sco	YER.003	Yer_00055.asd.sco	Yer_00058.asd.sco
w2200	2206.04	2200.39	2208.73	2223.08	2207.79	2207.53
hqd2200	0.0355	0.0386	0.164	0.0701	0.238	0.185
width2200	27.001	26.626	17.462	28.569	27.04	25.485
w2250	2250.47	2254.65	2252.98	2251.28	2246.66	2249.26
hqd2250	0.0126	0.101	0.214	0.0863	0.0633	0.109
w2350	2319.02	2338.96	2342.86	2344.41	2342.8	2347
hqd2350	0.0997	0.298	0.218	0.104	0.181	0.119
width2350	41.271	41.276	40.126	37.056	38.024	36.201
hqd1900	0.168	0.198	0.392	0.0404	0.371	0.187

Sample #	YD01-04	YD01-13A	YD01-30C	YD08-22	ANN006002.018	ANN007006.017
Mineral	Chl	Chl	Chl	Chl	Musc	Musc
Sample Type	TS billet	chip	chip (vn zone)	chip	chip	chip
ASD Sample#	Yer_00034.asd.sco	YER.010	YER.012	YER.054	ANN006002.018	Yer_00015.asd.sco
w2200	NULL	2199.03	2206.55	2215.23	2204.21	2209.18
hqd2200	NULL	0.186	0.0269	0.202	0.387	0.196
width2200	NULL	29.121	28.865	33.69	33.577	27.875
w2250	2253.78	2255.55	2250.45	2243.77	NULL	NULL
hqd2250	0.257	0.203	0.07	0.127	NULL	NULL
w2350	2339.13	2349.24	2341.56	2350.34	2345.9	2345.28
hqd2350	0.398	0.209	0.0991	0.181	0.271	0.113
width2350	38.502	38.132	32.01	37.627	39.436	37.159
hqd1900	0.168	0.0647	0.105	0.0471	0.0497	0.18

Table E1. Characteristics of SWIR spectra determined by TerraSpec spectrometer and The Spectral Geologist software (continued)

Sample #	99017A	G909153	G909155	G909155_spot1	G909155_spot2	G909157
Mineral	Musc	Musc	Musc	Musc	Musc	Musc
Sample Type	chip	TS billet	chip	TS billet	TS billet	TS billet
ASD Sample#	Yer_00002.asd.sco	Yer_00067.asd.sco	YER.024	Yer_00071.asd.sco	Yer_00072.asd.sco	Yer_00018.asd.sco
w2200	2208.44	2207.22	2201.75	2203.72	2206.51	2207.69
hqd2200	0.449	0.439	0.331	0.467	0.32	0.322
width2200	36.125	35.412	32.202	33.325	32.398	27.188
w2250	NULL	NULL	NULL	NULL	NULL	NULL
hqd2250	NULL	NULL	NULL	NULL	NULL	NULL
w2350	2351.59	2349.36	2346.32	2349.47	2349.53	2352.19
hqd2350	0.268	0.252	0.175	0.279	0.16	0.0673
width2350	39.219	39.845	40.243	39.906	38.796	38.753
hqd1900	0.122	0.236	0.195	0.198	0.232	0.331

Sample #	G909152	G909154	G909173_spot1	G909173_spot2	G909173_spot3	G909176
Mineral	Musc	Musc	Musc	Musc	Musc	Musc
Sample Type	TS billet	TS billet	TS billet	TS billet	TS billet	TS billet
ASD Sample#	Yer_00065.asd.sco	Yer_00069.asd.sco	Yer_00047.asd.sco	Yer_00049.asd.sco	Yer_00048.asd.sco	Yer_00060.asd.sco
w2200	2204.28	2204.46	2204.2	2207.78	2209.77	2207.78
hqd2200	0.497	0.251	0.481	0.387	0.399	0.341
width2200	33.554	32.691	34.722	35.267	35.537	31.615
w2250	NULL	NULL	NULL	NULL	NULL	NULL
hqd2250	NULL	NULL	NULL	NULL	NULL	NULL
w2350	2348.85	2348.07	2348.13	2348.83	2350.04	2349.6
hqd2350	0.302	0.0876	0.329	0.223	0.236	0.144
width2350	40.619	33.526	40.433	36.685	37.238	37.47
hqd1900	0.228	0.159	0.266	0.247	0.19	0.358

Table E1. Characteristics of SWIR spectra determined by TerraSpec spectrometer and The Spectral Geologist software (continued)

Sample #	G909160	G909163	G909173	YD08-21	YD09-06	H437199	H437113
Mineral	Musc	Musc	Musc	Musc	Musc	Pa	Pyr
Sample Type	TS billet	TS billet	chip	chip	chip	chip	chip
ASD Sample#	Yer_00063.asd.sco	Yer_00021.asd.sco	YER.044	YER.049	Yer_00053.asd.sco	H437199	H437113
w2200	2204.97	2208.68	2206.5	2196.39	2202.11	2187.78	NULL
hqd2200	0.484	0.235	0.332	0.482	0.471	0.531	NULL
width2200	33.313	26.669	27.497	33.622	33.117	29.132	NULL
w2250	NULL	NULL	NULL	NULL	NULL	NULL	NULL
hqd2250	NULL	NULL	NULL	NULL	NULL	NULL	NULL
w2350	2349.13	2350.95	2348	2344.61	2348.3	2337.69	2317.89
hqd2350	0.284	0.0559	0.0914	0.263	0.266	0.228	0.242
width2350	39.254	34.527	36.162	40.869	39.448	45.328	31.391
hqd1900	0.167	0.325	0.413	0.215	0.1	0.19	0.0604

Sample #	YD02-02	YD08-19C	G909158	YD01-13A	YD08-22
Mineral	Musc	Musc	Musc	Musc	Musc
Sample Type	chip	chip	chip	chip	chip
ASD Sample#	YER.057	YER.048	YER.027	YER.010	YER.054
w2200	2190.94	2193.2	2206.11	2199.03	2215.23
hqd2200	0.658	0.488	0.16	0.186	0.202
width2200	33.553	31.866	21.455	29.121	33.69
w2250	NULL	NULL	2249.97	2255.55	2243.77
hqd2250	NULL	NULL	0.0903	0.203	0.127
w2350	2339.97	2342.38	2339.21	2349.24	2350.34
hqd2350	0.358	0.245	0.242	0.209	0.181
width2350	44.849	42.346	38.631	38.132	37.627
hqd1900	0.189	0.0169	0.273	0.0647	0.0471

Appendix F. Laser ablation-inductively coupled plasma-mass spectrometry data

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS

Mineral	Act	Act	Act	Act	Act	Act	Act	Act	Act
LA-ICP-MS Spot ID	G909166_25-1	G909166_25-3	G909166_27-1	G909166_27-2	G909166_29-1	G909166_29-2	G909166_29-4	G909166_29-5	G909166_34-2
Data Quality (1-3)	1	0	1.5	1	1.5	1	1	1.5	1
Li (ppm)	1.50	5.59	1.05	1.00	1.38	2.08	1.69	1.60	18.55
B (ppm)	2.26	10.56	1.86	1.29	7.17	1.75	3.02	1.11	1.85
Si (ppm)	142436.42	142436.42	142436.42	142436.42	142436.42	142436.42	142436.42	142436.42	142436.42
P (ppm)	90.34	984827.54	22.22	95.50	4562.61	4104.65	54466.25	11.33	323.97
Sc (ppm)	52.82	53.30	35.38	37.86	65.47	75.97	62.94	29.44	38.21
Ti (ppm)	467.77	409.01	409.51	639.77	2502.59	1771.37	1324.57	178.83	193.80
V (ppm)	225.15	184.15	161.36	215.85	243.57	252.70	211.78	73.24	215.96
Cr (ppm)	5.05	10.31	3.51	3.76	11.34	21.11	7.83	6.59	7.89
Mn (ppm)	4318.73	3576.01	2749.96	2609.36	3080.45	2921.38	3169.34	1828.98	3615.69
Co (ppm)	40.50	31.60	27.03	25.90	31.25	34.70	41.04	18.61	68.81
Cu(63) (ppm)	15.18	33.70	9.12	10.90	14.27	10.39	19.17	16.85	106.21
Cu(65)* (ppm)	15.09	35.25	8.89	10.98	13.55	10.43	19.70	16.67	110.81
Zn(66)* (ppm)	149.46	120.36	106.91	96.22	112.80	113.56	161.24	90.35	276.19
Zn(68) (ppm)	146.42	129.60	104.89	98.00	109.90	113.10	161.54	91.50	268.32
As (ppm)	2.84	277.22	2.58	1.87	4.03	2.77	19.16	2.33	2.09
Se(76) (ppm)	0.86	6.31	0.70	0.71	0.95	0.98	1.29	0.34	2.19
Se(77)* (ppm)	0.81	23.39	0.41	0.03	0.53	BDL	2.99	BDL	BDL
Rb (ppm)	0.44	2.47	1.09	0.33	2.72	2.15	1.17	8.07	3.37
Sr (ppm)	53.50	2288.73	52.55	16.04	54.20	74.65	162.69	45.36	5.77
Mo (ppm)	0.13	2.45	0.30	0.42	0.80	0.40	0.81	0.25	0.35
Sn (ppm)	0.49	0.72	0.47	0.58	0.64	0.67	0.60	0.30	0.47
Te (ppm)	BDL	BDL	0.04	BDL	0.05	BDL	BDL	BDL	BDL
Cs (ppm)	0.08	0.27	0.07	0.06	0.13	0.07	0.15	0.13	0.33
Ba(137) (ppm)	2.52	86.42	11.28	73.87	6.63	252.58	3.10	101.89	2.82
Ba(138)* (ppm)	2.37	103.54	12.03	76.48	6.93	248.58	6.56	104.13	2.93
W (ppm)	0.18	10.93	0.23	0.07	0.57	0.35	1.11	0.14	0.11
Pb (ppm)	1.25	8.45	1.60	0.71	1.32	1.62	2.56	0.87	1.49
Bi (ppm)	0.02	0.05	0.02	0.00	0.02	0.01	0.04	0.02	0.02
Th (ppm)	1.24	89.93	0.97	1.23	2.87	1.01	16.64	0.40	0.32
U (ppm)	0.61	44.88	0.64	7.45	1.52	1.08	5.45	0.18	0.88
Tl (ppm)	0.00	0.03	BDL	BDL	0.01	0.01	0.01	0.04	0.01
SiO2 wt.%	30.47	30.47	30.47	30.47	30.47	30.47	30.47	30.47	30.47

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Act	Act	Act	Act	Act	Act	Act
LA-ICP-MS Spot ID	G909166_25-1	G909166_25-3	G909166_27-1	G909166_27-2	G909166_29-1	G909166_29-2	G909166_29-4
Data Quality (1-3)	1	0	1.5	1	1.5	1	1
Li (ppm)	1.50	5.59	1.05	1.00	1.38	2.08	1.69
B (ppm)	2.26	10.56	1.86	1.29	7.17	1.75	3.02
Si (ppm)	142436.42	142436.42	142436.42	142436.42	142436.42	142436.42	142436.42
P (ppm)	90.34	984827.54	22.22	95.50	4562.61	4104.65	54466.25
Sc (ppm)	52.82	53.30	35.38	37.86	65.47	75.97	62.94
Ti (ppm)	467.77	409.01	409.51	639.77	2502.59	1771.37	1324.57
V (ppm)	225.15	184.15	161.36	215.85	243.57	252.70	211.78
Cr (ppm)	5.05	10.31	3.51	3.76	11.34	21.11	7.83
Mn (ppm)	4318.73	3576.01	2749.96	2609.36	3080.45	2921.38	3169.34
Co (ppm)	40.50	31.60	27.03	25.90	31.25	34.70	41.04
Cu(63) (ppm)	15.18	33.70	9.12	10.90	14.27	10.39	19.17
Cu(65)* (ppm)	15.09	35.25	8.89	10.98	13.55	10.43	19.70
Zn(66)* (ppm)	149.46	120.36	106.91	96.22	112.80	113.56	161.24
Zn(68) (ppm)	146.42	129.60	104.89	98.00	109.90	113.10	161.54
As (ppm)	2.84	277.22	2.58	1.87	4.03	2.77	19.16
Se(76) (ppm)	0.86	6.31	0.70	0.71	0.95	0.98	1.29
Se(77)* (ppm)	0.81	23.39	0.41	0.03	0.53	BDL	2.99
Rb (ppm)	0.44	2.47	1.09	0.33	2.72	2.15	1.17
Sr (ppm)	53.50	2288.73	52.55	16.04	54.20	74.65	162.69
Mo (ppm)	0.13	2.45	0.30	0.42	0.80	0.40	0.81
Sn (ppm)	0.49	0.72	0.47	0.58	0.64	0.67	0.60
Te (ppm)	BDL	BDL	0.04	BDL	0.05	BDL	BDL
Cs (ppm)	0.08	0.27	0.07	0.06	0.13	0.07	0.15
Ba(137) (ppm)	2.52	86.42	11.28	73.87	6.63	252.58	3.10
Ba(138)* (ppm)	2.37	103.54	12.03	76.48	6.93	248.58	6.56
W (ppm)	0.18	10.93	0.23	0.07	0.57	0.35	1.11
Pb (ppm)	1.25	8.45	1.60	0.71	1.32	1.62	2.56
Bi (ppm)	0.02	0.05	0.02	0.00	0.02	0.01	0.04
Th (ppm)	1.24	89.93	0.97	1.23	2.87	1.01	16.64
U (ppm)	0.61	44.88	0.64	7.45	1.52	1.08	5.45
Tl (ppm)	0.00	0.03	BDL	BDL	0.01	0.01	0.01
SiO2 wt.%	30.47	30.47	30.47	30.47	30.47	30.47	30.47

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Act	Act	Act	Act	Act	Act	Act
LA-ICP-MS Spot ID	G909166_25-1	G909166_25-3	G909166_27-1	G909166_27-2	G909166_29-1	G909166_29-2	G909166_29-4
Data Quality (1-3)	1	0	1.5	1	1.5	1	1
1 standard error (ppm) *							
Li	0.07	0.55	0.06	0.27	0.05	0.56	0.06
B	0.22	0.97	0.08	0.15	0.32	0.14	0.13
Si	2848.73	2848.73	2848.73	2848.73	2848.73	2848.73	2848.73
P	20.65	44834.77	5.10	6.00	562.28	694.37	4343.21
Sc	2.60	2.62	1.78	2.36	3.29	4.16	3.71
Ti	26.49	42.18	36.72	98.34	126.52	98.19	71.74
V	6.62	13.87	7.01	11.23	8.57	9.68	6.88
Cr	0.14	0.47	0.14	0.13	0.32	0.97	0.25
Mn	117.59	98.89	87.16	109.84	107.22	161.88	83.10
Co	1.25	1.10	0.99	1.35	1.13	1.35	1.33
Cu	0.47	1.87	0.43	1.00	0.66	0.40	1.85
Cu	0.45	1.17	0.49	1.05	0.41	0.60	2.23
Zn	5.23	4.46	3.71	5.30	4.71	4.64	6.96
Zn	5.18	4.25	3.39	5.23	5.42	5.74	7.78
As	0.16	17.21	0.13	0.12	0.44	0.18	1.13
Se	0.05	0.58	0.06	0.04	0.05	0.13	0.17
Se	0.21	2.03	0.05	0.06	0.06	BDL	0.55
Rb	0.03	0.10	0.14	0.02	0.51	0.33	0.25
Sr	5.92	97.86	9.62	2.61	3.39	8.03	9.00
Mo	0.02	0.10	0.07	0.04	0.09	0.06	0.14
Sn	0.02	0.04	0.05	0.05	0.03	0.11	0.03
Te	BDL	BDL	0.01	BDL	0.01	BDL	BDL
Cs	0.01	0.05	0.00	0.01	0.01	0.01	0.02
Ba	0.21	6.47	2.05	38.68	0.41	98.53	0.39
Ba	0.14	6.65	2.09	60.35	0.48	92.99	0.61
W	0.02	0.44	0.04	0.01	0.06	0.05	0.14
Pb	0.08	0.91	0.09	0.06	0.04	0.18	0.23
Bi	0.01	0.02	0.01	0.00	0.00	0.01	0.01
Th	0.14	8.95	0.23	0.35	0.29	0.15	1.28
U	0.18	2.85	0.17	1.54	0.09	0.15	0.58
Tl	0.00	0.02	BDL	BDL	0.00	0.00	0.00

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Act	Act	Act	Act	Act	Act	Act
LA-ICP-MS Spot ID	G909166_25-1	G909166_25-3	G909166_27-1	G909166_27-2	G909166_29-1	G909166_29-2	G909166_29-4
Data Quality (1-3)	1	0	1.5	1	1.5	1	1
1 standard error (ppm)**							
Li	0.22	0.97	0.16	0.31	0.20	0.64	0.25
B	0.85	3.97	0.68	0.49	2.63	0.66	1.11
Si	4893.37	4893.37	4893.37	4893.37	4893.37	4893.37	4893.37
P	33.22	287130.75	8.18	28.15	1429.19	1370.91	16275.30
Sc	4.03	4.06	2.73	3.23	5.04	6.08	5.22
Ti	52.21	57.68	53.85	116.01	271.91	196.63	146.20
V	12.98	16.60	10.64	15.51	14.80	15.83	12.55
Cr	1.02	2.12	0.72	0.77	2.30	4.35	1.59
Mn	200.06	166.55	134.97	147.06	157.56	195.43	144.96
Co	2.60	2.09	1.81	1.99	2.09	2.37	2.66
Cu	1.68	4.05	1.06	1.53	1.66	1.18	2.76
Cu	1.67	3.92	1.06	1.57	1.50	1.26	3.06
Zn	7.29	6.06	5.19	6.23	6.08	6.04	8.86
Zn	6.99	5.95	4.78	6.11	6.46	6.79	9.35
As	1.00	98.18	0.91	0.66	1.47	0.98	6.77
Se	0.69	5.08	0.56	0.57	0.76	0.80	1.05
Se	0.69	18.92	0.33	0.07	0.43	BDL	2.47
Rb	0.03	0.12	0.14	0.02	0.51	0.34	0.25
Sr	6.19	124.70	9.78	2.67	3.85	8.42	10.54
Mo	0.03	0.22	0.07	0.05	0.11	0.07	0.15
Sn	0.09	0.14	0.10	0.11	0.12	0.16	0.11
Te	BDL	BDL	0.01	BDL	0.01	BDL	BDL
Cs	0.01	0.05	0.01	0.01	0.01	0.01	0.02
Ba	0.23	6.97	2.07	38.74	0.45	98.82	0.40
Ba	0.15	7.23	2.12	60.39	0.52	93.24	0.64
W	0.03	1.36	0.05	0.02	0.09	0.06	0.19
Pb	0.10	0.97	0.11	0.07	0.07	0.19	0.25
Bi	0.01	0.02	0.01	0.00	0.00	0.01	0.01
Th	0.17	11.11	0.24	0.36	0.36	0.17	1.77
U	0.18	4.41	0.18	1.64	0.15	0.17	0.71
Tl	0.00	0.02	BDL	BDL	0.00	0.00	0.00

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Act	Act	Act	Act	Act	Act	Act
LA-ICP-MS Spot ID	G909166_29-5	G909166_34-2	G909166_36-1	G909166_36-2	G909166_36-3	G909166_36-4	G909166_37-1
Data Quality (1-3)	1.5	1	1	1.5	1.5	1.5	1
Li (ppm)	1.60	18.55	2.00	0.70	2.65	4.48	0.91
B (ppm)	1.11	1.85	2.05	2.28	3.17	2.89	1.47
Si (ppm)	142436.42	142436.42	142436.42	142436.42	142436.42	142436.42	142436.42
P (ppm)	11.33	323.97	1351.78	118.55	630.30	4700.68	10.04
Sc (ppm)	29.44	38.21	34.62	49.83	50.68	60.18	48.66
Ti (ppm)	178.83	193.80	209.11	1847.08	3236.71	1700.92	668.24
V (ppm)	73.24	215.96	181.40	128.52	265.42	222.55	145.61
Cr (ppm)	6.59	7.89	4.30	4.75	13.16	4.25	7.58
Mn (ppm)	1828.98	3615.69	2584.42	2928.90	2624.93	3105.27	2630.93
Co (ppm)	18.61	68.81	33.18	30.36	46.05	51.76	27.69
Cu(63) (ppm)	16.85	106.21	15.38	17.70	39.29	35.69	9.05
Cu(65)* (ppm)	16.67	110.81	15.45	17.16	38.97	36.23	8.59
Zn(66)* (ppm)	90.35	276.19	157.37	129.91	164.92	227.55	112.52
Zn(68) (ppm)	91.50	268.32	152.47	125.56	160.41	220.21	108.28
As (ppm)	2.33	2.09	3.12	3.69	4.49	4.49	2.27
Se(76) (ppm)	0.34	2.19	0.70	0.95	1.06	0.83	0.90
Se(77)* (ppm)	BDL	BDL	0.28	0.79	0.24	BDL	BDL
Rb (ppm)	8.07	3.37	1.46	0.37	1.97	1.98	0.39
Sr (ppm)	45.36	5.77	13.61	9.30	45.63	20.71	7.17
Mo (ppm)	0.25	0.35	0.16	1.25	0.47	0.15	0.06
Sn (ppm)	0.30	0.47	0.48	0.46	0.80	0.75	0.31
Te (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs (ppm)	0.13	0.33	0.05	0.08	0.12	0.10	0.05
Ba(137) (ppm)	101.89	2.82	16.76	BDL	32.95	2.50	5.02
Ba(138)* (ppm)	104.13	2.93	18.68	BDL	31.25	2.53	4.54
W (ppm)	0.14	0.11	0.30	0.39	1.62	0.27	0.15
Pb (ppm)	0.87	1.49	0.60	1.55	2.10	0.89	0.97
Bi (ppm)	0.02	0.02	0.01	0.01	0.01	0.02	0.01
Th (ppm)	0.40	0.32	0.77	0.30	1.34	1.10	0.08
U (ppm)	0.18	0.88	0.53	0.67	1.02	0.78	0.26
Tl (ppm)	0.04	0.01	0.01	BDL	0.01	0.01	BDL
SiO2 wt.%	30.47	30.47	30.47	30.47	30.47	30.47	30.47

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Act	Act	Act	Act	Act	Act	Act
LA-ICP-MS Spot ID	G909166_29-5	G909166_34-2	G909166_36-1	G909166_36-2	G909166_36-3	G909166_36-4	G909166_37-1
Data Quality (1-3)	1.5	1	1	1.5	1.5	1.5	1
1 standard error (ppm) *							
Li	0.13	0.77	0.11	0.04	0.13	0.19	0.08
B	0.21	0.12	0.11	0.14	0.36	0.27	0.08
Si	2848.73	2848.73	2848.73	2848.73	2848.73	2848.73	2848.73
P	0.68	58.20	81.96	41.33	57.33	268.20	0.82
Sc	1.45	2.13	3.20	2.48	2.51	3.00	2.52
Ti	9.32	203.76	32.92	84.40	160.67	78.42	67.57
V	2.07	9.94	9.90	3.91	7.84	6.77	5.97
Cr	0.24	0.24	0.22	0.20	0.36	0.21	0.21
Mn	50.23	198.33	144.82	94.55	71.78	89.94	91.70
Co	0.54	2.84	2.11	1.07	1.31	1.51	1.15
Cu	0.84	3.40	0.54	0.65	1.41	1.45	0.40
Cu	0.74	4.34	0.61	0.55	1.38	1.64	0.97
Zn	3.15	12.33	9.24	4.84	5.52	7.59	3.77
Zn	2.97	10.99	8.22	4.66	5.10	6.85	3.74
As	0.12	0.18	0.15	0.20	0.30	0.25	0.12
Se	0.06	0.17	0.07	0.07	0.04	0.09	0.06
Se	BDL	BDL	0.10	0.14	0.10	BDL	BDL
Rb	0.55	0.12	0.06	0.01	0.48	0.09	0.04
Sr	2.20	0.26	4.05	0.81	2.76	1.19	0.34
Mo	0.08	0.05	0.01	0.18	0.07	0.02	0.03
Sn	0.03	0.06	0.03	0.03	0.11	0.08	0.02
Te	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs	0.01	0.01	0.02	0.01	0.01	0.01	0.01
Ba	4.00	0.24	1.40	BDL	10.46	0.22	0.50
Ba	4.75	0.33	1.71	BDL	8.65	0.11	0.24
W	0.02	0.10	0.05	0.11	0.12	0.04	0.02
Pb	0.04	0.09	0.02	0.10	0.09	0.07	0.04
Bi	0.00	0.01	0.00	0.00	0.00	0.00	0.00
Th	0.06	0.10	0.14	0.02	0.18	0.09	0.01
U	0.02	0.06	0.08	0.04	0.05	0.04	0.04
Tl	0.00	0.00	0.00	BDL	0.00	0.00	BDL

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Act	Act	Act	Act	Act	Act	Act
LA-ICP-MS Spot ID	G909166_29-5	G909166_34-2	G909166_36-1	G909166_36-2	G909166_36-3	G909166_36-4	G909166_37-1
Data Quality (1-3)	1.5	1	1	1.5	1.5	1.5	1
1 standard error (ppm)**							
Li	0.26	2.74	0.31	0.11	0.40	0.66	0.15
B	0.46	0.68	0.76	0.84	1.21	1.09	0.54
Si	4893.37	4893.37	4893.37	4893.37	4893.37	4893.37	4893.37
P	3.33	109.96	397.82	53.61	190.35	1380.01	3.00
Sc	2.24	3.08	3.78	3.82	3.88	4.62	3.79
Ti	19.56	204.61	38.58	196.67	350.30	181.41	93.25
V	4.18	14.61	13.37	7.48	15.32	12.94	9.37
Cr	1.34	1.60	0.89	0.97	2.67	0.88	1.54
Mn	84.98	240.20	174.22	144.87	121.78	147.08	134.65
Co	1.18	4.79	2.82	2.01	2.90	3.27	1.93
Cu	1.98	11.82	1.73	2.00	4.42	4.07	1.04
Cu	1.92	12.55	1.75	1.90	4.37	4.18	1.33
Zn	4.40	15.50	10.68	6.56	7.87	10.84	5.38
Zn	4.17	13.96	9.57	6.16	7.24	9.84	5.10
As	0.82	0.75	1.10	1.30	1.59	1.59	0.80
Se	0.28	1.76	0.56	0.76	0.85	0.67	0.72
Se	BDL	BDL	0.25	0.65	0.22	BDL	BDL
Rb	0.58	0.14	0.07	0.02	0.48	0.10	0.04
Sr	2.68	0.33	4.08	0.87	3.16	1.38	0.42
Mo	0.09	0.05	0.02	0.21	0.08	0.03	0.03
Sn	0.06	0.10	0.09	0.09	0.18	0.16	0.06
Te	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs	0.01	0.03	0.02	0.01	0.02	0.01	0.01
Ba	5.03	0.25	1.49	BDL	10.51	0.23	0.52
Ba	5.55	0.34	1.79	BDL	8.70	0.13	0.27
W	0.02	0.11	0.06	0.12	0.23	0.05	0.03
Pb	0.05	0.10	0.03	0.11	0.12	0.08	0.06
Bi	0.00	0.01	0.00	0.00	0.00	0.00	0.00
Th	0.07	0.11	0.15	0.03	0.20	0.12	0.01
U	0.02	0.09	0.09	0.07	0.09	0.07	0.04
Tl	0.00	0.00	0.00	BDL	0.00	0.00	BDL

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Act	Act	Act	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	G909166_37-2	G909166_39-1	G909166_39-2	80JD-94D_01-1	80JD-94D_01-2	80JD-94D_02-1	80JD-94D_02-2
Data Quality (1-3)	1.5	1.5	1.5	2.5	2.5	2	1.5
Li (ppm)	1.72	2.16	1.41	50.74	55.72	47.80	56.52
B (ppm)	3.12	2.43	2.15	2.00	2.37	1.75	2.57
Si (ppm)	142436.42	142436.42	142436.42	132619.67	132619.67	132619.67	132619.67
P (ppm)	727.08	24.11	7778.55	432.21	20.98	28.28	1889.19
Sc (ppm)	47.60	59.82	57.51	2.67	2.45	3.02	5.65
Ti (ppm)	505.82	1325.02	1354.47	2422.49	2140.70	7617.12	44273.24
V (ppm)	120.65	215.82	190.97	142.01	128.21	103.73	220.77
Cr (ppm)	6.01	33.40	5.63	101.40	135.76	58.61	61.19
Mn (ppm)	3260.49	3843.39	3145.04	2030.07	1730.85	1972.06	1785.30
Co (ppm)	34.18	37.91	30.54	67.50	49.92	35.44	29.80
Cu(63) (ppm)	19.43	19.39	11.48	509.28	504.37	578.31	607.85
Cu(65)* (ppm)	19.75	18.67	11.70	498.74	501.24	570.36	599.07
Zn(66)* (ppm)	135.07	144.77	120.83	138.74	118.69	126.87	111.27
Zn(68) (ppm)	132.58	143.77	120.03	139.46	133.27	132.11	109.91
As (ppm)	4.07	3.36	5.60	1.90	0.45	0.61	2.84
Se(76) (ppm)	0.89	BDL	0.91	2.07	1.93	BDL	2.36
Se(77)* (ppm)	0.42	BDL	0.64	BDL	BDL	BDL	1.34
Rb (ppm)	0.66	0.98	0.45	35.16	58.50	23.26	33.45
Sr (ppm)	11.89	16.76	58.38	15.54	110.48	7.33	33.18
Mo (ppm)	0.24	0.62	0.38	BDL	0.08	BDL	0.14
Sn (ppm)	0.49	0.40	0.58	0.27	0.28	0.37	1.60
Te (ppm)	BDL	BDL	BDL	BDL	0.06	BDL	0.06
Cs (ppm)	0.10	0.11	0.08	2.77	4.09	2.01	3.85
Ba(137) (ppm)	0.39	65.82	BDL	144.53	340.05	112.53	104.32
Ba(138)* (ppm)	0.87	64.80	BDL	143.22	344.27	110.62	106.79
W (ppm)	0.18	0.40	0.39	0.41	0.25	3.02	11.44
Pb (ppm)	1.15	1.43	1.57	1.26	3.20	4.05	4.63
Bi (ppm)	0.00	0.02	0.01	BDL	0.03	0.02	0.09
Th (ppm)	0.46	0.26	1.58	0.87	0.31	0.02	0.05
U (ppm)	0.30	0.73	1.03	0.74	1.72	0.78	0.89
Tl (ppm)	0.01	BDL	0.01	0.24	0.40	0.09	0.25
SiO2 wt.%	30.47	30.47	30.47	28.37	28.37	28.37	28.37

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Act	Act	Act	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	G909166_37-2	G909166_39-1	G909166_39-2	80JD-94D_01-1	80JD-94D_01-2	80JD-94D_02-1	80JD-94D_02-2
Data Quality (1-3)	1.5	1.5	1.5	2.5	2.5	2	1.5
1 standard error (ppm) *							
Li	0.09	0.22	0.06	2.34	2.02	1.31	1.24
B	0.28	0.19	0.40	0.22	0.15	0.25	0.40
Si	2848.73	2848.73	2848.73	2652.39	2652.39	2652.39	2652.39
P	111.83	1.22	550.11	25.89	1.13	4.89	414.11
Sc	2.35	3.34	3.51	0.25	0.09	0.17	0.29
Ti	19.63	47.50	65.31	125.80	54.77	561.45	1630.19
V	3.62	6.57	5.80	5.97	4.60	6.57	7.40
Cr	0.17	1.05	0.18	3.13	5.56	2.83	1.90
Mn	88.87	111.92	114.47	51.51	47.55	64.69	42.43
Co	0.97	1.21	1.48	2.51	1.90	1.13	1.03
Cu	0.99	0.88	0.39	19.26	14.12	18.27	27.77
Cu	0.59	0.84	0.41	23.66	19.79	24.52	30.00
Zn	5.01	4.90	4.55	3.68	4.94	3.42	3.15
Zn	4.24	4.95	6.00	3.89	3.73	4.17	3.03
As	0.22	0.16	0.38	0.76	0.04	0.14	0.21
Se	0.10	BDL	0.07	0.20	0.17	BDL	0.17
Se	0.10	BDL	0.21	BDL	BDL	BDL	0.41
Rb	0.05	0.04	0.04	1.86	1.82	1.68	0.82
Sr	0.84	0.74	3.09	0.82	4.49	0.33	1.41
Mo	0.03	0.08	0.05	BDL	0.03	BDL	0.02
Sn	0.05	0.03	0.03	0.02	0.03	0.05	0.11
Te	BDL	BDL	BDL	BDL	0.03	BDL	0.02
Cs	0.01	0.01	0.01	0.26	0.13	0.08	0.15
Ba	3.57	6.01	BDL	12.51	18.79	6.90	8.00
Ba	3.08	5.90	BDL	12.50	16.09	8.23	8.16
W	0.02	0.08	0.04	0.05	0.03	1.35	0.55
Pb	0.15	0.06	0.06	0.08	0.50	0.38	0.46
Bi	0.00	0.00	0.00	BDL	0.01	0.01	0.01
Th	0.04	0.04	0.21	0.12	0.06	0.01	0.01
U	0.03	0.13	0.07	0.12	0.66	0.11	0.06
Tl	0.00	BDL	0.00	0.02	0.03	0.05	0.02

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Act	Act	Act	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	G909166_37-2	G909166_39-1	G909166_39-2	80JD-94D_01-1	80JD-94D_01-2	80JD-94D_02-1	80JD-94D_02-2
Data Quality (1-3)	1.5	1.5	1.5	2.5	2.5	2	1.5
1 standard error (ppm)**							
Li	0.26	0.38	0.21	7.46	8.04	6.80	7.99
B	1.17	0.91	0.88	0.76	0.87	0.68	1.02
Si	4893.37	4893.37	4893.37	4556.12	4556.12	4556.12	4556.12
P	237.37	7.05	2306.61	126.83	6.13	9.48	682.65
Sc	3.64	4.83	4.86	0.27	0.14	0.21	0.36
Ti	52.46	135.99	145.72	260.09	208.49	909.72	4468.43
V	6.99	12.56	11.10	9.56	8.16	8.54	13.77
Cr	1.22	6.79	1.14	20.62	27.85	12.12	12.45
Mn	151.09	182.41	164.30	89.50	78.45	96.12	77.09
Co	2.15	2.45	2.27	4.60	3.42	2.32	1.99
Cu	2.29	2.25	1.29	57.37	55.35	64.03	70.22
Cu	2.18	2.15	1.31	58.33	57.12	65.71	70.72
Zn	6.80	6.95	6.13	5.26	5.89	4.85	4.36
Zn	6.00	6.77	7.13	5.50	5.26	5.57	4.31
As	1.44	1.18	1.99	1.01	0.16	0.25	1.01
Se	0.72	BDL	0.73	1.67	1.55	BDL	1.89
Se	0.35	BDL	0.56	BDL	BDL	BDL	1.15
Rb	0.06	0.04	0.04	1.94	2.04	1.72	0.97
Sr	0.93	0.93	3.66	0.85	4.74	0.34	1.48
Mo	0.03	0.10	0.06	BDL	0.03	BDL	0.03
Sn	0.10	0.08	0.11	0.05	0.06	0.08	0.31
Te	BDL	BDL	BDL	BDL	0.03	BDL	0.03
Cs	0.01	0.01	0.01	0.32	0.30	0.15	0.29
Ba	3.57	6.32	BDL	12.67	19.35	7.07	8.13
Ba	3.08	6.16	BDL	12.66	16.80	8.38	8.30
W	0.03	0.09	0.06	0.07	0.04	1.40	1.47
Pb	0.16	0.08	0.09	0.11	0.54	0.45	0.54
Bi	0.00	0.00	0.00	BDL	0.01	0.01	0.01
Th	0.05	0.05	0.24	0.13	0.07	0.01	0.01
U	0.04	0.14	0.10	0.13	0.68	0.13	0.09
Tl	0.00	BDL	0.00	0.03	0.05	0.05	0.03

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	80JD-94D_02-3	80JD-94D_03-1	80JD-94D_03-3	80JD-94D_03-4	80JD-94D_03-5	80JD-94D_05-1	80JD-94D_05-2
Data Quality (1-3)	1.5	0	1	2.5	2	2	3
Li (ppm)	10.50	14.79	22.35	45.33	41.82	59.56	43.65
B (ppm)	19.60	4.87	1.63	2.13	0.94	2.32	1.21
Si (ppm)	132619.67	132619.67	132619.67	132619.67	132619.67	132619.67	132619.67
P (ppm)	112.66	380458.08	10427.70	86.84	1104.01	46.36	26.59
Sc (ppm)	34.78	16.17	6.28	3.06	1.81	2.34	1.97
Ti (ppm)	1633.68	346.61	11741.79	5621.19	1133.83	8182.39	151.65
V (ppm)	157.51	166.98	115.63	110.29	88.46	161.34	123.84
Cr (ppm)	26.27	50.19	51.34	64.21	64.67	52.00	43.35
Mn (ppm)	1739.29	1263.35	1516.19	2081.65	2296.62	1803.54	2437.90
Co (ppm)	6.13	12.34	27.36	36.83	41.02	35.24	29.17
Cu(63) (ppm)	134.66	261.38	269.05	542.03	408.38	989.26	222.37
Cu(65)* (ppm)	132.72	255.97	272.92	544.05	409.75	1056.82	219.17
Zn(66)* (ppm)	27.19	38.86	93.01	130.37	132.16	128.01	136.78
Zn(68) (ppm)	63.16	48.04	92.38	128.22	129.35	128.25	131.63
As (ppm)	7.48	35.06	1.37	0.53	0.46	1.03	0.15
Se(76) (ppm)	2.25	BDL	2.39	3.06	2.10	3.80	0.08
Se(77)* (ppm)	BDL	0.66	BDL	BDL	BDL	BDL	BDL
Rb (ppm)	32.87	14.86	2.22	33.73	2.53	87.66	0.64
Sr (ppm)	2820.66	3726.76	60.03	61.08	38.43	BDL	238.45
Mo (ppm)	0.01	0.12	0.28	0.17	BDL	0.17	0.11
Sn (ppm)	1.16	0.93	0.82	0.38	0.27	0.47	0.18
Te (ppm)	BDL	BDL	BDL	0.05	0.13	BDL	BDL
Cs (ppm)	1.54	1.01	0.30	3.08	0.67	6.28	0.18
Ba(137) (ppm)	691.02	90.63	7.19	25.94	8.74	82.19	3.06
Ba(138)* (ppm)	709.33	88.75	7.77	24.51	8.97	79.16	3.25
W (ppm)	0.32	12.61	1.92	2.48	0.45	2.47	BDL
Pb (ppm)	18.55	4.82	1.13	4.06	1.68	3.21	1.58
Bi (ppm)	0.79	0.91	0.07	0.03	0.02	0.19	0.03
Th (ppm)	1.64	20.33	0.61	0.02	0.02	0.01	0.08
U (ppm)	2.34	6.66	0.76	0.39	0.19	0.33	0.16
Tl (ppm)	0.22	0.11	0.01	0.27	0.03	0.65	0.02
SiO2 wt.%	28.37	28.37	28.37	28.37	28.37	28.37	28.37

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	80JD-94D_02-3	80JD-94D_03-1	80JD-94D_03-3	80JD-94D_03-4	80JD-94D_03-5	80JD-94D_05-1	80JD-94D_05-2
Data Quality (1-3)	1.5	0	1	2.5	2	2	3
1 standard error (ppm) *							
Li	0.24	0.40	0.87	1.02	1.29	1.75	1.85
B	1.25	0.49	0.36	0.16	0.26	0.39	0.15
Si	2652.39	2652.39	2652.39	2652.39	2652.39	2652.39	2652.39
P	144.32	15358.10	1223.90	21.28	48.12	5.20	1.24
Sc	0.92	1.81	0.53	0.09	0.11	0.12	0.10
Ti	56.14	15.85	409.29	219.93	45.91	419.81	7.56
V	5.39	5.80	5.26	3.87	5.21	5.70	4.15
Cr	0.89	1.62	2.34	1.84	2.14	1.88	1.25
Mn	98.17	33.62	47.71	55.84	55.33	53.60	57.73
Co	0.31	0.56	0.99	1.19	1.23	1.43	0.96
Cu	15.43	13.91	11.25	15.91	12.46	47.20	6.03
Cu	15.58	14.40	8.98	15.90	18.40	37.85	7.05
Zn	0.73	1.78	3.13	3.67	5.15	6.97	4.55
Zn	2.05	1.40	2.96	4.22	5.18	6.03	3.73
As	0.26	1.09	0.14	0.05	0.08	0.04	0.06
Se	0.25	BDL	0.25	0.30	0.51	0.36	0.69
Se	BDL	0.45	BDL	BDL	BDL	BDL	BDL
Rb	1.07	1.77	0.29	0.85	0.50	2.15	0.36
Sr	63.95	104.24	33.88	5.26	2.87	BDL	6.32
Mo	0.05	0.04	0.12	0.07	BDL	0.06	0.06
Sn	0.10	0.09	0.03	0.04	0.06	0.08	0.03
Te	BDL	BDL	BDL	0.06	0.03	BDL	BDL
Cs	0.07	0.08	0.02	0.09	0.08	0.28	0.03
Ba	15.68	7.96	0.46	0.73	0.51	3.58	0.26
Ba	18.96	7.31	0.37	0.80	0.36	1.95	0.12
W	0.04	0.70	0.22	0.15	0.24	0.98	BDL
Pb	1.10	0.33	0.09	0.38	0.16	0.19	0.11
Bi	0.06	0.05	0.01	0.01	0.00	0.08	0.01
Th	0.09	0.77	0.21	0.01	0.02	0.04	0.02
U	0.10	0.31	0.03	0.09	0.02	0.06	0.02
Tl	0.03	0.02	0.00	0.04	0.00	0.03	0.00

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	80JD-94D_02-3	80JD-94D_03-1	80JD-94D_03-3	80JD-94D_03-4	80JD-94D_03-5	80JD-94D_05-1	80JD-94D_05-2
Data Quality (1-3)	1.5	0	1	2.5	2	2	3
1 standard error (ppm)**							
Li	1.49	2.10	3.24	6.41	5.98	8.50	6.37
B	7.24	1.84	0.69	0.79	0.43	0.93	0.46
Si	4556.12	4556.12	4556.12	4556.12	4556.12	4556.12	4556.12
P	147.90	110366.96	3235.92	32.79	320.77	14.30	7.74
Sc	1.65	1.92	0.58	0.15	0.13	0.15	0.13
Ti	163.46	36.22	1176.87	572.19	116.02	876.06	16.13
V	9.88	10.53	8.04	6.97	6.98	10.22	7.72
Cr	5.35	10.22	10.58	13.04	13.17	10.62	8.80
Mn	116.48	56.61	72.55	93.54	99.58	84.27	105.15
Co	0.47	0.90	1.85	2.41	2.64	2.47	1.92
Cu	21.03	31.03	30.69	59.67	45.09	115.09	24.35
Cu	21.07	30.92	30.52	60.29	47.51	119.14	24.46
Zn	1.03	2.07	4.01	5.09	6.27	7.79	5.86
Zn	2.70	1.94	3.92	5.53	6.31	7.01	5.23
As	2.61	12.19	0.50	0.19	0.18	0.36	0.08
Se	1.82	BDL	1.93	2.47	1.76	3.06	0.69
Se	BDL	0.70	BDL	BDL	BDL	BDL	BDL
Rb	1.19	1.79	0.29	1.01	0.50	2.56	0.36
Sr	74.85	116.22	33.89	5.33	2.91	BDL	7.12
Mo	0.05	0.04	0.12	0.07	BDL	0.06	0.06
Sn	0.23	0.19	0.15	0.08	0.08	0.12	0.04
Te	BDL	BDL	BDL	0.06	0.04	BDL	BDL
Cs	0.12	0.11	0.03	0.22	0.09	0.50	0.03
Ba	18.31	8.06	0.47	0.81	0.52	3.76	0.27
Ba	21.41	7.41	0.39	0.87	0.38	2.25	0.13
W	0.06	1.66	0.32	0.33	0.24	1.02	BDL
Pb	1.56	0.44	0.11	0.45	0.19	0.27	0.14
Bi	0.09	0.10	0.01	0.01	0.01	0.08	0.01
Th	0.13	1.37	0.21	0.01	0.02	0.04	0.02
U	0.20	0.57	0.06	0.09	0.03	0.07	0.02
Tl	0.03	0.03	0.00	0.05	0.01	0.07	0.00

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	80JD-94D_05-3	80JD-94D_06-1	80JD-94D_06-2	80JD-94D_08-1	80JD-94D_08-2	80JD-94D_08-3	81JD-94B_18-1
Data Quality (1-3)	3	3	3	1	0	0	2.5
Li (ppm)	34.55	44.31	40.87	5.33	19.69	6.77	127.17
B (ppm)	2.35	1.59	1.54	6.27	8.78	22.01	2.76
Si (ppm)	132619.67	132619.67	132619.67	132619.67	132619.67	132619.67	336106.96
P (ppm)	28.98	27.29	49.02	136.38	635374.32	1824991.11	240.86
Sc (ppm)	1.75	2.14	2.50	33.07	22.71	42.42	5.81
Ti (ppm)	287.89	159.88	200.90	709.74	2247.05	105582.31	227.36
V (ppm)	99.59	113.59	136.30	253.43	188.29	698.04	236.75
Cr (ppm)	84.20	40.57	23.52	47.93	61.86	106.54	167.74
Mn (ppm)	2402.03	2432.19	2403.58	692.80	2956.94	6290.82	12392.58
Co (ppm)	28.14	33.54	38.27	5.35	22.70	8.27	26.18
Cu(63) (ppm)	267.36	242.37	120.91	112.39	283.31	157.79	769.64
Cu(65)* (ppm)	261.15	242.04	118.78	108.31	279.16	158.16	775.76
Zn(66)* (ppm)	124.10	135.49	125.24	19.47	75.43	36.15	749.69
Zn(68) (ppm)	119.34	126.55	120.15	21.46	85.89	52.00	731.94
As (ppm)	0.19	0.29	0.22	1.92	45.90	85.46	0.81
Se(76) (ppm)	1.70	2.65	1.93	2.96	4.54	7.53	6.37
Se(77)* (ppm)	1.50	BDL	0.49	BDL	6.09	16.80	1.51
Rb (ppm)	0.56	0.69	0.53	1.64	8.80	3.19	1.17
Sr (ppm)	9.44	108.71	213.63	5885.09	4454.74	9118.80	141.52
Mo (ppm)	BDL	BDL	0.20	BDL	0.03	3.95	BDL
Sn (ppm)	0.11	0.17	0.34	1.50	0.68	5.26	0.52
Te (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs (ppm)	0.24	0.15	0.18	0.22	0.64	0.47	0.12
Ba(137) (ppm)	8.61	2.27	3.73	4.27	74.66	47.44	2.42
Ba(138)* (ppm)	8.58	1.78	2.77	4.13	85.62	83.96	3.07
W (ppm)	0.04	BDL	0.25	0.28	11.92	63.09	BDL
Pb (ppm)	1.97	1.28	1.14	6.92	8.61	33.06	1.81
Bi (ppm)	0.03	0.06	0.10	1.97	1.39	1.78	0.11
Th (ppm)	BDL	BDL	BDL	1.67	51.08	228.60	16.98
U (ppm)	0.01	0.09	0.14	3.61	14.70	76.91	0.98
Tl (ppm)	0.00	BDL	BDL	BDL	0.06	0.01	BDL
SiO2 wt.%	28.37	28.37	28.37	28.37	28.37	28.37	28.70

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	80JD-94D_05-3	80JD-94D_06-1	80JD-94D_06-2	80JD-94D_08-1	80JD-94D_08-2	80JD-94D_08-3	81JD-94B_18-1
Data Quality (1-3)	3	3	3	1	0	0	2.5
1 standard error (ppm) *							
Li	0.78	1.12	0.98	0.54	0.58	0.57	1.14
B	0.12	0.27	0.27	0.72	0.24	1.26	6.85
Si	2652.39	2652.39	2652.39	2652.39	2652.39	2652.39	6722.14
P	1.35	1.37	2.07	10.57	23838.09	79510.89	20.16
Sc	0.06	0.10	0.12	1.03	0.72	1.47	1.75
Ti	42.50	6.69	4.93	27.97	65.02	5107.47	1.27
V	3.43	3.80	5.28	10.22	6.26	25.45	1.08
Cr	2.46	1.22	0.78	1.82	2.32	3.33	1.07
Mn	69.67	58.22	56.46	20.28	106.97	198.78	1.06
Co	0.91	1.03	1.24	0.31	0.94	0.36	0.97
Cu	6.53	8.39	4.41	6.33	7.51	5.83	1.12
Cu	7.77	7.79	4.87	5.22	8.98	5.96	0.98
Zn	4.19	4.04	3.30	1.03	2.28	1.60	0.81
Zn	3.58	3.54	3.36	1.04	3.37	2.78	1.12
As	0.08	0.05	0.04	0.54	1.13	2.67	2.67
Se	0.16	0.22	0.26	1.06	0.44	0.49	0.22
Se	0.36	BDL	0.44	BDL	0.81	1.87	8.00
Rb	0.03	0.04	0.03	0.14	0.82	0.21	5.67
Sr	0.79	13.14	11.24	471.72	97.24	308.05	2.20
Mo	BDL	BDL	0.10	BDL	0.16	0.61	BDL
Sn	0.05	0.05	0.12	0.12	0.11	0.29	4.23
Te	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs	0.01	0.02	0.04	0.03	0.05	0.04	7.25
Ba	0.84	0.18	0.24	0.52	5.55	2.30	4.49
Ba	1.41	0.06	0.63	0.14	5.86	3.97	1.44
W	0.01	BDL	0.06	0.05	0.73	3.42	BDL
Pb	0.12	0.14	0.08	0.42	0.51	1.82	1.55
Bi	0.01	0.01	0.03	0.36	0.07	0.10	7.24
Th	BDL	BDL	BDL	0.10	1.43	10.33	1.54
U	0.01	0.03	0.01	0.16	0.59	4.21	3.05
Tl	0.00	BDL	BDL	BDL	0.02	0.02	BDL

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	80JD-94D_05-3	80JD-94D_06-1	80JD-94D_06-2	80JD-94D_08-1	80JD-94D_08-2	80JD-94D_08-3	81JD-94B_18-1
Data Quality (1-3)	3	3	3	1	0	0	2.5
1 standard error (ppm)**							
Li	4.89	6.29	5.79	0.92	2.81	1.10	4.52
B	0.86	0.64	0.62	2.39	3.20	8.11	10.67
Si	4556.12	4556.12	4556.12	4556.12	4556.12	4556.12	11546.88
P	8.43	7.96	14.23	40.58	184072.34	530255.39	26.08
Sc	0.09	0.13	0.16	1.67	1.15	2.23	2.36
Ti	50.38	16.45	19.51	72.32	220.94	11159.22	3.39
V	6.26	7.08	8.90	16.80	11.71	44.67	1.98
Cr	17.10	8.25	4.79	9.80	12.65	21.67	6.22
Mn	111.14	105.25	103.42	32.17	151.02	301.57	1.64
Co	1.85	2.17	2.51	0.43	1.60	0.59	1.85
Cu	29.11	27.05	13.57	13.50	30.99	17.73	3.20
Cu	28.98	27.02	13.60	12.70	31.16	17.92	3.11
Zn	5.37	5.46	4.73	1.16	3.06	1.88	1.11
Zn	4.88	5.00	4.74	1.20	4.13	3.13	1.58
As	0.10	0.11	0.09	0.86	15.94	29.73	7.40
Se	1.37	2.13	1.57	2.60	3.66	6.04	1.65
Se	1.25	BDL	0.59	BDL	4.95	13.62	12.26
Rb	0.03	0.04	0.03	0.14	0.83	0.21	5.68
Sr	0.80	13.22	11.62	478.65	115.01	332.72	2.57
Mo	BDL	BDL	0.10	BDL	0.16	0.69	BDL
Sn	0.05	0.05	0.13	0.30	0.16	0.99	5.82
Te	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs	0.02	0.02	0.04	0.04	0.07	0.05	7.56
Ba	0.84	0.19	0.24	0.52	5.65	2.39	4.54
Ba	1.41	0.07	0.63	0.15	5.98	4.14	1.57
W	0.01	BDL	0.06	0.06	1.60	8.27	BDL
Pb	0.17	0.16	0.11	0.59	0.72	2.68	2.17
Bi	0.01	0.01	0.03	0.40	0.15	0.20	7.59
Th	BDL	BDL	BDL	0.13	3.18	16.39	2.26
U	0.01	0.03	0.01	0.31	1.22	6.99	3.68
Tl	0.00	BDL	BDL	BDL	0.02	0.02	BDL

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	81JD-94B_18-2	81JD-94B_18-3	81JD-94B_19-1	81JD-94B_19-2	81JD-94B_21-1	81JD-94B_21-2	81JD-94B_21-3
Data Quality (1-3)	2.5	3	1.5	1.5	2.5	3	3
Li (ppm)	125.39	142.29	82.63	82.75	43.96	56.40	56.37
B (ppm)	3.24	4.08	3.27	2.43	1.76	4.79	2.09
Si (ppm)	336106.96	336106.96	248691.10	248691.10	134162.30	134162.30	134162.30
P (ppm)	79.32	62.40	1619.42	78.28	27.45	50.11	30.47
Sc (ppm)	4.96	3.60	2.80	4.66	8.32	2.26	5.39
Ti (ppm)	188.61	228.21	134.24	11734.30	82.11	95.92	119.80
V (ppm)	218.30	205.17	146.50	221.91	78.23	82.83	88.81
Cr (ppm)	140.18	106.37	142.13	145.09	50.53	46.08	83.67
Mn (ppm)	10976.89	12326.84	8237.84	7822.32	3955.73	4899.41	4912.34
Co (ppm)	24.29	25.47	15.28	15.29	8.49	10.00	9.78
Cu(63) (ppm)	776.08	944.59	828.57	500.92	273.65	292.78	385.45
Cu(65)* (ppm)	784.66	945.81	829.11	498.15	273.33	292.32	385.97
Zn(66)* (ppm)	670.72	711.93	573.53	515.64	233.05	294.91	292.28
Zn(68) (ppm)	637.90	709.71	562.55	502.85	227.94	286.10	280.27
As (ppm)	0.61	0.36	0.90	0.73	0.18	0.35	BDL
Se(76) (ppm)	5.88	5.18	4.80	5.60	1.79	2.45	2.90
Se(77)* (ppm)	BDL	1.47	1.81	1.82	0.39	0.19	BDL
Rb (ppm)	5.93	0.98	1.10	0.83	0.54	0.74	0.30
Sr (ppm)	33.80	7.46	5.54	17.06	105.68	2.87	BDL
Mo (ppm)	0.15	0.26	0.18	0.32	0.02	BDL	0.11
Sn (ppm)	0.52	0.62	0.35	1.05	0.23	0.69	0.15
Te (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs (ppm)	0.33	0.08	0.19	0.11	0.12	0.09	0.05
Ba(137) (ppm)	202.11	3.75	6.71	10.08	5.49	1.58	0.62
Ba(138)* (ppm)	199.73	3.81	6.27	8.79	6.90	1.86	0.26
W (ppm)	BDL	BDL	0.08	5.15	BDL	0.12	BDL
Pb (ppm)	1.13	1.02	3.20	1.67	0.79	1.01	0.52
Bi (ppm)	0.01	0.03	0.04	0.03	0.10	0.01	0.02
Th (ppm)	0.25	0.19	0.44	0.23	7.45	0.08	1.02
U (ppm)	0.03	BDL	0.14	0.12	0.31	0.01	2.49
Tl (ppm)	0.03	BDL	BDL	BDL	0.00	BDL	BDL
SiO2 wt.%	28.70	28.70	28.70	28.70	28.70	28.70	28.70

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	81JD-94B_18-2	81JD-94B_18-3	81JD-94B_19-1	81JD-94B_19-2	81JD-94B_21-1	81JD-94B_21-2	81JD-94B_21-3
Data Quality (1-3)	2.5	3	1.5	1.5	2.5	3	3
1 standard error (ppm) *							
Li	1.72	1.40	1.47	1.54	1.93	1.70	2.77
B	3.37	3.61	11.32	7.87	0.08	0.62	0.19
Si	6722.14	6722.14	4973.82	4973.82	2683.25	2683.25	2683.25
P	4.71	10.51	80.81	626.09	13.33	7.13	0.87
Sc	1.94	1.76	3.88	1.86	0.80	0.12	0.24
Ti	1.07	1.01	279.98	307.12	4.24	2.25	4.26
V	1.03	1.06	1.58	1.41	3.28	2.74	2.66
Cr	0.73	0.93	1.11	1.09	1.67	1.81	1.09
Mn	0.88	0.89	6.73	6.39	164.45	128.13	165.86
Co	1.02	0.90	1.25	1.34	0.45	0.35	0.35
Cu	0.90	0.93	1.42	1.38	15.55	10.32	21.04
Cu	0.86	0.93	1.30	1.30	14.88	9.81	20.51
Zn	0.97	0.77	1.45	1.29	8.40	9.68	13.08
Zn	1.25	1.27	2.07	1.99	10.87	10.31	12.31
As	5.84	6.96	6.46	3.13	0.14	0.03	BDL
Se	0.08	0.09	0.38	0.27	0.14	0.12	0.15
Se	BDL	2.53	0.93	0.56	0.40	#VALUE!	BDL
Rb	3.06	10.30	1.28	6.11	0.07	0.26	0.03
Sr	11.44	3.07	3.40	2.68	3.03	1.09	BDL
Mo	18.95	11.53	8.42	8.24	#VALUE!	BDL	0.04
Sn	5.09	4.92	3.93	3.00	0.02	0.07	0.03
Te	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs	1.58	14.01	3.86	10.13	0.01	0.04	0.02
Ba	4.54	4.41	7.18	12.08	0.28	9.00	1.54
Ba	5.09	4.22	3.14	9.02	0.30	3.69	2.69
W	BDL	BDL	42.52	3.40	BDL	#VALUE!	BDL
Pb	3.00	5.63	3.03	7.42	0.16	0.13	0.03
Bi	48.33	13.06	4.89	13.08	0.05	0.01	0.00
Th	7.22	3.98	5.02	3.74	0.71	0.06	0.04
U	9.82	BDL	4.90	8.49	0.13	0.01	#VALUE!
Tl	1.65	BDL	BDL	BDL	#VALUE!	BDL	BDL

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	81JD-94B_18-2	81JD-94B_18-3	81JD-94B_19-1	81JD-94B_19-2	81JD-94B_21-1	81JD-94B_21-2	81JD-94B_21-3
Data Quality (1-3)	2.5	3	1.5	1.5	2.5	3	3
1 standard error (ppm)**							
Li	4.82	4.72	6.32	6.19	7.46	7.30	8.52
B	9.32	8.70	21.49	19.35	0.41	0.78	0.62
Si	11546.88	11546.88	8543.73	8543.73	4609.12	4609.12	4609.12
P	17.08	19.49	407.37	742.76	30.63	11.55	7.20
Sc	2.42	2.28	4.53	2.97	0.81	0.15	0.25
Ti	3.11	3.13	810.11	807.77	9.68	7.56	9.71
V	1.95	1.98	2.73	2.64	5.86	5.25	4.98
Cr	6.15	6.29	9.16	9.21	13.49	11.34	8.56
Mn	1.49	1.52	11.17	10.90	255.54	215.48	255.65
Co	1.82	1.82	2.62	2.59	0.75	0.66	0.68
Cu	3.14	3.18	4.67	4.83	36.70	35.07	45.90
Cu	3.09	3.06	4.64	4.65	36.59	35.21	45.63
Zn	1.24	1.10	1.94	1.81	11.39	11.87	14.97
Zn	1.72	1.74	2.87	2.78	15.06	13.74	15.93
As	8.68	9.82	10.97	9.57	0.18	0.09	BDL
Se	1.31	1.21	2.59	3.42	2.04	1.88	1.66
Se	BDL	9.40	2.21	2.05	0.62	#VALUE!	BDL
Rb	3.07	10.30	1.34	6.12	0.07	0.26	0.03
Sr	11.51	3.31	3.72	3.06	3.26	1.12	BDL
Mo	19.08	11.77	8.99	8.76	#VALUE!	BDL	0.04
Sn	6.46	6.38	6.33	5.72	0.04	0.08	0.05
Te	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs	2.66	14.17	4.44	10.38	0.01	0.05	0.02
Ba	4.58	4.45	7.35	12.19	0.28	9.18	1.54
Ba	5.13	4.26	3.48	9.14	0.30	4.05	2.69
W	BDL	BDL	42.80	5.83	BDL	#VALUE!	BDL
Pb	3.34	5.83	3.87	7.82	0.17	0.13	0.04
Bi	48.38	13.26	5.73	13.41	0.05	0.01	0.00
Th	7.36	4.22	5.50	4.32	0.80	0.06	0.05
U	10.03	BDL	5.77	9.00	0.14	0.01	#VALUE!
Tl	2.02	BDL	BDL	BDL	#VALUE!	BDL	BDL

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	81JD-94B_22-1	81JD-94B_22-2	81JD-94B_22-3	81JD-94B_22-4	81JD-94B_22-5	81JD-94B_23-1	81JD-94B_23-2
Data Quality (1-3)	2.5	2.5	2.5	2.5	3	3	3
Li (ppm)	33.81	55.33	55.29	55.32	55.76	48.29	54.90
B (ppm)	1.31	2.01	0.72	1.69	2.36	1.31	1.79
Si (ppm)	134162.30	134162.30	134162.30	134162.30	134162.30	134162.30	134162.30
P (ppm)	148.72	86.43	24.67	29.69	28.50	39.87	26.15
Sc (ppm)	2.07	2.82	1.58	3.51	2.65	2.39	2.17
Ti (ppm)	59.58	97.83	385.06	113.07	94.36	89.42	116.82
V (ppm)	48.77	83.92	78.28	91.81	103.27	89.46	82.68
Cr (ppm)	31.70	54.12	55.76	58.53	85.23	90.03	82.63
Mn (ppm)	3031.32	4941.42	4803.23	4670.95	4980.21	4778.07	4922.75
Co (ppm)	6.30	9.56	10.44	9.44	10.40	7.57	7.74
Cu(63) (ppm)	1656.66	1115.33	468.43	790.41	358.78	326.33	348.39
Cu(65)* (ppm)	1678.68	1133.75	480.50	802.11	361.32	326.52	346.15
Zn(66)* (ppm)	211.48	301.18	299.86	281.31	300.91	305.33	305.26
Zn(68) (ppm)	208.68	300.25	294.96	273.79	293.08	300.74	297.29
As (ppm)	0.31	0.36	0.55	0.26	0.41	0.34	BDL
Se(76) (ppm)	3.80	2.85	2.28	2.79	2.83	2.95	2.69
Se(77)* (ppm)	BDL	1.74	BDL	0.76	BDL	BDL	0.43
Rb (ppm)	2.94	0.35	0.70	1.73	0.54	0.62	0.51
Sr (ppm)	116.02	70.37	0.45	374.76	0.59	0.77	3.53
Mo (ppm)	BDL	0.10	0.21	0.14	BDL	BDL	0.11
Sn (ppm)	0.10	0.22	0.25	0.22	0.21	0.24	0.35
Te (ppm)	BDL	0.08	BDL	BDL	BDL	BDL	BDL
Cs (ppm)	0.07	0.21	0.04	0.26	0.16	0.10	0.05
Ba(137) (ppm)	62.47	3.66	1.73	37.11	1.88	1.26	1.86
Ba(138)* (ppm)	62.57	3.20	1.80	34.72	2.01	1.69	2.21
W (ppm)	BDL	0.08	0.13	BDL	0.02	0.02	BDL
Pb (ppm)	1.69	2.51	0.55	1.50	0.60	0.54	0.55
Bi (ppm)	0.12	0.10	0.01	0.16	0.01	0.01	0.00
Th (ppm)	0.75	9.70	0.07	2.48	0.06	0.17	0.28
U (ppm)	0.14	0.76	BDL	1.22	0.01	0.01	BDL
Tl (ppm)	0.03	0.01	BDL	0.02	0.02	0.01	BDL
SiO2 wt.%	28.70	28.70	28.70	28.70	28.70	28.70	28.70

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	81JD-94B_22-1	81JD-94B_22-2	81JD-94B_22-3	81JD-94B_22-4	81JD-94B_22-5	81JD-94B_23-1	81JD-94B_23-2
Data Quality (1-3)	2.5	2.5	2.5	2.5	3	3	3
1 standard error (ppm) *							
Li	1.78	1.67	1.57	2.04	1.95	1.15	2.20
B	0.38	0.18	0.75	0.78	0.30	0.70	0.31
Si	2683.25	2683.25	2683.25	2683.25	2683.25	2683.25	2683.25
P	122.98	3.06	1.57	2.68	1.44	25.66	9.82
Sc	0.07	0.09	1.43	0.23	0.25	0.12	0.12
Ti	2.68	234.00	4.71	3.78	4.90	2.77	3.57
V	2.97	4.13	2.62	2.98	2.94	1.60	2.71
Cr	2.26	1.85	1.17	0.98	1.74	0.67	1.59
Mn	128.18	137.21	123.93	149.19	143.26	95.66	153.64
Co	0.30	0.26	0.29	0.34	0.35	0.22	0.30
Cu	38.03	11.10	10.32	9.82	12.40	56.67	36.06
Cu	34.39	11.18	10.58	9.91	12.11	57.26	36.13
Zn	8.31	7.10	5.92	7.74	7.24	5.28	7.58
Zn	10.97	9.48	8.40	9.96	9.93	7.37	10.68
As	0.15	0.04	0.01	0.11	#VALUE!	0.04	BDL
Se	0.40	0.34	0.05	0.17	0.19	0.18	0.22
Se	BDL	0.24	BDL	0.07	BDL	BDL	0.51
Rb	0.03	0.04	0.03	0.02	0.01	0.16	0.02
Sr	0.15	1.38	392.52	0.15	#VALUE!	5.98	3.11
Mo	BDL	0.03	0.00	#VALUE!	BDL	BDL	0.03
Sn	0.05	0.11	0.03	0.10	0.01	0.02	0.03
Te	BDL	#VALUE!	BDL	BDL	BDL	BDL	BDL
Cs	0.02	0.01	0.09	0.02	0.01	0.01	0.09
Ba	0.49	0.30	0.55	0.06	0.08	4.07	0.39
Ba	0.57	0.37	0.51	0.10	0.01	8.24	0.17
W	BDL	0.49	#VALUE!	BDL	#VALUE!	#VALUE!	BDL
Pb	0.18	0.05	0.09	0.06	0.07	0.16	0.40
Bi	0.00	0.00	0.06	0.00	0.02	0.12	0.23
Th	0.02	0.01	26.90	0.00	0.47	0.20	0.74
U	0.01	0.01	BDL	0.00	1.87	0.09	BDL
Tl	#VALUE!	#VALUE!	BDL	#VALUE!	#VALUE!	0.02	BDL

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	81JD-94B_22-1	81JD-94B_22-2	81JD-94B_22-3	81JD-94B_22-4	81JD-94B_22-5	81JD-94B_23-1	81JD-94B_23-2
Data Quality (1-3)	2.5	2.5	2.5	2.5	3	3	3
1 standard error (ppm)**							
Li	6.57	6.55	6.43	8.26	8.23	4.93	8.15
B	0.75	0.51	0.99	1.91	0.82	0.84	0.80
Si	4609.12	4609.12	4609.12	4609.12	4609.12	4609.12	4609.12
P	279.09	12.49	8.03	14.62	8.86	49.77	26.66
Sc	0.10	0.14	1.47	0.25	0.34	0.15	0.17
Ti	7.44	650.28	9.17	9.94	12.48	6.35	10.03
V	5.03	7.42	4.80	5.20	5.43	2.97	5.10
Cr	15.50	15.76	10.17	9.27	16.82	6.38	10.94
Mn	217.50	216.02	199.56	244.51	241.35	153.35	248.55
Co	0.56	0.54	0.57	0.67	0.66	0.42	0.63
Cu	61.52	31.27	31.36	33.16	43.51	187.99	125.95
Cu	59.29	31.09	31.35	33.08	43.39	190.06	127.62
Zn	11.49	10.07	8.42	10.83	10.43	7.57	10.83
Zn	15.41	13.55	11.69	14.27	14.09	10.48	15.13
As	0.23	0.14	0.06	0.16	#VALUE!	0.12	BDL
Se	2.11	2.44	1.44	1.97	2.33	3.05	2.29
Se	BDL	0.82	BDL	0.17	BDL	BDL	1.48
Rb	0.03	0.04	0.03	0.03	0.01	0.16	0.03
Sr	0.16	1.39	392.53	0.17	#VALUE!	6.47	3.45
Mo	BDL	0.03	0.00	#VALUE!	BDL	BDL	0.03
Sn	0.06	0.15	0.05	0.16	0.03	0.03	0.05
Te	BDL	#VALUE!	BDL	BDL	BDL	BDL	BDL
Cs	0.02	0.01	0.09	0.02	0.01	0.01	0.09
Ba	0.50	0.33	0.57	0.07	0.09	4.32	0.40
Ba	0.58	0.38	0.53	0.10	0.02	8.34	0.18
W	BDL	0.59	#VALUE!	BDL	#VALUE!	#VALUE!	BDL
Pb	0.20	0.07	0.10	0.08	0.07	0.18	0.42
Bi	0.00	0.00	0.06	0.00	0.02	0.12	0.23
Th	0.02	0.02	26.90	0.01	0.48	0.21	0.90
U	0.01	0.01	BDL	0.00	1.88	0.09	BDL
Tl	#VALUE!	#VALUE!	BDL	#VALUE!	#VALUE!	0.02	BDL

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	81JD-94B_24-1	81JD-94B_24-2	81JD-94B_24-3	81JD-94B_26-1	81JD-94B_26-2	81JD-94B_26-3	ANN006001.045-10
Data Quality (1-3)	3	2.5	3	3	2.5	1.5	1.5
Li (ppm)	58.03	52.09	54.97	50.50	48.91	48.09	46.25
B (ppm)	1.99	5.34	1.47	1.67	1.22	1.39	2.54
Si (ppm)	134162.30	134162.30	134162.30	134162.30	134162.30	134162.30	131946.52
P (ppm)	182.43	604.07	119.17	149.44	138.43	4143.75	68.53
Sc (ppm)	1.64	4.74	1.96	1.76	1.85	1.94	11.22
Ti (ppm)	60.02	97.79	81.18	93.40	413.61	85.96	12628.68
V (ppm)	88.71	77.32	78.71	77.16	98.30	87.82	476.04
Cr (ppm)	41.13	57.67	69.30	63.61	56.69	70.18	21.39
Mn (ppm)	4615.51	4549.33	4991.68	5184.14	5063.44	4743.47	492.63
Co (ppm)	8.35	7.42	10.40	9.31	8.99	7.70	41.83
Cu(63) (ppm)	115.96	172.28	138.56	192.79	154.50	189.46	6.12
Cu(65)* (ppm)	118.00	170.33	137.76	188.13	152.65	187.60	7.02
Zn(66)* (ppm)	277.61	271.35	282.63	272.09	279.53	284.77	104.22
Zn(68) (ppm)	271.85	260.23	281.83	270.95	282.88	284.84	120.57
As (ppm)	0.37	0.49	0.11	0.48	0.38	0.83	0.59
Se(76) (ppm)	2.01	2.09	2.03	2.18	2.31	0.74	3.56
Se(77)* (ppm)	0.43	BDL	BDL	BDL	1.33	0.33	BDL
Rb (ppm)	0.60	0.61	0.95	0.27	0.32	0.21	95.25
Sr (ppm)	1.07	185.26	2.09	1.63	4.66	8.36	3.72
Mo (ppm)	0.02	0.17	0.05	BDL	0.18	0.06	0.07
Sn (ppm)	0.23	0.30	0.30	0.32	0.26	0.21	1.65
Te (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	0.07
Cs (ppm)	0.08	0.11	0.22	BDL	0.12	0.07	4.99
Ba(137) (ppm)	1.90	3.54	33.19	56.02	240.60	2.01	480.98
Ba(138)* (ppm)	1.63	3.73	30.29	57.71	230.50	0.84	486.21
W (ppm)	0.08	0.13	0.11	0.84	0.77	0.13	2.45
Pb (ppm)	1.85	4.59	6.89	7.15	1.75	0.64	0.32
Bi (ppm)	0.02	0.92	0.02	BDL	0.03	0.02	0.01
Th (ppm)	0.12	2.18	0.19	0.04	0.06	0.75	0.17
U (ppm)	0.01	0.85	0.03	BDL	0.02	0.07	0.47
Tl (ppm)	BDL	BDL	BDL	BDL	BDL	0.01	0.62
SiO2 wt.%	28.70	28.70	28.70	28.70	28.70	28.70	28.23

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	81JD-94B_24-1	81JD-94B_24-2	81JD-94B_24-3	81JD-94B_26-1	81JD-94B_26-2	81JD-94B_26-3	ANN006001.045-10
Data Quality (1-3)	3	2.5	3	3	2.5	1.5	1.5
1 standard error (ppm) *							
Li	2.12	2.22	3.03	1.92	2.02	2.00	1.64
B	0.14	0.21	0.34	0.42	0.36	0.21	0.41
Si	2683.25	2683.25	2683.25	2683.25	2683.25	2683.25	2638.93
P	2.63	1.98	2.61	2.09	0.91	62.18	9.99
Sc	0.15	0.13	0.13	0.19	0.12	0.09	0.42
Ti	14.33	3.37	2.95	2.85	4.61	2.03	574.74
V	2.63	2.89	3.68	2.91	2.81	2.86	13.26
Cr	1.32	1.22	1.85	1.92	1.78	0.98	0.64
Mn	138.13	140.79	153.72	160.11	141.18	134.05	14.42
Co	0.33	0.31	0.37	0.37	0.27	0.29	1.23
Cu	15.64	26.68	12.11	11.68	15.39	4.00	0.80
Cu	16.16	28.95	11.64	10.44	12.20	3.76	0.68
Zn	7.57	7.73	8.51	10.02	7.63	7.41	3.15
Zn	10.39	9.71	10.92	11.52	10.74	10.98	3.18
As	0.11	0.05	0.23	0.05	#VALUE!	0.07	0.06
Se	0.23	0.16	0.21	0.19	0.20	2.41	0.29
Se	#VALUE!	BDL	BDL	BDL	0.17	0.28	BDL
Rb	0.08	0.09	0.04	0.10	0.06	0.10	2.45
Sr	0.16	29.72	0.02	0.02	1.25	0.27	0.18
Mo	0.81	0.03	#VALUE!	BDL	0.04	0.01	0.04
Sn	0.03	0.02	0.03	0.05	0.07	0.02	0.12
Te	BDL	BDL	BDL	BDL	BDL	BDL	0.09
Cs	0.01	0.04	0.03	BDL	0.02	0.02	0.19
Ba	14.84	10.45	0.07	0.08	0.38	8.59	19.18
Ba	18.80	11.70	0.11	0.11	0.50	17.73	16.01
W	0.02	#VALUE!	0.01	0.00	#VALUE!	0.02	0.17
Pb	0.14	0.16	0.03	0.04	0.11	0.13	0.06
Bi	0.00	0.03	0.00	BDL	0.00	0.00	0.01
Th	0.04	0.51	0.01	0.07	0.06	0.01	0.04
U	#VALUE!	0.06	0.00	BDL	#VALUE!	0.00	0.03
Tl	BDL	BDL	BDL	BDL	BDL	#VALUE!	0.05

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	81JD-94B_24-1	81JD-94B_24-2	81JD-94B_24-3	81JD-94B_26-1	81JD-94B_26-2	81JD-94B_26-3	ANN006001.045-10
Data Quality (1-3)	3	2.5	3	3	2.5	1.5	1.5
1 standard error (ppm)**							
Li	8.13	8.16	8.47	7.12	8.05	8.47	6.73
B	0.30	0.65	0.92	0.64	0.74	0.75	1.02
Si	4609.12	4609.12	4609.12	4609.12	4609.12	4609.12	4532.99
P	7.55	8.74	8.58	11.62	7.55	81.26	22.10
Sc	0.16	0.20	0.17	0.21	0.15	0.11	0.61
Ti	39.59	11.35	9.51	9.03	12.11	6.10	1318.18
V	4.81	5.54	6.47	5.44	5.10	5.39	25.64
Cr	11.23	11.77	17.15	18.11	16.62	8.29	4.34
Mn	234.84	232.23	249.81	247.64	240.45	226.44	23.09
Co	0.68	0.62	0.70	0.57	0.52	0.56	2.61
Cu	53.04	89.59	40.66	37.19	40.71	13.17	1.04
Cu	54.34	91.31	40.71	36.77	39.31	13.28	1.01
Zn	10.79	10.58	11.50	12.72	10.94	10.28	4.38
Zn	14.79	13.77	15.12	15.74	15.10	14.65	4.59
As	0.22	0.10	0.27	0.13	#VALUE!	0.15	0.21
Se	1.84	2.24	2.28	2.37	2.16	2.90	2.87
Se	#VALUE!	BDL	BDL	BDL	0.38	0.44	BDL
Rb	0.08	0.09	0.04	0.10	0.06	0.10	3.02
Sr	0.16	30.78	0.03	0.03	1.25	0.27	0.20
Mo	0.81	0.03	#VALUE!	BDL	0.04	0.01	0.04
Sn	0.06	0.04	0.05	0.06	0.10	0.05	0.32
Te	BDL	BDL	BDL	BDL	BDL	BDL	0.09
Cs	0.01	0.05	0.04	BDL	0.02	0.02	0.39
Ba	14.84	10.49	0.08	0.09	0.38	8.59	23.92
Ba	18.80	11.73	0.12	0.12	0.51	17.73	20.01
W	0.02	#VALUE!	0.01	0.00	#VALUE!	0.02	0.34
Pb	0.14	0.18	0.04	0.05	0.12	0.16	0.06
Bi	0.00	0.03	0.00	BDL	0.00	0.00	0.01
Th	0.04	0.52	0.01	0.07	0.06	0.01	0.04
U	#VALUE!	0.11	0.00	BDL	#VALUE!	0.00	0.05
Tl	BDL	BDL	BDL	BDL	BDL	#VALUE!	0.09

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	ANN006001.045-11	ANN006001.045-12	ANN006001.045-2	ANN006001.045-3	ANN006001.045-4	ANN006001.045-5	ANN006001.045-6
Data Quality (1-3)	1.5	3	2.5	2	2.5	1.5	1.5
Li (ppm)	38.49	36.21	51.92	52.49	44.78	50.83	52.04
B (ppm)	1.23	2.16	1.13	2.54	1.36	2.44	2.13
Si (ppm)	131946.52	131946.52	131965.22	131965.22	131965.22	131965.22	131965.22
P (ppm)	30.62	29.54	29.97	44.40	35.20	41.55	3896.64
Sc (ppm)	9.52	2.67	2.30	2.96	1.51	4.31	2.29
Ti (ppm)	19730.04	1939.03	2692.34	4028.74	197.40	23996.35	1324.19
V (ppm)	509.36	230.78	307.22	355.77	260.87	375.35	317.77
Cr (ppm)	19.51	25.75	17.36	67.17	48.58	44.75	32.91
Mn (ppm)	638.63	354.17	560.45	492.41	646.13	583.60	665.75
Co (ppm)	43.08	31.59	49.65	43.72	60.11	52.57	57.28
Cu(63) (ppm)	2.01	2.49	6.35	3.03	3.01	3.41	0.83
Cu(65)* (ppm)	1.88	2.88	6.81	2.20	3.55	4.15	0.84
Zn(66)* (ppm)	88.28	84.92	150.01	124.92	169.76	138.14	146.04
Zn(68) (ppm)	90.26	95.33	154.45	143.54	173.64	151.14	156.02
As (ppm)	0.99	0.43	0.52	0.55	BDL	0.34	0.99
Se(76) (ppm)	2.08	1.43	2.69	5.65	BDL	2.13	3.81
Se(77)* (ppm)	BDL	BDL	0.73	2.49	BDL	BDL	BDL
Rb (ppm)	34.26	43.56	19.07	103.65	7.86	37.49	49.86
Sr (ppm)	2.42	29.46	20.42	9.95	0.26	4.51	15.05
Mo (ppm)	0.04	BDL	BDL	BDL	BDL	0.38	BDL
Sn (ppm)	2.26	0.40	0.39	0.62	BDL	2.77	0.42
Te (ppm)	BDL	BDL	0.00	0.10	BDL	BDL	BDL
Cs (ppm)	1.64	2.24	1.62	4.57	1.39	2.23	4.40
Ba(137) (ppm)	118.29	260.90	186.10	739.44	84.01	361.21	466.82
Ba(138)* (ppm)	118.60	259.02	188.99	719.97	81.23	361.71	442.41
W (ppm)	1.87	0.33	1.21	0.50	BDL	15.31	0.20
Pb (ppm)	0.15	0.33	1.11	0.30	0.22	0.76	0.21
Bi (ppm)	0.02	BDL	BDL	0.00	BDL	0.01	BDL
Th (ppm)	0.12	0.03	0.03	0.02	BDL	0.09	0.10
U (ppm)	0.44	0.04	0.05	0.02	0.01	0.96	0.03
Tl (ppm)	0.26	0.34	0.15	0.76	0.09	0.37	0.49
SiO2 wt.%	28.23	28.23	28.23	28.23	28.23	28.23	28.23

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	ANN006001.045-11	ANN006001.045-12	ANN006001.045-2	ANN006001.045-3	ANN006001.045-4	ANN006001.045-5	ANN006001.045-6
Data Quality (1-3)	1.5	3	2.5	2	2.5	1.5	1.5
1 standard error (ppm) *							
Li	1.21	1.29	3.29	2.47	2.77	3.29	2.60
B	0.23	0.19	0.76	0.18	0.70	0.20	1.23
Si	2638.93	2638.93	2639.30	2639.30	2639.30	2639.30	2639.30
P	2.69	2.91	3.40	9.33	4.25	7.11	346.05
Sc	0.30	0.14	0.37	0.12	0.07	0.27	0.28
Ti	610.92	107.55	108.35	365.46	44.24	3256.63	239.15
V	11.25	6.43	10.81	12.12	10.48	12.73	10.96
Cr	1.00	0.90	0.73	2.75	2.10	2.02	1.41
Mn	16.23	10.02	12.31	12.98	14.49	14.41	24.80
Co	1.76	0.86	1.43	1.36	2.09	1.76	3.17
Cu	0.21	0.18	0.23	0.16	0.29	0.27	0.48
Cu	0.24	0.33	0.70	0.27	0.26	0.45	0.42
Zn	2.66	2.62	4.53	3.68	6.28	4.72	6.67
Zn	2.65	2.64	7.55	7.71	9.46	6.86	8.07
As	0.11	0.16	0.20	0.30	BDL	0.14	0.20
Se	0.18	0.10	0.89	1.31	BDL	0.56	0.86
Se	BDL	BDL	0.34	0.69	BDL	BDL	BDL
Rb	1.06	1.15	0.73	4.13	1.66	1.78	1.07
Sr	0.10	1.00	1.17	0.45	3.94	0.24	1.19
Mo	0.03	BDL	BDL	BDL	BDL	0.18	BDL
Sn	0.15	0.02	0.07	0.09	BDL	0.11	0.13
Te	BDL	BDL	0.07	0.17	BDL	BDL	BDL
Cs	0.08	0.10	0.21	0.27	0.08	0.12	0.26
Ba	4.60	10.95	12.81	33.36	22.48	15.60	25.39
Ba	3.72	9.02	9.63	33.57	23.69	15.04	18.93
W	0.21	0.05	0.22	0.04	BDL	1.04	0.10
Pb	0.04	0.03	0.28	0.10	0.05	0.18	0.04
Bi	0.01	BDL	BDL	0.01	BDL	0.02	BDL
Th	0.03	0.02	0.01	0.00	BDL	0.09	0.03
U	0.03	0.01	0.02	0.00	0.01	0.52	0.01
Tl	0.03	0.02	0.02	0.08	0.03	0.07	0.09

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	ANN006001.045-11	ANN006001.045-12	ANN006001.045-2	ANN006001.045-3	ANN006001.045-4	ANN006001.045-5	ANN006001.045-6
Data Quality (1-3)	1.5	3	2.5	2	2.5	1.5	1.5
1 standard error (ppm)**							
Li	5.56	5.27	8.25	8.03	7.09	8.10	8.01
B	0.51	0.81	0.86	0.95	0.86	0.91	1.45
Si	4532.99	4532.99	4533.63	4533.63	4533.63	4533.63	4533.63
P	9.21	8.98	9.49	16.11	11.25	14.20	1203.53
Sc	0.48	0.17	0.39	0.18	0.10	0.34	0.30
Ti	1951.45	211.53	283.49	535.93	48.23	4007.14	271.65
V	26.04	12.43	19.56	22.43	17.36	23.64	20.11
Cr	4.04	5.24	3.58	13.85	10.04	9.27	6.80
Mn	28.47	16.39	22.91	21.38	26.58	24.75	33.79
Co	2.95	1.94	3.14	2.81	3.97	3.44	4.52
Cu	0.30	0.33	0.73	0.37	0.44	0.46	0.49
Cu	0.32	0.45	1.01	0.36	0.46	0.63	0.43
Zn	3.70	3.61	6.17	5.08	7.88	6.10	7.82
Zn	3.62	3.72	10.19	9.99	12.19	9.58	10.62
As	0.36	0.22	0.27	0.36	BDL	0.18	0.40
Se	1.68	1.15	2.41	4.87	BDL	1.86	3.27
Se	BDL	BDL	0.68	2.11	BDL	BDL	BDL
Rb	1.24	1.41	0.77	4.36	1.67	1.85	1.25
Sr	0.11	1.19	1.29	0.53	3.94	0.27	1.26
Mo	0.03	BDL	BDL	BDL	BDL	0.18	BDL
Sn	0.43	0.07	0.10	0.14	BDL	0.51	0.15
Te	BDL	BDL	0.07	0.17	BDL	BDL	BDL
Cs	0.14	0.19	0.24	0.40	0.12	0.19	0.39
Ba	5.79	13.42	13.65	38.30	22.58	18.11	28.03
Ba	4.73	11.06	11.14	39.77	23.81	18.46	23.02
W	0.31	0.06	0.26	0.07	BDL	2.08	0.11
Pb	0.04	0.05	0.29	0.10	0.05	0.18	0.04
Bi	0.01	BDL	BDL	0.01	BDL	0.02	BDL
Th	0.03	0.02	0.01	0.00	BDL	0.09	0.03
U	0.05	0.01	0.02	0.00	0.01	0.53	0.01
Tl	0.04	0.05	0.03	0.11	0.03	0.08	0.10

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	ANN006001.045-7	ANN006001.045-8	ANN006001.045-9	ANN006002.023-2	ANN006002.023-3	ANN006002.023-4	ANN006002.023-5
Data Quality (1-3)	1.5	1.5	1.5	2.5	1.5	2.5	1.5
Li (ppm)	34.10	38.87	41.38	19.48	21.47	16.57	23.10
B (ppm)	2.86	2.82	1.42	1.21	1.08	2.05	1.67
Si (ppm)	131965.22	131965.22	131965.22	127902.95	127902.95	127902.95	127902.95
P (ppm)	38.09	27.53	626.66	28.97	65.40	6.46	252.63
Sc (ppm)	6.00	3.43	3.58	2.00	4.99	2.62	3.17
Ti (ppm)	14096.10	12291.17	18632.41	1786.46	26354.23	7023.71	14655.60
V (ppm)	408.37	331.47	383.34	139.49	438.61	166.77	374.73
Cr (ppm)	53.46	67.91	65.68	13.22	26.04	13.70	16.64
Mn (ppm)	633.42	815.75	771.70	2234.93	3138.80	1307.57	2461.51
Co (ppm)	42.89	51.33	48.52	67.64	87.15	50.52	136.66
Cu(63) (ppm)	6.15	9.83	2.45	1.36	1.68	2.72	1.34
Cu(65)* (ppm)	5.54	11.68	3.03	1.58	2.51	3.68	1.76
Zn(66)* (ppm)	122.70	121.90	112.77	429.25	555.06	281.51	467.11
Zn(68) (ppm)	120.95	126.22	114.46	437.33	528.74	320.80	445.20
As (ppm)	0.55	0.85	0.41	BDL	0.52	0.54	BDL
Se(76) (ppm)	5.90	4.36	2.26	3.23	2.69	2.62	4.46
Se(77)* (ppm)	1.92	BDL	BDL	BDL	BDL	0.31	1.80
Rb (ppm)	11.20	2.63	3.17	129.02	21.66	150.46	2.53
Sr (ppm)	28.86	1.88	4.27	27.27	17.04	108.96	3.33
Mo (ppm)	BDL	BDL	BDL	BDL	0.38	0.48	0.10
Sn (ppm)	1.40	1.20	1.16	0.18	0.58	0.26	0.32
Te (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs (ppm)	0.64	0.32	0.35	9.16	2.52	6.93	1.37
Ba(137) (ppm)	164.88	22.22	13.21	525.16	75.52	1471.04	3.62
Ba(138)* (ppm)	165.26	21.66	13.20	512.90	73.76	1429.93	3.68
W (ppm)	1.59	0.93	0.33	0.06	1.44	0.27	0.48
Pb (ppm)	1.76	1.24	0.33	0.57	0.60	4.13	0.26
Bi (ppm)	0.28	0.10	0.08	BDL	0.03	0.02	0.04
Th (ppm)	0.06	BDL	0.02	BDL	0.13	BDL	BDL
U (ppm)	0.24	0.06	0.17	0.07	0.23	0.28	0.19
Tl (ppm)	0.07	BDL	0.05	0.65	0.14	0.71	0.01
SiO2 wt.%	28.23	28.23	28.23	27.36	27.36	27.36	27.36

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	ANN006001.045-7	ANN006001.045-8	ANN006001.045-9	ANN006002.023-2	ANN006002.023-3	ANN006002.023-4	ANN006002.023-5
Data Quality (1-3)	1.5	1.5	1.5	2.5	1.5	2.5	1.5
1 standard error (ppm) *							
Li	1.91	2.30	2.37	0.77	0.67	0.64	0.70
B	0.28	1.18	0.40	0.16	0.22	0.25	0.08
Si	2639.30	2639.30	2639.30	2558.06	2558.06	2558.06	2558.06
P	4.23	54.68	139.28	1.57	4.63	70.13	49.58
Sc	0.22	0.23	0.40	0.12	0.13	0.21	0.21
Ti	541.76	734.66	1091.75	80.22	734.62	349.22	711.55
V	16.68	14.02	17.43	3.29	10.36	5.31	8.52
Cr	2.81	3.20	2.87	0.35	0.76	0.44	0.65
Mn	30.17	17.65	17.71	71.81	78.37	33.46	92.02
Co	2.24	1.55	1.72	2.23	2.34	2.08	4.45
Cu	1.24	2.93	0.36	0.18	0.26	0.31	0.14
Cu	0.30	3.51	0.69	0.22	0.12	0.29	0.27
Zn	6.53	5.82	3.95	13.57	16.48	8.11	17.40
Zn	9.71	6.97	5.74	13.66	14.92	9.67	15.50
As	0.17	0.15	0.11	BDL	0.14	0.08	BDL
Se	1.32	1.18	0.83	0.22	0.16	0.81	0.40
Se	0.29	BDL	BDL	BDL	BDL	0.21	0.55
Rb	0.62	0.08	0.37	3.61	0.93	4.29	0.12
Sr	1.09	0.24	0.31	1.00	0.74	17.63	0.11
Mo	BDL	BDL	BDL	BDL	0.04	0.15	0.06
Sn	0.12	0.18	0.29	0.02	0.03	0.05	0.03
Te	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs	0.02	0.02	0.06	0.48	0.09	0.23	0.09
Ba	5.63	1.56	0.62	59.58	3.92	53.02	0.17
Ba	7.24	0.74	0.54	55.22	3.75	56.69	0.16
W	0.08	0.07	0.36	0.02	0.30	0.04	0.08
Pb	0.11	0.34	0.15	0.08	0.07	0.49	0.07
Bi	0.10	0.05	0.05	BDL	0.01	0.00	0.01
Th	0.02	BDL	0.02	BDL	0.03	BDL	BDL
U	0.02	0.04	0.05	0.01	0.02	0.04	0.04
Tl	0.03	BDL	0.02	0.05	0.03	0.05	0.01

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	ANN006001.045-7	ANN006001.045-8	ANN006001.045-9	ANN006002.023-2	ANN006002.023-3	ANN006002.023-4	ANN006002.023-5
Data Quality (1-3)	1.5	1.5	1.5	2.5	1.5	2.5	1.5
1 standard error (ppm)**							
Li	5.32	6.11	6.48	2.85	3.10	2.43	3.33
B	1.08	1.57	0.66	0.47	0.45	0.79	0.61
Si	4533.63	4533.63	4533.63	4394.08	4394.08	4394.08	4394.08
P	12.04	55.28	231.87	8.48	19.37	70.15	87.97
Sc	0.36	0.28	0.44	0.15	0.23	0.23	0.25
Ti	1474.67	1403.56	2116.28	186.00	2582.31	746.50	1549.70
V	27.34	22.50	26.79	7.23	22.72	9.35	19.26
Cr	11.17	14.09	13.58	2.68	5.28	2.78	3.40
Mn	37.25	33.21	31.97	108.87	139.11	58.41	128.80
Co	3.29	3.28	3.22	4.34	5.34	3.47	8.74
Cu	1.41	3.12	0.45	0.23	0.32	0.43	0.20
Cu	0.67	3.73	0.76	0.28	0.30	0.49	0.33
Zn	7.38	6.75	5.06	18.48	23.12	11.55	22.11
Zn	11.09	8.93	7.65	18.18	20.82	13.08	19.74
As	0.25	0.33	0.18	BDL	0.23	0.21	BDL
Se	5.07	3.81	2.05	2.59	2.16	2.25	3.59
Se	1.57	BDL	BDL	BDL	BDL	0.33	1.54
Rb	0.64	0.08	0.37	4.34	1.01	5.12	0.13
Sr	1.34	0.24	0.33	1.16	0.83	17.79	0.13
Mo	BDL	BDL	BDL	BDL	0.05	0.15	0.06
Sn	0.28	0.28	0.36	0.04	0.11	0.07	0.07
Te	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs	0.05	0.03	0.07	0.79	0.20	0.53	0.13
Ba	7.02	1.66	0.71	61.59	4.52	68.71	0.20
Ba	8.74	0.98	0.67	56.65	4.17	66.78	0.19
W	0.20	0.13	0.36	0.02	0.34	0.05	0.10
Pb	0.12	0.34	0.15	0.10	0.09	0.64	0.08
Bi	0.10	0.05	0.05	BDL	0.01	0.00	0.01
Th	0.02	BDL	0.02	BDL	0.03	BDL	BDL
U	0.03	0.04	0.05	0.01	0.03	0.05	0.05
Tl	0.03	BDL	0.02	0.09	0.03	0.09	0.01

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	ANN006002.023-7	ANN006002.023-8	ANN007006.057-1	ANN007006.057-10	ANN007006.057-12	ANN007006.057-2	ANN007006.057-3
Data Quality (1-3)	2	2.5	2	2.5	3	2.5	3
Li (ppm)	22.45	24.13	50.77	68.59	57.44	60.50	58.27
B (ppm)	1.28	1.63	0.81	0.87	0.93	1.83	0.75
Si (ppm)	127902.95	127902.95	128389.12	128389.12	128389.12	128389.12	128389.12
P (ppm)	936.68	38.91	38.78	30.65	33.12	81.37	34.94
Sc (ppm)	1.99	2.03	16.78	15.22	15.93	13.21	15.68
Ti (ppm)	4078.89	4361.46	216.64	1471.24	236.22	1461.25	226.26
V (ppm)	266.54	276.65	559.16	373.90	425.56	456.18	522.69
Cr (ppm)	17.44	10.90	6.56	103.67	16.10	9.15	9.08
Mn (ppm)	2881.18	2655.75	792.92	690.07	700.05	742.98	760.92
Co (ppm)	144.27	149.47	4.71	4.83	4.65	4.09	3.44
Cu(63) (ppm)	4.90	4.26	0.70	1.72	BDL	0.93	1.49
Cu(65)* (ppm)	4.54	3.93	BDL	1.57	BDL	1.58	1.04
Zn(66)* (ppm)	520.47	504.05	80.23	100.56	87.44	88.95	79.75
Zn(68) (ppm)	500.07	479.01	76.83	96.87	85.15	93.01	81.44
As (ppm)	0.33	0.31	BDL	BDL	0.42	0.43	BDL
Se(76) (ppm)	6.23	3.10	4.09	2.99	4.50	4.56	4.25
Se(77)* (ppm)	BDL	BDL	BDL	BDL	BDL	0.97	BDL
Rb (ppm)	3.40	4.28	0.49	0.77	2.91	0.46	0.33
Sr (ppm)	4.07	2.12	0.18	0.65	0.42	0.51	0.53
Mo (ppm)	BDL	BDL	BDL	0.08	0.01	BDL	0.11
Sn (ppm)	0.10	0.07	0.15	0.81	0.20	0.21	0.14
Te (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs (ppm)	1.66	1.52	0.24	0.21	0.23	0.22	0.29
Ba(137) (ppm)	4.40	4.77	BDL	0.33	0.58	0.44	0.54
Ba(138)* (ppm)	4.21	5.52	0.16	0.57	0.66	0.28	0.26
W (ppm)	0.11	0.17	BDL	2.24	0.11	0.70	0.03
Pb (ppm)	0.54	0.52	0.08	0.13	0.03	0.13	0.09
Bi (ppm)	BDL	0.00	BDL	BDL	0.01	BDL	BDL
Th (ppm)	0.14	0.05	BDL	0.68	BDL	0.26	BDL
U (ppm)	0.12	0.05	0.32	1.81	BDL	1.22	0.05
Tl (ppm)	0.03	0.03	BDL	BDL	0.02	BDL	BDL
SiO2 wt.%	27.36	27.36	27.47	27.47	27.47	27.47	27.47

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	ANN006002.023-7	ANN006002.023-8	ANN007006.057-1	ANN007006.057-10	ANN007006.057-12	ANN007006.057-2	ANN007006.057-3
Data Quality (1-3)	2	2.5	2	2.5	3	2.5	3
1 standard error (ppm) *							
Li	0.81	1.01	1.81	2.12	1.78	2.27	2.34
B	0.36	0.24	0.13	0.35	0.23	0.63	0.15
Si	2558.06	2558.06	2567.78	2567.78	2567.78	2567.78	2567.78
P	46.55	3.57	2.35	7.00	3.77	4.35	1.73
Sc	0.21	0.07	0.42	0.54	0.55	0.32	0.54
Ti	200.96	133.14	5.72	120.32	12.03	139.99	12.21
V	6.63	6.32	12.31	9.17	11.77	11.55	22.11
Cr	0.80	0.35	0.61	3.07	0.74	0.41	0.43
Mn	99.31	80.21	19.84	17.44	20.82	19.24	32.57
Co	3.93	4.39	0.17	0.20	0.25	0.18	0.16
Cu	1.10	0.46	0.06	0.15	BDL	0.17	0.15
Cu	0.77	0.81	BDL	0.11	BDL	0.19	0.20
Zn	14.96	19.90	3.20	3.40	2.60	3.14	2.66
Zn	13.25	14.67	2.26	2.90	2.39	3.75	2.82
As	0.23	0.08	BDL	BDL	0.09	0.14	BDL
Se	0.32	0.46	0.32	0.21	0.25	0.29	0.27
Se	BDL	BDL	BDL	BDL	BDL	0.24	BDL
Rb	0.15	0.16	0.06	0.05	0.09	0.05	0.05
Sr	0.28	0.15	0.02	0.06	0.06	0.05	2.48
Mo	BDL	BDL	BDL	0.03	0.08	BDL	0.05
Sn	0.05	0.01	0.03	0.10	0.05	0.08	0.02
Te	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs	0.07	0.11	0.05	0.03	0.04	0.02	0.03
Ba	0.58	0.27	BDL	0.21	0.20	0.17	0.22
Ba	0.15	0.21	0.03	0.08	0.06	0.03	0.10
W	0.11	0.04	BDL	0.28	0.04	0.15	0.05
Pb	0.09	0.10	0.02	0.02	0.02	0.05	0.02
Bi	BDL	0.01	BDL	BDL	0.01	BDL	BDL
Th	0.03	0.01	BDL	0.56	BDL	0.05	BDL
U	0.04	0.02	0.07	1.19	BDL	0.36	0.02
Tl	0.01	0.01	BDL	BDL	0.02	BDL	BDL

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	ANN006002.023-7	ANN006002.023-8	ANN007006.057-1	ANN007006.057-10	ANN007006.057-12	ANN007006.057-2	ANN007006.057-3
Data Quality (1-3)	2	2.5	2	2.5	3	2.5	3
1 standard error (ppm)**							
Li	3.27	3.55	7.39	9.91	8.30	8.83	8.55
B	0.59	0.64	0.32	0.48	0.41	0.92	0.31
Si	4394.08	4394.08	4410.78	4410.78	4410.78	4410.78	4410.78
P	273.42	11.75	11.40	11.26	10.24	23.81	10.20
Sc	0.22	0.11	0.78	0.81	0.84	0.61	0.82
Ti	432.66	430.79	21.14	183.24	25.24	196.06	24.51
V	13.96	14.24	28.57	19.53	22.88	23.99	32.70
Cr	3.59	2.21	1.45	21.03	3.31	1.88	1.87
Mn	144.88	126.05	35.17	30.70	33.02	33.32	42.86
Co	8.86	9.32	0.31	0.33	0.36	0.29	0.25
Cu	1.22	0.65	0.10	0.24	BDL	0.20	0.22
Cu	0.91	0.91	BDL	0.20	BDL	0.25	0.23
Zn	21.33	24.76	3.97	4.49	3.65	4.07	3.54
Zn	19.08	19.70	3.09	3.93	3.34	4.54	3.60
As	0.26	0.13	BDL	BDL	0.17	0.21	BDL
Se	5.00	2.52	3.29	2.41	3.61	3.66	3.42
Se	BDL	BDL	BDL	BDL	BDL	0.82	BDL
Rb	0.17	0.18	0.06	0.05	0.11	0.05	0.05
Sr	0.29	0.15	0.02	0.07	0.06	0.05	2.48
Mo	BDL	BDL	BDL	0.03	0.08	BDL	0.05
Sn	0.05	0.02	0.04	0.18	0.06	0.09	0.03
Te	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs	0.14	0.15	0.06	0.03	0.04	0.03	0.03
Ba	0.60	0.31	BDL	0.21	0.20	0.17	0.22
Ba	0.18	0.25	0.03	0.08	0.06	0.03	0.10
W	0.11	0.05	BDL	0.38	0.05	0.17	0.05
Pb	0.11	0.11	0.02	0.02	0.03	0.05	0.02
Bi	BDL	0.01	BDL	BDL	0.01	BDL	BDL
Th	0.03	0.01	BDL	0.56	BDL	0.06	BDL
U	0.04	0.02	0.07	1.20	BDL	0.37	0.02
Tl	0.01	0.01	BDL	BDL	0.02	BDL	BDL

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	ANN007006.057-4	ANN007006.057-5	ANN007006.057-6	ANN007006.057-7	ANN007006.057-8	ANN007006.057-9	G909166_27-3
Data Quality (1-3)	1.5	2.5	2.5	2	2.5	3	1.5
Li (ppm)	49.74	53.46	67.05	84.37	79.67	48.73	43.23
B (ppm)	0.95	1.10	2.24	3.65	4.56	0.65	1.63
Si (ppm)	128389.12	128389.12	128389.12	128389.12	128389.12	128389.12	142436.42
P (ppm)	28.23	37.00	63.54	53.96	37.18	33.39	10404.12
Sc (ppm)	16.86	18.60	9.01	16.03	17.40	15.20	5.68
Ti (ppm)	14503.13	218.75	23.29	9529.19	5361.35	234.81	393.87
V (ppm)	568.32	552.17	429.60	562.96	539.85	476.57	276.12
Cr (ppm)	13.20	5.85	108.25	104.18	109.60	29.58	9.07
Mn (ppm)	736.13	748.63	655.66	537.48	505.52	678.68	5166.70
Co (ppm)	3.53	3.79	10.16	10.61	9.55	8.74	130.86
Cu(63) (ppm)	4.33	0.71	2.43	4.32	5.39	0.70	102.53
Cu(65)* (ppm)	3.06	1.17	1.97	4.77	6.47	0.93	98.86
Zn(66)* (ppm)	72.11	77.74	140.30	129.42	119.98	99.23	520.04
Zn(68) (ppm)	66.40	73.61	133.95	128.69	120.58	101.55	513.78
As (ppm)	0.43	BDL	0.39	1.02	0.20	0.62	13.33
Se(76) (ppm)	4.67	3.79	3.45	3.44	3.54	4.22	2.45
Se(77)* (ppm)	BDL	BDL	0.84	BDL	BDL	BDL	1.21
Rb (ppm)	0.65	0.89	4.50	15.84	30.21	3.14	4.58
Sr (ppm)	4.09	0.13	1.43	4.07	3.22	0.25	91.76
Mo (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	0.49
Sn (ppm)	5.35	0.15	BDL	3.50	1.99	0.22	0.22
Te (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs (ppm)	0.20	0.21	0.28	0.54	0.68	0.19	0.31
Ba(137) (ppm)	1.04	0.70	10.77	38.67	90.64	2.95	60.20
Ba(138)* (ppm)	0.90	0.23	8.80	36.42	93.25	3.08	59.23
W (ppm)	8.73	BDL	BDL	8.22	3.58	0.27	1.23
Pb (ppm)	0.32	0.10	0.28	0.34	0.42	0.14	1.16
Bi (ppm)	0.05	BDL	BDL	BDL	BDL	BDL	0.01
Th (ppm)	0.13	BDL	0.13	0.30	0.15	0.47	2.20
U (ppm)	1.17	0.02	0.98	1.04	0.84	2.05	0.63
Tl (ppm)	BDL	BDL	0.03	0.16	0.28	0.03	BDL
SiO2 wt.%	27.47	27.47	27.47	27.47	27.47	27.47	30.47

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	ANN007006.057-4	ANN007006.057-5	ANN007006.057-6	ANN007006.057-7	ANN007006.057-8	ANN007006.057-9	G909166_27-3
Data Quality (1-3)	1.5	2.5	2.5	2	2.5	3	1.5
1 standard error (ppm) *							
Li	1.56	1.84	2.07	4.74	3.03	1.70	1.71
B	0.21	0.39	0.31	0.19	0.35	0.22	0.14
Si	2567.78	2567.78	2567.78	2567.78	2567.78	2567.78	2848.73
P	4.41	1.53	6.94	6.71	6.95	1.81	1343.89
Sc	0.79	0.58	0.48	0.80	0.58	0.45	0.30
Ti	1205.20	8.67	85.16	534.91	375.53	18.67	51.47
V	12.60	12.68	9.87	14.55	14.74	15.12	8.21
Cr	0.59	0.25	3.03	2.69	2.89	0.89	0.34
Mn	21.22	19.42	17.70	18.13	13.80	17.37	174.83
Co	0.27	0.15	0.46	0.37	0.29	0.27	3.98
Cu	0.69	0.11	0.28	0.58	0.90	0.17	3.39
Cu	0.68	0.45	0.26	0.44	0.46	0.17	2.95
Zn	3.50	2.20	7.30	4.57	3.93	3.45	20.27
Zn	2.21	2.13	6.09	3.61	3.74	2.96	18.20
As	0.19	BDL	0.16	0.14	0.18	0.15	0.95
Se	0.45	0.30	0.29	0.40	0.29	0.36	0.20
Se	BDL	BDL	0.27	BDL	BDL	BDL	0.33
Rb	0.05	0.04	0.42	1.39	0.89	0.12	0.15
Sr	2.38	0.01	0.09	0.14	0.15	0.03	4.18
Mo	BDL	BDL	BDL	BDL	BDL	BDL	0.12
Sn	0.55	0.05	BDL	0.29	0.14	0.03	0.02
Te	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs	0.03	0.02	0.01	0.05	0.04	0.01	0.01
Ba	0.60	0.26	0.67	2.65	5.11	0.64	3.61
Ba	0.16	0.02	0.71	1.58	4.30	0.38	3.05
W	0.77	BDL	BDL	2.35	0.36	0.09	0.15
Pb	0.06	0.03	0.05	0.09	0.09	0.04	0.06
Bi	0.02	BDL	BDL	BDL	BDL	BDL	0.00
Th	0.29	BDL	0.10	0.02	0.04	0.05	0.19
U	0.52	0.00	0.50	0.12	0.05	0.52	0.07
Tl	BDL	BDL	0.01	0.03	0.04	0.01	BDL

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	ANN007006.057-4	ANN007006.057-5	ANN007006.057-6	ANN007006.057-7	ANN007006.057-8	ANN007006.057-9	G909166_27-3
Data Quality (1-3)	1.5	2.5	2.5	2	2.5	3	1.5
1 standard error (ppm)**							
Li	7.19	7.76	9.69	12.81	11.64	7.08	6.37
B	0.40	0.56	0.87	1.34	1.70	0.33	0.61
Si	4410.78	4410.78	4410.78	4410.78	4410.78	4410.78	4893.37
P	9.24	10.75	19.55	16.91	12.76	9.78	3283.75
Sc	1.03	0.93	0.60	1.02	0.90	0.75	0.45
Ti	1818.94	22.30	85.19	1042.78	628.22	28.90	63.91
V	29.07	28.44	22.13	29.76	28.93	26.67	15.96
Cr	2.71	1.20	21.93	21.07	22.18	6.00	1.85
Mn	34.30	33.59	29.83	26.76	23.09	30.32	260.87
Co	0.33	0.26	0.72	0.69	0.60	0.55	8.35
Cu	0.83	0.13	0.38	0.75	1.07	0.18	11.44
Cu	0.76	0.46	0.34	0.67	0.83	0.20	10.92
Zn	4.09	3.16	8.37	5.93	5.27	4.50	26.91
Zn	2.86	2.94	7.11	5.05	4.99	4.06	24.55
As	0.24	BDL	0.21	0.38	0.20	0.26	4.74
Se	3.76	3.05	2.78	2.78	2.85	3.40	1.97
Se	BDL	BDL	0.73	BDL	BDL	BDL	1.03
Rb	0.05	0.05	0.43	1.42	1.05	0.13	0.18
Sr	2.38	0.01	0.09	0.17	0.16	0.03	5.20
Mo	BDL	BDL	BDL	BDL	BDL	BDL	0.13
Sn	1.11	0.05	BDL	0.69	0.38	0.05	0.05
Te	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs	0.03	0.02	0.02	0.06	0.06	0.02	0.03
Ba	0.60	0.26	0.74	2.89	5.78	0.65	4.03
Ba	0.16	0.02	0.74	1.82	4.88	0.39	3.46
W	1.29	BDL	BDL	2.55	0.56	0.10	0.21
Pb	0.07	0.03	0.06	0.10	0.10	0.04	0.08
Bi	0.02	BDL	BDL	BDL	BDL	BDL	0.00
Th	0.29	BDL	0.10	0.03	0.04	0.06	0.25
U	0.53	0.00	0.50	0.14	0.08	0.55	0.09
Tl	BDL	BDL	0.01	0.03	0.05	0.01	BDL

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	G909166-1	G909166-10	G909166-2	G909166-3	G909166-4	G909166-5	G909166-6
Data Quality (1-3)	2	1.5	1.5	2	2.5	1.5	3
Li (ppm)	25.16	21.23	30.33	28.43	7.36	31.00	17.61
B (ppm)	2.68	2.65	2.58	2.70	2.31	2.05	2.65
Si (ppm)	142450.45	142450.45	142450.45	142450.45	142450.45	142450.45	142450.45
P (ppm)	BDL	8005.84	10332.77	245.51	44.16	2302.91	30.84
Sc (ppm)	50.80	39.65	23.98	22.94	18.85	16.14	20.52
Ti (ppm)	92.81	281.28	93.64	77.95	169.55	5212.30	133.03
V (ppm)	348.92	260.60	281.61	262.75	216.64	344.02	212.35
Cr (ppm)	12.04	8.24	9.59	9.92	6.13	12.42	7.25
Mn (ppm)	3747.92	3965.44	3600.55	4011.51	2747.45	4379.53	3185.44
Co (ppm)	106.17	94.23	95.81	108.37	55.83	114.27	75.16
Cu(63) (ppm)	169.85	188.82	160.64	197.95	126.97	190.17	116.54
Cu(65)* (ppm)	163.33	191.48	162.43	193.11	127.07	194.47	116.04
Zn(66)* (ppm)	414.05	376.49	397.21	448.68	232.55	450.61	307.76
Zn(68) (ppm)	396.15	375.33	400.24	430.54	228.92	425.26	303.49
As (ppm)	1.20	16.44	27.75	2.73	3.30	8.05	3.89
Se(76) (ppm)	2.38	1.92	1.38	2.97	1.22	3.28	BDL
Se(77)* (ppm)	2.57	BDL	2.98	2.01	0.89	BDL	BDL
Rb (ppm)	0.71	1.05	1.44	2.82	0.43	0.73	0.42
Sr (ppm)	292.77	36.77	311.09	25.56	16.31	11.72	7.93
Mo (ppm)	0.10	0.28	1.47	0.79	0.29	0.66	0.39
Sn (ppm)	0.86	0.49	0.34	0.31	0.30	0.87	0.53
Te (ppm)	BDL	BDL	BDL	BDL	BDL	0.10	BDL
Cs (ppm)	0.10	0.13	0.09	0.36	0.04	0.13	0.15
Ba(137) (ppm)	2.04	6.75	5.52	3.26	2.38	16.46	23.65
Ba(138)* (ppm)	3.04	6.94	4.98	3.87	2.08	16.40	25.14
W (ppm)	0.09	0.63	0.62	0.09	0.06	1.18	0.08
Pb (ppm)	2.17	1.38	2.62	1.22	1.65	8.57	0.85
Bi (ppm)	0.06	0.01	0.07	0.01	0.01	0.01	BDL
Th (ppm)	8.76	2.51	18.63	0.29	0.06	0.61	0.06
U (ppm)	2.55	1.50	3.03	0.17	0.15	0.83	0.13
Tl (ppm)	BDL	BDL	0.01	0.02	BDL	0.01	BDL
SiO2 wt.%	30.47	30.47	30.47	30.47	30.47	30.47	30.47

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	G909166-1	G909166-10	G909166-2	G909166-3	G909166-4	G909166-5	G909166-6
Data Quality (1-3)	2	1.5	1.5	2	2.5	1.5	3
1 standard error (ppm) *							
Li	0.79	1.07	1.31	1.03	0.25	1.38	0.67
B	0.30	0.19	0.30	0.41	0.15	0.08	0.14
Si	2849.01	2849.01	2849.01	2849.01	2849.01	2849.01	2849.01
P	BDL	405.40	345.30	176.94	7.72	237.01	1.46
Sc	1.88	1.00	1.20	0.61	0.92	0.63	0.70
Ti	3.36	168.43	5.48	14.65	5.73	137.86	5.58
V	7.89	6.08	7.33	5.96	4.64	8.97	6.60
Cr	0.41	0.29	0.35	0.58	0.22	0.47	0.36
Mn	106.37	90.78	132.55	96.58	61.12	119.79	84.54
Co	3.90	3.00	3.00	2.85	1.47	3.63	2.22
Cu	5.47	5.50	7.35	4.92	6.46	5.70	6.14
Cu	6.03	5.14	6.19	5.49	7.67	6.93	8.60
Zn	14.76	10.44	14.57	12.54	6.83	12.36	8.81
Zn	12.87	10.15	11.41	12.81	7.48	15.36	11.98
As	0.45	0.50	1.07	0.31	0.12	0.26	0.16
Se	0.23	0.17	0.30	0.55	0.08	0.12	BDL
Se	0.95	BDL	1.12	0.29	0.18	BDL	BDL
Rb	0.04	0.06	0.05	0.35	0.04	0.06	0.03
Sr	9.01	2.83	16.82	1.12	1.18	0.87	0.64
Mo	0.09	0.02	0.35	0.15	0.05	0.10	0.07
Sn	0.07	0.05	0.05	0.07	0.03	0.05	0.07
Te	BDL	BDL	BDL	BDL	BDL	0.06	BDL
Cs	0.02	0.02	0.02	0.07	0.01	0.04	0.04
Ba	0.13	0.29	0.25	0.52	0.16	3.43	10.33
Ba	0.24	0.31	0.20	0.58	0.09	3.66	10.50
W	0.03	0.09	0.14	0.02	0.01	0.04	0.02
Pb	0.11	0.15	0.37	0.26	0.13	0.32	0.05
Bi	0.01	0.00	0.02	0.00	0.00	0.01	BDL
Th	0.34	0.14	0.51	0.06	0.02	0.11	0.01
U	0.11	0.15	0.22	0.02	0.02	0.04	0.01
Tl	BDL	BDL	0.00	0.01	BDL	0.00	BDL

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	G909166-1	G909166-10	G909166-2	G909166-3	G909166-4	G909166-5	G909166-6
Data Quality (1-3)	2	1.5	1.5	2	2.5	1.5	3
1 standard error (ppm)**							
Li	3.61	3.16	4.44	4.11	1.06	4.56	2.55
B	1.02	0.98	0.98	1.06	0.85	0.75	0.97
Si	4893.85	4893.85	4893.85	4893.85	4893.85	4893.85	4893.85
P	BDL	2326.26	2976.54	190.38	14.81	700.24	8.95
Sc	2.73	1.84	1.52	1.08	1.18	0.89	1.07
Ti	9.33	170.48	10.35	16.37	16.90	507.97	13.67
V	17.85	13.41	14.85	13.45	10.97	18.15	11.77
Cr	2.44	1.68	1.95	2.07	1.25	2.53	1.49
Mn	167.76	164.56	181.94	169.13	113.04	193.21	138.94
Co	6.96	5.92	6.00	6.53	3.37	7.18	4.64
Cu	18.82	20.77	18.56	21.56	14.93	20.96	13.80
Cu	18.35	20.96	18.31	21.22	15.51	21.77	15.02
Zn	18.73	14.80	18.29	17.70	9.42	17.61	12.29
Zn	17.00	14.62	16.01	17.60	9.86	19.44	14.69
As	0.61	5.72	9.67	0.99	1.15	2.80	1.36
Se	1.92	1.54	1.14	2.44	0.98	2.63	BDL
Se	2.26	BDL	2.64	1.64	0.74	BDL	BDL
Rb	0.04	0.06	0.06	0.35	0.04	0.06	0.03
Sr	9.75	2.87	17.28	1.16	1.20	0.88	0.65
Mo	0.09	0.03	0.37	0.16	0.06	0.11	0.08
Sn	0.17	0.10	0.08	0.09	0.06	0.16	0.12
Te	BDL	BDL	BDL	BDL	BDL	0.06	BDL
Cs	0.02	0.02	0.02	0.07	0.01	0.04	0.04
Ba	0.14	0.30	0.26	0.52	0.16	3.44	10.34
Ba	0.25	0.33	0.21	0.58	0.09	3.67	10.51
W	0.03	0.11	0.16	0.03	0.01	0.14	0.02
Pb	0.13	0.15	0.38	0.26	0.14	0.44	0.06
Bi	0.01	0.00	0.02	0.01	0.00	0.01	BDL
Th	0.59	0.20	1.14	0.06	0.02	0.11	0.01
U	0.22	0.19	0.31	0.03	0.02	0.07	0.01
Tl	BDL	BDL	0.01	0.01	BDL	0.00	BDL

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	G909166-8	G909166-9	G909168_12-2	G909168_12-3	G909168_13-1	G909168_13-2	G909168_13-3
Data Quality (1-3)	3	1.5	1	2.5	3	3	2.5
Li (ppm)	43.89	28.70	0.32	53.78	57.12	58.03	42.28
B (ppm)	1.91	2.66	2.96	9.94	2.89	1.90	18.66
Si (ppm)	142450.45	142450.45	129814.88	129814.88	129814.88	129814.88	129814.88
P (ppm)	39.95	10116.46	83.01	91.07	78.25	33.28	361.88
Sc (ppm)	9.17	20.07	1.72	20.63	5.02	5.52	13.50
Ti (ppm)	104.84	1217.86	2.81	3948.85	181.78	190.47	9838.42
V (ppm)	249.42	312.79	1.85	220.06	154.01	169.76	293.13
Cr (ppm)	7.08	10.20	1.54	51.08	5.83	5.91	69.97
Mn (ppm)	4778.48	4162.27	15.98	1739.30	2828.86	2822.74	979.55
Co (ppm)	125.70	115.78	BDL	26.12	35.19	38.27	21.93
Cu(63) (ppm)	114.36	149.82	0.78	235.94	101.47	103.66	356.82
Cu(65)* (ppm)	113.51	158.40	0.20	237.44	106.60	105.52	356.44
Zn(66)* (ppm)	510.96	469.18	1.32	179.89	207.83	198.90	222.89
Zn(68) (ppm)	488.28	465.55	3.09	179.09	204.29	197.62	213.44
As (ppm)	1.30	23.36	0.27	1.49	0.27	0.23	3.68
Se(76) (ppm)	0.69	2.98	0.75	1.94	1.54	2.22	3.29
Se(77)* (ppm)	BDL	1.94	BDL	0.58	BDL	BDL	1.14
Rb (ppm)	0.67	0.99	2.06	62.70	9.53	11.00	188.07
Sr (ppm)	14.58	23.57	297.94	382.46	12.17	2.70	31.50
Mo (ppm)	1.07	0.32	BDL	0.32	BDL	0.08	1.35
Sn (ppm)	0.32	0.26	0.07	1.06	0.15	0.29	1.65
Te (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	0.18
Cs (ppm)	0.08	0.25	0.09	2.75	0.07	0.29	6.87
Ba(137) (ppm)	2.27	3.11	13.97	59.11	14.58	8.80	170.22
Ba(138)* (ppm)	1.80	2.63	14.59	60.33	16.77	8.92	172.96
W (ppm)	0.00	1.01	0.01	1.28	BDL	0.01	3.68
Pb (ppm)	0.71	1.53	0.74	4.59	0.07	0.23	11.17
Bi (ppm)	BDL	0.02	0.01	0.21	BDL	0.03	0.53
Th (ppm)	0.07	1.16	0.01	0.84	BDL	BDL	1.54
U (ppm)	0.09	0.59	0.01	3.18	BDL	0.01	5.42
Tl (ppm)	0.01	0.01	0.01	0.45	0.01	0.01	1.45
SiO2 wt.%	30.47	30.47	27.77	27.77	27.77	27.77	27.77

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	G909166-8	G909166-9	G909168_12-2	G909168_12-3	G909168_13-1	G909168_13-2	G909168_13-3
Data Quality (1-3)	3	1.5	1	2.5	3	3	2.5
1 standard error (ppm) *							
Li	1.11	0.76	0.06	2.00	1.62	1.94	1.60
B	0.07	0.40	0.31	0.72	0.12	0.22	1.15
Si	2849.01	2849.01	2596.30	2596.30	2596.30	2596.30	2596.30
P	1.57	685.58	19.34	103.89	2.88	1.68	26.84
Sc	0.46	0.55	0.09	1.15	0.25	0.25	0.49
Ti	4.13	161.68	0.55	120.99	5.78	5.20	511.08
V	6.02	6.81	0.25	6.58	5.09	4.62	8.05
Cr	0.49	0.31	0.11	1.31	0.17	0.23	2.51
Mn	114.53	89.94	1.59	74.01	66.77	64.86	29.18
Co	3.28	2.90	BDL	0.68	0.95	1.13	1.16
Cu	6.11	3.73	0.17	6.72	4.54	4.15	29.41
Cu	5.99	4.70	0.05	5.56	3.44	3.91	27.62
Zn	14.13	13.70	0.05	7.90	5.66	5.89	10.16
Zn	13.61	12.55	0.20	6.75	6.07	5.90	11.72
As	0.31	1.20	0.04	0.27	0.09	0.09	0.40
Se	0.21	0.20	0.05	0.43	0.11	0.18	1.10
Se	BDL	0.25	BDL	0.16	BDL	BDL	0.20
Rb	0.07	0.06	0.09	2.09	0.32	0.46	9.59
Sr	5.20	0.85	8.47	34.68	0.47	0.10	2.20
Mo	0.29	0.09	BDL	0.03	BDL	0.02	0.13
Sn	0.04	0.12	0.02	0.06	0.04	0.04	0.26
Te	BDL	BDL	BDL	BDL	BDL	BDL	0.06
Cs	0.02	0.08	0.01	0.15	0.02	0.04	0.36
Ba	0.38	0.25	0.49	1.42	0.60	0.42	8.33
Ba	0.59	0.13	0.46	2.29	0.92	0.38	8.13
W	0.02	0.21	0.01	0.24	BDL	0.29	0.19
Pb	0.03	0.11	0.07	0.27	0.03	0.08	0.70
Bi	BDL	0.01	0.00	0.04	BDL	0.02	0.12
Th	0.01	0.21	0.01	0.08	BDL	BDL	0.18
U	0.02	0.13	0.01	0.31	BDL	0.01	0.18
Tl	0.01	0.00	0.00	0.04	0.01	0.00	0.08

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	G909166-8	G909166-9	G909168_12-2	G909168_12-3	G909168_13-1	G909168_13-2	G909168_13-3
Data Quality (1-3)	3	1.5	1	2.5	3	3	2.5
1 standard error (ppm)****							
Li	6.25	4.09	0.07	7.84	8.21	8.41	6.17
B	0.70	1.04	1.12	3.69	1.06	0.73	6.89
Si	4893.85	4893.85	4459.76	4459.76	4459.76	4459.76	4459.76
P	11.54	2974.64	30.65	107.12	22.59	9.68	107.05
Sc	0.58	0.96	0.11	1.40	0.32	0.33	0.72
Ti	10.67	197.97	0.61	390.58	18.05	18.65	1057.02
V	12.93	15.89	0.26	12.40	8.95	9.33	16.15
Cr	1.50	2.06	0.33	10.32	1.18	1.21	14.24
Mn	201.18	169.83	1.68	95.34	118.39	117.14	44.69
Co	7.57	6.92	BDL	1.57	2.12	2.35	1.66
Cu	13.58	16.32	0.19	25.83	11.65	11.72	47.83
Cu	13.45	17.45	0.05	25.73	11.79	11.83	46.74
Zn	20.06	18.93	0.06	9.30	8.02	8.01	11.85
Zn	19.31	18.11	0.22	8.29	8.18	7.94	13.05
As	0.55	8.18	0.10	0.58	0.13	0.12	1.34
Se	0.59	2.40	0.60	1.61	1.23	1.79	2.85
Se	BDL	1.57	BDL	0.49	BDL	BDL	0.93
Rb	0.07	0.06	0.10	2.43	0.37	0.51	10.28
Sr	5.20	0.90	9.93	35.31	0.51	0.11	2.27
Mo	0.30	0.09	BDL	0.04	BDL	0.02	0.17
Sn	0.07	0.13	0.03	0.20	0.04	0.06	0.39
Te	BDL	BDL	BDL	BDL	BDL	BDL	0.07
Cs	0.02	0.09	0.01	0.24	0.02	0.05	0.58
Ba	0.38	0.25	0.52	1.58	0.63	0.44	8.56
Ba	0.59	0.14	0.54	2.58	0.98	0.42	8.82
W	0.02	0.24	0.01	0.28	BDL	0.29	0.47
Pb	0.04	0.13	0.09	0.39	0.03	0.08	0.97
Bi	BDL	0.01	0.00	0.04	BDL	0.02	0.13
Th	0.01	0.22	0.01	0.09	BDL	BDL	0.20
U	0.02	0.13	0.01	0.39	BDL	0.01	0.44
Tl	0.01	0.00	0.00	0.06	0.01	0.00	0.17

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	G909168_13-4	G909168_14-1	G909168_14-2	G909168_14-3	G909168_15-1	G909168_15-2	G909168_15-3
Data Quality (1-3)	1.5	3	3	3	1.5	1.5	1.5
Li (ppm)	1.82	53.60	41.13	47.02	34.22	39.29	32.20
B (ppm)	75.36	14.73	19.95	16.24	7.04	7.85	5.96
Si (ppm)	129814.88	129814.88	129814.88	129814.88	129814.88	129814.88	129814.88
P (ppm)	54.75	209.40	223.19	180.27	35238.99	276.90	196.28
Sc (ppm)	75.28	9.71	10.88	8.71	8.12	6.90	14.18
Ti (ppm)	649.07	3728.09	4198.64	3297.06	34946.69	39813.05	66527.56
V (ppm)	486.88	218.09	225.81	224.87	381.14	395.02	573.66
Cr (ppm)	10.27	67.52	67.67	64.56	33.11	39.33	35.32
Mn (ppm)	1821.38	1345.97	654.25	1254.88	1194.18	1318.24	1134.63
Co (ppm)	1.11	22.72	19.00	22.83	16.14	20.88	14.92
Cu(63) (ppm)	6.72	385.54	330.34	396.22	62.45	119.94	66.95
Cu(65)* (ppm)	6.26	380.91	332.15	395.58	64.29	128.01	69.45
Zn(66)* (ppm)	8.95	147.36	129.34	153.47	113.51	132.02	95.03
Zn(68) (ppm)	12.05	151.01	129.47	162.03	128.45	141.13	104.47
As (ppm)	5.72	1.09	1.83	1.35	5.65	3.04	3.55
Se(76) (ppm)	0.27	2.18	1.92	2.38	1.91	1.04	2.01
Se(77)* (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	0.71
Rb (ppm)	12.07	137.45	150.75	151.33	218.58	152.42	210.20
Sr (ppm)	7193.15	114.61	48.49	25.94	164.05	15.62	277.88
Mo (ppm)	BDL	0.60	0.75	0.62	0.85	0.84	1.06
Sn (ppm)	1.20	0.75	0.70	0.79	1.71	2.11	3.35
Te (ppm)	BDL	BDL	BDL	BDL	0.12	BDL	BDL
Cs (ppm)	0.30	4.82	5.99	5.93	7.09	6.52	7.85
Ba(137) (ppm)	22.00	121.58	179.17	109.03	564.37	260.61	390.23
Ba(138)* (ppm)	23.65	121.99	183.96	111.90	583.07	279.33	408.54
W (ppm)	0.24	1.22	1.76	1.24	4.91	4.91	8.02
Pb (ppm)	19.16	2.63	3.19	2.39	4.07	5.73	8.09
Bi (ppm)	0.42	0.06	0.12	0.22	0.17	0.34	0.14
Th (ppm)	5.53	0.74	1.09	0.53	1.87	1.48	2.30
U (ppm)	9.27	1.78	2.03	1.50	4.18	6.02	8.03
Tl (ppm)	0.10	1.07	1.31	1.29	2.23	1.42	2.01
SiO2 wt.%	27.77	27.77	27.77	27.77	27.77	27.77	27.77

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	G909168_13-4	G909168_14-1	G909168_14-2	G909168_14-3	G909168_15-1	G909168_15-2	G909168_15-3
Data Quality (1-3)	1.5	3	3	3	1.5	1.5	1.5
1 standard error (ppm) *							
Li	0.38	1.69	1.49	1.52	1.26	1.58	1.13
B	2.88	0.48	0.89	0.49	0.18	0.35	0.28
Si	2596.30	2596.30	2596.30	2596.30	2596.30	2596.30	2596.30
P	2.20	9.92	9.58	5.24	4121.39	121.65	54.05
Sc	5.29	0.30	0.33	0.22	0.28	0.32	0.49
Ti	19.91	93.36	209.98	101.64	1150.92	999.01	1594.64
V	13.33	6.22	6.62	6.15	10.22	10.35	14.58
Cr	0.31	1.65	1.79	1.64	0.80	0.96	0.86
Mn	51.23	31.09	24.76	28.83	26.61	30.16	25.92
Co	0.09	0.57	0.74	0.57	0.43	0.49	0.60
Cu	0.35	8.90	10.45	10.05	2.11	4.38	2.05
Cu	0.66	10.56	10.41	9.88	2.54	4.34	1.65
Zn	0.41	4.15	5.26	4.06	3.18	3.52	2.83
Zn	0.47	4.54	5.71	5.12	3.36	3.77	4.38
As	0.45	0.18	0.18	0.11	0.17	0.07	0.17
Se	0.58	0.19	0.14	0.10	0.11	0.16	0.13
Se	BDL	BDL	BDL	BDL	BDL	BDL	0.13
Rb	0.84	3.84	4.41	4.51	5.90	4.19	5.69
Sr	219.55	4.29	1.81	0.83	14.11	0.71	8.12
Mo	BDL	0.11	0.09	0.09	0.05	0.11	0.04
Sn	0.06	0.04	0.06	0.04	0.05	0.11	0.23
Te	BDL	BDL	BDL	BDL	0.11	BDL	BDL
Cs	0.03	0.16	0.18	0.33	0.25	0.18	0.28
Ba	0.94	3.97	5.27	3.17	11.42	8.88	9.05
Ba	0.96	4.27	5.17	3.03	15.31	9.68	11.14
W	0.03	0.10	0.09	0.10	0.18	0.16	0.26
Pb	1.08	0.19	0.29	0.15	0.28	0.35	0.48
Bi	0.02	0.01	0.04	0.01	0.01	0.04	0.01
Th	0.78	0.07	0.13	0.04	0.15	0.32	0.12
U	0.35	0.09	0.19	0.05	0.16	0.21	0.33
Tl	0.03	0.05	0.06	0.05	0.08	0.06	0.07

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	G909168_13-4	G909168_14-1	G909168_14-2	G909168_14-3	G909168_15-1	G909168_15-2	G909168_15-3
Data Quality (1-3)	1.5	3	3	3	1.5	1.5	1.5
1 standard error (ppm)**							
Li	0.46	7.74	5.99	6.80	4.99	5.76	4.68
B	27.58	5.38	7.31	5.93	2.57	2.88	2.19
Si	4459.76	4459.76	4459.76	4459.76	4459.76	4459.76	4459.76
P	15.83	60.78	64.62	51.89	10900.07	145.21	77.98
Sc	6.05	0.48	0.54	0.41	0.42	0.41	0.74
Ti	64.21	362.82	447.22	326.30	3482.25	3875.19	6456.59
V	26.81	12.14	12.66	12.38	20.88	21.52	31.04
Cr	2.08	13.63	13.67	13.04	6.68	7.94	7.13
Mn	81.15	55.94	33.53	52.07	49.10	54.63	47.00
Co	0.10	1.35	1.26	1.36	0.97	1.23	1.00
Cu	0.79	41.72	36.45	43.08	6.93	13.42	7.37
Cu	0.93	41.66	36.65	43.00	7.26	14.22	7.53
Zn	0.47	5.78	6.34	5.83	4.44	5.04	3.84
Zn	0.57	6.09	6.69	6.72	4.82	5.35	5.21
As	2.03	0.42	0.66	0.48	1.96	1.05	1.24
Se	0.62	1.75	1.55	1.91	1.53	0.85	1.61
Se	BDL	BDL	BDL	BDL	BDL	BDL	0.58
Rb	0.88	4.70	5.31	5.40	7.30	5.15	7.04
Sr	252.75	4.73	2.00	0.95	14.40	0.76	9.45
Mo	BDL	0.12	0.11	0.11	0.08	0.13	0.09
Sn	0.22	0.14	0.14	0.15	0.31	0.39	0.64
Te	BDL	BDL	BDL	BDL	0.12	BDL	BDL
Cs	0.03	0.36	0.44	0.52	0.54	0.47	0.60
Ba	0.97	4.22	5.67	3.42	13.19	9.39	10.14
Ba	1.07	4.90	6.32	3.76	19.17	11.15	13.76
W	0.04	0.18	0.23	0.17	0.60	0.60	0.98
Pb	1.59	0.25	0.35	0.21	0.37	0.50	0.69
Bi	0.05	0.01	0.05	0.02	0.02	0.05	0.02
Th	0.83	0.08	0.14	0.05	0.18	0.33	0.17
U	0.76	0.16	0.24	0.12	0.34	0.49	0.67
Tl	0.03	0.12	0.14	0.14	0.24	0.16	0.21

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	G909168_15-4	G909168_19-1	G909168_19-2	G909168_23-1	G909168_23-2	G909168_24-1	G909168_24-2
Data Quality (1-3)	2	3	2.5	2.5	2.5	1.5	1.5
Li (ppm)	41.33	62.92	61.55	54.52	55.14	3.37	1.56
B (ppm)	8.66	5.24	4.65	31.99	15.91	23.67	13.66
Si (ppm)	129814.88	129814.88	129814.88	129814.88	129814.88	129814.88	129814.88
P (ppm)	164.72	85.49	229.22	197.59	281.86	76.19	265.85
Sc (ppm)	7.52	4.63	3.93	3.41	4.98	8.02	26.18
Ti (ppm)	10010.78	222.22	328.40	51.27	250.19	6988.14	8359.82
V (ppm)	315.39	148.85	175.67	34.07	132.29	359.28	516.44
Cr (ppm)	39.37	13.58	9.00	18.77	13.33	20.37	29.37
Mn (ppm)	1354.90	3468.51	2925.22	255.80	1968.52	1497.78	1460.20
Co (ppm)	22.73	35.45	34.06	4.39	22.98	2.12	1.39
Cu(63) (ppm)	144.32	147.46	254.17	89.38	167.12	12.50	31.10
Cu(65)* (ppm)	143.20	148.59	251.49	88.48	166.43	13.11	33.82
Zn(66)* (ppm)	138.54	205.46	232.66	21.17	131.39	17.15	10.68
Zn(68) (ppm)	145.33	206.46	229.06	22.54	131.88	17.59	13.88
As (ppm)	2.22	0.55	0.55	0.39	0.34	4.13	3.56
Se(76) (ppm)	1.37	1.06	3.70	1.72	1.62	1.17	1.92
Se(77)* (ppm)	0.68	BDL	BDL	BDL	0.91	BDL	BDL
Rb (ppm)	156.62	5.58	28.65	3.48	5.59	1.53	3.31
Sr (ppm)	118.23	30.38	11.13	49.40	76.78	8157.40	9009.24
Mo (ppm)	0.72	0.23	0.10	0.16	0.14	0.10	1.20
Sn (ppm)	1.25	0.25	1.39	0.40	0.56	1.02	2.23
Te (ppm)	BDL	0.02	BDL	BDL	BDL	BDL	0.08
Cs (ppm)	6.23	0.01	0.79	0.29	0.10	0.08	0.11
Ba(137) (ppm)	254.16	14.28	28.84	45.87	54.15	9.20	22.79
Ba(138)* (ppm)	264.52	16.34	28.34	45.93	60.20	10.34	29.99
W (ppm)	1.84	BDL	0.11	0.05	0.37	1.04	1.48
Pb (ppm)	4.28	0.28	1.33	0.37	0.51	17.84	22.65
Bi (ppm)	0.13	0.03	0.10	1.37	0.02	0.29	0.55
Th (ppm)	1.35	1.03	0.04	0.69	0.13	0.92	5.72
U (ppm)	3.08	0.13	BDL	0.03	0.07	4.68	13.38
Tl (ppm)	1.37	0.03	0.18	0.00	BDL	BDL	0.02
SiO2 wt.%	27.77	27.77	27.77	27.77	27.77	27.77	27.77

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	G909168_15-4	G909168_19-1	G909168_19-2	G909168_23-1	G909168_23-2	G909168_24-1	G909168_24-2
Data Quality (1-3)	2	3	2.5	2.5	2.5	1.5	1.5
1 standard error (ppm) *							
Li	1.28	2.12	1.87	2.04	1.70	0.13	0.37
B	0.60	0.47	0.62	0.91	0.79	0.67	1.54
Si	2596.30	2596.30	2596.30	2596.30	2596.30	2596.30	2596.30
P	7.18	2.87	14.87	7.66	10.19	3.05	12.68
Sc	0.59	0.21	0.21	0.12	0.23	0.38	1.33
Ti	487.06	6.09	26.94	7.25	67.71	212.57	565.89
V	8.45	3.72	4.80	0.86	3.61	9.15	12.90
Cr	0.99	0.45	0.46	0.66	0.54	0.69	0.97
Mn	41.43	74.43	78.90	12.86	51.16	31.68	33.78
Co	0.53	1.20	0.89	0.17	0.88	0.21	0.08
Cu	3.63	3.66	12.49	3.65	4.24	0.41	1.40
Cu	3.65	3.62	13.14	3.10	4.29	0.56	3.03
Zn	4.07	8.03	7.47	0.80	3.66	0.73	0.32
Zn	6.15	5.80	12.47	0.73	4.22	0.48	0.70
As	0.24	0.15	0.08	0.05	0.04	0.27	0.36
Se	0.10	0.15	0.57	0.07	0.18	0.21	0.17
Se	0.14	BDL	BDL	BDL	0.11	BDL	BDL
Rb	4.34	0.17	1.39	0.16	0.22	0.06	0.09
Sr	30.51	0.84	1.17	1.32	2.18	211.53	229.11
Mo	0.13	0.05	0.06	0.04	0.03	0.03	0.06
Sn	0.03	0.03	0.33	0.04	0.12	0.13	0.12
Te	BDL	0.06	BDL	BDL	BDL	BDL	0.00
Cs	0.23	0.02	0.10	0.02	0.05	0.02	0.04
Ba	8.30	0.50	2.17	1.76	1.75	0.53	2.05
Ba	6.98	0.47	2.07	1.58	1.71	0.42	3.92
W	0.18	BDL	0.08	0.02	0.05	0.03	0.16
Pb	0.26	0.04	0.25	0.05	0.05	1.05	1.32
Bi	0.01	0.01	0.01	0.15	0.01	0.03	0.04
Th	0.52	0.16	0.02	0.22	0.09	0.06	0.24
U	0.14	0.03	BDL	0.03	0.05	0.12	0.37
Tl	0.12	0.01	0.03	0.00	BDL	BDL	0.01

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	G909168_15-4	G909168_19-1	G909168_19-2	G909168_23-1	G909168_23-2	G909168_24-1	G909168_24-2
Data Quality (1-3)	2	3	2.5	2.5	2.5	1.5	1.5
1 standard error (ppm)**							
Li	5.96	9.12	8.88	7.95	7.96	0.49	0.43
B	3.21	1.96	1.80	11.68	5.84	8.64	5.20
Si	4459.76	4459.76	4459.76	4459.76	4459.76	4459.76	4459.76
P	47.71	24.65	67.30	57.10	81.35	22.03	77.17
Sc	0.66	0.27	0.26	0.18	0.30	0.49	1.68
Ti	1059.99	21.77	40.99	8.71	71.68	690.72	968.68
V	17.28	8.02	9.67	1.84	7.28	19.45	27.84
Cr	7.95	2.76	1.86	3.82	2.72	4.14	5.96
Mn	62.52	141.09	128.24	15.61	85.11	60.69	60.72
Co	1.34	2.26	2.04	0.29	1.52	0.24	0.11
Cu	15.68	16.01	29.63	10.13	18.17	1.38	3.57
Cu	15.58	16.13	29.68	9.86	18.12	1.50	4.69
Zn	5.56	9.80	9.81	0.99	5.13	0.87	0.43
Zn	7.29	8.03	13.91	0.95	5.51	0.67	0.80
As	0.80	0.24	0.21	0.14	0.12	1.45	1.28
Se	1.10	0.86	3.02	1.38	1.31	0.96	1.55
Se	0.56	BDL	BDL	BDL	0.73	BDL	BDL
Rb	5.32	0.20	1.50	0.18	0.25	0.07	0.11
Sr	30.58	0.99	1.19	1.58	2.55	254.78	277.65
Mo	0.14	0.05	0.06	0.04	0.03	0.03	0.11
Sn	0.23	0.05	0.42	0.08	0.16	0.22	0.42
Te	BDL	0.06	BDL	BDL	BDL	BDL	0.01
Cs	0.48	0.02	0.11	0.03	0.05	0.03	0.04
Ba	8.81	0.53	2.20	1.84	1.86	0.54	2.06
Ba	8.73	0.57	2.14	1.82	2.08	0.47	3.97
W	0.28	BDL	0.08	0.03	0.06	0.13	0.23
Pb	0.37	0.04	0.26	0.05	0.06	1.51	1.90
Bi	0.02	0.01	0.01	0.20	0.01	0.04	0.06
Th	0.53	0.17	0.02	0.22	0.09	0.08	0.39
U	0.27	0.03	BDL	0.03	0.05	0.36	1.05
Tl	0.19	0.01	0.04	0.00	BDL	BDL	0.01

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	G909168_24-3	G909172-1	G909172-10	G909172-2	G909172-3	G909172-4	G909172-5
Data Quality (1-3)	1.5	2	2.5	2	2.5	2	1.5
Li (ppm)	38.71	31.78	35.09	26.01	32.84	28.23	15.16
B (ppm)	4.40	1.99	1.21	2.08	1.17	1.93	1.80
Si (ppm)	129814.88	128225.50	128225.50	128225.50	128225.50	128225.50	128225.50
P (ppm)	202.42	40.33	36.63	36.70	30.22	34.34	26.10
Sc (ppm)	6.58	5.93	4.05	4.32	3.40	3.96	3.19
Ti (ppm)	91538.64	4117.78	6887.65	5628.31	4593.42	9067.78	13214.20
V (ppm)	414.54	330.61	406.43	318.34	287.74	295.14	247.28
Cr (ppm)	79.72	16.18	13.28	13.12	11.82	12.03	6.20
Mn (ppm)	2681.06	1742.37	2125.93	1694.83	1867.60	1474.67	804.67
Co (ppm)	25.21	44.01	70.30	35.26	40.70	37.64	28.29
Cu(63) (ppm)	88.31	325.04	403.26	218.28	615.28	596.43	181.46
Cu(65)* (ppm)	92.23	322.72	405.94	215.34	606.23	592.67	180.52
Zn(66)* (ppm)	156.22	315.62	335.08	256.73	318.88	257.01	131.25
Zn(68) (ppm)	149.88	306.79	314.38	248.11	329.75	260.65	137.12
As (ppm)	3.30	0.57	BDL	0.77	0.17	0.63	0.53
Se(76) (ppm)	2.35	1.50	3.90	1.47	1.24	BDL	1.18
Se(77)* (ppm)	BDL	BDL	1.26	0.43	BDL	BDL	0.32
Rb (ppm)	9.07	0.96	5.52	9.41	68.29	56.30	21.29
Sr (ppm)	63.60	188.62	12.48	137.26	69.34	17.04	67.75
Mo (ppm)	1.11	0.22	BDL	BDL	BDL	BDL	0.19
Sn (ppm)	4.40	0.40	0.15	0.24	0.05	0.21	0.66
Te (ppm)	BDL	BDL	BDL	0.10	BDL	BDL	BDL
Cs (ppm)	0.32	0.16	0.40	0.19	2.87	3.78	0.59
Ba(137) (ppm)	44.93	3.64	21.68	94.54	720.33	416.01	357.94
Ba(138)* (ppm)	49.81	4.18	22.64	104.13	773.60	449.08	378.84
W (ppm)	18.31	0.19	0.16	0.56	0.07	0.33	0.43
Pb (ppm)	4.81	1.07	0.87	1.14	2.81	2.58	1.05
Bi (ppm)	0.61	0.03	0.00	0.02	BDL	BDL	0.02
Th (ppm)	0.40	0.22	0.09	0.16	0.13	0.14	0.68
U (ppm)	4.60	0.24	0.06	0.14	0.09	0.10	0.39
Tl (ppm)	0.07	0.02	0.03	0.04	0.60	0.44	0.14
SiO2 wt.%	27.77	27.43	27.43	27.43	27.43	27.43	27.43

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	G909168_24-3	G909172-1	G909172-10	G909172-2	G909172-3	G909172-4	G909172-5
Data Quality (1-3)	1.5	2	2.5	2	2.5	2	1.5
1 standard error (ppm) *							
Li	1.16	1.73	1.25	1.31	1.47	1.37	0.42
B	0.36	0.63	0.48	0.62	0.43	0.57	0.31
Si	2596.30	2564.51	2564.51	2564.51	2564.51	2564.51	2564.51
P	6.20	2.22	5.07	2.69	3.44	2.44	1.26
Sc	0.19	0.36	0.29	0.34	0.39	0.50	0.07
Ti	2984.74	169.94	268.43	241.19	171.03	399.99	454.67
V	10.66	10.44	12.40	12.08	10.23	9.96	9.44
Cr	2.90	0.72	0.57	0.60	0.54	0.38	0.29
Mn	64.35	142.09	61.11	70.57	70.06	50.93	26.44
Co	0.67	1.85	2.09	1.36	1.53	1.29	1.18
Cu	2.74	13.00	11.99	7.29	24.08	21.56	10.54
Cu	2.28	13.89	10.48	7.50	19.76	17.37	6.95
Zn	4.76	14.91	9.49	8.10	8.60	8.02	4.38
Zn	4.66	12.94	10.61	8.26	9.69	7.88	4.47
As	0.24	0.21	BDL	0.19	0.04	0.22	0.16
Se	0.14	0.66	0.89	0.54	0.96	BDL	0.30
Se	BDL	BDL	0.82	0.53	BDL	BDL	0.39
Rb	0.47	0.21	0.25	0.32	2.44	2.96	0.64
Sr	7.69	5.97	1.07	9.94	10.19	0.66	1.83
Mo	0.12	0.09	BDL	BDL	BDL	BDL	0.07
Sn	0.12	0.10	0.05	0.08	0.17	0.07	0.10
Te	BDL	BDL	BDL	0.10	BDL	BDL	BDL
Cs	0.02	0.06	0.01	0.05	0.14	0.14	0.06
Ba	2.12	0.43	1.07	4.75	56.69	10.48	9.79
Ba	1.96	0.22	1.12	4.96	58.71	15.73	14.74
W	0.57	0.07	0.02	0.06	0.07	0.16	0.05
Pb	0.38	0.10	0.08	0.05	0.30	0.07	0.07
Bi	0.10	0.02	0.00	0.01	BDL	BDL	0.00
Th	0.04	0.08	0.05	0.08	0.04	0.02	0.08
U	0.27	0.08	0.03	0.03	0.04	0.03	0.05
Tl	0.01	0.00	0.00	0.01	0.12	0.05	0.01

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	G909168_24-3	G909172-1	G909172-10	G909172-2	G909172-3	G909172-4	G909172-5
Data Quality (1-3)	1.5	2	2.5	2	2.5	2	1.5
1 standard error (ppm)**							
Li	5.58	4.80	5.10	3.89	4.85	4.20	2.18
B	1.64	0.96	0.65	0.98	0.60	0.91	0.73
Si	4459.76	4405.16	4405.16	4405.16	4405.16	4405.16	4405.16
P	58.30	11.79	11.67	10.87	9.33	10.16	7.60
Sc	0.32	0.42	0.32	0.38	0.41	0.53	0.14
Ti	9111.47	428.20	710.10	588.87	470.61	953.45	1340.71
V	22.49	19.67	23.95	20.09	17.75	17.91	15.64
Cr	16.23	3.32	2.72	2.69	2.42	2.44	1.27
Mn	112.80	156.98	101.80	95.88	100.11	76.04	40.61
Co	1.52	3.06	4.42	2.38	2.73	2.45	1.96
Cu	9.73	37.00	44.62	24.38	69.85	67.12	22.02
Cu	10.02	37.07	44.48	24.13	67.52	65.46	20.44
Zn	6.39	17.32	13.33	10.82	12.39	10.76	5.71
Zn	6.16	15.64	13.92	10.90	13.53	10.86	5.95
As	1.17	0.29	BDL	0.32	0.07	0.31	0.24
Se	1.88	1.37	3.26	1.30	1.38	BDL	1.00
Se	BDL	BDL	1.30	0.64	BDL	BDL	0.47
Rb	0.50	0.21	0.27	0.37	2.78	3.15	0.76
Sr	7.77	6.89	1.09	10.25	10.27	0.73	2.21
Mo	0.15	0.09	BDL	BDL	BDL	BDL	0.07
Sn	0.79	0.12	0.06	0.09	0.17	0.08	0.16
Te	BDL	BDL	BDL	0.10	BDL	BDL	BDL
Cs	0.03	0.06	0.03	0.05	0.24	0.29	0.08
Ba	2.19	0.43	1.10	4.88	57.32	11.55	10.65
Ba	2.19	0.24	1.27	5.65	62.06	19.59	17.73
W	2.22	0.07	0.02	0.09	0.07	0.17	0.07
Pb	0.48	0.10	0.09	0.06	0.31	0.11	0.07
Bi	0.12	0.02	0.00	0.01	BDL	BDL	0.00
Th	0.05	0.08	0.05	0.08	0.04	0.02	0.09
U	0.43	0.09	0.03	0.03	0.04	0.03	0.06
Tl	0.02	0.00	0.00	0.01	0.13	0.07	0.02

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	G909172-6	G909172-7	G909172-8	G909172-9	G909174-1	G909174-10	G909174-11
Data Quality (1-3)	2	2.5	2.5	1.5	3	3	3
Li (ppm)	37.29	31.59	32.25	36.00	44.26	45.79	42.70
B (ppm)	1.12	3.47	1.43	1.93	0.71	0.91	1.89
Si (ppm)	128225.50	128225.50	128225.50	128225.50	128692.97	128692.97	128692.97
P (ppm)	34.81	26.50	37.95	37.49	161.31	45.27	91.39
Sc (ppm)	4.04	11.68	4.73	5.58	2.25	3.67	4.38
Ti (ppm)	10377.13	6652.10	5400.07	11483.91	66.60	73.78	2053.21
V (ppm)	443.63	391.98	402.82	418.62	168.82	302.24	332.80
Cr (ppm)	13.19	11.58	11.08	14.61	18.75	44.11	32.06
Mn (ppm)	2009.15	1543.91	1729.94	1910.78	1794.62	2006.66	2045.97
Co (ppm)	76.86	58.15	78.47	66.17	158.51	33.94	34.25
Cu(63) (ppm)	418.65	994.02	371.68	546.36	102.61	78.90	165.86
Cu(65)* (ppm)	415.32	995.37	374.15	540.64	103.84	77.94	169.11
Zn(66)* (ppm)	324.27	251.43	291.00	301.95	267.96	328.55	333.30
Zn(68) (ppm)	311.17	251.49	287.23	305.05	268.23	312.22	325.90
As (ppm)	0.18	1.13	BDL	0.65	0.28	BDL	0.65
Se(76) (ppm)	BDL	0.87	BDL	4.02	2.74	BDL	BDL
Se(77)* (ppm)	BDL	BDL	BDL	BDL	BDL	1.68	BDL
Rb (ppm)	10.42	88.18	79.12	22.97	5.01	2.04	6.37
Sr (ppm)	12.14	27.52	10.91	17.03	4.67	3.08	5.62
Mo (ppm)	BDL	0.38	0.14	0.03	BDL	BDL	0.05
Sn (ppm)	0.25	0.43	0.24	0.63	0.15	0.05	0.31
Te (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs (ppm)	0.65	6.61	3.42	0.96	0.29	0.44	0.41
Ba(137) (ppm)	68.22	436.37	357.79	212.97	6.75	5.38	8.03
Ba(138)* (ppm)	70.02	455.19	372.73	219.91	7.07	4.93	9.35
W (ppm)	0.31	1.18	0.24	0.42	0.01	0.02	0.50
Pb (ppm)	0.81	4.90	2.13	1.32	5.11	3.52	2.57
Bi (ppm)	BDL	0.01	BDL	0.02	BDL	BDL	BDL
Th (ppm)	0.32	2.94	0.16	0.35	0.08	0.01	0.09
U (ppm)	0.04	0.40	0.08	0.17	BDL	0.00	0.04
Tl (ppm)	0.09	0.71	0.55	0.16	0.01	0.01	0.05
SiO2 wt.%	27.43	27.43	27.43	27.43	27.53	27.53	27.53

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	G909172-6	G909172-7	G909172-8	G909172-9	G909174-1	G909174-10	G909174-11
Data Quality (1-3)	2	2.5	2.5	1.5	3	3	3
1 standard error (ppm) *							
Li	2.04	1.52	0.94	1.65	2.19	1.98	2.55
B	0.95	0.38	0.44	0.73	0.55	0.59	0.36
Si	2564.51	2564.51	2564.51	2564.51	2573.86	2573.86	2573.86
P	1.41	4.33	3.69	3.71	12.66	6.97	8.23
Sc	0.11	0.43	0.23	0.40	0.16	0.18	0.42
Ti	496.07	343.48	160.30	414.28	5.00	2.12	85.17
V	13.99	13.68	13.00	13.68	4.27	7.40	8.19
Cr	0.71	0.35	0.53	1.15	0.64	1.40	1.02
Mn	62.24	45.00	48.82	57.35	59.24	58.90	56.49
Co	2.33	1.55	2.43	2.40	5.17	0.92	1.41
Cu	13.62	30.87	10.46	17.49	4.03	2.41	4.71
Cu	13.07	29.46	10.21	17.54	3.72	3.41	5.39
Zn	14.89	7.46	8.23	12.32	8.95	9.71	10.49
Zn	9.05	7.61	9.64	8.94	9.66	8.25	9.02
As	0.13	0.07	BDL	0.08	0.29	BDL	0.30
Se	BDL	0.40	BDL	0.34	0.44	BDL	BDL
Se	BDL	BDL	BDL	BDL	BDL	0.87	BDL
Rb	0.33	2.80	2.15	0.62	0.21	0.12	0.24
Sr	0.37	0.88	0.43	1.68	0.23	0.13	0.23
Mo	BDL	0.09	0.08	0.09	BDL	BDL	0.05
Sn	0.09	0.07	0.11	0.06	0.09	0.01	0.03
Te	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs	0.04	0.30	0.13	0.07	0.05	0.07	0.05
Ba	1.57	13.03	8.52	9.83	0.84	0.24	0.80
Ba	2.43	21.24	13.88	10.27	0.22	0.19	0.34
W	0.03	0.04	0.11	0.14	0.00	0.00	0.09
Pb	0.08	0.17	0.09	0.09	0.37	0.32	0.13
Bi	BDL	0.00	BDL	0.01	BDL	BDL	BDL
Th	0.27	0.37	0.06	0.14	0.02	0.02	0.03
U	0.05	0.05	0.02	0.04	BDL	0.00	0.03
Tl	0.02	0.05	0.04	0.03	0.02	0.02	0.02

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	G909172-6	G909172-7	G909172-8	G909172-9	G909174-1	G909174-10	G909174-11
Data Quality (1-3)	2	2.5	2.5	1.5	3	3	3
1 standard error (ppm)**							
Li	5.63	4.70	4.64	5.33	6.75	6.90	6.67
B	1.03	1.32	0.68	1.01	0.60	0.68	0.78
Si	4405.16	4405.16	4405.16	4405.16	4421.22	4421.22	4421.22
P	10.09	8.75	11.50	11.38	48.68	14.92	27.88
Sc	0.19	0.61	0.30	0.45	0.19	0.24	0.46
Ti	1107.75	721.88	539.77	1171.78	8.04	7.29	211.91
V	26.39	24.04	24.12	25.15	9.07	16.13	17.78
Cr	2.73	2.34	2.28	3.14	3.83	9.00	6.54
Mn	98.96	74.30	82.30	92.97	89.87	95.81	95.54
Co	4.85	3.58	4.98	4.38	10.12	2.08	2.35
Cu	46.65	110.34	40.97	60.80	11.69	8.78	18.36
Cu	46.12	110.02	41.13	60.19	11.76	9.05	18.96
Zn	17.43	10.25	11.57	14.93	11.54	13.19	13.86
Zn	12.71	10.48	12.68	12.50	11.83	11.46	12.26
As	0.14	0.40	BDL	0.24	0.31	BDL	0.38
Se	BDL	0.81	BDL	3.24	2.23	BDL	BDL
Se	BDL	BDL	BDL	BDL	BDL	1.60	BDL
Rb	0.39	3.28	2.64	0.76	0.23	0.13	0.26
Sr	0.43	1.01	0.48	1.71	0.25	0.14	0.26
Mo	BDL	0.09	0.08	0.09	BDL	BDL	0.05
Sn	0.10	0.11	0.12	0.13	0.10	0.01	0.06
Te	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs	0.06	0.53	0.26	0.10	0.06	0.08	0.06
Ba	1.76	14.00	9.49	10.14	0.85	0.27	0.82
Ba	3.04	24.32	16.93	11.76	0.28	0.23	0.40
W	0.05	0.14	0.11	0.15	0.00	0.00	0.11
Pb	0.08	0.23	0.11	0.10	0.43	0.35	0.16
Bi	BDL	0.00	BDL	0.01	BDL	BDL	BDL
Th	0.27	0.41	0.06	0.14	0.02	0.02	0.03
U	0.05	0.06	0.02	0.04	BDL	0.00	0.03
Tl	0.02	0.09	0.07	0.04	0.02	0.02	0.02

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	G909174-2	G909174-3	G909174-4	G909174-5	G909174-6	G909174-7	G909174-8
Data Quality (1-3)	1.5	2.5	1.5	2.5	2	2	2
Li (ppm)	46.51	48.74	43.04	52.50	53.26	46.53	42.20
B (ppm)	0.79	0.75	2.07	0.52	1.37	1.65	1.13
Si (ppm)	128692.97	128692.97	128692.97	128692.97	128692.97	128692.97	128692.97
P (ppm)	47.48	353.01	630.49	173.82	228.75	439.54	88.04
Sc (ppm)	2.22	2.61	3.09	1.72	1.89	2.10	5.09
Ti (ppm)	13178.77	3757.94	12320.03	2082.32	8536.45	5043.54	2640.52
V (ppm)	288.73	219.60	239.26	204.67	372.24	305.60	337.36
Cr (ppm)	19.71	19.43	12.96	23.42	19.92	12.69	11.91
Mn (ppm)	1699.30	1817.45	1836.36	1734.65	1610.57	1506.87	1455.19
Co (ppm)	155.45	152.06	155.02	156.80	113.00	39.77	32.53
Cu(63) (ppm)	95.94	76.62	105.57	44.99	37.00	50.35	59.49
Cu(65)* (ppm)	90.83	74.82	106.87	50.01	35.85	51.38	57.19
Zn(66)* (ppm)	249.77	247.22	253.47	251.10	235.69	256.80	236.56
Zn(68) (ppm)	245.15	238.42	245.08	242.20	230.92	240.61	230.93
As (ppm)	0.56	0.89	1.15	BDL	BDL	0.83	0.42
Se(76) (ppm)	BDL	2.36	1.47	BDL	2.71	0.77	1.07
Se(77)* (ppm)	BDL	BDL	BDL	BDL	0.66	BDL	BDL
Rb (ppm)	6.48	4.36	4.23	2.38	3.70	5.73	4.68
Sr (ppm)	7.17	5.09	9.35	2.62	9.95	4.88	329.12
Mo (ppm)	0.15	0.08	0.19	BDL	0.10	0.14	BDL
Sn (ppm)	0.62	0.23	0.55	0.05	0.21	0.06	0.24
Te (ppm)	0.14	BDL	BDL	BDL	BDL	0.14	0.06
Cs (ppm)	0.23	0.17	0.37	0.16	0.28	0.26	0.16
Ba(137) (ppm)	69.77	4.94	10.08	3.24	10.94	4.99	5.33
Ba(138)* (ppm)	69.66	5.50	9.91	3.22	11.28	4.88	5.27
W (ppm)	0.32	0.26	1.39	0.08	0.41	0.10	0.20
Pb (ppm)	3.95	5.19	8.20	3.56	2.86	2.84	2.95
Bi (ppm)	0.02	0.00	0.02	0.01	0.02	0.01	0.02
Th (ppm)	0.21	0.07	0.09	BDL	0.32	0.05	0.15
U (ppm)	0.33	0.13	0.18	0.05	0.45	0.22	1.31
Tl (ppm)	0.05	0.05	0.03	0.02	0.04	0.03	0.04
SiO2 wt.%	27.53	27.53	27.53	27.53	27.53	27.53	27.53

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	G909174-2	G909174-3	G909174-4	G909174-5	G909174-6	G909174-7	G909174-8
Data Quality (1-3)	1.5	2.5	1.5	2.5	2	2	2
1 standard error (ppm) *							
Li	2.66	2.07	2.36	4.59	2.39	3.51	2.46
B	0.61	0.14	0.22	0.84	0.40	0.43	0.40
Si	2573.86	2573.86	2573.86	2573.86	2573.86	2573.86	2573.86
P	5.01	37.04	43.20	19.52	18.16	32.03	21.81
Sc	0.26	0.08	0.22	0.14	0.10	0.47	0.60
Ti	400.13	129.42	336.85	169.28	428.15	245.74	122.53
V	7.98	7.15	6.19	8.69	11.46	13.97	8.41
Cr	0.83	0.74	0.46	1.17	0.75	0.75	0.72
Mn	60.61	51.78	49.70	105.38	75.80	79.47	73.51
Co	5.31	5.71	4.72	7.49	3.20	1.79	0.94
Cu	3.62	2.45	2.92	2.56	1.16	1.87	2.13
Cu	3.67	3.67	3.28	4.39	1.40	3.90	2.01
Zn	9.28	7.01	9.66	10.68	7.82	15.19	8.76
Zn	9.59	6.44	7.80	10.28	5.64	7.41	6.76
As	0.08	0.33	0.16	BDL	BDL	0.43	0.18
Se	BDL	0.60	0.76	BDL	0.80	0.30	0.76
Se	BDL	BDL	BDL	BDL	0.46	BDL	BDL
Rb	0.25	0.18	0.21	0.32	0.12	0.31	0.25
Sr	0.34	0.30	0.44	0.24	0.37	0.50	13.48
Mo	0.09	0.05	0.19	BDL	0.06	0.08	BDL
Sn	0.11	0.09	0.16	0.16	0.06	0.04	0.05
Te	0.20	BDL	BDL	BDL	BDL	0.28	0.11
Cs	0.05	0.05	0.06	0.03	0.04	0.07	0.06
Ba	2.62	0.16	0.84	0.58	0.52	0.84	0.46
Ba	3.29	0.24	0.43	0.49	0.34	0.39	0.35
W	0.12	0.02	0.16	0.07	0.05	0.01	0.05
Pb	0.23	0.27	0.30	0.84	0.10	0.22	0.13
Bi	0.01	0.01	0.02	0.01	0.01	0.01	0.01
Th	0.08	0.02	0.01	BDL	0.05	0.03	0.06
U	0.03	0.03	0.02	0.02	0.02	0.03	0.15
Tl	0.04	0.04	0.01	0.01	0.00	0.01	0.02

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	G909174-2	G909174-3	G909174-4	G909174-5	G909174-6	G909174-7	G909174-8
Data Quality (1-3)	1.5	2.5	1.5	2.5	2	2	2
1 standard error (ppm)**							
Li	7.22	7.33	6.65	8.86	8.05	7.58	6.57
B	0.67	0.30	0.79	0.86	0.64	0.74	0.57
Si	4421.22	4421.22	4421.22	4421.22	4421.22	4421.22	4421.22
P	14.72	109.34	188.75	54.29	69.09	132.03	33.68
Sc	0.28	0.13	0.25	0.16	0.13	0.48	0.63
Ti	1308.19	378.00	1212.08	259.58	913.33	536.27	278.01
V	15.85	12.63	12.92	13.02	21.04	20.12	18.07
Cr	4.06	3.98	2.65	4.86	4.08	2.66	2.50
Mn	88.13	85.82	85.16	123.98	97.08	97.65	91.68
Co	10.05	10.12	9.73	11.41	6.98	2.83	2.02
Cu	10.88	8.55	11.66	5.45	4.12	5.70	6.71
Cu	10.43	8.84	11.94	6.94	4.10	6.76	6.47
Zn	11.49	9.71	11.86	12.67	10.10	16.72	10.86
Zn	11.45	8.85	9.99	11.99	8.15	9.62	8.97
As	0.21	0.45	0.43	BDL	BDL	0.52	0.24
Se	BDL	1.98	1.40	BDL	2.31	0.68	1.15
Se	BDL	BDL	BDL	BDL	0.70	BDL	BDL
Rb	0.28	0.20	0.22	0.32	0.14	0.33	0.27
Sr	0.37	0.32	0.48	0.25	0.42	0.51	14.98
Mo	0.10	0.05	0.19	BDL	0.07	0.08	BDL
Sn	0.16	0.10	0.19	0.16	0.07	0.04	0.07
Te	0.20	BDL	BDL	BDL	BDL	0.28	0.11
Cs	0.06	0.05	0.07	0.03	0.05	0.07	0.06
Ba	3.11	0.20	0.88	0.59	0.59	0.85	0.48
Ba	3.67	0.27	0.49	0.50	0.43	0.41	0.37
W	0.13	0.04	0.23	0.07	0.07	0.02	0.05
Pb	0.28	0.34	0.45	0.85	0.15	0.25	0.18
Bi	0.01	0.01	0.02	0.01	0.01	0.01	0.01
Th	0.09	0.02	0.01	BDL	0.05	0.03	0.06
U	0.04	0.04	0.03	0.02	0.04	0.04	0.19
Tl	0.04	0.04	0.01	0.01	0.01	0.01	0.02

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	H437269_10-1	H437269_10-2	H437269_10-3	H437269_11-1	H437269_11-2	H437269_11-3	H437269_12-1
Data Quality (1-3)	1	2	2	3	3	2	1.5
Li (ppm)	46.35	53.45	72.59	56.01	72.25	36.94	86.37
B (ppm)	9.09	5.15	10.38	3.94	4.89	4.09	4.04
Si (ppm)	130843.31	130843.31	130843.31	130843.31	130843.31	130843.31	130843.31
P (ppm)	1135.40	194.38	225.66	42.95	31.18	64.99	1948.94
Sc (ppm)	29.36	30.13	33.27	35.68	36.31	21.02	37.16
Ti (ppm)	188.87	95.54	732.68	153.00	202.05	1888.37	778.56
V (ppm)	523.53	543.70	712.01	673.49	656.30	374.01	597.77
Cr (ppm)	89.23	103.26	122.60	50.33	45.28	54.09	96.42
Mn (ppm)	387.43	474.81	613.67	556.44	670.92	340.89	602.93
Co (ppm)	30.56	25.78	26.62	17.43	9.90	13.50	15.10
Cu(63) (ppm)	23069.14	14102.41	8691.53	1023.29	480.80	1999.96	2671.61
Cu(65)* (ppm)	22490.17	13793.22	8567.39	1034.84	482.61	2011.31	2686.46
Zn(66)* (ppm)	198.82	174.79	184.09	118.95	95.44	99.39	140.57
Zn(68) (ppm)	192.43	185.72	182.87	113.61	99.03	101.05	134.62
As (ppm)	35.01	13.61	18.24	1.42	0.76	2.24	10.48
Se(76) (ppm)	3.57	3.69	4.13	3.30	4.76	1.66	4.17
Se(77)* (ppm)	2.11	0.69	BDL	BDL	BDL	BDL	18.14
Rb (ppm)	1.80	1.47	1.52	4.21	1.38	1.86	7.85
Sr (ppm)	30.59	24.08	3.54	2.25	0.75	51.60	29.26
Mo (ppm)	5.38	2.84	5.03	0.70	0.12	0.77	0.10
Sn (ppm)	0.52	0.17	0.56	0.95	0.69	0.34	0.45
Te (ppm)	0.63	0.40	1.07	0.64	BDL	0.08	0.18
Cs (ppm)	0.78	1.06	0.86	1.81	0.90	0.88	1.29
Ba(137) (ppm)	4.95	164.14	3.36	3.19	1.15	10.14	15.10
Ba(138)* (ppm)	5.60	158.09	3.78	3.55	1.13	9.55	25.29
W (ppm)	3.38	1.45	2.40	0.97	0.20	1.56	1.04
Pb (ppm)	3.10	1.53	3.47	1.39	0.68	5.34	0.72
Bi (ppm)	0.36	0.18	0.43	0.64	0.08	0.07	0.01
Th (ppm)	1.11	0.67	0.37	0.60	0.02	0.55	23.09
U (ppm)	11.39	5.23	6.10	1.25	0.19	5.55	15.78
Tl (ppm)	BDL	0.01	0.01	0.02	BDL	0.02	0.02
SiO2 wt.%	27.99	27.99	27.99	27.99	27.99	27.99	27.99

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	H437269_10-1	H437269_10-2	H437269_10-3	H437269_11-1	H437269_11-2	H437269_11-3	H437269_12-1
Data Quality (1-3)	1	2	2	3	3	2	1.5
1 standard error (ppm) *							
Li	3.19	2.22	2.20	2.16	2.44	1.31	3.71
B	0.86	0.23	0.53	0.33	0.49	0.66	0.49
Si	2616.87	2616.87	2616.87	2616.87	2616.87	2616.87	2616.87
P	280.48	32.85	34.74	7.20	4.98	10.00	369.57
Sc	1.79	0.96	1.08	1.82	1.29	0.75	1.02
Ti	29.44	13.11	89.60	20.12	23.07	281.49	135.53
V	17.86	16.33	22.05	30.57	20.24	11.02	16.81
Cr	2.79	2.71	3.09	1.76	2.43	1.41	2.57
Mn	14.20	13.55	17.21	23.85	20.20	9.13	17.86
Co	1.91	0.83	0.64	0.90	0.24	0.38	0.40
Cu	1948.09	633.75	319.94	128.83	20.38	83.78	125.38
Cu	1606.64	708.12	347.57	131.00	20.07	85.47	106.30
Zn	11.81	6.38	4.69	3.49	3.73	3.80	5.96
Zn	10.15	6.63	5.10	3.05	3.49	2.97	4.35
As	2.35	0.52	0.85	0.24	0.06	0.19	1.40
Se	0.37	0.40	0.42	0.40	0.58	1.01	0.43
Se	0.56	0.13	BDL	BDL	BDL	BDL	2.86
Rb	0.15	0.05	0.06	0.26	0.05	0.07	0.75
Sr	1.22	0.91	0.16	0.08	0.04	1.95	4.01
Mo	0.69	0.32	0.25	0.14	0.02	0.12	0.05
Sn	0.11	0.05	0.04	0.18	0.05	0.06	0.07
Te	0.17	0.12	0.11	0.12	BDL	0.20	0.06
Cs	0.03	0.07	0.08	0.13	0.08	0.05	0.05
Ba	0.41	4.91	0.19	0.38	0.05	0.65	3.12
Ba	0.33	6.22	0.15	0.19	0.05	0.43	1.24
W	0.11	0.18	0.17	0.22	0.06	0.15	0.18
Pb	0.32	0.12	0.19	0.04	0.09	0.70	0.03
Bi	0.05	0.01	0.03	0.09	0.03	0.03	0.01
Th	0.11	0.03	0.06	0.07	0.02	0.04	3.71
U	1.01	0.40	0.26	0.14	0.03	1.12	1.18
Tl	BDL	0.00	0.01	0.01	BDL	0.02	0.02

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	H437269_10-1	H437269_10-2	H437269_10-3	H437269_11-1	H437269_11-2	H437269_11-3	H437269_12-1
Data Quality (1-3)	1	2	2	3	3	2	1.5
1 standard error (ppm)**							
Li	7.28	7.87	10.48	8.20	10.49	5.38	12.75
B	3.42	1.89	3.82	1.47	1.85	1.63	1.55
Si	4495.09	4495.09	4495.09	4495.09	4495.09	4495.09	4495.09
P	461.42	70.81	80.68	15.62	11.23	23.23	729.46
Sc	2.16	1.57	1.74	2.34	1.97	1.14	1.83
Ti	40.34	19.14	139.53	30.06	37.45	394.01	176.88
V	31.46	31.46	41.56	45.22	38.26	21.54	34.02
Cr	18.11	20.88	24.78	10.25	9.40	10.94	19.51
Mn	20.37	22.44	28.82	31.75	32.35	15.76	28.89
Co	2.52	1.62	1.57	1.30	0.58	0.82	0.91
Cu	3183.40	1664.49	1001.09	170.50	56.29	233.80	317.39
Cu	2943.17	1669.94	1001.62	173.31	56.60	236.51	313.15
Zn	12.88	7.82	6.69	4.65	4.48	4.59	6.98
Zn	11.47	8.39	7.19	4.38	4.44	4.08	5.73
As	12.35	4.74	6.38	0.55	0.27	0.80	3.89
Se	2.88	2.98	3.33	2.67	3.86	1.67	3.37
Se	1.78	0.57	BDL	BDL	BDL	BDL	14.83
Rb	0.16	0.06	0.07	0.28	0.06	0.09	0.77
Sr	1.40	1.06	0.18	0.10	0.04	2.25	4.06
Mo	0.81	0.38	0.46	0.15	0.02	0.14	0.05
Sn	0.14	0.06	0.11	0.25	0.13	0.09	0.11
Te	0.20	0.14	0.22	0.17	BDL	0.20	0.07
Cs	0.06	0.10	0.10	0.18	0.10	0.08	0.11
Ba	0.43	6.11	0.20	0.39	0.06	0.68	3.14
Ba	0.36	7.32	0.18	0.21	0.05	0.49	1.39
W	0.41	0.25	0.33	0.25	0.07	0.24	0.22
Pb	0.34	0.13	0.22	0.06	0.09	0.72	0.04
Bi	0.06	0.02	0.05	0.11	0.03	0.03	0.01
Th	0.12	0.05	0.06	0.08	0.02	0.05	3.93
U	1.32	0.56	0.53	0.17	0.03	1.20	1.67
Tl	BDL	0.00	0.01	0.01	BDL	0.02	0.02

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	H437269_12-3	H437269_12-4	H437269_13-1	H437269_13-2	H437269_13-3	H437269_15-1	H437269_15-2
Data Quality (1-3)	3	2.5	2.5	1	2.5	3	3
Li (ppm)	68.15	71.17	95.95	86.548	94.33	68.79	70.69
B (ppm)	4.14	4.74	5.96	7.177	9.05	2.87	4.43
Si (ppm)	130843.31	130843.31	130843.31	130843.306	130843.31	130843.31	130843.31
P (ppm)	67.63	23.53	43.98	62.885	64.59	59.37	40.42
Sc (ppm)	48.82	28.55	46.32	41.618	48.35	40.37	31.91
Ti (ppm)	5937.87	192.42	250.86	275.899	276.81	172.77	123.06
V (ppm)	732.30	504.02	796.76	709.463	740.75	578.55	534.73
Cr (ppm)	83.05	91.01	112.41	101.660	114.63	89.33	106.73
Mn (ppm)	537.15	522.24	609.93	2156.467	604.63	492.85	583.26
Co (ppm)	13.22	15.62	11.38	76.877	12.59	13.91	20.22
Cu(63) (ppm)	2968.62	4735.41	811.94	1062.548	773.46	832.95	1430.45
Cu(65)* (ppm)	2717.08	3557.84	814.50	1069.936	778.62	834.72	1446.60
Zn(66)* (ppm)	125.96	134.89	115.98	91.923	126.30	84.43	157.89
Zn(68) (ppm)	123.13	130.36	121.00	93.651	120.86	82.83	147.30
As (ppm)	3.16	0.93	1.78	3.405	1.26	1.74	0.89
Se(76) (ppm)	2.96	2.77	3.91	2.846	3.15	3.14	3.89
Se(77)* (ppm)	0.62	0.25	BDL	BDL	BDL	BDL	BDL
Rb (ppm)	3.25	1.01	22.57	39.436	40.74	1.47	1.91
Sr (ppm)	17.64	27.38	2.54	1.774	2.03	30.38	19.63
Mo (ppm)	0.20	BDL	0.09	0.483	0.18	0.59	BDL
Sn (ppm)	2.78	0.34	0.92	0.725	2.00	0.32	0.31
Te (ppm)	BDL	BDL	1.70	3.093	0.48	0.11	BDL
Cs (ppm)	1.11	0.71	1.76	2.000	1.55	0.74	0.90
Ba(137) (ppm)	6.69	3.65	9.29	22.443	18.41	5.33	4.26
Ba(138)* (ppm)	4.72	3.91	11.84	22.056	19.41	4.71	4.56
W (ppm)	5.71	0.24	0.26	0.427	0.16	0.29	0.01
Pb (ppm)	6.17	0.69	0.94	170.943	2.12	2.50	1.17
Bi (ppm)	0.03	0.01	0.96	0.929	1.01	0.26	0.07
Th (ppm)	0.85	0.67	0.05	0.132	0.67	0.08	0.50
U (ppm)	3.09	2.32	0.70	1.718	5.86	0.52	2.29
Tl (ppm)	0.00	0.01	0.12	0.309	0.27	0.01	0.00
SiO2 wt.%	27.99	27.99	27.99	27.990	27.99	27.99	27.99

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	H437269_12-3	H437269_12-4	H437269_13-1	H437269_13-2	H437269_13-3	H437269_15-1	H437269_15-2
Data Quality (1-3)	3	2.5	2.5	1	2.5	3	3
1 standard error (ppm) *							
Li	2.06	2.54	2.98	2.665	2.79	2.28	2.39
B	0.37	0.41	0.28	0.448	0.33	0.26	0.20
Si	2616.87	2616.87	2616.87	2616.866	2616.87	2616.87	2616.87
P	16.54	4.06	8.95	9.700	18.85	10.43	6.50
Sc	1.57	0.75	1.20	1.290	1.35	1.69	0.84
Ti	682.83	23.06	29.12	31.729	31.68	20.69	15.12
V	21.64	19.42	23.28	21.389	21.28	16.40	15.15
Cr	2.20	4.25	2.84	2.595	2.87	2.34	2.82
Mn	14.24	18.46	15.90	58.122	16.68	13.34	17.08
Co	0.43	0.66	0.55	1.973	0.42	0.50	0.58
Cu	157.93	421.15	61.79	37.537	27.97	32.00	85.99
Cu	110.81	188.43	61.70	39.826	29.41	32.00	63.28
Zn	3.22	7.82	3.90	2.332	4.04	2.52	4.36
Zn	3.67	7.07	4.22	3.009	3.90	2.85	4.20
As	0.16	0.14	0.10	0.172	0.14	0.15	0.08
Se	0.24	0.78	0.44	0.126	0.29	0.16	0.61
Se	0.25	0.22	BDL	BDL	BDL	BDL	BDL
Rb	0.15	0.07	0.66	2.102	1.34	0.05	0.17
Sr	0.54	1.03	0.20	0.052	0.15	1.74	1.39
Mo	0.03	BDL	0.02	0.080	0.06	0.15	BDL
Sn	0.10	0.06	0.08	0.075	0.53	0.05	0.02
Te	BDL	BDL	0.05	0.126	0.12	0.06	BDL
Cs	0.05	0.05	0.08	0.180	0.08	0.07	0.03
Ba	2.70	0.22	1.16	0.961	0.51	0.29	0.19
Ba	1.65	0.25	0.56	0.794	0.60	0.16	0.23
W	0.38	0.06	0.08	0.035	0.05	0.07	0.02
Pb	0.16	0.04	0.12	4.300	0.42	0.09	0.03
Bi	0.00	0.00	0.12	0.091	0.18	0.07	0.01
Th	0.20	0.15	0.04	0.015	0.22	0.01	0.07
U	0.12	0.91	0.38	0.325	1.72	0.08	0.57
Tl	0.00	0.00	0.02	0.019	0.03	0.00	0.00

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	H437269_12-3	H437269_12-4	H437269_13-1	H437269_13-2	H437269_13-3	H437269_15-1	H437269_15-2
Data Quality (1-3)	3	2.5	2.5	1	2.5	3	3
1 standard error (ppm)**							
Li	9.84	10.36	13.87	12.506	13.61	9.98	10.26
B	1.55	1.77	2.19	2.651	3.31	1.08	1.62
Si	4495.09	4495.09	4495.09	4495.092	4495.09	4495.09	4495.09
P	27.38	8.61	16.78	22.492	28.10	21.81	14.58
Sc	2.55	1.39	2.25	2.142	2.40	2.37	1.56
Ti	1103.53	36.34	46.79	51.276	51.35	32.62	23.48
V	42.20	31.61	45.78	41.101	42.38	32.98	30.49
Cr	16.80	18.74	22.72	20.551	23.17	18.07	21.59
Mn	24.74	26.98	27.94	99.883	28.23	22.86	27.83
Co	0.83	1.07	0.82	4.585	0.80	0.90	1.23
Cu	360.43	666.68	108.03	121.889	88.93	96.37	178.23
Cu	317.86	433.23	108.55	123.890	90.30	96.96	170.77
Zn	4.59	8.57	4.92	3.334	5.20	3.34	5.98
Zn	5.01	7.94	5.39	3.973	5.14	3.66	5.85
As	1.11	0.35	0.63	1.192	0.46	0.62	0.32
Se	2.38	2.35	3.16	2.281	2.53	2.52	3.17
Se	0.56	0.30	BDL	BDL	BDL	BDL	BDL
Rb	0.17	0.08	0.85	2.301	1.65	0.06	0.18
Sr	0.66	1.20	0.21	0.065	0.15	1.86	1.45
Mo	0.03	BDL	0.02	0.089	0.06	0.16	BDL
Sn	0.51	0.08	0.18	0.150	0.64	0.08	0.06
Te	BDL	BDL	0.31	0.569	0.15	0.06	BDL
Cs	0.09	0.07	0.15	0.230	0.14	0.09	0.07
Ba	2.70	0.23	1.18	1.082	0.65	0.32	0.21
Ba	1.65	0.26	0.63	0.959	0.76	0.20	0.26
W	0.77	0.07	0.09	0.061	0.05	0.08	0.02
Pb	0.26	0.05	0.12	6.979	0.42	0.12	0.05
Bi	0.01	0.00	0.15	0.127	0.21	0.07	0.01
Th	0.20	0.16	0.04	0.016	0.22	0.01	0.08
U	0.26	0.92	0.38	0.349	1.78	0.09	0.60
Tl	0.00	0.00	0.02	0.037	0.04	0.00	0.00

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	H437269_15-3	H437289_27-1	H437289_31-1	H437289_31-2	H437289_31-3	H437289_35-1	H437289_35-2
Data Quality (1-3)	3	2.5	2.5	2.5	2.5	2.5	2.5
Li (ppm)	44.48	60.19	76.27	85.63	86.92	87.26	92.08
B (ppm)	4.72	3.48	2.85	3.65	3.51	2.25	1.50
Si (ppm)	130843.31	134676.51	134676.51	134676.51	134676.51	134676.51	134676.51
P (ppm)	38.31	21.19	70.58	70.61	990.96	90.22	26.92
Sc (ppm)	21.37	6.91	4.09	6.50	5.25	6.42	7.95
Ti (ppm)	1065.12	729.70	464.42	691.93	1265.15	269.48	154.27
V (ppm)	398.76	119.53	113.08	142.66	128.00	188.45	248.59
Cr (ppm)	83.74	5.31	11.44	8.79	12.12	114.61	78.38
Mn (ppm)	370.86	375.73	527.86	550.05	576.69	623.99	743.47
Co (ppm)	18.51	89.65	122.62	133.60	136.92	125.61	142.01
Cu(63) (ppm)	1843.64	332.41	574.74	633.49	598.09	395.42	432.49
Cu(65)* (ppm)	1833.88	328.68	566.80	620.14	596.71	392.55	438.87
Zn(66)* (ppm)	126.75	52.45	86.28	87.14	88.20	80.54	82.53
Zn(68) (ppm)	124.10	50.05	82.81	86.33	87.26	75.13	82.25
As (ppm)	1.66	0.32	0.18	0.84	0.98	0.27	0.52
Se(76) (ppm)	3.09	1.55	3.17	3.07	3.47	4.91	3.66
Se(77)* (ppm)	0.38	BDL	1.50	BDL	BDL	BDL	0.52
Rb (ppm)	1.89	14.83	3.58	25.37	8.38	3.90	1.50
Sr (ppm)	12.05	0.26	0.76	0.62	2.43	1.84	0.79
Mo (ppm)	0.11	BDL	BDL	BDL	BDL	BDL	BDL
Sn (ppm)	0.62	0.17	0.30	0.92	0.40	0.31	0.45
Te (ppm)	0.70	0.09	BDL	BDL	0.09	BDL	BDL
Cs (ppm)	0.91	0.23	BDL	0.23	0.24	0.19	0.20
Ba(137) (ppm)	3.94	6.34	BDL	16.18	12.64	4.66	2.50
Ba(138)* (ppm)	3.82	6.86	BDL	15.36	14.34	3.96	2.37
W (ppm)	0.85	3.96	1.74	3.33	10.60	BDL	0.03
Pb (ppm)	1.62	0.19	0.26	0.45	0.40	0.35	0.25
Bi (ppm)	0.22	0.07	BDL	0.02	BDL	0.05	0.04
Th (ppm)	0.17	0.30	0.11	0.25	1.56	0.05	0.10
U (ppm)	0.64	0.16	0.08	0.05	0.91	0.03	0.02
Tl (ppm)	BDL	0.02	BDL	0.08	BDL	BDL	BDL
SiO2 wt.%	27.99	28.81	28.81	28.81	28.81	28.81	28.81

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	H437269_15-3	H437289_27-1	H437289_31-1	H437289_31-2	H437289_31-3	H437289_35-1	H437289_35-2
Data Quality (1-3)	3	2.5	2.5	2.5	2.5	2.5	2.5
1 standard error (ppm) *							
Li	2.03	3.09	3.08	3.07	3.73	3.17	3.23
B	0.17	0.48	0.35	0.41	0.61	0.65	0.17
Si	2616.87	2693.53	2693.53	2693.53	2693.53	2693.53	2693.53
P	5.82	1.11	12.46	5.08	446.41	37.85	3.46
Sc	0.65	0.34	0.20	0.49	0.29	0.25	0.38
Ti	132.73	54.30	292.57	35.51	61.48	20.51	4.87
V	11.47	5.01	3.98	5.08	4.04	6.16	8.35
Cr	2.09	0.16	0.48	0.36	0.49	2.78	2.20
Mn	10.03	13.62	18.55	16.41	17.02	18.35	23.06
Co	0.62	2.88	3.96	4.28	4.28	4.16	4.39
Cu	86.87	12.38	22.96	26.73	19.44	13.13	14.44
Cu	88.40	11.20	23.61	26.99	19.17	12.88	19.60
Zn	3.87	2.28	3.45	2.26	2.64	3.30	2.32
Zn	5.78	2.98	4.17	3.11	3.22	3.30	2.88
As	0.13	0.08	0.23	0.16	0.12	0.06	0.18
Se	0.11	0.74	0.13	0.23	0.70	0.21	0.10
Se	0.08	BDL	0.42	BDL	BDL	BDL	0.12
Rb	0.06	0.91	5.17	0.70	1.73	0.14	0.09
Sr	0.46	0.04	0.16	0.04	2.00	0.76	0.15
Mo	0.03	BDL	BDL	BDL	BDL	BDL	BDL
Sn	0.05	0.05	0.02	0.10	0.04	0.07	0.07
Te	0.05	0.03	BDL	BDL	0.05	BDL	BDL
Cs	0.05	0.01	BDL	0.02	0.03	0.02	0.01
Ba	0.33	0.40	BDL	1.32	1.80	0.77	0.19
Ba	0.14	0.30	BDL	0.81	2.74	0.17	0.12
W	0.14	0.67	1.77	1.23	0.61	BDL	0.02
Pb	0.20	0.02	0.08	0.06	0.04	0.04	0.03
Bi	0.03	0.01	BDL	0.01	BDL	0.02	0.01
Th	0.03	0.03	1.23	0.04	0.14	0.02	0.01
U	0.03	0.02	0.95	0.03	0.10	0.01	0.02
Tl	BDL	0.00	BDL	0.01	BDL	BDL	BDL

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	H437269_15-3	H437289_27-1	H437289_31-1	H437289_31-2	H437289_31-3	H437289_35-1	H437289_35-2
Data Quality (1-3)	3	2.5	2.5	2.5	2.5	2.5	2.5
1 standard error (ppm)**							
Li	6.60	9.08	11.25	12.53	12.89	12.78	13.46
B	1.72	1.35	1.09	1.39	1.42	1.05	0.57
Si	4495.09	4626.78	4626.78	4626.78	4626.78	4626.78	4626.78
P	13.66	6.18	23.77	20.88	529.19	45.85	8.46
Sc	1.09	0.45	0.27	0.56	0.37	0.37	0.51
Ti	204.44	88.54	295.94	75.22	135.95	32.98	15.57
V	22.82	7.93	7.05	8.93	7.73	11.49	15.27
Cr	16.92	1.07	2.34	1.80	2.47	23.09	15.83
Mn	17.20	20.15	27.92	27.25	28.45	30.75	37.36
Co	1.17	5.90	8.08	8.79	8.95	8.33	9.26
Cu	219.16	38.04	66.29	73.57	67.57	44.75	48.97
Cu	219.65	37.21	65.59	72.19	67.21	44.29	51.28
Zn	5.08	2.65	4.10	3.18	3.48	3.89	3.14
Zn	6.73	3.48	5.11	4.38	4.48	4.25	4.11
As	0.59	0.14	0.24	0.33	0.36	0.11	0.25
Se	2.48	1.44	2.54	2.46	2.86	3.94	2.93
Se	0.31	BDL	1.27	BDL	BDL	BDL	0.43
Rb	0.08	0.93	5.17	0.76	1.73	0.15	0.09
Sr	0.53	0.04	0.16	0.04	2.00	0.76	0.15
Mo	0.03	BDL	BDL	BDL	BDL	BDL	BDL
Sn	0.12	0.06	0.06	0.19	0.08	0.09	0.11
Te	0.13	0.04	BDL	BDL	0.05	BDL	BDL
Cs	0.08	0.02	BDL	0.03	0.03	0.03	0.02
Ba	0.34	0.42	BDL	1.37	1.83	0.77	0.20
Ba	0.17	0.33	BDL	0.88	2.76	0.19	0.13
W	0.17	0.81	1.79	1.29	1.38	BDL	0.02
Pb	0.20	0.02	0.08	0.06	0.05	0.04	0.03
Bi	0.04	0.01	BDL	0.01	BDL	0.02	0.01
Th	0.03	0.04	1.23	0.04	0.17	0.02	0.01
U	0.06	0.03	0.95	0.03	0.12	0.01	0.02
Tl	BDL	0.00	BDL	0.01	BDL	BDL	BDL

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	Y-727-1	Y-727-2	Y-727-3	Y-727-4	Y-727-5	Y-727-6	Y-727-7
Data Quality (1-3)	1.5	1.5	3	1.5	2	1.5	2
Li (ppm)	63.28	39.23	52.19	53.16	48.06	47.77	57.41
B (ppm)	5.67	6.61	3.67	3.66	2.65	6.74	1.39
Si (ppm)	124345.55	124345.55	124345.55	124345.55	124345.55	124345.55	124345.55
P (ppm)	40.46	1055.11	44.32	464.89	28.82	88.64	196.29
Sc (ppm)	18.78	17.36	9.35	24.66	5.24	31.56	19.62
Ti (ppm)	11996.61	16915.87	7862.37	11804.60	6937.44	38755.82	6822.92
V (ppm)	266.30	226.96	203.45	317.64	159.08	382.46	210.59
Cr (ppm)	9.35	7.45	7.74	12.43	4.96	7.63	10.12
Mn (ppm)	3070.61	2496.62	2844.61	2672.22	1902.96	2473.76	2277.57
Co (ppm)	71.24	46.34	68.97	66.84	49.49	51.18	63.71
Cu(63) (ppm)	153.66	168.63	289.47	180.43	404.71	296.04	243.76
Cu(65)* (ppm)	158.76	173.72	292.88	176.08	405.32	298.57	244.59
Zn(66)* (ppm)	356.54	232.23	334.99	315.35	251.17	234.64	290.15
Zn(68) (ppm)	346.18	228.10	326.31	307.09	256.34	233.27	284.59
As (ppm)	1.22	1.71	1.07	0.84	0.88	2.25	0.54
Se(76) (ppm)	2.68	2.25	1.54	2.08	0.64	2.67	4.07
Se(77)* (ppm)	BDL	1.37	BDL	BDL	BDL	2.52	1.44
Rb (ppm)	2.47	29.75	2.32	29.67	34.57	50.74	27.55
Sr (ppm)	4.02	109.92	4.83	5.95	12.39	56.79	88.11
Mo (ppm)	BDL	0.14	BDL	0.19	BDL	0.09	0.24
Sn (ppm)	1.12	1.38	0.73	1.06	0.91	3.53	1.21
Te (ppm)	BDL	BDL	BDL	BDL	BDL	0.20	BDL
Cs (ppm)	1.41	0.85	0.95	1.93	2.06	2.84	2.14
Ba(137) (ppm)	2.43	34.36	3.19	33.43	180.62	82.11	43.64
Ba(138)* (ppm)	2.99	35.07	2.90	34.75	182.56	80.86	44.06
W (ppm)	12.60	20.59	7.21	6.24	4.19	17.49	4.79
Pb (ppm)	9.61	4.58	4.71	7.09	3.28	4.92	5.17
Bi (ppm)	0.02	0.03	0.01	0.04	0.06	0.09	0.06
Th (ppm)	BDL	0.02	BDL	0.01	BDL	0.30	0.21
U (ppm)	0.23	0.35	0.21	0.24	0.32	1.15	0.53
Tl (ppm)	0.02	0.13	0.02	0.32	0.33	0.60	0.43
SiO2 wt.%	26.60	26.60	26.60	26.60	26.60	26.60	26.60

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	Y-727-1	Y-727-2	Y-727-3	Y-727-4	Y-727-5	Y-727-6	Y-727-7
Data Quality (1-3)	1.5	1.5	3	1.5	2	1.5	2
1 standard error (ppm) *							
Li	3.13	1.55	2.29	1.68	1.88	2.44	2.41
B	0.77	2.39	0.68	0.98	0.41	1.51	0.67
Si	2486.91	2486.91	2486.91	2486.91	2486.91	2486.91	2486.91
P	18.59	424.65	4.94	25.22	2.17	74.97	18.27
Sc	0.74	0.75	0.92	1.08	0.27	2.87	0.81
Ti	1176.30	2383.89	331.78	465.27	210.91	3211.38	678.74
V	11.04	6.63	7.29	6.88	5.24	11.30	4.96
Cr	1.18	0.39	0.30	0.38	0.56	0.52	0.34
Mn	317.62	83.71	68.53	70.59	113.85	198.17	102.94
Co	3.31	1.47	1.84	2.14	1.32	2.04	2.63
Cu	6.80	4.57	9.29	5.38	11.15	8.37	6.21
Cu	8.99	4.63	11.39	7.66	9.27	12.61	5.54
Zn	14.08	7.67	9.37	7.52	7.89	6.51	6.67
Zn	14.99	6.76	10.35	7.78	10.82	9.07	6.62
As	0.32	0.47	0.27	0.19	0.16	0.22	0.41
Se	0.72	0.76	0.64	0.50	0.30	0.97	1.12
Se	BDL	0.17	BDL	BDL	BDL	0.59	1.04
Rb	0.25	1.87	0.29	0.78	1.29	1.42	0.87
Sr	0.36	13.77	0.22	0.30	0.78	14.79	2.31
Mo	BDL	0.05	BDL	0.04	BDL	0.15	0.08
Sn	0.14	0.14	0.08	0.09	0.10	0.15	0.06
Te	BDL	BDL	BDL	BDL	BDL	0.16	BDL
Cs	0.15	0.06	0.08	0.16	0.22	0.12	0.15
Ba	0.78	5.43	0.45	1.90	10.38	7.15	8.72
Ba	0.47	3.80	0.10	1.14	14.27	6.58	8.77
W	1.94	6.87	0.40	1.36	0.34	4.35	0.40
Pb	0.64	0.32	0.47	0.61	0.16	0.29	0.29
Bi	0.02	0.01	0.01	0.00	0.01	0.05	0.01
Th	BDL	0.04	BDL	0.03	BDL	0.40	0.04
U	0.04	0.08	0.07	0.04	0.05	0.11	0.05
Tl	0.02	0.05	0.01	0.03	0.06	0.10	0.06

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	Y-727-1	Y-727-2	Y-727-3	Y-727-4	Y-727-5	Y-727-6	Y-727-7
Data Quality (1-3)	1.5	1.5	3	1.5	2	1.5	2
1 standard error (ppm)**							
Li	9.44	5.73	7.69	7.67	7.02	7.15	8.43
B	2.20	3.39	1.50	1.65	1.05	2.88	0.84
Si	4271.86	4271.86	4271.86	4271.86	4271.86	4271.86	4271.86
P	21.94	522.19	13.69	136.25	8.58	79.20	59.41
Sc	1.12	1.07	1.01	1.54	0.35	3.20	1.19
Ti	1629.59	2865.61	810.17	1203.31	685.43	4856.64	933.86
V	16.43	12.31	11.81	16.06	8.96	20.81	10.82
Cr	2.21	1.54	1.58	2.52	1.14	1.61	2.05
Mn	335.13	120.67	120.43	116.78	131.72	216.07	129.94
Co	5.04	2.87	4.10	4.15	2.95	3.40	4.29
Cu	17.60	18.39	31.96	19.81	44.18	32.37	26.49
Cu	19.04	18.94	33.00	20.13	43.85	33.99	26.45
Zn	16.32	9.36	12.16	10.48	9.80	8.48	9.46
Zn	16.98	8.56	12.79	10.51	12.32	10.54	9.31
As	0.53	0.76	0.46	0.35	0.34	0.81	0.45
Se	2.26	1.95	1.39	1.74	0.59	2.35	3.44
Se	BDL	1.11	BDL	BDL	BDL	2.10	1.55
Rb	0.25	1.93	0.29	0.90	1.40	1.63	0.97
Sr	0.36	13.91	0.24	0.31	0.81	14.83	2.81
Mo	BDL	0.05	BDL	0.04	BDL	0.15	0.08
Sn	0.24	0.29	0.15	0.21	0.19	0.65	0.23
Te	BDL	BDL	BDL	BDL	BDL	0.16	BDL
Cs	0.17	0.08	0.10	0.20	0.26	0.22	0.21
Ba	0.78	5.47	0.45	2.01	10.95	7.33	8.76
Ba	0.47	3.86	0.12	1.33	14.72	6.77	8.81
W	2.45	7.29	0.94	1.55	0.60	4.81	0.69
Pb	0.82	0.40	0.54	0.72	0.24	0.39	0.40
Bi	0.02	0.01	0.01	0.00	0.01	0.05	0.01
Th	BDL	0.04	BDL	0.03	BDL	0.40	0.04
U	0.05	0.09	0.07	0.05	0.06	0.14	0.06
Tl	0.02	0.05	0.01	0.05	0.07	0.11	0.07

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	Y-727-8	Y-727-9	YD01-01C_15-1	YD01-01C_15-2	YD01-01C_15-3	YD01-01C_17-1	YD01-01C_17-2
Data Quality (1-3)	1.5	1.5	3	2.5	2	2	3
Li (ppm)	66.59	57.63	40.57	34.71	43.41	27.01	44.97
B (ppm)	3.72	6.67	1.52	1.29	1.23	3.13	2.15
Si (ppm)	124345.55	124345.55	133741.59	133741.59	133741.59	133741.59	133741.59
P (ppm)	46.54	32.88	30.52	31.49	23.28	BDL	35.58
Sc (ppm)	9.84	19.28	2.28	2.56	0.26	5.81	3.01
Ti (ppm)	25312.05	31041.18	87.65	4547.69	132.66	9073.39	123.65
V (ppm)	311.88	345.82	298.30	345.04	231.73	314.49	288.37
Cr (ppm)	8.23	9.01	39.20	42.50	35.65	35.35	30.13
Mn (ppm)	4187.33	3048.94	3944.26	3753.78	3952.73	2614.42	3998.37
Co (ppm)	67.61	64.55	12.00	12.51	12.42	8.79	12.07
Cu(63) (ppm)	250.55	184.86	198.72	263.20	262.77	270.37	252.70
Cu(65)* (ppm)	259.36	183.53	193.81	259.08	259.88	266.97	250.28
Zn(66)* (ppm)	318.13	284.02	232.34	229.27	230.64	175.18	235.65
Zn(68) (ppm)	306.92	282.78	221.70	224.20	225.72	213.38	220.53
As (ppm)	3.37	2.58	0.57	1.85	0.58	0.94	0.47
Se(76) (ppm)	2.49	BDL	3.78	2.67	2.44	1.26	2.51
Se(77)* (ppm)	BDL	BDL	1.13	BDL	BDL	0.52	0.65
Rb (ppm)	21.12	9.02	0.98	2.08	0.62	31.79	0.99
Sr (ppm)	5.63	4.52	1.64	2.95	BDL	75.70	1.42
Mo (ppm)	BDL	BDL	BDL	0.18	0.19	0.04	0.18
Sn (ppm)	1.20	2.03	0.11	0.46	0.35	0.36	0.17
Te (ppm)	BDL	BDL	BDL	0.16	BDL	0.41	0.08
Cs (ppm)	2.76	1.38	0.63	0.94	0.71	1.07	0.92
Ba(137) (ppm)	14.89	11.16	1.78	3.70	1.86	1114.36	2.23
Ba(138)* (ppm)	15.61	10.92	1.46	3.46	1.55	1175.99	2.07
W (ppm)	21.92	17.29	0.15	30.60	0.36	24.77	0.18
Pb (ppm)	8.63	7.23	4.55	16.99	3.14	9.03	6.10
Bi (ppm)	0.09	0.08	0.09	0.43	0.10	0.65	0.28
Th (ppm)	0.07	BDL	BDL	1.12	BDL	13.47	0.01
U (ppm)	0.80	1.14	0.00	2.00	BDL	2.31	0.03
Tl (ppm)	0.23	0.10	BDL	0.03	BDL	0.18	BDL
SiO2 wt.%	26.60	26.60	28.61	28.61	28.61	28.61	28.61

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	Y-727-8	Y-727-9	YD01-01C_15-1	YD01-01C_15-2	YD01-01C_15-3	YD01-01C_17-1	YD01-01C_17-2
Data Quality (1-3)	1.5	1.5	3	2.5	2	2	3
1 standard error (ppm) *							
Li	3.40	4.41	2.04	1.47	0.91	0.82	1.39
B	0.62	1.32	0.22	0.19	0.53	0.18	0.37
Si	2486.91	2486.91	2674.83	2674.83	2674.83	2674.83	2674.83
P	6.15	4.27	1.83	2.90	4.20	BDL	5.87
Sc	0.43	1.94	0.17	0.07	2.61	0.22	0.16
Ti	4578.43	5863.09	3.79	180.37	5.55	207.87	5.31
V	8.42	15.94	10.94	12.28	7.74	12.66	9.65
Cr	0.70	1.47	1.27	1.24	1.14	1.08	0.92
Mn	219.15	154.85	99.93	88.71	94.49	65.18	95.99
Co	3.53	2.06	0.54	0.43	0.41	0.34	0.38
Cu	12.35	6.02	4.94	7.36	8.13	11.30	6.49
Cu	13.61	8.07	5.73	7.16	8.39	7.81	8.77
Zn	11.06	7.36	6.15	7.51	9.93	5.21	6.71
Zn	13.38	7.38	6.43	6.57	7.02	7.22	6.66
As	0.14	0.73	0.05	0.22	0.13	0.21	0.07
Se	0.61	BDL	0.55	0.12	0.21	0.23	0.21
Se	BDL	BDL	0.37	BDL	BDL	0.16	0.12
Rb	0.57	0.26	0.07	0.06	0.02	2.28	0.06
Sr	0.63	3.26	0.14	0.09	BDL	2.26	0.05
Mo	BDL	BDL	BDL	0.03	0.06	0.04	0.03
Sn	0.18	0.13	0.05	0.04	0.04	0.06	0.01
Te	BDL	BDL	BDL	0.09	BDL	0.06	0.05
Cs	0.32	0.08	0.04	0.04	0.05	0.08	0.04
Ba	0.64	0.51	0.12	0.30	0.15	58.43	0.19
Ba	1.38	0.35	0.07	0.13	0.07	180.56	0.06
W	5.91	2.44	0.05	1.81	0.10	1.05	0.03
Pb	0.54	0.40	0.27	1.05	0.29	0.55	0.36
Bi	0.03	0.02	0.01	0.02	0.07	0.05	0.02
Th	0.04	BDL	BDL	1.05	BDL	0.59	0.01
U	0.19	0.15	0.02	0.10	BDL	0.09	0.01
Tl	0.04	0.02	BDL	0.01	BDL	0.04	BDL

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	Y-727-8	Y-727-9	YD01-01C_15-1	YD01-01C_15-2	YD01-01C_15-3	YD01-01C_17-1	YD01-01C_17-2
Data Quality (1-3)	1.5	1.5	3	2.5	2	2	3
1 standard error (ppm)**							
Li	9.97	9.23	6.02	5.07	6.13	3.86	6.43
B	1.49	2.76	0.59	0.51	0.70	1.15	0.87
Si	4271.86	4271.86	4594.66	4594.66	4594.66	4594.66	4594.66
P	14.75	10.39	8.96	9.50	7.89	BDL	11.79
Sc	0.62	2.12	0.19	0.12	2.61	0.32	0.20
Ti	5159.86	6549.14	9.07	463.86	13.65	877.62	12.77
V	16.55	22.44	19.12	21.91	14.44	20.83	17.98
Cr	1.79	2.32	7.98	8.63	7.26	7.19	6.13
Mn	263.21	187.74	173.80	161.81	170.98	114.60	173.18
Co	5.04	4.01	0.87	0.83	0.82	0.61	0.79
Cu	29.21	20.44	21.66	28.88	29.04	30.83	27.59
Cu	30.62	21.02	21.49	28.61	29.02	29.59	28.15
Zn	13.28	9.87	8.79	9.74	11.73	7.05	9.26
Zn	15.13	9.84	8.92	9.07	9.43	9.35	9.07
As	1.18	1.15	0.20	0.68	0.24	0.39	0.18
Se	2.08	BDL	3.08	2.14	1.97	1.03	2.02
Se	BDL	BDL	0.98	BDL	BDL	0.44	0.53
Rb	0.65	0.30	0.07	0.07	0.02	2.33	0.06
Sr	0.63	3.26	0.14	0.10	BDL	2.49	0.05
Mo	BDL	BDL	BDL	0.03	0.06	0.04	0.03
Sn	0.28	0.39	0.05	0.09	0.08	0.09	0.03
Te	BDL	BDL	BDL	0.09	BDL	0.09	0.05
Cs	0.37	0.12	0.06	0.07	0.06	0.11	0.07
Ba	0.70	0.55	0.12	0.30	0.15	60.39	0.20
Ba	1.42	0.41	0.07	0.14	0.08	181.31	0.06
W	6.46	3.19	0.05	4.08	0.11	3.14	0.03
Pb	0.71	0.56	0.38	1.45	0.35	0.77	0.51
Bi	0.03	0.02	0.01	0.05	0.07	0.08	0.03
Th	0.04	BDL	BDL	1.05	BDL	0.96	0.01
U	0.20	0.17	0.02	0.18	BDL	0.19	0.01
Tl	0.04	0.03	BDL	0.01	BDL	0.05	BDL

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	YD01-01C_18-1	YD01-01C_18-2	YD01-01C_18-3	YD01-01C_18-4	YD01-01C_18-5	YD01-01C_18-6	YD01-01C_18-7
Data Quality (1-3)	2	2.5	2	2.5	2.5	2.5	2.5
Li (ppm)	29.71	34.64	33.06	32.29	37.57	34.33	29.52
B (ppm)	0.86	1.53	1.34	0.95	1.82	3.66	0.78
Si (ppm)	133741.59	133741.59	133741.59	133741.59	133741.59	133741.59	133741.59
P (ppm)	31.19	33.20	35.52	29.61	58.98	81.58	20.87
Sc (ppm)	2.03	2.69	2.37	2.58	5.83	3.51	2.17
Ti (ppm)	284.57	1665.05	919.90	1450.99	8739.10	4223.93	1101.61
V (ppm)	219.92	197.40	227.07	217.23	299.65	291.95	207.48
Cr (ppm)	29.54	33.82	28.66	26.48	34.51	27.17	28.03
Mn (ppm)	2979.38	3012.97	3065.76	2858.65	3456.39	3567.16	2780.11
Co (ppm)	10.06	10.01	9.80	8.83	11.27	11.28	9.18
Cu(63) (ppm)	189.73	260.47	204.04	262.08	251.55	281.12	162.77
Cu(65)* (ppm)	189.81	258.73	204.82	258.41	250.28	277.45	164.88
Zn(66)* (ppm)	186.92	195.29	187.53	178.63	204.15	218.03	169.01
Zn(68) (ppm)	198.21	190.72	227.93	184.30	193.26	208.31	168.21
As (ppm)	0.58	0.66	0.71	0.95	1.32	1.02	0.56
Se(76) (ppm)	2.46	2.01	2.60	2.30	3.15	5.40	1.12
Se(77)* (ppm)	BDL	0.48	BDL	0.41	0.94	BDL	0.95
Rb (ppm)	8.22	1.96	23.27	8.74	3.06	2.72	1.30
Sr (ppm)	8.50	2.23	20.58	41.83	78.82	15.40	1.49
Mo (ppm)	BDL	BDL	BDL	BDL	0.10	BDL	0.20
Sn (ppm)	0.23	0.27	0.24	0.23	0.67	0.47	0.27
Te (ppm)	BDL	0.07	0.10	0.06	0.11	BDL	BDL
Cs (ppm)	0.79	0.70	0.85	0.75	0.81	0.61	0.58
Ba(137) (ppm)	370.56	29.14	1120.19	238.64	57.52	49.98	2.99
Ba(138)* (ppm)	380.53	30.37	1138.30	243.00	57.31	43.78	3.32
W (ppm)	0.70	5.72	2.85	6.78	11.51	8.35	2.18
Pb (ppm)	4.06	6.32	3.98	7.37	5.15	7.30	5.66
Bi (ppm)	0.02	0.15	0.09	0.18	0.10	0.25	0.17
Th (ppm)	0.07	3.51	0.27	0.78	10.69	0.78	0.60
U (ppm)	0.01	1.08	0.49	0.95	2.12	1.40	0.32
Tl (ppm)	0.05	0.01	0.15	0.03	BDL	0.02	BDL
SiO2 wt.%	28.61	28.61	28.61	28.61	28.61	28.61	28.61

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	YD01-01C_18-1	YD01-01C_18-2	YD01-01C_18-3	YD01-01C_18-4	YD01-01C_18-5	YD01-01C_18-6	YD01-01C_18-7
Data Quality (1-3)	2	2.5	2	2.5	2.5	2.5	2.5
1 standard error (ppm) *							
Li	0.73	1.53	0.85	1.37	1.02	1.07	1.29
B	0.21	0.18	0.14	0.23	0.27	0.60	0.32
Si	2674.83	2674.83	2674.83	2674.83	2674.83	2674.83	2674.83
P	2.30	2.26	2.19	2.35	2.79	22.05	2.33
Sc	0.11	0.09	0.13	0.40	0.27	0.15	0.11
Ti	52.93	80.60	96.68	188.41	205.60	215.22	156.43
V	7.48	7.07	7.75	9.94	10.14	13.35	6.99
Cr	1.09	1.06	0.98	0.97	1.32	0.90	0.89
Mn	83.92	81.40	75.70	96.53	101.29	89.77	65.63
Co	0.40	0.34	0.44	0.43	0.48	0.38	0.45
Cu	5.02	9.35	5.20	9.71	6.53	8.49	6.34
Cu	6.07	9.57	6.08	12.30	7.20	8.57	4.59
Zn	5.68	5.29	5.81	5.05	5.35	6.07	5.75
Zn	5.43	6.22	6.43	5.22	5.36	6.09	4.51
As	0.08	0.04	0.16	0.08	0.13	0.06	0.07
Se	0.23	0.10	0.27	0.07	0.25	0.81	0.20
Se	BDL	0.14	BDL	0.28	0.30	BDL	0.20
Rb	0.51	0.08	1.45	0.29	0.08	0.13	0.11
Sr	0.28	0.08	1.61	6.88	3.91	1.60	0.16
Mo	BDL	BDL	BDL	BDL	0.04	BDL	0.05
Sn	0.04	0.04	0.05	0.04	0.04	0.05	0.02
Te	BDL	0.05	0.04	0.06	0.03	BDL	BDL
Cs	0.05	0.07	0.04	0.03	0.04	0.12	0.04
Ba	12.74	6.87	28.76	7.84	9.79	6.43	0.24
Ba	11.35	7.62	31.71	8.13	9.43	6.33	0.23
W	0.68	0.45	0.17	0.73	0.54	0.33	0.42
Pb	0.30	0.37	0.46	0.49	0.33	0.49	0.36
Bi	0.01	0.03	0.02	0.02	0.02	0.02	0.03
Th	0.01	0.13	0.05	0.53	0.38	0.40	0.24
U	0.09	0.12	0.12	0.23	0.21	0.18	0.05
Tl	0.01	0.00	0.02	0.01	BDL	0.02	BDL

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	YD01-01C_18-1	YD01-01C_18-2	YD01-01C_18-3	YD01-01C_18-4	YD01-01C_18-5	YD01-01C_18-6	YD01-01C_18-7
Data Quality (1-3)	2	2.5	2	2.5	2.5	2.5	2.5
1 standard error (ppm)**							
Li	4.21	5.08	4.69	4.71	5.34	4.91	4.32
B	0.38	0.58	0.51	0.42	0.72	1.46	0.43
Si	4594.66	4594.66	4594.66	4594.66	4594.66	4594.66	4594.66
P	9.25	9.80	10.44	8.83	17.17	32.18	6.43
Sc	0.14	0.14	0.16	0.41	0.36	0.20	0.14
Ti	59.30	176.01	129.69	232.58	846.58	451.52	187.58
V	13.77	12.56	14.24	15.14	18.74	20.35	12.96
Cr	6.04	6.88	5.84	5.41	7.06	5.53	5.71
Mn	136.31	135.74	133.96	141.20	160.58	156.83	119.80
Co	0.70	0.66	0.71	0.66	0.80	0.75	0.69
Cu	20.75	29.17	22.27	29.45	27.48	31.01	18.40
Cu	21.18	29.26	22.72	30.24	27.71	30.87	18.21
Zn	7.60	7.48	7.71	6.99	7.69	8.46	7.35
Zn	7.75	8.18	9.04	7.32	7.60	8.42	6.51
As	0.21	0.23	0.29	0.34	0.48	0.36	0.21
Se	1.98	1.61	2.10	1.84	2.53	4.39	0.92
Se	BDL	0.41	BDL	0.43	0.82	BDL	0.79
Rb	0.53	0.09	1.49	0.32	0.09	0.13	0.11
Sr	0.30	0.08	1.64	6.90	4.06	1.61	0.16
Mo	BDL	BDL	BDL	BDL	0.04	BDL	0.05
Sn	0.06	0.06	0.07	0.06	0.13	0.10	0.05
Te	BDL	0.06	0.05	0.06	0.04	BDL	BDL
Cs	0.07	0.08	0.07	0.06	0.06	0.13	0.05
Ba	13.72	6.88	32.60	8.50	9.82	6.46	0.25
Ba	12.54	7.64	35.49	8.81	9.47	6.36	0.24
W	0.68	0.82	0.38	1.09	1.48	1.05	0.49
Pb	0.38	0.53	0.52	0.66	0.45	0.66	0.49
Bi	0.01	0.04	0.02	0.03	0.02	0.03	0.03
Th	0.01	0.23	0.05	0.53	0.70	0.40	0.25
U	0.09	0.14	0.12	0.24	0.26	0.21	0.05
Tl	0.01	0.00	0.02	0.01	BDL	0.02	BDL

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	YD01-01C_18-8	YD01-01C_21-1	YD01-01C_22-1	YD01-01C_22-2	YD01-01C_22-3	YD01-04_01-1	YD01-04_01-10
Data Quality (1-3)	2	2.5	3	3	2.5	3	2.5
Li (ppm)	34.47	39.85	38.97	39.93	43.55	45.39	40.87
B (ppm)	1.41	2.43	1.76	1.53	2.13	2.52	9.18
Si (ppm)	133741.59	133741.59	133741.59	133741.59	133741.59	131544.50	131544.50
P (ppm)	30.12	25.28	28.90	38.28	35.51	73.34	216.28
Sc (ppm)	2.07	1.78	3.05	2.41	2.38	3.03	2.41
Ti (ppm)	97.13	480.71	2277.42	776.65	5267.30	66.10	108.85
V (ppm)	218.78	256.87	272.74	253.06	262.55	110.21	120.49
Cr (ppm)	31.74	48.98	34.74	32.51	37.28	36.91	45.86
Mn (ppm)	3287.89	3754.45	3665.02	3524.42	3876.48	1995.23	1559.49
Co (ppm)	9.98	12.89	11.66	10.82	11.59	20.97	19.86
Cu(63) (ppm)	222.44	233.81	263.70	224.97	379.34	1579.23	717.65
Cu(65)* (ppm)	228.24	237.36	264.94	224.98	393.01	1612.41	676.11
Zn(66)* (ppm)	198.97	242.12	237.32	217.82	255.59	157.98	162.85
Zn(68) (ppm)	223.82	223.76	231.14	202.89	249.34	155.13	154.05
As (ppm)	0.27	0.52	1.12	0.88	1.20	0.18	0.74
Se(76) (ppm)	2.54	2.37	2.53	3.42	2.64	4.38	6.60
Se(77)* (ppm)	BDL	BDL	0.65	0.33	BDL	BDL	BDL
Rb (ppm)	20.85	1.45	2.39	0.98	1.90	0.55	4.56
Sr (ppm)	12.82	2.21	2.06	1.83	2.37	205.22	27.01
Mo (ppm)	0.11	0.05	0.10	BDL	0.28	BDL	0.17
Sn (ppm)	0.40	BDL	0.32	0.17	0.38	0.11	0.76
Te (ppm)	BDL	BDL	BDL	BDL	0.18	BDL	BDL
Cs (ppm)	0.72	1.25	1.12	0.81	1.19	0.51	0.56
Ba(137) (ppm)	691.71	3.44	2.54	2.17	2.32	0.68	9.68
Ba(138)* (ppm)	699.02	3.03	2.67	2.10	3.51	0.79	8.43
W (ppm)	BDL	1.23	4.44	2.47	13.98	BDL	0.29
Pb (ppm)	3.64	6.63	7.49	5.86	8.93	0.88	3.83
Bi (ppm)	0.09	BDL	0.25	0.14	0.46	BDL	0.20
Th (ppm)	BDL	0.06	0.07	0.47	4.21	1.42	0.24
U (ppm)	0.02	0.09	0.81	0.32	1.35	0.17	3.01
Tl (ppm)	0.15	0.02	0.02	BDL	0.02	0.01	0.01
SiO2 wt.%	28.61	28.61	28.61	28.61	28.61	28.14	28.14

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	YD01-01C_18-8	YD01-01C_21-1	YD01-01C_22-1	YD01-01C_22-2	YD01-01C_22-3	YD01-04_01-1	YD01-04_01-10
Data Quality (1-3)	2	2.5	3	3	2.5	3	2.5
1 standard error (ppm) *							
Li	0.92	1.79	1.03	1.88	1.31	1.57	1.46
B	0.28	0.17	0.12	0.29	0.28	0.14	4.89
Si	2674.83	2674.83	2674.83	2674.83	2674.83	2630.89	2630.89
P	3.53	4.20	1.62	1.40	3.65	26.24	97.99
Sc	0.06	0.18	0.21	0.12	0.23	0.14	0.14
Ti	71.28	62.75	105.73	36.63	266.09	8.22	12.57
V	7.42	8.82	9.15	9.12	9.11	3.45	3.99
Cr	1.55	1.75	1.55	0.94	1.35	1.26	3.42
Mn	93.97	88.84	93.79	116.40	155.27	52.78	84.74
Co	0.34	0.43	0.51	0.48	0.51	0.87	0.51
Cu	12.31	6.89	6.38	7.40	10.31	56.74	34.78
Cu	10.10	6.74	9.17	9.19	11.35	60.28	36.96
Zn	5.27	6.41	6.22	11.29	8.38	4.90	15.12
Zn	6.62	7.17	6.82	9.99	8.12	7.25	8.64
As	0.12	0.04	0.31	0.03	0.15	0.04	0.26
Se	0.22	0.19	0.31	0.20	0.24	0.46	2.11
Se	BDL	BDL	0.08	0.24	BDL	BDL	BDL
Rb	0.68	0.05	0.15	0.05	0.10	0.08	0.89
Sr	0.37	0.06	0.16	0.06	0.15	18.48	3.86
Mo	0.03	0.08	0.06	BDL	0.06	BDL	0.08
Sn	0.07	BDL	0.06	0.11	0.04	0.05	0.10
Te	BDL	BDL	BDL	BDL	0.08	BDL	BDL
Cs	0.06	0.11	0.09	0.03	0.06	0.03	0.03
Ba	18.13	0.16	0.23	0.15	1.50	0.29	2.55
Ba	16.66	0.11	0.10	0.12	0.50	0.08	0.58
W	BDL	0.27	0.43	0.17	0.63	BDL	0.08
Pb	0.21	0.42	0.62	0.38	0.99	0.05	1.22
Bi	0.01	BDL	0.03	0.03	0.04	BDL	0.06
Th	BDL	0.03	0.02	0.04	0.35	0.29	0.08
U	0.01	0.01	0.03	0.02	0.06	0.06	0.44
Tl	0.02	0.01	0.01	BDL	0.00	0.01	0.01

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	YD01-01C_18-8	YD01-01C_21-1	YD01-01C_22-1	YD01-01C_22-2	YD01-01C_22-3	YD01-04_01-1	YD01-04_01-10
Data Quality (1-3)	2	2.5	3	3	2.5	3	2.5
1 standard error (ppm)**							
Li	4.90	5.85	5.54	5.89	6.22	6.60	5.95
B	0.59	0.90	0.65	0.63	0.82	0.93	5.93
Si	4594.66	4594.66	4594.66	4594.66	4594.66	4519.18	4519.18
P	9.35	8.39	8.46	11.09	10.83	35.34	120.30
Sc	0.10	0.19	0.24	0.15	0.25	0.18	0.18
Ti	71.86	77.32	238.71	81.66	561.97	12.67	20.26
V	13.69	16.13	17.02	16.14	16.54	6.45	7.17
Cr	6.57	10.00	7.15	6.60	7.61	7.51	9.81
Mn	151.27	161.91	162.03	172.32	208.90	91.84	103.11
Co	0.66	0.85	0.84	0.78	0.83	1.43	1.18
Cu	26.62	25.75	28.70	24.99	41.55	181.45	85.70
Cu	26.40	26.25	29.77	25.74	43.52	186.79	82.83
Zn	7.54	9.17	8.94	12.74	10.87	6.39	15.69
Zn	9.10	9.50	9.38	11.48	10.69	8.43	9.63
As	0.15	0.19	0.50	0.31	0.44	0.07	0.37
Se	2.05	1.91	2.05	2.75	2.13	3.54	5.69
Se	BDL	BDL	0.53	0.36	BDL	BDL	BDL
Rb	0.75	0.06	0.16	0.05	0.11	0.08	0.90
Sr	0.41	0.06	0.16	0.07	0.16	19.02	3.91
Mo	0.03	0.08	0.06	BDL	0.07	BDL	0.08
Sn	0.10	BDL	0.08	0.12	0.08	0.05	0.17
Te	BDL	BDL	BDL	BDL	0.09	BDL	BDL
Cs	0.07	0.14	0.11	0.06	0.10	0.05	0.05
Ba	20.46	0.17	0.23	0.15	1.50	0.29	2.55
Ba	19.33	0.11	0.11	0.13	0.50	0.08	0.61
W	BDL	0.31	0.68	0.34	1.78	BDL	0.09
Pb	0.30	0.58	0.76	0.51	1.12	0.06	1.23
Bi	0.01	BDL	0.04	0.03	0.06	BDL	0.06
Th	BDL	0.03	0.02	0.05	0.42	0.30	0.08
U	0.01	0.01	0.07	0.03	0.11	0.06	0.49
Tl	0.02	0.01	0.01	BDL	0.00	0.01	0.01

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	YD01-04_01-2	YD01-04_01-3	YD01-04_01-4	YD01-04_01-5	YD01-04_01-6	YD01-04_01-7	YD01-04_01-8
Data Quality (1-3)	3	1.5	1	2.5	2.5	2.5	2
Li (ppm)	40.65	33.87	23.29	44.06	43.27	40.84	48.33
B (ppm)	1.12	6.08	2.58	3.23	7.24	0.80	12.05
Si (ppm)	131544.50	131544.50	131544.50	131544.50	131544.50	131544.50	131544.50
P (ppm)	30.10	42.75	36.16	88.93	80.76	38.08	290.60
Sc (ppm)	3.22	8.63	10.77	2.33	2.48	2.41	3.07
Ti (ppm)	69.08	215.90	140.52	78.10	86.04	62.42	64.17
V (ppm)	131.97	124.81	139.52	120.58	127.72	115.16	111.21
Cr (ppm)	38.49	35.49	26.63	25.63	26.22	33.42	83.20
Mn (ppm)	1882.66	1173.29	991.60	1891.17	1962.98	1679.98	1578.80
Co (ppm)	18.79	12.37	8.69	21.49	22.15	18.79	19.47
Cu(63) (ppm)	849.15	8055.21	2307.56	488.98	304.73	310.65	624.96
Cu(65)* (ppm)	854.60	8001.55	1997.62	474.11	306.02	320.30	648.73
Zn(66)* (ppm)	129.25	105.81	63.10	130.78	142.05	113.28	241.92
Zn(68) (ppm)	127.01	120.78	81.58	129.08	136.04	111.88	233.93
As (ppm)	0.37	0.59	0.53	0.15	0.07	0.24	1.85
Se(76) (ppm)	3.93	3.62	5.37	3.88	2.64	BDL	2.74
Se(77)* (ppm)	0.35	0.71	BDL	BDL	0.17	BDL	BDL
Rb (ppm)	0.53	82.25	35.94	1.60	2.34	0.55	8.55
Sr (ppm)	490.23	1057.74	1888.66	8.45	2.49	2.82	14.25
Mo (ppm)	0.08	0.02	0.08	BDL	BDL	0.10	BDL
Sn (ppm)	0.31	0.46	0.53	0.19	0.61	0.14	3.01
Te (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs (ppm)	0.64	5.01	1.69	0.59	0.75	0.66	0.40
Ba(137) (ppm)	0.82	397.18	259.13	1.74	1.79	1.73	8.21
Ba(138)* (ppm)	1.13	386.39	253.66	3.04	1.75	1.66	3.04
W (ppm)	0.01	0.23	0.09	0.19	0.13	0.04	0.24
Pb (ppm)	1.99	3.10	4.54	0.84	1.06	0.45	5.59
Bi (ppm)	0.15	0.26	0.65	0.08	0.06	0.01	0.09
Th (ppm)	2.77	9.78	17.66	0.06	BDL	0.00	0.10
U (ppm)	0.97	1.68	3.00	0.04	0.02	0.01	0.09
Tl (ppm)	0.01	0.56	0.17	0.01	0.03	0.01	BDL
SiO2 wt.%	28.14	28.14	28.14	28.14	28.14	28.14	28.14

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	YD01-04_01-2	YD01-04_01-3	YD01-04_01-4	YD01-04_01-5	YD01-04_01-6	YD01-04_01-7	YD01-04_01-8
Data Quality (1-3)	3	1.5	1	2.5	2.5	2.5	2
1 standard error (ppm) *							
Li	1.38	1.86	1.13	1.62	1.77	2.67	3.18
B	0.08	0.39	0.11	0.81	1.94	0.28	4.02
Si	2630.89	2630.89	2630.89	2630.89	2630.89	2630.89	2630.89
P	4.88	7.75	5.95	34.66	14.36	11.74	125.46
Sc	0.30	0.41	0.62	0.15	0.07	0.09	0.26
Ti	8.06	37.59	25.46	9.38	10.71	7.44	10.55
V	3.86	4.98	4.14	4.05	4.75	4.95	3.73
Cr	1.10	1.31	0.75	0.73	1.24	1.34	2.94
Mn	69.95	37.77	60.22	55.93	51.11	76.54	41.07
Co	0.68	0.38	0.53	0.54	0.66	0.85	1.20
Cu	50.24	481.79	150.13	20.80	11.18	18.62	65.97
Cu	57.01	556.89	93.98	21.89	15.72	16.46	71.54
Zn	4.65	5.44	3.07	3.40	4.72	4.83	52.42
Zn	5.42	5.63	2.79	3.88	4.55	4.66	45.11
As	0.07	0.07	0.08	0.11	0.09	0.10	0.71
Se	0.22	0.31	0.33	0.47	0.27	BDL	0.29
Se	0.07	0.24	BDL	BDL	0.27	BDL	BDL
Rb	0.06	6.91	3.60	0.40	0.32	0.03	2.78
Sr	25.39	63.15	89.18	2.20	0.33	0.26	1.60
Mo	0.04	0.03	0.03	BDL	BDL	0.03	BDL
Sn	0.05	0.04	0.04	0.07	0.08	0.05	1.14
Te	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs	0.03	0.50	0.11	0.20	0.20	0.04	0.09
Ba	0.09	35.47	24.59	1.22	0.19	0.30	2.18
Ba	0.16	36.96	25.38	0.50	0.19	0.35	1.07
W	0.01	0.01	0.01	0.07	0.07	0.02	0.10
Pb	0.15	0.12	0.28	0.28	0.24	0.12	1.94
Bi	0.02	0.01	0.07	0.03	0.02	0.00	0.01
Th	0.37	0.82	0.83	0.01	BDL	0.01	0.01
U	0.14	0.14	0.12	0.02	0.02	0.00	0.04
Tl	0.00	0.10	0.06	0.01	0.01	0.00	BDL

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	YD01-04_01-2	YD01-04_01-3	YD01-04_01-4	YD01-04_01-5	YD01-04_01-6	YD01-04_01-7	YD01-04_01-8
Data Quality (1-3)	3	1.5	1	2.5	2.5	2.5	2
1 standard error (ppm)**							
Li	5.90	5.13	3.48	6.43	6.36	6.35	7.53
B	0.42	2.25	0.94	1.43	3.27	0.41	5.95
Si	4519.18	4519.18	4519.18	4519.18	4519.18	4519.18	4519.18
P	10.87	15.82	13.10	45.00	29.75	17.00	156.64
Sc	0.32	0.54	0.76	0.18	0.13	0.14	0.29
Ti	12.91	49.06	32.70	14.76	16.51	11.77	14.11
V	7.58	7.94	8.05	7.21	7.91	7.55	6.65
Cr	7.80	7.24	5.39	5.19	5.40	6.83	16.94
Mn	99.61	58.14	70.86	90.57	89.89	99.31	72.28
Co	1.22	0.77	0.71	1.28	1.36	1.32	1.59
Cu	105.42	1002.49	293.20	57.28	35.09	38.68	94.89
Cu	109.69	1039.16	238.34	56.40	37.05	38.79	100.88
Zn	5.73	6.09	3.48	4.80	5.99	5.65	52.79
Zn	6.46	6.55	3.59	5.28	5.91	5.59	45.58
As	0.14	0.22	0.20	0.12	0.09	0.13	0.95
Se	3.15	2.91	4.31	3.14	2.13	BDL	2.21
Se	0.29	0.62	BDL	BDL	0.31	BDL	BDL
Rb	0.06	7.18	3.70	0.41	0.32	0.04	2.79
Sr	27.60	67.34	98.46	2.21	0.33	0.27	1.63
Mo	0.04	0.03	0.04	BDL	BDL	0.03	BDL
Sn	0.08	0.09	0.10	0.07	0.14	0.05	1.26
Te	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs	0.06	0.62	0.16	0.20	0.21	0.06	0.09
Ba	0.10	36.54	25.26	1.22	0.20	0.30	2.19
Ba	0.16	38.14	26.12	0.51	0.19	0.35	1.08
W	0.01	0.03	0.02	0.07	0.07	0.02	0.10
Pb	0.16	0.16	0.31	0.28	0.24	0.12	1.95
Bi	0.02	0.03	0.09	0.03	0.02	0.00	0.01
Th	0.40	0.99	1.30	0.01	BDL	0.01	0.02
U	0.16	0.19	0.25	0.02	0.02	0.00	0.04
Tl	0.00	0.12	0.07	0.01	0.01	0.00	BDL

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	YD01-04_03-1	YD01-04_03-2	YD01-04_03-3	YD01-04_03-4	YD01-04_03-5	YD01-04_04-1	YD01-04_04-2
Data Quality (1-3)	1.5	1.5	3	3	0	2	2.5
Li (ppm)	5.35	5.53	51.25	46.20	47.78	151.13	51.68
B (ppm)	5.00	2.35	1.09	3.41	21.37	2.85	5.10
Si (ppm)	131544.50	131544.50	131544.50	131544.50	131544.50	131544.50	131544.50
P (ppm)	54.27	29.12	46.53	53.88	933516.31	29.59	69.56
Sc (ppm)	16.57	7.91	2.20	2.28	3.89	2.01	2.57
Ti (ppm)	113.76	94.51	106.40	92.72	965.77	571.76	202.13
V (ppm)	132.68	83.42	130.69	112.55	103.88	96.73	112.70
Cr (ppm)	20.37	14.75	38.43	30.12	33.54	24.38	25.16
Mn (ppm)	517.51	416.41	2007.97	1971.96	762.39	1483.51	1784.32
Co (ppm)	2.20	2.70	22.32	21.64	9.88	16.50	19.62
Cu(63) (ppm)	2147.52	678.13	921.39	704.03	8023.87	28237.44	5760.02
Cu(65)* (ppm)	2250.59	684.76	914.73	714.62	7329.88	27575.69	4957.35
Zn(66)* (ppm)	19.79	20.50	152.44	138.66	99.81	175.29	160.97
Zn(68) (ppm)	60.92	74.83	148.22	133.96	113.94	176.27	159.00
As (ppm)	1.50	0.81	0.42	0.25	542.11	0.37	0.11
Se(76) (ppm)	3.13	2.43	3.59	2.13	10.97	2.29	3.81
Se(77)* (ppm)	0.44	BDL	1.17	BDL	1.19	BDL	BDL
Rb (ppm)	48.57	65.71	2.76	3.38	171.25	119.88	75.49
Sr (ppm)	2840.85	1514.61	10.22	3.64	2003.67	21.13	20.48
Mo (ppm)	0.06	BDL	BDL	0.00	0.22	0.17	0.19
Sn (ppm)	0.59	0.43	0.22	0.28	1.56	0.29	0.32
Te (ppm)	0.21	BDL	0.16	0.08	0.22	0.11	BDL
Cs (ppm)	1.01	0.65	0.95	0.97	11.57	13.90	6.87
Ba(137) (ppm)	814.35	1237.92	4.45	1.52	477.67	68.29	24.09
Ba(138)* (ppm)	842.06	1448.10	3.06	1.42	504.26	68.62	23.67
W (ppm)	0.16	0.10	BDL	0.07	31.39	BDL	0.18
Pb (ppm)	6.36	3.80	0.25	0.36	3.68	0.93	0.37
Bi (ppm)	0.41	0.38	0.02	0.01	0.17	0.05	0.09
Th (ppm)	22.73	13.31	0.04	0.02	29.36	0.36	0.08
U (ppm)	4.09	2.13	0.05	0.00	1.21	0.29	0.06
Tl (ppm)	0.30	0.35	0.01	0.02	1.00	0.81	0.51
SiO2 wt.%	28.14	28.14	28.14	28.14	28.14	28.14	28.14

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	YD01-04_03-1	YD01-04_03-2	YD01-04_03-3	YD01-04_03-4	YD01-04_03-5	YD01-04_04-1	YD01-04_04-2
Data Quality (1-3)	1.5	1.5	3	3	0	2	2.5
1 standard error (ppm) *							
Li	0.23	0.30	1.97	2.67	4.67	5.56	2.97
B	0.35	0.29	0.16	0.60	3.89	0.20	1.89
Si	2630.89	2630.89	2630.89	2630.89	2630.89	2630.89	2630.89
P	10.82	4.49	7.42	9.14	141552.05	4.74	24.97
Sc	0.48	0.27	0.09	0.17	0.42	0.11	0.20
Ti	25.14	11.30	12.19	12.34	112.31	68.11	27.25
V	3.88	2.98	3.84	3.92	5.09	2.82	3.51
Cr	0.55	0.61	1.16	1.28	3.20	0.99	0.82
Mn	16.65	16.60	52.21	62.75	40.46	43.53	51.75
Co	0.15	0.18	0.54	0.50	0.35	0.41	0.66
Cu	261.50	29.52	36.31	37.55	295.25	1209.19	208.36
Cu	192.14	32.43	39.67	37.20	314.14	1151.94	195.39
Zn	0.84	0.55	4.00	4.45	14.07	5.37	5.85
Zn	2.74	2.85	4.36	5.18	12.55	5.28	7.26
As	0.16	0.05	0.05	0.06	14.31	0.04	0.09
Se	0.13	0.12	0.18	0.22	0.38	0.20	0.65
Se	0.18	BDL	0.20	BDL	1.10	BDL	BDL
Rb	3.17	2.85	0.12	0.47	7.84	3.61	3.64
Sr	80.19	47.97	0.68	0.28	85.33	10.63	1.50
Mo	0.03	BDL	BDL	0.04	0.05	0.06	0.12
Sn	0.04	0.04	0.02	0.02	0.40	0.03	0.03
Te	0.07	BDL	0.09	0.03	0.12	0.04	BDL
Cs	0.06	0.05	0.04	0.04	0.66	0.71	0.36
Ba	27.47	44.24	0.25	0.11	32.04	1.97	1.45
Ba	26.67	50.93	0.44	0.11	32.42	2.40	1.48
W	0.10	0.03	BDL	0.04	2.11	BDL	0.05
Pb	0.22	0.15	0.07	0.05	0.52	0.13	0.13
Bi	0.04	0.02	0.01	0.01	0.04	0.03	0.02
Th	0.67	0.47	0.02	0.01	6.38	0.08	0.02
U	0.20	0.08	0.02	0.01	0.60	0.14	0.01
Tl	0.03	0.04	0.01	0.02	0.06	0.03	0.04

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	YD01-04_03-1	YD01-04_03-2	YD01-04_03-3	YD01-04_03-4	YD01-04_03-5	YD01-04_04-1	YD01-04_04-2
Data Quality (1-3)	1.5	1.5	3	3	0	2	2.5
1 standard error (ppm)**							
Li	0.79	0.84	7.50	7.05	8.21	22.05	7.88
B	1.85	0.90	0.43	1.38	8.70	1.06	2.65
Si	4519.18	4519.18	4519.18	4519.18	4519.18	4519.18	4519.18
P	20.58	10.42	16.75	19.64	332840.30	10.66	33.58
Sc	0.83	0.42	0.13	0.20	0.45	0.14	0.23
Ti	30.13	17.84	19.75	18.32	180.26	107.74	40.17
V	7.62	5.09	7.52	6.81	7.23	5.56	6.59
Cr	4.12	3.02	7.79	6.17	7.45	4.99	5.11
Mn	25.64	22.84	91.91	97.24	49.62	70.84	84.83
Co	0.19	0.23	1.32	1.27	0.64	0.98	1.25
Cu	351.17	79.68	106.91	85.52	924.15	3310.53	662.27
Cu	312.75	81.79	107.86	86.74	862.91	3235.57	577.61
Zn	0.99	0.76	5.62	5.72	14.30	7.04	7.18
Zn	3.22	3.53	5.99	6.37	12.95	7.19	8.49
As	0.54	0.29	0.15	0.11	188.33	0.13	0.10
Se	2.50	1.94	2.88	1.72	8.79	1.85	3.12
Se	0.40	BDL	0.96	BDL	1.45	BDL	BDL
Rb	3.37	3.25	0.14	0.48	8.83	4.60	4.06
Sr	101.83	58.49	0.71	0.29	96.13	10.64	1.57
Mo	0.03	BDL	BDL	0.04	0.05	0.06	0.12
Sn	0.11	0.09	0.05	0.05	0.49	0.06	0.06
Te	0.08	BDL	0.10	0.03	0.13	0.04	BDL
Cs	0.09	0.07	0.08	0.08	1.06	1.22	0.61
Ba	32.86	52.05	0.27	0.12	33.74	2.48	1.54
Ba	33.67	61.98	0.44	0.12	34.67	2.93	1.59
W	0.10	0.04	BDL	0.04	4.25	BDL	0.06
Pb	0.30	0.19	0.07	0.05	0.54	0.14	0.13
Bi	0.05	0.04	0.01	0.01	0.05	0.03	0.02
Th	1.45	0.89	0.02	0.01	6.59	0.09	0.02
U	0.37	0.18	0.02	0.01	0.61	0.14	0.01
Tl	0.04	0.05	0.01	0.02	0.12	0.09	0.07

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	YD01-04_05-1	YD01-04_05-3	YD01-30C-1	YD01-30C-10	YD01-30C-2	YD01-30C-3	YD01-30C-5
Data Quality (1-3)	3	2	3	2	2.5	2.5	3
Li (ppm)	47.65	58.44	17.23	16.39	37.71	17.56	23.65
B (ppm)	1.75	2.74	1.23	5.46	2.62	4.05	0.65
Si (ppm)	131544.50	131544.50	128038.52	128038.52	128038.52	128038.52	128038.52
P (ppm)	52.95	25.79	48.00	62.68	42.21	100.19	34.57
Sc (ppm)	2.64	3.60	6.11	13.97	14.56	17.48	6.66
Ti (ppm)	143.98	1808.04	30.52	120.30	1564.31	85.12	46.93
V (ppm)	129.31	101.21	369.30	165.11	456.25	475.10	664.07
Cr (ppm)	20.71	10.25	3.35	2.74	4.86	5.64	5.01
Mn (ppm)	1975.78	1349.93	3566.21	2330.08	5005.28	3341.75	4622.62
Co (ppm)	23.23	16.36	67.08	47.89	105.13	58.60	92.20
Cu(63) (ppm)	2794.85	10346.93	165.27	167.26	631.77	472.98	149.37
Cu(65)* (ppm)	2822.65	10066.39	167.03	164.48	630.63	475.30	150.19
Zn(66)* (ppm)	166.20	128.18	968.67	648.59	1363.00	893.10	1200.46
Zn(68) (ppm)	158.07	129.29	943.51	657.50	1330.16	878.87	1156.72
As (ppm)	0.09	6.22	1.06	0.70	0.78	3.16	0.29
Se(76) (ppm)	2.63	1.73	1.46	2.17	4.12	3.71	4.38
Se(77)* (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Rb (ppm)	11.70	96.81	2.15	10.53	8.36	2.49	1.81
Sr (ppm)	13.32	254.05	3.24	268.80	11.20	855.74	121.39
Mo (ppm)	BDL	0.07	0.15	0.11	0.14	0.33	BDL
Sn (ppm)	0.37	0.19	0.12	0.22	0.18	0.33	0.15
Te (ppm)	BDL	BDL	0.09	0.00	0.05	BDL	BDL
Cs (ppm)	2.34	8.76	0.26	0.60	0.40	0.41	0.02
Ba(137) (ppm)	5.58	71.50	43.15	136.47	65.49	34.14	9.85
Ba(138)* (ppm)	5.68	62.04	44.49	129.19	68.06	33.03	9.98
W (ppm)	BDL	1.73	0.04	0.16	0.09	0.41	0.06
Pb (ppm)	0.66	1.71	0.14	8.76	0.34	3.31	1.10
Bi (ppm)	0.11	0.11	BDL	0.01	0.01	0.01	0.03
Th (ppm)	0.20	2.73	0.08	0.83	0.02	2.23	0.02
U (ppm)	0.12	2.01	0.18	0.51	0.12	0.50	0.03
Tl (ppm)	0.05	0.63	BDL	0.16	0.03	0.01	BDL
SiO2 wt.%	28.14	28.14	27.39	27.39	27.39	27.39	27.39

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	YD01-04_05-1	YD01-04_05-3	YD01-30C-1	YD01-30C-10	YD01-30C-2	YD01-30C-3	YD01-30C-5
Data Quality (1-3)	3	2	3	2	2.5	2.5	3
1 standard error (ppm) *							
Li	2.32	2.22	1.02	0.62	1.72	0.85	1.36
B	0.23	0.35	0.41	0.65	0.29	0.63	0.30
Si	2630.89	2630.89	2560.77	2560.77	2560.77	2560.77	2560.77
P	18.03	3.92	4.28	14.02	3.54	7.71	5.40
Sc	0.11	0.18	0.56	0.82	0.70	1.63	0.38
Ti	16.88	219.34	1.02	23.34	67.90	3.26	2.18
V	4.03	3.08	12.12	8.10	17.39	16.58	17.24
Cr	0.57	0.34	0.33	0.58	0.61	0.37	0.93
Mn	68.40	38.43	124.63	98.08	180.13	117.12	131.98
Co	0.66	0.51	2.64	1.89	3.12	2.60	2.43
Cu	114.76	517.06	4.46	8.69	25.32	19.96	6.38
Cu	113.87	523.82	6.24	7.64	23.38	17.54	5.37
Zn	5.56	3.58	32.13	16.65	35.47	32.96	28.32
Zn	5.48	5.54	29.54	21.22	38.77	40.55	31.49
As	0.06	0.90	0.20	0.32	0.45	0.25	0.25
Se	0.29	0.15	0.19	0.49	1.74	0.30	1.02
Se	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Rb	0.43	3.84	0.17	0.93	0.34	0.15	0.17
Sr	1.49	14.91	0.17	32.47	1.50	20.14	4.51
Mo	BDL	0.05	0.12	0.12	0.04	0.13	BDL
Sn	0.08	0.02	0.02	0.07	0.08	0.03	0.07
Te	BDL	BDL	0.22	0.13	0.14	BDL	BDL
Cs	0.13	0.42	0.01	0.05	0.07	0.02	0.12
Ba	0.23	17.53	3.17	28.20	11.82	2.79	0.79
Ba	0.27	12.78	1.50	23.51	9.72	3.58	1.99
W	BDL	0.12	0.01	0.02	0.04	0.03	0.04
Pb	0.17	0.11	0.02	1.64	0.04	0.40	0.09
Bi	0.05	0.01	BDL	0.00	0.01	0.01	0.01
Th	0.03	0.13	0.09	0.27	0.01	0.76	0.04
U	0.02	0.17	0.03	0.07	0.03	0.16	0.01
Tl	0.01	0.07	BDL	0.04	0.01	0.01	BDL

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	YD01-04_05-1	YD01-04_05-3	YD01-30C-1	YD01-30C-10	YD01-30C-2	YD01-30C-3	YD01-30C-5
Data Quality (1-3)	3	2	3	2	2.5	2.5	3
1 standard error (ppm)**							
Li	7.12	8.54	2.65	2.40	5.61	2.63	3.62
B	0.68	1.06	0.61	2.09	0.99	1.60	0.38
Si	4519.18	4519.18	4398.73	4398.73	4398.73	4398.73	4398.73
P	24.84	9.20	14.62	23.02	12.80	30.19	11.43
Sc	0.15	0.23	0.61	0.99	0.90	1.77	0.46
Ti	26.96	343.20	3.05	25.94	162.12	8.65	4.92
V	7.56	5.88	21.36	11.29	27.82	28.05	36.01
Cr	4.19	2.08	0.75	0.80	1.15	1.19	1.37
Mn	101.08	63.74	184.33	132.26	262.27	172.95	220.02
Co	1.42	1.02	4.41	3.15	6.35	4.03	5.43
Cu	325.90	1242.00	18.01	19.68	71.33	53.77	17.01
Cu	329.78	1221.73	18.72	18.98	70.61	53.19	16.75
Zn	7.04	4.89	38.88	22.18	46.99	38.65	39.22
Zn	7.01	6.59	36.89	26.22	49.74	45.47	41.54
As	0.06	2.33	0.42	0.40	0.52	1.13	0.27
Se	2.13	1.39	1.18	1.81	3.73	2.99	3.66
Se	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Rb	0.52	4.48	0.17	0.94	0.37	0.15	0.17
Sr	1.52	15.93	0.18	32.69	1.51	23.37	4.81
Mo	BDL	0.05	0.12	0.12	0.04	0.13	BDL
Sn	0.10	0.04	0.03	0.08	0.08	0.07	0.08
Te	BDL	BDL	0.22	0.13	0.14	BDL	BDL
Cs	0.21	0.75	0.02	0.06	0.07	0.03	0.12
Ba	0.26	17.60	3.28	28.32	11.89	2.87	0.82
Ba	0.31	12.87	1.70	23.62	9.79	3.63	2.00
W	BDL	0.24	0.01	0.03	0.04	0.06	0.04
Pb	0.17	0.12	0.02	1.68	0.05	0.43	0.10
Bi	0.05	0.02	BDL	0.00	0.01	0.01	0.01
Th	0.03	0.20	0.09	0.27	0.01	0.77	0.04
U	0.03	0.23	0.03	0.08	0.03	0.17	0.01
Tl	0.01	0.09	BDL	0.05	0.01	0.01	BDL

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl?	Chl?	Chl?	Chl?
LA-ICP-MS Spot ID	YD01-30C-6	YD01-30C-7	YD01-30C-8	H437269_14-1	H437269_14-2	H437269_16-1	H437269_16-3
Data Quality (1-3)	2.5	3	3	1	1	1.5	1
Li (ppm)	20.87	30.39	28.70	24.31	20.78	7.34	3.34
B (ppm)	1.95	1.46	1.39	8.77	4.94	3.44	3.21
Si (ppm)	128038.52	128038.52	128038.52	130843.31	130843.31	130843.31	130843.31
P (ppm)	50.42	24.95	54.07	566.27	BDL	103.05	23.03
Sc (ppm)	9.34	6.75	9.24	26.17	12.76	6.83	3.57
Ti (ppm)	73.01	280.96	91.60	30779.63	84.58	902.51	10.50
V (ppm)	662.70	440.37	444.09	365.69	190.49	73.13	14.69
Cr (ppm)	3.89	2.10	4.02	46.97	37.83	15.22	3.58
Mn (ppm)	3751.77	5073.79	4233.57	168.65	161.39	55.28	9.31
Co (ppm)	73.95	106.64	87.40	16.75	10.48	3.37	3.26
Cu(63) (ppm)	403.20	173.96	272.69	7134.49	4757.60	636.22	2462.97
Cu(65)* (ppm)	403.47	172.24	269.56	6216.04	3791.02	643.24	1985.70
Zn(66)* (ppm)	959.68	1465.82	1153.86	84.56	63.50	25.09	22.32
Zn(68) (ppm)	942.56	1347.12	1131.73	82.68	61.27	27.47	25.22
As (ppm)	1.07	0.25	0.80	5.70	2.52	1.59	0.54
Se(76) (ppm)	BDL	0.31	3.76	4.25	2.88	1.51	2.02
Se(77)* (ppm)	BDL	BDL	BDL	BDL	0.19	BDL	0.21
Rb (ppm)	4.85	3.14	3.87	4.74	2.43	2.49	3.86
Sr (ppm)	1233.81	38.21	273.16	107.13	88.55	151.14	158.51
Mo (ppm)	0.33	0.02	0.17	0.66	0.56	BDL	0.12
Sn (ppm)	BDL	BDL	0.30	5.57	0.26	0.32	0.33
Te (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs (ppm)	0.31	0.40	0.30	0.73	0.78	0.39	0.34
Ba(137) (ppm)	31.13	28.22	36.17	16.71	12.65	26.31	43.31
Ba(138)* (ppm)	28.64	29.15	35.43	17.14	13.07	27.91	42.51
W (ppm)	0.16	BDL	BDL	17.71	0.45	0.82	0.08
Pb (ppm)	3.86	1.19	1.52	8.95	4.34	5.76	3.40
Bi (ppm)	BDL	BDL	0.01	0.13	0.11	0.03	0.04
Th (ppm)	BDL	BDL	0.87	1.79	0.22	1.15	0.31
U (ppm)	0.12	BDL	0.32	4.89	1.34	2.46	1.34
Tl (ppm)	BDL	0.01	0.02	0.03	0.02	0.05	0.04
SiO2 wt.%	27.39	27.39	27.39	27.99	27.99	27.99	27.99

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl?	Chl?	Chl?	Chl?
LA-ICP-MS Spot ID	YD01-30C-6	YD01-30C-7	YD01-30C-8	H437269_14-1	H437269_14-2	H437269_16-1	H437269_16-3
Data Quality (1-3)	2.5	3	3	1	1	1.5	1
1 standard error (ppm) *							
Li	1.22	1.71	0.99	1.04	1.21	0.61	0.34
B	0.54	0.69	0.70	1.19	0.55	0.69	0.35
Si	2560.77	2560.77	2560.77	2616.87	2616.87	2616.87	2616.87
P	7.49	2.00	5.93	86.51	BDL	34.00	4.09
Sc	0.52	0.93	0.68	1.16	0.90	0.26	0.24
Ti	3.37	37.47	15.34	4732.69	15.27	111.62	2.93
V	17.92	12.56	13.85	15.08	9.94	2.58	0.85
Cr	0.76	2.21	0.30	1.91	1.48	0.61	0.19
Mn	173.45	219.88	152.52	5.63	7.86	1.73	0.40
Co	2.14	3.73	3.45	0.86	0.71	0.12	0.16
Cu	15.11	7.61	7.99	253.56	180.85	59.84	129.46
Cu	17.71	5.19	14.28	305.45	148.24	52.02	103.47
Zn	27.48	72.63	41.30	3.51	2.23	0.79	1.26
Zn	27.06	37.37	28.30	2.35	2.22	1.55	1.53
As	0.22	0.45	0.27	0.20	0.27	0.07	0.13
Se	BDL	6.79	0.51	0.52	0.16	0.09	0.33
Se	BDL	BDL	BDL	BDL	0.19	BDL	0.09
Rb	0.18	0.76	0.10	0.41	0.18	0.19	0.12
Sr	78.72	4.08	23.05	4.57	4.27	6.26	5.63
Mo	0.10	0.19	0.08	0.05	0.07	BDL	0.07
Sn	BDL	BDL	0.07	0.45	0.02	0.03	0.06
Te	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs	0.05	0.10	0.03	0.04	0.06	0.02	0.02
Ba	4.27	2.29	5.10	1.38	0.64	1.08	3.20
Ba	3.96	2.17	4.83	1.44	0.43	1.00	1.69
W	0.12	BDL	BDL	1.21	0.07	0.07	0.03
Pb	0.23	0.27	0.11	0.68	0.28	0.31	0.67
Bi	BDL	BDL	0.01	0.02	0.03	0.01	0.01
Th	BDL	BDL	0.31	0.14	0.03	0.20	0.05
U	0.03	BDL	0.08	0.16	0.12	0.37	0.20
Tl	BDL	0.02	0.01	0.01	0.00	0.01	0.01

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl?	Chl?	Chl?	Chl?
LA-ICP-MS Spot ID	YD01-30C-6	YD01-30C-7	YD01-30C-8	H437269_14-1	H437269_14-2	H437269_16-1	H437269_16-3
Data Quality (1-3)	2.5	3	3	1	1	1.5	1
1 standard error (ppm)**							
Li	3.20	4.63	4.18	3.59	3.17	1.20	0.58
B	0.90	0.87	0.87	3.41	1.88	1.43	1.22
Si	4398.73	4398.73	4398.73	4495.09	4495.09	4495.09	4495.09
P	16.48	7.54	16.83	202.18	BDL	47.56	8.48
Sc	0.63	0.96	0.77	1.58	1.04	0.38	0.28
Ti	7.65	45.86	17.60	6526.21	19.64	172.69	3.30
V	36.28	24.44	25.27	23.55	13.69	4.45	1.12
Cr	1.09	2.25	0.86	9.61	7.73	3.11	0.74
Mn	224.72	292.72	221.94	8.49	9.94	2.71	0.53
Co	4.44	6.74	5.75	1.25	0.91	0.22	0.24
Cu	45.16	19.88	29.87	818.89	549.83	91.66	298.35
Cu	46.16	18.92	31.86	746.88	441.32	87.64	241.06
Zn	35.02	79.83	48.85	4.14	2.77	1.03	1.39
Zn	34.92	48.91	38.77	3.28	2.80	1.72	1.68
As	0.43	0.46	0.39	1.98	0.91	0.55	0.23
Se	BDL	6.79	3.06	3.44	2.31	1.21	1.65
Se	BDL	BDL	BDL	BDL	0.25	BDL	0.19
Rb	0.20	0.76	0.12	0.43	0.19	0.20	0.15
Sr	80.55	4.11	23.35	5.15	4.70	7.10	6.63
Mo	0.10	0.19	0.08	0.07	0.08	BDL	0.07
Sn	BDL	BDL	0.09	1.10	0.05	0.07	0.09
Te	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs	0.06	0.10	0.03	0.06	0.08	0.03	0.03
Ba	4.31	2.36	5.15	1.43	0.70	1.23	3.34
Ba	3.99	2.23	4.87	1.50	0.53	1.21	1.98
W	0.12	BDL	BDL	2.40	0.09	0.12	0.03
Pb	0.28	0.27	0.12	0.74	0.31	0.36	0.68
Bi	BDL	BDL	0.01	0.02	0.03	0.01	0.01
Th	BDL	BDL	0.32	0.17	0.03	0.21	0.06
U	0.04	BDL	0.09	0.40	0.16	0.42	0.23
Tl	BDL	0.02	0.01	0.01	0.00	0.01	0.01

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl?	Chl?	Chl?	Chl?	Chl?	Chl?	Chl?
LA-ICP-MS Spot ID	H437289_27-2	H437289_27-3	H437289_27-4	H437289_29-1	H437289_29-2	H437289_30-1	H437289_30-2
Data Quality (1-3)	1.5	1	1.5	1.5	1.5	1.5	1.5
Li (ppm)	13.92	6.38	24.53	14.54	34.01	7.12	7.02
B (ppm)	16.29	16.91	11.25	19.76	9.38	21.13	21.25
Si (ppm)	134676.51	134676.51	134676.51	134676.51	134676.51	134676.51	134676.51
P (ppm)	203.21	260.16	482.50	26.49	14.77	297.37	19.58
Sc (ppm)	9.69	8.79	9.95	7.68	7.35	10.97	11.12
Ti (ppm)	3500.53	3291.82	2888.65	4505.13	2270.60	1203.47	1286.71
V (ppm)	166.77	112.33	150.30	196.73	146.36	122.54	113.79
Cr (ppm)	16.46	9.65	12.60	9.26	8.97	4.67	9.78
Mn (ppm)	84.88	41.72	188.64	109.10	236.31	45.67	43.49
Co (ppm)	22.31	8.88	44.56	27.11	64.53	9.44	8.43
Cu(63) (ppm)	685.68	298.15	341.42	8385.36	525.24	337.41	324.22
Cu(65)* (ppm)	681.41	300.18	333.99	8278.04	523.94	338.29	313.19
Zn(66)* (ppm)	19.96	7.08	30.78	26.16	47.44	9.20	8.76
Zn(68) (ppm)	46.20	34.08	44.68	43.61	57.08	43.83	42.09
As (ppm)	2.67	0.88	1.70	1.68	1.00	0.41	0.29
Se(76) (ppm)	3.45	2.14	3.09	2.72	2.79	2.19	2.27
Se(77)* (ppm)	0.56	BDL	BDL	0.28	BDL	BDL	BDL
Rb (ppm)	174.51	146.54	103.84	161.62	90.15	191.01	194.90
Sr (ppm)	3.95	3.38	3.14	3.81	2.31	4.16	4.25
Mo (ppm)	0.21	0.07	0.16	0.10	0.05	0.08	BDL
Sn (ppm)	0.91	0.52	0.53	0.74	0.63	0.83	0.62
Te (ppm)	BDL	BDL	BDL	0.28	0.17	BDL	0.04
Cs (ppm)	3.41	2.96	1.61	3.14	1.71	3.74	4.63
Ba(137) (ppm)	867.05	693.19	418.26	517.64	268.36	1032.51	1050.90
Ba(138)* (ppm)	880.85	687.77	418.90	515.08	264.50	1027.31	1063.09
W (ppm)	32.11	16.55	29.56	25.44	8.21	6.90	9.56
Pb (ppm)	1.78	0.54	0.96	1.22	1.10	0.23	0.20
Bi (ppm)	0.14	0.06	0.13	0.49	0.18	0.14	0.10
Th (ppm)	3.39	1.19	1.81	0.59	0.49	0.29	0.37
U (ppm)	2.06	0.67	1.43	2.67	0.32	0.13	0.47
Tl (ppm)	0.52	0.47	0.27	0.53	0.27	0.54	0.58
SiO2 wt.%	28.81	28.81	28.81	28.81	28.81	28.81	28.81

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl?	Chl?	Chl?	Chl?	Chl?	Chl?	Chl?
LA-ICP-MS Spot ID	H437289_27-2	H437289_27-3	H437289_27-4	H437289_29-1	H437289_29-2	H437289_30-1	H437289_30-2
Data Quality (1-3)	1.5	1	1.5	1.5	1.5	1.5	1.5
1 standard error (ppm) *							
Li	0.53	0.25	1.40	0.51	1.63	0.31	0.27
B	1.22	0.74	0.66	0.84	1.55	1.75	1.09
Si	2693.53	2693.53	2693.53	2693.53	2693.53	2693.53	2693.53
P	25.45	25.97	72.74	1.76	2.08	90.39	1.30
Sc	0.42	0.37	0.73	0.27	0.42	0.40	0.43
Ti	157.42	173.94	164.43	214.95	81.42	39.80	44.67
V	5.37	4.16	9.97	6.28	4.92	5.48	3.85
Cr	0.45	0.47	0.75	0.38	0.40	0.22	0.22
Mn	3.24	1.50	9.52	3.57	7.69	2.05	1.62
Co	0.81	0.38	2.07	0.87	2.40	0.37	0.31
Cu	24.52	11.94	13.48	288.66	17.75	11.94	11.26
Cu	22.52	12.74	11.19	424.60	19.55	11.76	15.13
Zn	0.71	0.27	1.31	0.97	1.75	0.44	0.42
Zn	2.01	1.46	1.66	1.59	2.53	1.91	1.53
As	0.17	0.06	0.15	0.21	0.22	0.03	0.04
Se	0.40	0.08	0.40	0.43	0.82	0.15	0.13
Se	0.31	BDL	BDL	0.16	BDL	BDL	BDL
Rb	3.88	3.40	6.19	4.66	3.19	9.25	3.95
Sr	0.23	0.17	0.32	0.18	0.11	0.31	0.17
Mo	0.04	0.03	0.05	0.03	0.07	0.03	BDL
Sn	0.07	0.09	0.05	0.05	0.07	0.11	0.03
Te	BDL	BDL	BDL	0.09	0.05	BDL	0.03
Cs	0.20	0.11	0.09	0.13	0.08	0.16	0.15
Ba	53.54	19.58	19.05	14.91	10.16	54.05	34.31
Ba	40.80	27.05	14.59	15.26	11.53	53.98	31.62
W	0.85	0.78	2.48	0.87	0.46	0.22	0.26
Pb	0.18	0.03	0.18	0.11	0.19	0.02	0.03
Bi	0.02	0.01	0.01	0.02	0.02	0.02	0.01
Th	0.14	0.09	0.16	0.26	0.04	0.01	0.11
U	0.15	0.06	0.07	0.17	0.02	0.04	0.43
Tl	0.06	0.04	0.02	0.03	0.02	0.02	0.04

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl?	Chl?	Chl?	Chl?	Chl?	Chl?	Chl?
LA-ICP-MS Spot ID	H437289_27-2	H437289_27-3	H437289_27-4	H437289_29-1	H437289_29-2	H437289_30-1	H437289_30-2
Data Quality (1-3)	1.5	1	1.5	1.5	1.5	1.5	1.5
1 standard error (ppm)**							
Li	2.04	0.94	3.75	2.12	5.10	1.06	1.03
B	6.06	6.20	4.15	7.24	3.75	7.89	7.82
Si	4626.78	4626.78	4626.78	4626.78	4626.78	4626.78	4626.78
P	63.59	79.00	156.32	7.80	4.72	124.27	5.76
Sc	0.59	0.53	0.84	0.43	0.53	0.61	0.64
Ti	370.60	360.27	322.01	482.33	232.35	122.02	131.16
V	10.12	7.12	12.62	11.91	8.99	8.35	7.01
Cr	3.32	1.99	2.63	1.89	1.84	0.96	1.97
Mn	4.67	2.23	12.10	5.60	12.10	2.73	2.36
Co	1.52	0.63	3.29	1.79	4.42	0.66	0.57
Cu	78.14	34.40	39.32	952.09	59.54	38.41	36.84
Cu	76.94	34.82	37.75	989.44	59.85	38.37	37.04
Zn	0.87	0.32	1.53	1.18	2.14	0.50	0.48
Zn	2.60	1.90	2.30	2.22	3.25	2.47	2.15
As	0.94	0.31	0.61	0.62	0.41	0.15	0.11
Se	2.79	1.71	2.50	2.22	2.38	1.76	1.82
Se	0.55	BDL	BDL	0.28	BDL	BDL	BDL
Rb	4.35	3.78	6.30	5.01	3.35	9.49	4.52
Sr	0.25	0.18	0.32	0.19	0.12	0.32	0.20
Mo	0.05	0.03	0.05	0.03	0.07	0.03	BDL
Sn	0.18	0.13	0.11	0.14	0.13	0.18	0.11
Te	BDL	BDL	BDL	0.10	0.06	BDL	0.03
Cs	0.31	0.23	0.14	0.25	0.14	0.31	0.35
Ba	57.11	25.22	21.33	19.06	11.88	59.01	41.93
Ba	44.86	30.72	17.07	18.75	12.82	58.19	38.80
W	3.84	2.08	4.25	3.09	1.06	0.83	1.14
Pb	0.20	0.04	0.19	0.13	0.20	0.02	0.03
Bi	0.02	0.01	0.02	0.05	0.03	0.03	0.01
Th	0.23	0.11	0.19	0.26	0.04	0.02	0.12
U	0.21	0.08	0.13	0.26	0.03	0.04	0.44
Tl	0.08	0.06	0.03	0.06	0.03	0.06	0.07

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl?	Chl?	Chl?	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	H437289_34-1	H437289_34-2	H437289_35-3	G909158-1	G909158-10	G909158-2	G909158-3
Data Quality (1-3)	1.5	1.5	1.5	2	1.5	2	3
Li (ppm)	5.66	12.60	11.54	45.44	46.61	38.82	44.56
B (ppm)	37.41	19.15	17.32	2.66	2.17	2.71	2.73
Si (ppm)	134676.51	134676.51	134676.51	135424.46	135424.46	135424.46	135424.46
P (ppm)	16.45	23.78	7.79	783.54	6125.55	107.36	95.66
Sc (ppm)	10.74	10.53	8.83	2.80	2.28	2.09	1.70
Ti (ppm)	951.41	870.50	1167.13	4714.04	207.06	125.64	151.49
V (ppm)	130.21	106.60	111.38	113.78	98.17	80.90	102.23
Cr (ppm)	3.85	3.58	6.65	13.01	28.51	17.98	11.58
Mn (ppm)	34.90	86.49	72.09	2365.85	2590.33	1763.30	2384.94
Co (ppm)	4.97	21.75	16.93	14.95	13.32	15.05	18.63
Cu(63) (ppm)	255.95	382.88	265.65	518.40	600.14	554.60	419.31
Cu(65)* (ppm)	241.02	388.08	262.19	513.99	591.37	553.12	413.22
Zn(66)* (ppm)	6.49	18.48	14.53	277.84	303.95	236.99	247.77
Zn(68) (ppm)	41.16	44.75	46.53	266.41	296.45	230.25	234.23
As (ppm)	0.32	0.43	0.23	1.88	2.46	0.54	1.25
Se(76) (ppm)	3.21	2.71	1.84	BDL	2.72	1.92	0.70
Se(77)* (ppm)	BDL	0.90	BDL	0.83	1.12	0.76	BDL
Rb (ppm)	224.39	161.79	187.70	20.11	42.11	21.70	16.52
Sr (ppm)	4.30	2.99	4.22	16.19	43.32	7.21	5.08
Mo (ppm)	BDL	0.07	0.00	0.93	0.19	0.14	0.36
Sn (ppm)	0.82	0.69	0.93	0.24	0.26	0.07	0.28
Te (ppm)	BDL	0.06	BDL	BDL	0.19	BDL	BDL
Cs (ppm)	4.18	3.72	4.77	0.76	0.58	0.96	0.69
Ba(137) (ppm)	1017.39	783.32	1030.73	16.27	85.67	11.97	10.39
Ba(138)* (ppm)	1006.51	774.07	1029.60	15.76	84.79	13.50	8.66
W (ppm)	6.81	6.57	8.62	1.25	0.33	0.13	0.08
Pb (ppm)	0.20	0.20	0.37	1.67	1.31	0.52	0.41
Bi (ppm)	0.03	0.18	0.01	BDL	BDL	BDL	BDL
Th (ppm)	0.03	0.19	0.43	0.58	0.56	0.03	BDL
U (ppm)	0.04	0.22	0.22	1.25	1.00	0.06	0.01
Tl (ppm)	0.69	0.52	0.59	0.15	0.21	0.12	0.08
SiO2 wt.%	28.81	28.81	28.81	28.97	28.97	28.97	28.97

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl?	Chl?	Chl?	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	H437289_34-1	H437289_34-2	H437289_35-3	G909158-1	G909158-10	G909158-2	G909158-3
Data Quality (1-3)	1.5	1.5	1.5	2	1.5	2	3
1 standard error (ppm) *							
Li	0.32	0.48	0.62	1.74	2.30	2.36	1.32
B	1.30	0.85	0.68	0.79	0.19	0.32	0.86
Si	2693.53	2693.53	2693.53	2708.49	2708.49	2708.49	2708.49
P	2.29	2.60	55.75	66.37	243.78	4.90	5.32
Sc	0.36	0.60	0.27	0.18	0.17	0.25	0.16
Ti	31.57	27.15	43.38	226.69	11.09	6.72	4.81
V	4.25	3.84	3.55	3.54	3.32	3.06	3.35
Cr	0.17	0.17	0.16	0.31	1.01	0.60	1.10
Mn	1.28	2.59	2.43	68.54	73.17	94.36	64.03
Co	0.20	1.04	0.72	0.87	0.41	0.68	0.64
Cu	9.78	13.54	9.28	16.12	16.84	18.19	15.87
Cu	10.13	13.97	11.26	17.06	15.54	15.44	16.01
Zn	0.24	0.99	0.54	7.77	8.34	9.05	7.89
Zn	1.65	1.75	1.82	9.29	8.53	9.06	9.51
As	0.05	0.03	0.06	0.32	0.27	0.34	0.18
Se	0.30	0.15	0.20	BDL	0.62	0.33	0.36
Se	BDL	0.45	BDL	0.86	1.21	0.56	BDL
Rb	5.01	3.95	4.51	0.68	1.17	0.83	0.83
Sr	0.36	0.14	0.17	1.10	4.02	0.30	0.24
Mo	BDL	0.01	0.02	0.06	0.12	0.16	0.11
Sn	0.03	0.07	0.08	0.12	0.17	0.03	0.04
Te	BDL	0.02	BDL	BDL	0.10	BDL	BDL
Cs	0.20	0.14	0.22	0.08	0.05	0.07	0.04
Ba	35.20	22.46	30.84	2.44	7.78	0.31	0.57
Ba	29.97	21.65	31.01	0.51	9.96	0.66	0.55
W	0.42	0.22	0.31	0.12	0.12	0.07	0.08
Pb	0.03	0.02	0.06	0.18	0.15	0.06	0.06
Bi	0.01	0.02	0.00	BDL	BDL	BDL	BDL
Th	0.01	0.02	0.09	0.10	0.67	0.03	BDL
U	0.01	0.03	0.05	0.17	0.13	0.03	0.01
Tl	0.03	0.02	0.03	0.03	0.07	0.03	0.04

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl?	Chl?	Chl?	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	H437289_34-1	H437289_34-2	H437289_35-3	G909158-1	G909158-10	G909158-2	G909158-3
Data Quality (1-3)	1.5	1.5	1.5	2	1.5	2	3
1 standard error (ppm)****							
Li	0.86	1.85	1.75	6.63	6.95	5.95	6.41
B	13.68	7.03	6.34	1.25	0.81	1.04	1.31
Si	4626.78	4626.78	4626.78	4652.48	4652.48	4652.48	4652.48
P	5.24	7.30	55.79	234.51	1775.20	31.21	27.97
Sc	0.59	0.75	0.46	0.20	0.19	0.26	0.17
Ti	96.50	87.74	119.98	503.82	22.66	13.75	15.24
V	7.93	6.70	6.74	6.74	5.96	5.10	6.15
Cr	0.79	0.74	1.34	2.62	5.79	3.65	2.56
Mn	1.88	4.29	3.74	113.60	123.27	116.03	111.54
Co	0.35	1.63	1.21	1.20	0.84	1.07	1.21
Cu	29.37	43.58	30.20	57.55	66.13	61.84	47.42
Cu	27.92	44.16	30.46	57.33	64.86	60.89	46.83
Zn	0.29	1.10	0.65	10.99	11.90	11.21	10.50
Zn	2.21	2.37	2.47	12.03	12.04	11.21	11.64
As	0.12	0.15	0.10	0.73	0.89	0.39	0.47
Se	2.58	2.17	1.49	BDL	2.27	1.58	0.67
Se	BDL	0.85	BDL	1.09	1.51	0.83	BDL
Rb	5.60	4.35	4.98	0.78	1.43	0.93	0.89
Sr	0.38	0.15	0.19	1.14	4.10	0.32	0.25
Mo	BDL	0.01	0.02	0.09	0.12	0.16	0.11
Sn	0.15	0.14	0.19	0.12	0.18	0.03	0.06
Te	BDL	0.02	BDL	BDL	0.11	BDL	BDL
Cs	0.35	0.29	0.39	0.09	0.06	0.10	0.06
Ba	42.23	28.76	38.85	2.45	7.84	0.34	0.58
Ba	36.76	27.14	37.89	0.66	10.20	0.75	0.59
W	0.90	0.80	1.05	0.19	0.12	0.07	0.08
Pb	0.03	0.02	0.06	0.19	0.15	0.06	0.06
Bi	0.01	0.02	0.00	BDL	BDL	BDL	BDL
Th	0.01	0.02	0.09	0.11	0.68	0.03	BDL
U	0.01	0.04	0.05	0.20	0.15	0.03	0.01
Tl	0.07	0.06	0.07	0.04	0.07	0.04	0.04

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	G909158-4	G909158-5	G909158-6	G909158-7	G909158-8	G909158-9	YD09-04area1-1
Data Quality (1-3)	2	1.5	2	2	2.5	3	3
Li (ppm)	29.13	41.17	57.75	54.85	58.52	57.48	59.14
B (ppm)	5.15	1.58	1.67	2.44	1.47	1.45	12.58
Si (ppm)	135424.46	135424.46	135424.46	135424.46	135424.46	135424.46	163612.57
P (ppm)	1009.46	5220.98	65.95	1051.92	61.93	260.22	159.02
Sc (ppm)	2.05	3.47	2.61	2.40	1.66	2.73	BDL
Ti (ppm)	73.83	724.18	1059.00	175.44	184.62	170.26	1014.32
V (ppm)	73.98	88.28	130.71	119.37	132.54	126.07	72.05
Cr (ppm)	16.95	14.70	12.28	15.35	9.06	20.09	88.96
Mn (ppm)	1262.00	2026.80	3318.49	3231.14	3164.10	3401.25	1331.02
Co (ppm)	12.17	12.06	18.04	19.52	22.84	18.90	2.14
Cu(63) (ppm)	624.13	558.86	265.31	325.14	235.28	495.05	458.39
Cu(65)* (ppm)	625.45	549.50	263.87	324.71	226.66	491.82	442.86
Zn(66)* (ppm)	205.67	250.26	327.14	295.14	253.61	364.09	228.87
Zn(68) (ppm)	198.49	246.47	317.11	292.72	251.54	350.91	198.10
As (ppm)	3.65	3.19	1.00	0.78	BDL	0.95	BDL
Se(76) (ppm)	1.59	BDL	5.31	1.68	BDL	BDL	BDL
Se(77)* (ppm)	BDL	BDL	BDL	BDL	1.27	0.69	BDL
Rb (ppm)	19.10	23.30	18.27	21.77	23.55	31.76	null
Sr (ppm)	11.55	101.72	6.56	6.71	2.57	7.54	null
Mo (ppm)	0.32	0.47	0.76	BDL	BDL	0.17	BDL
Sn (ppm)	0.55	0.38	0.34	0.30	0.16	BDL	BDL
Te (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs (ppm)	1.70	0.81	0.46	0.52	0.54	0.37	1.05
Ba(137) (ppm)	12.11	41.04	13.82	7.43	4.04	13.58	8.65
Ba(138)* (ppm)	11.89	39.76	14.73	8.28	5.00	13.91	11.54
W (ppm)	0.33	1.59	0.32	0.04	BDL	0.09	1.40
Pb (ppm)	1.28	5.14	1.67	0.35	0.13	0.61	BDL
Bi (ppm)	BDL	0.06	BDL	0.01	BDL	0.02	BDL
Th (ppm)	0.00	10.83	2.23	0.07	BDL	0.02	null
U (ppm)	0.41	2.01	1.92	0.02	BDL	0.12	null
Tl (ppm)	0.10	0.16	0.09	0.11	0.13	0.12	BDL
SiO2 wt.%	28.97	28.97	28.97	28.97	28.97	28.97	35.00

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	G909158-4	G909158-5	G909158-6	G909158-7	G909158-8	G909158-9	YD09-04area1-1
Data Quality (1-3)	2	1.5	2	2	2.5	3	3
1 standard error (ppm) *							
Li	0.92	1.61	3.13	1.71	2.63	2.62	3.82
B	0.96	2.18	0.17	0.66	0.40	0.49	2.60
Si	2708.49	2708.49	2708.49	2708.49	2708.49	2708.49	3272.25
P	83.95	1181.06	5.06	56.43	6.90	19.96	19.57
Sc	0.31	0.51	0.25	0.08	0.57	0.54	BDL
Ti	20.53	93.21	587.62	9.25	6.31	6.16	71.09
V	2.97	3.61	5.46	5.42	4.81	4.28	2.32
Cr	0.65	0.33	0.33	0.84	0.44	0.68	4.64
Mn	69.47	103.32	108.54	89.21	91.00	102.13	34.24
Co	0.46	0.66	0.93	0.58	0.79	0.63	0.87
Cu	21.64	15.87	9.49	10.18	7.01	14.63	33.27
Cu	23.58	16.66	7.61	8.96	7.48	17.68	21.67
Zn	8.03	12.11	13.52	8.86	7.00	12.01	18.75
Zn	8.98	10.07	10.07	9.94	11.45	16.38	12.35
As	0.59	0.25	0.40	0.21	BDL	0.51	BDL
Se	0.41	BDL	2.27	1.24	BDL	BDL	BDL
Se	BDL	BDL	BDL	BDL	0.74	0.96	BDL
Rb	1.10	1.08	1.28	0.61	1.46	0.85	
Sr	0.60	9.57	1.94	0.56	0.16	0.39	
Mo	0.12	0.09	0.18	BDL	BDL	0.06	BDL
Sn	0.05	0.12	0.11	0.06	0.14	BDL	BDL
Te	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs	0.25	0.04	0.09	0.05	0.14	0.04	0.10
Ba	0.29	2.37	1.47	0.79	0.63	1.32	1.50
Ba	0.45	1.51	0.59	0.35	0.34	0.45	1.36
W	0.09	0.33	0.21	0.04	BDL	0.07	0.78
Pb	0.11	0.70	0.33	0.07	0.09	0.02	BDL
Bi	BDL	0.03	BDL	0.01	BDL	0.01	BDL
Th	0.03	0.56	0.85	0.02	BDL	0.02	
U	0.07	0.44	0.47	0.01	BDL	0.02	
Tl	0.02	0.04	0.03	0.04	0.05	0.01	BDL

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	G909158-4	G909158-5	G909158-6	G909158-7	G909158-8	G909158-9	YD09-04area1-1
Data Quality (1-3)	2	1.5	2	2	2.5	3	3
1 standard error (ppm)**							
Li	4.20	6.02	8.71	7.91	8.65	8.51	4.79
B	2.11	2.25	0.63	1.11	0.67	0.72	2.61
Si	4652.48	4652.48	4652.48	4652.48	4652.48	4652.48	3403.19
P	301.69	1908.16	19.59	307.19	19.07	77.32	31.54
Sc	0.32	0.52	0.27	0.12	0.58	0.55	BDL
Ti	21.71	116.04	596.25	19.13	18.72	17.38	79.27
V	4.77	5.73	8.56	8.10	8.24	7.66	7.54
Cr	3.45	2.96	2.48	3.18	1.86	4.08	8.59
Mn	84.63	129.22	167.13	152.54	151.54	165.52	46.14
Co	0.82	0.94	1.37	1.23	1.49	1.22	0.88
Cu	69.94	61.63	29.82	36.11	26.04	54.75	43.38
Cu	70.66	60.84	29.11	35.72	25.27	55.28	35.99
Zn	9.88	13.98	16.32	12.10	9.96	15.74	21.74
Zn	10.63	12.30	13.57	13.00	13.53	19.23	15.04
As	1.40	1.13	0.53	0.34	BDL	0.60	BDL
Se	1.35	BDL	4.83	1.84	BDL	BDL	BDL
Se	BDL	BDL	BDL	BDL	1.26	1.11	BDL
Rb	1.16	1.17	1.33	0.74	1.53	1.05	
Sr	0.63	9.75	1.95	0.58	0.17	0.42	
Mo	0.13	0.09	0.19	BDL	BDL	0.07	BDL
Sn	0.11	0.13	0.12	0.08	0.15	BDL	BDL
Te	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs	0.27	0.07	0.09	0.06	0.15	0.05	0.22
Ba	0.32	2.42	1.48	0.80	0.63	1.33	1.58
Ba	0.55	1.83	0.70	0.41	0.37	0.58	1.49
W	0.10	0.38	0.21	0.04	BDL	0.08	0.78
Pb	0.12	0.72	0.34	0.07	0.09	0.03	BDL
Bi	BDL	0.03	BDL	0.01	BDL	0.01	BDL
Th	0.03	0.87	0.86	0.02	BDL	0.02	
U	0.08	0.46	0.50	0.01	BDL	0.02	
Tl	0.02	0.04	0.03	0.04	0.06	0.02	BDL

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	YD09-04area1-2	YD09-04area1-3	YD09-04area1-4	YD09-04area3-1	YD09-04area3-2	YD09-04area3-3	YD09-04area3-4
Data Quality (1-3)	3	3	3	3	3	3	3
Li (ppm)	64.53	58.73	73.95	43.42	51.66	50.50	51.53
B (ppm)	BDL	6.44	9.72	BDL	5.76	BDL	BDL
Si (ppm)	163612.57	163612.57	163612.57	144913.99	144913.99	144913.99	144913.99
P (ppm)	49.31	BDL	BDL	BDL	41.32	31.90	78.66
Sc (ppm)	BDL	5.26	BDL	1.73	BDL	BDL	4.27
Ti (ppm)	1103.76	51.88	462.67	73.66	332.38	1416.85	422.33
V (ppm)	93.15	101.08	85.85	81.96	73.73	88.35	70.62
Cr (ppm)	87.74	153.84	115.14	622.68	966.79	961.54	890.47
Mn (ppm)	1953.82	2254.57	1568.94	1966.60	1409.74	1622.08	1692.75
Co (ppm)	BDL	2.97	BDL	1.80	2.13	1.92	BDL
Cu(63) (ppm)	378.95	351.89	463.99	409.68	523.33	501.78	498.96
Cu(65)* (ppm)	413.37	328.31	443.41	421.35	482.86	452.99	493.27
Zn(66)* (ppm)	293.82	278.83	226.83	269.33	198.27	224.90	233.93
Zn(68) (ppm)	240.32	276.13	222.20	248.16	173.99	215.72	211.36
As (ppm)	BDL	BDL	BDL	2.96	BDL	BDL	BDL
Se(76) (ppm)	166.99	43.42	BDL	100.45	110.02	122.55	98.65
Se(77)* (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Rb (ppm)	null	null	null	null	null	null	null
Sr (ppm)	null	null	null	null	null	null	null
Mo (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Sn (ppm)	BDL	BDL	1.68	BDL	BDL	BDL	0.19
Te (ppm)	BDL	BDL	3.91	BDL	1.91	2.48	BDL
Cs (ppm)	BDL	0.35	4.60	1.38	1.07	3.37	2.69
Ba(137) (ppm)	7.82	5.36	16.04	2.52	7.61	4.22	7.19
Ba(138)* (ppm)	4.67	2.67	17.21	2.21	6.00	4.19	4.45
W (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Pb (ppm)	BDL	0.14	BDL	BDL	0.60	0.84	0.17
Bi (ppm)	BDL	BDL	0.10	BDL	BDL	BDL	BDL
Th (ppm)	null	null	null	null	null	null	null
U (ppm)	null	null	null	null	null	null	null
Tl (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	BDL
SiO2 wt.%	35.00	35.00	35.00	31.00	31.00	31.00	31.00

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	YD09-04area1-2	YD09-04area1-3	YD09-04area1-4	YD09-04area3-1	YD09-04area3-2	YD09-04area3-3	YD09-04area3-4
Data Quality (1-3)	3	3	3	3	3	3	3
1 standard error (ppm) *							
Li	5.26	2.33	2.85	1.51	1.69	2.54	2.97
B	BDL	10.23	2.84	BDL	4.41	BDL	BDL
Si	3272.25	3272.25	3272.25	2898.28	2898.28	2898.28	2898.28
P	12.50	BDL	BDL	BDL	10.81	19.22	30.38
Sc	BDL	0.91	BDL	0.48	BDL	BDL	0.90
Ti	67.24	7.04	63.96	11.46	361.98	87.00	45.50
V	3.83	3.46	4.46	2.74	2.29	6.75	2.93
Cr	4.54	6.99	5.86	20.90	30.08	29.97	27.78
Mn	53.93	57.89	41.45	48.18	34.60	51.83	41.70
Co	BDL	0.53	BDL	0.77	0.43	0.62	BDL
Cu	18.65	14.28	29.25	14.86	19.26	18.22	25.17
Cu	26.72	13.64	23.40	19.42	19.63	23.00	30.45
Zn	26.59	11.98	11.22	8.82	7.09	9.07	9.56
Zn	8.81	8.03	12.12	11.16	5.58	9.59	5.68
As	BDL	BDL	BDL	0.79	BDL	BDL	BDL
Se	37.98	16.66	BDL	16.91	26.80	33.92	30.91
Se	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Rb							
Sr							
Mo	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Sn	BDL	BDL	0.28	BDL	BDL	BDL	0.61
Te	BDL	BDL	2.82	BDL	1.08	1.14	BDL
Cs	BDL	0.05	0.37	0.23	0.20	0.59	0.26
Ba	1.41	1.13	1.61	0.85	0.75	0.62	1.99
Ba	0.85	0.40	0.69	0.17	0.62	0.45	0.61
W	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Pb	BDL	0.22	BDL	BDL	0.18	0.18	0.21
Bi	BDL	BDL	0.09	BDL	BDL	BDL	BDL
Th							
U							
Tl	BDL	BDL	BDL	BDL	BDL	BDL	BDL

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	YD09-04area1-2	YD09-04area1-3	YD09-04area1-4	YD09-04area3-1	YD09-04area3-2	YD09-04area3-3	YD09-04area3-4
Data Quality (1-3)	3	3	3	3	3	3	3
1 standard error (ppm)**							
Li	6.13	3.70	4.61	2.60	3.04	3.54	3.89
B	BDL	10.23	2.85	BDL	4.41	BDL	BDL
Si	3403.19	3403.19	3403.19	3014.26	3014.26	3014.26	3014.26
P	14.67	BDL	BDL	BDL	12.57	19.85	32.75
Sc	BDL	0.92	BDL	0.48	BDL	BDL	0.91
Ti	77.31	7.26	65.92	11.74	362.16	99.83	47.79
V	10.04	10.65	9.65	8.61	7.69	11.09	7.62
Cr	8.45	14.32	11.04	54.74	84.12	83.68	77.50
Mn	70.49	78.07	55.20	66.40	47.65	64.08	57.32
Co	BDL	0.56	BDL	0.78	0.44	0.63	BDL
Cu	29.62	25.70	40.61	28.97	37.16	35.50	39.39
Cu	37.86	25.30	37.09	33.54	36.97	37.32	44.18
Zn	30.11	17.98	15.64	15.67	11.88	14.11	14.76
Zn	13.64	14.41	15.48	15.50	9.38	13.39	10.78
As	BDL	BDL	BDL	0.80	BDL	BDL	BDL
Se	38.38	16.72	BDL	17.24	27.05	34.16	31.08
Se	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Rb							
Sr							
Mo	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Sn	BDL	BDL	0.29	BDL	BDL	BDL	0.61
Te	BDL	BDL	2.84	BDL	1.09	1.16	BDL
Cs	BDL	0.08	0.95	0.35	0.28	0.87	0.57
Ba	1.47	1.17	1.85	0.86	0.87	0.66	2.03
Ba	0.89	0.42	1.14	0.21	0.69	0.50	0.66
W	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Pb	BDL	0.22	BDL	BDL	0.18	0.19	0.21
Bi	BDL	BDL	0.09	BDL	BDL	BDL	BDL
Th							
U							
Tl	BDL	BDL	BDL	BDL	BDL	BDL	BDL

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	99017-10	99017-4	99017-5	99017-6	99017-7	99017-8	99017-9
Data Quality (1-3)	3	2	3	3	3	3	3
Li (ppm)	116.85	54.16	77.76	116.66	101.26	110.42	95.40
B (ppm)	8.70	6.92	2.64	14.33	3.12	4.44	5.21
Si (ppm)	126402.39	126402.39	126402.39	126402.39	126402.39	126402.39	126402.39
P (ppm)	266.65	316.67	209.99	291.37	85.45	133.62	104.58
Sc (ppm)	1.83	1.71	1.13	1.90	1.85	1.43	2.45
Ti (ppm)	145.46	106.36	175.65	140.55	223.16	205.12	234.99
V (ppm)	55.32	43.90	66.76	43.58	83.52	78.93	70.59
Cr (ppm)	6.56	5.45	5.29	5.93	7.23	8.81	6.25
Mn (ppm)	1714.69	704.90	3389.02	1151.86	3733.71	3269.36	3188.22
Co (ppm)	196.43	93.75	175.28	126.12	207.50	207.24	205.64
Cu(63) (ppm)	36.77	69.83	12.16	81.15	20.06	39.36	20.66
Cu(65)* (ppm)	36.73	68.76	12.49	82.17	20.75	39.11	20.46
Zn(66)* (ppm)	594.75	243.92	683.61	453.18	797.84	744.30	733.58
Zn(68) (ppm)	580.38	242.71	674.22	440.38	772.57	719.08	711.82
As (ppm)	1.04	5.93	0.34	4.60	0.03	BDL	0.45
Se(76) (ppm)	BDL	1.60	2.20	5.44	3.39	5.66	1.91
Se(77)* (ppm)	BDL	BDL	BDL	BDL	1.51	BDL	BDL
Rb (ppm)	28.30	27.42	11.95	52.50	15.59	24.77	21.15
Sr (ppm)	3.62	3.85	1.28	5.90	2.17	3.21	2.45
Mo (ppm)	0.17	0.51	0.11	BDL	0.05	BDL	BDL
Sn (ppm)	0.10	0.14	BDL	0.12	BDL	BDL	0.05
Te (ppm)	0.11	0.11	0.12	BDL	BDL	BDL	BDL
Cs (ppm)	1.94	3.55	1.21	6.12	1.81	3.27	1.43
Ba(137) (ppm)	13.64	90.11	6.82	30.23	11.40	14.27	26.91
Ba(138)* (ppm)	12.92	91.53	5.84	30.40	10.96	16.10	25.59
W (ppm)	BDL	0.45	0.04	0.29	0.02	0.08	0.05
Pb (ppm)	0.20	0.42	0.15	0.82	0.24	0.60	0.16
Bi (ppm)	0.01	0.00	0.01	0.03	0.01	0.01	0.01
Th (ppm)	0.21	0.98	BDL	0.46	0.01	0.06	0.01
U (ppm)	0.11	0.62	0.00	0.24	0.00	0.04	0.01
Tl (ppm)	0.55	0.40	0.16	1.18	0.31	0.45	0.31
SiO2 wt.%	27.04	27.04	27.04	27.04	27.04	27.04	27.04

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	99017-10	99017-4	99017-5	99017-6	99017-7	99017-8	99017-9
Data Quality (1-3)	3	2	3	3	3	3	3
1 standard error (ppm) *							
Li	5.65	1.55	4.26	4.44	3.75	4.40	2.91
B	0.65	1.03	0.42	1.73	0.87	0.68	0.93
Si	2528.05	2528.05	2528.05	2528.05	2528.05	2528.05	2528.05
P	16.78	27.24	13.22	19.04	4.33	12.67	7.57
Sc	0.20	0.11	0.31	0.10	0.26	0.14	0.12
Ti	9.72	2.88	8.20	7.55	6.77	6.63	11.49
V	1.93	1.67	1.83	1.91	2.35	2.06	1.55
Cr	0.26	0.45	0.16	0.38	0.50	0.65	0.29
Mn	56.90	25.62	92.29	184.52	114.60	176.85	73.63
Co	6.87	4.17	4.21	6.13	4.62	6.02	4.59
Cu	1.39	2.41	0.59	4.06	0.77	1.76	1.07
Cu	1.19	3.13	1.21	3.26	1.04	1.83	0.94
Zn	20.55	5.91	15.31	15.62	19.61	17.00	17.58
Zn	21.93	7.52	16.21	15.48	17.02	18.68	16.02
As	0.50	0.23	0.26	0.22	0.14	BDL	0.17
Se	BDL	0.25	0.94	0.67	0.17	2.11	0.22
Se	BDL	BDL	BDL	BDL	0.33	BDL	BDL
Rb	1.20	0.73	0.40	5.07	0.57	1.55	1.08
Sr	0.28	0.13	0.17	0.28	0.18	0.52	0.26
Mo	0.11	0.12	0.11	BDL	0.10	BDL	BDL
Sn	0.03	0.05	BDL	0.03	BDL	BDL	0.07
Te	0.20	0.18	0.17	BDL	BDL	BDL	BDL
Cs	0.07	0.15	0.10	2.27	0.13	0.12	0.15
Ba	2.48	10.44	0.80	2.15	0.57	2.36	2.33
Ba	1.94	6.80	0.86	1.49	0.83	0.68	1.66
W	BDL	0.10	0.04	0.01	0.05	0.05	0.03
Pb	0.06	0.06	0.02	0.10	0.04	0.11	0.07
Bi	0.02	0.01	0.01	0.01	0.02	0.02	0.01
Th	0.05	0.11	BDL	0.05	0.01	0.04	0.01
U	0.07	0.06	0.01	0.04	0.01	0.03	0.01
Tl	0.07	0.05	0.03	0.21	0.04	0.06	0.11

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	99017-10	99017-4	99017-5	99017-6	99017-7	99017-8	99017-9
Data Quality (1-3)	3	2	3	3	3	3	3
1 standard error (ppm)**							
Li	17.38	7.78	11.74	17.00	14.73	16.15	13.73
B	3.23	2.72	1.05	5.49	1.43	1.75	2.11
Si	4342.53	4342.53	4342.53	4342.53	4342.53	4342.53	4342.53
P	78.61	95.19	61.91	86.05	24.99	40.52	31.06
Sc	0.22	0.13	0.32	0.13	0.28	0.15	0.16
Ti	16.78	10.40	18.44	15.22	22.04	20.39	24.90
V	3.18	2.61	3.56	2.76	4.48	4.15	3.58
Cr	1.34	1.18	1.07	1.25	1.53	1.88	1.28
Mn	82.47	35.47	149.79	188.82	173.29	210.31	133.20
Co	12.51	6.50	10.23	9.09	11.97	12.56	11.86
Cu	4.13	7.76	1.41	9.49	2.25	4.52	2.43
Cu	4.06	7.91	1.79	9.28	2.43	4.52	2.36
Zn	24.73	8.17	22.01	18.81	26.93	24.19	24.44
Zn	25.68	9.37	22.44	18.50	24.62	24.96	22.92
As	0.62	2.07	0.29	1.61	0.14	BDL	0.23
Se	BDL	1.31	1.99	4.40	2.71	5.00	1.55
Se	BDL	BDL	BDL	BDL	1.25	BDL	BDL
Rb	1.28	0.85	0.44	5.14	0.62	1.60	1.13
Sr	0.29	0.15	0.17	0.30	0.19	0.52	0.27
Mo	0.11	0.13	0.11	BDL	0.10	BDL	BDL
Sn	0.03	0.05	BDL	0.03	BDL	BDL	0.07
Te	0.20	0.18	0.17	BDL	BDL	BDL	BDL
Cs	0.15	0.28	0.13	2.30	0.18	0.25	0.18
Ba	2.50	10.59	0.81	2.23	0.61	2.37	2.38
Ba	1.96	7.03	0.87	1.61	0.86	0.75	1.73
W	BDL	0.11	0.04	0.04	0.05	0.06	0.03
Pb	0.06	0.06	0.02	0.11	0.04	0.12	0.07
Bi	0.02	0.01	0.01	0.01	0.02	0.02	0.01
Th	0.05	0.13	BDL	0.05	0.01	0.04	0.01
U	0.07	0.08	0.01	0.04	0.01	0.03	0.01
Tl	0.09	0.06	0.03	0.24	0.05	0.07	0.11

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	ANN007006.017-1	ANN007006.017-11	ANN007006.017-12	ANN007006.017-13	ANN007006.017-2	ANN007006.017-3	G909165_40-1
Data Quality (1-3)	1	2.5	2	1.5	2.5	2.5	2
Li (ppm)	57.58	55.81	39.40	61.93	56.63	55.65	49.28
B (ppm)	4.16	2.45	0.98	1.90	2.18	2.34	8.72
Si (ppm)	131030.29	131030.29	131030.29	131030.29	131030.29	131030.29	127337.32
P (ppm)	50.65	41.83	31.15	46.89	67.74	59.06	37.47
Sc (ppm)	30.80	5.22	2.79	9.38	8.61	9.60	7.73
Ti (ppm)	84439.36	4365.86	90.53	12915.13	9803.68	7428.11	710.99
V (ppm)	545.12	252.98	146.19	256.00	284.91	245.11	172.77
Cr (ppm)	139.76	108.81	68.03	76.51	66.20	66.39	4.63
Mn (ppm)	553.85	672.43	496.60	609.70	543.78	554.18	2115.07
Co (ppm)	5.39	4.31	2.76	5.14	5.94	6.85	22.97
Cu(63) (ppm)	2.74	1.03	0.39	1.39	3.89	4.53	722.60
Cu(65)* (ppm)	3.44	1.35	0.49	2.43	4.33	4.56	716.66
Zn(66)* (ppm)	177.43	231.92	175.17	196.41	186.64	196.88	235.41
Zn(68) (ppm)	168.02	223.71	173.17	194.15	184.67	190.79	243.81
As (ppm)	4.49	0.95	0.60	1.58	1.05	1.04	0.54
Se(76) (ppm)	2.11	2.48	5.38	1.30	1.71	BDL	2.05
Se(77)* (ppm)	1.90	BDL	BDL	BDL	BDL	2.13	1.16
Rb (ppm)	10.00	0.99	0.83	2.88	3.90	2.93	80.40
Sr (ppm)	59.62	2.70	1.34	23.91	31.54	36.43	7.13
Mo (ppm)	0.14	604.56	0.53	0.30	0.13	0.23	BDL
Sn (ppm)	31.94	3.26	0.55	5.89	6.41	4.64	0.61
Te (ppm)	BDL	0.54	BDL	BDL	BDL	BDL	0.09
Cs (ppm)	2.64	1.55	1.46	1.62	2.80	2.81	1.43
Ba(137) (ppm)	23.75	4.90	1.33	23.77	18.91	18.31	819.59
Ba(138)* (ppm)	21.93	5.18	1.26	23.18	18.79	18.22	822.39
W (ppm)	105.27	18.33	0.44	20.63	21.90	13.96	0.12
Pb (ppm)	36.49	3.44	0.27	8.96	10.22	8.64	0.64
Bi (ppm)	0.06	0.14	BDL	0.09	0.04	0.01	BDL
Th (ppm)	9.92	0.81	0.03	1.33	1.04	13.63	BDL
U (ppm)	25.62	3.31	0.06	3.48	4.29	26.59	BDL
Tl (ppm)	0.10	0.01	BDL	0.02	0.03	0.04	0.38
SiO2 wt.%	28.03	28.03	28.03	28.03	28.03	28.03	27.24

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	ANN007006.017-1	ANN007006.017-11	ANN007006.017-12	ANN007006.017-13	ANN007006.017-2	ANN007006.017-3	G909165_40-1
Data Quality (1-3)	1	2.5	2	1.5	2.5	2.5	2
1 standard error (ppm) *							
Li	1.58	4.28	1.43	3.20	2.80	2.53	1.89
B	0.53	0.44	0.61	0.75	0.40	0.85	1.07
Si	2620.61	2620.61	2620.61	2620.61	2620.61	2620.61	2546.75
P	6.99	1.77	3.63	2.86	59.35	10.18	8.26
Sc	4.59	0.38	0.14	0.71	0.67	0.65	0.42
Ti	4382.99	221.51	2.28	1030.15	262.97	1169.59	23.37
V	16.55	6.64	3.75	12.42	11.70	16.97	4.98
Cr	4.63	4.19	2.58	2.29	2.50	3.48	0.30
Mn	12.26	21.03	11.87	17.96	12.90	19.97	56.06
Co	0.27	0.12	0.23	0.24	0.27	0.28	0.79
Cu	0.27	0.16	0.27	0.32	0.38	1.26	28.30
Cu	1.07	0.29	0.16	0.42	1.03	1.10	24.09
Zn	6.00	7.33	4.25	6.76	5.93	7.77	7.83
Zn	6.71	9.57	5.75	6.26	5.50	6.41	7.74
As	0.56	0.40	0.07	0.36	0.65	0.41	0.11
Se	0.11	0.38	0.43	0.96	0.56	BDL	0.11
Se	1.40	BDL	BDL	BDL	BDL	1.10	0.45
Rb	0.30	0.25	0.19	0.30	0.10	0.41	3.10
Sr	5.92	0.12	0.05	3.96	3.50	2.81	0.53
Mo	0.07	232.43	0.04	0.07	0.22	0.18	BDL
Sn	1.06	0.12	0.04	0.69	0.52	0.94	0.05
Te	BDL	0.14	BDL	BDL	BDL	BDL	0.03
Cs	0.13	0.21	0.08	0.14	0.16	0.28	0.07
Ba	0.97	0.56	0.32	3.51	1.79	2.84	36.80
Ba	0.92	0.52	0.20	2.65	2.33	3.88	31.43
W	12.89	1.93	0.04	1.16	1.83	3.79	0.02
Pb	1.86	0.45	0.13	0.70	1.14	2.20	0.05
Bi	0.04	0.05	BDL	0.05	0.01	0.00	BDL
Th	1.84	0.18	0.01	0.28	0.25	3.80	BDL
U	5.27	0.36	0.02	0.43	0.74	4.48	BDL
Tl	0.04	0.02	BDL	0.01	0.03	0.01	0.03

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	ANN007006.017-1	ANN007006.017-11	ANN007006.017-12	ANN007006.017-13	ANN007006.017-2	ANN007006.017-3	G909165_40-1
Data Quality (1-3)	1	2.5	2	1.5	2.5	2.5	2
1 standard error (ppm)**							
Li	8.25	8.94	5.72	9.28	8.45	8.23	7.25
B	1.60	0.99	0.71	1.02	0.89	1.21	3.35
Si	4501.52	4501.52	4501.52	4501.52	4501.52	4501.52	4374.64
P	16.18	12.18	9.68	13.81	62.48	19.82	13.59
Sc	4.79	0.44	0.18	0.82	0.77	0.78	0.61
Ti	9067.61	466.38	8.81	1592.26	958.40	1362.19	72.26
V	29.90	13.33	7.66	17.06	17.50	20.33	9.91
Cr	28.35	22.17	13.86	15.48	13.48	13.73	0.98
Mn	22.85	31.47	20.97	27.80	22.91	27.77	97.08
Co	0.40	0.26	0.27	0.36	0.41	0.46	1.51
Cu	0.39	0.19	0.27	0.35	0.56	1.34	82.06
Cu	1.13	0.33	0.17	0.49	1.12	1.20	79.90
Zn	7.27	9.09	5.87	8.14	7.34	9.00	11.21
Zn	7.74	10.87	7.00	7.69	6.95	7.77	11.00
As	1.65	0.52	0.22	0.65	0.74	0.55	0.22
Se	1.69	2.02	4.33	1.42	1.48	BDL	1.65
Se	2.07	BDL	BDL	BDL	BDL	2.03	1.03
Rb	0.34	0.25	0.19	0.30	0.11	0.42	3.59
Sr	6.01	0.13	0.05	3.98	3.55	2.89	0.59
Mo	0.07	237.25	0.06	0.07	0.22	0.18	BDL
Sn	5.83	0.60	0.11	1.26	1.26	1.25	0.12
Te	BDL	0.17	BDL	BDL	BDL	BDL	0.03
Cs	0.22	0.24	0.13	0.18	0.24	0.33	0.12
Ba	1.07	0.57	0.32	3.54	1.83	2.86	44.17
Ba	1.02	0.53	0.21	2.69	2.36	3.89	38.69
W	17.94	2.91	0.07	2.71	3.18	4.14	0.02
Pb	2.71	0.48	0.13	0.85	1.26	2.25	0.05
Bi	0.04	0.05	BDL	0.05	0.01	0.00	BDL
Th	1.94	0.19	0.01	0.29	0.26	3.89	BDL
U	5.62	0.44	0.02	0.50	0.81	4.91	BDL
Tl	0.04	0.02	BDL	0.01	0.03	0.01	0.05

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	G909165_40-3	G909165_41-1	G909165_41-2	G909165_46-1	G909165_46-2	G909165_46-3	G909165_46-4
Data Quality (1-3)	3	2	3	1.5	1.5	1.5	1.5
Li (ppm)	50.61	51.73	40.30	62.61	67.65	44.12	67.06
B (ppm)	2.03	1.22	6.34	1.89	1.37	2.17	1.54
Si (ppm)	127337.32	127337.32	127337.32	127337.32	127337.32	127337.32	127337.32
P (ppm)	17.89	152.22	241.36	39.67	BDL	98.27	8403.41
Sc (ppm)	4.55	4.92	5.70	6.41	6.02	4.26	7.42
Ti (ppm)	213.89	9581.07	516.14	16107.50	20069.80	15108.85	16645.68
V (ppm)	141.36	250.55	141.55	341.82	362.58	231.87	308.56
Cr (ppm)	3.42	245.41	6.22	123.09	153.98	118.76	162.03
Mn (ppm)	1931.99	2561.97	1731.59	3065.15	3048.26	2043.57	3034.78
Co (ppm)	23.30	27.22	18.19	30.83	32.23	22.52	31.96
Cu(63) (ppm)	1487.76	224.28	393.63	282.20	348.33	148.87	236.78
Cu(65)* (ppm)	1534.65	220.15	396.99	278.87	344.43	149.29	214.92
Zn(66)* (ppm)	223.24	268.69	183.36	320.24	308.69	215.38	305.37
Zn(68) (ppm)	224.94	254.47	195.38	307.24	290.61	209.16	304.51
As (ppm)	0.33	15.73	16.50	4.51	6.67	3.93	14.32
Se(76) (ppm)	1.75	1.95	2.06	3.01	2.96	2.08	3.62
Se(77)* (ppm)	BDL	1.13	BDL	BDL	BDL	BDL	7.36
Rb (ppm)	20.20	0.31	57.52	1.61	2.03	10.20	2.82
Sr (ppm)	2.60	1.51	5.70	1.40	0.24	2.52	37.68
Mo (ppm)	BDL	0.49	0.36	0.04	0.50	0.13	0.47
Sn (ppm)	0.14	1.57	0.37	1.13	1.83	1.25	1.58
Te (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs (ppm)	0.45	BDL	1.05	0.15	0.08	0.22	0.07
Ba(137) (ppm)	253.55	4.86	643.18	12.10	10.74	133.42	34.89
Ba(138)* (ppm)	251.65	4.23	669.59	14.79	9.46	134.39	45.98
W (ppm)	BDL	4.00	2.76	2.03	1.72	1.82	1.98
Pb (ppm)	0.14	0.88	0.52	1.19	0.86	0.69	1.91
Bi (ppm)	BDL	BDL	BDL	BDL	0.05	0.02	0.04
Th (ppm)	0.92	2.50	2.40	1.80	2.14	2.02	81.08
U (ppm)	0.09	1.92	0.51	2.93	2.77	2.52	8.02
Tl (ppm)	0.12	BDL	0.36	BDL	BDL	0.08	0.02
SiO2 wt.%	27.24	27.24	27.24	27.24	27.24	27.24	27.24

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	G909165_40-3	G909165_41-1	G909165_41-2	G909165_46-1	G909165_46-2	G909165_46-3	G909165_46-4
Data Quality (1-3)	3	2	3	1.5	1.5	1.5	1.5
1 standard error (ppm) *							
Li	2.43	2.26	1.57	2.54	2.24	2.09	2.86
B	0.18	0.25	0.50	0.26	0.35	0.17	0.66
Si	2546.75	2546.75	2546.75	2546.75	2546.75	2546.75	2546.75
P	1.53	21.62	12.05	7.34	BDL	41.88	378.87
Sc	0.24	0.29	0.28	0.36	0.41	0.29	0.38
Ti	11.85	361.62	24.06	628.02	702.64	500.95	558.64
V	4.53	9.78	4.09	14.10	10.81	6.63	9.46
Cr	0.16	9.10	0.29	3.67	5.03	3.76	4.49
Mn	49.97	118.30	44.70	81.34	82.33	66.66	83.54
Co	0.70	1.03	0.62	1.02	0.92	0.84	0.98
Cu	39.97	10.65	19.81	9.85	19.07	4.12	13.32
Cu	44.58	10.46	21.69	10.17	17.69	3.73	10.35
Zn	7.81	12.15	6.12	11.94	10.63	7.12	10.86
Zn	7.28	14.09	7.04	10.46	9.66	7.00	10.83
As	0.06	1.22	1.34	0.22	0.39	0.33	1.00
Se	0.30	0.28	0.13	0.27	0.28	0.12	0.25
Se	BDL	0.21	BDL	BDL	BDL	BDL	2.08
Rb	1.23	0.06	2.26	0.16	0.16	1.06	0.29
Sr	0.12	0.60	0.32	0.10	1.64	0.13	1.60
Mo	BDL	0.06	0.04	0.18	0.06	0.08	0.13
Sn	0.04	0.12	0.07	0.11	0.08	0.14	0.08
Te	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs	0.06	BDL	0.06	0.03	0.02	0.01	0.03
Ba	18.61	4.67	39.27	1.05	0.55	12.56	4.34
Ba	17.76	3.74	38.88	1.39	0.52	11.37	3.24
W	BDL	0.31	0.20	0.21	0.08	0.10	0.16
Pb	0.00	0.13	0.06	0.10	0.04	0.08	0.24
Bi	BDL	BDL	BDL	BDL	0.01	0.01	0.01
Th	0.15	0.40	0.25	0.18	0.46	0.12	5.10
U	0.06	0.15	0.06	0.10	0.19	0.10	0.66
Tl	0.02	BDL	0.02	BDL	BDL	0.01	0.01

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	G909165_40-3	G909165_41-1	G909165_41-2	G909165_46-1	G909165_46-2	G909165_46-3	G909165_46-4
Data Quality (1-3)	3	2	3	1.5	1.5	1.5	1.5
1 standard error (ppm)**							
Li	7.59	7.68	5.93	9.24	9.86	6.60	9.94
B	0.76	0.51	2.36	0.73	0.61	0.81	0.86
Si	4374.64	4374.64	4374.64	4374.64	4374.64	4374.64	4374.64
P	5.37	48.88	70.54	13.58	BDL	50.55	2449.48
Sc	0.36	0.41	0.43	0.52	0.54	0.38	0.57
Ti	23.74	989.85	55.16	1671.56	2054.07	1536.98	1695.52
V	8.35	15.81	8.12	22.04	20.97	13.27	17.99
Cr	0.70	50.10	1.28	24.98	31.32	24.14	32.84
Mn	87.97	152.36	78.80	140.75	140.81	101.53	141.11
Co	1.48	1.84	1.19	2.01	2.03	1.52	2.04
Cu	163.55	26.17	46.40	31.65	41.74	16.39	28.54
Cu	169.10	25.63	47.45	31.34	40.66	16.30	25.08
Zn	10.89	15.21	8.74	16.17	14.95	10.22	15.03
Zn	10.25	16.28	9.42	14.37	13.43	9.70	14.58
As	0.13	5.62	5.91	1.59	2.36	1.41	5.09
Se	1.43	1.59	1.65	2.43	2.39	1.67	2.91
Se	BDL	0.94	BDL	BDL	BDL	BDL	6.27
Rb	1.31	0.06	2.60	0.16	0.17	1.08	0.29
Sr	0.15	0.60	0.37	0.11	1.64	0.16	2.04
Mo	BDL	0.07	0.05	0.18	0.07	0.08	0.13
Sn	0.05	0.31	0.09	0.23	0.34	0.27	0.30
Te	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs	0.06	BDL	0.10	0.03	0.02	0.02	0.03
Ba	20.09	4.68	43.70	1.11	0.63	13.17	4.46
Ba	19.05	3.74	43.01	1.44	0.58	11.95	3.47
W	BDL	0.56	0.38	0.32	0.22	0.24	0.28
Pb	0.01	0.13	0.06	0.11	0.05	0.08	0.25
Bi	BDL	BDL	BDL	BDL	0.01	0.01	0.01
Th	0.16	0.44	0.31	0.22	0.49	0.19	7.83
U	0.06	0.21	0.07	0.24	0.28	0.21	0.89
Tl	0.02	BDL	0.04	BDL	BDL	0.01	0.01

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	G909165_46-5	G909165_47-2	G909165_47-3	G909165_47-4	G909165_47-5	YD01-13A-1	YD01-13A-10
Data Quality (1-3)	1.5	1	0	0	2	3	2
Li (ppm)	70.60	39.38	8.17	8.72	52.97	47.87	33.69
B (ppm)	1.45	8.46	12.60	11.77	1.34	1.19	4.08
Si (ppm)	127337.32	127337.32	127337.32	127337.32	127337.32	113266.64	113266.64
P (ppm)	3683.15	546.84	820368.05	1564945.94	190.84	30.64	31.17
Sc (ppm)	6.25	12.77	9.49	11.17	3.50	7.26	8.07
Ti (ppm)	20462.10	437078.59	477.46	867.66	5881.31	143.86	103.11
V (ppm)	326.72	712.51	84.07	148.93	103.40	153.99	107.38
Cr (ppm)	135.81	27.04	10.79	26.43	15.34	151.18	87.78
Mn (ppm)	2949.71	1428.12	3093.10	3912.02	1745.59	1933.64	1145.18
Co (ppm)	32.78	21.61	5.72	5.47	24.71	39.83	17.65
Cu(63) (ppm)	185.20	299.86	568.27	257.15	4886.77	2.44	9.16
Cu(65)* (ppm)	191.09	318.23	571.18	256.95	4140.04	2.67	10.46
Zn(66)* (ppm)	317.97	267.45	45.70	41.63	245.37	278.88	182.71
Zn(68) (ppm)	300.16	261.12	71.33	67.58	242.40	285.36	179.44
As (ppm)	6.66	43.36	57.37	81.37	1.60	0.53	BDL
Se(76) (ppm)	2.82	6.55	6.43	7.33	0.91	BDL	BDL
Se(77)* (ppm)	0.62	BDL	20.97	42.04	BDL	BDL	0.56
Rb (ppm)	2.03	50.70	2.70	2.19	17.63	BDL	23.88
Sr (ppm)	12.41	24.71	2292.81	4401.60	7.33	11.83	5.03
Mo (ppm)	0.71	3.06	5.44	4.89	1.73	0.24	BDL
Sn (ppm)	2.53	44.77	0.45	0.60	0.38	0.17	0.18
Te (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs (ppm)	0.11	1.09	0.26	0.28	0.57	BDL	0.25
Ba(137) (ppm)	17.47	545.50	642.21	461.17	15.83	413.45	249.24
Ba(138)* (ppm)	19.40	541.51	627.28	513.43	16.26	422.85	250.22
W (ppm)	1.92	148.02	0.85	1.36	0.78	BDL	BDL
Pb (ppm)	1.16	14.09	16.67	16.36	0.45	0.06	0.36
Bi (ppm)	0.01	0.26	0.28	0.29	0.01	BDL	BDL
Th (ppm)	3.83	29.64	140.56	279.03	4.86	BDL	0.12
U (ppm)	4.93	59.14	86.38	104.64	1.65	BDL	0.10
Tl (ppm)	0.01	0.38	0.03	BDL	0.12	BDL	0.99
SiO2 wt.%	27.24	27.24	27.24	27.24	27.24	24.23	24.23

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	G909165_46-5	G909165_47-2	G909165_47-3	G909165_47-4	G909165_47-5	YD01-13A-1	YD01-13A-10
Data Quality (1-3)	1.5	1	0	0	2	3	2
1 standard error (ppm) *							
Li	2.63	1.56	0.65	0.61	2.22	2.06	1.36
B	0.54	0.70	0.74	2.02	0.17	0.22	0.49
Si	2546.75	2546.75	2546.75	2546.75	2546.75	2265.33	2265.33
P	1794.29	34.41	35612.79	97833.97	8.79	2.86	3.55
Sc	0.41	0.68	0.83	1.39	0.19	0.73	0.38
Ti	775.84	20915.08	26.55	40.04	219.49	4.87	8.24
V	9.35	32.21	2.97	5.37	2.98	4.34	3.53
Cr	4.14	0.97	0.56	1.13	0.65	4.36	2.43
Mn	76.07	42.62	101.38	130.91	45.12	61.30	34.09
Co	1.00	0.64	0.22	1.50	0.76	0.86	0.77
Cu	4.90	8.42	21.25	12.43	201.25	0.17	0.41
Cu	7.32	9.03	18.00	13.90	111.50	0.63	0.66
Zn	11.02	9.38	2.12	1.65	8.34	8.10	5.09
Zn	9.34	9.28	3.37	3.53	8.13	8.26	4.81
As	0.34	2.27	3.04	9.12	0.19	0.29	BDL
Se	0.32	0.40	0.35	0.89	0.19	BDL	BDL
Se	0.49	BDL	2.00	10.86	BDL	BDL	0.52
Rb	0.15	1.46	0.12	0.86	0.53	BDL	1.05
Sr	6.29	1.03	97.85	367.81	0.33	0.44	0.99
Mo	0.05	0.30	0.30	0.78	0.57	0.07	BDL
Sn	0.29	1.68	0.06	0.09	0.04	0.02	0.02
Te	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs	0.03	0.04	0.04	0.12	0.06	BDL	0.14
Ba	2.88	18.92	40.77	30.71	0.57	10.81	12.65
Ba	1.87	18.83	43.32	45.88	0.53	10.56	13.27
W	0.18	5.77	0.12	0.06	0.07	BDL	BDL
Pb	0.12	0.75	0.88	1.83	0.06	0.03	0.04
Bi	0.00	0.02	0.03	0.07	0.01	BDL	BDL
Th	0.78	1.76	8.00	36.69	0.53	BDL	0.06
U	0.40	3.19	2.79	8.27	0.14	BDL	0.06
Tl	0.01	0.04	0.01	BDL	0.02	BDL	0.13

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	G909165_46-5	G909165_47-2	G909165_47-3	G909165_47-4	G909165_47-5	YD01-13A-1	YD01-13A-10
Data Quality (1-3)	1.5	1	0	0	2	3	2
1 standard error (ppm)**							
Li	10.36	5.80	1.33	1.38	7.84	7.09	4.96
B	0.76	3.16	4.65	4.74	0.52	0.49	1.57
Si	4374.64	4374.64	4374.64	4374.64	4374.64	3891.25	3891.25
P	2084.34	161.19	238917.12	461167.02	55.66	9.37	9.75
Sc	0.55	1.01	1.00	1.54	0.28	0.78	0.49
Ti	2115.30	46950.63	53.04	92.56	606.71	14.39	12.73
V	18.70	47.81	5.12	9.13	5.93	8.52	6.21
Cr	27.58	5.51	2.24	5.42	3.15	30.64	17.78
Mn	134.19	68.42	153.99	196.55	79.47	95.82	55.36
Co	2.09	1.37	0.39	1.54	1.58	2.26	1.21
Cu	20.34	33.05	64.20	30.10	558.45	0.31	1.05
Cu	21.59	35.01	63.32	30.65	453.96	0.69	1.29
Zn	15.44	13.07	2.63	2.17	11.80	10.26	6.55
Zn	13.41	12.50	4.07	4.14	11.25	10.62	6.39
As	2.35	15.29	20.23	29.80	0.59	0.35	BDL
Se	2.28	5.26	5.16	5.93	0.75	BDL	BDL
Se	0.70	BDL	16.98	35.50	BDL	BDL	0.69
Rb	0.15	1.84	0.13	0.86	0.66	BDL	1.13
Sr	6.30	1.33	124.78	396.71	0.41	0.47	0.99
Mo	0.07	0.38	0.52	0.87	0.59	0.07	BDL
Sn	0.54	8.22	0.10	0.14	0.08	0.03	0.04
Te	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs	0.03	0.09	0.04	0.12	0.07	BDL	0.14
Ba	2.93	24.95	45.04	33.65	0.74	13.50	13.56
Ba	1.95	23.98	46.61	47.99	0.69	12.98	14.01
W	0.29	18.36	0.16	0.17	0.12	BDL	BDL
Pb	0.13	0.93	1.09	1.93	0.06	0.03	0.04
Bi	0.00	0.03	0.04	0.08	0.01	BDL	BDL
Th	0.83	2.79	13.03	41.99	0.64	BDL	0.06
U	0.54	5.46	7.05	11.39	0.18	BDL	0.06
Tl	0.01	0.06	0.01	BDL	0.02	BDL	0.18

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	YD01-13A-14	YD01-13A-15	YD01-13A-2	YD01-13A-3	YD01-13A-4	YD01-13A-5	YD01-13A-9
Data Quality (1-3)	1	1.5	2.5	2.5	3	3	2
Li (ppm)	14.32	26.22	48.61	51.81	32.53	55.56	54.72
B (ppm)	16.41	11.57	0.16	1.19	1.40	2.84	2.77
Si (ppm)	113266.64	113266.64	113266.64	113266.64	113266.64	113266.64	113266.64
P (ppm)	110.94	70.49	28.52	65.37	45.94	75.58	BDL
Sc (ppm)	15.36	20.21	6.01	7.00	4.11	7.09	6.66
Ti (ppm)	3580.58	289.03	117.61	125.18	74.44	120.24	744.21
V (ppm)	136.40	145.75	140.60	145.02	80.10	140.92	141.74
Cr (ppm)	26.84	48.15	136.51	113.96	49.28	124.80	138.38
Mn (ppm)	504.92	859.42	1885.36	2258.53	1041.84	1958.43	1737.91
Co (ppm)	7.47	12.73	45.60	32.78	20.36	36.43	27.23
Cu(63) (ppm)	3.82	13.62	1.72	8.26	4.28	11.69	24.47
Cu(65)* (ppm)	3.63	14.42	1.29	7.44	4.12	12.83	23.34
Zn(66)* (ppm)	73.53	142.51	263.30	277.13	169.64	295.75	303.37
Zn(68) (ppm)	101.23	156.73	262.64	283.86	158.88	296.73	303.86
As (ppm)	0.57	0.92	BDL	1.09	0.19	0.66	0.01
Se(76) (ppm)	BDL	2.36	BDL	3.68	BDL	2.98	4.41
Se(77)* (ppm)	BDL	BDL	BDL	0.71	0.06	1.64	0.97
Rb (ppm)	104.04	70.61	BDL	1.11	0.21	0.33	1.83
Sr (ppm)	17.02	10.32	0.41	2.43	0.62	14.70	BDL
Mo (ppm)	0.07	BDL	BDL	0.33	0.31	0.59	BDL
Sn (ppm)	0.86	0.49	0.13	0.24	0.18	0.19	0.31
Te (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs (ppm)	1.72	1.05	BDL	0.05	0.07	0.11	0.13
Ba(137) (ppm)	895.72	711.46	12.71	82.73	11.60	463.74	16.94
Ba(138)* (ppm)	913.64	728.36	12.82	80.08	11.41	470.32	18.47
W (ppm)	0.97	0.10	0.07	1.51	0.02	0.58	0.28
Pb (ppm)	1.17	0.85	0.25	1.00	0.11	0.25	0.30
Bi (ppm)	0.05	BDL	BDL	0.04	BDL	BDL	BDL
Th (ppm)	0.31	4.91	BDL	0.16	0.02	0.02	BDL
U (ppm)	0.45	2.82	BDL	0.01	0.01	0.04	0.12
Tl (ppm)	4.05	2.53	BDL	0.09	BDL	0.01	0.03
SiO2 wt.%	24.23	24.23	24.23	24.23	24.23	24.23	24.23

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	YD01-13A-14	YD01-13A-15	YD01-13A-2	YD01-13A-3	YD01-13A-4	YD01-13A-5	YD01-13A-9
Data Quality (1-3)	1	1.5	2.5	2.5	3	3	2
1 standard error (ppm) *							
Li	0.68	1.15	2.63	1.72	1.56	2.20	2.40
B	1.40	1.13	0.94	1.43	0.75	0.36	0.42
Si	2265.33	2265.33	2265.33	2265.33	2265.33	2265.33	2265.33
P	17.53	4.52	13.58	9.02	6.60	5.81	BDL
Sc	0.87	1.73	0.46	0.69	0.18	0.33	0.51
Ti	379.65	12.20	5.54	6.81	1.92	8.91	239.62
V	3.67	4.65	4.11	3.59	3.00	3.63	4.83
Cr	0.77	1.82	3.68	3.36	1.49	4.17	4.84
Mn	19.20	32.68	78.61	133.73	36.00	176.82	60.54
Co	0.18	0.39	1.40	0.82	0.77	1.26	1.21
Cu	0.19	0.39	0.45	0.64	0.44	0.79	0.77
Cu	0.34	0.52	0.27	0.63	0.24	0.62	1.76
Zn	2.42	4.30	9.54	6.28	5.54	7.44	10.95
Zn	2.59	8.74	6.89	10.69	3.63	7.30	12.73
As	0.27	0.14	BDL	0.45	0.05	0.26	0.31
Se	BDL	0.14	BDL	0.39	BDL	0.96	1.40
Se	BDL	BDL	BDL	1.09	0.29	0.68	0.45
Rb	3.48	1.78	BDL	0.19	0.07	0.12	0.23
Sr	0.73	0.32	0.08	0.10	0.15	1.44	BDL
Mo	0.04	BDL	BDL	0.14	0.12	0.07	BDL
Sn	0.14	0.12	0.13	0.06	0.01	0.06	0.05
Te	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs	0.08	0.10	BDL	0.05	0.03	0.05	0.09
Ba	35.58	18.97	0.94	9.87	2.57	65.46	2.78
Ba	32.99	17.74	0.81	7.40	3.12	54.51	2.49
W	0.22	0.04	0.05	0.13	0.01	0.29	0.12
Pb	0.48	0.07	0.08	0.27	0.03	0.05	0.11
Bi	0.01	BDL	BDL	0.02	BDL	BDL	BDL
Th	0.08	2.67	BDL	0.06	0.02	0.01	BDL
U	0.05	1.53	BDL	0.01	0.01	0.01	0.05
Tl	0.39	0.23	BDL	0.04	BDL	0.02	0.02

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	YD01-13A-14	YD01-13A-15	YD01-13A-2	YD01-13A-3	YD01-13A-4	YD01-13A-5	YD01-13A-9
Data Quality (1-3)	1	1.5	2.5	2.5	3	3	2
1 standard error (ppm)**							
Li	2.14	3.89	7.37	7.54	4.87	8.17	8.12
B	6.13	4.36	0.94	1.50	0.91	1.09	1.09
Si	3891.25	3891.25	3891.25	3891.25	3891.25	3891.25	3891.25
P	36.77	21.03	15.92	21.07	14.92	22.77	BDL
Sc	1.05	1.90	0.51	0.74	0.24	0.43	0.58
Ti	507.62	29.81	12.38	13.61	7.26	14.40	249.64
V	7.46	8.35	7.85	7.78	4.85	7.63	8.30
Cr	5.44	9.83	27.64	23.11	10.00	25.38	28.18
Mn	27.18	46.25	106.47	159.00	53.57	191.90	89.69
Co	0.43	0.78	2.78	1.91	1.32	2.29	1.88
Cu	0.45	1.49	0.48	1.08	0.63	1.47	2.69
Cu	0.51	1.61	0.31	1.01	0.50	1.49	3.03
Zn	2.94	5.38	11.24	8.87	6.74	10.00	12.92
Zn	3.51	9.48	9.24	12.59	5.20	10.08	14.59
As	0.34	0.35	BDL	0.59	0.08	0.35	0.31
Se	BDL	1.90	BDL	2.97	BDL	2.57	3.80
Se	BDL	BDL	BDL	1.23	0.30	1.48	0.90
Rb	3.93	2.17	BDL	0.19	0.07	0.12	0.23
Sr	0.77	0.35	0.08	0.10	0.15	1.45	BDL
Mo	0.04	BDL	BDL	0.14	0.12	0.09	BDL
Sn	0.21	0.15	0.13	0.07	0.03	0.07	0.07
Te	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs	0.15	0.13	BDL	0.05	0.03	0.05	0.09
Ba	39.66	23.53	0.97	10.01	2.58	66.08	2.80
Ba	36.81	22.01	0.84	7.54	3.12	55.15	2.51
W	0.25	0.04	0.05	0.22	0.01	0.30	0.13
Pb	0.48	0.07	0.08	0.27	0.03	0.05	0.11
Bi	0.01	BDL	BDL	0.03	BDL	BDL	BDL
Th	0.09	2.68	BDL	0.06	0.02	0.01	BDL
U	0.06	1.54	BDL	0.01	0.01	0.01	0.05
Tl	0.67	0.41	BDL	0.04	BDL	0.02	0.02

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	YD08-22area1-1	YD08-22area2-1	YD08-22area2-2	YD08-22area2-4	YTD-23-2008_area1_1	YTD-23-2008_area1_2	YTD-23-2008_area1_3
Data Quality (1-3)	3	2	3	3	3	3	3
Li (ppm)	34.53	104.02	37.65	30.93	176.44	164.44	169.94
B (ppm)	BDL	BDL	BDL	BDL	6.34	3.26	3.58
Si (ppm)	123878.09	123878.09	123878.09	123878.09	140239.34	140239.34	140239.34
P (ppm)	BDL	BDL	BDL	703.22	64.72	46.65	49.57
Sc (ppm)	BDL	BDL	BDL	6.48	4.15	4.25	3.63
Ti (ppm)	326.52	182.89	151.79	90.79	135.68	158.69	130.33
V (ppm)	81.32	87.13	75.24	76.40	101.03	117.19	104.80
Cr (ppm)	81.49	814.63	46.30	343.07	57.90	43.02	46.95
Mn (ppm)	2017.95	1640.78	1561.38	1883.91	1161.66	1309.30	1263.41
Co (ppm)	27.49	23.78	11.04	BDL	80.35	77.92	80.07
Cu(63) (ppm)	46.51	211.70	105.27	149.69	3.53	3.47	2.50
Cu(65)* (ppm)	34.81	347.57	BDL	87.44	2.68	1.74	2.14
Zn(66)* (ppm)	376.07	366.24	271.96	300.41	805.80	817.58	819.10
Zn(68) (ppm)	264.73	678.21	301.12	272.59	726.19	711.58	685.78
As (ppm)	13.56	BDL	BDL	BDL	BDL	0.84	BDL
Se(76) (ppm)	68.32	BDL	197.45	BDL	BDL	BDL	BDL
Se(77)* (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Rb (ppm)	null	null	null	null	8.12	2.40	1.71
Sr (ppm)	null	null	null	null	4.82	3.71	3.20
Mo (ppm)	21.69	BDL	BDL	BDL	0.50	0.11	BDL
Sn (ppm)	5.85	BDL	BDL	BDL	BDL	BDL	0.61
Te (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs (ppm)	BDL	BDL	BDL	2.01	0.43	0.12	0.16
Ba(137) (ppm)	8.57	BDL	BDL	BDL	57.35	13.11	10.73
Ba(138)* (ppm)	5.58	2.33	0.26	0.97	57.92	14.98	10.74
W (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Pb (ppm)	3.11	BDL	BDL	BDL	0.76	0.38	0.50
Bi (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Th (ppm)	null	null	null	null	null	null	null
U (ppm)	null	null	null	null	null	null	null
Tl (ppm)	BDL	BDL	BDL	BDL	0.23	BDL	BDL
SiO2 wt.%	26.50	26.50	26.50	26.50	30.00	30.00	30.00

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	YD08-22area1-1	YD08-22area2-1	YD08-22area2-2	YD08-22area2-4	YTD-23-2008_area1_1	YTD-23-2008_area1_2	YTD-23-2008_area1_3
Data Quality (1-3)	3	2	3	3	3	3	3
1 standard error (ppm) *							
Li	1.38	98.18	3.61	3.13	6.63	5.59	5.40
B	BDL	BDL	BDL	BDL	0.53	0.75	0.48
Si	2477.56	2477.56	2477.56	2477.56	2804.79	2804.79	2804.79
P	BDL	BDL	BDL	623.53	6.37	4.50	4.21
Sc	BDL	BDL	BDL	10.38	0.52	0.27	0.47
Ti	61.17	178.28	33.07	205.80	29.61	18.88	9.83
V	5.37	33.06	6.51	28.81	3.47	4.40	4.04
Cr	12.54	689.03	21.85	103.35	1.97	1.31	1.40
Mn	55.65	751.08	66.39	510.04	32.82	39.64	34.10
Co	1.95	8.58	2.83	BDL	2.46	2.19	2.27
Cu	6.04	457.43	38.88	60.41	0.25	0.42	0.38
Cu	3.84	260.50	BDL	147.48	0.81	0.79	0.48
Zn	16.92	239.20	21.88	169.63	24.98	23.27	23.99
Zn	27.16	430.87	25.80	113.15	33.29	30.95	29.92
As	2.57	BDL	BDL	BDL	BDL	0.19	BDL
Se	61.90	BDL	135.18	BDL	BDL	BDL	BDL
Se	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Rb					0.51	0.12	0.18
Sr					0.15	0.24	0.20
Mo	15.46	BDL	BDL	BDL	0.17	0.08	BDL
Sn	1.92	BDL	BDL	BDL	BDL	BDL	0.11
Te	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs	BDL	BDL	BDL	3.19	0.12	0.04	0.06
Ba	4.49	BDL	BDL	BDL	7.57	1.31	0.81
Ba	3.63	4.33	0.43	0.84	3.78	0.53	0.36
W	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Pb	1.43	BDL	BDL	BDL	0.12	0.10	0.08
Bi	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Th							
U							
Tl	BDL	BDL	BDL	BDL	0.11	BDL	BDL

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl	Chl	Chl	Chl
LA-ICP-MS Spot ID	YD08-22area1-1	YD08-22area2-1	YD08-22area2-2	YD08-22area2-4	YTD-23-2008_area1_1	YTD-23-2008_area1_2	YTD-23-2008_area1_3
Data Quality (1-3)	3	2	3	3	3	3	3
1 standard error (ppm)**							
Li	2.18	98.31	4.05	3.48	14.81	13.55	13.85
B	BDL	BDL	BDL	BDL	0.79	0.81	0.59
Si	2576.70	2576.70	2576.70	2576.70	3416.31	3416.31	3416.31
P	BDL	BDL	BDL	633.05	10.92	7.82	7.99
Sc	BDL	BDL	BDL	10.38	0.67	0.51	0.60
Ti	62.20	178.39	33.49	205.82	34.35	27.76	19.39
V	9.72	34.18	9.93	29.80	11.09	12.99	11.65
Cr	14.18	692.20	22.17	107.04	5.32	3.90	4.24
Mn	72.77	752.04	75.66	511.91	49.09	57.13	52.33
Co	2.54	8.69	2.91	BDL	5.41	5.16	5.31
Cu	6.66	457.61	39.41	61.09	0.39	0.51	0.44
Cu	4.45	261.48	BDL	147.59	0.84	0.80	0.52
Zn	24.76	239.84	25.49	170.24	89.55	90.30	90.65
Zn	29.49	431.87	28.92	113.76	87.64	85.26	82.20
As	2.64	BDL	BDL	BDL	BDL	0.25	BDL
Se	61.94	BDL	135.34	BDL	BDL	BDL	BDL
Se	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Rb					0.55	0.14	0.18
Sr					0.16	0.24	0.20
Mo	15.54	BDL	BDL	BDL	0.18	0.08	BDL
Sn	1.94	BDL	BDL	BDL	BDL	BDL	0.12
Te	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs	BDL	BDL	BDL	3.21	0.12	0.04	0.06
Ba	4.52	BDL	BDL	BDL	7.71	1.35	0.86
Ba	3.64	4.33	0.43	0.84	3.89	0.58	0.40
W	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Pb	1.43	BDL	BDL	BDL	0.12	0.10	0.08
Bi	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Th							
U							
Tl	BDL	BDL	BDL	BDL	0.11	BDL	BDL

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl?	Chl?	Chl?	Chl?
LA-ICP-MS Spot ID	YTD-23-2008_area2_4	YTD-23-2008_area2_5	YTD-23-2008_area2_6	G909165_42-1	G909165_42-2	G909165_45-3	G909165_45-4
Data Quality (1-3)	1.5	2.5	2.5	1.5	1.5	1.5	1.5
Li (ppm)	93.40	102.26	122.84	11.35	11.03	14.12	6.13
B (ppm)	7.85	7.40	3.01	23.07	24.46	8.81	23.09
Si (ppm)	140239.34	140239.34	140239.34	127337.32	127337.32	127337.32	127337.32
P (ppm)	9165.48	65.53	36.71	397.47	171.72	1000.97	10.17
Sc (ppm)	14.33	13.07	10.95	8.73	10.69	5.58	17.08
Ti (ppm)	1299.70	377.40	6819.33	1411.54	1495.67	1790.17	1201.95
V (ppm)	152.30	149.95	127.76	198.76	207.55	144.78	279.38
Cr (ppm)	78.19	82.69	74.41	3.07	3.55	42.23	4.11
Mn (ppm)	1178.07	1285.48	1687.79	470.94	414.68	551.28	232.01
Co (ppm)	63.27	72.24	89.56	6.48	5.55	7.13	3.24
Cu(63) (ppm)	1.00	1.27	1.80	43.40	24.66	44.86	96.30
Cu(65)* (ppm)	1.51	1.79	BDL	43.38	23.88	45.07	94.04
Zn(66)* (ppm)	549.36	593.73	612.22	72.58	59.81	80.24	41.52
Zn(68) (ppm)	498.32	517.81	559.16	130.24	121.37	109.57	115.10
As (ppm)	5.74	1.40	BDL	0.12	0.61	1.89	0.36
Se(76) (ppm)	BDL	BDL	BDL	2.14	2.65	2.11	2.26
Se(77)* (ppm)	BDL	BDL	BDL	1.22	0.60	2.14	BDL
Rb (ppm)	67.74	51.78	10.00	193.07	202.00	96.28	227.49
Sr (ppm)	62.40	5.88	3.02	17.32	17.79	16.38	14.18
Mo (ppm)	BDL	0.20	0.30	0.19	BDL	0.07	BDL
Sn (ppm)	1.58	0.38	0.98	1.20	1.21	0.70	0.67
Te (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs (ppm)	2.75	2.72	0.49	3.19	3.24	1.59	3.39
Ba(137) (ppm)	272.72	163.49	66.04	1965.14	2199.17	1034.62	2534.08
Ba(138)* (ppm)	284.19	152.92	71.58	1973.27	2211.01	1017.11	3214.81
W (ppm)	BDL	BDL	2.33	0.35	0.33	0.19	0.13
Pb (ppm)	0.32	0.14	0.72	1.55	1.62	1.17	1.10
Bi (ppm)	BDL	BDL	BDL	0.01	BDL	BDL	BDL
Th (ppm)	null	null	null	3.02	0.13	36.97	1.75
U (ppm)	null	null	null	0.18	0.06	0.58	2.10
Tl (ppm)	0.26	0.27	0.07	1.26	1.21	0.58	1.42
SiO2 wt.%	30.00	30.00	30.00	27.24	27.24	27.24	27.24

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl?	Chl?	Chl?	Chl?
LA-ICP-MS Spot ID	YTD-23-2008_area2_4	YTD-23-2008_area2_5	YTD-23-2008_area2_6	G909165_42-1	G909165_42-2	G909165_45-3	G909165_45-4
Data Quality (1-3)	1.5	2.5	2.5	1.5	1.5	1.5	1.5
1 standard error (ppm) *							
Li	3.19	3.37	4.51	0.48	0.48	0.81	0.26
B	0.50	0.52	0.41	0.99	0.86	0.40	0.86
Si	2804.79	2804.79	2804.79	2546.75	2546.75	2546.75	2546.75
P	801.01	8.91	4.42	182.89	9.63	44.57	13.72
Sc	0.84	0.49	0.47	0.43	0.79	0.28	0.96
Ti	248.74	36.03	1538.48	44.02	52.84	86.74	50.35
V	5.21	4.14	4.34	5.68	6.15	5.29	8.60
Cr	2.25	2.46	2.34	0.12	0.15	2.07	0.17
Mn	37.28	39.98	56.71	14.62	11.73	24.78	6.11
Co	1.97	1.98	2.67	0.25	0.21	0.55	0.13
Cu	0.78	0.23	0.56	3.63	0.88	3.95	4.19
Cu	0.54	0.81	BDL	3.66	1.01	3.71	3.36
Zn	24.49	16.81	19.25	2.85	2.41	4.22	1.46
Zn	23.76	22.70	28.82	4.71	4.01	4.92	4.56
As	0.75	0.45	BDL	0.14	0.11	0.33	0.12
Se	BDL	BDL	BDL	0.10	0.15	0.13	0.18
Se	BDL	BDL	BDL	0.34	0.29	0.42	BDL
Rb	2.19	1.66	0.47	5.55	6.01	3.31	7.75
Sr	1.75	0.44	0.09	0.71	0.78	0.71	0.63
Mo	BDL	0.11	0.11	0.05	BDL	0.03	BDL
Sn	0.18	0.08	0.38	0.07	0.09	0.06	0.05
Te	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs	0.14	0.09	0.04	0.10	0.11	0.06	0.11
Ba	10.05	9.76	5.32	78.35	79.15	38.52	111.45
Ba	8.97	5.65	6.17	75.65	84.10	37.10	149.33
W	BDL	BDL	1.44	0.03	0.05	0.06	0.02
Pb	0.05	0.04	0.08	0.08	0.06	0.06	0.05
Bi	BDL	BDL	BDL	0.00	BDL	BDL	BDL
Th				0.42	0.02	3.06	0.55
U				0.06	0.01	0.04	0.71
Tl	0.05	0.04	0.03	0.07	0.07	0.03	0.08

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl	Chl	Chl	Chl?	Chl?	Chl?	Chl?
LA-ICP-MS Spot ID	YTD-23-2008_area2_4	YTD-23-2008_area2_5	YTD-23-2008_area2_6	G909165_42-1	G909165_42-2	G909165_45-3	G909165_45-4
Data Quality (1-3)	1.5	2.5	2.5	1.5	1.5	1.5	1.5
1 standard error (ppm)**							
Li	7.70	8.38	10.26	1.68	1.64	2.16	0.91
B	0.89	0.87	0.50	8.46	8.96	3.24	8.46
Si	3416.31	3416.31	3416.31	4374.64	4374.64	4374.64	4374.64
P	1490.06	12.65	6.70	215.76	50.38	291.68	14.03
Sc	1.68	1.42	1.21	0.67	1.00	0.43	1.38
Ti	299.44	60.35	1769.76	142.71	153.24	192.78	126.08
V	16.71	16.17	14.01	11.38	11.99	8.92	16.30
Cr	7.04	7.47	6.76	0.63	0.73	8.73	0.84
Mn	52.54	56.83	77.65	22.92	19.47	32.27	10.63
Co	4.28	4.76	6.00	0.44	0.38	0.68	0.22
Cu	0.79	0.26	0.58	5.88	2.77	6.20	11.09
Cu	0.55	0.83	BDL	5.89	2.73	6.06	10.55
Zn	63.54	65.56	68.12	3.77	3.16	5.02	2.03
Zn	60.49	62.11	68.76	6.29	5.59	6.05	5.86
As	1.35	0.53	BDL	0.15	0.24	0.74	0.17
Se	BDL	BDL	BDL	1.71	2.12	1.69	1.82
Se	BDL	BDL	BDL	1.04	0.56	1.77	BDL
Rb	2.81	2.14	0.54	7.03	7.52	3.95	9.26
Sr	1.90	0.45	0.10	0.92	0.98	0.90	0.79
Mo	BDL	0.11	0.11	0.06	BDL	0.03	BDL
Sn	0.20	0.09	0.38	0.23	0.24	0.14	0.13
Te	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs	0.25	0.22	0.06	0.24	0.25	0.12	0.25
Ba	12.29	10.64	5.59	97.83	102.77	49.35	134.63
Ba	9.99	6.13	6.26	93.03	103.70	46.43	173.44
W	BDL	BDL	1.44	0.05	0.07	0.06	0.02
Pb	0.05	0.04	0.08	0.10	0.09	0.08	0.07
Bi	BDL	BDL	BDL	0.00	BDL	BDL	BDL
Th				0.48	0.02	4.09	0.57
U				0.06	0.01	0.06	0.73
Tl	0.06	0.04	0.03	0.15	0.14	0.07	0.17

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl?	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	YD08-22area2-3	G909153_13-2	G909153_13-3	G909153_14-1	G909153_14-2	G909153_14-3	G909153_15-1
Data Quality (1-3)	1	2.5	3	3	1.5	3	3
Li (ppm)	BDL	6.81	6.56	5.93	7.80	6.43	5.79
B (ppm)	142.26	78.00	97.36	81.42	79.63	80.80	93.06
Si (ppm)	123878.09	234433.43	234433.43	234433.43	234433.43	234433.43	234433.43
P (ppm)	BDL	159.95	124.25	225.26	1387.45	143.42	247.54
Sc (ppm)	BDL	16.49	18.43	14.44	18.96	21.60	20.00
Ti (ppm)	215.88	1560.96	1268.25	1279.59	1271.50	1339.70	1304.19
V (ppm)	180.21	328.78	409.52	356.42	428.52	454.35	512.32
Cr (ppm)	159.44	68.08	76.35	88.56	84.78	97.07	75.31
Mn (ppm)	BDL	71.89	63.08	61.04	65.56	72.35	64.87
Co (ppm)	BDL	0.45	BDL	0.14	0.55	0.92	0.35
Cu(63) (ppm)	BDL	0.26	4.25	3.62	3.72	3.55	4.60
Cu(65)* (ppm)	BDL	2.83	4.82	5.22	4.54	2.45	4.49
Zn(66)* (ppm)	10.19	9.76	10.00	12.13	7.85	10.70	10.36
Zn(68) (ppm)	96.57	87.24	60.16	56.63	57.94	63.05	60.38
As (ppm)	8.07	0.65	0.68	0.57	0.56	0.29	0.52
Se(76) (ppm)	BDL	5.97	4.82	2.82	4.12	4.62	7.14
Se(77)* (ppm)	BDL	1.15	1.29	2.45	BDL	BDL	BDL
Rb (ppm)	null	358.76	359.00	342.15	349.20	392.40	368.47
Sr (ppm)	null	19.61	16.22	14.70	16.73	13.91	16.16
Mo (ppm)	BDL	BDL	BDL	0.35	BDL	BDL	BDL
Sn (ppm)	8.03	5.13	3.62	4.60	4.34	4.87	3.76
Te (ppm)	BDL	BDL	0.13	BDL	0.14	BDL	BDL
Cs (ppm)	5.33	2.42	2.24	2.48	4.15	3.26	3.00
Ba(137) (ppm)	210.25	1758.06	1299.50	1111.06	1211.63	1367.57	1346.11
Ba(138)* (ppm)	236.65	1816.36	1302.38	1113.53	1253.39	1463.86	1347.83
W (ppm)	BDL	1.98	1.40	1.13	1.43	1.56	0.98
Pb (ppm)	BDL	0.51	0.34	0.40	0.29	0.27	0.43
Bi (ppm)	BDL	0.02	0.05	0.06	BDL	0.03	0.06
Th (ppm)	null	0.06	0.07	0.11	0.18	0.07	0.12
U (ppm)	null	0.15	0.17	0.16	0.27	0.18	0.22
Tl (ppm)	BDL	2.20	2.69	2.73	2.80	3.05	3.02
SiO2 wt.%	26.50	50.15	50.15	50.15	50.15	50.15	50.15

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl?	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	YD08-22area2-3	G909153_13-2	G909153_13-3	G909153_14-1	G909153_14-2	G909153_14-3	G909153_15-1
Data Quality (1-3)	1	2.5	3	3	1.5	3	3
1 standard error (ppm) *							
Li	BDL	0.36	0.18	0.30	0.69	0.35	0.35
B	29.48	4.62	3.16	2.57	2.90	3.29	2.44
Si	2477.56	4688.67	4688.67	4688.67	4688.67	4688.67	4688.67
P	BDL	15.24	5.00	14.23	120.66	7.18	11.90
Sc	BDL	0.65	0.53	0.90	1.02	0.77	1.19
Ti	78.98	89.82	62.90	41.61	34.24	35.07	37.62
V	12.98	9.26	11.75	10.12	14.01	12.49	16.72
Cr	27.90	2.58	3.48	2.92	3.04	2.90	2.41
Mn	BDL	1.81	1.46	1.41	2.18	2.96	1.52
Co	BDL	0.16	BDL	0.07	0.12	0.14	0.09
Cu	BDL	0.43	0.60	0.47	0.77	0.38	0.31
Cu	BDL	0.43	0.28	0.26	0.78	0.36	0.27
Zn	5.31	0.69	0.54	0.51	0.27	0.46	0.55
Zn	30.09	2.86	2.56	2.94	2.20	2.32	2.03
As	10.82	0.26	0.10	0.11	0.25	0.10	0.12
Se	BDL	0.82	0.24	0.30	0.15	0.76	2.03
Se	BDL	0.64	0.70	0.39	BDL	BDL	BDL
Rb		9.56	8.83	8.18	9.64	10.11	12.82
Sr		0.82	0.58	0.53	1.23	0.46	0.64
Mo	BDL	BDL	BDL	0.11	BDL	BDL	BDL
Sn	2.52	0.20	0.19	0.25	0.13	0.20	0.18
Te	BDL	BDL	0.01	BDL	0.09	BDL	BDL
Cs	0.98	0.16	0.11	0.23	0.22	0.15	0.12
Ba	53.45	47.01	31.22	28.19	27.64	44.52	37.88
Ba	20.89	43.36	30.47	25.27	35.39	68.91	43.85
W	BDL	0.14	0.22	0.08	0.12	0.14	0.41
Pb	BDL	0.03	0.02	0.04	0.04	0.01	0.07
Bi	BDL	0.02	0.01	0.01	BDL	0.01	0.01
Th		0.02	0.02	0.03	0.08	0.03	0.02
U		0.04	0.02	0.02	0.01	0.02	0.03
Tl	BDL	0.15	0.11	0.12	0.14	0.15	0.26

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Chl?	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	YD08-22area2-3	G909153_13-2	G909153_13-3	G909153_14-1	G909153_14-2	G909153_14-3	G909153_15-1
Data Quality (1-3)	1	2.5	3	3	1.5	3	3
1 standard error (ppm)**							
Li	BDL	1.02	0.94	0.88	1.29	0.97	0.88
B	29.68	28.75	35.56	29.73	29.12	29.58	33.95
Si	2576.70	8053.91	8053.91	8053.91	8053.91	8053.91	8053.91
P	BDL	48.48	36.10	66.35	417.02	41.88	72.21
Sc	BDL	0.91	0.89	1.06	1.26	1.14	1.42
Ti	79.33	172.78	135.42	127.95	125.01	131.45	128.93
V	22.15	17.89	22.40	19.44	24.39	24.57	29.14
Cr	30.76	13.87	15.68	17.97	17.25	19.65	15.27
Mn	BDL	3.07	2.63	2.54	3.14	3.88	2.71
Co	BDL	0.16	BDL	0.07	0.12	0.15	0.09
Cu	BDL	0.43	0.75	0.61	0.86	0.53	0.58
Cu	BDL	0.53	0.59	0.61	0.92	0.44	0.55
Zn	5.33	0.74	0.60	0.60	0.34	0.54	0.61
Zn	30.38	3.63	2.99	3.28	2.66	2.83	2.56
As	10.82	0.35	0.26	0.22	0.32	0.14	0.21
Se	BDL	4.85	3.86	2.27	3.30	3.77	6.06
Se	BDL	1.12	1.25	2.00	BDL	BDL	BDL
Rb		11.36	10.75	10.06	11.34	12.14	14.29
Sr		0.85	0.61	0.55	1.25	0.49	0.67
Mo	BDL	BDL	BDL	0.11	BDL	BDL	BDL
Sn	2.55	0.94	0.67	0.86	0.79	0.89	0.69
Te	BDL	BDL	0.02	BDL	0.09	BDL	BDL
Cs	1.41	0.23	0.19	0.28	0.35	0.26	0.23
Ba	54.73	52.71	35.85	31.97	32.16	48.23	42.05
Ba	24.35	49.55	34.99	29.24	39.07	71.57	47.32
W	BDL	0.27	0.28	0.15	0.21	0.23	0.42
Pb	BDL	0.04	0.03	0.04	0.04	0.02	0.07
Bi	BDL	0.02	0.01	0.01	BDL	0.01	0.01
Th		0.02	0.02	0.03	0.08	0.03	0.02
U		0.04	0.02	0.03	0.02	0.02	0.04
Tl	BDL	0.27	0.30	0.30	0.32	0.35	0.40

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909153_15-2	G909153_15-3	G909153_15-4	G909153_15-5	G909153_15-6	G909153_15-7	G909153_16-1
Data Quality (1-3)	3	2.5	3	3	3	1.5	3
Li (ppm)	5.89	7.77	8.12	7.09	7.40	4.58	6.54
B (ppm)	95.88	91.16	93.98	85.59	100.50	77.64	75.32
Si (ppm)	234433.43	234433.43	234433.43	234433.43	234433.43	234433.43	234433.43
P (ppm)	133.82	210.43	251.26	193.70	240.47	2738.48	104.59
Sc (ppm)	37.79	48.10	29.45	41.07	36.74	12.84	15.52
Ti (ppm)	1364.25	1659.74	1526.19	1518.25	1431.53	1304.33	1142.54
V (ppm)	717.27	733.12	611.03	804.39	685.22	324.41	340.25
Cr (ppm)	88.00	108.20	89.90	93.41	108.25	85.74	57.05
Mn (ppm)	79.20	79.81	70.85	73.02	70.83	67.03	73.37
Co (ppm)	0.17	BDL	BDL	BDL	BDL	BDL	0.21
Cu(63) (ppm)	2.85	4.17	3.23	2.75	2.01	4.85	2.98
Cu(65)* (ppm)	3.47	4.90	3.03	3.92	2.54	6.24	3.22
Zn(66)* (ppm)	13.72	9.49	11.45	15.28	8.79	7.81	9.46
Zn(68) (ppm)	76.52	91.03	70.50	76.85	74.44	47.29	59.53
As (ppm)	BDL	BDL	0.57	0.52	BDL	1.09	BDL
Se(76) (ppm)	3.83	3.86	3.79	4.48	4.24	4.17	5.29
Se(77)* (ppm)	BDL	1.13	2.00	BDL	BDL	0.36	BDL
Rb (ppm)	401.77	395.22	374.25	392.96	381.85	328.37	370.66
Sr (ppm)	13.65	18.84	15.98	13.15	13.90	22.15	13.97
Mo (ppm)	BDL	0.44	BDL	BDL	0.52	BDL	BDL
Sn (ppm)	4.70	3.82	3.90	4.05	3.89	4.04	5.10
Te (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs (ppm)	3.55	3.31	3.21	3.04	3.21	4.48	2.55
Ba(137) (ppm)	1730.53	1883.74	1492.65	1565.20	1623.50	1020.52	1303.82
Ba(138)* (ppm)	1739.70	1901.96	1480.16	1552.28	1625.64	1044.34	1308.92
W (ppm)	1.71	0.80	1.01	1.09	0.81	0.80	1.53
Pb (ppm)	0.41	0.34	0.27	0.37	0.33	0.11	0.46
Bi (ppm)	0.02	0.02	0.02	0.07	0.02	BDL	0.06
Th (ppm)	0.08	0.07	0.03	0.04	0.11	0.26	0.02
U (ppm)	0.17	0.32	0.18	0.21	0.13	0.41	0.14
Tl (ppm)	3.53	3.77	2.83	3.14	3.78	2.23	2.15
SiO2 wt.%	50.15	50.15	50.15	50.15	50.15	50.15	50.15

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909153_15-2	G909153_15-3	G909153_15-4	G909153_15-5	G909153_15-6	G909153_15-7	G909153_16-1
Data Quality (1-3)	3	2.5	3	3	3	1.5	3
1 standard error (ppm) *							
Li	0.52	0.45	0.37	0.38	0.29	0.64	0.35
B	4.43	3.11	3.12	2.85	3.14	3.47	1.89
Si	4688.67	4688.67	4688.67	4688.67	4688.67	4688.67	4688.67
P	15.16	11.15	20.03	9.86	12.76	140.45	11.05
Sc	2.21	1.55	1.09	0.93	1.29	0.44	0.41
Ti	39.67	44.05	41.25	41.98	42.15	34.18	37.96
V	37.45	21.37	13.90	19.44	26.85	7.68	9.03
Cr	3.35	6.43	3.05	2.17	2.52	2.25	1.79
Mn	1.81	1.98	1.79	1.66	1.54	1.74	1.59
Co	0.10	BDL	BDL	BDL	BDL	BDL	0.09
Cu	0.33	0.52	0.18	0.26	0.15	1.10	0.33
Cu	0.68	0.79	0.37	0.27	0.22	1.53	0.23
Zn	0.69	0.48	0.46	0.55	0.32	0.34	0.36
Zn	3.44	3.71	2.25	2.28	2.14	2.10	1.51
As	BDL	BDL	0.10	0.10	BDL	0.13	BDL
Se	0.63	0.35	0.20	0.27	0.30	0.35	0.19
Se	BDL	0.74	0.40	BDL	BDL	0.54	BDL
Rb	11.12	10.69	9.63	11.62	9.17	8.47	10.01
Sr	0.39	0.95	0.53	0.37	0.44	0.82	0.35
Mo	BDL	0.13	BDL	BDL	0.06	BDL	BDL
Sn	0.25	0.24	0.30	0.34	0.26	0.15	0.21
Te	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs	0.14	0.11	0.08	0.17	0.10	0.14	0.09
Ba	51.79	55.70	38.50	33.30	43.48	26.47	30.95
Ba	52.45	54.08	31.22	38.14	46.73	28.60	35.05
W	0.14	0.26	0.04	0.21	0.20	0.16	0.19
Pb	0.05	0.06	0.04	0.09	0.04	0.03	0.03
Bi	0.01	0.02	0.01	0.01	0.01	BDL	0.01
Th	0.01	0.03	0.05	0.03	0.01	0.07	0.02
U	0.02	0.07	0.03	0.01	0.04	0.04	0.01
Tl	0.15	0.14	0.11	0.10	0.22	0.09	0.10

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909153_15-2	G909153_15-3	G909153_15-4	G909153_15-5	G909153_15-6	G909153_15-7	G909153_16-1
Data Quality (1-3)	3	2.5	3	3	3	1.5	3
1 standard error (ppm)**							
Li	0.97	1.18	1.19	1.06	1.08	0.91	0.98
B	35.16	33.31	34.33	31.27	36.70	28.46	27.47
Si	8053.91	8053.91	8053.91	8053.91	8053.91	8053.91	8053.91
P	41.38	61.56	75.01	56.59	70.35	800.30	32.06
Sc	2.65	2.43	1.58	1.85	1.92	0.66	0.73
Ti	134.96	163.01	150.10	149.58	141.78	127.99	114.51
V	50.19	40.28	31.67	42.21	41.71	16.95	18.24
Cr	17.94	22.60	18.26	18.83	21.82	17.32	11.56
Mn	3.28	3.40	3.03	3.02	2.90	2.90	3.00
Co	0.10	BDL	BDL	BDL	BDL	BDL	0.09
Cu	0.45	0.68	0.39	0.39	0.26	1.22	0.45
Cu	0.78	0.94	0.49	0.50	0.35	1.67	0.41
Zn	0.78	0.54	0.55	0.68	0.40	0.40	0.44
Zn	3.96	4.38	2.88	3.02	2.87	2.42	2.15
As	BDL	BDL	0.22	0.21	BDL	0.40	BDL
Se	3.13	3.11	3.04	3.60	3.40	3.35	4.23
Se	BDL	1.17	1.65	BDL	BDL	0.61	BDL
Rb	13.07	12.65	11.56	13.42	11.25	10.16	11.85
Sr	0.42	0.98	0.56	0.41	0.47	0.86	0.39
Mo	BDL	0.14	BDL	BDL	0.07	BDL	BDL
Sn	0.87	0.72	0.76	0.80	0.74	0.74	0.94
Te	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs	0.27	0.24	0.23	0.26	0.23	0.33	0.19
Ba	56.86	61.28	43.50	39.49	48.74	29.87	35.64
Ba	57.27	59.63	36.84	43.30	51.43	31.75	39.08
W	0.24	0.28	0.12	0.25	0.23	0.19	0.26
Pb	0.06	0.06	0.04	0.09	0.04	0.03	0.04
Bi	0.01	0.02	0.01	0.01	0.01	BDL	0.01
Th	0.01	0.03	0.05	0.03	0.01	0.07	0.02
U	0.03	0.07	0.03	0.02	0.04	0.05	0.01
Tl	0.39	0.41	0.31	0.34	0.45	0.25	0.24

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909153_16-2	G909153_16-3	G909153_16-4	G909153_16-5	G909153_16-6	G909155_33-4	G909155_33-5
Data Quality (1-3)	3	2.5	3	3	3	1	1
Li (ppm)	4.12	6.06	4.92	8.03	7.46	16.72	12.10
B (ppm)	74.58	80.69	79.16	69.23	77.32	35.12	50.66
Si (ppm)	234433.43	234433.43	234433.43	234433.43	234433.43	224476.44	224476.44
P (ppm)	263.90	436.02	201.90	181.76	168.81	645.37	9142.63
Sc (ppm)	12.58	20.84	15.44	11.81	20.61	13.44	19.28
Ti (ppm)	1233.91	1404.02	1361.96	1003.88	1435.19	5244.12	90631.47
V (ppm)	297.33	370.67	343.87	300.88	400.70	169.86	234.14
Cr (ppm)	68.29	73.45	78.88	42.48	78.21	77.58	104.44
Mn (ppm)	59.97	67.93	61.37	96.87	71.84	33.95	57.16
Co (ppm)	0.63	0.12	BDL	BDL	0.25	3.83	5.17
Cu(63) (ppm)	3.42	3.54	3.65	1.45	4.47	701.08	1410.42
Cu(65)* (ppm)	3.16	4.61	2.57	1.85	4.11	696.15	1453.16
Zn(66)* (ppm)	8.13	8.64	8.70	12.03	13.25	24.34	16.75
Zn(68) (ppm)	60.40	62.14	61.68	60.45	58.88	95.85	66.92
As (ppm)	0.38	0.59	0.56	0.48	BDL	5.48	33.87
Se(76) (ppm)	3.15	2.77	3.74	3.14	4.01	2.14	7.69
Se(77)* (ppm)	BDL	BDL	0.78	2.26	0.91	2.40	8.50
Rb (ppm)	321.22	361.47	347.60	386.15	368.85	73.68	49.28
Sr (ppm)	14.49	18.43	16.33	13.61	14.28	40.43	3702.75
Mo (ppm)	BDL	0.30	BDL	BDL	0.14	6.62	71.96
Sn (ppm)	4.60	4.26	4.36	5.33	5.96	5.51	15.65
Te (ppm)	BDL	0.16	BDL	BDL	BDL	4.39	24.52
Cs (ppm)	2.50	2.76	2.42	3.04	3.04	1.63	1.54
Ba(137) (ppm)	1210.62	1421.08	1221.26	1194.86	1224.40	1516.28	1188.72
Ba(138)* (ppm)	1220.65	1424.41	1218.35	1212.99	1232.33	1539.78	1198.68
W (ppm)	1.11	0.92	1.12	1.56	1.92	4.27	35.12
Pb (ppm)	0.42	0.32	0.51	0.18	0.39	1.44	32.24
Bi (ppm)	0.01	0.00	BDL	BDL	BDL	2.22	54.64
Th (ppm)	0.10	0.16	0.06	0.14	BDL	4.99	118.10
U (ppm)	0.16	0.30	0.18	0.19	0.18	9.28	134.65
Tl (ppm)	2.50	2.60	2.10	1.86	2.97	0.37	0.30
SiO2 wt.%	50.15	50.15	50.15	50.15	50.15	48.02	48.02

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909153_16-2	G909153_16-3	G909153_16-4	G909153_16-5	G909153_16-6	G909155_33-4	G909155_33-5
Data Quality (1-3)	3	2.5	3	3	3	1	1
1 standard error (ppm) *							
Li	0.39	0.31	0.53	0.63	0.30	0.83	0.61
B	2.49	4.25	2.32	1.98	4.01	1.18	2.71
Si	4688.67	4688.67	4688.67	4688.67	4688.67	4489.53	4489.53
P	16.49	113.53	13.21	17.70	9.06	28.09	497.29
Sc	0.56	0.60	0.53	0.50	0.53	0.32	1.05
Ti	36.94	53.54	72.52	29.09	47.59	972.22	12460.20
V	8.26	10.85	8.04	8.01	12.22	6.74	9.86
Cr	1.97	1.90	2.63	1.31	1.87	2.24	6.84
Mn	1.76	1.78	1.67	2.36	1.53	1.37	3.08
Co	0.16	0.11	BDL	BDL	0.03	0.16	0.28
Cu	0.12	0.18	0.35	0.15	0.27	24.12	76.65
Cu	0.38	0.28	0.43	0.21	0.24	26.96	78.72
Zn	0.34	0.52	0.49	1.13	0.63	0.73	0.91
Zn	2.71	2.14	2.38	2.15	2.04	3.49	3.62
As	0.11	0.14	0.07	0.20	BDL	0.39	3.41
Se	0.65	0.51	0.34	0.18	0.24	0.43	0.71
Se	BDL	BDL	0.24	0.22	0.34	0.49	0.98
Rb	8.93	9.37	8.36	12.48	9.16	3.35	2.45
Sr	0.59	0.44	0.55	0.52	0.72	2.87	320.08
Mo	BDL	0.11	BDL	BDL	0.11	0.80	5.82
Sn	0.22	0.20	0.19	0.41	0.18	0.27	0.79
Te	BDL	0.15	BDL	BDL	BDL	0.51	2.31
Cs	0.08	0.15	0.13	0.16	0.11	0.10	0.07
Ba	28.76	38.41	26.40	66.07	33.20	45.15	33.70
Ba	28.27	50.44	26.31	65.64	30.56	48.04	47.29
W	0.23	0.11	0.07	0.12	0.11	1.28	2.61
Pb	0.04	0.05	0.06	0.04	0.05	0.08	2.96
Bi	0.01	0.05	BDL	BDL	BDL	0.08	3.95
Th	0.01	0.14	0.02	0.02	BDL	0.71	20.63
U	0.02	0.05	0.04	0.03	0.03	2.09	20.29
Tl	0.20	0.14	0.16	0.10	0.12	0.08	0.05

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909153_16-2	G909153_16-3	G909153_16-4	G909153_16-5	G909153_16-6	G909155_33-4	G909155_33-5
Data Quality (1-3)	3	2.5	3	3	3	1	1
1 standard error (ppm)**							
Li	0.70	0.90	0.87	1.29	1.09	2.50	1.81
B	27.25	29.66	28.89	25.27	28.42	12.84	18.64
Si	8053.91	8053.91	8053.91	8053.91	8053.91	7711.84	7711.84
P	77.69	169.20	59.57	55.21	49.41	186.87	2663.97
Sc	0.74	1.01	0.80	0.68	0.96	0.61	1.29
Ti	122.39	143.15	147.80	99.28	143.81	1089.07	15073.00
V	16.12	20.39	17.92	16.14	22.31	10.38	14.69
Cr	13.82	14.83	16.01	8.60	15.77	15.72	22.04
Mn	2.72	2.95	2.70	4.10	2.92	1.86	3.74
Co	0.16	0.11	BDL	BDL	0.04	0.27	0.41
Cu	0.38	0.42	0.52	0.21	0.55	79.65	170.88
Cu	0.51	0.56	0.51	0.29	0.50	80.83	177.47
Zn	0.40	0.57	0.54	1.18	0.72	1.04	1.04
Zn	3.12	2.67	2.86	2.65	2.54	4.48	4.12
As	0.17	0.25	0.21	0.26	BDL	1.95	12.27
Se	2.60	2.27	3.01	2.52	3.22	1.76	6.20
Se	BDL	BDL	0.67	1.82	0.80	1.98	6.87
Rb	10.48	11.22	10.26	14.12	11.12	3.52	2.56
Sr	0.61	0.49	0.58	0.54	0.74	2.95	326.09
Mo	BDL	0.12	BDL	BDL	0.11	0.95	8.09
Sn	0.85	0.79	0.80	1.03	1.08	1.02	2.91
Te	BDL	0.15	BDL	BDL	BDL	0.96	5.09
Cs	0.18	0.23	0.20	0.26	0.23	0.14	0.12
Ba	33.12	42.98	31.16	68.03	37.12	50.06	37.72
Ba	32.54	53.84	30.84	67.57	34.62	53.39	50.65
W	0.27	0.15	0.15	0.22	0.25	1.38	4.85
Pb	0.05	0.05	0.06	0.04	0.05	0.10	3.15
Bi	0.01	0.05	BDL	BDL	BDL	0.23	6.54
Th	0.01	0.14	0.02	0.02	BDL	0.76	21.62
U	0.02	0.05	0.04	0.03	0.03	2.20	22.57
Tl	0.32	0.30	0.27	0.22	0.32	0.09	0.06

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909155_33-6	G909155_33-7	G909155_33-8	G909155_33-9	G909155_34-1	G909155_36-1	G909155_36-2
Data Quality (1-3)	1	1	1	1	1.5	2.5	2.5
Li (ppm)	10.47	0.63	BDL	BDL	21.17	2.97	6.10
B (ppm)	56.09	2.78	3.04	2.00	36.19	3.13	10.18
Si (ppm)	224476.44	224476.44	224476.44	224476.44	224476.44	224476.44	224476.44
P (ppm)	16140.75	160.11	67.58	41.40	1416.11	48.18	403.13
Sc (ppm)	13.35	2.16	1.89	1.54	5.36	2.25	2.87
Ti (ppm)	54459.33	78.83	82.70	73.18	164.63	84.99	492.61
V (ppm)	180.45	1.83	0.07	0.07	37.02	7.09	15.79
Cr (ppm)	73.90	6.31	5.12	4.60	53.67	4.10	22.04
Mn (ppm)	42.20	5.37	13.73	2.96	60.39	8.26	17.73
Co (ppm)	3.58	BDL	BDL	0.20	7.37	0.08	0.34
Cu(63) (ppm)	1103.91	52.79	8.31	0.26	1268.53	2.10	75.53
Cu(65)* (ppm)	1143.61	53.73	7.44	0.83	1289.35	1.70	76.45
Zn(66)* (ppm)	15.09	2.36	4.17	3.44	9.12	1.44	3.46
Zn(68) (ppm)	57.40	12.39	17.24	17.26	18.27	31.57	60.53
As (ppm)	22.29	0.49	0.58	0.34	1.67	BDL	0.80
Se(76) (ppm)	6.17	2.55	2.10	1.87	2.65	1.30	1.23
Se(77)* (ppm)	9.79	1.77	BDL	BDL	BDL	BDL	1.36
Rb (ppm)	48.35	1.53	1.90	0.79	6.12	31.75	46.22
Sr (ppm)	4357.14	1501.31	1774.82	1864.16	89.94	87.47	191.45
Mo (ppm)	44.33	1.29	BDL	BDL	5.35	0.08	1.69
Sn (ppm)	17.07	0.05	0.14	0.12	1.79	0.24	0.34
Te (ppm)	17.06	BDL	BDL	BDL	1.15	0.08	BDL
Cs (ppm)	1.27	0.04	BDL	0.26	1.00	0.28	0.63
Ba(137) (ppm)	1072.52	239.93	317.06	326.32	27.15	767.45	1106.59
Ba(138)* (ppm)	1082.69	234.33	320.94	319.51	30.29	795.80	1125.13
W (ppm)	24.67	0.03	BDL	BDL	0.11	0.23	0.68
Pb (ppm)	88.77	5.26	6.83	7.08	1.16	0.37	0.87
Bi (ppm)	60.79	0.08	BDL	0.02	0.68	0.05	0.18
Th (ppm)	53.19	0.52	0.20	BDL	2.65	0.08	4.93
U (ppm)	57.21	0.13	BDL	0.00	1.45	0.01	1.26
Tl (ppm)	0.36	BDL	0.01	BDL	BDL	0.13	0.15
SiO2 wt.%	48.02	48.02	48.02	48.02	48.02	48.02	48.02

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909155_33-6	G909155_33-7	G909155_33-8	G909155_33-9	G909155_34-1	G909155_36-1	G909155_36-2
Data Quality (1-3)	1	1	1	1	1.5	2.5	2.5
1 standard error (ppm) *							
Li	0.55	0.21	BDL	BDL	2.40	0.25	0.36
B	2.58	0.33	0.22	0.38	2.17	0.28	1.13
Si	4489.53	4489.53	4489.53	4489.53	4489.53	4489.53	4489.53
P	596.92	13.28	9.14	2.40	63.92	2.36	34.30
Sc	0.71	0.16	0.07	0.12	0.46	0.10	0.13
Ti	1455.08	6.60	3.77	2.42	33.31	3.35	61.03
V	4.15	0.27	0.03	0.03	1.86	0.33	0.66
Cr	5.87	0.20	0.45	0.22	3.42	0.28	0.65
Mn	1.15	0.24	1.91	0.09	2.31	0.32	0.72
Co	0.12	BDL	BDL	0.06	0.29	0.01	0.09
Cu	37.82	2.27	0.43	0.38	48.37	0.16	3.97
Cu	41.86	2.47	0.46	0.09	56.15	0.20	3.73
Zn	0.64	0.16	0.86	0.29	0.59	0.18	0.10
Zn	3.04	0.55	0.66	0.81	0.93	1.74	3.33
As	0.95	0.07	0.18	0.08	0.26	BDL	0.12
Se	0.32	0.19	0.14	0.24	1.10	0.09	0.40
Se	0.55	0.41	BDL	BDL	BDL	BDL	0.40
Rb	2.39	0.06	0.12	0.08	0.38	1.68	2.05
Sr	259.96	42.74	47.01	60.92	3.00	2.28	6.94
Mo	1.62	0.32	BDL	BDL	1.02	0.05	0.05
Sn	0.69	0.10	0.04	0.07	0.07	0.03	0.03
Te	1.10	BDL	BDL	BDL	0.17	0.05	BDL
Cs	0.13	0.02	BDL	0.03	0.12	0.04	0.07
Ba	26.56	13.11	9.64	7.97	1.20	39.66	52.33
Ba	27.92	7.13	10.01	7.33	4.15	32.60	46.49
W	1.44	0.03	BDL	BDL	0.09	0.04	0.06
Pb	5.66	0.28	0.25	0.19	0.17	0.16	0.14
Bi	2.86	0.01	BDL	0.01	0.09	0.02	0.07
Th	1.70	0.07	0.02	BDL	0.80	0.02	2.85
U	5.32	0.02	BDL	0.03	0.08	0.13	0.09
Tl	0.02	BDL	0.01	BDL	BDL	0.02	0.02

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909155_33-6	G909155_33-7	G909155_33-8	G909155_33-9	G909155_34-1	G909155_36-1	G909155_36-2
Data Quality (1-3)	1	1	1	1	1.5	2.5	2.5
1 standard error (ppm)**							
Li	1.57	0.23	BDL	BDL	3.83	0.49	0.93
B	20.58	1.07	1.13	0.82	13.35	1.17	3.87
Si	7711.84	7711.84	7711.84	7711.84	7711.84	7711.84	7711.84
P	4658.81	47.72	21.40	12.09	410.38	13.99	120.39
Sc	0.88	0.18	0.10	0.13	0.51	0.13	0.17
Ti	5300.18	9.90	8.61	7.26	36.70	8.63	76.48
V	9.36	0.28	0.03	0.03	2.54	0.46	0.99
Cr	15.94	1.28	1.12	0.95	11.30	0.87	4.47
Mn	1.94	0.31	1.98	0.14	3.21	0.44	0.98
Co	0.24	BDL	BDL	0.06	0.51	0.02	0.09
Cu	125.37	6.15	1.00	0.38	145.62	0.28	9.09
Cu	131.99	6.38	0.93	0.12	151.89	0.27	9.16
Zn	0.79	0.18	0.87	0.31	0.65	0.19	0.15
Zn	3.48	0.66	0.83	0.95	1.07	1.97	3.77
As	7.81	0.18	0.27	0.14	0.63	BDL	0.30
Se	4.95	2.05	1.68	1.52	2.38	1.05	1.06
Se	7.85	1.47	BDL	BDL	BDL	BDL	1.16
Rb	2.50	0.07	0.13	0.08	0.39	1.75	2.16
Sr	270.09	49.64	55.68	68.52	3.36	2.71	7.65
Mo	3.82	0.34	BDL	BDL	1.10	0.05	0.14
Sn	3.13	0.10	0.05	0.07	0.33	0.05	0.07
Te	3.34	BDL	BDL	BDL	0.27	0.06	BDL
Cs	0.15	0.02	BDL	0.04	0.14	0.04	0.08
Ba	30.65	13.55	10.64	9.22	1.26	41.15	54.66
Ba	32.38	7.96	11.13	8.78	4.17	34.76	49.51
W	3.21	0.03	BDL	BDL	0.09	0.05	0.10
Pb	6.40	0.33	0.34	0.31	0.18	0.16	0.14
Bi	6.47	0.01	BDL	0.01	0.11	0.02	0.07
Th	3.36	0.07	0.02	BDL	0.81	0.02	2.86
U	6.78	0.02	BDL	0.03	0.13	0.13	0.13
Tl	0.04	BDL	0.01	BDL	BDL	0.02	0.03

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909155_36-3	G909155-1	G909155-10	G909155-2	G909155-3	G909155-4	G909155-5
Data Quality (1-3)	2.5	2.5	2.5	2.5	3	3	2.5
Li (ppm)	8.36	13.03	12.69	10.96	10.17	12.60	10.95
B (ppm)	11.59	29.51	16.80	34.13	24.72	29.88	27.76
Si (ppm)	224476.44	224485.79	224485.79	224485.79	224485.79	224485.79	224485.79
P (ppm)	52.92	136.50	234.55	200.31	321.33	306.47	96.70
Sc (ppm)	3.20	16.92	2.78	15.92	17.59	18.81	16.77
Ti (ppm)	208.08	3981.70	122.55	4024.89	4459.12	4104.90	3968.14
V (ppm)	38.63	329.87	14.84	322.11	341.37	329.57	337.17
Cr (ppm)	16.37	13.94	2.81	14.76	12.41	11.09	12.14
Mn (ppm)	12.26	45.02	35.99	53.51	40.39	41.42	42.40
Co (ppm)	0.24	0.34	0.24	BDL	0.65	0.31	BDL
Cu(63) (ppm)	25.65	16.21	25.10	20.45	12.73	12.59	11.11
Cu(65)* (ppm)	26.17	19.21	23.65	20.33	14.64	11.01	13.24
Zn(66)* (ppm)	2.79	8.97	6.58	9.39	6.07	5.21	6.65
Zn(68) (ppm)	20.60	89.78	70.97	82.48	75.77	86.61	71.28
As (ppm)	BDL	BDL	0.37	BDL	BDL	BDL	BDL
Se(76) (ppm)	BDL	2.88	2.06	2.74	4.54	2.90	1.87
Se(77)* (ppm)	BDL	1.53	2.42	BDL	BDL	1.33	BDL
Rb (ppm)	48.47	233.76	141.24	242.49	229.19	232.12	233.40
Sr (ppm)	253.99	27.81	84.16	24.70	32.50	33.88	26.95
Mo (ppm)	0.06	BDL	0.13	0.30	BDL	BDL	BDL
Sn (ppm)	0.47	9.23	0.49	8.63	8.97	8.50	8.44
Te (ppm)	BDL	BDL	BDL	BDL	BDL	0.22	0.22
Cs (ppm)	0.71	1.35	1.58	1.40	0.89	1.26	1.05
Ba(137) (ppm)	503.67	2537.57	2313.82	2509.14	2268.06	2694.76	2242.33
Ba(138)* (ppm)	512.96	2552.91	2203.11	2594.10	2315.88	2729.92	2255.71
W (ppm)	0.15	4.33	0.99	4.55	4.11	3.69	3.98
Pb (ppm)	0.55	0.31	1.36	0.52	0.17	0.32	0.22
Bi (ppm)	0.06	0.08	0.07	0.20	0.03	0.33	0.02
Th (ppm)	0.10	0.00	0.05	1.88	BDL	12.49	0.71
U (ppm)	0.19	0.06	0.11	0.11	0.02	0.22	0.04
Tl (ppm)	0.16	0.89	0.66	0.86	0.99	0.90	1.06
SiO2 wt.%	48.02	48.02	48.02	48.02	48.02	48.02	48.02

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909155_36-3	G909155-1	G909155-10	G909155-2	G909155-3	G909155-4	G909155-5
Data Quality (1-3)	2.5	2.5	2.5	2.5	3	3	2.5
1 standard error (ppm) *							
Li	0.48	1.11	0.42	0.27	0.39	0.59	0.57
B	0.85	1.50	0.93	1.56	1.13	0.91	1.01
Si	4489.53	4489.72	4489.72	4489.72	4489.72	4489.72	4489.72
P	10.23	40.05	36.35	24.54	63.59	55.52	23.70
Sc	0.13	0.59	0.30	0.42	0.78	0.74	0.66
Ti	95.33	114.24	4.50	130.76	113.82	123.49	99.27
V	1.62	7.02	0.33	8.06	8.99	8.40	7.87
Cr	0.60	0.65	0.21	0.70	0.66	0.39	0.59
Mn	0.52	1.71	1.29	3.28	0.91	1.01	0.98
Co	0.14	0.11	0.08	BDL	0.14	0.05	BDL
Cu	4.08	1.04	1.88	1.29	0.72	0.61	0.38
Cu	4.09	1.39	1.71	1.76	1.27	0.68	1.02
Zn	0.36	0.99	0.20	1.66	0.28	0.40	0.26
Zn	2.42	3.91	2.65	3.56	4.24	3.60	2.34
As	BDL	BDL	0.08	BDL	BDL	BDL	BDL
Se	BDL	0.86	0.11	0.94	0.57	0.63	0.32
Se	BDL	0.53	0.62	BDL	BDL	0.54	BDL
Rb	1.24	4.98	3.47	6.51	5.07	5.82	5.12
Sr	9.75	1.30	12.76	1.01	2.11	1.63	0.88
Mo	0.56	BDL	0.08	0.10	BDL	BDL	BDL
Sn	0.12	0.38	0.08	0.30	0.29	0.23	0.27
Te	BDL	BDL	BDL	BDL	BDL	0.14	0.15
Cs	0.03	0.18	0.05	0.12	0.05	0.08	0.04
Ba	24.59	60.90	85.99	70.73	55.99	91.20	65.09
Ba	26.73	54.69	93.34	82.60	63.97	77.85	58.15
W	0.13	0.12	0.06	0.43	0.14	0.15	0.15
Pb	0.06	0.05	0.15	0.13	0.05	0.07	0.01
Bi	0.01	0.03	0.02	0.04	0.01	0.10	0.01
Th	0.14	0.02	0.02	0.90	BDL	4.02	0.18
U	0.13	0.02	0.02	0.04	0.01	0.09	0.01
Tl	0.04	0.09	0.03	0.03	0.06	0.05	0.06

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909155_36-3	G909155-1	G909155-10	G909155-2	G909155-3	G909155-4	G909155-5
Data Quality (1-3)	2.5	2.5	2.5	2.5	3	3	2.5
1 standard error (ppm)**							
Li	1.27	2.14	1.83	1.56	1.48	1.86	1.64
B	4.31	10.84	6.18	12.51	9.06	10.91	10.15
Si	7711.84	7712.16	7712.16	7712.16	7712.16	7712.16	7712.16
P	18.28	55.94	76.32	62.34	111.79	103.79	36.43
Sc	0.18	0.89	0.32	0.75	1.04	1.04	0.93
Ti	97.30	390.56	12.34	399.53	433.47	404.35	385.21
V	2.42	16.68	0.75	16.83	18.06	17.30	17.36
Cr	3.34	2.86	0.60	3.04	2.57	2.25	2.50
Mn	0.69	2.31	1.79	3.77	1.67	1.75	1.76
Co	0.14	0.11	0.08	BDL	0.15	0.05	BDL
Cu	4.94	2.01	3.26	2.53	1.53	1.47	1.24
Cu	5.00	2.47	3.04	2.78	2.01	1.35	1.74
Zn	0.37	1.03	0.27	1.68	0.32	0.43	0.32
Zn	2.49	4.65	3.31	4.25	4.74	4.34	3.08
As	BDL	BDL	0.15	BDL	BDL	BDL	BDL
Se	BDL	2.46	1.65	2.39	3.68	2.41	1.53
Se	BDL	1.33	2.04	BDL	BDL	1.19	BDL
Rb	1.43	5.80	3.91	7.20	5.85	6.52	5.92
Sr	10.65	1.35	12.80	1.06	2.15	1.69	0.94
Mo	0.56	BDL	0.08	0.11	BDL	BDL	BDL
Sn	0.15	1.69	0.12	1.57	1.63	1.54	1.53
Te	BDL	BDL	BDL	BDL	BDL	0.15	0.15
Cs	0.06	0.20	0.12	0.15	0.07	0.11	0.08
Ba	25.62	70.98	92.19	79.39	64.78	99.08	72.63
Ba	27.84	64.04	97.67	89.26	70.75	85.61	65.18
W	0.13	0.52	0.13	0.68	0.50	0.46	0.49
Pb	0.07	0.05	0.16	0.13	0.05	0.07	0.01
Bi	0.01	0.03	0.02	0.04	0.01	0.10	0.01
Th	0.14	0.02	0.02	0.90	BDL	4.08	0.19
U	0.13	0.02	0.02	0.04	0.01	0.09	0.01
Tl	0.04	0.13	0.08	0.09	0.11	0.10	0.12

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909155-6	G909155-7	G909155-8	G909155-9	G909157_1-1	G909157_1-3	G909157_10-1
Data Quality (1-3)	2.5	2.5	3	1.5	2.5	1.5	2.5
Li (ppm)	9.23	16.47	15.13	20.30	10.85	13.78	12.57
B (ppm)	22.75	18.58	23.99	33.88	56.25	50.32	62.38
Si (ppm)	224485.79	224485.79	224485.79	224485.79	233825.73	233825.73	233825.73
P (ppm)	161.67	103.19	66.29	1243.46	170.47	3890.98	108.49
Sc (ppm)	17.13	2.73	3.41	3.06	26.97	28.46	16.28
Ti (ppm)	4121.11	188.78	279.90	233.17	2223.92	4429.69	684.52
V (ppm)	328.47	25.68	25.08	51.62	349.98	337.52	300.66
Cr (ppm)	12.08	2.47	5.52	6.69	42.89	60.28	15.69
Mn (ppm)	39.79	44.26	48.89	96.04	168.27	153.65	184.95
Co (ppm)	BDL	BDL	0.26	9.97	0.88	3.54	0.46
Cu(63) (ppm)	11.10	20.54	4.57	998.95	9.40	20.34	2.95
Cu(65)* (ppm)	13.20	27.13	6.28	977.86	7.01	23.49	2.66
Zn(66)* (ppm)	7.34	6.71	8.15	17.09	17.39	23.04	14.39
Zn(68) (ppm)	60.18	103.32	111.54	123.66	52.73	45.33	56.50
As (ppm)	BDL	BDL	0.63	5.50	0.49	1.73	BDL
Se(76) (ppm)	2.65	0.70	8.06	2.05	3.94	2.46	3.29
Se(77)* (ppm)	3.63	BDL	BDL	1.59	BDL	BDL	0.22
Rb (ppm)	218.26	150.97	195.74	194.65	361.35	323.39	422.03
Sr (ppm)	25.36	56.46	119.92	87.19	38.16	42.26	53.18
Mo (ppm)	0.11	0.15	0.11	22.87	0.45	2.98	0.35
Sn (ppm)	8.30	1.74	0.98	1.41	1.54	1.95	1.64
Te (ppm)	BDL	BDL	BDL	0.50	BDL	0.42	BDL
Cs (ppm)	1.40	1.97	2.36	2.48	3.26	3.24	3.05
Ba(137) (ppm)	2006.22	3453.35	3569.59	3816.04	915.86	503.68	1059.40
Ba(138)* (ppm)	2022.09	3548.04	3673.78	3890.51	915.91	515.20	1079.85
W (ppm)	4.28	1.68	1.19	2.97	1.98	3.46	2.49
Pb (ppm)	0.14	0.24	0.24	0.76	1.59	2.13	0.81
Bi (ppm)	0.00	BDL	0.00	0.11	0.08	0.59	BDL
Th (ppm)	BDL	BDL	0.03	4.01	BDL	5.14	1.64
U (ppm)	0.02	0.06	0.09	0.67	1.67	5.06	2.11
Tl (ppm)	1.09	0.88	0.91	1.13	1.60	1.51	1.58
SiO2 wt.%	48.02	48.02	48.02	48.02	50.02	50.02	50.02

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909155-6	G909155-7	G909155-8	G909155-9	G909157_1-1	G909157_1-3	G909157_10-1
Data Quality (1-3)	2.5	2.5	3	1.5	2.5	1.5	2.5
1 standard error (ppm) *							
Li	0.47	0.51	0.65	0.68	0.51	0.53	0.45
B	1.34	0.51	1.02	0.79	3.04	2.14	2.04
Si	4489.72	4489.72	4489.72	4489.72	4676.51	4676.51	4676.51
P	13.77	25.62	1.84	234.76	28.48	264.22	10.01
Sc	0.44	0.31	0.29	0.28	1.47	0.96	0.64
Ti	101.11	6.57	6.45	6.05	91.61	227.36	30.59
V	7.63	0.99	1.07	1.80	9.12	7.81	7.20
Cr	0.52	0.18	0.13	0.32	1.18	2.16	0.68
Mn	0.99	1.06	1.20	2.82	5.32	4.31	4.27
Co	BDL	BDL	0.04	1.55	0.07	0.15	0.10
Cu	0.48	5.31	0.48	37.98	1.19	0.74	0.48
Cu	0.53	10.02	0.31	34.91	0.75	1.08	0.21
Zn	0.56	0.49	0.54	1.41	0.69	0.71	0.65
Zn	3.13	2.86	3.15	4.38	2.98	1.53	2.64
As	BDL	BDL	0.16	0.81	0.09	0.13	BDL
Se	0.49	0.13	1.04	0.31	0.30	0.17	0.22
Se	1.20	BDL	BDL	0.60	BDL	BDL	0.95
Rb	5.52	3.34	4.15	4.52	8.50	10.85	9.82
Sr	0.75	1.75	2.52	2.25	1.38	2.95	2.35
Mo	0.10	0.06	0.03	0.99	0.10	0.18	0.13
Sn	0.66	0.07	0.09	0.16	0.14	0.08	0.07
Te	BDL	BDL	BDL	0.19	BDL	0.08	BDL
Cs	0.29	0.08	0.09	0.09	0.09	0.09	0.12
Ba	81.94	86.60	83.11	116.53	23.53	12.87	25.26
Ba	71.49	111.52	86.60	120.30	26.78	12.96	27.08
W	0.24	0.12	0.07	0.13	0.13	0.16	0.29
Pb	0.07	0.04	0.05	0.10	0.34	0.17	0.17
Bi	0.01	BDL	0.01	0.03	0.04	0.03	BDL
Th	BDL	BDL	0.01	0.32	BDL	0.35	0.36
U	0.03	0.05	0.02	0.04	1.62	0.19	0.47
Tl	0.03	0.05	0.04	0.08	0.08	0.16	0.11

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909155-6	G909155-7	G909155-8	G909155-9	G909157_1-1	G909157_1-3	G909157_10-1
Data Quality (1-3)	2.5	2.5	3	1.5	2.5	1.5	2.5
1 standard error (ppm)**							
Li	1.38	2.36	2.22	2.92	1.62	2.02	1.83
B	8.38	6.78	8.79	12.35	20.72	18.46	22.82
Si	7712.16	7712.16	7712.16	7712.16	8033.03	8033.03	8033.03
P	48.26	39.09	19.05	426.26	56.54	1145.80	32.66
Sc	0.80	0.32	0.32	0.31	1.93	1.63	0.99
Ti	399.56	18.89	27.03	22.69	228.86	475.60	71.44
V	16.89	1.54	1.57	2.97	18.69	17.56	15.75
Cr	2.47	0.53	1.11	1.38	8.67	12.26	3.22
Mn	1.70	1.86	2.08	4.36	7.99	6.94	7.82
Co	BDL	BDL	0.04	1.64	0.08	0.24	0.10
Cu	1.27	5.74	0.68	112.55	1.55	2.28	0.57
Cu	1.50	10.42	0.74	109.48	1.06	2.72	0.36
Zn	0.60	0.52	0.59	1.49	0.86	0.98	0.77
Zn	3.56	4.07	4.44	5.58	3.33	2.00	3.09
As	BDL	BDL	0.27	2.07	0.19	0.61	BDL
Se	2.18	0.57	6.53	1.67	3.17	1.98	2.65
Se	3.14	BDL	BDL	1.41	BDL	BDL	0.96
Rb	6.18	3.86	4.84	5.15	10.30	12.03	11.95
Sr	0.81	1.89	2.95	2.51	1.58	3.06	2.57
Mo	0.10	0.06	0.03	2.03	0.10	0.30	0.14
Sn	1.62	0.32	0.20	0.30	0.31	0.36	0.30
Te	BDL	BDL	BDL	0.21	BDL	0.11	BDL
Cs	0.30	0.15	0.18	0.18	0.23	0.23	0.24
Ba	86.86	99.81	97.66	128.79	27.68	15.16	30.36
Ba	76.20	120.75	98.98	130.57	30.87	15.57	32.57
W	0.56	0.23	0.16	0.37	0.26	0.44	0.41
Pb	0.07	0.04	0.06	0.10	0.36	0.23	0.18
Bi	0.01	BDL	0.01	0.04	0.04	0.06	BDL
Th	BDL	BDL	0.01	0.39	BDL	0.46	0.37
U	0.03	0.05	0.02	0.06	1.63	0.41	0.50
Tl	0.12	0.10	0.10	0.14	0.18	0.22	0.20

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909157_10-2	G909157_10-4	G909157_2-1	G909157_3-1	G909157_3-2	G909157_3-3	G909157_6-1
Data Quality (1-3)	3	1.5	1.5	2.5	2	2.5	1
Li (ppm)	13.86	7.85	11.94	11.74	8.41	12.86	5.22
B (ppm)	67.08	23.52	50.18	69.60	21.47	53.60	55.71
Si (ppm)	233825.73	233825.73	233825.73	233825.73	233825.73	233825.73	233825.73
P (ppm)	39.15	8305.17	6054.31	106.04	211.79	767.00	46878.58
Sc (ppm)	18.25	44.90	49.76	29.29	15.22	28.53	233.45
Ti (ppm)	553.35	3709.72	7803.06	1860.83	5595.86	1879.55	8326.69
V (ppm)	335.40	508.98	613.10	378.51	166.61	369.90	1775.21
Cr (ppm)	13.72	107.09	80.71	62.96	46.21	75.42	278.40
Mn (ppm)	184.95	243.51	356.25	175.98	76.07	173.81	1281.62
Co (ppm)	0.31	55.09	45.63	0.36	1.04	0.76	226.36
Cu(63) (ppm)	3.35	335.96	325.11	1.98	7.63	5.52	2197.85
Cu(65)* (ppm)	2.92	348.79	312.30	2.90	8.50	5.27	2139.88
Zn(66)* (ppm)	18.17	123.56	89.79	19.71	15.57	17.25	422.54
Zn(68) (ppm)	53.32	126.42	106.43	50.49	159.15	63.91	441.67
As (ppm)	0.54	117.04	103.84	0.28	0.93	0.64	813.89
Se(76) (ppm)	4.89	8.96	3.36	2.64	2.81	2.56	BDL
Se(77)* (ppm)	BDL	8.16	9.56	BDL	BDL	0.84	28.86
Rb (ppm)	460.14	9.38	238.53	414.99	240.83	411.49	12.11
Sr (ppm)	52.55	78.45	123.31	27.01	340.61	61.84	637.69
Mo (ppm)	BDL	59.05	63.81	1.00	2.19	1.04	261.65
Sn (ppm)	1.51	3.84	3.39	1.59	1.62	1.84	3.82
Te (ppm)	BDL	6.56	8.00	0.64	1.22	0.31	35.77
Cs (ppm)	3.19	0.88	2.65	3.28	1.94	2.85	BDL
Ba(137) (ppm)	867.74	119.37	451.97	863.09	3910.92	1211.22	576.58
Ba(138)* (ppm)	867.91	125.85	456.52	856.71	5037.06	1229.24	576.46
W (ppm)	2.81	10.00	10.49	2.79	1.90	3.26	52.68
Pb (ppm)	0.31	14.50	10.25	0.67	4.07	0.92	53.18
Bi (ppm)	0.01	5.67	5.06	0.31	0.71	0.32	33.72
Th (ppm)	0.13	138.70	48.51	0.45	2.07	1.02	538.45
U (ppm)	0.13	11.30	19.35	2.51	5.99	2.22	43.55
Tl (ppm)	1.84	0.06	0.93	1.83	1.38	1.56	0.38
SiO2 wt.%	50.02	50.02	50.02	50.02	50.02	50.02	50.02

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909157_10-2	G909157_10-4	G909157_2-1	G909157_3-1	G909157_3-2	G909157_3-3	G909157_6-1
Data Quality (1-3)	3	1.5	1.5	2.5	2	2.5	1
1 standard error (ppm) *							
Li	0.71	0.41	0.64	0.49	0.41	0.64	0.78
B	3.25	1.18	2.63	4.50	1.22	2.05	9.62
Si	4676.51	4676.51	4676.51	4676.51	4676.51	4676.51	4676.51
P	3.20	306.95	291.38	10.43	23.91	29.03	2079.45
Sc	0.79	2.12	1.82	1.15	0.79	0.96	8.51
Ti	14.39	176.01	255.49	93.53	1088.47	243.35	204.43
V	7.77	16.98	18.06	11.95	5.46	9.41	43.65
Cr	0.46	4.87	2.12	1.82	1.46	2.24	9.07
Mn	4.52	9.14	11.65	5.07	2.31	4.42	33.83
Co	0.04	2.81	1.42	0.04	0.05	0.06	7.77
Cu	0.32	16.20	12.47	0.25	0.51	0.60	55.29
Cu	0.17	14.61	13.35	0.19	0.36	0.21	57.93
Zn	0.64	10.44	2.68	1.06	0.77	0.67	22.07
Zn	1.67	12.19	3.87	1.89	5.25	2.05	12.29
As	0.18	3.25	5.12	0.08	0.10	0.09	23.06
Se	0.36	1.17	0.24	0.16	0.29	0.40	BDL
Se	BDL	0.60	0.78	BDL	BDL	0.69	3.02
Rb	12.64	0.37	5.70	14.02	6.17	15.48	0.64
Sr	2.77	5.26	11.66	1.37	9.39	2.59	19.55
Mo	BDL	3.11	2.27	0.13	0.25	0.12	9.62
Sn	0.12	0.70	0.18	0.07	0.25	0.14	0.20
Te	BDL	1.01	0.58	0.15	0.37	0.08	1.97
Cs	0.09	0.09	0.14	0.17	0.10	0.10	BDL
Ba	23.64	5.02	21.93	22.21	125.14	34.46	15.29
Ba	25.53	4.64	21.78	22.82	169.18	38.02	13.71
W	0.19	0.58	0.37	0.18	0.22	0.26	1.55
Pb	0.04	1.09	0.78	0.10	0.31	0.19	3.79
Bi	0.01	0.25	0.24	0.02	0.15	0.06	0.84
Th	0.01	18.54	3.31	0.14	0.43	0.15	18.86
U	0.03	0.50	0.89	0.39	2.10	0.21	1.72
Tl	0.17	0.00	0.06	0.10	0.07	0.08	0.09

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909157_10-2	G909157_10-4	G909157_2-1	G909157_3-1	G909157_3-2	G909157_3-3	G909157_6-1
Data Quality (1-3)	3	1.5	1.5	2.5	2	2.5	1
1 standard error (ppm)**							
Li	2.08	1.18	1.81	1.73	1.26	1.93	1.08
B	24.66	8.65	18.48	25.76	7.92	19.64	22.47
Si	8033.03	8033.03	8033.03	8033.03	8033.03	8033.03	8033.03
P	11.67	2399.48	1759.10	32.13	65.23	221.68	13592.58
Sc	1.15	2.97	2.94	1.78	1.06	1.63	13.74
Ti	54.13	391.63	778.96	198.85	1209.65	301.06	811.42
V	17.46	29.17	33.80	21.31	9.49	19.64	93.53
Cr	2.79	21.99	16.30	12.74	9.37	15.27	56.49
Mn	7.96	12.56	17.17	8.03	3.55	7.58	56.60
Co	0.05	4.08	2.83	0.04	0.07	0.07	14.43
Cu	0.48	39.08	36.60	0.33	0.96	0.84	239.14
Cu	0.36	39.86	35.79	0.36	0.97	0.60	234.82
Zn	0.84	11.06	3.77	1.21	0.90	0.84	25.35
Zn	2.25	12.70	4.90	2.37	6.92	2.73	17.51
As	0.26	40.67	36.33	0.12	0.34	0.24	282.87
Se	3.93	7.27	2.70	2.12	2.27	2.09	BDL
Se	BDL	6.57	7.70	BDL	BDL	0.96	23.32
Rb	14.65	0.40	6.88	15.54	7.29	16.84	0.67
Sr	2.96	5.49	11.91	1.48	11.58	2.86	23.30
Mo	BDL	5.53	5.44	0.15	0.30	0.15	22.43
Sn	0.30	0.98	0.63	0.29	0.38	0.36	0.71
Te	BDL	1.55	1.54	0.19	0.43	0.10	6.69
Cs	0.23	0.11	0.23	0.28	0.16	0.21	BDL
Ba	27.37	5.37	23.08	26.12	139.76	39.48	17.83
Ba	29.38	5.09	23.08	26.96	189.06	43.24	16.77
W	0.38	1.30	1.28	0.37	0.31	0.46	6.33
Pb	0.04	1.53	1.09	0.11	0.43	0.21	5.47
Bi	0.01	0.59	0.54	0.04	0.17	0.07	3.29
Th	0.02	20.21	4.35	0.14	0.45	0.16	36.55
U	0.03	0.96	1.66	0.43	2.15	0.26	3.60
Tl	0.25	0.01	0.11	0.21	0.16	0.18	0.10

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909157_6-2	G909157_6-3	G909157_6-4	G909157_8-3	G909157_9-1	G909157_9-2	G909157_9-3
Data Quality (1-3)	3	2	1	1.5	1.5	1.5	1.5
Li (ppm)	13.45	12.01	7.96	56.04	11.89	11.91	12.87
B (ppm)	34.30	34.06	16.18	25.66	40.68	57.42	36.10
Si (ppm)	233825.73	233825.73	233825.73	233825.73	233825.73	233825.73	233825.73
P (ppm)	388.21	1446.39	16240.11	151362.28	12915.03	4288.03	13620.48
Sc (ppm)	21.57	35.13	34.27	46.92	21.56	25.19	19.09
Ti (ppm)	678.15	1257.17	11509.37	13935.32	1475.48	662.95	1059.61
V (ppm)	237.42	314.75	346.22	195.92	261.53	328.38	210.22
Cr (ppm)	62.42	55.37	80.11	76.40	70.71	64.58	67.72
Mn (ppm)	128.35	166.60	172.49	755.25	124.15	168.45	108.57
Co (ppm)	3.79	10.28	31.47	10.19	3.07	1.98	4.76
Cu(63) (ppm)	45.26	90.10	283.53	99.43	19.04	10.31	19.36
Cu(65)* (ppm)	40.33	91.25	285.75	98.47	17.52	9.40	22.29
Zn(66)* (ppm)	39.91	42.55	66.92	127.06	14.19	17.93	13.57
Zn(68) (ppm)	56.24	68.54	97.27	143.76	34.00	39.76	27.34
As (ppm)	5.02	20.04	95.54	3.96	0.77	0.71	1.15
Se(76) (ppm)	0.49	5.20	3.35	8.00	4.19	2.52	2.67
Se(77)* (ppm)	BDL	2.66	3.67	17.94	2.41	BDL	2.14
Rb (ppm)	204.90	214.86	39.18	131.92	253.53	350.67	208.29
Sr (ppm)	10.38	55.58	323.35	1064.41	80.92	30.80	85.18
Mo (ppm)	2.22	14.49	41.01	17.68	2.16	0.94	1.55
Sn (ppm)	1.77	1.79	1.90	2.72	2.71	2.34	2.50
Te (ppm)	BDL	1.65	4.03	0.19	0.13	BDL	0.43
Cs (ppm)	2.30	2.11	1.44	8.75	2.25	2.79	2.46
Ba(137) (ppm)	338.03	728.43	766.99	530.58	466.84	574.70	310.48
Ba(138)* (ppm)	337.20	739.98	761.73	539.32	454.57	583.36	317.41
W (ppm)	1.75	3.47	8.41	2.78	1.61	2.36	1.44
Pb (ppm)	1.10	2.94	10.41	12.41	0.75	0.25	0.65
Bi (ppm)	0.35	1.52	4.67	0.87	0.36	0.09	0.30
Th (ppm)	3.94	16.37	71.28	28.79	14.46	2.65	4.32
U (ppm)	0.76	2.36	11.78	48.73	2.98	1.07	3.72
Tl (ppm)	0.84	1.02	0.27	0.95	0.90	1.44	1.01
SiO2 wt.%	50.02	50.02	50.02	50.02	50.02	50.02	50.02

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909157_6-2	G909157_6-3	G909157_6-4	G909157_8-3	G909157_9-1	G909157_9-2	G909157_9-3
Data Quality (1-3)	3	2	1	1.5	1.5	1.5	1.5
1 standard error (ppm) *							
Li	0.61	0.60	0.84	2.11	0.58	0.46	0.50
B	1.92	2.02	0.92	2.07	1.74	2.06	1.43
Si	4676.51	4676.51	4676.51	4676.51	4676.51	4676.51	4676.51
P	20.65	59.17	1072.36	4649.41	680.48	265.61	624.65
Sc	0.80	1.51	2.00	2.05	1.13	0.93	0.75
Ti	29.55	92.52	472.54	463.64	66.23	27.49	311.29
V	5.82	8.63	15.66	5.19	8.73	7.92	5.33
Cr	1.93	2.62	2.93	3.46	1.79	1.60	1.94
Mn	3.89	6.85	8.95	23.13	4.05	4.23	2.97
Co	0.22	0.32	1.67	0.24	0.17	0.13	0.16
Cu	1.32	2.57	16.84	3.02	0.74	0.41	0.47
Cu	1.85	2.96	15.96	2.61	1.20	0.31	1.56
Zn	1.81	1.28	3.19	4.57	0.63	0.90	0.75
Zn	2.52	2.07	4.12	3.98	1.47	1.24	0.95
As	0.59	0.79	4.18	0.61	0.09	0.19	0.09
Se	0.80	0.45	0.29	0.81	0.36	0.19	0.30
Se	BDL	0.32	0.24	1.19	0.73	BDL	0.62
Rb	5.01	5.81	0.93	3.93	10.23	11.59	5.34
Sr	0.34	2.51	27.31	29.41	4.98	1.80	4.28
Mo	0.31	0.67	1.89	0.96	0.25	0.18	0.50
Sn	0.14	0.05	0.19	0.16	0.09	0.07	0.09
Te	BDL	0.18	0.44	0.17	0.07	BDL	0.13
Cs	0.11	0.10	0.08	0.33	0.12	0.10	0.09
Ba	9.87	27.05	19.37	17.01	18.46	17.64	11.73
Ba	9.68	19.84	18.00	17.59	17.43	16.67	11.54
W	0.13	0.21	0.54	0.10	0.22	0.45	0.14
Pb	0.12	0.23	0.88	1.07	0.07	0.08	0.15
Bi	0.05	0.09	0.12	0.06	0.03	0.02	0.08
Th	0.36	0.55	3.95	1.16	2.35	0.36	0.53
U	0.11	0.08	0.48	1.52	0.35	0.15	0.43
Tl	0.06	0.05	0.02	0.09	0.11	0.06	0.04

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909157_6-2	G909157_6-3	G909157_6-4	G909157_8-3	G909157_9-1	G909157_9-2	G909157_9-3
Data Quality (1-3)	3	2	1	1.5	1.5	1.5	1.5
1 standard error (ppm)**							
Li	2.00	1.80	1.41	8.20	1.78	1.75	1.89
B	12.65	12.57	5.97	9.58	14.93	21.02	13.23
Si	8033.03	8033.03	8033.03	8033.03	8033.03	8033.03	8033.03
P	113.14	418.65	4775.40	43619.82	3762.71	1257.07	3952.48
Sc	1.28	2.22	2.55	2.98	1.51	1.49	1.16
Ti	70.45	150.38	1183.79	1393.55	154.10	68.30	326.94
V	12.50	17.01	22.48	10.50	14.99	17.23	11.15
Cr	12.65	11.39	16.31	15.69	14.27	13.03	13.70
Mn	5.98	9.04	10.83	35.36	5.98	7.31	4.86
Co	0.30	0.64	2.38	0.60	0.24	0.17	0.30
Cu	4.97	9.88	34.42	10.95	2.15	1.16	2.10
Cu	4.67	10.14	34.33	10.79	2.22	1.05	2.84
Zn	2.16	1.79	3.75	5.91	0.76	1.05	0.85
Zn	2.98	2.84	4.95	5.68	1.76	1.68	1.22
As	1.84	6.99	33.36	1.50	0.28	0.31	0.41
Se	0.89	4.19	2.69	6.45	3.37	2.02	2.16
Se	BDL	2.15	2.95	14.43	2.07	BDL	1.82
Rb	6.00	6.76	1.13	4.47	11.01	12.90	6.30
Sr	0.40	2.75	28.06	36.23	5.23	1.90	4.60
Mo	0.35	1.31	3.70	1.67	0.30	0.19	0.52
Sn	0.34	0.33	0.39	0.51	0.49	0.43	0.46
Te	BDL	0.35	0.85	0.17	0.07	BDL	0.15
Cs	0.19	0.17	0.13	0.67	0.19	0.21	0.18
Ba	11.24	29.43	22.90	18.99	19.90	19.87	12.73
Ba	11.21	23.39	22.06	19.77	19.02	19.32	12.71
W	0.24	0.46	1.12	0.34	0.29	0.52	0.22
Pb	0.14	0.32	1.17	1.41	0.09	0.09	0.16
Bi	0.06	0.17	0.46	0.10	0.05	0.02	0.09
Th	0.43	1.10	5.72	2.04	2.50	0.39	0.58
U	0.12	0.19	0.98	3.85	0.41	0.17	0.51
Tl	0.10	0.12	0.03	0.13	0.14	0.16	0.11

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909163_20-2	G909163_20-3	G909163_20-4	G909163_21-1	G909163_21-2	G909163_22-2	G909163_22-3
Data Quality (1-3)	2	1.5	2.5	1.5	2.5	1.5	1.5
Li (ppm)	5.61	7.09	1.20	2.96	2.43	2.46	1.46
B (ppm)	12.22	19.86	5.29	9.53	6.65	7.53	5.42
Si (ppm)	229618.55	229618.55	229618.55	229618.55	229618.55	229618.55	229618.55
P (ppm)	554.62	3323.50	335.38	4386.18	726.50	567.56	408.07
Sc (ppm)	15.19	111.79	9.40	6.67	11.80	29.35	23.55
Ti (ppm)	4698.93	165735.90	2891.01	322.06	2117.66	15309.09	35845.26
V (ppm)	56.30	532.99	30.48	48.79	67.26	205.42	204.72
Cr (ppm)	61.52	93.11	23.98	41.19	27.08	53.89	32.90
Mn (ppm)	21.23	267.01	15.96	141.13	24.47	10.54	6.26
Co (ppm)	1.91	3.14	0.94	4.63	1.19	1.21	0.75
Cu(63) (ppm)	49.87	92.75	27.97	197.69	23.90	51.63	43.29
Cu(65)* (ppm)	49.41	92.44	30.34	201.09	25.90	53.19	45.50
Zn(66)* (ppm)	5.21	12.46	2.97	8.90	2.22	8.07	7.51
Zn(68) (ppm)	18.13	19.12	18.14	13.38	37.66	14.79	10.60
As (ppm)	2.33	68.58	1.86	81.64	8.99	11.00	5.43
Se(76) (ppm)	4.05	4.17	BDL	2.74	5.06	3.67	0.80
Se(77)* (ppm)	1.31	5.84	BDL	9.10	1.66	2.69	1.18
Rb (ppm)	25.64	79.41	17.84	3.40	49.81	14.78	5.17
Sr (ppm)	113.74	115.80	142.48	82.09	155.27	52.47	45.92
Mo (ppm)	2.28	46.93	1.58	19.31	1.60	5.53	4.61
Sn (ppm)	2.06	16.21	1.11	0.98	1.73	7.03	7.71
Te (ppm)	0.64	9.40	0.21	0.70	0.15	1.92	1.26
Cs (ppm)	1.27	2.24	0.74	0.97	1.22	1.22	1.15
Ba(137) (ppm)	173.41	200.39	264.09	69.49	653.43	54.47	29.55
Ba(138)* (ppm)	171.77	210.58	266.55	63.45	676.20	53.24	30.56
W (ppm)	1.61	63.68	0.96	0.19	1.70	10.46	3.27
Pb (ppm)	2.09	44.16	3.17	3.59	3.95	12.79	19.18
Bi (ppm)	1.71	18.83	2.37	3.25	2.01	4.28	2.93
Th (ppm)	3.46	90.20	3.44	74.17	7.22	15.65	5.35
U (ppm)	6.82	95.93	3.93	2.80	1.14	17.42	14.21
Tl (ppm)	0.19	0.91	0.11	0.02	0.19	0.07	0.04
SiO2 wt.%	49.12	49.12	49.12	49.12	49.12	49.12	49.12

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909163_20-2	G909163_20-3	G909163_20-4	G909163_21-1	G909163_21-2	G909163_22-2	G909163_22-3
Data Quality (1-3)	2	1.5	2.5	1.5	2.5	1.5	1.5
1 standard error (ppm) *							
Li	0.35	0.63	0.13	0.21	0.34	0.33	0.10
B	0.61	1.13	1.06	0.83	0.27	0.57	0.25
Si	4592.37	4592.37	4592.37	4592.37	4592.37	4592.37	4592.37
P	26.78	142.94	18.25	265.03	37.25	33.95	18.35
Sc	0.92	3.68	1.41	0.36	0.41	2.10	0.86
Ti	1129.33	5450.50	264.14	12.46	91.09	946.84	1459.67
V	5.83	14.21	4.34	2.62	2.59	6.03	5.49
Cr	2.38	3.83	3.29	1.51	0.88	1.83	1.08
Mn	1.33	8.68	0.62	5.81	0.76	0.66	0.27
Co	0.17	0.14	0.17	0.21	0.18	0.06	0.04
Cu	2.57	2.92	1.88	7.72	2.05	1.93	1.82
Cu	2.05	4.63	1.44	7.24	0.71	1.89	1.21
Zn	0.48	0.42	0.14	0.33	0.24	1.04	0.44
Zn	0.99	1.03	0.86	0.69	2.69	1.63	0.41
As	0.49	2.61	0.37	3.58	0.59	0.88	0.56
Se	0.23	0.39	BDL	1.46	0.64	0.23	0.10
Se	0.55	0.61	BDL	0.77	0.43	0.93	0.29
Rb	2.12	4.01	0.93	0.39	3.03	1.83	0.21
Sr	12.80	6.50	4.97	8.08	9.23	1.71	1.48
Mo	0.61	3.53	0.21	2.10	0.21	0.32	0.34
Sn	0.14	0.67	0.12	0.06	0.11	0.70	1.03
Te	0.05	0.77	0.13	0.16	0.03	0.35	0.32
Cs	0.08	0.11	0.03	0.05	0.12	0.08	0.08
Ba	8.35	11.70	13.32	9.38	37.23	6.01	2.17
Ba	8.88	17.20	13.44	11.26	35.59	6.72	2.61
W	0.88	2.02	0.23	0.02	0.05	0.55	0.22
Pb	1.10	1.80	0.42	0.83	0.58	0.98	0.92
Bi	0.47	1.14	0.34	0.49	0.13	0.20	0.17
Th	0.18	5.55	0.33	3.12	0.72	0.90	0.29
U	0.87	5.03	0.37	0.14	0.07	1.88	1.44
Tl	0.02	0.12	0.01	0.01	0.02	0.01	0.01

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909163_20-2	G909163_20-3	G909163_20-4	G909163_21-1	G909163_21-2	G909163_22-2	G909163_22-3
Data Quality (1-3)	2	1.5	2.5	1.5	2.5	1.5	1.5
1 standard error (ppm)**							
Li	0.88	1.20	0.22	0.47	0.49	0.48	0.23
B	4.49	7.32	2.20	3.57	2.44	2.80	1.99
Si	7888.49	7888.49	7888.49	7888.49	7888.49	7888.49	7888.49
P	161.73	966.40	98.16	1288.91	212.22	166.71	118.78
Sc	1.14	6.25	1.47	0.47	0.67	2.49	1.37
Ti	1216.27	16834.28	383.35	33.37	222.97	1749.58	3741.28
V	6.44	29.44	4.58	3.52	4.16	11.63	11.32
Cr	12.62	19.14	5.84	8.43	5.52	11.01	6.71
Mn	1.56	13.46	0.87	7.96	1.21	0.77	0.36
Co	0.20	0.22	0.18	0.33	0.19	0.09	0.06
Cu	5.96	10.43	3.55	22.68	3.29	5.89	5.01
Cu	5.63	10.86	3.53	22.55	2.84	5.96	4.98
Zn	0.51	0.59	0.17	0.44	0.25	1.08	0.50
Zn	1.14	1.19	1.03	0.81	2.93	1.69	0.53
As	0.95	23.91	0.74	28.52	3.17	3.91	1.96
Se	3.25	3.37	BDL	2.63	4.10	2.95	0.65
Se	1.19	4.72	BDL	7.33	1.40	2.34	0.98
Rb	2.22	4.49	1.03	0.40	3.28	1.87	0.25
Sr	13.15	7.18	6.23	8.37	10.10	2.20	1.92
Mo	0.63	5.16	0.25	2.61	0.25	0.55	0.50
Sn	0.40	2.99	0.24	0.19	0.33	1.45	1.73
Te	0.13	1.86	0.13	0.21	0.04	0.49	0.40
Cs	0.12	0.19	0.06	0.08	0.14	0.12	0.11
Ba	9.80	13.12	15.45	9.60	41.95	6.22	2.34
Ba	10.04	18.13	15.27	11.40	40.05	6.88	2.74
W	0.90	7.76	0.26	0.03	0.21	1.35	0.44
Pb	1.11	2.65	0.44	0.85	0.60	1.13	1.25
Bi	0.50	2.17	0.41	0.59	0.24	0.46	0.34
Th	0.27	7.72	0.39	5.40	0.84	1.29	0.43
U	1.02	9.06	0.48	0.26	0.11	2.33	1.83
Tl	0.03	0.15	0.01	0.01	0.03	0.01	0.01

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909163_22-4	G909163_22-6	G909163_23-2	G909163_23-3	G909163_23-4	G909163_23-5	G909163_24-3
Data Quality (1-3)	2	2	1.5	1.5	2.5	2	2.5
Li (ppm)	2.20	2.88	20.78	1.90	3.57	3.62	1.85
B (ppm)	7.41	7.53	36.56	12.23	7.24	8.27	3.47
Si (ppm)	229618.55	229618.55	229618.55	229618.55	229618.55	229618.55	229618.55
P (ppm)	221.90	289.46	12001.35	2737.55	463.78	941.35	233.58
Sc (ppm)	42.94	39.45	63.28	6.26	8.00	7.36	8.51
Ti (ppm)	564.84	428.80	2393.33	1202.12	341.45	548.64	388.41
V (ppm)	81.39	103.63	1328.15	50.25	93.91	88.20	36.38
Cr (ppm)	29.42	30.25	68.64	16.95	9.69	17.35	18.63
Mn (ppm)	3.16	5.09	218.82	46.75	31.40	85.47	11.52
Co (ppm)	0.56	0.71	1.66	0.71	0.24	1.00	0.68
Cu(63) (ppm)	31.48	25.96	61.67	19.83	6.80	25.46	14.24
Cu(65)* (ppm)	32.51	28.44	62.49	18.75	7.14	26.29	14.60
Zn(66)* (ppm)	4.40	5.78	73.01	11.80	6.85	11.77	5.06
Zn(68) (ppm)	7.63	9.07	124.22	18.82	63.24	121.96	55.04
As (ppm)	0.47	0.82	7.73	3.86	1.55	13.86	2.37
Se(76) (ppm)	0.96	2.24	5.12	3.03	1.53	1.09	2.28
Se(77)* (ppm)	BDL	BDL	3.24	BDL	BDL	BDL	0.66
Rb (ppm)	22.47	25.35	376.99	45.77	128.29	151.46	95.63
Sr (ppm)	38.76	120.91	73.69	578.35	361.82	281.50	152.75
Mo (ppm)	0.22	0.16	1.97	0.90	0.27	5.52	0.69
Sn (ppm)	1.60	1.77	5.74	1.04	0.44	0.90	0.93
Te (ppm)	0.05	BDL	0.68	BDL	BDL	BDL	0.08
Cs (ppm)	1.73	1.81	7.19	1.38	2.23	1.63	0.63
Ba(137) (ppm)	19.33	34.38	1331.46	105.27	1609.09	3132.04	1324.85
Ba(138)* (ppm)	21.25	30.81	1359.97	102.21	1617.57	4120.30	1330.19
W (ppm)	0.09	0.06	5.68	1.75	0.68	1.41	0.33
Pb (ppm)	0.59	2.30	4.32	3.85	1.38	3.15	1.85
Bi (ppm)	0.48	0.97	3.32	1.38	0.18	1.24	2.24
Th (ppm)	0.51	0.95	6.77	2.64	1.41	18.50	14.24
U (ppm)	1.42	1.43	9.74	3.05	0.29	1.08	17.40
Tl (ppm)	0.09	0.13	1.84	0.21	0.61	0.87	0.56
SiO2 wt.%	49.12	49.12	49.12	49.12	49.12	49.12	49.12

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909163_22-4	G909163_22-6	G909163_23-2	G909163_23-3	G909163_23-4	G909163_23-5	G909163_24-3
Data Quality (1-3)	2	2	1.5	1.5	2.5	2	2.5
1 standard error (ppm) *							
Li	0.21	0.18	0.99	0.35	0.20	0.21	0.19
B	0.31	0.50	2.00	0.84	0.55	0.58	0.20
Si	4592.37	4592.37	4592.37	4592.37	4592.37	4592.37	4592.37
P	19.08	13.30	485.12	139.87	23.74	78.37	12.30
Sc	2.12	1.71	2.26	0.24	0.35	0.47	0.74
Ti	20.58	15.74	360.13	75.19	18.49	25.40	177.20
V	3.26	3.39	36.50	1.76	2.68	3.35	4.83
Cr	1.90	1.06	2.30	0.84	0.45	0.98	1.27
Mn	0.52	0.15	10.84	2.07	1.17	2.90	0.92
Co	0.11	0.04	0.13	0.10	0.05	0.05	0.14
Cu	1.16	0.83	2.49	1.78	0.45	1.94	1.13
Cu	1.06	0.72	1.65	0.93	1.05	1.12	0.69
Zn	0.35	0.25	3.31	0.47	0.33	0.60	0.57
Zn	0.33	0.90	4.16	0.74	2.30	3.96	1.90
As	0.05	0.06	0.25	0.22	0.35	0.96	0.13
Se	0.16	0.12	0.68	0.20	0.28	0.60	0.36
Se	BDL	BDL	1.01	BDL	BDL	BDL	0.19
Rb	2.19	1.20	11.90	2.22	3.97	5.26	3.17
Sr	3.20	6.98	3.10	22.76	11.98	9.32	5.22
Mo	0.04	0.03	0.35	0.14	0.04	0.56	0.14
Sn	0.07	0.07	0.34	0.12	0.04	0.06	0.05
Te	0.10	BDL	0.13	BDL	BDL	BDL	0.05
Cs	0.08	0.14	0.36	0.10	0.08	0.08	0.06
Ba	0.84	2.16	46.10	6.01	61.35	127.29	48.18
Ba	0.84	1.43	57.45	5.73	62.45	203.83	48.08
W	0.03	0.01	0.99	0.13	0.04	0.18	0.11
Pb	0.48	0.33	1.00	0.17	0.14	0.46	0.43
Bi	0.06	0.09	0.45	0.14	0.03	0.25	0.20
Th	0.34	0.11	0.86	0.16	0.33	0.98	3.35
U	0.28	0.09	0.53	0.23	0.03	0.10	4.15
Tl	0.02	0.02	0.06	0.02	0.04	0.09	0.02

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909163_22-4	G909163_22-6	G909163_23-2	G909163_23-3	G909163_23-4	G909163_23-5	G909163_24-3
Data Quality (1-3)	2	2	1.5	1.5	2.5	2	2.5
1 standard error (ppm)**							
Li	0.38	0.45	3.15	0.44	0.55	0.56	0.33
B	2.72	2.78	13.46	4.53	2.69	3.07	1.28
Si	7888.49	7888.49	7888.49	7888.49	7888.49	7888.49	7888.49
P	66.61	84.30	3485.25	799.59	135.47	281.83	68.29
Sc	2.87	2.47	3.64	0.37	0.50	0.58	0.83
Ti	58.05	44.11	427.31	137.84	37.66	58.52	181.09
V	5.11	6.05	73.90	3.00	5.28	5.42	5.14
Cr	6.22	6.18	14.01	3.52	2.00	3.63	3.96
Mn	0.54	0.25	13.73	2.74	1.68	4.38	1.02
Co	0.12	0.05	0.16	0.11	0.06	0.08	0.15
Cu	3.59	2.92	7.10	2.78	0.86	3.36	1.91
Cu	3.61	3.10	6.84	2.20	1.30	3.01	1.70
Zn	0.37	0.31	4.08	0.61	0.40	0.71	0.59
Zn	0.40	0.94	5.68	0.94	3.03	5.49	2.56
As	0.17	0.29	2.69	1.36	0.64	4.90	0.83
Se	0.78	1.79	4.16	2.43	1.26	1.06	1.86
Se	BDL	BDL	2.79	BDL	BDL	BDL	0.56
Rb	2.27	1.37	15.30	2.51	5.14	6.52	4.00
Sr	3.36	7.67	3.66	27.40	15.32	11.92	6.59
Mo	0.04	0.03	0.38	0.15	0.05	0.71	0.15
Sn	0.30	0.33	1.09	0.22	0.09	0.17	0.18
Te	0.10	BDL	0.18	BDL	BDL	BDL	0.05
Cs	0.14	0.19	0.61	0.14	0.17	0.14	0.08
Ba	1.02	2.39	60.64	6.77	77.66	157.46	62.11
Ba	1.02	1.65	68.30	6.36	76.36	232.53	60.14
W	0.03	0.01	1.20	0.24	0.09	0.24	0.12
Pb	0.48	0.34	1.02	0.24	0.15	0.48	0.44
Bi	0.08	0.13	0.55	0.20	0.03	0.28	0.30
Th	0.34	0.12	0.95	0.22	0.34	1.47	3.45
U	0.30	0.14	0.93	0.33	0.04	0.13	4.37
Tl	0.02	0.03	0.19	0.03	0.08	0.13	0.06

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909158-11	G909158-12	G909158-13	G909158-14	G909158-15	ANN006002.018-1	ANN006002.018-11
Data Quality (1-3)	3	2	3	2	3	2.5	2.5
Li (ppm)	16.02	17.05	15.39	22.07	15.01	7.21	5.92
B (ppm)	60.12	67.21	66.75	67.81	64.02	42.13	51.81
Si (ppm)	234526.93	234526.93	234526.93	234526.93	234526.93	215477.75	215477.75
P (ppm)	36.19	45.31	36.24	32.27	39.67	56.76	39.18
Sc (ppm)	10.13	10.73	10.67	11.72	9.67	6.70	7.06
Ti (ppm)	815.60	828.76	547.27	739.04	479.80	2489.12	2603.83
V (ppm)	263.38	281.18	277.56	334.15	256.64	71.64	71.22
Cr (ppm)	7.53	9.57	7.28	10.68	7.53	3.72	6.06
Mn (ppm)	160.03	168.44	151.75	206.66	140.44	42.51	42.09
Co (ppm)	1.06	1.36	1.13	1.92	1.18	0.38	BDL
Cu(63) (ppm)	11.10	47.80	16.82	132.22	8.61	2.46	1.00
Cu(65)* (ppm)	11.26	47.21	16.97	126.35	8.49	3.68	0.46
Zn(66)* (ppm)	21.92	31.35	23.78	48.11	19.75	9.38	7.50
Zn(68) (ppm)	40.98	48.48	40.40	66.55	36.95	117.63	100.52
As (ppm)	0.45	0.17	0.40	0.59	0.17	BDL	0.80
Se(76) (ppm)	1.28	5.42	2.38	6.29	1.10	2.49	4.33
Se(77)* (ppm)	BDL	BDL	1.23	BDL	BDL	BDL	BDL
Rb (ppm)	556.24	538.99	535.12	605.99	513.64	292.07	280.25
Sr (ppm)	62.31	49.29	51.11	12.51	67.79	30.88	26.25
Mo (ppm)	0.21	BDL	0.49	BDL	BDL	0.04	457.79
Sn (ppm)	0.95	1.23	1.14	1.27	0.99	3.25	2.54
Te (ppm)	BDL	0.10	BDL	BDL	BDL	0.16	BDL
Cs (ppm)	5.07	4.95	4.49	5.46	4.31	2.00	2.49
Ba(137) (ppm)	700.56	688.25	674.88	692.54	654.26	2763.49	2451.84
Ba(138)* (ppm)	660.38	658.48	642.31	649.18	612.74	2729.66	2449.91
W (ppm)	3.10	3.29	2.83	3.55	2.75	9.77	7.47
Pb (ppm)	0.46	1.09	0.31	0.34	0.43	0.50	0.27
Bi (ppm)	0.01	0.02	0.02	0.02	0.02	BDL	0.12
Th (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	0.05
U (ppm)	0.22	0.51	0.09	0.11	0.07	BDL	0.05
Tl (ppm)	3.03	2.94	2.82	3.24	2.90	1.68	1.59
SiO2 wt.%	50.17	50.17	50.17	50.17	50.17	46.10	46.10

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909158-11	G909158-12	G909158-13	G909158-14	G909158-15	ANN006002.018-1	ANN006002.018-11
Data Quality (1-3)	3	2	3	2	3	2.5	2.5
1 standard error (ppm) *							
Li	1.68	0.98	0.60	2.54	1.00	0.36	0.65
B	4.34	3.05	2.60	2.71	2.14	1.80	1.92
Si	4690.54	4690.54	4690.54	4690.54	4690.54	4309.55	4309.55
P	2.02	4.63	2.79	2.29	22.44	5.40	3.21
Sc	0.44	0.25	0.38	0.46	0.36	0.19	0.38
Ti	41.17	59.34	17.18	35.81	15.88	71.47	61.54
V	10.91	11.83	12.70	16.61	11.38	1.68	1.61
Cr	0.57	1.01	0.43	1.46	0.59	0.31	0.18
Mn	5.53	6.95	6.21	5.80	3.87	1.40	1.05
Co	0.19	0.19	0.18	0.14	0.23	0.13	BDL
Cu	0.57	4.94	0.75	4.57	0.44	0.55	0.32
Cu	0.59	5.91	1.30	3.90	1.35	0.30	0.56
Zn	1.11	1.28	0.74	1.74	0.72	0.49	0.33
Zn	1.90	1.98	1.27	4.11	1.60	4.46	3.50
As	0.19	0.13	0.24	0.19	0.16	BDL	0.22
Se	0.78	1.28	0.28	4.42	0.63	0.38	0.36
Se	BDL	BDL	1.90	BDL	BDL	BDL	BDL
Rb	19.72	24.54	17.50	17.75	23.18	7.68	7.30
Sr	2.82	2.44	1.69	0.51	2.78	1.57	0.86
Mo	0.12	BDL	0.15	BDL	BDL	0.04	36.17
Sn	0.20	0.28	0.05	0.14	0.11	0.18	0.25
Te	BDL	0.19	BDL	BDL	BDL	0.13	BDL
Cs	0.27	0.33	0.17	0.23	0.24	0.07	0.14
Ba	29.38	40.00	28.62	31.40	22.22	105.72	84.33
Ba	25.78	35.33	33.72	28.77	29.89	93.39	72.90
W	0.31	0.69	0.59	0.43	0.09	0.50	0.33
Pb	0.09	0.07	0.13	0.06	0.04	0.09	0.08
Bi	0.02	0.02	0.01	0.01	0.01	BDL	0.05
Th	BDL	BDL	BDL	BDL	BDL	BDL	0.01
U	0.04	0.10	0.01	0.02	0.03	BDL	0.01
Tl	0.20	0.35	0.19	0.25	0.27	0.12	0.11

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909158-11	G909158-12	G909158-13	G909158-14	G909158-15	ANN006002.018-1	ANN006002.018-11
Data Quality (1-3)	3	2	3	2	3	2.5	2.5
1 standard error (ppm)**							
Li	2.81	2.59	2.25	4.01	2.34	1.08	1.06
B	22.32	24.67	24.45	24.85	23.41	15.47	19.00
Si	8057.12	8057.12	8057.12	8057.12	8057.12	7402.69	7402.69
P	10.58	13.81	10.77	9.54	25.17	17.20	11.72
Sc	0.58	0.47	0.55	0.64	0.51	0.33	0.47
Ti	88.06	98.88	54.99	79.11	48.47	244.50	252.22
V	17.19	18.46	18.90	23.66	17.23	3.71	3.66
Cr	1.61	2.16	1.52	2.59	1.62	0.81	1.23
Mn	8.25	9.48	8.50	9.81	6.63	2.09	1.86
Co	0.19	0.21	0.19	0.17	0.24	0.13	BDL
Cu	1.31	7.10	1.94	14.81	1.02	0.61	0.34
Cu	1.34	7.76	2.22	14.01	1.62	0.49	0.56
Zn	1.27	1.55	1.00	2.20	0.91	0.56	0.39
Zn	2.23	2.42	1.72	4.53	1.92	5.50	4.46
As	0.25	0.14	0.28	0.28	0.17	BDL	0.36
Se	1.29	4.53	1.93	6.71	1.09	2.03	3.49
Se	BDL	BDL	2.14	BDL	BDL	BDL	BDL
Rb	22.47	26.66	20.34	21.27	25.22	9.42	8.98
Sr	3.04	2.60	1.93	0.56	3.04	1.70	1.03
Mo	0.12	BDL	0.16	BDL	BDL	0.04	51.05
Sn	0.26	0.35	0.21	0.27	0.21	0.61	0.52
Te	BDL	0.19	BDL	BDL	BDL	0.14	BDL
Cs	0.44	0.47	0.35	0.43	0.37	0.15	0.22
Ba	30.51	40.80	29.69	32.43	23.50	133.85	111.43
Ba	30.98	39.26	37.63	33.36	33.88	115.16	94.72
W	0.47	0.79	0.68	0.59	0.33	1.26	0.94
Pb	0.09	0.08	0.13	0.06	0.04	0.10	0.09
Bi	0.02	0.02	0.01	0.01	0.01	BDL	0.05
Th	BDL	BDL	BDL	BDL	BDL	BDL	0.01
U	0.05	0.11	0.01	0.02	0.03	BDL	0.01
Tl	0.39	0.47	0.36	0.44	0.42	0.23	0.22

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	ANN006002.018-2	ANN006002.018-3	ANN006002.018-4	ANN006002.018-5	ANN006002.018-6	ANN006002.018-7	ANN006002.018-8
Data Quality (1-3)	2.5	3	3	3	2.5	2.5	3
Li (ppm)	8.69	7.75	8.17	9.29	6.82	8.20	8.05
B (ppm)	71.20	42.94	107.72	87.85	87.38	64.29	54.47
Si (ppm)	215477.75	215477.75	215477.75	215477.75	215477.75	215477.75	215477.75
P (ppm)	51.30	47.83	51.65	41.19	40.28	59.90	59.16
Sc (ppm)	5.95	6.89	5.93	8.80	7.42	6.64	7.37
Ti (ppm)	2567.24	3028.19	2116.05	2958.00	2365.27	2512.95	2721.17
V (ppm)	72.62	75.70	67.35	72.27	65.54	64.90	73.12
Cr (ppm)	5.12	7.08	4.69	13.12	6.19	9.77	5.41
Mn (ppm)	45.28	44.61	49.54	48.09	43.99	43.54	46.69
Co (ppm)	BDL	0.62	BDL	BDL	BDL	0.03	BDL
Cu(63) (ppm)	1.26	1.35	2.26	2.55	1.79	1.19	1.42
Cu(65)* (ppm)	3.06	2.05	3.80	3.62	2.12	1.73	1.49
Zn(66)* (ppm)	10.39	8.79	10.06	10.91	8.33	7.05	6.96
Zn(68) (ppm)	115.78	121.21	89.17	117.49	107.43	98.32	122.56
As (ppm)	BDL	BDL	BDL	BDL	0.21	BDL	0.55
Se(76) (ppm)	BDL	BDL	1.87	3.21	BDL	BDL	6.62
Se(77)* (ppm)	1.30	BDL	1.20	BDL	BDL	0.47	1.64
Rb (ppm)	295.70	296.48	305.61	305.39	280.64	267.91	298.91
Sr (ppm)	26.91	29.17	22.22	23.34	21.72	25.30	29.79
Mo (ppm)	BDL	0.07	BDL	BDL	BDL	BDL	BDL
Sn (ppm)	3.31	2.82	2.72	2.89	2.88	2.58	3.36
Te (ppm)	BDL	0.46	BDL	BDL	BDL	2.55	BDL
Cs (ppm)	2.84	2.24	4.84	3.74	3.45	3.00	2.60
Ba(137) (ppm)	2560.25	2754.75	2133.61	2760.89	2284.75	2287.29	2930.24
Ba(138)* (ppm)	2562.91	2771.39	2174.37	2797.41	2283.80	2311.69	2990.52
W (ppm)	8.89	9.52	6.79	7.38	6.10	7.72	8.08
Pb (ppm)	0.64	0.71	0.88	0.67	0.32	1.34	0.63
Bi (ppm)	BDL	0.33	BDL	BDL	0.03	0.12	BDL
Th (ppm)	0.05	BDL	0.04	0.03	0.02	0.04	0.14
U (ppm)	0.08	0.03	0.17	BDL	0.11	0.04	0.04
Tl (ppm)	1.73	1.46	1.88	1.63	1.55	1.77	1.57
SiO2 wt.%	46.10	46.10	46.10	46.10	46.10	46.10	46.10

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	ANN006002.018-2	ANN006002.018-3	ANN006002.018-4	ANN006002.018-5	ANN006002.018-6	ANN006002.018-7	ANN006002.018-8
Data Quality (1-3)	2.5	3	3	3	2.5	2.5	3
1 standard error (ppm) *							
Li	0.47	0.52	0.37	0.46	0.42	0.96	0.31
B	2.66	1.61	5.27	3.29	3.80	6.09	2.60
Si	4309.55	4309.55	4309.55	4309.55	4309.55	4309.55	4309.55
P	2.78	2.05	2.63	2.87	3.58	7.39	10.19
Sc	0.50	0.47	0.25	0.27	0.52	0.29	0.21
Ti	70.50	78.12	58.27	69.35	64.04	58.03	63.47
V	1.60	1.72	1.64	1.76	2.50	1.96	2.32
Cr	0.58	0.37	0.28	0.43	0.29	0.44	0.23
Mn	1.29	1.21	1.39	1.17	1.20	1.16	1.79
Co	BDL	0.12	BDL	BDL	BDL	0.38	BDL
Cu	0.18	0.14	0.12	0.55	0.27	0.18	0.41
Cu	0.47	0.21	0.20	0.46	0.30	0.14	0.44
Zn	0.48	0.34	0.63	0.34	0.33	0.54	0.37
Zn	3.95	4.75	2.40	3.49	5.32	5.68	6.19
As	BDL	BDL	BDL	BDL	0.25	BDL	0.28
Se	BDL	BDL	0.22	0.44	BDL	BDL	0.40
Se	0.48	BDL	0.48	BDL	BDL	0.61	0.34
Rb	7.56	8.14	8.00	7.90	8.34	7.68	8.58
Sr	1.32	0.89	0.78	0.72	0.84	0.92	0.82
Mo	BDL	0.01	BDL	BDL	BDL	BDL	BDL
Sn	0.14	0.28	0.14	0.16	0.17	0.10	0.22
Te	BDL	0.17	BDL	BDL	BDL	0.67	BDL
Cs	0.14	0.11	0.38	0.18	0.15	0.11	0.12
Ba	93.28	99.66	74.95	97.32	101.40	86.76	99.54
Ba	77.49	85.45	65.92	85.45	85.02	83.30	94.26
W	0.31	0.41	0.47	0.37	0.32	0.34	0.31
Pb	0.07	0.11	0.16	0.10	0.04	0.14	0.09
Bi	BDL	0.07	BDL	BDL	0.01	0.08	BDL
Th	0.02	BDL	0.01	0.02	0.01	0.02	0.04
U	0.01	0.01	0.01	BDL	0.02	0.00	0.02
Tl	0.13	0.11	0.14	0.11	0.10	0.13	0.11

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	ANN006002.018-2	ANN006002.018-3	ANN006002.018-4	ANN006002.018-5	ANN006002.018-6	ANN006002.018-7	ANN006002.018-8
Data Quality (1-3)	2.5	3	3	3	2.5	2.5	3
1 standard error (ppm)**							
Li	1.31	1.21	1.21	1.39	1.05	1.50	1.18
B	26.11	15.74	39.64	32.21	32.10	24.23	20.04
Si	7402.69	7402.69	7402.69	7402.69	7402.69	7402.69	7402.69
P	15.02	13.91	15.09	12.19	12.13	18.75	19.83
Sc	0.55	0.55	0.34	0.44	0.59	0.39	0.36
Ti	251.25	294.99	207.14	286.39	231.23	243.09	263.38
V	3.71	3.89	3.51	3.77	3.92	3.58	4.09
Cr	1.18	1.47	0.98	2.67	1.27	2.01	1.11
Mn	2.10	2.03	2.29	2.12	2.01	1.97	2.48
Co	BDL	0.13	BDL	BDL	BDL	0.38	BDL
Cu	0.23	0.20	0.27	0.61	0.33	0.22	0.44
Cu	0.57	0.30	0.45	0.60	0.38	0.23	0.47
Zn	0.57	0.43	0.70	0.47	0.41	0.58	0.42
Zn	5.07	5.80	3.43	4.75	6.08	6.29	7.04
As	BDL	BDL	BDL	BDL	0.26	BDL	0.34
Se	BDL	BDL	1.51	2.60	BDL	BDL	5.32
Se	1.15	BDL	1.07	BDL	BDL	0.72	1.36
Rb	9.36	9.84	9.83	9.74	9.85	9.16	10.23
Sr	1.45	1.10	0.92	0.88	0.97	1.07	1.05
Mo	BDL	0.01	BDL	BDL	BDL	BDL	BDL
Sn	0.61	0.58	0.51	0.54	0.54	0.48	0.64
Te	BDL	0.19	BDL	BDL	BDL	0.82	BDL
Cs	0.24	0.19	0.50	0.31	0.28	0.23	0.21
Ba	120.36	128.96	98.16	127.28	122.02	110.20	132.24
Ba	100.03	109.46	85.01	109.86	102.01	100.97	119.73
W	1.10	1.20	0.93	0.95	0.79	0.98	1.01
Pb	0.09	0.13	0.18	0.12	0.05	0.20	0.11
Bi	BDL	0.08	BDL	BDL	0.01	0.08	BDL
Th	0.02	BDL	0.01	0.02	0.01	0.02	0.04
U	0.01	0.01	0.02	BDL	0.02	0.00	0.02
Tl	0.24	0.20	0.26	0.22	0.21	0.25	0.21

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	ANN006002.018-9	G909152_1-1	G909152_1-2	G909152_1-3	G909152_10-1	G909152_2-1	G909152_4-1
Data Quality (1-3)	3	3	1.5	3	1	3	2
Li (ppm)	7.21	8.52	7.53	7.37	11.40	8.86	4.18
B (ppm)	54.32	38.92	51.73	44.91	33.38	25.54	20.57
Si (ppm)	215477.75	222279.36	222279.36	222279.36	222279.36	222279.36	222279.36
P (ppm)	46.71	44.77	1453.26	36.31	6421.35	56.14	387.35
Sc (ppm)	8.37	3.76	4.47	4.61	9.13	7.35	5.65
Ti (ppm)	2528.41	915.49	1077.51	1208.86	2169.36	3200.61	1399.88
V (ppm)	78.12	50.67	70.38	72.03	139.90	140.64	73.86
Cr (ppm)	7.14	8.63	8.08	8.62	16.08	8.68	7.22
Mn (ppm)	46.75	28.74	31.69	28.65	27.53	26.50	16.29
Co (ppm)	0.29	BDL	1.28	0.59	1.50	0.27	0.76
Cu(63) (ppm)	1.29	6.65	835.53	12.87	1142.08	2.67	542.24
Cu(65)* (ppm)	2.63	6.81	838.30	13.41	1135.08	2.93	533.87
Zn(66)* (ppm)	8.44	8.07	8.48	6.34	14.86	5.27	5.35
Zn(68) (ppm)	122.60	40.74	51.52	61.47	151.42	91.59	64.34
As (ppm)	0.56	0.37	0.96	BDL	8.16	0.42	0.85
Se(76) (ppm)	2.03	2.34	4.73	1.56	6.38	4.15	5.53
Se(77)* (ppm)	1.74	BDL	25.48	0.97	95.30	BDL	31.13
Rb (ppm)	289.96	292.88	283.49	269.53	218.37	217.43	118.28
Sr (ppm)	30.24	15.72	17.47	21.16	3574.12	46.30	148.74
Mo (ppm)	BDL	BDL	1.16	0.11	5.42	BDL	0.63
Sn (ppm)	3.33	42.11	24.09	15.79	8.20	12.30	5.75
Te (ppm)	BDL	BDL	1.49	BDL	17.33	0.05	0.38
Cs (ppm)	2.19	2.12	2.96	1.79	6.20	0.76	1.55
Ba(137) (ppm)	2973.58	820.93	1034.46	1313.51	3688.81	2199.02	1276.58
Ba(138)* (ppm)	2960.46	830.30	1021.13	1306.73	4497.30	2244.77	1301.10
W (ppm)	9.12	23.54	10.16	6.99	3.40	6.94	1.95
Pb (ppm)	0.53	0.22	0.35	0.34	173.38	0.43	0.28
Bi (ppm)	0.01	0.03	0.36	0.02	5.16	BDL	0.66
Th (ppm)	BDL	0.05	3.68	0.03	93.08	0.21	0.83
U (ppm)	0.03	0.05	1.40	0.13	3.08	0.01	0.07
Tl (ppm)	1.50	1.81	1.52	1.44	1.33	1.32	0.66
SiO2 wt.%	46.10	47.55	47.55	47.55	47.55	47.55	47.55

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	ANN006002.018-9	G909152_1-1	G909152_1-2	G909152_1-3	G909152_10-1	G909152_2-1	G909152_4-1
Data Quality (1-3)	3	3	1.5	3	1	3	2
1 standard error (ppm) *							
Li	0.33	0.32	0.41	0.40	0.59	0.69	0.21
B	2.23	4.45	1.80	2.95	1.55	1.28	1.05
Si	4309.55	4445.59	4445.59	4445.59	4445.59	4445.59	4445.59
P	2.63	2.11	163.07	3.55	304.36	4.20	15.77
Sc	0.40	0.21	0.21	0.23	0.24	0.33	0.35
Ti	73.82	23.72	30.17	57.75	91.10	93.32	63.60
V	1.80	1.25	1.68	2.52	4.63	3.82	2.09
Cr	0.44	0.41	0.81	0.47	1.22	0.76	0.34
Mn	1.70	0.66	0.79	0.75	1.08	0.69	0.88
Co	0.12	BDL	0.17	0.08	0.07	0.12	0.10
Cu	0.31	0.52	102.47	1.78	29.66	0.17	15.06
Cu	0.14	1.04	115.61	1.55	31.21	0.21	14.61
Zn	0.45	0.39	0.46	0.16	0.68	0.28	0.68
Zn	4.49	1.99	1.41	2.16	4.85	2.90	2.46
As	0.17	0.15	0.14	BDL	0.94	0.13	0.18
Se	0.26	0.12	0.76	0.46	0.35	0.21	1.05
Se	0.79	BDL	2.23	0.33	4.25	BDL	1.70
Rb	7.41	8.17	7.41	7.93	7.63	6.02	9.78
Sr	0.93	0.40	0.60	1.24	103.78	1.44	6.40
Mo	BDL	BDL	0.17	0.06	0.77	BDL	0.12
Sn	0.25	1.04	1.26	0.77	0.57	0.31	0.24
Te	BDL	BDL	0.31	BDL	1.20	0.22	0.27
Cs	0.15	0.11	0.14	0.06	0.28	0.05	0.15
Ba	108.79	24.54	28.52	49.28	103.57	72.51	51.94
Ba	96.91	23.94	32.80	54.74	155.53	65.31	50.32
W	0.42	0.84	0.53	0.42	0.35	0.43	0.10
Pb	0.11	0.04	0.06	0.04	5.49	0.03	0.03
Bi	0.01	0.01	0.02	0.01	0.31	BDL	0.22
Th	BDL	0.02	0.72	0.01	6.95	0.03	0.09
U	0.02	0.03	0.21	0.02	0.34	0.01	0.01
Tl	0.11	0.14	0.11	0.08	0.13	0.05	0.08

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	ANN006002.018-9	G909152_1-1	G909152_1-2	G909152_1-3	G909152_10-1	G909152_2-1	G909152_4-1
Data Quality (1-3)	3	3	1.5	3	1	3	2
1 standard error (ppm)**							
Li	1.07	1.23	1.13	1.11	1.70	1.42	0.62
B	19.94	14.84	18.91	16.60	12.24	9.38	7.56
Si	7402.69	7636.36	7636.36	7636.36	7636.36	7636.36	7636.36
P	13.69	13.05	448.79	11.03	1872.37	16.69	112.55
Sc	0.52	0.25	0.27	0.29	0.43	0.43	0.41
Ti	248.72	89.76	106.26	128.07	224.45	316.71	146.86
V	4.02	2.67	3.68	4.19	7.99	7.58	4.03
Cr	1.50	1.78	1.81	1.79	3.45	1.90	1.48
Mn	2.41	1.19	1.35	1.25	1.44	1.15	1.04
Co	0.13	BDL	0.18	0.08	0.10	0.12	0.11
Cu	0.34	0.88	135.37	2.24	124.51	0.33	59.35
Cu	0.31	1.27	145.92	2.10	124.53	0.38	58.56
Zn	0.51	0.44	0.51	0.23	0.78	0.31	0.69
Zn	5.61	2.24	1.93	2.67	6.22	3.73	2.96
As	0.26	0.19	0.36	BDL	2.98	0.20	0.35
Se	1.64	1.87	3.86	1.33	5.12	3.33	4.55
Se	1.60	BDL	20.52	0.85	76.41	BDL	24.98
Rb	9.18	9.58	8.85	9.17	8.49	7.07	9.98
Sr	1.14	0.44	0.63	1.27	111.91	1.54	6.63
Mo	BDL	BDL	0.19	0.06	0.88	BDL	0.13
Sn	0.65	7.60	4.49	2.92	1.57	2.22	1.06
Te	BDL	BDL	0.41	BDL	3.34	0.22	0.28
Cs	0.21	0.18	0.24	0.13	0.50	0.07	0.18
Ba	140.14	26.95	31.78	52.40	115.02	78.40	54.75
Ba	121.37	26.33	35.46	57.40	166.49	71.73	53.17
W	1.16	2.87	1.30	0.92	0.53	0.91	0.25
Pb	0.12	0.04	0.06	0.05	8.42	0.04	0.04
Bi	0.01	0.01	0.05	0.01	0.64	BDL	0.23
Th	BDL	0.02	0.74	0.01	8.53	0.03	0.10
U	0.02	0.03	0.23	0.02	0.41	0.01	0.01
Tl	0.20	0.23	0.19	0.16	0.19	0.14	0.10

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909152_4-2	G909152_4-3	G909152_4-4	G909152_6-1	G909152_7-1	G909152_7-2	G909152_7-3
Data Quality (1-3)	3	3	3	1	3	3	3
Li (ppm)	10.49	10.26	9.85	3.44	10.39	10.55	10.96
B (ppm)	28.53	28.55	30.20	8.54	25.39	23.77	26.01
Si (ppm)	222279.36	222279.36	222279.36	222279.36	222279.36	222279.36	222279.36
P (ppm)	87.84	257.92	116.88	21.90	226.87	343.21	496.27
Sc (ppm)	10.53	10.28	9.88	4.51	10.02	12.21	9.03
Ti (ppm)	4669.79	3199.18	3958.57	1219.04	2247.15	2336.40	2268.61
V (ppm)	158.16	148.46	143.36	51.13	155.22	154.09	139.64
Cr (ppm)	12.82	28.50	14.75	14.29	19.03	19.90	19.12
Mn (ppm)	31.91	25.93	35.35	10.55	31.55	29.46	27.52
Co (ppm)	0.55	0.75	0.36	0.45	0.39	0.19	0.15
Cu(63) (ppm)	73.25	351.02	68.73	3.40	12.87	23.28	30.22
Cu(65)* (ppm)	75.20	351.09	66.44	5.94	10.00	22.36	29.48
Zn(66)* (ppm)	7.95	13.26	7.75	3.10	6.94	6.49	5.39
Zn(68) (ppm)	106.41	99.02	94.93	48.82	93.65	104.23	82.31
As (ppm)	BDL	BDL	BDL	0.24	0.61	0.56	0.28
Se(76) (ppm)	5.95	3.32	3.29	2.66	3.24	3.88	3.51
Se(77)* (ppm)	7.35	20.52	3.33	BDL	BDL	1.46	1.64
Rb (ppm)	244.97	207.80	251.43	71.81	237.74	233.23	232.61
Sr (ppm)	42.30	41.79	33.98	23.31	41.51	47.41	37.65
Mo (ppm)	0.18	BDL	1.08	0.37	0.15	0.19	0.07
Sn (ppm)	11.54	9.43	9.75	3.11	13.11	12.30	13.00
Te (ppm)	BDL	1.11	0.67	BDL	BDL	0.35	0.26
Cs (ppm)	1.51	2.66	2.34	0.44	1.14	0.90	0.82
Ba(137) (ppm)	2715.23	2141.29	2188.52	949.96	2196.01	2403.43	2075.63
Ba(138)* (ppm)	2728.13	2180.51	2200.69	952.14	2243.24	2424.07	2137.96
W (ppm)	8.57	3.69	5.88	1.78	7.28	7.71	7.24
Pb (ppm)	0.52	0.39	0.33	0.07	0.26	0.47	0.49
Bi (ppm)	0.03	0.04	0.14	0.02	0.02	0.12	0.24
Th (ppm)	0.05	0.45	0.68	0.23	1.65	4.23	6.74
U (ppm)	0.01	0.08	0.91	0.66	0.33	0.39	0.71
Tl (ppm)	1.42	1.35	1.33	0.34	1.55	1.24	1.26
SiO2 wt.%	47.55	47.55	47.55	47.55	47.55	47.55	47.55

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909152_4-2	G909152_4-3	G909152_4-4	G909152_6-1	G909152_7-1	G909152_7-2	G909152_7-3
Data Quality (1-3)	3	3	3	1	3	3	3
1 standard error (ppm) *							
Li	0.50	0.70	1.07	0.26	0.57	0.58	0.57
B	1.17	1.11	1.57	0.57	0.65	1.16	1.67
Si	4445.59	4445.59	4445.59	4445.59	4445.59	4445.59	4445.59
P	5.08	43.38	12.42	2.31	11.99	20.77	29.81
Sc	0.25	0.27	0.34	0.14	0.44	0.70	0.34
Ti	123.80	102.45	120.56	67.11	63.71	67.93	59.16
V	5.51	3.72	4.65	2.71	5.44	5.01	3.26
Cr	0.79	1.14	0.77	2.22	0.68	0.60	0.86
Mn	1.37	0.94	0.95	0.55	1.25	0.86	0.60
Co	0.05	0.12	0.11	0.08	0.08	0.15	0.06
Cu	5.79	67.20	7.36	0.64	1.18	1.64	1.47
Cu	5.28	60.00	7.43	0.80	1.19	1.11	1.70
Zn	0.39	0.65	0.96	0.09	0.22	0.32	0.46
Zn	4.26	5.44	2.44	1.61	4.20	4.19	2.45
As	BDL	BDL	BDL	0.09	0.06	0.18	0.14
Se	0.60	0.42	0.34	0.21	0.27	0.63	0.16
Se	0.61	3.29	0.54	BDL	BDL	0.31	0.54
Rb	8.20	8.10	6.11	3.60	7.07	5.70	7.78
Sr	1.11	1.08	1.43	1.09	1.42	1.23	0.89
Mo	0.06	BDL	0.14	0.12	0.15	0.09	0.09
Sn	0.37	0.26	0.28	0.13	0.72	0.47	0.43
Te	BDL	0.21	0.22	BDL	BDL	0.10	0.07
Cs	0.05	0.14	0.12	0.04	0.08	0.05	0.07
Ba	90.52	62.58	80.74	110.07	68.99	68.04	46.13
Ba	60.53	62.26	76.66	109.81	67.14	63.67	49.96
W	0.62	0.22	0.13	0.07	0.21	0.19	0.53
Pb	0.13	0.06	0.04	0.02	0.05	0.04	0.07
Bi	0.01	0.01	0.03	0.00	0.01	0.02	0.02
Th	0.01	0.09	0.14	0.05	0.20	0.38	0.35
U	0.02	0.02	0.26	0.10	0.07	0.04	0.02
Tl	0.10	0.07	0.16	0.03	0.07	0.10	0.07

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909152_4-2	G909152_4-3	G909152_4-4	G909152_6-1	G909152_7-1	G909152_7-2	G909152_7-3
Data Quality (1-3)	3	3	3	1	3	3	3
1 standard error (ppm)**							
Li	1.55	1.60	1.74	0.55	1.56	1.59	1.64
B	10.45	10.45	11.10	3.16	9.26	8.73	9.61
Si	7636.36	7636.36	7636.36	7636.36	7636.36	7636.36	7636.36
P	25.78	85.96	35.85	6.71	66.36	100.90	145.86
Sc	0.48	0.48	0.51	0.23	0.59	0.85	0.49
Ti	458.60	319.39	393.25	133.39	221.83	231.14	222.52
V	9.20	7.85	8.13	3.61	9.05	8.75	7.28
Cr	2.69	5.82	3.05	3.62	3.87	4.03	3.92
Mn	1.76	1.30	1.55	0.66	1.66	1.33	1.12
Co	0.06	0.13	0.11	0.09	0.08	0.15	0.06
Cu	9.68	76.80	10.35	0.74	1.80	2.96	3.52
Cu	9.57	70.64	10.25	1.02	1.60	2.62	3.56
Zn	0.44	0.74	0.98	0.12	0.29	0.36	0.48
Zn	5.06	6.01	3.45	2.04	4.84	4.97	3.23
As	BDL	BDL	BDL	0.12	0.22	0.26	0.17
Se	4.80	2.69	2.66	2.13	2.61	3.17	2.81
Se	5.91	16.75	2.72	BDL	BDL	1.21	1.42
Rb	9.21	8.85	7.48	3.80	8.16	6.96	8.74
Sr	1.22	1.18	1.49	1.12	1.50	1.35	0.99
Mo	0.06	BDL	0.16	0.12	0.15	0.10	0.09
Sn	2.10	1.70	1.76	0.57	2.45	2.25	2.36
Te	BDL	0.29	0.25	BDL	BDL	0.12	0.08
Cs	0.11	0.23	0.20	0.05	0.11	0.08	0.09
Ba	97.72	68.98	86.02	110.82	75.14	75.44	54.04
Ba	70.45	68.60	81.98	110.53	73.39	71.27	57.39
W	1.17	0.48	0.70	0.22	0.87	0.92	1.00
Pb	0.13	0.06	0.04	0.02	0.05	0.05	0.08
Bi	0.01	0.01	0.04	0.00	0.01	0.03	0.03
Th	0.02	0.09	0.14	0.05	0.22	0.44	0.50
U	0.02	0.02	0.27	0.11	0.08	0.05	0.06
Tl	0.18	0.15	0.21	0.05	0.17	0.16	0.14

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909152_7-4	G909152_8-1	G909152_8-2	G909152_9-1	G909152_9-2	G909152_9-3	G909152_9-4
Data Quality (1-3)	3	1.5	3	3	2.5	3	2.5
Li (ppm)	9.93	9.80	8.02	10.84	7.00	11.53	6.92
B (ppm)	26.36	30.19	31.61	27.89	21.33	27.39	28.65
Si (ppm)	222279.36	222279.36	222279.36	222279.36	222279.36	222279.36	222279.36
P (ppm)	410.65	1782.64	503.81	63.57	40.90	94.43	198.77
Sc (ppm)	11.26	8.08	7.41	7.69	8.82	7.90	7.52
Ti (ppm)	2096.85	2437.68	2605.94	2945.17	2551.80	2623.89	1966.32
V (ppm)	157.75	138.20	132.36	125.08	116.36	121.60	124.85
Cr (ppm)	17.07	10.63	6.73	10.41	9.03	12.47	7.92
Mn (ppm)	28.43	33.17	29.42	26.56	22.27	31.29	26.08
Co (ppm)	0.40	0.55	0.67	0.55	0.49	0.53	1.21
Cu(63) (ppm)	25.65	28.18	18.63	3.87	1.46	4.56	4.76
Cu(65)* (ppm)	26.82	27.06	16.10	3.70	1.43	4.09	6.70
Zn(66)* (ppm)	7.23	6.43	11.55	9.44	4.67	9.71	8.96
Zn(68) (ppm)	96.24	105.90	96.62	95.36	90.43	90.23	112.95
As (ppm)	0.62	0.24	0.63	BDL	BDL	BDL	BDL
Se(76) (ppm)	3.28	3.40	2.65	5.05	3.60	5.03	3.39
Se(77)* (ppm)	1.98	1.79	0.80	BDL	0.75	BDL	BDL
Rb (ppm)	234.95	235.35	239.14	226.58	188.43	237.50	186.88
Sr (ppm)	37.77	47.94	41.64	39.87	43.52	36.37	47.77
Mo (ppm)	0.12	1.58	0.83	BDL	BDL	BDL	BDL
Sn (ppm)	12.22	10.05	11.91	12.65	10.43	11.81	8.84
Te (ppm)	0.75	0.15	BDL	BDL	BDL	BDL	BDL
Cs (ppm)	1.24	1.67	2.09	0.92	0.59	1.20	1.31
Ba(137) (ppm)	2174.89	2443.24	2251.38	2289.81	2170.39	2115.01	2570.43
Ba(138)* (ppm)	2221.40	2501.22	2252.04	2335.38	2219.41	2164.18	2629.13
W (ppm)	6.97	4.82	5.57	7.59	6.29	7.11	3.85
Pb (ppm)	0.35	0.34	0.37	0.26	0.34	0.53	0.28
Bi (ppm)	0.15	0.17	0.14	BDL	BDL	BDL	BDL
Th (ppm)	5.02	3.10	2.37	0.18	0.07	0.19	0.63
U (ppm)	0.53	0.74	0.48	BDL	BDL	0.01	0.16
Tl (ppm)	1.46	1.27	1.38	1.14	1.04	1.29	1.19
SiO2 wt.%	47.55	47.55	47.55	47.55	47.55	47.55	47.55

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909152_7-4	G909152_8-1	G909152_8-2	G909152_9-1	G909152_9-2	G909152_9-3	G909152_9-4
Data Quality (1-3)	3	1.5	3	3	2.5	3	2.5
1 standard error (ppm) *							
Li	0.41	0.49	0.40	0.35	0.27	0.59	0.61
B	0.84	1.23	1.24	1.57	0.64	0.85	1.28
Si	4445.59	4445.59	4445.59	4445.59	4445.59	4445.59	4445.59
P	16.75	210.92	82.55	4.09	2.94	6.89	27.84
Sc	0.38	0.54	0.17	0.35	0.47	0.28	0.55
Ti	58.64	71.04	67.12	89.70	85.13	97.61	52.67
V	3.59	3.70	3.25	3.44	4.03	2.75	3.70
Cr	0.70	0.42	1.12	0.96	0.41	0.88	0.51
Mn	0.71	0.73	0.68	0.90	0.68	0.90	0.56
Co	0.05	0.13	0.14	0.11	0.04	0.08	0.10
Cu	0.98	2.26	1.28	0.40	0.28	0.62	0.34
Cu	0.89	2.26	1.66	0.41	0.41	0.31	0.28
Zn	0.25	0.25	0.42	0.42	0.20	0.46	0.35
Zn	3.89	3.48	4.46	4.58	4.05	3.27	4.01
As	0.07	0.33	0.17	BDL	BDL	BDL	BDL
Se	0.30	0.16	0.28	0.28	0.39	0.28	0.27
Se	0.39	0.60	0.67	BDL	0.61	BDL	BDL
Rb	7.37	6.72	7.06	9.35	5.63	6.56	4.52
Sr	1.79	1.59	1.82	0.97	1.47	0.91	1.13
Mo	0.11	0.53	0.30	BDL	BDL	BDL	BDL
Sn	0.52	0.28	0.36	0.64	0.40	0.37	0.31
Te	0.26	0.12	BDL	BDL	BDL	BDL	BDL
Cs	0.06	0.10	0.11	0.04	0.06	0.05	0.05
Ba	48.54	63.05	63.87	65.29	81.15	47.02	61.85
Ba	68.08	59.34	62.15	63.08	67.45	48.68	57.86
W	0.31	0.25	0.53	0.44	0.26	0.28	0.20
Pb	0.04	0.02	0.06	0.05	0.02	0.06	0.07
Bi	0.02	0.02	0.02	BDL	BDL	BDL	BDL
Th	0.20	0.53	0.35	0.03	0.02	0.03	0.06
U	0.05	0.22	0.05	BDL	BDL	0.04	0.03
Tl	0.06	0.05	0.09	0.05	0.05	0.10	0.08

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909152_7-4	G909152_8-1	G909152_8-2	G909152_9-1	G909152_9-2	G909152_9-3	G909152_9-4
Data Quality (1-3)	3	1.5	3	3	2.5	3	2.5
1 standard error (ppm)**							
Li	1.45	1.46	1.19	1.56	1.02	1.72	1.15
B	9.63	11.05	11.57	10.27	7.79	10.00	10.50
Si	7636.36	7636.36	7636.36	7636.36	7636.36	7636.36	7636.36
P	119.33	554.55	166.81	18.74	12.13	28.03	63.60
Sc	0.58	0.62	0.33	0.46	0.58	0.41	0.62
Ti	206.77	241.20	255.39	292.58	255.87	266.62	193.25
V	8.18	7.43	6.97	6.77	6.76	6.29	6.89
Cr	3.49	2.17	1.75	2.29	1.85	2.65	1.67
Mn	1.21	1.36	1.22	1.29	1.03	1.41	1.06
Co	0.05	0.13	0.14	0.11	0.05	0.09	0.12
Cu	2.89	3.74	2.35	0.58	0.32	0.79	0.61
Cu	2.98	3.65	2.38	0.57	0.43	0.53	0.77
Zn	0.32	0.31	0.52	0.49	0.24	0.53	0.42
Zn	4.60	4.41	5.10	5.19	4.67	4.00	4.94
As	0.23	0.34	0.27	BDL	BDL	BDL	BDL
Se	2.64	2.73	2.14	4.05	2.91	4.04	2.72
Se	1.63	1.56	0.93	BDL	0.85	BDL	BDL
Rb	8.39	7.83	8.16	10.12	6.49	7.72	5.53
Sr	1.85	1.69	1.89	1.08	1.56	1.00	1.26
Mo	0.11	0.55	0.30	BDL	BDL	BDL	BDL
Sn	2.25	1.82	2.16	2.35	1.91	2.14	1.61
Te	0.29	0.12	BDL	BDL	BDL	BDL	BDL
Cs	0.10	0.15	0.18	0.07	0.07	0.09	0.10
Ba	56.80	71.23	70.79	72.30	86.32	55.08	70.99
Ba	74.13	67.92	68.90	70.22	73.54	56.46	67.48
W	0.87	0.61	0.84	0.99	0.78	0.88	0.49
Pb	0.04	0.02	0.06	0.05	0.02	0.06	0.07
Bi	0.03	0.03	0.03	BDL	BDL	BDL	BDL
Th	0.34	0.55	0.37	0.03	0.02	0.04	0.07
U	0.06	0.23	0.06	BDL	BDL	0.04	0.03
Tl	0.16	0.14	0.17	0.12	0.12	0.16	0.14

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909154_19-1	G909154_19-2	G909154_19-3	G909154_19-5	G909154_21-1	G909154_22-1	G909154_22-2
Data Quality (1-3)	3	3	3	2.5	3	2	2.5
Li (ppm)	5.29	7.97	5.76	9.80	6.77	10.28	6.37
B (ppm)	18.41	23.45	23.81	23.58	22.76	23.17	30.36
Si (ppm)	220082.27	220082.27	220082.27	220082.27	220082.27	220082.27	220082.27
P (ppm)	88.46	81.74	112.55	93.27	154.29	106.96	90.70
Sc (ppm)	6.16	18.50	6.95	10.58	31.01	4.48	85.54
Ti (ppm)	2205.66	3217.40	2513.98	3071.80	5132.93	468.98	3333.02
V (ppm)	169.25	420.99	187.49	292.62	511.10	72.39	810.88
Cr (ppm)	14.75	33.43	14.51	16.57	50.60	6.82	14.62
Mn (ppm)	7.12	13.16	9.46	12.39	9.94	28.42	9.64
Co (ppm)	BDL	BDL	BDL	0.17	BDL	BDL	0.14
Cu(63) (ppm)	1.09	6.29	2.36	17.40	59.41	155.88	2.85
Cu(65)* (ppm)	1.35	4.07	2.54	15.53	56.89	153.53	2.63
Zn(66)* (ppm)	1.52	2.59	2.03	4.45	3.27	4.84	2.25
Zn(68) (ppm)	21.73	33.60	28.80	24.93	21.90	51.76	16.55
As (ppm)	BDL	0.51	BDL	2.50	1.63	0.65	BDL
Se(76) (ppm)	2.96	2.91	1.23	3.18	3.72	3.00	4.19
Se(77)* (ppm)	BDL	1.87	1.24	BDL	BDL	BDL	BDL
Rb (ppm)	330.90	389.75	378.44	409.97	491.79	229.44	588.95
Sr (ppm)	21.47	36.22	43.86	26.77	33.25	66.23	20.56
Mo (ppm)	0.15	BDL	BDL	1.49	27.57	1.12	0.58
Sn (ppm)	4.82	11.49	6.85	8.75	21.32	9.17	37.50
Te (ppm)	0.11	BDL	BDL	BDL	BDL	BDL	BDL
Cs (ppm)	2.92	2.49	2.84	2.88	3.35	1.81	4.65
Ba(137) (ppm)	537.39	736.64	744.04	542.70	513.93	1244.52	338.42
Ba(138)* (ppm)	529.04	754.00	749.36	544.28	520.40	1256.61	344.84
W (ppm)	21.19	52.98	27.71	38.84	96.24	5.13	40.64
Pb (ppm)	0.41	0.60	0.75	0.53	0.60	0.56	0.38
Bi (ppm)	0.01	0.03	0.01	0.02	0.03	0.05	0.03
Th (ppm)	BDL	0.02	BDL	0.19	0.61	0.68	BDL
U (ppm)	0.04	0.60	0.29	0.81	0.65	0.54	0.01
Tl (ppm)	1.37	1.61	1.62	1.98	2.24	1.05	2.59
SiO2 wt.%	47.08	47.08	47.08	47.08	47.08	47.08	47.08

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909154_19-1	G909154_19-2	G909154_19-3	G909154_19-5	G909154_21-1	G909154_22-1	G909154_22-2
Data Quality (1-3)	3	3	3	2.5	3	2	2.5
1 standard error (ppm) *							
Li	0.20	0.44	0.67	0.52	0.50	0.44	0.18
B	1.00	1.35	1.16	1.40	1.43	1.19	1.48
Si	4401.65	4401.65	4401.65	4401.65	4401.65	4401.65	4401.65
P	4.41	2.59	7.13	4.23	5.72	4.21	2.71
Sc	0.39	0.87	0.21	0.38	0.95	0.26	4.39
Ti	77.24	100.89	71.49	68.63	150.54	12.67	116.04
V	4.28	14.27	5.47	6.61	11.77	1.63	22.99
Cr	0.53	0.97	0.52	0.54	2.04	0.46	1.03
Mn	0.23	0.40	0.31	0.51	0.29	0.73	0.46
Co	BDL	BDL	BDL	0.06	BDL	BDL	0.08
Cu	0.20	0.53	0.22	1.89	3.36	5.26	0.29
Cu	0.24	0.39	0.26	1.01	3.36	5.73	0.32
Zn	0.08	0.14	0.26	0.25	0.17	0.23	0.17
Zn	0.78	1.79	0.89	0.97	0.98	1.78	0.83
As	BDL	0.17	BDL	0.37	0.44	0.11	BDL
Se	0.25	0.31	0.45	0.48	0.16	0.19	0.28
Se	BDL	0.44	0.45	BDL	BDL	BDL	BDL
Rb	8.13	9.57	15.22	15.12	11.52	5.86	16.45
Sr	2.02	1.49	1.24	2.74	1.04	3.17	0.73
Mo	0.09	BDL	BDL	0.28	2.39	0.21	0.13
Sn	0.40	0.28	0.17	0.30	0.73	0.30	1.01
Te	0.08	BDL	BDL	BDL	BDL	BDL	BDL
Cs	0.14	0.08	0.15	0.11	0.11	0.09	0.16
Ba	25.29	26.11	24.07	20.90	19.11	37.07	10.07
Ba	18.23	35.74	23.04	22.39	21.83	39.97	9.87
W	0.75	1.56	1.20	1.15	2.28	0.31	1.27
Pb	0.05	0.03	0.06	0.03	0.06	0.03	0.06
Bi	0.01	0.01	0.01	0.01	0.01	0.02	0.01
Th	BDL	0.01	BDL	0.08	0.21	0.12	BDL
U	0.02	0.08	0.05	0.07	0.11	0.13	0.01
Tl	0.07	0.09	0.08	0.08	0.29	0.04	0.12

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909154_19-1	G909154_19-2	G909154_19-3	G909154_19-5	G909154_21-1	G909154_22-1	G909154_22-2
Data Quality (1-3)	3	3	3	2.5	3	2	2.5
1 standard error (ppm)**							
Li	0.77	1.21	1.05	1.47	1.08	1.51	0.92
B	6.78	8.64	8.75	8.70	8.41	8.52	11.15
Si	7560.88	7560.88	7560.88	7560.88	7560.88	7560.88	7560.88
P	25.70	23.54	33.00	27.03	44.54	30.91	26.10
Sc	0.46	1.13	0.34	0.56	1.54	0.31	5.52
Ti	220.39	317.55	245.89	295.55	503.40	45.68	332.80
V	8.96	24.23	10.30	15.13	26.52	3.74	44.17
Cr	3.01	6.78	2.96	3.37	10.35	1.44	3.11
Mn	0.35	0.63	0.47	0.69	0.47	1.28	0.58
Co	BDL	BDL	BDL	0.06	BDL	BDL	0.08
Cu	0.23	0.86	0.34	2.67	7.26	17.68	0.42
Cu	0.28	0.59	0.38	1.98	7.08	17.75	0.43
Zn	0.09	0.16	0.27	0.29	0.19	0.27	0.18
Zn	1.01	2.05	1.22	1.22	1.17	2.34	0.96
As	BDL	0.25	BDL	0.95	0.72	0.25	BDL
Se	2.39	2.35	1.08	2.59	2.98	2.41	3.36
Se	BDL	1.56	1.09	BDL	BDL	BDL	BDL
Rb	9.46	11.14	16.19	16.27	13.58	6.75	18.57
Sr	2.06	1.61	1.44	2.78	1.18	3.36	0.81
Mo	0.09	BDL	BDL	0.31	3.22	0.23	0.14
Sn	0.95	2.07	1.24	1.59	3.88	1.67	6.78
Te	0.08	BDL	BDL	BDL	BDL	BDL	BDL
Cs	0.24	0.18	0.24	0.22	0.24	0.15	0.34
Ba	26.42	28.15	26.31	22.28	20.47	41.10	11.16
Ba	19.91	37.52	25.68	23.85	23.20	44.26	11.17
W	2.58	6.36	3.44	4.67	11.44	0.67	4.90
Pb	0.06	0.04	0.06	0.03	0.07	0.04	0.06
Bi	0.01	0.01	0.01	0.01	0.01	0.02	0.01
Th	BDL	0.01	BDL	0.08	0.22	0.13	BDL
U	0.02	0.09	0.06	0.09	0.12	0.13	0.01
Tl	0.16	0.19	0.19	0.22	0.37	0.12	0.29

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909154_22-4	G909154_23-2	G909154_23-3	G909154_23-4	G909154_23-5	G909154_25-1	G909154_25-2
Data Quality (1-3)	2.5	2	2.5	2.5	3	3	3
Li (ppm)	7.33	5.58	5.60	6.95	5.34	5.93	6.80
B (ppm)	31.01	18.15	42.18	34.62	29.73	21.24	30.22
Si (ppm)	220082.27	220082.27	220082.27	220082.27	220082.27	220082.27	220082.27
P (ppm)	143.44	71.04	83.98	88.60	83.58	98.31	83.14
Sc (ppm)	25.67	3.90	10.11	36.19	29.66	20.33	24.69
Ti (ppm)	4486.62	390.70	1218.54	4896.37	6087.75	3549.65	4308.86
V (ppm)	528.79	158.05	192.13	274.46	419.28	438.42	426.56
Cr (ppm)	59.55	6.51	34.57	37.96	16.86	66.82	19.15
Mn (ppm)	9.82	31.01	6.10	7.65	7.63	8.89	8.44
Co (ppm)	BDL	0.40	BDL	BDL	BDL	BDL	BDL
Cu(63) (ppm)	4.45	5.44	27.25	2.43	3.92	0.61	6.63
Cu(65)* (ppm)	4.95	3.93	25.23	3.74	2.80	BDL	7.98
Zn(66)* (ppm)	1.75	10.87	2.09	1.15	1.17	0.78	2.16
Zn(68) (ppm)	40.00	45.34	15.35	22.44	20.90	17.57	24.60
As (ppm)	0.26	BDL	BDL	BDL	0.87	0.52	0.36
Se(76) (ppm)	4.82	3.92	4.29	5.43	3.89	3.72	4.00
Se(77)* (ppm)	1.84	0.58	BDL	BDL	2.23	1.28	BDL
Rb (ppm)	458.94	329.24	385.17	448.78	485.90	485.86	408.18
Sr (ppm)	36.30	58.48	26.02	27.76	28.86	21.64	25.68
Mo (ppm)	0.23	0.23	BDL	BDL	BDL	0.12	BDL
Sn (ppm)	15.97	1.74	7.62	8.97	15.86	13.55	8.64
Te (ppm)	BDL	BDL	BDL	0.23	BDL	BDL	BDL
Cs (ppm)	3.22	3.21	3.00	3.53	3.21	3.66	3.05
Ba(137) (ppm)	937.37	906.02	319.25	569.10	457.90	387.54	570.72
Ba(138)* (ppm)	949.13	927.37	314.03	563.39	467.76	401.04	569.81
W (ppm)	43.30	2.42	13.79	43.40	56.20	31.48	31.93
Pb (ppm)	0.92	0.27	0.40	0.53	0.45	0.49	0.60
Bi (ppm)	0.03	0.16	0.02	BDL	BDL	0.01	0.03
Th (ppm)	BDL	0.37	0.11	BDL	BDL	BDL	BDL
U (ppm)	BDL	0.05	0.06	BDL	BDL	BDL	BDL
Tl (ppm)	2.64	1.98	1.79	1.83	2.43	2.12	1.98
SiO2 wt.%	47.08	47.08	47.08	47.08	47.08	47.08	47.08

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909154_22-4	G909154_23-2	G909154_23-3	G909154_23-4	G909154_23-5	G909154_25-1	G909154_25-2
Data Quality (1-3)	2.5	2	2.5	2.5	3	3	3
1 standard error (ppm) *							
Li	0.32	0.73	0.19	0.48	0.26	0.80	0.37
B	1.40	1.16	2.03	2.56	1.51	0.89	1.73
Si	4401.65	4401.65	4401.65	4401.65	4401.65	4401.65	4401.65
P	8.27	55.27	3.31	4.46	3.19	5.43	4.25
Sc	1.07	0.19	0.75	0.93	0.80	0.57	0.64
Ti	114.72	8.36	34.58	112.06	154.87	88.11	110.77
V	13.81	3.62	6.62	6.17	11.15	10.85	9.66
Cr	1.73	0.46	1.16	1.30	0.55	1.98	1.02
Mn	0.65	0.79	0.21	0.23	0.39	0.27	0.27
Co	BDL	0.04	BDL	BDL	BDL	BDL	BDL
Cu	0.27	1.57	1.03	0.18	0.14	0.20	0.30
Cu	0.37	1.40	1.76	0.66	0.30	BDL	0.46
Zn	0.07	0.52	0.45	0.11	0.19	0.31	0.25
Zn	2.29	2.16	1.30	1.19	1.10	0.81	0.86
As	0.19	BDL	BDL	BDL	0.44	0.09	0.11
Se	0.44	0.28	0.21	0.32	0.16	0.35	0.29
Se	0.53	0.81	BDL	BDL	0.44	0.63	BDL
Rb	11.33	7.46	10.45	9.94	17.00	14.28	9.73
Sr	0.99	15.09	0.81	1.46	0.94	0.94	0.62
Mo	0.15	0.12	BDL	BDL	BDL	0.15	BDL
Sn	0.82	0.16	0.32	0.28	0.63	0.44	0.31
Te	BDL	BDL	BDL	0.13	BDL	BDL	BDL
Cs	0.09	0.13	0.12	0.18	0.12	0.18	0.09
Ba	30.49	19.57	8.14	18.17	19.05	18.86	13.90
Ba	27.31	23.37	7.42	14.91	18.89	15.12	12.87
W	2.42	0.21	0.74	1.16	2.28	1.72	0.97
Pb	0.12	0.05	0.11	0.06	0.04	0.06	0.07
Bi	0.01	0.20	0.02	BDL	BDL	0.01	0.00
Th	BDL	0.08	0.02	BDL	BDL	BDL	BDL
U	BDL	0.01	0.01	BDL	BDL	BDL	BDL
Tl	0.20	0.07	0.06	0.14	0.09	0.12	0.09

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909154_22-4	G909154_23-2	G909154_23-3	G909154_23-4	G909154_23-5	G909154_25-1	G909154_25-2
Data Quality (1-3)	2.5	2	2.5	2.5	3	3	3
1 standard error (ppm)**							
Li	1.08	1.07	0.81	1.09	0.80	1.16	1.03
B	11.38	6.71	15.49	12.86	10.93	7.78	11.14
Si	7560.88	7560.88	7560.88	7560.88	7560.88	7560.88	7560.88
P	41.89	58.89	24.27	25.75	24.14	28.66	24.17
Sc	1.47	0.25	0.84	1.69	1.41	0.98	1.16
Ti	435.27	37.51	119.17	471.72	590.39	343.68	418.18
V	28.21	8.19	11.12	14.18	22.47	23.10	22.07
Cr	12.07	1.38	7.03	7.73	3.43	13.55	3.98
Mn	0.74	1.40	0.31	0.36	0.48	0.43	0.41
Co	BDL	0.04	BDL	BDL	BDL	BDL	BDL
Cu	0.55	1.68	3.13	0.32	0.45	0.21	0.78
Cu	0.66	1.46	3.28	0.78	0.43	BDL	0.99
Zn	0.09	0.62	0.46	0.12	0.19	0.32	0.26
Zn	2.57	2.54	1.37	1.36	1.26	0.96	1.12
As	0.21	BDL	BDL	BDL	0.53	0.20	0.17
Se	3.89	3.15	3.44	4.35	3.11	2.99	3.21
Se	1.56	0.93	BDL	BDL	1.84	1.21	BDL
Rb	13.17	8.88	11.87	11.91	18.42	15.95	11.42
Sr	1.17	15.13	0.92	1.53	1.06	1.00	0.76
Mo	0.15	0.12	BDL	BDL	BDL	0.15	BDL
Sn	2.97	0.35	1.40	1.63	2.91	2.46	1.58
Te	BDL	BDL	BDL	0.13	BDL	BDL	BDL
Cs	0.23	0.25	0.23	0.29	0.24	0.30	0.22
Ba	33.29	23.45	9.33	19.90	20.13	19.65	16.11
Ba	30.86	27.26	8.81	17.18	20.18	16.29	15.49
W	5.59	0.35	1.77	5.19	6.93	4.05	3.84
Pb	0.12	0.05	0.11	0.07	0.04	0.07	0.07
Bi	0.01	0.20	0.02	BDL	BDL	0.01	0.01
Th	BDL	0.09	0.02	BDL	BDL	BDL	BDL
U	BDL	0.01	0.02	BDL	BDL	BDL	BDL
Tl	0.34	0.21	0.19	0.23	0.26	0.25	0.22

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909154_26-1	G909154_28-1	G909154_28-2	G909160_11-1	G909160_11-2	G909160_11-3	G909160_11-4
Data Quality (1-3)	3	2.5	2.5	3	2.5	3	3
Li (ppm)	7.14	6.49	8.93	9.14	12.17	9.09	8.72
B (ppm)	26.14	30.83	27.09	60.35	60.02	56.43	61.48
Si (ppm)	220082.27	220082.27	220082.27	222326.10	222326.10	222326.10	222326.10
P (ppm)	81.44	74.48	129.85	75.64	157.36	227.65	234.44
Sc (ppm)	20.45	127.12	21.31	9.77	13.32	9.57	9.30
Ti (ppm)	4236.08	3142.17	5355.35	768.95	850.27	1019.80	875.38
V (ppm)	267.26	837.29	468.19	87.91	95.70	94.65	93.39
Cr (ppm)	16.12	12.02	45.53	8.45	28.60	8.97	8.85
Mn (ppm)	10.42	8.99	10.27	149.68	154.90	165.71	170.08
Co (ppm)	BDL	BDL	BDL	BDL	BDL	0.53	BDL
Cu(63) (ppm)	2.51	1.06	15.58	4.31	8.96	20.61	17.37
Cu(65)* (ppm)	3.56	1.14	14.20	4.77	11.66	21.33	16.39
Zn(66)* (ppm)	2.10	2.42	1.39	15.91	6.59	16.89	21.04
Zn(68) (ppm)	26.20	14.39	25.03	134.76	154.49	155.27	153.63
As (ppm)	0.21	BDL	BDL	BDL	0.33	1.26	1.08
Se(76) (ppm)	2.47	4.01	3.75	4.38	3.92	3.52	3.16
Se(77)* (ppm)	1.62	1.53	BDL	1.76	0.50	0.81	2.97
Rb (ppm)	358.85	574.51	443.14	310.47	322.75	313.29	301.63
Sr (ppm)	24.90	16.20	34.07	80.75	82.43	86.24	82.29
Mo (ppm)	1.10	BDL	0.69	0.03	0.06	3.27	1.87
Sn (ppm)	7.41	30.80	13.15	1.40	1.56	1.27	1.30
Te (ppm)	BDL	BDL	0.27	0.11	0.14	0.25	BDL
Cs (ppm)	2.43	3.97	3.52	2.31	3.32	2.18	2.42
Ba(137) (ppm)	605.13	292.17	654.62	3135.23	2838.48	3659.86	3423.30
Ba(138)* (ppm)	614.79	282.83	652.83	3198.61	2918.38	4797.22	3800.61
W (ppm)	35.05	34.45	42.23	1.06	1.26	1.04	0.63
Pb (ppm)	0.65	0.42	0.71	1.35	1.15	1.53	1.76
Bi (ppm)	0.01	BDL	0.05	0.10	0.12	0.40	0.28
Th (ppm)	0.02	BDL	0.02	0.15	0.58	0.81	0.28
U (ppm)	0.04	0.04	0.24	0.29	0.36	0.65	0.64
Tl (ppm)	1.68	2.58	1.96	2.04	1.84	2.05	1.91
SiO2 wt.%	47.08	47.08	47.08	47.56	47.56	47.56	47.56

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909154_26-1	G909154_28-1	G909154_28-2	G909160_11-1	G909160_11-2	G909160_11-3	G909160_11-4
Data Quality (1-3)	3	2.5	2.5	3	2.5	3	3
1 standard error (ppm) *							
Li	0.31	0.29	0.49	0.31	0.51	0.31	0.39
B	1.69	0.94	0.95	3.56	2.35	1.84	2.34
Si	4401.65	4401.65	4401.65	4446.52	4446.52	4446.52	4446.52
P	11.88	5.83	6.50	95.06	8.09	27.01	9.94
Sc	0.60	2.94	0.91	0.37	0.67	0.39	0.41
Ti	92.41	69.96	242.39	19.25	20.54	34.05	21.46
V	6.49	19.12	11.40	2.11	2.57	2.64	2.10
Cr	0.88	0.56	1.73	0.27	2.29	0.68	0.35
Mn	0.28	0.24	0.31	4.06	3.77	4.19	4.12
Co	BDL	BDL	BDL	BDL	BDL	0.12	BDL
Cu	0.59	0.19	0.75	8.97	0.48	2.25	0.66
Cu	0.26	0.21	0.71	9.05	0.45	2.52	0.68
Zn	0.25	0.10	0.17	0.88	0.24	0.82	0.71
Zn	1.11	0.58	1.11	4.43	5.01	5.09	4.51
As	0.11	BDL	BDL	BDL	0.12	0.28	0.15
Se	0.19	0.63	0.39	0.25	0.25	0.18	0.12
Se	0.63	1.29	BDL	0.72	0.17	0.38	0.66
Rb	8.16	17.22	9.94	7.27	7.82	9.78	7.14
Sr	0.67	0.50	1.14	2.13	2.37	3.54	2.21
Mo	0.08	BDL	0.23	1.16	0.17	0.42	0.09
Sn	0.29	0.83	0.53	0.05	0.15	0.06	0.09
Te	BDL	BDL	0.11	0.27	0.11	0.12	BDL
Cs	0.11	0.14	0.19	0.07	0.14	0.10	0.09
Ba	14.14	7.50	15.21	72.71	68.81	127.76	80.40
Ba	15.94	7.48	15.77	77.06	81.88	361.18	429.94
W	1.05	1.33	1.98	0.03	0.09	0.19	0.02
Pb	0.04	0.05	0.08	0.11	0.09	0.12	0.24
Bi	0.01	BDL	0.03	0.10	0.01	0.05	0.02
Th	0.02	BDL	0.01	0.39	0.05	0.09	0.06
U	0.02	0.02	0.02	0.29	0.02	0.14	0.10
Tl	0.10	0.10	0.14	0.10	0.10	0.13	0.10

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909154_26-1	G909154_28-1	G909154_28-2	G909160_11-1	G909160_11-2	G909160_11-3	G909160_11-4
Data Quality (1-3)	3	2.5	2.5	3	2.5	3	3
1 standard error (ppm)**							
Li	1.05	0.96	1.35	1.33	1.80	1.32	1.29
B	9.67	11.26	9.91	22.28	22.00	20.64	22.53
Si	7560.88	7560.88	7560.88	7637.96	7637.96	7637.96	7637.96
P	26.16	22.10	37.73	97.50	45.81	70.60	67.91
Sc	1.00	5.78	1.24	0.58	0.91	0.59	0.59
Ti	407.06	302.26	556.71	75.03	82.77	102.02	85.30
V	14.02	43.38	24.58	4.61	5.15	5.14	4.83
Cr	3.35	2.48	9.30	1.71	6.17	1.92	1.81
Mn	0.48	0.41	0.49	6.68	6.65	7.21	7.29
Co	BDL	BDL	BDL	BDL	BDL	0.12	BDL
Cu	0.65	0.22	1.85	8.98	1.06	3.13	1.95
Cu	0.47	0.25	1.71	9.06	1.32	3.39	1.87
Zn	0.25	0.12	0.18	1.00	0.31	0.96	0.94
Zn	1.35	0.71	1.33	5.84	6.64	6.72	6.26
As	0.14	BDL	BDL	BDL	0.17	0.52	0.40
Se	1.98	3.27	3.03	3.51	3.15	2.82	2.53
Se	1.44	1.78	BDL	1.58	0.43	0.75	2.47
Rb	9.70	19.16	11.87	8.83	9.39	11.00	8.64
Sr	0.79	0.57	1.28	2.67	2.88	3.94	2.75
Mo	0.12	BDL	0.24	1.16	0.17	0.49	0.17
Sn	1.36	5.57	2.41	0.25	0.32	0.24	0.25
Te	BDL	BDL	0.13	0.27	0.11	0.13	BDL
Cs	0.19	0.30	0.30	0.17	0.26	0.17	0.18
Ba	16.56	8.58	17.84	88.17	82.31	140.41	97.11
Ba	18.45	8.62	18.61	93.86	95.37	370.01	434.63
W	4.21	4.23	5.30	0.13	0.17	0.22	0.08
Pb	0.05	0.05	0.08	0.15	0.12	0.17	0.27
Bi	0.01	BDL	0.03	0.10	0.02	0.07	0.04
Th	0.02	BDL	0.01	0.39	0.06	0.10	0.06
U	0.02	0.02	0.03	0.29	0.03	0.14	0.11
Tl	0.20	0.28	0.25	0.23	0.21	0.25	0.22

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909160_12-1	G909160_12-2	G909160_14-1	G909160_14-2	G909160_14-3	G909160_14-4	G909160_17-1
Data Quality (1-3)	2	1.5	3	3	3	2	1.5
Li (ppm)	3.23	5.75	8.24	11.32	8.02	9.11	12.44
B (ppm)	105.28	124.33	54.26	62.32	67.83	67.77	56.52
Si (ppm)	222326.10	222326.10	222326.10	222326.10	222326.10	222326.10	222326.10
P (ppm)	298.21	4548.03	169.33	67.39	278.95	1100.49	3776.74
Sc (ppm)	19.68	18.94	9.66	12.21	10.24	9.84	8.93
Ti (ppm)	951.31	734.73	1125.06	1227.35	1342.35	1221.16	866.25
V (ppm)	302.15	271.39	97.81	106.90	102.01	106.30	116.24
Cr (ppm)	46.32	42.60	9.70	10.97	17.49	11.10	13.61
Mn (ppm)	133.84	145.83	143.88	152.96	139.99	151.94	232.21
Co (ppm)	0.30	1.09	0.23	BDL	0.46	0.63	1.81
Cu(63) (ppm)	7.34	111.87	2.07	2.10	15.45	61.43	228.93
Cu(65)* (ppm)	7.45	115.99	2.24	2.99	16.55	61.91	230.38
Zn(66)* (ppm)	21.41	27.15	16.62	10.89	16.61	25.59	43.55
Zn(68) (ppm)	23.93	48.36	134.00	149.37	142.86	125.24	161.52
As (ppm)	1.24	9.89	0.26	0.45	0.76	3.45	17.69
Se(76) (ppm)	3.05	3.31	4.11	3.56	4.20	3.23	0.53
Se(77)* (ppm)	1.24	BDL	BDL	BDL	0.61	1.81	3.60
Rb (ppm)	285.98	289.64	283.01	341.85	317.13	317.25	361.91
Sr (ppm)	11.88	184.40	83.79	93.27	102.96	99.72	85.85
Mo (ppm)	0.24	7.58	BDL	0.38	1.21	4.22	30.24
Sn (ppm)	1.77	1.41	0.98	1.17	1.24	1.18	1.27
Te (ppm)	0.29	7.71	BDL	BDL	0.58	0.29	2.50
Cs (ppm)	2.83	3.34	2.18	2.84	2.69	2.36	2.50
Ba(137) (ppm)	149.24	553.82	3173.82	3432.54	3183.13	2803.16	3250.03
Ba(138)* (ppm)	150.79	502.93	3272.67	3615.09	3283.54	2847.75	3354.05
W (ppm)	0.48	3.39	0.91	1.08	1.43	1.68	2.04
Pb (ppm)	0.58	36.38	1.78	1.60	1.61	2.22	3.41
Bi (ppm)	0.10	3.40	BDL	0.03	0.29	0.96	3.62
Th (ppm)	0.81	17.88	BDL	0.06	1.80	6.19	10.44
U (ppm)	0.54	2.59	0.11	0.04	0.60	2.02	11.36
Tl (ppm)	1.50	1.66	1.77	2.03	2.06	2.22	2.07
SiO2 wt.%	47.56	47.56	47.56	47.56	47.56	47.56	47.56

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909160_12-1	G909160_12-2	G909160_14-1	G909160_14-2	G909160_14-3	G909160_14-4	G909160_17-1
Data Quality (1-3)	2	1.5	3	3	3	2	1.5
1 standard error (ppm) *							
Li	0.37	0.36	0.41	0.42	0.47	0.57	0.55
B	3.64	8.37	2.25	2.08	2.31	2.52	2.09
Si	4446.52	4446.52	4446.52	4446.52	4446.52	4446.52	4446.52
P	17.19	137.66	12.90	3.31	16.57	111.14	281.86
Sc	0.69	0.87	0.47	0.70	0.61	0.54	0.35
Ti	118.31	25.96	28.97	49.32	39.13	33.61	33.80
V	7.10	6.57	2.46	2.78	2.50	2.79	3.00
Cr	1.44	1.00	0.32	1.09	0.91	0.56	0.80
Mn	3.62	3.71	3.41	6.18	3.31	3.82	11.30
Co	0.06	0.15	0.10	BDL	0.07	0.12	0.14
Cu	0.43	3.15	0.11	0.30	1.12	3.91	16.02
Cu	0.28	5.33	0.32	0.16	0.91	4.28	19.44
Zn	1.20	1.53	0.60	0.45	0.68	1.25	1.89
Zn	1.11	2.68	4.56	8.00	5.36	4.21	7.06
As	0.12	0.32	0.15	0.13	0.24	0.33	1.20
Se	0.20	0.18	0.20	0.24	0.47	0.60	0.35
Se	0.42	BDL	BDL	BDL	0.60	0.47	0.79
Rb	7.30	6.96	6.73	9.27	9.46	7.76	11.22
Sr	0.35	13.53	2.28	3.20	3.34	3.34	2.88
Mo	0.09	0.58	BDL	0.14	0.37	0.39	2.76
Sn	0.07	0.08	0.14	0.22	0.06	0.05	0.04
Te	0.11	1.26	BDL	BDL	0.11	0.14	0.45
Cs	0.10	0.25	0.10	0.14	0.10	0.07	0.19
Ba	8.16	44.65	77.14	121.49	76.17	67.94	113.70
Ba	7.12	40.32	80.78	162.20	77.62	66.92	94.75
W	0.08	0.25	0.11	0.07	0.10	0.14	0.38
Pb	0.06	4.97	0.21	0.20	0.16	0.19	0.31
Bi	0.01	0.23	BDL	0.01	0.07	0.03	0.23
Th	0.05	0.79	BDL	0.02	0.13	0.48	0.98
U	0.06	0.48	0.02	0.02	0.07	0.12	1.17
Tl	0.08	0.07	0.08	0.10	0.08	0.09	0.10

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909160_12-1	G909160_12-2	G909160_14-1	G909160_14-2	G909160_14-3	G909160_14-4	G909160_17-1
Data Quality (1-3)	2	1.5	3	3	3	2	1.5
1 standard error (ppm)**							
Li	0.59	0.89	1.24	1.66	1.23	1.41	1.84
B	38.54	46.07	19.90	22.81	24.82	24.82	20.70
Si	7637.96	7637.96	7637.96	7637.96	7637.96	7637.96	7637.96
P	87.16	1310.44	50.21	19.59	81.63	334.35	1118.29
Sc	1.14	1.23	0.65	0.90	0.77	0.70	0.54
Ti	148.48	73.99	109.98	125.82	132.50	119.97	88.41
V	15.77	14.25	5.18	5.70	5.37	5.69	6.19
Cr	9.39	8.59	1.97	2.45	3.62	2.29	2.84
Mn	5.96	6.36	6.13	8.21	5.96	6.60	13.98
Co	0.07	0.16	0.10	BDL	0.07	0.12	0.17
Cu	0.89	12.25	0.25	0.37	1.98	7.59	29.05
Cu	0.84	13.44	0.40	0.36	1.98	7.85	31.27
Zn	1.35	1.73	0.77	0.56	0.83	1.46	2.28
Zn	1.30	3.01	5.93	9.05	6.71	5.50	8.40
As	0.45	3.44	0.17	0.20	0.36	1.24	6.24
Se	2.45	2.66	3.29	2.86	3.40	2.65	0.55
Se	1.08	BDL	BDL	BDL	0.77	1.52	2.99
Rb	8.63	8.38	8.13	10.78	10.75	9.29	12.64
Sr	0.42	14.02	2.83	3.70	3.92	3.88	3.35
Mo	0.09	0.82	BDL	0.14	0.38	0.51	3.62
Sn	0.32	0.27	0.22	0.30	0.23	0.22	0.23
Te	0.12	1.87	BDL	BDL	0.15	0.15	0.63
Cs	0.21	0.33	0.18	0.24	0.20	0.17	0.26
Ba	8.50	45.51	92.20	133.21	91.47	81.27	124.90
Ba	7.55	41.19	97.63	173.14	95.14	82.19	110.16
W	0.10	0.47	0.15	0.14	0.19	0.24	0.45
Pb	0.08	5.66	0.25	0.23	0.20	0.25	0.40
Bi	0.02	0.39	BDL	0.01	0.08	0.10	0.41
Th	0.07	1.30	BDL	0.02	0.17	0.60	1.15
U	0.07	0.51	0.02	0.02	0.09	0.19	1.43
Tl	0.18	0.18	0.20	0.23	0.23	0.25	0.24

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909160_17-2	G909173-1	G909173-10	G909173-2	G909173-3	G909173-4	G909173-5
Data Quality (1-3)	3	3	1	2	2	3	3
Li (ppm)	8.52	6.11	7.36	6.81	7.13	5.80	8.97
B (ppm)	62.29	39.18	17.94	53.41	59.88	42.31	43.02
Si (ppm)	222326.10	223401.27	223401.27	223401.27	223401.27	223401.27	223401.27
P (ppm)	518.97	440.76	665.85	491.41	587.41	286.27	259.30
Sc (ppm)	9.00	5.92	2.46	5.46	6.13	7.37	7.24
Ti (ppm)	547.41	643.73	103.37	646.21	738.28	578.05	646.52
V (ppm)	80.43	77.46	0.96	88.86	91.88	77.63	78.12
Cr (ppm)	7.01	5.93	1.93	5.50	2.60	6.45	4.81
Mn (ppm)	146.97	18.33	18.47	14.45	15.29	15.50	17.08
Co (ppm)	0.53	0.94	0.21	0.58	BDL	0.22	BDL
Cu(63) (ppm)	32.94	22.80	5.85	24.89	3.32	5.13	3.36
Cu(65)* (ppm)	36.48	25.22	7.08	26.59	1.89	5.57	3.55
Zn(66)* (ppm)	20.73	4.73	7.94	9.52	3.89	7.53	7.76
Zn(68) (ppm)	139.25	20.18	125.28	31.66	24.06	20.71	16.34
As (ppm)	2.06	BDL	0.24	BDL	BDL	BDL	0.05
Se(76) (ppm)	2.44	1.12	BDL	1.33	BDL	4.40	2.13
Se(77)* (ppm)	1.54	BDL	BDL	0.41	BDL	BDL	2.21
Rb (ppm)	315.66	290.41	96.41	330.96	302.81	270.03	290.78
Sr (ppm)	84.65	15.72	37.24	33.65	19.02	16.47	19.94
Mo (ppm)	1.85	BDL	0.11	2.92	BDL	0.03	0.18
Sn (ppm)	0.97	5.14	0.12	7.11	6.60	4.09	3.98
Te (ppm)	0.29	BDL	BDL	0.06	BDL	BDL	BDL
Cs (ppm)	2.27	1.50	0.71	1.67	0.98	1.21	1.44
Ba(137) (ppm)	3096.06	389.36	3115.77	496.21	430.19	320.69	296.11
Ba(138)* (ppm)	3142.84	384.75	3238.36	504.40	433.67	318.66	300.50
W (ppm)	1.21	2.05	1.24	2.83	3.23	2.20	2.23
Pb (ppm)	1.50	0.19	0.10	4.86	0.14	0.24	0.13
Bi (ppm)	0.27	BDL	0.01	0.06	0.03	BDL	0.02
Th (ppm)	1.10	0.13	0.05	1.71	0.03	0.06	0.03
U (ppm)	1.22	0.11	2.05	0.10	0.09	0.08	0.18
Tl (ppm)	1.97	1.07	0.53	1.50	1.21	1.19	1.12
SiO2 wt.%	47.56	47.79	47.79	47.79	47.79	47.79	47.79

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909160_17-2	G909173-1	G909173-10	G909173-2	G909173-3	G909173-4	G909173-5
Data Quality (1-3)	3	3	1	2	2	3	3
1 standard error (ppm) *							
Li	0.40	0.54	0.80	0.72	1.17	0.99	0.45
B	2.27	3.11	1.33	2.13	5.01	2.21	2.12
Si	4446.52	4468.03	4468.03	4468.03	4468.03	4468.03	4468.03
P	21.74	29.28	202.69	38.94	36.90	30.45	24.67
Sc	0.44	0.48	0.16	0.29	1.04	0.63	0.53
Ti	24.18	40.96	8.79	40.99	53.08	33.14	36.83
V	2.13	1.98	0.13	5.01	5.44	3.90	4.68
Cr	0.37	0.67	0.60	1.16	1.46	0.60	0.59
Mn	3.93	0.74	1.18	0.87	0.77	0.57	0.83
Co	0.09	0.21	0.15	0.18	BDL	0.31	BDL
Cu	1.58	0.78	0.51	2.87	0.36	0.32	0.27
Cu	1.64	0.75	0.66	1.96	0.74	0.64	0.54
Zn	1.06	0.50	0.75	1.63	0.33	0.54	0.57
Zn	4.88	1.54	5.21	2.08	0.80	1.21	0.94
As	0.19	BDL	0.25	BDL	BDL	BDL	0.65
Se	0.13	0.90	BDL	0.66	BDL	0.48	1.03
Se	0.29	BDL	BDL	1.08	BDL	BDL	0.12
Rb	10.21	12.96	4.26	11.09	12.41	8.37	11.64
Sr	2.47	0.75	1.23	2.78	0.98	0.98	0.79
Mo	0.49	BDL	0.04	0.90	BDL	0.15	0.11
Sn	0.09	0.35	0.04	0.39	0.77	0.16	0.62
Te	0.16	BDL	BDL	0.35	BDL	BDL	BDL
Cs	0.10	0.19	0.06	0.16	0.11	0.18	0.14
Ba	90.03	21.57	196.67	22.82	17.40	16.93	10.40
Ba	96.80	17.66	194.76	25.36	24.55	17.19	12.54
W	0.09	0.19	0.12	0.46	0.45	0.10	0.19
Pb	0.13	0.03	0.04	0.86	0.03	0.05	0.04
Bi	0.03	BDL	0.01	0.04	0.02	BDL	0.02
Th	0.13	0.05	0.05	0.32	0.02	0.02	0.03
U	0.07	0.02	0.46	0.04	0.02	0.01	0.05
Tl	0.08	0.06	0.03	0.13	0.19	0.06	0.08

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909160_17-2	G909173-1	G909173-10	G909173-2	G909173-3	G909173-4	G909173-5
Data Quality (1-3)	3	3	1	2	2	3	3
1 standard error (ppm)**							
Li	1.27	1.01	1.31	1.20	1.54	1.29	1.34
B	22.81	14.60	6.67	19.57	22.38	15.57	15.81
Si	7637.96	7674.90	7674.90	7674.90	7674.90	7674.90	7674.90
P	150.29	131.74	280.59	148.40	175.11	88.81	79.49
Sc	0.60	0.53	0.19	0.36	1.07	0.69	0.60
Ti	57.01	80.12	14.12	80.36	95.15	70.16	78.35
V	4.31	4.16	0.14	6.53	6.95	5.35	5.96
Cr	1.45	1.36	0.72	1.60	1.55	1.42	1.13
Mn	6.52	0.99	1.35	1.02	0.95	0.79	1.03
Co	0.10	0.22	0.15	0.18	BDL	0.31	BDL
Cu	3.83	2.55	0.81	3.91	0.50	0.63	0.45
Cu	4.21	2.80	1.00	3.45	0.77	0.88	0.66
Zn	1.23	0.51	0.78	1.65	0.35	0.57	0.60
Zn	6.27	1.62	6.10	2.23	1.00	1.32	1.03
As	0.74	BDL	0.26	BDL	BDL	BDL	0.65
Se	1.96	1.27	BDL	1.25	BDL	3.55	1.99
Se	1.27	BDL	BDL	1.12	BDL	BDL	1.78
Rb	11.41	14.16	4.66	12.86	13.76	9.91	12.97
Sr	2.99	0.80	1.39	2.84	1.03	1.02	0.87
Mo	0.51	BDL	0.04	0.93	BDL	0.15	0.12
Sn	0.20	1.00	0.05	1.35	1.42	0.76	0.95
Te	0.16	BDL	BDL	0.35	BDL	BDL	BDL
Cs	0.18	0.21	0.08	0.20	0.13	0.20	0.17
Ba	102.63	24.08	214.51	26.59	21.03	19.08	13.20
Ba	110.19	20.44	213.21	28.74	27.16	19.19	14.90
W	0.17	0.31	0.19	0.57	0.60	0.28	0.33
Pb	0.17	0.04	0.04	0.89	0.03	0.05	0.04
Bi	0.04	BDL	0.01	0.04	0.02	BDL	0.02
Th	0.15	0.05	0.05	0.34	0.02	0.02	0.03
U	0.11	0.02	0.49	0.04	0.02	0.02	0.06
Tl	0.22	0.13	0.07	0.21	0.23	0.15	0.15

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909173-6	G909173-7	G909173-8	G909173-9	G909176-1	G909176-10	G909176-2
Data Quality (1-3)	1.5	1.5	1.5	1	2.5	2	2.5
Li (ppm)	17.50	18.05	16.51	0.15	11.88	7.12	14.46
B (ppm)	45.71	36.34	35.01	4.57	173.57	28.90	409.17
Si (ppm)	223401.27	223401.27	223401.27	223401.27	217277.49	217277.49	217277.49
P (ppm)	67.26	66.60	49.89	53.57	100.83	88.84	108.23
Sc (ppm)	30.14	27.17	23.03	2.40	56.64	28.56	66.64
Ti (ppm)	4203.42	10542.84	2617.80	21.90	2431.11	1342.35	2786.82
V (ppm)	287.06	260.79	248.95	0.64	513.55	260.93	562.34
Cr (ppm)	130.21	100.64	100.32	3.01	150.80	50.89	131.92
Mn (ppm)	19.18	19.40	17.36	5.90	34.27	20.94	35.28
Co (ppm)	BDL	0.02	BDL	0.10	0.16	0.07	0.13
Cu(63) (ppm)	15.48	9.13	13.37	3.22	3.29	3.66	4.27
Cu(65)* (ppm)	17.35	10.94	13.03	3.88	3.47	3.64	4.15
Zn(66)* (ppm)	6.66	5.84	6.17	3.00	7.75	4.82	7.60
Zn(68) (ppm)	39.63	37.67	41.83	9.51	27.22	15.76	23.98
As (ppm)	BDL	1.03	BDL	0.06	BDL	0.33	BDL
Se(76) (ppm)	1.35	2.94	BDL	BDL	BDL	4.70	0.33
Se(77)* (ppm)	BDL	1.80	BDL	BDL	BDL	1.45	2.40
Rb (ppm)	295.14	292.42	268.62	14.45	278.35	138.73	286.92
Sr (ppm)	39.57	36.25	43.25	377.66	36.09	30.48	48.61
Mo (ppm)	0.24	0.36	BDL	0.33	BDL	0.29	BDL
Sn (ppm)	10.80	13.09	10.97	0.14	2.22	1.21	2.59
Te (ppm)	BDL	BDL	0.23	0.10	BDL	BDL	BDL
Cs (ppm)	2.91	2.36	2.78	BDL	3.66	1.58	3.54
Ba(137) (ppm)	794.62	800.18	820.07	118.36	445.30	282.31	424.85
Ba(138)* (ppm)	805.40	829.41	850.89	117.96	449.45	288.07	438.40
W (ppm)	6.55	13.02	5.91	0.00	0.52	0.53	0.67
Pb (ppm)	0.33	0.28	0.31	0.26	0.16	0.33	0.22
Bi (ppm)	0.09	0.13	0.04	0.03	BDL	0.05	0.03
Th (ppm)	0.32	1.14	0.22	0.05	0.02	0.95	0.12
U (ppm)	0.43	1.83	0.56	0.03	0.13	0.74	0.23
Tl (ppm)	1.72	1.65	1.61	0.08	1.38	0.74	1.49
SiO2 wt.%	47.79	47.79	47.79	47.79	46.48	46.48	46.48

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909173-6	G909173-7	G909173-8	G909173-9	G909176-1	G909176-10	G909176-2
Data Quality (1-3)	1.5	1.5	1.5	1	2.5	2	2.5
1 standard error (ppm) *							
Li	1.02	1.23	0.91	0.50	0.63	0.78	0.53
B	1.43	3.26	4.03	0.65	5.32	1.18	27.73
Si	4468.03	4468.03	4468.03	4468.03	4345.55	4345.55	4345.55
P	4.40	4.89	9.27	7.81	6.98	5.96	6.60
Sc	1.21	1.49	0.75	0.40	1.68	0.77	2.72
Ti	333.87	701.78	168.00	1.58	153.34	109.02	171.25
V	10.33	6.56	8.96	0.09	23.54	13.45	16.79
Cr	5.23	2.58	2.63	0.83	6.46	1.60	3.33
Mn	0.55	0.88	0.53	0.44	1.80	0.56	1.22
Co	BDL	0.16	BDL	0.09	0.08	0.11	0.10
Cu	1.30	0.38	0.83	0.14	0.33	1.39	0.25
Cu	1.19	0.68	1.37	0.86	0.30	0.62	0.46
Zn	0.59	0.27	0.38	0.35	0.92	0.30	0.29
Zn	1.56	2.13	2.21	0.54	2.67	1.60	1.20
As	BDL	0.12	BDL	0.25	BDL	0.04	BDL
Se	0.96	0.52	BDL	BDL	BDL	0.53	1.16
Se	BDL	0.17	BDL	BDL	BDL	0.41	0.69
Rb	15.94	11.35	7.31	1.22	9.63	6.28	8.54
Sr	2.21	1.78	1.37	15.29	1.48	3.08	1.77
Mo	0.15	0.07	BDL	0.17	BDL	0.10	BDL
Sn	0.51	0.71	0.75	0.08	0.19	0.13	0.33
Te	BDL	BDL	0.07	0.15	BDL	BDL	BDL
Cs	0.28	0.39	0.13	BDL	0.20	0.11	0.17
Ba	45.64	26.45	53.36	14.48	17.43	12.01	21.34
Ba	46.65	30.18	58.39	13.73	19.30	13.32	21.56
W	0.56	0.86	0.35	0.03	0.14	0.10	0.10
Pb	0.09	0.07	0.11	0.05	0.01	0.07	0.03
Bi	0.02	0.06	0.01	0.01	BDL	0.01	0.01
Th	0.07	0.23	0.04	0.06	0.04	0.46	0.06
U	0.07	0.22	0.05	0.02	0.04	0.33	0.02
Tl	0.29	0.14	0.15	0.03	0.09	0.07	0.12

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909173-6	G909173-7	G909173-8	G909173-9	G909176-1	G909176-10	G909176-2
Data Quality (1-3)	1.5	1.5	1.5	1	2.5	2	2.5
1 standard error (ppm)**							
Li	2.67	2.82	2.50	0.50	1.79	1.27	2.10
B	16.71	13.63	13.37	1.79	63.44	10.59	151.58
Si	7674.90	7674.90	7674.90	7674.90	7464.52	7464.52	7464.52
P	20.09	20.01	17.24	17.46	30.20	26.57	32.22
Sc	1.70	1.84	1.18	0.41	2.79	1.36	3.78
Ti	560.04	1328.29	326.56	2.83	301.90	180.29	343.79
V	17.03	13.94	14.77	0.10	33.78	18.23	31.40
Cr	26.61	20.33	20.27	1.03	30.90	10.32	26.64
Mn	0.88	1.12	0.82	0.49	2.18	0.94	1.75
Co	BDL	0.16	BDL	0.09	0.08	0.11	0.10
Cu	2.10	1.05	1.65	0.37	0.48	1.45	0.52
Cu	2.20	1.35	1.95	0.96	0.48	0.73	0.64
Zn	0.61	0.31	0.41	0.36	0.94	0.33	0.34
Zn	1.86	2.34	2.45	0.59	2.76	1.65	1.35
As	BDL	0.38	BDL	0.25	BDL	0.12	BDL
Se	1.44	2.41	BDL	BDL	BDL	3.80	1.19
Se	BDL	1.45	BDL	BDL	BDL	1.23	2.04
Rb	16.96	12.72	9.02	1.25	11.07	6.84	10.23
Sr	2.32	1.89	1.56	16.64	1.61	3.12	1.96
Mo	0.16	0.07	BDL	0.17	BDL	0.10	BDL
Sn	2.02	2.47	2.12	0.09	0.44	0.26	0.57
Te	BDL	BDL	0.08	0.15	BDL	BDL	BDL
Cs	0.34	0.43	0.23	BDL	0.32	0.16	0.30
Ba	50.60	34.40	57.93	14.84	21.30	14.30	24.33
Ba	51.40	37.48	62.68	14.09	22.75	15.39	24.55
W	0.97	1.80	0.80	0.03	0.15	0.12	0.13
Pb	0.09	0.07	0.11	0.05	0.01	0.07	0.03
Bi	0.03	0.06	0.01	0.01	BDL	0.01	0.01
Th	0.07	0.25	0.04	0.06	0.04	0.47	0.06
U	0.08	0.26	0.07	0.02	0.04	0.33	0.02
Tl	0.34	0.23	0.24	0.03	0.18	0.11	0.20

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909176-3	G909176-4	G909176-5	G909176-6	G909176-7	G909176-8	YD08-19C_area2-1
Data Quality (1-3)	2	2	1.5	3	3	3	3
Li (ppm)	10.49	9.38	11.07	13.14	11.23	10.40	BDL
B (ppm)	47.36	36.69	46.29	60.32	48.96	54.22	86.78
Si (ppm)	217277.49	217277.49	217277.49	217277.49	217277.49	217277.49	222045.62
P (ppm)	88.93	101.77	415.08	88.90	87.30	130.15	196.95
Sc (ppm)	43.42	41.69	52.09	41.92	42.44	52.65	3.01
Ti (ppm)	1800.81	2519.13	22568.49	2210.75	2330.11	2403.47	704.47
V (ppm)	411.84	432.32	486.91	355.12	409.22	541.13	222.73
Cr (ppm)	89.83	120.01	89.61	41.69	72.46	85.74	288.04
Mn (ppm)	31.33	29.00	32.49	37.64	32.39	33.05	2.06
Co (ppm)	0.19	1.72	1.70	0.19	BDL	0.43	BDL
Cu(63) (ppm)	3.37	10.62	13.62	2.85	3.44	2.90	BDL
Cu(65)* (ppm)	3.21	10.11	13.86	2.84	3.39	3.36	BDL
Zn(66)* (ppm)	7.33	8.17	13.61	7.74	5.64	6.42	BDL
Zn(68) (ppm)	25.65	25.51	30.42	22.89	18.84	21.15	3.64
As (ppm)	0.50	0.04	2.52	BDL	0.36	BDL	BDL
Se(76) (ppm)	1.48	BDL	4.44	2.65	2.37	BDL	BDL
Se(77)* (ppm)	BDL	BDL	2.51	BDL	BDL	0.63	BDL
Rb (ppm)	262.33	189.02	231.06	287.37	244.09	260.65	150.48
Sr (ppm)	22.07	31.30	100.88	29.65	30.92	29.86	BDL
Mo (ppm)	BDL	0.35	1.91	BDL	0.11	BDL	1.00
Sn (ppm)	2.53	2.16	5.21	2.35	2.21	2.04	0.64
Te (ppm)	BDL	0.47	2.26	BDL	0.11	0.15	BDL
Cs (ppm)	2.37	2.53	2.93	2.51	2.68	2.23	0.92
Ba(137) (ppm)	555.80	401.25	466.73	411.32	337.11	370.04	1.61
Ba(138)* (ppm)	558.37	412.29	476.24	417.18	346.02	374.65	3.81
W (ppm)	0.76	0.63	10.05	0.51	0.51	0.65	BDL
Pb (ppm)	0.22	0.20	10.56	0.17	0.27	0.20	BDL
Bi (ppm)	0.04	0.14	2.19	BDL	BDL	0.11	BDL
Th (ppm)	0.61	2.70	2.43	0.15	0.05	0.96	null
U (ppm)	0.66	1.73	2.63	0.18	0.24	0.74	null
Tl (ppm)	1.25	1.17	1.28	1.45	1.29	1.30	1.45
SiO2 wt.%	46.48	46.48	46.48	46.48	46.48	46.48	47.50

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909176-3	G909176-4	G909176-5	G909176-6	G909176-7	G909176-8	YD08-19C_area2-1
Data Quality (1-3)	2	2	1.5	3	3	3	3
1 standard error (ppm) *							
Li	0.55	0.54	0.64	0.46	0.56	0.58	BDL
B	3.60	1.96	1.68	3.83	4.21	4.38	5.04
Si	4345.55	4345.55	4345.55	4345.55	4345.55	4345.55	4440.91
P	7.66	8.24	35.58	7.09	6.20	12.89	11.43
Sc	1.03	1.95	3.13	1.17	1.28	1.45	0.83
Ti	111.23	157.13	1560.67	134.75	130.69	139.70	31.23
V	15.59	11.88	16.99	11.15	10.29	13.81	6.27
Cr	2.76	4.07	4.36	1.59	1.74	2.23	7.09
Mn	0.98	0.88	1.11	1.31	0.78	1.05	0.35
Co	0.06	0.26	0.26	0.05	BDL	0.05	BDL
Cu	0.45	0.64	1.22	0.57	0.19	0.25	BDL
Cu	0.58	1.30	0.95	0.57	0.12	0.56	BDL
Zn	0.65	0.55	0.81	0.45	0.36	0.77	BDL
Zn	1.83	0.86	1.66	0.71	0.71	1.53	0.97
As	0.23	0.28	0.26	BDL	0.39	BDL	BDL
Se	1.31	BDL	4.02	1.59	0.29	BDL	BDL
Se	BDL	BDL	0.65	BDL	BDL	0.93	BDL
Rb	8.18	5.33	7.00	8.51	6.52	9.08	3.67
Sr	0.83	1.35	6.15	0.88	1.06	0.88	BDL
Mo	BDL	0.11	0.24	BDL	0.09	BDL	0.36
Sn	0.11	0.11	0.31	0.11	0.17	0.10	0.26
Te	BDL	0.32	0.12	BDL	0.15	0.08	BDL
Cs	0.22	0.18	0.11	0.13	0.21	0.16	0.10
Ba	20.03	17.42	20.00	21.47	13.59	13.78	2.94
Ba	21.10	15.94	18.32	16.46	11.46	13.41	0.28
W	0.13	0.20	0.84	0.12	0.12	0.10	BDL
Pb	0.05	0.11	0.93	0.07	0.02	0.05	BDL
Bi	0.02	0.08	0.34	BDL	BDL	0.02	BDL
Th	0.11	0.59	0.12	0.07	0.03	0.15	
U	0.07	0.26	0.17	0.03	0.05	0.08	
Tl	0.08	0.09	0.08	0.14	0.14	0.17	0.18

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	G909176-3	G909176-4	G909176-5	G909176-6	G909176-7	G909176-8	YD08-19C_area2-1
Data Quality (1-3)	2	2	1.5	3	3	3	3
1 standard error (ppm)**							
Li	1.58	1.43	1.68	1.91	1.68	1.58	BDL
B	17.62	13.51	16.94	22.30	18.32	20.23	9.02
Si	7464.52	7464.52	7464.52	7464.52	7464.52	7464.52	5409.16
P	27.02	30.78	126.09	26.86	26.19	40.06	27.09
Sc	2.00	2.55	3.75	2.03	2.10	2.53	0.88
Ti	222.44	311.94	2874.69	272.18	281.44	292.60	88.68
V	24.91	23.61	28.58	20.13	21.88	29.03	23.92
Cr	18.21	24.39	18.48	8.50	14.62	17.32	25.24
Mn	1.49	1.36	1.61	1.88	1.39	1.58	0.36
Co	0.06	0.28	0.27	0.05	BDL	0.06	BDL
Cu	0.58	1.30	1.90	0.64	0.41	0.40	BDL
Cu	0.68	1.69	1.76	0.65	0.38	0.67	BDL
Zn	0.68	0.59	0.88	0.49	0.39	0.79	BDL
Zn	1.95	1.08	1.83	0.92	0.85	1.62	1.04
As	0.29	0.28	0.91	BDL	0.41	BDL	BDL
Se	1.77	BDL	5.37	2.65	1.92	BDL	BDL
Se	BDL	BDL	2.11	BDL	BDL	1.06	BDL
Rb	9.67	6.50	8.35	10.21	8.09	10.42	4.31
Sr	0.91	1.45	6.40	1.02	1.19	1.02	BDL
Mo	BDL	0.11	0.29	BDL	0.09	BDL	0.36
Sn	0.47	0.41	0.99	0.44	0.44	0.38	0.27
Te	BDL	0.33	0.43	BDL	0.15	0.08	BDL
Cs	0.27	0.25	0.23	0.21	0.28	0.22	0.12
Ba	25.20	20.62	23.77	24.27	16.45	17.13	2.94
Ba	25.86	19.39	22.33	19.90	14.74	16.75	0.30
W	0.16	0.22	1.48	0.13	0.14	0.13	BDL
Pb	0.06	0.11	1.06	0.07	0.02	0.05	BDL
Bi	0.02	0.08	0.41	BDL	BDL	0.02	BDL
Th	0.12	0.62	0.21	0.07	0.03	0.16	
U	0.09	0.29	0.27	0.04	0.05	0.10	
Tl	0.16	0.16	0.16	0.21	0.20	0.22	0.20

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	YD08-19C_area2-2	YD08-19C_area2-3	YD08-19C_area2-4	YD08-19C_area2-5	YD08-19Carea1-1	YD08-19Carea1-2	YD08-19Carea1-3
Data Quality (1-3)	2.5	3	3	3	1	1	1
Li (ppm)	1.09	BDL	1.29	1.47	BDL	BDL	BDL
B (ppm)	79.52	74.40	82.24	78.47	15.77	BDL	58.68
Si (ppm)	222045.62	222045.62	222045.62	222045.62	224382.95	224382.95	224382.95
P (ppm)	390.42	141.49	196.10	223.27	BDL	BDL	498.95
Sc (ppm)	4.19	1.92	3.49	2.04	BDL	BDL	BDL
Ti (ppm)	773.98	766.17	619.05	645.94	624.72	556.26	613.50
V (ppm)	233.63	220.98	210.34	208.88	202.67	209.16	203.42
Cr (ppm)	304.33	252.23	275.05	284.18	173.62	304.38	145.97
Mn (ppm)	2.58	BDL	2.14	BDL	BDL	21.10	BDL
Co (ppm)	0.47	BDL	BDL	0.97	0.26	15.79	BDL
Cu(63) (ppm)	4.33	0.62	2.32	BDL	BDL	BDL	BDL
Cu(65)* (ppm)	0.69	BDL	BDL	BDL	29.45	BDL	BDL
Zn(66)* (ppm)	3.53	0.98	1.89	2.48	BDL	6.32	BDL
Zn(68) (ppm)	148.78	5.82	6.38	BDL	31.79	59.63	BDL
As (ppm)	BDL	BDL	0.05	BDL	BDL	BDL	BDL
Se(76) (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Se(77)* (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	127.55
Rb (ppm)	150.12	146.99	151.79	146.60	null	null	null
Sr (ppm)	160.55	0.53	0.75	1.15	null	null	null
Mo (ppm)	BDL	BDL	BDL	BDL	BDL	224.04	BDL
Sn (ppm)	1.83	1.79	1.32	1.39	5.16	1.86	BDL
Te (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	9.21
Cs (ppm)	0.83	1.06	0.31	BDL	BDL	BDL	1.57
Ba(137) (ppm)	4781.68	8.43	51.24	4.49	4.02	261.63	22.62
Ba(138)* (ppm)	4781.66	9.07	49.56	4.13	2.35	306.80	26.42
W (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Pb (ppm)	0.36	BDL	0.16	1.91	BDL	BDL	10.24
Bi (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Th (ppm)	null	null	null	null	null	null	null
U (ppm)	null	null	null	null	null	null	null
Tl (ppm)	1.09	0.85	1.54	1.23	BDL	BDL	1.19
SiO2 wt.%	47.50	47.50	47.50	47.50	48.00	48.00	48.00

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	YD08-19C_area2-2	YD08-19C_area2-3	YD08-19C_area2-4	YD08-19C_area2-5	YD08-19Carea1-1	YD08-19Carea1-2	YD08-19Carea1-3
Data Quality (1-3)	2.5	3	3	3	1	1	1
1 standard error (ppm) *							
Li	0.42	BDL	0.37	0.23	BDL	BDL	BDL
B	3.69	4.99	3.85	2.63	18.04	BDL	10.97
Si	4440.91	4440.91	4440.91	4440.91	4487.66	4487.66	4487.66
P	21.35	14.22	12.11	17.97	BDL	BDL	71.33
Sc	0.52	0.63	0.57	0.54	BDL	BDL	BDL
Ti	32.98	35.48	25.43	27.87	23.49	62.19	74.93
V	7.29	6.03	6.16	5.59	6.84	7.52	7.66
Cr	12.07	6.50	6.55	7.40	23.49	42.66	52.02
Mn	1.01	BDL	0.20	BDL	BDL	10.81	BDL
Co	0.29	BDL	BDL	0.35	7.09	3.97	BDL
Cu	0.82	0.78	0.49	BDL	BDL	BDL	BDL
Cu	0.65	BDL	BDL	BDL	26.02	BDL	BDL
Zn	1.27	0.32	0.56	0.64	BDL	4.34	BDL
Zn	7.37	1.14	1.25	BDL	7.76	20.32	BDL
As	BDL	BDL	1.15	BDL	BDL	BDL	BDL
Se	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Se	BDL	BDL	BDL	BDL	BDL	BDL	33.79
Rb	3.89	4.26	3.53	3.36			
Sr	7.61	0.15	0.29	0.08			
Mo	BDL	BDL	BDL	BDL	BDL	62.01	BDL
Sn	0.44	0.36	0.22	0.22	1.06	3.02	BDL
Te	BDL	BDL	BDL	BDL	BDL	BDL	14.43
Cs	0.19	0.05	0.06	BDL	BDL	BDL	0.51
Ba	220.49	2.22	13.60	0.57	2.76	30.95	8.85
Ba	159.06	1.71	13.48	0.50	0.65	22.84	5.99
W	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Pb	0.17	BDL	0.12	0.45	BDL	BDL	0.86
Bi	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Th							
U							
Tl	0.16	0.09	0.38	0.26	BDL	BDL	0.51

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	YD08-19C_area2-2	YD08-19C_area2-3	YD08-19C_area2-4	YD08-19C_area2-5	YD08-19Carea1-1	YD08-19Carea1-2	YD08-19Carea1-3
Data Quality (1-3)	2.5	3	3	3	1	1	1
1 standard error (ppm)**							
Li	0.43	BDL	0.38	0.25	BDL	BDL	BDL
B	7.78	8.12	8.07	7.25	18.04	BDL	11.09
Si	5409.16	5409.16	5409.16	5409.16	4667.24	4667.24	4667.24
P	53.16	22.66	27.29	33.14	BDL	BDL	105.42
Sc	0.67	0.66	0.66	0.57	BDL	BDL	BDL
Ti	96.97	96.99	77.24	81.05	33.04	65.54	78.32
V	25.28	23.68	22.65	22.35	20.87	21.69	21.22
Cr	28.29	22.18	24.04	25.02	27.55	49.56	53.40
Mn	1.01	BDL	0.21	BDL	BDL	10.83	BDL
Co	0.29	BDL	BDL	0.35	7.09	4.07	BDL
Cu	0.90	0.78	0.53	BDL	BDL	BDL	BDL
Cu	0.65	BDL	BDL	BDL	26.08	BDL	BDL
Zn	1.33	0.33	0.59	0.69	BDL	4.34	BDL
Zn	17.57	1.30	1.43	BDL	7.88	20.47	BDL
As	BDL	BDL	1.15	BDL	BDL	BDL	BDL
Se	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Se	BDL	BDL	BDL	BDL	BDL	BDL	34.50
Rb	4.50	4.80	4.20	4.01			
Sr	8.10	0.15	0.29	0.08			
Mo	BDL	BDL	BDL	BDL	BDL	64.05	BDL
Sn	0.45	0.38	0.24	0.23	1.08	3.02	BDL
Te	BDL	BDL	BDL	BDL	BDL	BDL	14.44
Cs	0.20	0.09	0.06	BDL	BDL	BDL	0.59
Ba	279.32	2.24	13.72	0.60	2.77	34.22	8.94
Ba	190.07	1.72	13.52	0.51	0.66	28.04	6.15
W	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Pb	0.17	BDL	0.12	0.45	BDL	BDL	0.86
Bi	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Th							
U							
Tl	0.17	0.10	0.39	0.27	BDL	BDL	0.51

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	YD08-21_area1-1	YD08-21_area1-2	YD08-21_area1-3	YD08-21_area2-4	YD08-21_area2-5	YD08-21_area2-6	YD09-06area2-1
Data Quality (1-3)	3	3	3	3	3	2.5	3
Li (ppm)	BDL	2.43	4.56	5.44	6.01	5.56	3.95
B (ppm)	131.78	96.47	82.82	104.78	148.08	111.10	72.43
Si (ppm)	220643.23	220643.23	220643.23	220643.23	220643.23	220643.23	222045.62
P (ppm)	BDL	36.72	59.95	31.30	BDL	22.71	36.28
Sc (ppm)	4.01	5.86	BDL	6.21	7.11	11.25	12.47
Ti (ppm)	1650.12	1743.36	1708.52	1502.14	1200.85	1244.44	1009.71
V (ppm)	234.59	235.60	239.16	210.95	213.90	187.76	212.83
Cr (ppm)	6.50	1.03	7.82	17.55	8.06	BDL	22.85
Mn (ppm)	23.93	24.34	25.25	15.32	13.67	25.51	63.83
Co (ppm)	BDL	BDL	BDL	BDL	BDL	2.21	BDL
Cu(63) (ppm)	54.15	BDL	98.40	2107.67	2409.26	5929.02	4.61
Cu(65)* (ppm)	57.90	7.52	116.03	2374.22	2614.09	7293.19	8.18
Zn(66)* (ppm)	BDL	4.74	2.55	BDL	BDL	9.80	4.06
Zn(68) (ppm)	43.48	61.14	45.15	43.61	37.32	48.70	93.72
As (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Se(76) (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Se(77)* (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Rb (ppm)	292.25	289.63	289.99	263.46	267.30	247.72	null
Sr (ppm)	15.43	19.42	15.86	26.00	19.44	33.87	null
Mo (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Sn (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	9.89
Te (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs (ppm)	1.44	0.90	1.08	0.65	BDL	BDL	3.01
Ba(137) (ppm)	1729.96	1617.72	1639.16	1762.74	1071.52	1993.53	1506.14
Ba(138)* (ppm)	1835.19	1714.36	1721.09	2034.35	1104.07	2296.01	1409.70
W (ppm)	5.34	BDL	BDL	1.46	BDL	BDL	0.11
Pb (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	0.07
Bi (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	0.10
Th (ppm)	null	null	null	null	null	null	null
U (ppm)	null	null	null	null	null	null	null
Tl (ppm)	BDL	0.91	0.43	0.42	1.19	2.21	2.42
SiO2 wt.%	47.20	47.20	47.20	47.20	47.20	47.20	47.50

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	YD08-21_area1-1	YD08-21_area1-2	YD08-21_area1-3	YD08-21_area2-4	YD08-21_area2-5	YD08-21_area2-6	YD09-06area2-1
Data Quality (1-3)	3	3	3	3	3	2.5	3
1 standard error (ppm) *							
Li	BDL	1.39	2.39	1.19	2.28	1.77	0.53
B	14.00	6.80	9.72	12.27	24.24	7.63	4.06
Si	4412.86	4412.86	4412.86	4412.86	4412.86	4412.86	4440.91
P	BDL	21.50	20.33	28.02	BDL	88.42	16.82
Sc	1.40	1.18	BDL	1.16	1.78	1.27	0.57
Ti	272.87	290.66	284.24	258.57	197.83	205.64	51.64
V	7.35	6.86	7.84	12.30	7.95	9.38	6.61
Cr	4.40	3.17	3.14	3.68	3.64	BDL	2.04
Mn	1.61	1.47	1.58	3.52	1.01	2.33	2.46
Co	BDL	BDL	BDL	BDL	BDL	0.73	BDL
Cu	5.83	BDL	13.67	186.81	210.33	2755.75	2.76
Cu	4.43	3.50	17.23	181.94	184.77	562.37	2.22
Zn	BDL	1.81	3.40	BDL	BDL	2.32	1.35
Zn	5.37	7.93	3.49	5.41	4.62	6.07	3.84
As	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Se	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Se	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Rb	11.86	12.10	14.71	13.84	11.98	12.03	
Sr	1.74	1.16	1.44	1.90	1.09	1.79	
Mo	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Sn	BDL	BDL	BDL	BDL	BDL	BDL	0.72
Te	BDL	BDL	BDL	BDL	BDL	BDL	0.49
Cs	0.34	0.72	0.23	0.29	BDL	BDL	46.40
Ba	90.74	96.47	94.57	93.00	56.21	107.03	38.00
Ba	71.42	70.55	72.76	80.56	43.05	122.67	0.14
W	1.07	BDL	BDL	0.08	BDL	BDL	0.15
Pb	BDL	BDL	BDL	BDL	BDL	BDL	0.03
Bi	BDL	BDL	BDL	BDL	BDL	BDL	0.23
Th							
U							
Tl	BDL	0.33	0.17	0.26	0.42	0.55	

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	YD08-21_area1-1	YD08-21_area1-2	YD08-21_area1-3	YD08-21_area2-4	YD08-21_area2-5	YD08-21_area2-6	YD09-06area2-1
Data Quality (1-3)	3	3	3	3	3	2.5	3
1 standard error (ppm)**							0.61
Li	BDL	1.41	2.42	1.28	2.34	1.83	7.75
B	19.49	12.04	12.93	16.34	28.64	13.75	5409.16
Si	5375.00	5375.00	5375.00	5375.00	5375.00	5375.00	18.52
P	BDL	23.02	24.36	28.89	BDL	88.56	1.38
Sc	1.46	1.32	BDL	1.32	1.92	1.71	129.61
Ti	425.41	450.97	441.57	393.86	309.11	320.73	23.27
V	25.43	25.40	26.03	25.11	23.58	21.63	2.97
Cr	4.45	3.17	3.23	4.07	3.72	BDL	3.34
Mn	1.79	1.67	1.78	3.56	1.10	2.48	BDL
Co	BDL	BDL	BDL	BDL	BDL	0.75	2.79
Cu	8.58	BDL	17.83	308.25	350.42	2840.76	2.33
Cu	7.48	3.59	21.04	306.84	328.85	944.61	1.42
Zn	BDL	1.89	3.41	BDL	BDL	2.57	10.97
Zn	7.31	10.56	6.22	7.35	6.28	8.23	BDL
As	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Se	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Se	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Rb	15.85	15.97	18.03	16.78	15.36	14.97	
Sr	1.76	1.20	1.46	1.94	1.13	1.87	
Mo	BDL	BDL	BDL	BDL	BDL	BDL	0.90
Sn	BDL	BDL	BDL	BDL	BDL	BDL	0.54
Te	BDL	BDL	BDL	BDL	BDL	BDL	58.58
Cs	0.36	0.73	0.24	0.29	BDL	BDL	41.76
Ba	117.23	118.85	117.86	119.88	72.62	137.01	0.14
Ba	90.83	87.89	89.80	101.79	54.71	141.34	0.15
W	1.11	BDL	BDL	0.12	BDL	BDL	0.03
Pb	BDL	BDL	BDL	BDL	BDL	BDL	0.26
Bi	BDL	BDL	BDL	BDL	BDL	BDL	
Th							
U							
Tl	BDL	0.34	0.17	0.27	0.43	0.58	

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	YD09-06area2-2	YD09-06area2-3	YD09-06area2-4	YD09-06area2-5	YD09-06area4-1	YD09-06area4-2	YD09-06area4-3
Data Quality (1-3)	3	3	3	3	3	3	3
Li (ppm)	6.11	3.41	4.49	5.30	5.25	5.05	8.85
B (ppm)	414.65	589.53	96.42	72.31	34.26	91.32	334.37
Si (ppm)	222045.62	222045.62	222045.62	222045.62	222045.62	222045.62	222045.62
P (ppm)	BDL	BDL	42.65	13.54	BDL	5.19	85.00
Sc (ppm)	13.06	10.31	13.28	11.92	19.76	20.83	18.04
Ti (ppm)	1068.42	621.97	1192.28	1097.94	3630.09	2955.09	2901.74
V (ppm)	238.05	197.17	284.30	236.64	156.88	162.75	136.06
Cr (ppm)	42.05	44.86	29.58	16.59	17.93	94.63	37.06
Mn (ppm)	64.47	56.14	65.87	68.08	30.13	48.22	146.84
Co (ppm)	0.63	BDL	BDL	BDL	BDL	0.76	0.95
Cu(63) (ppm)	20.61	7.86	18.62	15.85	BDL	19.52	32.70
Cu(65)* (ppm)	BDL	BDL	BDL	BDL	6.39	2.02	9.52
Zn(66)* (ppm)	7.17	7.73	11.51	8.03	5.43	3.55	17.12
Zn(68) (ppm)	93.97	52.26	105.97	91.64	54.88	53.22	68.68
As (ppm)	BDL	BDL	3.33	BDL	BDL	0.67	BDL
Se(76) (ppm)	BDL	BDL	BDL	BDL	57.43	108.56	65.72
Se(77)* (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Rb (ppm)	null	null	null	null	null	null	null
Sr (ppm)	null	null	null	null	null	null	null
Mo (ppm)	BDL	BDL	BDL	3.56	BDL	BDL	BDL
Sn (ppm)	4.96	1.24	3.39	6.34	3.23	6.55	15.60
Te (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	0.87
Cs (ppm)	3.08	3.18	10.47	3.10	0.37	1.00	1.35
Ba(137) (ppm)	1354.96	772.53	1843.33	1730.28	911.16	1044.96	858.08
Ba(138)* (ppm)	1364.76	723.93	1814.58	1629.56	922.90	1084.65	859.69
W (ppm)	0.36	0.71	0.46	0.39	1.88	BDL	1.77
Pb (ppm)	0.35	0.53	0.21	0.09	0.34	BDL	1.22
Bi (ppm)	0.07	BDL	BDL	0.05	BDL	BDL	0.16
Th (ppm)	null	null	null	null	null	null	null
U (ppm)	null	null	null	null	null	null	null
Tl (ppm)	2.45	2.40	3.54	2.87	1.33	3.30	1.52
SiO2 wt.%	47.50	47.50	47.50	47.50	47.50	47.50	47.50

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	YD09-06area2-2	YD09-06area2-3	YD09-06area2-4	YD09-06area2-5	YD09-06area4-1	YD09-06area4-2	YD09-06area4-3
Data Quality (1-3)	3	3	3	3	3	3	3
1 standard error (ppm) *							
Li	0.38	0.22	0.34	0.50	0.49	0.32	0.57
B	33.12	32.97	4.72	3.28	2.65	12.39	14.64
Si	4440.91	4440.91	4440.91	4440.91	4440.91	4440.91	4440.91
P	BDL	BDL	8.68	20.77	BDL	71.73	8.65
Sc	0.76	0.65	0.55	0.73	0.63	1.17	0.90
Ti	54.03	25.10	51.55	50.54	90.62	5479.70	154.81
V	8.46	6.75	8.78	7.65	4.52	7.38	3.64
Cr	2.59	3.14	3.04	1.46	2.48	3.92	8.25
Mn	2.57	2.50	2.18	2.54	1.00	1.66	8.78
Co	0.26	BDL	BDL	BDL	BDL	0.33	0.18
Cu	4.32	1.31	4.67	1.81	BDL	4.73	9.93
Cu	BDL	BDL	BDL	BDL	1.40	4.90	4.11
Zn	0.75	1.12	0.38	0.79	0.98	1.72	1.07
Zn	6.78	5.57	5.40	3.87	3.43	4.25	3.90
As	BDL	BDL	1.00	BDL	BDL	4.33	BDL
Se	BDL	BDL	BDL	BDL	9.62	22.02	17.45
Se	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Rb							
Sr							
Mo	BDL	BDL	BDL	5.04	BDL	BDL	BDL
Sn	0.56	0.43	0.57	0.32	0.38	0.78	1.43
Te	0.25	0.68	0.51	0.23	BDL	BDL	1.42
Cs	44.49	36.56	54.18	63.27	0.07	0.36	0.13
Ba	34.20	20.75	42.74	43.39	22.45	44.56	32.07
Ba	0.23	0.23	0.53	0.10	42.00	49.68	44.95
W	0.10	0.09	0.05	0.15	0.29	BDL	0.37
Pb	0.05	BDL	BDL	0.05	0.12	BDL	0.15
Bi	0.14	0.25	0.35	0.26	BDL	BDL	0.04
Th							
U							
Tl					0.23	0.69	0.08

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	YD09-06area2-2	YD09-06area2-3	YD09-06area2-4	YD09-06area2-5	YD09-06area4-1	YD09-06area4-2	YD09-06area4-3
Data Quality (1-3)	3	3	3	3	3	3	3
1 standard error (ppm)**	0.61	0.34	0.49	0.64			
Li	50.26	63.07	9.98	7.37	0.55	0.39	0.70
B	5409.16	5409.16	5409.16	5409.16	2.95	12.86	19.32
Si	BDL	BDL	12.58	20.97	4618.62	4618.62	4618.62
P	1.52	1.23	1.45	1.41	BDL	71.73	16.10
Sc	136.90	77.41	149.53	138.79	0.77	1.27	0.99
Ti	26.35	21.74	31.06	25.96	154.77	5480.65	184.45
V	4.74	5.27	4.13	2.14	16.12	17.67	13.90
Cr	3.44	3.20	3.19	3.50	2.85	8.44	8.75
Mn	0.26	BDL	BDL	BDL	1.18	1.95	9.32
Co	4.68	1.48	4.95	2.28	BDL	0.34	0.19
Cu	BDL	BDL	BDL	BDL	BDL	4.86	10.09
Cu	1.07	1.39	1.29	1.17	1.44	4.90	4.15
Zn	12.33	7.99	12.81	10.77	1.01	1.72	1.31
Zn	BDL	BDL	1.19	BDL	4.40	5.02	5.20
As	BDL	BDL	BDL	BDL	BDL	4.33	BDL
Se	BDL	BDL	BDL	BDL	9.97	22.58	17.71
Se	BDL	BDL	BDL	5.05	BDL	BDL	BDL
Rb							
Sr							
Mo	0.62	0.44	0.60	0.47	BDL	BDL	BDL
Sn	0.33	0.72	0.91	0.32	0.41	0.84	1.60
Te	54.90	40.90	69.64	75.43	BDL	BDL	1.42
Cs	38.09	22.58	48.21	47.79	0.10	0.40	0.29
Ba	0.23	0.23	0.53	0.10	53.15	70.98	55.56
Ba	0.10	0.09	0.05	0.15	73.39	86.44	71.86
W	0.05	BDL	BDL	0.05	0.31	BDL	0.39
Pb	0.18	0.28	0.39	0.29	0.12	BDL	0.15
Bi					BDL	BDL	0.04
Th							
U							
Tl					0.23	0.70	0.10

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	YD09-06area4-4	YD09-06area4-5	99017-1	99017-11	99017-2	99017-3	ANN007006.017-10
Data Quality (1-3)	2.5	3	2.5	1.5	3	3	1
Li (ppm)	8.30	6.90	4.13	2.02	2.63	2.96	8.12
B (ppm)	943.12	115.30	47.15	23.74	38.94	40.84	24.75
Si (ppm)	222045.62	222045.62	216249.07	216249.07	216249.07	216249.07	212182.12
P (ppm)	312.58	113.45	42.16	124.68	45.05	49.15	46.20
Sc (ppm)	16.51	21.39	7.83	23.83	9.68	9.92	8.11
Ti (ppm)	1967.52	3427.57	900.87	1300.80	1051.65	1114.19	186.99
V (ppm)	128.96	134.36	236.50	170.76	258.07	254.37	70.40
Cr (ppm)	20.38	39.94	6.17	27.42	7.54	7.81	9.10
Mn (ppm)	217.12	93.58	155.03	57.26	147.02	153.53	1632.15
Co (ppm)	1.20	1.13	3.48	3.10	3.45	3.27	BDL
Cu(63) (ppm)	13.15	33.54	2.39	1.90	1.22	1.81	3.55
Cu(65)* (ppm)	19.92	7.28	3.27	1.91	2.12	3.33	3.59
Zn(66)* (ppm)	18.37	15.37	42.87	14.12	37.93	40.28	16.52
Zn(68) (ppm)	51.84	80.21	112.33	47.99	105.50	107.38	99.01
As (ppm)	9.31	BDL	BDL	1.25	0.23	0.30	BDL
Se(76) (ppm)	46.11	25.40	BDL	0.74	3.51	3.35	4.37
Se(77)* (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	2.75
Rb (ppm)	null	null	303.29	217.18	284.97	286.73	125.45
Sr (ppm)	null	null	25.61	17.17	28.49	27.43	1917.49
Mo (ppm)	10.23	BDL	BDL	0.10	BDL	BDL	BDL
Sn (ppm)	16.56	28.42	0.97	0.81	1.22	0.88	3.05
Te (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	0.22
Cs (ppm)	1.50	1.63	2.82	2.70	2.42	2.43	2.57
Ba(137) (ppm)	803.02	1180.16	1948.85	1023.42	2065.54	2086.87	2326.88
Ba(138)* (ppm)	730.45	1156.02	1989.68	1031.21	2072.98	2111.09	2359.09
W (ppm)	1.07	2.88	0.98	0.66	0.85	0.76	2.07
Pb (ppm)	1.61	2.16	1.18	1.06	1.26	1.22	4.31
Bi (ppm)	0.36	0.12	0.08	0.08	0.12	BDL	BDL
Th (ppm)	null	null	0.08	5.05	0.03	BDL	2.22
U (ppm)	null	null	0.14	0.22	0.09	BDL	0.02
Tl (ppm)	1.35	2.03	4.18	2.29	3.41	3.57	0.81
SiO2 wt.%	47.50	47.50	46.26	46.26	46.26	46.26	45.39

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	YD09-06area4-4	YD09-06area4-5	99017-1	99017-11	99017-2	99017-3	ANN007006.017-10
Data Quality (1-3)	2.5	3	2.5	1.5	3	3	1
1 standard error (ppm) *							
Li	0.78	0.36	0.95	0.16	0.55	0.20	1.23
B	63.56	74.93	5.95	0.66	4.10	2.55	2.81
Si	4440.91	4440.91	4324.98	4324.98	4324.98	4324.98	4243.64
P	59.16	12.97	7.32	16.53	2.71	5.60	5.81
Sc	0.41	1.20	0.63	0.91	1.09	0.44	1.14
Ti	145.57	172.05	33.45	305.07	42.06	28.12	14.15
V	3.78	9.39	5.31	4.49	5.98	5.35	2.47
Cr	1.27	1.75	0.53	0.58	0.37	0.50	0.92
Mn	6.05	3.91	5.57	1.39	4.58	4.00	124.19
Co	0.17	0.19	0.29	0.32	0.25	0.35	BDL
Cu	3.75	3.14	0.45	0.10	0.65	0.61	0.43
Cu	2.68	1.83	0.41	0.28	0.50	0.69	0.46
Zn	1.29	2.48	1.89	1.88	1.24	1.66	0.84
Zn	2.27	6.42	4.62	4.39	2.63	2.72	4.56
As	1.53	BDL	BDL	0.31	0.31	0.12	BDL
Se	8.35	15.03	BDL	0.46	1.64	0.59	0.66
Se	BDL	BDL	BDL	BDL	BDL	BDL	1.61
Rb			13.49	6.01	8.03	8.24	4.37
Sr			0.72	0.51	0.77	0.83	132.48
Mo	2.18	BDL	BDL	0.17	BDL	BDL	BDL
Sn	1.50	3.86	0.12	0.19	0.15	0.18	0.32
Te	BDL	BDL	BDL	BDL	BDL	BDL	0.15
Cs	0.10	0.19	0.35	0.14	0.15	0.14	0.26
Ba	21.14	35.65	63.06	35.14	70.01	61.45	114.51
Ba	39.11	62.82	57.54	39.67	67.67	60.81	108.51
W	0.73	0.21	0.20	0.14	0.24	0.20	0.15
Pb	0.52	0.33	0.13	0.11	0.15	0.16	0.42
Bi	0.10	0.04	0.03	0.01	0.04	BDL	BDL
Th			0.05	0.45	0.03	BDL	0.25
U			0.06	0.05	0.03	BDL	0.02
Tl	0.23	0.18	0.39	0.14	0.28	0.21	0.06

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	YD09-06area4-4	YD09-06area4-5	99017-1	99017-11	99017-2	99017-3	ANN007006.017-10
Data Quality (1-3)	2.5	3	2.5	1.5	3	3	1
1 standard error (ppm)**							
Li	0.86	0.48	1.11	0.33	0.66	0.46	1.68
B	72.82	75.06	18.16	8.67	14.75	15.08	9.43
Si	4618.62	4618.62	7429.19	7429.19	7429.19	7429.19	7289.47
P	77.41	22.28	14.18	39.53	13.26	15.23	14.52
Sc	0.55	1.29	0.72	1.40	1.17	0.63	1.19
Ti	160.67	208.89	91.06	328.67	107.44	108.45	22.57
V	13.27	16.25	12.04	9.00	13.22	12.79	4.06
Cr	2.05	3.61	1.35	5.52	1.55	1.64	2.04
Mn	7.59	4.38	7.76	2.43	6.87	6.68	136.57
Co	0.18	0.20	0.35	0.36	0.31	0.39	BDL
Cu	3.82	3.66	0.51	0.22	0.66	0.64	0.57
Cu	2.90	1.87	0.54	0.35	0.55	0.77	0.60
Zn	1.52	2.57	2.13	1.90	1.52	1.90	0.93
Zn	3.45	7.57	5.29	4.53	3.58	3.67	5.10
As	1.57	BDL	BDL	0.53	0.32	0.16	BDL
Se	8.62	15.07	BDL	0.75	3.25	2.75	3.56
Se	BDL	BDL	BDL	BDL	BDL	BDL	2.73
Rb			14.29	6.88	9.17	9.36	4.78
Sr			0.86	0.60	0.93	0.97	136.99
Mo	2.30	BDL	BDL	0.17	BDL	BDL	BDL
Sn	1.69	4.08	0.21	0.24	0.27	0.24	0.63
Te	BDL	BDL	BDL	BDL	BDL	BDL	0.15
Cs	0.30	0.36	0.40	0.23	0.22	0.21	0.31
Ba	47.43	71.87	73.49	40.35	80.63	73.55	123.06
Ba	61.63	98.13	69.78	44.64	79.19	73.85	118.18
W	0.73	0.27	0.23	0.16	0.26	0.22	0.29
Pb	0.52	0.33	0.14	0.13	0.16	0.17	0.48
Bi	0.11	0.05	0.03	0.01	0.04	BDL	BDL
Th			0.05	0.54	0.03	BDL	0.28
U			0.06	0.06	0.03	BDL	0.02
Tl	0.23	0.19	0.59	0.28	0.45	0.43	0.10

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	ANN007006.017-4	ANN007006.017-6	ANN007006.017-7	ANN007006.017-8	ANN007006.017-9	YD01-13A-11	YD01-13A-12
Data Quality (1-3)	2	1	2.5	2.5	2.5	3	2
Li (ppm)	8.21	1.90	12.80	3.75	11.51	1.81	7.21
B (ppm)	28.85	2.79	28.25	15.68	24.24	56.41	7.48
Si (ppm)	212182.12	212182.12	212182.12	212182.12	212182.12	216529.54	216529.54
P (ppm)	27.46	BDL	37.47	35.75	37.45	35.86	336.16
Sc (ppm)	4.61	2.92	6.62	2.99	6.06	30.41	8.26
Ti (ppm)	338.31	110.94	382.85	242.06	224.76	252.56	56.95
V (ppm)	133.43	9.00	116.75	49.77	83.02	232.55	37.04
Cr (ppm)	4.70	2.78	5.12	6.08	4.11	22.81	12.42
Mn (ppm)	82.01	67.79	128.20	62.42	363.78	37.55	211.39
Co (ppm)	0.75	BDL	0.39	BDL	0.28	1.25	3.47
Cu(63) (ppm)	154.58	7.01	0.84	22.87	0.34	2.08	1.61
Cu(65)* (ppm)	164.72	7.69	1.67	15.78	1.23	3.05	1.42
Zn(66)* (ppm)	14.65	1.08	8.09	7.67	13.84	9.06	36.32
Zn(68) (ppm)	65.80	7.91	49.42	41.61	89.15	121.67	45.83
As (ppm)	0.25	BDL	BDL	BDL	BDL	1.42	2.32
Se(76) (ppm)	2.82	BDL	BDL	1.62	4.58	7.98	1.11
Se(77)* (ppm)	BDL	BDL	BDL	BDL	2.49	4.85	0.63
Rb (ppm)	195.21	11.86	258.28	131.40	149.52	304.10	27.13
Sr (ppm)	109.66	177.49	226.08	323.65	483.07	16.88	7.91
Mo (ppm)	0.14	0.13	BDL	BDL	BDL	BDL	BDL
Sn (ppm)	2.88	0.36	4.12	1.03	3.64	1.15	0.09
Te (ppm)	BDL	0.01	BDL	BDL	BDL	BDL	BDL
Cs (ppm)	2.01	0.33	3.91	1.71	2.81	4.65	0.57
Ba(137) (ppm)	1561.63	163.62	1518.02	1021.60	2600.45	4190.13	309.04
Ba(138)* (ppm)	1576.40	163.55	1509.78	1019.75	2598.78	4388.56	306.91
W (ppm)	2.26	0.17	2.13	0.54	3.53	0.08	0.04
Pb (ppm)	0.28	0.95	1.06	BDL	0.76	1.53	7.93
Bi (ppm)	0.15	0.01	BDL	BDL	BDL	0.05	BDL
Th (ppm)	0.19	0.12	0.51	BDL	1.65	0.02	6.16
U (ppm)	0.04	0.15	0.08	BDL	0.05	0.04	2.09
Tl (ppm)	1.08	0.12	1.86	0.77	1.10	9.20	0.91
SiO2 wt.%	45.39	45.39	45.39	45.39	45.39	46.32	46.32

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	ANN007006.017-4	ANN007006.017-6	ANN007006.017-7	ANN007006.017-8	ANN007006.017-9	YD01-13A-11	YD01-13A-12
Data Quality (1-3)	2	1	2.5	2.5	2.5	3	2
1 standard error (ppm) *							
Li	0.46	0.35	1.22	0.55	1.43	1.22	0.84
B	1.95	0.80	3.61	1.25	5.50	3.09	1.17
Si	4243.64	4243.64	4243.64	4243.64	4243.64	4330.59	4330.59
P	4.53	BDL	2.18	5.26	2.56	2.49	174.20
Sc	0.26	0.28	0.33	0.51	0.27	0.80	0.44
Ti	11.90	13.69	10.83	8.24	7.84	9.21	2.56
V	2.81	1.51	3.97	2.08	2.74	8.97	1.54
Cr	0.84	0.75	0.30	0.89	0.96	1.41	1.03
Mn	4.12	5.37	9.82	3.12	11.28	1.49	9.44
Co	0.07	BDL	0.10	BDL	0.18	0.10	0.13
Cu	8.70	0.34	0.11	9.23	0.19	0.42	0.26
Cu	16.92	0.99	0.45	4.53	0.31	0.50	0.24
Zn	0.61	0.08	0.34	0.40	0.83	0.29	2.82
Zn	2.29	0.44	4.12	1.60	3.76	5.26	2.31
As	0.17	BDL	BDL	BDL	BDL	0.91	0.36
Se	0.16	BDL	BDL	0.99	1.01	0.72	0.32
Se	BDL	BDL	BDL	BDL	1.06	1.81	0.53
Rb	5.04	1.16	6.07	4.93	7.67	11.35	0.76
Sr	3.40	8.68	22.26	11.98	14.62	0.85	0.98
Mo	0.09	0.13	BDL	BDL	BDL	BDL	BDL
Sn	0.22	0.03	0.16	0.26	0.37	0.24	0.06
Te	BDL	0.17	BDL	BDL	BDL	BDL	BDL
Cs	0.06	0.11	0.30	0.23	0.13	0.17	0.13
Ba	76.59	13.64	84.64	58.76	90.70	112.06	12.96
Ba	68.98	13.00	82.40	47.11	91.28	132.23	10.57
W	0.32	0.04	0.10	0.11	0.22	0.08	0.05
Pb	0.19	0.18	0.08	BDL	0.22	0.17	0.58
Bi	0.03	0.00	BDL	BDL	BDL	0.02	BDL
Th	0.03	0.05	0.03	BDL	0.12	0.02	1.71
U	0.02	0.03	0.04	BDL	0.04	0.01	0.56
Tl	0.06	0.04	0.09	0.03	0.18	0.94	0.17

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc	Musc
LA-ICP-MS Spot ID	ANN007006.017-4	ANN007006.017-6	ANN007006.017-7	ANN007006.017-8	ANN007006.017-9	YD01-13A-11	YD01-13A-12
Data Quality (1-3)	2	1	2.5	2.5	2.5	3	2
1 standard error (ppm)**							
Li	1.24	0.44	2.17	0.76	2.16	1.24	1.32
B	10.68	1.29	10.90	5.84	10.40	20.76	2.96
Si	7289.47	7289.47	7289.47	7289.47	7289.47	7438.82	7438.82
P	9.12	BDL	11.01	11.56	11.09	10.74	199.84
Sc	0.33	0.31	0.44	0.53	0.38	1.43	0.54
Ti	33.96	17.21	37.58	24.20	22.54	25.49	5.94
V	6.71	1.56	6.65	3.08	4.68	14.25	2.34
Cr	1.26	0.94	1.07	1.51	1.26	4.79	2.70
Mn	5.01	5.86	10.78	3.80	16.96	2.07	12.41
Co	0.08	BDL	0.10	BDL	0.18	0.12	0.22
Cu	18.50	0.82	0.14	9.54	0.19	0.48	0.31
Cu	24.29	1.28	0.49	4.83	0.34	0.59	0.28
Zn	0.70	0.08	0.39	0.44	0.89	0.35	2.94
Zn	2.74	0.47	4.27	1.87	4.28	5.98	2.55
As	0.19	BDL	BDL	BDL	BDL	1.04	0.88
Se	2.26	BDL	BDL	1.63	3.80	6.44	0.94
Se	BDL	BDL	BDL	BDL	2.26	4.28	0.73
Rb	5.88	1.18	7.27	5.33	8.01	12.56	0.90
Sr	3.94	9.26	22.63	13.35	17.06	0.88	0.99
Mo	0.09	0.13	BDL	BDL	BDL	BDL	BDL
Sn	0.56	0.07	0.76	0.32	0.75	0.31	0.06
Te	BDL	0.17	BDL	BDL	BDL	BDL	BDL
Cs	0.15	0.11	0.40	0.25	0.23	0.36	0.13
Ba	82.35	14.00	89.60	62.00	103.75	138.83	14.30
Ba	75.75	13.40	87.68	51.27	104.84	153.76	11.91
W	0.42	0.05	0.27	0.13	0.47	0.08	0.05
Pb	0.19	0.19	0.10	BDL	0.23	0.18	0.67
Bi	0.04	0.00	BDL	BDL	BDL	0.02	BDL
Th	0.03	0.05	0.04	BDL	0.16	0.02	1.74
U	0.02	0.03	0.04	BDL	0.04	0.01	0.58
Tl	0.13	0.04	0.21	0.09	0.21	1.54	0.21

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc?	Musc?
LA-ICP-MS Spot ID	YD01-13A-13	YD01-13A-6	YD01-13A-7	YD08-22area1-2	YD08-22area1-3	YD08-22area3-1	YD08-22area3-2
Data Quality (1-3)	1.5	1.5	3	3	3	3	2.5
Li (ppm)	2.54	34.10	6.80	BDL	BDL	BDL	14.90
B (ppm)	6.07	33.52	47.11	147.70	151.87	126.32	89.87
Si (ppm)	216529.54	216529.54	216529.54	226720.27	226720.27	226720.27	226720.27
P (ppm)	779.02	56.87	34.39	BDL	BDL	BDL	BDL
Sc (ppm)	6.21	29.06	36.32	33.27	13.82	31.19	7.46
Ti (ppm)	590.46	324.91	254.09	446.52	399.71	316.53	365.25
V (ppm)	25.53	277.32	331.14	780.44	839.33	650.11	239.68
Cr (ppm)	9.97	119.61	67.63	468.17	294.89	BDL	BDL
Mn (ppm)	79.41	960.33	162.29	68.88	78.91	67.12	53.25
Co (ppm)	1.36	14.07	3.18	BDL	BDL	17.61	BDL
Cu(63) (ppm)	1.21	17.20	2.55	BDL	BDL	BDL	BDL
Cu(65)* (ppm)	1.24	16.19	2.95	58.76	40.09	BDL	BDL
Zn(66)* (ppm)	10.82	182.99	31.90	16.71	7.58	13.68	14.61
Zn(68) (ppm)	19.13	238.66	118.30	63.42	BDL	68.56	72.45
As (ppm)	1.66	1.11	0.10	BDL	BDL	24.70	BDL
Se(76) (ppm)	BDL	4.75	0.59	224.17	50.73	BDL	BDL
Se(77)* (ppm)	0.61	2.54	4.00	BDL	BDL	75.91	BDL
Rb (ppm)	16.73	216.28	272.99	null	null	null	null
Sr (ppm)	8.12	17.28	16.36	null	null	null	null
Mo (ppm)	BDL	0.25	BDL	BDL	BDL	BDL	BDL
Sn (ppm)	0.33	1.18	1.11	BDL	BDL	BDL	BDL
Te (ppm)	BDL	0.40	BDL	BDL	BDL	BDL	BDL
Cs (ppm)	0.31	3.35	3.63	4.98	6.96	6.21	4.81
Ba(137) (ppm)	172.99	1981.30	3094.48	456.41	332.10	320.70	978.27
Ba(138)* (ppm)	171.80	1984.79	3153.50	535.25	365.54	311.05	930.99
W (ppm)	0.25	BDL	0.09	BDL	BDL	BDL	BDL
Pb (ppm)	4.04	2.59	2.02	BDL	BDL	BDL	BDL
Bi (ppm)	BDL	0.01	0.02	BDL	BDL	BDL	BDL
Th (ppm)	0.39	0.47	0.06	null	null	null	null
U (ppm)	0.16	0.35	0.04	null	null	null	null
Tl (ppm)	0.65	7.31	8.27	2.05	1.10	1.26	0.32
SiO2 wt.%	46.32	46.32	46.32	48.50	48.50	48.50	48.50

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc?	Musc?
LA-ICP-MS Spot ID	YD01-13A-13	YD01-13A-6	YD01-13A-7	YD08-22area1-2	YD08-22area1-3	YD08-22area3-1	YD08-22area3-2
Data Quality (1-3)	1.5	1.5	3	3	3	3	2.5
1 standard error (ppm) *							
Li	0.35	1.79	0.50	BDL	BDL	BDL	4.89
B	0.70	2.47	2.25	22.44	18.25	32.56	68.29
Si	4330.59	4330.59	4330.59	4534.41	4534.41	4534.41	4534.41
P	238.57	8.22	9.10	BDL	BDL	BDL	BDL
Sc	0.30	1.01	1.13	2.45	4.88	3.25	15.93
Ti	56.67	12.48	12.90	48.35	31.71	37.75	52.47
V	1.40	7.84	10.07	40.77	74.08	42.74	20.83
Cr	0.94	5.43	2.68	20.76	19.19	BDL	BDL
Mn	4.16	38.99	7.93	11.77	16.38	9.16	16.86
Co	0.07	0.39	0.19	BDL	BDL	5.75	BDL
Cu	0.13	1.71	0.45	BDL	BDL	BDL	BDL
Cu	0.36	0.87	0.88	5.38	25.40	BDL	BDL
Zn	0.49	7.46	2.29	5.21	4.31	12.72	4.13
Zn	1.78	15.75	6.17	15.89	BDL	16.71	17.03
As	0.43	0.27	0.70	BDL	BDL	11.07	BDL
Se	BDL	0.31	0.86	72.07	160.36	BDL	BDL
Se	1.20	1.75	1.27	BDL	BDL	27.63	BDL
Rb	0.67	7.07	8.96				
Sr	1.58	0.84	0.58				
Mo	BDL	0.15	BDL	BDL	BDL	BDL	BDL
Sn	0.08	0.06	0.27	BDL	BDL	BDL	BDL
Te	BDL	0.32	BDL	BDL	BDL	BDL	BDL
Cs	0.12	0.20	0.44	1.04	1.67	1.36	0.95
Ba	5.69	89.19	108.45	25.07	16.25	22.22	34.36
Ba	7.19	95.76	142.49	17.49	10.51	27.94	37.39
W	0.04	BDL	0.06	BDL	BDL	BDL	BDL
Pb	0.47	0.52	0.12	BDL	BDL	BDL	BDL
Bi	BDL	0.02	0.00	BDL	BDL	BDL	BDL
Th	0.15	0.10	0.07				
U	0.02	0.13	0.02				
Tl	0.10	0.69	0.83	0.93	0.46	0.67	1.21

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc	Musc	Musc	Musc	Musc	Musc?	Musc?
LA-ICP-MS Spot ID	YD01-13A-13	YD01-13A-6	YD01-13A-7	YD08-22area1-2	YD08-22area1-3	YD08-22area3-1	YD08-22area3-2
Data Quality (1-3)	1.5	1.5	3	3	3	3	2.5
1 standard error (ppm)**							
Li	0.50	5.15	1.08	BDL	BDL	BDL	4.94
B	2.32	12.45	17.29	22.72	18.61	32.69	68.32
Si	7438.82	7438.82	7438.82	4715.85	4715.85	4715.85	4715.85
P	329.27	18.49	13.53	BDL	BDL	BDL	BDL
Sc	0.38	1.52	1.81	2.56	4.89	3.33	15.93
Ti	79.37	33.03	27.17	50.75	34.59	39.30	53.97
V	1.85	15.36	18.71	87.79	111.71	77.59	31.69
Cr	2.21	24.61	13.83	43.34	30.70	BDL	BDL
Mn	5.14	53.46	10.05	11.87	16.48	9.29	16.91
Co	0.10	0.84	0.26	BDL	BDL	5.85	BDL
Cu	0.18	2.49	0.53	BDL	BDL	BDL	BDL
Cu	0.39	1.92	0.93	6.59	25.54	BDL	BDL
Zn	0.54	8.53	2.40	5.28	4.32	12.74	4.19
Zn	1.84	16.71	6.76	16.13	BDL	16.97	17.32
As	0.72	0.47	0.70	BDL	BDL	11.12	BDL
Se	BDL	3.82	0.98	72.46	160.37	BDL	BDL
Se	1.29	2.69	3.45	BDL	BDL	28.03	BDL
Rb	0.74	8.03	10.17				
Sr	1.58	0.87	0.62				
Mo	BDL	0.15	BDL	BDL	BDL	BDL	BDL
Sn	0.10	0.22	0.33	BDL	BDL	BDL	BDL
Te	BDL	0.33	BDL	BDL	BDL	BDL	BDL
Cs	0.12	0.31	0.51	1.41	2.13	1.81	1.32
Ba	6.62	97.25	124.20	35.85	24.73	28.60	64.79
Ba	7.82	102.12	153.24	33.27	22.00	32.42	61.82
W	0.05	BDL	0.06	BDL	BDL	BDL	BDL
Pb	0.50	0.53	0.15	BDL	BDL	BDL	BDL
Bi	BDL	0.02	0.01	BDL	BDL	BDL	BDL
Th	0.15	0.10	0.07				
U	0.02	0.14	0.02				
Tl	0.13	1.19	1.37	0.94	0.46	0.67	1.21

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Mu + Pa	Mu + Pa	Mu + Pa	Musc	Musc	Musc	Musc?
LA-ICP-MS Spot ID	YD02-02-area1_2	YD02-02-area1_3	YD02-02-area2_6	YD02-02-area1_1	YD02-02-area2_4	YD02-02-area2_5	YD02-02-area3_10
Data Quality (1-3)	0	2.5	2.5	2.5	2.5	2.5	2
Li (ppm)	11.30	25.73	7.83	10.33	1.34	1.19	BDL
B (ppm)	31.59	32.81	24.74	25.66	24.08	29.69	24.83
Si (ppm)	222045.62	222045.62	220175.77	222045.62	220175.77	220175.77	220175.77
P (ppm)	8054.65	113.40	89.81	91.61	87.61	82.90	85.06
Sc (ppm)	4.11	3.30	3.39	2.42	3.54	2.88	11.76
Ti (ppm)	324.07	248.08	362.41	329.45	337.01	442.84	191.68
V (ppm)	137.24	122.85	138.83	159.32	125.14	127.74	537.76
Cr (ppm)	21.56	22.11	8.33	11.32	8.94	6.15	76.12
Mn (ppm)	5.24	2.87	3.36	5.66	5.43	5.43	1.08
Co (ppm)	0.63	BDL	BDL	BDL	BDL	BDL	BDL
Cu(63) (ppm)	2.19	BDL	0.95	BDL	BDL	BDL	1.07
Cu(65)* (ppm)	BDL	0.17	0.69	BDL	BDL	BDL	BDL
Zn(66)* (ppm)	1.90	0.78	BDL	1.03	1.71	BDL	0.59
Zn(68) (ppm)	34.72	4.55	2.91	6.46	3.76	4.91	39.10
As (ppm)	4.08	BDL	BDL	2.21	1.09	2.88	2.53
Se(76) (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Se(77)* (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Rb (ppm)	159.62	110.75	179.57	174.00	180.05	188.77	214.84
Sr (ppm)	13750.02	13.44	1.34	1.36	1.29	1.49	88.95
Mo (ppm)	1.98	BDL	0.16	BDL	BDL	BDL	BDL
Sn (ppm)	0.53	BDL	0.60	1.42	0.46	2.27	1.47
Te (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs (ppm)	1.14	1.05	1.51	1.30	1.80	2.15	2.31
Ba(137) (ppm)	792.17	43.83	34.61	25.97	34.86	31.69	1048.06
Ba(138)* (ppm)	788.77	48.52	39.41	23.11	40.14	38.31	1032.87
W (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Pb (ppm)	8423.39	54.89	9.60	7.08	5.89	5.34	28.16
Bi (ppm)	1.01	BDL	BDL	BDL	BDL	BDL	BDL
Th (ppm)	null	null	null	null	null	null	null
U (ppm)	null	null	null	null	null	null	null
Tl (ppm)	3.16	2.59	3.26	3.94	3.74	3.81	3.00
SiO2 wt.%	47.50	47.50	47.10	47.50	47.10	47.10	47.10

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Mu + Pa	Mu + Pa	Mu + Pa	Musc	Musc	Musc	Musc?
LA-ICP-MS Spot ID	YD02-02-area1_2	YD02-02-area1_3	YD02-02-area2_6	YD02-02-area1_1	YD02-02-area2_4	YD02-02-area2_5	YD02-02-area3_10
Data Quality (1-3)	0	2.5	2.5	2.5	2.5	2.5	2
1 standard error (ppm) *							
Li	1.74	2.46	1.12	0.55	0.30	0.17	BDL
B	1.72	1.65	1.79	0.79	2.32	1.32	1.09
Si	4440.91	4440.91	4403.52	4440.91	4403.52	4403.52	4403.52
P	422.85	10.92	5.91	4.85	8.82	8.16	4.40
Sc	0.42	0.38	0.29	0.66	0.24	0.60	0.77
Ti	15.58	20.82	15.63	14.73	16.87	16.94	14.65
V	4.13	4.02	5.05	4.99	3.99	4.34	20.17
Cr	1.44	1.06	0.46	0.91	1.69	0.79	2.83
Mn	0.31	0.22	0.65	0.42	0.44	0.32	0.17
Co	0.29	BDL	BDL	BDL	BDL	BDL	BDL
Cu	0.45	BDL	0.70	BDL	BDL	BDL	0.23
Cu	BDL	0.76	0.29	BDL	BDL	BDL	BDL
Zn	0.37	0.21	BDL	0.34	0.26	BDL	0.53
Zn	3.04	0.50	0.67	0.36	0.92	0.96	1.96
As	1.37	BDL	BDL	0.45	0.38	0.74	0.92
Se	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Se	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Rb	4.78	2.94	4.81	5.30	5.06	4.97	9.79
Sr	2120.84	4.71	0.08	0.13	0.25	0.15	4.83
Mo	0.44	BDL	0.20	BDL	BDL	BDL	BDL
Sn	0.20	BDL	0.32	0.18	0.24	0.97	0.29
Te	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs	0.24	0.17	0.19	0.21	0.10	0.16	0.23
Ba	33.25	4.13	2.45	1.51	1.34	1.48	48.52
Ba	87.22	3.96	1.61	1.35	1.90	2.27	42.13
W	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Pb	431.53	15.53	0.53	0.36	0.46	0.36	1.55
Bi	0.19	BDL	BDL	BDL	BDL	BDL	BDL
Th							
U							
Tl	0.26	0.21	0.16	0.33	0.30	0.33	0.24

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Mu + Pa	Mu + Pa	Mu + Pa	Musc	Musc	Musc	Musc?
LA-ICP-MS Spot ID	YD02-02-area1_2	YD02-02-area1_3	YD02-02-area2_6	YD02-02-area1_1	YD02-02-area2_4	YD02-02-area2_5	YD02-02-area3_10
Data Quality (1-3)	0	2.5	2.5	2.5	2.5	2.5	2
1 standard error (ppm)**							
Li	1.92	3.09	1.26	0.93	0.32	0.19	BDL
B	3.24	3.30	2.80	2.37	3.13	2.91	2.43
Si	5409.16	5409.16	5363.61	5409.16	5363.61	5363.61	5363.61
P	1074.76	17.69	12.50	12.24	13.90	13.04	11.32
Sc	0.59	0.50	0.45	0.70	0.43	0.66	1.40
Ti	40.81	35.60	44.99	41.08	42.70	54.26	26.69
V	14.92	13.45	15.36	17.37	13.67	14.03	59.69
Cr	2.37	2.20	0.86	1.35	1.86	0.95	7.24
Mn	0.35	0.24	0.66	0.45	0.46	0.36	0.17
Co	0.29	BDL	BDL	BDL	BDL	BDL	BDL
Cu	0.49	BDL	0.71	BDL	BDL	BDL	0.25
Cu	BDL	0.76	0.29	BDL	BDL	BDL	BDL
Zn	0.42	0.23	BDL	0.36	0.32	BDL	0.54
Zn	4.81	0.70	0.74	0.78	1.00	1.09	4.64
As	1.57	BDL	BDL	0.62	0.43	0.93	1.04
Se	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Se	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Rb	5.63	3.59	5.85	6.21	6.06	6.08	10.57
Sr	2129.84	4.72	0.08	0.13	0.26	0.15	5.00
Mo	0.45	BDL	0.20	BDL	BDL	BDL	BDL
Sn	0.21	BDL	0.32	0.20	0.24	0.98	0.31
Te	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cs	0.26	0.19	0.23	0.23	0.17	0.23	0.29
Ba	38.20	4.26	2.59	1.63	1.57	1.66	54.52
Ba	89.31	4.14	1.88	1.46	2.14	2.45	49.08
W	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Pb	498.33	15.61	0.60	0.41	0.49	0.39	1.76
Bi	0.28	BDL	BDL	BDL	BDL	BDL	BDL
Th							
U							
Tl	0.30	0.24	0.23	0.38	0.35	0.38	0.28

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc?	Pa	Pa	Pa	Pa	Pa	Pa
LA-ICP-MS Spot ID	YD02-02-area3_8	H437119-1	H437119-10	H437119-11	H437119-2	H437119-3	H437119-4
Data Quality (1-3)	2	2.5	2.5	2.5	3	3	3
Li (ppm)	1.39	22.00	39.65	10.52	14.70	23.94	16.47
B (ppm)	12.93	26.87	24.91	31.38	19.37	22.14	18.45
Si (ppm)	220175.77	223494.76	223494.76	223494.76	223494.76	223494.76	223494.76
P (ppm)	122.65	57.57	102.84	78.77	51.88	59.57	47.35
Sc (ppm)	11.67	1.34	1.53	3.15	3.21	2.45	1.95
Ti (ppm)	235.20	29.89	34.95	51.19	38.02	22.58	20.53
V (ppm)	597.95	73.72	70.44	89.86	69.91	54.64	48.02
Cr (ppm)	34.87	18.89	41.17	65.36	28.59	17.89	19.58
Mn (ppm)	3.09	0.32	0.44	0.77	0.60	0.48	0.65
Co (ppm)	BDL	BDL	BDL	BDL	BDL	0.14	BDL
Cu(63) (ppm)	1.85	2.63	2.67	4.14	4.20	2.15	1.49
Cu(65)* (ppm)	BDL	1.72	1.74	3.27	2.90	2.45	1.22
Zn(66)* (ppm)	1.29	1.61	2.34	4.28	2.04	1.41	1.11
Zn(68) (ppm)	31.46	2.87	3.00	6.29	4.09	3.55	4.03
As (ppm)	BDL	BDL	1.91	1.65	0.72	0.69	BDL
Se(76) (ppm)	BDL	1.51	0.21	0.67	1.58	1.61	1.27
Se(77)* (ppm)	BDL	BDL	1.04	BDL	0.75	1.19	1.56
Rb (ppm)	168.61	26.94	21.61	42.62	31.61	15.29	15.85
Sr (ppm)	80.89	0.80	1.28	1.13	1.11	0.94	0.95
Mo (ppm)	BDL	BDL	28.34	22.32	3.68	0.95	0.28
Sn (ppm)	1.74	0.51	0.63	1.05	0.66	0.40	0.56
Te (ppm)	BDL	BDL	0.55	1.53	0.28	0.25	0.08
Cs (ppm)	2.33	0.26	0.34	0.60	0.52	0.27	0.33
Ba(137) (ppm)	1088.58	2.76	2.17	2.42	4.00	2.30	1.40
Ba(138)* (ppm)	1073.32	2.72	2.56	2.84	3.96	2.56	2.07
W (ppm)	BDL	BDL	0.08	0.11	0.04	0.02	0.01
Pb (ppm)	49.12	0.36	1.15	1.44	0.80	0.64	0.57
Bi (ppm)	BDL	BDL	0.24	0.21	0.05	0.00	0.00
Th (ppm)	null	BDL	BDL	BDL	BDL	BDL	BDL
U (ppm)	null	BDL	0.07	0.02	0.01	0.01	0.01
Tl (ppm)	3.53	1.04	0.81	1.73	0.98	0.61	0.76
SiO2 wt.%	47.10	47.81	47.81	47.81	47.81	47.81	47.81

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc?	Pa	Pa	Pa	Pa	Pa	Pa
LA-ICP-MS Spot ID	YD02-02-area3_8	H437119-1	H437119-10	H437119-11	H437119-2	H437119-3	H437119-4
Data Quality (1-3)	2	2.5	2.5	2.5	3	3	3
1 standard error (ppm) *							
Li	0.18	1.79	1.39	1.08	0.69	2.53	0.91
B	1.36	2.55	1.31	1.09	1.15	0.96	1.74
Si	4403.52	4469.90	4469.90	4469.90	4469.90	4469.90	4469.90
P	7.84	5.38	7.75	4.68	6.63	9.79	8.39
Sc	0.58	0.48	0.52	0.36	0.22	0.10	0.09
Ti	10.58	1.83	3.96	3.75	3.98	3.81	1.87
V	18.79	1.58	1.66	2.13	2.18	2.31	1.39
Cr	1.50	0.77	0.90	1.93	0.97	0.48	0.47
Mn	0.53	0.48	0.30	0.11	0.33	0.02	0.18
Co	BDL	BDL	BDL	BDL	BDL	0.10	BDL
Cu	0.36	0.23	0.52	0.23	1.07	0.10	0.33
Cu	BDL	0.32	0.44	0.49	0.76	0.38	0.50
Zn	0.29	1.12	0.34	0.57	0.68	0.17	0.24
Zn	1.61	0.75	0.77	1.35	1.45	0.41	0.46
As	BDL	BDL	0.69	1.00	0.14	0.32	BDL
Se	BDL	0.57	0.72	0.63	0.32	1.35	0.54
Se	BDL	BDL	1.30	BDL	0.93	0.43	0.88
Rb	4.68	0.89	2.23	1.47	1.35	0.36	0.50
Sr	4.68	0.15	0.29	0.11	0.05	0.04	0.03
Mo	BDL	BDL	4.13	2.85	1.19	0.12	0.31
Sn	0.22	0.31	0.03	0.20	0.13	0.09	0.14
Te	BDL	BDL	0.48	0.19	0.38	0.02	0.06
Cs	0.14	0.08	0.07	0.09	0.13	0.07	0.07
Ba	39.15	0.53	0.47	0.65	0.79	0.43	0.25
Ba	47.65	0.35	0.25	0.09	0.16	0.17	0.16
W	BDL	BDL	0.05	0.07	0.04	0.06	0.05
Pb	3.00	0.07	0.22	0.11	0.12	0.15	0.11
Bi	BDL	BDL	0.08	0.01	0.03	0.01	0.02
Th		BDL	BDL	BDL	BDL	BDL	BDL
U		BDL	0.04	0.02	0.02	0.02	0.01
Tl	0.22	0.13	0.14	0.25	0.09	0.14	0.16

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Musc?	Pa	Pa	Pa	Pa	Pa	Pa
LA-ICP-MS Spot ID	YD02-02-area3_8	H437119-1	H437119-10	H437119-11	H437119-2	H437119-3	H437119-4
Data Quality (1-3)	2	2.5	2.5	2.5	3	3	3
1 standard error (ppm)**							
Li	0.21	3.58	5.75	1.83	2.18	4.21	2.49
B	1.77	10.11	9.16	11.47	7.14	8.11	6.94
Si	5363.61	7678.11	7678.11	7678.11	7678.11	7678.11	7678.11
P	16.97	17.43	30.62	23.17	16.35	19.76	16.01
Sc	1.30	0.48	0.52	0.39	0.26	0.15	0.13
Ti	29.35	3.36	5.15	6.10	5.35	4.36	2.69
V	65.23	3.72	3.62	4.62	3.87	3.40	2.59
Cr	3.40	3.86	8.29	13.22	5.80	3.61	3.95
Mn	0.54	0.48	0.31	0.11	0.33	0.03	0.18
Co	BDL	BDL	BDL	BDL	BDL	0.10	BDL
Cu	0.39	0.36	0.59	0.50	1.16	0.25	0.37
Cu	BDL	0.37	0.48	0.60	0.82	0.46	0.52
Zn	0.32	1.12	0.34	0.58	0.68	0.17	0.24
Zn	3.75	0.75	0.78	1.36	1.45	0.42	0.47
As	BDL	BDL	0.96	1.15	0.28	0.40	BDL
Se	BDL	1.33	0.74	0.83	1.30	1.86	1.15
Se	BDL	BDL	1.55	BDL	1.10	1.04	1.53
Rb	5.63	0.98	2.26	1.61	1.43	0.43	0.55
Sr	4.82	0.15	0.29	0.12	0.05	0.04	0.04
Mo	BDL	BDL	4.69	3.35	1.23	0.14	0.32
Sn	0.25	0.32	0.12	0.27	0.17	0.12	0.17
Te	BDL	BDL	0.49	0.34	0.38	0.05	0.07
Cs	0.23	0.09	0.07	0.10	0.13	0.07	0.07
Ba	46.90	0.54	0.47	0.65	0.80	0.43	0.25
Ba	54.37	0.36	0.25	0.11	0.18	0.17	0.17
W	BDL	BDL	0.06	0.07	0.04	0.06	0.05
Pb	3.33	0.07	0.23	0.14	0.13	0.15	0.12
Bi	BDL	BDL	0.08	0.02	0.03	0.01	0.02
Th		BDL	BDL	BDL	BDL	BDL	BDL
U		BDL	0.04	0.02	0.02	0.02	0.01
Tl	0.28	0.17	0.16	0.31	0.14	0.16	0.17

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Pa	Pa	Pa	Pa	Pa	Pa	Pa?
LA-ICP-MS Spot ID	H437119-5	H437119-6	H437119-7	H437119-8	H437119-9	YD02-02-area2_7	YD02-02-area3_9
Data Quality (1-3)	3	3	2.5	2.5	2.5	2.5	2
Li (ppm)	13.39	21.67	10.97	22.43	17.83	107.39	154.98
B (ppm)	30.78	29.90	31.10	26.52	25.95	28.19	35.50
Si (ppm)	223494.76	223494.76	223494.76	223494.76	223494.76	220175.77	220175.77
P (ppm)	52.41	54.47	73.34	63.05	63.50	132.64	107.79
Sc (ppm)	2.27	1.94	BDL	2.96	2.57	0.91	4.72
Ti (ppm)	34.38	41.29	31.86	37.74	40.68	200.19	125.84
V (ppm)	74.73	79.87	81.22	81.90	80.37	116.17	268.69
Cr (ppm)	42.02	55.86	51.87	41.53	38.02	11.81	41.90
Mn (ppm)	0.46	0.92	BDL	0.92	0.64	3.29	2.00
Co (ppm)	BDL	0.06	BDL	0.22	BDL	BDL	BDL
Cu(63) (ppm)	2.21	2.49	BDL	2.78	2.89	BDL	1.18
Cu(65)* (ppm)	2.41	2.29	BDL	2.25	2.23	BDL	1.71
Zn(66)* (ppm)	2.79	3.07	BDL	2.45	2.72	1.32	1.87
Zn(68) (ppm)	5.15	4.56	2.35	4.02	5.77	3.48	11.53
As (ppm)	BDL	BDL	BDL	0.53	1.27	BDL	BDL
Se(76) (ppm)	BDL	3.40	2.92	0.56	1.22	BDL	BDL
Se(77)* (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Rb (ppm)	39.75	37.30	39.84	30.20	36.85	89.41	78.59
Sr (ppm)	0.82	1.15	BDL	1.19	1.88	11.58	44.00
Mo (ppm)	0.10	0.66	BDL	3.07	6.04	BDL	BDL
Sn (ppm)	0.91	0.92	BDL	0.74	0.94	BDL	0.89
Te (ppm)	BDL	BDL	BDL	BDL	0.37	BDL	BDL
Cs (ppm)	0.62	0.51	BDL	0.29	0.75	0.68	0.79
Ba(137) (ppm)	2.11	3.84	4.17	3.00	2.82	40.06	248.90
Ba(138)* (ppm)	2.51	3.67	4.60	2.50	3.22	40.90	285.80
W (ppm)	0.02	0.01	BDL	BDL	0.08	BDL	BDL
Pb (ppm)	0.57	0.75	BDL	1.17	1.09	19.68	33.18
Bi (ppm)	BDL	0.03	BDL	0.05	0.05	BDL	BDL
Th (ppm)	BDL	BDL	BDL	BDL	BDL	null	null
U (ppm)	BDL	BDL	BDL	BDL	0.02	null	null
Tl (ppm)	1.26	1.40	1.40	0.99	1.61	1.62	1.95
SiO2 wt.%	47.81	47.81	47.81	47.81	47.81	47.10	47.10

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Pa	Pa	Pa	Pa	Pa	Pa	Pa?
LA-ICP-MS Spot ID	H437119-5	H437119-6	H437119-7	H437119-8	H437119-9	YD02-02-area2_7	YD02-02-area3_9
Data Quality (1-3)	3	3	2.5	2.5	2.5	2.5	2
1 standard error (ppm) *							
Li	2.08	1.29	0.76	1.88	0.92	3.30	13.94
B	2.15	3.99	1.31	1.26	1.38	3.06	2.16
Si	4469.90	4469.90	4469.90	4469.90	4469.90	4403.52	4403.52
P	3.42	7.88	6.31	5.10	4.91	7.96	5.45
Sc	0.29	0.30	BDL	0.15	0.21	1.29	0.56
Ti	0.98	2.12	3.68	2.34	5.69	13.25	13.80
V	2.29	1.80	2.22	1.96	2.04	4.22	9.31
Cr	1.55	1.35	1.92	1.17	1.42	1.12	3.39
Mn	0.13	0.06	BDL	0.18	0.22	0.28	0.53
Co	BDL	0.13	BDL	0.16	BDL	BDL	BDL
Cu	0.27	0.35	BDL	0.67	0.41	BDL	0.84
Cu	0.45	0.06	BDL	0.15	0.64	BDL	0.71
Zn	0.21	0.24	BDL	0.92	0.29	0.29	0.58
Zn	0.54	0.10	0.40	0.73	0.84	0.25	1.34
As	BDL	BDL	BDL	0.10	0.51	BDL	BDL
Se	BDL	0.28	0.39	0.76	1.06	BDL	BDL
Se	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Rb	1.14	1.17	1.00	1.65	0.98	3.25	3.21
Sr	0.05	0.22	BDL	0.16	0.53	0.58	2.64
Mo	0.24	0.27	BDL	0.71	0.84	BDL	BDL
Sn	0.16	0.09	BDL	0.13	0.19	BDL	0.22
Te	BDL	BDL	BDL	BDL	0.51	BDL	BDL
Cs	0.08	0.14	BDL	0.06	0.09	0.06	0.08
Ba	0.57	0.24	0.76	0.29	0.45	1.61	20.78
Ba	0.19	0.26	0.47	0.11	0.23	2.24	27.30
W	0.05	0.02	BDL	BDL	0.04	BDL	BDL
Pb	0.05	0.05	BDL	0.18	0.11	1.09	2.51
Bi	BDL	0.02	BDL	0.02	0.02	BDL	BDL
Th	BDL	BDL	BDL	BDL	BDL		
U	BDL	BDL	BDL	BDL	0.01		
Tl	0.09	0.15	0.12	0.11	0.08	0.16	0.21

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Pa	Pa	Pa	Pa	Pa	Pa	Pa?
LA-ICP-MS Spot ID	H437119-5	H437119-6	H437119-7	H437119-8	H437119-9	YD02-02-area2_7	YD02-02-area3_9
Data Quality (1-3)	3	3	2.5	2.5	2.5	2.5	2
1 standard error (ppm)**							
Li	2.80	3.31	1.72	3.67	2.67	8.46	17.91
B	11.41	11.59	11.39	9.73	9.54	3.92	3.78
Si	7678.11	7678.11	7678.11	7678.11	7678.11	5363.61	5363.61
P	15.48	17.56	22.05	18.86	18.94	18.11	14.30
Sc	0.31	0.31	BDL	0.20	0.24	1.30	0.73
Ti	3.38	4.42	4.75	4.25	6.85	26.81	20.13
V	4.11	4.07	4.32	4.22	4.20	12.85	29.57
Cr	8.55	11.26	10.56	8.39	7.74	1.53	5.00
Mn	0.13	0.07	BDL	0.18	0.22	0.29	0.53
Co	BDL	0.13	BDL	0.16	BDL	BDL	BDL
Cu	0.36	0.44	BDL	0.73	0.51	BDL	0.85
Cu	0.52	0.25	BDL	0.28	0.68	BDL	0.72
Zn	0.22	0.25	BDL	0.93	0.30	0.32	0.62
Zn	0.55	0.14	0.40	0.74	0.85	0.45	1.83
As	BDL	BDL	BDL	0.21	0.68	BDL	BDL
Se	BDL	2.73	2.37	0.88	1.44	BDL	BDL
Se	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Rb	1.30	1.30	1.17	1.71	1.13	3.65	3.53
Sr	0.06	0.23	BDL	0.16	0.53	0.60	2.72
Mo	0.24	0.28	BDL	0.75	0.97	BDL	BDL
Sn	0.23	0.19	BDL	0.19	0.25	BDL	0.23
Te	BDL	BDL	BDL	BDL	0.52	BDL	BDL
Cs	0.09	0.15	BDL	0.06	0.11	0.08	0.10
Ba	0.57	0.25	0.77	0.30	0.45	1.87	21.60
Ba	0.20	0.27	0.48	0.12	0.24	2.46	28.18
W	0.05	0.02	BDL	BDL	0.05	BDL	BDL
Pb	0.06	0.06	BDL	0.19	0.12	1.24	2.70
Bi	BDL	0.02	BDL	0.02	0.02	BDL	BDL
Th	BDL	BDL	BDL	BDL	BDL		
U	BDL	BDL	BDL	BDL	0.01		
Tl	0.16	0.21	0.19	0.15	0.19	0.18	0.23

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Pyr	Pyr	Pyr	Pyr	Pyr	Pyr	Pyr
LA-ICP-MS Spot ID	H437113_25-1	H437113_25-2	H437113_25-3	H437113_25-4	H437113_25-6	H437113_25-7	H437113_26-2
Data Quality (1-3)	1.5	1	1.5	1.5	1.5	1.5	3
Li (ppm)	0.95	38.26	20.42	0.41	2.51	BDL	BDL
B (ppm)	5.97	69.35	24.11	12.10	5.36	6.99	5.86
Si (ppm)	312172.77	312172.77	312172.77	312172.77	312172.77	312172.77	312172.77
P (ppm)	4230.69	16240.06	7155.14	1695.43	5107.58	7805.42	996.38
Sc (ppm)	5.98	5.20	4.30	5.76	4.45	5.82	5.96
Ti (ppm)	800.12	294.10	373.23	81.80	159.61	23.90	180.01
V (ppm)	142.46	345.04	143.66	144.07	147.04	136.92	127.91
Cr (ppm)	8.37	328.44	92.94	4.52	11.48	6.86	7.23
Mn (ppm)	23.50	683.07	185.67	12.97	67.74	27.23	7.89
Co (ppm)	0.40	5.05	1.32	0.07	0.91	0.80	0.31
Cu(63) (ppm)	62.71	1421.61	441.84	29.31	227.32	72.18	23.34
Cu(65)* (ppm)	60.84	1415.45	439.61	34.03	226.52	73.11	22.35
Zn(66)* (ppm)	6.40	49.84	7.85	3.24	6.46	8.65	3.52
Zn(68) (ppm)	12.39	79.61	26.84	7.14	14.22	16.06	5.88
As (ppm)	8.85	122.93	34.85	12.33	23.89	9.47	9.24
Se(76) (ppm)	2.54	18.83	8.69	BDL	6.72	2.19	1.19
Se(77)* (ppm)	BDL	61.58	16.37	4.07	12.20	2.72	BDL
Rb (ppm)	0.49	3.52	1.85	0.68	1.11	0.84	0.19
Sr (ppm)	201.78	975.18	536.72	16.28	118.10	62.58	96.43
Mo (ppm)	6.46	330.84	83.16	25.99	84.33	27.36	31.36
Sn (ppm)	0.57	4.81	1.49	0.19	0.11	0.21	BDL
Te (ppm)	0.26	15.04	4.76	0.28	2.30	0.71	0.42
Cs (ppm)	0.17	0.34	BDL	0.23	BDL	BDL	BDL
Ba(137) (ppm)	42.08	692.49	228.55	27.12	122.47	99.51	11.41
Ba(138)* (ppm)	42.87	703.88	261.23	31.83	135.28	99.30	14.19
W (ppm)	2.57	3.01	1.77	0.32	1.94	0.76	0.37
Pb (ppm)	8.77	8.08	9.42	0.58	3.85	0.44	2.17
Bi (ppm)	0.07	0.37	0.58	0.02	0.03	0.02	0.06
Th (ppm)	23.73	54.37	66.82	1.64	8.49	1.84	12.38
U (ppm)	0.73	5.14	1.19	0.32	1.38	0.87	0.22
Tl (ppm)	BDL	BDL	BDL	0.02	BDL	BDL	BDL
SiO2 wt.%	66.78	66.78	66.78	66.78	66.78	66.78	66.78

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Pyr	Pyr	Pyr	Pyr	Pyr	Pyr	Pyr
LA-ICP-MS Spot ID	H437113_25-1	H437113_25-2	H437113_25-3	H437113_25-4	H437113_25-6	H437113_25-7	H437113_26-2
Data Quality (1-3)	1.5	1	1.5	1.5	1.5	1.5	3
1 standard error (ppm) *							
Li	0.09	2.68	3.61	0.26	0.15	BDL	BDL
B	0.43	9.43	2.29	0.54	0.49	0.78	0.74
Si	6243.46	6243.46	6243.46	6243.46	6243.46	6243.46	6243.46
P	198.36	1087.52	473.72	73.56	200.76	325.04	40.57
Sc	0.31	0.97	0.23	0.27	0.27	0.26	0.34
Ti	296.77	89.77	86.04	35.64	77.71	12.09	66.26
V	4.12	10.48	7.73	3.94	3.99	3.70	4.39
Cr	0.56	15.82	4.80	0.58	0.62	1.14	0.36
Mn	0.98	32.08	10.04	0.71	2.53	0.77	0.36
Co	0.05	0.84	0.40	0.08	0.30	0.10	0.08
Cu	2.54	67.64	23.19	1.41	7.61	2.81	1.17
Cu	1.98	45.07	23.44	1.72	6.03	2.21	1.13
Zn	0.45	14.71	0.58	0.45	0.35	1.52	0.57
Zn	0.68	13.75	1.45	0.57	0.81	0.82	0.25
As	0.27	7.68	1.85	1.09	0.84	0.51	0.79
Se	0.69	1.32	1.45	BDL	0.56	0.58	0.33
Se	BDL	10.27	2.82	1.32	1.20	1.03	BDL
Rb	0.18	0.81	0.24	0.11	0.18	0.10	0.09
Sr	11.93	164.02	32.96	2.46	13.02	4.79	12.96
Mo	0.31	14.73	4.57	1.32	3.33	0.96	1.64
Sn	0.15	1.66	0.32	0.06	0.03	0.10	BDL
Te	0.40	3.15	1.81	0.18	0.19	0.33	0.08
Cs	0.05	0.28	BDL	0.04	BDL	BDL	BDL
Ba	5.92	50.88	12.32	3.45	7.63	10.07	1.00
Ba	8.55	55.32	11.66	3.50	12.21	9.71	0.59
W	0.99	0.95	0.20	0.04	0.27	0.05	0.11
Pb	0.97	5.40	0.88	0.19	1.17	0.22	0.51
Bi	0.01	0.10	0.15	0.01	0.05	0.01	0.01
Th	1.37	5.42	3.89	0.64	0.81	1.57	1.51
U	0.05	0.60	0.18	0.03	0.09	0.14	0.08
Tl	BDL	BDL	BDL	0.02	BDL	BDL	BDL

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Pyr	Pyr	Pyr	Pyr	Pyr	Pyr	Pyr
LA-ICP-MS Spot ID	H437113_25-1	H437113_25-2	H437113_25-3	H437113_25-4	H437113_25-6	H437113_25-7	H437113_26-2
Data Quality (1-3)	1.5	1	1.5	1.5	1.5	1.5	3
1 standard error (ppm)**							
Li	0.17	6.13	4.65	0.27	0.39	BDL	BDL
B	2.21	26.96	9.07	4.44	2.01	2.66	2.26
Si	10724.62	10724.62	10724.62	10724.62	10724.62	10724.62	10724.62
P	1232.72	4795.24	2111.49	493.09	1482.48	2268.08	289.39
Sc	0.41	1.00	0.30	0.37	0.34	0.37	0.43
Ti	306.57	94.11	93.22	36.49	79.21	12.31	68.48
V	8.03	19.71	10.40	8.01	8.16	7.59	7.59
Cr	1.78	68.01	19.32	1.08	2.40	1.79	1.50
Mn	1.33	41.49	12.32	0.87	3.64	1.30	0.47
Co	0.06	0.89	0.41	0.08	0.30	0.11	0.08
Cu	7.23	167.63	53.01	3.46	25.68	8.28	2.78
Cu	6.76	156.93	52.24	4.00	24.80	8.07	2.63
Zn	0.50	14.80	0.64	0.46	0.41	1.54	0.59
Zn	0.79	13.97	1.68	0.61	0.93	0.96	0.31
As	3.08	43.29	12.22	4.41	8.32	3.32	3.30
Se	2.15	15.13	7.11	BDL	5.41	1.85	1.01
Se	BDL	50.39	13.41	3.52	9.84	2.41	BDL
Rb	0.18	0.82	0.25	0.11	0.18	0.10	0.09
Sr	13.06	166.02	35.87	2.50	13.38	5.06	13.21
Mo	0.60	30.35	8.08	2.47	7.54	2.40	3.00
Sn	0.18	1.87	0.42	0.07	0.04	0.10	BDL
Te	0.40	4.15	2.00	0.19	0.46	0.35	0.11
Cs	0.05	0.28	BDL	0.04	BDL	BDL	BDL
Ba	6.05	54.85	14.05	3.54	8.45	10.49	1.06
Ba	8.62	58.53	13.65	3.60	12.75	10.08	0.71
W	1.03	1.02	0.29	0.06	0.35	0.10	0.12
Pb	1.05	5.41	0.97	0.19	1.18	0.23	0.52
Bi	0.01	0.11	0.16	0.01	0.05	0.01	0.01
Th	1.97	6.31	5.56	0.65	0.95	1.57	1.68
U	0.07	0.72	0.20	0.04	0.14	0.15	0.08
Tl	BDL	BDL	BDL	0.02	BDL	BDL	BDL

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Pyr	Pyr	Pyr	Pyr	Pyr	Pyr	Pyr
LA-ICP-MS Spot ID	H437113_27-2	H437113_27-4	H437113_27-5	H437113_28-1	H437113_28-2	H437113_28-3	H437113_28-4
Data Quality (1-3)	2.5	3	2	2.5	2	3	2.5
Li (ppm)	1.48	1.22	5.19	0.62	2.09	0.63	3.35
B (ppm)	8.69	36.20	9.52	4.84	2.36	3.75	11.63
Si (ppm)	312172.77	312172.77	312172.77	312172.77	312172.77	312172.77	312172.77
P (ppm)	595.56	902.61	1024.28	829.02	1540.31	420.85	796.67
Sc (ppm)	5.81	4.20	1.77	5.80	3.91	3.87	4.66
Ti (ppm)	38.15	17.79	8.75	9.29	177.52	34.21	14.32
V (ppm)	118.22	105.66	100.84	116.77	101.52	87.53	93.69
Cr (ppm)	10.01	6.19	80.87	6.68	6.34	7.53	8.99
Mn (ppm)	0.09	10.79	9.78	2.51	10.74	5.38	6.12
Co (ppm)	BDL	0.41	0.21	0.18	BDL	0.52	BDL
Cu(63) (ppm)	2.40	12.56	11.08	3.83	2.26	3.03	5.89
Cu(65)* (ppm)	3.64	9.60	9.10	3.61	2.29	3.35	7.61
Zn(66)* (ppm)	2.09	7.61	3.21	1.94	1.68	1.72	9.97
Zn(68) (ppm)	5.19	10.07	6.48	8.09	6.57	4.22	12.72
As (ppm)	7.26	4.17	2.01	2.59	1.43	1.58	BDL
Se(76) (ppm)	3.96	4.25	BDL	4.75	2.74	4.00	BDL
Se(77)* (ppm)	1.81	BDL	BDL	1.85	BDL	1.96	BDL
Rb (ppm)	1.14	0.69	0.97	0.97	BDL	0.68	0.45
Sr (ppm)	82.70	87.96	113.31	253.50	779.95	28.04	97.79
Mo (ppm)	BDL	1.10	1.62	BDL	BDL	0.21	BDL
Sn (ppm)	BDL	0.26	BDL	0.46	0.18	0.06	0.38
Te (ppm)	BDL	0.18	0.87	BDL	BDL	BDL	BDL
Cs (ppm)	0.29	0.17	BDL	0.14	0.21	0.13	BDL
Ba(137) (ppm)	5.81	26.23	54.00	139.34	61.52	7.58	18.73
Ba(138)* (ppm)	5.38	25.59	30.02	135.49	59.65	6.69	23.64
W (ppm)	0.14	0.54	0.05	0.09	0.01	BDL	0.17
Pb (ppm)	3.56	4.52	0.86	6.46	17.78	0.29	5.09
Bi (ppm)	BDL	0.07	0.12	0.07	0.14	0.02	0.01
Th (ppm)	5.07	2.82	5.23	13.12	41.22	1.12	3.52
U (ppm)	0.30	0.29	0.19	0.14	1.39	0.04	0.20
Tl (ppm)	BDL	BDL	BDL	BDL	BDL	BDL	BDL
SiO2 wt.%	66.78	66.78	66.78	66.78	66.78	66.78	66.78

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Pyr	Pyr	Pyr	Pyr	Pyr	Pyr	Pyr
LA-ICP-MS Spot ID	H437113_27-2	H437113_27-4	H437113_27-5	H437113_28-1	H437113_28-2	H437113_28-3	H437113_28-4
Data Quality (1-3)	2.5	3	2	2.5	2	3	2.5
1 standard error (ppm) *							
Li	0.49	0.21	1.10	0.14	0.16	0.23	0.34
B	0.71	2.24	2.31	0.74	0.14	3.50	2.61
Si	6243.46	6243.46	6243.46	6243.46	6243.46	6243.46	6243.46
P	46.52	50.02	78.36	38.38	71.35	25.51	118.85
Sc	0.31	0.21	0.47	0.47	0.15	0.15	0.22
Ti	13.60	103.08	1.82	3.26	56.33	3.18	1.89
V	3.42	3.52	3.21	3.53	2.71	2.30	3.04
Cr	0.77	0.77	10.35	0.35	0.32	0.25	1.46
Mn	0.25	1.98	0.50	0.11	0.71	0.27	1.27
Co	BDL	0.20	0.14	0.04	BDL	0.06	BDL
Cu	0.12	2.32	2.09	0.41	0.15	0.75	1.35
Cu	0.57	1.76	1.43	0.31	0.13	0.43	0.73
Zn	0.40	0.97	0.36	0.38	0.18	0.25	2.72
Zn	0.28	1.73	0.72	0.44	0.28	0.20	2.23
As	0.32	0.59	0.38	0.24	0.11	0.09	BDL
Se	0.57	0.98	BDL	0.19	0.71	0.42	BDL
Se	0.26	BDL	BDL	0.60	BDL	0.97	BDL
Rb	0.15	0.09	0.31	0.06	BDL	0.17	0.09
Sr	16.38	4.48	12.92	37.15	47.36	7.97	8.94
Mo	BDL	0.35	0.27	BDL	BDL	0.08	BDL
Sn	BDL	0.13	BDL	0.08	0.06	0.01	0.15
Te	BDL	0.12	0.38	BDL	BDL	BDL	BDL
Cs	0.12	0.04	BDL	0.04	0.11	0.04	BDL
Ba	0.78	1.32	12.12	6.75	2.88	0.56	1.49
Ba	0.74	2.07	3.83	10.43	2.71	1.54	2.75
W	0.03	0.28	0.07	0.03	0.17	BDL	0.05
Pb	0.94	0.43	0.58	0.67	1.39	1.01	0.47
Bi	BDL	0.03	0.03	0.01	0.03	0.01	0.01
Th	0.72	0.71	1.09	1.73	2.15	0.16	0.67
U	0.03	0.04	0.04	0.02	0.11	0.02	0.02
Tl	BDL	BDL	BDL	BDL	BDL	BDL	BDL

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Pyr	Pyr	Pyr	Pyr	Pyr	Pyr	Pyr
LA-ICP-MS Spot ID	H437113_27-2	H437113_27-4	H437113_27-5	H437113_28-1	H437113_28-2	H437113_28-3	H437113_28-4
Data Quality (1-3)	2.5	3	2	2.5	2	3	2.5
1 standard error (ppm)**							
Li	0.53	0.27	1.33	0.17	0.34	0.25	0.59
B	3.24	13.37	4.17	1.91	0.87	3.76	4.98
Si	10724.62	10724.62	10724.62	10724.62	10724.62	10724.62	10724.62
P	177.47	264.35	304.81	241.48	448.67	123.69	258.10
Sc	0.41	0.28	0.48	0.54	0.23	0.23	0.31
Ti	14.08	103.09	2.00	3.38	58.86	4.57	2.34
V	6.67	6.21	5.84	6.66	5.61	4.82	5.46
Cr	2.16	1.47	19.30	1.39	1.32	1.54	2.33
Mn	0.25	2.02	0.62	0.15	0.82	0.34	1.30
Co	BDL	0.20	0.14	0.04	BDL	0.07	BDL
Cu	0.29	2.68	2.41	0.58	0.29	0.81	1.49
Cu	0.69	2.04	1.73	0.49	0.27	0.56	1.09
Zn	0.40	1.01	0.37	0.38	0.19	0.26	2.74
Zn	0.33	1.76	0.75	0.51	0.35	0.24	2.26
As	2.54	1.56	0.79	0.93	0.51	0.55	BDL
Se	3.22	3.54	BDL	3.81	2.30	3.23	BDL
Se	1.48	BDL	BDL	1.60	BDL	1.85	BDL
Rb	0.15	0.09	0.31	0.07	BDL	0.17	0.09
Sr	16.53	5.04	13.26	37.75	51.64	8.00	9.30
Mo	BDL	0.36	0.30	BDL	BDL	0.09	BDL
Sn	BDL	0.14	BDL	0.12	0.07	0.02	0.16
Te	BDL	0.12	0.42	BDL	BDL	BDL	BDL
Cs	0.13	0.04	BDL	0.04	0.11	0.04	BDL
Ba	0.80	1.53	12.23	7.91	3.41	0.60	1.59
Ba	0.76	2.19	3.92	11.06	3.16	1.55	2.82
W	0.04	0.29	0.07	0.03	0.17	BDL	0.06
Pb	0.95	0.48	0.58	0.73	1.59	1.01	0.52
Bi	BDL	0.03	0.03	0.01	0.03	0.01	0.01
Th	0.78	0.73	1.13	1.89	3.26	0.17	0.70
U	0.04	0.05	0.04	0.02	0.15	0.02	0.03
Tl	BDL	BDL	BDL	BDL	BDL	BDL	BDL

****DOES include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Pyr	Pyr	Pyr	Pyr	Pyr
LA-ICP-MS Spot ID	H437113_29-1	H437113_29-2	H437113_29-3	H437113_29-4	H437113_29-5
Data Quality (1-3)	1.5	3	3	1.5	3
Li (ppm)	2.00	BDL	BDL	0.20	0.99
B (ppm)	332.00	10.15	63.04	3.46	8.74
Si (ppm)	312172.77	312172.77	312172.77	312172.77	312172.77
P (ppm)	2384.29	412.19	796.76	2493.34	305.32
Sc (ppm)	4.73	6.74	5.82	4.63	5.35
Ti (ppm)	176.10	12.02	12.59	10.61	70.17
V (ppm)	122.27	121.47	119.46	125.23	126.81
Cr (ppm)	7.91	7.60	7.03	8.90	7.38
Mn (ppm)	7.96	4.16	5.14	12.67	6.55
Co (ppm)	0.36	BDL	0.09	0.38	0.13
Cu(63) (ppm)	20.99	11.26	8.83	29.47	6.09
Cu(65)* (ppm)	22.17	11.57	8.85	35.12	5.96
Zn(66)* (ppm)	5.79	5.61	6.57	3.26	1.92
Zn(68) (ppm)	10.14	9.14	7.05	16.03	5.27
As (ppm)	8.12	5.85	5.08	7.05	6.53
Se(76) (ppm)	3.90	3.21	5.95	4.15	1.63
Se(77)* (ppm)	4.95	BDL	3.78	6.44	BDL
Rb (ppm)	1.10	1.12	1.31	1.19	1.31
Sr (ppm)	375.02	7.88	9.39	18.65	1.99
Mo (ppm)	60.06	36.41	24.06	46.48	13.89
Sn (ppm)	0.50	0.25	0.27	BDL	0.25
Te (ppm)	1.02	1.12	0.12	1.02	0.12
Cs (ppm)	BDL	BDL	BDL	BDL	0.13
Ba(137) (ppm)	47.91	5.37	6.22	142.74	15.33
Ba(138)* (ppm)	49.89	4.32	6.67	133.60	19.25
W (ppm)	0.98	0.32	0.24	0.46	0.35
Pb (ppm)	37.11	0.72	0.35	0.26	0.10
Bi (ppm)	0.20	0.10	0.03	0.04	0.01
Th (ppm)	68.25	1.57	1.63	0.59	0.02
U (ppm)	1.18	0.11	0.14	1.38	0.07
Tl (ppm)	BDL	BDL	BDL	BDL	BDL
SiO2 wt.%	66.78	66.78	66.78	66.78	66.78

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Pyr	Pyr	Pyr	Pyr	Pyr
LA-ICP-MS Spot ID	H437113_29-1	H437113_29-2	H437113_29-3	H437113_29-4	H437113_29-5
Data Quality (1-3)	1.5	3	3	1.5	3
1 standard error (ppm) *					
Li	0.21	BDL	BDL	0.21	0.22
B	22.78	1.68	5.72	0.29	0.76
Si	6243.46	6243.46	6243.46	6243.46	6243.46
P	104.28	19.57	32.35	108.34	16.31
Sc	0.18	0.44	0.27	0.24	0.19
Ti	36.64	1.46	1.00	0.62	5.71
V	3.79	3.23	3.24	3.77	3.48
Cr	0.74	0.53	0.43	0.50	0.38
Mn	0.38	0.36	0.26	0.93	0.48
Co	0.06	BDL	0.02	0.09	0.09
Cu	0.98	0.58	0.39	1.28	0.32
Cu	0.90	1.02	0.41	3.60	0.22
Zn	0.80	1.74	0.32	0.49	0.11
Zn	0.70	1.67	1.07	2.36	0.30
As	0.28	0.30	0.21	0.63	0.28
Se	0.75	0.18	0.61	0.41	0.28
Se	0.75	BDL	0.66	0.53	BDL
Rb	0.12	0.03	0.27	0.22	0.08
Sr	13.57	0.74	4.47	2.46	0.43
Mo	3.72	1.99	1.13	2.35	0.69
Sn	0.09	0.12	0.09	BDL	0.03
Te	0.22	0.32	0.08	0.17	0.19
Cs	BDL	BDL	BDL	BDL	0.02
Ba	2.02	0.50	0.84	30.69	1.79
Ba	1.97	0.22	0.77	29.82	2.94
W	0.21	0.03	0.03	0.06	0.08
Pb	2.98	0.24	0.10	0.05	0.02
Bi	0.03	0.02	0.01	0.01	0.01
Th	3.45	0.39	0.64	0.06	0.07
U	0.09	0.03	0.04	0.09	0.01
Tl	BDL	BDL	BDL	BDL	BDL

***does NOT include uncertainty in calibration standard**

Table F1. Trace element concentrations (ppm) in minerals determined by LA-ICP-MS (continued)

Mineral	Pyr	Pyr	Pyr	Pyr	Pyr
LA-ICP-MS Spot ID	H437113_29-1	H437113_29-2	H437113_29-3	H437113_29-4	H437113_29-5
Data Quality (1-3)	1.5	3	3	1.5	3
1 standard error (ppm)**					
Li	0.35	BDL	BDL	0.21	0.27
B	123.02	4.06	23.66	1.29	3.27
Si	10724.62	10724.62	10724.62	10724.62	10724.62
P	693.55	120.14	231.40	725.17	89.30
Sc	0.28	0.53	0.38	0.32	0.31
Ti	40.35	1.86	1.57	1.19	8.83
V	7.03	6.70	6.63	7.13	7.05
Cr	1.76	1.62	1.48	1.86	1.53
Mn	0.49	0.39	0.33	1.05	0.54
Co	0.06	BDL	0.03	0.09	0.09
Cu	2.47	1.34	1.03	3.43	0.73
Cu	2.52	1.60	1.02	5.18	0.67
Zn	0.82	1.75	0.39	0.50	0.12
Zn	0.77	1.69	1.10	2.41	0.35
As	2.83	2.05	1.77	2.52	2.28
Se	3.21	2.58	4.80	3.35	1.34
Se	4.04	BDL	3.10	5.19	BDL
Rb	0.12	0.04	0.28	0.22	0.08
Sr	16.80	0.77	4.48	2.51	0.43
Mo	6.08	3.53	2.24	4.41	1.31
Sn	0.13	0.13	0.10	BDL	0.05
Te	0.28	0.38	0.08	0.25	0.19
Cs	BDL	BDL	BDL	BDL	0.02
Ba	2.47	0.52	0.86	30.98	1.85
Ba	2.39	0.25	0.79	30.04	2.98
W	0.24	0.05	0.04	0.08	0.09
Pb	3.40	0.25	0.10	0.05	0.02
Bi	0.04	0.02	0.01	0.01	0.01
Th	5.32	0.40	0.65	0.07	0.07
U	0.13	0.03	0.04	0.14	0.01
Tl	BDL	BDL	BDL	BDL	BDL

****DOES include uncertainty in calibration standard**

Appendix G. Inductively coupled plasma-mass spectrometry and inductively coupled plasma-atomic emission spectroscopy data (ICP-MS/AES)

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES

East (NAD 27)	304931	304728	304690	304552	304589	304720	304909	305129	304932
North (NAD 27)	4316567	4316718	4316602	4316780	4316821	4316883	4316806	4316828	4316512
Classification	Plag-KSpar	Plagioclase	Plag-KSpar	Plag-KSpar	Plagioclase	Plag-KSpar	Plag-KSpar	Plagioclase	Plag-KSpar
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	G909001	G909002	G909003	G909004	G909005	G909006	G909007	G909008	G909009
Lithology	Porphyry	Porphyry	Porphyry	Porphyry	Porphyry	Porphyry	McLeod	Porphyry	Porphyry
Ag (ppm)	0.01	0.01	-0.01	0.01	-0.01	0.35	0.12	0.07	0.08
Al (%)	6.78	6.87	7.23	7.16	7.21	7.61	7.94	7.01	7.2
As (ppm)	-0.2	2.5	2.2	5	2.2	4.8	2.3	0.4	0.6
Ba (ppm)	1580	210	1390	1640	170	2370	870	130	1640
Be (ppm)	1.96	1.74	1.7	1.92	1.8	1.65	1.97	1.81	1.57
Bi (ppm)	0.1	0.04	0.14	0.07	0.1	0.5	0.24	0.07	0.12
Ca (%)	1.95	2.03	2.49	2.52	2.52	2.04	3.53	2.26	2.09
Cd (ppm)	0.03	0.04	0.03	0.03	0.03	0.04	0.05	-0.02	0.05
Ce (ppm)	35.8	38.7	37	43.7	30.5	50.2	62.4	77.9	36.8
Co (ppm)	3	1.5	6.2	3.7	2	3	12.5	1.6	2.2
Cr (ppm)	28	17	14	19	21	16	12	16	24
Cs (ppm)	0.42	0.2	0.79	0.8	0.38	0.86	1.41	0.54	0.62
Cu (ppm)	18.4	539	59.1	59.5	10.8	114	46.9	17	71.2
Fe (%)	0.8	0.93	1.3	1.62	0.93	1.4	2.41	0.61	0.59
Ga (ppm)	22.1	20.1	22.6	22.3	20.6	20.5	22.6	21	20.5
Ge (ppm)	0.11	0.1	0.1	0.13	0.1	0.14	0.17	0.11	0.1
Hf (ppm)	1.5	1.8	1.4	1.4	1.7	1.5	0.7	1.4	1.2
In (ppm)	0.031	0.025	0.09	0.04	0.035	0.074	0.096	0.035	0.021
K (%)	2.98	0.18	2.13	2.76	0.29	3.07	1.71	0.36	2.94
La (ppm)	16.8	18.4	18.2	21	13.1	25.7	28.2	48.2	18.3
Li (ppm)	5	3.9	3.6	3.9	3.8	5.7	5.7	4.3	2.4
Mg (%)	0.46	0.61	0.51	0.63	0.63	0.52	1.24	0.67	0.46
Mn (ppm)	126	84	183	193	144	96	379	91	121
Mo (ppm)	0.68	1.12	0.68	2.55	0.45	2.46	1.82	0.58	0.69
Na (%)	2.98	4.46	2.98	2.72	4.25	3.04	3.34	4.4	3.13
Nb (ppm)	3.4	2.7	2.9	3.6	2.6	3.6	5.4	3.1	3
Ni (ppm)	8.5	7.4	8.5	9.9	9.5	7.2	14.7	9.8	8.4
P (ppm)	640	850	750	880	810	820	1580	780	650
Pb (ppm)	5.2	3.1	4.7	5.9	2.9	6.9	6.5	3.7	7.1
Rb (ppm)	59.5	4	47.3	62.9	7.7	71	52.6	9.5	68.1
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.01	0.02	0.01	0.05	0.03	0.03	0.01	-0.01	0.02
Sb (ppm)	1.34	0.41	0.92	0.58	0.77	0.47	0.96	0.49	0.92

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	304931	304728	304690	304552	304589	304720	304909	305129	304932
North (NAD 27)	4316567	4316718	4316602	4316780	4316821	4316883	4316806	4316828	4316512
Classification	Plag-KSpar	Plagioclase	Plag-KSpar	Plag-KSpar	Plagioclase	Plag-KSpar	Plag-KSpar	Plagioclase	Plag-KSpar
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	G909001	G909002	G909003	G909004	G909005	G909006	G909007	G909008	G909009
Lithology	Porphyry	Porphyry	Porphyry	Porphyry	Porphyry	Porphyry	McLeod	Porphyry	Porphyry
Ag (ppm)	0.01	0.01	-0.01	0.01	-0.01	0.35	0.12	0.07	0.08
Al (%)	6.78	6.87	7.23	7.16	7.21	7.61	7.94	7.01	7.2
As (ppm)	-0.2	2.5	2.2	5	2.2	4.8	2.3	0.4	0.6
Ba (ppm)	1580	210	1390	1640	170	2370	870	130	1640
Be (ppm)	1.96	1.74	1.7	1.92	1.8	1.65	1.97	1.81	1.57
Bi (ppm)	0.1	0.04	0.14	0.07	0.1	0.5	0.24	0.07	0.12
Ca (%)	1.95	2.03	2.49	2.52	2.52	2.04	3.53	2.26	2.09
Cd (ppm)	0.03	0.04	0.03	0.03	0.03	0.04	0.05	-0.02	0.05
Ce (ppm)	35.8	38.7	37	43.7	30.5	50.2	62.4	77.9	36.8
Co (ppm)	3	1.5	6.2	3.7	2	3	12.5	1.6	2.2
Cr (ppm)	28	17	14	19	21	16	12	16	24
Cs (ppm)	0.42	0.2	0.79	0.8	0.38	0.86	1.41	0.54	0.62
Cu (ppm)	18.4	539	59.1	59.5	10.8	114	46.9	17	71.2
Fe (%)	0.8	0.93	1.3	1.62	0.93	1.4	2.41	0.61	0.59
Ga (ppm)	22.1	20.1	22.6	22.3	20.6	20.5	22.6	21	20.5
Ge (ppm)	0.11	0.1	0.1	0.13	0.1	0.14	0.17	0.11	0.1
Hf (ppm)	1.5	1.8	1.4	1.4	1.7	1.5	0.7	1.4	1.2
In (ppm)	0.031	0.025	0.09	0.04	0.035	0.074	0.096	0.035	0.021
K (%)	2.98	0.18	2.13	2.76	0.29	3.07	1.71	0.36	2.94
La (ppm)	16.8	18.4	18.2	21	13.1	25.7	28.2	48.2	18.3
Li (ppm)	5	3.9	3.6	3.9	3.8	5.7	5.7	4.3	2.4
Mg (%)	0.46	0.61	0.51	0.63	0.63	0.52	1.24	0.67	0.46
Mn (ppm)	126	84	183	193	144	96	379	91	121
Mo (ppm)	0.68	1.12	0.68	2.55	0.45	2.46	1.82	0.58	0.69
Na (%)	2.98	4.46	2.98	2.72	4.25	3.04	3.34	4.4	3.13
Nb (ppm)	3.4	2.7	2.9	3.6	2.6	3.6	5.4	3.1	3
Ni (ppm)	8.5	7.4	8.5	9.9	9.5	7.2	14.7	9.8	8.4
P (ppm)	640	850	750	880	810	820	1580	780	650
Pb (ppm)	5.2	3.1	4.7	5.9	2.9	6.9	6.5	3.7	7.1
Rb (ppm)	59.5	4	47.3	62.9	7.7	71	52.6	9.5	68.1
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.01	0.02	0.01	0.05	0.03	0.03	0.01	-0.01	0.02
Sb (ppm)	1.34	0.41	0.92	0.58	0.77	0.47	0.96	0.49	0.92

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	304931	304728	304690	304552	304589	304720	304909	305129	304932
North (NAD 27)	4316567	4316718	4316602	4316780	4316821	4316883	4316806	4316828	4316512
Classification	Plag-KSpar	Plagioclase	Plag-KSpar	Plag-KSpar	Plagioclase	Plag-KSpar	Plag-KSpar	Plagioclase	Plag-KSpar
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	G909001	G909002	G909003	G909004	G909005	G909006	G909007	G909008	G909009
Lithology	Porphyry	Porphyry	Porphyry	Porphyry	Porphyry	Porphyry	McLeod	Porphyry	Porphyry
Sc (ppm)	4.8	5.7	5.1	6.3	5.3	5.7	10.1	6	4.8
Se (ppm)	1	2	2	2	1	2	1	1	1
Sn (ppm)	0.7	0.7	0.6	0.7	0.6	2.1	1.3	1.5	0.7
Sr (ppm)	992	1115	1225	1095	1310	1075	1270	973	1050
Ta (ppm)	0.23	0.19	0.2	0.25	0.17	0.27	0.34	0.22	0.22
Te (ppm)	-0.05	0.09	0.05	0.08	-0.05	0.28	0.05	-0.05	-0.05
Th (ppm)	7.3	4.9	6.7	8	4.5	7.8	8.8	6.7	6.7
Ti (%)	0.227	0.254	0.235	0.283	0.237	0.272	0.473	0.259	0.217
Tl (ppm)	0.21	0.03	0.22	0.26	0.05	0.27	0.21	0.05	0.23
U (ppm)	2.6	2.4	3.9	3.6	1.8	3.4	3.8	2.5	2.4
V (ppm)	40	59	62	69	55	59	121	59	41
W (ppm)	0.5	0.7	0.6	1.1	0.6	0.6	0.7	0.3	0.4
Y (ppm)	5.6	6	5.9	7.6	5.3	6.8	12.3	6	5.1
Zn (ppm)	9	6	14	16	11	10	32	9	12
Zr (ppm)	33	46.3	33.2	27.4	48.8	40.2	15.3	38.7	31.4
Al2O3 (%)	12.81	12.98	13.66	13.53	13.62	14.38	15.00	13.24	13.60
CaO (%)	2.73	2.84	3.48	3.53	3.53	2.85	4.94	3.16	2.92
FeO (%)	1.03	1.20	1.67	2.08	1.20	1.80	3.10	0.78	0.76
K2O (%)	3.59	0.22	2.57	3.33	0.35	3.70	2.06	0.43	3.54
MgO (%)	0.76	1.01	0.85	1.04	1.04	0.86	2.06	1.11	0.76
Na2O (%)	4.02	6.01	4.02	3.67	5.73	4.10	4.50	5.93	4.22
P2O5 (%)	0.15	0.19	0.17	0.20	0.19	0.19	0.36	0.18	0.15
TiO2 (%)	0.38	0.42	0.39	0.47	0.40	0.45	0.79	0.43	0.36
SO3 (%)	0.03	0.05	0.03	0.13	0.08	0.08	0.03	-0.03	0.05
Total (%)	25.49	24.92	26.83	27.97	26.12	28.41	32.83	25.25	26.37
SiO2 (%)	72.73	73.33	71.29	70.07	72.05	69.61	64.87	72.98	71.79
Al_m	0.25	0.25	0.27	0.27	0.27	0.28	0.29	0.26	0.27
Ca_m	0.05	0.05	0.06	0.06	0.06	0.05	0.09	0.06	0.05
K_m	0.08	0.00	0.05	0.07	0.01	0.08	0.04	0.01	0.08
Na_m	0.13	0.19	0.13	0.12	0.18	0.13	0.15	0.19	0.14
K_Al	0.30	0.02	0.20	0.27	0.03	0.28	0.15	0.04	0.28
Na_Al	0.52	0.76	0.48	0.45	0.69	0.47	0.49	0.74	0.51
Plag	0.71	0.96	0.72	0.68	0.93	0.65	0.79	0.95	0.71

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	304798	304694	304543	304374	304034	304639	304608	304572	304539
North (NAD 27)	4316504	4316384	4316253	4316203	4316210	4317241	4317263	4317289	4317313
Classification	Plag-KSpar	Plag-KSpar	Plagioclase	Plag-KSpar	Plag-KSpar	Albite	Plagioclase	Plag-KSpar	Plag-KSpar
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	G909010	G909011	G909012	G909013	G909014	G909033	G909034	G909035	G909036
Lithology	Porphyry	Porphyry	Porphyry	Porphyry	McLeod	null	null	null	null
Ag (ppm)	0.03	0.03	0.02	0.04	0.1	0.15	0.38	0.42	0.38
Al (%)	7.32	7.27	7.06	7.4	7.8	6.38	7.14	7.86	7.95
As (ppm)	1.3	4.4	0.5	2.5	2.3	0.4	0.8	-0.2	0.3
Ba (ppm)	2130	2090	140	2070	1210	130	170	670	1080
Be (ppm)	1.55	1.73	1.71	1.81	1.99	1.85	1.65	1.92	1.66
Bi (ppm)	0.2	0.26	0.11	0.25	0.14	0.1	0.14	0.16	0.21
Ca (%)	2.27	1.84	2.12	1.73	2.69	1.16	1.67	2.01	2
Cd (ppm)	-0.02	0.02	0.02	0.02	0.05	-0.02	-0.02	-0.02	-0.02
Ce (ppm)	38.8	33.1	38.6	41.4	54.6	25.3	14.55	49.6	46.1
Co (ppm)	3.4	7.2	1.9	24.8	15.9	1.2	1.9	11.4	8.5
Cr (ppm)	29	21	22	21	12	10	12	10	12
Cs (ppm)	0.5	0.7	0.18	1.38	1.64	0.49	1.65	2.64	2.77
Cu (ppm)	22.3	8.6	13.7	9	107.5	4210	4110	4580	2530
Fe (%)	1.15	1.35	0.86	1.63	3.65	0.69	0.83	2.74	2.29
Ga (ppm)	21.8	20.7	20.1	20.8	21.6	18.1	16.95	21.6	21.2
Ge (ppm)	0.11	0.12	0.09	0.12	0.17	0.12	0.09	0.15	0.13
Hf (ppm)	1.5	1.5	1.2	1.2	0.6	0.5	0.4	0.3	0.3
In (ppm)	0.089	0.044	0.038	0.021	0.039	0.028	0.028	0.038	0.025
K (%)	3.66	3.68	0.27	3.61	2.53	0.52	0.69	1.81	2.77
La (ppm)	18.2	14.4	20	22.6	27	10.8	7.4	24.1	22.4
Li (ppm)	3.9	2.5	4.1	3.6	5	3.9	5.1	6.2	6.3
Mg (%)	0.67	0.51	0.47	0.46	1.23	0.9	0.77	1.32	1.35
Mn (ppm)	122	147	126	186	543	35	37	99	96
Mo (ppm)	0.54	0.69	0.51	0.86	1.22	82.9	12.6	1.59	1.12
Na (%)	2.79	2.89	4.64	2.74	2.75	4.15	3.63	2.89	2.42
Nb (ppm)	3.2	3.1	2.9	2.9	4.8	4.1	2.1	2.9	2.2
Ni (ppm)	9.6	8.7	6.1	8.1	17.1	9.4	8.8	15.5	15.7
P (ppm)	720	650	600	660	1360	780	960	1170	1270
Pb (ppm)	2.9	4.3	2.2	5.4	12.2	3.2	4.5	4.1	4.5
Rb (ppm)	92.9	92.9	8	112.5	87.3	23.1	35.3	73.5	101.5
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	0.033	0.009	-0.002	0.002
S (%)	0.01	0.05	0.02	0.01	0.01	0.42	0.42	0.48	0.28
Sb (ppm)	2	1.32	1.1	1.16	0.63	0.38	0.36	0.21	0.21

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	304798	304694	304543	304374	304034	304639	304608	304572	304539
North (NAD 27)	4316504	4316384	4316253	4316203	4316210	4317241	4317263	4317289	4317313
Classification	Plag-KSpar	Plag-KSpar	Plagioclase	Plag-KSpar	Plag-KSpar	Albite	Plagioclase	Plag-KSpar	Plag-KSpar
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	G909010	G909011	G909012	G909013	G909014	G909033	G909034	G909035	G909036
Lithology	Porphyry	Porphyry	Porphyry	Porphyry	McLeod	null	null	null	null
Sc (ppm)	6.6	5.6	4.9	5.1	12	5.9	8.8	11.1	11
Se (ppm)	1	1	1	1	1	6	5	4	3
Sn (ppm)	0.8	0.7	0.7	0.6	1	1.2	1	1.4	1.1
Sr (ppm)	983	925	1080	1045	933	354	730	814	785
Ta (ppm)	0.22	0.22	0.21	0.22	0.34	0.29	0.17	0.2	0.17
Te (ppm)	-0.05	0.14	-0.05	0.14	-0.05	-0.05	0.1	0.12	0.09
Th (ppm)	6.6	6.7	6.5	7.4	10.4	16.2	11.7	6.8	10.6
Ti (%)	0.259	0.224	0.206	0.213	0.416	0.217	0.193	0.323	0.289
Tl (ppm)	0.32	0.28	0.04	0.39	0.33	0.11	0.19	0.35	0.48
U (ppm)	3	2.7	2.6	2.7	3.2	2.7	1.7	2.4	3
V (ppm)	61	53	42	48	114	66	69	109	112
W (ppm)	0.9	0.9	0.4	0.8	1.3	2.5	2.7	1.3	2.4
Y (ppm)	6.1	5.2	5	5.1	12.1	8.1	6.3	11.1	10.5
Zn (ppm)	6	9	8	15	69	5	8	13	17
Zr (ppm)	47.9	46	28.5	28.8	12.2	12	7.6	5.4	6.4
Al2O3 (%)	13.83	13.73	13.34	13.98	14.73	12.05	13.49	14.85	15.02
CaO (%)	3.18	2.57	2.97	2.42	3.76	1.62	2.34	2.81	2.80
FeO (%)	1.48	1.74	1.11	2.10	4.69	0.89	1.07	3.52	2.94
K2O (%)	4.41	4.43	0.33	4.35	3.05	0.63	0.83	2.18	3.34
MgO (%)	1.11	0.85	0.78	0.76	2.04	1.49	1.28	2.19	2.24
Na2O (%)	3.76	3.90	6.25	3.69	3.71	5.59	4.89	3.90	3.26
P2O5 (%)	0.16	0.15	0.14	0.15	0.31	0.18	0.22	0.27	0.29
TiO2 (%)	0.43	0.37	0.34	0.36	0.69	0.36	0.32	0.54	0.48
SO3 (%)	0.03	0.13	0.05	0.03	0.03	1.05	1.05	1.20	0.70
Total (%)	28.39	27.87	25.30	27.83	33.02	23.87	25.48	31.46	31.07
SiO2 (%)	69.63	70.18	72.93	70.22	64.67	74.46	72.73	66.34	66.75
Al_m	0.27	0.27	0.26	0.27	0.29	0.24	0.26	0.29	0.29
Ca_m	0.06	0.05	0.05	0.04	0.07	0.03	0.04	0.05	0.05
K_m	0.09	0.09	0.01	0.09	0.06	0.01	0.02	0.05	0.07
Na_m	0.12	0.13	0.20	0.12	0.12	0.18	0.16	0.13	0.11
K_Al	0.35	0.35	0.03	0.34	0.22	0.06	0.07	0.16	0.24
Na_Al	0.45	0.47	0.77	0.43	0.41	0.76	0.60	0.43	0.36
Plag	0.66	0.64	0.97	0.59	0.65	0.89	0.75	0.60	0.53

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	304505	304471	304437	304405	304369	304336	304302	304267	304234
North (NAD 27)	4317337	4317361	4317385	4317408	4317433	4317457	4317482	4317506	4317530
Classification	Plag-KSpar	Plag-KSpar	Albite	Plag-KSpar	Plag-KSpar	Plagioclase	Plag-KSpar	Plag-KSpar	Plag-KSpar
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	G909037	G909038	G909039	G909040	G909041	G909042	G909043	G909044	G909045
Lithology	null	null	null	null	null	null	null	null	null
Ag (ppm)	0.62	0.45	0.23	0.92	0.71	0.41	0.57	0.3	0.57
Al (%)	7.67	8.05	7.28	8.05	7.8	7.97	8.05	7.34	7.14
As (ppm)	1.9	-0.2	-0.2	2.1	1.1	7.8	1	2.6	0.5
Ba (ppm)	1270	1140	380	1440	800	330	930	960	1720
Be (ppm)	1.47	1.57	1.69	1.71	1.76	2.49	2.36	2.14	1.6
Bi (ppm)	0.73	0.6	0.11	0.77	0.37	0.27	0.26	0.34	0.34
Ca (%)	1.88	1.93	1.11	1.68	2.95	1.48	2.35	1.51	1.16
Cd (ppm)	0.02	0.02	-0.02	-0.02	0.02	0.19	0.04	0.02	-0.02
Ce (ppm)	37.9	48.6	42.7	36.2	51.2	47.9	51	48.9	43.6
Co (ppm)	11.6	9.8	6.6	3.8	7.5	4.9	7.4	2.7	1.9
Cr (ppm)	12	10	12	12	12	12	10	12	11
Cs (ppm)	2.42	2.61	1.06	1.34	1.84	1.97	1.89	1.37	1.21
Cu (ppm)	4320	4670	4820	8060	9610	6000	4200	3170	2070
Fe (%)	2.84	2.49	1.26	1.56	3.03	1.26	2.13	0.82	0.48
Ga (ppm)	20.8	22.4	19.2	21.9	21.1	21.8	22.8	20.6	18.95
Ge (ppm)	0.14	0.15	0.12	0.15	0.16	0.13	0.15	0.12	0.11
Hf (ppm)	0.2	0.2	1	0.2	0.3	0.6	0.5	0.8	0.8
In (ppm)	0.053	0.04	0.032	0.062	0.058	0.056	0.041	0.035	0.013
K (%)	2.81	2.76	0.83	2.77	1.51	1.33	1.97	2.81	3.35
La (ppm)	18.5	23.7	21	17	25.2	23.1	20.7	22.7	21
Li (ppm)	6.3	8.2	5.9	7.8	7	8.8	10.4	7.6	7.6
Mg (%)	1.4	1.58	0.71	1.36	1.38	1.4	1.43	0.88	0.63
Mn (ppm)	118	80	46	57	108	49	95	47	34
Mo (ppm)	128	1.83	17.8	3.52	39	7.66	12.25	28.3	299
Na (%)	2.22	2.43	4.12	2.31	2.34	4.07	2.82	2.93	2.87
Nb (ppm)	2.2	2.4	1.9	2.2	2.9	2.7	2.4	2.3	1.6
Ni (ppm)	16.9	19	8.3	16.6	18.5	33.4	17.9	12.5	9.7
P (ppm)	1220	1520	780	1440	1310	1370	1520	960	790
Pb (ppm)	6.7	4.6	4.3	4.5	5.4	21.2	7.6	6.3	7.3
Rb (ppm)	97.7	105.5	34.3	89.6	54.9	64	64.5	78.7	79.9
Re (ppm)	0.024	-0.002	0.018	0.004	0.023	0.01	0.013	0.011	0.293
S (%)	0.44	0.48	0.91	0.78	0.96	0.62	0.54	0.33	0.18
Sb (ppm)	0.45	0.24	0.48	0.75	0.45	1.52	0.69	0.99	0.32

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	304505	304471	304437	304405	304369	304336	304302	304267	304234
North (NAD 27)	4317337	4317361	4317385	4317408	4317433	4317457	4317482	4317506	4317530
Classification	Plag-KSpar	Plag-KSpar	Albite	Plag-KSpar	Plag-KSpar	Plagioclase	Plag-KSpar	Plag-KSpar	Plag-KSpar
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	G909037	G909038	G909039	G909040	G909041	G909042	G909043	G909044	G909045
Lithology	null	null	null	null	null	null	null	null	null
Sc (ppm)	11.1	12.2	5.6	11.1	12	10.5	11.5	7.3	5.7
Se (ppm)	9	7	4	8	6	5	4	4	3
Sn (ppm)	1	1.6	1.5	2.2	2.3	2.2	1.7	1.3	1
Sr (ppm)	785	783	701	731	1070	607	890	725	895
Ta (ppm)	0.17	0.17	0.14	0.16	0.21	0.18	0.16	0.17	0.12
Te (ppm)	0.41	0.21	-0.05	0.19	0.12	0.07	0.15	0.07	0.06
Th (ppm)	6.7	8.6	6.4	7.5	9.9	10.7	7.1	11.1	8.2
Ti (%)	0.317	0.33	0.183	0.267	0.331	0.283	0.313	0.204	0.151
Tl (ppm)	0.49	0.48	0.16	0.45	0.3	0.35	0.45	0.39	0.4
U (ppm)	1.3	2	2	1.8	2.9	2.8	2.6	2.5	1.4
V (ppm)	110	128	63	106	124	111	121	79	58
W (ppm)	0.6	1.4	2.3	2.4	1.8	2.4	1.5	1.8	1.4
Y (ppm)	8.9	10.7	5.4	10.1	11.6	11.7	11.9	10.2	6.9
Zn (ppm)	24	12	4	13	14	60	24	12	11
Zr (ppm)	4.7	5.2	30	5.2	6.1	10.8	8.3	19	20.6
Al2O3 (%)	14.49	15.21	13.75	15.21	14.73	15.06	15.21	13.87	13.49
CaO (%)	2.63	2.70	1.55	2.35	4.13	2.07	3.29	2.11	1.62
FeO (%)	3.65	3.20	1.62	2.01	3.90	1.62	2.74	1.05	0.62
K2O (%)	3.39	3.33	1.00	3.34	1.82	1.60	2.37	3.39	4.04
MgO (%)	2.32	2.62	1.18	2.25	2.29	2.32	2.37	1.46	1.04
Na2O (%)	2.99	3.28	5.55	3.11	3.15	5.49	3.80	3.95	3.87
P2O5 (%)	0.28	0.35	0.18	0.33	0.30	0.31	0.35	0.22	0.18
TiO2 (%)	0.53	0.55	0.31	0.45	0.55	0.47	0.52	0.34	0.25
SO3 (%)	1.10	1.20	2.28	1.95	2.40	1.55	1.35	0.83	0.45
Total (%)	31.38	32.43	27.42	30.99	33.27	30.49	32.00	27.21	25.56
SiO2 (%)	66.42	65.30	70.67	66.84	64.40	67.37	65.76	70.88	72.65
Al_m	0.28	0.30	0.27	0.30	0.29	0.30	0.30	0.27	0.26
Ca_m	0.05	0.05	0.03	0.04	0.07	0.04	0.06	0.04	0.03
K_m	0.07	0.07	0.02	0.07	0.04	0.03	0.05	0.07	0.09
Na_m	0.10	0.11	0.18	0.10	0.10	0.18	0.12	0.13	0.12
K_Al	0.25	0.24	0.08	0.24	0.13	0.12	0.17	0.27	0.32
Na_Al	0.34	0.35	0.66	0.34	0.35	0.60	0.41	0.47	0.47
Plag	0.51	0.52	0.77	0.48	0.61	0.72	0.61	0.61	0.58

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	304200	304171	304038	304018	303997	305124	304797	304649	303975
North (NAD 27)	4317554	4317575	4317885	4317900	4317917	4316373	4316337	4316233	4317934
Classification	Plag-KSpar	Plag-KSpar	Plag-KSpar	Plag-KSpar	Sericite	Plag-KSpar	Plag-KSpar	Plag-KSpar	Sericite
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	G909046	G909047	G909048	G909049	G909050	G909101	G909102	G909103	G909104
Lithology	null	null	null	null	null	Porphyry	Porphyry	Porphyry	null
Ag (ppm)	0.89	1.58	0.22	0.57	0.72	0.05	0.01	0.01	0.76
Al (%)	7.43	7.4	7.13	7.52	6.97	7.42	7.26	7.44	7.38
As (ppm)	-0.2	0.4	-0.2	2	1.6	2.5	0.8	1	16.4
Ba (ppm)	780	1440	1050	1060	2350	1620	1800	1640	1440
Be (ppm)	1.38	1.96	1.62	1.86	1	1.65	1.73	1.76	1.22
Bi (ppm)	0.5	0.95	0.08	0.35	0.35	0.1	0.1	0.13	1.14
Ca (%)	1.65	1.15	1.4	1.51	0.79	2.41	1.79	1.72	1.26
Cd (ppm)	-0.02	0.03	0.03	-0.02	0.02	0.02	0.02	-0.02	0.02
Ce (ppm)	51.5	50.9	29.4	45.4	32.3	41.2	30.1	47.2	31.8
Co (ppm)	3.9	3.4	4.7	7.6	5.2	4.6	4	3.2	19.3
Cr (ppm)	16	12	13	17	11	19	20	21	13
Cs (ppm)	1.45	1.8	0.78	1.75	1.31	0.69	0.4	0.49	1.76
Cu (ppm)	2550	6040	1970	4770	5000	134	18.1	14.9	6080
Fe (%)	0.99	0.96	1.23	2.39	1.43	1.51	1.05	1.08	2.54
Ga (ppm)	17.9	19.9	20.4	21.8	18.55	20.1	20.8	21.6	20.5
Ge (ppm)	0.32	0.12	0.1	0.15	0.12	0.11	0.11	0.12	0.13
Hf (ppm)	0.9	0.8	1.2	0.4	1.1	1.4	1.7	1.8	1.4
In (ppm)	0.014	0.029	0.026	0.049	0.082	0.024	0.025	0.094	0.116
K (%)	2.3	3.66	2.24	2.25	4.27	2.72	3.57	3.83	3.55
La (ppm)	22.2	24.9	14.4	22.6	17.6	19.8	12.9	23.6	17.2
Li (ppm)	8.2	7	6.5	10	6	4.5	4.2	3.5	7.3
Mg (%)	1.19	0.78	0.72	1.45	0.5	0.66	0.52	0.57	1.08
Mn (ppm)	44	37	91	162	64	228	113	119	94
Mo (ppm)	924	25	14.65	66.2	20.9	1.11	0.76	0.51	18.55
Na (%)	3.21	2.6	3.18	2.57	1.44	3.02	3.02	2.99	1.67
Nb (ppm)	1.4	1.4	1.6	2.5	1.5	3	3	2.9	1.5
Ni (ppm)	15.2	11.8	8.7	20.3	6.1	9.8	8.3	9.3	11
P (ppm)	1350	950	490	1150	590	910	600	780	660
Pb (ppm)	4.8	7.8	6.1	3.2	4.7	5.5	3.8	3.3	3
Rb (ppm)	73.7	102	56.3	71.8	100	55.5	76.4	91.8	88.6
Re (ppm)	1.195	0.021	0.023	0.076	0.036	-0.002	-0.002	-0.002	0.061
S (%)	0.26	0.47	0.9	0.67	0.73	0.03	0.02	0.01	1.38
Sb (ppm)	0.35	0.23	1.01	0.68	0.79	1.65	1.08	1.55	1.36

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	304200	304171	304038	304018	303997	305124	304797	304649	303975
North (NAD 27)	4317554	4317575	4317885	4317900	4317917	4316373	4316337	4316233	4317934
Classification	Plag-KSpar	Plag-KSpar	Plag-KSpar	Plag-KSpar	Sericite	Plag-KSpar	Plag-KSpar	Plag-KSpar	Sericite
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	G909046	G909047	G909048	G909049	G909050	G909101	G909102	G909103	G909104
Lithology	null	null	null	null	null	Porphyry	Porphyry	Porphyry	null
Sc (ppm)	10.1	7	5.9	12.5	4.2	6	5.4	6.5	6.8
Se (ppm)	4	6	3	5	4	1	1	1	7
Sn (ppm)	1.3	1.4	0.8	1.5	1	0.7	0.7	0.8	1.5
Sr (ppm)	805	833	608	465	383	1200	858	791	553
Ta (ppm)	0.1	0.09	0.1	0.15	0.11	0.19	0.21	0.19	0.11
Te (ppm)	0.1	0.11	0.06	0.23	0.09	-0.05	-0.05	-0.05	0.63
Th (ppm)	6.5	8.5	5	8.5	7.8	5.9	6.6	7.1	6
Ti (%)	0.23	0.166	0.177	0.29	0.122	0.267	0.222	0.241	0.192
Tl (ppm)	0.38	0.48	0.26	0.35	0.49	0.22	0.21	0.29	0.4
U (ppm)	1.5	2.1	2.2	2.6	2.1	2.5	2.5	3.4	3
V (ppm)	100	70	59	112	38	62	47	55	80
W (ppm)	2.7	2.2	1.6	2	2	0.6	0.8	0.6	1.5
Y (ppm)	6.6	7.5	5.2	10.9	4.7	5.9	5.2	6.3	5.8
Zn (ppm)	10	11	10	15	8	17	9	9	14
Zr (ppm)	27	16.6	30.9	9.9	27.2	40.8	46.1	50.7	38.9
Al2O3 (%)	14.04	13.98	13.47	14.21	13.17	14.02	13.71	14.05	13.94
CaO (%)	2.31	1.61	1.96	2.11	1.11	3.37	2.50	2.41	1.76
FeO (%)	1.27	1.23	1.58	3.07	1.84	1.94	1.35	1.39	3.27
K2O (%)	2.77	4.41	2.70	2.71	5.15	3.28	4.30	4.62	4.28
MgO (%)	1.97	1.29	1.19	2.40	0.83	1.09	0.86	0.95	1.79
Na2O (%)	4.33	3.50	4.29	3.46	1.94	4.07	4.07	4.03	2.25
P2O5 (%)	0.31	0.22	0.11	0.26	0.14	0.21	0.14	0.18	0.15
TiO2 (%)	0.38	0.28	0.30	0.48	0.20	0.45	0.37	0.40	0.32
SO3 (%)	0.65	1.18	2.25	1.68	1.83	0.08	0.05	0.03	3.45
Total (%)	28.03	27.70	27.85	30.39	26.19	28.50	27.36	28.05	31.21
SiO2 (%)	70.01	70.36	70.20	67.48	71.98	69.50	70.72	69.99	66.60
Al_m	0.28	0.27	0.26	0.28	0.26	0.27	0.27	0.28	0.27
Ca_m	0.04	0.03	0.04	0.04	0.02	0.06	0.04	0.04	0.03
K_m	0.06	0.09	0.06	0.06	0.11	0.07	0.09	0.10	0.09
Na_m	0.14	0.11	0.14	0.11	0.06	0.13	0.13	0.13	0.07
K_Al	0.21	0.34	0.22	0.21	0.42	0.25	0.34	0.36	0.33
Na_Al	0.51	0.41	0.52	0.40	0.24	0.48	0.49	0.47	0.27
Plag	0.66	0.52	0.66	0.54	0.32	0.70	0.65	0.63	0.38

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	303954	303933	303911	303890	303868	303847	303826	303808
North (NAD 27)	4317950	4317967	4317983	4318000	4318016	4318033	4318049	4318063
Classification	Albite-KSpar-Sericite	Albite	Albite	Plag-KSpar	Plagioclase	Albite-KSpar-Sericite	Plag-KSpar	Plagioclase
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	G909105	G909106	G909107	G909108	G909109	G909110	G909111	G909112
Lithology	null	null	null	null	null	null	null	null
Ag (ppm)	0.53	0.24	0.24	0.22	0.21	0.33	0.5	0.36
Al (%)	6.8	6.5	6.91	7.04	7.48	6.99	7.98	7.98
As (ppm)	2.2	0.3	0.4	4.5	0.9	-0.2	0.5	1.6
Ba (ppm)	940	150	390	1240	410	1910	540	200
Be (ppm)	1.57	1.35	1.67	1.79	2.86	1.38	2.53	2.77
Bi (ppm)	0.16	0.12	0.39	0.18	0.12	0.22	0.18	0.14
Ca (%)	0.8	0.59	0.63	1.21	1.54	0.7	1.56	1.67
Cd (ppm)	0.02	-0.02	-0.02	-0.02	-0.02	-0.02	0.02	-0.02
Ce (ppm)	35.7	25.7	40.3	30.6	48.9	45.1	53.8	48
Co (ppm)	20.3	8	4.2	5.9	5.6	2.3	7.9	6.1
Cr (ppm)	12	12	14	13	14	12	12	9
Cs (ppm)	1.11	0.55	1.02	1.41	1.09	0.71	1.36	1.45
Cu (ppm)	7120	3440	3990	1625	2030	4070	6790	3920
Fe (%)	1.8	1.02	1.05	1.13	1.28	0.79	1.94	1.31
Ga (ppm)	17.7	18.7	20.9	20.5	24.1	17.1	21.6	20
Ge (ppm)	0.13	0.11	0.11	0.09	0.11	0.11	0.12	0.13
Hf (ppm)	1.3	1	1.1	1.2	0.6	0.7	0.7	0.5
In (ppm)	0.058	0.032	0.077	0.021	0.023	0.041	0.046	0.03
K (%)	2.61	0.61	1.42	2.33	1.5	3.12	1.74	0.95
La (ppm)	19.1	13.8	20.7	15.1	25.3	23.4	27.9	20.2
Li (ppm)	3.6	5.5	5.7	6.4	11.2	4.4	8.5	7.9
Mg (%)	0.49	0.59	0.68	0.48	1.35	0.45	1.25	1.16
Mn (ppm)	39	45	43	60	73	37	56	67
Mo (ppm)	2.9	15.6	6.06	27.5	43.8	155.5	17.05	98.2
Na (%)	2.73	4.48	3.85	3.15	3.64	2.87	2.95	3.51
Nb (ppm)	1.6	1.4	1.8	1.6	3.5	1.3	2.6	2
Ni (ppm)	8.4	6.8	8.8	9.1	16.5	6	16.4	14.6
P (ppm)	540	510	590	570	1380	560	1260	1290
Pb (ppm)	3.7	2.7	3.9	5.4	3.4	4.9	3.3	4.2
Rb (ppm)	55.5	22	50.2	53.1	51	57.6	69.6	36.3
Re (ppm)	0.006	0.025	0.009	0.015	0.015	0.141	0.034	0.073
S (%)	1.54	0.82	0.59	0.43	0.34	0.47	0.89	0.77
Sb (ppm)	1.43	0.47	0.36	1.99	0.58	0.21	0.4	0.65

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	303954	303933	303911	303890	303868	303847	303826	303808
North (NAD 27)	4317950	4317967	4317983	4318000	4318016	4318033	4318049	4318063
Classification	Albite-KSpar-Sericite	Albite	Albite	Plag-KSpar	Plagioclase	Albite-KSpar-Sericite	Plag-KSpar	Plagioclase
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	G909105	G909106	G909107	G909108	G909109	G909110	G909111	G909112
Lithology	null	null	null	null	null	null	null	null
Sc (ppm)	4.6	3.9	5.8	4.9	10.5	4.8	10.7	10
Se (ppm)	9	4	4	2	3	4	6	5
Sn (ppm)	1	1	1.4	0.8	1.3	1.1	2.2	1.8
Sr (ppm)	603	213	338	459	617	480	805	876
Ta (ppm)	0.11	0.09	0.11	0.11	0.22	0.09	0.16	0.13
Te (ppm)	0.17	0.08	-0.05	0.06	-0.05	0.06	0.07	0.06
Th (ppm)	5.3	6.1	7.3	5.8	9.9	7.7	14.8	10.9
Ti (%)	0.132	0.118	0.161	0.162	0.35	0.114	0.274	0.215
Tl (ppm)	0.24	0.07	0.24	0.29	0.26	0.29	0.37	0.21
U (ppm)	2.8	1.4	1.5	2	3.2	1.6	4	4.1
V (ppm)	46	37	57	48	108	42	109	93
W (ppm)	1.1	1.6	1.2	1.4	2.2	1.5	2.6	3.6
Y (ppm)	5.3	3.4	5.6	4.5	11.6	5.1	11.9	14.1
Zn (ppm)	7	5	8	11	12	5	9	10
Zr (ppm)	35.2	23.3	28.8	33.4	13.1	16.4	11.9	9.5
Al2O3 (%)	12.85	12.28	13.05	13.30	14.13	13.20	15.07	15.07
CaO (%)	1.12	0.83	0.88	1.69	2.15	0.98	2.18	2.34
FeO (%)	2.31	1.31	1.35	1.45	1.65	1.02	2.49	1.68
K2O (%)	3.15	0.74	1.71	2.81	1.81	3.76	2.10	1.14
MgO (%)	0.81	0.98	1.13	0.80	2.24	0.75	2.07	1.92
Na2O (%)	3.68	6.04	5.19	4.25	4.91	3.87	3.98	4.73
P2O5 (%)	0.12	0.12	0.14	0.13	0.32	0.13	0.29	0.30
TiO2 (%)	0.22	0.20	0.27	0.27	0.58	0.19	0.46	0.36
SO3 (%)	3.85	2.05	1.48	1.08	0.85	1.18	2.23	1.93
Total (%)	28.11	24.53	25.19	25.77	28.63	25.07	30.87	29.47
SiO2 (%)	69.92	73.75	73.04	72.43	69.36	73.18	66.97	68.46
Al_m	0.25	0.24	0.26	0.26	0.28	0.26	0.30	0.30
Ca_m	0.02	0.01	0.02	0.03	0.04	0.02	0.04	0.04
K_m	0.07	0.02	0.04	0.06	0.04	0.08	0.04	0.02
Na_m	0.12	0.19	0.17	0.14	0.16	0.12	0.13	0.15
K_Al	0.27	0.06	0.14	0.23	0.14	0.31	0.15	0.08
Na_Al	0.47	0.81	0.65	0.53	0.57	0.48	0.43	0.52
Plag	0.55	0.87	0.72	0.64	0.71	0.55	0.57	0.66

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	303907	303893	303878	303864	303850	304518	304501	304414	304436
North (NAD 27)	4316952	4316898	4316844	4316790	4316736	4317143	4317167	4316585	4316647
Classification	Plag-KSpar	Plag-KSpar	Plagioclase	Sericite-Albite	Plagioclase	Plag-KSpar	Sericite-Albite	Plag-KSpar	Plag-KSpar
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	G909113	G909114	G909115	G909116	G909117	G909172	G909173	G909174	G909175
Lithology	null	null	null	null	null	McLeod QMD	Porphyry	McLeod QMD	Porphyry
Ag (ppm)	0.08	0.06	0.03	0.02	0.04	0.06	0.01	-0.01	-0.01
Al (%)	7.95	7.93	7.95	7.45	7.44	7.86	7.72	7.81	7.41
As (ppm)	0.7	4.4	2.9	1.3	0.5	4	8.4	3.8	3.3
Ba (ppm)	1240	1260	770	230	430	750	820	1140	1800
Be (ppm)	1.87	1.89	1.68	1.9	1.44	2.02	1.59	1.83	1.37
Bi (ppm)	0.27	0.73	0.79	1.48	0.15	0.07	0.19	0.06	0.13
Ca (%)	2.3	2.81	1.63	0.84	3.53	2.11	0.29	3.29	2.21
Cd (ppm)	0.02	0.04	-0.02	-0.02	0.05	-0.02	-0.02	0.03	-0.02
Ce (ppm)	49.1	47.8	45.3	63.5	47.2	53.1	22.2	55.6	32.5
Co (ppm)	14.4	15.3	10.9	10.4	9.5	6.6	1.7	14	1.4
Cr (ppm)	12	13	12	12	11	7	10	10	13
Cs (ppm)	1.49	2.77	1.91	2.32	0.63	2.08	0.93	0.97	0.54
Cu (ppm)	900	173.5	622	115.5	605	564	179	46.1	19.9
Fe (%)	2.58	3.35	2.94	3.05	2.5	3.17	1.59	3.38	1.78
Ga (ppm)	21.9	21.3	22.3	21.4	22.9	24.3	20	24	17.9
Ge (ppm)	0.15	0.12	0.14	0.16	0.17	0.24	0.14	0.26	0.16
Hf (ppm)	0.9	0.9	0.7	1.4	0.8	0.8	1.2	0.7	1.1
In (ppm)	0.055	0.095	0.066	0.089	0.051	0.057	0.016	0.037	0.022
K (%)	2.52	2.64	1.62	2.75	1.08	1.36	2.59	2.18	2.54
La (ppm)	23.6	22.9	21.2	30.9	22.1	30.2	12.6	26.5	19.1
Li (ppm)	6.4	5.6	7.3	7.8	5.2	8	5.9	4.1	2.6
Mg (%)	0.97	1.18	1.31	0.86	1.15	1.33	0.49	1.22	0.4
Mn (ppm)	167	452	107	80	300	133	25	465	153
Mo (ppm)	1.99	2.73	7.44	2.01	2.6	3.1	5.07	1.55	3.31
Na (%)	2.75	2.75	3.76	2.16	3.61	3.11	2.09	3.09	2.84
Nb (ppm)	5.1	5.1	2.8	2.3	5.1	5.1	0.9	5.7	2.6
Ni (ppm)	13.4	17.9	15.4	14.4	16.2	12.4	4.3	15.4	3.6
P (ppm)	970	1150	1290	1130	1130	1800	630	1450	810
Pb (ppm)	6.3	9.5	3.4	2.1	4.9	4	1.5	5.9	3.8
Rb (ppm)	65.1	84.3	54.7	107	32.9	40.8	77.3	57.9	54.4
Re (ppm)	-0.002	-0.002	0.006	-0.002	-0.002	0.002	-0.002	0.002	-0.002
S (%)	0.53	0.7	1.55	3.13	0.15	0.01	0.05	0.01	0.1
Sb (ppm)	0.42	0.67	0.6	0.56	0.85	0.7	0.35	0.66	0.64

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	303907	303893	303878	303864	303850	304518	304501	304414	304436
North (NAD 27)	4316952	4316898	4316844	4316790	4316736	4317143	4317167	4316585	4316647
Classification	Plag-KSpar	Plag-KSpar	Plagioclase	Sericite-Albite	Plagioclase	Plag-KSpar	Sericite-Albite	Plag-KSpar	Plag-KSpar
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	G909113	G909114	G909115	G909116	G909117	G909172	G909173	G909174	G909175
Lithology	null	null	null	null	null	McLeod QMD	Porphyry	McLeod QMD	Porphyry
Sc (ppm)	8.1	10.5	10.6	8.2	11	11.3	4.8	11.3	4.4
Se (ppm)	2	2	2	6	2	2	3	2	2
Sn (ppm)	1.1	0.9	0.9	0.9	1	2	2.7	1.1	0.5
Sr (ppm)	1005	948	721	292	925	848	240	1070	1170
Ta (ppm)	0.36	0.36	0.18	0.17	0.35	0.36	0.07	0.4	0.18
Te (ppm)	0.38	0.87	0.98	1.69	0.1	0.05	0.16	-0.05	0.24
Th (ppm)	12.4	10.7	8	7.6	9.7	8.1	6.6	9.7	5.7
Ti (%)	0.354	0.397	0.285	0.217	0.408	0.458	0.115	0.442	0.249
Tl (ppm)	0.26	0.32	0.24	0.51	0.13	0.27	0.33	0.22	0.24
U (ppm)	5.1	5.9	3.5	4	4.1	2.5	2.8	3.2	2.6
V (ppm)	89	103	108	70	105	136	63	116	57
W (ppm)	1.1	1.2	1.5	1.9	1.1	2.3	3.4	1.5	0.9
Y (ppm)	11.4	11.6	11	10.4	11.4	11.8	3.7	13.2	4.5
Zn (ppm)	20	52	9	9	25	13	4	37	8
Zr (ppm)	20.7	16.5	14.4	41.3	15.7	16.6	35.6	13.9	34.1
Al2O3 (%)	15.02	14.98	15.02	14.07	14.05	14.85	14.58	14.75	14.00
CaO (%)	3.22	3.93	2.28	1.18	4.94	2.95	0.41	4.60	3.09
FeO (%)	3.32	4.31	3.78	3.92	3.22	4.08	2.04	4.35	2.29
K2O (%)	3.04	3.18	1.95	3.31	1.30	1.64	3.12	2.63	3.06
MgO (%)	1.61	1.96	2.17	1.43	1.91	2.21	0.81	2.02	0.66
Na2O (%)	3.71	3.71	5.07	2.91	4.87	4.19	2.82	4.17	3.83
P2O5 (%)	0.22	0.26	0.30	0.26	0.26	0.41	0.14	0.33	0.19
TiO2 (%)	0.59	0.66	0.48	0.36	0.68	0.76	0.19	0.74	0.42
SO3 (%)	1.33	1.75	3.88	7.83	0.38	0.03	0.13	0.03	0.25
Total (%)	32.04	34.74	34.92	35.27	31.60	31.11	24.25	33.61	27.78
SiO2 (%)	65.71	62.83	62.64	62.26	66.19	66.71	74.06	64.04	70.27
Al_m	0.29	0.29	0.29	0.28	0.28	0.29	0.29	0.29	0.27
Ca_m	0.06	0.07	0.04	0.02	0.09	0.05	0.01	0.08	0.06
K_m	0.06	0.07	0.04	0.07	0.03	0.03	0.07	0.06	0.07
Na_m	0.12	0.12	0.16	0.09	0.16	0.14	0.09	0.13	0.12
K_Al	0.22	0.23	0.14	0.26	0.10	0.12	0.23	0.19	0.24
Na_Al	0.41	0.41	0.56	0.34	0.57	0.46	0.32	0.46	0.45
Plag	0.60	0.65	0.69	0.42	0.89	0.65	0.34	0.75	0.65

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	304407	302908	302874	302860	302931	302930	302754	302901
North (NAD 27)	4316964	4318908	4318747	4318597	4318645	4318520	4318332	4318219
Classification	Albite	Sericite	Albite-KSpar-Sericite	Albite-KSpar-Sericite	Albite-KSpar-Sericite	Sericite-Albite	Sericite	Sericite
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	G909176	H437225	H437226	H437227	H437228	H437229	H437230	H437231
Lithology	Porphyry	McLeod	Volcanic	Volcanic	Porphyry	Bear	Bear	Porphyry
Ag (ppm)	0.01	0.1	0.02	0.03	0.02	0.1	0.04	0.09
Al (%)	7.36	7.66	6.72	6.01	7.12	6.28	7.17	7.01
As (ppm)	4.2	147	2.3	4.9	23.6	25.8	3.7	7.3
Ba (ppm)	410	900	950	920	900	1470	930	3160
Be (ppm)	1.82	6.47	1.22	1.33	1.59	1.29	0.38	1.68
Bi (ppm)	0.46	1.27	0.06	0.12	0.43	0.22	0.27	0.07
Ca (%)	0.63	0.21	0.36	0.66	0.37	0.45	0.08	1.57
Cd (ppm)	0.02	-0.02	-0.02	0.06	0.03	-0.02	-0.02	0.07
Ce (ppm)	22.6	79.4	37.5	36.8	58	79.9	65.2	49.4
Co (ppm)	0.7	3.1	9.5	10.5	2.1	10.6	0.3	4.3
Cr (ppm)	12	5	21	6	21	14	8	15
Cs (ppm)	0.37	2.93	0.35	2.43	1.2	1.68	0.9	0.77
Cu (ppm)	16.1	72.1	6.8	5.8	80	403	59.6	31.7
Fe (%)	1.22	3.72	3.55	1.31	1.5	2.28	0.32	0.57
Ga (ppm)	20.1	24.9	16.55	10.55	20.4	15.15	13.2	19.2
Ge (ppm)	0.15	0.15	0.12	0.08	0.1	0.11	0.09	0.09
Hf (ppm)	1.9	1.5	1.2	2.5	2.2	1.2	0.8	1.9
In (ppm)	0.012	0.135	0.019	0.015	0.037	0.023	0.018	0.01
K (%)	0.63	2.66	2.14	2.11	1.89	1.75	3.1	5.56
La (ppm)	14.6	37.6	18.2	21.3	28.3	39	32.3	24.6
Li (ppm)	2.2	10.6	8.4	5.6	10	16.2	1	2.4
Mg (%)	0.11	0.91	1.12	0.13	0.37	0.83	0.06	0.19
Mn (ppm)	41	73	219	356	85	287	18	433
Mo (ppm)	1.81	2.36	0.28	0.71	1.45	2.27	1.54	0.66
Na (%)	4.82	0.32	3.55	2.62	3.4	2.6	0.24	2.27
Nb (ppm)	2.6	4	3.4	6.3	3.4	2.8	2.6	3.9
Ni (ppm)	1	10.2	14.7	2.6	8.8	15.6	1	10.5
P (ppm)	310	1580	1030	80	630	1010	1500	1570
Pb (ppm)	2.6	9.9	3.1	5.8	5.7	3.8	298	4.7
Rb (ppm)	25.4	141.5	44.9	89	61.1	54.5	104	109
Re (ppm)	-0.002	0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.11	0.14	0.01	0.01	0.01	0.02	0.19	0.02
Sb (ppm)	0.57	8.85	0.73	0.71	0.88	1.4	2.34	0.86

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	304407	302908	302874	302860	302931	302930	302754	302901
North (NAD 27)	4316964	4318908	4318747	4318597	4318645	4318520	4318332	4318219
Classification	Albite	Sericite	Albite-KSpar-Sericite	Albite-KSpar-Sericite	Albite-KSpar-Sericite	Sericite-Albite	Sericite	Sericite
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	G909176	H437225	H437226	H437227	H437228	H437229	H437230	H437231
Lithology	Porphyry	McLeod	Volcanic	Volcanic	Porphyry	Bear	Bear	Porphyry
Sc (ppm)	4.6	11.6	6.1	2.4	6.2	7.4	3.1	6.4
Se (ppm)	4	3	1	1	1	1	2	1
Sn (ppm)	0.6	2.1	0.9	1.3	0.7	0.7	1.5	0.9
Sr (ppm)	634	669	223	90.9	395	287	2100	787
Ta (ppm)	0.19	0.29	0.24	0.57	0.23	0.18	0.18	0.27
Te (ppm)	0.67	1.32	-0.05	-0.05	0.28	0.24	0.2	-0.05
Th (ppm)	7.1	29.4	6.3	15.6	6.5	5.1	9.1	7.8
Ti (%)	0.2	0.23	0.304	0.051	0.314	0.275	0.253	0.292
Tl (ppm)	0.08	0.7	0.11	0.29	0.33	0.42	0.93	0.56
U (ppm)	2.8	9.5	1.7	3.7	5.1	2.7	1.8	3.4
V (ppm)	41	268	49	8	87	87	71	53
W (ppm)	1.6	5.5	1.7	1.3	3.3	2.1	2.2	1.7
Y (ppm)	3.4	6.6	9.1	10.9	8.7	10.3	1.4	10.7
Zn (ppm)	2	12	23	14	18	41	2	12
Zr (ppm)	61.3	47.7	27.7	72	67	38.5	21.7	47.9
Al2O3 (%)	13.90	14.47	12.69	11.35	13.45	11.86	13.54	13.24
CaO (%)	0.88	0.29	0.50	0.92	0.52	0.63	0.11	2.20
FeO (%)	1.57	4.78	4.57	1.68	1.93	2.93	0.41	0.73
K2O (%)	0.76	3.21	2.58	2.54	2.28	2.11	3.74	6.70
MgO (%)	0.18	1.51	1.86	0.22	0.61	1.38	0.10	0.32
Na2O (%)	6.50	0.43	4.79	3.53	4.58	3.50	0.32	3.06
P2O5 (%)	0.07	0.36	0.24	0.02	0.14	0.23	0.34	0.36
TiO2 (%)	0.33	0.38	0.51	0.09	0.52	0.46	0.42	0.49
SO3 (%)	0.28	0.35	0.03	0.03	0.03	0.05	0.48	0.05
Total (%)	24.47	25.79	27.75	20.38	24.06	23.15	19.47	27.14
SiO2 (%)	73.82	72.41	70.31	78.19	74.25	75.22	79.17	70.96
Al_m	0.27	0.28	0.25	0.22	0.26	0.23	0.27	0.26
Ca_m	0.02	0.01	0.01	0.02	0.01	0.01	0.00	0.04
K_m	0.02	0.07	0.05	0.05	0.05	0.04	0.08	0.14
Na_m	0.21	0.01	0.15	0.11	0.15	0.11	0.01	0.10
K_Al	0.06	0.24	0.22	0.24	0.18	0.19	0.30	0.55
Na_Al	0.77	0.05	0.62	0.51	0.56	0.49	0.04	0.38
Plag	0.83	0.07	0.66	0.59	0.60	0.53	0.05	0.53

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	302736	302776	302641	302511	302643	302810	302849	302913
North (NAD 27)	4318179	4318113	4318043	4317941	4317776	4317666	4317664	4317641
Classification	Albite-KSpar-Sericite	Albite-KSpar-Sericite	Albite	Sericite	Plag-KSpar	Sericite	Albite-KSpar-Sericite	Sericite
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	H437232	H437233	H437234	H437235	H437236	H437237	H437238	H437239
Lithology	Porphyry	Porphyry	Volcanic	Volcanic	Volcanic	Bear (graphic txt.)	Porphyry	Bear
Ag (ppm)	0.04	0.05	0.02	0.06	0.11	0.03	0.03	0.03
Al (%)	6.95	6.96	6.47	7.08	7.69	7.71	8.23	5.3
As (ppm)	6.7	20.8	5.1	7.8	11.5	3.1	13.8	2.6
Ba (ppm)	3110	1240	250	1510	1780	490	1460	150
Be (ppm)	1.53	1.69	1.28	2.54	1.94	1.89	1.95	0.73
Bi (ppm)	0.19	0.3	0.33	0.16	0.22	0.51	0.12	0.09
Ca (%)	0.24	0.22	0.25	1.32	2.16	0.07	0.39	0.05
Cd (ppm)	0.03	0.02	-0.02	0.1	0.09	-0.02	0.02	-0.02
Ce (ppm)	73.8	47	18.7	73.3	64.4	24.2	65.8	15.2
Co (ppm)	2.2	0.5	0.5	4	5.2	0.2	2.5	0.3
Cr (ppm)	6	8	4	3	6	4	8	4
Cs (ppm)	1.35	1.06	0.83	4.71	5.22	2.68	1.82	2
Cu (ppm)	189.5	28.4	24.2	6.2	8.6	10.5	64.7	49.3
Fe (%)	1.54	1.37	1.5	1.96	2.45	0.67	1.72	0.48
Ga (ppm)	21.8	18.65	16.25	17.2	19.8	26.2	23.8	11.35
Ge (ppm)	0.1	0.1	0.08	0.11	0.1	0.06	0.1	0.05
Hf (ppm)	1.9	1.9	1.7	2.7	3.2	3.6	1.9	2.4
In (ppm)	0.038	0.047	0.01	0.03	0.03	0.121	0.053	0.009
K (%)	2.87	2.34	0.75	3.79	3.74	3.94	2.22	2.28
La (ppm)	36.7	23.3	8.5	39.5	33.3	11.9	34.4	7.7
Li (ppm)	7.1	5.5	3.6	67.4	29.2	6.8	8.5	4.5
Mg (%)	0.31	0.17	0.14	0.16	0.26	0.47	0.2	0.08
Mn (ppm)	151	32	43	269	281	38	57	29
Mo (ppm)	2.47	2.57	1.49	1.33	0.95	1.66	1	0.94
Na (%)	3.16	3.4	4.5	1.95	2.31	0.09	4.12	0.08
Nb (ppm)	3	3.1	2.5	8.8	8.8	3.1	3.3	3
Ni (ppm)	6	1.2	2.2	1.8	2.5	1.2	5.6	1
P (ppm)	650	330	500	550	630	60	890	140
Pb (ppm)	9.9	4.4	4.7	24	22.1	2.5	5.4	2.7
Rb (ppm)	75.2	68.5	31.3	134	116.5	167.5	64.4	76.7
Re (ppm)	-0.002	0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.03	0.06	0.02	0.05	0.02	0.05	0.01	0.06
Sb (ppm)	0.62	0.8	0.61	2.96	2.67	1.94	2.03	2.54

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	302736	302776	302641	302511	302643	302810	302849	302913
North (NAD 27)	4318179	4318113	4318043	4317941	4317776	4317666	4317664	4317641
Classification	Albite-KSpar-Sericite	Albite-KSpar-Sericite	Albite	Sericite	Plag-KSpar	Sericite	Albite-KSpar-Sericite	Sericite
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	H437232	H437233	H437234	H437235	H437236	H437237	H437238	H437239
Lithology	Porphyry	Porphyry	Volcanic	Volcanic	Volcanic	Bear (graphic txt.)	Porphyry	Bear
Sc (ppm)	6.1	5.9	4.4	5.3	5.6	5.2	6.1	2.2
Se (ppm)	2	2	1	1	2	2	2	2
Sn (ppm)	0.6	0.6	0.6	1.6	1.7	0.8	0.8	0.6
Sr (ppm)	595	308	530	235	352	27.5	436	33.7
Ta (ppm)	0.19	0.22	0.18	0.7	0.71	0.28	0.24	0.26
Te (ppm)	0.1	0.34	0.19	-0.05	-0.05	0.3	0.05	0.05
Th (ppm)	6.4	7.2	7.9	12.5	11.1	12.6	9.3	12.5
Ti (%)	0.256	0.257	0.196	0.222	0.269	0.156	0.281	0.114
Tl (ppm)	0.58	0.42	0.19	0.79	0.7	0.76	0.34	0.4
U (ppm)	2.2	5.4	2.3	2.9	3.4	5.3	4.5	2.4
V (ppm)	64	74	39	31	44	65	71	53
W (ppm)	2.4	4.3	4.1	1.6	1.8	2.6	2.6	1.5
Y (ppm)	25	4.7	3	12.7	11.8	3.8	8.5	1.9
Zn (ppm)	54	10	5	63	71	11	13	4
Zr (ppm)	54.1	51.3	44.8	89.5	98.5	103	45.7	65.1
Al2O3 (%)	13.13	13.15	12.22	13.37	14.53	14.56	15.55	10.01
CaO (%)	0.34	0.31	0.35	1.85	3.02	0.10	0.55	0.07
FeO (%)	1.98	1.76	1.93	2.52	3.15	0.86	2.21	0.62
K2O (%)	3.46	2.82	0.90	4.57	4.51	4.75	2.68	2.75
MgO (%)	0.51	0.28	0.23	0.27	0.43	0.78	0.33	0.13
Na2O (%)	4.26	4.58	6.07	2.63	3.11	0.12	5.55	0.11
P2O5 (%)	0.15	0.08	0.11	0.13	0.14	0.01	0.20	0.03
TiO2 (%)	0.43	0.43	0.33	0.37	0.45	0.26	0.47	0.19
SO3 (%)	0.08	0.15	0.05	0.13	0.05	0.13	0.03	0.15
Total (%)	24.33	23.56	22.19	25.82	29.39	21.57	27.56	14.06
SiO2 (%)	73.97	74.79	76.25	72.37	68.55	76.92	70.51	84.96
Al_m	0.26	0.26	0.24	0.26	0.28	0.29	0.30	0.20
Ca_m	0.01	0.01	0.01	0.03	0.05	0.00	0.01	0.00
K_m	0.07	0.06	0.02	0.10	0.10	0.10	0.06	0.06
Na_m	0.14	0.15	0.20	0.08	0.10	0.00	0.18	0.00
K_Al	0.29	0.23	0.08	0.37	0.34	0.35	0.19	0.30
Na_Al	0.53	0.57	0.82	0.32	0.35	0.01	0.59	0.02
Plag	0.56	0.59	0.84	0.45	0.54	0.02	0.62	0.02

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	302956	302940	302847	302766	303428	303507	303504	303610
North (NAD 27)	4317599	4317444	4317501	4317528	4317044	4317069	4317156	4317162
Classification	Albite	Albite-KSpar-Sericite	Albite-KSpar-Sericite	Albite-KSpar-Sericite	Albite	Plag-KSpar	Sericite	Sericite
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	H437240	H437241	H437242	H437243	H437244	H437245	H437246	H437247
Lithology	Porphyry	Bear (graphic txt.)	Porphyry	Porphyry	Porphyry	Bear	Porphyry	Bear QM
Ag (ppm)	0.11	0.01	0.05	0.03	0.05	0.06	0.07	0.04
Al (%)	6.94	8.64	7.7	7.89	7.09	6.57	7.04	7.05
As (ppm)	54.7	39.5	38.7	20.1	14.2	1.4	22.1	2.2
Ba (ppm)	60	1020	2230	2170	860	1290	990	310
Be (ppm)	1.05	1.93	1.53	1.26	1.56	1.68	1.76	0.7
Bi (ppm)	0.85	0.24	0.39	0.39	0.33	0.08	1.75	0.19
Ca (%)	0.39	0.61	0.27	0.24	0.42	1.31	0.07	0.08
Cd (ppm)	0.03	0.02	0.02	0.03	-0.02	0.03	-0.02	-0.02
Ce (ppm)	9.46	61.3	43.7	39.5	19.55	50.8	15.85	39.5
Co (ppm)	13.1	6.5	3.8	2.8	4.1	5.2	1.4	2.6
Cr (ppm)	11	3	17	8	11	11	8	8
Cs (ppm)	0.66	1.66	1.31	3.03	1.12	3.2	1.7	1.1
Cu (ppm)	1210	168.5	302	235	72.4	66.9	15.1	17.8
Fe (%)	2.15	3.93	1.56	1.77	2.08	1.85	3.05	0.68
Ga (ppm)	18.4	24	20.3	22.1	19.95	19.5	22.3	17.8
Ge (ppm)	0.09	0.13	0.09	0.09	0.08	0.08	0.08	0.07
Hf (ppm)	1.9	2.1	2.5	1.7	1.4	1.3	1	1.6
In (ppm)	0.011	0.045	0.029	0.027	0.034	0.015	0.039	0.015
K (%)	0.4	2.45	3.7	3.78	1.75	2.99	3.52	3.23
La (ppm)	4.8	30.7	22.6	20.2	12.6	22.4	8.8	22.4
Li (ppm)	13.7	13.7	6.7	5.4	5.9	6	2.4	3.3
Mg (%)	0.13	0.57	0.05	0.18	0.51	0.43	0.31	0.14
Mn (ppm)	30	69	41	71	121	272	52	47
Mo (ppm)	2.14	1.72	2.41	0.84	1.21	0.98	4.62	2.06
Na (%)	4.17	3.99	3.47	3.34	3.62	2.71	0.07	0.13
Nb (ppm)	2.2	5.7	3	2.8	2.4	4.4	1.9	4
Ni (ppm)	5.9	6.8	5.2	6.3	6.4	5.6	3.1	2.3
P (ppm)	1070	1340	880	530	640	510	320	150
Pb (ppm)	3.7	6.6	7.4	6.4	3.6	11.8	8.9	3.1
Rb (ppm)	19.3	76.2	87.3	115	65.5	106	121	106
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.01	0.04	0.07	0.02	0.01	0.01	0.05	0.08
Sb (ppm)	13.5	2.62	13.4	1.59	0.79	0.45	1.81	0.98

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	302956	302940	302847	302766	303428	303507	303504	303610
North (NAD 27)	4317599	4317444	4317501	4317528	4317044	4317069	4317156	4317162
Classification	Albite	Albite-KSpar-Sericite	Albite-KSpar-Sericite	Albite-KSpar-Sericite	Albite	Plag-KSpar	Sericite	Sericite
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	H437240	H437241	H437242	H437243	H437244	H437245	H437246	H437247
Lithology	Porphyry	Bear (graphic txt.)	Porphyry	Porphyry	Porphyry	Bear	Porphyry	Bear QM
Sc (ppm)	2.5	9.6	5.7	4.8	4.6	4	5.1	4.2
Se (ppm)	5	2	2	2	1	1	2	1
Sn (ppm)	0.5	1.4	0.7	0.7	0.7	1.9	1	0.8
Sr (ppm)	149.5	329	273	321	292	532	59.7	53.3
Ta (ppm)	0.15	0.43	0.22	0.21	0.16	0.37	0.15	0.38
Te (ppm)	1.72	0.2	0.13	0.08	0.22	-0.05	2.54	0.48
Th (ppm)	8.7	9.9	8.1	9.2	6.1	14.4	11.7	11.4
Ti (%)	0.178	0.454	0.284	0.223	0.196	0.202	0.117	0.157
Tl (ppm)	0.08	0.36	0.63	0.7	0.25	0.44	0.81	0.48
U (ppm)	7.7	10.8	13.4	4.5	3.3	4.1	3.5	2.9
V (ppm)	70	157	67	68	63	47	67	47
W (ppm)	11.9	9.1	3.9	2.8	2.3	1.2	2	2.2
Y (ppm)	3.2	11.1	5.7	4.6	4.8	8.2	2.2	3.5
Zn (ppm)	5	20	11	16	14	39	6	2
Zr (ppm)	47.5	53.7	67	36	33.8	30.1	26.3	40.5
Al2O3 (%)	13.11	16.32	14.55	14.90	13.39	12.41	13.30	13.32
CaO (%)	0.55	0.85	0.38	0.34	0.59	1.83	0.10	0.11
FeO (%)	2.76	5.05	2.01	2.28	2.67	2.38	3.92	0.87
K2O (%)	0.48	2.95	4.46	4.55	2.11	3.60	4.24	3.89
MgO (%)	0.22	0.95	0.08	0.30	0.85	0.71	0.51	0.23
Na2O (%)	5.62	5.38	4.68	4.50	4.88	3.65	0.09	0.18
P2O5 (%)	0.25	0.31	0.20	0.12	0.15	0.12	0.07	0.03
TiO2 (%)	0.30	0.76	0.47	0.37	0.33	0.34	0.20	0.26
SO3 (%)	0.03	0.10	0.18	0.05	0.03	0.03	0.13	0.20
Total (%)	23.31	32.67	27.00	27.42	24.99	25.07	22.56	19.10
SiO2 (%)	75.06	65.04	71.11	70.67	73.26	73.17	75.86	79.56
Al_m	0.26	0.32	0.29	0.29	0.26	0.24	0.26	0.26
Ca_m	0.01	0.02	0.01	0.01	0.01	0.03	0.00	0.00
K_m	0.01	0.06	0.09	0.10	0.04	0.08	0.09	0.08
Na_m	0.18	0.17	0.15	0.15	0.16	0.12	0.00	0.01
K_Al	0.04	0.20	0.33	0.33	0.17	0.32	0.35	0.32
Na_Al	0.71	0.54	0.53	0.50	0.60	0.48	0.01	0.02
Plag	0.74	0.59	0.55	0.52	0.64	0.62	0.02	0.03

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	303626	303639	303715	302820	302822	302754	302704
North (NAD 27)	4317253	4317346	4317326	4317516	4317494	4317421	4317400
Classification	Albite-KSpar-Sericite	Plag-KSpar	Plag-KSpar	Albite-KSpar-Sericite	Sericite	Sericite-Albite	Sericite-Albite
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	H437248	H437249	H437250	H437266	H437267	H437268	H437269
Lithology	Porphyry	McLeod QMD	Bear?	Porphyry (Ann-Mason)	Bear border granite phase	Bear border granite phase	McLeod QMD (or mafic ppy?)
Ag (ppm)	0.03	0.07	0.03	0.08	0.08	0.09	0.09
Al (%)	6.88	7.14	7.34	7.91	7.98	8.29	7.91
As (ppm)	6.9	2.2	6.8	41.7	45.3	11.8	11.6
Ba (ppm)	2550	1310	770	1460	550	500	500
Be (ppm)	1.36	1.72	1.84	1.43	2.46	1.7	1.67
Bi (ppm)	0.33	0.07	0.13	0.4	1.91	0.73	0.69
Ca (%)	0.18	3.09	2.91	0.39	0.44	0.47	0.44
Cd (ppm)	-0.02	0.05	0.03	0.06	-0.02	0.06	0.05
Ce (ppm)	27.5	50.9	49.7	46	12.9	42.4	40.8
Co (ppm)	0.5	12.4	12	1.3	1.7	47.2	46.5
Cr (ppm)	10	6	8	10	8	14	13
Cs (ppm)	1.42	2.36	1.7	2.09	3.02	2.13	2.13
Cu (ppm)	18.8	24.8	196	120.5	204	12050	12050
Fe (%)	1.59	4.03	3.5	1.64	4.73	2.99	2.84
Ga (ppm)	18.85	19.65	21.3	21.9	52.1	27.8	27.4
Ge (ppm)	0.08	0.14	0.13	0.1	0.11	0.09	0.11
Hf (ppm)	1.4	0.9	0.6	2	2.8	1.8	1.9
In (ppm)	0.023	0.046	0.06	0.029	0.084	0.059	0.057
K (%)	3.64	2.51	1.59	3.17	3.31	1.89	1.87
La (ppm)	15	24.2	24.2	23.3	5.7	19.7	18.9
Li (ppm)	2.6	9.3	5.8	6.5	10.3	11.7	11.3
Mg (%)	0.14	1.11	1.1	0.22	0.95	1.64	1.55
Mn (ppm)	55	891	470	48	51	524	499
Mo (ppm)	1.75	0.73	1.21	1.07	18.1	2.75	2.64
Na (%)	2.87	2.79	3.38	3.21	0.34	2.88	2.73
Nb (ppm)	2.4	5	4.2	2.6	2.6	2.4	2.5
Ni (ppm)	2.6	7.1	13.8	4	8.6	25.1	25
P (ppm)	340	1520	1390	450	1210	1330	1260
Pb (ppm)	4.7	12.3	7.2	3.8	11.6	6	5.9
Rb (ppm)	102	65.6	50.7	99	133.5	78.7	78.3
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.03	0.02	-0.01	0.01	0.59	0.06	0.06
Sb (ppm)	0.72	0.57	1.85	2.26	6.93	2.59	2.62

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	303626	303639	303715	302820	302822	302754	302704
North (NAD 27)	4317253	4317346	4317326	4317516	4317494	4317421	4317400
Classification	Albite-KSpar-Sericite	Plag-KSpar	Plag-KSpar	Albite-KSpar-Sericite	Sericite	Sericite-Albite	Sericite-Albite
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	H437248	H437249	H437250	H437266	H437267	H437268	H437269
Lithology	Porphyry	McLeod QMD	Bear?	Porphyry (Ann-Mason)	Bear border granite phase	Bear border granite phase	McLeod QMD (or mafic ppy?)
Sc (ppm)	4	9.8	10.2	5.7	12	14.6	14.1
Se (ppm)	1	1	1	2	5	3	3
Sn (ppm)	0.5	1.2	1.1	0.7	2.9	1.1	1.1
Sr (ppm)	339	936	1095	212	174	185	176
Ta (ppm)	0.17	0.33	0.26	0.19	0.19	0.17	0.18
Te (ppm)	0.16	-0.05	0.12	0.12	4.61	0.9	0.9
Th (ppm)	7.4	6.4	7.8	8.4	9.9	5.7	5.5
Ti (%)	0.187	0.437	0.393	0.224	0.26	0.319	0.32
Tl (ppm)	0.55	0.28	0.25	0.53	0.67	0.42	0.41
U (ppm)	4.1	2.3	2.6	5.1	12.6	7	6.7
V (ppm)	41	122	125	94	181	159	155
W (ppm)	2.3	1.3	2.1	2.7	6.6	4.4	4.4
Y (ppm)	4.2	14.5	11.7	4.2	4.5	9.9	9.6
Zn (ppm)	6	67	38	7	8	33	34
Zr (ppm)	30.1	20.5	11.2	49.6	77	51.4	51
Al2O3 (%)	13.00	13.49	13.87	14.94	15.07	15.66	14.94
CaO (%)	0.25	4.32	4.07	0.55	0.62	0.66	0.62
FeO (%)	2.04	5.18	4.50	2.11	6.08	3.85	3.65
K2O (%)	4.39	3.02	1.92	3.82	3.99	2.28	2.25
MgO (%)	0.23	1.84	1.82	0.36	1.58	2.72	2.57
Na2O (%)	3.87	3.76	4.56	4.33	0.46	3.88	3.68
P2O5 (%)	0.08	0.35	0.32	0.10	0.28	0.30	0.29
TiO2 (%)	0.31	0.73	0.66	0.37	0.43	0.53	0.53
SO3 (%)	0.08	0.05	-0.03	0.03	1.48	0.15	0.15
Total (%)	24.24	32.75	31.68	26.61	29.98	30.03	28.69
SiO2 (%)	74.06	64.96	66.10	71.53	67.92	67.87	69.31
Al_m	0.25	0.26	0.27	0.29	0.30	0.31	0.29
Ca_m	0.00	0.08	0.07	0.01	0.01	0.01	0.01
K_m	0.09	0.06	0.04	0.08	0.08	0.05	0.05
Na_m	0.12	0.12	0.15	0.14	0.01	0.13	0.12
K_Al	0.37	0.24	0.15	0.28	0.29	0.16	0.16
Na_Al	0.49	0.46	0.54	0.48	0.05	0.41	0.41
Plag	0.51	0.75	0.81	0.51	0.09	0.45	0.44

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	302662	302594	302508	302484	302468	302478	302469	302453
North (NAD 27)	4317400	4317337	4317271	4317261	4317140	4317101	4317043	4316987
Classification	Albite	Sericite	Sericite-Albite	Albite	Sericite-Albite	Albite	Albite	Sericite-Albite
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	H437270	H437271	H437272	H437273	H437274	H437275	H437276	H437277
Lithology	Porphyry	Bear border granite phase	Bear border granite phase	McLeod QMD	McLeod QMD fg??	McLeod QMD	Porphyry	McLeod QMD
Ag (ppm)	0.02	0.03	0.08	0.03	0.04	0.01	0.02	0.07
Al (%)	7.64	6.75	6.78	7.89	7.53	7.67	7.08	6.25
As (ppm)	4.4	5.3	7.6	5.1	10.9	5.4	18.7	24.1
Ba (ppm)	200	280	290	130	380	500	150	550
Be (ppm)	1.18	1.78	1.33	1.25	1.48	1.84	1.06	0.93
Bi (ppm)	0.15	0.33	1.03	0.12	0.75	0.08	0.25	2.09
Ca (%)	0.36	0.1	0.27	0.46	0.36	0.56	0.47	0.45
Cd (ppm)	0.05	-0.02	-0.02	0.03	-0.02	0.03	0.03	-0.02
Ce (ppm)	45.7	28.7	25	21.3	37.4	48.4	27	35.8
Co (ppm)	4.8	1.3	0.9	19.1	4.3	9.9	2.4	1.3
Cr (ppm)	9	3	4	17	6	7	12	7
Cs (ppm)	0.77	4.1	1.53	0.45	2.06	1.29	0.53	1.31
Cu (ppm)	242	135	129.5	1080	204	72.1	143	128.5
Fe (%)	1.24	0.8	1.21	4.03	1.98	2.49	1.87	2.4
Ga (ppm)	23.8	22	23.3	25.3	30.5	23.1	22.4	22.4
Ge (ppm)	0.09	0.06	0.07	0.1	0.1	0.11	0.11	0.11
Hf (ppm)	1.8	1.8	1.9	1.9	1.5	0.7	3.3	0.8
In (ppm)	0.008	0.032	0.037	0.036	0.056	0.059	0.01	0.039
K (%)	0.56	3.28	1.56	0.56	1.61	1.39	0.45	1.56
La (ppm)	23.1	13.5	12	8.3	17.7	24	12.6	17.7
Li (ppm)	8.2	5	4.8	13.3	8.8	10.5	10.1	9.5
Mg (%)	0.9	0.4	0.22	3.12	0.55	0.95	0.9	0.31
Mn (ppm)	117	56	39	538	74	209	54	59
Mo (ppm)	0.68	1.23	4.18	0.54	8.34	1.69	2.14	3.86
Na (%)	5.23	0.07	2.79	3.98	2.34	4.35	4.7	1.7
Nb (ppm)	2.3	2.9	4.7	2.8	4.8	3.9	3.1	2.4
Ni (ppm)	8	1	1.2	20.9	8.3	16.5	11.4	3.1
P (ppm)	790	210	230	2010	220	1250	400	640
Pb (ppm)	3.6	2.5	5.5	3	4	5.9	4.2	8.1
Rb (ppm)	30	148	75.5	10.7	77	58.8	10.4	60.4
Re (ppm)	-0.002	-0.002	-0.002	-0.002	0.002	-0.002	-0.002	-0.002
S (%)	0.01	0.08	0.1	0.01	0.06	0.01	0.02	0.42
Sb (ppm)	0.85	1.94	1.13	1.59	1.63	1.24	0.68	5.7

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	302662	302594	302508	302484	302468	302478	302469	302453
North (NAD 27)	4317400	4317337	4317271	4317261	4317140	4317101	4317043	4316987
Classification	Albite	Sericite	Sericite-Albite	Albite	Sericite-Albite	Albite	Albite	Sericite-Albite
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	H437270	H437271	H437272	H437273	H437274	H437275	H437276	H437277
Lithology	Porphyry	Bear border granite phase	Bear border granite phase	McLeod QMD	McLeod QMD fg??	McLeod QMD	Porphyry	McLeod QMD
Sc (ppm)	4.8	4.5	4.4	17.7	6	8	6.1	6.4
Se (ppm)	2	2	2	2	3	2	3	3
Sn (ppm)	0.8	1.7	1	1.1	2.9	1.6	0.8	1.7
Sr (ppm)	183	27.3	101.5	133	107.5	287	227	217
Ta (ppm)	0.17	0.25	0.4	0.19	0.36	0.3	0.21	0.16
Te (ppm)	0.17	0.09	0.53	0.25	0.65	-0.05	0.19	0.83
Th (ppm)	6.9	6.7	11.7	2.1	10.6	13.1	5.8	6.5
Ti (%)	0.182	0.111	0.242	0.449	0.288	0.296	0.287	0.272
Tl (ppm)	0.1	0.68	0.37	0.11	0.37	0.25	0.08	0.43
U (ppm)	4.1	2.7	4.6	6.1	3.3	2.5	5	4.6
V (ppm)	58	56	49	217	82	97	80	101
W (ppm)	3.7	1.3	5.6	6.5	13	6.6	6.7	5
Y (ppm)	3.7	2.2	3.3	13.5	6	8.6	6.3	4.7
Zn (ppm)	16	10	7	71	25	32	13	12
Zr (ppm)	42	43.6	43.7	58.3	38.7	14.8	105	18.6
Al2O3 (%)	14.43	12.75	12.81	14.90	14.22	14.49	13.37	11.81
CaO (%)	0.50	0.14	0.38	0.64	0.50	0.78	0.66	0.63
FeO (%)	1.59	1.03	1.56	5.18	2.55	3.20	2.40	3.09
K2O (%)	0.67	3.95	1.88	0.67	1.94	1.67	0.54	1.88
MgO (%)	1.49	0.66	0.36	5.17	0.91	1.58	1.49	0.51
Na2O (%)	7.05	0.09	3.76	5.37	3.15	5.86	6.34	2.29
P2O5 (%)	0.18	0.05	0.05	0.46	0.05	0.29	0.09	0.15
TiO2 (%)	0.30	0.19	0.40	0.75	0.48	0.49	0.48	0.45
SO3 (%)	0.03	0.20	0.25	0.03	0.15	0.03	0.05	1.05
Total (%)	26.26	19.06	21.45	33.18	23.96	28.39	25.43	21.86
SiO2 (%)	71.91	79.60	77.05	64.50	74.36	69.62	72.79	76.61
Al_m	0.28	0.25	0.25	0.29	0.28	0.28	0.26	0.23
Ca_m	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01
K_m	0.01	0.08	0.04	0.01	0.04	0.04	0.01	0.04
Na_m	0.23	0.00	0.12	0.17	0.10	0.19	0.20	0.07
K_Al	0.05	0.34	0.16	0.05	0.15	0.13	0.04	0.17
Na_Al	0.80	0.01	0.48	0.59	0.36	0.67	0.78	0.32
Plag	0.84	0.02	0.51	0.63	0.40	0.72	0.82	0.37

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	302426	302515	302354	303342	303342	303295	303296
North (NAD 27)	4316954	4316830	4316754	4317641	4317641	4317480	4317442
Classification	Albite	Sericite-Albite	Sericite	Sericite	Sericite	Albite-KSpar-Sericite	Sericite
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	H437278	H437279	H437280	H437281	H437282	H437283	H437284
Lithology	Porphyry	McLeod QMD	McLeod QMD fg?? Or Jbg	Bear border granite phase	Porphyry	Bear border granite phase	Bear border granite phase
Ag (ppm)	0.01	0.09	0.03	0.05	0.05	0.03	0.09
Al (%)	6.59	7.42	6.29	6.52	7.01	6.67	6.9
As (ppm)	4.9	12.6	3.6	12.5	29.4	3.7	19.8
Ba (ppm)	510	270	810	520	1290	960	390
Be (ppm)	1.7	1.19	1.19	1.13	1.2	1.61	1.02
Bi (ppm)	0.09	0.95	0.55	0.64	0.66	0.12	2.03
Ca (%)	0.34	0.2	0.25	0.29	0.28	0.36	0.26
Cd (ppm)	0.03	0.03	0.05	0.05	0.04	0.06	0.05
Ce (ppm)	40.7	26.4	45	48.8	47.3	51.1	30.5
Co (ppm)	10.2	0.6	0.4	0.5	4.5	4	0.4
Cr (ppm)	10	7	3	4	9	5	4
Cs (ppm)	0.68	1.41	2.27	1.57	2.98	2.04	1.22
Cu (ppm)	39.8	241	24.6	45.6	258	359	85.5
Fe (%)	1.86	2.56	1.12	1.25	3.41	2.03	2.28
Ga (ppm)	20.8	23.5	19.35	20.1	20.3	17.65	18.8
Ge (ppm)	0.09	0.12	0.11	0.12	0.14	0.13	0.12
Hf (ppm)	2.2	0.9	4	2.8	1.7	2.5	1.7
In (ppm)	0.017	0.028	0.033	0.053	0.049	0.025	0.061
K (%)	1.02	1.63	2.98	3.3	3.24	3.21	3.43
La (ppm)	21.2	10	23.7	24.9	24.2	25.4	15.2
Li (ppm)	7.8	3.3	2	2.4	5.5	4.3	2.3
Mg (%)	1.06	0.25	0.36	0.31	0.55	0.51	0.21
Mn (ppm)	209	20	44	60	140	135	48
Mo (ppm)	0.59	11.4	2.98	3.66	2.65	0.69	4.03
Na (%)	4.38	2.45	0.12	0.32	1.8	2.51	0.07
Nb (ppm)	2.7	2	3.6	2.9	3	4.6	4.2
Ni (ppm)	14.1	1.9	1	1.5	8.6	7	0.9
P (ppm)	810	1250	250	220	790	500	330
Pb (ppm)	3.4	2.9	1.9	2	4.4	8.9	3.9
Rb (ppm)	33.7	62.1	118	130	110.5	125.5	119
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.02	0.15	0.18	0.06	0.02	0.02	0.05
Sb (ppm)	0.63	2.17	0.94	1.92	2.13	1.28	1.79

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	302426	302515	302354	303342	303342	303295	303296
North (NAD 27)	4316954	4316830	4316754	4317641	4317641	4317480	4317442
Classification	Albite	Sericite-Albite	Sericite	Sericite	Sericite	Albite-KSpar-Sericite	Sericite
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	H437278	H437279	H437280	H437281	H437282	H437283	H437284
Lithology	Porphyry	McLeod QMD	McLeod QMD fg?? Or Jbg	Bear border granite phase	Porphyry	Bear border granite phase	Bear border granite phase
Sc (ppm)	4.6	8.5	5.9	4.4	5.3	4.7	7.6
Se (ppm)	2	4	2	2	2	1	4
Sn (ppm)	0.7	1	0.7	0.5	0.7	0.6	0.9
Sr (ppm)	193.5	167	42.6	60.6	194	190	40.8
Ta (ppm)	0.2	0.15	0.32	0.29	0.21	0.45	0.31
Te (ppm)	-0.05	0.74	0.25	0.59	0.31	-0.05	1.1
Th (ppm)	7.6	6.7	12.9	14.7	7.8	21.3	9.4
Ti (%)	0.228	0.232	0.171	0.125	0.246	0.195	0.297
Tl (ppm)	0.16	0.4	0.74	0.6	0.58	0.54	0.62
U (ppm)	3.2	3.9	6.3	5.1	4.9	6.2	4.9
V (ppm)	56	109	61	54	78	52	114
W (ppm)	6.2	4.8	1.9	3.1	4.8	2.9	3.9
Y (ppm)	6.9	3.5	7.5	5.1	6.2	10.7	6
Zn (ppm)	38	4	4	8	19	26	4
Zr (ppm)	58.1	22.7	112	76.1	43.3	70.1	43.3
Al2O3 (%)	12.45	14.02	11.88	12.32	13.24	12.60	13.03
CaO (%)	0.48	0.28	0.35	0.41	0.39	0.50	0.36
FeO (%)	2.39	3.29	1.44	1.61	4.39	2.61	2.93
K2O (%)	1.23	1.96	3.59	3.98	3.90	3.87	4.13
MgO (%)	1.76	0.41	0.60	0.51	0.91	0.85	0.35
Na2O (%)	5.90	3.30	0.16	0.43	2.43	3.38	0.09
P2O5 (%)	0.19	0.29	0.06	0.05	0.18	0.11	0.08
TiO2 (%)	0.38	0.39	0.29	0.21	0.41	0.33	0.50
SO3 (%)	0.05	0.38	0.45	0.15	0.05	0.05	0.13
Total (%)	24.82	24.32	18.81	19.66	25.90	24.30	21.60
SiO2 (%)	73.44	73.98	79.87	78.96	72.28	74.00	76.89
Al_m	0.24	0.27	0.23	0.24	0.26	0.25	0.26
Ca_m	0.01	0.01	0.01	0.01	0.01	0.01	0.01
K_m	0.03	0.04	0.08	0.08	0.08	0.08	0.09
Na_m	0.19	0.11	0.01	0.01	0.08	0.11	0.00
K_Al	0.11	0.15	0.33	0.35	0.32	0.33	0.34
Na_Al	0.78	0.39	0.02	0.06	0.30	0.44	0.01
Plag	0.82	0.41	0.05	0.09	0.33	0.48	0.04

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	303532	303520	303520	303552	303524	303509	303517	303200
North (NAD 27)	4318937	4318903	4318811	4318732	4318672	4318586	4318560	4318340
Classification	Sericite	Plag-KSpar	Albite-KSpar-Sericite	Sericite	Albite-KSpar-Sericite	Sericite	Sericite	Sericite-Albite
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	H437305	H437306	H437307	H437308	H437309	H437310	H437311	H437312
Lithology	Bear	McLeod	McLeod	McLeod	McLeod	Bear	Bear	Porphyry
Ag (ppm)	0.04	0.03	0.07	0.03	0.07	0.04	0.02	0.02
Al (%)	7.01	7.19	7.56	7.45	7.22	6.26	6.18	7.28
As (ppm)	14.6	5.6	6	6.3	3.2	4.4	2.5	4.3
Ba (ppm)	1090	1050	1220	360	1520	690	200	950
Be (ppm)	1.65	2.05	2.04	0.08	1.69	1.74	0.81	1.51
Bi (ppm)	0.47	0.1	0.07	0.02	0.03	0.23	0.2	0.64
Ca (%)	0.23	2.14	0.55	0.06	1.02	0.17	0.06	0.2
Cd (ppm)	0.04	0.06	0.04	0.03	0.05	0.05	0.02	0.03
Ce (ppm)	16.65	67	51.6	63.8	56.2	41.7	29.4	28.2
Co (ppm)	0.7	11.3	11.8	0.3	10.1	1.5	0.2	0.5
Cr (ppm)	9	10	6	6	8	3	4	8
Cs (ppm)	1.22	1.97	1.01	0.54	1.08	1.23	0.84	1.54
Cu (ppm)	15.6	80.3	399	3.9	253	150	28.1	29
Fe (%)	0.6	3.48	4.89	0.17	3.88	1.29	0.31	1.28
Ga (ppm)	35.5	23.3	21.9	2.74	21.1	18.2	15.4	20.3
Ge (ppm)	0.09	0.18	0.18	0.12	0.16	0.12	0.08	0.11
Hf (ppm)	1	1.1	0.7	0.4	0.8	2.4	3	1.6
In (ppm)	0.056	0.041	0.075	-0.005	0.031	0.02	0.015	0.111
K (%)	3.67	2.56	2.52	3.84	3.31	3.93	2.76	2.74
La (ppm)	7	29.7	28.4	28.8	25.9	22.2	12.5	14.5
Li (ppm)	3.1	5.8	5.6	0.9	4.7	3	1.1	4.8
Mg (%)	0.46	1.05	1.45	0.01	1.15	0.22	0.1	0.38
Mn (ppm)	43	430	430	18	480	48	22	30
Mo (ppm)	1.28	3.1	4.45	1.52	1.18	4.3	2.31	1.19
Na (%)	0.08	3.39	3.75	0.14	2.98	2.13	0.07	1.84
Nb (ppm)	5.7	7.7	6.2	4	6.6	4.8	5.2	2
Ni (ppm)	1.6	13.2	13.6	0.5	13.1	2.6	0.9	1
P (ppm)	100	1230	1460	1660	1360	110	60	240
Pb (ppm)	2.7	9.1	3.3	46.7	5.2	8	1.3	2.9
Rb (ppm)	147.5	95.7	69.9	101	96	126	96	98.5
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.1	0.01	0.01	0.23	0.02	0.02	0.06	0.15
Sb (ppm)	9.58	1.82	1.48	3.39	0.96	0.91	2.4	0.66

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	303532	303520	303520	303552	303524	303509	303517	303200
North (NAD 27)	4318937	4318903	4318811	4318732	4318672	4318586	4318560	4318340
Classification	Sericite	Plag-KSpar	Albite-KSpar-Sericite	Sericite	Albite-KSpar-Sericite	Sericite	Sericite	Sericite-Albite
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	H437305	H437306	H437307	H437308	H437309	H437310	H437311	H437312
Lithology	Bear	McLeod	McLeod	McLeod	McLeod	Bear	Bear	Porphyry
Sc (ppm)	14.3	9.2	9.4	0.9	8.4	2.7	3.1	5.1
Se (ppm)	2	2	2	1	1	1	2	3
Sn (ppm)	1.8	1.1	1	0.7	1	1.1	1.6	2.3
Sr (ppm)	50.2	602	330	2740	371	109.5	46.4	153.5
Ta (ppm)	0.36	0.51	0.38	0.25	0.41	0.41	0.46	0.15
Te (ppm)	0.49	-0.05	-0.05	0.07	-0.05	0.05	0.13	0.21
Th (ppm)	3.6	20.5	13.6	15	15.6	25.5	12.9	4.2
Ti (%)	0.481	0.428	0.449	0.263	0.427	0.136	0.134	0.169
Tl (ppm)	0.53	0.25	0.24	0.38	0.38	0.45	0.36	0.62
U (ppm)	6.9	5	3.6	1.7	3.3	4.3	3.5	2.3
V (ppm)	175	112	137	63	122	36	55	59
W (ppm)	2.9	2.5	3.1	1.1	3.2	1.2	1.7	1.3
Y (ppm)	8.2	15.3	13.8	0.8	13	7	2.2	3.6
Zn (ppm)	6	50	39	-2	43	17	-2	3
Zr (ppm)	25.1	32.5	16.9	10	21.5	64.8	75.2	39.9
Al2O3 (%)	13.24	13.58	14.28	14.07	13.64	11.83	11.67	13.75
CaO (%)	0.32	2.99	0.77	0.08	1.43	0.24	0.08	0.28
FeO (%)	0.77	4.48	6.29	0.22	4.99	1.66	0.40	1.65
K2O (%)	4.42	3.08	3.04	4.63	3.99	4.74	3.33	3.30
MgO (%)	0.76	1.74	2.40	0.02	1.91	0.36	0.17	0.63
Na2O (%)	0.11	4.57	5.06	0.19	4.02	2.87	0.09	2.48
P2O5 (%)	0.02	0.28	0.33	0.38	0.31	0.03	0.01	0.05
TiO2 (%)	0.80	0.71	0.75	0.44	0.71	0.23	0.22	0.28
SO3 (%)	0.25	0.03	0.03	0.58	0.05	0.05	0.15	0.38
Total (%)	20.70	31.47	32.94	20.60	31.04	22.00	16.13	22.80
SiO2 (%)	77.85	66.33	64.75	77.96	66.79	76.46	82.74	75.60
Al_m	0.26	0.27	0.28	0.28	0.27	0.23	0.23	0.27
Ca_m	0.01	0.05	0.01	0.00	0.03	0.00	0.00	0.01
K_m	0.09	0.07	0.06	0.10	0.08	0.10	0.07	0.07
Na_m	0.00	0.15	0.16	0.01	0.13	0.09	0.00	0.08
K_Al	0.36	0.25	0.23	0.36	0.32	0.43	0.31	0.26
Na_Al	0.01	0.55	0.58	0.02	0.48	0.40	0.01	0.30
Plag	0.04	0.75	0.63	0.03	0.58	0.42	0.02	0.32

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	303236	303178	303174	303160	303193	303228	303447	303502
North (NAD 27)	4318274	4318134	4318065	4317931	4317845	4317773	4316870	4316776
Classification	Sericite-Albite	Sericite-Albite	Sericite	Albite-KSpar-Sericite	Sericite	Albite-KSpar-Sericite	Plag-KSpar	Plag-KSpar
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	H437313	H437314	H437315	H437316	H437317	H437318	H437319	H437320
Lithology	Porphyry	McLeod	Porphyry	Porphyry	Bear (graphic txt.)	Bear (graphic txt.)	Bear	Porphyry
Ag (ppm)	0.04	0.05	0.03	0.06	0.13	0.04	0.03	0.02
Al (%)	7.26	8.18	7.44	6.94	6.36	7.25	7.01	6.92
As (ppm)	15.4	9.6	2.1	11.7	7.8	14.3	2.6	4.1
Ba (ppm)	2510	1050	1020	2230	1090	1030	1200	1890
Be (ppm)	1.35	1.42	1.43	1.39	1.18	1.75	2.07	1.5
Bi (ppm)	0.62	0.72	0.08	0.92	1.98	0.23	0.08	0.15
Ca (%)	0.26	0.28	0.09	0.16	0.19	0.3	1.6	1.32
Cd (ppm)	0.06	0.04	0.05	0.05	0.03	0.07	0.04	0.04
Ce (ppm)	22.2	78	18.2	44.9	35.3	58.7	49.4	39.5
Co (ppm)	0.9	0.7	0.9	0.3	1.1	1.8	6.6	5.3
Cr (ppm)	7	11	9	7	6	6	10	12
Cs (ppm)	1.08	1.42	1.66	0.93	1.38	1.83	1.85	1.18
Cu (ppm)	13.9	77.7	67.3	47.8	105	124.5	54.7	27.2
Fe (%)	1.4	2.03	1.02	1.53	1.67	1.27	2.42	2.12
Ga (ppm)	21.5	22.1	18.3	19.9	17.45	19.25	20.3	18.9
Ge (ppm)	0.1	0.15	0.09	0.13	0.13	0.14	0.16	0.14
Hf (ppm)	1.8	0.8	1.1	1.6	1.4	1.9	0.9	1.5
In (ppm)	0.058	0.037	0.024	0.115	0.053	0.053	0.036	0.024
K (%)	2.5	2.54	3.5	2.52	3.38	3.39	2.91	2.78
La (ppm)	10.9	32.2	7.8	24.1	18.4	28.3	26.4	20.3
Li (ppm)	3.4	5.1	6.5	4.1	8.6	7.1	5.1	5.3
Mg (%)	0.39	0.48	0.4	0.29	0.41	0.22	0.65	0.58
Mn (ppm)	69	53	53	32	44	51	352	405
Mo (ppm)	1.65	2.84	2.17	5.39	39.6	1.41	0.94	0.7
Na (%)	2.24	2.55	0.56	2.83	0.1	2.13	2.8	2.93
Nb (ppm)	2.8	3.1	2	2.2	3	5.4	4.4	2.8
Ni (ppm)	1.4	4.2	3	1.2	1.5	3.5	8.8	7.3
P (ppm)	290	560	130	350	470	490	740	670
Pb (ppm)	5.4	4	1.2	5.7	4.6	8	7.4	6.1
Rb (ppm)	90.7	88.2	121	75.4	125.5	109.5	102	81.1
Re (ppm)	-0.002	-0.002	-0.002	0.005	0.005	-0.002	-0.002	-0.002
S (%)	0.17	0.06	0.03	0.09	0.32	0.02	0.01	0.02
Sb (ppm)	0.71	0.85	0.81	0.67	1.84	2.09	0.5	1.03

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	303236	303178	303174	303160	303193	303228	303447	303502
North (NAD 27)	4318274	4318134	4318065	4317931	4317845	4317773	4316870	4316776
Classification	Sericite-Albite	Sericite-Albite	Sericite	Albite-KSpar-Sericite	Sericite	Albite-KSpar-Sericite	Plag-KSpar	Plag-KSpar
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	H437313	H437314	H437315	H437316	H437317	H437318	H437319	H437320
Lithology	Porphyry	McLeod	Porphyry	Porphyry	Bear (graphic txt.)	Bear (graphic txt.)	Bear	Porphyry
Sc (ppm)	5.3	10	3.6	5.2	7	5.2	5.8	4.6
Se (ppm)	2	3	1	3	4	2	1	-1
Sn (ppm)	2.5	1.2	1.5	1.5	4.2	1.3	1	0.6
Sr (ppm)	361	147	95.2	240	183	159.5	590	865
Ta (ppm)	0.19	0.21	0.16	0.17	0.24	0.44	0.35	0.19
Te (ppm)	0.36	0.2	0.05	0.14	0.65	0.08	0.06	0.1
Th (ppm)	6.4	6	2.9	8.2	16.9	19.7	13.5	7.1
Ti (%)	0.223	0.318	0.149	0.165	0.173	0.223	0.246	0.217
Tl (ppm)	0.61	0.7	0.94	0.96	1.29	0.6	0.37	0.5
U (ppm)	3	2.6	1.4	4.1	3.3	4	3.4	2.8
V (ppm)	60	111	49	70	83	61	65	53
W (ppm)	1.4	2.7	3	1.9	5.2	4.2	1.6	1.4
Y (ppm)	4.4	5.2	3.4	4.8	3.6	8.2	9.1	5.4
Zn (ppm)	11	12	12	7	6	16	25	35
Zr (ppm)	49.8	19.8	32.3	40.9	40.5	54.3	18.3	37.5
Al2O3 (%)	13.71	15.45	14.05	13.11	12.01	13.70	13.24	13.07
CaO (%)	0.36	0.39	0.13	0.22	0.27	0.42	2.24	1.85
FeO (%)	1.80	2.61	1.31	1.97	2.15	1.63	3.11	2.73
K2O (%)	3.01	3.06	4.22	3.04	4.07	4.08	3.51	3.35
MgO (%)	0.65	0.80	0.66	0.48	0.68	0.36	1.08	0.96
Na2O (%)	3.02	3.44	0.75	3.81	0.13	2.87	3.77	3.95
P2O5 (%)	0.07	0.13	0.03	0.08	0.11	0.11	0.17	0.15
TiO2 (%)	0.37	0.53	0.25	0.28	0.29	0.37	0.41	0.36
SO3 (%)	0.43	0.15	0.08	0.23	0.80	0.05	0.03	0.05
Total (%)	23.42	26.56	21.48	23.21	20.51	23.60	27.56	26.47
SiO2 (%)	74.94	71.58	77.02	75.16	78.05	74.74	70.52	71.68
Al_m	0.27	0.30	0.28	0.26	0.24	0.27	0.26	0.26
Ca_m	0.01	0.01	0.00	0.00	0.00	0.01	0.04	0.03
K_m	0.06	0.07	0.09	0.06	0.09	0.09	0.07	0.07
Na_m	0.10	0.11	0.02	0.12	0.00	0.09	0.12	0.13
K_Al	0.24	0.21	0.33	0.25	0.37	0.32	0.29	0.28
Na_Al	0.36	0.37	0.09	0.48	0.02	0.34	0.47	0.50
Plag	0.39	0.39	0.10	0.49	0.04	0.37	0.62	0.63

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	303437	303436	303394	303446	303286	302829	302998	303645	303751
North (NAD 27)	4316592	4316434	4316211	4315921	4315689	4316439	4316785	4317495	4317492
Classification	Plag-KSpar	Plag-KSpar	Plag-KSpar	Plag-KSpar	Plag-KSpar	Plag-KSpar	Plag-KSpar	Albite	Albite-KSpar-Sericite
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	H437321	H437322	H437323	H437324	H437325	H437326	H437327	H437351	H437352
Lithology	Porphyry	McLeod	McLeod	McLeod	McLeod	McLeod	Porphyry	McLeod	Porphyry
Ag (ppm)	0.03	0.07	0.05	0.06	0.04	0.03	0.05	0.29	0.03
Al (%)	7.01	7.32	7.25	7.39	7.57	7.03	6.81	6.46	7.19
As (ppm)	2.3	1.5	1.6	1.7	1.6	3.9	3.2	17.1	42.3
Ba (ppm)	1900	1160	1250	1290	1120	1210	1730	430	1800
Be (ppm)	1.64	1.81	1.67	1.86	1.63	1.55	1.31	1.08	1.72
Bi (ppm)	0.12	0.09	0.09	0.08	0.06	0.08	0.15	0.35	0.48
Ca (%)	1.62	2.83	2.79	2.92	3.17	3.07	1.3	0.26	0.37
Cd (ppm)	0.03	0.06	0.05	0.04	0.04	0.08	0.04	-0.02	0.02
Ce (ppm)	42.9	44.6	45.5	55.1	48.8	38.2	41.8	41.3	35.4
Co (ppm)	5.2	13.8	12.7	11.1	13.5	9.8	3.8	3.8	4.1
Cr (ppm)	13	13	12	5	10	10	11	10	9
Cs (ppm)	1.03	1.86	0.95	1.44	1.29	1.04	0.88	0.39	0.95
Cu (ppm)	50.9	74.4	52.5	70.9	62.3	39.7	154.5	3110	39.3
Fe (%)	1.87	3.64	3.46	3.9	3.8	3.34	2.07	2.03	1.94
Ga (ppm)	20.4	21.4	21.3	20.6	21.6	21.5	19.8	18.35	20.5
Ge (ppm)	0.15	0.18	0.18	0.17	0.18	0.19	0.14	0.16	0.14
Hf (ppm)	1.4	0.8	0.6	1	0.6	0.5	1.3	1.3	1.7
In (ppm)	0.024	0.035	0.037	0.04	0.035	0.028	0.022	0.026	0.041
K (%)	3.23	2.23	2.55	2.64	2.2	2.46	3.12	0.62	2.97
La (ppm)	21.3	20.4	21	26.5	22.9	18	21.9	19.8	16.9
Li (ppm)	5.2	4.9	2.6	5.8	3.8	3.2	5.6	5.9	5.8
Mg (%)	0.43	1.16	1.19	1.03	1.25	1.07	0.58	0.88	0.19
Mn (ppm)	306	494	514	517	482	517	394	104	81
Mo (ppm)	1.26	1.43	1.23	0.45	1.01	0.6	0.68	1.98	2.17
Na (%)	2.69	2.98	3.09	2.71	3.16	3.05	2.95	4.51	3.38
Nb (ppm)	3.1	3.8	4.2	5.3	4.3	4	2.9	2.9	3.5
Ni (ppm)	7	16.6	16.6	7.6	18	16.7	9.5	6.8	5
P (ppm)	670	1340	1300	1750	1440	1310	730	790	590
Pb (ppm)	7.5	10.5	10.1	7.6	7.2	9.5	5.5	2.6	5.4
Rb (ppm)	90.9	54.8	63.4	79.9	69.8	59.5	98.7	24.2	78.5
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.03	0.01	0.01	0.01	-0.01	0.01	0.02	0.05	0.04
Sb (ppm)	0.61	1	0.66	0.6	0.56	1.15	0.68	0.77	0.67

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	303437	303436	303394	303446	303286	302829	302998	303645	303751
North (NAD 27)	4316592	4316434	4316211	4315921	4315689	4316439	4316785	4317495	4317492
Classification	Plag-KSpar	Plag-KSpar	Plag-KSpar	Plag-KSpar	Plag-KSpar	Plag-KSpar	Plag-KSpar	Albite	Albite-KSpar-Sericite
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	H437321	H437322	H437323	H437324	H437325	H437326	H437327	H437351	H437352
Lithology	Porphyry	McLeod	McLeod	McLeod	McLeod	McLeod	Porphyry	McLeod	Porphyry
Sc (ppm)	4.3	9.2	9.4	10	9.2	9.9	4.9	4.5	5.4
Se (ppm)	-1	1	1	1	1	1	-1	3	3
Sn (ppm)	0.7	0.9	0.9	1.2	1	0.6	0.7	0.7	1
Sr (ppm)	844	961	940	996	1035	1115	669	168	623
Ta (ppm)	0.22	0.24	0.26	0.35	0.26	0.26	0.2	0.19	0.24
Te (ppm)	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05	0.05	0.29	0.42
Th (ppm)	7.3	6	5.4	6.7	7.1	6.6	7.2	7.6	8.8
Ti (%)	0.224	0.388	0.41	0.455	0.444	0.42	0.234	0.22	0.261
Tl (ppm)	0.47	0.23	0.26	0.31	0.23	0.24	0.72	0.11	0.49
U (ppm)	3	2.2	1.9	2.4	2.5	1.4	3	4.5	5.8
V (ppm)	50	115	114	129	123	121	55	64	78
W (ppm)	0.6	1.6	1.2	2.5	1.5	1	1.1	4.8	4.7
Y (ppm)	5.7	9.5	9.8	13.4	10.8	9.5	5.8	4.8	5
Zn (ppm)	26	60	59	46	48	41	35	8	13
Zr (ppm)	28.6	15.1	10.3	19.9	11	9	35.6	34.3	45.6
Al2O3 (%)	13.24	13.83	13.70	13.96	14.30	13.28	12.86	12.20	13.58
CaO (%)	2.27	3.96	3.90	4.09	4.43	4.29	1.82	0.36	0.52
FeO (%)	2.40	4.68	4.45	5.02	4.89	4.30	2.66	2.61	2.49
K2O (%)	3.89	2.69	3.07	3.18	2.65	2.96	3.76	0.75	3.58
MgO (%)	0.71	1.92	1.97	1.71	2.07	1.77	0.96	1.46	0.32
Na2O (%)	3.63	4.02	4.17	3.65	4.26	4.11	3.98	6.08	4.56
P2O5 (%)	0.15	0.31	0.30	0.40	0.33	0.30	0.17	0.18	0.14
TiO2 (%)	0.37	0.65	0.68	0.76	0.74	0.70	0.39	0.37	0.44
SO3 (%)	0.08	0.03	0.03	0.03	-0.03	0.03	0.05	0.13	0.10
Total (%)	26.75	32.07	32.27	32.79	33.65	31.75	26.65	24.14	25.72
SiO2 (%)	71.38	65.68	65.48	64.92	63.99	66.03	71.48	74.17	72.48
Al_m	0.26	0.27	0.27	0.27	0.28	0.26	0.25	0.24	0.27
Ca_m	0.04	0.07	0.07	0.07	0.08	0.08	0.03	0.01	0.01
K_m	0.08	0.06	0.07	0.07	0.06	0.06	0.08	0.02	0.08
Na_m	0.12	0.13	0.13	0.12	0.14	0.13	0.13	0.20	0.15
K_Al	0.32	0.21	0.24	0.25	0.20	0.24	0.32	0.07	0.29
Na_Al	0.45	0.48	0.50	0.43	0.49	0.51	0.51	0.82	0.55
Plag	0.61	0.74	0.76	0.70	0.77	0.80	0.64	0.85	0.59

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	303603	303508	303479	303507	303453	303474	304509	304528
North (NAD 27)	4317579	4317537	4317540	4317431	4317364	4317272	4317168	4317091
Classification	Sericite	Sericite	Albite-KSpar-Sericite	Sericite	Plag-KSpar	Sericite	Albite-KSpar-Sericite	Plag-KSpar
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	H437353	H437354	H437355	H437356	H437357	H437358	H437390	H437391
Lithology	Bear	Bear	Bear	Porphyry	McLeod	McLeod	Porphyry	Bear (K-spar phenos)
Ag (ppm)	0.22	0.06	0.02	0.12	0.04	0.26	0.07	0.13
Al (%)	7.26	4.17	6.98	7.13	7.62	6.31	7.64	7.67
As (ppm)	6.5	25.8	5.6	15.5	4.3	16	5	4
Ba (ppm)	1190	700	1310	570	1230	640	1480	1690
Be (ppm)	1.98	0.88	2.05	2.92	1.96	2.39	1.94	1.72
Bi (ppm)	0.17	1.81	0.11	1.76	0.15	0.68	0.41	0.37
Ca (%)	0.75	0.1	0.42	0.11	2.96	0.13	0.61	2.22
Cd (ppm)	0.06	-0.02	0.03	0.02	0.04	0.02	-0.02	0.02
Ce (ppm)	58.4	11.9	62.8	29.8	50.2	12.3	38.8	51
Co (ppm)	6.4	1.2	2.3	0.3	13.5	0.3	1.7	3.6
Cr (ppm)	8	9	10	10	10	6	10	17
Cs (ppm)	3.52	1.85	1.84	2.75	2.08	3.72	0.96	1.21
Cu (ppm)	2910	242	856	58	84.4	74.6	185	128.5
Fe (%)	3.33	2.55	2.11	1.96	4.04	1.92	1.99	1.85
Ga (ppm)	21.9	17.55	20.1	25.7	22.5	25.2	21.7	20.7
Ge (ppm)	0.2	0.15	0.18	0.15	0.2	0.13	0.12	0.13
Hf (ppm)	0.9	1.4	1.5	1.8	1.2	1.5	1.6	2
In (ppm)	0.055	0.071	0.022	0.276	0.05	0.143	0.044	0.094
K (%)	3.97	2.19	3.49	3.71	2.63	3.36	2.69	2.91
La (ppm)	30.2	5.8	35	14.4	24.2	7.1	20.9	27.6
Li (ppm)	9.4	4.6	6.9	4.5	3.1	5.2	5.9	5.5
Mg (%)	0.63	0.31	0.39	0.55	1.2	0.55	0.37	0.73
Mn (ppm)	256	45	77	63	592	106	29	133
Mo (ppm)	1.75	4.89	0.76	6.34	1.3	7.55	3.26	2.41
Na (%)	2.16	0.23	2.77	0.09	3.06	0.08	2.47	3.18
Nb (ppm)	6.5	3.7	4.8	3.2	5.2	6.3	1.6	3.5
Ni (ppm)	9.3	2.4	7.1	1.8	18.4	1.3	5.2	10.2
P (ppm)	940	160	610	320	1410	300	460	960
Pb (ppm)	13.3	4.2	7	6	13.8	6.2	3.4	8.5
Rb (ppm)	156	104.5	125	158.5	63.3	184.5	85	75
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.01	0.04	0.02	0.14	0.01	0.06	0.09	0.02
Sb (ppm)	1.81	1.65	0.8	2.05	0.79	1.4	0.53	0.51

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	303603	303508	303479	303507	303453	303474	304509	304528
North (NAD 27)	4317579	4317537	4317540	4317431	4317364	4317272	4317168	4317091
Classification	Sericite	Sericite	Albite-KSpar-Sericite	Sericite	Plag-KSpar	Sericite	Albite-KSpar-Sericite	Plag-KSpar
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	H437353	H437354	H437355	H437356	H437357	H437358	H437390	H437391
Lithology	Bear	Bear	Bear	Porphyry	McLeod	McLeod	Porphyry	Bear (K-spar phenos)
Sc (ppm)	7	4	4.1	5.9	10.2	4.2	5.4	6.9
Se (ppm)	2	4	2	3	2	6	2	2
Sn (ppm)	1.1	0.9	0.6	0.9	1.7	1.3	2.3	1.1
Sr (ppm)	273	43.3	246	52.1	936	39.2	598	1010
Ta (ppm)	0.44	0.32	0.42	0.23	0.32	0.55	0.11	0.24
Te (ppm)	0.06	1.22	-0.05	2.19	0.05	2.56	0.27	0.21
Th (ppm)	15.3	9.4	18.8	7.8	6.9	10.8	7.9	7.7
Ti (%)	0.321	0.166	0.214	0.241	0.407	0.184	0.168	0.301
Tl (ppm)	0.66	0.47	0.52	0.96	0.4	1.07	0.41	0.39
U (ppm)	4.1	4.1	5	6.4	3.1	5.6	3.8	3.7
V (ppm)	90	63	57	61	125	49	62	68
W (ppm)	5.3	5.5	3.6	1.1	2.3	2.6	2.4	1.2
Y (ppm)	11.6	2.5	11	5	13	2.6	3.6	7.8
Zn (ppm)	50	2	13	3	60	14	6	16
Zr (ppm)	29.1	43.4	42.4	52.9	38.4	42.4	39.1	54.6
Al2O3 (%)	13.71	7.88	13.19	13.47	14.39	11.92	14.43	14.49
CaO (%)	1.05	0.14	0.59	0.15	4.14	0.18	0.85	3.11
FeO (%)	4.28	3.28	2.71	2.52	5.20	2.47	2.56	2.38
K2O (%)	4.78	2.64	4.21	4.47	3.17	4.05	3.24	3.51
MgO (%)	1.04	0.51	0.65	0.91	1.99	0.91	0.61	1.21
Na2O (%)	2.91	0.31	3.73	0.12	4.12	0.11	3.33	4.29
P2O5 (%)	0.22	0.04	0.14	0.07	0.32	0.07	0.11	0.22
TiO2 (%)	0.54	0.28	0.36	0.40	0.68	0.31	0.28	0.50
SO3 (%)	0.03	0.10	0.05	0.35	0.03	0.15	0.23	0.05
Total (%)	28.56	15.17	25.62	22.47	34.04	20.16	25.64	29.75
SiO2 (%)	69.44	83.77	72.59	75.95	63.58	78.42	72.57	68.17
Al_m	0.27	0.15	0.26	0.26	0.28	0.23	0.28	0.28
Ca_m	0.02	0.00	0.01	0.00	0.07	0.00	0.02	0.06
K_m	0.10	0.06	0.09	0.10	0.07	0.09	0.07	0.07
Na_m	0.09	0.01	0.12	0.00	0.13	0.00	0.11	0.14
K_Al	0.38	0.36	0.35	0.36	0.24	0.37	0.24	0.26
Na_Al	0.35	0.06	0.47	0.01	0.47	0.01	0.38	0.49
Plag	0.42	0.08	0.51	0.03	0.73	0.03	0.43	0.68

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	304654	304583	304468	304425	304426	304446	304452	304420	303702
North (NAD 27)	4316940	4317013	4317000	4316982	4316904	4316791	4316795	4316757	4316364
Classification	Albite	Plag-KSpar	Plag-KSpar	Albite	Plag-KSpar	Plagioclase	Plag-KSpar	Plag-KSpar	Plag-KSpar
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	H437392	H437393	H437394	H437395	H437396	H437397	H437398	H437399	H437400
Lithology	McLeod	Porphyry	McLeod	Porphyry	McLeod	McLeod	Porphyry	Porphyry	McLeod
Ag (ppm)	0.03	0.06	0.08	0.01	0.05	0.42	0.02	0.03	0.09
Al (%)	7.39	7.52	7.38	6.64	7.64	8.31	7.13	6.9	7.81
As (ppm)	7.3	8.5	4.5	1.5	2.9	17.9	6.1	4.5	2.5
Ba (ppm)	270	1560	1270	390	780	250	2080	1770	1380
Be (ppm)	2.24	1.78	1.72	1.85	2.1	1.96	1.69	1.9	1.9
Bi (ppm)	0.21	0.22	0.12	0.24	0.14	0.15	0.22	0.17	0.15
Ca (%)	0.8	1.53	3.51	0.53	2.66	2.24	1.71	2.07	3.48
Cd (ppm)	-0.02	0.02	0.02	-0.02	0.02	0.02	0.02	0.05	0.06
Ce (ppm)	59.4	45.5	58.6	24.9	55.3	44.7	34.8	37.6	65.2
Co (ppm)	10.1	4.5	10.6	0.7	9.5	2.2	1.5	1.5	15.1
Cr (ppm)	11	15	8	11	9	5	10	11	11
Cs (ppm)	0.4	1.73	1.02	0.25	1.29	0.42	0.76	0.48	1.96
Cu (ppm)	129	211	149	11.5	134	1190	68.9	94.2	71.2
Fe (%)	1.36	1.53	3.93	0.86	2.55	2.3	1.35	1.3	4.19
Ga (ppm)	20.5	21.3	22.1	18.1	22.1	24.3	20	20.4	21.2
Ge (ppm)	0.13	0.13	0.16	0.07	0.16	0.17	0.12	0.1	0.19
Hf (ppm)	1.8	1.8	0.6	1.8	1	0.8	1.6	1.2	0.8
In (ppm)	0.035	0.055	0.054	0.013	0.047	0.038	0.027	0.086	0.045
K (%)	0.43	2.69	2.44	0.53	2.27	0.65	2.05	2.54	2.59
La (ppm)	27.7	25.3	29.6	15.3	28.5	18.3	17	19.3	35.8
Li (ppm)	5.6	7.2	5.7	1.4	4	4.9	3	2.7	4
Mg (%)	0.79	0.5	1.21	0.08	0.85	0.99	0.26	0.32	1.35
Mn (ppm)	49	63	490	30	341	153	60	136	748
Mo (ppm)	2.15	3.31	1.34	1.37	1.93	2.77	2.48	1.65	1.86
Na (%)	4.89	3.27	2.8	5.01	3.42	4.36	3.1	2.84	2.94
Nb (ppm)	3.4	3.6	4.9	2.6	5.5	6.1	2.7	3.2	4.9
Ni (ppm)	7	10.1	13.4	1.6	10.5	8.4	4.7	8.3	15
P (ppm)	860	940	1480	310	1010	1680	590	810	1510
Pb (ppm)	1.9	7	5.7	2.2	7.3	3.3	4	3.3	12.3
Rb (ppm)	16.7	86.6	79.7	18.5	76.8	27.5	51.7	66	87.7
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	0.002
S (%)	0.01	0.01	0.01	0.06	0.01	-0.01	0.01	0.01	0.01
Sb (ppm)	0.5	1.5	0.53	0.28	0.87	0.6	0.44	1.01	0.57

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	304654	304583	304468	304425	304426	304446	304452	304420	303702
North (NAD 27)	4316940	4317013	4317000	4316982	4316904	4316791	4316795	4316757	4316364
Classification	Albite	Plag-KSpar	Plag-KSpar	Albite	Plag-KSpar	Plagioclase	Plag-KSpar	Plag-KSpar	Plag-KSpar
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	H437392	H437393	H437394	H437395	H437396	H437397	H437398	H437399	H437400
Lithology	McLeod	Porphyry	McLeod	Porphyry	McLeod	McLeod	Porphyry	Porphyry	McLeod
Sc (ppm)	5.8	6.7	11.1	3.8	7.8	10.2	4.8	4.2	11.5
Se (ppm)	2	2	2	2	2	7	2	1	2
Sn (ppm)	2.9	1.2	1	0.6	1.3	3.3	0.7	0.7	1
Sr (ppm)	555	824	1145	570	915	781	1375	993	1090
Ta (ppm)	0.25	0.25	0.32	0.19	0.39	0.39	0.18	0.23	0.32
Te (ppm)	0.18	0.17	-0.05	0.4	-0.05	0.19	0.3	0.08	-0.05
Th (ppm)	8.6	7.2	7.2	6.2	14.9	6.6	4.7	7.5	9.6
Ti (%)	0.252	0.296	0.444	0.205	0.349	0.529	0.23	0.228	0.468
Tl (ppm)	0.06	0.4	0.32	0.07	0.28	0.11	0.27	0.26	0.33
U (ppm)	3.6	3.6	3	2.6	5.9	4.2	3.1	3.3	3.2
V (ppm)	66	71	128	38	94	143	53	49	128
W (ppm)	1.3	1.5	1.2	1.5	1.3	3.8	2.1	0.7	1.9
Y (ppm)	5.9	8.2	13.9	3.3	10.6	24.4	5	5.5	14.1
Zn (ppm)	-2	17	38	-2	29	20	5	6	77
Zr (ppm)	44.3	46.1	10.7	48	17.1	14.4	46.9	25.7	14.1
Al2O3 (%)	13.96	14.21	13.94	12.54	14.43	15.70	13.47	13.03	14.75
CaO (%)	1.12	2.14	4.91	0.74	3.72	3.13	2.39	2.90	4.87
FeO (%)	1.75	1.97	5.05	1.11	3.28	2.96	1.74	1.67	5.39
K2O (%)	0.52	3.24	2.94	0.64	2.74	0.78	2.47	3.06	3.12
MgO (%)	1.31	0.83	2.01	0.13	1.41	1.64	0.43	0.53	2.24
Na2O (%)	6.59	4.41	3.77	6.75	4.61	5.88	4.18	3.83	3.96
P2O5 (%)	0.20	0.22	0.34	0.07	0.23	0.38	0.14	0.19	0.35
TiO2 (%)	0.42	0.49	0.74	0.34	0.58	0.88	0.38	0.38	0.78
SO3 (%)	0.03	0.03	0.03	0.15	0.03	-0.03	0.03	0.03	0.03
Total (%)	25.89	27.53	33.73	22.48	31.03	31.33	25.22	25.61	35.48
SiO2 (%)	72.30	70.55	63.91	75.95	66.80	66.47	73.01	72.59	62.03
Al_m	0.27	0.28	0.27	0.25	0.28	0.31	0.26	0.26	0.29
Ca_m	0.02	0.04	0.09	0.01	0.07	0.06	0.04	0.05	0.09
K_m	0.01	0.07	0.06	0.01	0.06	0.02	0.05	0.07	0.07
Na_m	0.21	0.14	0.12	0.22	0.15	0.19	0.13	0.12	0.13
K_Al	0.04	0.25	0.23	0.06	0.21	0.05	0.20	0.25	0.23
Na_Al	0.78	0.51	0.45	0.89	0.53	0.62	0.51	0.48	0.44
Plag	0.85	0.65	0.77	0.94	0.76	0.80	0.67	0.69	0.74

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	304309	304304	304294	304291	304242	304348	304313	304256	304354
North (NAD 27)	4317260	4317164	4317082	4317099	4316984	4316919	4316875	4316827	4316782
Classification	Sericite-Albite	Plag-KSpar	Albite	Albite	Plagioclase	Plagioclase	Plag-KSpar	Plag-KSpar	Plag-KSpar
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	H437406	H437407	H437408	H437409	H437410	H437411	H437412	H437413	H437414
Lithology	Porphyry	McLeod	Porphyry	Porphyry	McLeod	McLeod	Porphyry	McLeod	Porphyry
Ag (ppm)	0.09	0.03	0.06	0.02	0.03	0.03	0.02	0.05	0.01
Al (%)	7.38	8.24	7.36	7.45	7.93	8.3	7.62	8.22	7.79
As (ppm)	1.3	5.2	4.7	20.4	2.7	2.2	3.4	4.9	4.2
Ba (ppm)	1150	680	240	150	100	130	1690	1510	1680
Be (ppm)	1.39	1.92	1.77	1.53	1.55	1.73	1.67	1.61	1.61
Bi (ppm)	0.48	0.07	0.18	0.13	0.08	0.06	0.1	0.13	0.19
Ca (%)	0.15	3.55	0.41	0.36	3.63	3.92	2.07	3.41	1.94
Cd (ppm)	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02
Ce (ppm)	38	62.9	41.7	32.3	51.5	60.7	44.9	45.9	42.2
Co (ppm)	0.4	13.8	11.7	14	6.8	12.2	1.2	3.9	1.3
Cr (ppm)	13	10	15	10	10	12	31	11	15
Cs (ppm)	0.94	0.72	0.39	0.55	0.17	0.27	0.6	1	0.46
Cu (ppm)	120	85.4	236	85.6	81.2	71.2	6.2	71.6	9.1
Fe (%)	1.88	3.35	0.94	1.22	2	2.22	1.37	1.52	1.37
Ga (ppm)	22.6	23.5	23.5	21.8	24	22.9	21.9	23.4	22.3
Ge (ppm)	0.1	0.17	0.09	0.09	0.13	0.15	0.11	0.12	0.11
Hf (ppm)	1.8	1	1.6	2.1	0.7	0.8	1.5	0.7	1.3
In (ppm)	0.038	0.052	0.086	0.015	0.071	0.051	0.059	0.139	0.073
K (%)	2.7	1.59	0.63	0.86	0.28	0.37	2.97	2.97	2.4
La (ppm)	17.9	30.6	17.9	14.3	24.9	29.9	24.5	20.4	20.7
Li (ppm)	5.5	6.1	5.7	7.3	3	2.7	3.6	2	3.6
Mg (%)	0.35	1.38	0.81	0.57	1.27	1.3	0.24	1.13	0.27
Mn (ppm)	20	406	61	91	344	366	130	225	105
Mo (ppm)	2.77	1.55	0.74	1.18	1.24	1.26	3	1.53	4.27
Na (%)	1.75	3.24	4.46	4.43	4.41	4.35	2.78	3.2	3.13
Nb (ppm)	1.4	5.8	2.5	2.6	5	5	3.4	5.3	3.2
Ni (ppm)	2.5	20.5	9.3	10.9	14.8	16.2	7	11.7	5.4
P (ppm)	310	1390	820	920	1420	1540	670	1430	620
Pb (ppm)	2.5	4.8	2.5	1.2	2.9	3.3	5.3	4.7	4.1
Rb (ppm)	97.1	44.5	22.7	35.3	6.1	13.4	71.2	69	65.2
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.38	0.03	0.01	-0.01	0.01	0.01	0.04	0.01	0.01
Sb (ppm)	0.49	0.75	0.52	0.53	0.64	0.5	1.22	1	1.1

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	304309	304304	304294	304291	304242	304348	304313	304256	304354
North (NAD 27)	4317260	4317164	4317082	4317099	4316984	4316919	4316875	4316827	4316782
Classification	Sericite-Albite	Plag-KSpar	Albite	Albite	Plagioclase	Plagioclase	Plag-KSpar	Plag-KSpar	Plag-KSpar
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	H437406	H437407	H437408	H437409	H437410	H437411	H437412	H437413	H437414
Lithology	Porphyry	McLeod	Porphyry	Porphyry	McLeod	McLeod	Porphyry	McLeod	Porphyry
Sc (ppm)	5.3	12	5.2	6.5	10.3	10.9	4.9	11	4.6
Se (ppm)	5	2	1	2	2	2	1	2	2
Sn (ppm)	3.1	1.3	1.2	0.8	1	1.1	0.8	2.1	0.8
Sr (ppm)	179.5	1220	371	204	1030	971	1120	1100	1000
Ta (ppm)	0.1	0.37	0.17	0.16	0.32	0.29	0.22	0.31	0.21
Te (ppm)	0.58	0.06	0.14	0.14	0.05	0.05	0.15	0.1	0.12
Th (ppm)	4.3	11.2	7	7.5	8.4	7.6	7.7	7.9	7.8
Ti (%)	0.145	0.451	0.218	0.208	0.425	0.446	0.235	0.457	0.221
Tl (ppm)	0.57	0.2	0.1	0.12	0.05	0.07	0.38	0.3	0.29
U (ppm)	2.1	4	2.4	3.2	3.3	3.1	3.2	4.5	3.6
V (ppm)	61	122	62	69	107	117	51	94	49
W (ppm)	2.3	1.1	2.6	3.3	0.9	1.1	1.2	1.6	1.4
Y (ppm)	2.1	15.1	5.4	6	12.6	12.7	6	12	5.8
Zn (ppm)	-2	24	7	2	24	24	12	15	6
Zr (ppm)	43.8	17	37.7	53	13.7	15.4	33.5	11.9	26.9
Al2O3 (%)	13.94	15.57	13.90	14.07	14.98	15.68	14.39	15.53	14.72
CaO (%)	0.21	4.97	0.57	0.50	5.08	5.48	2.90	4.77	2.71
FeO (%)	2.42	4.31	1.21	1.57	2.57	2.85	1.76	1.95	1.76
K2O (%)	3.25	1.92	0.76	1.04	0.34	0.45	3.58	3.58	2.89
MgO (%)	0.58	2.29	1.34	0.95	2.11	2.16	0.40	1.87	0.45
Na2O (%)	2.36	4.37	6.01	5.97	5.94	5.86	3.75	4.31	4.22
P2O5 (%)	0.07	0.32	0.19	0.21	0.33	0.35	0.15	0.33	0.14
TiO2 (%)	0.24	0.75	0.36	0.35	0.71	0.74	0.39	0.76	0.37
SO3 (%)	0.95	0.08	0.03	-0.03	0.03	0.03	0.10	0.03	0.03
Total (%)	24.02	34.56	24.38	24.63	32.08	33.60	27.42	33.13	27.29
SiO2 (%)	74.29	63.02	73.92	73.64	65.68	64.04	70.66	64.55	70.80
Al_m	0.27	0.31	0.27	0.28	0.29	0.31	0.28	0.30	0.29
Ca_m	0.00	0.09	0.01	0.01	0.09	0.10	0.05	0.09	0.05
K_m	0.07	0.04	0.02	0.02	0.01	0.01	0.08	0.08	0.06
Na_m	0.08	0.14	0.19	0.19	0.19	0.19	0.12	0.14	0.14
K_Al	0.25	0.13	0.06	0.08	0.02	0.03	0.27	0.25	0.21
Na_Al	0.28	0.46	0.71	0.70	0.65	0.62	0.43	0.46	0.47
Plag	0.29	0.75	0.75	0.73	0.96	0.93	0.61	0.74	0.64

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	304352	304249	304040	303993	303891	303782	306676	306586	306513
North (NAD 27)	4316652	4316654	4316742	4316701	4316669	4316511	4316886	4316723	4316596
Classification	Plagioclase	Plag-KSpar	Plagioclase	Plag-KSpar	Plag-KSpar	Plag-KSpar	Plag-KSpar	Plag-KSpar	Plag-KSpar
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	H437415	H437416	H437417	H437418	H437419	H437420	H437421	H437422	H437423
Lithology	McLeod	McLeod	McLeod	McLeod	Porphyry	Porphyry	Luhr Hill	Porphyry	Luhr Hill
Ag (ppm)	2.37	0.05	0.04	0.05	0.02	0.03	0.05	0.31	0.04
Al (%)	4.33	7.71	7.89	7.86	7.46	7.54	7.53	7.79	7.51
As (ppm)	63.6	2.9	6.5	2.8	3.4	2.1	0.5	0.6	0.9
Ba (ppm)	40	1060	110	1160	2340	1970	1630	1930	1380
Be (ppm)	0.91	1.62	1.6	1.93	1.62	1.67	1.61	1.8	1.8
Bi (ppm)	1.56	0.12	0.08	0.06	0.07	0.06	0.02	0.07	0.02
Ca (%)	3.4	3.1	2.28	2.58	1.83	1.97	1.7	1.44	1.76
Cd (ppm)	0.22	-0.02	-0.02	0.02	-0.02	-0.02	-0.02	0.03	-0.02
Ce (ppm)	93.5	56.4	42.2	58.2	33.7	46.7	43.1	43.6	43.2
Co (ppm)	3.9	15	4	10.8	1.8	5	6	7.6	5.4
Cr (ppm)	17	15	20	15	25	22	17	18	13
Cs (ppm)	0.3	1.66	0.42	1.77	0.49	0.84	0.82	1.67	0.9
Cu (ppm)	95100	378	413	71	60	10.9	129	390	208
Fe (%)	5.45	3.09	1.31	3.22	1.38	2.33	1.59	1.85	1.59
Ga (ppm)	24.1	23	20.5	22.3	21.2	22.5	21.2	22.1	21.7
Ge (ppm)	0.56	0.15	0.1	0.15	0.1	0.12	0.12	0.12	0.11
Hf (ppm)	1.3	0.8	1.6	0.7	1.4	1.7	0.7	1	1
In (ppm)	1.19	0.053	0.036	0.031	0.024	0.019	0.011	0.005	0.012
K (%)	0.06	2.09	0.24	2.84	3.26	3.2	3.07	2.85	3.08
La (ppm)	52	26.3	21.8	27.5	15.8	26.9	20	21.6	20.2
Li (ppm)	8.3	3.5	3.3	4.2	3.7	4.4	3.5	8.3	3.9
Mg (%)	1.23	1.16	0.44	1.02	0.39	0.49	0.49	0.61	0.48
Mn (ppm)	138	496	220	427	155	256	220	196	189
Mo (ppm)	10.95	1.41	1.31	1.45	0.63	0.93	0.7	0.76	0.83
Na (%)	0.96	3.08	4.58	2.83	2.8	2.58	2.92	3.14	2.94
Nb (ppm)	7.6	5	2.7	5.9	2.8	3.2	3.2	2.8	3.7
Ni (ppm)	32.4	17	9.4	15.5	7.4	8.7	9.1	10.3	8
P (ppm)	2330	1270	850	1110	580	650	700	780	680
Pb (ppm)	5.9	7.8	7	10.6	5.1	14.3	8.4	7.7	8.2
Rb (ppm)	2.7	56.3	7.7	92.1	92.3	93.3	89.1	99.3	88.3
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.06	0.01	0.02	-0.01	0.01	0.02	-0.01	0.05	-0.01
Sb (ppm)	3.16	1.03	1.66	0.83	0.83	0.73	0.19	0.18	0.25

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	304352	304249	304040	303993	303891	303782	306676	306586	306513
North (NAD 27)	4316652	4316654	4316742	4316701	4316669	4316511	4316886	4316723	4316596
Classification	Plagioclase	Plag-KSpar	Plagioclase	Plag-KSpar	Plag-KSpar	Plag-KSpar	Plag-KSpar	Plag-KSpar	Plag-KSpar
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	H437415	H437416	H437417	H437418	H437419	H437420	H437421	H437422	H437423
Lithology	McLeod	McLeod	McLeod	McLeod	Porphyry	Porphyry	Luhr Hill	Porphyry	Luhr Hill
Sc (ppm)	10.4	10	5.6	9	4.1	4.6	4.8	5.7	4.9
Se (ppm)	71	2	2	2	2	1	1	1	1
Sn (ppm)	3.9	1	0.7	1	0.6	0.8	0.7	0.3	0.7
Sr (ppm)	734	1030	1080	886	834	924	1010	1090	996
Ta (ppm)	0.45	0.32	0.17	0.39	0.18	0.21	0.2	0.19	0.26
Te (ppm)	0.52	0.05	0.14	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05
Th (ppm)	13.4	10	4.6	12.3	6.3	7.4	6.4	7	9.8
Ti (%)	0.662	0.404	0.241	0.398	0.203	0.229	0.234	0.226	0.228
Tl (ppm)	0.1	0.25	0.07	0.36	0.59	0.57	0.33	0.34	0.29
U (ppm)	107	4.1	2.5	4.2	2.7	3	1.8	2	2.6
V (ppm)	222	113	58	98	45	51	49	60	50
W (ppm)	18.6	1.1	1	1.3	0.5	0.8	0.3	0.4	0.3
Y (ppm)	21	12.5	5.7	12.1	5	5.6	5.6	6	6.2
Zn (ppm)	12	45	5	47	5	18	24	28	18
Zr (ppm)	24.6	13.9	42.4	14.1	29.7	41.2	10.9	28.8	18.1
Al2O3 (%)	8.18	14.56	14.90	14.85	14.09	14.24	14.22	14.72	14.19
CaO (%)	4.76	4.34	3.19	3.61	2.56	2.76	2.38	2.01	2.46
FeO (%)	7.01	3.97	1.68	4.14	1.77	3.00	2.04	2.38	2.04
K2O (%)	0.07	2.52	0.29	3.42	3.93	3.86	3.70	3.43	3.71
MgO (%)	2.04	1.92	0.73	1.69	0.65	0.81	0.81	1.01	0.80
Na2O (%)	1.29	4.15	6.17	3.81	3.77	3.48	3.94	4.23	3.96
P2O5 (%)	0.53	0.29	0.19	0.25	0.13	0.15	0.16	0.18	0.16
TiO2 (%)	1.10	0.67	0.40	0.66	0.34	0.38	0.39	0.38	0.38
SO3 (%)	0.15	0.03	0.05	-0.03	0.03	0.05	-0.03	0.13	-0.03
Total (%)	25.14	32.46	27.62	32.42	27.27	28.72	27.62	28.47	27.67
SiO2 (%)	73.10	65.27	70.45	65.31	70.82	69.27	70.45	69.54	70.39
Al_m	0.16	0.29	0.29	0.29	0.28	0.28	0.28	0.29	0.28
Ca_m	0.09	0.08	0.06	0.06	0.05	0.05	0.04	0.04	0.04
K_m	0.00	0.05	0.01	0.07	0.08	0.08	0.08	0.07	0.08
Na_m	0.04	0.13	0.20	0.12	0.12	0.11	0.13	0.14	0.13
K_Al	0.01	0.19	0.02	0.25	0.30	0.29	0.28	0.25	0.28
Na_Al	0.26	0.47	0.68	0.42	0.44	0.40	0.46	0.47	0.46
Plag	0.79	0.74	0.88	0.64	0.61	0.58	0.61	0.60	0.62

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	306426	306297	306237	306233	306306	306328	306101	305962	305867
North (NAD 27)	4316482	4316276	4316114	4316095	4315894	4315889	4315947	4316200	4316322
Classification	Plag-KSpar	Plag-KSpar	Plag-KSpar	Plagioclase	Plag-KSpar	Plagioclase	Plag-KSpar	Plag-KSpar	Plag-KSpar
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	H437424	H437425	H437426	H437427	H437428	H437429	H437430	H437431	H437432
Lithology	Porphyry	Luhr Hill	Luhr Hill	Luhr Hill	Porphyry	Luhr Hill	Luhr Hill	Porphyry	McLeod
Ag (ppm)	0.31	0.12	0.03	0.03	0.1	0.07	0.17	0.04	0.06
Al (%)	7.94	7.62	7.71	7.63	8.13	7.7	7.44	7.52	7.96
As (ppm)	1	1.6	0.5	2.1	5	2.9	3.5	1.3	4.7
Ba (ppm)	1310	1560	1370	270	1010	250	1420	1450	930
Be (ppm)	1.78	1.55	1.61	1.69	1.69	1.72	1.81	1.57	1.77
Bi (ppm)	0.2	0.07	0.09	0.04	0.06	0.04	0.26	0.12	0.14
Ca (%)	1.37	1.88	2.29	2.9	2.99	3.28	1.92	2.49	4.01
Cd (ppm)	0.07	0.02	0.05	-0.02	0.04	-0.02	-0.02	0.02	-0.02
Ce (ppm)	48.8	35	48.5	36.8	62.5	34.9	39.1	38.4	58.5
Co (ppm)	2.1	5.8	5.2	1.3	8	1.5	6.3	3	11.5
Cr (ppm)	13	16	17	16	46	15	14	27	13
Cs (ppm)	2.94	1.24	0.87	0.41	1.01	0.53	1.29	0.45	0.89
Cu (ppm)	240	313	73.7	9.2	14.6	8.1	259	45.1	128.5
Fe (%)	1.35	1.8	1.9	0.43	2.49	0.41	1.8	0.86	2.2
Ga (ppm)	24	20.2	18.95	20.8	22.4	20.2	21.4	21.1	22.9
Ge (ppm)	0.12	0.1	0.1	0.09	0.14	0.09	0.1	0.09	0.15
Hf (ppm)	0.5	1	0.7	1.1	1.7	1	0.9	1.2	0.6
In (ppm)	0.018	0.013	0.019	0.011	0.027	0.007	0.013	0.029	0.049
K (%)	3.75	2.85	2.85	0.28	2.09	0.24	2.96	2.66	1.63
La (ppm)	22.5	15.7	25.4	15.1	30.8	15.2	18.7	18.4	28.3
Li (ppm)	9.7	6.6	4.3	3.3	4.4	3.3	5.6	4.6	4.5
Mg (%)	0.46	0.52	0.61	0.61	1.11	0.78	0.53	0.52	1.41
Mn (ppm)	222	189	272	90	218	94	184	116	351
Mo (ppm)	1.69	0.78	0.94	0.53	1.2	0.58	0.92	0.59	1.23
Na (%)	2.33	2.93	2.91	3.98	3.61	3.78	2.93	2.92	3.27
Nb (ppm)	2	2.9	3.4	3.1	3.6	3.1	3.3	3	4.9
Ni (ppm)	8.4	7.9	9.6	5.7	22.7	5.5	8.7	9.1	18.3
P (ppm)	750	700	820	700	1080	680	730	670	1470
Pb (ppm)	7.6	8.1	12.8	4.8	8.2	4.9	7.8	7.9	6.8
Rb (ppm)	108	73.4	77.5	4.4	60	5.7	93.3	51.2	34.7
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.01	0.01	0.01	0.01	0.04	0.02	0.01	0.02	0.02
Sb (ppm)	0.43	0.27	0.32	0.55	0.68	0.69	0.26	0.74	0.92

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	306426	306297	306237	306233	306306	306328	306101	305962	305867
North (NAD 27)	4316482	4316276	4316114	4316095	4315894	4315889	4315947	4316200	4316322
Classification	Plag-KSpar	Plag-KSpar	Plag-KSpar	Plagioclase	Plag-KSpar	Plagioclase	Plag-KSpar	Plag-KSpar	Plag-KSpar
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	H437424	H437425	H437426	H437427	H437428	H437429	H437430	H437431	H437432
Lithology	Porphyry	Luhr Hill	Luhr Hill	Luhr Hill	Porphyry	Luhr Hill	Luhr Hill	Porphyry	McLeod
Sc (ppm)	5.2	4.6	5.8	5.6	9.9	5.5	5	4.9	11.6
Se (ppm)	1	1	1	1	2	1	1	1	2
Sn (ppm)	0.6	0.7	0.8	1.3	1.3	1	0.7	1	1.2
Sr (ppm)	268	1040	1130	1320	1230	1340	1020	1130	1190
Ta (ppm)	0.12	0.19	0.29	0.2	0.21	0.2	0.21	0.19	0.28
Te (ppm)	0.09	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05
Th (ppm)	7.6	6.5	9.6	6.2	6.6	6.1	9.3	6.2	7.7
Ti (%)	0.136	0.225	0.265	0.239	0.346	0.237	0.237	0.219	0.434
Tl (ppm)	0.38	0.29	0.32	0.04	0.22	0.07	0.34	0.22	0.17
U (ppm)	1.6	1.9	3.3	1.9	3.2	1.7	2.9	2.3	3.5
V (ppm)	56	50	63	43	89	48	53	51	116
W (ppm)	21.5	0.7	0.6	0.3	0.8	0.3	0.4	0.4	1.2
Y (ppm)	5.1	5.3	7	6.6	8.6	6.4	5.9	5.7	12.8
Zn (ppm)	15	20	18	5	23	5	16	7	25
Zr (ppm)	8.8	20.1	10.8	22.9	43.4	19.4	14.1	24.3	10.1
Al2O3 (%)	15.00	14.39	14.56	14.41	15.36	14.55	14.05	14.21	15.04
CaO (%)	1.92	2.63	3.20	4.06	4.18	4.59	2.69	3.48	5.61
FeO (%)	1.74	2.31	2.44	0.55	3.20	0.53	2.31	1.11	2.83
K2O (%)	4.52	3.43	3.43	0.34	2.52	0.29	3.57	3.21	1.96
MgO (%)	0.76	0.86	1.01	1.01	1.84	1.29	0.88	0.86	2.34
Na2O (%)	3.14	3.95	3.92	5.37	4.87	5.10	3.95	3.94	4.41
P2O5 (%)	0.17	0.16	0.19	0.16	0.25	0.16	0.17	0.15	0.34
TiO2 (%)	0.23	0.38	0.44	0.40	0.58	0.40	0.40	0.37	0.72
SO3 (%)	0.03	0.03	0.03	0.03	0.10	0.05	0.03	0.05	0.05
Total (%)	27.50	28.15	29.23	26.32	32.89	26.94	28.04	27.37	33.30
SiO2 (%)	70.58	69.88	68.72	71.84	64.81	71.17	70.00	70.72	64.37
Al_m	0.29	0.28	0.29	0.28	0.30	0.29	0.28	0.28	0.29
Ca_m	0.03	0.05	0.06	0.07	0.07	0.08	0.05	0.06	0.10
K_m	0.10	0.07	0.07	0.01	0.05	0.01	0.08	0.07	0.04
Na_m	0.10	0.13	0.13	0.17	0.16	0.16	0.13	0.13	0.14
K_Al	0.33	0.26	0.26	0.03	0.18	0.02	0.28	0.24	0.14
Na_Al	0.34	0.45	0.44	0.61	0.52	0.58	0.46	0.46	0.48
Plag	0.46	0.62	0.64	0.87	0.77	0.86	0.64	0.68	0.82

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	306176	306532	306883	304169	304112	304141	304154	304124	304098
North (NAD 27)	4316498	4316268	4316343	4317368	4317317	4317248	4317168	4317097	4317028
Classification	Plag-KSpar	Plag-KSpar	Plag-KSpar	Sericite	Plag-KSpar	Albite	Albite	Albite	Albite
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	H437433	H437434	H437435	H437460	H437461	H437462	H437463	H437464	H437465
Lithology	Luhr Hill	Luhr Hill	Luhr Hill	Porphyry	McLeod	Porphyry	Porphyry	Porphyry	Porphyry
Ag (ppm)	0.09	0.03	0.04	0.07	-0.01	-0.01	-0.01	-0.01	-0.01
Al (%)	7.59	7.47	7.22	7.06	6.5	6.83	6.89	7.03	6.54
As (ppm)	0.6	-0.2	0.3	27	3.3	7.4	3.8	7.3	0.8
Ba (ppm)	1290	1510	1280	1240	240	180	220	750	310
Be (ppm)	1.76	1.57	1.81	1.29	1.41	2.05	1.82	1.73	1.76
Bi (ppm)	0.01	0.01	0.02	1.12	0.03	0.65	0.21	0.34	0.65
Ca (%)	1.92	1.9	1.44	0.12	2.92	0.95	0.36	0.39	0.22
Cd (ppm)	-0.02	-0.02	-0.02	-0.02	0.02	0.04	0.03	0.02	0.03
Ce (ppm)	45.5	44.7	33.5	20.7	37.9	19.3	18.15	28.7	31.2
Co (ppm)	5.7	5.6	4.5	1.7	7.1	2.9	1.3	1.6	0.5
Cr (ppm)	14	19	15	13	9	13	8	14	9
Cs (ppm)	1.23	0.88	0.75	0.86	1.72	0.56	0.6	0.63	0.52
Cu (ppm)	377	41.5	15	90.9	71.7	21.6	70.4	46.3	11.8
Fe (%)	1.98	1.7	1.3	1.83	2.64	1.56	0.89	1.26	0.82
Ga (ppm)	21.7	20.6	21.4	25.5	20	19.7	21.3	20.8	21.3
Ge (ppm)	0.12	0.11	0.09	0.09	0.14	0.11	0.07	0.13	0.1
Hf (ppm)	0.8	0.7	0.8	1.7	0.5	1.6	1.4	1.9	1.8
In (ppm)	0.013	0.012	0.009	0.125	0.055	0.125	0.121	0.045	0.023
K (%)	2.72	2.88	2.89	3.32	1.3	0.62	0.77	1.07	1.18
La (ppm)	21.3	20.8	17	10.6	16.8	8.5	8.4	13.8	16
Li (ppm)	6.3	5	5.7	2.9	7.8	6	4.3	3.2	1.9
Mg (%)	0.55	0.49	0.37	0.37	1.38	0.55	0.32	0.19	0.16
Mn (ppm)	121	235	187	40	333	87	30	30	39
Mo (ppm)	0.74	0.63	0.57	3.93	0.97	1.21	1.56	2.88	1.46
Na (%)	2.86	2.93	2.91	0.23	3.09	4.21	4.48	4.34	4.31
Nb (ppm)	3.4	3.3	2.8	1.6	4.2	2.2	2.2	2.1	1.8
Ni (ppm)	9	7.9	6.2	4.1	15.6	9.5	4.2	3.2	1.5
P (ppm)	810	720	480	230	1360	810	630	390	180
Pb (ppm)	7.2	8.7	9.9	2.9	2.5	2.9	1.6	2.2	3.1
Rb (ppm)	74.3	80.2	91.7	116	57	25.2	32.8	36.2	47.6
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.01	-0.01	-0.01	0.16	-0.01	-0.01	0.01	0.02	0.09
Sb (ppm)	0.09	0.09	0.12	0.97	2.07	1.27	0.6	0.41	0.35

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	306176	306532	306883	304169	304112	304141	304154	304124	304098
North (NAD 27)	4316498	4316268	4316343	4317368	4317317	4317248	4317168	4317097	4317028
Classification	Plag-KSpar	Plag-KSpar	Plag-KSpar	Sericite	Plag-KSpar	Albite	Albite	Albite	Albite
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	H437433	H437434	H437435	H437460	H437461	H437462	H437463	H437464	H437465
Lithology	Luhr Hill	Luhr Hill	Luhr Hill	Porphyry	McLeod	Porphyry	Porphyry	Porphyry	Porphyry
Sc (ppm)	5.5	4.9	3.8	6.1	10.1	5.3	4.9	4.9	5.4
Se (ppm)	1	1	1	3	1	1	1	2	3
Sn (ppm)	0.9	0.7	0.6	2.1	0.9	0.6	0.6	0.6	0.5
Sr (ppm)	1010	1090	915	130.5	263	594	341	386	188.5
Ta (ppm)	0.22	0.21	0.18	0.12	0.29	0.16	0.15	0.16	0.13
Te (ppm)	-0.05	-0.05	-0.05	1.29	0.05	0.4	0.28	0.5	0.89
Th (ppm)	9.4	7.2	7.7	4.1	6.9	7.3	6.6	8	5.3
Ti (%)	0.253	0.239	0.177	0.144	0.382	0.183	0.186	0.189	0.146
Tl (ppm)	0.29	0.3	0.28	0.87	0.36	0.12	0.13	0.15	0.14
U (ppm)	2	2.3	3	2.6	2	3.1	2.7	3.8	2.3
V (ppm)	59	52	38	82	98	54	47	52	44
W (ppm)	0.3	0.3	0.2	2.9	6.1	1.2	1.1	2.2	0.9
Y (ppm)	6.7	6	4.5	3	11.9	4.5	3.1	3.9	3.4
Zn (ppm)	14	20	18	41	29	12	5	4	3
Zr (ppm)	13.2	9.9	13.4	41.4	8.3	38.3	32.3	45.9	50.2
Al2O3 (%)	14.34	14.11	13.64	13.34	12.28	12.90	13.02	13.28	12.35
CaO (%)	2.69	2.66	2.01	0.17	4.09	1.33	0.50	0.55	0.31
FeO (%)	2.55	2.19	1.67	2.35	3.40	2.01	1.14	1.62	1.05
K2O (%)	3.28	3.47	3.48	4.00	1.57	0.75	0.93	1.29	1.42
MgO (%)	0.91	0.81	0.61	0.61	2.29	0.91	0.53	0.32	0.27
Na2O (%)	3.86	3.95	3.92	0.31	4.17	5.68	6.04	5.85	5.81
P2O5 (%)	0.19	0.16	0.11	0.05	0.31	0.19	0.14	0.09	0.04
TiO2 (%)	0.42	0.40	0.30	0.24	0.64	0.31	0.31	0.32	0.24
SO3 (%)	0.03	-0.03	-0.03	0.40	-0.03	-0.03	0.03	0.05	0.23
Total (%)	28.25	27.73	25.72	21.47	28.70	24.04	22.64	23.35	21.72
SiO2 (%)	69.78	70.33	72.48	77.02	69.29	74.28	75.77	75.01	76.76
Al_m	0.28	0.28	0.27	0.26	0.24	0.25	0.26	0.26	0.24
Ca_m	0.05	0.05	0.04	0.00	0.07	0.02	0.01	0.01	0.01
K_m	0.07	0.07	0.07	0.09	0.03	0.02	0.02	0.03	0.03
Na_m	0.12	0.13	0.13	0.01	0.13	0.18	0.19	0.19	0.19
K_Al	0.25	0.27	0.28	0.33	0.14	0.06	0.08	0.11	0.12
Na_Al	0.44	0.46	0.47	0.04	0.56	0.72	0.76	0.72	0.77
Plag	0.61	0.63	0.61	0.05	0.86	0.82	0.80	0.76	0.80

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	304118	304138	304360	304457	304408	304318	304232	304140	303954
North (NAD 27)	4316884	4316798	4316721	4316629	4316542	4316457	4316437	4316367	4316379
Classification	Plag-KSpar	Plag-KSpar	Plag-KSpar	Plag-KSpar	Plagioclase	Sericite	Plag-KSpar	Plag-KSpar	Plag-KSpar
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	H437466	H437467	H437468	H437469	H437470	H437471	H437472	H437473	H437474
Lithology	Porphyry	Porphyry	Porphyry	Porphyry	McLeod	Porphyry	McLeod	Porphyry	Porphyry
Ag (ppm)	0.03	0.01	-0.01	0.01	-0.01	-0.01	0.01	0.01	0.01
Al (%)	7.01	7.13	7.05	7.24	7.59	7.28	7.63	7.3	6.97
As (ppm)	10.5	1.9	-0.2	2.3	0.8	1.6	3.8	0.8	0.8
Ba (ppm)	1780	2060	1690	1650	120	3420	1170	1460	1650
Be (ppm)	2.09	1.66	1.9	1.57	1.61	1.39	1.74	2	1.92
Bi (ppm)	0.1	0.17	0.06	0.11	0.04	0.15	0.26	0.09	0.05
Ca (%)	1.44	0.98	2.17	2.09	4.39	1.66	3.72	2.25	1.34
Cd (ppm)	0.03	0.03	0.05	0.02	0.02	0.02	0.05	0.02	0.07
Ce (ppm)	32.7	35.7	31.7	33.9	45.4	33.2	51.4	45.7	39.2
Co (ppm)	1.5	3.2	1.8	1.1	11.4	3.2	20.3	4.5	4.3
Cr (ppm)	12	19	15	20	11	16	15	26	16
Cs (ppm)	0.75	0.51	0.53	0.67	0.29	0.78	1.04	0.8	0.81
Cu (ppm)	14.1	26.1	8.6	9.1	65.4	3.3	76.3	7.9	4.3
Fe (%)	1.36	1.59	1.2	1.46	2.39	1.66	3.96	2.02	1.7
Ga (ppm)	23.7	22.4	22.2	21.6	23.5	20.9	23.8	20.9	22.7
Ge (ppm)	0.11	0.15	0.13	0.11	0.15	0.13	0.19	0.14	0.13
Hf (ppm)	1.4	1.4	1.4	1.3	0.8	1.8	0.7	1.9	1.5
In (ppm)	0.051	0.065	0.031	0.027	0.053	0.035	0.065	0.023	0.022
K (%)	2.69	2.63	2.16	2.72	0.28	4.76	2.37	2.32	2.61
La (ppm)	15.6	15.5	14.3	17.3	20.3	14.9	23.8	22.6	18.2
Li (ppm)	4.3	3.1	3.8	3.8	3	5.1	4.5	5.5	4.5
Mg (%)	0.16	0.16	0.37	0.39	1.28	0.49	1.2	0.68	0.51
Mn (ppm)	97	66	141	192	398	232	565	230	190
Mo (ppm)	2.38	2.31	0.93	2.24	1.44	0.41	1.12	0.32	0.52
Na (%)	2.81	3.06	3.14	2.75	4.03	1.89	2.73	2.84	3.15
Nb (ppm)	3.1	3	3.1	2.9	4.7	2.7	4.8	2.7	3
Ni (ppm)	4.6	4.4	7.4	4.7	16.2	8.1	18.4	10.7	8.5
P (ppm)	550	430	720	630	1390	590	1430	830	620
Pb (ppm)	6.2	3.3	2.6	5.9	3.3	5.4	9.3	4.8	4.2
Rb (ppm)	76.4	80.1	49.2	64.2	5.1	133.5	65.4	67.8	70.6
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	0.002	-0.002	-0.002
S (%)	0.01	0.43	-0.01	0.09	-0.01	-0.01	0.01	0.01	-0.01
Sb (ppm)	1.03	0.69	0.68	1.09	0.48	1.02	1.47	0.86	0.68

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	304118	304138	304360	304457	304408	304318	304232	304140	303954
North (NAD 27)	4316884	4316798	4316721	4316629	4316542	4316457	4316437	4316367	4316379
Classification	Plag-KSpar	Plag-KSpar	Plag-KSpar	Plag-KSpar	Plagioclase	Sericite	Plag-KSpar	Plag-KSpar	Plag-KSpar
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	H437466	H437467	H437468	H437469	H437470	H437471	H437472	H437473	H437474
Lithology	Porphyry	Porphyry	Porphyry	Porphyry	McLeod	Porphyry	McLeod	Porphyry	Porphyry
Sc (ppm)	5.4	5.2	5.6	5.4	11.4	5.5	11.7	7.1	5
Se (ppm)	2	4	1	3	1	1	1	1	1
Sn (ppm)	0.7	0.7	0.6	0.6	1.1	0.6	1	0.6	0.9
Sr (ppm)	1100	793	1175	1225	1115	773	1125	938	616
Ta (ppm)	0.2	0.2	0.2	0.2	0.3	0.18	0.29	0.18	0.2
Te (ppm)	0.47	0.43	0.13	0.1	-0.05	-0.05	0.07	-0.05	-0.05
Th (ppm)	6.2	6.2	6.5	7	7.1	6.7	7.4	7.7	7.8
Ti (%)	0.22	0.223	0.23	0.225	0.449	0.205	0.441	0.24	0.213
Tl (ppm)	0.44	0.37	0.22	0.34	0.04	0.54	0.27	0.4	0.34
U (ppm)	3.1	3.1	2.6	3.5	2.9	2.3	3.2	3.1	3.1
V (ppm)	50	48	47	50	123	50	129	64	47
W (ppm)	1.1	1.2	0.5	0.9	0.9	0.6	1.2	0.8	0.7
Y (ppm)	6.8	6.8	5.8	4.8	11.8	5.5	12.5	6.7	6.1
Zn (ppm)	16	5	14	15	26	23	46	16	13
Zr (ppm)	34.2	36.4	33.2	29.8	14.4	49.8	13.6	52.8	36.1
Al2O3 (%)	13.24	13.47	13.32	13.68	14.34	13.75	14.41	13.79	13.17
CaO (%)	2.01	1.37	3.04	2.92	6.14	2.32	5.20	3.15	1.87
FeO (%)	1.75	2.04	1.54	1.88	3.07	2.13	5.09	2.60	2.19
K2O (%)	3.24	3.17	2.60	3.28	0.34	5.74	2.86	2.80	3.15
MgO (%)	0.27	0.27	0.61	0.65	2.12	0.81	1.99	1.13	0.85
Na2O (%)	3.79	4.12	4.23	3.71	5.43	2.55	3.68	3.83	4.25
P2O5 (%)	0.13	0.10	0.16	0.14	0.32	0.14	0.33	0.19	0.14
TiO2 (%)	0.37	0.37	0.38	0.38	0.75	0.34	0.74	0.40	0.36
SO3 (%)	0.03	1.08	-0.03	0.23	-0.03	-0.03	0.03	0.03	-0.03
Total (%)	24.82	25.99	25.87	26.85	32.49	27.76	34.32	27.90	25.94
SiO2 (%)	73.44	72.19	72.32	71.27	65.24	70.30	63.27	70.14	72.25
Al_m	0.26	0.26	0.26	0.27	0.28	0.27	0.28	0.27	0.26
Ca_m	0.04	0.02	0.05	0.05	0.11	0.04	0.09	0.06	0.03
K_m	0.07	0.07	0.06	0.07	0.01	0.12	0.06	0.06	0.07
Na_m	0.12	0.13	0.14	0.12	0.18	0.08	0.12	0.12	0.14
K_Al	0.27	0.26	0.21	0.26	0.03	0.45	0.22	0.22	0.26
Na_Al	0.47	0.50	0.52	0.45	0.62	0.30	0.42	0.46	0.53
Plag	0.61	0.60	0.73	0.64	1.01	0.46	0.75	0.66	0.66

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	303843	305329	305345	305287	305517	305506	305875	305424	305389
North (NAD 27)	4316294	4315206	4315322	4315706	4315761	4315993	4316002	4316206	4316431
Classification	Plag-KSpar	Plag-KSpar	Plag-KSpar	Plagioclase	Plag-KSpar	Plag-KSpar	Plagioclase	Plag-KSpar	Plag-KSpar
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	H437475	H437476	H437477	H437478	H437479	H437480	H437481	H437482	H437483
Lithology	McLeod	McLeod	Porphyry	McLeod	McLeod	Porphyry	Porphyry	Porphyry	Porphyry
Ag (ppm)	0.03	0.03	-0.01	-0.01	0.06	0.03	-0.01	0.03	0.03
Al (%)	7.26	7.66	6.98	7.66	7.87	6.98	7.15	6.82	6.99
As (ppm)	2	2	1.5	0.3	1.7	0.5	0.3	0.5	4.3
Ba (ppm)	1210	1250	1540	130	1230	1610	120	1500	1220
Be (ppm)	1.91	1.73	1.54	1.55	1.78	1.95	1.71	1.91	1.5
Bi (ppm)	0.05	0.04	0.06	0.05	0.03	0.08	0.08	0.06	0.61
Ca (%)	2.88	3.11	3	3.81	4.29	1.84	2.57	1.68	3.21
Cd (ppm)	0.06	0.03	0.04	0.03	0.05	0.03	0.03	0.05	-0.02
Ce (ppm)	52	54.4	40.8	44.4	60.6	41.2	29.1	37.7	46.9
Co (ppm)	17.2	12.8	2.1	6.3	22.8	3.4	9.7	3.7	7.3
Cr (ppm)	10	13	15	14	7	18	19	15	18
Cs (ppm)	1.83	1.42	0.43	0.18	1.33	0.49	0.22	0.83	0.41
Cu (ppm)	56.1	263	10.7	8.8	61.9	97.4	22.4	11.1	149.5
Fe (%)	3.63	3.68	0.74	1.54	4.78	0.94	0.74	1.16	1.71
Ga (ppm)	22.8	24.6	22.2	23.1	26.8	23.4	21.2	21.3	24.3
Ge (ppm)	0.2	0.18	0.12	0.13	0.19	0.14	0.12	0.11	0.13
Hf (ppm)	0.7	0.8	1.5	0.9	1.4	1.6	1.3	1.4	1.7
In (ppm)	0.04	0.043	0.023	0.058	0.057	0.034	0.016	0.029	0.205
K (%)	2.43	2.45	2.91	0.15	2.11	3.32	0.13	2.92	2.16
La (ppm)	23.7	24.3	20.1	20.1	26.3	19.5	11.3	17.9	20.6
Li (ppm)	4.6	4.1	3.3	3.4	4.8	3.2	4.6	4	4.8
Mg (%)	1.28	1.16	0.46	1	1.67	0.57	0.5	0.47	0.71
Mn (ppm)	609	405	132	229	698	114	101	163	164
Mo (ppm)	1.16	1.34	0.79	1.16	3.38	0.6	0.48	2.3	0.41
Na (%)	2.8	3.21	2.98	4.41	3.16	3.21	4.37	3.17	3.08
Nb (ppm)	4.7	4.7	3.2	4.2	5.6	3.4	2.9	3	3
Ni (ppm)	18.7	18.5	10.9	18.6	21.7	11.4	8.1	7.8	13.2
P (ppm)	1400	1480	880	1290	2080	770	690	660	1070
Pb (ppm)	10.9	5.9	6.6	3	9.1	4.5	3.1	9.5	4.9
Rb (ppm)	81.5	73.1	57.3	2	49.5	76.9	2	66.3	44.7
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	-0.01	-0.01	0.01	-0.01	0.01	0.01	0.02	0.02	0.02
Sb (ppm)	0.51	0.49	0.6	0.64	0.31	0.8	0.55	0.66	5.52

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	303843	305329	305345	305287	305517	305506	305875	305424	305389
North (NAD 27)	4316294	4315206	4315322	4315706	4315761	4315993	4316002	4316206	4316431
Classification	Plag-KSpar	Plag-KSpar	Plag-KSpar	Plagioclase	Plag-KSpar	Plag-KSpar	Plagioclase	Plag-KSpar	Plag-KSpar
Block	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason	Ann-Mason
Sample#	H437475	H437476	H437477	H437478	H437479	H437480	H437481	H437482	H437483
Lithology	McLeod	McLeod	Porphyry	McLeod	McLeod	Porphyry	Porphyry	Porphyry	Porphyry
Sc (ppm)	12.6	11	5.5	8.5	15.6	6.4	4.8	4.7	7.4
Se (ppm)	2	2	1	1	2	1	1	1	1
Sn (ppm)	1	1.1	0.9	0.9	1.2	0.9	0.9	0.7	3.6
Sr (ppm)	907	1050	1070	1085	1365	762	1030	849	1170
Ta (ppm)	0.29	0.31	0.22	0.28	0.28	0.21	0.2	0.21	0.19
Te (ppm)	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05	0.05
Th (ppm)	7.3	7.2	7.4	5.9	5.1	7.1	6.5	7.8	4.9
Ti (%)	0.41	0.471	0.247	0.464	0.633	0.25	0.232	0.218	0.295
Tl (ppm)	0.28	0.22	0.2	0.03	0.22	0.22	0.02	0.22	0.19
U (ppm)	2.8	3.5	2.8	2.6	2.7	3	2.2	2.7	2.6
V (ppm)	114	122	58	110	175	53	49	45	87
W (ppm)	1.3	0.8	0.4	0.9	1.2	0.5	0.4	0.5	0.7
Y (ppm)	13	11.5	5.9	9.4	16	6.6	5.6	5.6	6.8
Zn (ppm)	65	39	11	16	72	10	7	13	12
Zr (ppm)	13.4	13.7	34	17.1	30.4	41.8	28.6	30.5	47.1
Al2O3 (%)	13.71	14.47	13.19	14.47	14.87	13.19	13.51	12.88	13.20
CaO (%)	4.03	4.35	4.20	5.33	6.00	2.57	3.60	2.35	4.49
FeO (%)	4.67	4.73	0.95	1.98	6.15	1.21	0.95	1.49	2.20
K2O (%)	2.93	2.95	3.51	0.18	2.54	4.00	0.16	3.52	2.60
MgO (%)	2.12	1.92	0.76	1.66	2.77	0.95	0.83	0.78	1.18
Na2O (%)	3.77	4.33	4.02	5.94	4.26	4.33	5.89	4.27	4.15
P2O5 (%)	0.32	0.34	0.20	0.30	0.48	0.18	0.16	0.15	0.25
TiO2 (%)	0.68	0.79	0.41	0.77	1.06	0.42	0.39	0.36	0.49
SO3 (%)	-0.03	-0.03	0.03	-0.03	0.03	0.03	0.05	0.05	0.05
Total (%)	32.22	33.86	27.26	30.61	38.14	26.86	25.52	25.86	28.61
SiO2 (%)	65.53	63.77	70.83	67.25	59.19	71.26	72.69	72.33	69.38
Al_m	0.27	0.28	0.26	0.28	0.29	0.26	0.26	0.25	0.26
Ca_m	0.07	0.08	0.08	0.10	0.11	0.05	0.06	0.04	0.08
K_m	0.06	0.06	0.07	0.00	0.05	0.09	0.00	0.07	0.06
Na_m	0.12	0.14	0.13	0.19	0.14	0.14	0.19	0.14	0.13
K_Al	0.23	0.22	0.29	0.01	0.19	0.33	0.01	0.30	0.21
Na_Al	0.45	0.49	0.50	0.68	0.47	0.54	0.72	0.55	0.52
Plag	0.72	0.77	0.79	1.01	0.84	0.72	0.96	0.71	0.83

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	305689	305542	295518	295553	295589	295599	295626
North (NAD 27)	4316506	4316498	4321901	4321953	4321342	4321477	4321965
Classification	Plagioclase	Plag-KSpar	Albite-KSpar-Sericite	Sericite	Sericite	Sericite	Sericite
Block	Ann-Mason	Ann-Mason	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin
Sample#	H437484	H437485	H437298	H437299	H437360	H437359	H437300
Lithology	Porphyry	Porphyry	Fulstone quartz latite, above cgl	Artesia Tuff Sandstone (top)	Jal	Jaa	Artesia breccia or tuff-bx
Ag (ppm)	0.01	0.02	0.04	0.09	0.14	0.07	0.03
Al (%)	6.67	6.87	7.2	7.82	5.88	9.09	6.83
As (ppm)	-0.2	1.7	3	1.4	4.3	3.6	0.9
Ba (ppm)	220	970	1070	990	280	1580	170
Be (ppm)	1.89	2.08	1.29	0.93	2.56	1.1	0.36
Bi (ppm)	0.02	0.36	0.08	0.28	0.09	0.1	0.14
Ca (%)	2.08	2.83	0.41	0.05	0.17	0.23	0.03
Cd (ppm)	0.03	0.03	0.02	-0.02	0.06	-0.02	-0.02
Ce (ppm)	32.5	41.8	36	30.8	64	46.5	26.7
Co (ppm)	1.7	4	17.7	1.2	0.7	3.5	2.4
Cr (ppm)	20	18	11	25	4	12	13
Cs (ppm)	0.34	0.37	0.85	0.94	4.04	1.11	0.76
Cu (ppm)	27.3	56.3	16.1	22.7	6.3	152.5	6.4
Fe (%)	0.57	1.12	5.01	1.07	0.5	3.36	0.24
Ga (ppm)	22.2	22.9	19.35	25.3	16.65	25.9	5.06
Ge (ppm)	0.12	0.13	0.15	0.09	0.15	0.21	0.09
Hf (ppm)	1.7	1.5	2.4	3.1	2.7	2.4	2.2
In (ppm)	0.016	0.094	0.03	0.015	0.026	0.059	-0.005
K (%)	0.36	1.92	2.43	3.67	4.19	2.96	3.23
La (ppm)	14.2	19.3	17.8	15	35	21.7	16.4
Li (ppm)	4.7	3.9	13.1	1.5	15.2	4.4	0.8
Mg (%)	0.58	0.58	1.54	0.11	0.1	0.13	0.02
Mn (ppm)	87	155	204	19	492	48	9
Mo (ppm)	0.79	1.05	0.31	1.86	0.63	1.18	3.69
Na (%)	4.48	3.4	3.2	0.16	1.29	0.69	0.14
Nb (ppm)	3.1	3.5	3.8	3.3	15	3.9	5
Ni (ppm)	10	10.3	18.4	2	1.3	6.1	1
P (ppm)	740	900	1230	610	210	1200	630
Pb (ppm)	2.6	5.1	4.1	3.5	24.3	3.6	6.4
Rb (ppm)	9.3	38.1	53.5	110.5	208	109.5	78
Re (ppm)	-0.002	0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	-0.01	-0.01	-0.01	0.07	0.01	0.01	0.06
Sb (ppm)	0.39	2.7	1.32	1.41	5.89	1.25	1.26

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	305689	305542	295518	295553	295589	295599	295626
North (NAD 27)	4316506	4316498	4321901	4321953	4321342	4321477	4321965
Classification	Plagioclase	Plag-KSpar	Albite-KSpar-Sericite	Sericite	Sericite	Sericite	Sericite
Block	Ann-Mason	Ann-Mason	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin
Sample#	H437484	H437485	H437298	H437299	H437360	H437359	H437300
Lithology	Porphyry	Porphyry	Fulstone quartz latite, above cgl	Artesia Tuff Sandstone (top)	Jal	Jaa	Artesia breccia or tuff-bx
Sc (ppm)	5.3	5.8	8.6	11.8	3.3	9.4	3.6
Se (ppm)	1	1	1	2	2	4	2
Sn (ppm)	1	1.3	1	1.1	2.6	0.8	1
Sr (ppm)	925	1080	264	267	103.5	873	1070
Ta (ppm)	0.21	0.25	0.24	0.22	1.51	0.3	0.32
Te (ppm)	-0.05	-0.05	-0.05	0.06	-0.05	0.11	0.31
Th (ppm)	7.4	7.9	7.2	7.2	25.6	10.7	6.5
Ti (%)	0.238	0.285	0.375	0.361	0.063	0.247	0.497
Tl (ppm)	0.05	0.13	0.14	0.35	1.38	0.62	0.25
U (ppm)	3	3.4	2.2	4.4	6.5	5.7	2.4
V (ppm)	51	65	80	148	5	249	192
W (ppm)	0.4	0.4	1.5	0.9	1.3	1.4	2.9
Y (ppm)	6.2	7.1	10.3	9.2	17.7	9.2	2.6
Zn (ppm)	7	11	25	-2	20	3	-2
Zr (ppm)	40.4	35.9	74.7	98.1	64.1	86.7	68.8
Al2O3 (%)	12.60	12.98	13.60	14.77	11.11	17.17	12.90
CaO (%)	2.91	3.96	0.57	0.07	0.24	0.32	0.04
FeO (%)	0.73	1.44	6.44	1.38	0.64	4.32	0.31
K2O (%)	0.43	2.31	2.93	4.42	5.05	3.57	3.89
MgO (%)	0.96	0.96	2.55	0.18	0.17	0.22	0.03
Na2O (%)	6.04	4.58	4.31	0.22	1.74	0.93	0.19
P2O5 (%)	0.17	0.21	0.28	0.14	0.05	0.27	0.14
TiO2 (%)	0.40	0.48	0.63	0.60	0.11	0.41	0.83
SO3 (%)	-0.03	-0.03	-0.03	0.18	0.03	0.03	0.15
Total (%)	24.22	26.89	31.29	21.96	19.12	27.24	18.49
SiO2 (%)	74.09	71.23	66.51	76.51	79.54	70.86	80.22
Al_m	0.25	0.25	0.27	0.29	0.22	0.34	0.25
Ca_m	0.05	0.07	0.01	0.00	0.00	0.01	0.00
K_m	0.01	0.05	0.06	0.09	0.11	0.08	0.08
Na_m	0.19	0.15	0.14	0.01	0.06	0.03	0.01
K_Al	0.04	0.19	0.23	0.32	0.49	0.23	0.33
Na_Al	0.79	0.58	0.52	0.02	0.26	0.09	0.02
Plag	1.00	0.86	0.56	0.03	0.28	0.11	0.03

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	295634	295654	295667	295693	295753	295756
North (NAD 27)	4321945	4321234	4322023	4321888	4321379	4321893
Classification	Sericite	Sericite	Sericite	Albite	Sericite	Sericite-Albite
Block	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin
Sample#	H437288	H437361	H437401	H437297	H437362	H437296
Lithology	Artesia Andesite (Cent Buckskin)	Jal	Artesia Andesite (lava/dike)-C Buckskin	Fulstone quartz latite, above cgl	Jfd	Fulstone quartz latite
Ag (ppm)	0.2	0.01	0.03	0.02	0.1	0.02
Al (%)	7.24	5.72	8.67	7.7	5.71	7.44
As (ppm)	1.1	6.3	3.4	3.8	15.7	1.4
Ba (ppm)	980	300	1130	660	300	670
Be (ppm)	1.86	2.45	2.81	1.72	3.09	1.93
Bi (ppm)	0.23	0.1	0.33	0.08	0.02	0.05
Ca (%)	0.31	0.07	0.39	1.13	0.18	0.8
Cd (ppm)	0.02	0.02	0.02	0.02	0.04	0.02
Ce (ppm)	35.7	68.9	50.1	58.4	60.6	35.6
Co (ppm)	20.9	0.9	18.5	17	0.9	11.5
Cr (ppm)	15	6	11	13	4	7
Cs (ppm)	3.11	4.57	2.93	1.09	6.61	2.13
Cu (ppm)	466	4	9.6	4.9	4.5	3.6
Fe (%)	5.49	0.6	6.45	4.81	0.71	4.38
Ga (ppm)	20.4	16.85	25.8	22.4	16.5	21.1
Ge (ppm)	0.14	0.17	0.2	0.17	0.13	0.16
Hf (ppm)	2.7	2.7	1.8	2.7	2.7	2.9
In (ppm)	0.027	0.024	0.059	0.032	0.012	0.033
K (%)	3.64	4.83	3.63	1.15	4.83	2.03
La (ppm)	15.8	37.1	24.6	30.4	33.3	16.2
Li (ppm)	13.6	14.1	13.7	15.5	13.2	20.6
Mg (%)	1.95	0.09	1.18	1.82	0.1	0.92
Mn (ppm)	112	111	140	356	245	140
Mo (ppm)	0.29	0.81	0.87	0.6	0.52	0.64
Na (%)	0.04	0.35	0.15	3.98	0.19	2.88
Nb (ppm)	2.8	15.5	4.4	4.9	15	3.9
Ni (ppm)	21.1	1.1	31	25.5	1.1	16.4
P (ppm)	1190	120	1910	1490	90	1220
Pb (ppm)	1.8	12.9	2.5	6.4	13.6	4.6
Rb (ppm)	114.5	232	143	33.3	208	79.2
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.01	0.02	0.01	-0.01	0.03	-0.01
Sb (ppm)	1.49	13.1	1.31	1.68	10.3	1.18

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	295634	295654	295667	295693	295753	295756
North (NAD 27)	4321945	4321234	4322023	4321888	4321379	4321893
Classification	Sericite	Sericite	Sericite	Albite	Sericite	Sericite-Albite
Block	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin
Sample#	H437288	H437361	H437401	H437297	H437362	H437296
Lithology	Artesia Andesite (Cent Buckskin)	Jal	Artesia Andesite (lava/dike)-C Buckskin	Fulstone quartz latite, above cgl	Jfd	Fulstone quartz latite
Sc (ppm)	10.5	3.3	14.1	11.3	3.2	10.2
Se (ppm)	1	2	1	1	2	1
Sn (ppm)	0.6	2.5	1.6	1	1.3	0.8
Sr (ppm)	41.2	67.3	44	717	65.4	366
Ta (ppm)	0.19	1.54	0.3	0.31	1.55	0.26
Te (ppm)	0.15	-0.05	0.05	0.05	-0.05	0.05
Th (ppm)	6	26.6	6.8	8.1	26.2	7
Ti (%)	0.326	0.061	0.482	0.509	0.061	0.412
Tl (ppm)	0.33	2.21	0.8	0.1	2.27	0.28
U (ppm)	2.4	6.1	2.8	2.9	5.1	2.8
V (ppm)	128	4	159	157	7	130
W (ppm)	15.7	1.9	4.1	2	2.9	1.7
Y (ppm)	8.2	18.5	8.7	13.2	21.1	9.9
Zn (ppm)	9	29	39	39	21	17
Zr (ppm)	86.7	64.8	60.3	79.8	62.4	93.5
Al2O3 (%)	13.68	10.81	16.38	14.55	10.79	14.05
CaO (%)	0.43	0.10	0.55	1.58	0.25	1.12
FeO (%)	7.06	0.77	8.29	6.19	0.91	5.63
K2O (%)	4.39	5.82	4.37	1.39	5.82	2.45
MgO (%)	3.23	0.15	1.96	3.02	0.17	1.53
Na2O (%)	0.05	0.47	0.20	5.37	0.26	3.88
P2O5 (%)	0.27	0.03	0.44	0.34	0.02	0.28
TiO2 (%)	0.54	0.10	0.80	0.85	0.10	0.69
SO3 (%)	0.03	0.05	0.03	-0.03	0.08	-0.03
Total (%)	29.68	18.30	33.02	33.25	18.39	29.60
SiO2 (%)	68.24	80.42	64.67	64.43	80.32	68.33
Al_m	0.27	0.21	0.32	0.29	0.21	0.28
Ca_m	0.01	0.00	0.01	0.03	0.00	0.02
K_m	0.09	0.12	0.09	0.03	0.12	0.05
Na_m	0.00	0.02	0.01	0.17	0.01	0.13
K_Al	0.35	0.58	0.29	0.10	0.59	0.19
Na_Al	0.01	0.07	0.02	0.61	0.04	0.45
Plag	0.04	0.08	0.05	0.71	0.06	0.53

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	295778	295790	295836	295849	295850	295861
North (NAD 27)	4322059	4321884	4321898	4321922	4321510	4322168
Classification	Pyroph/Alun/Topaz	Albite	Sericite	Pyroph/Alun/Topaz	Pyroph/Alun/Topaz	Pyroph/Alun/Topaz
Block	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin
Sample#	H437402	H437289	H437290	H437328	H437363	H437403
Lithology	Artesia bedded tuff breccia, 10-100 cm bedded	Fulstone Dacite lava	Artesia Andesite	Artesia	Jaa?	Artesia Andesite, brecciated
Ag (ppm)	0.08	0.03	0.02	0.01	0.52	0.02
Al (%)	7.45	6.99	7.78	6.46	5.95	6.21
As (ppm)	29.4	1.7	2.5	8.1	5.2	3.5
Ba (ppm)	370	240	1120	70	370	90
Be (ppm)	0.25	1.49	2.27	0.12	0.5	0.12
Bi (ppm)	1.86	0.05	0.04	0.7	0.95	4.26
Ca (%)	0.1	0.38	0.28	0.14	0.03	0.18
Cd (ppm)	0.03	0.03	0.03	-0.02	-0.02	-0.02
Ce (ppm)	62.2	64.9	43.8	89	53.7	29
Co (ppm)	0.3	7.7	20.9	0.2	0.6	0.5
Cr (ppm)	11	9	13	18	8	70
Cs (ppm)	0.39	1.18	1.78	0.05	0.98	0.06
Cu (ppm)	16.9	12.6	12.2	14.8	13.6	17.4
Fe (%)	1.31	4.95	7.85	0.11	1.61	0.76
Ga (ppm)	26.1	20.2	22.4	14.1	17.6	28.2
Ge (ppm)	0.22	0.14	0.17	0.12	0.16	0.13
Hf (ppm)	2.6	2.8	1.7	1.4	4.1	1.2
In (ppm)	0.019	0.023	0.047	0.014	0.011	0.036
K (%)	1.88	1.09	3.3	2.11	1.53	3.01
La (ppm)	33.3	29.1	19.8	33.9	27.7	10.8
Li (ppm)	16.7	17.7	12.5	4	1	3.9
Mg (%)	0.02	1.98	1.22	-0.01	0.02	0.01
Mn (ppm)	22	137	166	9	16	-5
Mo (ppm)	14.4	0.35	0.92	4.25	7.4	1.21
Na (%)	0.74	3.28	0.08	0.69	0.44	0.89
Nb (ppm)	5	2.2	2.9	4.4	5.9	0.9
Ni (ppm)	0.7	17.7	31.3	0.9	2.6	3.2
P (ppm)	1580	1170	1310	2400	670	1250
Pb (ppm)	24.4	4.6	2.9	41.6	5	144.5
Rb (ppm)	32	45.1	110.5	3.9	55.6	4.8
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	2.94	-0.01	0.01	5.88	0.53	7.71
Sb (ppm)	4.11	1.16	1.29	2.47	2.4	1.26

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	295778	295790	295836	295849	295850	295861
North (NAD 27)	4322059	4321884	4321898	4321922	4321510	4322168
Classification	Pyroph/Alun/Topaz	Albite	Sericite	Pyroph/Alun/Topaz	Pyroph/Alun/Topaz	Pyroph/Alun/Topaz
Block	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin
Sample#	H437402	H437289	H437290	H437328	H437363	H437403
Lithology	Artesia bedded tuff breccia, 10-100 cm bedded	Fulstone Dacite lava	Artesia Andesite	Artesia	Jaa?	Artesia Andesite, brecciated
Sc (ppm)	8	10.1	12.4	7	9.1	6.3
Se (ppm)	5	2	1	2	9	3
Sn (ppm)	1	0.6	0.8	1.4	0.9	0.7
Sr (ppm)	1365	210	35.3	1630	348	712
Ta (ppm)	0.36	0.16	0.19	0.29	0.43	0.07
Te (ppm)	0.97	-0.05	-0.05	0.93	1.24	0.78
Th (ppm)	12	6.9	5.9	14.3	10.1	3.2
Ti (%)	0.505	0.277	0.327	0.495	0.395	0.129
Tl (ppm)	0.32	0.1	0.54	0.02	0.52	0.02
U (ppm)	4.1	3	2.7	2.5	8.8	1.2
V (ppm)	166	123	137	176	268	104
W (ppm)	2.7	3.1	1.3	1.4	1.7	0.2
Y (ppm)	6.8	7.8	8.5	2	14.6	1.6
Zn (ppm)	-2	15	22	-2	-2	-2
Zr (ppm)	82.3	94.2	55.8	61.5	138.5	37.7
Al2O3 (%)	14.07	13.20	14.70	12.20	11.24	11.73
CaO (%)	0.14	0.53	0.39	0.20	0.04	0.25
FeO (%)	1.68	6.37	10.10	0.14	2.07	0.98
K2O (%)	2.27	1.31	3.98	2.54	1.84	3.63
MgO (%)	0.03	3.28	2.02	-0.02	0.03	0.02
Na2O (%)	1.00	4.42	0.11	0.93	0.59	1.20
P2O5 (%)	0.36	0.27	0.30	0.55	0.15	0.29
TiO2 (%)	0.84	0.46	0.55	0.83	0.66	0.22
SO3 (%)	7.35	-0.03	0.03	14.70	1.33	19.28
Total (%)	27.75	29.82	32.16	32.07	17.96	37.58
SiO2 (%)	70.31	68.09	65.59	65.68	80.78	59.79
Al_m	0.28	0.26	0.29	0.24	0.22	0.23
Ca_m	0.00	0.01	0.01	0.00	0.00	0.00
K_m	0.05	0.03	0.08	0.05	0.04	0.08
Na_m	0.03	0.14	0.00	0.03	0.02	0.04
K_Al	0.17	0.11	0.29	0.23	0.18	0.34
Na_Al	0.12	0.55	0.01	0.13	0.09	0.17
Plag	0.13	0.59	0.04	0.14	0.09	0.19

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	295880	295882	295886	295893	295912	295932	295967
North (NAD 27)	4321925	4322207	4321937	4322199	4321854	4321448	4321963
Classification	Pyroph/Alun/Topaz	Pyroph/Alun/Topaz	Pyroph/Alun/Topaz	Pyroph/Alun/Topaz	Pyroph/Alun/Topaz	Sericite	Pyroph/Alun/Topaz
Block	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin
Sample#	H437330	H437404	H437329	H437405	H437295	H437364	H437331
Lithology	Artesia	Artesia Andesite	Artesia	Artesia Andesite	Artesia breccia or tuff-bx	Jas	Artesia
Ag (ppm)	-0.01	0.15	0.02	0.08	0.02	0.52	0.13
Al (%)	5.32	7.22	4.85	8.15	7.08	0.74	4.38
As (ppm)	3.7	1.9	2.3	3.3	7	2.6	13.8
Ba (ppm)	70	810	370	220	140	100	230
Be (ppm)	0.11	1.51	0.14	0.75	0.4	0.13	0.17
Bi (ppm)	0.28	0.08	0.29	1.63	0.25	0.09	0.7
Ca (%)	0.08	0.29	0.03	0.29	0.07	0.09	0.08
Cd (ppm)	-0.02	-0.02	0.02	-0.02	-0.02	0.02	-0.02
Ce (ppm)	36.6	44.4	29	53.8	48.4	4.62	28.9
Co (ppm)	0.3	29.2	0.3	14.1	0.5	2	0.3
Cr (ppm)	46	16	9	42	13	31	15
Cs (ppm)	0.08	1.38	-0.05	0.64	0.8	0.21	-0.05
Cu (ppm)	17.3	81.2	18.5	36.7	12	13.9	4.9
Fe (%)	0.32	7.24	1.24	4.48	0.75	0.35	0.69
Ga (ppm)	15.65	24.7	8.51	21.5	5.32	3.25	12
Ge (ppm)	0.07	0.16	0.11	0.16	0.1	0.07	0.1
Hf (ppm)	1.2	2.4	0.9	1.3	3.1	3.1	1.6
In (ppm)	0.011	0.09	-0.005	0.085	0.047	0.006	0.006
K (%)	1.76	1.86	0.03	2.39	2.16	0.28	1.17
La (ppm)	17.1	17.4	19.4	20.9	29.8	2.3	15.2
Li (ppm)	0.7	29.3	42.4	16.1	0.6	3.5	1
Mg (%)	-0.01	2.18	-0.01	1.05	0.03	0.01	0.01
Mn (ppm)	21	523	12	242	12	48	19
Mo (ppm)	5.48	0.38	27.6	0.89	4.02	1.55	3.59
Na (%)	0.46	0.12	0.02	0.74	0.25	0.03	0.6
Nb (ppm)	4.7	2.5	3.6	2	5.1	6.8	3.4
Ni (ppm)	1.5	30.9	0.5	12.8	0.8	2.1	1
P (ppm)	1230	1100	810	1330	1080	420	860
Pb (ppm)	25.7	6.8	7.5	97.6	15.9	2.4	7.9
Rb (ppm)	2.8	59.5	0.3	31.4	59.8	10.3	1.4
Re (ppm)	-0.002	0.003	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	4.64	0.06	0.13	4.74	0.11	0.01	3.95
Sb (ppm)	1.56	1.19	2.4	1.02	2.21	3.6	2.96

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	295880	295882	295886	295893	295912	295932	295967
North (NAD 27)	4321925	4322207	4321937	4322199	4321854	4321448	4321963
Classification	Pyroph/Alun/Topaz	Pyroph/Alun/Topaz	Pyroph/Alun/Topaz	Pyroph/Alun/Topaz	Pyroph/Alun/Topaz	Sericite	Pyroph/Alun/Topaz
Block	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin
Sample#	H437330	H437404	H437329	H437405	H437295	H437364	H437331
Lithology	Artesia	Artesia Andesite	Artesia	Artesia Andesite	Artesia breccia or tuff-bx	Jas	Artesia
Sc (ppm)	3.5	16.6	1.3	8.1	5.2	3.4	3
Se (ppm)	1	2	4	2	2	3	3
Sn (ppm)	1.9	1.1	0.6	1.3	1.3	0.9	0.9
Sr (ppm)	855	76.2	1590	787	1295	25.3	982
Ta (ppm)	0.31	0.18	0.26	0.13	0.34	0.28	0.23
Te (ppm)	0.25	-0.05	1.06	0.36	1.19	0.26	0.72
Th (ppm)	6.5	9.2	3.6	6.3	8.2	5	4.1
Ti (%)	0.469	0.282	0.351	0.246	0.543	0.405	0.347
Tl (ppm)	0.02	3.04	-0.02	1.15	0.47	0.06	0.04
U (ppm)	2	2.7	0.9	2	4.8	2.3	1.9
V (ppm)	117	189	78	161	148	86	92
W (ppm)	1.1	0.5	2.7	0.5	5.3	13	1.6
Y (ppm)	1.6	5.7	0.8	4.6	3.2	4	1.8
Zn (ppm)	-2	259	-2	114	-2	-2	-2
Zr (ppm)	43.3	81.5	29.2	42.6	79.8	97.5	51.1
Al2O3 (%)	10.05	13.64	9.16	15.40	13.37	1.40	8.27
CaO (%)	0.11	0.41	0.04	0.41	0.10	0.13	0.11
FeO (%)	0.41	9.31	1.59	5.76	0.96	0.45	0.89
K2O (%)	2.12	2.24	0.04	2.88	2.60	0.34	1.41
MgO (%)	-0.02	3.61	-0.02	1.74	0.05	0.02	0.02
Na2O (%)	0.62	0.16	0.03	1.00	0.34	0.04	0.81
P2O5 (%)	0.28	0.25	0.19	0.30	0.25	0.10	0.20
TiO2 (%)	0.78	0.47	0.59	0.41	0.91	0.68	0.58
SO3 (%)	11.60	0.15	0.33	11.85	0.28	0.03	9.88
Total (%)	25.96	30.24	11.94	39.75	18.85	3.17	22.16
SiO2 (%)	72.22	67.64	87.22	57.47	79.83	96.61	76.29
Al_m	0.20	0.27	0.18	0.30	0.26	0.03	0.16
Ca_m	0.00	0.01	0.00	0.01	0.00	0.00	0.00
K_m	0.05	0.05	0.00	0.06	0.06	0.01	0.03
Na_m	0.02	0.01	0.00	0.03	0.01	0.00	0.03
K_Al	0.23	0.18	0.00	0.20	0.21	0.26	0.18
Na_Al	0.10	0.02	0.00	0.11	0.04	0.05	0.16
Plag	0.11	0.05	0.01	0.13	0.05	0.13	0.17

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	295969	295984	296000	296021	296028	296048	296052	296150
North (NAD 27)	4321893	4321825	4321863	4321900	4322544	4321579	4322009	4321583
Classification	Pyroph/Alun/Topaz	Sericite	Sericite	null	Sericite	Sericite	Pyroph/Alun/Topaz	Plagioclase
Block	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin
Sample#	H437292	H437293	H437294	YTD 23 2008	H437454	H437365	H437291	H437366
Lithology	Artesia bedded tuff breccia	Artesia Andesite (lava/dike)	Porphyry (?)	Porphyry	Artesia	Jaa	Artesia Andesite??	Granite porphyry
Ag (ppm)	0.01	0.04	0.07	0.41	0.03	0.05	0.14	0.03
Al (%)	8.89	8.33	8.29	7.61	8.2	7.96	7.57	6.84
As (ppm)	9.7	2	4.8	2.5	12.9	5.5	4.2	1.6
Ba (ppm)	890	1320	1780	420	1550	1160	490	2290
Be (ppm)	0.38	2.42	3.18	1.66	1.52	2.52	0.37	1.56
Bi (ppm)	0.3	0.25	0.06	0.07	0.97	0.54	1.18	0.06
Ca (%)	0.13	0.41	0.07	0.35	0.06	0.2	0.11	1.64
Cd (ppm)	0.02	0.12	-0.02	0.16	-0.02	0.07	0.03	0.05
Ce (ppm)	76.7	53.1	42.2	47.5	24	53.9	58.7	38.1
Co (ppm)	0.5	28.8	1.5	11.4	0.9	4.4	0.6	7.1
Cr (ppm)	12	8	35	24	15	10	16	19
Cs (ppm)	0.51	1.62	2.86	1.1	2.08	1.33	0.78	0.82
Cu (ppm)	19.5	122.5	27.3	6	27.2	178	27.8	11.6
Fe (%)	1.22	7.73	1.7	2.26	1	2.64	1.12	2.24
Ga (ppm)	35.5	23.5	25.4	21.6	25.4	23.5	24.3	19.25
Ge (ppm)	0.13	0.17	0.11	0.18	0.08	0.17	0.14	0.17
Hf (ppm)	3.1	3.2	1.7	2.6	1.8	1.9	2.9	1.8
In (ppm)	0.055	0.047	0.133	0.036	0.19	0.02	0.033	0.022
K (%)	0.82	2.88	3.59	0.95	3.11	3.19	1.45	1.19
La (ppm)	34.8	25.2	21.1	23.3	11.5	25.6	26.6	19.7
Li (ppm)	1.3	29.1	12.8	30.2	16	17.4	2.7	8.5
Mg (%)	0.02	0.96	0.3	1.47	0.54	0.21	0.03	0.76
Mn (ppm)	7	296	19	179	33	103	17	284
Mo (ppm)	2.98	6.41	2.22	0.21	2.8	1.12	3.48	0.23
Na (%)	0.12	0.17	0.13	3.26	1.24	0.13	0.21	3.54
Nb (ppm)	5.5	3.3	3.3	2.1	2.6	5	5.6	2.6
Ni (ppm)	2.6	22.2	8.4	23.3	6.5	5.1	4.3	12.7
P (ppm)	1860	1830	300	990	340	1170	1320	790
Pb (ppm)	20	2.6	3.9	12.6	5.2	14.8	29.3	9.1
Rb (ppm)	21.2	115	123.5	37.5	98.1	116	40.4	41
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.2	0.03	0.09	0.02	0.1	0.05	0.52	0.06
Sb (ppm)	2.66	1.6	1.25	2.08	1.92	1.51	5.15	1.55

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	295969	295984	296000	296021	296028	296048	296052	296150
North (NAD 27)	4321893	4321825	4321863	4321900	4322544	4321579	4322009	4321583
Classification	Pyroph/Alun/Topaz	Sericite	Sericite	null	Sericite	Sericite	Pyroph/Alun/Topaz	Plagioclase
Block	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin
Sample#	H437292	H437293	H437294	YTD 23 2008	H437454	H437365	H437291	H437366
Lithology	Artesia bedded tuff breccia	Artesia Andesite (lava/dike)	Porphyry (?)	Porphyry	Artesia	Jaa	Artesia Andesite??	Granite porphyry
Sc (ppm)	9.8	12.8	10	7.3	8.1	11.5	8	6.4
Se (ppm)	3	1	1	2	2	3	6	2
Sn (ppm)	1.3	0.8	1	0.6	2.5	0.6	1.2	0.6
Sr (ppm)	1050	84.1	123	297	171	259	890	557
Ta (ppm)	0.38	0.22	0.21	0.14	0.17	0.34	0.43	0.18
Te (ppm)	0.11	0.12	0.1	-0.05	0.29	-0.05	0.91	-0.05
Th (ppm)	11.6	11.8	4.7	5.7	3.2	10.4	10.4	5.9
Ti (%)	0.598	0.322	0.392	0.209	0.205	0.455	0.397	0.212
Tl (ppm)	0.72	0.95	1.39	0.29	1.38	0.93	0.96	0.33
U (ppm)	4	4.5	2.4	1.9	1.8	4.5	3.6	2
V (ppm)	221	177	114	66	67	151	129	64
W (ppm)	1.4	2	1.4	0.9	2	1.6	1.7	1.8
Y (ppm)	12.4	12.3	7.4	7.6	4.7	9	8	5.4
Zn (ppm)	-2	102	12	140	11	32	6	56
Zr (ppm)	104.5	106.5	59.4	75.4	60.8	65.4	105	61
Al2O3 (%)	16.79	15.74	15.66	14.38	15.49	15.04	14.30	12.92
CaO (%)	0.18	0.57	0.10	0.49	0.08	0.28	0.15	2.29
FeO (%)	1.57	9.94	2.19	2.91	1.29	3.40	1.44	2.88
K2O (%)	0.99	3.47	4.33	1.14	3.75	3.84	1.75	1.43
MgO (%)	0.03	1.59	0.50	2.44	0.90	0.35	0.05	1.26
Na2O (%)	0.16	0.23	0.18	4.39	1.67	0.18	0.28	4.77
P2O5 (%)	0.43	0.42	0.07	0.23	0.08	0.27	0.30	0.18
TiO2 (%)	1.00	0.54	0.65	0.35	0.34	0.76	0.66	0.35
SO3 (%)	0.50	0.08	0.23	0.05	0.25	0.13	1.30	0.15
Total (%)	21.65	32.57	23.89	26.37	23.84	24.23	20.24	26.25
SiO2 (%)	76.83	65.15	74.44	71.78	74.49	74.07	78.34	71.92
Al_m	0.33	0.31	0.31	0.28	0.30	0.29	0.28	0.25
Ca_m	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.04
K_m	0.02	0.07	0.09	0.02	0.08	0.08	0.04	0.03
Na_m	0.01	0.01	0.01	0.14	0.05	0.01	0.01	0.15
K_Al	0.06	0.24	0.30	0.09	0.26	0.28	0.13	0.12
Na_Al	0.02	0.02	0.02	0.50	0.18	0.02	0.03	0.61
Plag	0.03	0.06	0.02	0.53	0.18	0.04	0.04	0.77

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	296155	296167	296193	296194	296238	296253	296260	296266
North (NAD 27)	4322830	4322619	4322018	4322030	4322603	4322091	4321629	4322622
Classification	Sericite	Sericite	Pyroph/Alun/Topaz	Pyroph/Alun/Topaz	Sericite-Albite	Pyroph/Alun/Topaz	Sericite	Sericite
Block	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin
Sample#	H437385	H437455	H437332	H437333	H437456	H437334	H437367	H437457
Lithology	Jai	Artesia	Artesia	Artesia	Artesia	Artesia	Jaa	Artesia
Ag (ppm)	0.09	0.08	0.03	0.05	0.03	0.2	0.03	0.08
Al (%)	0.45	8.27	7.73	6.57	6.96	6.68	7.42	7.72
As (ppm)	3.3	6.8	1.9	7.1	3.6	18	10.7	9.8
Ba (ppm)	140	1370	360	160	1690	100	1860	1610
Be (ppm)	0.18	1.38	0.06	0.06	1.36	0.12	2.31	1.91
Bi (ppm)	0.06	0.89	0.1	0.06	0.45	1.46	0.25	0.24
Ca (%)	0.06	0.27	0.03	0.04	0.36	0.07	0.06	0.13
Cd (ppm)	0.02	0.08	0.03	-0.02	0.1	0.02	0.02	0.03
Ce (ppm)	5.25	26.4	26.4	18.85	31.9	38.7	45.2	56.9
Co (ppm)	1	1.5	0.3	0.5	8.7	0.4	1.3	0.7
Cr (ppm)	32	29	67	53	33	32	19	60
Cs (ppm)	0.17	2.08	0.08	0.18	1.28	-0.05	2.05	1.59
Cu (ppm)	19.5	29.4	12.9	7.2	74.1	16.3	11.4	47.3
Fe (%)	0.54	1.05	0.18	1.34	2.6	0.44	1.64	0.91
Ga (ppm)	1.21	31.4	51.6	22	20.8	23.3	23.2	24.5
Ge (ppm)	0.05	0.09	0.08	0.09	0.1	0.11	0.15	0.11
Hf (ppm)	0.4	1	0.2	0.1	0.8	0.5	1.8	0.7
In (ppm)	0.005	0.059	0.007	-0.005	0.053	-0.005	0.154	0.042
K (%)	0.17	4.59	0.8	1.59	1.56	2.14	3.8	3.29
La (ppm)	2.7	10.8	16.2	11.8	14.1	15.5	22.7	24.6
Li (ppm)	1.5	14.4	0.4	0.4	15.5	0.5	2.9	6.5
Mg (%)	0.03	0.73	-0.01	0.01	1.75	-0.01	0.36	0.52
Mn (ppm)	42	73	9	35	461	18	25	93
Mo (ppm)	4.44	1.02	0.96	0.68	1.64	1.8	0.76	1.85
Na (%)	0.02	0.05	0.53	0.81	2.91	0.9	0.18	0.4
Nb (ppm)	1.8	2.4	1.8	1.3	1.8	1.9	3	3.1
Ni (ppm)	4.9	13.6	2.4	1.1	29	1.4	5.7	14.3
P (ppm)	120	900	1100	780	1140	1280	210	1410
Pb (ppm)	1.7	21.5	52.7	24.7	13.4	62.2	4	11
Rb (ppm)	7.2	91.6	1.3	2.4	45.6	3.6	119.5	97.3
Re (ppm)	-0.002	-0.002	-0.002	-0.002	0.003	-0.002	-0.002	0.003
S (%)	0.02	0.03	2.58	4.87	0.04	6.44	0.08	0.1
Sb (ppm)	3.01	2.53	1.7	0.85	2.25	1.53	1.56	2.68

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	296155	296167	296193	296194	296238	296253	296260	296266
North (NAD 27)	4322830	4322619	4322018	4322030	4322603	4322091	4321629	4322622
Classification	Sericite	Sericite	Pyroph/Alun/Topaz	Pyroph/Alun/Topaz	Sericite-Albite	Pyroph/Alun/Topaz	Sericite	Sericite
Block	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin
Sample#	H437385	H437455	H437332	H437333	H437456	H437334	H437367	H437457
Lithology	Jai	Artesia	Artesia	Artesia	Artesia	Artesia	Jaa	Artesia
Sc (ppm)	1	6.1	1.1	0.8	8.1	2.3	9.6	13.1
Se (ppm)	2	1	2	3	1	3	3	4
Sn (ppm)	0.2	1	0.8	0.6	0.4	1.1	0.8	1.2
Sr (ppm)	34.3	566	1820	1085	307	929	55.8	546
Ta (ppm)	0.08	0.18	0.13	0.08	0.13	0.12	0.19	0.19
Te (ppm)	0.16	0.25	0.1	0.11	0.14	0.45	0.5	0.3
Th (ppm)	0.7	3.1	1.8	1.1	3.7	3.1	6.2	3.4
Ti (%)	0.299	0.219	0.184	0.143	0.219	0.247	0.284	0.441
Tl (ppm)	0.07	1.17	0.14	0.29	0.49	0.05	1.72	1.38
U (ppm)	0.5	0.8	0.3	0.2	1.5	1.5	3.2	1.8
V (ppm)	9	63	264	114	86	105	88	132
W (ppm)	1.9	0.8	0.4	0.2	0.8	0.4	1	0.8
Y (ppm)	1	4.4	0.3	0.2	4.7	1.2	5.1	4.4
Zn (ppm)	-2	42	-2	-2	116	-2	3	14
Zr (ppm)	11.9	34.8	5.2	6.6	25.5	20.5	61.4	22.4
Al2O3 (%)	0.85	15.62	14.60	12.41	13.15	12.62	14.02	14.58
CaO (%)	0.08	0.38	0.04	0.06	0.50	0.10	0.08	0.18
FeO (%)	0.69	1.35	0.23	1.72	3.34	0.57	2.11	1.17
K2O (%)	0.20	5.53	0.96	1.92	1.88	2.58	4.58	3.96
MgO (%)	0.05	1.21	-0.02	0.02	2.90	-0.02	0.60	0.86
Na2O (%)	0.03	0.07	0.71	1.09	3.92	1.21	0.24	0.54
P2O5 (%)	0.03	0.21	0.25	0.18	0.26	0.29	0.05	0.32
TiO2 (%)	0.50	0.37	0.31	0.24	0.37	0.41	0.47	0.74
SO3 (%)	0.05	0.08	6.45	12.18	0.10	16.10	0.20	0.25
Total (%)	2.49	24.81	23.55	29.81	26.43	33.86	22.35	22.61
SiO2 (%)	97.34	73.46	74.81	68.11	71.73	63.77	76.09	75.81
Al_m	0.02	0.31	0.29	0.24	0.26	0.25	0.27	0.29
Ca_m	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00
K_m	0.00	0.12	0.02	0.04	0.04	0.05	0.10	0.08
Na_m	0.00	0.00	0.02	0.04	0.13	0.04	0.01	0.02
K_Al	0.26	0.38	0.07	0.17	0.16	0.22	0.35	0.30
Na_Al	0.05	0.01	0.08	0.14	0.49	0.16	0.03	0.06
Plag	0.14	0.03	0.08	0.15	0.53	0.17	0.03	0.07

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	296311	296323	296345	296366	296402	296422	296426	296452
North (NAD 27)	4322086	4322546	4322792	4321615	4322078	4322754	4322532	4322592
Classification	Pyroph/Alun/Topaz	Albite	Plag-KSpar	Pyroph/Alun/Topaz	Albite	Plag-KSpar	Sericite-Albite	Albite-KSpar-Sericite
Block	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin
Sample#	H437335	H437458	H437386	H437368	H437336	H437387	H437389	H437388
Lithology	Artesia	Artesia	Jai	Jas	Artesia	Jai	Dacite	Jaa
Ag (ppm)	0.14	0.05	0.08	0.09	0.16	0.09	0.03	0.07
Al (%)	7.67	7.18	7.3	7.03	7.47	7.26	7.49	8.26
As (ppm)	23.3	3.5	3.2	20.3	4	2.9	2.2	3.2
Ba (ppm)	110	890	1240	120	1000	1120	1220	1760
Be (ppm)	0.19	1.16	2.2	0.12	1.26	2.11	1.83	1.41
Bi (ppm)	1.51	0.11	0.1	0.72	1.7	0.12	0.06	0.5
Ca (%)	0.2	0.22	1.42	0.51	0.21	1.46	0.22	0.27
Cd (ppm)	0.05	0.14	0.05	0.03	-0.02	0.07	0.02	-0.02
Ce (ppm)	58.4	18.8	56.5	54.9	35.5	59.2	12.5	30.3
Co (ppm)	1.7	2.5	4	4.8	0.6	3.7	0.6	1.6
Cr (ppm)	36	50	11	11	26	6	9	54
Cs (ppm)	0.14	0.62	3.36	0.13	1.07	3.38	1.05	1.98
Cu (ppm)	37	162.5	4.8	44.7	41.2	4.5	15.5	43
Fe (%)	3.01	2.3	1.22	4.23	1.55	1.47	1.04	7.39
Ga (ppm)	22.7	21	18.95	16.95	21.1	17.8	20.2	19.65
Ge (ppm)	0.2	0.1	0.11	0.12	0.14	0.12	0.07	0.18
Hf (ppm)	0.9	0.6	2	0.9	1.8	2	1.8	0.2
In (ppm)	0.01	0.035	0.038	0.01	0.074	0.032	0.02	0.021
K (%)	1.59	0.98	3.38	1.51	1.33	3.28	1.57	3.39
La (ppm)	21.8	9	30.5	26.6	18.2	33.3	7.2	17.7
Li (ppm)	1	14.6	31	0.8	7.1	29.4	3.6	2.5
Mg (%)	0.02	1.65	0.21	0.04	0.31	0.29	0.26	0.31
Mn (ppm)	40	288	351	89	30	346	65	62
Mo (ppm)	1.96	0.71	1.19	2.26	1.62	0.83	0.7	6.75
Na (%)	1.18	3.25	2.51	1.03	3.53	2.4	3.39	2.23
Nb (ppm)	1.3	1.5	10	1.5	4	9.4	1.9	2.2
Ni (ppm)	2.9	64.2	2	5.1	2.5	1.6	5.2	6.5
P (ppm)	2160	700	600	1640	410	470	210	650
Pb (ppm)	39.8	22.4	19.3	54.1	15.2	20.2	8	16.9
Rb (ppm)	5.9	28.6	118.5	12.2	44.2	115	62.2	119.5
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	0.002
S (%)	6.24	0.05	0.04	4.53	0.07	0.01	0.04	1.17
Sb (ppm)	3.27	1.47	0.87	2.51	1.1	0.91	0.7	1.52

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	296311	296323	296345	296366	296402	296422	296426	296452
North (NAD 27)	4322086	4322546	4322792	4321615	4322078	4322754	4322532	4322592
Classification	Pyroph/Alun/Topaz	Albite	Plag-KSpar	Pyroph/Alun/Topaz	Albite	Plag-KSpar	Sericite-Albite	Albite-KSpar-Sericite
Block	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin
Sample#	H437335	H437458	H437386	H437368	H437336	H437387	H437389	H437388
Lithology	Artesia	Artesia	Jai	Jas	Artesia	Jai	Dacite	Jaa
Sc (ppm)	4.8	9.5	6.3	3.5	8.3	6.1	5.9	6
Se (ppm)	4	1	2	3	9	2	1	8
Sn (ppm)	0.7	0.5	1.5	1.2	3.2	1.5	0.5	1.4
Sr (ppm)	1060	400	337	1315	473	333	591	724
Ta (ppm)	0.08	0.11	0.75	0.11	0.26	0.75	0.14	0.14
Te (ppm)	0.31	-0.05	-0.05	0.65	0.46	-0.05	-0.05	0.09
Th (ppm)	3.8	2.5	13.1	13.6	5.1	13.4	4.7	2.5
Ti (%)	0.147	0.204	0.209	0.136	0.372	0.208	0.173	0.273
Tl (ppm)	0.5	0.36	0.72	0.45	1.33	0.66	0.46	0.65
U (ppm)	1.7	1.1	4.7	2.5	2.1	4.3	2.9	1.3
V (ppm)	136	101	37	118	93	37	61	131
W (ppm)	0.4	0.3	1.5	0.6	1	1.2	0.4	2.3
Y (ppm)	4.3	7.9	14.1	2	4.2	20.4	3.5	0.7
Zn (ppm)	-2	160	40	7	5	47	20	21
Zr (ppm)	35.3	19.3	49.1	28	65.7	45.8	47.9	4.1
Al2O3 (%)	14.49	13.56	13.79	13.28	14.11	13.71	14.15	15.60
CaO (%)	0.28	0.31	1.99	0.71	0.29	2.04	0.31	0.38
FeO (%)	3.87	2.96	1.57	5.44	1.99	1.89	1.34	9.50
K2O (%)	1.92	1.18	4.07	1.82	1.60	3.95	1.89	4.08
MgO (%)	0.03	2.74	0.35	0.07	0.51	0.48	0.43	0.51
Na2O (%)	1.59	4.38	3.38	1.39	4.76	3.24	4.57	3.01
P2O5 (%)	0.49	0.16	0.14	0.38	0.09	0.11	0.05	0.15
TiO2 (%)	0.25	0.34	0.35	0.23	0.62	0.35	0.29	0.46
SO3 (%)	15.60	0.13	0.10	11.33	0.18	0.03	0.10	2.93
Total (%)	38.52	25.75	25.74	34.63	24.16	25.80	23.12	36.62
SiO2 (%)	58.78	72.45	72.46	62.94	74.15	72.40	75.26	60.82
Al_m	0.28	0.27	0.27	0.26	0.28	0.27	0.28	0.31
Ca_m	0.01	0.01	0.04	0.01	0.01	0.04	0.01	0.01
K_m	0.04	0.03	0.09	0.04	0.03	0.08	0.04	0.09
Na_m	0.05	0.14	0.11	0.04	0.15	0.10	0.15	0.10
K_Al	0.14	0.09	0.32	0.15	0.12	0.31	0.15	0.28
Na_Al	0.18	0.53	0.40	0.17	0.55	0.39	0.53	0.32
Plag	0.20	0.55	0.53	0.22	0.57	0.52	0.55	0.34

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	296460	296466	296471	296479	296540	296578	296579	296653	296670
North (NAD 27)	4322440	4321701	4321738	4322055	4321748	4322117	4321650	4320887	4322141
Classification	Sericite-Albite	Plag-KSpar	Pyroph/Alun/Topaz	Sericite	Pyroph/Alun/Topaz	Sericite	Sericite	Sericite	Sericite
Block	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin
Sample#	H437459	H437369	H437370	H437337	H437371	H437338	H437372	H437384	H437339
Lithology	Artesia	Jfd	Jas?	Artesia	Jas	Artesia	Jas	Jal	Artesia
Ag (ppm)	-0.01	0.11	0.19	0.09	0.04	0.06	0.04	0.27	0.08
Al (%)	7.17	7.23	7.22	7.13	6.12	7.56	0.21	8.37	7.43
As (ppm)	6.5	2.9	6.7	5.5	1.7	6.2	3.9	5.2	7
Ba (ppm)	1000	1000	1340	1280	90	630	110	890	930
Be (ppm)	1.16	1.8	0.35	1.26	0.05	1.37	0.36	2.53	0.98
Bi (ppm)	0.04	0.08	0.45	0.96	1.24	0.59	0.14	0.08	0.28
Ca (%)	0.15	1.46	0.19	0.1	0.06	0.06	0.02	0.46	0.27
Cd (ppm)	-0.02	0.03	0.02	-0.02	0.03	-0.02	0.04	0.02	-0.02
Ce (ppm)	39.1	50.3	62.9	40.2	44.1	49	16.8	22.1	46.5
Co (ppm)	0.8	11.6	1.1	0.2	0.4	0.2	1.4	7.4	0.2
Cr (ppm)	86	8	8	87	37	28	25	9	49
Cs (ppm)	0.69	2.04	0.22	1.44	-0.05	0.9	0.1	3.25	1.36
Cu (ppm)	61.4	5.6	14.6	14.3	6	11.3	16.2	15.4	12.4
Fe (%)	1.1	3.98	1.21	0.38	0.41	0.52	1.22	5.53	1.28
Ga (ppm)	20.8	20.5	21.7	24.6	20.2	23.4	1.16	22.3	20
Ge (ppm)	0.09	0.12	0.1	0.11	0.08	0.12	0.06	0.15	0.13
Hf (ppm)	0.7	3.1	3.4	0.9	0.2	0.9	0.8	1.5	0.2
In (ppm)	0.008	0.043	0.038	0.069	0.014	0.043	-0.005	0.033	0.127
K (%)	1.39	2.12	0.52	2.3	2.9	2.15	0.06	3.7	2.99
La (ppm)	17.2	25.4	30.6	18.6	19.1	23.6	7.1	10.5	20.9
Li (ppm)	7.3	12.6	0.6	2.6	0.6	3.2	1.6	7.3	7.3
Mg (%)	0.83	1.23	0.02	0.53	-0.01	0.09	-0.01	0.43	0.32
Mn (ppm)	243	262	6	11	27	8	42	306	13
Mo (ppm)	0.47	0.41	3.6	1.06	1.93	1.3	6.59	0.81	0.83
Na (%)	2.52	3.16	0.29	0.36	0.59	0.73	0.02	0.65	0.47
Nb (ppm)	2.1	4.5	3.8	3.5	1.6	2.9	2.8	3.9	1.2
Ni (ppm)	22.3	16.1	2.9	2	1.3	1.2	6.6	14.1	1.4
P (ppm)	570	1190	1520	140	1360	990	250	1350	520
Pb (ppm)	6.2	8.9	17.3	10.3	46.3	31.2	3.4	4.2	24.2
Rb (ppm)	40.4	59.2	6.8	68.8	2.8	67	2.4	154.5	77.8
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	0.002	-0.002	-0.002
S (%)	0.02	0.02	1.13	0.04	6.67	0.23	0.04	0.01	0.46
Sb (ppm)	2.05	1.68	2.27	8.44	2.76	5.41	4.42	1.7	4.63

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	296460	296466	296471	296479	296540	296578	296579	296653	296670
North (NAD 27)	4322440	4321701	4321738	4322055	4321748	4322117	4321650	4320887	4322141
Classification	Sericite-Albite	Plag-KSpar	Pyroph/Alun/Topaz	Sericite	Pyroph/Alun/Topaz	Sericite	Sericite	Sericite	Sericite
Block	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin
Sample#	H437459	H437369	H437370	H437337	H437371	H437338	H437372	H437384	H437339
Lithology	Artesia	Jfd	Jas?	Artesia	Jas	Artesia	Jas	Jal	Artesia
Sc (ppm)	10.9	9.9	12.3	9.8	1	5.2	1.1	8.9	9.4
Se (ppm)	1	1	5	2	2	3	2	1	3
Sn (ppm)	0.4	0.8	0.7	9.7	1.1	2.1	0.3	0.8	1.7
Sr (ppm)	729	551	725	144	816	1400	26.2	119	690
Ta (ppm)	0.16	0.29	0.31	0.22	0.1	0.19	0.15	0.26	0.08
Te (ppm)	0.07	-0.05	0.2	0.23	0.37	0.16	0.09	-0.05	0.15
Th (ppm)	3.6	7.7	23	3.6	5.8	4.4	2.4	6.1	2.1
Ti (%)	0.29	0.436	0.295	0.434	0.2	0.267	0.289	0.422	0.183
Tl (ppm)	0.82	0.24	0.28	2.54	0.04	2.49	0.02	1.27	2.41
U (ppm)	1.3	3.4	8.3	1.4	0.5	1.3	1	2.7	0.5
V (ppm)	106	114	137	111	69	91	7	129	108
W (ppm)	0.3	1.7	1.3	0.5	0.5	0.4	1.5	4.4	0.2
Y (ppm)	2.5	9.6	7.4	3	1.1	2.5	1.7	5.7	0.8
Zn (ppm)	58	14	-2	-2	-2	-2	5	22	4
Zr (ppm)	21.1	95.3	102	30.2	7.9	34.3	24.2	43.9	7.9
Al2O3 (%)	13.54	13.66	13.64	13.47	11.56	14.28	0.40	15.81	14.04
CaO (%)	0.21	2.04	0.27	0.14	0.08	0.08	0.03	0.64	0.38
FeO (%)	1.41	5.12	1.56	0.49	0.53	0.67	1.57	7.11	1.65
K2O (%)	1.67	2.55	0.63	2.77	3.49	2.59	0.07	4.46	3.60
MgO (%)	1.38	2.04	0.03	0.88	-0.02	0.15	-0.02	0.71	0.53
Na2O (%)	3.40	4.26	0.39	0.49	0.80	0.98	0.03	0.88	0.63
P2O5 (%)	0.13	0.27	0.35	0.03	0.31	0.23	0.06	0.31	0.12
TiO2 (%)	0.48	0.73	0.49	0.72	0.33	0.45	0.48	0.70	0.31
SO3 (%)	0.05	0.05	2.83	0.10	16.68	0.58	0.10	0.03	1.15
Total (%)	22.28	30.72	20.18	19.09	33.77	20.00	2.72	30.65	22.40
SiO2 (%)	76.16	67.13	78.41	79.58	63.87	78.59	97.09	67.20	76.03
Al_m	0.27	0.27	0.27	0.26	0.23	0.28	0.01	0.31	0.28
Ca_m	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.01	0.01
K_m	0.04	0.05	0.01	0.06	0.07	0.06	0.00	0.09	0.08
Na_m	0.11	0.14	0.01	0.02	0.03	0.03	0.00	0.03	0.02
K_Al	0.13	0.20	0.05	0.22	0.33	0.20	0.20	0.31	0.28
Na_Al	0.41	0.51	0.05	0.06	0.11	0.11	0.11	0.09	0.07
Plag	0.43	0.65	0.06	0.07	0.12	0.12	0.18	0.13	0.10

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	296676	296732	296762	296787	296798	296806	296850	296869	296873
North (NAD 27)	4321803	4321026	4321804	4322046	4321140	4321722	4321803	4322004	4321242
Classification	Sericite	Plag-KSpar	Sericite	Sericite-Albite	Plag-KSpar	Sericite	Sericite	Albite-KSpar-Sericite	Pyroph/Alun/Topaz
Block	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin
Sample#	H437373	H437383	H437374	H437340	H437382	H437375	H437376	H437341	H437381
Lithology	Jas	Jaa?	Jaa	Artesia	Jaa?	Jaa	Jaa	Artesia	Jas
Ag (ppm)	0.04	0.02	0.33	0.03	0.05	0.1	0.18	0.18	0.02
Al (%)	8.2	7.47	3.09	7.78	7.7	6.14	7.69	7.27	0.35
As (ppm)	10.4	5	10.8	3.3	2.9	13.9	10	22	1.9
Ba (ppm)	770	840	380	1070	1560	1300	3120	1330	960
Be (ppm)	1.81	1.63	0.59	2.35	1.91	1.59	4.06	2.84	0.08
Bi (ppm)	1.9	0.1	5	0.3	0.2	2.53	0.41	0.13	0.06
Ca (%)	0.01	2.13	0.07	0.15	1.17	0.24	0.19	0.32	0.06
Cd (ppm)	0.02	0.02	0.04	0.02	0.05	0.02	-0.02	0.05	-0.02
Ce (ppm)	45.7	46.6	29.9	21	57.3	72	40.9	38.8	5.41
Co (ppm)	1.5	9.8	0.5	0.4	13.3	0.4	0.4	1.1	0.3
Cr (ppm)	38	15	27	41	10	22	21	54	8
Cs (ppm)	1.61	1.03	0.49	1.45	1.76	2.48	1.53	1.99	0.12
Cu (ppm)	181.5	3.3	31.8	16.1	6.1	32.3	21	95.1	4.7
Fe (%)	7.53	4.14	1.45	1.35	2.55	4.11	2.37	3.87	0.2
Ga (ppm)	22.3	20.3	12.65	22.6	22.4	21.4	28.8	22.1	0.66
Ge (ppm)	0.18	0.16	0.09	0.14	0.13	0.16	0.12	0.2	-0.05
Hf (ppm)	0.8	1.8	0.7	0.5	1.9	0.3	1.3	0.4	0.5
In (ppm)	0.061	0.03	0.021	0.024	0.023	0.08	0.243	0.066	-0.005
K (%)	3.35	1.74	1.35	2.32	1.89	2.14	3.4	2.4	0.07
La (ppm)	24.6	23	17.8	8.8	28.7	34.6	20.3	16.2	2.7
Li (ppm)	0.6	5.4	0.9	8.3	11.5	15.2	9.9	17.3	1
Mg (%)	0.16	1.12	0.11	0.61	0.66	2.38	0.91	1.23	0.01
Mn (ppm)	18	221	60	133	156	373	329	348	29
Mo (ppm)	4.06	0.55	5.58	0.84	0.66	1.24	0.83	2.04	1.13
Na (%)	0.23	3.77	0.08	3.11	1.52	1.17	0.87	3.01	0.01
Nb (ppm)	0.9	4.4	2	2.4	4.6	1.4	3.6	2.8	2.4
Ni (ppm)	2.3	16.8	1.8	3.2	11	2.5	5	15.1	1.4
P (ppm)	1000	1440	900	550	1410	2260	1140	2780	1120
Pb (ppm)	5.2	5.3	12.2	6.3	5.9	17.2	9.8	12.2	1.7
Rb (ppm)	111.5	52.9	41.5	54.2	107.5	58	89.6	54.5	1.9
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.1	0.01	0.17	0.42	0.03	1.24	0.51	1.18	0.11
Sb (ppm)	2.53	2.06	3.34	2.64	1.12	5.94	4.16	3.35	0.76

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	296676	296732	296762	296787	296798	296806	296850	296869	296873
North (NAD 27)	4321803	4321026	4321804	4322046	4321140	4321722	4321803	4322004	4321242
Classification	Sericite	Plag-KSpar	Sericite	Sericite-Albite	Plag-KSpar	Sericite	Sericite	Albite-KSpar-Sericite	Pyroph/Alun/Topaz
Block	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin
Sample#	H437373	H437383	H437374	H437340	H437382	H437375	H437376	H437341	H437381
Lithology	Jas	Jaa?	Jaa	Artesia	Jaa?	Jaa	Jaa	Artesia	Jas
Sc (ppm)	7.4	8	3.9	11.6	6.1	13.2	12.8	17	0.8
Se (ppm)	9	1	8	4	2	4	3	6	2
Sn (ppm)	0.4	0.8	2.8	0.5	0.8	2	1.7	1.8	0.5
Sr (ppm)	265	926	255	456	666	172.5	189.5	1060	70.8
Ta (ppm)	0.06	0.29	0.13	0.15	0.34	0.09	0.25	0.17	0.15
Te (ppm)	0.35	-0.05	1.66	0.32	0.05	0.3	0.37	0.69	-0.05
Th (ppm)	3	6.3	2.9	1.9	8.1	3.2	2.6	1.7	0.8
Ti (%)	0.13	0.457	0.293	0.378	0.315	0.23	0.39	0.475	0.337
Tl (ppm)	2.82	0.17	0.86	1.02	0.51	1.99	1.58	1.32	0.03
U (ppm)	1	2.5	0.6	0.6	3.6	0.7	1.7	0.9	0.7
V (ppm)	120	119	58	133	83	143	154	177	11
W (ppm)	0.2	2	0.4	2.9	0.9	0.3	0.5	0.7	1.3
Y (ppm)	2.6	8.8	1.3	3.8	7.5	2	4.9	6.8	0.9
Zn (ppm)	4	16	2	11	20	39	29	41	-2
Zr (ppm)	28.4	47.9	28.1	17.9	60.6	7.8	40.2	14	14.6
Al2O3 (%)	15.49	14.11	5.84	14.70	14.55	11.60	14.53	13.73	0.66
CaO (%)	0.01	2.98	0.10	0.21	1.64	0.34	0.27	0.45	0.08
FeO (%)	9.68	5.32	1.86	1.74	3.28	5.29	3.05	4.98	0.26
K2O (%)	4.04	2.10	1.63	2.80	2.28	2.58	4.10	2.89	0.08
MgO (%)	0.27	1.86	0.18	1.01	1.09	3.95	1.51	2.04	0.02
Na2O (%)	0.31	5.08	0.11	4.19	2.05	1.58	1.17	4.06	0.01
P2O5 (%)	0.23	0.33	0.21	0.13	0.32	0.52	0.26	0.64	0.26
TiO2 (%)	0.22	0.76	0.49	0.63	0.53	0.38	0.65	0.79	0.56
SO3 (%)	0.25	0.03	0.43	1.05	0.08	3.10	1.28	2.95	0.28
Total (%)	30.50	32.57	10.84	26.45	25.81	29.32	26.81	32.53	2.21
SiO2 (%)	67.37	65.15	88.40	71.70	72.39	68.62	71.32	65.20	97.63
Al_m	0.30	0.28	0.11	0.29	0.29	0.23	0.28	0.27	0.01
Ca_m	0.00	0.05	0.00	0.00	0.03	0.01	0.00	0.01	0.00
K_m	0.09	0.04	0.03	0.06	0.05	0.05	0.09	0.06	0.00
Na_m	0.01	0.16	0.00	0.14	0.07	0.05	0.04	0.13	0.00
K_Al	0.28	0.16	0.30	0.21	0.17	0.24	0.31	0.23	0.14
Na_Al	0.03	0.59	0.03	0.47	0.23	0.22	0.13	0.49	0.03
Plag	0.03	0.78	0.05	0.48	0.33	0.25	0.15	0.52	0.15

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	296883	296931	296962	297016	297053	297055	297065	297082
North (NAD 27)	4321960	4321958	4321750	4321937	4321139	4321027	4321366	4320963
Classification	Sericite-Albite	Sericite	Pyroph/Alun/Topaz	Pyroph/Alun/Topaz	Pyroph/Alun/Topaz	Pyroph/Alun/Topaz	Pyroph/Alun/Topaz	Sericite
Block	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin
Sample#	H437342	H437343	H437377	H437344	H437348	H437349	H437380	H437350
Lithology	Porphyry	Artesia	Jaa?	Artesia	Artesia	Artesia	Jaa	Artesia
Ag (ppm)	0.02	0.01	0.04	0.01	0.17	0.13	0.07	0.02
Al (%)	6.99	4.08	7.39	7.3	0.27	6.36	6.4	6.21
As (ppm)	2.9	2.6	14.9	4	11	64.6	3.2	15.1
Ba (ppm)	1880	410	160	260	1660	300	1280	820
Be (ppm)	1.94	0.17	1.06	0.21	0.19	0.13	0.33	1.27
Bi (ppm)	0.33	0.11	0.82	2.3	0.86	0.49	0.99	1.26
Ca (%)	0.2	0.06	0.17	0.07	0.66	0.44	0.15	0.18
Cd (ppm)	0.03	-0.02	0.02	-0.02	0.05	0.07	0.05	-0.02
Ce (ppm)	13.65	45	53.5	49.4	7.65	48	46	33.2
Co (ppm)	0.3	0.3	0.3	0.2	1.7	0.9	0.7	0.5
Cr (ppm)	13	22	15	35	28	13	50	14
Cs (ppm)	1.61	0.33	0.61	0.21	0.15	0.16	0.36	2.3
Cu (ppm)	12.8	15.8	9.7	10.9	21.9	59.9	6.9	90.2
Fe (%)	0.95	0.44	0.77	0.42	1.12	3.37	0.16	3.11
Ga (ppm)	21.6	8.96	13.05	29.4	1.59	20.3	13.3	19.65
Ge (ppm)	0.13	0.14	0.11	0.13	0.14	0.2	0.1	0.16
Hf (ppm)	1.7	0.7	1.2	0.5	0.8	0.7	0.6	2.8
In (ppm)	0.033	-0.005	0.027	0.006	-0.005	0.013	0.019	0.081
K (%)	1.88	1.46	2.47	0.4	0.07	1.09	1.18	1.87
La (ppm)	6.5	21.6	25	23.1	3.3	23.4	23	15.4
Li (ppm)	3.8	0.7	0.8	0.7	2.2	3.3	0.5	10.8
Mg (%)	0.29	0.01	0.12	0.04	0.04	0.05	0.05	1.46
Mn (ppm)	79	22	22	8	78	44	39	200
Mo (ppm)	0.6	1.06	0.85	1.24	12.95	7.89	0.82	2
Na (%)	3.17	0.09	0.83	0.08	0.03	0.54	0.23	0.09
Nb (ppm)	2.8	2.4	4.1	3.5	2	2.4	2.8	4.7
Ni (ppm)	2.2	1	1	0.8	4.5	1.7	1.9	6.1
P (ppm)	160	1180	2540	2480	190	1530	1640	410
Pb (ppm)	10.3	21.4	29.6	23	3.6	14.3	69.9	3.2
Rb (ppm)	66.9	40	74.6	16.5	2.5	7.4	57.8	91.2
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.12	0.22	3.88	0.32	0.09	3.19	0.7	0.04
Sb (ppm)	1.84	5.32	7.83	5.17	11.9	12.2	4.1	3.14

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	296883	296931	296962	297016	297053	297055	297065	297082
North (NAD 27)	4321960	4321958	4321750	4321937	4321139	4321027	4321366	4320963
Classification	Sericite-Albite	Sericite	Pyroph/Alun/Topaz	Pyroph/Alun/Topaz	Pyroph/Alun/Topaz	Pyroph/Alun/Topaz	Pyroph/Alun/Topaz	Sericite
Block	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin
Sample#	H437342	H437343	H437377	H437344	H437348	H437349	H437380	H437350
Lithology	Porphyry	Artesia	Jaa?	Artesia	Artesia	Artesia	Jaa	Artesia
Sc (ppm)	6.1	3.8	9.2	7.5	1.5	4.1	5.8	13.3
Se (ppm)	2	2	4	5	3	8	4	3
Sn (ppm)	0.7	1	1.2	2.9	0.7	0.7	2.3	1.8
Sr (ppm)	488	1755	1150	3640	145	1055	1265	84.7
Ta (ppm)	0.2	0.14	0.28	0.21	0.1	0.16	0.19	0.3
Te (ppm)	0.12	0.21	1.09	0.44	1.05	1.62	0.11	0.64
Th (ppm)	5.4	3.7	5.5	3.9	1.1	8	4.1	9.1
Ti (%)	0.208	0.276	0.529	0.33	0.267	0.202	0.392	0.424
Tl (ppm)	0.68	0.35	0.92	0.86	0.11	0.25	2.9	3.45
U (ppm)	2.8	1	2	1.2	0.9	2	1.6	3.9
V (ppm)	64	83	156	133	18	154	100	147
W (ppm)	0.6	2.4	0.5	0.4	1.5	1.1	0.7	1.1
Y (ppm)	3.4	1.9	5.3	4.4	5.8	3.9	2.4	7.8
Zn (ppm)	8	-2	2	-2	-2	-2	-2	28
Zr (ppm)	53.8	26.5	34	17.9	26.2	25.4	19.7	95
Al2O3 (%)	13.20	7.71	13.96	13.79	0.51	12.01	12.09	11.73
CaO (%)	0.28	0.08	0.24	0.10	0.92	0.62	0.21	0.25
FeO (%)	1.22	0.57	0.99	0.54	1.44	4.33	0.21	4.00
K2O (%)	2.27	1.76	2.98	0.48	0.08	1.31	1.42	2.25
MgO (%)	0.48	0.02	0.20	0.07	0.07	0.08	0.08	2.42
Na2O (%)	4.27	0.12	1.12	0.11	0.04	0.73	0.31	0.12
P2O5 (%)	0.04	0.27	0.58	0.57	0.04	0.35	0.38	0.09
TiO2 (%)	0.35	0.46	0.88	0.55	0.45	0.34	0.65	0.71
SO3 (%)	0.30	0.55	9.70	0.80	0.23	7.98	1.75	0.10
Total (%)	22.41	11.53	30.65	17.00	3.78	27.75	17.10	21.68
SiO2 (%)	76.02	87.66	67.21	81.81	95.96	70.31	81.70	76.80
Al_m	0.26	0.15	0.27	0.27	0.01	0.24	0.24	0.23
Ca_m	0.01	0.00	0.00	0.00	0.02	0.01	0.00	0.00
K_m	0.05	0.04	0.06	0.01	0.00	0.03	0.03	0.05
Na_m	0.14	0.00	0.04	0.00	0.00	0.02	0.01	0.00
K_Al	0.19	0.25	0.23	0.04	0.18	0.12	0.13	0.21
Na_Al	0.53	0.03	0.13	0.01	0.13	0.10	0.04	0.02
Plag	0.55	0.04	0.15	0.02	1.78	0.15	0.06	0.04

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	297099	297101	297114	297121	297124	297154	297227	297294	302541
North (NAD 27)	4321197	4322072	4320977	4321686	4321440	4321245	4320977	4321107	4319190
Classification	Sericite	Albite	Plag-KSpar	Sericite	Pyroph/Alun/Topaz	Sericite	Sericite-Albite	Sericite	Plag-KSpar
Block	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Blue Hill
Sample#	H437347	H437345	H437451	H437378	H437379	H437346	H437452	H437453	G909015
Lithology	Artesia	Artesia	Porphyry	Jas	Jas	Artesia	Artesia	Artesia	null
Ag (ppm)	0.05	0.11	0.01	0.05	0.05	0.02	0.34	0.08	0.18
Al (%)	7.49	7.7	8.18	8.13	6.58	7.17	7.89	7.48	7.37
As (ppm)	7.3	9.6	0.8	5.6	41.8	8.4	11.3	8.9	-0.2
Ba (ppm)	1180	1200	1150	1370	130	1390	1110	930	1980
Be (ppm)	1.3	1.44	1.27	2.02	0.23	2.02	1.81	2.46	2.01
Bi (ppm)	1.06	0.12	0.09	1.08	3.6	6.1	0.61	2.03	0.21
Ca (%)	0.22	0.3	1.1	0.18	0.16	0.13	0.83	0.14	1.12
Cd (ppm)	0.02	0.02	0.06	-0.02	0.02	0.03	0.03	-0.02	0.03
Ce (ppm)	46.3	25.2	35.3	65.3	54.6	54	68.4	13.15	46.6
Co (ppm)	2	1.2	10.1	0.2	1.1	0.6	1	0.6	9.9
Cr (ppm)	35	30	18	13	48	9	9	14	12
Cs (ppm)	1.83	0.72	2.84	1.28	0.08	1.83	1.67	1.84	1.36
Cu (ppm)	709	49.3	260	10.3	46.6	35	91.1	44.2	1510
Fe (%)	9.39	4.24	2.6	0.51	3.47	3.11	2.43	2.51	1.79
Ga (ppm)	20.1	21.9	19.4	23	15.6	23.5	23.3	22.1	20
Ge (ppm)	0.26	0.2	0.12	0.13	0.19	0.19	0.15	0.1	0.11
Hf (ppm)	1.6	0.6	1.2	1.9	0.7	2.1	2.6	2.3	0.4
In (ppm)	0.219	0.018	0.027	0.044	0.037	0.098	0.127	0.109	0.046
K (%)	2.34	1.49	1.85	3.66	1.79	2.82	2.23	3.75	3.16
La (ppm)	20.6	10.6	18.8	32.7	27.7	26.1	33.9	6.2	24.7
Li (ppm)	15.6	8.8	20.2	1.1	0.7	1.3	10.1	9.4	5.1
Mg (%)	0.82	0.78	0.96	0.21	0.02	0.29	0.62	0.55	0.71
Mn (ppm)	202	299	190	21	13	30	94	69	145
Mo (ppm)	4.96	1.61	0.82	0.66	3.43	3.65	2.99	4.05	1.88
Na (%)	0.13	4.52	2.57	0.31	0.75	0.24	1.58	0.1	2.49
Nb (ppm)	1.8	3.5	4.2	5.2	1	4.8	7.2	3.4	2.2
Ni (ppm)	28.2	5.8	21.3	0.6	3.6	3.1	7.5	3	9.9
P (ppm)	1650	960	990	1230	1720	940	840	570	750
Pb (ppm)	10.9	12.7	18	10.9	99.5	31.9	64.3	12.5	3.7
Rb (ppm)	106.5	35.1	44	132.5	9.3	149	99	144.5	120
Re (ppm)	-0.002	-0.002	0.002	-0.002	-0.002	-0.002	-0.002	0.003	0.003
S (%)	0.07	0.8	-0.01	0.92	5.58	0.06	0.05	0.28	0.65
Sb (ppm)	1.16	4.39	1.16	6.84	3.33	4.34	6.14	2.01	0.21

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	297099	297101	297114	297121	297124	297154	297227	297294	302541
North (NAD 27)	4321197	4322072	4320977	4321686	4321440	4321245	4320977	4321107	4319190
Classification	Sericite	Albite	Plag-KSpar	Sericite	Pyroph/Alun/Topaz	Sericite	Sericite-Albite	Sericite	Plag-KSpar
Block	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Buckskin	Blue Hill
Sample#	H437347	H437345	H437451	H437378	H437379	H437346	H437452	H437453	G909015
Lithology	Artesia	Artesia	Porphyry	Jas	Jas	Artesia	Artesia	Artesia	null
Sc (ppm)	18.4	15.5	6.4	17.9	4.6	8.9	15.7	10.7	6.2
Se (ppm)	2	6	1	3	9	10	6	5	2
Sn (ppm)	5.6	1.1	0.8	1	1.5	1.5	3.2	1.9	1.7
Sr (ppm)	453	424	661	881	1025	456	336	196.5	691
Ta (ppm)	0.11	0.22	0.31	0.38	0.07	0.32	0.46	0.26	0.17
Te (ppm)	0.05	0.88	-0.05	0.64	1.05	0.73	0.42	0.29	0.15
Th (ppm)	4.3	2.3	3.5	9.6	7	10.8	12.9	9.7	8.8
Ti (%)	0.213	0.481	0.265	0.6	0.15	0.347	0.576	0.22	0.196
Tl (ppm)	3.08	0.6	0.38	1.95	0.31	12.15	1.57	3.34	0.43
U (ppm)	1.6	1.8	1.5	3.8	2.1	3.8	4.7	4.1	3.2
V (ppm)	188	157	71	198	116	146	173	106	50
W (ppm)	2.2	1	1	0.7	1.2	0.9	2.5	1.2	3.7
Y (ppm)	5.9	2.7	17.8	9	4	7.8	7.7	5.3	6.6
Zn (ppm)	67	16	78	2	-2	5	12	9	14
Zr (ppm)	57.1	20.1	31	55.7	23.2	84.9	84.1	78.2	9.7
Al2O3 (%)	14.15	14.55	15.45	15.36	12.43	13.54	14.90	14.13	13.92
CaO (%)	0.31	0.42	1.54	0.25	0.22	0.18	1.16	0.20	1.57
FeO (%)	12.08	5.45	3.34	0.66	4.46	4.00	3.12	3.23	2.30
K2O (%)	2.82	1.80	2.23	4.41	2.16	3.40	2.69	4.52	3.81
MgO (%)	1.36	1.29	1.59	0.35	0.03	0.48	1.03	0.91	1.18
Na2O (%)	0.18	6.09	3.46	0.42	1.01	0.32	2.13	0.13	3.36
P2O5 (%)	0.38	0.22	0.23	0.28	0.39	0.22	0.19	0.13	0.17
TiO2 (%)	0.36	0.80	0.44	1.00	0.25	0.58	0.96	0.37	0.33
SO3 (%)	0.18	2.00	-0.03	2.30	13.95	0.15	0.13	0.70	1.63
Total (%)	31.79	32.62	28.26	25.02	34.91	22.87	26.31	24.32	28.26
SiO2 (%)	65.98	65.09	69.76	73.22	62.64	75.53	71.84	73.98	69.77
Al_m	0.28	0.29	0.30	0.30	0.24	0.27	0.29	0.28	0.27
Ca_m	0.01	0.01	0.03	0.00	0.00	0.00	0.02	0.00	0.03
K_m	0.06	0.04	0.05	0.09	0.05	0.07	0.06	0.10	0.08
Na_m	0.01	0.20	0.11	0.01	0.03	0.01	0.07	0.00	0.11
K_Al	0.22	0.13	0.16	0.31	0.19	0.27	0.20	0.35	0.30
Na_Al	0.02	0.69	0.37	0.04	0.13	0.04	0.24	0.02	0.40
Plag	0.04	0.72	0.46	0.06	0.15	0.05	0.31	0.03	0.50

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	302541	302541	302541	302541	302541	302541	302541	302541	302541
North (NAD 27)	4319190	4319190	4319190	4319190	4319190	4319190	4319190	4319190	4319190
Classification	Plagioclase	Plag-KSpar	Plagioclase	Plag-KSpar	Plag-KSpar	Plag-KSpar	Plag-KSpar	Plag-KSpar	Plag-KSpar
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	G909016	G909017	G909018	G909019	G909020	G909021	G909022	G909023	G909024
Lithology	null	null	null	null	null	null	null	null	null
Ag (ppm)	0.22	1.2	0.24	0.15	0.13	0.18	0.64	0.11	0.37
Al (%)	7.01	7	7.61	7.71	7.68	7.29	6.77	7.7	7.73
As (ppm)	-0.2	0.5	-0.2	-0.2	-0.2	0.3	-0.2	-0.2	-0.2
Ba (ppm)	250	600	170	1780	1320	1420	870	1220	1200
Be (ppm)	2.06	2.34	2.33	1.74	1.8	1.65	2.16	1.79	1.95
Bi (ppm)	0.11	0.18	0.11	0.14	0.06	0.09	0.08	0.06	0.07
Ca (%)	1.44	1.79	1.83	1.47	2.11	1.55	1.27	1.96	1.84
Cd (ppm)	-0.02	0.03	0.02	0.02	0.04	0.07	0.04	-0.02	0.02
Ce (ppm)	50.1	48.2	37.5	51.9	43.8	41	28.3	43.5	53.8
Co (ppm)	4.4	5.2	5.8	5.1	6.3	6.1	5.3	7.6	12.1
Cr (ppm)	11	16	16	14	12	15	15	13	16
Cs (ppm)	0.69	2.22	1.86	2.08	1.66	1.62	1.19	0.93	2.27
Cu (ppm)	2010	5870	1280	922	603	476	2580	452	1255
Fe (%)	1.02	1.22	1.03	1.77	1.98	1.88	1.33	1.91	2.45
Ga (ppm)	21.7	21.5	23.2	21.3	21.8	20.6	20	20.9	21.7
Ge (ppm)	0.11	0.13	0.11	0.12	0.13	0.12	0.1	0.11	0.15
Hf (ppm)	0.8	0.3	0.4	0.8	0.6	0.5	0.3	0.5	0.5
In (ppm)	0.098	0.128	0.027	0.051	0.041	0.019	0.064	0.024	0.061
K (%)	0.41	1.56	0.58	3	2.76	3.04	1.92	2.86	2.96
La (ppm)	27.9	21.8	15.1	25	21.3	19.7	14.5	20.8	26.4
Li (ppm)	4.6	3.6	3.2	9.6	4.8	6.6	4.5	7	5.2
Mg (%)	0.58	0.65	0.69	0.7	0.66	0.58	0.55	0.67	0.8
Mn (ppm)	97	58	62	146	161	127	80	154	145
Mo (ppm)	1.64	58.7	1.23	5.6	1.28	1.87	4.82	11.9	1.25
Na (%)	4.66	3.16	4.29	2.85	2.91	2.67	3.26	2.92	2.77
Nb (ppm)	2.2	1.6	2.2	3.7	3.4	3	1.6	3.3	3.5
Ni (ppm)	8.7	9.3	6.9	9	9.8	9.7	6.9	9.3	11.1
P (ppm)	670	740	870	840	740	650	720	760	660
Pb (ppm)	1.9	5.4	4.1	5.9	6.6	9.5	5.1	6.6	6.3
Rb (ppm)	19	89.2	44.6	104	92.5	118.5	78.2	98.9	122.5
Re (ppm)	0.003	0.003	0.003	0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.45	0.83	0.71	0.22	0.08	0.16	0.5	0.18	0.89
Sb (ppm)	0.24	0.24	0.17	0.22	0.11	0.14	0.23	0.2	0.1

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	302541	302541	302541	302541	302541	302541	302541	302541	302541
North (NAD 27)	4319190	4319190	4319190	4319190	4319190	4319190	4319190	4319190	4319190
Classification	Plagioclase	Plag-KSpar	Plagioclase	Plag-KSpar	Plag-KSpar	Plag-KSpar	Plag-KSpar	Plag-KSpar	Plag-KSpar
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	G909016	G909017	G909018	G909019	G909020	G909021	G909022	G909023	G909024
Lithology	null	null	null	null	null	null	null	null	null
Sc (ppm)	6	5.8	7.7	6.4	6	5	5.7	6.1	8.2
Se (ppm)	1	3	2	2	1	1	2	1	3
Sn (ppm)	3	2.7	2.2	1.5	1.2	1.1	1.7	1.1	1.7
Sr (ppm)	603	999	991	917	1070	863	821	1055	1015
Ta (ppm)	0.17	0.11	0.17	0.27	0.24	0.21	0.13	0.23	0.24
Te (ppm)	0.06	0.09	0.06	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05
Th (ppm)	6.8	7.3	7.1	7.3	8.3	6.3	8.3	7.4	11.8
Ti (%)	0.198	0.152	0.195	0.282	0.266	0.238	0.182	0.276	0.299
Tl (ppm)	0.09	0.36	0.22	0.44	0.39	0.49	0.26	0.39	0.47
U (ppm)	3.4	2.5	5.8	2.9	4.1	2.3	3	3.3	7.6
V (ppm)	47	54	63	61	58	51	50	60	74
W (ppm)	3.2	20	14	2.2	1.8	11.7	3.5	5.4	9
Y (ppm)	4.8	7.1	9	7.4	6.3	5.8	5.2	6.2	9
Zn (ppm)	7	12	10	66	26	40	14	16	18
Zr (ppm)	19.2	6.6	7.2	18.2	10.9	8.4	6.2	8.4	8.9
Al2O3 (%)	13.24	13.22	14.38	14.56	14.51	13.77	12.79	14.55	14.60
CaO (%)	2.01	2.50	2.56	2.06	2.95	2.17	1.78	2.74	2.57
FeO (%)	1.31	1.57	1.32	2.28	2.55	2.42	1.71	2.46	3.15
K2O (%)	0.49	1.88	0.70	3.62	3.33	3.66	2.31	3.45	3.57
MgO (%)	0.96	1.08	1.14	1.16	1.09	0.96	0.91	1.11	1.33
Na2O (%)	6.28	4.26	5.78	3.84	3.92	3.60	4.39	3.94	3.73
P2O5 (%)	0.15	0.17	0.20	0.19	0.17	0.15	0.16	0.17	0.15
TiO2 (%)	0.33	0.25	0.33	0.47	0.44	0.40	0.30	0.46	0.50
SO3 (%)	1.13	2.08	1.78	0.55	0.20	0.40	1.25	0.45	2.23
Total (%)	25.91	27.01	28.19	28.73	29.16	27.53	25.61	29.32	31.83
SiO2 (%)	72.27	71.10	69.84	69.26	68.80	70.55	72.59	68.63	65.94
Al_m	0.26	0.26	0.28	0.29	0.28	0.27	0.25	0.29	0.29
Ca_m	0.04	0.04	0.05	0.04	0.05	0.04	0.03	0.05	0.05
K_m	0.01	0.04	0.01	0.08	0.07	0.08	0.05	0.07	0.08
Na_m	0.20	0.14	0.19	0.12	0.13	0.12	0.14	0.13	0.12
K_Al	0.04	0.15	0.05	0.27	0.25	0.29	0.20	0.26	0.27
Na_Al	0.78	0.53	0.66	0.43	0.44	0.43	0.57	0.45	0.42
Plag	0.92	0.70	0.82	0.56	0.63	0.57	0.69	0.62	0.58

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	302541	302541	302541	302541	302541	302541	302541	302541	302183
North (NAD 27)	4319190	4319190	4319190	4319190	4319190	4319190	4319190	4319190	4322079
Classification	Plag-KSpar	Plag-KSpar	Albite-KSpar-Sericite	Plag-KSpar	Plag-KSpar	Plag-KSpar	Plagioclase	Plagioclase	null
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	G909025	G909026	G909027	G909028	G909029	G909030	G909031	G909032	80JD-94
Lithology	null	null	null	null	null	null	null	null	McLeod QMD
Ag (ppm)	0.72	0.2	0.7	0.64	0.78	0.81	0.11	0.03	0.14
Al (%)	7.11	7.9	7.29	7.69	7.8	7.59	7.4	7.23	6.84
As (ppm)	-0.2	0.6	-0.2	-0.2	0.3	-0.2	-0.2	-0.2	3.8
Ba (ppm)	970	1330	1660	1210	1600	1460	500	90	2450
Be (ppm)	1.74	2.47	1.82	1.88	2.04	1.85	1.91	2.87	1.89
Bi (ppm)	0.08	0.24	0.07	0.13	0.13	0.13	0.1	0.03	0.46
Ca (%)	1.82	1.91	1.04	1.74	1.69	1.76	1.68	2.07	2.77
Cd (ppm)	0.03	0.2	-0.02	-0.02	0.03	0.05	0.03	0.02	0.06
Ce (ppm)	42.9	49.9	14.45	45.5	46.9	44.5	43.5	30.8	36.3
Co (ppm)	3.2	6	5.3	5.6	7.4	10.8	5.2	1.3	6.3
Cr (ppm)	12	14	11	11	13	11	11	9	29
Cs (ppm)	0.63	1.37	1.51	2.44	2.04	2.57	1.18	1.2	0.84
Cu (ppm)	3310	488	3420	2040	2120	3690	1130	138	189
Fe (%)	1.32	1.81	0.91	1.45	1.84	1.93	1.24	0.46	2.5
Ga (ppm)	20.1	22.1	19.9	21.9	21.6	21.2	22.1	24.2	20.5
Ge (ppm)	0.11	0.11	0.09	0.12	0.12	0.13	0.11	0.1	0.11
Hf (ppm)	0.4	0.6	0.4	0.4	0.4	0.4	0.4	0.2	1.4
In (ppm)	0.159	0.024	0.083	0.061	0.063	0.069	0.045	0.007	0.05
K (%)	2.08	2.56	3.78	2.43	3.07	2.97	0.81	0.34	2.63
La (ppm)	21.2	25.6	6.2	21.7	22.9	22.1	21.2	10.3	16.7
Li (ppm)	5.3	7.6	6.5	4.8	6.6	5.4	7.7	6.2	6
Mg (%)	0.48	0.69	0.59	0.67	0.68	0.71	1.02	0.7	0.92
Mn (ppm)	69	136	49	119	106	116	94	66	370
Mo (ppm)	1.34	1.33	55.4	171	17.45	2.18	4.53	6.54	0.48
Na (%)	2.91	2.92	2.86	3.07	2.89	2.65	4.08	4.27	2.3
Nb (ppm)	2.6	3.6	1.3	2.8	3.1	3	3.1	1.3	3
Ni (ppm)	4.9	9.7	7	9.4	9.1	9.9	9.3	4.6	18.3
P (ppm)	670	770	650	810	830	780	800	750	910
Pb (ppm)	3.9	8.1	6.1	8.2	8.4	6.4	3.4	5.1	9
Rb (ppm)	70.2	91.7	125.5	104	130.5	122.5	43	22.4	48.9
Re (ppm)	-0.002	-0.002	0.004	0.02	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.47	0.19	0.46	0.33	0.34	0.53	0.19	0.03	0.03
Sb (ppm)	0.2	0.34	0.11	0.13	0.23	0.15	0.15	0.16	5.21

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	302541	302541	302541	302541	302541	302541	302541	302541	302183
North (NAD 27)	4319190	4319190	4319190	4319190	4319190	4319190	4319190	4319190	4322079
Classification	Plag-KSpar	Plag-KSpar	Albite-KSpar-Sericite	Plag-KSpar	Plag-KSpar	Plag-KSpar	Plagioclase	Plagioclase	null
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	G909025	G909026	G909027	G909028	G909029	G909030	G909031	G909032	80JD-94
Lithology	null	null	null	null	null	null	null	null	McLeod QMD
Sc (ppm)	4.7	6.7	4.6	6.4	6.1	6.2	6.3	6	6.5
Se (ppm)	2	1	3	2	2	2	2	1	1
Sn (ppm)	1.2	1.2	1.3	1.5	1.5	1.6	1.2	1.4	0.8
Sr (ppm)	651	1040	753	978	994	998	768	806	1040
Ta (ppm)	0.19	0.26	0.1	0.21	0.23	0.23	0.23	0.1	0.22
Te (ppm)	0.05	-0.05	0.06	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05
Th (ppm)	7.5	9.6	5.3	8.1	8	6.9	7.4	8.4	4.2
Ti (%)	0.219	0.272	0.137	0.238	0.266	0.26	0.259	0.139	0.32
Tl (ppm)	0.22	0.35	0.44	0.45	0.49	0.46	0.19	0.11	0.29
U (ppm)	3.2	5.2	2.2	3.6	3.3	2.9	3	1.9	2.1
V (ppm)	51	60	51	59	63	63	63	56	76
W (ppm)	1.9	3.1	5.6	5.3	12.6	30.9	6.9	1.6	1.2
Y (ppm)	6.1	7.1	3.7	7.1	6.4	6.3	6.2	7.2	5.4
Zn (ppm)	9	22	9	24	20	15	8	10	21
Zr (ppm)	6.5	9.8	10.9	7.3	6.5	6.3	7	3.8	44
Al2O3 (%)	13.43	14.92	13.77	14.53	14.73	14.34	13.98	13.66	12.92
CaO (%)	2.55	2.67	1.45	2.43	2.36	2.46	2.35	2.90	3.88
FeO (%)	1.70	2.33	1.17	1.86	2.37	2.48	1.59	0.59	3.22
K2O (%)	2.51	3.08	4.55	2.93	3.70	3.58	0.98	0.41	3.17
MgO (%)	0.80	1.14	0.98	1.11	1.13	1.18	1.69	1.16	1.53
Na2O (%)	3.92	3.94	3.86	4.14	3.90	3.57	5.50	5.76	3.10
P2O5 (%)	0.15	0.18	0.15	0.19	0.19	0.18	0.18	0.17	0.21
TiO2 (%)	0.37	0.45	0.23	0.40	0.44	0.43	0.43	0.23	0.53
SO3 (%)	1.18	0.48	1.15	0.83	0.85	1.33	0.48	0.08	0.08
Total (%)	26.59	29.19	27.31	28.41	29.67	29.55	27.18	24.95	28.62
SiO2 (%)	71.55	68.76	70.78	69.60	68.25	68.38	70.92	73.30	69.37
Al_m	0.26	0.29	0.27	0.28	0.29	0.28	0.27	0.27	0.25
Ca_m	0.05	0.05	0.03	0.04	0.04	0.04	0.04	0.05	0.07
K_m	0.05	0.07	0.10	0.06	0.08	0.08	0.02	0.01	0.07
Na_m	0.13	0.13	0.12	0.13	0.13	0.12	0.18	0.19	0.10
K_Al	0.20	0.22	0.36	0.22	0.27	0.27	0.08	0.03	0.27
Na_Al	0.48	0.43	0.46	0.47	0.43	0.41	0.65	0.69	0.39
Plag	0.65	0.60	0.56	0.62	0.58	0.57	0.80	0.89	0.67

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	301667	301181	301214	301486	301433	301428	300645	301397	301578
North (NAD 27)	4322120	4320973	4320182	4322188	4319473	4319428	4321368	4322343	4321949
Classification	null	null	null	null	null	null	null	null	null
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	YD01-07A	YD01-30C	YD08-22	YD01-01A	JD09-06	JD09-04	YD01-13A	YD01-04	81JD-94B
Lithology	McLeod QMD	McLeod QMD	mafic dike	Bear QMD	Porphyry	Porphyry	Artesia Lake	McLeod QMD	McLeod QMD
Ag (ppm)	0.1	0.34	0.15	0.12	0.12	0.05	0.03	0.28	0.02
Al (%)	2.03	7.61	6.86	7.08	7.59	6.71	7.23	3.13	6.75
As (ppm)	41	9.7	2.5	4.3	5.5	2	2.4	1.7	4.6
Ba (ppm)	50	250	870	1820	1580	420	1020	160	1830
Be (ppm)	0.98	1.14	1.53	2.23	1.85	1.52	1.14	0.76	2.25
Bi (ppm)	2.57	0.08	0.05	0.29	0.45	0.83	-0.01	0.25	0.91
Ca (%)	5.99	1.56	3.53	2.49	2.06	0.08	0.13	1.35	2.54
Cd (ppm)	0.04	0.19	0.76	0.05	0.03	0.02	0.02	0.03	0.03
Ce (ppm)	86	60.5	36.8	42.1	50.9	3.59	18.35	34.3	26.1
Co (ppm)	7.3	21.3	13.2	1.7	0.7	0.3	10.6	3.5	0.8
Cr (ppm)	14	18	38	9	19	11	64	11	15
Cs (ppm)	1.56	0.33	2.16	2.2	0.74	0.8	0.8	0.33	0.74
Cu (ppm)	3390	304	105	133.5	90.9	8.6	10	973	428
Fe (%)	18.55	6.42	3.38	1.63	1.9	0.56	6.96	2.29	1.18
Ga (ppm)	13.1	19.15	17.2	22.3	22.4	32.3	20.1	12.3	20.3
Ge (ppm)	0.21	0.13	0.13	0.13	0.16	0.11	0.17	0.1	0.12
Hf (ppm)	0.2	1.1	2.9	1.5	1.4	1.6	2.2	0.8	1.2
In (ppm)	0.105	0.121	0.033	0.117	0.321	0.136	0.1	0.126	0.063
K (%)	0.08	0.24	2.47	2.47	2.21	2.98	1.83	0.27	1.89
La (ppm)	37	28.7	19	19.7	24.2	1.5	7.8	16.3	9.7
Li (ppm)	16.1	7.9	5.8	6.9	3.1	5.4	19	5.4	2.7
Mg (%)	1.43	2.09	1.31	0.58	0.44	0.58	2.31	1.25	0.18
Mn (ppm)	320	946	470	264	244	49	617	218	310
Mo (ppm)	9.1	1.24	0.66	1.35	2.3	2.79	0.15	0.9	0.39
Na (%)	0.02	4.03	1.65	2.38	3.06	0.2	0.17	0.8	2.87
Nb (ppm)	1	3.6	6.1	5.4	3.4	2.8	1.2	3.9	4.8
Ni (ppm)	42	38.8	25.1	7.1	7.4	2.7	50.4	9.1	2.1
P (ppm)	>10000	1920	800	880	540	90	550	740	490
Pb (ppm)	3.7	17.9	43	7.6	8.8	2.6	4.6	3	7.1
Rb (ppm)	6.6	5.8	88	58.5	70.6	110	22	11.1	44.3
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.01	0.02	0.03	0.01	-0.01	-0.01	-0.01	-0.01	-0.01
Sb (ppm)	2.98	2.54	1.22	4.07	4.77	0.49	1.47	0.74	5.84

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	301667	301181	301214	301486	301433	301428	300645	301397	301578
North (NAD 27)	4322120	4320973	4320182	4322188	4319473	4319428	4321368	4322343	4321949
Classification	null	null	null	null	null	null	null	null	null
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	YD01-07A	YD01-30C	YD08-22	YD01-01A	JD09-06	JD09-04	YD01-13A	YD01-04	81JD-94B
Lithology	McLeod QMD	McLeod QMD	mafic dike	Bear QMD	Porphyry	Porphyry	Artesia Lake	McLeod QMD	McLeod QMD
Sc (ppm)	40.6	13.1	13.8	2.2	5.9	7.2	16	3	1.3
Se (ppm)	1	1	1	1	1	1	1	1	1
Sn (ppm)	1.3	1.5	0.8	1	0.9	1.8	0.8	0.8	0.9
Sr (ppm)	331	819	239	969	1075	63.8	23.1	342	1005
Ta (ppm)	-0.05	0.27	0.51	0.55	0.27	0.22	0.11	0.3	0.45
Te (ppm)	0.34	0.08	-0.05	-0.05	0.31	1.4	-0.05	0.1	-0.05
Th (ppm)	34.9	6.1	7.5	18.8	8.3	1.7	2	9.8	8.4
Ti (%)	0.084	0.499	0.325	0.272	0.284	0.245	0.091	0.252	0.314
Tl (ppm)	0.09	0.07	0.47	0.31	0.44	0.7	1.83	0.05	0.28
U (ppm)	6.3	3.4	2.6	5.1	4.9	1.8	1.6	2.9	2.4
V (ppm)	445	224	104	40	63	64	130	39	37
W (ppm)	215	3.1	1.5	3	1.9	2.7	0.7	0.5	0.4
Y (ppm)	13.9	12.7	13.7	9.9	8.3	1.6	4.1	6.7	8.6
Zn (ppm)	31	278	238	19	20	9	89	18	13
Zr (ppm)	2	33.5	112.5	29.9	34.1	42.4	94.4	13.7	26.1
Al2O3 (%)	3.83	14.38	12.96	13.37	14.34	12.68	13.66	5.91	12.75
CaO (%)	8.38	2.18	4.94	3.48	2.88	0.11	0.18	1.89	3.55
FeO (%)	23.86	8.26	4.35	2.10	2.44	0.72	8.95	2.94	1.52
K2O (%)	0.10	0.29	2.98	2.98	2.66	3.59	2.21	0.33	2.28
MgO (%)	2.37	3.47	2.17	0.96	0.73	0.96	3.83	2.07	0.30
Na2O (%)	0.03	5.43	2.22	3.21	4.12	0.27	0.23	1.08	3.87
P2O5 (%)	#VALUE!	0.44	0.18	0.20	0.12	0.02	0.13	0.17	0.11
TiO2 (%)	0.14	0.83	0.54	0.45	0.47	0.41	0.15	0.42	0.52
SO3 (%)	0.03	0.05	0.08	0.03	-0.03	-0.03	-0.03	-0.03	-0.03
Total (%)	#VALUE!	35.32	30.42	26.78	27.75	18.73	29.31	14.79	24.88
SiO2 (%)	#VALUE!	62.20	67.45	71.35	70.30	79.95	68.64	84.18	73.38
Al_m	0.08	0.28	0.25	0.26	0.28	0.25	0.27	0.12	0.25
Ca_m	0.15	0.04	0.09	0.06	0.05	0.00	0.00	0.03	0.06
K_m	0.00	0.01	0.06	0.06	0.06	0.08	0.05	0.01	0.05
Na_m	0.00	0.18	0.07	0.10	0.13	0.01	0.01	0.03	0.12
K_Al	0.03	0.02	0.25	0.24	0.20	0.31	0.18	0.06	0.19
Na_Al	0.01	0.62	0.28	0.39	0.47	0.03	0.03	0.30	0.50
Plag	2.00	0.76	0.63	0.63	0.66	0.04	0.04	0.59	0.75

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	300972	301910	302099	301059	300858	301456	300836	300836	300744
North (NAD 27)	4320770	4321551	4321661	4320471	4320533	4322135	4319761	4319767	4319806
Classification	null	null	null	null	null	null	Sericite	Plag-KSpar	Albite-KSpar-Sericite
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	YD02-02	80JD-94D	80JD-94B	YD08-21	YD08-19C	YD01-01C	JC10-BHT303	JC10-BHT304	JC10-BHT401
Lithology	Artesia Lake	Porphyry	McLeod QMD	Artesia Lake	Artesia Lake	Bear QMD	Porphyry	McLeod QMD	McLeod QMD
Ag (ppm)	0.04	0.15	0.04	0.17	0.09	-0.01	-0.01	0.06	0.16
Al (%)	11.9	7.39	6.79	5.11	8.39	7.94	8	7.84	7.61
As (ppm)	2.5	3.7	1.4	2.3	2.2	4.4	11.6	10.8	7.7
Ba (ppm)	180	2840	250	450	250	3370	1550	1250	1370
Be (ppm)	1.14	1.57	2.72	0.59	0.19	3.39	1.59	1.8	2.81
Bi (ppm)	0.1	0.36	0.09	0.04	0.05	0.31	1.71	0.15	0.33
Ca (%)	0.04	2.75	2.07	0.09	0.11	1.35	0.36	3.2	0.81
Cd (ppm)	-0.02	0.04	0.04	0.03	0.02	0.02	-0.02	0.03	0.04
Ce (ppm)	20.2	38.5	44.8	45	106	24.9	43.7	47.6	78.3
Co (ppm)	-0.1	5.3	0.8	0.3	0.4	1.3	0.9	11.8	4.8
Cr (ppm)	51	33	10	19	127	11	19	8	14
Cs (ppm)	1.11	0.72	0.88	0.73	0.36	1.61	1.22	1.02	1.7
Cu (ppm)	2.2	138.5	12.2	1460	21.8	153	24.4	36.7	112.5
Fe (%)	0.1	2.52	0.83	0.59	0.55	1.76	3.66	4.06	3.1
Ga (ppm)	19.7	20.4	22.2	4.95	8.32	24.3	26.1	23.4	22.3
Ge (ppm)	0.11	0.16	0.14	0.14	0.22	0.17	0.1	0.18	0.2
Hf (ppm)	0.2	1.4	1.2	0.3	0.7	0.9	2.2	0.5	0.9
In (ppm)	0.011	0.034	0.064	0.005	-0.005	0.017	0.051	0.034	0.041
K (%)	2.98	2.61	0.42	2.24	4.09	3.06	3.66	2.73	3.58
La (ppm)	9.3	18.7	21.8	21	49	7.6	27.5	20.8	39.8
Li (ppm)	47.6	5.5	2.1	5.8	0.8	6.2	5.8	4.8	7.5
Mg (%)	0.02	0.89	0.15	0.11	0.06	0.86	0.4	1.06	0.58
Mn (ppm)	7	381	90	55	41	271	51	400	382
Mo (ppm)	0.32	0.56	0.96	0.39	1.17	0.28	2.86	1.36	2.3
Na (%)	2.5	2.35	4.04	0.15	0.18	2.6	1.84	3.21	2.87
Nb (ppm)	0.5	2.9	4.5	1.1	1.5	8	3.6	5.6	8.8
Ni (ppm)	0.5	17.2	1.8	1.5	1.3	4.2	7.1	16.1	7.6
P (ppm)	1520	900	60	140	2220	1550	1090	1770	980
Pb (ppm)	759	27.6	4.5	25.1	914	8.3	7.4	7.3	7.6
Rb (ppm)	76.1	48.1	15.9	60.3	63.4	107.5	148.5	75.4	132.5
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.16	0.04	-0.01	0.03	0.33	0.03	0.24	0.02	0.03
Sb (ppm)	1.45	4.95	0.65	1.84	3.37	2.14	1.02	1.51	0.83

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	300972	301910	302099	301059	300858	301456	300836	300836	300744
North (NAD 27)	4320770	4321551	4321661	4320471	4320533	4322135	4319761	4319767	4319806
Classification	null	null	null	null	null	null	Sericite	Plag-KSpar	Albite-KSpar-Sericite
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	YD02-02	80JD-94D	80JD-94B	YD08-21	YD08-19C	YD01-01C	JC10-BHT303	JC10-BHT304	JC10-BHT401
Lithology	Artesia Lake	Porphyry	McLeod QMD	Artesia Lake	Artesia Lake	Bear QMD	Porphyry	McLeod QMD	McLeod QMD
Sc (ppm)	1.9	6.9	0.7	2.3	1.9	9.9	7.4	12	6.9
Se (ppm)	2	1	1	1	1	1	1	2	2
Sn (ppm)	0.6	0.7	0.9	0.5	1.4	0.6	0.7	0.9	1
Sr (ppm)	2340	1160	1060	130	3210	499	553	1165	415
Ta (ppm)	0.08	0.2	0.39	0.06	0.11	0.56	0.21	0.34	0.65
Te (ppm)	0.08	-0.05	-0.05	-0.05	0.07	0.1	0.27	-0.05	0.1
Th (ppm)	1.2	4.5	6.8	2	5	26.8	8.9	10	32
Ti (%)	0.058	0.314	0.297	0.153	0.259	0.523	0.305	0.453	0.352
Tl (ppm)	1.11	0.29	0.08	0.3	0.56	0.54	0.58	0.37	0.57
U (ppm)	0.3	2.1	3	6.6	1	3.6	5.5	3.8	10
V (ppm)	131	78	22	61	107	108	97	140	79
W (ppm)	0.6	1.1	0.3	0.9	5.4	12.5	2.1	1.3	2.2
Y (ppm)	0.3	5.5	7.7	2.8	0.6	14.1	5.6	13	15.4
Zn (ppm)	-2	17	8	6	4	19	13	25	56
Zr (ppm)	6.6	39.6	21.3	9.3	22.3	24.1	71.8	12.4	29.8
Al2O3 (%)	22.48	13.96	12.83	9.65	15.85	15.00	15.11	14.81	14.38
CaO (%)	0.06	3.85	2.90	0.13	0.15	1.89	0.50	4.48	1.13
FeO (%)	0.13	3.24	1.07	0.76	0.71	2.26	4.71	5.22	3.99
K2O (%)	3.59	3.15	0.51	2.70	4.93	3.69	4.41	3.29	4.31
MgO (%)	0.03	1.48	0.25	0.18	0.10	1.43	0.66	1.76	0.96
Na2O (%)	3.37	3.17	5.45	0.20	0.24	3.50	2.48	4.33	3.87
P2O5 (%)	0.35	0.21	0.01	0.03	0.51	0.36	0.25	0.41	0.22
TiO2 (%)	0.10	0.52	0.50	0.26	0.43	0.87	0.51	0.76	0.59
SO3 (%)	0.40	0.10	-0.03	0.08	0.83	0.08	0.60	0.05	0.08
Total (%)	30.50	29.67	23.47	13.98	23.75	29.07	29.23	35.09	29.53
SiO2 (%)	67.36	68.26	74.88	85.04	74.59	68.89	68.72	62.45	68.41
Al_m	0.44	0.27	0.25	0.19	0.31	0.29	0.30	0.29	0.28
Ca_m	0.00	0.07	0.05	0.00	0.00	0.03	0.01	0.08	0.02
K_m	0.08	0.07	0.01	0.06	0.10	0.08	0.09	0.07	0.09
Na_m	0.11	0.10	0.18	0.01	0.01	0.11	0.08	0.14	0.12
K_Al	0.17	0.24	0.04	0.30	0.34	0.27	0.32	0.24	0.33
Na_Al	0.25	0.37	0.70	0.03	0.03	0.38	0.27	0.48	0.44
Plag	0.25	0.62	0.90	0.05	0.03	0.50	0.30	0.76	0.51

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	300730	300724	300748	301240	301247	301251	301970	301968	301968
North (NAD 27)	4319820	4319827	4319853	4318939	4318947	4318952	4318786	4318791	4318793
Classification	Plag-KSpar	Plag-KSpar	Plag-KSpar	Plag-KSpar	Albite-KSpar-Sericite	Albite	Albite	Albite	Albite
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	JC10-BHT402	JC10-BHT403	JC10-BHT404	JC10-BHT501	JC10-BHT502	JC10-BHT503	JC10-BHT601	JC10-BHT602	JC10-BHT603
Lithology	McLeod QMD	Porphyry	McLeod QMD	Bear QM	Bear QM	Bear QM	Porphyry	McLeod QMD	McLeod QMD
Ag (ppm)	0.11	0.04	0.15	0.05	0.02	0.02	0.02	0.03	0.04
Al (%)	7.7	7.46	6.83	7.02	7.73	7.32	7.34	7.55	6.7
As (ppm)	10.5	6.4	7.1	5.6	5.7	7.2	5.4	2.6	2.3
Ba (ppm)	1280	1160	1070	1280	2230	320	110	310	170
Be (ppm)	2.62	1.72	1.79	2.21	1.97	2.14	1.79	2	1.85
Bi (ppm)	0.09	0.18	0.33	0.08	0.07	0.09	0.04	0.13	0.02
Ca (%)	1.55	2.34	1.7	2.45	0.75	0.57	0.64	0.8	0.41
Cd (ppm)	0.04	0.02	0.04	0.04	-0.02	0.02	-0.02	0.02	-0.02
Ce (ppm)	79.5	47	46.7	41.2	80.8	55.9	26.1	30.7	12.45
Co (ppm)	6	2.8	4.4	10.4	10.5	12.7	1.1	3.2	0.9
Cr (ppm)	9	15	10	9	45	7	14	13	10
Cs (ppm)	1.61	0.55	0.77	2.17	1.58	0.74	0.29	1.13	0.35
Cu (ppm)	55.7	10.6	412	311	359	374	230	1425	175
Fe (%)	3.13	2.46	3.54	3.06	1.14	2.4	0.56	0.7	0.54
Ga (ppm)	23.2	21.8	20.3	21.7	19.25	21.8	21.1	21.2	17.65
Ge (ppm)	0.21	0.15	0.18	0.18	0.17	0.16	0.1	-0.05	-0.05
Hf (ppm)	0.8	1.1	0.7	1	1.7	0.8	0.5	0.3	0.3
In (ppm)	0.032	0.029	0.064	0.029	0.035	0.015	-0.005	-0.005	-0.005
K (%)	4.17	2.06	3.44	3.2	2.82	1.05	0.3	0.76	0.66
La (ppm)	40	21.8	23	19.6	41.8	26.9	12.9	13	4.5
Li (ppm)	6.2	4.5	4.4	4.1	11.4	10.7	6.5	7.7	4.5
Mg (%)	0.43	0.42	0.66	0.55	0.88	1.75	1.27	1.16	0.66
Mn (ppm)	775	311	660	289	130	219	66	103	63
Mo (ppm)	4.32	0.91	2.33	1.98	0.52	1.18	0.62	0.7	0.66
Na (%)	2.64	3.61	2.63	2.78	2.69	3.88	4.91	4.27	4.98
Nb (ppm)	10.1	4	7.6	6.2	1.4	5.3	1.5	1.9	2.1
Ni (ppm)	7.4	11.5	9.1	14.3	27.3	17.4	9.5	11.8	5.5
P (ppm)	1120	930	990	1230	1030	1210	890	1000	850
Pb (ppm)	10	5.1	6	8.5	2.2	2.7	2.2	3.9	2.2
Rb (ppm)	153.5	40.4	98.1	87.9	90.2	36	11.4	24.1	23.7
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.02	-0.01	0.01	0.01	0.02	0.01	0.02	0.02	0.01
Sb (ppm)	1.58	1.28	1.98	0.59	0.49	0.66	0.26	0.47	0.48

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	300730	300724	300748	301240	301247	301251	301970	301968	301968
North (NAD 27)	4319820	4319827	4319853	4318939	4318947	4318952	4318786	4318791	4318793
Classification	Plag-KSpar	Plag-KSpar	Plag-KSpar	Plag-KSpar	Albite-KSpar-Sericite	Albite	Albite	Albite	Albite
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	JC10-BHT402	JC10-BHT403	JC10-BHT404	JC10-BHT501	JC10-BHT502	JC10-BHT503	JC10-BHT601	JC10-BHT602	JC10-BHT603
Lithology	McLeod QMD	Porphyry	McLeod QMD	Bear QM	Bear QM	Bear QM	Porphyry	McLeod QMD	McLeod QMD
Sc (ppm)	8.1	6.3	6.4	7.8	9	8.1	5.9	5.7	2.7
Se (ppm)	2	1	1	1	1	2	1	1	1
Sn (ppm)	1.1	0.8	0.9	0.9	0.5	1	1.3	1.3	1.3
Sr (ppm)	694	953	557	921	413	340	446	733	332
Ta (ppm)	0.69	0.25	0.54	0.43	0.09	0.33	0.09	0.13	0.15
Te (ppm)	0.13	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05
Th (ppm)	33.5	7.3	22.3	11.3	8.8	10.5	6.3	6.7	3.9
Ti (%)	0.426	0.292	0.34	0.407	0.196	0.339	0.143	0.184	0.203
Tl (ppm)	0.66	0.26	0.41	0.38	0.43	0.16	0.06	0.13	0.08
U (ppm)	12.9	3.3	8.6	5.7	3.1	4	1.8	2.2	1.8
V (ppm)	98	67	81	101	79	87	66	61	44
W (ppm)	2.6	0.5	2.6	1.1	3.2	2.1	4.6	4.6	6.9
Y (ppm)	17.4	6.6	12.7	11.2	8.4	10.1	4.9	6.5	4.6
Zn (ppm)	82	10	43	34	13	25	6	15	6
Zr (ppm)	26.7	30.8	23.2	18.6	56.8	17	16.9	4.6	5.2
Al2O3 (%)	14.55	14.09	12.90	13.26	14.60	13.83	13.87	14.26	12.66
CaO (%)	2.17	3.27	2.38	3.43	1.05	0.80	0.90	1.12	0.57
FeO (%)	4.03	3.16	4.55	3.94	1.47	3.09	0.72	0.90	0.69
K2O (%)	5.02	2.48	4.15	3.86	3.40	1.27	0.36	0.92	0.80
MgO (%)	0.71	0.70	1.09	0.91	1.46	2.90	2.11	1.92	1.09
Na2O (%)	3.56	4.87	3.55	3.75	3.63	5.23	6.62	5.76	6.71
P2O5 (%)	0.26	0.21	0.23	0.28	0.24	0.28	0.20	0.23	0.19
TiO2 (%)	0.71	0.49	0.57	0.68	0.33	0.57	0.24	0.31	0.34
SO3 (%)	0.05	-0.03	0.03	0.03	0.05	0.03	0.05	0.05	0.03
Total (%)	31.05	29.25	29.44	30.12	26.21	27.98	25.06	25.46	23.09
SiO2 (%)	66.77	68.70	68.50	67.77	71.95	70.07	73.19	72.76	75.30
Al_m	0.29	0.28	0.25	0.26	0.29	0.27	0.27	0.28	0.25
Ca_m	0.04	0.06	0.04	0.06	0.02	0.01	0.02	0.02	0.01
K_m	0.11	0.05	0.09	0.08	0.07	0.03	0.01	0.02	0.02
Na_m	0.11	0.16	0.11	0.12	0.12	0.17	0.21	0.19	0.22
K_Al	0.37	0.19	0.35	0.32	0.25	0.10	0.03	0.07	0.07
Na_Al	0.40	0.57	0.45	0.46	0.41	0.62	0.79	0.66	0.87
Plag	0.54	0.78	0.62	0.70	0.47	0.67	0.84	0.74	0.91

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	302192	301281	302149	302012	301766	302150	301756	301590
North (NAD 27)	4322091	4318484	4319414	4319453	4319572	4319113	4319196	4319725
Classification	Albite-KSpar-Sericite	Plag-KSpar	Sericite-Albite	Sericite	Sericite-Albite	Sericite-Albite	Albite	Albite-KSpar-Sericite
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	JC10-BHN1	JC10-BHS1	G909151	G909152	G909153	G909154	G909155	G909156
Lithology	McLeod QMD	McLeod QMD	Porphyry	Porphyry	Porphyry	Porphyry	Porphyry	Porphyry
Ag (ppm)	-0.01	-0.01	0.02	0.04	0.14	0.28	0.05	0.02
Al (%)	7.3	7.09	7.41	7.48	7.25	7.53	7.56	7.33
As (ppm)	2.8	4.3	4.2	1.7	5	9.5	8.4	8.6
Ba (ppm)	1900	1150	350	1340	690	480	1450	1800
Be (ppm)	1.86	2.07	1.29	1.2	1.46	1.78	2.16	1.62
Bi (ppm)	0.1	0.13	0.74	0.22	0.58	0.17	0.45	0.29
Ca (%)	0.91	2.8	0.46	0.19	0.17	0.84	0.75	0.38
Cd (ppm)	0.02	0.03	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02
Ce (ppm)	51.8	47.8	32.1	12.8	21.5	41.7	40.3	42.6
Co (ppm)	1.6	30.9	1.4	0.9	0.7	1	1.7	0.7
Cr (ppm)	9	7	24	9	8	11	9	10
Cs (ppm)	1.26	2.22	0.74	1.19	0.91	1	0.72	0.67
Cu (ppm)	460	1270	84.3	47.1	34.2	379	161	53.8
Fe (%)	1.39	2.53	2.09	0.97	1.61	2.13	1.52	1
Ga (ppm)	21.1	19.55	23.9	30	21.5	26.6	23.5	20.9
Ge (ppm)	0.05	0.08	0.15	0.16	0.16	0.19	0.2	0.17
Hf (ppm)	1.1	0.9	1.9	1.3	1.4	1.1	1.2	1.3
In (ppm)	0.1	0.041	0.016	0.05	0.147	0.018	0.035	0.018
K (%)	2.72	3	1.77	3.19	1.77	1.94	1.69	2.85
La (ppm)	24.1	20	16.2	6.9	14	20.7	21.8	20.4
Li (ppm)	5.5	7.4	3	5	2.8	4.2	3.6	1.2
Mg (%)	0.63	0.94	0.23	0.31	0.26	0.28	0.23	0.05
Mn (ppm)	214	343	26	28	43	39	52	33
Mo (ppm)	0.68	1.57	3.23	4.92	9.83	5.09	10.1	3.43
Na (%)	2.5	2.42	2.04	0.86	3	2.68	3.6	3.06
Nb (ppm)	3.8	6.3	2.1	2.3	1.7	1.4	1.7	3.1
Ni (ppm)	10.3	18.7	1.6	1.7	1	1.8	2.5	0.9
P (ppm)	830	1050	360	550	240	520	600	230
Pb (ppm)	3.3	4.9	2.7	1.6	1.8	2.9	3.7	3.7
Rb (ppm)	93.5	68.8	73	100	76.8	98.9	48.5	82.1
Re (ppm)	-0.002	-0.002	-0.002	-0.002	0.002	0.002	0.002	-0.002
S (%)	0.02	0.01	0.17	0.02	0.05	0.23	0.02	0.03
Sb (ppm)	1.12	1.04	0.49	0.36	0.46	0.28	0.46	1.6

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	302192	301281	302149	302012	301766	302150	301756	301590
North (NAD 27)	4322091	4318484	4319414	4319453	4319572	4319113	4319196	4319725
Classification	Albite-KSpar-Sericite	Plag-KSpar	Sericite-Albite	Sericite	Sericite-Albite	Sericite-Albite	Albite	Albite-KSpar-Sericite
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	JC10-BHN1	JC10-BHS1	G909151	G909152	G909153	G909154	G909155	G909156
Lithology	McLeod QMD	McLeod QMD	Porphyry	Porphyry	Porphyry	Porphyry	Porphyry	Porphyry
Sc (ppm)	5.1	6.8	6.9	4.8	4.6	5.8	4.2	3.5
Se (ppm)	1	1	5	2	3	4	3	3
Sn (ppm)	0.9	1.1	2.9	5.6	0.8	3.7	0.7	0.7
Sr (ppm)	480	830	497	223	223	741	820	700
Ta (ppm)	0.27	0.4	0.15	0.19	0.14	0.1	0.13	0.23
Te (ppm)	-0.05	-0.05	0.77	0.21	0.76	0.08	0.59	0.67
Th (ppm)	13.9	6.9	6.3	8.2	7.9	8.2	8.5	8.2
Ti (%)	0.251	0.402	0.233	0.171	0.128	0.122	0.125	0.224
Tl (ppm)	0.32	0.3	0.27	0.42	0.36	0.38	0.21	0.43
U (ppm)	4.6	2.7	4	3.3	2.9	3.4	7.4	4.3
V (ppm)	72	101	71	54	45	68	43	31
W (ppm)	0.9	2.2	4.2	2.7	1.6	10.8	2.2	0.9
Y (ppm)	8	16.3	2.1	2.4	2.5	2.1	3.4	2.3
Zn (ppm)	14	23	-2	2	-2	-2	5	-2
Zr (ppm)	17.9	14.9	69.7	37	40.7	34.7	30.1	35.6
Al2O3 (%)	13.79	13.39	14.00	14.13	13.70	14.22	14.28	13.85
CaO (%)	1.27	3.92	0.64	0.27	0.24	1.18	1.05	0.53
FeO (%)	1.79	3.25	2.69	1.25	2.07	2.74	1.95	1.29
K2O (%)	3.28	3.62	2.13	3.84	2.13	2.34	2.04	3.43
MgO (%)	1.04	1.56	0.38	0.51	0.43	0.46	0.38	0.08
Na2O (%)	3.37	3.26	2.75	1.16	4.04	3.61	4.85	4.12
P2O5 (%)	0.19	0.24	0.08	0.13	0.05	0.12	0.14	0.05
TiO2 (%)	0.42	0.67	0.39	0.29	0.21	0.20	0.21	0.37
SO3 (%)	0.05	0.03	0.43	0.05	0.13	0.58	0.05	0.08
Total (%)	25.20	29.94	23.49	21.62	23.00	25.45	24.95	23.81
SiO2 (%)	73.03	67.97	74.87	76.87	75.38	72.77	73.30	74.53
Al_m	0.27	0.26	0.27	0.28	0.27	0.28	0.28	0.27
Ca_m	0.02	0.07	0.01	0.00	0.00	0.02	0.02	0.01
K_m	0.07	0.08	0.05	0.08	0.05	0.05	0.04	0.07
Na_m	0.11	0.11	0.09	0.04	0.13	0.12	0.16	0.13
K_Al	0.26	0.29	0.17	0.30	0.17	0.18	0.15	0.27
Na_Al	0.40	0.40	0.32	0.13	0.49	0.42	0.56	0.49
Plag	0.49	0.67	0.37	0.15	0.50	0.49	0.63	0.53

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	301409	301395	301179	301131	300901	300907	300741	300589
North (NAD 27)	4319840	4319818	4319693	4319840	4319769	4319920	4319740	4319841
Classification	Albite-KSpar-Sericite	Plag-KSpar	Sericite	Albite-KSpar-Sericite	Sericite	Albite-KSpar-Sericite	Albite-KSpar-Sericite	Sericite
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	G909157	G909158	G909159	G909160	G909161	G909162	G909163	G909164
Lithology	Porphyry	Porphyry	Porphyry	Porphyry	Porphyry	Porphyry	Porphyry	McLeod QMD?
Ag (ppm)	0.05	-0.01	0.01	0.03	0.27	0.07	-0.01	-0.01
Al (%)	7.36	7.23	7.73	6.97	6.64	7.35	6.95	7.24
As (ppm)	6.9	7.7	7.7	5.6	11.5	6.2	4.5	5
Ba (ppm)	2430	1620	430	1810	590	1420	2100	370
Be (ppm)	1.92	1.74	2.16	1.9	0.94	1.94	1.68	0.25
Bi (ppm)	0.45	0.25	0.57	0.33	1.4	0.59	0.61	0.11
Ca (%)	0.79	2.32	0.23	0.34	0.11	0.22	0.24	0.15
Cd (ppm)	0.02	0.04	-0.02	0.04	0.02	0.04	0.02	-0.02
Ce (ppm)	44.7	46.2	34.6	33.5	34	28.2	23.9	51.4
Co (ppm)	1.8	2.4	0.9	1	0.3	0.5	0.6	0.2
Cr (ppm)	10	13	9	11	9	10	8	10
Cs (ppm)	0.75	0.73	1.25	0.71	0.72	1.4	0.72	0.7
Cu (ppm)	19.3	152	37.6	40	18.9	42.9	10	14.9
Fe (%)	1.57	1.9	2.05	1.52	1.57	2.03	1.19	0.29
Ga (ppm)	21.1	21.1	26.5	20.8	28.5	20.8	18.7	14.7
Ge (ppm)	0.19	0.2	0.21	0.17	0.18	0.16	0.18	0.17
Hf (ppm)	1.4	1.4	1.1	1.7	1.5	1.3	1.4	0.9
In (ppm)	0.038	0.023	0.043	0.043	0.113	0.03	0.005	-0.005
K (%)	3.27	2.51	2.87	2.46	3.28	2.87	2.98	2.7
La (ppm)	24.1	22.6	18.3	18.5	20.8	17.2	14.7	23.7
Li (ppm)	2.7	3.9	7.3	1.9	2.7	5.5	1.7	0.7
Mg (%)	0.15	0.36	0.68	0.12	0.14	0.37	0.06	0.03
Mn (ppm)	107	340	40	79	61	97	48	19
Mo (ppm)	3.73	2.05	6.46	2.58	2.08	1.65	1.63	2.51
Na (%)	2.69	2.74	1.06	3.6	0.09	1.77	3.51	0.14
Nb (ppm)	3.2	3.6	5	3	2.5	2.5	2.6	4.1
Ni (ppm)	3.5	8.9	4.3	1.7	0.5	1	0.9	0.4
P (ppm)	600	1040	400	380	700	410	330	1710
Pb (ppm)	4.5	8.5	2.8	5.3	6.3	4	4.3	12.4
Rb (ppm)	96.9	66.6	142	77.8	114.5	104	92.8	92.8
Re (ppm)	-0.002	0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.01	0.02	0.1	0.09	0.51	0.12	0.12	0.18
Sb (ppm)	1.08	1.92	1.67	0.71	4.75	0.87	0.77	13.9

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	301409	301395	301179	301131	300901	300907	300741	300589
North (NAD 27)	4319840	4319818	4319693	4319840	4319769	4319920	4319740	4319841
Classification	Albite-KSpar-Sericite	Plag-KSpar	Sericite	Albite-KSpar-Sericite	Sericite	Albite-KSpar-Sericite	Albite-KSpar-Sericite	Sericite
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	G909157	G909158	G909159	G909160	G909161	G909162	G909163	G909164
Lithology	Porphyry	Porphyry	Porphyry	Porphyry	Porphyry	Porphyry	Porphyry	McLeod QMD?
Sc (ppm)	4.5	5.4	9.2	4.8	4.8	4.6	3.7	3.9
Se (ppm)	2	2	5	2	4	5	2	3
Sn (ppm)	0.7	0.8	1.8	0.6	1.2	0.6	0.6	1.3
Sr (ppm)	759	1050	179.5	505	89.2	263	432	2530
Ta (ppm)	0.24	0.27	0.36	0.23	0.2	0.19	0.2	0.27
Te (ppm)	0.23	0.14	0.65	0.48	4.01	3.99	0.28	0.15
Th (ppm)	8.8	8	17.4	8.3	7.9	6.4	7.5	12
Ti (%)	0.219	0.272	0.326	0.228	0.184	0.206	0.182	0.382
Tl (ppm)	0.54	0.41	0.53	0.41	0.78	0.53	0.46	0.47
U (ppm)	4.5	3.6	7.7	4	2.8	2.6	3.1	2.5
V (ppm)	46	59	114	47	48	50	30	126
W (ppm)	1.1	1	6.2	1.1	1	1.8	1.4	6.8
Y (ppm)	5.4	7.3	5.6	3.2	3.6	2.5	2.5	2.8
Zn (ppm)	6	20	5	5	2	5	2	-2
Zr (ppm)	38.5	41	32.8	48.7	39.9	36.5	37.2	31.2
Al2O3 (%)	13.90	13.66	14.60	13.17	12.54	13.88	13.13	13.68
CaO (%)	1.11	3.25	0.32	0.48	0.15	0.31	0.34	0.21
FeO (%)	2.02	2.44	2.64	1.95	2.02	2.61	1.53	0.37
K2O (%)	3.94	3.02	3.46	2.96	3.95	3.46	3.59	3.25
MgO (%)	0.25	0.60	1.13	0.20	0.23	0.61	0.10	0.05
Na2O (%)	3.63	3.69	1.43	4.85	0.12	2.39	4.73	0.19
P2O5 (%)	0.14	0.24	0.09	0.09	0.16	0.09	0.08	0.39
TiO2 (%)	0.37	0.45	0.54	0.38	0.31	0.34	0.30	0.64
SO3 (%)	0.03	0.05	0.25	0.23	1.28	0.30	0.30	0.45
Total (%)	25.37	27.40	24.46	24.31	20.76	24.00	24.10	19.23
SiO2 (%)	72.85	70.68	73.83	73.99	77.78	74.32	74.22	79.42
Al_m	0.27	0.27	0.29	0.26	0.25	0.27	0.26	0.27
Ca_m	0.02	0.06	0.01	0.01	0.00	0.01	0.01	0.00
K_m	0.08	0.06	0.07	0.06	0.08	0.07	0.08	0.07
Na_m	0.12	0.12	0.05	0.16	0.00	0.08	0.15	0.01
K_Al	0.31	0.24	0.26	0.24	0.34	0.27	0.30	0.26
Na_Al	0.43	0.44	0.16	0.61	0.02	0.28	0.59	0.02
Plag	0.50	0.66	0.18	0.64	0.03	0.30	0.62	0.04

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	300580	300559	300553	301063	301465	301464	301561	302012	302011
North (NAD 27)	4319816	4319775	4319798	4319919	4319427	4318659	4318665	4319450	4319452
Classification	Sericite	Plag-KSpar	Pyroph/Alun/Topaz	Plag-KSpar	Sericite	Sericite-Albite	Plagioclase	Albite	Sericite-Albite
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	G909165	G909166	G909167	G909168	G909169	G909170	G909171	JC10-BHT101	JC10-BHT102
Lithology	Artesia Lake	McLeod QMD	McLeod QMD?	Porphyry	Bear QM	Porphyry	Porphyry	Porphyry	Porphyry
Ag (ppm)	-0.01	0.04	-0.01	0.01	0.02	0.23	0.85	0.02	0.04
Al (%)	8.43	8.03	7.13	7.39	7.05	7.74	6.99	7.72	8.16
As (ppm)	3.9	9.3	11.9	6.2	8	5.6	3.2	3.6	1.3
Ba (ppm)	660	1140	1340	1440	340	1010	250	950	980
Be (ppm)	1.7	2.23	0.22	1.8	1.19	2.38	2.09	2.03	1.56
Bi (ppm)	0.08	0.05	0.05	0.2	2.13	0.8	0.33	0.43	1.09
Ca (%)	0.26	3.11	0.25	1.75	0.08	0.37	1.76	1.11	0.24
Cd (ppm)	0.02	0.07	0.02	0.02	-0.02	-0.02	-0.02	-0.02	-0.02
Ce (ppm)	28.9	60.7	58.3	51.1	23	40.1	43.3	37.4	36.8
Co (ppm)	8.5	23.2	0.9	5.9	0.5	3.4	1.8	0.9	0.9
Cr (ppm)	7	13	10	13	10	11	11	7	8
Cs (ppm)	0.78	0.67	0.17	1.06	0.65	1.43	0.7	0.71	1.75
Cu (ppm)	54	113	22.4	67.8	41.3	263	314	84.6	143.5
Fe (%)	5.83	4.58	1.28	2.14	1.07	1.45	1.12	1.18	2.31
Ga (ppm)	21.2	26	13.65	21.4	18.95	24.8	21.5	20.9	30.1
Ge (ppm)	0.17	0.27	0.17	0.2	0.14	0.18	0.17	-0.05	0.09
Hf (ppm)	0.7	1.2	0.9	1.5	1.4	1.2	1.1	1.5	1.7
In (ppm)	0.059	0.043	-0.005	0.03	0.067	0.051	0.059	0.033	0.072
K (%)	1.84	2.27	0.66	2.31	2.95	2.07	0.43	1.01	2.66
La (ppm)	14.6	28.5	28.4	25.6	13.9	22.3	21.2	18.3	20.3
Li (ppm)	24.4	5.7	80.7	6.8	11.8	4.1	4.4	3.6	4.8
Mg (%)	3.86	1.47	0.05	0.63	0.41	0.39	0.51	0.23	0.36
Mn (ppm)	545	872	43	337	25	41	84	30	28
Mo (ppm)	1.38	2.41	12.05	0.95	4.11	53.8	7.59	3.92	3.84
Na (%)	0.1	3.34	0.28	3.5	0.22	2.69	3.32	3.49	1.75
Nb (ppm)	2.1	5	2.6	3.6	1.9	1.8	1.5	1.8	2
Ni (ppm)	13.5	23.7	0.8	10.5	1.4	3.3	4.1	2.6	2.1
P (ppm)	1280	1790	1910	980	140	430	520	740	450
Pb (ppm)	1.6	8.8	28.9	4.2	1.3	2.2	3.9	3.1	3.1
Rb (ppm)	42.2	73.2	11.5	58.4	105	90.5	18.2	29.4	106
Re (ppm)	-0.002	0.004	0.002	-0.002	-0.002	0.003	0.002	-0.002	-0.002
S (%)	0.04	0.05	1.43	0.02	0.2	0.01	0.02	0.01	0.02
Sb (ppm)	4.46	2.39	10.55	3.04	0.86	0.48	0.65	0.93	0.31

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	300580	300559	300553	301063	301465	301464	301561	302012	302011
North (NAD 27)	4319816	4319775	4319798	4319919	4319427	4318659	4318665	4319450	4319452
Classification	Sericite	Plag-KSpar	Pyroph/Alun/Topaz	Plag-KSpar	Sericite	Sericite-Albite	Plagioclase	Albite	Sericite-Albite
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	G909165	G909166	G909167	G909168	G909169	G909170	G909171	JC10-BHT101	JC10-BHT102
Lithology	Artesia Lake	McLeod QMD	McLeod QMD?	Porphyry	Bear QM	Porphyry	Porphyry	Porphyry	Porphyry
Sc (ppm)	9.5	12.9	2.7	6.2	5.3	5.8	4.4	4.1	5.1
Se (ppm)	2	2	4	2	3	2	2	2	9
Sn (ppm)	0.7	1.1	0.6	0.8	1.2	1.2	0.8	0.9	4.5
Sr (ppm)	119	1020	2520	846	68.9	589	1280	969	386
Ta (ppm)	0.15	0.35	0.19	0.25	0.14	0.14	0.12	0.14	0.16
Te (ppm)	0.09	-0.05	0.47	-0.05	1.67	0.56	0.22	0.39	0.96
Th (ppm)	7.6	14	16.7	7.8	4.1	8.3	7.7	7.4	7.5
Ti (%)	0.263	0.435	0.209	0.287	0.166	0.162	0.127	0.156	0.18
Tl (ppm)	0.3	0.25	0.06	0.52	0.55	0.32	0.07	0.14	0.48
U (ppm)	3	4.8	2.5	3	2.2	3.3	3.2	3.9	2.9
V (ppm)	163	148	103	66	57	58	45	44	58
W (ppm)	0.9	2.4	7.7	0.7	3.2	13.1	6.7	1.8	3
Y (ppm)	6.6	14.6	2.7	7.1	2.3	3	6.7	2.7	1.8
Zn (ppm)	59	72	-2	17	-2	4	6	5	2
Zr (ppm)	22.2	34.4	28.6	45.9	40.8	36.9	35.2	32.6	35.7
Al2O3 (%)	15.92	15.17	13.47	13.96	13.32	14.62	13.20	14.58	15.41
CaO (%)	0.36	4.35	0.35	2.45	0.11	0.52	2.46	1.55	0.34
FeO (%)	7.50	5.89	1.65	2.75	1.38	1.86	1.44	1.52	2.97
K2O (%)	2.22	2.74	0.80	2.78	3.55	2.49	0.52	1.22	3.21
MgO (%)	6.40	2.44	0.08	1.04	0.68	0.65	0.85	0.38	0.60
Na2O (%)	0.13	4.50	0.38	4.72	0.30	3.63	4.48	4.70	2.36
P2O5 (%)	0.29	0.41	0.44	0.22	0.03	0.10	0.12	0.17	0.10
TiO2 (%)	0.44	0.73	0.35	0.48	0.28	0.27	0.21	0.26	0.30
SO3 (%)	0.10	0.13	3.58	0.05	0.50	0.03	0.05	0.03	0.05
Total (%)	33.37	36.35	21.08	28.46	20.15	24.16	23.33	24.41	25.34
SiO2 (%)	64.29	61.11	77.44	69.55	78.44	74.14	75.04	73.88	72.89
Al_m	0.31	0.30	0.26	0.27	0.26	0.29	0.26	0.29	0.30
Ca_m	0.01	0.08	0.01	0.04	0.00	0.01	0.04	0.03	0.01
K_m	0.05	0.06	0.02	0.06	0.08	0.05	0.01	0.03	0.07
Na_m	0.00	0.15	0.01	0.15	0.01	0.12	0.14	0.15	0.08
K_Al	0.15	0.20	0.06	0.22	0.29	0.19	0.04	0.09	0.23
Na_Al	0.01	0.49	0.05	0.56	0.04	0.41	0.56	0.53	0.25
Plag	0.03	0.75	0.07	0.72	0.04	0.44	0.73	0.63	0.27

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	302007	302007	302004	302001	301998	301991	301991	301991	301990
North (NAD 27)	4319456	4319457	4319462	4319469	4319476	4319484	4319487	4319487	4319493
Classification	Plag-KSpar	Albite-KSpar-Sericite	Plag-KSpar	Plag-KSpar	Albite	Albite	Sericite	Albite	Plag-KSpar
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	JC10-BHT104	JC10-BHT105	JC10-BHT106	JC10-BHT111	JC10-BHT114	JC10-BHT117	JC10-BHT119A	JC10-BHT119B	JC10-BHT120A
Lithology	Bear QM	Bear QM	Bear QM	Bear QM	Porphyry	Porphyry	Bear QM	Bear QM	Bear QM
Ag (ppm)	0.06	0.07	0.03	0.05	0.05	0.01	0.05	0.02	0.01
Al (%)	7.87	8.59	8.21	8.29	8.07	8.6	6.19	6.1	8.14
As (ppm)	1.4	1.8	1.2	5	2.1	1.8	1.3	5.1	6.5
Ba (ppm)	1390	1950	1610	1440	1390	1000	730	300	970
Be (ppm)	1.86	1.92	2.05	1.92	2.01	2.16	2.14	2.52	2.05
Bi (ppm)	0.88	0.7	0.2	0.88	0.23	0.49	0.08	0.06	0.13
Ca (%)	1.62	0.96	1.7	3.23	0.62	0.94	0.31	0.77	1.28
Cd (ppm)	0.02	-0.02	0.02	0.02	-0.02	-0.02	-0.02	0.02	-0.02
Ce (ppm)	54.6	42.1	63.9	51.6	34.8	47.6	4.38	8.74	50.2
Co (ppm)	2.5	2	2	4.1	0.6	0.8	0.3	0.6	0.5
Cr (ppm)	12	7	12	13	8	16	4	5	12
Cs (ppm)	0.85	0.93	0.94	0.96	0.44	0.66	1.1	0.44	1.03
Cu (ppm)	146	85.9	187	135.5	27.1	30.7	12	9.4	29.9
Fe (%)	1.54	1.34	1.76	2.33	0.96	0.97	0.64	0.92	1.73
Ga (ppm)	21.8	22	21.9	25.9	20.4	24.2	17	16.75	22.8
Ge (ppm)	0.14	0.17	0.2	0.16	0.11	0.13	0.11	0.09	-0.05
Hf (ppm)	1.1	1.2	1.1	1.2	1.3	2.2	1.2	1.1	1.1
In (ppm)	0.214	0.101	0.062	0.528	0.069	0.172	0.052	0.006	0.047
K (%)	2.58	2.7	2.64	2.44	1.3	0.82	4.42	0.67	2.76
La (ppm)	27.3	22.1	31.4	25.7	17.3	24.5	3.8	4.3	24.1
Li (ppm)	2.7	1.6	4.7	3.4	2.2	3.5	0.5	1.4	5.8
Mg (%)	0.39	0.07	0.48	0.46	0.14	0.27	0.02	0.03	0.41
Mn (ppm)	118	54	118	214	38	71	51	94	111
Mo (ppm)	2.32	5.38	1.66	2.99	1.81	2	6.18	0.96	1.34
Na (%)	3.14	3.16	3.12	3	4.47	4.45	1.97	3.7	3.4
Nb (ppm)	3.9	3.7	4.6	4.6	2.5	3.2	0.8	1	3.8
Ni (ppm)	6.5	3.1	8.8	12	1.9	3.5	1	1.2	5.4
P (ppm)	600	490	880	950	380	320	70	120	380
Pb (ppm)	8	8.7	7.3	6.8	3.3	3.1	4.7	3.2	4.6
Rb (ppm)	59.1	59.7	64.4	61.9	31.1	21.2	124.5	17.4	87.7
Re (ppm)	-0.002	-0.002	-0.002	0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.01	0.02	0.01	0.01	0.02	0.04	0.01	0.02	0.01
Sb (ppm)	0.86	0.44	0.58	2.37	0.41	1	0.28	0.2	0.88

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	302007	302007	302004	302001	301998	301991	301991	301991	301990
North (NAD 27)	4319456	4319457	4319462	4319469	4319476	4319484	4319487	4319487	4319493
Classification	Plag-KSpar	Albite-KSpar-Sericite	Plag-KSpar	Plag-KSpar	Albite	Albite	Sericite	Albite	Plag-KSpar
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	JC10-BHT104	JC10-BHT105	JC10-BHT106	JC10-BHT111	JC10-BHT114	JC10-BHT117	JC10-BHT119A	JC10-BHT119B	JC10-BHT120A
Lithology	Bear QM	Bear QM	Bear QM	Bear QM	Porphyry	Porphyry	Bear QM	Bear QM	Bear QM
Sc (ppm)	5.8	4.6	6.2	7.2	5	7	0.6	0.5	6
Se (ppm)	2	2	2	2	2	1	2	1	1
Sn (ppm)	1.5	1.2	1	1.3	0.6	1.1	0.5	0.4	1
Sr (ppm)	1020	994	1070	1230	716	854	350	543	854
Ta (ppm)	0.3	0.29	0.36	0.33	0.18	0.21	0.08	0.09	0.33
Te (ppm)	0.51	0.55	0.06	0.44	0.21	0.24	0.17	-0.05	0.13
Th (ppm)	9.8	9.8	12.4	9.4	6.9	5.9	11.5	17.9	10
Ti (%)	0.306	0.293	0.325	0.349	0.219	0.339	0.055	0.051	0.297
Tl (ppm)	0.26	0.25	0.28	0.2	0.13	0.09	0.33	0.08	0.31
U (ppm)	7.1	6.1	6.1	8.5	3.6	9.7	2.5	2.1	6.4
V (ppm)	60	36	64	105	39	43	5	6	68
W (ppm)	0.9	1.6	1.5	1.1	0.6	1.7	1.1	1	1.5
Y (ppm)	7	1.9	14.7	8.1	2.1	2.7	0.3	0.9	7.9
Zn (ppm)	11	8	13	16	-2	2	-2	-2	3
Zr (ppm)	16.9	18.4	15.7	17.5	24.8	61.9	26.1	23.6	16.5
Al2O3 (%)	14.87	16.23	15.51	15.66	15.24	16.25	11.69	11.52	15.38
CaO (%)	2.27	1.34	2.38	4.52	0.87	1.32	0.43	1.08	1.79
FeO (%)	1.98	1.72	2.26	3.00	1.23	1.25	0.82	1.18	2.22
K2O (%)	3.11	3.25	3.18	2.94	1.57	0.99	5.33	0.81	3.33
MgO (%)	0.65	0.12	0.80	0.76	0.23	0.45	0.03	0.05	0.68
Na2O (%)	4.23	4.26	4.21	4.04	6.03	6.00	2.66	4.99	4.58
P2O5 (%)	0.14	0.11	0.20	0.22	0.09	0.07	0.02	0.03	0.09
TiO2 (%)	0.51	0.49	0.54	0.58	0.37	0.57	0.09	0.09	0.50
SO3 (%)	0.03	0.05	0.03	0.03	0.05	0.10	0.03	0.05	0.03
Total (%)	27.77	27.57	29.10	31.75	25.67	26.98	21.10	19.79	28.59
SiO2 (%)	70.28	70.50	68.86	66.03	72.53	71.13	77.43	78.82	69.41
Al_m	0.29	0.32	0.30	0.31	0.30	0.32	0.23	0.23	0.30
Ca_m	0.04	0.02	0.04	0.08	0.02	0.02	0.01	0.02	0.03
K_m	0.07	0.07	0.07	0.06	0.03	0.02	0.11	0.02	0.07
Na_m	0.14	0.14	0.14	0.13	0.19	0.19	0.09	0.16	0.15
K_Al	0.23	0.22	0.22	0.20	0.11	0.07	0.49	0.08	0.23
Na_Al	0.47	0.43	0.45	0.42	0.65	0.61	0.37	0.71	0.49
Plag	0.61	0.51	0.59	0.69	0.70	0.68	0.41	0.80	0.60

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	301990	301987	301985	301984	301984	301357	301367	301369
North (NAD 27)	4319493	4319499	4319502	4319505	4319516	4319784	4319794	4319797
Classification	Plag-KSpar	Plag-KSpar	Albite-KSpar-Sericite	Albite	Albite	Albite-KSpar-Sericite	Plag-KSpar	Plag-KSpar
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	JC10-BHT120B	JC10-BHT123	JC10-BHT1WD	JC10-BHT125	JC10-BHT126	JC10-BHT201	JC10-BHT202	JC10-BHT203
Lithology	Bear QM	Bear QM	Bear QM	Bear QM	Bear QM	Porphyry	McLeod QMD	Porphyry
Ag (ppm)	0.03	0.03	0.02	0.02	0.01	0.1	0.14	0.01
Al (%)	7.95	7.83	6.74	7.8	7.66	7.97	8.63	7.65
As (ppm)	3.5	2.7	4.2	2	1.2	2.8	2.9	15.8
Ba (ppm)	1510	1530	1730	370	310	2280	950	2110
Be (ppm)	2	1.89	1.53	2.59	2.4	1.8	2.4	1.85
Bi (ppm)	0.06	0.05	0.16	0.2	0.07	0.81	0.1	0.44
Ca (%)	1.79	1.52	0.91	1.07	0.63	1.15	2.16	2.76
Cd (ppm)	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02	0.02	0.02
Ce (ppm)	48.1	64.3	31.2	76.2	17.9	52.4	84.9	50.8
Co (ppm)	4.2	1.9	1.5	0.6	0.8	1.5	7.4	1.7
Cr (ppm)	14	10	12	13	9	9	9	8
Cs (ppm)	1.07	1.06	0.74	1.1	0.96	0.62	1.86	1.29
Cu (ppm)	26.8	71.8	20.7	57.7	14.3	27.9	686	130.5
Fe (%)	2.03	1.72	0.82	1.01	0.92	1.83	3.2	2.17
Ga (ppm)	21.2	21	14.5	22.2	18.75	19.95	23.7	21
Ge (ppm)	0.14	0.19	0.1	0.14	0.09	0.14	0.23	0.13
Hf (ppm)	1.2	1.2	2.6	0.8	1	2	0.9	1.6
In (ppm)	0.033	0.033	0.018	0.021	0.009	0.04	0.044	0.043
K (%)	2.99	2.82	2.96	0.84	0.83	3.45	2.52	3.11
La (ppm)	24	29.4	19.2	37.3	9.5	26.9	39.3	25.3
Li (ppm)	3.2	1.9	2.7	3.4	3.4	3.1	4.8	4.9
Mg (%)	0.43	0.13	0.16	0.32	0.3	0.2	0.76	0.51
Mn (ppm)	182	111	103	43	58	130	188	476
Mo (ppm)	2.11	1.3	0.95	1.16	1.02	3.73	3.99	1.13
Na (%)	3.17	3.02	2.68	3.64	4.07	2.93	3.22	2.04
Nb (ppm)	4.5	4.3	5	2.3	2.2	3.5	8.8	3.8
Ni (ppm)	8	5.6	1.7	3.2	3.7	4.1	13.6	7.6
P (ppm)	440	410	80	550	200	720	1460	890
Pb (ppm)	9	7.9	3.4	5.2	3.3	5.6	9.8	11
Rb (ppm)	90.2	76.5	82.4	28.9	33.9	97.3	87.7	108
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	0.002	-0.002
S (%)	0.01	0.01	0.01	0.01	0.01	0.07	0.01	-0.01
Sb (ppm)	0.34	0.43	0.73	0.4	0.25	1.29	1.16	2.77

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	301990	301987	301985	301984	301984	301357	301367	301369
North (NAD 27)	4319493	4319499	4319502	4319505	4319516	4319784	4319794	4319797
Classification	Plag-KSpar	Plag-KSpar	Albite-KSpar-Sericite	Albite	Albite	Albite-KSpar-Sericite	Plag-KSpar	Plag-KSpar
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	JC10-BHT120B	JC10-BHT123	JC10-BHT1WD	JC10-BHT125	JC10-BHT126	JC10-BHT201	JC10-BHT202	JC10-BHT203
Lithology	Bear QM	Bear QM	Bear QM	Bear QM	Bear QM	Porphyry	McLeod QMD	Porphyry
Sc (ppm)	5.9	5.7	2.4	5.9	3.8	6	9.9	5.5
Se (ppm)	2	2	2	1	1	2	2	1
Sn (ppm)	1.1	0.9	0.6	0.8	0.5	0.8	2.1	0.8
Sr (ppm)	1010	1020	671	1020	708	982	892	1360
Ta (ppm)	0.35	0.33	0.49	0.13	0.16	0.23	0.56	0.26
Te (ppm)	-0.05	-0.05	-0.05	0.19	0.07	0.59	0.1	0.2
Th (ppm)	10.6	10.5	14	11.1	11.3	7.6	22.3	7.9
Ti (%)	0.294	0.305	0.119	0.174	0.168	0.305	0.543	0.294
Tl (ppm)	0.29	0.27	0.31	0.11	0.12	0.59	0.38	0.73
U (ppm)	5.3	8.7	7.7	5.4	2.9	3.5	11.1	3.6
V (ppm)	61	61	17	38	31	64	128	62
W (ppm)	1.3	1.1	0.8	1.5	1.8	0.7	1.3	1
Y (ppm)	7.4	9.3	6	4.9	3.1	6.1	18.4	7.7
Zn (ppm)	13	5	-2	11	3	4	26	32
Zr (ppm)	18	17	63.3	16.4	17.2	46.6	13.9	43.3
Al2O3 (%)	15.02	14.79	12.73	14.73	14.47	15.06	16.30	14.45
CaO (%)	2.50	2.13	1.27	1.50	0.88	1.61	3.02	3.86
FeO (%)	2.61	2.21	1.05	1.30	1.18	2.35	4.12	2.79
K2O (%)	3.60	3.40	3.57	1.01	1.00	4.16	3.04	3.75
MgO (%)	0.71	0.22	0.27	0.53	0.50	0.33	1.26	0.85
Na2O (%)	4.27	4.07	3.61	4.91	5.49	3.95	4.34	2.75
P2O5 (%)	0.10	0.09	0.02	0.13	0.05	0.16	0.33	0.20
TiO2 (%)	0.49	0.51	0.20	0.29	0.28	0.51	0.91	0.49
SO3 (%)	0.03	0.03	0.03	0.03	0.03	0.18	0.03	-0.03
Total (%)	29.34	27.44	22.75	24.42	23.87	28.30	33.34	29.12
SiO2 (%)	68.61	70.64	75.66	73.87	74.46	69.71	64.32	68.85
Al_m	0.29	0.29	0.25	0.29	0.28	0.30	0.32	0.28
Ca_m	0.04	0.04	0.02	0.03	0.02	0.03	0.05	0.07
K_m	0.08	0.07	0.08	0.02	0.02	0.09	0.06	0.08
Na_m	0.14	0.13	0.12	0.16	0.18	0.13	0.14	0.09
K_Al	0.26	0.25	0.30	0.07	0.08	0.30	0.20	0.28
Na_Al	0.47	0.45	0.47	0.55	0.62	0.43	0.44	0.31
Plag	0.62	0.58	0.56	0.64	0.68	0.53	0.61	0.56

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	301373	301374	301379	300841	300839	301823	301923	301933
North (NAD 27)	4319801	4319802	4319806	4319751	4319759	4319763	4321923	4319914
Classification	Albite-KSpar-Sericite	Plag-KSpar	Sericite-Albite	Albite-KSpar-Sericite	Plag-KSpar	Albite	Albite	Albite
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	JC10-BHT204	JC10-BHT205	JC10-BHT206	JC10-BHT301	JC10-BHT302	H437001	H437002	H437003
Lithology	Tourmaline breccia	McLeod QMD	McLeod QMD	Porphyry	McLeod QMD	Bear (graphic txt.)	Vein	Porphyry
Ag (ppm)	0.43	0.1	0.14	0.03	0.04	0.1	0.09	0.05
Al (%)	5.85	8.05	7.49	7.63	9.03	6.23	5.76	6.11
As (ppm)	14.3	4.4	6.9	2.9	5.4	4.8	2.7	2.4
Ba (ppm)	510	1130	650	1550	1260	430	180	280
Be (ppm)	1.37	2.19	1.86	1.67	2.14	1.53	2.25	2.46
Bi (ppm)	6.36	0.12	1.56	0.69	0.15	0.93	0.17	0.71
Ca (%)	0.21	2.62	0.45	0.31	2.89	0.31	0.25	0.65
Cd (ppm)	-0.02	0.04	-0.02	-0.02	0.03	0.04	0.02	0.05
Ce (ppm)	162.5	83.7	15.85	23.7	63.3	22.8	17.5	24
Co (ppm)	1	7.3	1.1	1.3	7	1.1	0.6	0.6
Cr (ppm)	4	6	7	8	8	4	10	7
Cs (ppm)	1.18	1.27	0.67	0.82	1.37	0.68	0.42	0.55
Cu (ppm)	272	462	45.4	22.6	36	103.5	8.2	23.4
Fe (%)	7.33	3.12	2.31	1.45	3.9	1.91	0.81	0.77
Ga (ppm)	19.85	22.5	26.9	19.65	24.5	17.95	15.15	17.2
Ge (ppm)	0.21	0.18	0.06	0.07	0.18	0.11	0.05	-0.05
Hf (ppm)	0.4	0.7	0.6	1.8	0.9	0.6	0.8	0.9
In (ppm)	0.103	0.061	0.077	0.026	0.039	0.029	0.024	0.041
K (%)	2.15	2.59	1.93	2.62	2.8	1.23	0.69	0.67
La (ppm)	81.7	41.6	8.8	11.8	31.1	12.5	9.1	13
Li (ppm)	18.6	3.9	7.4	2	2.9	2.1	1.1	3
Mg (%)	0.56	0.8	0.71	0.07	1.07	0.16	0.09	0.19
Mn (ppm)	55	282	74	40	330	34	42	47
Mo (ppm)	7.44	1.91	3.89	2.5	1.16	3.31	0.94	2.15
Na (%)	1.53	2.88	2.04	3.86	3.75	3.91	4.14	3.57
Nb (ppm)	3.4	8.1	5	3.2	5.6	4.5	1.9	2.2
Ni (ppm)	2.7	13.5	4.8	2.9	13.6	0.6	1	1
P (ppm)	1940	1550	440	310	1750	510	220	350
Pb (ppm)	7	18.3	18	3.5	6	6.8	5.1	3.7
Rb (ppm)	105	80.7	78.3	78.7	111	52.1	28	25.8
Re (ppm)	-0.002	-0.002	-0.002	-0.002	0.002	-0.002	-0.002	-0.002
S (%)	1.45	0.01	0.34	0.04	0.02	0.12	0.05	0.03
Sb (ppm)	0.79	1.44	0.76	0.55	1.33	0.96	0.69	0.5

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	301373	301374	301379	300841	300839	301823	301923	301933
North (NAD 27)	4319801	4319802	4319806	4319751	4319759	4319763	4321923	4319914
Classification	Albite-KSpar-Sericite	Plag-KSpar	Sericite-Albite	Albite-KSpar-Sericite	Plag-KSpar	Albite	Albite	Albite
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	JC10-BHT204	JC10-BHT205	JC10-BHT206	JC10-BHT301	JC10-BHT302	H437001	H437002	H437003
Lithology	Tourmaline breccia	McLeod QMD	McLeod QMD	Porphyry	McLeod QMD	Bear (graphic txt.)	Vein	Porphyry
Sc (ppm)	6.7	9.1	9.7	4.9	12.9	4.3	1.3	2.9
Se (ppm)	8	2	4	2	2	16	1	2
Sn (ppm)	2.6	1.8	2.5	0.7	0.9	1.3	0.5	0.7
Sr (ppm)	335	939	265	474	1030	292	285	548
Ta (ppm)	0.23	0.53	0.32	0.22	0.37	0.31	0.14	0.17
Te (ppm)	8.8	0.07	7.28	0.36	0.05	1.28	0.24	0.62
Th (ppm)	41.7	21.6	20.2	7.8	14	15.2	10.5	12.4
Ti (%)	0.237	0.517	0.342	0.254	0.482	0.254	0.08	0.101
Tl (ppm)	0.66	0.33	0.43	0.36	0.39	0.19	0.12	0.13
U (ppm)	5.2	7.9	5.6	4	4.2	3.3	1.1	2.4
V (ppm)	89	126	135	49	146	55	9	22
W (ppm)	2.1	1.4	3.4	1.1	1.1	1.7	0.9	1.2
Y (ppm)	12.5	19.4	3.5	4.1	16.1	2.1	1.2	1.6
Zn (ppm)	9	60	10	2	15	2	-2	2
Zr (ppm)	9.1	11.8	11	41.1	15.5	10.7	18.9	22.1
Al2O3 (%)	11.05	15.21	14.15	14.41	17.06	11.77	10.88	11.54
CaO (%)	0.29	3.67	0.63	0.43	4.04	0.43	0.35	0.91
FeO (%)	9.43	4.01	2.97	1.86	5.02	2.46	1.04	0.99
K2O (%)	2.59	3.12	2.33	3.16	3.37	1.48	0.83	0.81
MgO (%)	0.93	1.33	1.18	0.12	1.77	0.27	0.15	0.32
Na2O (%)	2.06	3.88	2.75	5.20	5.06	5.27	5.58	4.81
P2O5 (%)	0.44	0.36	0.10	0.07	0.40	0.12	0.05	0.08
TiO2 (%)	0.40	0.86	0.57	0.42	0.80	0.42	0.13	0.17
SO3 (%)	3.63	0.03	0.85	0.10	0.05	0.30	0.13	0.08
Total (%)	30.82	32.46	25.52	25.78	37.57	22.52	19.14	19.70
SiO2 (%)	67.03	65.27	72.69	72.41	59.80	75.91	79.52	78.92
Al_m	0.22	0.30	0.28	0.28	0.33	0.23	0.21	0.23
Ca_m	0.01	0.07	0.01	0.01	0.07	0.01	0.01	0.02
K_m	0.06	0.07	0.05	0.07	0.07	0.03	0.02	0.02
Na_m	0.07	0.13	0.09	0.17	0.16	0.17	0.18	0.16
K_Al	0.25	0.22	0.18	0.24	0.21	0.14	0.08	0.08
Na_Al	0.31	0.42	0.32	0.59	0.49	0.74	0.84	0.69
Plag	0.33	0.64	0.36	0.62	0.70	0.77	0.87	0.76

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	301978	301982	302009	302014	302021	301957	301827	302037	302030
North (NAD 27)	4319917	4319957	4320055	4320185	4320196	4320518	4319766	4320466	4320476
Classification	Sericite	Plag-KSpar	Plagioclase	Plag-KSpar	Plagioclase	Plagioclase	Plag-KSpar	Plagioclase	Plag-KSpar
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437004	H437005	H437006	H437007	H437008	H437009	H437010	H437011	H437012
Lithology	Porphyry	Bear equigr	Bear	Bear (K-spar phenos)	Bear	Porphyry	Bear	porphyry	Bear
Ag (ppm)	0.02	0.02	0.03	0.07	0.03	0.05	0.05	0.17	0.11
Al (%)	7.23	6.9	6.88	6.65	6.67	6.87	6.94	5.5	6.98
As (ppm)	0.8	1.4	2.5	7.1	3.4	2	3.2	3.5	2.3
Ba (ppm)	1370	1350	290	2440	340	220	1390	110	1340
Be (ppm)	1.98	2.23	2.82	1.87	2.23	2.6	2.15	2.29	1.87
Bi (ppm)	0.09	0.2	0.16	0.13	0.05	0.27	0.52	1.41	0.53
Ca (%)	0.09	2.05	2.64	2.21	2.58	2.83	2.6	1.29	1.61
Cd (ppm)	-0.02	0.02	0.05	0.02	0.03	0.03	0.05	-0.02	-0.02
Ce (ppm)	31.3	52.8	40	35	33.6	40.6	42.6	26.6	38.6
Co (ppm)	0.2	2.9	2.3	1.4	0.6	1	5.8	1.9	2.3
Cr (ppm)	12	10	10	15	12	12	12	9	7
Cs (ppm)	0.88	0.88	0.78	1.87	0.55	0.58	0.77	0.49	1.75
Cu (ppm)	16.8	369	20.4	31.7	52.2	104.5	168.5	2740	1830
Fe (%)	0.52	1.44	0.82	1.77	0.76	0.86	1.51	1.75	3.01
Ga (ppm)	24.3	20.3	19.4	20.4	20.6	20.6	20.5	16.65	25.4
Ge (ppm)	0.06	0.08	0.06	0.05	0.07	-0.05	0.08	-0.05	0.09
Hf (ppm)	0.9	1	0.8	1.3	0.9	1	0.7	1.2	0.6
In (ppm)	0.066	0.053	0.097	0.023	0.022	0.026	0.02	0.133	0.114
K (%)	3.9	2.33	0.53	2.91	0.34	0.28	1.91	0.19	1.6
La (ppm)	13.4	22.3	18.8	16.4	12.4	14.9	17.6	13.3	13.3
Li (ppm)	5.5	4.3	2.9	4.9	2.3	2.4	3	5.5	10.2
Mg (%)	0.37	0.43	0.59	0.22	0.34	0.68	0.64	1.46	2.34
Mn (ppm)	26	133	139	225	101	170	205	327	200
Mo (ppm)	1.52	1.26	0.7	5.02	0.66	0.5	0.81	1.9	1.33
Na (%)	0.12	3.07	3.97	2.34	3.92	3.94	3.35	2.67	2.21
Nb (ppm)	2.8	3.8	3.8	3.2	4.5	4.3	4	2	2.7
Ni (ppm)	0.9	7.1	5.9	7	2.6	2.7	10.1	9	10
P (ppm)	440	760	830	650	300	750	900	540	60
Pb (ppm)	1.8	6.1	7.5	7.4	4.8	5.2	5.7	2.6	2.8
Rb (ppm)	101.5	44.6	15.1	54.3	6.1	6.2	39	4.9	28.8
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.01	0.01	0.02	0.01	0.01	0.01	0.02	0.02	0.01
Sb (ppm)	0.5	0.9	1.16	5.27	0.47	1.1	0.73	1.87	1.37

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	301978	301982	302009	302014	302021	301957	301827	302037	302030
North (NAD 27)	4319917	4319957	4320055	4320185	4320196	4320518	4319766	4320466	4320476
Classification	Sericite	Plag-KSpar	Plagioclase	Plag-KSpar	Plagioclase	Plagioclase	Plag-KSpar	Plagioclase	Plag-KSpar
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437004	H437005	H437006	H437007	H437008	H437009	H437010	H437011	H437012
Lithology	Porphyry	Bear equigr	Bear	Bear (K-spar phenos)	Bear	Porphyry	Bear	porphyry	Bear
Sc (ppm)	6.8	5.2	4.9	4.2	4.2	6.3	5.6	3.7	12.1
Se (ppm)	1	2	1	1	1	1	1	2	1
Sn (ppm)	1.3	0.8	0.9	0.8	0.8	0.9	1	1	1.4
Sr (ppm)	62.6	1125	1125	1335	1295	1260	1190	724	777
Ta (ppm)	0.2	0.28	0.28	0.23	0.32	0.31	0.3	0.13	0.17
Te (ppm)	0.15	0.33	0.13	0.35	-0.05	0.14	0.4	1.41	0.2
Th (ppm)	8.6	7.5	8.3	6.2	6	10.4	6.8	4.2	7.2
Ti (%)	0.23	0.265	0.257	0.229	0.265	0.294	0.285	0.15	0.277
Tl (ppm)	0.34	0.21	0.09	0.33	0.05	0.05	0.2	0.03	0.24
U (ppm)	3.8	5.4	3	2.9	1.6	2.3	2.8	3.7	3.5
V (ppm)	73	61	51	53	29	39	63	59	80
W (ppm)	1.6	0.4	0.7	1.2	0.5	0.2	1	0.6	1.1
Y (ppm)	3.1	43.4	6.4	4.9	7.2	7.7	7.2	4.9	11
Zn (ppm)	-2	12	8	10	8	11	16	19	16
Zr (ppm)	17	16.7	14.1	29.6	17.2	18.3	13.8	31.1	11.3
Al2O3 (%)	13.66	13.03	13.00	12.56	12.60	12.98	13.11	10.39	13.19
CaO (%)	0.13	2.87	3.69	3.09	3.61	3.96	3.64	1.80	2.25
FeO (%)	0.67	1.85	1.05	2.28	0.98	1.11	1.94	2.25	3.87
K2O (%)	4.70	2.81	0.64	3.51	0.41	0.34	2.30	0.23	1.93
MgO (%)	0.61	0.71	0.98	0.36	0.56	1.13	1.06	2.42	3.88
Na2O (%)	0.16	4.14	5.35	3.15	5.28	5.31	4.52	3.60	2.98
P2O5 (%)	0.10	0.17	0.19	0.15	0.07	0.17	0.21	0.12	0.01
TiO2 (%)	0.38	0.44	0.43	0.38	0.44	0.49	0.48	0.25	0.46
SO3 (%)	0.03	0.03	0.05	0.03	0.03	0.03	0.05	0.05	0.03
Total (%)	20.44	26.05	25.38	25.51	23.98	25.51	27.30	21.12	28.60
SiO2 (%)	78.13	72.12	72.84	72.70	74.34	72.71	70.79	77.40	69.40
Al_m	0.27	0.26	0.25	0.25	0.25	0.25	0.26	0.20	0.26
Ca_m	0.00	0.05	0.07	0.06	0.06	0.07	0.07	0.03	0.04
K_m	0.10	0.06	0.01	0.07	0.01	0.01	0.05	0.00	0.04
Na_m	0.01	0.13	0.17	0.10	0.17	0.17	0.15	0.12	0.10
K_Al	0.37	0.23	0.05	0.30	0.04	0.03	0.19	0.02	0.16
Na_Al	0.02	0.52	0.68	0.41	0.69	0.67	0.57	0.57	0.37
Plag	0.03	0.72	0.94	0.64	0.95	0.95	0.82	0.73	0.53

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	302025	302044	302058	301754	301762	301609	301528	301440
North (NAD 27)	4320551	4320629	4320626	4319599	4319627	4319714	4319686	4319623
Classification	Plagioclase	Plag-KSpar	Plagioclase	Albite-KSpar-Sericite	Plag-KSpar	Albite-KSpar-Sericite	Plag-KSpar	Plag-KSpar
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437013	H437014	H437015	H437016	H437017	H437018	H437019	H437020
Lithology	Bear equigr	Porphyry	Porphyry	Porphyry	Bear	Bear	Bear	Bear
Ag (ppm)	0.05	0.06	0.02	0.18	0.22	0.1	0.18	0.03
Al (%)	6.97	6.92	7.12	7.01	6.64	6.69	7.02	6.58
As (ppm)	1.7	3.8	1.1	6.5	3.3	11.4	4.4	4.1
Ba (ppm)	200	2050	290	2630	1110	1810	1120	1850
Be (ppm)	3.45	2.11	1.84	2.31	2.68	2.22	2.64	1.52
Bi (ppm)	0.06	0.77	0.14	0.65	0.11	1.32	0.11	0.18
Ca (%)	2.25	1.15	2.42	0.63	1.44	0.45	2.23	2.33
Cd (ppm)	0.04	0.04	-0.02	-0.02	0.04	0.02	0.03	0.04
Ce (ppm)	33.8	26	34.8	13.55	55.8	17.9	68.2	40.6
Co (ppm)	0.9	1.7	3.2	0.5	3.6	1.1	8.5	3
Cr (ppm)	7	8	8	10	5	11	6	9
Cs (ppm)	0.69	0.62	0.42	0.56	0.92	0.59	1.44	0.45
Cu (ppm)	43.5	175	40.4	53.1	140.5	64.8	479	102.5
Fe (%)	0.47	1.57	1.29	1.2	1.19	1.54	3.14	1.8
Ga (ppm)	21.8	18.15	19.8	18.7	19.35	20.6	22.1	19.6
Ge (ppm)	0.05	0.06	0.05	0.05	0.09	0.06	0.11	0.06
Hf (ppm)	1	1.3	1.2	1.5	1.1	1.9	0.6	1.4
In (ppm)	0.008	0.025	0.04	0.171	0.028	0.039	0.039	0.036
K (%)	0.34	2.71	0.54	3.11	4.06	2.82	2.93	2.9
La (ppm)	11.8	12	17.8	8.2	22.4	10.4	27	19.2
Li (ppm)	3.2	3.2	3.2	1.5	2.7	2.4	5.9	4
Mg (%)	0.32	0.19	0.39	0.1	0.39	0.11	1.21	0.48
Mn (ppm)	79	109	155	51	132	44	413	237
Mo (ppm)	0.66	1.36	0.48	2.48	1.36	4.89	1.95	2.8
Na (%)	4.18	3.34	4.18	2.96	2.37	3.02	2.87	2.36
Nb (ppm)	7.4	3	2.9	2.5	6.9	2.3	7.5	3.3
Ni (ppm)	1.6	2.9	8.6	1.1	9.3	1.6	12.9	9.2
P (ppm)	390	460	760	250	810	380	1680	800
Pb (ppm)	5.8	3.5	2.5	5.2	6.6	5.1	6	7.5
Rb (ppm)	10	57.3	18.2	74.9	99.2	74.4	72.8	73.4
Re (ppm)	0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.01	0.01	0.01	0.04	0.02	0.04	0.01	-0.01
Sb (ppm)	0.52	0.9	0.73	1.19	1.01	0.51	1.29	1.36

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	302025	302044	302058	301754	301762	301609	301528	301440
North (NAD 27)	4320551	4320629	4320626	4319599	4319627	4319714	4319686	4319623
Classification	Plagioclase	Plag-KSpar	Plagioclase	Albite-KSpar-Sericite	Plag-KSpar	Albite-KSpar-Sericite	Plag-KSpar	Plag-KSpar
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437013	H437014	H437015	H437016	H437017	H437018	H437019	H437020
Lithology	Bear equigr	Porphyry	Porphyry	Porphyry	Bear	Bear	Bear	Bear
Sc (ppm)	5.7	4.3	4.6	3.1	5.4	3.8	9.6	5
Se (ppm)	1	1	1	2	2	2	1	1
Sn (ppm)	1.4	0.6	0.8	0.7	1.2	0.7	1.9	0.7
Sr (ppm)	926	707	1050	893	654	686	903	1015
Ta (ppm)	0.55	0.21	0.19	0.17	0.48	0.17	0.48	0.23
Te (ppm)	-0.05	0.76	-0.05	0.76	-0.05	1.83	0.07	0.14
Th (ppm)	14.4	6.9	5.8	7.8	22.6	7.3	14	6.4
Ti (%)	0.383	0.225	0.217	0.181	0.266	0.189	0.47	0.244
Tl (ppm)	0.07	0.29	0.07	0.4	0.37	0.37	0.36	0.44
U (ppm)	2.8	3.6	2.9	3.3	6.2	3.4	5.5	2.7
V (ppm)	46	50	50	30	58	46	137	57
W (ppm)	0.5	1	0.3	0.5	0.8	1.5	1.3	0.6
Y (ppm)	12	5.1	5.2	1.1	12.4	2.3	13.7	5.7
Zn (ppm)	10	5	2	2	13	4	34	11
Zr (ppm)	21.2	28.1	25.9	34.3	20.5	51.5	11.1	32.9
Al2O3 (%)	13.17	13.07	13.45	13.24	12.54	12.64	13.26	12.43
CaO (%)	3.15	1.61	3.39	0.88	2.01	0.63	3.12	3.26
FeO (%)	0.60	2.02	1.66	1.54	1.53	1.98	4.04	2.31
K2O (%)	0.41	3.27	0.65	3.75	4.89	3.40	3.53	3.49
MgO (%)	0.53	0.32	0.65	0.17	0.65	0.18	2.01	0.80
Na2O (%)	5.63	4.50	5.63	3.99	3.19	4.07	3.87	3.18
P2O5 (%)	0.09	0.11	0.17	0.06	0.19	0.09	0.38	0.18
TiO2 (%)	0.64	0.38	0.36	0.30	0.44	0.32	0.78	0.41
SO3 (%)	0.03	0.03	0.03	0.10	0.05	0.10	0.03	-0.03
Total (%)	24.25	25.29	25.99	24.03	25.50	23.40	31.02	26.04
SiO2 (%)	74.06	72.94	72.19	74.29	72.71	74.96	66.81	72.14
Al_m	0.26	0.26	0.26	0.26	0.25	0.25	0.26	0.24
Ca_m	0.06	0.03	0.06	0.02	0.04	0.01	0.06	0.06
K_m	0.01	0.07	0.01	0.08	0.10	0.07	0.08	0.07
Na_m	0.18	0.15	0.18	0.13	0.10	0.13	0.12	0.10
K_Al	0.03	0.27	0.05	0.31	0.42	0.29	0.29	0.31
Na_Al	0.70	0.57	0.69	0.50	0.42	0.53	0.48	0.42
Plag	0.92	0.68	0.92	0.56	0.57	0.58	0.69	0.66

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	301390	301470	301475	301089	301178	301358	301420	301173
North (NAD 27)	4319535	4319389	4319425	4319670	4319712	4319786	4319865	4319805
Classification	Albite-KSpar-Sericite	Albite-KSpar-Sericite	Plag-KSpar	Albite-KSpar-Sericite	Plag-KSpar	Plag-KSpar	Plag-KSpar	Albite
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437021	H437022	H437023	H437024	H437025	H437026	H437027	H437028
Lithology	porphyry	?	Bear	Porphyry	Bear	Bear (K-spar phenos)	Bear	McLeod
Ag (ppm)	0.42	0.26	0.18	0.07	0.05	0.02	0.01	0.06
Al (%)	6.36	6.47	6.72	6.81	7.02	6.52	6.58	7.14
As (ppm)	13.6	7.4	2.1	9.9	6	3.6	3.6	27.1
Ba (ppm)	1670	1300	1960	1760	980	1590	1830	120
Be (ppm)	1.91	1.97	1.85	2.1	2.45	1.77	1.66	1.95
Bi (ppm)	0.34	0.74	0.82	0.19	0.09	0.14	0.25	1
Ca (%)	0.59	0.2	1.1	0.74	3.2	2.26	1.91	0.29
Cd (ppm)	0.03	0.03	0.02	0.03	0.04	0.02	0.04	0.03
Ce (ppm)	27.2	14.45	49.9	48.7	56.5	37.9	39	44.9
Co (ppm)	1.3	0.5	0.9	0.7	11.3	1.6	2	1.3
Cr (ppm)	8	6	9	10	6	9	8	6
Cs (ppm)	0.57	0.92	0.67	1	1.57	0.53	0.49	0.38
Cu (ppm)	115.5	20	153.5	13.7	178	39.7	81	44.5
Fe (%)	1.2	1.61	1.27	0.97	3.66	1.81	1.76	3.82
Ga (ppm)	18.3	20.2	20	20.7	23.6	20.4	19.95	23.4
Ge (ppm)	0.05	0.06	0.06	0.06	0.09	0.06	0.08	0.14
Hf (ppm)	1.3	1.2	1.2	1.4	0.6	1.4	1.5	0.6
In (ppm)	0.02	0.056	0.251	0.016	0.041	0.026	0.045	0.052
K (%)	2.46	1.99	2.49	3.03	2.52	2.74	2.82	0.46
La (ppm)	15.4	7	25.3	27.6	24.5	17.5	18.5	22.5
Li (ppm)	2.2	2.4	6.2	2.1	3.5	5.4	5.1	9
Mg (%)	0.1	0.24	0.4	0.09	1.11	0.39	0.32	0.3
Mn (ppm)	53	67	95	108	478	230	225	52
Mo (ppm)	4.1	2.16	1.85	1.03	1.32	2.16	1.87	4.85
Na (%)	3.33	3.14	3.13	3.09	3.05	2.58	2.74	4.71
Nb (ppm)	2.5	1.3	2.2	2.8	6.7	3.2	3.4	3.6
Ni (ppm)	2.3	2.5	4.8	2.7	13.8	10.4	13.4	3.8
P (ppm)	430	260	190	500	1580	800	860	800
Pb (ppm)	4.6	2.7	4.7	7.1	9.3	7.5	5.6	5.1
Rb (ppm)	68.6	67.9	70.3	99.2	79	67	65.5	20.3
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.03	0.05	0.01	0.02	-0.01	-0.01	0.01	0.03
Sb (ppm)	1.01	0.51	1.2	1.02	1.48	1.2	1.86	2.08

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	301390	301470	301475	301089	301178	301358	301420	301173
North (NAD 27)	4319535	4319389	4319425	4319670	4319712	4319786	4319865	4319805
Classification	Albite-KSpar-Sericite	Albite-KSpar-Sericite	Plag-KSpar	Albite-KSpar-Sericite	Plag-KSpar	Plag-KSpar	Plag-KSpar	Albite
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437021	H437022	H437023	H437024	H437025	H437026	H437027	H437028
Lithology	porphyry	?	Bear	Porphyry	Bear	Bear (K-spar phenos)	Bear	McLeod
Sc (ppm)	3.1	3.4	5.4	4.1	10.4	5.3	5.2	11.2
Se (ppm)	2	2	2	2	2	1	2	17
Sn (ppm)	0.6	0.6	0.6	0.7	1.3	0.7	0.7	1
Sr (ppm)	776	387	697	685	981	1095	844	214
Ta (ppm)	0.17	0.08	0.15	0.19	0.42	0.22	0.23	0.22
Te (ppm)	0.78	0.44	0.9	0.09	0.07	0.05	0.13	2.21
Th (ppm)	5.8	5.1	7.7	6.2	13.1	5.8	6.5	10.8
Ti (%)	0.179	0.095	0.187	0.197	0.47	0.244	0.249	0.354
Tl (ppm)	0.41	0.29	0.4	0.57	0.28	0.47	0.36	0.11
U (ppm)	3.2	1.7	4.4	2.9	4.8	2.7	2.6	4.7
V (ppm)	36	42	46	40	127	58	56	131
W (ppm)	0.3	0.9	0.7	0.4	1.2	0.5	0.7	1.7
Y (ppm)	4.8	1.8	6	4.5	13.5	5.4	5.9	4.6
Zn (ppm)	4	4	11	9	44	9	10	13
Zr (ppm)	28	29.2	28.2	31.8	10.5	32.2	34.1	13.3
Al2O3 (%)	12.01	12.22	12.69	12.86	13.26	12.32	12.43	13.49
CaO (%)	0.83	0.28	1.54	1.04	4.48	3.16	2.67	0.41
FeO (%)	1.54	2.07	1.63	1.25	4.71	2.33	2.26	4.91
K2O (%)	2.96	2.40	3.00	3.65	3.04	3.30	3.40	0.55
MgO (%)	0.17	0.40	0.66	0.15	1.84	0.65	0.53	0.50
Na2O (%)	4.49	4.23	4.22	4.17	4.11	3.48	3.69	6.35
P2O5 (%)	0.10	0.06	0.04	0.11	0.36	0.18	0.20	0.18
TiO2 (%)	0.30	0.16	0.31	0.33	0.78	0.41	0.42	0.59
SO3 (%)	0.08	0.13	0.03	0.05	-0.03	-0.03	0.03	0.08
Total (%)	22.47	21.94	24.13	23.61	32.55	25.80	25.62	27.06
SiO2 (%)	75.95	76.52	74.18	74.74	65.17	72.40	72.58	71.05
Al_m	0.24	0.24	0.25	0.25	0.26	0.24	0.24	0.26
Ca_m	0.01	0.01	0.03	0.02	0.08	0.06	0.05	0.01
K_m	0.06	0.05	0.06	0.08	0.06	0.07	0.07	0.01
Na_m	0.14	0.14	0.14	0.13	0.13	0.11	0.12	0.20
K_Al	0.27	0.21	0.26	0.31	0.25	0.29	0.30	0.04
Na_Al	0.61	0.57	0.55	0.53	0.51	0.46	0.49	0.77
Plag	0.68	0.59	0.66	0.61	0.82	0.70	0.68	0.80

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	301166	301137	301137	301072	301033	300966	300927	300969
North (NAD 27)	4319827	4319850	4319850	4319850	4319964	4319913	4319916	4319797
Classification	Plag-KSpar	Albite-KSpar-Sericite	Sericite	Plag-KSpar	Albite-KSpar-Sericite	Plag-KSpar	Albite-KSpar-Sericite	Albite-KSpar-Sericite
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437029	H437030	H437031	H437032	H437033	H437034	H437035	H437036
Lithology	McLeod	Porphyry	Porphyry	McLeod	Porphyry	McLeod	Porphyry	Porphyry
Ag (ppm)	0.05	0.04	0.03	0.05	0.24	0.02	0.05	0.04
Al (%)	7.49	6.58	6.7	7.11	6.8	7.01	6.84	6.32
As (ppm)	7.7	2.6	3.2	5.4	15.9	5.3	12.8	4.7
Ba (ppm)	1050	1790	370	1010	2100	1030	2010	1920
Be (ppm)	2.14	2.02	2.14	2.04	1.92	1.94	1.93	1.78
Bi (ppm)	0.06	0.09	0.53	0.04	1.22	0.1	0.41	0.39
Ca (%)	2.9	0.31	0.11	3.44	0.34	2.86	0.26	0.2
Cd (ppm)	0.03	-0.02	0.02	0.03	0.02	0.03	0.02	-0.02
Ce (ppm)	53.5	38.6	6.09	51.5	31.8	44.9	6.24	14.4
Co (ppm)	9.9	0.3	0.3	14.9	0.5	11.2	0.5	0.7
Cr (ppm)	7	8	11	8	7	6	9	5
Cs (ppm)	1.35	0.69	0.6	1.03	0.91	0.56	0.68	0.43
Cu (ppm)	119.5	16	22.6	112.5	35.5	33.1	30.3	39
Fe (%)	3.94	1.12	2.14	4.36	1.05	4.08	1.47	1.46
Ga (ppm)	24.7	20.7	23.8	23.7	20.4	24.3	20.6	20.1
Ge (ppm)	0.1	0.06	0.07	0.13	0.07	0.1	0.06	0.07
Hf (ppm)	0.9	1.9	2.1	0.9	1.5	0.8	1.6	1.4
In (ppm)	0.036	0.02	0.036	0.034	0.023	0.035	0.018	0.008
K (%)	2.49	2.57	3.44	2.36	3.07	2.72	3.04	2.8
La (ppm)	25.1	22.8	3.7	23.3	18.9	19.5	3.9	7.1
Li (ppm)	3.1	1.7	3.7	2.9	2.8	2.3	2.1	1.3
Mg (%)	1	0.06	0.33	1.37	0.14	1.17	0.09	0.05
Mn (ppm)	240	46	47	453	60	389	68	31
Mo (ppm)	1.75	3.44	2.41	1.53	2.06	2.36	1.5	1.23
Na (%)	3.36	3.75	0.1	3.12	2.96	3.5	3.43	3.85
Nb (ppm)	4.2	2.9	2.8	5.4	2.8	4.3	2.7	2
Ni (ppm)	18.2	0.9	1.3	16.5	1.4	17	1.5	1.4
P (ppm)	1700	230	410	1970	290	1760	210	360
Pb (ppm)	5.9	5.5	2.3	5.9	5.6	5.9	5.4	3.7
Rb (ppm)	72.4	71.8	134.5	71.7	95	73.6	74	72.7
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.03	0.04	0.03	0.04	0.05	0.01	0.04	0.01
Sb (ppm)	1.89	0.72	0.84	0.65	0.74	1.35	0.62	0.39

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	301166	301137	301137	301072	301033	300966	300927	300969
North (NAD 27)	4319827	4319850	4319850	4319850	4319964	4319913	4319916	4319797
Classification	Plag-KSpar	Albite-KSpar-Sericite	Sericite	Plag-KSpar	Albite-KSpar-Sericite	Plag-KSpar	Albite-KSpar-Sericite	Albite-KSpar-Sericite
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437029	H437030	H437031	H437032	H437033	H437034	H437035	H437036
Lithology	McLeod	Porphyry	Porphyry	McLeod	Porphyry	McLeod	Porphyry	Porphyry
Sc (ppm)	11	4.7	6.7	12.4	4.5	11.5	3.8	3.8
Se (ppm)	2	3	3	2	3	2	4	2
Sn (ppm)	0.8	0.6	0.6	1	0.7	0.7	0.6	0.4
Sr (ppm)	893	613	62.2	905	725	894	474	357
Ta (ppm)	0.28	0.2	0.19	0.33	0.19	0.26	0.18	0.14
Te (ppm)	-0.05	0.56	0.51	-0.05	0.46	0.08	0.73	0.45
Th (ppm)	9.2	6.9	5.4	9.5	6.3	8	6	7
Ti (%)	0.417	0.232	0.235	0.433	0.214	0.383	0.222	0.147
Tl (ppm)	0.29	0.4	0.57	0.25	0.5	0.29	0.49	0.42
U (ppm)	3.8	3.2	3	3.9	3.1	3.4	4.2	4.9
V (ppm)	147	41	62	150	41	150	46	24
W (ppm)	1	0.9	1.2	0.8	0.9	0.8	0.9	1.6
Y (ppm)	12.8	3.1	3.4	12.2	2.3	11.2	1.4	2.8
Zn (ppm)	20	3	2	22	4	19	4	-2
Zr (ppm)	19.1	49.8	58.3	19.3	33.3	17.3	37.4	33.3
Al2O3 (%)	14.15	12.43	12.66	13.43	12.85	13.24	12.92	11.94
CaO (%)	4.06	0.43	0.15	4.81	0.48	4.00	0.36	0.28
FeO (%)	5.07	1.44	2.75	5.61	1.35	5.25	1.89	1.88
K2O (%)	3.00	3.10	4.15	2.84	3.70	3.28	3.66	3.37
MgO (%)	1.66	0.10	0.55	2.27	0.23	1.94	0.15	0.08
Na2O (%)	4.53	5.06	0.13	4.21	3.99	4.72	4.62	5.19
P2O5 (%)	0.39	0.05	0.09	0.45	0.07	0.40	0.05	0.08
TiO2 (%)	0.70	0.39	0.39	0.72	0.36	0.64	0.37	0.25
SO3 (%)	0.08	0.10	0.08	0.10	0.13	0.03	0.10	0.03
Total (%)	33.62	23.09	20.95	34.44	23.14	33.49	24.13	23.10
SiO2 (%)	64.03	75.29	77.58	63.14	75.24	64.16	74.18	75.29
Al_m	0.28	0.24	0.25	0.26	0.25	0.26	0.25	0.23
Ca_m	0.07	0.01	0.00	0.09	0.01	0.07	0.01	0.01
K_m	0.06	0.07	0.09	0.06	0.08	0.07	0.08	0.07
Na_m	0.15	0.16	0.00	0.14	0.13	0.15	0.15	0.17
K_Al	0.23	0.27	0.36	0.23	0.31	0.27	0.31	0.31
Na_Al	0.53	0.67	0.02	0.52	0.51	0.59	0.59	0.72
Plag	0.79	0.70	0.03	0.84	0.54	0.86	0.61	0.74

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	300904	300859	300760	300665	300581	300505	300503	300431	300439
North (NAD 27)	4319765	4319778	4319747	4319698	4319630	4319508	4319506	4319480	4319489
Classification	Sericite	Plag-KSpar	Albite-KSpar-Sericite	Plag-KSpar	Plag-KSpar	Plag-KSpar	Plag-KSpar	Sericite	Albite
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437037	H437038	H437039	H437040	H437041	H437042	H437043	H437044	H437045
Lithology	Porphyry	McLeod	Porphyry	McLeod	McLeod	McLeod	McLeod	Porphyry	Porphyry
Ag (ppm)	0.45	0.06	0.02	0.14	0.1	0.11	0.08	0.57	0.16
Al (%)	6.17	7.04	6.33	6.82	6.86	6.64	6.7	6.74	6.45
As (ppm)	3.8	7.9	5.1	8.6	6.5	5.1	8.5	13.5	8.5
Ba (ppm)	480	1020	1980	770	1130	1010	870	800	1050
Be (ppm)	1.92	2.46	1.83	2.04	3.01	3.09	2.51	0.28	2.13
Bi (ppm)	1.85	0.33	0.55	0.22	0.13	0.07	0.44	0.24	0.94
Ca (%)	0.05	3.22	0.22	3.1	2.85	2.72	3.24	0.04	0.4
Cd (ppm)	-0.02	0.04	-0.02	0.02	0.07	0.08	0.05	0.02	0.03
Ce (ppm)	11.65	48.3	26.3	78	56.3	53.5	51.2	46.4	11.25
Co (ppm)	0.1	12.3	0.7	9.2	12	13.5	6	0.3	0.4
Cr (ppm)	7	7	9	6	7	9	7	7	14
Cs (ppm)	0.81	0.54	0.94	0.3	1.9	2.86	1.05	1.11	3.82
Cu (ppm)	18.9	226	9.5	523	182.5	131.5	235	41.9	34.8
Fe (%)	1.72	4.18	0.82	3.48	3.77	3.69	3.11	3.18	1.06
Ga (ppm)	26.1	24.6	21	24.4	24	23.1	23.9	14.3	20.6
Ge (ppm)	0.08	0.11	0.06	0.14	0.12	0.09	0.09	0.14	0.07
Hf (ppm)	1.5	0.6	1.9	0.8	0.6	0.6	0.6	0.4	2.2
In (ppm)	0.168	0.059	0.013	0.062	0.035	0.04	0.065	0.014	0.127
K (%)	3.27	2.39	2.96	2.08	3.22	2.99	2.11	3.48	1.13
La (ppm)	9.5	21.9	12.2	39.4	23.6	22	21.6	24.1	6.1
Li (ppm)	4.7	3.5	1.2	5.4	5.7	5.7	5.5	1.3	2
Mg (%)	0.28	1.45	0.04	1.03	1.09	1.01	0.94	0.03	0.09
Mn (ppm)	43	451	31	721	605	574	653	34	56
Mo (ppm)	2.4	1.14	1.7	0.68	1.43	1.98	1.12	29.3	3.27
Na (%)	0.11	3.5	3.69	3.69	2.72	2.85	3.08	0.12	4.06
Nb (ppm)	2.1	5.1	3.4	5.1	7.6	7.6	7.4	2.3	2.9
Ni (ppm)	0.6	16.7	0.9	12.3	15	12.6	16.7	1	1.3
P (ppm)	1420	1620	360	1480	1450	1390	1370	830	270
Pb (ppm)	9.1	5.5	6.2	6.2	10.4	12	9.1	22.1	5.9
Rb (ppm)	115.5	63.3	87.3	44	109.5	119	70	131	40.7
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.34	0.01	0.04	0.01	0.01	0.02	0.01	0.97	0.08
Sb (ppm)	0.7	2.6	0.8	5.4	2.07	1.03	4.13	7.98	1.13

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	300904	300859	300760	300665	300581	300505	300503	300431	300439
North (NAD 27)	4319765	4319778	4319747	4319698	4319630	4319508	4319506	4319480	4319489
Classification	Sericite	Plag-KSpar	Albite-KSpar-Sericite	Plag-KSpar	Plag-KSpar	Plag-KSpar	Plag-KSpar	Sericite	Albite
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437037	H437038	H437039	H437040	H437041	H437042	H437043	H437044	H437045
Lithology	Porphyry	McLeod	Porphyry	McLeod	McLeod	McLeod	McLeod	Porphyry	Porphyry
Sc (ppm)	5.3	12.7	5.2	10.8	10.2	9.3	9.7	1.2	5.7
Se (ppm)	6	1	2	2	2	1	2	10	3
Sn (ppm)	1	1	0.8	1	1.1	1.3	1.4	2.2	0.7
Sr (ppm)	65.3	965	461	953	964	841	970	175.5	648
Ta (ppm)	0.15	0.31	0.22	0.32	0.49	0.5	0.46	0.16	0.17
Te (ppm)	6.48	0.15	0.09	0.09	-0.05	0.05	0.06	3.1	0.94
Th (ppm)	5.8	8.1	5.5	10.1	14.9	15.7	16.5	12.7	7.1
Ti (%)	0.161	0.444	0.254	0.424	0.459	0.432	0.429	0.192	0.251
Tl (ppm)	0.83	0.27	0.44	0.2	0.41	0.39	0.28	0.73	0.27
U (ppm)	2.7	2.8	3.7	6.6	5.6	5	6.5	1.1	2.8
V (ppm)	45	160	41	139	125	118	107	101	52
W (ppm)	0.8	1.3	1.3	1.1	1.5	1.6	1.9	5.3	1.1
Y (ppm)	2.8	11.9	2.1	11.2	12.5	12.4	12.8	1	2.9
Zn (ppm)	-2	17	-2	35	46	60	58	-2	3
Zr (ppm)	35.6	11.2	53	15.9	10.8	10.8	10.9	9.9	66.7
Al2O3 (%)	11.66	13.30	11.96	12.88	12.96	12.54	12.66	12.73	12.18
CaO (%)	0.07	4.50	0.31	4.34	3.99	3.81	4.53	0.06	0.56
FeO (%)	2.21	5.38	1.05	4.48	4.85	4.75	4.00	4.09	1.36
K2O (%)	3.94	2.88	3.57	2.51	3.88	3.60	2.54	4.19	1.36
MgO (%)	0.46	2.40	0.07	1.71	1.81	1.67	1.56	0.05	0.15
Na2O (%)	0.15	4.72	4.97	4.97	3.67	3.84	4.15	0.16	5.47
P2O5 (%)	0.33	0.37	0.08	0.34	0.33	0.32	0.31	0.19	0.06
TiO2 (%)	0.27	0.74	0.42	0.71	0.77	0.72	0.72	0.32	0.42
SO3 (%)	0.85	0.03	0.10	0.03	0.03	0.05	0.03	2.43	0.20
Total (%)	19.93	34.32	22.53	31.95	32.27	31.30	30.50	24.22	21.77
SiO2 (%)	78.67	63.28	75.89	65.81	65.47	66.51	67.37	74.09	76.70
Al_m	0.23	0.26	0.23	0.25	0.25	0.25	0.25	0.25	0.24
Ca_m	0.00	0.08	0.01	0.08	0.07	0.07	0.08	0.00	0.01
K_m	0.08	0.06	0.08	0.05	0.08	0.08	0.05	0.09	0.03
Na_m	0.00	0.15	0.16	0.16	0.12	0.12	0.13	0.01	0.18
K_Al	0.37	0.24	0.32	0.21	0.32	0.31	0.22	0.36	0.12
Na_Al	0.02	0.58	0.68	0.64	0.47	0.50	0.54	0.02	0.74
Plag	0.03	0.89	0.71	0.94	0.75	0.78	0.87	0.02	0.78

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	300361	300350	300348	300412	300425	301396	301399	301330	301265
North (NAD 27)	4319378	4319265	4319232	4319105	4319064	4319393	4319343	4319376	4319360
Classification	Plag-KSpar	Sericite	Plag-KSpar	Plag-KSpar	Albite-KSpar-Sericite	Sericite	Sericite	Plag-KSpar	Plag-KSpar
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437046	H437047	H437048	H437049	H437050	H437051	H437052	H437053	H437054
Lithology	McLeod	McLeod	McLeod	McLeod	Porphyry	Bear	Bear	McLeod	McLeod
Ag (ppm)	0.1	0.27	0.11	0.06	0.04	0.06	0.22	0.03	0.04
Al (%)	7.06	3.06	6.98	7.11	6.98	7.34	6.62	7.08	7.04
As (ppm)	4.5	12.9	4.7	4.6	6.3	4.7	3.7	3.4	4.8
Ba (ppm)	990	870	1230	1050	1930	1290	1060	1200	1350
Be (ppm)	2.67	0.5	2.59	2.73	1.67	1.53	1.55	2.25	1.89
Bi (ppm)	0.07	1.7	0.16	0.07	0.37	1.75	2.23	0.2	0.12
Ca (%)	2.82	0.45	1.98	2.83	0.4	0.04	0.11	1.87	1.43
Cd (ppm)	0.07	0.02	0.07	0.09	0.03	-0.02	0.02	0.06	0.04
Ce (ppm)	61.5	23.1	62.9	62.2	19.85	16.35	6.8	46	54.9
Co (ppm)	15.4	2.4	10.8	14.1	0.8	0.3	0.3	3.7	8.8
Cr (ppm)	6	28	7	14	7	7	7	7	9
Cs (ppm)	2.44	0.67	1.37	3.74	1.3	1.02	0.88	0.57	1.63
Cu (ppm)	153	59.1	223	73.6	37.6	119	62.1	609	687
Fe (%)	3.87	1.92	4.93	3.85	1.69	3.61	4.35	2.79	3.06
Ga (ppm)	24.1	8.26	24.3	22.8	19.65	25.9	25.7	21.9	21.3
Ge (ppm)	0.13	0.1	0.12	0.12	0.11	0.11	0.13	0.13	0.12
Hf (ppm)	0.5	0.3	0.5	0.7	1.4	0.6	0.7	0.7	0.8
In (ppm)	0.045	0.017	0.061	0.043	0.017	0.129	0.123	0.058	0.034
K (%)	3	1.37	3.15	3.02	3.02	3.94	3.62	3.54	3.18
La (ppm)	27.3	11.2	27.7	28	10.2	9.8	4.7	22.1	24.8
Li (ppm)	7.2	5.6	7.8	5.5	3.8	6.1	11.7	4.3	6.2
Mg (%)	1.11	0.09	1.18	1.09	0.13	0.46	0.49	0.77	0.75
Mn (ppm)	592	156	545	646	33	44	48	189	287
Mo (ppm)	2.51	4.41	1.85	2.47	6.76	11.95	16.9	5.17	1.71
Na (%)	3.01	0.05	2.88	2.9	3.52	0.1	0.13	2.55	2.58
Nb (ppm)	7.8	1.5	7.4	6.6	2.1	3.3	2.9	5.2	5.1
Ni (ppm)	14.4	2.9	14	12.6	2.3	1.6	1	10.6	14.2
P (ppm)	1460	230	1440	1450	480	860	440	1240	1220
Pb (ppm)	11.6	11.7	8.4	13.8	4	3	4.2	6.1	8.4
Rb (ppm)	121.5	53.2	102.5	122	90.3	147.5	151.5	82.9	95
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.01	0.34	0.01	0.01	0.01	0.22	0.63	0.01	-0.01
Sb (ppm)	1.01	4.95	1.8	1.18	0.52	0.84	0.63	1.1	1.13

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	300361	300350	300348	300412	300425	301396	301399	301330	301265
North (NAD 27)	4319378	4319265	4319232	4319105	4319064	4319393	4319343	4319376	4319360
Classification	Plag-KSpar	Sericite	Plag-KSpar	Plag-KSpar	Albite-KSpar-Sericite	Sericite	Sericite	Plag-KSpar	Plag-KSpar
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437046	H437047	H437048	H437049	H437050	H437051	H437052	H437053	H437054
Lithology	McLeod	McLeod	McLeod	McLeod	Porphyry	Bear	Bear	McLeod	McLeod
Sc (ppm)	10.5	0.9	10.6	10.2	5.3	12.3	9.6	8.8	8.5
Se (ppm)	2	11	2	2	4	10	7	2	2
Sn (ppm)	1.3	0.6	1.3	1.1	0.6	1.6	2	1	1.2
Sr (ppm)	864	241	660	863	378	110.5	76.7	833	675
Ta (ppm)	0.49	0.09	0.46	0.43	0.13	0.23	0.18	0.35	0.32
Te (ppm)	0.06	4.3	0.06	0.06	0.32	2.89	2.5	0.15	0.07
Th (ppm)	15.9	3.8	16.9	17.1	4.2	14	3.7	9.8	8.4
Ti (%)	0.469	0.12	0.448	0.424	0.195	0.321	0.238	0.342	0.354
Tl (ppm)	0.39	0.27	0.35	0.31	0.52	0.63	0.67	0.32	0.44
U (ppm)	4.3	2.6	6.2	5.2	2.2	2.8	2.5	5	3.8
V (ppm)	128	43	129	125	52	119	108	98	96
W (ppm)	1.5	1.6	2.3	1.6	1.5	3.2	6.1	1.5	1.9
Y (ppm)	13.1	0.9	13.6	12.9	3.5	1.6	1.4	11.4	12.3
Zn (ppm)	64	11	47	79	3	2	3	14	30
Zr (ppm)	8.1	7.3	9.7	14.7	43.9	12.7	16.1	11.7	12.6
Al2O3 (%)	13.34	5.78	13.19	13.43	13.19	13.87	12.51	13.37	13.30
CaO (%)	3.95	0.63	2.77	3.96	0.56	0.06	0.15	2.62	2.00
FeO (%)	4.98	2.47	6.34	4.95	2.17	4.64	5.59	3.59	3.94
K2O (%)	3.62	1.65	3.80	3.64	3.64	4.75	4.36	4.27	3.83
MgO (%)	1.84	0.15	1.96	1.81	0.22	0.76	0.81	1.28	1.24
Na2O (%)	4.06	0.07	3.88	3.91	4.74	0.13	0.18	3.44	3.48
P2O5 (%)	0.33	0.05	0.33	0.33	0.11	0.20	0.10	0.28	0.28
TiO2 (%)	0.78	0.20	0.75	0.71	0.33	0.54	0.40	0.57	0.59
SO3 (%)	0.03	0.85	0.03	0.03	0.03	0.55	1.58	0.03	-0.03
Total (%)	32.91	11.85	33.03	32.76	24.98	25.49	25.68	29.44	28.63
SiO2 (%)	64.78	87.32	64.66	64.95	73.27	72.72	72.53	68.50	69.36
Al_m	0.26	0.11	0.26	0.26	0.26	0.27	0.25	0.26	0.26
Ca_m	0.07	0.01	0.05	0.07	0.01	0.00	0.00	0.05	0.04
K_m	0.08	0.04	0.08	0.08	0.08	0.10	0.09	0.09	0.08
Na_m	0.13	0.00	0.13	0.13	0.15	0.00	0.01	0.11	0.11
K_Al	0.29	0.31	0.31	0.29	0.30	0.37	0.38	0.35	0.31
Na_Al	0.50	0.02	0.48	0.48	0.59	0.02	0.02	0.42	0.43
Plag	0.77	0.12	0.68	0.75	0.63	0.02	0.03	0.60	0.57

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	301213	301127	301145	301242	301344	300996	300901	302150
North (NAD 27)	4319354	4319360	4319278	4319484	4319486	4319202	4319097	4320001
Classification	Albite-KSpar-Sericite	Sericite	Sericite	Sericite	Albite-KSpar-Sericite	Albite-KSpar-Sericite	Plag-KSpar	Plagioclase
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437055	H437056	H437057	H437058	H437059	H437060	H437061	H437062
Lithology	Porphyry	Porphyry	Porphyry	Bear	Bear	Porphyry	Porphyry	Porphyry
Ag (ppm)	0.07	0.29	0.04	0.06	0.27	0.01	0.02	-0.01
Al (%)	7.01	6.48	7.05	7.04	6.93	7.22	7.03	7.01
As (ppm)	1.8	12	6.6	1.4	1.9	5	2.7	1.7
Ba (ppm)	2810	2450	4610	1120	1130	2920	1890	1380
Be (ppm)	1.81	1.15	1.06	2.26	2.01	1.67	1.55	2.09
Bi (ppm)	0.15	3.07	0.34	0.24	1.25	0.24	0.22	0.34
Ca (%)	0.24	0.19	0.66	0.07	0.39	0.95	1.79	1.52
Cd (ppm)	-0.02	0.04	-0.02	-0.02	0.02	0.02	0.02	0.03
Ce (ppm)	30.6	30.4	43.8	29.9	35.1	39	49.3	49.5
Co (ppm)	0.9	0.6	1.5	0.3	0.3	1	3.7	0.6
Cr (ppm)	7	8	10	9	7	14	18	13
Cs (ppm)	1.19	1.58	1.42	2.07	1.44	1.07	0.51	0.73
Cu (ppm)	264	104.5	230	16.3	26.1	198.5	556	7.9
Fe (%)	1.31	3.48	1.82	1.74	0.71	1.31	2	0.83
Ga (ppm)	19.35	25.8	22.5	23.9	21.7	20.2	20.7	20.5
Ge (ppm)	0.11	0.17	0.18	0.12	0.13	0.13	0.18	0.17
Hf (ppm)	1.3	0.5	1.4	1	0.9	1.5	1.5	1.4
In (ppm)	0.026	0.234	0.069	0.077	0.082	0.03	0.03	0.075
K (%)	3.54	3.69	4.62	4	2.45	4.05	2.88	1.28
La (ppm)	15.9	16.3	23.6	15.3	17.7	21.8	25.9	25
Li (ppm)	3	5	4.1	8.6	4.9	2.7	3.5	2.7
Mg (%)	0.16	0.52	0.26	0.53	0.33	0.34	0.72	0.42
Mn (ppm)	38	112	91	101	79	177	244	55
Mo (ppm)	1.77	2.96	1.38	14.85	3.79	1.65	0.53	1.51
Na (%)	2.3	0.33	0.9	0.1	2.63	2.54	2.94	3.26
Nb (ppm)	2.6	2.3	1.9	3.2	3.9	2.2	2.9	2.8
Ni (ppm)	2.3	2.6	3.5	2	2.1	5.2	10.9	4.4
P (ppm)	370	600	370	650	150	510	830	470
Pb (ppm)	4.7	8.6	6.2	5.9	3	7.3	9.1	3.5
Rb (ppm)	94.5	137.5	97.3	168	92.2	112.5	74.8	31.4
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.01	0.48	0.01	0.27	0.06	0.02	0.01	0.02
Sb (ppm)	0.85	1.55	0.99	0.72	0.48	1.5	1.46	0.81

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	301213	301127	301145	301242	301344	300996	300901	302150
North (NAD 27)	4319354	4319360	4319278	4319484	4319486	4319202	4319097	4320001
Classification	Albite-KSpar-Sericite	Sericite	Sericite	Sericite	Albite-KSpar-Sericite	Albite-KSpar-Sericite	Plag-KSpar	Plagioclase
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437055	H437056	H437057	H437058	H437059	H437060	H437061	H437062
Lithology	Porphyry	Porphyry	Porphyry	Bear	Bear	Porphyry	Porphyry	Porphyry
Sc (ppm)	4.6	7.4	4.1	9.1	8.3	4.1	6.8	4.5
Se (ppm)	4	3	1	2	4	1	1	1
Sn (ppm)	0.6	1.7	0.7	0.8	1.4	0.6	0.7	0.8
Sr (ppm)	573	238	670	56.2	203	758	834	1375
Ta (ppm)	0.18	0.21	0.17	0.28	0.37	0.19	0.24	0.25
Te (ppm)	0.17	2.96	0.17	0.62	0.65	0.11	0.07	0.33
Th (ppm)	5.7	8.5	6.7	16.7	19	6.7	8.1	9
Ti (%)	0.211	0.345	0.175	0.216	0.258	0.205	0.28	0.23
Tl (ppm)	0.51	0.7	1.14	1.11	0.55	0.88	0.4	0.15
U (ppm)	4.4	2.8	4.4	2.6	3.5	2.8	3	3.9
V (ppm)	42	107	49	97	103	42	63	45
W (ppm)	1	4	1.6	1.8	3.7	0.8	0.7	1
Y (ppm)	5.2	1.6	5.2	2.1	4.5	5.7	6.6	3.6
Zn (ppm)	2	21	5	19	6	13	18	3
Zr (ppm)	32.3	9.9	33.8	16.7	17.2	36.5	40.9	27.9
Al2O3 (%)	13.24	12.24	13.32	13.30	13.09	13.64	13.28	13.24
CaO (%)	0.34	0.27	0.92	0.10	0.55	1.33	2.50	2.13
FeO (%)	1.68	4.48	2.34	2.24	0.91	1.68	2.57	1.07
K2O (%)	4.27	4.45	5.57	4.82	2.95	4.88	3.47	1.54
MgO (%)	0.27	0.86	0.43	0.88	0.55	0.56	1.19	0.70
Na2O (%)	3.10	0.44	1.21	0.13	3.55	3.42	3.96	4.39
P2O5 (%)	0.08	0.14	0.08	0.15	0.03	0.12	0.19	0.11
TiO2 (%)	0.35	0.58	0.29	0.36	0.43	0.34	0.47	0.38
SO3 (%)	0.03	1.20	0.03	0.68	0.15	0.05	0.03	0.05
Total (%)	23.36	24.65	24.19	22.65	22.21	26.03	27.67	23.61
SiO2 (%)	75.01	73.63	74.11	75.76	76.24	72.15	70.40	74.74
Al_m	0.26	0.24	0.26	0.26	0.26	0.27	0.26	0.26
Ca_m	0.01	0.00	0.02	0.00	0.01	0.02	0.04	0.04
K_m	0.09	0.09	0.12	0.10	0.06	0.10	0.07	0.03
Na_m	0.10	0.01	0.04	0.00	0.11	0.11	0.13	0.14
K_Al	0.35	0.39	0.45	0.39	0.24	0.39	0.28	0.13
Na_Al	0.39	0.06	0.15	0.02	0.45	0.41	0.49	0.55
Plag	0.41	0.08	0.21	0.02	0.48	0.50	0.66	0.69

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	302303	302512	302544	302435	303028	301552	301633	301665
North (NAD 27)	4319953	4319901	4320098	4320148	4320260	4319363	4319285	4319145
Classification	Plagioclase	Plagioclase	Plag-KSpar	Plagioclase	Plagioclase	Albite-KSpar-Sericite	Plag-KSpar	Plagioclase
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437063	H437064	H437065	H437066	H437067	H437068	H437069	H437070
Lithology	Porphyry	Bear (K-spar phenos)	Bear (K-spar phenos)	Porphyry	Porphyry	Porphyry	McLeod	Bear
Ag (ppm)	-0.01	-0.01	0.02	-0.01	0.02	0.01	0.01	0.01
Al (%)	7.14	6.89	6.65	7.14	6.73	6.76	7.12	6.7
As (ppm)	0.7	0.9	0.3	-0.2	0.7	1.4	3	-0.2
Ba (ppm)	200	180	1130	180	260	1500	1990	120
Be (ppm)	2.06	1.79	1.97	2.57	1.88	1.74	3.01	3.34
Bi (ppm)	0.05	0.09	0.09	0.04	0.09	0.63	0.32	0.06
Ca (%)	3.23	3.15	2.64	3.11	2.96	0.34	1.98	1.88
Cd (ppm)	0.04	0.03	0.03	0.04	0.03	0.02	0.04	0.03
Ce (ppm)	43.6	50.7	42	49.5	46.3	28	60	50.3
Co (ppm)	1.3	2.2	5.6	3.4	1.7	0.9	4.1	9.8
Cr (ppm)	15	18	14	15	22	12	11	15
Cs (ppm)	0.3	0.17	0.63	0.24	0.23	0.91	1.06	0.7
Cu (ppm)	27	54.7	17.3	4.4	205	24.2	135	142
Fe (%)	0.59	0.78	1.14	0.7	1.15	0.88	0.87	0.82
Ga (ppm)	22.3	22.6	23.1	20.9	24	21.3	22.8	21.6
Ge (ppm)	0.15	0.15	0.27	0.14	0.15	0.11	0.19	0.16
Hf (ppm)	1	0.9	0.8	1	1.5	1.4	1	0.8
In (ppm)	0.018	0.058	0.042	0.014	0.256	0.065	0.042	0.036
K (%)	0.2	0.18	2.29	0.17	0.26	2.3	4.39	0.19
La (ppm)	21.1	25.1	20.4	25.1	23.7	14.7	23.4	25.8
Li (ppm)	0.8	1.5	2.1	1.3	1.2	2.8	1.7	7.1
Mg (%)	0.6	0.72	0.6	0.77	0.53	0.15	0.74	1.05
Mn (ppm)	108	112	192	143	109	33	162	124
Mo (ppm)	0.97	0.94	0.86	0.88	0.61	1.96	2.16	0.72
Na (%)	4.19	4.09	3.07	4.2	4.34	3.5	2.66	3.87
Nb (ppm)	3.6	3.4	3.2	3.6	2.9	2.1	6.3	2
Ni (ppm)	8.8	7.9	10.4	9.5	9	2.1	10.2	15
P (ppm)	910	990	740	880	710	270	1080	850
Pb (ppm)	5.1	4.1	6.2	4.2	2.4	4.1	7.4	3.1
Rb (ppm)	2.7	1.7	52.4	2	5.4	64.8	108.5	5.6
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	-0.01	-0.01	0.01	-0.01	0.01	0.04	0.01	0.01
Sb (ppm)	0.45	0.46	0.59	0.34	1.04	0.56	0.65	0.39

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	302303	302512	302544	302435	303028	301552	301633	301665
North (NAD 27)	4319953	4319901	4320098	4320148	4320260	4319363	4319285	4319145
Classification	Plagioclase	Plagioclase	Plag-KSpar	Plagioclase	Plagioclase	Albite-KSpar-Sericite	Plag-KSpar	Plagioclase
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437063	H437064	H437065	H437066	H437067	H437068	H437069	H437070
Lithology	Porphyry	Bear (K-spar phenos)	Bear (K-spar phenos)	Porphyry	Porphyry	Porphyry	McLeod	Bear
Sc (ppm)	6.8	6.9	6.5	7.5	5.2	4.7	9.1	7.1
Se (ppm)	1	1	1	1	1	1	1	1
Sn (ppm)	1.3	1.4	0.9	1.1	1.2	0.7	1.7	0.6
Sr (ppm)	1245	1170	1060	1200	1135	671	744	931
Ta (ppm)	0.32	0.3	0.31	0.33	0.24	0.18	0.59	0.19
Te (ppm)	0.05	0.09	0.06	0.05	0.06	0.48	0.14	0.05
Th (ppm)	10.1	12.1	10.5	12.2	7.4	7.6	17	16.5
Ti (%)	0.301	0.297	0.264	0.299	0.246	0.182	0.368	0.151
Tl (ppm)	0.03	0.02	0.16	0.02	0.03	0.29	0.45	0.04
U (ppm)	2.9	2.6	2.9	2.5	3.6	3.7	5.8	3.2
V (ppm)	43	55	57	57	67	33	84	51
W (ppm)	0.3	0.4	0.3	0.3	0.4	1.8	1	0.6
Y (ppm)	8.3	7.9	7	7.7	6.5	2.5	17.9	11.5
Zn (ppm)	9	7	14	10	5	5	18	9
Zr (ppm)	13.7	12.2	11.6	14.7	31.9	28.9	20.2	14.6
Al2O3 (%)	13.49	13.02	12.56	13.49	12.71	12.77	13.45	12.66
CaO (%)	4.52	4.41	3.69	4.35	4.14	0.48	2.77	2.63
FeO (%)	0.76	1.00	1.47	0.90	1.48	1.13	1.12	1.05
K2O (%)	0.24	0.22	2.76	0.20	0.31	2.77	5.29	0.23
MgO (%)	0.99	1.19	0.99	1.28	0.88	0.25	1.23	1.74
Na2O (%)	5.65	5.51	4.14	5.66	5.85	4.72	3.59	5.22
P2O5 (%)	0.21	0.23	0.17	0.20	0.16	0.06	0.25	0.19
TiO2 (%)	0.50	0.50	0.44	0.50	0.41	0.30	0.61	0.25
SO3 (%)	-0.03	-0.03	0.03	-0.03	0.03	0.10	0.03	0.03
Total (%)	26.33	26.05	26.25	26.56	25.97	22.58	28.33	24.00
SiO2 (%)	71.82	72.13	71.91	71.58	72.21	75.84	69.69	74.32
Al_m	0.26	0.26	0.25	0.26	0.25	0.25	0.26	0.25
Ca_m	0.08	0.08	0.07	0.08	0.07	0.01	0.05	0.05
K_m	0.01	0.00	0.06	0.00	0.01	0.06	0.11	0.00
Na_m	0.18	0.18	0.13	0.18	0.19	0.15	0.12	0.17
K_Al	0.02	0.02	0.24	0.02	0.03	0.24	0.43	0.02
Na_Al	0.69	0.70	0.54	0.69	0.76	0.61	0.44	0.68
Plag	0.99	1.01	0.81	0.98	1.05	0.64	0.63	0.87

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	301651	301645	301532	301466	301349	301383	301372	301291	301144
North (NAD 27)	4319045	4318926	4318891	4318824	4318858	4318747	4318642	4318601	4318493
Classification	Plagioclase	Plag-KSpar	Plagioclase	Plag-KSpar	Plag-KSpar	Plagioclase	Plagioclase	Albite	Sericite
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437071	H437072	H437073	H437074	H437075	H437076	H437077	H437078	H437079
Lithology	Bear	Porphyry	Bear	Bear	McLeod	Porphyry	McLeod	McLeod	Bear
Ag (ppm)	0.01	-0.01	-0.01	0.04	0.08	0.04	-0.01	0.01	0.16
Al (%)	6.64	6.56	6.88	6.61	7.27	6.71	7.25	7.17	8.35
As (ppm)	-0.2	2	1.7	5.1	1.7	1.1	1.7	5.4	8.3
Ba (ppm)	150	1250	210	1170	1460	150	780	240	1180
Be (ppm)	2.65	2.14	2.35	2.24	2.39	2.2	2.39	2.47	1.69
Bi (ppm)	0.08	0.09	0.08	0.32	0.42	0.98	0.17	0.13	2.61
Ca (%)	3.53	1.67	2.84	2.4	2.78	1.56	1.89	0.42	0.08
Cd (ppm)	0.07	0.02	0.02	0.03	0.05	-0.02	0.02	-0.02	0.02
Ce (ppm)	39.4	47.6	56.6	44.4	52.4	36.1	53.5	56.2	37.8
Co (ppm)	3.3	2.8	2.2	7.4	13.3	0.4	9.4	8.9	0.9
Cr (ppm)	15	15	9	13	10	13	10	8	8
Cs (ppm)	0.29	1.04	0.53	2.03	1.48	0.47	1.36	1.16	1.94
Cu (ppm)	217	127	52.3	434	281	14.7	140.5	375	168.5
Fe (%)	0.53	0.94	0.82	1.5	2.81	1.89	1.67	1.97	3.31
Ga (ppm)	22.6	21.1	21.8	22.1	22.9	19.75	22.1	22.5	30.2
Ge (ppm)	0.18	0.16	0.15	0.18	0.21	0.14	0.18	0.15	0.14
Hf (ppm)	1.1	1	0.9	0.7	0.7	1.3	1.2	0.9	0.7
In (ppm)	0.037	0.046	0.033	0.071	0.11	0.02	0.031	0.03	0.229
K (%)	0.1	2.97	0.36	2.4	2.88	0.39	1.6	1.05	3.69
La (ppm)	14.5	23.2	24.6	21	25.8	18.8	27.6	28.4	19.1
Li (ppm)	1	3.2	3	9	6.6	2	6.1	8.5	6.5
Mg (%)	0.66	0.33	0.95	0.85	1.22	0.22	0.79	1.58	0.41
Mn (ppm)	154	107	115	183	409	50	211	122	78
Mo (ppm)	0.61	1.28	0.94	3.98	3	3.57	2.49	1.89	2.41
Na (%)	4	2.82	4.08	3.13	2.89	3.5	3.76	4.05	0.09
Nb (ppm)	5.1	4.7	5.9	5.2	4.6	1.3	5.1	4.9	3.3
Ni (ppm)	3.7	7.9	8.2	10.8	16.4	1.3	10.7	17.7	2.1
P (ppm)	210	630	1070	1020	1420	460	940	1260	580
Pb (ppm)	4.6	6.6	3.4	7.3	10	3.8	5.8	1.9	4.7
Rb (ppm)	1.1	68.8	8.6	64.7	80.7	12.5	50.4	58.1	195
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.02	0.01	0.01	0.01	0.01	0.36	0.02	0.01	0.04
Sb (ppm)	0.51	0.3	0.61	1.34	0.81	0.25	0.39	1.84	0.8

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	301651	301645	301532	301466	301349	301383	301372	301291	301144
North (NAD 27)	4319045	4318926	4318891	4318824	4318858	4318747	4318642	4318601	4318493
Classification	Plagioclase	Plag-KSpar	Plagioclase	Plag-KSpar	Plag-KSpar	Plagioclase	Plagioclase	Albite	Sericite
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437071	H437072	H437073	H437074	H437075	H437076	H437077	H437078	H437079
Lithology	Bear	Porphyry	Bear	Bear	McLeod	Porphyry	McLeod	McLeod	Bear
Sc (ppm)	14.7	6.4	9	8.8	11.8	3.6	8.3	9.3	10.5
Se (ppm)	1	1	1	1	2	4	2	1	2
Sn (ppm)	1.2	1	1.7	1.2	1.1	0.6	1	1	1.3
Sr (ppm)	1020	806	926	729	1005	1450	815	216	332
Ta (ppm)	0.45	0.45	0.53	0.45	0.37	0.11	0.49	0.44	0.32
Te (ppm)	0.05	0.09	0.06	0.22	0.27	0.69	0.14	0.08	1.71
Th (ppm)	13.6	15	11.5	13	10.2	7.8	14.6	16.5	7.4
Ti (%)	0.359	0.288	0.363	0.364	0.42	0.118	0.341	0.367	0.367
Tl (ppm)	0.03	0.24	0.05	0.28	0.3	0.05	0.17	0.21	0.81
U (ppm)	2.6	4.5	4.1	3.5	2.8	2.2	4.9	4.4	5.5
V (ppm)	38	54	63	89	110	29	79	91	105
W (ppm)	0.3	1	0.3	2.8	2.1	0.8	1.1	3.9	10.2
Y (ppm)	18	11.4	15	12	13.5	1.7	12.9	15	1.7
Zn (ppm)	12	11	9	22	40	5	16	17	5
Zr (ppm)	19.7	15.1	13.9	12.9	11.4	28	20.7	14.1	13.8
Al2O3 (%)	12.54	12.39	13.00	12.49	13.73	12.68	13.70	13.54	15.77
CaO (%)	4.94	2.34	3.97	3.36	3.89	2.18	2.64	0.59	0.11
FeO (%)	0.68	1.21	1.05	1.93	3.61	2.43	2.15	2.53	4.26
K2O (%)	0.12	3.58	0.43	2.89	3.47	0.47	1.93	1.27	4.45
MgO (%)	1.09	0.55	1.58	1.41	2.02	0.36	1.31	2.62	0.68
Na2O (%)	5.39	3.80	5.50	4.22	3.90	4.72	5.07	5.46	0.12
P2O5 (%)	0.05	0.14	0.25	0.23	0.33	0.11	0.22	0.29	0.13
TiO2 (%)	0.60	0.48	0.61	0.61	0.70	0.20	0.57	0.61	0.61
SO3 (%)	0.05	0.03	0.03	0.03	0.03	0.90	0.05	0.03	0.10
Total (%)	25.47	24.51	26.41	27.16	31.68	24.04	27.63	26.94	26.23
SiO2 (%)	72.75	73.77	71.74	70.94	66.11	74.27	70.44	71.18	71.93
Al_m	0.25	0.24	0.25	0.24	0.27	0.25	0.27	0.27	0.31
Ca_m	0.09	0.04	0.07	0.06	0.07	0.04	0.05	0.01	0.00
K_m	0.00	0.08	0.01	0.06	0.07	0.01	0.04	0.03	0.09
Na_m	0.17	0.12	0.18	0.14	0.13	0.15	0.16	0.18	0.00
K_Al	0.01	0.31	0.04	0.25	0.27	0.04	0.15	0.10	0.31
Na_Al	0.71	0.50	0.70	0.56	0.47	0.61	0.61	0.66	0.01
Plag	1.07	0.68	0.97	0.80	0.72	0.77	0.78	0.70	0.02

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	301760	301678	301512	301863	301706	301615	301562	301526	301690
North (NAD 27)	4318804	4318721	4318603	4320738	4320820	4320834	4320930	4320892	4320894
Classification	Albite-KSpar-Sericite	Plag-KSpar	Plag-KSpar	Plag-KSpar	Sericite	Albite	Sericite	Sericite	Plag-KSpar
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437080	H437081	H437082	H437083	H437084	H437085	H437086	H437087	H437088
Lithology	Porphyry	Bear	Bear	Porphyry	Bear	Bear?	Porphyry	Bear?	Porphyry
Ag (ppm)	0.02	-0.01	0.01	0.01	-0.01	-0.01	0.01	0.14	0.01
Al (%)	6.87	6.96	6.9	6.87	6.61	6.51	6.91	5.74	6.9
As (ppm)	1.7	1	2.6	1.2	3.2	6	4.8	1.1	2.4
Ba (ppm)	900	1510	1080	1780	550	140	1170	510	1930
Be (ppm)	1.74	2.49	2.15	1.79	2.11	2.38	1.93	0.76	1.63
Bi (ppm)	0.14	0.15	0.22	0.18	3.17	0.2	1.35	11.25	0.2
Ca (%)	0.75	2.08	2.04	1.97	0.08	0.32	0.07	0.09	1.88
Cd (ppm)	0.02	0.03	0.02	0.03	0.02	0.03	0.02	-0.02	0.03
Ce (ppm)	54.4	49	51.1	36.1	22.1	6.1	7.77	8.61	32.7
Co (ppm)	5.8	5.7	7.4	2.9	0.7	2.2	0.3	0.5	1.8
Cr (ppm)	13	14	10	10	8	8	8	5	11
Cs (ppm)	0.78	0.79	1.15	1.02	1.86	0.71	1.27	0.94	1.11
Cu (ppm)	172	69.3	1775	59.7	30.2	11.6	23.8	18.9	152
Fe (%)	1.35	1.66	1.6	1.51	0.9	0.59	1.96	0.9	1.53
Ga (ppm)	21.2	21.7	22.5	21	24.9	18.6	25.2	14.85	22.1
Ge (ppm)	0.16	0.17	0.18	0.17	0.12	0.1	0.11	0.1	0.17
Hf (ppm)	0.7	1.4	1.2	1.4	2.1	1.7	1.7	2.4	1.4
In (ppm)	0.034	0.036	0.039	0.026	0.059	0.022	0.031	0.035	0.027
K (%)	2.18	3.26	2.24	2.64	3.07	0.71	3.74	2.81	2.84
La (ppm)	29.2	25.3	24.1	18.7	11.1	2.5	4.5	4.3	16.4
Li (ppm)	5.2	2.4	7.9	3.1	9.8	5.2	7.7	6.9	4.5
Mg (%)	0.87	0.64	0.81	0.37	0.57	0.53	0.45	0.26	0.39
Mn (ppm)	128	213	210	221	65	42	61	31	235
Mo (ppm)	1.81	1.63	1.7	1.35	8.34	1.65	1.52	6.54	0.41
Na (%)	3.38	2.85	3.11	2.67	0.12	3.54	0.05	0.07	2.72
Nb (ppm)	3.4	4.1	5.2	2.6	2.3	2.5	2.5	3	2.6
Ni (ppm)	12.6	11.1	13.1	9.2	5.9	6	1.8	1.3	10.4
P (ppm)	850	800	1050	690	350	730	240	100	690
Pb (ppm)	3.5	8.3	6.7	6	2.8	3	3.1	2.7	5.9
Rb (ppm)	65.5	84.5	62.8	65.2	152	41.1	141.5	111	73.5
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.01	0.01	-0.01	0.01	0.04	0.03	0.1	0.05	0.02
Sb (ppm)	0.67	0.31	0.52	1.09	1.37	0.99	1.56	1.19	1.51

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	301760	301678	301512	301863	301706	301615	301562	301526	301690
North (NAD 27)	4318804	4318721	4318603	4320738	4320820	4320834	4320930	4320892	4320894
Classification	Albite-KSpar-Sericite	Plag-KSpar	Plag-KSpar	Plag-KSpar	Sericite	Albite	Sericite	Sericite	Plag-KSpar
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437080	H437081	H437082	H437083	H437084	H437085	H437086	H437087	H437088
Lithology	Porphyry	Bear	Bear	Porphyry	Bear	Bear?	Porphyry	Bear?	Porphyry
Sc (ppm)	6.7	6.9	8.8	5.2	6.9	5.5	5.2	5.5	5.4
Se (ppm)	1	1	1	1	2	1	3	3	1
Sn (ppm)	1	1	1.2	0.7	1.6	1.1	0.8	1.2	0.6
Sr (ppm)	546	974	866	890	48.2	143	37.6	39.6	754
Ta (ppm)	0.3	0.36	0.49	0.22	0.25	0.22	0.21	0.33	0.22
Te (ppm)	0.1	0.11	0.11	0.06	1.01	0.15	1.31	2.66	0.06
Th (ppm)	10.6	13.1	15.1	7.8	19.1	17.6	5.9	6.7	7.1
Ti (%)	0.275	0.281	0.341	0.214	0.158	0.175	0.208	0.159	0.215
Tl (ppm)	0.25	0.26	0.21	0.35	0.91	0.23	0.61	0.76	0.43
U (ppm)	3.4	4.3	6.1	3.4	3	4.9	3.2	2.9	3
V (ppm)	56	60	76	51	67	44	51	57	51
W (ppm)	1.7	0.8	0.8	0.6	3.8	4.2	1.7	1.4	0.6
Y (ppm)	8.8	9.3	14.6	5.9	3.8	4.4	1.8	3.3	7.2
Zn (ppm)	12	20	25	12	6	5	4	3	19
Zr (ppm)	10.9	30.6	20.9	28.8	51.8	38.3	37	62.3	29.9
Al2O3 (%)	12.98	13.15	13.03	12.98	12.49	12.30	13.05	10.84	13.03
CaO (%)	1.05	2.91	2.85	2.76	0.11	0.45	0.10	0.13	2.63
FeO (%)	1.74	2.13	2.06	1.94	1.16	0.76	2.52	1.16	1.97
K2O (%)	2.63	3.93	2.70	3.18	3.70	0.86	4.51	3.39	3.42
MgO (%)	1.44	1.06	1.34	0.61	0.95	0.88	0.75	0.43	0.65
Na2O (%)	4.56	3.84	4.19	3.60	0.16	4.77	0.07	0.09	3.67
P2O5 (%)	0.19	0.18	0.24	0.16	0.08	0.17	0.05	0.02	0.16
TiO2 (%)	0.46	0.47	0.57	0.36	0.26	0.29	0.35	0.27	0.36
SO3 (%)	0.03	0.03	-0.03	0.03	0.10	0.08	0.25	0.13	0.05
Total (%)	25.07	27.70	26.96	25.61	19.01	20.54	21.64	16.45	25.93
SiO2 (%)	73.18	70.36	71.15	72.60	79.66	78.02	76.84	82.40	72.25
Al_m	0.25	0.26	0.26	0.25	0.24	0.24	0.26	0.21	0.26
Ca_m	0.02	0.05	0.05	0.05	0.00	0.01	0.00	0.00	0.05
K_m	0.06	0.08	0.06	0.07	0.08	0.02	0.10	0.07	0.07
Na_m	0.15	0.12	0.14	0.12	0.01	0.15	0.00	0.00	0.12
K_Al	0.22	0.32	0.22	0.27	0.32	0.08	0.37	0.34	0.28
Na_Al	0.58	0.48	0.53	0.46	0.02	0.64	0.01	0.01	0.46
Plag	0.65	0.68	0.73	0.65	0.03	0.67	0.02	0.02	0.65

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	301417	301283	301169	301121	301247	301202	301046	301043
North (NAD 27)	4321183	4321168	4321164	4321348	4321365	4319886	4320049	4320029
Classification	Albite-KSpar-Sericite	Sericite	Sericite	Sericite	Sericite	Albite-KSpar-Sericite	Plag-KSpar	Sericite
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437089	H437090	H437091	H437092	H437093	H437094	H437095	H437096
Lithology	Bear	Bear	Bear	Bear? Artesia?	Bear? Artesia?	Porphyry	Bear	Bear
Ag (ppm)	0.04	0.14	0.48	0.01	0.02	0.02	0.04	0.2
Al (%)	6.42	1.88	9.1	8.36	7.39	6.63	7.42	4.3
As (ppm)	2.1	5.8	36.3	20.7	48.5	4.2	8.6	8.2
Ba (ppm)	1040	920	6020	470	760	1960	1290	270
Be (ppm)	2.25	0.16	0.94	1.1	2.4	1.65	1.99	0.3
Bi (ppm)	1.09	0.17	0.55	0.5	0.42	0.44	0.19	0.69
Ca (%)	0.11	0.05	0.14	0.39	0.24	0.34	3.04	0.05
Cd (ppm)	0.02	0.02	0.03	-0.02	-0.02	0.04	0.05	0.02
Ce (ppm)	46	20.4	59	29.4	50	22.4	64.9	17.65
Co (ppm)	0.5	0.4	8.6	2.7	1.3	0.6	17.4	0.6
Cr (ppm)	4	18	28	77	8	18	10	12
Cs (ppm)	1.78	0.22	0.58	1.64	1.11	0.61	0.68	0.52
Cu (ppm)	70.9	98.2	359	64.9	15.8	34.3	120	85.2
Fe (%)	1.34	1.35	5.41	2.99	1.65	1.01	4.15	2.02
Ga (ppm)	21.1	2.5	9.62	23	29.1	21.6	24	4.99
Ge (ppm)	0.16	0.13	0.26	0.13	0.14	0.11	0.25	0.13
Hf (ppm)	3.6	1.3	0.5	0.3	2.8	1.8	1.4	0.4
In (ppm)	0.024	-0.005	0.011	0.099	0.058	0.017	0.044	-0.005
K (%)	2.72	0.88	4.24	2.2	3.12	2.97	2.76	1.78
La (ppm)	31.5	10.1	25	12.6	23.4	12.7	31.2	8.6
Li (ppm)	2.7	0.6	2.1	14.3	7.6	1.4	2.9	1.6
Mg (%)	0.19	0.02	0.1	0.74	0.64	0.05	1.3	0.05
Mn (ppm)	29	41	29	76	36	38	486	28
Mo (ppm)	7.2	5.05	40	7.45	1.69	3.57	2.18	4.1
Na (%)	2.46	0.07	0.13	0.37	0.24	3.55	3.19	0.05
Nb (ppm)	3.9	1.3	0.5	1.2	2.5	3.3	5.1	1.7
Ni (ppm)	1.2	1	10.4	12.2	7.5	3.1	17.7	1.3
P (ppm)	430	470	1260	1040	290	140	1480	520
Pb (ppm)	9.4	9.6	11.3	25.6	8	5.6	9.4	5.4
Rb (ppm)	91.7	24.1	88.7	77.5	90.2	74.8	80.8	58.8
Re (ppm)	-0.002	-0.002	0.006	0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.03	0.36	0.21	0.04	0.1	0.04	0.02	0.04
Sb (ppm)	0.81	5.03	5.91	2.86	17.55	0.79	2.77	6.73

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	301417	301283	301169	301121	301247	301202	301046	301043
North (NAD 27)	4321183	4321168	4321164	4321348	4321365	4319886	4320049	4320029
Classification	Albite-KSpar-Sericite	Sericite	Sericite	Sericite	Sericite	Albite-KSpar-Sericite	Plag-KSpar	Sericite
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437089	H437090	H437091	H437092	H437093	H437094	H437095	H437096
Lithology	Bear	Bear	Bear	Bear? Artesia?	Bear? Artesia?	Porphyry	Bear	Bear
Sc (ppm)	6.6	2	1.5	10.3	12.3	3.5	14.6	3
Se (ppm)	8	14	19	1	3	2	3	4
Sn (ppm)	1	0.4	0.9	3.8	0.9	0.8	1.1	0.8
Sr (ppm)	255	83.9	96.5	75.2	63.4	572	936	59.6
Ta (ppm)	0.41	0.15	-0.05	0.1	0.19	0.25	0.35	0.11
Te (ppm)	0.2	1.57	0.51	0.31	1.69	0.15	0.17	0.51
Th (ppm)	17.5	8.6	7	2.5	10.1	10	14.2	3.8
Ti (%)	0.212	0.058	0.087	0.182	0.229	0.232	0.438	0.159
Tl (ppm)	0.54	0.27	0.93	1.75	0.84	0.47	0.31	0.32
U (ppm)	4.2	1.3	1.2	2.5	3.9	4.8	4.6	0.8
V (ppm)	56	25	133	98	136	28	153	52
W (ppm)	1.5	0.4	2.2	6.8	0.9	1	1.3	1.6
Y (ppm)	4.9	0.9	3.1	6.9	5.2	1.7	16.1	0.9
Zn (ppm)	8	2	44	19	7	8	29	4
Zr (ppm)	88.4	39.4	16.7	10.1	87.8	40.8	36.4	10
Al2O3 (%)	12.13	3.55	17.19	15.79	13.96	12.52	14.02	8.12
CaO (%)	0.15	0.07	0.20	0.55	0.34	0.48	4.25	0.07
FeO (%)	1.72	1.74	6.96	3.85	2.12	1.30	5.34	2.60
K2O (%)	3.28	1.06	5.11	2.65	3.76	3.58	3.33	2.14
MgO (%)	0.32	0.03	0.17	1.23	1.06	0.08	2.16	0.08
Na2O (%)	3.32	0.09	0.18	0.50	0.32	4.79	4.30	0.07
P2O5 (%)	0.10	0.11	0.29	0.24	0.07	0.03	0.34	0.12
TiO2 (%)	0.35	0.10	0.15	0.30	0.38	0.39	0.73	0.27
SO3 (%)	0.08	0.90	0.53	0.10	0.25	0.10	0.05	0.10
Total (%)	21.44	7.65	30.75	25.20	22.26	23.26	34.51	13.57
SiO2 (%)	77.06	91.81	67.10	73.03	76.18	75.11	63.08	85.48
Al_m	0.24	0.07	0.34	0.31	0.27	0.25	0.27	0.16
Ca_m	0.00	0.00	0.00	0.01	0.01	0.01	0.08	0.00
K_m	0.07	0.02	0.11	0.06	0.08	0.08	0.07	0.05
Na_m	0.11	0.00	0.01	0.02	0.01	0.15	0.14	0.00
K_Al	0.29	0.32	0.32	0.18	0.29	0.31	0.26	0.29
Na_Al	0.45	0.04	0.02	0.05	0.04	0.63	0.50	0.01
Plag	0.46	0.06	0.03	0.08	0.06	0.66	0.78	0.02

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	300912	300826	300801	300804	300914	300938	300938	300950
North (NAD 27)	4320004	4319942	4320058	4320110	4320805	4320966	4320760	4320690
Classification	Pyroph/Alun/Topaz	Albite-KSpar-Sericite	Sericite	Albite	Sericite-Albite	Sericite-Albite	Sericite	Plag-KSpar
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437097	H437098	H437099	H437100	H437101	H437102	H437103	H437104
Lithology	Bear?	Bear	Bear (graphic txt.)	Porphyry	Porphyry (Blue Hill)	Artesia Andesite	Artesia Andesite	Artesia Andesite ± Volc Ss
Ag (ppm)	0.01	0.02	-0.01	0.01	0.01	0.02	0.07	0.1
Al (%)	4.37	7.1	7.7	5.86	7.42	7.76	7.77	7.3
As (ppm)	3.7	2.6	6.5	4.5	1	3.5	7.8	11.4
Ba (ppm)	620	2080	880	120	1420	740	440	3130
Be (ppm)	0.13	1.44	2.21	0.92	1.43	0.7	0.58	1.26
Bi (ppm)	0.04	0.23	0.85	1.2	0.06	0.98	2.54	0.12
Ca (%)	0.36	0.23	0.14	0.18	0.17	0.16	0.05	2.26
Cd (ppm)	1.57	0.02	0.03	0.04	0.04	0.02	-0.02	0.09
Ce (ppm)	45.6	14.65	53.1	22.5	48.7	30.9	26.6	54.7
Co (ppm)	0.3	0.5	0.5	0.9	3.1	0.7	0.2	18
Cr (ppm)	11	8	7	9	8	39	47	109
Cs (ppm)	0.12	1.16	1.89	0.38	1.53	1.09	1.19	1.61
Cu (ppm)	16.4	47.4	96.8	148	8.2	13.7	37.7	70
Fe (%)	0.34	1.49	2.34	1.49	2.55	0.63	1.6	4.01
Ga (ppm)	4.09	22.4	26.1	17.3	21.2	26.3	12.9	20.6
Ge (ppm)	0.21	0.12	0.16	0.14	0.16	0.13	0.12	0.23
Hf (ppm)	0.4	1.7	1.1	1.5	1.5	0.8	0.7	0.9
In (ppm)	-0.005	0.022	0.054	0.008	0.053	0.097	0.028	0.091
K (%)	0.3	2.97	3.84	0.23	1.95	2.2	1.98	2.14
La (ppm)	20.7	9	25.2	12.1	25.9	14.1	12.7	26.5
Li (ppm)	5.5	1.8	3.4	2.1	4.8	4.7	7.3	7.5
Mg (%)	0.03	0.08	0.36	0.04	0.49	0.25	0.06	2.65
Mn (ppm)	17	60	56	39	69	23	12	1305
Mo (ppm)	1.33	2.45	9.67	2.01	0.26	0.94	2.72	1.54
Na (%)	0.06	3.2	0.38	4.83	2.52	1.97	1.11	2.67
Nb (ppm)	1.9	3	4.1	2.6	1.3	2.1	1.1	3.7
Ni (ppm)	0.9	1.1	1.7	1.3	7.9	6.5	0.9	96.3
P (ppm)	7200	350	500	260	270	300	1060	1940
Pb (ppm)	62.9	6.2	3.8	4.2	9.7	99.3	96.9	32
Rb (ppm)	7.6	77	190	9.7	77.2	55.9	51.4	46.5
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	0.002	-0.002	-0.002
S (%)	0.65	0.02	0.07	0.05	0.01	0.07	0.5	0.03
Sb (ppm)	1.33	0.68	1.72	0.53	1.19	7.79	4.95	6.85

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	300912	300826	300801	300804	300914	300938	300938	300950
North (NAD 27)	4320004	4319942	4320058	4320110	4320805	4320966	4320760	4320690
Classification	Pyroph/Alun/Topaz	Albite-KSpar-Sericite	Sericite	Albite	Sericite-Albite	Sericite-Albite	Sericite	Plag-KSpar
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437097	H437098	H437099	H437100	H437101	H437102	H437103	H437104
Lithology	Bear?	Bear	Bear (graphic txt.)	Porphyry	Porphyry (Blue Hill)	Artesia Andesite	Artesia Andesite	Artesia Andesite ± Volc Ss
Sc (ppm)	1.3	4.7	10.3	3.6	5.1	8.8	3.1	13.8
Se (ppm)	1	7	3	3	1	2	3	1
Sn (ppm)	0.4	0.7	0.8	0.5	0.6	1.3	1.5	1.9
Sr (ppm)	4600	599	90.8	261	269	170	690	921
Ta (ppm)	0.13	0.22	0.32	0.18	0.1	0.14	0.07	0.22
Te (ppm)	0.08	0.56	0.53	0.13	-0.05	0.22	0.51	-0.05
Th (ppm)	8.9	7	17.9	7.1	7	2.8	2.6	2.7
Ti (%)	0.157	0.224	0.25	0.187	0.112	0.277	0.152	0.489
Tl (ppm)	0.03	0.49	0.65	0.04	0.77	1.46	0.91	0.71
U (ppm)	2	4	5.6	2.6	2.6	1.4	0.8	1.7
V (ppm)	72	44	105	30	48	87	89	129
W (ppm)	2	0.9	3.1	2.8	0.9	0.8	0.6	2.3
Y (ppm)	6.4	2.8	7.2	3.3	4	2.9	1.3	11.9
Zn (ppm)	3	8	8	3	17	8	-2	158
Zr (ppm)	10.4	37.9	27.1	34.2	36.5	26.2	21.8	23.9
Al2O3 (%)	8.25	13.41	14.55	11.07	14.02	14.66	14.68	13.79
CaO (%)	0.50	0.32	0.20	0.25	0.24	0.22	0.07	3.16
FeO (%)	0.44	1.92	3.01	1.92	3.28	0.81	2.06	5.16
K2O (%)	0.36	3.58	4.63	0.28	2.35	2.65	2.39	2.58
MgO (%)	0.05	0.13	0.60	0.07	0.81	0.41	0.10	4.39
Na2O (%)	0.08	4.31	0.51	6.51	3.40	2.66	1.50	3.60
P2O5 (%)	1.65	0.08	0.11	0.06	0.06	0.07	0.24	0.44
TiO2 (%)	0.26	0.37	0.42	0.31	0.19	0.46	0.25	0.82
SO3 (%)	1.63	0.05	0.18	0.13	0.03	0.18	1.25	0.08
Total (%)	13.22	24.18	24.19	20.59	24.37	22.12	22.53	34.01
SiO2 (%)	85.85	74.13	74.11	77.97	73.93	76.33	75.89	63.60
Al_m	0.16	0.26	0.29	0.22	0.27	0.29	0.29	0.27
Ca_m	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.06
K_m	0.01	0.08	0.10	0.01	0.05	0.06	0.05	0.05
Na_m	0.00	0.14	0.02	0.21	0.11	0.09	0.05	0.12
K_Al	0.05	0.29	0.35	0.03	0.18	0.20	0.18	0.20
Na_Al	0.02	0.53	0.06	0.97	0.40	0.30	0.17	0.43
Plag	0.07	0.55	0.07	0.99	0.41	0.31	0.17	0.64

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	300944	300952	301084	300746	300911	300632	300593	300375
North (NAD 27)	4320518	4320487	4320446	4320179	4320308	4320328	4320142	4319862
Classification	Sericite	Plag-KSpar	Sericite	Albite	Sericite-Albite	Sericite	Albite	Albite
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437105	H437106	H437107	H437108	H437109	H437110	H437111	H437112
Lithology	Artesia Andesite	Artesia Andesite	McLeod QMD	Porphyry, mafic (or QMDP)	Artesia Andesite	Artesia Andesite	Artesia Andesite (@ct with Ppy)	Porphyry at ct
Ag (ppm)	0.31	0.09	0.57	0.88	0.03	0.02	0.14	0.05
Al (%)	8.38	7.59	8.27	6.31	7.53	7.28	6.66	7.05
As (ppm)	47.6	13.5	16.6	18	7.2	42	5.9	12.9
Ba (ppm)	2770	2680	2120	570	1510	740	630	340
Be (ppm)	2	1.42	0.61	0.88	1.65	2.08	1.11	1.5
Bi (ppm)	1.04	0.19	0.2	1.29	0.02	0.35	0.44	0.24
Ca (%)	0.42	2.28	0.32	0.48	0.95	0.32	0.65	0.3
Cd (ppm)	0.03	0.11	-0.02	0.05	0.4	0.52	0.03	0.02
Ce (ppm)	58	47.7	37.3	45.8	53.1	28.9	33.5	41
Co (ppm)	5.6	6.3	6.4	11.4	15.6	2.3	3	2.7
Cr (ppm)	38	52	21	57	59	25	13	8
Cs (ppm)	1.37	1.53	1.25	1.15	1.56	1.56	1.05	1
Cu (ppm)	302	396	504	5330	86.9	48	857	256
Fe (%)	3.26	3.05	1.19	4.83	4.92	1.87	3.14	1.89
Ga (ppm)	26.8	23.8	7.8	23	22.2	19.6	20.9	20.4
Ge (ppm)	0.21	0.24	0.13	0.21	0.21	0.15	0.18	0.15
Hf (ppm)	0.9	1	0.7	1.3	1.1	0.7	1.4	1.2
In (ppm)	0.056	0.037	0.02	0.13	0.098	0.094	0.051	0.019
K (%)	3.42	4.03	3.15	0.78	2.57	2.4	1.06	0.94
La (ppm)	24.1	23	18.3	22.2	31.8	12.6	18.8	20.1
Li (ppm)	11.3	5	5.4	13.3	8.6	15.8	8.8	6.4
Mg (%)	0.79	1.46	0.46	2.09	1.1	1.71	1.3	0.59
Mn (ppm)	45	735	146	600	401	485	366	54
Mo (ppm)	6.1	3.11	2.29	1.98	1.63	1.58	5.79	0.78
Na (%)	0.45	2.95	0.71	2.27	1.83	0.26	2.95	4.18
Nb (ppm)	1.3	4.5	1.5	2.7	1.2	1.6	2.7	2.5
Ni (ppm)	16.7	54.9	6.8	49.7	41.4	21.4	15.7	8.2
P (ppm)	840	1680	1060	490	750	1360	650	480
Pb (ppm)	18.1	10.3	17.2	5.3	7.7	6.8	5.1	3.6
Rb (ppm)	97.9	84.7	83.7	22.5	95.8	87.6	44.7	40.4
Re (ppm)	-0.002	0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.32	0.02	0.11	0.03	0.07	0.04	0.01	0.01
Sb (ppm)	17.7	2.86	15.4	10.05	2.04	3	1.49	0.7

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	300944	300952	301084	300746	300911	300632	300593	300375
North (NAD 27)	4320518	4320487	4320446	4320179	4320308	4320328	4320142	4319862
Classification	Sericite	Plag-KSpar	Sericite	Albite	Sericite-Albite	Sericite	Albite	Albite
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437105	H437106	H437107	H437108	H437109	H437110	H437111	H437112
Lithology	Artesia Andesite	Artesia Andesite	McLeod QMD	Porphyry, mafic (or QMDP)	Artesia Andesite	Artesia Andesite	Artesia Andesite (@ct with Ppy)	Porphyry at ct
Sc (ppm)	8.6	16.1	7.7	8	11.6	10	6.3	5.6
Se (ppm)	9	3	3	2	1	3	1	1
Sn (ppm)	1.3	0.7	0.6	2	0.9	1	0.7	0.6
Sr (ppm)	117	1055	1150	207	186.5	176.5	256	337
Ta (ppm)	0.07	0.27	0.11	0.17	0.08	0.11	0.19	0.19
Te (ppm)	1.15	0.07	0.63	0.32	-0.05	0.06	0.09	0.08
Th (ppm)	5	3.4	3.3	4	3.3	3.9	6.4	8.1
Ti (%)	0.155	0.568	0.296	0.284	0.167	0.174	0.24	0.209
Tl (ppm)	0.66	0.5	0.55	0.13	1.06	2.45	0.25	0.17
U (ppm)	3.7	2	1.6	4.5	3.3	2.7	3.6	2.9
V (ppm)	120	151	111	101	99	90	73	69
W (ppm)	1.4	1.5	2.3	6.9	1.2	2	4.7	2.8
Y (ppm)	3.7	14.7	2.3	6.7	5.8	3.3	4.8	7.7
Zn (ppm)	11	85	19	95	66	84	50	7
Zr (ppm)	29.3	24.4	18.2	36.6	34.5	22.3	39.7	30.4
Al2O3 (%)	15.83	14.34	15.62	11.92	14.22	13.75	12.58	13.32
CaO (%)	0.59	3.19	0.45	0.67	1.33	0.45	0.91	0.42
FeO (%)	4.19	3.92	1.53	6.21	6.33	2.40	4.04	2.43
K2O (%)	4.12	4.86	3.80	0.94	3.10	2.89	1.28	1.13
MgO (%)	1.31	2.42	0.76	3.47	1.82	2.84	2.16	0.98
Na2O (%)	0.61	3.98	0.96	3.06	2.47	0.35	3.98	5.63
P2O5 (%)	0.19	0.38	0.24	0.11	0.17	0.31	0.15	0.11
TiO2 (%)	0.26	0.95	0.49	0.47	0.28	0.29	0.40	0.35
SO3 (%)	0.80	0.05	0.28	0.08	0.18	0.10	0.03	0.03
Total (%)	27.90	34.09	24.13	26.93	29.89	23.38	25.51	24.40
SiO2 (%)	70.15	63.53	74.18	71.19	68.01	74.98	72.70	73.90
Al_m	0.31	0.28	0.31	0.23	0.28	0.27	0.25	0.26
Ca_m	0.01	0.06	0.01	0.01	0.02	0.01	0.02	0.01
K_m	0.09	0.10	0.08	0.02	0.07	0.06	0.03	0.02
Na_m	0.02	0.13	0.03	0.10	0.08	0.01	0.13	0.18
K_Al	0.28	0.37	0.26	0.09	0.24	0.23	0.11	0.09
Na_Al	0.06	0.46	0.10	0.42	0.29	0.04	0.52	0.70
Plag	0.10	0.66	0.13	0.47	0.37	0.07	0.59	0.72

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	300396	301454	301484	301494	302735	302824	302878	301522
North (NAD 27)	4319865	4319918	4319997	4320087	4319528	4319677	4319803	4319292
Classification	Pyroph/Alun/Topaz	Albite-KSpar-Sericite	Plag-KSpar	Plag-KSpar	Albite	Albite	Plagioclase	Albite-KSpar-Sericite
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437113	H437114	H437115	H437116	H437117	H437118	H437119	H437120
Lithology	Porphyry at ct	Porphyry	Porphyry	McLeod QMD	Bear QM	Bear QM	Bear QM (just w of BH fault)	Bear QM
Ag (ppm)	0.02	0.04	0.01	0.04	0.01	0.41	0.01	0.03
Al (%)	2.96	7	6.96	7.29	6.91	6.82	6.15	7.24
As (ppm)	5.1	10.3	6.8	7.2	-0.2	-0.2	2.4	6
Ba (ppm)	230	2660	2120	760	650	170	350	1610
Be (ppm)	0.18	1.7	1.49	2.46	1.8	1.83	1.44	2.03
Bi (ppm)	0.04	0.61	0.19	0.45	0.04	0.03	0.18	0.32
Ca (%)	0.24	0.53	1.62	2.8	1.29	0.9	1.58	0.87
Cd (ppm)	0.02	0.06	0.04	0.04	0.02	0.02	0.03	0.02
Ce (ppm)	31.7	35	37.2	64	37.9	16.55	28.6	51
Co (ppm)	0.5	1.6	6.3	10.7	2.6	0.7	2.4	5.4
Cr (ppm)	39	12	12	8	12	13	11	7
Cs (ppm)	0.14	0.88	1	1.19	0.7	0.47	0.48	2.39
Cu (ppm)	15.6	17.4	41.2	192	22	8.6	14.2	340
Fe (%)	0.35	1.24	1.63	2.75	0.69	0.29	0.67	1.92
Ga (ppm)	4.56	19.7	21.1	24.1	21.8	18.2	17.9	23.2
Ge (ppm)	0.1	0.12	0.16	0.23	0.17	0.13	0.15	0.2
Hf (ppm)	0.9	1.5	1.2	0.7	0.9	0.6	0.7	0.8
In (ppm)	-0.005	0.064	0.032	0.067	0.034	0.012	0.018	0.059
K (%)	0.37	3.18	2.64	1.78	1.09	0.53	0.73	3.54
La (ppm)	15.8	19.9	20.1	28.5	19.5	8.4	13.5	25
Li (ppm)	1.3	2.3	5.1	5.2	6	2.8	3.5	5.1
Mg (%)	0.02	0.16	0.57	1.15	0.5	0.36	0.72	0.45
Mn (ppm)	38	96	328	368	88	50	104	115
Mo (ppm)	5.02	1.48	1.21	3.76	0.74	0.41	0.78	4.26
Na (%)	0.16	3.09	2.86	3.2	4.13	4.55	3.72	2.6
Nb (ppm)	3.7	2.9	3.1	8.1	3.5	2.7	3.1	5.7
Ni (ppm)	1.6	2.2	8.4	12	7.4	3.5	7.4	8.3
P (ppm)	810	610	660	1480	860	790	740	780
Pb (ppm)	11.8	5.3	6.9	7.7	2.4	1.4	3.6	9.3
Rb (ppm)	7.2	87.6	63.1	57.2	26.6	21.3	16.8	127.5
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.7	0.04	0.02	0.01	0.01	-0.01	-0.01	0.04
Sb (ppm)	4.98	0.56	1.96	1.99	0.43	0.18	0.3	0.61

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	300396	301454	301484	301494	302735	302824	302878	301522
North (NAD 27)	4319865	4319918	4319997	4320087	4319528	4319677	4319803	4319292
Classification	Pyroph/Alun/Topaz	Albite-KSpar-Sericite	Plag-KSpar	Plag-KSpar	Albite	Albite	Plagioclase	Albite-KSpar-Sericite
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437113	H437114	H437115	H437116	H437117	H437118	H437119	H437120
Lithology	Porphyry at ct	Porphyry	Porphyry	McLeod QMD	Bear QM	Bear QM	Bear QM (just w of BH fault)	Bear QM
Sc (ppm)	1.3	4.1	5.2	10.6	5.4	4.4	4.8	9.4
Se (ppm)	1	1	1	2	1	1	1	2
Sn (ppm)	0.6	0.7	0.7	1.7	1.1	1.2	1.1	1.2
Sr (ppm)	1025	649	899	852	706	560	653	695
Ta (ppm)	0.28	0.21	0.22	0.56	0.25	0.2	0.22	0.39
Te (ppm)	0.15	0.82	0.09	0.4	-0.05	-0.05	0.12	0.27
Th (ppm)	7.8	9.3	7.3	22.5	9.5	9.4	8.8	12.2
Ti (%)	0.294	0.196	0.218	0.455	0.246	0.199	0.206	0.375
Tl (ppm)	0.04	0.59	0.41	0.2	0.11	0.05	0.06	0.52
U (ppm)	1.6	3.2	2.9	6.4	2.8	1.8	2.5	8.5
V (ppm)	53	39	52	119	53	35	46	93
W (ppm)	3.3	0.9	1.2	2.1	2	2.5	1.8	3.9
Y (ppm)	1.8	3.4	6.3	16.6	6.2	4.5	6.7	13.5
Zn (ppm)	2	6	23	35	8	3	9	20
Zr (ppm)	23	33.6	25.4	12.3	15.4	8.6	12.8	14.3
Al2O3 (%)	5.59	13.22	13.15	13.77	13.05	12.88	11.62	13.68
CaO (%)	0.34	0.74	2.27	3.92	1.80	1.26	2.21	1.22
FeO (%)	0.45	1.59	2.10	3.54	0.89	0.37	0.86	2.47
K2O (%)	0.45	3.83	3.18	2.14	1.31	0.64	0.88	4.27
MgO (%)	0.03	0.27	0.95	1.91	0.83	0.60	1.19	0.75
Na2O (%)	0.22	4.17	3.86	4.31	5.57	6.13	5.01	3.50
P2O5 (%)	0.19	0.14	0.15	0.34	0.20	0.18	0.17	0.18
TiO2 (%)	0.49	0.33	0.36	0.76	0.41	0.33	0.34	0.63
SO3 (%)	1.75	0.10	0.05	0.03	0.03	-0.03	-0.03	0.10
Total (%)	9.50	24.39	26.06	30.71	24.09	22.37	22.27	26.78
SiO2 (%)	89.84	73.90	72.12	67.14	74.23	76.06	76.18	71.34
Al_m	0.11	0.26	0.26	0.27	0.26	0.25	0.23	0.27
Ca_m	0.01	0.01	0.04	0.07	0.03	0.02	0.04	0.02
K_m	0.01	0.08	0.07	0.05	0.03	0.01	0.02	0.09
Na_m	0.01	0.13	0.12	0.14	0.18	0.20	0.16	0.11
K_Al	0.09	0.31	0.26	0.17	0.11	0.05	0.08	0.34
Na_Al	0.06	0.52	0.48	0.52	0.70	0.78	0.71	0.42
Plag	0.12	0.57	0.64	0.77	0.83	0.87	0.88	0.50

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	301458	301398	301359	301318	301251	301237	301230	301213
North (NAD 27)	4319244	4319156	4319141	4319124	4319099	4319036	4318954	4318912
Classification	Albite	Sericite	Sericite-Albite	Albite-KSpar-Sericite	Plag-KSpar	Sericite-Albite	Plag-KSpar	Plag-KSpar
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437121	H437122	H437123	H437124	H437125	H437126	H437127	H437128
Lithology	Porphyry	Bear QM 1 mm	Bear QM but by 0.5 m wide HT breccia	Porphyry, crowded	McLeod QMD	Porphyry	Bear QM	Porphyry
Ag (ppm)	0.07	0.05	0.03	0.03	0.05	0.08	0.01	0.06
Al (%)	6.85	6.36	5.84	6.85	7.32	7.49	7.46	7.1
As (ppm)	11.6	5.1	5.6	4.1	4.3	6.4	3.7	4
Ba (ppm)	150	2350	640	2090	1550	1930	1050	1540
Be (ppm)	1.51	1.21	1.12	1.67	1.87	1.71	1.79	1.4
Bi (ppm)	0.34	1.38	1.4	1.03	0.61	0.77	0.11	0.24
Ca (%)	0.38	0.24	0.26	0.4	2.3	0.53	2.15	2.75
Cd (ppm)	0.51	0.07	0.06	0.06	0.09	0.06	0.09	0.07
Ce (ppm)	8.06	16.75	28.8	27.7	58.9	42.5	59.5	50.2
Co (ppm)	1.3	1.2	1.3	1.3	17.8	12.9	14.9	3.3
Cr (ppm)	7	8	6	10	8	52	8	18
Cs (ppm)	0.49	1.78	1.12	0.78	1.4	1.27	1.44	0.66
Cu (ppm)	84.9	110.5	60.6	86.4	328	884	113.5	115.5
Fe (%)	1.75	2.97	6.62	1.43	3.71	2.71	3.06	2.23
Ga (ppm)	21.5	19.7	21.4	18.5	22.9	21.7	23.1	21
Ge (ppm)	0.14	0.17	0.22	0.16	0.24	0.24	0.24	0.1
Hf (ppm)	1.7	0.7	0.4	1.5	0.6	1.7	1	1.4
In (ppm)	0.013	0.033	0.067	0.091	0.06	0.069	0.037	0.042
K (%)	0.53	4.29	2	2.72	2.88	1.66	2.25	2.59
La (ppm)	3.9	8.8	14.9	15.3	28.8	21	29.3	24.8
Li (ppm)	2.5	5	3.1	2.4	8.9	7.1	4.8	4.2
Mg (%)	0.11	0.35	0.41	0.19	1.17	0.85	0.64	0.66
Mn (ppm)	46	52	66	53	411	347	286	273
Mo (ppm)	4.78	10.9	10.65	2.5	3.98	14.2	2.27	1.09
Na (%)	4.63	0.9	1.82	3.33	2.33	2.88	3.43	2.34
Nb (ppm)	2.3	3.1	2.2	2.8	5.4	2.8	6.5	3.2
Ni (ppm)	2	2.8	2.2	2.9	18.3	25.3	20	18.8
P (ppm)	420	550	1470	420	1430	1140	1380	1000
Pb (ppm)	2.7	5.2	3.1	5.4	9	3.7	8.6	5.6
Rb (ppm)	24.2	139.5	96.1	60.7	75.4	61.9	69.2	70.3
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.03	0.52	1.41	0.12	0.03	0.01	0.01	0.01
Sb (ppm)	0.48	0.61	0.51	0.78	1.56	0.98	0.82	4.22

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	301458	301398	301359	301318	301251	301237	301230	301213
North (NAD 27)	4319244	4319156	4319141	4319124	4319099	4319036	4318954	4318912
Classification	Albite	Sericite	Sericite-Albite	Albite-KSpar-Sericite	Plag-KSpar	Sericite-Albite	Plag-KSpar	Plag-KSpar
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437121	H437122	H437123	H437124	H437125	H437126	H437127	H437128
Lithology	Porphyry	Bear QM 1 mm	Bear QM but by 0.5 m wide HT breccia	Porphyry, crowded	McLeod QMD	Porphyry	Bear QM	Porphyry
Sc (ppm)	4.5	7.9	7.6	3.6	11.8	11.1	10.9	8
Se (ppm)	5	7	10	1	2	14	2	1
Sn (ppm)	0.8	1.5	1.9	0.7	1.1	1.6	1.1	0.8
Sr (ppm)	331	259	400	614	919	433	855	1030
Ta (ppm)	0.15	0.22	0.15	0.2	0.36	0.19	0.4	0.2
Te (ppm)	0.61	1.01	2.06	0.66	0.37	0.57	0.08	0.05
Th (ppm)	4.4	5.2	6.4	6.8	10.5	9.2	11.6	6.2
Ti (%)	0.164	0.227	0.23	0.206	0.397	0.29	0.42	0.286
Tl (ppm)	0.1	0.57	0.36	0.29	0.39	0.3	0.27	0.35
U (ppm)	2.2	3.6	1.9	3.5	3.7	6.2	3.4	2.3
V (ppm)	41	92	100	42	117	104	112	73
W (ppm)	1.8	4	4.5	1.5	1.9	2.9	1.2	1.1
Y (ppm)	3	2.9	1.5	3.1	15.1	13.4	14.8	6.7
Zn (ppm)	2	6	4	4	28	35	33	11
Zr (ppm)	48.4	13	8.5	36.1	10.9	49	17.6	42.7
Al2O3 (%)	12.94	12.01	11.03	12.94	13.83	14.15	14.09	13.41
CaO (%)	0.53	0.34	0.36	0.56	3.22	0.74	3.01	3.85
FeO (%)	2.25	3.82	8.51	1.84	4.77	3.49	3.94	2.87
K2O (%)	0.64	5.17	2.41	3.28	3.47	2.00	2.71	3.12
MgO (%)	0.18	0.58	0.68	0.32	1.94	1.41	1.06	1.09
Na2O (%)	6.24	1.21	2.45	4.49	3.14	3.88	4.62	3.15
P2O5 (%)	0.10	0.13	0.34	0.10	0.33	0.26	0.32	0.23
TiO2 (%)	0.27	0.38	0.38	0.34	0.66	0.48	0.70	0.48
SO3 (%)	0.08	1.30	3.53	0.30	0.08	0.03	0.03	0.03
Total (%)	23.23	24.94	29.70	24.16	31.43	26.44	30.47	28.23
SiO2 (%)	75.15	73.32	68.22	74.15	66.37	71.71	67.39	69.80
Al_m	0.25	0.24	0.22	0.25	0.27	0.28	0.28	0.26
Ca_m	0.01	0.01	0.01	0.01	0.06	0.01	0.05	0.07
K_m	0.01	0.11	0.05	0.07	0.07	0.04	0.06	0.07
Na_m	0.20	0.04	0.08	0.14	0.10	0.13	0.15	0.10
K_Al	0.05	0.47	0.24	0.27	0.27	0.15	0.21	0.25
Na_Al	0.79	0.17	0.37	0.57	0.37	0.45	0.54	0.39
Plag	0.83	0.19	0.40	0.61	0.59	0.50	0.73	0.65

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	301208	301206	301154	301083	301029	301679	301553	301507
North (NAD 27)	4318897	4318799	4318730	4318670	4318661	4319420	4318658	4318601
Classification	Sericite	Albite	Plag-KSpar	Plag-KSpar	Plag-KSpar	Plag-KSpar	Plagioclase	Plagioclase
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437129	H437130	H437131	H437132	H437133	H437134	H437135	H437136
Lithology	Bear border granite phase	Porphyry	Bear QM	McLeod QMD ??	Porphyry	Bear QM	Porphyry	Bear QM
Ag (ppm)	0.05	0.02	0.03	0.03	0.02	0.02	0.3	0.03
Al (%)	6.44	6.98	7.25	7.25	6.9	7.19	7.04	7.24
As (ppm)	8	8.5	4.1	4.7	4.1	3.7	3.9	3.8
Ba (ppm)	1480	90	1330	1800	2180	930	240	550
Be (ppm)	1.32	1.75	1.94	1.91	1.68	1.67	1.73	2.58
Bi (ppm)	2.4	0.4	0.17	0.44	0.38	0.35	0.44	0.1
Ca (%)	0.23	0.73	2.7	3.17	2.36	3.67	1.61	2.27
Cd (ppm)	0.03	0.08	0.09	0.06	0.06	0.07	-0.02	0.05
Ce (ppm)	24	42.3	52.9	54.9	34.1	52.6	37.4	40.7
Co (ppm)	0.7	2.7	9.6	5	2.8	6	3.1	6.5
Cr (ppm)	5	11	8	8	18	9	9	10
Cs (ppm)	1.91	0.26	1.34	1.08	0.82	0.46	0.63	1.13
Cu (ppm)	112.5	157.5	126.5	167	44.5	658	343	1435
Fe (%)	4.42	1.25	2.72	3.04	1.74	2.53	1.9	1.29
Ga (ppm)	21.5	20.6	20.5	22.3	19.1	21	19.85	20.5
Ge (ppm)	0.15	0.09	0.14	0.14	0.09	0.13	0.1	0.08
Hf (ppm)	0.8	1.4	1	0.6	1.5	1.1	1.2	1.2
In (ppm)	0.094	0.068	0.047	0.065	0.053	0.043	0.059	0.018
K (%)	3.51	0.21	2.74	2.46	3.38	2.31	0.41	1.24
La (ppm)	13.2	20.8	25.2	25	17.6	24.9	19.4	17.7
Li (ppm)	4.2	3	3.3	6.6	4.8	3.5	3.6	4.4
Mg (%)	0.38	0.26	0.8	1.17	0.53	0.69	0.43	0.66
Mn (ppm)	68	54	407	449	259	256	66	156
Mo (ppm)	5.97	1.62	2.03	1.89	0.88	2.75	58.8	1.68
Na (%)	0.5	5.76	2.89	1.65	2.12	2.18	3.4	3.46
Nb (ppm)	4.2	3.1	5.5	4.5	2.8	5.3	1.5	5.3
Ni (ppm)	2.9	5.3	12.8	18.4	7.8	15.7	3.5	9.9
P (ppm)	600	450	1160	1380	710	1080	550	1040
Pb (ppm)	4.2	1.6	8.7	6.1	4.9	4.9	3.7	5.1
Rb (ppm)	184	9.1	83.2	84.6	82.1	69.3	15.8	43.7
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.09	-0.01	0.01	0.01	0.01	0.01	0.08	0.01
Sb (ppm)	1.21	0.57	0.8	3.04	2.71	2.53	0.51	0.45

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	301208	301206	301154	301083	301029	301679	301553	301507
North (NAD 27)	4318897	4318799	4318730	4318670	4318661	4319420	4318658	4318601
Classification	Sericite	Albite	Plag-KSpar	Plag-KSpar	Plag-KSpar	Plag-KSpar	Plagioclase	Plagioclase
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437129	H437130	H437131	H437132	H437133	H437134	H437135	H437136
Lithology	Bear border granite phase	Porphyry	Bear QM	McLeod QMD ??	Porphyry	Bear QM	Porphyry	Bear QM
Sc (ppm)	6.5	6.4	9.2	11.2	6.1	8.7	4.9	7.9
Se (ppm)	14	2	2	2	1	2	3	1
Sn (ppm)	1	0.9	1	1	0.6	1	0.8	1.1
Sr (ppm)	233	341	945	1225	940	1835	1275	875
Ta (ppm)	0.3	0.21	0.37	0.28	0.19	0.36	0.11	0.39
Te (ppm)	1.09	0.37	0.07	0.11	0.05	0.16	0.25	0.05
Th (ppm)	13.1	6.6	10.1	7	5.9	11.1	6.6	15.7
Ti (%)	0.27	0.239	0.353	0.418	0.221	0.356	0.117	0.303
Tl (ppm)	0.69	0.05	0.31	0.39	0.39	0.24	0.08	0.14
U (ppm)	5.2	3.6	4	2.8	2.6	4.8	2.9	4.1
V (ppm)	85	48	86	105	55	87	44	65
W (ppm)	5.8	1.7	1.5	1.7	0.9	0.9	16.1	0.9
Y (ppm)	1.7	5.9	12.5	11.1	5.8	14.7	3	11.5
Zn (ppm)	6	2	33	20	10	18	5	19
Zr (ppm)	14.9	38.3	19.8	13.9	45.8	20.5	31.4	22.6
Al2O3 (%)	12.17	13.19	13.70	13.70	13.03	13.58	13.30	13.68
CaO (%)	0.32	1.02	3.78	4.43	3.30	5.13	2.25	3.18
FeO (%)	5.68	1.61	3.50	3.91	2.24	3.25	2.44	1.66
K2O (%)	4.23	0.25	3.30	2.96	4.07	2.78	0.49	1.49
MgO (%)	0.63	0.43	1.33	1.94	0.88	1.14	0.71	1.09
Na2O (%)	0.67	7.76	3.90	2.22	2.86	2.94	4.58	4.66
P2O5 (%)	0.14	0.10	0.27	0.32	0.16	0.25	0.13	0.24
TiO2 (%)	0.45	0.40	0.59	0.70	0.37	0.59	0.20	0.51
SO3 (%)	0.23	-0.03	0.03	0.03	0.03	0.03	0.20	0.03
Total (%)	24.52	24.74	30.37	30.21	26.94	29.70	24.31	26.53
SiO2 (%)	73.77	73.53	67.50	67.68	71.18	68.22	73.99	71.61
Al_m	0.24	0.26	0.27	0.27	0.26	0.27	0.26	0.27
Ca_m	0.01	0.02	0.07	0.08	0.06	0.09	0.04	0.06
K_m	0.09	0.01	0.07	0.06	0.09	0.06	0.01	0.03
Na_m	0.02	0.25	0.13	0.07	0.09	0.09	0.15	0.15
K_Al	0.38	0.02	0.26	0.23	0.34	0.22	0.04	0.12
Na_Al	0.09	0.97	0.47	0.27	0.36	0.36	0.57	0.56
Plag	0.12	1.04	0.72	0.56	0.59	0.70	0.72	0.77

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	301785	300491	300506	300498	300496	300508	300474
North (NAD 27)	4318678	4320908	4320884	4320870	4320830	4320790	4320770
Classification	Albite	Sericite	Pyroph/Alun/Topaz	Pyroph/Alun/Topaz	Sericite-Albite	Pyroph/Alun/Topaz	Sericite
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437137	H437138	H437139	H437140	H437141	H437142	H437143
Lithology	Porphyry, crowded	Porphyry	Artesia Andesite Brecciated??	Artesia Andesite	Artesia Andesite	Artesia Andesite	Artesia Andesitic Sandstone
Ag (ppm)	0.04	0.04	0.04	0.02	0.04	0.01	0.05
Al (%)	6.93	7.58	4.84	6.19	6.44	6.6	6.68
As (ppm)	6.1	34	5.8	6.4	12.7	3.7	16.1
Ba (ppm)	320	1830	270	480	170	60	1110
Be (ppm)	2.15	2.39	0.2	0.42	0.37	0.16	1.61
Bi (ppm)	0.28	2.5	0.25	0.14	1.2	0.08	1.4
Ca (%)	0.58	0.21	0.21	0.43	0.34	0.19	0.83
Cd (ppm)	-0.02	0.07	0.07	0.03	0.12	0.02	0.03
Ce (ppm)	36.2	63.5	23.6	24.4	40.3	36	27.5
Co (ppm)	2.2	1.1	0.8	0.6	0.7	0.4	0.7
Cr (ppm)	8	28	22	23	25	25	44
Cs (ppm)	0.89	1.36	0.18	0.54	0.31	0.05	0.98
Cu (ppm)	35.8	106	29.6	9.1	62.6	7.7	19.5
Fe (%)	2.56	3.53	0.49	0.46	4.06	0.24	1.37
Ga (ppm)	20.7	24	8.5	18.4	20.6	7.46	21.1
Ge (ppm)	0.09	0.16	0.06	0.07	0.14	0.08	0.12
Hf (ppm)	1.5	2	1.6	1.1	1	1.3	1.8
In (ppm)	0.015	0.119	0.007	0.04	0.028	-0.005	0.055
K (%)	0.91	2.71	0.41	1.79	1.32	0.94	2.9
La (ppm)	20.8	32	12.1	12.4	18.6	18.5	13.1
Li (ppm)	3.3	5.6	2	1.6	1.1	1.5	7
Mg (%)	0.18	0.55	0.05	0.25	0.09	0.02	0.9
Mn (ppm)	21	152	81	61	90	40	44
Mo (ppm)	13.1	3.86	2.2	0.65	7.98	3.04	0.86
Na (%)	3.5	0.37	0.09	0.23	0.96	1.26	0.25
Nb (ppm)	1.2	2.4	1.8	2.2	0.7	1.5	2.4
Ni (ppm)	1.6	5.8	4.5	5.4	3.6	3.3	3.5
P (ppm)	400	940	550	450	1860	850	320
Pb (ppm)	2.2	12	21.8	10	187.5	104	5.4
Rb (ppm)	42.3	86.3	11.5	45.1	24	1.2	90.6
Re (ppm)	-0.002	-0.002	-0.002	-0.002	0.003	0.002	-0.002
S (%)	0.13	0.06	0.06	0.06	3.28	5.33	0.39
Sb (ppm)	0.43	6.98	3.55	5.59	3.91	2.62	2.86

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	301785	300491	300506	300498	300496	300508	300474
North (NAD 27)	4318678	4320908	4320884	4320870	4320830	4320790	4320770
Classification	Albite	Sericite	Pyroph/Alun/Topaz	Pyroph/Alun/Topaz	Sericite-Albite	Pyroph/Alun/Topaz	Sericite
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437137	H437138	H437139	H437140	H437141	H437142	H437143
Lithology	Porphyry, crowded	Porphyry	Artesia Andesite Brecciated??	Artesia Andesite	Artesia Andesite	Artesia Andesite	Artesia Andesitic Sandstone
Sc (ppm)	6.3	12.8	4.4	8.2	8.1	3.1	13.5
Se (ppm)	3	6	2	1	3	2	7
Sn (ppm)	1.2	0.9	0.9	1.3	0.9	0.7	0.9
Sr (ppm)	609	127.5	598	451	793	1155	113
Ta (ppm)	0.08	0.16	0.13	0.15	0.05	0.11	0.16
Te (ppm)	0.15	1.15	0.41	0.15	0.15	0.06	0.2
Th (ppm)	5.2	7.6	3.5	3.6	4.1	3.4	4.8
Ti (%)	0.141	0.268	0.167	0.206	0.058	0.122	0.261
Tl (ppm)	0.13	3.54	0.47	2.64	1.46	0.04	2.92
U (ppm)	2.8	2.7	1.3	1.1	1.4	1	3.8
V (ppm)	58	123	47	51	86	46	120
W (ppm)	4.6	1.7	0.9	0.8	1	0.6	0.7
Y (ppm)	1.5	8.9	3.3	2.9	3.4	2.3	4.4
Zn (ppm)	-2	18	-2	4	4	-2	7
Zr (ppm)	48.4	65.9	55.2	40.6	35	47.4	64.6
Al2O3 (%)	13.09	14.32	9.14	11.69	12.17	12.47	12.62
CaO (%)	0.81	0.29	0.29	0.60	0.48	0.27	1.16
FeO (%)	3.29	4.54	0.63	0.59	5.22	0.31	1.76
K2O (%)	1.10	3.27	0.49	2.16	1.59	1.13	3.49
MgO (%)	0.30	0.91	0.08	0.41	0.15	0.03	1.49
Na2O (%)	4.72	0.50	0.12	0.31	1.29	1.70	0.34
P2O5 (%)	0.09	0.22	0.13	0.10	0.43	0.19	0.07
TiO2 (%)	0.24	0.45	0.28	0.34	0.10	0.20	0.44
SO3 (%)	0.33	0.15	0.15	0.15	8.20	13.33	0.98
Total (%)	23.96	24.64	11.32	16.36	29.62	29.63	22.35
SiO2 (%)	74.36	73.63	87.89	82.49	68.31	68.30	76.09
Al_m	0.26	0.28	0.18	0.23	0.24	0.24	0.25
Ca_m	0.01	0.01	0.01	0.01	0.01	0.00	0.02
K_m	0.02	0.07	0.01	0.05	0.03	0.02	0.07
Na_m	0.15	0.02	0.00	0.01	0.04	0.05	0.01
K_Al	0.09	0.25	0.06	0.20	0.14	0.10	0.30
Na_Al	0.59	0.06	0.02	0.04	0.17	0.22	0.04
Plag	0.65	0.08	0.05	0.09	0.21	0.24	0.13

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	300738	300778	300837	300859	300791	301510	301724
North (NAD 27)	4320526	4320529	4320596	4320625	4320752	4320240	4320215
Classification	Sericite	Sericite-Albite	Albite	Sericite	Albite	Sericite-Albite	Plagioclase
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437144	H437145	H437146	H437147	H437148	H437149	H437150
Lithology	Artesia Andesitic bedded pyroclastics	Artesia Andesite	Artesia Andesite	Artesia Andesite	Porphyry	Bear QM cut by Tm Qz	Bear QM
Ag (ppm)	0.03	0.02	0.08	0.04	0.02	0.11	0.02
Al (%)	5.97	7.5	7.4	7.4	7.22	5.86	7.03
As (ppm)	4.7	5.7	8	4.1	13.4	5.3	2.5
Ba (ppm)	1450	1340	1480	2450	1190	210	420
Be (ppm)	1.34	1.9	1.42	1.63	1.8	2.2	2.61
Bi (ppm)	0.59	0.02	0.53	0.08	0.2	0.08	0.21
Ca (%)	0.46	0.33	0.53	0.44	0.47	0.42	2.1
Cd (ppm)	0.09	0.08	0.07	0.05	0.02	0.02	0.05
Ce (ppm)	30.7	45.4	18.9	51	34.5	10.6	33.1
Co (ppm)	1.4	12.8	0.8	19.1	2.9	2.9	1.4
Cr (ppm)	32	54	38	84	8	12	11
Cs (ppm)	0.88	1.16	0.26	1.49	1.22	0.51	0.82
Cu (ppm)	22.2	14.3	36.4	24.3	41.3	133.5	79
Fe (%)	2.2	3.69	2.21	6.37	2.1	1.1	0.74
Ga (ppm)	22.9	22.8	22.7	20.2	20.7	24.5	21.7
Ge (ppm)	0.11	0.15	0.1	0.18	0.1	0.06	0.1
Hf (ppm)	0.7	0.8	1.4	1.2	1.7	0.4	1.2
In (ppm)	0.076	0.048	0.024	0.132	0.049	0.016	0.026
K (%)	1.63	2.75	0.31	3.23	1.36	0.81	0.65
La (ppm)	15.2	20.5	8.9	24.6	18.3	4.7	13.5
Li (ppm)	5.6	7.1	2.1	10.2	7.4	3.5	3.4
Mg (%)	0.6	1.61	0.11	2.57	0.52	1.14	0.43
Mn (ppm)	113	421	69	675	125	45	112
Mo (ppm)	2.82	0.33	25.9	1.81	1.02	1.21	0.94
Na (%)	0.39	1.92	6.04	0.13	3.27	1.35	3.48
Nb (ppm)	1.3	1.3	1.3	1.1	1.1	3	4.5
Ni (ppm)	6.3	47.8	2.3	93.4	8	8.6	4.4
P (ppm)	1150	930	780	1370	440	1180	580
Pb (ppm)	15.9	5	11.2	3.9	5.7	1.3	4.5
Rb (ppm)	67.2	69.4	11.2	101	56.9	32.8	18.4
Re (ppm)	-0.002	-0.002	-0.002	0.002	-0.002	-0.002	-0.002
S (%)	0.23	0.03	0.12	0.12	0.02	0.01	0.01
Sb (ppm)	4.98	4.35	3.1	2.92	1.16	0.76	0.87

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	300738	300778	300837	300859	300791	301510	301724
North (NAD 27)	4320526	4320529	4320596	4320625	4320752	4320240	4320215
Classification	Sericite	Sericite-Albite	Albite	Sericite	Albite	Sericite-Albite	Plagioclase
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437144	H437145	H437146	H437147	H437148	H437149	H437150
Lithology	Artesia Andesitic bedded pyroclastics	Artesia Andesite	Artesia Andesite	Artesia Andesite	Porphyry	Bear QM cut by Tm Qz	Bear QM
Sc (ppm)	11.9	10.6	7.1	14.8	5.7	12	4.9
Se (ppm)	4	1	4	1	1	1	1
Sn (ppm)	0.8	0.8	0.9	1.6	0.5	2.2	0.9
Sr (ppm)	378	149.5	217	95.2	335	144	1060
Ta (ppm)	0.09	0.08	0.08	0.07	0.07	0.2	0.33
Te (ppm)	0.53	-0.05	0.43	-0.05	0.05	0.11	0.12
Th (ppm)	2.4	2.9	2.1	2.1	6.3	13.5	13.4
Ti (%)	0.161	0.201	0.164	0.196	0.096	0.215	0.288
Tl (ppm)	1.5	1.13	0.14	1.2	0.62	0.12	0.11
U (ppm)	0.9	0.9	1.5	2.5	2.6	2	3.8
V (ppm)	94	92	56	123	61	123	42
W (ppm)	0.6	0.5	2	1.3	0.9	9.3	0.7
Y (ppm)	3.1	8.5	2.4	5.1	4.1	4.3	11.9
Zn (ppm)	11	67	6	105	23	3	8
Zr (ppm)	24.9	30.2	52.3	38.8	46.1	8.1	24.3
Al2O3 (%)	11.28	14.17	13.98	13.98	13.64	11.07	13.28
CaO (%)	0.64	0.46	0.74	0.62	0.66	0.59	2.94
FeO (%)	2.83	4.75	2.84	8.19	2.70	1.41	0.95
K2O (%)	1.96	3.31	0.37	3.89	1.64	0.98	0.78
MgO (%)	0.99	2.67	0.18	4.26	0.86	1.89	0.71
Na2O (%)	0.53	2.59	8.14	0.18	4.41	1.82	4.69
P2O5 (%)	0.26	0.21	0.18	0.31	0.10	0.27	0.13
TiO2 (%)	0.27	0.34	0.27	0.33	0.16	0.36	0.48
SO3 (%)	0.58	0.08	0.30	0.30	0.05	0.03	0.03
Total (%)	19.34	28.57	27.01	32.06	24.22	18.41	23.99
SiO2 (%)	79.30	69.43	71.10	65.70	74.09	80.30	74.33
Al_m	0.22	0.28	0.27	0.27	0.27	0.22	0.26
Ca_m	0.01	0.01	0.01	0.01	0.01	0.01	0.05
K_m	0.04	0.07	0.01	0.08	0.03	0.02	0.02
Na_m	0.02	0.08	0.26	0.01	0.14	0.06	0.15
K_Al	0.19	0.25	0.03	0.30	0.13	0.10	0.06
Na_Al	0.08	0.30	0.96	0.02	0.53	0.27	0.58
Plag	0.13	0.33	1.01	0.06	0.58	0.32	0.78

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	301023	300926	300954	300916	300853	300791	300793	300759
North (NAD 27)	4319623	4319601	4319575	4319567	4319546	4319413	4319329	4319293
Classification	Albite-KSpar-Sericite	Albite-KSpar-Sericite	Plag-KSpar	Sericite	Albite-KSpar-Sericite	Plag-KSpar	Plag-KSpar	Plag-KSpar
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437151	H437152	H437153	H437154	H437155	H437156	H437157	H437158
Lithology	Porphyry	Porphyry	McLeod	Bear	Porphyry	Porphyry	McLeod	Porphyry
Ag (ppm)	0.32	0.03	0.05	0.03	0.09	-0.01	0.21	0.01
Al (%)	7.2	7.33	7.78	7.7	7.36	7.53	7.48	7.16
As (ppm)	5.8	4.4	9.5	3.1	1.6	3.6	5.4	1.4
Ba (ppm)	3770	2140	1350	280	2660	1920	1080	2160
Be (ppm)	1.76	2.14	2.64	0.25	1.59	1.83	2.47	1.67
Bi (ppm)	0.5	0.79	0.11	0.05	0.54	0.12	0.14	0.14
Ca (%)	0.34	0.37	2.18	0.05	0.24	2.09	2.45	1.28
Cd (ppm)	0.04	0.03	0.06	-0.02	0.08	0.02	0.2	0.02
Ce (ppm)	17.25	21	92.7	93.8	31	54.7	80.8	34.8
Co (ppm)	0.5	0.5	11.8	0.2	0.3	4.9	13.3	0.5
Cr (ppm)	7	7	18	5	6	15	8	12
Cs (ppm)	1.14	1.13	1.57	0.46	1.05	0.75	4.04	0.57
Cu (ppm)	12.3	11.2	213	5.2	7.6	7.2	1470	44.1
Fe (%)	0.64	1	3.79	0.19	0.83	2.43	3.92	1.51
Ga (ppm)	18.8	19.2	23.5	13.8	19	20.9	23	19.05
Ge (ppm)	0.08	0.08	0.19	0.15	0.09	0.13	0.17	0.1
Hf (ppm)	1.3	1.6	0.6	0.6	1.6	1.5	0.7	1.3
In (ppm)	0.022	0.035	0.064	-0.005	0.023	0.051	0.043	0.05
K (%)	3.58	2.83	3.64	3.49	4.08	3.05	3.19	2.61
La (ppm)	8.4	12.1	47.9	44	17.1	27	38.6	21.4
Li (ppm)	1.9	2.6	4.3	15.1	1.5	5	4.7	2.5
Mg (%)	0.09	0.14	0.94	0.02	0.1	0.83	1.07	0.41
Mn (ppm)	76	71	509	19	43	289	628	223
Mo (ppm)	2.92	4.55	1.67	1.6	1.81	0.89	2.08	0.56
Na (%)	2.8	3.3	2.94	0.14	2.6	2.73	2.61	3.45
Nb (ppm)	2	2.3	6.6	5.4	2.3	3.1	7.8	2.5
Ni (ppm)	1.2	1.9	13.9	1.3	1.1	12.9	12.3	6.2
P (ppm)	300	320	1420	160	220	800	1360	580
Pb (ppm)	25.3	5.7	10.2	2.1	4.4	4.9	11.7	3.1
Rb (ppm)	105.5	95.5	140	109.5	128.5	92.7	164	68.6
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.11	0.04	0.01	0.02	0.02	0.02	0.01	0.01
Sb (ppm)	0.9	0.96	2.6	3.91	0.68	1.31	1.56	0.94

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	301023	300926	300954	300916	300853	300791	300793	300759
North (NAD 27)	4319623	4319601	4319575	4319567	4319546	4319413	4319329	4319293
Classification	Albite-KSpar-Sericite	Albite-KSpar-Sericite	Plag-KSpar	Sericite	Albite-KSpar-Sericite	Plag-KSpar	Plag-KSpar	Plag-KSpar
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437151	H437152	H437153	H437154	H437155	H437156	H437157	H437158
Lithology	Porphyry	Porphyry	McLeod	Bear	Porphyry	Porphyry	McLeod	Porphyry
Sc (ppm)	4.5	5	10.7	3.3	4.7	8.6	10.9	4.7
Se (ppm)	3	2	2	1	3	1	2	1
Sn (ppm)	0.5	0.6	1.1	1	0.6	0.7	1.4	0.6
Sr (ppm)	647	534	743	119	531	807	778	512
Ta (ppm)	0.13	0.14	0.43	0.31	0.14	0.19	0.48	0.17
Te (ppm)	0.51	0.74	0.05	0.11	0.33	-0.05	-0.05	-0.05
Th (ppm)	4.1	3.7	21	18.6	3.5	6.3	21.3	5.4
Ti (%)	0.173	0.187	0.404	0.319	0.193	0.263	0.432	0.201
Tl (ppm)	0.76	0.64	0.44	0.47	0.92	0.42	0.41	0.38
U (ppm)	1.6	1.9	6	1.2	1.6	2.6	5.3	2.1
V (ppm)	30	37	116	81	36	67	120	40
W (ppm)	0.9	1.4	1.7	2.9	1.2	0.6	1.7	0.8
Y (ppm)	2.2	2.6	15.5	3.5	2.6	6.8	16.4	4.5
Zn (ppm)	16	6	43	-2	2	15	74	13
Zr (ppm)	37.6	50.1	12.7	13.3	48.5	43.1	12.9	35.1
Al2O3 (%)	13.60	13.85	14.70	14.55	13.90	14.22	14.13	13.53
CaO (%)	0.48	0.52	3.05	0.07	0.34	2.92	3.43	1.79
FeO (%)	0.82	1.29	4.87	0.24	1.07	3.12	5.04	1.94
K2O (%)	4.31	3.41	4.39	4.21	4.92	3.68	3.84	3.15
MgO (%)	0.15	0.23	1.56	0.03	0.17	1.38	1.77	0.68
Na2O (%)	3.77	4.45	3.96	0.19	3.50	3.68	3.52	4.65
P2O5 (%)	0.07	0.07	0.33	0.04	0.05	0.18	0.31	0.13
TiO2 (%)	0.29	0.31	0.67	0.53	0.32	0.44	0.72	0.34
SO3 (%)	0.28	0.10	0.03	0.05	0.05	0.05	0.03	0.03
Total (%)	23.77	24.23	33.55	19.91	24.32	29.68	32.79	26.23
SiO2 (%)	74.57	74.08	64.10	78.70	73.98	68.25	64.91	71.94
Al_m	0.27	0.27	0.29	0.29	0.27	0.28	0.28	0.27
Ca_m	0.01	0.01	0.05	0.00	0.01	0.05	0.06	0.03
K_m	0.09	0.07	0.09	0.09	0.10	0.08	0.08	0.07
Na_m	0.12	0.14	0.13	0.01	0.11	0.12	0.11	0.15
K_Al	0.34	0.27	0.32	0.31	0.38	0.28	0.30	0.25
Na_Al	0.46	0.53	0.44	0.02	0.41	0.43	0.41	0.57
Plag	0.49	0.56	0.63	0.03	0.44	0.61	0.63	0.69

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	300683	300756	300750	301919	302038	302108	302207	302259	302354
North (NAD 27)	4319147	4318889	4318724	4319591	4319623	4319619	4319633	4319563	4319605
Classification	Plag-KSpar	Plag-KSpar	Sericite	Plag-KSpar	Plag-KSpar	Plagioclase	Plagioclase	Plagioclase	Plagioclase
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437159	H437160	H437161	H437162	H437163	H437164	H437165	H437166	H437167
Lithology	McLeod	Porphyry	McLeod	Porphyry	Bear	Porphyry	Bear	Porphyry	Porphyry
Ag (ppm)	0.17	0.03	-0.01	0.03	-0.01	0.02	0.01	-0.01	0.01
Al (%)	7.82	7.35	7.12	7.56	7.26	6.64	6.57	6.77	6.48
As (ppm)	4.6	3.4	-0.2	4.3	4.3	4.4	1.7	1.8	1
Ba (ppm)	1560	2220	470	1370	1230	90	250	200	150
Be (ppm)	2.9	1.57	1.54	1.66	2.09	1.91	2	1.29	2.01
Bi (ppm)	0.3	0.71	0.03	0.11	0.32	0.26	0.03	0.04	0.03
Ca (%)	2.09	1.76	0.11	3.17	2.56	2.31	1.78	2.64	1.72
Cd (ppm)	0.12	0.02	-0.02	0.06	0.03	0.04	-0.02	0.02	0.02
Ce (ppm)	70.8	37.4	8.98	48.8	54.9	37.4	34.7	28.4	22.4
Co (ppm)	11.7	2.7	0.5	9.4	4.9	1.3	0.5	1.1	1.8
Cr (ppm)	7	13	9	10	10	11	16	14	12
Cs (ppm)	3.42	0.71	0.96	1.61	0.73	0.2	0.29	0.15	0.18
Cu (ppm)	837	39.2	1.1	35.5	68.7	15.8	3.6	2.8	4.7
Fe (%)	4.11	2.12	0.25	3.28	1.43	0.9	0.34	0.66	0.28
Ga (ppm)	23.1	20.5	30.9	23.2	21.8	18.9	21.5	13.35	18.85
Ge (ppm)	0.17	0.11	0.06	0.14	0.13	0.06	0.05	-0.05	0.05
Hf (ppm)	0.8	1.3	1.5	0.5	1	1.9	1.6	1	1.1
In (ppm)	0.042	0.081	0.025	0.04	0.12	0.071	0.01	0.009	0.006
K (%)	2.91	3.46	3.37	2.48	2.72	0.21	0.14	0.22	0.15
La (ppm)	31.8	19.9	3.7	22.5	27	14.2	15	12.5	9
Li (ppm)	5.9	4.1	3.8	2.6	2.6	1.3	2.7	1.2	1.9
Mg (%)	1.16	0.44	0.2	1.15	0.6	1.12	0.61	0.79	0.36
Mn (ppm)	511	247	15	497	220	100	52	97	51
Mo (ppm)	1.92	2.51	0.27	0.64	0.92	1.22	0.3	0.33	0.34
Na (%)	2.65	2.45	0.16	3.25	2.8	4.8	3.89	4.14	3.79
Nb (ppm)	6.5	2.6	3.1	4	4	2.4	2	2.2	2.9
Ni (ppm)	11.6	7.1	1.6	17	11.3	12.9	9.4	7.9	5.4
P (ppm)	1390	630	370	1360	840	1300	960	930	960
Pb (ppm)	7.2	5.7	1.4	9.2	5.4	2.7	3.6	2	2.8
Rb (ppm)	115.5	94.6	106	72.2	68.5	5.5	2.3	3.5	1.9
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.02	0.01	0.01	0.01	0.01	0.03	0.01	0.01	0.01
Sb (ppm)	1.72	1.21	0.59	1.03	0.96	0.51	0.28	0.4	0.26

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	300683	300756	300750	301919	302038	302108	302207	302259	302354
North (NAD 27)	4319147	4318889	4318724	4319591	4319623	4319619	4319633	4319563	4319605
Classification	Plag-KSpar	Plag-KSpar	Sericite	Plag-KSpar	Plag-KSpar	Plagioclase	Plagioclase	Plagioclase	Plagioclase
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437159	H437160	H437161	H437162	H437163	H437164	H437165	H437166	H437167
Lithology	McLeod	Porphyry	McLeod	Porphyry	Bear	Porphyry	Bear	Porphyry	Porphyry
Sc (ppm)	11.1	5.6	9.2	11	6.8	7.3	5.5	3.2	5.5
Se (ppm)	2	1	1	1	1	2	2	1	2
Sn (ppm)	1.2	0.7	5.4	0.7	0.9	0.9	0.8	0.6	1
Sr (ppm)	755	581	58.1	1100	992	975	985	1150	956
Ta (ppm)	0.41	0.17	0.2	0.24	0.29	0.24	0.21	0.22	0.25
Te (ppm)	0.06	0.1	-0.05	0.12	0.09	0.26	0.05	-0.05	-0.05
Th (ppm)	21.3	6.1	7.6	5.9	11	5.4	6.9	5.3	7
Ti (%)	0.4	0.202	0.231	0.415	0.277	0.273	0.172	0.27	0.226
Tl (ppm)	0.39	0.48	0.48	0.27	0.2	0.03	0.02	0.02	0.03
U (ppm)	6.2	3	3.2	1.7	3.5	2.8	2	1.6	1.3
V (ppm)	122	53	65	114	65	82	59	62	52
W (ppm)	1.8	0.9	2.3	0.7	0.5	0.9	1.5	0.2	1.3
Y (ppm)	15	5.3	5	10.1	8.7	8.2	6	4.8	6.9
Zn (ppm)	42	10	-2	41	13	15	9	10	5
Zr (ppm)	17.6	33.4	38.6	11.2	15.1	54.1	44.6	22.7	26
Al2O3 (%)	14.77	13.88	13.45	14.28	13.71	12.54	12.41	12.79	12.24
CaO (%)	2.92	2.46	0.15	4.43	3.58	3.23	2.49	3.69	2.41
FeO (%)	5.29	2.73	0.32	4.22	1.84	1.16	0.44	0.85	0.36
K2O (%)	3.51	4.17	4.06	2.99	3.28	0.25	0.17	0.27	0.18
MgO (%)	1.92	0.73	0.33	1.91	0.99	1.86	1.01	1.31	0.60
Na2O (%)	3.57	3.30	0.22	4.38	3.77	6.47	5.24	5.58	5.11
P2O5 (%)	0.32	0.14	0.08	0.31	0.19	0.30	0.22	0.21	0.22
TiO2 (%)	0.67	0.34	0.39	0.69	0.46	0.46	0.29	0.45	0.38
SO3 (%)	0.05	0.03	0.03	0.03	0.03	0.08	0.03	0.03	0.03
Total (%)	33.02	27.78	19.03	33.24	27.86	26.34	22.29	25.17	21.52
SiO2 (%)	64.67	70.27	79.64	64.43	70.19	71.82	76.15	73.06	76.98
Al_m	0.29	0.27	0.26	0.28	0.27	0.25	0.24	0.25	0.24
Ca_m	0.05	0.04	0.00	0.08	0.06	0.06	0.04	0.07	0.04
K_m	0.07	0.09	0.09	0.06	0.07	0.01	0.00	0.01	0.00
Na_m	0.12	0.11	0.01	0.14	0.12	0.21	0.17	0.18	0.16
K_Al	0.26	0.33	0.33	0.23	0.26	0.02	0.01	0.02	0.02
Na_Al	0.40	0.39	0.03	0.50	0.45	0.85	0.70	0.72	0.69
Plag	0.58	0.55	0.04	0.79	0.69	1.08	0.88	0.98	0.87

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	302515	301983	301999	302048	302089	302152	302185	302211	302014
North (NAD 27)	4319706	4319542	4319473	4319451	4319439	4319415	4319390	4319264	4319347
Classification	Plagioclase	Plag-KSpar	Plag-KSpar	Albite	Albite	Plag-KSpar	Plag-KSpar	Plagioclase	Plagioclase
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437168	H437169	H437170	H437171	H437172	H437173	H437174	H437175	H437176
Lithology	Bear	Bear	Porphyry	Porphyry	Porphyry	Bear	Bear	Bear	Bear
Ag (ppm)	0.04	0.01	0.09	0.01	0.07	0.02	0.02	0.06	0.02
Al (%)	6.45	6.72	6.74	6.43	6.52	6.7	6.86	6.57	6.87
As (ppm)	2.9	1.3	0.8	1.8	0.5	3	2.7	0.7	6.5
Ba (ppm)	170	1440	2390	840	800	1560	1420	720	980
Be (ppm)	1.92	1.72	1.54	1.85	2.07	2.09	1.27	1.96	2.46
Bi (ppm)	0.18	0.38	0.46	0.34	0.27	0.23	0.04	0.1	0.34
Ca (%)	3.16	1.69	1.13	0.84	0.73	1.81	1.94	2.53	1.53
Cd (ppm)	0.03	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02	0.02	0.02
Ce (ppm)	41.1	50.9	39.9	36.7	34.2	54.7	28.9	41.3	50.9
Co (ppm)	1.3	0.7	1.2	0.8	0.5	2.3	2.2	4.6	2.1
Cr (ppm)	13	13	10	7	8	11	12	12	9
Cs (ppm)	0.28	0.39	0.77	0.86	0.92	0.47	0.4	0.42	0.73
Cu (ppm)	356	28.8	53.5	78.8	50.8	60.3	244	271	124
Fe (%)	0.66	0.68	1.08	0.94	0.88	0.99	1.65	1.19	1.03
Ga (ppm)	20	19.9	19.45	20.6	19.5	20.1	13.45	21.6	24
Ge (ppm)	0.09	0.08	0.09	0.08	0.08	0.09	0.05	0.09	0.09
Hf (ppm)	0.8	1.6	1.3	1.4	1.4	0.9	0.6	0.8	1.4
In (ppm)	0.049	0.155	0.073	0.017	0.034	0.068	0.022	0.042	0.077
K (%)	0.17	2.55	2.15	1.19	1.3	2.84	2.64	1.38	1.58
La (ppm)	17.9	25.6	19.3	17.3	18.5	25.2	14	20.3	24.4
Li (ppm)	1.7	1.8	1.9	1.5	2	1.5	2.1	3.6	4.2
Mg (%)	0.8	0.53	0.21	0.1	0.18	0.57	0.59	0.58	0.32
Mn (ppm)	113	78	56	24	26	170	187	167	70
Mo (ppm)	0.85	1.03	1.27	4.75	1.79	1.57	0.63	0.7	1.67
Na (%)	3.67	3.13	3.27	3.56	3.17	3.11	3.04	3.47	3.65
Nb (ppm)	3.8	3.7	2.8	1.9	1.9	4.3	2.4	3.5	4.8
Ni (ppm)	4.5	5	2.9	1.5	1.2	7	8.1	8.7	9
P (ppm)	800	590	480	410	410	590	760	770	780
Pb (ppm)	4.1	4.2	3	3.2	2.4	4.7	3	3.6	5.2
Rb (ppm)	3.1	52.5	46.6	31.3	42.1	65	40.9	28.7	42.2
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.01	-0.01	0.03	0.07	0.12	0.01	0.01	0.01	0.01
Sb (ppm)	0.62	0.48	0.63	0.22	0.29	0.57	0.35	0.57	0.46

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	302515	301983	301999	302048	302089	302152	302185	302211	302014
North (NAD 27)	4319706	4319542	4319473	4319451	4319439	4319415	4319390	4319264	4319347
Classification	Plagioclase	Plag-KSpar	Plag-KSpar	Albite	Albite	Plag-KSpar	Plag-KSpar	Plagioclase	Plagioclase
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437168	H437169	H437170	H437171	H437172	H437173	H437174	H437175	H437176
Lithology	Bear	Bear	Porphyry	Porphyry	Porphyry	Bear	Bear	Bear	Bear
Sc (ppm)	6.1	5.3	4.4	3.4	4.5	5.9	3.5	5	5.8
Se (ppm)	2	2	2	2	2	2	1	2	2
Sn (ppm)	1.3	0.9	0.6	0.6	0.8	1	0.5	0.9	1
Sr (ppm)	1100	955	901	913	850	858	944	1030	858
Ta (ppm)	0.32	0.31	0.24	0.18	0.19	0.36	0.21	0.28	0.42
Te (ppm)	0.13	0.38	0.54	0.38	0.3	0.13	-0.05	0.05	0.24
Th (ppm)	8.4	8	6	7.2	8	8.1	6.2	8.2	15.2
Ti (%)	0.283	0.289	0.236	0.135	0.151	0.282	0.268	0.265	0.279
Tl (ppm)	0.03	0.2	0.2	0.13	0.18	0.26	0.14	0.12	0.17
U (ppm)	2	3.5	2.7	2.7	3.5	3.8	2.1	3.3	6
V (ppm)	48	51	46	32	39	55	63	62	58
W (ppm)	0.4	0.9	0.5	1.1	1.4	0.8	0.6	0.8	1.6
Y (ppm)	7.5	6.2	4.5	2.6	1.5	7.4	4.5	6.2	8.4
Zn (ppm)	9	8	5	5	4	13	17	10	10
Zr (ppm)	12	35.5	26.8	31.2	30.7	13.4	8.3	11.2	23.1
Al2O3 (%)	12.18	12.69	12.73	12.15	12.32	12.66	12.96	12.41	12.98
CaO (%)	4.42	2.36	1.58	1.18	1.02	2.53	2.71	3.54	2.14
FeO (%)	0.85	0.87	1.39	1.21	1.13	1.27	2.12	1.53	1.32
K2O (%)	0.20	3.07	2.59	1.43	1.57	3.42	3.18	1.66	1.90
MgO (%)	1.33	0.88	0.35	0.17	0.30	0.95	0.98	0.96	0.53
Na2O (%)	4.95	4.22	4.41	4.80	4.27	4.19	4.10	4.68	4.92
P2O5 (%)	0.18	0.14	0.11	0.09	0.09	0.14	0.17	0.18	0.18
TiO2 (%)	0.47	0.48	0.39	0.23	0.25	0.47	0.45	0.44	0.47
SO3 (%)	0.03	-0.03	0.08	0.18	0.30	0.03	0.03	0.03	0.03
Total (%)	24.61	24.70	23.63	21.42	21.25	25.65	26.70	25.43	24.47
SiO2 (%)	73.66	73.58	74.72	77.08	77.26	72.55	71.43	72.79	73.82
Al_m	0.24	0.25	0.25	0.24	0.24	0.25	0.25	0.24	0.25
Ca_m	0.08	0.04	0.03	0.02	0.02	0.05	0.05	0.06	0.04
K_m	0.00	0.07	0.06	0.03	0.03	0.07	0.07	0.04	0.04
Na_m	0.16	0.14	0.14	0.15	0.14	0.14	0.13	0.15	0.16
K_Al	0.02	0.26	0.22	0.13	0.14	0.29	0.27	0.15	0.16
Na_Al	0.67	0.55	0.57	0.65	0.57	0.54	0.52	0.62	0.62
Plag	1.00	0.72	0.68	0.74	0.65	0.73	0.71	0.88	0.77

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	302037	302057	302051	302150	301660	301873	301810	301803	302085
North (NAD 27)	4319301	4319241	4319144	4319115	4319392	4318848	4318777	4318696	4320785
Classification	Plagioclase	Plag-KSpar	Albite	Plagioclase	Plag-KSpar	Albite	Plag-KSpar	Plagioclase	Albite
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437177	H437178	H437179	H437180	H437181	H437182	H437183	H437184	H437185
Lithology	Porphyry	Bear	Porphyry	Bear	Porphyry	Porphyry	Bear	Bear	Bear (graphic txt.)
Ag (ppm)	0.09	0.02	0.38	0.27	0.01	0.01	0.03	0.06	0.02
Al (%)	6.88	6.8	6.51	6.71	7.05	6.55	7.06	7	6.54
As (ppm)	1.1	0.9	5.4	2	4.1	-0.2	2.4	2.3	1.6
Ba (ppm)	780	980	790	290	2100	170	1330	600	270
Be (ppm)	1.96	2.02	1.51	1.8	1.69	2.7	2.08	2.45	2.51
Bi (ppm)	0.32	0.11	0.12	0.16	1.03	0.07	0.05	0.1	0.03
Ca (%)	1.42	1.7	0.46	1.05	1.39	1.03	2.02	1.86	0.41
Cd (ppm)	-0.02	0.02	0.02	0.02	0.03	0.02	0.03	0.03	0.02
Ce (ppm)	31.7	42.5	46.2	43	45	41.5	48.4	47.4	7.53
Co (ppm)	10	3	2.3	0.3	1.5	1	3.1	2.8	6.7
Cr (ppm)	15	13	6	8	7	9	12	11	8
Cs (ppm)	0.83	1.3	0.67	0.69	0.91	0.32	0.78	0.88	0.87
Cu (ppm)	710	122.5	3420	217	220	161.5	224	142.5	2090
Fe (%)	1.7	0.98	0.95	0.98	1.19	0.53	0.91	1.09	0.61
Ga (ppm)	20.9	17.45	22.3	23.3	20.9	21.4	21.2	24.9	21.2
Ge (ppm)	0.09	0.07	0.07	0.08	0.09	0.07	0.09	0.06	0.05
Hf (ppm)	1.5	0.9	1	1	1.4	0.3	0.7	0.8	1.2
In (ppm)	0.029	0.036	0.081	0.029	0.147	0.045	0.048	0.022	0.01
K (%)	0.89	1.84	1.41	1.27	3.28	0.32	2.11	0.8	1.11
La (ppm)	14.2	20.8	22.3	20.3	22	21.1	24.2	22.6	3.1
Li (ppm)	3.4	4.1	3.6	3.1	2.3	4.7	5.2	5.7	3.7
Mg (%)	0.45	0.74	0.39	0.23	0.2	0.72	0.64	0.78	0.7
Mn (ppm)	72	165	67	28	75	57	139	93	53
Mo (ppm)	1.68	0.51	0.98	1.97	0.73	0.51	1.74	0.47	0.4
Na (%)	3.16	3.47	3.72	2.99	2.86	4.27	3.41	3.31	3.71
Nb (ppm)	1.6	3.2	1.5	1.4	3.6	1.3	3.8	2.9	4.6
Ni (ppm)	8.2	8.6	5.8	1.2	3.6	7.5	11.1	9.8	7.3
P (ppm)	590	850	570	350	520	520	790	840	770
Pb (ppm)	4.1	3.1	2.3	3.2	3.2	2.8	6.6	4.3	1.6
Rb (ppm)	29.3	40	47.7	54.2	85.3	11.5	53.6	30	53.7
Re (ppm)	0.004	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	0.002	-0.002
S (%)	1.46	0.01	0.03	0.24	0.02	-0.01	0.01	0.02	-0.01
Sb (ppm)	0.38	0.27	0.28	0.22	1.45	0.29	0.4	0.65	0.78

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	302037	302057	302051	302150	301660	301873	301810	301803	302085
North (NAD 27)	4319301	4319241	4319144	4319115	4319392	4318848	4318777	4318696	4320785
Classification	Plagioclase	Plag-KSpar	Albite	Plagioclase	Plag-KSpar	Albite	Plag-KSpar	Plagioclase	Albite
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437177	H437178	H437179	H437180	H437181	H437182	H437183	H437184	H437185
Lithology	Porphyry	Bear	Porphyry	Bear	Porphyry	Porphyry	Bear	Bear	Bear (graphic txt.)
Sc (ppm)	4.9	5.2	3.5	4.3	4.6	3.4	6	6.3	6
Se (ppm)	3	1	2	3	1	1	2	1	1
Sn (ppm)	0.8	1	2.7	3.2	0.9	1	1	1	1
Sr (ppm)	1225	879	407	931	768	810	978	1070	341
Ta (ppm)	0.14	0.24	0.13	0.13	0.27	0.12	0.31	0.22	0.4
Te (ppm)	0.29	0.08	0.09	0.11	0.74	-0.05	0.06	0.06	-0.05
Th (ppm)	6.2	7.8	6.3	6.1	7.7	5.4	8.6	10.5	21.9
Ti (%)	0.148	0.293	0.131	0.124	0.267	0.109	0.272	0.224	0.239
Tl (ppm)	0.14	0.17	0.19	0.24	0.34	0.05	0.21	0.13	0.19
U (ppm)	3.4	2.7	3.1	2.5	4	1.6	3.1	2.6	4.4
V (ppm)	49	61	45	40	56	36	56	53	43
W (ppm)	0.8	0.5	12.1	6.2	1.6	2.2	0.8	2.8	1.7
Y (ppm)	3.6	6.2	3.8	1.3	7.3	4.7	7.6	9	5.7
Zn (ppm)	8	11	9	3	9	7	16	12	9
Zr (ppm)	36.3	14.9	21.7	26	31.1	7	8.7	17.5	25.9
Al2O3 (%)	13.00	12.85	12.30	12.68	13.32	12.37	13.34	13.22	12.35
CaO (%)	1.99	2.38	0.64	1.47	1.94	1.44	2.83	2.60	0.57
FeO (%)	2.19	1.26	1.22	1.26	1.53	0.68	1.17	1.40	0.78
K2O (%)	1.07	2.22	1.70	1.53	3.95	0.39	2.54	0.96	1.34
MgO (%)	0.75	1.23	0.65	0.38	0.33	1.19	1.06	1.29	1.16
Na2O (%)	4.26	4.68	5.01	4.03	3.86	5.76	4.60	4.46	5.00
P2O5 (%)	0.14	0.19	0.13	0.08	0.12	0.12	0.18	0.19	0.18
TiO2 (%)	0.25	0.49	0.22	0.21	0.45	0.18	0.45	0.37	0.40
SO3 (%)	3.65	0.03	0.08	0.60	0.05	-0.03	0.03	0.05	-0.03
Total (%)	27.28	25.31	21.95	22.23	25.55	22.11	26.19	24.56	21.76
SiO2 (%)	70.81	72.91	76.52	76.21	72.67	76.35	71.97	73.72	76.72
Al_m	0.25	0.25	0.24	0.25	0.26	0.24	0.26	0.26	0.24
Ca_m	0.04	0.04	0.01	0.03	0.03	0.03	0.05	0.05	0.01
K_m	0.02	0.05	0.04	0.03	0.08	0.01	0.05	0.02	0.03
Na_m	0.14	0.15	0.16	0.13	0.12	0.19	0.15	0.14	0.16
K_Al	0.09	0.19	0.15	0.13	0.32	0.03	0.21	0.08	0.12
Na_Al	0.54	0.60	0.67	0.52	0.48	0.77	0.57	0.56	0.67
Plag	0.68	0.77	0.72	0.63	0.61	0.87	0.76	0.73	0.71

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	302045	302041	302145	302225	302253	302332	302446	302426	302506
North (NAD 27)	4320886	4321015	4321056	4321120	4321146	4321186	4321351	4321544	4321740
Classification	Plagioclase	Plagioclase	Sericite	Plagioclase	Sericite	Plag-KSpar	Plag-KSpar	Plag-KSpar	Plagioclase
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437186	H437187	H437188	H437189	H437190	H437191	H437192	H437193	H437194
Lithology	Bear (graphic txt.)	Bear (graphic txt.)	Bear (graphic txt.)	Bear (graphic txt.)	Bear	Bear	Bear	Bear	Bear
Ag (ppm)	0.01	0.01	0.01	0.02	0.08	0.02	0.02	0.01	0.01
Al (%)	6.84	6.15	6.51	6.8	6.92	6.71	6.77	6.74	6.77
As (ppm)	2.5	1.4	3.4	2	4.2	1.2	2.7	5.3	1.5
Ba (ppm)	240	200	5150	380	1390	740	860	1140	320
Be (ppm)	2.37	2.08	0.66	2.43	1.58	1.9	1.65	1.98	2.08
Bi (ppm)	0.1	0.07	0.77	0.23	0.25	0.32	0.89	0.07	0.07
Ca (%)	2.95	2.88	0.11	3.64	0.82	1.8	4.26	2.42	3.61
Cd (ppm)	0.05	0.03	0.02	0.04	0.02	-0.02	0.02	0.03	0.04
Ce (ppm)	33	7.17	1.35	36.3	23.4	28.1	44.6	42.6	32.5
Co (ppm)	2.3	0.7	0.6	1.2	1.1	3.2	7.1	3.8	1.6
Cr (ppm)	10	8	8	14	5	10	11	10	11
Cs (ppm)	1.26	0.22	0.83	0.33	2.14	2.02	1.08	1.11	0.22
Cu (ppm)	137.5	16.8	36.3	76	640	153.5	66.2	17.1	81.5
Fe (%)	0.82	0.6	0.73	0.91	2.01	1.37	2.07	1.25	0.73
Ga (ppm)	23.1	13.15	14.7	22.4	23.3	22.6	25.9	20.2	22.6
Ge (ppm)	0.08	-0.05	0.07	0.11	0.1	0.09	0.12	0.11	0.1
Hf (ppm)	1	0.7	1.1	1.3	0.9	0.9	0.9	0.9	1
In (ppm)	0.038	0.013	0.012	0.027	0.125	0.071	0.19	0.022	0.029
K (%)	0.29	0.24	5.13	0.31	2.91	1.18	1.22	2.24	0.29
La (ppm)	11.3	2.9	0.5	15.2	9.8	10.5	20.8	20.1	12.2
Li (ppm)	3	0.9	2.2	2.3	4.8	5	6.5	5	1.7
Mg (%)	0.54	0.33	0.04	0.61	0.61	0.82	0.77	0.58	0.55
Mn (ppm)	133	160	34	305	158	158	245	193	149
Mo (ppm)	0.39	0.22	10.9	0.74	2.67	0.33	0.85	0.76	0.44
Na (%)	3.84	3.2	0.68	3.26	1	2.43	2.2	2.97	3.58
Nb (ppm)	4.6	3.6	4.4	4.6	2.3	3.1	3.9	3.8	4.2
Ni (ppm)	4.1	1.4	0.9	4.6	4	3.6	10.4	9.1	4.2
P (ppm)	850	570	80	550	1000	150	860	720	670
Pb (ppm)	6.1	3.3	4.3	4.7	2.8	5.3	4.2	6.3	4.7
Rb (ppm)	5.6	2.8	117	6.2	145.5	43.8	22.5	49.5	3.4
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.01	0.01	0.01	0.01	-0.01	0.01	0.01	-0.01	-0.01
Sb (ppm)	1.05	0.92	0.47	1.71	1.74	1.84	5.56	0.97	0.68

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	302045	302041	302145	302225	302253	302332	302446	302426	302506
North (NAD 27)	4320886	4321015	4321056	4321120	4321146	4321186	4321351	4321544	4321740
Classification	Plagioclase	Plagioclase	Sericite	Plagioclase	Sericite	Plag-KSpar	Plag-KSpar	Plag-KSpar	Plagioclase
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437186	H437187	H437188	H437189	H437190	H437191	H437192	H437193	H437194
Lithology	Bear (graphic txt.)	Bear (graphic txt.)	Bear (graphic txt.)	Bear (graphic txt.)	Bear	Bear	Bear	Bear	Bear
Sc (ppm)	5.8	3.9	2.1	6.6	1.2	8.3	6	5	6.2
Se (ppm)	2	1	2	2	2	1	1	1	2
Sn (ppm)	1.6	0.5	1.7	1.3	1.3	0.7	1	0.8	1.1
Sr (ppm)	1310	951	353	1300	244	964	1250	1105	1405
Ta (ppm)	0.33	0.33	0.39	0.37	0.17	0.23	0.29	0.28	0.31
Te (ppm)	0.05	-0.05	0.57	0.06	-0.05	0.05	-0.05	-0.05	-0.05
Th (ppm)	10.7	18.9	10.4	12.1	6.5	7	8.6	8.4	8.6
Ti (%)	0.285	0.217	0.239	0.287	0.219	0.262	0.3	0.266	0.287
Tl (ppm)	0.05	0.03	0.83	0.07	0.65	0.25	0.11	0.19	0.04
U (ppm)	2.1	1.5	3.9	3.6	4	1.7	3.2	3.1	1.9
V (ppm)	34	31	29	25	32	34	82	51	25
W (ppm)	0.4	0.3	2.1	0.3	1.3	0.9	0.3	0.6	0.2
Y (ppm)	8.2	4.6	1.4	7.8	3.8	5.4	7.6	6.6	7.2
Zn (ppm)	15	17	6	17	10	12	6	17	12
Zr (ppm)	18.2	17.3	26.1	23.8	16.1	19.5	12.6	12.7	17.9
Al2O3 (%)	12.92	11.62	12.30	12.85	13.07	12.68	12.79	12.73	12.79
CaO (%)	4.13	4.03	0.15	5.09	1.15	2.52	5.96	3.39	5.05
FeO (%)	1.05	0.77	0.94	1.17	2.58	1.76	2.66	1.61	0.94
K2O (%)	0.35	0.29	6.18	0.37	3.51	1.42	1.47	2.70	0.35
MgO (%)	0.90	0.55	0.07	1.01	1.01	1.36	1.28	0.96	0.91
Na2O (%)	5.18	4.31	0.92	4.39	1.35	3.28	2.97	4.00	4.83
P2O5 (%)	0.19	0.13	0.02	0.13	0.23	0.03	0.20	0.16	0.15
TiO2 (%)	0.48	0.36	0.40	0.48	0.37	0.44	0.50	0.44	0.48
SO3 (%)	0.03	0.03	0.03	0.03	-0.03	0.03	0.03	-0.03	-0.03
Total (%)	25.22	22.09	21.00	25.52	23.24	23.51	27.85	25.97	25.47
SiO2 (%)	73.02	76.37	77.53	72.70	75.13	74.85	70.21	72.21	72.74
Al_m	0.25	0.23	0.24	0.25	0.26	0.25	0.25	0.25	0.25
Ca_m	0.07	0.07	0.00	0.09	0.02	0.05	0.11	0.06	0.09
K_m	0.01	0.01	0.13	0.01	0.07	0.03	0.03	0.06	0.01
Na_m	0.17	0.14	0.03	0.14	0.04	0.11	0.10	0.13	0.16
K_Al	0.03	0.03	0.55	0.03	0.29	0.12	0.12	0.23	0.03
Na_Al	0.66	0.61	0.12	0.56	0.17	0.43	0.38	0.52	0.62
Plag	0.95	0.93	0.13	0.92	0.25	0.61	0.81	0.76	0.98

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	302183	302072	301994	301122	300904	300920	302090	302186	302395
North (NAD 27)	4322097	4321836	4321678	4321356	4321308	4321361	4320161	4320365	4320400
Classification	Plagioclase	Plag-KSpar	Plag-KSpar	Sericite	Albite	Sericite	Plag-KSpar	Plagioclase	Plag-KSpar
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437195	H437196	H437197	H437198	H437199	H437200	H437201	H437202	H437203
Lithology	Bear (graphic txt.)	Bear	Bear	Artesia	Artesia	Artesia	Bear	Bear	Bear
Ag (ppm)	0.01	0.14	0.04	0.03	0.01	0.07	0.02	-0.01	0.01
Al (%)	6.43	6.08	6.79	7.44	7.71	7.87	6.66	7.37	7.04
As (ppm)	1.3	0.7	1.9	2.6	2.5	8.9	1.9	2	1.8
Ba (ppm)	410	1160	1400	90	90	350	1050	240	1310
Be (ppm)	2.17	2.01	2.13	0.99	0.91	1.23	1.96	2.17	2.03
Bi (ppm)	0.05	0.28	0.09	0.1	0.29	1.38	0.24	0.7	0.13
Ca (%)	2.38	1.74	1.88	0.08	0.03	0.37	2.41	3.58	2.84
Cd (ppm)	0.04	0.02	0.06	-0.02	-0.02	0.02	0.02	0.04	0.05
Ce (ppm)	31.3	35.5	48.6	20.4	30.9	38.2	43.7	50.2	44
Co (ppm)	0.3	1.7	5.9	0.1	0.2	0.2	5.1	1.8	4.3
Cr (ppm)	13	8	8	52	41	54	11	13	13
Cs (ppm)	0.94	0.97	1.42	1.09	0.35	2.01	1.48	0.38	0.5
Cu (ppm)	41.4	346	18.8	14.8	5.6	17.7	19.1	80.5	7.3
Fe (%)	0.27	1.44	1.96	0.73	0.23	1.45	1.28	0.85	1.1
Ga (ppm)	19.75	15.95	20.7	12.1	7.73	24.2	19.55	25	18.6
Ge (ppm)	0.08	0.09	0.13	0.06	0.06	0.09	0.09	0.06	0.11
Hf (ppm)	1.2	1	1.3	0.9	0.9	1.1	1	1.1	0.9
In (ppm)	-0.005	0.14	0.027	0.052	0.011	0.115	0.086	0.032	0.05
K (%)	0.5	1.75	3.11	3.2	0.75	3.04	1.3	0.21	2.15
La (ppm)	13	15.7	24.2	9.1	12.5	17.1	21	22.5	20.6
Li (ppm)	1.6	3.6	3.2	1	8	2.5	5.7	1.4	1.5
Mg (%)	0.03	0.42	0.56	0.11	0.02	0.17	0.6	0.62	0.71
Mn (ppm)	58	153	301	11	7	15	150	188	183
Mo (ppm)	0.81	0.71	1.35	2.15	18.15	1.41	1.31	1	1.28
Na (%)	3.6	1.94	2.71	0.4	1.91	0.52	2.8	3.69	3.11
Nb (ppm)	5.1	3.7	4	1.1	1.6	1.9	4	4.4	3.9
Ni (ppm)	1	2.9	8.9	1.3	0.5	1.4	9.9	6	9.3
P (ppm)	40	60	790	110	530	490	840	990	930
Pb (ppm)	3.4	2.5	13	7.4	59.9	11.4	4.8	4.2	5.6
Rb (ppm)	14.3	74.7	102.5	76	18.5	94.6	28.7	3.1	44.6
Re (ppm)	-0.002	-0.002	-0.002	-0.002	0.002	0.003	-0.002	-0.002	-0.002
S (%)	-0.01	0.01	0.01	0.11	0.08	0.57	0.02	0.03	0.01
Sb (ppm)	0.47	1.43	0.44	1.93	3.06	4.8	1.35	0.87	0.83

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	302183	302072	301994	301122	300904	300920	302090	302186	302395
North (NAD 27)	4322097	4321836	4321678	4321356	4321308	4321361	4320161	4320365	4320400
Classification	Plagioclase	Plag-KSpar	Plag-KSpar	Sericite	Albite	Sericite	Plag-KSpar	Plagioclase	Plag-KSpar
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437195	H437196	H437197	H437198	H437199	H437200	H437201	H437202	H437203
Lithology	Bear (graphic txt.)	Bear	Bear	Artesia	Artesia	Artesia	Bear	Bear	Bear
Sc (ppm)	0.5	2.7	5.3	4.4	1.9	8.7	5.1	6.5	5.7
Se (ppm)	2	1	2	1	2	3	2	2	2
Sn (ppm)	0.7	0.7	0.9	1.5	4.7	6.3	1.1	1.2	1.1
Sr (ppm)	1185	729	902	32.3	1065	178	1145	1470	1100
Ta (ppm)	0.42	0.3	0.31	0.1	0.13	0.15	0.32	0.29	0.3
Te (ppm)	-0.05	-0.05	-0.05	0.08	0.37	1.15	0.17	0.39	0.09
Th (ppm)	6.2	7.7	13	2.5	4.6	3.7	10.1	9.6	8.7
Ti (%)	0.306	0.232	0.268	0.216	0.26	0.306	0.262	0.313	0.277
Tl (ppm)	0.09	0.27	0.32	1.34	0.46	2.12	0.15	0.03	0.14
U (ppm)	1.8	3.3	5	1.2	1.2	2.4	4.3	2.9	3.4
V (ppm)	17	22	57	89	45	135	64	51	59
W (ppm)	0.1	0.4	0.7	0.7	1.5	2.2	0.6	0.2	0.3
Y (ppm)	6.7	7.1	7.7	1	0.8	1.9	7	9.8	7.3
Zn (ppm)	8	5	45	2	-2	4	12	13	15
Zr (ppm)	19.4	17.3	21.3	32.6	33.3	41.1	20.5	18	14.2
Al2O3 (%)	12.15	11.49	12.83	14.05	14.56	14.87	12.58	13.92	13.30
CaO (%)	3.33	2.43	2.63	0.11	0.04	0.52	3.37	5.01	3.97
FeO (%)	0.35	1.85	2.52	0.94	0.30	1.86	1.65	1.09	1.41
K2O (%)	0.60	2.11	3.75	3.86	0.90	3.66	1.57	0.25	2.59
MgO (%)	0.05	0.70	0.93	0.18	0.03	0.28	0.99	1.03	1.18
Na2O (%)	4.85	2.62	3.65	0.54	2.57	0.70	3.77	4.97	4.19
P2O5 (%)	0.01	0.01	0.18	0.03	0.12	0.11	0.19	0.23	0.21
TiO2 (%)	0.51	0.39	0.45	0.36	0.43	0.51	0.44	0.52	0.46
SO3 (%)	-0.03	0.03	0.03	0.28	0.20	1.43	0.05	0.08	0.03
Total (%)	21.82	21.62	26.96	20.34	19.17	23.94	24.61	27.10	27.35
SiO2 (%)	76.65	76.87	71.15	78.23	79.49	74.38	73.66	71.00	70.74
Al_m	0.24	0.23	0.25	0.28	0.29	0.29	0.25	0.27	0.26
Ca_m	0.06	0.04	0.05	0.00	0.00	0.01	0.06	0.09	0.07
K_m	0.01	0.04	0.08	0.08	0.02	0.08	0.03	0.01	0.06
Na_m	0.16	0.08	0.12	0.02	0.08	0.02	0.12	0.16	0.14
K_Al	0.05	0.20	0.32	0.30	0.07	0.27	0.14	0.02	0.21
Na_Al	0.66	0.37	0.47	0.06	0.29	0.08	0.49	0.59	0.52
Plag	0.91	0.57	0.66	0.07	0.29	0.11	0.74	0.92	0.79

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	302431	301630	301790	301790	301785	301776	301933	301911
North (NAD 27)	4320158	4319560	4319509	4319410	4319408	4319276	4319362	4319343
Classification	Plagioclase	Albite	Albite	Plagioclase	Plag-KSpar	Plag-KSpar	Albite	Plagioclase
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437204	H437205	H437206	H437207	H437208	H437209	H437210	H437211
Lithology	Bear (K-spar phenos)	Bear	Porphyry	Bear	Bear	Bear	Porphyry	Bear (K-spar phenos)
Ag (ppm)	0.01	0.06	0.02	0.02	0.06	-0.01	0.03	-0.01
Al (%)	7.09	6.77	6.7	6.86	6.81	7.21	6.51	7.21
As (ppm)	0.6	1.7	3.4	3.8	1.3	1.5	0.8	0.7
Ba (ppm)	170	610	510	150	1010	2510	300	230
Be (ppm)	2.26	2.57	1.96	2.59	2.57	1.76	1.66	2.45
Bi (ppm)	0.06	0.89	0.95	0.13	0.11	0.32	0.44	0.15
Ca (%)	3.16	0.32	0.33	3.8	2.02	1.79	0.71	3.2
Cd (ppm)	-0.02	-0.02	-0.02	0.03	0.02	0.02	0.02	0.03
Ce (ppm)	54.9	63.3	27.5	42.5	65.5	44.2	11.45	49.5
Co (ppm)	3.3	0.3	0.3	1.5	10	0.7	0.4	2.2
Cr (ppm)	12	5	7	7	7	13	8	12
Cs (ppm)	0.26	0.93	0.81	0.97	3.45	0.52	0.75	0.32
Cu (ppm)	3.9	100	139.5	347	533	7.4	34.3	47.7
Fe (%)	0.75	0.69	1.72	0.52	2.43	0.78	1.29	0.77
Ga (ppm)	18.5	20.2	18.7	20.5	18.85	16.6	17.65	19.55
Ge (ppm)	0.1	0.1	0.09	0.11	0.12	0.09	0.08	0.09
Hf (ppm)	0.9	1.3	1.3	1.2	1.4	1.7	1.4	0.8
In (ppm)	0.038	0.066	0.157	0.053	0.031	0.148	0.044	0.093
K (%)	0.2	1.09	0.79	0.21	3.43	3.75	1.02	0.33
La (ppm)	27	30.9	12.3	15.9	30.4	19.5	6.4	22.3
Li (ppm)	1.2	2.9	1.2	1.6	2.3	0.8	1.9	2.6
Mg (%)	0.71	0.22	0.06	0.38	0.66	0.55	0.15	0.74
Mn (ppm)	170	20	21	124	387	91	39	125
Mo (ppm)	0.77	2.68	1.78	1.13	1.99	1.81	2.08	0.91
Na (%)	3.93	3.55	4.23	3.82	2.6	2.72	3.2	3.82
Nb (ppm)	3.9	4.3	2.2	5.7	7.5	4	1.5	4.4
Ni (ppm)	8.2	1.4	0.8	3.5	10.3	5.1	1.1	8.8
P (ppm)	820	340	190	2430	880	960	310	1080
Pb (ppm)	4.4	2.9	2.1	4.4	10.2	2.5	2.7	3.4
Rb (ppm)	2.7	48.7	29.8	3.6	148	87	38.1	7.1
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.01	0.01	0.02	0.01	0.01	0.02	0.15	0.01
Sb (ppm)	0.33	0.76	0.54	0.51	0.44	0.48	0.32	0.39

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	302431	301630	301790	301790	301785	301776	301933	301911
North (NAD 27)	4320158	4319560	4319509	4319410	4319408	4319276	4319362	4319343
Classification	Plagioclase	Albite	Albite	Plagioclase	Plag-KSpar	Plag-KSpar	Albite	Plagioclase
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437204	H437205	H437206	H437207	H437208	H437209	H437210	H437211
Lithology	Bear (K-spar phenos)	Bear	Porphyry	Bear	Bear	Bear	Porphyry	Bear (K-spar phenos)
Sc (ppm)	5.5	4.9	3.7	5.9	6.4	5.6	4.5	6.2
Se (ppm)	1	2	2	2	1	2	4	2
Sn (ppm)	0.9	1.5	0.6	0.9	1.1	0.9	0.7	1.1
Sr (ppm)	1235	398	579	1160	678	926	760	1315
Ta (ppm)	0.32	0.36	0.18	0.44	0.59	0.28	0.11	0.33
Te (ppm)	-0.05	0.79	0.71	0.05	-0.05	0.26	0.49	0.07
Th (ppm)	9	22.4	6.5	9.9	17.6	8.4	6.4	9.7
Ti (%)	0.274	0.23	0.163	0.346	0.331	0.282	0.13	0.302
Tl (ppm)	0.03	0.19	0.14	0.05	0.49	0.33	0.19	0.04
U (ppm)	2.3	10.8	2.4	3.4	5.1	3.1	2.9	3.7
V (ppm)	56	53	38	52	78	46	49	62
W (ppm)	0.3	2	1	0.3	0.7	0.7	0.9	0.4
Y (ppm)	7.5	5.9	2.6	12.7	13.7	6.7	1.1	8.9
Zn (ppm)	13	4	2	15	56	7	4	11
Zr (ppm)	13.2	34.9	31.1	19.9	26.8	39.8	34.6	14.6
Al2O3 (%)	13.39	12.79	12.66	12.96	12.86	13.62	12.30	13.62
CaO (%)	4.42	0.45	0.46	5.32	2.83	2.50	0.99	4.48
FeO (%)	0.96	0.89	2.21	0.67	3.12	1.00	1.66	0.99
K2O (%)	0.24	1.31	0.95	0.25	4.13	4.52	1.23	0.40
MgO (%)	1.18	0.36	0.10	0.63	1.09	0.91	0.25	1.23
Na2O (%)	5.30	4.79	5.70	5.15	3.50	3.67	4.31	5.15
P2O5 (%)	0.19	0.08	0.04	0.56	0.20	0.22	0.07	0.25
TiO2 (%)	0.46	0.38	0.27	0.58	0.55	0.47	0.22	0.50
SO3 (%)	0.03	0.03	0.05	0.03	0.03	0.05	0.38	0.03
Total (%)	26.16	21.07	22.45	26.13	28.33	26.96	21.40	26.64
SiO2 (%)	72.00	77.45	75.98	72.04	69.69	71.15	77.10	71.50
Al_m	0.26	0.25	0.25	0.25	0.25	0.27	0.24	0.27
Ca_m	0.08	0.01	0.01	0.10	0.05	0.04	0.02	0.08
K_m	0.01	0.03	0.02	0.01	0.09	0.10	0.03	0.01
Na_m	0.17	0.15	0.18	0.17	0.11	0.12	0.14	0.17
K_Al	0.02	0.11	0.08	0.02	0.35	0.36	0.11	0.03
Na_Al	0.65	0.62	0.74	0.65	0.45	0.44	0.58	0.62
Plag	0.95	0.65	0.77	1.03	0.65	0.61	0.65	0.92

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	301876	301932	301938	302005	302054	302052	302032	302016
North (NAD 27)	4319229	4319132	4319040	4319043	4318988	4318957	4318918	4318955
Classification	Plag-KSpar	Albite	Plag-KSpar	Albite	Albite	Albite-KSpar-Sericite	Albite	Plag-KSpar
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437212	H437213	H437214	H437215	H437216	H437217	H437218	H437219
Lithology	gabbro	Bear	Bear	Porphyry	Bear	Porphyry	Bear	Bear
Ag (ppm)	0.07	0.18	0.03	0.25	0.06	0.16	0.15	0.04
Al (%)	8	6.94	6.85	6.86	6.64	6.78	7.04	7.06
As (ppm)	0.9	3.9	0.9	3.4	0.5	3	13.4	0.6
Ba (ppm)	930	190	1030	370	180	1660	590	1650
Be (ppm)	1.26	2.05	1.69	2.18	2.1	1.96	3.21	1.87
Bi (ppm)	0.08	0.28	0.1	0.34	0.02	0.19	0.14	0.09
Ca (%)	5.17	0.95	1.76	0.66	0.73	0.4	0.51	2.28
Cd (ppm)	0.06	-0.02	0.06	-0.02	0.03	-0.02	0.05	0.04
Ce (ppm)	30.7	54.6	47.6	21.2	20.9	10.5	46.2	49.8
Co (ppm)	23.2	0.7	18.3	0.6	1.2	0.8	19.8	5.6
Cr (ppm)	15	10	13	19	10	6	10	14
Cs (ppm)	0.73	0.57	0.43	0.76	0.33	0.65	3.64	0.73
Cu (ppm)	245	248	811	104	282	138.5	1960	324
Fe (%)	5.15	0.73	1.81	1.2	0.42	0.76	1.46	1.64
Ga (ppm)	18.45	21.9	17.85	15.85	19.45	18.25	19.45	19.4
Ge (ppm)	0.13	0.1	0.09	0.08	0.07	0.07	0.09	0.12
Hf (ppm)	1.5	1.5	0.7	1.3	1.2	1.2	0.4	0.9
In (ppm)	0.059	0.018	0.022	0.021	0.008	0.013	0.064	0.035
K (%)	1.68	0.51	2.37	0.71	0.48	2.45	1.56	2.46
La (ppm)	13.4	26	22.7	11.1	10.3	6.1	22.1	23.5
Li (ppm)	4.6	5.4	5.9	2.6	5.2	2.8	8.6	5.7
Mg (%)	2.38	0.53	0.72	0.16	0.68	0.12	0.59	0.72
Mn (ppm)	990	48	248	28	92	22	59	190
Mo (ppm)	0.38	2.5	0.82	5.1	1.46	2.07	1.43	0.85
Na (%)	2.34	4.14	2.96	4.1	4.56	3.35	3.41	2.83
Nb (ppm)	3.2	1.9	3.9	1.5	2.8	1.5	3.6	4.2
Ni (ppm)	17.9	7.2	15.7	2	8.7	1.3	38.8	15.5
P (ppm)	1590	500	860	410	920	260	790	980
Pb (ppm)	6.4	4.1	6.5	2.3	1.8	3.2	2.9	4.8
Rb (ppm)	32	22.5	60.2	31.8	21.3	62.9	66.2	47.5
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.01	0.03	0.01	0.09	0.01	0.03	0.01	0.01
Sb (ppm)	0.42	0.36	0.46	0.41	0.22	0.27	1.79	0.43

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	301876	301932	301938	302005	302054	302052	302032	302016
North (NAD 27)	4319229	4319132	4319040	4319043	4318988	4318957	4318918	4318955
Classification	Plag-KSpar	Albite	Plag-KSpar	Albite	Albite	Albite-KSpar-Sericite	Albite	Plag-KSpar
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437212	H437213	H437214	H437215	H437216	H437217	H437218	H437219
Lithology	gabbro	Bear	Bear	Porphyry	Bear	Porphyry	Bear	Bear
Sc (ppm)	21.7	4.8	5.8	3.6	4.6	2.7	5.6	6.3
Se (ppm)	1	2	2	3	1	2	2	2
Sn (ppm)	0.9	1.3	0.9	1	1.6	1.5	1.5	1.1
Sr (ppm)	999	856	928	626	532	468	278	1070
Ta (ppm)	0.21	0.15	0.3	0.11	0.2	0.12	0.27	0.3
Te (ppm)	0.05	0.19	0.05	0.27	-0.05	0.13	0.08	0.05
Th (ppm)	2.6	8.9	9.3	6.2	8.2	4.1	8.2	8
Ti (%)	0.465	0.15	0.273	0.148	0.199	0.13	0.258	0.309
Tl (ppm)	0.23	0.13	0.25	0.12	0.09	0.27	0.25	0.22
U (ppm)	1	3.8	3.8	2.7	3.3	2.2	3.7	3
V (ppm)	204	52	59	39	54	36	71	67
W (ppm)	0.6	2.4	0.8	2.6	6.5	1.8	7.9	0.6
Y (ppm)	14.3	4.4	8.1	2	5.8	1.3	7.6	7.8
Zn (ppm)	75	8	21	3	9	3	30	15
Zr (ppm)	47.2	40.5	11.7	36.8	32.8	31.6	4.7	13.9
Al2O3 (%)	15.11	13.11	12.94	12.96	12.54	12.81	13.30	13.34
CaO (%)	7.23	1.33	2.46	0.92	1.02	0.56	0.71	3.19
FeO (%)	6.62	0.94	2.33	1.54	0.54	0.98	1.88	2.11
K2O (%)	2.02	0.61	2.86	0.86	0.58	2.95	1.88	2.96
MgO (%)	3.95	0.88	1.19	0.27	1.13	0.20	0.98	1.19
Na2O (%)	3.15	5.58	3.99	5.53	6.15	4.52	4.60	3.81
P2O5 (%)	0.36	0.11	0.20	0.09	0.21	0.06	0.18	0.22
TiO2 (%)	0.78	0.25	0.46	0.25	0.33	0.22	0.43	0.52
SO3 (%)	0.03	0.08	0.03	0.23	0.03	0.08	0.03	0.03
Total (%)	39.26	22.89	26.45	22.64	22.52	22.36	23.98	27.37
SiO2 (%)	57.99	75.51	71.70	75.78	75.90	76.07	74.34	70.71
Al_m	0.30	0.26	0.25	0.25	0.25	0.25	0.26	0.26
Ca_m	0.13	0.02	0.04	0.02	0.02	0.01	0.01	0.06
K_m	0.04	0.01	0.06	0.02	0.01	0.06	0.04	0.06
Na_m	0.10	0.18	0.13	0.18	0.20	0.15	0.15	0.12
K_Al	0.15	0.05	0.24	0.07	0.05	0.25	0.15	0.24
Na_Al	0.34	0.70	0.51	0.70	0.81	0.58	0.57	0.47
Plag	0.78	0.79	0.68	0.77	0.88	0.62	0.62	0.69

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	302022	302161	302157	300909	300784	301793	301717	301668
North (NAD 27)	4318847	4318922	4318980	4320118	4319861	4320308	4320483	4320488
Classification	Albite-KSpar-Sericite	Albite-KSpar-Sericite	Plag-KSpar	Albite-KSpar-Sericite	Albite-KSpar-Sericite	Plag-KSpar	Sericite	Albite-KSpar-Sericite
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437220	H437221	H437222	H437223	H437224	H437251	H437252	H437253
Lithology	Porphyry	Porphyry	Bear	Porphyry	Bear	Porphyry (Blue Hill)	Porphyry	Porphyry, mafic
Ag (ppm)	0.27	0.67	0.06	0.02	0.04	0.04	0.06	0.04
Al (%)	6.93	7.34	6.95	6.44	7.36	7.91	7.88	7.93
As (ppm)	5.7	20.1	0.8	5.2	3.3	6.5	9.6	7.9
Ba (ppm)	1720	1730	1090	1760	1120	3580	3310	3550
Be (ppm)	1.46	1.73	1.95	1.57	2.76	1.9	2.22	1.96
Bi (ppm)	0.12	0.53	0.06	0.89	0.08	0.41	0.59	0.77
Ca (%)	0.57	0.43	1.21	0.24	0.99	2.33	0.56	0.43
Cd (ppm)	-0.02	-0.02	-0.02	0.03	0.02	0.03	-0.02	0.03
Ce (ppm)	23.7	11.25	42.4	16.5	66.5	43.9	50.8	34.9
Co (ppm)	0.8	0.4	0.9	0.9	5	2.9	1.7	0.6
Cr (ppm)	5	6	12	10	6	10	19	6
Cs (ppm)	0.92	0.89	0.28	0.9	3.59	1.46	1.8	0.98
Cu (ppm)	235	153	466	36.4	123.5	26	37	23
Fe (%)	0.77	0.71	1.21	1.33	3.38	1.88	2.11	1.64
Ga (ppm)	18.15	20	18.45	15.4	21	21.9	22.2	20.6
Ge (ppm)	0.08	0.08	0.09	0.08	0.14	0.1	0.09	0.08
Hf (ppm)	0.5	1.4	0.6	1.2	0.8	1.4	2	1.9
In (ppm)	0.044	0.073	0.024	0.024	0.032	0.046	0.029	0.045
K (%)	3.04	3.24	2.04	2.04	3.17	3.48	3.23	3.94
La (ppm)	11.8	5.4	21.1	9.1	33.4	21.5	24.8	18
Li (ppm)	3.6	6.4	4.1	1.5	7.6	5	6.9	2.3
Mg (%)	0.26	0.25	0.69	0.06	0.69	0.32	0.57	0.16
Mn (ppm)	29	27	164	42	198	201	126	46
Mo (ppm)	39	25.9	0.9	1.83	3.27	1.14	4.97	2.05
Na (%)	2.97	2.53	3.44	3.82	2.93	2.07	1.64	2.75
Nb (ppm)	1.4	2	3.1	2.7	7.8	3.1	3.1	3.3
Ni (ppm)	2.6	2.4	10.8	1.9	11.5	6.4	6.2	1.1
P (ppm)	290	180	810	320	1120	660	940	430
Pb (ppm)	3.7	1.3	2.4	4.7	6.5	6.1	3	6.5
Rb (ppm)	82.8	119	53.1	53.9	114	77.2	108.5	98.2
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	0.002	-0.002
S (%)	0.07	0.02	0.02	0.08	0.02	0.02	0.14	0.02
Sb (ppm)	0.32	12.45	0.31	1.12	1.43	2.07	0.86	0.79

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	302022	302161	302157	300909	300784	301793	301717	301668
North (NAD 27)	4318847	4318922	4318980	4320118	4319861	4320308	4320483	4320488
Classification	Albite-KSpar-Sericite	Albite-KSpar-Sericite	Plag-KSpar	Albite-KSpar-Sericite	Albite-KSpar-Sericite	Plag-KSpar	Sericite	Albite-KSpar-Sericite
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437220	H437221	H437222	H437223	H437224	H437251	H437252	H437253
Lithology	Porphyry	Porphyry	Bear	Porphyry	Bear	Porphyry (Blue Hill)	Porphyry	Porphyry, mafic
Sc (ppm)	3.1	5.2	5.3	3.2	7.7	4.7	7.5	4
Se (ppm)	3	4	1	2	2	3	3	2
Sn (ppm)	1.4	5.2	1.6	0.6	1.2	0.8	0.9	0.8
Sr (ppm)	593	312	689	460	418	1295	389	533
Ta (ppm)	0.1	0.14	0.24	0.19	0.56	0.23	0.22	0.25
Te (ppm)	0.08	0.06	-0.05	0.14	-0.05	0.35	0.36	0.57
Th (ppm)	5.9	4.7	8.1	8	28.6	8.1	8.1	8.4
Ti (%)	0.115	0.177	0.245	0.197	0.358	0.247	0.314	0.264
Tl (ppm)	0.33	0.44	0.21	0.29	0.45	0.38	0.6	0.63
U (ppm)	2.2	3	3.2	3	9.5	3.4	4.9	4.8
V (ppm)	42	95	53	36	96	63	94	52
W (ppm)	10.8	7.2	2.2	1.4	2.7	1.2	4.3	1.9
Y (ppm)	2.2	1.9	7.4	2	12.1	6.1	5.6	1.9
Zn (ppm)	6	3	13	5	25	12	15	6
Zr (ppm)	12.9	43.4	8.4	27.6	22	31	53.7	43.8
Al2O3 (%)	13.09	13.87	13.13	12.17	13.90	14.94	14.89	14.98
CaO (%)	0.80	0.60	1.69	0.34	1.39	3.26	0.78	0.60
FeO (%)	0.99	0.91	1.56	1.71	4.35	2.42	2.71	2.11
K2O (%)	3.66	3.90	2.46	2.46	3.82	4.19	3.89	4.75
MgO (%)	0.43	0.41	1.14	0.10	1.14	0.53	0.95	0.27
Na2O (%)	4.00	3.41	4.64	5.15	3.95	2.79	2.21	3.71
P2O5 (%)	0.07	0.04	0.19	0.07	0.26	0.15	0.22	0.10
TiO2 (%)	0.19	0.30	0.41	0.33	0.60	0.41	0.52	0.44
SO3 (%)	0.18	0.05	0.05	0.20	0.05	0.05	0.35	0.05
Total (%)	23.41	23.50	25.26	22.52	29.45	28.75	26.52	27.00
SiO2 (%)	74.95	74.86	72.97	75.90	68.49	69.24	71.62	71.11
Al_m	0.26	0.27	0.26	0.24	0.27	0.29	0.29	0.29
Ca_m	0.01	0.01	0.03	0.01	0.02	0.06	0.01	0.01
K_m	0.08	0.08	0.05	0.05	0.08	0.09	0.08	0.10
Na_m	0.13	0.11	0.15	0.17	0.13	0.09	0.07	0.12
K_Al	0.30	0.31	0.20	0.22	0.30	0.30	0.28	0.34
Na_Al	0.50	0.40	0.58	0.70	0.47	0.31	0.24	0.41
Plag	0.56	0.44	0.70	0.72	0.56	0.51	0.29	0.44

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	301490	301383	301362	301260	301324	301261	301435	301419
North (NAD 27)	4320455	4320240	4320152	4320170	4320310	4320384	4320347	4320488
Classification	Plag-KSpar	Sericite-Albite	Plag-KSpar	Plagioclase	Albite	Sericite	Plagioclase	Albite
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437254	H437255	H437256	H437257	H437258	H437259	H437260	H437261
Lithology	Porphyry	McLeod QMD	Porphyry, crowded	Bear QM	Porphyry	???	Qz-tourmaline breccias	Porphyry
Ag (ppm)	0.01	0.03	0.03	0.03	0.01	0.08	0.03	0.02
Al (%)	8.16	7.98	7.88	8.27	7.79	8.3	4.13	7.66
As (ppm)	4.7	14	8.1	8	4.7	3.4	6.3	6.3
Ba (ppm)	2410	620	2890	570	880	1210	130	210
Be (ppm)	1.79	2.75	1.9	3.13	2.01	1.98	0.83	2.06
Bi (ppm)	0.09	0.78	0.39	0.3	0.43	0.91	0.18	0.45
Ca (%)	1.34	0.57	2.01	3.29	0.41	0.12	0.71	0.32
Cd (ppm)	0.04	0.02	0.03	0.04	0.03	0.02	0.02	-0.02
Ce (ppm)	48.9	60.8	42.1	69.1	30.9	42.6	23.6	37.8
Co (ppm)	16.3	0.7	1.8	4.8	2.1	0.4	8.4	0.5
Cr (ppm)	37	10	9	7	6	11	6	9
Cs (ppm)	1.36	2.87	1.19	1.05	0.69	2.35	0.52	0.6
Cu (ppm)	94.9	71.6	58.7	414	49.5	57	68.8	47.3
Fe (%)	3.82	1.93	1.83	1.96	1.46	1.68	1.21	1.6
Ga (ppm)	19.65	29.5	22	27.6	21.4	21.6	10.2	21.2
Ge (ppm)	0.12	0.1	0.1	0.12	0.09	0.08	0.08	0.08
Hf (ppm)	2.5	0.8	1.6	0.8	1.8	0.9	1	1.6
In (ppm)	0.03	0.067	0.037	0.058	0.02	0.08	0.008	0.01
K (%)	3.04	2.48	3.17	1.07	1.27	3.61	0.44	0.69
La (ppm)	25.1	26.8	20.5	25.7	15.7	23.6	10.3	21.1
Li (ppm)	9.7	8.1	4.6	6.4	2.4	5.5	6.7	1.8
Mg (%)	1.46	0.92	0.33	1.07	0.16	0.45	0.27	0.13
Mn (ppm)	497	81	233	233	54	58	130	23
Mo (ppm)	1.89	3.46	1.52	0.59	2.05	2.77	1.18	4.24
Na (%)	2.67	1.89	3	4.55	4.91	0.52	1.99	5.27
Nb (ppm)	7.3	5.1	3.3	9.6	3.1	3.1	3.2	2.8
Ni (ppm)	29	5	4.4	10.3	1.9	3	4.5	1.1
P (ppm)	1020	470	650	1570	480	350	1890	410
Pb (ppm)	4	3.8	5.5	5.1	3.5	5.2	3.2	4.6
Rb (ppm)	79.1	124.5	73.1	30.2	37.6	143	15.2	30.3
Re (ppm)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.01	0.07	0.02	0.01	0.01	0.12	0.07	0.02
Sb (ppm)	2.08	2.8	1.7	2.51	0.78	2	0.75	0.7

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	301490	301383	301362	301260	301324	301261	301435	301419
North (NAD 27)	4320455	4320240	4320152	4320170	4320310	4320384	4320347	4320488
Classification	Plag-KSpar	Sericite-Albite	Plag-KSpar	Plagioclase	Albite	Sericite	Plagioclase	Albite
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437254	H437255	H437256	H437257	H437258	H437259	H437260	H437261
Lithology	Porphyry	McLeod QMD	Porphyry, crowded	Bear QM	Porphyry	???	Qz-tourmaline breccias	Porphyry
Sc (ppm)	15.5	12	5.1	10.1	4.1	7.5	4.8	4.7
Se (ppm)	2	3	3	3	2	2	2	2
Sn (ppm)	1.7	1.6	0.8	2	0.8	1.1	1	0.7
Sr (ppm)	642	172	1005	849	436	96	144	377
Ta (ppm)	0.6	0.35	0.24	0.63	0.22	0.24	0.37	0.2
Te (ppm)	0.05	0.75	0.19	0.2	0.15	0.86	0.18	0.24
Th (ppm)	9.5	18	7.3	21.5	7.9	23.8	43.7	8.3
Ti (%)	0.351	0.407	0.266	0.564	0.24	0.279	0.13	0.213
Tl (ppm)	0.39	0.64	0.43	0.17	0.19	0.74	0.09	0.11
U (ppm)	2.8	6.3	3.7	7.2	5	3.4	5.8	3.1
V (ppm)	118	151	65	146	51	96	61	49
W (ppm)	1.9	5.3	1.3	1.1	1.1	2	1.8	1.2
Y (ppm)	16.1	8.1	6.9	16.8	4.3	4.7	6	3.8
Zn (ppm)	69	11	14	19	6	9	7	4
Zr (ppm)	80.5	15.2	35.4	14.2	44	24.1	20.7	35.9
Al2O3 (%)	15.41	15.07	14.89	15.62	14.72	15.68	7.80	14.47
CaO (%)	1.87	0.80	2.81	4.60	0.57	0.17	0.99	0.45
FeO (%)	4.91	2.48	2.35	2.52	1.88	2.16	1.56	2.06
K2O (%)	3.66	2.99	3.82	1.29	1.53	4.35	0.53	0.83
MgO (%)	2.42	1.53	0.55	1.77	0.27	0.75	0.45	0.22
Na2O (%)	3.60	2.55	4.04	6.13	6.62	0.70	2.68	7.10
P2O5 (%)	0.23	0.11	0.15	0.36	0.11	0.08	0.43	0.09
TiO2 (%)	0.59	0.68	0.44	0.94	0.40	0.47	0.22	0.36
SO3 (%)	0.03	0.18	0.05	0.03	0.03	0.30	0.18	0.05
Total (%)	32.73	26.38	29.10	33.27	26.12	24.65	14.84	25.63
SiO2 (%)	64.98	71.78	68.86	64.40	72.06	73.62	84.13	72.58
Al_m	0.30	0.30	0.29	0.31	0.29	0.31	0.15	0.28
Ca_m	0.03	0.01	0.05	0.08	0.01	0.00	0.02	0.01
K_m	0.08	0.06	0.08	0.03	0.03	0.09	0.01	0.02
Na_m	0.12	0.08	0.13	0.20	0.21	0.02	0.09	0.23
K_Al	0.26	0.22	0.28	0.09	0.11	0.30	0.07	0.06
Na_Al	0.38	0.28	0.45	0.65	0.74	0.07	0.57	0.81
Plag	0.49	0.33	0.62	0.91	0.78	0.08	0.68	0.84

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	301382	301392	301213	300349	301700	301480	301470
North (NAD 27)	4320657	4320668	4320578	4319678	4322170	4322200	4322150
Classification	Sericite-Albite	Plagioclase	Sericite	Albite-KSpar-Sericite	Plagioclase	Sericite-Albite	Plagioclase
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437262	H437263	H437264	H437265	H437285	H437286	H437287
Lithology	Bear border granite phase	McLeod QMD	Porphyry ??	Porphyry	Bear QM (NW Blue Hill)	Bear QM, shaft	Bear QM/border gran
Ag (ppm)	0.06	0.04	0.06	0.04	0.6	0.49	0.48
Al (%)	8.28	8.18	8.4	8.12	4.36	4.81	6.42
As (ppm)	12.9	11.1	5.9	35.7	17	1.2	23.2
Ba (ppm)	2200	690	890	2150	1410	460	630
Be (ppm)	1.99	3.19	1.23	2.11	1.9	1.06	2.24
Bi (ppm)	1.29	0.11	0.78	1.06	5.3	0.48	3.46
Ca (%)	0.62	4.83	0.24	0.35	4.27	0.28	5.31
Cd (ppm)	0.02	0.05	-0.02	0.05	0.04	0.08	0.04
Ce (ppm)	53.9	18.2	25.7	29.9	39.3	13.9	44.1
Co (ppm)	1.1	7.3	0.8	1.8	18.6	2.4	13.2
Cr (ppm)	11	13	47	45	34	9	19
Cs (ppm)	1.62	0.17	2.6	1.05	1.05	2.12	0.66
Cu (ppm)	118.5	32.9	45.6	127.5	6040	15950	5000
Fe (%)	4.05	2.34	2.57	2.32	13.1	1.56	6.78
Ga (ppm)	26.1	21.1	22.3	21.7	20.8	21.1	25.8
Ge (ppm)	0.13	0.12	0.1	0.09	0.19	0.07	0.13
Hf (ppm)	2.4	1.2	0.5	2.8	0.9	0.6	1
In (ppm)	0.056	0.077	0.052	0.044	0.388	0.055	0.371
K (%)	2.96	0.51	3.95	2.46	0.22	1.42	0.74
La (ppm)	25	8.6	12	15	19.3	6.4	19
Li (ppm)	7.3	2.3	7.4	4	12.5	7.2	12.7
Mg (%)	0.67	2.25	0.41	0.37	2.31	0.47	2.82
Mn (ppm)	70	1385	40	99	672	44	1625
Mo (ppm)	7.4	1.93	1.98	3.36	3.64	8.7	2.22
Na (%)	1.86	5.2	0.49	4.18	0.1	0.89	0.37
Nb (ppm)	1.2	0.6	2.4	3	3.9	2.6	4.7
Ni (ppm)	2.6	7.9	2.9	8.2	30.2	6	19.1
P (ppm)	1540	100	430	690	2210	640	6250
Pb (ppm)	7.1	11.1	7.3	8.4	5.8	2.7	8.3
Rb (ppm)	119	5.4	132.5	58.3	11.1	59.3	20.6
Re (ppm)	-0.002	0.002	-0.002	-0.002	-0.002	-0.002	-0.002
S (%)	0.21	0.01	0.47	0.05	0.05	0.01	0.01
Sb (ppm)	2.02	10.05	2.23	1.5	6.16	5.81	11.85

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	301382	301392	301213	300349	301700	301480	301470
North (NAD 27)	4320657	4320668	4320578	4319678	4322170	4322200	4322150
Classification	Sericite-Albite	Plagioclase	Sericite	Albite-KSpar-Sericite	Plagioclase	Sericite-Albite	Plagioclase
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437262	H437263	H437264	H437265	H437285	H437286	H437287
Lithology	Bear border granite phase	McLeod QMD	Porphyry ??	Porphyry	Bear QM (NW Blue Hill)	Bear QM, shaft	Bear QM/border gran
Sc (ppm)	13.8	16.1	12.3	8.5	64.5	6.4	9.5
Se (ppm)	9	2	2	3	1	2	3
Sn (ppm)	1.3	0.8	0.5	0.9	1.1	2.5	1.1
Sr (ppm)	116	1515	149.5	388	994	114.5	1370
Ta (ppm)	0.08	0.06	0.16	0.21	0.28	0.2	0.35
Te (ppm)	0.66	0.05	0.56	0.66	1.72	0.2	0.73
Th (ppm)	7.6	1	4.3	9.1	54.7	9.5	27.2
Ti (%)	0.146	0.125	0.324	0.293	0.256	0.158	0.26
Tl (ppm)	1.07	0.12	0.96	0.58	0.04	0.23	0.1
U (ppm)	3.8	1	2.2	4.7	10.7	7.4	5
V (ppm)	182	58	132	87	272	81	209
W (ppm)	1.9	1.6	5	1.8	40.7	4.6	4.2
Y (ppm)	4	6	2.5	5	10.9	7.3	12.7
Zn (ppm)	12	67	7	16	23	8	46
Zr (ppm)	72.6	24.5	13.8	78.9	16.6	11.5	17.1
Al2O3 (%)	15.64	15.45	15.87	15.34	8.24	9.09	12.13
CaO (%)	0.87	6.76	0.34	0.49	5.97	0.39	7.43
FeO (%)	5.21	3.01	3.31	2.98	16.85	2.01	8.72
K2O (%)	3.57	0.61	4.76	2.96	0.27	1.71	0.89
MgO (%)	1.11	3.73	0.68	0.61	3.83	0.78	4.68
Na2O (%)	2.51	7.01	0.66	5.63	0.13	1.20	0.50
P2O5 (%)	0.35	0.02	0.10	0.16	0.51	0.15	1.43
TiO2 (%)	0.24	0.21	0.54	0.49	0.43	0.26	0.43
SO3 (%)	0.53	0.03	1.18	0.13	0.13	0.03	0.03
Total (%)	30.02	36.83	27.42	28.80	36.34	15.61	36.23
SiO2 (%)	67.88	60.59	70.66	69.19	61.11	83.30	61.23
Al_m	0.31	0.30	0.31	0.30	0.16	0.18	0.24
Ca_m	0.02	0.12	0.01	0.01	0.11	0.01	0.13
K_m	0.08	0.01	0.10	0.06	0.01	0.04	0.02
Na_m	0.08	0.23	0.02	0.18	0.00	0.04	0.02
K_Al	0.25	0.04	0.33	0.21	0.03	0.20	0.08
Na_Al	0.26	0.75	0.07	0.60	0.03	0.22	0.07
Plag	0.31	1.14	0.09	0.63	0.69	0.26	0.63

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	300833	300610	300809	300934
North (NAD 27)	4321369	4321384	4321229	4321219
Classification	Pyroph/Alun/Topaz	Sericite	Sericite	Sericite
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437301	H437302	H437303	H437304
Lithology	Artesia	Artesia	Artesia	Artesia
Ag (ppm)	-0.01	0.07	0.07	0.21
Al (%)	6.09	7.67	0.26	7.16
As (ppm)	6.7	5.5	3.7	2.8
Ba (ppm)	160	840	380	2450
Be (ppm)	0.15	0.73	0.68	0.39
Bi (ppm)	0.29	3.27	0.1	0.06
Ca (%)	0.07	0.18	0.1	0.08
Cd (ppm)	0.02	0.02	0.07	0.04
Ce (ppm)	37.6	40.5	9.28	20.8
Co (ppm)	0.1	0.2	0.7	0.3
Cr (ppm)	37	51	48	25
Cs (ppm)	0.25	1.36	0.13	0.78
Cu (ppm)	5.7	5.8	17.6	57.6
Fe (%)	0.21	1.44	0.67	0.34
Ga (ppm)	5.49	24.1	0.81	16.15
Ge (ppm)	0.09	0.11	0.06	0.07
Hf (ppm)	0.9	1	1.1	1.3
In (ppm)	0.007	0.156	0.005	0.021
K (%)	0.53	2.78	0.11	2.4
La (ppm)	17.6	18.8	3.8	10.5
Li (ppm)	0.5	4.2	1.5	1.7
Mg (%)	0.01	0.17	0.02	0.07
Mn (ppm)	8	9	83	19
Mo (ppm)	0.59	1.65	15.9	0.77
Na (%)	0.13	0.55	0.02	0.67
Nb (ppm)	1.9	2.1	1.5	2.4
Ni (ppm)	0.4	1.9	1.9	1.2
P (ppm)	920	480	190	280
Pb (ppm)	38.6	26.7	6.4	53.5
Rb (ppm)	18.4	80.2	3.7	65.3
Re (ppm)	-0.002	-0.002	-0.002	-0.002
S (%)	0.11	0.48	0.15	0.11
Sb (ppm)	10.4	4.18	1.64	3.23

Table G1. Rock major and trace element concentrations (ppm) by ICP-MS/AES (continued)

East (NAD 27)	300833	300610	300809	300934
North (NAD 27)	4321369	4321384	4321229	4321219
Classification	Pyroph/Alun/Topaz	Sericite	Sericite	Sericite
Block	Blue Hill	Blue Hill	Blue Hill	Blue Hill
Sample#	H437301	H437302	H437303	H437304
Lithology	Artesia	Artesia	Artesia	Artesia
Sc (ppm)	1.8	8.2	0.8	3.5
Se (ppm)	1	3	2	1
Sn (ppm)	1.6	6.9	1.6	1.3
Sr (ppm)	1535	409	87.5	290
Ta (ppm)	0.12	0.15	0.08	0.18
Te (ppm)	0.23	0.91	0.14	0.07
Th (ppm)	3	3.3	1.7	3.3
Ti (%)	0.268	0.255	0.182	0.222
Tl (ppm)	0.39	3.15	0.07	1.57
U (ppm)	0.7	1.5	2.3	1.3
V (ppm)	61	108	9	88
W (ppm)	1.7	1.1	1.4	0.6
Y (ppm)	1.8	2.3	2.2	2
Zn (ppm)	-2	-2	7	-2
Zr (ppm)	30.7	39.9	38.7	41.7
Al2O3 (%)	11.50	14.49	0.49	13.53
CaO (%)	0.10	0.25	0.14	0.11
FeO (%)	0.27	1.85	0.86	0.44
K2O (%)	0.64	3.35	0.13	2.89
MgO (%)	0.02	0.28	0.03	0.12
Na2O (%)	0.18	0.74	0.03	0.90
P2O5 (%)	0.21	0.11	0.04	0.06
TiO2 (%)	0.45	0.43	0.30	0.37
SO3 (%)	0.28	1.20	0.38	0.28
Total (%)	13.64	22.70	2.41	18.70
SiO2 (%)	85.41	75.71	97.42	80.00
Al_m	0.23	0.28	0.01	0.27
Ca_m	0.00	0.00	0.00	0.00
K_m	0.01	0.07	0.00	0.06
Na_m	0.01	0.02	0.00	0.03
K_Al	0.06	0.25	0.29	0.23
Na_Al	0.03	0.08	0.09	0.11
Plag	0.03	0.10	0.35	0.12