

Pyrite trace element chemistry of gold deposits in the Red Lake greenstone belt, Northwestern Ontario, Canada

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A thesis submitted in partial fulfillment of the requirements for the degree of
Master of Science in Geology

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December 2025

Abstract

The Red Lake greenstone belt located in northwestern Ontario, Canada, hosts a world class gold camp that contains the high grade Campbell-Red Lake, Cochenour-Willans, Howey, and Hasaga deposits, as well as several other gold deposits and gold occurrences. This thesis examined textures, trace element chemistry and sulfur isotope evolution of pyrite and its use as a tool to discriminate Red Lake gold deposits, as well as the potential to use of pyrite chemistry as vectoring and fertility assessment tools. Field and petrographic observations, along with results from scanning electron microscopy, LA-ICP-MS analyses and sulfur isotope composition of pyrite, were integrated to achieve the objectives of this study.

Petrographic analyses of chemically etched pyrite grains reveal two main groups of pyrites associated with Red Lake deposits namely hydrothermal zoned pyrites (Py1a, Py1b and Py2) and recrystallized pyrites (Py3). At the Campbell-Red Lake (CRL) deposit, Py1a which is a mineral inclusion rich pyrite is enriched in element suite of Sb-Tl-Au-Ag-Te-W $\pm$ Hg with average $\delta^{34}\text{S}$ values of approximately +6.6 ‰ and forms the core of zoned pyrites. It represent a stage of low temperature hydrothermal alteration. The second stage pyrite of pyrite growth at CRL is identified by the formation of arsenian, Au-rich Py1b crystals which represents metamorphic devolatilization and mobilization of main stage mineralizing fluids with a narrow range of $\delta^{34}\text{S}$ (+3‰ to +6.7‰). Py2, interpreted as the last stage of pyrite growth represents retrograde cooling of CRL deposit hydrothermal system resulting in the enrichment of Co, Ni and As and has $\delta^{34}\text{S}$ value around +6‰ consistent with a metamorphic fluid source. Py3 at the CRL represents recrystallization of early pyrites under high temperature contact metamorphism from plutonic rocks with trace element

content of Co, Ni and As around 1000ppm and average $\delta^{34}\text{S}$ of +1.1‰ whereas Py3 at the Howey deposit with similar trace element contents to the CRL have $\delta^{34}\text{S}$ of +2.5‰ consistent with association with fluids from intrusive rocks of the Howey diorite complex. In contrast to the CRL deposit, oscillatory zoned P1yb and Py2 are the early pyrite whereas mineral inclusion rich Py1a is the latest pyrite at the East Bay area deposits and gold occurrences. The paragenetic sequence of pyrite at the East Bay area and intrusion related deposits show evidence of coupled dissolution and reprecipitation of early pyrites to form gold-rich late stage Py1a. Sulfur isotope data from the East Bay area deposits suggests that early Py1b and Py2 formed from metamorphic fluid whereas Py1a have magmatic fluid input. The intrusion related Howey and Hasaga deposit have similar pyrite paragenesis and sulfur isotope characteristics compared to East Bay area deposit except the non occurrence of As-rich Py1b.

The Sb/Tl, Sb/Bi and Bi/Te ratios of Py1a across several Red Lake deposits and occurrences provide potential fertility indicator tools. The Sb/Bi ratio of pyrite decreases with decreasing deposit size whereas Bi/Te increases. Gold, Te, and Mo concentrations of ore related Py1b is appears to be a good discriminator between the large CRL and the smaller systems in the Red Lake greenstone belt.

Various elements in pyrite including Se, Te, Bi and Ni/Co ratio show systematic changes in concentration from the center of the CRL deposit to about 3km away approximately 1-2km more than the footprint of whole rock samples. Pyrite trace element composition from other Red Lake deposits effectively discriminates between deposit proximal or distal signature from a mineralized zone.

Acknowledgments

I want to firstly thank my wonderful supervisor Dr. Peter Hollings for the help, support and guidance from the beginning till the end of this project. Thank you very much for giving me the opportunity to do this project and the push to get me to the end. I would also like to thank NSERC, Amira Global, Evolution Mining, Mitacs Globalink and SEG Canada Foundation for their kind financial support to make this project possible. I especially like to thank Ned Howard, Vittoria D'Angelo, Logan Kucherhan, Allan Bieber and all the Evolution Mining Red Lake operation team for their support on this project. I am grateful to Dr. David Cooke, Dr. Lejun Zhang, Dr. Mike Baker, Dr. Matthew Cracknell and all staff and students at CODES, University of Tasmania, for their warm welcome and support during the short research stay at their facility. I would like to thank Dr. Ivan Belousov, Jeffrey Oalman, Jack Ward and all the team at the CODES laser ablation facility for the help in collecting data for this project. Special thanks to Dr. Karsten Goemann at the Central Science Laboratory, University of Tasmania for the assistance during data collection. At Lakehead University, I would like to thank my field work partner Jason Dyer for the help during field sampling and to Chase Turner for suggestions and recommendations to make this project better. My deep appreciation goes to Dr. Jonas Valiunas and Kristi Tavener for the kind support at the lapidary. Thanks to Dr. James Tolley, Dr. Moses Angombe and my colleagues at Lakehead University geology department for insightful recommendations to make this project better. To my amazing wife, mum, dad and the rest of my lovely family, thank you very much for the physical and emotional support during this project and for pushing me all the way. This project would not have been possible without your lovely support and motivation.

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Chapter 1 - Introduction

1.1 Background

Gold deposits have been studied over several decades due to their importance and complex genesis. They occur in different geological environments with various styles of ore mineralization (e.g., porphyry Au, epithermal Au etc.).

Archean greenstone-hosted gold deposits account for a significant portion of global gold production and have played a major role in the development of the mining industry. The Red Lake gold district in northwestern Ontario, Canada is one of the world's richest and most productive gold camps in history. Since the discovery of gold in the early 20th century, the Red Lake gold camp has produced over 30 million ounces of gold, with some deposits in the camp (i.e., Campbell-Red Lake deposit) yielding exceptional grades exceeding 20 grams per tonne (Dubé et al., 2002). However, finding the next Campbell-Red Lake deposit has become increasingly challenging due to rising cost of exploration, depth/concealment of deposits and increasingly limited results of traditional exploration techniques like bulk rock geochemistry. Hence, recent orogenic gold discoveries have become progressively focused on low grade high tonnage systems (Davies et al., 2020).

Mineral chemistry has emerged as a valuable tool which can be very powerful when coupled with traditional methods like whole rock geochemistry. For example, Gaillard et al. (2018) used mineral chemistry of white mica and biotite to vector towards fluid pathways at the Canadian Malartic deposit. Similar methods were applied by Nwakanma (2024) at the Moss Lake deposit

using chlorite and white mica mineral chemistry to vector towards ore zones. Vrzovski, (2018) used epidote, chlorite and pyrite mineral chemistry to vector towards and expand the alteration footprint of the Hemlo deposit and to well assess the potential of the mineral chemistry of these alteration minerals as fertility indicators. This method has the potential to reduce the exploration cost while having a high probability of locating the next high grade gold deposit.

1.2 Context and objectives of thesis

This thesis aims to build on the extensive mineral chemistry work done by researchers based at the Center for Ore Deposits and Earth Sciences (CODES), University of Tasmania, Australia. Several AMIRA projects completed in the past including P765, P765A P1060, P1153, P1202 and most recently P1249 (ongoing) have focused on the development of models for the mineral chemistry footprint around a variety of ore deposit types. This thesis was undertaken as part of P1249 (Exploring, characterising, and optimising complex orebodies). These AMIRA projects used mineral chemistry techniques to expand the alteration footprint of ore deposits especially within porphyry Cu-Au and epithermal environments. This project was undertaken as part of AMIRA P1249 project module one which focuses on using various tools including mineral chemistry, stable isotopes and field characterization to recognize fertility and proximity to high-grade ore in various deposit systems. Thus, the overall objectives of this thesis were designed to contribute towards the overall objectives of the module one theme of the AMIRA P1249 project by investigating fertility indicators and vectoring potentials of the gold deposits using pyrite mineral chemistry within the study area which is the Red Lake greenstone belt. The key objectives of this thesis were to: 1) investigate the texture, paragenesis and sulfur isotope variation of pyrite in the different deposit styles in the Red Lake greenstone belt. 2) Compare pyrite mineral chemistry

from the different styles of mineralization in the Red Lake greenstone belt. 3) Assess the potential use of pyrite mineral chemistry as vectoring and fertility indicators at the belt scale.

1.3 Location and access

The Red Lake greenstone belt is located around Red Lake Township, Balmertown and Cochrane Village in northwestern Ontario, approximately 450 km north of Thunder Bay (Fig. 1.1). The Red Lake greenstone belt hosts several past producing mines as well as the Evolution Mining Ltd. Campbell-Red Lake mine (also known as the Red Lake gold mines). The Campbell-Red Lake mine is located in Balmertown where the Campbell and Red Lake mine complex mine shafts are operational. Highways 125, 105, 618 and the Nungesser Road cut Balmertown and Red Lake Townships and can be used to access the area.

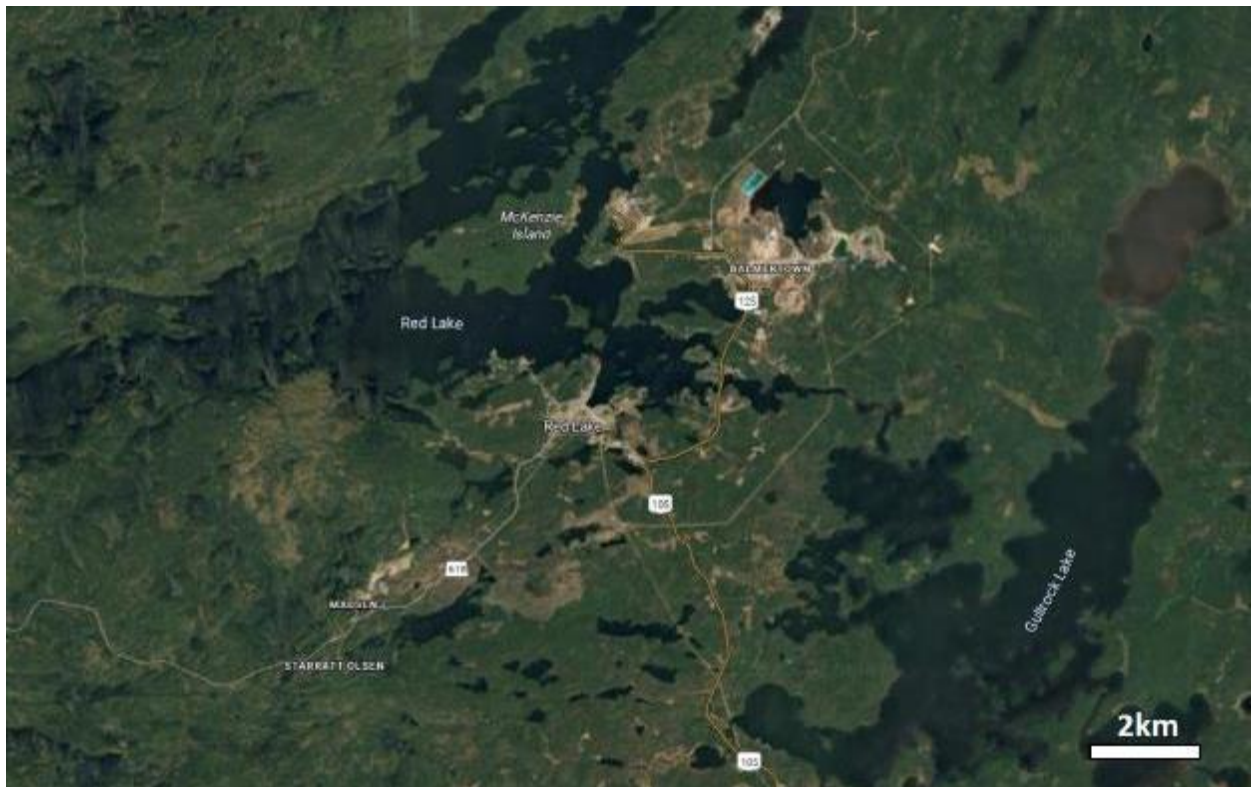


Figure 1.1 Location map of Red Lake area, Northwestern Ontario (modified from Google Earth, 2025)

1.4 Types of gold deposits in the Red Lake greenstone belt

The Red Lake greenstone belt consists of several gold deposits and occurrences which have been a subject of study over several decades (e.g., Pirie, 1981; Andrews et al., 1986; Penczak and Mason, 1997; Dube et. al., 2004 etc.). Several attempts have been made in the past to classify the various styles of gold deposits that occur within the Red Lake greenstone belt in order to develop an accurate genetic models that represent the different deposits.

1.4.1 Orogenic gold deposits

One of the earliest attempts at a unified genetic model for Red Lake gold deposit was made by Hugon and Schwerdtner (1985) and Andrews et al. (1986) to categorize deposits in the eastern and central parts of the Red Lake greenstone belt. Their study recognized belt-scale structural corridors otherwise known as deformation zones that were suggested to hosts most of the gold deposits in the Red Lake greenstone belt (Fig. 2.1). The authors suggested that Red Lake greenstone belt deposits are strictly hosted within belt-scale shear zones namely Cochenour-Gullrock Lake (also known as Red Lake mine trend), East Bay, Flat Lake-Howey Bay and Pipestone Bay-St. Paul deformation zones in the eastern, central and western part of Red Lake greenstone belt respectively. Deposits classified as orogenic style gold include Campbell-Red Lake, Cochenor-Willans, Gold Eagle and McKenzie in the Cochenour-Gullrock deformation zone; McMarmac and Abino deposits in the East Bay deformation zone; Madsen, Starratt-Olsen, Gold shore, Howey and Hasaga deposits in the Flat Lake-Howey Bay deformation zone; Red Summit and Mount Jamie in the Pipestone Bay-St. Paul deformation zone.

Various evidence presented for an orogenic-style deposit model for gold deposits within the deformation zones include 1) proximity of all gold deposits to large scale structural corridor 2) highly altered rocks with narrow alteration envelope 3) association of deposits to batholiths interpreted as probable source of mineralizing fluids. Deposit scale study of the Red Lake high grade zone by Dube et al. (2004) suggested that the structural architecture of the deposit was very important for fluid focusing with a complex array of low-pressure fold hinge characterized by silica flooding as an important auriferous fluid trap. The characteristics of orebodies of the gold deposits in the various deformation zones is elaborated in Chapter 2.

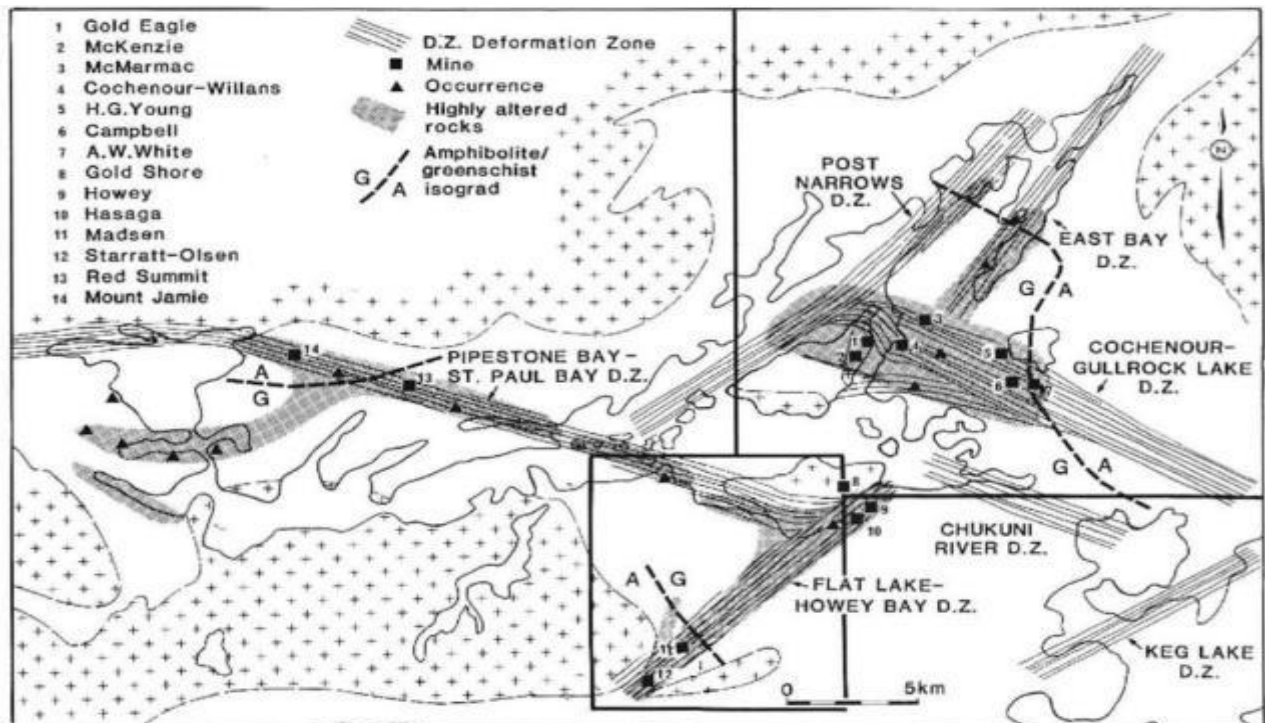


Figure 1.2 Major deformation zones and gold occurrences in the Red Lake greenstone belt (from Andrews et al., 1986)

1.4.2 Low sulfidation epithermal-style deposit

Penzcak and Mason (1997) proposed that the Campbell-Red Lake deposit is a metamorphosed Archean low-sulfidation epithermal Au deposit (i.e a magmatic-hydrothermal deposit). Evidence presented by the authors include nature of zonation of early aluminous alteration, textural

characteristics of veins including open space filling and anomalous geochemical enrichment of certain elements including Sb, Hg, and Ag within the Campbell-Red Lake ore zones. The authors emphasized that early aluminous alteration that affects basalt, ultramafic as well as diorite and rhyolite wall rocks reflects premetamorphic advanced argillic-like low temperature hydrothermal alteration system in Campbell-Red Lake rocks overprinted by a complex array of veins. However, this evidence was disputed by Tarnocai et al. (1998) who emphasized a synmetamorphic and syndeformation model for gold mineralization within the Campbell-Red Lake deposit.

1.4.3 Intrusion-related deposits

The McKenzie, Gold Eagle, Goldshore, Howey and Hasaga gold deposits were categorized as felsic intrusion hosted type deposit by Pirie (1981). The author suggested that these deposits have genetic relationship with intrusive rocks that range from diorite to granodiorite. The McKenzie and Gold Eagle deposits are hosted within the McKenzie Island stock in the eastern part of Red Lake greenstone belt whereas the Goldshore, Howey and Hasaga deposits occur within the Dome stock intrusive stock in the central part of the Red Lake greenstone belt. Evidence for interpretation of these deposits as intrusion related deposit include their close relationship with large highly altered and deformed host rocks, narrow envelope of enclosing wallrocks around orebodies and their close association to shear zones and metamorphic isograds. The association of these deposits to syn to late tectonic regional scale deformation event is considered very important evidence for classification as intrusion related deposits as described by Colvine, (1988) and Hastie et al. (2023) for other intrusion related deposits across the Archean Superior Province in Ontario.

Chapter 2 - Regional and District Geology

2.1 Superior Province

The Superior Province, the world largest Archean craton, covers an estimated 2 million km². It forms the core of the North American continent (Fig. 2.1; Card and Ciesielski, 1986; Thurston et al., 1991; Percival, 2007). It is bounded by the Paleoproterozoic (Churchill) Province in the east, north and west and by the Mesoproterozoic Greenville Province and Southern Province in the southeast and south respectively (Card and Ciesielski, 1986; Percival, 2007). Rocks in the Superior Province consist of about 75% gneissic and plutonic rocks and 25% low- to medium-grade supracrustal rocks (Card, 1990). The Superior Province is a highly distinctive Archean craton based on the nature of the internal subdivisions/subprovinces which are characterized by different rock types, structural history, geochronological attributes and metamorphic facies (Thurston et al., 1991).

Over the last three decades, a lot of work has been done to summarize the geological evolution and metallogeny of the Superior Province including refining knowledge of divisions and subprovinces. Percival (2007) noted that assembly of the Superior Province happened between 2.72 Ga and 2.68 Ga when protocontinents and oceanic crust were amalgamated. Percival et al. (2006) showed that five major tectonic events occurred during assembly of the Superior Province namely the Northern Superior, Uchian, Central Superior, Shebandowan, and Minnesotan orogenies. These orogenic events are collectively known as the Kenoran orogeny (Stott, 1997).

Tectonism started from the Northern Superior Province with a southward progression from the Neoproterozoic through to the Mesoproterozoic.

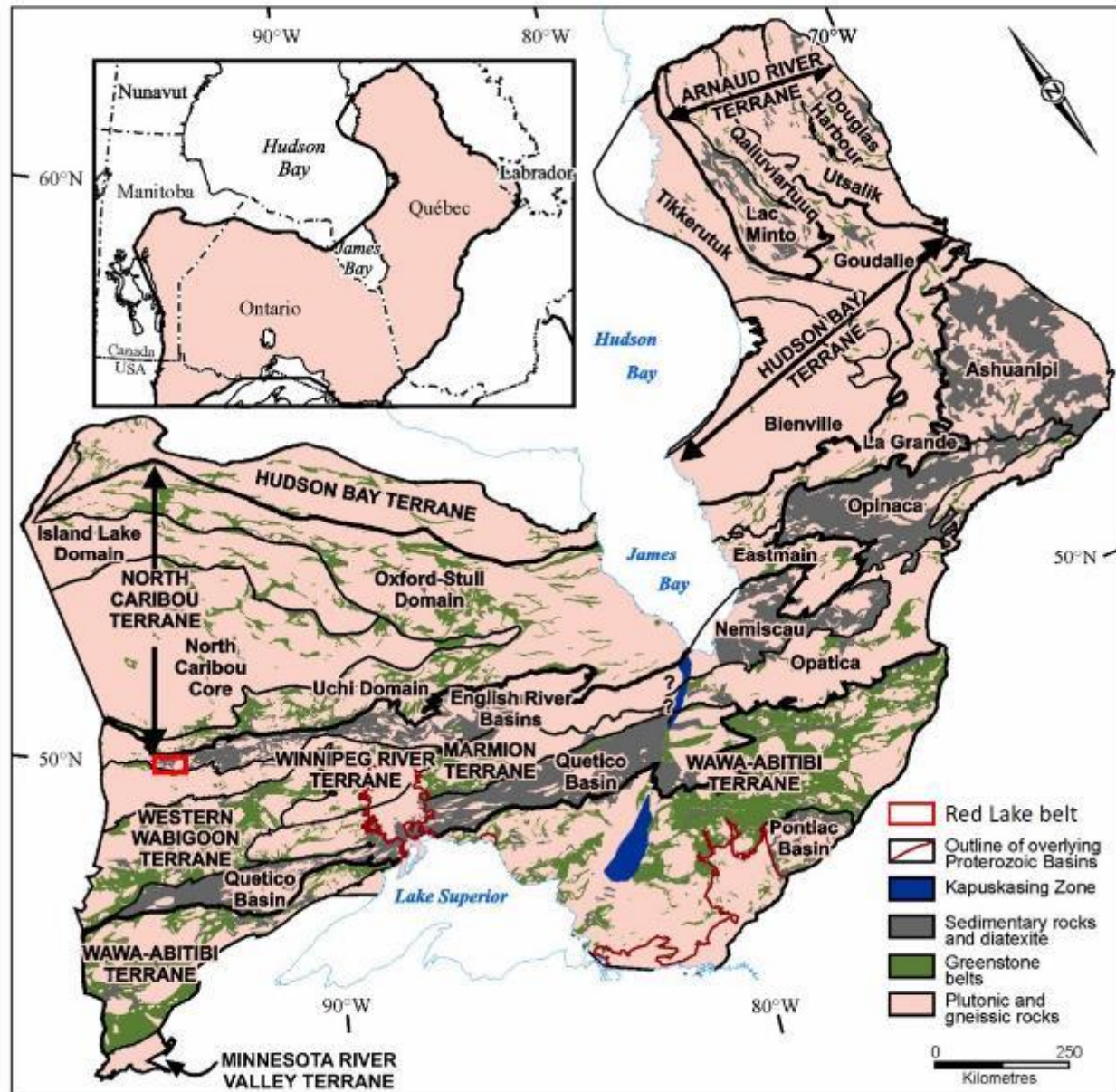


Figure 2.1 Terrane map of the Superior Province from Stott et al. (2010).

Early subdivisions and nomenclature of the Superior Province were developed by Card and Ciesielski (1986) based on geological, geochronologic, metallogenic and geophysical features

with boundaries between terranes defined by zones of metamorphic and structural transitions (Card, 1990). Later modifications to the nomenclature of the subdivisions include the work of Percival (2007) and Stott et al. (2010).

The subprovince model highlights the geographical extent of major regional assemblages in the Superior Province while providing a detailed lithological background of rock types in these assemblages (Card and Ciesielski, 1986). The main litho-tectonic division of the Superior Province according to this system include volcano-plutonic/granite-greenstone (e.g., Uchi, Wawa-Abitibi, and Wabigoon subprovinces), metasedimentary (e.g., English River, Quetico and Pontiac subprovinces) plutonic (e.g., Berens River and Winnipeg River), and high-grade gneiss subprovinces (e.g., Pikwotonei and Kapuskasing domains). The volcano-plutonic/granite-greenstone subprovinces consist mostly of greenstone belts bounded and intruded by felsic plutonic rocks. The rock record within these subprovinces is dominated by mafic and felsic volcanic, clastic and chemical sedimentary rocks, syn-late volcanic intrusions (Thurston et al., 1991). Metasedimentary subprovinces are accretionary prisms formed during Superior Craton assembly and consist of dominantly clastic sedimentary rocks such as turbidites and wackes and their metamorphic products with amphibolite grade facies rocks in terrane interiors (Card and Ciesielski, 1986). Plutonic subprovinces consist of intrusive rocks with little or no supracrustal rocks. Rock types in these subprovinces consist mostly of tonalitic gneiss with later felsic plutons cutting through earlier metamorphosed lithologies. High grade gneiss subprovinces such as the Kapuskasing structural domain are mostly dominated by high pressure amphibolite to granulite facies metamorphic rocks of plutonic and supracrustal origin. Rock types in these subprovinces include gneisses cut by mafic and felsic intrusive rocks (Card and Ciesielski, 1986).

The terrane system is the latest classification model for the various supracrustal and plutonic rocks of the Superior Province which incorporated more geophysical, geochemical and isotopic studies to understand the tectonic boundaries (Fig. 2.1; Stott. et al., 2010). In the western Superior Province, the terrane model suggests that the Mesoarchean (~3.0 Ga) North Caribou terrane was the structure upon which subsequent crust was accreted from the north and south (Fig. 2.1; Stott. et al., 2010). The North Caribou terrane consists of a core and several domains (younger and lithologically distinct part of a terrane; Stott. et al., 2010). These include the Oxford-Stull and Island Lake domains on the northern margin of the North Caribou core whereas the Uchi domain occurs on the south margin (Fig. 2.1; Stott et al., 2010, Percival et al., 2012). The subprovince classification scheme of Stott et al. (2010) and that of Card and Ciesielski (1986) will be cited in this study to explain the lithological and tectonic characteristics of the Superior Province.

2.2 Uchi Subprovince

Work by Stott et al. (2010) and Percival (2006, 2012) placed the Uchi Subprovince on the southern margin of the North Caribou terrane. Stott and Corfu (1991) described the Uchi Subprovince as a linear belt of volcanic-sedimentary assemblages intruded by plutonic suites (Fig. 2.2). It consists of various greenstone belts developed during continent accretion in the southern portion of the North Caribou Terrane during 300 million years of volcanic, sedimentary and magmatic activity (Stott and Corfu, 1991). The Uchi Subprovince has a gradational contact with the Berens River Subprovince to the North and a structural contact with the English River Subprovince to the South along the Sydney Lake-Lake St. Joseph Fault structure (Percival, 2006). Regional trace element geochemical and isotopic analysis across the Uchi Subprovince by Tomlinson et al. (1998),

Hollings et al. (1999) and Hollings and Kerrich (2000) proposed a plume-arc related setting with a component of older enriched source or a plume derived source that has been contaminated by felsic materials to explain the mafic and ultramafic rocks in the various supracrustal assemblages across the greenstone belts.

Volcanic assemblages are common to the various greenstone belts of the Uchi Subprovince (Fig. 2.2; Sanborn-Barrie et al., 2001). These include the Balmer, Woman/Kaminiskag and Confederation assemblages (Fig. 2.2; Stott and Corfu, 1991). The Balmer assemblage rocks (~2.9 Ga) include tholeiitic basalts, rhyolites and chemical sedimentary rocks common to the Red Lake greenstone belt (Stott and Corfu, 1991; Sanborn-Barrie et al., 2001). The Woman assemblage rocks (~2.87 Ga) include felsic to intermediate pyroclastic rock previously recognized as part of the Red Lake greenstone belt by Stott and Corfu (1991) has been suggested to be more common in the Birch-Uchi belt (Hollings and Kerrich, 2006). However, the younger Kaminiskag assemblage (~2.84 Ga) dominated by mafic volcanic flows is found in the Meen-Dempster and Pickle Lake belts (Hollings and Kerrich, 2006). The Confederation assemblage (~2.7 Ga) comprises calc-alkaline andesitic-dacitic flows and pyroclastic rocks and is present in most greenstone belts in the Uchi Subprovince (Fig. 2.2; Stott and Corfu, 1991; Sanborn-Barrie et al., 2001, Hollings and Kerrich, 2006).

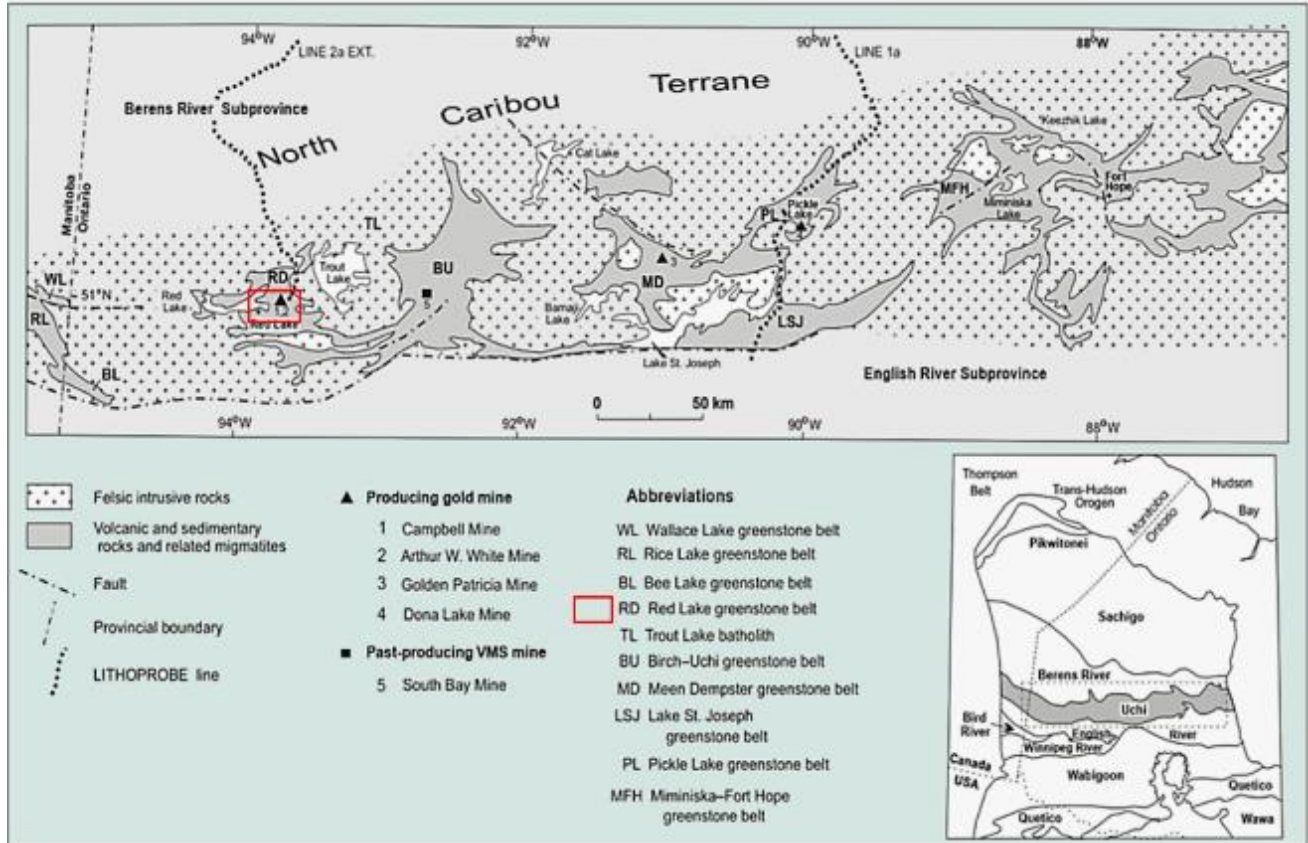


Figure 2.2 Map of the Uchi subprovince showing greenstone belts with location of the Red Lake greenstone belt shown by red box (from Stott and Corfu, 1991).

2.3 Red Lake Greenstone Belt

The Red Lake greenstone belt is dominated by Mesoarchean and Neoarchean supracrustal rocks with coeval plutonic rocks within and at the margins (Fig. 2.3; Stott and Corfu, 1991). The Red Lake greenstone belt consists of packages of subaerial volcanic rocks, felsic to intermediate flows, meta-sedimentary packages, and intrusive complexes (Fig. 2.3). Pirie (1981) originally subdivided the Red Lake greenstone belt supracrustal stratigraphy into a lithological packages of lower mafic volcanic rocks consisting of mafic and ultramafic volcanic flows (which was subdivided into tholeiitic basalt, variolitic basalt, and basaltic komatiite) and calc-alkaline sequences which consisted mostly of tuff, lapilli stone and breccias with dacitic and andesitic flows.

Sanborn-Barrie et al. (2000, 2001) divided the supracrustal assemblages of the Red Lake greenstone belt into Mesoarchean (including the Balmer, Ball, Slate Bay, Trout Bay and Bruce Channel assemblages) and Neoproterozoic assemblages (including the Confederation and Huston assemblages).

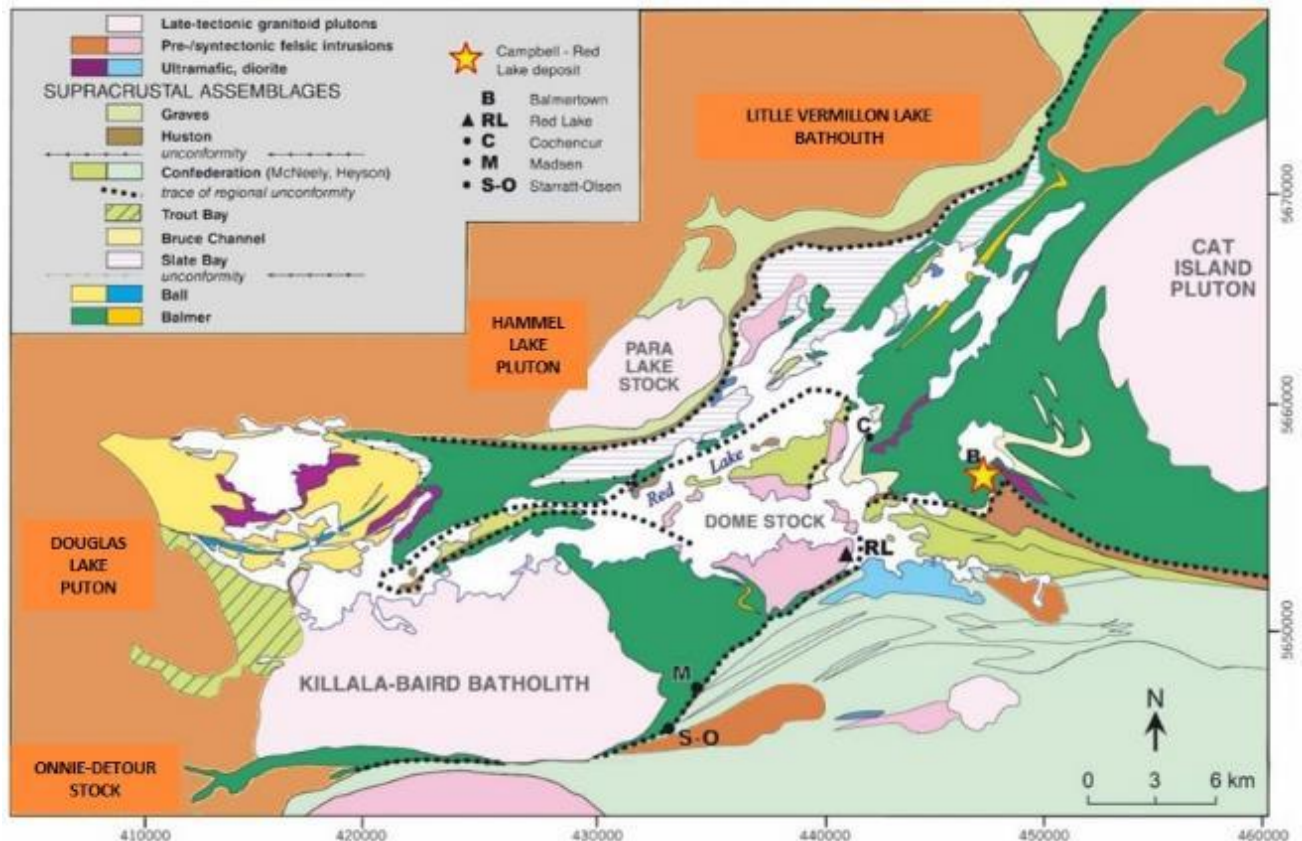


Figure 2.3 Map of Red Lake greenstone belt (from Sanborn-Barrie et al., 2004).

2.3.1.1 Balmer Assemblage

The Balmer assemblage consists of sub-aerial pillowed and tholeiitic basalts, komatiites and komatiitic basalts, chert-banded magnetite iron formation with minor felsic to intermediate pyroclastic flows and rhyolites (Sanborn-Barrie et al., 2001). Stott and Corfu (1991) interpreted the rocks of Balmer assemblage to have formed subaerially in a local shallow marine setting whereas Tomlison et al. (1998) and Hollings et al. (1999) interpreted the Balmer mafic and ultramafic flows

to have formed in a plume-arc setting based on geochemical evidence. Corfu and Wallace (1987) dated the Balmer assemblage between $2992 \pm 20/-9$ Ma to $2964 \pm 5/-1$ Ma. New geochronology data from the mafic and ultramafic volcanic north of the Madsen mine originally thought to be Balmer assemblage rocks returned an age of 2741 ± 0.9 Ma which is consistent with Confederation assemblage age (MacDonald, 2024). Thus shrinking the spatial occurrence of this assemblage within the Red Lake greenstone belt.

2.3.1.2 Ball Assemblage

The Ball assemblage mostly consists of calc-alkaline volcanic rocks including a sequence of massive to pillowed mafic volcanic flows, felsic to intermediate volcanic rocks including basalt, andesite, dacite and rhyolite (Fig. 2.3; Sanborn-Barrie et al., 2001). The Ball assemblage also features some marble-quartzite-chert sequences which preserve stromatolite growth. Most of the rocks of this assemblage occur in the western part of the Red Lake greenstone belt sharing a structural contact with Balmer assemblage (Fig. 2.3; Sanborn-Barrie et al., 2001). The Ball assemblage was deposited in a local submarine environment under subaqueous and subaerial condition in an arc setting (Stott and Corfu, 1991; Hollings et al., 1999). Corfu and Wallace (1986) dated the Ball assemblage between 2940 ± 2 Ma and 2925 ± 3 Ma. However, the Golden Arm rhyodacite which was previously mapped as part of the Ball assemblage returned new age of 2850 ± 0.9 Ma consistent with Trout Bay assemblage age thus shrinking the spatial extent of the Ball assemblage in the western part of Red Lake greenstone belt (McDonald, 2024).

2.3.1.3 Slate Bay Assemblage

Sedimentary rocks of the Slate Bay assemblage are exposed in the western part of the Red Lake greenstone belt around McDonough Township (Fig. 2.3). These sedimentary rocks sit

unconformably on the Balmer assemblage and are dominated by medium-bedded wacke mudstone (Pirie and Sawitzky 1977; Pirie, 1981), chaotic and polymictic pebble to cobble conglomerate, mature arkosic sandstone and conglomerates. Corfu et al. (1998) argued that the age of sedimentation was older than 2916 Ma making it considerably older than the overlying Bruce Channel assemblage.

2.3.1.4 Bruce Channel Assemblage

The Bruce Channel assemblage is in tectonic contact with the Balmer assemblage and in structural contact with Confederation assemblage in the eastern portion of the Red Lake greenstone belt (Fig. 2.3; Stott and Corfu, 1991). The assemblage is dominated by a lower sequence of intermediate volcanoclastic rocks overlain by a chert-pebble conglomerate, fine-grained siliciclastic rocks and quartz-magnetite iron formation (Sanborn-Barrie et al., 2001). High precision U-Pb age dating of this assemblage by Corfu and Wallace (1986) yielded an age of about 2984 Ma $\pm$ 2 Ma.

2.3.1.5 Trout Bay Assemblage

Tholeiitic and pillowed basalts occur in the basal unit of the Trout Bay assemblage and are overlain by fine-grained siliciclastic sediments and chert-magnetite iron formation. These assemblages share a tectonic contact with deformed Ball assemblage rocks in the western portion of the Red Lake greenstone belt (Sanborn-Barrie et al., 2004). The age of the Trout Bay assemblage is given as 2853 $\pm$ 1 Ma based on U-Pb geochronology of zircon grains from a tuffaceous rock in the lower sequence of the Trout Bay assemblage (Sanborn-Barrie et al., 2001). The spatial occurrence of the Trout Bay assemblage has significantly increased especially in the western part of Red Lake greenstone belt. This is based on recent geochronology particularly

from felsic volcanic rocks of what was thought to be part of the Ball assemblage which returned an age of 2857.3 ± 0.9 Ma consistent with existing Trout Bay assemblage ages (MacDonald, 2024).

2.3.1.6 Huston Assemblage

The Huston assemblage marks an unconformity between Mesoarchean and Neoarchean supracrustal rocks. This assemblage consists mainly of polymictic conglomeratic rocks (known locally as the Austin Tuff), argillite and turbiditic wackes deposited irregularly on eroded surfaces of Neocarchean assemblages (Sanborn-Barrie et al., 2001).

2.3.1.7 Confederation Assemblage

The Confederation assemblage is an extensive suite of volcanic rocks common to the Uchi Subprovince greenstone belt (Stott and Corfu, 1991). It has been divided into the McNeely (2745-2742 Ma) and Heyson (2744 Ma – 2739 Ma) volcanic units (Sanborn-Barrie et al., 2001). The McNeely volcanic sequence outcrops in the central region of the Red Lake greenstone belt and consists of calc-alkaline pyroclastic flows which unconformably overlies the Balmer assemblage. This volcanic sequence was interpreted to have formed in a continental margin setting (Sanborn-Barrie et al., 2001). The Heyson volcanic sequence outcrops in the southeastern section of the Red Lake greenstone belt and comprise rocks of tholeiitic affinity including andesite, basalt, dacitic tuff and rhyolite interpreted to have formed in a subaerial arc environment (Sanborn-Barrie et al., 2004).

2.3.1.8 Graves Assemblage

The Graves assemblage (2734 Ma – 2731 Ma) outcrops in the northern section of the Red Lake greenstone belt and consists of calc-alkaline andesitic to dacitic pyroclastic rocks erupted onto

Mesoarchean supracrustal rocks (Sanborn-Barrie et al., 2001). The Graves volcanic rocks represent the youngest Neoarchean volcanic activity and have been interpreted to have formed in a shallow water to subaerial arc setting (Sanborn-Barrie et al., 2004).

2.3.2 Intrusive rocks and associated metamorphism in the Red Lake greenstone belt

The intrusive rocks in the Red Lake greenstone belt range from tonalite-trondhjemite-granodiorite-diorite and comprise at least three phases of felsic magmatism (Parker, 2002). The first phase of magmatism includes the Douglas Lake batholith ($2734 \text{ Ma} \pm 2$), Little Vermilion Lake batholith ($2731 \pm 3 \text{ Ma}$) and Red Crest diorite stock, known together as the Graves Plutonic suite (Fig. 2.4; Sanborn-Barrie et al., 2004). They range in composition from biotite-hornblende tonalite to granodiorite and are located at the western margin of the belt and are considered to be external plutons (Parker, 2002). The second phase of plutonic magmatism consists of the McKenzie stock ($2720 \pm 2 \text{ Ma}$), Howey Diorite (2720 Ma), Dome Stock (2718 Ma) and the external Hammel Lake batholith ($2717 \pm 2 \text{ Ma}$; Parker, 2002).

The terminal phase of felsic intrusion corresponds to post-tectonic activities and subsequent thermal cooling event in the Red Lake greenstone belt (Sanborn-Barrie et al., 2004). The terminal phase of plutonism includes the Killala-Baird batholith ($2705 \pm 1.5 \text{ Ma}$) and Walsh Lake-Cat Island pluton ($2699 \pm 2 \text{ Ma}$). The external plutons to the Red Lake greenstone belt are generally considered to be linked to the D_1 deformation event and are generally barren of gold mineralization (Menard and Pattison, 1998).

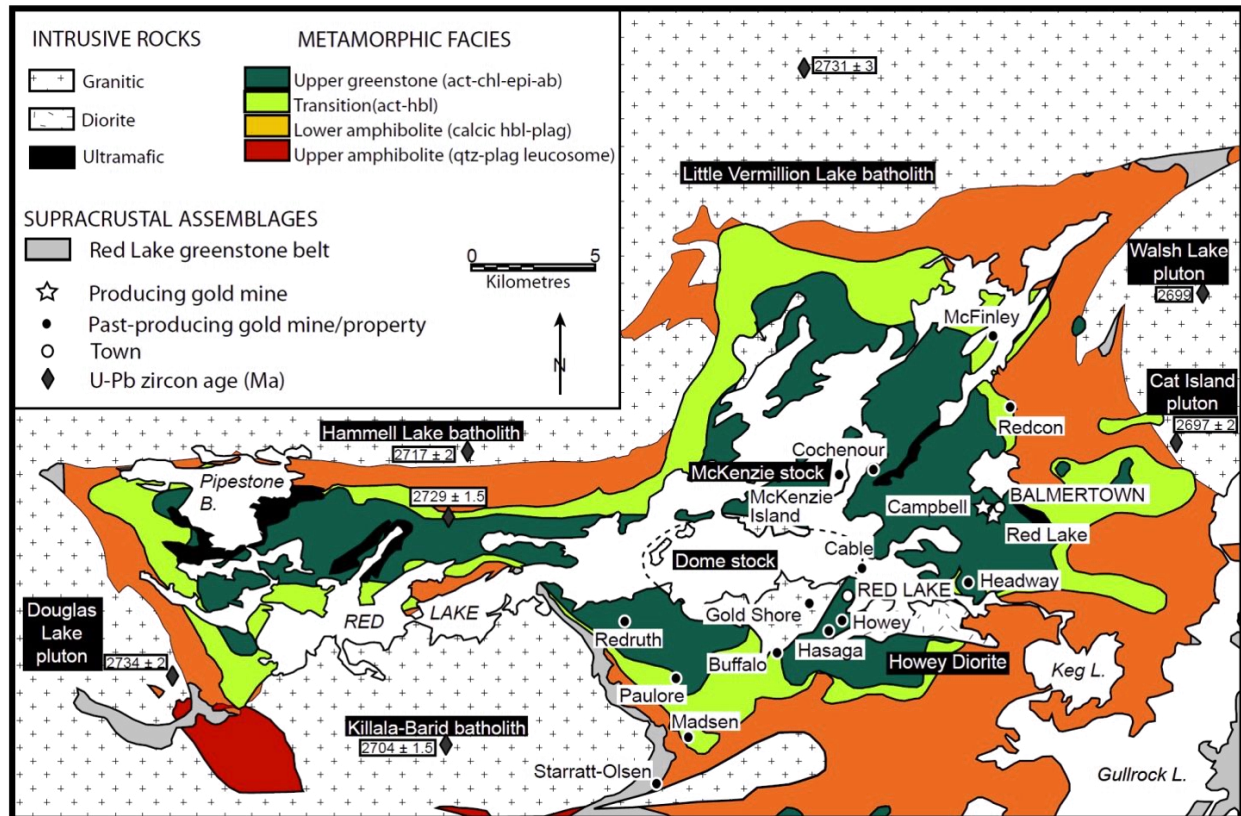


Figure 2.4 District scale metamorphic map of the Red Lake greenstone belt (modified from Stock, 2012).

In contrast, the internal intrusions which represents the second phase of felsic volcanism in the Red Lake greenstone belt are correlated to the D₂ district scale deformation of the Red Lake greenstone belt. These stocks and the final phase of plutonic events in the Red Lake greenstone belt are considered post-tectonic (Corfu and Wallace, 1986) or syn-tectonic (Sanborn-Barrie et al., 2001) and they host significant gold mineralization. The first and second intrusive phases are thought to be coeval with the Uchian phase of the Kenoran orogeny from 2720 Ma to 2700 Ma (Sanborn-Barrie et al., 2001).

Metamorphism of supracrustal assemblages in the Red Lake greenstone belt is generally attributed to the emplacement of intrusive plutons (from 2730 Ma to 2699 Ma) within the belt (Andrews and Wallace 1983; Andrews et al., 1986; Colvine et al., 1988; Damer, 1997; Menard

and Pattison, 1998). Kerrich et al. (1981) and Penczak and Mason (1997) argued that regional metamorphism with heat from plutons predates the main stage of gold mineralization. However, Thompson (2003) argued that the heat source for regional metamorphism could have been generated from radiogenic decay from the mantle in a tectonically active environment.

In the eastern and central section of the belt, studies of contact metamorphic aureoles around the Trout Lake batholith (i.e., Walsh Lake pluton) and the Killala-Baird batholith identified a metamorphic isograd transition in mafic lithologies from amphibolite facies that extends several kilometers into the Red Lake mine area (with a mineral assemblage of hornblende, plagioclase and quartz) to greenschist facies assemblage (with a mineral assemblage of actinolite, chlorite, albite and epidote) further away from the contact (Andrews et al., 1986). At the Madsen mine (central section of the belt), Andrews et al. (1986) noted that metamorphic mineralogical assemblage indicated a transition from amphibolite facies to greenschist facies over a distance of approximately two kilometers. Parker (2000) also suggested that at the Madsen mine, metamorphic minerals like andalusite, garnet and staurolite are all parallel to S_2 foliation which is probably an indication that peak metamorphism may have occurred during D_1 and early D_2 whereas garnets that crystalize along and overprint S_2 foliation may indicate that peak metamorphism postdates penetrative deformations in the Red Lake greenstone belt.

2.3.3 Deformation

The Red Lake greenstone belt consists of a multiple kilometer-thick stacked assemblage of supracrustal rocks which dip steeply (Stott and Corfu, 1991). Early work of Pirie (1981), Andrews et al. (1983, 1986), Lavigne and Crocket (1983) and Hugon and Schwerdtner (1985) established

the earliest deformation model for the Red Lake greenstone belt (Fig. 2.5). Pirie (1981) recognized a northeast-trending “anticline” in the central part of the belt. He also noted that penetrative foliation was prevalent in the southeastern part of the belt which were observed to be generally parallel to foliation. Andrews et al. (1983, 1986) built on the above model and developed a deformation model of the Red Lake greenstone belt proposing several deformation zones and their relationship to gold mineralization, stating that the Red Lake greenstone belt consists of zones of high strain environments within the deformation zones which occur parallel to the regional trend of foliation.

Hugon and Schwerdtner (1985) noted a system of subparallel northeast-trending sinistral shear zones between Howey Bay and Flat Lake in the western part of the belt based on evidence from penetrative foliation which was confirmed by Durocher and Hugon (1983) as the Howey Bay and Flat Lake deformation zone (Fig. 2.5). Andrews and Wallace (1983) developed a model of high strain (ductile, brittle-ductile) deformation zones that were interpreted to be temporally and spatially related to emplacement of plutonic events and gold mineralization in the belt. However, Tarnocai (2000) and Sanborn-Barrie et al. (2000, 2001, 2004) have proposed that the high strain corridor of Andrews et al. (1986) is outside of the regional scale shear zones.

A non-penetrative D_0 and multiple penetrative ductile (D_1 , D_2 , D_3) deformation episodes have been recognized within the Red Lake greenstone belt (Sanborn-Barrie et al., 2004). The D_0 deformation which is non-penetrative, is characterized by recumbent folding of overturned folds within Mesoarchean Balmer basalts and is assigned a maximum age of 2894 Ma based on a contact between Mesoarchean and Neoarchean lithologies within the belt (Sanborn-Barrie et

al., 2001). Later penetrative episodes of deformation followed the D_0 deformation and generated multiple generations of folds and other penetrative (L-S) fabrics which occurred post Confederation assemblage volcanism (2.74 Ga).

The first penetrative deformational episode is D_1 which has been assigned an age between 2744 Ma and 2733 Ma and formed F_1 folds (which trend northerly and plunge to the south) with associated penetrative S_1/L_1 fabrics (Sanborn-Barrie et al., 2004). The F_1 folds are mostly associated with siliciclastic sedimentary rocks within the belt as opposed to the S_1 fabrics (striking north) which are mostly associated with the volcanic assemblages. The D_1 deformation has been correlated with the emplacement of external plutons (2734-2731 Ma) and interpreted to involve a crustal shortening event on a regional scale (Sanborn-Barrie et al., 2001). Bouzari (2009) suggested that D_1 structures may have been reactivated during D_2 deformation mostly along deformed ultramafic units creating a possibility of mineralizing fluids being concentrated at the contact of ultramafic units by the younger D_2 structures.

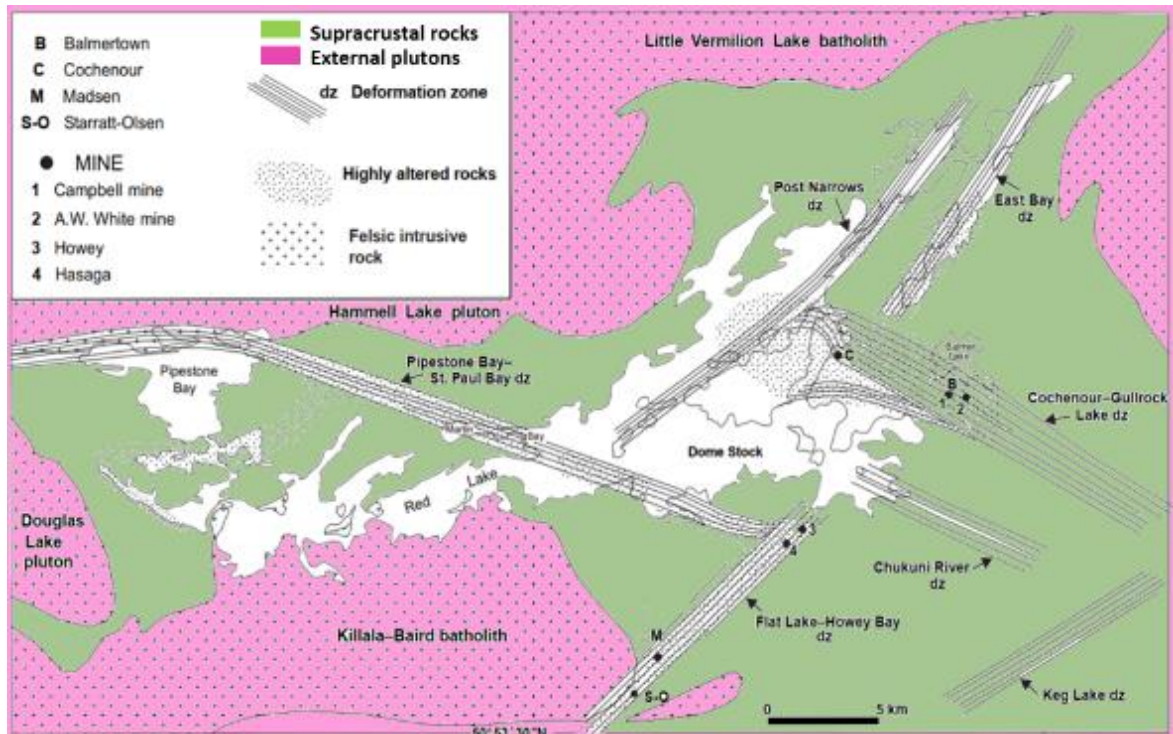


Figure 2.5 Structural map of the Red Lake greenstone belt (modified from Hugon and Schwerdtner, 1985; Andrews et al., 1986).

The second and more widespread D_2 penetrative deformation episode strikes east- to north-east and is characterized by the “high strain” corridor previously recognized by Hugon and Schwerdtner (1985) and Andrews et al. (1986). This corridor consists of a penetrative fabric with $120^\circ/75^\circ$ orientation (known locally as the Red Lake mine trend; Fig. 2.5). F_2 folds overprint F_1 folds but are commonly also well developed within siliciclastic sedimentary assemblages in the Red Lake greenstone belt. S_2 fabrics on the other hand strike mostly northeasterly with no overprinting relationship with F_2 folds, and have been interpreted to form during D_2 deformation.

D_2 has been suggested by Sanborn-Barrie et al. (2001) to record a continent building event in the southern portion of the North Caribou terrane involving collision with the 3.5 Ga Winnipeg River Suprovince to the south during the Uchian phase of the Kenoran orogeny. Post-collisional tectonics include a localized D_3 penetrative strain in the central Red Lake greenstone belt which

corresponds to the terminal stage of plutonic activities (2700 Ma) in the belt and subsequent thermal cooling (Sanborn-Barrie et al., 2004).

2.3.4 Hydrothermal alteration in the Red Lake greenstone belt

The Red Lake greenstone belt records different types and stages of hydrothermal alteration associated with deformation and gold mineralization (Pirie, 1981; Andrews et al., 1986; Colvine et al., 1988; Fig. 2.6). Pirie (1981) recognized an area within the Red Lake greenstone belt covering approximately 20km² of intensely altered mafic and ultramafic volcanic rocks previously mapped as 'andesites' due to their light grey to pale green color compared to unaltered equivalents. Mineralogy of rocks in this area have an assemblage of fine-grained quartz, carbonate, epidote, plagioclase, and chlorite all of which have replaced primary mineral assemblages. The high strain domain of regional deformation zones described by Andrews et al. (1986) consists of the most altered rocks in the belt (occurring in the eastern and central portion).

In the eastern part of the belt, the greenschist grade rocks are generally dominated by either calcite or ferroan-dolomite carbonitization which shows significant enrichment of CO₂, H₂O, Si, K and S with depletion in Fe, Mg or Na (Andrews et al., 1986). The Red Lake-Campbell mine sits on the greenschist-ampholite facies isograd divide with the amphibolite end of the isograd displaying a significant depletion in Ca, Mg, and Na and addition of SiO₂ and Al₂O₃ (Lavigne, 1983).

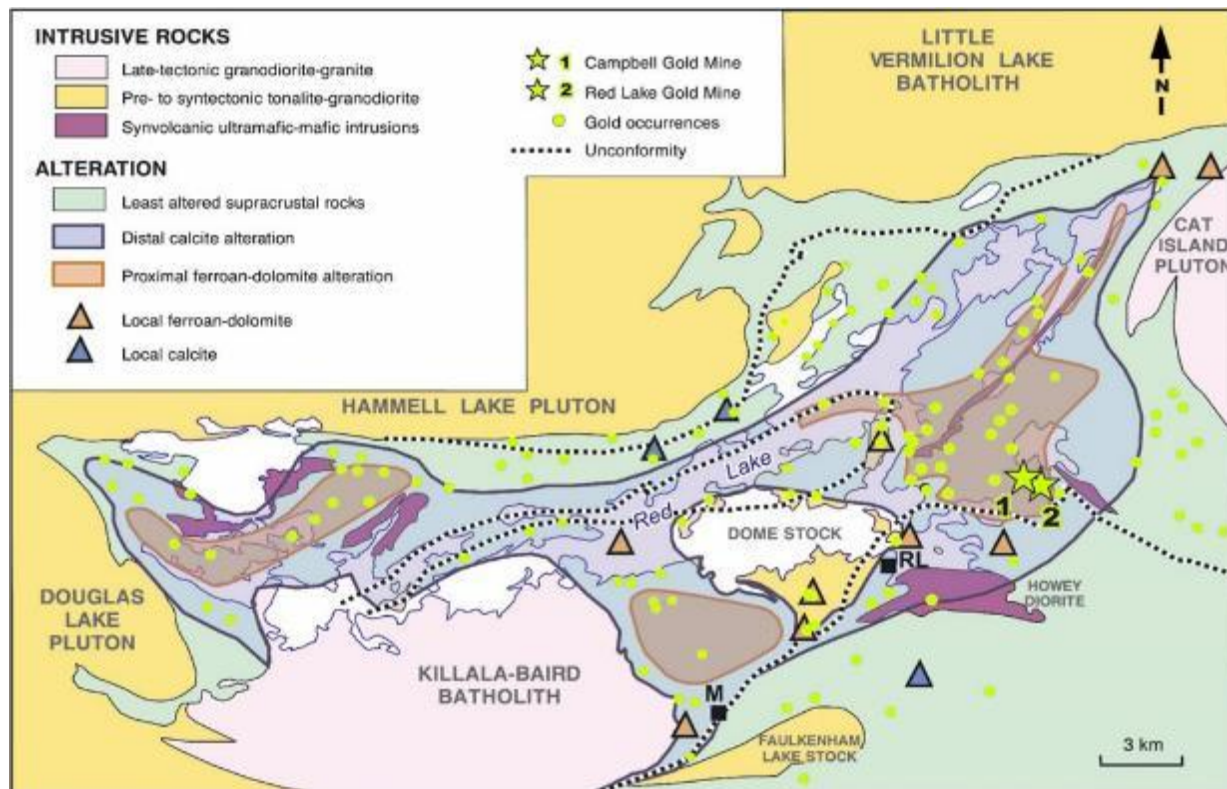


Figure 2.6 Alteration map of the Red Lake greenstone belt (from Sanborn-Barrie et al., 2004).

In the central part of the belt, calcite carbonitization dominates the amphibolite facies mafic rocks whereas ferroan-dolomite occurs within greenschist facies mafic rocks within the Flat Lake-Howey Bay deformation zone (Andrews et al., 1986). There has been significant addition of SiO_2 , K_2O , S, Ba and B with elemental depletion in Na_2O , CaO and MgO (Durocher and Hugon, 1983). Parker (2002) identified weak and localized calcite carbonitization as a widespread distal type of alteration which affects amphibolite-facies mafic and ultramafic metavolcanic rocks within the belt whereas ferroan-dolomite was recognized as the more proximal type of alteration found within the mine areas which affect mafic volcanic rocks, pyroclastic rocks and plutonic stocks of past mines (e.g., the Dome stock at Buffalo mine and McKenzie stock). Potassic alteration also affects mafic and ultramafic rocks of the belt occurring within the proximal and distal carbonate

alteration zone (Fig. 2.6). Furthermore, intense biotite alteration is common in ferroan-dolomite altered rocks within amphibolite facies mafic and ultramafic rocks.

At the mine scale, Penzcak and Mason (1997) suggested that all rocks at the Campbell mine have undergone intense carbonitization, accompanied by aluminous alteration and a stage of biotite-chlorite alteration all of which have been metamorphosed. At the Campbell and Red Lake mines, Hodgson and McGeehan (1981) recognized two main types of alteration associated with various rocks especially the mafic metavolcanic rocks namely albitization (which have affected the pillow margins, and quartz-epidote-carbonate-filled fissures in mafic volcanic rocks) and feldspar destructive alteration characterized by a significant depletion of Na.

2.3.5 Gold mineralization styles in the Red Lake greenstone belt

The Red Lake gold camp consists of world class gold deposits which have been mined for several decades (Lichtblau et al., 2016). Andrews et al. (1986) identified four major orebody types within the Red Lake greenstone belt; (i) foliation parallel, heavily deformed ferroan-dolomite veins that act as trap sites for subsequent quartz-gold mineralization based on their brittle characteristics. This type of orebody is largely restricted to greenschist facies host rocks accompanied by biotite, white mica and chlorite alteration and are located mostly within the Campbell-Red Lake deposit and parts of the Cochenour-Willans Complex, as well as in deposits along the East Bay deformation zone including the McMarmac, Abino and McFinley (formerly Phoenix Gold) deposits. (ii) Arsenopyrite-quartz-gold replacement ores are sheet like features associated with sulfides including pyrite and pyrrhotite which replaces host mafic and ultramafic rocks occurring within the contacts of the two lithologies. This orebody type is found predominantly in the

Campbell-Red Lake-Cochenour-Willans deposit. (iii) Sulfide replacement ores consisting of laterally extensive zones of pyrite and less abundant pyrrhotite occurring within the mafic metavolcanic package. Rogers (1992) considered this type of orebody to occur within the deeper parts of the Red Lake deposit as opposed to vein-related ores occurring higher up in the deposit complex. (iv) Quartz vein hosted lodes occur mostly within intrusive rocks which are highly deformed and brecciated. Gold-quartz veins are often associated with tourmaline, carbonates, and sulfides. These orebody types are present in former mines including McKenzie, Gold Eagle, Gold Shore, Wilmar and Abino.

The Campbell-Red Lake (formerly A.W. White and Dickenson) gold deposit is a world class deposit that has been the subject of various studies over several decades (Fig. 2.7). The deposit is currently being operated by Evolution Mining Ltd. (Red Lake Gold Mines) and produced more than seven million ounces of Au at 0.506 ounce per ton (Malegus et al., 2023). Pirie (1981) classified this deposit as a mafic metavolcanic hosted deposit in which orebodies consist of quartz-carbonate-gold veins with subordinate veinlets and stringer zones associated with varying amounts of sulfide including pyrite, arsenopyrite, pyrrhotite, stibnite and sphalerite. Dube (2002) described the Red Lake high grade zone (formerly Goldcorp) as being a gold-rich silicic replacement and remobilized lode deposit. He suggested that high grade gold deposits within the Red Lake complex formed as a result of remobilization of gold during a silicic replacement event into fold hinges coeval with D₂ deformation and CO₂-rich hydrothermal alteration. Ore zones are hosted within arsenopyrite-silica replacement ore and magnetite replacement ore all of which occur within a well-defined laterally extensive high-strain zone trending southeast with S₂ foliation noticeable in host mafic and ultramafic rocks (Dubé et al., 2002).

Penczak and Mason (1997) recognized various styles of mineralization within the Campbell complex including stockwork, disseminated and breccia cemented sulfides, Au-sulfide replacement, arsenopyrite-gold orebody with associated pyrite, pyrrhotite, magnetite, stibnite and sphalerite. Main stage veins which include crackle breccias, cockade breccias, fissure veins and vein stocks were considered to be originally barren with subsequent gold deposition post silicification. The nature of these veins led Penczak and Mason (1997) to suggest that the Campbell deposit may represent epithermal style gold mineralization.

Pirie (1981) described felsic intrusive and stratabound lode deposits as important styles of mineralization in the Red Lake greenstone belt. Felsic intrusive hosted deposits are mostly associated with stocks and late felsic plutons with orebodies mostly occurring as quartz-gold vein, ore lenses and stringer zones associated with sulfides including pyrite, chalcopyrite, pyrrhotite, sphalerite, galena and arsenopyrite (e.g., McKenzie, Gold Eagle, Gold Shore, Howey and Hasaga mines). Stratabound deposits occur within a sequence of mafic tholeiitic metavolcanic rocks associated with altered peridotite intrusions known locally as tuff horizons (e.g., the Madsen and Starett Olsen mines). Orebodies occur mostly as silicified lenses within tuff horizons with gold accompanying pyrite, pyrrhotite, ilmenite, arsenopyrite, chalcopyrite, sphalerite and scheelite (Ferguson, 1965).

Chapter 3 - Methodology

3.1 Field sampling

The first campaign of sampling was done as part of the P1153 project in 2016 which focused on alteration footprint of the Campbell-Red Lake high grade gold deposit (Fig. 3.1). The sampling used the approach developed by previous AMIRA footprint research which involved collecting samples ~500m apart in the distal alteration zones whereas a spacing of ~250m was used close to the deposit center. Surface sampling was done in the distal alteration zones whereas limited drill core sampling was completed proximal to the mineralized center with samples collected every 50ft of core. A total of 72 samples were collected during this field season, 53 from surface outcrops and 19 from core samples.



Figure 3.1 Sampling locations of pyrite in the Red Lake greenstone belt. Modified from Google maps (2025).

The second field campaign (July to August 2023) was done as part of the P1249 (current study) project to complement samples collected in the P1153 project (Fig. 3.1). Sampling was limited to surface outcrops and involved rock chips, outcrops and rock channeling. Sample collection for this study targeted past producing mines and current prospects with a total of 36 samples collected. Samples from both P1153 and P1249 were integrated to achieve a widespread sample distribution in the Red Lake greenstone belt.

3.2 Whole rock geochemistry

All 72 samples collected for the P1153 project were selected for analysis whereas 24 from P1249 samples were selected (to compliment existing sample list) and sent to ALS laboratories in North Vancouver, British Columbia and Thunder Bay, Ontario to be analyzed for whole rock geochemical content including major, minor and trace elements. The ALS method involves a first stage of sample preparation where 70% are crushed and passed through a 2mm screen. After first stage crushing, samples were divided using riffle or rotary splitters where subsamples are pulverized in a vibrating disc or bowl pulverizer to a fine powder till 85% pass through 75 μm mesh. About 0.1–0.2 g of samples was with lithium metaborate. The mixtures were fused at high temperature (around 1000°C) in a platinum or graphite crucible to form a homogeneous glass bead which was then dissolved in a 100 mL aqueous solution of 2% hydrochloric acid and 4% nitric acid.

All major and minor elements were analyzed by passing dissolved fusion solution into Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-AES) instrument, where it was atomized and excited by a plasma. Trace elements were analyzed by passing the sample fusion solution (or a

separate dilution) into a triple quadruple (QQQ) Inductively Coupled Plasma Mass Spectrometry, which detects ions based on their mass-to-charge ratio. Concentration of Au was measured by taking a portion of the sample and heating it up by fire assay, where gold is collected using a lead button and separated by cupellation. The resulting bead was then dissolved in aqua regia and analyzed using Inductively Coupled Plasma Atomic Emission Spectroscopy (ICP-AES).

Further Au analysis was done by taking a portion of the sample and analyzing it by fire assay followed by a gravimetric finish. After gold was collected in a lead button and separated by cupellation, the bead was then weighed directly to determine the gold content. Analysis of mercury was done by package Hg-MS42 where 0.5g of sample were weighed and then dried, thereafter by a digestion with aqua regia. The solution was then passed to the Inductively Coupled Plasma -Mass Spectrometer (ICP-MS) for measurement. The analytical techniques used by the laboratory are summarized in Table 3.1. Similar methods were applied to P1249 samples (current study) except for Au-ICP21 and Au-GRA21 for Au analysis.

Table 3.1 Laboratory package analytes and instruments used for whole rock geochemistry

ALS CODE	DESCRIPTION	INSTRUMENT
S-IR08	Total Sulphur (Leco)	LECO
Hg-MS42	Trace Hg by ICPMS	ICP-MS
ME-ICP06	Whole Rock Package – ICP-AES	ICP-AES
Au-ICP21	Au 30g FA ICP-AES Finish	ICP-AES
Au-GRA21	Au 30g FA-GRAV finish	WST-SIM
OA-GRA05	Loss on Ignition at 1000C	WST-SEQ
ME-MS81	Lithium Borate Fusion ICP-MS	ICP-MS
TOT-ICP06	Total Calculation for ICP06	ICP-AES
ME-MS61	48 element four acid ICP-MS	ICP-MS
C-IR07	Total Carbon (Leco)	LECO

3.3 Petrography

Textures of alteration minerals were studied using in house petrographic microscopes which included: 1) an Olympus BX 51 optical microscope equipped with an Olympus SC180 camera connected to an output screen and a range of objective lenses from 2.5x – 100x; and 2) a Zeiss Axioscope optical microscope equipped with an Axiocam 305 color camera connected to an output screen and range of objective lens from 2.5x – 50x. The Olympus BX 51 optical microscope was operated in both plane- and cross-polarized mode. Petrographic observations were made with both transmitted and reflected light. The light exposure was switched between manual and automatic mode to obtain best quality images.

The Zeiss Axioscope 7 was used to obtain full photomicrographs of samples in plane and polarized light while switching between transmitted and reflected light image. The output images from the camera were processed using the ZEN 3.9 software configured to generate high quality images.

3.4 Scanning Electron Microscopy (SEM) and Energy Dispersive Spectroscopy (EDS)

A Hitachi SU-70 field emission scanning electron microscope (FE-SEM) at the Central Science Laboratory, University of Tasmania, was used for backscattered electron (BSE) imaging and energy-dispersive x-ray spectrometry (EDS) of pyrite. The microscope is equipped with a Hitachi photodiode BSE detector and an Oxford Aztec EDS system with a Xmax80 silicon drift detector. Before SEM-EDS analysis, samples were coated with approximately 20 nm of carbon using an HHV Auto 306 carbon evaporator, and a coating correction was applied in the Aztec software. The operating conditions included a 15 kV accelerating voltage, approximately 3 nA beam current, and a working distance of 14.8 mm. Data acquisition was performed in Point & ID mode with a live spectrum acquisition time of 10 seconds, process time 3, 2048 channels, and a total

energy range of 20 keV. Typical count rates were about 40,000 counts per second, with total spectrum counts exceeding 1,000,000. Element calibration was carried out using a range of natural and synthetic standards. An indirect beam current calibration was conducted by measuring the Co K x-ray series intensity on cobalt metal.

3.5 Pyrite Acid Etching

Prior to laser ablation spot analysis and 2D imaging of pyrite, acid etching of target pyrite grains was performed to oxidize pyrite and observe any growth zonation. The etching was done on 2.5cm and 3cm diameter round polished pucks. 15-20ml solution of 8% NaOCl (sodium hypochlorite) was prepared in a beaker after which a clean surface of a round puck was dipped into the solution for 40 to 90 seconds. The round puck was then dipped into another beaker with clean water for about 3 to 5 seconds to wash off the NaOCl solution from the sample surface. The sample was then left to dry by exposing the surface to air. The procedure was repeated for all analyzed samples prior to analysis.

3.6 Laser Ablation ICP-MS

Laser ablation inductively coupled plasma mass spectrometry (LA-ICP-MS) spot analyses and imaging of pyrite were conducted at CODES Analytical Laboratories, University of Tasmania. The analyses were performed using a Resolution SE laser ablation system with an ATL ATLEX ArF excimer laser operating at a wavelength of 193 nm and a pulse width of approximately 5 ns, coupled with an Agilent 7900 quadrupole mass spectrometer. Sample ablation was carried out in a helium atmosphere flowing at 0.35 L/min, which was immediately mixed with argon flowing at 1.05 L/min. A circular laser beam of 30 μm was used for spot analyses, while square laser beams

of 6, 9, and 12 μm were used for imaging. Imaging was performed by rastering the entire grain surface with parallel lines at speeds of 6, 9, and 12 $\mu\text{m}/\text{sec}$, respectively. The following masses were measured: ^{23}Na , ^{24}Mg , ^{27}Al , ^{29}Si , ^{34}S , ^{39}K , ^{43}Ca , ^{49}Ti , ^{51}V , ^{53}Cr , ^{55}Mn , ^{57}Fe , ^{59}Co , ^{60}Ni , ^{65}Cu , ^{66}Zn , ^{75}As , ^{77}Se , ^{88}Sr , ^{90}Zr , ^{107}Ag , ^{111}Cd , ^{121}Sb , ^{125}Te , ^{157}Gd , ^{178}Hf , ^{181}Ta , ^{195}Pt , ^{197}Au , ^{202}Hg , ^{205}Tl , ^{208}Pb , and ^{209}Bi . The total sweep time was 0.67 seconds for spot analyses and 0.36 seconds for imaging.

Quantification and instrument drift correction were performed using STDGL3 (Belousov et al., 2023) and GSD-1G (Jochum et al., 2011) glasses analyzed at 51 μm . Internal standardization was based on ^{57}Fe , with analyses normalized to 100 wt.% total using calculated sulfur. Ablation was carried out at a laser frequency of 5 Hz for spot analyses and 10 Hz for imaging. Laser beam energy density was approximately 2.7 J/cm^2 for STDGL3 and sulfides and 3.5 J/cm^2 for GSD-1G glass. A “Squid” smoothing device was used as the interface between the laser ablation system and the ICP-MS for spot analyses, while straight 3 m nylon tubing was used for imaging. LADR software (Norris Scientific) was used for spot analysis quantification and to calculate cps/ppm conversion factors for imaging. Final image processing was carried out using an in-house Python script.

QA/QC procedure of pyrite LA-ICP-MS spot data was assessed using manual time interval selection for spot data using the LADR software to manually select inclusion-free analysis (Fig. 3.2). This process involved assessing 60 seconds of data collected by laser to identify areas of pyrite grains with mineral inclusions which are rejected whereas clean laser data are kept for export. This process is repeated for each spot data on the LADR software.

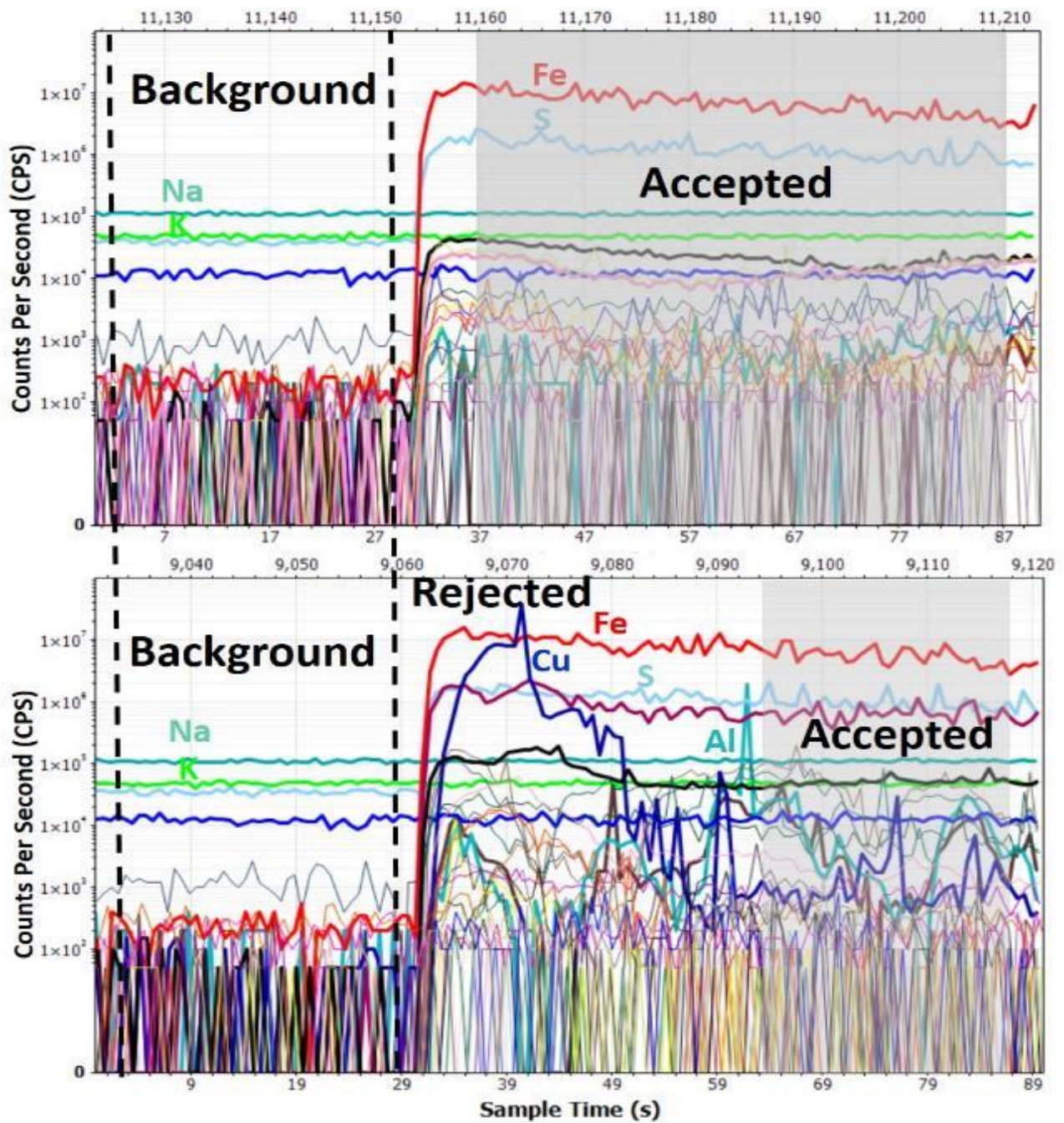


Figure 3.2 Laser ablation time interval of pyrite spot analysis. Top image is an inclusion free laser signal pyrite from sample NS009. Bottom image consist of laser signal with inclusion of chalcopyrite at the start of analysis from sample NS001.

3.7 Sulfur isotopes

Pyrite samples that were analyzed by LA-ICP-MS was selected for in-situ sulfur isotope analysis. The samples were selected to achieve an overlap between pyrite generations and sulfur isotope data. Sulfur isotopic ratios of pyrite were measured using LA-MC-ICP-MS at Nanjing FocuMS Technology Co. Ltd, Nanjing, China. The analyses were conducted using an Australian Scientific Instruments RESOlution LR S-155 laser ablation system (Canberra, Australia) coupled with a Nu Instruments, Nu Plasma II MC-ICP-MS (Wrexham, Wales, UK). The Nu Plasma II was operated with a medium-resolution source slit, achieving a resolving power greater than 8000. A 193 nm ArF excimer laser, homogenized by a set of beam delivery systems, was focused on the sample surface with a fluence of 2.5 J/cm². Each acquisition included a 30-second background measurement (gas blank), followed by ablation using spot diameters of 33 μm for pyrite at a repetition rate of 5 Hz for 35 seconds. The Nu Plasma II integration time was set to 0.3 seconds, corresponding to 115 cycles over the 35-second analysis period. Helium (400 mL/min) was used as the carrier gas to transport the aerosol from the ablation cell, and it was mixed with argon (~0.95 L/min) using a T-connector before entering the ICP torch. Natural pyrite Wenshan ($\delta^{34}\text{S}/^{32}\text{S}$ = +1.2‰ V-CDT, in-house standard) was used as the primary standard for samples. Pyrrhotite Po-H ($\delta^{34}\text{S}/^{32}\text{S}$ = +6.0‰ V-CDT, unpublished data from the Institute of Geochemistry, Chinese Academy of Sciences, Guiyang) was used as the secondary standard. The two standard materials were used to correct for fractionation from laser beams, however, if the instrument is in raster mode or if the crater diameter/depth ratio > 10, fractionation is negligible (Košler et al., 2005; McFarlane et al., 2016). The long-term reproducibility of $\delta^{34}\text{S}/^{32}\text{S}$ measurements was better than 0.5‰ (1 standard deviation).

Chapter 4 - Field and Petrographic Observations

Rock samples representing host rock alteration and veins were collected across the Red Lake greenstone belt. The sample locations have been divided into four different zones based on the geographical locations in the belt (Fig. 4.1). Each zone consists of different styles of gold mineralization and alteration as discussed by previous works. A total of 108 rock samples including both outcrop and drill-hole data were collected from across the belt and included rock samples collected from around the Campbell-Red Lake deposit from the previous AMIRA P1153 project. Representative polished thin sections from each zone were studied to characterize the occurrence of alteration minerals (Fig. 4.1). Proximal and distal rock samples from around the Campbell-Red Lake mine (Zone A) constitute most of the samples (Fig. 4.1). The samples include both outcrop chip and drill-hole samples proximal to the mine area. Samples from the East Bay trend (Zone B) consist of only outcrop samples (Fig. 4.1). Rock samples from the Slate Bay (Zone C) represent the eastern portion of the Red Lake greenstone belt with significant gold showings in metasedimentary and metamorphosed intrusive rocks. The Howey and Hasaga historical mines (Zone D) comprise rock samples from the southernmost part of the Red Lake greenstone belt (Fig. 4.1). Rock samples from this area include both outcrop and drill-hole from samples collected from the previous AMIRA P1153 project.

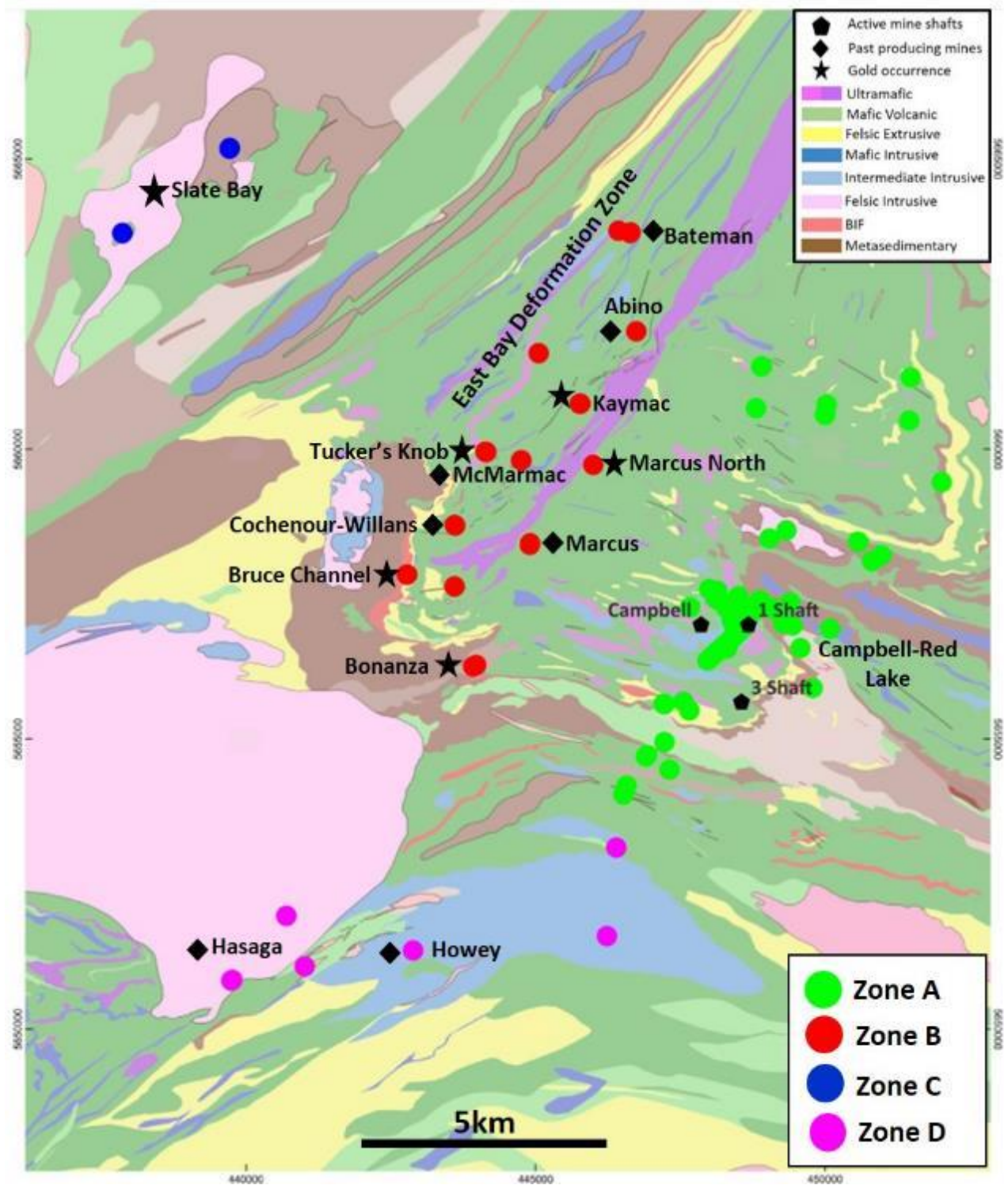


Figure 4.1 Sample location across the Red Lake greenstone belt with various deposits, occurrences and location of the Campbell-Red Lake mines. Legend shows rock types and classification of sample zones. Modified from Evolution Mining (2023).

4.1 Campbell-Red Lake deposit (Zone A)

The Campbell-Red Lake (CRL) deposit is a large, high-grade deposit in the Eastern part of Red Lake greenstone belt. It comprises a complex alteration assemblage from proximal to distal parts of the deposit. Various alteration assemblages were observed for CRL deposit rock samples including carbonate-quartz, white mica, chlorite, biotite, tourmaline and sulfides.

4.1.1 Silicates

Various silicate alteration minerals including white mica, chlorite, biotite and tourmaline are present in rocks around the CRL deposit. One of the most intense alteration phases around the CRL mine area is a pervasive white mica alteration which occurs with varying intensity from 30%-90% (Fig. 4.2). Pervasive sericite alteration affects Balmer assemblage metavolcanic host rocks of the CRL deposit making the rock appear bleached. Sericite alteration also affects the Bruce Channel assemblage rocks which is dominated by fine-grained phases (<50 µm) attributed to the breakdown of plagioclase (Fig. 4.2 C-D). However, coarse-grained white mica (800µm across) veins cut early quartz-carbonate veins in the Balmer assemblage metavolcanic rocks with halos of blue chlorite up to 500 µm thick (Fig. 4.3). Pervasive white mica alteration (in addition to quartz) in Balmer assemblage rocks make the rock appear bleached (Fig. 4.2). Away from the CRL deposit mine area, white mica alteration was not identified in rocks that occur in the distal footprint of CRL deposit.

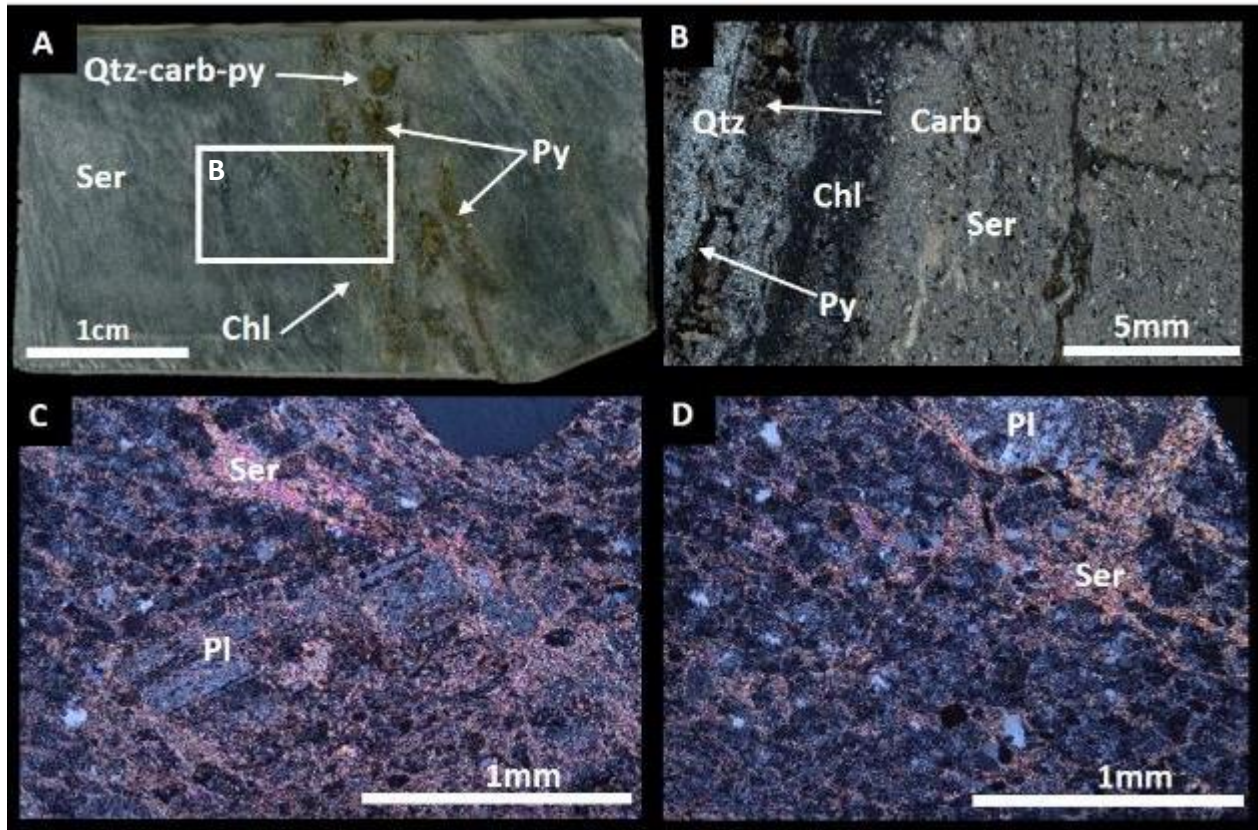


Figure 4.2 Occurrence of proximal sericite alteration around the Campbell-Red Lake mine area. (A) Thin section offcut photo showing proximal pervasive sericite alteration of host rock cut by quartz-carbonate-chlorite-pyrite vein (ND029). (B) XPL photomicrograph of pervasive sericite alteration of host rock cut by quartz-carbonate-chlorite-pyrite vein (ND029). (C-D) XPL images of intense sericite alteration of Bruce Channel metasedimentary rocks around Campbell-Red Lake mine area (ND120). Ser-sericite, Chl-chlorite, Qtz-quartz, Carb-carbonate, Py-pyrite

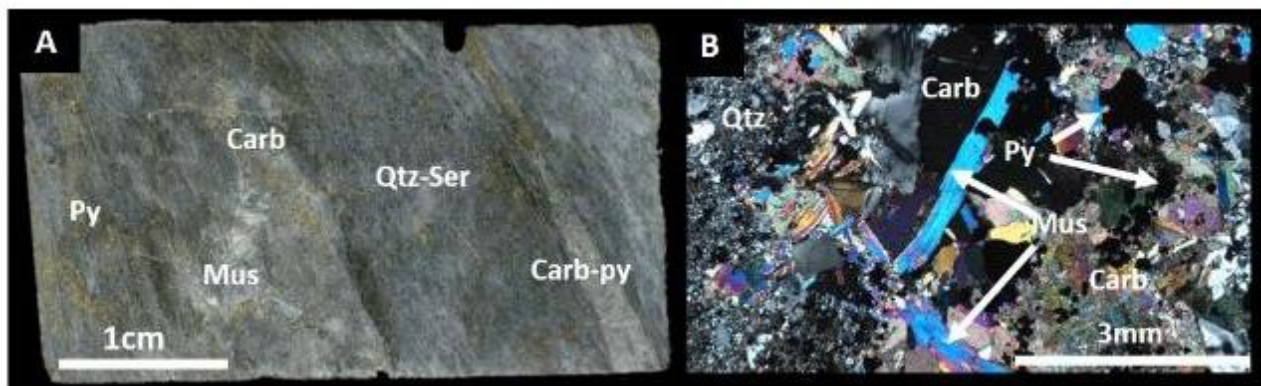


Figure 4.3 Proximal white mica alteration. (A) Thin section offcut photo showing carbonate-muscovite vein cutting early quartz-sericite-pyrite alteration (ND110) (B) XPL photomicrograph of coarse-grained muscovite alteration (ND110). Ser-sericite, Chl-chlorite, Qtz-quartz, Carb-carbonate, Py-pyrite

Chlorite occurs as a common alteration mineral in CRL deposit rocks especially within the Balmer assemblage. The common chlorite types include coarse-grained ($>1000\ \mu\text{m}$) grey chlorite that replaces carbonate in the host rock and occurs as acicular-shaped crystals (Fig. 4.4). Their abundance varies between 30-40%. The chlorite also occurs as veins in close association with pyrite cutting carbonate altered basalts (Fig. 4.4).

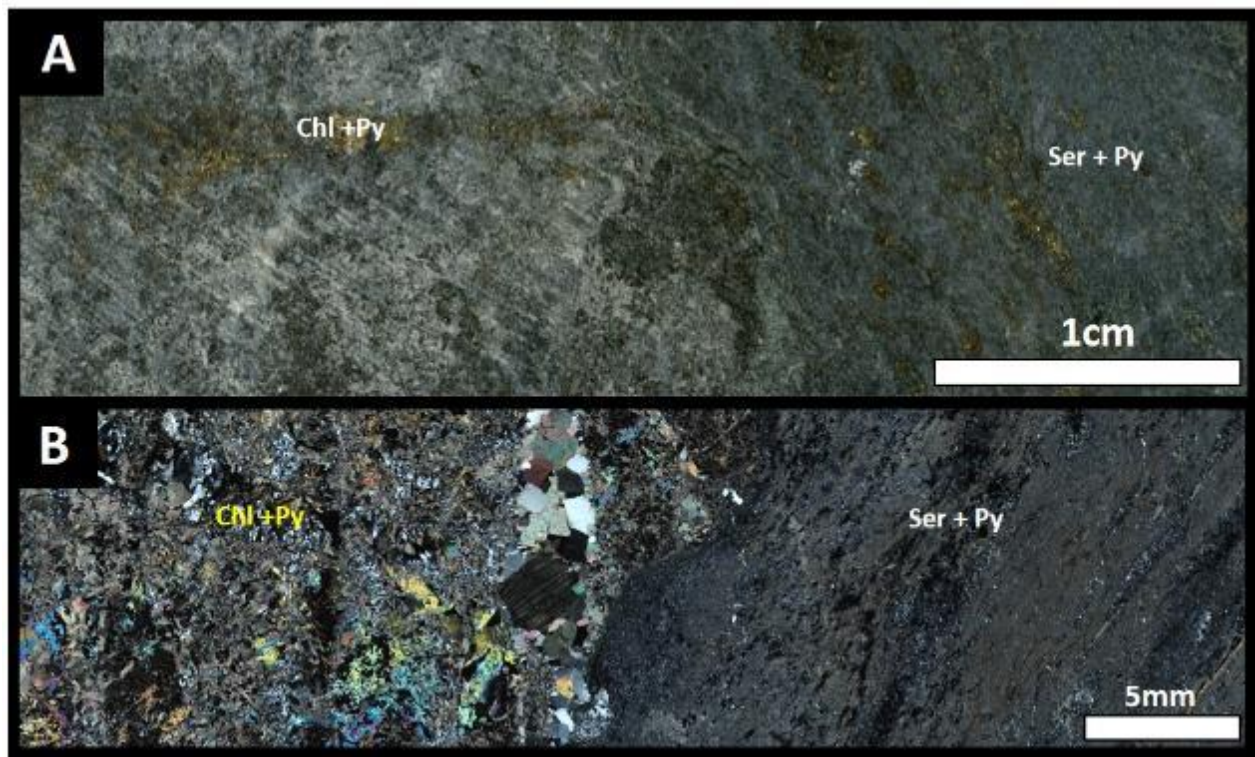


Figure 4.4 Occurrence of chlorite alteration in proximal Balmer assemblage rock (A). Thin section offcut photo showing relationship between chlorite, sericite and pyrite alteration in host basalt (ND039) (B) Photomicrograph of chlorite alteration (ND039). Ser-sericite, Chl-chlorite, Py-pyrite

Chlorite alteration also affects Balmer assemblage rocks in the distal parts of CRL deposit ($\sim 5\text{km}$ from mine area) where it occurs as coarse-grained ($>500\ \mu\text{m}$) crystals with deep blue to green birefringence (Fig. 4.5). The chlorite alteration is cut by sericitized thick quartz-albite veins ($\sim 1.5\text{cm}$ thick) with smaller veins ($\sim 100 - 200\ \mu\text{m}$ thick). Distal chlorite altered Balmer

metavolcanic rocks give the rocks a greenish coloration due to >70% abundance of chlorite (Fig. 4.5).

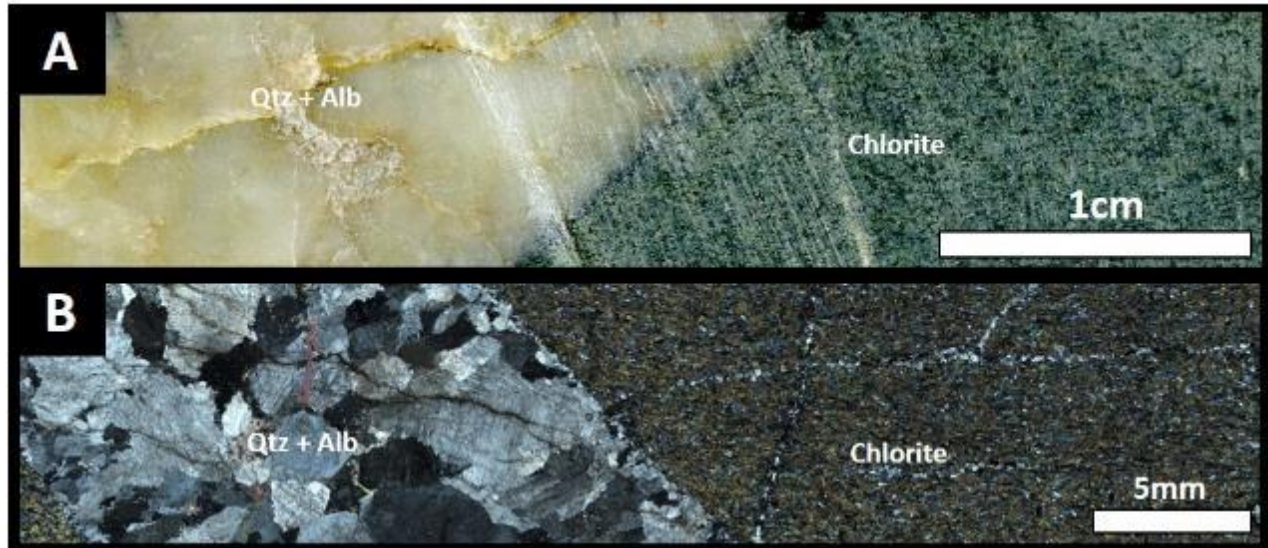


Figure 4.5 Occurrence of chlorite alteration in distal Balmer assemblage rock (A). Thin section offcut photo showing relationship between chlorite and quartz-albite vein in the host basalt (ND195) (B) Photomicrograph of chlorite alteration (ND195). Alb-albite, Qtz-quartz

Biotite alteration was identified in proximal rock samples around the CRL mine. The biotite alteration mostly affects Balmer assemblage rocks and occurs as veins with quartz and pyrite or as halos to the quartz-biotite-pyrite vein (Fig. 4.6). Biotite occurring with quartz and pyrite is coarse-grained (>200 μm grain size) compared to biotite occurring as vein halos (~50-100 μm). Both vein and halo biotite have bluish to greenish birefringence (Fig. 4.6). Biotite alteration was not observed in distal rock samples which were dominated by quartz-carbonate alteration.

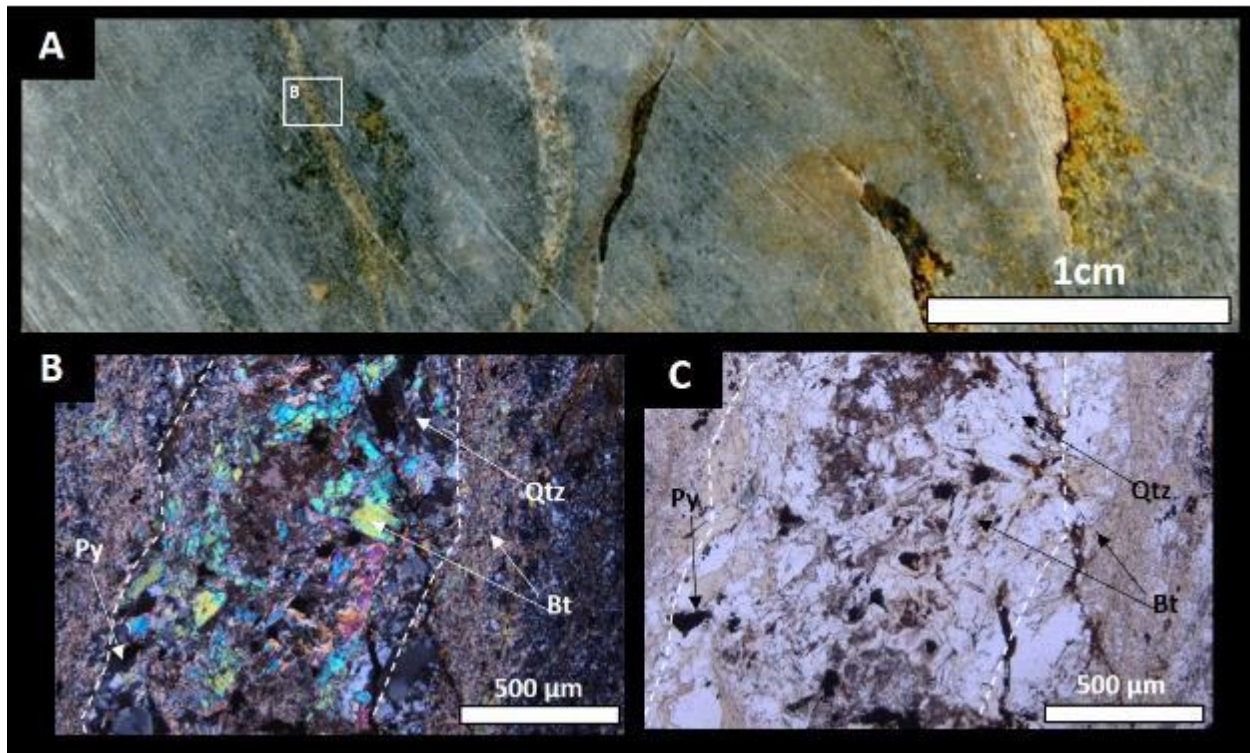


Figure 4.6 Occurrence of biotite alteration in Balmer assemblage rock (A). Thin section offcut photo showing occurrence of quartz-biotite vein in host basalt, inset image is explained in image B and C (ND195). (B) XPL Photomicrograph of quartz-biotite vein with fine-grained biotite halo (ND195). (C) PPL Photomicrograph of quartz-biotite vein with fine-grained biotite halo (ND195). Bt-biotite, Qtz-quartz, Py-pyrite

4.1.2 Carbonate-quartz

Carbonate quartz alteration is common in rocks occurring both proximal and distal to the CRL deposit. They occur as either coarse-grained phases ($>1000\ \mu\text{m}$) in veins or fine-grained phases ($<100\ \mu\text{m}$) when occurring as pervasive replacement (Fig. 4.7). Carbonate veins can host sulfide, mostly pyrite $\pm$ chalcopyrite. Sulfides are also associated with fine grained replacement carbonates and quartz. Carbonate + quartz (silica) alteration affects Balmer assemblage metavolcanic rocks including basalt and ultramafic rocks.

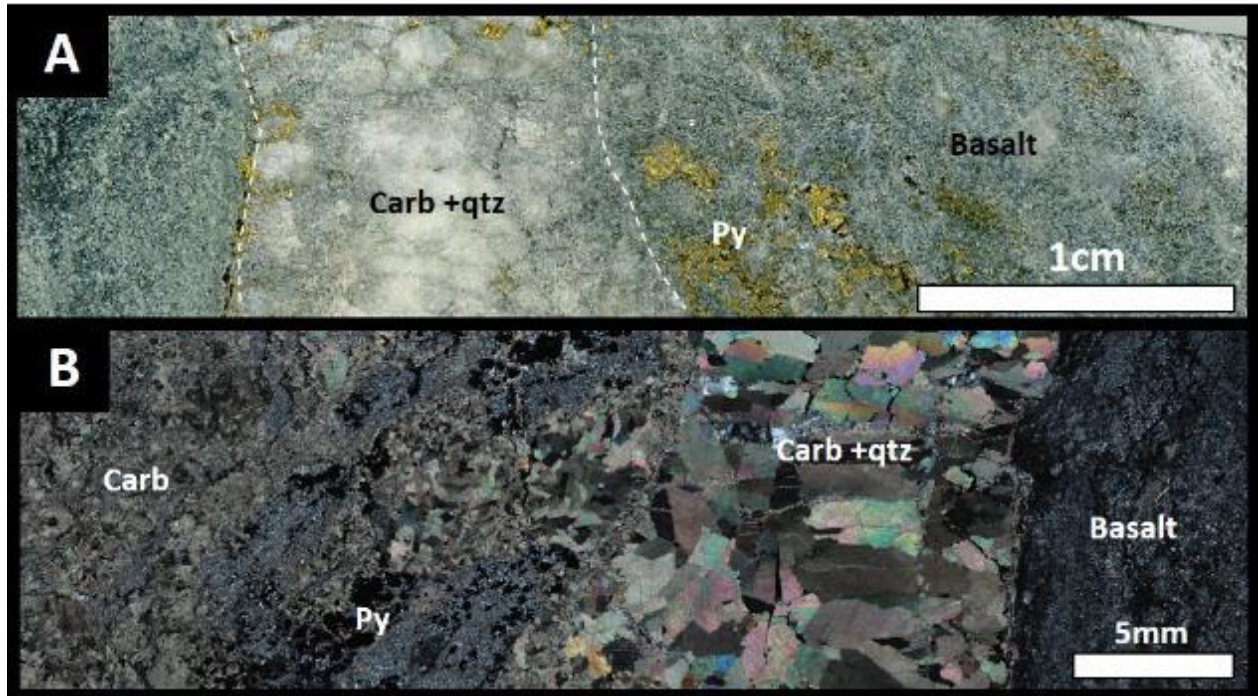


Figure 4.7 Occurrence of carbonate and quartz (silica) in Balmer assemblage rock (A). Thin section offcut photo showing occurrence of carbonate-quartz vein cutting altered basalt host rock (ND005) (B) XPL Photomicrograph of carbonate-quartz vein and fine-grained carbonate and quartz altered host rock (ND005). Qtz-quartz, Carb-carbonate, Py-pyrite.

4.1.3 Tourmaline

Tourmaline alteration also occurs in both the proximal and distal part of the Campbell-Red Lake deposit. Quartz-carbonate-tourmaline veins from thin section offcut samples were observed proximal to the mineralized center. These veins cut carbonate altered metavolcanic wallrock (Fig. 4.8). The veins consist of coarse-grained subhedral-anhedral quartz-carbonate phases that range in size from 200-5000 μm with clusters of tourmaline (Fig. 4.8). The tourmaline occurs as euhedral-subhedral with grain size ranging from $\sim 40\text{-}300\mu\text{m}$ prismatic/elongate crystals occurring in clusters within analyzed samples and constituting approximately 20- 30% of the samples (Fig. 4.8). Tourmaline alteration occurs within distal part of Campbell-Red Lake where they overprint quartz-carbonate veins.

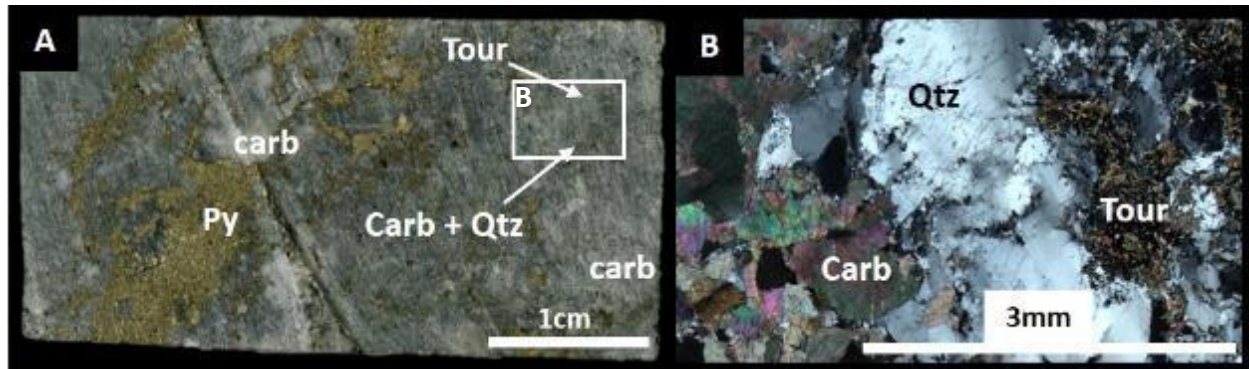


Figure 4.8 Occurrence of multiple alteration phases in Balmer assemblage host rock (A) Thin section offcut photo showing quartz-tourmaline vein cutting early carbonate altered host rock (ND023). (B) XPL photomicrograph of quartz-tourmaline vein cutting early carbonate altered host rock (ND023). Tour-tourmaline, Qtz-quartz, Carb-carbonate, Py-pyrite.

4.2 East Bay deformation zone (Zone B)

Marcus deposit

Carbonate alteration was observed at an outcrop in the Marcus deposit within the Balmer metavolcanic host rock occurring either as veins of massive ankerite or ankerite-quartz (Fig. 4.9). The massive ankerite veins (5-10cm across) in this area have extensive iron red coloration due to oxidation (Fig. 4.9 A-B). Fine-grained carbonates (<50 μ m) occur interstitially with quartz both in veins and within the host rocks (Fig. 4.10). However, the finer grained carbonate phases sometimes occur closely associated with a relatively coarse-grained carbonate phase (Fig. 4.10). The host Balmer assemblage rocks are cut by quartz veins with veins ranging in size from 3-5cm across with subordinate carbonate (Fig. 4.10). Rock samples show that silicification is normally pervasive in the host rock with fine-grained quartz replacing host rock mineralogy (Fig. 4.10).

Chlorite alteration occurs in veins in close contact with carbonate or as pervasive replacement of carbonate veins (Fig. 4.10). Fine-grained chlorite replacement of carbonate veins can be as intense as 40% with grains ranging from ~50-100 μ m (Fig. 4.10 C-D). Both chlorite types observed

at the Marcus deposit have similar birefringence (blue) and occur close to carbonates in the host basalt (Figs. 4.10, 4.11).

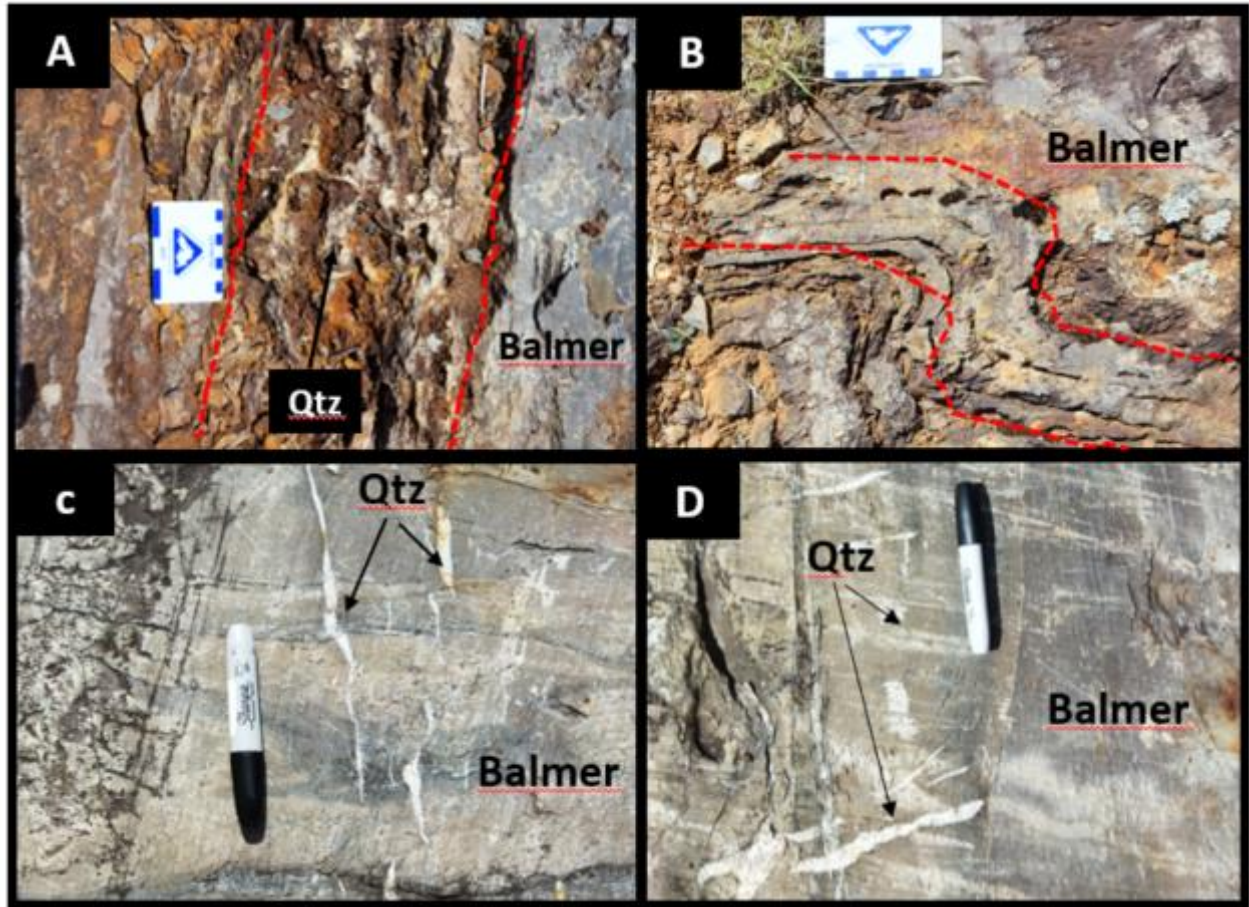


Figure 4.9 Outcrop photographs of alteration assemblages of the Marcus deposit surface exposure. (A) Ankerite-quartz vein cutting Balmer basalt (Marcus outcrop). (B) Deformed ankerite vein cutting Balmer assemblage rock (Marcus outcrop). (C-D) Multiple deformed quartz veins cutting Balmer basalt. Qtz-quartz.

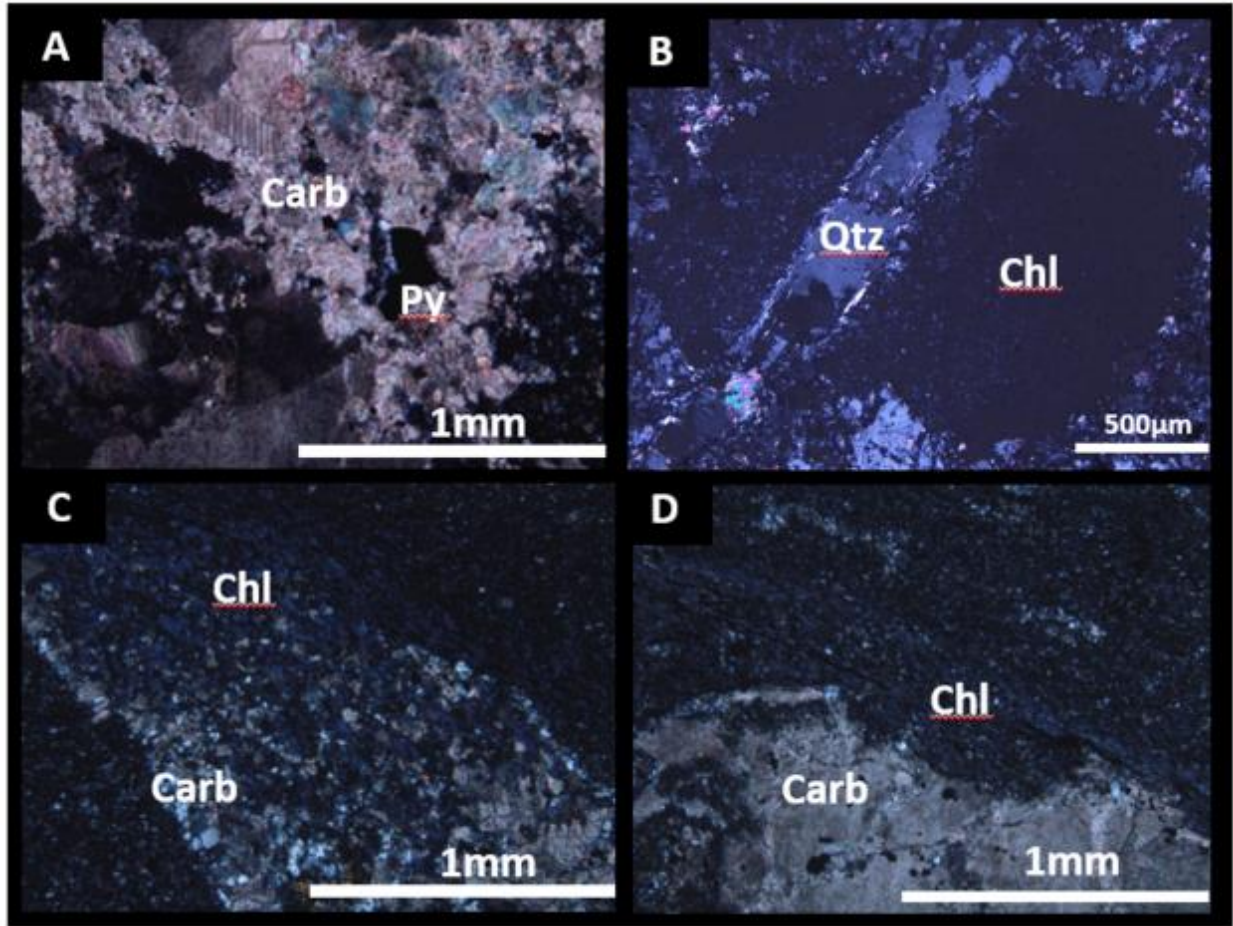


Figure 4.10 Representative photomicrographs of alteration phases in the Marcus deposit. (A-B) Photomicrograph of coarse-grained carbonate vein (NS001; PPL and XPL). (C) Chlorite replacing carbonate from rim to core (NS001; XPL). (D) Berlin blue chlorite occurring in vein adjacent to carbonate vein (NS001; XPL). Carb-carbonate, Qtz-quartz, Py-pyrite, Chl-chlorite

The chlorite replaces subrounded clast-like features occurring within the rock matrix which are cut by narrow (~300-500µm) quartz veins which occur in clusters with inclusions of carbonate and quartz (Fig. 4.11). Pyrite is the main sulfide present occurring as fine- to medium-grained clusters occurring within quartz-carbonate veins (Fig. 4.1).

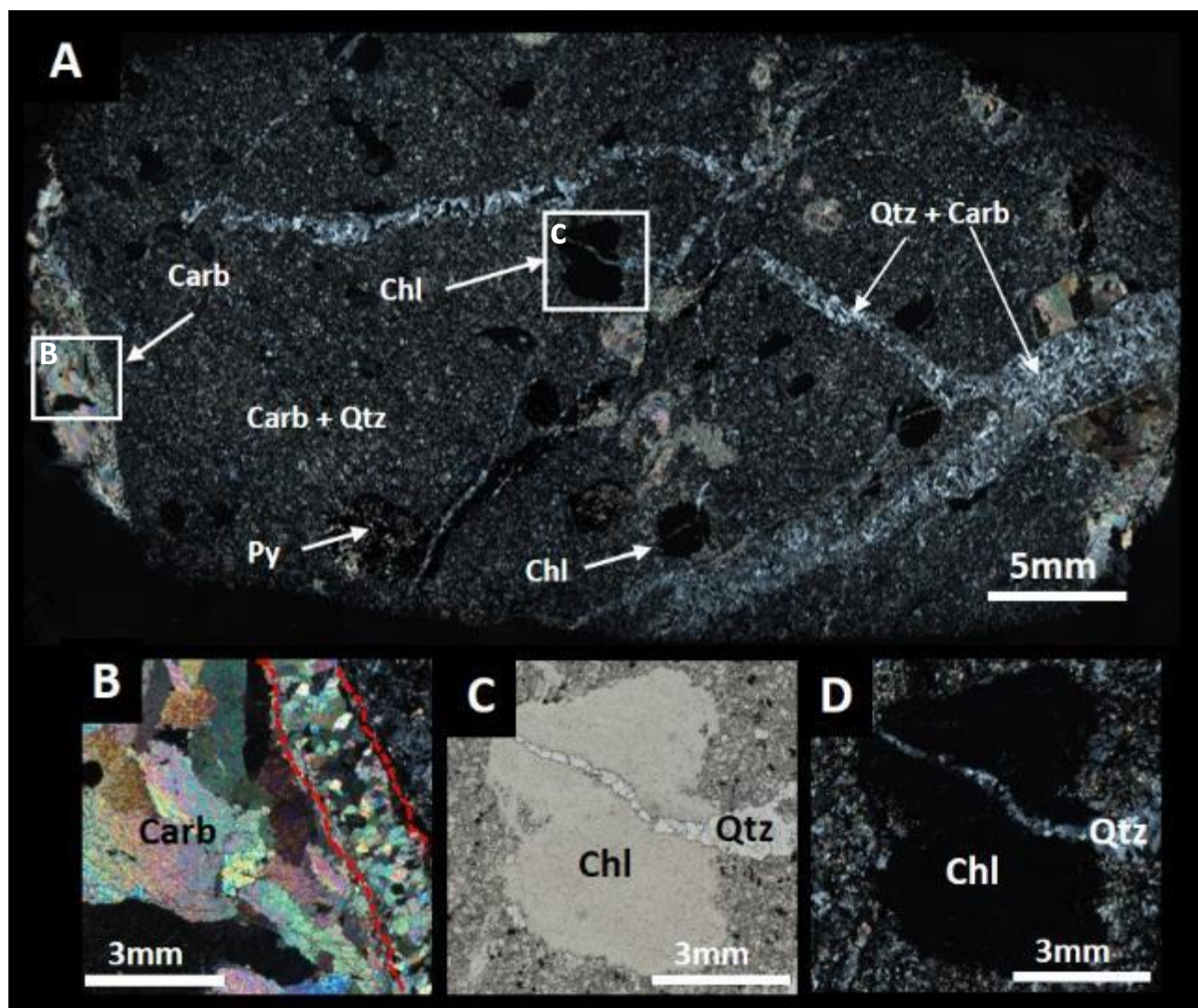


Figure 4.11 Representative photomicrographs of alteration phases in the Marcus deposit. (A) Full XPL thin section photomicrograph showing relationship between veins and host rock matrix (NS001). (B) Inset photomicrograph of coarse-grained (3mm) carbonate bordered by relatively fine-grained (1mm) carbonate phase (NS001; XPL). (C-D) Inset photomicrograph of replacement chlorite cut by quartz veinlet (NS001; PPL and XPL). Carb-carbonate, Qtz-quartz, Py-pyrite, Chl-chlorite

Cochenour-Willans Deposit

Alteration in this deposit occurs as ankerite, silica and chlorite (Figs. 4.12, 4.13). The carbonate alteration occurs as massive veins (~3m across) cutting through host Balmer metabasalts with rusted coloration due to oxidation. Crustiform ankerite with subordinate quartz overprints

massive carbonate veins (Fig. 4.12). Medium- to coarse-grained ($>500\mu\text{m}$) pyrite (with annealing textures) is the main sulfide alteration phase, occurring with white mica and ankerite altered host rock (Fig. 4.12).

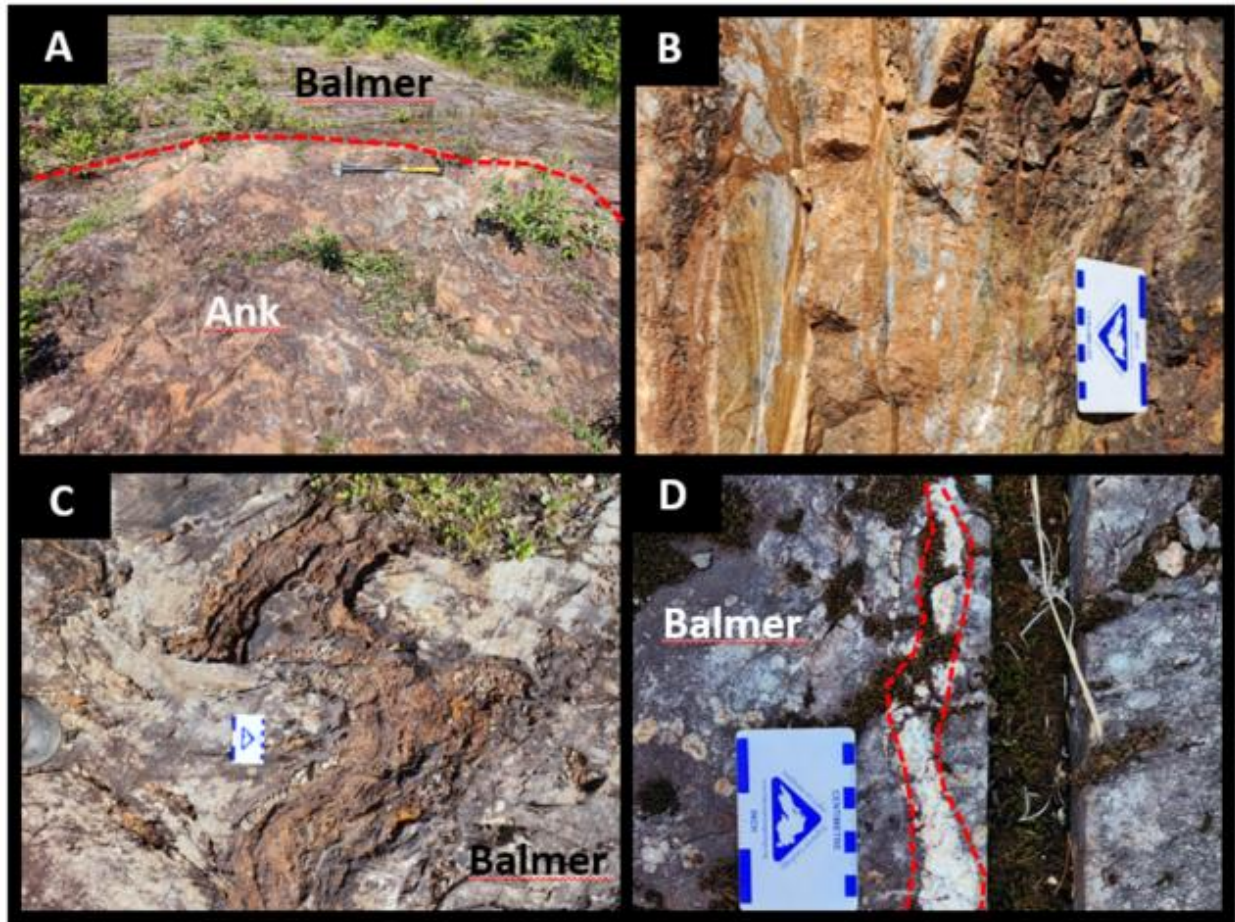


Figure 4.12 Outcrop and rock sample photographs of alteration and veins from the Cochenour-Willans deposit. (A) Massive ankerite vein (~10m across) cutting Balmer assemblage metavolcanic rock (Hammer for scale). (B) Crustiform texture ankerite and quartz vein. (C) Deformed ankerite vein cutting Balmer assemblage metavolcanic rock. (D) Quartz vein cutting Balmer assemblage metavolcanic rock.

Brown chlorite veins replaced by biotite occur as narrow veinlets ($<40\mu\text{m}$ across) that cut carbonate veins whereas berlin blue chlorite veins occur as a $200\mu\text{m}$ halo to localized quartz veins that cut the carbonate veins and as veins that overprints carbonate and quartz altered rock

matrix (Figs. 4.13, 4.14). White mica alteration only occurs with replacement pyrite, overprinting the carbonate and quartz altered host rock (Fig. 4.13).

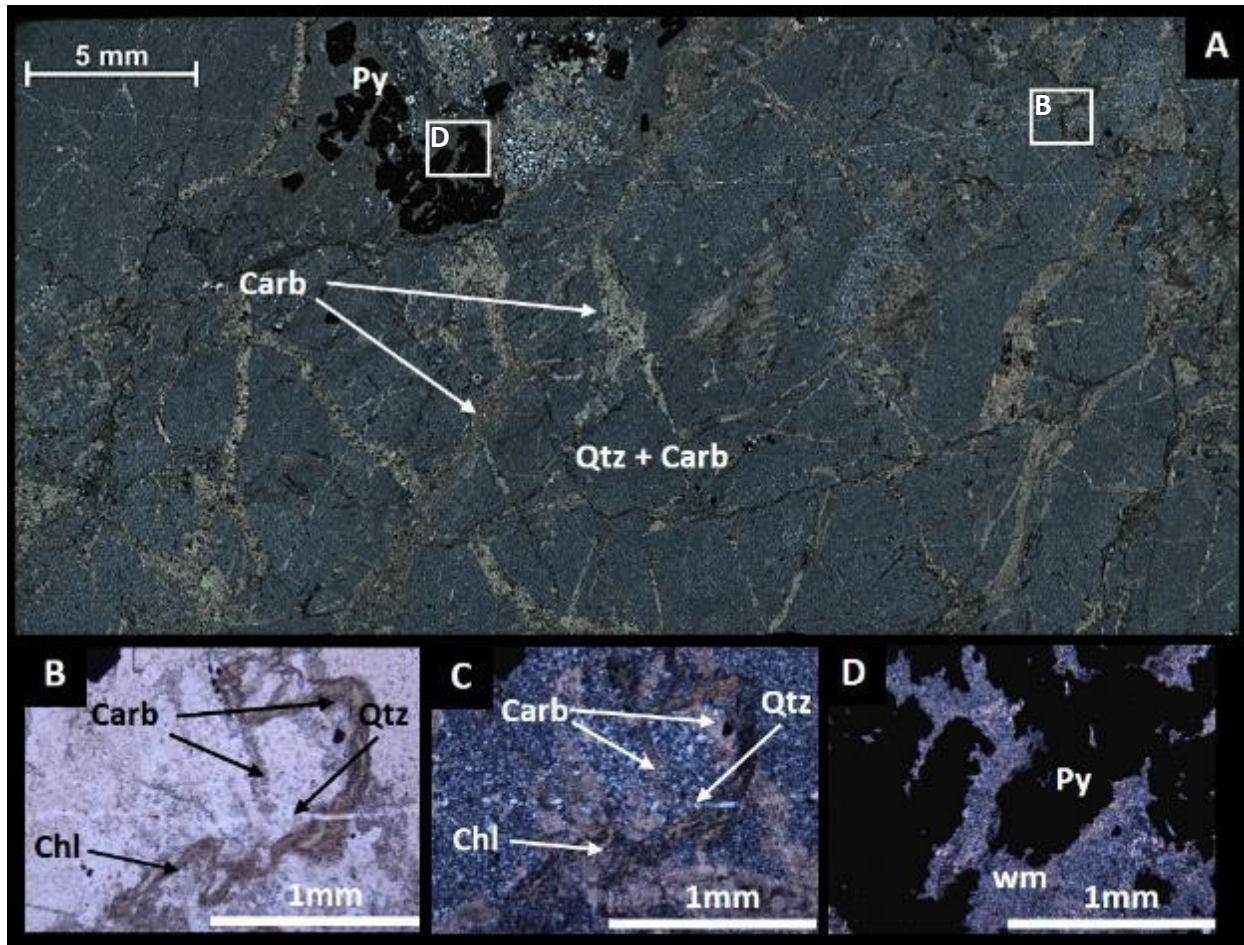


Figure 4.13 Representative photomicrograph and thin section offcut of alteration phases in the Cochenour-Willans deposit. (A) Full XPL thin section photomicrograph showing relationship between showing carbonate veinlets cutting silicified host rock (NS005). (B-C) inset PPL and XPL photomicrograph of chlorite vein replaced by biotite (D) inset XPL photomicrograph showing pyrite replacing white mica altered rock groundmass (NS005). Carb-carbonate, Qtz-quartz, Py-pyrite, Chl-chlorite, wm-white mica.

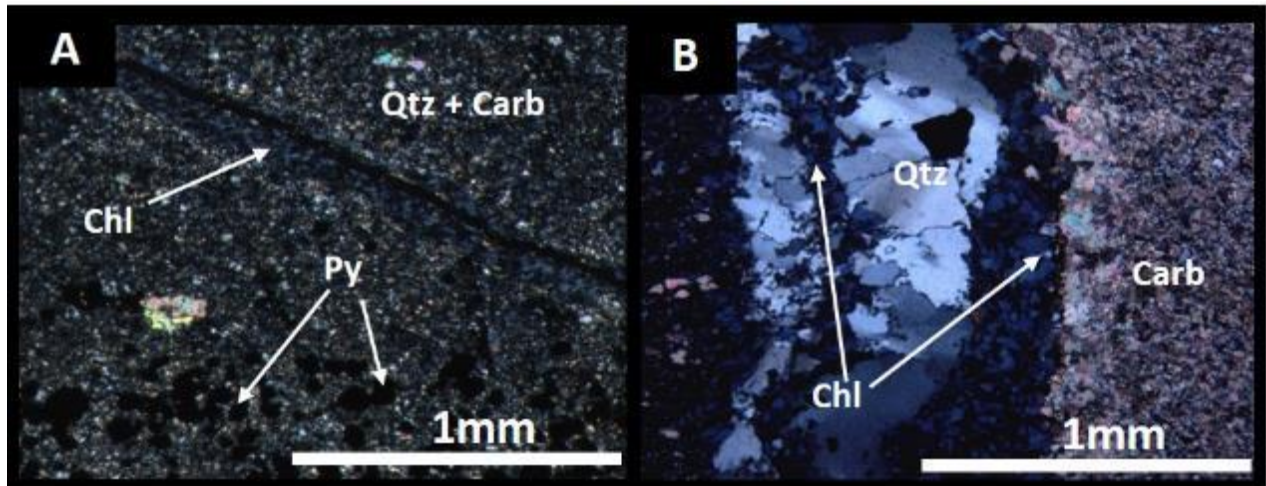


Figure 4.14 Chlorite alteration in the Cochenour-Willans deposit. (A) XPL photomicrograph of chlorite veinlet cutting quartz and carbonate altered rock matrix (NS006) (B) XPL photomicrograph of chlorite veinlet replacing quartz vein (NS005). Carb-carbonate, Qtz-quartz, pyrite, Chl-chlorite

McMarmac Deposit

Balmer assemblage host rock in this area is cut by quartz-albite $\pm$ carbonate $\pm$ pyrite veins. The veins range in thickness between 3-12mm and extend along strike for about 3 meters (Fig. 4.15). The host rock has been silicified with fine-grained quartz and subordinate fine-grained carbonate (Figs. 4.15, 4.16). The quartz veins have a coarse texture with crystals up to 1.5mm (Fig. 4.16). The albite crystals in veins have similar grain size to the quartz grains (1.5mm). They occur interstitially with the quartz but are overprinted by carbonate.

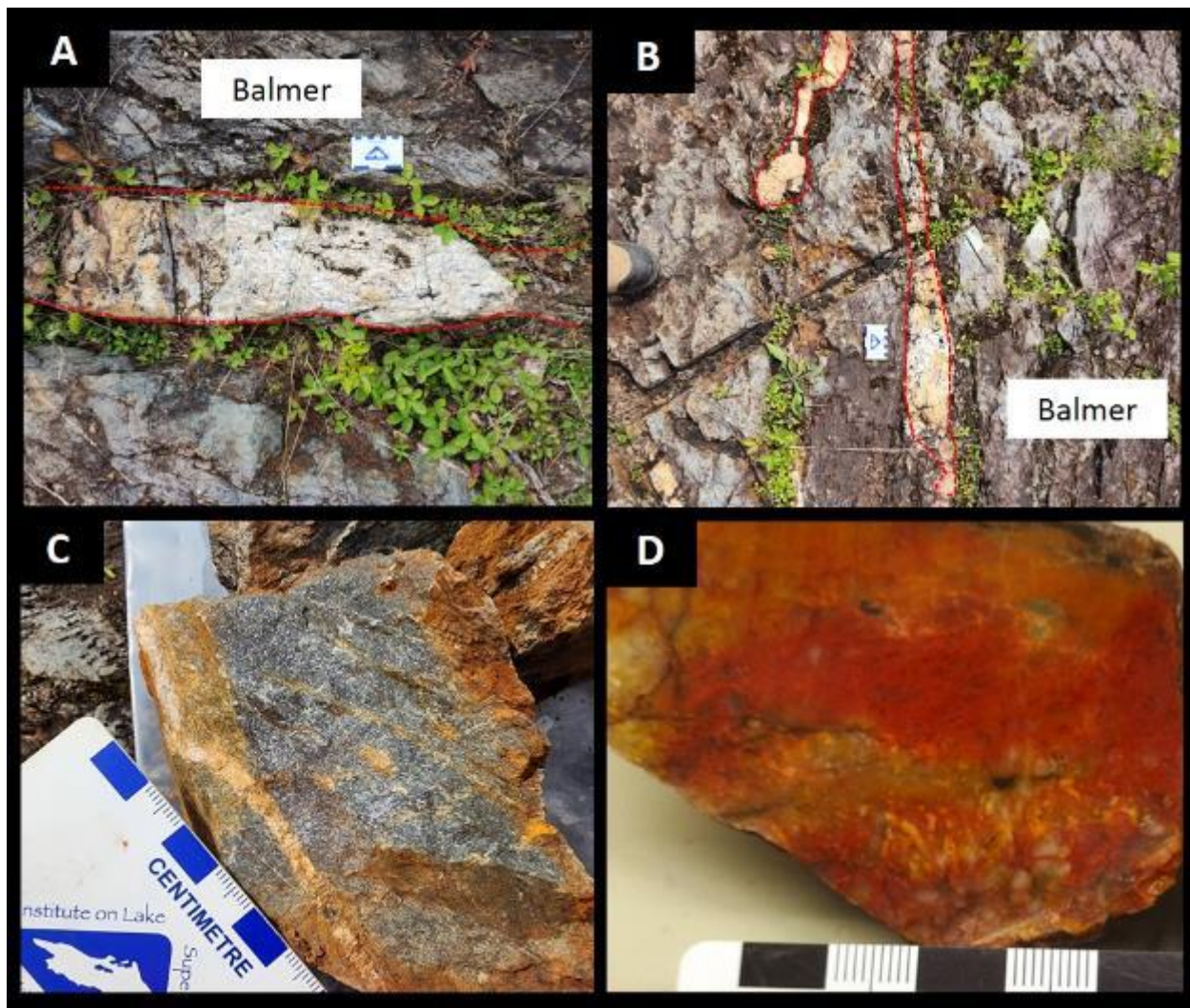


Figure 4.15 Outcrop and rock sample photographs of alteration phases in the McMarmac Deposit. (A-B) Field photographs of quartz-carbonate-albite vein cutting Balmer assemblage metavolcanic rock (NS017). (C) Outcrop chip sample showing ~0.3cm quartz-carbonate-albite vein

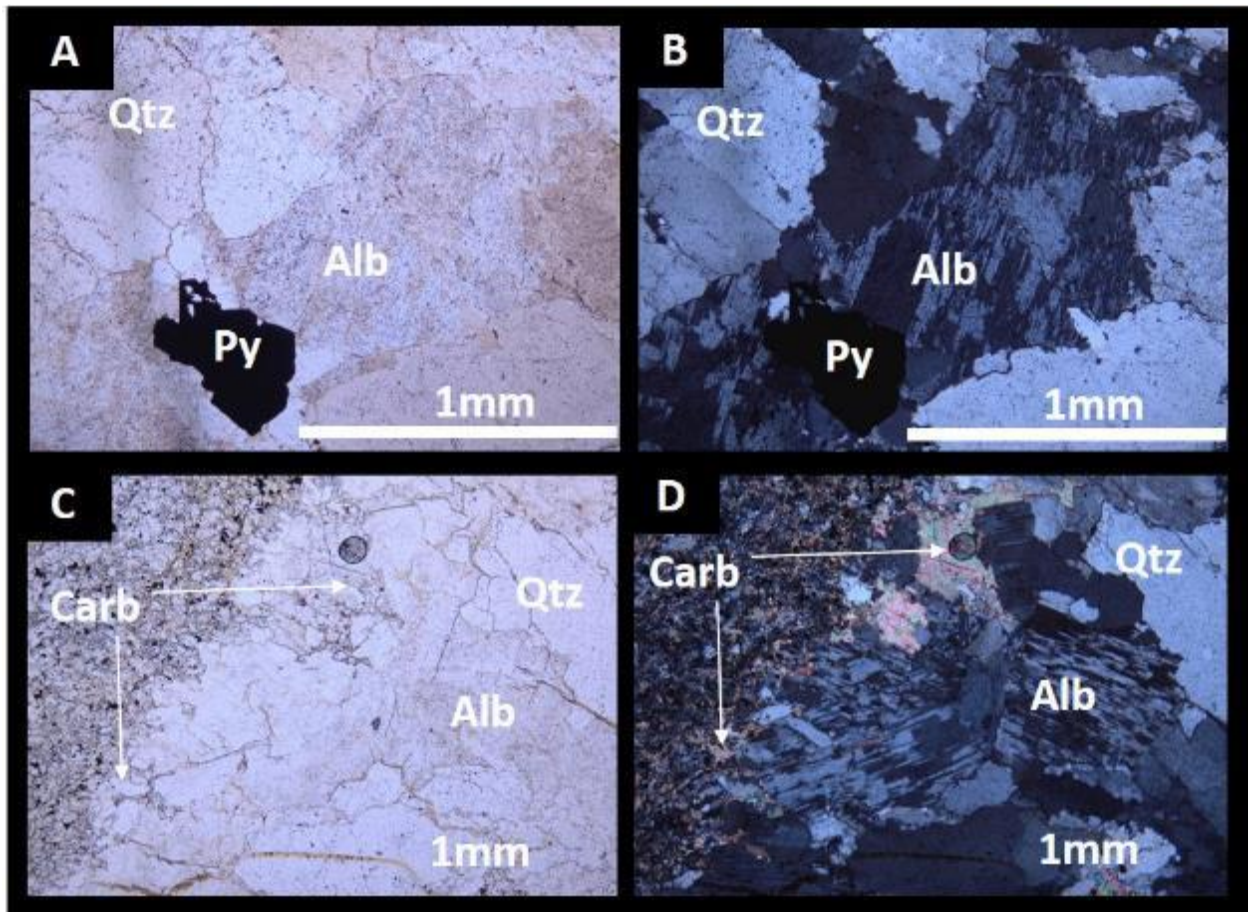


Figure 4.16 Representative photomicrographs of alteration phases in the McMarmac deposit. (A-B) PPL and XPL photomicrograph of quartz-albite vein overprinted by sulfide (NS016). (C-D) PPL and XPL photomicrograph of quartz-carbonate-albite vein cutting carbonate and quartz altered rock matrix (NS017). Carb-carbonate, Qtz-quartz, Alb-albite, Py-pyrite.

Abino Deposit

Quartz-carbonate, carbonate and white mica veins cut the Balmer assemblage host rock in this locality. The carbonate veins are relatively narrow (0.2-0.5cm thick) compared to the quartz-carbonate veins (approximately 1-2cm thick; Fig. 4.17 A-B). Fine-grained carbonate less than 100 μ m across occurs in the silicified groundmass whereas carbonate veins cut the groundmass (Fig. 4.17). Deformed white mica veins (<1mm thick) with narrow brown biotite halos occur adjacent to carbonate veins in the rock (Fig. 4.17). The biotite replaces the white mica in veins

and also within the host rock (Fig. 4.18). Chlorite occurs as narrow veinlets (<1mm thick) that cut carbonate veins occurring in clusters (Fig 4.18).

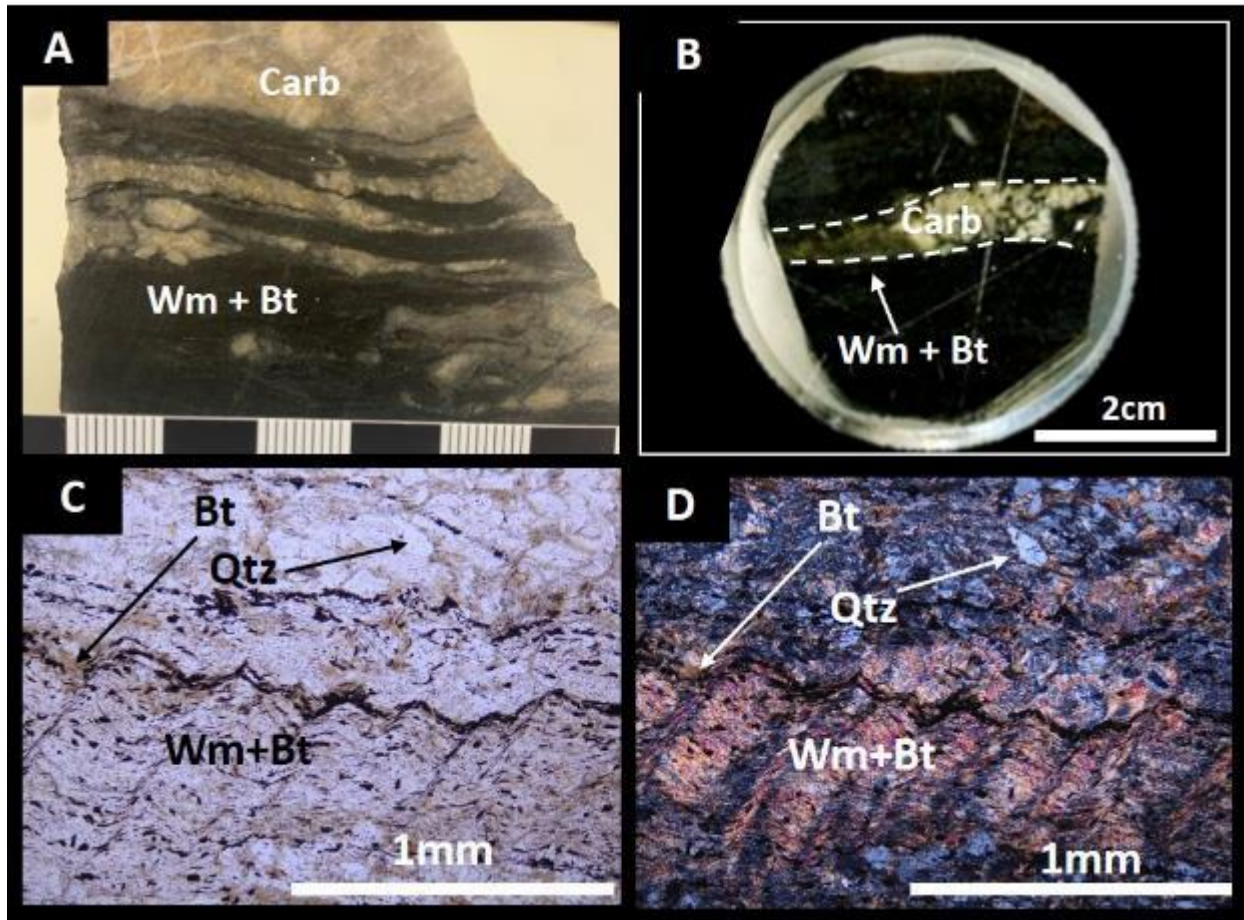


Figure 4.17 Rock sample photo and photomicrograph of alteration phases in the Abino deposit. (A-B) Slab and laser mount photo showing carbonate veins cutting biotite, white mica and chlorite altered rock matrix (NS021). (C-D) PPL and XPL photo of white mica and biotite occurrence within rock matrix (NS021). Carb-carbonate, Wm-white mica, Qtz-quartz, Chl-chlorite, Bt-biotite.

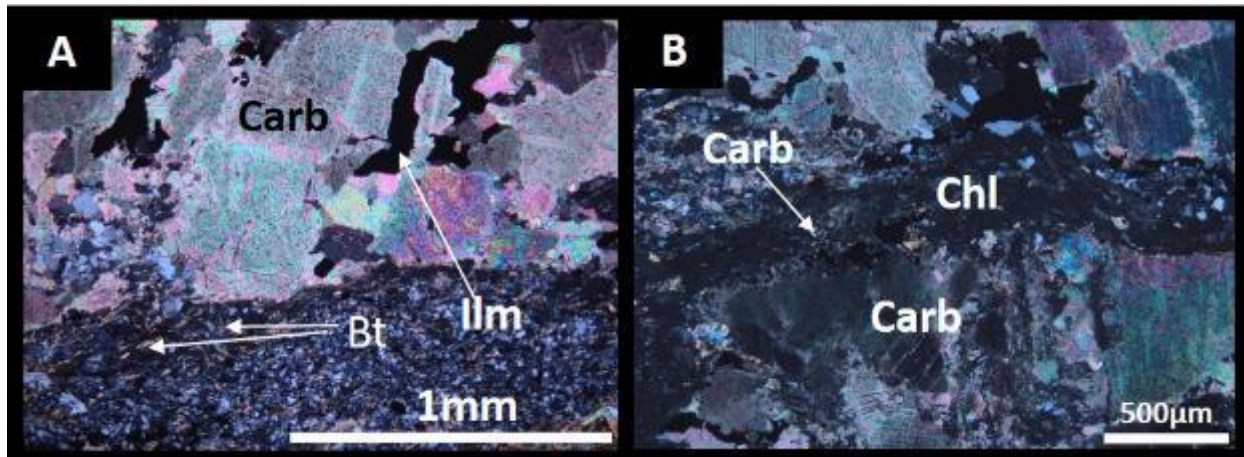


Figure 4.18 Occurrence of carbonate and chlorite vein in the Abino deposit. (A) XPL photo of ilmenite inclusion in carbonate vein (NS021). (B) XPL photo of chlorite vein cutting carbonate (NS021). Carb-carbonate, Chl-chlorite, Bt-biotite, Ilm-ilmenite.

Tucker's Knob Area

The Tucker's Knob area consists of a massive carbonate vein that cuts Balmer basalt (Fig. 4.19). The vein is more than 20m across and varies in texture. The central part of the outcrop consists of a crustiform ankerite vein about 10cm across whereas the southern portion consists of ankerite breccia (Fig. 4.19). The carbonate veins have undergone intense oxidation resulting in iron red coloration of the outcrop whereas the host metabasalts have been bleached (Fig. 4.19). Carbonate veinlets occur with quartz in the host rock but are cut by chlorite (Fig. 4.20). Crustiform, subhedral ankerite are the dominant clast in the breccia with a cement composed dominantly of chlorite with some sulfides and magnetite (Fig. 4.20). The ankerite clasts range in size from 1-10mm with a fine-grained cement (Fig. 4.21).

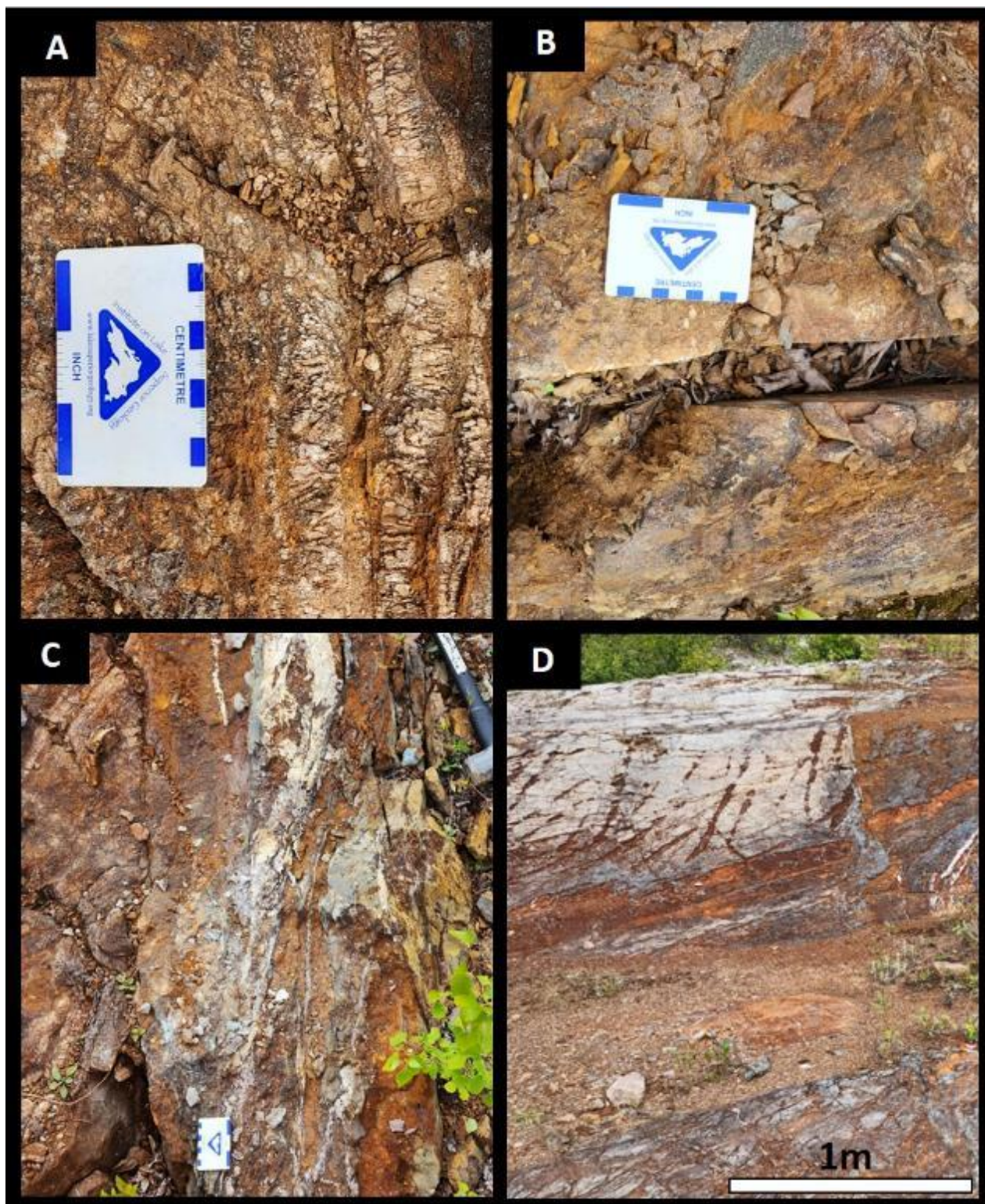


Figure 4.19 Outcrop photographs of ankerite veins in the Tucker's Knob area. (A-B) Crustiform texture ankerite vein showing iron rust coloration (C) Carbonate-quartz vein (D) Oxidized brecciated ankerite vein. Measuring card for scale.

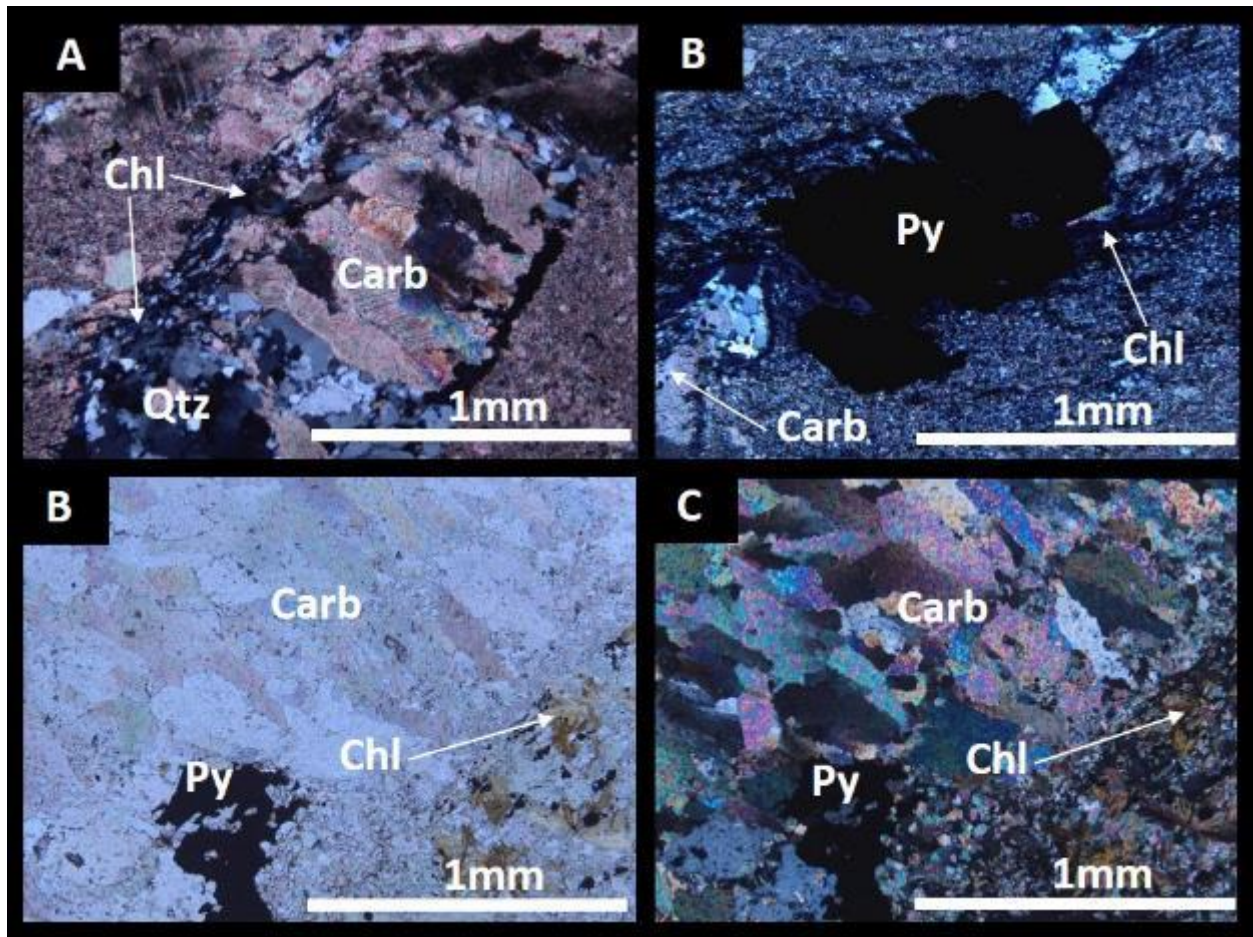


Figure 4.20 Representative photomicrographs of carbonate and chlorite alteration in the Tucker's Knob area. (A) XPL view of carbonate-quartz vein with berlin blue chlorite halo (NS013) (B) XPL view of chlorite pressure shadow on subhedral pyrite crystal (NS013). (C-D) PPL and XPL view of chlorite replaced by biotite in ankerite breccia (NS014). Carb-carbonate, Qtz-quartz, Chl-chlorite, Py-pyrite.

Chlorite occurs as cement replacement in the ankerite breccia (Figs. 4.20, 4.21). They also occur as narrow halos to carbonate veinlets and replacement of the veinlets with chlorite of different birefringence including berlin blue, brown and grey. The berlin blue chlorite occurs as fine-grained halos to quartz-carbonate veinlets and as replacement in the ankerite breccia (Figs. 4.20, 4.21). Grey chlorite occurs in clusters with grain size ranging from 200-600µm (Fig. 4.16). Brown chlorite also occurs in clusters but is relatively finer grained than grey chlorite with a grain size

less than 200µm. The brown chlorites occur in the breccia cements but have been partly replaced by biotite (Figs. 4.20, 4.21).

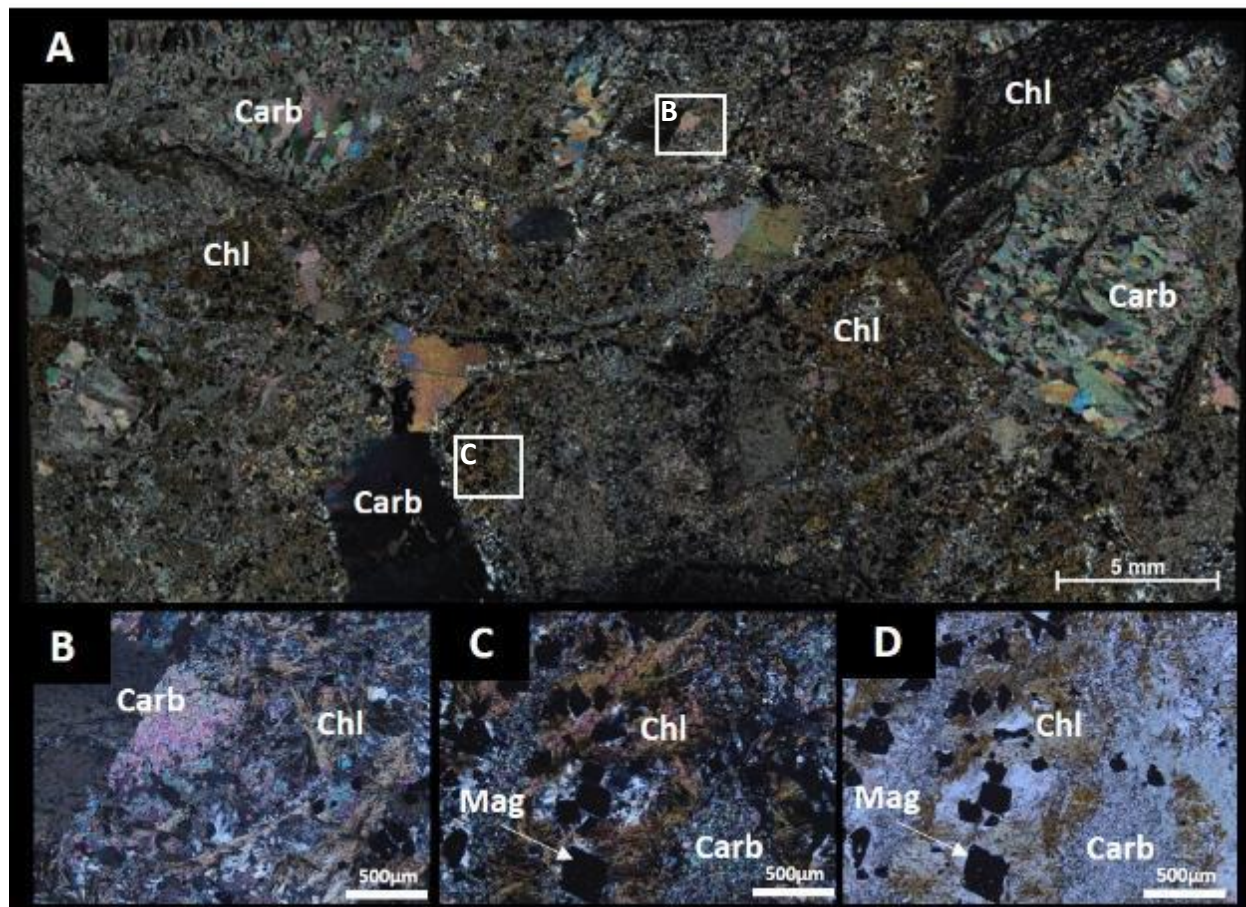


Figure 4.21 Representative photomicrographs of chlorite replacement within breccia matrix in the Tucker's Knob area. (A) XPL view of full thin section of ankerite breccia showing chlorite replacement within the breccia cement (NS014). (B) XPL view of top inset of Fig. 4.13A showing occurrence of grey chlorite (NS014). (C-D) XPL and PPL view of bottom inset of Fig. 4.13A showing occurrence of brown chlorite replaced by biotite. Carb-carbonate, Chl-chlorite, Py-pyrite.

Bruce Channel occurrence

Samples in this area are metaconglomerates and chemical sedimentary rocks of the Bruce Channel assemblage (Fig. 4.22). Conglomerate clasts in rock samples range from 1-5cm occurring within a quartz-rich matrix whereas the chemical sedimentary rocks consist of layers of chert and magnetite (Fig. 4.22). The conglomerate clasts have been affected by pervasive sericite alteration

(Figs. 4.22, 4.23). The degree of replacement of preexisting clasts is intense (about 100%) as there is no preserved original texture. The sericite alteration has also affected the matrix occurring interstitially with quartz which occurs as pressure shadows to the quartz grains (Fig. 4.22).

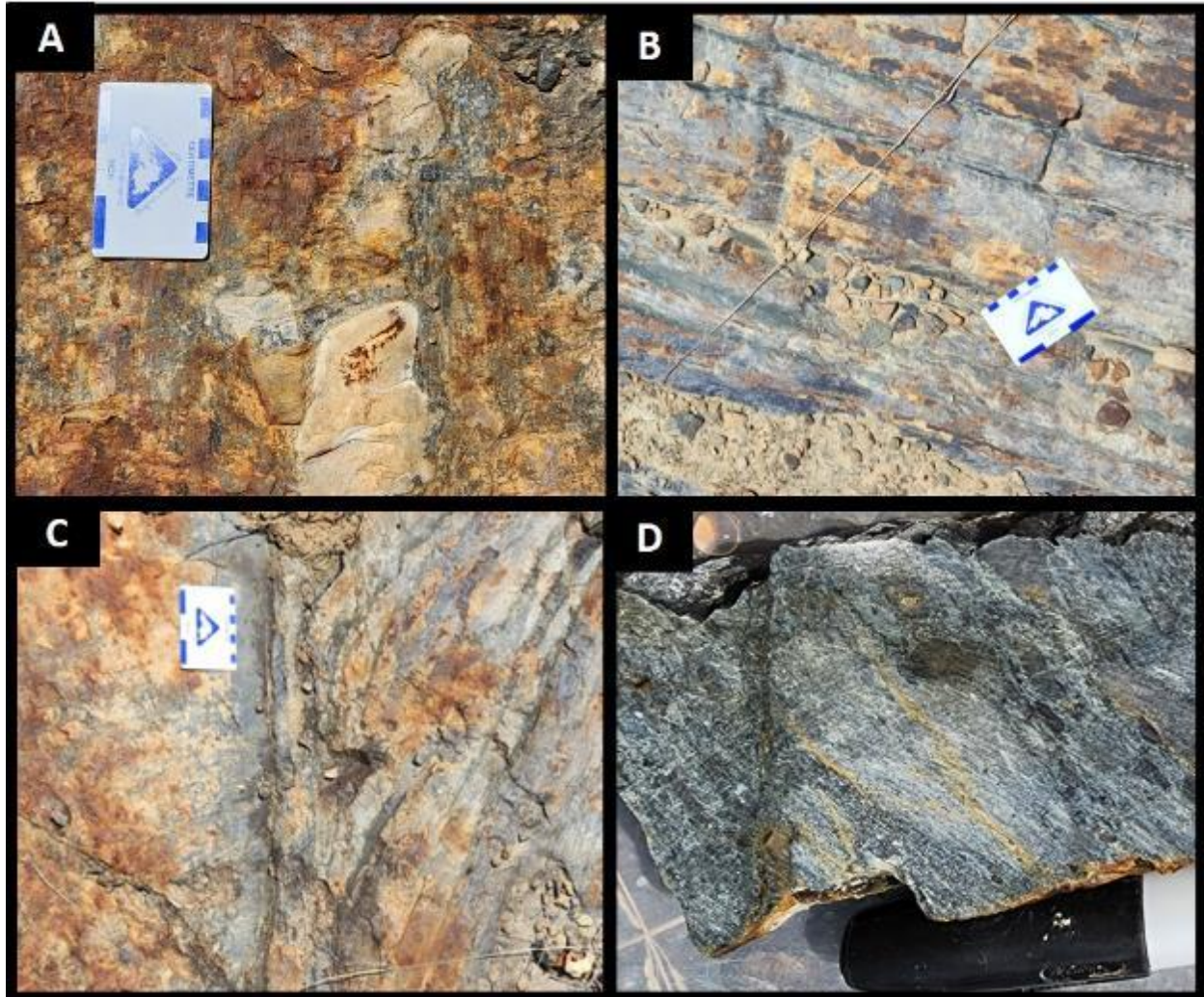


Figure 4.22 Outcrop photographs of the Bruce Channel clastic and chemical sedimentary rocks. (A) Conglomerate clast of Bruce Channel metasedimentary rocks. (B-C) Layers of chert and magnetite chemical sedimentary rocks of Bruce Channel assemblage. (D) Sericite altered conglomerate clast with quartz-rich matrix (Tip of sharpie for scale).

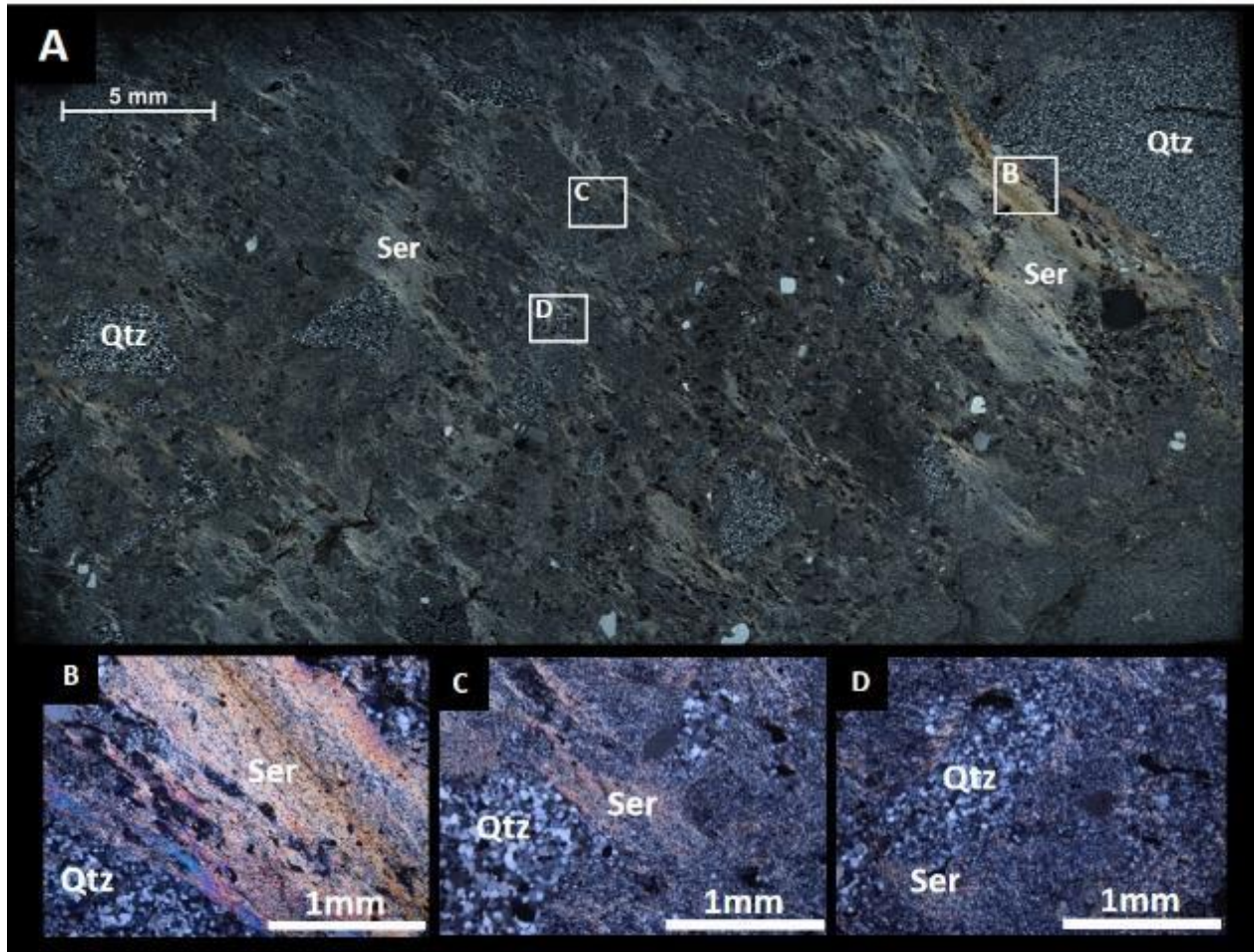


Figure 4.23 Occurrence of white mica alteration in Bruce Channel metasedimentary rocks. (A) XPL view of full thin section of sericite alteration of groundmass and clast of Bruce Channel metaconglomerate (NS034) (B-D) XPL view of right and central inset of Fig. 4.15A showing close view of sericite alteration in matrix and clast of Bruce Channel metaconglomerate (NS034). Qtz-quartz, Ser-sericite.

Bonanza Occurrence

The Bonanza gold occurrence is exposed in a low-lying outcrop comprised of meta-argillites and meta-conglomerates of the Bruce Channel assemblage. The argillite is fine-grained and comprised of quartz-rich groundmass whereas the metaconglomerate consists of clasts of quartz and feldspar-rich materials that range in size between 0.5-3cm (Fig. 4.24). Carbonate, white mica and sulfides are the alteration phases present. The carbonate phases are fine-grained ranging between 20-50µm occurring interstitially with matrix quartz and plagioclase (Fig. 4.25). Sulfides

which include pyrrhotite and arsenopyrite (with gold) overprints the carbonate altered rock matrix (Fig. 4.25). White mica occurs in veins cutting the carbonate altered groundmass with the thickness of veins varying from 200-800 μ m (Fig. 4.25). Carbonate occurs as fine-grained phases interstitially with fine-grained quartz and plagioclase.

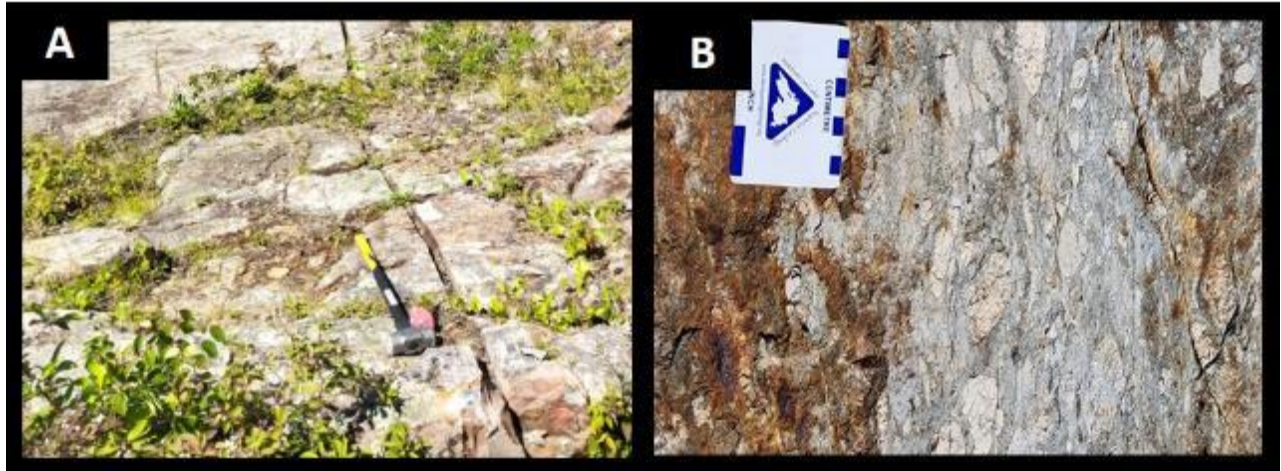


Figure 4.24 Outcrop photographs of argillite and metaconglomerate rocks of Bruce Channel assemblage. (A) Occurrence of argillite in outcrop of Bonanza prospect. (B) Occurrence of metaconglomerate in outcrop of Bonanza prospect.

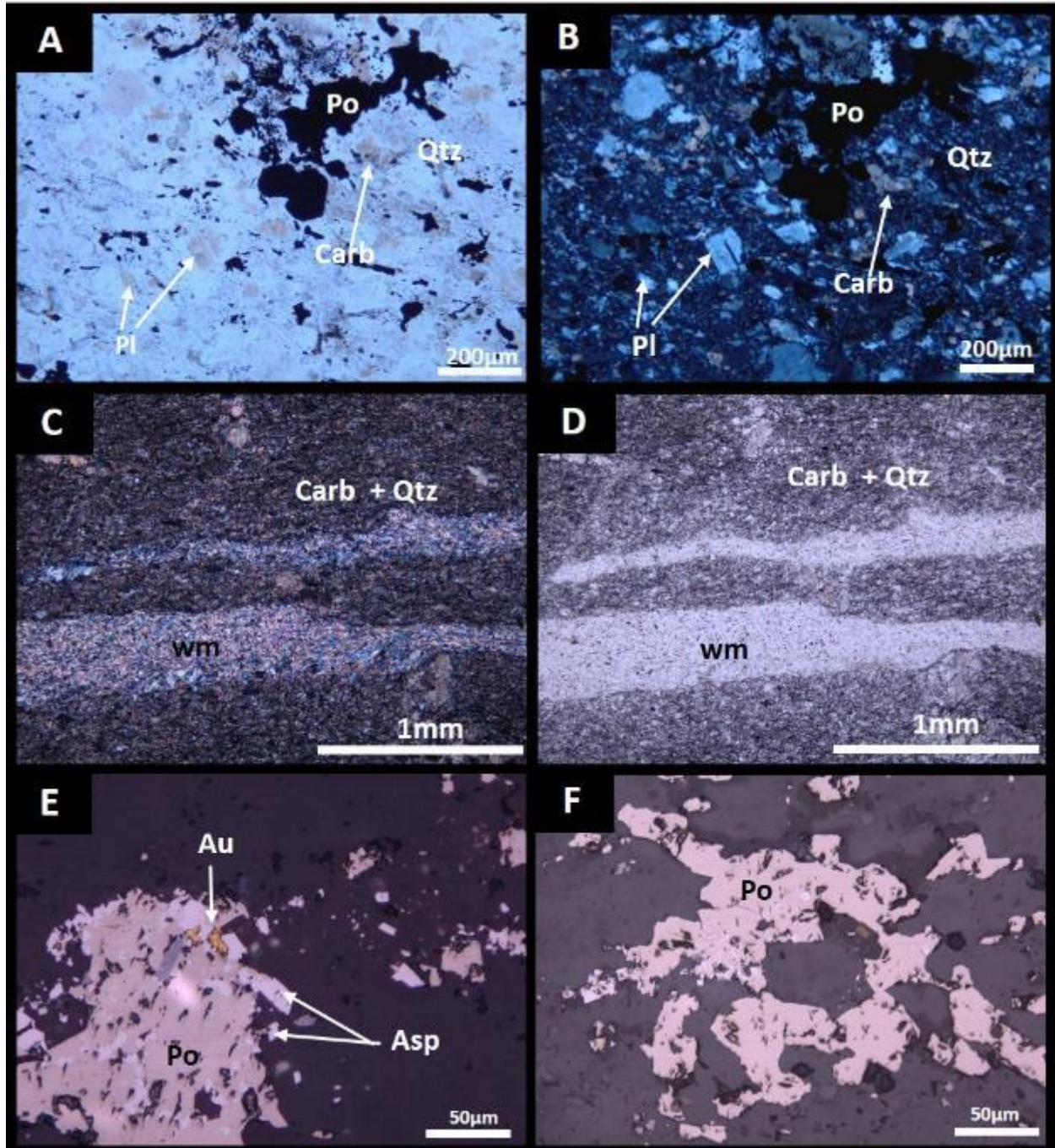


Figure 4.25 Transmitted and reflected light images of alteration in rock samples from the Bonanza prospect. (A-B) PPL and XPL photomicrograph of carbonate occurring within quartz and plagioclase rock matrix (NS007). PPL and XPL image of white mica vein cutting carbonate altered rock matrix (NS008). (E-F) Reflected light images of sulfides and gold in rocks of the Bonanza prospect area (NS007). Carb-carbonate, Qtz-quartz, Pl-plagioclase, Wm-white mica, Po-pyrrhotite, Au-gold

4.3 Slate Bay (Zone C)

Slate Bay Metaconglomerate

The rock in this area is comprised of subrounded to rounded and well sorted polymictic clasts with relatively coarse-grained groundmass up to 0.5cm (Fig. 4.26). The clasts consist of quartz and plagioclase-rich materials and mafic volcanic rocks whereas the groundmass consists of quartz sandstone (>90% quartz; Figs. 4.26, 4.27). Biotite, sericite and sulfides occur as the main alteration phases. Biotite occurs as veins and as replacement of the groundmass with the grain size ranging between 100-500 μ m (Fig. 4.27). In outcrop, pyrite occurs as disseminations and localized veinlets cutting host metasedimentary rock (Fig. 4.26). The pyrite occurs with biotite in veins and within the groundmass (Fig. 4.27). Sericitization of plagioclase is very common in clasts and the groundmass. Sericite alteration of the plagioclase is patchy occurring either in the core/rim or unevenly distributed in the plagioclase grains, the intensity of sericitization of plagioclase phases range from 5-10% (Fig. 4.27).

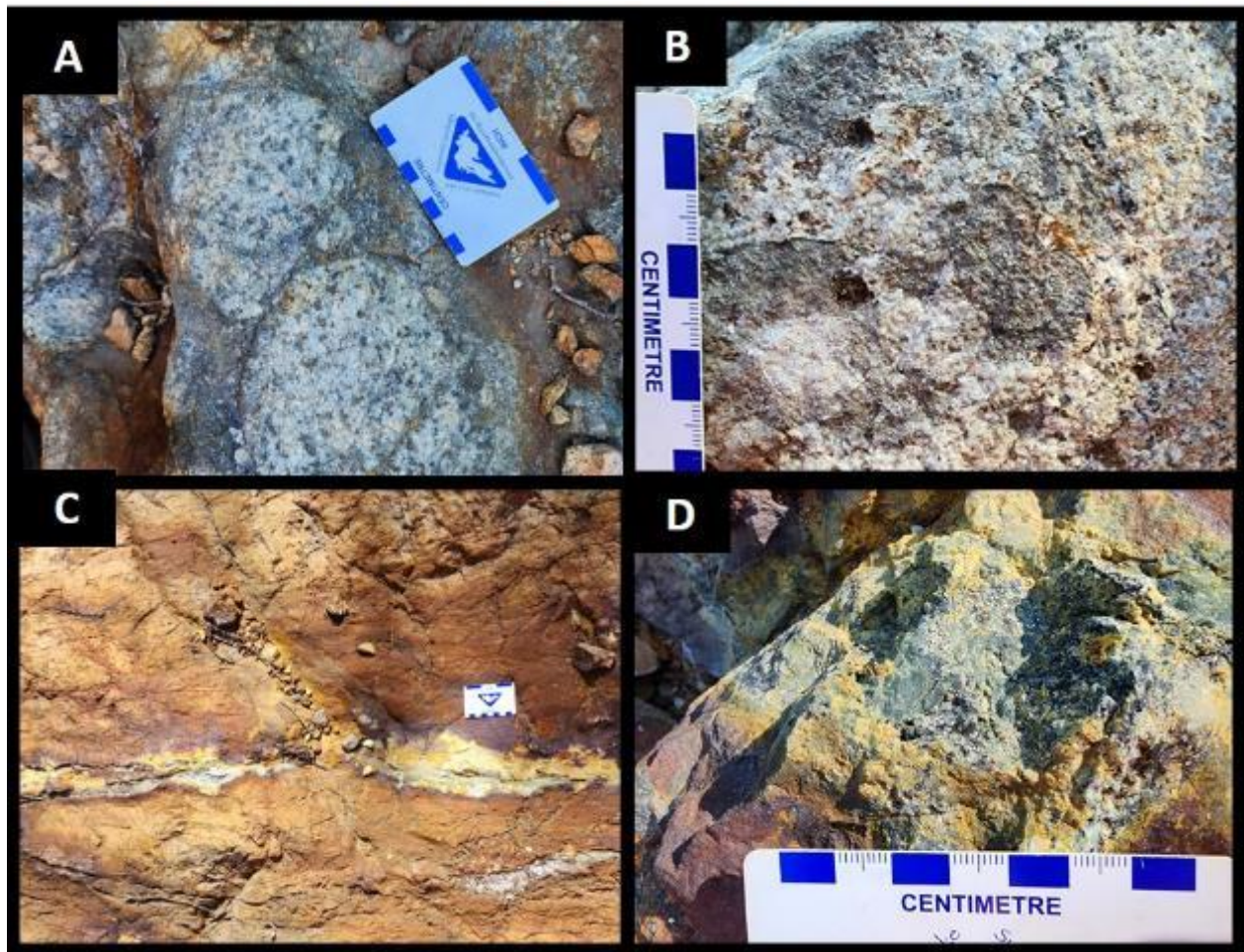


Figure 4.26 Outcrop photos of the Slate Bay assemblage metasedimentary rock. (A) Occurrence of rounded clasts composed of quartz and plagioclase-rich material within quartz sandstone matrix in the Slate Bay assemblage rock (B) Subrounded clast composed of mafic materials with quartz rich cement. (C) Pyrite veinlet cutting Slate Bay metasedimentary rock. (D) Sulphidic metaconglomerate in Slate Bay.

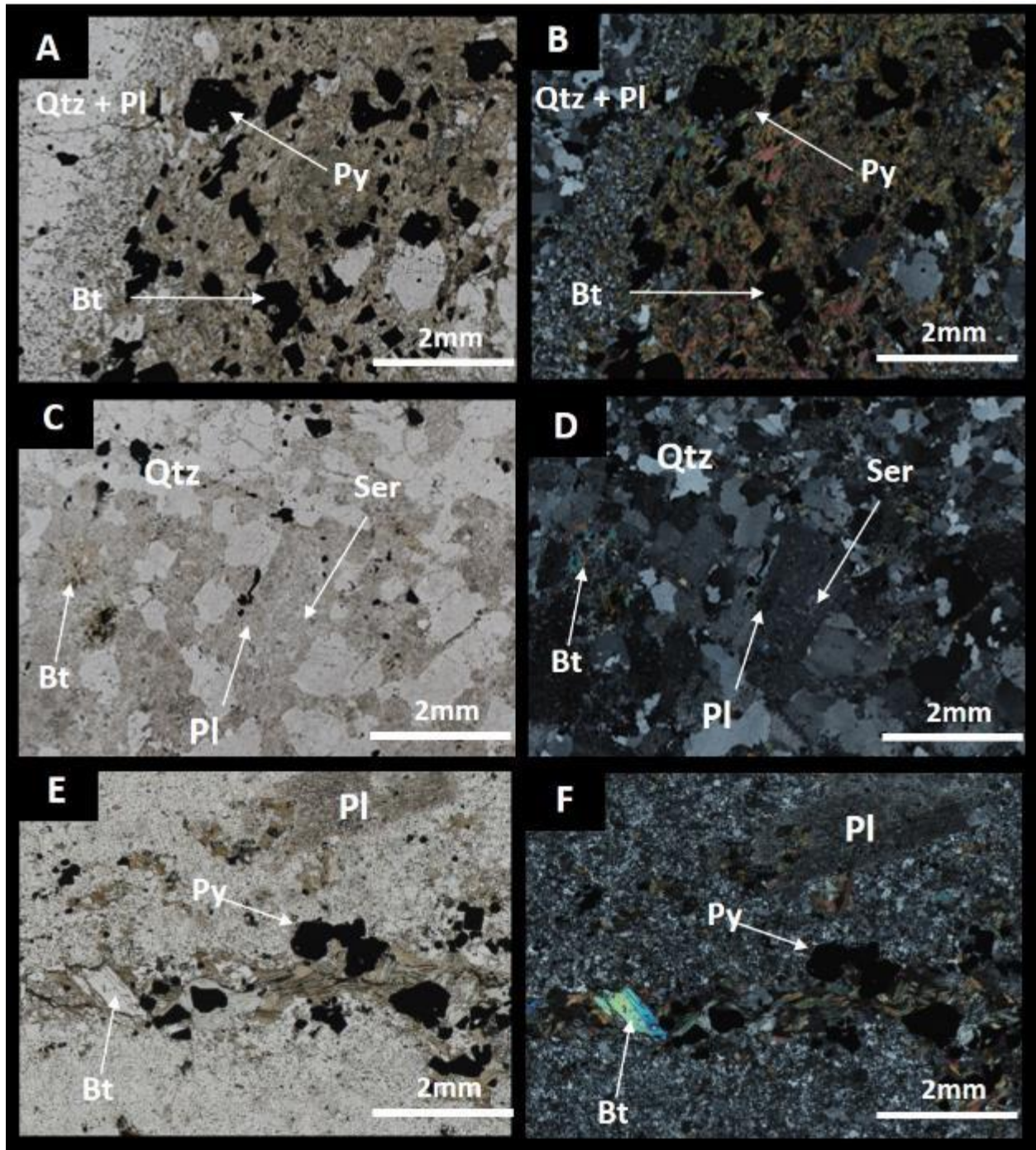


Figure 4.27 Representative photomicrographs of alteration phases in the Slate Bay assemblage. (A-B) PPL and XPL image of biotite overprinted by pyrite (NS024). (C-D) PPL and XPL image of sericite overprinting plagioclase (NS024). (E-F) PPL and XPL image of pyrite overprinting biotite in a vein (NS025). Bt-biotite, Ser-sericite, Qtz-quartz, Pl-plagioclase, Py-pyrite.

Slate Bay Stock

The outcrop in this locality consists of metamorphosed tonalite-trondhjemite of the Slate Bay stock cut by a quartz vein. The quartz vein ranges from 10-15cm and can be traced up to 3m along strike (Fig. 4.28 A). The quartz vein hosts pyrite that is up to 0.5cm across (Fig. 4.28 B). White mica alteration occurs interstitial to a deformed quartz vein (Fig. 4.29). Biotite and epidote are common metamorphic phases associated with the tonalite-trondhjemite stock. The biotite is medium to fine-grained (<30-200 μ m) occurring with quartz (Fig. 4.29). Epidote occurs as subhedral crystals with minor biotite and ranges between 100-500 μ m occurring with quartz in the rock matrix (Fig. 4.29).



Figure 4.28 Outcrop and rock sample photos of metamorphic phases in the tonalite of Slate Bay stock. (A-B) Occurrence of quartz vein in outcrop and in rock sample (C) Disseminated pyrite in tonalite stock of Slate Bay.

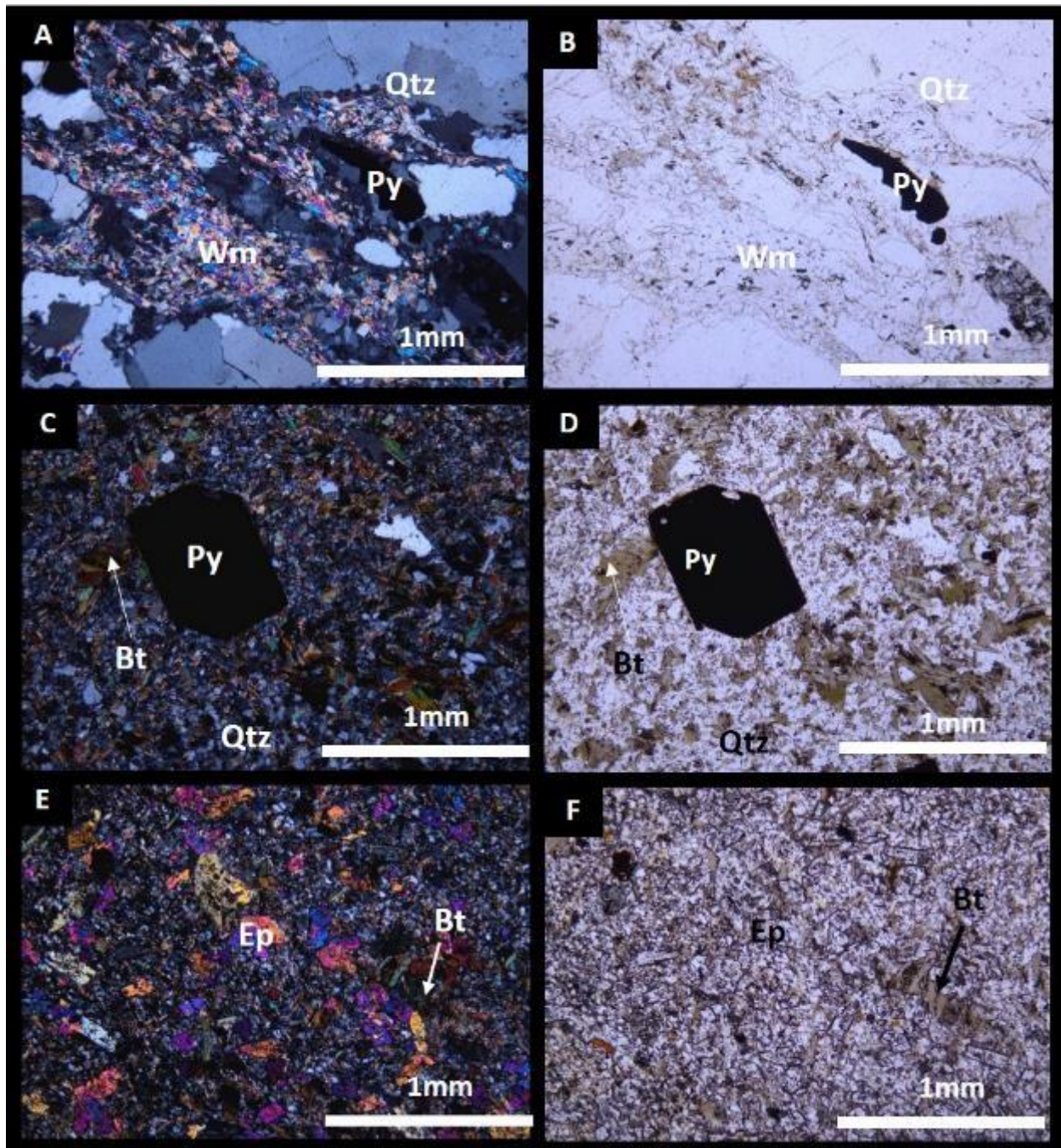


Figure 4.29 Representative photomicrographs of alteration and metamorphic phases in the Slate Bay stock. (A-B) XPL and PPL image of white mica occurring within quartz grain boundary (NS026). (C-D) XPL and PPL image of biotite occurring within quartz-rich groundmass overprinted by euhedral pyrite (NS027). (E-F) XPL and PPL image of epidote occurring with biotite (NS027). Wm-white mica, Bt-biotite, Qtz-quartz, Ep-epidote, Py-pyrite.

4.4 Howey and Hasaga mine area (Zone D)

Tourmaline veining and intense sericitization of plagioclase mostly affects metadiorites of the Howey and Hasaga mine area (Figs. 4.30, 4.31, 4.32). Tourmaline veins cut preexisting carbonate and sericite altered Howey and Hasaga intrusive rocks which are in turn cut by sulfides (Fig. 4.30). Grains range in size from 200 μ m-1mm and can either be anhedral or subhedral lath-like/elongate phases typically with a brown and green birefringence (Fig. 4.30). White mica alteration in the Howey and Hasaga mine area mostly occurs as moderate to intense sericitization of plagioclase within the intrusive rocks of this area. Varying from 10-70% in the Howey mine area but only 5-20% at the Hasaga mine (Fig. 4.31).

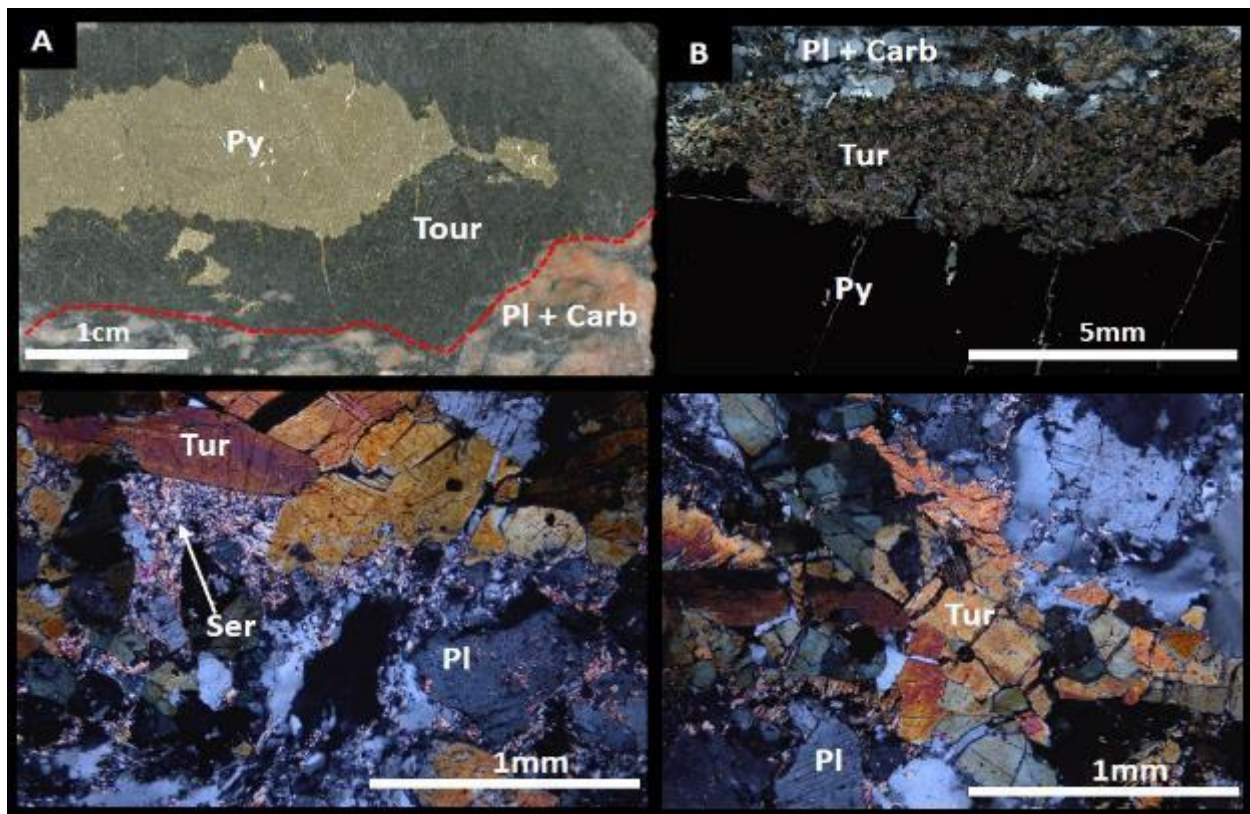


Figure 4.30 Tourmaline, sericite and pyrite alteration from the Hasaga mine area. (A) Thin section offcut photo showing a thick tourmaline-sulfide vein cutting carbonate altered host rock (ND088). (B) Photomicrograph of a thick tourmaline-sulfide vein cutting carbonate altered host rock. (C-D) XPL image of occurrence of tourmaline crystals within intrusive stock of Hasaga deposit (NS087). Tur-tourmaline, Carb-carbonate, Py-pyrite.

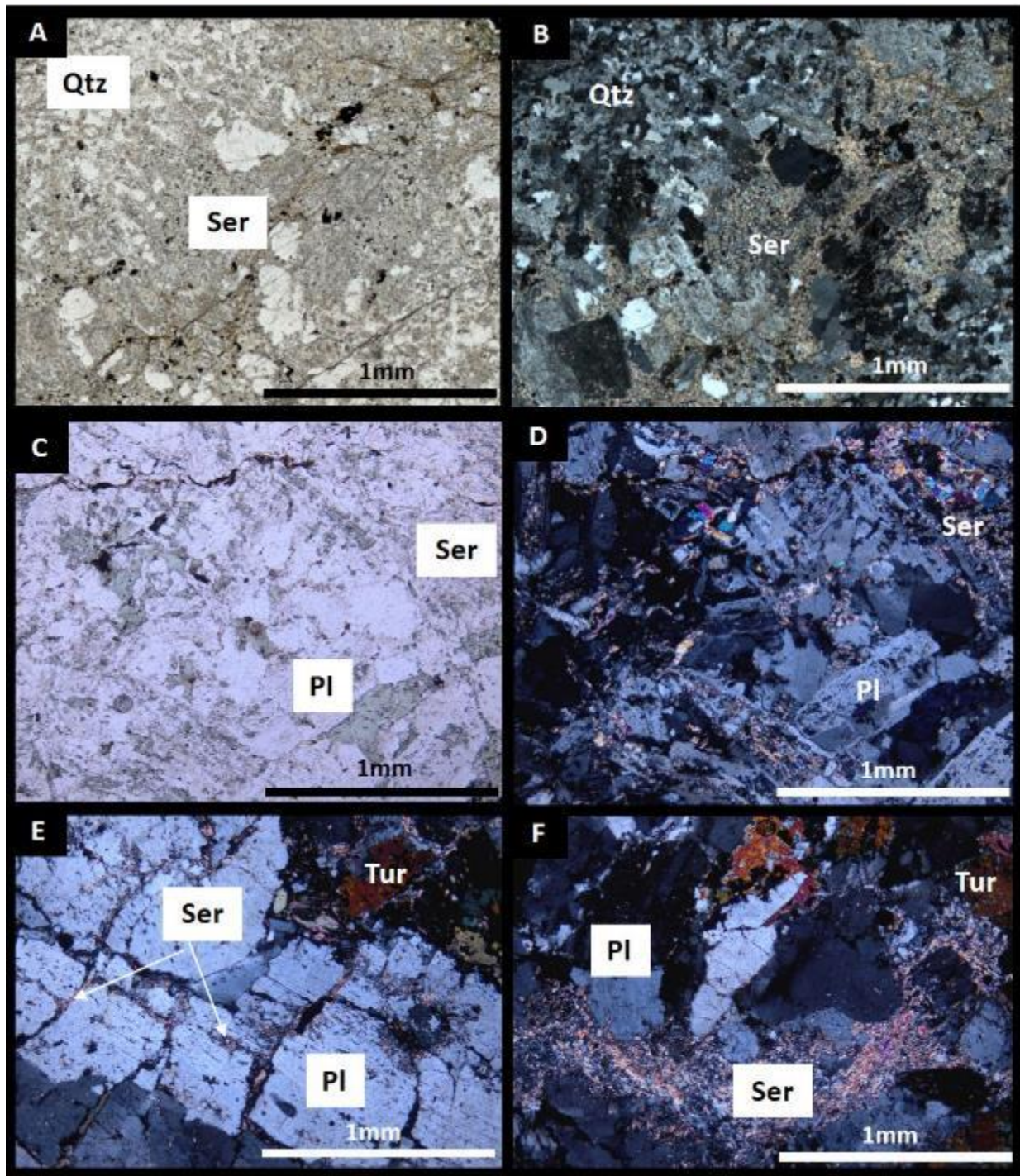


Figure 4.31 Sericite alteration in the Howey deposit. (A-B) PPL and XPL photomicrograph of pervasive sericitization of plagioclase lathes within a quartz background (ND211). (C-D) PPL and XPL photomicrograph of sericite altered plagioclase in Howey meta-diorites (ND212). (E-F) XPL images of sericite and tourmaline alteration in the intrusive rocks of Hasaga deposit (ND087). Ser-sericite, Qtz-quartz, Pl-plagioclase.

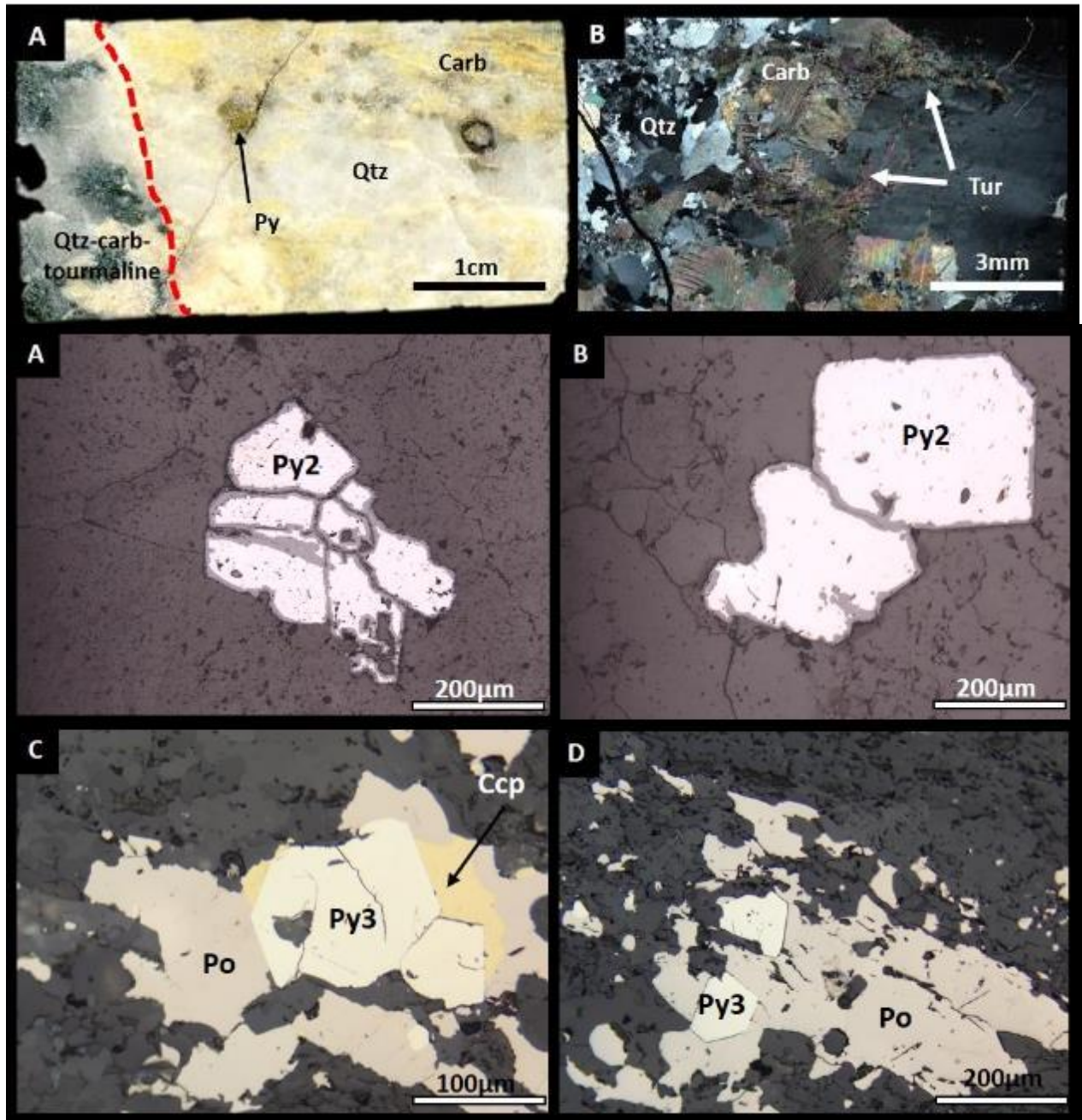


Figure 4.32 Quartz-carbonate-tourmaline and pyrite alteration from Howey mine area. (A) Thin section offcut photo showing quartz-carbonate-tourmaline vein cutting quartz-carbonate altered rock (ND216). (B) Photomicrograph of quartz-carbonate-tourmaline vein cutting quartz-carbonate altered rock (ND216). Qtz-quartz, Carb-carbonate, Py-pyrite

Chapter 5 - Texture, trace elements and sulfur isotope of pyrite

Pyrite in gold deposits in the Red Lake greenstone belt occurs either as hydrothermal zoned pyrites or recrystallized metamorphic pyrites. The hydrothermal zoned pyrites in the Red Lake gold deposits and occurrences consist of different types that vary in texture, morphology and chemistry. They are more common compared to the recrystallized pyrites. Sampling of pyrite has been divided into four zones (A-D) representing different parts of the Red Lake greenstone belt (Fig. 4.1). Zone A includes pyrite samples from around the Campbell-Red Lake (CRL) deposit whereas zones B, C and D represent pyrites from the East Bay trend (except the McFinley deposit), Slate Bay and Howey/Hasaga deposits, respectively. A summary of common pyrite types across the Red Lake greenstone belt is provided in Table 5.1.

5.1 Texture and LA-ICP-MS element maps of pyrite

Campbell-Red Lake deposit (Zone A)

Hydrothermal pyrites with core to rim zonation and metamorphic recrystallized pyrites have been identified from samples both proximal and distal to the CRL deposit. Zoned pyrite consists of Py1a, Py1b, and Py2 from core to rim whereas Py3 is recrystallized metamorphic pyrite. Py1a is anhedral pyrite which hosts a variety of silicate inclusions with sieve texture. Mineral inclusions identified include white mica, quartz, chlorite, carbonate, chalcocopyrite, electrum, arsenopyrite and oxides typically magnetite $\pm$ ilmenite and rutile (Fig. 5.1).

Table 5.1 Comparison of common pyrite types across the Red Lake greenstone belt

Pyrite Type	Campbell-Red Lake deposit- Zone A	East Bay trend deposits and occurrences- Zone B	Slate Bay- Zone C	Howey/Hasaga deposits- Zone D
Pyrite characteristics				
Py1a	Anhedral, sieve-like texture. Forms disseminations and veins 30-600µm. Rich in mineral inclusions (e.g., white mica, quartz, chlorite, carbonate, chalcopyrite, electrum, arsenopyrite). Enriched in Sb-Tl-Au-Ag-Te-W ± Hg	Anhedral with sieve-like texture, fine- to medium-grained (50-600µm), rich in mineral inclusions (e.g., ilmenite & chlorite). Core is enriched in Sb-Tl-Au-Ag-Te-Se-Bi-Pb ± Hg	Anhedral, fine- to coarse-grained (<200µm-1mm), common inclusions include quartz, biotite, white mica, and chalcopyrite.	Occur as coarse-grained crystals in Howey deposit (1mm), inclusion-rich with magnetite, rare earth phosphates, and Bi tellurides. Occurs as >5mm veins in Hasaga deposit, replaced by chalcopyrite and gold in fractures.
Py1b	Euhedral to subhedral, forms overgrowths on Py1a, irregular growth zones (<30-50µm) that are As (>1wt% As).	Occurs as oscillatory zonations (5-10µm), wisp-like, As-Co-rich (>1wt% As, Co).	Not observed	Not observed
Py2	Euhedral to anhedral, fine- to medium-grained (30-200µm), occurs in veins (50-2000µm), mostly inclusion-free. Contains Co-Ni-As (>1000ppm).	Euhedral to anhedral, fine to medium grains (30-100µm), less inclusions. Contains Co-Ni-As (>1000ppm).	Euhedral to anhedral, inclusion-free, highly fractured, occurs as both disseminations and vein. Lower trace element concentrations than early pyrites.	Euhedral to anhedral, medium-grained (200-400µm), inclusion-free, occurs with Py1a and Py1b. Lower trace element content compared to Py1a.
Py3	Subhedral to euhedral, occurs in veins (50-3000µm), surrounded by pyrrhotite, chalcopyrite, arsenides. Shows strong Co-Ni-As growth zonation (1 wt. %).	Euhedral, occurs as fine- to medium-grained crystals (50-300µm), surrounded by chalcopyrite and pyrrhotite.	Not observed	Euhedral, medium- to coarse-grained (100-500µm), surrounded by chalcopyrite & pyrrhotite. Lower trace elements abundances, but enriched in Co. Common to Howey deposit but not observed in Hasaga deposit. Co-Ni-As growth zonation (1 wt. %).

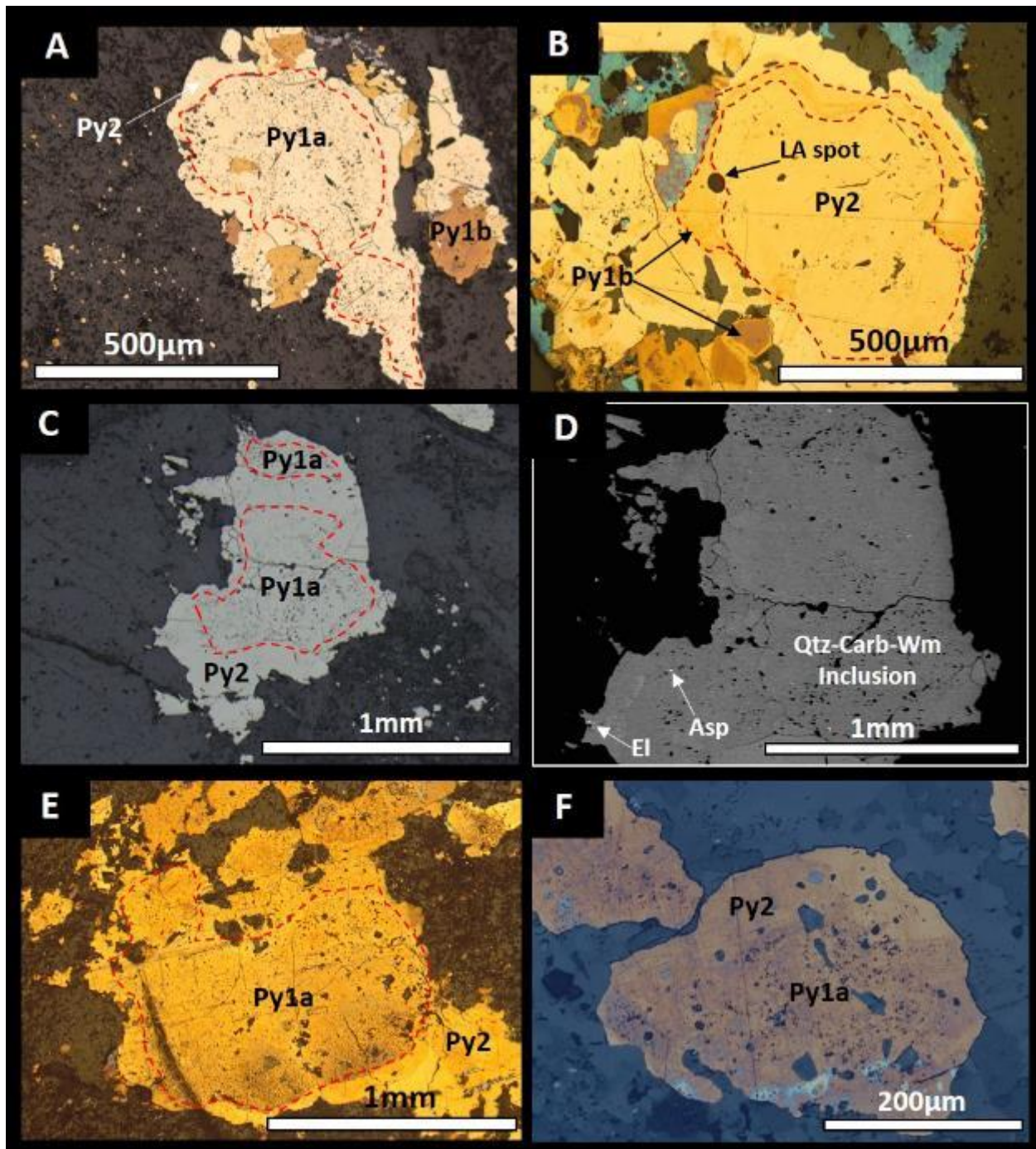


Figure 5.1 Texture of pyrite types from the Campbell-Red Lake deposit. (A) Reflected light photomicrograph of etched pyrites showing the textural relationship of different pyrite types (ND128). (B) Reflected light photomicrograph of pyrite showing Py1b texture (ND048). (C) Reflected light photomicrograph of unetched pyrite showing different pyrite generations (ND128). (D) BSE image of unetched pyrite showing mineral inclusions in pyrite (ND128). (E-F) Reflected light photomicrograph of etched pyrite type Py1a and Py2 (ND142, NS009).

Acid etched pyrites show distinct deep brown and light brown tints on the surface of the pyrite core (Py1a) that indicates element enrichments (Fig. 5.1). Py1a range in size from 30-600 μ m across and can comprise about 70% of host rock occurring as disseminations and in veins as both fine and coarse anhedral morphologies (Fig. 5.1). LA-ICP-MS mapping of the pyrite records enrichment in Sb-Tl-Au-Ag-Te-Se-Bi-Pb in Py1a (core). Antimony and Tl have concentrations up to 100ppm in the pyrite whereas Au-Ag-Te reach concentrations up to 10ppm and Pb, Bi and Se have concentrations of 10 to 50ppm (Fig. 5.2). The Py2 overgrows Py1a with Co, Ni and As all over 1,000ppm whereas other elements are below the detection limit.

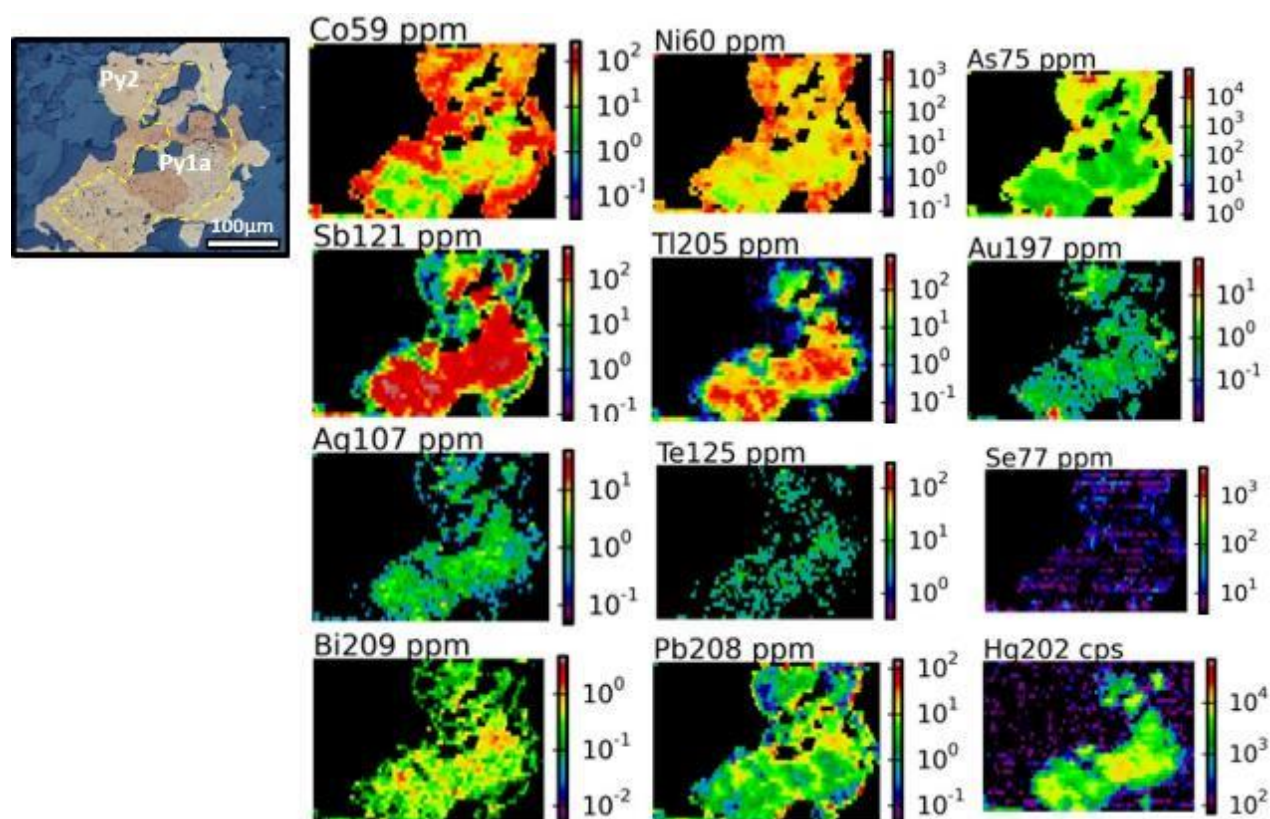


Figure 5.2 Reflected light photomicrograph of etched pyrite and representative LA-ICP-MS 2D maps (NS009). Antimony and Tl values show high concentration in the Py1a growth zone relative to Py2. Red spot on the arsenic map represents Au-rich arsenopyrite inclusion in Py1a.

Py1b overgrows Py1a and occurs as irregular subhedral pyrite growth zones surrounding Py1a. Acid etching exposed blue to dark brown tints of Py1b occurring with early Py1a (Fig. 5.3). BSE imaging indicates that Py1b growth have uneven distribution of minor and trace elements with few silicate inclusions compared to Py1a (Fig. 5.3). The width of the Py1b growth zones range from $<30\mu\text{m}$ to $50\mu\text{m}$.

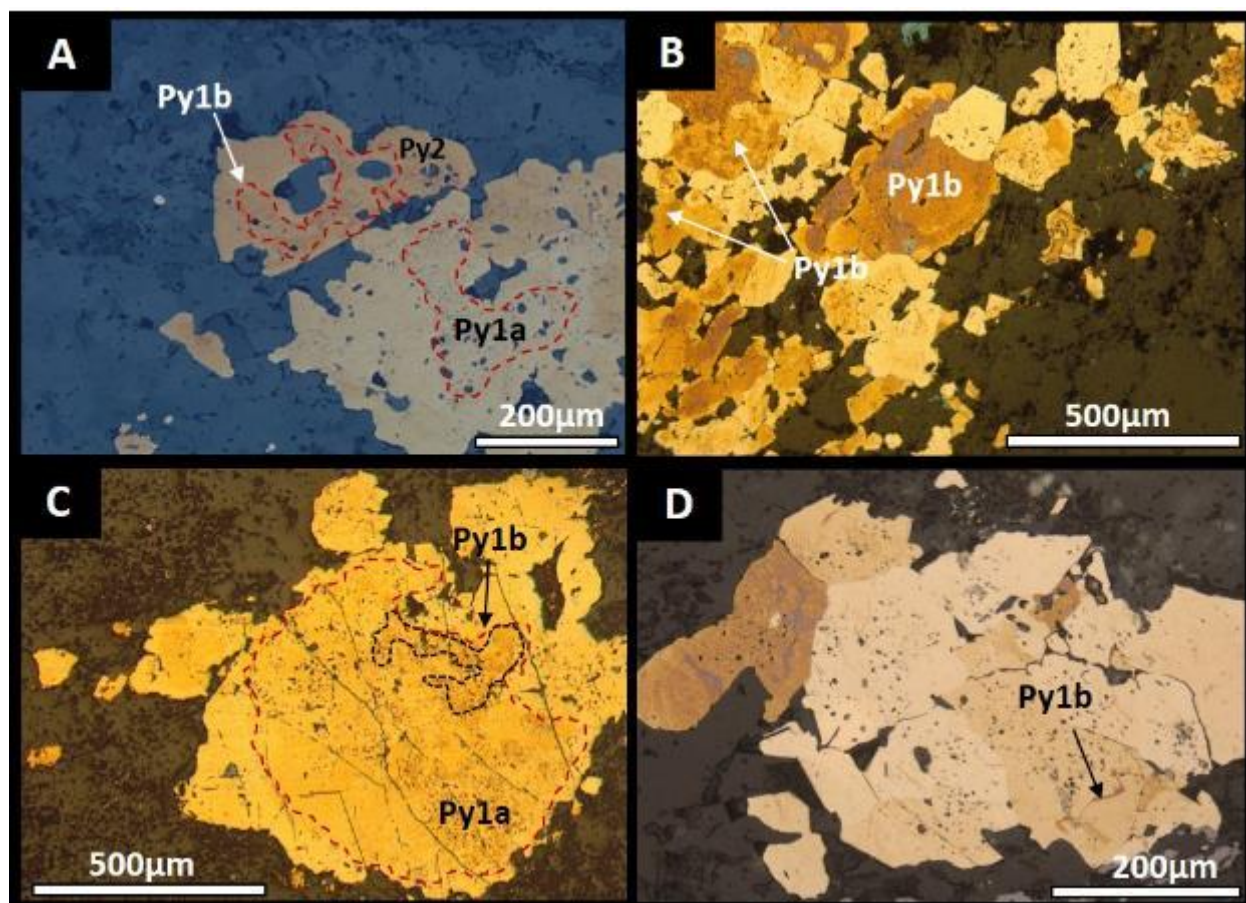


Figure 5.3 Representative reflected light photomicrographs of Py1b textures from the Campbell-Red Lake deposit. (A) Wisp-like Py1b occurring within Py2 exposed by acid etching (NS009). (B) Medium-grained Py1b texture (ND048). (C) Py1b occurring within Py1a groundmass (ND142). (D) Localized occurrence of Py1b in disseminated pyrite (ND128).

LA-ICP-MS mapping of Py1b reveal element enrichment up to one weight percent As and Co (Fig. 5.4). Nickel is also present albeit at lower concentrations (maximum of 1,000ppm) compared to As

and Co. Antimony, Au, Ag and Te are enriched within Py1b growth zones with concentrations of 100ppm, 1ppm, 10ppm and 10ppm respectively (Fig. 5.4).

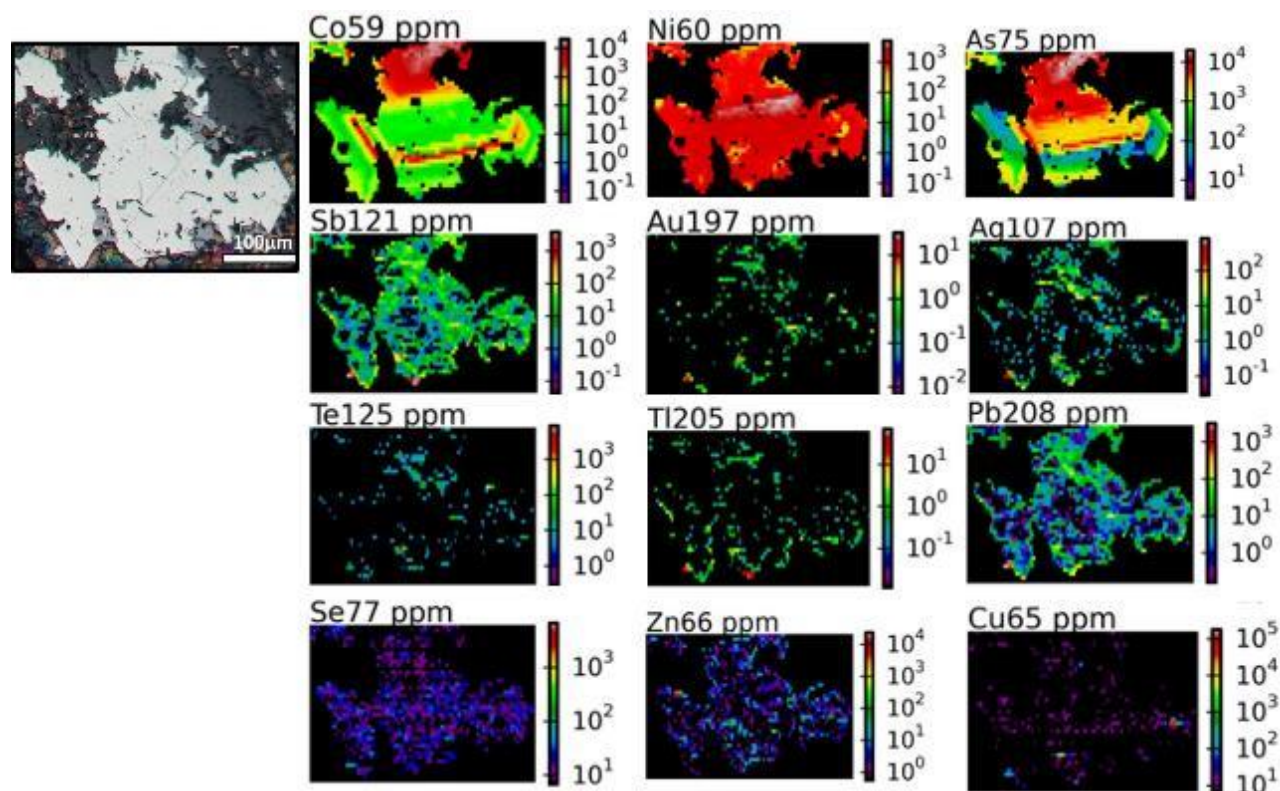


Figure 5.4 Reflected light photomicrograph of etched pyrite and representative LA-ICP-MS 2D map of pyrite from Campbell-Red Lake deposit (ND058). Gold and Ag map display occurrence as inclusions and in pyrite structure. Cobalt-As rich band of Py1b do not show Au enrichment.

Py2 occur after early pyrites (Py1a and Py1b) and vary in morphology from anhedral to euhedral. Py2 is usually free of mineral inclusions in comparison to Py1a and Py1b (Fig. 5.5). Py2 are distinguishable from early pyrite as they usually have very light brown coloration when etched (Fig. 5.5). Disseminated Py2 overgrowths occur as fine- to medium-grained phases with grain size ranging from less than 30 to 200µm (Fig. 5.5). Py2 occurs in veins and as disseminated fine- to coarse-grained anhedral crystals or as coarse-grained annealed aggregates with 120° junctions (Fig. 5.6). Py2 veins range in thickness from 50µm to 2000µm and are subhedral to anhedral making up less than 5% to 20% of the host vein. Py2 veins are homogeneous and have patchy irregular edges

with localized fractures within grains (Fig. 5.7). Vein Py2 occur as coarse-grained subhedral crystals formed due to annealing. Fracture networks are also present in these pyrites (Fig. 5.6 B-C). Etching of Py2 also showed they are chemically homogeneous with no clear growth zones in the annealed pyrite crystals (Fig. 5.7).

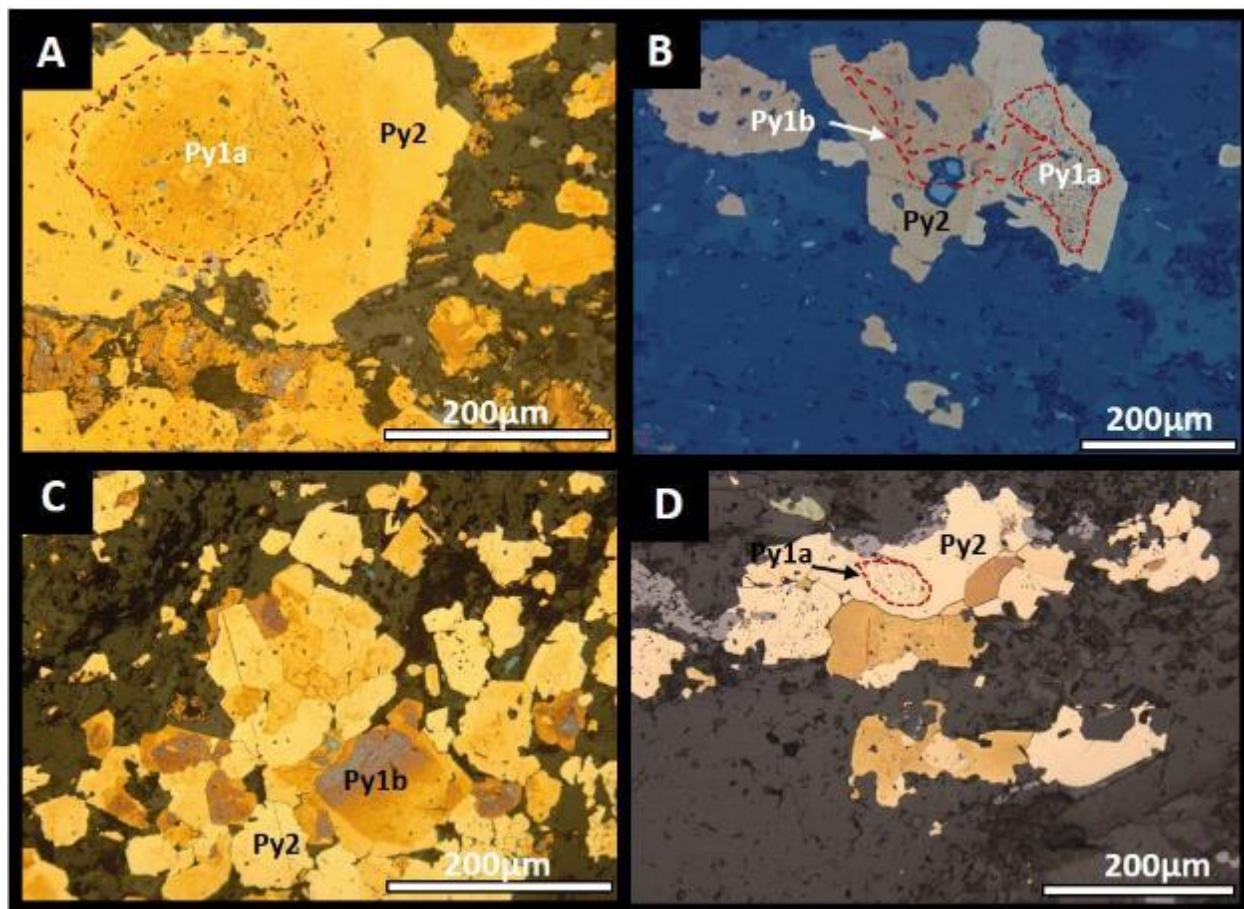


Figure 5.5 Texture of Py2 in comparison to Py1a and Py1b from Campbell-Red Lake deposit. (A) Reflected light photomicrograph of etched pyrite showing textural association of early inclusion-rich Py1a and inclusion-poor Py2 (ND142). (B) Reflected light photomicrograph of etched pyrite showing textural association of early Py1a, Py1b and Py2 (NS009). (C) Reflected light photomicrograph showing Py2 occurring with Py1b (ND048). (D) Reflected light photomicrograph of inclusion-free Py2 occurring with inclusion-rich Py1a (ND128).

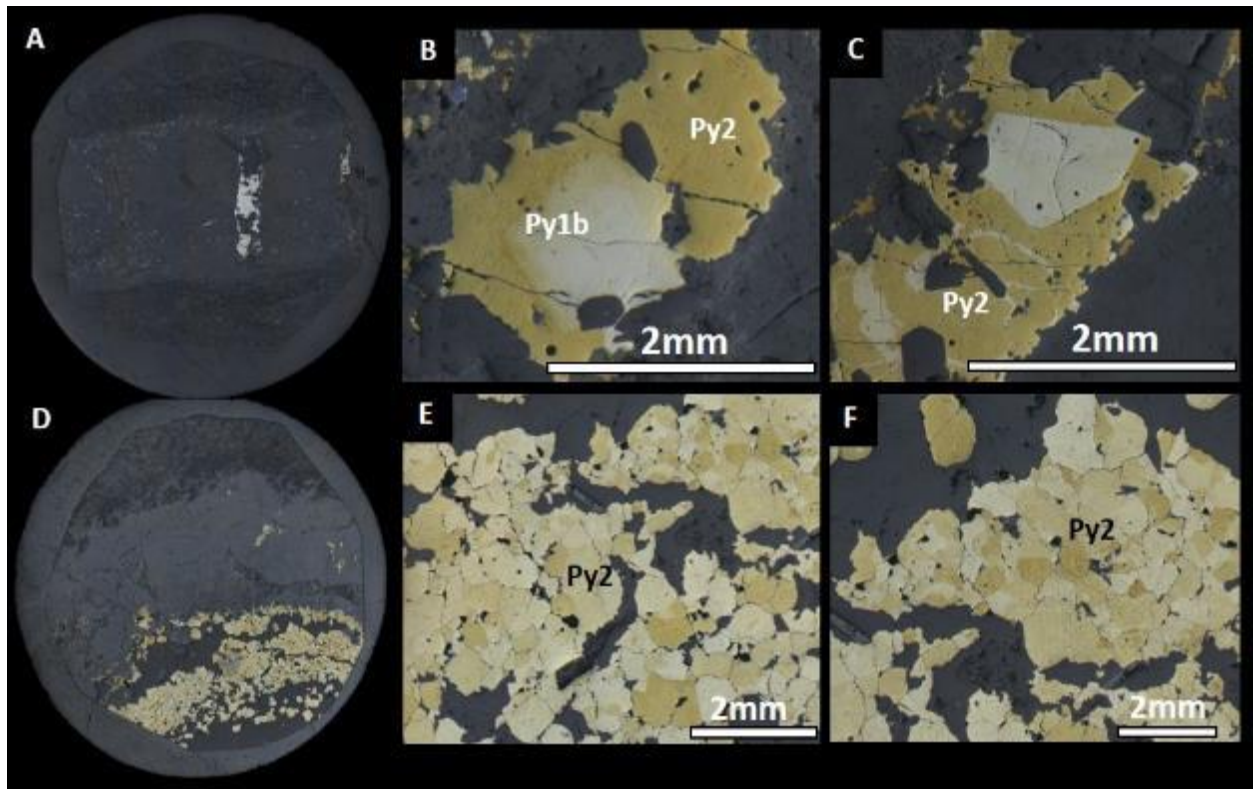


Figure 5.6 Occurrence of vein Py2 in Campbell-Red Lake deposit (A) Laser mount photo showing occurrence of vein Py2 (ND005). (B-C) Reflected photomicrograph of homogeneous Py2 replacing Py1b (ND005). (D) Laser mount photo of vein Py2 (ND023). (E-F) Reflected light photomicrograph of annealed vein Py2 with 120° triple junction (ND023). Field of view of laser mount image is 2.5cm.

Euhedral Py2 is common as disseminations within the carbonate-quartz altered host rock. They overgrow anhedral Py1a with grain sizes ranging from approximately 30µm to 200µm and comprising about 40% of the rock (Fig. 5.7). The euhedral pyrite displays annealing textures forming pyrite cubes in observed samples. LA-ICP-MS mapping indicates that inclusion free Py2 is considerably less enriched in most trace elements except Co, Ni and As which are up to 1000 ppm respectively, Se and Pb have enrichment up to 100ppm and 10ppm respectively (Fig. 5.8).

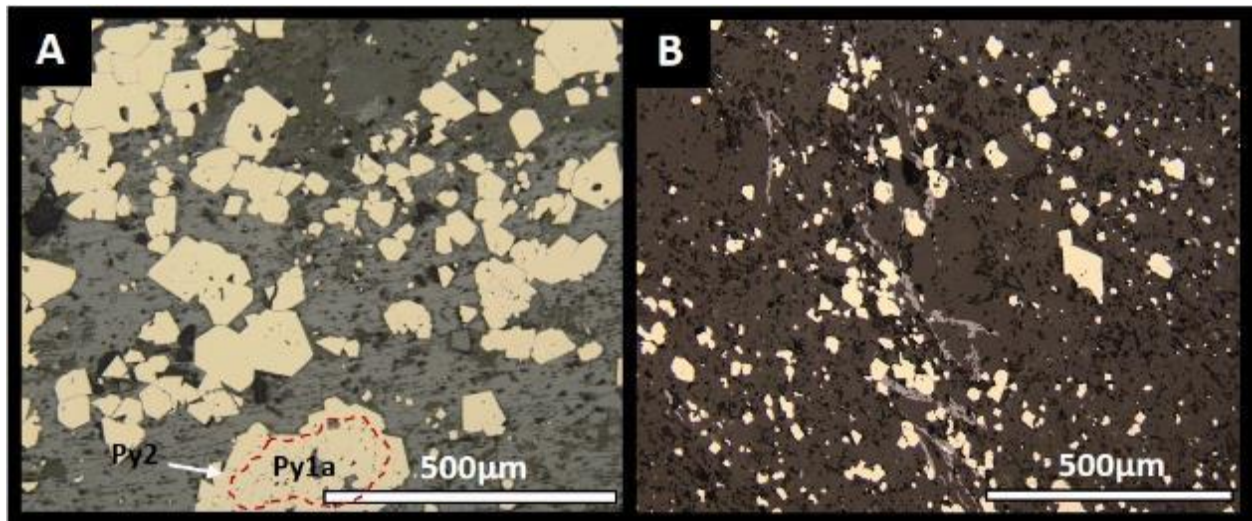


Figure 5.7 Euhedral textures of Py2 in the Campbell-Red Lake deposit. (A) Euhedral pyrite overgrowth on anhedral Py1a (ND110). (B) Foliated fine-grained disseminated euhedral pyrite (ND128).

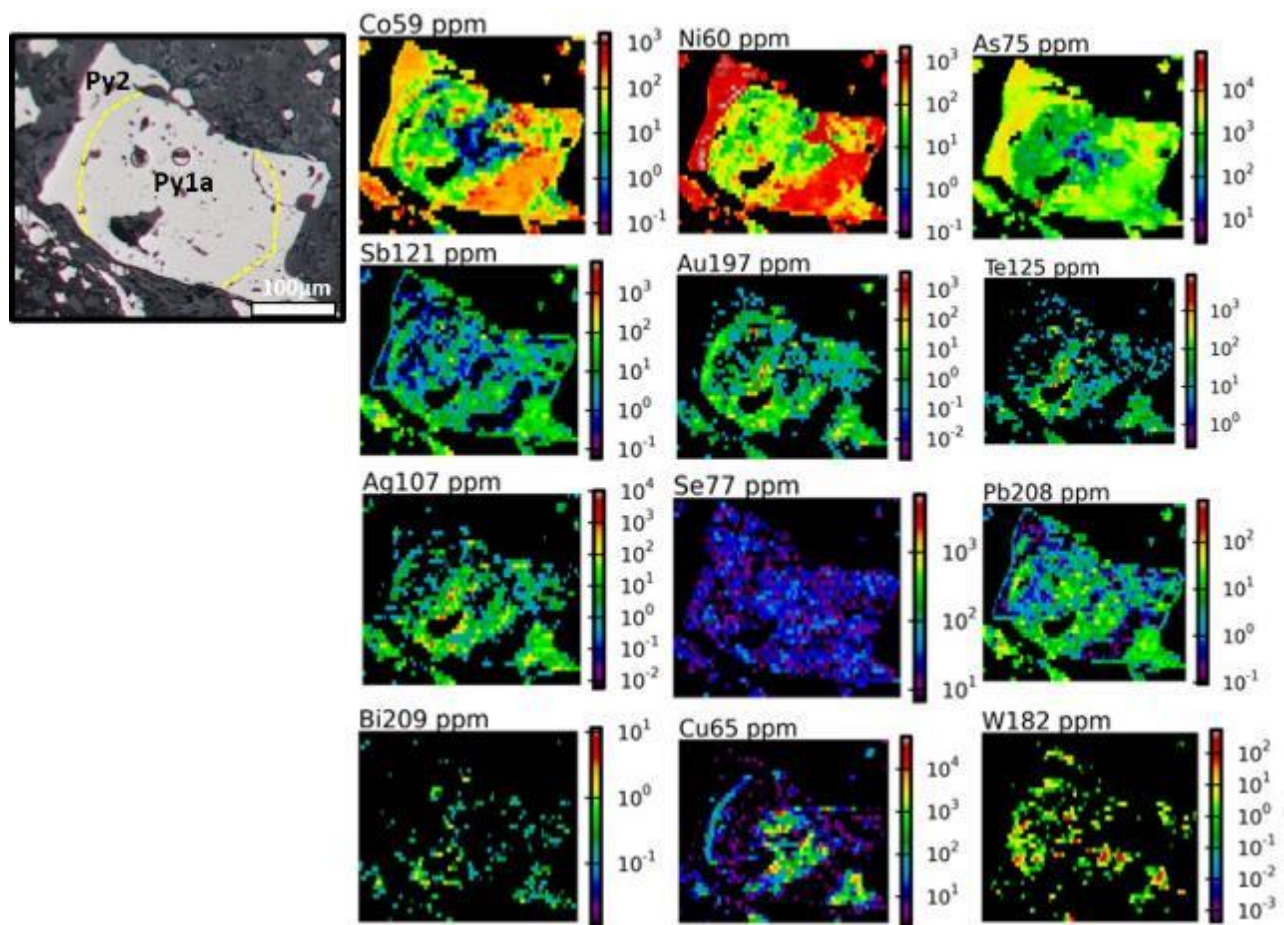


Figure 5.8 Reflected light photomicrograph of etched pyrite and representative LA-ICP-MS 2D maps of pyrite from Campbell-Red Lake deposit (ND128). Inclusion-rich Py1a have Ag, Au, Te, Bi, Cu, Pb and W inclusions. Py2 overgrowths are only enriched in Co, Ni and As.

Py3 occurs in veins and are subhedral to euhedral and are often surrounded by pyrrhotite $\pm$ chalcopyrite $\pm$ arsenides with grain sizes ranging from 50 μ m to 3000 μ m (Fig. 5.9). Py3 are less common in host veins, occupying less than 5% of the veins with ratios of pyrrhotite (and/or chalcopyrite and arsenide) to pyrite as high as 5:1 (Fig. 5.9). Inclusions in Py3 include carbonate, quartz, pyrrhotite, chalcopyrite, magnetite and rare earth phosphates (Fig. 5.10). However, some Py3 can have few mineral inclusions and can be inclusion free.

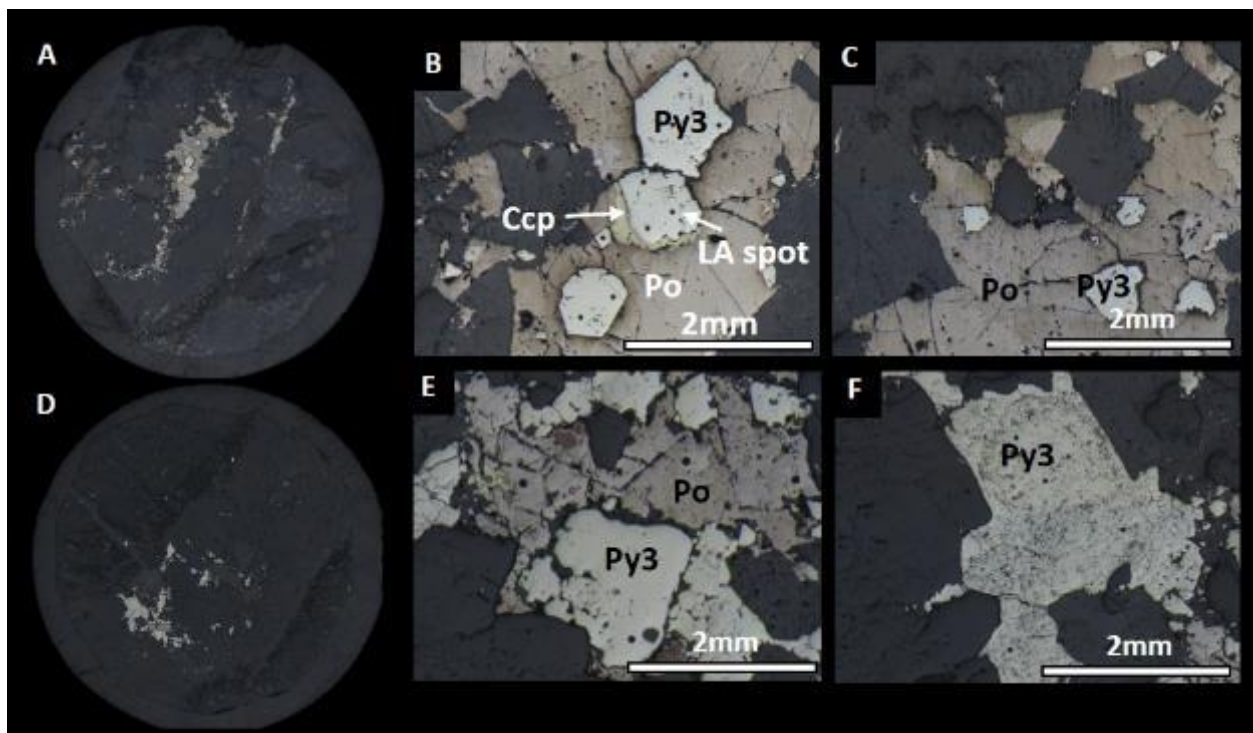


Figure 5.9 Occurrence of Py3 in the Campbell-Red Lake deposit (A) Laser mount photomicrograph showing occurrence of vein Py3 (ND175). (B-C) Reflected photomicrograph showing occurrence of vein Py3 with pyrrhotite and chalcopyrite (ND175). (D) Laser mount photo of Py3 (ND182A). (E) Reflected light photomicrograph of vein Py3 occurring with pyrrhotite (ND182A). (F) inclusion-rich euhedral Py3 (ND182A). Field of view of laser mount image is 2.5cm.

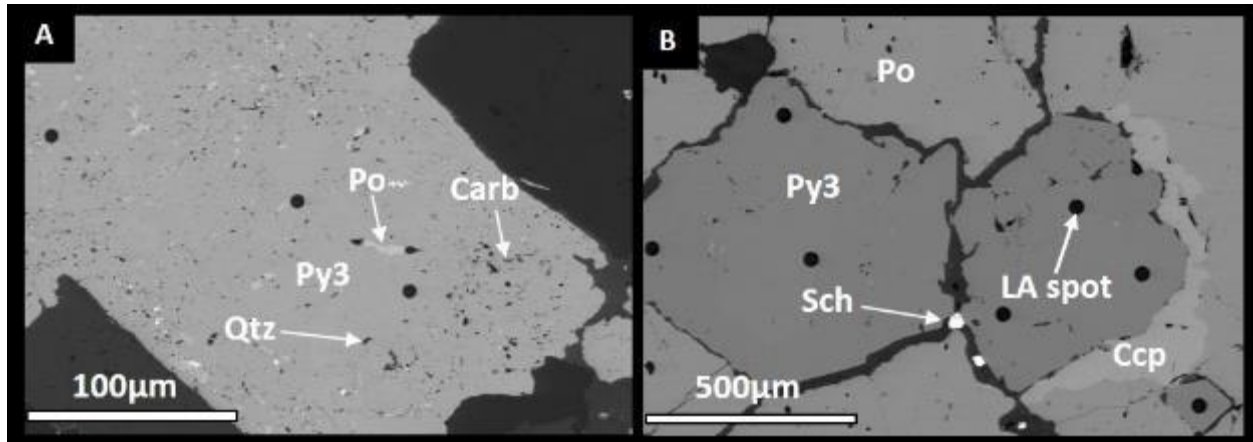


Figure 5.10 BSE images of Py3 texture from Campbell-Red Lake deposit (A) Inclusion-rich euhedral Py3 (ND182A). (B) Inclusion poor euhedral Py3 surrounded by pyrrhotite and chalcopyrite (ND175).

LA-ICP-MS mapping of Py3 shows strong growth zonation of Co-Ni-As with each element reaching one weight percent (Fig. 5.11). Fracture networks were formed after pyrite formation have measurable concentrations of several elements including Sb (100 ppm), Pb (100 ppm), Bi (100ppm), Au (10 ppm), Ag (10 ppm), Te (100 ppm), Cu (100 ppm), Mo (100 ppm) and As (1,000 ppm). Au-Ag-Te occur as very fine inclusions in both the pyrite and the arsenide. Selenium (100ppm) and Mo (100 ppm) are also present in both pyrite and the arsenide with Se occurring both in the pyrite and arsenide (Fig. 5.11).

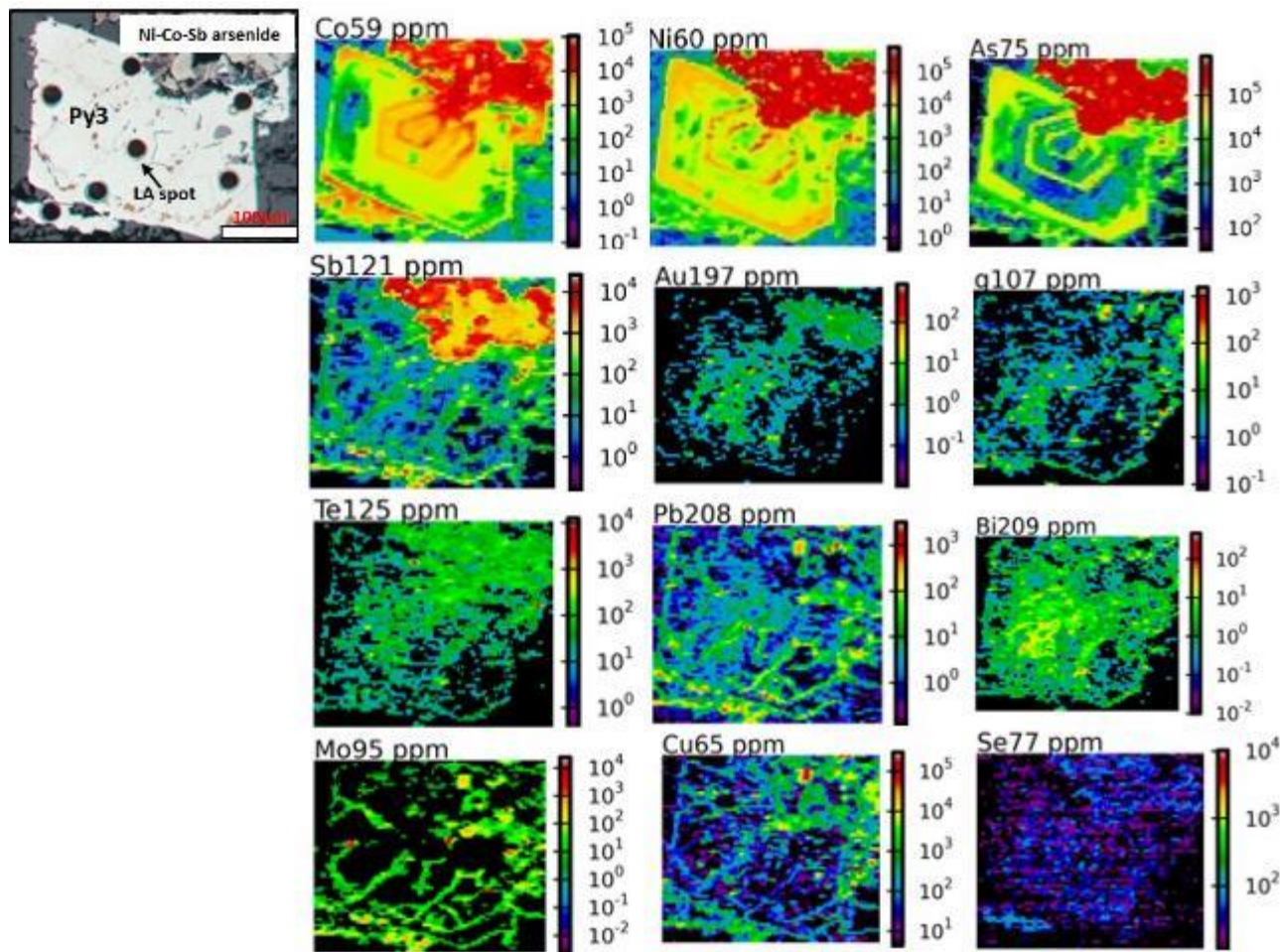


Figure 5.11 Reflected light photomicrograph of etched pyrite and representative LA-ICP-MS 2D map of pyrite from the Campbell-Red Lake deposit (ND070). Cyclic zonation of Co, Ni and As in Py3. Other elements occur in pyrite structure.

East Bay trend (Zone B)

Several small gold deposits and prospects occur along the East Bay trend in the Central part of the Red Lake greenstone belt (Fig. 4.1). Surface pyrite samples collected and analyzed from this area reveal differences in the type of pyrites that occur in the deposits.

Marcus Deposit

Hydrothermal zoned pyrite Py1a, Py1b and Py2 was observed at the Marcus deposit similar to that seen at CRL deposit. Py1a is disseminated, anhedral pyrite that is usually fine- to medium-grained with a suite of mineral inclusions giving the pyrite a “sieve-like” texture (Fig. 5.12). The grain size

of this pyrite ranges from less than 50 μ m to 200 μ m. Etching of pyrite reveal color differences between Py1a and later pyrite overgrowths with a deep brown coloration noticeable on Py1a (Fig. 5.12). BSE imaging and EDS analysis revealed that mineral inclusions in the pyrite include ilmenite and chlorite (Fig. 5.12). LA-ICP-MS mapping of pyrite revealed that Py1a is characterized by Sb-Au-Ag-Te-Se-Tl-Bi-Pb in the Py1a inner core surrounded by a Co-As enriched pyrite (Py1b; Fig. 5.13). The inclusion rich Py1a has Sb (10-100ppm), Se (50-100ppm), Pb (10ppm) Bi (1ppm), Co (1000ppm), As (1000ppm) and Ni (1000ppm; Fig. 5.13).

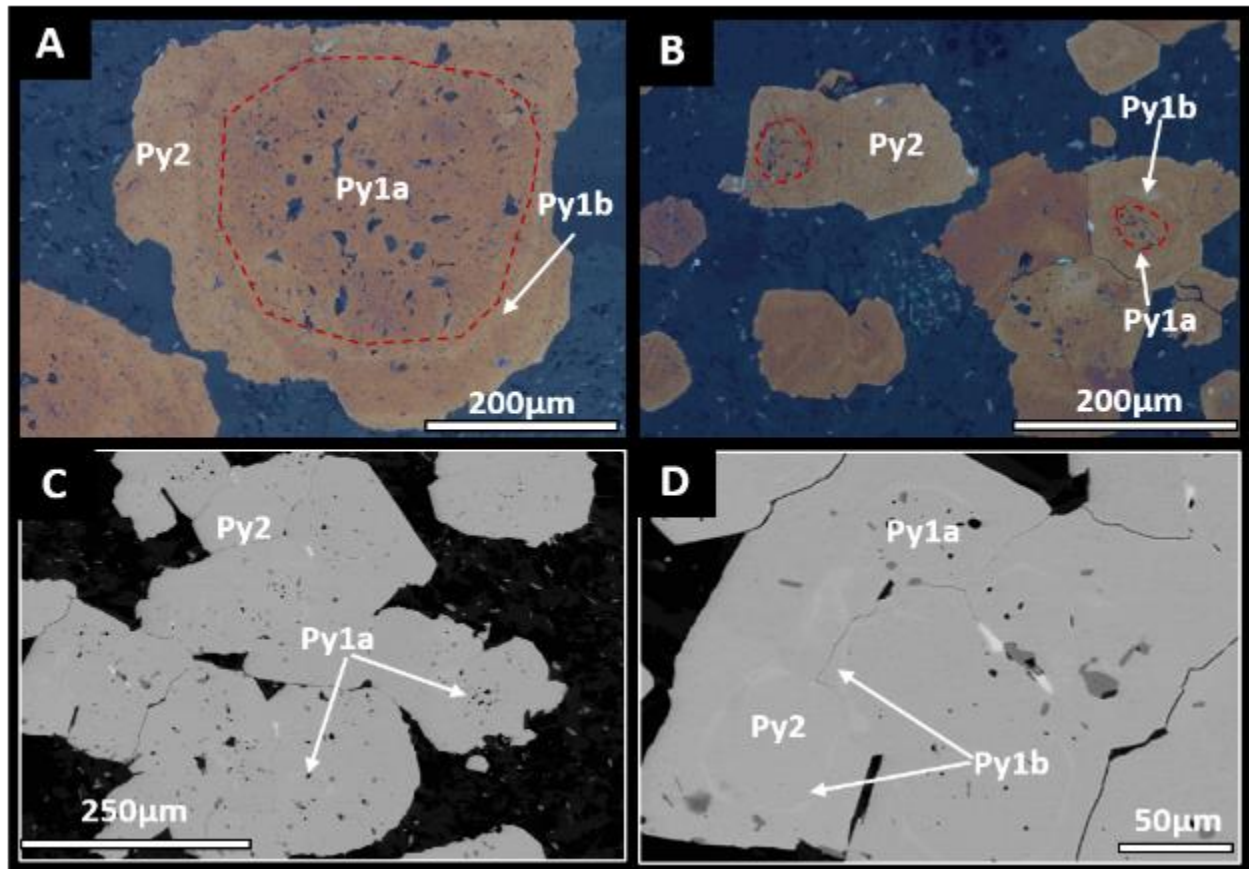


Figure 5.12 Representative reflected light and BSE images of Py1a texture from the Marcus deposit. (A-B) Reflected light photomicrograph of etched pyrite showing Py1a texture relative to Py1b and Py2 (NS001). (C-D) BSE image of Py1a texture (NS001).

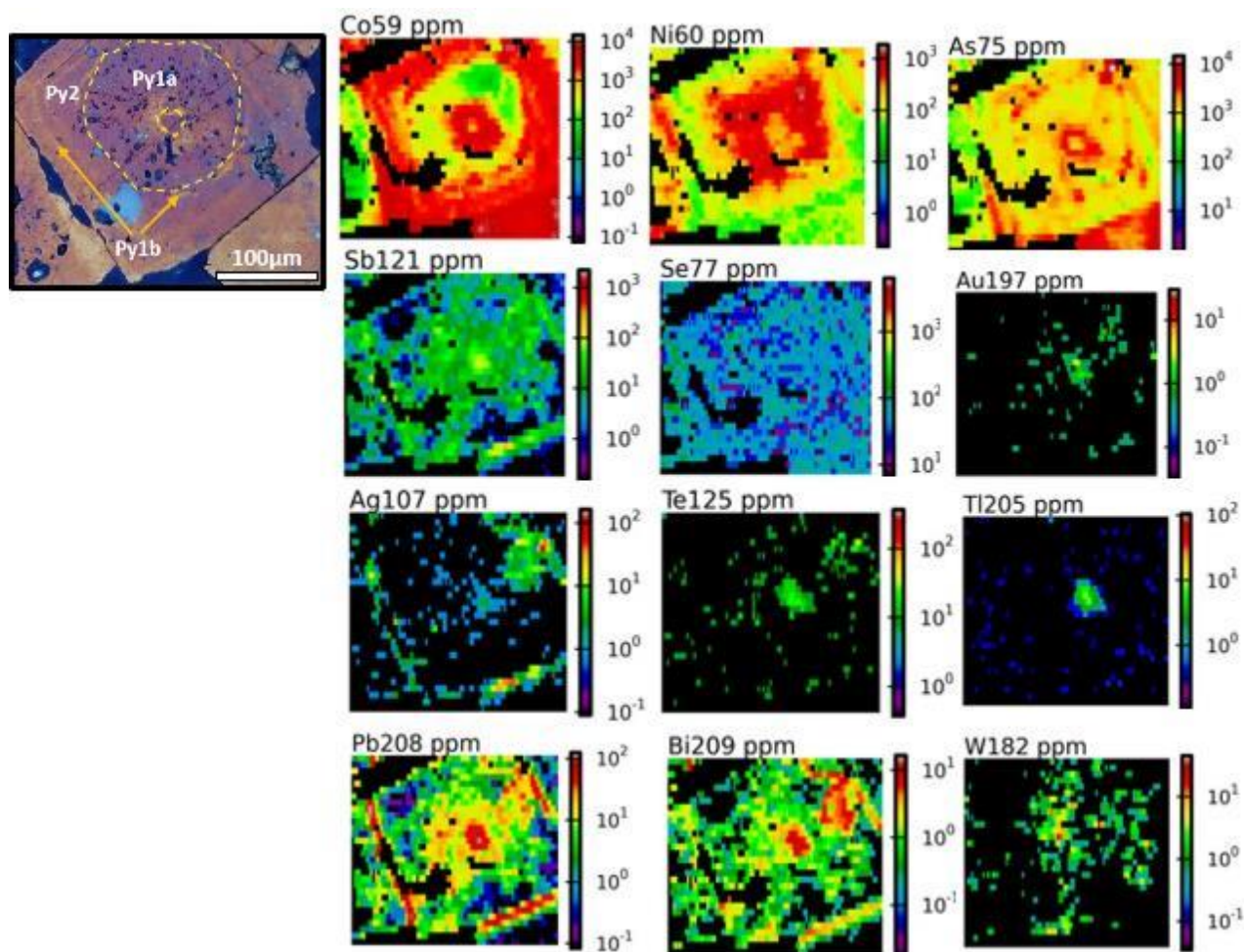


Figure 5.13 Reflected light photomicrograph of etched pyrite and representative LA-ICP-MS 2D map of pyrite from the Marcus deposit (NS001). Core of Py1a have enrichment of Ni, Sb, Tl, Te, Pb, Bi, W. Cyclic zonation of Py1b have Co, As and Sb enrichment.

Py1b in the Marcus deposit occurs as cyclic overgrowth between Py1a and Py2. Acid etching revealed that Py1b occurs as whisp-like features with cream-white coloration that are either euhedral or anhedral with more than five cyclic zones (Figs. 5.12, 5.13, 5.14). The spacing of cyclic Py1b growth zones is less than 20µm whereas the thickness varies from 5µm-10µm occurring as anhedral overgrowths on Py1a or subhedral/euhedral overgrowths on Py2 (Figs. 5.12, 5.14). The As-rich growth zones in Py1b have As (one weight percent), Co (one weight percent), Ni (100ppm),

Sb (100ppm), Se (50ppm) and Pb-Bi (1ppm), whereas gold, Ag, Te and Tl are either absent or below 1ppm (Fig. 5.13).

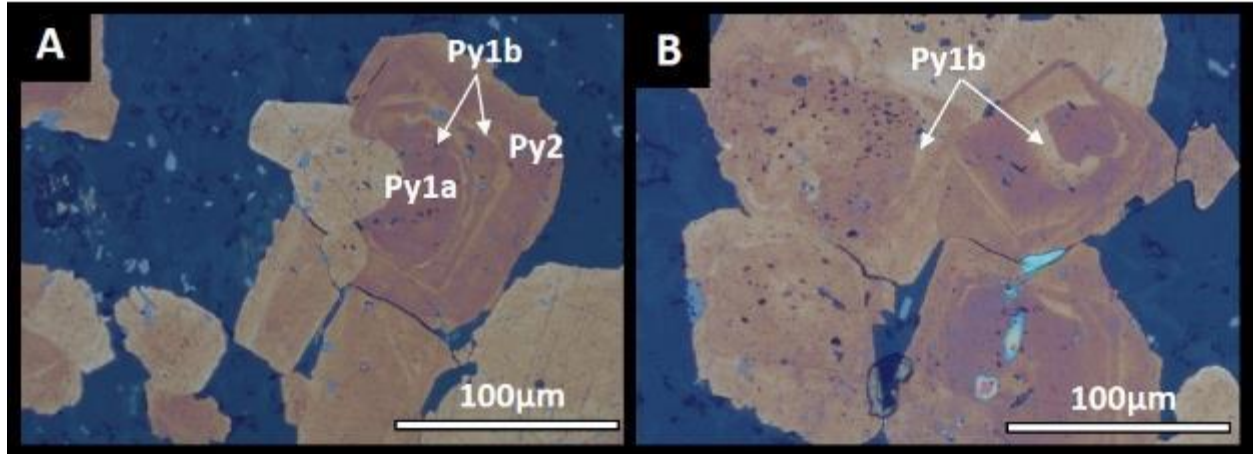


Figure 5.14 Representative reflected light photomicrographs of Py1b from Marcus deposit (A) Reflected light photo of etched pyrite showing cyclic occurrence of Py1b between Py1a and Py2 (NS001). (B) Py1b texture from etched pyrite (NS001).

Py2 in the Marcus deposit have fewer mineral inclusions than Py1a and occur as overgrowths of early Py1a and Py1b varying in morphology and grain size. This pyrite generation is usually fine- to medium-grained occurring as veinlets or disseminations (Figs. 5.12, 5.14, 5.15). Py2 are either anhedral or euhedral with grain sizes ranging from less than 30µm to 100µm (Fig. 5.15).

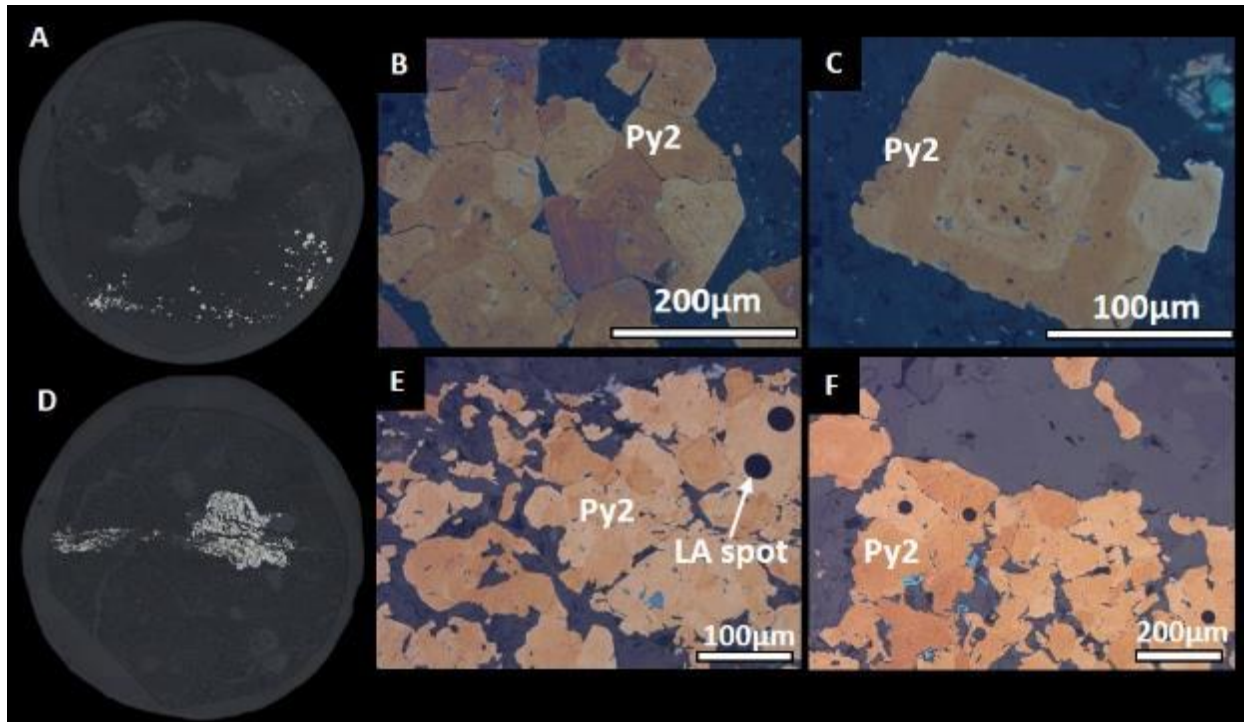


Figure 5.15 Occurrence of Py2 in Marcus deposit (A) Laser mount photo showing occurrence of disseminated Py1a, Py1b and Py3 (NS001). (B-C) Reflected photomicrograph showing occurrence of Py2 overgrowth on Py1a and Py1b (NS001). (D) Laser mount photo of vein Py2 (NS001B). (E-F) Reflected light photomicrograph of vein Py2 (NS001B). Field of view of laser mount image is 2.5cm.

Cochenour-Willans deposit

Zoned hydrothermal pyrite which include Py1a, Py1b and Py2 was observed in samples at the Cochenour-Willans deposit similar to those at the CRL and Marcus deposits albeit with some differences in texture (Table 5.1). Pyrite in the analyzed samples are fine- to coarse-grained with annealing textures (Fig. 5.16). Formation of fine-grained pyrite cubes especially for Py2 is also common. Py1a which is the earliest pyrite phase mineral inclusion-rich cores and are medium- to coarse-grained with grain sizes ranging from 40µm to 600µm (Fig. 5.17).

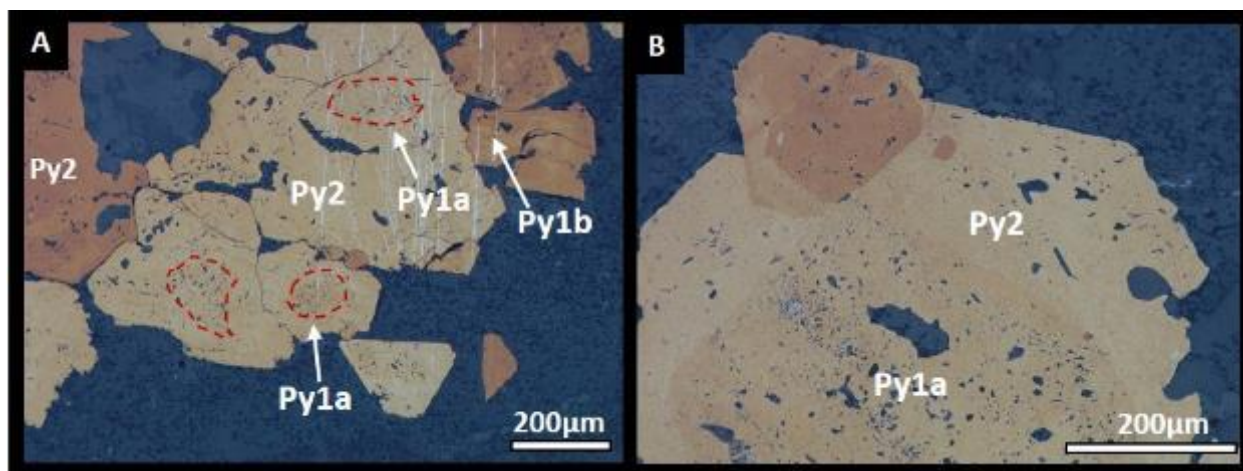


Figure 5.16 Texture of Py1a, Py1b and Py2 from the Cochenour-Willans deposit. (A) Reflected light photomicrographs of annealed pyrite grain showing texture of inclusion-rich Py1a, Py1b and Py2 (NS005). (B) Coarse-grained Py1a with Py2 overgrowth (NS006).

Py1b occurs as multiple growth zones on Py1a and Py2 as exposed by acid etching with whitish tints on the pyrite surface (Figs. 5.16, 5.17). The Py1b growth zones range in size from less than 30µm to 80µm with the morphology varying from regular euhedral wisp-like features to subhedral irregular zones (Fig. 5.17).

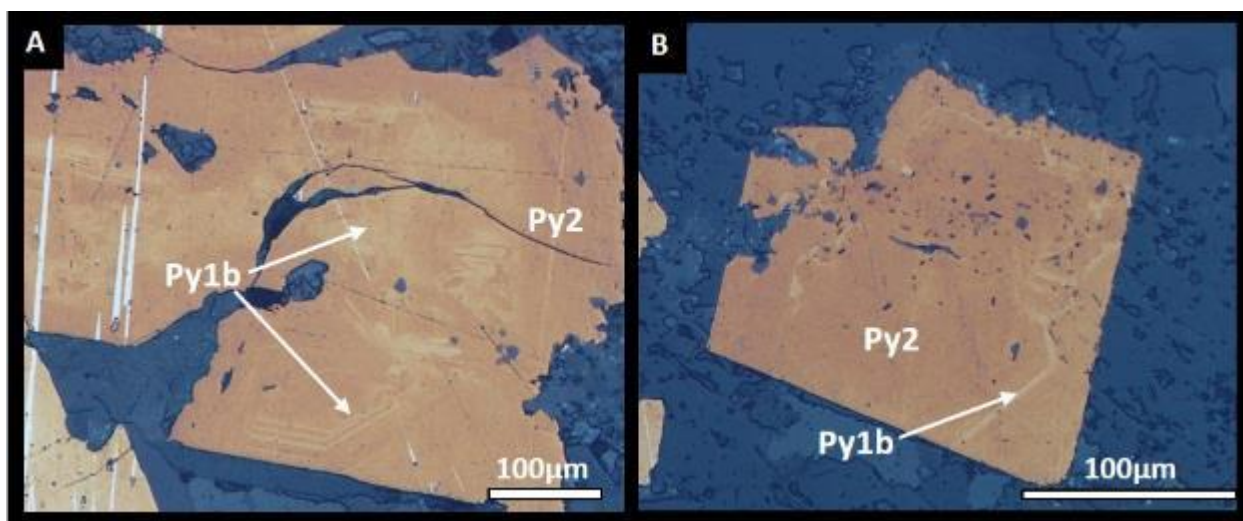


Figure 5.17 Py1b texture from Cochenour-Willans deposit. (A) Cyclic occurrence of Py1b growth within Py2 (NS005). (B) Wisp-like occurrence of Py1b growth (NS005).

Py2 is the last pyrite generation of the hydrothermal zoned pyrite observed from samples collected from the Cochenour-Willans deposit occurring mostly as inclusion-free pyrite after Py1a

and Py1b as fine- to medium-grained euhedral to anhedral phases. The medium-grained Py2 are subhedral with grain sizes that range from 100 μ m to 200 μ m (Figs. 5.17, 5.18). The fine-grained Py2 range in size from less than 20 μ m to approximately 100 μ m in size (which overlap in size with the medium-grained Py2 forms) occurring as clusters of pyrite cubes (Fig. 5.18).

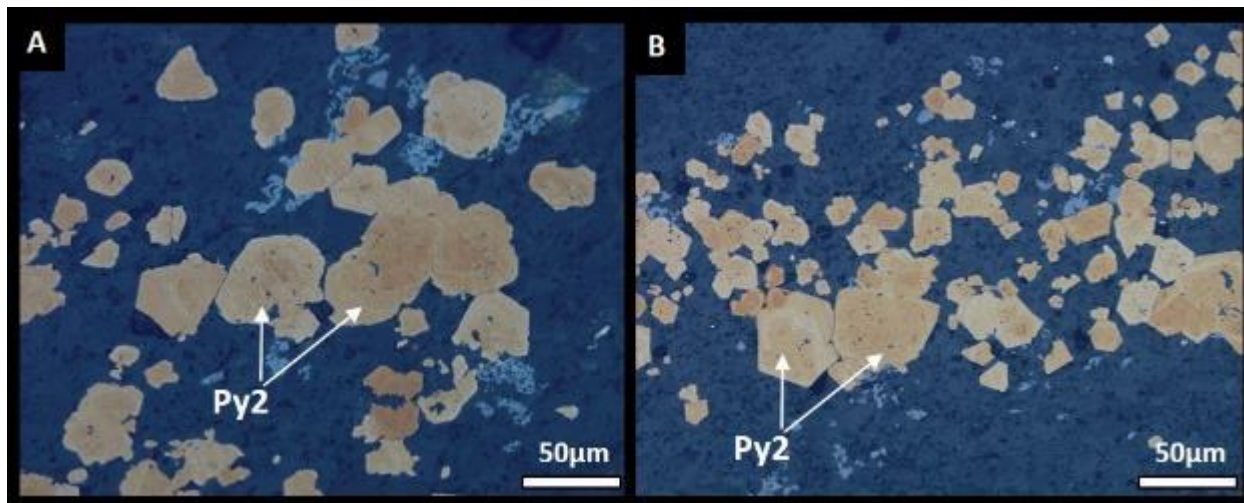


Figure 5.18 Reflected light photomicrograph of Py2 euhedral texture from the Cochenour-Willans deposit. (A-B) Fine-grained euhedral pyrite Py2 (NS006).

LA-ICP-MS maps of representative pyrite samples from the Cochenour-Willans deposit reveal that Py1a consists of Co (1000ppm), As (1000ppm), Ni (100), Sb (100ppm), Au (1ppm), Pb (10ppm), Bi (1ppm) whereas Py1b has lower Sb (less than 1ppm) higher Co (one weight percent), As (1000ppm), Ni (100ppm) and Au (10ppm; Fig. 5.19). Py2 have similar Co content to Py1b (one weight percent) and As (one weight percent). Selenium (50-100ppm) is present at higher abundances in Py1a and Py1b compared to Py2 (<10ppm; Fig. 5.19).

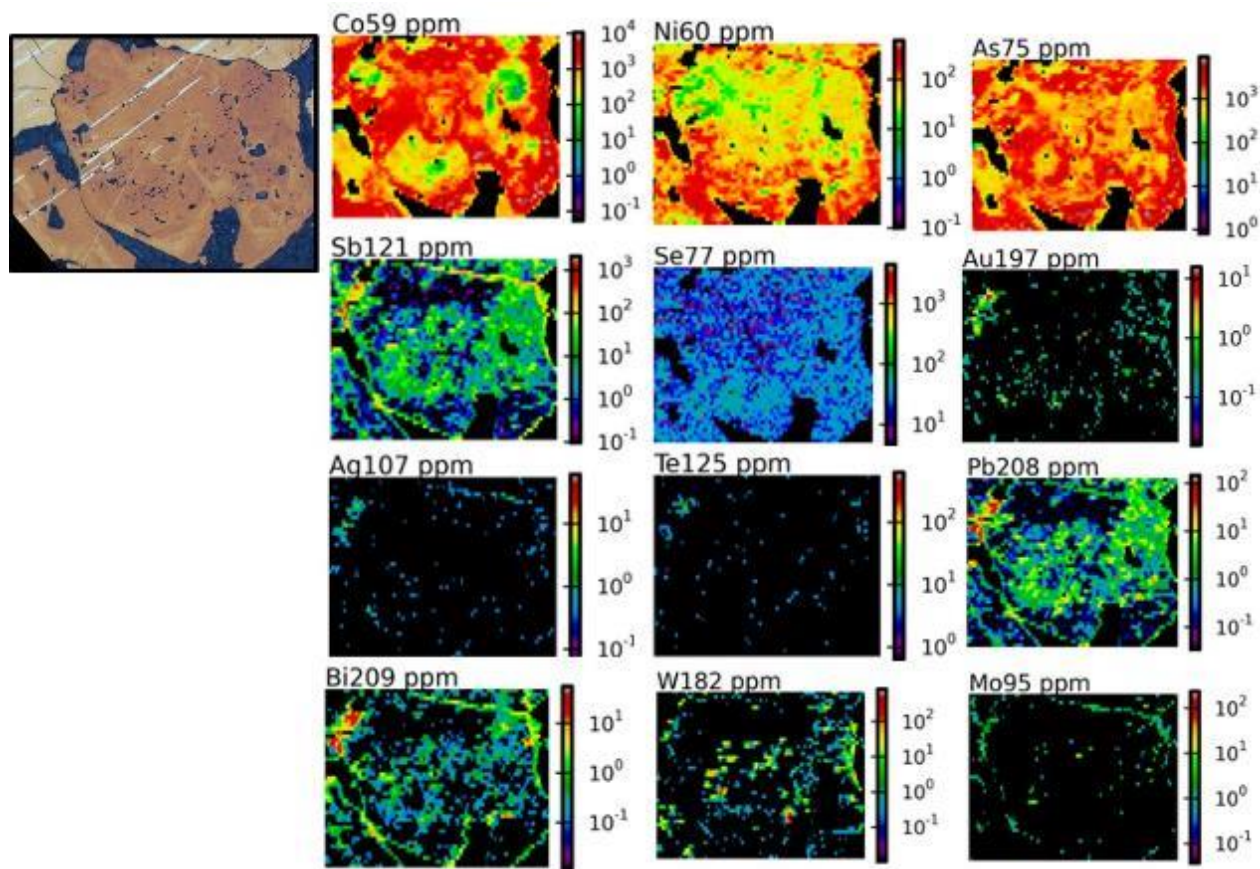


Figure 5.19 Reflected light photomicrograph of etched pyrite and representative LA-ICP-MS 2D map of pyrite from Cochenour-Willans deposit (NS001). Py1a have Sb, As and Ni enrichment. Cobalt and As have high concentration in Py1b with grey etching color. Gold, Bi, Pb, W and Mo occur as inclusions in Py1a.

McMarmac and Abino deposits

Petrographic analysis of samples from the McMarmac deposit reveal pyrite from this area consists of disseminated fine- to medium-grained Py2 pyrite with sparse inclusions and replacement rims of magnetite. The pyrite is subhedral to euhedral with grain sizes that range from 40µm to 400µm (Fig. 5.20). In the Abino deposit, fine- to medium-grained euhedral Py3 surrounded by chalcopyrite and pyrrhotite occur within and in the margin of deformed quartz-carbonate veins and white mica-biotite altered host rock with the grain size of the pyrite ranging from 50µm to 200µm (Fig. 5.20).

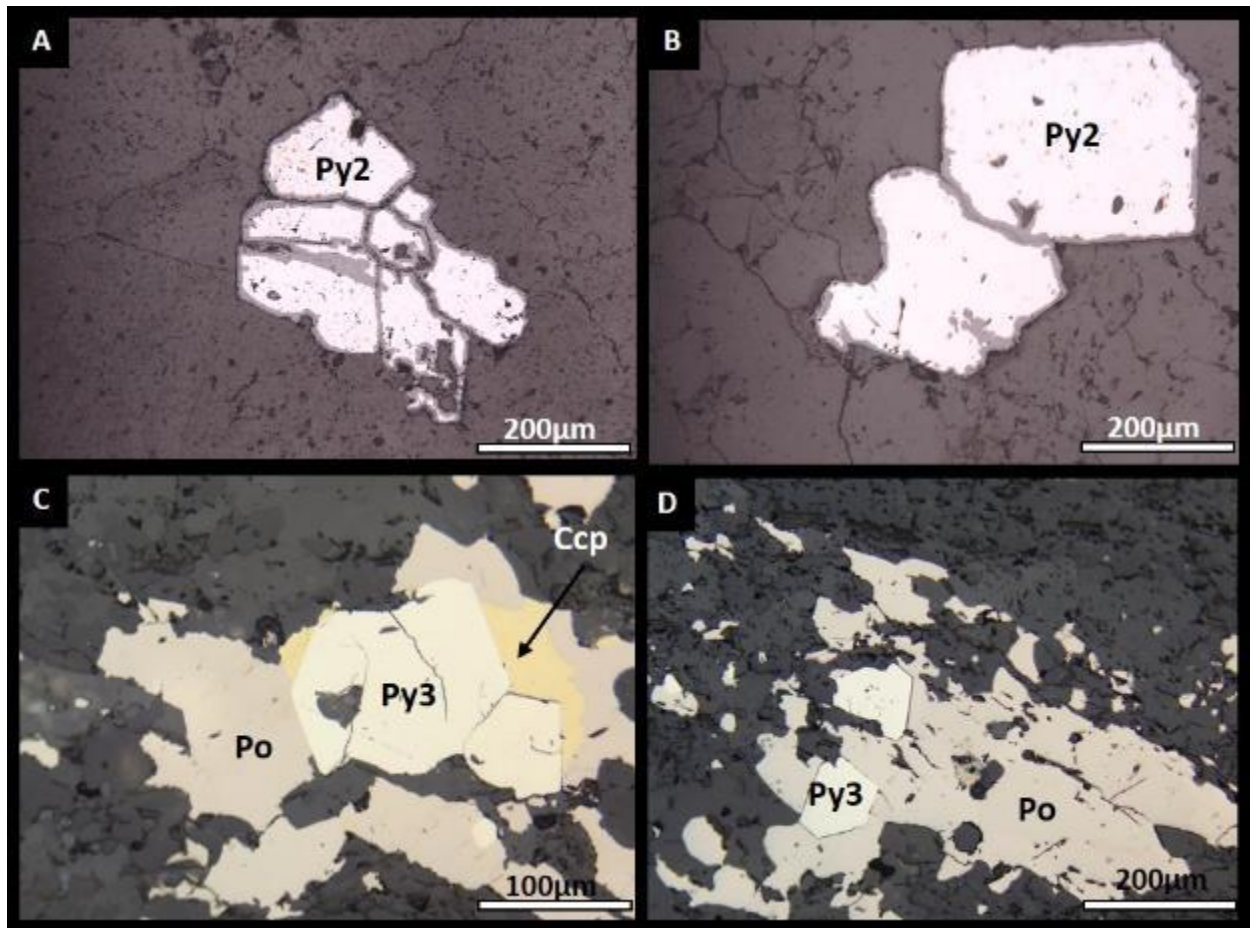


Figure 5.20 Texture of Py2 from the McMarmac and Abino deposits. (A-B) Disseminated subhedral quartz-albite vein Py2 from Marcus deposit (NS016). (C-D) Euhedral Py3 surrounded by pyrrhotite and chalcopyrite from Abino deposit (NS021).

Tucker's Knob occurrence

Py1a, Py1b and Py2 have been identified at Tucker's Knob. Py1a is the earliest pyrite occurring as disseminations in carbonate-quartz altered basalt with anhedral and euhedral morphologies overgrown by Py1b and Py2 (Figs. 5.21, 5.22). Mineral inclusions in Py1a include white mica and carbonate which gives this pyrite type a spongy texture (Fig. 5.22). An annealing effect is noticeable from one of the pyrite samples where different medium-grained Py1a, Py1b and Py2 merge to form a single large grain (Fig. 5.22).

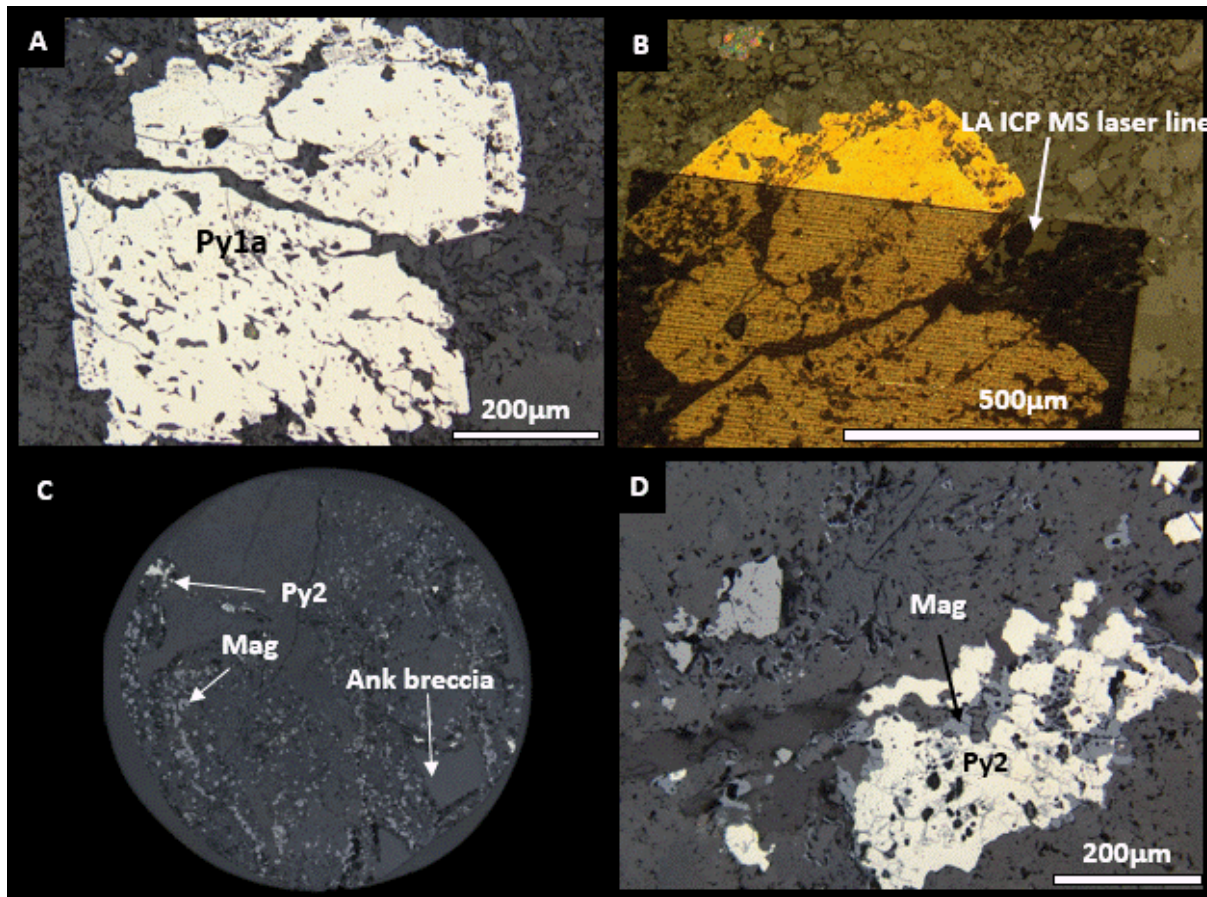


Figure 5.21 Texture of different pyrite types from the Tucker's Knob prospect. (A) Occurrence of disseminated euhedral pyrite with Py1a core (NS013). Etched pyrite Py1a with LA-ICP-MS laser lines (NS013). (C) Laser mount photo of breccia matrix replacement Py2 (NS014). (D) Occurrence of anhedral Py2 within chlorite altered ankerite breccia (NS014). Field of view of laser mount image is 2.5cm. Mag-magnetite, Ank-ankerite

Py1b is a Ni-Co rich arsenian pyrite growth zone on Py1a with a cyclic growth pattern (Fig. 5.23).

Etching and BSE imaging show that Py1b can occur as irregular patchy areas surrounding early pyrite Py1a (Fig. 5.22). Py2 is relatively inclusion poor with grain sizes that range from 100µm to about 300µm. Euhedral or anhedral Py2 occurring within ankerite breccia have been partially or fully replaced by secondary magnetite (Fig. 5.21).

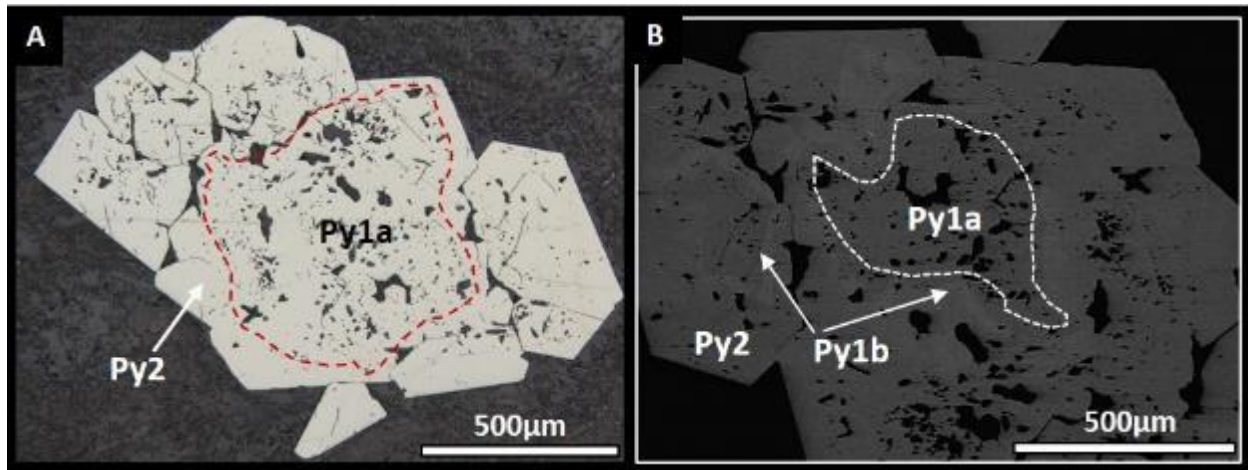


Figure 5.22 Occurrence of pyrite types from Tuckers' Knob occurrence. (A) Reflected photomicrograph showing occurrence of Py1a and Py2 (NS015). (B) BSE image showing occurrence of inclusion-rich Py1a, Py1b element enrichment and inclusion-poor Py2 (NS015).

LA-ICP-MS mapping reveal that the pyrite has concentric zonation of elements including Sb (10-100 ppm), Se (10 ppm), Pb (100 ppm), Bi (10 ppm), W (10 ppm) and Zn (10-100 ppm) which cyclically repeat between Py1b and Py2 (Fig. 5.23). Gold, Ag, Te, Zn and W occur as micro-inclusions in the pyrite with concentration up to 10 ppm. Co-As-Ni are enriched up to 1,000ppm whereas Sb (100 ppm), Se (100 ppm), Pb (100 ppm) and Bi (10 ppm) also have noticeable enrichment in Py1b (Fig. 5.23).

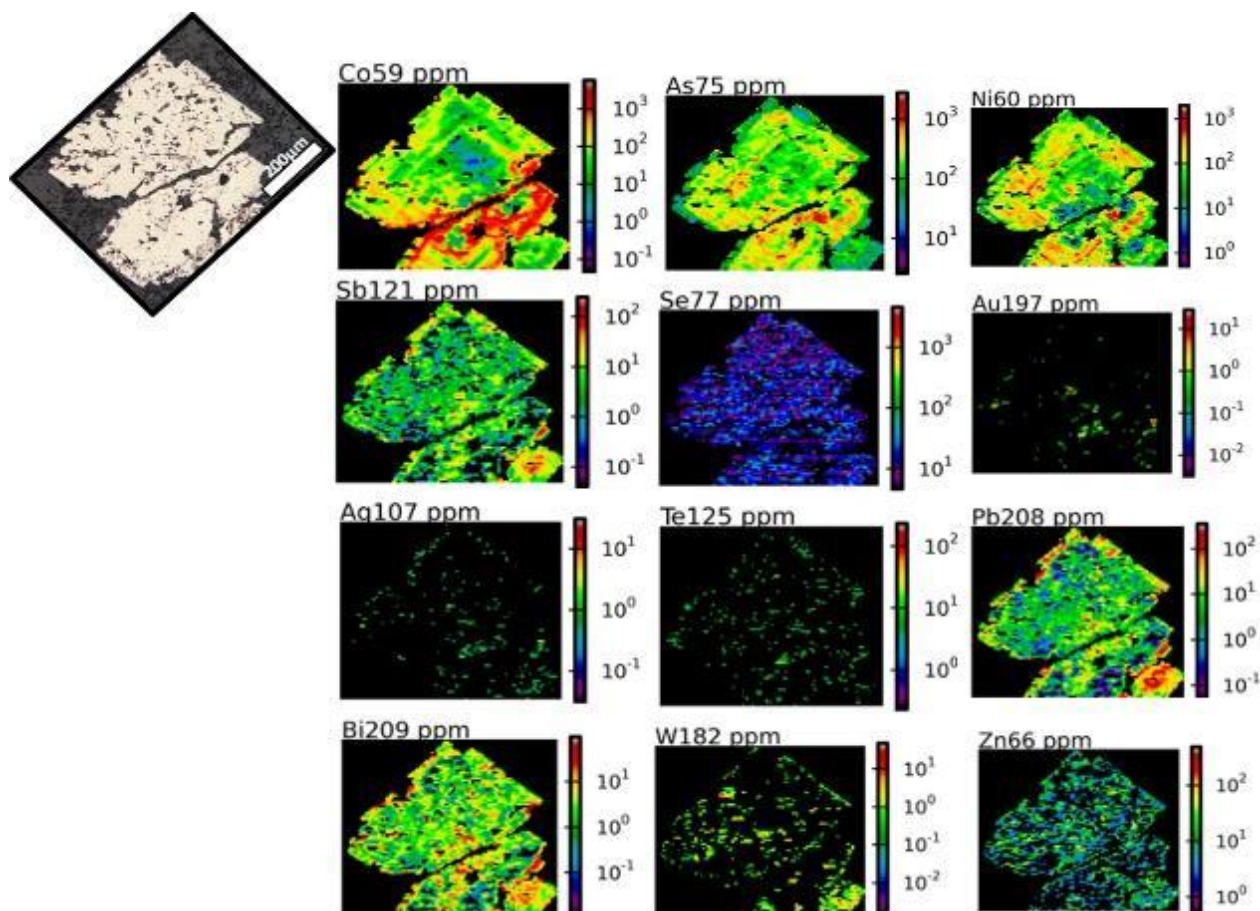


Figure 5.23 Reflected light photomicrograph of etched pyrite and representative LA-ICP-MS 2D map of pyrite from Tucker's Knob prospect (NS013). Cobalt, As, Sb, Pb, Bi, Zn and Se occur as cyclic zonation in pyrite. Gold, Ag and Te occur as inclusions in the pyrite.

Kaymac occurrence

Hydrothermal zoned pyrite (Py1a and Py2) and recrystallized Py3 samples were all identified at Kaymac. Py1a forms core of early pyrite, have few mineral inclusions, are subhedral to euhedral and are usually fine- to medium-grained with grain size ranging from less than 30µm to 400µm (Fig. 5.24). Py2 overgrow Py1a with fewer mineral inclusions and are euhedral grain. Py3 is medium-grained occurring as euhedral crystals surrounded by chalcopryite and pyrrhotite similar to Py3 samples from around the CRL deposit (Fig. 5.25; Table 5.1). Optical petrography and BSE imaging reveal that galena, chalcopryite and carbonate inclusions are present in Py3 (Fig. 5.25)

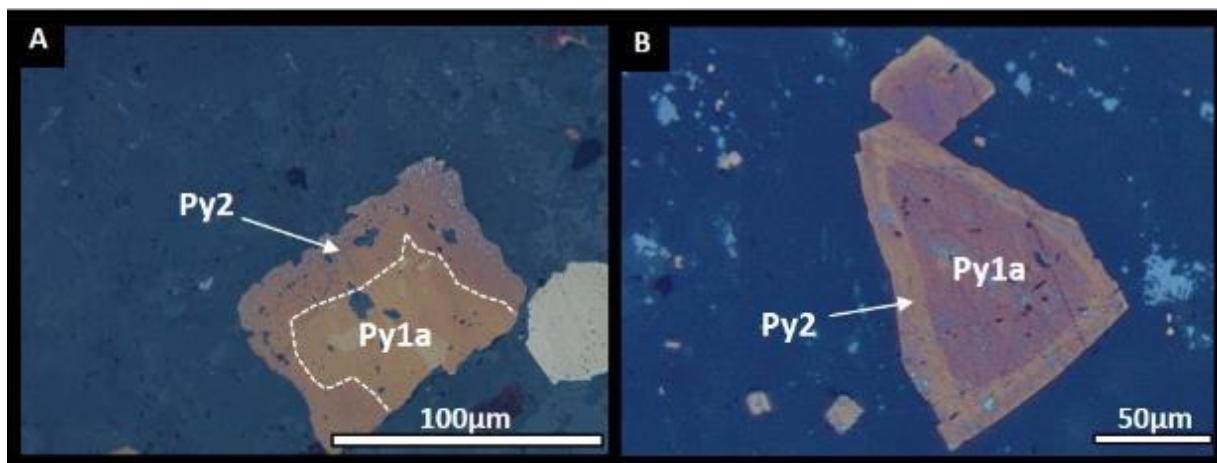


Figure 5.24 Occurrence of Py1a, Py2 and Py3 texture from the Kaymac prospect. (A-B) Euhedral fine-grained pyrite showing occurrence of Py1a and Py2 (NS019).

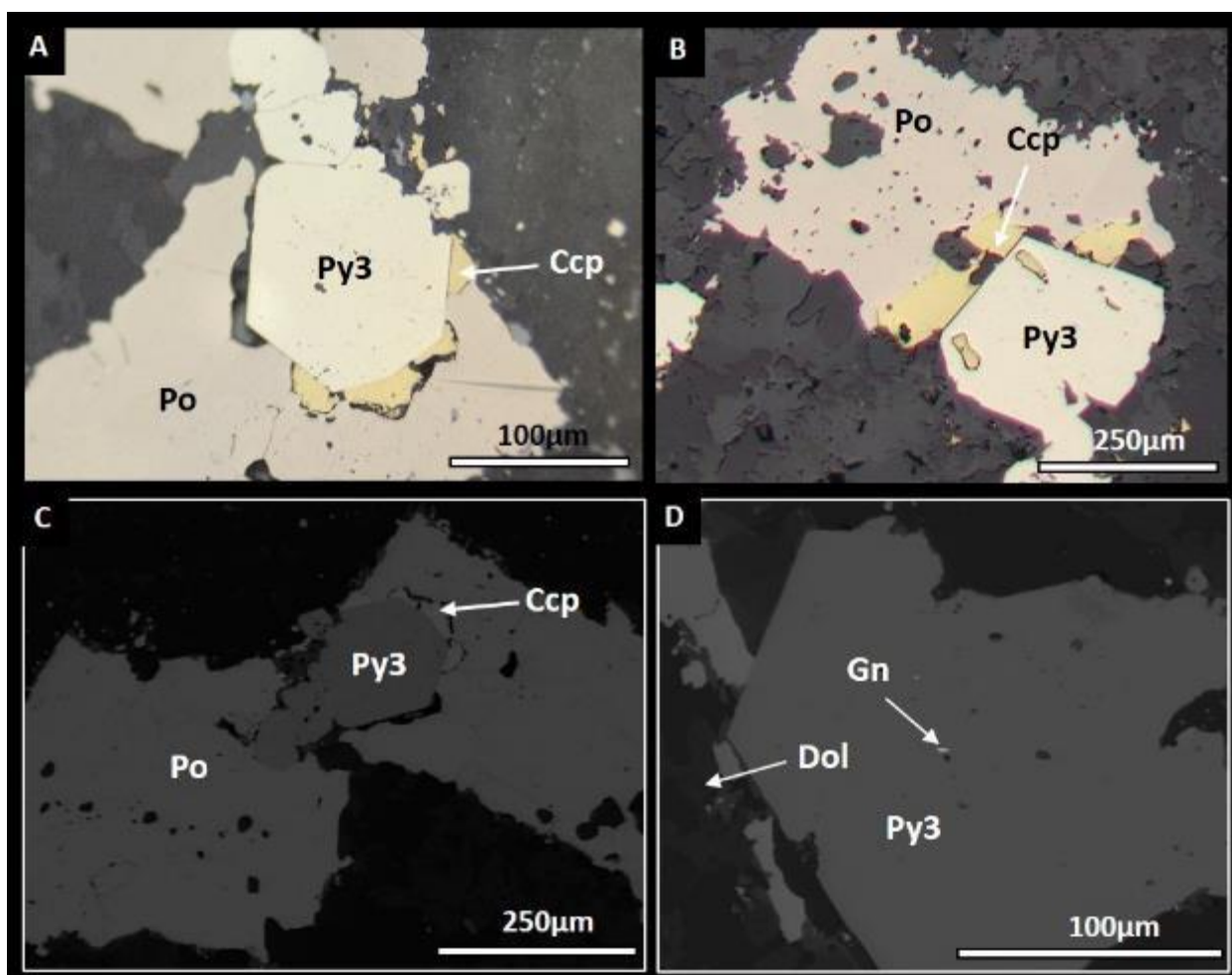


Figure 5.25 Reflected light and BSE image of Py3 from the Kaymac prospect. (A-B) Euhedral Py3 surrounded by chalcopyrite and pyrrhotite (NS019). (C-D) BSE image of euhedral Py3 crystal with mineral inclusions (NS019).

LA-ICP-MS mapping reveal that Py1a have Sb (10-50ppm), Au (1-5ppm), Se (100ppm), Au (1ppm), Ag (1ppm), Te 10 (ppm), Pb (10ppm) Bi (10ppm), W (1000ppm) whereas Cu (100ppm to one weight percent) occurs as inclusions of chalcopyrite (Fig. 5.26). Cobalt, As and Ni all have concentrations of 10ppm in Py1a. Py2 have higher concentrations of As (1000ppm) and Ni (1000ppm) but significantly lower concentrations of Sb-Au-Ag-Te-Pb-Bi (Fig. 5.26).

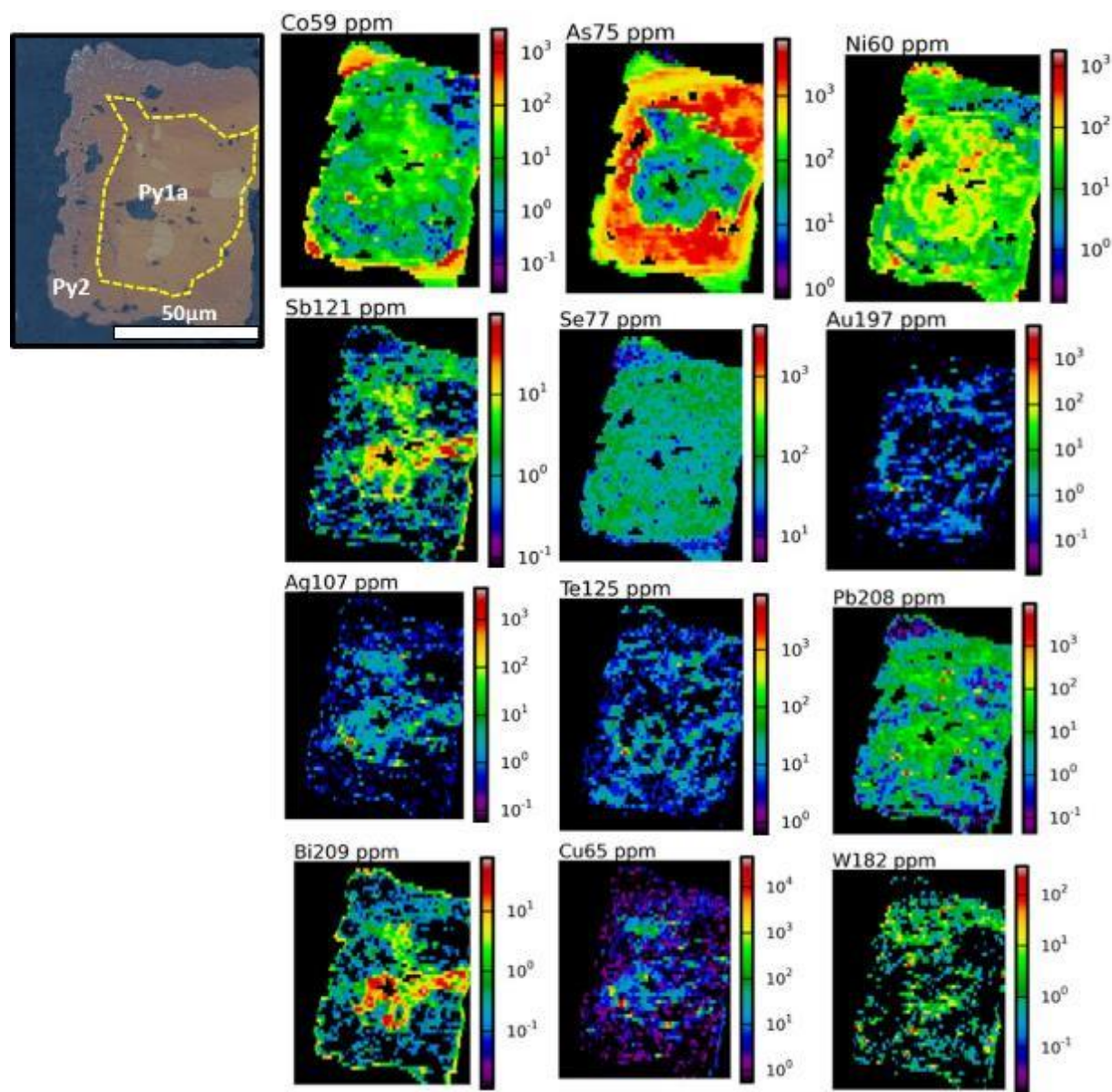


Figure 5.26 Reflected light photomicrograph of etched pyrite and representative LA-ICP-MS 2D map of pyrite from Kaymac prospect (NS019). Py1a have inclusions of Au, Ag, Te, Cu, Bi, Pb and W. Py2 have high concentration of Co, Ni and As in pyrite lattice.

Bruce Channel occurrence

Three main pyrite types were identified from the Bruce Channel occurrence including Py1a, Py1b and Py2. Py1a is early, disseminated anhedral pyrite with mineral inclusions (including carbonate and chlorite). Py1a is anhedral and is medium- to coarse-grained with grain sizes ranging from 100 μ m to 300 μ m (Fig. 5.27). Py1b occurs as narrow overgrowths of Py1a occurring as cream-white coloration exposed by acid etching (Fig. 5.27). Py2 is an inclusion-free pyrite that occurs as overgrowths on early pyrite (Py1a and Py1b). Average grain size of Py2 is larger than Py1 ranging from 100 μ m to 600 μ m across (Fig. 5.27).

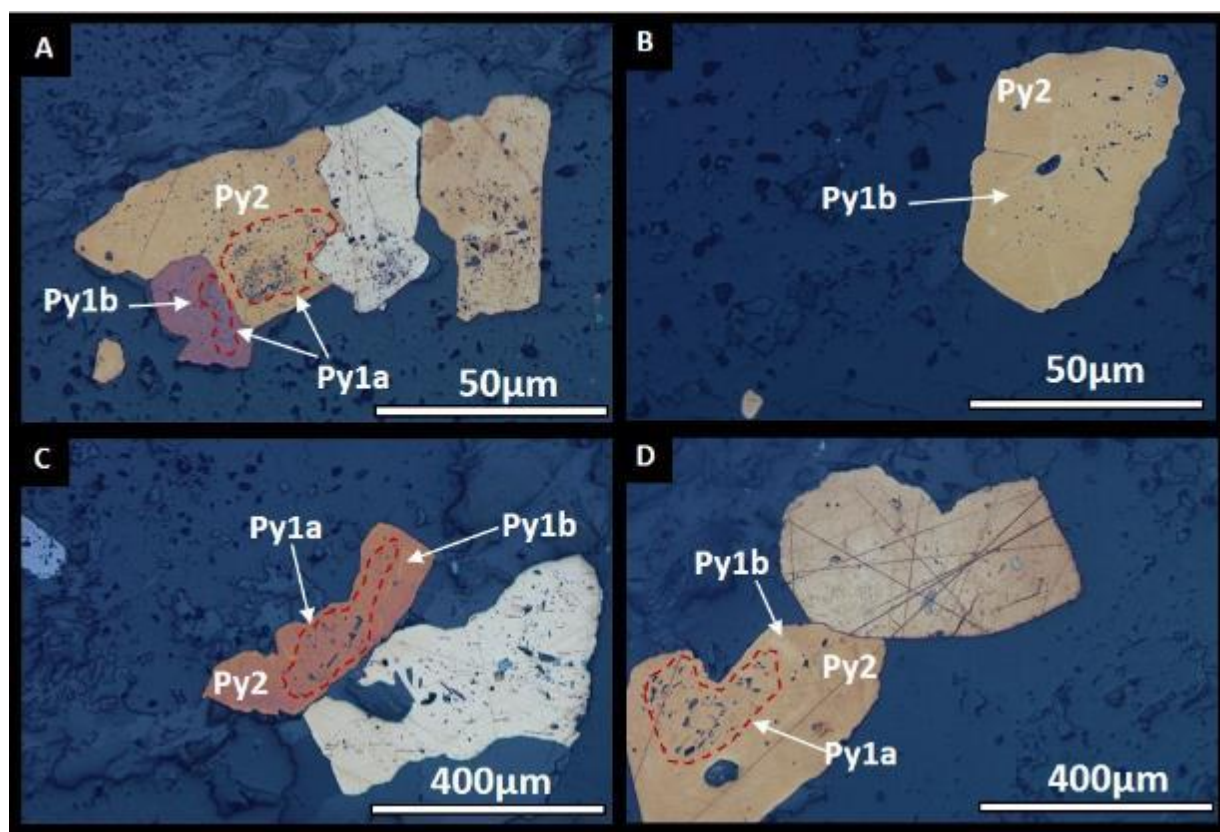


Figure 5.27 Py1a, Py1b and Py2 from the Bruce Channel prospect. (A) Medium- to coarse-grained Py2 overprinting early Py1a and Py1b (NS035). (B) Occurrence of Py1b (NS035). (C) Narrow inclusion-rich Py1a core overprinted by Py1b and Py2 (NS035). (D) Py1a overprinted by Py1b and Py2 (NS035).

LA-ICP-MS mapping of pyrite indicate that Py1a have As (1000ppm), Co (100ppm), Ni (1000ppm), Se (50ppm) and Pb (10ppm; Fig. 5.28). Py1b has Co (1000ppm), lower As (100ppm) and Ni (10ppm). Most trace elements in Py2 are below the detection limit except Co (1000ppm) As (1000ppm) and Ni (10ppm; Fig. 5.28).

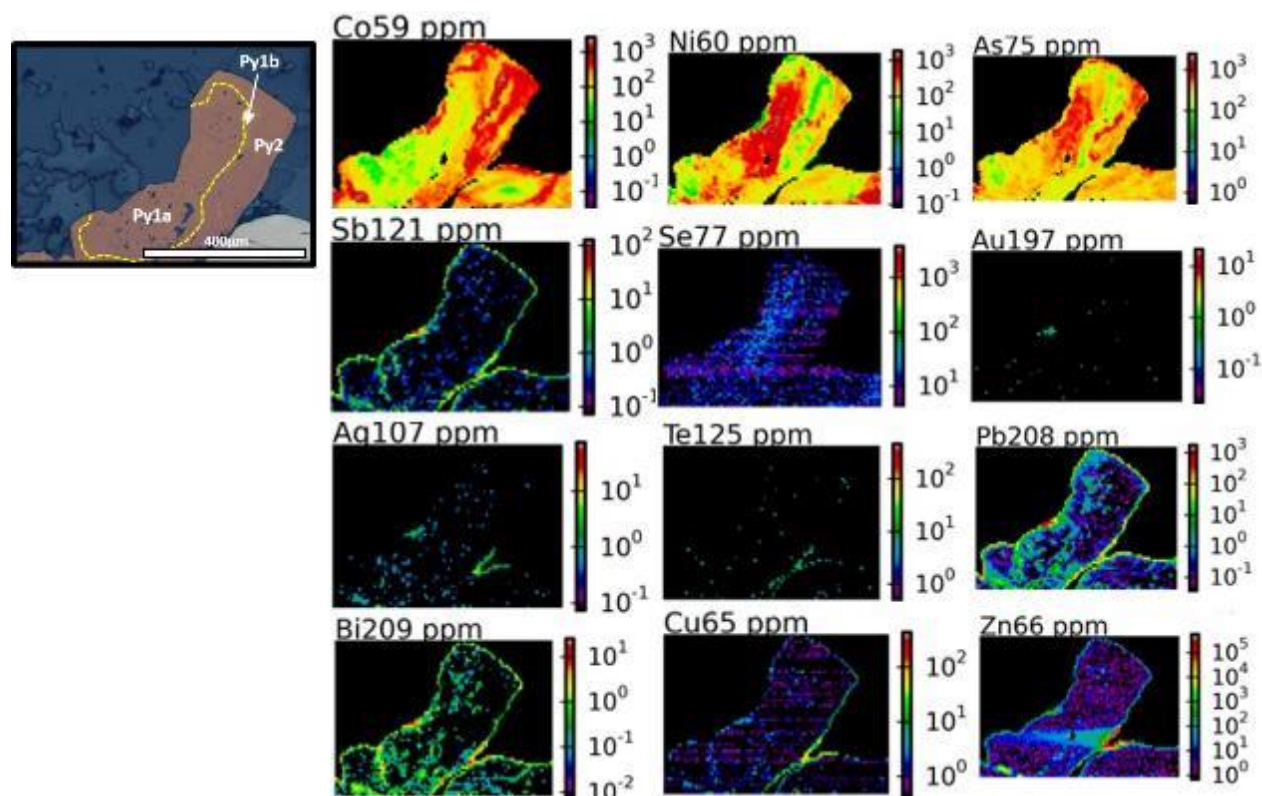


Figure 5.28 Reflected light photomicrograph of etched pyrite and representative LA-ICP-MS 2D map of pyrite from Bruce Channel prospect (NS035). Py1a have high Ni, As and Pb concentration. Py1b have grey color when etched with high Co and As. Py2 have high Co, Ni and As.

Slate Bay (Zone C)

Hydrothermal zoned pyrites at Slate Bay consist of Py1a and Py2. These pyrites occur within biotite and white mica altered rocks of the Slate Bay assemblage. Py1a is an anhedral inclusion-rich fine- to coarse-grained pyrite with grain sizes ranging from less than 200 μ m to about 1mm across, common mineral inclusions identified from optical petrography include quartz, biotite,

white mica and chalcopyrite (Fig. 5.29). Py1b occurs as wisp-like narrow overgrowths on Py1a appearing as a whitish tint on etched pyrite surfaces similar to pyrite samples from Campbell-Red Lake and deposits along the East Bay trend (Fig. 5.29; Table 5.1). Py2 is an anhedral-euhedral overgrowth of early pyrite mostly free of mineral inclusions but tend to be internally fractured compared to the early pyrites (Fig. 5.30). They also occur as well-formed euhedral crystals when they occur as disseminations in host rock but as anhedral crystals when they occur around biotite veins in host rock (Fig. 5.30).

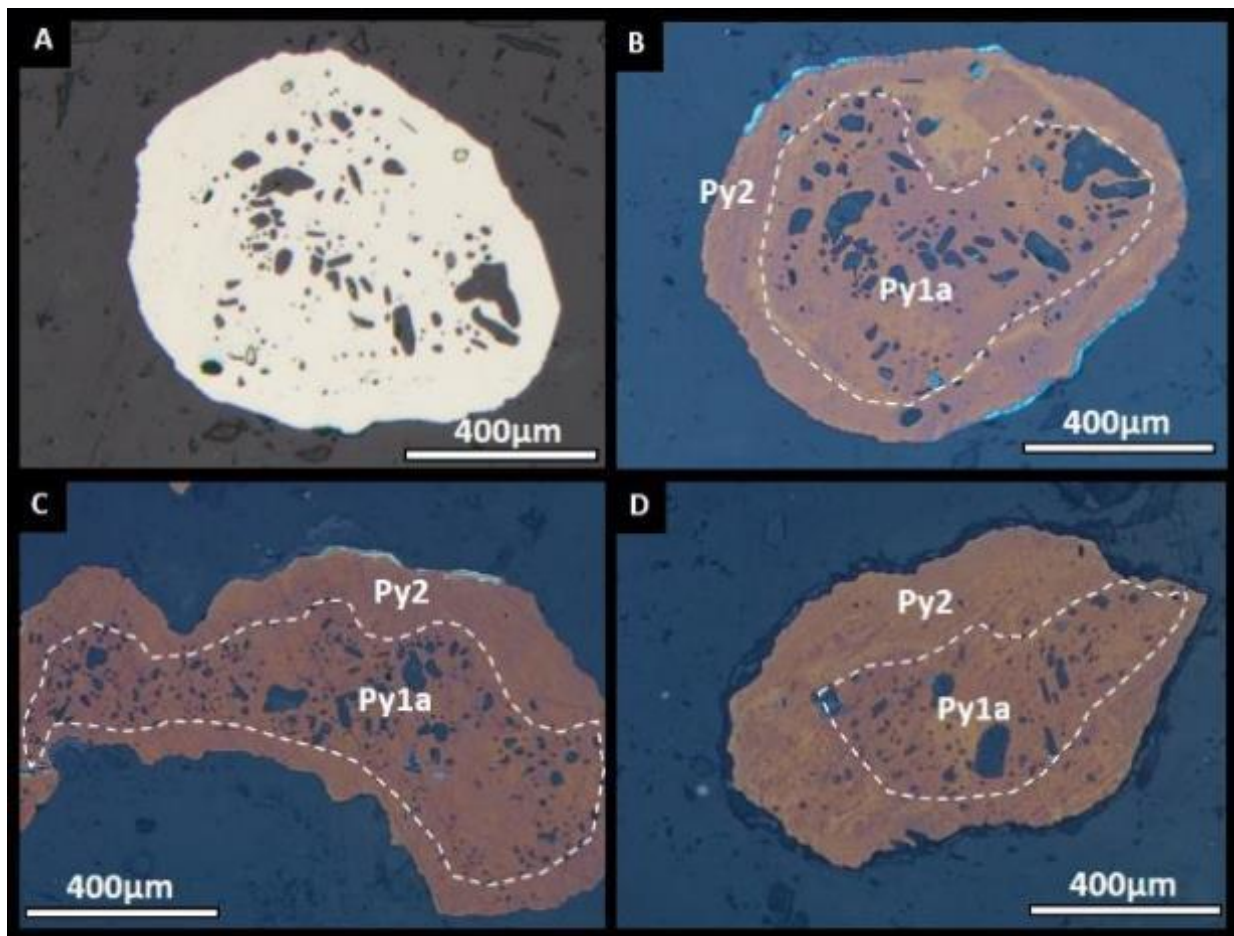


Figure 5.29 Pyrite texture from the Slate Bay metasedimentary assemblage. (A-B) Reflected light photomicrograph of unetched and etched pyrite showing growth zonation from to Py2 (NS025). (C-D) inclusion-rich Py1a and inclusion-poor Py2 (NS025).

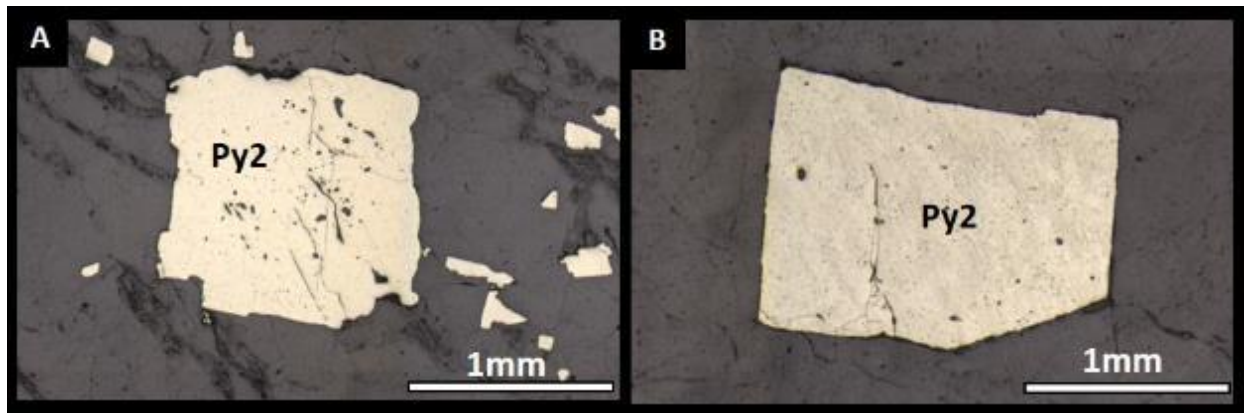


Figure 5.30 Occurrence of Py2 texture from quartz-vein hosted pyrite from Slate Bay tonalite stock. (A-B) Reflected light photomicrograph of unetched and etched highly fractured anhedral Py2 (NS026). (B) Reflected light photomicrograph of euhedral Py2 (NS026).

Howey and Hasaga deposits (Zone D)

Pyrite samples from the Howey and Hasaga deposits are associated with intrusive rocks. In the Howey deposit, hydrothermal zoned pyrites Py1a-Py2 and recrystallized Py3 were identified. Py1a at Howey deposit is anhedral early pyrite with mineral inclusions (hematite, rare earth phosphates and Bi tellurides identified from BSE imaging) that is coarse-grained with an average grain size of 1mm (Fig. 5.31). Py2 overgrow Py1a and are anhedral, medium-grained and inclusion-free occurring as overgrowth on early pyrite, grain size ranges from 200µm to 400µm (Fig. 5.31). Py3 is a fine- to medium-grained euhedral pyrite surrounded by chalcopyrite and pyrrhotite with grain sizes ranging from 100µm to 500µm (Fig. 5.32).

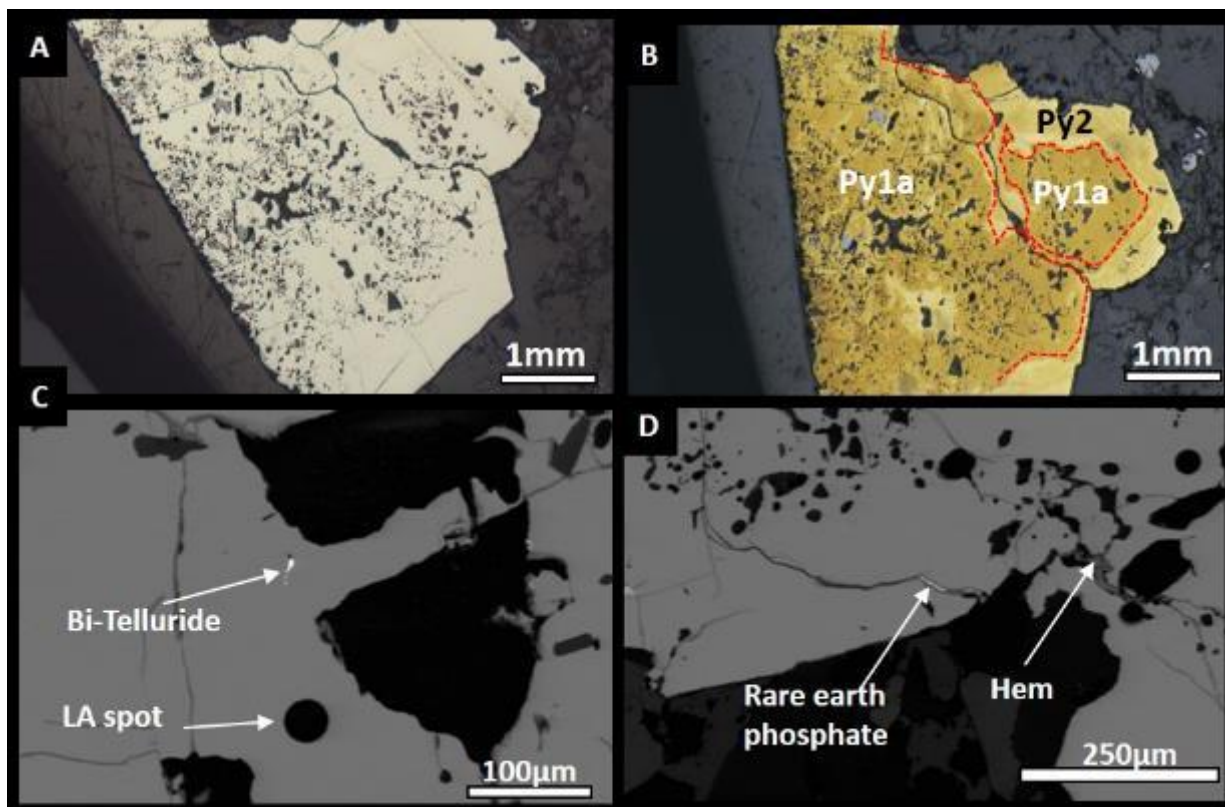


Figure 5.31 Textures of pyrite types from the Howey deposit. (A-B) Reflected light photomicrograph of unetched and etched pyrite showing textures of early Py1a-Py1b and later Py2 (ND212A). BSE image of mineral inclusions in pyrite types at the Howey deposit (ND212A)

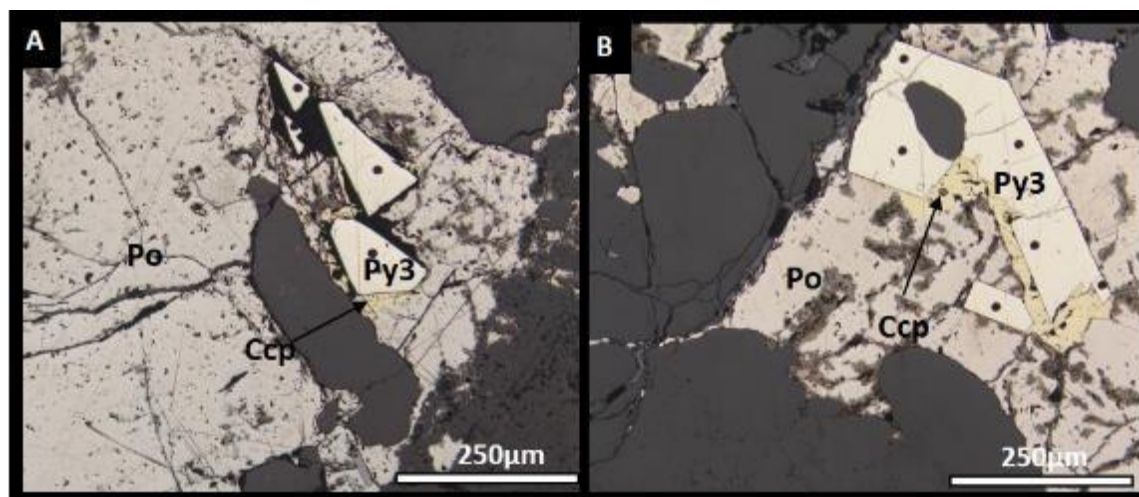


Figure 5.32 Occurrence of Py3 in the Howey deposit. (A-B) Euhedral Py3 surrounded by chalcopyrite and pyrrhotite (ND211A).

The main pyrite types observed in samples from the Hasaga deposit is Py1a occurring in veins. Py1a are subhedral to anhedral and are often inclusion rich with grain size ranging from 2-8mm (Figs. 5.33, 5.34). Py1a veins have rough and patchy edges that are replaced by chalcopyrite. Mineral inclusions include gold, chalcopyrite, quartz, carbonate and tourmaline (Fig. 5.34). Py1a are highly fractured with Au and chalcopyrite occurring along the fractures (Figs. 5.33; 5.34).

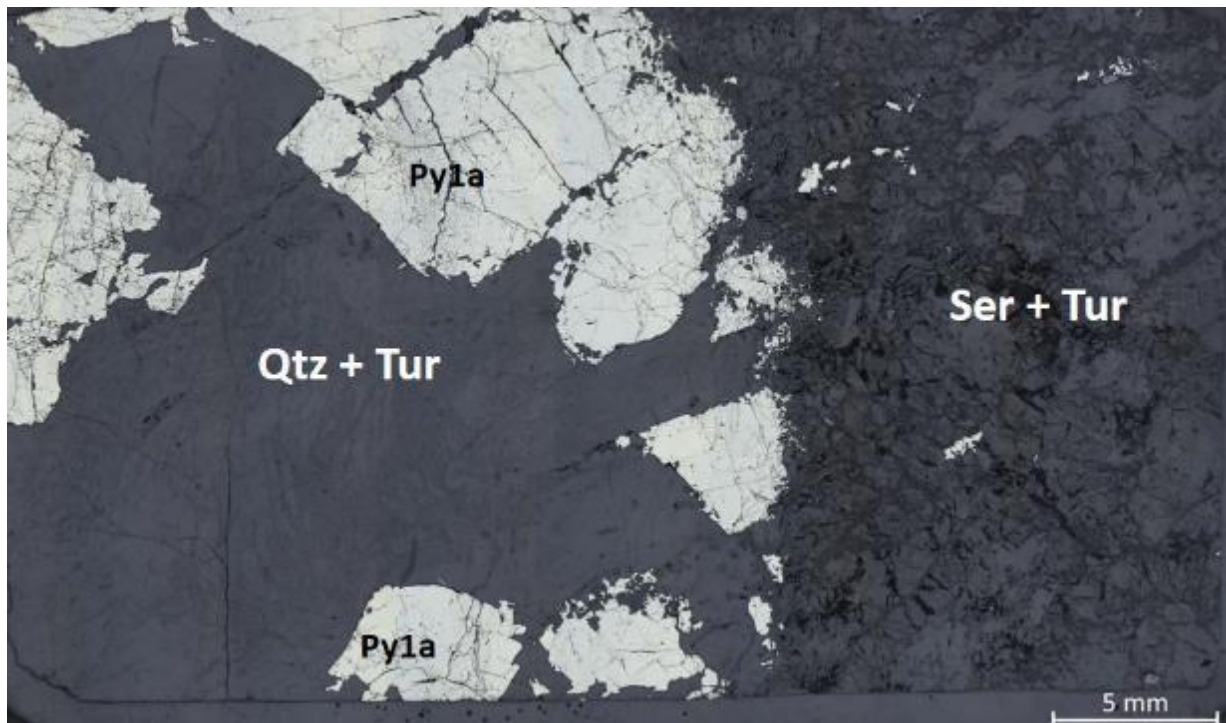


Figure 5.33 Full thin section scan showing occurrence of vein Py2 in the Hasaga deposit (ND087). Qtz-Quartz, Ser- Sericite, Tur-Tourmaline.

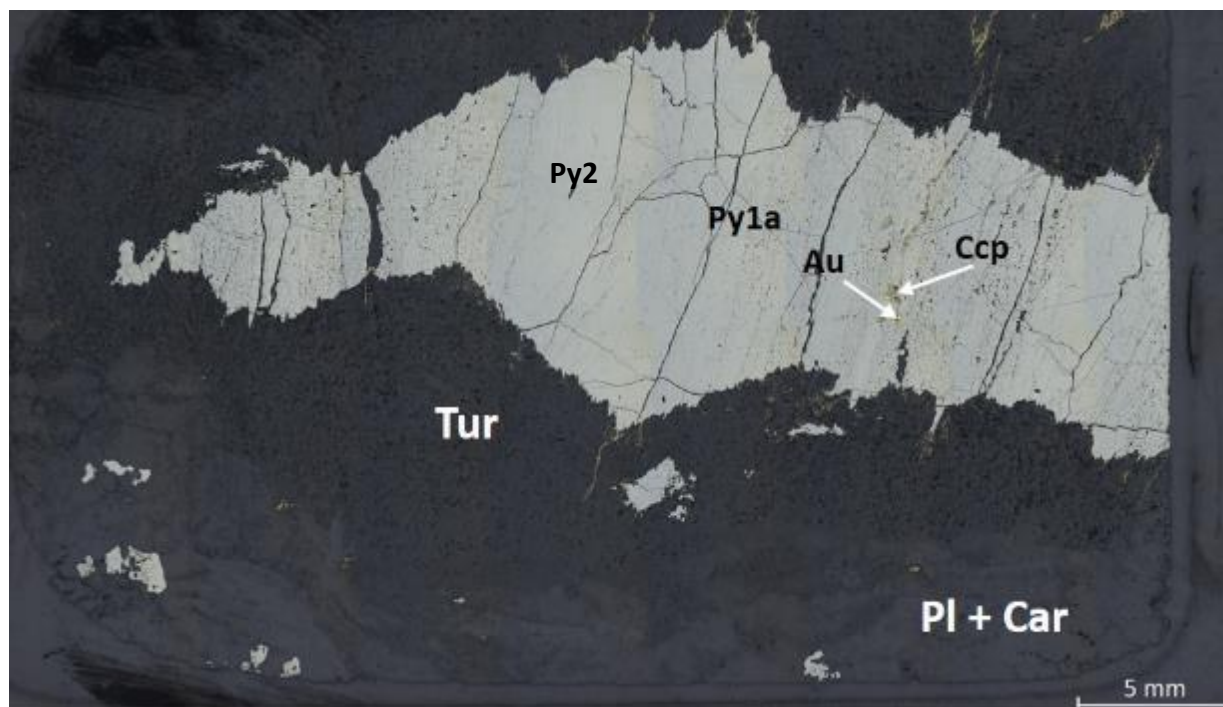


Figure 5.34 Full thin section scan showing occurrence of vein pyrite with inclusions of gold and chalcopyrite in the Hasaga deposit (ND088). Qtz-quartz, Tur-tourmaline, Pl-plagioclase, Au-gold, Ccp-chalcopyrite, Car-carbonate

5.2 LA-ICP-MS spot analysis

The Texture of pyrites across the Red Lake deposits and occurrences have shown that there are two main types namely hydrothermal zoned pyrites (Py1a, Py1b and Py2) and metamorphic recrystallized pyrites (Py3). LA-ICP-MS spot analysis was performed on a total of 70 samples to generate 1119 spots. The trace element compositions of pyrites for different deposits are presented below.

Campbell-Red Lake Deposit (Zone A)

Hydrothermal zoned pyrites at the CRL deposit have varying contents of trace elements for each pyrite type from core to rim. Early pyrite Py1a have high Au contents, reaching a maximum of 190ppm, with a mean of 2.25 ppm, Py1b have elevated As concentrations which peak at 5.7

weight percent (mean value of 5986ppm; Fig. 5.35). Py1b also have high Au values (maximum 102 ppm) but a lower mean of 2.76 ppm compared to Py1a. Py1a is enriched in Sb (maximum value of 7075 ppm), Tl (130 ppm), and Ag (172 ppm), Py1b contains slightly higher concentrations of Ag (mean value of 5.79 ppm) compared to Py1a with a mean value of 5.02 ppm (Fig. 5.35). Cobalt and Ni have high concentrations in Py1b (mean value of 1242.18 ppm and 1000.54 ppm respectively) compared to Py1a (mean value of 286.57 ppm and 757.85 ppm respectively). Py1b have higher concentration of Te (mean 11.87 ppm) compared to Py1a (mean 6.68 ppm) similar to observations for Se (Fig. 5.35).

Py2 have lower concentration of Au (mean 0.09ppm), Ag (mean 2.5ppm), Te (1.99ppm) and Bi (mean 0.52ppm) compared to Py1a and Py1b but have higher average concentration of Cu (241ppm) compared to Py1a and Py1b (Fig. 5.35). Average concentrations of As, Co and Ni in Py2 is 966ppm, 1227ppm and 1033ppm respectively. These values are comparable to those observed for similar elements in recrystallized Py3 (Fig. 5.35). Py3 have higher average Cu concentrations (570ppm) compared to Py2 (Fig. 5.35).

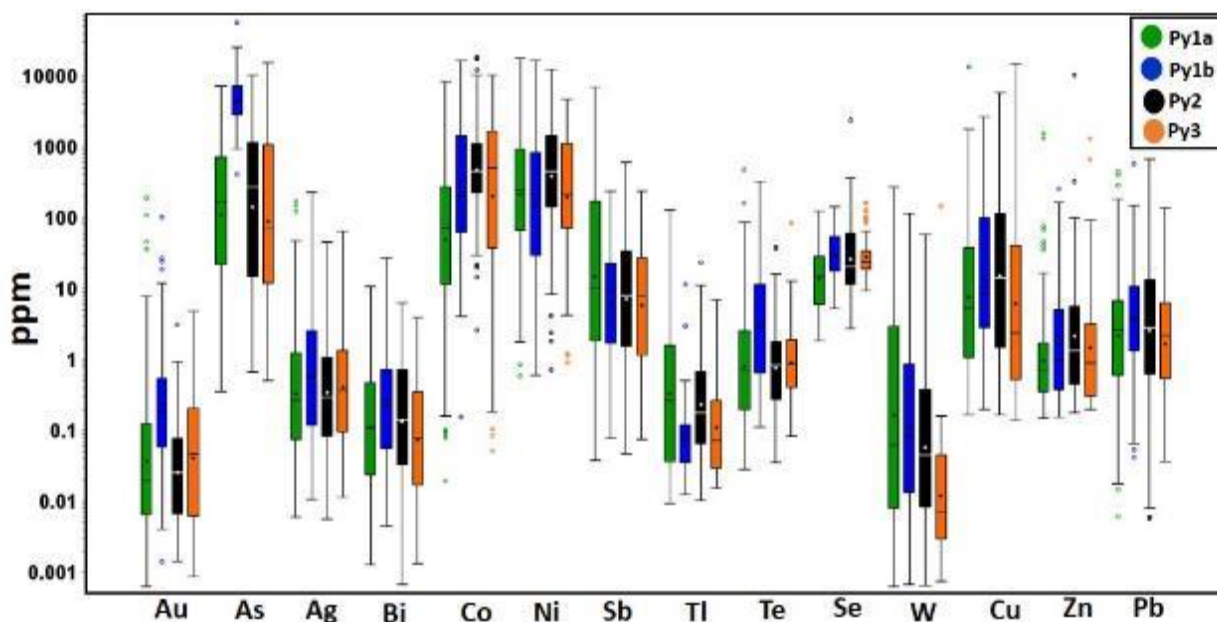


Figure 5.35 Box and whisker plot showing logged values of trace element concentrations of different pyrite types from the Campbell-Red Lake deposit.

East Bay deposits (Zone B)

Marcus Deposit

Pyrite from the Marcus deposit exhibits variability in trace element chemistry of hydrothermal zoned pyrites. Average values of Au decrease slightly from Py1a (mean 1ppm), through Py1b (mean 0.09ppm) and Py2 (mean 0.07ppm; Fig. 5.36). Py1a have higher average concentrations of Ag (mean 1.9ppm), Bi (mean 1.42ppm), Sb (mean 12.32ppm), Tl (mean 0.31ppm), Ni (mean 509.68ppm), Te (mean 2.09ppm), Cu (mean 53.09ppm) and Zn (mean 2.37ppm) compared to Py1b and Py2 (Fig. 5.36). Py1b have the highest average value of As (mean 3467.96ppm) and Co (mean 2852.06ppm) compared to Py1a and Py2 (Fig. 5.36).

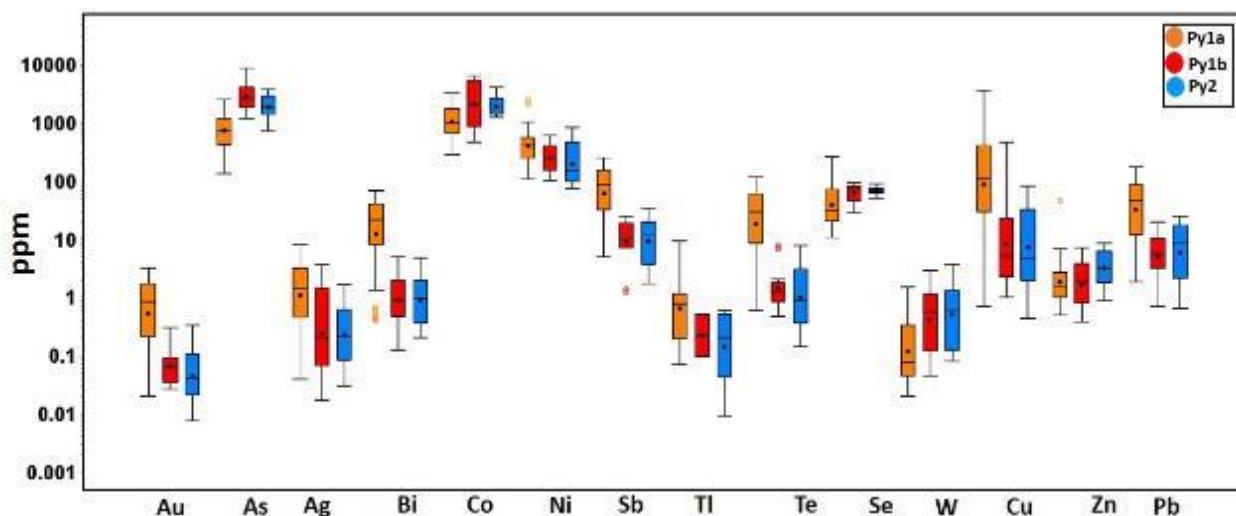


Figure 5.36 Box and whisker plot showing logged values of trace element concentrations of different pyrite types from the Marcus deposit.

Cochenour-Willans deposit

Only hydrothermal zoned pyrites with Py1a, Py1b and Py2 from core to rim were identified at the Cochenour-Willans deposit. The composition of Au in Py1a range from 0.01 to 3.35ppm whereas it ranges from 0.01 to 2.59ppm for Py1b and 0.02 to 1.3ppm for Py2 (Fig. 5.37). Py1a also have higher average composition of Bi (mean 1.46ppm) and Te (mean 14.98ppm) compared to Py1b and Py2 (Fig. 5.37). Antimony have mean value of 43.45ppm in Py1a whereas Py1b have 30.92ppm and Py2 have 21.39ppm. Py1b have higher average As (mean 3630.54ppm) and Co (mean 1449.37ppm) compared to Py1a and Py2 (Fig. 5.37). The average composition of Se and W in Py1a, Py1b and Py2 show almost equal distribution whereas average values of Pb have more variability between pyrite growth zones with Py1a having mean value of 10.94ppm whereas Py1b have mean 7.34ppm and Py2 have 8.49ppm (Fig. 5.37).

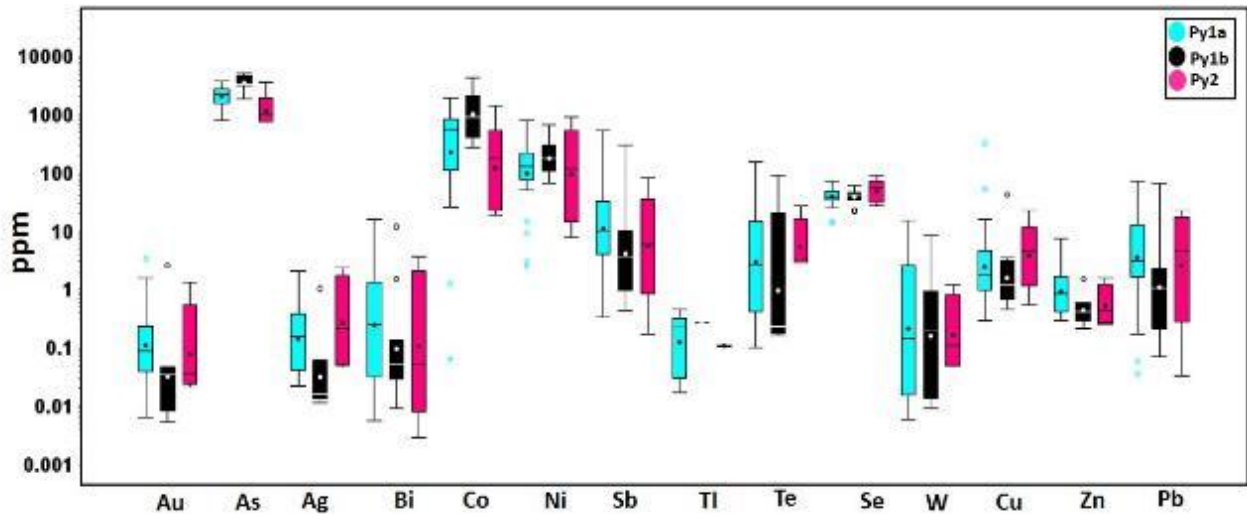


Figure 5.37 Box and whisker plot showing logged values of trace element concentrations of different pyrite types from Cochenour-Willans deposit.

McMarmac deposit

Zoned pyrite with Py1a and Py1b were identified at the McMarmac deposit. Py1a displays moderate Ni (489 ppm) and Co (284 ppm), with moderate values of Sb (19 ppm) and Pb (~45 ppm) also observed in Py1a (Fig. 5.38). Average Co (225ppm) and Ni (131ppm) composition of Py1b is slightly lower than Py1a. Gold and Te values of Py1a and Py1b at McMarmac are low with average values of both elements close to the instrument detection limit (Fig. 5.38). Py1b shows As enrichment (mean ~2682 ppm) but lower Co (225 ppm) and Ni (~131 ppm) compared to Py1a. Sb (6 ppm), Pb (3 ppm), Cu (2ppm) and Zn (0.4ppm) values of Py1b are lower than Py1a, whereas Se is similar (~36 ppm; Fig. 5.38).

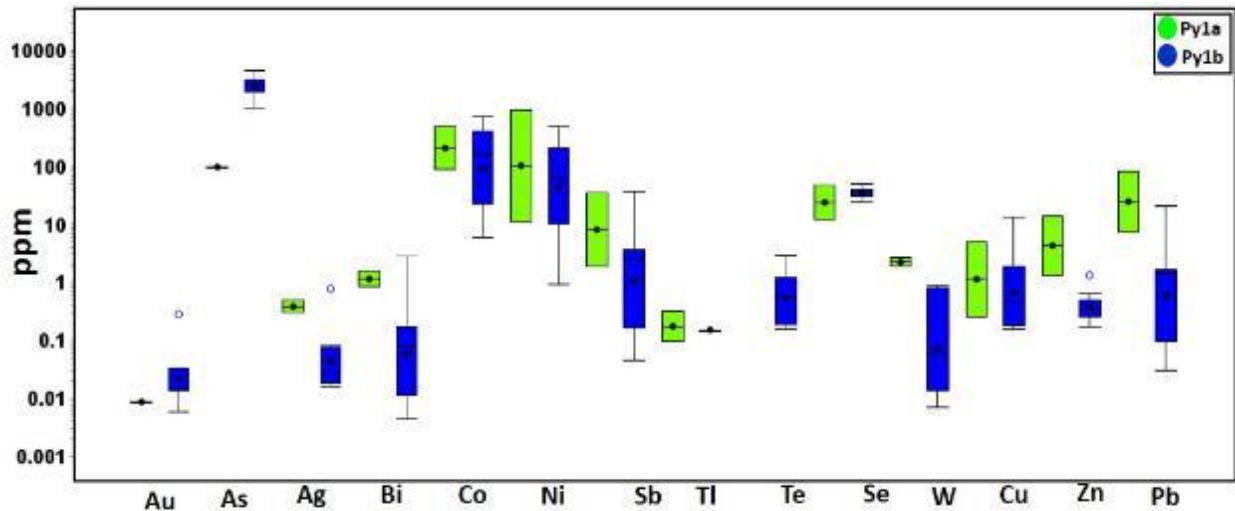


Figure 5.38 Box and whisker plot showing logged values of trace element concentrations of different pyrite types from the McMarmac deposit

Slate Bay occurrence (Zone C)

The mean As concentration of Py1a is 278 ppm in Py1a whereas it is slightly lower in Py2 (mean 191 ppm; Fig. 5.39). Average Au concentration is higher in Py1a (0.2ppm) relative to Py2 (0.04ppm). Average values of Sb (0.2ppm) and Tl (0.009ppm) are very low in both Py1a and Py2 (Fig. 5.39). Values of Ag, Bi and Te are all also low across Py1a and Py2. Selenium has higher average concentrations in Py1a (48ppm) compared to Py2 (27ppm) which is similar to observations for Te albeit with lower concentrations (Fig. 5.39). Cobalt has the highest concentration in Py2 (mean value of 1956ppm) compared to Py1a (mean value of 911 ppm) whereas Ni have mean concentrations of 1362ppm in Py1a and 243ppm in Py2 (Fig. 5.39).

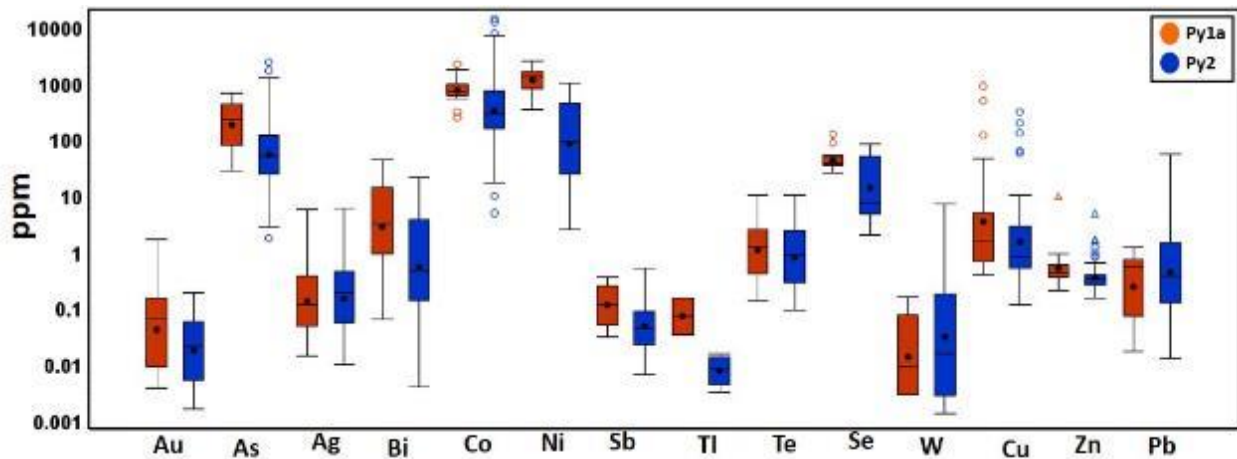


Figure 5.39 Box and whisker plot showing logged values of trace element concentrations of different pyrite types from the Slate Bay Au occurrence.

Howey deposit

The Howey deposit contains both zoned pyrites (Py1a, Py2), and recrystallized Py3 which show variability in trace element contents. The average value of Au varies between pyrite types with Py1a, Py2 and Py3 having 0.13ppm, 0.009ppm and 0.23ppm respectively (Fig. 5.40). The average values of Ag (7.7ppm), Bi (~6ppm) and Te (5.7ppm) in Py3 is higher than in Py1a and Py2 (Fig. 5.40). Values of As and Co is also higher in Py3 compared to Py1a and Py2. Nickel has higher average values (208ppm) in Py1a compared to other pyrite types (Fig. 5.40). Values of Sb and Tl are either very low or below the detection limit of instrument for all pyrite types at Howey deposit (Fig. 5.40). Average Se and Te values have almost equal distribution across all pyrite types whereas the average Cu concentration in Py3 (52ppm) is higher than average values in other pyrite types (Fig. 5.40).

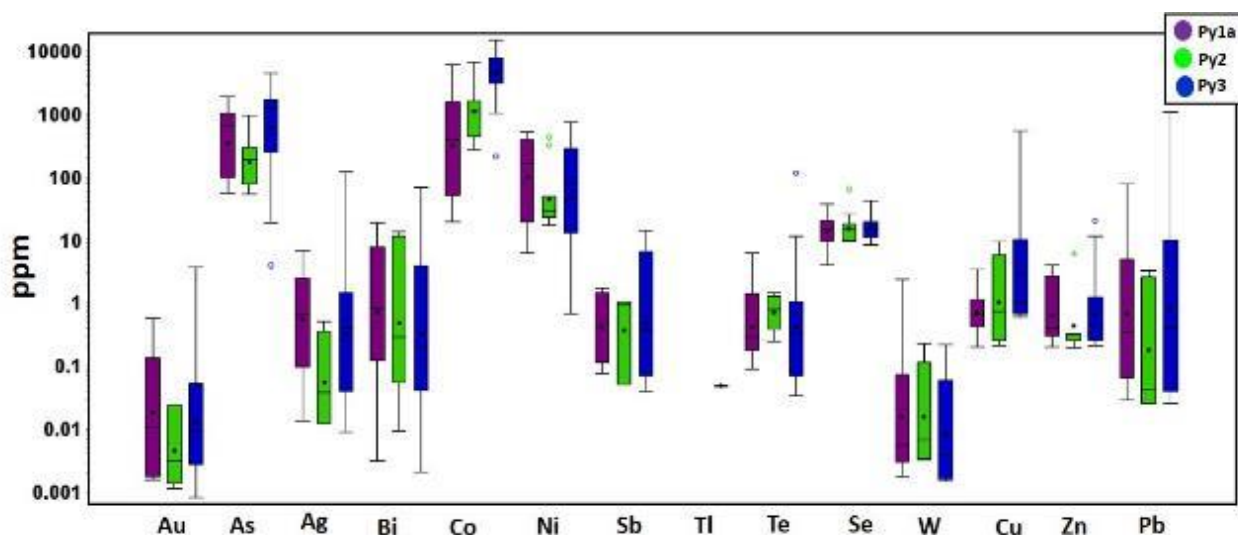


Figure 5.40 Box and whisker plot showing logged values of trace element concentrations of different pyrite types from the Howey deposit.

Hasaga deposit

Pyrite in the Hasaga deposit occurs as veins within the Dome stock diorite. Pyrite textures revealed inclusion rich Py1a is the main pyrite type with Py2 occurring as a narrow growth zone (Fig. 5.41). Py1a have low average Au (0.07 ppm), Ag (0.4ppm) Bi (4 ppm), and moderate As compositions (149 ppm). Antimony and Tl values of Py1a are very low whereas Co (100 ppm) and Ni (55 ppm) are modest, while Pb averages 5 ppm (Fig. 5.41). Tellurium (2.6 ppm) and Se (21 ppm) values in Py1a are low (Fig. 5.41). Py2 is similar but tends toward slightly higher average Co (303 ppm) and Ni (303 ppm), with lower As (52 ppm). Lead contents are low (6.5 ppm), and Au is again very low (~0.09 ppm). Compared to pyrite from mafic volcanic hosted deposits (e.g., CRL and McMarmac) Py2 from Hasaga are less enriched in As (52ppm) and Co (302ppm). Antimony and Tl values of Py2 are also very low, similar to observations in Py1a (Fig. 5.41).

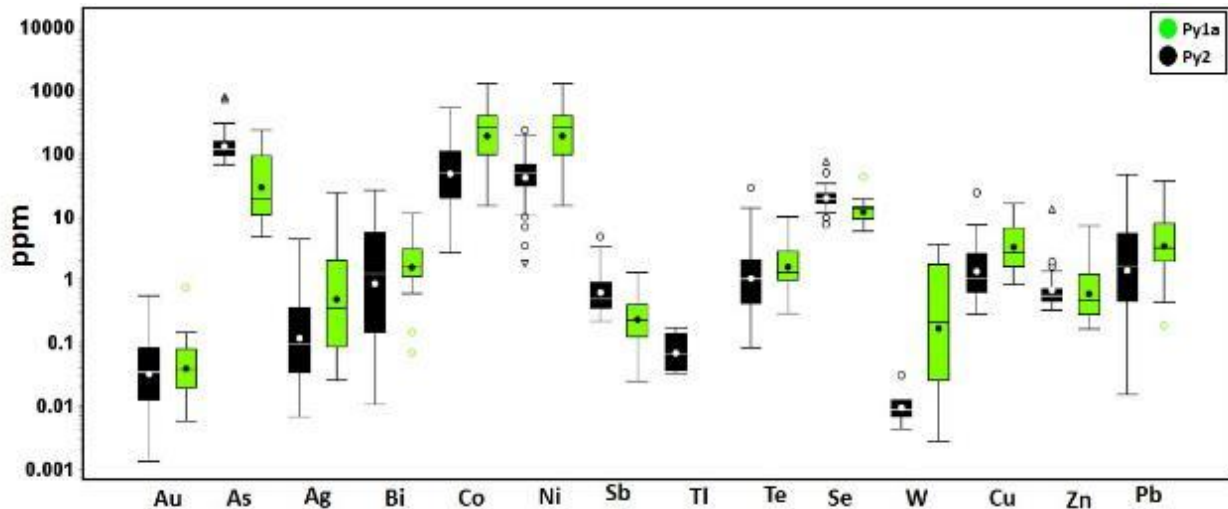


Figure 5.41 Box and whisker plot showing logged values of trace element concentrations of different pyrite types from the Hasaga deposit.

5.3 Sulfur isotopes

A total of 74 in-situ LA-MC-ICP-MS sulfur isotope analysis were generated from 18 samples from hydrothermal zoned and recrystallized pyrites. The in-situ sulfur isotope dataset per sample analyzed is in Appendix III. Values of $\delta^{34}\text{S}$ for Py1a at CRL range from +2.2‰ to +9.2‰ (mean of +4.5‰) whereas Py1b range from +3 to +6.7‰ (mean of +4.7‰; Fig. 5.42). Late Py2 at CRL have average $\delta^{34}\text{S}$ of +6.6‰ which is higher than average values for Py1a and Py1b (Fig. 5.42). At the Marcus deposit, zoned pyrites analyzed yield average value of $\delta^{34}\text{S}$ that range from +0.3‰ to +5.5‰ for Py1a, +5.8‰ to +5.9‰ for Py1b and +5.9‰ to +6.2‰ for late Py2 (Fig. 5.42). Cochenour-Willans deposit pyrites have higher $\delta^{34}\text{S}$ values for zoned pyrites with Py1a having a range of +3.6‰ to +5.2‰ whereas Py2 range from +5.2‰ to +10.1‰ (Fig. 5.42). The $\delta^{34}\text{S}$ value of zoned pyrites at the intrusion hosted Howey gold deposit range from +1.4‰ to +1.5‰ for Py1a whereas recrystallized Py3 range from +1.9‰ to +3.2‰ (Fig. 5.42).

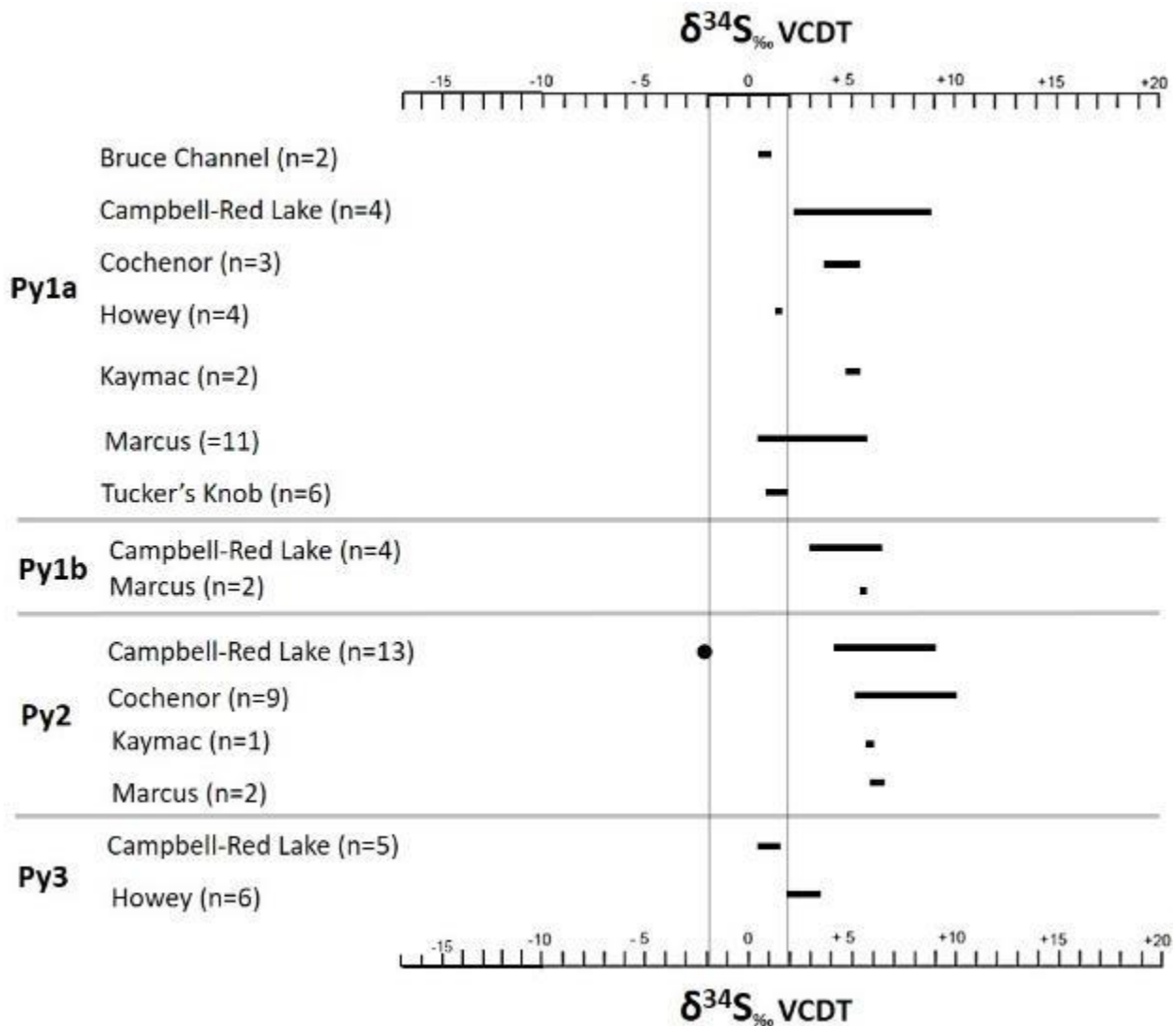


Figure 5.42 Range of $\delta^{34}\text{S}$ (VCDT) values for each pyrite type across multiple deposits in the Red Lake greenstone belt. The rectangular box denotes the range of mantle $\delta^{34}\text{S}$ values from Ripley and Li (2003).

Chapter 6 - Discussion

6.1 Occurrence and paragenesis of pyrite types in the Red Lake greenstone belt Au deposits

Pyrite samples were collected from different Au deposits and occurrences in the Red Lake greenstone belt, including the Campbell-Red Lake (CRL), Cochenour-Willans, Marcus, Howey and Hasaga deposits. Pyrite was also sampled at the Bruce Channel, Kaymac, Tucker's Knob, Slate Bay and Bonanza Au occurrences (Fig. 6.1). The occurrence of pyrite at the Red Lake gold deposits is either in veins or as replacement of host rocks (Figs. 4.7, 4.8, 4.11, 4.13). The pyrite samples were collected to compare texture and chemistry across deposits and Au occurrences. To understand variations between samples, it is important to highlight the differences between the styles and size of the deposits from where the samples were collected. This can be used to infer how pyrite mineral chemistry can discern similarities and/or differences amongst deposits and Au occurrences. The CRL deposit was categorized as a mafic volcanic hosted deposit by Pirie (1981). The deposit is a world class orogenic gold deposit primarily hosted within highly altered and deformed Balmer assemblage rocks including basalts and komatiites with minor occurrences in felsic and mafic intrusive and extrusive rocks that cut the mafic and ultramafic package. The CRL deposit (now called Red Lake Gold Mines) has produced more than 7 million ounces of gold from 2006-2023 making it one of the most prolific gold deposits in the Superior Province (Malegus et al., 2023). The Cochenour-Willans, Marcus and Abino deposits are historic deposits that were also interpreted to be mafic volcanic-hosted deposits like the CRL deposits as they occur in the highly altered and deformed Balmer assemblage rocks (Pirie, 1981). The various styles of mineralization in the current and past producing deposits have been outlined more fully in

Chapter 2. Pyrite samples collected from the above deposits and Au occurrences have different textures and chemistry.

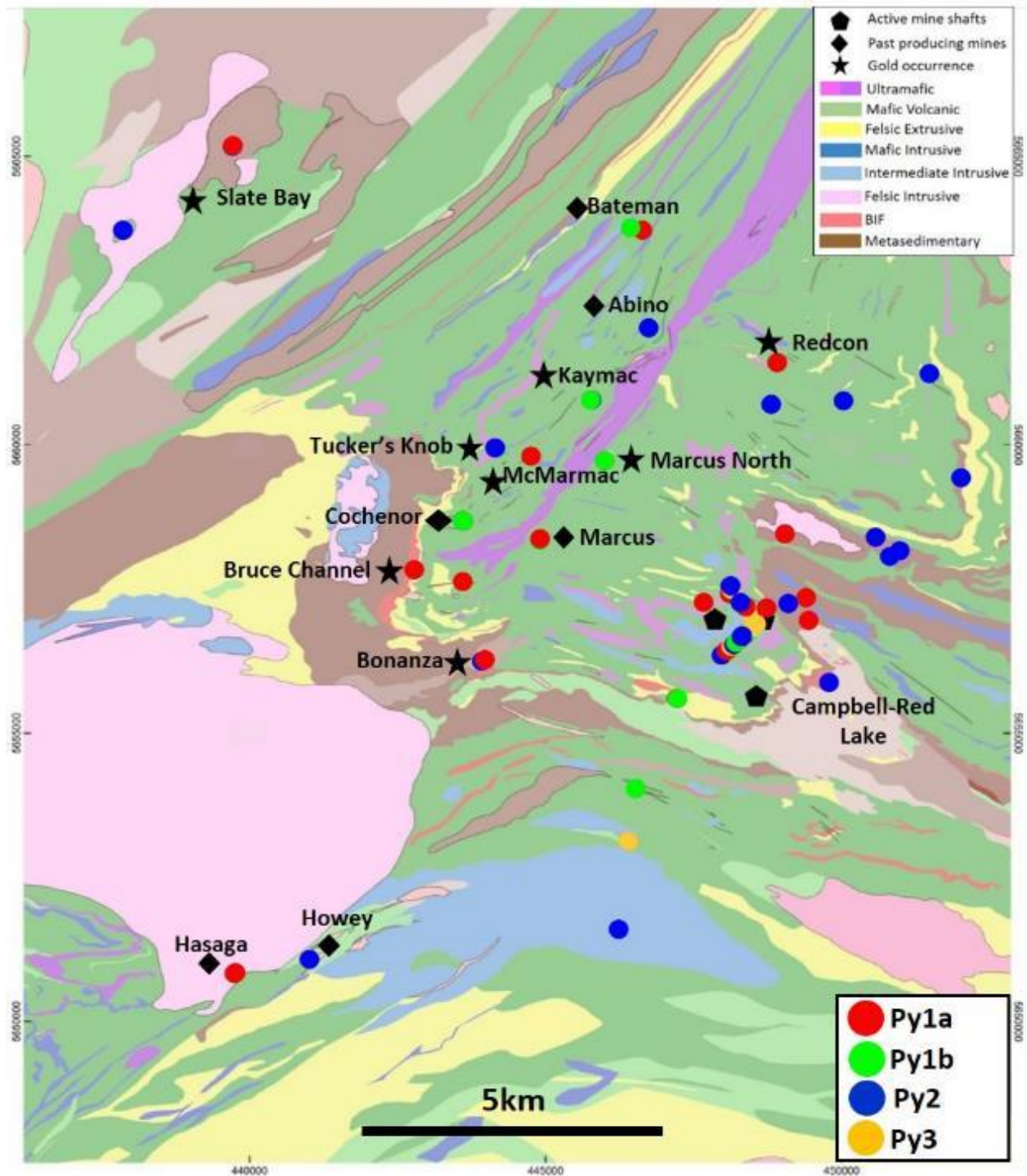


Figure 6.1 Map showing common pyrite types across main deposits, gold occurrences and non-mineralized samples in the Red Lake greenstone belt. Map modified from Evolution Mining (2023).

The nomenclature of pyrite types Py1a, Py1b, Py2 and Py3 as described in Chapter 5 is specific to this study and is based on the textural and chemical characteristics of each pyrite type as they represent the complex zonation from the different deposit types in the Red Lake greenstone belt. To simplify things, the pyrite nomenclature will be used to describe pyrites from all deposits and Au occurrences from the Red Lake greenstone belt where Py1a, Py1b and Py2 represent growth zonation in hydrothermal pyrites whereas Py3 represent recrystallization. However, the same pyrite types may not have formed at the same time across the different deposits (and Au occurrences) as gold mineralization occurred from 2720 Ma to 2714 Ma along the Red Lake mine trend (where the CRL and Cochenour-Willans deposits are located) and from 2718 Ma to 2699 Ma along the Howey Bay deformation zone (where the Howey and Hasaga deposits are located; Corfu and Andrews, 1987).

The zoned pyrites (which consist of Py1a and Py1b and recrystallized Py3) were all identified around the CRL deposit. Py1a and Py1b at CRL host gold either in their crystal structure or as mineral inclusions. However, Py1b was found to occur proximal to the CRL mine areas whereas Py1a and Py2 occur in both the distal and proximal portion of CRL deposit hence are more widespread (Fig. 6.2). Only Py1a, Py1b and Py2 were identified at the Cochenour-Willans and Marcus deposits whereas Py1a, Py2 and Py3 were identified from the intrusion related Howey and Hasaga deposits (Fig. 6.2). At the Red Lake gold occurrences, Py1a, Py1b and Py2 were identified at Tucker's Knob whereas Py1a, Py2 and Py3 were found at Kaymac. The Slate Bay, Bruce Channel, and Bonanza gold occurrences only have Py1a and Py2 zonation in pyrite samples. The grain scale variation of pyrites differs between gold deposits and occurrences from across the Red Lake greenstone belt.

At the Red Lake Au deposits and occurrences, a single pyrite grain can have two or three growth zones which is a typical feature of hydrothermal pyrites in orogenic Au deposits reflecting evolving hydrothermal fluids or as product of rapid disequilibrium growth (e.g., (Large et al., 2007; Velasquez et al., 2014; Román et al., 2019; Steadman et al., 2021; Sugiono et al., 2022)). The textural variations of each growth zone for major Red Lake Au deposits (including CRL, Marcus, Cochenour-Willans and Howey) will be used here to identify the district scale paragenesis of pyrite.

The core of zoned pyrites in the CRL deposit consist of Py1a which have abundant mineral inclusions overgrown by other pyrite types including Py1b and Py2 (Fig. 6.2). The mineral inclusions in Py1a (which include quartz, ankerite, white mica, illmenite, rutile, arsenopyrite etc.) are considered primary because they are as a result of replacement of wall rock minerals during sulfidation due to rapid crystal growth (Figs. 6.2, 6.3). Similar pyrite textures have been reported from orogenic gold deposits in the El Callao mining district, Venezuela where they have been interpreted as early, wall rock replacement pyrites (Velasquez et al., 2014). However, mineral inclusion rich pyrites can also form from secondary growth in hydrothermal deposits if there has been a process known as coupled dissolution-reprecipitation (CDR) that can create secondary mineral inclusions and/or pores in pyrite (Hastie et al., 2020). Evidence of CDR processes in pyrite is common to deposits and occurrences along the East Bay area e.g., Cochenour-Willans, Marcus, Kaymac, Tucker's Knob and Bruce Channel. Evidence of CDR process that develop secondary porosity and mineral inclusions in pyrite is presented in Figure 5.13 from Marcus deposit that demonstrates primary As-Co oscillatory zonation in Py1b occurring between As-deficient Py2 being dissolved by fluid to reprecipitate pore and mineral inclusion rich Py1a. This sequence of

complex pyrite dissolution and reprecipitation is also common across other deposits in the East Bay area as shown Figures 5.13, 5.19, 5.23, 5.26, 5.28 and 5.29. As such, porous and mineral inclusion rich Py1a in the East Bay area deposits represent the last stage of hydrothermal pyrite after Py1b and Py2 (Fig. 6.2).

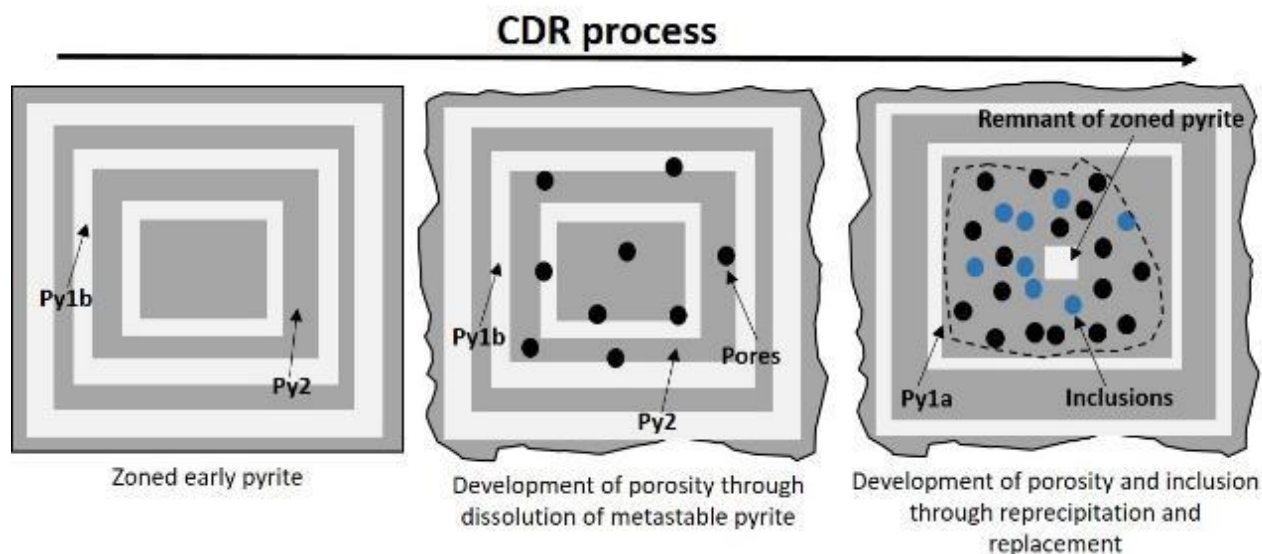


Figure 6.2 The progress of gradual replacement of early pyrites with pores and mineral inclusion of late Py1a through CDR process

The texture of Py3 across Red Lake deposits suggests that it coexists with other sulfides including pyrrhotite, chalcopyrite and other arsenides because these sulfides partially replace and overgrow Py3 (Fig. 6.3). This type of textural relationship involving Py3 and coexisting pyrrhotite and chalcopyrite can form when pyrite breaks down under high temperature metamorphism or deformation to form pyrrhotite and chalcopyrite (Craig et al., 1998). Since Py3 is a secondary product of other pyrite types, it is considered the last stage of pyrite growth in Red Lake greenstone belt deposits. Consequently, textural analysis suggests that paragenesis of pyrite at CRL include mineral inclusion-rich Py1a as the first generation pyrite overgrown by Py1b and Py2

whereas Py3 is late recrystallized pyrite. In the East Bay area deposits, oscillatory zoned Py1b and inclusion poor Py2 represents first stage growth which was accompanied by last stage mineral inclusion and porosity rich Py1a. Textural and chemical variation of each pyrite generation will be discussed in the next subsections.

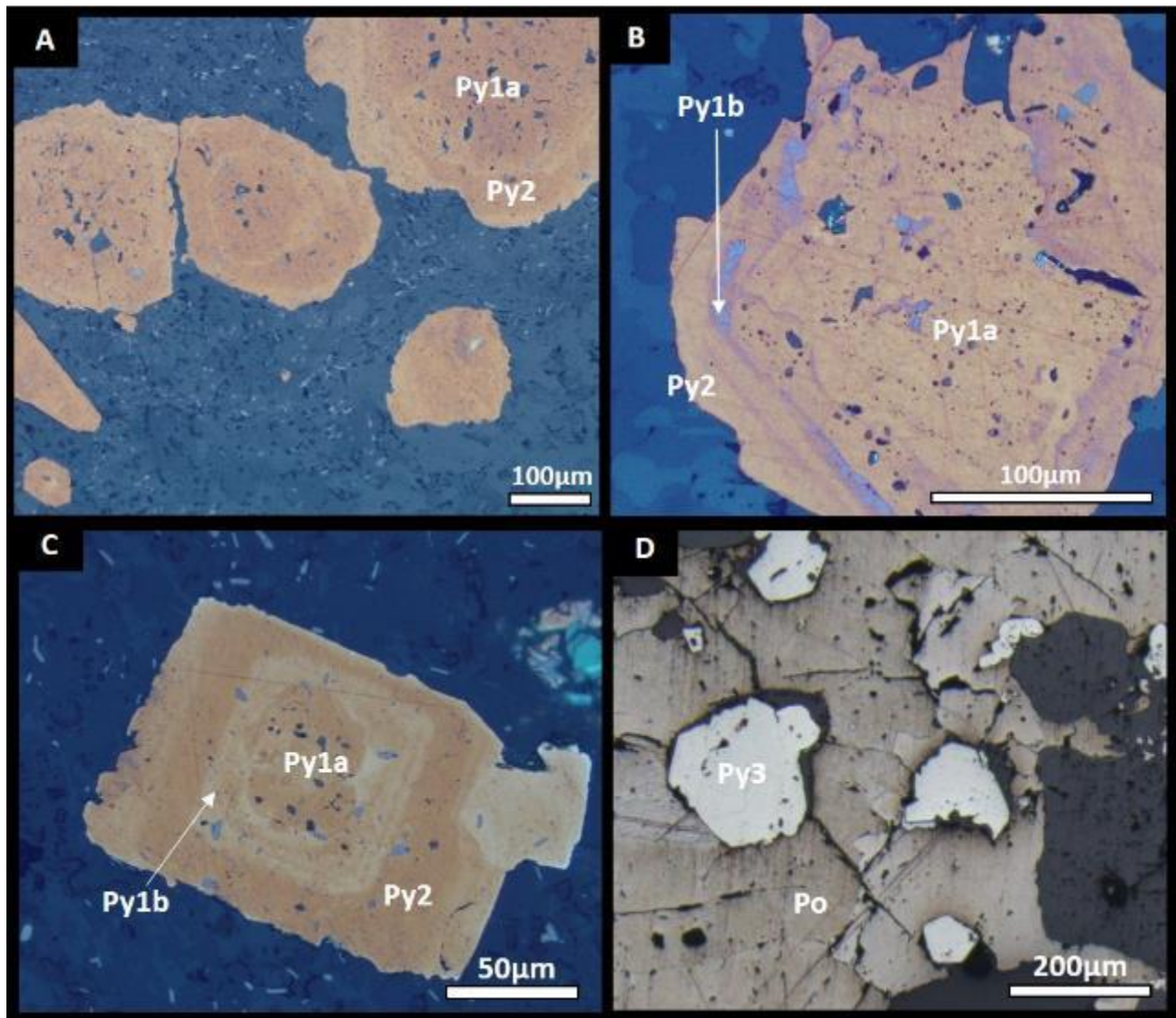


Figure 6.3 Common pyrite textures from Red Lake greenstone belt deposits. (A) Zoned pyrite from the Marcus deposit (NS001). (B) Purple stain of Py1b from CRL deposit (NS009). (C) Concentric zonation of As-Co-rich pyrite from the Marcus deposit (NS001). (D) Recrystallized pyrite from the Campbell-Red Lake deposit (ND182).

6.2 Trace element variation of pyrite types

Textural analysis of pyrite types has established the paragenesis of hydrothermal zoned and recrystallized pyrites at the Red Lake deposits. The zoned pyrites reflect changing physico-chemical conditions of fluids during pyrite growth from core to rim, thus, the trace element variation of each growth zone can identify changes in fluid chemistry, redox, and mineralization stage. The trace element chemistry of pyrite from the CRL deposit will first be discussed and then compared to other smaller deposits and gold occurrences in the Red Lake greenstone belt.

6.2.1 Pyrite trace element chemistry of Campbell-Red Lake deposit

Pyrite samples were collected both distal and proximal to the CRL, to study grain scale variation of hydrothermal and metamorphic pyrites. Py1a at the CRL have high abundances of trace elements including Sb, Tl, Au, W and Hg whereas Py1b have high abundances of As, Au, Mo and Te (Fig. 6.4). Volatile elements like Sb and Tl Py1a at the CRL (240 ppm and 7 ppm respectively) exceed the average for orogenic gold deposits especially Sb as described by Babedi et al. (2022; 137 ppm and 98 ppm for Sb and Tl respectively). Hence, it is possible that Py1a at CRL formed in a hydrothermal environment that promotes incorporation of low temperature fluid mobile volatile element like Sb and Tl because these elements have high compatibility in the pyrite structure under low temperature conditions (Mukherjee and Large, 2017). Penczak and Mason (1997) suggested that the CRL deposit formed in a shallow crustal environment similar to an epithermal low sulfidation system. The LA-ICP-MS map and spot data from this study supports this, as the early Py1a replaced Fe-Mg rich carbonates and hydrous silicates like white mica and chlorite which are common to epithermal or “epithermal-like” low sulfidation systems (Cooke and Simmons, 2000; Figs. 4.2, 4.3, 6.3). As the hydrothermal system changed from epithermal-

like (which have temperature range of 160°C to 200°C; Hendequist et al., 2000) to an orogenic, structurally controlled mineralization system, arsenic was introduced with Au, Te, and Mo in arsenian Py1b which overgrows Py1a. The trace element composition of P1yb with high concentrations of economic metals described above like Au, Te and Mo compared to other pyrite types suggests that Py1b formed during the main stage of Au mineralization in a deeper orogenic setting (7 to 14km; Chi et al., 2009) consistent with paucity of volatile elements like Tl in Py1b structure as they are not soluble in high temperature mineralizing fluids (Fig. 6.5; Goldfarb et al., 2005). Tellurium is highly soluble in magmatic fluids but its precipitation is highly redox dependent with high Te in pyrite indicating low fluid fO_2 conditions (Keith et al., 2018). Thus, high concentration of Te together with As and Mo in Py1b (Fig. 6.4) suggests a component of magmatic fluid that were reduced at the site of pyrite formation.

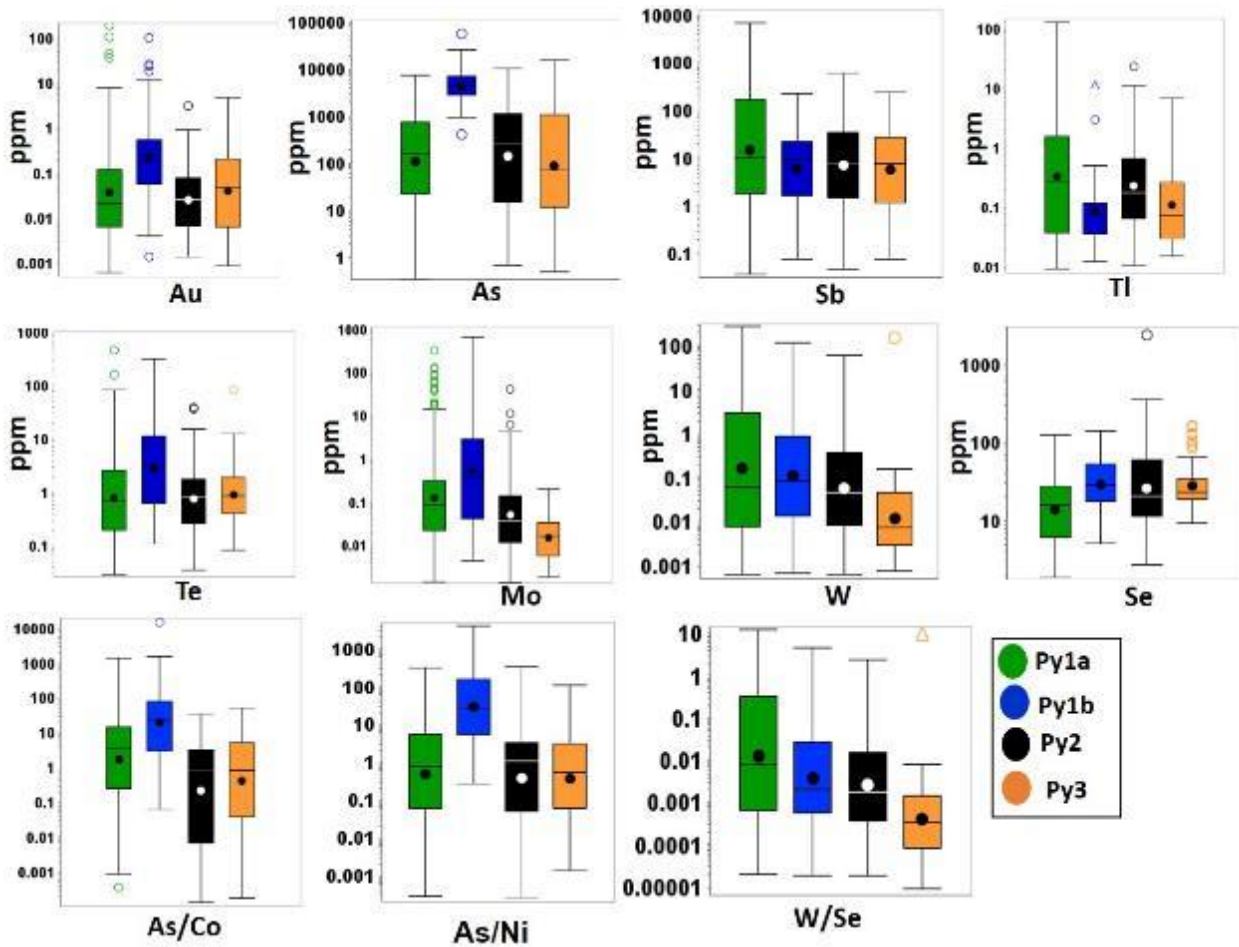


Figure 6.4 Trace element composition and element ratios of different pyrite types at the CRL

This is supported by higher average As/Co and As/Ni values in Py1b compared to other pyrite types as As will be highly soluble in high temperature fluids and will be precipitated during reaction between the host rock and ore fluids as a result of disequilibrium between the reacting media (Goldfarb et al., 2005).

The high As/Co and As/Ni ratio of Py1b suggests high As in the hydrothermal system compared to other elements which can also explain the higher Au concentration of Py1b relative to other pyrite types as high arsenic in pyrite facilitates Au incorporation through coupled substitution into the pyrite structural sites (Reich et al., 2005). Consequently, lattice bound Au is found in

arsenic-rich Py1b (which follows the Au-As gold solubility plot of Reich et al., 2005; Fig. 6.6) because As^{1-} substitutes for S^{2-} ion in tetrahedral sites of pyrite simultaneously enhancing Au^+ incorporation into pyrite Fe^{2+} octahedral sites (Fig. 6.6) as proposed by (Reich et al., 2005; Deditius et al., 2014). In contrast, gold as inclusions are associated with relatively As-poor pyrite which follows the Au-Ag-Te trend of Reich et al. (2005) which is common to intrusion related Au deposits such as the Geita Hill gold deposit, Tanzania (Fig. 6.6). Other pyrite growth zones at CRL including Py1a have gold occurrence in pyrite lattice and as inclusions whereas Py2 with low concentrations of Au occur exclusively in pyrite lattice. This suggests that high As concentration have influence on the Au solubility in pyrite as higher concentration of As in Py1b at CRL deposit enhanced higher gold concentration in this pyrite (Fig. 6.6).

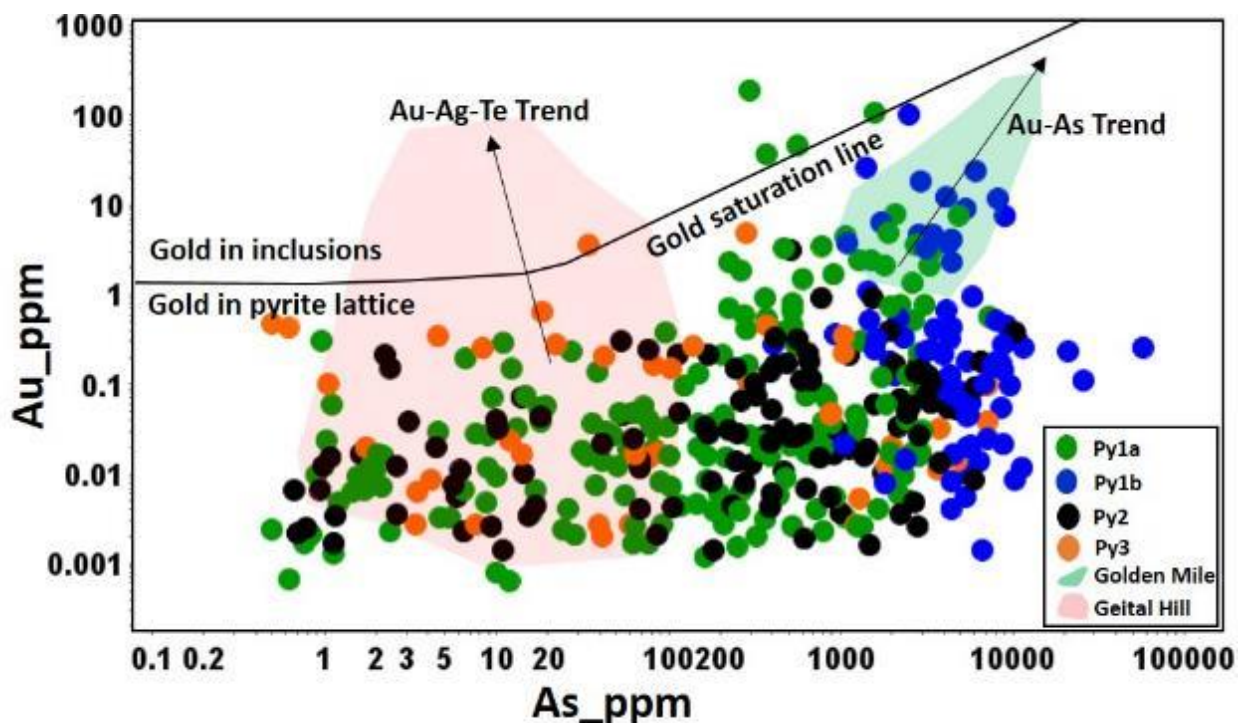


Figure 6.5 Gold solubility plot for pyrite types at the Campbell-Red Lake deposit. Modified from Reich et al. (2005). Additional data from Van Ryt et al. (2020) and Mueller et al. (2020).

Further evolution of the CRL hydrothermal system after the main ore mineralization stage resulted in retrograde cooling and precipitation of Py2 under gentle boiling conditions. This is supported by its textures and trace element composition (Co, Ni and As >800 ppm; Figs. 6.3, 6.7). Gentle boiling conditions precipitates pyrite with little or no mineral inclusions coupled with paucity of most trace elements in pyrite structure except As, Co and Ni (Román et al., 2019; Figs. 5.2, 5.9, 6.5, 6.9). This contrasts with the texture and trace element concentrations of inclusion-rich Py1a and sulfide replacement texture of Py3 but is consistent with previous observations of retrograde metamorphic related pyrites in orogenic Au deposits that overgrow early trace element and inclusion rich early pyrite similar to observations in this study (e.g., Kanowna Bell deposit; Sugiono et al., 2022). Daver et al. (2020) from their study of greenstone-hosted orogenic gold deposits in the Val-d'Or mining district also noticed similar late retrograde metamorphic pyrite compositions with non-auriferous inclusion poor Co-Ni-As (As>25 ppm, Ni>800 ppm and Co> 25ppm) rich pyrite overgrowing more trace element enriched inclusion-rich early pyrite. Py3 at the CRL is interpreted to represent the breakdown of pyrite under high temperature metamorphic conditions resulting in high average concentrations of lattice bound elements like Co, Ni and As as seen in Py2 (higher than 100 ppm; Fig. 6.7). Economic metals like Au, Ag, Te, and Mo are not abundant in the Py3 crystal structure because they are unstable in the pyrite structure during high temperature recrystallization (Craig et al., 1998). Rather, these elements occur as micro-inclusions in Py3 (Fig. 6.7). Consequently, mineral inclusions of Au-bearing phases (e.g., Au-Ag- tellurides) would be excluded from pyrite structures. This is consistent with the observations of Coldebella et al. (2025) on recrystallized pyrite in the supracrustal rocks of the Pontiac subprovince which contain inclusions of Ag and Bi. Although the Pontiac subprovince is

dominated by late Archean metasedimentary rocks, orogenic processes are still responsible for deposits in the area.

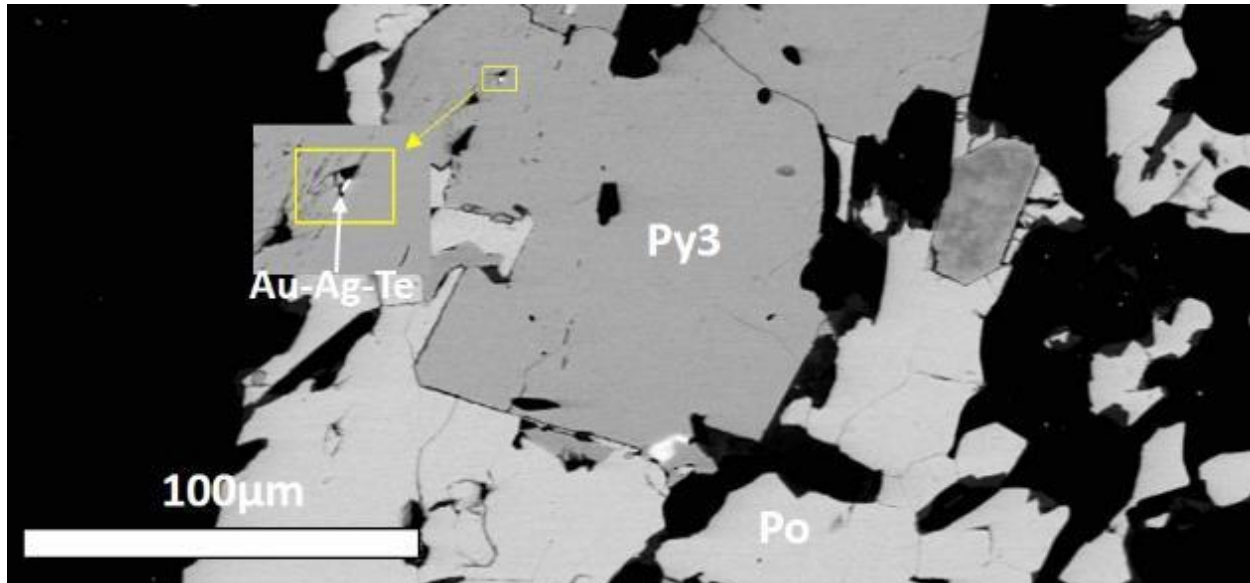


Figure 6.6 BSE image of an Au-Ag-Te inclusion occurring at the grain surface of pyrite Py3 that has been replaced by pyrrhotite (ND058). Inset image represents micron sized occurrence of Au-Ag telluride mineral inclusion in Py3. Po-Pyrrhotite

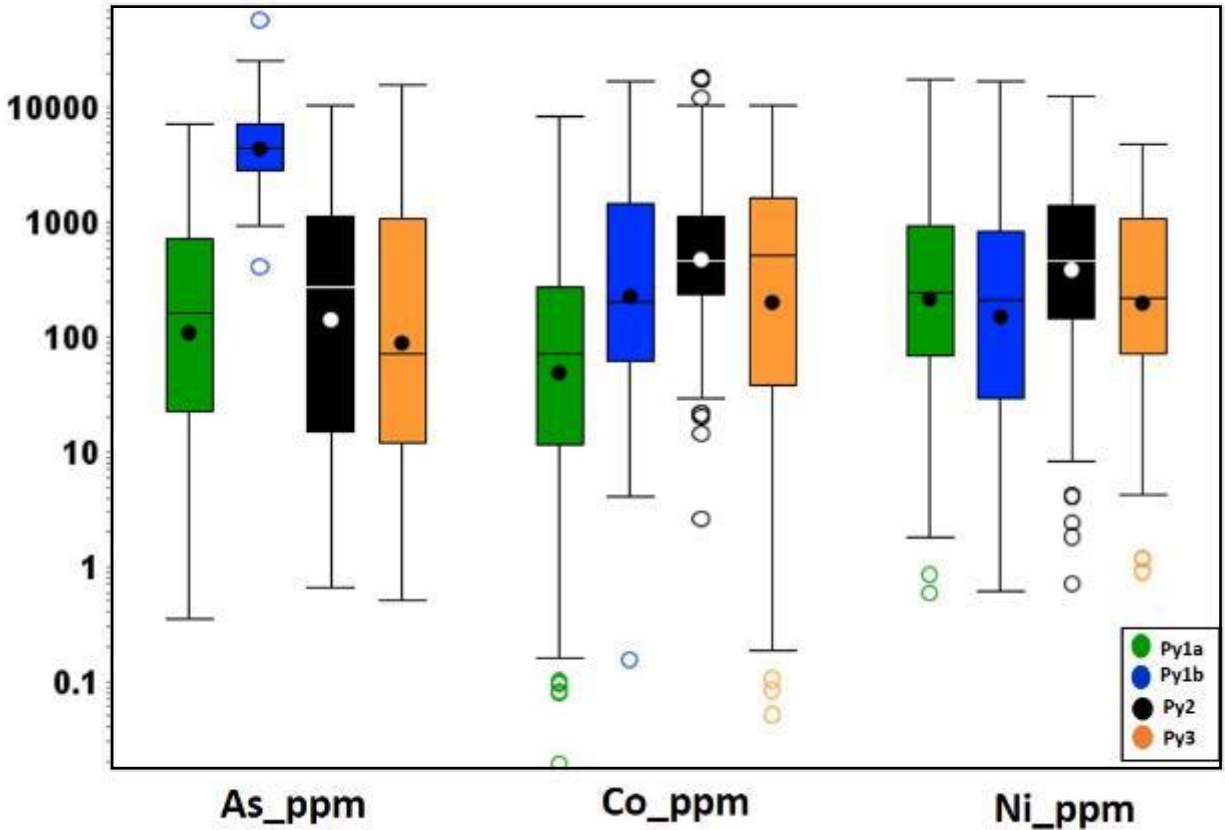


Figure 6.7 Comparison of Co, As, and Ni contents of pyrite types from the Campbell-Red Lake deposit.

6.2.2 Pyrite trace element chemistry of other Red Lake deposits

Several deposits and occurrences occur in other parts of Red Lake gold camp, as well as the world class CRL deposit. The age of main stage mineralization and the formation of co-genetic sulfides at CRL is constrained between 2723 Ma and 2712 Ma (Dubé et al., 2004) whereas the Cochenour-Willans deposit was constrained at 2720 Ma based on U-Pb dating of the crosscutting McKenzie stock (Corfu and Andrews, 1986). Gold mineralization in other deposits and occurrences within the East Bay deformation zone including Abino, Marcus, and McMarmac and the intrusion related Howey and Hasaga deposits/occurrences have been constrained to 2720 Ma (+7/-5 Ma) which is the lower limit of the main stage Au event and deformation at Red Lake (Corfu and Andrews, 1987; Parker, 2000, Dube et al., 2004). The texture of hydrothermal zoned pyrites in the East Bay

area deposits (e.g., Marcus and Cochenour-Willans) revealed a complex paragenesis of pyrite represented by early oscillatory zoned Py1b and Py2 and later mineral inclusion and pore-rich Py1a. The oscillatory zoned Py1b and Py2 suggests a stage of fluctuating physico-chemical nature of fluids with a stage of As-Co rich enrichment followed by paucity of As in fluids but continuous supply of Co during pyrite formation represented by up to one weight percent Co in both Py1b and Py2 (Figs. 5.13). LA-ICP-MS imaging and spot data for representative pyrite from the Marcus deposit show that the cores of Py1a also have high Sb values (mean of 98 ppm) and other elements including Au-Te-Bi-Pb $\pm$ Ag similar to the CRL deposit (Figs. 5.13, 6.9A). Similarly, LA-ICP-MS spot analysis of Py1a at the Cochenour-Willans deposit indicates that it has high compositions of Sb-Bi-Te-Mo (Fig. 6.9B).

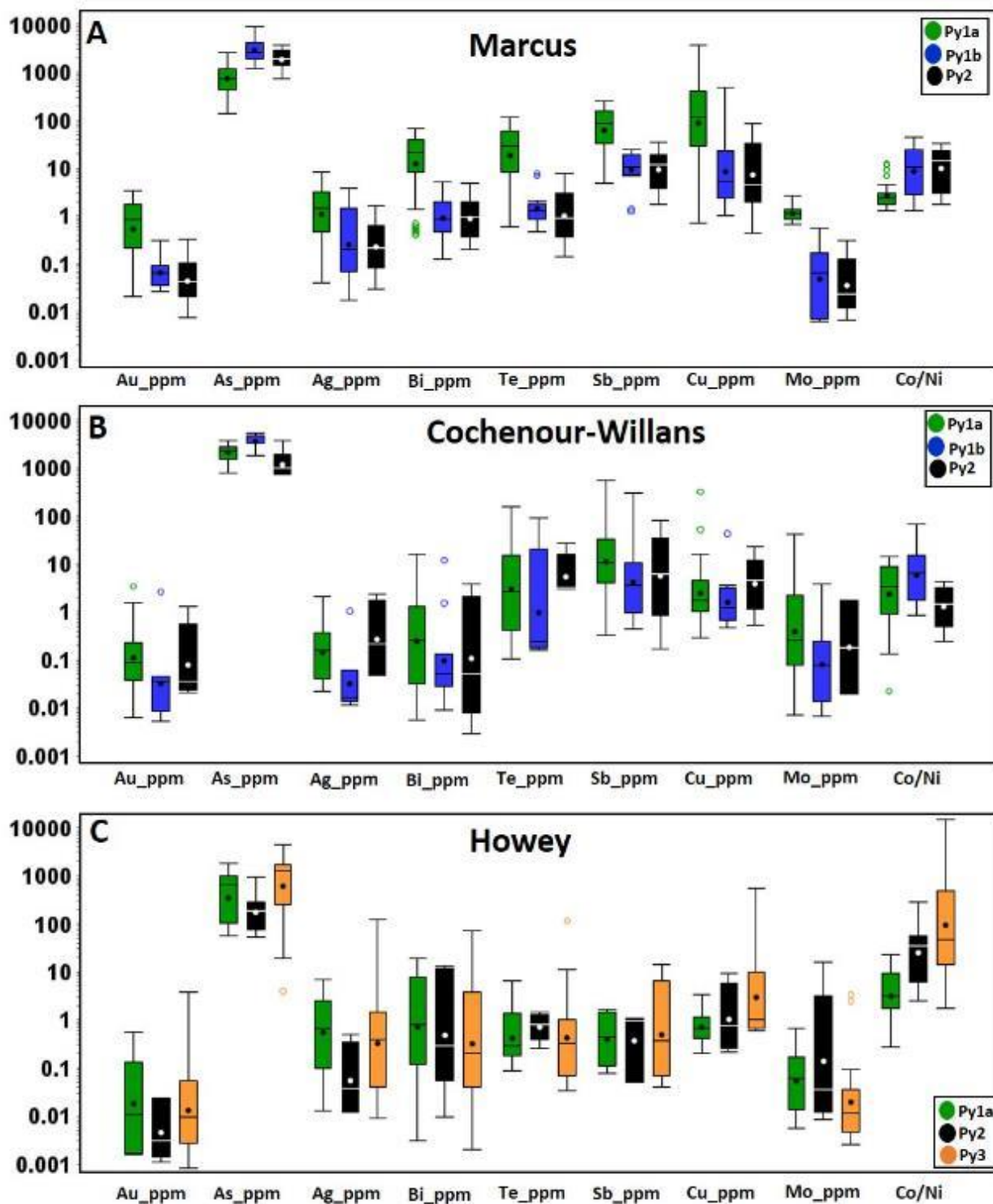


Figure 6.8 Trace element compositions and element ratios of pyrite from the East Bay area deposits. (A) Trace element content of pyrite from the Marcus deposit (B) Trace element contents of pyrite from the Cochenour-Willans deposit (C) Trace element contents of pyrite from the Howey deposit.

An LA-ICP-MS map of pyrite from the intrusion-related Howey and Hasaga deposits was not collected, however, spot analysis demonstrated that Py1a from these deposits have high abundances of Co-Ni-As-Bi whereas Sb and Tl values are either low or below detection limit (Fig. 6.9C). This suggests that Py1a from intrusion related deposits are distinct from the low temperature alteration system identified in CRL and East Bay area deposits as they are genetically related to high temperature intrusive stocks (Pirie, 1981). Co/Ni ratios of Py1a from the Cochenour-Willans, Marcus and Howey deposits have mean values of 4, 3 and 22 respectively (Fig. 6.9). The Co/Ni values of Py1a and Py1b from the Marcus and Cochenour-Willans deposits supports a hydrothermal environment of formation for Py1a whereas that of Howey deposit is consistent with a magmatic origin similar to those described by Steadman et al. (2021) for high temperature environments such as Ernst Henry IOCG deposit and the Northarkes porphyry-epithermal deposit in Australia. Co/Ni ratios of oscillatory zoned Py1b from Marcus and Cochenour-Willans deposits are several orders of magnitude higher than Py1a of the same deposits suggesting an increased Co input from the mafic volcanic host rocks relative to Ni in metamorphic fluids.

Py3 in the East Bay area gold occurrence (Kaymac) and intrusion related Howey deposit have high compositions of refractory elements like Co, Ni and As in its crystal structure similar to Py3 at CRL. Mean Co/Ni ratios for CRL, Howey, and Kaymac are 12, ~5000 and 875 respectively. This can be explained by the presence of pyrrhotite coexisting with pyrite which would shift pyrite compositions towards high Co since most of the Ni will preferentially be incorporated into the pyrrhotite crystal lattice while the Co will substitute into the pyrite octahedral sites (Belousov et al., 2016; Fig. 6.10).

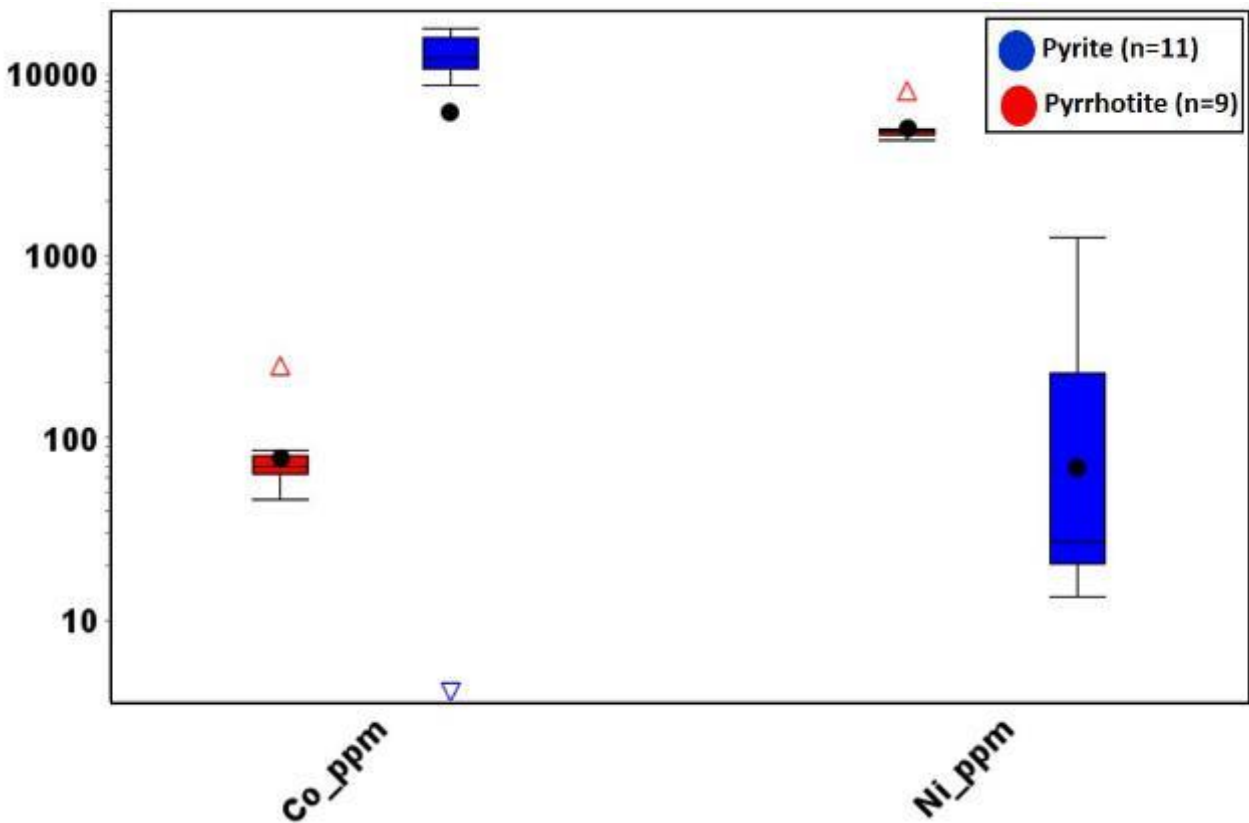


Figure 6.9 Co and Ni values of Py3 and coexisting pyrrhotite from LA-ICP-MS analysis of representative sample from Abino deposit (NS021).

6.2.3 Comparison of pyrite-hosted gold in the Red Lake greenstone belt

The texture and trace element chemistry of representative pyrite grains across multiple deposits have provided insights into the occurrence of gold and gold-bearing minerals in pyrite across the Red Lake greenstone belt deposits. At the CRL deposit, texture and LA-ICP-MS maps of representative pyrite grains (Fig. 5.2) show that Py1a have Au-Ag-Te micro inclusions and minerals bearing W and Mo (i.e. scheelite and molybdenite; Fig. 5.8). This stage of pyrite growth represents an early-stage low temperature related mineralization. The rapid rate of pyrite crystallization during sulfidation of wall rock minerals across the Red Lake greenstone belt Py1a

enhanced the formation of micro-inclusions of elements with large ionic radii that chemically would not fit in the pyrite crystal lattice (e.g., Au, Ag, W, Mo, Pb, etc.), resulting in widespread occurrence of Au and Au-bearing phases as inclusion in Py1a. Also, the relatively As-poor nature of Py1a in the CRL deposit indicates that solubility of Au in pyrite is very low and as such can only occur as Au inclusions, this is supported by the Au solubility plot modified from Reich et al. (2005; Fig. 6.11). It is possible that Py1a is likely one of the main contributing sources of internally derived gold in Red Lake Au deposits which was dissolved and remobilized into subsequent main stage mineralization (e.g., Py1b at CRL). This is consistent with observations in other orogenic gold deposits (e.g., Sukhoi Log Au deposit, Russia) where early pyrite was suggested as a key source of Au for subsequent main stage “invisible” or “lattice-bound” gold-rich pyrites (Large et al., 2007). Conversely, As-rich Py1b at the CRL have a positive Au-As relationship where an increase in As content of Py1b corresponds to a proportional increase in Au content with Au occurring structurally bound to pyrite as shown in the modified Reich et al. (2005) gold solubility plot (Fig. 6.11).

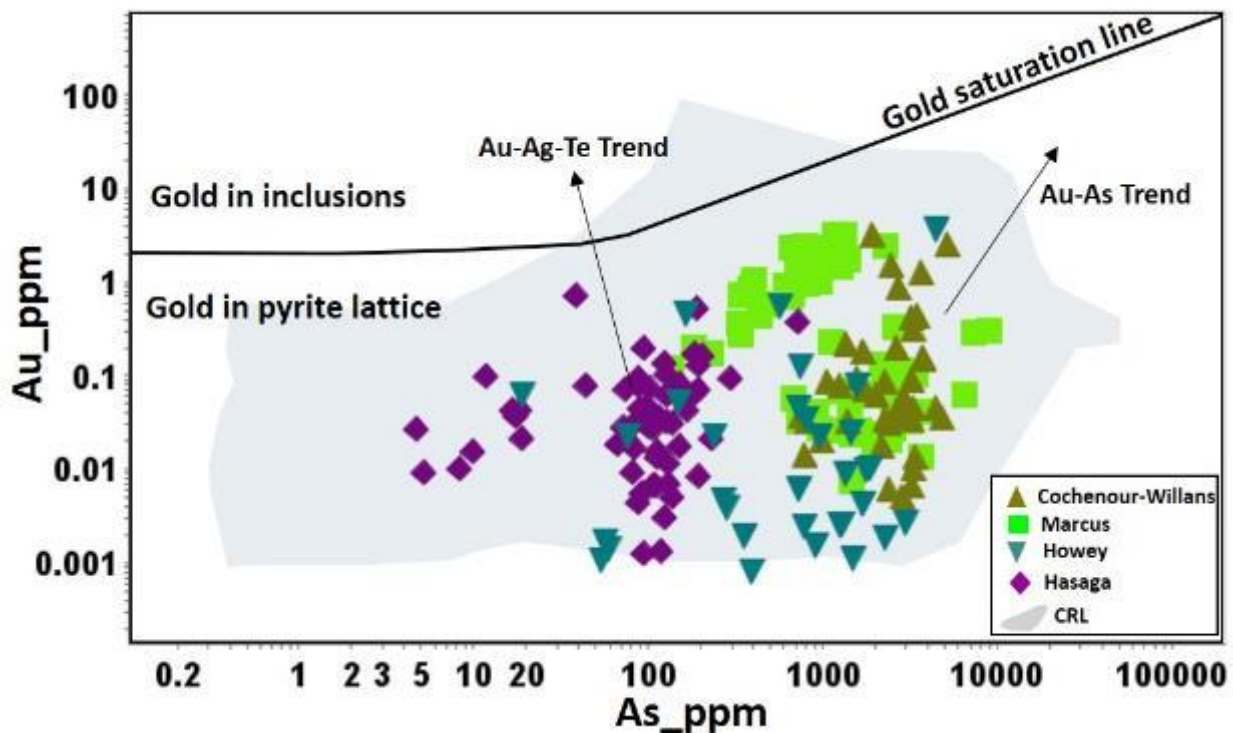


Figure 6.10 Gold solubility plot for East Bay area deposits. All data from this study.

In contrast to CRL desposit, sequence of gold mineralization recorded in complex pyrite growth history at East Bay area deposits suggests gold main gold mineralization is late stage. Early pyrite generation Py1b and Py2 in the Marcus and Cochenour-Willans deposit have oscillatory zonation that consist of As-Co and minor Au concentration (Fig. 5.13). This early pyrite was dissolved by external fluids and then recripated as microinclusion rich Py1a. However, early Py1b and Py2 from East Bay area deposits did not have sufficient concentration of Au within their structure to be the main source of Au seen in late stage Py1a (Fig. 5.13). Instead, evidence from LA-ICP-MS spot and map data (Figs. 5.13, 6.8) of pyrite suggest that the external fluids responsible for the CDR process that formed Py1a was likely responsible for the precipitation of Au and Au-bearing minerals in late stage Py1a.

Petrographic evidence presented for intrusion related Howey and Hasaga deposits shows that this gold occur in pyrite micro-fractures and as micro-inclusions in Py1a and Py2 (Fig. 5.34). This suggests that Au occurrence in this deposit is also related to CDR processes where Au have been remobilized from early pyrites into micro-inclusion and late fractures of late stage Py1a. At slate Bay, petrographic analysis and LA-ICP-MS spot data did not identify Au bearing pyrite growth stage, hence, Au formation could not be assessed in this Au occurrence.

6.3 Sulfur isotope variation of pyrite types

This section investigates the sulfur isotope evolution of hydrothermal zoned pyrites and recrystallized pyrite types at Red Lake. Early Py1a from the CRL are enriched in volatile, fluid mobile elements such as Sb, Tl, Au, W and Hg and are characterized by a wide range of $\delta^{34}\text{S}$ sulfur isotope values ranging from +2.2‰ to +9.2‰ (mean +4.5‰; n=4; Fig. 6.12). The trace element composition of Py1a is consistent with elements that are soluble and transported in a reduced sulfur-rich fluid. The positive $\delta^{34}\text{S}$ of early Py1a from the CRL suggests a low ratio of oxidized to reduced sulfur species (i.e. $\text{SO}_4^{2-}/\text{H}_2\text{S}$) of aqueous fluids forming pyrites which indirectly indicates low fluid $f\text{O}_2$ as reduced sulfur species like H_2S will be more abundant in fluid forming pyrite with moderate fluid pH and temperature (Evans et al., 2006; Neumayr et al., 2008). Conversely, ore stage As-rich Py1b at the CRL show different suites of element enrichment including As, Au, Mo and Te marked by an increased but narrow range of $\delta^{34}\text{S}$ value of pyrite from +3‰ to +6.7‰ (n=4; Fig. 6.12). It is difficult to isolate the key sources of Py1a and Py1b due to overlap in the $\delta^{34}\text{S}$ values of these two pyrite types. The trace element contents of Py1b at CRL and sulfur isotope values suggests that main stage Au mineralization was marked by a decrease in fluid sulfur fugacity during fluid-rock interaction resulting from consumption of sulfur in the fluid to

precipitate Py1b and gold consistent with observations from other orogenic gold deposits like the Callie, Kanowna Belle, and Wallaby deposits in Australia (Ward et al., 2017; Petrella et al., 2020; Sugiono et al., 2022). This is further supported by the suites of trace elements in Py1b (i.e. As, Au, Te and Mo) all of which are redox sensitive elements and the narrow positive range of $\delta^{34}\text{S}$ values for Py1b. Precipitation of elements like Te and Mo associated with Py1b suggest a decrease in fluid redox as these elements are soluble at high fluid $f\text{O}_2$ but will be effectively precipitated from the fluid with a decrease in redox (Keith et al., 2018). Decrease in fluid redox has been suggested as an excellent mechanism for gold precipitation in orogenic gold deposits (Ward et al., 2017) and it is likely that a similar process is partly responsible for gold mineralization at CRL. Previous work at the CRL deposit by Stock (2012) suggested that reduction of the ore fluid by oxidation of Fe^{2+} in wall rock to Fe^{3+} was likely the main trigger of gold mineralization and pyrite precipitation (with negative $\delta^{34}\text{S}$ values). Although, no mineralization related Py1b with negative $\delta^{34}\text{S}$ values were found in this study at the CRL, the presence of abundant auriferous pyrite supports the model that reduction of fluid sulfur and oxygen fugacity likely influenced gold mineralization. The sulfur isotopes of the late pyrites at CRL are different, with Py2 and Py3 having average $\delta^{34}\text{S}$ of +6.6‰ and +1.1‰ respectively. The $\delta^{34}\text{S}$ values Py2 which is the last growth zone of CRL hydrothermal pyrite likely suggests barren metamorphic fluids that followed mineralization. In contrast, light $\delta^{34}\text{S}$ values of Py3 at the CRL with values close to magmatic sulfur (Seal, 2006; Figs. 5.43, 6.12) may have been sourced from fluids associated with igneous rocks that have a genetic relationship with post-mineralization sulfides at CRL. This is comparable to the findings of Stock (2012) at the CRL who showed that post

mineralization pyrite had $\delta^{34}\text{S}$ value of around 0‰ consistent with a magmatic sulfur source (Fig. 6.12).

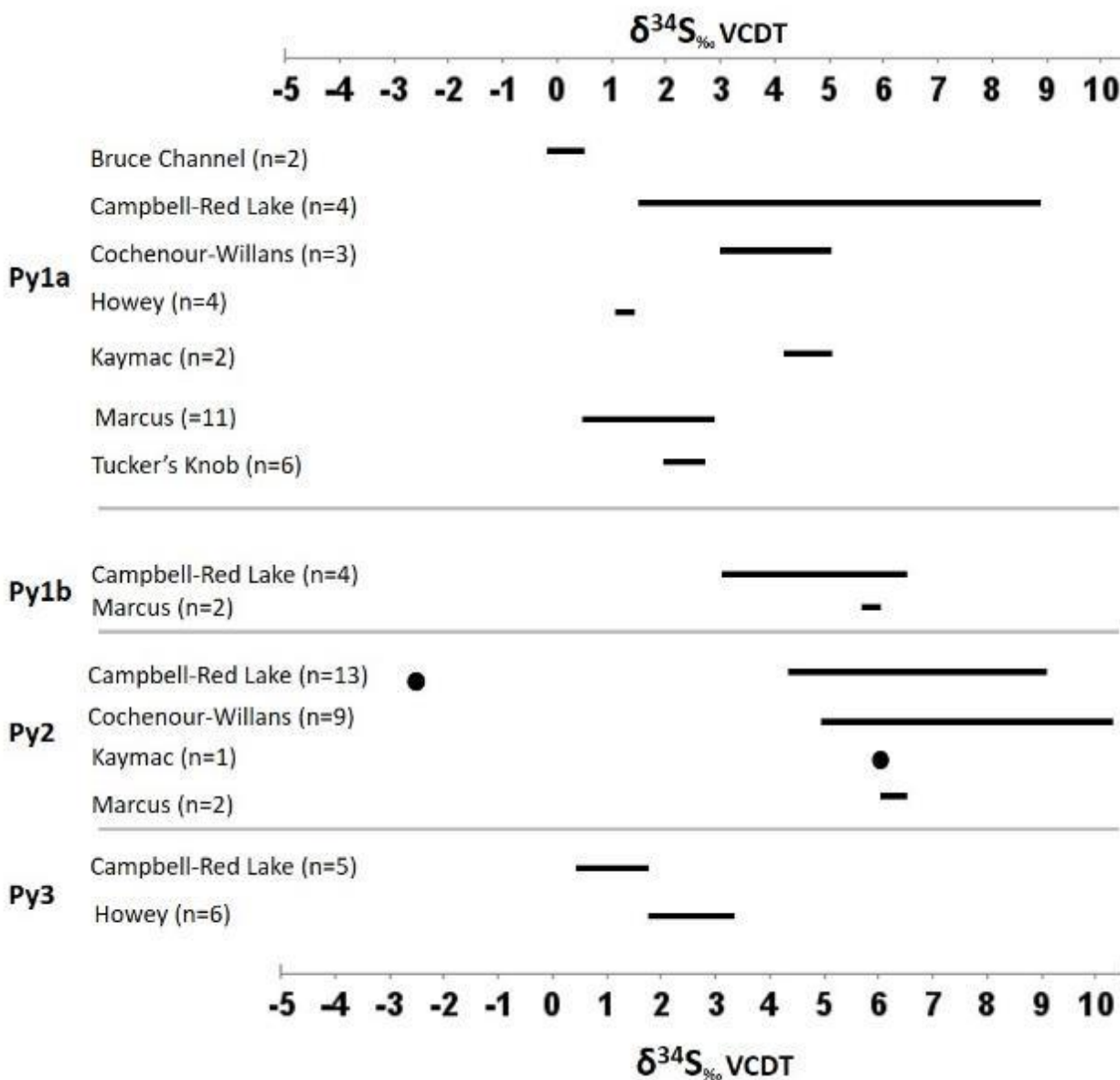


Figure 6.11 Sulfur isotope values of different pyrite types by deposit in the Red Lake greenstone belt. The $\delta^{34}\text{S}$ are in VCDT. (1 standard error per sample is less than 0.6‰). All $\delta^{34}\text{S}$ are in VCDT. Additional data from Thode et al. (1991) Hodkiewicz et al. (2009), Seal (2006), Stock (2012), Gallagher et al. (2018).

In the East Bay area deposits, average values of $\delta^{34}\text{S}$ for oscillatory zoned Py1b and Py2 ($\sim +6\text{‰}$) are similar for the Marcus deposit which suggests a closely linked fluid source (Fig. 6.12). The value of the $\delta^{34}\text{S}$ for these pyrite types suggests that they are likely of metamorphic source consistent with observations from other orogenic gold deposits which usually range from 0-10‰ (Goldfarb et. al., 2005). In Contrast, $\delta^{34}\text{S}$ value of Py1a from Marcus deposit show a sharp decrease to average value of approximately +3‰ which suggests fluids that formed this pyrite type have either a magmatic or metamorphic component. Similar pattern was observed in the Cochenour-Willans deposit which suggests similar fluid regime during pyrite growth.

The $\delta^{34}\text{S}$ value of pyrite types plotted against Au values in hydrothermal zoned pyrites from the East Bay area is consistent with in-situ trace element analysis and LA-ICP-MS elemental maps where early Py1b and Py2 are less Au-rich relative to late stage Py2 with an increase content of Au, Ag, Te, Sb, Mo and Cu (Figs. 5.13, 5.19, 5.23, 5.26, 5.28 and 5.29). The plot show increasing As/Co ratio, Au and Ag with increasing $\delta^{34}\text{S}$ from Py1b and Py2 to Py1a (Fig. 6.13). This suggest that Au and other economic metals during late-stage pyrite formation are likely associated with magmatic fluid input as highest Au values are close to 0‰ for Py1a $\delta^{34}\text{S}$. Consequently, the Au occurrence in Py1a at East Bay area deposits through CDR process likely took place in the presence of an external magmatic fluid. Similar observation is made for Py1a at the intrusion related Howey deposit with $\delta^{34}\text{S}$ close to 0‰ which also suggests magmatic fluid source for mineralization (Fig. 6.12).

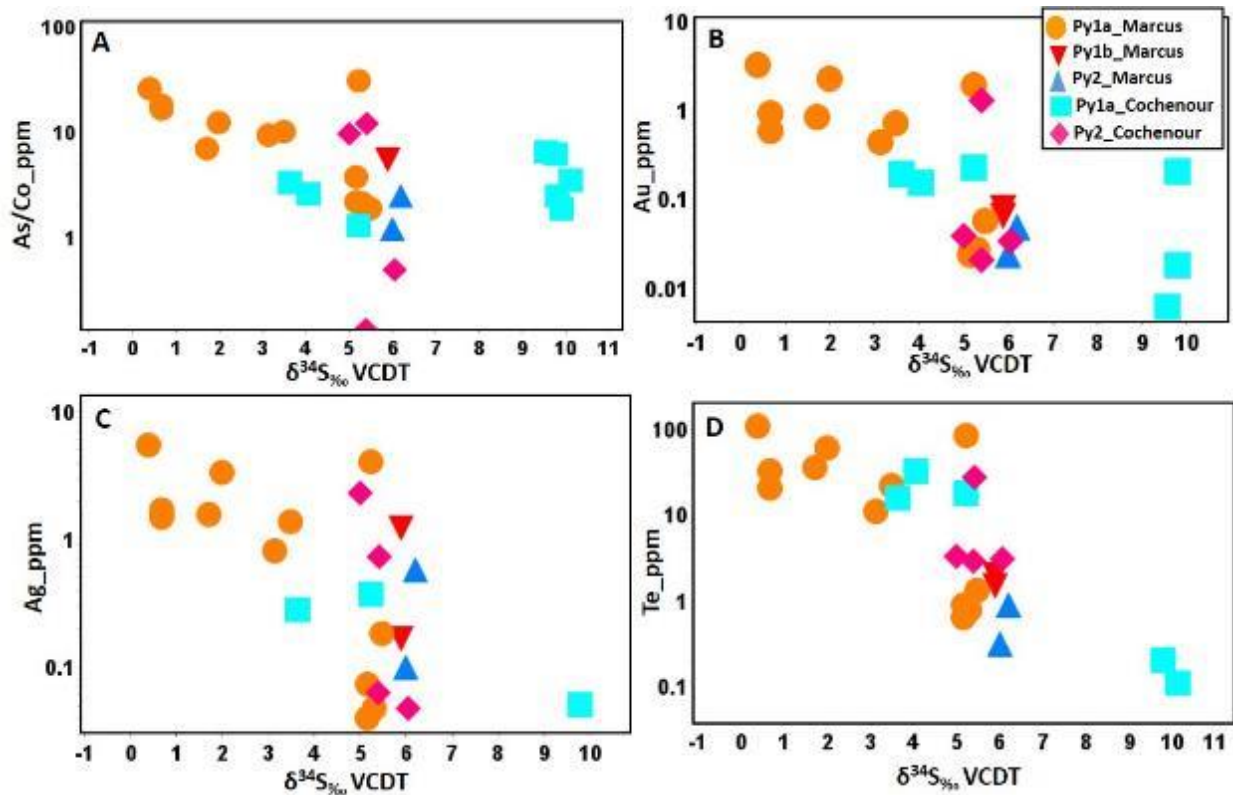


Figure 6.12 Plot of pyrite trace element and element ratios against $\delta^{34}\text{S}$ of pyrite for East Bay area deposits (A) As/Co vs. $\delta^{34}\text{S}$ (B) Au vs. $\delta^{34}\text{S}$ (C) Ag vs. $\delta^{34}\text{S}$ (D) Te vs. $\delta^{34}\text{S}$

Average $\delta^{34}\text{S}$ of Py1a and Py3 from the district is around +3‰ which suggests a magmatic sulfur component. The $\delta^{34}\text{S}$ values for district Py1b and Py2 show an increase in average values (compared to Py1a and Py3) with both pyrite types exceeding +5‰ (Fig. 6.14). This suggests that Py1b and Py2 are likely related to metamorphic fluids that were reduced at source. The data from this study was also compared to previous work from the Red Lake greenstone belt and other global gold deposits (Fig. 6.14). The $\delta^{34}\text{S}$ values of Red Lake district pyrites from this study show similar trends to values reported by Stock (2012) for pre-ore, syn-ore and post-ore pyrites at the core of CRL deposit albeit with different values. However, the method of data collection varies, as this study employed in situ LA-MC-ICP-MS of pyrite types whereas the work of Stock (2012) used micro-drilling for pre-ore, syn-ore and post-ore pyrites, thus, a direct grain scale comparison

is difficult. The results of this study were also compared to previous work from the East Bay area deposits by Gallagher et al. (2018), the data indicate that average value $\delta^{34}\text{S}$ of pyrite types from this study are similar to average values reported by Gallagher et al. (2018; Fig. 6.14).

Data from the Eastern Goldfields (EG), Australia show that average $\delta^{34}\text{S}$ from the deposits that were assessed range from -4‰ to +4‰ (Hodkiewicz et al., 2009; Fig. 6.13). The range of values observed in the Eastern Goldfields differs from that of the Red Lake deposits which show a wide range of value whereas data from the Eastern Goldfields show a narrow range. Compared to the CRL, the Hemlo gold deposit have very light $\delta^{34}\text{S}$ which range from -15.9‰ to +1‰ (Thode et al., 1991; Fig. 6.14). The negative values observed in the Hemlo and Eastern Goldfields deposits suggests the presence of oxidized mineralizing fluids evidenced by precipitation of abundant hematite in the Eastern Goldfields and Hemlo. Observed differences in the $\delta^{34}\text{S}$ values of pyrite across different deposits might have been influenced by different analytical methods. This study employed in situ laser ablation technique whereas other studies have used mineral separates (Thode et al., 1991), micro drilling (Stock, 2012) and in situ SIMS (Gallagher et al., 2018). Data from these different techniques tend to vary, thus making direct comparisons difficult. This is because micro-drilling, for example, can produce mixed sulfide samples where two or more sulfide assemblages coexist thereby affecting the $\delta^{34}\text{S}$ value of the target sulfide. This was demonstrated by a recent study of sulfides at Sunday Lake deposit by Mexia (2025) where in situ sulfide samples (with coexisting chalcopyrite and pyrrhotite) by LA-MC-ICP-MS yielded average $\delta^{34}\text{S}$ of +1.8‰ whereas micro-drilled samples analyzed by SIMS of same samples yielded average $\delta^{34}\text{S}$ of -1.0‰.

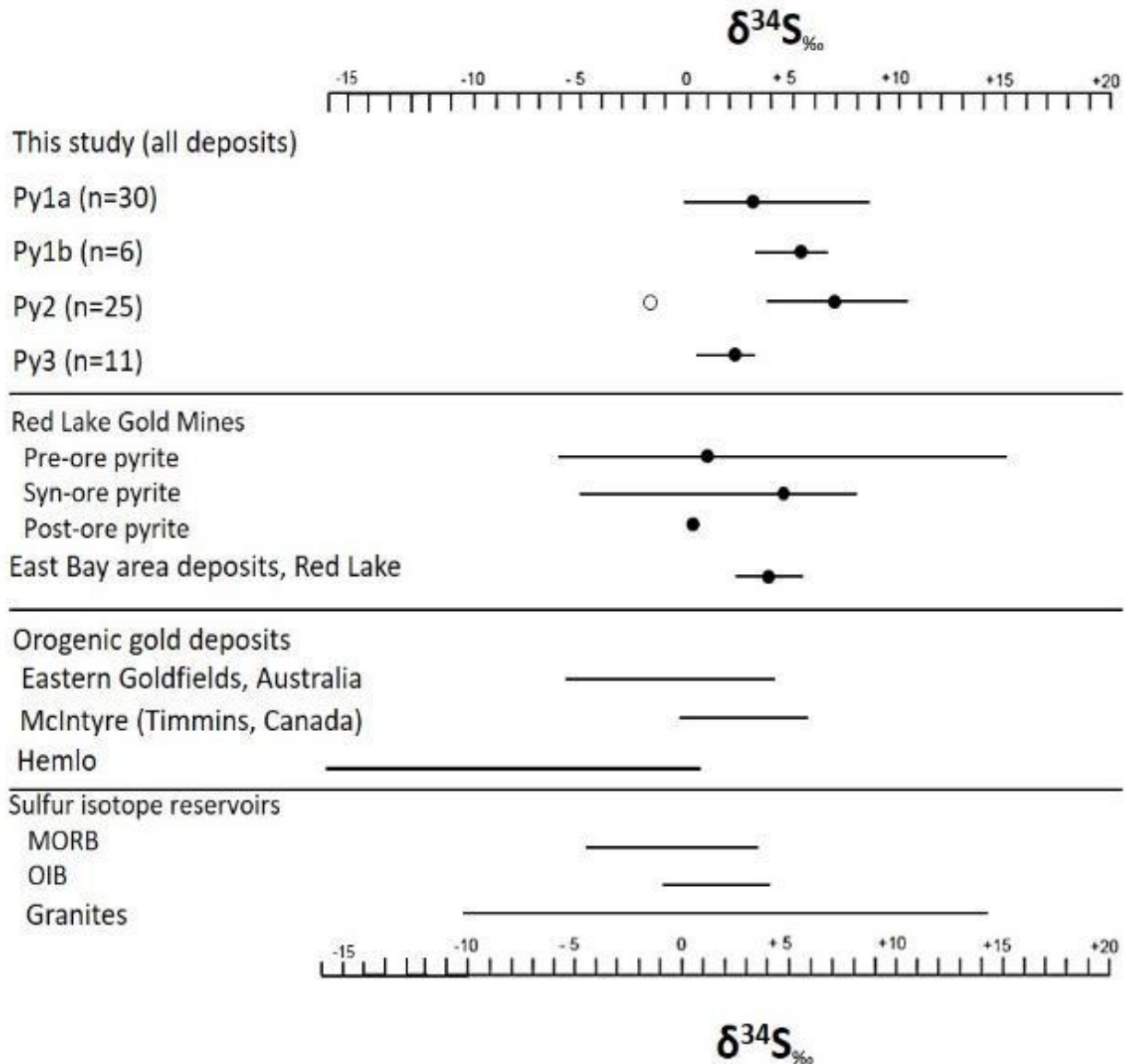


Figure 6.13 Sulfur isotope of data of pyrite types from the Red Lake greenstone belt deposit compared to previous work from Red Lake and other mining camps. Lone open circle represents outlier in the data. All $\delta^{34}\text{S}$ are in VCDT. Additional data from Thode et al. (1991) Hodkiewicz et al. (2009), Seal (2006), Stock (2012) and Gallagher et al. (2018).

6.3.1 Sulfur isotopes for fertility assessment

Deposits and Au occurrences from which sulfur isotope data of pyrite types were collected were assessed to see if there was a relationship the between sulfur isotope signature and deposit size.

Trace element compositions of pyrite suggest that early Py1a at CRL have a positive association

with early, sporadic gold mineralization preserved as inclusions of Au and Au-bearing minerals whereas arsenic-rich Py1b represents main stage Au mineralization at CRL deposit. Py1a at other Red Lake deposits represent late-stage gold mineralization especially at East Bay area deposits, gold occurrences and at the Howey and Hasaga deposits.

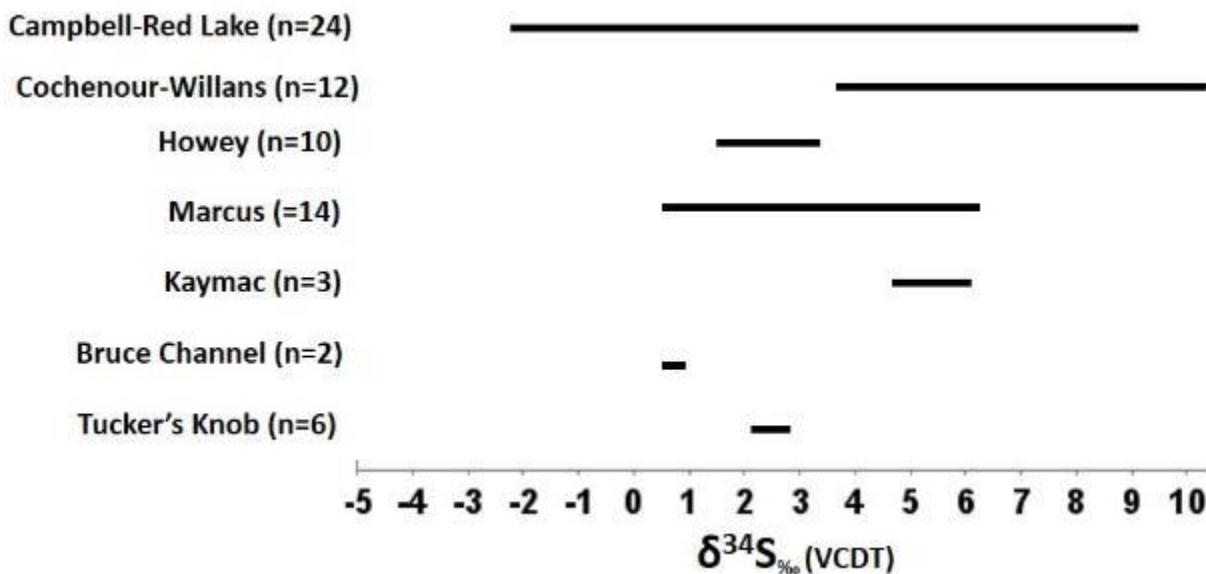


Figure 6.14 Sulfur isotope values for Red Lake greenstone belt deposits and Au occurrences. Deposits are ranked from largest at the top to smallest at the bottom of the chart. Deposit size data from Malegus et al. (2023).

The sulfur isotope data for each pyrite type by deposit show mostly positive values. Hence, sulfur isotope data from zoned pyrites from the Red Lake greenstone belt deposits were further assessed to observe groups in terms of deposit size. Based on data variability between pyrite types per deposit, it is difficult to establish clear patterns between the range of $\delta^{34}\text{S}$ values and deposit size, it is however clear that multiple pyrite generations are responsible for the large range recorded in pyrites from large deposits (Fig. 6.15). Hence Campbell-Red Lake, Marcus and Cochenour with complex zoned pyrites have $\delta^{34}\text{S}$ values that reflect the zonation of the pyrite and an evolving sulfur source and $\delta^{34}\text{S}$ enrichment (Fig. 6.15). Thus, the data indicates that deposits

with evolved sources of sulfur and $\delta^{34}\text{S}$ enrichment show a wide range of $\delta^{34}\text{S}$ values, are larger and flux the highest amounts of metals compared to smaller deposits with a less evolved sulfur source.

6.4 Summary of trace element and sulfur isotope variation of pyrite

The Red Lake greenstone belt consists of several orogenic gold deposits and gold occurrences. One of the key objectives of this study was to investigate the paragenesis of pyrite types at the district scale. Combining textural, mineral chemistry and sulfur isotope evidence has shown that Red Lake deposits and gold occurrences have both zoned and recrystallized pyrites with a complex paragenesis (Fig. 6.16). At the CRL deposit, the zoned pyrite was interpreted to represent changes in hydrothermal fluid chemistry recorded in pyrite growth. Pyrite trace element chemistry and $\delta^{34}\text{S}$ data showed that Py1a at the CRL represent early, shallow-crustal hydrothermal alteration which represents the pre-main stage mineralization event with abundant Au inclusions. Py1b represents evolution of hydrothermal alteration to deeper crustal levels accompanied by introduction of As with widespread formation of Au-rich arsenian pyrite. Py2 at the CRL represents retrograde cooling formed with slow pyrite growth rates with trace elements typical of late metamorphic pyrites (As, Co, Ni >100ppm). Py2 generally lacks mineral inclusions compared to early Py1a and Py1b consistent with the findings of Daver et al. (2020) for gold deposits at Val D'Or district. Py3 at the CRL represents pyrite recrystallization under peak metamorphic conditions. The texture of this pyrite type was interpreted to represent breakdown of pyrite under high temperature conditions to form other sulfides like pyrrhotite and chalcopyrite that replace pyrite. In contrast to the CRL, oscillatory zoned As-rich Py1b and Py2 at East Bay area and intrusion related deposits are the early pyrites which was dissolved and

reprecipitated as porous and inclusion-rich late Py1a through CDR process. The late Py1a have inclusions of Au and Au-bearing minerals with several $\delta^{34}\text{S}$ values that are close to magmatic sulfur value (0‰ to +5‰). Py3 at intrusion related and McMarmac deposits have similar textural, chemistry and $\delta^{34}\text{S}$ relative to the CRL deposit which suggests similar condition of formation.

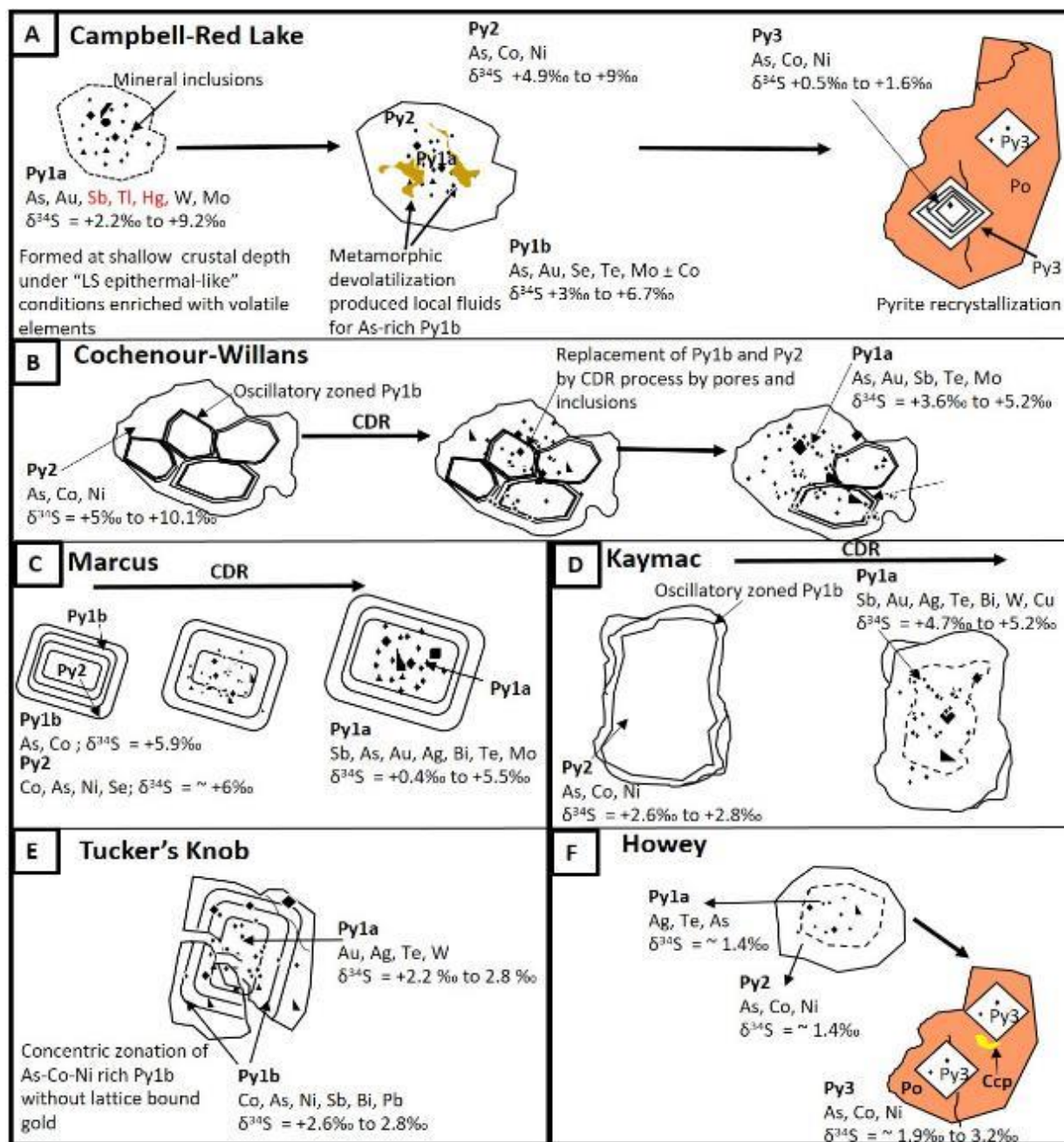


Figure 6.15 Schematic illustration of pyrite trace element and sulfur isotope evolution across the Red Lake gold deposits and occurrences.

6.5 Pyrite trace element comparisons and fertility assessment

Several factors affect the incorporation of metals into pyrite at gold mineralizing sites including pH, salinity, temperature and pressure (Brugger et al., 2016). Pyrite precipitating from mineralizing fluids with the right physico-chemical conditions incorporate a wide range of trace elements during mineralizing events. Since the Red Lake greenstone belt contains a variety of Au deposits (past producers and active mines) of different sizes, it serves as a natural laboratory to test pyrite fertility indicators across the district. In addition, pyrite chemistry from other orogenic gold districts and deposits (e.g., Hemlo and Fimiston lode deposit, Australia) have been compared to test endowment between districts. Different elements and element ratios were assessed for this purpose, however, only a few selected ones that show potential will be discussed.

Arsenic in Py1a from Red Lake varies significantly between deposits but is less than one weight percent in all deposits. However, As trends towards high values in Py1a at CRL compared to other Red Lake systems which is consistent with the higher Au values Py1a in this deposit (reaching a maximum of 10 ppm in pyrite lattice and about 100 ppm as Au inclusions; Fig. 6.11). Although, the sample size is larger for the CRL, it suggests that Py1a interacted with mineralizing fluids that were saturated with Au and Au-bearing minerals to a greater degree than other Red Lake deposits (Fig. 6.17). Antimony is elevated (maximum value of >7,000 ppm) in Py1a at the CRL deposit, whereas it has maximum value of 536 ppm and 98 ppm respectively from the smaller Cochenour-Willans and Marcus deposits. Antimony and Tl values are also elevated in the Tucker's Knob Au occurrence (maximum value of 155 ppm and 13 ppm respectively) compared to the Cochenour-Willans and Marcus deposits whereas Py1a from Howey and Hasaga have negligible Sb and Tl values (Fig. 6.17). This suggests that values of Sb and Tl from Py1a are elevated with

respect to proximal zones of large deposits like CRL in comparison to smaller deposits and occurrences.

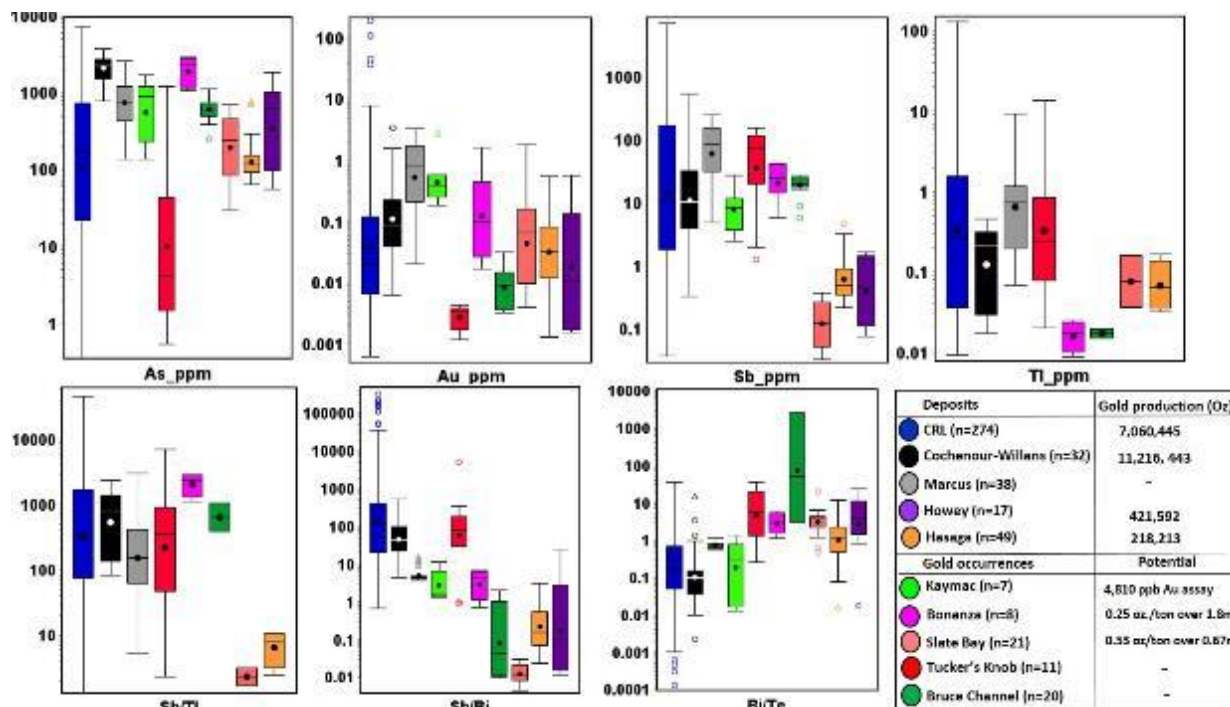


Figure 6.16 Trace element contents and element ratios of Py1a from the Red Lake greenstone belt deposits and Au occurrences. Gold production and exploration potential figures from Malegus et al. (2023), Goldcorp Tech Report (2015), Durocher et al. (1987).

Since Sb and Tl values in Py1a vary between deposits of different sizes based on paragenesis of this pyrite type, the Sb/Tl ratio was used to assess if these deposits and Au occurrences can be separated into groups. Mafic volcanic hosted deposits form a group according to their size with the CRL showing high Sb/Tl values followed by Cochénour-Willans and Marcus. Tucker's Knob, Bonanza and Bruce Channel Au occurrence also have high Sb/Tl values (Fig. 6.17). However, intrusion-related deposits like Howey and Hasaga have lower ratios of Sb/Tl in Py1a consistent with magmatic-related deposits and are likely not associated with low temperature hydrothermal events. Antimony was ratioed against Bi values in Py1a to assess its potential to group deposits by size. Sb/Bi values are highest in the large CRL deposit owing to very high mobility of Sb in the

low-medium temperature ore fluids that formed this deposit (Belousov et al., 2016). On the other hand, Bi is more soluble in higher temperature fluids (Thomson et al., 1999) and hence occurs in lower abundances in Py1 at CRL. The Sb/Bi ratio of Py1a values decreases with size of deposit (Fig. 6.17). Again, the Tucker's Knob and Kaymac Au occurrences show potential with considerably high Sb/Bi values (mean of 172 and 4 respectively). The above data suggests Sb and Tl values in pyrite can potentially be a good fertility indicator in the Red Lake greenstone belt distinguishing large Au systems from smaller ones.

In contrast to Py1a, arsenic-rich Py1b have a different set of trace elements in the CRL deposit. However, arsenic-rich Py1b across other deposits including Cochenour-Willans and Marcus have lower trace element concentrations compared to the CRL. Thus, Py1b trace element compositions were assessed for their potential to group deposits by size. Gold values of Py1b have highest concentrations at CRL followed by Cochenour-Willans, Marcus and McMarmac. Other elements in oscillatory zoned Py1b that show similar potential as fertility indicators in Py1b include Te and Mo (Fig. 6.18).

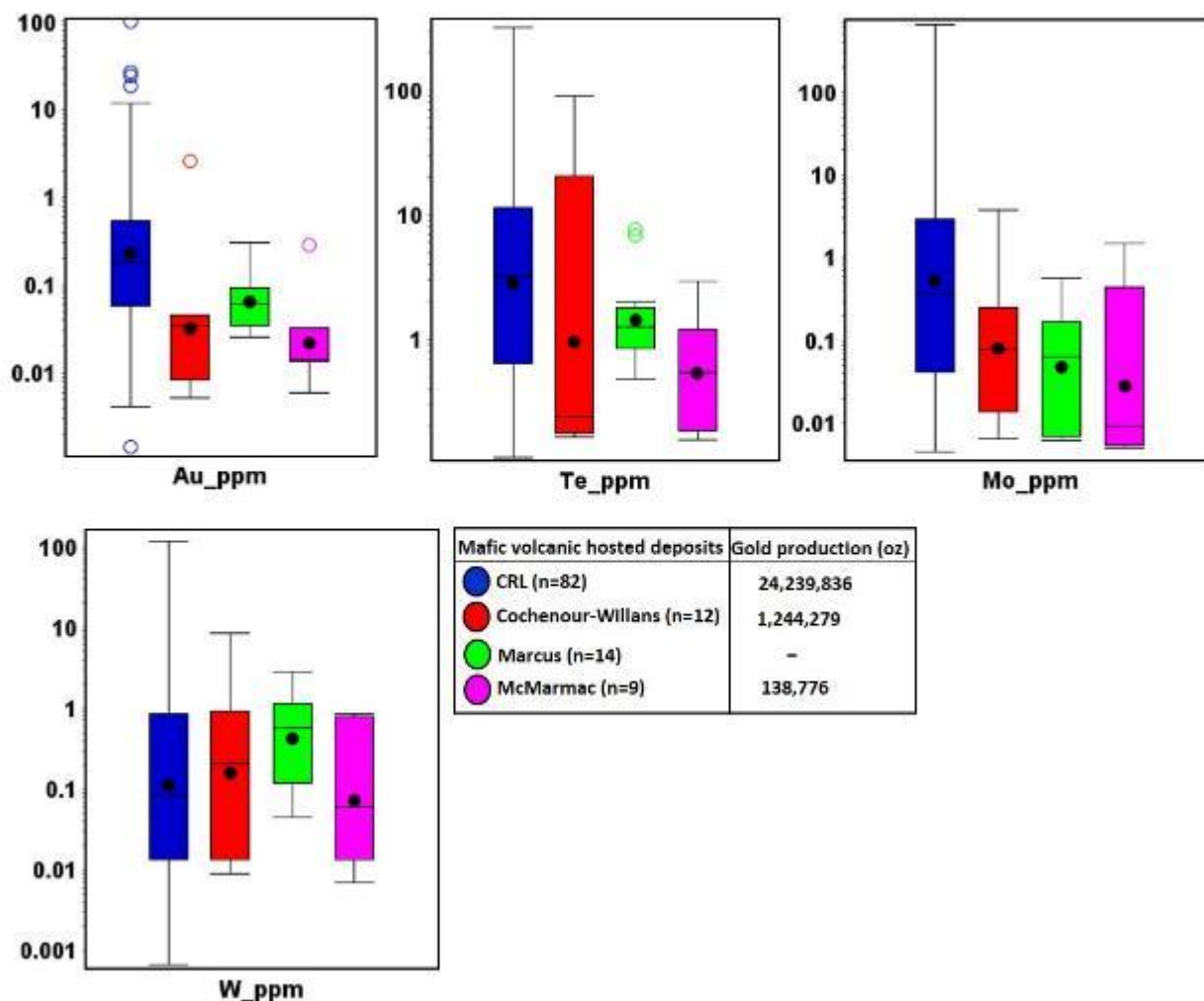


Figure 6.17 Fertility indicators in Py1b at Red Lake district deposits. Gold production figures from Malegus et al. (2023).

CRL district pyrites were compared to other orogenic gold mining districts and deposits to assess if pyrite mineral chemistry can distinguish well-endowed Au districts from smaller Au districts. The CRL dataset were grouped together irrespective of pyrite generations in order to achieve a direct comparison with other districts in Canada (Hemlo Au district and Heron Bay) and Australia (Fimiston Super Pit). The Fimiston lode gold deposit (super pit) is part of the Golden Mile Archean gold deposit in Western Australia with a total mineral resource of 189.6 Mt at 1.6 g/t Au (Northern Star Resources Annual Report, 2020). The Hemlo gold deposit contain 1.72 million ounces of gold at 0.91 g/t Au (Barrick Gold Technical Report, 2017) whereas Heron Bay is a small

deposit worked during the 1930s with further exploration work in 1985 returning 4.6 g/t Au over 25cm (OGS mineral inventory, 2022).

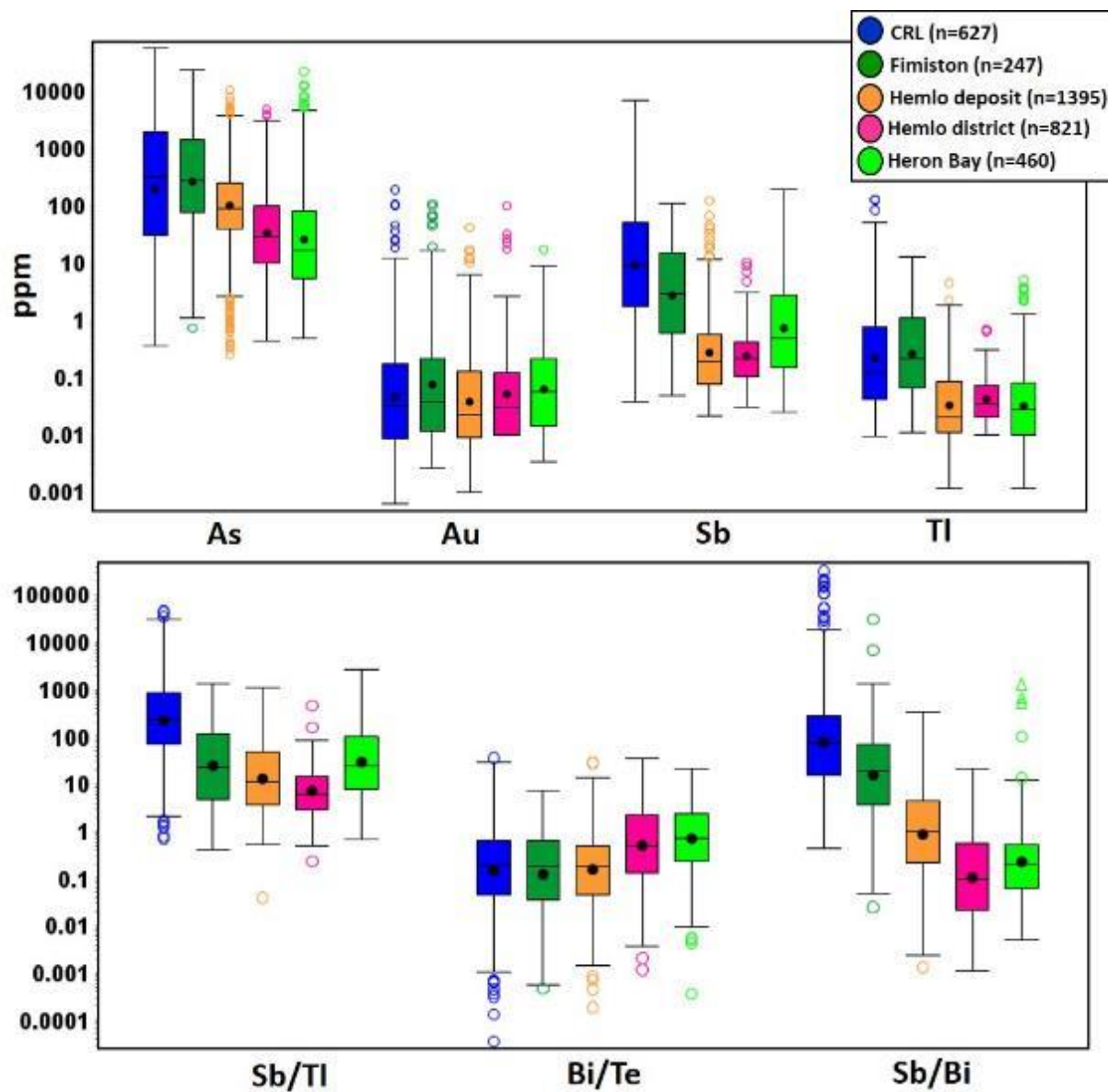


Figure 6.18 Trace element composition and element ratio of pyrite from Red Lake district compared to other orogenic gold districts. CRL data from this study, data from other districts from Fay, (2017), Gorner, (2018), Vrzovski, (2018) and Amira P1153, P1202 unpublished data.

The Sb/Tl ratio which was used to discriminate Red Lake deposits was also assessed for the district scale groupings. Gold values in pyrites across the assessed dataset (which include pyrite trace element data from CRL, Fimiston, Hemlo and Heron Bay; Fay, 2017; Gorner, 2018; Vrzovski, 2018, Amira P1153, P1202 unpublished data) are almost equal, hence, this cannot be used as a district scale fertility indicator (Fig. 6.19). The data reveal that Sb/Tl values are higher in CRL pyrite and Fimiston lodes than Hemlo district and deposit pyrites (Fig. 6.19). A similar pattern was observed for Sb/Bi values which are considerably lower in the Heron Bay and Hemlo district data compared to CRL and Fimiston lodes. One explanation for this is that the CRL and Fimiston lodes are probably associated with typical medium temperature orogenic-related hydrothermal fluids (Penczak and Mason, 1997; Gauthier et al., 2017) that are effective transport mechanism for As and Au complex and ligands that are capable of forming large scale orogenic gold deposits with the right structures and Au precipitation mechanisms (Goldfarb et al., 2005). This can explain the very high As values in CRL and Fimiston lodes compared to Hemlo and Heron Bay which are associated with felsic volcanic and intermediate intrusive rocks (Muir, 1997). Pyrite from deposits like Hemlo and Heron Bay have high compositions of granophilic elements like Bi and Te, resulting in low Sb/Bi but high Bi/Te values. Muir (2002) suggested that the Hemlo gold district had a genetic association with felsic to intermediate volcanic stocks which are also present in the core of the deposit. This could explain the source of granophilic elements observed and the low composition of volatile elements like Sb and Tl.

6.6 Spatial variations in pyrite versus whole rock chemistry at Red Lake district

Textural, chemical and sulfur isotope data have shown that the Red Lake deposit pyrites vary at the grain scale, hence trace elements in pyrite were assessed to study their variations at the district scale. This was then compared to whole rock values to determine if trace elements in pyrite have more potential as vectors compared to whole rock data especially in brownfield districts (and potentially greenfield districts). To test mineral chemistry vectoring, Evolution Mining Red Lake #1 shaft, Balmertown where current high-grade gold is being mined was selected as the reference mineralized center for vectoring. Then average values of fourteen elements including Au, As, Ag, Bi, Co, Ni, Sb, Tl, Cu, Mo, Se, Te, and Pb occurring in all pyrite types were compared to similar elements in whole rock samples around CRL in order to investigate element partitioning between pyrite and co-precipitated ore and gangue phases in whole rock. Most of the elements have higher mean values in pyrite compared to whole rock except Tl, Cu, Mo, W, Pb and Zn which have either higher or equal mean values in whole rock compared to pyrite (Fig. 6.20). Hence only elements with higher compositions in pyrite compared to whole rock will be assessed as potential mineral chemistry vectors.

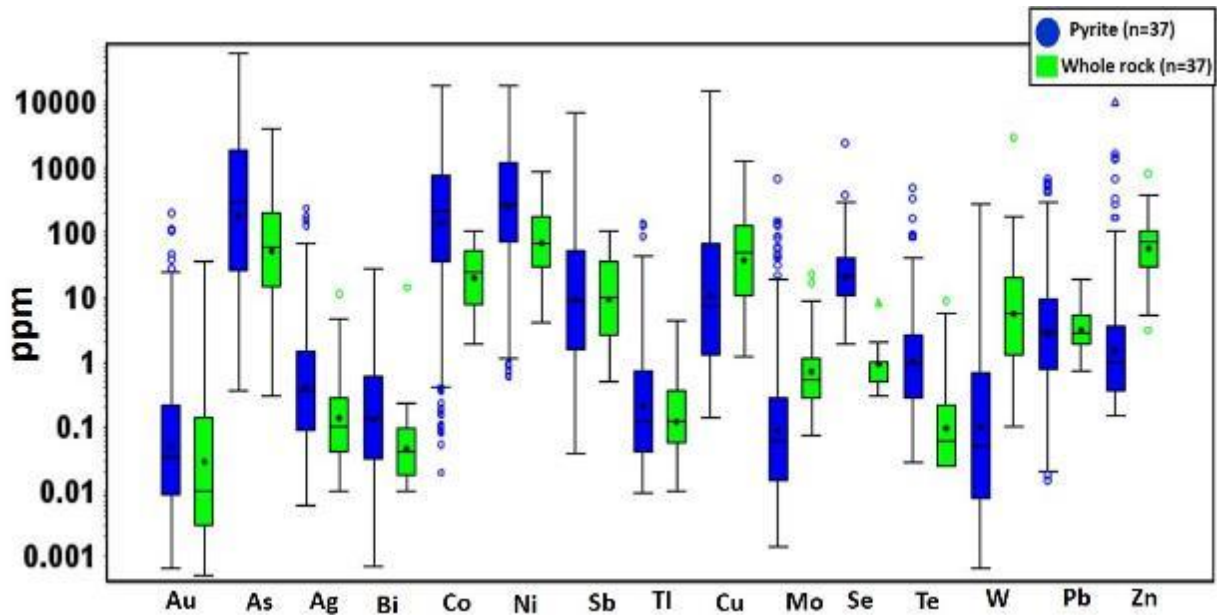


Figure 6.19 Comparisons of element distribution between pyrite (Py) and whole rock (WR) samples at the Campbell-Red Lake deposit.

Bivariate plots of inter-sample variation of Au and As in pyrite samples compared to the same elements in whole rock samples against the distance to the mineralized center show that a similar pattern is noticeable for both pyrite and whole rock. Low values (<3 ppm Au, <100 ppm As in pyrite) occur in distal samples (up to 5km from mineralized center) compared to proximal samples (with >10ppm Au and ~10,000 ppm pyrite As values) close to the mineralized center (Fig. 6.21), however, it is noticeable that Au values in both pyrite and whole rock samples drop sharply from high values in the mineralized center to background values outside the mineralized center. This suggests that there is a weak systematic variation of Au in pyrite from distal to proximal.

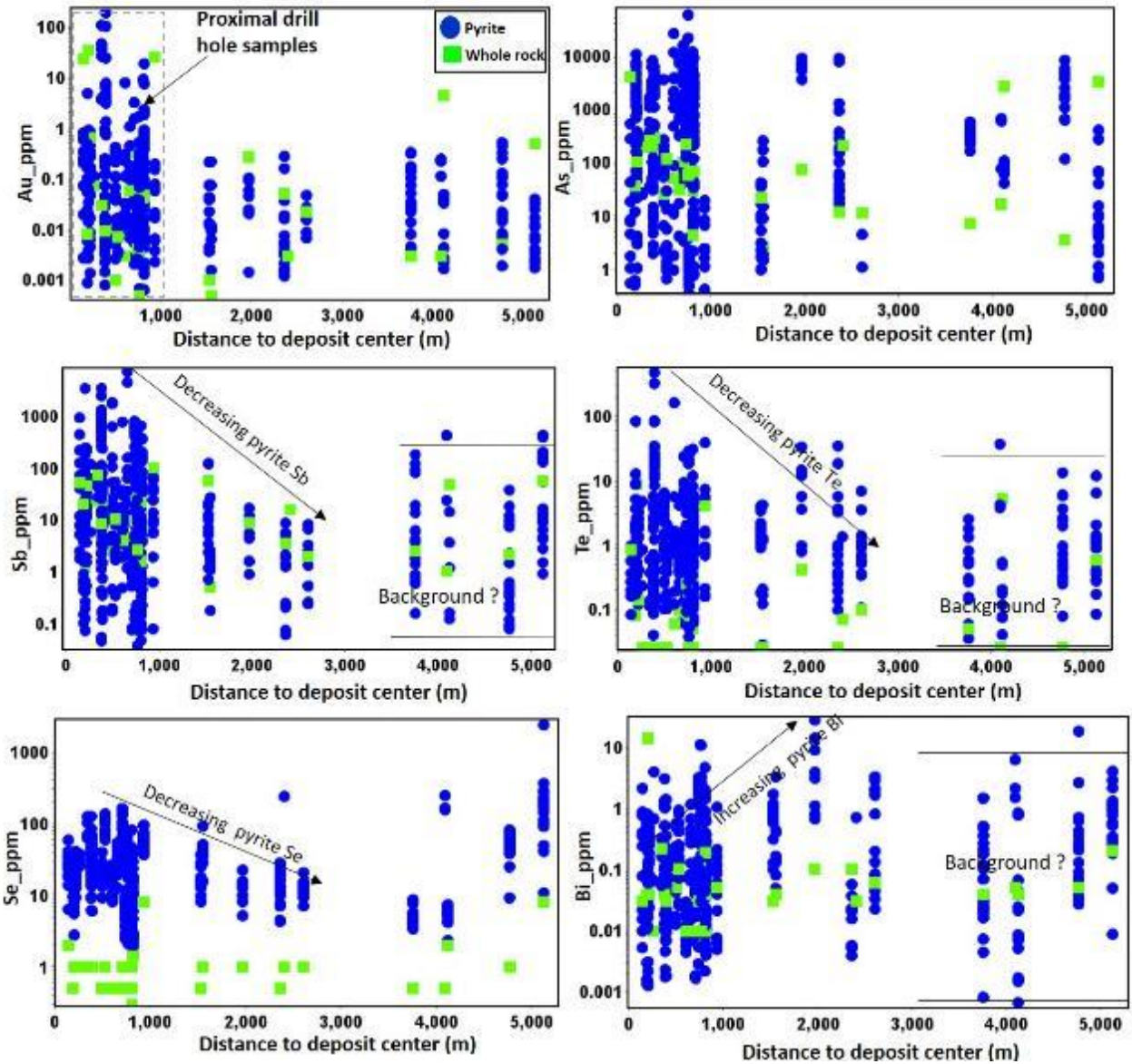


Figure 6.20 Plot of pyrite trace elements against distance to CRL deposit center compared to whole rock data.

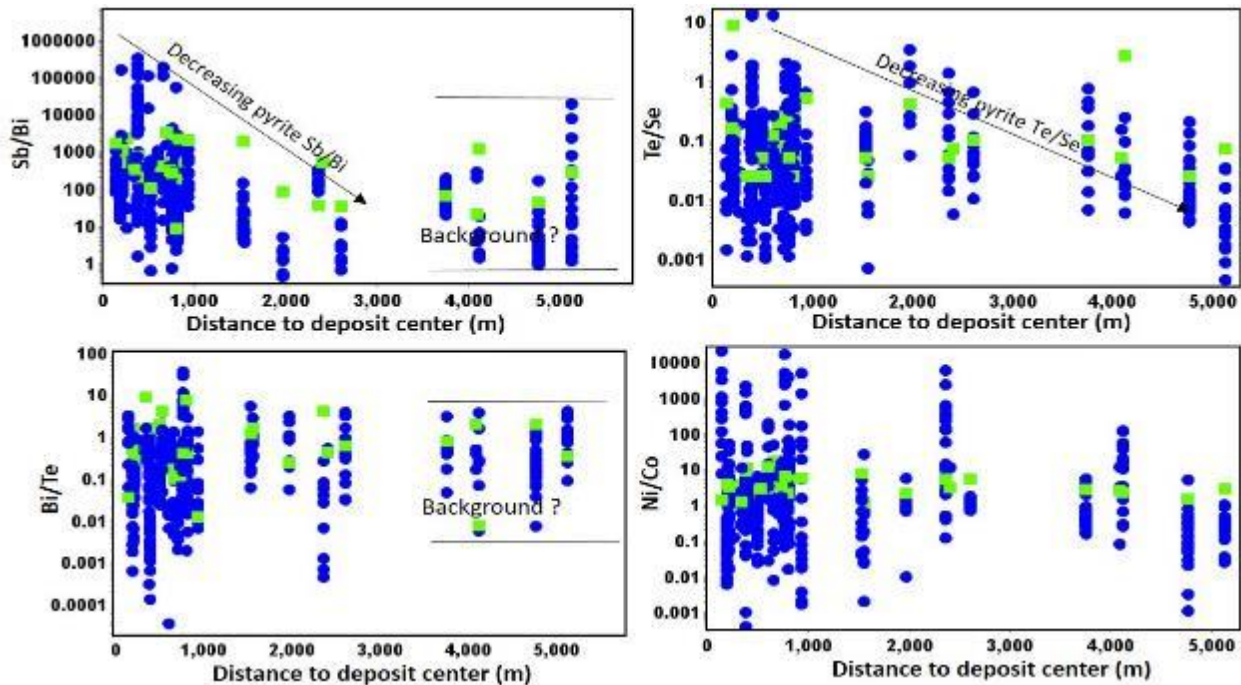


Figure 6.21 Plot of element ratios in pyrite against distance to CRL deposit center compared to whole rock data.

Other elements that occur with more variability in pyrite than whole rock towards mineralized center include Sb, Se, Te and Bi all of which are known to be enriched around orogenic gold deposits (Fig. 6.21; Eilu, 1999). Antimony, Te and Se values in pyrite were observed to decrease from the mineralized center to approximately 3km whereas Bi values in pyrite increase from the mineralized center up to 2km. Whole rock values of similar elements (Sb, Bi, Te, and Se) do not show significant changes in composition from proximal to distal portion of the CRL deposit compared to pyrite (Fig. 6.21). Similar whole rock vectoring assessment by Bouzari (2009) and Stock (2012) around the CRL deposit also showed that enrichment of potential whole rock vectors are limited to less than 1km footprint around the CRL deposit. Thus, elements that increase or decrease towards the mineralized center were ratioed against each other to enhance the compositional variation toward the CRL deposit. The Sb/Bi ratio of pyrite shows a systematic decrease from the mineralized center to approximately 3km beyond which this ratio has irregular

variations. However, the Sb/Bi ratio in whole rock samples closely follows similar trends showing systematic changes in values from proximal to the distal parts of the CRL deposit (Fig. 6.22). The ratio of Te/Se and Bi/Te in pyrite and whole rock samples also follow similar trends of decreasing values from proximal to distal parts of the CRL (Fig 6.22). Only the Ni/Co ratio of pyrite showed systematic variation compared to Ni/Co in whole rock samples with distance where high Ni/Co (>10) is noticeable in pyrite up to 3km from mineralized center whereas low ratio of Ni/Co in pyrite is noticeable with distance greater than 3km from the CRL deposit. This variation in Ni/Co ratio is consistent with the distribution of pyrite types around the CRL where early abundant Py1a proximal to the CRL (Fig. 6.1) have higher Ni/Co whereas Py2 in the distal parts of CRL have lower Ni/Co ratio. The variation in the Co/Ni ratio of pyrite was also plotted on the district geology map of the Red Lake greenstone belt. The plot shows that other smaller deposits along the East Bay trend with abundant Py1a distribution also have high Ni/Co in pyrite similar to the CRL (Fig. 6.23). The plot of Sb/Bi and Bi/Te for pyrite across the Red Lake district is consistent with the observation that pyrite trace element is a potential discriminator of deposit style at Red Lake (Figs 6.24, 6.25). Mafic volcanic hosted deposits such as CRL, Cochenour-Willans, Marcus and McMarmac have high Sb/Bi and low Bi/Te ratio in pyrite compared to intrusion related deposits such as Howey and Hasaga (Figs. 6.24, 6.25).

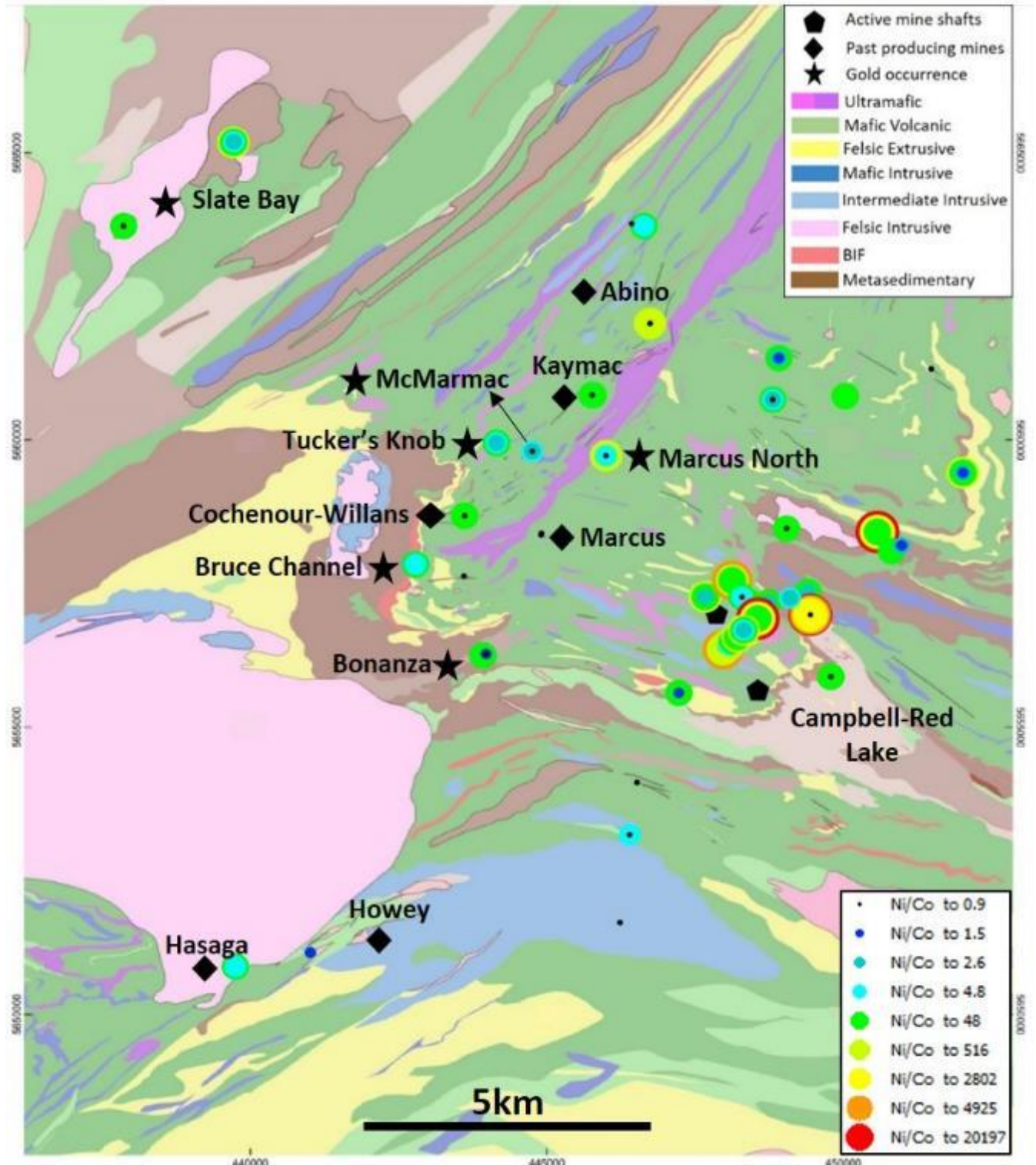


Figure 6.22 Red Lake district geology map showing spatial distribution of Ni/Co value in pyrite. Map modified from Evolution mining (2023).

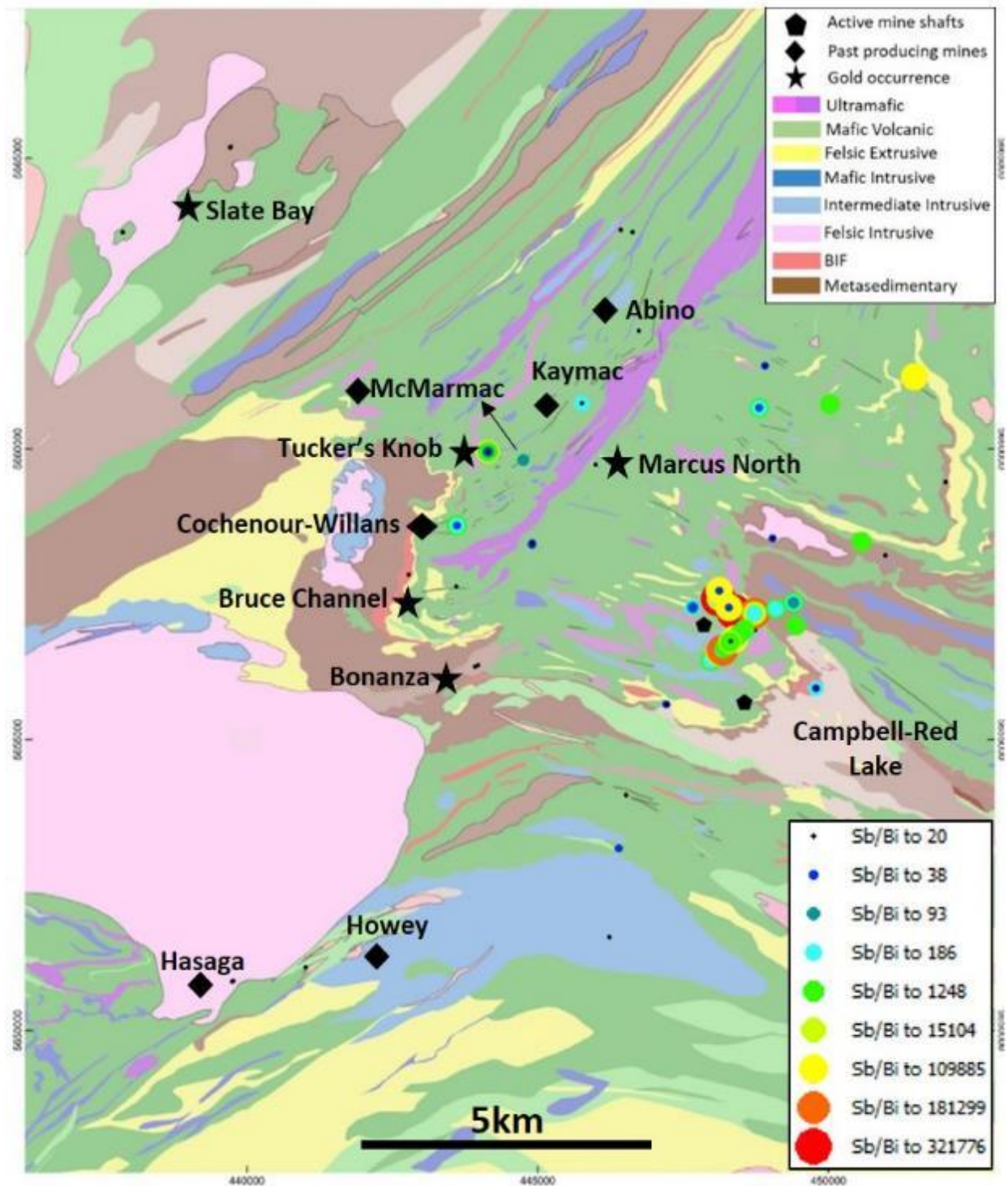


Figure 6.23 Red Lake district geology map showing spatial distribution of Sb/Bi value in pyrite. Map modified from Evolution mining (2003).

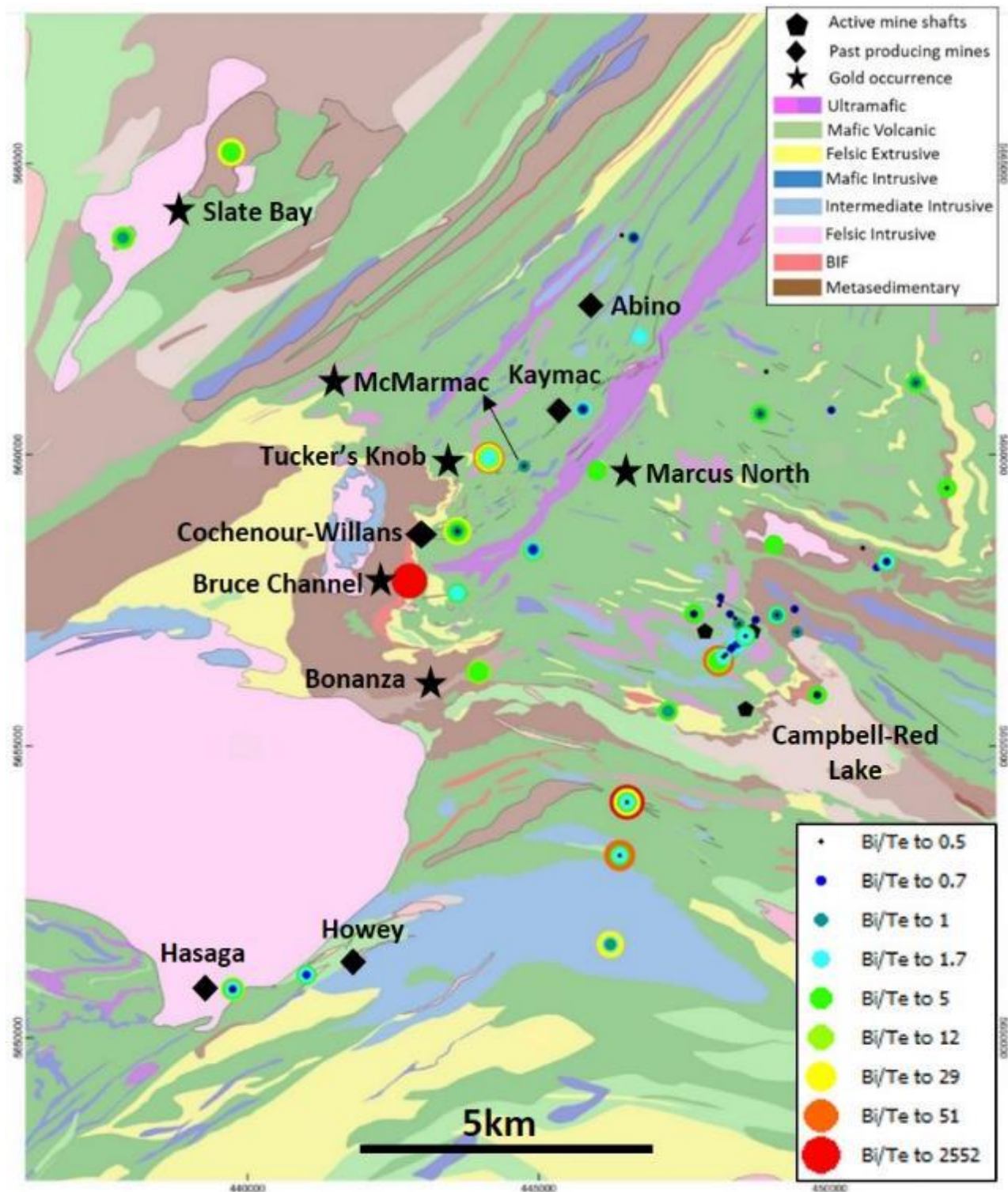


Figure 6.24 Red Lake district geology map showing spatial distribution of Bi/Te value in pyrite. Map modified from Evolution mining (2003).

Vrzovski (2018) showed a systematic decrease of Au, Te and As values in pyrite from proximal to distal portions of the Hemlo gold deposit beyond the recognizable whole rock footprint which supports an outward fluid flow of mineralizing fluids from orogenic gold orebodies to surrounding host rocks recorded in the chemistry of ore stage pyrites. The trace elements present in the pyrite halo of the CRL and Hemlo orebodies vary as a function of deposit style and mineralizing fluid chemistry (Penczak and Mason, 1997; Muir, 2002). The CRL is a high grade gold system and will be expected that a large volume of fluid and precise fluid focusing would have been required to create such system with outward flow of mineralizing fluids into country rocks (Dubé et al., 2002). The pyrite trace element chemistry from around the CRL in this study suggests that even though the mineralization footprint of the CRL is complex, pyrite trace element chemistry can trace the magnitude and extent of outward fluid flow around the CRL orebody which is beyond the limit of whole rock geochemistry similar to observations around the Hemlo system. Thus, pyrite trace element chemistry can be used as vectors for orogenic gold deposits.

To further constrain the vectoring and fertility assessment potential of other Red Lake deposit pyrites, methods developed by Belousov and Large (2014) were employed. This involved assigning a scoring system for orogenic gold deposit pyrites based on common trace elements in the pyrite including Ni, Au, Te, Bi, As and W with comparisons to VHMS style deposits based on trace elements common to pyrite from this deposit style (e.g., Co, Cu, Pb, Cd, Se, Sn and Tl. No VHMS style Au mineralization is present in the Red Lake greenstone belt. The scoring parameter for trace element in pyrite in orogenic gold and VHMS deposit is ranked from 0.1 to 50 where the concentration of more diagnostic elements is multiplied by higher scoring factors. Thus, the formula for orogenic gold score is given as: $(\text{Ni} \times 0.1) + (\text{Au} \times 50) + (\text{Te} \times 10) + (\text{Bi} \times 2) + (\text{As} \times 1.0)$

+ (W x 10) whereas that of VHMS style score is given as: $(Co \times 0.1) + (Cu \times 1) + (Pb \times 1) + (Cd \times 10) + (Se \times 10) + (Sn \times 50) + (Tl \times 20)$ with element concentrations in ppm and diagnostic scores for both orogenic gold and VHMS field starts from 1,000 whereas a score of 10,000 suggests follow up of a target zone (Fig. 6.26). This formula was adopted for Red Lake Au deposit pyrites and the plot in Figure 6.26 was made. The plot indicates that trace element in pyrite at the Red Lake greenstone belt deposits and occurrences showed both signature of deposit distal and deposit proximal samples (Fig. 6.26). However, samples from the CRL and one from the past producing Bateman mine along the East Bay trend fall into the category of “target” (Fig. 6.26). This suggests pyrites samples from the CRL and Bateman would likely indicate proximity to a potential deposit which is below detection with whole rock geochemistry as the samples returned whole rock Au contents of 0.01ppm and 0.003ppm for ND128 and ND058 respectively. Pyrite samples from Marcus and Cochenour-Willans indicate proximity to a deposit whereas pyrite trace element from the Slate Bay occurrence suggests distal signature to a deposit. Although samples from Kaymac occurrence fall within the proximal indicator of the VHMS field, it is unlikely that this Au occurrence points to a potential VHMS system because no potential VHMS style mineralization has been recorded from the East Bay area from previous work (e.g., Gallagher et al., 2018). The trace of element content of other Red Lake deposits including Marcus and Cochenour-Willans is consistent with their distal and proximal signature as samples from these deposits were collected from surface outcrops close to former mine environments and not within the orebody itself.

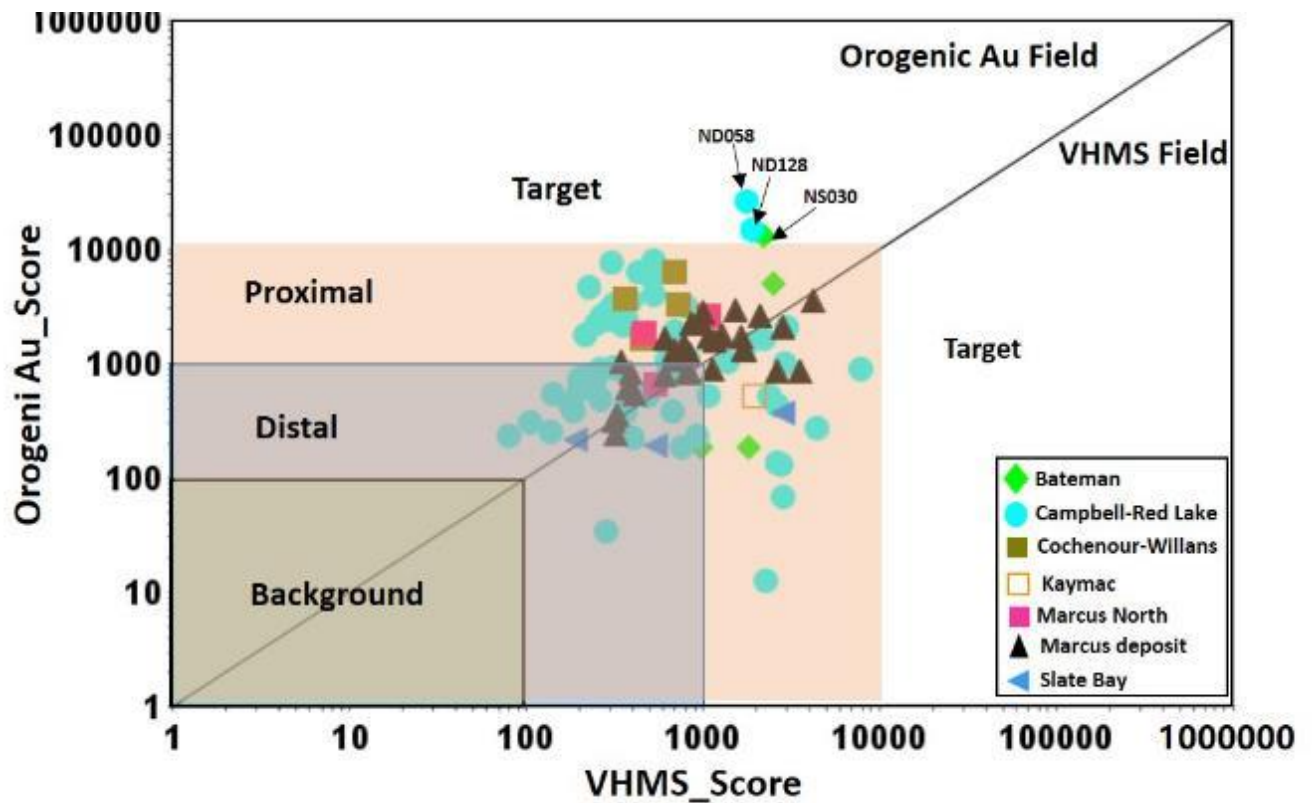


Figure 6.25 Plot of orogenic Au score against VHMS score for various Red Lake deposits and occurrences. Background, distal, proximal and target of pyrite represent how far away the sample is from a system. Orogenic Au field and VHMS field represent signature of pyrite based on calculations with respect to the most abundant trace elements in pyrites from orogenic gold and VHMS deposits. Modified from Belousov and Large (2014).

Chapter 7 - Conclusions

This study investigated the textural, trace element and sulfur isotope variations of pyrite samples from various Red Lake gold deposits. The key objectives of this thesis included: 1) investigating the texture, paragenesis and sulfur isotope evolution of pyrite in the different deposit styles found at the Red Lake greenstone belt. 2) Comparing pyrite mineral chemistry from the different styles of mineralization in the Red Lake greenstone belt. 3) Assessing the potential use of pyrite mineral chemistry as vectoring and fertility indicators at the belt scale. These objectives relates directly to the overall goal of module one of the AMIRA P1249 project to recognize fertility and proximity to high-grade ore bodies.

Textural and trace element investigation of Red Lake deposit pyrite using a combination of petrography, SEM BSE imaging, and LA-ICP-MS analyses showed that paragenesis of pyrite on the belt scale is complex. Two groups of pyrites associated with Red Lake deposits and occurrences were identified, namely hydrothermal zoned pyrites and recrystallized metamorphic pyrites. Hydrothermal zoned pyrites consist of complex growth zonation with three main pyrite types recognized within the growth zones namely Py1a, Py1b and Py2. Py3 crystals represent recrystallization of early pyrites under high temperature conditions with heat from pluton emplacement. Textural analysis was used to establish paragenesis of zoned pyrites at Red Lake. At CRL deposit, Py1a is the core of the zoned pyrites which consist of distinct mineral inclusions with sieve textures that represent the pre-main stage mineralization, early hydrothermal alteration at the CRL deposit. Furthermore, As-Au Py1b at the CRL deposit overgrows Py1a and represent main stage gold mineralization representing onset of metamorphic devolatilization

and mobilization of mineralizing fluids whereas the last growth stage of Py2 with mineral inclusion free pyrites represents retrograde cooling of the hydrothermal system at at CRL. Py3 across Red Lake have a consistent association with coexisting pyrrhotite and chalcopyrite that replaces early pyrites during recrystallization. At the East Bay area where several gold deposits and occurrences occur have a different paragenesis of hydrothermal pyrite compared to the CRL deposit. Here, oscillatory zoned Py1b and Py2 are the early pyrites in deposits such as Marcus, Cochenor-Willans, McMarmac and gold occurrences such Kaymac, Bruce Channel and Tucker's Knob. In contrast to the CRL deposit, mineral inclusion-rich Py1a at the East Bay area deposits are considered the latest pyrite formed by coupled dissolution and reprecipitation by external fluids LA-ICP-MS spot and 2D elemental maps reveal that trace element content of Py1a from the CRL deposit have enrichment of Sb, Tl, Au, Ag, Te, Se, W $\pm$ Hg consistent with volatile element enrichment in Py1a, whereas arsenian Py1b have abundant As, Au, Te and Mo consistent with the gold mineralization stage recorded by Au-As rich Py1b. Py2 at the CRL represent the latest pyrite growth stage with lower concentrations of most trace elements in pyrite except Co, Ni and As all of which exceed 1,000ppm consistent with signature of retrograde metamorphic pyrite under low boiling conditions (Daver et al., 2022).

In contrast to the CRL deposit, Py1b and Py2 in the East Bay area deposits have abundant As and Co with no observed association to gold mineralization whereas inclusion rich Py1a interpreted to represent late stage Au mineralization across East Bay area deposits have higher concentration of economic minerals such Au, Ag, Te, Cu, Mo and W compared to the early pyrites. Py3 have

high concentrations of refractory elements like Co, Ni and As all exceeding 1,000ppm across all Red Lake deposits and gold occurrences.

Together, the texture and trace element characteristics of hydrothermal zone pyrites suggests that the CRL deposit evolved from a low temperature, high crustal setting to a deeper, higher temperature setting at the onset of metamorphic devolatilization until the hydrothermal system cooled following mineralization, consistent with previous observations by Penczak and Mason (1997) and Stock (2012). In contrast, the East Bay area deposits likely formed as a result of deep orogenic activity with evidence from oscillatory zoned early pyrite which was then dissolved and reprecipitated by magmatic fluids. Similar process where observed at the intrusion-related Howey and Hasaga deposits which have Au remobilized into late pyrite fractures and as micro-inclusions.

In situ sulfur isotopic composition of zoned pyrites were studied by LA-MC-ICP-MS to understand sulfur isotope variation of pyrite types. Average $\delta^{34}\text{S}$ value of early, mineral inclusion rich Py1a is +4.5‰ at the CRL deposit but have display wide range of $\delta^{34}\text{S}$ enrichment which suggests multiple fluids were responsible for Py1a crystallization. Ore stage Py1b have narrow a range of $\delta^{34}\text{S}$ from +3‰ to +6.7‰ and have abundant concentration of redox sensitive elements including Au, As, Te and Mo suggesting redox changes of mineralizing fluids likely influenced Au precipitation in the CRL deposit whereas Py2 have average $\delta^{34}\text{S}$ of +6.6‰ which overlaps with metamorphic-hydrothermal signature of Py1b. Later stage Py3 at CRL have average $\delta^{34}\text{S}$ of +1.1‰ which suggests association with fluids from late-stage pluton emplacement within the contact metamorphic isograd of the CRL deposit.

At the East Bay deposits and gold occurrences, the relationship between trace element content and sulfur isotope composition of pyrite growth zones indicates an association of oscillatory zoned Py1b and Py2 with metamorphic fluids whereas later Py1a have $\delta^{34}\text{S}$ that suggests a magmatic fluid input during the formation of this pyrite.

In terms of fertility assessment, the concentration of Sb and Tl in Py1a together with the Sb/Tl, Sb/Bi and Bi/Te ratios serve as a potential fertility indicator at Red Lake especially with deposits hosted within mafic volcanic rocks, whereas Au, Te and Mo concentration of Py1b can differentiate the high grade CRL deposit from smaller deposits like Marcus, Cochenour-Willans McMarmac. The ratio of Sb/Bi decreases with the size of the deposits except for the intrusion related deposits whereas Bi/Te ratio increase with decreasing size. This is consistent with comparison CRL district pyrites with pyrites from other gold camps in Canada and Australia. Elements in pyrite samples that display consistent anomalism from distal to proximal parts of the CRL deposit relative to whole rock samples include Se, Te, Bi and Ni/Co. These elements elevated the signal and are enriched around the CRL deposit about 1-2km more than the recognizable footprint of the whole rock samples similar to previous observations from the Hemlo deposit where anomalous Au, Te and As were associated with pyrite samples from this district (Vrzovski, 2018).

The results from this study show that although the paragenesis and trace element chemistry of pyrite at Red Lake is complex, there is potential to use pyrite as a fertility assessment and vectoring tool for both early stage and brownfield exploration that can be applied in other gold districts.

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Appendix I – Sample Description

Sample_ID	UTM_East	UTM_North	Aseemblage	Description	Pyrite Occurrence
RL-23-NS-001	444932	5658319	Balmer	Massive basalt, oxidized in parts. Sulfides distributed irregularly on surface sample and on quartz veins about mm thick	Replacement
RL-23-NS-001B	444937	5658346	Balmer	Sample cut from a massive basalt but oxidized, contains abundant pyrites distributed irregularly on surface sample and on quartz veins	Vein
RL-23-NS-002	446951	5654702	Confederation	Mafic volcanic rock (silicified?), sulfides occur as tiny grains of pyrites on the surface of the sample	Replacement
RL-23-NS-003	446947	5654698	Confederation	Sample appears to have undergone a cycle of structural stress. Some sulfide from this sample occurs as tiny grains of pyrites on the surface of the meta-basalt	Replacement
RL-23-NS-004	446933	5654679	Confederation	The sample is a silicified metavolcanic. sulfides occur as dissminated fine grained pyrite	Replacement
RL-23-NS-005	443636	5658661	Balmer	The sample is a fuchsite-rich quartz-ankerite vein. Sulfides occur as vein pyrites with well-formed crystals on quartz-ankerite vein	Vein
RL-23-NS-006	443646	5658650	Balmer	Massive basalt with cm-wide veining. Oxidation evident. disseminated pyrites on what appears to be a metamorphosed basalt	Replacement

Sample_ID	UTM_East	UTM_North	Aseemblage	Description	Pyrite Occurrence
RL-23-NS-007	443955	5656227	Bruce Channel	Sample appears to be from the conglomerate unit of the outcrop cut from the unidentified contact with argillites. Contains very fine grained mafic mineral matrix that appears silicified. The fine-grained disseminated grains of pyrites visible on the sample.	Replacement
RL-23-NS-008	444007	5656253	Bruce Channel	Meta-agillite appearing very indurated. It appears silicified and have fine grain dissemination of pyrites.	Replacement
RL-23-NS-009	448136	5657521	Balmer	Massive basalt with crosscutting quartz vein ranging from less than a cm to 3cm thickness. Veins appears deformed. Sulfide occurs both as dissemination and vein on the sample.	Replacement +Vein
RL-23-NS-010	448164	5657530	Balmer	This sample is cut from what appear to be the felsic lithology of the outcrop. It appear to be a silicified basalt. the sulfides on the sample occur as fine-grained dissemination of pyrites	Replacement
RL-23-NS-011	447694	5657245	Balmer	disseminated pyrites on what appears to be a meta-basalt	Replacement
RL-23-NS-012	447692	5657244	Balmer	Sulfides in this sample occur mainly as vein pyrites from the oxidized high grade carbonate-quartz vein	Replacement +Vein

Sample_ID	UTM_East	UTM_North	Aseemblage	Description	Pyrite Occurrence
RL-23-NS-013	444178	5659916	Balmer	Sulfide in this sample occur in veinlet and disseminations. The sample was cut from the contact of a carbonate-quartz vein.	Replacement +Vein
RL-23-NS-014	444181	5659916	Balmer	The sample was cut from a quartz-carbonate vein of the outcrop. Brecciation of the Q-C vein visible. Sulfides on this sample exist as pyrites.	Replacement +Vein
RL-23-NS-015	444168	5659921	Balmer	The sample is a mafic or ultramafic rock. Pyrites occur as the primary sulfide on this sample with a euhedral crystals measuring up to mm as dissemination on the surface of the sample.	Replacement
RL-23-NS-016	444783	5659773	Balmer	The sample is mostly from a quartz-carbonate vein with sulfides on this sample occurring mainly as pyrites. The sample was observed to be oxidized.	Replacement
RL-23-NS-017	444784	5659773	Balmer	The sample is a metabasalt. Pyrites was observed on the surface of the sample as dissemination.	Replacement
RL-23-NS-018	446025	5659695	Balmer	Sample is from a massive basalt. Sulfides on the sample occur as well formed disseminated pyrites	Replacement
RL-23-NS-019	445804	5660746	Balmer	Massive basalt with pyrites observed on irregular quartz vein on the sample.	Replacement

Sample_ID	UTM_East	UTM_North	Aseemblage	Description	Pyrite Occurrence
RL-23-NS-020	448931	5661390	Balmer	Massive carbonitized basalt	Replacement
RL-23-NS-021	446766	5661991	Balmer	metamorphosed mafic/ultramafic rock with some preserved tiny veinlets	Replacement +Vein
RL-23-NS-022	450021	5660568	Balmer	Metabasalt, possibly chlorite altered. Sulfides present as fine grained disseminated pyrites on the sample.	Replacement
RL-23-NS-023	451471	5660456	Balmer	Massive basalt, sulfides occur as fine grained dissemination of pyrites on the surface of the sample. Couple of irregular and stretched quartz vein also present on sample indicating structural deformation.	Replacement
RL-23-NS-024	439757	5665133	Slate Bay	Altered meta-conglomerate. sulfide on this sample occur as finely formed crystals of pyrite occurring both as fine grained dissemination as well as on small veinlet pyrites.	Replacement +Vein
RL-23-NS-025	439762	5665146	Slate Bay	Meta-conglomerate possibly silicified. Sulfides occur as euheudral disseminated pyrite grains. There is also some evidence of bitoite (and chlorite?) alteration on the sample.	Replacement

Sample_ID	UTM_East	UTM_North	Aseemblage	Description	Pyrite Occurrence
RL-23-NS-026	437913	5663679	Slate Bay	Oxidized primary quartz vein with a sizable amount of well-formed pyrite grains occurring on the quartz vein.	Replacement
RL-23-NS-027	437909	5663682	Slate Bay	Oxidized tonalite, sulfides on this sample occur as fine grained dissemination of pyrites on the sample surface with signs of chlorite (and bitoite?) alteration.	Replacement
RL-23-NS-028	446668	5663694	Balmer	Metamorphosed ultramafic intrusive lithology. Fine grained pyrites occur as dissemination on sample. It may have been metamorphosed and fractured indicating structural and metamorphic deformation. Possibly chlorite/talc altered.	Replacement
RL-23-NS-029	446660	5663683	Balmer	Metamorphosed ultramafic rock. Fine grained pyrites occur as dissemination on sample. Evidence of metamorphism and possibly chlorite/talc alteration	Replacement
RL-23-NS-030	446458	5663723	Balmer	Metamorphosed ultramafic intrusive. Fine grained pyrites occur as dissemination on sample. Chlorite/talc alteration evident on sample.	Replacement
RL-23-NS-031	445085	5661615	Balmer	Sample was cut from a mafic rock (metabasalt?) and appears oxidized.	Replacement

Sample_ID	UTM_East	UTM_North	Aseemblage	Description	Pyrite Occurrence
RL-23-NS-032	443634	5657603	Balmer	~30cm channel sample consisting of two parallel and closely associated quartz-tourmaline veins (~8cm thick) and host rock (granodiorite). Pyrites are closely associated with oxidized and chlorite altered quartz-tourmaline porphyry vein.	Replacement +Vein
RL-23-NS-033	443633	5657603	Balmer	Second channel sample of the Windsor outcrop. Pyrites are associated with 7cm-10 cm wide parallel quartz-tourmaline porphyry vein. Quartz and tourmaline show an intrinsic relationship. The veins have been chlorite altered.	Replacement +Vein
RL-23-NS-034	442815	5657806	Bruce Channel	Sample was channeled at the contact between Chert-Magnetite and Conglomerates. On the conglomerate side, pyrites rim around 0.1cm-0.3cm clasts. On the chert-magnetite side, pyrites occur as dissemination on the banded layers.	Replacement
RL-23-NS-035	442818	5657808	Bruce Channel	Pyrites observed to rim around and on the surface of polymictic clasts of conglomerates. Clasts range in size from 0.5-3cm, some composed of mainly quartz, and few others composed of mafic materials.	Replacement

Sample_ID	UTM_East	UTM_North	Aseemblage	Description	Pyrite Occurrence
RL-16ND001	448918.4	5661386	Balmer	carbonate altered rock, approximately 85% chlorite-carbonate alteration, 5% quartz vein so can't really identify protolith but suspect ultramafic, remaining 10% is fairly micaceous, also contains disseminated pyrrhotite (in the micaceous 10%)	
RL-16ND005	447993.4	5656329.7	Balmer (Dickenson-Campbell "diorite")	foliated meta-dacite with 5% recrystallized coarse quartz grains	Vein
RL-16ND013	448034.3	5656367	Balmer (Dickenson-Campbell "diorite")	meta-andesite with 5% deformed narrow quartz and carbonate veins; one larger undeformed quartz-carbonate vein with chlorite in wall rock contact, minor disseminated pyrrhotite	
RL-16ND023	448081.9	5656412.2	Balmer Plutonic Suite	meta-andesite cut by 5-10cm irregular deformed quartz-carbonate hydrothermal vein/alteration; some coarse grained relict orthopyroxene beginning to alter to carbonate; some chlorite at vein margins	Replacement +Vein
RL-16ND029	448115.2	5656442.8	Balmer	2-3 cm quartz-carbonate-pyrrhotite vein, with concentrations of disseminated pyrrhotite and hairline fractures of pyrrhotite	Replacement +Vein
RL-16ND039	448157	5656485.4	Balmer	Metabasalt with disseminated pyrite and pyrrhotite and quartz-carbonate	Replacement

Sample_ID	UTM_East	UTM_North	Aseemblage	Description	Pyrite Occurrence
RL-16ND042	448461.1	5657070.2	Balmer	Metabasalt with carbonate-breccia vein containing carbonate altered clasts and minor crosscutting quartz veins; disseminated pyrite	Replacement
RL-16ND043	448409.6	5657018.1	Balmer	almost entire sample is quartz-carbonate vein and carbonate alteration; wall rock mainly chlorite-sericite with chlorite veins	
RL-16ND048	448200.5	5656513.6	Balmer	metabasalt with 10-15% veins, 10-15% pyrite stringers, and 15-30% silica and carbonate rich zones; chlorite alteration at vein margin + minor chlorite veins	Replacement +Vein
RL-16ND056	448239	5656549.7	Balmer (Dickenson-Campbell "diorite")	approx 5% 1-2mm quartz veins, 5-10% recrystallized metamorphic quartz, 5-10% coarse metamorphic amphibole	
RL-16ND058	448239	5656549.7	Balmer (Dickenson-Campbell "diorite")	heavily altered to carbonate and magnetite, can't really tell what protolith was but presumably mafic-ultramafic	Replacement
RL-16ND064	448404.2	5657167.8	Balmer	strongly altered so can't say with certainty what protolith was, also have some quartz veins	
RL-16ND065	448400.4	5657168.4	Balmer	metabasalt, or a large homogeneous bed of a metapelite; quartz-magnetite vein with some magnetite along fractures elsewhere in sample also; minor pyrite in vein	Vein

Sample_ID	UTM_East	UTM_North	Aseemblage	Description	Pyrite Occurrence
RL-16ND067	448276.6	5656586	Balmer	strongly altered meta-andesite with quartz-carbonate veins and disseminated pyrrhotite (and lesser pyrite) crosscut by mafic dyke with chlorite at contact	Replacement
RL-16ND068	448452.9	5656923.3	Balmer	meta-diorite with straight quartz vein	
RL-16ND069	448130.8	5657392.7	Balmer	>95% quartz-carbonate alteration, a few pyrite grains along fractures	Vein
RL-16ND070	448158.9	5657468	Balmer	>95% quartz-carbonate alteration with only minor slivers of micaceous minerals remaining, best guess is ultramafic protolith but don't really know	
RL-16ND071	448650.2	5657275.7	Balmer	>95% quartz carbonate alteration with quartz-carbonate veins	
RL-16ND073	448147.2	5657530.1	Balmer	>95% quartz-carbonate veining and alteration, Mg:Fe ratio and regional mapping suggests ultramafic protolith, some pyrite associated with veins and to a lesser extent disseminated, possibly some other sulphides (ex arsenopyrite); sulphides were more abundant a few m from sample on the same outcrop	Replacement +Vein
RL-16ND074	448021	5657556.4	Balmer	meta-dacite with quartz vein; biotite and tourmaline both present as dissemination and vein alteration (but just a few grains of tourmaline, biotite is 5-10% of sample)	

Sample_ID	UTM_East	UTM_North	Aseemblage	Description	Pyrite Occurrence
RL-16ND075	448650.2	5657275.7	Balmer	brecciated rock (metabasalt?) with carbonate clasts and quartz and chlorite matrix	
RL-16ND076	448750.1	5657143.4	Balmer	looks like meta-basalt, although much of the sample is very light in colour around a vein (silica alteration?); pyrite as vein and disseminations	Replacement +Vein
RL-16ND077	448444.3	5657325.7	Balmer	meta-dacite with quartz vein... although looks like it could also have been something more mafic than dacite that experienced silica alteration;	
RL-16ND078	448526.2	5657435.4	Balmer	one side of sample is unknown brown lithology (lamprophyre??), other side appears to be carbonate altered metabasalt with carbonate veins (15-20% of sample) coming off the brown lithology	
RL-16ND079	448312.4	5657241.5	Balmer	metabasalt with quartz-pyrite vein	Vein
RL-16ND080	449419.2	5657325.7	Huston (conglomerate dominated)	3-15mm chert/quartz clasts in foliated micaceous matrix with pyrite replacing certain clasts and some of matrix; matrix could also be highly elongated clasts and contains significant black non-magnetitic opaque mineral	Replacement
RL-16ND084	449595.7	5656543.7	Huston (conglomerate dominated)	Metabasalt with quartz-biotite-chlorite veins	

Sample_ID	UTM_East	UTM_North	Aseemblage	Description	Pyrite Occurrence
RL-16ND085	440736.4	5651937.6	Dome Stock Granodiorite	Granodiorite with quartz-tourmaline-chlorite veining	Replacement
RL-16ND086	441052.3	5651068.1	Dome Stock Granodiorite	beige granodiorite with quartz-tourmaline vein and minor disseminated pyrite	Replacement
RL-16ND087	439805.6	5650836	Dome Stock Granodiorite	grey granodiorite with pyrite-quartz-tourmaline vein	Vein
RL-16ND088	439789	5650825	Dome Stock Granodiorite	pink granodiorite with irregular tourmaline-quartz-pyrite veining	Vein
RL-16ND090	447236.6	5655582.4	Huston (conglomerate dominated)	mainly carbonate alteration transitioning into a quartz vein, unsure of protolith, could be ultramafic; a few grains of pyrite (vein & disseminated); chlorite surrounding carbonate clasts in quartz vein	Replacement +Vein
RL-16ND091	446935.5	5654683.2	Confederation (McNeeley Sequence)	probably meta-argillite but hard to say for sure because my sample is significantly modified by quartz-carbonate veins	
RL-16ND092	446600.5	5654177.6	Huston (wacke dominated)	coarsely recrystallized meta-andesite or gabbro with quartz-carbonate vein with perpendicular veinlets coming off it	
RL-16ND094	449461.5	5656933	Huston (conglomerate dominated)	Looks like maybe chert-mt iron formation brecciated and altered by a fluid that deposited pyrite along the fractures.	Vein
RL-16ND095	449293.7	5656972	Bruce Channel	metabasalt with large K-rich quartz vein (pink tinting); radiating chlorite in both wall rock and vein	

Sample_ID	UTM_East	UTM_North	Aseemblage	Description	Pyrite Occurrence
RL-16ND096	450111.3	5656875.8	Pre- to Syn-Tectonic gabbro/leucogabbro/diorite	metabasalt with irregular/wispy vein; wall rock is primarily amphibole	
RL-16ND097	448334.3	5656539	Balmer Plutonic Suite	fine grained foliated rock with metamorphic garnets and straight vein	
RL-16ND102	448296	5656604.7	Balmer	meta-basalt with deformed quartz-carbonate veins	Vein
RL-16ND120	449061.6	5658429	Bruce Channel	2-4mm quartz-feldspar clasts in dark matrix	
RL-16ND121	449353.9	5658568.5	Brewis Porphyry	2-4mm quartz-feldspar clasts in light olive-grey matrix, small amounts of tourmaline disseminated and in vein	
RL-16ND122	450588.8	5658370.9	Bruce Channel Assemblage	polymictic (chert, magnetite, possibly other siliceous clasts) conglomerate, 2-20mm clasts	Replacement
RL-16ND123	449805.3	5655857.7	Huston (conglomerate dominated)	polymictic (chert, felsic igneous, magnetite) conglomerate, clasts up to 10cm large	Replacement
RL-16ND128	448394.3	5656696.4	Balmer	foliated meta-andesite with significant disseminated pyrite clustering along certain bands beginning to form stringers, 1 quartz-pyrite vein, 5mm metamorphic quartz grains	Replacement +Vein
RL-16ND142	448406	5656699.4	Balmer	meta-basalt with 15-25% pyrrhotite-pyrite stringers and minor quartz-carbonate veining	Replacement +Vein

Sample_ID	UTM_East	UTM_North	Aseemblage	Description	Pyrite Occurrence
RL-16ND147	448433.5	5656726.9	Balmer	meta-andesite with 20% deformed qtz-cb veins, carbonate mostly at vein margins; 5% disseminated pyrrhotite	
RL-16ND155	448461	5656754.4	Balmer (Dickenson-Campbell "diorite")	suspect protolith was mafic or ultramafic but only slivers of mafic minerals remain with >90% of sample altered to carbonate and 2-3 mm stockwork quartz-carbonate veins	
RL-16ND161	448902.3	5657365.6	Balmer	appears strongly carbonate(+chlorite) altered so difficult to identify protolith, large quartz vein at edge of sample	
RL-16ND162	449115.6	5657226.5	Bruce Channel	deformed (folded) meta-sediment, probably pelitic or iron formation (about 25% magnetite) with quartz vein; may have some primary magnetite but most appears to be remobilized (alteration and minor veining)	
RL-16ND163	449118.3	5657224.6	Bruce Channel	Samples is 95%+ quartz vein with just little slivers of other material (chlorite+garnet	
RL-16ND170	448522	5656812.5	Balmer (Dickenson-Campbell "diorite")	meta-andesite with 10cm deformed zone containing fragmented veins	Replacement
RL-16ND175	448543.6	5656833.9	Balmer (Dickenson-Campbell "diorite")	meta-basalt amphibolite grade (garnets) and disseminated pyrrhotite	Replacement +Vein

Sample_ID	UTM_East	UTM_North	Aseemblage	Description	Pyrite Occurrence
RL-16ND182	448577.4	5656866.3	Balmer	Meta-andesite with 5-10% 1-2mm veins	Vein
RL-16ND187	448596.7	5656882.9	Balmer Plutonic Suite	Metagabbro with 35% igneous blue quartz and 20% coarse amphibole	
RL-16ND189	450826.9	5658038.1	Balmer	Metabasalt, largely featureless except for a couple faint streaks of quartz and pyrite	Vein
RL-16ND190	450996	5658137.4	Bruce Channel	Metasediment - altering 2-3cm beds rich and poor in garnets; garnet rich bed contain magnetite (primary, also have <1mm mt veins) and a few 1-3cm felsic clasts; garnet poor beds are mostly quartzo-feldspathic	
RL-16ND193	452028.9	5659398.3	Bruce Channel	Difficult to determine protolith, appears significantly altered - 15-30% pyrite layers, 5% quartz veins, 10% metamorphic looking quartz grains (possibly alteration), 25%+ magnetite; quartz is Fe-rich (yellow); rest is chlorite and amphibole; possibly altered iron formation	Replacement
RL-16ND195	451495.1	5661201.4	Balmer	meta-basalt with quartz-carbonate vein, basalt is mostly metamorphosed to chlorite	
RL-16ND197	447338.9	5654451.4	Confederation (McNeeley Sequence)	meta-basalt with amphibole (probably tremolite) rimming chlorite-carbonate amygdules; irregular wispy carbonate veins, a few grains of pyrite and quartz in the amygdules	Replacement

Sample_ID	UTM_East	UTM_North	Aseemblage	Description	Pyrite Occurrence
RL-16ND199	447252.6	5654927.7	Confederation (McNeeley Sequence)	meta-basalt with lots of wispy hairline veining that appears dehydration related but also thicker straight (with some right angle bends) veins, vein VG in one part of the sample	Vein
RL-16ND200	447248.8	5655576.2	Huston (conglomerate dominated)	brecciated chert with a couple thin pyrite beds (unsure if primary or replacement of magnetite), also have carbonate beds; brecciated by carbonate; have two 1-2cm pyrrhotite clasts as well	
RL-16ND201	447253	5655580.5	Huston (conglomerate dominated)	carbonate-quartz-epidote-sericite alteration entirely replacing whatever the protolith was	
RL-16ND202	447578.3	5655623.4	Balmer (rhyodacite)	meta-basalt with quartz vein; basalt proximal to the vein mostly consists of hornblende and chlorite; some carbonate throughout; spot analyses suggest epidote was mistaken for chlorite, but should make sure this isn't just a fine grained mixture of chlorite and carbonate, or hornblende	
RL-16ND204	447680.8	5655472.1	Balmer (rhyodacite)	meta-rhyolite (light grey, mainly quartz, feldspar, sericite) with 15% stockwork of black veinlets (non-magnetic opaque); quartz veins	

Sample_ID	UTM_East	UTM_North	Aseemblage	Description	Pyrite Occurrence
RL-16ND205	450019.2	5660554.8	Balmer	Metabasalt with quartz-carbonate veins and mineral with anomalous blue birefringence (epidote?); clinopyroxene, hornblende wall rock with some quartz and carbonate	
RL-16ND206	450047.3	5660730.2	Balmer	Metabasalt with irregular quartz veins	Replacement
RL-16ND208	448830	5660669	Balmer	pyritic, probably metasediment; quartz if originally a vein is fragmented and deformed; wall rock is fine grained of carbonate, quartz, sericite and occasionally hornblende; chlorite and pyrite focused at quartz-wall rock contact	Replacement
RL-16ND209	445789.4	5660747	Balmer	Mainly quartz-carbonate veining and alteration with a sliver of fine grained quartz+hornblende; best guess is mafic/ultramafic protolith but hard to say	
RL-16ND211	446421.5	5653111.9	Howey Diorite	Meta-rhyolite (yellow-brown) with carbonate vein and narrow quartz-carbonate sulphide veins	Replacement +Vein
RL-16ND212	446260.5	5651589.4	Howey Diorite	Meta-andesite cut by straight quartz vein, a few grains of disseminated pyrite throughout, also have thinner, wispier, more irregular quartz-carbonate veins and pyrite vein	Replacement

Sample_ID	UTM_East	UTM_North	Aseemblage	Description	Pyrite Occurrence
RL-16ND215	442920.2	5651342.5	Howey Diorite	Hosted by Howey diorite, but the sample itself is entirely contained within a quartz-tourmaline vein	
RL-16ND216	446545.8	5654023.2	Confederation (McNeeley Sequence)	Meta-sediment? Foliated rock with yellow colour adjacent to vein transitioning to olive green away from it. A few grains of pyrite in veins and even lesser amounts disseminated in wall rock	Replacement +Vein

Appendix II – Whole rock geochemistry

Sample_ID	RL-23-NS-001b	RL-23-NS-002	RL-23-NS-003	RL-23-NS-005	RL-23-NS-007	RL-23-NS-009	RL-23-NS-010	RL-23-NS-011
SiO ₂	51.80	39.10	43.50	49.10	67.00	39.20	74.00	40.50
Al ₂ O ₃	14.50	19.60	15.60	6.23	14.05	7.60	14.10	9.31
Fe ₂ O ₃	12.55	16.00	12.05	3.93	5.16	12.30	2.02	11.00
MgO	4.77	7.35	5.97	6.65	0.98	6.32	2.23	7.66
CaO	5.02	7.18	11.00	11.95	2.07	11.85	3.36	11.65
Na ₂ O	1.20	3.42	2.11	0.17	7.80	0.32	0.20	0.10
K ₂ O	0.36	0.60	0.34	1.56	0.13	1.48	1.47	0.64
TiO ₂	2.00	0.87	0.69	0.37	0.61	0.46	0.13	0.63
P ₂ O ₅	0.15	0.06	0.09	0.02	0.01	0.03	0.05	0.04
MnO	0.21	0.24	0.17	0.10	0.05	0.21	0.03	0.25
Cr ₂ O ₃	0.00	0.05	0.02	0.14	0.01	0.28	0.01	0.13
LOI	6.47	5.58	8.84	18.10	3.44	12.20	2.29	16.55
Total	99.04	100.13	100.43	98.33	101.36	92.28	99.91	98.48

Sample_ID	RL-23-NS-012	RL-23-NS-013	RL-23-NS-014	RL-23-NS-015	RL-23-NS-018	RL-23-NS-019	RL-23-NS-020
SiO ₂	78.20	24.20	13.25	56.90	53.00	43.40	10.70
Al ₂ O ₃	0.47	1.56	1.92	15.15	16.20	11.50	1.33
Fe ₂ O ₃	3.08	15.30	28.90	14.65	9.27	14.75	10.80
MgO	1.16	9.74	10.85	5.46	4.54	5.82	12.65
CaO	4.36	20.00	17.30	1.08	3.99	7.46	26.10
Na ₂ O	0.01	0.01	0.01	0.18	1.05	2.89	0.04
K ₂ O	0.06	0.02	0.15	0.28	2.35	0.41	0.21
TiO ₂	<0.01	0.08	0.10	0.82	0.59	1.40	0.15
P ₂ O ₅	<0.01	0.01	0.01	0.06	0.16	0.15	0.02
MnO	0.04	0.77	0.72	0.13	0.16	0.21	0.40
Cr ₂ O ₃	0.00	0.01	0.02	0.05	0.01	0.01	<0.002
LOI	3.30	27.40	25.10	4.69	7.79	10.85	37.70
Total	90.68	99.11	98.33	99.45	99.14	98.85	100.10

Sample_ID	RL-23-NS-021	RL-23-NS-024	RL-23-NS-025	RL-23-NS-026	RL-23-NS-027	RL-23-NS-029	RL-23-NS-031	RL-23-NS-032
SiO ₂	42.10	71.20	69.40	95.30	54.60	47.90	45.50	68.00
Al ₂ O ₃	12.70	12.35	13.10	0.87	18.45	14.30	13.90	15.35
Fe ₂ O ₃	8.85	3.49	5.21	1.80	8.42	12.35	17.30	2.72
MgO	6.29	1.92	1.56	0.06	3.33	5.86	5.82	0.72
CaO	12.35	2.68	2.00	0.07	5.15	7.26	10.25	2.38
Na ₂ O	0.29	3.43	3.76	0.08	3.29	3.28	3.11	5.03
K ₂ O	2.48	1.04	1.54	0.28	3.41	0.18	0.22	2.37
TiO ₂	0.64	0.62	0.50	0.04	0.90	1.14	1.11	0.40

P ₂ O ₅	0.05	0.01	0.09	0.01	0.37	0.10	0.12	0.09
MnO	0.22	0.02	0.01	<0.01	0.12	0.18	0.18	0.03
Cr ₂ O ₃	0.04	0.03	0.06	0.00	0.00	0.03	0.03	<0.002
LOI	11.95	2.14	3.19	0.72	2.25	5.56	2.39	3.06
Total	98.00	98.98	100.46	99.25	100.53	98.15	99.94	100.26

Sample_ID	RL-23-NS-034	RL-16ND001	RL-16ND005	RL-16ND013	RL-16ND023	RL-16ND029	RL-16ND039	RL-16ND042
SiO ₂	69.60	18.25	59.60	60.90	30.10	72.30	46.50	55.60
Al ₂ O ₃	15.45	7.97	12.85	17.85	5.61	9.47	8.68	13.45
Fe ₂ O ₃	6.10	10.20	8.14	7.46	10.95	8.86	11.50	9.83
MgO	0.70	11.25	3.70	3.39	15.15	1.50	4.89	4.58
CaO	0.16	22.30	5.09	4.20	13.35	1.37	9.76	6.85
Na ₂ O	0.24	0.40	0.19	0.31	0.04	0.34	0.25	1.25
K ₂ O	4.33	1.61	0.32	0.40	0.17	1.57	0.83	0.50
TiO ₂	0.74	0.83	0.68	0.94	0.45	0.71	0.51	0.74
P ₂ O ₅	0.08	0.08	0.04	0.09	0.20	0.05	0.01	0.06
MnO	0.07	0.33	0.19	0.19	0.23	0.27	0.28	0.22
Cr ₂ O ₃	0.01	0.01	0.01	0.01	0.10	0.01	0.02	0.07
LOI	2.83	25.00	8.65	4.86	22.20	4.64	10.45	6.57
Total	100.37	98.26	99.48	100.61	98.60	101.11	93.70	99.76

Sample_ID	RL-16ND043	RL-16ND048	RL-16ND056	RL-16ND058	RL-16ND064	RL-16ND065	RL-16ND067	RL-16ND068
SiO ₂	69.00	52.60	47.50	38.40	78.50	62.10	51.40	58.30
Al ₂ O ₃	4.09	8.14	13.80	3.62	13.70	10.10	11.35	17.60
Fe ₂ O ₃	7.67	12.45	11.95	25.30	3.79	18.85	18.45	10.75
MgO	3.50	6.59	5.81	6.24	0.23	3.21	4.93	3.71
CaO	6.37	7.87	8.91	6.88	0.37	0.10	4.11	2.06
Na ₂ O	0.08	0.10	0.43	0.02	0.13	0.01	0.04	0.30
K ₂ O	0.30	0.07	0.86	0.29	0.09	0.03	0.05	0.32
TiO ₂	0.21	0.46	0.98	0.29	0.69	0.54	0.66	0.85
P ₂ O ₅	0.03	0.06	0.07	0.02	0.02	0.08	0.07	0.06
MnO	0.33	0.19	0.21	0.81	0.07	0.25	0.45	0.18
Cr ₂ O ₃	0.02	0.02	0.01	0.01	0.04	0.04	0.02	0.04
LOI	10.15	11.70	8.81	14.65	2.40	3.63	7.14	4.26
Total	101.75	100.25	99.48	100.61	98.60	101.11	98.67	98.44

Sample_ID	RL-16ND069	RL-16ND070	RL-16ND071	RL-16ND073	RL-16ND074	RL-16ND075	RL-16ND076	RL-16ND077
SiO ₂	41.50	40.50	46.20	22.80	75.00	67.30	69.30	70.70
Al ₂ O ₃	0.48	3.19	0.38	2.43	13.55	11.65	14.55	15.75
Fe ₂ O ₃	4.50	7.60	4.18	8.06	1.86	8.24	7.72	2.20

MgO	9.53	8.74	8.77	12.55	0.71	3.52	0.89	0.75
CaO	16.70	14.55	15.25	20.80	1.39	3.56	1.15	3.17
Na2O	0.03	0.09	0.03	0.04	1.15	0.20	0.19	1.51
K2O	0.08	0.45	0.09	0.40	3.06	0.13	1.05	2.83
TiO ₂	0.02	0.21	0.01	0.15	0.29	0.76	0.79	0.35
P ₂ O ₅	0.01	0.02	0.01	0.01	0.08	0.05	0.07	0.09
MnO	0.21	0.28	0.10	0.26	0.02	0.19	0.02	0.02
Cr ₂ O ₃	0.01	0.24	0.02	0.38	<0.01	0.02	0.03	<0.01
LOI	25.20	22.40	23.70	30.80	1.95	4.27	4.76	2.63
Total	98.27	98.30	98.76	98.79	99.13	99.90	100.53	100.11

Sample_ID	RL- 16ND078	RL- 16ND079	RL- 16ND080	RL- 16ND084	RL- 16ND085	RL- 16ND086	RL- 16ND087	RL- 16ND088
SiO ₂	64.20	62.00	89.20	67.80	71.40	74.30	62.20	46.60
Al ₂ O ₃	13.05	13.60	1.86	15.20	12.65	12.70	15.20	21.10
Fe ₂ O ₃	6.96	15.80	5.71	5.26	3.04	1.88	6.23	8.14
MgO	3.60	2.22	0.05	1.08	1.36	0.72	0.92	2.65
CaO	4.12	0.19	0.09	1.69	3.51	1.63	1.88	4.98
Na2O	1.14	0.64	0.19	2.11	3.71	4.65	4.53	4.12
K ₂ O	1.08	0.02	0.21	2.47	1.58	1.64	2.54	1.17
TiO ₂	0.68	0.19	0.08	0.47	0.28	0.31	0.84	0.86
P ₂ O ₅	0.06	0.05	<0.01	0.13	0.07	0.07	0.18	0.19
MnO	0.15	0.22	0.01	0.08	0.07	0.07	0.08	0.14
Cr ₂ O ₃	0.26	0.02	0.01	0.01	<0.01	<0.01	<0.01	<0.01
LOI	4.09	4.00	3.66	1.87	2.75	2.68	3.72	5.35
Total	99.42	98.96	101.10	98.26	100.61	100.76	98.41	95.42

Sample_ID	RL- 16ND090	RL- 16ND091	RL- 16ND092	RL- 16ND094	RL- 16ND095	RL- 16ND096	RL- 16ND097	RL- 16ND102
SiO ₂	55.30	26.90	56.50	85.70	56.50	54.90	67.60	47.50
Al ₂ O ₃	7.19	7.71	16.45	0.12	21.00	10.85	9.58	13.40
Fe ₂ O ₃	9.68	4.49	5.62	11.40	15.95	17.70	11.15	12.10
MgO	4.11	1.37	2.55	0.30	1.83	5.17	1.84	6.32
CaO	7.39	30.10	5.42	0.03	0.62	7.11	1.64	8.39
Na2O	0.16	0.25	4.01	0.01	0.23	1.57	0.23	0.31
K ₂ O	1.48	1.67	1.09	0.02	0.07	0.31	1.88	0.21
TiO ₂	0.56	0.27	0.60	0.01	1.44	1.20	0.66	0.70
P ₂ O ₅	0.03	0.06	0.15	0.01	0.14	0.10	0.06	0.06
MnO	0.25	0.25	0.10	0.13	0.62	0.24	0.14	0.39
Cr ₂ O ₃	0.20	0.01	0.01	0.01	0.04	<0.01	0.01	0.04
LOI	12.05	24.80	5.58	3.99	2.96	1.28	4.29	11.00

Total	98.42	98.02	98.15	101.71	101.40	100.45	99.10

Sample_ID	RL-16ND120	RL-16ND121	RL-16ND122	RL-16ND123	RL-16ND128	RL-16ND142	RL-16ND147	RL-16ND155
SiO ₂	75.70	74.40	91.20	81.40	63.30	53.30	70.60	8.58
Al ₂ O ₃	13.20	13.60	0.62	5.40	13.55	9.73	8.66	2.38
Fe ₂ O ₃	2.45	1.22	8.35	9.01	8.15	19.15	10.95	10.50
MgO	0.33	0.21	0.22	0.46	2.71	3.97	1.36	12.95
CaO	0.91	0.25	0.05	0.19	4.86	2.19	1.08	26.40
Na ₂ O	2.79	2.20	0.04	0.25	0.23	0.27	0.17	0.05
K ₂ O	4.56	4.86	0.12	1.07	0.54	0.68	1.57	0.30
TiO ₂	0.13	0.10	0.05	0.29	0.81	0.66	0.65	0.11
P ₂ O ₅	0.04	0.03	0.02	0.03	0.04	0.05	0.02	0.01
MnO	0.06	0.02	0.08	0.24	0.12	0.14	0.15	0.57
Cr ₂ O ₃	0.01	<0.01	0.01	0.12	0.03	0.02	0.01	0.01
LOI	1.05	1.13	1.15	2.88	5.32	7.56	4.40	37.10
Total	101.29	98.08	101.92	101.36	99.68	97.72	99.63	98.97

Sample_ID	RL-16ND161	RL-16ND162	RL-16ND163	RL-16ND170	RL-16ND175	RL-16ND182	RL-16ND187
SiO ₂	57.90	53.40	86.80	56.20	35.00	58.80	44.60
Al ₂ O ₃	16.35	3.33	2.55	15.90	3.33	14.45	17.15
Fe ₂ O ₃	8.19	32.00	7.15	11.55	35.70	8.01	11.50
MgO	5.52	3.30	0.59	4.48	8.06	4.26	8.72
CaO	1.97	1.80	0.51	6.13	6.05	6.41	10.95
Na ₂ O	2.01	0.06	0.05	0.41	0.03	0.42	1.71
K ₂ O	0.53	0.04	0.05	0.62	0.17	1.03	0.07
TiO ₂	0.54	0.09	0.09	0.97	0.29	0.94	0.51
P ₂ O ₅	0.05	0.09	0.07	0.04	0.04	0.07	0.04
MnO	0.12	0.76	0.10	0.16	1.14	0.17	0.19
Cr ₂ O ₃	0.03	0.01	0.01	0.01	0.01	0.02	0.03
LOI	5.04	3.43	2.11	3.94	5.51	5.31	2.97
Total	98.28	98.30	100.08	100.42	95.34	99.91	98.46

Sample_ID	RL-16ND189	RL-16ND190	RL-16ND193	RL-16ND195	RL-16ND197	RL-16ND199	RL-16ND200	RL-16ND201

SiO ₂	53.40	52.20	71.60	49.70	48.10	70.00	86.70	54.80
Al ₂ O ₃	17.30	12.95	2.45	14.10	17.55	14.45	4.51	7.42
Fe ₂ O ₃	7.29	24.60	18.10	14.20	11.25	3.09	5.12	5.05
MgO	3.99	3.75	3.00	6.86	8.63	0.57	0.29	4.93
CaO	10.90	2.98	2.04	8.76	9.24	3.14	0.13	9.44
Na ₂ O	2.56	0.40	0.11	2.82	2.48	3.79	0.44	0.11
K ₂ O	0.53	0.66	0.04	0.17	0.14	1.43	1.24	2.21
TiO ₂	1.11	0.58	0.19	0.89	0.55	0.37	0.17	0.56
P ₂ O ₅	0.09	0.05	0.03	0.08	0.07	0.11	0.01	0.02
MnO	0.17	1.46	0.47	0.19	0.17	0.06	0.05	0.21
Cr ₂ O ₃	0.03	0.05	0.01	0.03	0.01	<0.01	0.01	0.24
LOI	2.29	0.76	2.56	1.00	2.53	2.84	2.58	14.40
Total	99.71	100.46	100.60	100.75	99.91	99.91	101.27	99.43

Sample_ID	RL-16ND202	RL-16ND204	RL-16ND205	RL-16ND206	RL-16ND208	RL-16ND209	RL-16ND211	RL-16ND212
SiO ₂	55.30	84.10	54.20	55.50	41.50	71.50	64.30	68.10
Al ₂ O ₃	11.45	10.35	13.00	14.25	9.00	9.72	13.20	13.65
Fe ₂ O ₃	13.20	0.52	11.65	10.20	28.10	6.10	5.23	6.71
MgO	7.04	0.14	7.20	7.67	2.47	2.76	1.05	2.05
CaO	11.95	0.32	10.10	7.09	2.06	3.43	4.46	2.36
Na ₂ O	0.19	3.88	3.07	4.29	0.74	1.35	6.14	3.90
K ₂ O	0.08	1.00	0.08	0.07	0.72	0.02	0.98	0.70
TiO ₂	0.59	0.11	0.82	0.73	0.65	0.05	0.50	0.50
P ₂ O ₅	0.06	0.01	0.08	0.04	0.05	0.02	0.13	0.16
MnO	0.43	<0.01	0.21	0.16	0.06	0.14	0.23	0.08
Cr ₂ O ₃	0.04	<0.01	0.03	0.03	<0.01	<0.01	<0.01	<0.01
LOI	0.79	0.80	0.49	0.69	12.75	6.24	4.94	3.38
Total	101.13	101.27	100.95	100.74	98.11	101.33	101.21	101.62

Sample_ID	RL-16ND215	RL-16ND216
SiO ₂	93.90	41.20
Al ₂ O ₃	2.03	12.85

Fe ₂ O ₃	1.50	7.16
MgO	0.42	3.85
CaO	1.37	13.45
Na ₂ O	0.19	4.18
K ₂ O	0.01	0.78
TiO ₂	0.08	0.67
P ₂ O ₅	0.05	0.17
MnO	0.02	0.16
Cr ₂ O ₃	<0.01	0.04
LOI	1.17	15.00
Total	100.75	99.56

Sample_ID	RL-23-NS-001b	RL-23-NS-002	RL-23-NS-003	RL-23-NS-005	RL-23-NS-007	RL-23-NS-009	RL-23-NS-010	RL-23-NS-011
S_ppm	0.22	0.77	0.01	0.02	1.50	3.71	0.13	0.74
C_ppm	0.99	0.88	1.62	4.90	0.81	4.58	0.09	4.27
Pb_ppm	9.00	8.00	6.00	4.00	13.00	3.00	<2	18.00
Pr_ppm	2.91	1.45	2.90	0.50	3.31	0.49	0.89	1.62
As_ppm	14.20	0.30	7.50	>250	>250	>250	29.70	>250
Ba_ppm	33.80	282.00	192.00	54.70	277.00	149.00	125.50	92.80
Be_ppm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bi_ppm	0.07	0.07	0.03	0.02	0.17	0.04	0.01	0.04
Cd_ppm	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ce_ppm	19.80	10.60	22.00	4.20	26.20	3.30	6.50	7.30
Co_ppm	36.00	55.00	52.00	51.00	18.00	98.00	8.00	63.00
Cr_ppm	35.00	383.00	123.00	963.00	86.00	1930.00	46.00	917.00
Cs_ppm	1.16	7.55	2.94	2.91	0.50	1.76	2.11	1.58
Cu_ppm	92.00	99.00	93.00	21.00	84.00	121.00	2.00	118.00
Dy_ppm	6.67	2.37	2.67	1.12	1.43	1.42	0.59	2.40
Er_ppm	4.48	1.51	1.58	0.82	0.82	0.86	0.31	1.58
Eu_ppm	1.41	0.53	0.87	0.28	0.64	0.36	0.21	0.63
Ga_ppm	21.20	21.20	15.10	6.40	17.10	13.20	15.20	10.90

Gd_ppm	5.37	2.12	2.68	0.82	1.85	1.17	0.67	2.15
Ge_ppm	2.50	0.70	1.20	1.50	1.20	2.80	2.60	2.00
Hf_ppm	3.16	1.23	1.70	0.75	2.28	0.79	1.88	0.96
Hg_ppm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ho_ppm	1.51	0.51	0.58	0.25	0.28	0.30	0.11	0.48
In_ppm	0.09	<0.005	0.01	0.01	0.03	0.01	<0.005	0.02
La_ppm	7.50	4.40	10.50	1.90	12.00	1.30	2.80	5.50
Li_ppm	80.00	50.00	40.00	20.00	<10	60.00	70.00	40.00
Lu_ppm	0.63	0.19	0.21	0.12	0.12	0.10	0.04	0.21
Mo_ppm	<1	6.00	1.00	<1	1.00	22.00	1.00	<1
Nb_ppm	5.46	2.32	3.46	1.19	4.10	1.15	5.51	3.01
Nd_ppm	13.60	6.30	11.80	2.40	12.30	2.70	3.20	7.20
Ni_ppm	52.00	197.00	139.00	221.00	52.00	825.00	62.00	322.00
Rb_ppm	9.60	17.80	8.20	40.80	2.10	44.90	28.70	13.80
Sb_ppm	2.77	0.63	0.58	15.40	12.35	7.44	5.36	40.40
Sc_ppm	44.00	26.00	25.00	19.00	11.00	24.00	5.00	37.00
Se_ppm	0.50	0.70	0.30	0.30	1.50	1.40	0.30	0.70
Sm_ppm	3.72	1.84	2.46	0.73	2.17	0.75	0.87	1.96
Sn_ppm	1.20	<0.5	0.70	0.70	<0.5	<0.5	<0.5	<0.5
Sr_ppm	129.50	447.00	300.00	50.40	204.00	143.00	61.80	107.00
Ta_ppm	0.20	<0.1	0.10	<0.1	0.20	<0.1	<0.1	<0.1
Tb_ppm	0.95	0.37	0.43	0.15	0.25	0.23	0.10	0.35
Te_ppm	0.10	0.04	0.04	0.02	0.16	0.33	0.05	0.10
Th_ppm	0.83	0.69	1.68	0.42	2.79	0.07	0.33	0.19
Tl_ppm	0.02	0.12	0.06	0.02	<0.02	4.25	0.05	0.08
Tm_ppm	0.61	0.20	0.22	0.14	0.13	0.12	0.04	0.20
U_ppm	0.24	0.24	0.44	0.12	0.89	<0.05	0.19	0.09
V_ppm	509.00	317.00	197.00	112.00	47.00	267.00	61.00	249.00
W_ppm	62.50	1.00	0.70	12.40	12.10	44.00	5.60	76.30
Y_ppm	41.00	13.90	16.00	7.40	7.90	8.50	3.30	13.80
Yb_ppm	4.12	1.42	1.43	0.85	0.86	0.85	0.28	1.43
Zn_ppm	113.00	183.00	95.00	46.00	125.00	94.00	17.00	206.00
Zr_ppm	116.00	42.00	62.00	25.00	84.00	19.00	62.00	37.00

Sample_ID	RL-23-NS-012	RL-23-NS-013	RL-23-NS-014	RL-23-NS-015	RL-23-NS-018	RL-23-NS-019	RL-23-NS-020
S_ppm	0.99	0.72	0.89	0.04	0.10	0.57	0.03
C_ppm	0.82	7.86	6.84	0.12	1.35	2.96	10.70

Pb_ppm	3.00	6.00	7.00	5.00	5.00	10.00	2.00
Pr_ppm	0.65	1.37	1.28	0.95	3.62	2.12	0.57
As_ppm	>250	43.60	25.20	16.00	52.00	55.00	11.20
Ba_ppm	23.30	2.60	7.10	19.60	222.00	36.40	18.40
Be_ppm	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bi_ppm	0.13	0.11	0.12	<0.01	0.01	0.13	0.02
Cd_ppm	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ce_ppm	2.40	7.90	7.90	6.00	28.20	14.80	3.10
Co_ppm	3.00	16.00	16.00	38.00	31.00	46.00	15.00
Cr_ppm	22.00	62.00	167.00	373.00	94.00	57.00	6.00
Cs_ppm	0.17	0.10	2.77	0.42	4.17	0.41	0.17
Cu_ppm	3.00	121.00	105.00	218.00	48.00	85.00	8.00
Dy_ppm	1.17	3.87	5.90	2.72	3.19	4.66	1.35
Er_ppm	0.56	2.66	3.90	1.50	2.12	3.02	0.80
Eu_ppm	0.40	0.87	0.86	0.53	0.93	0.77	0.41
Ga_ppm	0.70	2.20	2.80	16.40	18.00	16.00	2.10
Gd_ppm	1.03	3.38	4.13	2.17	3.05	3.62	1.21
Ge_ppm	3.10	0.60	0.90	1.50	1.80	1.40	<0.5
Hf_ppm	<0.05	0.25	0.37	1.28	2.38	2.69	0.32
Hg_ppm	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ho_ppm	0.22	0.92	1.33	0.53	0.70	1.04	0.27
In_ppm	0.01	0.02	0.03	0.07	0.02	0.05	0.02
La_ppm	2.30	3.50	3.40	2.40	12.60	5.70	2.20
Li_ppm	<10	10.00	<10	110.00	90.00	50.00	10.00
Lu_ppm	0.05	0.34	0.59	0.23	0.31	0.45	0.08
Mo_ppm	4.00	<1	<1	<1	<1	1.00	<1
Nb_ppm	0.67	0.58	0.55	2.39	4.77	5.10	0.71
Nd_ppm	2.80	7.30	7.00	4.80	14.50	10.00	2.50
Ni_ppm	11.00	57.00	69.00	152.00	71.00	71.00	31.00
Rb_ppm	1.50	0.50	3.80	7.60	61.40	14.60	4.80
Sb_ppm	36.30	0.78	0.74	3.94	1.42	2.50	0.61
Sc_ppm	2.00	54.00	53.00	34.00	27.00	34.00	3.00
Se_ppm	0.90	0.70	1.00	0.20	0.50	0.70	0.30
Sm_ppm	0.72	2.60	2.54	1.56	3.61	3.06	0.81
Sn_ppm	<0.5	<0.5	<0.5	<0.5	0.70	<0.5	<0.5
Sr_ppm	49.50	74.30	36.80	15.20	77.50	53.40	33.60
Ta_ppm	<0.1	<0.1	<0.1	<0.1	0.20	0.20	<0.1
Tb_ppm	0.17	0.57	0.77	0.42	0.47	0.66	0.20
Te_ppm	0.63	0.06	0.08	0.02	0.02	0.01	0.02
Th_ppm	<0.05	<0.05	0.05	0.32	1.86	0.63	0.06
Tl_ppm	0.10	0.07	0.04	<0.02	0.03	0.02	0.02
Tm_ppm	0.07	0.40	0.56	0.21	0.32	0.49	0.11
U_ppm	<0.05	<0.05	0.09	0.12	0.51	0.18	<0.05
V_ppm	59.00	120.00	179.00	333.00	214.00	347.00	39.00
W_ppm	>10000	188.00	156.50	42.60	32.20	73.70	12.20

Y_ppm	6.00	29.90	44.10	13.80	18.60	27.40	9.10
Yb_ppm	0.42	2.38	3.78	1.44	2.00	3.10	0.60
Zn_ppm	6.00	34.00	50.00	79.00	71.00	117.00	54.00
Zr_ppm	2.00	18.00	30.00	42.00	93.00	107.00	14.00

Sample_ID	RL-23- NS-021	RL-23- NS-024	RL-23-NS- 025	RL-23-NS- 026	RL-23-NS- 027	RL-23- NS-029	RL-23-NS- 031	RL-23- NS-032
S_ppm	0.51	1.69	3.08	0.77	0.89	0.07	0.37	0.36
C_ppm	3.48	0.09	0.02	0.02	0.06	0.95	0.34	0.58
Pb_ppm	7.00	6.00	7.00	5.00	10.00	8.00	7.00	4.00
Pr_ppm	1.54	0.63	1.65	0.12	3.15	1.59	3.05	4.20
As_ppm	97.10	5.90	18.60	0.60	3.60	2.00	22.40	3.10
Ba_ppm	311.00	152.50	192.00	164.50	1780.00	51.50	42.90	774.00
Be_ppm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bi_ppm	0.02	1.08	17.20	0.27	1.30	0.02	0.02	0.10
Cd_ppm	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ce_ppm	10.60	3.90	13.70	1.00	25.50	11.00	23.80	37.20
Co_ppm	60.00	10.00	49.00	8.00	18.00	48.00	67.00	7.00
Cr_ppm	271.00	210.00	478.00	36.00	26.00	253.00	249.00	11.00
Cs_ppm	1.92	4.57	5.45	0.14	4.46	1.20	0.25	2.26
Cu_ppm	63.00	33.00	2170.00	9.00	53.00	98.00	630.00	36.00
Dy_ppm	2.95	1.27	1.52	0.13	2.64	4.18	4.46	1.18
Er_ppm	1.81	0.70	1.04	0.07	1.80	2.62	2.61	0.50
Eu_ppm	1.06	0.24	0.36	0.03	0.92	0.84	1.57	0.64
Ga_ppm	13.40	14.00	17.20	1.90	24.90	17.80	19.90	21.80
Gd_ppm	2.50	1.11	1.48	0.08	2.30	3.29	3.96	1.69
Ge_ppm	1.50	1.50	1.50	0.50	1.20	1.40	1.50	0.70
Hf_ppm	1.29	2.78	3.40	0.26	4.49	1.94	2.15	3.49
Hg_ppm	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Ho_ppm	0.68	0.26	0.32	0.02	0.55	0.91	0.98	0.18
In_ppm	0.05	0.01	0.02	<0.005	0.02	0.03	0.02	0.01
La_ppm	4.40	1.80	6.80	0.50	12.00	4.30	11.60	19.90
Li_ppm	70.00	30.00	30.00	<10	30.00	20.00	20.00	30.00
Lu_ppm	0.28	0.13	0.19	<0.01	0.27	0.33	0.36	0.06
Mo_ppm	1.00	6.00	1.00	12.00	1.00	1.00	1.00	<1
Nb_ppm	2.97	7.48	4.45	0.55	7.44	3.41	4.48	4.65
Nd_ppm	6.90	2.90	6.50	0.40	12.60	8.30	13.30	14.10
Ni_ppm	120.00	36.00	156.00	2.00	4.00	131.00	170.00	8.00
Rb_ppm	69.30	52.10	53.70	5.20	76.90	9.20	2.00	47.90
Sb_ppm	2.68	0.20	0.16	<0.05	<0.05	0.16	0.84	1.11
Sc_ppm	32.00	12.00	16.00	1.00	17.00	37.00	34.00	4.00
Se_ppm	0.60	1.80	3.30	0.80	0.40	0.50	1.00	0.20
Sm_ppm	2.18	1.05	1.46	0.11	3.10	2.62	3.79	2.55
Sn_ppm	<0.5	1.80	1.80	<0.5	1.80	0.80	1.10	0.90
Sr_ppm	64.10	242.00	234.00	5.50	449.00	88.00	132.00	282.00

Ta_ppm	0.10	0.40	0.30	<0.1	0.30	0.10	0.20	0.20
Tb_ppm	0.46	0.19	0.24	0.01	0.37	0.61	0.63	0.20
Te_ppm	0.07	0.20	2.02	0.05	0.73	0.02	0.04	0.02
Th_ppm	0.41	4.89	4.25	0.24	7.25	0.36	0.77	3.78
Tl_ppm	0.47	0.49	0.32	<0.02	0.38	0.04	0.02	0.04
Tm_ppm	0.28	0.12	0.15	0.01	0.25	0.38	0.40	0.07
U_ppm	0.13	1.23	1.85	<0.05	1.47	0.11	0.23	1.09
V_ppm	211.00	67.00	133.00	14.00	209.00	337.00	334.00	37.00
W_ppm	21.80	33.20	12.20	18.30	10.70	8.50	8.80	5.80
Y_ppm	18.10	8.20	10.10	0.60	16.30	25.50	24.50	5.20
Yb_ppm	1.69	0.80	1.12	0.04	1.77	2.44	2.56	0.43
Zn_ppm	56.00	32.00	31.00	3.00	67.00	97.00	54.00	11.00
Zr_ppm	48.00	116.00	144.00	11.00	194.00	76.00	80.00	151.00

Sample_ID	RL-23-NS-034	RL-16ND001	RL-16ND005	RL-16ND013	RL-16ND023	RL-16ND029	RL-16ND039	RL-16ND042
S_ppm	1.10	0.58	0.09	0.05	0.39	0.42	2.93	0.24
C_ppm	0.04	7.23	2.12	0.61	5.70	1.09	3.37	1.44
Pb_ppm	5.00	4.50	1.90	2.20	4.20	3.10	14.60	3.50
Pr_ppm	7.25	1.50	0.71	0.89	6.40	0.66	0.96	1.16
As_ppm	4.00	2.80	21.80	284.00	200.00	256.00	>10000	154.50
Ba_ppm	487.00	220.00	200.00	70.00	20.00	140.00	70.00	110.00
Be_ppm	0.00	0.81	0.29	0.33	0.28	0.35	0.38	0.49
Bi_ppm	0.15	0.51	0.03	0.03	0.04	0.22	0.05	0.02
Cd_ppm	<0.5	0.20	0.06	0.06	0.39	0.21	1.50	0.13
Ce_ppm	61.30	9.67	5.52	5.42	51.30	4.06	5.85	7.88
Co_ppm	21.00	20.10	23.70	42.50	51.50	57.70	40.70	41.80
Cr_ppm	62.00	42.00	83.00	61.00	529.00	86.00	101.00	379.00
Cs_ppm	5.44	1.18	2.86	1.83	1.15	2.85	2.28	7.89
Cu_ppm	46.00	40.20	104.00	166.00	19.10	809.00	100.50	114.00
Dy_ppm	3.13	3.45	2.05	2.03	2.16	3.22	4.29	2.55
Er_ppm	1.75	2.15	1.32	1.47	1.26	2.62	2.97	1.78
Eu_ppm	1.43	0.88	0.31	0.41	1.10	0.42	0.67	0.63
Ga_ppm	18.00	11.65	14.65	18.50	7.83	10.45	9.50	13.95
Gd_ppm	3.84	3.03	1.58	1.66	3.22	2.23	2.66	1.97
Ge_ppm	1.40	0.06	0.03	0.03	0.06	0.05	0.08	0.06
Hf_ppm	5.54	1.60	1.20	1.50	1.30	1.30	0.80	1.30
Hg_ppm	0.00	0.02	0.06	0.22	0.02	0.07	2.56	0.03
Ho_ppm	0.62	0.77	0.41	0.45	0.46	0.86	0.95	0.56
In_ppm	0.01	0.05	0.06	0.06	0.05	0.07	0.05	0.05
La_ppm	31.10	3.60	2.10	1.80	23.70	1.60	2.40	3.20
Li_ppm	50.00	40.60	139.00	145.00	38.20	51.40	23.10	47.60
Lu_ppm	0.20	0.31	0.18	0.21	0.19	0.36	0.41	0.25
Mo_ppm	1.00	0.28	0.13	0.07	0.12	0.33	3.01	0.21

Nb_ppm	8.49	1.60	1.90	2.60	8.60	1.80	1.10	2.00
Nd_ppm	27.30	7.40	3.50	4.50	24.90	3.30	5.00	5.80
Ni_ppm	49.00	69.40	180.00	466.00	461.00	68.90	225.00	122.00
Rb_ppm	85.00	37.80	10.60	3.20	5.30	31.90	14.20	14.90
Sb_ppm	1.05	2.69	56.50	23.80	8.17	71.50	99.50	18.00
Sc_ppm	9.00	19.10	34.90	47.90	20.00	17.30	27.20	40.40
Se_ppm	0.30	1.00	0.50	1.00	1.00	1.00	8.00	0.50
Sm_ppm	5.08	2.25	1.09	1.47	4.26	1.25	1.49	1.66
Sn_ppm	1.30	0.70	0.40	0.40	0.30	0.70	0.50	0.70
Sr_ppm	66.40	90.00	41.60	44.60	458.00	41.00	45.60	260.00
Ta_ppm	0.50	0.11	0.12	0.17	0.36	0.13	0.07	0.13
Tb_ppm	0.53	0.54	0.32	0.31	0.41	0.42	0.54	0.36
Te_ppm	0.05	0.29	0.03	0.03	0.03	0.03	4.02	0.03
Th_ppm	7.11	0.62	0.31	0.36	1.01	0.34	0.19	0.36
Tl_ppm	0.07	0.32	0.12	0.16	0.10	0.55	0.49	0.29
Tm_ppm	0.24	0.33	0.15	0.19	0.16	0.37	0.42	0.25
U_ppm	2.02	0.17	0.09	0.13	0.50	0.12	0.09	0.10
V_ppm	85.00	189.00	256.00	332.00	107.00	175.00	209.00	254.00
W_ppm	3.70	12.70	7.60	12.70	8.20	157.00	53.40	14.40
Y_ppm	16.30	18.00	6.00	8.50	9.20	6.90	4.90	7.50
Yb_ppm	1.43	2.03	1.21	1.42	1.13	2.33	2.77	1.63
Zn_ppm	54.00	54.00	48.00	38.00	140.00	42.00	770.00	96.00
Zr_ppm	244.00	60.60	44.60	57.60	51.30	47.80	29.20	42.90

Sample_ID	RL- 16ND043	RL- 16ND048	RL- 16ND056	RL- 16ND058	RL- 16ND064	RL- 16ND065	RL- 16ND067	RL- 16ND068
S_ppm	0.03	0.40	0.34	0.87	0.02	0.31	0.22	<0.01
C_ppm	2.38	2.97	2.21	4.68	0.05	0.03	1.46	0.05
Pb_ppm	1.50	1.80	2.80	1.70	0.80	3.00	0.80	4.30
Pr_ppm	0.56	0.68	1.35	0.81	0.85	1.60	1.49	1.20
As_ppm	67.90	288.00	47.90	2130.00	110.50	103.00	188.50	10.80
Ba_ppm	20.00	40.00	100.00	40.00	30.00	20.00	10.00	70.00
Be_ppm	0.19	0.31	0.46	0.27	0.41	0.17	0.38	0.41
Bi_ppm	0.01	0.01	0.03	0.03	0.03	0.01	0.01	<0.01
Cd_ppm	0.33	0.10	0.12	0.12	0.02	0.01	0.08	0.13
Ce_ppm	3.62	5.41	8.30	5.51	2.97	11.45	9.32	7.01
Co_ppm	12.20	47.30	49.60	17.10	7.50	18.20	42.80	20.60
Cr_ppm	88.00	86.00	46.00	23.00	224.00	240.00	143.00	237.00
Cs_ppm	1.26	1.02	2.67	2.21	0.71	0.27	0.37	2.37
Cu_ppm	37.60	551.00	203.00	23.20	21.90	62.90	58.50	70.00
Dy_ppm	2.38	1.74	3.69	4.88	1.28	2.93	4.64	3.11
Er_ppm	1.44	1.14	2.45	3.63	0.87	1.99	2.94	1.82
Eu_ppm	0.83	0.57	0.65	0.67	0.44	0.63	1.00	0.84
Ga_ppm	4.30	10.05	15.85	5.33	11.50	14.10	12.65	16.80

Gd_ppm	2.19	1.49	3.28	3.29	1.38	2.47	3.99	2.60
Ge_ppm	0.07	0.03	0.05	0.03	0.03	0.05	0.07	0.05
Hf_ppm	0.30	1.00	1.40	0.50	0.90	1.00	1.20	1.10
Hg_ppm	0.03	0.12	0.19	0.30	0.01	0.02	0.04	0.02
Ho_ppm	0.49	0.39	0.86	1.20	0.27	0.67	1.01	0.62
In_ppm	0.04	0.03	0.09	0.07	0.03	0.04	0.05	0.04
La_ppm	1.70	3.00	2.90	2.20	1.00	5.40	3.90	2.50
Li_ppm	33.20	93.60	78.70	16.20	31.60	7.90	41.50	127.00
Lu_ppm	0.18	0.20	0.37	0.62	0.11	0.35	0.48	0.27
Mo_ppm	0.19	0.11	0.10	1.31	0.36	1.06	0.27	0.14
Nb_ppm	0.50	1.10	2.40	0.90	1.30	1.20	1.70	2.00
Nd_ppm	3.40	3.50	6.90	4.50	4.00	7.20	8.30	5.70
Ni_ppm	65.90	61.80	226.00	68.70	21.80	60.60	165.50	86.50
Rb_ppm	5.10	1.20	18.30	8.80	3.10	0.30	0.70	4.00
Sb_ppm	21.70	35.90	19.50	17.85	22.90	33.30	22.30	7.34
Sc_ppm	22.90	27.80	40.50	66.80	14.30	88.30	49.40	47.40
Se_ppm	0.50	1.00	1.00	1.00	0.50	1.00	1.00	0.50
Sm_ppm	1.46	1.26	2.20	1.80	1.46	2.24	2.75	1.85
Sn_ppm	0.20	0.30	0.60	0.20	0.40	0.20	0.40	0.60
Sr_ppm	45.80	44.10	94.50	33.10	75.10	5.60	28.50	41.80
Ta_ppm	0.03	0.09	0.15	0.06	0.09	0.08	0.12	0.12
Tb_ppm	0.37	0.26	0.60	0.68	0.24	0.44	0.69	0.43
Te_ppm	0.03	0.03	0.03	0.42	0.03	0.08	0.03	0.03
Th_ppm	0.09	0.33	0.34	0.11	0.36	0.20	0.27	0.29
Tl_ppm	0.09	0.05	0.46	0.58	0.06	0.01	0.03	0.06
Tm_ppm	0.19	0.19	0.34	0.55	0.08	0.34	0.44	0.26
U_ppm	0.06	0.26	0.15	0.06	0.08	0.11	0.12	0.09
V_ppm	89.00	191.00	327.00	211.00	205.00	390.00	285.00	312.00
W_ppm	9.60	19.10	21.10	97.30	11.20	2.80	39.40	7.00
Y_ppm	6.90	4.40	7.80	5.80	2.20	5.00	9.30	6.00
Yb_ppm	1.33	1.27	2.45	4.01	0.71	2.17	2.83	1.90
Zn_ppm	68.00	84.00	55.00	95.00	13.00	95.00	369.00	84.00
Zr_ppm	12.10	33.70	54.20	24.50	31.00	38.10	48.30	39.00

Sample_ID	RL-16ND069	RL-16ND070	RL-16ND071	RL-16ND073	RL-16ND074	RL-16ND075	RL-16ND076	RL-16ND077
S_ppm	0.06	0.09	<0.01	0.46	0.07	0.03	4.45	0.03
C_ppm	7.09	6.29	6.65	8.78	0.13	0.53	0.06	0.35
Pb_ppm	1.40	1.00	0.70	1.60	6.90	2.60	1.10	12.80
Pr_ppm	0.23	0.29	0.10	0.26	3.13	1.45	2.15	3.58
As_ppm	30.00	583.00	51.20	677.00	13.60	54.90	330.00	11.50
Ba_ppm	70.00	3250.00	800.00	80.00	450.00	30.00	100.00	610.00
Be_ppm	0.46	0.49	0.33	0.64	0.97	0.18	0.23	0.92

Bi_ppm	0.01	0.02	0.01	0.19	0.02	0.01	0.08	0.09
Cd_ppm	0.07	0.19	0.06	0.17	0.04	0.11	0.14	0.05
Ce_ppm	1.25	1.79	0.55	1.66	30.10	11.30	15.00	30.00
Co_ppm	2.60	66.20	6.20	83.70	4.00	21.70	86.20	4.10
Cr_ppm	41.00	1330.00	93.00	2260.00	14.00	137.00	165.00	10.00
Cs_ppm	0.12	1.69	0.08	0.43	4.66	0.57	2.80	4.57
Cu_ppm	4.30	38.20	2.10	37.00	18.60	67.30	693.00	7.20
Dy_ppm	0.97	0.92	0.23	0.86	0.58	2.34	2.52	0.74
Er_ppm	0.57	0.59	0.15	0.51	0.26	1.60	1.43	0.26
Eu_ppm	0.23	0.29	0.12	0.25	0.40	0.61	0.60	0.50
Ga_ppm	1.02	5.08	0.46	5.47	18.55	11.35	12.50	21.90
Gd_ppm	0.76	0.83	0.21	0.75	1.14	2.00	2.60	1.23
Ge_ppm	0.03	0.05	0.03	0.05	0.07	0.05	0.06	0.07
Hf_ppm	0.05	0.20	0.05	0.20	2.60	1.00	1.60	3.10
Hg_ppm	0.03	0.05	0.03	0.22	0.01	0.04	0.18	0.01
Ho_ppm	0.22	0.20	0.06	0.19	0.10	0.51	0.49	0.11
In_ppm	0.01	0.02	0.01	0.01	0.01	0.04	0.02	0.01
La_ppm	0.50	0.70	0.25	0.80	16.50	5.00	6.30	15.60
Li_ppm	3.10	27.60	8.20	24.30	37.70	41.20	43.10	23.60
Lu_ppm	0.09	0.08	0.02	0.07	0.04	0.24	0.26	0.04
Mo_ppm	16.40	9.20	2.63	6.05	0.24	0.15	1.24	0.18
Nb_ppm	0.05	0.20	0.00	0.10	2.30	1.70	1.10	2.90
Nd_ppm	1.30	1.50	0.40	1.20	10.80	6.50	9.40	11.80
Ni_ppm	43.50	508.00	73.70	786.00	7.90	77.40	132.50	4.80
Rb_ppm	1.60	13.20	0.90	8.80	80.20	3.00	21.50	79.50
Sb_ppm	4.94	7.70	4.00	6.58	11.40	15.95	249.00	13.80
Sc_ppm	3.30	10.40	1.40	11.80	2.40	29.40	15.70	2.70
Se_ppm	0.50	1.00	0.50	1.00	1.00	0.50	2.00	0.50
Sm_ppm	0.61	0.58	0.22	0.42	1.70	1.68	2.44	1.79
Sn_ppm	0.20	0.40	0.10	0.20	0.80	0.80	0.80	0.70
Sr_ppm	50.50	193.50	219.00	866.00	178.50	70.40	29.40	316.00
Ta_ppm	0.03	0.03	0.03	0.03	0.19	0.10	0.08	0.24
Tb_ppm	0.15	0.13	0.04	0.14	0.13	0.34	0.40	0.14
Te_ppm	0.10	0.11	0.06	1.46	0.03	0.03	0.08	0.03
Th_ppm	0.01	0.06	0.01	0.05	6.88	0.39	0.49	7.33
Tl_ppm	0.02	0.17	0.01	0.23	0.63	0.05	0.38	0.76
Tm_ppm	0.09	0.09	0.02	0.07	0.03	0.24	0.23	0.04
U_ppm	0.03	0.03	0.03	0.03	1.49	0.09	0.19	1.79
V_ppm	32.00	112.00	21.00	94.00	21.00	210.00	148.00	25.00
W_ppm	2.10	6.50	2.90	4.30	1.30	17.60	34.90	0.80
Y_ppm	3.10	3.10	1.50	3.10	2.40	5.80	7.40	2.50
Yb_ppm	0.55	0.53	0.14	0.47	0.25	1.70	1.57	0.24
Zn_ppm	22.00	73.00	12.00	127.00	22.00	59.00	41.00	48.00
Zr_ppm	1.70	7.10	0.80	6.90	98.10	32.90	55.90	117.50

Sample_ID	RL- 16ND078	RL- 16ND079	RL- 16ND080	RL- 16ND084	RL- 16ND085	RL- 16ND086	RL- 16ND087	RL- 16ND088
S_ppm	0.04	0.09	4.19	0.04	0.01	0.11	2.56	0.95
C_ppm	0.69	0.16	0.46	0.18	0.50	0.53	0.35	1.01
Pb_ppm	3.90	4.80	5.40	23.00	7.70	7.00	7.10	6.10
Pr_ppm	1.17	1.78	0.29	5.08	5.37	14.20	13.45	12.65
As_ppm	115.50	101.00	56.70	7.20	4.40	2.70	9.60	3.90
Ba_ppm	150.00	30.00	140.00	490.00	950.00	620.00	440.00	100.00
Be_ppm	0.30	0.55	0.18	1.09	1.33	1.53	1.39	1.44
Bi_ppm	0.10	0.04	0.14	0.12	0.19	0.12	53.80	13.90
Cd_ppm	0.10	0.10	0.01	0.11	0.04	0.11	0.07	0.11
Ce_ppm	7.68	13.85	1.88	43.90	42.10	111.00	99.60	96.10
Co_ppm	75.10	42.80	10.20	11.00	4.70	3.10	10.50	7.40
Cr_ppm	1580.00	106.00	33.00	85.00	11.00	9.00	6.00	5.00
Cs_ppm	9.80	0.22	1.12	11.40	1.33	0.61	2.42	0.19
Cu_ppm	23.00	181.00	14.30	17.70	92.30	7.40	133.00	96.80
Dy_ppm	2.43	2.82	0.27	2.29	2.70	6.88	6.00	6.03
Er_ppm	1.41	1.40	0.18	1.47	1.66	4.26	3.27	3.64
Eu_ppm	0.61	1.15	0.10	0.86	0.98	1.51	3.25	3.29
Ga_ppm	17.05	13.35	2.14	17.10	15.45	17.30	20.20	23.50
Gd_ppm	2.24	3.70	0.26	2.46	2.50	7.39	7.39	7.21
Ge_ppm	0.05	0.03	0.03	0.09	0.08	0.14	0.17	0.16
Hf_ppm	1.20	0.30	0.40	3.40	1.90	5.60	3.90	3.60
Hg_ppm	0.01	0.03	0.71	0.01	0.01	0.00	0.01	0.04
Ho_ppm	0.51	0.49	0.06	0.45	0.61	1.44	1.21	1.23
In_ppm	0.05	0.08	0.01	0.04	0.03	0.04	0.06	0.05
La_ppm	2.90	5.10	0.90	22.30	19.90	50.80	45.50	44.30
Li_ppm	39.90	14.10	16.80	27.40	13.40	4.80	8.80	3.80
Lu_ppm	0.17	0.17	0.02	0.20	0.27	0.70	0.50	0.57
Mo_ppm	0.48	0.71	1.10	1.03	0.53	0.48	1.02	0.68
Nb_ppm	1.70	0.50	0.30	5.70	4.30	7.20	11.80	8.10
Nd_ppm	6.10	8.90	1.10	18.00	19.30	52.30	53.10	50.30
Ni_ppm	213.00	139.50	13.90	50.20	10.00	3.30	5.00	4.90
Rb_ppm	36.50	0.70	7.00	99.90	31.20	37.20	51.50	16.40
Sb_ppm	10.45	45.40	22.40	0.53	1.57	1.43	0.94	1.18
Sc_ppm	36.20	32.30	1.80	8.80	4.40	5.30	10.80	15.20
Se_ppm	1.00	1.00	1.00	0.50	1.00	1.00	2.00	1.00
Sm_ppm	1.85	3.08	0.27	3.09	3.45	9.16	9.61	8.76
Sn_ppm	0.80	0.50	2.10	1.20	1.90	2.00	1.70	0.60
Sr_ppm	108.50	61.40	21.60	254.00	557.00	378.00	233.00	737.00
Ta_ppm	0.12	0.03	0.03	0.48	0.23	0.56	0.62	0.42
Tb_ppm	0.39	0.55	0.04	0.41	0.38	1.13	1.03	1.01
Te_ppm	0.03	0.14	0.19	0.03	0.03	0.03	30.60	8.71
Th_ppm	0.53	0.11	0.48	9.77	4.87	12.30	6.57	5.67
Tl_ppm	0.37	0.06	0.51	0.72	0.12	0.19	0.28	0.12

Tm_ppm	0.21	0.17	0.02	0.21	0.27	0.68	0.50	0.56
U_ppm	0.25	0.18	0.31	2.71	1.96	3.20	1.52	1.89
V_ppm	234.00	219.00	18.00	66.00	49.00	16.00	15.00	30.00
W_ppm	5.80	8.00	0.50	0.90	3.20	8.20	9.00	3.30
Y_ppm	7.00	5.60	1.20	11.40	16.40	13.70	19.20	12.70
Yb_ppm	1.31	1.43	0.16	1.25	1.76	4.40	3.19	3.67
Zn_ppm	103.00	80.00	3.00	81.00	22.00	15.00	25.00	85.00
Zr_ppm	45.40	11.80	14.80	126.00	71.40	186.50	143.50	144.00

Sample_ID	RL- 16ND090	RL- 16ND091	RL- 16ND092	RL- 16ND094	RL- 16ND095	RL- 16ND096	RL- 16ND097	RL- 16ND102
S_ppm	0.12	0.02	<0.01	3.27	0.01	0.10	1.74	0.18
C_ppm	3.20	6.55	1.03	0.39	0.07	0.20	0.23	2.37
Pb_ppm	0.90	1.50	2.70	1.50	2.00	7.60	6.60	1.40
Pr_ppm	0.50	1.63	4.03	0.07	2.11	1.69	1.06	0.80
As_ppm	30.70	9.60	26.30	35.90	217.00	2.70	3970.00	36.20
Ba_ppm	110.00	1050.00	620.00	20.00	60.00	50.00	140.00	30.00
Be_ppm	0.29	0.13	0.88	0.23	2.52	0.29	0.44	0.33
Bi_ppm	0.26	0.08	0.05	0.04	0.03	0.05	0.03	0.01
Cd_ppm	0.05	0.10	0.02	0.03	0.10	0.16	0.11	0.10
Ce_ppm	3.17	12.90	34.00	0.48	12.15	11.80	7.07	6.70
Co_ppm	53.90	16.40	15.50	6.00	54.50	37.70	31.30	28.20
Cr_ppm	1200.00	48.00	29.00	13.00	253.00	10.00	61.00	188.00
Cs_ppm	2.00	1.47	3.02	0.25	1.93	1.67	5.85	1.96
Cu_ppm	132.00	40.70	1.20	14.50	2.90	118.50	172.00	91.50
Dy_ppm	1.47	1.70	1.73	0.33	4.01	5.11	2.98	2.60
Er_ppm	0.83	0.95	0.84	0.29	2.45	3.22	2.00	1.57
Eu_ppm	0.44	0.77	0.81	0.05	0.93	0.98	0.63	0.48
Ga_ppm	10.25	7.70	20.10	0.25	23.30	17.15	11.65	13.25
Gd_ppm	1.25	1.64	2.27	0.17	3.39	4.16	2.40	1.91
Ge_ppm	0.07	0.06	0.08	0.03	0.07	0.05	0.05	0.06
Hf_ppm	0.80	0.60	3.20	0.05	2.20	0.90	1.00	1.20
Hg_ppm	0.23	0.05	0.01	1.18	0.01	0.00	1.18	0.01
Ho_ppm	0.30	0.34	0.32	0.08	0.85	1.16	0.65	0.62
In_ppm	0.04	0.03	0.03	0.01	0.20	0.09	0.05	0.05
La_ppm	1.20	6.50	15.70	0.25	4.30	4.20	2.60	2.50
Li_ppm	38.60	13.20	18.00	2.80	48.30	27.30	35.30	61.40
Lu_ppm	0.12	0.15	0.12	0.04	0.34	0.51	0.29	0.26
Mo_ppm	7.94	0.32	0.90	0.48	0.53	1.45	8.57	0.35
Nb_ppm	1.40	1.50	4.90	0.10	3.40	3.20	2.00	1.80
Nd_ppm	2.50	6.50	15.00	0.30	9.70	8.70	5.30	4.10
Ni_ppm	449.00	44.20	33.90	23.30	162.50	29.50	44.70	189.50
Rb_ppm	46.60	33.30	23.40	0.40	2.50	6.60	42.60	4.10
Sb_ppm	3.46	0.41	2.43	19.95	9.59	0.48	52.00	17.35

Sc_ppm	28.50	11.30	8.40	1.70	45.30	40.50	32.50	33.30
Se_ppm	0.50	1.00	0.50	0.50	1.00	2.00	2.00	1.00
Sm_ppm	0.93	1.54	2.84	0.10	2.70	2.80	1.76	1.50
Sn_ppm	0.40	0.70	0.70	0.40	1.20	0.80	1.10	0.40
Sr_ppm	97.00	158.50	246.00	1.20	25.80	116.50	40.00	62.60
Ta_ppm	0.09	0.10	0.34	0.03	0.22	0.19	0.12	0.12
Tb_ppm	0.24	0.28	0.33	0.04	0.60	0.71	0.48	0.40
Te_ppm	0.24	0.03	0.03	0.08	0.25	0.03	0.84	<0.05
Th_ppm	0.21	0.85	4.08	0.05	0.55	0.37	0.28	0.29
Tl_ppm	0.16	0.15	0.16	0.08	0.10	0.05	1.15	0.06
Tm_ppm	0.12	0.13	0.11	0.03	0.38	0.48	0.28	0.23
U_ppm	0.07	0.25	1.22	0.20	1.42	0.08	0.09	0.10
V_ppm	187.00	71.00	75.00	6.00	415.00	325.00	279.00	254.00
W_ppm	4.40	1.00	0.40	0.20	1.30	0.50	2790.00	9.70
Y_ppm	3.40	9.00	8.10	1.10	15.40	30.60	5.50	9.20
Yb_ppm	0.79	0.82	0.76	0.42	2.19	3.20	1.93	1.76
Zn_ppm	57.00	29.00	112.00	7.00	146.00	123.00	60.00	61.00
Zr_ppm	28.10	24.30	124.50	3.90	79.40	33.40	39.80	44.10

Sample_ID	RL-16ND120	RL-16ND121	RL-16ND122	RL-16ND123	RL-16ND128	RL-16ND142	RL-16ND147	RL-16ND155
S_ppm	0.01	<0.01	0.36	1.23	3.71	6.88	2.78	0.08
C_ppm	0.18	0.06	0.02	0.06	0.42	0.65	0.51	10.65
Pb_ppm	25.00	21.90	2.60	2.30	7.90	5.70	12.20	1.70
Pr_ppm	3.79	2.57	0.48	0.40	0.92	0.82	1.36	0.50
As_ppm	22.50	9.30	208.00	11.10	2640.00	3220.00	10000.00	60.50
Ba_ppm	520.00	420.00	70.00	190.00	50.00	40.00	70.00	40.00
Be_ppm	1.83	2.93	0.21	0.56	0.41	0.20	0.40	0.49
Bi_ppm	0.03	0.84	0.03	0.06	0.04	0.20	0.08	0.02
Cd_ppm	0.02	0.02	0.02	0.11	0.17	0.05	0.47	0.19
Ce_ppm	36.20	26.10	3.98	3.25	6.06	4.37	9.07	3.56
Co_ppm	3.00	1.20	2.80	26.50	50.60	104.00	54.70	8.20
Cr_ppm	16.00	9.00	38.00	789.00	166.00	91.00	40.00	20.00
Cs_ppm	9.07	6.00	0.82	3.84	2.47	1.92	5.18	1.89
Cu_ppm	10.50	2.00	7.30	46.90	132.50	295.00	99.30	11.00
Dy_ppm	1.75	3.62	0.32	0.75	2.61	4.95	2.61	2.18
Er_ppm	1.07	2.14	0.28	0.51	1.77	3.65	1.74	1.38
Eu_ppm	0.38	0.24	0.12	0.23	0.64	0.56	0.59	0.46
Ga_ppm	17.00	21.30	1.51	6.43	14.35	11.50	13.00	2.99
Gd_ppm	1.81	2.61	0.24	0.53	2.10	3.56	2.39	1.71
Ge_ppm	0.05	0.07	0.03	0.03	0.03	0.06	0.05	0.11

Hf_ppm	3.20	4.10	0.20	0.50	1.00	1.20	1.20	0.20
Hg_ppm	0.01	0.01	0.11	0.06	0.18	0.08	0.67	0.04
Ho_ppm	0.38	0.73	0.08	0.17	0.58	1.25	0.58	0.48
In_ppm	0.02	0.03	0.01	0.03	0.05	0.04	0.05	0.02
La_ppm	19.10	12.60	2.10	1.50	2.30	1.60	3.50	1.50
Li_ppm	40.80	34.90	4.40	26.00	58.90	59.20	68.80	25.10
Lu_ppm	0.17	0.39	0.02	0.07	0.24	0.51	0.24	0.16
Mo_ppm	0.22	2.05	0.27	0.44	5.89	0.75	1.04	0.15
Nb_ppm	9.60	18.40	0.50	0.90	1.30	1.90	2.00	0.30
Nd_ppm	12.60	8.50	1.80	1.70	4.30	4.30	6.40	2.60
Ni_ppm	6.80	3.80	8.50	140.50	114.50	293.00	301.00	60.40
Rb_ppm	207.00	252.00	3.00	28.00	12.80	14.60	33.80	7.90
Sb_ppm	1.42	1.47	15.35	1.98	46.80	55.20	195.50	3.27
Sc_ppm	3.20	2.90	1.20	15.00	42.60	35.90	25.70	16.60
Se_ppm	0.50	1.00	1.00	1.00	2.00	8.00	4.00	0.50
Sm_ppm	2.23	2.42	0.25	0.49	1.61	1.81	2.02	0.94
Sn_ppm	2.00	2.20	0.20	0.50	0.40	0.40	0.60	0.30
Sr_ppm	73.00	60.90	9.40	30.10	64.00	32.30	25.40	95.30
Ta_ppm	1.53	4.10	0.03	0.06	0.12	0.12	0.13	0.03
Tb_ppm	0.31	0.50	0.06	0.11	0.39	0.71	0.40	0.31
Te_ppm	0.03	0.03	0.07	0.10	5.31	0.58	0.07	0.03
Th_ppm	18.10	17.60	0.33	0.29	0.36	0.21	0.30	0.05
Tl_ppm	1.14	1.15	0.19	0.58	0.33	0.48	1.12	0.12
Tm_ppm	0.14	0.37	0.02	0.05	0.23	0.51	0.26	0.14
U_ppm	7.18	8.36	0.10	0.14	0.11	0.11	0.11	0.05
V_ppm	16.00	10.00	11.00	106.00	226.00	240.00	275.00	93.00
W_ppm	4.60	1.10	1.30	5.20	175.50	23.70	129.50	6.90
Y_ppm	9.80	21.40	1.20	3.00	4.00	7.40	5.20	6.30
Yb_ppm	1.12	2.29	0.31	0.57	1.66	3.44	1.65	1.10
Zn_ppm	42.00	19.00	13.00	122.00	51.00	52.00	220.00	67.00
Zr_ppm	87.10	87.40	10.50	22.90	27.10	46.70	46.60	10.30

Sample_ID	RL-16ND161	RL-16ND162	RL-16ND163	RL-16ND170	RL-16ND175	RL-16ND182	RL-16ND187
S_ppm	<0.01	0.53	0.21	1.73	1.66	0.20	0.04
C_ppm	0.24	0.91	0.21	0.61	2.55	1.08	0.50
Pb_ppm	0.90	2.50	1.70	2.20	1.20	2.10	0.90
Pr_ppm	0.66	1.47	1.79	0.86	1.56	1.18	0.94
As_ppm	8.40	72.90	40.20	46.70	712.00	218.00	29.10
Ba_ppm	210.00	10.00	10.00	60.00	60.00	100.00	120.00
Be_ppm	0.35	1.19	0.26	0.32	0.32	0.33	0.37
Bi_ppm	0.01	0.10	0.07	0.03	0.04	0.03	0.03
Cd_ppm	0.07	0.53	0.29	0.08	0.10	0.15	0.26
Ce_ppm	4.53	12.60	16.40	5.80	9.89	7.38	6.47

Co_ppm	58.80	21.60	11.40	29.00	21.60	55.70	63.00
Cr_ppm	181.00	28.00	43.00	22.00	12.00	106.00	188.00
Cs_ppm	0.75	0.34	0.28	4.67	1.22	3.54	0.15
Cu_ppm	23.50	1225.00	41.20	1895.00	38.70	152.50	35.40
Dy_ppm	1.41	2.44	0.88	2.42	8.75	2.57	2.37
Er_ppm	0.77	1.79	0.45	1.60	6.20	1.75	1.55
Eu_ppm	0.36	0.88	0.47	0.53	1.36	0.69	0.68
Ga_ppm	14.40	5.10	3.89	17.90	4.19	15.45	16.60
Gd_ppm	1.07	2.16	1.04	1.88	6.34	2.28	2.15
Ge_ppm	0.03	0.12	0.03	0.10	0.13	0.10	0.11
Hf_ppm	0.50	0.60	0.60	1.60	0.40	1.50	0.60
Hg_ppm	0.01	0.02	0.01	0.03	0.03	0.08	0.00
Ho_ppm	0.30	0.56	0.15	0.57	2.01	0.59	0.55
In_ppm	0.03	0.19	0.06	0.10	0.16	0.07	0.06
La_ppm	1.80	6.40	7.80	2.20	4.10	2.90	2.40
Li_ppm	83.90	5.80	5.50	59.70	9.80	46.90	37.00
Lu_ppm	0.12	0.24	0.07	0.25	0.86	0.26	0.21
Mo_ppm	0.22	0.78	1.01	0.61	0.11	0.15	0.10
Nb_ppm	1.50	1.30	1.10	2.20	0.80	2.50	1.60
Nd_ppm	3.00	6.00	7.00	4.30	8.00	5.80	4.80
Ni_ppm	222.00	47.20	28.50	66.20	68.30	83.90	316.00
Rb_ppm	9.70	0.80	2.40	11.30	5.50	15.70	0.10
Sb_ppm	0.95	8.55	15.55	29.40	93.10	74.50	6.65
Sc_ppm	16.20	15.10	4.20	38.80	48.80	39.10	27.30
Se_ppm	1.00	1.00	1.00	1.00	1.00	0.50	0.50
Sm_ppm	0.85	1.53	1.51	1.53	3.31	1.93	1.65
Sn_ppm	0.40	1.30	0.70	0.30	0.40	0.50	0.70
Sr_ppm	100.50	3.50	3.20	86.60	68.90	121.50	129.50
Ta_ppm	0.10	0.09	0.10	0.15	0.05	0.17	0.10
Tb_ppm	0.20	0.38	0.15	0.41	1.24	0.45	0.39
Te_ppm	0.03	0.41	0.19	0.10	0.09	0.03	0.03
Th_ppm	0.21	1.10	1.18	0.41	0.12	0.37	0.23
Tl_ppm	0.05	0.03	0.12	0.49	0.28	5.09	0.02
Tm_ppm	0.12	0.24	0.06	0.21	0.89	0.22	0.22
U_ppm	0.08	0.36	0.38	0.13	0.06	0.11	0.06
V_ppm	146.00	49.00	22.00	354.00	217.00	289.00	163.00
W_ppm	1.10	4.50	0.80	11.10	32.00	53.60	0.40
Y_ppm	6.10	15.50	4.00	5.10	25.10	6.30	15.40
Yb_ppm	0.78	1.61	0.39	1.78	5.38	1.73	1.40
Zn_ppm	86.00	292.00	148.00	69.00	87.00	80.00	76.00
Zr_ppm	17.40	24.10	23.60	56.30	18.50	53.60	19.90

Sample_ID	RL- 16ND189	RL- 16ND190	RL- 16ND193	RL- 16ND195	RL- 16ND197	RL- 16ND199	RL- 16ND200	RL- 16ND201

S_ppm	0.05	0.43	2.11	0.03	0.01	0.03	1.75	0.12
C_ppm	0.82	0.06	0.03	0.07	0.04	0.50	0.29	3.87
Pb_ppm	0.90	4.40	1.50	1.90	0.80	13.60	4.00	1.40
Pr_ppm	1.49	1.96	0.46	1.16	1.77	4.15	1.18	0.61
As_ppm	16.30	7.00	6.90	3.50	0.30	5.00	72.30	1070.00
Ba_ppm	280.00	180.00	10.00	40.00	60.00	310.00	210.00	230.00
Be_ppm	0.35	0.74	0.13	0.37	0.29	1.03	0.44	0.37
Bi_ppm	0.05	0.04	0.04	0.05	0.01	0.09	0.17	0.03
Cd_ppm	0.13	0.10	0.20	0.11	0.04	0.04	0.02	0.10
Ce_ppm	11.05	19.00	2.99	8.00	11.90	36.60	9.41	3.90
Co_ppm	53.20	16.20	5.10	45.40	56.90	4.40	12.70	87.30
Cr_ppm	187.00	283.00	34.00	150.00	53.00	19.00	46.00	1330.00
Cs_ppm	2.95	5.08	0.37	0.38	0.15	3.38	1.23	2.72
Cu_ppm	149.00	21.10	12.10	109.50	134.50	26.90	115.50	94.00
Dy_ppm	3.49	3.49	4.88	3.46	2.16	1.26	0.59	1.48
Er_ppm	2.33	2.49	3.43	2.33	1.34	0.73	0.30	0.86
Eu_ppm	0.90	0.83	0.45	0.85	0.62	0.70	0.26	0.37
Ga_ppm	19.05	15.15	3.91	17.30	15.45	18.55	5.43	10.00
Gd_ppm	3.08	2.66	2.73	2.97	1.93	1.67	0.75	1.23
Ge_ppm	0.11	0.12	0.03	0.12	0.03	0.03	0.09	0.03
Hf_ppm	1.60	2.20	0.50	1.40	0.50	3.20	1.20	0.80
Hg_ppm	0.02	0.02	0.00	0.00	0.07	0.01	0.35	0.03
Ho_ppm	0.79	0.82	1.07	0.79	0.46	0.24	0.12	0.27
In_ppm	0.07	0.04	0.05	0.07	0.04	0.02	0.01	0.05
La_ppm	4.30	12.10	1.20	2.80	5.20	18.80	4.40	1.50
Li_ppm	61.70	40.80	6.10	28.50	23.30	36.50	14.90	31.80
Lu_ppm	0.34	0.38	0.55	0.32	0.19	0.09	0.02	0.13
Mo_ppm	0.27	0.39	0.49	0.26	0.20	0.58	0.95	0.28
Nb_ppm	3.00	2.70	0.60	3.30	1.90	5.60	1.80	0.70
Nd_ppm	7.50	8.00	3.00	6.20	7.20	14.70	4.30	3.10
Ni_ppm	134.50	44.60	21.30	65.10	173.50	10.60	33.80	797.00
Rb_ppm	18.40	23.00	1.10	1.50	0.40	51.50	24.60	66.10
Sb_ppm	1.03	2.55	1.20	2.09	0.70	4.79	4.01	9.56
Sc_ppm	43.20	32.00	28.50	44.00	27.20	5.40	3.50	35.70
Se_ppm	0.50	0.50	1.00	1.00	1.00	0.50	1.00	1.00
Sm_ppm	2.42	1.99	1.33	2.05	1.77	2.34	0.90	1.01
Sn_ppm	0.80	0.50	0.30	0.80	0.30	0.70	0.40	0.30
Sr_ppm	170.50	43.50	32.30	238.00	194.50	258.00	34.90	73.10
Ta_ppm	0.21	0.17	0.03	0.22	0.11	0.55	0.14	0.03
Tb_ppm	0.58	0.51	0.61	0.53	0.34	0.23	0.13	0.21
Te_ppm	0.03	0.05	0.07	0.03	0.03	0.03	0.19	0.03
Th_ppm	0.45	1.64	0.11	0.68	0.55	7.45	1.79	0.18
Tl_ppm	0.16	0.49	0.22	0.01	0.01	0.29	0.30	0.31
Tm_ppm	0.36	0.36	0.54	0.32	0.20	0.10	0.02	0.12

U_ppm	0.13	0.51	0.10	0.16	0.17	2.88	0.54	0.05
V_ppm	326.00	202.00	106.00	314.00	153.00	41.00	31.00	195.00
W_ppm	0.60	0.60	0.30	0.40	0.20	0.70	2.80	12.30
Y_ppm	22.00	22.90	21.00	21.80	10.90	6.70	2.90	5.10
Yb_ppm	2.48	2.63	3.58	2.29	1.19	0.60	0.25	0.82
Zn_ppm	75.00	77.00	118.00	102.00	67.00	48.00	12.00	60.00
Zr_ppm	60.00	80.20	23.70	45.20	17.60	123.00	45.30	27.80

Sample_ID	RL- 16ND189	RL- 16ND190	RL- 16ND193	RL- 16ND195	RL- 16ND197	RL- 16ND199	RL- 16ND200	RL- 16ND201	RL- 16ND202
S_ppm	0.05	0.43	2.11	0.03	0.01	0.03	1.75	0.12	0.01
C_ppm	0.82	0.06	0.03	0.07	0.04	0.50	0.29	3.87	0.06
Pb_ppm	0.90	4.40	1.50	1.90	0.80	13.60	4.00	1.40	1.50
Pr_ppm	1.49	1.96	0.46	1.16	1.77	4.15	1.18	0.61	0.87
As_ppm	16.30	7.00	6.90	3.50	0.30	5.00	72.30	1070.00	83.00
Ba_ppm	280.00	180.00	10.00	40.00	60.00	310.00	210.00	230.00	10.00
Be_ppm	0.35	0.74	0.13	0.37	0.29	1.03	0.44	0.37	0.48
Bi_ppm	0.05	0.04	0.04	0.05	0.01	0.09	0.17	0.03	0.12
Cd_ppm	0.13	0.10	0.20	0.11	0.04	0.04	0.02	0.10	0.55
Ce_ppm	11.05	19.00	2.99	8.00	11.90	36.60	9.41	3.90	6.57
Co_ppm	53.20	16.20	5.10	45.40	56.90	4.40	12.70	87.30	31.50
Cr_ppm	187.00	283.00	34.00	150.00	53.00	19.00	46.00	1330.00	220.00
Cs_ppm	2.95	5.08	0.37	0.38	0.15	3.38	1.23	2.72	0.09
Cu_ppm	149.00	21.10	12.10	109.50	134.50	26.90	115.50	94.00	3.30
Dy_ppm	3.49	3.49	4.88	3.46	2.16	1.26	0.59	1.48	2.60
Er_ppm	2.33	2.49	3.43	2.33	1.34	0.73	0.30	0.86	1.52
Eu_ppm	0.90	0.83	0.45	0.85	0.62	0.70	0.26	0.37	0.65
Ga_ppm	19.05	15.15	3.91	17.30	15.45	18.55	5.43	10.00	14.40
Gd_ppm	3.08	2.66	2.73	2.97	1.93	1.67	0.75	1.23	2.39
Ge_ppm	0.11	0.12	0.03	0.12	0.03	0.03	0.09	0.03	0.10
Hf_ppm	1.60	2.20	0.50	1.40	0.50	3.20	1.20	0.80	0.90
Hg_ppm	0.02	0.02	0.00	0.00	0.07	0.01	0.35	0.03	0.00
Ho_ppm	0.79	0.82	1.07	0.79	0.46	0.24	0.12	0.27	0.52
In_ppm	0.07	0.04	0.05	0.07	0.04	0.02	0.01	0.05	0.04
La_ppm	4.30	12.10	1.20	2.80	5.20	18.80	4.40	1.50	3.40
Li_ppm	61.70	40.80	6.10	28.50	23.30	36.50	14.90	31.80	3.10
Lu_ppm	0.34	0.38	0.55	0.32	0.19	0.09	0.02	0.13	0.18
Mo_ppm	0.27	0.39	0.49	0.26	0.20	0.58	0.95	0.28	0.20
Nb_ppm	3.00	2.70	0.60	3.30	1.90	5.60	1.80	0.70	2.20
Nd_ppm	7.50	8.00	3.00	6.20	7.20	14.70	4.30	3.10	4.20
Ni_ppm	134.50	44.60	21.30	65.10	173.50	10.60	33.80	797.00	161.50
Rb_ppm	18.40	23.00	1.10	1.50	0.40	51.50	24.60	66.10	2.40
Sb_ppm	1.03	2.55	1.20	2.09	0.70	4.79	4.01	9.56	4.46
Sc_ppm	43.20	32.00	28.50	44.00	27.20	5.40	3.50	35.70	34.60

Se_ppm	0.50	0.50	1.00	1.00	1.00	0.50	1.00	1.00	1.00
Sm_ppm	2.42	1.99	1.33	2.05	1.77	2.34	0.90	1.01	1.20
Sn_ppm	0.80	0.50	0.30	0.80	0.30	0.70	0.40	0.30	1.00
Sr_ppm	170.50	43.50	32.30	238.00	194.50	258.00	34.90	73.10	51.00
Ta_ppm	0.21	0.17	0.03	0.22	0.11	0.55	0.14	0.03	0.10
Tb_ppm	0.58	0.51	0.61	0.53	0.34	0.23	0.13	0.21	0.46
Te_ppm	0.03	0.05	0.07	0.03	0.03	0.03	0.19	0.03	0.03
Th_ppm	0.45	1.64	0.11	0.68	0.55	7.45	1.79	0.18	0.49
Tl_ppm	0.16	0.49	0.22	0.01	0.01	0.29	0.30	0.31	0.01
Tm_ppm	0.36	0.36	0.54	0.32	0.20	0.10	0.02	0.12	0.19
U_ppm	0.13	0.51	0.10	0.16	0.17	2.88	0.54	0.05	0.21
V_ppm	326.00	202.00	106.00	314.00	153.00	41.00	31.00	195.00	202.00
W_ppm	0.60	0.60	0.30	0.40	0.20	0.70	2.80	12.30	2.40
Y_ppm	22.00	22.90	21.00	21.80	10.90	6.70	2.90	5.10	13.40
Yb_ppm	2.48	2.63	3.58	2.29	1.19	0.60	0.25	0.82	1.29
Zn_ppm	75.00	77.00	118.00	102.00	67.00	48.00	12.00	60.00	362.00
Zr_ppm	60.00	80.20	23.70	45.20	17.60	123.00	45.30	27.80	30.10

Sample_ID	RL-16ND204	RL-16ND205	RL-16ND206	RL-16ND208	RL-16ND209	RL-16ND211	RL-16ND212	RL-16ND215	RL-16ND216
S_ppm	0.01	0.03	0.02	14.05	0.10	0.50	0.04	<0.01	0.11
C_ppm	0.14	0.03	0.04	0.22	1.44	1.45	0.44	0.29	4.02
Pb_ppm	2.50	0.60	1.50	7.70	8.80	17.80	2.20	3.10	2.70
Pr_ppm	0.18	1.26	0.88	0.69	1.04	6.85	4.74	0.33	6.40
As_ppm	63.20	3.00	2.40	144.50	15.60	30.50	2.60	2.20	11.90
Ba_ppm	200.00	50.00	60.00	70.00	10.00	260.00	140.00	<10	160.00
Be_ppm	0.32	0.27	0.17	0.31	0.75	1.22	0.75	0.06	0.81
Bi_ppm	0.01	0.02	0.03	1.51	0.04	0.09	0.04	0.01	0.10
Cd_ppm	0.01	0.12	0.15	0.08	0.06	0.39	0.04	0.11	0.13
Ce_ppm	1.26	8.37	5.65	5.09	9.34	51.40	38.20	2.76	53.10
Co_ppm	1.90	42.80	47.00	125.50	4.70	3.80	17.10	2.30	24.80
Cr_ppm	27.00	175.00	184.00	19.00	10.00	7.00	27.00	28.00	200.00
Cs_ppm	1.99	0.02	0.17	2.77	0.06	0.46	0.52	0.02	1.46
Cu_ppm	1.30	113.00	138.00	94.70	6.80	44.50	5.00	2.10	35.80
Dy_ppm	0.12	3.36	2.52	1.72	2.45	6.25	3.37	0.20	2.13
Er_ppm	0.07	2.23	1.72	1.13	1.24	3.71	1.92	0.15	1.25
Eu_ppm	0.10	0.75	0.58	0.38	0.26	1.51	1.06	0.08	1.14
Ga_ppm	11.00	14.85	12.90	12.75	12.90	18.55	17.20	2.44	14.10
Gd_ppm	0.13	2.89	2.11	1.43	2.11	6.22	3.84	0.31	3.23
Ge_ppm	0.03	0.05	0.10	0.06	0.03	0.07	0.06	0.03	0.08
Hf_ppm	1.10	0.60	0.90	1.30	0.80	6.20	4.10	0.10	1.50
Hg_ppm	0.02	0.00	0.00	0.01	0.02	0.01	0.01	0.00	0.02
Ho_ppm	0.02	0.75	0.59	0.37	0.46	1.29	0.62	0.06	0.45
In_ppm	0.01	0.07	0.06	0.07	0.02	0.06	0.04	0.01	0.04
La_ppm	0.60	3.20	2.20	2.00	5.10	25.20	19.10	1.50	26.20
Li_ppm	11.80	14.30	10.80	55.30	10.00	5.90	23.70	1.00	21.70

Lu_ppm	0.01	0.33	0.22	0.16	0.16	0.53	0.26	0.02	0.16
Mo_ppm	0.17	0.35	0.13	2.00	0.57	2.36	0.86	0.30	0.28
Nb_ppm	0.50	2.20	1.80	1.90	2.30	13.60	2.70	0.20	4.40
Nd_ppm	0.70	6.10	4.50	3.30	3.90	26.70	18.00	1.40	25.00
Ni_ppm	12.30	74.60	78.40	103.00	10.80	4.00	19.60	2.30	132.00
Rb_ppm	18.90	0.60	0.80	18.00	0.70	16.80	15.40	0.30	20.20
Sb_ppm	2.64	0.46	0.76	10.30	1.97	1.36	0.50	0.42	3.54
Sc_ppm	0.80	39.90	40.30	30.40	2.20	9.10	8.00	3.00	20.70
Se_ppm	0.50	1.00	0.50	2.00	0.50	1.00	1.00	0.50	0.50
Sm_ppm	0.15	1.91	1.72	0.99	1.18	5.58	3.77	0.31	4.28
Sn_ppm	0.20	0.60	0.50	0.90	0.80	1.10	0.60	0.20	0.80
Sr_ppm	144.50	79.00	79.80	52.60	44.20	165.00	98.20	44.50	287.00
Ta_ppm	0.03	0.14	0.12	0.13	0.41	0.80	0.20	0.03	0.26
Tb_ppm	0.02	0.48	0.38	0.22	0.37	0.98	0.54	0.03	0.42
Te_ppm	0.03	0.03	0.03	0.52	0.03	0.09	0.03	0.03	0.03
Th_ppm	0.18	0.34	0.26	0.35	4.25	5.44	3.41	0.11	3.22
Tl_ppm	0.20	0.01	0.01	0.13	0.01	0.07	0.05	0.01	0.12
Tm_ppm	0.01	0.37	0.21	0.16	0.16	0.54	0.26	0.02	0.16
U_ppm	0.16	0.10	0.07	0.16	1.84	2.02	1.12	0.03	0.76
V_ppm	14.00	277.00	288.00	225.00	17.00	3.00	47.00	54.00	118.00
W_ppm	13.10	0.20	0.30	0.80	1.10	5.00	0.10	0.05	23.00
Y_ppm	0.60	21.10	14.50	7.70	7.30	12.70	17.70	1.20	10.70
Yb_ppm	0.07	2.20	1.62	1.03	1.11	3.32	1.68	0.11	0.91
Zn_ppm	5.00	83.00	97.00	75.00	59.00	67.00	59.00	11.00	99.00
Zr_ppm	34.40	16.10	29.80	49.10	22.80	261.00	159.50	3.70	64.60

Appendix III - Sulfur isotopes

Sample ID	Pyrite type	Deposit	Average ‰ delta 34/32S V-CDT	1 Std Error
NS001	Py1b_Marcus	Marcus	5.9	0.3
NS001	Py1a_Marcus	Marcus	5.3	0.5
NS001	Py1a_Marcus	Marcus	5.5	0.5
NS001	Py1a_Marcus	Marcus	5.2	0.3
NS001	Py1b_Marcus	Marcus	5.9	0.5
NS001	Py2_Marcus	Marcus	6.2	0.4
NS001	Py2_Marcus	Marcus	6.0	0.4
NS001	Py1a_Marcus	Marcus	5.2	0.6
NS001B	Py1a_Marcus	Marcus	0.4	0.5
NS001B	Py1a_Marcus	Marcus	3.5	0.5
NS001B	Py1a_Marcus	Marcus	3.1	0.4
NS001B	Py1a_Marcus	Marcus	0.7	0.5
NS001B	Py1a_Marcus	Marcus	0.7	0.4
NS001B	Py1a_Marcus	Marcus	1.7	0.4
NS001B	Py1a_Marcus	Marcus	2.0	0.3
NS006	Py1a_Cochenour-Willans	Cochenour-Willans	5.2	0.4
NS006	Py2_Cochenour-Willans	Cochenour-Willans	5.4	0.5
NS006	Py2_Cochenour-Willans	Cochenour-Willans	5.4	0.4
NS006	Py1a_Cochenour-Willans	Cochenour-Willans	3.6	0.3
NS006	Py1a_Cochenour-Willans	Cochenour-Willans	4.0	0.4
NS006	Py2_Cochenour-Willans	Cochenour-Willans	5.0	0.3
NS006	Py2_Cochenour-Willans	Cochenour-Willans	6.0	0.3
NS009	Py1a_CRL	Campbell-Red Lake	9.2	0.3
NS009	Py2_CRL	Campbell-Red Lake	8.9	0.3
NS009	Py2_CRL	Campbell-Red Lake	8.9	0.3
NS013	Py1a_TK	Tucker's knob	2.2	0.4
NS013	Py1a_TK	Tucker's knob	2.8	0.3
NS014	Py1a_TK	Tucker's knob	2.8	0.3
NS014	Py1a_TK	Tucker's knob	2.7	0.5
NS014	Py1a_TK	Tucker's knob	2.6	0.3
NS014	Py1a_TK	Tucker's knob	2.8	0.5
NS035	Py1a_Bruce Channel	Bruce Channel	0.4	0.4
NS035	Py1a_Bruce Channel	Bruce Channel	1.0	0.3
ND005	Py2_CRL	Campbell-Red Lake	7.5	0.3
ND005	Py2_CRL	Campbell-Red Lake	7.4	0.3
ND005	Py2_CRL	Campbell-Red Lake	7.9	0.4
ND005	Py2_CRL	Campbell-Red Lake	7.7	0.4
ND023	Py2_CRL		7.3	0.4
ND023	Py2_CRL	Campbell-Red Lake	8.0	0.4
ND023	Py2_CRL	Campbell-Red Lake	7.7	0.4
ND023	Py2_CRL	Campbell-Red Lake	7.7	0.3
ND048	Py1b_CRL	Campbell-Red Lake	3.0	0.3
ND048	Py1b_CRL	Campbell-Red Lake	3.7	0.4
ND142	Py1a_CRL	Campbell-Red Lake	3.5	0.5
ND142	Py1a_CRL	Campbell-Red Lake	3.1	0.3
ND142	Py1a_CRL	Campbell-Red Lake	2.2	0.4
ND175	Py3_CRL	Campbell-Red Lake	1.6	0.4
ND175	Py3_CRL	Campbell-Red Lake	1.1	0.4

ND175	Py3_CRL	Campbell-Red Lake	1.3	0.3
ND175	Py3_CRL	Campbell-Red Lake	1.0	0.4
ND175	Py3_CRL		0.5	0.3
ND193	Py2_CRL	Campbell-Red Lake	-2.3	0.4
ND193	Py2_CRL	Campbell-Red Lake	4.2	0.4
ND193	Py2_CRL	Campbell-Red Lake	4.5	0.4
ND211A	Py3_Howey	Howey	1.9	0.3
ND211A	Py3_Howey	Howey	2.6	0.3
ND211A	Py3_Howey	Howey	2.2	0.4
ND211A	Py3_Howey	Howey	2.5	0.4
ND211A	Py3_Howey	Howey	2.5	0.4
ND211A	Py3_Howey	Howey	3.2	0.3
ND-212A	Py1a_Howey	Howey	1.4	0.4
ND-212A	Py1a_Howey	Howey	1.4	0.2
ND-212A	Py1a_Howey	Howey	1.5	0.4
ND-212A	Py1a_Howey	Howey	1.4	0.3
NS005	Py2_Cochenour-Willans	Cochenour-Willans	10.1	0.4
NS005	Py2_Cochenour-Willans	Cochenour-Willans	9.6	0.4
NS005	Py2_Cochenour-Willans	Cochenour-Willans	9.9	0.4
NS005	Py2_Cochenour-Willans	Cochenour-Willans	9.8	0.5
NS005	Py2_Cochenour-Willans	Cochenour-Willans	9.8	0.4
NS012	Py1b_CRL	Campbell-Red Lake	5.5	0.4
NS012	Py1b_CRL	Campbell-Red Lake	6.7	0.3
NS019	Py2_Kaymac	Kaymac	6.0	0.3
NS019	Py1a_Kaymac	Kaymac	5.2	0.5
NS019	Py1a_Kaymac	Kaymac	4.7	0.5

Appendix IV – SEM EDS analysis of selected samples

Sample ID	S_pct	Fe_pct	Co_pct	As_pct
NS001	51.72	42.82	3.58	3.66
NS001	51.82	43.79	2.62	2.58
NS001	52.23	44.32	2.62	2.31
NS001	51.47	43.18	3.02	3.16
NS001	52.41	44.44	2.47	2.31
NS001	50.79	41.49	4.5	4.81
NS006	52.74	46.12	1.22	1.05
ND048	50.93	42.96	3.38	3.8
ND048	50.79	42.74	3.43	3.63
ND048	51.27	42.59	3.58	3.79
ND048	52.7	45.09	1.88	1.55
ND048	51.59	43.4	3.1	3.09
ND048	52.08	43.93	2.87	3.02
ND048	51.04	42.89	3.47	3.54
ND048	51.4	42.85	3.21	3.49
ND048	50.81	42.44	3.65	3.88
ND048	51.2	42.94	3.17	3.33
ND048	51.12	43.07	3.2	3.16
ND048	53.81	44.28	1.97	1.83
ND048	53.45	43.91	2.32	2.09
NS001	52.39	44.59	1.88	1.66
NS002	51.17	42.21	2.44	2.46
NS003	51.85	42.33	3.22	3.57
NS004	52.51	43.55	2.36	2.33
NS005	52.04	42.61	3.3	3.23
NS015	51.89	43.64	2.55	2.11
NS015	52.06	43.89	2.38	2.02
NS015	52.39	44.41	1.55	1.06
NS015	51.73	43.32	2.66	2.1
NS015	51.72	43.43	2.43	2.17
NS015	51.81	43.63	2.76	2.21

NS015	51.46	43.19	2.56	2.32
NS015	51.44	43.62	2.59	2.1
NS015	51.65	43.64	2.25	2.1
NS015	51.68	43.28	2.47	2.37
NS015	52.24	43.85	2.14	1.31
NS015	52.35	44.16	2.29	1.87
NS015	51.58	43.43	2.56	2.31
NS015	51.9	43.65	2.52	1.75
NS006	52.54	44.74	1.62	1.4
NS006	52.54	44.07	2.26	2.35
NS006	48.88	38.69	6.43	9.94
ND073	54.08	45.95	2.62	2.86
ND073	54.75	45.77	2.81	2.15
ND073	54.54	46.1	2.4	2.23
NS005	52.41	44.69	1.7	1.74
NS005	51.69	43.88	2.41	2.4
NS005	51.78	43.82	2.35	2.36
NS005	51.68	43.58	2.44	2.08
NS005	52.48	44.64	1.86	1.73
NS005	52.37	44.16	2.24	1.93
NS005	51.99	43.5	2.28	2.13
NS005	20.67	5.99	25.63	45.63
NS005	20.89	6.22	24.89	46.13

Appendix V – Pyrite LA-ICP-MS Mineral Chemistry

Sample ID	Ag107_ppm	Al_ppm	As_ppm	Au_ppm	Bi_ppm	Ca43_ppm	Cd_ppm	Co_ppm	Cr53_ppm	Cu65_ppm	Fe57_ppm	Gd_ppm
RL-23-NS-001	0.21	201.25	2879.75	0.09	1.23	1072.17	<0.03	1426.4	1.47	49.47	456977.89	1.16
RL-23-NS-001	0.58	21.19	1424.88	0.05	0.98	<108.36	<0.02	2097.36	3.06	3.64	462335.93	0.79
RL-23-NS-001	0.1	481.06	1478.58	0.02	0.47	271.39	0.04	3641.9	<0.46	13.12	459105.47	0.12
RL-23-NS-001	0.38	1270.66	2177.91	0.13	2.43	353.74	0.02	1238.48	2.26	82.66	455557.48	0.61
RL-23-NS-001	0.05	187.26	1459.26	0.01	0.2	<43.35	<0.01	2165.3	<0.18	0.43	461805.93	0.02
RL-23-NS-001	0.13	19.97	727.88	0.03	0.56	<72.11	<0.02	1363.7	0.39	18.9	462767.39	0.04
RL-23-NS-001	0.98	63.25	907.49	0.04	1.57	134.49	<0.01	1543.78	0.58	4.48	461351.77	0.09
RL-23-NS-001	0.17	4.66	1437.5	0.05	1.07	<100.84	<0.02	1505.98	<0.42	3.81	461194.71	0.58
RL-23-NS-001	1.61	599.73	2803.49	0.11	2.68	139.34	0.01	1530.57	1.23	20.57	459009.97	0.67
RL-23-NS-001	0.35	625.66	2935.26	0.03	0.81	<40.36	<0.01	3297.93	0.81	2.85	456677.59	0.08
RL-23-NS-001	0.68	1108.45	2588.23	0.33	4.81	1224.87	0.04	1431.91	1.73	73.45	453560.5	2.08
RL-23-NS-001	0.03	69.26	1962.68	0.02	0.27	<43.07	<0.01	1532.15	0.21	1.41	462634.26	0.04
RL-23-NS-001	0.07	53.02	3688.53	0.01	0.25	<98.14	<0.02	4076.17	<0.39	0.84	459765.64	<0.01
RL-23-NS-001	0.2	681.99	6470.77	0.06	0.87	<39.60	<0.01	6532.46	0.76	2.41	454248.96	0.16
RL-23-NS-001	0.17	380.64	2544.36	0.08	0.96	177.93	<0.01	1811.69	1.65	6.41	457353.41	0.29
RL-23-NS-001	1.23	333.21	1949.42	0.07	1.92	51.89	<0.01	855.12	1.39	5.1	459460.95	0.1
RL-23-NS-001	1.62	110.44	1169.52	0.03	1.93	80.96	0.02	884.54	0.22	6.72	463454.27	0.1
RL-23-NS-001	0.02	165.36	1603.49	0.03	0.31	<42.74	<0.01	2193.52	<0.18	1.78	462366.63	<0.00
RL-23-NS-001	0.05	334.21	972.26	0.03	0.44	<43.77	<0.01	1041	1.13	1.12	462730.1	0.02
RL-23-NS-001	0.18	838.5	686.43	0.06	1.34	1863.34	0.06	619.72	1.42	2.23	459478.45	0.48
RL-23-NS-001	0.07	786.88	2554.11	0.03	0.58	<44.01	<0.01	1848.61	2.97	2.49	460097.07	0.05
RL-23-NS-001	0.04	193.32	1806.75	0.02	0.4	<41.25	<0.01	911.43	1.26	2.59	462236.4	1.43
RL-23-NS-001	0.07	82.09	3628.75	0.04	0.86	2035.67	<0.01	815.87	0.44	3.51	460089.04	0.59
RL-23-NS-001	<0.02	1.45	2041.48	<0.01	0.13	383.75	<0.02	2371.21	<0.45	1.01	462204.93	0.18
RL-23-NS-001	0.33	438.15	1259.94	0.07	1.08	180.54	<0.01	464.66	2.72	3.22	461530.09	0.7
RL-23-NS-001	0.05	137.68	3171.09	0.03	0.44	<116.75	<0.03	1955.11	0.93	5.39	460721.26	0.87
RL-23-NS-001	0.39	12.8	2295.13	0.1	0.68	1159.61	<0.03	2315.94	2.07	6.76	457651.81	0.32
RL-23-NS-001	0.47	14.09	2383.73	<0.02	0.49	<298.37	0.07	2867.53	<1.18	0.71	460094.97	0.47
RL-23-NS-001	0.06	242.02	2426.88	0.02	0.6	382.1	<0.03	1791.71	<0.46	2.76	459817.85	0.88
RL-23-NS-001	1.67	289.85	8897.08	0.31	4.98	363.38	<0.02	6566.71	<0.41	158.54	453479.33	0.23
RL-23-NS-001	3.73	14.58	2539.57	0.05	0.72	<111.21	0.04	2334.39	<0.44	468.08	461778.07	<0.01

Sample ID	Ag107_ppm	Al_ppm	As_ppm	Au_ppm	Bi_ppm	Ca43_ppm	Cd_ppm	Co_ppm	Cr53_ppm	Cu65_ppm	Fe57_ppm	Gd_ppm
RL-23-NS-001	0.07	89.12	2574.81	0.04	0.47	<108.77	<0.02	1751.93	0.54	1.98	461133.56	0.1
RL-23-NS-001b	5.43	26.82	1172.88	3.27	67.73	<187.19	0.53	2021.97	<0.38	1424.28	460596.2	<0.00
RL-23-NS-001b	1.38	<1.33	338.79	0.72	15.25	<186.14	0.53	2844.87	<0.38	58.27	460352.58	0
RL-23-NS-001b	0.81	13.92	435.41	0.45	10.38	<187.98	0.71	3327.54	<0.38	263.91	459111.78	0.01
RL-23-NS-001b	1.48	173.42	464.51	0.58	13.94	321.29	0.14	1841.69	<0.39	90.33	460700.12	0.02
RL-23-NS-001b	1.71	192.13	610.94	0.92	24.27	<183.27	0.12	1725.51	<0.39	143.13	462351.47	0.04
RL-23-NS-001b	1.58	<1.37	380.07	0.83	23.45	<184.92	0.33	1088.3	<0.39	87.29	463413.86	0.01
RL-23-NS-001b	3.35	94.57	893.48	2.3	38.27	<177.69	0.18	905.65	<0.38	541.79	462381.36	<0.00
RL-23-NS-001b	1.85	64.74	804.46	0.97	27.38	<185.28	0.18	1086.53	0.4	174.55	463330.31	0.07
RL-23-NS-001b	1.36	135.09	1109.45	0.23	6.09	514.84	0.13	2300.92	<0.39	74.21	461245.61	0.09
RL-23-NS-001b	3.8	529.97	1269.06	1.47	41.91	<234.36	0.75	1436.6	<0.50	2204.37	459530.3	0.23
RL-23-NS-001b	2.39	113.12	709.38	1.24	24.42	<173.51	0.48	1826.48	<0.37	294	461754.15	0
RL-23-NS-001b	8.14	849.76	2267.34	2.41	50.76	<435.02	0.93	1338.6	<0.95	3659.51	458027.17	<0.00
RL-23-NS-001b	1.41	137.51	661.72	0.73	18.64	<178.67	0.25	1407.39	<0.39	124.88	462748.07	0.06
RL-23-NS-001b	2.22	197.09	967.03	1.02	34.25	<370.26	0.46	861.09	<0.81	990.08	462192.16	0.02
RL-23-NS-001b	1.15	<1.85	460.19	0.58	24.42	<235.69	0.38	954.38	<0.52	128.48	463583.04	<0.00
RL-23-NS-001b	0.41	3.64	181	0.2	8.77	<181.82	0.13	386.43	<0.40	32.38	464652.86	0
RL-23-NS-001b	3.56	10.14	755.48	1.76	43.34	<168.83	0.39	561.21	<0.37	832.57	463270.39	<0.00
RL-23-NS-001b	1.54	<1.49	402.76	1.05	23.17	<185.93	0.21	404.92	<0.41	93.9	464478.19	<0.00
RL-23-NS-001b	0.39	170.76	7257.55	0.28	4.62	<286.74	0.06	6252.06	<0.64	63.16	456779.37	0.03
RL-23-NS-001b	0.32	30.76	227.31	0.17	7.73	<174.95	0.13	527.39	<0.39	20.7	464476.74	0
RL-23-NS-001b	0.94	20.51	329.85	0.37	20.29	<171.02	0.3	460.28	<0.38	50.06	464510.29	<0.00
RL-23-NS-001b	0.33	<1.45	135.63	0.12	8.17	<175.49	0.08	284.05	<0.40	21.62	464976.25	<0.00
RL-23-NS-001b	0.07	26.21	3443.63	0.1	0.57	<180.60	0.03	5139.51	<0.41	15.9	459228.98	0.04
RL-23-NS-001b	3.43	176.84	1382.67	1.79	54.23	<403.07	0.62	866.87	<0.92	71.74	463061.83	0.05
RL-23-NS-001b	0.62	10.6	341.08	0.28	12.19	<168.61	0.09	530.44	<0.39	108.16	464309.28	<0.00
RL-23-NS-001b	2.75	<1.40	666.96	2.38	41.76	<165.54	0.18	1048.04	<0.38	325.48	463394.82	0.01
RL-23-NS-001b	4.53	68.35	791.56	2.42	41.21	<163.48	0.5	674.41	<0.38	862.53	462576.24	<0.00
RL-23-NS-001b	1.39	22.08	397.52	0.88	19.21	<160.51	0.26	957.23	<0.38	118.65	463640.16	<0.00
RL-23-NS-001b	5.7	14.65	1343.35	3.24	66.08	<157.78	0.8	1065.69	<0.37	1048.96	462047.27	<0.00
RL-23-NS-001b	1.31	195.4	653.86	0.69	19.2	<162.97	0.21	564.25	<0.39	84.45	463822.51	0

Sample ID	Ag107_ppm	Al_ppm	As_ppm	Au_ppm	Bi_ppm	Ca43_ppm	Cd_ppm	Co_ppm	Cr53_ppm	Cu65_ppm	Fe57_ppm	Gd_ppm
RL-23-NS-001b	1.9	48.74	681.37	0.93	24.83	<158.08	0.36	745.58	<0.38	371.97	463489.07	<0.00
RL-23-NS-001b	3.18	72.65	828.46	1.7	39.25	<159.07	0.44	839.68	<0.38	165.33	463456.24	0
RL-23-NS-001b	4.04	253.56	1133.27	1.95	50.55	<168.54	0.61	804.85	<0.41	493.01	462426.29	<0.00
RL-23-NS-005	0.23	1209.79	1558.26	0.1	1.52	<45.11	0.02	188.46	3.23	15.68	454413.28	0.85
RL-23-NS-005	0.02	537.94	4754.15	0.04	1.51	<43.07	<0.01	321.08	<0.33	1.43	462435.26	<0.00
RL-23-NS-005	<0.01	<0.10	1849.28	<0.00	<0.00	<44.06	<0.01	310.33	<0.34	0.46	464471.22	<0.00
RL-23-NS-005	0.01	42.16	4861.04	<0.00	0.03	<39.64	<0.01	4392.93	<0.30	0.66	459786.98	<0.00
RL-23-NS-005	0.02	245.53	4455.17	0.05	0.07	<44.92	<0.01	3081.42	0.75	3.53	460089.97	0.65
RL-23-NS-005	<0.01	16.32	990.02	<0.00	0	<41.49	<0.01	175.99	<0.29	0.54	464891.38	<0.00
RL-23-NS-005	<0.01	57.66	2538.05	<0.00	0.01	<42.69	<0.01	626.24	0.38	0.28	463977.1	0.04
RL-23-NS-005	<0.01	59.73	2364.83	0.01	0.11	<42.94	<0.01	907.96	<0.30	0.49	463549	0.36
RL-23-NS-005	<0.01	<0.10	2065.92	<0.00	0.01	<41.07	<0.01	685.4	<0.28	<0.11	464168.56	<0.00
RL-23-NS-005	<0.01	660.59	2176.05	0.02	0.3	<40.55	<0.01	758.72	<0.39	0.43	462310.68	0.3
RL-23-NS-005	0.05	631.57	2619.04	0.21	0.03	<70.52	<0.02	666.29	0.83	1.67	462601.78	0.01
RL-23-NS-005	<0.01	1578.75	2400.16	0.03	0.57	<54.37	<0.02	632.43	4.67	0.93	460077.04	0.18
RL-23-NS-005	<0.01	679.21	3208.02	0.01	0.14	<65.82	<0.02	828.89	0.7	0.95	461293.23	0.1
RL-23-NS-005	0.16	118.15	2241.05	0.09	3.04	<41.70	<0.01	151.53	<0.27	0.85	464316.44	0
RL-23-NS-005	<0.01	28.87	2248.91	0.03	0.14	<45.40	<0.01	410.53	<0.29	1.39	450494.54	<0.00
RL-23-NS-005	0.01	42.06	3334.2	0.01	0.03	307.05	<0.01	277.39	<0.38	2.53	463099.05	<0.00
RL-23-NS-005	<0.01	100.13	3217.74	0.03	0.05	<40.92	<0.01	787.55	<0.39	3.28	463236.68	0
RL-23-NS-005	<0.02	549.06	3282.24	0.05	0.09	<82.49	<0.03	980.85	<0.77	1.44	461862.6	0.64
RL-23-NS-005	0.02	176.8	2021.67	0.06	0.09	<41.52	<0.01	1127.07	0.58	1.87	462896.58	0.61
RL-23-NS-005	<0.01	0.7	3370.64	<0.00	0.05	<41.30	<0.01	2273.74	<0.37	0.67	462229.17	0.01
RL-23-NS-005	<0.01	1.35	2840.62	0.01	0.01	<41.92	<0.01	1718.01	<0.37	0.49	462891.02	0.21
RL-23-NS-005	0.01	12.13	3257.32	0.01	0.02	<40.36	<0.01	1563.99	<0.35	0.99	462841.02	<0.00
RL-23-NS-006	0.06	24.38	978.33	0.02	0.02	<116.07	<0.03	18.73	<0.45	4.47	465092.46	0.02
RL-23-NS-006	0.37	388.1	1354.26	0.23	0.77	<113.02	0.03	32.92	2.04	2.99	462999.12	0.11
RL-23-NS-006	0.28	471.04	1695.41	0.19	0.85	<99.31	<0.02	959.52	2.2	2.91	457515.17	0.12
RL-23-NS-006	<0.08	165.44	3731.68	0.15	1.22	<398.28	<0.09	1743.07	<1.48	3.13	444534.94	0.47
RL-23-NS-006	0.15	507.93	3242.71	0.32	0.7	<137.86	0.04	148.92	1.02	4.14	462564.36	0.49
RL-23-NS-006	0.2	377.06	3167.27	0.43	1.53	<99.95	<0.02	591.04	1.82	14.75	462247.49	0.18

Sample ID	Ag107_ppm	Al_ppm	As_ppm	Au_ppm	Bi_ppm	Ca43_ppm	Cd_ppm	Co_ppm	Cr53_ppm	Cu65_ppm	Fe57_ppm	Gd_ppm
RL-23-NS-006	0.64	514.91	3431.89	0.46	3.52	<259.49	<0.06	1494.26	0.98	6.13	459858.14	0.1
RL-23-NS-006	0.8	413.37	2454.79	1.55	9.39	151.68	0.12	671.67	1.57	319.98	461519.41	0.51
RL-23-NS-006	0.02	473.04	1238.38	0.08	0.22	<100.19	<0.02	546.85	3.36	1	463319.21	0.02
RL-23-NS-006	0.52	150.05	2696.23	0.91	2.08	<88.33	<0.02	1921.77	1.32	6.37	462125.14	0.33
RL-23-NS-006	0.73	684.47	3656.13	1.3	3.67	<85.70	<0.02	1392.01	1.21	22.98	460898.75	0.13
RL-23-NS-006	0.03	6.21	783.95	0.01	0.03	<112.70	<0.02	112.66	<0.43	0.75	465090.77	0.03
RL-23-NS-006	0.07	1013.48	1056.41	0.09	0.16	<188.76	<0.04	250.73	2.6	1.02	462492.9	0.04
RL-23-NS-006	2.05	143.14	1911.22	3.35	15.87	<86.13	0.1	633.78	1.67	51.76	462667.12	0.1
RL-23-NS-006	0.37	370.48	3696.42	0.16	0.89	<95.55	<0.02	1666.51	0.82	1.65	461659.42	<0.01
RL-23-NS-006	0.12	80.39	1726.53	0.07	0.46	<42.23	<0.01	116.17	<0.17	0.39	464402.56	<0.00
RL-23-NS-006	0.04	238.74	2916.42	0.06	0.02	<40.73	<0.01	1.24	1.09	1.2	464120.92	0.01
RL-23-NS-006	0.05	42.97	797.35	0.03	0.05	<41.46	<0.01	26.44	0.58	2.52	465029.21	0.17
RL-23-NS-006	0.09	92.59	3191.81	0.09	0.07	<72.08	<0.02	44.29	<0.29	3.67	464395.74	0.12
RL-23-NS-006	2.3	271.66	748.39	0.04	1.15	335.8	0.09	207.87	1.07	5.81	458987.54	0.33
RL-23-NS-006	<0.02	<0.28	1176.92	<0.01	<0.01	<116.51	<0.03	866.1	<0.44	<0.27	464238.92	<0.01
RL-23-NS-006	0.02	234.63	2752.55	0.04	0.03	112.13	0.02	101.89	0.24	1.06	463938.78	<0.00
RL-23-NS-006	<0.06	744.01	2679.09	0.05	0.07	1534.67	<0.06	300.21	2.35	7.12	458189.07	0.14
RL-23-NS-006	<0.03	0.57	1391.97	0.03	0.02	<123.14	0.04	25.93	<0.47	2.67	465012.48	0.12
RL-23-NS-006	<0.02	<0.26	1507.14	<0.01	<0.01	<109.15	<0.02	32.62	<0.41	1.35	464828.19	0.01
RL-23-NS-006	<0.02	<0.27	1455.42	<0.01	0.01	<111.81	<0.02	0.06	<0.42	2.08	465054.69	3.05
RL-23-NS-006	1.03	285.83	5136.07	2.59	11.88	<91.99	0.11	856.26	1.81	42.32	460726.05	0.05
RL-23-NS-007	0.05	25.6	661.77	0.01	0.32	<49.85	<0.01	7.44	1.05	3.53	464838.23	0.34
RL-23-NS-007	0.02	108.71	2849.41	0.02	1.92	<53.22	0.02	82.67	<0.31	3.31	461129.19	0.01
RL-23-NS-007	0.06	29.81	3060.41	0.13	0.47	<52.04	<0.01	95.63	<0.32	4.01	463678.66	<0.00
RL-23-NS-007	0.72	161.57	0.43	<0.01	4.57	185.47	<0.02	128.08	3.13	4.93	463315.21	0.03
RL-23-NS-008	0.61	1289.65	1154.36	0.46	9.86	467.86	<0.01	78.25	6.12	34.54	456876.83	0.05
RL-23-NS-008	0.15	8.53	2445.37	0.06	2.55	<40.19	<0.01	920.06	<0.16	1.23	461187.74	<0.00
RL-23-NS-008	0.11	54.22	2596.54	0.05	2.34	83.84	<0.01	360.37	0.38	1.29	454268.79	0.01
RL-23-NS-008	0.52	1206.22	2219.26	0.17	24.46	1496.33	<0.01	53.91	11.54	4.01	448034.53	0.03
RL-23-NS-008	0.14	629.56	1054.98	0.02	8.03	<60.78	<0.01	419.46	1.88	1	455361.81	<0.00
RL-23-NS-008	0.37	78.8	2840.9	0.4	5.71	927.27	0.02	532.23	0.28	3.9	457187.26	0.01

Sample ID	Ag107_ppm	Al_ppm	As_ppm	Au_ppm	Bi_ppm	Ca43_ppm	Cd_ppm	Co_ppm	Cr53_ppm	Cu65_ppm	Fe57_ppm	Gd_ppm
RL-23-NS-008	2.15	959.46	1137.11	1.61	16.88	177.92	0.04	666.24	1.09	10.62	452626.01	0.01
RL-23-NS-009	<0.02	1.44	2384.73	<0.01	0.01	<100.66	<0.02	307.11	<0.39	0.29	463909.42	<0.01
RL-23-NS-009	2.67	8.25	1797.3	2.13	0.07	141.41	<0.01	30.05	1.27	4.51	464333.48	0.01
RL-23-NS-009	0.02	0.11	3298.64	2.08	0	<41.96	<0.01	59.97	<0.17	13.62	464219.44	<0.00
RL-23-NS-009	1.07	57.09	223.09	0.71	0.19	155.26	<0.01	15.19	21.21	17.23	464418.69	0.01
RL-23-NS-009	0.59	12.48	519.83	0.66	0.1	26827.09	<0.01	4.2	0.52	9.6	447563.05	0.14
RL-23-NS-009	2.8	72.44	225.94	2.29	0.13	565.44	<0.01	5.87	2.97	190.44	464044.98	<0.00
RL-23-NS-009	0.5	2.7	208.07	0.05	0.04	<41.67	0.23	17.32	0.82	140.76	465174.93	<0.00
RL-23-NS-009	17.8	6.28	2917.96	18.54	0.14	400.98	0.04	37.16	1.42	629.01	463282.74	0.01
RL-23-NS-009	0.05	199.03	2432.14	0.04	0.01	69.9	<0.01	111.43	3.6	3.37	463457.32	<0.00
RL-23-NS-009	0.02	<0.11	2501.84	0	0	<44.69	<0.01	51.82	<0.18	0.17	464268.62	<0.00
RL-23-NS-009	1.53	144.39	284.3	0.41	0.14	288.78	<0.01	10.38	2.55	9.92	464265.41	0.01
RL-23-NS-009	0.12	43.95	2204.54	0.07	0.01	<115.10	<0.02	303.74	11.75	0.78	463710.29	<0.01
RL-23-NS-009	1.53	76.03	371.11	0.54	0.3	95.64	<0.01	15.79	6.01	78.77	464322.46	0
RL-23-NS-009	1.25	18.25	2236.68	0.77	0.06	837.82	<0.01	18.58	5.36	29.94	463715.29	0
RL-23-NS-009	1.87	8.55	1568.83	0.06	0.14	<41.95	0.09	51.05	21.45	11.31	464409.07	0
RL-23-NS-009	1.6	224.34	462.11	0.38	0.61	205.68	0.01	27.39	34.96	12.88	463326.5	0.02
RL-23-NS-009	1.98	127.59	365.94	0.91	0.27	169.57	<0.01	9.92	21.44	15.65	464069.17	0
RL-23-NS-009	0.46	99.95	295.6	0.1	0.1	4992.55	0.02	8.63	4.13	3.47	461570.33	0.09
RL-23-NS-009	0.75	75.13	1127.43	0.21	0.36	7148.91	<0.01	84.17	6.68	19.73	459817.45	0.11
RL-23-NS-009	<0.02	<0.26	1789.38	0.01	<0.01	194.6	<0.02	120.21	0.55	0.33	463629	<0.01
RL-23-NS-009	1.62	156.53	9073.49	7.5	0.08	859.89	<0.02	16.29	21.75	5.49	461405.27	0.03
RL-23-NS-009	3.26	188.28	4450.74	2.3	0.04	<108.15	0.03	90.71	22.87	242.16	462311.27	0.02
RL-23-NS-009	0.05	0.73	4099.17	0.66	0.02	1100.73	0.03	4.05	33.5	1.98	463547.58	0.04
RL-23-NS-009	0.41	1.79	2675.78	0.53	0.02	608.82	<0.01	109.44	1.82	10.11	463482.32	<0.00
RL-23-NS-009	1.1	109.02	524.69	0.46	0.11	3269.37	<0.01	12.84	4.31	6.53	461716.82	0.04
RL-23-NS-009	2.72	1.07	263.83	1.84	0.09	<43.38	0.01	0.89	<0.18	23.41	465302.07	0.01
RL-23-NS-010	18.83	352.25	5367.18	9.19	1.69	<239.21	<0.01	2023.39	7.01	18.56	459196.32	0.12
RL-23-NS-010	<0.02	103.23	5763.24	0.06	0.04	<222.40	<0.01	3797.62	<0.94	<2.79	459311.34	<0.01
RL-23-NS-011	0.24	172.26	8650.4	0.06	0.9	<303.70	<0.01	1299.9	28.53	<3.77	431773.9	0.08
RL-23-NS-011	0.11	1985.99	7528.59	<0.00	0.62	<240.72	0.02	2312.84	135.81	<2.90	450985.75	<0.01

Sample ID	Ag107_ppm	Al_ppm	As_ppm	Au_ppm	Bi_ppm	Ca43_ppm	Cd_ppm	Co_ppm	Cr53_ppm	Cu65_ppm	Fe57_ppm	Gd_ppm
RL-23-NS-011	0.11	1985.99	7528.59	<0.00	0.62	<240.72	0.02	2312.84	135.81	<2.90	450985.75	<0.01
RL-23-NS-011	0.18	165.65	4504.81	0.07	0.74	<309.93	<0.01	1538.45	38.27	<3.56	452062.4	<0.01
RL-23-NS-011	0.07	392.72	5445.3	0.01	0.31	3830.23	<0.01	2828.13	4.97	<2.94	456913.68	0.02
RL-23-NS-011	0.19	586.07	4886.97	0.08	0.56	<369.41	0.02	1620.3	180.67	<3.46	448727.6	<0.01
RL-23-NS-012	1.79	40.63	1498.48	2.45	2.66	<47.62	0.03	31.71	<0.35	23.43	452213.83	<0.00
RL-23-NS-012	5.27	4.33	1286.59	2.45	6.44	<166.50	<0.04	29.15	<1.23	44.13	369211.94	<0.01
RL-23-NS-012	0.15	5.81	4091.88	12.1	0.32	<36.48	0.01	13.93	<0.29	6.1	464085.97	<0.00
RL-23-NS-012	<0.01	0.31	1249.61	0.02	0.06	<39.05	0.01	117.06	<0.31	2.03	464148.99	0
RL-23-NS-012	<0.01	<0.10	149.25	0.02	0.01	<37.60	<0.01	43.78	<0.30	6.25	465196.44	<0.00
RL-23-NS-012	<0.01	<0.10	616.97	0.02	0.01	<39.41	0.02	175.02	<0.32	0.9	463961.83	0.01
RL-23-NS-012	0.06	<0.13	546.25	0.28	0.01	143.41	0.02	35.82	<0.39	6.3	465066.49	<0.01
RL-23-NS-012	0.58	3.41	2835.36	4.67	0.06	<37.97	<0.01	11.77	<0.30	7.02	463458.23	<0.00
RL-23-NS-012	0.32	0.2	1833.94	0.06	1.68	<39.19	<0.01	28.04	<0.31	0.75	461793.13	0.01
RL-23-NS-012	0.06	<0.11	2349.76	0.33	0.01	60.16	<0.01	0.15	<0.34	15.71	464780.8	<0.00
RL-23-NS-012	0.41	<0.18	2176.68	0.55	0.1	1437.09	<0.02	6.18	<0.56	3.08	463268.5	<0.01
RL-23-NS-012	1.14	573.77	770.25	0.92	2.32	<42.21	<0.01	21.43	0.43	18.19	461216.98	<0.00
RL-23-NS-012	0.2	1.44	1315.59	0.31	0.42	<39.86	0.01	39.16	<0.30	5.36	464999.98	<0.00
RL-23-NS-012	<0.01	436.86	626.76	0.07	0.19	207.09	<0.01	43.71	0.37	0.76	464399.13	<0.00
RL-23-NS-012	<0.01	12.7	1215.02	0.05	0.08	<39.36	<0.01	27.41	<0.31	0.89	465075.63	<0.00
RL-23-NS-012	0.11	<0.10	8216.42	11.67	0.06	<36.89	<0.01	5.18	<0.30	92.71	463143.59	<0.00
RL-23-NS-012	0.09	<0.10	783.02	3.51	0.07	<37.57	<0.01	18.1	<0.30	4.63	465198.99	<0.00
RL-23-NS-013	4.33	<1.28	<0.89	<0.00	1.06	<143.44	0.74	521.13	<0.35	1.97	463698.68	0.01
RL-23-NS-013	0.4	8.13	3.01	<0.00	0.66	1797.26	0.08	520.1	<0.39	23.61	462266.43	0.05
RL-23-NS-013	1.78	<1.46	1.5	<0.00	0.21	1161.44	0.15	525.33	0.6	0.95	462722.12	0.07
RL-23-NS-013	0.48	5.79	14.98	<0.00	0.02	<145.02	0.05	362.47	<0.38	3.12	464435.67	<0.00
RL-23-NS-013	1.09	<1.40	3.3	<0.00	1.47	149.73	0.23	730.83	<0.39	16.77	463060.59	0.04
RL-23-NS-013	0.94	<1.39	5.23	0	3.85	<146.81	0.11	622.42	<0.39	65.7	463228.78	0.01
RL-23-NS-013	0.23	11.73	9.22	0	0.22	<145.55	0.16	398.21	<0.39	70.41	460604.47	0.01
RL-23-NS-013	0.1	<1.39	1.34	0	0.74	<146.49	0.01	771.17	<0.39	317.8	462612.23	0
RL-23-NS-013	0.02	314.02	467.99	<0.00	1.12	<166.91	<0.00	46.15	7.09	<0.36	464291.85	0.04
RL-23-NS-013	0.02	272.86	564.02	0	1.63	<160.02	<0.00	158.53	5.99	0.66	464070.14	0.34

Sample ID	Ag107_ppm	Al_ppm	As_ppm	Au_ppm	Bi_ppm	Ca43_ppm	Cd_ppm	Co_ppm	Cr53_ppm	Cu65_ppm	Fe57_ppm	Gd_ppm
RL-23-NS-013	0.02	44.93	474.51	0	0.44	<146.50	0.01	1194.99	1.1	<0.33	463794.96	0.07
RL-23-NS-013	0.03	92.74	286.34	0	0.26	<273.57	<0.00	303.39	<0.75	<0.63	464905.91	<0.00
RL-23-NS-013	0.07	172.07	430.93	0.01	0.68	<169.39	<0.00	15.57	2.72	<0.40	464634.13	0.03
RL-23-NS-013	0.03	16.6	613.6	0	0.52	<182.95	<0.00	194.7	<0.51	<0.44	464851.15	0.07
RL-23-NS-013	0.02	616.74	113.43	0.01	3.27	<147.66	0.01	21.03	8.93	<0.36	463556.83	0.29
RL-23-NS-013	<0.01	53.04	97.89	<0.00	1.07	<194.79	<0.00	256.18	0.99	<0.49	463320.55	0
RL-23-NS-013	0.11	1287.07	101.31	0	5.89	<156.01	0.01	307.85	9.63	0.61	458881.36	0.08
RL-23-NS-013	0.03	7.6	1215.49	0	1.29	473.78	0	55.14	<0.42	<0.39	464129.14	0.19
RL-23-NS-013	0.02	541.73	1037.4	0	2.28	<155.27	<0.00	187.4	4.74	<0.42	463397.63	0.09
RL-23-NS-014	0.27	82.07	0.53	<0.00	0.65	113.57	<0.01	624.1	0.15	1.72	462704.16	0.02
RL-23-NS-014	0.09	0.14	<0.14	<0.00	0.19	110.1	<0.01	636.93	<0.13	270.99	463082.47	0.01
RL-23-NS-014	0.38	2.89	<0.13	0	1.1	366.55	<0.01	791.62	0.19	197.23	460925.53	0.03
RL-23-NS-014	0.71	<0.08	0.18	0	2.3	149.14	<0.01	834.88	<0.12	6.4	460979.18	0.01
RL-23-NS-014	1.08	6.96	0.19	0.01	2.39	223.91	<0.01	905.93	0.61	1796.45	452385.72	0.04
RL-23-NS-014	0.59	9.18	<0.30	0.01	1.4	140.03	<0.02	1202.77	4.29	1459.78	445516.93	0.01
RL-23-NS-014	0.33	0.87	0.29	<0.00	2.37	205.37	0.04	316.49	<0.13	1.19	463569.83	0.01
RL-23-NS-014	1.13	<0.08	0.27	0.01	1.34	<31.10	0.03	597.1	<0.13	3.15	463164.56	0.01
RL-23-NS-014	28.39	0.41	7.36	<0.00	8.41	245.56	0.17	1261.39	0.34	79.21	460864.56	0.02
RL-23-NS-014	0.39	0.08	0.15	0	2.36	<30.62	0.01	469.26	<0.12	0.75	462938.39	0.04
RL-23-NS-014	0.02	<0.08	<0.14	<0.00	0.22	<30.45	0.01	611.23	<0.12	<0.10	463102.93	0.01
RL-23-NS-014	5.78	0.94	<0.17	0.02	3.96	72.82	0.1	115.87	<0.15	1787.19	462980.49	0.04
RL-23-NS-014	0.13	39.35	0.21	<0.00	0.67	117.48	<0.01	446.82	0.47	3.13	462551.29	0.03
RL-23-NS-014	0.19	<0.08	<0.13	<0.00	0.7	<30.45	0.02	674.24	<0.12	0.55	463271.96	0.01
RL-23-NS-014	0.04	<0.07	<0.12	0.01	0.1	95.13	<0.01	1103.23	<0.12	24.24	455614.29	0.01
RL-23-NS-014	1.01	0.14	<0.13	0	1.14	45.05	<0.01	749.19	<0.12	10.45	462849.57	0.01
RL-23-NS-014	0.9	0.14	<0.14	0.01	0.21	<30.86	<0.01	1030.95	<0.13	3.35	461682.98	0.01
RL-23-NS-014	0.35	0.08	<0.13	<0.00	3.06	108.97	<0.01	664.77	<0.12	27.48	463039.05	0.02
RL-23-NS-014	0.16	0.1	<0.14	<0.00	2.02	82.19	<0.01	610.51	<0.13	0.31	463331.58	0
RL-23-NS-014	0.05	1.02	<0.14	<0.00	0.35	47.57	<0.01	638.19	0.42	0.11	463382.47	0.06
RL-23-NS-016	0.02	0.17	4564.84	0.01	0.02	137.63	<0.01	211.84	<0.28	<0.12	463476.44	<0.00
RL-23-NS-016	0.02	487.65	2116.95	<0.01	0.14	<60.09	0.02	24.99	<0.40	0.47	462956.96	<0.01

Sample ID	Ag107_ppm	Al_ppm	As_ppm	Au_ppm	Bi_ppm	Ca43_ppm	Cd_ppm	Co_ppm	Cr53_ppm	Cu65_ppm	Fe57_ppm	Gd_ppm
RL-23-NS-016	0.77	333.65	1835.44	0.28	2.77	101.68	0.02	718.78	0.56	13.58	462607.64	0.15
RL-23-NS-016	<0.01	6.6	3196.45	<0.00	0	<46.66	<0.01	535.88	<0.28	0.16	463431.53	<0.00
RL-23-NS-016	0.06	124.98	1011.19	0.01	0.08	<46.44	<0.01	37.04	1.28	0.47	464449.68	<0.00
RL-23-NS-016	0.02	0.68	2603.79	0.03	0.03	<46.41	<0.01	312.16	<0.28	<0.12	464348.58	<0.00
RL-23-NS-016	0.03	279.1	3188.48	0.01	0.09	<43.76	<0.01	5.91	<0.27	1.85	463334.31	<0.00
RL-23-NS-016	0.08	2.88	2654.71	0.01	0.01	400.87	<0.01	20.84	<0.30	0.18	463324.18	0.01
RL-23-NS-016	0.02	367.38	2965.29	0.02	0.21	<41.35	<0.01	158.32	0.36	0.37	462071.15	<0.00
RL-23-NS-017	0.49	24205.7	<0.43	<0.01	1.55	3191.94	<0.03	478.54	53.24	0.26	398107.45	1.31
RL-23-NS-017	0.3	1511.21	98.02	0.01	0.84	108.32	0.01	89.72	2.39	5.02	457117.71	0.25
RL-23-NS-018	0.02	5.66	525.56	0	0.68	447.38	<0.00	25.18	<0.38	42.66	464373.3	0.01
RL-23-NS-018	0.14	204.18	124.1	0.04	3.59	5194.96	0.02	100.02	<0.39	141.89	459736.39	0.05
RL-23-NS-018	4.4	263.64	1688.62	0.19	12.17	86770.86	0.07	18.62	1.16	57.32	404839.71	0.07
RL-23-NS-018	1.06	1636.32	277.57	0.03	3.94	2290.58	<0.00	62.22	2.02	28.56	456655.34	<0.00
RL-23-NS-018	158.37	1783.29	1272.46	28	5.42	334.58	<0.00	38.92	3.04	6.56	459533.33	0.04
RL-23-NS-018	2.27	966.6	2152.97	0.03	5.79	31629.4	<0.00	934.16	<0.49	1.03	440219.31	0.01
RL-23-NS-018	1.06	89.01	2568.12	0.07	12.33	66584.91	0.2	13.09	<1.38	13.04	418914.66	0.01
RL-23-NS-018	0.18	165.01	2719.98	0.01	0.71	<133.30	<0.00	935.77	0.6	<0.69	462365.23	0
RL-23-NS-018	0.04	17.77	1171.03	0.01	0.42	<122.41	<0.00	3320.4	<0.34	1.11	461715.27	0.04
RL-23-NS-018	0.02	293.77	1851.15	0	0.84	<121.33	0.01	5183.97	<0.34	<0.64	459142.26	0.34
RL-23-NS-018	<0.04	2398.96	3358.22	<0.00	1.11	<470.02	<0.01	6892.81	7.7	<2.47	453250.99	0.07
RL-23-NS-018	0.42	262.91	2424.22	0.01	0.93	<121.16	<0.00	6467.56	0.58	46.46	457811.34	<0.00
RL-23-NS-018	0.33	738.99	1053.91	<0.00	0.56	<213.97	<0.01	2866.34	0.65	<1.13	460727.27	0.03
RL-23-NS-018	0.4	1860.84	602.73	0.04	2.85	2871.05	0.04	1343.2	2.15	48.44	456908.34	0.07
RL-23-NS-018	0.28	295.49	2510.62	0.15	1.69	202.24	0.66	4656.83	<0.33	148.37	458107.06	0.29
RL-23-NS-018	0.22	576.37	1364.94	0	0.41	<120.48	<0.00	2071.62	0.72	<0.64	461465.77	0
RL-23-NS-018	0.03	619.19	3099.85	0.01	0.93	<121.04	<0.00	3275.02	2.03	<0.64	459349.08	0.08
RL-23-NS-018	0.12	1569.72	1819.83	0.04	4.05	4327.84	0.01	79.06	0.46	1.82	457239.5	0.19
RL-23-NS-018	<0.03	631.52	3095.93	0.02	1.61	<339.27	<0.01	355.68	<0.92	<1.79	461698.3	0.09
RL-23-NS-019	0.11	1	658.45	0.02	0.11	<41.13	<0.01	17.7	0.76	1.72	465074.78	0.01
RL-23-NS-019	33.22	20.88	194.84	2.02	0.55	424.04	0.51	93.38	1.49	20.35	463888.41	0.05
RL-23-NS-019	0.74	11.6	1223.22	0.18	0.32	<48.41	<0.01	19.72	11.44	24.4	463257.58	0.08

Sample ID	Ag107_ppm	Al_ppm	As_ppm	Au_ppm	Bi_ppm	Ca43_ppm	Cd_ppm	Co_ppm	Cr53_ppm	Cu65_ppm	Fe57_ppm	Gd_ppm
RL-23-NS-019	0.06	<0.14	309.9	0.01	0.02	<62.29	<0.01	95.5	<0.30	<0.12	465261.67	0.01
RL-23-NS-019	10.64	9.37	229.28	2.75	6.19	<47.52	0.03	98.07	8.03	58.86	462717.58	0.15
RL-23-NS-019	3.44	4.16	1189.53	0.39	7.53	<45.52	0.01	127.32	3.42	6.41	464093.15	0.1
RL-23-NS-019	0.42	14.05	1714.09	0.25	0.39	4001.39	<0.01	31.13	5.69	4.98	460284.81	0.15
RL-23-NS-019	0.32	<0.10	356.08	0.09	0.32	<46.85	<0.01	79.6	<0.30	4.27	465139.28	<0.00
RL-23-NS-019	0.02	0.81	428.06	<0.00	0.07	<61.18	<0.01	155.09	0.85	0.26	464964.63	0.02
RL-23-NS-019	1.63	1.66	196.09	0.48	1.64	2698.31	<0.01	71.54	<0.31	3.42	463362.83	0.08
RL-23-NS-019	2.89	4.54	883.01	0.58	7.79	<50.13	0.04	201.91	1.23	56.53	462068.65	0.2
RL-23-NS-019	3.27	87.35	237.06	0.3	2.14	<100.00	0.22	115.37	1.2	42.48	462714.45	0.17
RL-23-NS-019	3.95	25.48	135.69	0.36	18.69	<41.27	1.59	41.61	0.53	8.81	464648.29	0.01
RL-23-NS-019	1.9	1.15	305.55	0.96	2.46	<50.44	0.03	112.19	0.91	4.86	465083.1	<0.00
RL-23-NS-019	0.37	0.7	351.19	0.07	0.56	110.87	0.02	57.27	1.19	7.67	464825.51	0.07
RL-23-NS-019	0.45	214.07	387.26	0.09	0.69	77.81	0.05	1314.54	2.23	30.3	461978.62	0.06
RL-23-NS-019	1.33	2.57	150.43	0.14	0.42	<41.84	<0.01	76.48	2.28	48.66	464080.89	0.69
RL-23-NS-019	0.08	34.55	848.74	0.02	0.13	41.08	0.03	10.13	<0.29	1.18	464511.5	<0.00
RL-23-NS-019	0.13	0.59	858.31	0.01	0.09	<39.48	<0.01	20.01	0.83	2.9	464604.92	0.02
RL-23-NS-019	2.02	5.05	106.97	0.02	6.81	<40.45	<0.01	14839.8	3.1	2.18	448943.56	0.14
RL-23-NS-019	0.01	<0.10	531.4	<0.00	0.06	<42.71	<0.01	69.24	<0.29	0.26	465032.38	<0.00
RL-23-NS-020	0.28	27.54	82.6	<0.00	1.48	62.17	<0.01	5430.1	<0.32	4.15	459529.99	<0.01
RL-23-NS-020	0.3	0.19	76.92	<0.00	0.16	74.39	<0.01	92.36	<0.30	2.79	464787.99	<0.00
RL-23-NS-020	9.91	3.77	26.37	0.39	85.68	<37.04	<0.01	20275.1	<0.31	4.67	445182.71	<0.00
RL-23-NS-020	0.13	<0.09	419.01	0.03	0	<39.02	<0.01	436.29	<0.35	1.63	464122.43	<0.00
RL-23-NS-020	0.06	0.12	961.9	0.05	4.22	<37.08	<0.01	268.23	<0.35	0.88	464542.97	<0.00
RL-23-NS-021	10.91	96.22	18.97	0.04	2.28	<258.94	<0.00	10638.8	<0.44	0.67	454599.54	0.02
RL-23-NS-021	0.16	271.67	852.96	<0.00	0.93	1391.84	0.03	16401.3	0.97	1.39	447092.36	0.16
RL-23-NS-021	2.32	1180.44	188.18	0.03	1.93	<386.97	0.01	12557	5.54	2.88	449728.06	0.01
RL-23-NS-021	2.56	30.76	37.24	0	2.12	<277.01	0.01	10877	<0.48	0.6	454645.95	0.01
RL-23-NS-021	3.81	4.75	225.53	0.03	1.43	<200.34	0.01	10679.3	<0.35	4.89	454705.08	<0.00
RL-23-NS-021	0.2	607.54	1245.42	0	0.81	<198.50	<0.00	17467.4	1.97	0.29	446543.45	0
RL-23-NS-021	2.59	20.85	195.83	0.02	4.09	<238.69	<0.00	8707.36	<0.43	1.01	455582.9	0.06
RL-23-NS-021	0.38	3.18	1.78	0.01	0.47	<211.47	0.03	4.01	<0.38	210.94	464490.68	<0.00

Sample ID	Ag107_ppm	Al_ppm	As_ppm	Au_ppm	Bi_ppm	Ca43_ppm	Cd_ppm	Co_ppm	Cr53_ppm	Cu65_ppm	Fe57_ppm	Gd_ppm
RL-23-NS-021	0.76	24.13	153.68	0	0.23	<183.40	<0.00	15199.2	<0.34	0.32	450469.03	<0.00
RL-23-NS-021	0.37	<1.31	298.25	<0.00	4.21	4404.77	<0.00	12241.7	<0.36	<0.20	450457.48	0.36
RL-23-NS-021	<0.01	<1.29	56.32	<0.00	<0.00	<189.74	<0.00	15848.4	<0.35	<0.20	450018.9	<0.00
RL-23-NS-024	<0.01	<1.57	35.96	<0.00	0.04	<135.31	0	227.47	<0.36	0.75	464591.41	0
RL-23-NS-024	0.03	<1.62	9.34	0.01	0.66	147.35	<0.00	29.14	<0.39	0.71	465035.64	<0.00
RL-23-NS-024	<0.01	<1.59	4.29	0	0.06	<139.25	0	10.41	<0.39	<0.69	465223.42	0
RL-23-NS-024	<0.01	<1.65	2.86	0	0.08	<143.82	<0.00	18.86	<0.41	<0.71	465274.11	<0.00
RL-23-NS-024	<0.01	<1.53	20.72	0	0.19	<133.64	<0.00	67.18	<0.38	<0.67	464948.21	<0.00
RL-23-NS-024	0.01	<1.54	22.15	<0.00	0.03	<133.98	<0.00	17.84	<0.39	<0.68	465075.68	<0.00
RL-23-NS-024	0.1	136.72	106.66	<0.00	2.99	<131.81	<0.00	344.69	7.34	2.29	463844.15	<0.00
RL-23-NS-024	<0.01	<1.61	25.45	0.01	0.47	<138.47	0	240.32	<0.41	0.88	464421.33	<0.00
RL-23-NS-024	0.21	474.94	52.52	0.03	9.66	<132.89	0	188.64	29.37	1.72	462595.48	0
RL-23-NS-024	<0.01	<1.59	3.36	<0.00	0.02	<134.85	0	5.14	<0.41	0.87	464900.17	<0.00
RL-23-NS-024	0.39	58.11	2.86	0.2	3.46	<130.34	<0.00	262.69	1.83	208.07	464698.67	0
RL-23-NS-024	0.08	1.87	33.15	0.08	4.07	<129.48	0.02	179.9	1.51	66.35	464663.28	<0.00
RL-23-NS-024	<0.01	<1.54	65.64	0.01	0.27	<127.28	0	71.39	<0.41	<0.75	465047.07	<0.00
RL-23-NS-024	<0.01	<1.62	24.84	0	0.54	<132.02	<0.00	165.96	<0.43	0.84	464668.4	0
RL-23-NS-024	<0.01	<1.56	24.89	<0.00	0.01	<125.13	0	253.66	<0.42	<0.79	464331.41	0
RL-23-NS-024	<0.01	<1.57	76.39	<0.00	0.24	<124.49	0	140.66	<0.42	<0.82	464634.44	<0.00
RL-23-NS-024	<0.01	<1.55	25.43	0	0.25	<120.25	<0.00	222.26	<0.42	<0.82	464542.74	<0.00
RL-23-NS-024	<0.01	1.48	17.26	<0.00	0.03	<111.56	<0.00	299.62	<0.40	0.99	464286.06	<0.00
RL-23-NS-024	0.18	34.9	31.5	0.04	5.69	<115.71	<0.00	124.55	<0.42	140.43	464335.46	0.01
RL-23-NS-024	<0.01	<1.53	53.81	<0.00	0.06	<111.93	0	173.35	<0.42	<0.88	464814.86	0
RL-23-NS-024	0.13	31.17	18.75	0.01	2.02	<108.45	<0.00	230.13	2.98	6.47	464453.45	0
RL-23-NS-024	0.39	23.57	1.86	0.16	2.25	<110.96	0	18.26	<0.43	60.59	465130.68	0
RL-23-NS-024	<0.01	<1.55	28.38	<0.00	0.05	<106.96	<0.00	172.05	<0.42	<0.97	464503.44	<0.00
RL-23-NS-024	<0.01	7.32	23.54	<0.00	0.29	<105.90	<0.00	235.32	0.47	<1.01	464635.25	<0.00
RL-23-NS-024	<0.01	1.68	60.31	<0.00	0.31	<99.84	<0.00	227.69	<0.41	<1.00	464170.79	<0.00
RL-23-NS-025	<0.01	<0.10	54.35	<0.00	0.11	<40.95	<0.01	2321.66	<0.26	0.83	461599.65	<0.00
RL-23-NS-025	0.02	0.94	256.87	0.04	1.24	<42.04	<0.01	662.51	<0.25	0.43	463128.67	0.02
RL-23-NS-025	0.11	<0.10	77.48	0.01	2.03	<44.10	0.02	323.94	<0.25	511.05	464291.68	0

Sample ID	Ag107_ppm	Al_ppm	As_ppm	Au_ppm	Bi_ppm	Ca43_ppm	Cd_ppm	Co_ppm	Cr53_ppm	Cu65_ppm	Fe57_ppm	Gd_ppm
RL-23-NS-025	<0.01	<0.10	29.69	<0.00	0.07	<45.80	0.01	807.75	<0.27	0.72	462921.37	<0.00
RL-23-NS-025	0.09	<0.11	700.03	0.01	0.61	<47.86	<0.01	1846.58	<0.28	48.21	461955.43	0.01
RL-23-NS-025	1.14	<0.19	412.24	0.4	2.14	<81.71	<0.02	915.55	<0.47	949.1	462557.32	<0.01
RL-23-NS-025	0.15	154.21	644.79	0.17	10.25	<42.09	<0.01	263.3	7.81	3.51	461609.65	<0.00
RL-23-NS-025	<0.02	124.25	499.58	0.01	3.34	<105.70	<0.03	739.5	<0.62	<0.28	461381.59	0.01
RL-23-NS-025	0.02	104.94	526.96	0.01	3.62	70.08	<0.01	678.77	<0.28	0.42	462287.35	0.02
RL-23-NS-025	0.14	254.49	194.85	0.07	18.51	138.3	<0.01	638.36	0.29	1.05	458663.21	0.04
RL-23-NS-025	0.07	130.83	664.72	0.07	10.05	<44.59	<0.01	828.55	1.45	0.83	462063.6	0.05
RL-23-NS-025	0.01	<0.10	500.5	<0.00	0.07	<41.08	<0.01	7181.43	<0.26	0.24	458093.67	<0.00
RL-23-NS-025	0.38	70.96	261.64	0.01	3.37	<49.23	<0.01	1063.98	<0.29	2.78	462758.81	<0.00
RL-23-NS-025	0.02	1.66	86.66	0.01	0.9	<46.13	<0.01	686.51	<0.28	0.42	463576.2	0.02
RL-23-NS-025	0.12	413.31	291.29	1.77	14	92.04	<0.01	1260.42	<0.27	4.2	461703.33	0.04
RL-23-NS-025	0.04	106.89	85.35	0.07	6.27	<46.55	<0.01	962.48	<0.29	0.55	463044.28	0.07
RL-23-NS-025	0.41	58.42	237.79	0	1.04	<47.53	<0.01	606.06	<0.29	5.23	463375.34	0
RL-23-NS-025	6.12	3954.28	214.97	0.15	22.84	453.9	<0.01	708.88	4.04	126.76	449013.81	1.55
RL-23-NS-025	<0.01	<0.10	429.29	0.01	0.25	<42.40	<0.01	8169.21	<0.26	0.35	457139.61	<0.00
RL-23-NS-025	0.31	956.17	507.19	0.16	14.47	1278.29	<0.02	7360.53	<0.37	323.59	453577.23	<0.01
RL-23-NS-025	0.5	46.47	1340.26	0.02	0.85	<40.66	<0.01	14668	<0.25	5.02	450605.11	<0.00
RL-23-NS-025	0.07	441.92	295.14	0.16	15.3	225.35	<0.01	559.34	<0.27	0.78	462934.49	0.15
RL-23-NS-025	0.43	<0.10	82.59	0.15	47.09	174.42	0.01	698.33	<0.27	4.53	461979.46	0
RL-23-NS-025	0.22	1579.72	192.7	0.17	33.25	1072.42	<0.02	1791.5	<0.50	5.1	444515.11	0.09
RL-23-NS-025	<0.01	<0.10	37.88	0	0.13	<43.08	<0.01	773.97	<0.25	0.7	463048.13	<0.00
RL-23-NS-026	0.12	145.83	331.16	<0.00	0.41	<45.80	<0.01	611.31	<0.29	2.2	463631.81	0.01
RL-23-NS-026	0.23	2.87	14.22	0.04	4.53	<43.53	<0.01	1302.1	<0.31	3.87	463457.62	0.01
RL-23-NS-026	<0.01	24.58	69.63	<0.00	0.02	<41.46	<0.01	828.61	<0.30	0.18	464615.36	<0.00
RL-23-NS-026	<0.01	0.27	2503.74	0.03	0.6	<43.46	0.02	449.77	<0.28	0.28	464141.66	<0.00
RL-23-NS-026	0.38	3.48	1798.26	0.13	8.89	<46.62	0.01	220.7	<0.30	0.18	464687.91	<0.00
RL-23-NS-026	0.29	0.21	257.51	0.04	6.36	<44.45	<0.01	284.57	<0.29	0.56	464960.71	<0.00
RL-23-NS-026	0.12	0.55	839.85	0.05	7.6	<40.76	<0.01	65.02	<0.27	0.79	465160.83	0.01
RL-23-NS-026	0.8	174.11	189.6	0.06	14.18	<42.75	0.04	581.02	1.44	0.66	462824.01	0.08
RL-23-NS-026	0.52	1.13	437.54	0.06	13.05	<42.72	0.02	574.03	<0.29	0.65	464738.96	<0.00

Sample ID	Ag107_ppm	Al_ppm	As_ppm	Au_ppm	Bi_ppm	Ca43_ppm	Cd_ppm	Co_ppm	Cr53_ppm	Cu65_ppm	Fe57_ppm	Gd_ppm
RL-23-NS-026	<0.01	0.15	305.58	0.01	0.51	<44.12	<0.01	111.28	<0.30	0.19	465251.55	<0.00
RL-23-NS-026	<0.01	<0.10	2.93	<0.00	0.02	<42.39	<0.01	69.95	<0.29	0.12	465368.15	0.01
RL-23-NS-026	<0.01	<0.10	63.07	<0.00	0.05	<42.97	<0.01	414.52	<0.30	<0.12	465036.87	<0.00
RL-23-NS-026	<0.01	0.11	124.43	<0.00	0	<42.80	<0.01	214.75	<0.30	<0.12	465208.65	0.01
RL-23-NS-026	0.01	51.08	195.38	<0.00	0.51	<46.14	<0.01	74.89	<0.33	0.16	465272.13	0.01
RL-23-NS-027	0.7	117.7	33.39	<0.00	0.45	778.32	<0.00	563.88	<0.44	1.2	463973.9	0.06
RL-23-NS-027	0.47	536.77	65.72	0.12	17.73	1584.58	0.72	199.8	6.18	4.52	459607.49	0.09
RL-23-NS-027	<0.01	12.79	42.23	0	0.37	<157.97	<0.00	834.26	<0.45	0.5	464533.01	<0.00
RL-23-NS-027	0.07	656.04	52.8	0.02	2	<160.65	<0.00	746.1	<0.46	0.47	462519.07	0
RL-23-NS-027	0.02	<1.95	32.9	<0.00	0.01	<192.81	<0.00	607.93	<0.56	<0.58	464856.29	<0.00
RL-23-NS-027	<0.01	12.2	83.59	<0.00	0.74	<162.33	0	1309.33	<0.47	<0.50	464039.18	0.01
RL-23-NS-027	1.38	765.7	105.88	0.01	4.51	12460.92	<0.00	307.13	1.31	10.9	438546.84	0.96
RL-23-NS-027	6.27	296.94	208.32	0.1	21.99	<136.06	0.27	27546.4	<0.40	0.67	437663.03	1.24
RL-23-NS-027	0.8	1266.28	47.75	0.16	6	<143.98	<0.00	22.49	<0.42	0.86	461905.98	19.71
RL-23-NS-027	0.58	792.26	65.68	0.07	4.05	<342.16	0.02	19.78	<1.00	<1.14	463497.2	0.24
RL-23-NS-027	<0.01	46.03	756.41	0	0.31	<143.53	<0.00	13242.2	<0.42	<0.48	452083.72	0.01
RL-23-NS-027	0.22	437.67	35.58	0.01	3.58	<142.53	<0.00	1346.3	1.71	1.33	462599.05	<0.00
RL-23-NS-027	<0.03	595.8	53.15	<0.00	4.94	6213.24	0.03	1065.75	2.94	<1.32	447969.32	0.02
RL-23-NS-027	0.28	322.42	52.46	0.03	6.94	<158.59	<0.00	770.12	1.29	1.2	463357.61	<0.00
RL-23-NS-027	0.09	<1.61	34.31	0.04	0.2	<156.30	<0.00	400.57	<0.46	<0.56	465064.99	0
RL-23-NS-027	0.14	88	45.77	0.01	2.12	21051.17	<0.00	648.2	<0.48	1.07	450762.49	3
RL-23-NS-027	0.02	337.38	41.02	<0.00	0.47	257.3	0	358.01	<0.42	<0.61	463845.5	<0.00
RL-23-NS-027	<0.01	<1.59	53.78	<0.00	<0.00	<145.86	0.01	375.51	<0.43	0.72	464963.5	<0.00
RL-23-NS-027	0.01	13.9	131.41	<0.00	0.22	<140.41	<0.00	1208.85	<0.41	<0.62	464150.6	<0.00
RL-23-NS-027	0.1	15.59	59.38	<0.00	0.2	<133.58	<0.00	1426.4	<0.39	<0.60	463958.01	<0.00
RL-23-NS-027	1.52	659.33	13.43	0.04	0.9	721.63	<0.00	28068.9	0.7	2.48	436223.5	9.58
RL-23-NS-027	0.04	2.25	79.54	0	1.06	3835.5	0	708.91	<0.41	<0.65	462213.48	0.23
RL-23-NS-027	0.01	<1.42	42.5	0	<0.00	<126.02	<0.00	1835.24	<0.37	<0.59	463664.53	<0.00
RL-23-NS-027	<0.01	10.58	35.59	<0.00	0.11	<138.31	<0.00	359.37	<0.40	<0.66	465082.96	0
RL-23-NS-029	0.26	7.51	102.49	<0.00	0.09	50.15	0.04	18114.6	<0.26	6.2	447450.76	0.03
RL-23-NS-029	1.86	104.92	139.41	0.01	0.86	436.8	0.24	398.12	0.61	52.63	462986.75	0.13

Sample ID	Ag107_ppm	Al_ppm	As_ppm	Au_ppm	Bi_ppm	Ca43_ppm	Cd_ppm	Co_ppm	Cr53_ppm	Cu65_ppm	Fe57_ppm	Gd_ppm
RL-23-NS-029	0.2	743.77	11.31	0.01	1.1	508.26	0.03	199.46	3.37	12.25	460921.06	0.44
RL-23-NS-029	0.19	698.98	5.14	<0.01	1.7	1034.5	0.16	75.89	3.77	63.84	460124.76	1.53
RL-23-NS-029	1.41	490.45	38.37	0.14	2.23	2258.26	0.51	194.52	2.94	859.07	457938.58	0.82
RL-23-NS-029	0.75	249.23	42.91	0.03	0.58	402.62	0.33	188.48	1.4	398.35	462616.83	0.19
RL-23-NS-030	0.44	<1.29	458.49	<0.00	0.04	<83.38	0.04	7383.38	<0.35	178.51	457605.91	<0.00
RL-23-NS-030	0.97	109.98	556.66	<0.00	0.09	<89.64	0.13	1597.93	<0.38	551.26	461789.5	<0.00
RL-23-NS-030	0.07	174.46	12804.43	0	0.5	4001.23	0.01	13956.6	1.71	19.36	439608.54	0.92
RL-23-NS-030	2.75	187.23	4872.79	0	0.3	366.64	0.08	9226.98	2.09	845.72	451137.86	0.14
RL-23-NS-030	0.77	162.42	899.82	<0.00	0.52	1716.85	0.05	9988.99	1.69	56.04	450771.77	0.16
RL-23-NS-032	0.07	75.46	3217.81	0.01	1.7	<122.23	0	1042.33	<0.33	<0.63	462073.57	<0.00
RL-23-NS-032	0.87	<2.47	314.31	0.01	7.55	<208.62	0.01	288.02	<0.56	1.2	460871.21	<0.00
RL-23-NS-032	0.33	53.82	872.7	0.1	12.47	929.65	0.04	821.9	<0.56	2.67	460183.73	0.12
RL-23-NS-032	0.86	25.86	751.14	0.28	30.09	253.9	<0.00	1137.17	<0.34	7.63	452990.21	<0.00
RL-23-NS-034	0.23	356.88	591.57	<0.00	2.83	<47.36	0.02	1875.37	3.44	0.83	460175.62	0.13
RL-23-NS-035	<0.01	<0.10	668.65	<0.00	<40.74	<40.74	<0.01	32.63	<0.16	0.25	463684.21	<0.00
RL-23-NS-035	<0.01	<0.10	384.63	<0.00	<41.12	<41.12	<0.01	220.51	<0.16	0.14	465056.25	<0.00
RL-23-NS-035	<0.01	<0.10	652.93	<0.00	<42.55	<42.55	<0.01	87.95	<0.17	<0.13	464590.92	<0.00
RL-23-NS-035	0.01	1.74	914.14	0	<41.94	<41.94	<0.01	25.44	0.24	0.15	464485.28	<0.00
RL-23-NS-035	0.35	33.55	741.38	0.03	128.9	128.9	<0.01	116.91	<0.17	0.79	462996.15	0
RL-23-NS-035	0.01	0.12	603	0.01	<43.11	<43.11	<0.01	77.02	<0.17	0.44	464559.31	<0.00
RL-23-NS-035	<0.01	<0.11	573.85	<0.00	<42.67	<42.67	<0.01	130.21	<0.17	0.54	464474.8	<0.00
RL-23-NS-035	<0.01	0.14	418.6	<0.00	<43.83	<43.83	<0.01	65.4	<0.18	0.15	464845.5	<0.00
RL-23-NS-035	<0.01	0.89	534.28	<0.00	<40.52	<40.52	<0.01	67.77	<0.16	0.13	465018.92	<0.00
RL-23-NS-035	0.01	<0.10	573.99	<0.00	<40.63	<40.63	<0.01	129.45	<0.16	0.18	464727.86	<0.00
RL-23-NS-035	<0.01	<0.10	384.95	<0.00	<41.97	<41.97	<0.01	64.38	<0.17	<0.13	465022.66	0.01
RL-23-NS-035	<0.01	0.19	491.47	<0.00	<40.47	<40.47	<0.01	333.22	<0.16	0.17	464901.04	<0.00
RL-23-NS-035	<0.01	0.38	1103.09	<0.00	<39.56	<39.56	0.02	26.68	<0.16	0.3	464054.3	<0.00
RL-23-NS-035	0.02	133.68	241.61	<0.00	<40.56	<40.56	0.02	273.11	1.45	0.41	463649.27	0.01
RL-23-NS-035	0.07	6.12	443.74	<0.00	119.48	119.48	<0.01	242.33	<0.18	0.7	462142.46	0.22
RL-23-NS-035	0.01	0.61	248.65	<0.00	601.96	601.96	0.02	93.7	<0.15	0.33	464639.58	0.08
RL-23-NS-035	<0.01	1.34	263.03	<0.00	<38.43	<38.43	<0.01	338.96	<0.16	0.32	464902.15	0.01

Sample ID	Ag107_ppm	Al_ppm	As_ppm	Au_ppm	Bi_ppm	Ca43_ppm	Cd_ppm	Co_ppm	Cr53_ppm	Cu65_ppm	Fe57_ppm	Gd_ppm
RL-23-NS-035	0.02	32.79	247.36	<0.00	<40.22	<40.22	0.03	299.7	0.28	0.39	464384.94	0
RL-23-NS-035	<0.01	0.8	318.8	<0.00	<40.34	<40.34	<0.01	219.79	<0.16	0.21	464991.29	0
RL-23-NS-035	0.02	3.48	211.79	<0.00	<41.55	<41.55	<0.01	219.58	<0.17	0.6	458005.27	<0.00
RL-23-NS-035	<0.01	4.28	243.06	<0.00	<40.04	<40.04	<0.01	307.4	0.2	0.2	464952.39	0
RL-23-NS-035	<0.01	0.13	489.23	<0.00	<40.74	<40.74	<0.01	75.64	<0.17	0.2	464331.63	<0.00
RL-23-NS-035	0.02	8.36	317.53	<0.00	<42.46	<42.46	0.03	317.47	0.32	0.71	464321.22	0
RL-23-NS-035	0.11	32.49	727.09	0.01	<42.31	<42.31	1.1	118.87	0.27	0.77	464349.16	<0.00
RL-23-NS-035	0.14	6.86	898.31	0.01	2017.14	2017.14	<0.01	72.1	1.14	0.88	462178.51	0.26
RL-23-NS-035	<0.01	1.13	619.92	0.01	<41.21	<41.21	<0.01	675.52	<0.16	0.16	464499.73	<0.00
RL-23-NS-035	0.01	0.27	666.22	0	<39.20	<39.20	0.02	51.48	<0.16	0.23	464918.08	<0.00
RL-23-NS-035	<0.01	0.18	1044.63	<0.00	<42.15	<42.15	<0.01	26.65	<0.17	0.77	464169.83	0.01
RL-23-NS-035	0.02	1.02	440.06	<0.00	<42.55	<42.55	<0.01	143.79	0.51	0.81	464695.19	<0.00
RL-23-NS-035	0.03	6.64	540.03	<0.00	<57.52	<57.52	<0.01	110.39	<0.23	0.33	464787.25	0
RL-16ND069	12.58	9.56	149.3	0.04	<0.00	<107.74	<0.02	914.04	<0.43	7.54	463588.67	<0.01
RL-16ND069	1.16	35.69	88.87	<0.00	<0.00	<37.51	0.07	177.63	0.36	5.42	464520.32	<0.00
RL-16ND069	1.06	52.55	165.62	0.01	<0.00	41.88	0.18	106.28	0.22	4.39	463799.72	0.01
RL-16ND069	2.88	305.49	164.09	0.03	0.01	357.21	0.23	224.59	2.7	15.36	463038.88	0.02
RL-16ND069	3.07	<0.08	166.38	0.02	<0.00	78.35	0.41	270.7	<0.12	19.83	463198.7	0.02
RL-16ND069	0.71	0.15	47.64	0.03	0.01	70.06	<0.01	162.69	<0.14	3.5	465015.46	0.03
RL-16ND069	0.26	0.34	24.43	0	<0.00	<36.17	<0.01	109.88	<0.14	1.58	465291.74	<0.00
RL-16ND069	0.25	<0.10	22.42	<0.00	<0.00	<38.40	0.01	113.71	<0.15	2.41	465303.45	0
RL-16ND069	1.21	8.12	26.04	0	<0.00	<37.42	0.03	134.96	<0.15	5.31	465202.86	<0.00
RL-16ND069	5.53	4.2	123.05	0.09	0.02	115.34	0.03	655.28	<0.46	12.75	452238.68	0.13
RL-16ND069	0.26	17.93	4314.61	0.32	0.05	1559.02	0.06	17.56	1.87	64.16	463088.67	<0.01
RL-16ND069	2.44	29.09	2063.45	0.12	0.57	383.26	0.05	210.22	1.87	3.81	460921.42	0.02
RL-16ND069	1.1	249.55	2201.75	0.14	0.11	10682.65	<0.02	258.83	3.9	2.9	456958.37	0.05
RL-16ND069	0.52	0.29	922.89	0.36	0.44	15410.48	0.09	379.37	<0.39	8.21	453932.89	0.21
RL-16ND069	0.85	0.65	149.01	0.13	0.08	1460.7	<0.02	305.73	<0.39	42.2	463961.55	0.01
RL-16ND086	0.09	11.95	4.62	0.03	2.74	<36.41	<0.01	82.52	<0.14	3	465151.93	0
RL-16ND086	0.03	306.66	5.07	0.01	1.5	<36.97	<0.01	343.53	<0.14	0.81	464264.12	1.43
RL-16ND086	1.43	4.13	8.11	0.01	0.14	189.42	0.01	655.32	<0.16	1.25	464100.07	<0.00

Sample ID	Ag107_ppm	Al_ppm	As_ppm	Au_ppm	Bi_ppm	Ca43_ppm	Cd_ppm	Co_ppm	Cr53_ppm	Cu65_ppm	Fe57_ppm	Gd_ppm
RL-16ND086	5.09	620.29	11.54	0.1	6.74	602.41	0.06	255.47	<0.19	6.13	459348.88	0.18
RL-16ND086	0.36	43.08	37.65	0.74	11.03	<40.59	0.02	246.81	<0.16	2.7	464854.39	<0.00
RL-16ND086	0.03	50.52	89.16	0.01	1.85	<38.12	<0.01	14.43	<0.15	1.7	465075.54	<0.00
RL-16ND086	0.03	3.31	16.93	0.04	1.04	93.36	<0.01	382.71	<0.14	2.56	464363.1	<0.00
RL-16ND086	0.16	94.96	72.82	0.07	5.58	4060.77	0.01	108.85	<0.15	4.91	460575.01	0.03
RL-16ND086	1.27	0.82	9.71	0.02	0.07	123.9	0.02	50.28	<0.14	1.21	464680.79	0.2
RL-16ND086	2.14	8.4	16.31	0.04	1.11	106.07	0.04	385.99	<0.14	6.65	463916.41	0.07
RL-16ND086	0.23	55.93	43.28	0.08	2.1	<37.66	<0.01	343.62	<0.15	1.46	463544.18	0.12
RL-16ND086	4.69	79.21	103.8	0.03	0.59	157.41	0.13	141.37	<0.15	2.27	463610.43	0.03
RL-16ND086	1.3	180.39	18.57	0.02	1.62	43.06	<0.01	105.24	<0.14	8.05	464639.59	5.23
RL-16ND086	0.25	29.02	88.01	0.05	1.64	<37.48	<0.01	1253.09	<0.15	4.13	460896.54	<0.00
RL-16ND086	23.58	156.73	121.14	0.14	3.44	142.27	0.06	419.08	<0.16	15.95	462275.36	1.5
RL-16ND086	0.08	26.46	225.08	0.02	1.49	<39.20	<0.01	28.69	<0.15	1.97	465263.43	0.01
RL-16ND086	1.9	18.04	18.17	0.04	2.45	80.42	0.05	327.45	<0.14	14.45	463794.99	0.13
RL-16ND090	0.02	1.84	4.26	<0.01	0.04	1693.04	<0.02	1246.9	<0.38	0.33	461932.73	0.01
RL-16ND090	0.06	105.28	26.97	<0.01	0.16	<101.70	<0.02	613.9	<0.38	<0.25	461094.95	0.01
RL-16ND090	0.21	469.4	719.25	0.02	1.37	161.08	<0.02	653.36	5.6	3.27	460926.73	2.44
RL-16ND090	0.1	1227.35	387.17	0.02	4.8	1294.25	<0.03	804.89	108.41	2.43	436795.88	0.01
RL-16ND102	0.15	13.78	56.19	0.01	0.44	<40.41	<0.01	1017.39	<0.16	141.46	463341.65	0.01
RL-16ND102	0.38	24.75	178.6	0.04	1.28	656.73	0.04	11.48	0.22	530.64	453476.66	0.02
RL-16ND102	3.37	4.68	<0.31	0.01	0.57	<64.69	0.03	1291.92	<0.25	2.67	464180.2	0.02
RL-16ND102	0.05	106.4	959.49	0.03	0.73	<38.13	<0.01	16.41	11.53	4.59	456392.07	0.01
RL-16ND102	0.22	34.02	294.46	0.03	1.06	36.82	0.03	63.41	<0.14	169.24	457958.24	0.01
RL-16ND102	0.03	57.62	72.3	0.06	0.85	38.33	<0.01	32.38	0.25	5.16	463210.28	0.01
RL-16ND102	0.18	53.38	5.42	0	0.28	<41.69	<0.01	303.74	0.31	410	464691.82	<0.00
RL-16ND102	0.08	53.2	41.14	0.01	0.48	<45.51	<0.01	67.03	<0.18	5.64	464310.4	<0.00
RL-16ND102	0.04	126.1	1061.9	0	0.38	131.12	0.01	47.39	<0.14	5.2	462244.56	0.01
RL-16ND102	0.3	312.42	31.58	0.02	1.82	230.48	0.02	105.67	0.67	6.53	462921.77	0.02
RL-16ND102	1.35	12.39	<0.31	<0.00	0.26	717.63	0.02	1429.59	<0.26	0.67	463176.29	0.01
RL-16ND102	1.45	42.26	<0.27	<0.00	0.44	1893.83	0.06	1407.3	0.29	1.01	461658.87	0.02

Sample ID	Ag107_ppm	Al_ppm	As_ppm	Au_ppm	Bi_ppm	Ca43_ppm	Cd_ppm	Co_ppm	Cr53_ppm	Cu65_ppm	Fe57_ppm	Gd_ppm
RL-16ND102	0.05	1.46	434.7	0.01	0.35	82.33	<0.01	305.65	<0.14	42.01	461106.36	<0.00
RL-16ND102	0.07	53.72	82.84	0.02	1.71	109.1	<0.01	392.47	0.68	40.78	446976.47	<0.00
RL16ND005	<0.01	0.21	2.21	<0.00	<0.00	<59.82	<0.01	17863.2	<0.35	<0.38	465000	<0.01
RL16ND005	<0.01	<0.13	<0.37	<0.00	<0.00	<45.19	<0.01	18.16	<0.28	<0.29	465000	<0.00
RL16ND005	<0.01	0.18	0.42	<0.00	<0.00	<55.51	<0.00	52.81	<0.24	<0.26	465000	<0.00
RL16ND005	0.34	5671.55	2.43	0.15	1.04	1146.65	0.07	17405	9.28	267.39	465000	0.26
RL16ND005	1.88	0.74	6.62	0.19	0.21	15627.75	0.03	536.36	<0.43	810.87	465000	0.13
RL16ND005	0.09	323.92	13.94	0.07	0.16	103.1	<0.02	4665.19	0.41	0.96	465000	<0.00
RL16ND005	1.99	0.4	19.26	0.06	0.12	128.64	<0.06	10.27	<0.61	957.85	465000	<0.00
RL16ND005	0.02	<0.24	<0.54	0.01	0.09	<68.91	0.04	274.02	<0.46	<0.85	465000	<0.01
RL16ND005	0.45	3.95	<0.49	0.01	0.09	20437.74	<0.01	77.47	<0.39	78.17	465000	0.05
RL16ND005	2.95	<0.17	<0.41	0.08	0.06	<57.53	0.03	2.6	<0.34	2196.68	465000	<0.00
RL16ND005	0.08	<0.17	8.34	<0.00	0.06	156.57	<0.02	191.09	<0.53	24.26	465000	0.01
RL16ND005	0.76	<0.25	<0.66	0.02	0.05	<78.37	0.03	71.8	<0.60	873.58	465000	<0.00
RL16ND005	0.02	<0.27	<0.75	0.02	0.04	<72.85	0.04	235.04	<0.64	1.25	465000	0.01
RL16ND005	<0.01	<0.10	1.61	0.02	0.04	<45.62	<0.01	12186.2	<0.23	1.18	465000	0.01
RL16ND005	0.03	<0.13	<0.40	0.02	0.02	<38.49	<0.01	72.84	<0.29	<0.35	465000	<0.00
RL16ND005	0.49	<0.15	2.41	0	0.01	<52.70	0.06	14.19	<0.37	421.48	465000	<0.00
RL16ND005	0.02	<0.16	1.1	0.06	0.01	<47.25	<0.01	461.71	<0.37	0.41	465000	<0.00
RL16ND005	<0.01	<0.12	<0.37	0	0	<32.15	<0.02	14.57	<0.30	<0.29	465000	<0.00
RL16ND023	0.02	<0.18	1.12	0	<0.00	<41.10	<0.00	11.69	<0.38	3.55	465000	<0.00
RL16ND023	0.69	25.02	788.48	0.08	1.53	<32.69	0.03	864.1	5.44	1.48	465000	0.31
RL16ND023	0.49	4.14	38.93	0.14	1.43	41.31	<0.02	14.43	1.92	2.44	465000	<0.00
RL16ND023	0.51	2.35	707.95	0.03	0.89	200.67	<0.01	703.15	0.58	1.94	465000	39.51
RL16ND023	0.48	1.69	212.59	0.04	0.7	<41.88	<0.00	46.04	1.26	1.19	465000	<0.00
RL16ND023	0.08	65.09	12.24	0.15	0.64	<49.39	0.02	59.37	20.22	6.14	465000	0.48
RL16ND023	0.08	0.25	43.7	0.03	0.39	<34.95	<0.00	22.47	<0.42	1.79	465000	<0.00
RL16ND023	0.04	<0.17	17.77	0.06	0.25	<38.66	0.05	11.01	16.48	0.69	465000	<0.00
RL16ND023	0.08	0.26	1237.74	0.03	0.19	<31.58	<0.01	924.73	1.81	0.72	465000	<0.00
RL16ND023	0.12	1.63	262.52	0.01	0.16	<39.35	<0.01	257.59	1.36	1.39	465000	<0.00
RL16ND023	0.05	<0.14	36.33	0.04	0.16	<28.36	0.01	54.58	<0.24	0.72	465000	<0.00

Sample ID	Ag107_ppm	Al_ppm	As_ppm	Au_ppm	Bi_ppm	Ca43_ppm	Cd_ppm	Co_ppm	Cr53_ppm	Cu65_ppm	Fe57_ppm	Gd_ppm
RL16ND023	<0.01	3.43	2.16	0.01	0.14	<55.76	<0.01	3.61	<0.42	0.8	465000	<0.00
RL16ND023	0.04	0.75	7.64	0.03	0.11	<23.33	<0.01	2.45	0.54	0.89	465000	<0.00
RL16ND023	0.01	0.62	118.04	0	0.11	<32.80	<0.01	29.93	<0.28	0.67	465000	<0.00
RL16ND023	0.02	<0.14	33.9	0.02	0.09	<31.71	<0.01	5.38	0.33	<0.17	465000	<0.00
RL16ND023	0.03	<0.14	8.86	0.03	0.08	<45.35	0.01	6.96	1.26	0.61	465000	<0.00
RL16ND023	0.01	<0.15	10.03	0.01	0.05	<32.69	<0.00	6.55	<0.38	1.5	465000	<0.00
RL16ND023	<0.01	<0.16	9.46	0.07	0.02	<52.25	<0.00	3.36	0.66	1.06	465000	0.01
RL16ND023	<0.01	<0.12	73.1	<0.00	0.02	<43.42	<0.00	748.53	<0.30	0.25	465000	<0.00
RL16ND023	0.01	0.17	0.84	0	0.02	<39.22	<0.01	0.87	0.71	0.49	465000	<0.00
RL16ND023	<0.01	<0.15	11.84	0	0	<33.60	<0.01	3.93	<0.31	<0.21	465000	<0.00
RL16ND023	<0.01	0.26	0.76	0	0	<34.01	<0.00	2.69	<0.30	0.4	465000	<0.00
RL16ND029	0.28	34.81	<0.29	0	10.77	<27.26	0.02	551.95	0.3	0.43	465000	0.6
RL16ND029	0.11	18.66	<0.30	0	3.26	40.42	<0.00	426.77	0.31	1.86	465000	0.23
RL16ND029	0.4	5.05	0.9	0.01	3.22	<41.38	<0.01	567.89	<0.30	12.38	465000	0.1
RL16ND029	0.53	63.85	79.64	0.03	2.65	120.09	0.02	1012.74	0.98	0.79	465000	0.22
RL16ND029	0.13	1.36	<0.29	0	2.31	<33.68	<0.01	625.01	<0.22	0.55	465000	0.1
RL16ND029	0.14	1524.31	1.63	<0.00	1.82	<51.90	0.05	94.9	5.85	230.73	465000	0.09
RL16ND029	0.09	0.48	1.72	0.01	1.45	<38.67	<0.01	531.85	<0.24	0.59	465000	0.09
RL16ND029	0.22	53.45	1.85	0.01	1.18	30.09	0.05	1132	1.05	6.92	465000	0.66
RL16ND029	0.06	30.73	<0.30	<0.00	0.84	32.01	<0.00	412.62	0.29	<0.25	465000	0.27
RL16ND029	0.02	0.59	2.27	<0.00	0.73	<33.87	0.01	248.8	0.27	0.58	465000	0.07
RL16ND029	0.03	2.14	1.49	<0.00	0.71	<55.10	0.02	390.85	<0.29	16.43	465000	0.03
RL16ND029	0.08	0.64	1.38	<0.00	0.67	<31.99	<0.00	425.19	<0.24	<0.21	465000	0.13
RL16ND029	0.06	3.19	2.16	<0.00	0.63	<35.18	<0.01	428.44	5.96	0.24	465000	0.14
RL16ND029	0.01	8.08	0.49	0	0.61	<36.82	<0.01	384.8	<0.35	<0.29	465000	0.08
RL16ND029	0.17	30.64	<0.31	<0.00	0.55	<49.19	<0.01	468.63	0.34	<0.25	465000	0.24
RL16ND029	0.45	1.12	0.73	<0.00	0.47	<35.31	<0.01	390.96	<0.25	3.74	465000	0.27
RL16ND029	0.05	4	0.36	<0.00	0.39	<31.35	<0.00	404.2	<0.23	<0.25	465000	0.12
RL16ND029	<0.01	1.66	0.49	<0.00	0.34	<35.19	<0.01	302.58	<0.31	<0.20	465000	0.11
RL16ND029	0.04	25.61	1.09	<0.00	0.27	57.35	0.03	506.5	<0.30	<0.27	465000	0.1

Sample ID	Ag107_ppm	Al_ppm	As_ppm	Au_ppm	Bi_ppm	Ca43_ppm	Cd_ppm	Co_ppm	Cr53_ppm	Cu65_ppm	Fe57_ppm	Gd_ppm
RL16ND029	0.22	69.66	0.63	0	0.17	<35.41	0.03	455.09	<0.23	1.95	465000	0.12
RL16ND029	0.1	0.22	3.86	<0.00	0.17	<30.69	<0.01	445.65	0.23	<0.25	465000	0.09
RL16ND039	<0.02	<0.61	77.34	0.02	<0.01	295.15	<0.03	30.91	<0.75	<0.26	465000	0.02
RL16ND039	<0.01	<0.28	41.28	0	<0.00	<47.64	<0.02	152.56	<0.39	0.14	465000	0.01
RL16ND039	0.05	<0.30	1455.91	<0.00	<0.00	<34.57	<0.01	248.87	<0.44	<0.14	465000	<0.00
RL16ND039	<0.03	<0.45	59.76	0	<0.00	<74.88	0.03	56	<0.68	<0.19	465000	<0.00
RL16ND039	<0.02	0.48	15608.87	<0.00	<0.00	<43.48	<0.02	1541.44	<0.44	0.19	465000	<0.00
RL16ND039	<0.02	<0.28	3132.24	<0.00	<0.00	<37.65	<0.01	1132.03	<0.44	<0.14	465000	0.01
RL16ND039	0.03	<0.23	3.38	0	<0.00	<38.88	<0.03	328.72	<0.43	0.27	465000	<0.00
RL16ND039	<0.02	<0.27	354.04	<0.00	<0.00	<53.61	<0.02	129.47	<0.46	<0.17	465000	<0.00
RL16ND039	18.9	<0.33	3407.71	3.17	0.05	614.1	0.12	1418.5	<0.47	278.96	465000	0.07
RL16ND039	7.87	814	603.7	1.52	0.04	<46.80	0.03	152.26	14.9	11.08	465000	<0.00
RL16ND039	0.11	1097.12	7100.8	0.04	0.04	545.02	0.04	1993.24	<0.42	0.5	465000	<0.00
RL16ND039	0.57	23.63	8538.69	0.17	0.02	<51.42	0.02	614.56	<0.38	0.4	465000	<0.00
RL16ND039	0.63	<0.36	2964.27	0.1	0.02	1993.85	<0.03	472.43	<0.48	1.96	465000	0.06
RL16ND039	0.08	<0.63	1864.63	0.01	0.01	<101.23	<0.03	999.43	<0.74	<0.29	465000	<0.00
RL16ND039	0.04	6.02	4791.42	0.01	0	<46.60	<0.03	731.15	<0.42	<0.12	465000	<0.00
RL16ND039	0.05	<0.25	1292.3	0.01	0	<47.13	<0.02	413.51	<0.33	<0.15	465000	<0.00
RL16ND042	7.68	916.72	289.06	0.11	3.92	11439.8	0.12	2258.89	83.24	31.56	465000	0.38
RL16ND042	3.28	2978.56	24.51	<0.00	0.66	1499.32	<0.03	639.33	1.9	<1.04	465000	<0.01
RL16ND042	2.65	<0.13	26.48	<0.00	0.07	2873.66	<0.01	805.84	0.55	7.45	465000	0.07
RL16ND048	1.65	226.28	1449.16	1.07	1.16	413.13	0.35	555.96	18.95	2666.24	465000	<0.00
RL16ND048	0.39	184.33	9318.56	0.45	0.66	1879.36	<0.02	332.16	1.38	146.49	465000	0.04
RL16ND048	1.05	5.5	658.79	0.18	0.46	<47.66	0.03	473.62	0.76	28.42	465000	<0.00
RL16ND048	2.47	201.28	9718.52	0.1	0.38	923.62	<0.03	81.36	13.86	25.07	465000	0.03
RL16ND048	0.21	0.36	8797.37	0.14	0.3	<57.20	<0.03	1565.34	<0.47	99.91	465000	0.02
RL16ND048	1.04	3.38	7128.24	0.1	0.27	1440.36	<0.02	6731.59	<0.52	16.71	465000	<0.00
RL16ND048	0.39	15.88	671.81	0.12	0.13	<36.14	0.1	323.8	1.77	454.43	465000	<0.00
RL16ND048	<0.02	48.18	4.13	<0.00	0.08	221.5	<0.02	58.79	4.06	0.79	465000	<0.00
RL16ND048	0.71	2.79	952.42	0.03	0.07	<51.69	<0.03	207.05	<0.42	1884.6	465000	<0.00
RL16ND048	172.41	3030.99	316.08	0.1	0.06	5470.62	3.62	112.59	20.85	1079.96	465000	0.42

Sample ID	Ag107_ppm	Al_ppm	As_ppm	Au_ppm	Bi_ppm	Ca43_ppm	Cd_ppm	Co_ppm	Cr53_ppm	Cu65_ppm	Fe57_ppm	Gd_ppm
RL16ND048	47.77	107.89	16.77	0.01	0.02	972.3	0.19	41.8	<0.80	141.21	465000	0.1
RL16ND048	0.02	<0.28	10287.22	0.01	0.02	<59.67	0.28	7503.96	<0.41	2.93	465000	<0.00
RL16ND048	<0.03	<0.47	1577.56	<0.00	0.01	<102.26	<0.05	828.96	0.85	<0.27	465000	<0.00
RL16ND048	<0.02	17.79	921.5	0.02	0.01	<75.45	0.04	84.87	<0.49	1.82	465000	<0.00
RL16ND058	0.22	1.27	1.78	<0.00	<0.00	<57.18	<0.02	4.57	<0.29	<0.13	465000	0.04
RL16ND058	1.68	7.52	0.96	0.31	<0.00	6583.51	<0.02	9.61	<0.31	0.34	465000	0.36
RL16ND058	<0.02	3.87	1486.58	<0.00	<0.00	<67.04	<0.01	153.42	<0.44	<0.23	465000	<0.00
RL16ND058	0.14	2.15	<0.36	0.01	<0.00	<52.26	<0.02	3.74	<0.35	<0.13	465000	0.02
RL16ND058	0.86	<0.27	11.01	0.29	0.07	<59.80	<0.03	79.69	<0.35	0.27	465000	0.01
RL16ND058	0.81	7194.55	3763.64	0.03	0.03	182.19	<0.02	351.47	4.11	0.96	465000	0.08
RL16ND058	0.18	191.01	1036.47	0.22	0.03	<70.36	<0.03	186.41	<0.68	<0.21	465000	<0.00
RL16ND058	1.27	2433.18	13.18	0.03	0.02	<254.04	<0.05	16.14	6.04	<0.52	465000	0.05
RL16ND058	0.37	180.84	470.45	0.01	0.02	<69.64	<0.03	97.11	<0.59	0.44	465000	2.3
RL16ND058	0.55	558.35	25758.13	0.11	0.02	<70.18	0.03	16741.6	1.57	0.32	465000	0.11
RL16ND058	0.4	477.3	3699.96	0.01	0.02	<102.89	<0.04	202.36	<0.98	0.4	465000	<0.00
RL16ND058	0.32	206.76	1989.43	0.02	0.01	<88.05	<0.04	213.45	<0.91	<0.42	465000	<0.00
RL16ND058	0.25	16.15	86.73	0.02	0.01	<52.14	<0.02	872.92	<0.49	0.19	465000	<0.01
RL16ND058	122.79	21.41	2101.62	7.87	0.01	<113.88	<0.03	100.14	<0.90	<0.32	465000	<0.02
RL16ND058	0.09	15.84	11372.9	0.01	0	<79.20	<0.03	198.77	<0.54	<0.24	465000	<0.01
RL16ND065	<0.02	<0.29	2.79	<0.00	<0.00	<52.52	<0.02	56.69	<0.35	<0.13	465000	<0.00
RL16ND065	<0.01	<0.28	121.05	<0.00	<0.00	<54.62	<0.01	8896.53	<0.40	<0.12	465000	<0.00
RL16ND065	<0.01	0.37	10.88	0	<0.00	<53.80	<0.03	194.96	<0.37	0.3	465000	<0.00
RL16ND065	0.13	0.63	54	0.04	1.03	<54.60	<0.01	10333.3	<0.41	0.8	465000	<0.00
RL16ND065	11.46	353.72	64.84	<0.01	0.1	121.73	<0.03	317.93	14.68	148.71	465000	31.03
RL16ND065	0.31	1184.64	369.42	0.03	0.09	<146.24	<0.07	94.29	18.59	196.15	465000	0.4
RL16ND065	0.6	0.49	4.72	0	0.08	<75.44	<0.03	174.93	<0.57	13.04	465000	0.01
RL16ND065	2.82	23.58	8.78	0	0.05	<46.82	<0.02	284.21	0.66	38.46	465000	0.01
RL16ND065	0.61	0.35	6.44	0	0.04	<55.79	<0.03	239.5	<0.31	0.57	465000	<0.00
RL16ND065	1.77	3.48	30.1	<0.00	0.04	<52.74	0.08	352.01	<0.60	11.52	465000	<0.00
RL16ND065	0.85	300.4	216.63	0.02	0.02	<76.71	0.38	101.85	12.57	191.01	465000	0.02
RL16ND065	4.62	127.39	182.91	0	0.02	<134.73	0.3	204.28	4.91	281.46	465000	0.05

Sample ID	Ag107_ppm	Al_ppm	As_ppm	Au_ppm	Bi_ppm	Ca43_ppm	Cd_ppm	Co_ppm	Cr53_ppm	Cu65_ppm	Fe57_ppm	Gd_ppm
RL16ND065	0.43	163.61	34.44	<0.00	0.01	<103.59	<0.06	202.91	3.85	45.14	465000	3.2
RL16ND065	0.61	1.42	80.55	<0.00	0.01	<46.10	0.25	98.87	<0.44	4.59	465000	0.03
RL16ND065	1.58	2.19	10.51	<0.00	0.01	<40.86	<0.02	285.53	<0.36	11.88	465000	0.02
RL16ND065	2.5	10.84	14.4	0.01	0	<43.67	0.06	285.46	0.88	14.27	465000	0.12
RL16ND065	0.1	3.84	10.05	0	0	<39.84	0.12	55.58	<0.28	7.16	465000	0.13
RL16ND065	<0.02	<0.35	1.98	<0.01	0	<49.53	<0.03	45.76	<0.49	<0.17	465000	0
RL16ND070	5.79	<0.27	908.43	1.68	10.85	<51.07	<0.03	2026.66	<0.40	29.54	465000	<0.00
RL16ND070	3.28	<0.50	15161.82	0.42	2.49	190.44	0.76	787.31	<0.81	3588.17	465000	<0.00
RL16ND070	1.15	<0.40	57061.78	0.26	2.45	115.58	<0.03	1230.27	<0.62	31.16	465000	0.01
RL16ND070	2.62	<1.83	1951.71	0.18	1.37	651.58	<0.22	119.16	29.22	59	465000	<0.01
RL16ND070	1.69	<0.55	21058.79	0.23	1.17	<76.30	<0.03	3150.78	<0.70	53.72	465000	<0.01
RL16ND070	0.4	37.15	13682.46	0.11	1.11	<99.45	<0.03	17.04	88.88	19.71	465000	<0.00
RL16ND070	3.41	<0.29	5424.55	0.18	0.73	316.18	<0.02	5845.91	<0.42	242.31	465000	0.02
RL16ND070	2.4	<0.31	10697.82	0.31	0.62	<54.38	0.17	691.91	<0.50	1078.53	465000	<0.00
RL16ND070	2.57	17.35	2854.55	0.14	0.36	<52.37	0.24	6030.27	63.07	959.35	465000	0.01
RL16ND070	5.81	136.98	1481.82	0.52	0.26	315.09	<0.01	1617.9	1166.3	185.18	465000	<0.00
RL16ND070	0.04	<0.40	993.88	0	0.02	<65.16	<0.02	750.01	<0.46	91.53	465000	<0.00
RL16ND070	<0.01	<0.26	1219.74	0	0.02	<44.98	<0.02	336.55	<0.38	<0.13	465000	<0.00
RL16ND073	0.83	1294	407.64	0.28	4.63	122.16	<0.05	6496.61	139.03	8.34	465000	<0.00
RL16ND073	1.67	<0.43	48240.68	0.12	4.21	<90.03	0.08	5658.35	2.25	374.16	465000	<0.00
RL16ND073	1.22	<1.02	64076.59	0.1	3.98	<194.55	<0.08	7008.64	<1.59	1.53	465000	<0.02
RL16ND073	3.84	12.48	11608.05	0.26	2.01	<87.59	<0.07	3071.88	50.58	4.59	465000	<0.00
RL16ND073	2.32	<0.23	305.14	0.01	0.16	<61.95	0.02	2305.53	0.75	15.37	465000	<0.00
RL16ND073	0.79	<0.60	4.6	0.03	0.07	<105.38	<0.08	97.31	<0.99	751.54	465000	<0.01
RL16ND073	0.49	24.62	9.88	<0.00	0.06	<91.30	<0.08	4.66	7.79	15.94	465000	<0.00
RL16ND073	<0.01	0.29	7378.94	<0.00	0.02	<55.18	0.02	950.76	<0.30	<0.13	465000	<0.00
RL16ND073	1.34	707.93	436.49	0.37	0.01	1163.78	<0.05	164.96	16.77	228.68	465000	0.02
RL16ND073	<0.02	<0.27	1012.56	<0.00	0.01	<53.84	<0.04	61.71	<0.34	<0.15	465000	<0.00
RL16ND073	<0.01	<0.24	5.86	0.01	0.01	<58.87	<0.02	7277.31	<0.37	<0.15	465000	<0.00
RL16ND073	<0.02	<0.22	700.11	<0.00	0	<43.61	<0.01	68.46	0.37	<0.13	465000	<0.00
RL16ND076	<0.01	<0.42	2659.91	<0.00	<0.00	<47.78	0.02	547.66	<0.44	<0.16	465000	<0.00

Sample ID	Ag107_ppm	Al_ppm	As_ppm	Au_ppm	Bi_ppm	Ca43_ppm	Cd_ppm	Co_ppm	Cr53_ppm	Cu65_ppm	Fe57_ppm	Gd_ppm
RL16ND076	<0.03	<0.55	1673.02	<0.00	<0.00	<74.76	<0.04	928.67	<0.67	3.92	465000	<0.00
RL16ND076	<0.02	<0.35	3142	<0.00	<0.00	<46.05	<0.02	630.16	<0.49	<0.17	465000	<0.00
RL16ND076	<0.01	<0.34	237.15	<0.00	<0.00	<42.41	<0.03	245.02	<0.41	1.66	465000	0.01
RL16ND076	0.43	487.92	7289.75	0.58	0.77	167.39	0.14	415.78	4.61	293.71	465000	0.24
RL16ND076	0.16	2538.68	1919.61	0.39	0.52	356.88	0.37	679.41	12.8	106.51	465000	0.16
RL16ND076	0.08	5512.35	2078.35	0.17	0.47	540.74	0.03	916.57	35.07	24.35	465000	0.05
RL16ND076	0.04	201.37	1530.93	0.91	0.28	84.33	<0.02	560.18	11.86	19.23	465000	0.01
RL16ND076	0.03	2500.81	2153.45	0.03	0.24	512.41	0.69	259.35	50.87	69.53	465000	0.1
RL16ND076	<0.03	1480.2	2898.95	0.17	0.22	210.56	<0.06	819.4	14.25	19.3	465000	0.09
RL16ND076	0.02	812.51	6615.06	0.18	0.22	860.42	<0.02	4483.31	4.81	30.46	465000	0.05
RL16ND076	<0.02	1817.43	3098.61	0.1	0.22	217.38	<0.03	992.46	10.05	17.68	465000	0.05
RL16ND076	<0.02	16029.5	6043.59	0.09	0.2	2552.18	0.05	2385.54	38.73	65.27	465000	0.06
RL16ND076	0.02	184.5	3350.28	0.06	0.13	<48.98	0.02	1107.42	1.01	12.83	465000	<0.00
RL16ND076	0.02	81.25	1372.09	0.02	0.12	<45.25	<0.02	586.85	3.6	19.64	465000	<0.00
RL16ND076	0.04	553.22	10396.48	0.38	0.11	243.47	<0.01	2281.68	2.15	22.95	465000	0.02
RL16ND076	<0.02	28.17	4700.31	0.05	0.06	<46.07	<0.02	415.52	0.7	111.03	465000	<0.00
RL16ND076	<0.01	25.02	1124.68	0.02	0.03	<42.12	<0.02	251.06	<0.46	14.4	465000	<0.00
RL16ND076	0.08	4362.41	208.2	0	0.02	145.12	1.88	404.77	1.38	1169.39	465000	0.34
RL16ND076	0.03	76.05	68.61	0.01	0.02	351.21	<0.01	249.01	1.28	39.48	465000	0.01
RL16ND076	<0.01	0.42	680.44	<0.00	0	<46.02	<0.03	109.81	0.58	24.04	465000	<0.00
RL16ND076	<0.02	<0.33	156.46	<0.00	0	<56.10	<0.02	204.14	<0.44	1.16	465000	<0.00
RL16ND076	<0.02	<0.27	4237.78	0.05	0	<53.72	<0.02	529.31	<0.39	1.87	465000	<0.00
RL16ND076	<0.02	0.8	722.46	0	0	<66.63	<0.03	87.99	<0.42	<0.18	465000	<0.00
RL16ND079	<0.04	<0.34	<1.29	0.04	<0.01	<116.32	<0.03	25.73	<1.20	<0.53	465000	0.05
RL16ND079	<0.03	<0.29	<0.89	0	<0.01	<76.55	<0.01	29.11	<0.83	<0.45	465000	<0.00
RL16ND079	0.22	25.73	103.7	0.01	<0.01	<74.22	<0.04	306.5	1.14	8.07	465000	0.12
RL16ND079	0.84	104.16	53.02	0.3	0.55	<104.37	<0.01	436.01	6.79	1704.35	465000	0.32
RL16ND079	1.66	284.47	113.73	0.22	0.49	173.08	<0.04	507.59	2.97	79.88	465000	1.22
RL16ND079	0.04	<0.36	<0.95	0	0.24	<119.00	<0.02	47.43	<0.62	3.53	465000	<0.00
RL16ND079	0.16	<0.22	63.04	0.05	0.22	<78.46	0.1	114.52	0.89	1.47	465000	<0.00
RL16ND079	0.27	0.54	205.77	0.21	0.2	<95.21	<0.07	39.28	2.22	2.16	465000	<0.00

Sample ID	Ag107_ppm	Al_ppm	As_ppm	Au_ppm	Bi_ppm	Ca43_ppm	Cd_ppm	Co_ppm	Cr53_ppm	Cu65_ppm	Fe57_ppm	Gd_ppm
RL16ND079	0.05	<0.41	<1.22	0.11	0.18	<104.68	<0.06	83.6	<1.13	24.63	465000	<0.00
RL16ND079	0.04	0.69	2.2	0.02	0.18	<102.86	<0.02	25.95	<0.81	2.04	465000	0.08
RL16ND079	0.29	1.02	3537.74	0.42	0.16	<118.83	<0.04	54.86	<0.95	1.89	465000	<0.00
RL16ND079	0.13	<0.48	<1.47	0.11	0.16	<123.73	<0.03	107.5	<0.80	25.16	465000	<0.00
RL16ND079	0.38	37.08	6.47	0.01	0.14	<104.10	<0.03	207.48	<0.94	15.44	465000	0.29
RL16ND079	1.48	19.39	18.12	0.04	0.13	<95.05	0.06	23.82	<0.76	56.39	465000	0.02
RL16ND079	0.45	0.53	95.45	0.38	0.12	<88.58	0.1	14.53	1.94	3.05	465000	<0.00
RL16ND079	0.23	<0.29	67.98	0.01	0.12	<99.39	0.04	327.11	<0.62	8.7	465000	<0.00
RL16ND079	0.07	1.73	27.17	0.23	0.11	<100.05	<0.07	107.61	3.87	0.72	465000	<0.00
RL16ND079	0.25	3.67	<0.82	0.01	0.07	<97.26	0.03	82.88	2.28	10.06	465000	0.03
RL16ND079	0.14	<0.31	263.54	0.07	0.07	<126.13	<0.04	20.11	<0.94	0.71	465000	<0.00
RL16ND079	0.8	146.65	26.37	<0.00	0.04	<113.05	0.56	171.55	2.78	38.52	465000	0.1
RL16ND079	<0.02	<0.35	<1.08	<0.01	0.02	<103.44	<0.06	3.67	<0.79	<0.46	465000	<0.00
RL16ND079	0.59	49.54	161.34	<0.01	0.02	<83.56	<0.02	217	<0.77	36.27	465000	2.44
RL16ND079	0.02	<0.28	<1.03	<0.00	0.01	<108.22	<0.01	32.58	<0.79	<0.44	465000	<0.00
RL16ND080	<0.02	<0.28	123.84	<0.00	<0.00	<51.46	<0.03	75.71	<0.46	<0.13	465000	<0.00
RL16ND080	<0.01	<0.22	1658.23	0	<0.00	<26.89	<0.04	94.24	<0.40	0.18	465000	<0.00
RL16ND080	<0.02	<0.33	523.15	0	<0.00	<35.72	<0.02	127.4	<0.49	<0.13	465000	<0.00
RL16ND080	1.38	102.23	801.63	0.04	3.11	126.85	0.19	34.12	0.89	65.71	465000	<0.00
RL16ND080	1.24	183.66	791.33	0.02	2.93	73.16	0.27	30.4	1.18	65.89	465000	0.02
RL16ND080	0.98	57.32	697.27	0.02	2.45	44.9	0.33	28.03	0.63	62.32	465000	0
RL16ND080	0.99	41.35	511.96	0.02	2.08	68.78	0.3	37.1	0.67	54.42	465000	0
RL16ND080	0.81	122.61	658.58	0.02	1.92	81.31	0.14	23.85	1.09	51.75	465000	<0.00
RL16ND080	1.64	60.91	344.36	0.02	1.85	67.25	0.15	99.16	<0.39	41.48	465000	0.02
RL16ND080	0.95	42.18	634.5	0.02	1.81	172.41	0.32	37.25	0.64	61.35	465000	0.03
RL16ND080	0.49	9.66	480.21	0.01	1.35	71.06	0.25	19.6	0.68	45.55	465000	0.01
RL16ND080	0.87	231.76	339.18	0.02	1.14	<72.91	0.04	56.29	2.21	17.88	465000	<0.00
RL16ND080	0.21	9.05	278.94	0.01	0.45	54.91	0.09	20.39	<0.46	25.3	465000	<0.00
RL16ND080	0.11	771	448	<0.00	0.14	214.94	<0.03	126.96	4.83	3.4	465000	0.01
RL16ND080	0.1	9.31	325.78	0	0.11	<31.90	<0.01	175.5	<0.35	4.22	465000	<0.00
RL16ND080	0.03	<0.29	952.05	<0.00	0.08	<42.57	<0.03	86.35	<0.51	0.29	465000	0.01

Sample ID	Ag107_ppm	Al_ppm	As_ppm	Au_ppm	Bi_ppm	Ca43_ppm	Cd_ppm	Co_ppm	Cr53_ppm	Cu65_ppm	Fe57_ppm	Gd_ppm
RL16ND080	0.08	6.2	160.71	<0.00	0.05	<43.66	0.04	57.37	<0.33	3.06	465000	<0.01
RL16ND080	0.02	27.17	794.68	<0.00	0.03	<34.32	<0.03	58.88	<0.37	1.24	465000	<0.00
RL16ND080	<0.02	<0.28	1256.47	0	0.03	<37.45	0.05	100.49	<0.46	0.2	465000	<0.00
RL16ND080	<0.03	205.33	237.99	<0.00	0.02	<71.29	<0.04	87.26	<0.65	1.18	465000	<0.00
RL16ND080	0.04	10.75	854.01	<0.00	0.02	37	<0.01	79.87	<0.45	1.91	465000	<0.00
RL16ND080	<0.02	<0.28	663.71	<0.00	0.01	<42.82	<0.03	68.93	<0.43	<0.14	465000	<0.00
RL16ND080	<0.02	<0.30	1348.86	0	0	<43.52	<0.02	70.26	<0.35	<0.16	465000	<0.01
RL16ND087	<0.01	<0.19	88.99	<0.00	<0.00	<96.36	<0.04	113.24	0.31	<0.22	465000	<0.00
RL16ND087	<0.01	<0.16	95.31	<0.00	<0.00	<76.19	<0.02	66.05	<0.29	<0.21	465000	<0.01
RL16ND087	<0.01	<0.16	132.68	<0.00	<0.00	<77.15	<0.01	56.37	<0.25	<0.21	465000	0.01
RL16ND087	<0.01	<0.17	134.78	0.01	<0.00	<92.42	<0.01	5.02	<0.28	<0.21	465000	<0.00
RL16ND087	0.89	<0.30	704.47	0.38	19.94	<154.24	0.3	89.94	<0.38	6.49	465000	0.02
RL16ND087	0.4	<0.20	186.61	0.55	11.23	<90.85	<0.03	452.79	<0.33	6.08	465000	<0.00
RL16ND087	0.23	<0.19	136.66	0.08	2.25	<76.01	<0.01	59.23	<0.30	1.17	465000	0.01
RL16ND087	0.14	<0.36	162.04	0.04	2.05	<139.66	<0.06	90.6	0.84	0.91	465000	<0.00
RL16ND087	0.04	<0.11	179.22	0.18	1.74	<96.56	<0.03	524.54	<0.26	0.94	465000	<0.00
RL16ND087	0.24	<0.13	125.3	0.06	1.43	<78.55	<0.04	111.29	0.7	23.28	465000	<0.00
RL16ND087	0.03	<0.25	178.59	0.07	1.4	<122.79	0.09	326.3	<0.48	0.67	465000	<0.00
RL16ND087	0.08	<0.24	189.37	0.07	1.22	<137.14	<0.08	46.71	<0.38	1.07	465000	<0.00
RL16ND087	0.06	<0.15	148.78	0.09	0.72	<64.94	<0.02	239.75	<0.21	1.26	465000	0.01
RL16ND087	0.03	<0.17	111.12	0.02	0.26	<96.71	<0.03	30.68	<0.23	2.47	465000	<0.00
RL16ND087	0.02	<0.17	64.76	0.02	0.2	<85.45	<0.03	3.71	<0.25	0.76	465000	<0.00
RL16ND087	0.07	<0.16	116.03	0	0.15	<78.30	<0.02	38.81	<0.31	1.33	465000	<0.00
RL16ND087	0.03	<0.28	773.17	<0.00	0.14	<138.08	<0.04	76.96	<0.29	<0.28	465000	<0.00
RL16ND087	0.02	<0.13	126.18	0.01	0.08	<87.71	<0.02	159.53	<0.15	1.02	465000	<0.00
RL16ND087	0.03	<0.18	191.68	0.01	0.06	<85.67	<0.01	12.73	0.5	<0.20	465000	<0.00
RL16ND087	0.05	<0.18	128.79	0.01	0.04	<82.80	<0.02	48.66	<0.32	<0.22	465000	0.02
RL16ND087	0.04	<0.16	147.56	0.02	0.03	<75.75	0.04	2.61	<0.25	0.54	465000	0.01
RL16ND087	0.02	<0.17	91.24	0	0.03	<85.96	<0.02	125.27	<0.28	0.49	465000	0.02
RL16ND087	0.03	<0.22	108.44	0.01	0.01	<86.65	0.05	67.07	<0.29	4.98	465000	<0.00
RL16ND087	<0.01	<0.20	122.18	0	0.01	<79.13	0.07	102.08	0.43	0.36	465000	<0.00

Sample ID	Ag107_ppm	Al_ppm	As_ppm	Au_ppm	Bi_ppm	Ca43_ppm	Cd_ppm	Co_ppm	Cr53_ppm	Cu65_ppm	Fe57_ppm	Gd_ppm
RL16ND088	2.99	<0.47	200.6	0.17	25.55	618.89	0.16	242.81	<0.84	7.08	465000	<0.00
RL16ND088	0.93	<0.18	292.14	0.1	22.57	<81.36	0.58	412.03	<0.30	7.2	465000	0.02
RL16ND088	4.3	<0.32	125.19	0.11	15.54	<119.34	<0.03	501.58	<0.48	3.29	465000	<0.00
RL16ND088	1.86	<0.18	99.42	0.03	13.98	<86.70	0.08	6.49	<0.37	1.99	465000	<0.00
RL16ND088	0.36	<0.33	152.52	0.07	10.25	<156.19	0.11	31.44	0.51	2.15	465000	<0.00
RL16ND088	0.53	<0.17	113.85	0.04	8.75	<97.00	0.27	35.23	<0.27	2.61	465000	<0.01
RL16ND088	0.25	<0.22	98.37	0.08	6.5	<84.97	0.06	46.77	<0.24	1.72	465000	<0.00
RL16ND088	0.64	<0.16	92.25	0.2	6.09	<75.42	0.14	23.43	0.26	3.14	465000	<0.00
RL16ND088	0.73	<0.18	96.13	0.05	5.91	<87.15	0.02	18.8	<0.22	3.38	465000	<0.00
RL16ND088	0.22	<0.28	124.08	0.03	5	<141.24	0.16	16.1	<0.33	0.51	465000	<0.00
RL16ND088	0.16	<0.28	133.86	0.03	4.29	<119.44	0.06	24.99	<0.30	0.61	465000	<0.00
RL16ND088	0.93	<0.16	80.09	0.03	4.04	<70.29	0.06	13.1	0.5	0.38	465000	<0.00
RL16ND088	0.17	<0.19	94.6	0.04	3.26	<79.83	<0.03	48.74	<0.37	1.05	465000	<0.00
RL16ND088	0.3	<0.17	190.75	0.14	2.91	<63.41	<0.02	290.07	<0.26	1.82	465000	<0.00
RL16ND088	0.06	<0.16	79.54	0.01	2.49	<76.86	<0.03	21.12	0.39	0.52	465000	<0.00
RL16ND088	0.1	<0.17	96.02	0.03	1.07	<96.95	0.11	32.07	<0.28	1.12	465000	<0.01
RL16ND088	0.04	<0.19	103.36	0.01	1.03	<112.02	<0.02	34.07	<0.27	0.39	465000	<0.00
RL16ND088	0.13	<0.17	110.03	0.01	0.97	<79.22	0.05	17.87	<0.33	0.86	465000	<0.00
RL16ND088	0.11	<0.18	86.41	0.1	0.53	<75.39	<0.03	19.19	<0.27	0.27	465000	<0.00
RL16ND088	0.08	<0.12	85.68	0.08	0.51	<78.90	<0.03	48.3	<0.19	0.78	465000	<0.00
RL16ND088	0.03	0.29	80.86	0.02	0.39	<75.68	<0.03	60.83	<0.24	0.91	465000	<0.00
RL16ND088	0.01	<0.19	70.88	0.03	0.25	<79.56	<0.03	62.77	<0.32	<0.16	465000	<0.00
RL16ND088	0.03	<0.16	89.44	<0.00	0.06	<83.36	<0.01	18.82	<0.23	0.77	465000	<0.00
RL16ND088	0.03	<0.17	85.67	0	0.03	<98.30	<0.03	3.06	<0.31	<0.23	465000	0.01
RL16ND088	0.01	<0.17	72.77	<0.00	0.02	<81.59	<0.04	16.67	0.34	0.38	465000	0.03
RL16ND094	0.1	103.7	1.02	0.02	<0.02	<93.58	0.09	0.08	<0.73	<0.47	465000	0.1
RL16ND094	0.18	89.27	<0.82	0	<0.02	<83.27	0.03	0.1	1.45	0.47	465000	0.06
RL16ND094	<0.01	<0.17	2156.38	<0.00	<0.00	<61.90	<0.01	249.42	<0.45	<0.50	465000	<0.00
RL16ND094	<0.01	<0.20	699.17	<0.00	<0.00	<49.19	<0.01	27.92	<0.47	<0.46	465000	<0.00
RL16ND094	<0.01	<0.17	749.15	<0.00	<0.00	<38.27	<0.01	248.49	<0.46	<0.40	465000	<0.00
RL16ND094	<0.01	<0.14	394.27	0	<0.00	<31.91	<0.01	103.39	<0.35	<0.29	465000	<0.00

Sample ID	Ag107_ppm	Al_ppm	As_ppm	Au_ppm	Bi_ppm	Ca43_ppm	Cd_ppm	Co_ppm	Cr53_ppm	Cu65_ppm	Fe57_ppm	Gd_ppm
RL16ND094	<0.01	<0.18	796.3	0	<0.00	<51.30	0.03	114.79	<0.43	<0.47	465000	0.01
RL16ND094	0.01	0.3	908.94	<0.00	<0.00	<38.11	<0.00	221.47	<0.35	<0.34	465000	0.01
RL16ND094	<0.01	<0.17	2567.74	<0.00	<0.00	<45.93	<0.01	115.43	<0.46	<0.43	465000	<0.00
RL16ND094	0.24	5.78	894.24	0.04	0.5	<43.95	0.03	131.13	<0.43	0.46	465000	0.02
RL16ND094	0.39	1.02	836.64	0.07	0.31	<48.61	<0.00	208.23	<0.30	0.74	465000	0.01
RL16ND094	0.1	3.63	492.02	<0.00	0.09	<34.75	<0.01	138.38	<0.33	0.62	465000	<0.01
RL16ND094	1.45	21.04	<1.12	0.01	0.06	271.41	0.49	0.02	<0.86	13463.73	465000	0.07
RL16ND094	0.61	81.96	1.2	0	0.06	<91.99	<0.02	0.41	3.8	<0.47	465000	0.03
RL16ND094	0.04	<0.18	722.07	0.03	0.04	<36.16	<0.01	167.61	<0.38	<0.35	465000	<0.00
RL16ND094	0.17	111.83	<0.71	0.01	0.03	<112.10	0.05	0.08	0.81	<0.42	465000	0.03
RL16ND094	<0.01	1.22	1181.42	<0.00	0.02	<37.52	<0.00	146.92	<0.30	0.66	465000	0.09
RL16ND094	0.18	193.48	<0.88	0.01	0.02	<108.37	0.05	0.16	1.22	<0.56	465000	0.13
RL16ND094	<0.01	<0.16	522.91	<0.00	0.01	<44.01	0.01	47.95	<0.35	0.44	465000	<0.00
RL16ND120	0.66	464.78	169.99	0.21	3.24	155.43	<0.00	18242.5	4.25	319.29	465000	0.96
RL16ND120	0.26	21.15	14.87	0.07	0.44	<64.60	0.03	565.52	0.83	366.17	465000	0.01
RL16ND120	<0.00	128.63	1.46	0.01	0.4	77.54	<0.01	4061.35	0.3	1.51	465000	<0.00
RL16ND120	0.01	2.31	1.96	0.01	0.17	<40.73	<0.00	267.3	<0.34	0.51	465000	<0.00
RL16ND120	0.02	4.1	249.91	0	0.15	<41.77	<0.00	1624.5	<0.29	0.41	465000	<0.00
RL16ND120	0.03	202.65	8.95	0.01	0.13	164.85	0.03	7.3	1.52	3.13	465000	<0.00
RL16ND120	0.23	0.16	1.55	0.01	0.08	<35.57	0.05	103.65	<0.27	188.28	465000	<0.00
RL16ND120	<0.01	30.33	102.51	<0.00	0.05	<37.10	0.01	2645.38	<0.36	<0.19	465000	<0.00
RL16ND122	<0.01	<0.14	363.6	0	<0.01	<48.56	<0.01	19.28	<0.34	<0.33	465000	<0.00
RL16ND122	<0.01	<0.16	28.38	0	<0.01	<44.69	0.04	1.28	<0.40	<0.40	465000	<0.00
RL16ND122	0.15	101.14	51.89	0.05	<0.00	<46.91	0.01	3.29	0.6	3.33	465000	<0.00
RL16ND122	<0.01	<0.15	15.99	0	<0.00	<46.04	<0.01	11.56	<0.45	<0.32	465000	0.01
RL16ND122	<0.01	0.37	17.43	<0.00	<0.00	<57.49	<0.01	0.35	<0.54	<0.52	465000	<0.00
RL16ND122	<0.01	<0.10	31.02	<0.00	<0.00	<58.80	<0.02	1.56	<0.28	<0.40	465000	<0.00
RL16ND122	<0.01	<0.19	58.72	0.02	<0.00	<43.43	<0.01	0.66	<0.47	0.55	465000	<0.00
RL16ND122	<0.01	0.25	280.07	<0.00	<0.00	<47.52	<0.02	89.6	<0.41	<0.31	465000	<0.00
RL16ND122	<0.01	<0.16	21.67	<0.00	<0.00	<47.13	<0.00	0.09	<0.37	<0.39	465000	<0.00
RL16ND122	<0.01	0.16	28.41	<0.00	<0.00	<27.30	<0.01	0.1	<0.33	<0.35	465000	<0.00

Sample ID	Ag107_ppm	Al_ppm	As_ppm	Au_ppm	Bi_ppm	Ca43_ppm	Cd_ppm	Co_ppm	Cr53_ppm	Cu65_ppm	Fe57_ppm	Gd_ppm
RL16ND122	<0.01	0.16	28.41	<0.00	<0.00	<27.30	<0.01	0.1	<0.33	<0.35	465000	<0.00
RL16ND122	<0.01	1.98	147.2	0	<0.00	<33.17	<0.01	0.22	<0.28	<0.35	465000	<0.00
RL16ND122	0.02	0.6	7634.16	0.16	<0.00	<36.17	0.01	251.19	<0.24	0.79	465000	<0.00
RL16ND122	0.35	10.43	162.32	0	0.06	<52.97	<0.02	32.53	<0.35	21.96	465000	<0.00
RL16ND122	0.06	17.59	922.8	0.01	0.04	54.2	<0.01	121.35	<0.37	2.05	465000	<0.00
RL16ND122	0.13	<0.18	38.06	0.01	0.02	<38.50	0.01	3.52	<0.38	5.4	465000	<0.00
RL16ND122	0.12	1.64	8814.02	0.27	0.02	<49.37	<0.03	113.28	2.48	0.91	465000	<0.00
RL16ND122	0.04	15.22	1255.58	0.04	0.02	<34.03	<0.03	72.31	<0.36	0.35	465000	<0.00
RL16ND122	0.04	0.19	101.23	0.02	0.02	<44.48	<0.01	13.46	<0.39	<0.34	465000	<0.00
RL16ND122	0.01	<0.17	61.91	0	0.01	<33.84	<0.01	6.88	<0.28	<0.32	465000	<0.00
RL16ND122	<0.01	<0.16	21.87	<0.00	0.01	<36.59	0.02	0.91	<0.34	<0.38	465000	<0.00
RL16ND122	<0.01	<0.14	182.12	0	0	<35.22	<0.02	21.35	<0.44	1.78	465000	<0.00
RL16ND123	<0.02	<0.37	18.84	<0.00	<0.02	<131.38	0.05	3324.64	<0.88	<0.57	465000	<0.00
RL16ND123	1.79	172.04	3.08	0.04	1.69	<106.67	0.05	612.83	143.67	2.45	465000	<0.00
RL16ND123	0.69	602.92	0.97	0.01	1.19	<66.82	0.03	613.01	77.33	<0.46	465000	0.06
RL16ND123	0.66	674.92	1.69	<0.00	1.16	167.61	0.05	605.13	13.01	<0.51	465000	<0.01
RL16ND123	0.41	903.78	<1.06	0.01	1.12	104.96	0.13	554.47	8.09	0.55	465000	0.04
RL16ND123	0.34	0.55	17.93	0.04	1.06	<99.27	0.14	325.87	<0.79	<0.51	465000	<0.00
RL16ND123	0.82	1723.58	<0.89	0	1.02	<91.49	0.06	589.6	10.4	<0.46	465000	0.07
RL16ND123	0.13	2121.24	5.31	<0.00	0.98	<131.85	<0.03	170.49	3.37	1.5	465000	<0.00
RL16ND123	<0.04	1820.07	40.91	<0.00	0.87	535.09	0.06	394.7	15.69	2.05	465000	<0.00
RL16ND123	0.44	533.74	2.25	0.21	0.86	245.67	0.09	596.87	71.09	0.38	465000	<0.01
RL16ND123	0.25	428.69	1.01	<0.00	0.82	<61.98	0.07	573.73	7.45	0.64	465000	0.04
RL16ND123	0.06	6677.26	34.83	<0.01	0.74	<119.96	<0.03	459.45	62.52	2.44	465000	<0.00
RL16ND123	0.41	425.76	<1.06	0.07	0.65	<80.50	0.01	602.97	35.91	<0.42	465000	0.02
RL16ND123	0.08	13.73	40.97	0.02	0.58	<110.79	<0.03	2139.19	2.65	<0.70	465000	<0.00
RL16ND123	0.1	323.1	16.86	0	0.31	<105.32	0.03	4048.51	11.32	1.67	465000	<0.00
RL16ND123	0.04	34.53	10.34	<0.00	0.13	<195.79	<0.09	701.28	<1.47	2.44	465000	<0.00
RL16ND123	0.03	39.86	8.56	<0.00	0.1	<101.92	0.06	1600.73	<0.94	<0.60	465000	<0.00
RL16ND128	0.72	<0.28	2849.16	0.22	<0.00	<27.00	0.12	4.18	<0.33	15.63	465000	<0.00
RL16ND128	0.04	<0.32	3299.45	<0.00	<0.00	<32.16	<0.01	235.61	<0.27	<0.19	465000	<0.00

Sample ID	Ag107_ppm	Al_ppm	As_ppm	Au_ppm	Bi_ppm	Ca43_ppm	Cd_ppm	Co_ppm	Cr53_ppm	Cu65_ppm	Fe57_ppm	Gd_ppm
RL16ND128	0.04	<0.32	3299.45	<0.00	<0.00	<32.16	<0.01	235.61	<0.27	<0.19	465000	<0.00
RL16ND128	<0.01	<0.11	2179.59	0.01	<0.00	<43.37	<0.00	163.62	<0.26	<0.25	465000	0.01
RL16ND128	150.94	695.84	296.01	190.88	1.39	146.87	1.46	29.77	1.43	1511.26	465000	<0.00
RL16ND128	228.47	971.06	2520.36	102.27	0.35	<47.30	0.83	323.5	0.9	423.15	465000	0.01
RL16ND128	18.41	1095.27	4901.06	7.69	0.18	126.59	0.21	493.97	3.89	182.52	465000	<0.00
RL16ND128	11.58	3788.82	4432.85	4.18	0.12	2156.25	0.22	385.8	62.57	227.61	465000	0.12
RL16ND128	6.78	2349.34	3479.29	4.66	0.1	1842.32	0.28	90.54	6.85	144.72	465000	<0.00
RL16ND128	14.23	471.63	1724.04	6.42	0.09	<43.03	0.03	253.32	20	94.01	465000	0.01
RL16ND128	9.99	1103.2	6111.12	24.31	0.06	213.8	0.05	51.87	50.8	137.58	465000	0.03
RL16ND128	4.14	453.86	2747.98	3.65	0.06	<41.88	<0.01	798.89	2.13	1.63	465000	<0.00
RL16ND128	10.09	512.72	1078.66	4.5	0.05	<64.75	0.06	27.31	23.88	1787.87	465000	<0.00
RL16ND128	2.41	213.12	2644.84	1.34	0.04	39.83	0.01	105.14	3.95	30.72	465000	0.01
RL16ND128	2.64	115.48	1907.44	4.91	0.04	<55.72	0.04	178.59	30.66	10.77	465000	0.1
RL16ND128	14.04	571.02	516.93	3.12	0.04	<48.82	1.78	74.82	4.81	1355.32	465000	0.03
RL16ND128	1.92	1696.16	3139.98	3.27	0.03	288.3	0.01	323.2	7.64	12.33	465000	0.03
RL16ND128	1.67	81.03	3970.75	0.22	0.02	2539.02	<0.01	198.78	0.75	2	465000	0.01
RL16ND128	0.93	51.65	1961.54	0.74	0.02	<42.95	<0.00	302.74	0.49	0.74	465000	0.81
RL16ND128	1.9	355.95	2461.55	0.12	0.02	48.95	<0.01	143.59	0.92	3.04	465000	<0.00
RL16ND128	18.45	913.19	469.53	3.31	0.01	<37.61	<0.00	10.17	19.99	1793.88	465000	<0.00
RL16ND128	0.48	35.88	2450.69	0.04	0.01	<37.87	<0.01	279.08	0.34	0.53	465000	0.01
RL16ND128	5.28	1.82	3105.01	0.77	0.01	<40.94	10.09	10.52	<0.26	174.67	465000	<0.00
RL16ND128	1.68	17.39	4255.22	3.68	0.01	<34.61	0.04	74.02	0.43	48.99	465000	<0.00
RL16ND128	0.14	3.32	2834.88	0.02	0.01	<67.65	0.01	262.89	<0.56	2.87	465000	0.01
RL16ND128	0.02	22.03	2278.7	0.01	0	<34.19	<0.00	219.51	2.08	0.23	465000	<0.00
RL16ND142	0.66	657.16	3141.78	0.23	3.03	<47.62	0.06	1050.45	1.5	6.5	465000	0.03
RL16ND142	0.41	21.04	5889.86	0.94	1.35	<34.80	<0.00	763.83	1.25	64.18	465000	0.37
RL16ND142	9.5	504.82	50.37	0.01	1.15	1817.03	0.04	6.23	3.22	66.22	465000	0.65
RL16ND142	0.22	471.29	2886.38	0.07	1.12	<42.36	0.01	230.71	0.34	4.26	465000	0.48
RL16ND142	0.37	0.42	1743.81	0.12	1.1	<36.10	0.02	462.31	<0.32	3.3	465000	<0.00
RL16ND142	0.2	306.75	3367.96	0.25	1.02	121.96	<0.01	1395.3	0.35	1.29	465000	<0.00
RL16ND142	0.09	606.7	7991.05	0.18	0.52	<75.15	0.01	3177.98	12.69	1.91	465000	10.44

Sample ID	Ag107_ppm	Al_ppm	As_ppm	Au_ppm	Bi_ppm	Cd43_ppm	Cd_ppm	Co_ppm	Cr53_ppm	Cu65_ppm	Fe57_ppm	Gd_ppm
RL16ND142	0.09	606.7	7991.05	0.18	0.52	<75.15	0.01	3177.98	12.69	1.91	465000	10.44
RL16ND142	0.04	178.23	2913.77	0.02	0.25	50.95	0.01	780.57	<0.29	0.37	465000	0.13
RL16ND142	0.07	134.28	1944.21	0.02	0.22	<48.62	<0.01	309.95	0.61	0.6	465000	0.16
RL16ND142	0.29	1161.82	101.21	<0.00	0.22	136.33	0.08	1.06	1.06	42.18	465000	0.34
RL16ND142	0.02	338.22	2356.18	0.01	0.19	<54.58	0.04	612.04	<0.44	0.5	465000	0.06
RL16ND142	0.02	96.52	2971.57	0.03	0.19	<40.07	<0.01	1008.46	<0.32	0.49	465000	0.42
RL16ND142	0.23	337.08	180.99	<0.00	0.15	<48.16	0.06	2.49	0.84	25.79	465000	0.31
RL16ND142	0.8	186.77	196.33	0.01	0.11	<37.78	0.02	4	0.42	8.53	465000	1.52
RL16ND142	0.05	59.37	2293.17	0.01	0.1	<31.34	<0.00	653.76	<0.25	3.04	465000	0.67
RL16ND142	0.02	65.99	2630.24	0.02	0.08	<42.55	<0.00	706.57	<0.28	<0.32	465000	0.47
RL16ND142	0.61	185.25	34.79	<0.00	0.07	<82.63	0.13	0.39	<0.57	4.52	465000	0.3
RL16ND142	0.11	58.9	36.98	<0.00	0.07	<34.19	<0.01	5.29	<0.24	25.44	465000	0.04
RL16ND142	0.23	196.03	31.17	<0.00	0.06	<41.27	0.04	1.55	<0.26	4.02	465000	0.04
RL16ND142	0.16	258.57	43.97	<0.00	0.04	33.15	0.03	4.96	0.45	46.82	465000	0.06
RL16ND142	<0.01	4.26	6422.55	0.01	0.02	<40.90	<0.02	4415.32	<0.26	<0.29	465000	<0.00
RL16ND142	0.15	17.98	36.77	<0.00	0.01	<32.54	<0.01	4.5	<0.21	38.1	465000	0.01
RL16ND142	<0.01	12.53	2303.77	<0.00	0.01	<46.71	0.05	801.23	<0.39	<0.30	465000	<0.00
RL16ND147	0.54	229.11	34.26	3.64	<0.05	<100.00	<0.65	274.77	<8.18	14800.92	465000	<0.01
RL16ND147	7.28	64.4	561.39	46.06	0.32	<100.30	<0.04	8353.26	<0.90	15.91	465000	<0.00
RL16ND147	7.8	<0.47	370.13	36.39	0.22	<98.84	<0.06	2212.57	<0.71	75.53	465000	<0.00
RL16ND147	15.48	25.03	1585.57	107.56	0.22	<147.77	<0.06	7489.42	<1.08	29.17	465000	<0.00
RL16ND147	2.11	1308.48	1096.18	3.83	0.17	<489.63	<0.21	1011.07	<3.57	2.51	465000	2.35
RL16ND147	4.88	<0.60	1418.68	26.54	0.06	<104.92	0.07	2569.56	<0.85	130.28	465000	<0.00
RL16ND155	<0.06	1825.84	269.09	0.02	<0.03	23757.43	<0.12	12.35	6.91	<1.25	465000	1.59
RL16ND155	<0.00	<0.09	75.3	<0.00	<0.00	<30.11	0.03	0.06	<0.21	<0.14	465000	<0.00
RL16ND155	0.42	12.41	952.62	0.02	<0.00	10671.75	0.16	5.85	4.48	63.8	465000	0.09
RL16ND155	<0.00	<0.12	106.39	0	<0.00	<44.01	0.02	0.02	<0.22	<0.14	465000	<0.00
RL16ND155	0.03	0.38	143.62	0.01	<0.00	3628.86	0.02	0.79	1.13	0.98	465000	0.06
RL16ND155	0.01	355.12	462.46	0.01	<0.00	84.41	<0.02	2.47	1.44	<0.23	465000	<0.01
RL16ND155	0.01	<0.12	66.95	<0.00	<0.00	<38.30	<0.01	0.44	<0.20	0.26	465000	0.01
RL16ND155	0.03	<0.14	111.4	0	<0.00	<38.45	0.01	0.99	<0.24	1.33	465000	<0.00
RL16ND155	<0.01	0.17	93.26	<0.00	<0.00	<32.17	0.03	0.07	<0.35	0.21	465000	0.02

Sample ID	Ag107_ppm	Al_ppm	As_ppm	Au_ppm	Bi_ppm	Ca43_ppm	Cd_ppm	Co_ppm	Cr53_ppm	Cu65_ppm	Fe57_ppm	Gd_ppm
RL16ND155	<0.01	0.17	93.26	<0.00	<0.00	<32.17	0.03	0.07	<0.35	0.21	465000	0.02
RL16ND155	<0.01	<0.13	341.31	0.05	<0.00	546.12	0.04	1.2	<0.29	<0.14	465000	0.01
RL16ND155	0.01	<0.13	129.85	0	<0.00	<26.57	0.01	0.3	<0.23	0.25	465000	<0.00
RL16ND155	<0.00	<0.13	229.89	<0.00	<0.00	<24.40	0.02	0.25	<0.25	<0.13	465000	<0.00
RL16ND155	0.21	<0.14	455.43	0.01	<0.00	1067.83	0.09	0.42	0.54	2.44	465000	<0.00
RL16ND155	0.02	5.21	63.2	0	<0.00	<35.26	<0.01	0.18	<0.33	1.49	465000	<0.00
RL16ND155	<0.01	0.62	174.87	0.08	<0.00	<38.09	<0.01	1.61	0.26	0.43	465000	<0.00
RL16ND155	0.14	342.74	524.02	0	0	528.46	0.11	5.22	2.05	0.58	465000	0.08
RL16ND155	0.02	0.67	198.75	0.03	0	384.44	0.08	1.39	<0.26	0.43	465000	0.02
RL16ND163	1.8	429.03	2.62	0	0.92	449.49	5.54	1449	1.41	<0.28	465000	0.08
RL16ND163	1.12	460.32	14.05	0.02	0.84	287.18	2.92	1803.52	2.24	406.53	465000	0.09
RL16ND163	0.8	380.42	13.1	<0.00	0.82	148.77	0.91	871.46	2.59	119.03	465000	0.04
RL16ND163	0.58	268.31	0.67	0.01	0.56	153.63	0.24	619.03	<0.71	5.33	465000	0.02
RL16ND163	0.72	230.41	0.95	0.01	0.43	<101.01	2.71	953.68	<0.83	58.84	465000	0.07
RL16ND163	0.61	387.17	1.87	<0.01	0.42	214.08	1.59	967.75	1.57	45.08	465000	0.06
RL16ND163	0.79	22.55	2.79	<0.01	0.25	<128.66	0.07	660.6	<0.93	1755.53	465000	<0.00
RL16ND163	0.28	23.6	1.06	<0.00	0.22	<137.97	<0.05	672.41	<1.27	1401.33	465000	0.04
RL16ND163	0.03	21.77	1.19	<0.00	0.16	<99.05	0.16	522.58	<0.76	1886.55	465000	<0.00
RL16ND163	0.27	26.29	0.98	<0.00	0.15	1333.18	<0.05	637.95	<0.80	1604.05	465000	<0.00
RL16ND163	0.2	282.97	<0.66	<0.00	0.13	103.74	1.14	735.58	<0.78	12.02	465000	0.01
RL16ND163	0.21	250.67	1.16	0	0.12	108.9	0.1	616.19	0.96	17.39	465000	0.11
RL16ND163	0.1	60.42	29.28	<0.01	0.07	<109.35	0.2	600.19	<0.90	315.87	465000	<0.00
RL16ND163	0.1	257.33	5.63	0.01	0.03	180.59	2.9	1338.72	1.16	69.99	465000	0.02
RL16ND163	0.12	37.93	1.39	<0.00	0.03	<104.29	0.39	638.35	0.92	707.89	465000	<0.00
RL16ND170	<0.01	<0.16	2.97	<0.00	<0.01	34.54	<0.01	0.08	<0.39	<0.29	465000	<0.00
RL16ND170	0.06	<0.14	<0.38	0	<0.01	<32.58	<0.01	34.28	<0.23	0.26	465000	<0.00
RL16ND170	0.33	41.01	139.3	0.27	0.59	<39.36	0.04	2419.35	<0.34	85	465000	<0.00
RL16ND170	2.59	3008.64	1054.01	0.34	0.48	8530.56	0.17	209.8	0.94	18.49	465000	0.19
RL16ND170	1.35	435.77	<0.52	0.85	0.39	317.57	5.18	1190.23	0.4	2834.52	465000	<0.00
RL16ND170	2.19	518.2	81.41	0.16	0.33	7861.63	1.54	3843.61	<0.38	1940.89	465000	0.01
RL16ND170	0.13	15.83	368.84	0.45	0.3	2280.31	0.24	119.93	<0.89	2.2	465000	<0.00

Sample ID	Ag107_ppm	Al_ppm	As_ppm	Au_ppm	Bi_ppm	Ca43_ppm	Cd_ppm	Co_ppm	Cr53_ppm	Cu65_ppm	Fe57_ppm	Gd_ppm
RL16ND170	0.13	15.83	368.84	0.45	0.3	2280.31	0.24	119.93	<0.89	2.2	465000	<0.00
RL16ND170	3.3	3562.2	292.42	0.16	0.29	15031.88	0.27	280.82	2.53	117.75	465000	0.36
RL16ND170	0.14	7653.25	861.9	0.05	0.26	<54.51	0.06	798.19	0.45	3.26	465000	0.03
RL16ND170	0.93	1.27	22.06	0.28	0.25	<36.40	0.36	81.76	<0.47	2598.94	465000	<0.00
RL16ND170	0.68	28.35	104.24	0.15	0.18	43.09	0.09	10294.1	<0.28	170.24	465000	<0.00
RL16ND170	0.19	2071.31	64.05	0.02	0.14	15210.56	0.02	1802.53	<0.35	2.7	465000	0.36
RL16ND170	0.18	60.55	47.8	<0.00	0.13	1286.07	<0.01	31.01	<0.81	0.85	465000	0.12
RL16ND170	0.05	1632.53	238.57	0	0.13	3548.59	0.03	39.34	1.58	0.76	465000	0.02
RL16ND170	0.11	7.24	888.83	0.05	0.08	<46.61	<0.01	16.88	0.36	1.71	465000	<0.00
RL16ND170	0.07	<0.12	1.05	0.1	0.06	103.93	0.01	5.62	0.81	0.98	465000	<0.00
RL16ND170	0.07	299.97	3.44	0.01	0.06	<56.25	0.02	5.11	0.9	2.62	465000	0.01
RL16ND170	0.01	565.88	<0.43	<0.00	0.04	<42.60	<0.01	8.55	1.15	0.45	465000	<0.00
RL16ND170	<0.01	<0.15	4.15	0.01	0.02	<34.33	<0.00	9.69	<0.34	<0.18	465000	<0.00
RL16ND175	<0.02	<0.33	<0.37	<0.00	<0.00	<50.24	<0.02	1320.68	<0.42	<0.19	465000	<0.00
RL16ND175	<0.02	<0.29	<0.47	<0.00	<0.00	<61.14	<0.02	1614	<0.47	<0.16	465000	<0.00
RL16ND175	2.63	0.95	0.62	0.42	0.8	<48.78	<0.02	3470.18	<0.42	242.64	465000	0
RL16ND175	1.09	<0.40	<0.40	0.1	0.72	<65.67	<0.03	7908.79	<0.42	0.81	465000	<0.00
RL16ND175	65.78	<0.76	283.89	4.83	0.57	629.62	<0.04	2334.69	<1.13	0.6	465000	<0.00
RL16ND175	0.52	<0.34	<0.47	0.16	0.5	<63.16	<0.02	2629.85	<0.44	4.37	465000	<0.00
RL16ND175	1.26	17.33	39.19	0	0.46	<51.66	<0.02	1890.13	0.72	1.2	465000	0.03
RL16ND175	1.89	3.61	11.86	0.02	0.43	575.47	<0.03	866.68	<0.29	0.98	465000	<0.00
RL16ND175	0.7	<0.33	<0.44	0.05	0.4	<49.16	<0.02	937.41	<0.39	3.8	465000	<0.00
RL16ND175	0.3	<0.22	<0.34	0	0.22	<55.58	<0.01	1777.97	<0.32	0.64	465000	<0.00
RL16ND175	0.61	<0.29	<0.34	0.17	0.21	<62.51	<0.02	885.88	<0.36	44.81	465000	<0.00
RL16ND175	0.11	73.11	23.35	<0.00	0.09	<53.13	<0.02	2841.49	1.47	0.28	465000	<0.00
RL16ND175	0.11	9.77	48.68	<0.00	0.08	<74.60	<0.03	1862.21	<0.51	0.3	465000	0.02
RL16ND175	0.09	<0.28	<0.41	0.01	0.07	<52.72	<0.02	750.16	<0.44	2.05	465000	<0.01
RL16ND175	0.14	<0.72	11.79	<0.00	0.04	<135.97	<0.06	264.64	<0.84	<0.29	465000	<0.01
RL16ND175	7.98	<0.29	0.5	0.48	0.03	<55.15	<0.01	2688.49	0.42	17.95	465000	<0.00
RL16ND175	0.08	<0.26	<0.39	<0.00	0.03	<49.54	<0.01	1408.66	<0.36	<0.18	465000	<0.00
RL16ND175	<0.01	<0.25	<0.38	0	0.01	<49.22	<0.02	2104.97	<0.41	<0.12	465000	<0.00

Sample ID	Ag107_ppm	Al_ppm	As_ppm	Au_ppm	Bi_ppm	Ca43_ppm	Cd_ppm	Co_ppm	Cr53_ppm	Cu65_ppm	Fe57_ppm	Gd_ppm
RL16ND175	<0.01	<0.25	<0.38	0	0.01	<49.22	<0.02	2104.97	<0.41	<0.12	465000	<0.00
RL16ND175	<0.02	<0.36	<0.49	<0.00	0.01	<61.76	<0.02	1748.89	<0.51	<0.22	465000	<0.00
RL16ND175	<0.02	<0.26	<0.32	<0.00	0.01	<47.93	0.04	889.12	<0.40	0.16	465000	<0.00
RL16ND175	<0.03	<0.37	<0.56	<0.00	0	<70.00	<0.03	1189.37	<0.61	<0.21	465000	<0.01
RL16ND175	<0.02	<0.28	<0.46	<0.00	0	<51.30	<0.03	1360.36	<0.41	<0.14	465000	<0.01
RL16ND175	<0.02	<0.27	<0.40	0	0	<63.86	<0.02	542.61	<0.40	<0.13	465000	<0.00
RL16ND182	0.45	<0.87	<1.82	<0.01	<0.01	<159.32	0.07	0.05	<1.31	<1.20	465000	0.06
RL16ND182	<0.01	<0.20	0.54	<0.00	<0.00	<36.07	<0.00	<0.00	0.29	0.22	465000	<0.00
RL16ND182	6.52	<0.33	18.34	0.64	2.11	86.33	0.26	0.66	<0.57	4143.79	465000	<0.00
RL16ND182	42.03	<0.14	525.57	0.8	0.86	<29.44	0.45	0.38	<0.33	151.45	465000	<0.00
RL16ND182	23.92	<0.23	274.53	0.59	0.76	<44.93	0.38	0.39	<0.43	109.04	465000	<0.00
RL16ND182	5.9	<0.27	42.31	0.2	0.4	339.7	0.04	10.29	<0.61	20.55	465000	0.03
RL16ND182	2.06	<0.19	8.35	0.25	0.35	144.86	0.15	0.85	<0.50	1459.73	465000	0.04
RL16ND182	1.08	<0.16	4.56	0.34	0.24	<36.28	0.01	1.26	<0.34	658.65	465000	<0.00
RL16ND182	0.2	<0.23	1.73	0.02	0.08	3573.16	0.02	11.34	<0.33	3.19	465000	<0.00
RL16ND182	2.07	<0.57	<1.36	<0.00	0.02	<126.47	<0.01	0.1	<1.06	4.8	465000	<0.00
RL16ND182	0.07	<0.21	<210.38	0.07	0.02	204.87	<0.01	2.22	<0.44	0.37	465000	0.03
RL16ND182	0.07	<0.16	7.64	0	0.01	<35.90	<0.02	24.67	<0.27	<0.25	465000	<0.00
RL16ND182	0.06	<0.17	1.05	<0.00	0.01	<39.75	<0.01	0.18	<0.37	<0.18	465000	<0.00
RL16ND189	2.88	85.93	<1.62	<0.01	0.71	<185.26	<0.12	265.7	<1.56	<0.55	465000	0.08
RL16ND190	1.75	19373.9	4.44	0.02	3.28	<269.94	1.26	2152.55	4.45	13.36	465000	0.38
RL16ND190	1.23	4220.94	<1.13	0.05	2.88	<162.28	0.1	1277.43	209.06	3.28	465000	0.03
RL16ND190	1.48	11716.2	<0.92	0.02	2.05	<106.25	<0.06	1197.66	4.42	5.57	465000	0.12
RL16ND190	0.59	15121.3	1.09	0.02	1.99	221.05	0.11	2025.61	37.45	<0.34	465000	0.32
RL16ND190	1.05	1251.04	<4.19	<0.02	1.64	<652.61	<0.33	1239.02	11.46	72.64	465000	<0.07
RL16ND190	0.59	4205.54	<1.17	0.03	0.8	263.37	0.07	1408.22	313.15	1.55	465000	0.79
RL16ND190	0.11	1468.47	<1.52	<0.01	0.2	<166.06	0.14	1251.52	3.08	<0.48	465000	1.7
RL16ND190	0.15	3942.66	<0.79	<0.00	0.13	<123.66	<0.05	1326.24	257.16	1.45	465000	0.22
RL16ND190	0.15	1820.18	<1.53	0.01	0.08	<193.33	<0.10	1587.36	1.54	<0.43	465000	0.29
RL16ND190	0.12	1365.68	<0.88	<0.01	0.07	131.91	<0.05	1136.66	1.5	<0.27	465000	0.38
RL16ND190	0.08	2531.87	<1.15	0.01	0.04	236.73	<0.04	1141.68	70.83	0.25	465000	0.73

Sample ID	Ag107_ppm	Al_ppm	As_ppm	Au_ppm	Bi_ppm	Ca43_ppm	Cd_ppm	Co_ppm	Cr53_ppm	Cu65_ppm	Fe57_ppm	Gd_ppm
RL16ND190	0.08	2531.87	<1.15	0.01	0.04	236.73	<0.04	1141.68	70.83	0.25	465000	0.73
RL16ND190	<0.04	2039.4	<0.89	<0.00	0.03	<104.86	<0.03	1335.68	1.97	<0.27	465000	0.36
RL16ND190	0.24	1803.34	<1.96	<0.01	0.02	<235.24	0.16	968.41	<1.75	<0.51	465000	0.27
RL16ND193	<0.03	43.98	96.1	<0.00	<0.00	<77.22	<0.01	6.21	<0.64	<0.24	465000	1.08
RL16ND193	<0.02	<0.45	67.6	<0.00	<0.00	<65.50	<0.02	70.87	<0.47	<0.26	465000	<0.01
RL16ND193	<0.02	0.44	40.72	<0.00	<0.00	<50.05	<0.01	75.5	<0.39	0.17	465000	<0.00
RL16ND193	<0.01	<0.27	64.08	0	<0.00	<52.57	<0.02	44.56	<0.37	<0.14	465000	<0.00
RL16ND193	0.29	0.32	76.72	0.04	0.84	<45.92	<0.02	0.18	<0.33	0.66	465000	<0.00
RL16ND193	0.16	2121.47	99.59	0.03	0.79	<102.58	0.11	2.91	8.39	15.17	465000	2.01
RL16ND193	0.11	234.92	89.02	0.01	0.77	5593.67	0.26	18.82	0.62	1.9	465000	0.49
RL16ND193	<0.03	2.42	84.49	<0.00	0.07	<97.72	<0.04	2.7	<0.75	<0.34	465000	0.04
RL16ND193	<0.02	<0.25	65.13	<0.00	0.04	<45.42	<0.01	10.67	<0.40	<0.15	465000	<0.00
RL16ND193	<0.01	<0.24	63.51	0.05	0.02	<49.86	<0.01	4.65	<0.40	0.21	465000	<0.00
RL16ND193	<0.02	<0.25	76.34	0	0.02	<57.96	<0.03	6.6	<0.34	<0.16	465000	<0.00
RL16ND193	<0.01	<0.23	59.99	<0.00	0.01	<46.25	<0.03	0.66	<0.31	<0.14	465000	<0.00
RL16ND193	<0.01	<0.26	102.74	<0.00	0.01	<52.39	<0.02	10.24	<0.30	<0.12	465000	<0.00
RL16ND193	0.02	<0.31	92.39	0	0.01	<67.11	<0.02	0.98	<0.35	<0.18	465000	<0.01
RL16ND193	<0.02	<0.27	66.43	<0.00	0.01	<55.43	<0.01	269.99	<0.42	<0.15	465000	<0.00
RL16ND193	<0.01	0.35	89.07	<0.00	0	<56.24	<0.01	0.37	<0.41	<0.14	465000	<0.00
RL16ND193	<0.02	<0.28	106.3	0	0	<55.31	<0.02	67.32	0.45	<0.16	465000	0
RL16ND193	<0.01	<0.24	85.42	0	0	<52.75	<0.02	73.19	<0.29	<0.15	465000	<0.00
RL16ND195	2.51	3130.23	10.16	0.03	4.01	6257.61	<0.03	2352.77	1.54	145.46	465000	0.32
RL16ND195	14.94	334.86	<0.74	0.01	2.88	<110.55	<0.02	2946.2	<0.68	349.26	465000	0.04
RL16ND195	4.78	560.32	9.41	0	2.16	240.37	<0.02	2557.76	0.73	294.78	465000	0.82
RL16ND195	44.95	667.85	15.26	0	1.32	147.74	0.61	1956.7	1.54	239.14	465000	0.03
RL16ND195	4.27	456.77	39.77	<0.01	1.16	1211.17	<0.04	2816.2	2.1	174.22	465000	<0.01
RL16ND195	1.28	732.5	62.99	0.03	1.16	209.08	<0.01	1746.02	0.51	125.34	465000	0.03
RL16ND195	6.08	28.68	0.69	0	1.12	<51.45	0.03	1928.92	<0.33	219.29	465000	<0.00
RL16ND195	25.6	4509.42	68.63	0	0.98	570.13	0.36	2152.69	1.7	68.29	465000	0.31
RL16ND195	16.76	2.46	1.13	0	0.92	62.6	<0.02	1893.55	<0.49	248.12	465000	0
RL16ND195	18.08	298.18	5.43	<0.00	0.77	219.68	0.07	1769.37	2.38	295.82	465000	0.07

Sample ID	Ag107_ppm	Al_ppm	As_ppm	Au_ppm	Bi_ppm	Ca43_ppm	Cd_ppm	Co_ppm	Cr53_ppm	Cu65_ppm	Fe57_ppm	Gd_ppm
RL16ND195	18.08	298.18	5.43	<0.00	0.77	219.68	0.07	1769.37	2.38	295.82	465000	0.07
RL16ND195	7.44	125.43	2.03	0.02	0.57	700.61	<0.02	70.21	0.48	497.58	465000	0.04
RL16ND195	11.76	49.42	9.95	0.04	0.57	59.72	0.07	397.39	<0.34	323.29	465000	0.01
RL16ND195	0.98	41.94	4.04	<0.00	0.52	<42.17	<0.03	2311.05	0.67	191.48	465000	<0.00
RL16ND195	0.4	21.29	0.79	0	0.34	<45.11	<0.02	2420.37	<0.41	258.73	465000	0.01
RL16ND195	21.4	548.75	4.62	<0.00	0.31	300.28	0.33	1872.64	0.87	63.83	465000	0.03
RL16ND195	9.78	102.89	6.22	0.01	0.25	362.35	0.05	720.08	<0.35	377.1	465000	0
RL16ND195	16.56	89.12	2.61	0.01	0.18	589.78	0.06	2004.84	0.61	270.39	465000	0.03
RL16ND195	20.83	4845.49	396.6	0.01	0.05	16258.25	0.13	621.57	5.19	57.64	465000	0.14
RL16ND195	10.47	361.59	265.92	<0.00	0.01	5751.81	0.17	128.2	2.44	58.47	465000	0.25
RL16ND200	3.08	31.07	6867.08	0.1	27.41	<42.39	0.07	146.44	<0.35	9.48	465000	0.01
RL16ND200	3.6	1236.58	3519.2	0.09	14.04	<40.79	0.02	65.21	<0.35	6.45	465000	<0.00
RL16ND200	1.35	56.28	5243.71	0.06	8.95	<40.18	<0.00	43.79	<0.36	5.36	465000	0.01
RL16ND200	0.61	40.34	5761.81	0.02	3.88	<36.53	0.01	88.37	<0.38	3.29	465000	0.02
RL16ND200	0.3	8.41	8874.86	0.02	3.06	<49.55	0.03	7801.25	<0.27	2.88	465000	0.02
RL16ND200	0.08	5.54	5452.18	0.04	1.09	<40.58	<0.00	66.04	<0.40	3.42	465000	0.04
RL16ND200	0.28	0.28	7110.88	0.02	0.8	<32.51	<0.00	51.03	<0.39	0.2	465000	0.03
RL16ND200	0.02	0.53	6659.95	0	0.67	<39.34	<0.01	38.56	<0.29	0.41	465000	<0.00
RL16ND206	7.83	10.02	75.91	0.24	6.18	220.34	175.27	614.21	<0.38	4102.54	465000	<0.00
RL16ND206	26.69	577.14	650.98	0.22	2.11	1497.98	0.77	603.22	0.56	5802.19	465000	0.47
RL16ND206	11.54	215.63	594.45	0.11	1.5	2482.24	0.51	309.97	<0.38	926.71	465000	4.66
RL16ND208	<0.02	33.53	342.69	<0.01	<0.00	790.38	<0.04	193.92	<0.58	0.39	465000	0.39
RL16ND208	0.89	24.86	419.35	0.33	1.47	84.41	0.69	44	<0.36	140.69	465000	0
RL16ND208	0.92	1297.94	569.19	0.32	1.46	71.61	0.6	251.81	0.53	47.28	465000	0.02
RL16ND208	0.48	118.1	287.47	0.16	0.51	<41.41	0.42	33.7	<0.33	58.09	465000	0.1
RL16ND208	0.69	78.78	414.45	0.16	0.48	<82.19	0.68	103.54	<0.59	80.56	465000	0.01
RL16ND208	0.22	1497.63	386.38	0.14	0.36	67	<0.04	551.38	0.58	9.74	465000	0.02
RL16ND208	0.28	402.75	487.7	0.17	0.27	<73.77	<0.04	358.63	<0.76	5.08	465000	0.12
RL16ND208	0.2	1191.36	315.33	0.1	0.21	<40.06	<0.02	230.67	0.62	3.56	465000	0.02
RL16ND208	0.14	2.56	322.51	0.07	0.18	<40.14	<0.02	216.89	<0.34	1.35	465000	<0.00

Sample ID	Ag107_ppm	Al_ppm	As_ppm	Au_ppm	Bi_ppm	Ca43_ppm	Cd_ppm	Co_ppm	Cr53_ppm	Cu65_ppm	Fe57_ppm	Gd_ppm
RL16ND208	0.14	2.56	322.51	0.07	0.18	<40.14	<0.02	216.89	<0.34	1.35	465000	<0.00
RL16ND208	0.1	92.01	399	0.05	0.12	<63.42	<0.03	395.33	<0.44	1.42	465000	0.09
RL16ND208	<0.02	104.62	519.69	0.03	0.12	<65.08	<0.04	402.08	<0.61	2.17	465000	0.02
RL16ND208	0.03	1056.72	224.29	0.03	0.1	<45.08	<0.02	288.52	<0.45	11.61	465000	0.49
RL16ND208	0.06	<0.32	161.7	0.03	0.07	<46.91	<0.02	259.13	<0.38	4.33	465000	<0.00
RL16ND208	<0.03	65.93	252.2	0.03	0.07	<72.06	<0.03	325.11	<0.64	3.05	465000	0.25
RL16ND208	<0.02	5156.66	393.62	0.02	0.03	106.64	<0.03	196.63	0.79	2.22	465000	0.03
RL16ND208	<0.03	157.76	227.41	<0.01	0.03	<78.13	0.06	267.49	<0.66	1.64	465000	0.02
RL16ND208	0.16	2.3	244.87	0.15	0.03	<52.81	<0.03	296.67	<0.46	1.99	465000	<0.00
RL16ND208	<0.02	12.66	388.03	0	0.02	<39.64	<0.01	386.44	<0.42	1.06	465000	0.03
RL16ND208	0.02	2.62	249.4	0.01	0.02	<47.70	<0.03	258.27	<0.49	0.29	465000	<0.01
RL16ND208	<0.02	52.79	236.53	0	0.02	<41.14	<0.02	449.14	<0.37	0.53	465000	0.02
RL16ND208	0.03	22.4	278.56	0.01	0.01	<51.42	<0.03	327.86	<0.41	14.06	465000	0.01
RL16ND208	<0.01	9.33	412.59	<0.00	0	<54.71	<0.01	179.01	<0.43	<0.16	465000	<0.00
RL16ND208	<0.02	0.41	249.44	<0.00	0	<66.04	<0.02	320.23	<0.43	0.34	465000	<0.00
RL16ND209	20.92	2151.48	1582.58	0.25	17.94	1180.01	0.61	515.68	2.2	189.52	465000	0.15
RL16ND209	1.01	39.94	115.56	0.05	2.62	<41.17	<0.01	141.6	1.36	93.95	465000	0.05
RL16ND209	1.15	432.88	1634.38	0.32	0.71	<44.21	<0.01	9.97	<0.36	1.06	465000	0.02
RL16ND209	0.02	68.1	1054.64	0.02	0.63	<31.50	0.01	101.83	<0.31	0.64	465000	0.01
RL16ND209	0.22	48.23	8083.59	0.51	0.42	<39.25	<0.02	224.17	<0.33	20.93	465000	<0.00
RL16ND209	0.01	<0.16	5442.71	0.02	0.35	<42.23	<0.00	2050.36	<0.36	<0.44	465000	0.04
RL16ND209	<0.01	<0.18	4120.74	0.1	0.27	<55.60	<0.01	82.15	<0.44	<0.52	465000	0.05
RL16ND209	<0.01	7.67	637	0.01	0.24	<60.74	0.01	1037.51	<0.45	<0.35	465000	<0.00
RL16ND209	11.3	22.87	4410.98	0.08	0.23	715.65	0.06	107.43	<0.62	118.62	465000	0.02
RL16ND209	0.02	0.29	5560.8	0.05	0.21	<60.73	<0.01	185.5	<0.50	<0.57	465000	0.01
RL16ND209	<0.01	2.63	4498.35	0.02	0.21	<44.95	0.01	39.42	0.52	<0.26	465000	0.01
RL16ND209	0.02	<0.15	4041.7	0.11	0.13	<26.92	<0.00	77.73	<0.35	0.9	465000	<0.00
RL16ND209	0.04	16.67	4410.61	0.44	0.09	<42.74	<0.02	121.14	<0.31	3.81	465000	0.94
RL16ND209	0.1	22.06	1829.47	0.01	0.07	<38.02	<0.01	12.01	<0.33	4.75	465000	0.03
RL16ND209	0.2	0.21	2410.01	0.01	0.07	<51.34	<0.01	71.7	<0.41	<0.41	465000	<0.00

Sample ID	Ag107_ppm	Al_ppm	As_ppm	Au_ppm	Bi_ppm	Ca43_ppm	Cd_ppm	Co_ppm	Cr53_ppm	Cu65_ppm	Fe57_ppm	Gd_ppm
RL16ND209	0.2	0.21	2410.01	0.01	0.07	<51.34	<0.01	71.7	<0.41	<0.41	465000	<0.00
RL16ND209	<0.01	<0.30	4428.87	0.01	0.06	<88.85	<0.02	5.63	<0.63	<0.77	465000	0.04
RL16ND209	0.01	<0.22	3608.81	<0.00	0.06	<47.89	<0.01	173.41	<0.58	<0.51	465000	0.02
RL16ND209	<0.01	<0.19	4376.71	0.13	0.04	<79.62	<0.03	18.96	<0.44	<0.55	465000	0.01
RL16ND209	<0.01	<0.22	5350.94	0.01	0.04	<31.82	0.01	28.65	<0.47	<0.36	465000	0.01
RL16ND209	<0.01	<0.11	613.15	0	0.03	<41.61	0.03	570.88	<0.27	<0.33	465000	<0.00
RL16ND209	<0.01	<0.14	4380.68	0	0.03	<33.28	<0.00	79.34	0.33	<0.36	465000	<0.00
RL-16ND211	0.05	<0.26	1655.66	<0.00	<0.00	<50.18	<0.02	11471.3	<0.35	<0.15	465000	<0.00
RL16ND211	121.58	<0.63	4472.45	3.71	48.69	<114.53	<0.05	8855.5	<0.76	0.6	465000	<0.00
RL16ND211	0.95	3517.56	1769.39	0.01	16.31	<69.64	0.04	7010.3	<0.90	0.99	465000	0.62
RL16ND211	4.4	85.64	1439.35	0.03	15.77	96	0.31	4317.56	<0.48	10.02	465000	0.5
RL16ND211	3	<0.27	18.68	0.06	12.25	<38.40	<0.03	12382.5	<0.40	14.88	465000	<0.00
RL16ND211	1.43	<0.48	147.56	0.05	3.25	<74.65	<0.02	9515.46	<0.74	1.04	465000	<0.01
RL16ND211	1.02	2.27	153.56	<0.01	1.05	<221.88	<0.08	214.33	<2.20	<0.84	465000	0.06
RL16ND211	0.04	<0.29	780.21	0	0.3	<49.56	<0.02	1019.62	<0.42	<0.13	465000	<0.00
RL16ND211	0.51	<3.68	<5.58	<0.02	0.3	<784.89	<0.26	40.91	<5.04	<1.99	465000	<0.01
RL16ND211	0.02	<0.32	2272.18	0	0.28	<57.49	<0.02	10831.5	<0.38	<0.12	465000	<0.00
RL16ND211	<0.02	<0.32	278.39	0	0.22	<39.09	<0.02	2289.92	<0.40	<0.16	465000	<0.00
RL16ND211	0.65	1.64	<0.82	<0.00	0.21	188.92	<0.04	52.51	<0.74	<0.29	465000	0.11
RL16ND211	0.08	<0.64	3.92	<0.00	0.19	<87.97	<0.06	15113.3	<0.90	0.67	465000	0.02
RL16ND211	<0.02	<0.33	2951.28	0	0.11	<52.63	<0.02	11999.6	<0.36	<0.13	465000	<0.00
RL16ND211	0.51	0.7	<0.92	<0.01	0.04	<131.44	<0.06	48.5	<0.95	<0.30	465000	<0.00
RL16ND211	0.02	<0.31	82.2	<0.00	0.02	<53.13	<0.02	10888	<0.35	<0.16	465000	<0.00
RL16ND212	<0.01	<0.18	145.92	<0.00	<0.01	<58.90	0.01	2964.47	<0.39	<0.31	465000	<0.00
RL16ND212	<0.01	<0.16	354.34	0	<0.01	<41.87	0.02	6592.6	<0.33	<0.26	465000	<0.00
RL16ND212	<0.01	<0.20	203.43	<0.00	<0.01	<58.51	<0.01	1531.52	<0.36	<0.29	465000	<0.00
RL16ND212	0.01	<0.12	58.39	<0.00	<0.00	<35.08	<0.00	381.35	<0.26	<0.26	465000	<0.00
RL16ND212	<0.01	<0.13	130.15	<0.00	<0.00	<31.84	<0.01	28.33	<0.25	0.46	465000	0.02
RL16ND212	<0.01	<0.15	132.33	<0.00	<0.00	<44.03	<0.00	156.73	<0.28	0.38	465000	<0.00
RL16ND212	<0.01	0.23	58.46	0	<0.00	<40.55	<0.01	434.31	<0.25	<0.23	465000	<0.00

Sample ID	Ag107_ppm	Al_ppm	As_ppm	Au_ppm	Bi_ppm	Ca43_ppm	Cd_ppm	Co_ppm	Cr53_ppm	Cu65_ppm	Fe57_ppm	Gd_ppm
RL16ND212	<0.01	0.23	58.46	0	<0.00	<40.55	<0.01	434.31	<0.25	<0.23	465000	<0.00
RL16ND212	<0.01	<0.13	117.69	<0.00	<0.00	<37.82	<0.01	19.72	<0.26	<0.23	465000	<0.00
RL16ND212	0.01	<0.13	287.07	<0.00	<0.00	<42.05	<0.02	1600.49	<0.32	0.21	465000	<0.00
RL16ND212	0.11	1654.29	76.57	0.02	11.02	279.43	<0.01	273.82	0.48	9.24	465000	0.79
RL16ND212	0.87	2.64	164.66	0.47	8.92	<37.44	0.06	2094.06	<0.31	532.51	465000	0.01
RL16ND212	0.04	151.81	238.25	0.02	7.44	26740.62	<0.01	3128.66	<0.72	0.86	465000	6.89
RL16ND212	<0.01	24.89	185.03	<0.00	0.38	<44.39	<0.02	1135.56	<0.35	<0.23	465000	<0.00
RL16ND212	<0.01	15.26	55.96	0	0.32	<36.84	<0.00	167.29	<0.30	<0.25	465000	<0.00
RL16ND212	<0.01	0.62	265.1	0	0.22	<36.98	<0.00	1012.91	<0.32	<0.23	465000	<0.00
RL16ND212	<0.01	<0.14	416.11	<0.00	0.12	<40.99	0.01	5686.71	<0.37	<0.23	465000	<0.00
RL16ND212	<0.01	<0.19	114.35	<0.00	0.1	<41.02	<0.01	1356.23	<0.36	<0.24	465000	<0.00
RL16ND212	0.1	0.46	58.44	<0.00	0.07	<35.86	<0.01	215.96	<0.42	0.95	465000	0.03
RL16ND212	<0.01	<0.13	415.25	<0.00	0.07	<39.86	<0.01	7087.63	<0.40	<0.25	465000	<0.00
RL16ND212	0.31	0.13	268.7	<0.00	0.02	<31.68	<0.02	5882.45	<0.27	<0.23	465000	<0.00
RL16ND212	0.01	<0.14	179.56	<0.00	0.02	<35.47	<0.00	4118.53	<0.35	<0.24	465000	<0.00
RL16ND212	0.01	0.18	53.4	0	0.01	<35.05	<0.00	308.28	<0.23	0.41	465000	<0.00
RL16ND216	20.14	<0.36	1571.76	0.08	69.37	<69.02	0.13	3119.4	<0.37	9.19	465000	<0.01
RL16ND216	6.7	161.16	570.89	0.57	18.5	<68.45	<0.05	432.64	<0.67	3.44	465000	<0.00
RL16ND216	0.51	6.62	955.6	0.02	13.24	5280.79	0.09	1037.96	1.2	1.33	465000	1.44
RL16ND216	1.7	36.26	739.32	0.13	11.1	<53.14	<0.01	1581.72	16.76	1.37	465000	<0.00
RL16ND216	4.38	1.41	1850.84	0.01	8.67	<63.97	<0.04	6219.45	<0.62	0.65	465000	<0.00
RL16ND216	2.43	99.6	714.87	0.05	6.74	<39.34	<0.02	1445.66	<0.41	0.87	465000	<0.00
RL16ND216	0.99	<0.27	727.08	0.01	4.93	<39.16	0.01	1899.48	<0.29	0.49	465000	<0.00
RL16ND216	0.49	1.88	798.58	0.04	4.02	<42.89	<0.01	2985.93	<0.32	0.62	465000	<0.00
RL16ND216	1.46	<0.28	1350.94	0.01	2.24	<41.35	<0.03	3988.47	<0.32	0.87	465000	<0.00
RL16ND216	<0.03	<0.70	1493.94	<0.01	1.65	<126.02	<0.04	772.23	<0.83	<0.29	465000	<0.00
RL16ND216	0.05	<0.28	910.03	0	0.82	<53.38	<0.02	2813.86	0.41	0.2	465000	<0.01
RL16ND216	0.07	<0.32	1379.29	<0.00	0.66	<70.09	<0.04	3896.78	<0.51	<0.21	465000	<0.00
RL16ND216	<0.02	4.44	1648.93	<0.00	0.24	<50.24	<0.03	5041.29	<0.39	<0.14	465000	<0.00
RL16ND216	<0.02	<0.22	1235.82	0	0.11	<48.00	<0.01	3279.41	<0.32	<0.15	465000	<0.00

Sample ID	Ag107_ppm	Al_ppm	As_ppm	Au_ppm	Bi_ppm	Ca43_ppm	Cd_ppm	Co_ppm	Cr53_ppm	Cu65_ppm	Fe57_ppm	Gd_ppm
RL16ND216	<0.02	<0.22	1235.82	0	0.11	<48.00	<0.01	3279.41	<0.32	<0.15	465000	<0.00
RL16ND216	<0.01	<0.28	1470.79	0	0.07	<50.72	<0.02	4842.62	<0.40	<0.13	465000	<0.00
RL16ND216	<0.02	<0.24	2041.94	<0.00	0.06	<37.29	<0.01	2205.47	<0.38	<0.13	465000	0.02
RL16ND216	0.02	0.48	1697.58	0	0.05	<59.48	<0.03	5508.62	<0.37	<0.15	465000	0
RL16ND216	<0.02	<0.23	1573.31	<0.00	0.04	<41.45	<0.02	6510.51	<0.35	<0.14	465000	<0.00
RL16ND216	<0.01	<0.21	388.06	0	0.01	<40.08	<0.03	1321.15	<0.35	<0.11	465000	<0.00
RL16ND216	<0.02	<0.26	1277.72	0	0.01	<44.44	<0.03	2741.24	<0.42	<0.15	465000	<0.00
RL16ND216	<0.02	<0.28	1413.89	<0.00	0.01	<56.17	<0.01	4777.02	<0.38	<0.16	465000	<0.00
RL16ND216	<0.02	<0.30	1375.14	<0.00	0	<56.83	<0.03	697.71	<0.47	<0.17	465000	<0.00
RL16ND216	<0.02	0.4	1737.02	<0.00	0	<46.78	<0.03	4396.54	<0.37	<0.16	465000	<0.00
RL16ND110	<0.01	<0.27	4622.41	<0.00	<0.00	<97.60	<0.02	414.23	<0.27	<0.25	465000	<0.00
RL16ND110	0.02	<0.25	3359.28	<0.00	<0.00	<112.43	<0.02	205.75	<0.34	<0.26	465000	<0.00
RL16ND110	<0.01	<0.19	2701.76	0	<0.00	<81.45	<0.01	230.35	<0.26	<0.21	465000	<0.00
RL16ND110	2.11	1466.63	2542.56	0.06	0.09	<92.74	0.08	261.7	<0.34	7.29	465000	<0.00
RL16ND110	0.16	4.98	3145.02	0.07	0.08	<98.07	<0.01	321.05	<0.29	0.97	465000	0.01
RL16ND110	0.03	2479.05	2828.82	0	0.06	<82.19	0.05	238.64	<0.33	1.39	465000	<0.00
RL16ND110	0.02	609.3	3799.05	0.01	0.05	<85.55	<0.04	259.34	<0.21	<0.24	465000	<0.00
RL16ND110	0.14	129.29	3234.49	0.13	0.05	<83.37	<0.03	293.41	<0.23	0.96	465000	<0.00
RL16ND110	0.07	<0.20	2836.12	0.14	0.04	<73.78	<0.01	200.82	<0.25	0.7	465000	<0.00
RL16ND110	0.08	<0.22	3339.35	0.1	0.03	<85.28	<0.03	211.98	<0.30	0.32	465000	<0.00
RL16ND110	0.01	1146.89	2887.3	0.03	0.02	<85.95	<0.02	226.52	<0.19	6.36	465000	<0.00
RL16ND110	0.13	<0.16	2733.12	0.14	0.01	<87.74	<0.03	273.72	<0.27	0.7	465000	<0.00
RL16ND110	0.03	<0.23	2448.35	0.05	0.01	<84.05	<0.03	258.98	<0.22	<0.21	465000	<0.00
RL16ND110	0.02	<0.41	5964.66	0.01	0	<140.12	<0.03	407.19	<0.38	<0.36	465000	<0.00
RL16ND114	<0.01	0.33	2244.51	0	<0.00	<120.74	<0.01	202.33	0.37	<0.27	465000	<0.01
RL16ND114	<0.01	<0.15	1489.86	0	<0.00	<100.94	<0.02	1375.7	0.42	<0.28	465000	<0.00
RL16ND114	<0.01	<0.18	1180.46	<0.00	<0.00	<99.58	<0.01	136.91	<0.32	<0.25	465000	<0.01
RL16ND114	<0.01	<0.14	722.75	<0.00	<0.00	<82.79	0.11	2114.97	<0.19	<0.33	465000	<0.01
RL16ND114	<0.01	<0.14	867.5	0.01	<0.00	<75.55	<0.03	725.84	0.35	<0.33	465000	<0.00
RL16ND114	<0.00	<0.14	256.78	0	<0.00	<81.83	<0.02	5.83	0.56	<0.21	465000	<0.00

Sample ID	Ag107_ppm	Al_ppm	As_ppm	Au_ppm	Bi_ppm	Ca43_ppm	Cd_ppm	Co_ppm	Cr53_ppm	Cu65_ppm	Fe57_ppm	Gd_ppm
RL16ND114	<0.00	<0.14	256.78	0	<0.00	<81.83	<0.02	5.83	0.56	<0.21	465000	<0.00
RL16ND114	<0.00	<0.14	1032.89	<0.00	<0.00	<89.38	<0.03	308.3	0.48	<0.26	465000	<0.00
RL16ND114	1.12	0.18	681.08	0.11	2.63	<76.55	0.14	545.67	0.34	522.71	465000	<0.01
RL16ND114	0.09	<0.19	470.56	0.03	1.4	<88.17	<0.03	150.15	<0.16	0.82	465000	<0.00
RL16ND114	0.08	<0.15	553.21	0.03	0.91	<94.12	<0.03	417.8	<0.21	24.9	465000	<0.00
RL16ND114	0.01	<0.15	170.2	0.03	0.52	<83.45	<0.02	325.92	<0.20	0.96	465000	<0.00
RL16ND114	0.03	<0.17	609.11	0.03	0.43	<70.73	<0.03	2584.64	<0.24	2.38	465000	<0.00
RL16ND114	0.13	<0.15	1432.95	0.02	0.33	<90.88	<0.01	369.93	0.31	<0.25	465000	<0.00
RL16ND114	<0.01	<0.16	756.74	0.01	0.26	<72.37	0.02	342.75	<0.27	0.96	465000	<0.00
RL16ND114	0.02	<0.18	177.59	0.01	0.09	<121.61	<0.04	190.86	<0.28	5.56	465000	<0.00
RL16ND114	<0.00	<0.22	649.86	<0.00	0.07	<113.75	<0.02	277.06	0.41	<0.30	465000	<0.00
RL16ND114	<0.01	<0.19	1430.86	<0.00	0.01	<69.02	<0.01	5408.06	<0.27	<0.24	465000	<0.00
RL16ND114	0.01	<0.16	2399.98	<0.00	0.01	<73.87	<0.04	697.79	<0.15	<0.24	465000	<0.00

Sample ID	Hf_ppm	K_ppm	Mg_ppm	Mn_ppm	Mo95_ppm	Na_ppm	Nb_ppm	Ni_ppm	Pb208_ppm	S_ppm	Sb_ppm	Se_ppm
RL-23-NS-001	2.85	24.52	80.47	91.65	0.04	<5.40	2.4	813.16	16.15	526029	20.92	78.8
RL-23-NS-001	0.85	7.89	4.64	6.36	<0.01	<4.80	0.02	150.58	8.34	532764	18.08	60.76
RL-23-NS-001	0.07	<4.46	219.4	55	<0.01	<5.04	0.28	112.15	4.24	530659	4.22	91.31
RL-23-NS-001	0.84	3.53	807.07	121.59	0.19	<2.57	1.91	492.23	19.34	524184	21.39	71.79
RL-23-NS-001	0.22	<1.72	106.87	9.09	0.01	<2.09	0.08	75.49	1.05	532110	1.72	63.05
RL-23-NS-001	0.64	<2.87	17.68	47.51	0.01	<3.60	0.57	76.12	2.59	532675	5.51	72.42
RL-23-NS-001	0.73	1.9	58.78	77.93	0.01	4.16	1.19	83.04	18.92	531182	16.98	61.45
RL-23-NS-001	0.86	<4.02	25.25	108.5	0.01	<4.59	2.34	113.87	4.11	530756	11.6	64.39
RL-23-NS-001	2.01	38.86	254.77	87.2	0.11	11.91	0.96	453.53	13.53	528086	17.45	69.05
RL-23-NS-001	0.34	78.66	308.36	136.56	0.07	3.09	1.62	228.44	11.48	527012	10.7	50.93
RL-23-NS-001	1.63	221	318.63	136.7	0.31	26.49	2.3	545.44	24.29	521986	34.52	74.73
RL-23-NS-001	0.53	4.02	38.03	23.82	<0.01	<2.30	0.49	195.86	1.74	532291	3.27	64.74
RL-23-NS-001	0.01	<3.72	34.91	21.79	0.01	<4.23	0.23	143.37	0.64	530959	2.79	83.33
RL-23-NS-001	0.22	4.38	357.41	70.11	<0.00	<1.94	0.96	149.33	4.31	526140	7.05	40.14
RL-23-NS-001	0.67	2.94	380.12	185.4	0.04	<2.05	2.84	425.99	10.46	526556	18.63	76.57
RL-23-NS-001	0.2	4.76	467.12	85.03	<0.01	<2.44	0.91	454.29	14.94	528214	16.87	79.92
RL-23-NS-001	0.85	2.52	98.91	5.63	<0.01	<2.28	0.05	283.26	10.3	532965	8.56	88.76
RL-23-NS-001	0.02	3.95	84.74	2.32	0.01	<2.30	0	104.61	0.8	532746	1.23	85.92
RL-23-NS-001	0.18	<1.76	169.07	22.74	<0.01	<2.35	0.45	150.79	1.89	532240	4.91	70.42
RL-23-NS-001	0.63	<5.70	759.79	130.58	<0.01	<7.32	0.75	243.96	10.13	528264	12.2	127.73
RL-23-NS-001	0.97	2.48	401.73	52.54	<0.01	3.02	0.5	203.8	3.06	529472	6.37	92.59
RL-23-NS-001	0.32	3.69	105.65	52.53	<0.00	<2.31	0.75	304.58	2	531342	5.62	80.62
RL-23-NS-001	2.85	3.43	49.77	53.54	<0.00	<2.42	1.03	621.18	4.41	528338	9.76	93
RL-23-NS-001	0.48	<4.24	3.21	0.77	<0.01	<4.87	0.02	135.33	0.71	532607	1.4	66.05
RL-23-NS-001	1.92	3.01	225.97	64.11	0.01	<2.17	1.31	262.39	5.96	530244	13.55	76.11
RL-23-NS-001	0.55	<4.43	80.96	52.86	<0.01	7.96	0.74	397.85	3.36	530265	7.39	69.97
RL-23-NS-001	0.62	<4.49	32.2	181.5	<0.01	<5.35	2.34	196.09	5.99	527297	10.56	67.77
RL-23-NS-001	0.69	<11.33	9.41	97.38	<0.03	<13.46	1.89	237.53	3	530675	6.05	116.69
RL-23-NS-001	2.29	<4.39	137.85	75.17	<0.01	8.73	1.1	385.8	3.41	529363	7.92	46.62
RL-23-NS-001	0.94	49.06	134	60.65	0.11	4.39	1.23	358.28	19.48	524658	24.69	49.01
RL-23-NS-001	0.15	<4.23	6.92	15.4	<0.01	<4.55	0.07	171.65	8.92	532398	24.16	63.03

Sample ID	Hf_ppm	K_ppm	Mg_ppm	Mn_ppm	Mo95_ppm	Na_ppm	Nb_ppm	Ni_ppm	Pb208_ppm	S_ppm	Sb_ppm	Se_ppm
RL-23-NS-001	0.45	<4.14	53.97	38.74	<0.01	<4.82	0.78	228.4	2.55	530578	7.36	80.1
RL-23-NS-001b	<0.00	7.93	17.82	5.15	1.52	9.71	<0.00	729.12	166.09	533139	252.85	28.05
RL-23-NS-001b	<0.00	<3.47	0.56	1.2	1.66	3.75	<0.00	2107.7	34.1	533952	65.23	206.79
RL-23-NS-001b	<0.00	6.12	11.59	1.29	1.38	8.36	0.01	2517.84	47.19	533677	50.2	266.77
RL-23-NS-001b	0	10.36	179.03	13.36	0.77	30.72	0.02	507.55	32.62	531554	58.76	27.74
RL-23-NS-001b	0	7.16	97.16	6.09	0.89	7.74	0	497.52	49.5	533345	98.9	29.44
RL-23-NS-001b	<0.00	4.57	1.49	1.86	0.99	5.55	<0.00	571.61	61.84	533967	86.59	81.35
RL-23-NS-001b	0.01	20.91	178.64	5.28	1.21	26.21	0	407.81	81.5	532728	152.04	32.84
RL-23-NS-001b	<0.00	4.13	16.87	4.37	0.79	20.31	<0.00	363.6	57.15	533591	113	32.9
RL-23-NS-001b	<0.00	27.06	11.66	18.61	0.65	13.75	0	821.52	49.11	532662	25.71	134.22
RL-23-NS-001b	<0.00	68.74	192.61	11.21	0.84	39.68	0	626.6	100.37	531816	173.68	32.8
RL-23-NS-001b	<0.00	13.29	8.44	2.36	1.67	33.43	<0.00	1025.91	66.2	533432	99.56	106.95
RL-23-NS-001b	<0.00	32.23	2.62	28.51	0.71	39.93	<0.00	417.78	114.32	530853	231.51	24.37
RL-23-NS-001b	<0.00	15.17	5.94	3.65	0.97	34.5	<0.00	539.35	43.26	533434	77.3	40.52
RL-23-NS-001b	<0.00	39.75	53.74	16.51	1.22	14.94	<0.00	524.76	86.94	533002	144.01	43.47
RL-23-NS-001b	<0.00	6.49	0.88	1.91	1.3	8.9	<0.00	581.65	39.01	534051	95.45	43.18
RL-23-NS-001b	<0.00	4.22	0.35	0.67	1.33	3.35	<0.00	246.28	5.43	534263	38.69	19.33
RL-23-NS-001b	<0.00	5.69	0.6	3.71	0.84	21.01	0	330.93	100.68	533671	167.3	15
RL-23-NS-001b	<0.00	5.99	1.17	2.01	0.71	3.74	<0.00	273.01	43.03	534142	95.12	18.78
RL-23-NS-001b	<0.00	10.43	99.14	3.88	0.57	<3.81	<0.00	177.22	8.74	528508	20.07	35.02
RL-23-NS-001b	<0.00	6.41	0.41	1.18	1.04	7.83	<0.00	228.12	9.17	534156	30.67	20.91
RL-23-NS-001b	<0.00	10.66	0.46	2.69	1.14	4.02	<0.00	237.83	35.09	534177	86.7	20.16
RL-23-NS-001b	<0.00	4.24	0.28	1.19	2.58	4.2	<0.00	106.99	12.92	534376	32.64	23.42
RL-23-NS-001b	<0.00	<3.89	30.98	2.68	0.09	<2.48	<0.00	154.86	5.63	531665	11.76	28.59
RL-23-NS-001b	<0.00	<8.70	121.66	13.4	1.21	19.11	<0.00	360.25	134.58	532832	241.83	23.42
RL-23-NS-001b	<0.00	5.2	59.32	19.96	1.31	6.61	<0.00	245.53	24.64	534050	51.92	20.83
RL-23-NS-001b	0	8.46	0.92	2.46	0.95	8.22	0	349.13	84.45	533870	155.25	24.41
RL-23-NS-001b	0	21.44	20.3	2.73	1.11	17.32	<0.00	416.79	94.83	533108	176.13	21.17
RL-23-NS-001b	<0.00	5.41	0.47	1.42	0.95	6.99	<0.00	486.97	39.48	534010	76.08	53.51
RL-23-NS-001b	<0.00	12	1.48	4.68	1.65	10.03	<0.00	570.89	174.72	533147	253.34	18.4
RL-23-NS-001b	<0.00	13.79	73.18	4.68	0.77	33.47	0	248.06	36.06	533403	75.5	10.85

Sample ID	Hf_ppm	K_ppm	Mg_ppm	Mn_ppm	Mo95_ppm	Na_ppm	Nb_ppm	Ni_ppm	Pb208_ppm	S_ppm	Sb_ppm	Se_ppm
RL-23-NS-001b	<0.00	8.74	3.37	2.32	1.68	17.03	<0.00	462.51	50.55	533757	104.09	21.68
RL-23-NS-001b	<0.00	9.91	0.47	3.16	0.92	17.7	<0.00	419.38	89.92	533562	156.46	23.26
RL-23-NS-001b	<0.00	7.23	123.39	7.35	1.82	23.03	<0.00	422.25	126.39	532607	206.49	13.7
RL-23-NS-005	0.85	513.08	26.94	5.6	1.76	52.12	0.31	239.03	2.66	521709	85.59	37.39
RL-23-NS-005	<0.00	189.39	8.57	<0.22	<0.01	19.97	0	105.61	6.07	529464	8.8	43.93
RL-23-NS-005	<0.00	<1.90	0.08	<0.23	<0.01	<2.25	<0.00	197.15	<0.01	533124	<0.03	41.55
RL-23-NS-005	<0.00	16.05	0.69	<0.20	<0.00	<2.03	0	65.57	0.19	530764	0.73	22.12
RL-23-NS-005	0.65	81.73	2.32	<0.23	0.1	18.96	0.37	204.31	1.73	530015	10.18	41.59
RL-23-NS-005	<0.00	4.56	0.27	<0.21	<0.00	<2.13	<0.00	119.02	0.03	533745	0.17	36.1
RL-23-NS-005	0.04	6.27	6.83	<0.22	1.64	2.95	0.01	129.51	0.17	532536	0.96	36.85
RL-23-NS-005	0.36	14.29	5	<0.22	0.16	3.08	0.09	250.78	0.41	532562	2.66	38.14
RL-23-NS-005	<0.00	<1.79	0.07	<0.21	<0.00	2.97	<0.00	73.77	0.04	532959	0.33	38.67
RL-23-NS-005	0.3	42.63	129.31	<0.23	0.1	33.97	0	249.49	1.01	531054	4.89	39.9
RL-23-NS-005	0.01	216.37	7.63	<0.36	27.16	25.75	<0.00	73.65	4.13	530939	15.34	29.53
RL-23-NS-005	0.18	593.92	19.65	<0.27	0.29	70.02	0.01	135.28	1.63	528133	9.93	47.12
RL-23-NS-005	0.1	264.49	39.42	<0.33	0.06	41.24	0.01	119.12	1.71	529377	6.99	46.64
RL-23-NS-005	0	48.95	2.88	<0.21	<0.00	4.7	0	75.91	2.77	532488	13.22	39.12
RL-23-NS-005	<0.00	2.05	9.88	0.32	0.01	<2.34	<0.00	110.07	1.83	516932	9.96	28.45
RL-23-NS-005	<0.00	14.6	137.39	5.72	0.01	<2.13	<0.00	323.95	0.89	531019	3.48	46.17
RL-23-NS-005	0	42.67	1.85	<0.23	<0.01	3.33	0	342.65	0.34	531805	1.39	37.19
RL-23-NS-005	0.64	291.93	6.72	<0.46	0.09	33.34	0.04	153.73	2.25	530201	10.85	60.29
RL-23-NS-005	0.61	41.73	44.8	<0.23	0.13	15.16	0.69	114.35	1.33	532056	9.46	32.57
RL-23-NS-005	0.01	1.95	0.35	<0.23	<0.01	<2.13	0.08	89.99	1.05	531928	1.93	22.6
RL-23-NS-005	0.21	<1.82	0.28	<0.23	<0.01	<2.16	0.02	129.95	0.07	532346	0.43	37.19
RL-23-NS-005	<0.00	6.96	0.25	<0.22	0.02	<2.07	<0.00	220.43	0.21	532044	0.96	34.38
RL-23-NS-006	0.12	11.7	0.52	<0.55	<0.01	<5.01	0.1	7.84	2.42	533688	4.21	57.91
RL-23-NS-006	0.37	82.41	90.4	2.77	3.85	<5.71	0.43	93.22	11.36	531249	22.73	71.11
RL-23-NS-006	1.37	73.34	192.27	57.77	0.59	7.44	2.53	128.78	14.24	525878	37.45	38.83
RL-23-NS-006	0.47	37.59	37.55	22.78	1.86	36.58	9.55	125.74	18.21	510951	39.74	47.68
RL-23-NS-006	3.44	35.98	149.84	16.87	0.24	8.87	0.54	140.19	19.58	530126	31.17	68.84
RL-23-NS-006	1.26	16.77	126	5.37	0.27	6.67	0.24	351.47	14.69	530547	41.05	36.05

Sample ID	Hf_ppm	K_ppm	Mg_ppm	Mn_ppm	Mo95_ppm	Na_ppm	Nb_ppm	Ni_ppm	Pb208_ppm	S_ppm	Sb_ppm	Se_ppm
RL-23-NS-006	3.33	101.71	229.4	80.41	41.5	<13.29	0.36	197.19	31.75	528526	42.64	34.13
RL-23-NS-006	0.8	22.99	152.28	12.05	6.42	17.04	0.06	809.84	66.91	531141	302.67	24.44
RL-23-NS-006	0.07	121.29	88.45	3.9	0.03	<4.49	0.07	51.48	11.81	532166	9.92	62
RL-23-NS-006	1.6	10.62	45.48	2.63	0.12	<4.26	0.5	187.68	12.87	531843	24.25	42.01
RL-23-NS-006	1.42	69.76	207.87	9	1.69	7.89	0.03	328.62	22.3	529675	81.34	26.72
RL-23-NS-006	0.11	6.29	<0.08	<0.53	0.02	<5.41	0.01	14.36	2.16	533881	3.3	39.09
RL-23-NS-006	0.4	126.02	326.37	19.86	<0.02	<9.97	<0.00	86.73	6.12	531020	10.49	40.99
RL-23-NS-006	0.09	23.02	60.86	11.11	9.14	25.58	0.17	561.09	70.53	532302	536.97	14.73
RL-23-NS-006	0.36	<3.71	154.88	15.03	0.18	<4.74	0.02	223.99	7.44	530628	15.6	40.03
RL-23-NS-006	0.1	32.75	1.19	<0.21	<0.00	<2.13	0.01	303.87	2.45	533011	5.03	33.95
RL-23-NS-006	0.06	112.79	1.78	<0.20	0.01	5.55	0.01	9.46	2.94	531725	4.08	50.09
RL-23-NS-006	0.03	17.76	2.21	<0.20	0.02	<2.23	0.01	26.68	4.53	533724	6	54.04
RL-23-NS-006	0.04	22.96	8.38	0.44	<0.01	<3.37	0	50.61	12.92	532025	6.49	44.43
RL-23-NS-006	0.15	162.28	62.84	20.78	<0.01	18.56	0	890.44	13.17	527948	15.25	91.09
RL-23-NS-006	<0.00	<4.45	0.13	<0.55	<0.01	<5.85	<0.00	73.36	0.06	533626	<0.05	13.74
RL-23-NS-006	0.03	94.12	41.78	7.45	0.03	6.6	0.01	84.31	3.04	531780	2.3	40.22
RL-23-NS-006	0.08	163.63	627.2	68.35	<0.03	25.82	<0.00	139.79	11.59	525496	10.94	55.85
RL-23-NS-006	<0.00	<4.71	49.01	5.25	<0.01	<5.15	0.01	2.42	2.21	533428	3.71	35.76
RL-23-NS-006	<0.00	<4.18	0.1	<0.52	<0.01	<5.27	<0.00	196.56	<0.03	533372	<0.05	58.43
RL-23-NS-006	<0.00	5.01	2.48	<0.53	<0.01	<4.71	<0.00	2.88	0.37	533410	0.63	54.3
RL-23-NS-006	0.22	46.04	72.91	5.61	3.75	12.27	0.99	666.57	66.23	528833	294.39	46.87
RL-23-NS-007	2.71	<1.73	0.18	<0.21	0.01	18.42	1.16	71.65	1.79	533608	0.16	8.12
RL-23-NS-007	<0.00	11.24	5.08	<0.22	<0.01	61.26	0	403.23	4.12	528856	<0.14	11.47
RL-23-NS-007	0.07	1.97	1.12	<0.23	<0.01	10.19	0	93.66	3.57	531362	<0.14	33.37
RL-23-NS-007	0	49.71	94.75	52.67	<0.01	29.18	0.02	982.09	320.65	533424	0.51	20.49
RL-23-NS-008	0.17	159.08	368.5	11.15	0.67	588.82	0.14	94	33.82	524418	41.45	49.78
RL-23-NS-008	0	<1.79	7.23	<0.20	0.03	<2.40	<0.00	369.61	7.26	529973	16.89	30.51
RL-23-NS-008	<0.00	<1.68	35.82	0.84	0.17	<2.15	<0.00	290.67	5.72	521268	14.68	23.96
RL-23-NS-008	0.02	253.77	683.14	34.23	0.05	342.36	0.02	47.45	23.72	513699	28.49	32.29
RL-23-NS-008	0.01	<2.72	381.75	2.84	0.65	<3.56	<0.00	159.93	7.27	523102	5.74	24.2
RL-23-NS-008	<0.00	7.31	44.6	4.25	1.84	20.4	<0.00	263.82	11.96	524685	24.77	29.94

Sample ID	Hf_ppm	K_ppm	Mg_ppm	Mn_ppm	Mo95_ppm	Na_ppm	Nb_ppm	Ni_ppm	Pb208_ppm	S_ppm	Sb_ppm	Se_ppm
RL-23-NS-008	<0.00	<2.65	193.59	5.79	5.4	570.06	<0.00	133.64	20.08	520216	41.92	21.02
RL-23-NS-009	<0.00	<3.83	<0.07	<0.47	<0.47	<4.06	<0.00	639.1	0.09	532743	0.44	10.11
RL-23-NS-009	0.01	2.27	20.86	1.82	1.82	<1.94	<0.00	237.11	0.92	532819	80.78	9.68
RL-23-NS-009	<0.00	<1.73	<0.03	<0.20	<0.20	2.57	<0.00	301.58	0.33	532080	0.22	17.23
RL-23-NS-009	0	31.01	353.23	43.76	43.76	4.47	0.01	261.89	7.12	533587	38.27	2.67
RL-23-NS-009	<0.00	4.29	120.75	129.53	129.53	<2.13	0	51.08	2.95	513848	40.44	2.99
RL-23-NS-009	<0.00	37.19	18.99	2.88	2.88	5.46	<0.00	89.69	1.03	533410	369.68	2.58
RL-23-NS-009	<0.00	<1.72	1.41	0.38	0.38	<2.24	0	31.25	0.88	534346	63.59	<1.70
RL-23-NS-009	<0.00	<1.76	3.72	1.58	1.58	<2.34	<0.00	411.43	6.23	531977	82.68	9.02
RL-23-NS-009	<0.00	28.49	8.3	0.7	0.7	7.81	<0.00	932.61	1.67	532312	0.7	15.74
RL-23-NS-009	0.01	<1.85	<0.04	<0.22	<0.22	<2.32	<0.00	493.79	0.03	532667	0.08	12.91
RL-23-NS-009	0	87.19	162.22	17.13	17.13	5.6	<0.00	147.19	2.99	533337	154.34	2.11
RL-23-NS-009	<0.00	92.96	27.13	<0.54	<0.54	<4.56	<0.00	762.47	2.69	532726	1.26	7.48
RL-23-NS-009	0.01	36.64	384.02	55.12	55.12	7.64	<0.00	176.33	4.14	533512	200.85	2.69
RL-23-NS-009	0	33.71	186.95	10.49	10.49	<1.90	<0.00	340.6	7.61	532006	24.13	10.89
RL-23-NS-009	<0.00	4.56	10.99	0.58	0.58	<2.12	0	522.86	4.51	533304	3.72	11.15
RL-23-NS-009	<0.00	81.49	751.18	123.37	123.37	45.69	<0.00	356.94	6.55	532501	197.94	2.69
RL-23-NS-009	<0.00	45.97	382.16	86.72	86.72	12.32	<0.00	145.57	2.31	533268	352.99	2.43
RL-23-NS-009	0	33.9	23.13	18.88	18.88	4.46	<0.00	87.94	2.66	530163	164	2.51
RL-23-NS-009	<0.00	24.49	51.22	41.27	41.27	20.07	0.02	208.67	7.98	527933	46.51	4.62
RL-23-NS-009	<0.00	<4.27	0.98	0.58	0.58	<4.72	<0.00	1142.16	0.25	533018	<0.05	18.61
RL-23-NS-009	<0.00	168.5	292.8	38.49	38.49	8.25	0.22	55.63	20.84	526059	5.03	36.53
RL-23-NS-009	<0.00	198.96	265.49	2.93	2.93	7.54	0.01	347.71	13	529722	4.06	29.53
RL-23-NS-009	<0.00	<4.33	50.2	14.51	14.51	<5.47	<0.00	19.76	2.71	530586	0.59	23.23
RL-23-NS-009	<0.00	3.08	70.32	6.12	6.12	<2.12	<0.00	704.79	0.93	532000	8.77	15.35
RL-23-NS-009	<0.00	46.65	88.2	21.46	21.46	8.05	0	99.57	2.36	530242	134.3	1.86
RL-23-NS-009	<0.00	<1.77	0.26	<0.21	<0.21	<2.46	<0.00	35.91	0.39	534312	32.24	5.93
RL-23-NS-010	0.33	213.56	153.99	5.21	0.02	8.22	0.09	1387.03	34.35	528779	11.71	31.05
RL-23-NS-010	<0.00	16.99	22.32	0.95	<0.00	<5.51	<0.00	613.14	1.39	529780	1.25	27.77
RL-23-NS-011	0.29	16.62	125.48	61.8	<0.00	76	1.38	2087.43	5.24	495851	34.36	21.42

Sample ID	Hf_ppm	K_ppm	Mg_ppm	Mn_ppm	Mo95_ppm	Na_ppm	Nb_ppm	Ni_ppm	Pb208_ppm	S_ppm	Sb_ppm	Se_ppm
RL-23-NS-011	0.08	147.9	1408.63	21.69	<0.00	<5.60	0.94	1784.04	3.88	519163	21.1	18.29
RL-23-NS-011	0.17	13.01	97.82	4.29	<0.00	<6.88	0.22	640.47	3.67	519597	22.9	12.33
RL-23-NS-011	<0.00	<8.44	70.86	28.93	<0.00	38.14	<0.00	693.67	2.3	526207	9.37	16.45
RL-23-NS-011	0.03	146.84	136.38	1.62	<0.00	<6.88	0.01	922.24	3.48	516000	15.9	14.03
RL-23-NS-012	<0.00	2.78	18.28	2.68	0.03	<2.40	<0.00	1064.39	27.99	520030	176.6	12.34
RL-23-NS-012	<0.01	7.54	9.38	4.08	0.03	<8.40	0.01	3070.82	57.66	427542	833.92	32.79
RL-23-NS-012	<0.00	<1.71	0.31	0.27	0.05	<2.02	0	155.9	4.55	531391	17.5	9.27
RL-23-NS-012	<0.00	<1.83	0.74	0.35	<0.00	<2.17	<0.00	192.33	0.22	532797	1.58	43.67
RL-23-NS-012	<0.00	<1.76	0.25	<0.21	0.07	<2.08	<0.00	178.12	0.05	534379	0.23	42.84
RL-23-NS-012	0.05	<1.84	<0.04	<0.22	0.07	<2.18	0	1193.88	0.07	534015	0.2	26.8
RL-23-NS-012	<0.00	<2.32	85.18	10.22	0.06	<2.74	0	46.49	0.59	533920	0.59	14.88
RL-23-NS-012	<0.00	<1.76	<0.04	<0.20	0.01	<2.08	<0.00	8.9	3.51	531026	4.17	27.99
RL-23-NS-012	<0.00	<1.81	<0.04	<0.21	<0.00	<2.14	<0.00	3227.94	5.83	533067	1.15	34.49
RL-23-NS-012	<0.00	<2.01	0.85	0.28	2.93	<2.37	0	0.61	2.32	532744	0.79	11.57
RL-23-NS-012	0.01	<3.28	795.11	26.53	1.09	<3.87	0	30.26	8.12	531114	5.5	9.63
RL-23-NS-012	<0.00	<1.80	142.53	1.11	0.14	32.45	<0.00	740.2	19.49	530249	103.24	12.46
RL-23-NS-012	<0.00	<1.71	3.73	0.46	0.01	<2.06	<0.00	22.5	7.73	533532	49.03	13.9
RL-23-NS-012	<0.00	<1.81	1.4	<0.22	<0.00	9.52	<0.00	13.86	0.25	533090	3.27	11.81
RL-23-NS-012	0	<1.82	0.16	<0.21	<0.00	<2.16	0	29.22	0.12	533612	0.75	11.52
RL-23-NS-012	<0.00	<1.72	<0.04	<0.20	1.25	7.36	<0.00	3.53	2.75	528407	3.53	98.77
RL-23-NS-012	0	<1.76	<0.04	<0.21	0.79	<2.08	0	33.54	0.37	533939	1.76	12.04
RL-23-NS-013	<0.00	<3.30	37.89	8.76	0.19	7.32	0	1053.65	137.43	534276	30.96	34.53
RL-23-NS-013	0.01	<3.60	559.55	155.6	0.09	12.98	<0.00	728.89	42.79	532308	87.53	33.06
RL-23-NS-013	<0.00	<3.72	425.63	59.3	0.17	4.43	0	898.25	109.99	533005	73.31	32.01
RL-23-NS-013	<0.00	<3.46	9.28	8.65	0.1	<2.19	<0.00	541.11	37.65	534424	116.12	15.16
RL-23-NS-013	0.01	<3.54	161.45	61.97	0.08	10.97	<0.00	1283.09	78.77	534070	117.81	54.38
RL-23-NS-013	<0.00	<3.52	25.74	5.63	0.12	<2.23	<0.00	1396.95	60.8	534341	155.07	61.28
RL-23-NS-013	<0.00	3.68	23.11	0.39	0.46	78.64	<0.00	579.22	26.84	530094	20.23	26.58
RL-23-NS-013	<0.00	<3.52	1.15	<0.25	0.09	<2.23	0	1711.74	8.28	534361	139.97	65.9
RL-23-NS-013	0.15	<4.02	202.59	3.51	<0.00	<2.54	0.01	149.38	0.54	533181	0.55	15.98
RL-23-NS-013	0.68	<3.86	240.94	4.38	<0.00	<2.44	0.19	196.18	2.47	533062	2.09	16.88

Sample ID	Hf_ppm	K_ppm	Mg_ppm	Mn_ppm	Mo95_ppm	Na_ppm	Nb_ppm	Ni_ppm	Pb208_ppm	S_ppm	Sb_ppm	Se_ppm
RL-23-NS-013	1	<3.54	59.25	0.79	<0.00	<2.23	0.02	97.63	0.66	533802	1.09	14.58
RL-23-NS-013	0.03	<6.61	62.22	<0.47	<0.00	<4.18	0.03	49.55	0.46	534131	0.48	26.25
RL-23-NS-013	0.11	<4.10	180.47	1.92	<0.00	<2.59	0.02	130.52	1.65	533534	1.44	25.01
RL-23-NS-013	0.44	<4.43	13.68	1.52	0.01	<2.80	0.06	158.77	0.78	533931	1.05	21.57
RL-23-NS-013	0.05	<3.58	424.64	4.31	<0.00	<2.26	0.05	23.2	2.56	532326	1.69	23.05
RL-23-NS-013	0.04	<4.73	22.24	0.33	<0.00	<2.99	<0.00	31.97	1.52	532324	0.74	18.1
RL-23-NS-013	0.12	<3.80	932.34	13.79	<0.00	<2.40	0.02	41.45	5.63	527305	5.38	12.76
RL-23-NS-013	0.12	9.12	248.71	22.73	<0.00	<2.30	0.07	232.8	1.11	532775	1.25	21.43
RL-23-NS-013	0.07	<3.79	381.3	4.2	0	<2.40	0	287.7	1.28	532220	1.95	11.51
RL-23-NS-014	0.32	3.71	74.85	3.87	0.15	1.92	<0.00	1709.53	1.38	533933	43.71	35.18
RL-23-NS-014	<0.00	7.83	65.23	34.81	0.39	<1.84	<0.00	1379.9	0.74	534253	0.89	39.41
RL-23-NS-014	<0.00	1.95	377.05	227.64	0.37	18.18	0	2615.61	3.28	533222	2.84	45.97
RL-23-NS-014	0	2.73	69.52	45.22	0.47	7.3	0	3217.44	3.38	533847	72.76	53.97
RL-23-NS-014	0	4.39	328.47	265.55	0.17	11.67	0.04	9473.3	8.97	532647	11.42	60.98
RL-23-NS-014	0.1	5.53	273.34	152.64	0.2	8.63	0.01	16918.1	5.21	532860	18.93	107.78
RL-23-NS-014	0.07	<1.44	96.5	13.22	0.17	<1.64	<0.00	1235.19	1.09	534069	42.45	25.46
RL-23-NS-014	<0.00	1.4	1.6	1.55	0.1	<1.56	<0.00	1664.02	6.53	534415	89.11	37.07
RL-23-NS-014	<0.00	18.85	99.6	25.85	0.02	30.78	<0.00	1812.51	717.88	533183	369.96	30.72
RL-23-NS-014	<0.00	1.57	5.02	0.62	0.1	<1.58	<0.00	1866.46	27.99	534256	109.58	45.4
RL-23-NS-014	<0.00	1.5	0.3	0.19	0.13	<1.63	0	1732.11	0.32	534419	76.44	39.08
RL-23-NS-014	<0.00	2.66	191.03	78.81	0.02	2.31	<0.00	240.39	13.84	533870	1.37	27.03
RL-23-NS-014	<0.00	15.31	277.75	78.42	0.35	4.67	0.01	1755.29	1.69	533584	3.09	37.41
RL-23-NS-014	<0.00	<1.32	0.33	0.17	0.18	1.7	0	1518.4	1	534429	41.95	34.1
RL-23-NS-014	<0.00	3.71	12.34	4.63	0.09	2.42	<0.00	8892.38	1.39	534142	3.43	39.23
RL-23-NS-014	<0.00	4.97	13.47	17.34	0.31	3.26	0	1850.15	4.46	534359	6.77	40.65
RL-23-NS-014	<0.00	1.57	1.87	0.35	0.4	<1.65	0	2828.34	4.22	534383	4.66	45.73
RL-23-NS-014	<0.00	9.08	25.26	8.14	0.36	2.14	<0.00	1679.11	1.59	534313	4.7	38.74
RL-23-NS-014	<0.00	<1.36	9.55	14.43	0.3	4.09	<0.00	1423.38	7.45	534283	5.98	43.09
RL-23-NS-014	0.51	1.41	21.63	13.39	0.27	3.19	0	1322.36	1.16	534256	1.7	41.59
RL-23-NS-016	<0.00	<1.67	88.39	0.37	<0.00	2.68	0	13.37	0.09	530508	0.15	50.8
RL-23-NS-016	0.01	16.91	29.04	<0.29	0.01	249.22	<0.00	59.98	1.63	530816	3.33	35.97

Sample ID	Hf_ppm	K_ppm	Mg_ppm	Mn_ppm	Mo95_ppm	Na_ppm	Nb_ppm	Ni_ppm	Pb208_ppm	S_ppm	Sb_ppm	Se_ppm
RL-23-NS-016	1.01	31.03	77.06	3.46	1.48	25.4	0.28	293.31	20.35	531599	36.61	24.26
RL-23-NS-016	<0.00	<1.65	51.4	0.63	<0.00	2.23	<0.00	481.18	0.03	531913	0.04	33.95
RL-23-NS-016	0.01	40.24	19.2	<0.20	0.01	42.78	0.03	143.42	1.45	533103	2.51	46.05
RL-23-NS-016	0.01	<1.68	10.63	<0.20	<0.00	<2.03	<0.00	32.09	0.29	532486	0.33	32.33
RL-23-NS-016	0.02	6.04	1.5	<0.19	<0.00	225.55	<0.00	0.94	1.67	530707	3.18	34.57
RL-23-NS-016	<0.00	3.21	395.55	<0.22	0.01	14.64	0.01	8.06	0.09	530943	0.18	36.32
RL-23-NS-016	0.02	66.68	13.79	<0.20	<0.00	206.17	0.02	149.36	1.58	529683	4.12	28.78
RL-23-NS-017	1.15	9679.07	3194.32	31.92	<0.01	135.85	0.57	966.85	7.42	458749	1.85	47.66
RL-23-NS-017	0.18	650.37	66.68	10.7	0	182.93	0.62	11.15	83.16	525060	35.69	11.97
RL-23-NS-018	<0.00	<3.57	10.64	22.43	<0.00	<2.35	0.43	344.58	1.83	533461	2.03	76.63
RL-23-NS-018	0.01	47.76	38.25	64.68	0.02	4.68	1.18	1114.89	11.16	529305	10.07	168.66
RL-23-NS-018	<0.00	37.17	459.14	799.2	0.21	47.56	1.76	345.69	14.29	464611	14.69	120.04
RL-23-NS-018	<0.00	85.13	874.39	39.96	0.02	11.12	2.97	318.16	22.46	524719	13.98	92.28
RL-23-NS-018	0.01	682.59	75.56	4.79	<0.00	117.01	0.82	359.91	30.65	527644	14.32	107.8
RL-23-NS-018	<0.00	82.13	459.56	585.58	0.02	50.87	2.48	179.48	5.15	505801	4.15	77.38
RL-23-NS-018	<0.00	53.91	296.75	632.23	<0.00	25.05	0.04	1133.66	11.69	481133	9.22	284.93
RL-23-NS-018	<0.00	10.74	119.49	29.82	0.01	<2.51	1.3	238.57	2.22	531041	1.37	91.57
RL-23-NS-018	0.15	<3.46	15.07	2.61	<0.00	6.59	0.27	8.74	1.02	533321	0.52	41.5
RL-23-NS-018	0.68	76.88	55.14	1.89	<0.00	3.81	0.16	30.02	1.5	532122	1.45	52.84
RL-23-NS-018	1	31.77	1041.39	8.03	<0.00	<9.14	<0.00	28.62	2.57	526554	1.78	99.99
RL-23-NS-018	0.03	23.97	96.84	1.34	0.01	19.03	0.08	25.22	1.55	531789	2.03	50.05
RL-23-NS-018	0.11	240.58	8.56	<0.43	<0.00	29.22	0.01	9.71	1.41	531741	0.75	46.66
RL-23-NS-018	0.44	680.02	151.15	25.5	0.11	75.11	2.79	99.57	3.42	526051	5.1	34.25
RL-23-NS-018	0.05	37.44	86.21	14.34	0.04	9.66	1.21	24.75	4.31	530234	3.56	44.18
RL-23-NS-018	0.04	197.77	29.51	0.62	0.23	59.4	0.01	183.91	1.63	531791	2.84	27.11
RL-23-NS-018	0.12	250.48	9.74	<0.24	0.01	30.74	1.33	206.73	1.38	529950	3.61	36.37
RL-23-NS-018	0.12	558.03	55.54	1.65	<0.00	317.52	0.17	226.22	6.47	524622	6.28	44.21
RL-23-NS-018	0.07	163.32	66.1	<0.68	0.32	23.86	0.01	295.48	2.27	529565	2.82	46.98
RL-23-NS-019	0.08	<1.87	0.66	<0.22	<0.01	<2.21	0.08	60.7	3.86	533843	0.73	91.12
RL-23-NS-019	0.24	<1.74	163.44	7.06	0.04	14.48	0.32	178	38.99	533101	2.68	63.68
RL-23-NS-019	0.72	5.94	1.61	<0.22	0.13	<2.30	1.25	112.48	25.76	531608	3.68	108.04

Sample ID	Hf_ppm	K_ppm	Mg_ppm	Mn_ppm	Mo95_ppm	Na_ppm	Nb_ppm	Ni_ppm	Pb208_ppm	S_ppm	Sb_ppm	Se_ppm
RL-23-NS-019	0.03	<1.76	<0.04	<0.24	<0.01	<2.00	0.03	22.22	0.1	534273	0.07	23.5
RL-23-NS-019	0.42	<1.87	0.77	<0.22	0.22	8.64	1.88	141.96	82.96	531609	8.34	80.83
RL-23-NS-019	1.16	6.37	4.33	0.36	0.15	5.33	0.42	172.19	30.86	532757	11.85	92.48
RL-23-NS-019	0.56	3.56	1464.4	105.14	0.05	12.74	0.34	231.39	23.38	528103	2.45	93.41
RL-23-NS-019	<0.00	<1.77	0.07	<0.21	0.01	<2.12	0.01	104.59	5.9	534179	1.42	58.07
RL-23-NS-019	0.39	<1.90	0.1	<0.26	<0.01	9.87	0.13	41.06	0.51	533967	0.9	29.61
RL-23-NS-019	0.13	<1.83	26.24	18.47	<0.01	<2.19	0.01	153.17	16.77	532260	3.75	52.38
RL-23-NS-019	1.52	<1.85	4.27	<0.22	0.24	12.31	1.57	505.98	54.35	531091	11.04	67.45
RL-23-NS-019	1.91	3.84	0.95	<0.43	0.38	65.9	1.42	194.5	95.97	531663	7.6	84.92
RL-23-NS-019	0.02	<1.86	0.89	<0.21	0.01	20.06	0.07	53.5	48.52	534067	27.83	76.31
RL-23-NS-019	0.03	<1.75	0.1	<0.21	0	<2.13	<0.00	151.67	24.89	534233	2.51	55.31
RL-23-NS-019	0.19	<3.01	38.99	2.04	0.17	<3.56	0.21	120.46	116.78	533851	1.77	68.16
RL-23-NS-019	0.07	47.5	87.86	3.69	1.84	14.65	0.13	1089.63	19.23	532943	2.63	172.76
RL-23-NS-019	0.34	2.63	0.56	<0.21	0.01	<2.15	0.55	277.46	19.39	533289	2.79	56.07
RL-23-NS-019	0.02	<1.75	29.53	1.19	<0.00	<2.07	0.13	23.97	2.4	533077	0.61	61.44
RL-23-NS-019	0.11	<1.67	0.21	<0.19	<0.00	<1.98	0.37	189.66	6.93	533375	1.02	63.93
RL-23-NS-019	0.7	<1.69	0.92	<0.20	<0.00	<2.01	1.4	5.65	12.05	531659	15.63	51.25
RL-23-NS-019	0.01	<1.76	3.75	0.67	<0.00	<2.09	0.01	143.29	0.22	534003	0.19	63.14
RL-23-NS-020	<0.00	<1.95	5.31	<0.23	<0.01	<2.32	0.01	553.06	4.31	534165	0.79	60.51
RL-23-NS-020	<0.00	<1.84	25.13	1.1	<0.01	<2.19	<0.00	502.25	1.6	534351	0.28	30.42
RL-23-NS-020	0	2.62	0.88	<0.21	<0.00	5.8	0	347.12	83.72	533701	6.82	92.96
RL-23-NS-020	<0.00	2.3	5.64	0.4	0.01	4.87	<0.00	809.14	<0.01	534141	0.06	46.68
RL-23-NS-020	<0.00	2.33	0.08	<0.22	0.01	2.4	<0.00	393.48	5.8	533758	2.91	51.02
RL-23-NS-021	0.12	40.14	22.72	3.98	0.01	<2.15	0.03	137.8	4.12	533761	3.97	24.62
RL-23-NS-021	0	30.65	351.73	16.42	0.01	2.77	0.03	25.22	4.8	530926	0.65	28.68
RL-23-NS-021	<0.00	539.06	744.35	17.45	<0.00	9.46	0.04	19.86	102.76	530085	5.02	27.02
RL-23-NS-021	<0.00	<4.18	14.48	1.6	0.01	<2.57	<0.00	62.97	3.44	533979	0.99	24.45
RL-23-NS-021	<0.00	<3.12	17.33	3.75	<0.00	<1.91	<0.00	225.36	6.99	533934	0.87	24.74
RL-23-NS-021	0.02	261.43	143.58	7.14	<0.00	8.43	0.01	20.28	1.43	531283	2.06	21.51
RL-23-NS-021	0	10.73	9.2	3.89	<0.00	<2.40	0	1272.3	4.72	533949	1.29	27.52
RL-23-NS-021	<0.00	<3.65	0.61	<0.27	<0.00	<2.22	<0.00	783.6	0.77	534464	1.95	32.01

Sample ID	Hf_ppm	K_ppm	Mg_ppm	Mn_ppm	Mo95_ppm	Na_ppm	Nb_ppm	Ni_ppm	Pb208_ppm	S_ppm	Sb_ppm	Se_ppm
RL-23-NS-021	<0.00	<3.15	4.73	0.57	0.01	<1.92	<0.00	21.76	1.48	533789	0.24	22.66
RL-23-NS-021	<0.00	<3.44	25.51	55.97	0.01	<2.09	<0.00	13.32	1.58	530490	1.52	21.45
RL-23-NS-021	<0.00	<3.36	<0.14	<0.25	<0.00	<2.04	<0.00	26.96	<0.02	534026	<0.02	20.6
RL-23-NS-024	<0.00	<3.67	<0.18	<0.26	<0.00	<2.50	<0.00	528.06	<0.01	534306	<0.01	52.44
RL-23-NS-024	<0.00	<3.77	1.48	<0.26	<0.00	<2.54	0	181.25	0.1	534232	<0.01	54.47
RL-23-NS-024	<0.00	<3.71	0.27	<0.26	<0.00	<2.49	<0.00	155.84	<0.02	534397	0.01	62.61
RL-23-NS-024	<0.00	<3.83	0.68	<0.27	<0.00	<2.57	0	171.68	<0.02	534494	<0.01	35.04
RL-23-NS-024	<0.00	<3.57	0.28	<0.25	<0.00	<2.39	<0.00	447.47	<0.01	534458	<0.01	53.53
RL-23-NS-024	<0.00	<3.59	0.43	<0.25	0	<2.39	<0.00	367.14	<0.01	534466	0.01	45.9
RL-23-NS-024	<0.00	89.53	127.27	0.95	<0.00	2.76	0.01	558.18	0.32	533577	0.02	63.02
RL-23-NS-024	<0.00	<3.74	<0.18	<0.26	0	<2.48	0	810.15	0.02	534432	<0.01	64.3
RL-23-NS-024	0	98.08	544.55	9.18	<0.00	4.37	<0.00	935.32	0.53	532417	0.07	51.66
RL-23-NS-024	<0.00	<3.69	0.19	<0.26	<0.00	2.82	<0.00	556.14	<0.02	534456	<0.01	70.84
RL-23-NS-024	0	<3.60	30.3	0.26	0	<2.36	0	101.22	0.24	534217	0.05	74.52
RL-23-NS-024	<0.00	<3.61	4.42	<0.26	101.9	<2.36	0	467.34	0.17	534404	0.05	62.69
RL-23-NS-024	<0.00	<3.60	<0.17	<0.26	<0.00	<2.34	<0.00	329.92	<0.02	534429	<0.01	53.56
RL-23-NS-024	<0.00	<3.78	<0.18	<0.27	<0.00	<2.45	<0.00	632.16	<0.02	534443	<0.01	59.69
RL-23-NS-024	<0.00	<3.63	<0.17	<0.26	<0.00	<2.35	<0.00	889.86	<0.02	534430	<0.01	63.68
RL-23-NS-024	<0.00	<3.68	1.09	<0.26	<0.00	5.51	<0.00	674.66	<0.02	534400	0.01	60.11
RL-23-NS-024	<0.00	<3.62	0.78	<0.26	<0.00	<2.33	0	703.66	<0.02	534435	0.01	64.74
RL-23-NS-024	<0.00	<3.42	0.93	<0.25	<0.00	9.84	<0.00	888.55	<0.01	534437	<0.01	49.21
RL-23-NS-024	4.96	13.52	4.78	0.36	<0.00	39.87	<0.00	614.02	0.37	534138	0.11	56.5
RL-23-NS-024	<0.00	<3.58	<0.17	<0.26	<0.00	2.46	<0.00	467.48	<0.02	534428	<0.01	53.65
RL-23-NS-024	0	17.92	16.94	<0.26	0.04	5.46	0	547.87	0.28	534186	0.05	53.84
RL-23-NS-024	<0.00	3.91	38.06	<0.27	<0.00	7.35	<0.00	112.21	<0.02	534305	0.04	86.41
RL-23-NS-024	<0.00	<3.67	0.47	<0.27	<0.00	<2.33	<0.00	797.52	<0.02	534441	<0.01	53.81
RL-23-NS-024	0.01	<3.72	12.97	<0.28	<0.00	<2.36	0	582.75	0.14	534429	<0.01	53.64
RL-23-NS-024	0.01	<3.59	3.07	<0.27	<0.00	<2.27	<0.00	1066.67	<0.02	534395	0.01	66.53
RL-23-NS-025	<0.00	<1.77	0.05	<0.20	<0.00	<2.10	0	1516.94	<0.01	534228	<0.03	37.46
RL-23-NS-025	1.64	<1.74	<0.03	<0.20	<0.00	<2.09	0.01	1627.98	0.06	534217	0.03	27.46
RL-23-NS-025	<0.00	<1.81	0.15	0.91	<0.01	5.04	<0.00	354.22	0.16	534376	0.04	51.08

Sample ID	Hf_ppm	K_ppm	Mg_ppm	Mn_ppm	Mo95_ppm	Na_ppm	Nb_ppm	Ni_ppm	Pb208_ppm	S_ppm	Sb_ppm	Se_ppm
RL-23-NS-025	0	<1.87	0.2	<0.22	<0.01	<2.25	<0.00	1790.03	0.02	534407	<0.03	38.51
RL-23-NS-025	<0.00	<1.94	1.93	<0.23	<0.01	3.02	<0.00	1498.44	<0.01	533848	<0.03	92.56
RL-23-NS-025	<0.00	<3.31	<0.06	<0.39	<0.01	<3.99	<0.00	1001.61	0.08	534011	<0.05	132.25
RL-23-NS-025	0	211.21	228.07	0.81	0.01	11.79	0	2630.1	0.72	532972	0.11	34.12
RL-23-NS-025	<0.01	<4.07	<0.08	<0.49	<0.01	119.86	<0.00	1727.78	<0.03	532290	<0.07	54.21
RL-23-NS-025	3.63	<1.83	2.63	<0.22	<0.01	20	0	1941.1	0.12	533486	0.06	52.78
RL-23-NS-025	0.6	<1.83	0.87	0.23	<0.01	74.9	0.02	1130.55	0.81	528549	0.22	42.17
RL-23-NS-025	1.72	4.38	6.39	0.5	<0.00	78.38	0.05	1760.41	1.27	533139	0.3	54.58
RL-23-NS-025	<0.00	<1.77	0.4	<0.20	<0.00	<2.11	<0.00	259.91	<0.01	533927	<0.03	32.21
RL-23-NS-025	0.28	14.86	0.23	<0.23	0.02	42.33	0.04	1381.38	0.18	533957	<0.03	39.1
RL-23-NS-025	0.93	<1.75	0.13	<0.21	<0.00	2.51	0	1193.27	0.08	534350	<0.03	38.65
RL-23-NS-025	0.94	4.44	0.06	<0.21	<0.00	231.55	0.01	727.31	1.13	532242	0.13	28.88
RL-23-NS-025	3.19	<1.77	0.93	<0.21	0.01	62.05	0.01	973.39	0.56	533807	0.05	29.64
RL-23-NS-025	0.01	77.1	2.27	<0.22	0.09	2.23	0	1214.17	0.02	533996	<0.03	37.53
RL-23-NS-025	3.09	614.72	370.36	6.49	0.75	1062.53	0.01	647.74	0.75	517141	0.28	41.85
RL-23-NS-025	<0.00	<1.82	<0.03	<0.21	0.01	<2.17	<0.00	272.9	<0.01	533951	<0.03	33.81
RL-23-NS-025	<0.00	3.71	0.28	0.61	<0.01	346.79	<0.00	328.11	0.46	529338	0.11	38.17
RL-23-NS-025	<0.00	<1.73	12.73	<0.20	0.09	5.33	<0.00	83.43	0.05	532925	<0.03	37.28
RL-23-NS-025	2.26	3.47	1.8	0.39	<0.01	111.15	0.01	507.07	0.61	532637	0.1	53.24
RL-23-NS-025	1.23	<1.88	0.61	1.15	<0.01	<2.26	0.01	2672.29	1.06	534170	0.21	46.15
RL-23-NS-025	0.89	11.36	0.91	1.41	<0.01	390.95	0.07	628.73	0.76	513021	0.37	41.39
RL-23-NS-025	0.08	<1.79	<0.03	<0.21	0.01	2.59	0	1688.33	<0.01	534401	<0.03	38.59
RL-23-NS-026	0.01	8.56	45.13	0.71	1.22	<2.13	0.4	58.83	0.09	533007	<0.03	6.25
RL-23-NS-026	0.01	<1.79	0.24	<0.22	1.17	<2.16	<0.00	94.89	1.17	533734	0.04	7.32
RL-23-NS-026	<0.00	<1.72	0.08	<0.21	0.06	<2.07	0.02	6.64	0.06	534422	<0.03	4.7
RL-23-NS-026	<0.00	<1.66	0.42	0.33	0.02	<2.02	0	226.45	0.01	532664	0.06	6.92
RL-23-NS-026	0.01	<1.79	2.94	<0.22	<0.00	<2.18	0	76.65	0.16	533184	0.03	6.14
RL-23-NS-026	<0.00	<1.71	3.36	6.32	<0.00	<2.08	0.04	39.13	1.34	534186	0.05	4.74
RL-23-NS-026	<0.00	<1.58	0.04	<0.19	0.01	4.79	<0.00	8.16	5.58	533896	0.28	3.79
RL-23-NS-026	0.17	69.21	118.65	27.63	2.9	<2.02	2.35	37.48	1.07	532092	0.29	2.15
RL-23-NS-026	<0.00	<1.67	4.7	<0.21	0.18	2.47	<0.00	36.66	4.99	534171	0.19	3.78

Sample ID	Hf_ppm	K_ppm	Mg_ppm	Mn_ppm	Mo95_ppm	Na_ppm	Nb_ppm	Ni_ppm	Pb208_ppm	S_ppm	Sb_ppm	Se_ppm
RL-23-NS-026	<0.00	<1.74	<0.04	<0.21	0.02	<2.11	<0.00	27.81	<0.01	534295	<0.03	4.39
RL-23-NS-026	<0.00	<1.68	<0.04	<0.21	0.02	<2.04	0	31.34	<0.01	534515	<0.03	7.58
RL-23-NS-026	<0.00	<1.72	<0.04	<0.21	<0.00	<2.08	0	12.15	<0.01	534465	<0.03	3.48
RL-23-NS-026	<0.00	<1.73	<0.04	<0.21	0.01	<2.09	0	18.88	<0.01	534426	<0.03	2.99
RL-23-NS-026	<0.00	<1.88	<0.04	<0.23	0.02	<2.27	<0.00	26.92	0.14	534325	<0.03	3.36
RL-23-NS-027	0.45	17.76	21.7	1.81	0.18	23.44	0.23	12.67	0.26	533423	0.04	4.48
RL-23-NS-027	0.05	382.93	365.5	86.15	0.04	<3.65	2.76	197.45	22	528222	0.47	8.49
RL-23-NS-027	<0.00	10.67	5.49	<0.27	<0.00	<2.46	<0.00	11.25	0.14	534351	0.02	6.12
RL-23-NS-027	<0.00	5.49	1.46	<0.28	<0.00	234.98	<0.00	13.88	0.47	531942	<0.01	4.7
RL-23-NS-027	0.01	<4.83	<0.22	<0.34	<0.00	<3.06	<0.00	11.75	<0.02	534479	<0.01	5.77
RL-23-NS-027	<0.00	10.5	8.55	0.7	0	<2.55	<0.00	35.46	0.68	534310	<0.01	4.74
RL-23-NS-027	0.58	58.69	55.66	38.08	0.61	23.72	23.35	118.66	1.56	504047	0.36	7.07
RL-23-NS-027	0.05	201.49	159.41	7.48	<0.00	<2.15	0.04	42.99	57.15	532557	0.06	5.56
RL-23-NS-027	2.15	689.84	521.33	24.15	0.01	9.33	0.14	100.37	5.29	530553	0.03	3.36
RL-23-NS-027	0.21	264.37	223.03	7.51	<0.00	<5.44	0.21	147.14	2.98	532418	0.03	<6.28
RL-23-NS-027	0.05	22.4	4.2	<0.26	<0.00	<2.29	<0.00	7.1	0.41	533246	<0.01	5.12
RL-23-NS-027	0.02	228.79	42.96	2.03	0.12	35.37	0.38	25.24	1.58	532711	0.07	5.6
RL-23-NS-027	0.02	178.47	35.86	17.7	0.02	8.57	10.48	19.58	4.11	515592	0.54	7.97
RL-23-NS-027	<0.00	292.5	232.82	15.41	<0.00	28.09	0.09	81.11	3.07	533009	0.09	6.21
RL-23-NS-027	<0.00	<3.96	<0.18	<0.28	<0.00	<2.53	<0.00	5.1	0.02	534486	<0.01	4.33
RL-23-NS-027	<0.00	4.35	5.03	24.39	<0.00	38.05	0.13	25.41	1.56	518351	0.05	4.44
RL-23-NS-027	0	12.05	4.28	0.39	<0.00	143.44	0	12.48	0.35	533044	0.02	5.83
RL-23-NS-027	<0.00	<3.88	<0.18	<0.28	<0.00	<2.52	<0.00	55.14	<0.02	534388	<0.01	7.86
RL-23-NS-027	<0.00	9.44	7.07	0.41	<0.00	2.53	0	83.27	0.12	534359	<0.01	6.23
RL-23-NS-027	<0.00	<3.58	0.53	0.77	0.01	2.64	0.01	18.69	0.04	534334	<0.01	8.13
RL-23-NS-027	0.02	6.06	15.9	13.53	0.07	3.72	0.55	2.7	1.82	531483	0.04	10.24
RL-23-NS-027	0.04	<3.81	<0.18	3.92	<0.00	2.91	<0.00	39.21	0.92	531565	0.02	6.7
RL-23-NS-027	<0.00	<3.44	<0.16	<0.24	0.01	<2.26	<0.00	9.54	<0.01	534441	<0.01	2.96
RL-23-NS-027	<0.00	5.86	0.98	<0.27	<0.00	4.12	<0.00	10.86	0.09	534467	<0.01	5.37
RL-23-NS-029	0.01	<1.53	8.59	0.79	0.01	<1.81	0.05	46.73	3.06	533532	0.7	70.44
RL-23-NS-029	0.77	3.12	186.14	9.75	0.02	7.75	0.09	259.36	11.46	532368	2.69	60.95

Sample ID	Hf_ppm	K_ppm	Mg_ppm	Mn_ppm	Mo95_ppm	Na_ppm	Nb_ppm	Ni_ppm	Pb208_ppm	S_ppm	Sb_ppm	Se_ppm
RL-23-NS-029	0.24	16.93	446.16	7.27	0.05	82.07	1.87	1291.01	21.79	530915	5.22	90.67
RL-23-NS-029	0.14	15.06	692.94	16.72	0.01	25.11	0.91	535.83	27.22	529109	8.55	78.78
RL-23-NS-029	0.02	54	324.84	6.96	0.01	23.94	2.09	926.59	32.96	527940	9.25	90.06
RL-23-NS-029	1.42	6.02	147.82	4.94	<0.01	41.86	0.56	675.76	9.34	532539	2.44	117.22
RL-23-NS-030	0.06	<3.05	0.96	0.37	<0.00	<1.94	<0.00	123.72	0.18	533570	0.04	195.1
RL-23-NS-030	<0.00	<3.35	98.85	7.07	0.02	13.13	<0.00	508.27	0.42	532851	0.19	155.44
RL-23-NS-030	0.67	3.71	5.45	7.69	0.02	33.36	3.27	108.71	1.06	514645	0.54	72.93
RL-23-NS-030	1.18	12.38	204.22	7.22	0.22	39.19	0.04	269.8	1.69	527147	0.57	71.28
RL-23-NS-030	1.49	4.3	48.4	3.29	0.01	12.69	0.89	52.09	1.06	528214	0.63	82.07
RL-23-NS-032	<0.00	28.33	7.83	<0.24	<0.00	18.22	<0.00	1020.22	1.81	531496	2.07	12.24
RL-23-NS-032	0.01	<5.82	0.67	<0.41	0.02	4.95	<0.00	87.02	10.36	529536	23.9	23.27
RL-23-NS-032	<0.00	25.53	185.18	9.55	<0.00	<3.99	0.01	109.51	11.66	529111	13.28	19.67
RL-23-NS-032	<0.00	12.26	6.81	1.69	<0.00	5.96	<0.00	213.79	42.84	521412	52.91	22.67
RL-23-NS-034	2.34	209.15	9.18	130.55	<0.01	24.79	2.11	8.71	5.04	530250	5.85	6.28
RL-23-NS-035	0	<1.72	0.25	<0.20	<0.00	<2.15	0.01	1092.95	0.28	533412	19.55	19.55
RL-23-NS-035	<0.00	<1.76	0.48	<0.20	<0.00	<2.25	<0.00	95.91	<0.01	534227	9.19	9.19
RL-23-NS-035	<0.00	<1.83	<0.04	<0.21	<0.01	<2.45	0	628.93	<0.01	534010	25.92	25.92
RL-23-NS-035	<0.00	<1.80	2.22	2.15	<0.00	<2.23	0	720.87	0.95	533810	26.94	26.94
RL-23-NS-035	0.09	2.32	155.91	13.58	<0.00	7.01	0	577.02	4.39	532129	17	17
RL-23-NS-035	<0.00	1.97	0.19	<0.21	<0.01	2.93	<0.00	682.59	0.31	534043	22.9	22.9
RL-23-NS-035	<0.00	<1.83	0.29	<0.21	<0.01	<1.99	<0.00	726.19	0.29	534063	26.85	26.85
RL-23-NS-035	<0.00	<1.89	<0.04	<0.21	<0.01	<2.13	<0.00	455.61	<0.01	534192	17.09	17.09
RL-23-NS-035	<0.00	<1.75	0.24	<0.20	0.01	<2.17	<0.00	242.64	<0.01	534110	20.16	20.16
RL-23-NS-035	<0.00	<1.75	0.26	<0.20	<0.00	<2.15	<0.00	467.71	<0.01	534070	26.15	26.15
RL-23-NS-035	<0.00	2.04	<0.04	<0.21	<0.00	<2.06	0	282.79	0.01	534219	18.86	18.86
RL-23-NS-035	<0.00	<1.72	2.09	<0.20	<0.00	<2.24	<0.00	111.99	0.05	534144	9.8	9.8
RL-23-NS-035	<0.00	<1.71	0.39	<0.19	<0.00	<2.17	<0.00	1116.15	0.01	533666	28.09	28.09
RL-23-NS-035	0.01	<1.75	485.36	112.14	<0.00	<2.30	0.01	132.63	1.96	532782	8.07	8.07
RL-23-NS-035	0.14	2.91	1	12.28	0.02	4.32	<0.00	166.57	10.81	530991	10.11	10.11
RL-23-NS-035	0.06	<1.65	0.58	12.64	0.02	<2.11	0	64.42	5.63	533653	8.92	8.92
RL-23-NS-035	<0.00	<1.66	6.21	2.96	<0.00	<2.12	<0.00	157.21	0.31	534298	12.55	12.55

Sample ID	Hf_ppm	K_ppm	Mg_ppm	Mn_ppm	Mo95_ppm	Na_ppm	Nb_ppm	Ni_ppm	Pb208_ppm	S_ppm	Sb_ppm	Se_ppm
RL-23-NS-035	<0.00	<1.74	188.93	67.1	0	2.84	0	128.91	0.75	533639	12.2	12.2
RL-23-NS-035	<0.00	<1.75	25.66	23.39	<0.00	<2.17	0	144.08	0.17	534235	9.91	9.91
RL-23-NS-035	0.01	3.47	8.99	1.41	<0.00	<2.11	<0.00	127.6	1.04	526240	9.64	9.64
RL-23-NS-035	<0.00	1.96	40.45	15.54	0.01	<2.20	0	101.43	0.58	534270	12.82	12.82
RL-23-NS-035	0	<1.77	0.18	<0.20	<0.00	<2.53	<0.00	953.48	0.02	534127	16.5	16.5
RL-23-NS-035	0.01	<1.80	203.66	56.78	<0.00	<2.20	0.01	174.51	1.08	533606	9.84	9.84
RL-23-NS-035	<0.00	<1.80	32.39	6	<0.01	<2.15	0.02	406.67	3.58	533863	20.76	20.76
RL-23-NS-035	0.07	4.68	3.02	10.62	0.05	7.56	0.02	1086.09	40.86	531697	20.84	20.84
RL-23-NS-035	<0.00	<1.76	<0.04	<0.20	<0.00	<2.37	<0.00	147.71	0.4	534039	10.98	10.98
RL-23-NS-035	<0.00	<1.68	1.12	0.28	<0.00	<2.11	<0.00	325.01	0.23	534011	20	20
RL-23-NS-035	0	<1.81	1.27	<0.21	<0.00	<2.23	<0.00	573.36	0.31	533233	23.94	23.94
RL-23-NS-035	<0.00	<1.82	1.24	3.18	<0.00	3.29	0.02	514.35	1.37	534160	20.37	20.37
RL-23-NS-035	0.02	<2.47	7.08	35.97	<0.01	<3.03	0.01	381.81	1.79	534055	24.28	24.28
RL-16ND069	<0.00	7.67	50.18	35.32	66.91	45.18	<0.00	914.04	78.2	533857	592.21	9.07
RL-16ND069	<0.00	9.28	5.02	4.23	8.67	6.03	<0.00	177.63	3.3	533947	430.65	4.3
RL-16ND069	<0.00	19.73	17.31	5.81	7.64	29.44	<0.00	106.28	4.28	533814	1439.5	3.98
RL-16ND069	<0.00	150.67	140.3	23.62	41.95	43.33	<0.00	224.59	6.31	532828	1084.9	3.24
RL-16ND069	<0.00	6.19	49.86	31.62	87.13	64.32	<0.00	270.7	17.19	533592	1701.9	4.83
RL-16ND069	<0.00	<1.70	31.76	15.3	37.18	23.81	<0.00	162.69	0.41	534227	43.38	<3.12
RL-16ND069	<0.00	<1.68	2.34	0.35	0.08	39.98	<0.00	109.88	0.4	534466	41.27	<3.12
RL-16ND069	0	<1.79	0.3	0.31	0.01	<2.05	<0.00	113.71	0.56	534494	53.37	3.52
RL-16ND069	<0.00	<1.74	6.06	3.13	7.56	5.62	<0.00	134.96	3.53	534457	113.01	3.54
RL-16ND069	0	<4.36	119.62	75.96	322.3	31.37	<0.00	655.28	90.7	520468	258.73	12.74
RL-16ND069	<0.00	<4.50	63.55	52.03	<0.01	<5.54	0.01	17.56	10.7	530023	7.8	45.43
RL-16ND069	<0.00	11.02	850.21	26.82	547.99	47.77	0.01	210.22	34.1	529139	44.89	18.27
RL-16ND069	<0.00	<3.76	97.92	38.31	27.5	26.46	<0.00	258.83	9.03	524151	9.34	43.24
RL-16ND069	0	<4.09	235.35	171.16	335.61	93.51	0.01	379.37	9.93	521602	30.87	11.49
RL-16ND069	<0.00	<4.17	179.45	30.7	1.61	<4.66	<0.00	305.73	4.37	533119	7.48	13
RL-16ND086	0.04	4.98	0.76	<0.18	0.02	<1.91	<0.00	82.52	4.71	534465	0.12	41.31
RL-16ND086	0.13	172.84	17.67	<0.18	0.01	<2.32	0.15	343.53	4.28	533647	0.22	5.91
RL-16ND086	0	<1.90	89	0.32	<0.00	2.38	<0.00	655.32	0.19	533795	<0.02	10.41

Sample ID	Hf_ppm	K_ppm	Mg_ppm	Mn_ppm	Mo95_ppm	Na_ppm	Nb_ppm	Ni_ppm	Pb208_ppm	S_ppm	Sb_ppm	Se_ppm
RL-16ND086	0.11	10.27	606.22	4.94	0.83	450.98	0.09	255.47	13.87	528038	0.23	9.69
RL-16ND086	<0.00	<1.87	0.04	<0.20	0	31.09	<0.00	246.81	1.97	534275	0.21	5.97
RL-16ND086	<0.00	19.51	4.17	<0.19	<0.00	<2.21	0.01	14.43	3.11	534370	0.09	14.19
RL-16ND086	<0.00	<1.69	<0.03	<0.18	0	2.53	<0.00	382.71	0.43	534400	0.02	12.93
RL-16ND086	0.01	51.41	3.36	<0.20	0.01	24.34	0.01	108.85	15.02	530999	0.32	13.45
RL-16ND086	0.09	<1.65	65.65	2.13	0.02	<2.12	<0.00	50.28	1.58	534102	<0.02	10.31
RL-16ND086	0.32	3.25	90.98	8.93	0.41	<1.97	2.76	385.99	2.57	533582	0.31	18.34
RL-16ND086	3.95	25.4	4.72	<0.19	0.09	7.76	2.02	343.62	1.85	533923	0.4	8.24
RL-16ND086	0.18	41.37	211.18	31.14	0.73	4.36	0.32	141.37	3.41	532808	0.76	14.83
RL-16ND086	0.15	87.04	20.62	0.44	0.04	<2.08	0.13	105.24	12.87	533911	1.29	14.28
RL-16ND086	0.04	14.88	0.51	<0.18	0.09	4.06	0.01	1253.09	3.65	534279	0.11	11.72
RL-16ND086	0.78	7.35	101.24	6.38	0.73	29.92	0.64	419.08	35.7	532659	1.04	12.76
RL-16ND086	0.26	13.69	1.45	<0.19	0.01	<2.26	0.02	28.69	2.64	534308	0.15	5.67
RL-16ND086	0.04	<1.69	88.5	14.87	0.84	15.23	<0.00	327.45	3.17	533770	0.14	13.68
RL-16ND090	<0.00	<3.96	398.38	64.66	0.03	<5.07	0	1246.9	1.79	532781	1.08	25.55
RL-16ND090	<0.00	42.23	19.2	2.98	0.04	4.81	<0.00	613.9	3.12	534202	1.69	34.74
RL-16ND090	0.16	<4.23	342.09	9.06	<0.01	<5.02	0.12	653.36	3.99	532192	7.05	28.15
RL-16ND090	<0.01	19.42	1103.37	58.03	<0.01	<7.82	0.01	804.89	14.94	505635	31.15	23.35
RL-16ND102	<0.00	5.88	2.19	4.67	<0.00	<2.33	0	1017.39	0.77	534068	4.3	48.34
RL-16ND102	0.08	6.96	189.71	38.29	<0.00	3.27	0	11.48	2.4	532854	9.61	30.95
RL-16ND102	0.01	<3.05	0.61	5.98	0.01	<3.40	<0.00	1291.92	5.34	534445	1.4	47.54
RL-16ND102	<0.00	3.64	37.22	2.11	0.01	2.54	<0.00	16.41	2.8	532835	6.48	24.75
RL-16ND102	0.01	<1.68	18.52	1.22	<0.00	<2.07	<0.00	63.41	4.04	531518	6	23.22
RL-16ND102	<0.00	3.05	60.2	9.28	<0.00	12.11	<0.00	32.38	2.08	534235	4.25	24.52
RL-16ND102	<0.00	<1.97	32.95	0.8	<0.01	<2.66	<0.00	303.74	0.32	534382	1.1	27.62
RL-16ND102	<0.00	<2.12	28.3	0.96	0.01	<2.55	0	67.03	4.85	534037	4.06	24.41
RL-16ND102	0.01	27.14	36.47	1.21	<0.00	2.3	0	47.39	5.63	532987	3.34	15.76
RL-16ND102	0.03	35.99	40.64	10.75	<0.00	15.15	<0.00	105.67	11.06	532385	12.35	24.02
RL-16ND102	<0.00	<3.07	159.01	28.03	<0.01	<3.85	<0.00	1429.59	3.76	533438	0.47	48.58
RL-16ND102	0.01	3.93	505.34	76.47	<0.01	<3.56	<0.00	1407.3	2.54	531683	0.65	43.76

Sample ID	Hf_ppm	K_ppm	Mg_ppm	Mn_ppm	Mo95_ppm	Na_ppm	Nb_ppm	Ni_ppm	Pb208_ppm	S_ppm	Sb_ppm	Se_ppm
RL16ND102	<0.00	<1.74	1.36	1.03	0.01	<2.22	<0.00	305.65	11.9	529832	5.98	44.54
RL16ND102	0.04	3.27	32.66	7.05	0.07	3.53	<0.00	392.47	1.79	532997	10.23	55
RL16ND005	<0.00	<2.72	<0.12	<0.34	0	<4.33	<0.00	29.96	<0.01	582523	<0.05	60.96
RL16ND005	<0.00	<2.15	0.06	<0.27	0	<3.67	<0.00	6.16	<0.01	478693	<0.04	68.71
RL16ND005	<0.00	<2.05	<0.05	<0.29	<0.00	<3.50	<0.00	2.5	<0.01	459044	0.08	93.66
RL16ND005	0.04	88.84	509.75	47.97	0.01	136.88	0.11	35.73	10.31	486855	34.98	61.25
RL16ND005	<0.00	<2.47	3783.38	621.09	0.05	<4.17	<0.00	10074	17.78	560820	59.5	50.1
RL16ND005	<0.00	4.44	164.97	25	<0.00	10.77	<0.00	357.96	2.64	487490	9.34	57.78
RL16ND005	<0.00	<5.93	184.09	91.3	0.06	33.72	<0.00	13422.4	13.06	639887	66.25	53.85
RL16ND005	<0.00	<3.45	<0.17	<0.50	<0.00	<5.95	<0.00	8.3	0.62	630613	10.09	75.06
RL16ND005	<0.00	<3.10	4057.12	1048.1	0.03	<5.64	<0.00	3358.39	51.01	530222	59.31	55.79
RL16ND005	<0.00	<2.64	1.39	0.81	0.02	42.59	<0.00	12551	3.47	603212	41.22	54.73
RL16ND005	<0.00	<2.92	3583.81	763.15	0.05	<4.28	0	1007.69	7.53	412419	13.51	40.81
RL16ND005	<0.00	<4.08	0.85	<0.50	0.01	<6.95	<0.00	11770	4.16	626817	23.85	69.84
RL16ND005	<0.00	<4.80	<0.07	<0.59	<0.00	<7.98	<0.00	4.15	0.39	660719	5.76	95.54
RL16ND005	<0.00	<2.36	<0.08	<0.24	<0.00	<4.00	0	44.12	0.38	553293	5.51	36.51
RL16ND005	<0.00	<2.44	<0.03	<0.27	<0.00	<4.34	<0.00	9.23	0.91	532362	1.92	59.94
RL16ND005	<0.00	<2.53	333	149.51	0.01	<4.78	0	871.55	5.58	498492	8.48	48.36
RL16ND005	0.01	<2.58	0.89	0.31	<0.00	<4.21	<0.00	9.15	0.06	558359	0.63	47.83
RL16ND005	<0.00	<2.23	<0.04	<0.29	<0.00	<3.36	<0.00	22.79	<0.02	478680	<0.04	44.8
RL16ND023	0	<2.63	<0.07	<0.31	0	<4.62	<0.00	2054.56	0.13	470012	0.15	10.68
RL16ND023	0.86	10.49	8.12	<0.27	<0.00	<3.78	1.24	193.22	8.45	454264	30.03	3.54
RL16ND023	<0.00	<2.29	0.31	<0.31	0.01	<3.76	0	31.95	23.64	514820	17.18	<2.04
RL16ND023	0.23	<2.12	4.16	<0.31	<0.00	<3.74	0.1	232.82	5.02	489376	6.08	5.75
RL16ND023	0.03	<2.68	<0.06	<0.30	0.01	<4.40	0.03	388.85	6.07	541815	8.57	5.74
RL16ND023	0.91	2.99	1.95	0.38	3.38	5.34	1.68	1841.59	23.93	506928	46.09	<2.36
RL16ND023	0	<2.85	<0.07	<0.33	<0.00	<4.13	<0.00	108.69	1.66	470172	1.93	<1.92
RL16ND023	0	<2.66	0.32	<0.32	<0.00	5.96	<0.00	136.74	6.44	495736	5.76	2.88
RL16ND023	<0.00	<2.36	0.4	<0.31	0.85	<4.01	<0.00	1467.42	6.6	521311	1.21	4.91
RL16ND023	0.02	<2.76	0.88	<0.34	<0.00	<3.72	0.01	1475.11	1.5	539311	1.77	7.5
RL16ND023	<0.00	<2.17	<0.06	<0.27	<0.00	<3.32	<0.00	1712.48	2.87	455261	1.5	6.83

Sample ID	Hf_ppm	K_ppm	Mg_ppm	Mn_ppm	Mo95_ppm	Na_ppm	Nb_ppm	Ni_ppm	Pb208_ppm	S_ppm	Sb_ppm	Se_ppm
RL-16ND102	<0.00	<1.74	1.36	1.03	0.01	<2.22	<0.00	305.65	11.9	529832	5.98	44.54
RL-16ND102	0.04	3.27	32.66	7.05	0.07	3.53	<0.00	392.47	1.79	532997	10.23	55
RL16ND005	<0.00	<2.72	<0.12	<0.34	0	<4.33	<0.00	29.96	<0.01	582523	<0.05	60.96
RL16ND005	<0.00	<2.15	0.06	<0.27	0	<3.67	<0.00	6.16	<0.01	478693	<0.04	68.71
RL16ND005	<0.00	<2.05	<0.05	<0.29	<0.00	<3.50	<0.00	2.5	<0.01	459044	0.08	93.66
RL16ND005	0.04	88.84	509.75	47.97	0.01	136.88	0.11	35.73	10.31	486855	34.98	61.25
RL16ND005	<0.00	<2.47	3783.38	621.09	0.05	<4.17	<0.00	10074	17.78	560820	59.5	50.1
RL16ND005	<0.00	4.44	164.97	25	<0.00	10.77	<0.00	357.96	2.64	487490	9.34	57.78
RL16ND005	<0.00	<5.93	184.09	91.3	0.06	33.72	<0.00	13422.4	13.06	639887	66.25	53.85
RL16ND005	<0.00	<3.45	<0.17	<0.50	<0.00	<5.95	<0.00	8.3	0.62	630613	10.09	75.06
RL16ND005	<0.00	<3.10	4057.12	1048.1	0.03	<5.64	<0.00	3358.39	51.01	530222	59.31	55.79
RL16ND005	<0.00	<2.64	1.39	0.81	0.02	42.59	<0.00	12551	3.47	603212	41.22	54.73
RL16ND005	<0.00	<2.92	3583.81	763.15	0.05	<4.28	0	1007.69	7.53	412419	13.51	40.81
RL16ND005	<0.00	<4.08	0.85	<0.50	0.01	<6.95	<0.00	11770	4.16	626817	23.85	69.84
RL16ND005	<0.00	<4.80	<0.07	<0.59	<0.00	<7.98	<0.00	4.15	0.39	660719	5.76	95.54
RL16ND005	<0.00	<2.36	<0.08	<0.24	<0.00	<4.00	0	44.12	0.38	553293	5.51	36.51
RL16ND005	<0.00	<2.44	<0.03	<0.27	<0.00	<4.34	<0.00	9.23	0.91	532362	1.92	59.94
RL16ND005	<0.00	<2.53	333	149.51	0.01	<4.78	0	871.55	5.58	498492	8.48	48.36
RL16ND005	0.01	<2.58	0.89	0.31	<0.00	<4.21	<0.00	9.15	0.06	558359	0.63	47.83
RL16ND005	<0.00	<2.23	<0.04	<0.29	<0.00	<3.36	<0.00	22.79	<0.02	478680	<0.04	44.8
RL16ND023	0	<2.63	<0.07	<0.31	0	<4.62	<0.00	2054.56	0.13	470012	0.15	10.68
RL16ND023	0.86	10.49	8.12	<0.27	<0.00	<3.78	1.24	193.22	8.45	454264	30.03	3.54
RL16ND023	<0.00	<2.29	0.31	<0.31	0.01	<3.76	0	31.95	23.64	514820	17.18	<2.04
RL16ND023	0.23	<2.12	4.16	<0.31	<0.00	<3.74	0.1	232.82	5.02	489376	6.08	5.75
RL16ND023	0.03	<2.68	<0.06	<0.30	0.01	<4.40	0.03	388.85	6.07	541815	8.57	5.74
RL16ND023	0.91	2.99	1.95	0.38	3.38	5.34	1.68	1841.59	23.93	506928	46.09	<2.36
RL16ND023	0	<2.85	<0.07	<0.33	<0.00	<4.13	<0.00	108.69	1.66	470172	1.93	<1.92
RL16ND023	0	<2.66	0.32	<0.32	<0.00	5.96	<0.00	136.74	6.44	495736	5.76	2.88
RL16ND023	<0.00	<2.36	0.4	<0.31	0.85	<4.01	<0.00	1467.42	6.6	521311	1.21	4.91
RL16ND023	0.02	<2.76	0.88	<0.34	<0.00	<3.72	0.01	1475.11	1.5	539311	1.77	7.5
RL16ND023	<0.00	<2.17	<0.06	<0.27	<0.00	<3.32	<0.00	1712.48	2.87	455261	1.5	6.83

Sample ID	Hf_ppm	K_ppm	Mg_ppm	Mn_ppm	Mo95_ppm	Na_ppm	Nb_ppm	Ni_ppm	Pb208_ppm	S_ppm	Sb_ppm	Se_ppm
RL16ND023	<0.00	<3.16	0.09	<0.37	<0.00	<5.42	<0.00	34.94	14.44	537694.36	3.66	2.83
RL16ND023	0	<2.43	<0.07	<0.28	<0.00	<3.56	<0.00	42.21	4.43	488777.85	2.2	4.21
RL16ND023	<0.00	<2.30	0.09	<0.30	<0.00	<4.05	<0.00	429.13	2.36	519503.43	0.41	5.46
RL16ND023	<0.00	<2.70	<0.09	<0.31	<0.00	<3.76	<0.00	40.55	0.98	512975.16	1.26	4.6
RL16ND023	0	<2.68	<0.07	<0.27	0.01	<3.58	<0.00	18.45	1.83	492028.22	1.88	2.28
RL16ND023	<0.00	<2.62	<0.05	<0.32	0.01	<3.89	<0.00	56.74	0.95	487419.2	0.21	<2.11
RL16ND023	<0.00	<2.94	<0.07	<0.30	0.01	<3.73	<0.00	11.8	0.34	502561.79	0.1	2.71
RL16ND023	<0.00	<2.51	0.66	<0.29	<0.00	<4.56	<0.00	61.96	3.52	449452.18	0.91	11.58
RL16ND023	<0.00	<2.38	<0.06	<0.32	<0.00	<4.36	<0.00	13.96	0.45	507663.63	0.24	<1.86
RL16ND023	<0.00	<2.76	<0.05	<0.30	<0.00	<4.60	<0.00	224.99	0.16	547868.81	<0.04	3.02
RL16ND023	0	<2.52	<0.08	<0.32	<0.00	<4.13	0	13.06	0.48	493825.34	0.33	<2.00
RL16ND029	0.02	17.96	4.23	2.54	0.13	5.11	<0.00	1461.64	2.94	450335.47	92.66	28.99
RL16ND029	0.06	4.53	13.82	2.43	0.13	5.2	0.01	1182.25	1.29	451433.32	48.95	20.35
RL16ND029	0.07	2.18	8.17	3.16	0.09	4.34	<0.00	1859.2	1.91	429169.23	352.93	24.67
RL16ND029	0.01	21.5	183.93	156.3	0.08	<2.78	0.02	2748.45	22.27	463526.51	89.57	67.94
RL16ND029	<0.00	1.92	1.85	0.89	0.07	3.37	<0.00	1780.44	1.17	450434.81	95.76	37.54
RL16ND029	0.03	<2.21	798.9	23.13	0.04	<3.52	0	275.31	0.72	437547.16	228.91	4.99
RL16ND029	<0.00	<2.14	1.1	0.35	0.07	<2.94	0.01	1472.67	2.14	436369.6	465.2	25.18
RL16ND029	0.04	15.85	7.62	6.74	0.14	5.07	0.01	3812.2	3.94	457241.28	258.31	56.83
RL16ND029	<0.00	14.28	7.29	1.92	0.11	7.84	0	1235.9	0.57	442465.04	35.83	23.16
RL16ND029	<0.00	<1.59	0.61	0.94	0.05	<2.93	0	619.88	0.13	457093.27	489.13	11.65
RL16ND029	<0.00	3.51	5.44	1.36	0.08	<3.84	0	1181.91	1.01	487674.23	515.98	21.58
RL16ND029	<0.00	2.35	2.04	0.44	0.11	5.54	<0.00	1285.91	0.59	458038.57	403.82	26.75
RL16ND029	<0.00	<1.81	4.17	1.27	0.07	5.73	<0.00	1319.97	0.64	438062.45	494.32	26.95
RL16ND029	0.01	<1.97	0.57	2.41	0.07	<3.30	<0.00	998.74	0.12	435414.86	163.71	26.65
RL16ND029	0.08	20	11.18	3.93	0.14	<2.89	0	1280.28	1.04	485609.85	25.14	24.96
RL16ND029	0.01	<2.08	1.81	0.66	0.09	<2.87	<0.00	1397.6	2.19	447007.91	243.34	25.98
RL16ND029	<0.00	2.33	4.72	2.56	0.1	<3.11	<0.00	1202.26	0.16	421947	119.23	21.29
RL16ND029	0	<2.07	1.76	1.47	0.1	<3.01	0	807.27	0.04	482317.24	222	9.43
RL16ND029	0	1.76	310.03	228.3	0.05	2.87	<0.00	1500.67	0.95	444856.84	366.27	26.04

Sample ID	Hf_ppm	K_ppm	Mg_ppm	Mn_ppm	Mo95_ppm	Na_ppm	Nb_ppm	Ni_ppm	Pb208_ppm	S_ppm	Sb_ppm	Se_ppm
RL16ND029	<0.00	2.06	4.96	2.41	0.13	4.21	<0.00	1532.16	0.94	451607.44	65.16	23.6
RL16ND029	<0.00	<1.83	0.4	0.8	0.13	<2.51	<0.00	1593.25	0.32	434909.43	691.75	21.83
RL16ND039	<0.00	<4.62	48.23	13.68	<0.01	<10.12	<0.00	528.9	0.84	586833.42	1.99	160.26
RL16ND039	<0.00	<2.50	<0.11	<0.22	<0.00	<4.59	0	500.48	<0.02	495323.61	<0.05	129.5
RL16ND039	<0.00	<2.17	<0.16	<0.28	<0.00	<4.25	<0.00	415.09	0.85	490649.79	0.78	92.35
RL16ND039	<0.00	<2.83	<0.21	<0.40	<0.00	<7.26	<0.00	362.55	<0.02	530585.09	<0.05	161.52
RL16ND039	0.26	<2.55	<0.20	<0.30	<0.00	<5.93	<0.00	3124.86	0.07	569715.68	0.55	54.11
RL16ND039	<0.00	<1.94	<0.14	<0.23	<0.00	<4.77	<0.00	1036.07	<0.02	499584.67	0.08	104.44
RL16ND039	<0.00	<1.97	<0.09	<0.25	<0.00	<4.49	<0.00	2233.21	<0.02	441654.96	0.08	162.68
RL16ND039	<0.00	<2.54	<0.16	<0.25	<0.01	<6.01	<0.00	134.7	<0.02	534916.06	<0.04	56.38
RL16ND039	<0.00	<2.38	16.13	19.05	<0.00	<4.48	<0.00	1801.78	8.22	476144.58	8.97	88.52
RL16ND039	<0.00	9.41	11.35	3.5	<0.00	32.49	0.02	194.79	1.92	488588.43	63.58	83.93
RL16ND039	<0.00	<2.98	15.22	1.17	<0.00	53.18	<0.00	1122.58	6.97	465486.2	4.38	32.93
RL16ND039	<0.00	2.59	19.54	0.39	<0.00	<4.14	<0.00	3084.35	5.73	476694.21	1.8	142.88
RL16ND039	0	<2.37	15.68	42.84	<0.00	5.27	<0.00	675.04	14.67	523885.76	3.55	84.21
RL16ND039	<0.00	<4.62	<0.22	<0.53	<0.00	<9.06	<0.00	718.24	0.14	568096.95	1.15	99.03
RL16ND039	<0.00	<2.16	0.23	<0.26	<0.00	<4.09	<0.00	966.36	0.18	456992.96	0.91	28.69
RL16ND039	<0.00	<2.60	<0.13	0.28	<0.00	<5.02	<0.00	288.97	0.07	494433.39	0.52	65.32
RL16ND042	0.02	60.96	364.55	99.91	<0.00	113.8	0.02	276.93	139.74	449350.96	115.3	25.53
RL16ND042	0.25	288.96	156.96	4.98	<0.01	86	0.03	1530.55	5.58	393290.34	5.75	29.13
RL16ND042	<0.00	<1.92	7.52	23.51	<0.00	8.35	<0.00	1097.33	30.66	441339.21	61.55	37.21
RL16ND048	<0.00	4.5	186.06	14.46	0.8	39.51	<0.00	4994.11	15.07	549126.52	154.88	24.36
RL16ND048	0.15	5.01	630.91	48.36	0.17	12.69	0.05	2499.35	4.83	562776.22	61.93	47.05
RL16ND048	<0.00	2.28	0.57	1.02	0.62	<4.25	<0.00	3738.36	9.06	446038.95	92.86	54.3
RL16ND048	0	<2.56	311.08	30.08	0.04	<6.98	<0.00	590.57	58.46	589636.59	85.53	37.67
RL16ND048	0.02	<2.07	0.4	<0.29	0.09	<5.34	0	1092.6	1.27	464385.17	12.63	28.51
RL16ND048	<0.00	<2.63	585.12	49.73	<0.00	<5.94	<0.00	1101.28	23.02	464585.15	35.96	12.52
RL16ND048	<0.00	<1.58	3.71	0.64	0.65	6.85	<0.00	4375.77	1.95	424851.67	22.08	33.58
RL16ND048	0.05	3.08	53.88	0.93	0.12	7.05	0	5.58	0.09	481080.23	1.21	29.99
RL16ND048	<0.00	<2.11	<0.13	0.99	0.14	<5.86	0	198.96	0.82	480519.97	9.36	30
RL16ND048	0.06	12.27	3305.08	267.65	0.1	31.6	0.01	1797.79	284.68	448392.44	7075.2	43.39

Sample ID	Hf_ppm	K_ppm	Mg_ppm	Mn_ppm	Mo95_ppm	Na_ppm	Nb_ppm	Ni_ppm	Pb208_ppm	S_ppm	Sb_ppm	Se_ppm
RL16ND048	<0.00	4.29	236.91	11.81	0.04	21.43	<0.00	2003.53	20.37	390563.79	4392.9	19.31
RL16ND048	<0.00	<2.27	0.22	<0.23	0.11	<5.95	<0.00	397.11	0.07	517454.17	2.39	28.41
RL16ND048	0	<3.75	<0.24	<0.36	0	<8.03	<0.00	6.55	<0.03	618045.57	<0.07	47.75
RL16ND048	<0.00	<2.64	<0.18	<0.27	0.04	8.63	<0.00	88.39	<0.02	534008.86	1.13	51.41
RL16ND058	<0.00	<1.74	6.67	4.65	0.12	<3.81	<0.00	720.97	0.57	476349.39	36.98	13.55
RL16ND058	<0.00	3.46	1419.63	761.75	0.13	6.52	0	1300.17	5.9	450105.55	768.76	21.59
RL16ND058	<0.00	4.36	0.42	<0.30	<0.01	<6.15	<0.00	2180.49	0.11	553880.46	0.49	21.5
RL16ND058	<0.00	3.44	22.25	4.07	0.32	<4.42	<0.00	706.29	0.14	487384.68	6.41	10.43
RL16ND058	<0.00	<2.21	<0.15	<0.27	0	<4.55	<0.00	1085.91	2.68	534781.83	13.17	21.29
RL16ND058	<0.00	1677.9	2864.08	60.17	<0.00	24.18	0.11	1147.47	7.92	547801.35	29.92	14.4
RL16ND058	<0.00	90.38	13.63	0.69	<0.00	<7.91	<0.00	2073.84	1.34	476401.52	8.85	25.98
RL16ND058	0.02	1233.91	1602.03	29.51	<0.00	<16.99	0.12	674.85	9.37	439918.45	4.33	18.06
RL16ND058	1.27	89.3	39.85	16	<0.00	<6.24	0	1161.12	3.38	555311.22	11.64	16.6
RL16ND058	0.05	260.41	18.59	3.11	78.74	10.32	0.14	464.21	3.19	520195.51	17.49	9.27
RL16ND058	<0.00	166.55	34.37	1.09	<0.01	<11.57	0.02	2031.63	2.25	584728.8	6.32	26.52
RL16ND058	0.03	99.8	91.53	3.19	<0.00	<10.83	0.01	1427.19	0.98	584875.3	3.75	19.53
RL16ND058	<0.00	5.6	3.72	0.52	0.01	<5.29	<0.00	1258.67	1.62	489960.83	3.56	21.53
RL16ND058	<0.00	12.51	27.62	0.62	0.04	<11.08	0.01	526.29	0.71	667731.17	3.56	12.56
RL16ND058	<0.00	5.58	8.09	1.73	<0.00	<5.87	<0.00	1357.28	0.51	514605.06	1.88	8.14
RL16ND065	<0.00	<2.11	<0.14	<0.24	<0.00	<5.11	<0.00	113.59	<0.02	491172.49	<0.04	23.15
RL16ND065	<0.00	<2.16	<0.12	<0.26	0.01	<4.53	<0.00	8.9	<0.02	516724.96	<0.04	24.72
RL16ND065	<0.00	<1.84	<0.18	<0.22	<0.00	<4.85	<0.00	14.59	<0.02	506332.51	0.05	30.64
RL16ND065	<0.00	<2.06	<0.12	0.24	0.01	<4.59	<0.00	4.07	0.08	466329.78	1.55	40.43
RL16ND065	<0.00	12.94	17.03	8.03	0.38	13.27	0.08	1915.54	162.52	429710.13	624.54	25.8
RL16ND065	<0.00	7.69	32.31	2.1	0.3	23.33	<0.00	29.78	11.24	662264.29	58.54	41.67
RL16ND065	<0.00	<3.44	1.25	1.05	0.03	<6.08	0	1324.32	5.6	528887.35	721.95	62.24
RL16ND065	<0.00	<2.64	7.79	1.09	0.01	8.58	0	1365.06	4.14	504258.35	1034.8	41.43
RL16ND065	<0.00	<2.46	0.27	0.42	0	<4.39	<0.00	1093.25	2.81	504473.93	378.08	32.95
RL16ND065	<0.00	<2.72	0.88	1.46	0.05	<5.61	<0.00	1365.15	9.75	562085.13	1318.2	33.88
RL16ND065	<0.00	16.27	24.16	4	0.17	<7.27	0.01	662.3	3.9	442855.52	505.14	13.31
RL16ND065	<0.00	<5.74	1.31	<0.64	0.09	13.31	<0.00	477.47	10.57	589324.81	1073.2	44.45

Sample ID	Hf_ppm	K_ppm	Mg_ppm	Mn_ppm	Mo95_ppm	Na_ppm	Nb_ppm	Ni_ppm	Pb208_ppm	S_ppm	Sb_ppm	Se_ppm
RL16ND065	0.03	<6.01	0.97	<0.73	<0.01	<12.64	<0.00	1722.02	13.63	660852.68	110.7	20.36
RL16ND065	0.01	<2.13	3.54	3.6	0.01	15.21	0	399.83	39.56	512625.91	3414.1	9.45
RL16ND065	<0.00	<1.95	3.42	2.06	0.02	<4.18	0	1323.28	6.67	467056.11	1028.6	35.5
RL16ND065	0	1.93	0.45	0.82	0.58	5.05	<0.00	2722.77	7.18	462944.05	506.19	43.62
RL16ND065	<0.00	2.17	1.44	1.03	0.2	<3.79	0	353.67	0.22	449695.48	493.99	6.16
RL16ND065	<0.00	<2.44	<0.16	<0.25	<0.00	<5.47	<0.00	101.72	<0.02	514901.82	0.05	56.57
RL16ND070	<0.00	<1.84	0.12	<0.24	0.16	5.24	<0.00	3261.56	4.56	470768.7	7.86	35.48
RL16ND070	<0.00	<3.82	11.79	5.92	13.83	<8.05	<0.00	7414.7	115.31	484983.6	93.23	30.56
RL16ND070	0	27.78	7.32	3.08	18.7	17.53	<0.00	16789.5	6.91	567032.4	56.16	21.71
RL16ND070	0.46	<13.69	312.37	22.93	661.53	<31.58	0.85	1751.35	23.23	502288.92	42.31	43.22
RL16ND070	0.32	<3.34	8.43	1.39	0.85	<8.38	<0.00	5800.1	2.97	556422.96	20.78	23.32
RL16ND070	<0.00	<4.21	5.07	2.12	0.05	<9.08	<0.00	4739.24	2.96	593617.98	5.31	13.34
RL16ND070	<0.00	5.06	37.45	11.43	1.76	12.97	<0.00	2164.84	7.92	449316.74	12.16	58.79
RL16ND070	<0.00	<2.38	<0.13	<0.35	0.01	<4.99	0	6326.06	1.12	475915.85	2.66	24.77
RL16ND070	<0.00	<2.05	<0.16	0.58	0.02	<5.00	<0.00	3189.85	1.52	512640.52	3.26	60.64
RL16ND070	<0.00	37.62	25.84	16.6	12.72	26.54	0.18	5375.75	1.54	442270.53	19.08	54.41
RL16ND070	<0.00	<2.92	0.41	<0.31	0.07	<7.43	<0.00	4428.46	0.04	522621.28	0.16	53.35
RL16ND070	<0.00	<1.89	<0.11	<0.25	<0.01	<5.58	<0.00	4735.76	0.04	498417.26	0.23	54.89
RL16ND073	<0.01	<3.87	417.69	0.59	2.02	183.82	<0.00	802.52	16.71	484128.49	10.15	46.75
RL16ND073	0.62	<3.37	0.37	<0.41	<0.00	7.56	0.04	15911.5	2.92	455278.34	40.29	12.01
RL16ND073	<0.00	7.71	<0.54	<1.10	<0.01	<16.77	<0.00	17345.6	2.62	619387.39	34.3	16.79
RL16ND073	0.05	<4.30	6.61	<0.60	0.68	<10.07	0.03	4176.37	1.95	502135.11	6.82	28.18
RL16ND073	<0.00	7.07	54.47	19.46	11.19	10.22	0	2043.33	5.45	531721.44	4.96	81.67
RL16ND073	<0.00	<5.02	0.32	<0.75	<0.00	<11.21	0.01	3314.03	3.43	534382.41	6.33	40.88
RL16ND073	0.1	<3.84	21.08	0.66	0.04	<8.19	<0.00	17531.1	2.75	451423.97	59.47	29.54
RL16ND073	<0.00	<1.99	<0.11	<0.20	<0.00	<4.21	<0.00	3289.11	0.02	531884.72	0.18	27.6
RL16ND073	0.01	24.14	1692.51	17.62	14.7	12.96	<0.00	10533	61.99	465149.45	641.28	16.02
RL16ND073	0	<2.22	<0.17	<0.26	<0.00	<4.31	0	602.23	<0.02	571896.92	<0.04	35.97
RL16ND073	<0.01	<1.85	<0.11	<0.25	0.01	<4.28	<0.00	116.05	0.02	521644.73	0.08	14.96
RL16ND073	<0.00	<1.77	<0.12	<0.21	<0.00	<4.00	<0.00	1437.91	<0.01	488688.51	0.05	27.95
RL16ND076	0	<2.22	<0.14	<0.28	0	<5.36	<0.00	656.12	<0.02	563454.68	0.07	11.39

Sample ID	Hf_ppm	K_ppm	Mg_ppm	Mn_ppm	Mo95_ppm	Na_ppm	Nb_ppm	Ni_ppm	Pb208_ppm	S_ppm	Sb_ppm	Se_ppm
RL16ND076	<0.00	<3.33	<0.20	<0.44	0.01	<8.40	<0.00	637.77	<0.03	675530.66	0.64	5.6
RL16ND076	<0.00	<2.15	<0.13	<0.28	<0.00	<5.24	<0.00	655.34	<0.02	547047.83	<0.04	9.46
RL16ND076	<0.00	<2.37	<0.12	<0.23	<0.00	<4.59	<0.00	909.75	<0.02	547647.71	0.41	6.68
RL16ND076	0.36	21.83	69.78	4.94	0.12	26.75	0	5109.46	3.32	512584.43	111.57	18.46
RL16ND076	0.68	262.83	548.91	14	<0.00	107.7	0.12	1539.35	22.88	476545.53	239.74	10.97
RL16ND076	0.4	1696.65	232.1	3.81	0.06	164.09	0.02	1105.78	3.03	501174	80.13	12.64
RL16ND076	0.01	44.58	39.06	0.86	0.04	12.81	0.07	1673.67	2.11	503775.24	44.73	15.52
RL16ND076	0.35	60.03	1131.57	32.94	<0.01	58.01	0.04	2305.96	10.24	502045.39	69.89	17.71
RL16ND076	0.1	129.22	131.48	6.91	0.02	78.95	<0.00	901.17	0.51	545096.15	51.45	14.94
RL16ND076	0.16	47.15	136.87	3.23	0.01	52.75	0.02	523.72	1.39	499956.33	111.2	8.33
RL16ND076	0.21	40.71	24.51	0.61	0.04	18.77	0.12	1533.47	0.56	511927.16	43.37	11.01
RL16ND076	0.25	2318.3	278.31	8.44	0.01	623.88	0.05	678.1	7.43	540191.01	178.45	11.16
RL16ND076	<0.00	12.23	7.28	2.44	0.01	4.95	<0.00	845.43	0.39	509494.04	112.24	12.07
RL16ND076	<0.00	14	11.31	<0.25	<0.00	11.01	0.01	1129.08	0.3	539206.26	16.79	7.39
RL16ND076	<0.00	18.27	24.09	1.61	0.02	19.53	0.01	1232.21	4.8	506993.25	35.14	12.57
RL16ND076	0	9.56	6.48	<0.28	0.04	<5.34	<0.00	1440	0.17	569621.21	9.85	13.8
RL16ND076	<0.00	3.5	0.61	<0.24	0.01	<4.93	<0.00	1052.09	0.08	499442.45	10.17	12.71
RL16ND076	<0.00	274.01	209.6	5.2	0.12	25.72	<0.00	2053.37	116.54	472140.35	3393.3	17.86
RL16ND076	<0.00	11.52	62.09	3.95	<0.00	19.56	0	711.21	0.63	452644.87	24.33	16.96
RL16ND076	<0.00	<2.35	<0.15	<0.25	0.01	<5.39	<0.00	579.42	<0.02	555125.46	8.45	11.64
RL16ND076	<0.00	<2.23	<0.14	<0.33	<0.00	<5.27	<0.00	378.13	<0.02	571843.96	0.26	5.58
RL16ND076	<0.00	<2.68	<0.14	<0.25	0.05	<4.88	<0.00	241.39	<0.02	552122.26	0.19	2.77
RL16ND076	<0.00	<2.84	0.55	<0.33	<0.00	<5.18	0	81.26	<0.02	564229.27	0.12	8.35
RL16ND079	<0.00	<5.40	<0.14	<0.89	<0.01	<9.24	<0.00	0.85	0.1	548012.68	0.46	20.96
RL16ND079	<0.00	<4.36	<0.16	<0.61	0.02	<7.59	<0.00	0.72	<0.04	521045.46	0.17	16.93
RL16ND079	<0.00	<4.15	11.87	13.1	0.07	10.61	<0.00	1537.68	5.83	498972.53	1708.8	15.52
RL16ND079	<0.00	12.13	8.54	61.51	0.78	28.92	0.01	64.67	10.63	555467.14	103.81	24.92
RL16ND079	0.01	39.14	27.34	284.48	1.2	60.2	<0.00	245.52	21.09	570922.23	155.96	39.84
RL16ND079	<0.00	<5.35	0.35	16.43	0.04	<7.53	<0.00	9.55	11.56	478398.84	17.56	15.92
RL16ND079	<0.01	<4.24	<0.16	<0.66	<0.00	<7.00	<0.00	15.41	5.86	493198.15	18.43	23.55
RL16ND079	<0.01	<4.98	<0.18	<0.74	<0.00	<8.04	<0.00	18.73	4.61	561461.96	11.89	28.56

Sample ID	Hf_ppm	K_ppm	Mg_ppm	Mn_ppm	Mo95_ppm	Na_ppm	Nb_ppm	Ni_ppm	Pb208_ppm	S_ppm	Sb_ppm	Se_ppm
RL16ND079	<0.00	<5.94	0.26	<0.95	0.05	<10.82	<0.00	17.45	12.29	568074.55	19.71	26.41
RL16ND079	<0.00	<4.52	0.94	5.01	0.03	<7.49	<0.00	9.38	5.57	471021.64	17.97	21.69
RL16ND079	<0.00	<6.59	0.12	1.1	0.03	<9.99	<0.00	35.61	5.78	570856.63	11.18	28.28
RL16ND079	<0.00	<6.95	<0.15	<0.82	0.09	<8.71	<0.00	10.8	47.37	609010.68	25.16	23.08
RL16ND079	<0.00	5.55	3.04	14.18	0.43	17.92	<0.00	1140.78	2.23	491662.44	17.64	13.11
RL16ND079	<0.00	<5.79	3.41	16.84	0.26	<9.82	<0.00	27.19	6.57	558226.94	51.93	16.35
RL16ND079	0	<5.23	0.41	9.61	0.12	<8.53	<0.00	10.75	4.58	522699.55	3.49	18.74
RL16ND079	0.01	<5.04	<0.19	<0.68	<0.02	<8.51	<0.00	50.15	4.84	499669.29	12.04	19.1
RL16ND079	<0.00	<5.25	1.7	<0.66	<0.02	<7.93	<0.00	68.48	3.18	492158.86	9.78	16.04
RL16ND079	<0.00	<4.37	<0.19	0.75	<0.00	<7.22	<0.00	27.4	4.29	445714.35	4.92	22.45
RL16ND079	<0.00	<5.85	<0.16	<0.76	<0.02	<10.30	<0.00	18.07	3.7	575578.17	3.87	18.45
RL16ND079	<0.00	18.65	8.77	43.73	0.68	55.35	<0.00	1073.39	2.33	541839.07	614.69	9.2
RL16ND079	<0.00	<5.39	<0.17	<0.77	<0.00	<7.89	<0.00	0.59	0.21	496091.25	0.2	25.78
RL16ND079	0.01	6.39	18.85	204.07	0.34	22.2	<0.00	1025.95	9.27	421163.87	1835.1	14.45
RL16ND079	<0.00	<5.77	0.13	<0.64	0.03	<6.81	<0.00	2.41	0.48	505378.99	0.44	17.71
RL16ND080	<0.00	<2.06	0.18	<0.25	0.01	<5.18	<0.00	43.71	<0.02	517216.58	<0.04	5.94
RL16ND080	<0.00	<2.03	<0.10	<0.24	<0.00	5.7	<0.00	141.98	0.04	470091.53	0.16	6.83
RL16ND080	<0.00	<2.41	0.18	<0.27	0	<5.29	<0.00	78.55	<0.02	534726.87	<0.04	7.24
RL16ND080	<0.00	92.58	34.35	9.87	0.6	211.99	0.03	273.19	95.85	518692.51	790.34	8
RL16ND080	0	87.81	25.22	8.58	0.75	57.64	0.03	255.83	101.58	472289.36	739.53	5
RL16ND080	0	70.09	13.66	8.89	0.22	48.08	<0.00	221.74	88.63	462307.81	631.5	2.88
RL16ND080	<0.00	68.42	18.24	14.07	0.36	70.65	<0.00	282.67	59.42	450323.1	493.41	4.56
RL16ND080	0	93.61	22.87	12.74	0.69	65.53	0.01	196.65	64	466922.37	547.27	3.65
RL16ND080	0.02	76.45	16.63	8.22	0.32	88.8	0.02	226.12	47.89	496303.8	255.35	5.19
RL16ND080	<0.00	80.54	34.99	12.58	0.27	108.57	0	221	59.38	452667.2	529.51	5.89
RL16ND080	<0.00	63.36	15.9	9.44	0.09	75.06	<0.00	286.34	34.95	461033.42	409.25	2.48
RL16ND080	<0.00	121.1	58.68	20.55	0.16	59.94	0.06	175.02	27.77	485250.83	175.67	5.98
RL16ND080	<0.00	66.66	12.44	8.01	0.18	85.61	<0.00	159.24	10.76	430031.85	162.61	3.78
RL16ND080	0.05	27.72	6.2	5.01	0.68	82.11	0.01	107.31	9.22	624485.52	55.19	9.36
RL16ND080	<0.00	2.84	0.74	0.63	0.01	<4.29	<0.00	100.69	2.62	482508.61	18.08	8.28
RL16ND080	<0.00	<2.29	<0.12	<0.26	0.01	<4.76	<0.00	127.65	0.84	539647.97	4.88	6.2

Sample ID	Hf_ppm	K_ppm	Mg_ppm	Mn_ppm	Mo95_ppm	Na_ppm	Nb_ppm	Ni_ppm	Pb208_ppm	S_ppm	Sb_ppm	Se_ppm
RL16ND080	<0.00	<2.14	0.53	<0.29	0.03	<4.19	0	45.29	1.92	487561.87	12.65	5.73
RL16ND080	0	<1.96	1.68	0.42	<0.00	31.59	0	87.57	0.5	457768.9	2.57	6.99
RL16ND080	<0.00	<2.37	<0.15	<0.31	<0.01	<4.58	<0.00	203.39	0.32	518609.03	1.29	5.34
RL16ND080	<0.00	8.03	1.62	<0.49	0.01	21.11	<0.00	68.53	2.18	606986.21	7.83	7.92
RL16ND080	<0.00	<2.26	2.93	0.7	0	52.07	<0.00	93.75	0.22	507215.1	4.54	5.14
RL16ND080	<0.00	<2.66	<0.14	<0.28	0	<5.01	0	46.45	0.12	518508.42	0.54	4.7
RL16ND080	<0.00	<2.06	<0.12	<0.29	0	<5.02	<0.00	115.06	<0.02	515920.5	0.12	7.83
RL16ND087	<0.00	<4.79	<0.02	<0.39	<0.00	<4.21	<0.00	38.18	0.02	547295.93	<0.31	21.73
RL16ND087	<0.00	<5.37	0.05	<0.44	0	<4.18	<0.00	18.21	<0.01	547504.49	<0.30	18.99
RL16ND087	<0.00	<4.48	0.03	<0.43	<0.00	<3.86	<0.00	21.32	<0.01	517898.46	<0.28	14.03
RL16ND087	0	<4.43	<0.05	<0.37	<0.00	<4.01	<0.00	6.68	<0.01	547183.31	<0.27	11.56
RL16ND087	<0.01	<7.36	<0.07	<0.67	<0.01	22.84	<0.00	58.04	33.29	582719.13	3.25	48.34
RL16ND087	<0.00	<5.98	<0.08	<0.50	<0.00	<4.05	<0.00	41.93	8.16	542575.03	1.2	15.7
RL16ND087	<0.00	<4.80	0.07	<0.43	0	<4.31	<0.00	89.87	5.36	519655.29	0.77	20.49
RL16ND087	<0.00	<8.30	0.27	<0.65	<0.00	11.67	<0.00	43.39	5.95	627442.91	0.51	23.28
RL16ND087	0.02	<4.70	<0.05	<0.40	<0.00	<3.58	<0.00	75.41	0.91	504259.73	<0.26	18.81
RL16ND087	<0.00	<3.27	<0.03	<0.34	<0.00	3.41	<0.00	98.81	1.31	474345.46	0.22	15.33
RL16ND087	<0.00	<7.61	<0.12	<0.64	<0.01	<6.02	0	232.78	2.99	551928.56	<0.39	22.79
RL16ND087	<0.00	<7.68	0.13	<0.74	<0.01	<6.29	<0.00	50.69	0.71	555379	<0.42	18.71
RL16ND087	<0.00	<4.06	<0.03	<0.40	<0.00	<3.52	0	54.6	0.34	461860.97	<0.26	14.43
RL16ND087	<0.00	<4.60	0.58	0.73	0.01	9.91	0	32.03	2.93	501620.26	0.32	18.34
RL16ND087	<0.00	<4.89	<0.05	<0.43	<0.00	4.84	0	1.79	3.38	542045.54	0.51	7.47
RL16ND087	<0.00	<4.65	<0.05	<0.38	0	<3.85	<0.00	9.69	3.01	531844.53	0.45	16.92
RL16ND087	<0.01	<6.94	<0.06	<0.60	<0.01	<6.23	<0.00	29.56	0.34	584168.81	<0.38	73.43
RL16ND087	<0.00	<4.65	0.08	<0.37	<0.00	<3.62	<0.00	192.92	0.45	551730.7	0.25	19.71
RL16ND087	<0.00	<4.43	<0.03	<0.33	<0.01	<4.21	<0.00	10.17	1.64	512151.91	<0.28	12.32
RL16ND087	0	<4.99	<0.06	<0.42	<0.00	<4.29	<0.00	15.84	1.64	535538.73	<0.29	16.76
RL16ND087	<0.00	<5.07	<0.05	<0.36	<0.01	<4.00	<0.00	3.38	1.29	514686.59	<0.27	9.24
RL16ND087	<0.00	<4.22	<0.02	<0.37	<0.00	<4.19	<0.00	32.83	0.43	515979.04	<0.27	16.16
RL16ND087	<0.00	<4.93	0.17	<0.45	0.03	<2.93	<0.00	27.66	0.02	520485.51	<0.24	13.33
RL16ND087	<0.00	<3.94	<0.04	<0.37	0.01	<3.35	<0.00	34.94	0.04	519434.97	<0.24	20.48

Sample ID	Hf_ppm	K_ppm	Mg_ppm	Mn_ppm	Mo95_ppm	Na_ppm	Nb_ppm	Ni_ppm	Pb208_ppm	S_ppm	Sb_ppm	Se_ppm
RL16ND088	<0.00	<10.99	2.18	12.53	<0.01	<7.89	<0.00	44.49	45.88	627411.69	1.63	32.49
RL16ND088	<0.00	23.96	0.09	6.06	<0.00	65.14	<0.00	51.54	18.71	488414.97	1.52	29.35
RL16ND088	<0.00	<7.33	0.2	<0.62	0.02	8.4	<0.00	27.91	7.86	567973.84	0.84	27.56
RL16ND088	<0.00	<4.62	0.06	<0.48	<0.00	5.9	<0.00	54.14	9.04	447558.45	0.32	20.03
RL16ND088	<0.00	9.76	0.18	1.39	<0.00	23.34	<0.00	52.63	11.64	537470.97	0.91	24.16
RL16ND088	<0.00	5.43	<0.06	1.12	<0.00	13.47	<0.00	76.17	26.62	523166.29	4.68	21.33
RL16ND088	<0.00	<4.52	<0.07	<0.45	<0.00	<3.66	<0.00	66.39	3.66	539195.93	0.48	23.25
RL16ND088	<0.00	<3.82	<0.05	0.46	<0.00	12.22	<0.00	43.16	4.23	485809.4	0.34	22.54
RL16ND088	<0.00	3.7	0.03	<0.38	0.01	10.6	<0.00	62.45	8.27	448207.5	0.42	14.9
RL16ND088	<0.00	<6.28	<0.03	<0.47	<0.01	12.2	<0.00	39.48	5.37	550995.34	<0.36	17.41
RL16ND088	<0.00	<6.41	0.05	0.55	0.01	8.39	<0.00	59.8	4.23	524873.6	0.35	17.31
RL16ND088	<0.00	<3.95	<0.06	<0.42	<0.00	<3.70	<0.00	43.58	2.03	523854.13	<0.27	22.56
RL16ND088	<0.00	<4.45	<0.03	<0.47	<0.00	5.33	<0.00	63.14	1.3	521743.97	0.66	17.06
RL16ND088	<0.00	<3.98	0.05	<0.30	0.01	<3.07	0	68.84	1.34	460792.4	0.35	33.47
RL16ND088	<0.00	<3.89	<0.04	<0.38	<0.00	<3.42	<0.00	59.48	0.54	467031.98	<0.26	15.63
RL16ND088	<0.00	<4.21	<0.07	<0.40	<0.00	<3.74	<0.00	83.32	4.5	530733.87	0.6	18.65
RL16ND088	<0.00	<4.19	<0.04	0.43	0	6.57	<0.00	93.56	2.09	543747.64	<0.28	17.88
RL16ND088	<0.00	<4.27	<0.04	<0.39	<0.00	5.69	<0.00	71.37	1.47	507312.49	0.36	17.24
RL16ND088	0.01	<4.48	<0.05	<0.34	0	<3.43	<0.00	48.26	0.17	527038.86	<0.24	19.13
RL16ND088	<0.00	<3.60	<0.04	<0.33	<0.00	<3.80	<0.00	48.03	0.93	478652.58	0.44	14.48
RL16ND088	<0.00	<3.99	<0.05	<0.40	<0.00	<3.48	<0.00	136.62	0.49	441372.1	<0.26	20.69
RL16ND088	<0.00	<3.96	0.07	0.51	<0.00	<3.70	0.01	31.58	0.03	503726.79	<0.24	16.24
RL16ND088	<0.00	<4.46	<0.05	<0.39	<0.00	<3.29	0	57.59	0.17	523247.22	<0.26	25.86
RL16ND088	<0.00	<4.87	<0.08	<0.48	<0.00	<4.96	<0.00	26.86	0.01	561487.8	<0.32	21.35
RL16ND088	<0.00	<4.81	<0.05	<0.46	<0.00	<3.60	<0.00	50.67	0.31	540480.75	<0.31	21.16
RL16ND094	<0.00	<5.67	27.72	47.73	0.02	2693.1	<0.00	223.83	2	464379.93	11.91	12.18
RL16ND094	<0.00	5.79	29.57	85.66	0.02	183.54	<0.00	399.27	2.47	454172.37	9.96	7.75
RL16ND094	<0.00	<3.21	<0.06	<0.39	<0.01	<4.39	<0.00	91.38	<0.02	545345.87	<0.06	<2.92
RL16ND094	0	<3.07	<0.09	<0.38	<0.00	<4.03	<0.00	14.06	<0.02	546548.01	<0.06	3.83
RL16ND094	<0.00	<2.77	<0.08	<0.37	<0.00	<4.72	0	16.45	<0.02	533214.6	<0.05	2.94
RL16ND094	<0.00	<2.30	<0.07	<0.32	0.01	<3.83	<0.00	7.86	<0.01	526959.88	<0.04	2.86

Sample ID	Hf_ppm	K_ppm	Mg_ppm	Mn_ppm	Mo95_ppm	Na_ppm	Nb_ppm	Ni_ppm	Pb208_ppm	S_ppm	Sb_ppm	Se_ppm
RL16ND094	<0.00	<3.15	<0.06	<0.36	<0.00	<4.71	0	18.6	0.01	535058.66	0.07	2.93
RL16ND094	<0.00	<2.16	1.5	<0.23	<0.01	<3.19	<0.00	17.61	0.02	482944.18	0.04	3.12
RL16ND094	<0.00	<2.69	<0.04	<0.29	0.01	<4.12	<0.00	97.09	<0.01	504160.02	<0.04	6.85
RL16ND094	<0.00	<2.35	1.8	3.46	<0.00	<3.91	<0.00	18.45	3.03	520001.98	8.96	3.29
RL16ND094	<0.00	<2.23	1.14	0.55	<0.00	<3.52	<0.00	19.52	4.25	467985.31	15.62	2.11
RL16ND094	<0.00	<2.18	2.4	0.46	<0.00	<3.76	<0.00	18.7	4.28	471518.7	24.52	<2.03
RL16ND094	0.01	6.8	49.07	79.56	0.04	359.16	<0.00	317.71	20.2	495693.23	5.29	17.45
RL16ND094	0.02	<4.86	24.31	56.22	0.06	4380.97	<0.00	257.7	3.54	442298.92	4.59	17.94
RL16ND094	<0.00	<2.53	<0.08	<0.32	<0.00	<3.37	<0.00	17.08	0.65	519687.27	4.48	3.43
RL16ND094	0.02	5.38	21.28	64.06	0.02	867.35	0.01	400.03	3.19	440454.53	2.07	9.39
RL16ND094	0.12	<2.17	0.82	0.76	<0.00	<3.58	0	38.19	0.22	490935.49	0.69	3.63
RL16ND094	<0.00	4.23	23.62	119.03	0.01	502.32	<0.00	364.57	3.99	422896.98	4	9.9
RL16ND094	<0.00	<2.88	<0.06	<0.31	<0.00	<4.61	<0.00	13.62	<0.01	564838.09	<0.05	3.78
RL16ND120	0.31	143.31	68.62	28.69	<0.00	28.02	0.26	35.92	8.15	537570.69	26.75	92.19
RL16ND120	<0.00	<3.30	0.31	2.99	<0.00	<6.16	<0.00	98.69	0.36	599750.34	1.78	51.29
RL16ND120	<0.00	11.64	29.64	14.14	<0.00	<3.46	0	205.62	0.36	508596.94	1.54	46.72
RL16ND120	<0.00	<1.99	3.68	2.1	<0.00	<3.01	<0.00	187.8	0.45	471089.86	1.08	28.12
RL16ND120	<0.00	<2.33	0.46	<0.26	<0.00	<3.28	<0.00	38.86	0.17	520821.54	1.25	15.63
RL16ND120	<0.00	<4.11	53.76	0.9	<0.00	<7.73	<0.00	190.83	0.88	527976.89	2.49	35.23
RL16ND120	<0.00	<2.43	<0.08	<0.28	0.01	<3.56	<0.00	55.9	0.15	492267.01	1.95	41.33
RL16ND120	<0.00	<1.96	<0.07	<0.30	<0.00	<3.94	<0.00	65.95	<0.01	547470.27	0.18	41.07
RL16ND122	0	<2.53	<0.06	<0.28	<0.00	<4.11	0	264.57	<0.02	588749.27	<0.05	13.12
RL16ND122	<0.00	<3.56	0.15	<0.35	<0.00	<4.31	<0.00	162.68	<0.01	602184.1	<0.05	11.9
RL16ND122	<0.00	<3.18	3.83	0.49	0.02	<4.56	<0.00	428.24	0.04	586621.59	2.12	16.07
RL16ND122	0	<2.85	<0.05	<0.31	<0.00	<3.98	<0.00	22.94	<0.01	541374.08	<0.06	7.14
RL16ND122	<0.00	<3.07	0.07	<0.39	<0.01	<4.50	<0.00	48.43	<0.01	549871.96	<0.05	11.29
RL16ND122	<0.00	<2.66	<0.10	<0.30	<0.00	<3.62	<0.00	491.1	<0.01	563789.78	<0.04	16.36
RL16ND122	<0.00	<2.66	<0.05	<0.29	<0.01	<3.34	<0.00	351.14	0.02	499222.31	0.07	9.92
RL16ND122	<0.00	<2.49	0.1	<0.28	<0.00	<3.54	<0.00	239.56	<0.01	517024.27	0.06	10.5
RL16ND122	<0.00	<2.39	<0.06	<0.29	<0.01	<3.63	<0.00	554.4	<0.01	540107.43	<0.04	16.59

Sample ID	Hf_ppm	K_ppm	Mg_ppm	Mn_ppm	Mo95_ppm	Na_ppm	Nb_ppm	Ni_ppm	Pb208_ppm	S_ppm	Sb_ppm	Se_ppm
RL16ND122	<0.00	<2.56	<0.04	<0.28	<0.00	<3.55	<0.00	37.41	<0.01	538346.33	<0.05	7.61
RL16ND122	<0.00	<2.37	0.13	0.43	<0.00	<3.43	<0.00	516.3	0.04	476193.59	0.2	13.22
RL16ND122	<0.00	<2.14	0.7	1.74	0.01	<3.12	<0.00	99.71	0.05	492205.36	0.25	19.19
RL16ND122	0	<2.24	0.38	2.61	<0.00	<3.57	<0.00	218.57	1.55	518721.23	4.83	12.06
RL16ND122	<0.00	9.31	2136.31	398.87	0.03	<3.84	0.01	61.49	5.88	493024.6	8.62	4.26
RL16ND122	<0.00	<2.44	1.41	0.8	0.01	<3.67	<0.00	819.22	3.7	552194.06	3.4	28.09
RL16ND122	<0.00	<2.27	<0.08	<0.29	0.01	<4.03	<0.00	13.39	0.8	535411.74	5.54	21.67
RL16ND122	0.03	<1.93	1.43	<0.31	0.18	<3.38	<0.00	285.68	0.94	499031.81	3.46	4.45
RL16ND122	<0.00	<2.59	0.37	<0.32	<0.00	<4.10	<0.00	768.58	0.66	579554.78	1.81	25.73
RL16ND122	<0.00	<2.16	0.06	<0.26	<0.00	<3.79	<0.00	69.98	0.82	553561.53	1.41	7.01
RL16ND122	<0.00	<2.46	<0.08	<0.26	<0.00	<3.45	<0.00	551.76	<0.01	556185.51	<0.04	13.33
RL16ND122	<0.00	<2.09	<0.04	<0.28	<0.01	<3.29	<0.00	267.95	1.02	543937.39	1.24	13.18
RL16ND123	<0.00	<6.70	<0.21	<0.75	<0.01	<9.66	<0.00	132.66	<0.04	531188.15	<0.19	17.01
RL16ND123	<0.00	35.42	65.66	12.9	<0.00	862.36	<0.00	3582.78	54.81	436403.62	118.39	13.21
RL16ND123	0.01	206.31	243.84	23.29	0.01	852.92	<0.00	3561.55	14.94	432410.12	12.4	17.74
RL16ND123	0.04	129.32	182.94	20.25	<0.00	225.17	0.02	3304.62	29.57	410191.75	5.66	8.08
RL16ND123	0.03	354.8	272.55	27.54	<0.01	3496.01	0.03	3573.12	17.1	441116.69	57.71	15.59
RL16ND123	<0.00	<4.24	0.24	<0.65	<0.01	<6.85	<0.00	440.73	2.55	500874.12	5.11	12.81
RL16ND123	0.03	1080.96	812.12	53.41	0.01	1565.36	0.04	3289.78	29.63	437436.14	20.69	16.19
RL16ND123	0.14	238.13	594.9	82.26	<0.01	<10.12	<0.00	110.78	21.15	477012.38	11.37	9.71
RL16ND123	<0.00	745.01	382.94	134.35	<0.01	<10.39	0.04	623.85	11.12	567241.19	10.72	36.57
RL16ND123	0.01	182.74	122.08	16.86	<0.00	24.64	0.02	3438.98	29.33	409225.81	121.87	15.34
RL16ND123	0.02	109.15	100.99	15.12	0.02	14.65	0.01	3242.53	9.26	421949.01	6.96	15.58
RL16ND123	<0.00	2959.3	250.59	27.27	<0.01	166.5	0.02	1194.61	10.45	498393.67	9.91	25.01
RL16ND123	0.03	204.11	58.53	15.57	0.01	80.31	0.03	3082.06	15.61	453372.86	18.25	16.66
RL16ND123	<0.00	<5.73	6.24	3.88	0.01	30.17	<0.00	437.06	5.06	483381.98	3.42	28.72
RL16ND123	0.02	223.28	105.4	11.27	0.05	<8.49	<0.00	185.41	2.93	479278.27	2.33	15.13
RL16ND123	<0.00	<11.04	13.1	<1.42	<0.03	<16.89	<0.00	224.56	1.25	632538.22	1.15	17.28
RL16ND123	<0.01	<5.77	11.51	1.44	<0.01	38.49	<0.00	212.17	0.92	499564.58	0.7	14.86
RL16ND128	<0.00	<2.54	0.17	<0.27	0.17	<3.82	<0.00	9.26	1.4	553527.02	0.15	51.03

Sample ID	Hf_ppm	K_ppm	Mg_ppm	Mn_ppm	Mo95_ppm	Na_ppm	Nb_ppm	Ni_ppm	Pb208_ppm	S_ppm	Sb_ppm	Se_ppm
RL16ND128	0.01	<2.52	<0.09	<0.28	<0.00	<3.82	<0.00	642.14	0.1	53791.1	0.18	26.65
RL16ND128	0.08	<2.14	0.2	<0.25	<0.00	<3.57	<0.00	454.46	0.03	528573.85	0.12	25.2
RL16ND128	0.01	682.69	19.92	4.27	0.08	16.43	<0.00	1345.66	28.93	661971.4	78.75	32.52
RL16ND128	0.01	68.64	201.98	8.25	0.1	11.19	<0.00	435.31	7.97	518369.85	36.87	25.55
RL16ND128	<0.00	200.74	690.29	14.59	0.11	8.66	0	1219.22	6.42	571260.56	34.44	25.91
RL16ND128	0.41	44	240.29	17.74	56.94	135.09	1.13	784.42	9.32	577486.15	44.54	25.55
RL16ND128	0.04	36.99	595.24	70.62	0.3	9.5	0.24	117.3	21.41	584229.87	41.2	34.75
RL16ND128	0.21	206.09	126.82	3.86	2.67	77.63	<0.00	221.1	9.83	545614.45	54.04	23.79
RL16ND128	<0.00	176.95	397.15	73.75	1.2	7.03	<0.00	183.48	36.11	518854.46	232.96	5.98
RL16ND128	<0.00	52.08	176.7	2.91	0.33	6.18	<0.00	428.69	3.2	502646.99	7.78	28.58
RL16ND128	<0.00	442.06	602.62	8.19	0.32	6.39	0	58.34	8.26	540422.55	15.15	40.19
RL16ND128	0.04	112.31	117.76	2.51	18.18	3.42	<0.00	393.48	4.65	479317.51	7.26	27.54
RL16ND128	0.67	111.18	134.55	19.44	7.09	7	0.6	84.97	10.73	523740.69	40.82	25.93
RL16ND128	0.25	148.11	60.07	6.56	0.16	6.44	0.45	448.74	13.34	529704.3	29.92	36.37
RL16ND128	0.25	229.51	152.44	4.23	10.54	783.26	0.01	370.31	10.8	527954.28	23.35	32.79
RL16ND128	0.02	<2.61	49.81	33.93	<0.00	5.63	0	903.75	4.45	534588.85	9.73	22.81
RL16ND128	0.32	2.64	31.4	1.86	13.98	<3.59	<0.00	278.88	2.36	528594.95	4.11	32.11
RL16ND128	<0.00	<3.35	310.84	6.7	<0.00	<5.40	<0.00	590.44	1.82	565721.91	4.97	24.57
RL16ND128	0	540.74	593.79	22.24	0.17	35.29	0.01	38.52	16.59	552509.87	8.04	28.39
RL16ND128	0.13	<2.13	5.08	<0.29	0.06	<3.73	<0.00	418.41	0.99	579890.51	1.47	26.56
RL16ND128	<0.00	<2.14	2.44	1.99	0.18	<3.35	<0.00	331.96	11.82	516001.06	3.02	46
RL16ND128	0.13	<2.25	4.88	0.36	0.66	8.62	0.08	469.88	3.3	482867.75	4.82	16.51
RL16ND128	<0.00	<4.09	0.42	<0.49	0.02	<6.99	<0.00	343.83	0.34	636257.35	0.74	32.81
RL16ND128	0.03	20.17	21.5	0.44	<0.00	<3.15	<0.00	388.64	0.13	480838.74	0.35	21.25
RL16ND142	0.32	68.84	173.19	45.32	0.02	13.39	0.36	363.09	12.45	577786.75	78.36	18.43
RL16ND142	0.01	<2.09	4.77	1.29	0.1	<3.30	0.16	214.22	8.27	541495.94	51.77	125.85
RL16ND142	0.99	31.9	1368.55	159.62	0.26	54.6	1.2	3608.63	46.41	473587.38	832.35	84.13
RL16ND142	3.24	134.76	36.77	36.13	<0.00	6.7	0.36	411.43	10.55	548046.53	27.09	25.12
RL16ND142	0.01	<2.48	<0.04	0.34	<0.00	<4.26	0.01	199.57	2.02	510048.25	14.67	15.28
RL16ND142	0.01	14.31	3.33	1.95	<0.00	11.3	0.08	266.83	1.71	532848.98	12.78	21.39

Sample ID	Hf_ppm	K_ppm	Mg_ppm	Mn_ppm	Mo95_ppm	Na_ppm	Nb_ppm	Ni_ppm	Pb208_ppm	S_ppm	Sb_ppm	Se_ppm
RL16ND142	1.62	111.88	217.77	11.14	<0.01	28.16	0.57	122.24	3.54	604326.63	25.38	55.98
RL16ND142	0.07	19.88	34.4	29.47	<0.00	5.76	0.28	415.03	1.66	499610.47	6.68	15.05
RL16ND142	0.98	50.57	19.97	88.8	0	<3.66	0.64	272.77	1.08	559614.79	9.1	23.17
RL16ND142	0.17	71.9	1481.16	31.47	0.27	139.45	0.29	2285.68	5.63	473684.81	695.37	71.08
RL16ND142	0.55	<3.04	162.78	5.15	<0.00	<4.08	0.03	308.68	1.34	488606.1	3.42	20.8
RL16ND142	0.58	11.59	52.48	6.3	0.01	<3.99	0.6	289.86	1.2	558564.42	7.89	16.17
RL16ND142	0.31	25.64	1000.06	46.35	0.22	18.49	0.27	1221.34	3.92	484242.88	834.49	44.95
RL16ND142	0.11	10.05	586.15	16.28	0.1	48.85	0.01	2066.48	3.82	483330.33	343.33	61.99
RL16ND142	0.03	<1.94	4.62	3.89	<0.00	<3.56	0.03	246.12	0.27	516374.27	2.26	15.94
RL16ND142	0.11	22.15	19.21	3.17	<0.00	<3.80	0.08	313.11	0.45	510582.25	2.2	18.06
RL16ND142	0.02	14.58	896.05	28.8	0.01	58.43	0.01	230.55	0.98	551090.46	2437.2	9.04
RL16ND142	<0.00	8.6	317.71	7.67	0.08	12.88	0.01	1915.01	0.97	463252.78	389.72	49.3
RL16ND142	0	3.21	266.06	4.51	0.03	20.62	0.01	2186.9	2.2	486311.67	265.01	67.86
RL16ND142	0.03	21.95	634.26	13.39	0.09	17.39	0.02	2119.79	1.91	460247.46	659.15	57.62
RL16ND142	0.01	<2.32	3.87	<0.29	<0.00	<3.31	<0.00	201.98	0.04	509182.4	1.13	15.64
RL16ND142	<0.00	5.83	197.93	5.41	0.1	10.31	<0.00	1939.29	0.43	454247.28	378.67	54.74
RL16ND142	<0.00	<2.79	0.83	<0.34	<0.00	<4.84	0.01	190.7	0.06	550664.87	0.42	13.78
RL16ND147	<0.01	42.64	22.62	<4.94	0.21	<92.31	<0.03	2947.34	25.42	492686.07	95.62	62.48
RL16ND147	<0.00	6.16	3.1	2.6	0.02	<8.87	<0.00	2095.17	6.19	597302.16	67.67	125.15
RL16ND147	0.67	<3.64	<0.19	<0.43	0.01	<7.96	0	1314.86	11.66	438661.74	56.04	69.48
RL16ND147	<0.00	<6.26	6.08	<0.72	<0.00	<10.75	0.01	2385.07	11.68	615557.22	91.29	123.87
RL16ND147	0.69	105.93	83.34	3.19	0.04	91.66	0.06	2475.13	41.39	508581.46	42.77	65.29
RL16ND147	<0.00	<4.34	0.29	<0.50	<0.00	<7.90	<0.00	2362.22	3.41	494539.24	27.5	101.49
RL16ND155	0.42	42.06	1651.96	894.64	0.63	30.48	1.97	112.41	68.34	649530.06	331.22	<7.84
RL16ND155	<0.00	<2.28	<0.06	424.47	0.05	<2.96	<0.00	0.79	0.04	488291.22	170.41	<1.54
RL16ND155	<0.00	<2.55	4154.99	462.15	0.25	3.66	<0.00	95.05	6.47	468336.48	336.8	<2.03
RL16ND155	<0.00	<2.39	<0.07	463.81	0.04	<3.67	<0.00	0.65	<0.01	510167.19	243.2	<1.98
RL16ND155	<0.00	<1.86	7.03	450.75	0.48	<2.69	<0.00	13.47	6.14	472332.85	143.27	<1.48
RL16ND155	0.01	112.03	180.39	1332.58	0.42	14.75	0	30.35	17.17	566864.87	554.66	3.35
RL16ND155	<0.00	<2.17	0.07	331.06	0.49	<3.21	<0.00	10.44	0.12	464539.74	162.8	<1.68
RL16ND155	0	<2.10	0.1	434.26	0.05	<3.69	<0.00	10.84	0.06	505146.05	241.1	<2.17

Sample ID	Hf_ppm	K_ppm	Mg_ppm	Mn_ppm	Mo95_ppm	Na_ppm	Nb_ppm	Ni_ppm	Pb208_ppm	S_ppm	Sb_ppm	Se_ppm
RL16ND155	<0.00	<1.90	0.04	366.42	0.05	<2.99	<0.00	4.16	0.03	506041.83	288.42	<1.82
RL16ND155	<0.00	<1.98	1.1	432.21	0.08	<3.63	<0.00	28.12	1.61	493386.43	250.45	<1.72
RL16ND155	<0.00	<1.95	0.29	492.03	0.18	<3.15	<0.00	6.84	0.1	472296.06	186.73	<1.72
RL16ND155	<0.00	<2.02	0.29	373.27	0.01	<3.12	<0.00	6.65	<0.01	471287.68	267.17	<1.55
RL16ND155	<0.00	<1.91	1.88	99.84	0.07	6.45	<0.00	48.93	1.22	438249.21	229.08	<1.81
RL16ND155	<0.00	<2.40	3.73	432.83	0.31	<3.62	<0.00	2.99	0.45	507863.74	134.56	<2.13
RL16ND155	<0.00	<2.27	9.5	394.82	0.37	<4.15	<0.00	30.02	5.17	462119.13	279.79	1.92
RL16ND155	0.53	11.33	185.94	570.64	0.24	17.24	2.4	99.85	34.22	506441.46	562.97	<2.01
RL16ND155	<0.00	<1.99	1.47	314.08	0.86	<3.85	<0.00	35.52	1.86	467379.38	286.44	2.18
RL16ND163	0.01	11.01	48.95	6.55	0.16	119.51	0.02	3752.68	11.23	536935.6	17.37	100.54
RL16ND163	<0.00	10.42	41.24	6.56	0.05	541.26	<0.00	4633.76	11.17	666857.11	35.67	125.75
RL16ND163	0.15	7.48	27.56	5.47	0.12	247.49	0.02	2434.88	12.12	552305.2	52.56	82.64
RL16ND163	0.01	6.7	28.59	6.03	0.02	<7.30	<0.00	1540.41	3	509473.71	0.34	66.64
RL16ND163	<0.00	5.04	35.08	5.48	0.05	<8.66	0	2297.98	4.02	454427.51	2.13	73.21
RL16ND163	0.03	<5.64	29	6.12	0.08	<11.12	<0.00	2560.22	5.8	674841.83	7.91	111.11
RL16ND163	<0.00	7.21	6.1	<0.72	0.23	<11.31	0	1299.56	3.35	606930.55	3.73	125.74
RL16ND163	<0.00	7.93	5.93	1.31	0.02	<12.51	0	1549.17	2.55	654967.4	1.67	135.93
RL16ND163	0.01	<4.92	6.31	1.26	0.21	12.18	<0.00	799.55	1.22	495479.48	2.4	76.8
RL16ND163	<0.00	10.67	12.03	1.09	0.04	32.63	0.01	1288.27	2.28	561744	1.87	118.59
RL16ND163	<0.00	<3.86	27.87	4.28	0.01	9.51	0.01	1765.52	1.66	490359.56	0.36	67.87
RL16ND163	<0.00	9.45	35.38	6.78	0.06	113.27	<0.00	1783.38	1.53	462016.76	2.4	59.11
RL16ND163	<0.00	19.34	13.95	1.22	0.46	37.89	<0.00	1353.07	2.28	537033.72	33.73	102.15
RL16ND163	<0.00	9.56	25.53	5.75	0.02	9.88	<0.00	3429.05	2.02	488008.53	16.38	72.12
RL16ND163	<0.00	14.36	10.33	0.61	0.09	10.97	0	1345.09	1.01	565587.11	4.4	112.07
RL16ND170	<0.00	<2.36	0.17	<0.35	0.01	<4.33	<0.00	1.14	0.12	533230.36	0.53	9.25
RL16ND170	<0.00	<2.01	0.07	<0.28	<0.00	<3.39	<0.00	163.62	3	541100.38	1.53	40.76
RL16ND170	<0.00	<2.34	7.06	<0.27	0.02	<3.46	<0.00	132.05	6.74	488644.77	69.65	19.16
RL16ND170	<0.00	75.01	883.4	101.72	0.01	15.41	0.01	214.41	16.52	485659.47	240.59	24.94
RL16ND170	<0.00	49.77	105.04	1.13	<0.00	12.65	<0.00	122.67	11.72	491412.3	58.68	25.55
RL16ND170	0	3.39	305.66	83.15	0.03	72.52	<0.00	362.7	13.54	535638.27	52.87	24.46

Sample ID	Hf_ppm	K_ppm	Mg_ppm	Mn_ppm	Mo95_ppm	Na_ppm	Nb_ppm	Ni_ppm	Pb208_ppm	S_ppm	Sb_ppm	Se_ppm
RL16ND170	<0.01	<5.79	104.19	27.28	0.02	<6.87	<0.00	49.22	6.96	623555.1	42.66	20.81
RL16ND170	0.01	1201.41	406.68	158.25	0.01	62.44	0.01	1667.55	35.37	511459.1	206.39	18.54
RL16ND170	0.03	761.67	1161.1	10.98	0.01	242.04	0.01	156.34	6.11	530616.54	32.63	23.34
RL16ND170	<0.00	<2.36	3.82	0.85	0.03	<3.66	<0.00	2718.39	3.83	489713.56	18.14	24.3
RL16ND170	<0.00	<2.30	11.71	<0.32	<0.00	<3.61	<0.00	170.7	3.1	491811.25	18.69	19.13
RL16ND170	<0.00	320.51	276.64	228.03	<0.00	122.04	<0.00	819.34	7.03	463776.89	26.92	15.12
RL16ND170	0.03	<5.52	23.32	15.64	<0.02	<7.93	<0.00	46.74	2.51	618669.65	15.85	19.4
RL16ND170	<0.00	237.21	1733.85	245.48	0	52.18	0.1	21.08	2.05	492238.53	12.9	12.52
RL16ND170	<0.00	<2.42	<0.05	<0.29	<0.00	<3.22	<0.00	8.27	2.94	520047.68	12.78	16.84
RL16ND170	<0.00	<2.27	0.15	0.58	0.01	<2.99	<0.00	10.43	2.18	480281.73	17.33	21.25
RL16ND170	<0.00	24.58	187.98	18.99	<0.00	<4.34	<0.00	258.73	3.46	575581.61	11.05	20.27
RL16ND170	<0.00	48.63	479.98	4.91	<0.00	<3.20	0.01	0.91	1.02	530557.5	3.63	13.21
RL16ND170	0	<2.18	0.03	<0.26	<0.00	<3.25	<0.00	1.2	0.21	482261.66	1.91	14.02
RL16ND175	<0.00	<2.50	<0.12	<0.30	0	<5.98	<0.00	135.41	<0.02	550335.98	<0.05	26.29
RL16ND175	<0.00	<2.12	<0.15	<0.30	<0.00	<5.46	<0.00	153.27	<0.02	568714.97	<0.05	19.32
RL16ND175	0	<1.51	0.56	7.62	0	<4.16	<0.00	51.49	2.59	512342.15	12.25	20.96
RL16ND175	<0.00	<1.97	<0.18	1.17	0.06	<5.36	<0.00	72.26	0.95	562486.82	16.56	25.99
RL16ND175	<0.01	<6.33	494.68	91.66	<0.01	<16.66	<0.00	143.77	4.69	648339.88	11.55	30.89
RL16ND175	0	<2.11	<0.17	<0.33	0	<5.81	<0.00	143.14	0.57	603566.46	9.01	30.03
RL16ND175	<0.00	<2.09	5.71	3.11	<0.00	<4.57	<0.00	80.93	5.61	510603.35	16.22	18.83
RL16ND175	<0.00	<1.68	116.28	74.78	0.01	17.54	<0.00	254.33	4.77	390375.76	12.01	14.82
RL16ND175	<0.00	<2.12	<0.12	0.38	0.02	<5.77	<0.00	306.3	4.58	493164.49	9.17	21.7
RL16ND175	0.01	<1.82	1.08	85.61	<0.00	<4.52	<0.00	83.35	2.86	492792.89	8.16	20.57
RL16ND175	<0.00	<1.90	0.16	1.09	<0.00	<4.58	<0.00	106.13	0.68	480088.45	5.89	19.02
RL16ND175	<0.00	<2.70	3.65	123.3	<0.00	<6.36	0.01	59.12	1.02	535010.01	3.72	22.92
RL16ND175	<0.00	<2.62	10.79	185.26	0.03	<6.47	<0.00	16.75	1.12	462469.8	5.13	16.79
RL16ND175	<0.00	<2.23	<0.11	4.07	0.19	<5.17	<0.00	189.78	0.5	553637.55	1.57	24.15
RL16ND175	<0.00	<5.01	<0.32	19.24	<0.01	<9.54	<0.00	10.08	0.2	534506.05	0.71	9.45
RL16ND175	<0.00	<2.11	<0.10	<0.27	<0.00	<4.87	<0.00	16.01	0.13	513733.05	0.68	17.95
RL16ND175	<0.00	<1.97	0.38	23.61	0	<4.68	<0.00	95.34	0.37	554500.6	0.9	19.44

Sample ID	Hf_ppm	K_ppm	Mg_ppm	Mn_ppm	Mo95_ppm	Na_ppm	Nb_ppm	Ni_ppm	Pb208_ppm	S_ppm	Sb_ppm	Se_ppm
RL16ND175	0.01	<1.84	<0.10	1.9	<0.00	<4.63	<0.00	138.07	0.2	510239.2	0.47	16.14
RL16ND175	<0.00	<2.91	<0.19	1.63	<0.00	<7.35	<0.00	45.41	0.16	620515.6	0.58	21.95
RL16ND175	<0.00	<1.91	<0.10	0.25	0	<4.91	<0.00	161.55	0.08	538777.43	0.43	23.3
RL16ND175	0.01	<2.82	<0.23	0.68	<0.00	<6.63	<0.00	9.13	0.04	574110.89	0.1	21.07
RL16ND175	0	<2.44	<0.10	<0.26	<0.00	<5.27	<0.00	63.72	<0.02	548774.45	<0.05	18.93
RL16ND175	<0.00	<2.10	<0.16	0.4	<0.00	<5.39	<0.00	228.82	0.04	551415.43	0.15	25.05
RL16ND182	<0.00	<11.42	<0.30	<1.39	0.04	<23.03	<0.00	1036.36	0.61	434073.42	<0.20	27.23
RL16ND182	<0.00	<2.73	<0.06	<0.34	<0.00	<3.85	<0.00	0.9	<0.01	535606.05	<0.05	17.97
RL16ND182	<0.00	<3.97	11.87	0.67	0.08	158.72	<0.00	2115.05	5.99	600136.98	215.49	22.92
RL16ND182	0	<2.51	0.84	<0.30	<0.00	<4.34	<0.00	149.22	402.38	522951.53	911.41	6.36
RL16ND182	<0.00	<3.14	0.43	0.46	<0.00	<5.71	<0.00	417.23	181.17	550568.93	434.99	13.69
RL16ND182	<0.00	<3.94	1.99	5.34	0.06	23.77	<0.00	229.01	60.63	622591.29	124.08	34.15
RL16ND182	<0.00	<2.68	1.16	1.42	0	<4.35	<0.00	218.38	2.59	527583.31	70.27	29.33
RL16ND182	<0.00	<2.31	<0.09	<0.26	<0.00	<4.13	<0.00	66.98	2.66	498728.43	40.36	25.06
RL16ND182	<0.00	<3.38	4.44	26.87	0.02	<5.07	<0.00	1293.85	1.1	576386.92	11.67	41.17
RL16ND182	<0.00	<8.24	0.54	<0.87	<0.00	<15.78	<0.00	559.64	8.17	413995.36	1.8	18.61
RL16ND182	<0.00	<3.66	0.29	3.08	0.02	<6.36	<0.00	1689.18	2.15	565756.61	7.73	35.72
RL16ND182	<0.00	<2.73	<0.08	<0.28	0.03	<5.31	<0.00	183.58	0.66	493387.08	5.16	18.81
RL16ND182	<0.00	<2.69	<0.07	<0.27	0.01	<3.84	<0.00	4.27	1.34	535094.72	2.45	58.79
RL16ND189	0.84	15.65	12.03	10.32	0.02	<19.97	<0.00	2955.95	0.13	427309.28	<0.17	238.64
RL16ND190	<0.01	19.74	15.73	31.8	<0.01	<19.53	<0.00	3365.12	16.41	519964.48	8.15	12.88
RL16ND190	<0.00	38.55	46.86	19.47	0.07	205.96	<0.00	1485.5	26.94	518993.07	3.22	15.21
RL16ND190	<0.00	32.47	96.83	3.88	0.03	60.72	<0.00	1479.99	24.11	531444.29	6.52	10.68
RL16ND190	<0.00	271.27	13.22	10.49	0.01	427.98	<0.00	3548.22	16.55	462137.03	2.45	13.18
RL16ND190	0.06	35.26	61.75	<2.67	<0.03	<50.94	<0.00	1603.79	14.22	635436.59	1.79	20.72
RL16ND190	0.07	162.15	52.74	18.29	0.07	218.73	0.02	1479.95	7.34	535805.82	0.53	14.25
RL16ND190	<0.00	<8.04	27.54	67.15	<0.02	<14.19	<0.00	1173.89	2.77	500381.64	0.26	13.42
RL16ND190	<0.00	57.47	17.49	5.63	0.02	387.7	0.01	1553.11	3.01	493914.8	1.3	15.07
RL16ND190	<0.00	11.52	21.14	5.65	0.01	<16.38	<0.00	1526.17	0.77	570715.89	0.24	11.62
RL16ND190	<0.00	19.24	8.77	4.52	0.01	154.89	<0.00	1311.19	0.9	390771.06	<0.11	7.03

Sample ID	Hf_ppm	K_ppm	Mg_ppm	Mn_ppm	Mo95_ppm	Na_ppm	Nb_ppm	Ni_ppm	Pb208_ppm	S_ppm	Sb_ppm	Se_ppm
RL16ND190	0.01	114.06	15.29	30.87	0.02	175.46	<0.00	1262.48	0.77	410913.14	0.53	10.24
RL16ND190	0.01	16.88	9.11	7.82	0.05	25.23	<0.00	937.45	0.07	446400.49	<0.14	9.22
RL16ND190	<0.00	<10.84	14.76	6.01	0.02	<23.24	<0.00	1060.79	0.7	460368.17	<0.26	11.46
RL16ND193	<0.00	<3.03	0.39	1.91	<0.00	<6.46	<0.00	104.75	0.06	598800.64	<0.06	6.88
RL16ND193	0	<2.71	<0.15	<0.40	<0.00	<6.93	<0.00	20.13	<0.02	524582.52	<0.05	7.13
RL16ND193	0	<2.05	<0.11	<0.33	<0.01	<4.91	<0.00	149.15	<0.02	534333.93	<0.04	6.81
RL16ND193	<0.00	<1.69	<0.12	<0.28	<0.00	<4.45	<0.00	28.88	<0.02	520859.76	<0.04	5.23
RL16ND193	<0.00	<1.54	<0.15	<0.23	0.01	<3.89	<0.00	9.73	2.86	497898.16	1.18	2.2
RL16ND193	0.01	7.64	158.96	23.06	0.02	15.97	0.01	139.84	6.99	543598.1	14.18	5.17
RL16ND193	<0.00	<2.14	6377.81	714.25	0.02	21.04	0.01	63.12	8.14	586293.64	3.61	6.85
RL16ND193	0.08	<4.94	26.91	7.85	<0.00	<9.20	<0.00	41.21	0.08	654729.69	0.12	6.96
RL16ND193	<0.00	<2.23	1.15	<0.27	<0.00	<4.07	<0.00	109.16	0.03	541952.89	<0.04	5.28
RL16ND193	<0.00	<1.91	<0.12	<0.27	<0.00	<4.21	<0.00	74.08	1.02	504760.89	0.16	4.38
RL16ND193	<0.00	<2.03	0.12	0.27	<0.00	<4.73	<0.00	72.07	<0.02	533662.65	<0.04	6.56
RL16ND193	<0.00	<1.58	0.13	<0.25	<0.00	<4.32	<0.00	77.18	<0.02	486992.03	<0.03	5.91
RL16ND193	<0.00	<1.70	<0.14	<0.27	<0.00	<3.62	<0.00	206.36	<0.02	546309.76	<0.03	5.61
RL16ND193	0.01	<3.03	<0.18	<0.40	<0.00	<5.31	0	116.28	<0.02	558159.28	<0.05	6.13
RL16ND193	0	<1.85	0.13	<0.31	<0.00	<4.84	<0.00	68.23	<0.02	548038.48	<0.04	4.17
RL16ND193	0	<1.81	0.71	<0.31	<0.01	<4.61	<0.00	13.58	<0.02	524393.34	<0.03	2.33
RL16ND193	<0.00	<1.97	<0.13	<0.30	<0.00	<4.88	<0.00	153.61	<0.02	584120.6	<0.04	6.06
RL16ND193	<0.00	<1.95	<0.12	<0.25	<0.00	<4.16	<0.00	105.18	<0.01	507286.93	<0.03	7.38
RL16ND195	<0.00	22.98	616.46	16.51	0.01	346.35	0.01	902.5	74.36	472703.1	4.61	2374.9
RL16ND195	<0.00	<4.59	39	5.87	<0.01	<10.67	<0.00	664.24	114.51	646954.9	4.24	361.78
RL16ND195	<0.00	<2.61	90.17	5.64	0.01	<6.38	<0.00	738.63	58.77	461308.8	6.37	289.42
RL16ND195	<0.00	19.6	214.66	8.66	0.03	58.58	0	411.67	115.63	448418.62	16.42	184.77
RL16ND195	<0.00	289.89	67.02	4.31	<0.00	14.47	<0.00	330.46	66.33	585205.4	128.38	275.75
RL16ND195	0	10.43	351.73	8.25	0.02	7.37	0	189.91	38.91	499274.18	13.48	41.15
RL16ND195	<0.00	<1.94	17.68	4.59	0.01	<4.38	<0.00	396.97	89.45	454476.9	2.78	143.43
RL16ND195	0.01	74.86	1301.98	30.65	0.01	81.81	0.03	463.41	77.16	547373.98	54.05	220.02
RL16ND195	<0.00	<2.12	4.18	1.92	0.02	<4.63	0	373.39	174.13	541208.58	10.07	192.27

Sample ID	Hf_ppm	K_ppm	Mg_ppm	Mn_ppm	Mo95_ppm	Na_ppm	Nb_ppm	Ni_ppm	Pb208_ppm	S_ppm	Sb_ppm	Se_ppm
RL16ND195	0.01	9.21	138.51	7.08	<0.00	18.81	0.01	318.05	192.33	558820.43	12.06	169.18
RL16ND195	<0.00	7.17	55.37	8.29	<0.00	5.41	<0.00	1.78	449.02	483739.39	181.68	91.15
RL16ND195	<0.00	2.98	29.67	1.32	<0.00	<5.52	0	188.83	542.33	535924.23	142.75	190.94
RL16ND195	<0.00	<2.13	21.3	1.05	0.01	<4.16	0	269.23	36.27	489484.5	0.91	10.78
RL16ND195	0	<1.77	4.31	<0.25	0	<4.14	0	313.74	6.57	498920.31	1.49	99.18
RL16ND195	<0.00	15.66	150	10.27	0.02	168.65	0	382.76	48.88	452058.04	8.78	172.34
RL16ND195	<0.00	3.78	48.02	5.33	<0.00	<3.45	0	19.32	661.57	481994.73	201.39	112.76
RL16ND195	0	6.57	6.68	2.08	0.04	<4.37	<0.00	70.04	147.13	496682.14	426.18	210.02
RL16ND195	0.02	26.11	495.9	139.56	0.09	2471.07	0.02	555.55	508.25	649499.38	387.18	230.12
RL16ND195	0.01	8.36	396.69	80.34	0.05	95.1	0.02	127.65	153.33	492539.25	166.46	49.69
RL16ND200	0.18	15	1.38	1.12	0.25	5.19	0	113.35	22.58	517301.99	11.98	12.61
RL16ND200	0.12	558.11	49.95	1.01	0.18	15.28	0.05	119.84	18.87	482289.59	16.61	8.08
RL16ND200	0.12	32.38	8.08	0.48	0.02	<3.60	0.19	74.17	7.33	490160.85	4.35	9.96
RL16ND200	0.05	3.9	6.96	<0.25	0.11	5.16	<0.00	60.74	11.27	521550.92	9.18	14.51
RL16ND200	1.19	<2.32	0.7	1.06	0.07	3.9	0.02	75.3	11.21	524545.58	1.56	5.17
RL16ND200	0.14	<2.77	0.55	0.31	0.01	37.47	0	367.51	3.88	491269.09	5.47	22.34
RL16ND200	0.12	<2.20	<0.06	<0.26	<0.00	<3.58	0.02	49.92	0.87	542683.19	1.58	15.55
RL16ND200	0.04	<2.03	0.25	<0.22	0.01	<2.85	0	50.92	1.17	491317.21	0.89	14.27
RL16ND206	<0.00	<2.99	21.04	8.84	<0.01	<5.74	0.01	49.52	17.84	586999.36	23.47	245.08
RL16ND206	4.93	32.37	656.5	35.71	0.06	31.19	0.41	1922.94	261.83	524752.12	418.8	162.7
RL16ND206	1.84	5.26	58.86	4.14	0.1	101.39	0.02	3547.98	229.8	584713.77	415.63	156.29
RL16ND208	0.03	<3.48	<0.18	1.2	<0.00	<7.12	<0.00	131.31	0.26	609678.39	0.6	4.45
RL16ND208	0	34.58	13.32	6.73	1.82	91.03	0	240.57	74.24	496327.8	178.99	3.39
RL16ND208	0.01	107.37	339.15	25.4	0.86	137.29	0.01	214.69	76.08	531946.13	117.57	4
RL16ND208	0.03	120.26	14.67	27.25	1.64	68.94	<0.00	138.9	25.44	497571.4	80.29	3.77
RL16ND208	<0.00	38.61	33.43	11.75	6.24	95.8	<0.00	200.69	28.18	528682.91	90.81	4.62
RL16ND208	0.05	60.66	352.98	18.31	0.1	100.18	0.05	92.82	6.23	570795.06	13.6	5.23
RL16ND208	0.02	24.64	37.8	6.58	0.06	29.6	<0.00	136.69	8.52	645165.47	18.91	8.68
RL16ND208	<0.00	4.55	1179.32	10.9	1.61	<5.47	<0.00	120.77	3.39	489643.68	6.21	5.65

Sample ID	Hf_ppm	K_ppm	Mg_ppm	Mn_ppm	Mo95_ppm	Na_ppm	Nb_ppm	Ni_ppm	Pb208_ppm	S_ppm	Sb_ppm	Se_ppm
RL16ND195	0.01	9.21	138.51	7.08	<0.00	18.81	0.01	318.05	192.33	558820.43	12.06	169.18
RL16ND195	<0.00	7.17	55.37	8.29	<0.00	5.41	<0.00	1.78	449.02	483739.39	181.68	91.15
RL16ND195	<0.00	2.98	29.67	1.32	<0.00	<5.52	0	188.83	542.33	535924.23	142.75	190.94
RL16ND195	<0.00	<2.13	21.3	1.05	0.01	<4.16	0	269.23	36.27	489484.5	0.91	10.78
RL16ND195	0	<1.77	4.31	<0.25	0	<4.14	0	313.74	6.57	498920.31	1.49	99.18
RL16ND195	<0.00	15.66	150	10.27	0.02	168.65	0	382.76	48.88	452058.04	8.78	172.34
RL16ND195	<0.00	3.78	48.02	5.33	<0.00	<3.45	0	19.32	661.57	481994.73	201.39	112.76
RL16ND195	0	6.57	6.68	2.08	0.04	<4.37	<0.00	70.04	147.13	496682.14	426.18	210.02
RL16ND195	0.02	26.11	495.9	139.56	0.09	2471.07	0.02	555.55	508.25	649499.38	387.18	230.12
RL16ND195	0.01	8.36	396.69	80.34	0.05	95.1	0.02	127.65	153.33	492539.25	166.46	49.69
RL16ND200	0.18	15	1.38	1.12	0.25	5.19	0	113.35	22.58	517301.99	11.98	12.61
RL16ND200	0.12	558.11	49.95	1.01	0.18	15.28	0.05	119.84	18.87	482289.59	16.61	8.08
RL16ND200	0.12	32.38	8.08	0.48	0.02	<3.60	0.19	74.17	7.33	490160.85	4.35	9.96
RL16ND200	0.05	3.9	6.96	<0.25	0.11	5.16	<0.00	60.74	11.27	521550.92	9.18	14.51
RL16ND200	1.19	<2.32	0.7	1.06	0.07	3.9	0.02	75.3	11.21	524545.58	1.56	5.17
RL16ND200	0.14	<2.77	0.55	0.31	0.01	37.47	0	367.51	3.88	491269.09	5.47	22.34
RL16ND200	0.12	<2.20	<0.06	<0.26	<0.00	<3.58	0.02	49.92	0.87	542683.19	1.58	15.55
RL16ND200	0.04	<2.03	0.25	<0.22	0.01	<2.85	0	50.92	1.17	491317.21	0.89	14.27
RL16ND206	<0.00	<2.99	21.04	8.84	<0.01	<5.74	0.01	49.52	17.84	586999.36	23.47	245.08
RL16ND206	4.93	32.37	656.5	35.71	0.06	31.19	0.41	1922.94	261.83	524752.12	418.8	162.7
RL16ND206	1.84	5.26	58.86	4.14	0.1	101.39	0.02	3547.98	229.8	584713.77	415.63	156.29
RL16ND208	0.03	<3.48	<0.18	1.2	<0.00	<7.12	<0.00	131.31	0.26	609678.39	0.6	4.45
RL16ND208	0	34.58	13.32	6.73	1.82	91.03	0	240.57	74.24	496327.8	178.99	3.39
RL16ND208	0.01	107.37	339.15	25.4	0.86	137.29	0.01	214.69	76.08	531946.13	117.57	4
RL16ND208	0.03	120.26	14.67	27.25	1.64	68.94	<0.00	138.9	25.44	497571.4	80.29	3.77
RL16ND208	<0.00	38.61	33.43	11.75	6.24	95.8	<0.00	200.69	28.18	528682.91	90.81	4.62
RL16ND208	0.05	60.66	352.98	18.31	0.1	100.18	0.05	92.82	6.23	570795.06	13.6	5.23
RL16ND208	0.02	24.64	37.8	6.58	0.06	29.6	<0.00	136.69	8.52	645165.47	18.91	8.68
RL16ND208	<0.00	4.55	1179.32	10.9	1.61	<5.47	<0.00	120.77	3.39	489643.68	6.21	5.65

Sample ID	Hf_ppm	K_ppm	Mg_ppm	Mn_ppm	Mo95_ppm	Na_ppm	Nb_ppm	Ni_ppm	Pb208_ppm	S_ppm	Sb_ppm	Se_ppm
RL16ND208	0	<1.84	1.78	<0.24	<0.00	<4.41	<0.00	143.84	1.79	521964.34	3.83	4.4
RL16ND208	0.39	<2.60	18.59	0.99	0.55	<5.91	<0.00	158.09	2.1	558160.47	3.78	4.55
RL16ND208	<0.00	11.05	47.69	4.69	2.43	32.98	0	127.05	2.92	493620.12	5.88	4.05
RL16ND208	0.3	5.53	539.55	79.45	0.04	<5.78	0.01	78.13	3.75	511809.22	4.14	4.84
RL16ND208	<0.00	<1.69	<0.11	<0.26	<0.01	<4.46	<0.00	69	0.76	508570.12	1.96	4.96
RL16ND208	0.29	20.27	15.69	7.91	<0.00	15.71	<0.00	72.43	0.9	568247.35	1.39	<3.59
RL16ND208	0.07	<2.98	1038.55	6.12	<0.00	314.14	0.01	155.15	1.31	551576.46	1.95	5.48
RL16ND208	0.01	<3.44	40	7.7	0.01	<8.92	<0.00	82.91	0.64	635690.4	0.87	4.4
RL16ND208	0	<1.82	0.28	<0.32	<0.01	7.6	<0.00	90.64	0.41	562685.39	0.82	5.07
RL16ND208	0.02	<1.78	2.71	2.64	1.57	<5.29	<0.00	145.15	2.83	525100.62	1.78	5.7
RL16ND208	<0.00	<2.58	1.81	<0.30	0.47	<5.73	<0.00	144.02	0.41	604182.39	0.61	7.65
RL16ND208	<0.00	<1.70	4.41	0.88	<0.00	<3.98	<0.00	69.31	0.15	518947.7	0.62	5.26
RL16ND208	<0.00	<2.00	0.26	<0.25	<0.00	<4.78	<0.00	107.53	0.49	494312.73	0.77	<1.57
RL16ND208	<0.00	<2.09	4.17	<0.29	0.06	<5.21	<0.00	160.39	0.09	555486.32	0.16	5.24
RL16ND208	<0.00	<2.38	0.4	<0.35	0.01	<6.02	<0.00	140.56	0.04	563163.34	<0.05	4.87
RL16ND209	0.12	15.52	2346.67	52.82	146.3	1874.95	12.73	274.5	578.2	439197.83	17.97	65.29
RL16ND209	0.52	24.33	1.17	0.81	<0.00	32.24	2.4	204.71	63.31	486667.82	37.06	43.33
RL16ND209	0.3	<2.49	113.08	1.03	30.86	<4.05	<0.00	50.14	13.26	467779.14	7.23	46.14
RL16ND209	0.14	<2.17	0.26	<0.26	<0.00	52.42	0.66	33.01	1.56	481520.13	1.47	37.97
RL16ND209	0.01	<2.26	22.99	<0.33	<0.00	<3.79	0.09	48.62	6.03	465556.33	9.76	77.85
RL16ND209	0.12	<2.35	0.18	<0.29	0.03	<3.48	1.31	2.22	0.65	493979.04	0.39	43.65
RL16ND209	0.11	<3.01	<0.08	<0.44	0.42	<5.32	0.07	3.82	1.49	518746.13	0.36	81.82
RL16ND209	<0.00	<3.00	1.47	<0.33	4.37	<3.96	<0.00	21.24	0.37	497473.16	0.42	24.99
RL16ND209	0.04	<4.64	1103.6	22.52	2.6	30.09	<0.00	9.91	147.96	493770.87	7.96	71.37
RL16ND209	0.16	<3.58	<0.12	<0.43	0.08	<6.13	0.17	5.49	0.63	576314.52	0.19	60.06
RL16ND209	0.14	<2.41	<0.06	<0.25	0.32	9.99	1.31	3.08	0.52	515401.33	0.61	53.87
RL16ND209	0.17	<2.19	<0.10	<0.26	<0.00	<3.51	0.42	25.26	0.62	469755.8	0.52	53.7
RL16ND209	0.51	<2.28	6.16	<0.33	<0.00	<3.93	0.01	96.96	0.57	477655.49	2.25	52.12
RL16ND209	0.05	2.9	1.79	0.29	10.6	14.15	0	2.46	3.65	512841.91	11.93	39.78

Sample ID	Hf_ppm	K_ppm	Mg_ppm	Mn_ppm	Mo95_ppm	Na_ppm	Nb_ppm	Ni_ppm	Pb208_ppm	S_ppm	Sb_ppm	Se_ppm
RL16ND209	<0.00	<2.61	12.7	<0.30	0.7	<4.67	0.01	9.91	0.98	476157.15	0.12	52.81
RL16ND209	0.13	<4.74	<0.13	<0.67	<0.00	<7.78	0.52	2.5	0.3	644948.93	0.34	75.04
RL16ND209	0.11	<3.26	<0.10	<0.34	0.26	<5.92	0.02	22.78	0.26	525298.19	0.23	63.37
RL16ND209	0.18	<3.77	<0.12	<0.47	0.03	<5.92	0.3	5.45	0.2	573066.27	0.09	71.59
RL16ND209	0.16	<2.81	0.19	<0.27	0.45	<4.56	0.04	1.68	0.22	551340.45	0.08	58.77
RL16ND209	0.14	<2.30	0.16	<0.29	0.01	<3.06	<0.00	1.82	0.13	507717.95	<0.04	9.13
RL16ND209	0.05	<2.11	<0.06	<0.27	0.24	<3.58	0.06	4.51	0.17	543478.94	0.09	57.95
RL-16ND211	<0.00	<1.93	<0.13	<0.21	<0.00	<5.08	0	91.91	<0.02	468474.73	<0.04	19.88
RL16ND211	<0.00	<3.75	<0.26	<0.50	<0.00	8.61	<0.00	3.44	3.28	537038.01	2.1	11.17
RL16ND211	0.15	1501.75	108.92	2.96	3.29	401.02	0.53	9.9	41.94	569674.71	7.17	11.06
RL16ND211	0.11	<2.48	4.34	51.21	0.09	7.07	0.01	81.26	125.74	430136.3	14.28	15.94
RL16ND211	<0.00	<2.13	12.75	8.8	<0.00	7.7	<0.00	4.51	80.52	506192.94	6.46	22.5
RL16ND211	<0.00	<3.73	<0.19	<0.45	0.01	<8.98	<0.00	0.68	0.43	573352.2	0.28	16.35
RL16ND211	<0.00	<11.07	<0.72	2.41	0.04	<25.13	0.02	125.44	8.22	396075.32	0.67	22.01
RL16ND211	<0.00	<2.00	<0.11	<0.25	0	<6.10	<0.00	37.74	0.09	515806.12	0.04	16.43
RL16ND211	<0.01	<31.16	<1.97	<4.33	<0.02	<68.36	0.03	149.15	0.36	423933.27	<0.57	27.02
RL16ND211	<0.00	<1.89	<0.13	<0.25	<0.00	<3.89	<0.00	1.43	0.03	468992.13	0.07	13.91
RL16ND211	<0.00	<2.46	<0.13	<0.27	<0.00	<4.25	<0.00	50.25	0.06	478860.35	<0.04	12.6
RL16ND211	<0.00	14.9	3.3	3.36	0.17	20.61	<0.00	161.46	0.28	412805.06	1.68	23.35
RL16ND211	<0.00	<4.54	0.42	<0.56	<0.01	<9.42	<0.00	1.05	11.6	596559.6	0.37	41.31
RL16ND211	<0.00	<2.00	<0.13	<0.27	0	<4.08	<0.00	1.38	0.03	506340.68	<0.04	17.22
RL16ND211	<0.00	6.33	2.39	1.45	0.16	87.86	<0.00	154.72	5.16	398429.83	0.92	20.65
RL16ND211	<0.00	<2.09	<0.12	<0.24	0.01	<4.52	<0.00	0.82	0.04	469147.85	<0.04	17.43
RL16ND212	<0.00	<2.88	<0.11	<0.30	0.03	<3.70	<0.00	17.3	<0.02	565897.98	<0.06	17.69
RL16ND212	<0.00	<2.43	<0.07	<0.30	0.02	<3.75	0	23.02	<0.01	582584.6	<0.05	25.5
RL16ND212	<0.00	<2.84	<0.04	<0.34	<0.00	<4.12	<0.00	27.27	<0.01	573788.02	<0.05	9.2
RL16ND212	0.01	<2.05	<0.04	<0.32	<0.00	<3.56	<0.00	33.04	<0.01	536181.48	<0.04	10.56
RL16ND212	<0.00	<1.76	0.24	<0.26	0.66	<3.16	<0.00	11.22	0.07	480394.9	<0.04	15.84
RL16ND212	<0.00	<2.16	0.19	<0.29	<0.01	<3.39	<0.00	51.34	<0.01	532148.12	<0.04	37.58

Sample ID	Hf_ppm	K_ppm	Mg_ppm	Mn_ppm	Mo95_ppm	Na_ppm	Nb_ppm	Ni_ppm	Pb208_ppm	S_ppm	Sb_ppm	Se_ppm
RL16ND212	<0.00	<2.15	<0.06	<0.25	<0.00	<3.46	<0.00	17.1	<0.01	478948.51	<0.05	9.71
RL16ND212	<0.00	<2.39	0.08	<0.29	0.01	<3.54	<0.00	6.11	<0.01	506696.38	<0.05	14.96
RL16ND212	<0.00	<2.22	0.18	<0.31	<0.01	<3.26	0	46.32	<0.01	500062.29	<0.05	16.84
RL16ND212	0.05	119.76	681	20	16.01	127.59	3.65	29.59	3.32	504663.19	0.95	9.41
RL16ND212	0	<1.85	<0.05	<0.25	0.02	<3.04	0.04	26.45	0.4	526510.08	0.07	10.01
RL16ND212	0.31	<5.04	99.24	18.34	0.03	8.74	0.29	36.85	2.65	605562.24	0.68	12.05
RL16ND212	0.09	10.25	0.09	<0.29	0.01	<3.25	0	322.68	0.04	542267.92	<0.05	63.99
RL16ND212	<0.00	<1.96	10.69	0.47	0.01	<3.42	0	10.7	0.03	508624.14	<0.05	3.96
RL16ND212	0	<2.09	0.29	<0.26	<0.01	<2.98	0.11	24.66	0.03	500941.87	0.05	14.7
RL16ND212	<0.00	<2.44	<0.09	<0.31	0.02	<3.48	<0.00	26.56	<0.01	577591.76	<0.05	29.44
RL16ND212	<0.00	<2.70	<0.06	<0.30	<0.00	<3.92	0	29.47	<0.01	560441.42	<0.05	10.14
RL16ND212	<0.00	<2.07	0.52	<0.31	0.15	<3.33	<0.00	9.5	0.03	531320.38	<0.05	8.98
RL16ND212	<0.00	<2.08	<0.04	<0.28	<0.00	<3.02	0	22.85	<0.02	541358.18	<0.04	25.55
RL16ND212	<0.00	<2.15	1.83	0.61	2.42	3.73	<0.00	16.95	<0.01	485857.85	<0.04	22.45
RL16ND212	<0.00	<2.46	<0.05	<0.28	0.01	<3.18	<0.00	41.08	<0.01	554392.59	<0.05	28.63
RL16ND212	<0.00	<1.63	<0.04	<0.26	0.64	<3.32	<0.00	50.07	0.03	471077.61	<0.04	15.4
RL16ND216	<0.00	<2.28	<0.11	<0.29	<0.01	<5.20	<0.00	737.73	1076.49	530204.89	10.06	15.32
RL16ND216	<0.00	3.72	0.4	<0.39	<0.00	114.78	0.01	218.08	77.87	616442.52	1.54	12.93
RL16ND216	0.02	<2.76	4.95	0.81	<0.00	<5.29	0	428.91	1.92	535390.26	1.05	9.71
RL16ND216	0.06	16.91	1.05	0.23	<0.01	<5.06	0.13	478.17	1.44	546502	1.25	16.37
RL16ND216	0.01	<3.16	<0.16	<0.36	<0.00	<6.47	0.01	377.31	11.45	631936.71	0.12	19.13
RL16ND216	<0.00	12.29	1.53	0.86	0.03	17.71	<0.00	191.46	1.4	510085.67	0.08	9.03
RL16ND216	<0.00	<1.64	<0.12	<0.20	0.01	<3.92	<0.00	409.92	4.55	516102.93	0.11	14.86
RL16ND216	<0.00	<1.87	0.93	0.92	<0.00	<3.86	<0.00	293.66	0.23	476762.2	<0.04	9.84
RL16ND216	<0.00	<2.18	<0.15	<0.25	<0.00	<4.90	<0.00	235.7	1.47	554580.74	0.08	14.28
RL16ND216	<0.00	<4.16	<0.21	<0.53	<0.01	<10.28	<0.00	511.76	0.29	676184.72	0.21	7.17
RL16ND216	0	<1.95	<0.10	<0.25	<0.00	<4.16	<0.00	480.34	0.06	484737.89	<0.04	10.27
RL16ND216	0	<3.05	<0.14	<0.37	0	<6.71	<0.00	272.29	0.07	674905.94	<0.05	11.9
RL16ND216	<0.00	<2.24	<0.19	<0.25	<0.00	<5.82	<0.00	238.94	0.04	562508.94	<0.04	14.87

Sample ID	Hf_ppm	K_ppm	Mg_ppm	Mn_ppm	Mo95_ppm	Na_ppm	Nb_ppm	Ni_ppm	Pb208_ppm	S_ppm	Sb_ppm	Se_ppm
RL16ND216	<0.00	<1.75	<0.11	<0.22	<0.00	<3.63	<0.00	372.71	<0.02	538942.15	0.04	12.32
RL16ND216	<0.00	<1.84	<0.14	<0.23	<0.00	<5.55	<0.00	316.03	<0.02	550710.9	<0.05	18.99
RL16ND216	0	<1.96	<0.11	<0.27	0.01	<4.67	0	682.39	0.03	544439.1	0.04	10.22
RL16ND216	<0.00	<1.92	<0.12	<0.25	<0.00	<4.48	<0.00	273.54	<0.02	541776.02	<0.04	10.98
RL16ND216	<0.00	<2.06	<0.08	<0.25	0.01	<4.43	<0.00	344.84	<0.02	532046.14	<0.04	16.48
RL16ND216	<0.00	<1.77	0.13	<0.23	0	<3.93	<0.00	360.21	<0.02	512549.76	<0.03	8.35
RL16ND216	<0.00	<1.65	<0.13	<0.27	<0.01	<4.80	0	197.95	<0.02	560092.26	<0.04	9.75
RL16ND216	<0.00	<2.04	<0.15	<0.23	0.02	<4.51	<0.00	624.59	0.03	584677.83	<0.04	10.24
RL16ND216	<0.00	<1.98	<0.12	<0.27	<0.01	<5.53	<0.00	283.52	<0.02	559337.6	<0.04	12.38
RL16ND216	<0.00	<2.14	<0.11	<0.25	0.01	<5.00	0	123.32	<0.02	588876.31	<0.04	11.72
RL16ND110	<0.00	<5.09	<0.02	<0.36	<0.00	<4.70	<0.00	676.62	0.08	519021.75	<0.32	23.57
RL16ND110	<0.00	<4.88	<0.04	<0.40	<0.00	<4.97	<0.00	421.84	0.12	554054.81	0.48	19.01
RL16ND110	<0.00	<4.27	<0.04	<0.40	<0.00	<3.72	<0.00	301.63	0.03	538806.52	0.34	19.12
RL16ND110	<0.00	17.58	19.23	0.86	<0.00	19.72	<0.00	308.7	23.23	520724.45	77.93	20.64
RL16ND110	<0.00	<4.89	0.39	<0.42	0	<3.41	0.01	417.08	2.66	547027.75	19.51	19.7
RL16ND110	<0.00	<4.00	9.52	<0.39	<0.00	<4.13	<0.00	324.86	4.43	490181.72	24.7	18.55
RL16ND110	<0.00	<5.37	16.32	<0.38	<0.00	<4.03	<0.00	538.72	1.1	484717.92	8.56	13.14
RL16ND110	<0.00	<4.21	1.56	<0.39	<0.00	<3.34	<0.00	432.85	1.32	550149.48	12.52	19.19
RL16ND110	<0.00	<4.17	0.11	<0.38	<0.01	<3.24	0	438.86	1.19	498664.19	13.32	16.57
RL16ND110	0	<4.48	0.45	<0.36	<0.00	<3.58	<0.00	377.26	0.92	520214.72	12	22.36
RL16ND110	<0.00	<4.38	6.43	0.47	<0.00	<3.91	<0.00	293.99	2.73	529519.88	16.55	24.61
RL16ND110	<0.00	<3.65	0.09	<0.37	<0.01	<3.52	<0.00	334.91	1.45	430216.44	20.56	20.44
RL16ND110	<0.00	<4.00	0.07	<0.34	<0.00	<3.58	<0.00	208.07	0.92	463245.04	6.08	23.19
RL16ND110	<0.00	<6.95	<0.04	<0.49	<0.00	<6.41	<0.00	485.56	0.23	555796.88	3.96	24.82
RL16ND114	<0.00	<4.91	<0.03	<0.41	<0.01	<4.16	0	852.05	0.01	556608.69	<0.28	73.98
RL16ND114	<0.00	<5.15	<0.04	<0.39	<0.00	<4.09	<0.00	489.62	<0.00	544896.82	<0.26	52.48
RL16ND114	<0.00	<4.99	0.22	<0.41	<0.01	<3.97	<0.00	376.01	0.01	538929.61	<0.26	70.97
RL16ND114	0.01	<4.53	<0.03	<0.45	<0.00	<4.91	<0.00	607.13	0.01	536901.94	<0.25	52.5
RL16ND114	<0.00	<4.47	0.11	<0.40	<0.01	<4.21	<0.00	1704.82	0.01	561802.76	<0.25	71.79

Sample ID	Hf_ppm	K_ppm	Mg_ppm	Mn_ppm	Mo95_ppm	Na_ppm	Nb_ppm	Ni_ppm	Pb208_ppm	S_ppm	Sb_ppm	Se_ppm
RL16ND114	<0.00	<3.41	<0.03	<0.30	<0.00	<3.59	<0.00	457.09	0.01	471910.6	<0.23	33.64
RL16ND114	<0.00	<4.59	0.05	<0.43	<0.00	<3.98	<0.00	1352.45	0.01	563344.14	<0.27	73.7
RL16ND114	0	<3.87	0.22	<0.43	<0.00	<3.74	<0.00	1437.31	4.52	503963.03	17.85	55.5
RL16ND114	<0.00	<4.70	<0.04	<0.45	<0.00	<4.71	<0.00	795.54	1.03	495445.38	10.62	75.47
RL16ND114	<0.00	<5.16	0.06	<0.47	0.01	<4.09	<0.00	648.43	0.71	527163.49	4.48	54.99
RL16ND114	<0.00	<4.32	<0.02	<0.36	<0.00	<3.97	<0.00	51.53	0.93	526880.68	4.43	32.45
RL16ND114	<0.00	<4.18	<0.02	<0.40	<0.00	<3.48	<0.00	198.48	0.21	544672.09	2.42	57.68
RL16ND114	<0.00	<4.88	0.38	<0.42	<0.00	<4.21	0.01	1546.29	0.85	522169.04	1.48	82.96
RL16ND114	<0.00	<4.23	0.03	<0.39	<0.00	<3.46	<0.00	457.84	0.13	505696.32	1.08	79.07
RL16ND114	<0.00	<4.95	<0.12	<0.49	<0.00	<4.88	<0.00	140.73	0.1	526025.19	<0.35	28.78
RL16ND114	0	<6.46	<0.04	<0.49	<0.00	<4.91	<0.00	54.1	0.21	547784.43	0.61	69.9
RL16ND114	<0.00	<4.15	0.2	<0.41	<0.00	3.61	<0.00	265.1	0.05	588166.86	<0.23	56.93
RL16ND114	<0.00	<4.52	<0.04	<0.42	<0.00	<3.70	<0.00	1807.04	0.01	503117.6	<0.21	101.93

Sample ID	Si_ppm	Sn_ppm	Ta_ppm	Te_ppm	Th_ppm	Ti47_ppm	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn66_ppm	Zr_ppm
RL-23-NS-001	1973.74	1.17	0.15	1.26	0.31	3107.55	0.07	0.23	15.38	3.71	3.24	97.29
RL-23-NS-001	271.85	<0.28	<0.00	0.88	0.09	14.4	<0.02	0.05	289.19	0.08	3.74	27.45
RL-23-NS-001	970.26	<0.30	0.02	0.32	0.01	639.4	<0.03	0	6.72	0.12	7.76	5.3
RL-23-NS-001	3537.49	0.23	0.08	4.28	0.15	2457.13	0.49	0.09	16.18	1.32	8.38	47.03
RL-23-NS-001	699.76	<0.12	0.01	0.14	0.02	158.57	<0.01	0.03	2.47	0.08	1.14	7.71
RL-23-NS-001	<121.42	0.32	0.04	0.84	0.07	1272.1	<0.01	0.05	6.15	0.52	1.89	24.61
RL-23-NS-001	279.69	<0.11	0.06	1.04	0.07	2199.76	0.01	0.06	7.55	0.81	2.54	27.48
RL-23-NS-001	<170.00	<0.30	0.08	2.69	0.12	2793.29	<0.02	0.06	10.93	0.63	3.15	30.6
RL-23-NS-001	1370.55	<0.12	0.05	3.35	0.18	1814.01	0.13	0.18	14.33	1.21	4.45	73.29
RL-23-NS-001	1837.34	<0.11	0.09	0.7	0.04	2297.51	0.6	0.03	9.85	1.31	5.21	13.67
RL-23-NS-001	3844.33	0.19	0.13	7.69	0.22	3910.77	0.31	0.16	20.1	2.56	7.22	60.71
RL-23-NS-001	<72.69	<0.12	0.03	0.42	0.05	633.41	<0.01	0.03	2.35	0.34	1.71	19.17
RL-23-NS-001	207.15	0.43	0.02	0.25	0.01	386.46	<0.02	0.02	1.91	0.12	0.87	0.26
RL-23-NS-001	715.34	<0.11	0.04	1.59	0.04	1719.16	<0.01	0.05	8.07	0.61	4.06	8.09
RL-23-NS-001	780.1	0.22	0.16	1.52	0.09	4564.69	<0.01	0.04	17.22	2.87	7.05	26.63
RL-23-NS-001	2292.95	<0.14	0.05	2.02	0.02	1451.9	<0.01	0.01	7.7	1.19	3.68	6.32
RL-23-NS-001	214.62	<0.13	0.01	0.95	0.13	74.46	<0.01	0.11	2.43	0.04	0.96	39.23
RL-23-NS-001	199.95	<0.12	<0.00	0.47	<0.00	3.18	<0.01	<0.00	0.6	<0.00	0.81	0.1
RL-23-NS-001	300.78	<0.13	0.02	0.79	0.02	709.76	<0.01	0.01	6.19	0.33	2.24	3.56
RL-23-NS-001	1297.68	<0.41	0.05	1.34	0.08	1241.95	<0.03	0.04	29.81	1.01	6.73	29.66
RL-23-NS-001	762.12	<0.13	0.03	0.91	0.1	1072.9	<0.01	0.11	13.54	0.43	4.06	39.7
RL-23-NS-001	182.54	<0.12	0.05	0.64	0.1	1358.92	<0.01	0.04	13.7	0.36	2.45	9.58
RL-23-NS-001	<72.46	<0.12	0.06	1.25	0.19	1856.41	<0.01	0.23	11.68	0.68	2.36	112.34
RL-23-NS-001	<174.63	0.43	0	<0.13	0.01	5.93	<0.02	0.04	<0.07	0.12	0.38	13.05
RL-23-NS-001	495.05	<0.12	0.08	1.37	0.59	2036.53	<0.01	0.21	36.39	0.56	4.15	71.94
RL-23-NS-001	363.07	0.3	0.05	0.84	0.05	1264.86	<0.03	0.07	8.6	0.48	3.01	22.01
RL-23-NS-001	<185.61	0.34	0.18	1.01	0.05	4885.48	<0.03	0.05	25.45	0.86	6.2	14.54
RL-23-NS-001	<468.08	<0.75	0.06	<0.35	0.14	2034.87	<0.07	0.09	8.65	0.3	2.59	31.46
RL-23-NS-001	442.61	<0.29	0.06	0.6	0.34	2264.42	<0.03	0.18	7.09	0.62	3.55	78.84
RL-23-NS-001	773.25	0.32	0.07	7.69	0.13	1587.24	0.53	0.06	5.36	1.06	3.15	41.56
RL-23-NS-001	<175.26	0.4	<0.00	0.63	0.01	85.64	<0.02	0.02	0.51	0.07	0.41	5.7

Sample ID	Si_ppm	Sn_ppm	Ta_ppm	Te_ppm	Th_ppm	Ti47_ppm	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn66_ppm	Zr_ppm
RL-23-NS-001	733.43	<0.27	0.04	0.83	0.07	1035.94	<0.02	0.05	3.66	0.37	1.55	25.53
RL-23-NS-001b	127.21	0.34	0	107.33	0	3.18	0.42	<0.00	0.48	0.08	2.85	<0.00
RL-23-NS-001b	<56.20	0.79	<0.00	22.23	0	2.27	6.68	<0.00	0.05	0.07	0.93	<0.00
RL-23-NS-001b	77.17	0.69	<0.00	10.99	0	1.04	9.28	<0.00	0.06	0.14	45.78	0.03
RL-23-NS-001b	1655.97	0.38	<0.00	20.78	0	8.58	0.2	0	0.78	0.24	1.16	0.7
RL-23-NS-001b	263.56	0.38	<0.00	32.96	0	1.12	0.39	<0.00	1.11	0.14	1.29	0.37
RL-23-NS-001b	98.25	0.58	<0.00	35.49	0	1.95	1.21	0	0.21	0.11	0.97	0
RL-23-NS-001b	598.21	0.44	<0.00	59.91	0	2.93	0.76	<0.00	0.81	0.02	0.93	0.06
RL-23-NS-001b	101.58	0.29	<0.00	33.62	0	2.54	0.17	0	0.66	1.53	1.78	0.17
RL-23-NS-001b	229.76	0.63	<0.00	8.18	0.05	2.4	0.4	0	0.83	0.12	0.55	0.01
RL-23-NS-001b	593.22	0.39	<0.00	58.13	0.05	4.73	1.13	0	3.85	0.71	4.44	<0.00
RL-23-NS-001b	165.23	0.55	<0.00	37.99	0	2.53	2.75	<0.00	0.63	0.07	1.31	<0.00
RL-23-NS-001b	585.42	0.46	<0.00	95.48	0	3.5	0.08	<0.00	1.94	0.02	2.17	<0.00
RL-23-NS-001b	258.95	0.43	<0.00	25.67	0	2.17	0.85	0	0.84	0.8	1.4	0.02
RL-23-NS-001b	274.37	0.49	<0.00	51.88	0	2.04	1.56	0	1.21	1.13	2.3	<0.00
RL-23-NS-001b	<76.29	0.67	<0.00	26.89	0	3.16	4.33	<0.00	0.29	0.05	1.1	0.01
RL-23-NS-001b	65.05	0.47	<0.00	8.76	0	2.32	1	<0.00	0.34	0.05	0.74	0
RL-23-NS-001b	82.44	0.32	<0.00	62.45	0	3.58	0.13	0	0.39	0.03	2.23	<0.00
RL-23-NS-001b	<61.32	0.35	<0.00	29.83	0	1.16	0.16	0	0.29	0.04	1.11	<0.00
RL-23-NS-001b	177.05	<0.15	<0.00	6.89	0	3.42	0.09	<0.00	1.6	0.12	0.78	0.01
RL-23-NS-001b	97.8	0.33	<0.00	7.38	0	2.15	0.86	<0.00	0.41	0.03	0.5	0.01
RL-23-NS-001b	<57.27	0.34	<0.00	19.6	0	3.05	1.17	<0.00	0.33	0.03	1.08	0
RL-23-NS-001b	<59.18	0.28	<0.00	7.36	0	3.02	0.52	<0.00	0.18	0.02	0.76	0
RL-23-NS-001b	88.48	<0.10	<0.00	1.15	0	4.72	<0.01	0	0.44	1.94	0.91	0.23
RL-23-NS-001b	174.05	<0.22	<0.00	86.55	0	3.94	0.89	<0.00	1.2	0.2	2.5	<0.00
RL-23-NS-001b	65.41	0.28	<0.00	14.4	0	1.88	0.12	<0.00	0.21	0.04	0.87	<0.00
RL-23-NS-001b	<56.96	0.31	<0.00	52.79	0	2.78	0.38	<0.00	0.25	0.06	1.62	<0.00
RL-23-NS-001b	469.24	0.44	<0.00	73.17	0	2.63	0.59	<0.00	0.51	0.05	2.53	0.04
RL-23-NS-001b	60.29	0.45	<0.00	29.44	0	2.89	1.17	<0.00	0.33	0.05	1.04	0
RL-23-NS-001b	84.42	0.21	<0.00	115.85	0	2.48	0.08	<0.00	0.37	0.07	3.11	<0.00
RL-23-NS-001b	239.66	0.67	<0.00	26.41	0	1.9	1.14	<0.00	1.29	0.1	1.37	0.07

Sample ID	Si_ppm	Sn_ppm	Ta_ppm	Te_ppm	Th_ppm	Ti47_ppm	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn66_ppm	Zr_ppm
RL-23-NS-001b	66.16	0.47	<0.00	37.04	0	2.5	5.09	<0.00	0.27	0.06	0.97	0
RL-23-NS-001b	107.18	0.38	<0.00	63.07	0	2.11	0.59	<0.00	0.68	0.03	1.59	0
RL-23-NS-001b	450.24	0.24	<0.00	85.27	0	2.1	0.07	<0.00	2.34	0.06	3.76	0
RL-23-NS-005	8539.58	0.75	0.01	0.1	0.39	236.06	0.04	0.23	2.98	2.32	7.62	36.43
RL-23-NS-005	731.68	0.16	0	0.22	<0.00	3.37	<0.01	<0.00	0.43	0.02	0.27	0
RL-23-NS-005	<80.18	<0.15	<0.00	<0.09	0	3.05	<0.01	<0.00	<0.05	<0.00	0.37	<0.00
RL-23-NS-005	<71.86	<0.13	0	<0.08	<0.00	3.24	<0.01	<0.00	0.13	<0.00	0.27	<0.00
RL-23-NS-005	465.19	<0.14	0.03	<0.09	0.23	287.46	<0.01	0.14	1.15	2.6	0.47	22.93
RL-23-NS-005	<74.13	<0.13	<0.00	<0.09	<0.00	2.54	<0.01	0	<0.04	<0.00	0.25	0.09
RL-23-NS-005	<76.04	<0.13	0	0.11	0.08	10.83	<0.01	0.02	0.17	0.06	0.37	2.13
RL-23-NS-005	<76.22	<0.13	0.01	<0.10	0.16	94.05	<0.01	0.16	0.43	5.97	0.32	16.57
RL-23-NS-005	<72.65	<0.12	<0.00	<0.09	<0.00	2.37	<0.01	<0.00	<0.04	<0.00	0.58	<0.00
RL-23-NS-005	847.55	0.22	0	<0.07	0.07	9.07	<0.01	0.08	1.38	0.01	0.85	12.45
RL-23-NS-005	704.12	<0.21	<0.00	0.21	0.01	5.46	0.19	<0.00	1.21	0.69	0.69	0.6
RL-23-NS-005	2185.7	0.17	0	0.44	0.08	22.43	0.02	0.09	4.55	0.07	0.45	8.39
RL-23-NS-005	1574.79	<0.19	<0.00	0.26	0.03	9.96	<0.01	0.05	1.48	0.09	0.6	4.26
RL-23-NS-005	172.42	<0.12	<0.00	0.9	0	3.04	<0.01	0	0.09	0.01	0.41	0
RL-23-NS-005	13875.06	0.15	0	0.15	<0.00	2.58	<0.01	<0.00	<0.04	0.01	0.41	0.1
RL-23-NS-005	526.06	0.17	0	0.16	0	2.77	<0.01	<0.00	0.08	0.01	0.6	0
RL-23-NS-005	147.29	<0.17	<0.00	<0.07	<0.00	2.56	<0.01	0	0.22	0.01	0.21	0
RL-23-NS-005	869.37	<0.35	0.04	<0.15	0.28	61.49	<0.02	0.41	0.79	0.3	0.46	33.46
RL-23-NS-005	220.42	<0.17	0.05	0.22	0.17	448.18	<0.01	0.21	4.45	2.63	0.59	28.04
RL-23-NS-005	<80.64	<0.17	0.01	<0.07	0.01	45.52	<0.01	0	0.21	0.32	0.43	0.6
RL-23-NS-005	<81.09	<0.17	0	<0.07	0.02	16.86	<0.01	0.02	<0.05	0.21	0.39	3.91
RL-23-NS-005	<77.42	<0.16	<0.00	<0.07	0	2.59	<0.01	<0.00	<0.05	<0.00	0.4	0.48
RL-23-NS-006	<185.28	<0.29	0	2.94	0.08	<116.07	<0.03	0.01	0.23	0.05	<0.36	2.55
RL-23-NS-006	754.39	0.95	0.04	17.96	0.08	<113.02	<0.02	0.04	4.67	3.62	1	14.56
RL-23-NS-006	1270.26	1.5	0.13	15.79	0.11	<99.31	<0.02	0.13	10.02	5.6	1.59	37.31
RL-23-NS-006	1741.3	2.23	0.65	32.36	0.05	<398.28	<0.09	0.03	15.47	5.34	1.74	6.27
RL-23-NS-006	797.28	<0.37	0.04	14.51	0.57	<137.86	<0.03	0.33	3.29	0.67	1.5	160.28
RL-23-NS-006	422.89	<0.26	0.02	12.84	0.27	<99.95	0.26	0.12	5.42	15.31	0.93	55.83

Sample ID	Si_ppm	Sn_ppm	Ta_ppm	Te_ppm	Th_ppm	Ti47_ppm	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn66_ppm	Zr_ppm
RL-23-NS-006	1494.62	<0.68	0.02	23.87	0.14	<259.49	<0.05	0.19	3.52	3.36	3.88	92.56
RL-23-NS-006	601.91	0.61	<0.00	63.09	0.15	151.68	0.27	0.09	2.2	0.22	3.8	39.2
RL-23-NS-006	599.22	<0.26	<0.00	12.16	0.01	<100.19	<0.02	0.01	5.15	0.25	0.85	3.2
RL-23-NS-006	<143.34	<0.23	0.03	14.44	0.35	<88.33	<0.02	0.17	2.11	1.57	0.8	63.54
RL-23-NS-006	921.92	<0.22	0.01	27.36	0.12	<85.70	0.11	0.14	3.65	1.21	1.54	42.15
RL-23-NS-006	<180.10	<0.29	<0.00	1.22	0.02	<112.70	<0.02	0.01	0.3	0.09	<0.35	1.76
RL-23-NS-006	1096.56	<0.51	<0.00	4.38	0.03	<188.76	<0.04	0.05	5.57	0.01	3.12	19.27
RL-23-NS-006	145.53	0.36	0.01	154.18	0.03	<86.13	0.45	0.02	2.14	0.61	2.1	0.85
RL-23-NS-006	469.22	<0.25	0	9.3	0.11	<95.55	<0.02	0.06	2.04	0.08	1.24	21.07
RL-23-NS-006	90.7	<0.13	0	2.77	0	<42.23	<0.01	0	0.55	0.01	0.38	2.03
RL-23-NS-006	245.26	<0.12	<0.00	2.56	0.01	<40.73	<0.01	0.01	15.12	0.06	0.3	1.22
RL-23-NS-006	<71.94	<0.12	0	3.08	0.01	<41.46	<0.01	0.01	0.52	0.25	0.31	1.15
RL-23-NS-006	<125.39	<0.22	0	1.64	0.03	<72.08	<0.01	0.01	0.22	<0.00	0.39	1.51
RL-23-NS-006	4546.62	1.01	<0.00	3.32	0.03	335.8	<0.02	0.1	1.93	0.05	0.61	3.26
RL-23-NS-006	<186.39	<0.29	<0.00	<0.15	<0.00	<116.51	<0.03	<0.00	<0.07	0.01	0.92	<0.00
RL-23-NS-006	227.2	<0.12	<0.00	0.34	0	112.13	<0.01	0	1.1	0.02	0.41	0.85
RL-23-NS-006	3783.84	<0.71	<0.00	<0.36	0.1	1534.67	<0.06	<0.00	4.45	0.09	2.01	2.92
RL-23-NS-006	<197.38	<0.31	0	1.42	0.01	<123.14	<0.03	<0.00	<0.08	<0.01	0.6	0.12
RL-23-NS-006	<175.32	<0.28	<0.00	<0.15	<0.00	<109.15	<0.02	<0.00	<0.07	<0.01	<0.34	<0.00
RL-23-NS-006	<179.76	<0.29	0	2.4	0.07	<111.81	<0.02	0.01	<0.07	0.01	<0.35	<0.00
RL-23-NS-006	341.63	0.38	0.03	89.72	0.02	<91.99	0.27	0.09	5.41	8.41	1.52	5.36
RL-23-NS-007	116.75	0.16	0.02	0.3	0.49	194.56	<0.01	1.94	1.2	1.7	0.14	135.61
RL-23-NS-007	2964.15	<0.14	0	0.42	0	1.53	<0.01	<0.00	0.26	0.03	0.57	0.04
RL-23-NS-007	738.69	<0.14	0	5.61	0.03	2.38	<0.01	0.03	<0.05	<0.00	0.37	2.17
RL-23-NS-007	374.15	0.51	0	3.09	0.01	13.11	0.15	<0.00	2.8	0.04	0.56	0.23
RL-23-NS-008	5805.22	0.17	0.01	3.36	0.17	36.51	0.02	0.11	5.55	0.11	3.47	2.95
RL-23-NS-008	2343.2	0.23	<0.00	2.28	<0.00	2.3	<0.01	0	0.03	<0.00	0.45	0.01
RL-23-NS-008	9760.55	0.13	<0.00	1.54	<0.00	2.35	<0.01	<0.00	0.36	0.01	0.65	0.02
RL-23-NS-008	13773.38	0.32	<0.00	4.09	0.01	8.27	0.03	0.01	10.38	0.08	2.16	0.47
RL-23-NS-008	8418.28	<0.21	<0.00	1.43	<0.00	4.65	<0.01	0.01	3.59	0.01	2.34	0.81
RL-23-NS-008	6003.65	<0.13	0	3.38	0	2.3	0.01	0	0.48	0.02	0.55	0.06

Sample ID	Si_ppm	Sn_ppm	Ta_ppm	Te_ppm	Th_ppm	Ti47_ppm	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn66_ppm	Zr_ppm
RL-23-NS-008	10252.47	<0.20	<0.00	5.83	0	2.84	0.01	<0.00	1.3	0.03	0.94	0.04
RL-23-NS-009	<159.49	0.55	<0.00	0.34	<0.00	1.33	<0.02	0	<0.06	<0.00	0.38	<0.00
RL-23-NS-009	183.72	0.44	<0.00	3.46	<0.00	2.2	29.2	0	0.6	0	0.29	0
RL-23-NS-009	<71.74	<0.12	<0.00	0.75	0	1.69	<0.01	<0.00	<0.03	<0.00	0.15	<0.00
RL-23-NS-009	137.77	0.31	<0.00	2.04	0	28.82	28.51	0	7.07	2.34	0.94	0.1
RL-23-NS-009	<74.03	0.17	<0.00	1.23	<0.00	1.63	18.65	<0.00	0.12	0.18	0.36	0.02
RL-23-NS-009	254.71	<0.12	<0.00	2.5	<0.00	2.25	84.29	<0.00	0.41	0.03	1.33	0.01
RL-23-NS-009	<71.47	<0.12	<0.00	0.54	<0.00	2.66	2.02	<0.00	0.03	0	0.73	0
RL-23-NS-009	<73.04	<0.12	<0.00	5.88	<0.00	2.41	11.71	0	0.3	0.01	10.39	<0.00
RL-23-NS-009	83.2	<0.12	0	0.13	<0.00	6.94	0.01	<0.00	2.55	0.13	0.4	0
RL-23-NS-009	<76.82	<0.13	0	0.12	<0.00	2.25	<0.01	<0.00	<0.03	<0.00	0.32	<0.00
RL-23-NS-009	307.65	<0.12	<0.00	1.83	<0.00	3.58	32.64	<0.00	1.58	0.2	0.74	0.05
RL-23-NS-009	<182.66	0.41	0	0.55	<0.00	10.25	<0.02	<0.00	3.93	0	0.55	<0.00
RL-23-NS-009	100.16	<0.11	<0.00	4.73	<0.00	2.81	38.3	<0.00	3.24	1.53	0.92	0.03
RL-23-NS-009	<71.65	<0.12	<0.00	2.05	0	4.18	5.94	<0.00	1.11	0.03	1.28	0.01
RL-23-NS-009	<72.34	<0.12	0	0.95	<0.00	3.38	0.1	<0.00	2.97	0.03	28.17	<0.00
RL-23-NS-009	291.98	<0.11	0	4.59	<0.00	4.2	130.26	0	7.66	1.07	1.67	0.04
RL-23-NS-009	137.85	0.13	<0.00	2.63	<0.00	3.55	126.6	<0.00	5.2	1.12	1.28	0.04
RL-23-NS-009	184.93	<0.12	<0.00	0.85	0	3.42	7.89	0	0.49	0.03	0.81	0.03
RL-23-NS-009	177.52	<0.12	0.02	2.33	0	5.97	7.59	0	0.85	0.07	0.97	0.06
RL-23-NS-009	<178.03	<0.28	<0.00	<0.14	<0.00	3.85	<0.02	<0.00	<0.07	<0.01	0.36	<0.00
RL-23-NS-009	372.16	<0.25	0.01	4.86	0	129.4	0.09	0	11.6	1.02	2.14	<0.00
RL-23-NS-009	769.57	<0.27	0	2.8	<0.00	18.85	0.1	<0.00	10.08	0.05	8.88	0.05
RL-23-NS-009	<180.95	<0.29	<0.00	0.51	<0.00	3.67	<0.02	<0.00	8.82	<0.01	2.4	0.01
RL-23-NS-009	<73.02	0.17	<0.00	0.27	<0.00	2.07	0.85	<0.00	0.34	0.01	0.59	0.01
RL-23-NS-009	1019.28	0.12	<0.00	1.34	0	2.33	42.37	<0.00	1.32	0.15	0.88	0.02
RL-23-NS-009	<73.77	<0.12	<0.00	2.63	<0.00	2.92	11.29	<0.00	<0.03	0	0.4	0
RL-23-NS-010	669.71	0.56	0.02	30.87	0.01	279.5	0.08	0.03	1.37	0.54	0.39	5.32
RL-23-NS-010	208.29	<0.24	<0.00	<0.21	0	2.82	<0.01	<0.00	<0.03	<0.00	0.3	0.01
RL-23-NS-011	25612.76	0.63	0.08	0.44	0.02	2799.29	<0.01	0.02	8.18	3.08	4.48	10.43

Sample ID	Si_ppm	Sn_ppm	Ta_ppm	Te_ppm	Th_ppm	Ti47_ppm	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn66_ppm	Zr_ppm
RL-23-NS-011	5306.18	0.43	0.04	1.24	0	175	0.03	0.01	16.37	1.49	14.37	3.72
RL-23-NS-011	9648.23	<0.33	0.01	0.31	0.01	242.6	<0.01	0.01	2.6	1.48	6.65	6.48
RL-23-NS-011	732.95	<0.28	<0.00	<0.21	0	<0.72	<0.01	<0.00	0.13	0.01	0.44	0.1
RL-23-NS-011	12150.57	<0.33	0	0.32	0	8.43	<0.01	0.01	5.1	0.02	13.21	3.06
RL-23-NS-012	11589.84	0.22	<0.00	3.22	0	0	1.33	<0.00	0.1	0.03	0.96	<0.00
RL-23-NS-012	92469.8	1.03	0.01	1.85	<0.00	<0.00	11.59	<0.00	0.25	0.07	1.27	<0.00
RL-23-NS-012	91.19	<0.12	<0.00	0.27	<0.00	<0.00	0.17	0	0.05	0.02	0.15	<0.00
RL-23-NS-012	673.33	<0.13	<0.00	<0.15	<0.00	<0.00	<0.01	<0.00	0.04	0	0.33	<0.00
RL-23-NS-012	<71.38	<0.13	<0.00	12.05	<0.00	<0.00	<0.01	<0.00	<0.04	0.01	0.23	<0.00
RL-23-NS-012	<74.50	<0.13	0	1.26	<0.00	<0.00	<0.01	0	0.12	0.06	0.3	2.35
RL-23-NS-012	<93.51	<0.17	<0.00	4.82	<0.00	<0.00	<0.01	<0.00	1.41	<0.00	0.35	0.3
RL-23-NS-012	1216.1	<0.13	<0.00	22.96	<0.00	<0.00	<0.01	<0.00	<0.04	<0.00	0.33	<0.00
RL-23-NS-012	<72.81	<0.13	<0.00	6.27	<0.00	<0.00	<0.01	<0.00	<0.04	<0.00	0.33	0
RL-23-NS-012	<80.80	<0.14	0	36.73	<0.00	<0.00	0.02	<0.00	0.1	<0.00	0.39	0
RL-23-NS-012	<131.87	<0.23	<0.00	17.18	<0.00	<0.00	<0.02	<0.00	5.16	0.03	0.61	<0.00
RL-23-NS-012	2545.82	<0.14	<0.00	1.05	<0.00	<0.00	0.76	<0.00	16.3	0.04	1.7	0.02
RL-23-NS-012	<72.07	<0.13	0	0.71	<0.00	<0.00	0.31	<0.00	0.08	0.01	0.31	<0.00
RL-23-NS-012	314.27	<0.14	<0.00	0.5	<0.00	<0.00	<0.01	<0.00	2.33	<0.00	0.41	<0.00
RL-23-NS-012	<74.70	<0.13	0	<0.14	0	0	<0.01	<0.00	0.08	<0.00	0.21	0.01
RL-23-NS-012	<70.30	<0.12	<0.00	92.38	<0.00	<0.00	<0.01	<0.00	<0.04	0.01	0.27	<0.00
RL-23-NS-012	<71.64	<0.13	<0.00	5.04	<0.00	<0.00	<0.01	0	<0.04	0.02	0.37	<0.00
RL-23-NS-013	61.41	0.2	<0.00	<0.07	0	2.4	13.34	0	<0.01	5.82	0.47	0.01
RL-23-NS-013	136.39	0.23	<0.00	<0.08	0	2.52	0.24	0	0.12	8.61	0.59	2.81
RL-23-NS-013	97.32	0.18	<0.00	0.1	<0.00	2.03	0.69	<0.00	<0.01	1.69	0.34	<0.00
RL-23-NS-013	<54.45	<0.08	<0.00	0.09	0	1.63	0.16	0	<0.01	8.26	0.31	0.03
RL-23-NS-013	<55.75	0.17	<0.00	0.13	0	2.45	0.76	0	0.06	1.87	0.39	1.85
RL-23-NS-013	<55.45	0.12	<0.00	0.11	<0.00	2.31	0.2	<0.00	<0.01	3.16	0.35	<0.00
RL-23-NS-013	3731.53	0.14	<0.00	<0.08	<0.00	1.8	0.96	<0.00	0.11	10.67	0.36	0.14
RL-23-NS-013	<55.68	<0.09	<0.00	<0.08	<0.00	3.62	0.02	<0.00	<0.01	0.86	0.32	0.01
RL-23-NS-013	393.69	0.1	0	0.21	0.01	26.73	<0.01	0.01	2.56	0.05	0.78	8.98
RL-23-NS-013	418.87	<0.09	0	0.23	0.13	25.89	<0.00	0.13	2.63	0.28	1	49.94

Sample ID	Si_ppm	Sn_ppm	Ta_ppm	Te_ppm	Th_ppm	Ti47_ppm	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn66_ppm	Zr_ppm
RL-23-NS-013	118.5	0.1	0	0.11	0.11	55.61	<0.00	0.11	0.67	0.05	0.26	84.3
RL-23-NS-013	<105.33	0.21	<0.00	<0.14	0.01	8.95	<0.01	0.01	0.74	0.01	0.68	1.43
RL-23-NS-013	269.23	0.16	<0.00	0.3	0.02	6.27	<0.01	0.02	1.94	0.16	0.91	4.56
RL-23-NS-013	<70.92	<0.11	0	0.13	0.05	87.03	<0.01	0.05	0.11	0.12	0.18	24.72
RL-23-NS-013	834.39	<0.09	<0.00	0.24	0.01	134.03	<0.00	0.01	16.46	1.71	2.15	3.61
RL-23-NS-013	1776.63	0.15	<0.00	<0.10	0	2.83	<0.01	0	0.53	0.01	0.42	2.13
RL-23-NS-013	4317.02	0.11	0	0.39	0.03	23.76	<0.00	0.03	23.07	0.23	3.99	9.11
RL-23-NS-013	147.19	0.12	0	<0.08	0.01	66.51	<0.00	0.01	0.87	0.96	0.39	8.73
RL-23-NS-013	537.87	<0.09	<0.00	0.14	0.01	7.75	<0.00	0.01	9.41	0.05	1.18	5.94
RL-23-NS-014	217.18	0.33	<0.00	0.24	<0.00	2.2	0.04	0.01	0.91	19.09	0.42	5.11
RL-23-NS-014	<57.99	<0.10	<0.00	0.14	0	2.13	0.02	0	0.56	13.18	0.32	0.14
RL-23-NS-014	330.14	0.13	<0.00	<0.09	<0.00	2.75	0.04	<0.00	2.04	14.79	0.63	0
RL-23-NS-014	265.13	0.11	<0.00	0.25	0	2.01	0.1	<0.00	0.27	13.91	0.38	0.01
RL-23-NS-014	671.77	0.17	<0.00	0.59	<0.00	10.52	0.07	0	1.79	10.97	1.23	0.06
RL-23-NS-014	446.37	<0.22	<0.00	0.44	<0.00	18.01	0.1	0.02	10.21	8.62	0.94	9.86
RL-23-NS-014	116.94	0.2	<0.00	0.53	<0.00	2.74	0.03	0	2.09	7	0.37	4.59
RL-23-NS-014	<57.55	<0.10	<0.00	0.4	<0.00	1.88	0.03	<0.00	0.73	9.68	0.39	<0.00
RL-23-NS-014	477.49	<0.10	<0.00	<0.10	<0.00	1.75	0.77	0	1.84	0.83	0.35	0.01
RL-23-NS-014	119.95	0.11	<0.00	0.17	<0.00	1.59	0.07	<0.00	1.02	10.97	0.45	0
RL-23-NS-014	<56.59	<0.10	<0.00	0.15	<0.00	1.66	0.02	<0.00	0.87	11.8	0.39	<0.00
RL-23-NS-014	190.04	0.21	0	0.79	<0.00	1.79	0.06	<0.00	0.96	2.51	11.53	0.03
RL-23-NS-014	355.89	0.15	<0.00	2.79	<0.00	4.01	0.04	<0.00	0.88	19.56	0.7	0.02
RL-23-NS-014	<55.17	0.2	<0.00	0.16	<0.00	1.56	0.04	<0.00	0.79	19.68	0.5	<0.00
RL-23-NS-014	<51.86	0.18	<0.00	<0.08	<0.00	2.15	0.43	<0.00	0.44	7.14	0.41	0
RL-23-NS-014	<53.37	0.11	<0.00	0.15	<0.00	1.85	0.1	<0.00	0.9	4.14	0.52	0
RL-23-NS-014	<56.10	<0.10	<0.00	<0.09	<0.00	2.41	0.09	<0.00	0.71	4.06	0.51	<0.00
RL-23-NS-014	<54.11	0.11	<0.00	2.4	<0.00	1.62	0.05	<0.00	0.92	3.85	0.44	0
RL-23-NS-014	60.34	0.25	<0.00	0.17	0	1.66	0.02	<0.00	0.77	3.14	0.31	0
RL-23-NS-014	75.84	0.16	<0.00	0.29	0	2.33	0.01	0.04	1.84	4.04	0.28	53.15
RL-23-NS-016	386.94	<0.13	<0.00	0.19	<0.00	1.8	<0.01	<0.00	<0.04	<0.00	0.31	<0.00
RL-23-NS-016	1234.74	<0.19	<0.00	0.45	0	6.85	<0.01	0	2.3	0.01	0.66	0.27

Sample ID	Si_ppm	Sn_ppm	Ta_ppm	Te_ppm	Th_ppm	Ti47_ppm	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn66_ppm	Zr_ppm
RL-23-NS-016	543.34	<0.14	0.01	2.9	0.14	384.53	0.15	0.11	4.01	0.86	1.33	53.78
RL-23-NS-016	140.97	0.14	<0.00	<0.13	<0.00	2.69	<0.01	<0.00	0.06	0.01	0.35	0.03
RL-23-NS-016	379.94	<0.13	0	<0.13	<0.00	7.64	<0.01	<0.00	1.77	0.2	0.17	0.62
RL-23-NS-016	74.83	<0.13	<0.00	<0.13	<0.00	2.86	<0.01	<0.00	<0.04	<0.00	0.36	0.27
RL-23-NS-016	875.93	<0.13	<0.00	0.9	<0.00	2.16	<0.01	<0.00	0.24	0.01	0.28	2.35
RL-23-NS-016	823.02	<0.15	<0.00	0.15	<0.00	3.25	<0.01	<0.00	0.08	0.06	0.23	0.12
RL-23-NS-016	1788.18	<0.13	0	0.65	0	16	<0.01	0	5.46	0.79	0.37	1.02
RL-23-NS-017	34161.54	2.87	0.02	<0.16	0.17	422.29	0.31	0.09	226.07	2.65	13.98	34.25
RL-23-NS-017	5479.28	<0.14	0.03	<0.09	0.07	938.96	0.1	0.02	15.39	1.86	1.34	6.16
RL-23-NS-018	138.27	0.21	0.01	1.57	0.04	98.22	<0.00	0.04	0.23	0.33	0.73	1.47
RL-23-NS-018	288.65	0.17	0.06	18.45	0.4	463.39	<0.00	0.15	2.72	1.1	1.27	18.49
RL-23-NS-018	578.74	0.53	0.17	7.28	0.99	1867.9	<0.01	0.46	4.82	2.42	1.38	84
RL-23-NS-018	1882.39	0.34	0.26	3.29	1.05	3442.04	0.02	0.56	11.3	3.1	5.17	83.46
RL-23-NS-018	2447.42	0.15	0.05	1.8	0.91	309.39	0.03	0.36	4.62	0.75	0.55	64.38
RL-23-NS-018	935.99	0.34	0.08	2.65	0.88	456.72	<0.01	0.34	2.14	0.78	1.95	68.66
RL-23-NS-018	523.62	0.63	0.01	7.66	0.03	22.38	<0.01	0.01	0.87	0.05	0.86	1.15
RL-23-NS-018	162.53	<0.11	0.04	0.22	0.43	975.63	<0.00	0.31	0.75	0.09	1.04	59.52
RL-23-NS-018	<62.19	<0.10	0.01	0.27	0.43	191.52	<0.00	0.17	0.21	0.13	0.51	25.46
RL-23-NS-018	346.23	<0.10	0	0.49	0.39	58.3	0.01	0.16	1.53	0.16	0.72	24.39
RL-23-NS-018	1622.26	<0.41	<0.00	1.3	0	6.22	<0.01	<0.00	3.65	<0.00	3.68	0.03
RL-23-NS-018	261.19	<0.10	0.02	1.09	0.13	56.51	<0.00	0.06	0.69	0.32	0.95	10.58
RL-23-NS-018	820.22	<0.18	0.01	0.31	0.37	8.95	0.01	0.25	1.53	0.01	0.46	37.68
RL-23-NS-018	1873.68	0.21	0.14	1.68	0.27	1257.57	0.03	0.31	7.76	2.53	1.23	31.86
RL-23-NS-018	510.71	0.19	0.07	1.33	2.03	1155.71	0.01	0.86	1.8	0.99	5.81	161.86
RL-23-NS-018	740.63	<0.10	<0.00	0.34	0.18	12.99	0.01	0.13	2.27	0.1	0.24	21.1
RL-23-NS-018	679.13	0.18	0.08	0.44	0.26	616.5	0	0.26	2.86	1.68	0.34	52.75
RL-23-NS-018	2635.06	0.17	0.01	1.48	0.32	45.68	0.01	0.1	4.1	0.27	0.33	10.51
RL-23-NS-018	1583.45	<0.29	<0.00	0.54	0.01	8.13	0.01	<0.00	1.38	<0.00	0.66	0.06
RL-23-NS-019	<75.14	0.27	0	31.4	0.01	142.82	<0.01	0.01	0.24	0.34	0.28	3.85
RL-23-NS-019	101.02	0.38	0.02	33.63	0.03	633.99	<0.01	0.01	1.79	1.2	161.1	5.75
RL-23-NS-019	<78.18	0.28	0.07	19.22	0.13	2104.62	<0.01	1.12	9.11	12.66	1.05	24.46

Sample ID	Si_ppm	Sn_ppm	Ta_ppm	Te_ppm	Th_ppm	Ti47_ppm	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn66_ppm	Zr_ppm
RL-23-NS-019	<76.60	<0.13	<0.00	<0.09	0	7.75	<0.01	0	<0.04	0.01	0.3	0.75
RL-23-NS-019	<75.78	0.63	0.07	21.98	0.13	2901.4	<0.01	0.06	12.73	16.29	3.46	26.84
RL-23-NS-019	<71.72	0.14	0.03	24.14	0.17	850.41	<0.01	0.07	1.46	1.46	0.82	46.93
RL-23-NS-019	86.38	0.12	0.02	30.77	0.1	646.9	<0.01	0.04	2.22	1.03	1.48	19.39
RL-23-NS-019	<72.16	<0.13	0.01	4.81	<0.00	41.07	<0.01	<0.00	<0.04	0.02	0.47	0.28
RL-23-NS-019	<83.09	<0.14	0.01	<0.09	0.08	225.16	<0.01	0.07	3.25	1.91	0.25	13.61
RL-23-NS-019	<74.84	<0.13	<0.00	8.69	0.01	14.66	<0.01	0	0.06	0.06	0.58	5.2
RL-23-NS-019	91.3	0.34	0.09	9.95	0.23	2842.22	<0.01	0.1	2.17	1.86	15.05	51.47
RL-23-NS-019	261.41	0.28	0.06	5.47	0.21	2363.49	<0.02	0.13	2.1	1.48	17.72	48.14
RL-23-NS-019	120.01	0.35	0	13.73	0.01	66.42	<0.01	0	0.13	0.1	421.15	1.34
RL-23-NS-019	<73.93	<0.13	0	9.91	0	9.63	<0.01	<0.00	0.16	0.01	0.63	0.28
RL-23-NS-019	<120.81	0.3	0.01	2.06	0.04	210.64	<0.02	0.03	0.47	0.39	3.35	16.32
RL-23-NS-019	415.17	0.24	0	1.14	0.03	251.38	0.95	0.01	1.75	0.1	0.62	2.6
RL-23-NS-019	<73.06	0.15	0.04	7.12	0.35	1178.02	0.01	0.04	2.62	1.92	0.44	10.38
RL-23-NS-019	578.11	0.14	0	2.16	0	30.48	<0.01	0	0.15	0.29	0.28	0.61
RL-23-NS-019	<67.22	<0.12	0.02	3.25	0.02	519.18	<0.01	0.01	0.68	1	0.34	5.21
RL-23-NS-019	<67.98	0.23	0.07	7.09	0.12	2568.56	<0.01	0.08	8.16	1.94	0.48	36.36
RL-23-NS-019	<70.86	<0.12	0	<0.16	<0.00	89.01	<0.01	<0.00	0.19	0.21	0.39	0.2
RL-23-NS-020	<83.73	<0.16	<0.00	14.1	<0.00	11.29	<0.01	<0.00	0.33	0.04	0.41	<0.00
RL-23-NS-020	<78.91	<0.15	<0.00	1.72	<0.00	3.1	<0.01	<0.00	<0.04	0.01	0.97	0.01
RL-23-NS-020	74.14	0.17	<0.00	227.42	<0.00	2.12	<0.01	<0.00	0.05	<0.00	0.34	0.13
RL-23-NS-020	<79.97	<0.16	<0.00	0.53	<0.00	2.43	<0.01	0	<0.05	<0.00	0.38	<0.00
RL-23-NS-020	<78.73	<0.16	0	14.07	<0.00	2.33	<0.01	0	<0.05	<0.00	0.3	0
RL-23-NS-021	192.86	0.14	0	10.85	0	63.72	<0.01	0.02	0.32	0.14	0.24	5.24
RL-23-NS-021	697.97	0.15	0	8.57	0	37.24	<0.01	0	0.79	0.44	1.27	0.1
RL-23-NS-021	1414.82	0.25	<0.00	10.63	0	51.88	0.02	0.01	4.97	0.07	1.25	0.13
RL-23-NS-021	128.66	<0.13	<0.00	10.06	0	2.32	<0.01	<0.00	0.03	<0.00	0.32	0.02
RL-23-NS-021	66.9	<0.09	<0.00	4.58	0	1.39	<0.01	0	0.01	<0.00	0.32	<0.00
RL-23-NS-021	777.99	0.16	0	5.81	0	11.53	0.01	0	3.35	0.05	0.52	0.44
RL-23-NS-021	75.54	0.28	<0.00	8.96	0	9.54	<0.01	0.02	0.05	0.02	0.21	0.07
RL-23-NS-021	<63.25	<0.10	<0.00	2.45	0	1.11	<0.01	0	<0.01	<0.00	0.77	0.02

Sample ID	Si_ppm	Sn_ppm	Ta_ppm	Te_ppm	Th_ppm	Ti47_ppm	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn66_ppm	Zr_ppm
RL-23-NS-021	132.82	0.09	<0.00	4.87	0	1.79	<0.01	<0.00	<0.01	<0.00	0.2	0.01
RL-23-NS-021	88.06	0.19	<0.00	3.71	0	2.04	<0.01	0	<0.01	0.03	0.25	0.02
RL-23-NS-021	<56.88	0.14	<0.00	0.35	0	1.81	<0.01	<0.00	<0.01	<0.00	0.14	<0.00
RL-23-NS-024	118.11	0.28	<0.00	<0.09	0	2.9	<0.00	<0.00	<0.01	<0.00	0.24	0
RL-23-NS-024	113.09	0.18	<0.00	0.12	0	3.43	<0.00	<0.00	<0.01	<0.00	0.21	0.01
RL-23-NS-024	67.23	0.18	<0.00	0.1	0	0.73	0	<0.00	<0.01	<0.00	0.28	<0.00
RL-23-NS-024	<67.32	<0.10	<0.00	0.1	0	1.2	<0.00	<0.00	<0.01	<0.00	0.37	<0.00
RL-23-NS-024	<62.56	0.1	<0.00	<0.09	0	2.11	<0.00	0	<0.01	<0.00	0.24	0
RL-23-NS-024	<62.78	0.18	<0.00	<0.09	0	2.69	<0.00	<0.00	<0.01	<0.00	0.18	0
RL-23-NS-024	413.7	0.11	0	0.69	0	12.42	0.02	0	0.83	0.01	0.45	0.07
RL-23-NS-024	<65.24	<0.09	<0.00	0.25	0	2.66	<0.00	<0.00	<0.01	<0.00	0.16	0
RL-23-NS-024	818.87	0.14	<0.00	2.27	0	6.72	0.01	<0.00	2.08	0	1.78	<0.00
RL-23-NS-024	<64.24	0.11	<0.00	<0.09	0	2.04	<0.00	<0.00	<0.01	<0.00	0.24	<0.00
RL-23-NS-024	120.7	0.1	0	0.4	0	4.99	<0.00	0	0.06	0	0.49	0.06
RL-23-NS-024	<62.70	<0.09	<0.00	1.18	0	2.28	<0.00	<0.00	0.14	0.02	0.3	<0.00
RL-23-NS-024	<62.33	<0.09	<0.00	0.1	0	1.84	<0.00	<0.00	<0.01	<0.00	0.27	0
RL-23-NS-024	<65.43	<0.09	<0.00	0.31	0	2.53	<0.00	<0.00	<0.01	<0.00	0.28	<0.00
RL-23-NS-024	<62.91	<0.09	<0.00	<0.09	0	3.59	<0.00	<0.00	<0.01	<0.00	0.22	<0.00
RL-23-NS-024	<63.63	0.09	<0.00	0.33	0	2.46	<0.00	<0.00	<0.01	<0.00	0.27	0
RL-23-NS-024	<62.64	<0.09	<0.00	0.24	0	2.57	<0.00	<0.00	<0.01	<0.00	0.37	<0.00
RL-23-NS-024	<59.20	<0.08	0	<0.09	0	2.07	0	<0.00	<0.01	0	0.25	0.01
RL-23-NS-024	98.88	<0.09	0	1.88	0	2.31	<0.00	1.01	0.23	0	0.31	185.49
RL-23-NS-024	<62.12	0.13	<0.00	0.1	0	2.83	<0.00	<0.00	<0.01	<0.00	0.25	<0.00
RL-23-NS-024	168.57	0.13	<0.00	1.01	0	8.47	<0.00	0.01	3.65	0.03	0.39	0.16
RL-23-NS-024	72.52	<0.09	<0.00	0.33	0	2.2	<0.00	<0.00	0.16	0	0.29	0
RL-23-NS-024	<63.98	<0.09	<0.00	<0.09	0	1.87	<0.00	0	<0.01	<0.00	0.19	0.04
RL-23-NS-024	<65.03	<0.09	<0.00	0.18	0	2.34	<0.00	0	0.06	<0.00	0.34	0.08
RL-23-NS-024	<62.98	<0.09	<0.00	<0.09	0	2.55	<0.00	0.01	<0.01	0	0.23	0.32
RL-23-NS-025	110.65	0.18	<0.00	0.17	0	2.21	<0.01	<0.00	<0.04	<0.00	0.39	<0.00
RL-23-NS-025	<69.84	<0.11	0	0.38	0	4.75	<0.01	0.73	<0.04	<0.00	0.45	64.44
RL-23-NS-025	<72.94	<0.11	<0.00	0.5	0	2.01	<0.01	<0.00	<0.04	<0.00	0.75	<0.00

Sample ID	Si_ppm	Sn_ppm	Ta_ppm	Te_ppm	Th_ppm	Ti47_ppm	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn66_ppm	Zr_ppm
RL-23-NS-025	<75.41	<0.12	<0.00	0.15	0	2.55	<0.01	0	<0.04	<0.00	0.49	0
RL-23-NS-025	<78.52	<0.12	<0.00	0.52	0	1.21	<0.01	<0.00	<0.04	<0.00	0.21	<0.00
RL-23-NS-025	<133.94	<0.21	<0.00	0.53	0	4.31	<0.02	<0.00	<0.07	<0.01	10.5	<0.00
RL-23-NS-025	397.63	<0.11	<0.00	2.14	0	14.57	0.04	0	1.84	<0.00	0.64	0
RL-23-NS-025	1355.37	0.4	0	0.89	0	4.62	<0.02	<0.00	<0.09	<0.01	0.35	<0.00
RL-23-NS-025	252.5	0.17	<0.00	1.5	0	3.34	<0.01	1.87	<0.04	0	0.6	141.56
RL-23-NS-025	4652.46	<0.13	<0.00	4.36	0	2.58	<0.01	0.23	0.1	<0.00	0.56	23.99
RL-23-NS-025	475.22	<0.12	0	2.74	0	7.29	<0.01	0.93	0.51	0.02	0.55	71.29
RL-23-NS-025	<70.76	0.17	<0.00	<0.10	0	2.05	<0.01	<0.00	<0.04	<0.00	0.43	0
RL-23-NS-025	143.95	<0.13	0	1.38	0	2.41	<0.01	0.06	<0.04	<0.00	0.48	9.49
RL-23-NS-025	<73.75	<0.12	0	0.42	0	1.5	<0.01	0.76	<0.04	<0.00	0.29	55.4
RL-23-NS-025	1149.35	<0.12	0	3.2	0	2.11	<0.01	0.48	0.05	<0.00	0.38	33.16
RL-23-NS-025	308.98	<0.12	0.01	1.2	0	3.28	<0.01	1.16	0.05	0	0.45	130.34
RL-23-NS-025	147.81	<0.13	<0.00	0.29	0	<0.86	<0.01	<0.00	<0.04	<0.00	0.32	0
RL-23-NS-025	9803.68	0.23	0.01	10.65	0	14.38	0.16	14.59	3.13	0.17	0.98	130.5
RL-23-NS-025	<72.72	<0.12	<0.00	0.11	0	2.09	<0.01	<0.00	<0.04	<0.00	0.41	0
RL-23-NS-025	2074.97	<0.16	0	4.05	0	1.86	<0.01	<0.00	<0.06	<0.00	0.67	0.09
RL-23-NS-025	98.17	0.12	<0.00	0.29	0	4.29	<0.01	0.01	0.17	0.01	0.33	0.01
RL-23-NS-025	749.25	0.12	0	2.45	0	3.4	<0.01	1.04	<0.04	0	0.42	74.17
RL-23-NS-025	<75.42	0.16	<0.00	2.29	0	2.31	<0.01	0.59	<0.04	0.06	0.36	44.12
RL-23-NS-025	16212.66	<0.22	0.01	7.68	0	8.23	<0.02	0.22	0.1	<0.01	0.87	38.93
RL-23-NS-025	<71.92	<0.11	<0.00	<0.11	0	2.39	<0.01	0.03	<0.04	<0.00	0.4	3.35
RL-23-NS-026	886.87	0.15	0.03	6.75	0	50	<0.01	0	1.33	4.19	0.45	0.18
RL-23-NS-026	637.03	<0.14	0	1.91	0	5.28	<0.01	0	0.34	0.02	0.51	0.21
RL-23-NS-026	<72.71	<0.13	0	<0.13	0	3.15	<0.01	0	<0.04	0.11	0.45	0.01
RL-23-NS-026	<70.55	<0.12	0.01	3.08	0	2.82	<0.01	<0.00	<0.04	0.01	0.27	0.02
RL-23-NS-026	<76.03	<0.13	<0.00	1.68	0	2.62	<0.01	0	<0.04	<0.00	0.38	0.09
RL-23-NS-026	<72.86	<0.12	0.01	1.67	0	146.63	<0.01	0	0.05	0.01	0.3	<0.00
RL-23-NS-026	<67.13	<0.12	<0.00	1.18	0	1.98	<0.01	0	<0.04	0.01	0.37	0.52
RL-23-NS-026	294.76	0.21	0.11	2.38	0	1773.74	<0.01	0.75	3.18	3.41	1.04	3.57
RL-23-NS-026	<71.23	<0.12	<0.00	3.84	0	2.71	<0.01	<0.00	<0.04	0	0.37	<0.00

Sample ID	Si_ppm	Sn_ppm	Ta_ppm	Te_ppm	Th_ppm	Ti47_ppm	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn66_ppm	Zr_ppm
RL-23-NS-026	<74.03	<0.13	<0.00	2.05	0	2.09	<0.01	<0.00	<0.04	0.01	0.32	<0.00
RL-23-NS-026	<71.64	<0.13	<0.00	<0.13	0	2.48	<0.01	0	<0.04	<0.00	0.39	<0.00
RL-23-NS-026	<73.16	<0.13	<0.00	0.37	0	2.89	<0.01	<0.00	<0.04	0	0.35	<0.00
RL-23-NS-026	<73.39	<0.13	0	<0.13	0	2.29	<0.01	<0.00	<0.04	<0.00	0.38	0
RL-23-NS-026	<79.71	<0.14	0	0.67	0	2.55	<0.01	<0.00	<0.04	0.05	0.36	<0.00
RL-23-NS-027	210.65	0.3	0.01	0.57	0	73.06	<0.00	0.49	0.47	1.99	0.38	5.45
RL-23-NS-027	1823.05	1.07	0.01	8.03	0	1969.7	0.01	0.02	24.86	0.66	5.13	1.2
RL-23-NS-027	78.96	0.17	<0.00	<0.09	0	3.43	<0.01	0	0.09	<0.00	0.43	<0.00
RL-23-NS-027	1471.65	0.13	<0.00	1.18	0	2.78	<0.01	<0.00	<0.01	0	0.38	<0.00
RL-23-NS-027	<79.51	0.14	<0.00	<0.11	0	3.19	<0.01	0	<0.01	<0.00	0.3	0.26
RL-23-NS-027	73.42	0.12	<0.00	<0.09	0	4.92	<0.01	<0.00	0.06	0	0.42	0
RL-23-NS-027	7801.88	4.81	0.79	3.44	0	12519.6	<0.01	1.06	61.1	7.53	0.55	8.42
RL-23-NS-027	357.86	0.12	0.04	10.95	0	22.2	0.01	0.07	0.96	0.02	0.85	1.75
RL-23-NS-027	1414.2	0.16	0.09	3.39	0	70.48	0.01	1.48	2.23	0.07	1.7	45.53
RL-23-NS-027	737.84	<0.22	0.02	1.99	0	36.6	0.02	0.14	0.65	0.09	0.91	6.54
RL-23-NS-027	246.19	<0.09	<0.00	0.4	0	2.51	<0.00	0.01	0.12	<0.00	0.31	6.4
RL-23-NS-027	711.76	0.24	0.02	2.41	0	304.43	<0.00	0.15	3.13	4.39	0.33	0.48
RL-23-NS-027	5821.29	2.86	0.52	3.03	0	7573.82	<0.01	0.08	27.25	2.98	0.38	0.69
RL-23-NS-027	549.63	0.13	0	5.09	0	73.39	<0.01	<0.00	3.59	0.07	1.29	0.01
RL-23-NS-027	<66.88	<0.10	<0.00	0.29	0	2.32	<0.01	<0.00	<0.01	<0.00	0.34	<0.00
RL-23-NS-027	183.52	0.17	0.01	2.92	0	25.23	<0.01	0.34	0.26	0.18	0.27	0.01
RL-23-NS-027	687.72	0.16	<0.00	0.84	0	4.27	<0.00	0	0.04	<0.00	0.32	0.12
RL-23-NS-027	70.75	0.15	<0.00	<0.09	0	2.13	<0.00	<0.00	<0.01	<0.00	0.41	<0.00
RL-23-NS-027	<65.38	0.17	<0.00	0.43	0	4.12	<0.00	<0.00	0.06	0	0.2	<0.00
RL-23-NS-027	69.89	<0.10	<0.00	0.31	0	6.02	<0.00	0.01	0.06	0.24	0.18	0.03
RL-23-NS-027	845.25	0.25	0.07	4.52	0	27.71	<0.00	2.32	3.95	1	0.42	0.26
RL-23-NS-027	<67.02	<0.11	<0.00	0.47	0	2.39	<0.00	0.03	0.02	0.01	0.32	0.77
RL-23-NS-027	<60.54	<0.10	<0.00	<0.08	0	2.53	<0.00	<0.00	<0.01	0	0.22	<0.00
RL-23-NS-027	<66.93	<0.11	<0.00	0.14	0	2.23	<0.00	<0.00	0.02	<0.00	0.38	<0.00
RL-23-NS-029	209.4	0.24	0	1.59	0	73.56	<0.01	<0.00	0.48	0.02	0.58	0.36
RL-23-NS-029	1095.71	0.27	0	4.45	0	128.18	<0.01	0	2.74	0.14	1.87	6.11

Sample ID	Si_ppm	Sn_ppm	Ta_ppm	Te_ppm	Th_ppm	Ti47_ppm	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn66_ppm	Zr_ppm
RL-23-NS-029	1233.27	0.49	0.04	3	0	518.66	0.01	0.01	4.99	0.99	1.87	12.3
RL-23-NS-029	2421.49	<0.23	0.03	2.13	0	452.84	0.02	0.01	14.6	0.41	7.15	4.39
RL-23-NS-029	1775.9	0.38	0.12	3.88	0	2038	0.02	0.01	14.14	0.2	5.71	0.29
RL-23-NS-029	641.92	<0.19	0.02	3.19	0	366.87	<0.01	0.05	3	0.13	4.64	59.24
RL-23-NS-030	218.84	0.12	<0.00	0.13	0	2.55	0.16	0	<0.01	0.52	0.52	8.81
RL-23-NS-030	740.06	0.12	<0.00	0.35	0	1.82	0.42	0	0.73	1.9	1.9	0.02
RL-23-NS-030	2730.01	0.54	0.17	1.2	0	4131.03	1.09	0.09	12.38	0.39	0.39	24.88
RL-23-NS-030	2318.74	0.18	<0.00	1.35	0	73.86	1.82	0.08	5.63	2.45	2.45	41.31
RL-23-NS-030	1872.13	0.24	0.07	2.34	0	1811.37	1.06	0.06	8.49	0.75	0.75	69.61
RL-23-NS-032	426.33	<0.10	<0.00	0.94	0	3.53	1.68	0	0.03	0.27	0.27	0.02
RL-23-NS-032	4125.44	<0.17	<0.00	1.81	0	1.37	11.16	0	<0.02	0.19	0.19	0.04
RL-23-NS-032	3310.49	<0.17	0	4.57	0	2.97	12.07	0.01	0.03	0.55	0.55	0.12
RL-23-NS-032	10701.5	0.14	<0.00	28.77	0	2.02	38.8	<0.00	<0.01	0.23	0.23	<0.00
RL-23-NS-034	5.85	0.41	0.19	0.93	0	2652.72	0.02	0.91	2.39	0.49	0.68	100.12
RL-23-NS-035	506.46	0.33	<0.00	<0.10	0	3.11	<0.01	0	<0.02	<0.00	0.38	0.13
RL-23-NS-035	<72.74	<0.13	<0.00	<0.11	0	2.89	<0.01	<0.00	<0.02	<0.00	0.29	<0.00
RL-23-NS-035	<75.36	<0.13	<0.00	<0.11	0	2.05	<0.01	<0.00	<0.02	<0.00	0.37	<0.00
RL-23-NS-035	<74.35	<0.13	<0.00	0.12	0	3	<0.01	<0.00	0.24	<0.00	0.63	0
RL-23-NS-035	1338.25	<0.13	0	2.52	0	3.75	<0.01	0.02	0.31	<0.00	0.97	3.95
RL-23-NS-035	<76.55	<0.13	<0.00	<0.11	0	2.3	<0.01	<0.00	<0.03	<0.00	0.43	<0.00
RL-23-NS-035	<75.87	<0.13	<0.00	<0.11	0	2.22	<0.01	<0.00	<0.02	<0.00	0.39	0
RL-23-NS-035	<78.01	<0.14	<0.00	<0.12	0	2.97	<0.01	<0.00	<0.03	<0.00	0.39	<0.00
RL-23-NS-035	<72.19	<0.13	<0.00	<0.11	0	1.95	<0.01	0	<0.02	<0.00	0.42	<0.00
RL-23-NS-035	<72.47	<0.13	<0.00	<0.11	0	2.62	<0.01	<0.00	<0.02	<0.00	0.27	<0.00
RL-23-NS-035	<74.93	<0.13	<0.00	<0.11	0	2.54	<0.01	<0.00	<0.02	<0.00	0.47	<0.00
RL-23-NS-035	<70.64	<0.12	<0.00	<0.10	0	2.52	<0.01	0.01	<0.02	<0.00	0.35	0.16
RL-23-NS-035	<70.72	<0.12	<0.00	<0.11	0	2.21	<0.01	<0.00	<0.02	<0.00	0.45	<0.00
RL-23-NS-035	784.98	<0.13	0	<0.11	0	5.6	<0.01	0.01	4.36	<0.00	10.29	0.94
RL-23-NS-035	2682.21	<0.14	<0.00	0.13	0	1.61	<0.01	0.03	0.1	<0.00	25.39	13.26
RL-23-NS-035	183.22	<0.12	<0.00	<0.10	0	1.28	<0.01	0.16	<0.02	0	15.52	13.2
RL-23-NS-035	<69.00	<0.12	<0.00	<0.11	0	3.65	<0.01	<0.00	2.84	<0.00	0.75	<0.00

Sample ID	Si_ppm	Sn_ppm	Ta_ppm	Te_ppm	Th_ppm	Ti47_ppm	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn66_ppm	Zr_ppm
RL-23-NS-035	379.25	<0.13	<0.00	<0.11	0	3.45	<0.01	<0.00	0.64	0.01	2.43	<0.00
RL-23-NS-035	<72.58	<0.13	<0.00	<0.11	0	2.83	<0.01	<0.00	<0.02	<0.00	2.18	<0.00
RL-23-NS-035	7081.87	<0.13	<0.00	<0.12	0	2.16	<0.01	0.04	<0.02	<0.00	1.15	1.75
RL-23-NS-035	<72.21	<0.13	<0.00	<0.11	0	6.16	<0.01	<0.00	1.74	<0.00	1.67	0.01
RL-23-NS-035	<73.55	<0.13	<0.00	<0.11	0	3.13	<0.01	0	<0.02	<0.00	0.39	<0.00
RL-23-NS-035	380.67	<0.13	0	<0.10	0	2.97	<0.01	0.01	1.74	0	1.84	0.53
RL-23-NS-035	<73.97	0.13	0	0.15	0	3.51	0.02	0	2.41	<0.00	374.72	<0.00
RL-23-NS-035	475.93	<0.13	<0.00	0.79	0	5.16	<0.01	0.14	15.42	0.01	35.17	7.77
RL-23-NS-035	<72.63	0.14	<0.00	0.29	0	2.04	<0.01	<0.00	<0.02	<0.00	0.23	<0.00
RL-23-NS-035	<69.16	<0.12	<0.00	<0.10	0	2.76	<0.01	<0.00	0.2	<0.00	0.42	<0.00
RL-23-NS-035	430.37	<0.13	0	<0.11	0	2.42	<0.01	0.01	<0.02	<0.00	0.36	0.34
RL-23-NS-035	<75.18	<0.13	<0.00	<0.11	0	3.5	<0.01	0	2.21	0	1.13	<0.00
RL-23-NS-035	<99.30	<0.17	<0.00	<0.14	0	4.01	<0.01	0.01	2.99	<0.00	15.71	1.66
RL-16ND069	229.66	0.57	0	<0.12	0	2	1.2	0	0.3	0.01	3.87	0.01
RL-16ND069	325.05	0.54	<0.00	<0.13	0	2.48	7.91	0	0.84	0.04	0.91	<0.00
RL-16ND069	164.55	0.16	<0.00	<0.12	0	2.48	35.09	<0.00	1.25	0.16	0.91	0.01
RL-16ND069	445.02	<0.12	<0.00	0.15	0	2.32	30.01	0	10	0.14	0.76	0
RL-16ND069	257.59	0.12	<0.00	<0.11	0	1.85	50.4	0	0.23	0.21	0.76	<0.00
RL-16ND069	117.14	<0.13	<0.00	<0.13	0	2.66	0.34	0	0.23	0	0.68	0
RL-16ND069	<70.03	<0.13	<0.00	<0.13	0	2.3	0.46	<0.00	<0.02	<0.00	0.58	<0.00
RL-16ND069	<74.41	<0.14	<0.00	<0.14	0	2.23	0.54	<0.00	<0.02	<0.00	0.75	<0.00
RL-16ND069	<72.58	<0.13	0	<0.14	0	2.33	1.88	<0.00	<0.02	0.02	1.03	<0.00
RL-16ND069	11816.97	<0.29	<0.00	0.25	0	2.19	1.37	0.01	2.59	0.14	2.71	0.1
RL-16ND069	<188.00	<0.31	<0.00	1.71	0	4.71	<0.02	<0.00	16.99	0.27	1.22	0.04
RL-16ND069	2242.72	<0.21	<0.00	3.87	0	1.68	0.51	<0.00	14.6	0.48	2.26	0.02
RL-16ND069	278.84	<0.26	<0.00	2.51	0	2.07	<0.02	<0.00	15.92	0.17	1.01	0.01
RL-16ND069	193.06	<0.28	<0.00	6.51	0	2.8	0.12	0.01	1.34	0.14	1.43	0.2
RL-16ND069	<173.70	<0.28	<0.00	4.14	0	1.78	<0.02	<0.00	0.6	0.01	0.53	<0.00
RL-16ND086	<68.41	0.15	0	1	0	2.04	<0.01	0.01	<0.02	<0.00	0.32	0.95
RL-16ND086	335.57	<0.13	0.01	0.72	0	35.34	<0.01	0.06	0.61	0.97	0.48	4.13
RL-16ND086	411.3	0.47	0	0.29	0	1.87	<0.01	0.01	<0.02	0	0.16	<0.00

Sample ID	Si_ppm	Sn_ppm	Ta_ppm	Te_ppm	Th_ppm	Ti47_ppm	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn66_ppm	Zr_ppm
RL-16ND086	3929.44	0.44	<0.00	2.78	0	5.45	<0.01	1.93	0.09	0.56	1.16	3.03
RL-16ND086	119.51	<0.14	<0.00	5.61	0	2.62	<0.01	0	<0.02	<0.00	0.19	<0.00
RL-16ND086	<73.08	<0.13	0	1.35	0	4.5	<0.01	<0.00	0.02	0.02	0.24	0.01
RL-16ND086	<70.11	<0.13	<0.00	0.95	0	1.9	<0.01	<0.00	<0.02	<0.00	0.25	0
RL-16ND086	184.4	<0.14	0	2.12	0	6.12	<0.01	0	0.06	0.03	1.42	0.43
RL-16ND086	211.19	<0.12	<0.00	<0.13	0	1.96	<0.01	0.3	<0.02	0.01	0.44	2.15
RL-16ND086	442.22	0.26	0.12	0.99	0	233.71	<0.01	0.22	0.15	2.1	1.22	5.82
RL-16ND086	148.58	<0.13	0.14	1.63	0	221.99	<0.01	1.02	0.18	1.71	0.48	128.41
RL-16ND086	981.63	0.14	0.02	1.16	0	63.38	<0.01	0.19	0.29	1.83	1.02	3.59
RL-16ND086	216.98	<0.12	0.01	0.53	0	25.07	<0.01	0.17	0.37	0.69	0.46	5.55
RL-16ND086	<70.78	<0.13	0.01	1.24	0	4.02	<0.01	0.02	<0.02	0.08	0.4	1.27
RL-16ND086	1069.67	<0.14	0.04	9.8	0	73.62	<0.01	3.39	0.96	3.55	7.13	33.59
RL-16ND086	<74.19	<0.13	<0.00	2.64	0	5.7	<0.01	0.05	0.03	0.03	0.41	7.1
RL-16ND086	454.64	<0.13	<0.00	4.15	0	1.96	<0.01	0.88	0.08	0.06	1.71	1.28
RL-16ND090	<165.75	0.28	<0.00	1.49	0	1.71	<0.02	<0.00	0.32	<0.00	0.53	<0.00
RL-16ND090	<165.57	<0.27	<0.00	1.54	0	2.29	<0.02	<0.00	1	0.03	<0.32	<0.00
RL-16ND090	544.41	<0.29	<0.00	1.79	0	185.42	<0.02	0.01	2.71	0.13	1.18	6.02
RL-16ND090	21981.12	<0.40	<0.00	6.28	0	8.65	<0.03	<0.00	8.21	0.05	4.09	0.01
RL-16ND102	263.75	0.31	<0.00	2.28	0	2.68	<0.01	0	0.18	<0.00	0.4	0
RL-16ND102	398.98	<0.13	<0.00	1.06	0	2	0.03	0.07	0.95	0.01	1.98	11.66
RL-16ND102	<126.43	1.41	<0.00	0.27	0	1.39	<0.01	<0.00	<0.04	<0.01	<0.23	0.43
RL-16ND102	495.71	<0.14	<0.00	0.6	0	4.21	<0.01	<0.00	9.05	0.01	13.35	<0.00
RL-16ND102	2218.34	<0.13	0	1.53	0	2.24	<0.01	0	0.67	0.01	1.16	3.34
RL-16ND102	<71.23	<0.13	<0.00	0.94	0	2.66	<0.01	0	0.58	0.01	0.43	0
RL-16ND102	<81.55	<0.15	<0.00	0.76	0	2.34	<0.01	<0.00	0.31	<0.00	2.59	0
RL-16ND102	294.09	0.21	<0.00	1.18	0	2.07	0.01	<0.00	0.07	<0.00	0.33	0.02
RL-16ND102	347.73	0.19	<0.00	0.4	0	3.72	<0.01	<0.00	1.16	0	0.34	<0.00
RL-16ND102	1313.57	<0.13	<0.00	4.02	0	2.73	0.1	0.01	2.26	0.01	0.35	4.72
RL-16ND102	265.67	1.08	<0.00	<0.25	0	1.69	<0.01	<0.00	0.23	0.05	0.35	0.05
RL-16ND102	707.28	1.22	<0.00	<0.21	0	2.57	0.05	0	1.14	0.06	0.32	0.39

Sample ID	Si_ppm	Sn_ppm	Ta_ppm	Te_ppm	Th_ppm	Ti47_ppm	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn66_ppm	Zr_ppm
RL-16ND102	3723.32	<0.13	<0.00	0.3	0	2.46	<0.01	<0.00	<0.02	0	0.41	<0.00
RL-16ND102	642.73	<0.12	<0.00	2.62	0	3.7	<0.01	0.05	1.7	0.01	0.29	6.42
RL16ND005	<75.05	0.06	<0.00	<0.07	<0.00	0.86	<0.01	<0.00	<0.01	0	0.3	<0.00
RL16ND005	<56.06	0.04	<0.00	1.49	<0.00	0.84	<0.01	<0.00	<0.01	0	0.21	0
RL16ND005	<57.69	<0.04	<0.00	4.96	<0.00	0.88	<0.01	<0.00	<0.01	<0.00	0.24	<0.00
RL16ND005	7093.19	0.16	0.01	38.95	0.01	557.1	0.02	0.01	87.26	2.98	6.81	1.68
RL16ND005	<72.56	0.06	<0.00	0.16	<0.00	1.38	0.03	<0.00	0.65	0.01	2.76	<0.00
RL16ND005	1120.01	<0.05	<0.00	7.29	<0.00	2.89	<0.01	<0.00	5.37	0	0.58	<0.00
RL16ND005	<148.18	<0.07	<0.00	1.64	<0.00	0.81	<0.02	<0.00	0.23	<0.00	2.78	<0.00
RL16ND005	<109.05	<0.06	<0.00	5.62	<0.00	2.9	<0.02	<0.00	<0.02	0.01	0.45	<0.00
RL16ND005	<86.07	0.07	<0.00	0.17	<0.00	1.59	0.24	<0.00	<0.01	<0.00	0.26	<0.00
RL16ND005	<64.64	0.08	<0.00	0.21	<0.00	0.69	<0.01	<0.00	0.06	0.01	1.67	<0.00
RL16ND005	<75.70	<0.05	0	0.7	<0.00	2.73	0.04	<0.00	1.49	0.02	4.89	<0.00
RL16ND005	<99.35	0.11	<0.00	0.79	<0.00	2.35	0.02	0	<0.02	<0.00	3.37	<0.00
RL16ND005	<130.25	<0.07	<0.00	4.47	<0.00	1.36	<0.02	<0.00	<0.04	<0.00	<0.37	<0.00
RL16ND005	<61.08	0.03	<0.00	0.74	<0.00	1.39	<0.01	<0.00	<0.01	<0.00	0.27	<0.00
RL16ND005	<65.71	<0.04	<0.00	0.89	<0.00	1.32	<0.01	<0.00	<0.02	<0.00	0.22	<0.00
RL16ND005	<70.63	0.08	<0.00	<0.05	<0.00	1.89	<0.01	<0.00	0.24	0.03	3.27	<0.00
RL16ND005	<65.57	0.04	<0.00	0.95	<0.00	1.2	<0.01	<0.00	<0.01	<0.00	0.2	<0.00
RL16ND005	<55.21	0.05	<0.00	<0.06	<0.00	1.6	<0.01	<0.00	<0.01	<0.00	0.26	<0.00
RL16ND023	<72.28	<0.03	<0.00	<0.06	<0.00	1.33	<0.01	<0.00	<0.01	0	0.2	<0.00
RL16ND023	75.05	0.38	0.09	1.63	0.61	1306.7	<0.01	0.28	6.98	10.67	0.26	31.14
RL16ND023	<68.54	<0.04	0	1.68	0	1.01	<0.01	<0.00	<0.01	0	0.38	<0.00
RL16ND023	<66.77	0.09	0.01	1.32	3.73	105.81	0.02	0.84	0.63	0.85	0.28	8.65
RL16ND023	<69.35	0.07	0	0.94	0.01	31.54	<0.01	0	0.22	0.3	0.41	0.67
RL16ND023	115.85	0.62	0.09	0.22	0.71	2635.97	<0.01	0.27	20.37	12.85	0.52	27.2
RL16ND023	<73.17	0.05	<0.00	0.47	0	0.94	<0.01	0	0.01	0	0.18	<0.00
RL16ND023	<71.79	<0.04	<0.00	0.23	0	1.48	<0.01	<0.00	<0.01	0	0.39	0.01
RL16ND023	<72.67	0.04	0	0.14	<0.00	1.17	<0.01	0	0.34	0.01	0.59	0
RL16ND023	<73.18	0.04	<0.00	0.23	0.02	24.7	<0.01	0	0.12	0.3	<0.23	1.06
RL16ND023	<56.55	0.03	<0.00	1.05	<0.00	1.05	<0.01	<0.00	<0.01	<0.00	0.24	<0.00

Sample ID	Si_ppm	Sn_ppm	Ta_ppm	Te_ppm	Th_ppm	Ti47_ppm	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn66_ppm	Zr_ppm
RL16ND023	<91.10	0.04	<0.00	<0.12	<0.00	0.66	<0.01	0	<0.01	<0.00	0.29	0
RL16ND023	<59.03	<0.03	<0.00	0.14	<0.00	0.91	<0.01	<0.00	<0.01	<0.00	0.25	0
RL16ND023	<63.16	0.03	0	0.22	<0.00	0.94	<0.01	<0.00	<0.01	<0.00	0.27	0.01
RL16ND023	<66.36	0.04	0	0.06	<0.00	1.46	<0.01	<0.00	<0.01	<0.00	0.37	0.01
RL16ND023	<69.05	<0.03	<0.00	0.11	<0.00	1.16	<0.01	<0.00	<0.01	<0.00	0.25	<0.00
RL16ND023	<65.82	<0.03	0	0.19	0	0.77	<0.01	<0.00	<0.01	0	0.28	0.01
RL16ND023	<70.32	0.05	<0.00	<0.05	<0.00	1.23	<0.01	0	0.03	<0.00	<0.17	0.01
RL16ND023	<76.17	<0.03	<0.00	<0.05	<0.00	0.92	<0.01	0	<0.01	<0.00	0.19	<0.00
RL16ND023	<72.56	0.04	<0.00	<0.05	<0.00	1.95	<0.01	<0.00	<0.01	<0.00	<0.19	<0.00
RL16ND023	<69.57	0.05	<0.00	0.08	0	1.23	<0.01	<0.00	<0.01	<0.00	0.29	0
RL16ND023	<65.47	0.05	<0.00	<0.11	0	8.59	<0.01	0	0.07	0.06	0.4	0.03
RL16ND029	369.68	0.07	<0.00	<0.02	0.02	2.08	0.02	0.01	0.9	98.36	0.85	1.06
RL16ND029	207.33	0.06	<0.00	<0.02	0.02	2.5	0.02	0.01	0.98	124.05	0.79	6.06
RL16ND029	2685.93	0.05	<0.00	0.11	0	0.68	0.03	0	0.47	64.94	0.6	9.79
RL16ND029	116.23	0.06	<0.00	0.07	0.01	3.26	0.02	0	1.13	272.87	0.96	0.97
RL16ND029	102.8	<0.03	<0.00	<0.03	0.01	0.97	0.02	0	0.2	75.46	0.54	0.04
RL16ND029	2833.32	0.09	<0.00	<0.08	0.02	6.87	0.04	0	8.29	47.15	5.78	0.52
RL16ND029	72.22	0.05	<0.00	<0.03	0.02	1.87	0.03	<0.00	1.43	55.52	0.55	0.01
RL16ND029	159.55	0.08	<0.00	0.1	0.02	3.6	0.06	0	2.04	151.29	1.56	1.97
RL16ND029	420.21	0.06	<0.00	<0.03	0	1.74	<0.01	0	1.09	114.86	6.02	0.02
RL16ND029	<53.38	0.04	<0.00	0.17	0.01	0.78	0.02	<0.00	0.94	53.07	0.58	0
RL16ND029	<60.69	0.04	0	<0.04	0.01	2.9	0.31	0	0.2	88.48	0.3	0.02
RL16ND029	83.55	0.05	<0.00	0.21	0	0.83	0.01	<0.00	0.21	61.04	0.51	0
RL16ND029	287.3	<0.03	<0.00	<0.03	0	0.89	0.04	<0.00	2.29	55.29	0.49	<0.00
RL16ND029	<52.03	<0.03	<0.00	0.1	0.01	0.95	<0.01	<0.00	0.73	84.46	0.56	0.01
RL16ND029	117.59	0.08	<0.00	<0.04	0.01	2.4	0.02	0.01	0.88	131.39	0.88	5.08
RL16ND029	106.07	0.03	<0.00	0.06	0	0.95	0.01	<0.00	0.48	107.99	0.57	<0.00
RL16ND029	287.14	0.03	<0.00	<0.03	<0.00	0.64	<0.01	<0.00	0.55	81.07	0.45	0.38
RL16ND029	<64.89	0.06	<0.00	0.11	0	1.37	<0.01	0	0.84	80.36	0.68	0.21
RL16ND029	353.82	<0.03	<0.00	0.06	0.01	0.77	0.09	<0.00	0.99	55.72	1.41	0.01

Sample ID	Si_ppm	Sn_ppm	Ta_ppm	Te_ppm	Th_ppm	Ti47_ppm	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn66_ppm	Zr_ppm
RL16ND029	131.99	0.04	<0.00	<0.06	0	1.11	0.04	0	0.47	112.46	0.65	0.04
RL16ND029	<52.53	0.06	<0.00	0.04	<0.00	1.17	0.18	0	1.26	60.98	0.7	<0.00
RL16ND039	<148.21	<0.08	<0.00	0.87	<0.00	1.93	<0.02	<0.00	<0.03	<0.00	<0.41	<0.00
RL16ND039	<70.94	0.05	<0.00	0.19	<0.00	0.8	<0.01	<0.00	<0.02	0	<0.22	<0.00
RL16ND039	<70.25	0.04	<0.00	0.48	0	0.33	<0.01	<0.00	<0.02	0.01	<0.23	<0.00
RL16ND039	<95.86	<0.06	<0.00	0.48	<0.00	<0.52	<0.01	<0.00	<0.03	0	<0.27	<0.00
RL16ND039	<73.59	<0.04	0	<0.05	0	0.78	<0.01	0.01	<0.01	0	0.29	6.51
RL16ND039	<66.09	<0.03	0	1.29	<0.00	0.53	<0.01	<0.00	<0.02	0	<0.22	<0.00
RL16ND039	<55.55	0.05	<0.00	7.05	<0.00	0.75	<0.01	<0.00	<0.01	<0.00	<0.19	<0.00
RL16ND039	<79.22	0.06	<0.00	0.13	<0.00	0.61	<0.01	<0.00	<0.01	<0.00	0.24	<0.00
RL16ND039	<64.19	0.07	<0.00	23.61	<0.00	0.44	<0.01	<0.00	0.03	<0.00	11.09	<0.00
RL16ND039	<69.12	0.12	0	9.29	<0.00	47.93	<0.01	<0.00	5.9	0.03	1380.46	0
RL16ND039	9270.06	0.09	<0.00	1.66	<0.00	1.78	<0.01	<0.00	0.12	0	0.37	0.02
RL16ND039	68.75	0.05	<0.00	5.56	<0.00	0.97	<0.01	<0.00	<0.02	0	0.25	0.01
RL16ND039	<77.65	0.08	0	1.3	<0.00	0.81	0.02	<0.00	0.02	<0.00	0.46	<0.00
RL16ND039	<136.20	0.09	0	0.93	<0.00	1.3	<0.02	0.01	<0.03	<0.01	<0.43	0.01
RL16ND039	<57.95	0.08	<0.00	0.13	<0.00	1.12	<0.01	<0.00	0.04	<0.00	0.24	<0.00
RL16ND039	<68.51	0.06	<0.00	0.19	0	1.56	<0.01	<0.00	<0.01	<0.00	0.22	0.01
RL16ND042	1707.83	0.08	<0.00	4.73	0.02	26.11	0.82	0	220.55	0.16	10.32	0.56
RL16ND042	3613.99	3.31	<0.00	0.85	0.06	49.02	<0.03	0.02	6.58	0.13	2.12	5.85
RL16ND042	<53.06	<0.03	<0.00	0.23	0	0.85	0.07	0	0.85	<0.00	0.25	<0.00
RL16ND048	316.74	0.28	0	4.12	<0.00	1.57	0.06	<0.00	14.98	2.36	74.83	<0.00
RL16ND048	14297.81	<0.06	0.01	1.23	0.11	32.15	<0.02	0.04	1.78	0.85	5.83	4.27
RL16ND048	<56.04	0.04	<0.00	1.12	0	<0.22	0.2	<0.00	0.22	0.74	1.36	<0.00
RL16ND048	494.83	0.08	0	0.47	0	1.12	0.18	<0.00	0.98	0.03	1.18	0
RL16ND048	<68.64	0.06	<0.00	0.26	0.04	3.52	<0.01	0.01	0.16	0.04	0.44	1.01
RL16ND048	18147.33	0.06	0	0.21	<0.00	0.86	0.09	<0.00	<0.03	<0.00	0.98	0.03
RL16ND048	<48.00	0.08	<0.00	1.07	<0.00	0.61	0.11	<0.00	1.69	0.64	3.45	<0.00
RL16ND048	1781.89	0.05	<0.00	0.4	0.03	1.59	<0.01	0.02	7.28	0	<0.27	2.08
RL16ND048	<56.25	0.2	<0.00	0.36	0.01	0.77	<0.01	0	0.35	<0.00	8.47	0.26
RL16ND048	11534.17	0.38	<0.00	0.73	<0.00	5.02	26.14	0.04	30.19	0.17	11.99	1.01

Sample ID	Si_ppm	Sn_ppm	Ta_ppm	Te_ppm	Th_ppm	Ti47_ppm	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn66_ppm	Zr_ppm
RL16ND048	686.76	0.09	<0.00	0.06	<0.00	1.73	2.02	0	3.97	0.22	1	0.09
RL16ND048	<60.51	0.12	<0.00	0.54	<0.00	1.7	<0.01	<0.00	0.13	<0.00	164.75	<0.00
RL16ND048	<110.87	0.08	<0.00	0.71	<0.00	1.75	<0.02	0	<0.02	0.03	<0.38	0
RL16ND048	<77.62	0.04	<0.00	1.44	0	1.46	<0.01	<0.00	<0.02	<0.00	0.41	<0.00
RL16ND058	108.54	0.07	0	0.12	0	1.81	1.89	0	0.15	65.09	0.36	<0.00
RL16ND058	213.44	0.06	0	<0.05	0	0.94	12.39	0.01	0.68	38.53	0.74	0.09
RL16ND058	<92.38	<0.04	<0.00	1.1	<0.00	2.22	<0.01	<0.00	0.05	<0.00	<0.27	<0.00
RL16ND058	65.49	<0.05	<0.00	<0.09	<0.00	0.55	0.02	0.01	0.23	135.38	<0.22	<0.00
RL16ND058	<66.24	<0.03	<0.00	5.57	<0.00	1.22	0.01	<0.00	<0.01	<0.00	0.32	<0.00
RL16ND058	10067.4	0.17	0	1.4	0.01	60.98	0.18	<0.00	11.22	146.64	18.54	0.01
RL16ND058	221.44	<0.05	<0.00	1.66	<0.00	8.48	<0.01	0.01	0.74	0.04	0.29	<0.00
RL16ND058	4021.82	0.16	<0.00	<0.16	<0.00	155.3	0.47	<0.00	21.27	0.12	4.12	6
RL16ND058	217.71	0.07	0	0.88	0.11	9.7	0.07	0.13	0.51	0.11	5.76	74.23
RL16ND058	3166.01	0.07	<0.00	0.91	0.01	150.72	0.05	0	2.39	3.6	0.6	5.28
RL16ND058	741.28	<0.07	<0.00	1.21	<0.00	7.44	0.02	<0.00	1.86	0.12	0.88	0.04
RL16ND058	349.15	<0.09	<0.00	0.74	0.06	28.39	0.04	<0.00	0.46	0.01	1.08	1.16
RL16ND058	249.66	<0.04	<0.00	1.11	<0.00	1.19	0.02	<0.00	0.03	<0.00	0.35	0.02
RL16ND058	194.72	0.15	<0.00	161.53	<0.00	3.98	<0.02	<0.00	0.06	0.01	<0.46	0.34
RL16ND058	<84.36	<0.06	<0.00	0.19	<0.00	1.47	<0.01	<0.00	0.03	0.01	<0.31	<0.00
RL16ND065	<58.36	<0.04	0	0.13	<0.00	1.31	<0.01	<0.00	<0.02	0	0.78	<0.00
RL16ND065	<55.90	0.07	<0.00	0.25	<0.00	0.48	<0.01	<0.00	<0.01	0	<0.21	0.01
RL16ND065	<58.89	<0.03	<0.00	0.17	<0.00	1.03	<0.01	<0.00	0.03	<0.00	0.34	0.01
RL16ND065	<58.50	<0.04	<0.00	4.53	<0.00	1.27	<0.01	<0.00	0.1	<0.00	<0.22	<0.00
RL16ND065	3300.03	0.29	<0.00	<0.08	0.12	146.86	0.1	0.01	30.81	1.77	3.08	0.61
RL16ND065	1575.79	0.16	<0.00	2.51	<0.00	<0.47	<0.03	<0.00	41.1	0.87	<0.74	0.2
RL16ND065	<100.80	0.11	<0.00	0.68	<0.00	1.09	0.02	<0.00	<0.02	0.93	<0.36	0.01
RL16ND065	<73.29	0.09	<0.00	0.38	0	0.69	0.06	0	0.1	3.04	0.44	0.01
RL16ND065	<62.19	<0.03	<0.00	0.34	<0.00	0.51	<0.01	0	<0.02	0.2	0.59	<0.00
RL16ND065	<65.15	0.13	<0.00	0.19	<0.00	1.76	0.04	<0.00	0.11	0.27	0.7	0.01
RL16ND065	148.49	0.33	<0.00	0.18	0.01	0.45	0.06	0.01	35.91	8.71	2.44	0.01
RL16ND065	1003.29	0.08	<0.00	0.71	<0.00	2.44	<0.04	0	12.24	0.08	<0.55	0.04

Sample ID	Si_ppm	Sn_ppm	Ta_ppm	Te_ppm	Th_ppm	Ti47_ppm	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn66_ppm	Zr_ppm
RL16ND065	335.82	0.18	<0.00	<0.11	0.04	<0.48	<0.03	0	4.48	0.01	<0.62	0.3
RL16ND065	<57.34	0.06	<0.00	0.16	<0.00	0.46	0.07	<0.00	<0.01	0.08	1.09	0.01
RL16ND065	<46.79	0.09	<0.00	0.43	0	1.71	0.04	<0.00	0.08	0.95	0.84	<0.00
RL16ND065	<48.78	0.08	<0.00	0.09	<0.00	1.12	0.04	<0.00	1.29	22.55	0.43	0
RL16ND065	<44.89	0.04	<0.00	0.04	<0.00	1.43	0.07	<0.00	1.15	18.72	0.69	0
RL16ND065	<71.79	0.08	0	5.73	<0.00	0.4	<0.01	<0.00	<0.02	<0.00	<0.22	0
RL16ND070	<60.34	0.09	<0.00	28.74	<0.00	<0.37	<0.01	<0.00	<0.01	<0.00	0.35	<0.00
RL16ND070	<109.33	0.34	<0.00	12.26	<0.00	3.04	0.03	0.02	0.23	0.42	18.51	0.03
RL16ND070	<91.25	<0.06	<0.00	24.7	0	1.34	0.02	0.04	<0.02	0.04	<0.33	0
RL16ND070	<444.98	<0.33	0.07	18.24	0.06	1449.3	<0.07	0.01	4.68	35.69	2.02	16.63
RL16ND070	<112.46	<0.07	<0.00	21.01	0.02	<0.48	<0.02	0.03	<0.02	<0.00	<0.45	3.61
RL16ND070	<112.31	<0.06	0	9.61	<0.00	3.24	0.02	<0.00	1.71	0.01	7.85	<0.00
RL16ND070	<64.04	0.08	<0.00	8.09	<0.00	0.53	0.03	0	0.03	0.03	0.52	0.01
RL16ND070	<68.01	0.07	<0.00	4.4	<0.00	<0.38	<0.01	<0.00	<0.02	<0.00	4.73	<0.00
RL16ND070	<67.13	0.06	<0.00	4.05	<0.00	1.76	<0.01	<0.00	1.17	0.01	5.17	<0.00
RL16ND070	110.91	0.05	0.02	6.59	0.01	583.32	0.07	0.01	28.7	3.27	259.14	0.04
RL16ND070	<82.48	<0.05	<0.00	0.24	<0.00	0.83	<0.01	0	<0.01	<0.00	0.32	0
RL16ND070	<57.31	0.07	<0.00	0.59	<0.00	0.88	<0.01	<0.00	<0.01	<0.00	<0.20	<0.00
RL16ND073	2087.49	<0.10	<0.00	8.19	<0.00	41.79	0.05	<0.00	40.7	<0.00	1.21	0.04
RL16ND073	<104.37	<0.08	<0.00	40.06	0.02	49.53	<0.02	0.01	0.2	2.9	0.7	17.39
RL16ND073	<291.37	<0.14	<0.01	43.58	<0.00	2.52	<0.04	0.01	<0.06	0.01	<0.75	0.02
RL16ND073	<109.65	<0.08	<0.00	11.78	<0.00	13.48	0.06	<0.00	4.3	0.87	12	0.04
RL16ND073	78.36	0.04	0	0.78	<0.00	0.62	0.24	0.01	0.2	0.92	0.27	0.01
RL16ND073	<159.05	<0.09	<0.00	2.59	<0.00	1.98	<0.03	<0.00	<0.05	0.02	0.82	<0.00
RL16ND073	<120.46	<0.07	<0.00	0.34	<0.00	1.79	0.45	<0.00	0.73	65.08	2.04	1.59
RL16ND073	<49.53	0.03	0	0.24	0	0.81	<0.01	<0.00	<0.01	<0.00	0.3	<0.00
RL16ND073	2239.03	0.14	<0.00	0.61	<0.00	0.83	7.19	0	5.21	5.49	1.46	0.2
RL16ND073	<67.62	0.04	0	0.12	<0.00	1.6	<0.01	<0.00	<0.01	<0.00	0.24	<0.00
RL16ND073	<65.35	<0.04	<0.00	0.17	<0.00	0.91	<0.01	<0.00	<0.01	<0.00	<0.22	<0.00
RL16ND073	<48.59	0.04	<0.00	1.13	0	<0.33	<0.01	<0.00	<0.02	<0.00	<0.20	0.01
RL16ND076	<56.48	<0.03	0	<0.09	<0.00	0.74	<0.01	0	<0.02	<0.00	0.31	0.04

Sample ID	Si_ppm	Sn_ppm	Ta_ppm	Te_ppm	Th_ppm	Ti47_ppm	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn66_ppm	Zr_ppm
RL16ND076	<125.48	<0.06	<0.00	0.34	<0.00	1.9	<0.02	<0.00	<0.03	0.04	<0.34	0.19
RL16ND076	<62.85	0.04	<0.00	<0.08	0	2.03	<0.01	<0.00	<0.01	0.02	0.33	0
RL16ND076	<66.73	0.04	<0.00	1.43	<0.00	0.45	<0.01	<0.00	<0.01	<0.00	<0.22	<0.00
RL16ND076	2345.72	0.13	<0.00	2.61	0.14	0.78	0.03	0.02	3.94	0.02	16.3	4.42
RL16ND076	17261.04	0.09	0	1.05	0.03	71.65	2.02	0.09	12.04	0.93	17.43	18.81
RL16ND076	9254.86	0.05	<0.00	0.95	0.07	45.79	0.12	0.04	34.21	0.38	1.68	14.5
RL16ND076	664.65	<0.05	<0.00	1.71	0.01	65	0.05	0	4.34	0.24	16.95	0.29
RL16ND076	2330.63	0.03	0	1.03	0.02	89.14	0.03	0.01	23.63	0.45	22.04	9.8
RL16ND076	13963.94	0.09	0	0.94	0.01	4.34	<0.02	0.04	5.88	0.05	3.4	5.98
RL16ND076	9759.91	0.07	<0.00	0.33	0.05	32.62	0.2	0.04	3.44	2.28	1.42	9.21
RL16ND076	1781.73	0.05	0.01	1.16	0.03	171.44	0.02	0.25	5.6	2.36	0.6	3.17
RL16ND076	17833.89	0.05	0	1.77	0.05	67.05	0.28	0.03	30.38	3.95	3.88	11.33
RL16ND076	316.85	<0.04	<0.00	0.55	0.01	1.01	<0.01	0	0.32	0.07	1.69	0.06
RL16ND076	137.73	0.08	0	0.84	0	7.4	<0.01	<0.00	2.23	0.07	1.35	0.01
RL16ND076	2996.86	<0.03	<0.00	1.35	<0.00	42.35	0.46	<0.00	0.76	0.1	1.99	0.03
RL16ND076	<64.91	<0.04	<0.00	1.82	<0.00	1.49	<0.01	<0.00	0.61	0.01	<0.25	0.07
RL16ND076	<63.92	0.05	<0.00	1.27	<0.00	1.24	<0.01	<0.00	0.19	0.01	<0.20	<0.00
RL16ND076	5033.73	<0.05	0	0.41	0.01	1.42	7.09	0.03	1.71	0.04	0.98	0.13
RL16ND076	379.22	<0.04	<0.00	0.18	<0.00	0.54	0.13	<0.00	0.23	0.01	0.42	<0.00
RL16ND076	<72.04	<0.04	0	0.49	<0.00	1.18	<0.01	<0.00	0.16	<0.00	<0.25	<0.00
RL16ND076	<83.54	0.05	<0.00	0.53	<0.00	1.29	<0.01	<0.00	<0.02	<0.00	<0.21	<0.00
RL16ND076	<63.75	0.05	<0.00	0.44	<0.00	1.69	<0.01	<0.00	<0.01	0	<0.20	<0.00
RL16ND076	<73.35	0.06	<0.00	<0.05	<0.00	1.05	<0.01	<0.00	<0.01	0.01	<0.22	0
RL16ND079	<218.68	<0.12	<0.00	4.34	<0.00	2.22	<0.05	0	<0.04	0	<0.60	<0.00
RL16ND079	<173.92	<0.11	<0.00	0.1	0.01	1.39	<0.04	<0.00	<0.04	<0.00	<0.55	<0.00
RL16ND079	339.87	<0.08	<0.00	<0.14	<0.00	<1.24	<0.03	<0.00	0.05	16.53	1.09	<0.00
RL16ND079	259.33	2.74	<0.00	3.06	0	2.31	<0.04	0.02	0.93	1.8	2.46	0.15
RL16ND079	788.92	6.09	<0.00	5.58	<0.00	<1.20	0.08	0.04	2.06	17.76	5.17	0.19
RL16ND079	<149.19	<0.09	<0.00	2.44	<0.00	1.71	<0.03	<0.00	<0.04	0.02	<0.46	<0.00
RL16ND079	<138.98	<0.11	0	3.74	<0.00	<0.41	<0.03	<0.00	<0.04	<0.00	<0.44	<0.00
RL16ND079	<152.67	<0.12	<0.00	6.43	<0.00	1.68	<0.04	<0.00	<0.05	<0.01	<0.51	<0.00

Sample ID	Si_ppm	Sn_ppm	Ta_ppm	Te_ppm	Th_ppm	Ti47_ppm	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn66_ppm	Zr_ppm
RL16ND079	<195.98	<0.12	<0.00	1.5	<0.00	1.71	<0.05	<0.00	<0.04	<0.01	<0.62	<0.00
RL16ND079	<158.42	0.19	<0.00	1.37	<0.00	<0.37	<0.03	<0.00	<0.03	0.01	<0.47	0.02
RL16ND079	<181.31	<0.12	<0.00	2.5	<0.00	1.76	<0.05	0	<0.04	0.01	<0.62	<0.00
RL16ND079	<171.51	<0.11	<0.00	0.41	0	2.1	0.12	<0.00	<0.03	<0.00	<0.54	<0.00
RL16ND079	<163.09	0.79	<0.00	0.27	<0.00	1.39	<0.03	<0.00	0.14	119.2	1.07	0.03
RL16ND079	<180.15	1.02	<0.00	1.01	<0.00	1.42	0.26	0	0.16	0.1	0.59	0.01
RL16ND079	<173.74	0.21	<0.00	1.45	<0.00	1.48	<0.04	0	<0.05	0	0.51	<0.00
RL16ND079	<144.52	0.09	<0.00	2.29	<0.00	<0.62	<0.03	<0.00	<0.03	<0.00	0.57	<0.00
RL16ND079	<155.23	0.13	<0.00	4.69	<0.00	<0.99	<0.04	<0.00	0.05	<0.00	<0.43	<0.00
RL16ND079	<141.78	<0.09	<0.00	1.45	<0.00	<0.76	<0.03	<0.00	<0.04	0.01	<0.45	0.03
RL16ND079	<198.08	<0.12	<0.00	0.84	<0.00	<0.77	<0.04	<0.00	<0.04	<0.00	<0.58	<0.00
RL16ND079	310.25	2.99	<0.00	0.26	0.01	<1.45	0.25	0.02	0.98	22.1	1.35	0.11
RL16ND079	<176.55	<0.10	<0.00	0.64	<0.00	2.32	<0.04	<0.00	<0.03	<0.00	<0.43	<0.00
RL16ND079	494.02	0.74	<0.00	0.41	<0.00	0.86	<0.03	0	0.91	2.88	4.55	0.52
RL16ND079	<166.47	<0.09	<0.00	0.15	<0.00	2.03	<0.03	<0.00	0.04	<0.00	<0.42	<0.00
RL16ND080	<69.85	0.05	<0.00	<0.03	<0.00	0.64	<0.01	<0.00	<0.02	<0.00	0.3	0
RL16ND080	<59.87	0.06	<0.00	<0.03	<0.00	0.79	<0.01	<0.00	<0.02	<0.00	0.35	<0.00
RL16ND080	<58.93	0.09	<0.00	<0.04	<0.00	<0.37	<0.01	<0.00	<0.02	<0.00	<0.24	<0.00
RL16ND080	649.47	0.62	0	8.06	0.02	14.03	1.59	<0.00	0.38	0.07	6.33	0.1
RL16ND080	463.33	0.4	<0.00	6.34	0.04	10.27	1.01	0	0.87	0.08	6.33	0.12
RL16ND080	144.25	0.35	0	5.75	0.01	2.69	0.84	0	0.61	0.05	6.26	0.05
RL16ND080	272.32	0.39	<0.00	4.49	0	1.49	0.82	0	0.36	0.12	7.67	0.02
RL16ND080	455.97	0.57	0	4.42	0	2.98	0.87	0	0.84	0.07	6.27	0.04
RL16ND080	5217.44	0.29	0	3.94	0.04	5.54	0.71	0.03	0.41	0.08	4.13	1.67
RL16ND080	112.11	0.49	<0.00	4.32	0.01	1.8	1.56	<0.00	0.4	0.08	6.22	0.04
RL16ND080	<66.76	0.35	<0.00	3.12	0.01	0.54	0.78	0	0.18	0.07	6.78	0.02
RL16ND080	486.67	0.36	<0.00	2.05	0.04	12.78	2.74	0.01	1.35	0.1	76.15	0.2
RL16ND080	<73.95	0.37	<0.00	1	0	<0.20	0.55	<0.00	0.22	0.11	6.44	0.01
RL16ND080	3612.61	0.36	<0.00	0.23	0.04	2.04	0.32	0.02	0.64	0.06	1.42	1.53
RL16ND080	<61.50	<0.03	0	0.37	0	0.71	0.07	0.01	0.06	<0.00	0.37	0.01
RL16ND080	<78.88	0.1	<0.00	0.22	<0.00	0.35	<0.01	<0.00	<0.02	<0.00	<0.23	<0.00

Sample ID	Si_ppm	Sn_ppm	Ta_ppm	Te_ppm	Th_ppm	Ti47_ppm	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn66_ppm	Zr_ppm
RL16ND080	2786.29	0.14	<0.00	0.12	0	1.09	0.02	<0.00	0.02	0	0.35	0.02
RL16ND080	118.89	0.08	<0.00	0.09	0.02	1.19	0.01	0.01	0.06	0.02	0.2	0.29
RL16ND080	<65.90	0.08	0	<0.05	0	1.25	<0.01	0	<0.02	<0.00	0.25	<0.00
RL16ND080	1868.77	0.21	<0.00	<0.07	<0.00	1.07	0.11	<0.00	1.38	<0.00	<0.34	<0.00
RL16ND080	326.13	0.11	<0.00	0.09	0	0.94	<0.01	<0.00	0.03	0	<0.23	0.03
RL16ND080	<60.06	0.05	<0.00	<0.04	0	0.75	<0.01	0	<0.02	0.01	<0.22	<0.00
RL16ND080	<71.04	0.05	<0.00	<0.07	0	0.32	<0.01	0	<0.02	<0.00	<0.24	<0.00
RL16ND087	<103.13	<0.06	<0.00	<0.17	<0.00	3	<0.01	<0.00	<0.01	<0.01	0.41	<0.00
RL16ND087	<97.04	<0.06	<0.00	0.29	<0.00	3.63	<0.01	<0.00	<0.02	<0.00	0.54	<0.00
RL16ND087	<87.41	<0.06	<0.00	0.1	<0.00	2.61	<0.02	<0.00	<0.02	<0.00	<0.34	<0.00
RL16ND087	<88.13	<0.05	<0.00	0.25	<0.00	2.48	<0.01	<0.00	<0.02	<0.00	0.54	<0.01
RL16ND087	<156.42	<0.11	<0.00	28.25	<0.00	3.05	<0.02	<0.00	<0.02	0.01	0.93	<0.01
RL16ND087	<107.24	<0.06	<0.00	13.67	<0.00	3.56	<0.01	<0.00	<0.02	<0.00	0.61	<0.00
RL16ND087	<85.98	<0.05	<0.00	1.89	<0.00	1.98	<0.01	<0.00	<0.03	0.01	<0.33	<0.00
RL16ND087	<176.80	<0.11	0	0.91	<0.00	7.41	<0.02	<0.00	<0.03	<0.01	<0.73	<0.00
RL16ND087	<106.59	<0.06	<0.00	2.39	<0.00	4.39	<0.02	<0.00	<0.01	<0.00	0.38	0.02
RL16ND087	<87.31	<0.05	<0.00	1.64	<0.00	1.67	<0.01	<0.00	<0.02	<0.00	<0.30	<0.00
RL16ND087	<138.83	<0.10	<0.00	1.09	<0.00	2.4	<0.02	<0.00	<0.05	0.03	<0.55	<0.00
RL16ND087	<134.53	<0.12	<0.00	2.64	<0.00	2.42	<0.02	<0.00	<0.03	<0.01	0.68	<0.00
RL16ND087	<67.03	<0.04	<0.00	1.53	<0.00	2.41	<0.01	<0.00	<0.01	0.01	0.45	<0.00
RL16ND087	<104.08	<0.06	<0.00	<0.15	0	4.25	<0.01	0	0.01	<0.00	0.5	0
RL16ND087	<95.85	<0.06	0	0.76	0	2.11	<0.01	<0.00	<0.01	<0.01	<0.40	<0.01
RL16ND087	<103.74	<0.06	<0.00	0.46	<0.00	1.87	<0.01	<0.00	<0.02	<0.01	<0.36	<0.00
RL16ND087	<132.65	<0.09	<0.00	9.15	<0.00	3.11	<0.02	<0.00	<0.02	<0.01	<0.59	<0.00
RL16ND087	<83.80	<0.06	0	0.08	<0.00	3.79	<0.01	<0.00	<0.01	<0.00	0.37	<0.00
RL16ND087	<85.15	<0.05	<0.00	0.24	<0.00	2.5	<0.01	0	<0.02	<0.00	0.53	<0.00
RL16ND087	<106.21	<0.07	<0.00	0.35	<0.00	2.78	<0.01	<0.00	<0.01	<0.00	0.59	0
RL16ND087	<89.29	<0.05	<0.00	0.4	<0.00	2.02	<0.01	<0.00	<0.01	<0.00	<0.38	<0.00
RL16ND087	<91.13	<0.06	<0.00	<0.13	0	2.31	<0.02	<0.00	<0.02	<0.01	0.58	<0.00
RL16ND087	<93.04	<0.06	<0.00	<0.10	<0.00	2.75	<0.01	<0.00	<0.02	0.01	0.49	<0.00
RL16ND087	<93.55	<0.06	<0.00	<0.18	<0.00	1.88	<0.01	<0.00	<0.01	<0.00	<0.39	<0.00

Sample ID	Si_ppm	Sn_ppm	Ta_ppm	Te_ppm	Th_ppm	Ti47_ppm	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn66_ppm	Zr_ppm
RL16ND088	<197.82	<0.15	<0.00	11.95	<0.00	<1.80	<0.03	0.01	<0.04	<0.02	<0.81	<0.00
RL16ND088	<86.14	<0.07	<0.00	9.28	<0.00	6.42	<0.01	<0.00	<0.01	<0.01	13.06	<0.00
RL16ND088	<133.00	<0.11	<0.00	1.94	<0.00	1.31	0.08	0	<0.02	0.01	<0.51	0.01
RL16ND088	<104.49	<0.07	<0.00	2.06	<0.00	1.54	0.05	0.01	<0.01	0.01	0.4	<0.00
RL16ND088	<129.81	<0.10	0	1.53	<0.00	2.28	<0.02	<0.00	0.02	<0.01	1.59	<0.00
RL16ND088	<86.10	<0.05	<0.00	1.61	<0.00	2.51	<0.01	<0.00	0.02	0	1.89	<0.01
RL16ND088	<91.59	<0.07	<0.00	4.08	<0.00	2.28	<0.02	0	<0.02	<0.01	0.6	<0.00
RL16ND088	<85.12	<0.05	<0.00	2.28	<0.00	1.39	0.03	<0.00	<0.02	<0.00	0.62	<0.00
RL16ND088	<67.19	<0.05	<0.00	0.49	0	3.43	0.17	<0.00	0.02	<0.00	0.42	<0.00
RL16ND088	<123.94	<0.07	<0.00	0.98	<0.00	5.09	<0.03	<0.00	<0.02	0.01	1.28	<0.00
RL16ND088	<128.71	<0.08	<0.00	1.04	0.01	3.4	<0.02	<0.00	<0.01	<0.01	1.36	<0.00
RL16ND088	<100.02	<0.07	<0.00	1.88	<0.00	1.03	<0.01	<0.00	<0.01	<0.01	<0.35	<0.00
RL16ND088	<83.19	<0.06	<0.00	2.59	<0.00	2.75	<0.01	<0.00	<0.01	<0.00	<0.35	<0.00
RL16ND088	<69.44	<0.04	0	1.67	<0.00	3.03	<0.01	<0.00	<0.01	<0.00	0.46	<0.00
RL16ND088	<66.98	<0.06	<0.00	1.71	<0.00	1.07	<0.01	<0.00	<0.01	<0.01	<0.27	<0.00
RL16ND088	<84.79	<0.06	<0.00	0.51	<0.00	2.99	<0.01	<0.00	<0.02	<0.00	0.33	<0.00
RL16ND088	<80.74	<0.06	<0.00	0.45	<0.00	2.23	<0.02	<0.00	<0.02	<0.01	0.74	<0.00
RL16ND088	<89.88	<0.06	<0.00	1.01	0	2.29	<0.01	<0.00	<0.01	<0.00	0.55	<0.00
RL16ND088	<95.18	<0.07	<0.00	0.5	<0.00	1.43	<0.01	<0.00	<0.01	<0.00	<0.33	<0.00
RL16ND088	<75.36	<0.05	<0.00	0.66	<0.00	3.26	<0.01	0	<0.02	<0.01	<0.28	0.01
RL16ND088	<69.39	<0.06	<0.00	0.29	<0.00	3.23	<0.01	<0.00	<0.01	<0.01	<0.31	<0.00
RL16ND088	<83.26	<0.06	<0.00	0.47	<0.00	1.27	<0.01	<0.00	<0.02	<0.01	0.53	<0.00
RL16ND088	<90.13	<0.07	<0.00	0.3	<0.00	1.87	<0.01	<0.00	<0.02	0.01	0.46	<0.00
RL16ND088	<106.03	<0.10	<0.00	0.14	<0.00	1.72	<0.01	<0.00	<0.02	<0.01	<0.43	<0.00
RL16ND088	<93.12	<0.06	<0.00	0.17	<0.00	2.29	<0.01	0	<0.02	<0.01	<0.37	<0.00
RL16ND094	261.98	<0.10	0.01	<0.08	0.01	0.55	<0.04	0.05	1.09	0.04	1.53	0.02
RL16ND094	310.56	<0.11	<0.00	0.19	0.01	1.66	0.08	0.05	0.99	<0.00	2.77	0.12
RL16ND094	<91.73	0.06	0	<0.08	<0.00	2.08	<0.01	<0.00	<0.02	0	0.33	<0.00
RL16ND094	<86.67	<0.06	<0.00	<0.09	<0.00	1.41	<0.01	<0.00	0.02	<0.00	0.44	<0.00
RL16ND094	<84.31	<0.04	<0.00	<0.07	0	<0.62	<0.01	<0.00	<0.01	<0.00	0.42	<0.00
RL16ND094	82.75	<0.04	0	<0.04	0	1.85	<0.01	<0.00	<0.01	0.01	0.36	<0.00

Sample ID	Si_ppm	Sn_ppm	Ta_ppm	Te_ppm	Th_ppm	Ti47_ppm	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn66_ppm	Zr_ppm
RL16ND094	<85.11	<0.05	0	<0.08	<0.00	0.73	<0.01	<0.00	<0.01	<0.00	<0.23	0
RL16ND094	<61.45	<0.04	<0.00	0.05	<0.00	1.63	<0.01	0	<0.01	<0.00	0.44	0.02
RL16ND094	<87.23	0.05	<0.00	<0.06	<0.00	1.3	<0.01	<0.00	0.02	<0.00	0.3	<0.00
RL16ND094	84.38	<0.04	0	1.27	0.01	2.61	<0.01	0.01	0.19	<0.00	0.26	0.07
RL16ND094	<61.89	0.06	<0.00	0.68	0	0.54	<0.01	0	<0.02	<0.00	<0.19	0.05
RL16ND094	811.07	<0.04	<0.00	0.11	0	0.8	0.02	<0.00	0.03	0	0.43	0.02
RL16ND094	<199.55	0.21	<0.00	<0.21	<0.00	<0.59	0.18	0.04	0.29	0.01	1.84	<0.00
RL16ND094	381.18	0.28	0	<0.11	0.03	8.82	<0.04	0.07	1.51	0.04	2.43	0.09
RL16ND094	<76.45	<0.05	<0.00	0.27	<0.00	0.83	<0.01	0	<0.01	<0.00	0.33	0.02
RL16ND094	529.16	<0.11	<0.00	<0.08	0.02	<0.54	<0.04	0.1	1.6	0.02	1.83	1.05
RL16ND094	103.09	0.07	0	<0.03	0.06	1.16	<0.01	0.15	0.02	0.07	<0.18	12.81
RL16ND094	671.07	0.14	0	<0.08	0.02	2.18	0.12	0.22	2.61	0.04	3.05	0.37
RL16ND094	<87.49	0.06	0	<0.06	<0.00	1.72	<0.01	0	<0.01	<0.00	0.99	<0.00
RL16ND120	2643.41	0.03	0.03	4.19	3.21	947.83	<0.01	0.15	25.58	0.73	1.94	5.89
RL16ND120	<93.51	0.09	<0.00	1.17	<0.00	1.44	<0.01	0	0.15	<0.00	0.47	0.1
RL16ND120	93.35	<0.03	<0.00	1.28	<0.00	0.8	<0.01	<0.00	0.73	<0.00	0.3	<0.00
RL16ND120	<60.37	0.03	<0.00	0.16	<0.00	<0.52	<0.01	<0.00	<0.01	0	0.27	<0.00
RL16ND120	<67.76	<0.03	0	0.12	<0.00	1.51	<0.01	<0.00	0.09	<0.00	<0.19	<0.00
RL16ND120	198.41	<0.07	<0.00	0.21	<0.00	2.14	<0.02	0	0.42	0.01	<0.38	<0.00
RL16ND120	<60.35	<0.04	<0.00	0.03	<0.00	1.07	<0.01	<0.00	<0.01	<0.00	2.03	0
RL16ND120	<64.22	<0.03	<0.00	<0.04	<0.00	<0.39	<0.01	0	0.05	<0.00	<0.18	<0.00
RL16ND122	<71.47	<0.04	<0.00	3.69	<0.00	1.89	<0.01	<0.00	0.02	<0.00	0.3	0
RL16ND122	<82.05	<0.04	<0.00	<0.11	<0.00	1.42	<0.01	<0.00	<0.02	<0.00	0.35	<0.00
RL16ND122	1443.89	<0.04	0	0.35	0.01	3.99	<0.01	0	0.18	0.04	0.76	0.09
RL16ND122	<82.30	0.05	<0.00	<0.04	<0.00	1.2	<0.01	<0.00	<0.02	<0.00	0.23	<0.00
RL16ND122	<85.01	<0.05	<0.00	<0.08	0	2.27	<0.02	0	<0.02	<0.00	<0.26	0
RL16ND122	<65.59	<0.05	<0.00	0.37	<0.00	1.62	<0.01	<0.00	<0.01	<0.00	0.24	<0.00
RL16ND122	<66.21	0.05	<0.00	<0.07	<0.00	0.79	<0.01	<0.00	<0.01	<0.00	<0.22	<0.00
RL16ND122	<72.86	<0.04	<0.00	0.25	<0.00	1.04	<0.01	<0.00	<0.01	0.01	0.67	<0.00
RL16ND122	<66.19	<0.03	<0.00	0.88	<0.00	1.36	<0.01	<0.00	<0.01	<0.00	<0.19	<0.00

Sample ID	Si_ppm	Sn_ppm	Ta_ppm	Te_ppm	Th_ppm	Ti47_ppm	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn66_ppm	Zr_ppm
RL16ND122	<63.47	<0.03	<0.00	<0.03	<0.00	1.87	<0.01	<0.00	<0.02	<0.00	0.34	<0.00
RL16ND122	<55.77	<0.03	<0.00	0.32	0	<0.48	<0.01	<0.00	<0.01	0.01	0.23	<0.00
RL16ND122	<62.12	<0.04	<0.00	1	<0.00	0.71	<0.01	<0.00	0.02	0.01	0.16	0.02
RL16ND122	<72.16	<0.05	<0.00	0.69	0.01	1.14	<0.01	<0.00	0.06	0	0.97	0.01
RL16ND122	11407.27	<0.04	<0.00	0.14	0	1.47	0.03	0	0.01	<0.00	5.68	<0.00
RL16ND122	206.24	<0.04	<0.00	18.29	<0.00	1.44	<0.01	0	<0.01	<0.00	0.38	<0.00
RL16ND122	97.91	<0.04	<0.00	3.25	0	3.01	0.02	<0.00	1.65	<0.00	1.59	0.01
RL16ND122	162.74	<0.03	0	0.51	<0.00	1.57	<0.01	<0.00	<0.01	<0.00	0.3	0.84
RL16ND122	<67.18	<0.04	<0.00	34.65	<0.00	1.13	<0.01	<0.00	0.01	0	0.32	0.01
RL16ND122	<63.72	<0.04	<0.00	0.1	0	1.02	<0.01	<0.00	<0.01	<0.00	0.25	<0.00
RL16ND122	<70.97	<0.03	<0.00	0.19	<0.00	0.95	<0.01	0	<0.02	0	0.38	0.01
RL16ND122	<64.13	<0.04	0	5.68	<0.00	1.95	<0.01	<0.00	0.01	<0.00	0.22	<0.00
RL16ND123	<188.68	<0.14	<0.00	<0.19	<0.00	2.75	<0.05	<0.00	<0.04	<0.00	<0.61	<0.00
RL16ND123	5321	<0.11	0.01	4.01	0.02	7.22	4.43	0.01	0.83	5.18	4.6	0.71
RL16ND123	1960.25	<0.10	<0.00	1.72	0.17	20.63	0.13	0.02	3.44	1.4	4.34	0.82
RL16ND123	3667.04	<0.10	<0.00	1.02	0.04	5.75	0.08	0.02	2.3	0.38	3.34	0.63
RL16ND123	1902.85	<0.11	0.01	2.17	0.05	16.04	2.06	0.02	2.89	0.44	4.46	0.66
RL16ND123	<154.09	<0.10	<0.00	2.17	0.01	0.85	<0.04	<0.00	<0.02	<0.00	0.83	<0.00
RL16ND123	14708.87	<0.09	<0.00	1.72	0.06	40.24	0.59	0.02	3	1.94	6.61	1.16
RL16ND123	5938.82	0.17	<0.00	0.18	0.01	7.04	0.13	0.02	2.15	<0.00	6.8	6.12
RL16ND123	5168.99	<0.13	0.01	1.81	<0.00	38.08	0.16	0.02	4.22	0.03	5.35	0.07
RL16ND123	2701.42	0.13	<0.00	1.25	0.07	10.57	5.57	0.01	1.71	3.33	4.55	0.7
RL16ND123	1019.9	0.11	<0.00	2.08	0.02	3.75	0.08	0.01	0.96	0.9	2.75	0.29
RL16ND123	7671.82	0.18	0	1.68	0	44.15	0.2	<0.00	28.97	0.13	3.6	0.03
RL16ND123	2369.03	<0.11	<0.00	1.42	0.05	5.03	0.25	0.02	1.82	3.35	2.62	0.54
RL16ND123	<160.74	<0.13	<0.00	3.4	<0.00	<0.54	<0.05	<0.00	<0.04	0.01	2.6	0.02
RL16ND123	967.01	<0.11	<0.00	1.21	0.01	22.87	<0.03	0	4.43	0.02	2.7	1.15
RL16ND123	716.85	<0.20	<0.00	0.91	0.01	5.31	<0.08	<0.00	<0.06	<0.00	1.27	<0.01
RL16ND123	<170.77	0.14	<0.00	1.66	<0.00	1.25	<0.04	0	0.07	0.02	0.74	<0.00
RL16ND128	<65.29	0.03	<0.00	81.46	<0.00	1.91	<0.01	<0.00	<0.01	<0.00	11.12	<0.00

Sample ID	Si_ppm	Sn_ppm	Ta_ppm	Te_ppm	Th_ppm	Ti47_ppm	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn66_ppm	Zr_ppm
RL16ND128	252.67	0.06	<0.00	0.12	<0.00	0.46	<0.01	<0.00	<0.02	<0.00	<0.21	<0.00
RL16ND128	<55.93	<0.03	<0.00	0.12	0	2.24	<0.01	0	<0.01	<0.00	0.21	2.18
RL16ND128	1871.93	0.17	<0.00	476.8	<0.00	2.41	0.05	0	0.37	0.01	45.76	<0.00
RL16ND128	1125.61	0.07	<0.00	322.87	0	3.45	<0.01	<0.00	1.39	0.05	104.19	0.02
RL16ND128	2387.85	0.08	<0.00	32.59	<0.00	17.5	0.04	<0.00	9.73	0.01	35.34	0.02
RL16ND128	4884.21	0.24	0.05	18.13	0.08	1721.89	0.07	0.04	9.25	115.72	30.9	12.92
RL16ND128	3519.06	0.09	0.01	19.75	0.02	719.6	0.09	0	2.38	7.92	32.87	0.99
RL16ND128	1034.05	0.05	<0.00	26.36	0.02	10.69	0.33	0.01	6.99	0.02	3.95	5.65
RL16ND128	1169.63	0.11	<0.00	10.97	0	3.65	2.97	<0.00	25.02	0.4	2.67	0.05
RL16ND128	619.74	<0.03	<0.00	22.25	0	6.81	0.02	<0.00	1.5	0.01	0.4	<0.00
RL16ND128	1245.95	0.06	0	34.52	<0.00	43.6	0.08	<0.00	17.1	0.01	4.95	0.01
RL16ND128	478.32	<0.03	<0.00	12.42	0.02	7.84	0.01	0	6.13	0.03	3.27	1.88
RL16ND128	300.36	0.94	0.11	13.16	0.14	1711.68	0.03	0.05	27.57	27.68	2.19	13.93
RL16ND128	1329.15	0.21	0.05	15.83	0.03	1431.79	0.01	0.01	3.73	58.61	323.58	4.48
RL16ND128	4421.49	0.05	0	15.76	0.03	40.63	0.06	0.01	7.57	1.44	1.91	5.76
RL16ND128	2933.77	0.03	<0.00	3.03	0	2.55	<0.01	<0.00	0.26	0.01	0.75	0.58
RL16ND128	93.07	0.19	0	8.4	0.07	2.38	<0.01	0.01	0.64	0.05	0.49	5.75
RL16ND128	641.08	<0.04	0	2.63	<0.00	2.96	0.02	<0.00	1.74	<0.00	3.07	<0.00
RL16ND128	2171.66	0.07	0	22.34	<0.00	29	0.1	0	23.88	0.02	12.79	0.04
RL16ND128	<66.87	<0.03	0	1.23	0	<0.58	<0.01	0	<0.01	<0.00	0.23	2.83
RL16ND128	<57.41	0.07	<0.00	85.48	0	0.94	<0.01	0	0.11	<0.00	1555.22	<0.00
RL16ND128	59.63	0.05	0.02	4.45	0.02	188.91	0.01	0.01	0.15	5.13	1	2.6
RL16ND128	<101.99	<0.06	<0.00	0.55	<0.00	<0.62	<0.02	<0.00	0.05	<0.00	1.21	<0.00
RL16ND128	<52.93	<0.03	<0.00	0.17	0	4.02	<0.01	0	0.39	<0.00	1.01	1.1
RL16ND142	855.8	0.07	0.01	3.77	0.01	485.32	0.05	0.03	5.07	0.97	14.36	8.94
RL16ND142	1653.43	0.11	0	1.94	0.02	222.98	0.39	0	1.75	2.43	2.48	0.97
RL16ND142	8354.08	0.07	0.06	<0.06	0.1	2465.66	0.27	0.04	27.38	19.75	1.77	39.26
RL16ND142	2552.27	0.07	0.02	1.8	0.08	372.42	0.18	0.36	4.49	0.58	1.18	131.48
RL16ND142	<67.34	<0.04	<0.00	2.64	<0.00	5.32	<0.01	<0.00	<0.01	0	0.26	0.16
RL16ND142	268.83	<0.03	<0.00	2	0.01	26.21	0.04	0	0.79	0.46	0.32	0.22

Sample ID	Si_ppm	Sn_ppm	Ta_ppm	Te_ppm	Th_ppm	Ti47_ppm	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn66_ppm	Zr_ppm
RL16ND142	1025.68	0.22	0.02	0.49	0.63	1093.33	<0.02	0.15	19	11.43	3.41	71.86
RL16ND142	236.74	0.06	0.01	0.21	0.01	330.05	<0.01	0.01	2.6	1.2	1.58	4.87
RL16ND142	363.24	0.08	0.04	0.15	0.06	1130.54	<0.01	0.04	3.54	3.09	15.36	44.13
RL16ND142	6751.94	0.13	0.01	<0.04	0.06	379.79	0.86	0.01	4.7	28.42	0.92	6.48
RL16ND142	229.22	<0.05	0	0.16	0.01	19.74	<0.01	0.02	0.55	0.22	0.78	17.43
RL16ND142	98.22	0.09	0.03	<0.04	0.05	264.73	<0.01	0.05	1.82	3.57	1.39	24.71
RL16ND142	3378.8	<0.04	0.02	0.21	0.07	569.32	0.38	0.02	5.5	11.72	1.43	11.61
RL16ND142	1814.97	0.07	0	0.28	0.05	6.11	0.53	0.02	1.51	45.6	0.7	5.98
RL16ND142	76.35	0.08	<0.00	0.16	0.01	36.53	<0.01	0	0.22	0.24	6.51	2.93
RL16ND142	75.75	0.05	0	<0.04	0.03	62.29	0.02	0.01	1.08	0.43	1.01	4.91
RL16ND142	5660.31	<0.07	<0.00	0.21	<0.00	2.07	0.33	0.01	4.22	4.67	4.07	0.56
RL16ND142	1285.67	0.05	0	0.22	0	14.83	0.72	0	0.45	34.02	1.51	0.04
RL16ND142	1649.01	<0.03	0	<0.06	0.02	2.05	0.48	0	0.19	29.19	0.54	0.56
RL16ND142	2093.68	0.1	<0.00	0.17	0	10.19	0.79	0	1.74	33.51	1.06	0.35
RL16ND142	<65.87	<0.04	<0.00	<0.07	<0.00	2.92	<0.01	0	0.15	0.03	0.36	0.1
RL16ND142	907.37	0.03	<0.00	<0.05	0	2.73	0.49	<0.00	0.08	27.03	0.53	0.08
RL16ND142	<87.36	<0.05	<0.00	<0.06	0	5.27	<0.01	<0.00	0.05	0.05	<0.24	0.25
RL16ND147	<1,341.06256	<0.86	<0.00	<1.03	<0.00	8.54	<0.27	<0.01	<0.40	<0.03	12.81	0.16
RL16ND147	<125.25	<0.10	<0.00	0.37	<0.00	1.35	0.06	0	0.9	0	<0.44	<0.00
RL16ND147	<115.74	<0.08	0.01	0.14	<0.00	1.26	0.07	0.01	<0.03	<0.00	<0.38	17.95
RL16ND147	<174.91	0.18	0	0.59	0.01	<0.21	0.2	<0.00	0.16	0.01	<0.71	<0.00
RL16ND147	3452.68	<0.37	<0.00	<0.36	0.03	96.54	<0.14	0.01	4.59	0.15	8.56	21.31
RL16ND147	<145.37	<0.10	<0.00	0.11	<0.00	2.46	<0.03	0	<0.03	<0.00	<0.46	<0.00
RL16ND155	3343.61	<0.28	0.11	<0.25	0.05	3316.89	2.69	0.41	25.25	168.92	11.86	35.41
RL16ND155	<55.74	0.03	<0.00	<0.05	<0.00	1.96	0.02	<0.00	0.11	0.01	15.92	<0.00
RL16ND155	<66.02	<0.03	<0.00	<0.04	<0.00	0.77	0.52	0.01	6.13	0.02	13.55	<0.00
RL16ND155	<59.40	0.06	<0.00	0.07	<0.00	1.03	0.01	<0.00	0.09	<0.00	19.92	0
RL16ND155	<53.24	<0.02	<0.00	<0.06	0	0.83	0.13	<0.00	0.1	0.01	9.55	0
RL16ND155	630.37	<0.06	<0.00	<0.06	<0.00	9.01	4.41	0	4.01	0.02	23.9	0.12
RL16ND155	<51.72	<0.03	<0.00	<0.07	<0.00	1.19	0.03	<0.00	0.11	0.02	10.92	0.01
RL16ND155	<61.43	<0.03	<0.00	<0.03	<0.00	2.23	0.06	<0.00	0.16	0	15.19	<0.00

Sample ID	Si_ppm	Sn_ppm	Ta_ppm	Te_ppm	Th_ppm	Ti47_ppm	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn66_ppm	Zr_ppm
RL16ND155	<60.57	0.04	<0.00	<0.04	<0.00	0.57	0.04	<0.00	0.09	0	18.89	0
RL16ND155	<50.60	0.05	<0.00	<0.04	<0.00	1.11	0.86	<0.00	0.01	0	5.86	<0.00
RL16ND155	<54.95	0.04	<0.00	0.06	0	0.96	0.32	<0.00	0.28	0.01	11.13	<0.00
RL16ND155	<44.73	<0.02	<0.00	<0.03	<0.00	2.18	0.04	<0.00	0.05	<0.00	20.02	<0.00
RL16ND155	<62.08	<0.02	<0.00	<0.03	<0.00	1.01	0.84	<0.00	0.04	0	4.42	<0.00
RL16ND155	103.46	0.05	0	<0.03	0	1.77	0.09	<0.00	0.2	<0.00	12.16	<0.00
RL16ND155	<57.18	<0.03	<0.00	<0.05	<0.00	<0.35	0.55	<0.00	0.14	0.01	5.86	<0.00
RL16ND155	495.42	0.07	0.1	<0.04	0.03	5518.65	5.43	0.71	13.73	275.98	10.91	51.4
RL16ND155	<48.04	<0.03	<0.00	0.14	<0.00	1.1	0.44	<0.00	0.09	0.01	5.12	0.01
RL16ND163	1383.92	0.41	<0.00	1.48	0.23	3.27	0.05	0.03	1.09	0.01	66.44	1.88
RL16ND163	578.69	<0.17	<0.00	2.05	0.39	4.34	0.19	0.05	4.77	0.05	82.66	1.56
RL16ND163	1032	0.12	<0.00	0.65	0.33	7.78	0.12	0.1	2.81	0.05	66.81	4.73
RL16ND163	<113.13	0.07	<0.00	0.38	0.06	0.74	<0.02	0.01	0.38	0.01	69.43	0.04
RL16ND163	129.67	0.07	<0.00	0.11	0.11	1.75	0.05	0.01	0.34	0.02	75.43	0.5
RL16ND163	652.5	0.23	<0.00	0.73	0.15	2.77	0.09	0.04	2.65	0.04	81.33	1.19
RL16ND163	960.47	0.24	<0.00	0.76	<0.00	0.81	1.75	0.04	0.04	0.07	0.66	<0.00
RL16ND163	<178.09	<0.11	<0.00	0.16	0	2.99	1.37	0.03	<0.06	0.23	1.39	0.01
RL16ND163	<134.73	0.09	<0.00	0.18	<0.00	2.2	1.46	0.07	0.06	0.11	1.1	<0.00
RL16ND163	<134.27	0.14	<0.00	0.52	0.02	2.8	0.89	0.03	0.04	0.07	2.85	<0.00
RL16ND163	<118.99	0.06	<0.00	0.5	0.11	<0.30	<0.02	0.01	0.52	0.02	62.05	0.03
RL16ND163	807.31	1.75	<0.00	0.74	0.07	1.3	0.03	0	0.52	0.03	73.6	0.68
RL16ND163	355.62	0.23	<0.00	0.1	0	3.11	0.42	0.06	0.17	0.42	2.13	<0.00
RL16ND163	342.69	<0.07	<0.00	0.59	0.16	1.68	0.12	0.02	1.2	0.05	84.34	0.55
RL16ND163	877.49	0.16	<0.00	<0.14	0.01	6.42	0.32	0.02	0.05	0.11	1.52	0.01
RL16ND170	<77.27	<0.04	<0.00	0.12	0	1.55	<0.01	0	<0.01	<0.00	0.24	<0.00
RL16ND170	<61.42	<0.03	0	0.75	<0.00	0.64	<0.01	<0.00	<0.01	<0.00	0.25	0
RL16ND170	107.09	0.05	<0.00	3.25	<0.00	2.07	0.02	<0.00	0.14	<0.00	2.2	<0.00
RL16ND170	2600.09	<0.04	<0.00	3.94	0	6.31	6.96	<0.00	6.26	0.05	2.93	0
RL16ND170	422.23	0.15	<0.00	0.41	0.01	5.03	0.28	<0.00	3.77	0	1314.31	<0.00
RL16ND170	637.04	0.06	0	0.75	0	2.16	0.5	<0.00	2.37	0	663.54	0.42

Sample ID	Si_ppm	Sn_ppm	Ta_ppm	Te_ppm	Th_ppm	Ti47_ppm	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn66_ppm	Zr_ppm
RL16ND170	<151.53	<0.10	<0.00	3.18	<0.00	<0.57	0.05	<0.00	0.26	<0.00	0.49	0.03
RL16ND170	6220.92	<0.04	<0.00	2.48	0.01	22.34	5.25	<0.00	15.55	0.08	3.33	0.07
RL16ND170	15000.92	0.07	<0.00	1.38	<0.00	4.96	0.14	0	10.28	0.02	4.88	0.37
RL16ND170	<66.76	<0.05	<0.00	2.63	<0.00	1.35	0.02	<0.00	0.04	<0.00	37.72	<0.00
RL16ND170	104.35	0.04	<0.00	0.86	<0.00	2.11	0.02	0	<0.01	<0.00	12.09	<0.00
RL16ND170	2630.65	<0.04	<0.00	2.04	<0.00	0.6	0.11	<0.00	3.07	0.01	1.34	0.02
RL16ND170	174.27	<0.10	<0.00	0.41	<0.00	5.07	0.18	<0.00	0.15	<0.00	<0.50	<0.00
RL16ND170	9416.74	0.07	<0.00	1.28	0	10.77	0.06	<0.00	7.01	0.1	0.77	0.08
RL16ND170	<67.14	<0.04	<0.00	0.22	<0.00	1.28	<0.01	<0.00	0.05	<0.00	<0.20	<0.00
RL16ND170	<64.06	<0.04	0	0.4	<0.00	1.17	0.04	0	<0.01	0	0.5	<0.00
RL16ND170	878.55	<0.05	<0.00	1.8	<0.00	4.4	0.03	0	2.11	0.03	1.02	<0.00
RL16ND170	673.34	<0.04	<0.00	0.24	<0.00	7.25	<0.02	<0.00	5.71	0.01	1.23	0
RL16ND170	<54.11	<0.04	0	0.12	0	1	<0.01	<0.00	<0.01	<0.00	<0.23	<0.00
RL16ND175	<70.94	0.08	<0.00	2.13	<0.00	0.77	<0.01	<0.00	<0.02	<0.00	0.34	<0.00
RL16ND175	<72.29	0.07	0	0.75	<0.00	0.48	<0.01	<0.00	<0.02	0	0.28	<0.00
RL16ND175	<60.47	<0.04	<0.00	5.16	<0.00	0.83	<0.01	<0.00	<0.02	0	2.13	<0.00
RL16ND175	<66.17	0.05	<0.00	9.07	<0.00	0.64	<0.01	<0.00	<0.01	<0.00	<0.26	<0.00
RL16ND175	<193.41	<0.11	<0.00	83.7	<0.00	<1.10	<0.02	0.01	0.2	<0.00	1.95	0.32
RL16ND175	<76.84	<0.05	<0.00	8.71	<0.00	1.29	<0.01	<0.00	<0.02	<0.00	<0.27	<0.00
RL16ND175	<64.36	0.16	<0.00	0.69	0	2.65	<0.01	<0.00	0.08	0.02	19.97	<0.00
RL16ND175	<49.68	0.04	<0.00	3.63	<0.00	<0.22	<0.01	<0.00	0.01	<0.00	<0.17	<0.00
RL16ND175	<63.92	0.05	<0.00	0.38	<0.00	1.27	<0.01	<0.00	<0.01	<0.00	0.27	<0.00
RL16ND175	<59.43	0.05	<0.00	1.63	<0.00	<0.32	<0.01	<0.00	<0.01	<0.00	1.5	<0.00
RL16ND175	<57.52	<0.03	<0.00	1.81	<0.00	1.23	<0.01	<0.00	<0.01	0	0.94	<0.00
RL16ND175	<73.35	0.24	<0.00	1.98	<0.00	44.95	<0.01	<0.00	0.34	0.01	94.02	<0.00
RL16ND175	<78.98	0.06	<0.00	0.43	<0.00	1.46	<0.01	<0.00	0.1	<0.00	2.49	<0.00
RL16ND175	<64.87	<0.04	<0.00	0.99	<0.00	1.01	<0.01	<0.00	<0.02	<0.00	0.32	<0.00
RL16ND175	<127.74	0.09	<0.00	0.17	<0.00	0.66	<0.02	<0.00	<0.03	<0.00	0.61	<0.00
RL16ND175	<58.29	0.03	0	12.72	<0.00	2.5	<0.01	<0.00	0.02	0	5.26	0
RL16ND175	<61.33	<0.03	0	0.69	<0.00	0.66	<0.01	<0.00	<0.02	<0.00	0.29	<0.00

Sample ID	Si_ppm	Sn_ppm	Ta_ppm	Te_ppm	Th_ppm	Ti47_ppm	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn66_ppm	Zr_ppm
RL16ND175	<59.61	<0.03	<0.00	1.71	<0.00	0.61	<0.01	<0.00	<0.01	<0.00	<0.20	<0.00
RL16ND175	<82.89	0.08	<0.00	0.49	<0.00	0.64	<0.01	<0.00	<0.02	<0.00	<0.26	<0.00
RL16ND175	<60.89	<0.03	<0.00	0.64	0	1.22	<0.01	<0.00	<0.02	<0.00	0.23	<0.00
RL16ND175	<88.17	<0.05	0	0.2	0	1.35	<0.01	<0.00	<0.02	0	<0.28	<0.00
RL16ND175	<68.00	0.07	<0.00	0.88	<0.00	2.03	<0.01	<0.00	<0.02	<0.00	0.37	<0.00
RL16ND175	<74.88	<0.04	0	2.15	<0.00	<0.50	<0.01	<0.00	<0.01	<0.00	<0.22	<0.00
RL16ND182	<320.80	<0.19	<0.00	<0.34	<0.00	<1.42	<0.04	<0.00	0.13	<0.00	<1.01	<0.00
RL16ND182	<64.27	0.05	<0.00	<0.06	0	<0.47	<0.01	<0.00	0.01	<0.00	0.37	<0.00
RL16ND182	<106.68	0.15	<0.00	0.8	<0.00	2.08	0.51	<0.00	<0.01	0.01	3.27	0.01
RL16ND182	<67.23	0.04	<0.00	0.27	<0.00	0.86	10.91	<0.00	<0.01	<0.00	0.3	<0.00
RL16ND182	<89.24	<0.05	0	0.98	<0.00	<0.57	5.79	<0.00	<0.01	<0.00	0.41	<0.00
RL16ND182	<106.52	<0.06	<0.00	0.57	<0.00	1.9	1.51	<0.00	<0.01	<0.00	0.55	<0.00
RL16ND182	<74.31	<0.05	0	0.2	<0.00	1.79	0.42	0	<0.01	<0.00	2.92	0.01
RL16ND182	<62.00	<0.03	<0.00	0.16	<0.00	1.79	0.23	<0.00	<0.01	<0.00	0.2	0.01
RL16ND182	<69.28	<0.04	<0.00	0.36	<0.00	1.03	0.03	0	0.02	<0.00	<0.21	<0.00
RL16ND182	<194.41	<0.13	<0.00	<0.10	<0.00	<1.31	0.05	<0.00	<0.05	<0.01	<0.80	<0.00
RL16ND182	<83.82	<0.06	<0.00	<0.07	<0.00	0.74	0.07	<0.00	<0.01	0	0.36	<0.00
RL16ND182	<68.10	0.07	<0.00	<0.05	<0.00	3.3	0.02	<0.00	<0.02	<0.00	<0.18	0.01
RL16ND182	<61.71	0.05	0	0.08	<0.00	0.65	0.08	<0.00	<0.01	0	0.2	<0.00
RL16ND189	<236.11	<0.14	<0.00	1.34	<0.00	0.9	<0.04	0.03	<0.06	<0.01	<0.92	50.76
RL16ND190	15057.74	<0.17	0.01	3.53	0.21	<1.17	<0.06	1.05	10.56	0.2	55.9	0.05
RL16ND190	5353.07	0.13	0	0.92	0.23	1.07	<0.04	0.1	4.53	0.29	11.3	0.47
RL16ND190	7237.77	0.17	<0.00	6.91	0.02	1.71	0.04	0.25	9.39	0.1	16.79	0.1
RL16ND190	13502.8	0.17	<0.00	0.52	0.13	1.15	<0.03	0.29	11.31	0.05	28.91	0.28
RL16ND190	1978.99	<0.40	<0.01	0.99	0.34	4.75	<0.13	0.16	3.14	0.34	3.66	1.37
RL16ND190	2743.16	0.15	0	1.38	0.22	11.09	<0.04	0.29	7.59	0.4	52.88	1.02
RL16ND190	1049.52	<0.15	<0.00	0.34	0.03	<0.77	<0.05	0.2	3.06	0.02	99.44	<0.00
RL16ND190	4021.5	<0.08	<0.00	0.36	0.2	5.04	<0.02	0.13	10.5	0.09	20.16	0.06
RL16ND190	678.79	0.17	0	1.08	0.09	3.07	<0.05	0.16	2.1	<0.01	35.89	<0.00
RL16ND190	447.97	<0.09	0.01	0.57	0.02	2.24	<0.02	0.18	0.7	0.02	29.79	<0.00

Sample ID	Si_ppm	Sn_ppm	Ta_ppm	Te_ppm	Th_ppm	Ti47_ppm	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn66_ppm	Zr_ppm
RL16ND190	1525.55	<0.09	0.01	0.1	0.37	1.88	<0.03	0.23	3.99	0.01	49.73	0.04
RL16ND190	562.63	<0.09	<0.00	1.05	0.03	0.43	<0.03	0.18	1.47	0	46.38	<0.00
RL16ND190	522.65	<0.20	<0.00	0.69	0.36	<0.99	<0.06	0.12	1.04	<0.01	24.96	<0.00
RL16ND193	149.64	<0.06	<0.00	<0.06	<0.00	1.42	<0.01	0.01	0.71	<0.01	<0.35	<0.00
RL16ND193	<91.48	0.07	<0.00	<0.09	<0.00	1.58	<0.02	<0.00	<0.02	<0.00	<0.36	0.39
RL16ND193	<69.30	0.07	<0.00	0.04	<0.00	0.43	<0.01	0	<0.01	0	0.23	<0.00
RL16ND193	<68.29	0.03	<0.00	<0.07	<0.00	0.93	<0.01	0	<0.01	<0.00	<0.20	<0.00
RL16ND193	<59.15	0.04	<0.00	0.54	<0.00	0.92	<0.01	<0.00	<0.01	<0.00	0.3	0.01
RL16ND193	2647.34	0.2	<0.00	0.49	0.03	7.04	<0.02	0.11	91.1	0.11	67.6	0.3
RL16ND193	15317.85	0.1	<0.00	0.21	<0.00	5.38	<0.01	<0.00	1.21	0.04	40.06	0.04
RL16ND193	<146.99	<0.07	<0.00	<0.12	<0.00	1.39	<0.02	0.01	<0.04	<0.01	<0.48	12.31
RL16ND193	<64.68	0.06	<0.00	0.18	<0.00	1.2	<0.01	<0.00	<0.01	<0.00	<0.19	0
RL16ND193	<64.88	<0.02	<0.00	<0.08	<0.00	0.61	<0.01	0	0.03	<0.00	0.23	<0.00
RL16ND193	<57.07	0.06	<0.00	0.08	<0.00	0.37	<0.01	<0.00	<0.02	<0.00	<0.22	<0.00
RL16ND193	<54.45	0.03	<0.00	<0.03	<0.00	0.67	<0.01	<0.00	<0.01	<0.00	<0.20	0.01
RL16ND193	<59.50	0.06	<0.00	<0.04	<0.00	1.04	<0.01	<0.00	<0.01	0	<0.24	<0.00
RL16ND193	<79.91	0.05	<0.00	<0.06	<0.00	1.16	<0.01	<0.00	<0.02	<0.00	<0.29	<0.00
RL16ND193	<67.08	0.04	0	0.07	<0.00	0.96	<0.01	<0.00	<0.02	0	<0.26	<0.00
RL16ND193	<57.09	<0.03	0	<0.05	<0.00	1.35	<0.01	<0.00	<0.02	0	<0.26	<0.00
RL16ND193	<65.00	<0.03	0	<0.03	<0.00	1.07	<0.01	0	<0.01	<0.00	0.23	0
RL16ND193	<57.61	0.03	<0.00	0.12	0	0.68	<0.01	<0.00	<0.01	0	0.18	<0.00
RL16ND195	5134.27	0.05	<0.00	1.04	0.01	3.86	0.11	0.04	6.18	0.06	1.18	0.03
RL16ND195	536.54	0.08	<0.00	11.74	<0.00	<0.77	0.44	<0.00	0.47	<0.01	<0.44	0.01
RL16ND195	1410.53	<0.04	<0.00	2.05	0.08	0.89	0.16	0.2	3.7	0.03	<0.27	0.08
RL16ND195	1787.34	0.06	<0.00	0.89	0	5.12	23.61	0.01	10.9	0.05	1.3	0.04
RL16ND195	674.17	<0.07	<0.00	0.89	<0.00	2.97	0.09	0.05	2.84	<0.00	2.35	0.04
RL16ND195	2762.68	0.09	<0.00	1.31	0.01	3.11	0.09	<0.00	1.31	<0.00	0.74	0.02
RL16ND195	3454.09	<0.03	<0.00	0.4	<0.00	1.1	0.41	0	0.42	<0.00	<0.21	0.02
RL16ND195	10303.09	0.11	<0.00	1.12	0.01	11.44	10.86	0.02	24.17	0.02	4.56	0.01
RL16ND195	78.46	0.09	<0.00	0.28	<0.00	0.44	0.6	0	0.04	<0.00	0.29	0

Sample ID	Si_ppm	Sn_ppm	Ta_ppm	Te_ppm	Th_ppm	Ti47_ppm	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn66_ppm	Zr_ppm
RL16ND195	2564.65	0.06	<0.00	0.28	0.01	4.37	0.93	0	7.99	0	0.89	0.07
RL16ND195	381.21	0.1	0	1.41	<0.00	3.58	1.28	0	2.64	<0.00	2.54	0.02
RL16ND195	499.74	0.13	<0.00	6.47	<0.00	1.55	1.22	0	1.07	<0.00	1.81	0
RL16ND195	317.58	0.03	0	0.17	<0.00	1.18	0.12	<0.00	0.93	<0.00	0.33	0.02
RL16ND195	<60.54	0.05	<0.00	0.08	<0.00	0.61	<0.01	0	<0.01	<0.00	0.2	0.01
RL16ND195	1292.83	<0.03	<0.00	1.13	0	5.43	11.13	0	4.5	<0.00	0.94	<0.00
RL16ND195	291.15	0.1	<0.00	0.35	<0.00	1.7	1.64	0	1	0	1.05	0
RL16ND195	322.96	<0.03	<0.00	0.51	<0.00	0.65	0.51	0.01	0.36	<0.00	1.42	<0.00
RL16ND195	13210.46	<0.08	<0.00	<0.15	<0.00	20.28	9.36	<0.00	6.7	0.43	3.38	0.06
RL16ND195	1580.79	0.13	<0.00	<0.06	0.03	8.07	4.9	0.01	2.99	<0.00	1.17	0.09
RL16ND200	125.22	0.03	<0.00	12.01	0.05	0.95	0.08	0.02	0.04	<0.00	0.4	5.11
RL16ND200	9343.18	<0.03	<0.00	14.46	0.03	12.23	0.03	0.05	1.32	0.09	0.56	9.69
RL16ND200	372.09	<0.03	0.02	33.57	0.06	70.95	<0.01	0.03	0.06	0.05	0.43	6.48
RL16ND200	1490.47	0.04	<0.00	3.6	0.01	1.54	0.1	0	<0.01	<0.00	0.38	0.73
RL16ND200	1706.87	<0.03	<0.00	0.98	0.07	0.5	0.08	0.1	0.02	0.01	0.65	13.79
RL16ND200	9720.58	0.05	0	5.72	0.04	1.33	<0.01	0.01	<0.01	0.01	<0.21	3.05
RL16ND200	<62.72	0.06	0	14.48	0.06	2.42	<0.01	0.02	<0.01	0	0.28	4.38
RL16ND200	<53.37	0.05	<0.00	0.79	0.02	1.08	<0.01	0.01	<0.01	0.01	0.34	3.91
RL16ND206	<71.51	2.25	<0.00	36.91	<0.00	1.26	0.04	<0.00	0.09	<0.00	10248.25	<0.00
RL16ND206	4275.66	1.12	0.04	4.16	0.26	717.54	0.64	0.19	1.62	0.09	40.76	210.74
RL16ND206	13471.97	2.8	0.01	3.8	0.92	7.78	0.39	0.16	0.65	0.05	51.34	101.29
RL16ND208	<107.22	0.07	<0.00	<0.07	0.06	0.94	<0.02	0	0.04	0.01	<0.36	4.17
RL16ND208	<57.57	0.09	<0.00	2.53	<0.00	1.52	0.01	<0.00	1.14	0.06	10.03	0.01
RL16ND208	1837.77	0.08	<0.00	1.79	0.01	5.63	0.03	0.01	2.97	0.02	11.05	0.72
RL16ND208	309.71	0.07	<0.00	1.33	0.02	1.14	<0.01	0.01	1.43	0.07	8.39	1.23
RL16ND208	211.41	0.08	<0.00	0.8	0	2.89	0.01	0.01	1.42	0.02	17.41	0.04
RL16ND208	3422.08	0.18	0	0.51	0.02	80.97	<0.01	0.01	12.47	0.39	3.25	1.1
RL16ND208	696.93	0.12	<0.00	0.59	<0.00	3.21	<0.02	<0.00	0.93	0.01	1.92	0.05
RL16ND208	1904.18	0.04	<0.00	0.3	0	3.74	<0.01	<0.00	4.53	0.01	4.19	0.19

Sample ID	Si_ppm	Sn_ppm	Ta_ppm	Te_ppm	Th_ppm	Ti47_ppm	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn66_ppm	Zr_ppm
RL16ND208	<56.68	<0.03	<0.00	0.06	<0.00	1.6	<0.01	<0.00	<0.02	<0.00	<0.21	0
RL16ND208	85.23	0.04	<0.00	0.27	0.03	2.23	<0.01	0.05	0.16	0	0.44	12.81
RL16ND208	270.17	0.14	<0.00	<0.09	<0.00	3.34	<0.02	0.01	0.38	0.05	1.04	<0.00
RL16ND208	1789.59	0.21	<0.00	0.15	0.01	3.97	<0.01	0	8.17	0.07	7.1	10.84
RL16ND208	<62.39	0.07	<0.00	<0.05	<0.00	0.59	<0.01	<0.00	<0.02	0	0.22	0
RL16ND208	586.63	0.19	<0.00	<0.08	0.01	2.72	<0.02	0.08	0.29	0.07	0.77	16.12
RL16ND208	6993.15	<0.05	<0.00	<0.10	0.01	82.15	<0.02	0.01	41.96	0.02	7.06	3.02
RL16ND208	732.14	0.15	<0.00	<0.06	<0.00	0.69	<0.02	<0.00	0.59	0	1.28	0.51
RL16ND208	<80.88	0.04	<0.00	0.15	<0.00	1.36	<0.01	<0.00	<0.02	<0.00	0.27	0.01
RL16ND208	706.88	0.05	<0.00	<0.05	0	0.54	<0.01	<0.00	0.07	0	1.35	0.27
RL16ND208	<84.94	<0.04	<0.00	<0.06	<0.00	1.54	<0.01	<0.00	0.02	<0.00	1.19	<0.00
RL16ND208	93.16	0.09	<0.00	0.04	<0.00	1.33	<0.01	<0.00	0.06	<0.00	0.24	0.03
RL16ND208	<61.86	0.05	<0.00	0.15	<0.00	1.55	<0.01	<0.00	0.03	0	<0.21	<0.00
RL16ND208	<65.68	0.08	<0.00	<0.06	<0.00	0.97	<0.01	0	0.02	0	<0.22	0
RL16ND208	<75.68	<0.04	<0.00	<0.06	<0.00	1.65	<0.01	0	<0.02	0	<0.28	0.01
RL16ND209	10576.72	0.39	4.25	13.28	1.18	611.09	<0.03	0.32	5.27	4.12	165.74	2.19
RL16ND209	206.91	0.11	0.66	1.99	4.15	81.41	0.26	21.65	0.28	0.68	1.26	12.54
RL16ND209	376.43	<0.04	0	6.04	0.42	2.83	<0.01	0.76	0.19	0.3	0.99	9.17
RL16ND209	205.5	0.04	0.14	0.73	0.24	95.84	<0.01	0.3	0.06	0.16	<0.21	4.98
RL16ND209	91.83	0.05	0.02	2.61	<0.00	4.8	<0.01	<0.00	0.12	0.08	0.33	<0.00
RL16ND209	<70.97	0.1	0.25	0.33	0.18	122.39	<0.01	0.6	0.43	0.34	0.66	0.99
RL16ND209	<95.08	<0.04	0.03	3.65	0.91	4.91	<0.02	0.45	<0.01	0.01	<0.26	3.66
RL16ND209	107.93	0.08	<0.00	0.28	<0.00	0.87	<0.01	<0.00	<0.02	0.02	<0.25	<0.00
RL16ND209	1258.88	<0.08	<0.00	0.72	<0.00	1.5	<0.03	0.17	0.1	0.14	36.79	0.67
RL16ND209	<111.94	<0.05	0.02	<0.05	0.35	2.42	<0.02	0.35	0.05	0.02	0.92	3.81
RL16ND209	<69.61	0.51	0.32	0.42	0.26	43.65	<0.01	0.14	0.24	0.41	0.22	2.54
RL16ND209	<70.23	0.07	0.13	0.48	0.21	19.16	<0.01	0.2	0.12	0.11	0.24	3.74
RL16ND209	<76.23	0.05	0	2.44	0.17	1.28	<0.01	0.24	0.02	<0.00	0.29	14.41
RL16ND209	122.85	0.06	0	0.58	0.08	3.93	<0.01	0.08	<0.01	0.05	0.34	1.13

Sample ID	Si_ppm	Sn_ppm	Ta_ppm	Te_ppm	Th_ppm	Ti47_ppm	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn66_ppm	Zr_ppm
RL16ND209	<96.95	<0.04	<0.00	0.32	<0.00	1.4	<0.02	0.01	0.04	0.01	0.38	0.05
RL16ND209	<144.94	0.09	0.09	0.96	0.23	21.14	<0.03	0.04	0.09	0.04	<0.40	0.93
RL16ND209	<108.54	<0.05	0.01	0.44	0.11	1.86	<0.02	0.12	<0.03	0.01	0.68	1.81
RL16ND209	<103.92	0.22	0.08	5.76	0.3	14.09	<0.02	0.28	0.02	0.12	0.37	3.15
RL16ND209	<79.41	<0.04	0.03	0.25	0.37	2.25	<0.02	0.33	<0.01	0.01	0.46	3.73
RL16ND209	<66.50	0.04	<0.00	0.08	0.19	1.37	<0.01	0.2	<0.01	<0.00	0.31	8.16
RL16ND209	<70.96	<0.04	0.01	0.26	0.12	2.73	<0.01	0.06	<0.02	0	0.21	1.18
RL-16ND211	<56.38	0.05	<0.00	0.06	<0.00	1.39	<0.01	<0.00	<0.02	<0.00	<0.20	0
RL16ND211	<127.31	0.1	<0.00	115.25	<0.00	1.1	<0.02	<0.00	<0.03	<0.00	0.75	<0.00
RL16ND211	14842.75	0.21	0.03	0.35	0.86	30.82	<0.02	0.99	0.47	0.21	1.49	8.55
RL16ND211	158.66	0.08	<0.00	3.73	0.02	0.94	<0.01	0.24	<0.02	<0.00	20.05	2.88
RL16ND211	<59.79	0.05	<0.00	11.25	<0.00	1.24	0.05	0.01	<0.02	<0.00	11.28	0.01
RL16ND211	<109.43	0.15	<0.00	3.81	<0.00	1.74	<0.02	<0.00	<0.03	<0.00	<0.42	<0.00
RL16ND211	<332.09	0.19	<0.00	0.48	<0.00	<2.38	<0.05	0.02	<0.09	<0.00	1.48	0.03
RL16ND211	<67.74	<0.04	<0.00	0.17	<0.00	1.11	<0.01	0	<0.02	<0.00	<0.24	<0.00
RL16ND211	<909.00	<0.50	<0.00	<0.99	<0.00	<3.74	<0.15	0.06	<0.25	0.03	<3.21	<0.00
RL16ND211	<64.34	0.05	0	0.23	<0.00	1.2	<0.01	<0.00	<0.02	<0.00	<0.19	0.01
RL16ND211	<59.02	0.05	<0.00	0.07	<0.00	0.57	<0.01	<0.00	<0.02	0	<0.23	0
RL16ND211	<133.90	<0.07	<0.00	0.28	<0.00	<0.55	<0.02	0.05	0.04	<0.00	2.64	0.01
RL16ND211	<123.69	0.18	<0.00	0.9	<0.00	1.02	<0.02	<0.00	<0.03	<0.00	0.65	<0.00
RL16ND211	<66.09	0.05	<0.00	0.06	<0.00	1.67	<0.01	0	<0.02	0	<0.23	0
RL16ND211	<145.73	<0.09	<0.00	<0.13	<0.00	0.62	<0.02	0.01	<0.03	0.01	0.62	0.01
RL16ND211	<62.41	0.06	<0.00	0.03	<0.00	0.58	<0.01	<0.00	<0.02	<0.00	<0.22	<0.00
RL16ND212	<76.73	<0.05	<0.00	<0.04	<0.00	1.37	<0.01	<0.00	<0.01	<0.00	<0.24	<0.00
RL16ND212	<83.36	0.05	<0.00	<0.06	<0.00	1.21	<0.02	<0.00	<0.01	0	0.31	<0.00
RL16ND212	<78.62	<0.04	<0.00	1.23	0	1.65	<0.02	<0.00	<0.01	0	0.32	<0.00
RL16ND212	<67.76	<0.04	<0.00	<0.04	<0.00	1.28	<0.01	<0.00	0.02	<0.00	0.24	<0.00
RL16ND212	<65.56	0.05	<0.00	0.09	<0.00	1.11	<0.01	0.01	<0.02	0	0.4	<0.00
RL16ND212	<73.59	<0.05	<0.00	0.19	<0.00	0.68	<0.01	<0.00	<0.01	<0.00	0.33	<0.00

Sample ID	Si_ppm	Sn_ppm	Ta_ppm	Te_ppm	Th_ppm	Ti47_ppm	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn66_ppm	Zr_ppm
RL16ND212	<58.55	<0.04	<0.00	<0.03	<0.00	1.09	<0.01	0	<0.02	<0.00	<0.20	0.01
RL16ND212	<62.27	<0.03	<0.00	0.18	<0.00	1.34	<0.01	<0.00	<0.02	<0.00	0.29	<0.00
RL16ND212	<70.68	<0.04	<0.00	0.65	<0.00	2.11	<0.01	<0.00	<0.01	<0.00	0.25	0
RL16ND212	2200.89	0.25	0.13	0.94	4.14	110.76	<0.01	0.35	2.01	0.22	6.21	1.75
RL16ND212	<62.68	0.08	0	1.18	0.01	1.66	<0.01	<0.00	<0.01	<0.00	0.73	0.01
RL16ND212	373.82	0.11	0.04	0.26	4.42	47.12	<0.03	0.17	0.17	0.14	1.22	9.7
RL16ND212	88.92	<0.03	<0.00	0.25	0.06	1.78	<0.01	0.01	0.02	<0.00	<0.21	1.37
RL16ND212	<65.44	<0.04	<0.00	<0.07	<0.00	1.47	<0.01	<0.00	0.22	0	0.56	<0.00
RL16ND212	<56.52	0.06	0.01	0.44	<0.00	8.36	<0.01	0	0.62	0.01	0.29	<0.00
RL16ND212	<80.76	<0.05	0	<0.04	<0.00	2.15	<0.02	<0.00	0.01	<0.00	<0.22	0
RL16ND212	<71.11	0.04	<0.00	<0.07	0	2.16	<0.01	<0.00	<0.01	<0.00	<0.19	0.02
RL16ND212	70.66	<0.04	<0.00	<0.10	0	0.7	<0.01	0	<0.01	0	<0.20	0.01
RL16ND212	<71.96	0.09	<0.00	0.07	<0.00	1.63	<0.01	<0.00	<0.01	<0.00	0.41	0.01
RL16ND212	82.36	0.04	0	<0.03	<0.00	1.28	<0.01	0.03	<0.01	0	0.21	<0.00
RL16ND212	<68.92	0.04	<0.00	<0.05	0	1.72	<0.01	<0.00	<0.01	0	<0.20	<0.00
RL16ND212	<53.94	0.04	<0.00	<0.06	<0.00	0.52	<0.01	0.02	<0.01	<0.00	0.19	<0.00
RL16ND216	<71.77	0.05	<0.00	0.91	<0.00	2.51	<0.01	0	<0.02	<0.00	0.41	0.01
RL16ND216	416.32	0.09	<0.00	6.28	0.01	5.04	<0.02	0.01	<0.02	0.17	2.68	0.13
RL16ND216	8437.09	<0.05	<0.00	1.48	0.05	5.26	<0.01	0.02	0.07	0.06	0.33	1.06
RL16ND216	<58.33	0.05	0.02	2.06	0.02	78.28	<0.01	0.01	1.14	2.37	4.05	3.18
RL16ND216	<95.75	<0.06	<0.00	0.37	<0.00	<0.27	<0.02	<0.00	<0.02	<0.00	<0.37	<0.00
RL16ND216	6482.26	0.04	0	1.7	<0.00	0.91	<0.01	<0.00	0.16	0.01	0.2	<0.00
RL16ND216	<53.12	0.04	<0.00	0.71	<0.00	0.99	<0.01	<0.00	<0.01	<0.00	<0.18	<0.00
RL16ND216	383.88	0.05	<0.00	0.71	<0.00	0.48	<0.01	0.01	<0.01	<0.00	0.28	<0.00
RL16ND216	85.88	<0.04	<0.00	0.9	<0.00	1.29	<0.01	0	<0.01	<0.00	0.21	<0.00
RL16ND216	159.7	<0.06	0	0.09	0	1.2	<0.02	0	<0.03	0	<0.52	0.03
RL16ND216	<63.63	<0.04	0	0.29	<0.00	1.18	<0.01	<0.00	<0.02	<0.00	0.32	0
RL16ND216	<83.18	0.07	<0.00	0.33	0	1.34	<0.01	<0.00	<0.03	0.01	0.32	<0.00
RL16ND216	<77.18	0.05	<0.00	0.14	<0.00	0.61	<0.01	0	<0.01	<0.00	<0.23	<0.00

Sample ID	Si_ppm	Sn_ppm	Ta_ppm	Te_ppm	Th_ppm	Ti47_ppm	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn66_ppm	Zr_ppm
RL16ND216	<55.90	<0.03	<0.00	0.15	0	0.64	<0.01	0	<0.02	0.01	0.24	<0.00
RL16ND216	<69.25	0.04	<0.00	1.45	<0.00	0.52	<0.01	<0.00	<0.01	<0.00	<0.22	<0.00
RL16ND216	<64.20	<0.04	<0.00	0.06	<0.00	5.6	<0.01	0.01	0.02	0.06	0.25	0.24
RL16ND216	<56.09	<0.04	0	<0.04	<0.00	0.41	<0.01	<0.00	<0.01	<0.00	<0.23	0
RL16ND216	<57.76	<0.03	<0.00	<0.03	<0.00	1.42	<0.01	<0.00	<0.01	0	<0.19	<0.00
RL16ND216	<55.30	0.04	<0.00	0.07	<0.00	1.01	<0.01	<0.00	<0.01	0	<0.20	0
RL16ND216	<59.97	<0.03	0	<0.08	0	<0.32	<0.01	<0.00	<0.01	<0.00	0.34	0
RL16ND216	<61.36	0.05	<0.00	<0.06	0	1.78	<0.01	<0.00	<0.02	<0.00	0.32	<0.00
RL16ND216	<61.53	0.05	0	0.18	<0.00	1.01	<0.01	0	<0.01	<0.00	<0.27	<0.00
RL16ND216	<59.34	0.03	<0.00	<0.03	<0.00	2.17	<0.01	<0.00	<0.01	<0.00	0.22	0.01
RL16ND110	<93.37	<0.08	<0.00	0.35	<0.00	2.64	<0.01	<0.00	<0.02	<0.00	0.44	<0.00
RL16ND110	<116.19	<0.09	<0.00	0.15	<0.00	5.4	<0.01	<0.00	<0.01	<0.00	<0.38	<0.00
RL16ND110	<88.26	<0.06	0	<0.10	<0.00	2.63	<0.01	<0.00	<0.01	0.01	0.43	0.01
RL16ND110	7154.25	0.07	<0.00	0.13	<0.00	4.05	0.06	<0.00	1.09	0.04	0.84	<0.00
RL16ND110	332.02	<0.06	<0.00	<0.10	<0.00	1.2	<0.01	<0.00	<0.01	<0.00	0.67	<0.00
RL16ND110	2771.12	<0.07	<0.00	0.19	<0.00	1.47	<0.01	0	0.95	0.03	0.57	<0.00
RL16ND110	814.11	<0.07	<0.00	0.27	<0.00	2.01	<0.01	<0.00	0.13	0.01	0.44	<0.00
RL16ND110	124.66	<0.06	<0.00	0.25	<0.00	1.5	<0.01	<0.00	0.09	<0.01	18.82	0.03
RL16ND110	<85.42	<0.06	<0.00	0.13	<0.00	2	<0.01	<0.00	<0.01	<0.00	<0.28	<0.00
RL16ND110	<88.42	<0.07	<0.00	<0.11	<0.00	3.22	<0.01	<0.00	<0.01	0.01	0.39	<0.00
RL16ND110	1346.04	<0.06	0	<0.09	<0.00	1.51	0.01	0	0.55	0.01	0.31	<0.00
RL16ND110	<86.83	<0.05	<0.00	<0.13	<0.00	2.22	<0.01	<0.00	<0.01	0.01	0.36	<0.00
RL16ND110	<87.81	<0.06	<0.00	0.18	<0.00	2.27	<0.01	<0.00	0.02	0.01	<0.31	<0.00
RL16ND110	<142.93	<0.13	<0.00	<0.10	<0.00	2.58	<0.02	0	<0.02	<0.01	0.55	<0.00
RL16ND114	<71.57	<0.06	<0.00	0.54	<0.00	2.25	<0.01	<0.00	<0.02	<0.00	0.48	<0.00
RL16ND114	<93.90	<0.07	<0.00	0.2	<0.00	1.69	<0.01	<0.00	<0.01	<0.00	0.79	<0.00
RL16ND114	<74.16	<0.06	<0.00	0.08	0	3.28	<0.01	<0.00	<0.02	<0.00	0.53	0.01
RL16ND114	<92.58	<0.06	<0.00	<0.09	0	2.72	<0.01	0	<0.01	0.01	<0.39	<0.00
RL16ND114	<83.22	<0.05	<0.00	<0.15	<0.00	1.87	<0.01	<0.00	<0.01	<0.00	<0.38	<0.00

Sample ID	Si_ppm	Sn_ppm	Ta_ppm	Te_ppm	Th_ppm	Ti47_ppm	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn66_ppm	Zr_ppm
RL16ND114	<55.52	<0.05	<0.00	<0.09	0	<0.71	<0.01	0	<0.01	<0.00	<0.33	<0.00
RL16ND114	<80.46	<0.07	<0.00	<0.21	<0.00	2.08	<0.01	0	0.01	<0.00	0.43	<0.00
RL16ND114	<78.12	<0.05	<0.00	7.6	<0.00	0.97	0.02	<0.00	<0.01	<0.00	4.76	<0.00
RL16ND114	<101.30	<0.06	<0.00	2.43	<0.00	1.98	<0.01	0	<0.02	<0.01	0.34	<0.00
RL16ND114	<101.28	<0.08	<0.00	5.98	0	2.55	<0.01	<0.00	<0.02	<0.01	0.95	<0.00
RL16ND114	<94.43	<0.07	<0.00	3.9	<0.00	1.78	<0.01	0	<0.02	<0.00	0.61	<0.00
RL16ND114	<78.18	<0.04	<0.00	3.29	<0.00	2.34	<0.01	<0.00	<0.01	<0.00	0.45	<0.00
RL16ND114	<93.43	<0.06	<0.00	2.39	0	2.6	<0.01	<0.00	<0.02	<0.01	<0.37	<0.00
RL16ND114	<72.83	<0.05	<0.00	9.4	<0.00	2.48	<0.01	<0.00	<0.02	<0.00	0.35	<0.00
RL16ND114	<112.20	<0.09	<0.00	0.24	<0.00	4.08	<0.01	<0.00	<0.02	<0.00	0.53	<0.00
RL16ND114	<100.39	<0.07	<0.00	0.6	<0.00	3.58	<0.01	<0.00	<0.02	<0.00	0.75	<0.00
RL16ND114	<84.17	<0.05	<0.00	<0.07	<0.00	7.15	<0.01	<0.00	0.03	<0.00	0.41	<0.00
RL16ND114	<89.16	<0.06	<0.00	<0.19	<0.00	1.31	<0.01	<0.00	<0.02	0.01	0.52	0