# The genesis and development of the Guli dunite core complex of the Guli Massif, northern Siberia, Russia. A multi - disciplinary study.

# Genese und magmatische Entwicklung des Guli Dunit Komplexes des Guli Massivs, Nordsibirien, Russland. Eine multidisziplinäre Studie.

## DISSERTATION

**PhD Thesis submitted to obtain the degree of:**

***Doktor der montanistischen Wissenschaften***

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## Affidavit:

I declare in lieu of oath, that I wrote this thesis
and performed the associated research myself,
using only literature cited in this volume.

Leoben, May 2008. Janine Pink

This work is dedicated to my husband and family

Many thanks for your love and support

# Table of Contents

# 1. Abstract

The Guli Massif, located in the Meimecha – Kotui province of northern Siberia, Russia, represents the world's largest Alaskan-Uralian-type complex, oval in shape, and with an extension of 35 x 45 km, occupying an area of 1500 to 1600 $km^2$. It is composed of a giant dunite core complex with occasional uneconomic chromite disseminations and clinopyroxenite dykes, an alkaline suite surrounding the core complex, and carbonatite intrusions. Geological field work was primarily focused on logging and sampling of selected drill cores from the Guli core complex (G17, G13) and from the ultramafic-mafic alkaline sequence forming the envelope around the core complex (G1).

The aims of this study were i) to characterise the formation and genesis of the dunite core complex, ii) investigate possible links between the dunite core complex, its surrounding ultramafics and the meimechites, and iii) investigate a possible source for the PGE placers that occur within the Massif.

The detailed mineralogical, textural, petrological and geochemical investigations of this study revealed the following results:

The Guli dunite core complex represents a restitic mantle material with a metasomatic overprint. This becomes obvious on the basis of textural, mineralogical (e.g. Fo of olivine 91-93) geochemical evidences and by modelling data. The Guli core dunite composition is achieved after 9 episodes of continuous partial melting of primitive mantle material under "wet" conditions, equivalent to a total partial melting of 52% and an extraction of approximately 95% of each melt batch. Clinopyroxenite dykes and plugs, intruding the dunite restite and found in the Guli core complex surrounding alkaline suite, represent early melt batches. Very minor melt portions of similar composition can be found in interstitial spaces within the restitic dunites of the core complex and are interpreted as not having escaped from the residue. Two distinct olivine cumulates (i.e. from G1 and G13), occurring at the periphery of the core complex, represent late melt batches, after approximately 40% of partial melting. The meimechites show a clear genetic link to the more primitive, less fractionated type of olivine cumulates (G1). Mineralogical and geochemical evidences indicate a common parental magma for the G1 olivine cumulates and the meimechites, the residuum of which is represented by the Guli core dunites. All rock types investigated show a

variable enrichment of LREE, which has been characterised by addition of 0.03 to 0.05% of carbonatitic material to the dunite residuum and the melt batches on the basis of modelling data.

No primary chromite and PGE mineralised horizons were found in rocks of the Guli core complex investigated. It can be assumed that estimates, previous to this study, of PGE concentrations in the placer deposits of the Guli Massif are the result of misinterpretation and exaggeration.

# 2. Zusammenfassung

Das Guli Massiv liegt in der Meimecha – Kotui Provinze von Nordsibirien, Russland und repräsentiert den weltweit größten Alaskan-Uralian-Typ Komplex. Das Massiv zeigt eine ovale Form und umfasst eine Größe von 35 x 45 km, was einer eingenommenen Fläche von 1500 bis 1600 $km^2$ entspricht. Das Guli Massiv besteht aus einem riesigen Dunit Kernkomplex mit vereinzelten nicht ökonomischen Disseminationen von Chromit und Klinopyroxenit-Gängen, einer den Kernkomplex umgebenden Alkalinen Gesteinsabfolge und Karbonatit-Intrusionen. Die Geologische Feldarbeit konzentrierte sich auf die Aufnahme und Beprobung von selektierten Bohrkernen vom Guli Kernkomplex (G17, G13), sowie von ultramafisch-mafischen Gesteinssequenzen (G1), die den Kernkomplex umgeben.

Die Ziele dieser Arbeit waren: i) Eine Charakterisierung der Bildung und Genese des Dunit Kernkomplexes, ii) ein Studium der möglichen, genetischen Verbindung zwischen dem Dunit Kernkomplex, den umgebenden ultramafischen Gesteinen und den Meimechiten, sowie iii) die mögliche Herkunft der PGE in Seifen innerhalb des Guli Massivs zu untersuchen.

Der Guli Dunit Kernkomplex repräsentiert einen Mantel-Restit mit einer metasomatischen Überprägung. Diese Schlussfolgerung ergibt sich auf der Basis von texturellen, mineralogischen (z.B. Fo-Gehalt des Olivins 91-93) und geochemischen Ergebnissen sowie aus den Daten der Modellierungen. Die Zusammensetzung des Guli Kernkomplex wird nach 9 Episoden kontinuierlicher, partieller Aufschmelzung von primitiven Mantelmaterial unter wässrigen Bedingungen und einer Schmelzextraktion von ca. 95% erreicht, was einem totalen Aufschmelzungsgrad von 52% entspricht. Klinopyroxenit-Gänge und Stöcke, die in den Restit des Kernkomplexes intrudieren und die alkaline Gesteinssequenzen um den Kernkomplex bilden, repräsentieren frühe partielle Schmelzen. Kleine Mengen von Schmelzen ähnlicher Zusammensetzung, treten im Intersertalraum der Dunite des Kernkomplexes auf und werden als nicht vom Restit extrahierte Reste von Schmelzen angesehen. Zwei unterschiedliche Olivin-Kumulate (von G1 und G13), die in der Peripherie des Guli Kernkomplexes auftreten, repräsentieren späte partielle Schmelzen nach ca. 40% partieller Aufschmelzung. Die Meimechite zeigen eine deutliche, genetische Verbindung zu den primitiveren, weniger fraktionierten Olivin-Kumulaten (G1). Mineralogische und geochemische Erkenntnisse deuten auf ein für die Olivin-Kumultae und die Meimechite gemeinsames Stammmagma hin. Das Residuum dieses Magmas ist durch die Dunite des Kernkomplexes repräsentiert. Sämtliche untersuchten Gesteine sind durch eine unterschiedliche Anreicherung der LREE gekennzeichnet. Diese LREE Anreicherung konnte, auf der Basis von Modellierungs-Daten, als eine Addition einer 0.03 bis 0.05% Karbonatit-Komponente charakterisiert werden.

Es konnten keine primären Chromit und PGE vererzten Horizonte innerhalb der untersuchten Gesteine des Guli Kernkomplexes gefunden werden. Daher kann vermutet werden, dass frühere Angaben über die Konzentrationen von PGE in den Seifen einer Miss-Interprätation und Übertreibung unterlagen.

# 3. Introduction

There are three main types of mafic – ultramafic igneous complexes: 1: layered intrusions, 2: zoned Alaskan – Uralian – Aldan type massifs and 3: ophiolite complexes. Thes complexes differ in their igneous rock assemblages, in size, in shape and particularly in the geotectonic setting in which they occur. What these different complexes have in common however, is that they host world sized deposits of chromite and platinum group minerals. The current knowledge of layered complexes and ophiolite massifs is quite developed however, there is a lack of information and understanding of zoned massifs. In the research project, P16440-NII, supported by the National Austrian Research Fund (FWF) a so called Zoned Alaskan – Uralian type complex, the Guli Massif, was studied.

# 4. Regional Geology

## 4.1. The Siberian Platform[1]

- The Siberian Platform is composed predominately of Archean basement and is overlain by sediments of an Early Proterozoic and younger age. The platform forms the oldest consolidated element in northern Asia and is located centrally in the north of the Asian continent. To the north the craton is bounded by the Taimyr Fold Belt, the Verkhoyansk Fold Belt to the east, the Bailkal fold belt to the south and the Sajan-Jenissej Fold Belt to the west. The Aldan Shield and the Anabar Massif are the outcropping examples of the Archean basement. They are highly metamorphosed, up to granulite facies and are of an Archean to Early Proterozoic age. See Fig 4 - 1

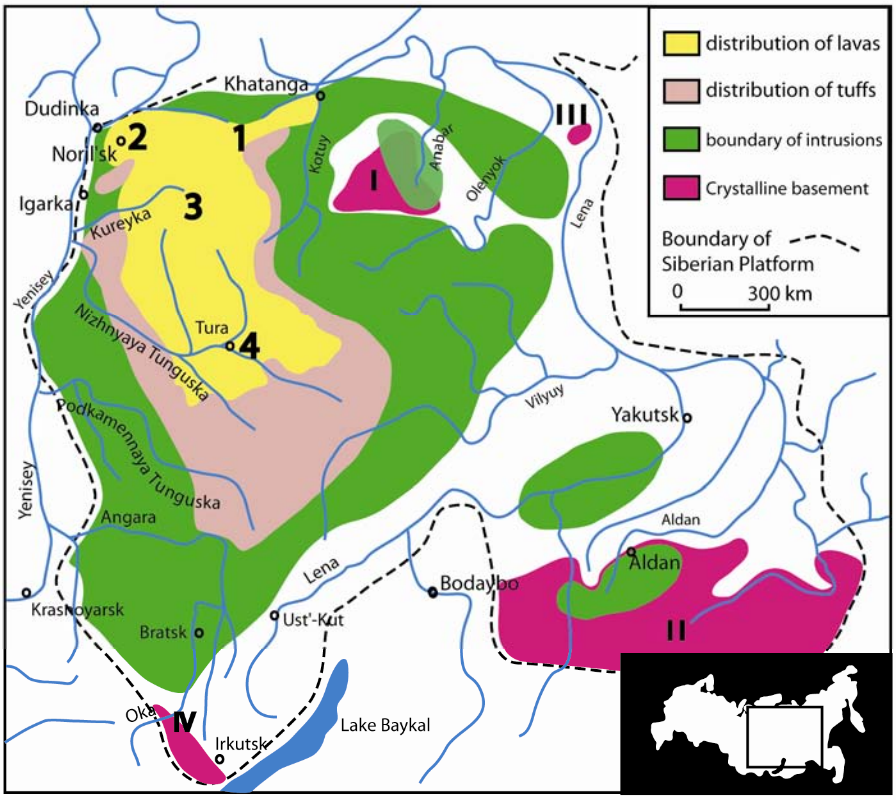
- The Aldan Shield is a massif of ~200,000 $km^2$ and is composed of Precambrian granulites, it is bounded to the south, west and east by younger fold belts. It consists of several blocks that reflect a primary heterogeneity of composition and differences in the structural and thermodynamic evolution of different parts of the area (Perchuk et al., 1985). The massif can be divided into two megablocks, the eastern Aldan and the western Aldan, on the basis of structural and petrological data. These megablocks are separated by a narrow meridional fold-belt. On the basis of geodynamics, the structural evolution of this zone was completed in the late Archaen. In the south this central fold belt becomes the small Sutam block, which adjoins the Stanovoy fold belt that forms the southern

[1] The geology of the Siberian Platform is described after Chain & Koronovskij (1995), Dolginow & Kropatschjow (1994) and Khain (1985)

boundary of the Aldan shield. A system of north trending grabens filled by post Archaean sediments separates the Sutam block from the other structural units of the Aldan shield. The Aldan shield is composed of Archaean high grade granulites, while the Stanovy fold belt, to the south, consists of highly foliated Proterozoic rocks metamorphosed under relatively lower grade conditions. However, relics of the granulites are mapped within the fold belt (Perchuk et al., 1985).

- The Anabar Massif is the second largest outcrop of the basement of the Siberian Craton. The Precambrian formations correspond to those of the Aldan Shield and have been exposed due to erosion. Metamorphic conditions up to granulite facies are observed. The Anabar Massif has a quite complex fold structure and is characterized by a predominance of north west trends. The accumulation of protoplatform sediments began in the Early Proterozoic, this was followed by significant accumulations of platform deposits in the Middle and Late Riphean and Vendian periods. The rate of sedimentation was influenced by events of significant uplift and subsidence. As a result, the cover consists largely of terrigenous, shallow marine, marine and continental clastic sediments (Dolginow and Kropatschjow, 1994).

**Figure 4-1 Map of the Siberian Platform from (Fedorenko and Czamanske, 1997)**




Numbers 1 - 4 principal areas of differing volcanic sequence.
1 :Maymecha-Kotuy, 2 :Noril'sk, 3 :Putorana, 4 :Nizhnyaya Tunguska
Roman Numerals : Crystalline basement; I : Anabar shield,
II : Aldan shield, III : Olenyok uplift, IV : Sharyzhalgay uplift.

## 4.2. Maimecha – Kotui Province

- The Maimecha-Kotui province is located in the northern part of the Siberian Platform and is unique due to the presence of both effusive and intrusive alkaline – ultramafic magmatism occurring both spatially and temporally during a very short period of time. The Maimecha – Kotui province comprises an area of approximately 70 000 $km^2$. Geologically it is located at the northern margin of the Siberian platform. Geographically it is located between the Kotui and Maimecha Rivers, which flow approximately from south to north, between Essei and Khatanga. A significant section of the province are Upper Proterozoic carbonate – terrigenous sediments, which discordantly cover the Archaean – Lower Proterozoic crystalline basement. To the north of the province is a cover of Permian sediments and a sequence of Mesozoic ultramafic lavas, which are partly overlain by the younger sediments of the Khatanga trough (Vasiliev and Zolotukhin, 1995). During the formation of the sedimentary cover of the Siberian platform, intense tectonic activity and at least two periods of major igneous / volcanic events (Upper Proterozoic and Early Triassic) led to a block – type structure of the Siberian platform. The Upper Proterozoic event is characterized by dolerite dykes and sills, which are associated with Ryphean terrigenous carbonate sediments. The Early Triassic event was by far the most expansive. The first event, were the emplacement of dolerite dykes and sills within Permian sediments. Later events are characterised by alkaline – ultramafic igneous, extrusive and effusive rocks, which have four clearly distinguished groups (Vasiliev and Zolotukhin, 1995):

- 1: effusive eruptions of alkaline – ultramafic and alkaline rocks with related dykes, sills and explosion pipes.
- 2: complex massifs of alkaline – ultramafic rocks (associated with carbonatites)
- 3: post intrusive dykes and explosion pipes of alkaline – ultramafic rocks
- 4: dykes and pipes of kimberlites.

## 4.3. Maimecha – Kotui Province: Volcanism

- The volcanic rocks from the Lower Triassic are exposed to the northwest of the province, along the north – western margin of the Siberian platform and dip beneath the younger sediments of the Khatanga Trough. They have been classified into five suites.

  **The Pravobayaraskay suite:**

- This suite consists of basic tuffs and tuffites, which overlie Permian sediments. The thickness varies from 250 to 400m.

  **The Aridzhanskay suite:**

- This suite is at the same stratigraphical level as the Pravobayaraskay suite and consists of a basal layer of alkaline ultramafic tuffs 20 – 25 m thick. This is then followed by melanephelinites, melilitites, their olivine varieties, augitites, limburgites, alkaline picrites and shoshonites. The thickness of the suite is between 300 – 500m and is exposed along the cliffs of the Kotui river.

  **The Kogotokskay suite:**

- This suite has been divided into two sub suites. The lower suite is comprised of basaltic flows in contact with flood basalts, it has a thickness of 500 – 545 m. The upper sub suite is comprised of subalkaline olivine basalts and trachybasalts, with alternating flows of trachybasaltic andesites, andesites, shoshonites and trachytes. It has a thickness of 350 – 400 m.

**The Delkanskay suite:**

- The Delkanskay suite is also divided into two sub suites, the lower of these is between 400 – 500 m in thickness and is comprised of melanephelinites, melilitites, melanalicimites, limburgites, augitites and alkaline picrites. The upper suite has a thickness of 400 – 500 m and is comprised of trachybasalt, trachytes, additionally flows of ultramafic foidites, andesites, rhyolites and trachytes.

**The Maimechinskay suite:**

- The Maimechinskay suite is composed of unique ultramafic lavas and flows, called "meimechites" alternating with these lavas are tuffs which lie concordantly over the Delkanskay suite. There are varying estimates on the thickness of this suite, with estimates ranging from 400 to 2000 m. Meimechites are defined as an ultramafic volcanic rock composed of olivine phenocrysts; in a groundmass of olivine, clinopyroxene, magnetite and glass. (Le Maitre, 2002).The difference between meimechites and alkali picrites is less abundant olivine and phlogopite often present in the groundmass, which sometimes exhibits spinifex- like textures. (Kogarko and Ryabchikov, 2000). In samples collected from drill cores, alteration of the glass and olivine, the variation in phlogopite content and the variation in geochemistry has made the differentiation of these two rock types difficult. As a result the high Mg volcanic ultra mafic rocks are referred to as Meimechites in this work. The relationship between the Meimechites and the Guli Massif is some what ambiguous with various authors attributing the meimechites to the Siberian Flood Basalts (Fedorenko and Czamanske, 1997; Kogarko and Ryabchikov, 2000) and others that they represent an extension of the peridotitic facies of the Guli complex. References from (Fedorenko and Czamanske, 1997).

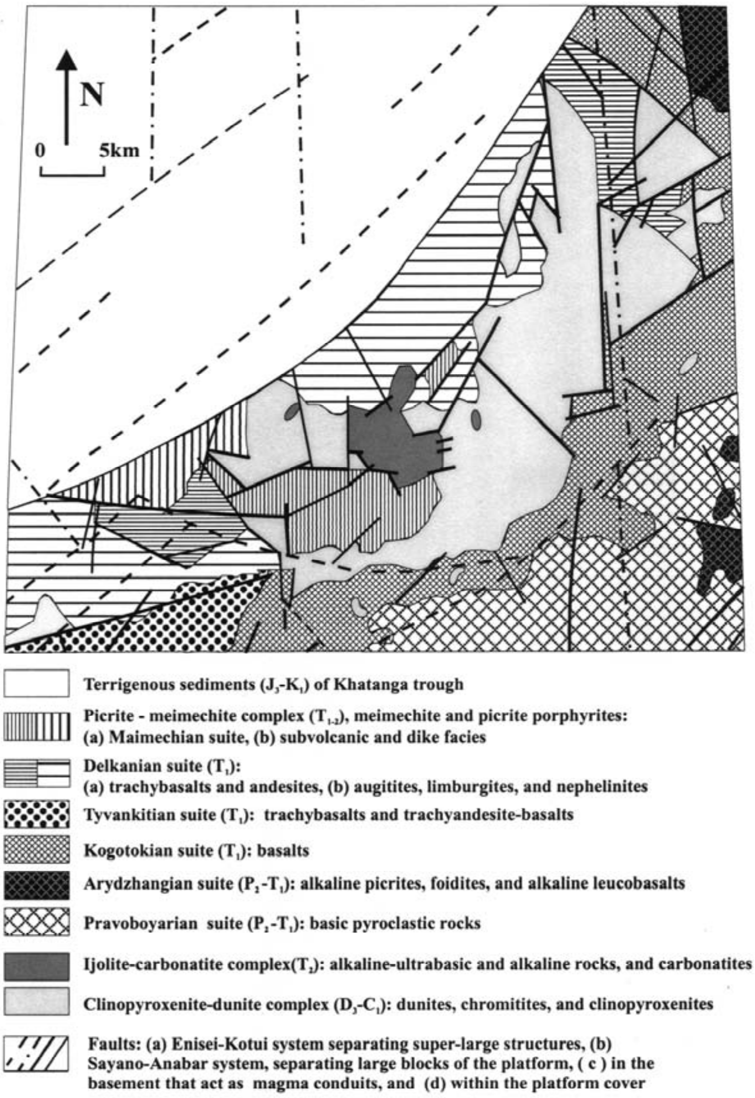
## 4.4. Alkaline – ultramafic and carbonatite intrusive complexes.

- More than 50 multiphase alkaline – ultramafic and carbonatitic complexes have been identified within the Maimecha- Kotui province. The largest complex, the Guli complex, covers 1500 $km^2$. Two complexes are between 42 to 56 $km^2$, three are 11 to 18$km^2$, and four are from 3 to 7 $km^2$, and other complexes are from 10 to 100 $m^2$. These complexes are concentrated along submeridianal faults, they have a cylinder-like morphology and intrude Palaeozonic terrigenous – carbonate rocks. The current consensus from Russian geologists is, that these complexes have been emplaced concentrically, have a multiphase origin, which consists of the following:
- Phase 1: Dunites (olivinites, peridotites),
- Phase 2: Melilite rocks,
- Phase3: Jacupirangites- melteigites and related alkaline mafic rocks,
- Phase 4: Ijolites,
- Phase 5: Nepheline and alkaline aegirine syenites,
- Phase 6 : Rocks of a phoscorite series,
- Phase 7: Carbonatites. All phases are represented in only two massifs, Guli and Kugda.

## *4.5. The Guli Massif*

- The Guli massif (70°57' N; 101°26' E) is located in the Kotui basin of the Maimecha – Kotui magmatic province. The western margin of the Guli massif lies on the right bank of the Maymecha River, while the northeastern margin lies 10 km from the Kotui valley. The Guli massif is a large heterogeneous intrusive body, composed of ultramafics, alkaline rocks and carbonatite. Aeromagnetic data suggests that the intrusive is oval in shape, with dimensions of 35 x 45 km and occupies an area of 1500 to 1600 $km^2$. As such it is the world's largest dunite – clinopyroxenite massif. Approximately two thirds of the Guli Massif lies beneath the deposits of the Khatanga basin. On the basis of geophysical data, the buried portion of the massif increases in thickness from 0.5 to 2-4 km towards the Khatanga basin. Only the southeastern part of the massif is exposed. This crescent shaped outcrop occupies an area of 470 $km^2$.(Yegorov, 1989). See Fig 4 - 2

**Figure 4-2** Schematic geological map of the Guli Massif, modified after (Malitch and Anonymous, 2002)




## Structural and Geological location:

- Early Triassic volcanics host the massif. These volcanics are composed of ultramafic foidites of the Ary-Dzhang formation to the northeast, basalts of the Lower Kogotok sub-formation to the south and east, while to the southwest trachybasalts, trachyandesites, trachyrhyolites, dacites, ultramafic foidites, alkalic metapicrites and meimechites of the Kotogok, Del'kan and Meimecha formations form the host rock See Fig 4 - 2. The total thickness of the lava sequence, intruded by and covering the massif, is approximately 4 km. The northern and northwestern sections of the pluton are buried beneath the Mesozoic – Cenozoic deposits of the Khatanga basin. It has been interpreted that caldera subsidence of the roof of the pluton (during the early stages of emplacement or possibly after emplacement) led to isolated remnants of the lava sequence (e.g. alkalic metapicrites and meimechites) occurring within the pluton.

- The Guli massif is located on the boundary between the Siberian platform and the Mesozoic – Cenozoic Khatanga basin, where the most active abyssal faults of Early Triassic magmatic activity meet. To the north, the Central Taymyr (Baykura – Meimecha) fault approaches the massif and can be traced to the south where it is known as the Meimecha – Kotui fault. Both of these faults are part of the Taimyr –Baikla fault system. To the west, the Malaya Kheta-Kheta and the Yenisey – Guli deep faults, which are elements of the Pyasina – Khatanga paleorift, are truncated by the Guli massif. To the northeast the pluton is truncated by a branch of the Kotui deep fault, while to the southwest the Romanikha fault can be traced.
- Geological and geophysical data indicate that the southeastern contact of the massif with the volcanic sequence is nearly vertical. The gravity field over the massif is similar to the geophysical anomalies produced by other vertical plutons in the Maimecha – Kotui region. On this basis the Guli massif has been interpreted as having a stock-like form, the width of which decreased with depth. See Fig 4 -3, which shows the geophysical outline of the Guli massif.

- Within the pluton, several petrographically different rock groups have been identified. They have been interpreted by (Yegorov, 1989) as being the result of successive phases and subphases of intrusive activity. These phases are described in Table 4 -1.

**Table 4-1** Sequence of formation of the Guli massif, after (Yegorov, 1989)

| Phase of emplacement | Subphase of emplacement | Rocks |
|---|---|---|
| Seventh | Third<br>Second<br>First | Dolomitic carbonatite<br>Fine grained calcitic carbonatite<br>Coarse grained calcitic carbonatite |
| Sixth | | Phoscorite |
| Fifth | Second<br>First | Microshonkinite and solvsbergite |
| Fourth | Third?<br>Second<br><br>First | Ijolite and ijolite pegmatite<br><br>Jacupirangite and melteigite<br>Melanephelinite, olivine melanephelinite, nepheline and biotite - pyroxene picrites<br>Melteigite, malignite and shonkinite |
| Second | | Melilite rocks |
| First | Second<br>First | Ore pyroxenite (koswite)<br>Dunite |

- The Guli massif differs from the typical zoned massifs in that it is not concentrically zoned. The exposed section of the massif, ~ 600 $km^2$ is composed of dunites, chromitites, wehrlites and magnetite-bearing clinopyroxenites. Dunites comprise the dominant rock type, with a body ~ 30 km long and 10 – 15 km wide, which dips moderately to the northwest. The southwestern section of the massif is overlain by Meimechian ultramafic volcanics (meimechites). The central sections of the massif are comprised of nepheline basalts (called ankaratrites – a melanocratic nepheline basalt) and picrite. The picrites are cut by stock – like bodies of the Meimecha – Kotui ijolite – carbonatite complex. To the north and northwest the Guli massif is overlain by continental and marine sediments. See Fig 4-3 Map of the Guli massif. The Guli massif, while being considerably larger, not concentrically zoned and without the rounded shape of other zoned massifs, it has the ultramafic rock suite and many of the petrological and geochemical characteristics typical of zoned massifs.

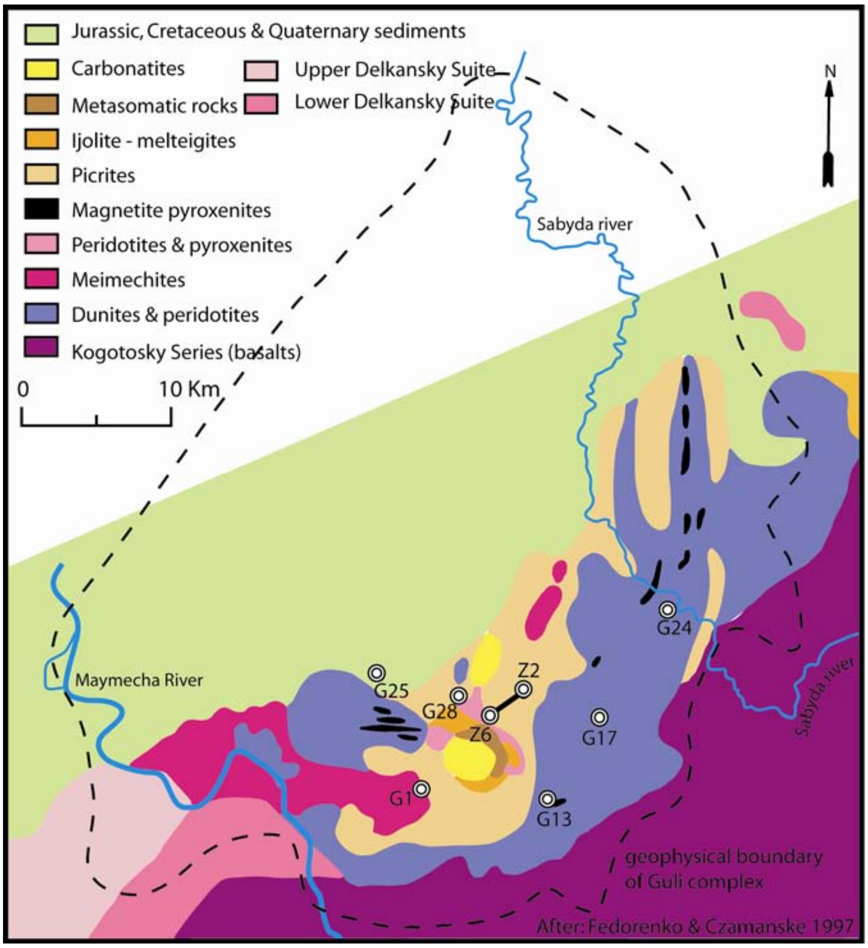
- Mineralisation within the Guli complex is associated with a number of different systems. Most notably the gold and PGE mineralisation (Malich and Thalhammer, 2002) with placer deposits of noble metals prognosticated at ~ 20 tons (Malich and Lopatin, 1997). The Guli Massif is a known source of phlogopite and clinohumite in association with the carbonatitic intrusion. It is also regarded as having potential ore deposits of titanomagnetite and chromite from the dunite core. (Kogarko et al., 1995)

**Age constraints of the Guli Massif**

- The age of the Guli Massif is poorly constrained. (Dalrymple et al., 1995) have reported an $^{40}Ar/^{39}Ar$ age of 437.7 ±1.2 Ma for the carbonatites. Meimechites are generally assigned to the upper most stratigraphic position of the Siberian flood volcanic plateau, which has been dated at 245 ± 1 Ma. (Arndt et al., 1998a; Dalrymple et al., 1995; Horan et al., 1995). Age determination of the meimechites on the basis of Sm-Nd, K-Ar and Os isotope data suggest an age within the time interval of 220 -245 Ma. (i.e Permian/Triassic) (Dalrymple et al., 1995; Malich and Kostoyanov, 1999; Yegorov, 1989). More recent preliminary Os isotope data from PGM from placer deposits in the vicinity of the Guli Massif reveal model ages of ~370 Ma. (Malich and Kostoyanov, 1999). This suggests that the Guli ultramafic complex is Early Carboniferous, corresponding to the final stage of the Middle Paleozoic tectonic cycle of development of the

Siberian Platform. A 206Pb/238U vs 207Pb/235U age of 250.8 ± 3.5 Ma was obtained from perovskite from a clinopyroxenite from drill core G28 by (Dvorani, 2007) as a part of this project.

**Figure 4-3** Map of the Guli massif showing the geophysical outline of the massif



## *4.6. Genesis and economic potential of Zoned Alkali – Ultrabasic Complexes (with reference to Russia)*

- Summary after (Zalishchak et al., 1994). Zoned alkali - ultrabasic complexes are often found in tectonically stable zones. They are usually limited to deep seated fractures and zones of tectonic – magmatic activity during the Meso-Cenozoic age. These complexes often form concentric – zoned structures and are comprised of various carbonatitic, calc- alkalic to ultramafic rocks. Older complexes, forming over a long period of time often contain rocks that are not co- magmatic. Older ultramafic cores of either Precambrian or Paleozoic age, and younger Mesozoic alkaline rocks have been observed within these complexes. Alkali – ultramafic volcanic and sub-volcanic rocks are comprised of alkaline picrites, ankermanites, ultrabasic foidites, nephelinites and in some case lamproites and kimberlites.
- A multiphase genesis of the zoned alkali- ultrabasic complexes is most common. The first phase consists of ultramafic rocks such as dunites and pyroxenites (with grain size varying from fine to pegmatoidal). These have undergone varying degrees of metasomatism (kaersutitised, biotitsed or phenitised). The pyroxenites may contain economic concentrations of titanomagnetite, ilmentite, sphene, perovskite and apatite. The alkaline – ultramafic rocks are composed of aegirine ijolite- melteigites and hastingsite-aegirine-augite ijolite-melteigites and may form bands and lenses in nepheline syenites or occur in separate bodies among pyroxenites. The second phase is comprised of veins of foyaites, mayaskites and aegirine-augite-hastingsite-nepheline syenites. The third phase is represented by emplacement of veins of lujavrites, rischorites and mariupolites

and their pegmatitodal equivalents. Small carbonatite bodies (approximately 1 km in diameter) occurring both outside the massif and within complete the formation of the complexes. Metasomatically altered pyroxenites can form an external zone, often several hundred meters thick and distributed along the inner sections of the tectonic fractures of the massif. Mineral variations of the ultrabasic and alkaline rocks are usually controlled by alkali metasomatism in the temperature range of 600 to 100°C. The platinum mineralisation is spatially and genetically connected with the dunites, it has also been associated in ore-bearing pyroxenites, metasomatic rocks and in skarns. Gold was commonly deposited after platinum mineralisation. Additionally significant chrome spinels bearing inclusions of platinum group minerals have been observed in zoned alkali – ultrabasic complexes.

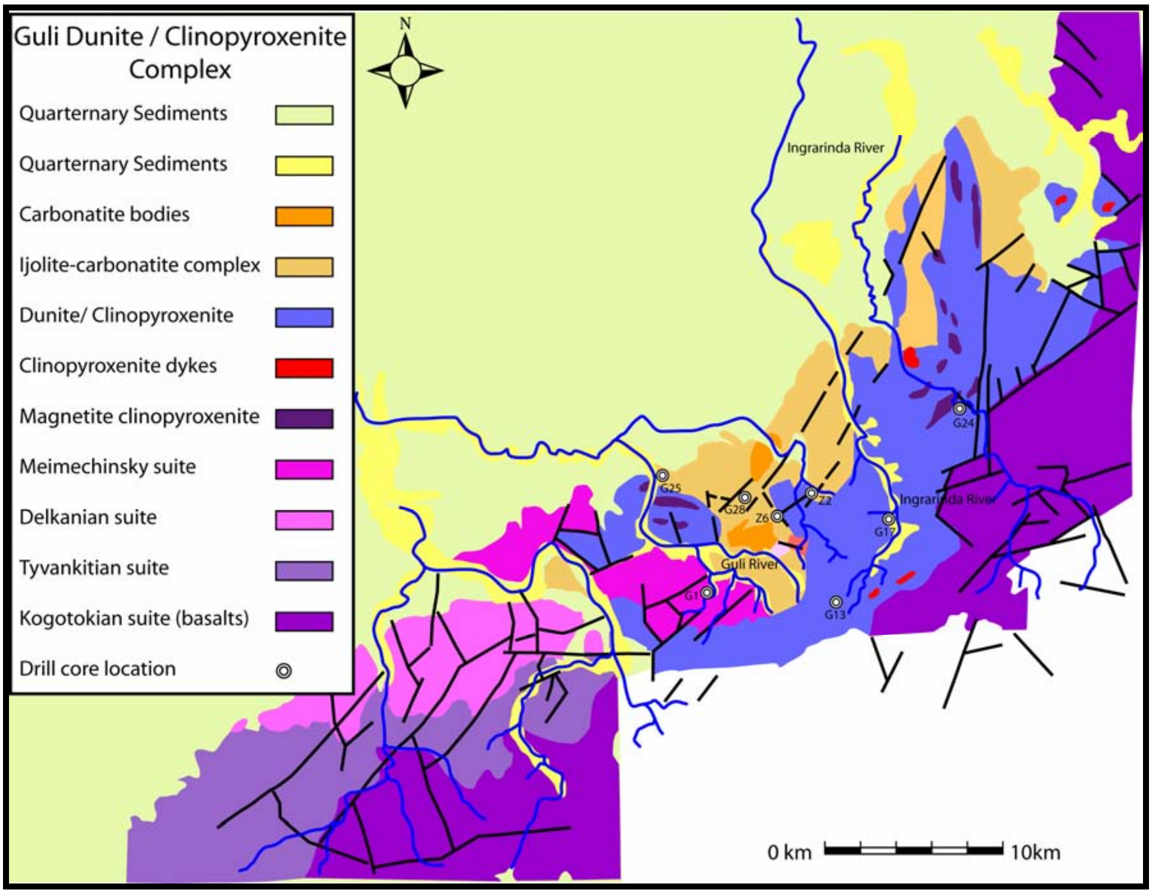
- Alkali – ultramafic complexes are characterised by a genetic diversity (magmatogene, hydrothermal and exogenic origin, etc.) and by a variety of ore minerals and non – metallic mineral resources. These can include
- Sphene – apatite – titanomagnetite mineralisation.
- Rare metal mineralisation (zircon, pyrochlore and rare earth element minerals)
- Skarn and fenite rocks with mineral occurrences such as perovskite, gahnite, phlogopite, richterite-asbestos.
- Gelzircon- baddeleyite occurrences.
- Platinum – chromite and gold mineralisation and associate placer deposits.
- Diamond deposits in subvolcanic bodies.
- Exogenic vermicuilte deposits.

# 5. The Guli Massif

## 5.1. Previous studies and Field work during this study

Previous work on the complex has been carried out mainly by Russian geologists, starting with the discovery of the massif by Sheinman in 1943. Moor & Sheinmann (1946) carried out a petrographic study of the complex. Epshtey *et al* (1961) carried out exploration on the phlogopite deposit and surrounding area during the 1950's. The complex has been extensively mapped during various drilling and mapping campaigns between 1990 – 1994 (Polar Party, Noril'sky Kombinant); however few of these maps have been released or made available in the West. From this information, and documents made available during the field work for this study a geological map was constructed. (See Fig 5-1). On the basis of these different studies the Guli massif has been interpreted as a multi-stage intrusion, beginning with the intrusion of the dunite mass, with the final stage being represented by the carbonatite bodies (Kogarko et al., 1995). Considerable age dating has been done on the rocks of the Maimecha-Kotui province. Most of the isotope dating has been done on the surrounding volcanics, which consistently give ages of between, 253 and 243 Ma. Age data from the Guli Massif itself is somewhat varied. Older Russian articles often give ages and isotope systems used for analysis, but not the mineral or location of the sample. The oldest age is 437.7 ± 2.0 Ma., using the Ar – Ar system on biotite from the carbonatite or metasomatic zone. (Dalrymple et al., 1995), while (Kamo et al., 2000) obtained an age of 252.7 ± 0.3 Ma. from baddeleyite ($ZrO_2$) from the carbonatite, while Os - Os isotopes from PGM nuggets from the rivers of the Guli massif have yielded two ages 370 ± 45 Ma. and 230 ± 30 Ma. (Malich and Kostoyanov, 1999). A young age of 240 Ma. has was published in Kogarko *et .al. 1988*, this was obtained using Rb – Sr and Sm – Nd isotope systems however the location of the sample is given only as "Guli".

**Figure 5-1** Map of the Guli Massif complied from various sources.



## 5.2. Economic Potential – Guli Massif

An evaluation of the metallogenic potential of the Guli Massif and the entire Maymecha-Kotui province was given by (Malich et al., 1996). PGE placers were explored by Likhachev *et al.* (1987), Lazarenkov *et al.* (1992) and (Malich and Lopatin, 1997), and later studied by Malitch *et al.* (1995), Malitch & Auge (1998), (Malich and Kostoyanov, 1999) and (Malich and Thalhammer, 2002). A few PGM were identified from chromitite-bearing dunites of the Guli Massif by Malitch & Rudashevsky (1992). The gold placers were investigated by Sazonov *et al.* (1994) and Simonov *et al. (*1995). The placer deposits are located in valleys and tributaries that drain the Guli Massif, and occur in Upper Quaternary and recent alluvial sediments (Malich and Thalhammer, 2002). A detailed study on gold nuggets and their numerous inclusions had been recently completed within the frame of this research project by S. Dvorani (Dvorani, 2007).

## 5.3. Aims of the Project

The aims of this project were to investigate the Guli Massif, host of the largest dunite complex in the world. The genesis and formation of such large dunite masses is very poorly understood. Therefore this project was focused on characterising the dunite mass, on a mineralogical, petrographical and geochemical basis. The meimechites, which occur on the periphery of the Guli Massif are somewhat of an enigma. The close association to the Guli massif and a possible genetic relationship with the Dunite core complex creates an interesting field of investigation. The Guli Massif is said to host one of the largest concentrations of IPGE placers in the world. The primary source of these placers is as yet unknown. A further aim of this project was is identify possible sources of these IPGE placers.

## *5.4. Field work carried out during this study*

The field work of this study was carried out during summer 2003. A field camp, located on the banks of the Guli River (Fig 5-2), represented the base for the mapping and sampling campaign carried out. The camp had been previously utilised as a base for drilling expeditions of the Polar Party and subsequently was used as the camp for mining operations on the Guli River. The camp consisted of a number of converted railway carriages as sleeping quarters and a small hut that was used as a kitchen and dining room. The water supply was the river, cooking was done on an open fire or cast iron stove. Although the camp had a number of vehicles remaining from the drilling expedition none of these were available for use. A great deal of the drill core from the Polar Party drilling programs was stored on site. See Fig 5-4. However, two of the cores of most interest for the present study remained at their original drill location. See Fig 5 - 3 In order to sample and log these cores, several very long, up to 23 hour hikes had to be done. See Fig 5-5

**Figure 5-2** The field camp on the banks of the Guli River

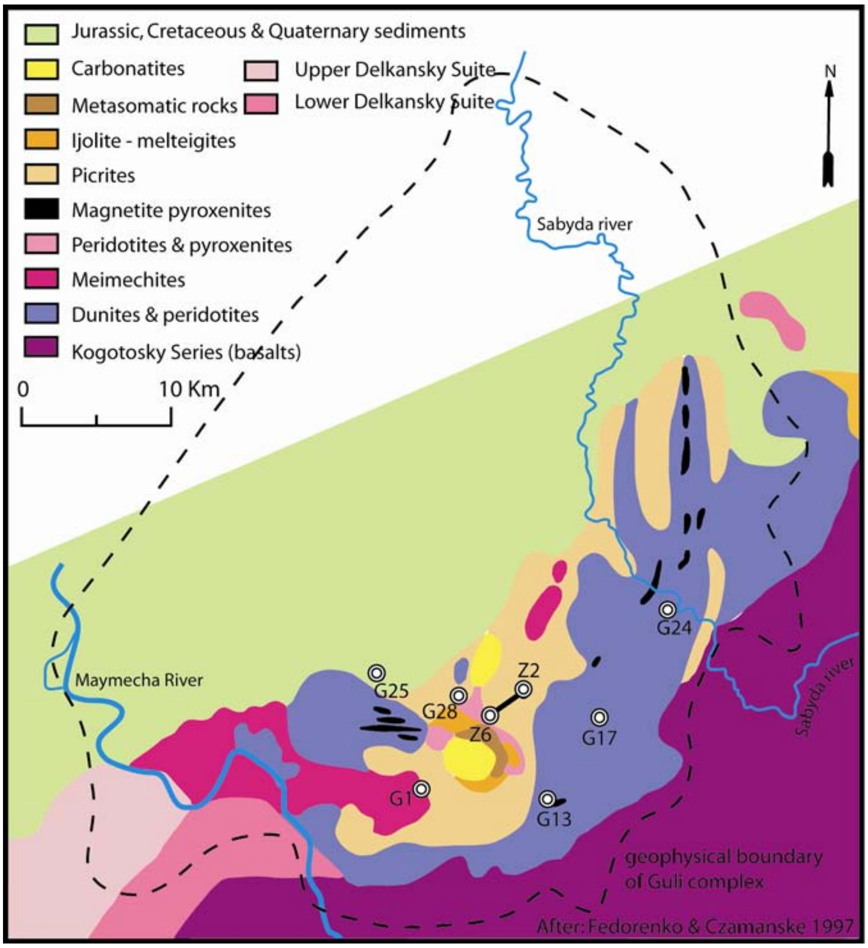
**Figure 5-3** Drill core G17

**Figure 5-4** Storage location for drill core

**Figure 5-5** The Ingarinda River

Apart of collecting surface rock samples from various outcrops and mapping some sections in detail, the dominant number of samples for this study was collected from drill cores. See Fig 5-6 for the locations of the drill cores.

**Figure 5-6** Detailed map of the Guli Massif showing drill core locations and the geophysical boundaries of the complex



The following drill cores had been logged and sampled

G13 (0 – 662.0 m end of core)

G28 (251.0 -506.0m end of core)

G17 (0 – 1281.5 m end of core)

Z2 (0 – 220.5 m end of core)

Z3 (0 – 191.0 end of core)

Z4 (0 – 216 m end of core)

Z12 (0- 99.7 end of core)

G1 (~7.5m – 401.0 m end of core)

A number of representative samples were collected from other drill cores. The drill cores were logged on the basis of, rock type, grain size, visible accessory minerals, veining and degree of alteration. Samples of the drill core were taken at regular intervals, or at locations of specific interest.

Drill cores G28, Z2, Z3, and Z4 have been investigated as part of the of the Diploma thesis of Gernot Loidl (2005), entitled "The metasomatic contact aureole between the carbonatite and dunite – complex of the Guli Massif, Taimyr province, northern Siberia, Russia. A mineralogical – petrological – geochemical study" and the PhD thesis of Sami Dvorani (2007), entitled "Die Genese und die Herkunft von Gold Nuggets aus dem Guli Massiv, Nordsibirien, Russland: eine multidisziplinäre mineralogische und geochemische Studie". These cores had been selected, because they represented a transect from the dunite core complex to the carbonatites, with G28 representing the core closest to the carbonatites and Z2 the core closest to the dunite rock of the Guli Massif.

For the purpose of this study drills cores G17 (1200m), located in the centre of the dunite complex of the Guli Massif, G13 (662m), located at the periphery of the dunite complex, and core G1 (401m), located at the periphery of the Massif, were investigated in detail.

Figs 5-7 to 16 shows the results of the drill core logging for cores G17, G13 and G1, while Table 5 1 & 2 show samples list and analysis carried out.

## 5.5. Drill core logs

**Figure 5-7** Drill core log G17 0 – 250 m

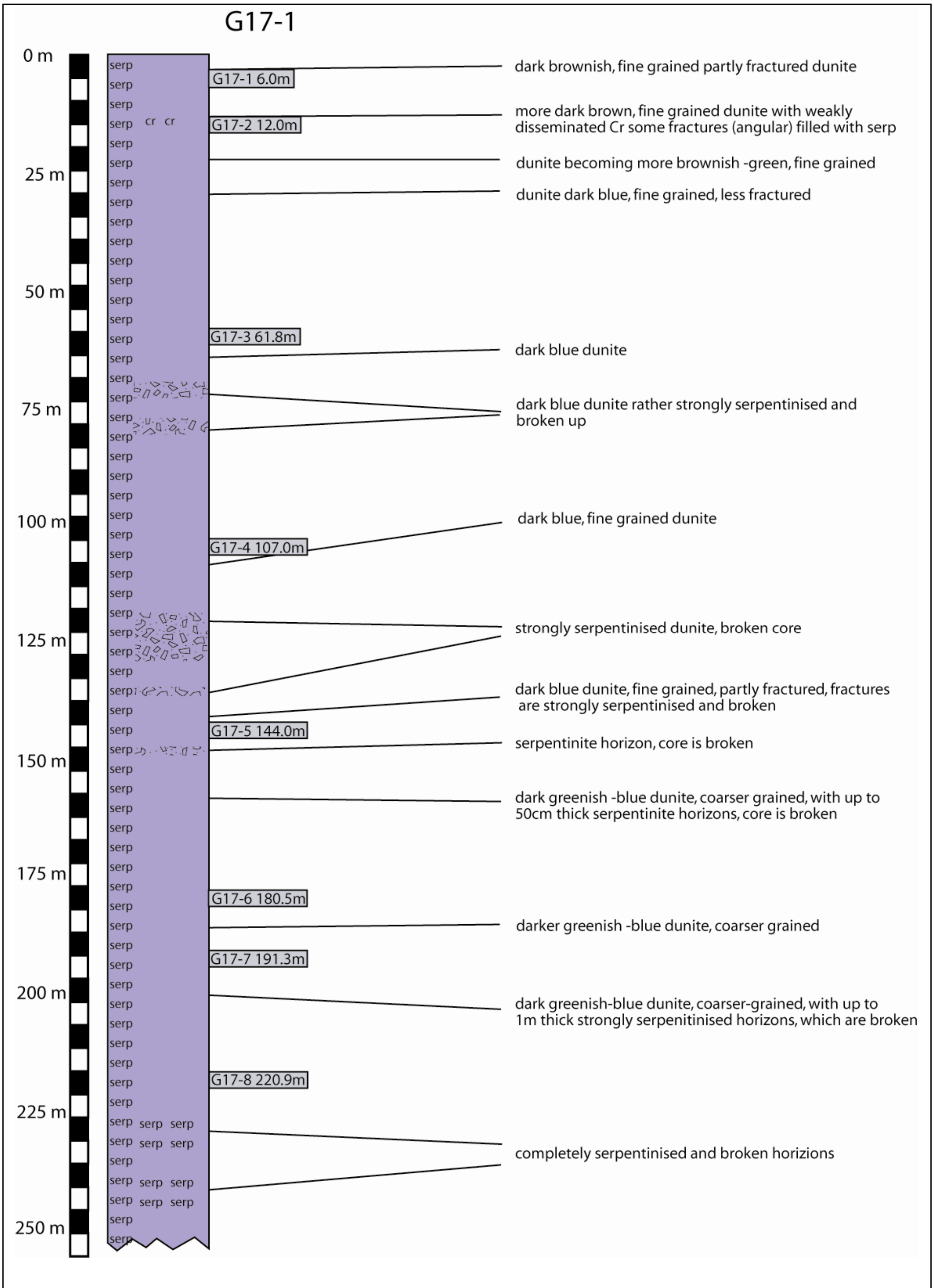


**Figure 5-8** Drill core log G17 250 – 500 m

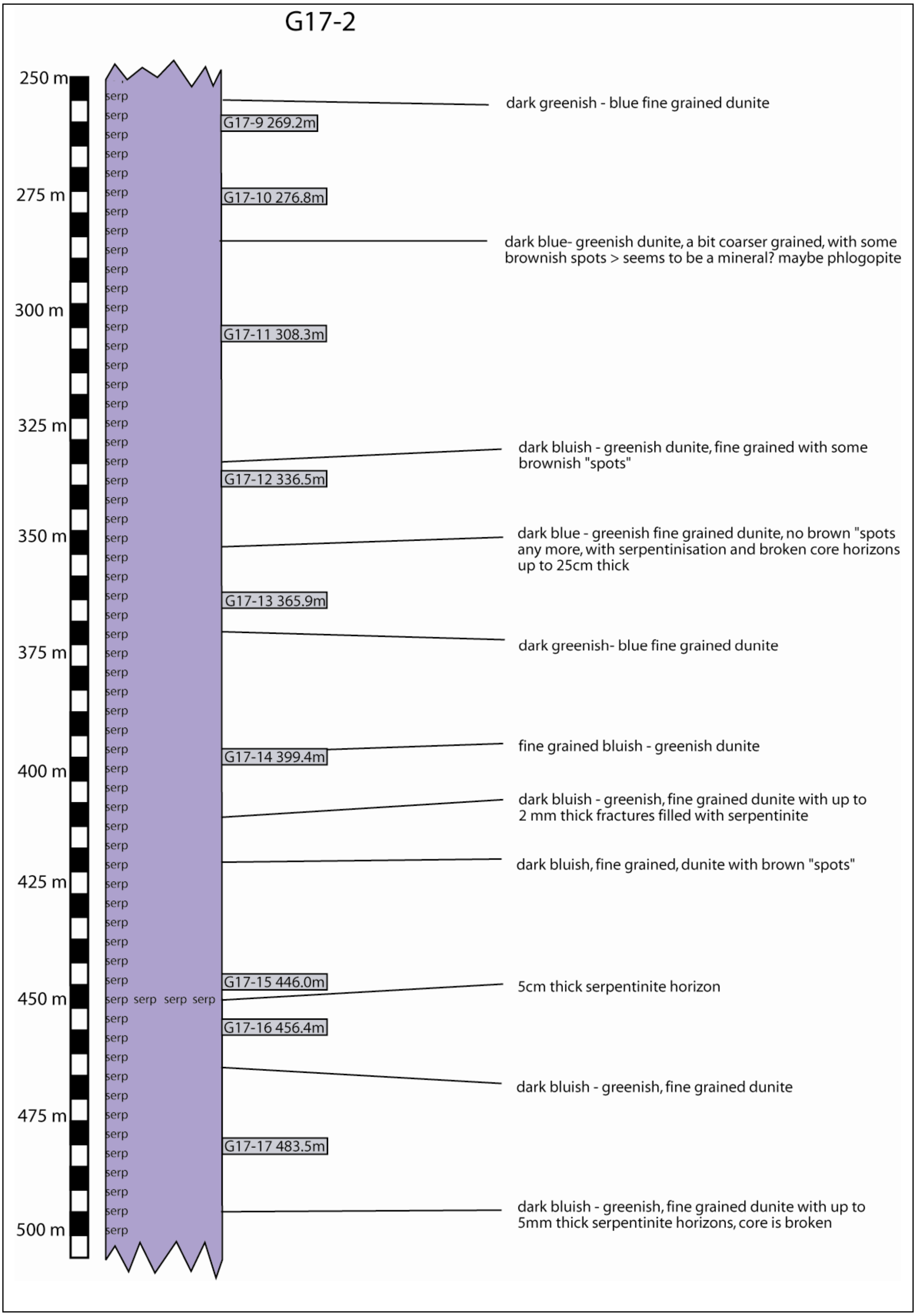


**Figure 5-9** Drill core log G17 500- 750 m

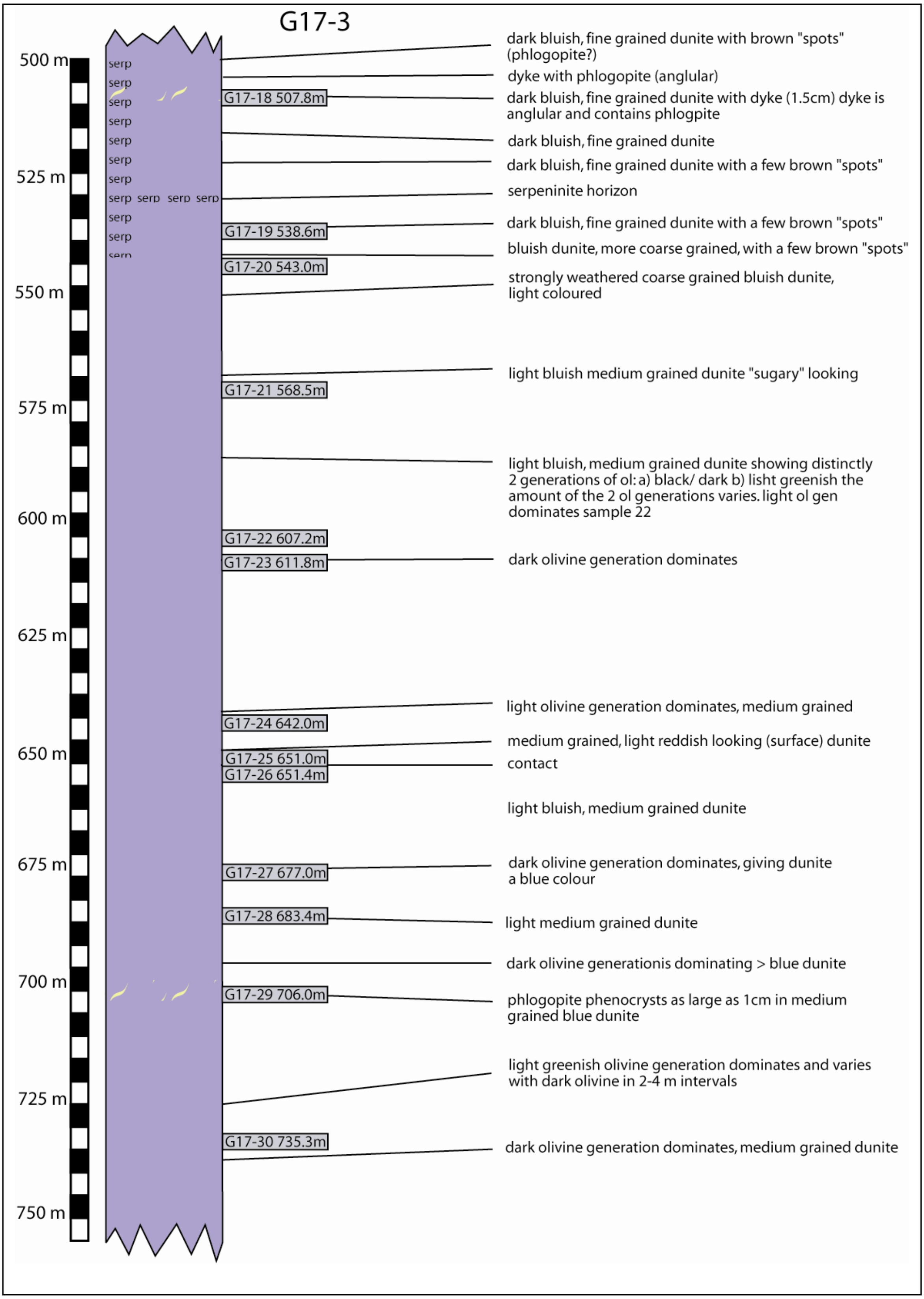


**Figure 5-10** Drill core log G17 750 -1000 m

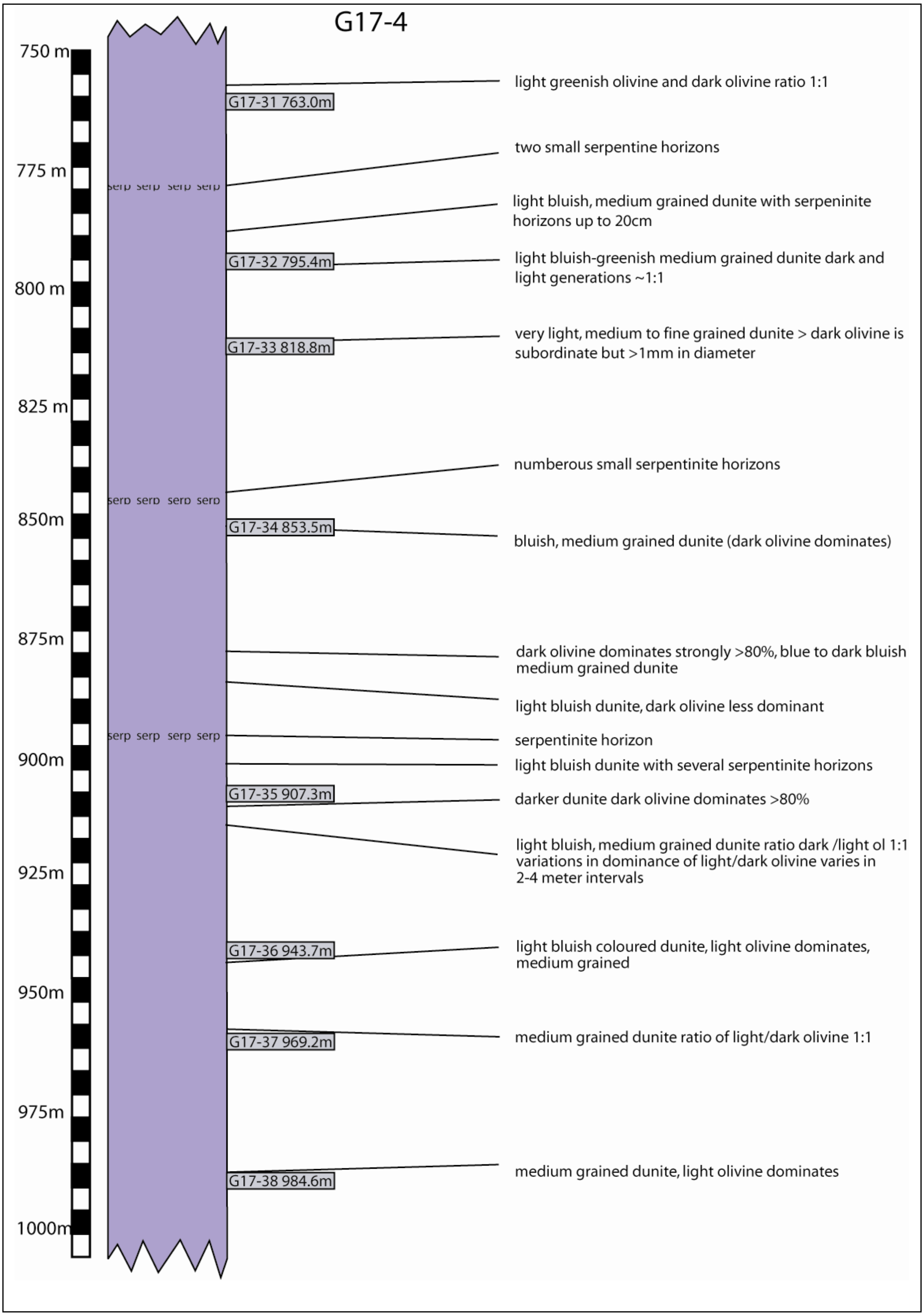
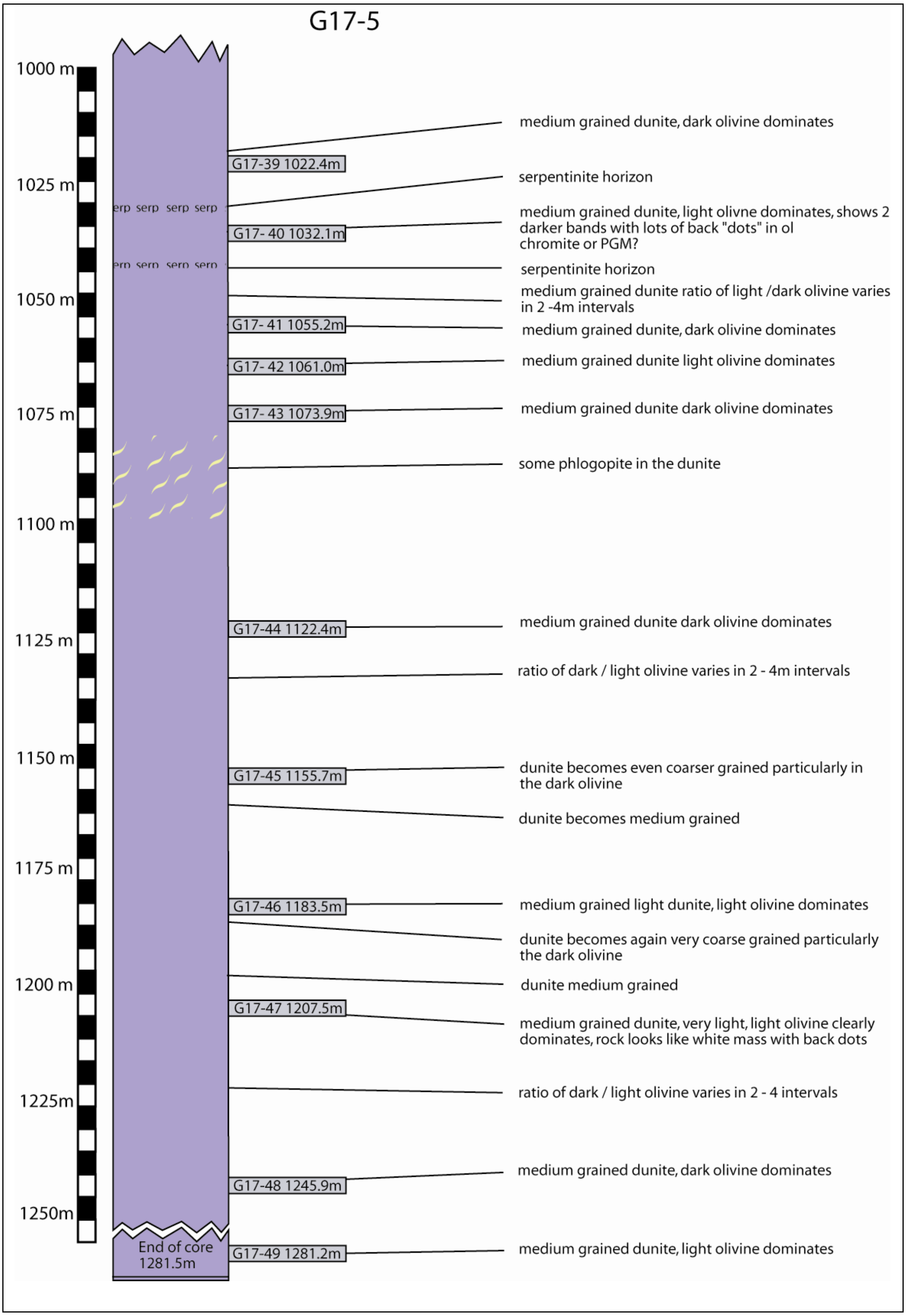


**Figure 5-11** Drill core log G17 1000 to end of core.



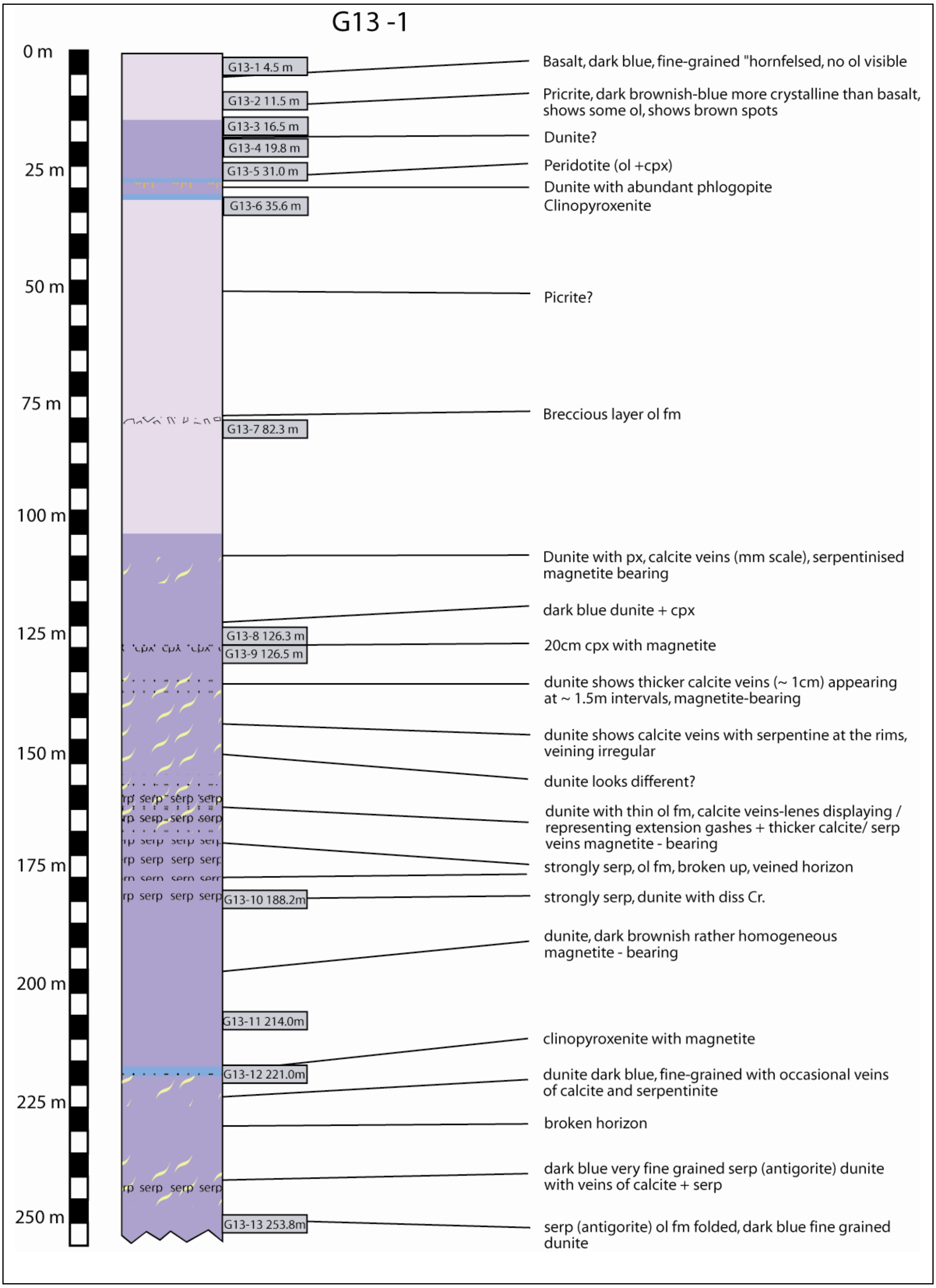



**Figure 5-12** Drill core log G13 0 - 250 m

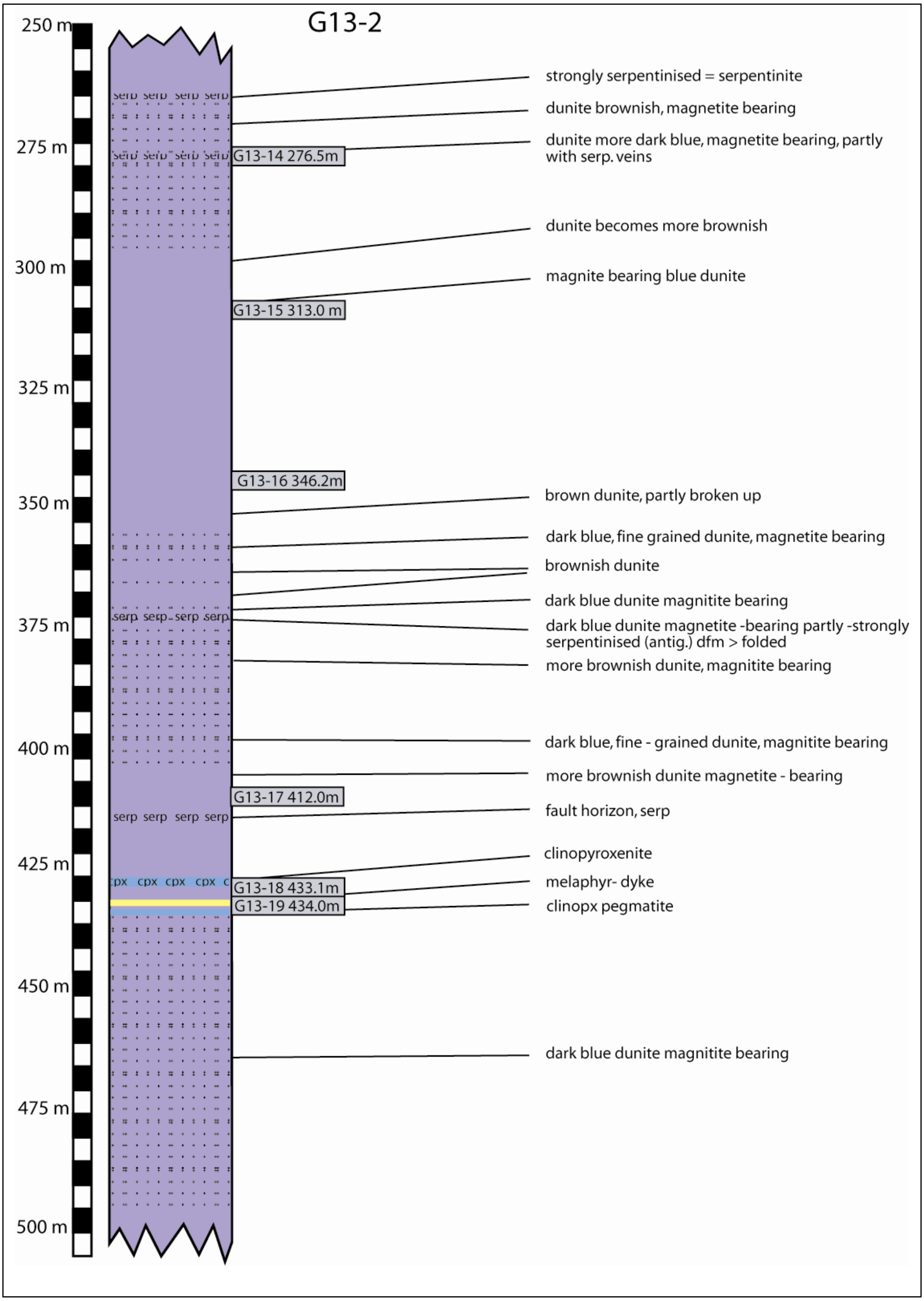



**Figure 5-13** Drill core log G13 250 -500 m

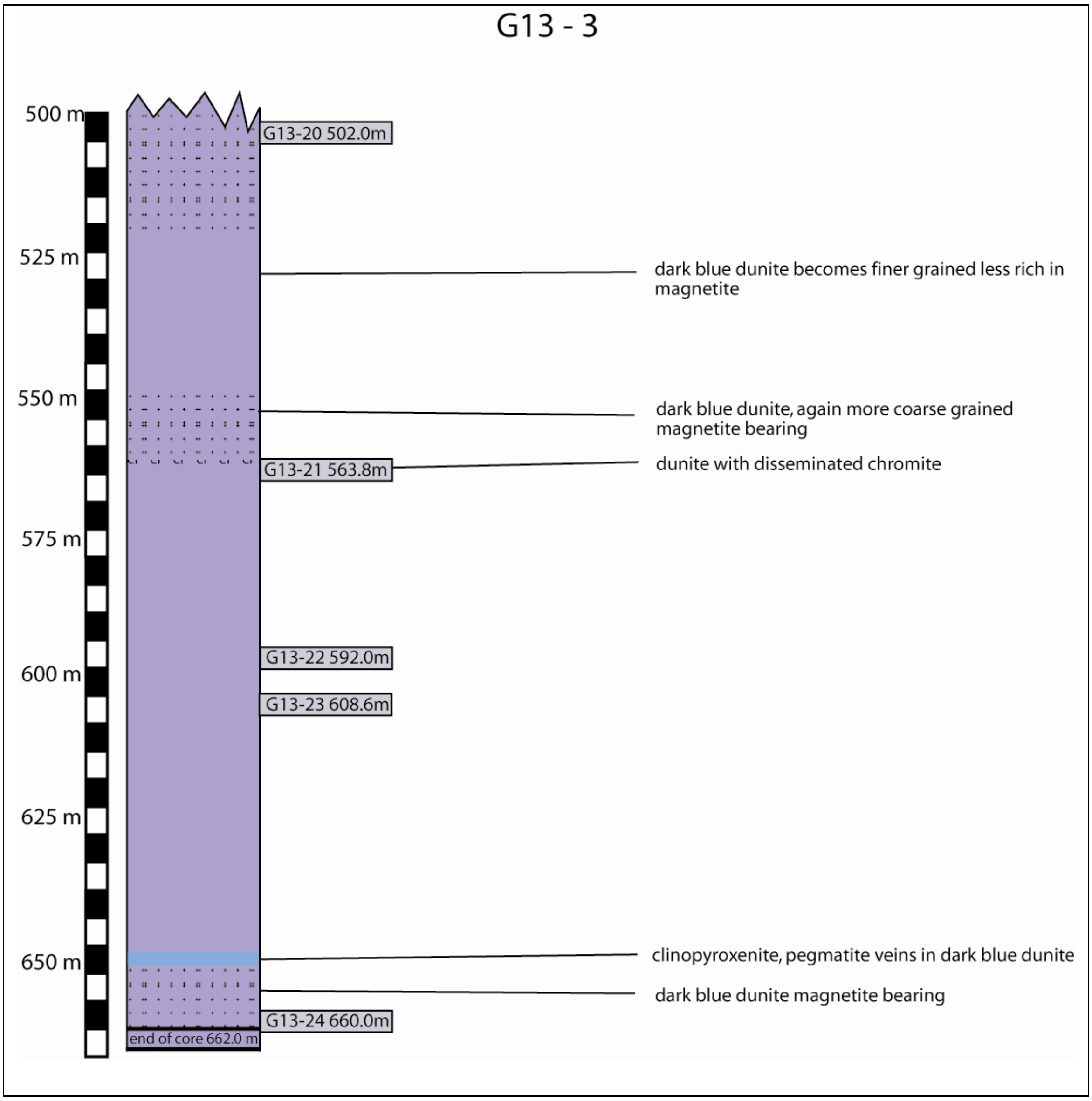



**Figure 5-14** Drill core log G13 500m – to end of core.

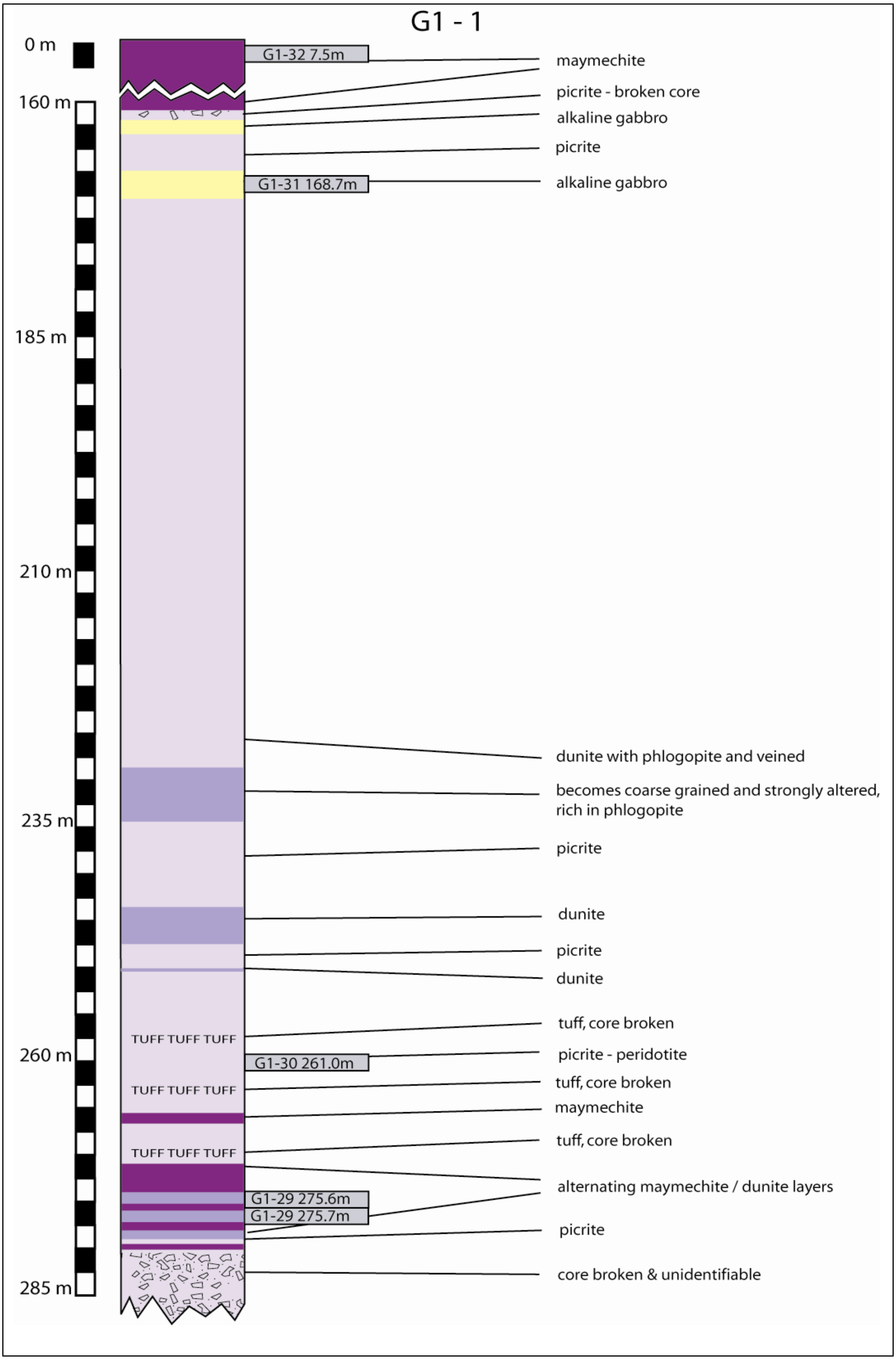



**Figure 5-15** Drill core log G1 – 1 0 – 285 m

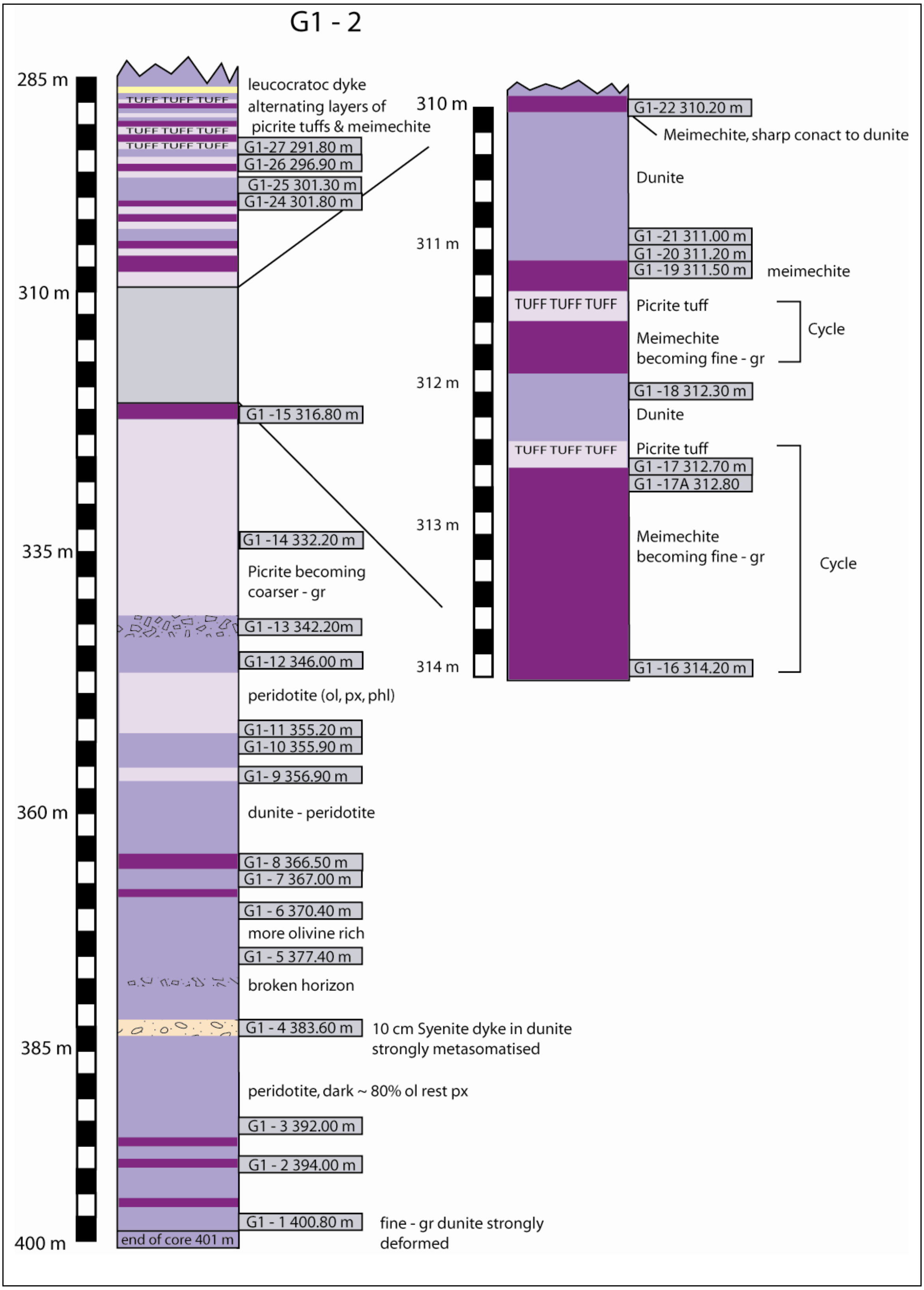



**Figure 5-16** Drill core log G1 – 2 285 – 400 m

| Drill Core | Sample # | Depth | | Analysis | | | IC-PMS | |
|---|---|---|---|---|---|---|---|---|
| | | | | Thin Section | Micro Probe | XRF | PGE | REE |
| G-17 | 1 | 6 | | | | | | |
| G-17 | 2 | 12 | | | | | x | x |
| G-17 | 3 | 61.8 | | | | | | |
| G-17 | 4 | 107.8 | | x | | x | x | x |
| G-17 | 5 | 146 | | | | | | |
| G-17 | 6 | 180.5 | | | | | | |
| G-17 | 7 | 191.3 | | x | | x | x | x |
| G-17 | 8 | 220.9 | | | | | | |
| G-17 | 9 | 269.2 | | x | | | | |
| G-17 | 10 | 276.8 | | | | | | |
| G-17 | 11 | 308.3 | | | | | | |
| G-17 | 12 | 336.5 | | x | | x | x | x |
| G-17 | 13 | | | | | | | |
| G-17 | 14 | 399.4 | | | | | | |
| G-17 | 15 | 446 | | | | | | |
| G-17 | 16 | 456.4 | | x | x | x | x | x |
| G-17 | 17 | 483.5 | | | | | | |
| G-17 | 18 | 607 | | x | | x | x | x |
| G-17 | 19 | 538.6 | | x | | x | x | x |
| G-17 | 20A | 543 | | x | | | | |
| G-17 | 21 | 568.5 | | x | | | | |
| G-17 | 22 | 607.2 | | x | | x | x | x |
| G-17 | 23 | | | | | | | |
| G-17 | 24 | 642 | | | | x | x | x |
| G-17 | 25 | 650 | | x | x | x | | x |
| G-17 | 26 | 650.4 | | | | | | |
| G-17 | 27 | 677 | | | | | | |
| G-17 | 28 | 683.5 | | | | | | |
| G-17 | 29 | 706.2 | | x | x | x | x | x |
| G-17 | 30 | 735.3 | | x | | | | |
| G-17 | 31 | 763 | | | | | | |
| G-17 | 32 | 795.4 | | x | | | | |
| G-17 | 33 | 818.8 | | x | x | x | x | x |
| G-17 | 34 | 853.5 | | | | | | |
| G-17 | 35 | 907.3 | | x | x | x | x | x |
| G-17 | 36 | 943.7 | | | | | | |
| G-17 | 37 | 969.2 | | | | x | x | x |
| G-17 | 38 | 984.6 | | x | x | | | |
| G-17 | 39 | 1022.5 | | x | x | | | |
| G-17 | 40 | 1032.1 | | x | x | x | x | x |
| G-17 | 41 | 1055.2 | | | | | | |
| G-17 | 42 | 1061 | | x | x | x | x | x |
| G-17 | 43 | 1073.9 | | x | x | x | x | x |
| G-17 | 44 | 1122.4 | | x | x | x | x | x |
| G-17 | 45 | 1165.9 | | x | x | x | x | x |
| G-17 | 46 | 1183.5 | | | | | | |
| G-17 | 47 | 1207.5 | | x | x | x | x | x |
| G-17 | 48 | 1245.9 | | | | | | |
| G-17 | 49 | 1281.2 | | x | x | x | x | x |

**Table 5-1** List of samples and analysis

| Drill Core | Sample # | Depth | | Analysis | | | IC-PMS | |
|---|---|---|---|---|---|---|---|---|
| | | | | Thin Section | Micro Probe | XRF | PGE | REE |
| G-1 | 1 | 400.8 | | | | | | |
| G-1 | 2 | 394 | | x | x | x | x | x |
| G-1 | 3 | 392 | | x | | | | |
| G-1 | 4 | 383.6 | | x | | | | |
| G-1 | 5 | 377.4 | | x | | | | |
| G-1 | 6 | 370.4 | | | | x | x | x |
| G-1 | 7 | 367 | | | | | | |
| G-1 | 8 | 366.5 | | x | | x | x | x |
| G-1 | 9 | 356.9 | | | | | | |
| G-1 | 10 | 355.9 | | x | | | | |
| G-1 | 11 | 355.2 | | | | | | |
| G-1 | 12 | 346.1 | | x | | x | x | x |
| G-1 | 13 | 342.2 | | x | x | | | |
| G-1 | | | | x | x | x | x | x |
| G-1 | 15 | 316.8 | | x | | | | |
| G-1 | 16 | 314.2 | | | | | | |
| G-1 | 17A | 312.8 | | | | | | |
| G-1 | 17 | 312.5 | | x | | | | |
| G-1 | 18 | 312.3 | | x | x | | | |
| G-1 | 19 | 311.4 | | x | x | | | |
| G-1 | 20 | 311.3 | | x | x | x | x | x |
| G-1 | 21 | 311 | | x | x | | | |
| G-1 | 22 | 310.2 | | | | | | |
| G-1 | 23 | 306.1 | | x | | | | |
| G-1 | 24 | 301.8 | | x | x | | | |
| G-1 | 25 | 301.3 | | x | | x | x | x |
| G-1 | 26 | 296.4 | | x | x | x | x | x |
| G-1 | 27 | 291.8 | | x | | | | |
| G-1 | 28 | 275.4 | | x | x | | | |
| G-1 | 29 | 275.3 | | x | | | | |
| G-1 | 30 | 268 | | x | | | | |
| G-1 | 31 | 168.7 | | | | | | |
| G-1 | 32 | 7.5 | | x | | | | |
| | | | | | | | | |
| G-13 | 1 | 4.5 | | | | | | |
| G-13 | 2 | 11.5 | | | | | | |
| G-13 | 3 | 16.3 | | x | x | | | |
| G-13 | 4 | 19.8 | | | | x | x | x |
| G-13 | 5 | 31 | | | | | | |
| G-13 | 6 | 35.6 | | x | x | x | x | x |
| G-13 | 7 | 82.3 | | x | x | | | |
| G-13 | 8 | 126.3 | | | | | | |
| G-13 | 9 | 126.4 | | | | | | |
| G-13 | 10 | 188.2 | | x | x | x | x | x |
| G-13 | 11 | | | | | | | |
| G-13 | 12 | 221.2 | | | | | | |
| G-13 | 13 | 253.8 | | | | | | |
| G-13 | 14 | 276.5 | | | | | | |
| G-13 | 15 | 313.2 | | | | | | |
| G-13 | 16 | 346.2 | | x | | x | x | x |
| G-13 | 17 | 412 | | x | x | x | x | x |
| G-13 | 18 | 433.1 | | | | | x | |
| G-13 | 19 | 433.1 | | | | | | |
| G-13 | 20 | 502 | | x | x | x | x | x |
| G-13 | 21 | 563.6 | | x | x | x | x | x |
| G-13 | 22 | 592.5 | | | | | | |
| G-13 | 23 | 608.6 | | | | | | |
| G-13 | 24 | 660 | | x | x | x | x | |

**Table 5-2** List of sample and analysis

# 6. Methods

## 6.1. Sampling and sample preparation

In total 55 thin sections were prepared for microscopic investigation. The thin sections were prepared as uncovered polished thin sections using *Logitech* thin section and *Rehwald* polishing machines. Lapidary discs with a diamond slurry were used for polishing. For microprobe analyses the sections were carbon coated.

### Microscopy

Transmitted and reflected light microscopy was carried out on an *Olympus BX 40 polarising microscope*, which was equipped with an *Olympus U-RLA bright field / dark field vertical illuminator* and an *Olympus TH3 halogen lamp unit* for reflected light microscopy. Five-, ten-, twenty-, forty-, fifty-, and one hundred times magnification objectives were used. Thin section images were taken on a *Zeiss Axiolab* microscope fitted with a *JVC KY-F55B* video camera and a *Leica Q500IW* computerised image capture and processing system. *Leica Qwin Standard Y2.3a* software was used for image processing.

### Electron Microprobe

The electron microprobe was used to determine the chemical composition of individual mineral phases, inclusions and exsolutions selected in the microscopy study. With this technique an electron beam, accelerated on the basis of a selected voltage (In the range of 15 to 30kV) is focused on the surface of the sample. The diameter of the focused beam is ~ 3 µm. With the influence of the surrounding minerals, the minimum grain size that can be measured is between 5 – 10 µm. Interaction between the primary electron beam and the sample creates a number of phenomena including the creation of element characteristic X-rays. The intensity of these X-rays is detected using wavelength dispersive and/or energy dispersive spectrometers. The microprobe used at the Department of Applied Geosciences and Geophysics (Mineralogy and Petrology) is an *upgraded ARL-SEMQ 30*, equipped with 4 wavelength dispersive spectrometers (WDS) with *TAP, LIF and PET diffraction crystals* and a LINK 860 engery – dispersive spectrometer (EDS). Typical beam operating conditions are 15-20 KeV and up to 30 nA. Computer control allows for digitized image acquisition (in beam – scanning mode) and processing of various signals from the sample including secondary electron (SE) emission, back-scattered electrons (BSE) and characteristic X-rays. The probe is controlled by a modified *ARL program (JamiWin2)* software, written by S. Merz. Elements heavier than fluorine (atomic number greater than 9) can be analysed quantitatively. Appropriate standardisation programs using typical standard minerals were used for quantitative analyses. Table 6 - 1 gives an overview of the standard minerals used in the various standardisation programs. Analytical conditions were 20 – 25 kV and 15 – 20 nA. Matrix correction and oxide recalculation were carried out after the model of *Bastin* which is intergrated in the JamiWin2 data processing program. All spreadsheets used to calculate cation distribution and mineral classification have been designed and developed by Jeremy Preston (Preston, 2002) using high quality published techniques, equations, distribution coefficients in addition to thermodynamic and mineralogical data.

Further EMP analysis was carried out with the new JEOL-JXA 8200- WD/Ed combined microanalyzer microprobe at the Chair of Mineralogy and Petrology at the Department of Applied Geosciences, University of Leoben. See Table 6 - 2 for the mineral standards used. Measurements were done with an accelerating voltage of 15 kV at 1.09E-8 A with an analysis time of peak 15 sec and background 5 sec. The applied correction for all standardisation is ZAF.

| Standardisation program | Analysed Minerals | Determined Oxides | Standard minerals (standard identification name) |
|---|---|---|---|
| Standardisation program "Silicates" | Amphibole pyroxene olivine phlogopite | MgO, FeO, $SiO_2$ | Olivine ( $ro_{10}$ ) |
| | | $CrO_2$, $Al_2O_3$ | Chromite ( $Chro_9$ ) |
| | | $TiO_2$ | Ilmenite ( $ro_{17}$ ) |
| | | MnO | Rhodonite ( $ro_2$ ) |
| | | CaO | Diopsite ( $ro_{14}$ ) |
| | | $K_2O$ | Biotite ( $ro_5$ ) |
| | | $Na_2O$ | Jadeit ( $ro_3$ ) |
| | | NiO | Nickel alloy ( eis ni ) |
| Standardisation program "Spinel" | Olivine Spinel | $SiO_2$, MgO | Olivine ( $ro_{10}$ ) |
| | | FeO, $Al_2O_3$, $Cr_2O_3$ | Chromite ( $Chro_9$ ) |
| | | NiO | Nickel alloy ( eis ni ) |
| | | ZnO | Bustamite ( $ro_1$ ) |
| | | MnO | Rhodonite ( $ro_2$ ) |
| | | CaO, TiO | Kaersutite ( $ro_6$ ) |
| | | $V_2O_3$ | Vanadium alloy ( v ) |

**Table 6-1** Overview of standardisation programs and mineral standards used on the *upgraded ARL-SEMQ 30 microprobe.*

| Determined Oxides | Mineral Standard used for silicate analysis | Mineral Standard used for spinel analysis |
|---|---|---|
| MgO | F-Phlogopit | Chromite_S08 |
| Al2O3 | S08_Kearsutit | Chromite_S08 |
| Cr2O3 | Cromite_S08 | Chromite_S08 |
| TiO2 | Titanit_P26 | Titanit_P26 |
| CaO | S08_Kearsutit | S08_Kearsutit |
| SiO2 | S08_Kearsutit | S08_Kearsutit |
| Na2O | Albite_S02 | Albite_S02 |
| FeO | Garnet_S06 | Chromite_S08 |
| MnO | Rhodonite_S23 | Rhodonite_S23 |
| NiO | NiS-454 | NiS-454 |
| K2O | Adular_S01 | Adular_S01 |
| V2O | | Chromite_S08 |
| ZnO | | ZnS |

**Table 6-2** Overview of standardisation programs and mineral standards used on the JEOL-JXA 8200-WD/ED microprobe.

## *X-Ray Fluorescence Spectroscopy (XRF)*

The whole rock chemical composition (major elements and trace elements) were determined using the XRF – technique on fused glass beads (lithium tetraborate 1+6). A list of the analysed elements/compounds and the precision is given in Table 6 - 3. The XRF instrument at the *Department of General, Analytical and Physical Chemistry, University of Leoben*, is an *ARL 8410* wavelength dispersive X-ray fluorescence spectrometer (WDXRF). The calibration programs (GEO-M for major elements and GEO-T for trace elements) have been programmed by T. Meisel using geological reference materials Rhyolite RGM-1 and basalt BCR-2, both USGS.

X-ray fluorescence spectrometry is a non destructive method for the elemental analysis of solids and liquids. It is a common technique for the analysis of major and trace elements in geological samples. The samples are prepared as pressed powder pellets or as fused glass beads. The sample is irradiated by an intense X-ray beam which causes the emission of fluorescent x-rays. The emitted spectrum is detected using either energy dispersive or wavelength dispersive detectors. The elements in the sample are identified by the wavelengths of the emitted X-rays, while the concentrations of the elements are determined by the intensity of these X-rays. These influences require accurate calibration.

| XRF Determinations | | | |
|---|---|---|---|
| Major | Trace | | Precision |
| $Na_2O$ | Sr | $SiO_2$ | 0.35 |
| $Al_2O_3$ | Zn | $TiO_2$ | 0.08 |
| $SiO_2$ | Y | $Al_2O_3$ | 0.23 |
| CaO | Rb | $Cr_2O_3$ | 0.02 |
| $Cr_2O_3$ | Zr | $Fe_2O_3$ | 0.15 |
| $Fe_2O_3$ | Cu | MnO | 0.004 |
| $K_2O$ | Cr | MgO | 0.33 |
| MgO | Ni | CaO | 0.13 |
| MnO | | $Na_2O$ | 0.07 |
| $P_2O_5$ | | $K_2O$ | 0.08 |
| $TiO_2$ | | $P_2O_5$ | 0.02 |

**Table 6-3** Show the list of elements analysed using the XRF technique and the precision for major element determination using the technique after (Meisel et al., 1997)

*Inductively Coupled Plasma Mass Spectroscopy (ICP-MS)*

The ICP-MS technique was used for multiple trace element analyses, including rare earth and platinum group element determinations. Different digestion methods were required for the determination of these elements and are described in the sample preparation section. The instrument used was a *Hewlett Packard HP 4500* ICP-MS, equipped with a quadrupole mass spectrometer at the Department for General, Analytical and Physical Chemistry, University of Leoben. Geological reference materials used for external clalibration. (see Table 6 - 4)

| REE | PGE |
|---|---|
| Jp-1 | Jp-1 |
| GP-13 | GP-13 |
| | Ref A220 |
| | Ref A213 |

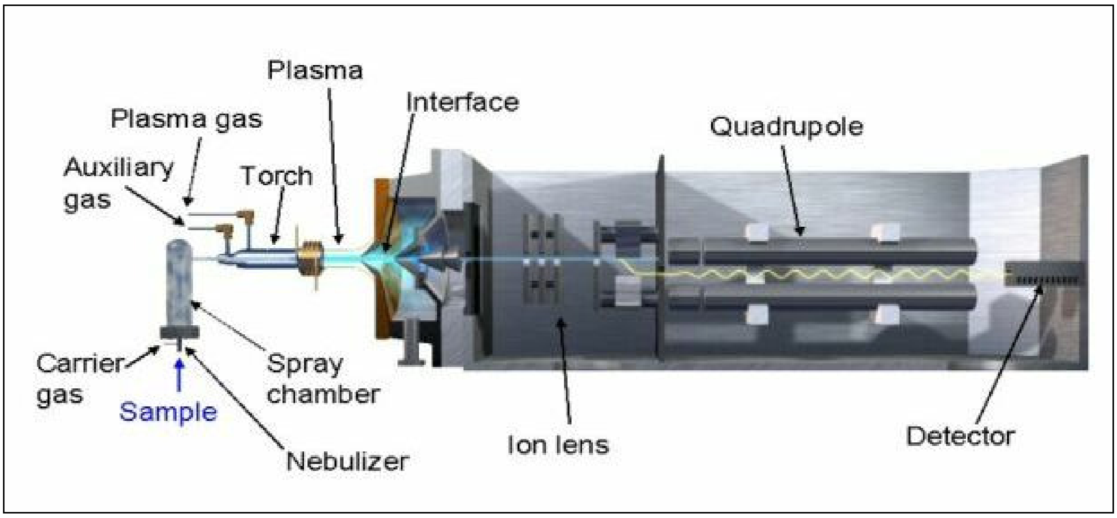
**Table 6-4** Table of the Geological reference materials used as standards in ICP-MS determinations.

**Principles of the ICP-MS technique**

The Inductively Coupled Plasma Mass Spectrometry (ICP-MS) is a powerful tool for trace elemental analysis (Higgins, 2002). It is widely used in many industries including semiconductor, environmental, geological, chemical, nuclear, clinical and research laboratories. It is an analytical technique that performs elemental analysis with excellent sensitivity and high sample throughput. The ICP-MS instrument uses plasma as the ionisation source and a mass spectrometer analyser to detect the ions produced. It can simultaneously measure most elements of the periodic table and determines analytic concentrations down to parts per trillion (ppt). It can perform qualitative, semi quantitative and quantitative analysis as it employs a mass analyser. It is also possible to measure isotopic ratios. The most important units of an ICP-MS instrument are shown in the schematic diagram in Fig 6 - 1 and consist of three main components.

- The argon plasma unit comprising nebuliser, cloud chamber, torch, work coils and power supply.
- A quadrupole mass spectrometer and associated data processing unit, which permits rapid scanning of selected masses ranging between 0 and 300 amu.
- An interface unit which permits sampling of the plasma gases and transfer of the ion beam into the mass spectrometer.

**Figure 6-1** Schematic block diagram of an ICP-MS. (picture is from the internet URL: http://www.chem.agilent.com/Scripts/Generic.ASP?lPage=455&indcol=N&PF=Y&Emailthispage=true




In general liquid samples are introduced by a peristaltic pump to the nebulizer where the sample aerosol is formed. A double pass spray chamber ensures that a consistent aerosol is introduced into the plasma. Argon (Ar) gas is introduced through a series of concentric quartz tubes which form the ICP. The torch is located in the centre of a radiofrequency (RF) coil, through which RF energy is passed. The intense RF field causes collisions between the Ar atoms, generating high energy plasma. The sample aerosol is instantaneously decomposed in the plasma to form analyte atoms which are simultaneously ionised. Plasma temperature is in the order of 6,000 – 10,000 K. The ions produced are extracted from the plasma into the mass spectrometer region which is held at a high vacuum (typically 10 – 4 Pa). The vacuum is maintained by differential pumping: the analyte ions pass through a pair of orifices, known as the sampling and skimmer cones. The analyte ions are then focused by a series of ion lenses into a quadrupole mass analyser. The mass analyser separates the ions on the basis of their mass/charge ratio. The term quadrupole is used because the mass analyser essentially consists of four parallel molybdenum rods to which a combination of RF and DC voltages are applied. The combination of these voltages allows the analyser to transmit only ions of a specific mass/charge ration. Finally ions are measured using an electron multiplier and are collected by a counter for each mass number. The mass spectrum generated is extremely simple. Each elemental isotope appears at a different mass (e.g. $^{27}Al$ would appear at 27 amu) with a peak intensity directly proportional to the initial concentration of that isotope in the sample solution. A large number of elements ranging from Lithium (Li) at low mass to Uranium (U) at high mass are simultaneously analysed typically within 1-3 minutes.

**Standardisation:**

A method to address internal drift is to use an internal standardisation procedure. A certain amount of a solution (in this case Ir and Re) with a well defined concentration is added to all samples and standard solutions. The analysed mass counts are then normalised to the internal standard intensity. The selected elements which are used as internal standards should have similar ionisation characteristics in the plasma as the elements to be determined. Suitable internal standard solutions may contain several elements to satisfy this demand. The second procedure used for the correction of instrumental drift and for the quantification of individual elements is the isotope dilution analysis. The element to be determined must possess more than one naturally occurring isotope. An isotope dilution spike containing an enriched fraction of one of those isotopes is added at a certain concentration to all analyte solutions. Measurements are then made of the relative intensity of the spike to the natural isotope. Quantification is carried out from the isotopic abundance of the enriched spike, the measured isotope ratio and the known natural isotopic abundance of the element.

## 6.2. Sample preparation and digestion methods

*General*

The sampling and the sample preparation are very important procedures to achieve accurate and precise results. Therefore the samples that were selected for geochemical investigations were homogeneous with no anomalous enrichment of sulphide phases and veining. They were also characterised by low alteration. Before analysis the selected samples were be crushed to a grain size lower than 1 mm using a jaw crusher. Subsequently the material was milled in an agate ring mill for approximately 10 – 15 minute to achieve a powder with a grain size of a few µm. To avoid contamination of the sample material, the mill was cleaned with water, acetone and dried with compressed air. This milled powder is then used for the different digestion methods.

*Preparation for XRF analysis*

To analyse geological material for bulk chemistry a fused glass bead must be prepared. Fusion is considered the best method currently available when preparing samples for XRF analysis. Prior to the fusion procedure, the loss on ignition (LOI) was determined by heating 3 grams of sample at 1000 $^{o}$C for 2 hours or till constant mass was reach, measuring the mass before and after. The fusion is achieved by mixing the sample with a flux at a ratio of 1+6. (1 gram of sample to 6 grams lithium-tetra-borate ($Li_2B_4O_7$)) The sample fusion was performed in crucibles made of 95% platinum and 5% gold, a standard non-wetting alloy. After homogenizing the mixture of flux and sample using a platinum spatula the mixture was heated in the *Claisse – Fluxer BIS* to a fusion temperature in the range of 1000 $^{o}$ and 1100 $^{o}$C. In this process the mixture is continuously heated and the crucible is regularly agitated. When the sample is completely molten the melt is poured into a mould and annealed forming a glass disc.

## *Sodium Peroxide Digestion Method*

Complete digestion of samples is important when determining trace elements including rare earth elements. Sample decomposition with sodium peroxide ($Na_2O_2$) is highly effective in attacking minerals rapidly and the resulting sinter residue is easy to dissolve. It decomposes to NaOH and $O_2$ and does not introduce elements that cause instrument memory.

100 mg of finely powdered sample and 0.6 g of fine grained $Na_2O_2$ are added to graphite crucibles. These glassy carbon crucibles are used to withstand low ph caused by the sodium peroxide. The mixtures were sintered at 480 ± 10 $^{o}$C in a muffle furnace for 30 minutes. It is of great importance to monitor the temperatures as higher temperatures lead to the melting of the $Na_2O_2$. Molten $Na_2O_2$ has a significantly stronger oxidation effect and may result in the oxidation of elements such as Ce and others, resulting in strong negative anomalies. Water is slowly added to the cruible drop wise (resulting in a vigorous reaction) until the reaction stops. Undissolved hydroxides are separated via centrifuge and the supernatant collected in a 100 ml volumetric flask. The hydroxides are dissolved in 3 mol $L^{-1}$ HCl (~3 ml). 2 ml of concentrated HCl is used to rinse the crucibles. Once the hydroxides and rinse fluids are dissolved they are added to the volumetric flask. On occasion it is necessary to add 1 or 2 ml of 3 mol $L^{-1}$ HCl to dissolve a white precipitate caused by a high pH. The solution was then made up to certified volume and homogenised. The analyte solution has a dilution of 1:1000 and the solution is ready for ICP-MS measurement. (Meisel et al., 2002).

*Digestion Procedure for PGE Analysis*

The sample preparation consists of a sample digestion step in a high pressure asher (HPA-S, Anton Paar Graz, Austria) with concentrated $HNO_3$ and HCl and drying of the sample solution after the Os concentration was determined via sparging $OsO_4$ into the ICP-MS. After drying and the dissolution of the remaining solution, the other PGE are separated on-line from their matrix in a simple cation exchange column coupled to a quadrupole ICP-MS. More details about this method are described in (Meisel et al., 2003 a). 2 g of sample material and ~ 0.17 g of "dilute mixed PGE spike" solution was added to a quartz crucible. Then 2 ml concentrated sub-boiled HCl and 5 ml $HNO_3$ were added. The samples were homogenized after adding HCl. Samples must be sealed immediately after adding $HNO_3$ to prevent the loss of osmium due to rapid oxidation. The samples were treated in the HPA-S for between 5 and 12 hours at 300 $^{o}$C and 120 bars. After this procedure a small amount of the liquid was decanted for Os measurement. The Os analyte solution remaining after analysis was returned to the quartz crucibles. The crucibles were placed in an ultrasonic bath to suspend any undigested material. The sample is then placed in a centrifuge and the supernatant removed. The supernatant is slowly heated on a hotplate until the sample is nearly dry. The residue is then treated with 2 mL of 0.1 mol $L^{-1}$ HCl and slowly warmed on a hot plate. Once filtered through a 0.45 µm cellulose acetate syringe filter the sample is ready for measurement (Meisel et al., 2003 a). Details on method validation can be found in (Meisel et al., 2003 b) and (Meisel et al., 2002)

# 7. Petrography

## Note:

A number of inclusion types in olivine were identified in multiple samples from various drill cores, for ease of description these have been named “Platy”, “Wormy” and “Lamella”. A general description of these inclusion types and a photo (See Figs 7 – 1, 2 & 3) are given here these names are referred to in the following Petrography Chapter without further description. Due to the ultra thin nature and often inclined habit (i.e. exposures are < 1 µm) quantitative microprobe analysis of these inclusions has not been possible. Rare qualitative EDS analyses indicate spinels (i.e. Fe, Cr, Al and Ti clearly identified). These descriptions refer only to inclusions in olivine and not any other mineral.

**Platy**: ultra thin (<3µm) negative crystal shaped, translucent brown inclusion 10-50µm long. Fig 7 – 1 & 3

**Wormy**: like “Platy” except negative crystal shape looks “corroded” and inclusion has “lobes” Fig 7 - 1

**Lamella**: ultra thin (<3µm) elongated, needle like, inclusion. Fig 7 - 2

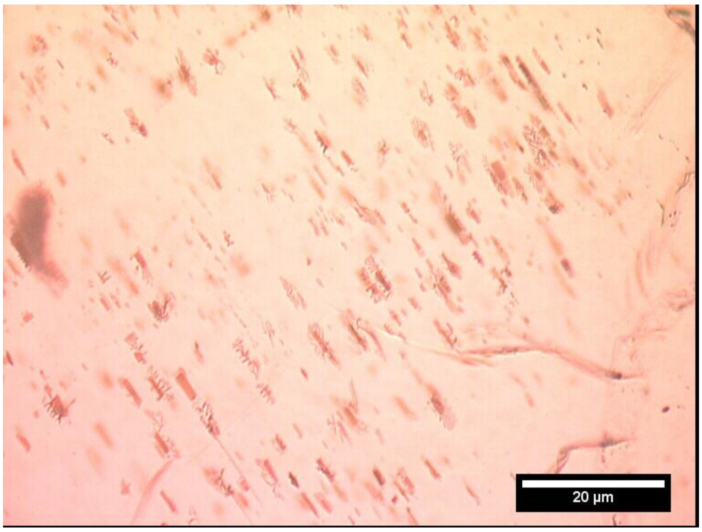



**Figure 7-1** Photomicrograph under transmitted light, parallel nicols, showing “wormy’ and “platy” inclusions in olivine.

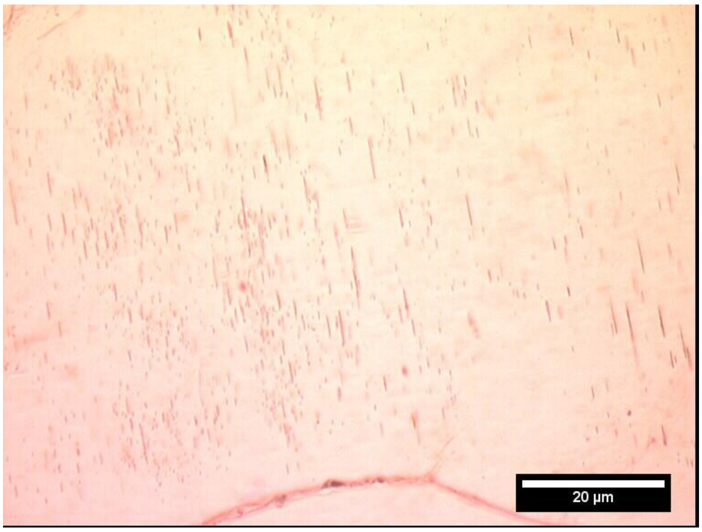



**Figure 7-2** Photomicrograph under transmitted light, parallel nicols showing “lamella” inclusions in olivine.

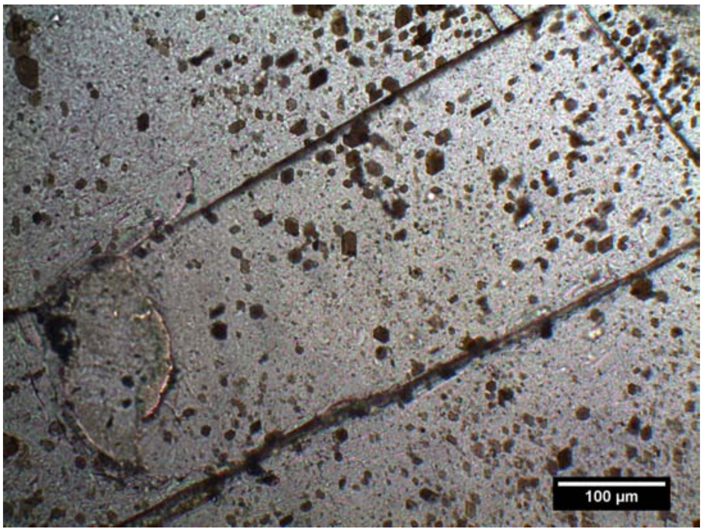



**Figure 7-3** Photomicropgraph under transmitted light, parallel nicols showing "platy" inclusions in olivine

It should be also noted that despite the use of the word "inclusion" in reference to larger spinels grains occurring within olivine, that they are not "true" inclusion. Microprobe imaging and images produced from SEM have shown that these "inclusions" usually have a reaction rim and/or associated with cracks. See Fig 7 – 4, 5 & 6

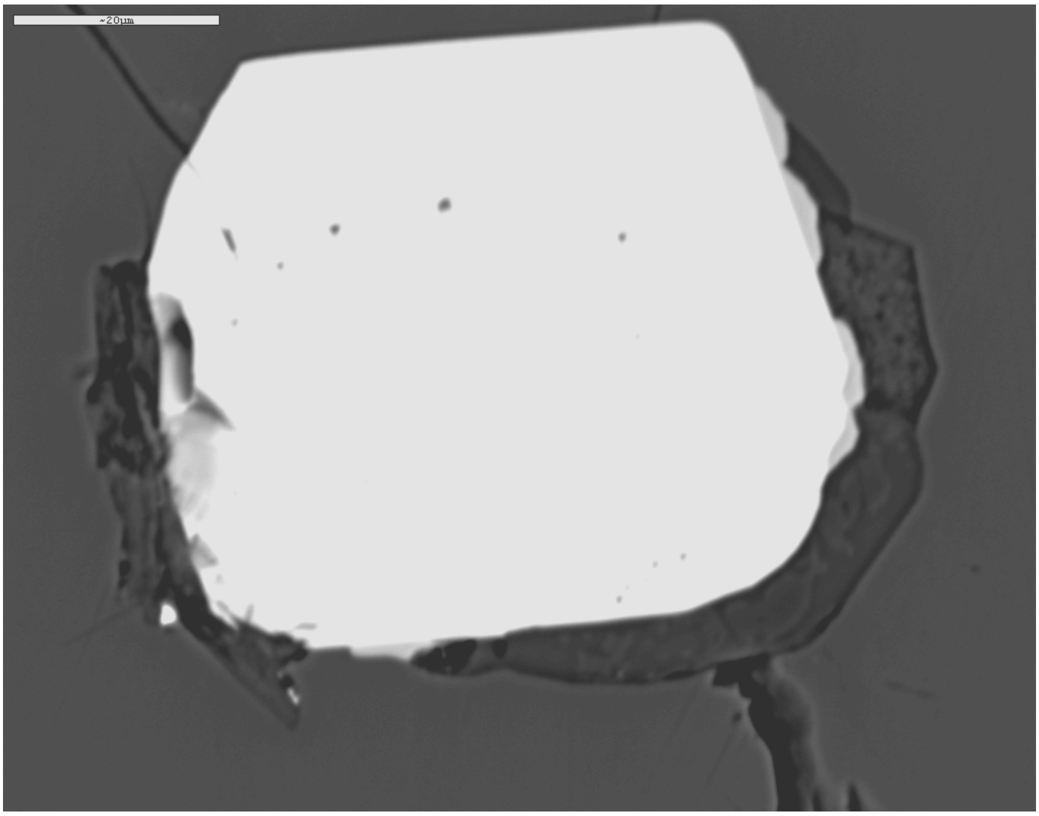


**Figure 7-4** Image of spinel inclusion in olivine, under SEM, showing cracks and reaction rim.

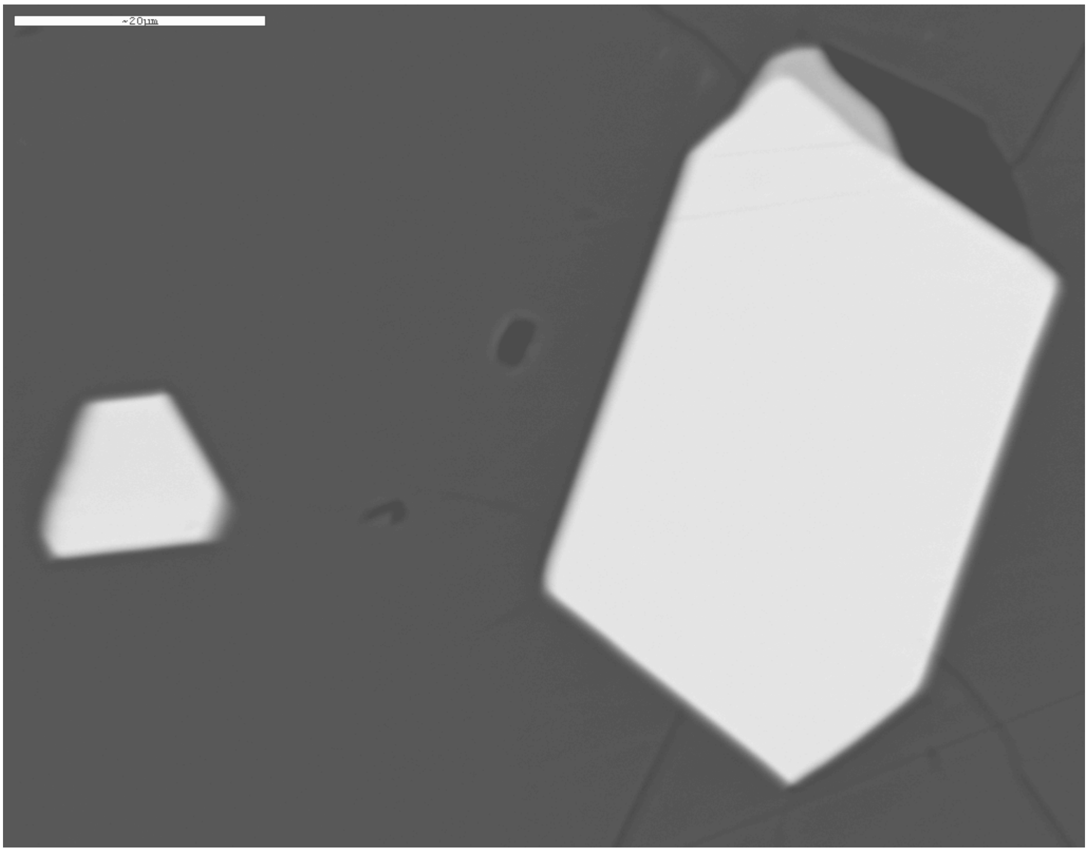


**Figure 7-5** Image of spinel inclusion in olivine, under SEM, showing cracks and reaction rim.

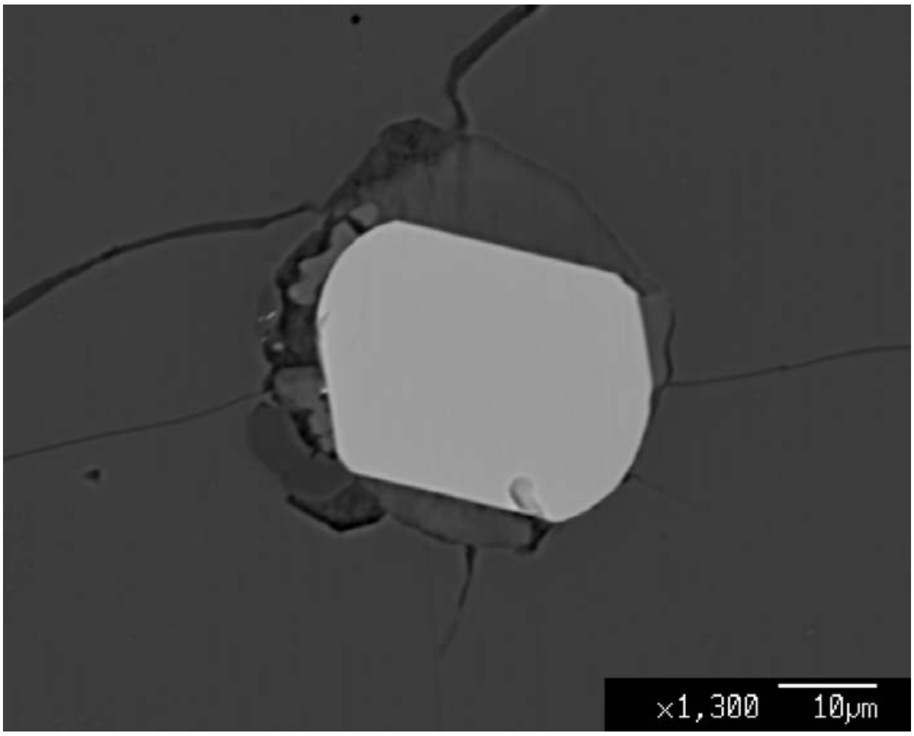



**Figure 7-6** Image of spinel inclusion in olivine, (microprobe), showing reaction rim and cracks.

## G17 Discriptions

*<u>G17-16 456.4 m</u>*

**Drill core description:**

Dark bluish, fine grained dunite.

**Thin section description:**

The section is highly altered (i.e. approximately 93% altered material); however some remnant/skeletal grains of olivine lie in a transparent, sometimes brownish coloured mass of very fine–grained to fibrous serpentine minerals ± chlorite. The altered material shows long complex trails of opaques throughout the whole section. The trails are often "worm-like" and can appear to follow previous grain boundaries. These trails are predominantly magnetite, which is in a dendritic habit and may have formed between sheets of serpentinite and thus represents a by-product of serpentinisation. Some of the skeletal olivine crystals have "platy" and "lamella" inclusions. These extend out of the crystals into the altered material. The "lamella" inclusions have an average thickness of ~ 3µm, while the largest of the platy inclusions is 30µm in length. The only clearly recognisable grains are olivine, magnetite and perovskite. All other minerals have been altered beyond recognition. Perovskite occurs very rarely as small >100µm grains.

Sulphides are always very small and occur finely disseminated in the altered material.

*G17-25 650 m*

**Drill core description:**

Medium grained, light reddish looking surface, dunite.

**Thin section description:**

Olivine dominates the section. Most of the crystals are broken and there is minor serpentinisation along larger cracks; oxide minerals are very rare (<<1%). Olivine grain size varies, from large ~ 4 mm to medium grained ~250 µm. Primary grain boundaries are often difficult to distinguish due to degree of cracking. However, under crossed polars, grain boundaries with triple point junctions can be distinguished. Olivine grains with triple point junctions usually have a smaller grain size. The cracking is parallel across the section and the cracks are filled with carbonate minerals and serpentine. There is very little alteration of olivine crystals. See Fig 7 - 7. Large trails of very small solid inclusions can be observed. Sulphides are concentrated within the serpentinised zones. At least three types of spinel phases can be distinguished: i) interstitial – usually small, euhedral – subhedral with a maximum size of 0.3 mm, ii) inclusions in olivine, which are small (maximum size 65 µm) and euhedral in shape. iii) Large spinel grains, neither included in olivine nor occurring interstitially are cracked in the same manner as olivine grains and have a maximum size of 0.5mm. Inclusions of Cr- rich spinel within olivine are also observed.

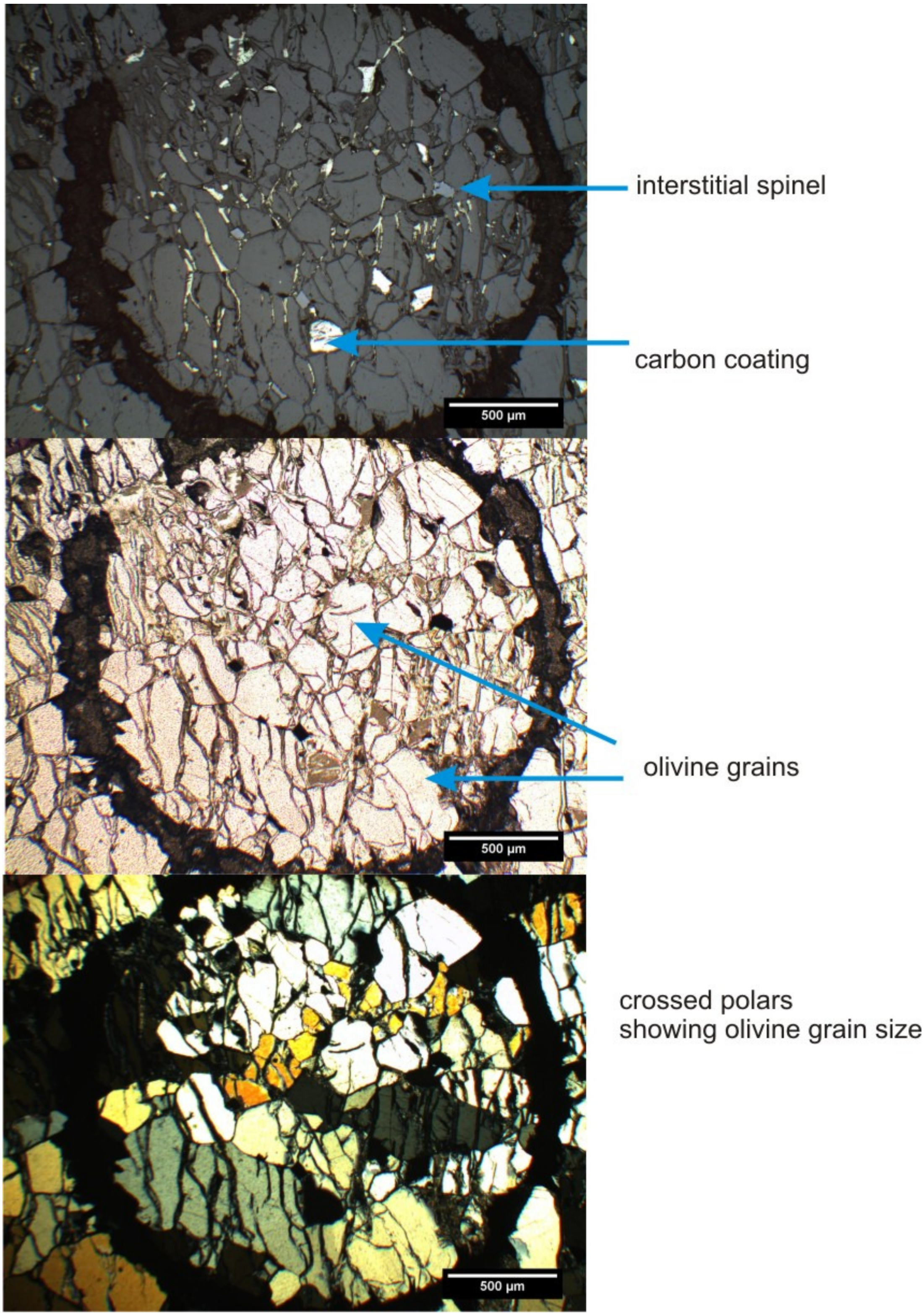



**Figure 7-7** Photomicrographs from sample G17 – 25 under transmitted light (parallel & crossed nicols) and reflected light

*G17-29 706m*

**Drill core description:**

Phlogopite phenocrysts (up to 1 cm in length) occurring in blue medium grained dunite.

**Thin section description:**

In this section two distinct types of olivine can be distinguished: a) A type of matrix is formed by fine-grained, anhedrally shaped olivine, the size of which varies from 200 μm to 2 mm and commonly shows triple junction grain boundaries ($120^o$) indicating recrystallisation. b) Large olivine crystals, 3 - 4mm in diameter, occur within the matrix olivine. They exhibit very irregular shape, undulose extinction and are characterised by abundant spinel and "platy" inclusions, which appear disseminated and as inclusion trails. On the basis of shape and size, spinel inclusions can be separated into 3 groups 1: <10 μm up to 100 μm euhedrally shaped inclusions occurring as disseminations. 2: trails and /or clusters of inclusions, commonly less than 5μm in diameter. (See Fig 7 – 8). 3: spinel grains (usually euheral to anhedrally shaped, 600 – 800 μm in size), small (3 – 4 μm), multiphase (chalcopyrite and bornite) sulphides are located in the interstitial space. Perovskite was also observed.

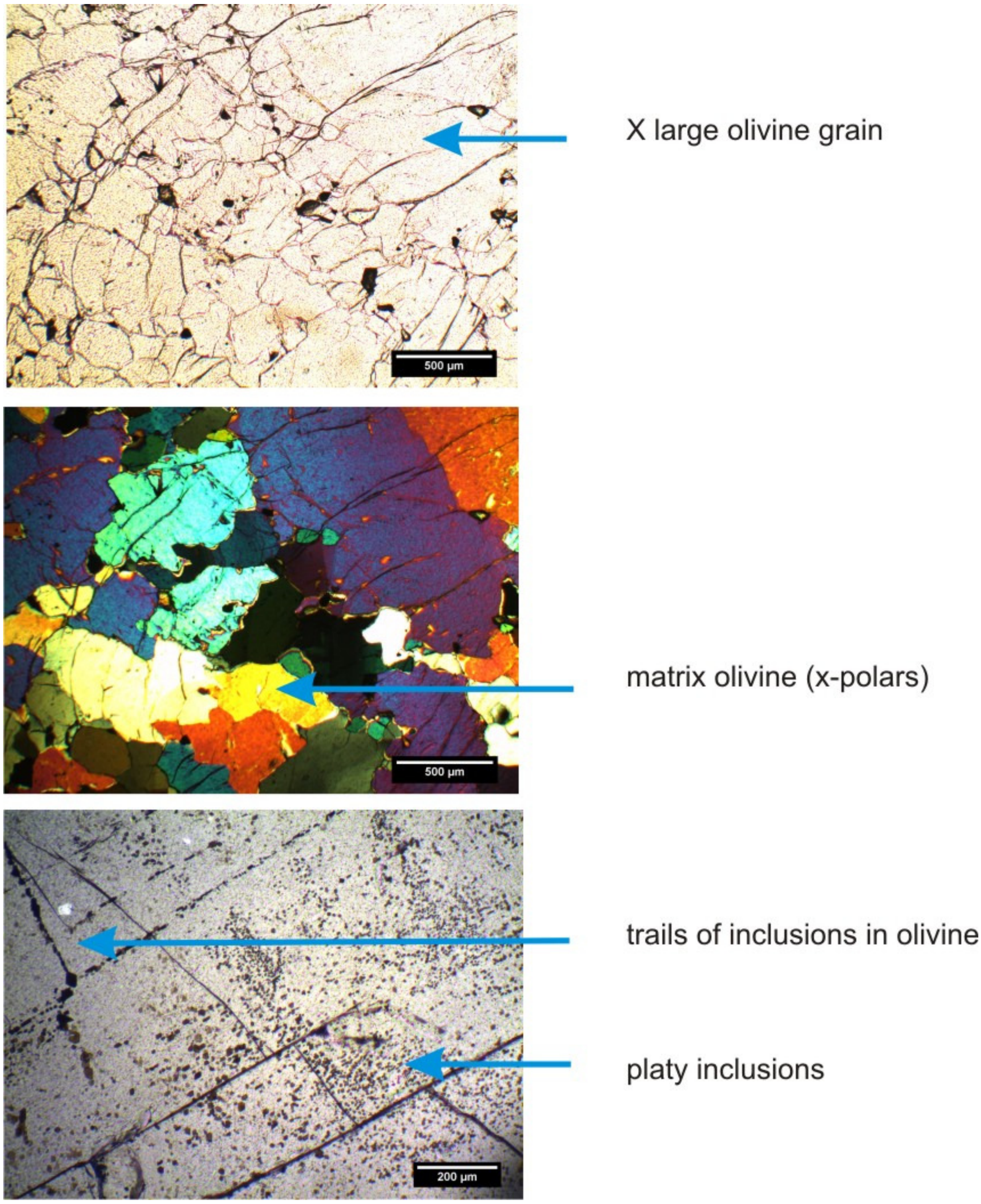



**Figure 7-8** Photomicrographs from sample G17-29 under parallel & crossed nicols (transmitted light)

## *G17-30 735.3 m*

**Drill core description:**

Coarse grained dunite, medium blue in colour.

**Thin section description**

The section is comprised of more than 95% olivine. Grain size varies considerably, with large grains between 5 mm and 2 mm and small grains ~ 0.5 mm. The average grain size is 2 mm. Olivine type a) is sub- to anhedral with 120$^o$ triple point junctions. There is no alteration. The larger olivine grains type b) are highly included with "platy, wormy and lamella" type inclusion. See Fig 7 - 9 Small Cr-rich spinel inclusions are rarely found in olivine. They are euhedral with a grain size of 30 – 50 µm. Spinel inclusions can also be found in interstitial spaces and as interstitial filling. Rare phlogopite can be found in interstitial spaces as can perovskite. Very rare, small (~ 10 µm) chalcopyrite grains can be observed in interstitial spaces.

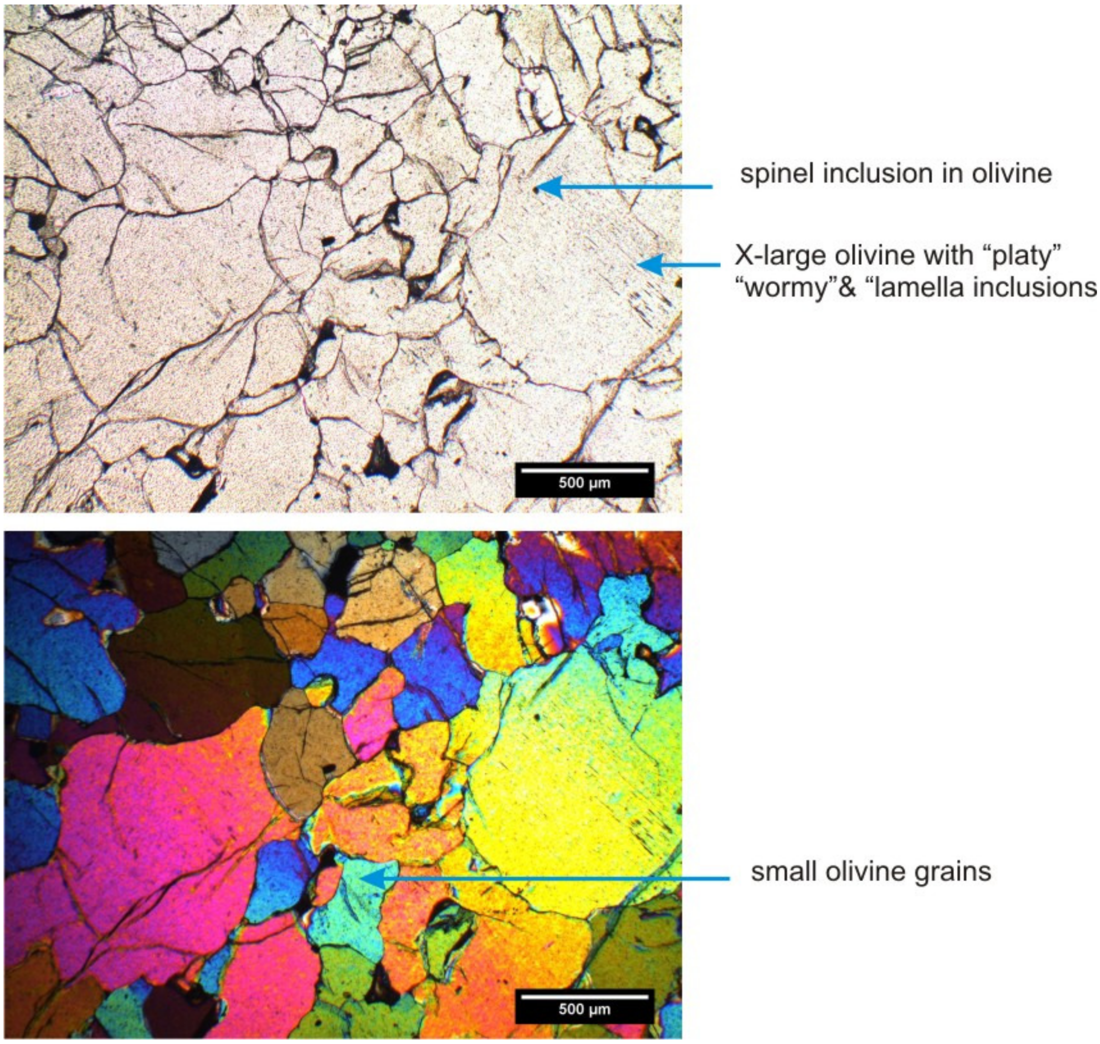



**Figure 7-9** Photomicrograph of sample G17-30 under transmitted light (parallel & crossed nicols).

*Note: good pics of the “wormy, platy and lamella” inclusions!*

## *G17-35 907 m*

**Drill core description:**

Darker dunite, dark olivine dominant ~80%.

**Thin section description:**

This section is characterised by evenly grained (2 – 3mm in diameter), colourless olivine forming a granoblastic texture. Grain boundaries are quite regular, frequently with 120$^o$ triple point junctions, indicating recrystallisation. The majority of olivine grains contain "lamella type" inclusions. Furthermore, tiny little dendritically shaped subsurface inclusions are very common but due to their small size they were not able to be identified. The high abundance of these inclusions gives the olivine in hand specimen a darker appearance. (See drill core log).

Accessory minerals comprise perovskite, phlogopite, Cr- rich spinel and carbonate located commonly at the 120$^o$ triple point junctions. See Figure 7 -10

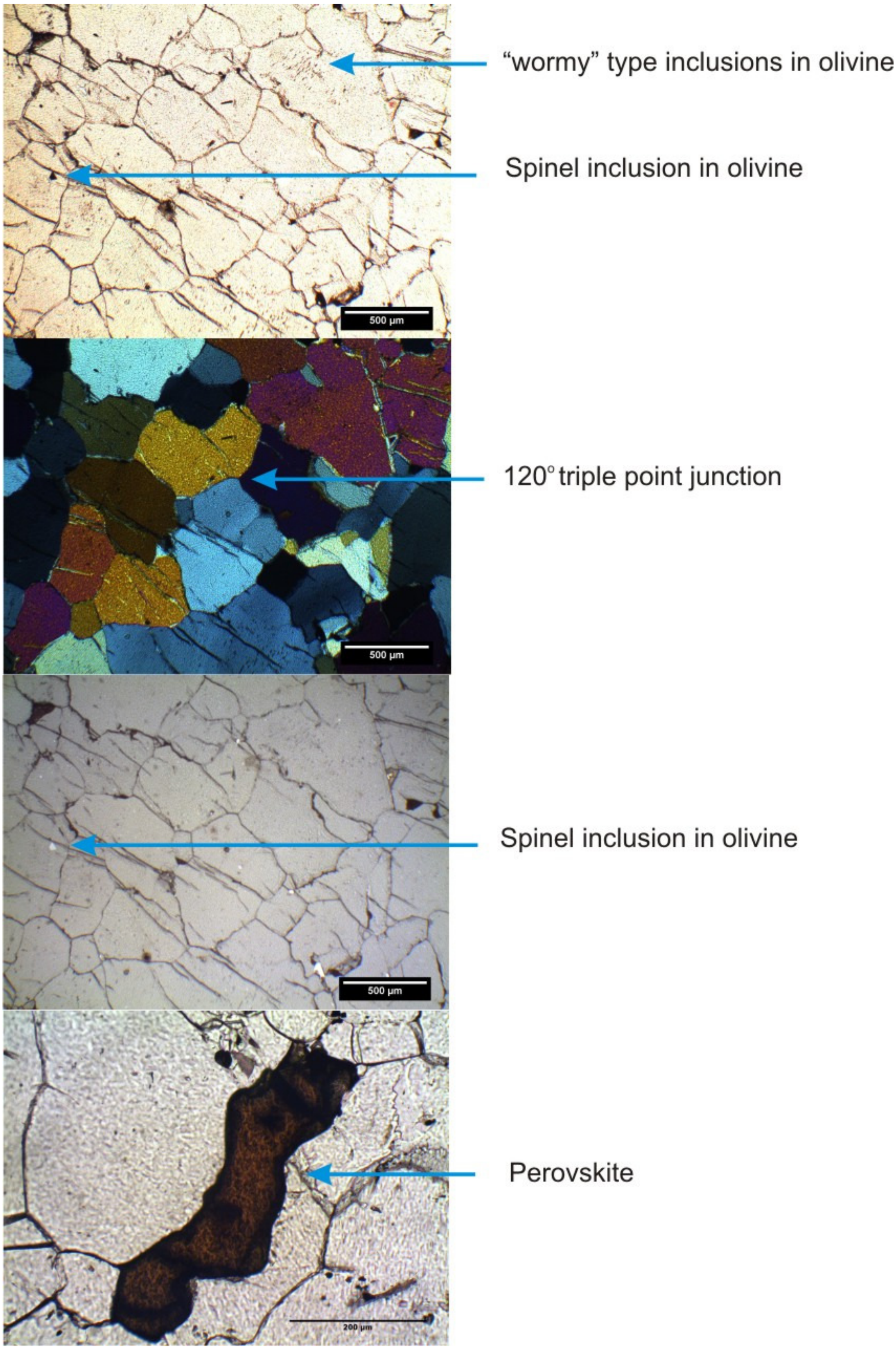



**Figure 7-10** Photomicrograph of sample G17-35 under reflected and transmitted light (parallel & crossed nicols)

## *G17-38 984.6 m*

**Drill core description:**

Medium grained dunite, light olivine dominates.

**Thin section description:**

This section is dominated by olivine (approximately 95%), 60% of olivine is represented by medium to small grains (<1mm), with the remainder consisting of large grains. Many of the olivine grains are cracked and nearly all show undulose extinction. The olivine grains contain many inclusions, including translucent brown plates (randomly oriented) and inclusion trails (healed cracks). The larger olivine grains are rarely included by Cr - rich spinel, with the remainder of the spinels occurring interstitially. Two different types of spinels are observed, i.e. darker spinels having a higher Cr content and the lighter ones are richer in Al. Accessory phases of perovskite, calcite and phlogopite have been observed. This section has a number of small sulphides (bornite and chalcopyrite, often too small to identify), these occur predominantly as inclusions in olivine and less commonly interstitial. This occurrence of sulphides is distinct compared to other sections, where sulphides only occur interstitially.

*G17-39 1022.5 m*

**Drill core description:**

Medium grained dunite, dark olivine dominates.

**Thin section description:**

The section is dominated by two types of olivine. Type a) very large grains up to 4.5mm, type b) small, recrystallised, with straight grain boundaries and triple point junctions. Within the section ~ 50% is type A olivine. The large grains are often cracked and are highly included. There are trails of fluid and melt inclusions, in addition to "platy" inclusions and "wormy" inclusions. In this section the recrystallised grains also contain inclusions but these are only of the "wormy" variety and are much smaller than those of the larger grains. Accessory spinels comprise 0.5 to 1% of the section and occur interstitially and as inclusions. There is no perovskite or calcite. Very rare pyrite grains were observed but they are very small and occur interstitially.

## *G17-40 1032.1*

**Drill core description:**

Medium grained dunite, light olivine dominates, shows two darker bands with lots of black "dots" in olivine.

**Thin section description:**

The section is dominated by olivine, making up more than 98% of the section. Rare olivine grains occur up to ~ 3 mm, while the average is 1-2 mm. Grain shape is irregular and smaller grains have 120$^{o}$ triple point junctions. Very small "wormy" and "platy" type inclusions are found in the larger olivine grains. The larger grains are highly included with melt inclusion trails. Inclusions of Cr-rich spinel occur rarely in olivine. They are ~70 µm and euhedral in shape. Larger Cr-poor spinels are found in interstitial space and these have a grain size of ~ 250 µm. See Figure 7 - 11. Rare phlogopite and chlorite is found filling interstitial spaces. A vein, composed of serpentine minerals and chlorite as alteration products, crosses the section. No perovskite was observed in this section. Despite the section having both dark and light olivine, all the olivine grains carry inclusions, the main difference is the size and abundance of these inclusions.

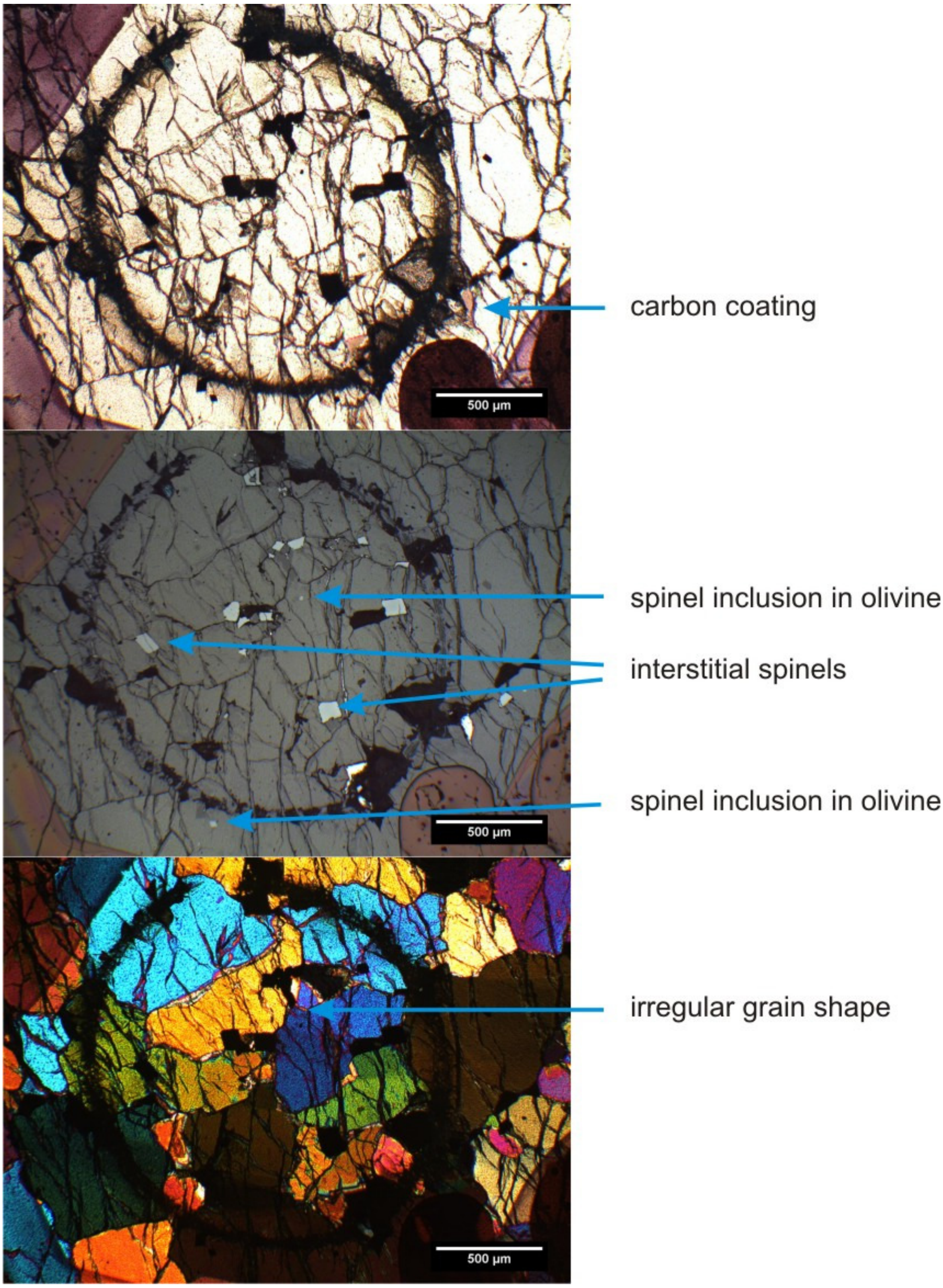



**Figure 7-11** Photomicrograph of sample G17-40 under reflected and transmitted light (parallel & crossed nicols)

## *G17-42 1061.0 m*

**Drill core description:**

Medium grained dunite, light olivine dominates.

**Block description:**

Medium grained, block varies from dark to light

**Thin section description:**

Very irregular, abundantly cracked, undulose, and commonly recrystallised olivine dominates the section, with large grains composing only 5 % of total. Abundant fluid and melt inclusion trails contained within the large olivine grains, occasionally crossing grain boundaries, can be observed. Cracks are often very fine and are filled with serpentine ± chlorite as alteration products. Larger olivine grains have platy inclusions, while the smaller "recrystallised" grains are inclusion free. Rare phlogopite has also been observed. Opaque phases consist of spinels and sulphides (chalcopyrite and pyrrhotite). The sulphides are very small and usually associated with fine cracks, or occurring in the interstitial space in euhedral to subhedral shape. The spinels ~1% of the total occur as inclusions, in interstitial spaces and as large grains. There is usually an alteration rim associated with the larger grains.

## *G17-43 1073.9 m*

**Drill core description:**

Medium grained dunite. Dark olivine dominates.

**Thin section description:**

The olivine in this section is highly recrystallised with ~ 20% consisting of large olivine grains. The large grains are between 3 – 5 mm and the remaining olivine is small, recrystallised grains between 0.25 – 0.5 mm. The larger olivine grains have rare "platy" type inclusion. See Fig 7 – 12. The small olivine grains have occasional very small "platy" type inclusions usually concentrated in the centre of the grain. Rare Cr-rich spinel inclusions are found in the large olivine. They are small (~30 μm) and euhedral. Larger spinel inclusions can be found in interstitial spaces and as interstitial filling. Perovskite can be rarely found in interstitial spaces. There is no carbonate or phlogopite within the section.

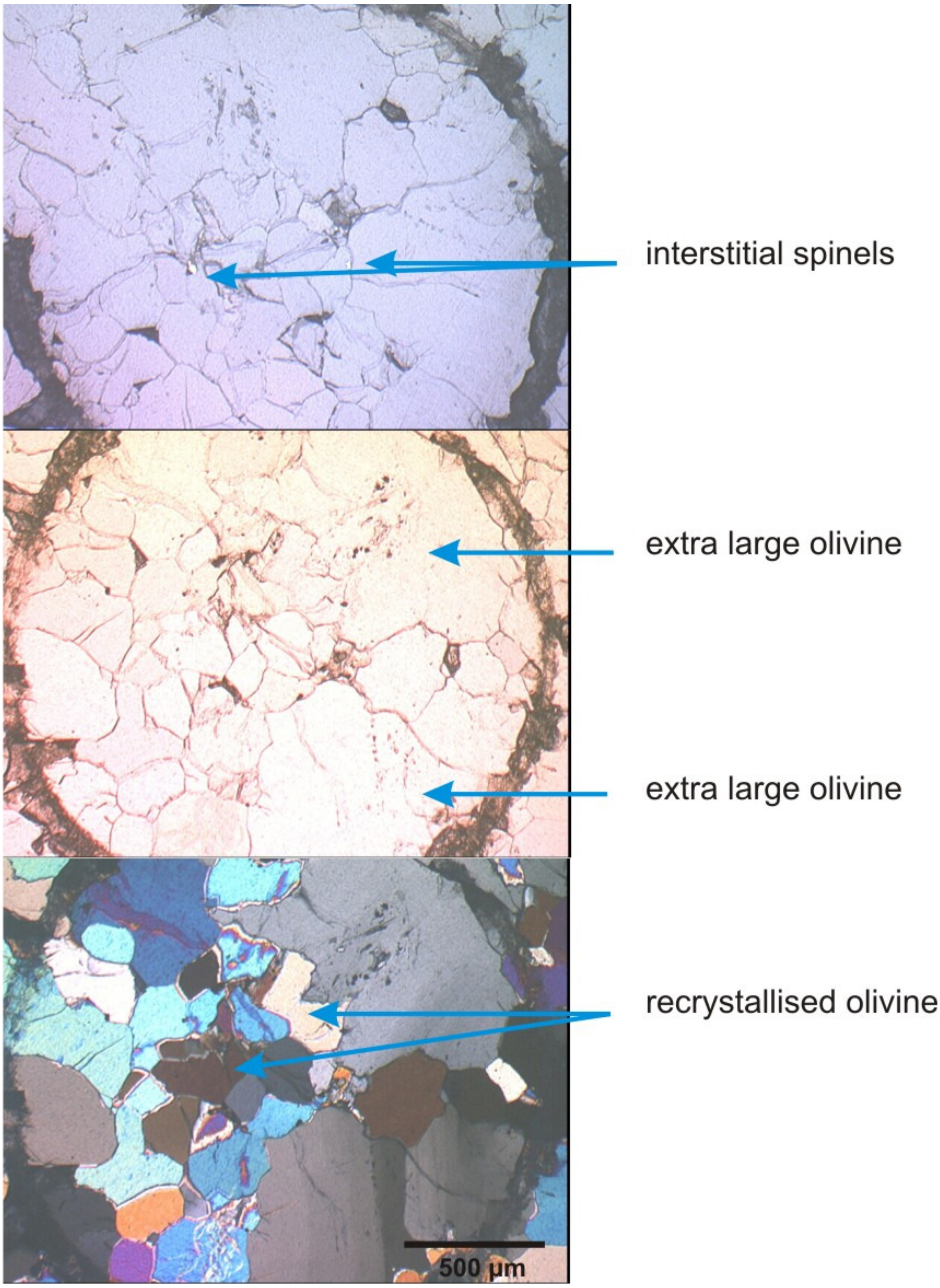



**Figure 7-12** Photomicrograph of sample G17-43 under reflected and transmitted light (parallel & crossed nicols)

## *G17-44 1122.4 m*

**Drill core description:**

Medium grained dunite, dark olivine dominates. Ratio of dark / light olivine varies in 2-4 m intervals.

**Thin section description:**

The section is dominated by olivine, greatly varying in grain size and containing abundant inclusions, both the "platy" and "wormy". Olivine with smaller grain size is characterised with 120$^{o}$ triple point junctions and straight grain boundaries. The section is characterised by a significant amount of cracking throughout. 30% of the olivine grains are >1mm. Accessory calcite ~1mm and clinopyroxene grains ~ 1mm in addition to phlogopite are observed. Calcite and phlogopite occur in interstitial spaces. See Fig 7 - 13. There is also an area rich in spinels phases. See Fig 7 - 14

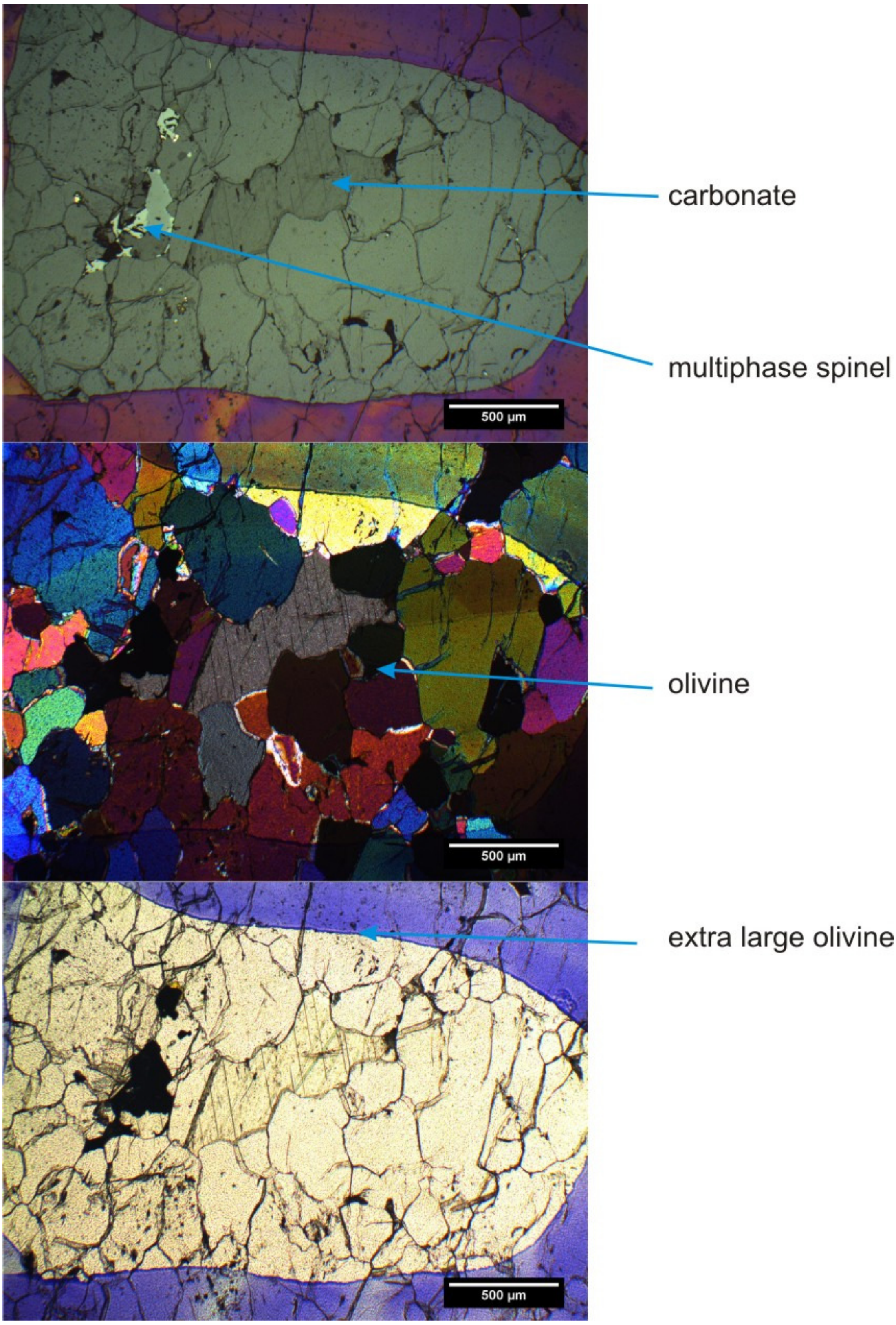



**Figure 7-13** Photomicrograph of sample G17-44 under reflected and transmitted light (parallel & crossed nicols)

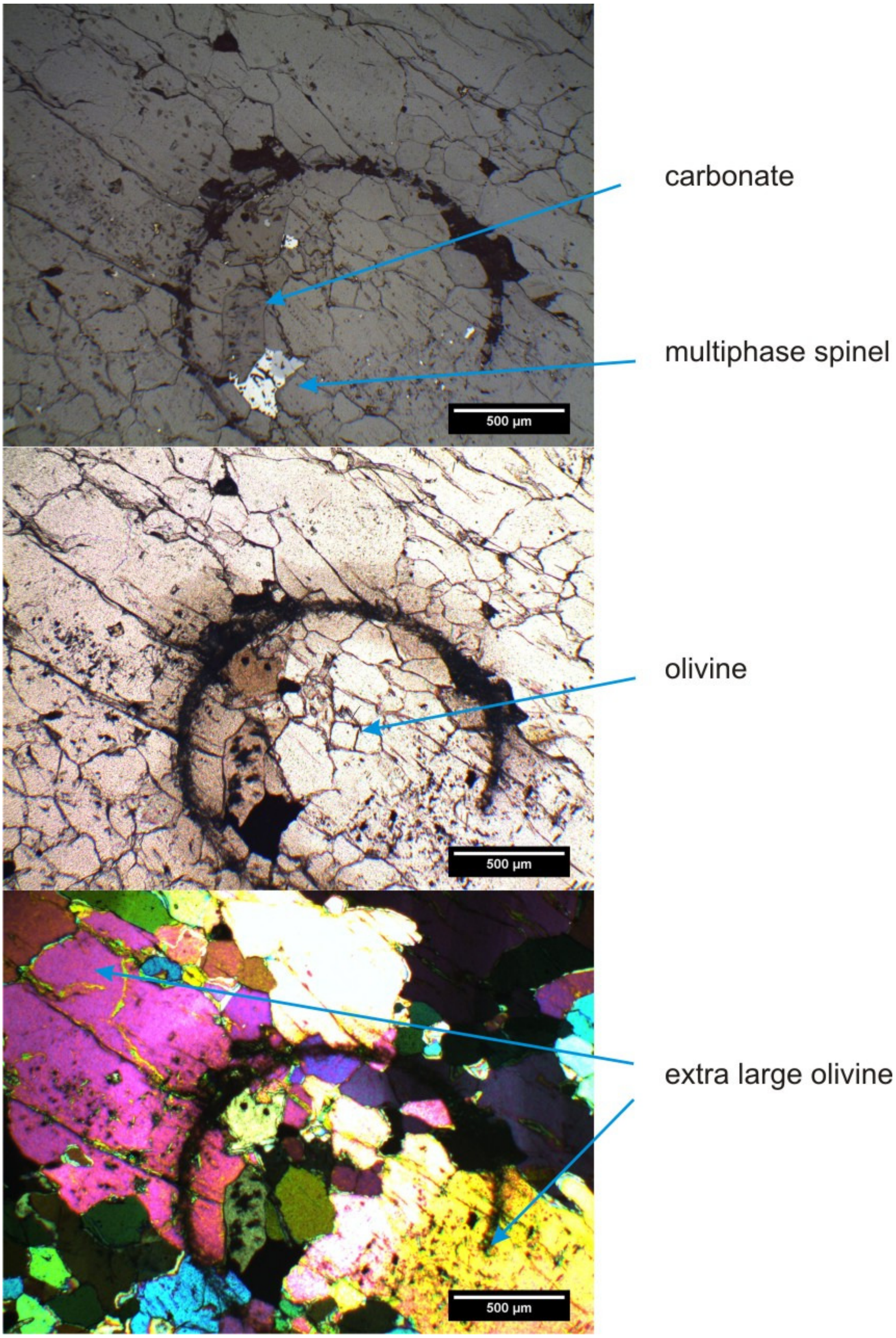



**Figure 7-14** Photomicrograph of sample G17-44 under reflected and transmitted light (parallel & crossed nicols)

## *G17-45 1165.9m*

**Drill core description:**

Dunite becomes even coarser grained, particularly the dark olivine.

**Thin section description:**

The section is dominated by olivine, greatly varying in grain size and containing abundant inclusions, both of the “platy” and “wormy” type. See Fig 7 - 17. Extra large olivine grains up to 5 mm are common. See Fig 7 – 16. Olivine with smaller grain size is characterised with 120$^o$ triple point junctions and straight grain boundaries. The section is characterised by minor cracking with no alteration. 30% of the olivine grains are >1mm. Accessory calcite ~1mm and clinopyroxene grains ~ 1mm in addition to phlogopite are observed. Calcite and phlogopite occur in interstitial spaces. Clinopyroxene is characterized by ilmenite exsolution. See Fig 7 – 15. Rare Cr-rich spinel inclusions can be found in olivine. They are euhedral to subhedral with a grain size of ~ 30 µm. Larger Cr-poor spinel grains can be found in interstitial spaces and as interstitial filling.

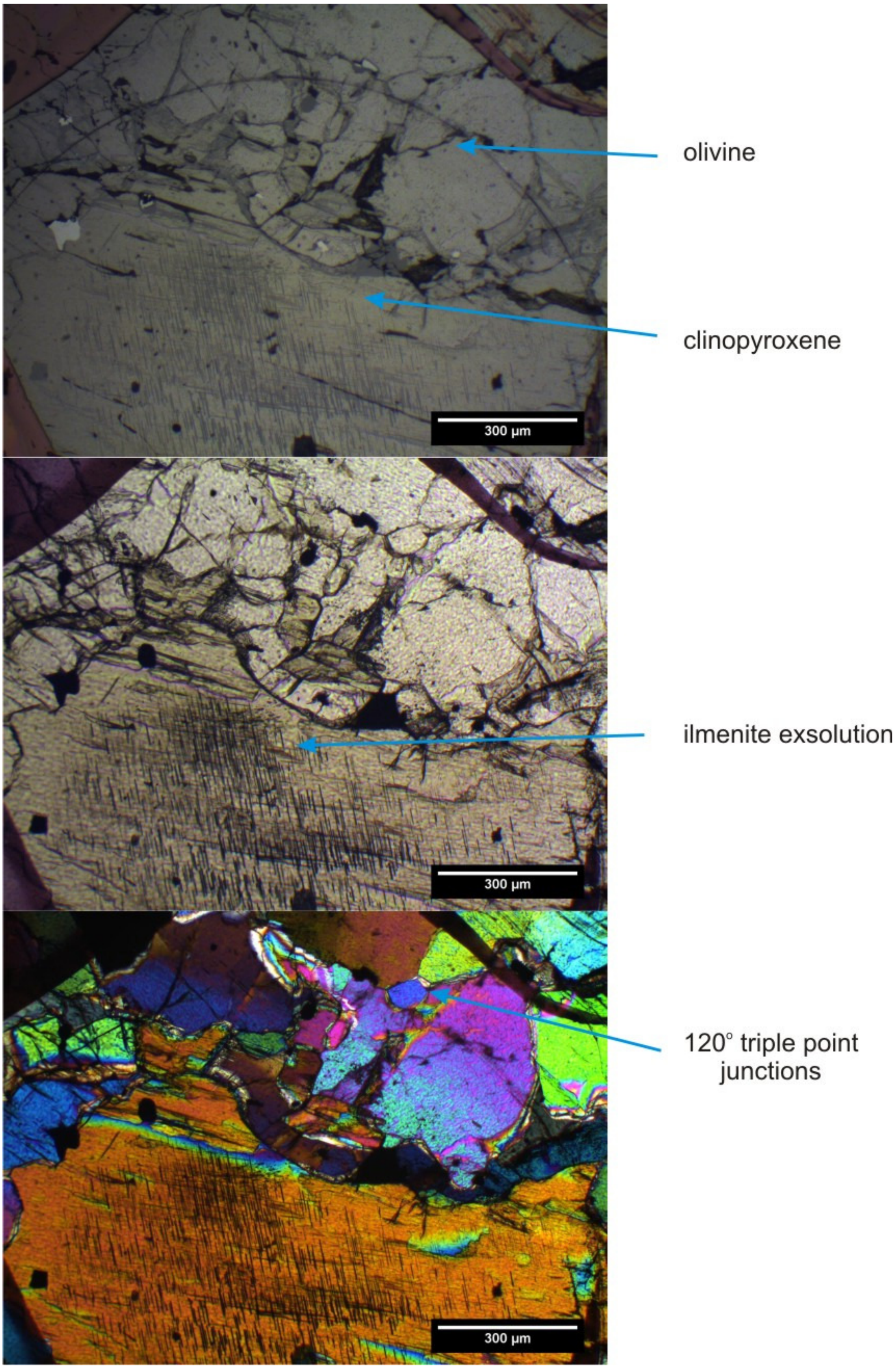



**Figure 7-15** Photomicrographs of sample G17-45 under reflected and transmitted light (parallel & crossed nicols)

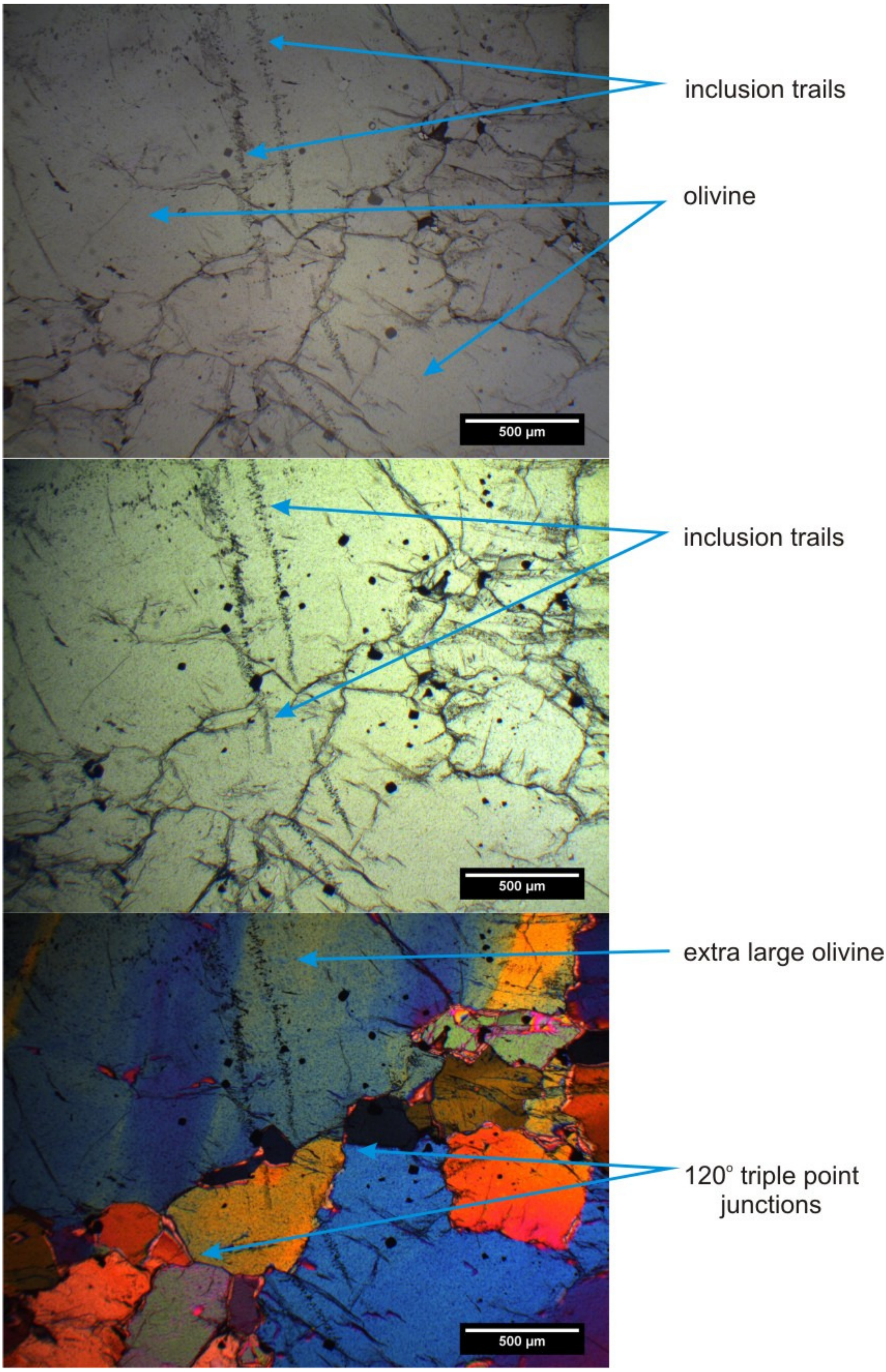



**Figure 7-16** Photomicrographs of sample G17-45 under reflected and transmitted light (parallel & crossed nicols)

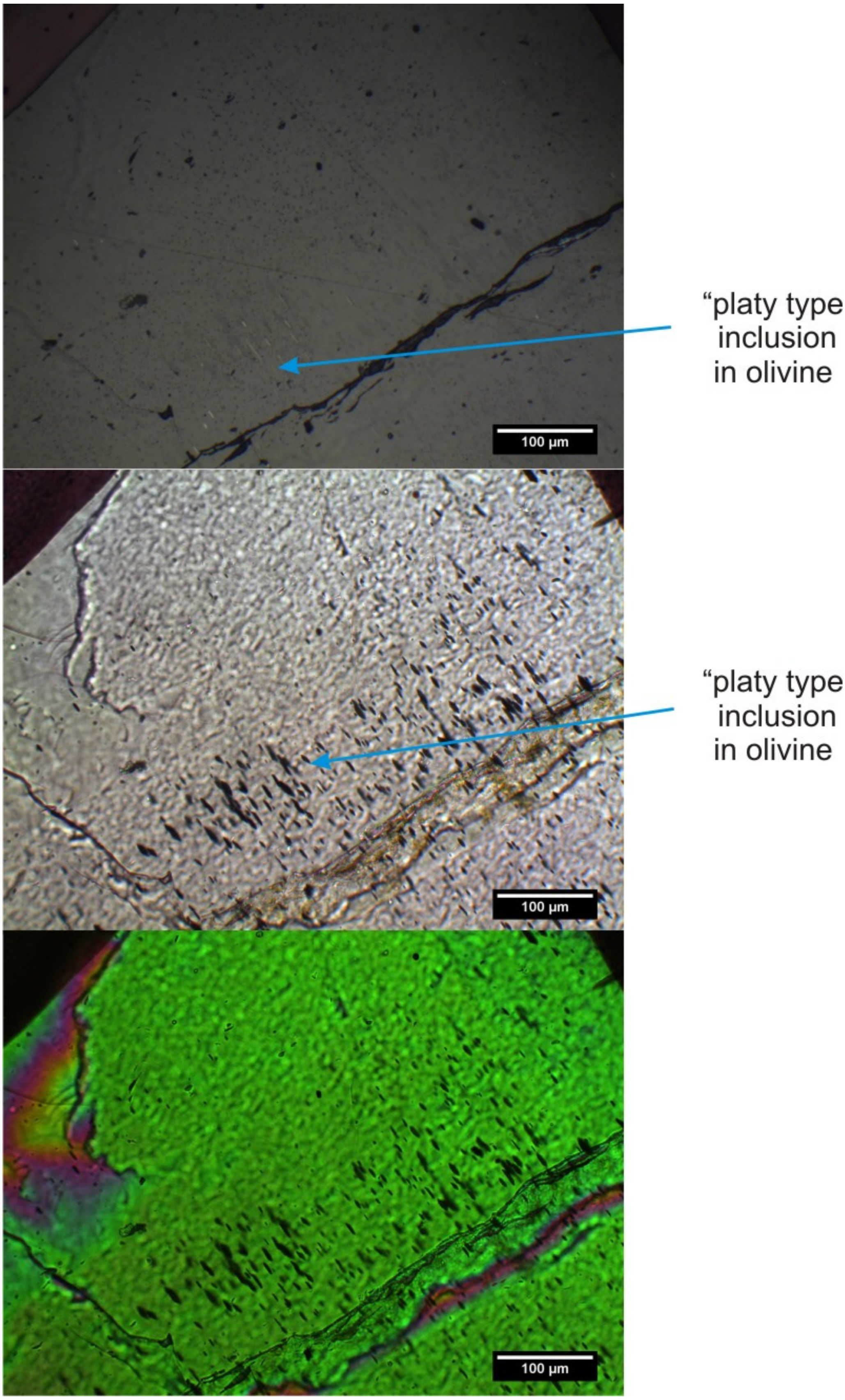



**Figure 7-17** Photomicrographs of sample G17-45 under reflected and transmitted light (parallel & crossed nicols)

*G17-47 1183.5 m*

**Drill core description:**

Medium grained dunite, very light olivine dominates.

**Thin section description:**

This section is comprised of more than 98% olivine. 70% of the olivine is represented by small grains (0.25 - 0.75mm) with $120^0$ triple point junctions, indicating recrystallisation, and showing rare "platy" type inclusions. About 30% of olivine is made up by large (up to 2 mm) irregular grains with abundant "platy" type inclusions. Small Cr-rich spinels can be found as inclusions in olivine. They have a grain size of less than 70 μm. Larger spinel inclusions can be found in interstitial spaces and as interstitial filling. Perovskite, carbonate and phlogopite can be found interstitially.

## *G17-49 1281.2 m*

**Drill core description:**

Medium grained dunite, light olivine dominates.

**Thin section description:**

Olivine comprises more than 95% of the section. Olivine grain sizes vary from rare large grains (3 mm) to small grains (0.25 mm). Average grain is 1 mm or less. The texture of the rock is dominated by subhedral olivine showing $120^0$ triple point junctions, indicating recrystallisation. See Fig 7 - 18. Inclusions in olivine consist of rare Cr-rich spinel inclusions (50 µm) and “platy” type inclusions. The size of the “platy” inclusions is variable. Rare interstitial Cr-poor inclusions with a grain size of ~ 100 µm can be found. Carbonate and perovskite can be found filling interstitial spaces.

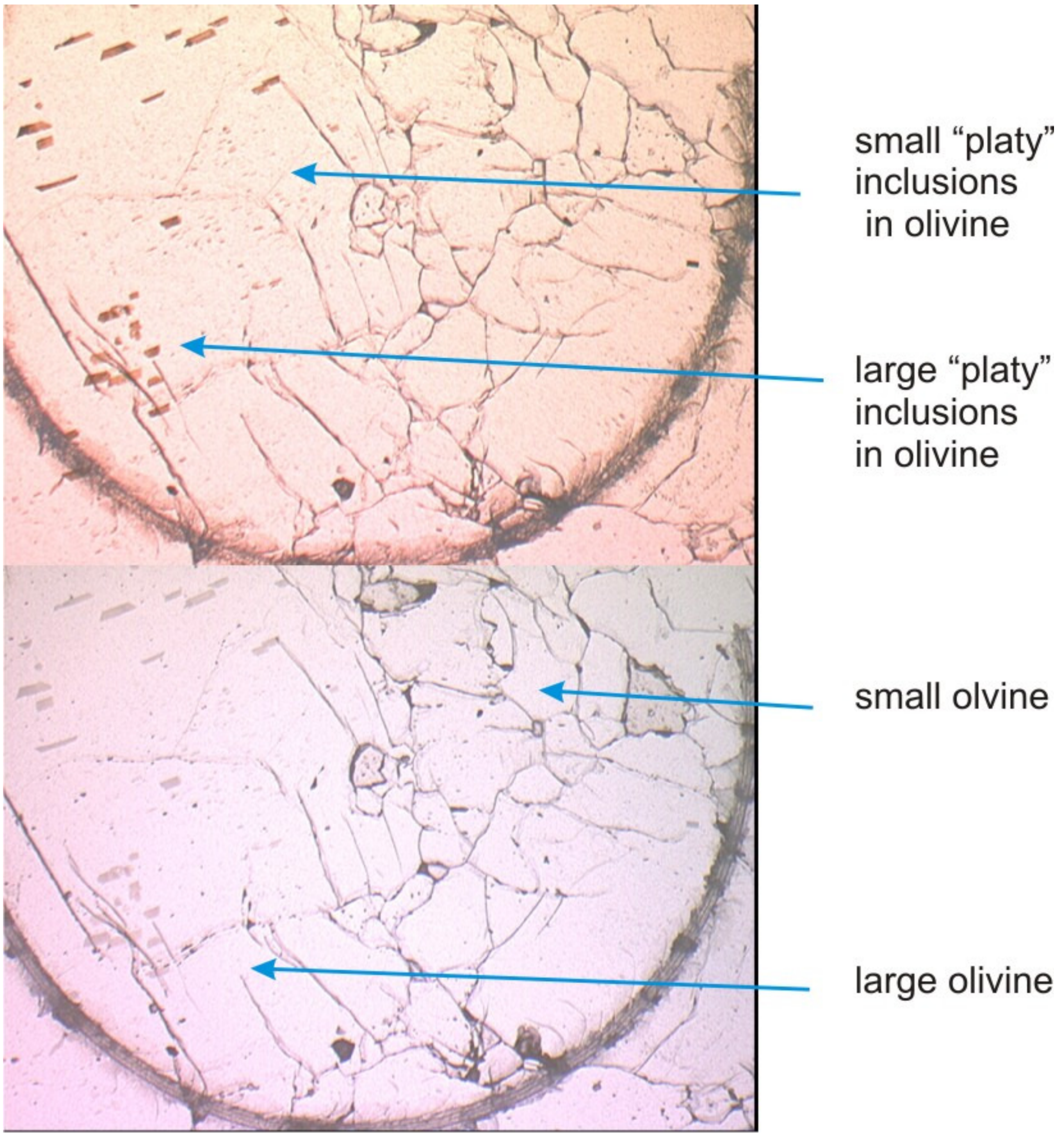



**Figure 7-18** Photomicrograph of sample G17-49 under transmitted and reflected light.

## G13 descriptions

<u>*G13-6 35.6 m*</u>

**Drill core description:**

Olivine cumulate

**Thin section description:**

This section is highly serpentinised and cracked with ~ 50% of the slide composed of serpentine minerals, carbonate and ± chlorite. Relic olivine comprises 22% of the slide. It is not possible to determine grain boundaries due to the degree of alteration. Olivine contains melt inclusion trails and inclusions of Cr–rich spinels, but none of the "platy", "wormy" or "lamella" type of inclusions that are common in G17 are present in this section. Clinopyroxene comprises 15 - 17% of the slide and it is characterised by exsolution lamella of ilmenite. The clinopyroxene grains are altered and cracked in the same manner as olivine. Opaque minerals comprise ~ 11% of the section. Magnetite with ilmenite exsolution occurs as large cracked grains ~ 1.5 mm in size and Cr-rich spinel occurs as euhedral inclusions in olivine up to 100 µm. Disseminations of magnetite, ~ 10 µm in size, are associated with veining and alteration. The section is crosscut by a three carbonate veins. In the altered material are sulphides ~5-10 µm in size. Rare apatite grain observed. See Fig 7 - 19. Possible olivine cumulate on the basis of geochemistry.

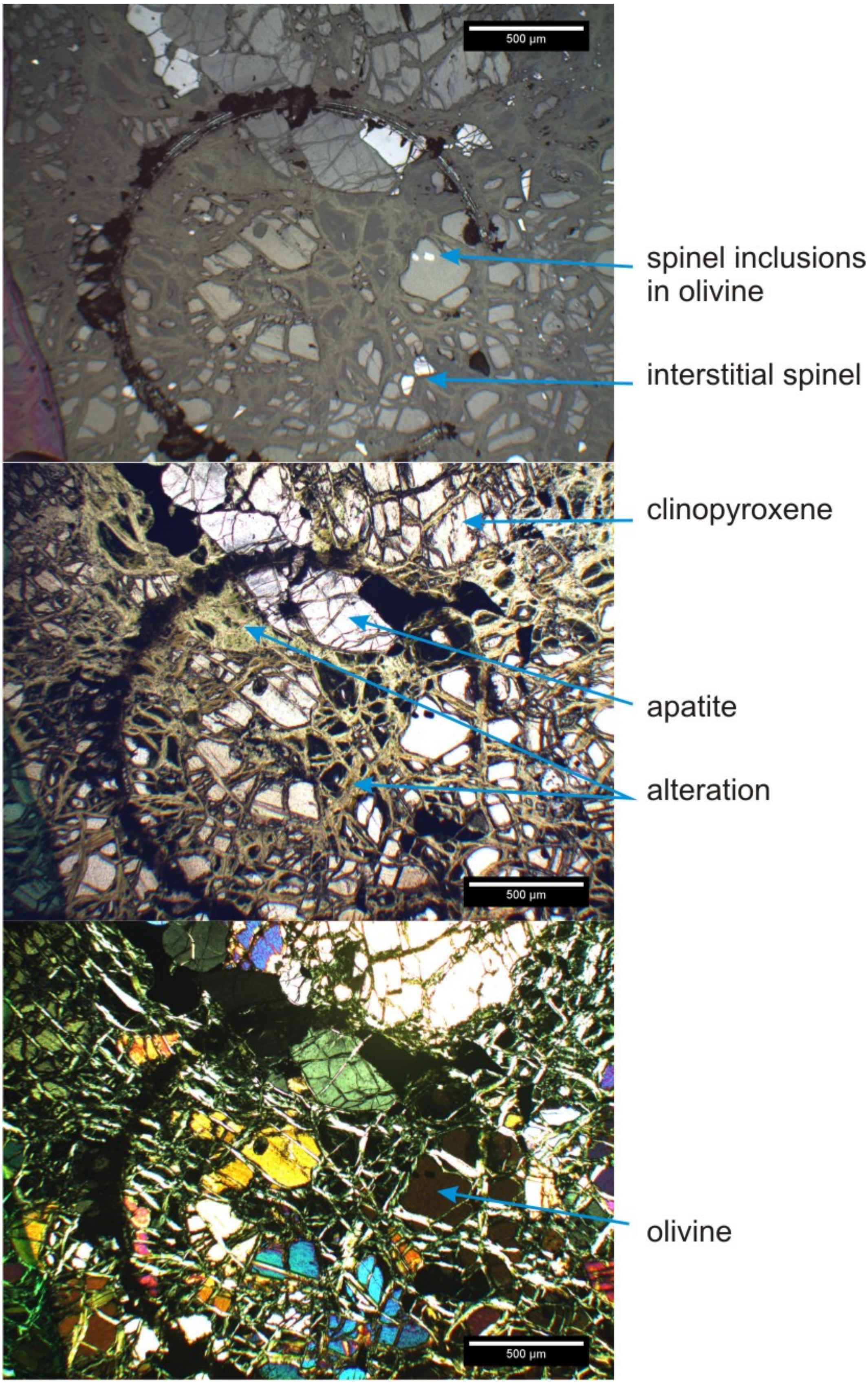



**Figure 7-19** Photomicrograph of sample G13-6 under reflected and transmitted light (parallel and crossed nicols)

*G13-10 355.9m*

**Drill core description:**

Dunite with clinopyroxenite vein.

**Thin section description:**

This section is composed of dunite and a clinopyroxenite vein, the contact between the olivine rich area and the vein is highly altered, with various serpentine minerals and chlorite. The dunite part of the section is similar to G13 - 6 but has much less clinopyroxene. It is impossible to determine relic grain size of olivine due to the degree of serpentinisation. There are rare secondary inclusion trails and small 30 - 50 μm euhedral inclusions of Cr - rich spinel within olivine. The dunite part contains also grains of a larger Cr - poor spinel. The clinopyroxene dyke is dominated by clinopyroxene and magnetite with ilmenite, in coarse grain size (mm scale). Clinopyroxene has ilmenite exsolution, while the oxides are comprised of a complex intergrowth of magnetite, Ti-rich magnetite with ilmenite exsolution of anhedral to subhedral shape. Tiny grains of sulphides (pyrrhotite, chalcopyrite and bornite) occur within magnetite and clinopyroxene.

*G13-17 412 m*

**Drill core description:**

Broken up, dark blue and brown dunite.

**Thin section description:**

The section is highly serpentinised with very small broken relic olivine grains remaining (~ 60% alteration). No evidence of original grain size or shape of olivine can be observed. Some olivine grains have many fluid inclusions and on rare occasions the relic grains contain spinel inclusions. The serpentine is very fine grained and associated with very small dendritic magnetite grains (3 - 5 μm). There are sulphides within the altered material, but they never occur as inclusions within olivine. There are two types of spinel, with slight variations in the Cr content being the notable difference. The Cr-poor spinels are usually found interstitially, whereas the more Cr-rich spinels appear as inclusions in olivine. The section contains a very large perovskite grain (~ 0.5 mm) that is slightly broken and rare phlogopite occurring as interstitial filling. The sulphide grains are usually very small, anhedral and pitted or broken. They are comprised of pyrrhotite, chalcopyrite and bornite and are isolated in the altered material.

*G13-20 502 m*

**Drill core description:**

Dark blue dunite becomes finer grained, less rich in magnetite.

**Thin section description:**

Olivine is the main phase and is quite highly serpentinised, with 25 - 30% of the slide altered. Average relic grain size it 200 – 300µm. There is much less of the reddish brown alteration material. Some of the relic olivine contains spinel inclusions. These are usually subhedral and have a slightly higher Cr content than the spinels occurring interstitially. Cr - rich spinels are still very common. The Cr - rich spinels occur in all shapes, from euhedral to anhedral. See Fig 7 - 20. The larger spinels are often cracked. Sulphides occur within the serpentinised network and are comprised of pyrrhotite, chalcopyrite and bornite.  This sample contains no calcite, neither as veins or grains/inclusions nor clinopyroxene.

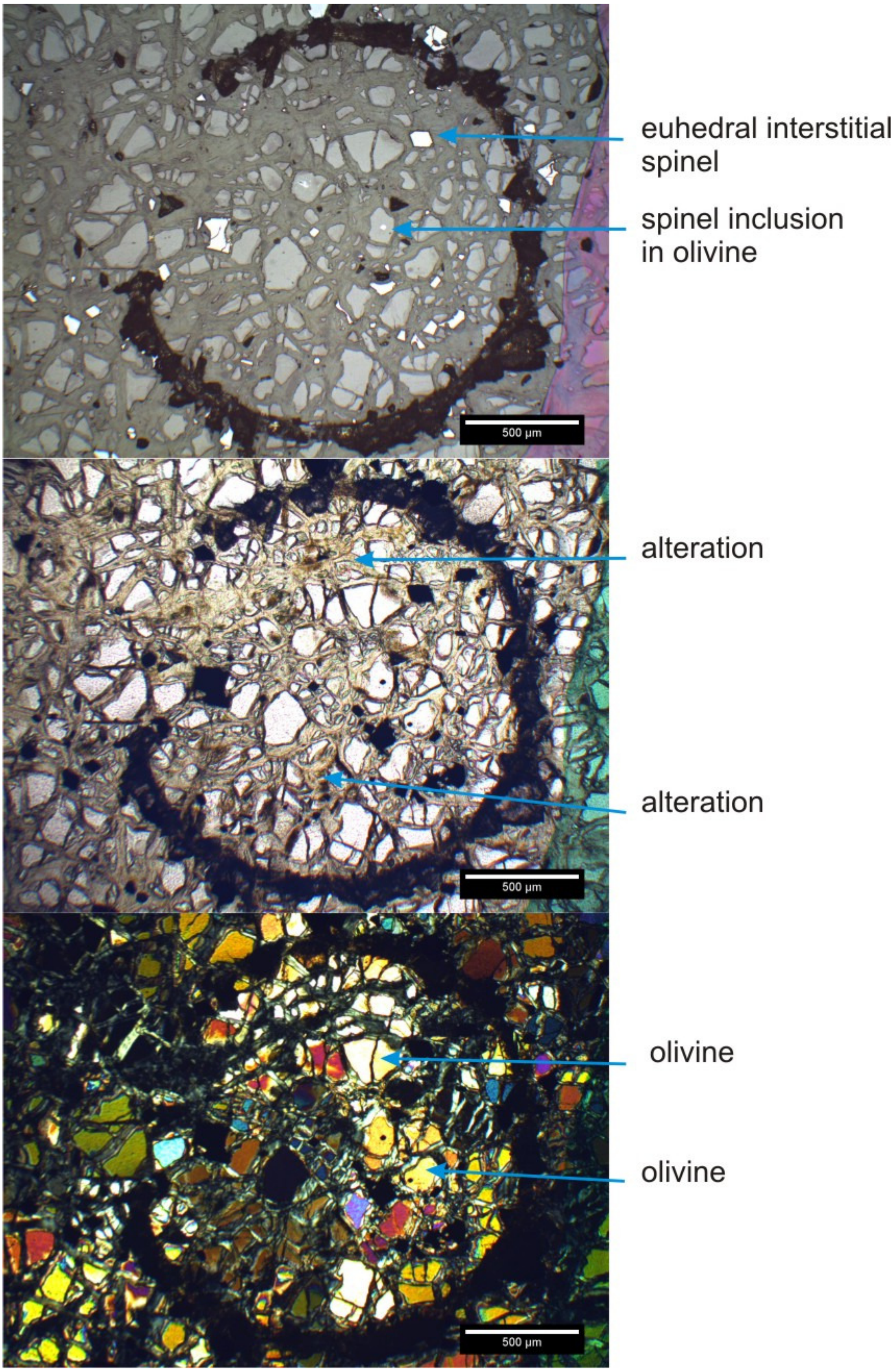



**Figure 7-20** Photomicrograph of sample G13-20 under reflected and transmitted light (parallel and crossed nicols)

*<u>G13-21</u>*

**Drill core description:**

Dunite with disseminated Chromite

**Thin section description:**

The section is highly serpentinised, except some very small relic olivine grains remaining, the largest grains 0.6 mm in size. The relic olivine grains contain no “platy, wormy or lamella” type inclusions, but rare euhedral Cr-rich spinels inclusions are found in olivine. Approximately 50-60% of the sample is altered. It is not possible to identify the original grain size due to the degree of serpentinisation. The significant difference to other sections of this drill core is that the spinels are concentrated in large grains, whereas in other sections they have been quite small and disseminated. The large spinels (from 0.5 mm up to 2 mm) are usually “cracked” which appears to be related to the alteration. There are very small (3 - 5 μm) sulphides occurring within the serpentinised network, comprising pyrrhotite, chalcopyrite and bornite. There are some thin calcite veins cutting through the rock. Some of the larger sulphides are broken by the carbonate veins. There are some euhedral spinels. No clinopyroxene could be observed.

## *G13/24 660 m*

**Drill core description:**

Dark blue dunite magnetite bearing.

**Thin section description:**

The section is highly serpentinised, resulting in a network of serpentine minerals and veins of carbonate. See Fig 7 - 21. Relic olivine grains are cracked and filled with serpentine minerals. The largest size of the relic grains is ~ 0.8 mm, while the original grain size of olivine can be estimated at up to 2 mm. The relic olivines are highly included, but it is extremely difficult to determine if these are fluid or solid inclusions. The serpentine network contains abundant spinels. Some of these appear to be associated with the serpentinisation, while others occur as either inclusions in olivine (pristine) or are part of a "cracked" grain (i.e. cracked by vein). There is a significant variation in spinel shape. The inclusions within olivine can be euhedral or subhedral "blobs", which, under reflected light, are slightly darker and have a slightly higher Cr content. Inclusions within the altered material range from euhedral to anhedral and have a slightly lower Cr content. There are sulphides within the serpentine network, while there are no sulphides within the relic olivine. The sulphides are highly irregular in shape and are often intergrown with spinels and are comprised of pyrrhotite, chalcopyrite and bornite

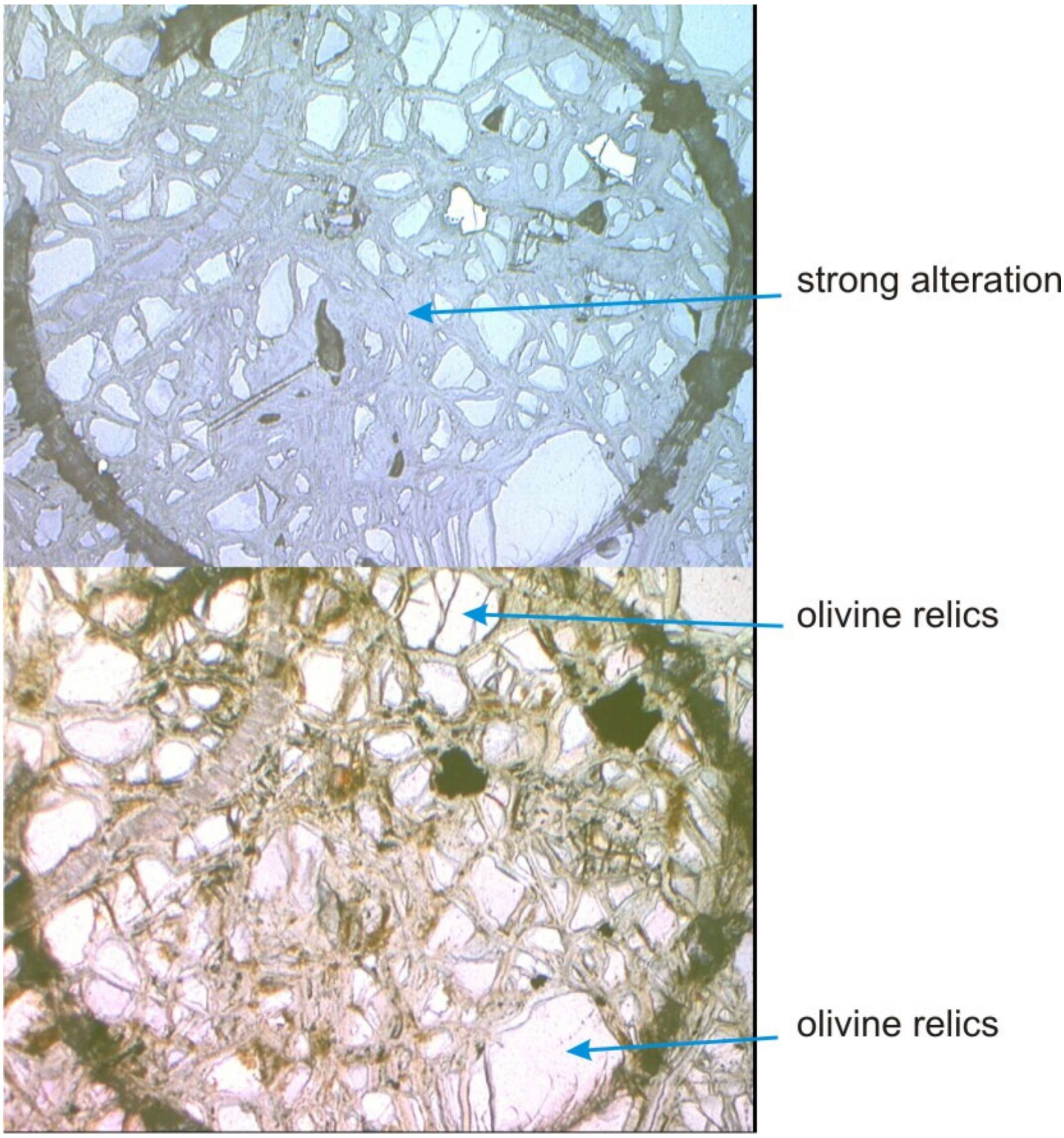



**Figure 7-21** Photomicrograph of sample G13-24 under reflected and transmitted light (parallel nicols)

## G1 Discriptions

*G1-2 394 m*

**Drill core description:**

Meimechite (Volcanic)

**Thin section description:**

Comprised of large broken olivine phenocrysts in a matrix. Olivine phenocrysts comprise ~50% of the slide with considerably varying grains size. Maximum grain size is ~ 10 mm, minimum grain size is 1 mm, while the average is ~ 6 mm. The olivine phenocrysts are euhedral and characterised by remarkable alteration rims, clearly indicating that they had been reacting with the melt. The reaction rim is composed of serpentine minerals and chlorite. It is often irregular in thickness with "corners" more affected. The serpentine minerals and chlorite extend into some phenocrysts via cracks and extend through out the crystal. See Fig 7 - 22. This alteration halo is characteristic of the meimechites, there is a variation in the degree or thickness of the alteration in different samples, but it is always present and is thus diagnostic. The smaller grains are altered to a greater degree than the larger grains. The olivine contains none of the "lamella" or "platy" inclusions, but melt inclusion trails and Cr-rich spinels are observed. The larger olivine grains are slightly cracked and are filled with serpentine minerals and chlorite.

The matrix is composed of phlogopite, clinopyroxene, apatite, oxides and altered material. See Fig 7 – 23. Within the matrix phlogopite is medium to small grained, maximum grain size ~ 3 mm, minimum grain size 0.5 mm, with an average of 0.9 mm. The phlogopite, was originally lath shaped, but now displays skeletal laths, with partial replacement by chlorite and serpentine. It is highly pleochroic and comprises 35% of the matrix. Clinopyroxene makes up ~ 30% of the matrix. The clinopyroxene laths show an ophitic texture and are often broken, pitted and altered. Oxides comprise 20% of the matrix, with a grain size of 250 µm or less. There is a complex intergrowth of anhedrally shaped magnetite and ilmenite, also aggregates of disseminated magnetite have been observed. Rare Cr - rich spinels were also observed.

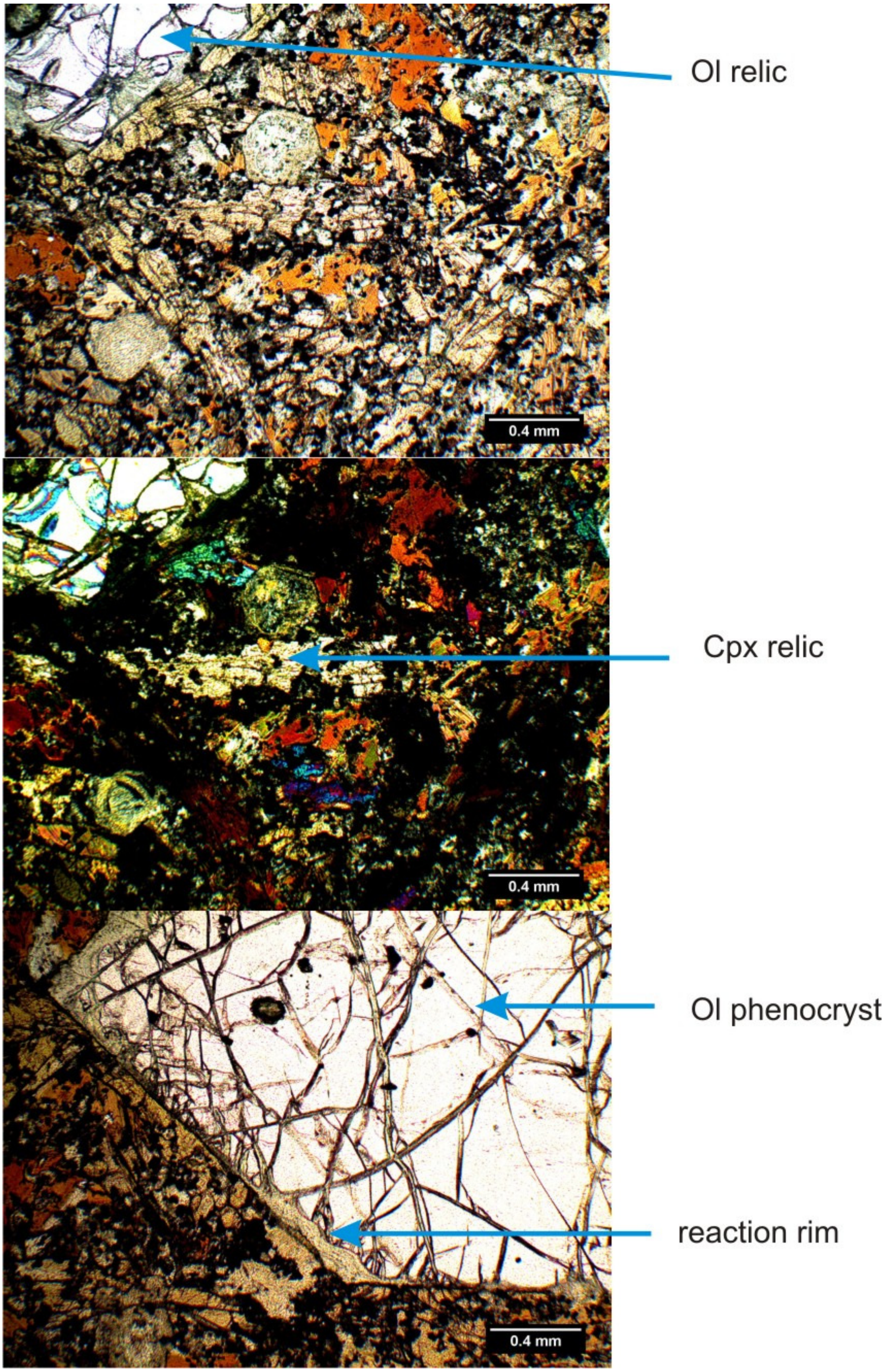



**Figure 7-22** A photomicrograph of sample G1-2 under reflected and transmitted light (parallel and crossed nicols).

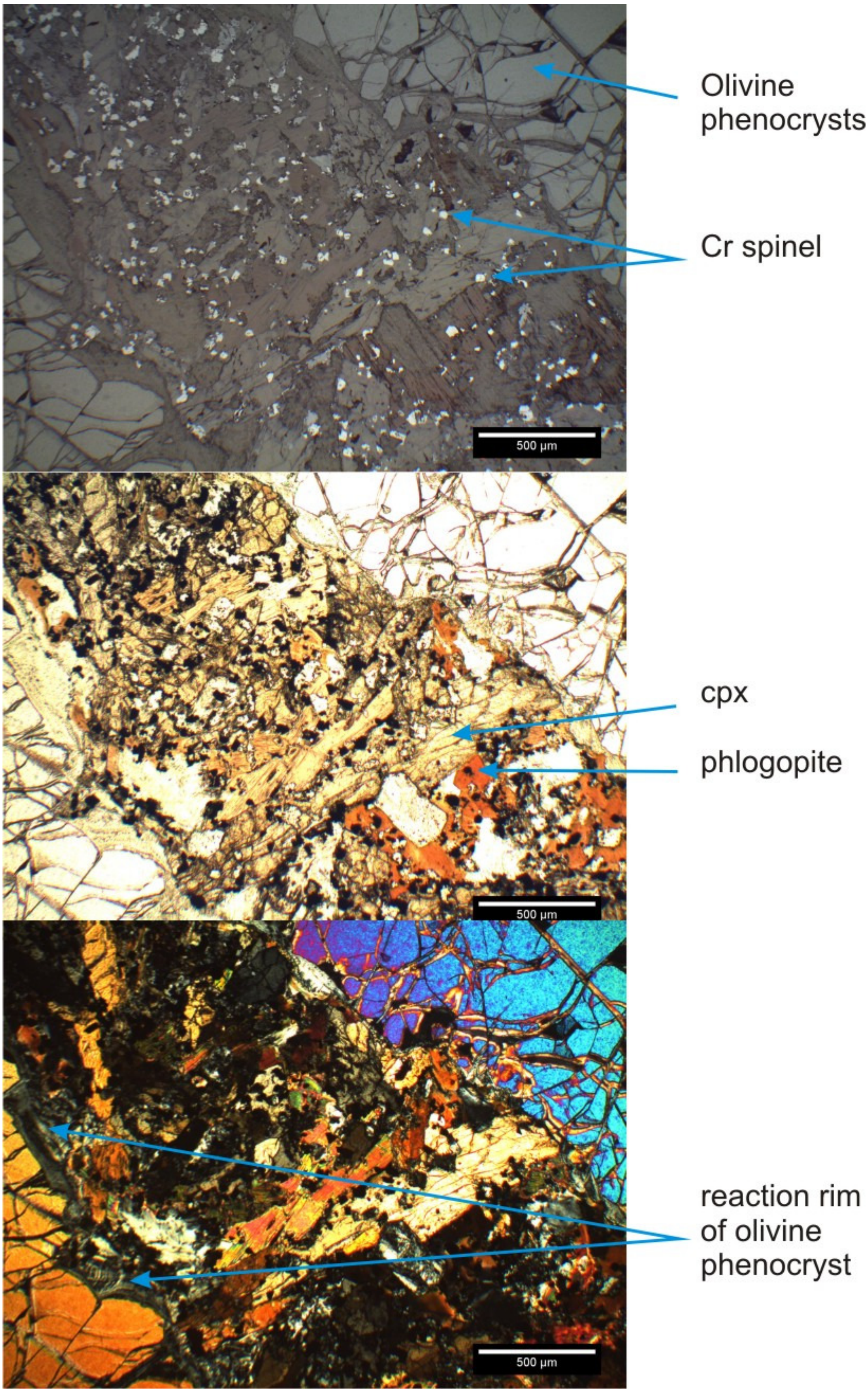



**Figure 7-23** A photomicrograph of sample G1-2 under reflected and transmitted light (parallel and crossed nicols).

*G1-3 392 m*

**Drill core description:**

Meimechite (Volcanic),

**Thin section description:**

Large olivine grains in a groundmass of clinopyroxene, oxides, phlogopite and altered material. Olivine grains are highly cracked, with minimal alteration at the rims. Internal cracks in the olivine are filled with serpentine. Grain size varies from a maximum of ~ 7 mm to a minimum of 0.6 mm, with the average grain size being 2 mm. Olivine comprises ~ 65% of the slide. Rare Cr-rich spinel inclusions occur within the olivine but they are relatively free of melt inclusions. Under crossed polars a primary euhedral grain shape can be observed. The groundmass comprises 25% of the slide, 10% is represented by altered material. The grain size of the groundmass is smaller than in G1-2 and is dominated by moderately altered clinopyroxene. The clinopyroxene appears as needle-like laths displaying an ophitic texture. See Fig 7 – 24. Grain size varies from 2 mm to 3 mm. The phlogopite is not as pleochroic as in G1-2, appearing as small broken grains. There is a complex intergrowth of magnetite and ilmenite. Grains are irregular and often pitted with a highly variable grain size, i.e. large grains ~ 0.5 mm to clusters of ~ 10 μm grains. Rare large grained magnetite has melt inclusions. Cr- rich spinels up to 200 μm, can also be found in the matrix. On the basis of the texture (ophitic texture of clinopyroxene), this rock represents a volcanic rock and can be classified as meimechite.

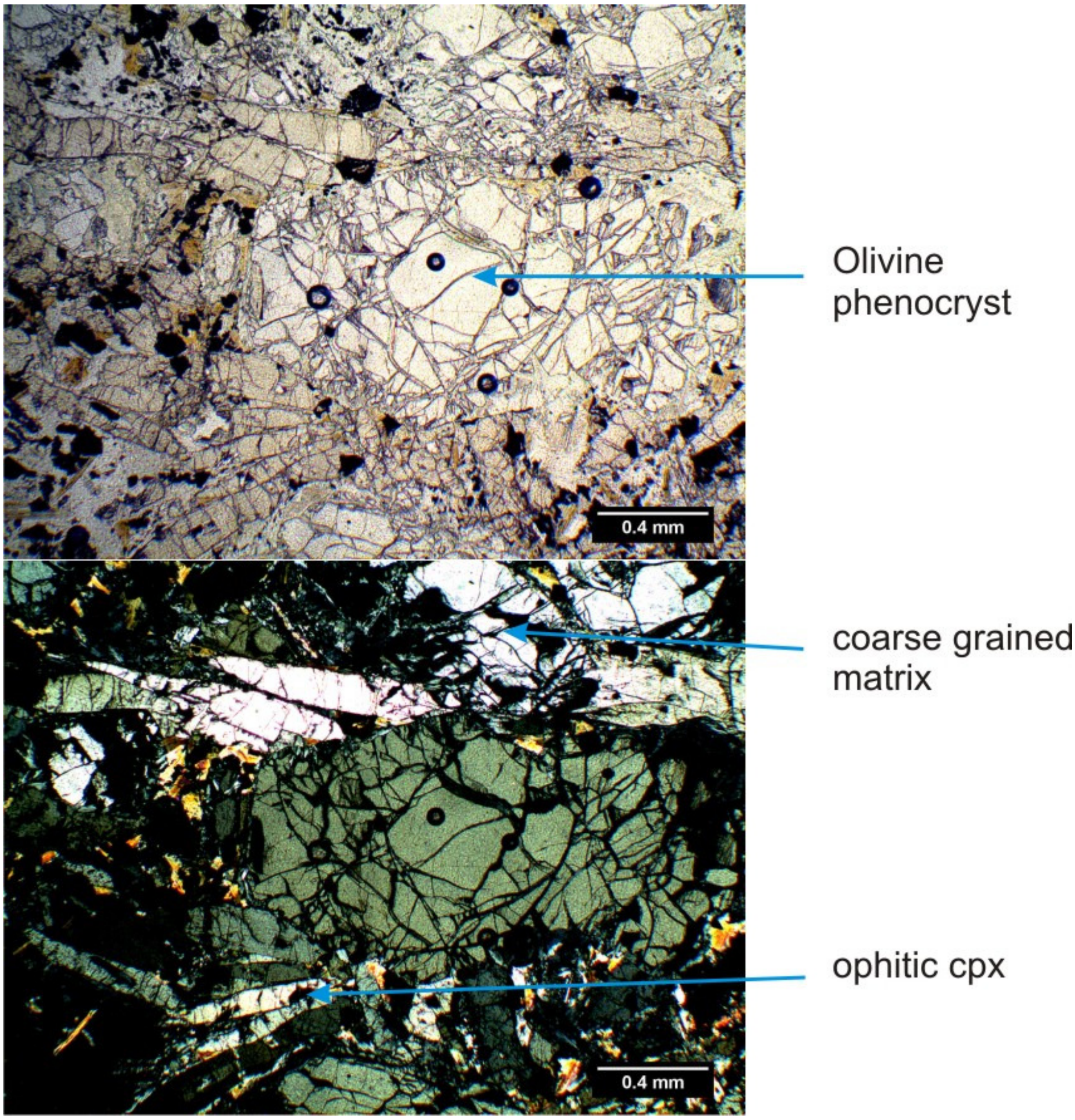



**Figure 7-24** Photomicrograph of sample G1-3 under transmitted light (parallel and crossed nicols).

*G1-12 346.1 m*

**Drill core description:**

Meimechite (volcanic)

**Thin section description:**

Olivine comprises ~ 50% of the slide, the grains are large and euhedral to subhedral and have straight grain boundaries. Grain size varies from a maximum of 4.4 mm to a minimum of 1 mm with an average of 2 mm. The olivine grains are cracked and have melt inclusion trails. See Fig 7 - 25 Cr - rich spinel inclusions (around 30 µm in diameter) are rare in olivine. The section is further characterised by a network of serpentine ± chlorite and magnetite through the olivine grains. The ground mass is comprised of clinopyroxene, phlogopite, serpentine minerals, magnetite chlorite and amphiboles. Clinopyroxene occurs as laths up to 2.2 mm in size and comprises ~ 45% of the matrix. The clinopyroxene is zoned; the zonation is defined by a pale to colourless core with a darker brown rim. Clinopyroxenes are often broken and exhibit in places a radial growth of lath shaped crystals. Magnetite comprises ~15% of the matrix and occurs as filling of interstitial spaces, aggregates of small (3 - 5 µm) grains and larger grains ~ 70 µm which are zoned. The zonation is defined by a core of less reflectance and a higher reflecting rim. Phlogopite, occurring as irregular sheets up to 300 µm, has a strong red coloured pleochroism and comprises 10% of the matrix. On the basis of the texture of the matrix this rock represents a volcanic rock, based on the mineral composition this rock is classified as meimechite.

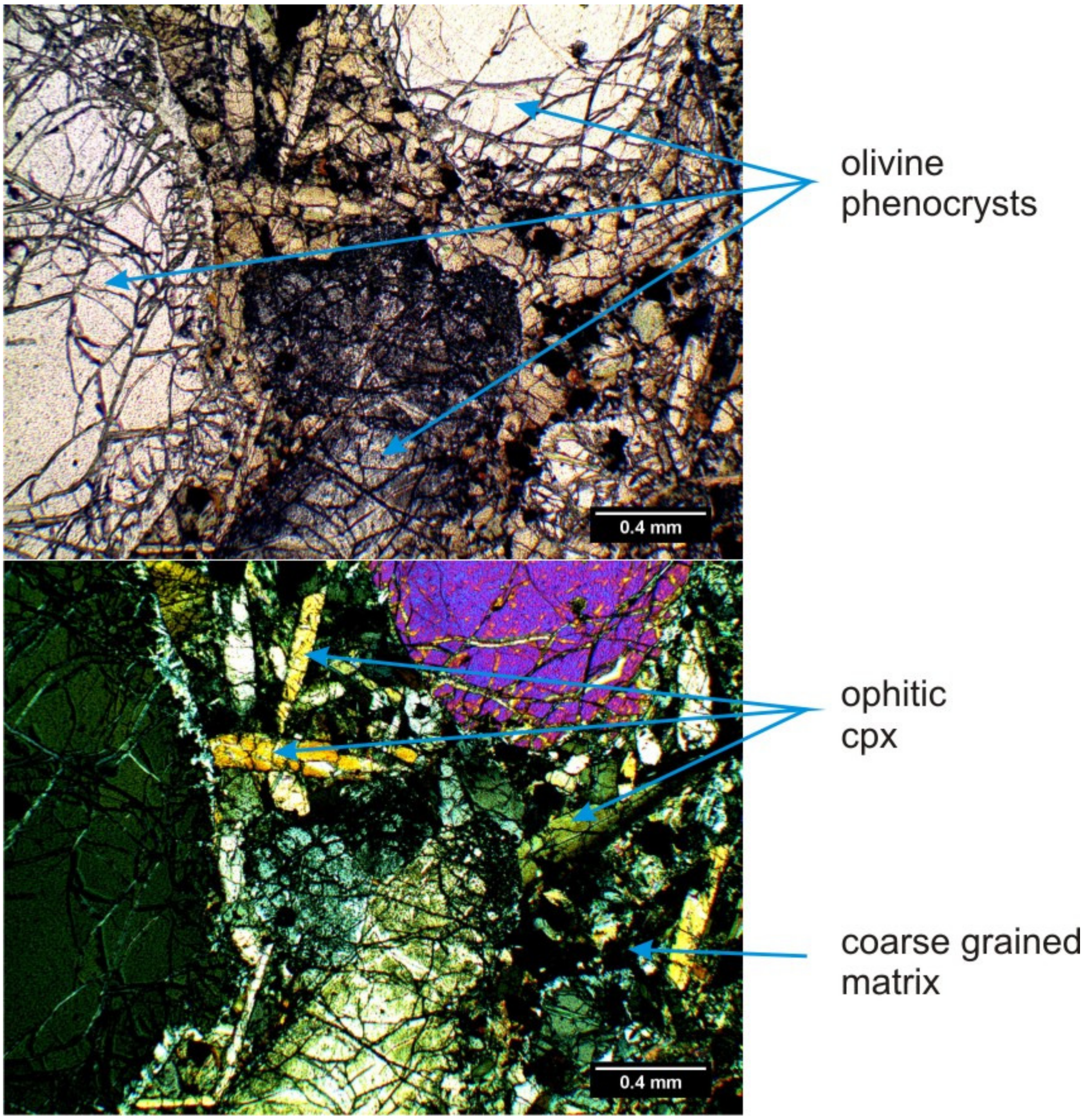



**Figure 7-25** Photomicrograph of sample G1-12 under transmitted light (parallel and crossed nicols).

*<u>G1-13 342.2 m</u>*

**Drill core description:**

Meimechite (Volcanic)

**Thin section description:**

The section is dominated by ~ 80% of groundmass. A few relic olivine grains remain. These grains are surrounded by a reaction rim, which is composed of serpentine minerals, chlorite and biotite. This reaction rim can sometimes replace the entire olivine grains. See Fig 7 - 26. Primary grain shape was euhedral to subhedral; the relic cores now have an irregular grain shape. Grain size varies from 1 to 3 mm, with an average grain size of 2 mm. Rare euhedral to subhedral Cr - rich spinel inclusions can be found in the olivine, these are ~ 40 µm. No fluid or melt inclusion trails were observed in the olivine. The groundmass is medium grained and dominated by clinopyroxene, phlogopite, magnetite, feldspar, apatite, serpentine minerals, chlorite and white mica. Clinopyroxene appears as needles or are of lath shape (up to 1 mm in length), with radial crystal growth and locally displaying ophitic texture. Phlogopite comprises 15 - 20% of the groundmass. It is highly pleochroic, with colours ranging from near colourless to a rich red brown. Grain size and shape is highly irregular often forming a sheet like network. Magnetite is abundant in the groundmass and ranges from small and disseminated to large (~200 µm) grains. The larger grains are subhedral to euhedral, and often show corroded rims. There is no ilmenite exsolution. Very small (5 - 10 µm) grains of chalcopyrite and bornite can occasionally be observed. Within this section the grain size grades from coarse to fine. The mineralogical composition of the finer grained part is identical to that of the matrix. Occasionally pseudomorphs of completely replaced olivine phenocrysts can be observed. On the basis of the texture and mineralogy the coarser-grained portion of the section is classified as strongly altered meimechite; the fine-grained part of the section is interpreted as a chilled margin.

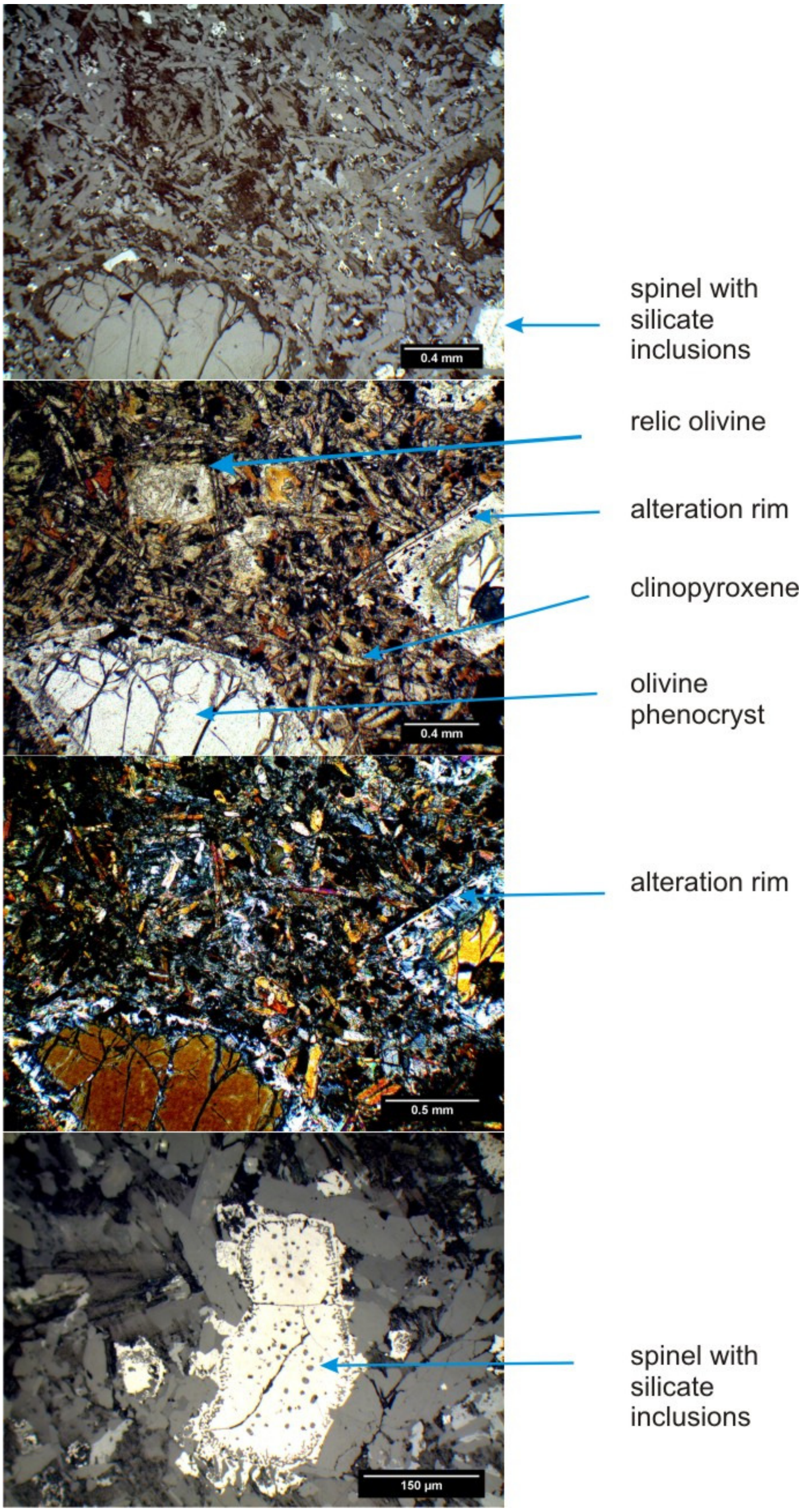



**Figure 7-26** Photomicrograph of sample G1-13 under reflected and transmitted light (parallel and crossed nicols).

## *G1-14 332.2 m*

**Drill core description:**

Olivine cumulate

**Thin section description:**

Olivine phenocrysts comprise approximately 50% of the slide. Grain size varies considerably, large grains up to ~1 cm, medium sized grains ~ 2 mm and small grains ~500 µm. The large olivine grains are subhedral, with fairly straight grain boundaries, the medium and small olivine grains are anhedral with irregular grain boundaries. All olivine grains are cracked; cracks are filled with alteration products (i.e. serpentine phases and chlorite). Very rare, small (20 - 30 µm), Cr-rich spinel inclusions can be found in some of the olivine phenocrysts. Olivine phenocysts contain rare melt inclusion trails. The rims / grain boundaries are often “corroded”. Olivine contains some of the “platy” inclusions. Olivine with a small grain size is often more heavily included, with Cr-rich spinels and solid/fluid inclusion trails. The matrix is comprised primarily of phlogopite, i.e. ~ 50% of the matrix. The phlogopite forms interlocking sheets and is not as pleochroic as in other sections. Clinopyroxene within the groundmass has uneven grain boundaries and no obvious grain shape or size. Grains appear as corroded altered relics. The grain size of the magnetite varies from small disseminated ~ 5 µm to larger ~ 250 µm sub- to euhedral grains which can show a zonation and silicate inclusions. Cr - rich spinel grains can also be found in the matrix. Perovskite grains up to 200 µm are present in the groundmass. Subordinate plagioclase, carbonate and white mica can be observed. Altered material within the matrix is comprised of white mica, phlogopite (in irregular patches) serpentine minerals, carbonate, apatite and chlorite. On the basis of geochemistry this rock is classified as an olivine cumulate.

## *G1-15 316.8 m*

**Drill core description:**

Meimechite (Volcanic)

**Thin section description:**

The section is comprised of large to medium grained olivine phenocrysts in a coarse grained partly altered matrix of clinopyroxene, phlogopite, magnetite and rare plagioclase. Olivine comprises approximately 60 - 70% of the slide. The olivine grains are cracked, with minor alteration filling the cracks. Some grains show alteration rims. See Fig 7 – 27. Olivine grain size varies considerably, with large grains ~ 7.5 mm, medium grains ~ 2.2 mm. The olivine has small inclusions of Cr-rich spinels. The matrix is coarser grained than G1-14, and slightly altered. Clinopyroxene has a varied grain shape, with broken grains and laths. Large grains are up to 1.2 mm, while medium grains are ~ 0.5 mm. Phlogopite is highly pleochroic, with colour variation from a light tan to burnt orange and shows uneven sheet-like shape. See Fig 7 – 28. Magnetite and Cr – rich spinel grains are disseminated throughout the matrix, grain size varies from ~2 - 3 µm to 250 µm. The larger grains are zoned with a grey blue core of Cr – rich spinel and a higher reflecting magnetite rim. The smaller grains are sub to euhedral and not zoned and have the same reflectance as the rims of the larger grains.

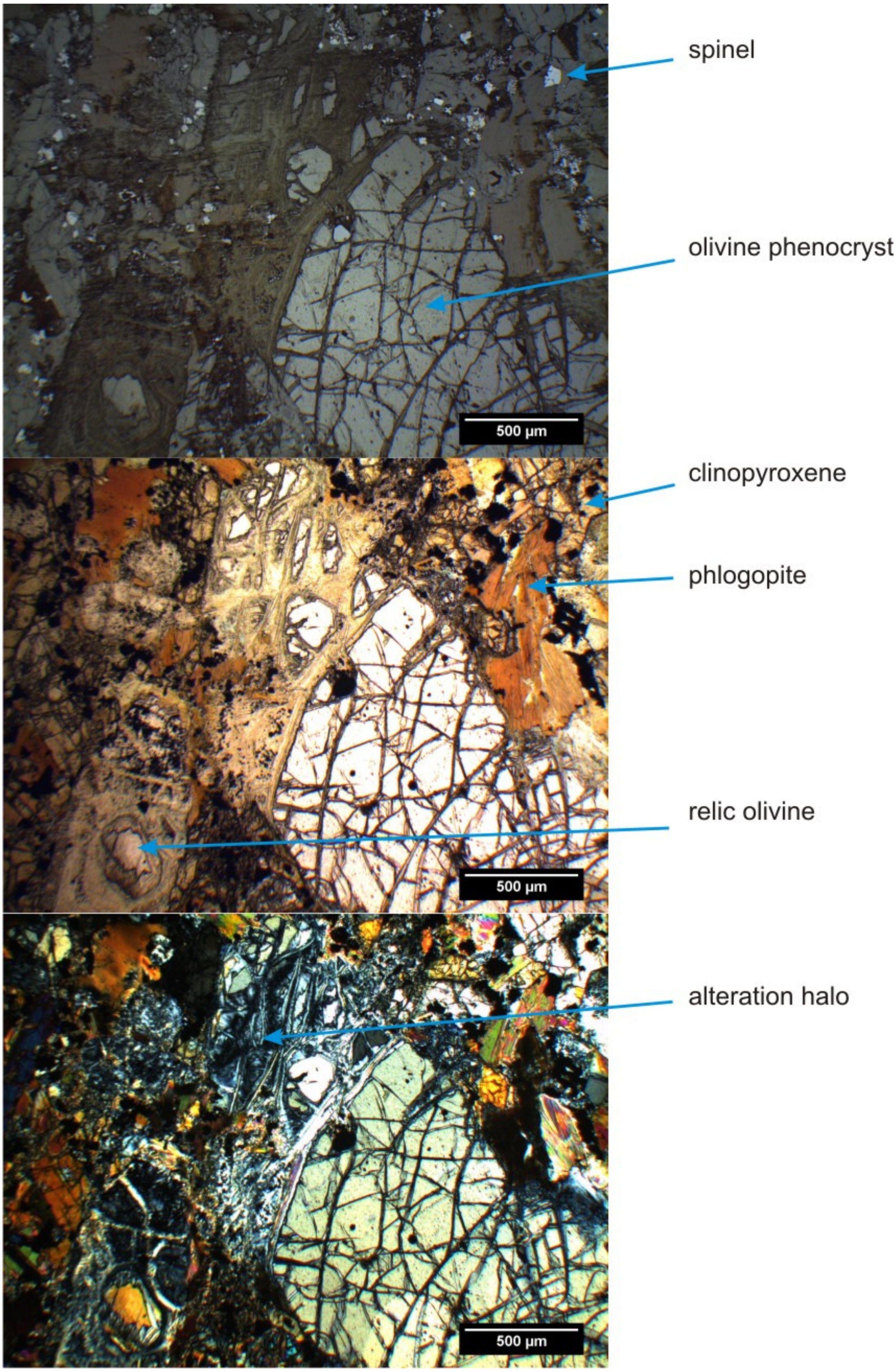



**Figure 7-27** Photomicrograph of sample G1-15 under reflected and transmitted light (parallel and crossed nicols)

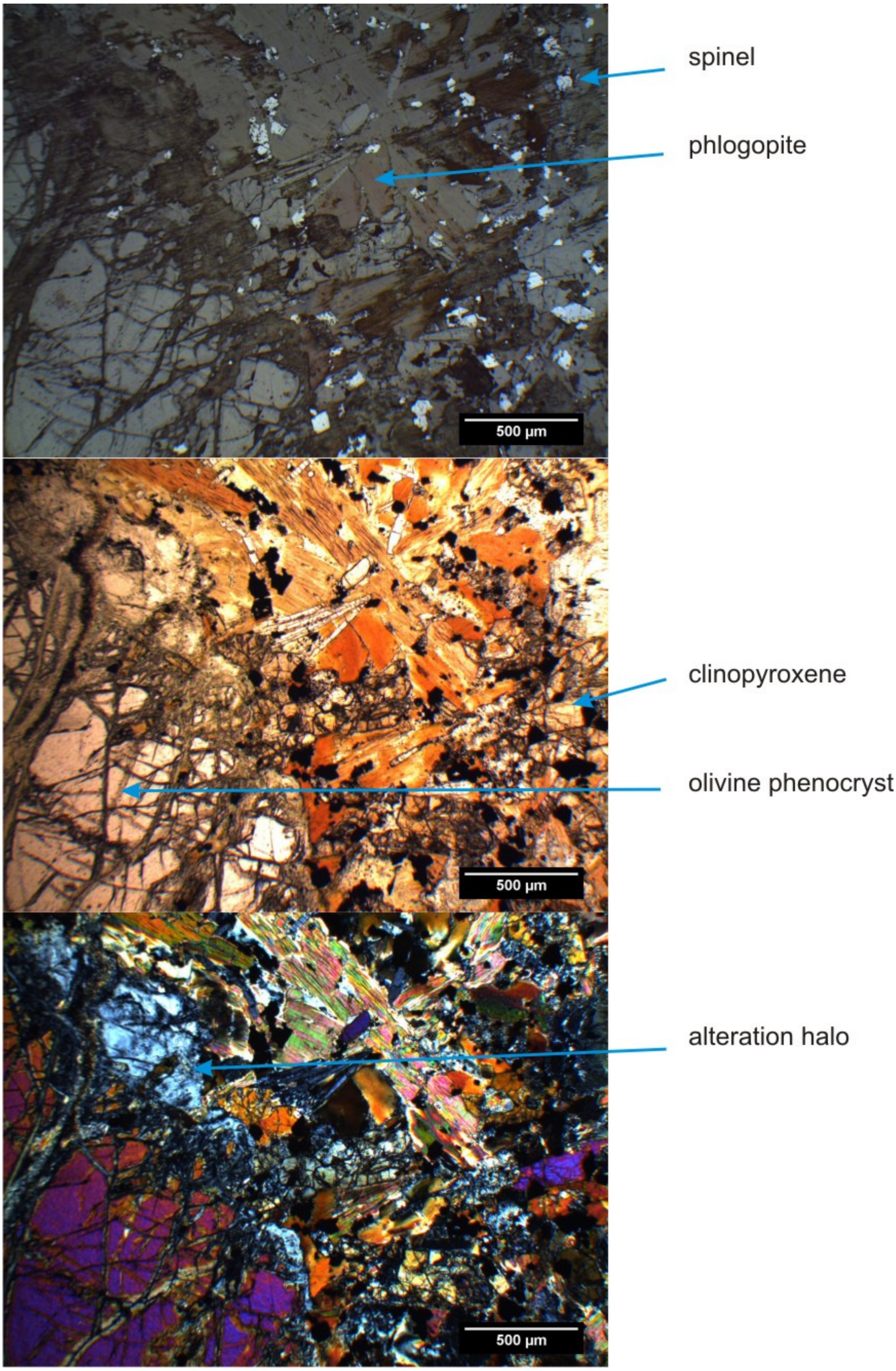



**Figure 7-28** Photomicrograph of sample G1-15 under reflected and transmitted light (parallel and crossed nicols)

## *G1-17 312.5 m*

**Drill core description:**

Tholeiitic basalt.

**Thin section description:**

This section is composed of phenocrysts of clinopyroxene, phlogopite and plagioclase in a matrix of fine grained to cryptocrystalline matrix that has been partly recrystallised. The matrix has an amorphous texture and appears to be recrystallised glass. Clinopyroxene comprises ~ 55% of the phenocrysts and shows a sub - ophitic texture formed by relic laths and needles. The clinopyroxene phenocrysts are up to 3-4 mm in length. Phlogopite is highly pleochroic, from tan to bright orange / red, there is often some zonation of the phlogopite. Phlogopite occurs as sheets without an obvious grain shape. Magnetite comprises 5% of the groundmass. The proportion of matrix varies throughout the section.

## *G1-18 312.3 m*

**Drill core description:**

Olivine cumulate

**Thin section description:**

The section is dominated by olivine, approximately 90% of the slide, with a partly altered interstitial mass of clinopyroxene, phlogopite and magnetite and Cr - poor spinel. The olivine grains are cracked, with minor alteration along the cracks, grain size varies, from large irregular grains ~ 3 mm, to medium euhedral grains ~ 0.5 mm with a strong cumulate texture. See Fig 7 - 29. Olivine is highly included, with trails of melt inclusions and subordinate fluid inclusions. Cr-rich spinels (~ 125 µm in size), with a subhedral grain shape are observed in the interstitial spaces, very rarely euhedral Cr-rich spinel inclusions (~ 30 µm in size) within olivine are observed. The intercumulate material is comprised of phlogopite, alteration products, such as serpentine minerals ± chlorite and clinopyroxene. The percentage of cumulus olivine and intercumulus mineral phases varies, in that locally veins and zones rich in intercumulus clinopyroxene and phlogopite of massive grain size can be observed, the olivine in these zones shows little/no alteration.

On the basis of the clearly observable cumulate texture, this rock is an intrusive olivine cumulate.

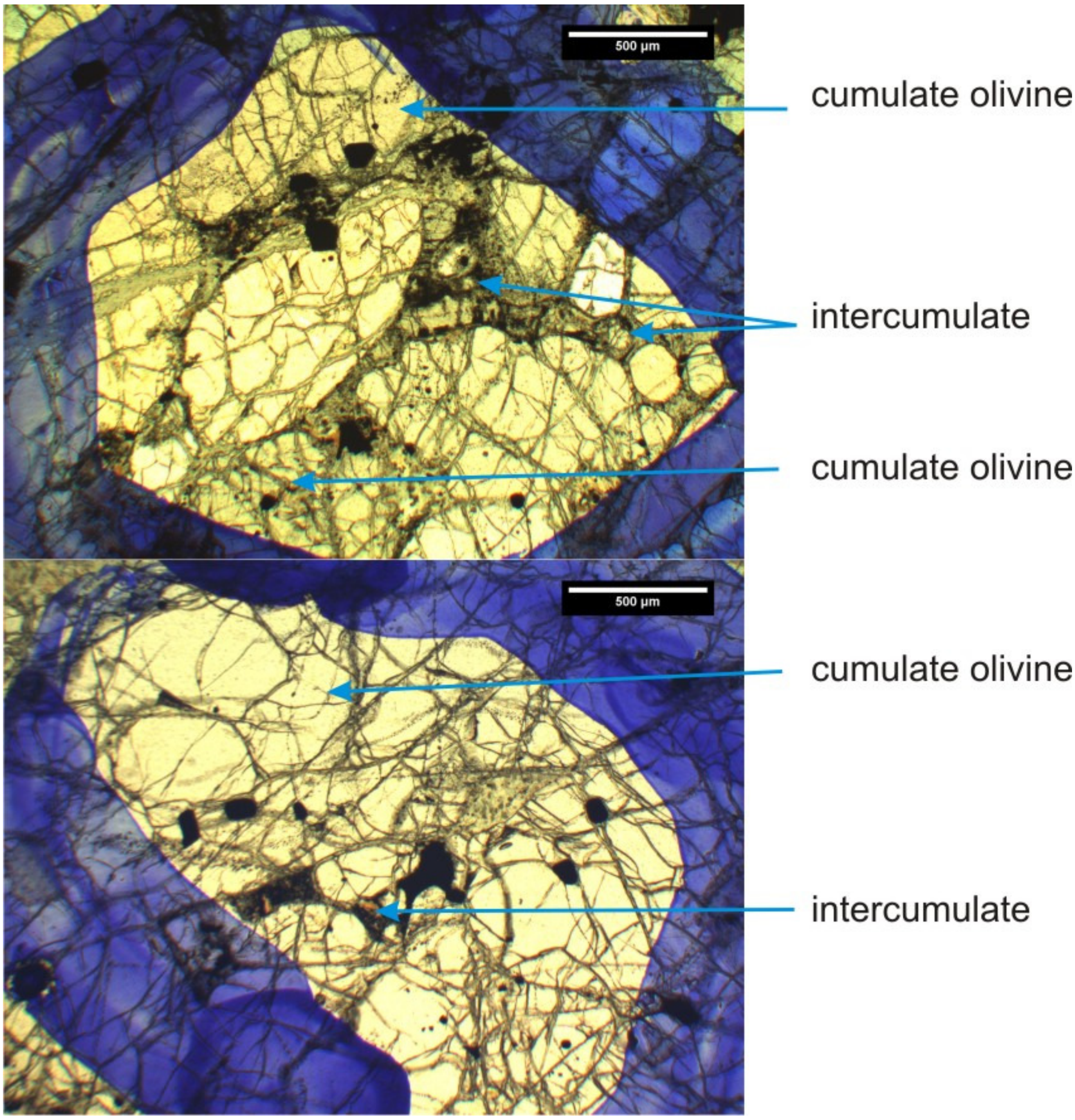



**Figure 7-29** Photomicrograph of sample G1-18 under transmitted light (parallel nicols)

## *G1-19 311.4 m*

**Drill core description:**

Meimechite (Volcanic)

**Thin section description:**

The slide is comprised of coarse grained olivine phenocrysts in a groundmass of clinopyroxene, phlogopite and oxides. Olivine phenocrysts in this section are much larger than in other sections with average grain size of 6 - 7 mm and grains up ~ 9 mm. Olivine grains are cracked, with minor alteration (i.e. serpentine and chlorite) filling cracks. The larger olivine grains show slight alteration along the rims; this alteration rim is more significant on the small grains. See Fig 7 – 30. Inclusions of Cr - rich spinels can be found within olivine, these are euhedral and 60 µm in size. Magnetite and Cr-rich spinels occur in the interstitial spaces. Clinopyroxene comprises ~ 45% of the groundmass. Clinopyroxene occurs as laths and needle-like grains displaying ophitic textures. Furthermore, the clinopyroxenes are often corroded and appear as relic grains. Plagioclase occurs as ~ 250 µm clumps of small subhedral grains. Phlogopite comprises approximately 35% of the groundmass. Phlogopite is most common as large sheets ~ 500 µm. Within the coarse grained groundmass is a more fine grained material that maybe a recrystallised glass or alteration.

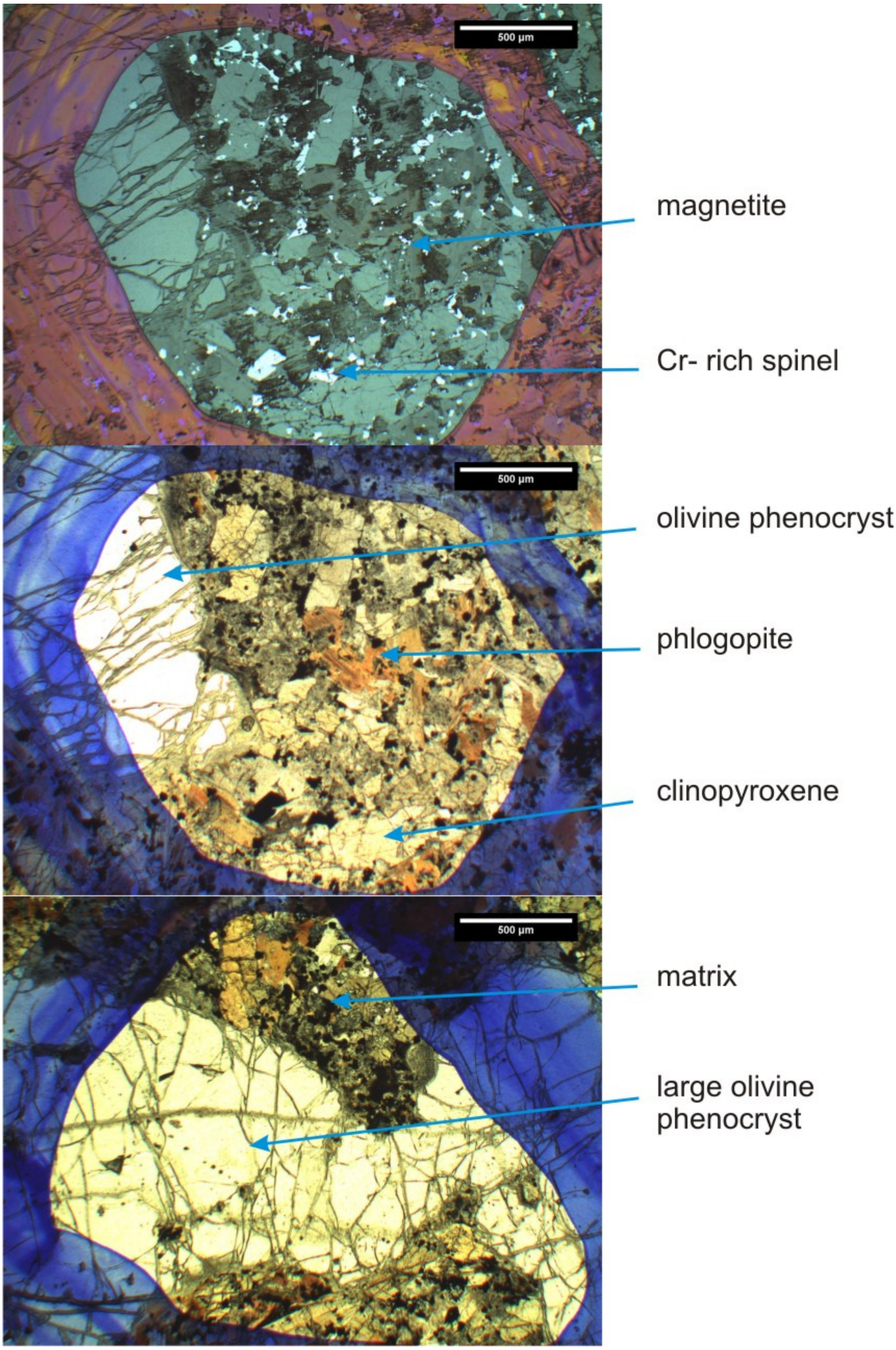



**Figure 7-30** Photomicrograph of sample G1-19 under reflected and transmitted light (parallel nicols).

*G1-20 311.3 m*

**Drill core description:**

Olivine cumulate

**Thin section description:**

The section is dominated by olivine. The grains are highly cracked, with serpentine minerals filling the cracks. Original grain shape and size is visible under crossed polars. Large olivine grains are ~ 2.2 mm and comprise 30% if the slide. Medium sized grains are ~ 0.8 mm and comprise 30% of the slide. Small olivine grains are ~ 0.25 mm and comprise 10% of the slide. Inclusion trails are common in olivine especially near veins. Rare Cr-rich spinel inclusions are found in olivine. These are ~ 40 µm in size and are sub- to euhedral in shape. Alteration minerals (serpentine minerals + chlorite) comprise 10% of the section, with the remainder comprised of phlogopite ~ 3%, clinopyroxene ~ 2% and magnetite ~ 5%. The rock is characterised by a poikilitic texture of clinopyroxene, phlogopite and apatite as intercumulus mineral phases and olivine as cumulus. See Fig 7 - 31. Interstitial anhedral, to subhedral Cr - spinels are common. Grain size varies from 300 µm to 30 µm. Occasionally magnetite occurs as intercumulus Within in the altered material very small (2 – 3 µm) euhedral magnetite grains can be observed

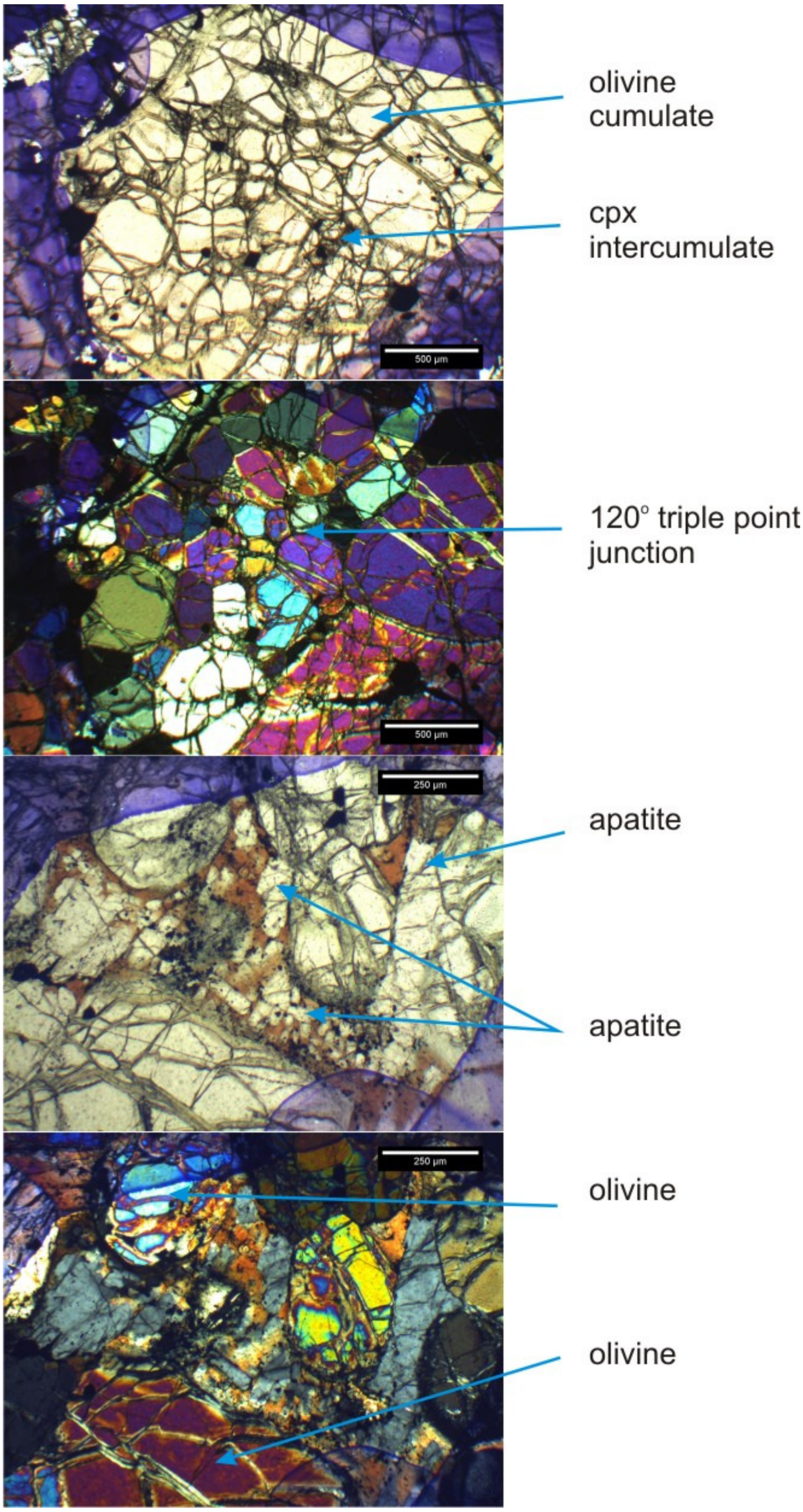



**Figure 7-31** Photomicrograph of sample G1-20 under transmitted light (parallel and crossed nicols)

*G1-21 311.0 m*

**Drill core description:**

Olivine cumulate

**Thin section description:**

The section is dominated by medium to small grained olivine. Grain size varies from 2 mm to 0.4 mm. There is a network of alteration within the olivine. The alteration is composed of serpentine minerals and chlorite. Olivine shows cumulate texture with common $120^0$ triple point junctions. See Fig 7 - 32. Intercumulus is comprised of phlogopite, clinopyroxene (altered) serpentine minerals, chlorite ± plagioclase. The olivine is highly included by multiple generations of melt/fluid inclusions. Cr-rich spinel inclusions in olivine are euhedral to subhedral. Grain size is ~ 70 µm. Interstitial spinels are slightly poorer in chromium. (See microprobe results in Appendix XY: Spinel analysis and Mineral Chemistry section: Spinels) and have a more irregular shape. Magnetite can occur as intercumulus. See Fig 7 – 33. There is no ilmenite exsolution in the magnetite. There is some alignment of the olivine, suggesting a magmatic texture or deformation. On the basis of the texture the rock has been classified as an olivine cumulate

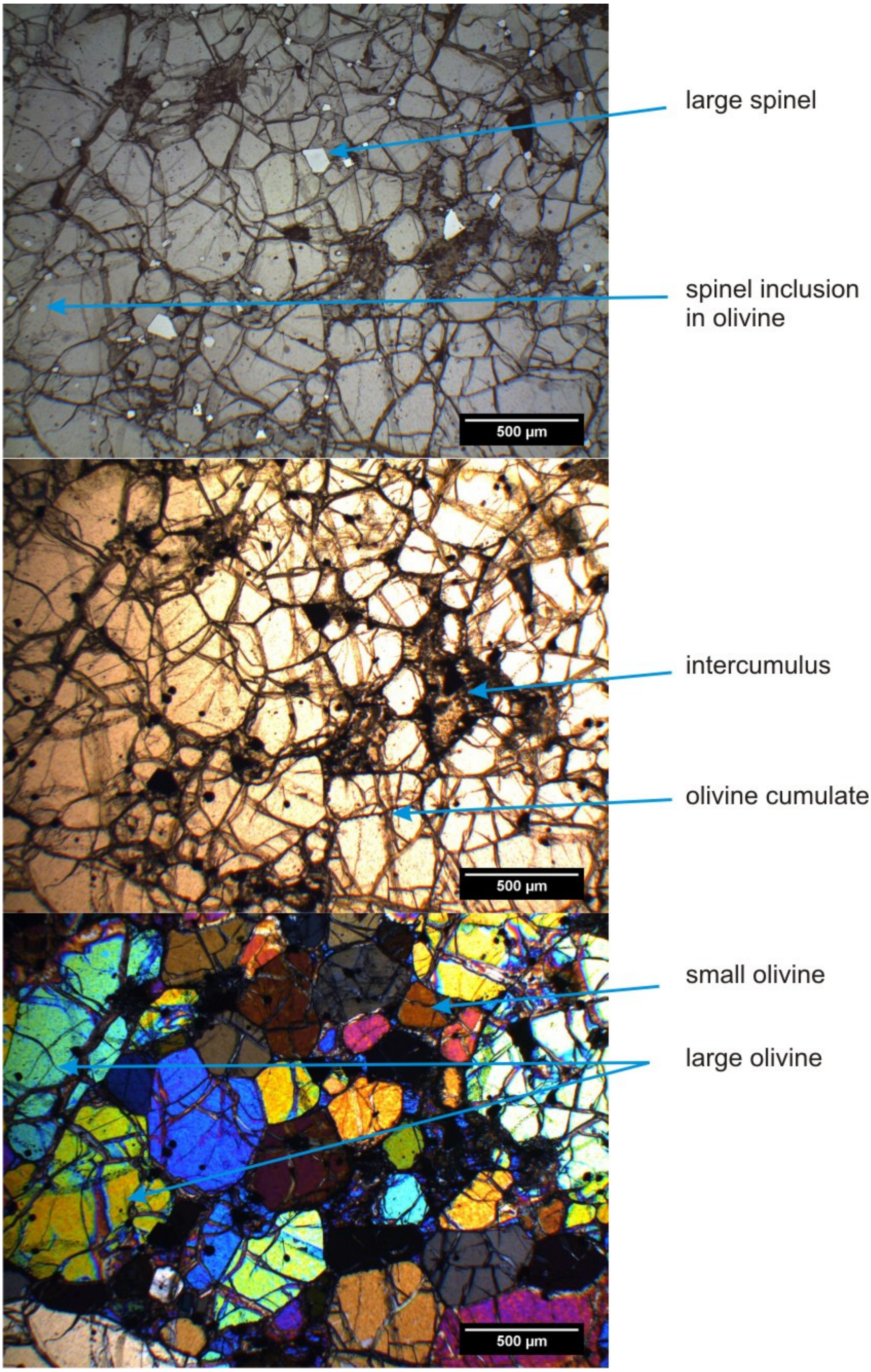



**Figure 7-32** Photomicrograph of sample G1-21 under reflected and transmitted light (parallel and crossed nicols)

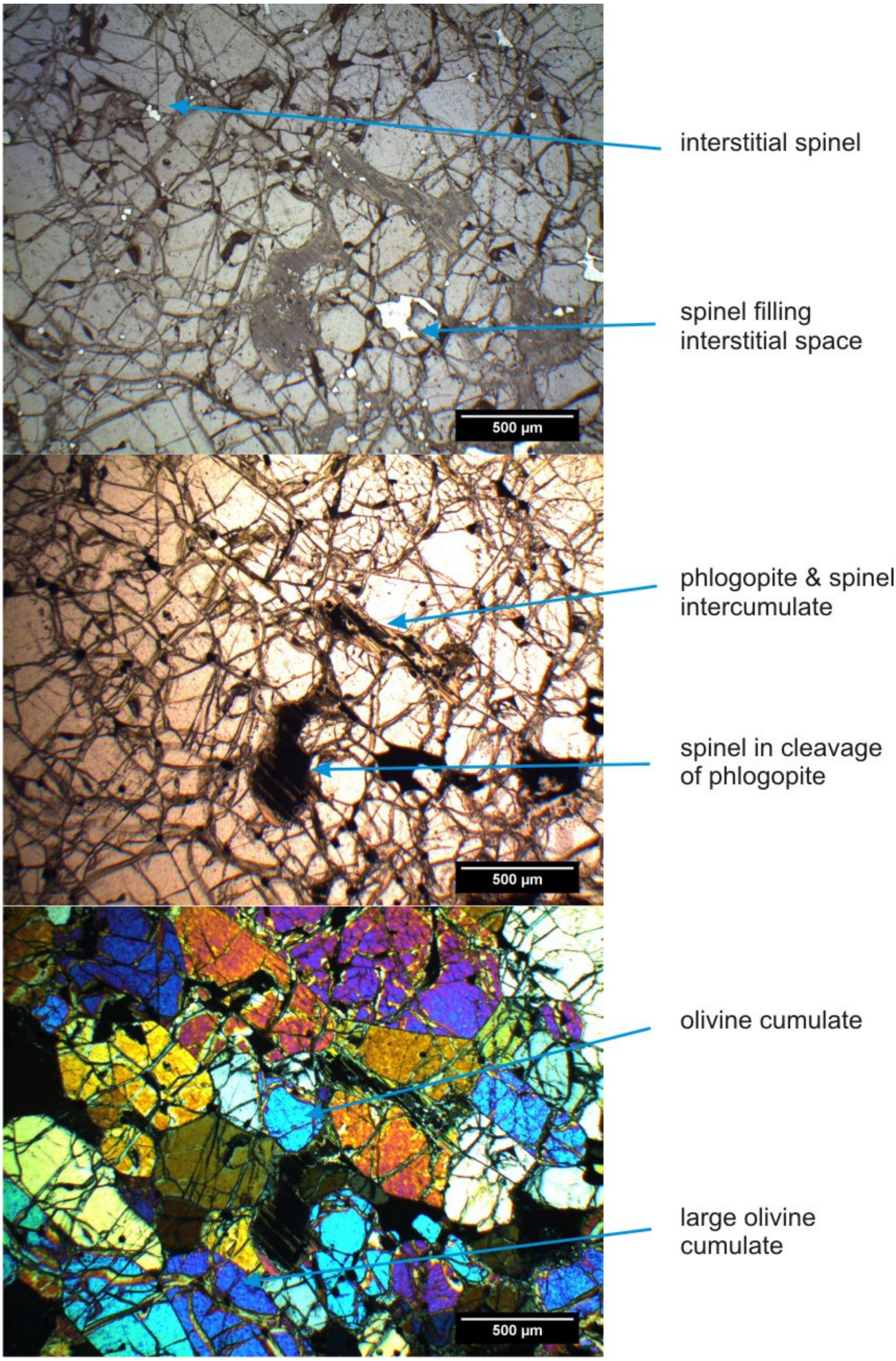



**Figure 7-33** Photomicrograph of sample G1-21 under reflected and transmitted light (parallel and crossed nicols)

*G1-23 306.1 m*

**Drill core description:**

Meimechite (volcanic)

**Thin section description:**

This section is divided into two parts, 1: Picrite dyke. Large euhedral to subhedral olivine phenocrysts in a very fine grained matrix. Olivine phenocrysts comprise 50 – 60% of the sample. The olivine grains show a very distinct reaction rim. Olivine grain size varies from ~ 4 mm to ~ 0.6 mm, smaller olivine phenocrysts have been completely "eaten up" by alteration. See Fig 7 – 34. Cr-rich spinel inclusions occur in olivine. These are between 20 and 100 µm and are subhedral in shape. The groundmass is a very fine crypto-crystalline mass. Two types of magnetite occur in the matrix. 1: aggregates of very small (2-3 µm) euhedral grains, 2: Subhedral grains up to 150 µm that are often rimmed by small grains. See Fig 7 - 35

The second part of the section is composed of a coarser-grained matrix, without olivine phenocrysts. The contact between the picrite dyke and the second part of the section is very sharp. The coarser-grained matrix is comprised of clinopyroxene, magnetite, plagioclase and serpentine minerals. Clinopyroxene occurs as relic, altered laths/needles and size varies from 2 mm to 100 µm. See Fig 7 - 36. There is little alteration of the coarser-grained material at the contact, but away from the contact, alteration becomes very intense up to complete replacement by serpentine minerals. This coarser-grained, mostly strongly altered matrix is interpreted as the chilled margin of the meimechite dyke.

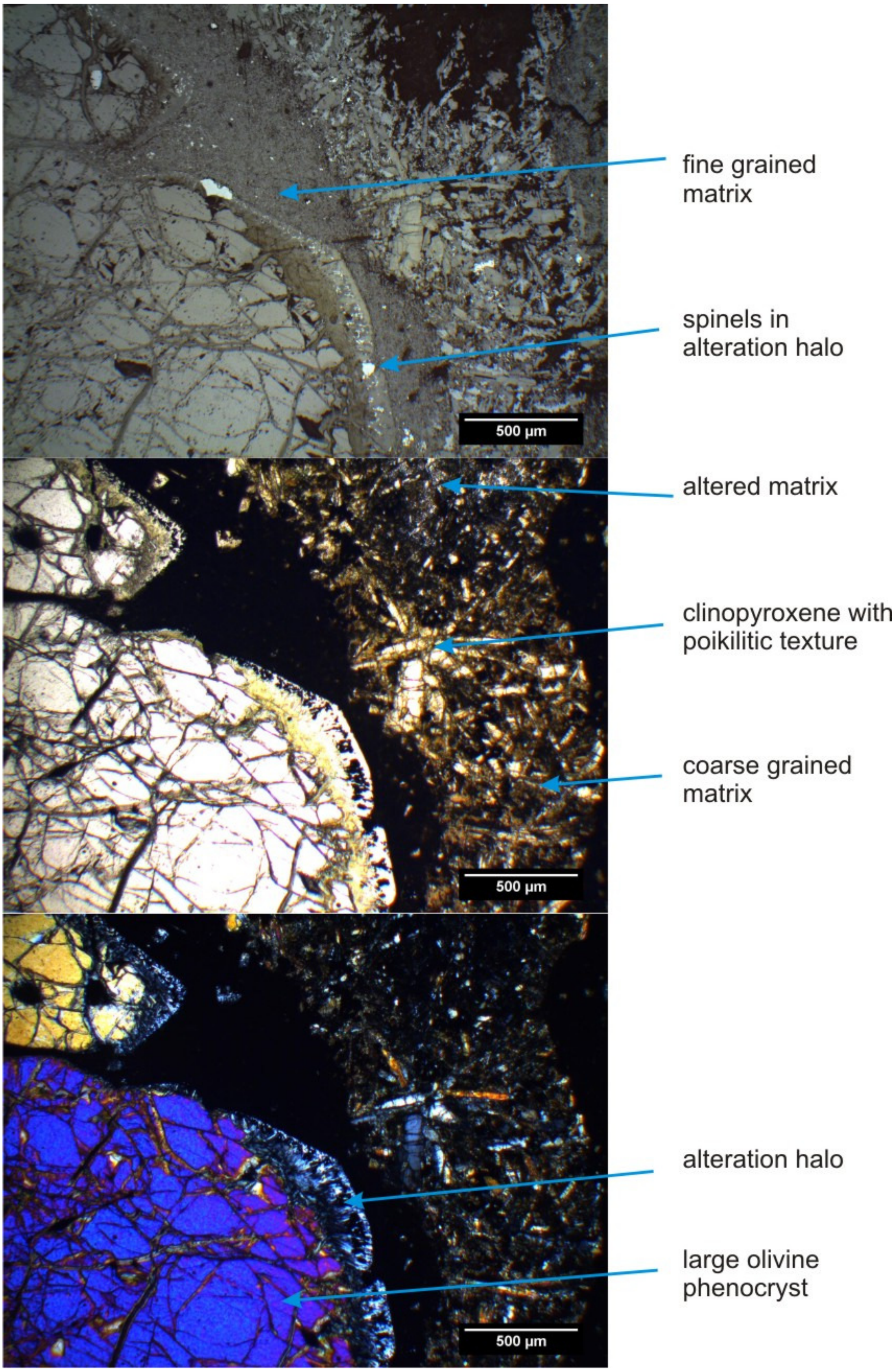



**Figure 7-34** Photomicrograph of sample G1-23 under reflected and transmitted light (parallel and crossed nicols)

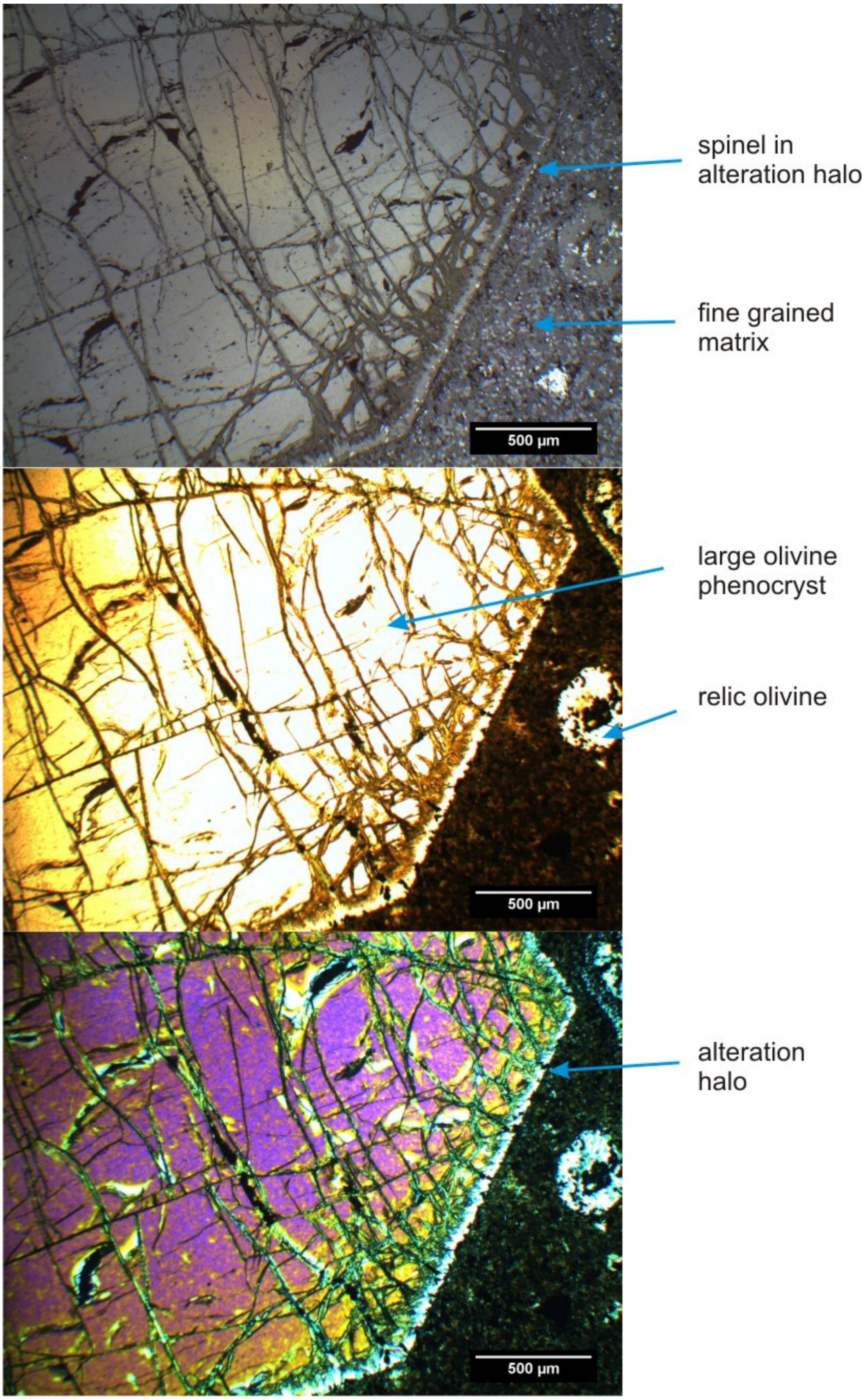



**Figure 7-35** Photomicrograph of sample G1-23 under reflected and transmitted light (parallel and crossed nicols)

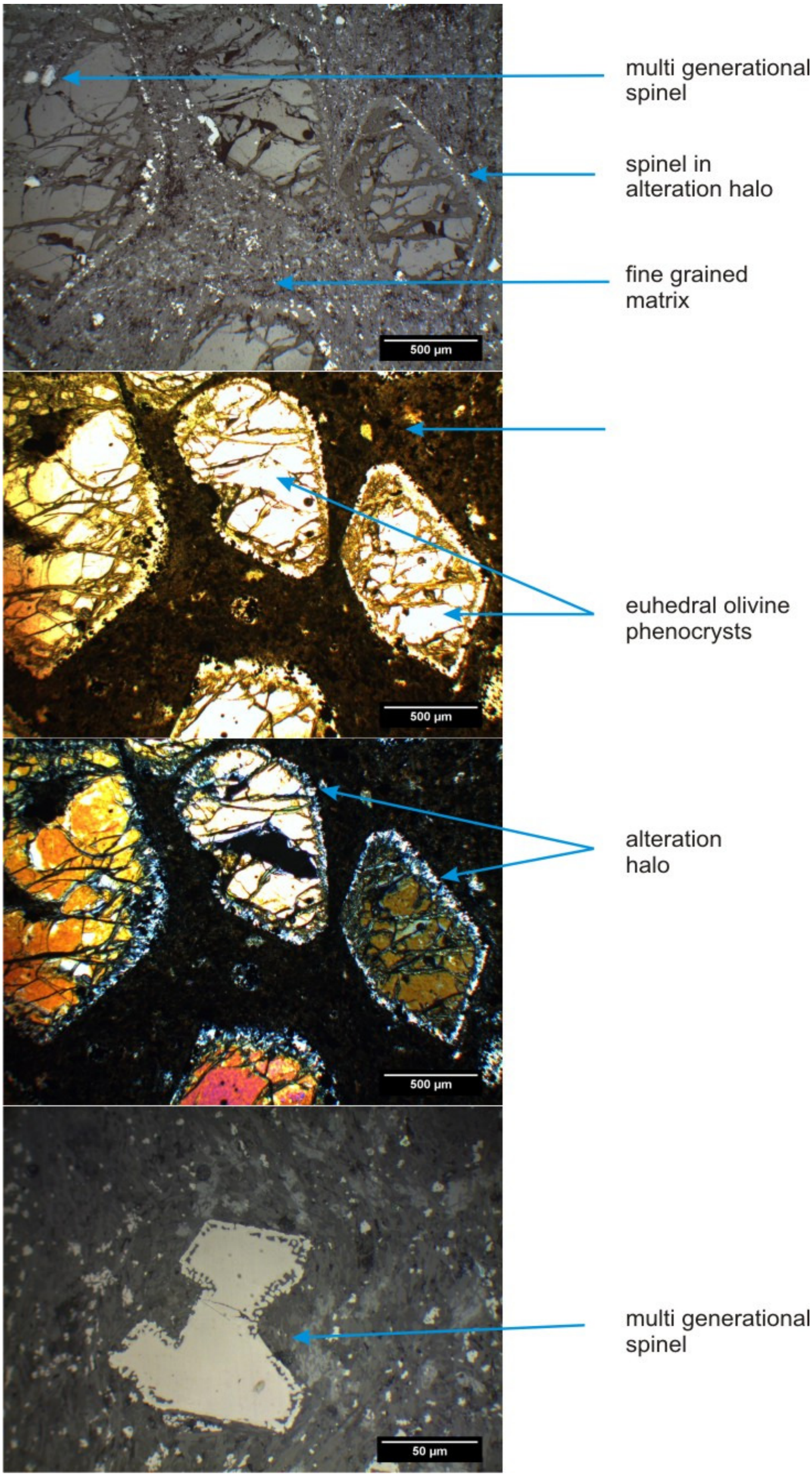



**Figure 7-36** Photomicrograph of sample G1-23 under reflected and transmitted light (parallel and crossed nicols)

*G1-24 301.8 m*

**Drill core description:**

Meimechite / Olivine cumulate. (Volcanic / olivine cumulate contact)

**Thin section description:**

Two rock types with a sharp contact dominate this section. The first is a fine grained matrix with small (0.5 mm) olivine phenocrysts, making up ~ 10% of this part of the section. Olivine phenocrysts are cracked with serpentine minerals filling the cracks, are subhedral and show the typical alteration halo. The matrix is comprised of fine grained interlocking crystals of phlogopite, disseminated Cr- spinel, magnetite, serpentine minerals, relic plagioclase and rare carbonate. This rock is classified as meimechite. See Fig 7 - 37 & 38

The second rock type is a dunite cumulate. Olivine is subhedral and grain size varies from 2 mm to 0.3 mm and can be clearly identified as cumulus phase. The olivine is cracked, with serpentine minerals filling the cracks. The olivine also has multiple generations of melt/fluid inclusions. Cr-rich spinel inclusions in olivine are euhedral with a grain size of ~ 120 μm or less. The intercummulus is comprised of clinopyroxene, serpentine minerals, chlorite, Cr - spinel, magnetite and phlogopite. There is no zoning of the magnetite. On occasion magnetite forms part of the intercumulus.

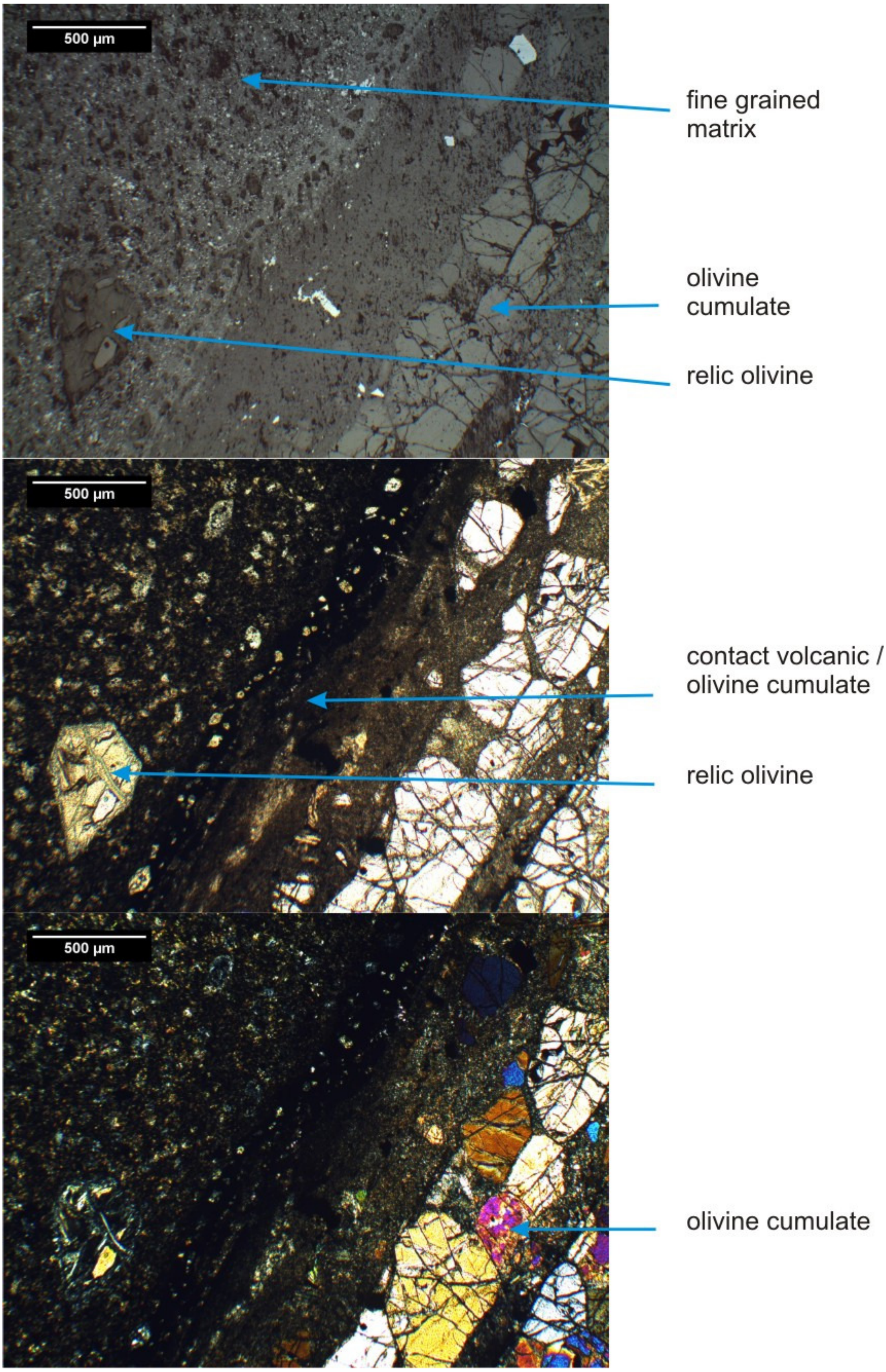



**Figure 7-37** Photomicrograph of sample G1-24 under reflected and transmitted light (parallel and crossed nicols)

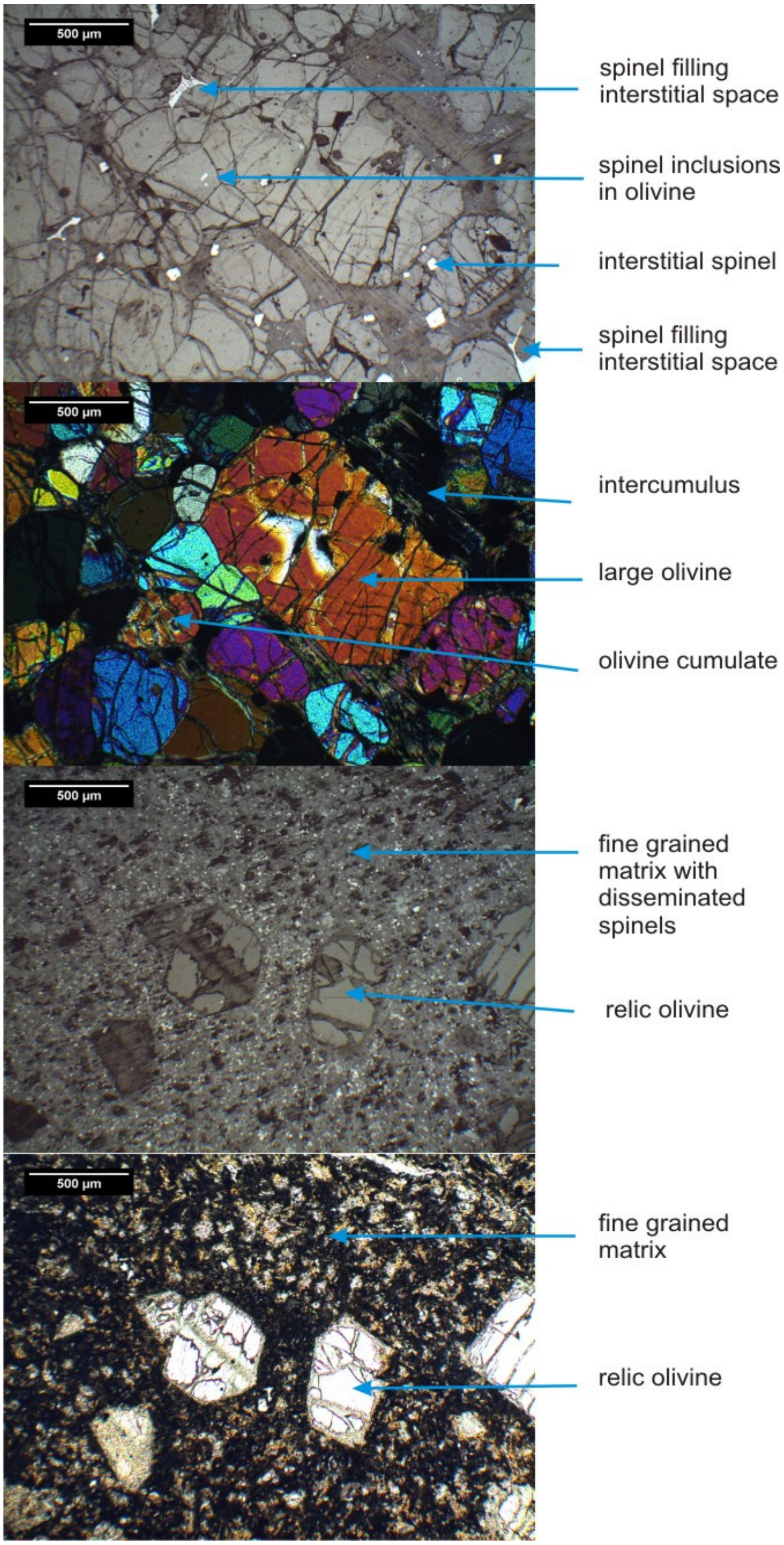



**Figure 7-38** Photomicrograph of sample G1-24 under reflected and transmitted light (parallel and crossed nicols)

*G1-25 301.3 m*

**Drill core description:**

Meimechite (volcanic)

**Thin section description:**

This section is comprised of olivine phenocrysts in a coarse grained matrix. Olivine phenocryst grain size varies from ~ 5 mm to 2 mm. Phenocrysts show reaction rims and smaller olivine grains have been replaced by serpentine minerals and chlorite completely. The larger olivine phenocrysts are cracked and the cracks are filled with serpentinite. Original grain shape was euhedral. There are no melt / fluid inclusion trails. Inclusion of Cr - rich spinel can be found in olivine. They are ~ 20 -50 µm in size and occur as euhedral to subhedral blobs. The matrix is coarse grained and comprised of clinopyroxene, phlogopite, Cr- spinels, magnetite, plagioclase and altered material. The clinopyroxene occurs as broken relic needle like grains with a radial growth texture. Magnetite occurs in two forms. 1: aggregates of small (2 - 3 µm) euhedral to subhedral grains also as disseminations. 2: larger sub to anhedral grains. Often with a darker core and rimmed by lighter colour material or disseminated material.

## *G1-26 296.4 m*

**Drill core description:**

Olivine cumulate: sharp tectonical overprinted contact.

**Thin section description:**

This section represents an altered olivine cumulate. Olivine grain sizes vary from 3 mm to 0.3 mm and are orientated. The olivine grains display an elongation and are orientated parallel to this elongation creating a foliation, which may be the result of deformation or a primary magmatic feature. See Fig 7 – 39. Multi-generational trails of melt/fluid inclusions can be observed in the olivine. Inclusions of Cr-rich spinels are found in olivine, grain size varies from ~ 20 µm to 100 µm. Alteration comprises ~ 30% of the section and is composed of serpentine minerals, chlorite and magnetite. The alteration forms an interlocking network through the section. The intercumulate is composed of clinopyroxene and rare phlogopite. Three types of Cr- rich spinel are observed. 1: large (~ 300 µm) sub to anhedral interstitial grains. 2: small (3 - 5 µm) disseminated grains. 3: intercumulus.

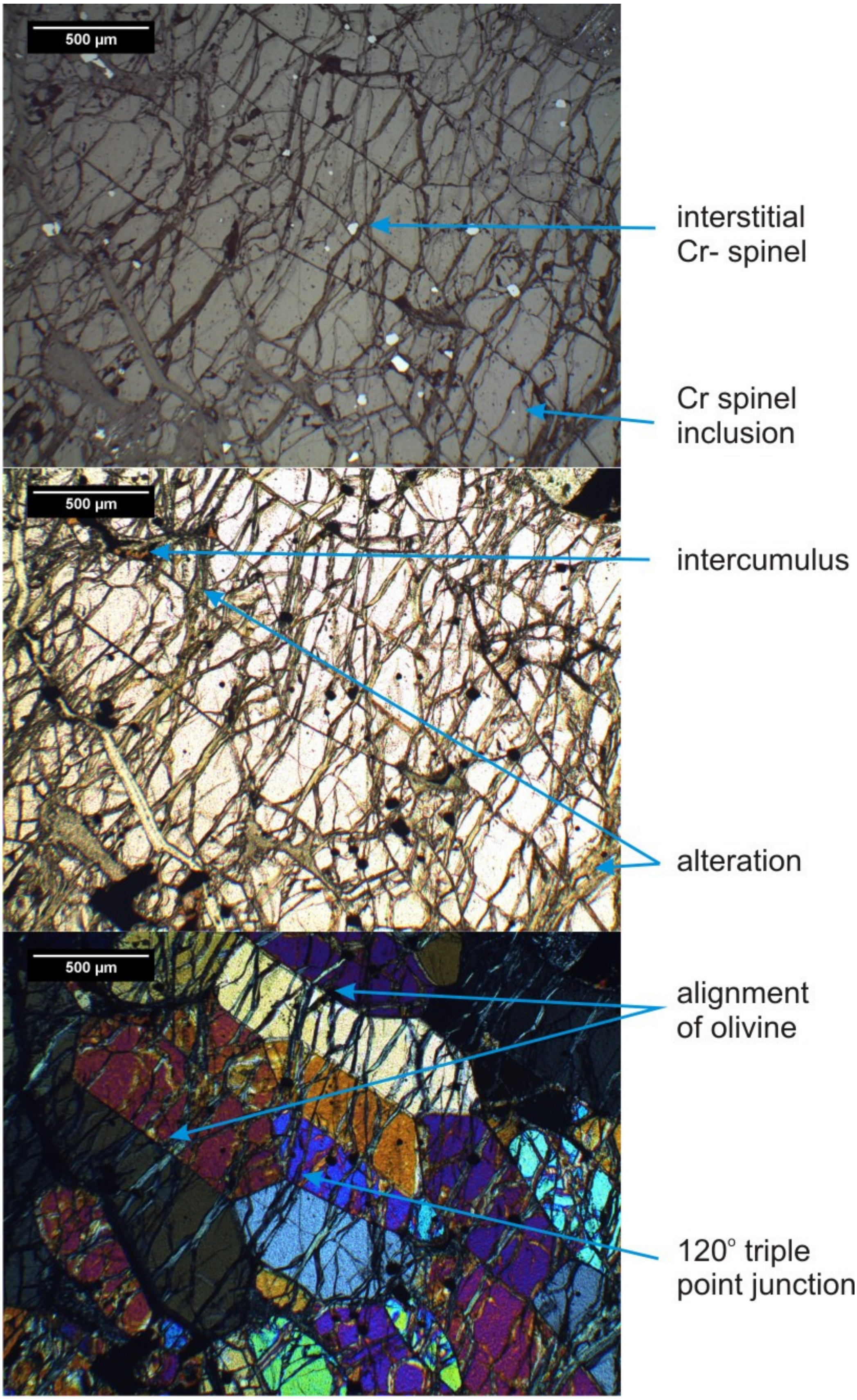



**Figure 7-39** Photomicrograph of sample G1-26 under reflected and transmitted light (parallel and crossed nicols).

## *G1-27 291.8 m*

**Drill core description:**

Meimechite (Volcanic)

**Thin section description:**

This section is comprised of two rock types. 1: Large subhedral olivine phenocrysts in a medium to coarse grained matrix. Olivine phenocrysts are between ~ 4 mm and 2 mm. The olivine grains are cracked with minor filling of serpentinite minerals. Very small (20 – 30 μm) subhedral Cr - rich spinel inclusions can be found in the olivine phenocrysts. Other larger spinels occur in cracks and interstitial spaces. The matrix is medium to coarse grained. It is dominated by clinopyroxene, which occurs as radial laths and comprises ~ 50% of the matrix. Magnetite and Cr - rich spinel comprises ~ 25% of the matrix. It occurs as interstitial filling and anhedral grains. Phlogopite, occurring as irregular laths, comprises ~ 20% of the matrix. Serpentine minerals, chlorite and rare plagioclase form the subordinate constituents of the matrix.

The second rock type is composed of very fine grained, nearly completely altered matrix. Locally, partly recyrstallised needles of phenocrysts (i.e. they are too small to identify under the microscope) can be observed. See Fig 7 - 40.

The first part of the section is classified as meimechite. The second part is supposed to represent a chilled margin which has partly recrystallised and had been strongly altered.

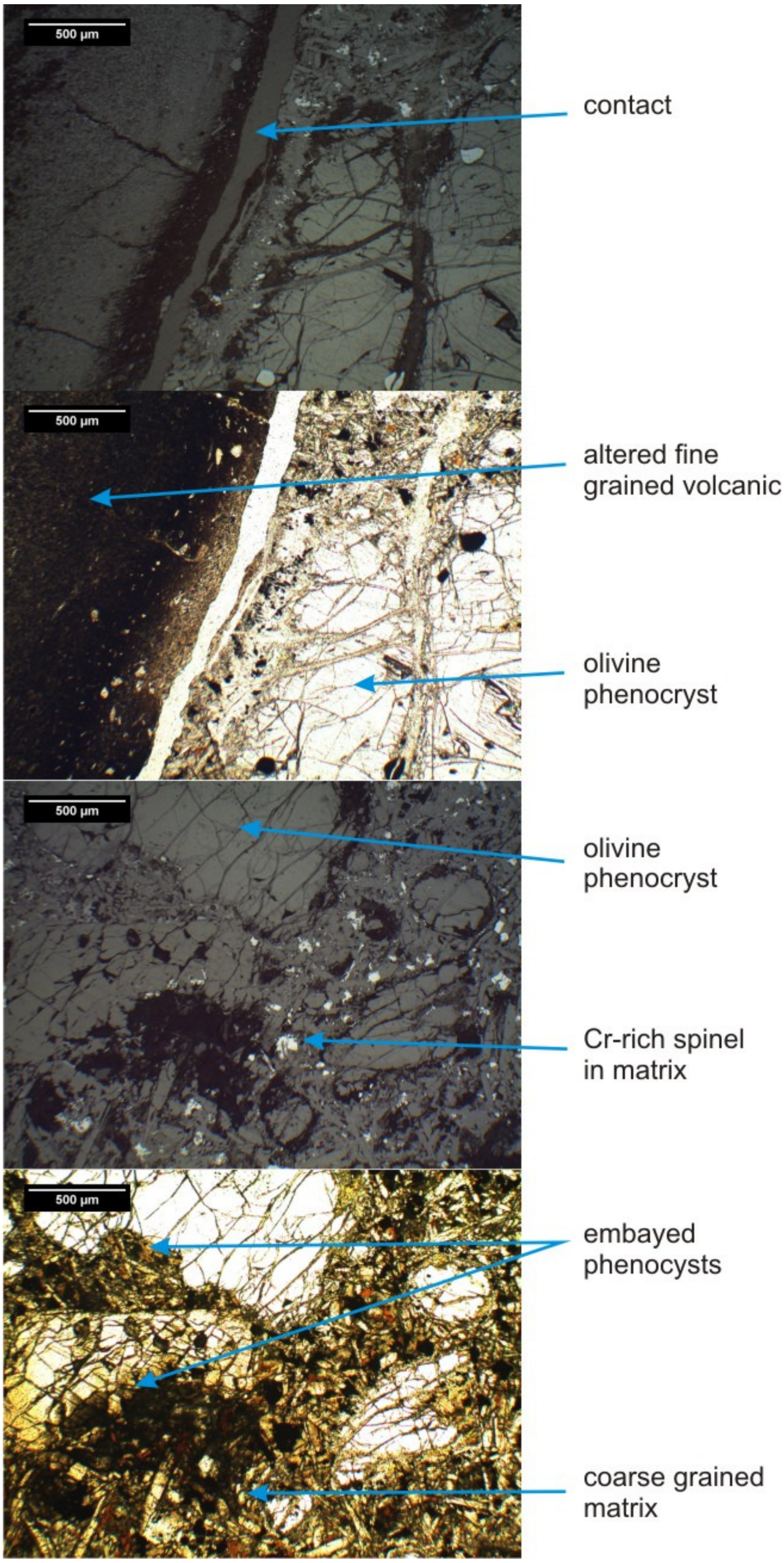



**Figure 7-40** Photomicrograph of sample G1-27 under reflected and transmitted light (parallel nicols).

## *G1-28 275.4 m*

**Drill core description:**

Olivine cumulate.

**Thin section description:**

This section represents an altered olivine cumulate. There is network of alteration throughout the section that is composed of serpentine minerals and magnetite. The cumulus olivine is generally equigranular and subhedral with grain size varying from 0.1 mm to 0.4 mm, apart of some large olivine grains up to 2 – 3 mm. See Fig 7 - 41. There are multiply generations of melt / fluid inclusion trails. Cr-rich spinel inclusions in olivine are small, 30 to 50 µm and euhedral. The intercumulus is comprised of phlogopite, clinopyroxene and Cr- rich spinel. The clinopyroxene has been altered to serpentine minerals and magnetite. The phlogopite is unaltered. Carbonate is also found within the altered material.

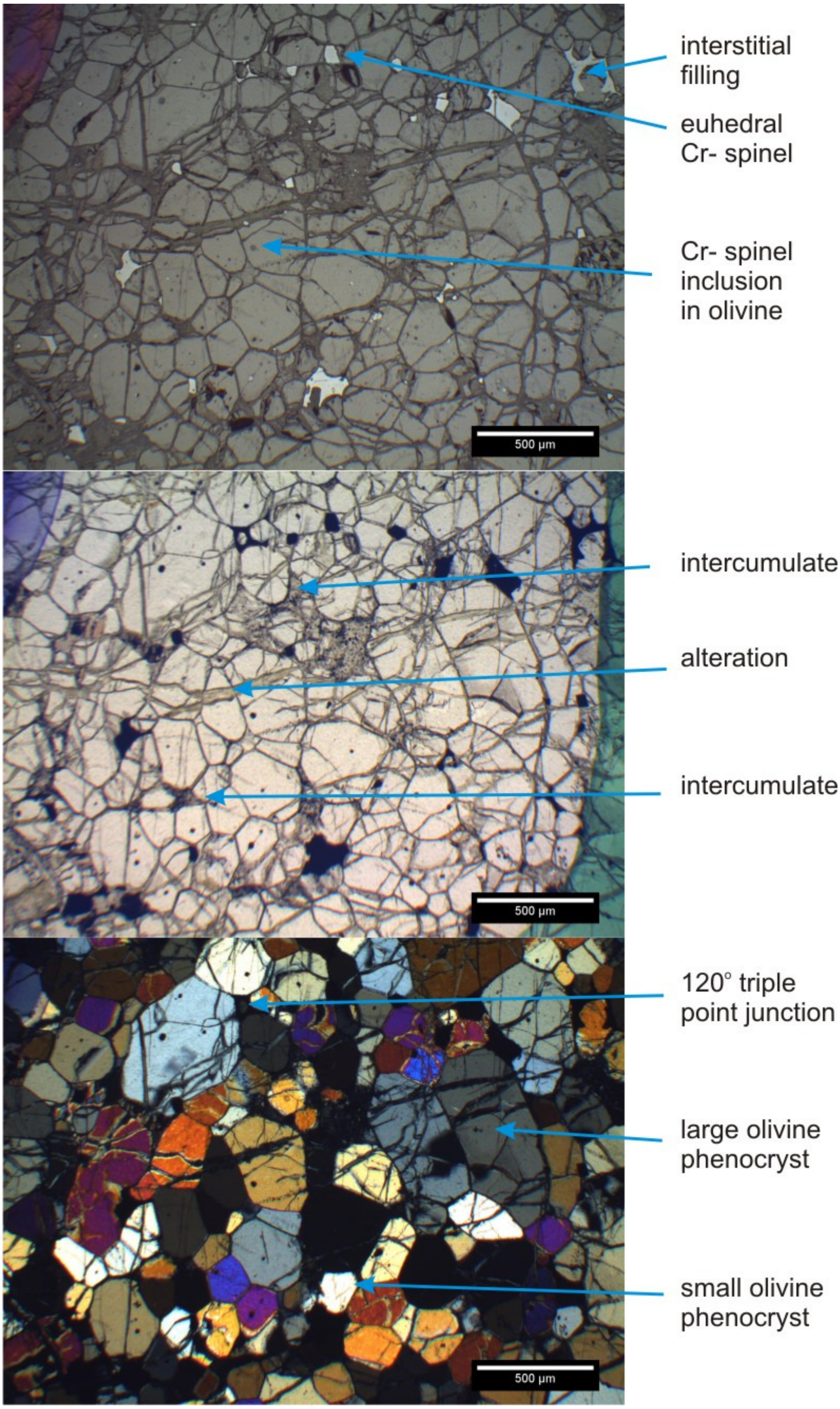



**Figure 7-41** Photomicrograph of sample G1-28 under reflected and transmitted light (parallel and crossed nicols).

*<u>G1-29 275.3 m</u>*

**Drill core description:**

Meimechite (volcanic).

**Thin section description:**

This section is comprised of large olivine phenocrysts in a medium grained groundmass. The section grades into a highly altered very fine grained material that cannot be identified. The olivine is cracked with minor filling of the cracks by serpentine minerals. The olivine has a noticeable reaction rim comprised of serpentine minerals and chlorite. Rare C r-rich spinel inclusions (30 – 60 μm in diameter) are found in olivine. Larger spinel inclusions are also observed in olivine always in association with cracks and alteration. The matrix is comprised of clinopyroxene, phlogopite, magnetite, Cr - rich spinel and plagioclase. Clinopyroxene occurs within the matrix as large (up to 1 mm) needle like laths. The grains are broken and a radial growth pattern can be observed. Clinopyroxene comprises ~ 50% of the matrix and shows little to no alteration. Phlogopite comprises ~ 20% of the matrix. It occurs as irregular sheets and is unaltered. Magnetite and Cr - rich spinel comprises ~ 20% of the matrix. Grains are anhedral, small (30 – 60 μm) and disseminated throughout the matrix. Some grains appear as aggregates.

## *G1-30 268.0 m*

**Drill core description:**

Meimechite (Volcanic)

**Thin section description:**

This section is comprised of olivine phenocrysts in a coarse grained matrix. The olivine phenocrysts are cracked. Serpentine minerals and chlorite fill the cracks. All phenocrysts show a reaction rim, smaller olivine grains have been completely consumed by this reaction. The olivine phenocrysts are euhedral to subhedral and grain size varies from 1 to 3 mm. Melt or fluid inclusion trails are rare. Small (20 – 40 µm) C r-rich spinel inclusions are rarely found in olivine. The matrix is coarse grained and comprised of clinopyroxene, Cr – rich spinel, magnetite, alteration and phlogopite. The clinopyroxene is the dominant phase in the matrix comprising ~ 60% of the matrix. It occurs as large (2 – 3 mm) needle like laths. They are broken and have a radial growth pattern. Alteration products comprise 20% of the matrix. The alteration minerals are dominated by chlorite, serpentine minerals are also present. Rarely carbonate can be observed in the altered material. Magnetite and Cr – rich spinel comprises ~ 15% of the matrix. It occurs as small (5-10 µm) disseminated grains and as larger aggregates. The fine grained disseminated grains form a rim around the original olivine grain boundaries.

## *G1-32 7.5 m*

**Drill core description:**

Meimechite (volcanic)

**Thin section description:**

The section is dominated by olivine. Olivine comprises ~ 80% of the section with the remainder comprised of alteration ~ 10%, matrix ~5% and magnetite ~5%. The olivine grains are subhedral with a grain size between 5mm and 1mm. The grains are often broken with serpentine minerals filling the cracks. There is little reaction rim. Approximately 30% of the olivine grains are highly included with multiple generations of melt/fluid inclusion. The other olivine grains have very few inclusion trails. Cr - rich spinel inclusions are rare in olivine. They are small between 20 – 40 µm with a euhedral shape. Alteration comprises ~ 10% of the section and is concentrated in a series of veins, composed of serpentine minerals, chlorite and magnetite. The matrix makes up ~ 5% of the section and is comprised of clinopyroxene, phlogopite, Cr - rich spinels and magnetite. Clinopyroxene occurs as unevenly broken grains up to ~ 0.5 mm. Phlogopite occurs as interstitial filling. The "matrix" material shows selectively more alteration than the olivine.

## Summary Drill core G17, G13 & G1

### *G17 summary*

Drill core G17 is 1281.5 m long the upper 600 m are best characterised as partially to completely serpentinised dunite. In some sections relic olivine can be observed, however primary textures are no longer obvious. The lower section is dominated by unaltered olivine, comprising ~ 95% of the rock. Olivine grain size varies considerably, from small equigranular recrystallised grains (~ 0.5 mm) to large irregular highly included grains (up to 6 mm). Larger olivine grains are characterised by a greater proportion of small inclusions, these “wormy”, “platy” and “lamella” – type inclusions can also be found in the smaller olivine grains to a much lesser extent. The lower section of the drill core is also characterised by unusual accessory phases. Phases such as clinopyroxene, phlogopite, calcite, apatite and perovskite occur in interstitial spaces. Very small Cr- rich spinels occur rarely as inclusions in olivine, while a slightly Cr poorer spinel occurs in interstitial spaces. At two levels (706.2 m and 1165.9 m) the core becomes much richer in clinopyroxene and phlogopite. Very rare carbonate veining can be observed.

### *G13 summary*

Drill core G13 is 660 m long and is variably serpentinised. The lower sections are comprised of highly serpentinised dunite, while the upper sections are much richer in clinopyroxene. The section is highly veined, with carbonate veins affecting the entire core. These veins are usually mm to cm in thickness and are associated with a greater degree of alteration. A vein or dyke (~ 20 cm thick) of clinopyroxenite cuts the core at

188.2 m. It is not possible to distinguish primary grain size or shape in the lower sections. Small Cr – rich spinels can be found as inclusions in olivine and in the altered material, No clinopyroxene was observed in the lower sections. The upper section, from 188 m to the surface, is serpentinised to a slightly lesser extent than the lower section. It is comprised of olivine, clinopyroxene, serpentine minerals, spinel and apatite. The spinels are Cr- poor and occur as large inclusion in olivine and as large interstitial grains. Clinopyroxene is characterised by ilmenite exsolution.

*G1 summary*

Drill core G1 is 400.8 m long and dominated my meimechites, the lower 88 m and the upper 275.3 m is meimechite. There is some veining and associated alteration affecting these parts of the section. There is some variation in the grain size of the matrix in these section, ranging from, coarse grained, to cryptocrystalline altered glass. The matrix is composed of clinopyroxene, phlogopite, apatite, Cr- rich spinels, magnetite ± chlorite, plagioclase and amphibole. Large olivine phenocrysts lie within the matrix, these are characterised by an alteration / reaction rim. The thickness of the rim varies from section to section. In some cases smaller olivine phenocrysts are completely consumed by this reaction. A segment of ~38 m between these two meimechite sections is an alternating olivine cumulate and meimechite. The olivine cumulate has a variable grain size, from large irregular grains ~ 1 cm to small and equigranular, with a grain size of ~ 0.5 mm. Cr – rich spinels are often found as inclusions within the olivine. Olivine forms a clear cumulate texture, with small portions of intercumulate. The intercumulate material is comprised of phlogopite, clinopyroxene, alteration products, Cr – rich spinel, magnetite and rarely apatite.

# 8. Mineral Chemistry

Electron microprobe (EMP) analyses were carried out on selected samples from all drill cores to obtain the composition of various mineral phases within these samples. EMP analysis is used to compositionally characterise the particular mineral phases and to quantify chemical trends within individual drill cores and between different cores.

## *8.1. Olivine*

14 sections were selected from drill core G17 for EMP analysis, the entire data set is shown in Appendices 4 to 8. The compositional characteristics of olivine are illustrated in Figures 8 – 1, 2 & 3. Sample G17-45 has two different types of olivine that show two different chemistries and as such is not included in the average analysis for this drill core.

The average MgO wt % is 50.85, while FeO wt % has an average of 7.12 over the whole drill core. 0.28 wt % is the average CaO content, while 0.39 wt % is the average for NiO. The forsterite content of olivine from drill core G17 is very consistent, with an average value of 92.59. Sample G17-45 has two different olivine chemistries, the first is consistent with the averages for all other sample from G17, the second olivine type has a MgO wt % of 45.19, a FeO wt % of 12.34, while the CaO and NiO values are consistent with other samples. As a result of the different MgO and FeO contents the forsterite value for sample G17-45 is significantly lower than all others from the drill core with an average of 86.51.

Seven samples were selected from drill core G13 for analysis. These can be divided into restitic dunites and olivine cumulates. The restitic dunites have an average MgO content of 49.65 wt% and a FeO content of 7.98 wt% and concentrations of CaO and NiO are

0.33 and 0.35 wt% respectively, very similar to the compositional characteristics of olivines from drill core G17. The values for the olivine cumulates are slightly different. The MgO content averages 44.04 wt%, while FeO averages 12.99 wt%. The concentrations of CaO and NiO are slightly lower than those in the restitic dunites, with concentrations of 0.21 and 0.24 wt% respectively.

Nine samples were analysed from drill core G1, these can be separated into olivine cumulates and meimechites The olivine cumulates have an average olivine composition of MgO 47.36 wt%, FeO 10.36 wt% with concentrations of CaO and NiO of 0.37 and 0.25 wt%, respectively. The average forsterite content for the olivine cumulates is 89.61. The meimechite or volcanic sequences have olivine with an average MgO content of 50.75 wt% and FeO content of 8.26 wt%, while concentrations of CaO and NiO are 0.32 wt% and 0.32 wt%, respectively. The average forsterite content for the meimechites is 91.36.

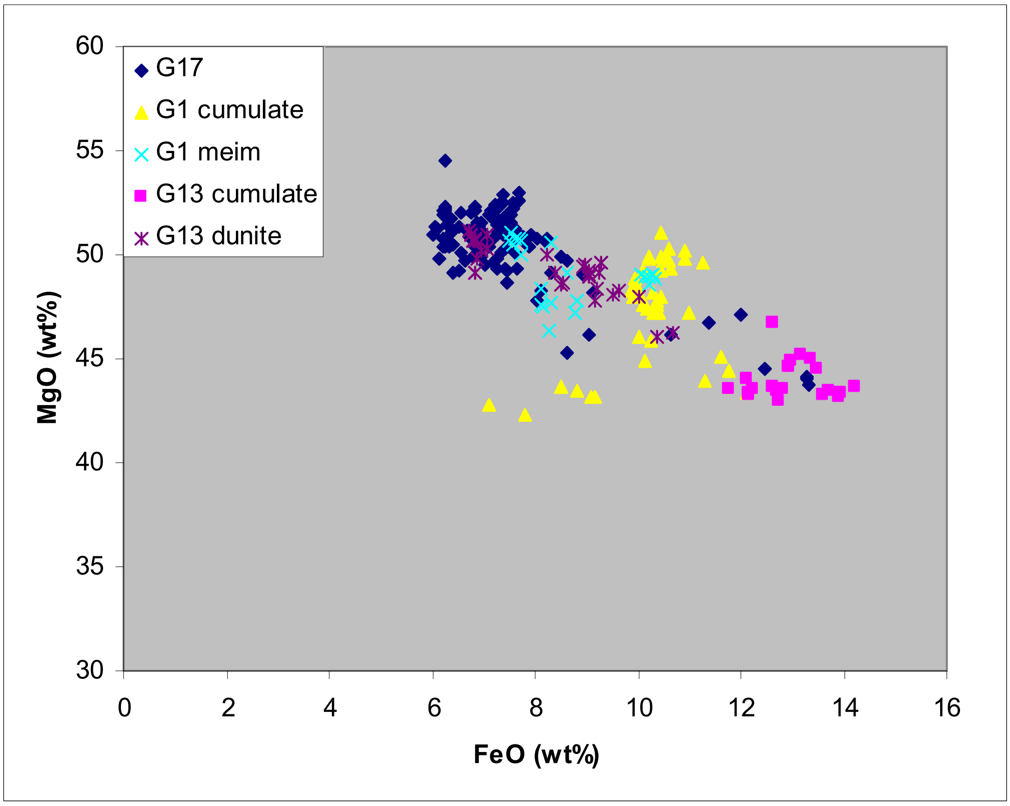



**Figure 8-1** MgO vs. FeO diagram for olivines from the Guli Massif, northern Siberia. A clear trend starting from restitic dunites of drill core G17, via dunites from core G13, and olivine cumulates from core G1 to olivine cumulates from core G13 becomes obvious.

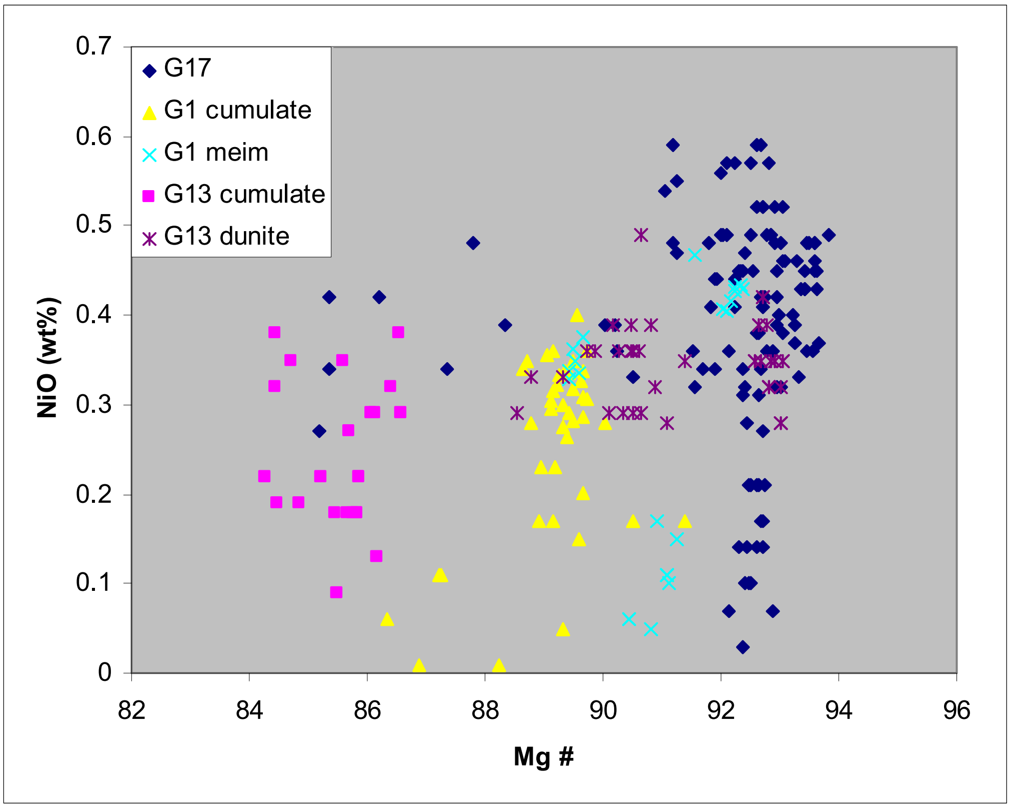



**Figure 8-2** Mg# vs NiO diagram for olivines from the Guli Massif, northern Siberia.

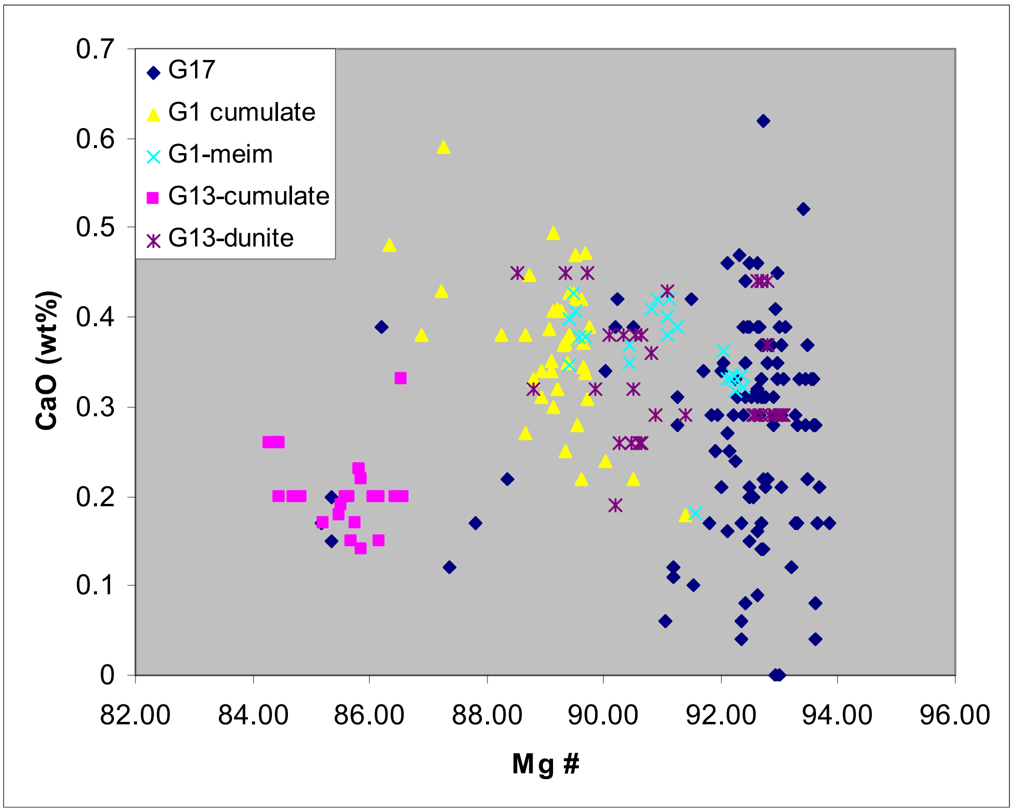



**Figure 8-3** Mg# vs CaO diagram for olivines from the Guli Massif, northern Siberia

A continuous trend, starting from the restitic dunites from drill core G17 via those from core G13 to olivines from olivine cumulates from drill core G1 and those from olivine-cumulates from core G13 becomes obvious in Figure 8 - 1. The meimechites occupy a position between the dunites from core G17 and the olivine cumulates from core G1. A similar trend can be depicted from Figure 8 - 2, with respect to Mg# values, taken as a fractionation trend, where the restitic dunites display the highest Ni contents.

## *8.2. Clinopyroxene*

On the basis of microprobe analyses, the clinopyroxenes from drill core G17, occurring as accessory mineral phases in the interstitial space of restitic dunites, can be classified as diopsides (Fig. 8 - 4). They show average concentrations of CaO of 20.39 wt%, while $SiO_2$ averages 54.20 wt%. The concentrations of MgO and FeO have an average of 17.69 and 2.18 wt%, respectively, corresponding to Mg# values between 93.1 and 89.75. Additionally the average concentrations of $Al_2O_3$, $TiO_2$ and $Na_2O$ are 1.57, 1.29 and 1.37 wt%. No clinopyroxene had been found in the restitic dunites of drill core G13.

Clinopyroxene from the cumulate section of drill core G13 can also be classified as diopsides. (Fig. 8 - 4), have an average CaO concentration of 22.93 wt%, while the $SiO_2$ concentration averages 52.19 wt%. The concentrations of MgO and FeO have an average of 15.29 and 4.09 wt%, respectively, corresponding to Mg# values ranging from 88.1 to 84.2. Additionally the average concentration of $Al_2O_3$, TiO and $Na_2O$ are 1.91, 1.99 and 0.40 wt%.

The clinopyroxene from the cumulate section of drill core G1 are classified as diopsides, showing an average CaO concentration of 22.52 wt%, while the $SiO_2$ concentration averages 51.40 wt%. The concentrations of MgO and FeO have an average of 16.22 and 3.26 wt%, respectively, corresponding to Mg# values from 89.4 to 84.1. Additionally the average concentration of Al2O3, TiO and Na2O are 2.13, 2.13 and 0.40 wt%.

Clinopyroxene from the volcanic section (i.e. meimechites) of drill core G1 can be classified as augite (Fig 8 - 4), having an average CaO concentration of 22.6 wt%, while the $SiO_2$ concentration averages 51.18 wt%. The concentrations of MgO and FeO have an average of 14.83 and 5.37 wt%, respectively, which corresponds to an Mg# ranging from 91.5 to 87.6. Additionally the average concentration of Al2O3, TiO and Na2O are 2.22, 2.31 and 0.48 wt% respectively.

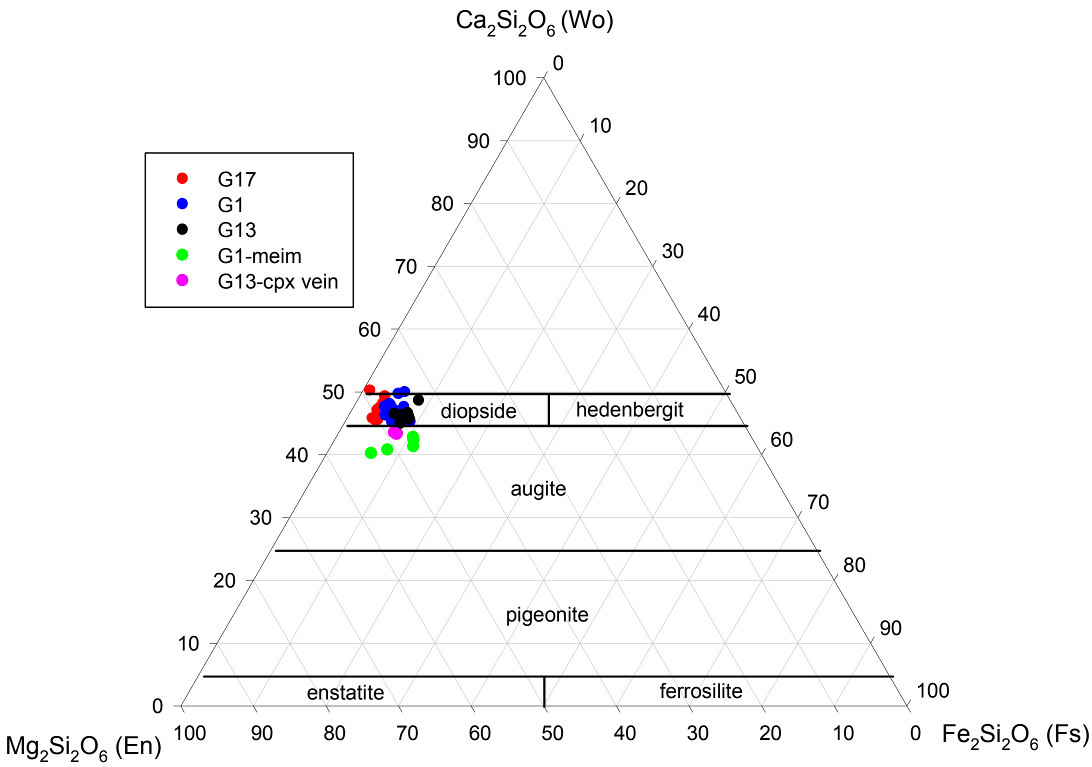



**Figure 8-4** Ternary diagram (En – Wo – Fs) for pyroxene showing analysis of pyroxenes from the Guli Massif, northern Siberia. The classification fields are after Morimoto (1988).

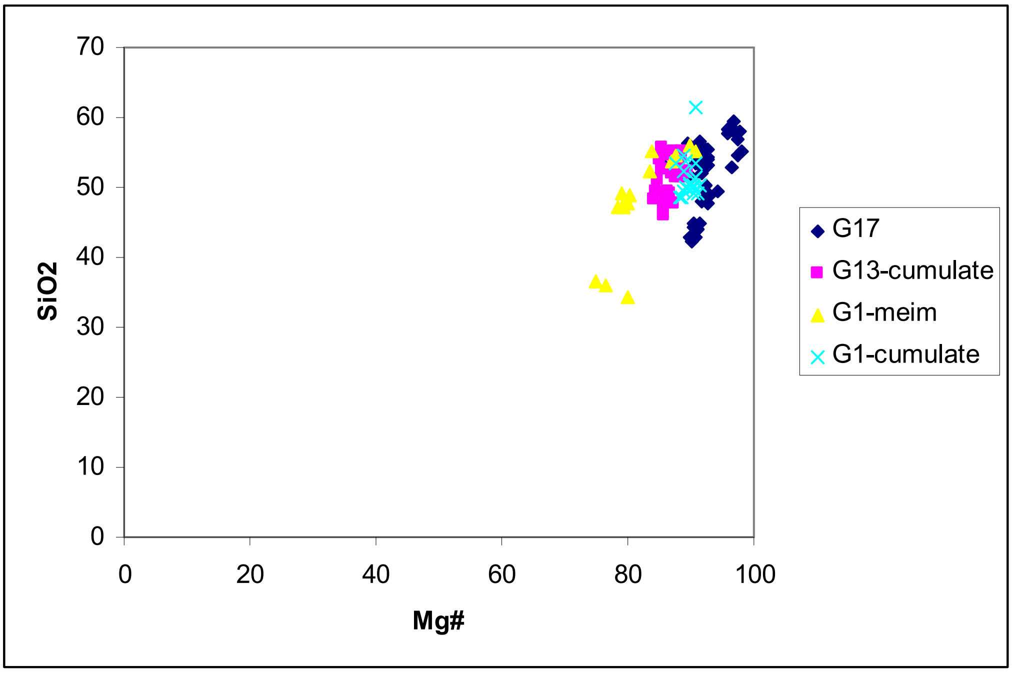



**Figure 8-5** Variation diagram Mg# vs. $SiO_2$ wt% of clinopyroxenes from the Guli Massif, northern Siberia

The clinopyroxene compositions are also illustrated in Figures 8 - 5 & 6, where $SiO_2$ and CaO+$Na_2O$ were plotted against Mg# numbers as a fractionation index. A weak compositional trend is indicated starting with diopsides from G17 with the highest Mg# numbers to olivine cumulates from G1 and further to cumulates from G13. The augites from the meimechites occupy a position between restitic dunites across the olivine cumulates.

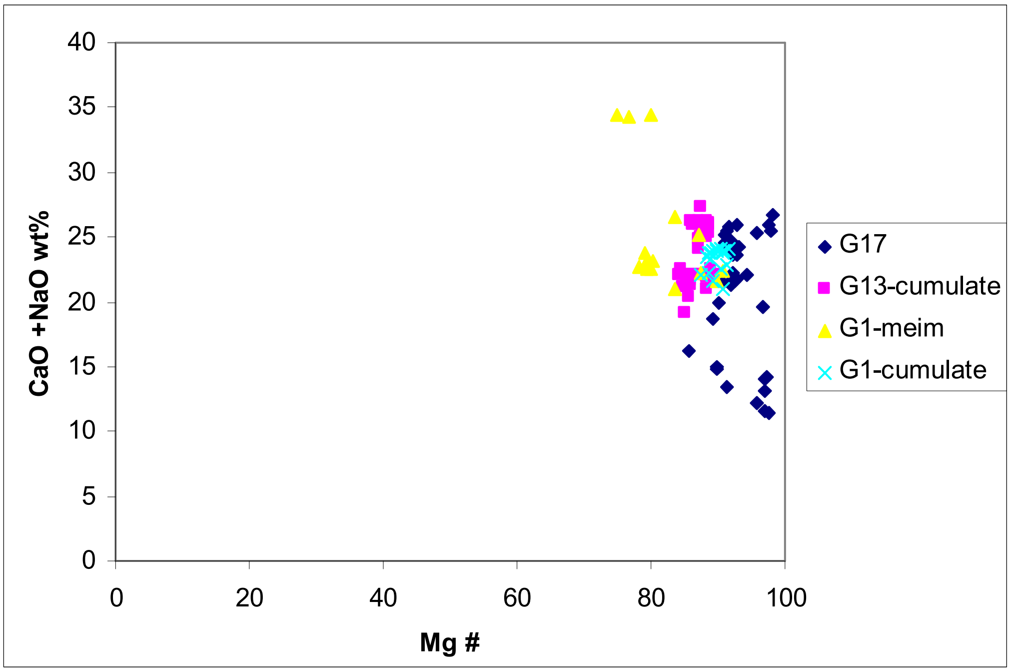



**Figure 8-6** Variation diagram Mg # vs (CaO+$Na_2O$) wt% of clinopyroxenes from the Guli Massif, northern Siberia.

## 8.3. Spinel

The majority of the spinels can classified as Cr - rich magnetites, subordinately into Cr-containing magnetites, Ti - magnetites to Ti - containing magnetites, and accessory chromites (i.e. > 40 wt% $Cr_2O_3$). Compositional characteristics and variations are illustrated in Figures 8 – 7, 8, 9 &10, the microprobe data are shown in the Appendix 6: Spinel analysis.

Spinels from drill core G17 have an average $Cr_2O_3$ concentration of 28.78 wt%, with a minimum and maximum of 0.04 and 41.32 wt% respectively. Concentrations of FeO average 47.10 wt% and range from a maximum of 98.54 to a minimum of 28.08 wt%. $TiO_2$ concentrations average 3.95 wt% and have a minimum of 0.07 and a maximum of 7.62 wt%. $Al_2O_3$ concentrations average 9.00 wt%, while the minimum concentration is 0.07 wt% the maximum concentration is 19.19 wt%. Concentrations of MgO have an average of 9.13 wt%, while the minimum concentration is 1.26 wt% and the maximum is 22.13 wt%.

Some of the larger spinels are zoned, with a slight variation in Cr2O3 between core and rim (i.e. Cr2O3 wt % in the core is 30.82 and 33.09 in the rim, respectively).

The dunites from drill core G13 have an average $Cr_2O_3$ concentration of 32.85 wt%, with a minimum and maximum of 0.09 and 54.42 wt%, respectively. Concentrations of FeO average 49.41 wt% and range from a maximum of 92.97 to a minimum of 28.08 wt%. TiO2 concentrations average 4.73 wt% and have a minimum of 0.14 and a maximum of 9.34 wt%. Al2O3 concentrations average 3.48 wt%, while the minimum concentration is 0.04 wt% the maximum concentration is 9.34 wt%. Concentrations of

MgO have an average of 6.87 wt%, while the minimum concentration is 1.26 wt% and the maximum is 22.13 wt%.

Spinels from within the cumulate section of G13 have an average $Cr_2O_3$ concentration of 6.94 wt%, with a minimum and maximum of 4.65 and 9.36 wt% respectively. Concentrations of FeO average 67.38 wt% and range from a maximum of 82.22 to a minimum of 50.49 wt%. TiO2 concentrations average 13.53 wt% and have a minimum of 3.15 and a maximum of 28.02 wt%. Al2O3 concentrations average 2.68 wt%, while the minimum concentration is 0.17 wt% the maximum concentration is 3.27 wt%. Concentrations of MgO have an average of 5.59 wt%, while the minimum concentration is 1.93 wt% and the maximum is 11.49 wt%.

Spinels from within the cumulate section of G1 have an average Cr2O3 concentration of 28.64 wt%, with a minimum and maximum of 1.78 and 43.82 wt% respectively. Concentrations of FeO average 47.97 wt% and range from a maximum of 72.53 to a minimum of 25.22 wt%. TiO2 concentrations average 6.48 wt% and have a minimum of 2.65 and a maximum of 20.64 wt%. Al2O3 concentrations average 4.79 wt%, while the minimum concentration is 0.42 wt% the maximum concentration is 12.22 wt%. Concentrations of MgO have an average of 6.03 wt%, while the minimum concentration is 1.18 and the maximum is 17.83 wt%.

Spinels from within the meimechite section of drill core G1 have an average Cr2O3 concentration of 14.47 wt%, with a minimum and maximum of 0.02 and 54.03 respectively. Concentrations of FeO average 68.87 wt% and range from a maximum of 98.43 to a minimum of 27.27 wt%. TiO2 concentrations average 6.42 and have a minimum of 0.14 and a maximum of 12.87 wt%. Al2O3 concentrations average 2.63 wt%, while the minimum concentration is 0.03 wt% the maximum concentration is 8.31 wt%. Concentrations of MgO have an average of 3.44 wt%, while the minimum concentration is 0.22 and the maximum is 11.34 wt%.

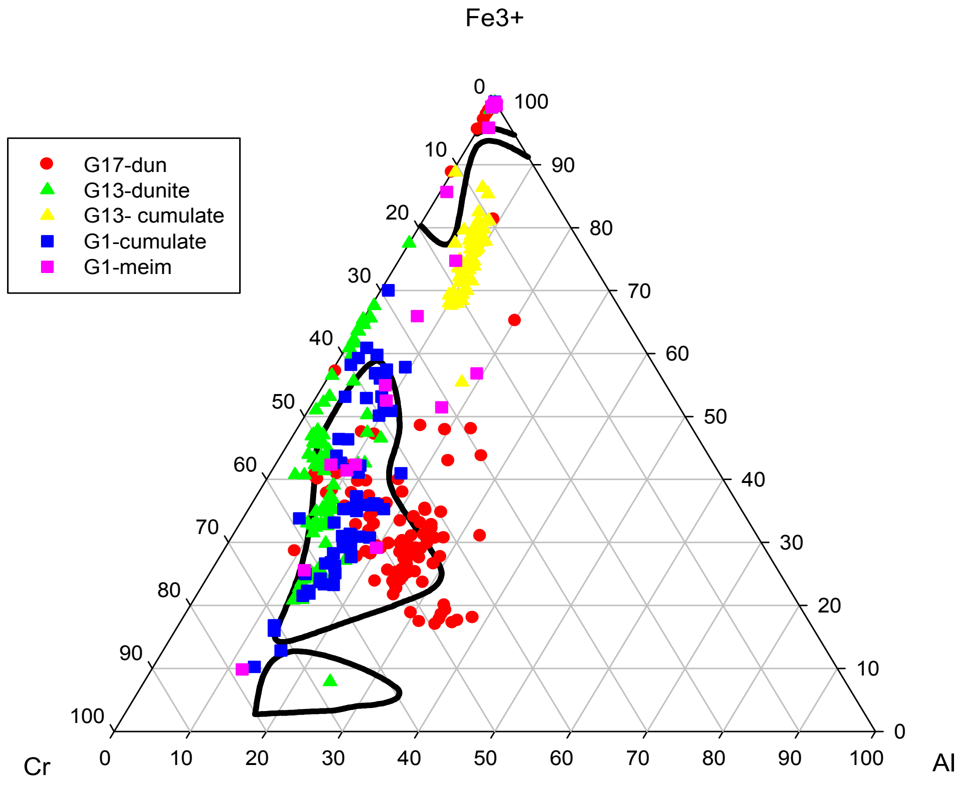



**Figure 8-7** Ternary diagram Cr - Fe3+ - Al for spinels from the Guli Massif, northern Siberia. The discrimination fields for typical Alaskan-type complexes are from Barnes & Roeder (2001)

In the ternary $Fe^{3+}$- Cr - Al plot (Fig 8 - 7) several groups of spinels can be distinguished:

1. The spinels from drill core G17, showing the highest Al-contents, can divided into two subgroups: there is a cluster of samples with a higher Cr content. The higher Cr content is associated with the size of the spinel, with small grains having a lower concentration and correspondingly larger grains with higher Cr concentrations. The

second sub-group from drill core G17 with lower Cr concentrations in most cases these correspond to very small inclusions (~20 µm).

2. The dunite samples from drill core G13 have considerably less Al than those from G17. Two distinct sub-groups can be identified, those with lower Cr and very low Al concentrations, which are interstitial spinels and lie within the altered material, and a second sub-group with higher Cr and Al concentrations, which are inclusions within olivine or very large (200 µm) spinel grains. Within this sub-group there are also Cr-spinels, with $Cr_2O_3$ concentration of up to 44 wt%. The two sub-groups are not clearly separated but indicate a trend of depletion of both Cr and Al that could be interpreted as related to alteration, marked by a gradual decrease in Cr and Al and a corresponding increase in $Fe^{3+}$.

3. The spinels from the G1 cumulates plot within the field of Alaskan Ultramafic Complexes from the database of (Barnes and Roeder, 2001). It is also possible to identify two sub-groups within the G1 cumulates, the first is characterised by lower Cr and Al concentrations and represent spinels that occur interstitially or as intercumulate phase. The second sub-group is characterised by slightly higher Al and higher Cr concentrations. These represent spinels occurring as inclusions within olivine. Some of the spinels from the G1 cumulate are Cr-spinels, with $Cr_2O_3$ concentrations of up to 43 wt%.

The meimechites from G1 plot in a very similar manner to the G1 cumulates. There are a group of relatively Cr depleted spinels, which again represent interstitial or matrix spinels. A second group is also identified, relatively enriched in Cr and representing inclusions within olivine. From the meimechite samples abundant magnetite is present, occurring in the matrix (i.e. plotting close to the $Fe^{3+}$ corner in Fig. ).

4. The spinels from the cumulates from G13 deviate significantly from all the others. The spinels which occur as inclusion are significantly larger than in other drill cores and the interstitial spinels are more abundant and larger than in other sections. They have by far the highest Ti concentrations and are most likely a mixture of Cr- magnetite and ilmenite exsolution.

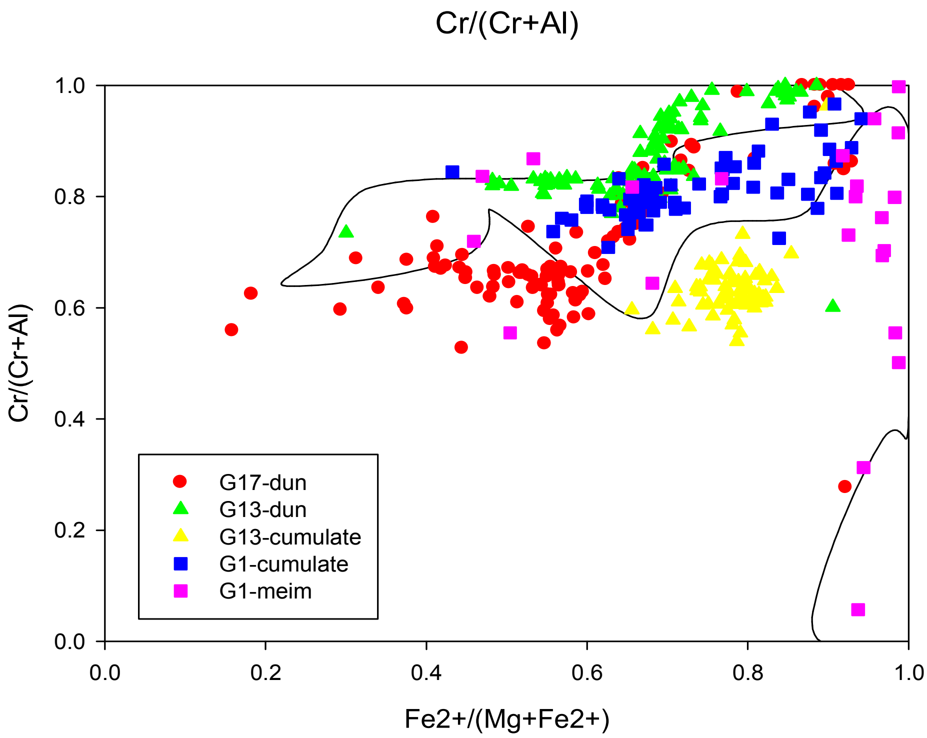



**Figure 8-8** Variation diagram of $Fe^{2+}$ / ($Mg+Fe^{2+}$) vs Cr / (Cr + Al) for spinels from the Guli Massif, northern Siberia. Alaskan Ultramafic fields from the database of (Barnes and Roeder, 2001).

In the variation diagram $Fe^{2+}$/ ($Mg+Fe^{2+}$) vs Cr/ (Cr+Al) (Fig 8 - 8) most of the plotted spinel compositions come to lie within the field of typical Alskan-type Ultramafic Complexes. The alteration trend, mirrored by the spinels from G13 dunites, is becoming obvious again. A second trend is indicated by the spinels from G17 restitic dunites and those from G1 olivine cumulates. The spinels from olivine cumulate from core G13 deviate clearly from all other spinel compositions.

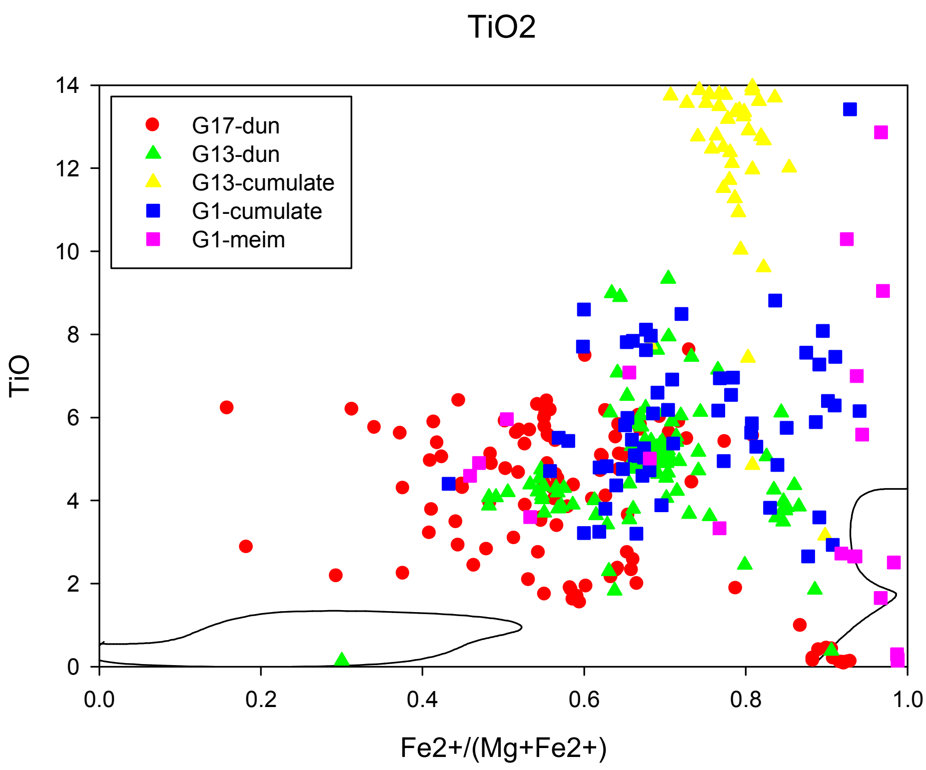



**Figure 8-9** Variation diagram of $Fe^{2+}$ / ($Mg+Fe^{2+}$) vs TiO for spinels of the Guli Massif, northern Siberia. Alaskan-type Ultramafic fields from the database of (Barnes and Roeder, 2001).

In the variation diagram Fe2+/(Mg+Fe2+) vs TiO (Fig 8 - 9) it is becoming obvious that all spinels are enriched in Ti compared to those from typical Alaskan-type Ultramafic Complexes (Barnes and Roeder, 2001). It is also clearly obvious that the spinels from the G13 cumulates are considerably more enriched in Ti than all other samples.

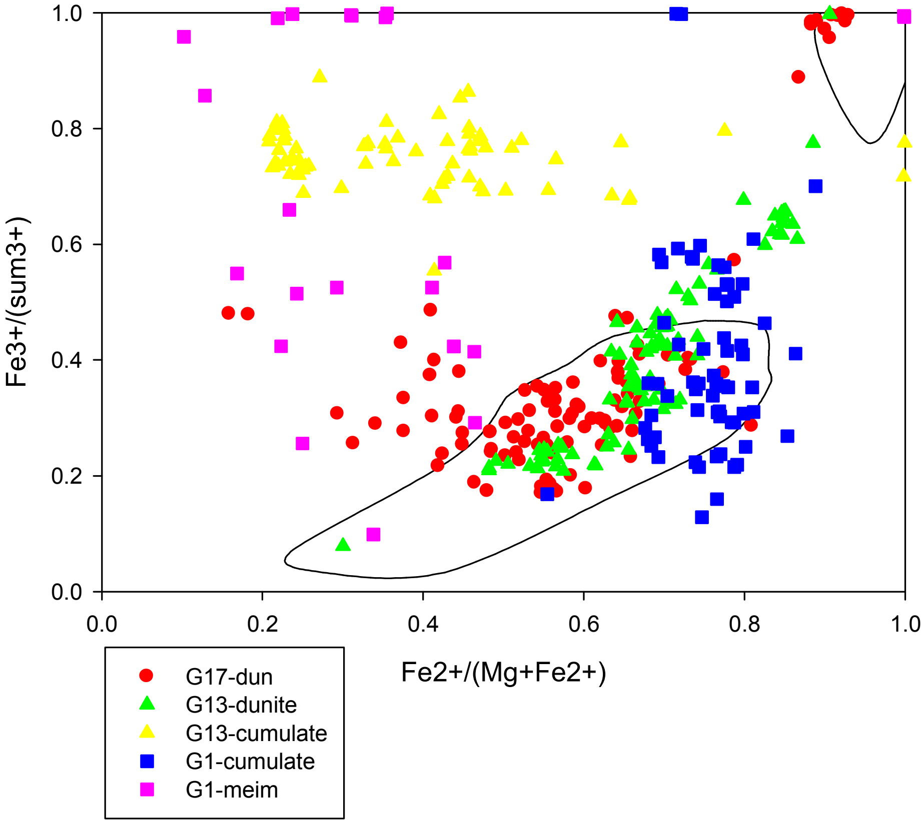



**Figure 8-10** Variation diagram $Fe^{2+}$ / ($Mg+Fe^{2+}$) vs $Fe^{3+}$ / ($sum^{3+}$) for spinels from the Guli Massif, northern Siberia. Alaskan Ultramafic fields from the database of (Barnes and Roeder, 2001).

In the variation diagram $Fe^{2+}/(Mg+Fe^{2+})$ vs $Fe^{3+}/(sum^{3+})$ (Fig 8 - 10) the deviation of the spinels from the G13 olivine cumulates and the meimechites from those from typical Alaskan-type Complexes is clearly shown.

## 8.4. Phlogopite

Phlogopite was observed in all drill cores, with the exception of the cumulates from G13. Within the dunites of G17, it appears rarely as an accessory phase, while in the olivine cumulates of G1 it forms part of the intercumulus. In the meimechites it comprises a part of the matrix. Microprobe analysis can be found in Appendix 7: Phlogopite analysis.

In drill core G17 (dunite) the average Mg# of phlogopite is 91.12. While $K_2O$ averages 7.53 wt% the average concentration of $Al_2O_3$ is 12.59 wt%. The average concentration of $TiO_2$ and $Na_2O$ are 1.98 and 1.26 wt% respectively.

Within the dunite section of drill core G13 the average Mg# of phlogopite is 94.1. While the $K_2O$ averages 8.45 wt% the average concentration of $Al_2O_3$ is 12.25 wt%. The average concentration of $TiO_2$ and $Na_2O$ are 1.89 and 1.00 wt% respectively.

In drill core G1 phlogopite occurs as part of the intercumulus of the olivine cumulates. It has an average Mg# of 89.18. While $K_2O$ averages 4.46 wt% the average concentration of $Al_2O_3$ is 14.34 wt%. The average concentration of $TiO_2$ and $Na_2O$ are 5.03 and 1.43 wt% respectively.

Within the meimechites phlogopite has Mg # of 78.17. While K2O averages 5.76 wt% the average concentration of Al2O3 is 10.84 wt%. The average concentration of TiO2 and Na2O are 3.14 and 0.63 wt% respectively.

All brown micas measured, can be classified as phlogopite according to the classification scheme of (Guidotti, 1984). See Fig 8 – 11.

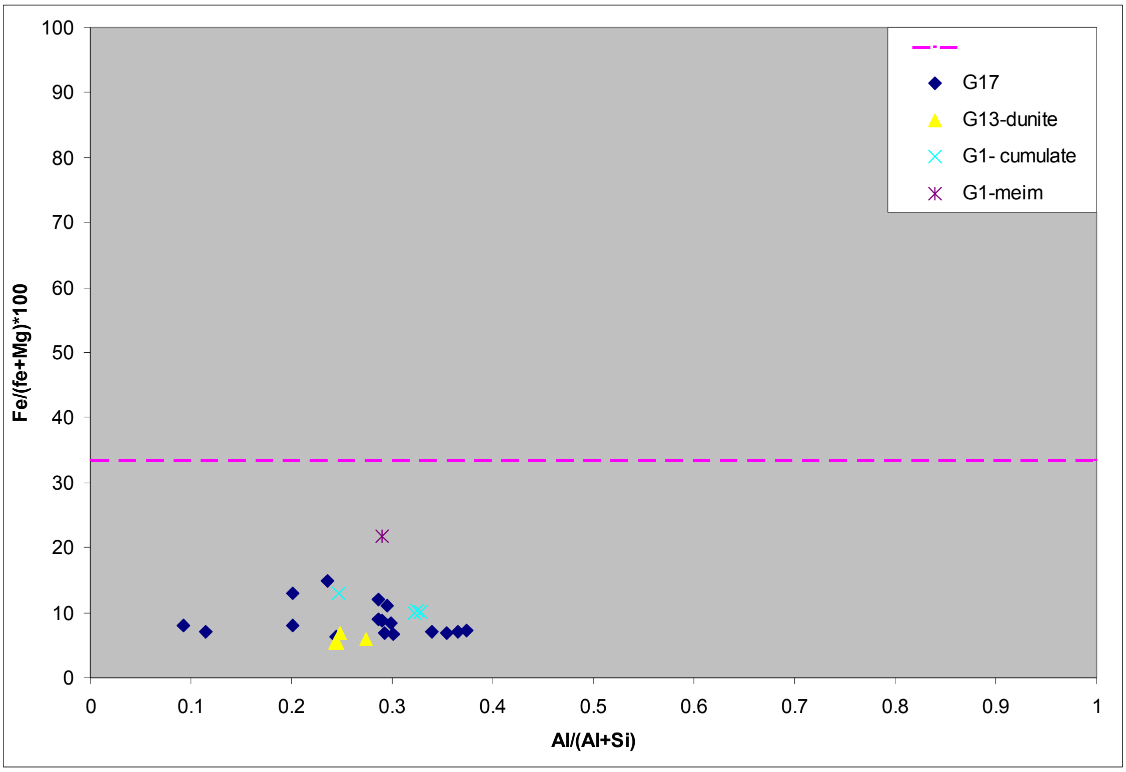



**Figure 8-11** Classification of the phlogopite – biotite series after (Guidotti, 1984)

## 8.5. Perovskite

Pervoskite occurs as an accessory phase in drill core G17. It occurs very rarely in drill core G13. It was also observed in drill core G1 in one sample of the meimechites. Only one sample from drill core G17 (sample 35) had elevated REE concentrations, all other perovskite (in all drill cores) had no elevated REEs. REE depleted perovskite has an average concentration of $TiO_2$ of 61.4 wt% and a CaO concentration of 38.07 wt%. Average concentrations of FeO and Na2O are 0.24 and 0.13 wt% respectively. The REE enriched perovskite has an average concentration of 56.85 wt% $TiO_2$ and 35.33 wt% CaO. While the average concentrations of FEO and $Na_2O$ are 0.56 and 0.79 wt% respectively. The REE concentrations average 0.87 wt% for $La_2O_3$, 2.46 wt% of $Ce_2O_3$, 1.16 wt% for $NdO_3$, 0.15 wt% for $Sm_2O_3$, 0.35 wt% $Gd_2O_3$ and 0.38 wt% for $Nb_2O_3$. Microprobe analysis of perovskite can be found in Appendix 8-Perovskite analysis.

# 9. Geochemistry

## 9.1. *Major and Trace Elements*

Dunites from the central part of the Guli Dunite Massif (drill core G17) have concentrations of MgO that range from 37.93 wt% in the most altered (i.e. serpentinised) samples to 49.77 wt% in the fresh dunite. The FeO concentrations vary between 6.75 wt% in the unaltered material and 11.64 wt% the altered material. The concentration of CaO ranges from 0.36 wt% to 1.22 wt%. The concentrations of $TiO_2$ range from 0.04 wt% to 0.18 wt% with an average of 0.06 wt% over the whole drill core. The concentrations of $Al_2O_3$ are between 0.08 and 0.13 wt% with an average of 0.10 wt%. The Cr concentrations range from 571 ppm to 2490 ppm, with an average of 810 ppm over the whole drill core. The concentration of Ni varies from 3660 ppm to 5599 ppm with an average over the whole drill core of 4264 ppm. Selected major and trace element concentrations over the entire drill core are shown in Figure 9 - 3; the analytical data are given in Table 9 - 2 & 3.

In the peripheral portion (i.e. drill core G13) of the Guli Dunite Massif, the concentrations of MgO vary from 19.24 wt % to 46.97 wt%, on average 38.54 wt%. The FeO concentrations range between 8.53 wt% and 23.47 wt% with an average of 12.28 wt%. The concentration of CaO ranges from 0.22 wt% to 2.60 wt% with an average of 1.52 wt%. The concentration of $TiO_2$ range from 0.15 to 6.42 wt% while having an average of 0.48 wt%. The concentrations of $Al_2O_3$ are between 0.12 and 0.83 wt% and average 0.28 wt%. The concentrations of Cr and Ni are 430 ppm to 8123 ppm, average 4236 ppm and 469 ppm to 3944 ppm, average 2722 ppm, respectively (Table 9 - 1 & 3). Drill core G13 also contains a sample of clinopyroxenite vein material the major elements from this sample are not included in the averages given here.

The samples from the drill core G1 contain both cumulate dunites and meimechites, the MgO concentrations vary from 24.29 wt% to 43.12 wt%. FeO concentrations were measured from 10.94 to 14.25 wt%. CaO concentrations ranging from 1.04 wt% to 7.60 wt% were measured. Concentrations of $TiO_2$ range from 0.37 to 3.24 wt% and averaged 0.48 wt%. Concentrations of $Al_2O_3$ were measured from 0.15 to 4.57 wt% and averaged 0.28 wt% over the whole core. While the concentrations of Cr and Ni is from 1568 ppm to 4178 ppm and 1161 ppm and 2271 ppm, respectively. The results of the major element determinations after correction for loss on ignition (LOI) are shown in Table 9 - 1, 2 & 3. Haker variation diagrams were plotted for all drill cores and are shown in Figure 9-1. In the AFM diagrams shown in Figure 9 - 3 all the samples typically plot towards the Mg corner as expected for ultramafic rocks. The sample from G13, which plots in the direction to the Fe corner, is a clinopyroxenite dyke cutting through the dunites. A trend is becoming evident starting with samples from the central part (drill core G17) to the peripheral portion of the dunite complex (G13)

**Table 9-1** Table of XRF results corrected after LOI

| Sample | Detection Limit* | G1-12 | G1-14 | G1-14 | G1-2 | G1-20 | G1-26 | G1-26 | G1-6 | G1-8 | G13-10 vein | G13-16 | G13-17 | G13-21 | G13-4 | G17-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SiO2 (%) | 0.01 | 39.34 | 39.18 | 39.21 | 38.60 | 38.71 | 38.63 | 38.72 | 36.79 | 38.88 | 32.42 | 35.11 | 33.98 | 33.73 | 34.90 | 32.15 |
| Al2O3 (%) | 0.01 | 4.57 | 1.63 | 1.63 | 3.50 | 1.16 | 0.59 | 0.58 | 0.92 | 0.81 | 2.00 | 0.12 | 0.15 | 0.18 | 0.29 | 0.18 |
| Fe2O3 (%) | 0.01 | 14.25 | 11.52 | 11.52 | 13.27 | 10.94 | 11.90 | 11.91 | 14.07 | 11.07 | 23.47 | 11.88 | 10.16 | 8.53 | 14.32 | 11.64 |
| MnO (%) | 0.01 | 0.197 | 0.183 | 0.184 | 0.177 | 0.157 | 0.167 | 0.166 | 0.199 | 0.160 | 0.242 | 0.168 | 0.143 | 0.126 | 0.199 | 0.168 |
| MgO (%) | 0.01 | 24.29 | 37.08 | 37.09 | 27.37 | 42.87 | 42.11 | 42.08 | 39.27 | 43.12 | 19.24 | 40.63 | 40.80 | 42.12 | 38.15 | 37.93 |
| CaO (%) | 0.01 | 7.65 | 4.02 | 4.02 | 6.65 | 1.07 | 1.04 | 1.04 | 0.98 | 1.08 | 10.15 | 0.72 | 0.74 | 0.22 | 1.42 | 0.45 |
| Na2O (%) | 0.02 | 1.22 | 0.92 | 0.93 | 0.75 | 0.14 | 0.17 | 0.20 | 0.15 | 0.18 | 0.28 | 0.06 | 0.04 | 0.03 | 0.07 | 0.05 |
| K2O (%) | 0.01 | 1.33 | 0.79 | 0.79 | 1.46 | 0.43 | 0.18 | 0.18 | 0.35 | 0.31 | 0.09 | 0.04 | 0.05 | 0.01 | 0.04 | 0.01 |
| TiO2 (%) | 0.01 | 3.05 | 0.71 | 0.71 | 2.90 | 0.42 | 0.37 | 0.37 | 0.48 | 0.45 | 6.42 | 0.22 | 0.22 | 0.15 | 0.73 | 0.08 |
| P2O5 (%) | 0.01 | 0.46 | 0.24 | 0.24 | 0.41 | 0.12 | 0.05 | 0.05 | 0.05 | 0.06 | 0.04 | 0.03 | 0.03 | 0.02 | 0.03 | 0.02 |
| LOI () | | 2.13 | 2.52 | 2.52 | 3.43 | 2.92 | 3.77 | 3.77 | 5.86 | 2.86 | 4.19 | 10.24 | 12.56 | 12.99 | 8.93 | 16.41 |
| Sum (%) | | 99.12 | 99.28 | 99.31 | 99.15 | 99.69 | 99.66 | 99.78 | 99.75 | 99.71 | 98.94 | 99.88 | 99.69 | 99.29 | 99.75 | 100.05 |
| Ba (PPM) | 20 | 490 | 268 | 243 | 439 | 69 | 55 | 33 | 45 | 32 | 76 | 15 | 14 | 16 | 26 | 0 |
| Ce (PPM) | 20-30 | 112 | 26 | 24 | 88 | 0 | 0 | 0 | 0 | 0 | 24 | 0 | 0 | 0 | 0 | 22 |
| Co (PPM) | 15 | 96 | 103 | 97 | 100 | 127 | 144 | 141 | 154 | 125 | 100 | 124 | 116 | 105 | 137 | 132 |
| Cr (PPM) | 15 | 1623 | 2320 | 2318 | 1569 | 3916 | 3926 | 3920 | 3003 | 4179 | 431 | 2054 | 4535 | 8123 | 3351 | 2145 |
| Cu (PPM) | 15 | 149 | 61 | 64 | 130 | 29 | 14 | 10 | 19 | 26 | 678 | 17 | 19 | 12 | 21 | 4 |
| Ga (PPM) | 10-15 | 13 | 6 | 6 | 14 | 10 | 8 | 8 | 8 | 10 | 14 | 8 | 5 | 6 | 8 | 6 |
| Hf (PPM) | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *La (PPM)* | *20-30* | *27* | *0* | *0* | *10* | *0* | *0* | *0* | *0* | *6* | *0* | *0* | *0* | *2* | *0* | *0* |
| Nb (PPM) | 20-30 | 69 | 0 | 0 | 62 | 0 | 0 | 0 | 0 | 0 | 14 | 0 | 0 | 0 | 0 | 0 |
| *Nd (PPM)* | *20-30* | *62* | *0* | *0* | *44* | *0* | *0* | *0* | *0* | *0* | *15* | *19* | *0* | *0* | *0* | *0* |
| Ni (PPM) | 15 | 1162 | 1415 | 1417 | 1455 | 2271 | 1980 | 1982 | 2013 | 2115 | 469 | 2370 | 2437 | 2468 | 2016 | 2155 |
| Pb (PPM) | 15 | 8 | 0 | 0 | 0 | 8 | 0 | 5 | 6 | 7 | 26 | 0 | 0 | 8 | 8 | 0 |
| Rb (PPM) | 5-10 | 25 | 14 | 12 | 24 | 6 | 4 | 4 | 6 | 4 | 1 | 4 | 2 | 1 | 4 | 4 |
| Sc (PPM) | 20 | 24 | 8 | 8 | 24 | 12 | 0 | 9 | 0 | 11 | 80 | 0 | 0 | 0 | 14 | 0 |
| Sr (PPM) | 15-20 | 964 | 194 | 195 | 549 | 88 | 77 | 79 | 97 | 73 | 136 | 19 | 18 | 8 | 35 | 8 |
| Th (PPM) | 20 | 9 | 12 | 6 | 10 | 3 | 4 | 4 | 7 | 7 | 0 | 5 | 9 | 7 | 7 | 7 |
| *U (PPM)* | *20* | *0* | *9* | *0* | *0* | *9* | *5* | *11* | *0* | *7* | *0* | *0* | *13* | *0* | *6* | *6* |
| V (PPM) | 15 | 282 | 95 | 83 | 275 | 47 | 46 | 42 | 56 | 55 | 722 | 24 | 33 | 20 | 77 | 7 |
| *W (PPM)* | *20-30* | *7* | *0* | *3* | *0* | *2* | *15* | *0* | *6* | *0* | *3* | *0* | *0* | *0* | *1* | *1* |
| Y (PPM) | 15-20 | 16 | 4 | 7 | 15 | 3 | 2 | 2 | 3 | 3 | 4 | 0 | 0 | 1 | 1 | 2 |
| Zn (PPM) | 15 | 101 | 80 | 80 | 94 | 71 | 84 | 85 | 87 | 77 | 146 | 82 | 76 | 64 | 90 | 64 |
| Zr (PPM) | 15-20 | 298 | 56 | 39 | 254 | 41 | 41 | 43 | 46 | 36 | 116 | 0 | 0 | 0 | 26 | 14 |

**Table 9-2** Table of XRF results corrected after LOI

| Sample | G17/16 | G17/18 | G17/19 | G17/25 | G17/29 | G17/33 | G17/35 | G17/42 | G17/43 | G17/45 | G17/4 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MgO (%) | 41.67 | 41.13 | 46.19 | 50.29 | 47.92 | 49.77 | 47.62 | 50.54 | 49.38 | 48.24 | 40.36 |
| $Fe_2O_3$ (%) | 7.04 | 6.75 | 7.79 | 8.32 | 10.53 | 8.27 | 8.03 | 8.50 | 7.97 | 9.92 | 6.92 |
| $SiO_2$ (%) | 34.25 | 33.54 | 37.99 | 41.05 | 40.27 | 40.89 | 43.97 | 41.33 | 41.12 | 41.49 | 33.54 |
| MnO (%) | 0.11 | 0.10 | 0.12 | 0.13 | 0.14 | 0.12 | 0.12 | 0.13 | 0.12 | 0.15 | 0.11 |
| $Al_2O_3$ (%) | 0.07 | 0.07 | 0.08 | 0.08 | 0.10 | 0.08 | 0.09 | 0.08 | 0.08 | 0.13 | 0.10 |
| $TiO_2$ (%) | 0.04 | 0.04 | 0.05 | 0.05 | 0.08 | 0.05 | 0.06 | 0.05 | 0.04 | 0.11 | 0.05 |
| $Cr_2O_3$ (%) | 0.09 | 0.08 | 0.09 | 0.09 | 0.22 | 0.09 | 0.09 | 0.10 | 0.08 | 0.12 | 0.09 |
| CaO (%) | 0.32 | 0.42 | 0.37 | 0.40 | 0.41 | 0.39 | 0.40 | 0.38 | 0.36 | 1.22 | 0.49 |
| $Na_2O$ (%) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 |
| $K_2O$ (%) | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 |
| $P_2O_5$ (%) | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.02 |
| LOI | 16.00 | 18.00 | 7.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 18.00 |
| Sum (%) | 99.60 | 100.14 | 99.69 | 100.43 | 99.67 | 99.66 | 100.39 | 101.14 | 99.17 | 101.38 | 99.71 |
| | | | | | | | | | | | |
| Cr ppm | 749.75 | 657.74 | 628.24 | 632.06 | 1490.50 | 603.72 | 605.14 | 714.43 | 571.91 | 791.09 | 783.16 |
| Ni ppm | 4257.05 | 4306.00 | 4248.98 | 4241.00 | 4109.00 | 4290.43 | 3949.01 | 4101.00 | 4123.56 | 3906.50 | 5599.87 |
| Sr ppm | 0.00 | 1.36 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.76 | 12.40 |
| Zn ppm | 64.54 | 65.48 | 63.65 | 60.93 | 73.99 | 68.14 | 60.10 | 59.12 | 70.89 | 77.31 | 352.10 |
| Y ppm | 2.03 | 1.90 | 2.14 | 2.34 | 2.49 | 1.94 | 1.72 | 1.68 | 2.46 | 2.53 | 2.11 |
| Rh ppm | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rb ppm | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Zr ppm | 3.86 | 3.45 | 9.47 | 3.21 | 4.20 | 5.45 | 5.19 | 3.16 | 4.11 | 4.28 | 6.75 |
| Cu ppm | 79.82 | 86.21 | 60.88 | 29.04 | 51.88 | 101.25 | 49.65 | 33.86 | 30.65 | 38.92 | 100.89 |

**Table 9-3** Table of XRF results corrected after LOI

| Sample | G17/7 | G17/22 | G17/24 | G17/40 | G17/44 | avG17/47 | avG17/49 | G13/6 | G13/20 | G13/24 | G1/25 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MgO (%) | 41.77 | 51.83 | 39.24 | 49.73 | 50.19 | 50.30 | 50.20 | 35.00 | 46.97 | 45.42 | 29.90 |
| $Fe_2O_3$ (%) | 7.18 | 8.32 | 10.74 | 8.24 | 8.08 | 8.05 | 8.17 | 16.81 | 11.30 | 12.97 | 14.19 |
| $SiO_2$ (%) | 34.50 | 42.34 | 33.99 | 40.96 | 41.22 | 41.13 | 41.16 | 39.79 | 39.96 | 39.68 | 41.48 |
| MnO (%) | 0.11 | 0.13 | 0.15 | 0.13 | 0.12 | 0.13 | 0.12 | 0.22 | 0.16 | 0.19 | 0.18 |
| $Al_2O_3$ (%) | 0.09 | 0.10 | 0.11 | 0.11 | 0.12 | 0.09 | 0.13 | 0.83 | 0.27 | 0.14 | 3.39 |
| $TiO_2$ (%) | 0.04 | 0.05 | 0.15 | 0.06 | 0.05 | 0.04 | 0.04 | 1.60 | 0.23 | 0.18 | 3.24 |
| $Cr_2O_3$ (%) | 0.08 | 0.10 | 0.31 | 0.09 | 0.09 | 0.10 | 0.09 | 0.42 | 0.87 | 0.40 | 0.27 |
| CaO (%) | 0.37 | 0.44 | 0.58 | 0.52 | 0.39 | 0.36 | 0.36 | 6.04 | 0.88 | 0.61 | 7.60 |
| $Na_2O$ (%) | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 |
| $K_2O$ (%) | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.01 | 1.13 |
| $P_2O_5$ (%) | 0.01 | 0.01 | 0.01 | 0.02 | 0.01 | 0.01 | 0.01 | 0.03 | 0.02 | 0.02 | 0.41 |
| LOI | 15.00 | 0.00 | 15.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Sum (%) | 99.16 | 103.31 | 100.29 | 99.87 | 100.27 | 100.21 | 100.30 | 100.75 | 100.68 | 99.63 | 102.13 |
| Cr ppm | 666.64 | 651.87 | 2490.92 | 636.51 | 642.24 | 677.22 | 604.71 | 2901.18 | 5959.52 | 2730.45 | 1831.38 |
| Ni ppm | 4348.60 | 4330.43 | 3660.86 | 4217.79 | 4314.72 | 4395.39 | 4357.00 | 2236.47 | 3944.88 | 3582.48 | 1851.80 |
| Sr ppm | 0.00 | 0.00 | 4.31 | 105.13 | 10.78 | 0.00 | 0.00 | 105.13 | 10.78 | 3.75 | 554.71 |
| Zn ppm | 62.77 | 72.14 | 86.84 | 102.73 | 80.85 | 57.47 | 62.55 | 102.73 | 80.85 | 86.16 | 92.76 |
| Y ppm | 1.68 | 2.28 | 2.00 | 5.93 | 1.85 | 1.71 | 2.34 | 5.93 | 1.85 | 2.48 | 19.72 |
| Rh ppm | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rb ppm | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 18.89 |
| Zr ppm | 2.57 | 3.48 | 4.71 | 40.80 | 5.84 | 4.65 | 3.14 | 40.80 | 5.84 | 6.05 | 245.04 |
| Cu ppm | 56.65 | 60.40 | 43.11 | 106.90 | 71.68 | 35.00 | 38.09 | 106.90 | 71.68 | 112.72 | 193.15 |

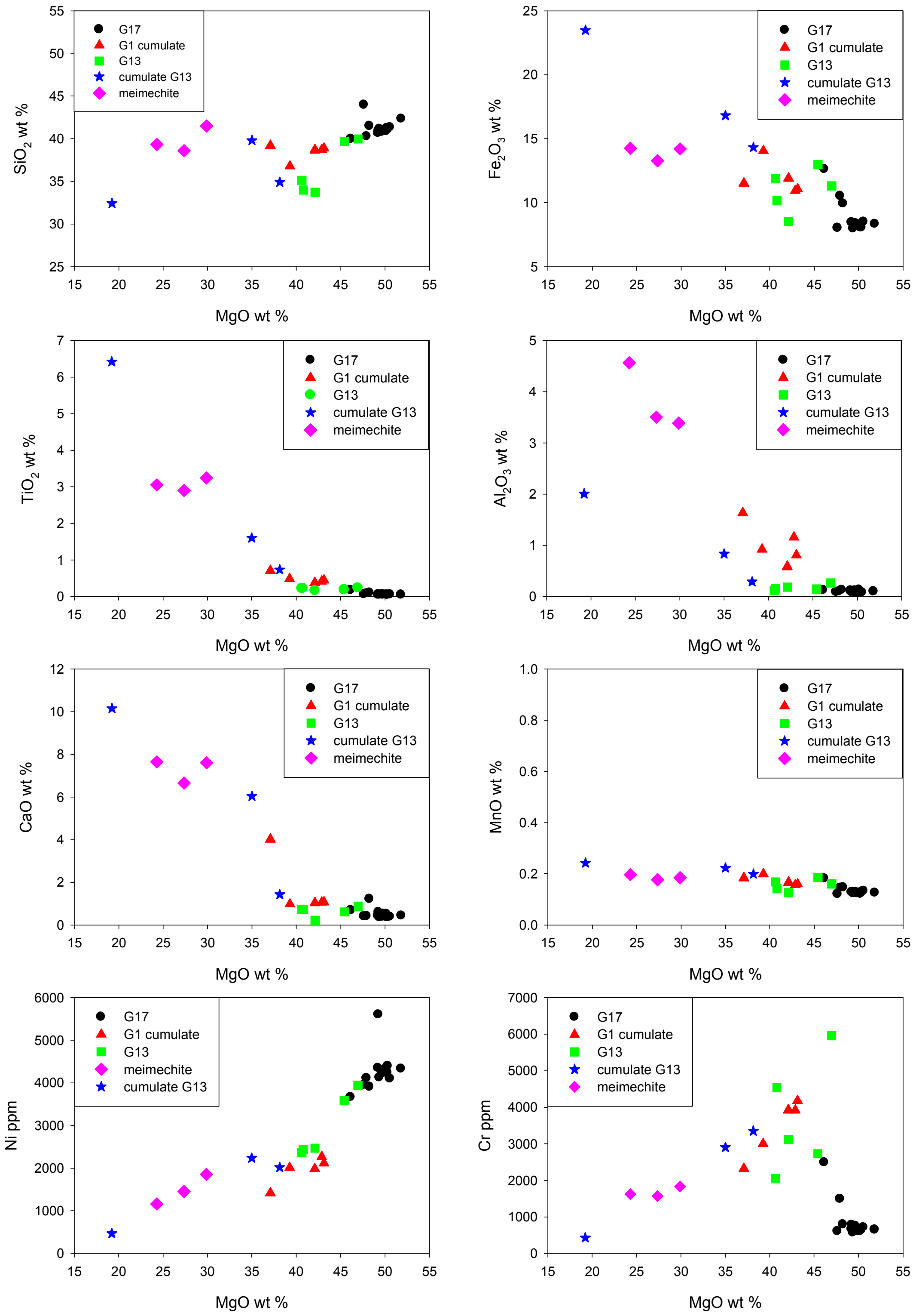



**Figure 9-1** Variation diagrams plotted against MgO wt% for drill cores G17, G13 and G1

In this study, due to the ultramafic composition of the samples, MgO wt % was used rather than $SiO_2$ wt % as a "fractionation index" in the Harker variation diagrams. In general, Harker variation diagrams may indicate genetic relationships between rocks within one common igneous rock suite, as well as genetic links between several different rock suites. In Figure 9 - 1, silica, iron, titanium, aluminium, calcium, manganese, nickel and chromium were plotted against magnesium. The outlier in all these plots is from the drill core G13 and represents a sample of clinopyroxenite dyke. There is a weak positive trend from samples of the central to those from the peripheral parts of the dunite complex in terms of $SiO_2$. A negative trend is indicated with respect to TiO wt% vs. MgO, where the dunite samples cluster at $TiO_2$ contents between ~0.3 wt % and 1 wt %, and an obvious Ti-enrichment can be observed with samples from the Ol-cumulates to those from the meimechites. The same trends can be observed with respect to aluminium and CaO concentrations Fig 9 – 1. The significant higher CaO concentrations in Ol-cumulates and meimechites are also attributed to carbonate veining and a higher concentration of carbonate in the matrix. There is little or no change in manganese concentration over the three drill cores. There is a positive trend in the Ni plot, the highest concentrations occurring in the dunite core and becoming more depleted to the periphery of the complex.

The Cr vs. MgO diagram displays a very interesting trend: dunites from the Guli core complex gather at rather low Cr-concentrations of around 700ppm and show a Cr-increase (i.e. up to 4000ppm) with corresponding decrease of MgO towards the Ol-cumulates. Furthermore, there is a distinct negative trend from the Ol-cumulates to the meimechites.

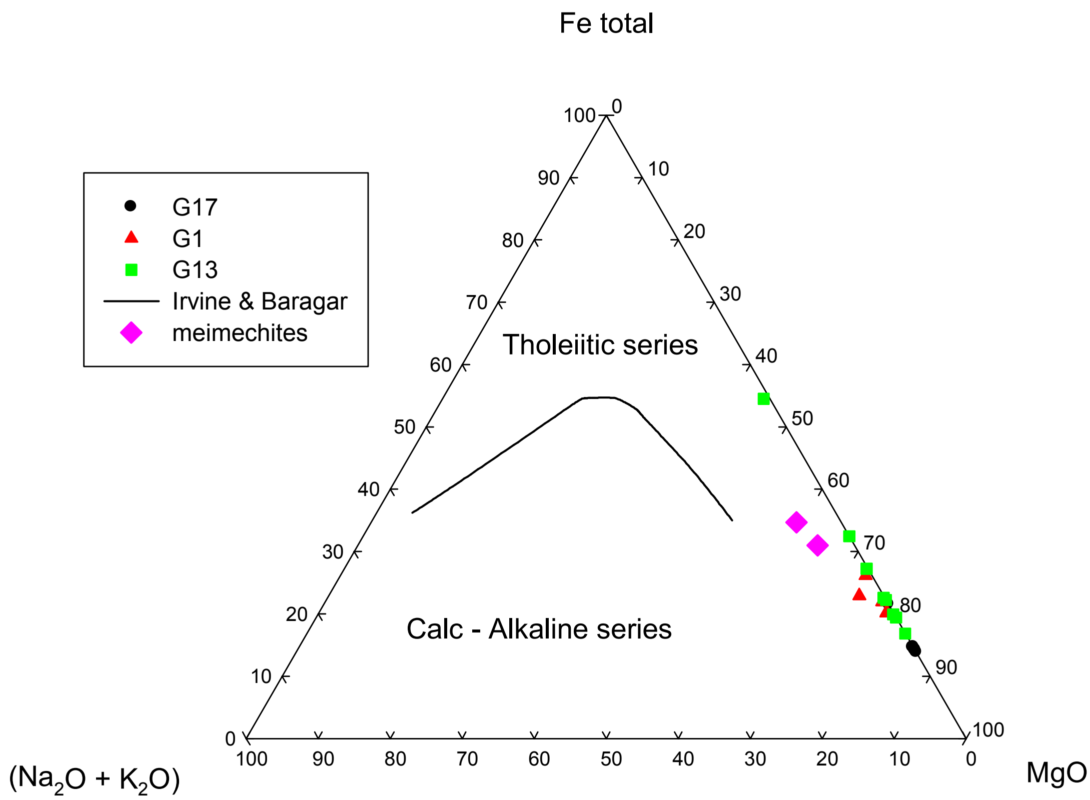



**Figure 9-2** AFM diagram after (Wilson et al., 1989) showing the boundary between the calc – alkaline and the tholeiitic field after Irvine and Baragar (1971); drill core G17, G13 & G1

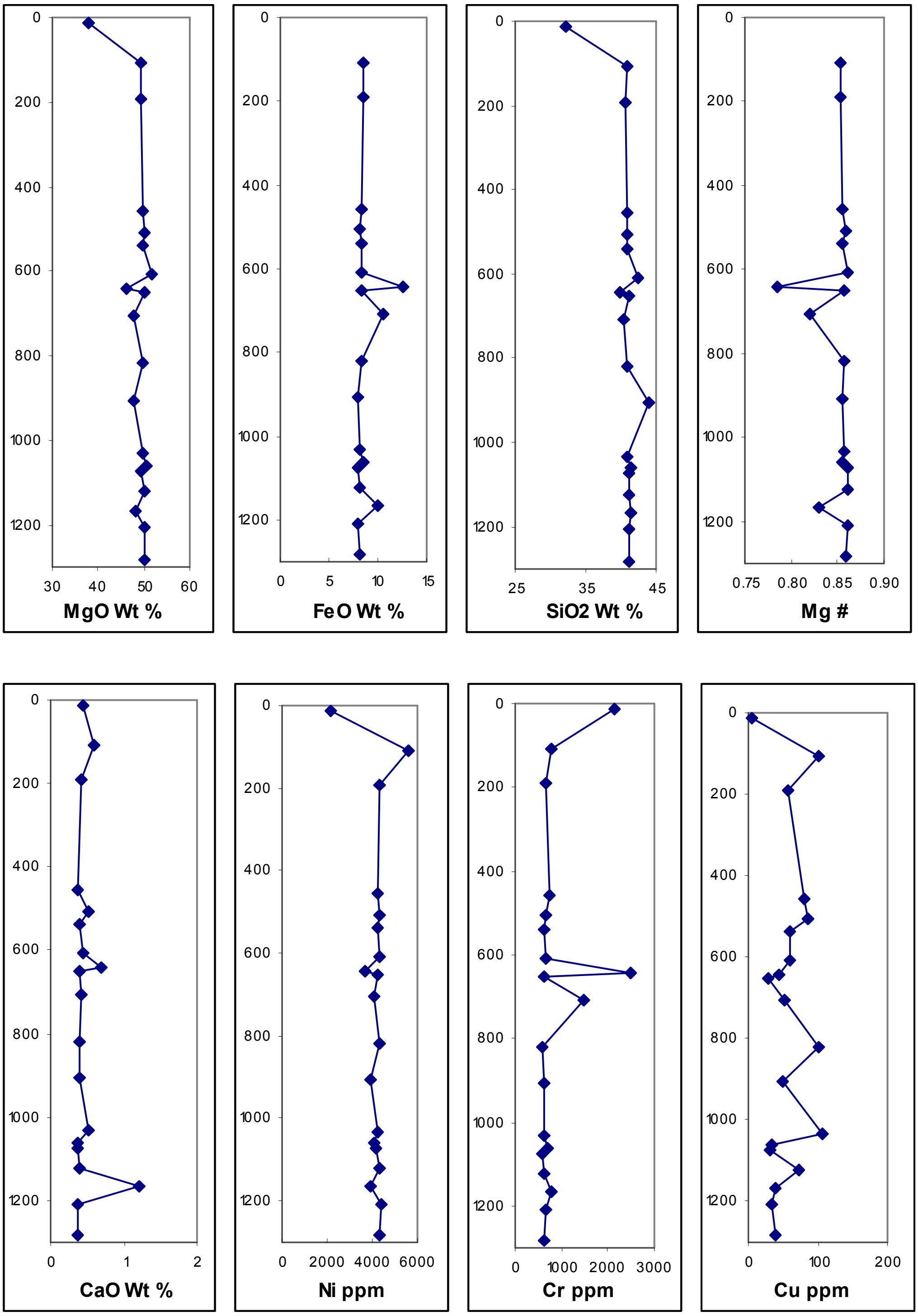



**Figure 9-3** Drill core G17, plots versus depth for major and trace elements

The plots of drill core G17 versus depth show (Fig 9 – 3) that there is almost no variation in the bulk chemistry with depth. MgO, FeO, $SiO_2$, CaO as well as Ni and Cr are very consistent in the central part of the Guli Dunite Massif over a depth of more than 1000m. Two levels are easily identified 1165.9 m and 642m as being different. These levels have lower Mg# and have interstitial carbonate, which skews the CaO figure. The variation at higher levels is associated with serpentinisation. The inverses relationship between Mg and Fe and Ni and Cr is clearly identifiable. In the plot CaO wt % versus depth samples with interstitial carbonate have noticeable positive peaks. The Cu plot shows the very low concentration of Cu in the dunites, which confirms the very rare occurrence of Cu-Ni-sulfides, as stressed in the petrography section (See section 7: Petrography). Small positive peaks of local Cu-enrichment are interpreted as the nugget effect in this analysis.

## *9.2. Rare Earth Elements*

Rare Earth Element (REE) concentrations from selected samples are given in Table 9 – 4 & 5 and the chondrite normalized plots are show in Figures 9 - 4, 5 & 6. In the chondrite normalized plots it is possible to notice some similarities between the various REE patterns.

The patterns from drill core G17 all show similarly shaped REE patterns, defined by rather flat patterns, but a slight enrichment in LREE. The LREE concentrations for G17 are between, 1.2 and 7.2 times chondrite, while the HREE are between 0.1 and 0.6 times chondrite.

In drill core G13 two different types of patterns are becoming obvious. The patterns from the deeper sections of the drill core show patterns similar to those of drill core G17, again defined by a flat shape with a slight enrichment in LREE (1.6 to 3.4 times chondrite) and depletion in HREE (0.16 to 0.2 times chondrite). These are samples of dunite, similar to those from the central portion of the Guli dunite core complex (i.e. drill core G17). The samples from the top of the drill core are characterized by much higher REE concentrations, LREE between 4.4 and 16.7 times chondrite and HREE between 0.7 and 1.4 times chondrite. These patterns are from Ol - cumulates. The sample of clinopyroxenite dyke has the highest concentrations of REE of all samples from drill core G13. The pattern is similar to the enriched Ol- cumulate, with LREE concentrations 37 times chondrite and HREE 2.4 times chondrite. As shown in Fig 9 - 5.

| sample | G17/7 | G17/12 | G17/16 | G17/18 | G17/22 | G17/25 | G17/29 | G17/33 | G17/35 | G17/37 | G17/40 | G17/43 | G17/44 | G17/45 | G17/47 | G17/49 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Y | 0.29 | 0.10 | | 0.32 | 0.25 | | | 0.22 | 0.35 | 0.57 | 0.38 | 0.21 | | | | 0.20 |
| Zr | 1.20 | 1.48 | 1.84 | 0.41 | 1.04 | 2.37 | 2.10 | 0.01 | 0.76 | 4.17 | 4.23 | 0.06 | 1.23 | 2.31 | 1.10 | 0.25 |
| Nb | | 0.30 | 0.02 | 0.03 | 0.01 | 0.10 | 0.05 | | 0.13 | | 0.08 | | 0.02 | 0.04 | | 0.01 |
| Mo | | | | | | | | | | | | | 0.31 | | | |
| Ba | 5.05 | 1.76 | 5.10 | 15.43 | 3.61 | 7.16 | 3.92 | 2.62 | 1.30 | 1.92 | 6.89 | 3.03 | 7.20 | 4.66 | 10.57 | 2.04 |
| La | 0.13 | 0.15 | 1.25 | 0.19 | 0.03 | 0.56 | 0.35 | 0.05 | 0.29 | 0.08 | 0.56 | 0.05 | 0.27 | 0.43 | 0.50 | 0.03 |
| Ce | 0.17 | 0.32 | | 0.26 | 0.05 | | | 0.09 | 0.70 | 0.19 | 1.06 | 0.09 | 0.08 | | | 0.05 |
| Pr | 0.04 | 0.04 | 0.19 | 0.04 | | 0.11 | 0.07 | 0.02 | 0.09 | 0.02 | 0.14 | 0.01 | 0.03 | 0.16 | 0.10 | 0.01 |
| Nd | 0.11 | 0.17 | 0.57 | 0.15 | 0.02 | 0.39 | 0.27 | 0.07 | 0.34 | 0.08 | 0.52 | 0.04 | 0.08 | 0.80 | 0.37 | 0.03 |
| Sm | 0.09 | 0.03 | 0.07 | 0.02 | | 0.08 | 0.05 | 0.04 | 0.06 | 0.00 | 0.12 | 0.01 | 0.01 | 0.18 | 0.08 | 0.01 |
| Eu | 0.03 | 0.01 | 0.02 | 0.01 | | 0.02 | 0.01 | 0.01 | 0.02 | 0.01 | 0.03 | 0.01 | 0.01 | 0.05 | 0.02 | 0.01 |
| Gd | 0.03 | 0.01 | 0.06 | 0.04 | | 0.07 | 0.05 | 0.02 | 0.05 | 0.01 | 0.04 | 0.02 | 0.02 | 0.17 | 0.07 | 0.03 |
| Tb | 0.11 | 0.00 | | 0.02 | 0.08 | | | 0.02 | 0.01 | | 0.01 | 0.01 | 0.00 | | | 0.01 |
| Dy | 0.07 | 0.01 | 0.05 | 0.05 | 0.01 | 0.08 | 0.05 | 0.03 | 0.05 | 0.00 | 0.03 | 0.02 | 0.02 | 0.11 | 0.09 | 0.03 |
| Ho | 0.12 | 0.00 | | 0.02 | 0.08 | | | 0.02 | 0.01 | 0.01 | 0.01 | 0.02 | 0.01 | | | 0.02 |
| Er | 0.06 | 0.01 | 0.04 | 0.03 | 0.00 | 0.06 | 0.04 | 0.03 | 0.03 | 0.01 | 0.03 | 0.03 | 0.02 | 0.06 | 0.06 | 0.03 |
| Tm | 0.05 | | 0.01 | 0.01 | | 0.01 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.01 | 0.01 | 0.01 |
| Yb | 0.09 | 0.01 | 0.04 | 0.04 | 0.01 | 0.06 | 0.05 | 0.05 | 0.04 | 0.01 | 0.04 | 0.04 | 0.03 | 0.06 | 0.07 | 0.04 |
| Lu | 0.05 | 0.00 | 0.01 | 0.01 | | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.00 | 0.01 | 0.01 | 0.01 |
| Hf | 0.03 | 0.02 | 0.02 | 0.01 | 0.03 | 0.05 | 0.04 | 0.01 | 0.02 | 0.08 | 0.05 | 0.01 | 0.09 | 0.09 | 0.01 | 0.01 |
| Ta | | 0.01 | 0.00 | | | 0.01 | 0.03 | | | 0.01 | 0.02 | | 0.11 | 0.01 | 0.00 | |
| W | | 0.01 | | | | | | | | 0.84 | 1.23 | | 2.69 | | | |
| Th | 0.01 | 0.02 | 0.29 | 0.14 | | 0.23 | 0.19 | 0.06 | 0.06 | 0.03 | 0.12 | 0.05 | 0.08 | 0.14 | 0.10 | 0.03 |

**Table 9-4** Table of trace element results of samples from drill core G17

**Table 9-5** Table of Trace element results of samples from drill core G13, G1 & M1

| sample | G13-4 | G13/6 | G13/10 | G13/16 | G13/17 | G13/20 | G13/21 | | M1-1 | | G1/2 | G1/6 | G1/8 | G1/12 | G1/14 | G1/20 | G1/25 | G1/26 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Y | 1.30 | 3.47 | 6.98 | | | 0.27 | 0.21 | | 9.76 | | 17.19 | 3.07 | 2.51 | 22.27 | 4.54 | 2.45 | 14.41 | 1.91 |
| Zr | 8.89 | 22.60 | 83.38 | 4.27 | 5.56 | 2.52 | | | 119.87 | | 239.82 | 55.32 | 48.87 | 301.25 | 50.17 | 38.61 | 170.39 | 42.97 |
| Nb | 0.20 | 0.10 | 11.51 | 0.22 | 0.06 | | | | 28.27 | | 58.64 | 12.87 | 11.57 | 81.12 | 10.15 | 8.19 | 37.23 | 7.63 |
| Mo | 0.66 | | 0.21 | 1.11 | 1.22 | 0.59 | | | 0.16 | | 0.13 | 0.32 | 0.61 | 0.27 | 0.72 | 0.55 | | 0.23 |
| Ba | 20.01 | 1.34 | 30.59 | 14.58 | 21.02 | 6.48 | 4.01 | | 127.12 | | 447.95 | 40.69 | 37.95 | 524.52 | 281.10 | 97.01 | 333.40 | 46.45 |
| La | 1.05 | 3.94 | 6.82 | 0.82 | 0.43 | 0.34 | 0.39 | | 31.80 | | 53.47 | 7.66 | 6.48 | 62.11 | 7.03 | 6.52 | 39.99 | 5.05 |
| Ce | 3.76 | 14.96 | 21.14 | 1.55 | 0.86 | 0.66 | 0.64 | | 70.12 | | 110.62 | 14.96 | 12.51 | 129.22 | 15.00 | 13.17 | 88.71 | 9.18 |
| Pr | 0.67 | 2.42 | 3.43 | 0.22 | 0.16 | 0.08 | 0.09 | | 8.65 | | 13.29 | 1.72 | 1.41 | 15.55 | 1.93 | 1.57 | 11.11 | 1.04 |
| Nd | 3.34 | 11.30 | 17.10 | 0.89 | 0.70 | 0.32 | 0.33 | | 34.72 | | 51.62 | 6.38 | 5.27 | 60.30 | 7.71 | 5.86 | 46.05 | 3.95 |
| Sm | 0.71 | 2.17 | 3.93 | 0.20 | 0.13 | 0.06 | 0.06 | | 5.98 | | 8.68 | 1.03 | 0.87 | 10.38 | 1.46 | 0.99 | | 0.69 |
| Eu | 0.21 | 0.61 | 1.15 | 0.06 | 0.04 | 0.02 | 0.01 | | 1.64 | | 2.43 | 0.30 | 0.25 | 2.92 | 0.43 | 0.29 | 8.37 | 0.21 |
| Gd | 0.56 | 1.64 | 3.15 | 0.14 | 0.11 | 0.02 | 0.02 | | 4.34 | | 6.08 | 0.72 | 0.63 | 7.16 | 1.13 | 0.69 | 2.35 | 0.50 |
| Tb | 0.07 | 0.20 | 0.39 | 0.01 | 0.01 | 0.00 | 0.00 | | 0.53 | | 0.73 | 0.09 | 0.08 | 0.87 | 0.15 | 0.09 | 6.16 | 0.06 |
| Dy | 0.30 | 0.92 | 1.76 | 0.06 | 0.04 | | 0.02 | | 2.55 | | 3.55 | 0.49 | 0.42 | 4.38 | 0.80 | 0.46 | 0.74 | 0.35 |
| Ho | 0.05 | 0.16 | 0.27 | 0.02 | 0.01 | 0.01 | 0.01 | | 0.42 | | 0.57 | 0.09 | 0.07 | 0.68 | 0.14 | 0.08 | 3.60 | 0.06 |
| Er | 0.13 | 0.36 | 0.60 | 0.03 | 0.02 | 0.04 | 0.02 | | 0.97 | | 1.28 | 0.21 | 0.17 | 1.60 | 0.37 | 0.20 | 0.57 | 0.16 |
| Tm | 0.01 | 0.04 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.12 | | 0.15 | 0.03 | 0.02 | 0.20 | 0.05 | 0.03 | 1.32 | 0.02 |
| Yb | 0.09 | 0.22 | 0.39 | 0.05 | 0.04 | 0.02 | 0.03 | | 0.63 | | 0.84 | 0.17 | 0.12 | 1.10 | 0.31 | 0.17 | 0.16 | 0.14 |
| Lu | 0.02 | 0.03 | 0.06 | 0.01 | 0.01 | 0.00 | 0.01 | | 0.09 | | 0.11 | 0.02 | 0.02 | 0.15 | 0.05 | 0.02 | 0.83 | 0.02 |
| Hf | 0.33 | 1.13 | 3.14 | 0.16 | 0.24 | 0.09 | | | 3.64 | | 5.28 | 1.10 | 0.94 | 6.35 | 1.15 | 0.73 | 0.11 | 0.85 |
| Ta | 0.05 | 0.11 | 0.82 | 0.03 | 0.02 | 0.01 | 0.01 | | 2.11 | | 3.33 | 0.57 | 0.56 | 4.17 | 0.50 | 0.38 | 4.73 | 0.31 |
| W | | 2.54 | 0.55 | 84.22 | 90.99 | 10.27 | 1.16 | | 52.64 | | 0.83 | 4.94 | 1.00 | 0.49 | 1.11 | 1.35 | 2.68 | 0.68 |
| Th | 0.11 | 0.08 | 0.70 | 0.24 | 0.11 | 0.16 | 0.12 | | 3.29 | | 4.12 | 0.85 | 0.79 | 4.43 | 0.51 | 0.64 | 0.74 | 0.93 |

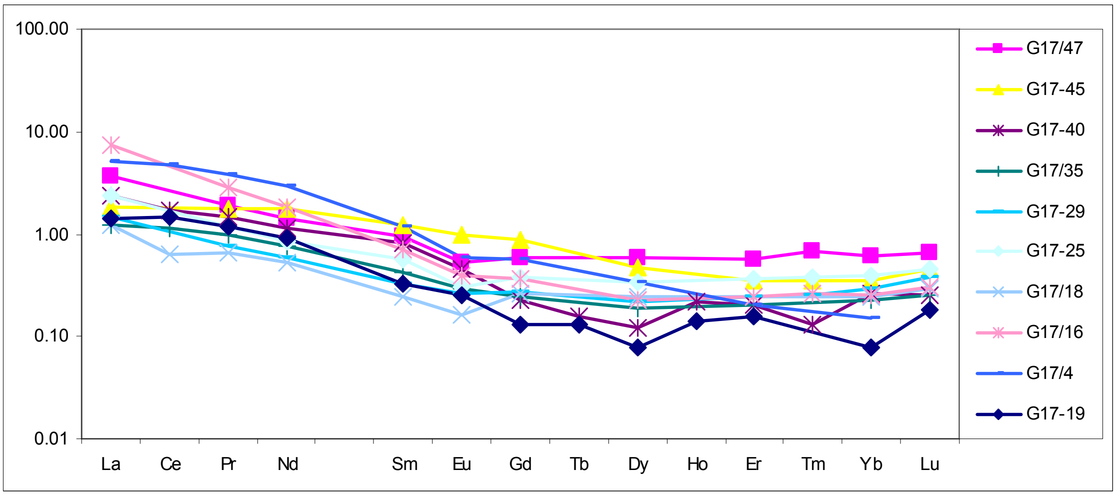



**Figure 9-4** Chondrite normalised REE concentrations of drill core G17 (selected samples)

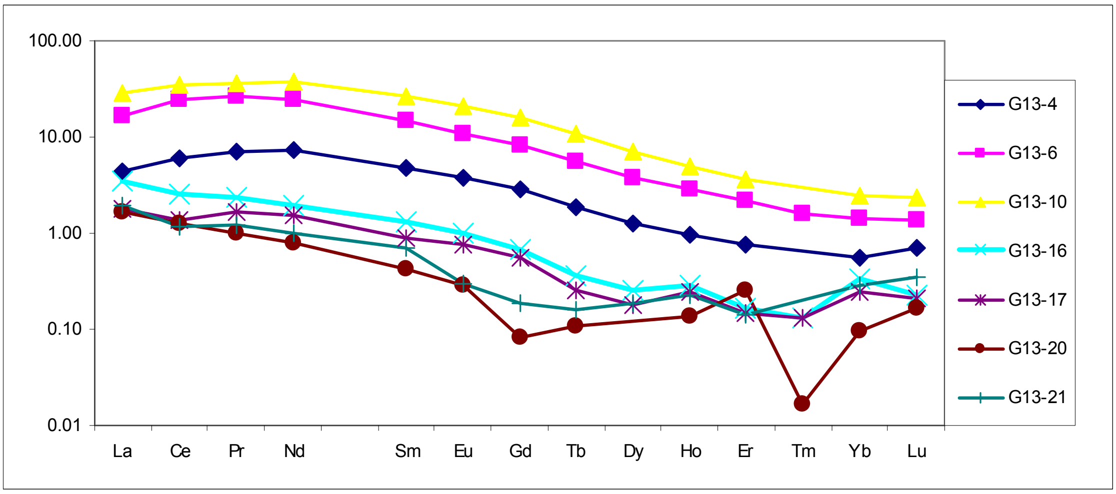



**Figure 9-5** Chondrite normalised REE concentrations of drill core G13

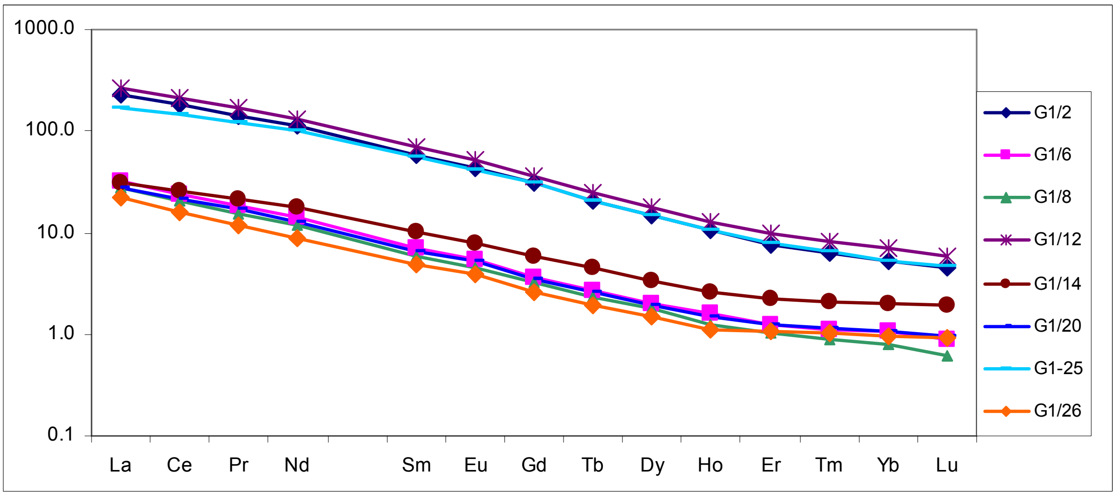



**Figure 9-6** Chondrite normalised REE concentrations of drill core G1

Samples from drill core G1 also show two different types of patterns: the olivine cumulates show patterns rather similar to those from the Ol-cumulates from G13 with LREE concentrations ranging from 20 to 32 times chondrite and HREE concentrations between 0.9 and 2.1 times chondrite. They differ from the Ol-cumulates from core G13 (from the periphery of the dunite core complex) by more pronounced LREE enrichment, which gives the REE pattern a straight negative shape (Fig 9 – 6). The highest REE concentrations are represented by the meimechitic volcanics, revealing LREE concentrations of 169 to 263 times chondrite and HREE concentrations of 4.5 and 6.1 chondrite. The shape of these REE patterns is almost identical to those of the Ol-cumulates (Fig 9 – 6).

### 9.3. Platinum Group Elements

Platinum group element concentrations were measured by ICP-MS using the method described in Section 6: Methods and the results are shown in Table 9 – 6. Plots of the primitive mantle normalised platinum group element concentrations are shown in Figures 9 - 7, 8, 9 & 10.

In general the PGE concentrations are very low from 0.01 to 8 times primitive mantle. The PGE patterns from the dunites of drill core G17 (i.e. central portion of the Guli dunite core complex) are characterised by a positive ruthenium anomaly and a negative anomaly for platinum and palladium. Concentrations of Ir vary from 0.02 to 1.33 times primitive mantle. Ru concentrations range from 0.14 to 1.26 times primitive mantle. Rh between 0.05 and 0.79, Pt from 0.01 to 0.20 times primitive mantle. While the concentrations of Pd and Re are 0.01 to 0.16 and 0.01 to 3.05 times primitive mantle, respectively. The Os concentrations vary from 0.01 to 7.4 times primitive mantle, which is most likely due to analytical uncertainties due to very low Os-concentrations. In summary, as expected, the PGE patterns of the dunites of the central portion of the core complex show negatively shape (Fig 9 – 7).

The shape of the PGE patterns of samples from core G13 is similar, but the PGE concentrations are higher. The primitive mantle normalised concentrations for the dunites from drill core G13 range from, Os: 0.13 to 2.84, Ir: 0.13 to 0.59, Ru: 0.15 to 4.15, Rh: 0.41 to 2.32, Pt: 0.07 to 1.2, Pd: 0.06 to 1.1 and Re: 0.19 to 1.0 times primitive mantle (Figure 9- 8). One pattern (sample G13-10) is distinctly different, displaying a so-called positive pattern, defined by depletion of IPGE and significant enrichment of PPGE. This sample represents a clinopyroxenite dyke.

The primitive mantle normalised platinum group element concentrations from drill core G1 again show two distinctly different rock types. The first is the dunite cumulate, which shows similar patterns to those from drill core G17 and G13, defined by enrichment of IPGE and depletion in platinum and palladium. In contrast the other rock type, represented by the meimechites, shows rather flat patterns and are characterised by concentrations of IPGE similar to those of the cumulates, while the concentration of PPGE is significantly more enriched, giving the patterns a slight positive shape. Concentrations for drill core G1 range from Os: 0.38 to 1.15, Ir: 0.24 to 0.79, Ru: 0.46 to 1.57, Rh: 0.41 to 0.59, Pt: 0.09 to 1.58, Pd 0.11 to 1.18 and Re 0.75 to 3.04 times primitive mantle. These results are shown if Figure 9 - 9.

The PGE patterns from disseminated chromites are typically negatively shaped with enrichment of IPGE and depletion of PPGE Fig 9 – 10. The ranges in concentrations for the surficial samples are Os: 0.32 to 7.14 times primitive mantle, Ir: 0.31 to 4.96 times, Ru: 0.66 to 12.99 times primitive mantle. Rh concentrations range from 0.38 to 3.61 times, while Pt varies from 0.02 to 0.15 times primitive mantle. Pd and Re concentrations range between 0.07 to 0.2 and 0.13 and 0.59 times primitive mantle respectively. It is interesting to note that, despite the higher chromite concentrations, IPGE concentrations are higher, but the levels of PPGE are the same as measured in the drill core without disseminated chromite.

| ppb | Os content | Ir content | Ru content | Rh content | Pt content | Pd content | Re content | Ir/Ru |
|---|---|---|---|---|---|---|---|---|
| **G1-2** | 1.8 | 1.18 | 2.30 | 0.40 | 4.45 | 4.56 | 0.21 | 0.513 |
| **G1-6** | 2.7 | 2.41 | 6.01 | 0.43 | 0.94 | 0.74 | 0.49 | 0.402 |
| **G1-8** | 3.9 | 2.53 | 7.69 | 0.37 | 1.02 | 0.66 | 0.66 | 0.329 |
| **G1-12** | 2.3 | 1.54 | 2.84 | 0.50 | 11.22 | 6.83 | 0.42 | 0.541 |
| **G1-14** | 1.5 | 0.78 | 2.44 | 0.38 | 3.01 | 2.30 | 0.19 | 0.318 |
| **G1-20** | 3.0 | 1.73 | 5.70 | 0.50 | 1.15 | 0.82 | 0.52 | 0.303 |
| **G1/25** | 1.28 | 1.06 | 2.33 | 0.53 | 6.39 | 4.62 | 0.31 | 0.453 |
| **G1/25b** | 1.36 | 0.96 | 2.75 | 0.43 | 6.26 | 4.54 | 0.85 | 0.351 |
| **G1-26** | 3.2 | 2.49 | 7.87 | 0.42 | 0.67 | 0.43 | 0.30 | 0.317 |
| **G17/02** | 0.57 | 0.24 | 2.12 | 0.17 | 0.38 | 0.12 | 0.08 | 0.114 |
| **G17/04** | 25.41 | 4.27 | 5.18 | 0.13 | 0.23 | 0.19 | 0.03 | 0.823 |
| **G17/07** | 0.03 | 0.08 | 5.68 | 0.12 | 0.09 | 0.37 | 0.00 | 0.014 |
| **G17/12** | 0.20 | 0.39 | 3.27 | 0.35 | 0.44 | 0.15 | 0.06 | 0.119 |
| **G17/16** | 1.65 | 0.37 | 1.52 | 0.12 | 0.58 | 0.25 | 0.02 | 0.243 |
| **G17/18** | 15.94 | 0.11 | 0.89 | 0.05 | 0.76 | 0.09 | 0.13 | 0.119 |
| **G17/19** | 0.05 | 0.13 | 0.92 | 0.12 | 0.27 | 0.08 | 0.03 | 0.137 |
| **G17/22** | 0.03 | 0.08 | 0.70 | 0.14 | 1.20 | 0.63 | 0.03 | 0.108 |
| **G17/24** | 4.72 | 1.51 | 0.28 | 0.41 | 1.17 | 0.53 | 0.24 | 5.349 |
| **G17/25** | 0.04 | 0.11 | 0.90 | 0.05 | 0.76 | 0.13 | 0.14 | 0.121 |
| **G17/29** | 1.05 | 0.12 | 0.93 | 0.14 | 0.78 | 0.13 | 0.13 | 0.124 |
| **G17/33** | 0.04 | 0.14 | 1.31 | 0.16 | 0.18 | 0.32 | 0.03 | 0.104 |
| **G17/35** | 1.30 | 0.35 | 1.40 | 0.18 | 1.26 | 0.31 | 0.06 | 0.247 |
| **G17/37** | 0.03 | 0.06 | 2.82 | 0.15 | 0.30 | 0.06 | 0.38 | 0.020 |
| **G17/40** | 0.03 | 0.12 | 0.99 | 0.16 | 0.64 | 0.40 | 0.04 | 0.116 |
| **G17/42** | 0.19 | 0.12 | 6.29 | 0.62 | 0.69 | 0.37 | 0.03 | 0.019 |
| **G17/43.** | 0.03 | 0.14 | 0.99 | 0.13 | 1.42 | 0.17 | 0.08 | 0.140 |
| **G17/44** | 0.03 | 0.09 | 6.19 | 0.71 | 0.99 | 0.36 | 0.03 | 0.014 |
| **G17/45** | 0.43 | 0.25 | 0.97 | 0.07 | 0.14 | 0.22 | 0.85 | 0.255 |
| **G17/47** | 0.03 | 0.14 | 1.15 | 0.17 | 0.30 | 0.06 | 0.07 | 0.120 |
| **G17/49** | 0.04 | 0.12 | 1.14 | 0.18 | 0.31 | 0.43 | 0.03 | 0.102 |
| **G13/04** | 3.24 | 1.90 | 4.93 | 1.29 | 2.13 | 0.41 | 0.23 | 0.386 |
| **G13/06** | 2.47 | 1.62 | 3.30 | 0.65 | 1.32 | 0.38 | 0.14 | 0.491 |
| **G13/10** | 0.44 | 0.40 | 0.66 | 0.59 | 30.46 | 32.73 | 0.91 | 0.604 |
| **G13/16** | 1.40 | 1.15 | 20.73 | 2.09 | 1.05 | 0.42 | 0.17 | 0.056 |
| **G13/17** | 1.30 | 1.07 | 6.80 | 0.49 | 0.57 | 0.34 | 0.10 | 0.157 |
| **G13/18** | 1.78 | 1.16 | 4.61 | 0.40 | 0.51 | 0.35 | 0.88 | 0.251 |
| **G13/20** | 1.94 | 1.46 | 5.33 | 0.44 | 0.25 | 0.35 | 0.05 | 0.273 |
| **G13/21** | 1.38 | 0.95 | 6.68 | 0.51 | 1.31 | 0.24 | 0.06 | 0.143 |
| **G13/24** | 9.64 | 1.84 | 3.84 | 0.37 | 0.75 | 0.30 | 0.26 | 0.479 |
| **G-03-2** | 13.73 | 10.28 | 15.06 | 0.76 | 0.28 | 0.45 | 0.04 | 0.682 |
| **G-03-3** | 1.08 | 1.00 | 3.29 | 0.34 | 0.12 | 0.26 | 0.07 | 0.304 |
| **Gu-02** | 4.64 | 4.17 | 8.81 | 0.50 | 1.08 | 0.57 | 0.12 | 0.474 |
| **Gu-06** | 24.27 | 15.87 | 64.96 | 3.25 | 0.55 | 0.78 | 0.16 | 0.244 |
| **Gu-07** | 1.80 | 1.40 | 5.03 | 0.28 | 0.27 | 0.56 | 0.15 | 0.279 |
| **M1-1** | 0.59 | 0.76 | 3.21 | 0.47 | 3.65 | 3.65 | 0.05 | 0.236 |

**Table 9-6** Table of Platinum Group Element concentrations (ppb) for drill cores G17, G13, G1 & surficial samples

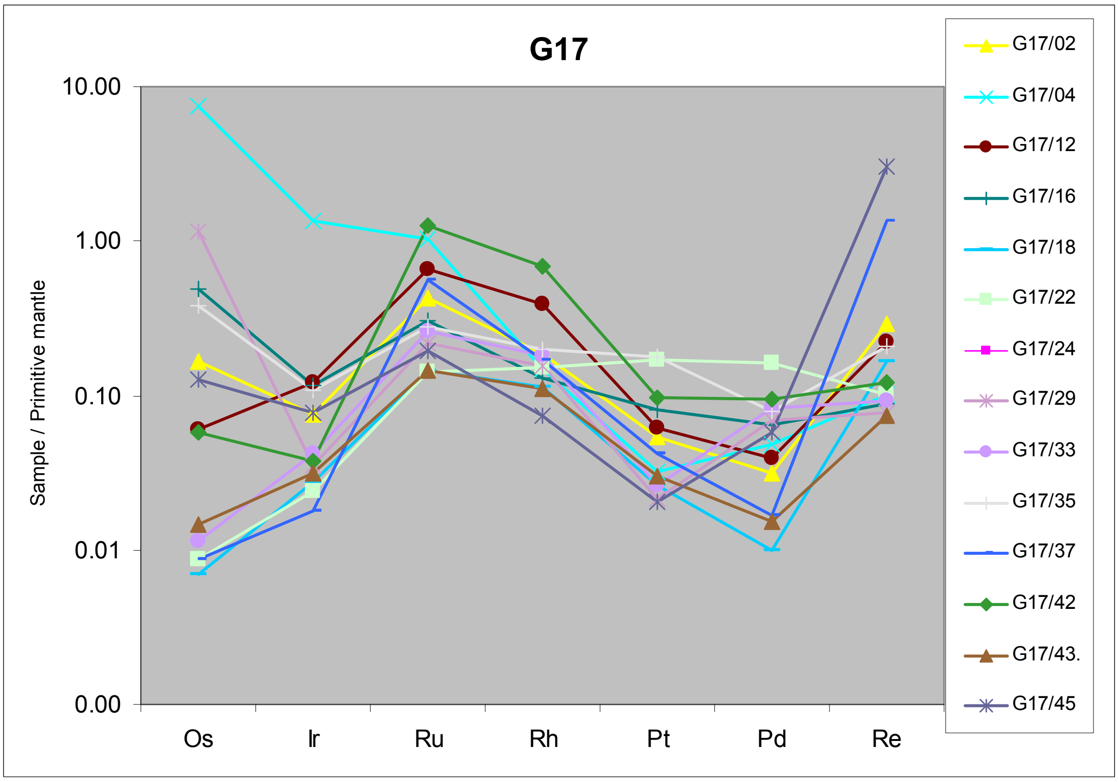



**Figure 9-7** Primitive mantle normalised platinum group element plots (including Re) for drill core G17 (representative samples)

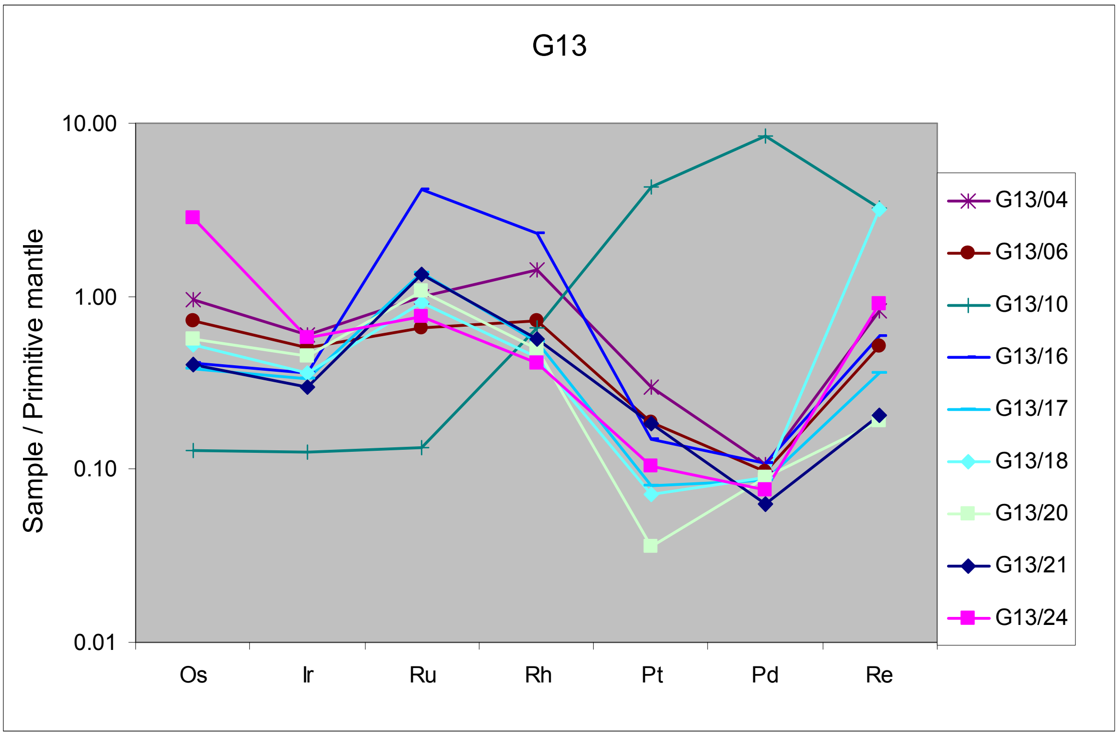



**Figure 9-8** Primitive mantle normalised platinum group element plots (including Re) for drill core G13

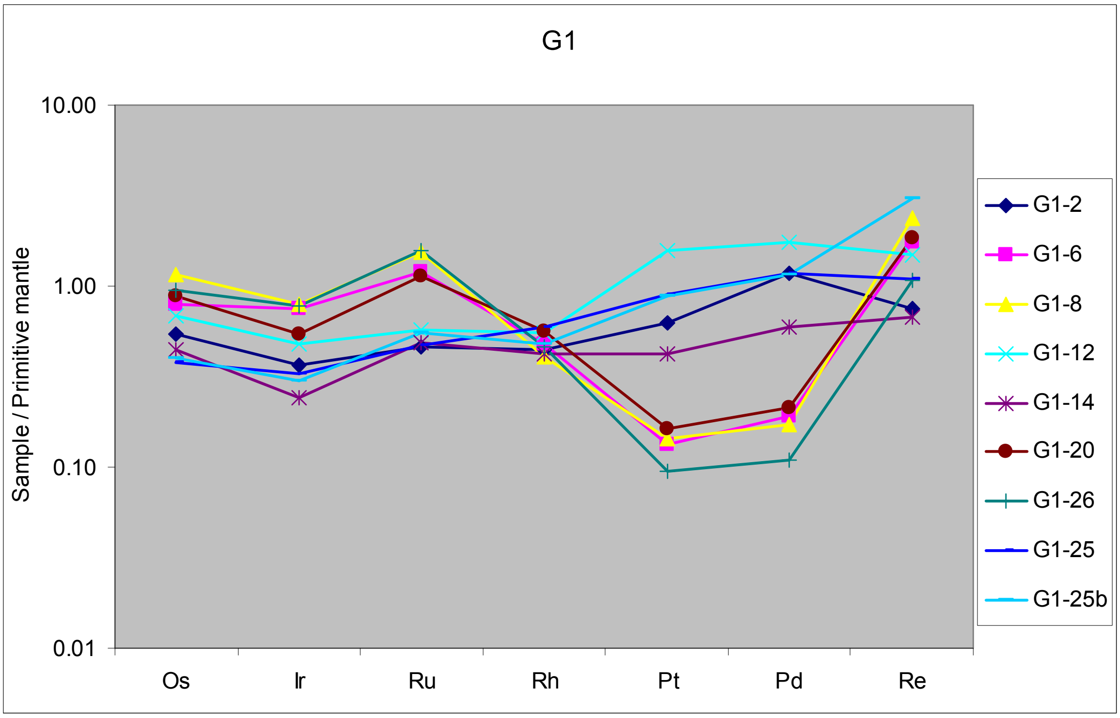



**Figure 9-9** Primitive mantle normalised platinum group element plots (including Re) for drill core G1

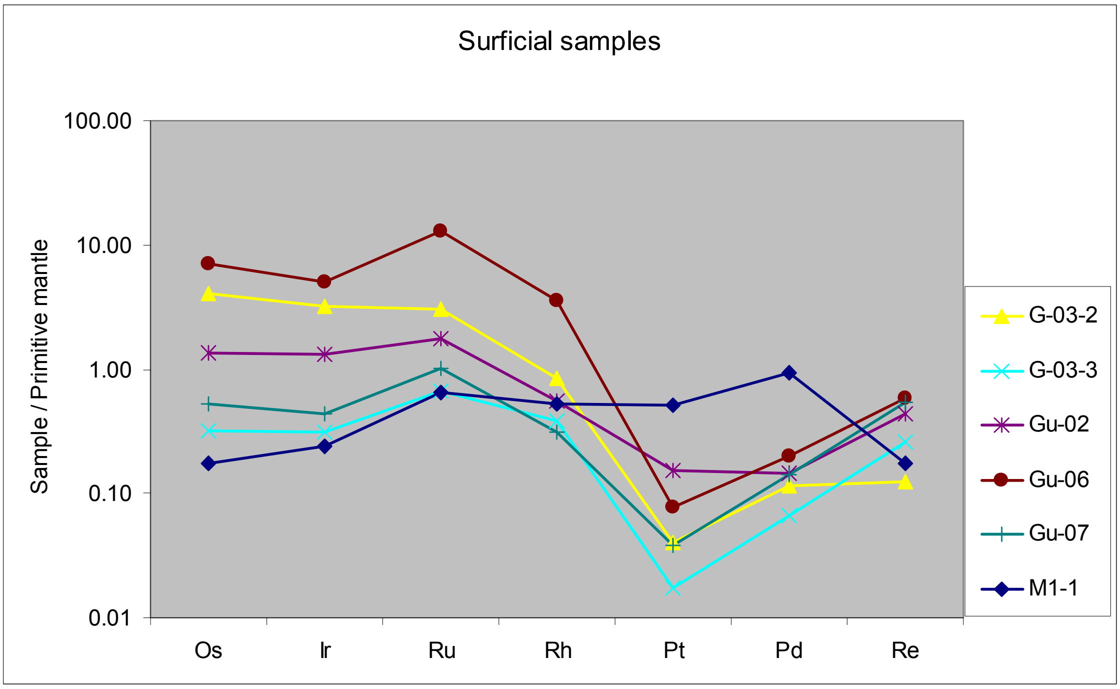



**Figure 9-10** Primitive mantle normalised platinum group element plots (including Re) from disseminated chromites (surface samples).

# 10. Discussion

The major aims of this project were: 1. The Guli Massif hosts the largest dunite complex in the world, the formation and the genesis of such giant dunite masses is poorly understood. Therefore this study presents a characterisation of the dunite mass, on the basis of detailed mineralogical, petrographical and geochemical investigations.

2. Meimechites, the Mesozoic equivalent to komatiites, appear closely associated with the dunite core complex of the Guli Massif. The possible genetic relationship between the Guli dunites, meimechites and various ultramafic rock types forming part of the rock suite of the Guli Massif, was studied.

3. The Guli Massif was / is supposed to host one of the largest concentrations of IPGE in the world. Apart of known IPGE and Au placers, primary IPGE mineralisations in the dunite core complex were unknown. Thus the third aim of this study was to identify possible sources for the placer mineralisations and justify “the claim” of the Guli Massif to host one of the largest IPGE concentrations in the world

## *10.1. Genesis of the Guli dunite core complex*

The dunite core complex, composed of more than 95% of olivine (Mg# 92 - 93), comprises the majority of the exposed sections of the Guli Massif. This together with textures such as equigranular recrystallised olivines in addition to irregular “patches” of olivine with abundant solid / fluid and melt inclusions (see Section 7: Petrography) clearly indicate that the Guli dunites are mantle rocks. The whole rock major and trace element geochemistry (i.e. MgO FeO, CaO, Cr, Ni,) has shown that the concentrations of these elements are very consistent with depth over more than 600 m, as is show in Fig 9 – 3 Section 9: Geochemistry. Slight variations become obvious within the upper 600 m of investigated drill cores due to the effects of serpentinisation. Major and trace element concentrations are further compatible with those in other mafic / ultramafic complexes, such as ophiolites, with the exception of Cr (McDonough, 1991). The PGE concentrations are very low generally, with enrichment in Ru and significant depletion in Pt and Pd, displayed by typical negatively shaped normalised PGE patterns (See Fig 9 – 7 & 8, Section 9: Geochemistry). These features clearly indicate that the Guli core dunites can be classified as restitic mantle rocks. However, unusual accessory mineral phases such as, clinopyroxene, phlogopite, pervoskite, calcite and apatite occurring in the interstitial space abundantly associated with recrystallised olivine indicate that the restitic mantle dunites had been affected by additional processes. Unusual accessory, interstitial mineral phases together with more abundant veining (see Section 7: Petrography) are becoming evident in the periphery of the Guli dunite core complex. These features indicate that additional processes are more pronounced in the periphery of the core complex, possibly due to the closer vicinity of the carbonatites of the Guli Massif. In the following “these processes” are considered in more detail.

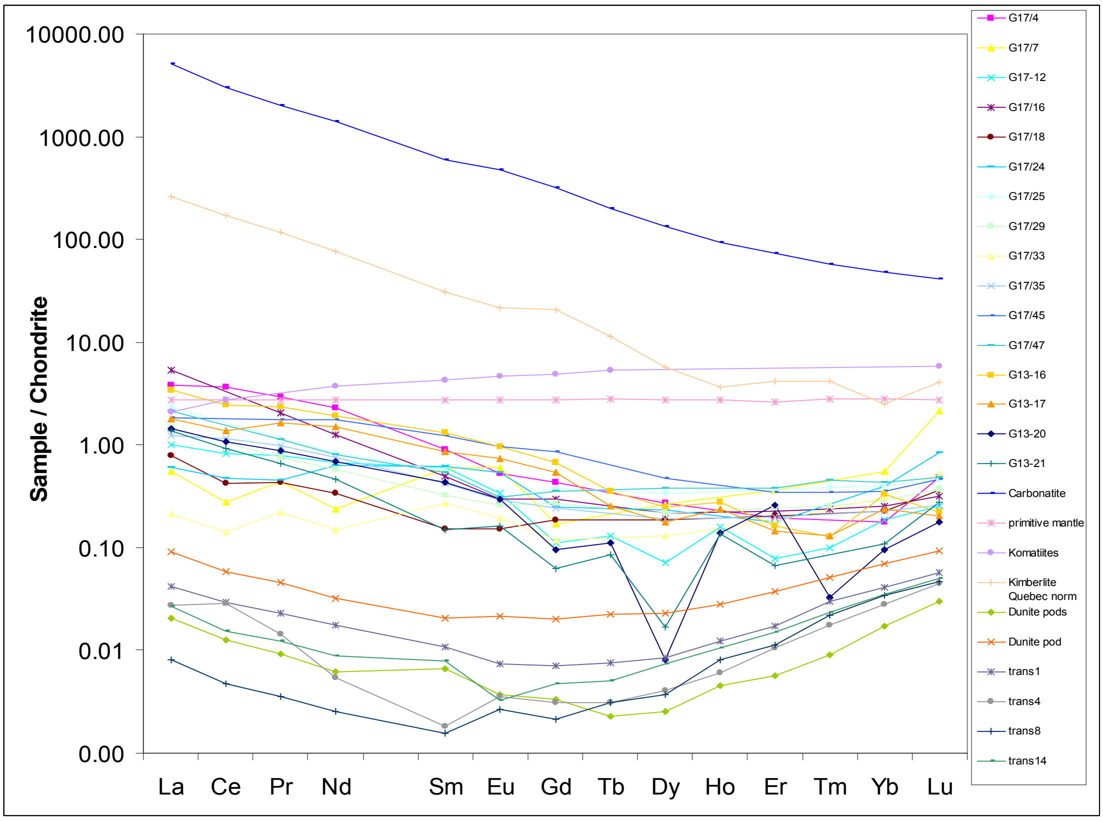



**Figure 10-1** Normalised REE patterns from G17 & G13, in comparison to Carbonatites, komaiitites, primitive mantle, kimberlite (Quebec), transitional dunites and dunite pods from (Zhou et al., 2005).

Fig 10 - 1 illustrates normalised REE distribution patterns of the Guli dunite core complex (G17 + G13) in comparison with those from ophiolites, periodites, komatiities and carbonatites. The Guli dunite REE patterns are distinct from typical "U" shaped mantle peridotites, by a significant enrichment of LREE. This gives an indication that the Guli restitic core complex has been affected by a metasomatic overprint during its development. Furthermore it becomes obvious that the Guli dunite core complex, apart of having distinct similarities to typical Alaskan and Uralian type complexes (e.g. rock and mineral composition), shows distinctive differences. Unusual accessory mineral phases, PGE patterns, lacking positive Os and Pt anomalies, as well as elevated LREE concentrations define these differences together with the "huge" size of the Guli Massif. In general Alaskan – type complexes are less than 80 km$^2$, with most having a size ranging from 12 – 40 km$^2$ (Johan, 2002). They also show a concentrically zoned structure with a dunite core, surrounded successively by clinopyroxenite, hornblendite and monzonite-gabbro rims (Johan, 2002) and references within. While the Guli Massif is oval in shape and has a size of 1500 -1600 $km^2$. (Kogarko et al., 1995). The dunite portion of the Guli Massif alone (~640 $km^2$) (Kogarko et al., 1995) is by far larger than the largest known Alaskan – Uralian type complex. (Tulameen – 80 $Km^2$) (Johan, 2002).

The genesis of huge restitic dunite masses has been under debate for a long time. ((Kubo, 2002) and references within). In general there are two possibilities for the formation of a dunite rock: 1. High degrees of partial melting (> 50%) of upper mantle material would leave a highly depleted dunite residue behind. However, these high degrees of partial melting are in most cases not realistic. 2. Precipitation of olivine from a mafic / ultramafic melt over a significant period of time would theoretically result in a dunite cumulate mass. However, keeping olivine on the liquidus over a certain period of time is also not viable, apart of the fact that olivine cumulates differ in mineral composition and texture from residual dunite ((Kubo, 2002) and references within.) In an attempt to explain the genesis of the giant Guli dunites a modelling experiment was carried out (Loidl *et al.* in prep). A lherzolite primitive mantle compostion (McDonough and Sun, 1995) was taken as a starting material and modelled under hydrous conditions using the thermodynamic algorithm of (Ghiorso and Sack, 1995), (Asimow and Ghiorso, 1998) and (Ghiorso, 2001). The results clearly indicate that the residual dunite of the Guli Massif was formed by continuous melting and predominant extraction of melt batches from the melting site. Nine melting episodes are required, equivalent to a total of 52% of partial melting, to obtain a residuum with the characteristics of the Guli dunite (Fig 10 - 2). This result offers a new alternative model explaining the derivation and formation of the huge Guli dunite core complex. The modelling experiment also includes predicted REE distribution patterns of each of the nine successive residual and batch melt compositions (Fig 10 – 3 & 4).

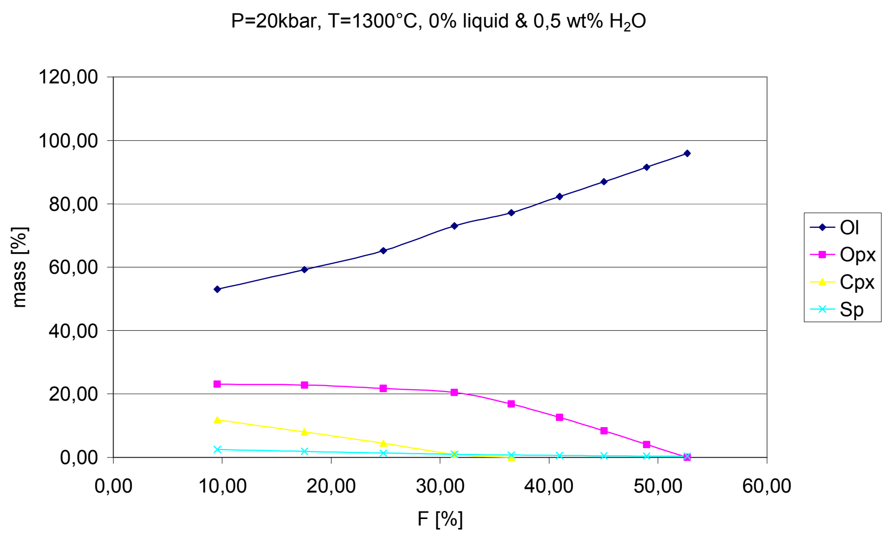



**Figure 10-2** Total % of partial melting vs mass % of major minerals in the residual. (Loidl *et al.* in prep)

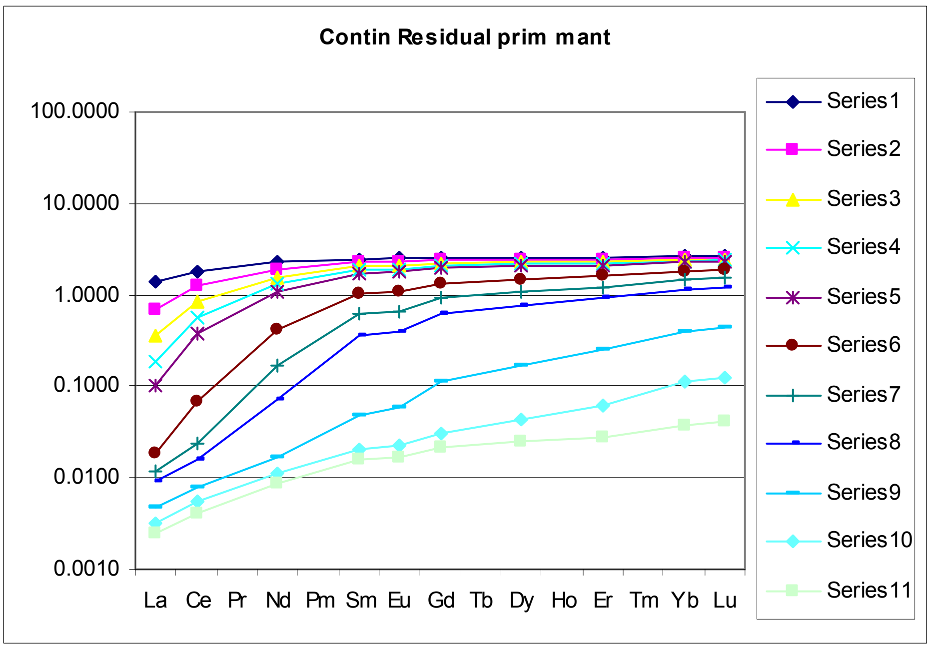



**Figure 10-3** Modelled REE patterns of Residuals after continuous melting episodes. (Loidl *et al.* in prep).

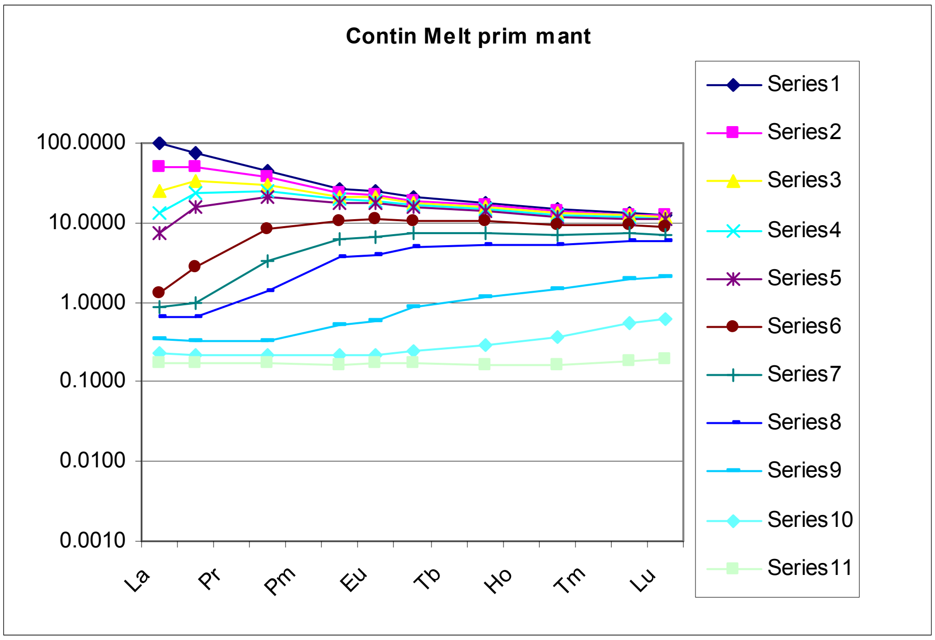



**Figure 10-4** Modelled REE pattern of melt batches after continuous partial melting. (Loidl *et al.* in prep).

However, a significant deviation becomes obvious, when comparing the REE pattern of the Guli residual dunite with those of the modelled residues. In Fig 10 - 5 the modelled REE pattern of the residual after 8 continuous melting episodes is shown in comparison with those from the Guli residual dunite. The Guli residual dunites, show a significant enrichment in LREE in the range of two to three orders magnitude when compared to the modelling results (Fig 10 - 5), whereas the HREE show an ideal match. Therefore, the most important question emerging within this context is: Where does this LREE enriched component come from? To address this issue, Fig 10 - 5 also shows a representative REE pattern from a kimberlite (data from (Birkett et al., 2004)). The residual Guli dunite REE patterns occupy with respect to the LREE a field between the modelled residual pattern and that of the kimberitite (Fig 10 - 5). This assumes that the residual Guli dunites represent a mixture of a "normal" primitive mantle residue and a LREE enriched material.

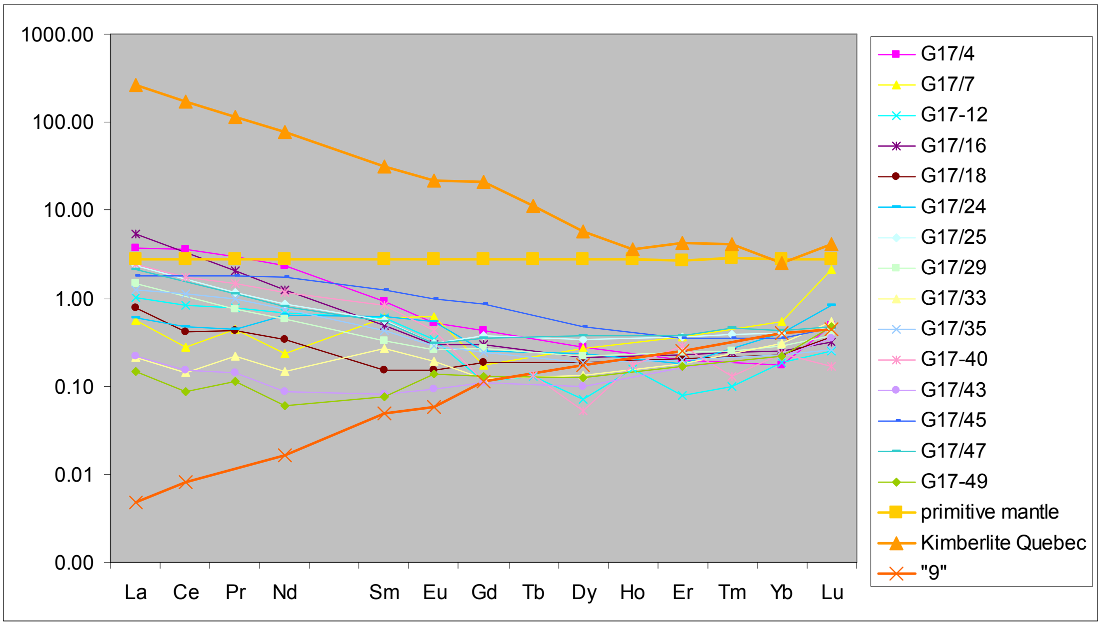



**Figure 10-5** showing REE patterns from G17, in comparison to primitive mantle, Kimberlite (Quebec) and modelled pattern of residual after 8 continuous partial melting episodes ("9").

Therefore, it is suggested that the Guli residual dunites had been contaminated by a LREE enriched component during development. In order to define more clearly and to quantify this LREE enriched component, the modelled residue composition, shown in Fig 10 - 5 ("9"), was taken as a basis and mixed with varying proportion of a LREE enriched material. An addition in the range of 0.03 to 0.05 % of a highly LREE enriched carbonatite resulted in the best match to the REE patterns of the Guli residual, as illustrated in Fig 10 - 6.

Consequently the Guli residual dunites are interpreted to represent the result of eight continuous melting episodes, followed by metasomatism which can be defined by the addition of a LREE enriched carbonatitic material. The contamination is indicated from the modelling results to represent 0.03 to 0.05 % carbonatitic material.

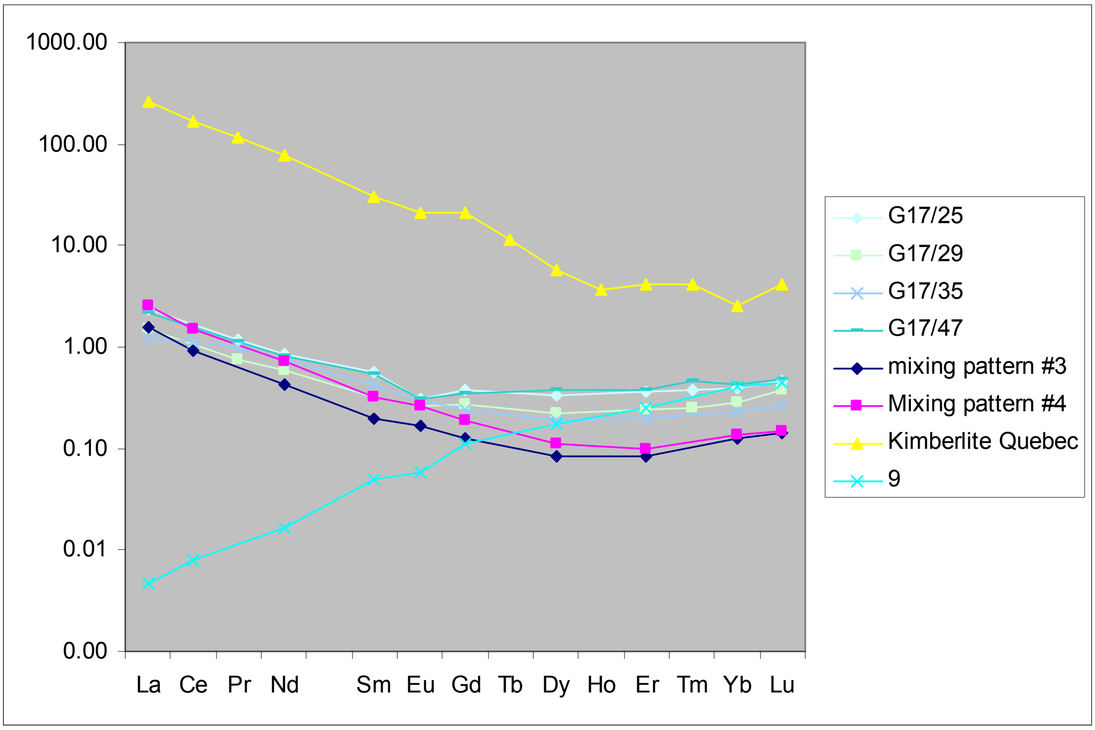



**Figure 10-6** REE patterns of representative Guli residual dunites (G17) compared to modelled mixing patterns (#3, #4). REE pattern of a modelled primitive mantle residue and a kimberite, taken from Fig 10 – 5, are shown for comparison.

## *10.2. The development of the Guli Dunite core complex and the relationship to the Meimechites*

In section 10 – 1, the genesis of the Guli dunites as the residuum of continuous partial melting episodes was discussed. This section considers the melt portions produced from the modelled partial melting episodes. The question emerging in this context is: can we find melt equivalents in the rocks of the Guli Massif?

The first possibility is the olivine cumulates, which occur at the periphery of the dunite core complex, possibly forming an incomplete envelop around the dunite core complex, although direct field evidence of contacts between olivine cumulate and residual dunite is lacking. Nevertheless, olivine cumulates appear in direct contact with residual dunites in the investigated drill cores, forming the uppermost section of drill core G13 and appear in an intercalated section together with meimechites at the periphery of the dunite core complex (see Section 7: Petrography & Section 8: Mineral Chemistry). The olivine cumulates can be clearly distinguished from the dunites of the Guli core complex on the basis of their texture, geochemistry, (i.e. significantly higher Cr concentration), and mineral chemistry, (i.e. lower Fo of olivine, lower Mg# of clinopyroxene). Furthermore, two types of olivine cumulates are present in the area of investigation. Olivine cumulates studied in drill core G1, intimately associated with meimechites, are more primitive, e.g. higher Cr, less fractionated, than those from drill core G13 forming the hanging wall of residual dunites of the Guli core complex (see Section 8: Mineral Chemistry and Section 9: Geochemistry). However, no significant difference can be observed with respect to the PGE pattern between the two cumulate types, characterised by predominantly negatively shaped patterns (see Fig 9 – 8 & 9

Geochemistry). Furthermore the PGE patterns of olivine cumulates do not significantly differ from those of the residual dunites.

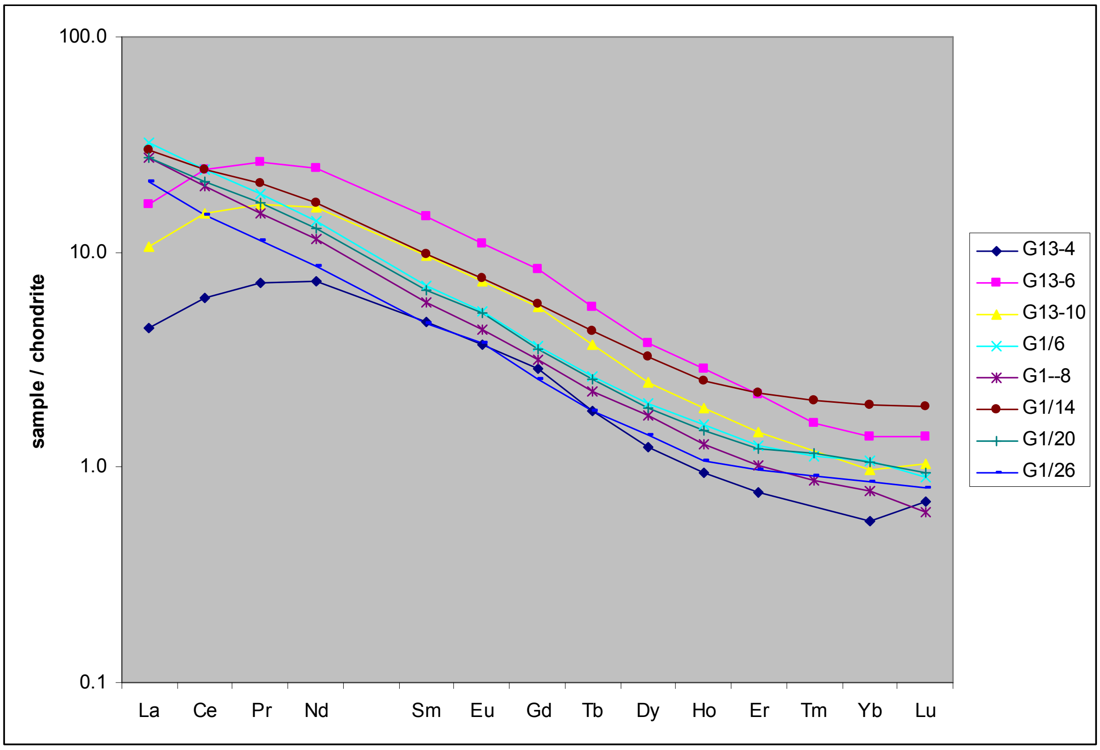



**Figure 10-7** REE patterns of olivine cumulates from the Guli Massif .

The distinction between the two types of cumulates also becomes obvious with respect to the REE patterns, illustrated in Fig 10 - 7. Olivine cumulates from G13 show a La / Yb ratio 8 – 12, whereas the olivine cumulates from G1 are characterised by much high La / Yb ratios ranging between 15 and 35.

In Fig 10 - 8 the REE patterns of olivine cumulates from G13 are compared to modelled melt batches produced after the 9$^{th}$ and 10$^{th}$ partial melting episode of primitive mantle. A good match with respect to the HREE can be observed, but there is a significant gap of 1.5 - 2 orders of magnitude in the LREE concentrations. This remarkable enrichment in LREE of G13 olivine cumulates compared to modelled melt batches corresponds to that observed in the Guli residual dunites. Therefore, it is suggested that the G13 olivine cumulates indeed represent the result of a batch melt, produced during continuous partial melting of the mantle source of the Guli Massif. Best match with respect to the HREE is obtained with melt batch 9 to 10, equivalent to a total degree of partial melting of > 40% (Fig 10-8). The remarkable gap in the LREE is explained by the addition of a LREE enriched component during metasomatism. In accordance to the residual material remaining after partial melting of the Guli mantle source, it is assumed that the LREE enriched component derived from a carbonatitic source.

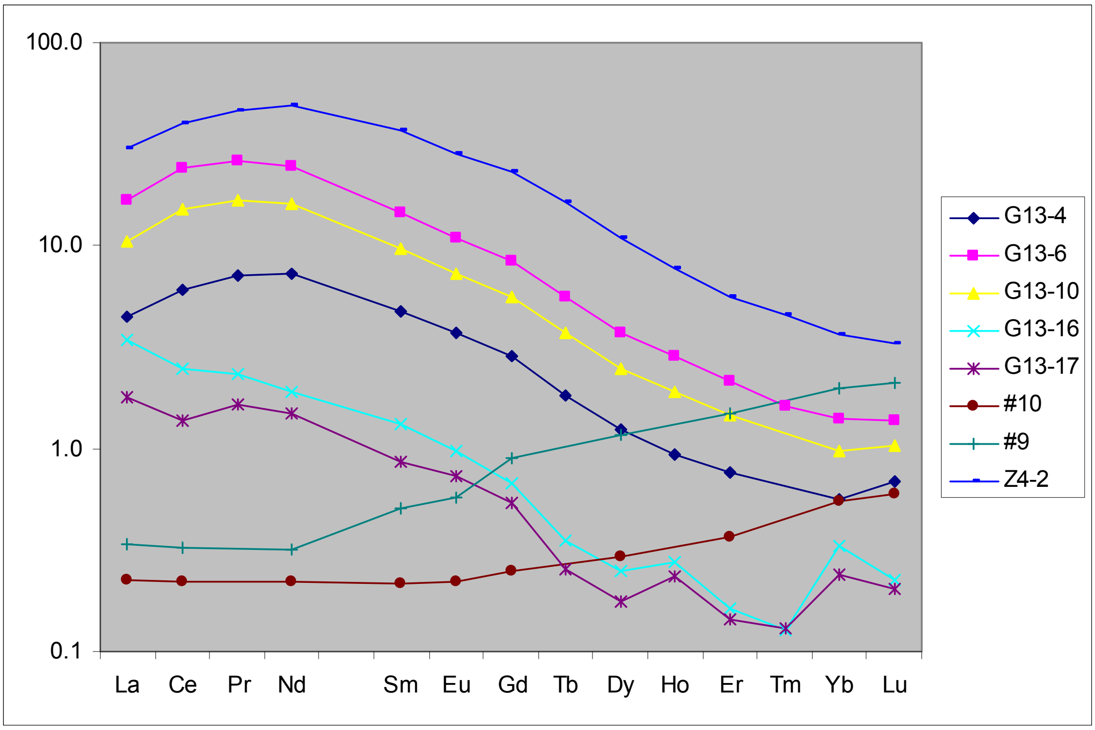



**Figure 10-8** Olivine cumulate REE patterns from the Guli Massif (G13) in comparison to REE patterns of 9th and 10th melt batches of the modelling experiment (Loidl *et al.* in prep) Representative REE pattern from the residual dunites (G13) are shown for comparison.

Fig 10 – 9 illustrates the REE patterns of olivine cumulates from G1 in comparison to the same modelled melt batches of Fig 10 - 8. A good match with respect to the HREE becomes also obvious, as well as a significant LREE enrichment of the G1 olivine cumulate, up to 2.5 orders of magnitude. Consequently, the G1 olivine cumulates also are suggested to represent the result of a batch melt, produced during continuous partial melting of the mantle source of the Guli Massif. Major and trace elements as well as mineral compositions indicate that the G1 olivine cumulates are less fractionated, but had been affected more intensely by metasomatism. It should also be emphasized here that the G1 olivine cumulates are highly enriched in Cr (i.e. up to 4200 ppm, See Appendix 1 - XRF data), particularly when compared to the residual dunites which show Cr concentrations between 600 – 700 ppm (See Appendix 1 – XRF data). This indicates that Cr was removed significantly from the mantle source during partial melting and taken up preferentially by the melt portions represented now by the G1 olivine cumulates. The high Cr concentration is reflected by the occurrence of intercumulate chromite and / or chromite inclusions in olivine, whereas chromite is lacking in the residual dunites (See

Section 7: Petrography).

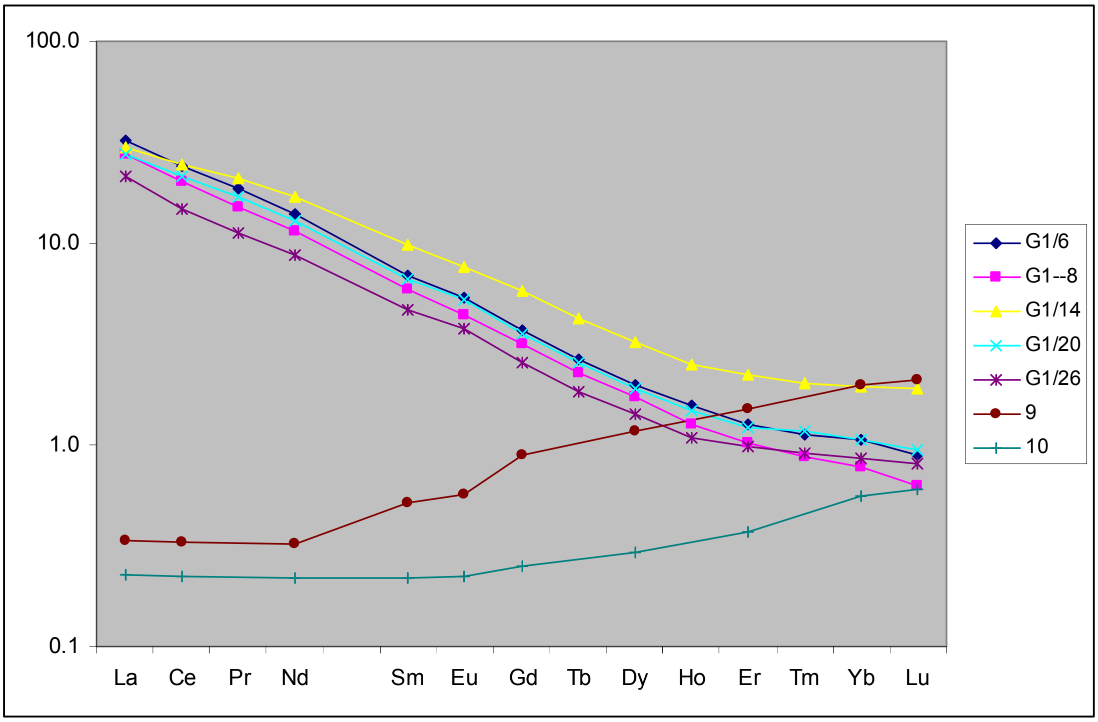



**Figure 10-9** Olivine cumulate REE patterns from the Guli Massif (G1) in comparison to REE patterns of the 9th and 10th melt batches of the modelling experiment (Loidl *et al.* in prep)

The next possibility in search for melt portions resulting from partial melting of the Guli mantle source is clinopyroxenite. The clinopyroxenites occur as dykes, veins and plugs occasionally within the Guli dunite core complex, becoming more abundant in the periphery of the core complex and are representing the major rock types when approaching the carbonatite intrusion. (Loidl 2005) and (Dvorani, 2007). The clinopyroxenites are characterised by distinct positive PGE patterns, indicating that particularly PPGE had been dominantly removed from the mantle source during early episodes of partial melting (Fig 10 - 10). Clinopyroxenite G28-2 shows the highest PGE concentration of the Guli Massif collected for this project (FWF P16440-N11), with a remarkable PPGE enrichment, as illustrated in Fig 10 – 10.

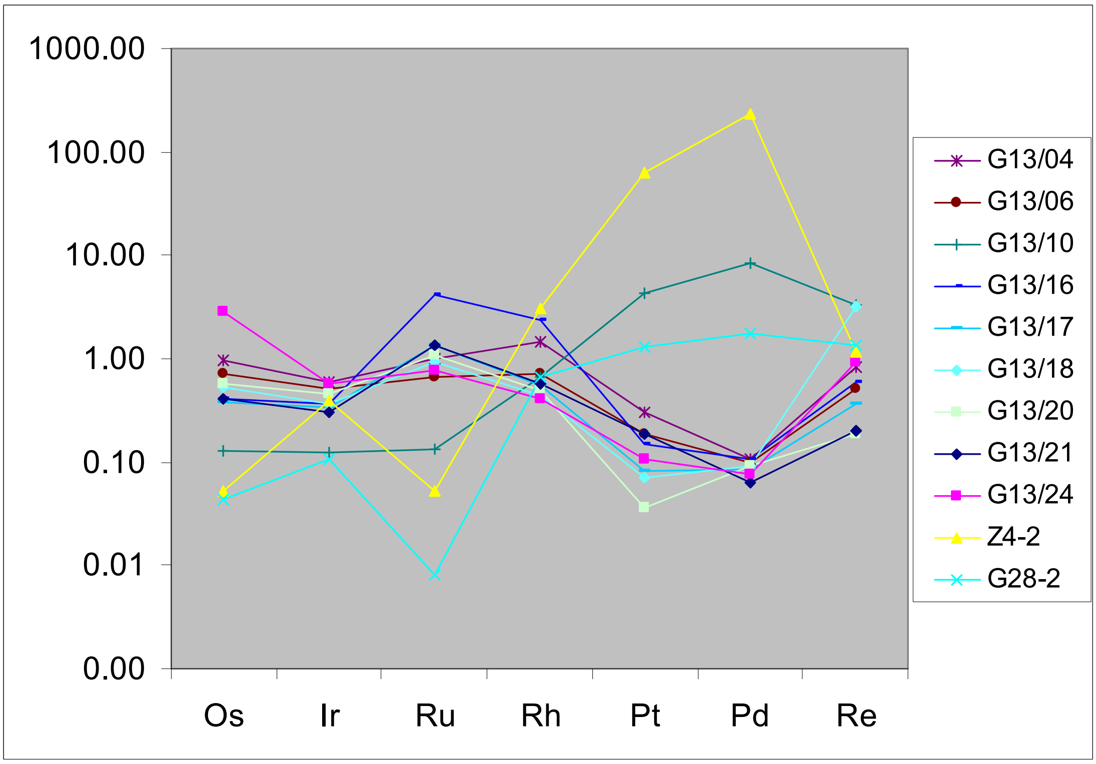



**Figure 10-10** PGE patterns of clinopyroxenites (G28-2, Z4-2 & G13-10) in comparison with those of olivine cumulates from drill core G13. Data of patterns G28 and Z4 taken from (Loidl 2005)

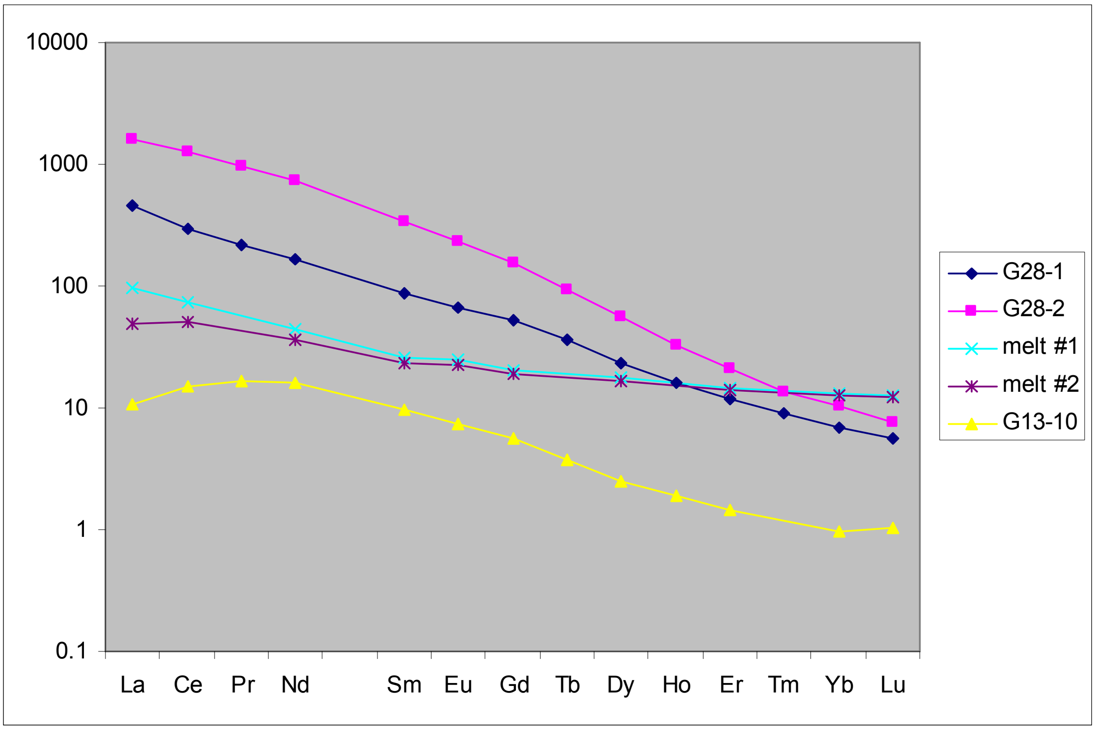



**Figure 10-11** REE patterns of clinopyroxenite (data of G28 were taken from Loidl 2005) in comparison to the 1st and 2nd melt batches of the modelling experiment (Loidl *et al.* in prep).

Fig 10-11 illustrates REE patterns of representative clinopyroxenites from the Guli Massif (G28) compared to early melt batches of the modelling experiment (Loidl et al. in prep). An excellent match becomes obvious with respect to the HREE, whereas the Guli clinopyroxenites show an order of magnitude of enrichment in LREE when compared to the first and second modelled melt batches. Therefore it can be concluded that clinopyroxenites of the Guli Massif represent early melt batches removed from the mantle source during partial melting. The melt batches had been metasomatised, i.e. addition of a LREE enriched component, as illustrated in Fig 10 - 11. One REE pattern (G13-10), shown in Fig 10 - 11, is deviating from the other clinopyroxenite REE patterns by lower HREE concentrations and lack of LREE enrichment. This particular clinopyroxenite occurs at the boundary of the dunite residual and the olivine cumulates. In the immediate surrounding both the olivine cumulate and the residual dunite are highly altered. This indicates that the clinopyroxenite has reacted with its surrounding resulting in a loss of REE. This assumption is supported by the fact that the residual dunite in close vicinity shows the highest REE concentrations of the residual dunites of G13 (See Fig 9 – 5: Geochemistry). Consequently this clinopyroxenite is interpreted to represent a small melt portion which had not escaped from the site of partial melting. Further support for conclusion comes from the unusual accessory mineral phases (i.e. clinopyroxene, phlogopite, calcite, apatite and perovskite) in the residual dunites (see Section 7: Petrography), but display similar mineral paragenesis if compared with the clinopyroxenites. These mineral phases can not be considered as part of the residual dunite paragenesis. Therefore, the accessory minerals, filling interstitial spaces, presumably represent trapped tiny melt portions. The differing clinopyroxene composition (e.g. lower Fe content compared to the clinopyroxenite, mentioned above, see Appendix 5: CPX data) is assumed to be the result of melt droplet / solid residual reaction. This conclusion is supported by the modelling experiment (Loidl et al. in prep) where 95% of melt extraction is calculated, 5 % is supposed to remain with the residue.

The meimechites, probably the most unusual rocks in the area of the Guli Massif, are considered as part of the Siberian Flood Basalt province and not representing an integrated part of the Guli Massif, e.g. (Arndt et al., 1995; Fedorenko and Czamanske, 1997; Kogarko and Ryabchikov, 2000). However, meimechites had been observed in the frame of this study particularly in drill core G1, where they occur in an intercalated section together with olivine cumulates. Therefore, the meimechites are considered as an integrated part of the Guli Massif in this study, the reason for this will be discussed in the following.

A clear genetic relationship between meimechites, G1 olivine cumulates and residual dunites becomes already obvious in the Harker diagrams with particular reference to elements such as Ni, Al, Cr and Fe (see Section 9: Geochemistry).

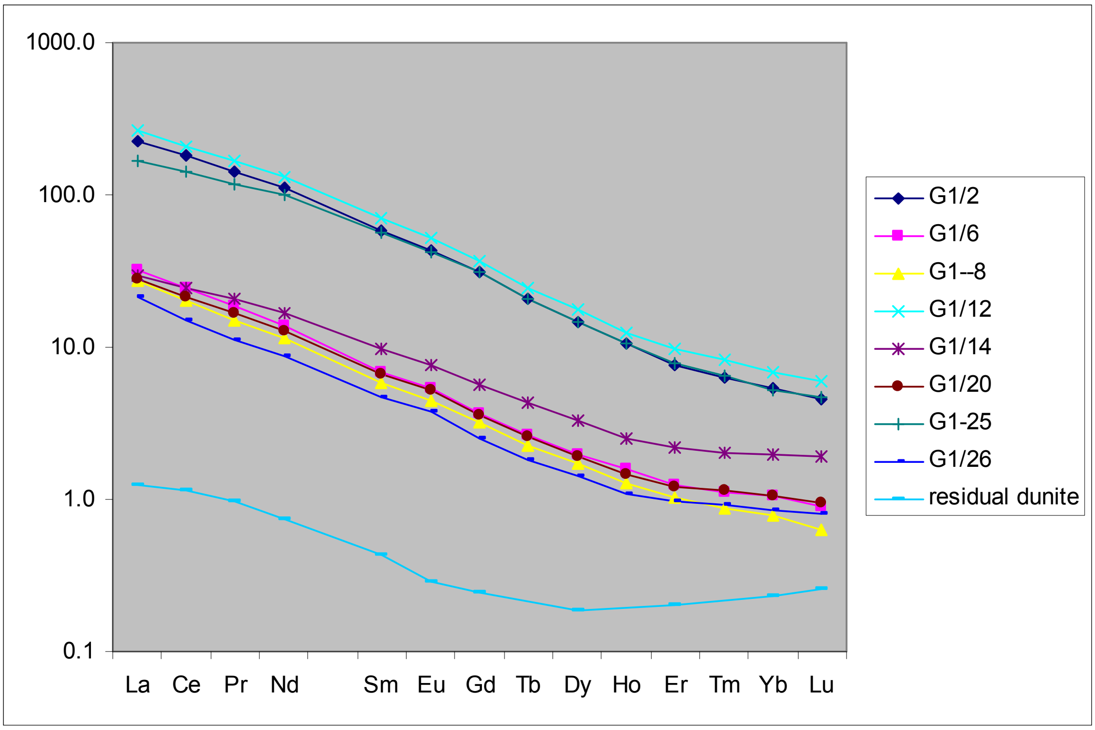



**Figure 10-12** REE pattern of G1 olivine cumulates and meimechites in comparison with a representative pattern from the residual dunites (G17).

The genetic relationship between G1 olivine cumulates and meimechites becomes even more obvious when looking at the normalized REE patterns (Fig 10 – 12). The REE patterns from the meimechites clearly indicate higher fractionation compared to those of the G1 cumulates. Therefore, it is suggested that G1 olivine cumulates and meimechites developed from the same common parental melt. The REE pattern from the representative residual dunites, as shown for comparison in Fig 10- 12, can be interpreted clearly as the residue of this parental melt. Further support for this conclusion comes from the presence of accessory chromites in the meimechites, which can be interpreted as early fractionation products (i.e. early formed phenocrysts) transported in the liquid / crystal "mash" up to the surface.

The meimechites show flat to slightly positive PGE patterns (See. Fig 9 – 9: Geochemistry), whereas the PGE patterns of G1 olivine cumulates are characterised by a depletion in Pt and Pd. This enrichment in PPGE in the meimechites can be considered as further evidence that the meimechites are more highly fractionated than the G1 olivine cumulates. It can be further suggested that this fractionation of the meimechites took place during ascent of parts of the parental melt to the G1 olivine cumulate.

## *10.3. Primary IPGE concentrations?*

The claims that the Guli Massif hosts the largest concentrations of IPGE in the world are not consistent with the finding of this study. The low IPGE concentrations of the dunite and the almost lack of any PGE mineral from any thin section studied suggests that these claims are exaggerated. In the peripheral area of the dunite core complex a small region of highly disseminated to *schlieren* type chromitites were observed. The PGE concentrations are slightly elevated, when compared to those of the dunite hosts, and the normalized PGE patterns mirror those of the dunite host. This could indicate that some PGE migrated from the core to the periphery, possibly during the metasomatism. This differs significantly from typical Alaskan – Uralian type complexes, which are characterized by abundant occurrences of Ir–Os and Pt-Fe alloys. However, it should be emphasized here that possibly due to the location of and the limited access to drill cores in the area, a "hidden" level of higher PGE concentrations could still exist.

# 11. Conclusions

The Guli Dunite core complex represents a metasomatised restitic residual. This is evident in the recrystallised textures, fluid / melt inclusions and very low PGE concentrations. The presence of unusual accessory phases such as, clinopyroxene, phlogopite, perovskite, calcite and apatite, occurring in interstitial spaces is evidence for a metasomatic overprint. This metasomatic overprint is also evident in the REE patterns, which show a significant increase in LREE, compared to complexes of a similar nature. The modelling data of (Loidl et al. in prep), has shown that the residual dunites of the Guli Massif were formed by continuous melting and predominant segregation of the melt batches from the melting site. Nine episodes of partial melting, equivalent to a total of 52% of partial melting are required to receive a residue matching the dunites of the Guli core complex. The LREE metasomatic component has been characterised as 0.03 to 0.05 % carbonatitic material, which was added to the residuum as was as to the cumulate sequences

The olivine cumulates present in drill cores G13 and G1, represent the result of a batch melt produced during continuous partial melting of the mantle source. This is confirmed with the modelled REE patterns for the later melt batches, where episodes 9 &10, representing > 40% partial melt, show a good fit to the HREE concentrations of the olivine cumulates of both drill core G13 and G1. Geochemical data indicate that the G1 cumulates are less fractionated, but have been affected more intensely by metasomatism.

The clinopyroxenites have been interpreted as representing early melt portions, which have been partially removed from the mantle source. This is evident in the close fit of the HREE of the modelled REE patterns for the first and second melt batches. The LREE enrichment relative to the modelled patterns is the result of the addition of metasomatic LREE - rich material. The positive PGE patterns common only to the clinopyroxenites, gives evidence that the PPGE were preferentially removed from the mantle source during early episodes of partial melting. The presence of accessory mineral phases within dunites, very similar to the mineral paragenesis in clinopyroxenites represents small melt portions, which did not escape the site of partial melting, trapped in the residue they have reacted with it. Clinopyroxenite dykes cutting through the Guli Dunite core complex represent early melt batches which have re-intruded the residual.

The meimechites occur as an intercalated section, together with the olivine cumulates in drill core G1. Geochemical evidence show a clear genetic link between the meimechites, the G1 olivine cumulates and the restitic dunites. Olivine cumulates and meimechites derived from one common melt batch, the residue of which is represented by the dunites of the Guli core complex. REE and PGE patterns of the meimechites clearly indicate that they are more highly fractionated than the G1 olivine cumulates. The presence of high Cr concentrations in the G1 olivine cumulates together with accessory chromite in both the olivine cumulates and the meimechites show that Cr was preferentially removed into the early melt fraction during continuous partial melting of the mantle source of the Guli Massif.

On the basis of the present detailed mineralogical, petrological and geochemical study, it was possible to fit “piece after piece” together, similar to a “puzzle”. In particular, a definite genetic link between the Guli core complex, as the residuum and several melt portions, produced during continuous partial melting, which are represented by olivine cumulates as part of the alkalic suite surrounding the Guli core complex and the remarkable meimechites. However, what is missing in this study and what was the initial intention of this thesis, is a better time constraint of the various processes proposed and detailed in this study. Events beyond the control of this study (e.g. brake down of external analytical equipment and thus loss of a significant amount of already well prepared samples), prevented that meaningful age data becoming available during the time frame of this thesis. However, some results are expected in the near future and will be integrated in an almost completed manuscript and will be published in an international journal.

# 12. Acknowledgments

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Special thanks must go to Gernot Loidl, who was part of this project for the first two years, with whom I shared an office, many conversations and a lot of laughs. It was a pleasure to work with you.

A great deal of thanks must also go to Miriam Baumgartner, with whom I have shared an office since January 2006, thanks for the laughs, thanks for listening to the complaints and thank you for a great friendship.

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I appreciate the great support shown by Johann G. Raith and Ronal J. Bakker, who always showed an interest in my study and were always available to answer questions.

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A great deal of the geochemical analysis for this thesis was carried out at the Department of General, Analytical and Physical Chemistry, University of Leoben, Austria. These results would not have been possible without the supervision of

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# 13. References

Arndt, N., Chauvel, C., Czamanske, G. and Fedorenko, V., 1998a. Two mantle sources, two plumbing systems: tholeiitic and alkaline magmatism of the Maymecha River basin. Siberian flood volcanic privince. Contributions to Mineralogy and Petrology, 133: 297-313.

Arndt, N. et al., 1998b. Were Komatiites wet? Geology, 26(8): 739-742.

Arndt, N., Lehnert, K. and Vasil'ev, Y., 1995. Meimechites: highly magnesian lithosphere-contaminated alkaline magmas from deep subcontinental mantle. Lithos, 34(1-3): 41-59.

Asimow, P.D. and Ghiorso, M.S., 1998. Algorithmic modifications extending MELTS to calculate subsolidus phase relations. American Mineralogist, 83(9-10): 1127-1132.

Ballhaus, C., Berry, R.F. and Green, D.H., 1991. High pressure experimental calibration of the olivine-orthopyroxene-spinel oxygen geobarometer: implications for the oxidation state of the upper mantle. Contributions to Mineralogy and Petrology, 107: 27-40.

Barnes, S.J. and Roeder, P.L., 2001. The Range of Spinel Compositions in Terrestrial Mafic and Ultramafic Rocks. J. Petrology, 42(12): 2279-2302.

Birkett, T.C., McCandless, T.E. and Hood, C.T., 2004. Petrology of the Renard igneous bodies: host rocks for diamond in the northern Otish Mountains region, Quebec. Lithos, 76(1-4): 475-490.

Brenker, F.E., Meibom, A. and Frei, R., 2003. On the formation of peridotite-derived Os-rich PGE alloys. American Mineralogist, 88(11-12, Part 1): 1731-1740.

Brenker, F.E., Stachel, T. and Harris, J.W., 2002. Exhumation of lower mantle inclusions in diamond: ATEM investigation of retrograde phase transitions, reactions and exsolution. Earth and Planetary Science Letters, 198(1-2): 1-9.

Cabri, L.J., Harris, D.C. and Weiser, T.W., 1996. Mineralogy and Distribution of Platinum- group Mineral (PGM) Placer deposits of the World. Exploration and Mining Geology, 5(2): 73-167.

Cabri, L.J. and Laflamme, J.H.G., 1997. Platinum - Group Minerals from the Konder Massif, Russian Far East. The Mineralogical Record, 28(March - April): 97-106.

Chain, V.E. and Koronovskij, N., 1995. Nordasien. Ferdinand Enke Verlag, Stuttgart, Germany.

Dalrymple, B.G. et al., 1995. A reconnaissance 40Ar/39Ar geochronologic study of ore-bearing and related rocks, Siberian Russia. Geochimica et Cosmochimica Acta, 59(10): 2071-2083.

Dolginow, J. and Kropatschjow, S., 1994. Abriß der Geologie Rußlands und angrenzender Staaten. E. Schweizerbart´sche Verlagsbuchhandlung (Nägele u. Obermiller), Stuttgard, Germany.

Dunlop, H.M. and Fouillac, A.M., 1986. Isotope geochemistry of Oman basic-ultrabasic rocks and chromite deposits.

Dvorani, S., 2007. Genese und Herkunft von Gold- Nuggets aus dem Guli Massiv, Nordsiberian, Russland: Eine Multidisciplinaere Mineralogische und Geochemische studie. Dissertation Thesis, Montanuniversität, Leoben, 256 pp.

Earth-Ref, 2003. GERM - Geochemical Earth Reference Material.

Fabries, J., 1979. Spinel-Olivine Geothermometry in Peridotites from Ultramafic Complexes. Contributions to Mineralogy and Petrology, 69: 329-336.

Fedorenko, V. and Czamanske, G., 1997. Results of New Field and Geochemical Studies of the Volcanic and Intrusive Rocks of the Maymecha-Kotuy Area, Siberian Flood - Basalt Province, Russia,. International Geology Review, 39: 479-531.

Fedorenko, V., Czamanske, G., Zen'ko, T., Budahn, J. and Siems, D., 2000. Field and Geochemical Studies of the Melilite-bearing Arydzhangsky suite, and an Overall perspective on the Siberian Alkaline- Ultramafic Flood - Volcanic rocks. International Geology Review, 42: 769-804.

Fritsche, J. and Meisel, T., 2004. Determination pf anthropogenic input of Ru, Rh, Pd, Rs, Os, Ir and Pt in soils along Austrian motorways by isotope dilution ICP-MS. Science of the Total Environment, 325: 145-154.

Gaetani, G.A. and Grove, T.L., 1998. The influence of water on melting of mantle peridotite. Contributions to Mineralogy and Petrology, 131(4): 323-346.

Garuti, G. et al., 1997. Platinum-group elements as petrological indicators in mafic-ultramafic complexes of the central and southern Urals: preliminary results. Tectonophysics, 276(1-4): 181-194.

Garuti, G., Zaccarini, F., Moloshag, V. and Alimov, V., 1999. Platinum-group minerals as indicators of sulfur fugacity in ophiolitic upper mantle; an example from chromitites of the Ray-Iz ultramafic complex, Polar Urals, Russia. The Canadian Mineralogist, 37(5): 1099-1115.

Ghiorso, M.S., 2001. Utilizing thermodynamic models to better understand the phase equilibria and energetics of melting of the upper mantle; achievements, perspectives and future directions.

Ghiorso, M.S. and Sack, R.O., 1995. Chemical mass transfer in magmatic processes; IV, A revised and internally consistent thermodynamic model for the interpolation and extrapolation of liquid-solid equilibria in magmatic systems at elevated temperatures and pressures. Contributions to Mineralogy and Petrology, 119(2-3): 197-212.

Green, H.W. and Gueguen, Y., 1983. Deformation of Peridotite in the Mantle and Exrraction by Kimberlite: A case history documented by fluid and solid precipitates in olivine. Tectonophysicis, 92: 71-92.

Guidotti, C.V., 1984. Micas in metamorphic rocks. In: S.W. Bailey (Editor), Reviews in Mineralogy. Micas. Mineralogical Society of America, Washington, DC, United States (USA), pp. 357 - 467.

Halkoaho, T., Liimatainen, J., Papunen, H. and Valimaa, J., 2000. Exceptionally Cr-rich basalts in the komatiitic volcanic association of the Archaean Kuhmo greenstone belt, eastern Finland. Mineralogy and Petrology, 70(1-2): 105-120.

Harris, D.C. and Cabri, L.J., 1973. The nomenclature of the natural alloys of osmium, iridium and ruthenium based on new compositional data of alloys from world-wide occurrences. The Canadian Mineralogist, 12, Part 2(2): 104-112.

Higgins, B.J., 2002. VG Axiom High-Resolution Magnetic-Sector ICP-MS.

Horan, M.F., Walker, R.J., Fedorenko, V.A. and Czamanske, G.K., 1995. Osmium and neodymium isotopic constraints on the temporal and spatial evolution of Siberian flood basalt sources. Geochimica et Cosmochimica Acta, 59(24): 5159-5168.

Johan, Z., 2002. Alaskan - type Complexes and Their Platinum - Group Element Mineralization. The Geology, Geochemistry, Mineralogy and Mineral Beneficiation of PGE, 54. Canadian Institute of Mining, Metallury and Petroleum, 669-719 pp.

Kamo, S.L., Czamanske, G., Amelin, Y., Fedorenko, V. and Trofimov, V.R., 2000. U-Pb Zircon and Baddeleyite and U- Th- Pb Perovskite Ages for Siberian Flood Vocanism, Maymecha- Kotuy Area, Siberia. Journal of Conference Abstracts, 5(2): 569.

Kamo, S.L. et al., 2003. Rapid eruption of Siberian flood-volcanic rocks and evidence for coincidence with the Permian-Triassic boundary and mass extinction at 251 Ma. Earth and Planetary Science Letters, 214(1-2): 75-91.

Khain, V.E., 1985. Geology of the USSR, First part - Old cratons and Paleozoic fold belts. Gebrüder Borntraeger, Berlin - Stuttgart, Germany.

Kogarko, L.N., Kononova, V.A., Orlova, M.P. and Woolley, A.R., 1995. Alkaline Rocks and Carbonatites of the World. Part 2: Former USSR. Chapman and Hall, London, U.K.

Kogarko, L.N., Plant, D.A., Henderson, C.M.B. and Kjarsgaad, B.A., 1991. Na-rich carbonate inclusions in perovskite and calzirtite from the Guli intrusive Ca-carbonatite, polar Siberia. Contributions to Mineralogy and Petrology, 109: 124-129.

Kogarko, L.N. and Ryabchikov, I.D., 2000. Geochemical evidence for meimechite magma generation in the subcontinental lithosphere of Polar Siberia. Journal of Asian Earth Sciences, 18(2): 195-203.

Kohler, T.P. and Brey, G.P., 1990. Calcium exchange between olivine and clinopyroxene calibrated as a geothermobarometer for natural peridotites from 2 to 60 kb with applications. Geochimica et Cosmochimica Acta, 54(9): 2375-2388.

Krause, J., Brugmann, G.E. and Pushkarev, E.V., 2007. Accessory and rock forming minerals monitoring the evolution of zoned mafic-ultramafic complexes in the Central Ural Mountains. Lithos, 95(1-2): 19-42.

Kubo, K., 2002. Dunite formation processes in highly depleted peridotite; case study of the Iwanaidake Peridotite, Hokkaido, Japan. Journal of Petrology, 43(3): 423-448.

Lazarenko, V.G. and Landa, E.A., 1992. Evidence of solid-state emplacement of the Konder Pluton and the problem of mantle diapirism. International Geology Review, 34(6): 617-628.

Lazarenko, V.G. and Malich, K.N., 1992. Platinum -Group Element Distribution in Meymechites of the Maymecha-Kotuy Province. Transaction (Doklady) Russian Academy of Sciences: Earth Science sections, 323(2): 185-188.

Lazarenko, V.G., Malich, K.N. and Lopatin, G.G., 1994. Geochemistry of the Ultramafites of the Guli Platiniferous Intrusion, Maymecha-Kotuy Province. Geochemistry International, 31(6): 1-6.

Le Maitre, R.W., 2002. Igneous Rocks: A Classification and Glossary of Terms. Cambridge University Press.

Malich, K.N., 1991. Petrographic Association of Platinum - Bearing Ultramafics in Concentrically Zoned Plutons of the Siberian Craton. Transaction (Doklady) Russian Academy of Sciences: Earth Science sections, 318(6): 198-204.

Malich, K.N., 1996. Assesmetn of the Platinum Potential of Clinopyroxenite - Dunite Massifs. Transaction (Doklady) Russian Academy of Sciences: Earth Science sections, 347A(3): 400-404.

Malich, K.N. et al., 2002. Os-rich nuggets from Au-PGE placers of the Maimecha-Kotui Province, Russia: a multi disciplinary study. Mineralogy and Petrology, 76(1-2): 121-148.

Malich, K.N. et al., 1996. The Maimecha - Koitui Region: A new Platinum Province in Russia. Doklady Earth Sciences, 348(2): 232 - 235.

Malich, K.N. and Kostoyanov, A.I., 1999. Model Re-Os Isotopic Age of the PGE Mineralization at the Gulinsk Massif (at the Northern Siberian Platform, Russia). Geology of Ore Deposits, 41(2): 126-135.

Malich, K.N. and Lopatin, G.G., 1997. New data on the Metallogeny of the Unique Gulin Klinopyroxenite-Dunite Massif (Northern Siberian, Russia). Geology of Ore Deposits, 39(3): 209-218.

Malich, K.N., Melcher, F. and Muehlhaus, H.W., 2001. Palladium and gold mineralization in podiform chromitite at Kraubath, Austria. Mineralogy and Petrology, 73: 247-277.

Malich, K.N. and Thalhammer, O.A.R., 2002. Pt-Fe nuggets derived from clinopyroxenite-dunite massifs, Russia: a Structural, Compositional and Osmium Isotope study. The Canadian Mineralogist, 40: 395-418.

Malich, K.N., Thalhammer, O.A.R., Knauf, V.V. and Melcher, F., 2003. Diversity of platinum-group mineral assemblages in banded and podiform chromitite from the Kraubath ultramafic massif, Austria: evidence for an ophiolitic transition zone? Mineralium Deposita, 38(3): 282-297.

Malitch, K.N., 1998. Peculiarities of platinum-group elements distribution in ultramafites of clinopyroxenite-dunite massives as an indicator of their origin.

Malitch, K.N. and Anonymous, 2002. Constraints on melting and osmium isotopic sources in the ophiolitic upper mantle; evidence from Ru-Os sulfides and Os-Ir-Ru alloys. Geochimica et Cosmochimica Acta, 66(15A): 478.

Malitch, K.N. et al., 2003. Laurite and ruarsite from podiform chromitites at Kraubath and Hochgroesse, Austria; new insights from osmium isotopes. The Canadian Mineralogist, 41(2): 331-352.

McDonough, W.F., 1991. Chemical and isotopic systematics of continental lithospheric mantle. Kimberlites; Related Rocks and Mantle Xenoliths, 1. Companhia de Pesquisa de Recursos Minerals, Rio de Janeiro, 478-485 pp.

McDonough, W.F. and Frey, F.A., 1989. Rare Earth Elements in the Upper Mantle Rocks. In: B.R. Lipin and G.A. McKay (Editors), Reviews of Mineralogy. Geochemisty and Mineralogy of Rare Earth Elements. Mineralogical Society of America, Washington, D.C., United States (USA), pp. 99 - 139.

McDonough, W.F. and Sun, S.S., 1995. The composition of the Earth. In: W.F. McDonough, N.T. Arndt and S. Shirey (Editors), Chemical Geology, pp. 223-253.

Meisel, T., Fellner, N. and Moser, J., 2003 a. A simple procedure for the determination of platinum group elements and rhenium (Ru, Rh, Pd, Re, Os, Ir and Pt) using ID-ICP-MS with an inexpensive on-line matrix seperation in geological and enviromental materials. Journal of Analytical Atomic Spectrometry, 18: 720 - 726.

Meisel, T., Melcher, F., Tomascak, P., Dingeldey, C. and Koller, F., 1997. Re - Os isotopes in orogenic peridotite massives in the Eastern Alps. Chemical Geology, 143, No. 3 - 4: 217 - 229.

Meisel, T. et al., 2003 b. Re-Os systematics of UB-N, a serpentinized peridotite reference material. Chemical Geology, 201(1-2): 161-179.

Meisel, T., Schoener, N., Paliulionyte, V. and Kahr, E., 2002. Determination of rare earth elements, Y, Th, Zr, Hf, Nb and Ta in geological reference materials G-2, G-3, SCo-1 and WGB-1 by sodium peroxide sintering and inductively coupled plasma-mass spectrometry. Geostandards Newsletter, 26(1): 53-61.

Mungall, J., Hanley, J., Arndt, N. and Debecdelievre, A., 2006. Evidence from meimechites and other low-degree mantle melts for redox controls on mantle - crust fractionation of platinum - group elements. PNAS, 103(34): 12695-12700.

O'Neill, H.S.C. and Wall, V.J., 1987. The Olivine - Orthopyroxene - Spinel Oxygen Geobarometer, the Nickel Precipitation Curve, and the Oxygen Fugacity of the Earth's Upper Mantle. Journal of Petrology, 28(6): 1169-1191.

Okrugin, A.V., 1998. Mineralogy, Types and Origin of the Platinum - Bearing Placer Deposits of the Siberian Platform. International Geology Review, 40: 677-687.

Pearson, D.G., Irvine, G.J., Ionov, D.A., Boyd, F.R. and Dreibus, G.E., 2004. Re-Os isotope systematics and platinum group element fractionation during mantle melt extraction: a study of massif and xenolith peridotite suites. Chemical Geology, 208(1-4): 29-59.

Perchuk, L.L. et al., 1985. Precambrian granulites of the Aldan shield, eastern Siberia, USSR. Journal of Metamorphic Geology, 3(3): 265-310.

Preston, J., 2002. Mineral Chemistry Spreadsheets.

Pushkarev, E.V., Anikina, E.V., Garuti, J., Zaccarini, F. and Cabella, R., 1999. Geikielite (Mg- Ilmenite) in Association with Cr-Spinels and Platinoids from the Uktus Massif Dunites, Middle Urals: Genetic Implications. Doklady Earth Sciences, 369A(3): 1220-1223.

Rass, I.T. and Plechov, P.Y., 2000. Melt Inclusions in Olivines from the Olivine - Melilitite Rock of the Guli Massif, Northwestern Siberian Platform. Doklady Earth Sciences, 375A(9): 1399 - 1402.

Roeder, P.L., Campbell, I.H. and Jamieson, H.E., 1979. A Re-evaluation of the Olivine - Spinel Geothermometer. Contributions to Mineralogy and Petrology, 68: 325-334.

Rollinson, H., 1993. Using Geochemical Data: Evaluation, Presentation, Interpretation. Addison Wesley Longman Limited, Essex, England.

Rudnick, R.L., McDonough, W.F. and Chapell, B.W., 1993. Carbonatite metasomatism in the northern Tanzanian mantle: petrographic and geochemical characteristics. Earth and Planetary Science Letters, 114: 463 - 475.

Ryabchikov, I.D. and Boyle, R.W., 1990. Fluid transport of ore metals in ultramafic mantle rocks. Proceedings of the Quadrennial IAGOD Symposium, 8: A239-A240.

Schiano, P. and Anonymous, 2002. The nature of melt inclusions inside minerals in ultramafic cumulates from island arcs; implications for the origin of high-Al basalts. Geochimica et Cosmochimica Acta, 66(15A): 678.

Schiano, P., Clocchiatti, R., Boivin, P. and Medard, E., 2004. The nature of melt inclusions inside minerals in an ultramafic cumulate from Adak volcanic center, aleutian arc: implications for the origin of high-Al basalts. Chemical Geology, 203(1-2): 169-179.

Scoon, R.N. and Eales, H.V., 2002. Unusual Fe-Ti-Cr spinels from discordant bodies of iron-rich ultramafic pegmatite at the Amandelbult Platinum mine, northwestern Bushveld Complex. Mineralogical Magazine, 66(6): 857-879.

Taylor, H., 1967. The Zoned ultramafic complexes of southeastern Alaska. Ultramafic and related rocks. John Wiley, New York.

Thalhammer, O.A.R., Prochaska, W. and Muehlhaus, H.W., 1990. Solid inclusions in chrome-spinels and platinum group element concentrations from the Hochgroessen and Kraubath ultramafic massifs (Austria). Contributions to Mineralogy and Petrology, 105(1): 66-80.

Vasiliev, Y.R. and Zolotukhin, V.V., 1995. The Maimecha-Kotui alkaline-ultramafic province of the northen Siberian platform, Russia. Episodes (International Union of Geological Sciences), 18(4): 155-164.

Wilson, A.H., Naldrett, A.J. and Tredoux, M., 1989. Distribution and controls of platinum group element and base metal mineralization in the Darwendale Subchamber of the Great Dyke, Zimbabwe. Geology, 17(7): 649-652.

Yegorov, L.S., 1989. Form, Structure and Developent of the Guli Ultramafic-Alkalic and Carbonatite Pluton. International Geology Review, 31: 1226-1239.

Zalishchak, B.L., Lennikov, A.M., Oktyabrsky, R.A., Solynaik, V.A. and Pakhomova, V.A., 1994. Mineralization of zonal alkali-ultrabasic complexes of Far East Russia. In: R.D. Hagni (Editor), Ninth quadrennial IAGOD symposium. E. Schweizerbart'sche Verlagsbuchhandlung (Naegele u. Obermiller), Stuttgart, Germany, Beijing, China.

Zhang, R.Y., Shu, J.F., Mao, H.K. and Liou, J.G., 1999. Magnetite lamellae in olivine and clinohumite from Dabie UHP ultramafic rocks, central China. American Mineralogist, 84: 564-569.

Zhou, M.-F., Robinson, P.T., Malpas, J., Edwards, S.J. and Qi, L., 2005. REE and PGE Geochemical Constraints on the Formation of Dunites in the Luobusa Ophiolite, Southern Tibet. J. Petrology, 46(3): 615-639.

# 14. Appendix 1 - XRF data

| Sample | G17/16 | G17/18 | G17/19 | G17/25 | G17/29 | G17/33 | G17/35 | G17/42 | G17/43 | G17/45 | G17/4 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MgO (%) | 41.67 | 41.13 | 46.19 | 50.29 | 47.92 | 49.77 | 47.62 | 50.54 | 49.38 | 48.24 | 40.36 |
| $Fe_2O_3$ (%) | 7.04 | 6.75 | 7.79 | 8.32 | 10.53 | 8.27 | 8.03 | 8.50 | 7.97 | 9.92 | 6.92 |
| $SiO_2$ (%) | 34.25 | 33.54 | 37.99 | 41.05 | 40.27 | 40.89 | 43.97 | 41.33 | 41.12 | 41.49 | 33.54 |
| MnO (%) | 0.11 | 0.10 | 0.12 | 0.13 | 0.14 | 0.12 | 0.12 | 0.13 | 0.12 | 0.15 | 0.11 |
| $Al_2O_3$ (%) | 0.07 | 0.07 | 0.08 | 0.08 | 0.10 | 0.08 | 0.09 | 0.08 | 0.08 | 0.13 | 0.10 |
| $TiO_2$ (%) | 0.04 | 0.04 | 0.05 | 0.05 | 0.08 | 0.05 | 0.06 | 0.05 | 0.04 | 0.11 | 0.05 |
| $Cr_2O_3$ (%) | 0.09 | 0.08 | 0.09 | 0.09 | 0.22 | 0.09 | 0.09 | 0.10 | 0.08 | 0.12 | 0.09 |
| CaO (%) | 0.32 | 0.42 | 0.37 | 0.40 | 0.41 | 0.39 | 0.40 | 0.38 | 0.36 | 1.22 | 0.49 |
| $Na_2O$ (%) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 |
| $K_2O$ (%) | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 |
| $P_2O_5$ (%) | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.02 |
| LOI | 16.00 | 18.00 | 7.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 18.00 |
| Sum (%) | 99.60 | 100.14 | 99.69 | 100.43 | 99.67 | 99.66 | 100.39 | 101.14 | 99.17 | 101.38 | 99.71 |
| Cr ppm | 749.75 | 657.74 | 628.24 | 632.06 | 1490.50 | 603.72 | 605.14 | 714.43 | 571.91 | 791.09 | 783.16 |
| Ni ppm | 4257.05 | 4306.00 | 4248.98 | 4241.00 | 4109.00 | 4290.43 | 3949.01 | 4101.00 | 4123.56 | 3906.50 | 5599.87 |
| Sr ppm | 0.00 | 1.36 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.76 | 12.40 |
| Zn ppm | 64.54 | 65.48 | 63.65 | 60.93 | 73.99 | 68.14 | 60.10 | 59.12 | 70.89 | 77.31 | 352.10 |
| Y ppm | 2.03 | 1.90 | 2.14 | 2.34 | 2.49 | 1.94 | 1.72 | 1.68 | 2.46 | 2.53 | 2.11 |
| Rh ppm | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rb ppm | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Zr ppm | 3.86 | 3.45 | 9.47 | 3.21 | 4.20 | 5.45 | 5.19 | 3.16 | 4.11 | 4.28 | 6.75 |
| Cu ppm | 79.82 | 86.21 | 60.88 | 29.04 | 51.88 | 101.25 | 49.65 | 33.86 | 30.65 | 38.92 | 100.89 |

| Sample | G17/7 | G17/22 | G17/24 | G17/40 | G17/44 | G17/47 | G17/49 | G13/6 | G13/20 | G13/24 | G1/25 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MgO (%) | 41.77 | 51.83 | 39.24 | 49.73 | 50.19 | 50.30 | 50.20 | 35.00 | 46.97 | 45.42 | 29.90 |
| $Fe_2O_3$ (%) | 7.18 | 8.32 | 10.74 | 8.24 | 8.08 | 8.05 | 8.17 | 16.81 | 11.30 | 12.97 | 14.19 |
| $SiO_2$ (%) | 34.50 | 42.34 | 33.99 | 40.96 | 41.22 | 41.13 | 41.16 | 39.79 | 39.96 | 39.68 | 41.48 |
| MnO (%) | 0.11 | 0.13 | 0.15 | 0.13 | 0.12 | 0.13 | 0.12 | 0.22 | 0.16 | 0.19 | 0.18 |
| $Al_2O_3$ (%) | 0.09 | 0.10 | 0.11 | 0.11 | 0.12 | 0.09 | 0.13 | 0.83 | 0.27 | 0.14 | 3.39 |
| $TiO_2$ (%) | 0.04 | 0.05 | 0.15 | 0.06 | 0.05 | 0.04 | 0.04 | 1.60 | 0.23 | 0.18 | 3.24 |
| $Cr_2O_3$ (%) | 0.08 | 0.10 | 0.31 | 0.09 | 0.09 | 0.10 | 0.09 | 0.42 | 0.87 | 0.40 | 0.27 |
| CaO (%) | 0.37 | 0.44 | 0.58 | 0.52 | 0.39 | 0.36 | 0.36 | 6.04 | 0.88 | 0.61 | 7.60 |
| $Na_2O$ (%) | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 |
| $K_2O$ (%) | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.01 | 1.13 |
| $P_2O_5$ (%) | 0.01 | 0.01 | 0.01 | 0.02 | 0.01 | 0.01 | 0.01 | 0.03 | 0.02 | 0.02 | 0.41 |
| LOI | 15.00 | 0.00 | 15.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Sum (%) | 99.16 | 103.31 | 100.29 | 99.87 | 100.27 | 100.21 | 100.30 | 100.75 | 100.68 | 99.63 | 102.13 |
| Cr ppm | 666.64 | 651.87 | 2490.92 | 636.51 | 642.24 | 677.22 | 604.71 | 2901.18 | 5959.52 | 2730.45 | 1831.38 |
| Ni ppm | 4348.60 | 4330.43 | 3660.86 | 4217.79 | 4314.72 | 4395.39 | 4357.00 | 2236.47 | 3944.88 | 3582.48 | 1851.80 |
| Sr ppm | 0.00 | 0.00 | 4.31 | 105.13 | 10.78 | 0.00 | 0.00 | 105.13 | 10.78 | 3.75 | 554.71 |
| Zn ppm | 62.77 | 72.14 | 86.84 | 102.73 | 80.85 | 57.47 | 62.55 | 102.73 | 80.85 | 86.16 | 92.76 |
| Y ppm | 1.68 | 2.28 | 2.00 | 5.93 | 1.85 | 1.71 | 2.34 | 5.93 | 1.85 | 2.48 | 19.72 |
| Rh ppm | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rb ppm | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 18.89 |
| Zr ppm | 2.57 | 3.48 | 4.71 | 40.80 | 5.84 | 4.65 | 3.14 | 40.80 | 5.84 | 6.05 | 245.04 |
| Cu ppm | 56.65 | 60.40 | 43.11 | 106.90 | 71.68 | 35.00 | 38.09 | 106.90 | 71.68 | 112.72 | 193.15 |

Table of XRF analysis from drill core G17 and G13

| Sample | Detection Limit* | G1-12 | G1-14 | G1-14_2 | G1-2 | G1-20 | G1-26 | G1-26_2 | G1-6 | G1-8 | G13-10 vein | G13-16 | G13-17 | G13-21 | G13-4 | G17-2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $SiO_2$ (%) | 0.01 | 39.34 | 39.18 | 39.21 | 38.60 | 38.71 | 38.63 | 38.72 | 36.79 | 38.88 | 32.42 | 35.11 | 33.98 | 33.73 | 34.90 | 32.15 |
| $Al_2O_3$ (%) | 0.01 | 4.57 | 1.63 | 1.63 | 3.50 | 1.16 | 0.59 | 0.58 | 0.92 | 0.81 | 2.00 | 0.12 | 0.15 | 0.18 | 0.29 | 0.18 |
| $Fe_2O_3$ (%) | 0.01 | 14.25 | 11.52 | 11.52 | 13.27 | 10.94 | 11.90 | 11.91 | 14.07 | 11.07 | 23.47 | 11.88 | 10.16 | 8.53 | 14.32 | 11.64 |
| MnO (%) | 0.01 | 0.20 | 0.18 | 0.18 | 0.18 | 0.16 | 0.17 | 0.17 | 0.20 | 0.16 | 0.24 | 0.17 | 0.14 | 0.13 | 0.20 | 0.17 |
| MgO (%) | 0.01 | 24.29 | 37.08 | 37.09 | 27.37 | 42.87 | 42.11 | 42.08 | 39.27 | 43.12 | 19.24 | 40.63 | 40.80 | 42.12 | 38.15 | 37.93 |
| CaO (%) | 0.01 | 7.65 | 4.02 | 4.02 | 6.65 | 1.07 | 1.04 | 1.04 | 0.98 | 1.08 | 10.15 | 0.72 | 0.74 | 0.22 | 1.42 | 0.45 |
| $Na_2O$ (%) | 0.02 | 1.22 | 0.92 | 0.93 | 0.75 | 0.14 | 0.17 | 0.20 | 0.15 | 0.18 | 0.28 | 0.06 | 0.04 | 0.03 | 0.07 | 0.05 |
| $K_2O$ (%) | 0.01 | 1.33 | 0.79 | 0.79 | 1.46 | 0.43 | 0.18 | 0.18 | 0.35 | 0.31 | 0.09 | 0.04 | 0.05 | 0.01 | 0.04 | 0.01 |
| $TiO_2$ (%) | 0.01 | 3.05 | 0.71 | 0.71 | 2.90 | 0.42 | 0.37 | 0.37 | 0.48 | 0.45 | 6.42 | 0.22 | 0.22 | 0.15 | 0.73 | 0.08 |
| $P_2O_5$ (%) | 0.01 | 0.46 | 0.24 | 0.24 | 0.41 | 0.12 | 0.05 | 0.05 | 0.05 | 0.06 | 0.04 | 0.03 | 0.03 | 0.02 | 0.03 | 0.02 |
| LOI () | | 2.13 | 2.52 | 2.52 | 3.43 | 2.92 | 3.77 | 3.77 | 5.86 | 2.86 | 4.19 | 10.24 | 12.56 | 12.99 | 8.93 | 16.41 |
| Sum (%) | | 99.12 | 99.28 | 99.31 | 99.15 | 99.69 | 99.66 | 99.78 | 99.75 | 99.71 | 98.94 | 99.88 | 99.69 | 99.29 | 99.75 | 100.05 |
| Ba (PPM) | 20.00 | 490.30 | 267.90 | 243.00 | 438.50 | 69.30 | 55.10 | 32.90 | 44.50 | 31.70 | 75.90 | 14.50 | 13.70 | 16.10 | 26.40 | 0.00 |
| Ce (PPM) | 20-30 | 112.30 | 25.60 | 23.70 | 87.90 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 23.60 | 0.00 | 0.00 | 0.00 | 0.00 | 22.30 |
| Co (PPM) | 15.00 | 96.20 | 102.70 | 96.50 | 99.50 | 127.20 | 143.60 | 141.20 | 153.80 | 124.50 | 100.00 | 123.50 | 116.30 | 105.30 | 137.30 | 131.70 |
| Cr (PPM) | 15.00 | 1622.80 | 2319.90 | 2317.80 | 1568.70 | 3915.60 | 3926.30 | 3919.90 | 3003.00 | 4178.90 | 430.70 | 2054.40 | 4535.20 | 8123.20 | 3350.70 | 2144.60 |
| Cu (PPM) | 15.00 | 149.10 | 60.50 | 64.10 | 130.40 | 29.00 | 13.50 | 10.20 | 18.90 | 25.80 | 678.30 | 16.70 | 18.80 | 12.30 | 21.00 | 4.10 |
| Ga (PPM) | 10-15 | 12.50 | 6.30 | 6.30 | 14.30 | 9.80 | 7.50 | 7.80 | 8.10 | 10.20 | 13.50 | 8.30 | 4.50 | 5.70 | 7.80 | 5.80 |
| Hf (PPM) | 5.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| *La (PPM)* | *20-30* | *26.90* | *0.00* | *0.00* | *10.20* | *0.00* | *0.00* | *0.00* | *0.00* | *6.10* | *0.00* | *0.00* | *0.00* | *2.30* | *0.00* | *0.00* |
| Nb (PPM) | 20-30 | 68.60 | 0.00 | 0.00 | 61.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 14.40 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| *Nd (PPM)* | *20-30* | *62.20* | *0.00* | *0.00* | *44.10* | *0.00* | *0.00* | *0.00* | *0.00* | *0.00* | *14.90* | *18.60* | *0.00* | *0.00* | *0.00* | *0.00* |
| Ni (PPM) | 15.00 | 1161.80 | 1414.80 | 1417.40 | 1455.20 | 2271.30 | 1980.00 | 1981.60 | 2012.80 | 2114.80 | 469.40 | 2370.10 | 2437.30 | 2467.60 | 2016.20 | 2154.80 |
| Pb (PPM) | 15.00 | 7.70 | 0.00 | 0.00 | 0.00 | 7.60 | 0.00 | 5.30 | 5.50 | 6.60 | 25.70 | 0.00 | 0.00 | 7.50 | 8.40 | 0.00 |
| Rb (PPM) | 5-10 | 25.20 | 14.00 | 11.50 | 23.60 | 5.50 | 4.30 | 4.20 | 5.90 | 3.50 | 1.20 | 4.10 | 1.70 | 1.40 | 3.90 | 3.70 |
| Sc (PPM) | 20.00 | 24.10 | 8.00 | 7.50 | 24.00 | 12.40 | 0.00 | 8.60 | 0.00 | 10.60 | 79.70 | 0.00 | 0.00 | 0.00 | 13.80 | 0.00 |
| Sr (PPM) | 15-20 | 964.20 | 194.10 | 194.60 | 548.80 | 88.00 | 77.40 | 79.30 | 97.40 | 73.20 | 135.80 | 19.20 | 17.60 | 8.30 | 34.80 | 8.40 |
| Th (PPM) | 20.00 | 8.90 | 11.60 | 6.40 | 9.60 | 3.10 | 4.40 | 4.00 | 6.90 | 7.00 | 0.10 | 5.30 | 9.20 | 7.20 | 6.60 | 6.80 |
| *U (PPM)* | *20.00* | *0.00* | *9.30* | *0.00* | *0.00* | *9.40* | *5.20* | *11.00* | *0.00* | *6.90* | *0.00* | *0.00* | *12.50* | *0.00* | *5.80* | *6.20* |
| V (PPM) | 15.00 | 281.70 | 95.40 | 82.50 | 274.60 | 47.30 | 45.70 | 41.70 | 55.80 | 55.40 | 721.90 | 24.10 | 32.50 | 20.40 | 77.00 | 7.30 |
| *W (PPM)* | *20-30* | *7.30* | *0.00* | *3.40* | *0.00* | *1.60* | *14.60* | *0.00* | *6.40* | *0.00* | *2.50* | *0.00* | *0.00* | *0.00* | *0.90* | *0.70* |
| Y (PPM) | 15-20 | 16.00 | 3.90 | 6.70 | 14.50 | 2.50 | 1.90 | 1.60 | 3.00 | 3.20 | 3.60 | 0.00 | 0.00 | 0.50 | 1.30 | 1.50 |
| Zn (PPM) | 15.00 | 100.80 | 79.60 | 80.10 | 94.30 | 70.80 | 83.50 | 84.50 | 86.60 | 76.50 | 145.80 | 82.00 | 75.80 | 64.40 | 90.10 | 63.90 |
| Zr (PPM) | 15-20 | 297.90 | 56.20 | 38.50 | 254.00 | 40.70 | 41.30 | 42.50 | 46.40 | 36.20 | 116.10 | 0.00 | 0.00 | 0.00 | 25.70 | 14.10 |

Table of XRF analysis from drill core G1 and G13

# 15. Appendix 2 - PGE data

| ppb | Os content | Ir content | Ru content | Rh content | Pt content | Pd content | Re content | Ir/Ru |
|---|---|---|---|---|---|---|---|---|
| G1-2 | 1.8 | 1.18 | 2.30 | 0.40 | 4.45 | 4.56 | 0.21 | 0.513 |
| G1-6 | 2.7 | 2.41 | 6.01 | 0.43 | 0.94 | 0.74 | 0.49 | 0.402 |
| G1-8 | 3.9 | 2.53 | 7.69 | 0.37 | 1.02 | 0.66 | 0.66 | 0.329 |
| G1-12 | 2.3 | 1.54 | 2.84 | 0.50 | 11.22 | 6.83 | 0.42 | 0.541 |
| G1-14 | 1.5 | 0.78 | 2.44 | 0.38 | 3.01 | 2.30 | 0.19 | 0.318 |
| G1-20 | 3.0 | 1.73 | 5.70 | 0.50 | 1.15 | 0.82 | 0.52 | 0.303 |
| G1/25 | 1.28 | 1.06 | 2.33 | 0.53 | 6.39 | 4.62 | 0.31 | 0.453 |
| G1/25b | 1.36 | 0.96 | 2.75 | 0.43 | 6.26 | 4.54 | 0.85 | 0.351 |
| G1-26 | 3.2 | 2.49 | 7.87 | 0.42 | 0.67 | 0.43 | 0.30 | 0.317 |
| G17/02 | 0.57 | 0.24 | 2.12 | 0.17 | 0.38 | 0.12 | 0.08 | 0.114 |
| G17/04 | 25.41 | 4.27 | 5.18 | 0.13 | 0.23 | 0.19 | 0.03 | 0.823 |
| G17/07 | 0.03 | 0.08 | 5.68 | 0.12 | 0.09 | 0.37 | 0.00 | 0.014 |
| G17/12 | 0.20 | 0.39 | 3.27 | 0.35 | 0.44 | 0.15 | 0.06 | 0.119 |
| G17/16 | 1.65 | 0.37 | 1.52 | 0.12 | 0.58 | 0.25 | 0.02 | 0.243 |
| G17/18 | 15.94 | 0.11 | 0.89 | 0.05 | 0.76 | 0.09 | 0.13 | 0.119 |
| G17/19 | 0.05 | 0.13 | 0.92 | 0.12 | 0.27 | 0.08 | 0.03 | 0.137 |
| G17/22 | 0.03 | 0.08 | 0.70 | 0.14 | 1.20 | 0.63 | 0.03 | 0.108 |
| G17/24 | 4.72 | 1.51 | 0.28 | 0.41 | 1.17 | 0.53 | 0.24 | 5.349 |
| G17/25 | 0.04 | 0.11 | 0.90 | 0.05 | 0.76 | 0.13 | 0.14 | 0.121 |
| G17/29 | 1.05 | 0.12 | 0.93 | 0.14 | 0.78 | 0.13 | 0.13 | 0.124 |
| G17/33 | 0.04 | 0.14 | 1.31 | 0.16 | 0.18 | 0.32 | 0.03 | 0.104 |
| G17/35 | 1.30 | 0.35 | 1.40 | 0.18 | 1.26 | 0.31 | 0.06 | 0.247 |
| G17/37 | 0.03 | 0.06 | 2.82 | 0.15 | 0.30 | 0.06 | 0.38 | 0.020 |
| G17/40 | 0.03 | 0.12 | 0.99 | 0.16 | 0.64 | 0.40 | 0.04 | 0.116 |
| G17/42 | 0.19 | 0.12 | 6.29 | 0.62 | 0.69 | 0.37 | 0.03 | 0.019 |
| G17/43. | 0.03 | 0.14 | 0.99 | 0.13 | 1.42 | 0.17 | 0.08 | 0.140 |
| G17/44 | 0.03 | 0.09 | 6.19 | 0.71 | 0.99 | 0.36 | 0.03 | 0.014 |
| G17/45 | 0.43 | 0.25 | 0.97 | 0.07 | 0.14 | 0.22 | 0.85 | 0.255 |
| G17/47 | 0.03 | 0.14 | 1.15 | 0.17 | 0.30 | 0.06 | 0.07 | 0.120 |
| G17/49 | 0.04 | 0.12 | 1.14 | 0.18 | 0.31 | 0.43 | 0.03 | 0.102 |
| G13/04 | 3.24 | 1.90 | 4.93 | 1.29 | 2.13 | 0.41 | 0.23 | 0.386 |
| G13/06 | 2.47 | 1.62 | 3.30 | 0.65 | 1.32 | 0.38 | 0.14 | 0.491 |
| G13/10 | 0.44 | 0.40 | 0.66 | 0.59 | 30.46 | 32.73 | 0.91 | 0.604 |
| G13/16 | 1.40 | 1.15 | 20.73 | 2.09 | 1.05 | 0.42 | 0.17 | 0.056 |
| G13/17 | 1.30 | 1.07 | 6.80 | 0.49 | 0.57 | 0.34 | 0.10 | 0.157 |
| G13/18 | 1.78 | 1.16 | 4.61 | 0.40 | 0.51 | 0.35 | 0.88 | 0.251 |
| G13/20 | 1.94 | 1.46 | 5.33 | 0.44 | 0.25 | 0.35 | 0.05 | 0.273 |
| G13/21 | 1.38 | 0.95 | 6.68 | 0.51 | 1.31 | 0.24 | 0.06 | 0.143 |
| G13/24 | 9.64 | 1.84 | 3.84 | 0.37 | 0.75 | 0.30 | 0.26 | 0.479 |
| G-03-2 | 13.73 | 10.28 | 15.06 | 0.76 | 0.28 | 0.45 | 0.04 | 0.682 |
| G-03-3 | 1.08 | 1.00 | 3.29 | 0.34 | 0.12 | 0.26 | 0.07 | 0.304 |
| Gu-02 | 4.64 | 4.17 | 8.81 | 0.50 | 1.08 | 0.57 | 0.12 | 0.474 |
| Gu-06 | 24.27 | 15.87 | 64.96 | 3.25 | 0.55 | 0.78 | 0.16 | 0.244 |
| Gu-07 | 1.80 | 1.40 | 5.03 | 0.28 | 0.27 | 0.56 | 0.15 | 0.279 |
| M1-1 | 0.59 | 0.76 | 3.21 | 0.47 | 3.65 | 3.65 | 0.05 | 0.236 |

Table of PGE concentrations in ppb for drill core G17, G13, G1 and surficial samples

| Mantle norm | Os content | Ir content | Ru content | Rh content | Pt content | Pd content | Re content |
|---|---|---|---|---|---|---|---|
| G13/04 | 0.95 | 0.59 | 0.99 | 1.43 | 0.30 | 0.11 | 0.82 |
| G13/06 | 0.73 | 0.51 | 0.66 | 0.72 | 0.19 | 0.10 | 0.51 |
| G13/10 | 0.13 | 0.13 | 0.13 | 0.66 | 4.29 | 8.39 | 3.25 |
| G13/16 | 0.41 | 0.36 | 4.15 | 2.32 | 0.15 | 0.11 | 0.59 |
| G13/17 | 0.38 | 0.33 | 1.36 | 0.54 | 0.08 | 0.09 | 0.36 |
| G13/18 | 0.52 | 0.36 | 0.92 | 0.44 | 0.07 | 0.09 | 3.16 |
| G13/20 | 0.57 | 0.45 | 1.07 | 0.49 | 0.04 | 0.09 | 0.19 |
| G13/21 | 0.41 | 0.30 | 1.34 | 0.57 | 0.19 | 0.06 | 0.20 |
| G13/24 | 2.84 | 0.57 | 0.77 | 0.41 | 0.11 | 0.08 | 0.91 |
| G17/02 | 0.17 | 0.08 | 0.42 | 0.19 | 0.05 | 0.03 | 0.29 |
| G17/04 | 7.47 | 1.33 | 1.04 | 0.15 | 0.03 | 0.05 | 0.10 |
| G17/07 | 0.01 | 0.03 | 1.14 | 0.14 | 0.01 | 0.10 | 0.01 |
| G17/12 | 0.06 | 0.12 | 0.65 | 0.39 | 0.06 | 0.04 | 0.22 |
| G17/16 | 0.49 | 0.12 | 0.30 | 0.13 | 0.08 | 0.06 | 0.09 |
| G17/18 |  | 0.03 | 0.18 | 0.05 | 0.11 | 0.02 | 0.45 |
| G17/18 | 0.01 | 0.03 | 0.15 | 0.11 | 0.03 | 0.01 | 0.17 |
| G17/19 | 0.01 | 0.04 | 0.18 | 0.14 | 0.04 | 0.02 | 0.09 |
| G17/22 | 0.01 | 0.02 | 0.14 | 0.15 | 0.17 | 0.16 | 0.10 |
| G17/24 | 0.01 | 0.03 | 0.18 | 0.06 | 0.11 | 0.03 | 0.49 |
| G17/24 |  |  |  |  |  |  |  |
| G17/24 | 0.01 | 0.08 | 0.20 | 0.15 | 0.13 | 0.06 | 0.15 |
| G17/29 | 0.31 | 0.04 | 0.19 | 0.15 | 0.11 | 0.03 | 0.45 |
| G17/29 | 1.15 | 0.04 | 0.22 | 0.16 | 0.02 | 0.07 | 0.08 |
| G17/33 | 0.01 | 0.04 | 0.26 | 0.18 | 0.03 | 0.08 | 0.09 |
| G17/35 | 0.38 | 0.11 | 0.28 | 0.20 | 0.18 | 0.08 | 0.21 |
| G17/37 | 0.01 | 0.02 | 0.56 | 0.17 | 0.04 | 0.02 | 1.35 |
| G17/40 | 0.01 | 0.04 | 0.20 | 0.18 | 0.09 | 0.10 | 0.14 |
| G17/42 | 0.06 | 0.04 | 1.26 | 0.68 | 0.10 | 0.09 | 0.12 |
| G17/43. | 0.01 | 0.04 | 0.20 | 0.15 | 0.20 | 0.04 | 0.28 |
| G17/43. | 0.01 | 0.03 | 0.15 | 0.11 | 0.03 | 0.02 | 0.07 |
| G17/44 | 0.01 | 0.03 | 1.24 | 0.79 | 0.14 | 0.09 | 0.09 |
| G17/45 | 0.13 | 0.08 | 0.19 | 0.07 | 0.02 | 0.06 | 3.05 |
| G17/45 | 0.03 | 0.10 | 0.27 | 0.12 | 0.07 | 0.06 | 0.08 |
| G17/47 | 0.01 | 0.04 | 0.23 | 0.19 | 0.04 | 0.02 | 0.26 |
| G17/49 | 0.01 | 0.04 | 0.23 | 0.20 | 0.04 | 0.11 | 0.11 |
| G-03-2 | 4.04 | 3.21 | 3.01 | 0.84 | 0.04 | 0.12 | 0.13 |
| G-03-3 | 0.32 | 0.31 | 0.66 | 0.38 | 0.02 | 0.07 | 0.26 |
| Gu-02 | 1.37 | 1.30 | 1.76 | 0.56 | 0.15 | 0.15 | 0.44 |
| Gu-06 | 7.14 | 4.96 | 12.99 | 3.61 | 0.08 | 0.20 | 0.59 |
| Gu-07 | 0.53 | 0.44 | 1.01 | 0.31 | 0.04 | 0.14 | 0.53 |
| M1-1 | 0.17 | 0.24 | 0.64 | 0.52 | 0.51 | 0.94 | 0.18 |
| G1-2 | 0.541 | 0.37 | 0.46 | 0.44 | 0.63 | 1.17 | 0.75 |
| G1-6 | 0.784 | 0.75 | 1.20 | 0.48 | 0.13 | 0.19 | 1.74 |
| G1-8 | 1.148 | 0.79 | 1.54 | 0.41 | 0.14 | 0.17 | 2.37 |
| G1-12 | 0.681 | 0.48 | 0.57 | 0.56 | 1.58 | 1.75 | 1.49 |
| G1-14 | 0.444 | 0.24 | 0.49 | 0.42 | 0.42 | 0.59 | 0.67 |
| G1-20 | 0.879 | 0.54 | 1.14 | 0.56 | 0.16 | 0.21 | 1.84 |
| G1-26 | 0.942 | 0.78 | 1.57 | 0.46 | 0.09 | 0.11 | 1.07 |
| G1/25 | 0.38 | 0.33 | 0.47 | 0.59 | 0.90 | 1.18 | 1.10 |
| G1/25b | 0.40 | 0.30 | 0.55 | 0.48 | 0.88 | 1.16 | 3.04 |

Table of mantle normalised PGE concentrations

# 16. Appendix 3: REE data

| sample | Y | Zr | Nb | Mo | Ba | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu | Hf | Ta | W | Th |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| G17/2 | 0.04 | | | | | 0.01 | 0.06 | 0.01 | 0.03 | 0.00 | 0.00 | | 0.00 | | 0.00 | 0.00 | | 0.00 | 0.00 | | 0.00 | 0.86 | |
| G17/4 | 0.41 | 5.52 | 0.36 | | 7.29 | 0.89 | 2.23 | 0.27 | 1.05 | 0.14 | 0.03 | 0.08 | 0.08 | 0.07 | 0.07 | 0.03 | 0.00 | 0.03 | 0.00 | 0.18 | 0.05 | | 0.26 |
| G17/7 | 0.29 | 1.20 | | | 5.05 | 0.13 | 0.17 | 0.04 | 0.11 | 0.09 | 0.03 | 0.03 | 0.11 | 0.07 | 0.12 | 0.06 | 0.05 | 0.09 | 0.05 | 0.03 | | | 0.01 |
| G17/12 | 0.10 | 1.48 | 0.30 | | 1.76 | 0.15 | 0.32 | 0.04 | 0.17 | 0.03 | 0.01 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | | 0.01 | 0.00 | 0.02 | 0.01 | 0.01 | 0.02 |
| G17/16 | | 1.84 | 0.02 | | 5.10 | 1.25 | | 0.19 | 0.57 | 0.07 | 0.02 | 0.06 | | 0.05 | | 0.04 | 0.01 | 0.04 | 0.01 | 0.02 | 0.00 | | 0.29 |
| G17/18 | 0.32 | 0.41 | 0.03 | | 15.43 | 0.19 | 0.26 | 0.04 | 0.15 | 0.02 | 0.01 | 0.04 | 0.02 | 0.05 | 0.02 | 0.03 | 0.01 | 0.04 | 0.01 | 0.01 | | | 0.14 |
| G17/19 | 0.26 | 2.16 | | | 1.28 | 0.24 | 0.64 | 0.08 | 0.29 | 0.03 | 0.01 | 0.01 | 0.00 | 0.01 | 0.01 | 0.03 | | 0.01 | 0.00 | 0.04 | 0.02 | 1.99 | 0.09 |
| G17/22 | 0.25 | 1.04 | 0.01 | | 3.61 | 0.03 | 0.05 | | 0.02 | | | | 0.08 | 0.01 | 0.08 | 0.00 | | 0.01 | | 0.03 | | | |
| G17/24 | 0.31 | 1.39 | | | 6.20 | 0.14 | 0.29 | 0.04 | 0.29 | 0.09 | 0.01 | 0.05 | 0.09 | 0.06 | 0.08 | 0.03 | 0.00 | 0.06 | 0.00 | 0.08 | | | |
| G17/25 | | 2.37 | 0.10 | | 7.16 | 0.56 | | 0.11 | 0.39 | 0.08 | 0.02 | 0.07 | | 0.08 | | 0.06 | 0.01 | 0.06 | 0.01 | 0.05 | 0.01 | | 0.23 |
| G17/29 | | 2.10 | 0.05 | | 3.92 | 0.35 | | 0.07 | 0.27 | 0.05 | 0.01 | 0.05 | | 0.05 | | 0.04 | 0.01 | 0.05 | 0.01 | 0.04 | 0.03 | | 0.19 |
| G17/33 | 0.22 | 0.01 | | | 2.62 | 0.05 | 0.09 | 0.02 | 0.07 | 0.04 | 0.01 | 0.02 | 0.02 | 0.03 | 0.02 | 0.03 | 0.01 | 0.05 | 0.01 | 0.01 | | | 0.06 |
| G17/35 | 0.35 | 0.76 | 0.13 | | 1.30 | 0.29 | 0.70 | 0.09 | 0.34 | 0.06 | 0.02 | 0.05 | 0.01 | 0.05 | 0.01 | 0.03 | 0.00 | 0.04 | 0.01 | 0.02 | | | 0.06 |
| G17/37 | 0.57 | 4.17 | | | 1.92 | 0.08 | 0.19 | 0.02 | 0.08 | 0.00 | 0.01 | 0.01 | | 0.00 | 0.01 | 0.01 | 0.00 | 0.01 | 0.01 | 0.08 | 0.01 | 0.84 | 0.03 |
| G17/40 | 0.38 | 4.23 | 0.08 | | 6.89 | 0.56 | 1.06 | 0.14 | 0.52 | 0.12 | 0.03 | 0.04 | 0.01 | 0.03 | 0.01 | 0.03 | 0.00 | 0.04 | 0.01 | 0.05 | 0.02 | 1.23 | 0.12 |
| G17/42 | 0.23 | 1.07 | | | 4.39 | 0.01 | 0.02 | | 0.01 | | | | 0.07 | 0.02 | 0.07 | 0.01 | | 0.01 | | 0.04 | | | |
| G17/43 | 0.21 | 0.06 | | | 3.03 | 0.05 | 0.09 | 0.01 | 0.04 | 0.01 | 0.01 | 0.02 | 0.01 | 0.02 | 0.02 | 0.03 | 0.01 | 0.04 | 0.01 | 0.01 | | | 0.05 |
| G17/44 | | 1.23 | 0.02 | 0.31 | 7.20 | 0.27 | 0.08 | 0.03 | 0.08 | 0.01 | 0.01 | 0.02 | 0.00 | 0.02 | 0.01 | 0.02 | 0.00 | 0.03 | 0.00 | 0.09 | 0.11 | 2.69 | 0.08 |
| G17/45 | | 2.31 | 0.04 | | 4.66 | 0.43 | | 0.16 | 0.80 | 0.18 | 0.05 | 0.17 | | 0.11 | | 0.06 | 0.01 | 0.06 | 0.01 | 0.09 | 0.01 | | 0.14 |
| G17/47 | | 1.10 | | | 10.57 | 0.50 | | 0.10 | 0.37 | 0.08 | 0.02 | 0.07 | | 0.09 | | 0.06 | 0.01 | 0.07 | 0.01 | 0.01 | 0.00 | | 0.10 |
| G17/49 | 0.20 | 0.25 | 0.01 | | 2.04 | 0.03 | 0.05 | 0.01 | 0.03 | 0.01 | 0.01 | 0.03 | 0.01 | 0.03 | 0.02 | 0.03 | 0.01 | 0.04 | 0.01 | 0.01 | | | 0.03 |
| G13-4 | 1.30 | 8.89 | 0.20 | 0.66 | 20.01 | 1.05 | 3.76 | 0.67 | 3.34 | 0.71 | 0.21 | 0.56 | 0.07 | 0.30 | 0.05 | 0.13 | 0.01 | 0.09 | 0.02 | 0.33 | 0.05 | | 0.11 |
| G13/6 | 3.47 | 22.60 | 0.10 | | 1.34 | 3.94 | 14.96 | 2.42 | 11.30 | 2.17 | 0.61 | 1.64 | 0.20 | 0.92 | 0.16 | 0.36 | 0.04 | 0.22 | 0.03 | 1.13 | 0.11 | 2.54 | 0.08 |
| G13/10 | 6.98 | 83.38 | 11.51 | 0.21 | 30.59 | 6.82 | 21.14 | 3.43 | 17.10 | 3.93 | 1.15 | 3.15 | 0.39 | 1.76 | 0.27 | 0.60 | 0.07 | 0.39 | 0.06 | 3.14 | 0.82 | 0.55 | 0.70 |
| G13/16 | | 4.27 | 0.22 | 1.11 | 14.58 | 0.82 | 1.55 | 0.22 | 0.89 | 0.20 | 0.06 | 0.14 | 0.01 | 0.06 | 0.02 | 0.03 | 0.00 | 0.05 | 0.01 | 0.16 | 0.03 | 84.22 | 0.24 |
| G13/17 | | 5.56 | 0.06 | 1.22 | 21.02 | 0.43 | 0.86 | 0.16 | 0.70 | 0.13 | 0.04 | 0.11 | 0.01 | 0.04 | 0.01 | 0.02 | 0.00 | 0.04 | 0.01 | 0.24 | 0.02 | 90.99 | 0.11 |
| G13/20 | 0.27 | 2.52 | | 0.59 | 6.48 | 0.34 | 0.66 | 0.08 | 0.32 | 0.06 | 0.02 | 0.02 | 0.00 | | 0.01 | 0.04 | 0.00 | 0.02 | 0.00 | 0.09 | 0.01 | 10.27 | 0.16 |
| G13/21 | 0.21 | | | | 4.01 | 0.39 | 0.64 | 0.09 | 0.33 | 0.06 | 0.01 | 0.02 | 0.00 | 0.02 | 0.01 | 0.02 | 0.00 | 0.03 | 0.01 | | 0.01 | 1.16 | 0.12 |
| M1-1 | 9.76 | 119.87 | 28.27 | 0.16 | 127.12 | 31.80 | 70.12 | 8.65 | 34.72 | 5.98 | 1.64 | 4.34 | 0.53 | 2.55 | 0.42 | 0.97 | 0.12 | 0.63 | 0.09 | 3.64 | 2.11 | 52.64 | 3.29 |
| G1/2 | 17.19 | 239.82 | 58.64 | 0.13 | 447.95 | 53.47 | 110.62 | 13.29 | 51.62 | 8.68 | 2.43 | 6.08 | 0.73 | 3.55 | 0.57 | 1.28 | 0.15 | 0.84 | 0.11 | 5.28 | 3.33 | 0.83 | 4.12 |
| G1/6 | 3.07 | 55.32 | 12.87 | 0.32 | 40.69 | 7.66 | 14.96 | 1.72 | 6.38 | 1.03 | 0.30 | 0.72 | 0.09 | 0.49 | 0.09 | 0.21 | 0.03 | 0.17 | 0.02 | 1.10 | 0.57 | 4.94 | 0.85 |
| G1/8 | 2.51 | 48.87 | 11.57 | 0.61 | 37.95 | 6.48 | 12.51 | 1.41 | 5.27 | 0.87 | 0.25 | 0.63 | 0.08 | 0.42 | 0.07 | 0.17 | 0.02 | 0.12 | 0.02 | 0.94 | 0.56 | 1.00 | 0.79 |
| G1/12 | 22.27 | 301.25 | 81.12 | 0.27 | 524.52 | 62.11 | 129.22 | 15.55 | 60.30 | 10.38 | 2.92 | 7.16 | 0.87 | 4.38 | 0.68 | 1.60 | 0.20 | 1.10 | 0.15 | 6.35 | 4.17 | 0.49 | 4.43 |
| G1/14 | 4.54 | 50.17 | 10.15 | 0.72 | 281.10 | 7.03 | 15.00 | 1.93 | 7.71 | 1.46 | 0.43 | 1.13 | 0.15 | 0.80 | 0.14 | 0.37 | 0.05 | 0.31 | 0.05 | 1.15 | 0.50 | 1.11 | 0.51 |
| G1/20 | 2.45 | 38.61 | 8.19 | 0.55 | 97.01 | 6.52 | 13.17 | 1.57 | 5.86 | 0.99 | 0.29 | 0.69 | 0.09 | 0.46 | 0.08 | 0.20 | 0.03 | 0.17 | 0.02 | 0.73 | 0.38 | 1.35 | 0.64 |
| G1/25 | 14.41 | 170.39 | 37.23 | | 333.40 | 39.99 | 88.71 | 11.11 | 46.05 | | 8.37 | 2.35 | 6.16 | 0.74 | 3.60 | 0.57 | 1.32 | 0.16 | 0.83 | 0.11 | 4.73 | 2.68 | 0.74 |
| G1/26 | 1.91 | 42.97 | 7.63 | 0.23 | 46.45 | 5.05 | 9.18 | 1.04 | 3.95 | 0.69 | 0.21 | 0.50 | 0.06 | 0.35 | 0.06 | 0.16 | 0.02 | 0.14 | 0.02 | 0.85 | 0.31 | 0.68 | 0.93 |

Table of REE concentrations from drill core G17, G3 and G1 in ppm.

| condrite norm | La | Ce | Pr | Nd | Pm | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| G17/2 | 0.06 | 0.09 | 0.08 | 0.06 | | 0.00 | 0.05 | 0.00 | 0.01 | 0.00 | 0.04 | 0.01 | 0.00 | 0.01 | 0.09 |
| G17/4 | 3.78 | 3.62 | 2.92 | 2.30 | | 0.91 | 0.53 | 0.43 | 2.19 | 0.27 | 1.26 | 0.20 | 0.09 | 0.18 | 0.08 |
| G17/7 | 0.55 | 0.27 | 0.44 | 0.24 | | 0.59 | 0.61 | 0.17 | 3.19 | 0.27 | 2.13 | 0.37 | 1.96 | 0.55 | 2.14 |
| G17/12 | 0.62 | 0.53 | 0.46 | 0.38 | | 0.19 | 0.17 | 0.07 | 0.08 | 0.03 | 0.09 | 0.04 | 0.00 | 0.05 | 0.13 |
| G17/16 | 5.30 | 0.00 | 2.04 | 1.25 | | 0.49 | 0.30 | 0.29 | 0.00 | 0.22 | 0.00 | 0.23 | 0.24 | 0.25 | 0.32 |
| G17/18 | 0.79 | 0.42 | 0.43 | 0.34 | | 0.15 | 0.15 | 0.19 | 0.45 | 0.18 | 0.37 | 0.20 | 0.32 | 0.23 | 0.36 |
| G17/19 | 1.01 | 1.04 | 0.85 | 0.64 | | 0.22 | 0.19 | 0.04 | 0.01 | 0.02 | 0.12 | 0.15 | 0.00 | 0.07 | 0.18 |
| G17/22 | 0.11 | 0.08 | 0.00 | 0.05 | | 0.00 | 0.00 | 0.00 | 2.31 | 0.06 | 1.40 | 0.02 | 0.00 | 0.07 | 0.00 |
| G17/24 | 0.60 | 0.47 | 0.45 | 0.63 | | 0.62 | 0.26 | 0.25 | 2.44 | 0.23 | 1.53 | 0.18 | 0.12 | 0.40 | 0.18 |
| G17/25 | 2.36 | 0.00 | 1.16 | 0.85 | | 0.56 | 0.30 | 0.38 | 0.00 | 0.34 | 0.00 | 0.36 | 0.38 | 0.40 | 0.46 |
| G17/29 | 1.48 | 0.00 | 0.76 | 0.58 | | 0.32 | 0.26 | 0.27 | 0.00 | 0.22 | 0.00 | 0.25 | 0.25 | 0.29 | 0.37 |
| G17/33 | 0.21 | 0.14 | 0.22 | 0.15 | | 0.27 | 0.20 | 0.12 | 0.43 | 0.13 | 0.37 | 0.18 | 0.50 | 0.31 | 0.53 |
| G17/35 | 1.24 | 1.14 | 0.98 | 0.75 | | 0.43 | 0.29 | 0.24 | 0.32 | 0.19 | 0.26 | 0.20 | 0.20 | 0.23 | 0.26 |
| G17/37 | 0.34 | 0.30 | 0.25 | 0.16 | | 0.01 | 0.11 | 0.03 | 0.00 | 0.00 | 0.13 | 0.08 | 0.00 | 0.07 | 0.21 |
| G17/40 | 2.37 | 1.71 | 1.47 | 1.13 | | 0.83 | 0.46 | 0.22 | 0.16 | 0.12 | 0.22 | 0.20 | 0.15 | 0.27 | 0.25 |
| G17/42 | 0.04 | 0.03 | 0.00 | 0.02 | | 0.00 | 0.00 | 0.00 | 1.93 | 0.07 | 1.20 | 0.05 | 0.00 | 0.08 | 0.00 |
| G17/43 | 0.22 | 0.15 | 0.14 | 0.09 | | 0.08 | 0.09 | 0.11 | 0.31 | 0.10 | 0.28 | 0.16 | 0.29 | 0.22 | 0.35 |
| G17/44 | 1.14 | 0.14 | 0.30 | 0.19 | | 0.05 | 0.19 | 0.12 | 0.02 | 0.07 | 0.17 | 0.10 | 0.11 | 0.21 | 0.18 |
| G17/45 | 1.82 | 0.00 | 1.76 | 1.75 | | 1.23 | 0.97 | 0.87 | 0.00 | 0.47 | 0.00 | 0.35 | 0.35 | 0.36 | 0.46 |
| G17/47 | 2.13 | 0.00 | 1.12 | 0.81 | | 0.54 | 0.31 | 0.35 | 0.00 | 0.38 | 0.00 | 0.38 | 0.45 | 0.43 | 0.48 |
| G17/49 | 0.15 | 0.09 | 0.11 | 0.06 | | 0.08 | 0.14 | 0.13 | 0.41 | 0.12 | 0.32 | 0.17 | 0.39 | 0.22 | 0.47 |
| G13-4 | 4.44 | 6.10 | 7.17 | 7.31 | | 4.74 | 3.72 | 2.85 | 1.84 | 1.24 | 0.94 | 0.77 | 0.57 | 0.56 | 0.69 |
| G13/6 | 16.69 | 24.29 | 26.07 | 24.72 | | 14.59 | 10.91 | 8.34 | 5.54 | 3.75 | 2.85 | 2.16 | 1.61 | 1.39 | 1.38 |
| G13/10 | 28.89 | 34.32 | 36.96 | 37.42 | | 26.36 | 20.59 | 15.98 | 10.93 | 7.17 | 4.95 | 3.62 | 2.96 | 2.42 | 2.37 |
| G13/16 | 3.48 | 2.51 | 2.37 | 1.94 | | 1.33 | 0.99 | 0.69 | 0.36 | 0.25 | 0.28 | 0.16 | 0.13 | 0.34 | 0.23 |
| G13/17 | 1.81 | 1.39 | 1.68 | 1.53 | | 0.88 | 0.75 | 0.55 | 0.26 | 0.18 | 0.24 | 0.15 | 0.13 | 0.24 | 0.21 |
| G13/20 | 1.45 | 1.08 | 0.88 | 0.70 | | 0.43 | 0.29 | 0.10 | 0.11 | 0.00 | 0.14 | 0.26 | 0.03 | 0.10 | 0.18 |
| G13/21 | 1.64 | 1.04 | 0.94 | 0.73 | | 0.43 | 0.23 | 0.12 | 0.12 | 0.10 | 0.18 | 0.10 | 0.12 | 0.20 | 0.31 |
| M1-1 | 134.75 | 113.84 | 93.11 | 75.96 | | 40.15 | 29.33 | 22.01 | 14.92 | 10.42 | 7.71 | 5.87 | 4.83 | 3.95 | 3.58 |
| G1/2 | 226.55 | 179.58 | 143.05 | 112.96 | | 58.24 | 43.46 | 30.87 | 20.55 | 14.49 | 10.47 | 7.70 | 6.38 | 5.29 | 4.53 |
| G1/6 | 32.45 | 24.29 | 18.53 | 13.97 | | 6.93 | 5.34 | 3.67 | 2.65 | 1.99 | 1.58 | 1.25 | 1.13 | 1.07 | 0.90 |
| G1/8 | 27.44 | 20.31 | 15.21 | 11.53 | | 5.86 | 4.40 | 3.18 | 2.26 | 1.73 | 1.27 | 1.03 | 0.87 | 0.78 | 0.62 |
| G1/12 | 263.18 | 209.76 | 167.36 | 131.94 | | 69.66 | 52.13 | 36.35 | 24.60 | 17.87 | 12.54 | 9.66 | 8.17 | 6.93 | 5.93 |
| G1/14 | 29.78 | 24.36 | 20.81 | 16.87 | | 9.83 | 7.59 | 5.74 | 4.28 | 3.25 | 2.52 | 2.21 | 2.03 | 1.94 | 1.91 |
| G1/20 | 27.62 | 21.38 | 16.87 | 12.82 | | 6.64 | 5.23 | 3.53 | 2.57 | 1.89 | 1.48 | 1.22 | 1.16 | 1.06 | 0.95 |
| G1/25 | 169.44 | 144.01 | 119.54 | 100.77 | | 0.00 | 149.46 | 11.92 | 173.62 | 3.04 | 65.91 | 3.46 | 54.68 | 0.99 | 33.86 |
| G1/26 | 21.40 | 14.90 | 11.23 | 8.64 | | 4.65 | 3.77 | 2.54 | 1.82 | 1.41 | 1.07 | 0.98 | 0.91 | 0.85 | 0.80 |

Table of chondrite normalised REE concentrations

# 17. Appendix 4 Olivine microprobe analysis

| Sample | G17/49b4 | G17/49b5 | G17/49b6 | G17/49b7 | G17/49b8 | G17/49b9 | G17/49b12 | G17/49b13 | G17/49b14 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 52.54 | 51.70 | 52.43 | 51.83 | 52.36 | 52.22 | 52.48 | 52.46 | 51.39 |
| Al2O3 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 |
| Cr2O3 | 0.43 | 0.30 | 0.00 | 0.00 | 0.00 | 0.00 | 0.14 | 0.29 | 0.02 |
| FeO | 7.23 | 7.25 | 7.21 | 7.14 | 7.18 | 7.14 | 6.45 | 6.64 | 7.07 |
| TiO2 | 0.05 | 0.05 | 0.00 | 0.00 | 0.03 | 0.00 | 0.03 | 0.08 | 0.03 |
| MnO | 0.13 | 0.08 | 0.10 | 0.16 | 0.10 | 0.10 | 0.05 | 0.13 | 0.16 |
| SiO2 | 40.52 | 39.94 | 39.71 | 40.49 | 40.91 | 41.36 | 39.43 | 38.27 | 38.74 |
| CaO | 0.14 | 0.09 | 0.21 | 0.14 | 0.12 | 0.25 | 0.02 | 0.04 | 0.09 |
| K2O | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Na2O | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| NiO | 0.31 | 0.31 | 0.42 | 0.34 | 0.31 | 0.31 | 0.23 | 0.38 | 0.34 |
| Summe | 101.35 | 99.72 | 100.08 | 100.10 | 101.01 | 101.38 | 98.83 | 98.29 | 97.89 |
| Formula | | | | | | | | | |
| Si | 0.974 | 0.960 | 0.955 | 0.974 | 0.984 | 0.994 | 0.948 | 0.920 | 0.931 |
| Ti | 0.001 | 0.001 | 0.000 | 0.000 | 0.001 | 0.000 | 0.001 | 0.001 | 0.001 |
| Al | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 |
| Cr | 0.008 | 0.006 | 0.000 | 0.000 | 0.000 | 0.000 | 0.003 | 0.006 | 0.000 |
| Fe(ii) | 0.145 | 0.146 | 0.145 | 0.144 | 0.144 | 0.144 | 0.130 | 0.134 | 0.142 |
| Mn | 0.003 | 0.002 | 0.002 | 0.003 | 0.002 | 0.002 | 0.001 | 0.003 | 0.003 |
| Mg | 1.883 | 1.853 | 1.879 | 1.858 | 1.877 | 1.872 | 1.881 | 1.880 | 1.842 |
| Ni | 0.006 | 0.006 | 0.008 | 0.007 | 0.006 | 0.006 | 0.004 | 0.007 | 0.007 |
| Ca | 0.004 | 0.002 | 0.005 | 0.004 | 0.003 | 0.006 | 0.001 | 0.001 | 0.002 |
| TOTAL | 3.024 | 2.976 | 2.995 | 2.988 | 3.017 | 3.024 | 2.968 | 2.952 | 2.930 |
| Mg # | 92.71 | 92.63 | 92.75 | 92.68 | 92.76 | 92.78 | 93.50 | 93.25 | 92.68 |

| Sample | G17/49d4 | G17/49d5 | G17/49d6 | G17/49d7 | G17/49d8 | G17/49d9 | G17/49d10 | G17/49f1 | G17/49f2 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 51.41 | 51.4 | 51.25 | 52.63 | 53.11 | 53.32 | 51.46 | 51.34 | 45.67 |
| Al2O3 | 0 | 0 | 0.09 | 0 | 0.05 | 0 | 0 | 0.05 | 0.18 |
| Cr2O3 | 0.02 | 0.02 | 0 | 0.02 | 0 | 0.05 | 0.04 | 0.04 | 0 |
| FeO | 7.92 | 8.06 | 8.38 | 7.68 | 7.76 | 7.56 | 8.24 | 8.15 | 6.8 |
| TiO2 | 0.05 | 0.05 | 0 | 0.03 | 0.03 | 0 | 0 | 0 | 0 |
| MnO | 0.18 | 0.16 | 0.13 | 0.08 | 0.16 | 0.1 | 0.16 | 0.1 | 0.1 |
| SiO2 | 41.28 | 40.89 | 41.2 | 39.41 | 39.92 | 40.05 | 41.61 | 41.74 | 50.67 |
| CaO | 0.27 | 0.32 | 0.2 | 0.06 | 0.05 | 0.13 | 0.26 | 0.27 | 0.01 |
| K2O | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.09 |
| Na2O | 0.07 | 0 | 0.07 | 0 | 0 | 0 | 0 | 0 | 0 |
| NiO | 0.42 | 0.38 | 0.38 | 0.34 | 0.42 | 0.42 | 0.5 | 0.38 | 0.08 |
| Summe | 101.62 | 101.28 | 101.7 | 100.25 | 101.5 | 101.63 | 102.27 | 102.07 | 103.6 |
| Formula | | | | | | | | | |
| Si | 0.993 | 0.984 | 0.991 | 0.948 | 0.961 | 0.964 | 1.001 | 1.004 | 1.219 |
| Ti | 0.001 | 0.001 | 0.000 | 0.001 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 |
| Al | 0.000 | 0.000 | 0.003 | 0.000 | 0.001 | 0.000 | 0.000 | 0.001 | 0.005 |
| Cr | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.001 | 0.001 | 0.000 |
| Fe(ii) | 0.159 | 0.162 | 0.169 | 0.155 | 0.156 | 0.152 | 0.166 | 0.164 | 0.137 |
| Mn | 0.004 | 0.003 | 0.003 | 0.002 | 0.003 | 0.002 | 0.003 | 0.002 | 0.002 |
| Mg | 1.844 | 1.844 | 1.838 | 1.888 | 1.905 | 1.913 | 1.846 | 1.842 | 1.638 |
| Ni | 0.008 | 0.007 | 0.007 | 0.007 | 0.008 | 0.008 | 0.010 | 0.007 | 0.002 |
| Ca | 0.007 | 0.008 | 0.005 | 0.002 | 0.001 | 0.003 | 0.007 | 0.007 | 0.000 |
| TOTAL | 3.017 | 3.010 | 3.016 | 3.001 | 3.036 | 3.043 | 3.033 | 3.028 | 3.003 |
| Fo | 91.88 | 91.77 | 91.48 | 92.36 | 92.28 | 92.54 | 91.61 | 91.73 | 92.19 |

Olivine microprobe analysis from drill core G17 sample 49

| Sample | G17/49b15 | G17/49e11 | G17/49e13 | G17/49e14 | G17/49d1 | G17/49d2 | G17/49d3 |
|---|---|---|---|---|---|---|---|
| MgO | 52.08 | 52.22 | 52.49 | 51.10 | 51.44 | 51.76 | 51.66 |
| Al2O3 | 0.00 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 |
| Cr2O3 | 0.00 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0.04 |
| FeO | 7.14 | 7.28 | 7.35 | 7.44 | 8.19 | 8.39 | 8.01 |
| TiO2 | 0.03 | 0.03 | 0.00 | 0.00 | 0.05 | 0 | 0.03 |
| MnO | 0.16 | 0.08 | 0.10 | 0.10 | 0.13 | 0.16 | 0.03 |
| SiO2 | 39.48 | 40.15 | 40.19 | 38.50 | 41.06 | 41.66 | 40.72 |
| CaO | 0.22 | 0.17 | 0.16 | 0.07 | 0.28 | 0.27 | 0.28 |
| K2O | 0.00 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 |
| Na2O | 0.00 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0.06 |
| NiO | 0.27 | 0.42 | 0.38 | 0.34 | 0.5 | 0.5 | 0.42 |
| Summe | 99.38 | 100.35 | 100.67 | 97.55 | 101.65 | 102.74 | 101.25 |
| Formula | | | | | | | |
| Si | 0.949 | 0.965 | 0.966 | 0.926 | 0.988 | 1.002 | 0.980 |
| Ti | 0.001 | 0.001 | 0.000 | 0.000 | 0.001 | 0.000 | 0.001 |
| Al | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cr | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 |
| Fe(ii) | 0.144 | 0.146 | 0.148 | 0.150 | 0.165 | 0.169 | 0.161 |
| Mn | 0.003 | 0.002 | 0.002 | 0.002 | 0.003 | 0.003 | 0.001 |
| Mg | 1.867 | 1.872 | 1.882 | 1.832 | 1.845 | 1.857 | 1.853 |
| Ni | 0.005 | 0.008 | 0.007 | 0.007 | 0.010 | 0.010 | 0.008 |
| Ca | 0.006 | 0.004 | 0.004 | 0.002 | 0.007 | 0.007 | 0.007 |
| TOTAL | 2.974 | 2.998 | 3.009 | 2.917 | 3.018 | 3.048 | 3.011 |
| Mg # | 92.71 | 92.67 | 92.63 | 92.36 | 91.68 | 91.52 | 91.97 |

| Sample | G17/49f3 | G17/49f6 | G17/49f7 | G17/49f8 | G17/49f9 | G17/49a3 | G17/49a5 |
|---|---|---|---|---|---|---|---|
| MgO | 53.07 | 51.85 | 51.8 | 51.94 | 51.8 | 53.36 | 53.41 |
| Al2O3 | 0 | 0.05 | 0 | 0 | 0.14 | 0.05 | 0 |
| Cr2O3 | 0.02 | 0 | 0 | 0.02 | 0 | 0.02 | 0 |
| FeO | 8.24 | 8.1 | 8.27 | 8.12 | 8.08 | 7.87 | 7.54 |
| TiO2 | 0 | 0.03 | 0.03 | 0 | 0.05 | 0.53 | 0 |
| MnO | 0.16 | 0.13 | 0.16 | 0.16 | 0.1 | 0.13 | 0.05 |
| SiO2 | 41.05 | 40.77 | 41.66 | 40.93 | 41.33 | 40.21 | 41.22 |
| CaO | 0.1 | 0.17 | 0.2 | 0.18 | 0.06 | 0.13 | 0.12 |
| K2O | 0.01 | 0 | 0 | 0 | 0 | 0 | 0 |
| Na2O | 0.07 | 0 | 0 | 0 | 0 | 0 | 0 |
| NiO | 0.5 | 0.42 | 0.31 | 0.46 | 0.42 | 0.57 | 0.38 |
| Summe | 103.22 | 101.52 | 102.43 | 101.81 | 101.98 | 102.87 | 102.72 |
| Formula | | | | | | | |
| Si | 0.988 | 0.981 | 1.002 | 0.985 | 0.994 | 0.967 | 0.992 |
| Ti | 0.000 | 0.001 | 0.001 | 0.000 | 0.001 | 0.010 | 0.000 |
| Al | 0.000 | 0.001 | 0.000 | 0.000 | 0.004 | 0.001 | 0.000 |
| Cr | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 0.166 | 0.163 | 0.166 | 0.163 | 0.163 | 0.158 | 0.152 |
| Mn | 0.003 | 0.003 | 0.003 | 0.003 | 0.002 | 0.003 | 0.001 |
| Mg | 1.904 | 1.860 | 1.858 | 1.863 | 1.858 | 1.914 | 1.916 |
| Ni | 0.010 | 0.008 | 0.006 | 0.009 | 0.008 | 0.011 | 0.007 |
| Ca | 0.003 | 0.004 | 0.005 | 0.005 | 0.002 | 0.003 | 0.003 |
| TOTAL | 3.073 | 3.021 | 3.042 | 3.028 | 3.032 | 3.068 | 3.071 |
| Fo | 91.84 | 91.82 | 91.63 | 91.79 | 91.86 | 92.24 | 92.62 |

Olivine microprobe analysis from drill core G17 sample 49

| Sample | G17/47B/1b | G17/47B/1c | G17/47B/1e | G17/47B/1d | G17/47B/1e | G17/47B/1f | G17/47B/1g | G17/47B/1h |
|---|---|---|---|---|---|---|---|---|
| SiO2 | 41.89 | 41.57 | 37.88 | 39.36 | 39.47 | 39.24 | 41.06 | 39.51 |
| MgO | 49.2 | 49.42 | 50.72 | 51.26 | 51.85 | 52.29 | 54.46 | 51.75 |
| FeO | 7.14 | 7.03 | 7.99 | 7.93 | 7.65 | 7.65 | 4.45 | 7.58 |
| Al2O3 | 0 | 0 | 0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Cr2O3 | 0.02 | 0.02 | 0 | 0 | 0 | 0 | 0.03 | 0 |
| NiO | 0.2 | 0.16 | 0.22 | 0.2 | 0.2 | 0.18 | 0.14 | 0.22 |
| Summe | 98.45 | 98.2 | 96.81 | 98.85 | 99.27 | 99.46 | 100.24 | 99.16 |
| | | | | | | | | |
| Formula | | | | | | | | |
| Si | 1.026 | 1.018 | 0.928 | 0.964 | 0.967 | 0.961 | 1.006 | 0.968 |
| Ti | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Al | 0.000 | 0.000 | 0.000 | 0.003 | 0.003 | 0.003 | 0.003 | 0.003 |
| Cr | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 |
| Fe(ii) | 0.146 | 0.144 | 0.164 | 0.162 | 0.157 | 0.157 | 0.091 | 0.155 |
| Mn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Mg | 1.797 | 1.805 | 1.852 | 1.872 | 1.894 | 1.910 | 1.989 | 1.890 |
| Ni | 0.004 | 0.003 | 0.004 | 0.004 | 0.004 | 0.004 | 0.003 | 0.004 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 2.974 | 2.971 | 2.948 | 3.006 | 3.024 | 3.034 | 3.092 | 3.020 |
| | | | | | | | | |
| Fo | 92.47 | 92.61 | 91.88 | 92.02 | 92.36 | 92.42 | 95.62 | 92.41 |

| Sample | G17/47B/1i | G17/47B/1j | G17/47B/3a | G17/47B/3c | G17/47B/3d | G17/47B/4a | G17/47B/4b | G17/47B/4c |
|---|---|---|---|---|---|---|---|---|
| SiO2 | 39.22 | 39.36 | 39.05 | 39.12 | 38.86 | 39.36 | 38.5 | 37.35 |
| MgO | 54.24 | 51.28 | 51.52 | 51.4 | 50.73 | 51.26 | 51.12 | 51.35 |
| FeO | 3.86 | 7.41 | 7.34 | 7.55 | 7.34 | 7.72 | 7.34 | 8.03 |
| Al2O3 | 0 | 0 | 0 | 0 | 0.1 | 0 | 0 | 0 |
| Cr2O3 | 0.03 | 0 | 0.02 | 0 | 0 | 0 | 0 | 0 |
| NiO | 0.14 | 0.22 | 0.28 | 0.22 | 0.2 | 0.24 | 0.26 | 0.22 |
| Summe | 97.49 | 98.27 | 98.21 | 98.29 | 97.23 | 98.58 | 97.22 | 96.95 |
| | | | | | | | | |
| Formula | | | | | | | | |
| Si | 0.961 | 0.964 | 0.957 | 0.958 | 0.952 | 0.964 | 0.943 | 0.915 |
| Ti | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Al | 0.000 | 0.000 | 0.000 | 0.000 | 0.003 | 0.000 | 0.000 | 0.000 |
| Cr | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 0.079 | 0.152 | 0.150 | 0.155 | 0.150 | 0.158 | 0.150 | 0.164 |
| Mn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Mg | 1.981 | 1.873 | 1.882 | 1.877 | 1.853 | 1.872 | 1.867 | 1.875 |
| Ni | 0.003 | 0.004 | 0.006 | 0.004 | 0.004 | 0.005 | 0.005 | 0.004 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 3.024 | 2.993 | 2.994 | 2.995 | 2.962 | 2.999 | 2.966 | 2.959 |
| | | | | | | | | |
| Fo | 96.16 | 92.50 | 92.60 | 92.39 | 92.49 | 92.21 | 92.55 | 91.94 |

| Sample | G17/47a1 | G17/47a3 | G17/47a4 | G17/47a6 | G17/47a7 | G17/47a8 | G17/47a10 | G17/47a11 | G17/47a13 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 49.01 | 49.19 | 50.08 | 50.39 | 50.78 | 49.41 | 49.24 | 49.35 | 50.08 |
| Al2O3 | 0.05 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.11 |
| Cr2O3 | 0 | 0.02 | 0.05 | 0 | 0 | 0 | 0 | 0.02 | 0 |
| FeO | 7.38 | 7.26 | 7.41 | 7.12 | 7.17 | 7.23 | 7.45 | 7.43 | 7.6 |
| TiO2 | 0.02 | 0 | 0.02 | 0.02 | 0.07 | 0.05 | 0.07 | 0 | 0 |
| MnO | 0.15 | 0.17 | 0 | 0.57 | 0.17 | 0.17 | 0.15 | 0.39 | 0.15 |
| SiO2 | 40.03 | 40.39 | 39.86 | 40.04 | 40.33 | 40.3 | 40.48 | 40.37 | 40.24 |
| CaO | 0.22 | 0.37 | 0.29 | 0.27 | 0.21 | 0.26 | 0.35 | 0.29 | 0.34 |
| K2O | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Na2O | 0.11 | 0 | 0 | 0.05 | 0.05 | 0 | 0 | 0 | 0 |
| NiO | 0.37 | 0.41 | 0.49 | 0.57 | 0.57 | 0.49 | 0.49 | 0.41 | 0.49 |
| Summe | 97.34 | 97.81 | 98.2 | 99.03 | 99.35 | 97.91 | 98.23 | 98.26 | 99.01 |
| | | | | | | | | | |
| Formula | | | | | | | | | |
| Si | 1.002 | 1.011 | 0.998 | 1.002 | 1.009 | 1.009 | 1.013 | 1.010 | 1.007 |
| Ti | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.001 | 0.001 | 0.000 | 0.000 |
| Al | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.003 |
| Cr | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 0.154 | 0.152 | 0.155 | 0.149 | 0.150 | 0.151 | 0.156 | 0.155 | 0.159 |
| Mn | 0.003 | 0.004 | 0.000 | 0.012 | 0.004 | 0.004 | 0.003 | 0.008 | 0.003 |
| Mg | 1.828 | 1.835 | 1.868 | 1.880 | 1.894 | 1.843 | 1.837 | 1.841 | 1.868 |
| Ni | 0.007 | 0.008 | 0.010 | 0.011 | 0.011 | 0.010 | 0.010 | 0.008 | 0.010 |
| Ca | 0.006 | 0.010 | 0.008 | 0.007 | 0.006 | 0.007 | 0.009 | 0.008 | 0.009 |
| TOTAL | 3.003 | 3.020 | 3.040 | 3.062 | 3.076 | 3.025 | 3.030 | 3.032 | 3.060 |
| | | | | | | | | | |
| Fo | 92.06 | 92.19 | 92.34 | 92.11 | 92.50 | 92.25 | 92.03 | 91.83 | 92.01 |

Olivine microprobe analysis from drill core G17 sample 47

| Sample | G17/45a1 | G17/45a2 | G17/45a5 | G17/45a7 | G17/45a8 | G17/45a11 | G17/45a12 | G17/45a13 | G17/45a14 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 44 | 43.79 | 44.1 | 45.27 | 46.4 | 45.02 | 45.8 | 45.6 | 44.61 |
| Al2O3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.09 |
| Cr2O3 | 0 | 0.02 | 0 | 0 | 0 | 0.04 | 0.02 | 0.06 | 0.02 |
| FeO | 13.29 | 13.32 | 13.28 | 13.65 | 12.56 | 13.21 | 13.27 | 13.32 | 13.09 |
| TiO2 | 0.03 | 0 | 0 | 0.03 | 0.03 | 0.05 | 0 | 0.03 | 0.03 |
| MnO | 0.16 | 0.26 | 0.22 | 0.2 | 0.24 | 0.22 | 0.24 | 0.2 | 0.2 |
| SiO2 | 42.7 | 42.47 | 42.18 | 42.33 | 43.13 | 42.45 | 42.9 | 41.93 | 42.72 |
| CaO | 0.15 | 0.17 | 0.2 | 0.22 | 0.16 | 0.16 | 0.22 | 0.19 | 0.21 |
| K2O | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Na2O | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NiO | 0.42 | 0.27 | 0.34 | 0.27 | 0.31 | 0.27 | 0.38 | 0.31 | 0.38 |
| ZnO | 0 | 0 | 0 | 0.04 | 0.04 | 0 | 0 | 0 | 0 |
| Summe | 100.75 | 100.3 | 100.32 | 102.01 | 102.87 | 101.42 | 102.83 | 101.64 | 101.35 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 1.050 | 1.045 | 1.037 | 1.041 | 1.061 | 1.044 | 1.055 | 1.031 | 1.051 |
| Ti | 0.001 | 0.000 | 0.000 | 0.001 | 0.001 | 0.001 | 0.000 | 0.001 | 0.001 |
| Al | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.003 |
| Cr | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.001 | 0.000 |
| Fe(ii) | 0.273 | 0.274 | 0.273 | 0.281 | 0.258 | 0.272 | 0.273 | 0.274 | 0.269 |
| Mn | 0.003 | 0.005 | 0.005 | 0.004 | 0.005 | 0.005 | 0.005 | 0.004 | 0.004 |
| Mg | 1.613 | 1.606 | 1.617 | 1.660 | 1.701 | 1.651 | 1.679 | 1.672 | 1.636 |
| Ni | 0.008 | 0.005 | 0.007 | 0.005 | 0.006 | 0.005 | 0.008 | 0.006 | 0.008 |
| Ca | 0.004 | 0.004 | 0.005 | 0.006 | 0.004 | 0.004 | 0.006 | 0.005 | 0.006 |
| TOTAL | 2.953 | 2.940 | 2.944 | 2.998 | 3.036 | 2.982 | 3.026 | 2.994 | 2.977 |
| | | | | | | | | | |
| Fo | 85.36 | 85.18 | 85.34 | 85.35 | 86.60 | 85.66 | 85.80 | 85.74 | 85.68 |

| Sample | G17/45e1 | G17/45e4 | G17/45e5 | G17/45e9 | G17/45e11 | G17/45e15 | G17/45e16 | G17/45d1 | G17/45d3 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 46.95 | 46.41 | 47.09 | 47.1 | 46.74 | 46.71 | 47.46 | 47.77 | 47.08 |
| Al2O3 | 0 | 0.04 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cr2O3 | 0.02 | 0.04 | 0.06 | 0 | 0 | 0.13 | 0 | 0 | 0 |
| FeO | 12.18 | 12.28 | 12.09 | 12.13 | 12.32 | 11.89 | 12.11 | 12.56 | 12 |
| TiO2 | 0 | 0.8 | 0.59 | 0.03 | 0.03 | 0 | 0.03 | 0.03 | 0.03 |
| MnO | 0.18 | 0.2 | 0.22 | 0.2 | 0.2 | 0.22 | 0.18 | 0.18 | 0.16 |
| SiO2 | 41.51 | 41.43 | 41.65 | 42.3 | 41.8 | 41.39 | 41.67 | 41.68 | 39.99 |
| CaO | 0.19 | 0.14 | 0.07 | 0.16 | 0.15 | 0.14 | 0.12 | 0.07 | 0.12 |
| K2O | 0 | 0 | 0 | 0 | 0.03 | 0 | 0 | 0 | 0 |
| Na2O | 0 | 0 | 0 | 0 | 0.08 | 0 | 0 | 0 | 0 |
| NiO | 0.42 | 0.31 | 0.27 | 0.34 | 0.34 | 0.34 | 0.38 | 0.34 | 0.34 |
| ZnO | 0 | 0 | 0.04 | 0.04 | 0 | 0 | 0 | 0 | 0 |
| Summe | 101.45 | 101.65 | 102.08 | 102.3 | 101.69 | 100.82 | 101.95 | 102.63 | 99.72 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 1.021 | 1.019 | 1.024 | 1.040 | 1.028 | 1.018 | 1.025 | 1.025 | 0.984 |
| Ti | 0.000 | 0.015 | 0.011 | 0.001 | 0.001 | 0.000 | 0.001 | 0.001 | 0.001 |
| Al | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cr | 0.000 | 0.001 | 0.001 | 0.000 | 0.000 | 0.003 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 0.251 | 0.253 | 0.249 | 0.249 | 0.253 | 0.245 | 0.249 | 0.258 | 0.247 |
| Mn | 0.004 | 0.004 | 0.005 | 0.004 | 0.004 | 0.005 | 0.004 | 0.004 | 0.003 |
| Mg | 1.722 | 1.702 | 1.727 | 1.727 | 1.714 | 1.713 | 1.740 | 1.752 | 1.726 |
| Ni | 0.008 | 0.006 | 0.005 | 0.007 | 0.007 | 0.007 | 0.008 | 0.007 | 0.007 |
| Ca | 0.005 | 0.004 | 0.002 | 0.004 | 0.004 | 0.004 | 0.003 | 0.002 | 0.003 |
| TOTAL | 3.011 | 3.004 | 3.024 | 3.033 | 3.011 | 2.993 | 3.029 | 3.048 | 2.971 |
| | | | | | | | | | |
| Fo | 87.13 | 86.89 | 87.21 | 87.19 | 86.94 | 87.30 | 87.32 | 86.99 | 87.34 |

Olivine microprobe analysis from drill core G17 sample 45

| Sample | G17/45e1 | G17/45e4 | G17/45e5 | G17/45e9 | G17/45e11 | G17/45e15 | G17/45e16 | G17/45d1 | G17/45d3 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 46.95 | 46.41 | 47.09 | 47.1 | 46.74 | 46.71 | 47.46 | 47.77 | 47.08 |
| Al2O3 | 0 | 0.04 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cr2O3 | 0.02 | 0.04 | 0.06 | 0 | 0 | 0.13 | 0 | 0 | 0 |
| FeO | 12.18 | 12.28 | 12.09 | 12.13 | 12.32 | 11.89 | 12.11 | 12.56 | 12 |
| TiO2 | 0 | 0.8 | 0.59 | 0.03 | 0.03 | 0 | 0.03 | 0.03 | 0.03 |
| MnO | 0.18 | 0.2 | 0.22 | 0.2 | 0.2 | 0.22 | 0.18 | 0.18 | 0.16 |
| SiO2 | 41.51 | 41.43 | 41.65 | 42.3 | 41.8 | 41.39 | 41.67 | 41.68 | 39.99 |
| CaO | 0.19 | 0.14 | 0.07 | 0.16 | 0.15 | 0.14 | 0.12 | 0.07 | 0.12 |
| K2O | 0 | 0 | 0 | 0 | 0.03 | 0 | 0 | 0 | 0 |
| Na2O | 0 | 0 | 0 | 0 | 0.08 | 0 | 0 | 0 | 0 |
| NiO | 0.42 | 0.31 | 0.27 | 0.34 | 0.34 | 0.34 | 0.38 | 0.34 | 0.34 |
| ZnO | 0 | 0 | 0.04 | 0.04 | 0 | 0 | 0 | 0 | 0 |
| Summe | 101.45 | 101.65 | 102.08 | 102.3 | 101.69 | 100.82 | 101.95 | 102.63 | 99.72 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 1.021 | 1.019 | 1.024 | 1.040 | 1.028 | 1.018 | 1.025 | 1.025 | 0.984 |
| Ti | 0.000 | 0.015 | 0.011 | 0.001 | 0.001 | 0.000 | 0.001 | 0.001 | 0.001 |
| Al | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cr | 0.000 | 0.001 | 0.001 | 0.000 | 0.000 | 0.003 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 0.251 | 0.253 | 0.249 | 0.249 | 0.253 | 0.245 | 0.249 | 0.258 | 0.247 |
| Mn | 0.004 | 0.004 | 0.005 | 0.004 | 0.004 | 0.005 | 0.004 | 0.004 | 0.003 |
| Mg | 1.722 | 1.702 | 1.727 | 1.727 | 1.714 | 1.713 | 1.740 | 1.752 | 1.726 |
| Ni | 0.008 | 0.006 | 0.005 | 0.007 | 0.007 | 0.007 | 0.008 | 0.007 | 0.007 |
| Ca | 0.005 | 0.004 | 0.002 | 0.004 | 0.004 | 0.004 | 0.003 | 0.002 | 0.003 |
| TOTAL | 3.011 | 3.004 | 3.024 | 3.033 | 3.011 | 2.993 | 3.029 | 3.048 | 2.971 |
| | | | | | | | | | |
| Fo | 87.13 | 86.89 | 87.21 | 87.19 | 86.94 | 87.30 | 87.32 | 86.99 | 87.34 |

| Sample | G17/45d8 | G17/45d12 | G17/45c1 | G17/45c2 | G17/45c4 | G17/45c5 | G17/45c7 | G17/45c8 | G17/45b1 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 46.86 | 43.95 | 44.36 | 44.12 | 44.56 | 44.97 | 44.47 | 45.32 | 47.04 |
| Al2O3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.04 | 0 |
| Cr2O3 | 0 | 0.04 | 0 | 0 | 0 | 0.02 | 0.02 | 0 | 0 |
| FeO | 11.74 | 12.85 | 12.88 | 13.05 | 12.57 | 12.59 | 12.71 | 12.79 | 12.02 |
| TiO2 | 0.03 | 0 | 0.05 | 0.08 | 0 | 0 | 0 | 0.03 | 0.03 |
| MnO | 0.22 | 0.18 | 0.2 | 0.22 | 0.22 | 0.18 | 0.22 | 0.22 | 0.2 |
| SiO2 | 39.57 | 41.85 | 40.75 | 40.81 | 40.52 | 41.57 | 40.56 | 41 | 38.48 |
| CaO | 0.11 | 0.1 | 0.12 | 0.09 | 0.07 | 0.12 | 0.12 | 0.1 | 0.21 |
| K2O | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Na2O | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.24 |
| NiO | 0.27 | 0.31 | 0.38 | 0.31 | 0.31 | 0.31 | 0.46 | 0.27 | 0.38 |
| ZnO | 0.04 | 0.07 | 0 | 0.04 | 0 | 0 | 0.04 | 0 | 0 |
| Summe | 98.84 | 99.35 | 98.74 | 98.72 | 98.25 | 99.76 | 98.6 | 99.77 | 98.6 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 0.973 | 1.029 | 1.002 | 1.004 | 0.997 | 1.022 | 0.998 | 1.008 | 0.976 |
| Ti | 0.001 | 0.000 | 0.001 | 0.001 | 0.000 | 0.000 | 0.000 | 0.001 | 0.001 |
| Al | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 |
| Cr | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 0.241 | 0.264 | 0.265 | 0.268 | 0.259 | 0.259 | 0.261 | 0.263 | 0.255 |
| Mn | 0.005 | 0.004 | 0.004 | 0.005 | 0.005 | 0.004 | 0.005 | 0.005 | 0.004 |
| Mg | 1.718 | 1.612 | 1.627 | 1.618 | 1.634 | 1.649 | 1.631 | 1.662 | 1.779 |
| Ni | 0.005 | 0.006 | 0.008 | 0.006 | 0.006 | 0.006 | 0.009 | 0.005 | 0.008 |
| Ca | 0.003 | 0.003 | 0.003 | 0.002 | 0.002 | 0.003 | 0.003 | 0.003 | 0.006 |
| TOTAL | 2.946 | 2.919 | 2.910 | 2.905 | 2.902 | 2.944 | 2.907 | 2.948 | 3.029 |
| | | | | | | | | | |
| Fo | 87.47 | 85.74 | 85.81 | 85.56 | 86.13 | 86.26 | 85.98 | 86.13 | 87.28 |

Olivine microprobe analysis from drill core G17 sample 45

| Sample | G17/45b5 | G17/45b12 | G17/45b13 | G17/45b14 | G17/45b15 | G17/45f1 | G17/45f2 | G17/45f3 | G17/45f4 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 47.2 | 46.98 | 46.75 | 46.66 | 46.79 | 48.9 | 49.46 | 49.4 | 48.71 |
| Al2O3 | 0 | 0.97 | 0.09 | 0.09 | 0 | 0.04 | 0.09 | 0.13 | 0.04 |
| Cr2O3 | 0 | 0 | 0 | 0.04 | 0 | 0 | 0 | 0.02 | 0.02 |
| FeO | 12.3 | 11.16 | 10.96 | 11.09 | 11.16 | 8.41 | 8.48 | 8.49 | 8.62 |
| TiO2 | 0.03 | 0.08 | 0.03 | 0.05 | 0 | 0.03 | 0 | 0.03 | 0.03 |
| MnO | 0.22 | 0.18 | 0.22 | 0.18 | 0.16 | 0.18 | 0.2 | 0.14 | 0.16 |
| SiO2 | 38.07 | 38.4 | 38.76 | 37.18 | 38.83 | 38.86 | 38.74 | 38.5 | 38.58 |
| CaO | 0.17 | 0.24 | 0.16 | 0.19 | 0.21 | 0.24 | 0.15 | 0.15 | 0.22 |
| K2O | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Na2O | 0.08 | 0 | 0.16 | 0.08 | 0 | 0.07 | 0 | 0.15 | 0 |
| NiO | 0.42 | 0.42 | 0.38 | 0.38 | 0.46 | 0.27 | 0.42 | 0.15 | 0.31 |
| ZnO | 0 | 0.04 | 0 | 0.07 | 0.04 | 0 | 0.07 | 0 | 0 |
| Summe | 98.49 | 98.47 | 97.51 | 96.01 | 97.65 | 97 | 97.61 | 97.16 | 96.69 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 0.966 | 0.974 | 0.983 | 0.943 | 0.985 | 0.986 | 0.983 | 0.977 | 0.979 |
| Ti | 0.001 | 0.002 | 0.001 | 0.001 | 0.000 | 0.001 | 0.000 | 0.001 | 0.001 |
| Al | 0.000 | 0.029 | 0.003 | 0.003 | 0.000 | 0.001 | 0.003 | 0.004 | 0.001 |
| Cr | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 0.261 | 0.237 | 0.233 | 0.235 | 0.237 | 0.178 | 0.180 | 0.180 | 0.183 |
| Mn | 0.005 | 0.004 | 0.005 | 0.004 | 0.003 | 0.004 | 0.004 | 0.003 | 0.003 |
| Mg | 1.785 | 1.777 | 1.768 | 1.765 | 1.770 | 1.850 | 1.871 | 1.868 | 1.842 |
| Ni | 0.009 | 0.009 | 0.008 | 0.008 | 0.009 | 0.006 | 0.009 | 0.003 | 0.006 |
| Ca | 0.005 | 0.007 | 0.004 | 0.005 | 0.006 | 0.007 | 0.004 | 0.004 | 0.006 |
| TOTAL | 3.031 | 3.037 | 3.004 | 2.965 | 3.010 | 3.032 | 3.053 | 3.040 | 3.022 |
| | | | | | | | | | |
| Fo | 87.05 | 88.07 | 88.17 | 88.07 | 88.05 | 91.03 | 91.04 | 91.07 | 90.82 |

| Sample | G17/45f5 | G17/45f6 | G17/45c2 | G17/45c3 | G17/45c4 | G17/45c5 | G17/45c6 | G17/45a1 | G17/45a2 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 49.74 | 49.44 | 46.94 | 45.72 | 46.52 | 46.58 | 47.07 | 44.75 | 44.81 |
| Al2O3 | 0.04 | 0 | 0 | 0.06 | 0 | 0.09 | 0 | 0 | 0 |
| Cr2O3 | 0 | 0 | 0.02 | 0 | 0.04 | 0 | 0.02 | 0 | 0 |
| FeO | 8.61 | 8.43 | 11.27 | 11.41 | 11.63 | 11.55 | 11.79 | 12.24 | 11.88 |
| TiO2 | 0 | 0.03 | 0.03 | 0 | 0.03 | 0 | 0.03 | 0 | 0.06 |
| MnO | 0.1 | 0.12 | 0.21 | 0.23 | 0.21 | 0.21 | 0.23 | 0.18 | 0.25 |
| SiO2 | 39.91 | 39.27 | 40.1 | 40.98 | 40.95 | 41.35 | 41.36 | 42.26 | 42.15 |
| CaO | 0.06 | 0.17 | 0.28 | 0.22 | 0.28 | 0.17 | 0.44 | 0.44 | 0.17 |
| K2O | 0 | 0 | 0 | 0 | 0 | 0.01 | 0 | 0 | 0 |
| Na2O | 0.15 | 0.07 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NiO | 0.54 | 0.35 | 0.42 | 0.39 | 0.45 | 0.27 | 0.39 | 0.36 | 0.33 |
| ZnO | 0.04 | 0 | | | | | | | |
| Summe | 99.19 | 97.88 | 99.27 | 99.01 | 100.11 | 100.23 | 101.33 | 100.23 | 99.65 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 1.013 | 0.996 | 1.001 | 1.023 | 1.023 | 1.033 | 1.033 | 1.055 | 1.053 |
| Ti | 0.000 | 0.001 | 0.001 | 0.000 | 0.001 | 0.000 | 0.001 | 0.000 | 0.001 |
| Al | 0.001 | 0.000 | 0.000 | 0.002 | 0.000 | 0.003 | 0.000 | 0.000 | 0.000 |
| Cr | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 0.183 | 0.179 | 0.235 | 0.238 | 0.243 | 0.241 | 0.246 | 0.256 | 0.248 |
| Mn | 0.002 | 0.003 | 0.004 | 0.005 | 0.004 | 0.004 | 0.005 | 0.004 | 0.005 |
| Mg | 1.881 | 1.870 | 1.747 | 1.702 | 1.732 | 1.734 | 1.752 | 1.666 | 1.668 |
| Ni | 0.011 | 0.007 | 0.008 | 0.008 | 0.009 | 0.005 | 0.008 | 0.007 | 0.007 |
| Ca | 0.002 | 0.005 | 0.007 | 0.006 | 0.007 | 0.005 | 0.012 | 0.012 | 0.005 |
| TOTAL | 3.093 | 3.060 | 3.005 | 2.984 | 3.020 | 3.025 | 3.057 | 3.000 | 2.986 |
| | | | | | | | | | |
| Fo | 91.06 | 91.16 | 87.93 | 87.50 | 87.51 | 87.59 | 87.47 | 86.53 | 86.82 |

Olivine microprobe analysis from drill core G17 sample 45

| Sample | G17/45a3 | G17/45e8 | G17/45f1 | G17/45f2 | G17/45f3 | G17/45h3 | G17/45g1 | G17/45g3 | G17/45g5 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 45.87 | 47.19 | 49.3 | 49.18 | 49.22 | 45.89 | 46.92 | 46.97 | 46.64 |
| Al2O3 | 0 | 0.03 | 0 | 0.06 | 0.06 | 0 | 0.09 | 0 | 0 |
| Cr2O3 | 0 | 0.02 | 0 | 0.02 | 0.02 | 0.02 | 0 | 0 | 0 |
| FeO | 12.45 | 11.89 | 8.73 | 8.31 | 8.49 | 10 | 11.97 | 11.63 | 11.26 |
| TiO2 | 0.03 | 0 | 0 | 0.03 | 0.03 | 0.03 | 0.03 | 0.06 | 0.06 |
| MnO | 0.21 | 0.14 | 0.18 | 0.16 | 0.18 | 0.16 | 0.2 | 0.21 | 0.16 |
| SiO2 | 42.71 | 41.97 | 42.63 | 42.2 | 42.35 | 42.1 | 43.86 | 43.2 | 43.12 |
| CaO | 0.22 | 0.17 | 0.22 | 0.11 | 0.22 | 0.22 | 0.11 | 0.39 | 0.28 |
| K2O | 0 | 0.02 | 0 | 0.02 | 0 | 0 | 0.01 | 0 | 0.02 |
| Na2O | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NiO | 0.36 | 0.33 | 0.36 | 0.48 | 0.45 | 0.36 | 0.36 | 0.42 | 0.48 |
| ZnO | | | | | | | | | |
| Summe | 101.85 | 101.76 | 101.42 | 100.57 | 101.02 | 98.78 | 103.55 | 102.88 | 102.02 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 1.067 | 1.048 | 1.065 | 1.054 | 1.058 | 1.051 | 1.095 | 1.079 | 1.077 |
| Ti | 0.001 | 0.000 | 0.000 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 |
| Al | 0.000 | 0.001 | 0.000 | 0.002 | 0.002 | 0.000 | 0.003 | 0.000 | 0.000 |
| Cr | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 0.260 | 0.248 | 0.182 | 0.174 | 0.177 | 0.209 | 0.250 | 0.243 | 0.235 |
| Mn | 0.004 | 0.003 | 0.004 | 0.003 | 0.004 | 0.003 | 0.004 | 0.004 | 0.003 |
| Mg | 1.708 | 1.757 | 1.835 | 1.831 | 1.832 | 1.708 | 1.747 | 1.749 | 1.736 |
| Ni | 0.007 | 0.007 | 0.007 | 0.010 | 0.009 | 0.007 | 0.007 | 0.008 | 0.010 |
| Ca | 0.006 | 0.005 | 0.006 | 0.003 | 0.006 | 0.006 | 0.003 | 0.010 | 0.007 |
| TOTAL | 3.052 | 3.068 | 3.099 | 3.077 | 3.089 | 2.986 | 3.109 | 3.095 | 3.070 |
| | | | | | | | | | |
| Fo | 86.59 | 87.49 | 90.79 | 91.19 | 91.01 | 88.95 | 87.30 | 87.61 | 87.92 |

| Sample | G17/45g8 | G17/45i2 | G17/45i3 | G17/45e2 | G17/45e5 | G17/45b1 | G17/45b5 | |
|---|---|---|---|---|---|---|---|---|
| MgO | 46.87 | 46.39 | 46.17 | 46.8 | 46.69 | 44.51 | 42.25 | 45.4 |
| Al2O3 | 0.46 | 0 | 0 | 0 | 0.09 | 0.09 | 0 | 0 |
| Cr2O3 | 0.04 | 0 | 0.02 | 0 | 0 | 0.02 | 0 | 0.02 |
| FeO | 11.38 | 10.79 | 10.65 | 11.24 | 11.36 | 12.47 | 12.49 | 12.32 |
| TiO2 | 0.06 | 0 | 0 | 0.03 | 0.06 | 0.06 | 0 | 0.03 |
| MnO | 0.2 | 0.21 | 0.21 | 0.21 | 0.2 | 0.23 | 0.14 | 0.21 |
| SiO2 | 43.46 | 43.13 | 42.15 | 42.88 | 42.18 | 43.24 | 42.77 | 42.03 |
| CaO | 0.17 | 0.11 | 0.22 | 0.22 | 0.17 | 0.39 | 0.33 | 0.28 |
| K2O | 0.01 | 0.02 | 0 | 0 | 0.03 | 0 | 0.01 | 0 |
| Na2O | 0 | 0.07 | 0 | 0 | 0 | 0 | 0 | 0.07 |
| NiO | 0.36 | 0.45 | 0.39 | 0.39 | 0.48 | 0.42 | 0.45 | 0.39 |
| ZnO | | | | | | | | |
| Summe | 103.01 | 101.17 | 99.81 | 101.77 | 101.26 | 101.43 | 98.44 | 100.75 |

| Formula | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Si | 1.085 | 1.077 | 1.053 | 1.071 | 1.053 | 1.080 | 1.068 | 1.050 |
| Ti | 0.001 | 0.000 | 0.000 | 0.001 | 0.001 | 0.001 | 0.000 | 0.001 |
| Al | 0.014 | 0.000 | 0.000 | 0.000 | 0.003 | 0.003 | 0.000 | 0.000 |
| Cr | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 0.238 | 0.225 | 0.222 | 0.235 | 0.237 | 0.260 | 0.261 | 0.257 |
| Mn | 0.004 | 0.004 | 0.004 | 0.004 | 0.004 | 0.005 | 0.003 | 0.004 |
| Mg | 1.745 | 1.727 | 1.719 | 1.742 | 1.738 | 1.657 | 1.573 | 1.690 |
| Ni | 0.007 | 0.009 | 0.008 | 0.008 | 0.010 | 0.008 | 0.009 | 0.008 |
| Ca | 0.005 | 0.003 | 0.006 | 0.006 | 0.005 | 0.010 | 0.009 | 0.007 |
| TOTAL | 3.099 | 3.046 | 3.012 | 3.066 | 3.051 | 3.025 | 2.922 | 3.018 |
| | | | | | | | | |
| Fo | 87.83 | 88.26 | 88.34 | 87.93 | 87.80 | 86.20 | 85.64 | 86.59 |

Olivine microprobe analysis from drill core G17 sample 45

| Sample | G17/44d1 | G17/44d2 | G17/44d7 | G17/44d9 | G17/44d10 | G17/44d12 | G17/44d13 | G17/44d14 | G17/44d15 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 52.55 | 50.93 | 50.34 | 51.43 | 49.18 | 50.73 | 52.46 | 52.43 | 51.88 |
| Al2O3 | 0.07 | 0 | 0 | 0.07 | 0 | 0 | 0 | 0 | 0 |
| Cr2O3 | 0 | 0 | 0 | 0 | 0 | 0 | 0.02 | 0.03 | 0.05 |
| FeO | 4.59 | 6 | 6.33 | 3.86 | 6.03 | 6.21 | 6.45 | 6.42 | 6.23 |
| TiO2 | 0 | 0.02 | 0.02 | 0 | 0 | 0.04 | 0 | 0.07 | 0.04 |
| MnO | 0.13 | 0.13 | 0.11 | 0.15 | 0.11 | 0.11 | 0.11 | 0.11 | 0.13 |
| SiO2 | 43.58 | 42.72 | 42.41 | 42.79 | 41.97 | 42.56 | 43.42 | 43.65 | 42.56 |
| CaO | 0 | 0.21 | 0.17 | 0.04 | 0.33 | 0.37 | 0.25 | 0.25 | 0.29 |
| K2O | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.02 |
| Na2O | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NiO | 0.2 | 0.37 | 0.46 | 0.23 | 0.37 | 0.48 | 0.37 | 0.34 | 0.4 |
| Summe | 101.12 | 100.38 | 99.84 | 98.57 | 97.99 | 100.5 | 103.08 | 103.3 | 101.6 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 1.027 | 1.007 | 0.999 | 1.008 | 0.989 | 1.003 | 1.023 | 1.029 | 1.003 |
| Ti | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.001 | 0.001 |
| Al | 0.002 | 0.000 | 0.000 | 0.002 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cr | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.001 |
| Fe(ii) | 0.090 | 0.118 | 0.125 | 0.076 | 0.119 | 0.122 | 0.127 | 0.127 | 0.123 |
| Mn | 0.003 | 0.003 | 0.002 | 0.003 | 0.002 | 0.002 | 0.002 | 0.002 | 0.003 |
| Mg | 1.846 | 1.789 | 1.769 | 1.807 | 1.728 | 1.782 | 1.843 | 1.842 | 1.823 |
| Ni | 0.004 | 0.007 | 0.009 | 0.004 | 0.007 | 0.009 | 0.007 | 0.006 | 0.008 |
| Ca | 0.000 | 0.005 | 0.004 | 0.001 | 0.008 | 0.009 | 0.006 | 0.006 | 0.007 |
| TOTAL | 2.972 | 2.930 | 2.908 | 2.902 | 2.853 | 2.929 | 3.009 | 3.014 | 2.968 |
| | | | | | | | | | |
| Fo | 95.20 | 93.67 | 93.30 | 95.81 | 93.45 | 93.47 | 93.44 | 93.47 | 93.56 |

| Sample | G17/44b1 | G17/44b2 | G17/44b5 | G17/44b6 | G17/44b7 | G17/44b8 | G17/44b9 | G17/44a2 | G17/44a3 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 53.63 | 51.29 | 52.43 | 58.11 | 52.72 | 51.97 | 52.33 | 51.82 | 51.91 |
| Al2O3 | 0 | 0 | 0 | 0 | 0 | 0 | 0.04 | 0.26 | 0 |
| Cr2O3 | 0.02 | 0 | 0 | 0 | 0.03 | 0 | 0 | 0 | 0 |
| FeO | 3.83 | 6.1 | 5.39 | 4.44 | 6.19 | 6.27 | 6.39 | 6.33 | 6.33 |
| TiO2 | 0 | 0.02 | 0.04 | 0 | 0.02 | 0 | 0.02 | 0.02 | 0.04 |
| MnO | 0.13 | 0.13 | 0.11 | 0.13 | 0.13 | 0.06 | 0.17 | 0.08 | 0.15 |
| SiO2 | 41.92 | 42.33 | 43.01 | 43.19 | 43.55 | 43.09 | 43.02 | 42.55 | 44.02 |
| CaO | 0.04 | 0.04 | 0.29 | 0.04 | 0.12 | 0.21 | 0.21 | 0.37 | 0.33 |
| K2O | 0.01 | 0 | 0 | 0.01 | 0 | 0.01 | 0 | 0 | 0.01 |
| Na2O | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NiO | 0.14 | 0.43 | 0.43 | 0.23 | 0.34 | 0.4 | 0.37 | 0.51 | 0.43 |
| Summe | 99.72 | 100.34 | 101.7 | 106.15 | 103.1 | 102.01 | 102.55 | 101.94 | 103.22 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 0.988 | 0.998 | 1.014 | 1.018 | 1.026 | 1.015 | 1.014 | 1.003 | 1.037 |
| Ti | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 |
| Al | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.007 | 0.000 |
| Cr | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 0.075 | 0.120 | 0.106 | 0.087 | 0.122 | 0.124 | 0.126 | 0.125 | 0.125 |
| Mn | 0.003 | 0.003 | 0.002 | 0.003 | 0.003 | 0.001 | 0.003 | 0.002 | 0.003 |
| Mg | 1.884 | 1.802 | 1.842 | 2.042 | 1.852 | 1.826 | 1.838 | 1.821 | 1.824 |
| Ni | 0.003 | 0.008 | 0.008 | 0.004 | 0.006 | 0.008 | 0.007 | 0.010 | 0.008 |
| Ca | 0.001 | 0.001 | 0.007 | 0.001 | 0.003 | 0.005 | 0.005 | 0.009 | 0.008 |
| TOTAL | 2.954 | 2.932 | 2.980 | 3.155 | 3.013 | 2.979 | 2.995 | 2.976 | 3.006 |
| | | | | | | | | | |
| Fo | 96.02 | 93.62 | 94.44 | 95.77 | 93.70 | 93.60 | 93.43 | 93.51 | 93.45 |

Olivine microprobe analysis from drill core G17 sample 44

| Sample | G17/44a4 | G17/44a5 | G17/44a6 | G17/44c1 | std | G17/44c6 | G17/44c7 | G17/44c8 | G17/44c11 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 50.66 | 51.72 | 50.51 | 53.02 | 51.02 | 53.95 | 50.38 | 52.09 | 51.27 |
| Al2O3 | 0.15 | 0 | 0 | 0 | 0 | 0.26 | 0 | 0.29 | 0.04 |
| Cr2O3 | 0 | 0.03 | 0.02 | 0.02 | 0 | 0 | 0.02 | 0.02 | 0.02 |
| FeO | 6.35 | 6.39 | 6.39 | 6.59 | 6.1 | 6.77 | 6.25 | 6.2 | 6.35 |
| TiO2 | 0.02 | 0.02 | 0 | 0.02 | 0.02 | 0 | 0.04 | 0.02 | 0 |
| MnO | 0.15 | 0.15 | 0.11 | 0.13 | 0.06 | 0.13 | 0.15 | 0.15 | 0.08 |
| SiO2 | 43.82 | 43.49 | 43.68 | 42.74 | 42.13 | 43.86 | 43.02 | 42.47 | 42.29 |
| CaO | 0.21 | 0.25 | 0.29 | 0.29 | 0.04 | 0.29 | 0.33 | 0.08 | 0.33 |
| K2O | 0 | 0 | 0.01 | 0 | 0 | 0 | 0 | 0 | 0.01 |
| Na2O | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NiO | 0.46 | 0.37 | 0.37 | 0.37 | 0.43 | 0.4 | 0.43 | 0.46 | 0.43 |
| Summe | 101.82 | 102.42 | 101.38 | 103.18 | 99.8 | 105.66 | 100.62 | 101.78 | 100.82 |
| | | | | | | | | | |
| Formula | | | | | | | | | |
| Si | 1.033 | 1.025 | 1.029 | 1.007 | 0.993 | 1.034 | 1.014 | 1.001 | 0.997 |
| Ti | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 |
| Al | 0.004 | 0.000 | 0.000 | 0.000 | 0.000 | 0.007 | 0.000 | 0.008 | 0.001 |
| Cr | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 0.125 | 0.126 | 0.126 | 0.130 | 0.120 | 0.133 | 0.123 | 0.122 | 0.125 |
| Mn | 0.003 | 0.003 | 0.002 | 0.003 | 0.001 | 0.003 | 0.003 | 0.003 | 0.002 |
| Mg | 1.780 | 1.817 | 1.775 | 1.863 | 1.792 | 1.895 | 1.770 | 1.830 | 1.801 |
| Ni | 0.009 | 0.007 | 0.007 | 0.007 | 0.008 | 0.008 | 0.008 | 0.009 | 0.008 |
| Ca | 0.005 | 0.006 | 0.007 | 0.007 | 0.001 | 0.007 | 0.008 | 0.002 | 0.008 |
| TOTAL | 2.959 | 2.985 | 2.947 | 3.017 | 2.916 | 3.087 | 2.928 | 2.976 | 2.943 |
| | | | | | | | | | |
| Fo | 93.28 | 93.38 | 93.27 | 93.36 | 93.66 | 93.31 | 93.35 | 93.60 | 93.43 |

| Sample | G17/44c12 | G17/44e1 | G17/44e2 | G17/44e3 | G17/44e4 | G17/44e9 | G17/44e10 | G17/44e11 | G17/44e12 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 51.38 | 52.53 | 52.35 | 52.85 | 53.1 | 53.29 | 54.3 | 53.48 | 53.87 |
| Al2O3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cr2O3 | 0.02 | 0.03 | 0 | 0.03 | 0.02 | 0.05 | 0.02 | 0.02 | 0 |
| FeO | 6.54 | 6.71 | 6.85 | 6.6 | 6.57 | 6.54 | 6.62 | 6.79 | 6.6 |
| TiO2 | 0.02 | 0 | 0 | 0.04 | 0.02 | 0 | 0.02 | 0 | 0 |
| MnO | 0.13 | 0.13 | 0.13 | 0.08 | 0.11 | 0.11 | 0.13 | 0.08 | 0.11 |
| SiO2 | 41.89 | 42.63 | 42.88 | 42.84 | 42.94 | 43.02 | 43.15 | 42.78 | 43.28 |
| CaO | 0.12 | 0.29 | 0.21 | 0.17 | 0.29 | 0.12 | 0.29 | 0.25 | 0.21 |
| K2O | 0.02 | 0 | 0 | 0 | 0.01 | 0 | 0 | 0.02 | 0 |
| Na2O | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NiO | 0.4 | 0.34 | 0.46 | 0.4 | 0.37 | 0.43 | 0.43 | 0.43 | 0.46 |
| Summe | 100.52 | 102.66 | 102.88 | 103.01 | 103.43 | 103.56 | 104.96 | 103.85 | 104.53 |
| | | | | | | | | | |
| Formula | | | | | | | | | |
| Si | 0.987 | 1.005 | 1.011 | 1.010 | 1.012 | 1.014 | 1.017 | 1.008 | 1.020 |
| Ti | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Al | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cr | 0.000 | 0.001 | 0.000 | 0.001 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 0.129 | 0.132 | 0.135 | 0.130 | 0.129 | 0.129 | 0.130 | 0.134 | 0.130 |
| Mn | 0.003 | 0.003 | 0.003 | 0.002 | 0.002 | 0.002 | 0.003 | 0.002 | 0.002 |
| Mg | 1.805 | 1.846 | 1.839 | 1.857 | 1.866 | 1.872 | 1.908 | 1.879 | 1.893 |
| Ni | 0.008 | 0.006 | 0.009 | 0.008 | 0.007 | 0.008 | 0.008 | 0.008 | 0.009 |
| Ca | 0.003 | 0.007 | 0.005 | 0.004 | 0.007 | 0.003 | 0.007 | 0.006 | 0.005 |
| TOTAL | 2.935 | 2.999 | 3.001 | 3.011 | 3.024 | 3.029 | 3.074 | 3.037 | 3.059 |
| | | | | | | | | | |
| Fo | 93.21 | 93.19 | 93.04 | 93.38 | 93.41 | 93.46 | 93.48 | 93.28 | 93.47 |

Olivine microprobe analysis from drill core G17 sample 44

| Sample | G17/44f2 | G17/44f3 | G17/44f4 | G17/44f5 | G17/44g2 | G17/44g3 | G17/44g4 |
|---|---|---|---|---|---|---|---|
| MgO | 52.67 | 54.67 | 53.69 | 53.21 | 50.74 | 49.62 | 48.6 |
| Al2O3 | 0.04 | 0.04 | 0.04 | 0 | 1.53 | 0.99 | 1.26 |
| Cr2O3 | 0 | 0.03 | 0.03 | 0.02 | 0.02 | 0 | 0 |
| FeO | 6.32 | 4.32 | 6.16 | 6.64 | 6.56 | 6.74 | 6.57 |
| TiO2 | 0 | 0 | 0.02 | 0.07 | 0.05 | 0 | 0 |
| MnO | 0.15 | 0.17 | 0.13 | 0.15 | 0.16 | 0.19 | 0.14 |
| SiO2 | 42.58 | 43.78 | 43.42 | 42.57 | 41.08 | 41.21 | 40.56 |
| CaO | 0.17 | 0.08 | 0.29 | 0.46 | 0.04 | 0.35 | 0.26 |
| K2O | 0.01 | 0 | 0.01 | 0 | 0 | 0 | 0 |
| Na2O | 0 | 0 | 0 | 1.19 | 0.82 | 0.24 | 0 |
| NiO | 0.43 | 0.17 | 0.46 | 0.43 | 0.44 | 0.47 | 0.56 |
| Summe | 102.37 | 103.26 | 104.25 | 104.74 | 101.44 | 99.81 | 97.95 |

| Formula | | | | | | | |
|---|---|---|---|---|---|---|---|
| Si | 1.003 | 1.032 | 1.023 | 1.003 | 1.025 | 1.028 | 1.012 |
| Ti | 0.000 | 0.000 | 0.000 | 0.001 | 0.001 | 0.000 | 0.000 |
| Al | 0.001 | 0.001 | 0.001 | 0.000 | 0.045 | 0.029 | 0.037 |
| Cr | 0.000 | 0.001 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 0.125 | 0.085 | 0.121 | 0.131 | 0.137 | 0.141 | 0.137 |
| Mn | 0.003 | 0.003 | 0.003 | 0.003 | 0.003 | 0.004 | 0.003 |
| Mg | 1.850 | 1.921 | 1.886 | 1.869 | 1.887 | 1.845 | 1.807 |
| Ni | 0.008 | 0.003 | 0.009 | 0.008 | 0.009 | 0.009 | 0.011 |
| Ca | 0.004 | 0.002 | 0.007 | 0.012 | 0.001 | 0.009 | 0.007 |
| TOTAL | 2.995 | 3.048 | 3.052 | 3.028 | 3.108 | 3.066 | 3.014 |
| | | | | | | | |
| Fo | 93.55 | 95.59 | 93.83 | 93.32 | 93.08 | 92.73 | 92.81 |

| Sample | G17/44g5 | G17/44GA10 | G17/44gA4 | G17/44gA10 | G17/44gA11 | G17/44gA12 |
|---|---|---|---|---|---|---|
| MgO | 49.96 | 50.11 | 49.34 | 47.6 | 47.99 | 46.89 |
| Al2O3 | 0 | 0 | 0 | 1.25 | 0 | 1.42 |
| Cr2O3 | 0.04 | 0 | 0.04 | 0 | 0.02 | 0.02 |
| FeO | 6.39 | 6.54 | 6.01 | 6.93 | 7 | 6.82 |
| TiO2 | 0 | 0.02 | 0.02 | 0 | 0.02 | 0.02 |
| MnO | 0.12 | 0.19 | 0.16 | 0.12 | 0.12 | 0.09 |
| SiO2 | 40.49 | 40.79 | 39.25 | 41.1 | 41.52 | 41.77 |
| CaO | 0.09 | 0.35 | 0.26 | 0.44 | 0.4 | 0.26 |
| K2O | 0 | 0 | 0 | 0 | 0.1 | 0 |
| Na2O | 0.14 | 0 | 1.58 | 0 | 0.44 | 0 |
| NiO | 0.47 | 0.47 | 0.44 | 0.34 | 0.38 | 0.38 |
| Summe | 97.7 | 98.47 | 97.1 | 97.78 | 97.99 | 97.67 |

| Formula | | | | | | |
|---|---|---|---|---|---|---|
| Si | 1.010 | 1.018 | 0.979 | 1.025 | 1.036 | 1.042 |
| Ti | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Al | 0.000 | 0.000 | 0.000 | 0.037 | 0.000 | 0.042 |
| Cr | 0.001 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 0.133 | 0.136 | 0.125 | 0.145 | 0.146 | 0.142 |
| Mn | 0.003 | 0.004 | 0.003 | 0.003 | 0.003 | 0.002 |
| Mg | 1.858 | 1.864 | 1.835 | 1.770 | 1.785 | 1.744 |
| Ni | 0.009 | 0.009 | 0.009 | 0.007 | 0.008 | 0.008 |
| Ca | 0.002 | 0.009 | 0.007 | 0.012 | 0.011 | 0.007 |
| TOTAL | 3.016 | 3.041 | 2.960 | 2.998 | 2.988 | 2.987 |
| | | | | | | |
| Fo | 93.19 | 92.99 | 93.44 | 92.33 | 92.32 | 92.36 |

Olivine microprobe analysis from drill core G17 – sample 44

| Sample | G17/43a2 | G17/43a3 | G17/43a5 | G17/43a8 | G17/43a13 | g17/43a16 | g17/43b8 | g17/43b10 | g17/43b11 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 49.35 | 49.32 | 50.32 | 49.35 | 53.21 | 50.68 | 51.22 | 48.75 | 48.68 |
| Al2O3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cr2O3 | 0 | 0 | 0.14 | 0 | 0.21 | 0 | 0.03 | 0.02 | 0 |
| FeO | 7.27 | 7.64 | 6.89 | 7.39 | 7.16 | 7.76 | 7.51 | 7.72 | 7.47 |
| TiO2 | 0.02 | 0 | 0.05 | 0 | 0.02 | 0 | 0.02 | 0.05 | 0.07 |
| MnO | 0.15 | 0.1 | 0.15 | 0.13 | 0.05 | 0.2 | 0.18 | 0.23 | 0.15 |
| SiO2 | 42.29 | 42.06 | 41.89 | 41.71 | 41.41 | 42.54 | 42.83 | 43.12 | 43.15 |
| CaO | 0.29 | 0.25 | 0.14 | 0.34 | 0.14 | 0.14 | 0.18 | 0.23 | 0.29 |
| K2O | 0 | 0 | 0 | 0.01 | 0 | 0 | 0 | 0 | 0 |
| Na2O | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NiO | 0.44 | 0.44 | 0.52 | 0.4 | 0.32 | 0.4 | 0.48 | 0.32 | 0.44 |
| ZnO | 0.01 | 0 | 0 | 0.01 | 0 | 0 | 0.01 | 0 | 0 |
| Summe | 99.82 | 99.81 | 100.1 | 99.34 | 102.52 | 101.72 | 102.46 | 100.44 | 100.25 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 1.027 | 1.021 | 1.017 | 1.013 | 1.005 | 1.033 | 1.040 | 1.047 | 1.048 |
| Ti | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.001 |
| Al | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cr | 0.000 | 0.000 | 0.003 | 0.000 | 0.004 | 0.000 | 0.001 | 0.000 | 0.000 |
| Fe(ii) | 0.148 | 0.155 | 0.140 | 0.150 | 0.145 | 0.158 | 0.152 | 0.157 | 0.152 |
| Mn | 0.003 | 0.002 | 0.003 | 0.003 | 0.001 | 0.004 | 0.004 | 0.005 | 0.003 |
| Mg | 1.786 | 1.785 | 1.821 | 1.786 | 1.926 | 1.834 | 1.854 | 1.765 | 1.762 |
| Ni | 0.009 | 0.009 | 0.010 | 0.008 | 0.006 | 0.008 | 0.009 | 0.006 | 0.009 |
| Ca | 0.008 | 0.007 | 0.004 | 0.009 | 0.004 | 0.004 | 0.005 | 0.006 | 0.008 |
| TOTAL | 2.980 | 2.979 | 2.999 | 2.968 | 3.092 | 3.041 | 3.065 | 2.987 | 2.982 |
| | | | | | | | | | |
| Fo | 92.22 | 91.91 | 92.72 | 92.12 | 92.94 | 91.90 | 92.23 | 91.62 | 91.93 |

| Sample | g17/43b12 | g17/43b13 | g17/43b16 | g17/43d13 | g17/43d16 | g17/43d18 | g17/43d20 | g17/43d24 | g17/43d25 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 49.33 | 48.29 | 48.74 | 50.68 | 51.05 | 50.45 | 50.21 | 52.85 | 50.4 |
| Al2O3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cr2O3 | 0.02 | 0.02 | 0.05 | 0 | 0.23 | 0.02 | 0 | 0.02 | 0.03 |
| FeO | 7.88 | 7.76 | 7.55 | 7.74 | 7.92 | 7.62 | 7.6 | 4.58 | 7.88 |
| TiO2 | 0.05 | 0.02 | 0.02 | 0.05 | 0 | 0 | 0.05 | 0 | 0.02 |
| MnO | 0.08 | 0.2 | 0.08 | 0.1 | 0.13 | 0.08 | 0.15 | 0.13 | 0.15 |
| SiO2 | 42.73 | 42.75 | 43.63 | 41.41 | 41.08 | 41.71 | 40.52 | 40.5 | 40.98 |
| CaO | 0.18 | 0.29 | 0.26 | 0.27 | 0.18 | 0.21 | 0.2 | 0 | 0.17 |
| K2O | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Na2O | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NiO | 0.44 | 0.36 | 0.48 | 0.4 | 0.48 | 0.44 | 0.44 | 0.4 | 0.48 |
| ZnO | 0 | 0 | 0 | 0 | 0.02 | 0 | 0 | 0 | 0 |
| Summe | 100.71 | 99.69 | 100.81 | 100.65 | 101.09 | 100.53 | 99.17 | 98.48 | 100.11 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 1.038 | 1.038 | 1.059 | 1.005 | 0.997 | 1.013 | 0.984 | 0.983 | 0.995 |
| Ti | 0.001 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 |
| Al | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cr | 0.000 | 0.000 | 0.001 | 0.000 | 0.004 | 0.000 | 0.000 | 0.000 | 0.001 |
| Fe(ii) | 0.160 | 0.158 | 0.153 | 0.157 | 0.161 | 0.155 | 0.154 | 0.093 | 0.160 |
| Mn | 0.002 | 0.004 | 0.002 | 0.002 | 0.003 | 0.002 | 0.003 | 0.003 | 0.003 |
| Mg | 1.786 | 1.748 | 1.764 | 1.834 | 1.848 | 1.826 | 1.817 | 1.913 | 1.824 |
| Ni | 0.009 | 0.007 | 0.009 | 0.008 | 0.009 | 0.009 | 0.009 | 0.008 | 0.009 |
| Ca | 0.005 | 0.008 | 0.007 | 0.007 | 0.005 | 0.005 | 0.005 | 0.000 | 0.004 |
| TOTAL | 2.999 | 2.963 | 2.996 | 3.015 | 3.027 | 3.010 | 2.973 | 3.000 | 2.997 |
| | | | | | | | | | |
| Fo | 91.70 | 91.53 | 91.93 | 92.01 | 91.87 | 92.11 | 92.03 | 95.24 | 91.79 |

Olivine microprobe analysis from drill core G17 – sample 43

| Sample | g17/43d26 | g17/43d27 | g17/43d28 | g17/43d29 | g17/43d30 | g17/43d32 | g17/43d35 | g17/43d37 | G17/43e2 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 49.78 | 52.33 | 52.3 | 50.12 | 50.46 | 50.69 | 50.65 | 49.95 | 54.54 |
| Al2O3 | 0.04 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cr2O3 | 0.03 | 0.02 | 0.02 | 0.02 | 0 | 0.03 | 0.36 | 0.78 | 0.03 |
| FeO | 7.91 | 4.13 | 5.03 | 7.8 | 7.86 | 7.75 | 8.19 | 8.52 | 6.26 |
| TiO2 | 0 | 0 | 0 | 0.05 | 0 | 0 | 0.02 | 0.05 | 0 |
| MnO | 0.2 | 0.1 | 0.1 | 0.15 | 0.05 | 0.1 | 0.15 | 0.1 | 0.12 |
| SiO2 | 41.54 | 41.72 | 41.12 | 40.01 | 40.02 | 40.63 | 40.5 | 39.63 | 38.5 |
| CaO | 0.26 | 0.01 | 0.03 | 0.2 | 0.1 | 0.21 | 0.1 | 0.12 | 0.17 |
| K2O | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Na2O | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NiO | 0.55 | 0.44 | 0.28 | 0.4 | 0.52 | 0.56 | 0.32 | 0.59 | 0.49 |
| ZnO | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.01 | |
| Summe | 100.31 | 98.75 | 98.88 | 98.75 | 99.01 | 99.97 | 100.29 | 99.75 | 100.11 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 1.009 | 1.013 | 0.998 | 0.971 | 0.972 | 0.987 | 0.983 | 0.962 | 0.939 |
| Ti | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 |
| Al | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cr | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.007 | 0.015 | 0.001 |
| Fe(ii) | 0.161 | 0.084 | 0.102 | 0.158 | 0.160 | 0.157 | 0.166 | 0.173 | 0.128 |
| Mn | 0.004 | 0.002 | 0.002 | 0.003 | 0.001 | 0.002 | 0.003 | 0.002 | 0.002 |
| Mg | 1.802 | 1.894 | 1.893 | 1.814 | 1.827 | 1.835 | 1.833 | 1.808 | 1.982 |
| Ni | 0.011 | 0.009 | 0.005 | 0.008 | 0.010 | 0.011 | 0.006 | 0.012 | 0.010 |
| Ca | 0.007 | 0.000 | 0.001 | 0.005 | 0.003 | 0.005 | 0.003 | 0.003 | 0.004 |
| TOTAL | 2.994 | 3.002 | 3.002 | 2.961 | 2.972 | 2.998 | 3.002 | 2.976 | 3.066 |
| | | | | | | | | | |
| Fo | 91.62 | 95.66 | 94.78 | 91.83 | 91.92 | 92.01 | 91.54 | 91.17 | 93.84 |

| Sample | G17/43e5 | G17/43d2 | G17/43d3 | G17/43d5 | G17/43d6 | G17/43d7 | G17/43d8 | G17/43d9 | G17/43d10 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 52.67 | 51.67 | 50.97 | 51.24 | 50.87 | 50.59 | 50.92 | 50.79 | 50.92 |
| Al2O3 | 0.15 | 0 | 0 | 0.08 | 0 | 0 | 0.23 | 0 | 0.23 |
| Cr2O3 | 0.02 | 0.02 | 0 | 0.03 | 0.05 | 0 | 0.02 | 0 | 0 |
| FeO | 7.25 | 7.64 | 7.36 | 7.56 | 7.34 | 7.58 | 7.46 | 7.47 | 7.44 |
| TiO2 | 0 | 0 | 0 | 0 | 0.09 | 0.07 | 0.07 | 0 | 0.02 |
| MnO | 0.08 | 0.13 | 0.13 | 0.1 | 0.12 | 0.08 | 0.12 | 0.15 | 0.15 |
| SiO2 | 41.42 | 41.38 | 40.61 | 41.9 | 41.15 | 42 | 42.82 | 41.22 | 41.7 |
| CaO | 0.26 | 0.22 | 0.29 | 0.25 | 0.27 | 0.16 | 0.14 | 0.24 | 0.26 |
| K2O | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.01 |
| Na2O | 0.09 | 0 | 0.05 | 0.32 | 0.83 | 0 | 0 | 0.14 | 0 |
| NiO | 0.49 | 0.53 | 0.45 | 0.45 | 0.45 | 0.45 | 0.53 | 0.49 | 0.41 |
| ZnO | | | | | | | | | |
| Summe | 102.43 | 101.59 | 99.86 | 101.93 | 101.17 | 100.93 | 102.31 | 100.5 | 101.14 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 1.010 | 1.009 | 0.990 | 1.021 | 1.003 | 1.024 | 1.044 | 1.005 | 1.017 |
| Ti | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | 0.001 | 0.001 | 0.000 | 0.000 |
| Al | 0.004 | 0.000 | 0.000 | 0.002 | 0.000 | 0.000 | 0.007 | 0.000 | 0.007 |
| Cr | 0.000 | 0.000 | 0.000 | 0.001 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 0.148 | 0.156 | 0.150 | 0.154 | 0.150 | 0.155 | 0.152 | 0.152 | 0.152 |
| Mn | 0.002 | 0.003 | 0.003 | 0.002 | 0.002 | 0.002 | 0.002 | 0.003 | 0.003 |
| Mg | 1.914 | 1.878 | 1.852 | 1.862 | 1.849 | 1.839 | 1.851 | 1.846 | 1.851 |
| Ni | 0.010 | 0.010 | 0.009 | 0.009 | 0.009 | 0.009 | 0.010 | 0.010 | 0.008 |
| Ca | 0.007 | 0.006 | 0.008 | 0.007 | 0.007 | 0.004 | 0.004 | 0.006 | 0.007 |
| TOTAL | 3.095 | 3.062 | 3.012 | 3.058 | 3.023 | 3.033 | 3.071 | 3.022 | 3.044 |
| | | | | | | | | | |
| Fo | 92.76 | 92.22 | 92.38 | 92.26 | 92.40 | 92.17 | 92.29 | 92.24 | 92.28 |

Olivine microprobe analysis from drill core G17 – sample 43

| Sample | G17/43c2 | G17/43c8 | G17/43c9 | G17/43c10 | G17/43c12 | G17/43c14 | G17/43c15 | G17/43c17 | G17/43c19 | G17/43c21 |
|---|---|---|---|---|---|---|---|---|---|---|
| MgO | 50.91 | 50.73 | 50.81 | 50.29 | 50.44 | 50.71 | 51.08 | 50.22 | 53.23 | 50.68 |
| Al2O3 | 0.68 | 0 | 0.46 | 0 | 0.38 | 0.15 | 0 | 0.15 | 0 | 0 |
| Cr2O3 | 0.02 | 0.02 | 0 | 0.02 | 0 | 0 | 0.02 | 0.02 | 0.02 | 0.02 |
| FeO | 7.39 | 7.17 | 7.68 | 7.41 | 7.35 | 7.61 | 7.42 | 7.47 | 4.3 | 7.57 |
| TiO2 | 0.04 | 0 | 0.02 | 0 | 0.02 | 0 | 0 | 0.04 | 0.02 | 0 |
| MnO | 0.1 | 0.17 | 0.12 | 0.13 | 0.12 | 0.13 | 0.08 | 0.17 | 0.1 | 0.13 |
| SiO2 | 41.74 | 40.96 | 41.87 | 41.7 | 42.66 | 42.93 | 42.94 | 42.19 | 43.35 | 42.7 |
| CaO | 0.16 | 0.2 | 0.11 | 0.24 | 0.15 | 0.17 | 0.16 | 0.2 | 0 | 0.25 |
| K2O | 0 | 0 | 0 | 0.01 | 0 | 0.01 | 0 | 0 | 0 | 0 |
| Na2O | 0 | 0 | 0 | 0 | 0.05 | 0 | 0 | 0.14 | 0.04 | 0 |
| NiO | 0.49 | 0.49 | 0.57 | 0.41 | 0.53 | 0.45 | 0.49 | 0.53 | 0.33 | 0.53 |
| ZnO | | | | | | | | | | |
| Summe | 101.53 | 99.74 | 101.64 | 100.21 | 101.7 | 102.16 | 102.19 | 101.13 | 101.39 | 101.88 |

| Formula | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Si | 1.018 | 0.999 | 1.021 | 1.017 | 1.040 | 1.047 | 1.047 | 1.029 | 1.057 | 1.041 |
| Ti | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 |
| Al | 0.020 | 0.000 | 0.013 | 0.000 | 0.011 | 0.004 | 0.000 | 0.004 | 0.000 | 0.000 |
| Cr | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 0.151 | 0.146 | 0.157 | 0.151 | 0.150 | 0.155 | 0.151 | 0.152 | 0.088 | 0.154 |
| Mn | 0.002 | 0.004 | 0.002 | 0.003 | 0.002 | 0.003 | 0.002 | 0.004 | 0.002 | 0.003 |
| Mg | 1.850 | 1.844 | 1.847 | 1.828 | 1.833 | 1.843 | 1.856 | 1.825 | 1.935 | 1.842 |
| Ni | 0.010 | 0.010 | 0.011 | 0.008 | 0.010 | 0.009 | 0.010 | 0.010 | 0.006 | 0.010 |
| Ca | 0.004 | 0.005 | 0.003 | 0.006 | 0.004 | 0.004 | 0.004 | 0.005 | 0.000 | 0.007 |
| TOTAL | 3.055 | 3.007 | 3.054 | 3.013 | 3.051 | 3.065 | 3.070 | 3.031 | 3.088 | 3.057 |
| | | | | | | | | | | |
| Fo | 92.38 | 92.49 | 92.07 | 92.24 | 92.33 | 92.11 | 92.39 | 92.14 | 95.57 | 92.15 |

Olivine microprobe analysis from drill core G17 - 43

| Sample | G17/42e2 | G17/42e3 | G17/42e4 | G17/42e9 | G17/42e12 | G17/42e13 | G17/42e16 | G17/42f3 | G17/42f4 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 51.35 | 52.16 | 55.37 | 53.02 | 51.54 | 52.93 | 53.02 | 52.28 | 52.41 |
| Al2O3 | 0 | 0.06 | 0 | 0.17 | 0 | 0.11 | 0.06 | 0.17 | 0 |
| Cr2O3 | 0.02 | 0.04 | 0.02 | 0.02 | 0.02 | 0 | 0.02 | 0 | 0 |
| FeO | 6.9 | 6.88 | 3.91 | 6.63 | 6.87 | 7.04 | 7.33 | 7.85 | 7.47 |
| TiO2 | 0 | 0 | 0.05 | 0.02 | 0.05 | 0 | 0 | 0.05 | 0.02 |
| MnO | 0.12 | 0.15 | 0.17 | 0.12 | 0.1 | 0.04 | 0.1 | 0.19 | 0.17 |
| SiO2 | 41.4 | 40.8 | 42.04 | 41.16 | 40.68 | 39.84 | 40.32 | 41.99 | 41.93 |
| CaO | 0.28 | 0.39 | 0 | 0.24 | 0.35 | 0.31 | 0.39 | 0.39 | 0.35 |
| K2O | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.01 |
| Na2O | 0 | 0.06 | 0 | 0 | 0 | 0 | 0 | 0.06 | 0.06 |
| NiO | 0.36 | 0.44 | 0.14 | 0.33 | 0.39 | 0.33 | 0.47 | 0.47 | 0.39 |
| Summe | 100.43 | 100.98 | 101.7 | 101.71 | 100 | 100.6 | 101.71 | 103.45 | 102.81 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 1.000 | 0.986 | 1.016 | 0.995 | 0.983 | 0.963 | 0.974 | 1.015 | 1.013 |
| Ti | 0.000 | 0.000 | 0.001 | 0.000 | 0.001 | 0.000 | 0.000 | 0.001 | 0.000 |
| Al | 0.000 | 0.002 | 0.000 | 0.005 | 0.000 | 0.003 | 0.002 | 0.005 | 0.000 |
| Cr | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 0.139 | 0.139 | 0.079 | 0.134 | 0.139 | 0.142 | 0.148 | 0.159 | 0.151 |
| Mn | 0.002 | 0.003 | 0.003 | 0.002 | 0.002 | 0.001 | 0.002 | 0.004 | 0.003 |
| Mg | 1.850 | 1.879 | 1.995 | 1.910 | 1.857 | 1.907 | 1.910 | 1.883 | 1.888 |
| Ni | 0.007 | 0.009 | 0.003 | 0.006 | 0.008 | 0.006 | 0.009 | 0.009 | 0.008 |
| Ca | 0.007 | 0.010 | 0.000 | 0.006 | 0.009 | 0.008 | 0.010 | 0.010 | 0.009 |
| TOTAL | 3.007 | 3.028 | 3.097 | 3.059 | 2.998 | 3.030 | 3.056 | 3.085 | 3.073 |
| | | | | | | | | | |
| Fo | 92.88 | 92.97 | 96.03 | 93.33 | 92.95 | 93.02 | 92.71 | 92.06 | 92.44 |

| Sample | G17/42f5 | G17/42f6 | G17/42f7 | G17/42f8 | G17/42f10 | G17/42f15 | G17/42f16 | G17/42d1 | G17/42c4 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 52.6 | 51.08 | 50.18 | 50.19 | 51.94 | 51.27 | 51.74 | 52.79 | 49.77 |
| Al2O3 | 0.11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cr2O3 | 0 | 0 | 0 | 0 | 0.04 | 0 | 0.02 | 0 | 0.02 |
| FeO | 7.41 | 7.38 | 7.29 | 7.42 | 7.09 | 7.69 | 7.78 | 4.5 | 7.26 |
| TiO2 | 0 | 0.02 | 0.02 | 0.05 | 0.05 | 0.02 | 0.02 | 0 | 0.02 |
| MnO | 0.21 | 0.1 | 0.19 | 0.15 | 0.12 | 0 | 0.1 | 0.16 | 0.14 |
| SiO2 | 39.86 | 40.16 | 39.04 | 39.6 | 40.36 | 41.92 | 41.65 | 42.46 | 41.95 |
| CaO | 0.51 | 0.35 | 0.43 | 0.47 | 0.35 | 0.38 | 0.42 | 0 | 0.47 |
| K2O | 0 | 0.01 | 0 | 0 | 0 | 0 | 0 | 0.01 | 0 |
| Na2O | 0.06 | 0 | 0 | 0 | 0.06 | 0.11 | 0.11 | 0 | 0 |
| NiO | 0.5 | 0.47 | 0.5 | 0.44 | 0.36 | 0.64 | 0.5 | 0.52 | 0.45 |
| Summe | 101.26 | 99.57 | 97.65 | 98.32 | 100.37 | 102.03 | 102.34 | 100.44 | 100.08 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 0.963 | 0.970 | 0.943 | 0.957 | 0.975 | 1.013 | 1.006 | 1.011 | 0.999 |
| Ti | 0.000 | 0.000 | 0.000 | 0.001 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 |
| Al | 0.003 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cr | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 0.150 | 0.149 | 0.147 | 0.150 | 0.143 | 0.155 | 0.157 | 0.090 | 0.145 |
| Mn | 0.004 | 0.002 | 0.004 | 0.003 | 0.002 | 0.000 | 0.002 | 0.003 | 0.003 |
| Mg | 1.895 | 1.840 | 1.808 | 1.808 | 1.871 | 1.847 | 1.864 | 1.875 | 1.767 |
| Ni | 0.010 | 0.009 | 0.010 | 0.009 | 0.007 | 0.012 | 0.010 | 0.010 | 0.009 |
| Ca | 0.013 | 0.009 | 0.011 | 0.012 | 0.009 | 0.010 | 0.011 | 0.000 | 0.012 |
| TOTAL | 3.038 | 2.980 | 2.923 | 2.940 | 3.010 | 3.038 | 3.051 | 2.989 | 2.935 |
| | | | | | | | | | |
| Fo | 92.48 | 92.41 | 92.28 | 92.20 | 92.78 | 92.24 | 92.13 | 95.28 | 92.30 |

Olivine microprobe analysis from drill core G17 – sample 42

| Sample | G17/42d2 | G17/42d3 | G17/42d4 | G17/42d5 | G17/42d6 | G17/42d7 | G17/42d8 | G17/42c1 | G17/42c2 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 50.12 | 50.8 | 50.65 | 50.65 | 51.51 | 50.79 | 50.88 | 51.18 | 49.92 |
| Al2O3 | 0 | 0.1 | 0 | 0 | 0 | 0.05 | 0 | 0 | 0.05 |
| Cr2O3 | 0 | 0 | 0 | 0.05 | 0.02 | 0 | 0 | 0.02 | 0 |
| FeO | 6.9 | 6.97 | 7.08 | 7.12 | 7.08 | 7.21 | 7.15 | 7.29 | 6.94 |
| TiO2 | 0 | 0 | 0.02 | 0.04 | 0.04 | 0 | 0.04 | 0 | 0 |
| MnO | 0.17 | 0.16 | 0.16 | 0.16 | 0.17 | 0.12 | 0.14 | 0.19 | 0.14 |
| SiO2 | 41.51 | 42.23 | 42.17 | 42.2 | 42.43 | 41.61 | 42.69 | 42.62 | 42.01 |
| CaO | 0.29 | 0.36 | 0.29 | 0.29 | 0.25 | 0.36 | 0.36 | 0.32 | 0.32 |
| K2O | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Na2O | 0.05 | 0.05 | 0 | 0 | 0 | 0.05 | 0 | 0 | 0 |
| NiO | 0.59 | 0.45 | 0.48 | 0.45 | 0.52 | 0.52 | 0.52 | 0.48 | 0.38 |
| Summe | 99.63 | 101.12 | 100.85 | 100.96 | 102.02 | 100.71 | 101.78 | 102.1 | 99.76 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 0.989 | 1.006 | 1.004 | 1.005 | 1.011 | 0.991 | 1.017 | 1.015 | 1.001 |
| Ti | 0.000 | 0.000 | 0.000 | 0.001 | 0.001 | 0.000 | 0.001 | 0.000 | 0.000 |
| Al | 0.000 | 0.003 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.001 |
| Cr | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 0.137 | 0.139 | 0.141 | 0.142 | 0.141 | 0.144 | 0.142 | 0.145 | 0.138 |
| Mn | 0.003 | 0.003 | 0.003 | 0.003 | 0.003 | 0.002 | 0.003 | 0.004 | 0.003 |
| Mg | 1.780 | 1.804 | 1.799 | 1.799 | 1.829 | 1.804 | 1.807 | 1.817 | 1.773 |
| Ni | 0.011 | 0.009 | 0.009 | 0.009 | 0.010 | 0.010 | 0.010 | 0.009 | 0.007 |
| Ca | 0.007 | 0.009 | 0.007 | 0.007 | 0.006 | 0.009 | 0.009 | 0.008 | 0.008 |
| TOTAL | 2.928 | 2.972 | 2.964 | 2.966 | 3.002 | 2.961 | 2.989 | 2.999 | 2.931 |
| | | | | | | | | | |
| Fo | 92.67 | 92.70 | 92.58 | 92.54 | 92.68 | 92.51 | 92.56 | 92.42 | 92.63 |

| Sample | G17/42b5 | G17/42b7 | G17/42b8 | G17/42b9 | G17/42b10 | G17/42b11 | G17/42a1 | G17/42a6 | G17/42a7 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 51.34 | 52.11 | 50.47 | 50.98 | 50.35 | 51.29 | 49.57 | 48.31 | 52.11 |
| Al2O3 | 0 | 0 | 0.1 | 0 | 0.1 | 0 | 0.05 | 0 | 0.05 |
| Cr2O3 | 0 | 0 | 0 | 0.03 | 0 | 0 | 0 | 0 | 0 |
| FeO | 6.97 | 6.99 | 7.03 | 6.81 | 6.94 | 6.81 | 7.17 | 7.1 | 6.84 |
| TiO2 | 0 | 0 | 0 | 0 | 0.02 | 0 | 0.02 | 0 | 0.04 |
| MnO | 0.16 | 0.14 | 0.14 | 0.1 | 0.16 | 0.1 | 0.17 | 0.12 | 0.14 |
| SiO2 | 41.81 | 41.03 | 41.74 | 41.22 | 41.2 | 40.21 | 42.81 | 42.12 | 40.44 |
| CaO | 0.22 | 0.32 | 0.32 | 0 | 0 | 0.11 | 0.04 | 0 | 0 |
| K2O | 0 | 0 | 0.01 | 0 | 0 | 0 | 0 | 0 | 0 |
| Na2O | 0.1 | 0 | 0 | 0 | 0.1 | 0.05 | 0 | 0 | 0 |
| NiO | 0.52 | 0.48 | 0.59 | 0.45 | 0.38 | 0.42 | 0.45 | 0.52 | 0.48 |
| Summe | 101.12 | 101.07 | 100.4 | 99.59 | 99.25 | 98.99 | 100.28 | 98.17 | 100.1 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 0.996 | 0.977 | 0.994 | 0.982 | 0.981 | 0.958 | 1.020 | 1.003 | 0.963 |
| Ti | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 |
| Al | 0.000 | 0.000 | 0.003 | 0.000 | 0.003 | 0.000 | 0.001 | 0.000 | 0.001 |
| Cr | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 0.139 | 0.139 | 0.140 | 0.136 | 0.138 | 0.136 | 0.143 | 0.141 | 0.136 |
| Mn | 0.003 | 0.003 | 0.003 | 0.002 | 0.003 | 0.002 | 0.003 | 0.002 | 0.003 |
| Mg | 1.823 | 1.850 | 1.792 | 1.810 | 1.788 | 1.821 | 1.760 | 1.715 | 1.850 |
| Ni | 0.010 | 0.009 | 0.011 | 0.009 | 0.007 | 0.008 | 0.009 | 0.010 | 0.009 |
| Ca | 0.006 | 0.008 | 0.008 | 0.000 | 0.000 | 0.003 | 0.001 | 0.000 | 0.000 |
| TOTAL | 2.977 | 2.987 | 2.951 | 2.939 | 2.921 | 2.928 | 2.937 | 2.872 | 2.964 |
| | | | | | | | | | |
| Fo | 92.77 | 92.87 | 92.62 | 92.93 | 92.67 | 92.97 | 92.33 | 92.26 | 93.01 |

Olivine microprobe analysis from drill core G17 – sample 42

| Sample | G17/40c6 | G17/40c7 | G17/40c8 | G17/40c9 | G17/40c10 | G17/40c11 | G17/40d1 | G17/40d2 | G17/40d3 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 52.85 | 53.1 | 52.81 | 53.23 | 53.06 | 53.07 | 53.2 | 52.67 | 52.54 |
| Al2O3 | 0 | 0 | 0 | 0.06 | 0 | 0 | 0.06 | 0.06 | 0 |
| Cr2O3 | 0 | 0.04 | 0 | 0 | 0 | 0.04 | 0 | 0.02 | 0 |
| FeO | 7.56 | 7.63 | 7.39 | 7.44 | 7.53 | 7.22 | 7.55 | 7.56 | 7.36 |
| TiO2 | 0.08 | 0 | 0 | 0 | 0 | 0 | 0.08 | 0.04 | 0.04 |
| MnO | 0.02 | 0.02 | 0 | 0 | 0.07 | 0 | 0 | 0.04 | 0 |
| SiO2 | 41.7 | 42.3 | 41.58 | 41.66 | 42.11 | 41.56 | 39.78 | 40.58 | 38.94 |
| CaO | 0.23 | 0.23 | 0.31 | 0.46 | 0.62 | 0.23 | 0.62 | 0.23 | 0.62 |
| K2O | 0 | 0 | 0 | 0.01 | 0 | 0 | 0.03 | 0.01 | 0.01 |
| Na2O | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NiO | 0.14 | 0.14 | 0.14 | 0.14 | 0.21 | 0.14 | 0.17 | 0.07 | 0.17 |
| Summe | 102.58 | 103.46 | 102.23 | 103 | 103.6 | 102.26 | 101.49 | 101.28 | 99.68 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 0.988 | 1.003 | 0.986 | 0.987 | 0.998 | 0.985 | 0.943 | 0.962 | 0.923 |
| Ti | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.001 | 0.001 |
| Al | 0.000 | 0.000 | 0.000 | 0.002 | 0.000 | 0.000 | 0.002 | 0.002 | 0.000 |
| Cr | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 0.150 | 0.151 | 0.146 | 0.147 | 0.149 | 0.143 | 0.150 | 0.150 | 0.146 |
| Mn | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.001 | 0.000 |
| Mg | 1.867 | 1.876 | 1.866 | 1.881 | 1.875 | 1.875 | 1.880 | 1.861 | 1.857 |
| Ni | 0.003 | 0.003 | 0.003 | 0.003 | 0.004 | 0.003 | 0.003 | 0.001 | 0.003 |
| Ca | 0.006 | 0.006 | 0.008 | 0.012 | 0.016 | 0.006 | 0.016 | 0.006 | 0.016 |
| TOTAL | 3.016 | 3.040 | 3.009 | 3.032 | 3.043 | 3.013 | 2.994 | 2.984 | 2.945 |
| | | | | | | | | | |
| Fo | 92.55 | 92.52 | 92.72 | 92.73 | 92.56 | 92.91 | 92.63 | 92.51 | 92.72 |

| Sample | G17/40d4 | G17/40d5 | 6 | G17/40d7 | G17/40d8 | G17/40d10 | G17/40d11 | G17/40e3 | G17/40e4 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 51.85 | 52.05 | 52.65 | 52.9 | 52.48 | 51.91 | 52.26 | 53.24 | 53.48 |
| Al2O3 | 0.06 | 0 | 0.06 | 0 | 0 | 0 | 0 | 0.06 | 0 |
| Cr2O3 | 0.04 | 0.02 | 0 | 0.04 | 0 | 0 | 0.02 | 0 | 0.02 |
| FeO | 7.46 | 7.61 | 7.37 | 7.37 | 7.58 | 7.44 | 7.58 | 7.74 | 7.55 |
| TiO2 | 0.04 | 0 | 0 | 0.04 | 0.04 | 0 | 0.08 | 0.04 | 0 |
| MnO | 0.04 | 0.02 | 0.07 | 0.04 | 0.04 | 0.04 | 0 | 0 | 0.04 |
| SiO2 | 38.94 | 38.65 | 39.93 | 39.8 | 40.01 | 39.32 | 38.58 | 40.29 | 39.75 |
| CaO | 0.39 | 0.31 | 0.46 | 0.31 | 0.39 | 0.31 | 0.31 | 0.39 | 0.31 |
| K2O | 0.02 | 0.02 | 0 | 0.01 | 0.01 | 0 | 0 | 0.01 | 0.02 |
| Na2O | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.22 |
| NiO | 0.21 | 0.07 | 0 | 0.14 | 0.21 | 0.1 | 0.14 | 0.17 | 0.21 |
| Summe | 99.05 | 98.75 | 100.54 | 100.65 | 100.76 | 99.12 | 98.97 | 101.94 | 101.6 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 0.923 | 0.916 | 0.946 | 0.943 | 0.948 | 0.932 | 0.914 | 0.955 | 0.942 |
| Ti | 0.001 | 0.000 | 0.000 | 0.001 | 0.001 | 0.000 | 0.001 | 0.001 | 0.000 |
| Al | 0.002 | 0.000 | 0.002 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | 0.000 |
| Cr | 0.001 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 0.148 | 0.151 | 0.146 | 0.146 | 0.150 | 0.147 | 0.150 | 0.153 | 0.150 |
| Mn | 0.001 | 0.000 | 0.001 | 0.001 | 0.001 | 0.001 | 0.000 | 0.000 | 0.001 |
| Mg | 1.832 | 1.839 | 1.860 | 1.869 | 1.854 | 1.834 | 1.847 | 1.881 | 1.890 |
| Ni | 0.004 | 0.001 | 0.000 | 0.003 | 0.004 | 0.002 | 0.003 | 0.003 | 0.004 |
| Ca | 0.010 | 0.008 | 0.012 | 0.008 | 0.010 | 0.008 | 0.008 | 0.010 | 0.008 |
| TOTAL | 2.921 | 2.916 | 2.968 | 2.971 | 2.968 | 2.924 | 2.924 | 3.005 | 2.995 |
| | | | | | | | | | |
| Fo | 92.50 | 92.40 | 92.66 | 92.72 | 92.47 | 92.52 | 92.48 | 92.46 | 92.63 |

Olivine microprobe analysis from drill core G17 – sample 40

| Sample | G17/40e7 | G17/40e9 | G17/40e10 | G17/40e11 | G17/40b1 | G17/40b2 | G17/40b3 | G17/40b4 | G17/40b5 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 54.77 | 54.55 | 54.15 | 53 | 51.53 | 50.79 | 33.42 | 51.98 | 53.2 |
| Al2O3 | 0 | 0.06 | 0 | 0.06 | 0 | 0 | 9.87 | 0.06 | 0.17 |
| Cr2O3 | 0.04 | 0.04 | 0 | 0 | 0 | 0 | 0.24 | 0 | 0.16 |
| FeO | 7.58 | 7.63 | 7.36 | 7.67 | 7.37 | 7.54 | 10.49 | 7.6 | 7.67 |
| TiO2 | 0 | 0 | 0.08 | 0.04 | 0 | 0 | 0 | 0.11 | 0 |
| MnO | 0.04 | 0 | 0.02 | 0 | 0 | 0.02 | 0 | 0.04 | 0.04 |
| SiO2 | 39.5 | 39.88 | 38.94 | 38.82 | 41.56 | 42.4 | 37.75 | 41.27 | 42.34 |
| CaO | 0.23 | 0.15 | 0.39 | 0.46 | 0.39 | 0.46 | 0.08 | 0.46 | 0.31 |
| K2O | 0 | 0 | 0 | 0.02 | 0.01 | 0.01 | 3.97 | 0 | 0 |
| Na2O | 0 | 0 | 0 | 0 | 0 | 0 | 0.97 | 0 | 0 |
| NiO | 0.14 | 0.1 | 0.21 | 0.21 | 0.14 | 0.07 | 0.24 | 0.17 | 0.17 |
| Summe | 102.3 | 102.41 | 101.15 | 100.28 | 101 | 101.29 | 97.03 | 101.69 | 104.06 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 0.936 | 0.945 | 0.923 | 0.920 | 0.985 | 1.005 | 0.895 | 0.978 | 1.004 |
| Ti | 0.000 | 0.000 | 0.001 | 0.001 | 0.000 | 0.000 | 0.000 | 0.002 | 0.000 |
| Al | 0.000 | 0.002 | 0.000 | 0.002 | 0.000 | 0.000 | 0.276 | 0.002 | 0.005 |
| Cr | 0.001 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.004 | 0.000 | 0.003 |
| Fe(ii) | 0.150 | 0.151 | 0.146 | 0.152 | 0.146 | 0.149 | 0.208 | 0.151 | 0.152 |
| Mn | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.001 |
| Mg | 1.935 | 1.928 | 1.913 | 1.873 | 1.821 | 1.795 | 1.181 | 1.837 | 1.880 |
| Ni | 0.003 | 0.002 | 0.004 | 0.004 | 0.003 | 0.001 | 0.005 | 0.003 | 0.003 |
| Ca | 0.006 | 0.004 | 0.010 | 0.012 | 0.010 | 0.012 | 0.002 | 0.012 | 0.008 |
| TOTAL | 3.032 | 3.032 | 2.998 | 2.963 | 2.965 | 2.963 | 2.570 | 2.985 | 3.055 |
| | | | | | | | | | |
| Fo | 92.76 | 92.73 | 92.90 | 92.49 | 92.57 | 92.29 | 85.03 | 92.38 | 92.48 |

| Sample | G17/40b6 | G17/40b7 | G17/40b9 | G17/40b10 | G17/40b11 | G17/40b12 | G17/40a2 | G17/40a3 | G17/40a4 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 53.07 | 53.16 | 53.11 | 52.68 | 52.85 | 52.16 | 52.82 | 50.12 | 52.29 |
| Al2O3 | 0 | 0.06 | 0.06 | 0.06 | 0.12 | 0.06 | 0.06 | 0 | 0 |
| Cr2O3 | 0 | 0.14 | 0 | 0 | 0.06 | 0.04 | 0.06 | 0 | 0 |
| FeO | 7.56 | 7.7 | 7.54 | 7.41 | 7.63 | 7.24 | 7.36 | 7.35 | 7.36 |
| TiO2 | 0 | 0 | 0 | 0 | 0.08 | 0 | 0 | 0 | 0.04 |
| MnO | 0.07 | 0.04 | 0.07 | 0 | 0.07 | 0.04 | 0.04 | 0 | 0.04 |
| SiO2 | 42.1 | 41.42 | 42.18 | 41.13 | 40.62 | 41.56 | 41.83 | 41.77 | 41.21 |
| CaO | 0.39 | 0.23 | 0.31 | 0.46 | 0.31 | 0.39 | 0.46 | 0.08 | 0.46 |
| K2O | 0 | 0 | 0 | 0 | 0.01 | 0 | 0 | 0 | 0.01 |
| Na2O | 0 | 0 | 0 | 0 | 0 | 0 | 0.07 | 0 | 0.07 |
| NiO | 0.1 | 0.17 | 0.03 | 0.21 | 0.17 | 0.24 | 0.17 | 0.1 | 0.17 |
| Summe | 103.29 | 102.92 | 103.3 | 101.95 | 101.92 | 101.73 | 102.87 | 99.42 | 101.65 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 0.998 | 0.982 | 1.000 | 0.975 | 0.963 | 0.985 | 0.991 | 0.990 | 0.977 |
| Ti | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.001 |
| Al | 0.000 | 0.002 | 0.002 | 0.002 | 0.003 | 0.002 | 0.002 | 0.000 | 0.000 |
| Cr | 0.000 | 0.003 | 0.000 | 0.000 | 0.001 | 0.001 | 0.001 | 0.000 | 0.000 |
| Fe(ii) | 0.150 | 0.153 | 0.149 | 0.147 | 0.151 | 0.143 | 0.146 | 0.146 | 0.146 |
| Mn | 0.001 | 0.001 | 0.001 | 0.000 | 0.001 | 0.001 | 0.001 | 0.000 | 0.001 |
| Mg | 1.875 | 1.878 | 1.877 | 1.861 | 1.867 | 1.843 | 1.866 | 1.771 | 1.848 |
| Ni | 0.002 | 0.003 | 0.001 | 0.004 | 0.003 | 0.005 | 0.003 | 0.002 | 0.003 |
| Ca | 0.010 | 0.006 | 0.008 | 0.012 | 0.008 | 0.010 | 0.012 | 0.002 | 0.012 |
| TOTAL | 3.036 | 3.027 | 3.037 | 3.001 | 3.000 | 2.989 | 3.022 | 2.911 | 2.987 |
| | | | | | | | | | |
| Fo | 92.54 | 92.45 | 92.56 | 92.69 | 92.44 | 92.74 | 92.71 | 92.40 | 92.65 |

Olivine microprobe analysis from drill core G17 – sample 40

| Sample | G17/40a6 | G17/40a8 | G17/40a9 | G17/40a10 | G17/40a11 |
|---|---|---|---|---|---|
| MgO | 52.95 | 52.4 | 52.36 | 52.19 | 51.55 |
| Al2O3 | 0 | 0.06 | 0.06 | 0 | 0.06 |
| Cr2O3 | 0 | 0 | 0 | 0 | 0 |
| FeO | 7.72 | 7.46 | 7.29 | 7.39 | 6.94 |
| TiO2 | 0 | 0 | 0 | 0.04 | 0 |
| MnO | 0.02 | 0.07 | 0 | 0.02 | 0.09 |
| SiO2 | 41.69 | 41.68 | 40.32 | 41.21 | 41.02 |
| CaO | 0.39 | 0.31 | 0.31 | 0.46 | 0.31 |
| K2O | 0.01 | 0 | 0 | 0 | 0 |
| Na2O | 0 | 0 | 0 | 0.07 | 0 |
| NiO | 0.21 | 0.14 | 0.21 | 0.17 | 0.07 |
| Summe | 102.99 | 102.12 | 100.55 | 101.55 | 100.04 |

| Formula | | | | | |
|---|---|---|---|---|---|
| Si | 0.988 | 0.988 | 0.956 | 0.977 | 0.972 |
| Ti | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 |
| Al | 0.000 | 0.002 | 0.002 | 0.000 | 0.002 |
| Cr | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 0.153 | 0.148 | 0.144 | 0.146 | 0.138 |
| Mn | 0.000 | 0.001 | 0.000 | 0.000 | 0.002 |
| Mg | 1.871 | 1.852 | 1.850 | 1.844 | 1.822 |
| Ni | 0.004 | 0.003 | 0.004 | 0.003 | 0.001 |
| Ca | 0.010 | 0.008 | 0.008 | 0.012 | 0.008 |
| TOTAL | 3.026 | 3.001 | 2.964 | 2.983 | 2.944 |
| | | | | | |
| Fo | 92.42 | 92.54 | 92.76 | 92.62 | 92.89 |

Olivine microprobe analysis from drill core G17 – sample 40

| Sample | G17/39a1 | G17/39a2 | G17/39a3 | G17/39a4 | G17/39b1 | G17/39b2 | G17/39b3 | G17/39b4 | G17/39b5 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 49.66 | 49.48 | 49.5 | 49.85 | 49.66 | 49.67 | 49.99 | 50.4 | 49.18 |
| Al2O3 | 0 | 0.03 | 0 | 0.06 | 0 | 0 | 0 | 0 | 0 |
| Cr2O3 | 0 | 0 | 0.02 | 0.04 | 0 | 0.02 | 0.04 | 0.04 | 0.02 |
| FeO | 6.66 | 6.63 | 6.63 | 6.56 | 6.42 | 6.63 | 6.48 | 6.21 | 6.15 |
| TiO2 | 0.03 | 0.03 | 0 | 0.03 | 0.07 | 0 | 0.03 | 0.03 | 0.03 |
| MnO | 0.16 | 0.09 | 0.11 | 0.14 | 0.13 | 0.09 | 0.13 | 0.11 | 0.14 |
| SiO2 | 42.89 | 43.24 | 42.74 | 42.35 | 42.71 | 42.84 | 43.01 | 42.84 | 42.9 |
| CaO | 0.28 | 0.39 | 0.22 | 0.39 | 0.28 | 0.33 | 0.33 | 0.28 | 0.22 |
| K2O | 0 | 0.03 | 0 | 0.01 | 0.01 | 0 | 0.01 | 0.03 | 0.02 |
| Na2O | 0 | 0 | 0 | 0.06 | 0 | 0 | 0 | 0 | 0.06 |
| NiO | 0.36 | 0.45 | 0.39 | 0.48 | 0.33 | 0.42 | 0.45 | 0.45 | 0.36 |
| Summe | 100.04 | 100.37 | 99.61 | 99.97 | 99.61 | 100 | 100.47 | 100.39 | 99.08 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 1.034 | 1.043 | 1.031 | 1.021 | 1.030 | 1.033 | 1.037 | 1.033 | 1.035 |
| Ti | 0.001 | 0.001 | 0.000 | 0.001 | 0.001 | 0.000 | 0.001 | 0.001 | 0.001 |
| Al | 0.000 | 0.001 | 0.000 | 0.002 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cr | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.001 | 0.001 | 0.000 |
| Fe(ii) | 0.134 | 0.134 | 0.134 | 0.132 | 0.129 | 0.134 | 0.131 | 0.125 | 0.124 |
| Mn | 0.003 | 0.002 | 0.002 | 0.003 | 0.003 | 0.002 | 0.003 | 0.002 | 0.003 |
| Mg | 1.786 | 1.779 | 1.780 | 1.792 | 1.786 | 1.786 | 1.797 | 1.812 | 1.768 |
| Ni | 0.007 | 0.009 | 0.008 | 0.009 | 0.006 | 0.008 | 0.009 | 0.009 | 0.007 |
| Ca | 0.007 | 0.010 | 0.006 | 0.010 | 0.007 | 0.009 | 0.009 | 0.007 | 0.006 |
| TOTAL | 2.972 | 2.978 | 2.960 | 2.971 | 2.963 | 2.972 | 2.987 | 2.990 | 2.943 |
| | | | | | | | | | |
| Fo | 92.85 | 92.92 | 92.90 | 92.99 | 93.11 | 92.95 | 93.09 | 93.43 | 93.30 |

| Sample | G17/39b6 | G17/39c3 | G17/39c4 | G17/39c5 | G17/39c6 | G17/39d1 | G17/39d2 | G17/39d3 | G17/39d4 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 52 | 52.01 | 51.37 | 51.26 | 51.93 | 51.22 | 51.38 | 52.15 | 52.01 |
| Al2O3 | 0 | 0.06 | 0 | 0.03 | 0 | 0.06 | 0.03 | 0.03 | 0 |
| Cr2O3 | 0 | 0 | 0 | 0 | 0.04 | 0.02 | 0 | 0 | 0.04 |
| FeO | 6.26 | 6.13 | 6.34 | 6.24 | 6.21 | 6.18 | 6.09 | 6.26 | 6.04 |
| TiO2 | 0 | 0 | 0 | 0.03 | 0.07 | 0 | 0 | 0 | 0 |
| MnO | 0.13 | 0.13 | 0.13 | 0.09 | 0.14 | 0.05 | 0.11 | 0.14 | 0.13 |
| SiO2 | 39.97 | 40.28 | 40.73 | 40.23 | 40.84 | 39.62 | 40.34 | 40.43 | 40.5 |
| CaO | 0.28 | 0.17 | 0.28 | 0.33 | 0.28 | 0.22 | 0.22 | 0.33 | 0.22 |
| K2O | 0 | 0 | 0 | 0 | 0 | 0.01 | 0 | 0 | 0 |
| Na2O | 0 | 0 | 0 | 0 | 0 | 0.06 | 0 | 0.06 | 0 |
| NiO | 0.42 | 0.39 | 0.36 | 0.42 | 0.45 | 0.36 | 0.33 | 0.36 | 0.39 |
| Summe | 99.06 | 99.17 | 99.21 | 98.63 | 99.96 | 97.8 | 98.5 | 99.76 | 99.33 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 0.964 | 0.971 | 0.982 | 0.970 | 0.985 | 0.956 | 0.973 | 0.975 | 0.977 |
| Ti | 0.000 | 0.000 | 0.000 | 0.001 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 |
| Al | 0.000 | 0.002 | 0.000 | 0.001 | 0.000 | 0.002 | 0.001 | 0.001 | 0.000 |
| Cr | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.001 |
| Fe(ii) | 0.126 | 0.124 | 0.128 | 0.126 | 0.125 | 0.125 | 0.123 | 0.126 | 0.122 |
| Mn | 0.003 | 0.003 | 0.003 | 0.002 | 0.003 | 0.001 | 0.002 | 0.003 | 0.003 |
| Mg | 1.870 | 1.870 | 1.847 | 1.843 | 1.867 | 1.842 | 1.847 | 1.875 | 1.870 |
| Ni | 0.008 | 0.008 | 0.007 | 0.008 | 0.009 | 0.007 | 0.006 | 0.007 | 0.008 |
| Ca | 0.007 | 0.004 | 0.007 | 0.009 | 0.007 | 0.006 | 0.006 | 0.009 | 0.006 |
| TOTAL | 2.978 | 2.981 | 2.974 | 2.959 | 2.998 | 2.938 | 2.958 | 2.996 | 2.985 |
| | | | | | | | | | |
| Fo | 93.55 | 93.67 | 93.40 | 93.52 | 93.58 | 93.61 | 93.66 | 93.56 | 93.76 |

Olivine microprobe analysis from drill core G17 – sample 39

| Sample | G17/39d5 | G17/39d6 | G17/39d7 | G17/39e2 | G17/39e3 | G17/39e4 | G17/39e5 | G17/39?1 | G17/39f2 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 52.2 | 52.26 | 51.36 | 51.01 | 52.02 | 52.36 | 51.49 | 52.01 | 51.3 |
| Al2O3 | 0.09 | 0.06 | 0 | 0 | 0 | 0 | 0 | 0.06 | 0 |
| Cr2O3 | 0.02 | 0 | 0.02 | 0.04 | 0 | 0 | 0 | 0.02 | 0 |
| FeO | 6.27 | 6.27 | 6.17 | 6.38 | 6.58 | 6.47 | 6.29 | 6.45 | 6.05 |
| TiO2 | 0.03 | 0 | 0.1 | 0.03 | 0.03 | 0.07 | 0.03 | 0 | 0.03 |
| MnO | 0.09 | 0.11 | 0.13 | 0.13 | 0.13 | 0.14 | 0.11 | 0.13 | 0.16 |
| SiO2 | 40.83 | 40.79 | 40.33 | 41.52 | 41.05 | 41.38 | 41.1 | 41.39 | 41.65 |
| CaO | 0.28 | 0.33 | 0.22 | 0.28 | 0.17 | 0.22 | 0.22 | 0.17 | 0.17 |
| K2O | 0 | 0.02 | 0 | 0 | 0.01 | 0.01 | 0 | 0.02 | 0.01 |
| Na2O | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NiO | 0.48 | 0.48 | 0.36 | 0.33 | 0.39 | 0.42 | 0.48 | 0.48 | 0.45 |
| Summe | 100.29 | 100.32 | 98.69 | 99.72 | 100.38 | 101.07 | 99.72 | 100.73 | 99.82 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 0.985 | 0.984 | 0.973 | 1.001 | 0.990 | 0.998 | 0.991 | 0.998 | 1.005 |
| Ti | 0.001 | 0.000 | 0.002 | 0.001 | 0.001 | 0.001 | 0.001 | 0.000 | 0.001 |
| Al | 0.003 | 0.002 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | 0.000 |
| Cr | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 0.126 | 0.126 | 0.124 | 0.129 | 0.133 | 0.130 | 0.127 | 0.130 | 0.122 |
| Mn | 0.002 | 0.002 | 0.003 | 0.003 | 0.003 | 0.003 | 0.002 | 0.003 | 0.003 |
| Mg | 1.877 | 1.879 | 1.847 | 1.834 | 1.870 | 1.883 | 1.851 | 1.870 | 1.844 |
| Ni | 0.009 | 0.009 | 0.007 | 0.006 | 0.008 | 0.008 | 0.009 | 0.009 | 0.009 |
| Ca | 0.007 | 0.009 | 0.006 | 0.007 | 0.004 | 0.006 | 0.006 | 0.004 | 0.004 |
| TOTAL | 3.010 | 3.011 | 2.961 | 2.982 | 3.008 | 3.029 | 2.987 | 3.017 | 2.988 |
| | | | | | | | | | |
| Fo | 93.60 | 93.59 | 93.56 | 93.32 | 93.25 | 93.39 | 93.48 | 93.37 | 93.64 |

| Sample | G17/39f3 | G17/39f5 | G17/39f6 | G17/39f7 | G17/39f8 | G17/39f9 | G17/39g1 | G17/39g2 | G17/39g3 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 52.25 | 51.26 | 51.76 | 50.14 | 53.74 | 53.25 | 53.13 | 53.42 | 52.9 |
| Al2O3 | 0 | 0 | 0 | 0.09 | 0 | 0 | 0.13 | 0 | 0 |
| Cr2O3 | 0.53 | 0 | 0.08 | 0.06 | 0.17 | 0 | 0 | 0.02 | 0.02 |
| FeO | 5.71 | 6.36 | 6.38 | 6.28 | 6.23 | 6.42 | 6.5 | 6.41 | 6.34 |
| TiO2 | 0.1 | 0.03 | 0 | 0.07 | 0 | 0.03 | 0 | 0.03 | 0 |
| MnO | 0.09 | 0.14 | 0.07 | 0.05 | 0.09 | 0.13 | 0.14 | 0.13 | 0.11 |
| SiO2 | 41.72 | 41.07 | 40.62 | 40.91 | 41.99 | 42.07 | 41.41 | 41.17 | 40.46 |
| CaO | 0.17 | 0.28 | 0.22 | 0.28 | 0.17 | 0.17 | 0.33 | 0.17 | 0.28 |
| K2O | 0 | 0.02 | 0 | 0.01 | 0 | 0.03 | 0.02 | 0.02 | 0.01 |
| Na2O | 0 | 0 | 0.13 | 0 | 0.06 | 0 | 0 | 0 | 0 |
| NiO | 0.42 | 0.33 | 0.36 | 0.42 | 0.39 | 0.48 | 0.39 | 0.42 | 0.48 |
| Summe | 100.99 | 99.49 | 99.62 | 98.31 | 102.84 | 102.58 | 102.05 | 101.79 | 100.6 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 1.006 | 0.991 | 0.980 | 0.987 | 1.013 | 1.015 | 0.999 | 0.993 | 0.976 |
| Ti | 0.002 | 0.001 | 0.000 | 0.001 | 0.000 | 0.001 | 0.000 | 0.001 | 0.000 |
| Al | 0.000 | 0.000 | 0.000 | 0.003 | 0.000 | 0.000 | 0.004 | 0.000 | 0.000 |
| Cr | 0.010 | 0.000 | 0.002 | 0.001 | 0.003 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 0.115 | 0.128 | 0.129 | 0.127 | 0.126 | 0.129 | 0.131 | 0.129 | 0.128 |
| Mn | 0.002 | 0.003 | 0.001 | 0.001 | 0.002 | 0.003 | 0.003 | 0.003 | 0.002 |
| Mg | 1.879 | 1.843 | 1.861 | 1.803 | 1.932 | 1.915 | 1.910 | 1.921 | 1.902 |
| Ni | 0.008 | 0.006 | 0.007 | 0.008 | 0.008 | 0.009 | 0.008 | 0.008 | 0.009 |
| Ca | 0.004 | 0.007 | 0.006 | 0.007 | 0.004 | 0.004 | 0.009 | 0.004 | 0.007 |
| TOTAL | 3.026 | 2.979 | 2.985 | 2.937 | 3.088 | 3.076 | 3.063 | 3.059 | 3.025 |
| | | | | | | | | | |
| Fo | 94.14 | 93.36 | 93.47 | 93.39 | 93.81 | 93.54 | 93.45 | 93.57 | 93.60 |

Olivine microprobe analysis from drill core G17 – sample 39

| Sample | G17/38b | G17/38b8 | G17/38b15 | G17/38b16 | G17/38b17 | G17/38b18 | G17/38b19 | G17/38b20 | G17/38b21 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 51.66 | 51.49 | 50.83 | 51.93 | 51.89 | 51.72 | 52.22 | 51.73 | 51.19 |
| Al2O3 | 0 | 0 | 0 | 0 | 0 | 0 | 0.12 | 0.12 | 0 |
| Cr2O3 | 0.04 | 0.04 | 0.02 | 0 | 0.02 | 0 | 0.02 | 0 | 0.38 |
| FeO | 7.2 | 7.25 | 7.75 | 7.7 | 7.46 | 7.44 | 7.35 | 7.36 | 7.25 |
| TiO2 | 0.08 | 0 | 0.04 | 0 | 0.04 | 0 | 0 | 0 | 0 |
| MnO | 0.04 | 0 | 0 | 0 | 0.09 | 0 | 0 | 0 | 0 |
| SiO2 | 41.56 | 41.31 | 41.74 | 41.53 | 41.5 | 41.65 | 41.79 | 41.22 | 41.17 |
| CaO | 0.39 | 0.31 | 0.46 | 0.15 | 0.39 | 0.31 | 0.31 | 0.31 | 0.39 |
| K2O | 0.01 | 0.01 | 0 | 0 | 0.02 | 0.03 | 0.01 | 0 | 0 |
| Na2O | 0.15 | 0 | 0.08 | 0.15 | 0 | 0.07 | 0 | 0 | 0.15 |
| NiO | 0.14 | 0.17 | 0.07 | 0.1 | 0.14 | 0.17 | 0.07 | 0.21 | 0.21 |
| Summe | 101.27 | 100.58 | 100.99 | 101.56 | 101.55 | 101.39 | 101.89 | 100.95 | 100.74 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 0.999 | 0.993 | 1.003 | 0.998 | 0.997 | 1.001 | 1.004 | 0.990 | 0.989 |
| Ti | 0.001 | 0.000 | 0.001 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 |
| Al | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.003 | 0.003 | 0.000 |
| Cr | 0.001 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.007 |
| Fe(ii) | 0.145 | 0.146 | 0.156 | 0.155 | 0.150 | 0.149 | 0.148 | 0.148 | 0.146 |
| Mn | 0.001 | 0.000 | 0.000 | 0.000 | 0.002 | 0.000 | 0.000 | 0.000 | 0.000 |
| Mg | 1.851 | 1.844 | 1.821 | 1.860 | 1.859 | 1.853 | 1.871 | 1.853 | 1.834 |
| Ni | 0.003 | 0.003 | 0.001 | 0.002 | 0.003 | 0.003 | 0.001 | 0.004 | 0.004 |
| Ca | 0.010 | 0.008 | 0.012 | 0.004 | 0.010 | 0.008 | 0.008 | 0.008 | 0.010 |
| TOTAL | 3.010 | 2.995 | 2.994 | 3.019 | 3.022 | 3.014 | 3.036 | 3.007 | 2.990 |
| | | | | | | | | | |
| Fo | 92.71 | 92.68 | 92.12 | 92.32 | 92.45 | 92.53 | 92.68 | 92.61 | 92.64 |

| Sample | G17/38b22 | G17/38b21 | G17/38b22 | G17/38b25 | G17/38c1 | G17/38c2 | G17/38c3 | G17/38c5 | G17/38c6 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 49.72 | 49.8 | 52.17 | 52.62 | 53.31 | 54.26 | 53.95 | 54.03 | 51.01 |
| Al2O3 | 0.06 | 0 | 0 | 0 | 0.12 | 0 | 0 | 0 | 0 |
| Cr2O3 | 0 | 0 | 0.06 | 0.02 | 0 | 0 | 0 | 0.04 | 0.04 |
| FeO | 7.27 | 7.06 | 7.58 | 7.53 | 8.01 | 7.87 | 7.93 | 7.82 | 7.27 |
| TiO2 | 0 | 0.04 | 0 | 0 | 0 | 0 | 0.04 | 0 | 0 |
| MnO | 0.02 | 0 | 0.02 | 0 | 0.07 | 0.02 | 0.04 | 0.04 | 0 |
| SiO2 | 40.82 | 40.99 | 40.77 | 41.31 | 40.97 | 40.81 | 41 | 41.3 | 42.94 |
| CaO | 0.23 | 0.31 | 0.39 | 0.39 | 0.39 | 0.08 | 0.23 | 0.23 | 0.31 |
| K2O | 0.01 | 0 | 0.02 | 0 | 0 | 0 | 0 | 0 | 0 |
| Na2O | 0.07 | 0 | 0 | 0 | 0 | 0 | 0.08 | 0 | 0 |
| NiO | 0.17 | 0.17 | 0.14 | 0.1 | 0.07 | 0.1 | 0.17 | 0.14 | 0.1 |
| Summe | 98.37 | 98.37 | 101.15 | 101.97 | 102.94 | 103.14 | 103.44 | 103.6 | 101.67 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 0.981 | 0.985 | 0.980 | 0.993 | 0.984 | 0.981 | 0.985 | 0.992 | 1.032 |
| Ti | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 |
| Al | 0.002 | 0.000 | 0.000 | 0.000 | 0.003 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cr | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.001 |
| Fe(ii) | 0.146 | 0.142 | 0.152 | 0.151 | 0.161 | 0.158 | 0.159 | 0.157 | 0.146 |
| Mn | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.001 | 0.001 | 0.000 |
| Mg | 1.781 | 1.784 | 1.869 | 1.885 | 1.910 | 1.944 | 1.933 | 1.935 | 1.827 |
| Ni | 0.003 | 0.003 | 0.003 | 0.002 | 0.001 | 0.002 | 0.003 | 0.003 | 0.002 |
| Ca | 0.006 | 0.008 | 0.010 | 0.010 | 0.010 | 0.002 | 0.006 | 0.006 | 0.008 |
| TOTAL | 2.919 | 2.923 | 3.015 | 3.041 | 3.071 | 3.087 | 3.088 | 3.095 | 3.016 |
| | | | | | | | | | |
| Fo | 92.40 | 92.63 | 92.45 | 92.57 | 92.16 | 92.46 | 92.35 | 92.46 | 92.60 |

Olivine microprobe analysis from drill core G17 – sample 38

| Sample | G17/38c8 | G17/38c9 | G17/38c10 | G17/38c11 | G17/38d1 | G17/38d2 | G17/38d3 | G17/38d4 |
|---|---|---|---|---|---|---|---|---|
| MgO | 49.52 | 49.14 | 51.78 | 51.96 | 51.97 | 51.15 | 51.53 | 51.76 |
| Al2O3 | 0.11 | 0 | 0.12 | 0 | 0 | 0 | 0 | 0 |
| Cr2O3 | 0 | 0 | 0 | 0.02 | 0 | 0 | 0 | 0 |
| FeO | 7.01 | 7.03 | 7.46 | 7.55 | 7.56 | 7.6 | 7.54 | 7.67 |
| TiO2 | 0 | 0.08 | 0 | 0 | 0.04 | 0.04 | 0.04 | 0 |
| MnO | 0.04 | 0.02 | 0.04 | 0.04 | 0.02 | 0.02 | 0.04 | 0.07 |
| SiO2 | 41.82 | 42.01 | 41.46 | 41.26 | 41.84 | 41.19 | 40.89 | 41.34 |
| CaO | 0.39 | 0.46 | 0.15 | 0.31 | 0.31 | 0.31 | 0.39 | 0.46 |
| K2O | 0.03 | 0.01 | 0.01 | 0 | 0 | 0 | 0 | 0.02 |
| Na2O | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NiO | 0.14 | 0.24 | 0.1 | 0.28 | 0.1 | 0.14 | 0.03 | 0.21 |
| Summe | 99.06 | 98.99 | 101.12 | 101.42 | 101.84 | 100.45 | 100.46 | 101.53 |

| Formula | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Si | 1.005 | 1.009 | 0.996 | 0.991 | 1.005 | 0.990 | 0.983 | 0.993 |
| Ti | 0.000 | 0.001 | 0.000 | 0.000 | 0.001 | 0.001 | 0.001 | 0.000 |
| Al | 0.003 | 0.000 | 0.003 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cr | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 0.141 | 0.141 | 0.150 | 0.152 | 0.152 | 0.153 | 0.151 | 0.154 |
| Mn | 0.001 | 0.000 | 0.001 | 0.001 | 0.000 | 0.000 | 0.001 | 0.001 |
| Mg | 1.774 | 1.760 | 1.855 | 1.861 | 1.862 | 1.832 | 1.846 | 1.854 |
| Ni | 0.003 | 0.005 | 0.002 | 0.005 | 0.002 | 0.003 | 0.001 | 0.004 |
| Ca | 0.010 | 0.012 | 0.004 | 0.008 | 0.008 | 0.008 | 0.010 | 0.012 |
| TOTAL | 2.936 | 2.929 | 3.011 | 3.019 | 3.030 | 2.987 | 2.992 | 3.019 |
| | | | | | | | | |
| Fo | 92.60 | 92.55 | 92.49 | 92.43 | 92.44 | 92.29 | 92.38 | 92.26 |

Olivine microprobe analysis from drill core G17 – sample 38

| Sample | G17/35a5 | G17/35a8 | G17/35a9 | G17/35a10 | G17/35a11 | G17/35a12 | G17/35a13 | G17/35a14 | G17/35a15 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 50.75 | 51.09 | 52.09 | 51.63 | 51.16 | 52.05 | 50.36 | 50.46 | 51.05 |
| Al2O3 | 0.05 | 0 | 0.05 | 0 | 0.05 | 0 | 0 | 0 | 0.05 |
| Cr2O3 | 0.04 | 0.04 | 0.04 | 0.04 | 0 | 0 | 0 | 0 | 0.08 |
| FeO | 7.44 | 6.99 | 6.66 | 6.86 | 7.32 | 6.75 | 6.82 | 6.87 | 7 |
| TiO2 | 0 | 0 | 0 | 0.05 | 0 | 0.05 | 0.05 | 0 | 0 |
| MnO | 0.14 | 0.09 | 0.14 | 0.18 | 0.18 | 0.27 | 0.14 | 0.18 | 0.18 |
| SiO2 | 42.18 | 40.51 | 41.36 | 41.57 | 41.06 | 40.87 | 40.92 | 40.37 | 40.19 |
| CaO | 0.22 | 0.22 | 0.07 | 0.22 | 0.44 | 0.45 | 0.22 | 0.22 | 0.07 |
| K2O | 0 | 0 | 0 | 0.01 | 0 | 0 | 0 | 0 | 0 |
| Na2O | 0 | 0 | 0.1 | 0.05 | 0 | 0 | 0.05 | 0.05 | 0 |
| NiO | 0.32 | 0.49 | 0.57 | 0.65 | 0.32 | 0.32 | 0.57 | 0.32 | 0.24 |
| Summe | 101.14 | 99.43 | 101.08 | 101.26 | 100.53 | 100.76 | 99.13 | 98.47 | 98.86 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 1.041 | 1.000 | 1.021 | 1.026 | 1.014 | 1.009 | 1.010 | 0.996 | 0.992 |
| Ti | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.001 | 0.001 | 0.000 | 0.000 |
| Al | 0.001 | 0.000 | 0.001 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.001 |
| Cr | 0.001 | 0.001 | 0.001 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 |
| Fe(ii) | 0.154 | 0.144 | 0.137 | 0.142 | 0.151 | 0.139 | 0.141 | 0.142 | 0.144 |
| Mn | 0.003 | 0.002 | 0.003 | 0.004 | 0.004 | 0.006 | 0.003 | 0.004 | 0.004 |
| Mg | 1.868 | 1.880 | 1.917 | 1.900 | 1.883 | 1.915 | 1.853 | 1.857 | 1.879 |
| Ni | 0.006 | 0.010 | 0.011 | 0.013 | 0.006 | 0.006 | 0.011 | 0.006 | 0.005 |
| Ca | 0.006 | 0.006 | 0.002 | 0.006 | 0.012 | 0.012 | 0.006 | 0.006 | 0.002 |
| TOTAL | 3.080 | 3.042 | 3.094 | 3.092 | 3.070 | 3.088 | 3.025 | 3.011 | 3.029 |
| | | | | | | | | | |
| Fo | 92.268 | 92.787 | 93.176 | 92.893 | 92.400 | 92.964 | 92.804 | 92.731 | 92.686 |

| Sample | G17/35a16 | G17/35b1 | G17/35b2 | G17/35b3 | G17/35b4 | G17/35a5 | G17/35a6 | G17/35a8 | G17/35a9 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 51 | 50.26 | 49.56 | 50.51 | 50.91 | 50.75 | 52.2 | 51.09 | 52.09 |
| Al2O3 | 0.11 | 0.11 | 0 | 0 | 0 | 0.05 | 0 | 0 | 0.05 |
| Cr2O3 | 0 | 0 | 0 | 0 | 0 | 0.04 | 0.04 | 0.04 | 0.04 |
| FeO | 6.9 | 6.91 | 6.5 | 6.79 | 6.71 | 7.44 | 6.63 | 6.99 | 6.66 |
| TiO2 | 0 | 0.05 | 0 | 0 | 0 | 0 | 0.05 | 0 | 0 |
| MnO | 0.09 | 0.14 | 0.14 | 0.14 | 0.09 | 0.14 | 0 | 0.09 | 0.14 |
| SiO2 | 40.28 | 40.21 | 40.76 | 40.76 | 40.98 | 42.18 | 41.73 | 40.51 | 41.36 |
| CaO | 0.37 | 0.37 | 0.07 | 0.07 | 0.37 | 0.22 | 0.22 | 0.22 | 0.07 |
| K2O | 0 | 0.01 | 0 | 0 | 0.01 | 0 | 0 | 0 | 0 |
| Na2O | 0 | 0.05 | 0 | 0 | 0 | 0 | 0.14 | 0 | 0.1 |
| NiO | 0.49 | 0.41 | 0.41 | 0.41 | 0.32 | 0.32 | 0.41 | 0.49 | 0.57 |
| Summe | 99.24 | 98.52 | 97.44 | 98.68 | 99.39 | 101.14 | 101.42 | 99.43 | 101.08 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 0.994 | 0.993 | 1.006 | 1.006 | 1.012 | 1.012 | 1.001 | 0.972 | 0.992 |
| Ti | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 |
| Al | 0.003 | 0.003 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.001 |
| Cr | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.001 | 0.001 | 0.001 |
| Fe(ii) | 0.142 | 0.143 | 0.134 | 0.140 | 0.138 | 0.149 | 0.133 | 0.140 | 0.134 |
| Mn | 0.002 | 0.003 | 0.003 | 0.003 | 0.002 | 0.003 | 0.000 | 0.002 | 0.003 |
| Mg | 1.877 | 1.850 | 1.824 | 1.859 | 1.873 | 1.815 | 1.867 | 1.827 | 1.863 |
| Ni | 0.010 | 0.008 | 0.008 | 0.008 | 0.006 | 0.006 | 0.008 | 0.009 | 0.011 |
| Ca | 0.010 | 0.010 | 0.002 | 0.002 | 0.010 | 0.006 | 0.006 | 0.006 | 0.002 |
| TOTAL | 3.038 | 3.010 | 2.977 | 3.018 | 3.041 | 2.993 | 3.016 | 2.957 | 3.006 |
| | | | | | | | | | |
| Fo | 92.860 | 92.704 | 93.009 | 92.853 | 93.029 | 92.27 | 93.35 | 92.79 | 93.18 |

Olivine microprobe analysis from drill core G17 – sample 35

| Sample | G17/35a10 | G17/35a11 | G17/35a12 | G17/35a13 | G17/35a14 | G17/35a15 |
|---|---|---|---|---|---|---|
| MgO | 51.63 | 51.16 | 52.05 | 50.36 | 50.46 | 51.05 |
| Al2O3 | 0 | 0.05 | 0 | 0 | 0 | 0.05 |
| Cr2O3 | 0.04 | 0 | 0 | 0 | 0 | 0.08 |
| FeO | 6.86 | 7.32 | 6.75 | 6.82 | 6.87 | 7 |
| TiO2 | 0.05 | 0 | 0.05 | 0.05 | 0 | 0 |
| MnO | 0.18 | 0.18 | 0.27 | 0.14 | 0.18 | 0.18 |
| SiO2 | 41.57 | 41.06 | 40.87 | 40.92 | 40.37 | 40.19 |
| CaO | 0.22 | 0.44 | 0.45 | 0.22 | 0.22 | 0.07 |
| K2O | 0.01 | 0 | 0 | 0 | 0 | 0 |
| Na2O | 0.05 | 0 | 0 | 0.05 | 0.05 | 0 |
| NiO | 0.65 | 0.32 | 0.32 | 0.57 | 0.32 | 0.24 |
| Summe | 101.26 | 100.53 | 100.76 | 99.13 | 98.47 | 98.86 |

| Formula | | | | | | |
|---|---|---|---|---|---|---|
| Si | 0.997 | 0.985 | 0.980 | 0.982 | 0.968 | 0.964 |
| Ti | 0.001 | 0.000 | 0.001 | 0.001 | 0.000 | 0.000 |
| Al | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.001 |
| Cr | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 |
| Fe(ii) | 0.138 | 0.147 | 0.135 | 0.137 | 0.138 | 0.140 |
| Mn | 0.004 | 0.004 | 0.005 | 0.003 | 0.004 | 0.004 |
| Mg | 1.846 | 1.830 | 1.861 | 1.801 | 1.805 | 1.826 |
| Ni | 0.013 | 0.006 | 0.006 | 0.011 | 0.006 | 0.005 |
| Ca | 0.006 | 0.011 | 0.012 | 0.006 | 0.006 | 0.002 |
| TOTAL | 3.005 | 2.984 | 3.001 | 2.940 | 2.926 | 2.943 |
| | | | | | | |
| Fo | 92.89 | 92.40 | 92.96 | 92.80 | 92.73 | 92.69 |

| Sample | G17/35a16 | G17/35b1 | G17/35b2 | G17/35b3 | G17/35b4 |
|---|---|---|---|---|---|
| MgO | 51 | 50.26 | 49.56 | 50.51 | 50.91 |
| Al2O3 | 0.11 | 0.11 | 0 | 0 | 0 |
| Cr2O3 | 0 | 0 | 0 | 0 | 0 |
| FeO | 6.9 | 6.91 | 6.5 | 6.79 | 6.71 |
| TiO2 | 0 | 0.05 | 0 | 0 | 0 |
| MnO | 0.09 | 0.14 | 0.14 | 0.14 | 0.09 |
| SiO2 | 40.28 | 40.21 | 40.76 | 40.76 | 40.98 |
| CaO | 0.37 | 0.37 | 0.07 | 0.07 | 0.37 |
| K2O | 0 | 0.01 | 0 | 0 | 0.01 |
| Na2O | 0 | 0.05 | 0 | 0 | 0 |
| NiO | 0.49 | 0.41 | 0.41 | 0.41 | 0.32 |
| Summe | 99.24 | 98.52 | 97.44 | 98.68 | 99.39 |

| Formula | | | | | |
|---|---|---|---|---|---|
| Si | 0.966 | 0.965 | 0.978 | 0.978 | 0.983 |
| Ti | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 |
| Al | 0.003 | 0.003 | 0.000 | 0.000 | 0.000 |
| Cr | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 0.138 | 0.139 | 0.130 | 0.136 | 0.135 |
| Mn | 0.002 | 0.003 | 0.003 | 0.003 | 0.002 |
| Mg | 1.824 | 1.797 | 1.772 | 1.806 | 1.821 |
| Ni | 0.009 | 0.008 | 0.008 | 0.008 | 0.006 |
| Ca | 0.010 | 0.010 | 0.002 | 0.002 | 0.010 |
| TOTAL | 2.952 | 2.925 | 2.893 | 2.933 | 2.956 |
| | | | | | |
| Fo | 92.86 | 92.70 | 93.01 | 92.85 | 93.03 |

Olivine microprobe analysis from drill core G17 – sample 35

| Sample | G17/33test1 | G17/33/1b | G17/33/1d | G17/33/1f | G17/33/1h | G17/33/1i | G17/33/4c |
|---|---|---|---|---|---|---|---|
| SiO2 | 41.8 | 41.73 | 41.66 | 41.75 | 42.09 | 39.86 | 41.06 |
| MgO | 51.98 | 52.29 | 51.56 | 51.89 | 51.07 | 52.67 | 52.75 |
| FeO | 7.77 | 7.66 | 7.73 | 7.77 | 7.48 | 7.92 | 7.25 |
| Al2O3 | 0 | 0 | 0.1 | 0 | 0 | 0 | 0 |
| Cr2O3 | 0 | 0 | 0.02 | 0 | 0 | 0 | 0.42 |
| NiO | 0.26 | 0.28 | 0.26 | 0.24 | 0.2 | 0.22 | 0.22 |
| Summe | 101.81 | 101.96 | 101.33 | 101.65 | 100.84 | 100.67 | 101.7 |

| Formula | | | | | | | |
|---|---|---|---|---|---|---|---|
| Si | 0.996 | 0.995 | 0.993 | 0.995 | 1.003 | 0.950 | 0.979 |
| Ti | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Al | 0.000 | 0.000 | 0.003 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cr | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.008 |
| Fe(ii) | 0.155 | 0.153 | 0.154 | 0.155 | 0.149 | 0.158 | 0.145 |
| Mn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Mg | 1.847 | 1.858 | 1.832 | 1.844 | 1.815 | 1.872 | 1.875 |
| Ni | 0.005 | 0.005 | 0.005 | 0.005 | 0.004 | 0.004 | 0.004 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 3.004 | 3.011 | 2.988 | 2.999 | 2.971 | 2.984 | 3.010 |
| | | | | | | | |
| Fo | 92.26 | 92.41 | 92.24 | 92.25 | 92.41 | 92.22 | 92.84 |

| Sample | G17/33/4e | G17/33/4f | G17/33/3a | G17/33/3b | G17/33/3c | G17/33/3e | G17/33/3 |
|---|---|---|---|---|---|---|---|
| SiO2 | 40.55 | 40.28 | 25.82 | 42.47 | 41.97 | 42.48 | 43 |
| MgO | 53.28 | 52.75 | 41.89 | 49.21 | 49.9 | 49.39 | 49.02 |
| FeO | 7.77 | 7.96 | 20.5 | 7.29 | 6.92 | 7.22 | 7.18 |
| Al2O3 | 0 | 0 | 1.78 | 0 | 0.1 | 0.1 | 0 |
| Cr2O3 | 0.02 | 0 | 11.95 | 0 | 0.02 | 0.02 | 0 |
| NiO | 0.22 | 0.16 | 0.3 | 0.2 | 0.26 | 0.22 | 0.24 |
| Summe | 101.84 | 101.15 | 102.24 | 99.17 | 99.17 | 99.43 | 99.44 |

| Formula | | | | | | | |
|---|---|---|---|---|---|---|---|
| Si | 0.967 | 0.960 | 0.615 | 1.012 | 1.000 | 1.013 | 1.025 |
| Ti | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Al | 0.000 | 0.000 | 0.050 | 0.000 | 0.003 | 0.003 | 0.000 |
| Cr | 0.000 | 0.000 | 0.225 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 0.155 | 0.159 | 0.409 | 0.145 | 0.138 | 0.144 | 0.143 |
| Mn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Mg | 1.893 | 1.875 | 1.489 | 1.749 | 1.773 | 1.755 | 1.742 |
| Ni | 0.004 | 0.003 | 0.006 | 0.004 | 0.005 | 0.004 | 0.005 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 3.020 | 2.997 | 2.794 | 2.910 | 2.920 | 2.919 | 2.915 |
| | | | | | | | |
| Fo | 92.44 | 92.20 | 78.46 | 92.33 | 92.78 | 92.42 | 92.41 |

Olivine microprobe analysis from drill core G17 – sample 33

| Sample | G17/29f1 | G17/29f3 | G17/29f7 | G17/29f8 | G17/29f9 | G17/29f10 | G17/29b1 | G17/29b5 | G17/29b7 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 47.07 | 46.98 | 48.28 | 47.83 | 47.79 | 49.98 | 49.05 | 49.78 | 49.56 |
| Al2O3 | 0 | 0.11 | 0.05 | 0 | 0.05 | 0.05 | 0 | 0 | 0.11 |
| Cr2O3 | 0.05 | 0 | 0 | 0 | 0 | 0.05 | 0.03 | 0 | 0.04 |
| FeO | 8.32 | 8.35 | 8.12 | 8.02 | 7.92 | 7.98 | 8.92 | 8.89 | 8.78 |
| TiO2 | 0 | 0.02 | 0.02 | 0.02 | 0.02 | 0 | 0.05 | 0.02 | 0 |
| MnO | 0.15 | 0.19 | 0.12 | 0.15 | 0.19 | 0.1 | 0.25 | 0.17 | 0.17 |
| SiO2 | 41.53 | 41.47 | 42.16 | 41.66 | 40.8 | 41.49 | 41.63 | 41.33 | 41.77 |
| CaO | 0.35 | 0.35 | 0.31 | 0.28 | 0.31 | 0.24 | 0.39 | 0.27 | 0.39 |
| K2O | 0 | 0 | 0 | 0 | 0 | 0.01 | 0 | 0 | 0 |
| Na2O | 0 | 0 | 0 | 0 | 0.06 | 0 | 0 | 0.06 | 0.06 |
| NiO | 0.33 | 0.33 | 0.55 | 0.47 | 0.33 | 0.28 | 0.33 | 0.3 | 0.28 |
| Summe | 97.8 | 97.8 | 99.61 | 98.43 | 97.47 | 100.18 | 100.65 | 100.82 | 101.16 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 1.034 | 1.033 | 1.050 | 1.037 | 1.016 | 1.033 | 1.037 | 1.029 | 1.040 |
| Ti | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 |
| Al | 0.000 | 0.003 | 0.001 | 0.000 | 0.001 | 0.001 | 0.000 | 0.000 | 0.003 |
| Cr | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.001 | 0.000 | 0.001 |
| Fe(ii) | 0.173 | 0.174 | 0.169 | 0.167 | 0.165 | 0.166 | 0.186 | 0.185 | 0.183 |
| Mn | 0.003 | 0.004 | 0.003 | 0.003 | 0.004 | 0.002 | 0.005 | 0.004 | 0.004 |
| Mg | 1.747 | 1.744 | 1.792 | 1.776 | 1.774 | 1.855 | 1.821 | 1.848 | 1.840 |
| Ni | 0.007 | 0.007 | 0.011 | 0.009 | 0.007 | 0.006 | 0.007 | 0.006 | 0.006 |
| Ca | 0.009 | 0.009 | 0.008 | 0.007 | 0.008 | 0.006 | 0.010 | 0.007 | 0.010 |
| TOTAL | 2.975 | 2.974 | 3.035 | 3.000 | 2.976 | 3.071 | 3.067 | 3.079 | 3.086 |
| | | | | | | | | | |
| Fo | 90.83 | 90.75 | 91.26 | 91.26 | 91.31 | 91.69 | 90.51 | 90.74 | 90.80 |

| Sample | G17/29a2 | G17/29a3 | G17/29a6 | G17/29a7 | G17/29a8 | G17/29a9 | G17/29e16 | G17/29e17 | G17/29e18 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 49.21 | 48.21 | 51.83 | 52.31 | 51.29 | 51.61 | 44.58 | 44.66 | 45.27 |
| Al2O3 | 0 | 0.05 | 0 | 0 | 0.06 | 0.17 | 0 | 0 | 0 |
| Cr2O3 | 0.02 | 0.03 | 0.04 | 0 | 0.05 | 0 | 0.11 | 0.38 | 0.06 |
| FeO | 8.81 | 9.12 | 8.89 | 9.19 | 8.95 | 9.06 | 8.19 | 8.3 | 8.61 |
| TiO2 | 0.02 | 0 | 0.05 | 0 | 0.02 | 0.02 | 0.11 | 0.11 | 0.04 |
| MnO | 0.17 | 0.21 | 0.29 | 0.17 | 0 | 0.29 | 0.2 | 0.16 | 0.12 |
| SiO2 | 41.82 | 42.14 | 40.67 | 40.01 | 40.71 | 41.23 | 43.7 | 43.48 | 43.86 |
| CaO | 0.27 | 0.39 | 0.27 | 0.31 | 0.35 | 0.39 | 0.42 | 0.25 | 0.42 |
| K2O | 0 | 0 | 0 | 0 | 0 | 0 | 0.01 | 0.01 | 0.01 |
| Na2O | 0.06 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NiO | 0.41 | 0.39 | 0.47 | 0.47 | 0.44 | 0.33 | 0.44 | 0.41 | 0.36 |
| Summe | 100.79 | 100.54 | 102.51 | 102.46 | 101.87 | 103.1 | 97.76 | 97.76 | 98.75 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 1.041 | 1.049 | 0.975 | 0.960 | 0.976 | 0.989 | 1.082 | 1.077 | 1.086 |
| Ti | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.002 | 0.002 | 0.001 |
| Al | 0.000 | 0.001 | 0.000 | 0.000 | 0.002 | 0.005 | 0.000 | 0.000 | 0.000 |
| Cr | 0.000 | 0.001 | 0.001 | 0.000 | 0.001 | 0.000 | 0.002 | 0.007 | 0.001 |
| Fe(ii) | 0.183 | 0.190 | 0.178 | 0.184 | 0.179 | 0.182 | 0.170 | 0.172 | 0.178 |
| Mn | 0.004 | 0.004 | 0.006 | 0.003 | 0.000 | 0.006 | 0.004 | 0.003 | 0.003 |
| Mg | 1.827 | 1.790 | 1.853 | 1.870 | 1.834 | 1.845 | 1.646 | 1.649 | 1.671 |
| Ni | 0.008 | 0.008 | 0.009 | 0.009 | 0.008 | 0.006 | 0.009 | 0.008 | 0.007 |
| Ca | 0.007 | 0.010 | 0.007 | 0.008 | 0.009 | 0.010 | 0.011 | 0.007 | 0.011 |
| TOTAL | 3.071 | 3.054 | 3.030 | 3.035 | 3.010 | 3.043 | 2.926 | 2.925 | 2.958 |
| | | | | | | | | | |
| Fo | 90.71 | 90.21 | 90.96 | 90.88 | 91.09 | 90.77 | 90.45 | 90.39 | 90.24 |

Olivine microprobe analysis from drill core G17 – sample 29

| Sample | G17/29e19 | | G17/29e20 | G17/29c15 | G17/29c16 | G17/29c17 | G17/29c18 | G17/29c19 | G17/29d20 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 45 | 45.11 | 46.18 | 50.49 | 51.49 | 51.72 | 51.04 | 51.23 | 51.27 |
| Al2O3 | 0 | 0 | 0.03 | 0 | 0.03 | 0.13 | 0 | 0 | 0 |
| Cr2O3 | 0.19 | 0 | 0.02 | 0 | 0.02 | 0.11 | 0.06 | 0.02 | 0.08 |
| FeO | 8.46 | 8.61 | 9.04 | 7.75 | 7.8 | 7.67 | 7.76 | 7.6 | 8.02 |
| TiO2 | 0.04 | 0 | 0.04 | 0 | 0 | 0.04 | 0 | 0.11 | 0.04 |
| MnO | 0.18 | 0.18 | 0.08 | 0.14 | 0.1 | 0.12 | 0.12 | 0.18 | 0.12 |
| SiO2 | 42.65 | 44.07 | 44.04 | 39.59 | 40.51 | 39.41 | 40.12 | 39.35 | 40.77 |
| CaO | 0.25 | 0.5 | 0.34 | 0.25 | 0.25 | 0.17 | 0.17 | 0.25 | 0.34 |
| K2O | 0.02 | 0 | 0 | 0.01 | 0.01 | 0 | 0 | 0 | 0 |
| Na2O | 0 | 0 | 0 | 0.09 | 0 | 0 | 0 | 0 | 0 |
| NiO | 0.49 | 0.36 | 0.39 | 0.41 | 0.36 | 0.34 | 0.44 | 0.36 | 0.41 |
| Summe | 97.28 | 98.83 | 100.16 | 98.73 | 100.57 | 99.71 | 99.71 | 99.1 | 101.05 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 1.056 | 1.091 | 1.091 | 0.980 | 1.003 | 0.976 | 0.994 | 0.974 | 1.010 |
| Ti | 0.001 | 0.000 | 0.001 | 0.000 | 0.000 | 0.001 | 0.000 | 0.002 | 0.001 |
| Al | 0.000 | 0.000 | 0.001 | 0.000 | 0.001 | 0.004 | 0.000 | 0.000 | 0.000 |
| Cr | 0.004 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | 0.001 | 0.000 | 0.002 |
| Fe(ii) | 0.175 | 0.178 | 0.187 | 0.160 | 0.162 | 0.159 | 0.161 | 0.157 | 0.166 |
| Mn | 0.004 | 0.004 | 0.002 | 0.003 | 0.002 | 0.003 | 0.003 | 0.004 | 0.003 |
| Mg | 1.661 | 1.665 | 1.705 | 1.864 | 1.901 | 1.909 | 1.884 | 1.891 | 1.893 |
| Ni | 0.010 | 0.007 | 0.008 | 0.008 | 0.007 | 0.007 | 0.009 | 0.007 | 0.008 |
| Ca | 0.007 | 0.013 | 0.009 | 0.007 | 0.007 | 0.005 | 0.005 | 0.007 | 0.009 |
| TOTAL | 2.917 | 2.959 | 3.003 | 3.023 | 3.083 | 3.065 | 3.055 | 3.043 | 3.090 |
| | | | | | | | | | |
| Fo | 90.28 | 90.15 | 90.03 | 91.94 | 92.08 | 92.21 | 92.03 | 92.15 | 91.82 |

| Sample | G17/29d21 | G17/29d22 | G17/29d23 | G17/29d24 | G17/29d25 | G17/29b20 | G17/29b21 | G17/29b22 | G17/29b23 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 51.54 | 51.34 | 50.74 | 51.56 | 51.29 | 50.97 | 51.21 | 52.41 | 51.3 |
| Al2O3 | 0.06 | 0.03 | 0.06 | 0.1 | 0.03 | 0 | 0.06 | 0 | 0.03 |
| Cr2O3 | 0.04 | 0.04 | 0 | 0.04 | 0.04 | 0.06 | 0 | 0.08 | 0.06 |
| FeO | 8.35 | 8.11 | 8.37 | 8.29 | 8.05 | 7.92 | 8.34 | 7.1 | 7.4 |
| TiO2 | 0.08 | 0.04 | 0.04 | 0 | 0.08 | 0.08 | 0.04 | 0.04 | 0.04 |
| MnO | 0.2 | 0.1 | 0.2 | 0.14 | 0.08 | 0.1 | 0.18 | 0.1 | 0.16 |
| SiO2 | 39.66 | 40.8 | 41.04 | 39.82 | 41.04 | 40.56 | 40.67 | 40.56 | 40.63 |
| CaO | 0.34 | 0.34 | 0.34 | 0.17 | 0.25 | 0.25 | 0.34 | 0.08 | 0.17 |
| K2O | 0 | 0.01 | 0 | 0 | 0 | 0.01 | 0 | 0 | 0 |
| Na2O | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.09 | 0 |
| NiO | 0.34 | 0.39 | 0.34 | 0.31 | 0.36 | 0.34 | 0.36 | 0.36 | 0.31 |
| Summe | 100.61 | 101.2 | 101.13 | 100.43 | 101.22 | 100.29 | 101.2 | 100.82 | 100.1 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 0.982 | 1.010 | 1.016 | 0.986 | 1.016 | 1.004 | 1.007 | 1.004 | 1.006 |
| Ti | 0.001 | 0.001 | 0.001 | 0.000 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 |
| Al | 0.002 | 0.001 | 0.002 | 0.003 | 0.001 | 0.000 | 0.002 | 0.000 | 0.001 |
| Cr | 0.001 | 0.001 | 0.000 | 0.001 | 0.001 | 0.001 | 0.000 | 0.002 | 0.001 |
| Fe(ii) | 0.173 | 0.168 | 0.173 | 0.172 | 0.167 | 0.164 | 0.173 | 0.147 | 0.153 |
| Mn | 0.004 | 0.002 | 0.004 | 0.003 | 0.002 | 0.002 | 0.004 | 0.002 | 0.003 |
| Mg | 1.903 | 1.895 | 1.873 | 1.903 | 1.894 | 1.882 | 1.891 | 1.935 | 1.894 |
| Ni | 0.007 | 0.008 | 0.007 | 0.006 | 0.007 | 0.007 | 0.007 | 0.007 | 0.006 |
| Ca | 0.009 | 0.009 | 0.009 | 0.005 | 0.007 | 0.007 | 0.009 | 0.002 | 0.005 |
| TOTAL | 3.082 | 3.095 | 3.085 | 3.079 | 3.095 | 3.068 | 3.093 | 3.100 | 3.070 |
| | | | | | | | | | |
| Fo | 91.49 | 91.77 | 91.34 | 91.60 | 91.83 | 91.89 | 91.46 | 92.84 | 92.36 |

Olivine microprobe analysis from drill core G17 – sample 29

| Sample | G17/25b1 | G17/25b2 | G17/25b6 | G17/25a1 | G17/25a2 | G17/25a3 | G17/25a4 | G17/25a5 | G17/25b9 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 49.54 | 49.69 | 49.18 | 51.09 | 47.25 | 50.62 | 50.08 | 49.76 | 51.32 |
| Al2O3 | 0 | 0.11 | 0.11 | 0 | 0 | 0 | 0 | 0.11 | 0.1 |
| Cr2O3 | 0.04 | 0 | 0 | 0.08 | 1.08 | 0 | 0.02 | 0.02 | 0.04 |
| FeO | 6.9 | 6.88 | 6.39 | 5.99 | 9.12 | 6.25 | 6.56 | 6.12 | 0.86 |
| TiO2 | 0 | 0 | 0 | 0 | 0.12 | 0.03 | 0 | 0.09 | 0 |
| MnO | 0.07 | 0.2 | 0.11 | 0.13 | 0.13 | 0.09 | 0.17 | 0.13 | 0.18 |
| SiO2 | 44.45 | 43.72 | 43.78 | 44.02 | 42.55 | 44.62 | 43.81 | 43.48 | 42.73 |
| CaO | 0.52 | 0.3 | 0.39 | 0.39 | 0.34 | 0.43 | 0.39 | 0.52 | 0.5 |
| K2O | 0 | 0 | 0.02 | 0 | 0.01 | 0 | 0 | 0 | 0 |
| Na2O | 0.05 | 0 | 0 | 0 | 0 | 0 | 0.05 | 0 | 0 |
| NiO | 0.4 | 0.36 | 0.46 | 0.4 | 0.4 | 0.5 | 0.4 | 0.43 | 0.28 |
| Summe | 101.97 | 101.26 | 100.44 | 102.1 | 101 | 102.54 | 101.48 | 100.66 | 102.01 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 1.052 | 1.035 | 1.036 | 1.042 | 1.007 | 1.056 | 1.037 | 1.029 | 1.047 |
| Ti | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | 0.001 | 0.000 | 0.002 | 0.000 |
| Al | 0.000 | 0.003 | 0.003 | 0.000 | 0.000 | 0.000 | 0.000 | 0.003 | 0.003 |
| Cr | 0.001 | 0.000 | 0.000 | 0.001 | 0.020 | 0.000 | 0.000 | 0.000 | 0.001 |
| Fe(ii) | 0.137 | 0.136 | 0.127 | 0.119 | 0.181 | 0.124 | 0.130 | 0.121 | 0.018 |
| Mn | 0.001 | 0.004 | 0.002 | 0.003 | 0.003 | 0.002 | 0.003 | 0.003 | 0.004 |
| Mg | 1.749 | 1.754 | 1.736 | 1.803 | 1.668 | 1.787 | 1.768 | 1.756 | 1.874 |
| Ni | 0.008 | 0.007 | 0.009 | 0.008 | 0.008 | 0.010 | 0.008 | 0.008 | 0.006 |
| Ca | 0.013 | 0.008 | 0.010 | 0.010 | 0.009 | 0.011 | 0.010 | 0.013 | 0.013 |
| TOTAL | 2.960 | 2.947 | 2.923 | 2.986 | 2.897 | 2.990 | 2.956 | 2.936 | 2.965 |
| | | | | | | | | | |
| Fo | 92.68 | 92.60 | 93.10 | 93.70 | 90.10 | 93.44 | 92.99 | 93.42 | 98.87 |

| Sample | G17/25b10 | G17/25a6 | G17/25a7 | G17/25a8 | G17/25a9 | G17/25a10 | G17/25c3 | G17/25c4 | G17/25c6 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 51.22 | 50.44 | 49.19 | 51.63 | 51.19 | 51.11 | 49.92 | 50.52 | 51.19 |
| Al2O3 | 0.05 | 0.05 | 0 | 0 | 0.3 | 0.1 | 0 | 0.05 | 0 |
| Cr2O3 | 0 | 0 | 0 | 0.02 | 0.02 | 0 | 0.06 | 0 | 0 |
| FeO | 6.8 | 6.963 | 6.53 | 6.83 | 6.69 | 6.69 | 6.81 | 6.99 | 6.71 |
| TiO2 | 0.03 | 0 | 0.03 | 0.05 | 0 | 0.03 | 0 | 0.03 | 0.03 |
| MnO | 0.16 | 0.2 | 0.16 | 0.18 | 0.14 | 0.11 | 0.18 | 0.11 | 0.11 |
| SiO2 | 42.37 | 42.52 | 42.79 | 42.83 | 42.34 | 41.95 | 43.05 | 42.47 | 42.36 |
| CaO | 0.29 | 0.46 | 0.41 | 0.41 | 0.37 | 0.33 | 0.37 | 0.33 | 0.29 |
| K2O | 0.01 | 0 | 0 | 0.02 | 0 | 0.01 | 0 | 0 | 0 |
| Na2O | 0 | 0 | 0 | 0.05 | 0.05 | 0 | 0.05 | 0 | 0 |
| NiO | 0.52 | 0.52 | 0.48 | 0.45 | 0.35 | 0.38 | 0.52 | 0.42 | 0.52 |
| Summe | 100.82 | 100.82 | 99.59 | 102.47 | 101.45 | 100.71 | 100.96 | 100.92 | 100.21 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 1.038 | 1.042 | 1.048 | 1.049 | 1.037 | 1.028 | 1.055 | 1.040 | 1.038 |
| Ti | 0.001 | 0.000 | 0.001 | 0.001 | 0.000 | 0.001 | 0.000 | 0.001 | 0.001 |
| Al | 0.001 | 0.001 | 0.000 | 0.000 | 0.009 | 0.003 | 0.000 | 0.001 | 0.000 |
| Cr | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 |
| Fe(ii) | 0.139 | 0.143 | 0.134 | 0.140 | 0.137 | 0.137 | 0.139 | 0.143 | 0.137 |
| Mn | 0.003 | 0.004 | 0.003 | 0.004 | 0.003 | 0.002 | 0.004 | 0.002 | 0.002 |
| Mg | 1.871 | 1.842 | 1.796 | 1.886 | 1.869 | 1.867 | 1.823 | 1.845 | 1.869 |
| Ni | 0.010 | 0.010 | 0.009 | 0.009 | 0.007 | 0.007 | 0.010 | 0.008 | 0.010 |
| Ca | 0.008 | 0.012 | 0.011 | 0.011 | 0.010 | 0.009 | 0.010 | 0.009 | 0.008 |
| TOTAL | 3.071 | 3.054 | 3.002 | 3.099 | 3.072 | 3.053 | 3.042 | 3.050 | 3.065 |
| | | | | | | | | | |
| Fo | 92.92 | 92.62 | 92.91 | 92.92 | 93.04 | 93.05 | 92.72 | 92.69 | 93.05 |

Olivine microprobe analysis from drill core G17 – sample 25

| Sample | G17/16 | G17/16 | G17/16 | G17/16 |
|---|---|---|---|---|
| MgO | 51.74 | 52.44 | 53.41 | 52.4 |
| Al2O3 | 2.87 | 0.18 | 0.73 | 1.99 |
| Cr2O3 | 0 | 0 | 0 | 0 |
| FeO | 6.45 | 6.71 | 6.14 | 6.32 |
| TiO2 | 0 | 0.02 | 0.05 | 0 |
| MnO | 0.19 | 0.16 | 0.14 | 0.12 |
| SiO2 | 41.26 | 40.87 | 39.42 | 39.5 |
| CaO | 0.35 | 0.44 | 0.35 | 0.31 |
| K2O | 0 | 0 | 0 | 0 |
| Na2O | 0 | 0 | 0 | 0 |
| NiO | 0.38 | 0.34 | 0.34 | 0.38 |
| Summe | 103.24 | 101.16 | 100.58 | 101.02 |
| | | | | |
| Formula | | | | |
| Si | 0.965 | 0.980 | 0.951 | 0.948 |
| Al | 0.079 | 0.005 | 0.021 | 0.056 |
| Ti | 0.000 | 0.000 | 0.001 | 0.000 |
| Fe | 0.126 | 0.135 | 0.124 | 0.127 |
| Mn | 0.004 | 0.003 | 0.003 | 0.002 |
| Mg | 1.805 | 1.875 | 1.922 | 1.875 |
| Ca | 0.009 | 0.011 | 0.009 | 0.008 |
| Na | 0.000 | 0.000 | 0.000 | 0.000 |
| K | 0.000 | 0.000 | 0.000 | 0.000 |
| Cr | 0.000 | 0.000 | 0.000 | 0.000 |
| Ni | 0.007 | 0.007 | 0.007 | 0.007 |
| Total | 2.995 | 3.017 | 3.037 | 3.024 |
| Fo | 93.46 | 93.30 | 93.94 | 93.66 |

Olivine microprobe analysis from drill core G17 – sample 16

| Sample | G13/24a1 | G13/24a2 | G13/24a2 | G13/24a5 | G13/24a6 | G13/24a7 | G13/24a8 | G13/24a9 | G13/24a10 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 43.65 | 47.87 | 47.86 | 42.91 | 42.62 | 42.99 | 46.03 | 46.55 | 46.22 |
| Al2O3 | 0.07 | 0 | 0 | 0.04 | 0 | 0 | 0.07 | 0.04 | 0 |
| Cr2O3 | 0 | 0.02 | 0.04 | 0 | 0.02 | 0 | 0.06 | 0.02 | 0 |
| FeO | 9.64 | 8.94 | 9.13 | 9.97 | 9.79 | 9.95 | 10.37 | 10.51 | 10.67 |
| TiO2 | 0 | 0.04 | 0 | 0 | 0 | 0 | 0.07 | 0 | 0 |
| MnO | 0.18 | 0.21 | 0.18 | 0.21 | 0.19 | 0.16 | 0.16 | 0.25 | 0.19 |
| SiO2 | 41.89 | 38.79 | 39.07 | 44.93 | 45.22 | 45.97 | 42.66 | 43.66 | 42.97 |
| CaO | 0.45 | 0.32 | 0.32 | 0.45 | 0.45 | 0.45 | 0.32 | 0.45 | 0.45 |
| K2O | 0.01 | 0 | 0.01 | 0.01 | 0.02 | 0 | 0.01 | 0 | 0 |
| Na2O | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.09 |
| NiO | 0.29 | 0.33 | 0.33 | 0.26 | 0.23 | 0.36 | 0.33 | 0.29 | 0.29 |
| Summe | 96.18 | 96.52 | 96.94 | 98.78 | 98.54 | 99.88 | 100.08 | 101.77 | 100.88 |
| | | | | | | | | | |
| Formula | | | | | | | | | |
| Si | 1.064 | 0.986 | 0.993 | 1.142 | 1.149 | 1.168 | 1.084 | 1.109 | 1.092 |
| Ti | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 |
| Al | 0.002 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.002 | 0.001 | 0.000 |
| Cr | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 |
| Fe(ii) | 0.205 | 0.190 | 0.194 | 0.212 | 0.208 | 0.211 | 0.220 | 0.223 | 0.227 |
| Mn | 0.004 | 0.005 | 0.004 | 0.005 | 0.004 | 0.003 | 0.003 | 0.005 | 0.004 |
| Mg | 1.653 | 1.813 | 1.813 | 1.625 | 1.614 | 1.628 | 1.744 | 1.763 | 1.751 |
| Ni | 0.006 | 0.007 | 0.007 | 0.005 | 0.005 | 0.007 | 0.007 | 0.006 | 0.006 |
| Ca | 0.012 | 0.009 | 0.009 | 0.012 | 0.012 | 0.012 | 0.009 | 0.012 | 0.012 |
| TOTAL | 2.947 | 3.010 | 3.020 | 3.002 | 2.993 | 3.031 | 3.071 | 3.121 | 3.092 |
| | | | | | | | | | |
| Fo | 88.79 | 90.31 | 90.16 | 88.25 | 88.39 | 88.34 | 88.63 | 88.52 | 88.35 |

Olivine microprobe analysis from drill core G13 – sample 24

| Sample | G13/21g3 | G13/21c2 | | G13/21c4 | G13/21c5 | G13/21d1 | G13/21d2 | G13/21d3 | G13/21d4 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 49.16 | 49.64 | 50.91 | 50.29 | 49.78 | 50.8 | 51.29 | 50.95 | 50.87 |
| Al2O3 | 0 | 0.04 | 0 | 0.04 | 0.04 | 0 | 0 | 0 | 0.04 |
| Cr2O3 | 0.05 | 0 | 0.02 | 0.02 | 0.02 | 0 | 0 | 0.02 | 0.02 |
| FeO | 6.82 | 6.38 | 6.87 | 7.06 | 6.87 | 6.85 | 7.02 | 7.06 | 7.1 |
| TiO2 | 0 | 0 | 0.07 | 0.04 | 0 | 0.04 | 0 | 0.04 | 0.04 |
| MnO | 0.08 | 0.08 | 0.16 | 0.14 | 0.14 | 0.14 | 0.1 | 0.16 | 0.14 |
| SiO2 | 43.03 | 41.06 | 42.35 | 41.25 | 41.62 | 41.04 | 41.59 | 41.54 | 41.81 |
| CaO | 0.29 | 0.37 | 0.37 | 0.29 | 0.44 | 0.29 | 0.37 | 0.44 | 0.29 |
| K2O | 0.01 | 0.01 | 0.01 | 0.02 | 0.02 | 0 | 0.01 | 0 | 0 |
| Na2O | 0 | 0.08 | 0 | 0.08 | 0 | 0.08 | 0.15 | 0 | 0.15 |
| NiO | 0.42 | 0.35 | 0.28 | 0.35 | 0.35 | 0.35 | 0.35 | 0.39 | 0.32 |
| Summe | 99.86 | 98.01 | 101.04 | 99.58 | 99.28 | 99.59 | 100.88 | 100.6 | 100.78 |
| Formula | | | | | | | | | |
| Si | 1.030 | 0.983 | 1.013 | 0.987 | 0.996 | 0.982 | 0.995 | 0.994 | 1.001 |
| Ti | 0.000 | 0.000 | 0.001 | 0.001 | 0.000 | 0.001 | 0.000 | 0.001 | 0.001 |
| Al | 0.000 | 0.001 | 0.000 | 0.001 | 0.001 | 0.000 | 0.000 | 0.000 | 0.001 |
| Cr | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 0.136 | 0.128 | 0.137 | 0.141 | 0.137 | 0.137 | 0.140 | 0.141 | 0.142 |
| Mn | 0.002 | 0.002 | 0.003 | 0.003 | 0.003 | 0.003 | 0.002 | 0.003 | 0.003 |
| Mg | 1.754 | 1.771 | 1.816 | 1.794 | 1.776 | 1.812 | 1.830 | 1.818 | 1.815 |
| Ni | 0.008 | 0.007 | 0.005 | 0.007 | 0.007 | 0.007 | 0.007 | 0.008 | 0.006 |
| Ca | 0.007 | 0.009 | 0.009 | 0.007 | 0.011 | 0.007 | 0.009 | 0.011 | 0.007 |
| TOTAL | 2.938 | 2.900 | 2.987 | 2.942 | 2.932 | 2.949 | 2.984 | 2.976 | 2.976 |
| | | | | | | | | | |
| Fo | 92.70 | 93.20 | 92.81 | 92.56 | 92.68 | 92.83 | 92.78 | 92.64 | 92.61 |

| Sample | G13/21b2 | G13/21b3 | G13/21b4 | G13/21b5 | G13/21b6 | G13/17c13 | G13/21a1 | G13/21a2 | G13/21a3 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 50.29 | 50.52 | 50.9 | 50.53 | 51.23 | 48.57 | 49.41 | 50.22 | 50.67 |
| Al2O3 | 0.08 | 0 | 0 | 0.04 | 0 | 0.08 | 0 | 0.12 | 0.04 |
| Cr2O3 | 0.02 | 0 | 0.07 | 0 | 0 | 0 | 0.05 | 0 | 0 |
| FeO | 7.17 | 7.27 | 7.27 | 7.31 | 7.43 | 8.51 | 7.25 | 6.96 | 6.85 |
| TiO2 | 0 | 0.07 | 0 | 0 | 0 | 0.04 | 0.11 | 0 | 0 |
| MnO | 0.12 | 0.16 | 0.16 | 0.12 | 0.18 | 0.18 | 0.14 | 0.2 | 0.16 |
| SiO2 | 43.26 | 42.54 | 42.57 | 42.54 | 42.92 | 41.28 | 43.64 | 41.82 | 41.54 |
| CaO | 0.29 | 0.29 | 0.51 | 0.37 | 0.37 | 0.29 | 0.37 | 0.29 | 0.37 |
| K2O | 0.01 | 0 | 0.01 | 0.02 | 0 | 0 | 0 | 0.01 | 0 |
| Na2O | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.08 | 0 |
| NiO | 0.39 | 0.28 | 0.42 | 0.39 | 0.53 | 0.32 | 0.39 | 0.35 | 0.32 |
| Summe | 101.63 | 101.13 | 101.91 | 101.32 | 102.66 | 99.27 | 101.36 | 100.05 | 99.95 |
| Formula | | | | | | | | | |
| Si | 1.035 | 1.018 | 1.019 | 1.018 | 1.027 | 0.988 | 1.044 | 1.001 | 0.994 |
| Ti | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.001 | 0.002 | 0.000 | 0.000 |
| Al | 0.002 | 0.000 | 0.000 | 0.001 | 0.000 | 0.002 | 0.000 | 0.003 | 0.001 |
| Cr | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 |
| Fe(ii) | 0.143 | 0.145 | 0.145 | 0.146 | 0.149 | 0.170 | 0.145 | 0.139 | 0.137 |
| Mn | 0.002 | 0.003 | 0.003 | 0.002 | 0.004 | 0.004 | 0.003 | 0.004 | 0.003 |
| Mg | 1.794 | 1.802 | 1.816 | 1.803 | 1.828 | 1.733 | 1.763 | 1.792 | 1.808 |
| Ni | 0.008 | 0.005 | 0.008 | 0.008 | 0.010 | 0.006 | 0.008 | 0.007 | 0.006 |
| Ca | 0.007 | 0.007 | 0.013 | 0.009 | 0.009 | 0.007 | 0.009 | 0.007 | 0.009 |
| TOTAL | 2.993 | 2.983 | 3.006 | 2.988 | 3.027 | 2.911 | 2.975 | 2.953 | 2.959 |
| | | | | | | | | | |
| Fo | 92.48 | 92.38 | 92.43 | 92.38 | 92.31 | 90.88 | 92.26 | 92.59 | 92.80 |

Olivine microprobe analysis from drill core G13 – sample 21

| Sample | G13/21a4 | G13/21a5 | G13/21a6 |
|---|---|---|---|
| MgO | 50.95 | 50.65 | 51.19 |
| Al2O3 | 0 | 0.04 | 0 |
| Cr2O3 | 0 | 0 | 0 |
| FeO | 6.77 | 6.79 | 6.7 |
| TiO2 | 0 | 0.07 | 0 |
| MnO | 0.16 | 0.2 | 0.14 |
| SiO2 | 41.49 | 41.6 | 41.21 |
| CaO | 0.29 | 0.29 | 0.29 |
| K2O | 0.01 | 0 | 0.01 |
| Na2O | 0 | 0 | 0 |
| NiO | 0.35 | 0.32 | 0.28 |
| Summe | 100.02 | 99.96 | 99.82 |

| Formula | | | |
|---|---|---|---|
| Si | 0.993 | 0.996 | 0.986 |
| Ti | 0.000 | 0.001 | 0.000 |
| Al | 0.000 | 0.001 | 0.000 |
| Cr | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 0.135 | 0.136 | 0.134 |
| Mn | 0.003 | 0.004 | 0.003 |
| Mg | 1.818 | 1.807 | 1.826 |
| Ni | 0.007 | 0.006 | 0.005 |
| Ca | 0.007 | 0.007 | 0.007 |
| TOTAL | 2.963 | 2.958 | 2.962 |
| | | | |
| Fo | 92.91 | 92.81 | 93.03 |

Olivine microprobe analysis from drill core G13 – sample 21

| Sample | G13/20a3 | G13/20a4 | G13/20a6 | G13/20a7 | G13/20a8 | G13/20a14 | G13/20a15 | G13/20a16 | G13/20a17 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 48.54 | 47.96 | 48.38 | 48.07 | 48.24 | 48.44 | 48.3 | 48.25 | 48.35 |
| Al2O3 | 0 | 0 | 0 | 0.11 | 0 | 0 | 0 | 0 | 0 |
| Cr2O3 | 0 | 0 | 0.06 | 0.06 | 0 | 0.04 | 0.02 | 0.06 | 0.17 |
| FeO | 9.65 | 10.02 | 9.81 | 9.84 | 9.63 | 9.65 | 9.52 | 9.77 | 9.42 |
| TiO2 | 0 | 0 | 0.04 | 0.04 | 0 | 0.04 | 0.04 | 0 | 0.04 |
| MnO | 0.18 | 0.19 | 0.19 | 0.19 | 0.21 | 0.14 | 0.16 | 0.18 | 0.14 |
| SiO2 | 42.83 | 41.33 | 42.3 | 42.31 | 41.37 | 42.83 | 42.78 | 42.35 | 42.84 |
| CaO | 0.32 | 0.45 | 0.25 | 0.32 | 0.45 | 0.32 | 0.32 | 0.32 | 0.32 |
| K2O | 0 | 0.01 | 0 | 0.01 | 0.01 | 0 | 0.01 | 0.03 | 0.01 |
| Na2O | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NiO | 0.39 | 0.33 | 0.42 | 0.33 | 0.36 | 0.42 | 0.36 | 0.36 | 0.33 |
| Summe | 101.91 | 100.29 | 101.45 | 101.28 | 100.27 | 101.88 | 101.51 | 101.32 | 101.62 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 1.029 | 0.993 | 1.016 | 1.016 | 0.994 | 1.029 | 1.027 | 1.017 | 1.029 |
| Ti | 0.000 | 0.000 | 0.001 | 0.001 | 0.000 | 0.001 | 0.001 | 0.000 | 0.001 |
| Al | 0.000 | 0.000 | 0.000 | 0.003 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cr | 0.000 | 0.000 | 0.001 | 0.001 | 0.000 | 0.001 | 0.000 | 0.001 | 0.003 |
| Fe(ii) | 0.194 | 0.201 | 0.197 | 0.198 | 0.193 | 0.194 | 0.191 | 0.196 | 0.189 |
| Mn | 0.004 | 0.004 | 0.004 | 0.004 | 0.004 | 0.003 | 0.003 | 0.004 | 0.003 |
| Mg | 1.738 | 1.717 | 1.732 | 1.721 | 1.727 | 1.734 | 1.729 | 1.727 | 1.731 |
| Ni | 0.008 | 0.006 | 0.008 | 0.006 | 0.007 | 0.008 | 0.007 | 0.007 | 0.006 |
| Ca | 0.008 | 0.012 | 0.006 | 0.008 | 0.012 | 0.008 | 0.008 | 0.008 | 0.008 |
| TOTAL | 2.980 | 2.933 | 2.965 | 2.958 | 2.937 | 2.977 | 2.967 | 2.961 | 2.970 |
| | | | | | | | | | |
| Fo | 89.80 | 89.33 | 89.61 | 89.52 | 89.73 | 89.82 | 89.89 | 89.63 | 90.02 |

| Sample | G13/20a18 | G13/20a19 | G13/20b1 | G13/20b2 | G13/20b3 | G13/20b4 | G13/20b5 | G13/20b6 | G13/20b7 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 48.04 | 48.17 | 48.46 | 49.34 | 48.41 | 48.69 | 48.55 | 48.84 | 48.37 |
| Al2O3 | 0 | 0 | 0.04 | 0 | 0.07 | 0 | 0 | 0 | 0 |
| Cr2O3 | 0.02 | 0 | 0 | 0.04 | 0 | 0.06 | 0.02 | 0.04 | 0 |
| FeO | 9.58 | 9.42 | 9.33 | 9.66 | 9.2 | 9.35 | 9.42 | 9.57 | 9.7 |
| TiO2 | 0.07 | 0.04 | 0 | 0 | 0.04 | 0.04 | 0 | 0.07 | 0 |
| MnO | 0.21 | 0.19 | 0.18 | 0.16 | 0.19 | 0.21 | 0.16 | 0.25 | 0.19 |
| SiO2 | 42.36 | 42.46 | 42.73 | 41.96 | 42.35 | 42.88 | 42.54 | 42.92 | 42.94 |
| CaO | 0.38 | 0.38 | 0.32 | 0.26 | 0.19 | 0.45 | 0.38 | 0.32 | 0.38 |
| K2O | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0 | 0.01 | 0.02 | 0 |
| Na2O | 0 | 0.17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NiO | 0.36 | 0.33 | 0.33 | 0.2 | 0.39 | 0.36 | 0.26 | 0.33 | 0.36 |
| Summe | 101.03 | 101.17 | 101.4 | 101.63 | 100.85 | 102.04 | 101.34 | 102.36 | 101.94 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 1.017 | 1.020 | 1.026 | 1.008 | 1.017 | 1.030 | 1.022 | 1.031 | 1.031 |
| Ti | 0.001 | 0.001 | 0.000 | 0.000 | 0.001 | 0.001 | 0.000 | 0.001 | 0.000 |
| Al | 0.000 | 0.000 | 0.001 | 0.000 | 0.002 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cr | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.001 | 0.000 | 0.001 | 0.000 |
| Fe(ii) | 0.192 | 0.189 | 0.187 | 0.194 | 0.185 | 0.188 | 0.189 | 0.192 | 0.195 |
| Mn | 0.004 | 0.004 | 0.004 | 0.003 | 0.004 | 0.004 | 0.003 | 0.005 | 0.004 |
| Mg | 1.720 | 1.725 | 1.735 | 1.767 | 1.733 | 1.743 | 1.738 | 1.749 | 1.732 |
| Ni | 0.007 | 0.006 | 0.006 | 0.004 | 0.008 | 0.007 | 0.005 | 0.006 | 0.007 |
| Ca | 0.010 | 0.010 | 0.008 | 0.007 | 0.005 | 0.012 | 0.010 | 0.008 | 0.010 |
| TOTAL | 2.952 | 2.954 | 2.968 | 2.983 | 2.954 | 2.985 | 2.967 | 2.993 | 2.978 |
| | | | | | | | | | |
| Fo | 89.74 | 89.93 | 90.08 | 89.96 | 90.19 | 90.08 | 90.03 | 89.86 | 89.71 |

Olivine microprobe analysis from drill core G13 – sample 20

| Sample | G13/20b8 | G13/20b9 | G13/20b11 | G13/20b12 | G13/20b13 | G13/20b14 | G13/20b15 | G13/20b16 | G13/20c1 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 48.91 | 49.66 | 49.93 | 48.61 | 47.98 | 48.41 | 48.05 | 47.75 | 49.36 |
| Al2O3 | 0.11 | 0.07 | 0.07 | 0.07 | 0.04 | 0 | 0 | 0.07 | 0.29 |
| Cr2O3 | 0.04 | 0.09 | 0 | 0.02 | 0 | 0.04 | 0.04 | 0.02 | 0.02 |
| FeO | 9.62 | 9.34 | 9.4 | 9.46 | 9.55 | 9.33 | 9.5 | 9.18 | 9.14 |
| TiO2 | 0.07 | 0 | 0.04 | 0 | 0 | 0 | 0.07 | 0 | 0.07 |
| MnO | 0.18 | 0.23 | 0.16 | 0.21 | 0.21 | 0.23 | 0.16 | 0.18 | 0.16 |
| SiO2 | 42.71 | 41.88 | 42.36 | 42.53 | 42.81 | 42.92 | 42 | 42.82 | 42.18 |
| CaO | 0.38 | 0.32 | 0.32 | 0.32 | 0.51 | 0.32 | 0.32 | 0.38 | 0.26 |
| K2O | 0.03 | 0.01 | 0 | 0 | 0.01 | 0 | 0 | 0.01 | 0.01 |
| Na2O | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NiO | 0.29 | 0.42 | 0.29 | 0.39 | 0.33 | 0.42 | 0.36 | 0.29 | 0.49 |
| Summe | 102.34 | 102.02 | 102.57 | 101.61 | 101.44 | 101.67 | 100.5 | 100.7 | 101.98 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 1.026 | 1.006 | 1.017 | 1.021 | 1.028 | 1.031 | 1.009 | 1.028 | 1.013 |
| Ti | 0.001 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.001 |
| Al | 0.003 | 0.002 | 0.002 | 0.002 | 0.001 | 0.000 | 0.000 | 0.002 | 0.008 |
| Cr | 0.001 | 0.002 | 0.000 | 0.000 | 0.000 | 0.001 | 0.001 | 0.000 | 0.000 |
| Fe(ii) | 0.193 | 0.188 | 0.189 | 0.190 | 0.192 | 0.187 | 0.191 | 0.184 | 0.184 |
| Mn | 0.004 | 0.005 | 0.003 | 0.004 | 0.004 | 0.005 | 0.003 | 0.004 | 0.003 |
| Mg | 1.751 | 1.778 | 1.788 | 1.740 | 1.718 | 1.733 | 1.720 | 1.710 | 1.767 |
| Ni | 0.006 | 0.008 | 0.006 | 0.008 | 0.006 | 0.008 | 0.007 | 0.006 | 0.009 |
| Ca | 0.010 | 0.008 | 0.008 | 0.008 | 0.013 | 0.008 | 0.008 | 0.010 | 0.007 |
| TOTAL | 2.994 | 2.996 | 3.013 | 2.974 | 2.963 | 2.973 | 2.940 | 2.944 | 2.993 |
| | | | | | | | | | |
| Fo | 89.89 | 90.24 | 90.30 | 89.96 | 89.76 | 90.03 | 89.86 | 90.09 | 90.44 |

| Sample | G13/20c2 | G13/20c3 | G13/20c4 | G13/20c6 | G13/20c7 | G13/20c8 | G13/20c9 | G13/20c11 | G13/20c12 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 49.06 | 49.66 | 49.2 | 49.48 | 48.99 | 49.1 | 48.54 | 49.09 | 48.87 |
| Al2O3 | 0.11 | 0 | 0.04 | 0.47 | 0 | 0 | 0.54 | 0.07 | 0 |
| Cr2O3 | 0.04 | 0 | 0 | 0.04 | 0 | 0.02 | 0.04 | 0 | 0.02 |
| FeO | 9.1 | 9.27 | 9.2 | 8.98 | 9.06 | 9.25 | 9.28 | 8.95 | 9.1 |
| TiO2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MnO | 0.16 | 0.21 | 0.21 | 0.14 | 0.14 | 0.19 | 0.12 | 0.19 | 0.18 |
| SiO2 | 41.86 | 41.03 | 41.8 | 41.17 | 42.08 | 41.8 | 41.77 | 42.37 | 42.28 |
| CaO | 0.32 | 0.38 | 0.32 | 0.38 | 0.26 | 0.26 | 0.38 | 0.19 | 0.32 |
| K2O | 0.01 | 0.01 | 0 | 0.01 | 0 | 0 | 0 | 0.01 | 0 |
| Na2O | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NiO | 0.39 | 0.29 | 0.39 | 0.29 | 0.36 | 0.36 | 0.33 | 0.33 | 0.36 |
| Summe | 101.05 | 100.85 | 101.16 | 100.96 | 100.89 | 100.98 | 101 | 101.2 | 101.13 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 1.005 | 0.985 | 1.004 | 0.989 | 1.011 | 1.004 | 1.003 | 1.018 | 1.015 |
| Ti | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Al | 0.003 | 0.000 | 0.001 | 0.013 | 0.000 | 0.000 | 0.015 | 0.002 | 0.000 |
| Cr | 0.001 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 |
| Fe(ii) | 0.183 | 0.186 | 0.185 | 0.180 | 0.182 | 0.186 | 0.186 | 0.180 | 0.183 |
| Mn | 0.003 | 0.004 | 0.004 | 0.003 | 0.003 | 0.004 | 0.002 | 0.004 | 0.004 |
| Mg | 1.756 | 1.778 | 1.761 | 1.772 | 1.754 | 1.758 | 1.738 | 1.758 | 1.750 |
| Ni | 0.008 | 0.006 | 0.008 | 0.006 | 0.007 | 0.007 | 0.006 | 0.006 | 0.007 |
| Ca | 0.008 | 0.010 | 0.008 | 0.010 | 0.007 | 0.007 | 0.010 | 0.005 | 0.008 |
| TOTAL | 2.967 | 2.969 | 2.971 | 2.973 | 2.963 | 2.965 | 2.962 | 2.972 | 2.967 |
| | | | | | | | | | |
| Fo | 90.42 | 90.33 | 90.31 | 90.63 | 90.47 | 90.26 | 90.20 | 90.54 | 90.37 |

Olivine microprobe analysis from drill core G13 – sample 20

| Sample | G13/17e1 | G13/17e2 | G13/17e3 | G13/17e | G13/17e6 | G13/17e8 | G13/17d1 | G13/17d2 | G13/17d4 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 49.66 | 48.89 | 50.3 | 49.44 | 49.13 | 50.44 | 50.35 | 49.85 | 49.48 |
| Al2O3 | 0.08 | 0 | 0 | 0 | 0 | 0 | 0 | 0.04 | 0.04 |
| Cr2O3 | 0.02 | 0 | 0 | 0.02 | 0 | 0 | 0.07 | 0 | 0.05 |
| FeO | 8.56 | 8.74 | 8.52 | 8.33 | 8.39 | 8.15 | 8.11 | 7.91 | 8.42 |
| TiO2 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0 | 0 | 0 | 0 |
| MnO | 0.18 | 0.14 | 0.2 | 0.14 | 0.18 | 0.1 | 0.14 | 0.12 | 0.16 |
| SiO2 | 42.69 | 43.09 | 42.09 | 41.92 | 42.12 | 42.48 | 42.59 | 42.15 | 42.28 |
| CaO | 0.36 | 0.43 | 0.29 | 0.43 | 0.43 | 0.36 | 0.36 | 0.29 | 0.36 |
| K2O | 0.03 | 0 | 0.03 | 0.03 | 0.01 | 0.01 | 0.04 | 0.03 | 0 |
| Na2O | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.08 | 0 |
| NiO | 0.25 | 0.31 | 0.25 | 0.31 | 0.28 | 0.22 | 0.28 | 0.25 | 0.41 |
| Summe | 101.87 | 101.64 | 101.72 | 100.66 | 100.58 | 101.76 | 101.94 | 100.72 | 101.2 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 1.022 | 1.031 | 1.007 | 1.003 | 1.008 | 1.017 | 1.019 | 1.009 | 1.012 |
| Ti | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 |
| Al | 0.002 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.001 |
| Cr | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.001 |
| Fe(ii) | 0.171 | 0.175 | 0.170 | 0.167 | 0.168 | 0.163 | 0.162 | 0.158 | 0.168 |
| Mn | 0.004 | 0.003 | 0.004 | 0.003 | 0.004 | 0.002 | 0.003 | 0.002 | 0.003 |
| Mg | 1.772 | 1.744 | 1.795 | 1.764 | 1.753 | 1.799 | 1.796 | 1.778 | 1.765 |
| Ni | 0.005 | 0.006 | 0.005 | 0.006 | 0.005 | 0.004 | 0.005 | 0.005 | 0.008 |
| Ca | 0.009 | 0.011 | 0.007 | 0.011 | 0.011 | 0.009 | 0.009 | 0.007 | 0.009 |
| TOTAL | 2.986 | 2.971 | 2.989 | 2.955 | 2.949 | 2.995 | 2.997 | 2.961 | 2.968 |
| | | | | | | | | | |
| Fo | 91.01 | 90.75 | 91.14 | 91.23 | 91.09 | 91.60 | 91.58 | 91.71 | 91.13 |

| Sample | G13/17d5 | G13/17d7 | G13/17c2 | G13/17c3 | G13/17c5 | G13/17c6 | G13/17c9 | G13/17b1 | G13/17b3 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 49.21 | 49.38 | 48.67 | 49.59 | 49.41 | 49.62 | 49.68 | 49.96 | 49.33 |
| Al2O3 | 0 | 0 | 0 | 0.04 | 0 | 0.12 | 0.08 | 0.08 | 0 |
| Cr2O3 | 0 | 0.02 | 0.1 | 0 | 0 | 0.07 | 0 | 0 | 0 |
| FeO | 8.11 | 8.05 | 8.53 | 8.59 | 8.51 | 8.72 | 8.7 | 8.22 | 8.57 |
| TiO2 | 0.04 | 0 | 0 | 0.04 | 0 | 0.11 | 0.04 | 0.04 | 0 |
| MnO | 0.18 | 0.14 | 0.24 | 0.14 | 0.18 | 0.08 | 0.06 | 0.16 | 0.16 |
| SiO2 | 43.36 | 43.25 | 42.21 | 42.54 | 42.61 | 42.19 | 42.4 | 40.95 | 43.06 |
| CaO | 0.36 | 0.29 | 0.36 | 0.29 | 0.22 | 0.29 | 0.29 | 0.29 | 0.29 |
| K2O | 0.01 | 0 | 0.01 | 0 | 0 | 0 | 0.01 | 0.01 | 0.04 |
| Na2O | 0 | 0 | 0 | 0.08 | 0.08 | 0 | 0.16 | 0.08 | 0 |
| NiO | 0.34 | 0.39 | 0.39 | 0.35 | 0.35 | 0.21 | 0.39 | 0.35 | 0.32 |
| Summe | 101.61 | 101.52 | 100.51 | 101.66 | 101.36 | 101.41 | 101.81 | 100.14 | 101.77 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 1.038 | 1.035 | 1.010 | 1.018 | 1.020 | 1.010 | 1.015 | 0.980 | 1.030 |
| Ti | 0.001 | 0.000 | 0.000 | 0.001 | 0.000 | 0.002 | 0.001 | 0.001 | 0.000 |
| Al | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.003 | 0.002 | 0.002 | 0.000 |
| Cr | 0.000 | 0.000 | 0.002 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 0.162 | 0.161 | 0.171 | 0.172 | 0.170 | 0.174 | 0.174 | 0.164 | 0.171 |
| Mn | 0.004 | 0.003 | 0.005 | 0.003 | 0.004 | 0.002 | 0.001 | 0.003 | 0.003 |
| Mg | 1.756 | 1.762 | 1.736 | 1.769 | 1.763 | 1.770 | 1.772 | 1.782 | 1.760 |
| Ni | 0.007 | 0.008 | 0.008 | 0.007 | 0.007 | 0.004 | 0.008 | 0.007 | 0.006 |
| Ca | 0.009 | 0.007 | 0.009 | 0.007 | 0.006 | 0.007 | 0.007 | 0.007 | 0.007 |
| TOTAL | 2.976 | 2.976 | 2.941 | 2.978 | 2.969 | 2.974 | 2.980 | 2.947 | 2.979 |
| | | | | | | | | | |
| Fo | 91.36 | 91.49 | 90.82 | 91.01 | 91.02 | 90.95 | 91.00 | 91.40 | 90.97 |

Olivine microprobe analysis from drill core G13 – sample 17

| Sample | G13-7b2 | G13-7b4 | G13-7b6 |
|---|---|---|---|
| Na2O | 0 | 0 | 0 |
| MgO | 44.61 | 44.59 | 44.94 |
| Al2O3 | 0 | 0.06 | 0 |
| FeO | 12.92 | 12.57 | 12.96 |
| CaO | 0.23 | 0.27 | 0.22 |
| SiO2 | 41.46 | 41.08 | 42.16 |
| MnO | 0.2 | 0.22 | 0.22 |
| TiO2 | 0.13 | 0.04 | 0 |
| K2O | 0 | 0 | 0 |
| Cr2O3 | 0 | 0 | 0 |
| NiO | 0.18 | 0.09 | 0.22 |
| Summe | 99.73 | 98.92 | 100.72 |

| Formula | | | |
|---|---|---|---|
| Si | 1.014 | 1.005 | 1.031 |
| Ti | 0.002 | 0.001 | 0.000 |
| Al | 0.000 | 0.002 | 0.000 |
| Cr | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 0.264 | 0.257 | 0.265 |
| Mn | 0.004 | 0.005 | 0.005 |
| Mg | 1.627 | 1.626 | 1.639 |
| Ni | 0.004 | 0.002 | 0.004 |
| Ca | 0.006 | 0.007 | 0.006 |
| TOTAL | 2.921 | 2.904 | 2.950 |
| | | | |
| Fo | 85.84 | 86.14 | 85.87 |

Olivine microprobe analysis from drill core G13 – sample 27

| No. | 9 | 13 | 14 | 15 | 16 | 18 |
|---|---|---|---|---|---|---|
| MgO | 45.34 | 44.815 | 44.006 | 44.921 | 45.748 | 45.29 |
| MnO | 0.358 | 0.42 | 0.368 | 0.415 | 0.226 | 0.354 |
| Cr2O3 | 0 | 0 | 0 | 0.007 | 0.09 | 0 |
| TiO2 | 0.046 | 0.045 | 0.002 | 0 | 0.083 | 0.101 |
| FeO | 14.697 | 14.656 | 14.795 | 14.78 | 14.988 | 14.699 |
| Al2O3 | 0.013 | 0.008 | 0 | 0.026 | 0.036 | 0 |
| SiO2 | 37.358 | 37.353 | 36.123 | 36.527 | 38.521 | 37.78 |
| CaO | 0.207 | 0.168 | 0.173 | 0.2 | 0.15 | 0.162 |
| NiO | 0.318 | 0.246 | 0.232 | 0.251 | 0.282 | 0.282 |
| Na2O | 0 | 0.004 | 0 | 0.005 | 0 | 0.005 |
| V2O3 | 0.022 | 0 | 0 | 0 | 0 | 0.016 |
| K2O | 0.017 | 0 | 0 | 0.004 | 0.005 | 0.016 |
| ZnO | 0 | 0.015 | 0.093 | 0.006 | 0.005 | 0.017 |
| Total | 98.376 | 97.73 | 95.792 | 97.142 | 100.134 | 98.722 |
| G13-6 | | | | | | |

| Formula | | | | | | |
|---|---|---|---|---|---|---|
| Si | 0.963 | 0.962 | 0.931 | 0.941 | 0.992 | 0.973 |
| Ti | 0.001 | 0.001 | 0.000 | 0.000 | 0.002 | 0.002 |
| Al | 0.000 | 0.000 | 0.000 | 0.001 | 0.001 | 0.000 |
| Cr | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | 0.000 |
| Fe(ii) | 0.317 | 0.316 | 0.319 | 0.318 | 0.323 | 0.317 |
| Mn | 0.008 | 0.009 | 0.008 | 0.009 | 0.005 | 0.008 |
| Mg | 1.742 | 1.721 | 1.690 | 1.725 | 1.757 | 1.740 |
| Ni | 0.007 | 0.005 | 0.005 | 0.005 | 0.006 | 0.006 |
| Ca | 0.006 | 0.005 | 0.005 | 0.006 | 0.004 | 0.004 |
| TOTAL | 3.042 | 3.020 | 2.957 | 3.006 | 3.092 | 3.050 |
| | | | | | | |
| Fo | 84.30 | 84.12 | 83.80 | 84.05 | 84.28 | 84.28 |

Olivine microprobe analysis from drill core G13 – sample 6

| Sample | G13/6c1 | G13/6c3 | G13/6c4 | G13/6c5 | G13/6c6 | G13/6c7 | G13/6c8 | G13/6a1 | G13/6a2 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 43.34 | 44.03 | 43.42 | 43.52 | 43.93 | 43.6 | 43.53 | 46.8 | 46.23 |
| Al2O3 | 0.04 | 0 | 0 | 0 | 0 | 0 | 0 | 0.08 | 0 |
| Cr2O3 | 0 | 0 | 0 | 0.06 | 0.03 | 0.06 | 0 | 0.03 | 0.03 |
| FeO | 12.15 | 12.1 | 11.73 | 12.8 | 13 | 11.78 | 12.22 | 13.03 | 13.42 |
| TiO2 | 0.03 | 0.03 | 0.16 | 0.06 | 0 | 0.03 | 0.03 | 0.06 | 0.03 |
| MnO | 0.27 | 0.23 | 0.27 | 0.27 | 0.33 | 0.31 | 0.33 | 0.23 | 0.25 |
| SiO2 | 44 | 43.45 | 43.34 | 43.46 | 43.73 | 43.61 | 43.33 | 42.65 | 42.76 |
| CaO | 0.2 | 0.2 | 0.26 | 0.2 | 0.26 | 0.33 | 0.2 | 0.2 | 0.2 |
| K2O | 0.01 | 0.01 | 0.01 | 0.01 | 0.03 | 0 | 0 | 0 | 0 |
| Na2O | 0 | 0 | 0 | 0.08 | 0 | 0 | 0 | 0 | 0 |
| NiO | 0.29 | 0.32 | 0.32 | 0.35 | 0.29 | 0.38 | 0.29 | 0.29 | 0.29 |
| Summe | 100.33 | 100.37 | 99.51 | 100.81 | 101.6 | 100.1 | 99.93 | 103.37 | 103.21 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 1.077 | 1.064 | 1.061 | 1.064 | 1.071 | 1.068 | 1.061 | 1.044 | 1.047 |
| Ti | 0.001 | 0.001 | 0.003 | 0.001 | 0.000 | 0.001 | 0.001 | 0.001 | 0.001 |
| Al | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | 0.000 |
| Cr | 0.000 | 0.000 | 0.000 | 0.001 | 0.001 | 0.001 | 0.000 | 0.001 | 0.001 |
| Fe(ii) | 0.249 | 0.248 | 0.240 | 0.262 | 0.266 | 0.241 | 0.250 | 0.267 | 0.275 |
| Mn | 0.006 | 0.005 | 0.006 | 0.006 | 0.007 | 0.006 | 0.007 | 0.005 | 0.005 |
| Mg | 1.582 | 1.607 | 1.585 | 1.589 | 1.604 | 1.592 | 1.589 | 1.708 | 1.688 |
| Ni | 0.006 | 0.006 | 0.006 | 0.007 | 0.006 | 0.007 | 0.006 | 0.006 | 0.006 |
| Ca | 0.005 | 0.005 | 0.007 | 0.005 | 0.007 | 0.009 | 0.005 | 0.005 | 0.005 |
| TOTAL | 2.927 | 2.936 | 2.908 | 2.935 | 2.961 | 2.925 | 2.919 | 3.039 | 3.027 |
| | | | | | | | | | |
| Fo | 86.15 | 86.42 | 86.58 | 85.58 | 85.45 | 86.54 | 86.08 | 86.28 | 85.77 |

| Sample | G13/6a2 | G13/6a3 | G13/6a4 | G13/6a5 | G13/6a6 | G13/6a7 | G13/6a8 | G13/6a9 | G13/6b3 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 45.77 | 43.85 | 43.83 | 43.36 | 43.35 | 43.63 | 43.45 | 43.22 | 42.85 |
| Al2O3 | 0.04 | 0 | 0 | 0.11 | 0.11 | 0 | 0.08 | 0 | 0.04 |
| Cr2O3 | 0 | 0 | 0 | 0 | 0.06 | 0.03 | 0.03 | 0 | 0 |
| FeO | 13.82 | 13.9 | 14.22 | 13.94 | 13.9 | 14.2 | 13.71 | 13.89 | 13.61 |
| TiO2 | 0.06 | 0.06 | 0 | 0 | 0.03 | 0 | 0.06 | 0.03 | 0 |
| MnO | 0.29 | 0.31 | 0.35 | 0.31 | 0.31 | 0.31 | 0.27 | 0.29 | 0.25 |
| SiO2 | 42.03 | 42.92 | 43.6 | 42.44 | 42.81 | 42.12 | 42.42 | 42.54 | 42.5 |
| CaO | 0.66 | 0.2 | 0.26 | 0.26 | 0.2 | 0.26 | 0.2 | 0.26 | 0.26 |
| K2O | 0 | 0.01 | 0.01 | 0 | 0.02 | 0.01 | 0 | 0.02 | 0.02 |
| Na2O | 0 | 0.26 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NiO | 0.29 | 0.26 | 0.26 | 0.32 | 0.19 | 0.22 | 0.35 | 0.38 | 0.26 |
| Summe | 102.96 | 101.77 | 102.53 | 100.74 | 100.98 | 100.78 | 100.57 | 100.63 | 99.79 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 1.029 | 1.051 | 1.068 | 1.039 | 1.048 | 1.031 | 1.039 | 1.042 | 1.041 |
| Ti | 0.001 | 0.001 | 0.000 | 0.000 | 0.001 | 0.000 | 0.001 | 0.001 | 0.000 |
| Al | 0.001 | 0.000 | 0.000 | 0.003 | 0.003 | 0.000 | 0.002 | 0.000 | 0.001 |
| Cr | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.001 | 0.001 | 0.000 | 0.000 |
| Fe(ii) | 0.283 | 0.285 | 0.291 | 0.285 | 0.285 | 0.291 | 0.281 | 0.284 | 0.279 |
| Mn | 0.006 | 0.006 | 0.007 | 0.006 | 0.006 | 0.006 | 0.006 | 0.006 | 0.005 |
| Mg | 1.671 | 1.601 | 1.600 | 1.583 | 1.583 | 1.593 | 1.586 | 1.578 | 1.564 |
| Ni | 0.006 | 0.005 | 0.005 | 0.006 | 0.004 | 0.004 | 0.007 | 0.007 | 0.005 |
| Ca | 0.017 | 0.005 | 0.007 | 0.007 | 0.005 | 0.007 | 0.005 | 0.007 | 0.007 |
| TOTAL | 3.014 | 2.954 | 2.978 | 2.930 | 2.936 | 2.933 | 2.927 | 2.925 | 2.902 |
| | | | | | | | | | |
| Fo | 85.25 | 84.62 | 84.28 | 84.43 | 84.47 | 84.28 | 84.71 | 84.45 | 84.64 |

Olivine microprobe analysis from drill core G13 – sample 6

| No. | 35 | 36 | 38 | 41 |
|---|---|---|---|---|
| MgO | 48.941 | 48.582 | 48.639 | 47.809 |
| MnO | 0.126 | 0.05 | 0.195 | 0.112 |
| Cr2O3 | 0.075 | 0.029 | 0.096 | 0.02 |
| TiO2 | 0.04 | 0 | 0 | 0 |
| FeO | 10.09 | 10.03 | 10.181 | 10.479 |
| Al2O3 | 0.024 | 0 | 0 | 0 |
| SiO2 | 37.941 | 37.751 | 38.012 | 37.931 |
| CaO | 0.283 | 0.313 | 0.308 | 0.317 |
| NiO | 0.322 | 0.365 | 0.408 | 0.37 |
| Na2O | 0 | 0 | 0.02 | 0.011 |
| V2O3 | 0 | 0 | 0.025 | 0.038 |
| K2O | 0.006 | 0 | 0.013 | 0 |
| ZnO | 0.123 | 0.041 | 0.097 | 0.041 |
| Total | 97.971 | 97.161 | 97.994 | 97.128 |
| | G13-20 | | | |

| Formula | | | | |
|---|---|---|---|---|
| Si | 0.978 | 0.973 | 0.979 | 0.977 |
| Ti | 0.001 | 0.000 | 0.000 | 0.000 |
| Al | 0.001 | 0.000 | 0.000 | 0.000 |
| Cr | 0.002 | 0.001 | 0.002 | 0.000 |
| Fe(ii) | 0.217 | 0.216 | 0.219 | 0.226 |
| Mn | 0.003 | 0.001 | 0.004 | 0.002 |
| Mg | 1.880 | 1.866 | 1.868 | 1.836 |
| Ni | 0.007 | 0.008 | 0.008 | 0.008 |
| Ca | 0.008 | 0.009 | 0.009 | 0.009 |
| TOTAL | 3.095 | 3.073 | 3.090 | 3.059 |
| | | | | |
| Fo | 89.52 | 89.57 | 89.31 | 88.95 |

Olivine microprobe analysis from drill core G13 – sample 20

| No. | 56 | 57 | 58 | 59 | 60 | 61 | 62 |
|---|---|---|---|---|---|---|---|
| MgO | 44.73 | 44.79 | 45.152 | 44.764 | 45.741 | 44.455 | 44.775 |
| MnO | 0.26 | 0.266 | 0.233 | 0.255 | 0.359 | 0.367 | 0.145 |
| Cr2O3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TiO2 | 0.022 | 0.05 | 0 | 0.021 | 0 | 0 | 0 |
| FeO | 12.261 | 12.346 | 12.583 | 12.454 | 12.328 | 12.131 | 12.164 |
| Al2O3 | 0.002 | 0 | 0 | 0 | 0 | 0.012 | 0.008 |
| SiO2 | 36.589 | 36.915 | 37.134 | 37.369 | 39.124 | 38.321 | 36.812 |
| CaO | 0.148 | 0.16 | 0.159 | 0.171 | 0.153 | 0.171 | 0.168 |
| NiO | 0.303 | 0.328 | 0.295 | 0.253 | 0.392 | 0.304 | 0.245 |
| Na2O | 0 | 0 | 0.011 | 0 | 0.003 | 0.014 | 0.002 |
| V2O3 | 0 | 0.026 | 0 | 0.021 | 0.014 | 0 | 0.011 |
| K2O | 0.008 | 0 | 0.001 | 0 | 0.01 | 0 | 0.007 |
| ZnO | 0 | 0.024 | 0.066 | 0 | 0 | 0 | 0.051 |
| Total | 94.323 | 94.905 | 95.634 | 95.308 | 98.124 | 95.775 | 94.388 |
| | G13-3 | | | | | | |

| Formula | | | | | | | |
|---|---|---|---|---|---|---|---|
| Si | 0.943 | 0.951 | 0.957 | 0.963 | 1.008 | 0.987 | 0.948 |
| Ti | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Al | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cr | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 0.264 | 0.266 | 0.271 | 0.268 | 0.266 | 0.261 | 0.262 |
| Mn | 0.006 | 0.006 | 0.005 | 0.006 | 0.008 | 0.008 | 0.003 |
| Mg | 1.718 | 1.720 | 1.734 | 1.719 | 1.757 | 1.708 | 1.720 |
| Ni | 0.006 | 0.007 | 0.006 | 0.005 | 0.008 | 0.006 | 0.005 |
| Ca | 0.004 | 0.004 | 0.004 | 0.005 | 0.004 | 0.005 | 0.005 |
| TOTAL | 2.941 | 2.955 | 2.978 | 2.966 | 3.051 | 2.976 | 2.943 |
| | | | | | | | |
| Fo | 86.43 | 86.36 | 86.26 | 86.26 | 86.53 | 86.37 | 86.64 |

Olivine microprobe analysis from drill core G13 – sample 3

| Sample | G13-3c2 | G13-3a4 | G13-3b1 | G13-3d2 | G13-3d3 | G13-3d5 | G13-3a1 | G13-3a3 | G13-3a4 |
|---|---|---|---|---|---|---|---|---|---|
| Na2O | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.05 |
| MgO | 43.69 | 43.52 | 43.3 | 45 | 44.59 | 44.55 | 43.45 | 45.21 | 45.3 |
| Al2O3 | 0 | 0.06 | 0 | 0.25 | 0.13 | 0.19 | 0.06 | 0 | 0.06 |
| FeO | 12.62 | 13.46 | 12.17 | 13.37 | 12.94 | 13.46 | 12.68 | 13.15 | 13.81 |
| CaO | 0.14 | 0.16 | 0.15 | 0.18 | 0.17 | 0.17 | 0.15 | 0.2 | 0.18 |
| SiO2 | 43.76 | 43.42 | 44.91 | 41.46 | 42.05 | 40.58 | 42.76 | 40.88 | 41.37 |
| MnO | 0.22 | 0.2 | 0.22 | 0.27 | 0.27 | 0.31 | 0.25 | 0.34 | 0.27 |
| TiO2 | 0 | 0.13 | 0 | 0.04 | 0.04 | 0 | 0.08 | 0 | 0.04 |
| K2O | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cr2O3 | 0 | 0 | 0.02 | 0.02 | 0 | 0.07 | 0 | 0 | 0 |
| NiO | 0.18 | 0.13 | 0.13 | 0.18 | 0.18 | 0.22 | 0.27 | 0.18 | 0.22 |
| Summe | 100.61 | 101.08 | 100.9 | 100.77 | 100.37 | 99.55 | 99.7 | 99.96 | 101.3 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 1.070 | 1.062 | 1.098 | 1.014 | 1.029 | 0.993 | 1.046 | 1.000 | 1.012 |
| Ti | 0.000 | 0.002 | 0.000 | 0.001 | 0.001 | 0.000 | 0.001 | 0.000 | 0.001 |
| Al | 0.000 | 0.002 | 0.000 | 0.007 | 0.004 | 0.005 | 0.002 | 0.000 | 0.002 |
| Cr | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 0.258 | 0.275 | 0.249 | 0.273 | 0.265 | 0.275 | 0.259 | 0.269 | 0.282 |
| Mn | 0.005 | 0.004 | 0.005 | 0.006 | 0.006 | 0.006 | 0.005 | 0.007 | 0.006 |
| Mg | 1.593 | 1.587 | 1.579 | 1.641 | 1.626 | 1.624 | 1.584 | 1.649 | 1.652 |
| Ni | 0.004 | 0.003 | 0.003 | 0.004 | 0.004 | 0.004 | 0.005 | 0.004 | 0.004 |
| Ca | 0.004 | 0.004 | 0.004 | 0.005 | 0.004 | 0.004 | 0.004 | 0.005 | 0.005 |
| TOTAL | 2.933 | 2.939 | 2.938 | 2.951 | 2.937 | 2.914 | 2.907 | 2.933 | 2.963 |
| | | | | | | | | | |
| Fo | 85.85 | 85.03 | 86.17 | 85.47 | 85.75 | 85.22 | 85.69 | 85.66 | 85.15 |

| G1-13 | | | |
|---|---|---|---|
| Comment | olcore | olivcore | olivrim |
| No. | 4 | 7 | 8 |
| MgO | 48.7 | 51.334 | 51.875 |
| Al2O3 | 0.046 | 0.045 | 0.044 |
| Cr2O3 | 0.08 | 0.098 | 0.03 |
| TiO2 | 0.028 | 0.013 | 0.018 |
| CaO | 0.584 | 0.488 | 0.511 |
| SiO2 | 39.469 | 39.705 | 40.637 |
| Na2O | 0.012 | 0.004 | 0 |
| FeO | 13.372 | 9.852 | 10.205 |
| MnO | 0.056 | 0.036 | 0.034 |
| NiO | 0.245 | 0.381 | 0.349 |
| K2O | 0 | 0.007 | 0.004 |
| Total | 102.592 | 101.963 | 103.707 |
| Comment | olcore | olivcore | olivrim |

| Formula | | | |
|---|---|---|---|
| Si | 0.964 | 0.961 | 0.967 |
| Al | 0.001 | 0.001 | 0.001 |
| Ti | 0.001 | 0.000 | 0.000 |
| Fe | 0.273 | 0.199 | 0.203 |
| Mn | 0.001 | 0.001 | 0.001 |
| Mg | 1.773 | 1.852 | 1.840 |
| Ca | 0.015 | 0.013 | 0.013 |
| Cr | 0.002 | 0.002 | 0.001 |
| Ni | 0.005 | 0.007 | 0.007 |
| Total | 3.034 | 3.037 | 3.032 |
| Fo | 86.652 | 90.279 | 90.060 |

Olivine microprobe analysis from drill core G13 – sample 3 & drill G1- sample 13

| No. | 27 | 28 | 30 | 34 | 35 | 36 | 40 |
|---|---|---|---|---|---|---|---|
| MgO | 51.588 | 53.713 | 52.316 | 54.665 | 55.074 | 54.342 | 53.437 |
| Al2O3 | 0.072 | 0.06 | 0.019 | 0.057 | 0.056 | 0.01 | 0.01 |
| Cr2O3 | 0.131 | 0.034 | 0 | 0.143 | 0.093 | 0 | 0.038 |
| TiO2 | 0.06 | 0 | 0.019 | 0.001 | 0.033 | 0.016 | 0 |
| CaO | 0.175 | 0.162 | 0.154 | 0.14 | 0.159 | 0.149 | 0.213 |
| SiO2 | 40.5 | 40.984 | 40.695 | 41.285 | 41.353 | 41.201 | 40.77 |
| Na2O | 0.065 | 0.099 | 0 | 0.013 | 0.066 | 0.011 | 0 |
| FeO | 10.166 | 6.991 | 9.601 | 6.18 | 5.578 | 8.453 | 8.574 |
| MnO | 0.027 | 0.025 | 0.013 | 0.02 | 0.035 | 0.025 | 0.037 |
| NiO | 0.389 | 0.388 | 0.421 | 0.354 | 0.372 | 0.402 | 0.391 |
| K2O | 0.004 | 0.006 | 0 | 0 | 0.017 | 0.011 | 0 |
| Total | 103.177 | 102.462 | 103.238 | 102.858 | 102.836 | 104.62 | 103.47 |
| Comment | g1-14ol | g1-14ol | ol | ol | olrim | ol | oliv |

| Formula | | | | | | | |
|---|---|---|---|---|---|---|---|
| Si | 0.969 | 0.981 | 0.974 | 0.988 | 0.990 | 0.986 | 0.976 |
| Ti | 0.001 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 |
| Al | 0.002 | 0.002 | 0.001 | 0.002 | 0.002 | 0.000 | 0.000 |
| Cr | 0.002 | 0.001 | 0.000 | 0.003 | 0.002 | 0.000 | 0.001 |
| Fe(ii) | 0.203 | 0.140 | 0.192 | 0.124 | 0.112 | 0.169 | 0.172 |
| Mn | 0.001 | 0.001 | 0.000 | 0.000 | 0.001 | 0.001 | 0.001 |
| Mg | 1.841 | 1.917 | 1.867 | 1.951 | 1.965 | 1.939 | 1.907 |
| Ni | 0.007 | 0.007 | 0.008 | 0.007 | 0.007 | 0.008 | 0.008 |
| Ca | 0.004 | 0.004 | 0.004 | 0.004 | 0.004 | 0.004 | 0.005 |
| TOTAL | 3.032 | 3.052 | 3.046 | 3.078 | 3.083 | 3.107 | 3.069 |
| | | | | | | | |
| Fo | 90.02 | 93.17 | 90.66 | 94.02 | 94.59 | 91.95 | 91.71 |

| No. | 13 | 14 | 16 | 18 | 19 | 20 | 23 | 25 |
|---|---|---|---|---|---|---|---|---|
| MgO | 48.957 | 50.91 | 51.223 | 51.197 | 51.017 | 51.617 | 51.732 | 51.014 |
| Al2O3 | 0.026 | 0.056 | 0.05 | 0.005 | 0.031 | 0 | 0.015 | 0.035 |
| Cr2O3 | 0.048 | 0 | 0.016 | 0.001 | 0 | 0.021 | 0 | 0.004 |
| TiO2 | 0.076 | 0.058 | 0.037 | 0.031 | 0.026 | 0.05 | 0.078 | 0.068 |
| CaO | 0.784 | 0.399 | 0.461 | 0.461 | 0.565 | 0.37 | 0.313 | 0.414 |
| SiO2 | 39.54 | 40.557 | 40.639 | 39.927 | 39.946 | 39.918 | 40.193 | 39.72 |
| Na2O | 0.018 | 0.048 | 0 | 0.013 | 0 | 0.015 | 0.008 | 0.001 |
| FeO | 11.355 | 11.522 | 11.916 | 11.397 | 10.702 | 10.63 | 10.098 | 11.062 |
| MnO | 0.033 | 0.041 | 0.038 | 0.033 | 0.041 | 0.036 | 0.032 | 0.039 |
| NiO | 0.282 | 0.268 | 0.308 | 0.336 | 0.246 | 0.304 | 0.319 | 0.317 |
| K2O | 0 | 0 | 0 | 0 | 0.021 | 0.007 | 0.021 | 0.01 |
| Total | 101.119 | 103.859 | 104.688 | 103.401 | 102.595 | 102.968 | 102.809 | 102.684 |
| Comment | g1-18oliv | g1-18oliv | ol | ol | ol | ol | ol | ol |

| Formula | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Si | 0.971 | 0.968 | 0.965 | 0.959 | 0.964 | 0.959 | 0.964 | 0.959 |
| Al | 0.001 | 0.002 | 0.001 | 0.000 | 0.001 | 0.000 | 0.000 | 0.001 |
| Ti | 0.001 | 0.001 | 0.001 | 0.001 | 0.000 | 0.001 | 0.001 | 0.001 |
| Fe | 0.233 | 0.230 | 0.237 | 0.229 | 0.216 | 0.214 | 0.203 | 0.223 |
| Mn | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 |
| Mg | 1.792 | 1.812 | 1.812 | 1.833 | 1.834 | 1.849 | 1.850 | 1.836 |
| Cr | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ni | 0.006 | 0.005 | 0.006 | 0.006 | 0.005 | 0.006 | 0.006 | 0.006 |
| Total | 3.027 | 3.030 | 3.034 | 3.040 | 3.036 | 3.040 | 3.034 | 3.039 |
| Fo | 88.49 | 88.73 | 88.46 | 88.90 | 89.47 | 89.64 | 90.13 | 89.15 |

Olivine microprobe analysis from drill core G1 – sample 14 & 18

| G1-13 | | | |
|---|---|---|---|
| Comment | olcore | olivcore | olivrim |
| No. | 4 | 7 | 8 |
| MgO | 48.7 | 51.334 | 51.875 |
| Al2O3 | 0.046 | 0.045 | 0.044 |
| Cr2O3 | 0.08 | 0.098 | 0.03 |
| TiO2 | 0.028 | 0.013 | 0.018 |
| CaO | 0.584 | 0.488 | 0.511 |
| SiO2 | 39.469 | 39.705 | 40.637 |
| Na2O | 0.012 | 0.004 | 0 |
| FeO | 13.372 | 9.852 | 10.205 |
| MnO | 0.056 | 0.036 | 0.034 |
| NiO | 0.245 | 0.381 | 0.349 |
| K2O | 0 | 0.007 | 0.004 |
| Total | 102.592 | 101.963 | 103.707 |
| Comment | olcore | olivcore | olivrim |

| Formula | | | |
|---|---|---|---|
| Si | 0.964 | 0.961 | 0.967 |
| Al | 0.001 | 0.001 | 0.001 |
| Ti | 0.001 | 0.000 | 0.000 |
| Fe | 0.273 | 0.199 | 0.203 |
| Mn | 0.001 | 0.001 | 0.001 |
| Mg | 1.773 | 1.852 | 1.840 |
| Ca | 0.015 | 0.013 | 0.013 |
| Cr | 0.002 | 0.002 | 0.001 |
| Ni | 0.005 | 0.007 | 0.007 |
| Total | 3.034 | 3.037 | 3.032 |
| Fo | 86.652 | 90.279 | 90.060 |

| Sample | G1-28 | | | | | |
|---|---|---|---|---|---|---|
| No. | 11 | 12 | 13 | 21 | 22 | 23 |
| MgO | 49.082 | 48.974 | 49.074 | 48.86 | 48.92 | 48.516 |
| SiO2 | 39.476 | 39.146 | 38.983 | 39.779 | 39.594 | 39.69 |
| CaO | 0.427 | 0.378 | 0.379 | 0.347 | 0.408 | 0.398 |
| Cr2O3 | 0.02 | 0.008 | 0.023 | 0.051 | 0.005 | 0.015 |
| FeO | 10.287 | 10.144 | 10.074 | 10.314 | 10.21 | 10.225 |
| Al2O3 | 0.03 | 0.01 | 0.013 | 0.017 | 0.024 | 0.023 |
| MnO | 0.208 | 0.152 | 0.184 | 0.184 | 0.175 | 0.145 |
| K2O | | 0.003 | | 0.006 | 0.013 | |
| TiO2 | 0.026 | 0.048 | 0.05 | 0.074 | 0.032 | 0.037 |
| Na2O | 0.018 | 0.005 | 0.02 | 0.014 | 0.007 | 0.015 |
| V2O3 | | | 0.01 | 0.017 | 0.004 | 0.014 |
| ZnO | 0.118 | 0.05 | 0.008 | 0.099 | 0.075 | 0.154 |
| NiO | 0.362 | 0.335 | 0.376 | 0.338 | 0.35 | 0.328 |
| Total | 100.054 | 99.253 | 99.194 | 100.1 | 99.817 | 99.56 |
| Comment | olivin | olivin | olivin | olivin | olivin | olivin |

| Formula | | | | | | |
|---|---|---|---|---|---|---|
| Si | 0.976 | 0.974 | 0.971 | 0.981 | 0.979 | 0.984 |
| Al | 0.001 | 0.000 | 0.000 | 0.000 | 0.001 | 0.001 |
| Ti | 0.000 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 |
| Fe | 0.213 | 0.211 | 0.210 | 0.213 | 0.211 | 0.212 |
| Mn | 0.004 | 0.003 | 0.004 | 0.004 | 0.004 | 0.003 |
| Mg | 1.808 | 1.817 | 1.822 | 1.797 | 1.804 | 1.793 |
| Zn | 0.002 | 0.001 | 0.000 | 0.002 | 0.001 | 0.003 |
| Ca | 0.011 | 0.010 | 0.010 | 0.009 | 0.011 | 0.011 |
| Na | 0.001 | 0.000 | 0.001 | 0.001 | 0.000 | 0.001 |
| K | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cr | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 |
| Ni | 0.007 | 0.007 | 0.008 | 0.007 | 0.007 | 0.007 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Total | 3.024 | 3.025 | 3.028 | 3.017 | 3.020 | 3.015 |
| | | | | | | |
| Fo | 89.48 | 89.59 | 89.67 | 89.41 | 89.52 | 89.43 |

Olivine microprobe analysis from drill core G1 – sample 13 & 28

| Sample | G1-2 | | | | | | | G1-20 |
|---|---|---|---|---|---|---|---|---|
| No. | 31 | 32 | 34 | 35 | 36 | 37 | 38 | 39 | 45 |
| MgO | 50.719 | 50.661 | 50.535 | 51.089 | 50.794 | 50.754 | 50.492 | 49.957 | 47.981 |
| SiO2 | 40.213 | 40.235 | 40.056 | 40.313 | 40.203 | 40.224 | 40.07 | 40.166 | 39.359 |
| CaO | 0.336 | 0.332 | 0.182 | 0.322 | 0.335 | 0.332 | 0.317 | 0.362 | 0.428 |
| Cr2O3 | 0.108 | 0.129 | 0.051 | 0.078 | 0.108 | 0.11 | 0.113 | 0.068 | 0.03 |
| FeO | 7.496 | 7.729 | 8.314 | 7.529 | 7.631 | 7.695 | 7.569 | 7.712 | 10.04 |
| Al2O3 | 0.055 | 0.064 | 0.021 | 0.054 | 0.058 | 0.058 | 0.056 | 0.054 | 0.036 |
| MnO | 0.112 | 0.114 | 0.448 | 0.148 | 0.131 | 0.077 | 0.115 | 0.15 | 0.183 |
| K2O | 0.009 | 0.01 | 0.001 | 0.007 | 0.012 | 0.008 | 0.012 | 0.007 | |
| TiO2 | 0.044 | 0.035 | 0.052 | 0.047 | 0.026 | 0.06 | 0.052 | 0.047 | 0.065 |
| Na2O | 0.024 | 0.016 | 0.013 | 0.019 | 0.014 | 0.008 | 0.027 | 0.012 | 0.004 |
| V2O3 | | 0.006 | 0.012 | 0.011 | 0.018 | 0.011 | 0.012 | 0.033 | 0.029 |
| ZnO | 0.044 | 0.076 | 0.006 | 0.009 | 0.051 | 0.049 | 0.128 | 0.013 | 0.004 |
| NiO | 0.433 | 0.405 | 0.468 | 0.43 | 0.428 | 0.415 | 0.431 | 0.408 | 0.317 |
| Total | 99.593 | 99.812 | 100.159 | 100.056 | 99.809 | 99.801 | 99.394 | 98.989 | 98.476 |
| Comment | mat | mat | olivin | olivin | olivin | olivin | olivin | olivin | G1-20 |
| Formula | | | | | | | | | |
| Si | 0.984 | 0.984 | 0.980 | 0.982 | 0.982 | 0.983 | 0.983 | 0.989 | 0.985 |
| Al | 0.002 | 0.002 | 0.001 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0.001 |
| Ti | 0.001 | 0.001 | 0.001 | 0.001 | 0.000 | 0.001 | 0.001 | 0.001 | 0.001 |
| Fe | 0.153 | 0.158 | 0.170 | 0.153 | 0.156 | 0.157 | 0.155 | 0.159 | 0.210 |
| Mn | 0.002 | 0.002 | 0.009 | 0.003 | 0.003 | 0.002 | 0.002 | 0.003 | 0.004 |
| Mg | 1.850 | 1.846 | 1.842 | 1.855 | 1.850 | 1.849 | 1.847 | 1.834 | 1.791 |
| Zn | 0.001 | 0.001 | 0.000 | 0.000 | 0.001 | 0.001 | 0.002 | 0.000 | 0.000 |
| Ca | 0.009 | 0.009 | 0.005 | 0.008 | 0.009 | 0.009 | 0.008 | 0.010 | 0.011 |
| Na | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.000 | 0.001 | 0.001 | 0.000 |
| K | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cr | 0.002 | 0.002 | 0.001 | 0.002 | 0.002 | 0.002 | 0.002 | 0.001 | 0.001 |
| Ni | 0.009 | 0.008 | 0.009 | 0.008 | 0.008 | 0.008 | 0.009 | 0.008 | 0.006 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 |
| Total | 3.014 | 3.014 | 3.019 | 3.016 | 3.015 | 3.014 | 3.014 | 3.008 | 3.012 |
| Fo | 92.34 | 92.12 | 91.55 | 92.36 | 92.23 | 92.16 | 92.24 | 92.03 | 89.49 |

| Sample | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| No. | 46 | 47 | 48 | 49 | 54 | 55 | 56 | 63 | 64 |
| MgO | 47.981 | 48.437 | 48.502 | 48.815 | 47.621 | 47.435 | 48.275 | 47.797 | 48.208 |
| SiO2 | 39.602 | 39.72 | 39.514 | 39.53 | 39.276 | 39.349 | 39.622 | 39.246 | 39.387 |
| CaO | 0.421 | 0.372 | 0.344 | 0.39 | 0.351 | 0.406 | 0.309 | 0.406 | 0.369 |
| Cr2O3 | 0.047 | 0.032 | 0.03 | 0.022 | 0.001 | 0.008 | 0.024 | 0.014 | 0.017 |
| FeO | 9.912 | 9.954 | 9.979 | 9.948 | 10.37 | 10.164 | 9.85 | 10.383 | 10.286 |
| Al2O3 | 0.027 | 0.027 | 0.026 | 0.02 | 0.01 | 0.025 | 0.024 | 0.002 | 0.01 |
| MnO | 0.185 | 0.122 | 0.172 | 0.135 | 0.183 | 0.176 | 0.187 | 0.192 | 0.241 |
| K2O | 0.003 | 0.001 | 0.005 | 0.004 | 0.02 | 0.009 | 0.016 | | 0.007 |
| TiO2 | 0.04 | 0.062 | 0.037 | 0.058 | 0.056 | 0.045 | 0.042 | 0.001 | 0.058 |
| Na2O | 0.01 | 0.015 | 0.01 | | 0.028 | 0.019 | 0.009 | 0.02 | 0.01 |
| V2O3 | | | | | 0.019 | | | 0.013 | 0.001 |
| ZnO | 0.067 | 0.166 | 0.112 | | | | 0.034 | 0.082 | 0.022 |
| NiO | 0.326 | 0.337 | 0.308 | 0.359 | 0.296 | 0.333 | 0.306 | 0.316 | 0.3 |
| Total | 98.621 | 99.245 | 99.039 | 99.281 | 98.231 | 97.969 | 98.698 | 98.472 | 98.916 |
| | G1-20 | olivin S | olivin S | olivin L | olivin | olivin | olivin | olivin | olivin |
| Formula | | | | | | | | | |
| Si | 0.989 | 0.986 | 0.984 | 0.981 | 0.987 | 0.990 | 0.988 | 0.985 | 0.983 |
| Al | 0.001 | 0.001 | 0.001 | 0.001 | 0.000 | 0.001 | 0.001 | 0.000 | 0.000 |
| Ti | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.000 | 0.001 |
| Fe | 0.207 | 0.207 | 0.208 | 0.207 | 0.218 | 0.214 | 0.205 | 0.218 | 0.215 |
| Mn | 0.004 | 0.003 | 0.004 | 0.003 | 0.004 | 0.004 | 0.004 | 0.004 | 0.005 |
| Mg | 1.787 | 1.793 | 1.800 | 1.807 | 1.784 | 1.780 | 1.795 | 1.788 | 1.794 |
| Zn | 0.001 | 0.003 | 0.002 | 0.000 | 0.000 | 0.000 | 0.001 | 0.002 | 0.000 |
| Ca | 0.011 | 0.010 | 0.009 | 0.010 | 0.009 | 0.011 | 0.008 | 0.011 | 0.010 |
| Na | 0.000 | 0.001 | 0.000 | 0.000 | 0.001 | 0.001 | 0.000 | 0.001 | 0.000 |
| K | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.001 | 0.000 | 0.000 |
| Cr | 0.001 | 0.001 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ni | 0.007 | 0.007 | 0.006 | 0.007 | 0.006 | 0.007 | 0.006 | 0.006 | 0.006 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Total | 3.009 | 3.012 | 3.015 | 3.017 | 3.012 | 3.009 | 3.011 | 3.015 | 3.016 |
| Fo | 89.61 | 89.66 | 89.65 | 89.74 | 89.11 | 89.27 | 89.73 | 89.14 | 89.31 |

Olivine microprobe analysis from drill core G1 – sample 2 & 20

| No. | 9 | 10 | 11 | 12 | 13 | 23 | 24 | 26 | 27 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 50.563 | 50.757 | 50.154 | 50.432 | 50.003 | 49.657 | 50.106 | 50.061 | 49.801 |
| Al2O3 | 0.033 | 0.025 | 0 | 0.023 | 0.037 | 0.037 | 0.01 | 0.002 | 0.004 |
| Cr2O3 | 0.088 | 0.072 | 0.045 | 0 | 0 | 0 | 0.079 | 0.032 | 0.069 |
| TiO2 | 0.052 | 0.036 | 0.058 | 0.024 | 0.02 | 0.008 | 0.037 | 0.055 | 0.063 |
| CaO | 0.378 | 0.376 | 0.394 | 0.423 | 0.415 | 0.52 | 0.497 | 0.339 | 0.35 |
| SiO2 | 40.115 | 39.966 | 40.161 | 40.014 | 40.032 | 40.071 | 40.145 | 39.927 | 39.877 |
| Na2O | 0.017 | 0.01 | 0 | 0.003 | 0.01 | 0 | 0.04 | 0.008 | 0.003 |
| FeO | 11.454 | 11.566 | 12.065 | 11.814 | 11.241 | 11.358 | 11.575 | 11.842 | 11.532 |
| MnO | 0.034 | 0.033 | 0.032 | 0.034 | 0.044 | 0.031 | 0.023 | 0.042 | 0.044 |
| NiO | 0.239 | 0.23 | 0.224 | 0.21 | 0.279 | 0.272 | 0.339 | 0.302 | 0.222 |
| K2O | 0.006 | 0 | 0.001 | 0 | 0 | 0.002 | 0 | 0 | 0.008 |
| Total | 102.979 | 103.071 | 103.134 | 102.977 | 102.081 | 101.956 | 102.851 | 102.61 | 101.973 |
| Comment | olivin | olivin | olivin2 | olivin2 | olivin | olivin | olivin | olivin | olivin |
| | G1-26 | | | | | | | | |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 0.966 | 0.963 | 0.968 | 0.965 | 0.972 | 0.974 | 0.969 | 0.967 | 0.970 |
| Al | 0.001 | 0.001 | 0.000 | 0.001 | 0.001 | 0.001 | 0.000 | 0.000 | 0.000 |
| Ti | 0.001 | 0.001 | 0.001 | 0.000 | 0.000 | 0.000 | 0.001 | 0.001 | 0.001 |
| Fe | 0.231 | 0.233 | 0.243 | 0.238 | 0.228 | 0.231 | 0.234 | 0.240 | 0.235 |
| Mn | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.000 | 0.001 | 0.001 |
| Mg | 1.815 | 1.822 | 1.802 | 1.814 | 1.809 | 1.799 | 1.803 | 1.807 | 1.806 |
| Ca | 0.010 | 0.010 | 0.010 | 0.011 | 0.011 | 0.014 | 0.013 | 0.009 | 0.009 |
| Na | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | 0.000 | 0.000 |
| K | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cr | 0.002 | 0.001 | 0.001 | 0.000 | 0.000 | 0.000 | 0.002 | 0.001 | 0.001 |
| Ni | 0.005 | 0.004 | 0.004 | 0.004 | 0.005 | 0.005 | 0.007 | 0.006 | 0.004 |
| Total | 3.032 | 3.036 | 3.030 | 3.034 | 3.028 | 3.025 | 3.030 | 3.032 | 3.028 |
| Fo | 88.72 | 88.66 | 88.11 | 88.38 | 88.80 | 88.63 | 88.53 | 88.28 | 88.50 |

| Sample | 1 | 2 | 3 | 7 | 9 | 11 | 22 | 23 | 28 | 32 | 34 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MgO | 49.358 | 49.27 | 31.383 | 49.799 | 49.732 | 50.114 | 49.681 | 49.206 | 49.934 | 50.161 | 49.89 |
| Al2O3 | 0.043 | 0.025 | 0.069 | 0.045 | 0.037 | 0.027 | 0.038 | 0 | 0.028 | 0.008 | 0.03 |
| Cr2O3 | 0.088 | 0.052 | 0.054 | 0.067 | 0.015 | 0.104 | 0.028 | 0 | 0.007 | 0.079 | 0.05 |
| TiO2 | 0.052 | 0.058 | 0.056 | 0.044 | 0.048 | 0.029 | 0.057 | 0.02 | 0.053 | 0.033 | 0.063 |
| CaO | 0.41 | 0.35 | 0.441 | 0.337 | 0.371 | 0.427 | 0.377 | 0.473 | 0.427 | 0.383 | 0.42 |
| SiO2 | 39.327 | 39.473 | 32.964 | 40.379 | 39.969 | 39.979 | 39.521 | 39.306 | 39.636 | 40.158 | 40.155 |
| Na2O | 0.027 | 0 | 0.035 | 0.048 | 0.008 | 0.017 | 0.004 | 0.014 | 0 | 0.038 | 0.008 |
| FeO | 10.645 | 10.455 | 7.127 | 10.22 | 10.588 | 11.007 | 10.504 | 10.097 | 10.541 | 10.856 | 10.434 |
| MnO | 0.037 | 0.044 | 0.045 | 0.02 | 0.049 | 0.039 | 0.036 | 0.043 | 0.033 | 0.038 | 0.031 |
| NiO | 0.323 | 0.338 | 0.192 | 0.202 | 0.275 | 0.228 | 0.263 | 0.287 | 0.291 | 0.38 | 0.281 |
| K2O | 0.002 | 0.021 | 0.043 | 0.008 | 0 | 0.023 | 0.006 | 0 | 0.003 | 0 | 0.018 |
| Total | 100.312 | 100.086 | 72.409 | 101.169 | 101.092 | 101.994 | 100.515 | 99.446 | 100.953 | 102.134 | 101.38 |
| Comment | G1-24 | olivine | olivine | olivine | olivine | olivin2 | olivin | olivin | olivine | olivin | olivine |

| Formula | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Si | 0.970 | 0.974 | 1.102 | 0.983 | 0.976 | 0.970 | 0.971 | 0.975 | 0.970 | 0.973 | 0.977 |
| Al | 0.001 | 0.001 | 0.003 | 0.001 | 0.001 | 0.001 | 0.001 | 0.000 | 0.001 | 0.000 | 0.001 |
| Ti | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.000 | 0.001 | 0.001 | 0.001 |
| Fe | 0.220 | 0.216 | 0.199 | 0.208 | 0.216 | 0.223 | 0.216 | 0.210 | 0.216 | 0.220 | 0.212 |
| Mn | 0.001 | 0.001 | 0.001 | 0.000 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 |
| Mg | 1.815 | 1.813 | 1.564 | 1.807 | 1.811 | 1.813 | 1.820 | 1.820 | 1.822 | 1.811 | 1.810 |
| Ca | 0.011 | 0.009 | 0.016 | 0.009 | 0.010 | 0.011 | 0.010 | 0.013 | 0.011 | 0.010 | 0.011 |
| Na | 0.001 | 0.000 | 0.002 | 0.002 | 0.000 | 0.001 | 0.000 | 0.001 | 0.000 | 0.002 | 0.000 |
| K | 0.000 | 0.001 | 0.002 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 |
| Cr | 0.002 | 0.001 | 0.001 | 0.001 | 0.000 | 0.002 | 0.001 | 0.000 | 0.000 | 0.002 | 0.001 |
| Ni | 0.006 | 0.007 | 0.005 | 0.004 | 0.005 | 0.004 | 0.005 | 0.006 | 0.006 | 0.007 | 0.006 |
| Total | 3.028 | 3.024 | 2.897 | 3.016 | 3.022 | 3.028 | 3.027 | 3.025 | 3.028 | 3.027 | 3.021 |
| Fo | 89.21 | 89.36 | 88.70 | 89.68 | 89.33 | 89.03 | 89.40 | 89.68 | 89.41 | 89.17 | 89.50 |

Olivine microprobe analysis from drill core G1 – sample 24 & 26

| No. | 1 | 2 | 4 | 5 | 15 | 17 |
|---|---|---|---|---|---|---|
| MgO | 50.232 | 50.299 | 49.657 | 49.832 | 50.805 | 50.829 |
| Al2O3 | 0.028 | 0.026 | 0.019 | 0 | 0.034 | 0.021 |
| Cr2O3 | 0 | 0 | 0 | 0 | 0 | 0.022 |
| TiO2 | 0.021 | 0.027 | 0.039 | 0.084 | 0.054 | 0.033 |
| CaO | 0.494 | 0.381 | 0.447 | 0.388 | 0.357 | 0.353 |
| SiO2 | 39.132 | 39.528 | 38.941 | 39.462 | 40.168 | 40.129 |
| Na2O | 0.016 | 0.04 | 0.078 | 0.021 | 0.007 | 0.027 |
| FeO | 10.897 | 10.618 | 11.26 | 10.906 | 11.188 | 10.935 |
| MnO | 0.031 | 0.037 | 0.037 | 0.045 | 0.032 | 0.041 |
| NiO | 0.361 | 0.336 | 0.349 | 0.356 | 0.333 | 0.37 |
| K2O | 0 | 0.004 | 0.027 | 0.018 | 0 | 0 |
| Total | 101.212 | 101.296 | 100.854 | 101.112 | 102.978 | 102.76 |
| Comment | olivin L | olivin L | olivin L | olivin S | olivin | olivin |
| | G1-21 | | | | | |
| Formula | | | | | | |
| Si | 0.959 | 0.966 | 0.960 | 0.967 | 0.966 | 0.967 |
| Al | 0.001 | 0.001 | 0.001 | 0.000 | 0.001 | 0.001 |
| Ti | 0.000 | 0.000 | 0.001 | 0.002 | 0.001 | 0.001 |
| Fe | 0.223 | 0.217 | 0.232 | 0.224 | 0.225 | 0.220 |
| Mn | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 |
| Mg | 1.835 | 1.832 | 1.824 | 1.820 | 1.822 | 1.826 |
| Ca | 0.013 | 0.010 | 0.012 | 0.010 | 0.009 | 0.009 |
| Na | 0.001 | 0.002 | 0.004 | 0.001 | 0.000 | 0.001 |
| K | 0.000 | 0.000 | 0.001 | 0.001 | 0.000 | 0.000 |
| Cr | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ni | 0.007 | 0.007 | 0.007 | 0.007 | 0.006 | 0.007 |
| Total | 3.040 | 3.035 | 3.042 | 3.032 | 3.032 | 3.033 |
| Fo | 89.15 | 89.41 | 88.71 | 89.06 | 89.00 | 89.23 |

Olivine microprobe analysis from drill core G1 – sample 21

| Sample | G1-20d4 | G1-20b4 | G1-20c1 | G1-20c2 | G1-20c3 | G1-20d6 | G1-20d9 | G1-20d10 | G1-20d12 |
|---|---|---|---|---|---|---|---|---|---|
| Na2O | 0.05 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.16 |
| MgO | 46.05 | 46.54 | 44.36 | 43.5 | 43.14 | 45.72 | 47.22 | 45.88 | 46.53 |
| Al2O3 | 0 | 0.05 | 0.05 | 0.16 | 0 | 0 | 0 | 0 | 0 |
| FeO | 10 | 11.72 | 9.35 | 8.81 | 9.07 | 11.05 | 10.3 | 10.27 | 11.06 |
| CaO | 0.31 | 0.36 | 0.23 | 0.22 | 0.25 | 0.35 | 0.34 | 0.27 | 0.36 |
| SiO2 | 43.5 | 42.87 | 47.06 | 47.5 | 47.27 | 44.08 | 41.34 | 42.81 | 43.05 |
| MnO | 0.21 | 0.21 | 0.12 | 0.19 | 0.12 | 0.21 | 0.19 | 0.19 | 0.21 |
| TiO2 | 0.05 | 0.05 | 0.07 | 0.1 | 0.07 | 0.1 | 0.07 | 0.02 | 0.05 |
| K2O | 0 | 0.02 | 0 | 0 | 0 | 0 | 0 | 0 | 0.01 |
| Cr2O3 | 0 | 0 | 0 | 0 | 0.02 | 0.02 | 0.02 | 0.06 | 0 |
| NiO | 0.23 | 0.11 | 0.23 | 0.15 | 0.05 | 0.28 | 0.17 | 0.34 | 0.34 |
| Summe | 100.4 | 101.93 | 101.47 | 100.63 | 99.99 | 101.81 | 99.65 | 99.84 | 101.77 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 1.058 | 1.043 | 1.145 | 1.155 | 1.150 | 1.072 | 1.006 | 1.041 | 1.047 |
| Ti | 0.001 | 0.001 | 0.001 | 0.002 | 0.001 | 0.002 | 0.001 | 0.000 | 0.001 |
| Al | 0.000 | 0.001 | 0.001 | 0.005 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cr | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 |
| Fe(ii) | 0.203 | 0.238 | 0.190 | 0.179 | 0.184 | 0.225 | 0.209 | 0.209 | 0.225 |
| Mn | 0.004 | 0.004 | 0.002 | 0.004 | 0.002 | 0.004 | 0.004 | 0.004 | 0.004 |
| Mg | 1.670 | 1.688 | 1.609 | 1.577 | 1.564 | 1.658 | 1.712 | 1.664 | 1.687 |
| Ni | 0.005 | 0.002 | 0.005 | 0.003 | 0.001 | 0.005 | 0.003 | 0.007 | 0.007 |
| Ca | 0.008 | 0.009 | 0.006 | 0.006 | 0.007 | 0.009 | 0.009 | 0.007 | 0.009 |
| TOTAL | 2.949 | 2.987 | 2.959 | 2.931 | 2.910 | 2.976 | 2.945 | 2.933 | 2.981 |
| | | | | | | | | | |
| Fo | 88.94 | 87.43 | 89.30 | 89.60 | 89.33 | 87.86 | 88.92 | 88.66 | 88.04 |

| Sample | G1-20d14 | G1-20e2 | G1-20e3 | G1-20e4 | G1-20e5 | G1-20e6 |
|---|---|---|---|---|---|---|
| Na2O | 0 | 0 | 0.05 | 0.16 | 0 | 0 |
| MgO | 47.27 | 43.19 | 42.76 | 42.33 | 41.95 | 41.5 |
| Al2O3 | 0.22 | 0 | 0 | 0 | 0.05 | 0 |
| FeO | 10.79 | 9.18 | 7.11 | 7.81 | 7.93 | 8.81 |
| CaO | 0.37 | 0.3 | 0.18 | 0.22 | 0.21 | 0.26 |
| SiO2 | 42.16 | 47.07 | 49.43 | 49.24 | 48.12 | 47.67 |
| MnO | 0.17 | 0.19 | 0.07 | 0.1 | 0.12 | 0.12 |
| TiO2 | 0.1 | 0.05 | 0 | 0.07 | 0.02 | 0.1 |
| K2O | 0 | 0 | 0 | 0 | 0 | 0 |
| Cr2O3 | 0.02 | 0.02 | 0.02 | 0.04 | 0 | 0.06 |
| NiO | 0.34 | 0.17 | 0.17 | 0.17 | 0.17 | 0.23 |
| Summe | 101.44 | 100.17 | 99.79 | 100.14 | 98.57 | 98.75 |

| Formula | | | | | | |
|---|---|---|---|---|---|---|
| Si | 1.025 | 1.145 | 1.202 | 1.198 | 1.170 | 1.159 |
| Ti | 0.002 | 0.001 | 0.000 | 0.001 | 0.000 | 0.002 |
| Al | 0.006 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 |
| Cr | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.001 |
| Fe(ii) | 0.219 | 0.187 | 0.145 | 0.159 | 0.161 | 0.179 |
| Mn | 0.004 | 0.004 | 0.001 | 0.002 | 0.002 | 0.002 |
| Mg | 1.714 | 1.566 | 1.551 | 1.535 | 1.521 | 1.505 |
| Ni | 0.007 | 0.003 | 0.003 | 0.003 | 0.003 | 0.005 |
| Ca | 0.010 | 0.008 | 0.005 | 0.006 | 0.005 | 0.007 |
| TOTAL | 2.987 | 2.914 | 2.907 | 2.905 | 2.866 | 2.860 |
| | | | | | | |
| Fo | 88.49 | 89.15 | 91.39 | 90.51 | 90.28 | 89.23 |

Olivine microprobe analysis from drill core G1 – sample 201

| Sample | G1-19c3 | G1-19c4 | G1-19b1 | G1-19c7 | G1-19c5 | G1-19c6 | G1-19c8 | G1-19c9 | G1-19c10 |
|---|---|---|---|---|---|---|---|---|---|
| Na2O | 0 | 0.06 | 0 | 0 | 0.34 | 0.06 | 0 | 0 | 0 |
| MgO | 47.58 | 46.65 | 48.32 | 48.46 | 46.31 | 45.72 | 47.18 | 47.66 | 47.67 |
| Al2O3 | 0 | 2.06 | 1.53 | 0 | 0 | 0.12 | 0 | 0 | 0 |
| FeO | 8.13 | 7.99 | 8.11 | 7.65 | 8.27 | 8.76 | 8.79 | 8.66 | 8.31 |
| CaO | 0.42 | 0.37 | 0.39 | 0.33 | 0.41 | 0.36 | 0.35 | 0.39 | 0.38 |
| SiO2 | 43.6 | 40.77 | 41.16 | 41.38 | 43.72 | 45.6 | 43.65 | 44.62 | 42.81 |
| MnO | 0.13 | 0.16 | 0.13 | 0.16 | 0.09 | 0.11 | 0.11 | 0.16 | 0.02 |
| TiO2 | 0.04 | 0 | 0.08 | 0.04 | 0.04 | 0 | 0.04 | 0.04 | 0 |
| K2O | 0 | 0 | 0 | 0.02 | 0 | 0 | 0 | 0 | 0 |
| Cr2O3 | 0.09 | 0.09 | 0.02 | 0.16 | 0.14 | 0.07 | 0.09 | 0.09 | 0.12 |
| NiO | 0.1 | 0.05 | 0.15 | 0 | 0.05 | 0.11 | 0.06 | 0.06 | 0.11 |
| Summe | 100.09 | 98.2 | 99.89 | 98.2 | 99.37 | 100.91 | 100.27 | 101.68 | 99.42 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 1.077 | 1.007 | 1.016 | 1.022 | 1.068 | 1.114 | 1.066 | 1.090 | 1.046 |
| Ti | 0.001 | 0.000 | 0.001 | 0.001 | 0.001 | 0.000 | 0.001 | 0.001 | 0.000 |
| Al | 0.000 | 0.060 | 0.045 | 0.000 | 0.000 | 0.003 | 0.000 | 0.000 | 0.000 |
| Cr | 0.002 | 0.002 | 0.000 | 0.003 | 0.003 | 0.001 | 0.002 | 0.002 | 0.002 |
| Fe(ii) | 0.168 | 0.165 | 0.167 | 0.158 | 0.169 | 0.179 | 0.180 | 0.177 | 0.170 |
| Mn | 0.003 | 0.003 | 0.003 | 0.003 | 0.002 | 0.002 | 0.002 | 0.003 | 0.000 |
| Mg | 1.752 | 1.717 | 1.779 | 1.784 | 1.687 | 1.665 | 1.718 | 1.736 | 1.736 |
| Ni | 0.002 | 0.001 | 0.003 | 0.000 | 0.001 | 0.002 | 0.001 | 0.001 | 0.002 |
| Ca | 0.011 | 0.010 | 0.010 | 0.009 | 0.011 | 0.009 | 0.009 | 0.010 | 0.010 |
| TOTAL | 3.015 | 2.965 | 3.025 | 2.980 | 2.941 | 2.977 | 2.979 | 3.020 | 2.967 |
| | | | | | | | | | |
| Fo | 91.13 | 91.07 | 91.27 | 91.71 | 90.80 | 90.18 | 90.43 | 90.59 | 91.07 |

| Sample | G1-19c11 | G1-19a1 | G1-19a3 | G1-19b1 | G1-19b2 | G1-19d1 | G1-19d2 | G1-19d3 |
|---|---|---|---|---|---|---|---|---|
| Na2O | 0 | 0.06 | 0.06 | 0 | 0.06 | 0.11 | 0.06 | 0.06 |
| MgO | 47.54 | 47.79 | 45.76 | 47.78 | 47.25 | 50.41 | 49.13 | 48.54 |
| Al2O3 | 0 | 0 | 0 | 0 | 0 | 0.06 | 0.12 | 0.06 |
| FeO | 8.17 | 8.82 | 9 | 9.4 | 9.54 | 8.63 | 8.62 | 8.62 |
| CaO | 0.4 | 0.37 | 0.38 | 0.37 | 0.37 | 0.41 | 0.42 | 0.42 |
| SiO2 | 43.06 | 41.98 | 46.12 | 44.62 | 45.01 | 41.57 | 41.62 | 43.81 |
| MnO | 0.13 | 0.18 | 0.2 | 0.16 | 0.07 | 0.13 | 0.13 | 0.09 |
| TiO2 | 0.08 | 0.08 | 0 | 0.08 | 0.04 | 0 | 0.04 | 0 |
| K2O | 0 | 0 | 0 | 0 | 0 | 0 | 0.02 | 0 |
| Cr2O3 | 0.14 | 0.07 | 0.19 | 0.12 | 0.12 | 0.09 | 0.16 | 0.12 |
| NiO | 0.11 | 0.06 | 0.06 | 0 | 0 | 0 | 0.17 | 0.23 |
| Summe | 99.63 | 99.41 | 101.77 | 102.53 | 102.46 | 101.41 | 100.49 | 101.95 |

| Formula | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Si | 1.052 | 1.026 | 1.127 | 1.090 | 1.100 | 1.016 | 1.017 | 1.070 |
| Ti | 0.001 | 0.001 | 0.000 | 0.001 | 0.001 | 0.000 | 0.001 | 0.000 |
| Al | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | 0.003 | 0.002 |
| Cr | 0.003 | 0.001 | 0.004 | 0.002 | 0.002 | 0.002 | 0.003 | 0.002 |
| Fe(ii) | 0.167 | 0.180 | 0.184 | 0.192 | 0.195 | 0.176 | 0.176 | 0.176 |
| Mn | 0.003 | 0.004 | 0.004 | 0.003 | 0.001 | 0.003 | 0.003 | 0.002 |
| Mg | 1.731 | 1.740 | 1.667 | 1.740 | 1.721 | 1.836 | 1.789 | 1.768 |
| Ni | 0.002 | 0.001 | 0.001 | 0.000 | 0.000 | 0.000 | 0.003 | 0.005 |
| Ca | 0.010 | 0.010 | 0.010 | 0.010 | 0.010 | 0.011 | 0.011 | 0.011 |
| TOTAL | 2.970 | 2.964 | 2.996 | 3.039 | 3.029 | 3.045 | 3.006 | 3.036 |
| | | | | | | | | |
| Fo | 91.08 | 90.44 | 89.86 | 89.91 | 89.76 | 91.12 | 90.92 | 90.85 |

Olivine microprobe analysis from drill core G1 – sample 19

| Sample | G1-18e1 | G1-18e3 | G1-18c1 | G1-18c2 | G1-18c3 | G1-18c4 | G1-18c5 | G1-18c7 | G1-18c9 |
|---|---|---|---|---|---|---|---|---|---|
| Na2O | 0.11 | 0.05 | 0.1 | 0 | 0 | 0 | 0 | 0.05 | 0.05 |
| MgO | 48.14 | 46.84 | 43.73 | 43.32 | 43.63 | 43.5 | 43.34 | 47.19 | 51.02 |
| Al2O3 | 0.05 | 0.05 | 0.1 | 0.1 | 0 | 0.05 | 0 | 0 | 0 |
| FeO | 10.62 | 10.35 | 8.59 | 8.51 | 8.5 | 7.63 | 8.21 | 10.42 | 10.46 |
| CaO | 0.42 | 0.39 | 0.29 | 0.21 | 0.24 | 0.2 | 0.29 | 0.33 | 0.28 |
| SiO2 | 41.82 | 43.23 | 46.66 | 47.69 | 48.09 | 47.77 | 47.15 | 42.32 | 37.01 |
| MnO | 0.14 | 0.21 | 0.1 | 0.14 | 0.12 | 0.19 | 0.12 | 0.21 | 0.14 |
| TiO2 | 0.02 | 0.02 | 0.1 | 0.05 | 0.05 | 0.05 | 0.02 | 0.07 | 0 |
| K2O | 0 | 0.01 | 0 | 0 | 0 | 0 | 0 | 0 | 0.01 |
| Cr2O3 | 0.04 | 0 | 0.02 | 0.06 | 0 | 0.04 | 0.04 | 0.02 | 0 |
| NiO | 0.28 | 0.17 | 0.11 | 0.23 | 0.28 | 0.23 | 0.17 | 0.28 | 0.4 |
| Summe | 101.64 | 101.32 | 99.8 | 100.31 | 100.91 | 99.66 | 99.34 | 100.89 | 99.37 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 1.015 | 1.049 | 1.133 | 1.158 | 1.167 | 1.159 | 1.144 | 1.027 | 0.898 |
| Ti | 0.000 | 0.000 | 0.002 | 0.001 | 0.001 | 0.001 | 0.000 | 0.001 | 0.000 |
| Al | 0.001 | 0.001 | 0.003 | 0.003 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 |
| Cr | 0.001 | 0.000 | 0.000 | 0.001 | 0.000 | 0.001 | 0.001 | 0.000 | 0.000 |
| Fe(ii) | 0.216 | 0.210 | 0.174 | 0.173 | 0.173 | 0.155 | 0.167 | 0.211 | 0.212 |
| Mn | 0.003 | 0.004 | 0.002 | 0.003 | 0.002 | 0.004 | 0.002 | 0.004 | 0.003 |
| Mg | 1.742 | 1.695 | 1.582 | 1.568 | 1.579 | 1.574 | 1.568 | 1.708 | 1.846 |
| Ni | 0.005 | 0.003 | 0.002 | 0.004 | 0.005 | 0.004 | 0.003 | 0.005 | 0.008 |
| Ca | 0.011 | 0.010 | 0.008 | 0.005 | 0.006 | 0.005 | 0.008 | 0.009 | 0.007 |
| TOTAL | 2.994 | 2.974 | 2.906 | 2.916 | 2.934 | 2.905 | 2.894 | 2.966 | 2.975 |
| | | | | | | | | | |
| Fo | 88.86 | 88.77 | 89.97 | 89.93 | 90.02 | 90.84 | 90.27 | 88.78 | 89.56 |

| Sample | G1-18c9 | G1-18c13 | G1-18b1 | G1-18b2 | G1-18b7 | G1-18b9 | G1-18b10 | G1-18b11 | G1-18a1 |
|---|---|---|---|---|---|---|---|---|---|
| Na2O | 0 | 0 | 0.11 | 0 | 0.06 | 0.06 | 0 | 0 | 0 |
| MgO | 47.64 | 49.86 | 48.18 | 44.92 | 43.34 | 44.41 | 42.72 | 46.41 | 47.2 |
| Al2O3 | 0 | 0.17 | 0 | 0.11 | 0.06 | 0.23 | 0.06 | 0 | 0 |
| FeO | 10.1 | 10.22 | 11.14 | 10.12 | 12.1 | 11.76 | 11.78 | 11.32 | 11 |
| CaO | 0.32 | 0.47 | 0.38 | 0.38 | 0.48 | 0.38 | 0.41 | 0.41 | 0.38 |
| SiO2 | 42.34 | 39.51 | 41.83 | 44.26 | 43.46 | 43.48 | 42.34 | 39.66 | 40.76 |
| MnO | 0.19 | 0.21 | 0.21 | 0.14 | 0.11 | 0.18 | 0.24 | 0.18 | 0.2 |
| TiO2 | 0 | 0.05 | 0.07 | 0.02 | 0 | 0.04 | 0.08 | 0.04 | 0.11 |
| K2O | 0 | 0.01 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cr2O3 | 0 | 0.02 | 0.04 | 0 | 0.07 | 0.02 | 0.02 | 0 | 0 |
| NiO | 0.23 | 0.35 | 0.34 | 0.34 | 0.06 | 0 | 0.06 | 0.06 | 0 |
| Summe | 100.82 | 100.87 | 102.3 | 100.29 | 99.74 | 100.56 | 97.71 | 98.08 | 99.65 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 1.028 | 0.959 | 1.015 | 1.074 | 1.073 | 1.074 | 1.046 | 0.979 | 1.007 |
| Ti | 0.000 | 0.001 | 0.001 | 0.000 | 0.000 | 0.001 | 0.001 | 0.001 | 0.002 |
| Al | 0.000 | 0.005 | 0.000 | 0.003 | 0.002 | 0.007 | 0.002 | 0.000 | 0.000 |
| Cr | 0.000 | 0.000 | 0.001 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 0.205 | 0.207 | 0.226 | 0.205 | 0.250 | 0.243 | 0.243 | 0.234 | 0.227 |
| Mn | 0.004 | 0.004 | 0.004 | 0.003 | 0.002 | 0.004 | 0.005 | 0.004 | 0.004 |
| Mg | 1.724 | 1.804 | 1.743 | 1.625 | 1.596 | 1.635 | 1.573 | 1.709 | 1.738 |
| Ni | 0.004 | 0.007 | 0.007 | 0.007 | 0.001 | 0.000 | 0.001 | 0.001 | 0.000 |
| Ca | 0.008 | 0.012 | 0.010 | 0.010 | 0.013 | 0.010 | 0.011 | 0.011 | 0.010 |
| TOTAL | 2.973 | 3.000 | 3.008 | 2.928 | 2.938 | 2.973 | 2.882 | 2.938 | 2.988 |
| | | | | | | | | | |
| Fo | 89.19 | 89.50 | 88.33 | 88.64 | 86.35 | 86.89 | 86.37 | 87.80 | 88.25 |

Olivine microprobe analysis from drill core G1 – sample 18

# 18. Appendix 5 – CPX microprobe analysis

| Sample | G17/45c1 | G17/45e6 | G17/45e10 | G17/45h1 | G17/45h2 | G17/45g9 | G17/45i1 | G17/45i9 | G17/44d3 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 16.11 | 16.72 | 16.67 | 15.91 | 15.94 | 15.44 | 15.53 | 15.92 | 23.55 |
| Al2O3 | 1.36 | 1.09 | 1.14 | 1.28 | 1.03 | 1.55 | 1.35 | 1.31 | 0.99 |
| Cr2O3 | 0.56 | 0.49 | 0.39 | 0.71 | 0.56 | 0.56 | 0.49 | 0.54 | 0.02 |
| FeO | 2.78 | 2.72 | 2.36 | 2.43 | 2.2 | 2.43 | 2.15 | 2.62 | 1.31 |
| TiO2 | 1.13 | 1.37 | 1.3 | 1.37 | 1.34 | 1.14 | 1.04 | 1.03 | 0.38 |
| MnO | 0.05 | 0.04 | 0.04 | 0.07 | 0.05 | 0.07 | 0.04 | 0 | 0.02 |
| SiO2 | 53.5 | 54.33 | 54.3 | 54.59 | 55.29 | 55.05 | 54.12 | 54.65 | 59.32 |
| CaO | 24.65 | 24.12 | 23.83 | 23.13 | 23.04 | 23.83 | 23.95 | 23.52 | 6.92 |
| K2O | 0.02 | 0.01 | 0.01 | 0 | 0 | 0 | 0 | 0.01 | 0.15 |
| Na2O | 0.49 | 0.42 | 0.35 | 0.49 | 0.62 | 0.42 | 0.35 | 0.35 | 6.2 |
| NiO | 0.12 | 0.06 | 0 | 0.09 | 0.06 | 0.06 | 0.03 | 0 | 0.06 |
| Summe | 100.77 | 101.37 | 100.39 | 100.07 | 100.13 | 100.55 | 99.05 | 99.95 | 98.92 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 1.927 | 1.957 | 1.955 | 1.966 | 1.991 | 1.982 | 1.949 | 1.968 | 2.085 |
| Ti | 0.037 | 0.030 | 0.031 | 0.035 | 0.028 | 0.042 | 0.037 | 0.035 | 0.010 |
| Al | 0.024 | 0.021 | 0.017 | 0.030 | 0.024 | 0.024 | 0.021 | 0.023 | 0.041 |
| Cr | 0.079 | 0.077 | 0.067 | 0.069 | 0.063 | 0.069 | 0.061 | 0.075 | 0.001 |
| Fe(ii) | 0.084 | 0.082 | 0.071 | 0.073 | 0.066 | 0.073 | 0.065 | 0.079 | 0.038 |
| Mn | 0.002 | 0.001 | 0.001 | 0.002 | 0.002 | 0.002 | 0.001 | 0.000 | 0.001 |
| Mg | 0.865 | 0.898 | 0.895 | 0.854 | 0.856 | 0.829 | 0.834 | 0.855 | 1.234 |
| Ca | 0.951 | 0.931 | 0.919 | 0.892 | 0.889 | 0.919 | 0.924 | 0.907 | 0.261 |
| Na | 0.034 | 0.029 | 0.024 | 0.034 | 0.043 | 0.029 | 0.024 | 0.024 | 0.422 |
| K | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.007 |
| TOTAL | 4.003 | 4.025 | 3.982 | 3.956 | 3.961 | 3.970 | 3.916 | 3.967 | 4.099 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Wo | 49.14 | 47.95 | 48.11 | 48.08 | 47.90 | 49.62 | 50.00 | 48.64 | 13.33 |
| En | 44.69 | 46.26 | 46.83 | 46.02 | 46.12 | 44.74 | 45.11 | 45.82 | 63.11 |
| Fs | 4.40 | 4.28 | 3.78 | 4.05 | 3.65 | 4.06 | 3.57 | 4.23 | 1.95 |
| Ac | 1.77 | 1.51 | 1.28 | 1.84 | 2.33 | 1.58 | 1.32 | 1.31 | |
| Mg # | 91.18 | 91.64 | 92.64 | 92.11 | 92.81 | 91.89 | 92.79 | 91.55 | 96.97 |

| Sample | G17/44c2 | G17/44e5 | G17/43a10 | g17/43d17 | G17/43c3 | G17/43c16 | G17/42e7 | G17/42f12 | G17/42b1 |
|---|---|---|---|---|---|---|---|---|---|
| MgO | 18.5 | 18.85 | 18.86 | 15.73 | 15.29 | 15.96 | 17.22 | 17.57 | 18.71 |
| Al2O3 | 14.34 | 13.48 | 12.02 | 2.96 | 3.76 | 2.64 | 4.51 | 4.65 | 0.12 |
| Cr2O3 | 0.82 | 1.1 | 0.92 | 0.7 | 0.98 | 0.68 | 0.69 | 1.21 | 0.1 |
| FeO | 3.44 | 3.34 | 3.84 | 2.32 | 2.25 | 2.29 | 2.42 | 2.31 | 0.7 |
| TiO2 | 2.5 | 2.32 | 2.16 | 2.31 | 2.38 | 2.03 | 3.37 | 3.62 | 0.15 |
| MnO | 0.06 | 0.06 | 0.03 | 0.03 | 0.07 | 0.02 | 0 | 0 | 0 |
| SiO2 | 44.81 | 43.93 | 41.57 | 50.17 | 52.82 | 53.01 | 47.83 | 49 | 55.06 |
| CaO | 13.51 | 13.62 | 10.74 | 21.87 | 21.1 | 19.18 | 25.14 | 23.46 | 25.32 |
| K2O | 0.26 | 0.25 | 0.29 | 0 | 0 | 0 | 0 | 0.01 | 0 |
| Na2O | 0.99 | 2.39 | 2.93 | 0.33 | 0.65 | 0.49 | 0.73 | 0.79 | 0.16 |
| NiO | 0.17 | 0.11 | 0.2 | 0.12 | 0.12 | 0.04 | 0 | 0.14 | 0.03 |
| Summe | 99.4 | 99.45 | 93.56 | 96.55 | 99.42 | 96.34 | 101.91 | 102.76 | 100.35 |

| Formula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 1.575 | 1.544 | 1.556 | 1.878 | 1.977 | 1.984 | 1.689 | 1.731 | 1.985 |
| Ti | 0.066 | 0.061 | 0.061 | 0.065 | 0.067 | 0.057 | 0.090 | 0.096 | 0.004 |
| Al | 0.594 | 0.558 | 0.530 | 0.131 | 0.166 | 0.116 | 0.188 | 0.194 | 0.005 |
| Cr | 0.023 | 0.031 | 0.027 | 0.021 | 0.029 | 0.020 | 0.019 | 0.034 | 0.003 |
| Fe(ii) | 0.101 | 0.098 | 0.120 | 0.073 | 0.070 | 0.072 | 0.071 | 0.068 | 0.021 |
| Mn | 0.002 | 0.002 | 0.001 | 0.001 | 0.002 | 0.001 | 0.000 | 0.000 | 0.000 |
| Mg | 0.969 | 0.988 | 1.052 | 0.878 | 0.853 | 0.891 | 0.907 | 0.925 | 1.006 |
| Ca | 0.509 | 0.513 | 0.431 | 0.877 | 0.846 | 0.769 | 0.951 | 0.888 | 0.978 |
| Na | 0.067 | 0.163 | 0.213 | 0.024 | 0.047 | 0.036 | 0.050 | 0.054 | 0.011 |
| K | 0.012 | 0.011 | 0.014 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 3.918 | 3.968 | 4.005 | 3.946 | 4.058 | 3.945 | 3.965 | 3.990 | 4.013 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Wo | 30.91 | 29.12 | 23.76 | 47.41 | 46.58 | 43.58 | 48.09 | 45.90 | 48.51 |
| En | 58.89 | 56.09 | 58.07 | 47.46 | 46.97 | 50.46 | 45.84 | 47.84 | 49.89 |
| Fs | 6.10 | 5.54 | 6.44 | 3.83 | 3.86 | 3.95 | 3.55 | 3.46 | 1.04 |
| Ac | | | 11.73 | 1.29 | 2.60 | 2.01 | 2.53 | 2.80 | 0.55 |
| Mg # | 90.56 | 90.96 | 89.75 | 92.36 | 92.38 | 92.55 | 92.69 | 93.13 | 97.94 |

Table of clinopyroxene (cpx) microprobe analysis drill core G17 samples 45, 44, 42

| Sample | G13-3c1 | G13-3a5 | G13-3a6 | G13-3d4 | G13-3d6 | G13-3a2 | G13-3a5 | G13-7b5 |
|---|---|---|---|---|---|---|---|---|
| Na2O | 0.54 | 0.54 | 0.58 | 0.5 | 0.54 | 0.44 | 0.64 | 0.44 |
| MgO | 14.39 | 13.48 | 13.51 | 14.2 | 14.58 | 15.22 | 14.7 | 14.51 |
| Al2O3 | 2.32 | 2.5 | 2.35 | 2.59 | 2.42 | 1.61 | 2.29 | 1.86 |
| FeO | 4.35 | 4.24 | 4.12 | 4.68 | 4.35 | 3.66 | 4.68 | 3.42 |
| CaO | 21.08 | 20.54 | 20.6 | 22.1 | 21.78 | 21.62 | 20.9 | 20.53 |
| SiO2 | 52.45 | 54.02 | 55.76 | 49.36 | 52.5 | 53.86 | 51.07 | 53.1 |
| MnO | 0.09 | 0.11 | 0.07 | 0.09 | 0.07 | 0.02 | 0.11 | 0.07 |
| TiO2 | 2.63 | 2.32 | 2.71 | 2.5 | 2.1 | 1.98 | 2.67 | 1.98 |
| K2O | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cr2O3 | 0.4 | 0.46 | 0.4 | 0.38 | 0.3 | 0.3 | 0.4 | 0.3 |
| NiO | 0 | 0 | 0.04 | 0.09 | 0 | 0.04 | 0.13 | 0.13 |
| Summe | 98.25 | 98.21 | 100.14 | 96.49 | 98.64 | 98.75 | 97.59 | 96.34 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SiO2 | 52.450 | 54.020 | 55.760 | 49.360 | 52.500 | 53.860 | 51.070 | 53.100 |
| TiO2 | 2.630 | 2.320 | 2.710 | 2.500 | 2.100 | 1.980 | 2.670 | 1.980 |
| Al2O3 | 2.320 | 2.500 | 2.350 | 2.590 | 2.420 | 1.610 | 2.290 | 1.860 |
| Cr2O3 | 0.400 | 0.460 | 0.400 | 0.380 | 0.300 | 0.300 | 0.400 | 0.300 |
| Fe2O3 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| FeO | 4.350 | 4.240 | 4.120 | 4.680 | 4.350 | 3.660 | 4.680 | 3.420 |
| MnO | 0.090 | 0.110 | 0.070 | 0.090 | 0.070 | 0.020 | 0.110 | 0.070 |
| MgO | 14.390 | 13.480 | 13.510 | 14.200 | 14.580 | 15.220 | 14.700 | 14.510 |
| CaO | 21.080 | 20.540 | 20.600 | 22.100 | 21.780 | 21.620 | 20.900 | 20.530 |
| Na2O | 0.540 | 0.540 | 0.580 | 0.500 | 0.540 | 0.440 | 0.640 | 0.440 |
| K2O | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 98.250 | 98.210 | 100.100 | 96.400 | 98.640 | 98.710 | 97.460 | 96.210 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Si | 1.946 | 2.004 | 2.069 | 1.831 | 1.948 | 1.998 | 1.895 | 1.970 |
| Al | 0.054 | -0.004 | -0.069 | 0.113 | 0.052 | 0.002 | 0.100 | 0.030 |
| Al | 0.048 | 0.114 | 0.172 | 0.000 | 0.054 | 0.069 | 0.000 | 0.052 |
| Fe(iii) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cr | 0.012 | 0.013 | 0.012 | 0.011 | 0.009 | 0.009 | 0.012 | 0.009 |
| Ti | 0.073 | 0.065 | 0.076 | 0.070 | 0.059 | 0.055 | 0.075 | 0.055 |
| Fe(ii) | 0.137 | 0.133 | 0.130 | 0.147 | 0.137 | 0.115 | 0.147 | 0.108 |
| Mn | 0.003 | 0.003 | 0.002 | 0.003 | 0.002 | 0.001 | 0.003 | 0.002 |
| Mg | 0.796 | 0.746 | 0.747 | 0.785 | 0.807 | 0.842 | 0.813 | 0.803 |
| Ca | 0.838 | 0.816 | 0.819 | 0.878 | 0.866 | 0.859 | 0.831 | 0.816 |
| Na | 0.039 | 0.039 | 0.042 | 0.036 | 0.039 | 0.032 | 0.046 | 0.032 |
| K | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 3.945 | 3.930 | 3.999 | 3.876 | 3.971 | 3.982 | 3.922 | 3.876 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Wo | 46.23 | 46.98 | 47.07 | 47.48 | 46.79 | 46.49 | 45.13 | 46.36 |
| En | 43.92 | 42.91 | 42.95 | 42.46 | 43.59 | 45.54 | 44.18 | 45.60 |
| Fs | 7.71 | 7.88 | 7.58 | 8.11 | 7.52 | 6.26 | 8.19 | 6.24 |
| Ac | 2.14 | 2.24 | 2.40 | 1.94 | 2.10 | 1.71 | 2.50 | 1.80 |
| Fo | 85.32 | 84.82 | 85.21 | 84.21 | 85.49 | 87.96 | 84.66 | 88.18 |

Table of cpx microprobe analysis drill core G13 sample 3

| No. | 56 | 57 | 58 | 59 | 60 | 61 | 62 |
|---|---|---|---|---|---|---|---|
| MgO | 44.73 | 44.79 | 45.152 | 44.764 | 45.741 | 44.455 | 44.775 |
| MnO | 0.26 | 0.266 | 0.233 | 0.255 | 0.359 | 0.367 | 0.145 |
| Cr2O3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TiO2 | 0.022 | 0.05 | 0 | 0.021 | 0 | 0 | 0 |
| FeO | 12.261 | 12.346 | 12.583 | 12.454 | 12.328 | 12.131 | 12.164 |
| Al2O3 | 0.002 | 0 | 0 | 0 | 0 | 0.012 | 0.008 |
| SiO2 | 36.589 | 36.915 | 37.134 | 37.369 | 39.124 | 38.321 | 36.812 |
| CaO | 0.148 | 0.16 | 0.159 | 0.171 | 0.153 | 0.171 | 0.168 |
| NiO | 0.303 | 0.328 | 0.295 | 0.253 | 0.392 | 0.304 | 0.245 |
| Na2O | 0 | 0 | 0.011 | 0 | 0.003 | 0.014 | 0.002 |
| V2O3 | 0 | 0.026 | 0 | 0.021 | 0.014 | 0 | 0.011 |
| K2O | 0.008 | 0 | 0.001 | 0 | 0.01 | 0 | 0.007 |
| ZnO | 0 | 0.024 | 0.066 | 0 | 0 | 0 | 0.051 |
| Total | 94.323 | 94.905 | 95.634 | 95.308 | 98.124 | 95.775 | 94.388 |
| | G13-3 | | | | | | |

| Formula | | | | | | | |
|---|---|---|---|---|---|---|---|
| Si | 0.943 | 0.951 | 0.957 | 0.963 | 1.008 | 0.987 | 0.948 |
| Ti | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Al | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cr | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 0.264 | 0.266 | 0.271 | 0.268 | 0.266 | 0.261 | 0.262 |
| Mn | 0.006 | 0.006 | 0.005 | 0.006 | 0.008 | 0.008 | 0.003 |
| Mg | 1.718 | 1.720 | 1.734 | 1.719 | 1.757 | 1.708 | 1.720 |
| Ni | 0.006 | 0.007 | 0.006 | 0.005 | 0.008 | 0.006 | 0.005 |
| Ca | 0.004 | 0.004 | 0.004 | 0.005 | 0.004 | 0.005 | 0.005 |
| TOTAL | 2.941 | 2.955 | 2.978 | 2.966 | 3.051 | 2.976 | 2.943 |
| | | | | | | | |
| Fo | 86.43 | 86.36 | 86.26 | 86.26 | 86.53 | 86.37 | 86.64 |

| No. | 9 | 13 | 14 | 15 | 16 | 18 |
|---|---|---|---|---|---|---|
| MgO | 45.34 | 44.815 | 44.006 | 44.921 | 45.748 | 45.29 |
| MnO | 0.358 | 0.42 | 0.368 | 0.415 | 0.226 | 0.354 |
| Cr2O3 | 0 | 0 | 0 | 0.007 | 0.09 | 0 |
| TiO2 | 0.046 | 0.045 | 0.002 | 0 | 0.083 | 0.101 |
| FeO | 14.697 | 14.656 | 14.795 | 14.78 | 14.988 | 14.699 |
| Al2O3 | 0.013 | 0.008 | 0 | 0.026 | 0.036 | 0 |
| SiO2 | 37.358 | 37.353 | 36.123 | 36.527 | 38.521 | 37.78 |
| CaO | 0.207 | 0.168 | 0.173 | 0.2 | 0.15 | 0.162 |
| NiO | 0.318 | 0.246 | 0.232 | 0.251 | 0.282 | 0.282 |
| Na2O | 0 | 0.004 | 0 | 0.005 | 0 | 0.005 |
| V2O3 | 0.022 | 0 | 0 | 0 | 0 | 0.016 |
| K2O | 0.017 | 0 | 0 | 0.004 | 0.005 | 0.016 |
| ZnO | 0 | 0.015 | 0.093 | 0.006 | 0.005 | 0.017 |
| Total | 98.376 | 97.73 | 95.792 | 97.142 | 100.134 | 98.722 |
| G13-6 | | | | | | |

| Formula | | | | | | |
|---|---|---|---|---|---|---|
| Si | 0.963 | 0.962 | 0.931 | 0.941 | 0.992 | 0.973 |
| Ti | 0.001 | 0.001 | 0.000 | 0.000 | 0.002 | 0.002 |
| Al | 0.000 | 0.000 | 0.000 | 0.001 | 0.001 | 0.000 |
| Cr | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | 0.000 |
| Fe(ii) | 0.317 | 0.316 | 0.319 | 0.318 | 0.323 | 0.317 |
| Mn | 0.008 | 0.009 | 0.008 | 0.009 | 0.005 | 0.008 |
| Mg | 1.742 | 1.721 | 1.690 | 1.725 | 1.757 | 1.740 |
| Ni | 0.007 | 0.005 | 0.005 | 0.005 | 0.006 | 0.006 |
| Ca | 0.006 | 0.005 | 0.005 | 0.006 | 0.004 | 0.004 |
| TOTAL | 3.042 | 3.020 | 2.957 | 3.006 | 3.092 | 3.050 |
| | | | | | | |
| Fo | 84.30 | 84.12 | 83.80 | 84.05 | 84.28 | 84.28 |

Table of cpx microprobe analysis drill core G13 samples 3 & 6

| Nr | 39 | 49 | 52 | 3 | 11 | 6 | 13 | 14 | 20 |
|---|---|---|---|---|---|---|---|---|---|
| Sample | G1-18e2 | G1-18c8 | G1-18c9 | G1-18b8 | G1-18a5 | G1-20d5 | G1-20b7 | G1-20b8 | G1-20c5 |
| Na2O | 0.34 | 0.44 | 0.33 | 0.43 | 1.11 | 0.39 | 0.61 | 0.39 | 0.38 |
| MgO | 14.67 | 16.4 | 16.04 | 13.35 | 14.54 | 14.97 | 14.39 | 15.16 | 14.44 |
| Al2O3 | 2.26 | 0.91 | 1.29 | 2.17 | 1.17 | 2.14 | 2.23 | 2.1 | 1.8 |
| FeO | 5.1 | 4.15 | 2.88 | 3.55 | 5.1 | 3.2 | 3.64 | 3.42 | 2.61 |
| CaO | 20.65 | 21.8 | 22.07 | 24.8 | 25.4 | 21.27 | 21.41 | 21.9 | 14.1 |
| SiO2 | 55.01 | 54.59 | 55.11 | 53.7 | 52.25 | 53.82 | 53.54 | 54.6 | 61.52 |
| MnO | 0.05 | 0.1 | 0.1 | 0.07 | 0 | 0.05 | 0.05 | 0.05 | 0.02 |
| TiO2 | 2.57 | 1.63 | 1.46 | 2.42 | 2.06 | 2.34 | 2.59 | 2.37 | 2.53 |
| K2O | 0.02 | 0.01 | 0.03 | 0.01 | 0.05 | 0.02 | 0.06 | 0.02 | 0.01 |
| Cr2O3 | 0.24 | 0.22 | 0.56 | 0.77 | 0.12 | 0.82 | 0.7 | 0.62 | 0.88 |
| NiO | 0.05 | 0.11 | 0 | 0 | 0 | 0.11 | 0 | 0.06 | 0.1 |
| Summe | 100.96 | 100.36 | 99.87 | 101.27 | 101.8 | 99.13 | 99.22 | 100.69 | 98.39 |

pyxcalc sheet

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| SiO2 | 55.01 | 54.59 | 55.11 | 53.70 | 52.25 | 53.820 | 53.540 | 54.600 | 61.520 |
| TiO2 | 2.57 | 1.63 | 1.46 | 2.42 | 2.06 | 2.340 | 2.590 | 2.370 | 2.530 |
| Al2O3 | 2.26 | 0.91 | 1.29 | 2.17 | 1.17 | 2.140 | 2.230 | 2.100 | 1.800 |
| Cr2O3 | 0.24 | 0.22 | 0.56 | 0.77 | 0.12 | 0.820 | 0.700 | 0.620 | 0.880 |
| Fe2O3 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.000 | 0.000 | 0.000 | 0.000 |
| FeO | 5.10 | 4.15 | 2.88 | 3.55 | 5.10 | 3.200 | 3.640 | 3.420 | 2.610 |
| MnO | 0.05 | 0.10 | 0.10 | 0.07 | 0.00 | 0.050 | 0.050 | 0.050 | 0.020 |
| MgO | 14.67 | 16.40 | 16.04 | 13.35 | 14.54 | 14.970 | 14.390 | 15.160 | 14.440 |
| CaO | 20.65 | 21.80 | 22.07 | 24.80 | 25.40 | 21.270 | 21.410 | 21.900 | 14.100 |
| Na2O | 0.34 | 0.44 | 0.33 | 0.43 | 1.11 | 0.390 | 0.610 | 0.390 | 0.380 |
| K2O | 0.02 | 0.01 | 0.03 | 0.01 | 0.05 | 0.020 | 0.060 | 0.020 | 0.010 |
| TOTAL | 100.91 | 100.25 | 99.87 | 101.27 | 101.80 | 99.020 | 99.220 | 100.630 | 98.290 |

Formula

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 1.979 | 1.964 | 1.982 | 1.932 | 1.879 | 1.967 | 1.957 | 1.996 | 2.249 |
| Ti | 0.070 | 0.044 | 0.039 | 0.065 | 0.056 | 0.064 | 0.071 | 0.065 | 0.070 |
| Al | 0.096 | 0.039 | 0.055 | 0.092 | 0.050 | 0.092 | 0.096 | 0.090 | 0.078 |
| Cr | 0.007 | 0.006 | 0.016 | 0.022 | 0.003 | 0.024 | 0.020 | 0.018 | 0.025 |
| Fe(ii) | 0.153 | 0.125 | 0.087 | 0.107 | 0.153 | 0.098 | 0.111 | 0.105 | 0.080 |
| Mn | 0.002 | 0.003 | 0.003 | 0.002 | 0.000 | 0.002 | 0.002 | 0.002 | 0.001 |
| Mg | 0.787 | 0.879 | 0.860 | 0.716 | 0.780 | 0.816 | 0.784 | 0.826 | 0.787 |
| Ca | 0.796 | 0.840 | 0.850 | 0.956 | 0.979 | 0.833 | 0.839 | 0.858 | 0.552 |
| Na | 0.024 | 0.031 | 0.023 | 0.030 | 0.077 | 0.028 | 0.043 | 0.028 | 0.027 |
| K | 0.001 | 0.000 | 0.001 | 0.000 | 0.002 | 0.001 | 0.003 | 0.001 | 0.000 |
| TOTAL | 3.913 | 3.931 | 3.917 | 3.922 | 3.980 | 3.925 | 3.926 | 3.988 | 3.868 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Wo | 45.10 | 44.66 | 46.60 | 52.72 | 49.12 | 46.86 | 47.08 | 47.14 | 38.13 |
| En | 44.58 | 46.76 | 47.12 | 39.49 | 39.13 | 45.89 | 44.04 | 45.40 | 54.35 |
| Fs | 8.97 | 6.95 | 5.02 | 6.14 | 7.87 | 5.70 | 6.45 | 5.94 | 5.66 |
| Ac | 1.34 | 1.63 | 1.26 | 1.65 | 3.88 | 1.55 | 2.43 | 1.52 | 1.86 |
| Mg# | 83.68 | 87.57 | 90.85 | 87.02 | 83.56 | 89.29 | 87.57 | 88.77 | 90.80 |

Table of cpx microprobe analysis drill core G1 samples 18 & 20

| Nr | 21 | 28 | 30 | No. | 8 | 14 | 15 | 25 | 28 |
|---|---|---|---|---|---|---|---|---|---|
| Sample | G1-20c6 | G1-20d1 | G1-20d1 | MgO | 16.817 | 15.808 | 16.345 | 15.956 | 16.251 |
| Na2O | 0.28 | 0.33 | 0.44 | Al2O3 | 2.052 | 3.293 | 2.967 | 2.83 | 2.441 |
| MgO | 16.6 | 15.21 | 16.26 | Cr2O3 | 0.706 | 0.767 | 0.743 | 0.713 | 0.64 |
| Al2O3 | 1.98 | 0 | 2.63 | TiO2 | 1.88 | 2.908 | 2.723 | 1.907 | 2.173 |
| FeO | 3.69 | 3.13 | 2.98 | CaO | 23.706 | 22.937 | 23.28 | 23.241 | 23.485 |
| CaO | 23.1 | 18.72 | 20.56 | SiO2 | 50.343 | 48.542 | 48.709 | 48.869 | 49.311 |
| SiO2 | 52.41 | 56.19 | 53.34 | Na2O | 0.392 | 0.518 | 0.503 | 0.493 | 0.374 |
| MnO | 0.05 | 0.05 | 0.02 | FeO | 3.429 | 3.758 | 3.744 | 3.584 | 3.618 |
| TiO2 | 2.42 | 2.12 | 1.75 | MnO | 0.018 | 0.016 | 0.002 | 0.005 | 0.002 |
| K2O | 0.02 | 0.01 | 0.35 | NiO | 0.067 | 0.076 | 0.079 | 0.078 | 0.028 |
| Cr2O3 | 0.84 | 0.74 | 1.15 | K2O | 0 | 0 | 0 | 0.018 | 0.006 |
| NiO | 0.05 | 0 | 0.06 | Total | 99.41 | 98.623 | 99.095 | 97.694 | 98.329 |
| Summe | 101.44 | 96.5 | 99.54 | Comment | G1-26 | cpx | cpx | cpx | cpx |

pyxcalc sheet

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| SiO2 | 52.410 | 56.190 | 53.340 | SiO2 | 50.343 | 48.542 | 48.709 | 48.869 | 49.311 |
| TiO2 | 2.420 | 2.120 | 1.750 | TiO2 | 1.880 | 2.908 | 2.723 | 1.907 | 2.173 |
| Al2O3 | 1.980 | 0.000 | 2.630 | Al2O3 | 2.052 | 3.293 | 2.967 | 2.830 | 2.441 |
| Cr2O3 | 0.840 | 0.740 | 1.150 | Cr2O3 | 0.706 | 0.767 | 0.743 | 0.713 | 0.640 |
| Fe2O3 | 3.876 | 0.000 | 0.000 | Fe2O3 | 5.072 | 0.000 | 2.750 | 0.000 | 0.000 |
| FeO | 0.203 | 3.130 | 2.980 | FeO | -1.135 | 3.758 | 1.269 | 3.584 | 3.618 |
| MnO | 0.050 | 0.050 | 0.020 | MnO | 0.018 | 0.016 | 0.002 | 0.005 | 0.002 |
| MgO | 16.600 | 15.210 | 16.260 | MgO | 16.817 | 15.808 | 16.345 | 15.956 | 16.251 |
| CaO | 23.100 | 18.720 | 20.560 | CaO | 23.706 | 22.937 | 23.280 | 23.241 | 23.485 |
| Na2O | 0.280 | 0.330 | 0.440 | Na2O | 0.392 | 0.518 | 0.503 | 0.493 | 0.374 |
| K2O | 0.020 | 0.010 | 0.350 | K2O | 0.000 | 0.000 | 0.000 | 0.018 | 0.006 |
| TOTAL | 101.778 | 96.500 | 99.480 | TOTAL | 99.851 | 98.547 | 99.291 | 97.616 | 98.301 |

| Formula | | | | Formula | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Si | 1.916 | 2.054 | 1.950 | Si | 1.872 | 1.805 | 1.811 | 1.817 | 1.834 |
| Ti | 0.067 | 0.058 | 0.048 | Ti | 0.053 | 0.081 | 0.076 | 0.053 | 0.061 |
| Al | 0.085 | 0.000 | 0.113 | Al | 0.090 | 0.144 | 0.130 | 0.124 | 0.107 |
| Cr | 0.024 | 0.021 | 0.033 | Cr | 0.021 | 0.023 | 0.022 | 0.021 | 0.019 |
| Fe(ii) | 0.113 | 0.096 | 0.091 | Fe(ii) | 0.107 | 0.117 | 0.116 | 0.111 | 0.112 |
| Mn | 0.002 | 0.002 | 0.001 | Mn | 0.001 | 0.001 | 0.000 | 0.000 | 0.000 |
| Mg | 0.905 | 0.829 | 0.886 | Mg | 0.932 | 0.876 | 0.906 | 0.885 | 0.901 |
| Ca | 0.905 | 0.733 | 0.805 | Ca | 0.944 | 0.914 | 0.927 | 0.926 | 0.936 |
| Na | 0.020 | 0.023 | 0.031 | Na | 0.028 | 0.037 | 0.036 | 0.036 | 0.027 |
| K | 0.001 | 0.000 | 0.016 | K | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 |
| TOTAL | 4.037 | 3.817 | 3.975 | TOTAL | 4.047 | 3.998 | 4.026 | 3.974 | 3.997 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Wo | 46.50 | 43.52 | 44.34 | Wo | 46.96 | 47.01 | 46.72 | 47.32 | 47.37 |
| En | 46.50 | 49.21 | 48.80 | En | 46.36 | 45.09 | 45.64 | 45.21 | 45.62 |
| Fs | 5.99 | 5.88 | 5.15 | Fs | 5.28 | 5.98 | 5.81 | 5.65 | 5.65 |
| Ac | 1.02 | 1.39 | 1.72 | Ac | 1.41 | 1.92 | 1.83 | 1.82 | 1.37 |
| Mg# | 88.91 | 89.65 | 90.68 | Mg # | 89.74 | 88.23 | 88.61 | 88.81 | 88.90 |

Table of cpx microprobe analysis from drill core G1 samples 20 & 26

| | G1-21 | | | G1-24 | | | | | G1-26 |
|---|---|---|---|---|---|---|---|---|---|
| No. | 9 | 10 | 16 | 27 | 30 | 31 | 38 | 39 | 7 |
| MgO | 17.269 | 17.344 | 16.876 | 16.731 | 16.624 | 16.105 | 17.137 | 16.938 | 16.698 |
| Al2O3 | 1.231 | 1.284 | 1.786 | 2.11 | 2.328 | 2.383 | 1.462 | 1.782 | 2.267 |
| Cr2O3 | 0.537 | 0.519 | 0.654 | 0.771 | 0.729 | 0.667 | 0.597 | 0.687 | 0.598 |
| TiO2 | 1.553 | 1.588 | 1.854 | 2.152 | 2.267 | 2.379 | 1.072 | 1.773 | 2.157 |
| CaO | 23.611 | 23.778 | 23.501 | 23.631 | 23.467 | 23.573 | 23.691 | 23.787 | 23.564 |
| SiO2 | 51.331 | 51.224 | 50.605 | 50.259 | 49.947 | 49.784 | 51.457 | 50.332 | 49.94 |
| Na2O | 0.345 | 0.29 | 0.406 | 0.422 | 0.389 | 0.53 | 0.304 | 0.283 | 0.399 |
| FeO | 3.121 | 3.274 | 3.429 | 3.129 | 3.073 | 3.201 | 3.042 | 2.804 | 3.562 |
| MnO | 0 | 0.011 | 0.011 | 0 | 0.017 | 0.001 | 0.02 | 0 | 0.01 |
| NiO | 0.082 | 0.039 | 0.028 | 0.072 | 0.097 | 0.046 | 0.015 | 0.125 | 0 |
| K2O | 0.007 | 0.016 | 0.006 | 0 | 0.002 | 0 | 0.018 | 0.004 | 0 |
| Total | 99.087 | 99.367 | 99.156 | 99.277 | 98.94 | 98.669 | 98.815 | 98.515 | 99.195 |
| Comment | cpx | cpx | cpx | cpx | cpx | cpx | cpx | cpx | cpx |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| SiO2 | 51.331 | 51.224 | 50.605 | 50.259 | 49.947 | 49.784 | 51.457 | 50.332 | 49.940 |
| TiO2 | 1.553 | 1.588 | 1.854 | 2.152 | 2.267 | 2.379 | 1.072 | 1.773 | 2.157 |
| Al2O3 | 1.231 | 1.284 | 1.786 | 2.110 | 2.328 | 2.383 | 1.462 | 1.782 | 2.267 |
| Cr2O3 | 0.537 | 0.519 | 0.654 | 0.771 | 0.729 | 0.667 | 0.597 | 0.687 | 0.598 |
| Fe2O3 | 3.331 | 4.516 | 3.042 | 3.501 | 1.791 | 0.355 | 3.075 | 0.613 | 4.133 |
| FeO | 0.124 | -0.790 | 0.692 | -0.022 | 1.462 | 2.881 | 0.275 | 2.252 | -0.157 |
| MnO | 0.000 | 0.011 | 0.011 | 0.000 | 0.017 | 0.001 | 0.020 | 0.000 | 0.010 |
| MgO | 17.269 | 17.344 | 16.876 | 16.731 | 16.624 | 16.105 | 17.137 | 16.938 | 16.698 |
| CaO | 23.611 | 23.778 | 23.501 | 23.631 | 23.467 | 23.573 | 23.691 | 23.787 | 23.564 |
| Na2O | 0.345 | 0.290 | 0.406 | 0.422 | 0.389 | 0.530 | 0.304 | 0.283 | 0.399 |
| K2O | 0.007 | 0.016 | 0.006 | 0.000 | 0.002 | 0.000 | 0.018 | 0.004 | 0.000 |
| TOTAL | 99.339 | 99.780 | 99.433 | 99.556 | 99.022 | 98.659 | 99.108 | 98.451 | 99.609 |
| Formula | | | | | | | | | |
| Si | 1.904 | 1.900 | 1.877 | 1.865 | 1.854 | 1.847 | 1.910 | 1.868 | 1.857 |
| Ti | 0.043 | 0.044 | 0.052 | 0.060 | 0.063 | 0.066 | 0.030 | 0.049 | 0.060 |
| Al | 0.054 | 0.056 | 0.078 | 0.092 | 0.102 | 0.104 | 0.064 | 0.078 | 0.099 |
| Cr | 0.016 | 0.015 | 0.019 | 0.023 | 0.021 | 0.020 | 0.018 | 0.020 | 0.018 |
| Fe(ii) | 0.097 | 0.102 | 0.106 | 0.097 | 0.095 | 0.099 | 0.094 | 0.087 | 0.111 |
| Mn | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.001 | 0.000 | 0.000 |
| Mg | 0.955 | 0.959 | 0.933 | 0.926 | 0.920 | 0.891 | 0.948 | 0.937 | 0.926 |
| Ca | 0.938 | 0.945 | 0.934 | 0.939 | 0.933 | 0.937 | 0.942 | 0.946 | 0.939 |
| Na | 0.025 | 0.021 | 0.029 | 0.030 | 0.028 | 0.038 | 0.022 | 0.020 | 0.029 |
| K | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 |
| TOTAL | 4.031 | 4.042 | 4.028 | 4.033 | 4.017 | 4.003 | 4.029 | 4.006 | 4.039 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Wo | 46.59 | 46.64 | 46.64 | 47.17 | 47.22 | 47.70 | 46.95 | 47.54 | 46.86 |
| En | 47.41 | 47.34 | 46.61 | 46.47 | 46.55 | 45.35 | 47.26 | 47.10 | 46.21 |
| Fs | 4.77 | 4.99 | 5.29 | 4.84 | 4.81 | 5.02 | 4.70 | 4.34 | 5.49 |
| Ac | 1.23 | 1.03 | 1.46 | 1.52 | 1.42 | 1.94 | 1.09 | 1.02 | 1.44 |
| Mg # | 90.80 | 90.43 | 89.77 | 90.51 | 90.61 | 89.97 | 90.95 | 91.50 | 89.31 |

Table of cpx microprobe analysis from drill core G1 samples 21, 24 & 26

| Sample | G1-2 | | | G1-20 | |
|---|---|---|---|---|---|
| No. | 30 | 33 | 42 | 57 | 58 |
| MgO | 14.459 | 13.989 | 14.678 | 15.992 | 15.856 |
| SiO2 | 47.769 | 47.032 | 47.736 | 49.281 | 49.142 |
| CaO | 22.214 | 22.325 | 22.253 | 22.347 | 22.308 |
| Cr2O3 | 0.023 | 0.129 | 0.071 | 0.923 | 0.859 |
| FeO | 6.66 | 6.925 | 6.5 | 2.751 | 2.943 |
| Al2O3 | 2.901 | 3.24 | 2.816 | 2.142 | 2.29 |
| MnO | 0.074 | 0.084 | 0.098 | 0.059 | 0.041 |
| K2O | 0.005 | 0.004 | 0.005 | 0.01 | 0.012 |
| TiO2 | 3.12 | 3.449 | 3.152 | 2.075 | 2.232 |
| Na2O | 0.313 | 0.31 | 0.297 | 0.494 | 0.28 |
| V2O3 | 0.23 | 0.235 | 0.203 | 0.123 | 0.173 |
| ZnO | 0.034 | | 0.108 | 0.203 | 0.01 |
| NiO | 0.034 | 0.018 | 0.035 | 0.051 | 0.056 |
| Total | 97.836 | 97.74 | 97.952 | 96.451 | 96.202 |
| Comment | mat cpx | mat cpx | cpx | cpx | cpx |

| | | | | | |
|---|---|---|---|---|---|
| SiO2 | 47.769 | 47.032 | 47.736 | 49.281 | 49.142 |
| TiO2 | 3.120 | 3.449 | 3.152 | 2.075 | 2.232 |
| Al2O3 | 2.901 | 3.240 | 2.816 | 2.142 | 2.290 |
| Cr2O3 | 0.023 | 0.129 | 0.071 | 0.923 | 0.859 |
| Fe2O3 | 2.786 | 1.336 | 3.390 | 2.972 | 1.349 |
| FeO | 4.153 | 5.723 | 3.449 | 0.077 | 1.729 |
| MnO | 0.074 | 0.084 | 0.098 | 0.059 | 0.041 |
| MgO | 14.459 | 13.989 | 14.678 | 15.992 | 15.856 |
| CaO | 22.214 | 22.325 | 22.253 | 22.347 | 22.308 |
| Na2O | 0.313 | 0.310 | 0.297 | 0.494 | 0.280 |
| K2O | 0.005 | 0.004 | 0.005 | 0.010 | 0.012 |
| TOTAL | 97.817 | 97.621 | 97.946 | 96.372 | 96.098 |

Formula

| | | | | | |
|---|---|---|---|---|---|
| Si | 1.829 | 1.801 | 1.828 | 1.887 | 1.882 |
| Ti | 0.090 | 0.099 | 0.091 | 0.060 | 0.064 |
| Al | 0.131 | 0.146 | 0.127 | 0.097 | 0.103 |
| Cr | 0.001 | 0.004 | 0.002 | 0.028 | 0.026 |
| Fe(ii) | 0.213 | 0.222 | 0.208 | 0.088 | 0.094 |
| Mn | 0.002 | 0.003 | 0.003 | 0.002 | 0.001 |
| Mg | 0.825 | 0.799 | 0.838 | 0.913 | 0.905 |
| Ca | 0.911 | 0.916 | 0.913 | 0.917 | 0.915 |
| Na | 0.023 | 0.023 | 0.022 | 0.037 | 0.021 |
| K | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 |
| TOTAL | 4.027 | 4.013 | 4.033 | 4.029 | 4.013 |

| | | | | | |
|---|---|---|---|---|---|
| Wo | 46.16 | 46.72 | 46.04 | 46.87 | 47.27 |
| En | 41.81 | 40.74 | 42.26 | 46.68 | 46.75 |
| Fs | 10.85 | 11.37 | 10.59 | 4.57 | 4.90 |
| Ac | 1.18 | 1.17 | 1.11 | 1.88 | 1.07 |
| Mg # | 79.47 | 78.27 | 80.10 | 91.20 | 90.57 |

Table of cpx microprobe analysis from drill core G1 samples 2 & 20

# 19. Appendix 6: Spinel microprobe analysis

| Sample | G17/43a4 | G17/43a12 | g17/43b4 | g17/43b5 | g17/43b9 | g17/43d14 | g17/43d115 | g17/43d31 | g17/43d33 | G17/40c21 |
|---|---|---|---|---|---|---|---|---|---|---|
| MgO | 9.78 | 10.7 | 10.38 | 10.32 | 11.15 | 7.22 | 6.9 | 9.19 | 6.6 | 9.69 |
| Al2O3 | 11.42 | 14.04 | 11.12 | 12.94 | 11.65 | 8.76 | 8.42 | 9.84 | 7 | 10.83 |
| Cr2O3 | 32.46 | 32.63 | 33.39 | 31.9 | 34.05 | 36.31 | 37.62 | 29.08 | 37.46 | 33.22 |
| FeO | 38.19 | 38.47 | 38.21 | 37.61 | 36.58 | 41.69 | 42.17 | 41.09 | 43.4 | 41.2 |
| TiO2 | 4.43 | 3.09 | 5.98 | 5.77 | 5.62 | 2.36 | 2.57 | 7.48 | 1.99 | 4.52 |
| MnO | 0.33 | 0.28 | 0.35 | 0.5 | 0.42 | 0.63 | 0.72 | 0.47 | 0.74 | 0.32 |
| SiO2 | 0.37 | 0.04 | 0 | 0.15 | 0.7 | 0.04 | 0.04 | 0.32 | 0.14 | 0.04 |
| CaO | 0 | 0 | 0 | 0.02 | 0.05 | 0 | 0.01 | 0 | 0 | |
| K2O | 0.01 | 0 | 0 | 0 | 0 | 0 | 0 | 0.01 | 0 | |
| Na2O | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| NiO | 0.65 | 0.54 | 0.57 | 0.54 | 0.54 | 0.23 | 0.38 | 0.69 | 0.23 | 0.45 |
| ZnO | 0.05 | 0.04 | 0.01 | 0.01 | 0.02 | 0.08 | 0.05 | 0.04 | 0.07 | |
| Summe | 97.69 | 99.83 | 100.01 | 99.76 | 100.78 | 97.32 | 98.88 | 98.21 | 97.63 | 100.27 |
| Formula without iron correction | | | | | | | | | | |
| Si | 0.105 | 0.011 | 0.000 | 0.041 | 0.189 | 0.012 | 0.012 | 0.091 | 0.042 | 0.011 |
| Ti | 0.944 | 0.638 | 1.241 | 1.187 | 1.142 | 0.524 | 0.564 | 1.604 | 0.448 | 0.949 |
| Al | 3.814 | 4.540 | 3.616 | 4.172 | 3.709 | 3.048 | 2.896 | 3.306 | 2.470 | 3.564 |
| Cr | 7.273 | 7.078 | 7.283 | 6.899 | 7.272 | 8.475 | 8.680 | 6.553 | 8.867 | 7.334 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 9.050 | 8.826 | 8.816 | 8.604 | 8.263 | 10.292 | 10.291 | 9.794 | 10.866 | 9.621 |
| Mn | 0.079 | 0.065 | 0.082 | 0.116 | 0.096 | 0.158 | 0.178 | 0.113 | 0.188 | 0.076 |
| Mg | 4.132 | 4.377 | 4.270 | 4.209 | 4.490 | 3.178 | 3.002 | 3.905 | 2.946 | 4.034 |
| Ca | 0.000 | 0.000 | 0.000 | 0.006 | 0.014 | 0.000 | 0.003 | 0.000 | 0.000 | 0.000 |
| Zn | 0.010 | 0.008 | 0.002 | 0.002 | 0.004 | 0.017 | 0.011 | 0.008 | 0.015 | 0.000 |
| TOTAL | 25.408 | 25.542 | 25.309 | 25.236 | 25.179 | 25.703 | 25.636 | 25.376 | 25.842 | 25.590 |
| Formula after iron correction normalised | | | | | | | | | | |
| Si | 0.099 | 0.010 | 0.000 | 0.039 | 0.180 | 0.011 | 0.011 | 0.086 | 0.039 | 0.010 |
| Ti | 0.892 | 0.599 | 1.177 | 1.129 | 1.088 | 0.489 | 0.528 | 1.517 | 0.416 | 0.890 |
| Al | 3.603 | 4.266 | 3.429 | 3.968 | 3.535 | 2.846 | 2.711 | 3.126 | 2.294 | 3.343 |
| Cr | 6.870 | 6.651 | 6.907 | 6.561 | 6.931 | 7.913 | 8.126 | 6.198 | 8.235 | 6.879 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(iii) | 3.545 | 3.865 | 3.311 | 3.135 | 2.996 | 4.240 | 4.085 | 3.469 | 4.561 | 3.977 |
| Fe(ii) | 5.003 | 4.428 | 5.049 | 5.048 | 4.879 | 5.370 | 5.549 | 5.794 | 5.530 | 5.046 |
| Mn | 0.075 | 0.061 | 0.078 | 0.110 | 0.092 | 0.147 | 0.167 | 0.107 | 0.174 | 0.071 |
| Mg | 3.903 | 4.112 | 4.049 | 4.003 | 4.280 | 2.967 | 2.810 | 3.694 | 2.736 | 3.784 |
| Ca | 0.000 | 0.000 | 0.000 | 0.006 | 0.014 | 0.000 | 0.003 | 0.000 | 0.000 | 0.000 |
| Zn | 0.010 | 0.008 | 0.002 | 0.002 | 0.004 | 0.016 | 0.010 | 0.008 | 0.014 | 0.000 |
| TOTAL | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 |

| Sample | g17/43d34 | g17/43d36 | G17/40c14 | G17/40c15 | G17/40c16 | G17/40c17 | G17/40c18 | G17/40c19 | G17/40c20 | G17/40d18 |
|---|---|---|---|---|---|---|---|---|---|---|
| MgO | 49.51 | 7.48 | 6.34 | 8.14 | 7.29 | 11.01 | 9.61 | 8.61 | 7.64 | 7.73 |
| Al2O3 | 0.04 | 9.37 | 2.52 | 5.43 | 3.77 | 11.77 | 11.03 | 9.93 | 7.41 | 5.29 |
| Cr2O3 | 3.46 | 37.06 | 33.08 | 32.72 | 32.05 | 33.77 | 31.63 | 34.15 | 32.76 | 30.99 |
| FeO | 11.35 | 41.91 | 51.03 | 49.64 | 51.02 | 38.77 | 42.68 | 43.69 | 47.28 | 49.1 |
| TiO2 | 0.21 | 2.15 | 5.63 | 5.82 | 5.7 | 5.35 | 4.06 | 4.03 | 5.04 | 5.11 |
| MnO | 0.23 | 0.7 | 0.69 | 0.46 | 0.55 | 0.29 | 0.35 | 0.38 | 0.5 | 0.51 |
| SiO2 | 37.16 | 0.04 | 0.14 | 0.11 | 0.14 | 0.11 | 0.11 | 0 | 0.04 | 0.07 |
| CaO | 0.13 | 0 | | | | | | | | |
| K2O | 0 | 0 | | | | | | | | |
| Na2O | 0 | 0 | | | | | | | | |
| NiO | 0.4 | 0.3 | 0.47 | 0.44 | 0.47 | 0.54 | 0.51 | 0.45 | 0.41 | 0.44 |
| ZnO | 0.01 | 0.06 | | | | | | | | |
| Summe | 102.5 | 99.07 | 99.9 | 102.76 | 100.99 | 101.61 | 99.98 | 101.24 | 101.08 | 99.24 |
| Formula without iron correction | | | | | | | | | | |
| Si | 7.320 | 0.012 | 0.043 | 0.032 | 0.042 | 0.030 | 0.031 | 0.000 | 0.012 | 0.021 |
| Ti | 0.031 | 0.468 | 1.289 | 1.257 | 1.276 | 1.089 | 0.860 | 0.852 | 1.093 | 1.150 |
| Al | 0.009 | 3.193 | 0.904 | 1.838 | 1.322 | 3.755 | 3.660 | 3.291 | 2.518 | 1.865 |
| Cr | 0.539 | 8.473 | 7.960 | 7.430 | 7.541 | 7.228 | 7.041 | 7.592 | 7.469 | 7.331 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 1.869 | 10.134 | 12.987 | 11.922 | 12.697 | 8.777 | 10.049 | 10.273 | 11.402 | 12.285 |
| Mn | 0.038 | 0.171 | 0.178 | 0.112 | 0.139 | 0.066 | 0.083 | 0.090 | 0.122 | 0.129 |
| Mg | 14.539 | 3.225 | 2.877 | 3.486 | 3.234 | 4.444 | 4.034 | 3.609 | 3.285 | 3.448 |
| Ca | 0.027 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.001 | 0.013 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 24.375 | 25.688 | 26.237 | 26.077 | 26.251 | 25.389 | 25.759 | 25.707 | 25.901 | 26.231 |
| Formula after iron correction normalised | | | | | | | | | | |
| Si | 7.207 | 0.011 | 0.039 | 0.029 | 0.038 | 0.028 | 0.029 | 0.000 | 0.011 | 0.019 |
| Ti | 0.031 | 0.437 | 1.179 | 1.157 | 1.167 | 1.030 | 0.801 | 0.796 | 1.013 | 1.052 |
| Al | 0.009 | 2.983 | 0.827 | 1.692 | 1.209 | 3.550 | 3.410 | 3.072 | 2.334 | 1.707 |
| Cr | 0.531 | 7.916 | 7.281 | 6.838 | 6.894 | 6.832 | 6.560 | 7.088 | 6.921 | 6.708 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(iii) | 0.985 | 4.205 | 5.456 | 5.098 | 5.488 | 3.502 | 4.369 | 4.249 | 4.698 | 5.443 |
| Fe(ii) | 0.856 | 5.263 | 6.424 | 5.875 | 6.121 | 4.795 | 4.994 | 5.342 | 5.867 | 5.798 |
| Mn | 0.038 | 0.160 | 0.163 | 0.103 | 0.127 | 0.063 | 0.078 | 0.084 | 0.113 | 0.118 |
| Mg | 14.316 | 3.013 | 2.631 | 3.208 | 2.957 | 4.201 | 3.759 | 3.370 | 3.044 | 3.155 |
| Ca | 0.027 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.001 | 0.012 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 |

Table of spinel microprobe analysis from drill core G17 samples 43 & 40

| Sample | G17/40c22 | G17/40c23 | G17/40d12 | G17/40d13 | G17/40d14 | G17/40d15 | G17/40d16 | G17/40d17 | G17/40b16 | G17/40b17 |
|---|---|---|---|---|---|---|---|---|---|---|
| MgO | 11.74 | 11.31 | 10.99 | 8.71 | 7.48 | 10.74 | 8.16 | 7.36 | 8.24 | 8.84 |
| Al2O3 | 11.53 | 11.86 | 11.33 | 7.37 | 5.75 | 10.85 | 5.69 | 3.77 | 7.97 | 9 |
| Cr2O3 | 35.05 | 35.33 | 30.71 | 30.37 | 31.51 | 31.74 | 29.91 | 30.29 | 33.08 | 34.35 |
| FeO | 36.23 | 36.5 | 38.25 | 44.1 | 46.1 | 39.77 | 47.82 | 51.44 | 46.89 | 45.29 |
| TiO2 | 5.9 | 5.69 | 4.76 | 4.36 | 4.74 | 4.66 | 5.08 | 6.04 | 5.52 | 6.16 |
| MnO | 0.3 | 0.22 | 0.27 | 0.38 | 0.51 | 0.29 | 0.45 | 0.43 | 0.37 | 0.42 |
| SiO2 | 0.04 | 0.07 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.04 |
| CaO | | | | | | | | | | |
| K2O | | | | | | | | | | |
| Na2O | | | | | | | | | | |
| NiO | 0.51 | 0.42 | 0.6 | 0.42 | 0.53 | 0.48 | 0.36 | 0.5 | 0.5 | 0.45 |
| ZnO | | | | | | | | | | |
| Summe | 101.3 | 101.4 | 97.02 | 95.82 | 96.73 | 98.64 | 97.58 | 99.94 | 102.68 | 104.55 |
| Formula without iron correction | | | | | | | | | | |
| Si | 0.011 | 0.019 | 0.031 | 0.033 | 0.034 | 0.031 | 0.033 | 0.033 | 0.031 | 0.011 |
| Ti | 1.194 | 1.151 | 1.019 | 0.990 | 1.086 | 0.988 | 1.154 | 1.368 | 1.169 | 1.263 |
| Al | 3.655 | 3.760 | 3.801 | 2.622 | 2.065 | 3.603 | 2.026 | 1.338 | 2.645 | 2.891 |
| Cr | 7.454 | 7.514 | 6.911 | 7.248 | 7.591 | 7.071 | 7.144 | 7.213 | 7.364 | 7.402 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 8.150 | 8.210 | 9.104 | 11.132 | 11.747 | 9.371 | 12.080 | 12.956 | 11.040 | 10.323 |
| Mn | 0.068 | 0.050 | 0.065 | 0.097 | 0.132 | 0.069 | 0.115 | 0.110 | 0.088 | 0.097 |
| Mg | 4.708 | 4.536 | 4.664 | 3.920 | 3.398 | 4.512 | 3.675 | 3.305 | 3.459 | 3.592 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 25.241 | 25.240 | 25.594 | 26.042 | 26.052 | 25.644 | 26.228 | 26.323 | 25.796 | 25.579 |
| Formula after iron correction normalised | | | | | | | | | | |
| Si | 0.010 | 0.018 | 0.029 | 0.031 | 0.031 | 0.029 | 0.030 | 0.030 | 0.029 | 0.010 |
| Ti | 1.135 | 1.095 | 0.956 | 0.912 | 1.001 | 0.924 | 1.056 | 1.248 | 1.088 | 1.185 |
| Al | 3.476 | 3.575 | 3.564 | 2.416 | 1.902 | 3.372 | 1.854 | 1.220 | 2.461 | 2.713 |
| Cr | 7.088 | 7.145 | 6.480 | 6.680 | 6.993 | 6.617 | 6.537 | 6.576 | 6.851 | 6.945 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(iii) | 3.146 | 3.145 | 3.986 | 5.018 | 5.041 | 4.104 | 5.436 | 5.648 | 4.455 | 3.952 |
| Fe(ii) | 4.603 | 4.662 | 4.551 | 5.241 | 5.780 | 4.666 | 5.618 | 6.164 | 5.816 | 5.734 |
| Mn | 0.065 | 0.048 | 0.061 | 0.090 | 0.121 | 0.065 | 0.105 | 0.100 | 0.082 | 0.091 |
| Mg | 4.477 | 4.313 | 4.373 | 3.612 | 3.130 | 4.222 | 3.363 | 3.013 | 3.218 | 3.370 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 |

| Sample | G17/40e12 | G17/40e13 | G17/40e14 | G17/40e15 | G17/40e16 | G17/40b13 | G17/40b14 | G17/40b15 | G17/40a17 | G17/38b25 |
|---|---|---|---|---|---|---|---|---|---|---|
| MgO | 9.6 | 10 | 9.56 | 6.1 | 5.41 | 9.29 | 7.51 | 4.87 | 5.97 | 10.7 |
| Al2O3 | 10.25 | 9.94 | 10.62 | 3.25 | 2.81 | 11.79 | 6.79 | 3.86 | 4.08 | 15.43 |
| Cr2O3 | 27.83 | 28.82 | 28.07 | 30.82 | 33.09 | 34.62 | 33.97 | 33.63 | 33.25 | 31.7 |
| FeO | 42.34 | 43.68 | 44.55 | 52.28 | 50.07 | 39.94 | 47.46 | 52.37 | 51.41 | 36.03 |
| TiO2 | 5.43 | 5.54 | 4.62 | 5.89 | 4.43 | 3.84 | 5.82 | 5.41 | 5.48 | 6.39 |
| MnO | 0.32 | 0.35 | 0.42 | 0.71 | 0.66 | 0.3 | 0.47 | 0.86 | 0.64 | 0.32 |
| SiO2 | 0.14 | 0.11 | 0.15 | 0.11 | 0.07 | 0.07 | 0.07 | 0.07 | 0.14 | 0.18 |
| CaO | | | | | | | | | | |
| K2O | | | | | | | | | | |
| Na2O | | | | | | | | | | |
| NiO | 0.57 | 0.65 | 0.65 | 0.59 | 0.5 | 0.36 | 0.44 | 0.35 | 0.3 | 0.39 |
| ZnO | | | | | | | | | | |
| Summe | 96.48 | 99.09 | 98.64 | 99.75 | 97.04 | 100.21 | 102.53 | 101.42 | 101.27 | 101.14 |
| Formula without iron correction | | | | | | | | | | |
| Si | 0.041 | 0.031 | 0.043 | 0.034 | 0.022 | 0.019 | 0.020 | 0.021 | 0.042 | 0.048 |
| Ti | 1.193 | 1.190 | 1.000 | 1.353 | 1.050 | 0.801 | 1.246 | 1.220 | 1.226 | 1.269 |
| Al | 3.528 | 3.346 | 3.603 | 1.170 | 1.044 | 3.856 | 2.277 | 1.363 | 1.430 | 4.801 |
| Cr | 6.426 | 6.508 | 6.388 | 7.441 | 8.247 | 7.595 | 7.642 | 7.969 | 7.818 | 6.617 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 10.341 | 10.433 | 10.723 | 13.350 | 13.199 | 9.268 | 11.292 | 13.126 | 12.785 | 7.955 |
| Mn | 0.079 | 0.085 | 0.102 | 0.184 | 0.176 | 0.071 | 0.113 | 0.218 | 0.161 | 0.072 |
| Mg | 4.180 | 4.258 | 4.102 | 2.777 | 2.543 | 3.843 | 3.186 | 2.176 | 2.647 | 4.212 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 25.789 | 25.851 | 25.961 | 26.308 | 26.282 | 25.454 | 25.775 | 26.093 | 26.109 | 24.974 |
| Formula after iron correction normalised | | | | | | | | | | |
| Si | 0.038 | 0.029 | 0.040 | 0.031 | 0.020 | 0.018 | 0.019 | 0.019 | 0.038 | 0.046 |
| Ti | 1.110 | 1.105 | 0.925 | 1.234 | 0.959 | 0.756 | 1.160 | 1.122 | 1.127 | 1.220 |
| Al | 3.284 | 3.106 | 3.330 | 1.067 | 0.953 | 3.636 | 2.120 | 1.254 | 1.315 | 4.614 |
| Cr | 5.981 | 6.042 | 5.905 | 6.788 | 7.531 | 7.161 | 7.115 | 7.330 | 7.186 | 6.359 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(iii) | 4.439 | 4.583 | 4.835 | 5.615 | 5.557 | 3.655 | 4.408 | 5.134 | 5.169 | 2.496 |
| Fe(ii) | 5.184 | 5.102 | 5.077 | 6.564 | 6.497 | 5.084 | 6.107 | 6.939 | 6.584 | 5.149 |
| Mn | 0.074 | 0.079 | 0.095 | 0.168 | 0.161 | 0.066 | 0.105 | 0.201 | 0.148 | 0.069 |
| Mg | 3.890 | 3.953 | 3.792 | 2.534 | 2.322 | 3.624 | 2.966 | 2.002 | 2.433 | 4.048 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 |

Table of spinel microprobe analysis drill core G17 sample 40

| Sample | G17/40b17 | G17/40b18 | G17/40b20 | G17/40A11 | G17/40a13 | G17/40a14 | G17/40a15 | G17/40a16 | G17/38c12 | G17/38c14 |
|---|---|---|---|---|---|---|---|---|---|---|
| MgO | 8.84 | 6.18 | 4.03 | 10.58 | 7.89 | 8.19 | 8.7 | 6.88 | 6.87 | 10.12 |
| Al2O3 | 9 | 2.58 | 3.89 | 11.36 | 7.89 | 9.49 | 10.69 | 5.37 | 7.93 | 16.39 |
| Cr2O3 | 34.35 | 31.86 | 37.95 | 34.18 | 33.77 | 34.68 | 33.24 | 33.03 | 41.32 | 35.7 |
| FeO | 45.29 | 52.58 | 47.04 | 38.85 | 46.02 | 43.42 | 45.08 | 49.4 | 38.86 | 33.41 |
| TiO2 | 6.16 | 7.62 | 5.55 | 6.1 | 5.09 | 4.1 | 4.71 | 6.01 | 2.32 | 3.51 |
| MnO | 0.42 | 0.69 | 0.97 | 0.32 | 0.35 | 0.4 | 0.37 | 0.51 | 0.68 | 0.37 |
| SiO2 | 0.04 | 0.11 | 0.14 | 0.07 | 0.04 | 0.14 | 0.04 | 0.11 | 0.11 | 0.15 |
| CaO | | | | | | | | | | |
| K2O | | | | | | | | | | |
| Na2O | | | | | | | | | | |
| NiO | 0.45 | 0.41 | 0.35 | 0.42 | 0.39 | 0.3 | 0.33 | 0.41 | 0.3 | 0.36 |
| ZnO | | | | | | | | | | |
| Summe | 104.55 | 102.03 | 99.92 | 101.88 | 101.44 | 100.72 | 103.16 | 101.72 | 98.39 | 100.01 |
| Formula without iron correction | | | | | | | | | | |
| Si | 0.011 | 0.033 | 0.042 | 0.019 | 0.011 | 0.040 | 0.011 | 0.032 | 0.038 | 0.052 |
| Ti | 1.263 | 1.701 | 1.252 | 1.239 | 1.091 | 0.872 | 0.973 | 1.316 | 0.602 | 0.910 |
| Al | 2.891 | 0.903 | 1.375 | 3.616 | 2.650 | 3.161 | 3.462 | 1.842 | 3.222 | 6.660 |
| Cr | 7.402 | 7.478 | 9.000 | 7.300 | 7.610 | 7.750 | 7.221 | 7.602 | 11.264 | 9.732 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 10.323 | 13.053 | 11.800 | 8.775 | 10.968 | 10.263 | 10.358 | 12.026 | 11.204 | 9.633 |
| Mn | 0.097 | 0.173 | 0.246 | 0.073 | 0.084 | 0.096 | 0.086 | 0.126 | 0.199 | 0.108 |
| Mg | 3.592 | 2.735 | 1.802 | 4.261 | 3.353 | 3.451 | 3.564 | 2.986 | 3.532 | 5.202 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 25.579 | 26.076 | 25.518 | 25.284 | 25.768 | 25.633 | 25.674 | 25.930 | 30.060 | 32.297 |
| Formula after iron correction normalised | | | | | | | | | | |
| Si | 0.010 | 0.030 | 0.039 | 0.018 | 0.011 | 0.037 | 0.010 | 0.030 | 0.030 | 0.038 |
| Ti | 1.185 | 1.566 | 1.178 | 1.176 | 1.016 | 0.816 | 0.910 | 1.218 | 0.480 | 0.676 |
| Al | 2.713 | 0.831 | 1.293 | 3.433 | 2.468 | 2.960 | 3.236 | 1.705 | 2.573 | 4.949 |
| Cr | 6.945 | 6.882 | 8.465 | 6.929 | 7.088 | 7.256 | 6.750 | 7.036 | 8.993 | 7.232 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(iii) | 3.952 | 5.095 | 3.807 | 3.249 | 4.390 | 4.077 | 4.174 | 4.763 | 12.902 | 16.442 |
| Fe(ii) | 5.734 | 6.919 | 7.290 | 5.080 | 5.826 | 5.532 | 5.508 | 6.368 | -3.957 | -9.283 |
| Mn | 0.091 | 0.160 | 0.232 | 0.069 | 0.079 | 0.090 | 0.080 | 0.116 | 0.159 | 0.080 |
| Mg | 3.370 | 2.517 | 1.695 | 4.044 | 3.123 | 3.232 | 3.331 | 2.764 | 2.820 | 3.866 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 |

| Sample | G17/38b25 | G17/38b26 | G17/38b27 | G17/38b28 | G17/38b29 | G17/38b30 | G17/38b31 | G17/38b32 | G17/25a17 | G17/25a18 |
|---|---|---|---|---|---|---|---|---|---|---|
| MgO | 10.7 | 10.55 | 8.44 | 8.84 | 3.87 | 10.15 | 9.88 | 10.5 | 11.61 | 7.08 |
| Al2O3 | 15.43 | 15.49 | 16.83 | 16.71 | 0.23 | 18.03 | 17.91 | 19.19 | 12.59 | 4.7 |
| Cr2O3 | 31.7 | 32.62 | 35.77 | 34.73 | 27.14 | 34.06 | 34.92 | 32.93 | 32.86 | 27.75 |
| FeO | 36.03 | 35.78 | 35.25 | 36.23 | 60.29 | 35.65 | 35.17 | 35.43 | 37.93 | 53.26 |
| TiO2 | 6.39 | 6.17 | 1.93 | 1.85 | 1.88 | 4.03 | 3.39 | 3.58 | 3.94 | 3.64 |
| MnO | 0.32 | 0.29 | 0.34 | 0.51 | 0.83 | 0.34 | 0.34 | 0.34 | 0.35 | 0.4 |
| SiO2 | 0.18 | 0.15 | 0.15 | 0.07 | 0.25 | 0.11 | 0.18 | 0.07 | | |
| CaO | | | | | | | | | | |
| K2O | | | | | | | | | | |
| Na2O | | | | | | | | | | |
| NiO | 0.39 | 0.54 | 0.27 | 0.18 | 0.35 | 0.42 | 0.3 | 0.27 | 0.34 | 0.71 |
| ZnO | | | | | | | | | | |
| Summe | 101.14 | 101.59 | 98.98 | 99.12 | 94.84 | 102.79 | 102.09 | 102.31 | 99.62 | 97.54 |
| Formula without iron correction | | | | | | | | | | |
| Si | 0.048 | 0.039 | 0.041 | 0.019 | 0.086 | 0.038 | 0.062 | 0.024 | 0.000 | 0.000 |
| Ti | 1.269 | 1.222 | 0.395 | 0.379 | 0.488 | 1.045 | 0.879 | 0.928 | 1.022 | 0.944 |
| Al | 4.801 | 4.806 | 5.392 | 5.361 | 0.093 | 7.327 | 7.278 | 7.798 | 5.116 | 1.910 |
| Cr | 6.617 | 6.790 | 7.687 | 7.474 | 7.398 | 9.285 | 9.519 | 8.977 | 8.958 | 7.565 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 7.955 | 7.877 | 8.012 | 8.247 | 17.383 | 10.279 | 10.140 | 10.215 | 10.936 | 15.356 |
| Mn | 0.072 | 0.065 | 0.078 | 0.118 | 0.242 | 0.099 | 0.099 | 0.099 | 0.102 | 0.117 |
| Mg | 4.212 | 4.141 | 3.420 | 3.588 | 1.989 | 5.218 | 5.079 | 5.397 | 5.968 | 3.639 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 24.974 | 24.941 | 25.025 | 25.185 | 27.680 | 33.290 | 33.057 | 33.439 | 32.102 | 29.531 |
| Formula after iron correction normalised | | | | | | | | | | |
| Si | 0.046 | 0.038 | 0.039 | 0.018 | 0.075 | 0.027 | 0.045 | 0.017 | 0.000 | 0.000 |
| Ti | 1.220 | 1.176 | 0.378 | 0.361 | 0.423 | 0.753 | 0.638 | 0.666 | 0.764 | 0.767 |
| Al | 4.614 | 4.625 | 5.171 | 5.109 | 0.081 | 5.282 | 5.284 | 5.597 | 3.825 | 1.552 |
| Cr | 6.359 | 6.534 | 7.372 | 7.123 | 6.415 | 6.694 | 6.911 | 6.443 | 6.697 | 6.148 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(iii) | 2.496 | 2.414 | 2.622 | 3.011 | 8.509 | 17.860 | 17.534 | 18.066 | 16.152 | 11.987 |
| Fe(ii) | 5.149 | 5.167 | 5.062 | 4.848 | 6.562 | -10.450 | -10.172 | -10.734 | -7.976 | 0.493 |
| Mn | 0.069 | 0.062 | 0.075 | 0.112 | 0.210 | 0.072 | 0.072 | 0.071 | 0.076 | 0.095 |
| Mg | 4.048 | 3.985 | 3.280 | 3.419 | 1.725 | 3.762 | 3.687 | 3.874 | 4.462 | 2.958 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 |

Table of spinel microprobe analysis from drill core G17 samples 40, 38 & 25

| Sample | G17/25b11 | G17/25a11 | G17/25a12 | G17/25a13 | G17/25a14 | G17/25a15 | G17/25a16 | G17/44d16 | G17/44d17 | G17/44d18 |
|---|---|---|---|---|---|---|---|---|---|---|
| MgO | 12.62 | 13.43 | 12.88 | 12.72 | 14.12 | 12.81 | 10.37 | 8.48 | 2 | 1.47 |
| Al2O3 | 10.38 | 11.65 | 12 | 7.06 | 12.58 | 12.6 | 7.78 | 11.8 | 0 | 0.03 |
| Cr2O3 | 31.84 | 36.06 | 35.17 | 33.84 | 37.93 | 35.3 | 33.83 | 32.88 | 0.95 | 0.25 |
| FeO | 35.11 | 33.38 | 37.63 | 40.69 | 32.94 | 35.99 | 43.4 | 41.03 | 92.88 | 95.41 |
| TiO2 | 3.77 | 5.04 | 4.3 | 3.21 | 5.38 | 4.39 | 3.88 | 5.05 | 0.4 | 0.1 |
| MnO | 0.25 | 0.25 | 0.29 | 0.37 | 0.22 | 0.2 | 0.25 | 0.4 | 0.06 | 0.04 |
| SiO2 | | | | | | | | | | |
| CaO | | | | | | | | | | |
| K2O | | | | | | | | | | |
| Na2O | | | | | | | | | | |
| NiO | 0.38 | 0.38 | 0.25 | 0.55 | 0.38 | 0.51 | 0.51 | 0.46 | 0.51 | 0.31 |
| ZnO | | | | | | | | | | |
| Summe | 94.35 | 100.19 | 102.52 | 98.44 | 103.55 | 101.8 | 100.02 | 100.1 | 96.8 | 97.61 |
| Formula without iron correction | | | | | | | | | | |
| Si | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ti | 0.978 | 1.307 | 1.115 | 0.832 | 1.395 | 1.139 | 1.006 | 1.310 | 0.104 | 0.026 |
| Al | 4.218 | 4.734 | 4.876 | 2.869 | 5.112 | 5.120 | 3.161 | 4.795 | 0.000 | 0.012 |
| Cr | 8.680 | 9.830 | 9.587 | 9.225 | 10.340 | 9.623 | 9.222 | 8.963 | 0.259 | 0.068 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 10.123 | 9.624 | 10.850 | 11.732 | 9.497 | 10.377 | 12.513 | 11.830 | 26.780 | 27.509 |
| Mn | 0.073 | 0.073 | 0.085 | 0.108 | 0.064 | 0.058 | 0.073 | 0.117 | 0.018 | 0.012 |
| Mg | 6.487 | 6.904 | 6.621 | 6.539 | 7.258 | 6.585 | 5.331 | 4.359 | 1.028 | 0.756 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 30.559 | 32.472 | 33.134 | 31.305 | 33.667 | 32.901 | 31.307 | 31.374 | 28.188 | 28.383 |
| Formula after iron correction normalised | | | | | | | | | | |
| Si | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ti | 0.768 | 0.966 | 0.808 | 0.638 | 0.995 | 0.830 | 0.771 | 1.002 | 0.088 | 0.022 |
| Al | 3.313 | 3.499 | 3.532 | 2.199 | 3.644 | 3.735 | 2.424 | 3.668 | 0.000 | 0.010 |
| Cr | 6.817 | 7.265 | 6.944 | 7.072 | 7.371 | 7.019 | 7.070 | 6.856 | 0.220 | 0.058 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(iii) | 13.736 | 16.698 | 17.643 | 14.934 | 18.377 | 17.315 | 14.937 | 15.042 | 9.508 | 9.882 |
| Fe(ii) | -5.785 | -9.584 | -9.784 | -5.940 | -11.606 | -9.746 | -5.344 | -5.992 | 13.292 | 13.379 |
| Mn | 0.057 | 0.054 | 0.061 | 0.083 | 0.046 | 0.043 | 0.056 | 0.089 | 0.015 | 0.010 |
| Mg | 5.095 | 5.102 | 4.796 | 5.013 | 5.174 | 4.803 | 4.087 | 3.335 | 0.875 | 0.639 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 |

| Sample | G17/25c14 | G17/25c16 | G17/25c17 | G17/25c18 | G17/25c19 | G17/25d10 | G17/25d11 | G17/44c16 | G17/44c17 | G17/44c18 |
|---|---|---|---|---|---|---|---|---|---|---|
| MgO | 7.25 | 13.7 | 11.09 | 10.06 | 9.92 | 11.8 | 8.38 | 2.54 | 1.55 | 13.83 |
| Al2O3 | 8.39 | 7.62 | 11.69 | 13.45 | 12.28 | 10.51 | 9.66 | 0 | 0 | 9.72 |
| Cr2O3 | 32.44 | 25.12 | 30.31 | 35.53 | 34.9 | 32.03 | 32.91 | 7.89 | 0.41 | 31.58 |
| FeO | 48.47 | 49.47 | 43.02 | 39.14 | 39.29 | 36 | 47.51 | 88.71 | 97.13 | 36.68 |
| TiO2 | 2.74 | 4.95 | 5.69 | 2.74 | 2.09 | 3.48 | 2.63 | 0.98 | 0.1 | 4.29 |
| MnO | 0.43 | 0.42 | 0.32 | 0.3 | 0.4 | 0.39 | 0.5 | 0.21 | 0.04 | 0.37 |
| SiO2 | | | | | | | | | | |
| CaO | | | | | | | | | | |
| K2O | | | | | | | | | | |
| Na2O | | | | | | | | | | |
| NiO | 0.46 | 0.63 | 0.38 | 0.51 | 0.38 | 0.42 | 0.34 | 0.51 | 0.34 | 0.53 |
| ZnO | | | | | | | | | | |
| Summe | 100.18 | 101.91 | 102.5 | 101.73 | 99.26 | 94.63 | 101.93 | 100.84 | 99.57 | 97 |
| Formula without iron correction | | | | | | | | | | |
| Si | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ti | 0.711 | 1.284 | 1.476 | 0.711 | 0.542 | 0.903 | 0.682 | 0.254 | 0.026 | 1.113 |
| Al | 3.409 | 3.096 | 4.750 | 5.466 | 4.990 | 4.271 | 3.925 | 0.000 | 0.000 | 3.950 |
| Cr | 8.843 | 6.848 | 8.262 | 9.685 | 9.514 | 8.731 | 8.971 | 2.151 | 0.112 | 8.609 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 13.975 | 14.263 | 12.404 | 11.285 | 11.328 | 10.380 | 13.698 | 25.577 | 28.005 | 10.576 |
| Mn | 0.126 | 0.123 | 0.093 | 0.088 | 0.117 | 0.114 | 0.146 | 0.061 | 0.012 | 0.108 |
| Mg | 3.727 | 7.042 | 5.701 | 5.171 | 5.099 | 6.066 | 4.308 | 1.306 | 0.797 | 7.109 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 30.791 | 32.656 | 32.686 | 32.405 | 31.590 | 30.464 | 31.731 | 29.349 | 28.951 | 31.464 |
| Formula after iron correction normalised | | | | | | | | | | |
| Si | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ti | 0.554 | 0.943 | 1.083 | 0.526 | 0.412 | 0.711 | 0.516 | 0.208 | 0.021 | 0.849 |
| Al | 2.657 | 2.276 | 3.488 | 4.048 | 3.791 | 3.365 | 2.969 | 0.000 | 0.000 | 3.013 |
| Cr | 6.893 | 5.033 | 6.067 | 7.173 | 7.228 | 6.879 | 6.786 | 1.759 | 0.093 | 6.566 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(iii) | 14.114 | 16.965 | 17.008 | 16.601 | 15.377 | 13.580 | 15.593 | 11.665 | 10.945 | 15.182 |
| Fe(ii) | -3.221 | -6.482 | -7.900 | -8.243 | -6.771 | -5.402 | -5.232 | 9.251 | 12.271 | -7.116 |
| Mn | 0.098 | 0.090 | 0.069 | 0.065 | 0.089 | 0.090 | 0.110 | 0.050 | 0.010 | 0.082 |
| Mg | 2.905 | 5.176 | 4.186 | 3.830 | 3.874 | 4.779 | 3.258 | 1.068 | 0.661 | 5.423 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 |

Table of spinel microprobe analysis from drill core G17 samples 25 & 44

| Sample | G17/44d19 | G17/44d20 | G17/44d21 | G17/44c13 | G17/44c14 | G17/44c15 | G17/44f8 | G17/44b9 | G17/44b10 | G17/16d5 |
|---|---|---|---|---|---|---|---|---|---|---|
| MgO | 1.68 | 11.46 | 11.82 | 1.26 | 9.83 | 1.88 | 1.75 | 2.17 | 1.47 | 10.96 |
| Al2O3 | 0.03 | 15.52 | 14.89 | 0.03 | 10.51 | 0.03 | 0 | 0.03 | 0.07 | 10.92 |
| Cr2O3 | 0.27 | 37.68 | 38.65 | 0.28 | 37.61 | 2.01 | 3.11 | 1.09 | 0.04 | 31.42 |
| FeO | 95.15 | 30.92 | 31.56 | 93.95 | 38.19 | 95.28 | 93.66 | 94.7 | 98.54 | 33.07 |
| TiO2 | 0.19 | 2.82 | 2.43 | 0.12 | 4.29 | 0.44 | 0.42 | 0.14 | 0.07 | 4.88 |
| MnO | 0.06 | 0.31 | 0.23 | 0.1 | 0.51 | 0.07 | 0.07 | 0.07 | 0.06 | 0.3 |
| SiO2 | | | | | | | | | | |
| CaO | | | | | | | | | | |
| K2O | | | | | | | | | | |
| Na2O | | | | | | | | | | |
| NiO | 0.38 | 0.32 | 0.28 | 0.55 | 0.28 | 0.62 | 0.55 | 0.27 | 0.51 | 0.39 |
| ZnO | | | | | | | | | | |
| Summe | 97.76 | 99.03 | 99.86 | 96.29 | 101.22 | 100.33 | 99.56 | 98.47 | 100.76 | 91.94 |
| Formula without iron correction | | | | | | | | | | |
| Si | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ti | 0.049 | 0.731 | 0.630 | 0.031 | 1.113 | 0.114 | 0.109 | 0.036 | 0.018 | 1.266 |
| Al | 0.012 | 6.307 | 6.051 | 0.012 | 4.271 | 0.012 | 0.000 | 0.012 | 0.028 | 4.437 |
| Cr | 0.074 | 10.271 | 10.536 | 0.076 | 10.252 | 0.548 | 0.848 | 0.297 | 0.011 | 8.565 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 27.434 | 8.915 | 9.100 | 27.088 | 11.011 | 27.472 | 27.004 | 27.304 | 28.411 | 9.535 |
| Mn | 0.018 | 0.091 | 0.067 | 0.029 | 0.149 | 0.020 | 0.020 | 0.020 | 0.018 | 0.088 |
| Mg | 0.864 | 5.891 | 6.076 | 0.648 | 5.053 | 0.966 | 0.900 | 1.115 | 0.756 | 5.634 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 28.450 | 32.206 | 32.459 | 27.885 | 31.849 | 29.133 | 28.881 | 28.786 | 29.242 | 29.524 |
| Formula after iron correction normalised | | | | | | | | | | |
| Si | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ti | 0.042 | 0.545 | 0.466 | 0.027 | 0.838 | 0.094 | 0.091 | 0.030 | 0.015 | 1.029 |
| Al | 0.010 | 4.700 | 4.474 | 0.010 | 3.218 | 0.010 | 0.000 | 0.010 | 0.023 | 3.607 |
| Cr | 0.062 | 7.654 | 7.790 | 0.066 | 7.726 | 0.451 | 0.704 | 0.248 | 0.009 | 6.962 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(iii) | 10.011 | 16.307 | 16.679 | 8.916 | 15.772 | 11.276 | 10.817 | 10.640 | 11.473 | 11.975 |
| Fe(ii) | 13.132 | -9.664 | -9.951 | 14.399 | -7.475 | 11.356 | 11.624 | 12.124 | 11.845 | -4.225 |
| Mn | 0.015 | 0.067 | 0.050 | 0.025 | 0.112 | 0.017 | 0.017 | 0.017 | 0.014 | 0.071 |
| Mg | 0.729 | 4.390 | 4.493 | 0.557 | 3.808 | 0.796 | 0.748 | 0.930 | 0.620 | 4.580 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 |

| Sample | G17/44g13 | G17/44g14 | G17/44g15 | G17/44g16 | G17/44g17 | G17/44f7 | G17/42a15 | G17/42a16 | G17/42a17 | G17/42a18 |
|---|---|---|---|---|---|---|---|---|---|---|
| MgO | 20.64 | 10.59 | 14.2 | 29.29 | 16.35 | 10.16 | 8.32 | 8.58 | 12.58 | 9.22 |
| Al2O3 | 10.84 | 10.2 | 15.36 | 15.82 | 15.08 | 11.39 | 12.47 | 12.86 | 16.58 | 12.44 |
| Cr2O3 | 20.48 | 27.12 | 34.07 | 26.65 | 33.17 | 34.92 | 31.38 | 31.52 | 27.59 | 28.71 |
| FeO | 38.91 | 44.3 | 35.87 | 30.27 | 35.4 | 39.12 | 43.8 | 44.92 | 40.17 | 43.98 |
| TiO2 | 6.22 | 6.3 | 2.24 | 2.21 | 2.18 | 4.88 | 1.54 | 1.68 | 2.92 | 1.74 |
| MnO | 0.27 | 0.39 | 0.25 | 0.22 | 0.31 | 0.56 | 0.48 | 0.54 | 0.27 | 0.29 |
| SiO2 | | | | | | | | | | |
| CaO | | | | | | | | | | |
| K2O | | | | | | | | | | |
| Na2O | | | | | | | | | | |
| NiO | 0.53 | 0.67 | 0.46 | 0.39 | 0.32 | 0.32 | 0.35 | 0.35 | 0.49 | 0.46 |
| ZnO | | | | | | | | | | |
| Summe | 97.89 | 99.57 | 102.45 | 104.85 | 102.81 | 101.35 | 98.34 | 100.45 | 100.6 | 96.84 |
| Formula without iron correction | | | | | | | | | | |
| Si | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ti | 1.613 | 1.634 | 0.581 | 0.573 | 0.565 | 1.266 | 0.399 | 0.436 | 0.757 | 0.451 |
| Al | 4.405 | 4.145 | 6.242 | 6.429 | 6.128 | 4.628 | 5.067 | 5.226 | 6.737 | 5.055 |
| Cr | 5.583 | 7.393 | 9.287 | 7.265 | 9.042 | 9.519 | 8.554 | 8.592 | 7.521 | 7.826 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 11.219 | 12.773 | 10.342 | 8.728 | 10.207 | 11.279 | 12.629 | 12.952 | 11.582 | 12.681 |
| Mn | 0.079 | 0.114 | 0.073 | 0.064 | 0.091 | 0.164 | 0.140 | 0.158 | 0.079 | 0.085 |
| Mg | 10.610 | 5.444 | 7.299 | 15.056 | 8.405 | 5.223 | 4.277 | 4.411 | 6.467 | 4.740 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 33.508 | 31.502 | 33.825 | 38.115 | 34.437 | 32.079 | 31.066 | 31.773 | 33.143 | 30.837 |
| Formula after iron correction normalised | | | | | | | | | | |
| Si | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ti | 1.155 | 1.245 | 0.412 | 0.361 | 0.394 | 0.947 | 0.309 | 0.329 | 0.548 | 0.351 |
| Al | 3.155 | 3.158 | 4.429 | 4.048 | 4.271 | 3.463 | 3.915 | 3.947 | 4.879 | 3.934 |
| Cr | 3.999 | 5.632 | 6.590 | 4.574 | 6.302 | 7.122 | 6.608 | 6.490 | 5.446 | 6.091 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(iii) | 18.161 | 15.241 | 18.589 | 23.701 | 19.397 | 16.118 | 14.558 | 15.658 | 17.656 | 14.190 |
| Fe(ii) | -10.125 | -5.510 | -11.251 | -18.205 | -12.284 | -7.679 | -4.801 | -5.875 | -9.269 | -4.321 |
| Mn | 0.056 | 0.087 | 0.052 | 0.040 | 0.063 | 0.122 | 0.108 | 0.119 | 0.057 | 0.066 |
| Mg | 7.599 | 4.147 | 5.179 | 9.481 | 5.857 | 3.907 | 3.304 | 3.331 | 4.683 | 3.689 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 |

Table of spinel microprobe analysis from drill core G17 samples 44, 42 & 16

| Sample | G13/24d22 | G13/20a20 | G13/20a21 | G13/20a22 | G13/20a23 | G13/20a24 | G13/20a25 | G13/20a26 | G13/20a27 | G13/20a28 |
|---|---|---|---|---|---|---|---|---|---|---|
| MgO | 3.02 | 7.31 | 6.95 | 7.44 | 6.6 | 5.92 | 7.45 | 7.13 | 7.71 | 6.44 |
| Al2O3 | 0.2 | 4.69 | 4.43 | 4.61 | 1.85 | 0.61 | 2.01 | 3.07 | 4.35 | 1.73 |
| Cr2O3 | 21.76 | 33.8 | 33.85 | 34.16 | 32.41 | 29.88 | 31.64 | 34.2 | 35.44 | 33.12 |
| FeO | 68.2 | 48.33 | 48.93 | 47.94 | 55.3 | 58.26 | 53.93 | 52.63 | 50.27 | 55.39 |
| TiO2 | 3.83 | 6.23 | 5.4 | 6.05 | 5.16 | 4.23 | 5.84 | 5.09 | 5.31 | 4.55 |
| MnO | 0.59 | 0.42 | 0.46 | 0.4 | 0.58 | 0.61 | 0.53 | 0.54 | 0.55 | 0.6 |
| SiO2 | | | | | | | | | | |
| CaO | | | | | | | | | | |
| K2O | | | | | | | | | | |
| Na2O | | | | | | | | | | |
| NiO | 0.26 | 0.43 | 0.53 | 0.36 | 0.3 | 0.46 | 0.33 | 0.43 | 0.43 | 0.23 |
| ZnO | | | | | | | | | | |
| Summe | 97.86 | 101.21 | 100.55 | 100.96 | 102.2 | 99.97 | 101.73 | 103.09 | 104.06 | 102.06 |
| Formula without iron correction | | | | | | | | | | |
| Si | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ti | 0.981 | 1.370 | 1.206 | 1.333 | 1.171 | 1.009 | 1.320 | 1.127 | 1.144 | 1.037 |
| Al | 0.080 | 1.617 | 1.550 | 1.591 | 0.658 | 0.228 | 0.712 | 1.065 | 1.469 | 0.618 |
| Cr | 5.860 | 7.815 | 7.947 | 7.908 | 7.732 | 7.489 | 7.515 | 7.957 | 8.027 | 7.934 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 19.424 | 11.820 | 12.150 | 11.739 | 13.955 | 15.445 | 13.549 | 12.951 | 12.042 | 14.035 |
| Mn | 0.170 | 0.104 | 0.116 | 0.099 | 0.148 | 0.164 | 0.135 | 0.135 | 0.133 | 0.154 |
| Mg | 1.534 | 3.187 | 3.077 | 3.248 | 2.969 | 2.798 | 3.337 | 3.128 | 3.293 | 2.909 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 28.049 | 25.914 | 26.045 | 25.918 | 26.634 | 27.133 | 26.567 | 26.362 | 26.108 | 26.687 |
| Formula after iron correction normalised | | | | | | | | | | |
| Si | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ti | 0.840 | 1.269 | 1.111 | 1.234 | 1.055 | 0.892 | 1.192 | 1.026 | 1.052 | 0.933 |
| Al | 0.069 | 1.497 | 1.429 | 1.473 | 0.593 | 0.202 | 0.643 | 0.969 | 1.350 | 0.556 |
| Cr | 5.014 | 7.238 | 7.323 | 7.323 | 6.968 | 6.625 | 6.789 | 7.244 | 7.379 | 7.135 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(iii) | 9.239 | 4.726 | 5.026 | 4.736 | 6.329 | 7.389 | 6.184 | 5.735 | 5.168 | 6.444 |
| Fe(ii) | 7.382 | 6.221 | 6.170 | 6.134 | 6.246 | 6.272 | 6.056 | 6.055 | 5.902 | 6.178 |
| Mn | 0.146 | 0.096 | 0.107 | 0.092 | 0.134 | 0.145 | 0.122 | 0.123 | 0.123 | 0.138 |
| Mg | 1.312 | 2.952 | 2.835 | 3.008 | 2.676 | 2.475 | 3.014 | 2.848 | 3.027 | 2.616 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 |

| Sample | G13/20a29 | G13/20b17 | G13/20b18 | G13/20b19 | G13/20b20 | G13/20b21 | G13/20b22 | G13/20b23 | G13/20b24 | G13/20b25 |
|---|---|---|---|---|---|---|---|---|---|---|
| MgO | 7.19 | 6.93 | 7.5 | 7.99 | 5 | 6.95 | 6.36 | 6.81 | 6.79 | 7.31 |
| Al2O3 | 4.95 | 2.28 | 4.42 | 4.6 | 0.16 | 2.59 | 1.73 | 1.73 | 2.83 | 4.53 |
| Cr2O3 | 35.99 | 34.1 | 35.52 | 35.93 | 27.94 | 33.84 | 32.03 | 31.96 | 33.02 | 34.75 |
| FeO | 46.7 | 52.82 | 48.67 | 46.64 | 62.11 | 52.57 | 56 | 55.01 | 53.73 | 47.49 |
| TiO2 | 5.46 | 5.17 | 4.99 | 6.52 | 3.62 | 5.23 | 4.67 | 5.28 | 5.09 | 5.78 |
| MnO | 0.4 | 0.62 | 0.53 | 0.4 | 0.54 | 0.67 | 0.67 | 0.49 | 0.53 | 0.36 |
| SiO2 | | | | | | | | | | |
| CaO | | | | | | | | | | |
| K2O | | | | | | | | | | |
| Na2O | | | | | | | | | | |
| NiO | 0.5 | 0.3 | 0.36 | 0.4 | 0.2 | 0.3 | 0.39 | 0.23 | 0.33 | 0.53 |
| ZnO | | | | | | | | | | |
| Summe | 101.19 | 102.22 | 101.99 | 102.48 | 99.57 | 102.15 | 101.85 | 101.51 | 102.32 | 100.75 |
| Formula without iron correction | | | | | | | | | | |
| Si | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ti | 1.244 | 1.178 | 1.137 | 1.486 | 0.825 | 1.192 | 1.064 | 1.203 | 1.160 | 1.317 |
| Al | 1.768 | 0.814 | 1.578 | 1.643 | 0.057 | 0.925 | 0.618 | 0.618 | 1.011 | 1.618 |
| Cr | 8.622 | 8.169 | 8.509 | 8.607 | 6.693 | 8.107 | 7.673 | 7.656 | 7.910 | 8.325 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 11.833 | 13.384 | 12.332 | 11.818 | 15.737 | 13.320 | 14.189 | 13.938 | 13.614 | 12.033 |
| Mn | 0.103 | 0.159 | 0.136 | 0.103 | 0.139 | 0.172 | 0.172 | 0.126 | 0.136 | 0.092 |
| Mg | 3.248 | 3.131 | 3.388 | 3.609 | 2.259 | 3.140 | 2.873 | 3.076 | 3.067 | 3.302 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 26.817 | 26.835 | 27.081 | 27.266 | 25.710 | 26.855 | 26.590 | 26.618 | 26.898 | 26.687 |
| Formula after iron correction normalised | | | | | | | | | | |
| Si | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ti | 1.114 | 1.054 | 1.008 | 1.308 | 0.770 | 1.065 | 0.961 | 1.085 | 1.035 | 1.185 |
| Al | 1.582 | 0.728 | 1.399 | 1.446 | 0.053 | 0.827 | 0.558 | 0.557 | 0.902 | 1.455 |
| Cr | 7.716 | 7.306 | 7.541 | 7.576 | 6.248 | 7.245 | 6.926 | 6.903 | 7.058 | 7.486 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(iii) | 6.724 | 6.761 | 7.281 | 7.666 | 4.257 | 6.805 | 6.233 | 6.295 | 6.896 | 6.445 |
| Fe(ii) | 3.866 | 5.209 | 3.648 | 2.736 | 10.433 | 5.099 | 6.574 | 6.273 | 5.251 | 4.376 |
| Mn | 0.092 | 0.142 | 0.121 | 0.090 | 0.129 | 0.154 | 0.155 | 0.113 | 0.121 | 0.083 |
| Mg | 2.907 | 2.800 | 3.003 | 3.177 | 2.108 | 2.806 | 2.593 | 2.774 | 2.737 | 2.970 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 |

Table of spinel microprobe analysis from drill core G13 sample 20

| Sample | G13/20b26 | G13/20b27 | G13/20b28 | G13/20c16 | G13/20c17 | G13/20c18 | G13/20c19 | G13/20c20 | G13/20c21 | G13/20c22 |
|---|---|---|---|---|---|---|---|---|---|---|
| MgO | 6.61 | 6.51 | 7.52 | 8.29 | 6.13 | 7.72 | 7.27 | 6.94 | 7.18 | 6.6 |
| Al2O3 | 1.61 | 1.65 | 4.38 | 4.76 | 1.13 | 4.99 | 4.43 | 2.52 | 2.96 | 2.28 |
| Cr2O3 | 33.02 | 32.91 | 36.86 | 35.24 | 32.06 | 35.49 | 34.62 | 31.53 | 32.29 | 32.02 |
| FeO | 55.36 | 55.6 | 48.07 | 45.23 | 54.14 | 45.6 | 48.22 | 53.5 | 51.71 | 52.63 |
| TiO2 | 4.96 | 4.9 | 4.41 | 6.12 | 4.06 | 5.85 | 4.82 | 5.44 | 4.9 | 5.37 |
| MnO | 0.56 | 0.45 | 0.51 | 0.33 | 0.56 | 0.46 | 0.69 | 0.58 | 0.54 | 0.53 |
| SiO2 | | | | | | | | | | |
| CaO | | | | | | | | | | |
| K2O | | | | | | | | | | |
| Na2O | | | | | | | | | | |
| NiO | 0.26 | 0.33 | 0.23 | 0.46 | 0.3 | 0.46 | 0.26 | 0.33 | 0.4 | 0.36 |
| ZnO | | | | | | | | | | |
| Summe | 102.38 | 102.35 | 101.98 | 100.43 | 98.38 | 100.57 | 100.31 | 100.84 | 99.98 | 99.79 |
| Formula without iron correction | | | | | | | | | | |
| Si | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ti | 1.130 | 1.117 | 1.005 | 1.395 | 0.925 | 1.333 | 1.099 | 1.240 | 1.117 | 1.224 |
| Al | 0.575 | 0.589 | 1.564 | 1.700 | 0.404 | 1.782 | 1.582 | 0.900 | 1.057 | 0.814 |
| Cr | 7.910 | 7.884 | 8.830 | 8.442 | 7.680 | 8.502 | 8.294 | 7.553 | 7.735 | 7.671 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 14.027 | 14.088 | 12.180 | 11.460 | 13.718 | 11.554 | 12.218 | 13.556 | 13.102 | 13.335 |
| Mn | 0.144 | 0.115 | 0.131 | 0.085 | 0.144 | 0.118 | 0.177 | 0.149 | 0.139 | 0.136 |
| Mg | 2.986 | 2.941 | 3.397 | 3.745 | 2.769 | 3.487 | 3.284 | 3.135 | 3.244 | 2.982 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 26.773 | 26.734 | 27.107 | 26.827 | 25.640 | 26.777 | 26.653 | 26.533 | 26.394 | 26.162 |
| Formula after iron correction normalised | | | | | | | | | | |
| Si | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ti | 1.013 | 1.003 | 0.890 | 1.248 | 0.866 | 1.195 | 0.989 | 1.121 | 1.015 | 1.123 |
| Al | 0.515 | 0.529 | 1.385 | 1.521 | 0.378 | 1.597 | 1.425 | 0.814 | 0.961 | 0.747 |
| Cr | 7.091 | 7.078 | 7.818 | 7.553 | 7.189 | 7.620 | 7.468 | 6.832 | 7.034 | 7.037 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(iii) | 6.628 | 6.546 | 7.337 | 6.744 | 4.094 | 6.637 | 6.371 | 6.110 | 5.804 | 5.288 |
| Fe(ii) | 5.947 | 6.102 | 3.447 | 3.509 | 8.747 | 3.719 | 4.630 | 6.152 | 6.110 | 6.945 |
| Mn | 0.129 | 0.104 | 0.116 | 0.076 | 0.135 | 0.106 | 0.159 | 0.135 | 0.126 | 0.125 |
| Mg | 2.677 | 2.640 | 3.008 | 3.350 | 2.592 | 3.126 | 2.957 | 2.836 | 2.949 | 2.735 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 |

| Sample | G13/20c23 | G13/20c24 | G13/20c25 | G13/20c26 | G13/20c27 | G13/20c28 | G13/20c29 | | G13/21g2 | G13/21g7 |
|---|---|---|---|---|---|---|---|---|---|---|
| MgO | 6.35 | 7.47 | 6.54 | 6.6 | 6.3 | 3.91 | 5.47 | 10.84 | 11.08 | 11.36 |
| Al2O3 | 1.37 | 4.12 | 1.25 | 1.65 | 1.09 | 0.16 | 0.45 | 6.46 | 6.21 | 6.53 |
| Cr2O3 | 32.12 | 34.27 | 31.85 | 31.96 | 32.28 | 20.99 | 30.64 | 43.52 | 43.23 | 44.22 |
| FeO | 54.28 | 50.26 | 55.32 | 54.34 | 55.48 | 69.57 | 57.16 | 33.98 | 33.5 | 32.33 |
| TiO2 | 5.21 | 4.76 | 4.64 | 5.42 | 5.01 | 2.45 | 3.68 | 4.2 | 4.08 | 4.08 |
| MnO | 0.67 | 0.64 | 0.63 | 0.56 | 0.61 | 0.46 | 0.52 | 0.36 | 0.31 | 0.26 |
| SiO2 | | | | | | | | | | |
| CaO | | | | | | | | | | |
| K2O | | | | | | | | | | |
| Na2O | | | | | | | | | | |
| NiO | 0.36 | 0.26 | 0.46 | 0.36 | 0.23 | 0.33 | 0.23 | 0.35 | 0.3 | 0.25 |
| ZnO | | | | | | | | | | |
| Summe | 100.36 | 101.78 | 100.69 | 100.89 | 101 | 97.87 | 98.15 | 99.71 | 98.71 | 99.03 |
| Formula without iron correction | | | | | | | | | | |
| Si | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ti | 1.187 | 1.085 | 1.057 | 1.235 | 1.142 | 0.558 | 0.839 | 0.957 | 0.930 | 0.930 |
| Al | 0.489 | 1.471 | 0.446 | 0.589 | 0.389 | 0.057 | 0.161 | 2.307 | 2.218 | 2.332 |
| Cr | 7.695 | 8.210 | 7.630 | 7.656 | 7.733 | 5.028 | 7.340 | 10.426 | 10.356 | 10.593 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 13.753 | 12.735 | 14.017 | 13.769 | 14.058 | 17.628 | 14.483 | 8.610 | 8.488 | 8.192 |
| Mn | 0.172 | 0.164 | 0.162 | 0.144 | 0.157 | 0.118 | 0.133 | 0.092 | 0.080 | 0.067 |
| Mg | 2.869 | 3.375 | 2.954 | 2.982 | 2.846 | 1.766 | 2.471 | 4.897 | 5.005 | 5.132 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 26.165 | 27.040 | 26.267 | 26.375 | 26.324 | 25.156 | 25.427 | 27.289 | 27.077 | 27.246 |
| Formula after iron correction normalised | | | | | | | | | | |
| Si | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ti | 1.089 | 0.963 | 0.966 | 1.124 | 1.041 | 0.533 | 0.792 | 0.842 | 0.824 | 0.819 |
| Al | 0.449 | 1.306 | 0.408 | 0.536 | 0.355 | 0.055 | 0.152 | 2.029 | 1.966 | 2.054 |
| Cr | 7.058 | 7.287 | 6.971 | 6.967 | 7.050 | 4.797 | 6.928 | 9.169 | 9.179 | 9.331 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(iii) | 5.296 | 7.194 | 5.524 | 5.763 | 5.651 | 2.941 | 3.592 | 7.714 | 7.273 | 7.624 |
| Fe(ii) | 7.319 | 4.109 | 7.284 | 6.766 | 7.166 | 13.877 | 10.078 | -0.141 | 0.251 | -0.408 |
| Mn | 0.158 | 0.146 | 0.148 | 0.131 | 0.143 | 0.113 | 0.126 | 0.081 | 0.071 | 0.059 |
| Mg | 2.631 | 2.995 | 2.699 | 2.713 | 2.595 | 1.685 | 2.332 | 4.307 | 4.437 | 4.521 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 |

Table of spinel microprobe analysis from drill core G13 sample 20 & 21

| Sample | G13/21g8 | G13/21g9 | G13/21g10 | G13/21g11 | G13/21e1 | G13/21e7 | G13/21e8 | G13/21d5 | G13/21d6 | G13/21d9 |
|---|---|---|---|---|---|---|---|---|---|---|
| MgO | 11.23 | 9.67 | 10.35 | 10.05 | 9.52 | 9.82 | 9.9 | 8.5 | 10.22 | 8.53 |
| Al2O3 | 6.14 | 6.23 | 6.03 | 6.13 | 6.12 | 5.78 | 5.94 | 6.93 | 6.89 | 6.51 |
| Cr2O3 | 44.36 | 42.44 | 44.51 | 44.37 | 45.92 | 42.25 | 44.07 | 44.98 | 42.08 | 44.37 |
| FeO | 32.38 | 35.04 | 35.06 | 36.74 | 36.66 | 37.14 | 36.17 | 38.75 | 37.14 | 38.48 |
| TiO2 | 3.88 | 4.03 | 4.39 | 4.34 | 4.3 | 4.66 | 4.12 | 3.65 | 4.75 | 4.01 |
| MnO | 0.28 | 0.36 | 0.3 | 0.42 | 0.3 | 0.34 | 0.4 | 0.36 | 0.34 | 0.4 |
| SiO2 | | | | | | | | | | |
| CaO | | | | | | | | | | |
| K2O | | | | | | | | | | |
| Na2O | | | | | | | | | | |
| NiO | 0.22 | 0.32 | 0.39 | 0.29 | 0.39 | 0.47 | 0.44 | 0.32 | 0.37 | 0.29 |
| ZnO | | | | | | | | | | |
| Summe | 98.49 | 98.09 | 101.03 | 102.34 | 103.21 | 100.46 | 101.04 | 103.49 | 101.79 | 102.59 |
| Formula without iron correction | | | | | | | | | | |
| Si | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ti | 0.884 | 0.918 | 1.001 | 0.989 | 0.980 | 1.062 | 0.939 | 0.832 | 1.083 | 0.914 |
| Al | 2.193 | 2.225 | 2.153 | 2.189 | 2.186 | 2.064 | 2.121 | 2.475 | 2.460 | 2.325 |
| Cr | 10.627 | 10.167 | 10.663 | 10.629 | 11.001 | 10.121 | 10.557 | 10.775 | 10.081 | 10.629 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 8.204 | 8.878 | 8.884 | 9.309 | 9.289 | 9.411 | 9.165 | 9.818 | 9.411 | 9.750 |
| Mn | 0.072 | 0.092 | 0.077 | 0.108 | 0.077 | 0.087 | 0.103 | 0.092 | 0.087 | 0.103 |
| Mg | 5.073 | 4.368 | 4.676 | 4.540 | 4.301 | 4.436 | 4.472 | 3.840 | 4.617 | 3.853 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 27.053 | 26.649 | 27.453 | 27.765 | 27.833 | 27.182 | 27.357 | 27.833 | 27.738 | 27.574 |
| Formula after iron correction normalised | | | | | | | | | | |
| Si | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ti | 0.784 | 0.827 | 0.875 | 0.855 | 0.845 | 0.938 | 0.824 | 0.717 | 0.937 | 0.795 |
| Al | 1.945 | 2.004 | 1.883 | 1.892 | 1.885 | 1.822 | 1.861 | 2.134 | 2.129 | 2.023 |
| Cr | 9.428 | 9.156 | 9.322 | 9.188 | 9.486 | 8.937 | 9.262 | 9.292 | 8.722 | 9.252 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(iii) | 7.223 | 6.363 | 8.049 | 8.678 | 8.813 | 7.491 | 7.854 | 8.813 | 8.626 | 8.296 |
| Fe(ii) | 0.055 | 1.633 | -0.283 | -0.631 | -0.803 | 0.818 | 0.186 | -0.347 | -0.483 | 0.191 |
| Mn | 0.064 | 0.083 | 0.067 | 0.093 | 0.066 | 0.077 | 0.090 | 0.080 | 0.075 | 0.089 |
| Mg | 4.501 | 3.934 | 4.088 | 3.924 | 3.708 | 3.917 | 3.923 | 3.311 | 3.995 | 3.354 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 |

| Sample | G13/21b8 | G13/21a5 | G13/21c1 | G13/21c2 | G13/21c3 | G13/21c4 | G13/21c5 | G13/21h1 | G13/21h2 | G13/21h3 |
|---|---|---|---|---|---|---|---|---|---|---|
| MgO | 10.07 | 7.29 | 7.48 | 7.4 | 10.26 | 9.74 | 9.61 | 9.57 | 9.19 | 9.14 |
| Al2O3 | 6.67 | 6.6 | 6.43 | 6.39 | 6.36 | 6.19 | 6.23 | 6.08 | 6.08 | 5.85 |
| Cr2O3 | 41.25 | 42.47 | 38.79 | 42.6 | 45.34 | 45.26 | 43.96 | 41.74 | 41.63 | 40.88 |
| FeO | 37.11 | 40.01 | 37.84 | 41.15 | 35.66 | 36.79 | 37.36 | 36.53 | 37.62 | 37.35 |
| TiO2 | 4.53 | 1.83 | 3.42 | 3.55 | 4.22 | 4.31 | 4.19 | 3.71 | 3.85 | 3.81 |
| MnO | 0.44 | 0.53 | 0.39 | 0.42 | 0.23 | 0.31 | 0.34 | 0.25 | 0.36 | 0.31 |
| SiO2 | | | | | | | | | | |
| CaO | | | | | | | | | | |
| K2O | | | | | | | | | | |
| Na2O | | | | | | | | | | |
| NiO | 0.32 | 0.22 | 0.39 | 0.29 | 0.32 | 0.39 | 0.25 | 0.32 | 0.27 | 0.27 |
| ZnO | | | | | | | | | | |
| Summe | 100.39 | 98.95 | 94.74 | 101.8 | 102.39 | 102.99 | 101.94 | 98.2 | 99 | 97.61 |
| Formula without iron correction | | | | | | | | | | |
| Si | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ti | 1.032 | 0.417 | 0.779 | 0.809 | 0.962 | 0.982 | 0.955 | 0.846 | 0.877 | 0.868 |
| Al | 2.382 | 2.357 | 2.296 | 2.282 | 2.271 | 2.211 | 2.225 | 2.171 | 2.171 | 2.089 |
| Cr | 9.882 | 10.174 | 9.293 | 10.205 | 10.862 | 10.843 | 10.531 | 9.999 | 9.973 | 9.793 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 9.403 | 10.138 | 9.588 | 10.427 | 9.036 | 9.322 | 9.466 | 9.256 | 9.532 | 9.464 |
| Mn | 0.113 | 0.136 | 0.100 | 0.108 | 0.059 | 0.080 | 0.087 | 0.064 | 0.092 | 0.080 |
| Mg | 4.549 | 3.293 | 3.379 | 3.343 | 4.635 | 4.400 | 4.341 | 4.323 | 4.152 | 4.129 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 27.361 | 26.515 | 25.435 | 27.174 | 27.824 | 27.837 | 27.606 | 26.659 | 26.798 | 26.423 |
| Formula after iron correction normalised | | | | | | | | | | |
| Si | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ti | 0.906 | 0.378 | 0.735 | 0.715 | 0.830 | 0.847 | 0.830 | 0.761 | 0.786 | 0.789 |
| Al | 2.089 | 2.133 | 2.167 | 2.015 | 1.959 | 1.906 | 1.934 | 1.955 | 1.945 | 1.898 |
| Cr | 8.668 | 9.209 | 8.768 | 9.013 | 9.369 | 9.348 | 9.156 | 9.002 | 8.932 | 8.895 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(iii) | 7.862 | 6.071 | 3.611 | 7.475 | 8.796 | 8.821 | 8.359 | 6.384 | 6.682 | 5.869 |
| Fe(ii) | 0.386 | 3.105 | 5.435 | 1.734 | -1.002 | -0.784 | -0.129 | 1.948 | 1.855 | 2.727 |
| Mn | 0.099 | 0.123 | 0.094 | 0.095 | 0.051 | 0.069 | 0.076 | 0.058 | 0.083 | 0.072 |
| Mg | 3.990 | 2.981 | 3.188 | 2.953 | 3.998 | 3.794 | 3.774 | 3.892 | 3.718 | 3.750 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 |

Table of spinel microprobe analysis from drill core G13 sample 21

| Sample | G13/21h4 | G13/21h5 | G13/24b21 | G13/24c11 | G13/24c13 | G13/24c14 | G13/24c15 | G13/24c16 | | G13/24d17 |
|---|---|---|---|---|---|---|---|---|---|---|
| MgO | 9.09 | 7.27 | 8.5 | 8.73 | 2.78 | 6.73 | 5.94 | 5.1 | 14.97 | 3.28 |
| Al2O3 | 6.01 | 5.89 | 4.56 | 4.28 | 0.16 | 3.71 | 3.16 | 1.41 | 13.18 | 0.2 |
| Cr2O3 | 41.08 | 39.07 | 27.68 | 27.33 | 21.75 | 24.89 | 24.08 | 23.43 | 54.42 | 22 |
| FeO | 37.48 | 44.44 | 49.98 | 49.54 | 66.62 | 54.56 | 56.55 | 59.9 | 17.42 | 65.65 |
| TiO2 | 3.86 | 3.8 | 8.9 | 8.99 | 4.37 | 7.95 | 7.46 | 7.15 | 0.14 | 6.12 |
| MnO | 0.31 | 0.57 | 0.33 | 0.48 | 0.59 | 0.58 | 0.64 | 0.78 | 0.13 | 0.74 |
| SiO2 | | | | | | | | | | |
| CaO | | | | | | | | | | |
| K2O | | | | | | | | | | |
| Na2O | | | | | | | | | | |
| NiO | 0.37 | 0.34 | 0.66 | 0.36 | 0.36 | 0.53 | 0.56 | 0.49 | 0 | 0.39 |
| ZnO | | | | | | | | | | |
| Summe | 98.2 | 101.38 | 100.61 | 99.71 | 96.63 | 98.95 | 98.39 | 98.26 | 100.26 | 98.38 |
| Formula without iron correction | | | | | | | | | | |
| Si | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ti | 0.880 | 0.866 | 2.028 | 2.049 | 0.996 | 1.812 | 1.700 | 1.630 | 0.032 | 1.395 |
| Al | 2.146 | 2.103 | 1.628 | 1.528 | 0.057 | 1.325 | 1.128 | 0.504 | 4.707 | 0.071 |
| Cr | 9.841 | 9.360 | 6.631 | 6.547 | 5.210 | 5.963 | 5.769 | 5.613 | 13.037 | 5.270 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 9.497 | 11.260 | 12.664 | 12.552 | 16.880 | 13.824 | 14.329 | 15.177 | 4.414 | 16.634 |
| Mn | 0.080 | 0.146 | 0.085 | 0.123 | 0.151 | 0.149 | 0.164 | 0.200 | 0.033 | 0.190 |
| Mg | 4.106 | 3.284 | 3.840 | 3.944 | 1.256 | 3.040 | 2.683 | 2.304 | 6.763 | 1.482 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 26.550 | 27.020 | 26.876 | 26.744 | 24.551 | 26.113 | 25.774 | 25.428 | 28.985 | 25.043 |
| Formula after iron correction normalised | | | | | | | | | | |
| Si | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ti | 0.795 | 0.769 | 1.811 | 1.839 | 0.974 | 1.665 | 1.583 | 1.538 | 0.026 | 1.337 |
| Al | 1.940 | 1.868 | 1.454 | 1.372 | 0.056 | 1.218 | 1.051 | 0.475 | 3.897 | 0.068 |
| Cr | 8.896 | 8.314 | 5.921 | 5.875 | 5.093 | 5.480 | 5.372 | 5.298 | 10.795 | 5.051 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(iii) | 6.146 | 7.153 | 6.849 | 6.566 | 1.436 | 5.179 | 4.404 | 3.593 | 11.008 | 2.665 |
| Fe(ii) | 2.438 | 2.849 | 4.459 | 4.698 | 15.065 | 7.527 | 8.939 | 10.732 | -7.353 | 13.277 |
| Mn | 0.072 | 0.130 | 0.076 | 0.111 | 0.148 | 0.137 | 0.153 | 0.189 | 0.028 | 0.182 |
| Mg | 3.712 | 2.917 | 3.429 | 3.539 | 1.228 | 2.794 | 2.499 | 2.175 | 5.599 | 1.420 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 |

| Sample | G13/24d18 | G13/24d20 | G13/24d21 | G13/24d22 | 3-20 spin-i | 3-20 spin-i | 3-20 spin-i | spin-int | spin-int-ins | spin-int |
|---|---|---|---|---|---|---|---|---|---|---|
| MgO | 7.01 | 3.05 | 5.53 | 3.02 | 6.673 | 5.93 | 6.197 | 5.4 | 50.368 | 6.769 |
| Al2O3 | 4.04 | 0.08 | 0.69 | 0.2 | 4.225 | 1.836 | 1.923 | 1.465 | 0.033 | 3.789 |
| Cr2O3 | 26.06 | 22.55 | 27.14 | 21.76 | 35.187 | 31.705 | 33.693 | 32.193 | 0.839 | 36.969 |
| FeO | 52.1 | 67.52 | 58.82 | 68.2 | 45.602 | 51.868 | 51.289 | 53.114 | 9.484 | 46.428 |
| TiO2 | 9.34 | 3.8 | 6.13 | 3.83 | 6.135 | 4.949 | 5.41 | 4.723 | 0.138 | 4.905 |
| MnO | 0.46 | 0.64 | 0.52 | 0.59 | 0.083 | 0.209 | 0.11 | 0.18 | 0.103 | 0.157 |
| SiO2 | | | | | 0.125 | 0 | 0.014 | 0.126 | 39.272 | 0 |
| CaO | | | | | 0 | 0.014 | 0.004 | 0.013 | 0.152 | 0.025 |
| K2O | | | | | 0 | 0 | 0.011 | 0.013 | 0.004 | 0 |
| Na2O | | | | | 0 | 0.02 | 0.013 | 0 | 0.023 | 0.044 |
| NiO | 0.49 | 0.29 | 0.49 | 0.26 | 0.436 | 0.275 | 0.354 | 0.346 | 0.278 | 0.318 |
| ZnO | | | | | 0.104 | 0.145 | 0.2 | 0.122 | 0 | 0.246 |
| Summe | 99.5 | 97.93 | 99.32 | 97.86 | 98.86 | 97.207 | 99.47 | 97.928 | 100.71 | 99.874 |
| Formula without iron correction | | | | | | | | | | |
| Si | 0.000 | 0.000 | 0.000 | 0.000 | 0.038 | 0.000 | 0.004 | 0.038 | 11.900 | 0.000 |
| Ti | 2.129 | 0.866 | 1.397 | 0.873 | 1.398 | 1.128 | 1.233 | 1.076 | 0.031 | 1.118 |
| Al | 1.443 | 0.029 | 0.246 | 0.071 | 1.509 | 0.656 | 0.687 | 0.523 | 0.012 | 1.353 |
| Cr | 6.243 | 5.402 | 6.502 | 5.213 | 8.429 | 7.595 | 8.072 | 7.712 | 0.201 | 8.856 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 13.201 | 17.108 | 14.904 | 17.281 | 11.555 | 13.142 | 12.996 | 13.458 | 2.403 | 11.764 |
| Mn | 0.118 | 0.164 | 0.133 | 0.151 | 0.021 | 0.054 | 0.028 | 0.046 | 0.026 | 0.040 |
| Mg | 3.167 | 1.378 | 2.498 | 1.364 | 3.015 | 2.679 | 2.799 | 2.439 | 22.754 | 3.058 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.005 | 0.001 | 0.004 | 0.049 | 0.008 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.023 | 0.032 | 0.045 | 0.027 | 0.000 | 0.055 |
| TOTAL | 26.300 | 24.947 | 25.681 | 24.953 | 25.988 | 25.291 | 25.865 | 25.325 | 37.377 | 26.253 |
| Formula after iron correction normalised | | | | | | | | | | |
| Si | 0.000 | 0.000 | 0.000 | 0.000 | 0.035 | 0.000 | 0.004 | 0.036 | 7.641 | 0.000 |
| Ti | 1.942 | 0.833 | 1.306 | 0.840 | 1.291 | 1.070 | 1.144 | 1.020 | 0.020 | 1.022 |
| Al | 1.317 | 0.027 | 0.230 | 0.069 | 1.393 | 0.622 | 0.637 | 0.496 | 0.008 | 1.237 |
| Cr | 5.697 | 5.197 | 6.076 | 5.014 | 7.785 | 7.208 | 7.490 | 7.309 | 0.129 | 8.096 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(iii) | 5.598 | 2.430 | 4.188 | 2.445 | 4.896 | 3.266 | 4.614 | 3.349 | 22.905 | 5.491 |
| Fe(ii) | 6.449 | 14.029 | 9.740 | 14.175 | 5.775 | 9.206 | 7.444 | 9.405 | -21.362 | 5.263 |
| Mn | 0.108 | 0.158 | 0.125 | 0.146 | 0.020 | 0.051 | 0.026 | 0.044 | 0.017 | 0.037 |
| Mg | 2.890 | 1.326 | 2.335 | 1.312 | 2.784 | 2.542 | 2.598 | 2.312 | 14.610 | 2.795 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.004 | 0.001 | 0.004 | 0.032 | 0.007 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.021 | 0.031 | 0.042 | 0.026 | 0.000 | 0.050 |
| TOTAL | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 |

Table of spinel microprobe analysis from drill core G13 samples 21, 24 & 20

| Sample | spin-int | spin-int | spin-inc | spin-inc | spin-inc |
|---|---|---|---|---|---|
| MgO | 6.592 | 5.66 | 6.093 | 6.129 | 6.251 |
| Al2O3 | 3.823 | 1.452 | 3.94 | 4.147 | 3.87 |
| Cr2O3 | 35.183 | 35.48 | 33.479 | 34.482 | 33.972 |
| FeO | 47.691 | 53.4 | 46.339 | 45.71 | 45.392 |
| TiO2 | 5.126 | 5.173 | 6.047 | 5.54 | 5.906 |
| MnO | 0.111 | 0.206 | 0 | 0.024 | 0.264 |
| SiO2 | 0.135 | 0.016 | 0.083 | 0.133 | 0.11 |
| CaO | 0.014 | 0 | 0.026 | 0.009 | 0 |
| K2O | 0.014 | 0 | 0.005 | 0.009 | 0.025 |
| Na2O | 0 | 0 | 0 | 0 | 0.01 |
| NiO | 0.373 | 0.368 | 0.293 | 0.302 | 0.395 |
| ZnO | 0.141 | 0.242 | 0.17 | 0.207 | 0.056 |
| Summe | 99.494 | 102.319 | 96.811 | 96.915 | 96.534 |
| Formula without iron correction | | | | | |
| Si | 0.041 | 0.005 | 0.025 | 0.040 | 0.033 |
| Ti | 1.168 | 1.179 | 1.378 | 1.263 | 1.346 |
| Al | 1.365 | 0.519 | 1.407 | 1.481 | 1.382 |
| Cr | 8.428 | 8.500 | 8.020 | 8.261 | 8.138 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 12.084 | 13.531 | 11.741 | 11.582 | 11.501 |
| Mn | 0.028 | 0.053 | 0.000 | 0.006 | 0.068 |
| Mg | 2.978 | 2.557 | 2.752 | 2.769 | 2.824 |
| Ca | 0.005 | 0.000 | 0.008 | 0.003 | 0.000 |
| Zn | 0.032 | 0.054 | 0.038 | 0.046 | 0.013 |
| TOTAL | 26.129 | 26.396 | 25.371 | 25.451 | 25.305 |
| Formula after iron correction normalised | | | | | |
| Si | 0.038 | 0.004 | 0.024 | 0.038 | 0.032 |
| Ti | 1.073 | 1.072 | 1.304 | 1.191 | 1.277 |
| Al | 1.254 | 0.471 | 1.331 | 1.397 | 1.311 |
| Cr | 7.742 | 7.728 | 7.587 | 7.790 | 7.719 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(iii) | 5.215 | 5.810 | 3.458 | 3.648 | 3.301 |
| Fe(ii) | 5.884 | 6.492 | 7.649 | 7.274 | 7.607 |
| Mn | 0.026 | 0.048 | 0.000 | 0.006 | 0.064 |
| Mg | 2.735 | 2.325 | 2.604 | 2.611 | 2.678 |
| Ca | 0.004 | 0.000 | 0.008 | 0.003 | 0.000 |
| Zn | 0.029 | 0.049 | 0.036 | 0.044 | 0.012 |
| TOTAL | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 |

Table of spinel microprobe analysis from drill core G13 sample 20

| Nr | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|
| Sample | G13-6e1 | G13-6e2 | G13-6e3 | G13-6e4 | G13-6e5 | G13-6e6 | G13-6e7 | G13-6e8 | G13-6e9 | G13-6e10 |
| MgO | 4.75 | 7.85 | 6.78 | 6.99 | 6.94 | 7.65 | 4.05 | 11.49 | 9.22 | 5.99 |
| Al2O3 | 2.79 | 2.65 | 2.45 | 2.45 | 2.25 | 2.59 | 2.23 | 2.64 | 0.16 | 2.73 |
| Cr2O3 | 6.49 | 6.88 | 6.18 | 6.43 | 5.74 | 6.06 | 5.33 | 5.82 | 0.14 | 6.28 |
| FeO | 72.53 | 67.54 | 68.36 | 67.39 | 69.29 | 67.23 | 82.22 | 50.49 | 39.54 | 71.54 |
| TiO2 | 13.62 | 15.16 | 14.4 | 15.1 | 14.58 | 15.21 | 4.86 | 28.02 | 51.53 | 12.79 |
| MnO | 0.53 | 0.45 | 0.37 | 0.4 | 0.37 | 0.47 | 0.52 | 0.96 | 0.72 | 0.6 |
| SiO2 | | | | | | | | | | |
| CaO | | | | | | | | | | |
| K2O | | | | | | | | | | |
| Na2O | | | | | | | | | | |
| NiO | 0.46 | 0.52 | 0.4 | 0.61 | 0.55 | 0.52 | 0.6 | 0.29 | 0.2 | 0.58 |
| ZnO | | | | | | | | | | |
| Summe | 101.17 | 101.05 | 98.94 | 99.37 | 99.72 | 99.73 | 99.81 | 99.71 | 101.51 | 100.51 |
| Formula without iron correction | | | | | | | | | | |
| Si | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ti | 3.236 | 3.501 | 3.435 | 3.571 | 3.464 | 3.566 | 1.260 | 5.922 | 9.892 | 3.055 |
| Al | 1.039 | 0.959 | 0.916 | 0.908 | 0.838 | 0.951 | 0.906 | 0.874 | 0.048 | 1.022 |
| Cr | 1.621 | 1.670 | 1.549 | 1.598 | 1.433 | 1.493 | 1.453 | 1.293 | 0.028 | 1.577 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 19.159 | 17.343 | 18.128 | 17.717 | 18.300 | 17.523 | 23.707 | 11.864 | 8.438 | 18.996 |
| Mn | 0.142 | 0.117 | 0.099 | 0.107 | 0.099 | 0.124 | 0.152 | 0.228 | 0.156 | 0.161 |
| Mg | 2.237 | 3.594 | 3.206 | 3.276 | 3.268 | 3.555 | 2.082 | 4.813 | 3.508 | 2.836 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 27.434 | 27.184 | 27.333 | 27.176 | 27.401 | 27.212 | 29.560 | 24.994 | 22.070 | 27.646 |
| Formula after iron correction normalised | | | | | | | | | | |
| Si | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ti | 2.831 | 3.091 | 3.016 | 3.153 | 3.034 | 3.145 | 1.023 | 5.686 | 10.757 | 2.652 |
| Al | 0.909 | 0.847 | 0.804 | 0.802 | 0.734 | 0.839 | 0.736 | 0.839 | 0.052 | 0.887 |
| Cr | 1.418 | 1.475 | 1.361 | 1.411 | 1.255 | 1.317 | 1.180 | 1.241 | 0.031 | 1.369 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(iii) | 8.011 | 7.496 | 7.804 | 7.480 | 7.944 | 7.554 | 12.038 | 2.546 | 0.000 | 8.441 |
| Fe(ii) | 8.750 | 7.815 | 8.114 | 8.166 | 8.085 | 7.900 | 7.210 | 8.845 | 9.176 | 8.050 |
| Mn | 0.124 | 0.103 | 0.087 | 0.094 | 0.087 | 0.109 | 0.123 | 0.219 | 0.169 | 0.140 |
| Mg | 1.957 | 3.173 | 2.815 | 2.893 | 2.862 | 3.135 | 1.690 | 4.622 | 3.815 | 2.462 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 |

| Nr | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
|---|---|---|---|---|---|---|---|---|---|---|
| Sample | G13-6e11 | G13-6b10 | G13-6b12 | G13-6b13 | G13-6b14 | G13-6b15 | G13-6a9 | G13-6a11 | G13-6a12 | G13-6a13 |
| MgO | 5.37 | 5.94 | 4.9 | 6.87 | 5.68 | 3.96 | 5.03 | 10.47 | 5.42 | 11.93 |
| Al2O3 | 2.82 | 2.76 | 2.68 | 2.74 | 2.81 | 2.23 | 3.06 | 0.25 | 2.8 | 0.22 |
| Cr2O3 | 6.54 | 6.96 | 7.24 | 6.26 | 6.51 | 5.42 | 7.47 | 0.29 | 7.17 | 0.42 |
| FeO | 70.89 | 61.61 | 65.26 | 63.29 | 67 | 71.55 | 63.61 | 32.1 | 63.82 | 29.73 |
| TiO2 | 14.12 | 16.98 | 13.35 | 16.69 | 15.85 | 9.61 | 15.6 | 61.36 | 15.63 | 60.6 |
| MnO | 0.58 | 0.55 | 0.95 | 0.41 | 0.7 | 0.83 | 0.58 | 0.62 | 0.65 | 0.66 |
| SiO2 | | | | | | | | | | |
| CaO | | | | | | | | | | |
| K2O | | | | | | | | | | |
| Na2O | | | | | | | | | | |
| NiO | 0.46 | 0.4 | 0.55 | 0.46 | 0.52 | 0.4 | 0.4 | 0.06 | 0.32 | 0.12 |
| ZnO | | | | | | | | | | |
| Summe | 100.78 | 95.2 | 94.93 | 96.72 | 99.07 | 94 | 95.75 | 105.15 | 95.81 | 103.68 |
| Formula without iron correction | | | | | | | | | | |
| Si | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ti | 3.372 | 4.055 | 3.188 | 3.986 | 3.786 | 2.295 | 3.726 | 14.655 | 3.733 | 14.474 |
| Al | 1.055 | 1.033 | 1.003 | 1.025 | 1.052 | 0.835 | 1.145 | 0.094 | 1.048 | 0.082 |
| Cr | 1.642 | 1.747 | 1.818 | 1.572 | 1.634 | 1.361 | 1.875 | 0.073 | 1.800 | 0.105 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 18.823 | 16.359 | 17.329 | 16.805 | 17.791 | 18.999 | 16.890 | 8.524 | 16.946 | 7.894 |
| Mn | 0.156 | 0.148 | 0.255 | 0.110 | 0.188 | 0.223 | 0.156 | 0.167 | 0.175 | 0.177 |
| Mg | 2.542 | 2.812 | 2.320 | 3.252 | 2.689 | 1.875 | 2.381 | 4.957 | 2.566 | 5.648 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 27.591 | 26.155 | 25.913 | 26.751 | 27.139 | 25.587 | 26.174 | 28.468 | 26.268 | 28.381 |
| Formula after iron correction normalised | | | | | | | | | | |
| Si | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ti | 2.933 | 3.721 | 2.953 | 3.576 | 3.348 | 2.153 | 3.416 | 12.355 | 3.411 | 12.239 |
| Al | 0.918 | 0.948 | 0.929 | 0.920 | 0.930 | 0.783 | 1.050 | 0.079 | 0.957 | 0.070 |
| Cr | 1.428 | 1.603 | 1.683 | 1.410 | 1.445 | 1.276 | 1.720 | 0.061 | 1.645 | 0.089 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(iii) | 8.330 | 5.273 | 4.724 | 6.582 | 7.403 | 3.970 | 5.316 | 10.045 | 5.525 | 9.879 |
| Fe(ii) | 8.043 | 9.738 | 11.325 | 8.495 | 8.330 | 13.851 | 10.172 | -2.860 | 9.958 | -3.203 |
| Mn | 0.136 | 0.136 | 0.237 | 0.099 | 0.166 | 0.209 | 0.143 | 0.141 | 0.160 | 0.150 |
| Mg | 2.211 | 2.580 | 2.148 | 2.918 | 2.378 | 1.758 | 2.183 | 4.179 | 2.344 | 4.776 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 |

Table of spinel microprobe analysis from drill core G13 sample 6

| Nr | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
|---|---|---|---|---|---|---|---|---|---|---|
| Sample | G13-6a14 | G13-6a15 | G13-6a16 | 13-6b10re | 13-6b13re | G13-6a17 | G13-6a18 | G13-6a19 | G13-6c11 | G13-6c12 |
| MgO | 5.67 | 5.84 | 5.21 | 6.57 | 7.53 | 5.35 | 8.15 | 7.31 | 4.73 | 5.73 |
| Al2O3 | 2.97 | 2.99 | 3.01 | 2.82 | 2.8 | 2.79 | 0.06 | 2.54 | 3.03 | 2.77 |
| Cr2O3 | 6.82 | 6.57 | 5.26 | 6.49 | 5.72 | 6.9 | 0.07 | 4.84 | 5.63 | 6.8 |
| FeO | 62.61 | 70.42 | 73.79 | 70.04 | 66.99 | 71.27 | 40.36 | 75.38 | 65.54 | 63.98 |
| TiO2 | 15.69 | 13.76 | 11.28 | 14.19 | 13.75 | 13.4 | 50.87 | 7.76 | 10.94 | 14.58 |
| MnO | 0.5 | 0.61 | 0.77 | 0.53 | 0.39 | 0.5 | 0.66 | 0.38 | 0.66 | 0.74 |
| SiO2 | | | | | | | | | | |
| CaO | | | | | | | | | | |
| K2O | | | | | | | | | | |
| Na2O | | | | | | | | | | |
| NiO | 0.4 | 0.49 | 0.49 | 0.43 | 0.55 | 0.43 | 0.12 | 0.49 | 0.37 | 0.43 |
| ZnO | | | | | | | | | | |
| Summe | 94.66 | 100.68 | 99.81 | 101.07 | 97.73 | 100.64 | 100.29 | 98.7 | 90.9 | 95.03 |
| Formula without iron correction | | | | | | | | | | |
| Si | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ti | 3.747 | 3.286 | 2.694 | 3.389 | 3.284 | 3.200 | 12.150 | 1.853 | 2.613 | 3.482 |
| Al | 1.111 | 1.119 | 1.126 | 1.055 | 1.048 | 1.044 | 0.022 | 0.951 | 1.134 | 1.037 |
| Cr | 1.712 | 1.649 | 1.321 | 1.629 | 1.436 | 1.732 | 0.018 | 1.215 | 1.413 | 1.707 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 16.625 | 18.699 | 19.594 | 18.598 | 17.788 | 18.924 | 10.717 | 20.016 | 17.403 | 16.989 |
| Mn | 0.134 | 0.164 | 0.207 | 0.143 | 0.105 | 0.134 | 0.177 | 0.102 | 0.177 | 0.199 |
| Mg | 2.684 | 2.765 | 2.466 | 3.110 | 3.565 | 2.533 | 3.858 | 3.461 | 2.239 | 2.713 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 26.015 | 27.682 | 27.408 | 27.924 | 27.225 | 27.568 | 26.942 | 27.598 | 24.980 | 26.126 |
| Formula after iron correction normalised | | | | | | | | | | |
| Si | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ti | 3.457 | 2.849 | 2.359 | 2.913 | 2.895 | 2.786 | 10.823 | 1.612 | 2.510 | 3.199 |
| Al | 1.025 | 0.970 | 0.986 | 0.907 | 0.924 | 0.909 | 0.020 | 0.827 | 1.089 | 0.952 |
| Cr | 1.580 | 1.430 | 1.156 | 1.400 | 1.266 | 1.508 | 0.016 | 1.057 | 1.358 | 1.568 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(iii) | 4.956 | 8.513 | 7.958 | 8.994 | 7.582 | 8.284 | 6.989 | 8.343 | 2.510 | 5.209 |
| Fe(ii) | 10.381 | 7.698 | 9.199 | 6.990 | 8.098 | 8.191 | 2.557 | 9.064 | 14.210 | 10.397 |
| Mn | 0.124 | 0.142 | 0.181 | 0.123 | 0.092 | 0.117 | 0.158 | 0.089 | 0.171 | 0.183 |
| Mg | 2.476 | 2.397 | 2.160 | 2.673 | 3.142 | 2.205 | 3.437 | 3.010 | 2.151 | 2.492 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 |

| Nr | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 |
|---|---|---|---|---|---|---|---|---|---|---|
| Sample | G13-6c13 | G13-6c14 | G13-6c15 | G13-6c16 | G13-6c17 | G13-6c18 | G13-6c19 | G13-6c20 | G13-6d13 | G13-6d14 |
| MgO | 5.92 | 4.45 | 4.39 | 5.19 | 4.68 | 10.62 | 5.02 | 4.96 | 5.53 | 5.47 |
| Al2O3 | 2.82 | 2.82 | 2.86 | 2.99 | 2.8 | 0.13 | 2.79 | 2.96 | 2.57 | 2.63 |
| Cr2O3 | 6.75 | 6.82 | 6.68 | 6.83 | 6.61 | 0.16 | 6.97 | 6.95 | 6.21 | 7.15 |
| FeO | 67.87 | 68.97 | 70.31 | 71.22 | 70.89 | 36.86 | 72.18 | 70.72 | 71.08 | 73.23 |
| TiO2 | 13.78 | 12.77 | 12.67 | 13.35 | 11.97 | 51.32 | 13.96 | 12.91 | 11.52 | 11.72 |
| MnO | 0.69 | 0.51 | 0.58 | 0.47 | 0.51 | 0.6 | 0.52 | 0.47 | 0.58 | 0.9 |
| SiO2 | | | | | | | | | | |
| CaO | | | | | | | | | | |
| K2O | | | | | | | | | | |
| Na2O | | | | | | | | | | |
| NiO | 0.52 | 0.43 | 0.43 | 0.49 | 0.49 | 0.09 | 0.52 | 0.46 | 0.46 | 0.49 |
| ZnO | | | | | | | | | | |
| Summe | 98.35 | 96.77 | 97.92 | 100.54 | 97.95 | 99.78 | 101.96 | 99.43 | 97.95 | 101.59 |
| Formula without iron correction | | | | | | | | | | |
| Si | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ti | 3.291 | 3.050 | 3.026 | 3.188 | 2.859 | 12.257 | 3.334 | 3.083 | 2.751 | 2.799 |
| Al | 1.055 | 1.055 | 1.070 | 1.119 | 1.048 | 0.049 | 1.044 | 1.108 | 0.962 | 0.984 |
| Cr | 1.695 | 1.712 | 1.677 | 1.715 | 1.659 | 0.040 | 1.750 | 1.745 | 1.559 | 1.795 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 18.022 | 18.314 | 18.669 | 18.911 | 18.823 | 9.787 | 19.166 | 18.778 | 18.874 | 19.445 |
| Mn | 0.186 | 0.137 | 0.156 | 0.126 | 0.137 | 0.161 | 0.140 | 0.126 | 0.156 | 0.242 |
| Mg | 2.803 | 2.107 | 2.078 | 2.457 | 2.216 | 5.028 | 2.377 | 2.348 | 2.618 | 2.590 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 27.051 | 26.375 | 26.677 | 27.517 | 26.742 | 27.322 | 27.810 | 27.189 | 26.920 | 27.855 |
| Formula after iron correction normalised | | | | | | | | | | |
| Si | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ti | 2.920 | 2.775 | 2.722 | 2.781 | 2.566 | 10.767 | 2.877 | 2.722 | 2.453 | 2.412 |
| Al | 0.936 | 0.960 | 0.963 | 0.976 | 0.940 | 0.043 | 0.901 | 0.978 | 0.857 | 0.848 |
| Cr | 1.503 | 1.558 | 1.509 | 1.496 | 1.489 | 0.035 | 1.510 | 1.540 | 1.390 | 1.547 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(iii) | 7.218 | 5.763 | 6.423 | 8.179 | 6.563 | 7.782 | 8.769 | 7.506 | 6.942 | 8.857 |
| Fe(ii) | 8.771 | 10.902 | 10.373 | 8.315 | 10.330 | 0.815 | 7.771 | 9.070 | 9.884 | 7.897 |
| Mn | 0.165 | 0.125 | 0.140 | 0.110 | 0.123 | 0.142 | 0.121 | 0.112 | 0.139 | 0.209 |
| Mg | 2.487 | 1.917 | 1.870 | 2.143 | 1.988 | 4.416 | 2.051 | 2.073 | 2.334 | 2.231 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 |

Table of spinel microprobe analysis from drill core G13 sample 6

| Nr | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 1 | 2 |
|---|---|---|---|---|---|---|---|---|---|---|
| Sample | G13-6d15 | G13-6d16 | G13-6d17 | G13-6d18 | G13-6g7 | G13-6g8 | G13-6g9 | G13-6f5 | G13-6 | spin-inc |
| MgO | 5.49 | 6.73 | 6.26 | 6.07 | 5.23 | 4.92 | 6.45 | 4.32 | 4.84 | 4.44 |
| Al2O3 | 2.94 | 2.39 | 2.52 | 2.53 | 2.93 | 2.88 | 2.49 | 2.83 | 2.529 | 2.596 |
| Cr2O3 | 5.8 | 4.65 | 5.31 | 7.01 | 6 | 6.44 | 6.54 | 6.67 | 7.493 | 7.382 |
| FeO | 72.75 | 64.92 | 68.5 | 69.91 | 67.88 | 70.06 | 68.65 | 75.54 | 65.453 | 65.527 |
| TiO2 | 12.38 | 13.57 | 14.11 | 12.47 | 12.12 | 13.87 | 12.76 | 7.44 | 15.419 | 15.564 |
| MnO | 1.08 | 0.36 | 0.34 | 0.39 | 0.43 | 0.53 | 0.87 | 1.15 | 0.469 | 0.611 |
| SiO2 | | | | | | | | | 0.082 | 0.019 |
| CaO | | | | | | | | | 0.013 | 0.038 |
| K2O | | | | | | | | | 0.004 | 0 |
| Na2O | | | | | | | | | 0.035 | 0.008 |
| NiO | 0.4 | 0.49 | 0.46 | 0.46 | 0.46 | 0.4 | 0.52 | 0.46 | 0.455 | 0.477 |
| ZnO | | | | | | | | | 0.194 | 0.089 |
| Summe | 100.84 | 93.11 | 97.5 | 98.84 | 95.05 | 99.1 | 98.28 | 98.41 | 97.554 | 97.364 |
| Formula without iron correction | | | | | | | | | | |
| Si | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.026 | 0.006 |
| Ti | 2.957 | 3.241 | 3.370 | 2.978 | 2.895 | 3.313 | 3.048 | 1.777 | 3.683 | 3.717 |
| Al | 1.100 | 0.894 | 0.943 | 0.947 | 1.097 | 1.078 | 0.932 | 1.059 | 0.946 | 0.972 |
| Cr | 1.456 | 1.167 | 1.333 | 1.760 | 1.506 | 1.617 | 1.642 | 1.674 | 1.881 | 1.853 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 19.317 | 17.238 | 18.189 | 18.563 | 18.024 | 18.603 | 18.229 | 20.058 | 17.380 | 17.399 |
| Mn | 0.290 | 0.097 | 0.091 | 0.105 | 0.116 | 0.143 | 0.234 | 0.309 | 0.126 | 0.164 |
| Mg | 2.599 | 3.186 | 2.964 | 2.874 | 2.476 | 2.329 | 3.053 | 2.045 | 2.291 | 2.102 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.045 | 0.021 |
| TOTAL | 27.720 | 25.824 | 26.890 | 27.227 | 26.113 | 27.082 | 27.137 | 26.923 | 26.379 | 26.235 |
| Formula after iron correction normalised | | | | | | | | | | |
| Si | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.024 | 0.006 |
| Ti | 2.560 | 3.012 | 3.008 | 2.625 | 2.660 | 2.936 | 2.695 | 1.584 | 3.351 | 3.401 |
| Al | 0.953 | 0.831 | 0.842 | 0.835 | 1.008 | 0.955 | 0.824 | 0.944 | 0.861 | 0.889 |
| Cr | 1.261 | 1.085 | 1.190 | 1.551 | 1.384 | 1.433 | 1.452 | 1.493 | 1.711 | 1.695 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(iii) | 8.589 | 4.520 | 6.878 | 7.585 | 5.179 | 7.283 | 7.399 | 6.949 | 5.772 | 5.451 |
| Fe(ii) | 8.136 | 11.500 | 9.356 | 8.778 | 11.386 | 9.203 | 8.722 | 10.932 | 10.041 | 10.466 |
| Mn | 0.251 | 0.090 | 0.082 | 0.092 | 0.106 | 0.126 | 0.207 | 0.276 | 0.115 | 0.150 |
| Mg | 2.250 | 2.961 | 2.645 | 2.533 | 2.276 | 2.064 | 2.700 | 1.823 | 2.085 | 1.923 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.041 | 0.019 |
| TOTAL | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 |

| Nr | 3 | 4 | 5 | 6 | 7 | 8 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|
| Sample | spin-int | spin-int | spin-int | spin-int | spin-int | spin-int | spin-inc | spin-inc | spin-inc | spin-inc |
| MgO | 1.93 | 5.106 | 11.681 | 5.398 | 4.721 | 6.22 | 4.943 | 4.691 | 4.851 | 4.108 |
| Al2O3 | 0.169 | 2.545 | 0.005 | 2.408 | 1.997 | 2.539 | 2.703 | 2.753 | 2.827 | 2.709 |
| Cr2O3 | 6.59 | 8.131 | 0.053 | 7.736 | 8.143 | 7.588 | 7.77 | 7.585 | 7.004 | 7.03 |
| FeO | 81.751 | 67.16 | 32.269 | 67.617 | 68.615 | 64.521 | 67.546 | 66.786 | 66.872 | 67.366 |
| TiO2 | 3.153 | 13.253 | 55.64 | 13.37 | 10.039 | 14.436 | 14.211 | 15.034 | 14.784 | 13.703 |
| MnO | 0.5 | 0.62 | 0.677 | 0.458 | 0.681 | 0.808 | 0.363 | 0.429 | 0.33 | 0.41 |
| SiO2 | 0 | 0.045 | 0.119 | 0.174 | 0.092 | 0.055 | 0.086 | 0.16 | 0.092 | 0 |
| CaO | 0.043 | 0.003 | 0.019 | 0.046 | 0.135 | 0 | 0.023 | 0.02 | 0.011 | 0.01 |
| K2O | 0.016 | 0.032 | 0 | 0.008 | 0.02 | 0.011 | 0 | 0.026 | 0.015 | 0.009 |
| Na2O | 0 | 0 | 0.015 | 0 | 0 | 0 | 0.051 | 0 | 0.034 | 0.01 |
| NiO | 0.465 | 0.44 | 0.136 | 0.377 | 0.457 | 0.487 | 0.341 | 0.48 | 0.454 | 0.442 |
| ZnO | 0.142 | 0.03 | 0.016 | 0 | 0.149 | 0.232 | 0 | 0.086 | 0.22 | 0.17 |
| Summe | 94.928 | 97.891 | 102.673 | 98.125 | 95.449 | 97.523 | 98.646 | 98.727 | 98.17 | 96.539 |
| Formula without iron correction | | | | | | | | | | |
| Si | 0.000 | 0.014 | 0.038 | 0.055 | 0.029 | 0.017 | 0.027 | 0.051 | 0.029 | 0.000 |
| Ti | 0.753 | 3.165 | 13.289 | 3.193 | 2.398 | 3.448 | 3.394 | 3.591 | 3.531 | 3.273 |
| Al | 0.063 | 0.952 | 0.002 | 0.901 | 0.747 | 0.950 | 1.012 | 1.030 | 1.058 | 1.014 |
| Cr | 1.654 | 2.041 | 0.013 | 1.942 | 2.044 | 1.905 | 1.951 | 1.904 | 1.758 | 1.765 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 21.707 | 17.833 | 8.568 | 17.954 | 18.219 | 17.132 | 17.936 | 17.734 | 17.757 | 17.888 |
| Mn | 0.134 | 0.167 | 0.182 | 0.123 | 0.183 | 0.217 | 0.098 | 0.115 | 0.089 | 0.110 |
| Mg | 0.914 | 2.417 | 5.530 | 2.555 | 2.235 | 2.945 | 2.340 | 2.221 | 2.297 | 1.945 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.033 | 0.007 | 0.004 | 0.000 | 0.035 | 0.054 | 0.000 | 0.020 | 0.052 | 0.040 |
| TOTAL | 25.260 | 26.597 | 27.626 | 26.725 | 25.891 | 26.669 | 26.757 | 26.666 | 26.570 | 26.034 |
| Formula after iron correction normalised | | | | | | | | | | |
| Si | 0.000 | 0.013 | 0.033 | 0.050 | 0.027 | 0.016 | 0.024 | 0.046 | 0.026 | 0.000 |
| Ti | 0.716 | 2.856 | 11.545 | 2.868 | 2.223 | 3.103 | 3.044 | 3.232 | 3.189 | 3.017 |
| Al | 0.060 | 0.859 | 0.002 | 0.809 | 0.693 | 0.855 | 0.907 | 0.927 | 0.956 | 0.935 |
| Cr | 1.572 | 1.842 | 0.012 | 1.744 | 1.895 | 1.714 | 1.750 | 1.714 | 1.588 | 1.627 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(iii) | 3.191 | 6.250 | 8.400 | 6.525 | 4.674 | 6.405 | 6.594 | 6.399 | 6.190 | 5.000 |
| Fe(ii) | 17.434 | 9.842 | -0.957 | 9.598 | 12.214 | 9.012 | 9.493 | 9.562 | 9.849 | 11.490 |
| Mn | 0.128 | 0.150 | 0.158 | 0.111 | 0.170 | 0.196 | 0.088 | 0.104 | 0.080 | 0.102 |
| Mg | 0.868 | 2.181 | 4.804 | 2.295 | 2.072 | 2.650 | 2.099 | 1.999 | 2.074 | 1.793 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.032 | 0.006 | 0.003 | 0.000 | 0.032 | 0.049 | 0.000 | 0.018 | 0.047 | 0.037 |
| TOTAL | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 |

Table of spinel microprobe analysis from drill core G13 sample 6

| Nr | 25 | 26 | 27 | 28 | 49 | 50 | 51 | 52 | 53 | 54 |
|---|---|---|---|---|---|---|---|---|---|---|
| Sample | spin-int | spin-int | spin-int | spin-inc | 13-3 spin-in | 13-3 spin-in | spin-int | spin-int-hell | spin-int | spin-inc |
| MgO | 5.408 | 5.521 | 5.699 | 6.379 | 6.475 | 6.268 | 5.771 | 6.172 | 3.471 | 4.955 |
| Al2O3 | 2.672 | 2.56 | 2.668 | 2.348 | 2.862 | 2.72 | 2.866 | 2.976 | 1.826 | 3.112 |
| Cr2O3 | 6.848 | 7.001 | 7.314 | 6.823 | 8.941 | 8.633 | 9.36 | 9.284 | 6.276 | 8.083 |
| FeO | 66.394 | 66.459 | 66.015 | 63.291 | 60.876 | 61.507 | 61.309 | 61.03 | 69.3 | 61.489 |
| TiO2 | 14.765 | 14.917 | 15.062 | 16.196 | 13.881 | 14.175 | 13.494 | 13.782 | 12.014 | 14.131 |
| MnO | 0.533 | 0.67 | 0.406 | 0.341 | 0.439 | 0.466 | 0.628 | 0.424 | 0.332 | 0.482 |
| SiO2 | 0.18 | 0.145 | 0.018 | 0.034 | 0.158 | 0.018 | 0.058 | 0.14 | 0.042 | 0.067 |
| CaO | 0.003 | 0 | 0.015 | 0.455 | 0.01 | 0.013 | 0 | 0.035 | 0.013 | 0.002 |
| K2O | 0 | 0 | 0.026 | 0 | 0 | 0.014 | 0 | 0.006 | 0 | 0.006 |
| Na2O | 0 | 0.013 | 0.005 | 0.005 | 0 | 0.023 | 0 | 0 | 0 | 0 |
| NiO | 0.399 | 0.471 | 0.477 | 0.353 | 0.451 | 0.498 | 0.405 | 0.36 | 0.493 | 0.495 |
| ZnO | 0.072 | 0 | 0.208 | 0.044 | 0.215 | 0.066 | 0.113 | 0.067 | 0 | 0.11 |
| Summe | 97.944 | 98.305 | 98.518 | 96.949 | 94.923 | 94.984 | 94.615 | 94.906 | 94.264 | 93.57 |
| Formula without iron correction | | | | | | | | | | |
| Si | 0.057 | 0.046 | 0.006 | 0.011 | 0.050 | 0.006 | 0.018 | 0.044 | 0.013 | 0.021 |
| Ti | 3.526 | 3.563 | 3.597 | 3.868 | 3.315 | 3.386 | 3.223 | 3.292 | 2.869 | 3.375 |
| Al | 1.000 | 0.958 | 0.998 | 0.879 | 1.071 | 1.018 | 1.073 | 1.114 | 0.683 | 1.165 |
| Cr | 1.719 | 1.758 | 1.836 | 1.713 | 2.245 | 2.167 | 2.350 | 2.331 | 1.576 | 2.029 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 17.630 | 17.647 | 17.529 | 16.806 | 16.164 | 16.332 | 16.279 | 16.205 | 18.401 | 16.327 |
| Mn | 0.143 | 0.180 | 0.109 | 0.092 | 0.118 | 0.125 | 0.169 | 0.114 | 0.089 | 0.130 |
| Mg | 2.560 | 2.614 | 2.698 | 3.020 | 3.065 | 2.967 | 2.732 | 2.922 | 1.643 | 2.346 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.017 | 0.000 | 0.049 | 0.010 | 0.050 | 0.015 | 0.026 | 0.016 | 0.000 | 0.026 |
| TOTAL | 26.653 | 26.765 | 26.823 | 26.398 | 26.079 | 26.017 | 25.871 | 26.038 | 25.275 | 25.419 |
| Formula after iron correction normalised | | | | | | | | | | |
| Si | 0.051 | 0.041 | 0.005 | 0.010 | 0.046 | 0.005 | 0.017 | 0.041 | 0.013 | 0.020 |
| Ti | 3.175 | 3.195 | 3.219 | 3.517 | 3.051 | 3.123 | 2.990 | 3.034 | 2.725 | 3.187 |
| Al | 0.900 | 0.859 | 0.893 | 0.799 | 0.986 | 0.939 | 0.995 | 1.027 | 0.649 | 1.100 |
| Cr | 1.548 | 1.576 | 1.643 | 1.557 | 2.066 | 1.999 | 2.180 | 2.148 | 1.496 | 1.916 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(iii) | 6.370 | 6.612 | 6.735 | 5.814 | 5.103 | 4.961 | 4.627 | 5.008 | 3.230 | 3.572 |
| Fe(ii) | 9.505 | 9.212 | 8.949 | 9.465 | 9.773 | 10.105 | 10.475 | 9.929 | 14.243 | 11.844 |
| Mn | 0.129 | 0.162 | 0.098 | 0.083 | 0.109 | 0.116 | 0.157 | 0.105 | 0.085 | 0.122 |
| Mg | 2.305 | 2.344 | 2.414 | 2.746 | 2.821 | 2.737 | 2.535 | 2.693 | 1.560 | 2.215 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.015 | 0.000 | 0.044 | 0.009 | 0.046 | 0.014 | 0.025 | 0.014 | 0.000 | 0.024 |
| TOTAL | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 |

| Nr | 55 | 67 | 68 | 69 | 70 | 71 |
|---|---|---|---|---|---|---|
| Sample | spin-inc | spin-int | spin-int | spin-int | spin-int | spin-int |
| MgO | 5.155 | 5.635 | 6.231 | 5.141 | 5.496 | 5.444 |
| Al2O3 | 3.064 | 2.933 | 3.062 | 2.646 | 3.274 | 2.79 |
| Cr2O3 | 8.584 | 8.444 | 8.503 | 8.98 | 8.612 | 8.121 |
| FeO | 62.325 | 61.19 | 61.192 | 62.092 | 62.063 | 62.778 |
| TiO2 | 14.342 | 14.387 | 13.573 | 13.349 | 12.51 | 13.183 |
| MnO | 0.566 | 0.52 | 0.278 | 0.427 | 0.413 | 0.591 |
| SiO2 | 0.122 | 0.147 | 0.147 | 0.217 | 0.113 | 0.097 |
| CaO | 0.025 | 0.018 | 0.045 | 0.08 | 0.026 | 0.083 |
| K2O | 0.012 | 0.004 | 0.018 | 0 | 0 | 0.014 |
| Na2O | 0 | 0.001 | 0.006 | 0.03 | 0 | 0.026 |
| NiO | 0.411 | 0.382 | 0.428 | 0.504 | 0.434 | 0.394 |
| ZnO | 0 | 0.081 | 0.137 | 0.151 | 0.177 | 0.134 |
| Summe | 95.269 | 94.401 | 94.308 | 94.222 | 93.606 | 94.268 |
| Formula without iron correction | | | | | | |
| Si | 0.039 | 0.047 | 0.047 | 0.069 | 0.036 | 0.031 |
| Ti | 3.425 | 3.436 | 3.242 | 3.188 | 2.988 | 3.149 |
| Al | 1.147 | 1.098 | 1.146 | 0.990 | 1.225 | 1.044 |
| Cr | 2.155 | 2.120 | 2.135 | 2.254 | 2.162 | 2.039 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 16.549 | 16.248 | 16.248 | 16.487 | 16.480 | 16.669 |
| Mn | 0.152 | 0.140 | 0.075 | 0.115 | 0.111 | 0.159 |
| Mg | 2.440 | 2.668 | 2.950 | 2.434 | 2.602 | 2.577 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.000 | 0.019 | 0.032 | 0.035 | 0.041 | 0.031 |
| TOTAL | 25.908 | 25.775 | 25.874 | 25.573 | 25.645 | 25.699 |
| Formula after iron correction normalised | | | | | | |
| Si | 0.036 | 0.043 | 0.043 | 0.065 | 0.034 | 0.029 |
| Ti | 3.173 | 3.200 | 3.007 | 2.992 | 2.796 | 2.940 |
| Al | 1.062 | 1.022 | 1.063 | 0.929 | 1.147 | 0.975 |
| Cr | 1.996 | 1.974 | 1.980 | 2.116 | 2.023 | 1.904 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(iii) | 4.713 | 4.407 | 4.636 | 3.937 | 4.105 | 4.232 |
| Fe(ii) | 10.618 | 10.723 | 10.436 | 11.536 | 11.317 | 11.335 |
| Mn | 0.141 | 0.130 | 0.069 | 0.108 | 0.104 | 0.148 |
| Mg | 2.261 | 2.484 | 2.736 | 2.284 | 2.435 | 2.407 |
| Ca | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.000 | 0.018 | 0.030 | 0.033 | 0.039 | 0.029 |
| TOTAL | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 |

Table of spinel microprobe analysis from drill core G13 samples 3 &6

| Nr | 17 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|
| Sample | spin G1-18 | pin intG1-2 | spin int | spin int | spin int | spin ins | spin ins | spin int | spin ins | spin ins |
| MgO | 3.401 | 3.809 | 2.782 | 6.563 | 6.829 | 7.07 | 6.837 | 1.739 | 7.202 | 7.246 |
| Al2O3 | 1.695 | 4.602 | 4.372 | 2.796 | 2.655 | 6.207 | 6.414 | 2.16 | 6.023 | 6.044 |
| Cr2O3 | 13.76 | 28.618 | 26.734 | 23.346 | 22.679 | 39.979 | 38.473 | 25.457 | 41.212 | 40.14 |
| FeO | 47.005 | 52.968 | 56.571 | 44.128 | 42.969 | 39.119 | 40.121 | 54.395 | 39.105 | 39.195 |
| TiO2 | 32.56 | 8.814 | 7.562 | 18.904 | 20.642 | 5.041 | 4.728 | 13.418 | 5.091 | 5.074 |
| MnO | 0.126 | 0.615 | 0.879 | 0.585 | 0.55 | 0.255 | 0.242 | 1.468 | 0.308 | 0.399 |
| SiO2 | 0.011 | 0.03 | 0.038 | 0.018 | 0.031 | 0.037 | 0.068 | 0.031 | 0.036 | 0.037 |
| CaO | 0.09 | 0.002 | 0.011 | 0.019 | 0.014 | 0.016 | 0.02 | 0.004 | 0.012 | 0.012 |
| K2O | 0.021 | | | | 0.013 | 0.001 | 0.005 | 0.002 | 0.006 | 0.013 |
| Na2O | 0 | 0.022 | 0.011 | 0.083 | 0.071 | | 0.027 | 0.061 | 0.001 | 0.003 |
| NiO | 0.148 | 0.516 | 0.492 | 0.345 | 0.344 | 0.314 | 0.344 | 0.369 | 0.355 | 0.35 |
| ZnO | | 0.456 | 0.412 | 0.42 | 0.397 | 0.375 | 0.25 | 0.794 | 0.544 | 0.268 |
| Summe | 98.817 | 101.318 | 100.606 | 98.808 | 98.906 | 98.925 | 98.047 | 101.039 | 100.402 | 99.284 |
| Formula without iron correction | | | | | | | | | | |
| Si | 0.003 | 0.009 | 0.012 | 0.005 | 0.009 | 0.011 | 0.020 | 0.009 | 0.010 | 0.011 |
| Ti | 6.942 | 1.997 | 1.760 | 4.189 | 4.534 | 1.105 | 1.036 | 2.941 | 1.116 | 1.112 |
| Al | 0.566 | 1.634 | 1.595 | 0.971 | 0.914 | 2.132 | 2.203 | 0.742 | 2.069 | 2.076 |
| Cr | 3.084 | 6.816 | 6.541 | 5.438 | 5.236 | 9.211 | 8.864 | 5.865 | 9.495 | 9.248 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 11.141 | 13.343 | 14.640 | 10.872 | 10.492 | 9.533 | 9.777 | 13.256 | 9.530 | 9.552 |
| Mn | 0.030 | 0.157 | 0.230 | 0.146 | 0.136 | 0.063 | 0.060 | 0.362 | 0.076 | 0.098 |
| Mg | 1.437 | 1.711 | 1.284 | 2.883 | 2.973 | 3.072 | 2.971 | 0.756 | 3.129 | 3.148 |
| Ca | 0.027 | 0.001 | 0.004 | 0.006 | 0.004 | 0.005 | 0.006 | 0.001 | 0.004 | 0.004 |
| Zn | 0.000 | 0.101 | 0.094 | 0.091 | 0.086 | 0.081 | 0.054 | 0.171 | 0.117 | 0.058 |
| TOTAL | 23.230 | 25.769 | 26.160 | 24.601 | 24.383 | 25.213 | 24.991 | 24.103 | 25.546 | 25.307 |
| Formula after iron correction normalised | | | | | | | | | | |
| Si | 0.003 | 0.008 | 0.011 | 0.005 | 0.009 | 0.010 | 0.019 | 0.009 | 0.010 | 0.010 |
| Ti | 7.172 | 1.860 | 1.615 | 4.087 | 4.462 | 1.052 | 0.995 | 2.929 | 1.048 | 1.055 |
| Al | 0.585 | 1.522 | 1.463 | 0.947 | 0.899 | 2.029 | 2.116 | 0.739 | 1.943 | 1.969 |
| Cr | 3.186 | 6.348 | 6.001 | 5.305 | 5.153 | 8.768 | 8.513 | 5.840 | 8.921 | 8.771 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(iii) | 0.000 | 4.393 | 5.284 | 1.564 | 1.005 | 3.078 | 2.538 | 0.275 | 3.874 | 3.306 |
| Fe(ii) | 11.510 | 8.034 | 8.147 | 9.042 | 9.323 | 5.997 | 6.851 | 12.924 | 5.079 | 5.752 |
| Mn | 0.031 | 0.146 | 0.211 | 0.142 | 0.134 | 0.060 | 0.057 | 0.361 | 0.071 | 0.093 |
| Mg | 1.485 | 1.593 | 1.178 | 2.812 | 2.926 | 2.924 | 2.853 | 0.752 | 2.940 | 2.986 |
| Ca | 0.028 | 0.001 | 0.003 | 0.006 | 0.004 | 0.005 | 0.006 | 0.001 | 0.004 | 0.004 |
| Zn | 0.000 | 0.094 | 0.086 | 0.089 | 0.084 | 0.077 | 0.052 | 0.170 | 0.110 | 0.055 |
| TOTAL | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 |

| Nr | 16 | 17 | 18 | 19 | 20 | 50 | 51 | 52 | 53 | 59 |
|---|---|---|---|---|---|---|---|---|---|---|
| Sample | spin int2 | spin int | spin int | spin ins | spin int | spin i | spin i | spin i | spin i | spin int |
| MgO | 7.552 | 4.123 | 3.978 | 7.099 | 4.832 | 7.303 | 6.491 | 4.799 | 6.467 | 9.292 |
| Al2O3 | 3.49 | 3.017 | 2.599 | 6.275 | 3.296 | 5.928 | 5.694 | 3.041 | 5.586 | 5.818 |
| Cr2O3 | 24.066 | 27.578 | 28.966 | 38.009 | 28.578 | 30.331 | 31.914 | 30.324 | 38.188 | 31.832 |
| FeO | 42.264 | 57.074 | 57.784 | 40.54 | 54.865 | 44.667 | 45.374 | 54.718 | 39.423 | 41.316 |
| TiO2 | 19.314 | 5.86 | 5.291 | 5.256 | 6.961 | 7.97 | 6.91 | 4.95 | 6.178 | 7.704 |
| MnO | 0.501 | 0.458 | 0.486 | 0.239 | 0.462 | 0.472 | 0.539 | 0.433 | 0.394 | 0.411 |
| SiO2 | 0.04 | 0.039 | 0.048 | 0.057 | 0.027 | 0.045 | 0.054 | 0.071 | 0.052 | 0.072 |
| CaO | 0.02 | | | 0.012 | 0.014 | 0.009 | 0.051 | 0.004 | 0.011 | 0.18 |
| K2O | 0.012 | | | 0.008 | | | 0.009 | 0.004 | 0.009 | |
| Na2O | 0.014 | 0.012 | 0.008 | 0.037 | 0.012 | 0.018 | 0.011 | | 0.002 | 0.015 |
| NiO | 0.345 | 0.644 | 0.653 | 0.358 | 0.473 | 0.42 | 0.431 | 0.47 | 0.333 | 0.438 |
| ZnO | 0.286 | 0.428 | 0.218 | 0.344 | 0.387 | 0.454 | 0.36 | 0.546 | 0.326 | 0.178 |
| Summe | 99.445 | 99.85 | 100.585 | 98.745 | 100.647 | 98.367 | 98.506 | 99.883 | 97.536 | 97.935 |
| Formula without iron correction | | | | | | | | | | |
| Si | 0.012 | 0.011 | 0.014 | 0.017 | 0.008 | 0.013 | 0.016 | 0.021 | 0.015 | 0.021 |
| Ti | 4.234 | 1.285 | 1.160 | 1.152 | 1.526 | 1.747 | 1.515 | 1.085 | 1.354 | 1.689 |
| Al | 1.199 | 1.036 | 0.893 | 2.155 | 1.132 | 2.036 | 1.956 | 1.044 | 1.919 | 1.998 |
| Cr | 5.545 | 6.354 | 6.674 | 8.757 | 6.585 | 6.988 | 7.353 | 6.987 | 8.799 | 7.334 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 10.300 | 13.909 | 14.082 | 9.879 | 13.370 | 10.885 | 11.058 | 13.335 | 9.607 | 10.069 |
| Mn | 0.124 | 0.113 | 0.120 | 0.059 | 0.114 | 0.117 | 0.133 | 0.107 | 0.097 | 0.101 |
| Mg | 3.281 | 1.791 | 1.728 | 3.084 | 2.099 | 3.173 | 2.820 | 2.085 | 2.810 | 4.037 |
| Ca | 0.006 | 0.000 | 0.000 | 0.004 | 0.004 | 0.003 | 0.016 | 0.001 | 0.003 | 0.056 |
| Zn | 0.062 | 0.092 | 0.047 | 0.074 | 0.083 | 0.098 | 0.077 | 0.117 | 0.070 | 0.038 |
| TOTAL | 24.761 | 24.592 | 24.717 | 25.182 | 24.922 | 25.060 | 24.943 | 24.782 | 24.675 | 25.344 |
| Formula after iron correction normalised | | | | | | | | | | |
| Si | 0.011 | 0.011 | 0.014 | 0.016 | 0.008 | 0.013 | 0.015 | 0.020 | 0.015 | 0.020 |
| Ti | 4.103 | 1.254 | 1.126 | 1.098 | 1.469 | 1.673 | 1.457 | 1.051 | 1.317 | 1.599 |
| Al | 1.162 | 1.011 | 0.867 | 2.054 | 1.090 | 1.950 | 1.882 | 1.011 | 1.866 | 1.892 |
| Cr | 5.374 | 6.201 | 6.480 | 8.346 | 6.341 | 6.693 | 7.075 | 6.766 | 8.558 | 6.945 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(iii) | 1.967 | 1.539 | 1.858 | 3.004 | 2.367 | 2.707 | 2.421 | 2.020 | 1.750 | 3.394 |
| Fe(ii) | 8.016 | 12.035 | 11.816 | 6.412 | 10.509 | 7.718 | 8.219 | 10.893 | 7.595 | 6.141 |
| Mn | 0.120 | 0.110 | 0.116 | 0.056 | 0.110 | 0.112 | 0.128 | 0.104 | 0.095 | 0.096 |
| Mg | 3.180 | 1.748 | 1.678 | 2.940 | 2.022 | 3.039 | 2.714 | 2.019 | 2.733 | 3.823 |
| Ca | 0.006 | 0.000 | 0.000 | 0.004 | 0.004 | 0.003 | 0.015 | 0.001 | 0.003 | 0.053 |
| Zn | 0.060 | 0.090 | 0.046 | 0.071 | 0.080 | 0.094 | 0.075 | 0.114 | 0.068 | 0.036 |
| TOTAL | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 |

Table of spinel microprobe analysis from drill core G1 samples 18 & 2

| Nr | 60 | 61 | 62 | 65 | 67 | 1 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|---|
| Sample | spin int | spin ins | spin ins | spin ins | spin int | hroint G1-2 | chroint | chroint | chroins | chroint |
| MgO | 1.947 | 7.823 | 4.745 | 6.48 | 6.871 | 3.129 | 5.056 | 9.449 | 9.118 | 5.041 |
| Al2O3 | 4.192 | 5.716 | 4.022 | 5.31 | 5.202 | 2.873 | 3.703 | 7.206 | 6.955 | 3.819 |
| Cr2O3 | 25.958 | 32.836 | 28.051 | 27.92 | 29.109 | 21.022 | 22.739 | 34.213 | 32.408 | 22.751 |
| FeO | 57.607 | 41.447 | 53.19 | 47.994 | 48.082 | 62.62 | 56.712 | 38.452 | 40.604 | 57.867 |
| TiO2 | 7.461 | 7.846 | 6.542 | 8.491 | 6.596 | 5.747 | 6.944 | 5.516 | 5.436 | 6.167 |
| MnO | 1.105 | 0.356 | 0.636 | 0.348 | 0.317 | 0.101 | 0.049 | 0 | 0 | 0.011 |
| SiO2 | 0.218 | 0.041 | 0.069 | 0.054 | 0.054 | 0.01 | 0 | 0.026 | 0.071 | 0.047 |
| CaO | 0.03 | 0.008 | 0.011 | 0.015 | 0.011 | 0.014 | 0.005 | 0.001 | 0.017 | 0.01 |
| K2O | 0.003 | 0.01 | 0.004 | 0.006 | 0.008 | 0.012 | 0 | 0 | 0.021 | 0 |
| Na2O | 0.037 | 0.035 | 0.005 | 0.017 | 0.018 | 0.019 | 0.062 | 0.022 | 0 | 0.025 |
| NiO | 0.459 | 0.369 | 0.449 | 0.484 | 0.419 | 0.377 | 0.404 | 0.291 | 0.344 | 0.355 |
| ZnO | 0.417 | 0.145 | 0.43 | 0.307 | 0.338 | | | | | |
| Summe | 100.161 | 97.389 | 98.791 | 98.219 | 97.708 | 95.924 | 95.674 | 95.176 | 94.974 | 96.093 |
| Formula without iron correction | | | | | | | | | | |
| Si | 0.064 | 0.012 | 0.020 | 0.016 | 0.016 | 0.003 | 0.000 | 0.008 | 0.021 | 0.014 |
| Ti | 1.635 | 1.720 | 1.434 | 1.861 | 1.446 | 1.260 | 1.522 | 1.209 | 1.192 | 1.352 |
| Al | 1.440 | 1.963 | 1.381 | 1.824 | 1.787 | 0.987 | 1.272 | 2.475 | 2.389 | 1.312 |
| Cr | 5.981 | 7.566 | 6.463 | 6.433 | 6.707 | 4.844 | 5.239 | 7.883 | 7.467 | 5.242 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 14.039 | 10.101 | 12.962 | 11.696 | 11.717 | 15.260 | 13.821 | 9.371 | 9.895 | 14.102 |
| Mn | 0.273 | 0.088 | 0.157 | 0.086 | 0.078 | 0.025 | 0.012 | 0.000 | 0.000 | 0.003 |
| Mg | 0.846 | 3.399 | 2.062 | 2.815 | 2.985 | 1.359 | 2.197 | 4.105 | 3.962 | 2.190 |
| Ca | 0.009 | 0.002 | 0.003 | 0.005 | 0.003 | 0.004 | 0.002 | 0.000 | 0.005 | 0.003 |
| Zn | 0.090 | 0.031 | 0.093 | 0.066 | 0.073 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 24.376 | 24.882 | 24.575 | 24.802 | 24.812 | 23.742 | 24.064 | 25.051 | 24.930 | 24.217 |
| Formula after iron correction normalised | | | | | | | | | | |
| Si | 0.063 | 0.012 | 0.020 | 0.015 | 0.015 | 0.003 | 0.000 | 0.007 | 0.020 | 0.014 |
| Ti | 1.610 | 1.659 | 1.400 | 1.801 | 1.399 | 1.273 | 1.518 | 1.158 | 1.147 | 1.340 |
| Al | 1.418 | 1.894 | 1.349 | 1.765 | 1.728 | 0.997 | 1.268 | 2.371 | 2.300 | 1.300 |
| Cr | 5.889 | 7.298 | 6.312 | 6.225 | 6.487 | 4.896 | 5.225 | 7.552 | 7.188 | 5.195 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(iii) | 0.987 | 2.268 | 1.499 | 2.069 | 2.095 | 0.000 | 0.170 | 2.685 | 2.388 | 0.574 |
| Fe(ii) | 12.835 | 7.475 | 11.160 | 9.249 | 9.239 | 15.426 | 13.613 | 6.293 | 7.138 | 13.401 |
| Mn | 0.269 | 0.085 | 0.153 | 0.083 | 0.076 | 0.025 | 0.012 | 0.000 | 0.000 | 0.003 |
| Mg | 0.833 | 3.279 | 2.013 | 2.724 | 2.888 | 1.374 | 2.191 | 3.933 | 3.814 | 2.171 |
| Ca | 0.009 | 0.002 | 0.003 | 0.005 | 0.003 | 0.004 | 0.002 | 0.000 | 0.005 | 0.003 |
| Zn | 0.088 | 0.030 | 0.090 | 0.064 | 0.070 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 |

| Nr | 17 | 18 | 20 | 21 | 22 | 6 | 8 | 10 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|---|
| Sample | croinscore | croinsrim | croins | croint | croint | G1-24mag | spinint | mag | crospins | crospins |
| MgO | 6.238 | 4.083 | 7.67 | 6.219 | 2.094 | 3.359 | 1.183 | 1.775 | 6.582 | 6.564 |
| Al2O3 | 4.503 | 3.396 | 7.313 | 2.816 | 1.508 | 1.112 | 0.872 | 0.421 | 6.337 | 4.629 |
| Cr2O3 | 23.402 | 22.546 | 26.511 | 25.428 | 25.646 | 22.128 | 20.415 | 18.106 | 28.15 | 30.59 |
| FeO | 56.798 | 59.989 | 47.454 | 56.859 | 60.407 | 64.234 | 63.507 | 72.529 | 44.231 | 43.065 |
| TiO2 | 5.376 | 5.631 | 3.801 | 3.888 | 3.593 | 3.826 | 6.155 | 2.932 | 4.598 | 6.101 |
| MnO | 0 | 0.02 | 0 | 0 | 0.046 | 0 | 0.134 | 0.077 | 0 | 0 |
| SiO2 | 0.021 | 0.026 | 0.06 | 0.027 | 0.034 | 0.039 | 0.052 | 0.031 | 0.044 | 0.091 |
| CaO | 0.025 | 0.026 | 0.016 | 0.012 | 0.24 | 0.023 | 0.038 | 0.039 | 0.009 | 0.016 |
| K2O | 0 | 0.008 | 0.005 | 0.008 | 0.009 | 0.012 | 0.015 | 0 | 0.008 | 0.016 |
| Na2O | 0 | 0.046 | 0.003 | 0.017 | 0.027 | 0.008 | 0.057 | 0.008 | 0.366 | 0.028 |
| NiO | 0.295 | 0.352 | 0.241 | 0.366 | 0.344 | 0.457 | 0.449 | 0.512 | 0.351 | 0.313 |
| ZnO | | | | | | | | | | |
| Summe | 96.658 | 96.123 | 93.074 | 95.64 | 93.948 | 95.198 | 92.877 | 96.43 | 90.676 | 91.413 |
| Formula without iron correction | | | | | | | | | | |
| Si | 0.006 | 0.008 | 0.017 | 0.008 | 0.010 | 0.011 | 0.015 | 0.009 | 0.013 | 0.027 |
| Ti | 1.178 | 1.234 | 0.833 | 0.852 | 0.788 | 0.839 | 1.349 | 0.643 | 1.008 | 1.337 |
| Al | 1.547 | 1.166 | 2.512 | 0.967 | 0.518 | 0.382 | 0.299 | 0.145 | 2.177 | 1.590 |
| Cr | 5.392 | 5.195 | 6.108 | 5.859 | 5.909 | 5.098 | 4.704 | 4.172 | 6.486 | 7.048 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 13.842 | 14.619 | 11.564 | 13.856 | 14.721 | 15.654 | 15.476 | 17.675 | 10.779 | 10.495 |
| Mn | 0.000 | 0.005 | 0.000 | 0.000 | 0.011 | 0.000 | 0.033 | 0.019 | 0.000 | 0.000 |
| Mg | 2.710 | 1.774 | 3.332 | 2.702 | 0.910 | 1.459 | 0.514 | 0.771 | 2.860 | 2.852 |
| Ca | 0.008 | 0.008 | 0.005 | 0.004 | 0.075 | 0.007 | 0.012 | 0.012 | 0.003 | 0.005 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 24.683 | 24.009 | 24.373 | 24.248 | 22.942 | 23.451 | 22.403 | 23.446 | 23.325 | 23.354 |
| Formula after iron correction normalised | | | | | | | | | | |
| Si | 0.006 | 0.008 | 0.017 | 0.008 | 0.010 | 0.012 | 0.016 | 0.009 | 0.013 | 0.027 |
| Ti | 1.146 | 1.234 | 0.820 | 0.844 | 0.824 | 0.858 | 1.445 | 0.658 | 1.037 | 1.374 |
| Al | 1.504 | 1.166 | 2.473 | 0.957 | 0.542 | 0.391 | 0.321 | 0.148 | 2.240 | 1.634 |
| Cr | 5.243 | 5.193 | 6.015 | 5.799 | 6.182 | 5.218 | 5.039 | 4.270 | 6.674 | 7.243 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(iii) | 1.770 | 0.025 | 0.978 | 0.655 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 11.688 | 14.589 | 10.409 | 13.059 | 15.400 | 16.020 | 16.580 | 18.093 | 11.091 | 10.785 |
| Mn | 0.000 | 0.005 | 0.000 | 0.000 | 0.012 | 0.000 | 0.035 | 0.019 | 0.000 | 0.000 |
| Mg | 2.635 | 1.773 | 3.282 | 2.674 | 0.952 | 1.494 | 0.551 | 0.789 | 2.943 | 2.931 |
| Ca | 0.008 | 0.008 | 0.005 | 0.004 | 0.078 | 0.007 | 0.013 | 0.012 | 0.003 | 0.005 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 |

Table of spinel microprobe analysis from drill core G1 samples 18, 24 & 26

| Nr | 15 | 16 | 17 | 18 | 19 | 24 | 25 | 26 | 29 | 33 |
|---|---|---|---|---|---|---|---|---|---|---|
| Sample | crospin | crospi | crospidark | crospidark | chroins | croint | croint | croint3 | croint | croint |
| MgO | 2.317 | 2.369 | 2.89 | 3.398 | 39.051 | 2.095 | 1.997 | 2.396 | 7.218 | 1.88 |
| Al2O3 | 2.495 | 2.604 | 0.014 | 1.432 | 0 | 1.77 | 0.004 | 3.638 | 5.216 | 2.189 |
| Cr2O3 | 19.885 | 19.5 | 1.123 | 12.263 | 0 | 20.301 | 1.716 | 19.061 | 31.73 | 20.678 |
| FeO | 63.777 | 64.269 | 45.126 | 52.441 | 12.052 | 66.435 | 47.089 | 65.095 | 40.484 | 63.702 |
| TiO2 | 8.084 | 7.271 | 47.235 | 30.185 | 0.031 | 6.394 | 50.052 | 5.891 | 8.115 | 6.293 |
| MnO | 0.051 | 0.036 | 0.397 | 0.152 | 0.045 | 0.049 | 0.309 | 0.064 | 0 | 0.097 |
| SiO2 | 0.048 | 0 | 1.486 | 0.065 | 38.946 | 0.055 | 0.011 | 0.001 | 0.048 | 0.073 |
| CaO | 0.018 | 0.023 | 0.03 | 0.025 | 0.433 | 0 | 0.047 | 0 | 0.006 | 0.018 |
| K2O | 0 | 0.016 | 0.016 | 0.03 | 0 | 0.017 | 0.023 | 0 | 0.005 | 0.016 |
| Na2O | 0 | 0.05 | 0 | 0.028 | 0.007 | 0.022 | 0.004 | 0.027 | 0.033 | 0.005 |
| NiO | 0.425 | 0.428 | 0.011 | 0.262 | 0.327 | 0.48 | 0.102 | 0.403 | 0.293 | 0.281 |
| ZnO | | | | | | | | | | |
| Summe | 97.1 | 96.566 | 98.328 | 100.281 | 90.892 | 97.618 | 101.354 | 96.576 | 93.148 | 95.232 |
| Formula without iron correction | | | | | | | | | | |
| Si | 0.014 | 0.000 | 0.433 | 0.019 | 11.350 | 0.016 | 0.003 | 0.000 | 0.014 | 0.021 |
| Ti | 1.772 | 1.594 | 10.354 | 6.617 | 0.007 | 1.402 | 10.971 | 1.291 | 1.779 | 1.379 |
| Al | 0.857 | 0.894 | 0.005 | 0.492 | 0.000 | 0.608 | 0.001 | 1.250 | 1.791 | 0.752 |
| Cr | 4.582 | 4.493 | 0.259 | 2.825 | 0.000 | 4.677 | 0.395 | 4.392 | 7.311 | 4.764 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 15.542 | 15.662 | 10.997 | 12.780 | 2.937 | 16.190 | 11.475 | 15.863 | 9.866 | 15.524 |
| Mn | 0.013 | 0.009 | 0.098 | 0.038 | 0.011 | 0.012 | 0.076 | 0.016 | 0.000 | 0.024 |
| Mg | 1.007 | 1.029 | 1.256 | 1.476 | 16.967 | 0.910 | 0.868 | 1.041 | 3.136 | 0.817 |
| Ca | 0.006 | 0.007 | 0.009 | 0.008 | 0.135 | 0.000 | 0.015 | 0.000 | 0.002 | 0.006 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 23.792 | 23.689 | 23.411 | 24.254 | 31.408 | 23.815 | 23.805 | 23.853 | 23.899 | 23.287 |
| Formula after iron correction normalised | | | | | | | | | | |
| Si | 0.014 | 0.000 | 0.444 | 0.019 | 8.673 | 0.016 | 0.003 | 0.000 | 0.014 | 0.022 |
| Ti | 1.788 | 1.615 | 10.615 | 6.547 | 0.005 | 1.412 | 11.061 | 1.299 | 1.786 | 1.422 |
| Al | 0.864 | 0.906 | 0.005 | 0.487 | 0.000 | 0.613 | 0.001 | 1.257 | 1.799 | 0.775 |
| Cr | 4.622 | 4.552 | 0.265 | 2.796 | 0.000 | 4.714 | 0.399 | 4.419 | 7.342 | 4.910 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(iii) | 0.000 | 0.000 | 0.000 | 0.671 | 15.094 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 15.678 | 15.868 | 11.274 | 11.975 | -12.850 | 16.316 | 11.569 | 15.961 | 9.908 | 15.999 |
| Mn | 0.013 | 0.009 | 0.100 | 0.037 | 0.008 | 0.012 | 0.077 | 0.016 | 0.000 | 0.025 |
| Mg | 1.016 | 1.043 | 1.287 | 1.461 | 12.965 | 0.917 | 0.875 | 1.047 | 3.149 | 0.842 |
| Ca | 0.006 | 0.007 | 0.010 | 0.008 | 0.103 | 0.000 | 0.015 | 0.000 | 0.002 | 0.006 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 |

| Nr | 36 | 6 | 7 | 8 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|
| Sample | crospiint | rspiint G1-2 | crspiins | crspiins | crspiint | crspiins | crspiins |
| MgO | 7.38 | 7.822 | 7.48 | 6.574 | 7.768 | 7.678 | 2.312 |
| Al2O3 | 5.713 | 6.582 | 6.599 | 6.666 | 5.877 | 6.911 | 0.838 |
| Cr2O3 | 33.099 | 34.845 | 35.923 | 33.634 | 26.628 | 35.663 | 24.749 |
| FeO | 40.289 | 36.856 | 37.089 | 41.242 | 44.72 | 36.245 | 63.595 |
| TiO2 | 5.994 | 4.798 | 3.249 | 3.198 | 7.809 | 4.826 | 2.652 |
| MnO | 0 | 0 | 0 | 0 | 0 | 0 | 0.001 |
| SiO2 | 0.039 | 0.032 | 0.015 | 0.06 | 0 | 0.054 | 0.001 |
| CaO | 0.044 | 0 | 0.016 | 0.014 | 0.021 | 0.016 | 0 |
| K2O | 0 | 0 | 0 | 0 | 0 | 0.005 | 0.009 |
| Na2O | 0.032 | 0 | 0.017 | 0 | 0.084 | 0.002 | 0.065 |
| NiO | 0.266 | 0.219 | 0.229 | 0.455 | 0.309 | 0.239 | 0.71 |
| ZnO | | | | | | | |
| Summe | 92.856 | 91.154 | 90.617 | 91.843 | 93.216 | 91.639 | 94.932 |
| Formula without iron correction | | | | | | | |
| Si | 0.011 | 0.009 | 0.004 | 0.017 | 0.000 | 0.016 | 0.000 |
| Ti | 1.314 | 1.052 | 0.712 | 0.701 | 1.712 | 1.058 | 0.581 |
| Al | 1.962 | 2.261 | 2.267 | 2.290 | 2.019 | 2.374 | 0.288 |
| Cr | 7.626 | 8.028 | 8.277 | 7.749 | 6.135 | 8.217 | 5.702 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 9.818 | 8.982 | 9.038 | 10.051 | 10.898 | 8.833 | 15.498 |
| Mn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Mg | 3.206 | 3.399 | 3.250 | 2.856 | 3.375 | 3.336 | 1.005 |
| Ca | 0.014 | 0.000 | 0.005 | 0.004 | 0.007 | 0.005 | 0.000 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 23.952 | 23.730 | 23.553 | 23.669 | 24.145 | 23.838 | 23.074 |
| Formula after iron correction normalised | | | | | | | |
| Si | 0.011 | 0.009 | 0.004 | 0.018 | 0.000 | 0.016 | 0.000 |
| Ti | 1.317 | 1.064 | 0.726 | 0.711 | 1.701 | 1.065 | 0.605 |
| Al | 1.966 | 2.286 | 2.309 | 2.322 | 2.006 | 2.390 | 0.299 |
| Cr | 7.641 | 8.120 | 8.434 | 7.858 | 6.098 | 8.273 | 5.931 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(iii) | 0.000 | 0.000 | 0.000 | 0.000 | 0.385 | 0.000 | 0.000 |
| Fe(ii) | 9.838 | 9.084 | 9.210 | 10.191 | 10.448 | 8.893 | 16.120 |
| Mn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Mg | 3.213 | 3.437 | 3.312 | 2.896 | 3.355 | 3.359 | 1.045 |
| Ca | 0.014 | 0.000 | 0.005 | 0.004 | 0.007 | 0.005 | 0.000 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 |

Table of spinel microprobe analysis from drill core G1 samples 26 & 21

| Nr | 1 | 2 | 5 | 6 | 10 | 25 | 26 | 27 | 28 | 44 |
|---|---|---|---|---|---|---|---|---|---|---|
| Sample | spin | spin | spin | spincore | pinrim G1-1 | 1-2 mat sp | -2 mat spin | -2 mat spin | 1-2 mat sp | spin |
| MgO | 0.658 | 0.509 | 0.227 | 11.154 | 0.221 | 1.165 | 1.133 | 0.811 | 0.236 | 1.199 |
| Al2O3 | 2.465 | 0.869 | 0.026 | 5.002 | 0.001 | 4.266 | 3.611 | 0.376 | 0.036 | 0.143 |
| Cr2O3 | 8.691 | 5.138 | 0.039 | 38.063 | 0.539 | 25.411 | 24.324 | 1.271 | 0.575 | 0.097 |
| FeO | 72.072 | 62.65 | 98.434 | 32.412 | 95.587 | 62.584 | 63.577 | 82.581 | 95.876 | 92.233 |
| TiO2 | 9.046 | 24.268 | 0.143 | 4.907 | 0.181 | 2.654 | 2.657 | 12.868 | 0.297 | 5.585 |
| MnO | 0.495 | 0.755 | 0.014 | 0 | 0.024 | 1.986 | 1.946 | 1.265 | 0.087 | 0.123 |
| SiO2 | 0.072 | 0.134 | 0.041 | 0.024 | 0.321 | 0.065 | 0.061 | 0.042 | 0.091 | 0.056 |
| CaO | 0.034 | 0.16 | 0.053 | 0.02 | 0.04 | 0.007 | 0.01 | 0.012 | 0.051 | 0.214 |
| K2O | 0 | 0.022 | 0 | 0.022 | 0.015 | 0.01 | 0.024 | 0.019 | 0.018 | 0.011 |
| Na2O | 0.088 | 0.035 | 0.086 | 0.006 | 0.015 | 0.054 | 0.041 | 0.029 | 0.027 | 0.011 |
| NiO | 0.293 | 0.04 | 0.492 | 0.257 | 0.253 | 0.182 | 0.208 | 0.274 | 0.239 | 0.258 |
| ZnO | | | | | | 3.956 | 3.565 | 0.052 | | |
| Summe | 93.914 | 94.58 | 99.555 | 91.867 | 97.197 | 102.867 | 101.678 | 100.764 | 97.789 | 99.93 |
| Formula without iron correction | | | | | | | | | | |
| Si | 0.026 | 0.044 | 0.016 | 0.007 | 0.125 | 0.021 | 0.020 | 0.014 | 0.036 | 0.022 |
| Ti | 2.416 | 5.938 | 0.041 | 1.123 | 0.053 | 0.636 | 0.649 | 3.330 | 0.087 | 1.639 |
| Al | 1.032 | 0.333 | 0.012 | 1.794 | 0.000 | 1.601 | 1.383 | 0.152 | 0.017 | 0.066 |
| Cr | 2.440 | 1.322 | 0.012 | 9.157 | 0.167 | 6.398 | 6.248 | 0.346 | 0.177 | 0.030 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 21.400 | 17.044 | 31.693 | 8.247 | 31.239 | 16.667 | 17.273 | 23.761 | 31.277 | 30.088 |
| Mn | 0.149 | 0.208 | 0.005 | 0.000 | 0.008 | 0.536 | 0.535 | 0.369 | 0.029 | 0.041 |
| Mg | 0.348 | 0.247 | 0.130 | 5.060 | 0.129 | 0.553 | 0.549 | 0.416 | 0.137 | 0.697 |
| Ca | 0.013 | 0.056 | 0.022 | 0.007 | 0.017 | 0.002 | 0.003 | 0.004 | 0.021 | 0.089 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.930 | 0.855 | 0.013 | 0.000 | 0.000 |
| TOTAL | 27.823 | 25.191 | 31.931 | 25.394 | 31.738 | 27.344 | 27.516 | 28.406 | 31.780 | 32.672 |
| Formula after iron correction normalised | | | | | | | | | | |
| Si | 0.022 | 0.042 | 0.012 | 0.007 | 0.095 | 0.018 | 0.017 | 0.012 | 0.027 | 0.016 |
| Ti | 2.084 | 5.658 | 0.031 | 1.061 | 0.040 | 0.558 | 0.566 | 2.814 | 0.066 | 1.204 |
| Al | 0.890 | 0.317 | 0.009 | 1.695 | 0.000 | 1.405 | 1.206 | 0.129 | 0.012 | 0.048 |
| Cr | 2.105 | 1.259 | 0.009 | 8.654 | 0.126 | 5.616 | 5.450 | 0.292 | 0.134 | 0.022 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(iii) | 8.793 | 3.025 | 15.896 | 3.514 | 15.604 | 7.827 | 8.177 | 9.927 | 15.668 | 16.987 |
| Fe(ii) | 9.666 | 13.213 | 7.925 | 4.280 | 8.019 | 6.802 | 6.889 | 10.148 | 7.951 | 5.115 |
| Mn | 0.128 | 0.198 | 0.003 | 0.000 | 0.006 | 0.470 | 0.467 | 0.311 | 0.022 | 0.030 |
| Mg | 0.300 | 0.235 | 0.098 | 4.782 | 0.097 | 0.485 | 0.479 | 0.351 | 0.104 | 0.512 |
| Ca | 0.011 | 0.053 | 0.016 | 0.006 | 0.013 | 0.002 | 0.003 | 0.004 | 0.016 | 0.066 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.816 | 0.746 | 0.011 | 0.000 | 0.000 |
| TOTAL | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 |

| Nr | 29 | 40 | 41 | 43 | 44 | 38 | 39 | 43 | 45 | 46 |
|---|---|---|---|---|---|---|---|---|---|---|
| Sample | G1-2 mat s | spin i | titanite | spin int cor | spin int rim | G1-14spin | spin | spin | spin | spin |
| MgO | 0.318 | 10.254 | | 1.414 | 1.286 | 6.879 | 11.018 | 1.752 | 1.375 | 0.641 |
| Al2O3 | 0.043 | 5.508 | 0.006 | 3.3 | 0.113 | 7.295 | 8.051 | 0.065 | 0.188 | 0.041 |
| Cr2O3 | 0.08 | 54.029 | 0.011 | 33.977 | 2.627 | 19.675 | 14.963 | 0.263 | 0.017 | 0.196 |
| FeO | 91.732 | 27.269 | 0.692 | 55.329 | 67.405 | 56.828 | 53.534 | 85.442 | 90.253 | 95.885 |
| TiO2 | 2.509 | 3.601 | 38.875 | 2.726 | 24.945 | 5.012 | 5.958 | 10.296 | 7 | 1.659 |
| MnO | 0.153 | 0.061 | | 2.27 | 2.444 | 0 | 0 | 0.316 | 0.165 | 0.029 |
| SiO2 | 0.251 | 0.126 | 29.871 | 0.052 | 0.095 | 0.066 | 0.092 | 0.063 | 0.066 | 0.122 |
| CaO | 0.888 | 0.004 | 27.166 | 0.028 | 0.044 | 0.005 | 0.023 | 0.144 | 0.1 | 0.061 |
| K2O | 0.026 | | | 0.003 | 0.023 | 0.012 | 0.041 | 0.003 | 0.004 | 0.013 |
| Na2O | 0.19 | 0.001 | 0.045 | 0.04 | 0.029 | 0.07 | 0.032 | 0.043 | 0.053 | 0 |
| NiO | 0.399 | 0.284 | 0.028 | 0.096 | 0.169 | 0.346 | 0.662 | 0.116 | 0.202 | 0.13 |
| ZnO | 0.042 | 0.124 | 0.061 | 4.742 | 0.341 | | | | | |
| Summe | 96.861 | 101.607 | 99.612 | 104.387 | 101.523 | 96.188 | 94.374 | 98.503 | 99.423 | 98.777 |
| Formula without iron correction | | | | | | | | | | |
| Si | 0.098 | 0.049 | 11.653 | 0.020 | 0.037 | 0.026 | 0.036 | 0.025 | 0.026 | 0.048 |
| Ti | 0.736 | 1.057 | 11.407 | 0.800 | 7.319 | 1.471 | 1.748 | 3.021 | 2.054 | 0.487 |
| Al | 0.020 | 2.532 | 0.003 | 1.517 | 0.052 | 3.354 | 3.702 | 0.030 | 0.086 | 0.019 |
| Cr | 0.025 | 16.664 | 0.003 | 10.479 | 0.810 | 6.068 | 4.615 | 0.081 | 0.005 | 0.060 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(ii) | 29.925 | 8.896 | 0.226 | 18.049 | 21.989 | 18.538 | 17.464 | 27.873 | 29.442 | 31.279 |
| Mn | 0.051 | 0.020 | 0.000 | 0.750 | 0.808 | 0.000 | 0.000 | 0.104 | 0.055 | 0.010 |
| Mg | 0.185 | 5.964 | 0.000 | 0.822 | 0.748 | 4.001 | 6.408 | 1.019 | 0.800 | 0.373 |
| Ca | 0.371 | 0.002 | 11.354 | 0.012 | 0.018 | 0.002 | 0.010 | 0.060 | 0.042 | 0.025 |
| Zn | 0.012 | 0.036 | 0.018 | 1.366 | 0.098 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 31.422 | 35.219 | 34.664 | 33.816 | 31.880 | 33.460 | 33.982 | 32.213 | 32.510 | 32.301 |
| Formula after iron correction normalised | | | | | | | | | | |
| Si | 0.075 | 0.033 | 8.068 | 0.014 | 0.028 | 0.018 | 0.025 | 0.018 | 0.019 | 0.035 |
| Ti | 0.562 | 0.720 | 7.898 | 0.568 | 5.510 | 1.055 | 1.235 | 2.251 | 1.516 | 0.362 |
| Al | 0.015 | 1.726 | 0.002 | 1.077 | 0.039 | 2.406 | 2.614 | 0.022 | 0.064 | 0.014 |
| Cr | 0.019 | 11.356 | 0.002 | 7.437 | 0.610 | 4.353 | 3.259 | 0.060 | 0.004 | 0.045 |
| V | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe(iii) | 15.117 | 20.387 | 19.689 | 18.578 | 15.819 | 18.094 | 18.800 | 16.317 | 16.752 | 16.447 |
| Fe(ii) | 7.739 | -14.325 | -19.533 | -5.768 | 0.735 | -4.797 | -6.466 | 4.449 | 4.983 | 6.794 |
| Mn | 0.039 | 0.014 | 0.000 | 0.532 | 0.608 | 0.000 | 0.000 | 0.078 | 0.040 | 0.007 |
| Mg | 0.141 | 4.064 | 0.000 | 0.584 | 0.563 | 2.870 | 4.526 | 0.759 | 0.590 | 0.277 |
| Ca | 0.283 | 0.001 | 7.861 | 0.008 | 0.014 | 0.001 | 0.007 | 0.045 | 0.031 | 0.019 |
| Zn | 0.009 | 0.024 | 0.012 | 0.969 | 0.074 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 | 24.000 |

Table of Spinel microprobe analysis from drill core G1 samples 13 & 2

# 20. Appendix 7: Phlogopite analysis

| Nr | 14 | 15 | 19 | 20 | 1 | 3 | 27 | 28 | 29 |
|---|---|---|---|---|---|---|---|---|---|
| | phl | phl | phl | phl | phl | phl | phl | phl | phl |
| Sample | G17-45-13 | G17-45-14 | G17-45-18 | G17-45-19 | G17-35a1 | G17-35b1 | G17-35b2 | G17-35b3 | G17-35b4 |
| SiO2 | 38.82 | 40.16 | 40.74 | 41.46 | 37.75 | 36.34 | 35.28 | 36.52 | 36.09 |
| Al2O3 | 13.47 | 13.8 | 12.86 | 13.66 | 12.87 | 12.88 | 12.76 | 12.4 | 12.48 |
| FeO | 5.44 | 5.12 | 4.8 | 5.06 | 3.4 | 3.66 | 3.63 | 4.06 | 4.2 |
| CaO | 0.07 | 0.08 | 0.26 | 0.22 | 0.02 | 0 | 0 | 0.01 | 0 |
| TiO2 | 6.5 | 5.49 | 3.69 | 3.65 | 2.69 | 2.74 | 2.55 | 3.61 | 3.12 |
| MnO | 0 | 0 | 0.03 | 0 | 0 | 0 | 0.02 | 0 | 0.02 |
| MgO | 20.38 | 21.08 | 21.44 | 22.25 | 20.95 | 20.93 | 21.14 | 21.89 | 21.68 |
| K2O | 8.45 | 8.35 | 9.51 | 10.29 | 9.26 | 9.22 | 8.91 | 8.96 | 8.94 |
| Sm2O3 | 0 | 0 | 0 | 0 | 0.03 | 0 | 0.03 | 0 | 0.03 |
| Nd2O3 | 0.07 | 0 | 0 | 0 | 0 | 0 | 0.03 | 0 | 0 |
| Ce2O3 | 0.04 | 0 | 0.04 | 0 | 0.04 | 0.04 | 0.04 | 0.09 | 0.09 |
| Y2O3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.07 | 0 |
| SrO | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| La2O3 | 0 | 0 | 0.05 | 0 | 0.05 | 0.1 | 0.05 | 0.05 | 0.05 |
| Gd2O3 | 0.07 | 0 | 0 | 0 | 0 | 0 | 0 | 0.03 | 0 |
| Nb2O5 | 0 | 0.04 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pr2O3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Na2O | 1.94 | 3.04 | 1.89 | 0.95 | 2.21 | 1.67 | 1.72 | 1.36 | 1.74 |
| P2O5 | 0.03 | 0 | 0 | 0 | 0 | 0.03 | 0 | 0 | 0 |
| Summe | 95.28 | 97.16 | 95.31 | 97.54 | 89.27 | 87.61 | 86.16 | 89.05 | 88.44 |
| Formula | | | | | | | | | |
| Si | 5.564 | 5.625 | 5.822 | 5.785 | 5.750 | 5.656 | 5.589 | 5.600 | 5.585 |
| Al iv | 2.275 | 2.278 | 2.166 | 2.215 | 2.250 | 2.344 | 2.383 | 2.241 | 2.276 |
| | | | | | | | | | |
| Al vi | 0.000 | 0.000 | 0.000 | 0.031 | 0.060 | 0.019 | 0.000 | 0.000 | 0.000 |
| Ti | 0.701 | 0.578 | 0.397 | 0.383 | 0.308 | 0.321 | 0.304 | 0.416 | 0.363 |
| Cr | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fe | 0.652 | 0.600 | 0.574 | 0.590 | 0.433 | 0.476 | 0.481 | 0.521 | 0.544 |
| Mn | 0.000 | 0.000 | 0.004 | 0.000 | 0.000 | 0.000 | 0.003 | 0.000 | 0.003 |
| Mg | 4.354 | 4.402 | 4.567 | 4.628 | 4.757 | 4.856 | 4.992 | 5.004 | 5.001 |
| Ni | 0.000 | 0.000 | 0.000 | 0.000 | | | | | |
| Ca | 0.011 | 0.012 | 0.040 | 0.033 | 0.003 | 0.000 | 0.000 | 0.002 | 0.000 |
| Na | 0.539 | 0.826 | 0.524 | 0.257 | 0.653 | 0.504 | 0.528 | 0.404 | 0.522 |
| K | 1.545 | 1.492 | 1.734 | 1.831 | 1.799 | 1.830 | 1.800 | 1.753 | 1.765 |
| Sr | 0.000 | 0.002 | 0.000 | 0.000 | 0.000 | 0.003 | 0.000 | 0.000 | 0.000 |
| OH* | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 |
| TOTAL | 19.640 | 19.816 | 19.827 | 19.753 | 20.013 | 20.009 | 20.080 | 19.941 | 20.058 |

Table of phlogopite analysis from drill core G17

| Nr | G1-13 | G1-28 | G1-20(cum | G1-21 | 8 | 12 | 18 | 19 | 35 | 13 |
|---|---|---|---|---|---|---|---|---|---|---|
| Beschreibung | | 24 | 68 | 14 | G1-20?2 | G13/17d3 | G13/17d9 | G13/17d10 | G13/17a1 | G17/35e1 |
| MgO | 18.125 | 22.158 | 21.947 | 24.139 | 22.44 | 24.57 | 25.85 | 25.44 | 27.2 | 24.23 |
| Al2O3 | 10.841 | 15.765 | 15.324 | 15.417 | 10.86 | 13.15 | 11.93 | 12.07 | 11.84 | 14 |
| Cr2O3 | 0.222 | 1.011 | 0.689 | 1.592 | 0.26 | 0.73 | 0.27 | 0.55 | 0.32 | 0.61 |
| FeO | 9.022 | 4.433 | 4.453 | 4.765 | 5.98 | 2.78 | 2.62 | 3.32 | 2.78 | 3.06 |
| TiO2 | 3.139 | 6.173 | 6.106 | 3.617 | 4.23 | 2.46 | 1.22 | 1.97 | 1.9 | 2.98 |
| MnO | 0.034 | 0.036 | 0.007 | 0 | 0 | 0 | 0 | 0.1 | 0 | 0.02 |
| SiO2 | 31.205 | 37.976 | 37.555 | 38.124 | 38.98 | 40.99 | 43.24 | 42.98 | 43.3 | 38.23 |
| CaO | 9.986 | 0.047 | 0.034 | 0.239 | 0 | 0.07 | 0 | 0 | 0 | 0 |
| K2O | 5.756 | 5.065 | 4.891 | 4.402 | 3.47 | 8.79 | 8.69 | 7.76 | 8.58 | 6.72 |
| Na2O | 0.63 | 0.269 | 0.371 | 3.353 | 1.72 | 0.93 | 1.04 | 0.91 | 1.13 | 1.26 |
| NiO | 0.067 | 0.222 | 0.173 | 0.244 | 0.17 | 0.03 | 0.03 | 0.07 | 0.14 | 0.21 |
| ZnO | | 0.014 | 0.084 | | | | | | | |
| Summe | 89.027 | 93.577 | 92.096 | 95.892 | 88.11 | 94.5 | 94.89 | 95.17 | 97.19 | 91.32 |
| | incl | phlog | phlog | inclsuion in spinel | | | | | | |

Formula

| Si | 5.041 | 5.397 | 5.422 | 5.332 | 5.862 | 5.805 | 6.058 | 6.000 | 5.942 | 5.578 |
|---|---|---|---|---|---|---|---|---|---|---|
| Al iv | 2.064 | 2.603 | 2.578 | 2.541 | 1.925 | 2.195 | 1.942 | 1.986 | 1.915 | 2.408 |
| | | | | | | | | | | |
| Al vi | 0.000 | 0.038 | 0.030 | 0.000 | 0.000 | 0.000 | 0.028 | 0.000 | 0.000 | 0.000 |
| Ti | 0.381 | 0.660 | 0.663 | 0.380 | 0.478 | 0.262 | 0.129 | 0.207 | 0.196 | 0.327 |
| Cr | 0.028 | 0.114 | 0.079 | 0.176 | 0.031 | 0.082 | 0.030 | 0.061 | 0.035 | 0.070 |
| Fe | 1.219 | 0.527 | 0.538 | 0.557 | 0.752 | 0.329 | 0.307 | 0.388 | 0.319 | 0.373 |
| Mn | 0.005 | 0.004 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.012 | 0.000 | 0.002 |
| Mg | 4.365 | 4.694 | 4.724 | 5.032 | 5.030 | 5.187 | 5.399 | 5.294 | 5.564 | 5.270 |
| Ni | 0.009 | 0.025 | 0.020 | 0.027 | 0.021 | 0.003 | 0.003 | 0.008 | 0.015 | 0.025 |
| Ca | 1.728 | 0.007 | 0.005 | 0.036 | 0.000 | 0.011 | 0.000 | 0.000 | 0.000 | 0.000 |
| Na | 0.197 | 0.074 | 0.104 | 0.909 | 0.502 | 0.255 | 0.283 | 0.246 | 0.301 | 0.356 |
| K | 1.186 | 0.918 | 0.901 | 0.785 | 0.666 | 1.588 | 1.553 | 1.382 | 1.502 | 1.251 |
| Sr | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| OH* | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 |
| TOTAL | 20.223 | 19.062 | 19.073 | 19.777 | 19.266 | 19.717 | 19.731 | 19.584 | 19.789 | 19.660 |

| Nr | 35 | 42 | 43 | 45 | 51 | 56 | 61 | 67 | 3 | 23 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Beschreibu | G17/40d9 | G17/40e5 | G17/40e6 | G17/40e8 | G17/40b3 | G17/40b8 | G17/40a1 | G17/40a7 | G17/45b2 | G17/45e8 | G17/45e7 |
| MgO | 28.4 | 24.65 | 25.07 | 22.63 | 33.42 | 22.66 | 36.38 | 36.01 | 14.81 | 27.49 | 28.47 |
| Al2O3 | 13.51 | 18.35 | 18.03 | 18.09 | 9.87 | 16.26 | 4.36 | 3.38 | 10.39 | 11.52 | 9.46 |
| Cr2O3 | 0.33 | 0.53 | 0.21 | 0.16 | 0.24 | 0.25 | 0.3 | 0.4 | 0.04 | 0.29 | 0.19 |
| FeO | 3.79 | 3.35 | 3.26 | 3.16 | 10.49 | 3.04 | 4.99 | 5.64 | 2.31 | 3.26 | 4.08 |
| TiO2 | 0.65 | 0.84 | 0.88 | 0.61 | 0 | 0.54 | 0.15 | 0.11 | 0.25 | 0.47 | 0.16 |
| MnO | 0 | 0 | 0 | 0 | 0 | 0.02 | 0 | 0 | 0 | 0.06 | 0.02 |
| SiO2 | 38.55 | 37.52 | 38.74 | 35.63 | 37.75 | 37.24 | 39.71 | 38.9 | 48.47 | 42.11 | 44.4 |
| CaO | 0.08 | 0 | 0 | 0 | 0.08 | 0 | 0 | 0 | 0 | 0 | 0.34 |
| K2O | 6.51 | 6.93 | 7.72 | 8.18 | 3.97 | 9.98 | 2.9 | 1.53 | 8.12 | 7.12 | 6.48 |
| Na2O | 0.52 | 0.6 | 0.52 | 0.67 | 0.97 | 0.3 | 0.22 | 0.15 | 1.82 | 1.59 | 1.22 |
| NiO | 0.07 | 0.17 | 0.03 | 0 | 0.24 | 0 | 0 | 0 | 0.11 | 0.11 | 0.06 |
| ZnO | | | | | | | | | 0 | 0 | |
| Summe | 92.41 | 92.94 | 94.46 | 89.13 | 97.03 | 90.29 | 89.01 | 86.12 | 86.32 | 94.02 | 94.88 |

Formula

| Si | 5.556 | 5.358 | 5.447 | 5.347 | 5.338 | 5.561 | 5.896 | 5.946 | 7.265 | 5.955 | 6.198 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Al iv | 2.295 | 2.642 | 2.553 | 2.653 | 1.645 | 2.439 | 0.763 | 0.609 | 0.735 | 1.920 | 1.557 |
| | | | | | | | | | | | |
| Al vi | 0.000 | 0.447 | 0.434 | 0.547 | 0.000 | 0.423 | 0.000 | 0.000 | 1.101 | 0.000 | 0.000 |
| Ti | 0.070 | 0.090 | 0.093 | 0.069 | 0.000 | 0.061 | 0.017 | 0.013 | 0.028 | 0.050 | 0.017 |
| Cr | 0.038 | 0.060 | 0.023 | 0.019 | 0.027 | 0.030 | 0.035 | 0.048 | 0.005 | 0.032 | 0.021 |
| Fe | 0.457 | 0.400 | 0.383 | 0.397 | 1.241 | 0.380 | 0.620 | 0.721 | 0.290 | 0.386 | 0.476 |
| Mn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.003 | 0.000 | 0.000 | 0.000 | 0.007 | 0.002 |
| Mg | 6.101 | 5.247 | 5.254 | 5.063 | 7.045 | 5.044 | 8.052 | 8.205 | 3.309 | 5.795 | 5.925 |
| Ni | 0.008 | 0.020 | 0.003 | 0.000 | 0.027 | 0.000 | 0.000 | 0.000 | 0.013 | 0.013 | 0.007 |
| Ca | 0.012 | 0.000 | 0.000 | 0.000 | 0.012 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.051 |
| Na | 0.145 | 0.166 | 0.142 | 0.195 | 0.266 | 0.087 | 0.063 | 0.044 | 0.529 | 0.436 | 0.330 |
| K | 1.197 | 1.262 | 1.384 | 1.566 | 0.716 | 1.901 | 0.549 | 0.298 | 1.552 | 1.284 | 1.154 |
| Sr | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| OH* | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 |
| TOTAL | 19.879 | 19.692 | 19.718 | 19.855 | 20.317 | 19.927 | 19.995 | 19.884 | 18.827 | 19.879 | 19.738 |

Table of phlogopite microprobe analysis from drill core G17, G13 and G1

# 21. Appendix 8: Perovskite analysis

| Sample | G17-35c1 | G17-35c2 | G17-35c3 | G17-35c6 | G17-35c7 | G17-35c8 | G17-35c9 | G17-35c10 | G17-35c11 |
|---|---|---|---|---|---|---|---|---|---|
| SiO2 | 0.04 | 0.11 | 0.07 | 0.11 | 0.07 | 0 | 0.04 | 0.07 | 0 |
| TiO2 | 56.96 | 57.21 | 56.51 | 55.53 | 58.11 | 54.8 | 56.38 | 55.67 | 54.77 |
| Al2O3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FeO | 0.51 | 0.51 | 0.77 | 0.86 | 0.67 | 0.61 | 0.37 | 0.47 | 0.77 |
| MnO | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MgO | 0.03 | 0 | 0 | 0.03 | 0 | 0 | 0 | 0 | 0 |
| CaO | 36.2 | 38.3 | 36.28 | 36 | 36.76 | 35.19 | 35.49 | 34.34 | 33.66 |
| Na2O | 0 | 1.19 | 0 | 1.5 | 1.5 | 0.6 | 0.6 | 1.21 | 1.51 |
| K2O | 0 | 0 | 0 | 0.02 | 0 | 0.01 | 0 | 0 | 0 |
| P2O5 | 0 | 0.05 | 0 | 0.1 | 0.05 | 0.02 | 0 | 0.02 | 0.02 |
| SrO | 0.19 | 0 | 0.06 | 0.06 | 0.06 | 0.03 | 0.12 | 0.13 | 0.13 |
| La2O3 | 0.76 | 0.67 | 0.9 | 1.1 | 1.05 | 0.91 | 0.81 | 1.05 | 1 |
| Ce2O3 | 2.63 | 2.25 | 2.93 | 2.89 | 2.89 | 2.55 | 2.08 | 2.89 | 3.14 |
| Nd2O3 | 1.25 | 1.07 | 1.47 | 1.5 | 1.39 | 1.25 | 0.81 | 1.5 | 1.28 |
| Sm2O3 | 0 | 0.13 | 0.27 | 0.17 | 0.03 | 0.1 | 0.2 | 0.24 | 0.13 |
| Gd2O3 | 0.34 | 0.24 | 0.41 | 0.54 | 0.54 | 0.27 | 0.3 | 0.47 | 0.44 |
| Y2O3 | 0 | 0.05 | 0.14 | 0 | 0.05 | 0.14 | 0 | 0.09 | 0.05 |
| Nb2O5 | 0.36 | 0.43 | 0.29 | 0.55 | 0.51 | 0.4 | 0.36 | 0.4 | 0.37 |
| Pr2O3 | 0.18 | 0 | 0.14 | 0.14 | 0.05 | 0.09 | 0 | 0.18 | 0.27 |
| Summe | 99.45 | 102.21 | 100.24 | 101.1 | 103.73 | 96.97 | 97.56 | 98.73 | 97.54 |
| Formula | | | | | | | | | |
| Si | 0.002 | 0.005 | 0.003 | 0.005 | 0.003 | 0.000 | 0.002 | 0.003 | 0.000 |
| Al | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ti | 2.005 | 1.957 | 1.986 | 1.945 | 1.973 | 1.984 | 2.011 | 1.990 | 1.986 |
| Fe | 0.020 | 0.019 | 0.030 | 0.034 | 0.025 | 0.025 | 0.015 | 0.019 | 0.031 |
| Mn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Mg | 0.002 | 0.000 | 0.000 | 0.002 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ca | 1.815 | 1.867 | 1.816 | 1.797 | 1.778 | 1.815 | 1.804 | 1.749 | 1.739 |
| Na | 0.000 | 0.105 | 0.000 | 0.135 | 0.131 | 0.056 | 0.055 | 0.112 | 0.141 |
| K | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 |
| P | 0.000 | 0.002 | 0.000 | 0.004 | 0.002 | 0.001 | 0.000 | 0.001 | 0.001 |
| La | 0.013 | 0.011 | 0.016 | 0.019 | 0.017 | 0.016 | 0.014 | 0.018 | 0.018 |
| Ce | 0.045 | 0.037 | 0.050 | 0.049 | 0.048 | 0.045 | 0.036 | 0.050 | 0.055 |
| Nd | 0.021 | 0.017 | 0.025 | 0.025 | 0.022 | 0.021 | 0.014 | 0.025 | 0.022 |
| Sm | 0.000 | 0.002 | 0.004 | 0.003 | 0.000 | 0.002 | 0.003 | 0.004 | 0.002 |
| Gd | 0.005 | 0.004 | 0.006 | 0.008 | 0.008 | 0.004 | 0.005 | 0.007 | 0.007 |
| Y | 0.000 | 0.001 | 0.003 | 0.000 | 0.001 | 0.004 | 0.000 | 0.002 | 0.001 |
| Nb | 0.008 | 0.009 | 0.006 | 0.012 | 0.010 | 0.009 | 0.008 | 0.009 | 0.008 |
| Pr | 0.003 | 0.000 | 0.002 | 0.002 | 0.001 | 0.002 | 0.000 | 0.003 | 0.005 |
| Summe | 3.938 | 4.037 | 3.948 | 4.041 | 4.022 | 3.983 | 3.967 | 3.993 | 4.016 |

Table of perovskite microprobe analysis from drill core G17 sample 35

| Sample | G17-35c12 | G17-35c13 | G17-35c15 | G17-35c16 | G17-35c17 | G17-35c18 | G17-35c19 | G17-35c20 | G17-35c21 |
|---|---|---|---|---|---|---|---|---|---|
| SiO2 | 0 | 0.07 | 0.11 | 0.07 | 0.04 | 0.07 | 0.07 | 0.07 | 0.15 |
| TiO2 | 56.93 | 58.25 | 56.96 | 57.57 | 57.25 | 57.69 | 54.67 | 58.12 | 58.29 |
| Al2O3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FeO | 0.75 | 0.36 | 0.47 | 0.45 | 0.44 | 0.58 | 0.54 | 0.51 | 0.6 |
| MnO | 0 | 0 | 0.02 | 0 | 0 | 0 | 0 | 0.02 | 0 |
| MgO | 0 | 0.13 | 0 | 0.06 | 0 | 0 | 0 | 0 | 0 |
| CaO | 34.74 | 36.39 | 35 | 34.2 | 35.54 | 35.46 | 32.81 | 35.37 | 34.99 |
| Na2O | 0.86 | 0.57 | 0.57 | 1.14 | 0.28 | 0.62 | 0.3 | 0.93 | 0.62 |
| K2O | 0 | 0.01 | 0 | 0 | 0.02 | 0.02 | 0 | 0.01 | 0 |
| P2O5 | 0.02 | 0.05 | 0.05 | 0.02 | 0 | 0 | 0.07 | 0.02 | 0.02 |
| SrO | 0.14 | 0.13 | 0.1 | 0.2 | 0.07 | 0.06 | 0.15 | 0.09 | 0 |
| La2O3 | 1.06 | 0.82 | 0.82 | 1.06 | 0.68 | 0.68 | 0.95 | 0.58 | 0.72 |
| Ce2O3 | 3.08 | 2.23 | 2.66 | 2.95 | 1.88 | 1.96 | 1.94 | 1.79 | 1.66 |
| Nd2O3 | 1.37 | 1.2 | 1.16 | 1.45 | 0.82 | 0.93 | 0.99 | 0.9 | 0.86 |
| Sm2O3 | 0.07 | 0.1 | 0.17 | 0.17 | 0.17 | 0.24 | 0.2 | 0.17 | 0.1 |
| Gd2O3 | 0.38 | 0.38 | 0.38 | 0.34 | 0.31 | 0.27 | 0.2 | 0.24 | 0.31 |
| Y2O3 | 0.09 | 0.05 | 0.19 | 0.05 | 0.09 | 0.09 | 0.09 | 0.09 | 0.14 |
| Nb2O5 | 0.27 | 0.27 | 0.44 | 0.34 | 0.43 | 0.28 | 0.54 | 0.4 | 0.25 |
| Pr2O3 | 0.23 | 0.19 | 0 | 0.14 | 0 | 0.09 | 0.18 | 0 | 0 |
| Summe | 99.99 | 101.2 | 99.1 | 100.21 | 98.02 | 99.04 | 93.7 | 99.31 | 98.71 |
| Formula | | | | | | | | | |
| Si | 0.000 | 0.003 | 0.005 | 0.003 | 0.002 | 0.003 | 0.003 | 0.003 | 0.007 |
| Al | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ti | 2.005 | 2.008 | 2.009 | 2.018 | 2.025 | 2.023 | 2.030 | 2.027 | 2.039 |
| Fe | 0.029 | 0.014 | 0.018 | 0.018 | 0.017 | 0.023 | 0.022 | 0.020 | 0.023 |
| Mn | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 |
| Mg | 0.000 | 0.009 | 0.000 | 0.004 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ca | 1.744 | 1.787 | 1.759 | 1.708 | 1.791 | 1.772 | 1.736 | 1.758 | 1.744 |
| Na | 0.078 | 0.051 | 0.052 | 0.103 | 0.026 | 0.056 | 0.029 | 0.084 | 0.056 |
| K | 0.000 | 0.001 | 0.000 | 0.000 | 0.001 | 0.001 | 0.000 | 0.001 | 0.000 |
| P | 0.001 | 0.002 | 0.002 | 0.001 | 0.000 | 0.000 | 0.003 | 0.001 | 0.001 |
| La | 0.018 | 0.014 | 0.014 | 0.018 | 0.012 | 0.012 | 0.017 | 0.010 | 0.012 |
| Ce | 0.053 | 0.037 | 0.046 | 0.050 | 0.032 | 0.033 | 0.035 | 0.030 | 0.028 |
| Nd | 0.023 | 0.020 | 0.019 | 0.024 | 0.014 | 0.015 | 0.017 | 0.015 | 0.014 |
| Sm | 0.001 | 0.002 | 0.003 | 0.003 | 0.003 | 0.004 | 0.003 | 0.003 | 0.002 |
| Gd | 0.006 | 0.006 | 0.006 | 0.005 | 0.005 | 0.004 | 0.003 | 0.004 | 0.005 |
| Y | 0.002 | 0.001 | 0.005 | 0.001 | 0.002 | 0.002 | 0.002 | 0.002 | 0.003 |
| Nb | 0.006 | 0.006 | 0.009 | 0.007 | 0.009 | 0.006 | 0.012 | 0.008 | 0.005 |
| Pr | 0.004 | 0.003 | 0.000 | 0.002 | 0.000 | 0.002 | 0.003 | 0.000 | 0.000 |
| Summe | 3.970 | 3.962 | 3.948 | 3.966 | 3.939 | 3.957 | 3.917 | 3.966 | 3.940 |

Table of perovskite microprobe analysis from drill core G17 sample 35

| Sample | G17-35c22 | G17-33a | G17-33b | G17-33c | G17-33d | G17-33e | G17-33f | G17-33g | G17-33h |
|---|---|---|---|---|---|---|---|---|---|
| SiO2 | 0 | 0.04 | 0.07 | 0.07 | 0.07 | 0.03 | 0.07 | 0.1 | 0.14 |
| TiO2 | 58.5 | 62.47 | 60.68 | 61.24 | 61.19 | 61.28 | 63.85 | 61.73 | 61.69 |
| Al2O3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FeO | 0.47 | 0.22 | 0.14 | 0.22 | 0.16 | 0.18 | 0.16 | 0.27 | 0.27 |
| MnO | 0 | 0 | 0 | 0 | 0.02 | 0.02 | 0.05 | 0 | 0.07 |
| MgO | 0.07 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.03 |
| CaO | 34.6 | 38.47 | 37.22 | 37.67 | 38.24 | 37.92 | 38.4 | 38.19 | 37.93 |
| Na2O | 0.93 | 0 | 0 | 0 | 0.3 | 0.3 | 0.61 | 0 | 0 |
| K2O | 0.01 | 0 | 0 | 0.01 | 0.04 | 0.01 | 0 | 0 | 0 |
| P2O5 | 0.05 | 0.02 | 0 | 0 | 0 | 0.02 | 0 | 0 | 0.02 |
| SrO | 0.06 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| La2O3 | 0.82 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.05 |
| Ce2O3 | 2.27 | 0.04 | 0.09 | 0.09 | 0 | 0.09 | 0 | 0 | 0.04 |
| Nd2O3 | 0.93 | 0.04 | 0 | 0 | 0 | 0 | 0.08 | 0.04 | 0 |
| Sm2O3 | 0.27 | 0 | 0 | 0.07 | 0 | 0 | 0.1 | 0 | 0 |
| Gd2O3 | 0.27 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.03 |
| Y2O3 | 0.09 | 0.09 | 0.14 | 0.19 | 0 | 0.05 | 0.05 | 0 | 0.09 |
| Nb2O5 | 0.31 | 0 | 0 | 0 | 0.03 | 0 | 0 | 0.06 | 0 |
| Pr2O3 | 0.05 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Summe | 99.7 | 101.39 | 98.34 | 99.56 | 100.05 | 99.9 | 103.37 | 100.39 | 100.36 |
| Formula | | | | | | | | | |
| Si | 0.000 | 0.002 | 0.003 | 0.003 | 0.003 | 0.001 | 0.003 | 0.004 | 0.006 |
| Al | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ti | 2.038 | 2.079 | 2.081 | 2.077 | 2.066 | 2.072 | 2.084 | 2.074 | 2.074 |
| Fe | 0.018 | 0.008 | 0.005 | 0.008 | 0.006 | 0.007 | 0.006 | 0.010 | 0.010 |
| Mn | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.001 | 0.002 | 0.000 | 0.003 |
| Mg | 0.005 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 |
| Ca | 1.718 | 1.824 | 1.819 | 1.820 | 1.839 | 1.827 | 1.786 | 1.828 | 1.817 |
| Na | 0.084 | 0.000 | 0.000 | 0.000 | 0.026 | 0.026 | 0.051 | 0.000 | 0.000 |
| K | 0.001 | 0.000 | 0.000 | 0.001 | 0.002 | 0.001 | 0.000 | 0.000 | 0.000 |
| P | 0.002 | 0.001 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.001 |
| La | 0.014 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 |
| Ce | 0.039 | 0.001 | 0.002 | 0.001 | 0.000 | 0.001 | 0.000 | 0.000 | 0.001 |
| Nd | 0.015 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.001 | 0.000 |
| Sm | 0.004 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 |
| Gd | 0.004 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Y | 0.002 | 0.002 | 0.003 | 0.005 | 0.000 | 0.001 | 0.001 | 0.000 | 0.002 |
| Nb | 0.006 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.001 | 0.000 |
| Pr | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Summe | 3.951 | 3.917 | 3.913 | 3.917 | 3.944 | 3.938 | 3.936 | 3.919 | 3.917 |

Table of perovskite analysis from drill core G17 samples 35 & 33

| Sample | G17-38a | G17-38b | G17-38c | G17-38d |
|---|---|---|---|---|
| SiO2 | 0.07 | 0.1 | 0.17 | 0.1 |
| TiO2 | 61.38 | 59.55 | 60.46 | 61.3 |
| Al2O3 | 0 | 0 | 0 | 0 |
| FeO | 0.27 | 0.22 | 0.38 | 0.36 |
| MnO | 0 | 0.02 | 0 | 0 |
| MgO | 0 | 0.03 | 0.09 | 0 |
| CaO | 38.16 | 37.7 | 38.22 | 38.74 |
| Na2O | 0 | 0.3 | 0 | 0 |
| K2O | 0.01 | 0 | 0 | 0 |
| P2O5 | 0 | 0 | 0.02 | 0.02 |
| SrO | 0 | 0 | 0 | 0 |
| La2O3 | 0 | 0.05 | 0 | 0 |
| Ce2O3 | 0.04 | 0.13 | 0 | 0.13 |
| Nd2O3 | 0.08 | 0.11 | 0 | 0.04 |
| Sm2O3 | 0.03 | 0 | 0 | 0.07 |
| Gd2O3 | 0 | 0 | 0 | 0 |
| Y2O3 | 0.09 | 0.05 | 0 | 0 |
| Nb2O5 | 0.03 | 0.03 | 0 | 0 |
| Pr2O3 | 0 | 0 | 0 | 0 |
| Summe | 100.16 | 98.29 | 99.34 | 100.76 |
| Formula | | | | |
| Si | 0.003 | 0.005 | 0.008 | 0.004 |
| Al | 0.000 | 0.000 | 0.000 | 0.000 |
| Ti | 2.070 | 2.052 | 2.055 | 2.058 |
| Fe | 0.010 | 0.008 | 0.014 | 0.013 |
| Mn | 0.000 | 0.001 | 0.000 | 0.000 |
| Mg | 0.000 | 0.002 | 0.006 | 0.000 |
| Ca | 1.834 | 1.851 | 1.851 | 1.853 |
| Na | 0.000 | 0.027 | 0.000 | 0.000 |
| K | 0.001 | 0.000 | 0.000 | 0.000 |
| P | 0.000 | 0.000 | 0.001 | 0.001 |
| La | 0.000 | 0.001 | 0.000 | 0.000 |
| Ce | 0.001 | 0.002 | 0.000 | 0.002 |
| Nd | 0.001 | 0.002 | 0.000 | 0.001 |
| Sm | 0.000 | 0.000 | 0.000 | 0.001 |
| Gd | 0.000 | 0.000 | 0.000 | 0.000 |
| Y | 0.002 | 0.001 | 0.000 | 0.000 |
| Nb | 0.001 | 0.001 | 0.000 | 0.000 |
| Pr | 0.000 | 0.000 | 0.000 | 0.000 |
| Summe | 3.923 | 3.953 | 3.936 | 3.934 |

Table of perovskite analysis from drill core G17 sample 38

# 22. Table of Figures

# 23. Table of Tables