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MINERALOGY – PETROLOGY · SECTION PREPARATION

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MINERALOGICAL REPORT No. 10023

by Alan C. Purvis, PhD

December 6th, 2011

TO :	Mr Andrei K. Karpinski Korab Resources Ltd PO Box 195 SOUTH PERTH WA 6951
COPY TO :	John A Earthrowl Consultant to Korab Resources Ltd PO Box 219 BATCHELOR NT 0845
YOUR REFERENCE :	J. Earthrowl emails 31/10/11 and 4/11/11
MATERIAL & IDENTIFICATION :	Six core samples numbered 13751 to 13779
WORK REQUESTED :	Polished thin section preparation, description and report with comments as specified.
SAMPLES & SECTIONS :	Returned to you with hard copy of this report.
DIGITAL COPY :	Emailed 12/12/11 to <sildol@bigpond.com> <akk@korabresources.com.au>

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SUMMARY COMMENTS

This report presents descriptions of six polished thin sections of core samples from the Rum Jungle Mineral field, N.T., for John Earthrowl on behalf of Korab resources. These are from an unnamed drillhole at depths from 65m to 201m as listed in the summary below. Fifteen photomicrographs are integrated with the individual petrographic descriptions.

These six core samples are labelled non-consecutively from 13751 to 13779 and represent low temperature altered and metamorphosed mafic and ultramafic rocks. The mafic rocks occur above and below definite and probable ultramafic rocks at 130m (13764) and 180m (13777).

The shallowest sample, at 65m (13751) represents altered dolerite with chlorite-carbonate-actinolite-stilpnomelane-quartz-pyrite-alteration, containing ilmenite-carbonate ex-magnetite and sparse chalcopyrite, millerite and polydymite). **This is followed at 95m (13757)** by an original mafic or ultramafic lithology, now altered to talc-carbonate-chlorite-magnetite-ilmenite with accessory pyrite, chalcopyrite and pentlandite.

The most clearly preserved ultramafic sample is at 130m (13764) containing largely parallel olivine shapes altered to talc and carbonate and sparse ilmenite in areas altered to tremolite, chlorite and microcrystalline opaque oxide, possibly indicating former 'schiller' oxide in pyroxene. This sample carries accessory magnetite and pyrrhotite, lesser pentlandite and chalcopyrite.

A less clearly preserved **probable ex-peridotite at 180m (13774)** is altered to talc-chlorite and carbonate, with accessory disseminated magnetite, ilmenite and sparse pyrrhotite, chalcopyrite and pyrite). The presence of ilmenite differentiates this sample from 13764.

Mafic samples at 195m (13777) and 200m (13779) contain abundant or minor stilpnomelane, with ilmenite ± anatase as the main oxide. The shallower sample at 195m is stilpnomelane-carbonate-chlorite-biotite-altered probable mafic lithology, with accessory lesser ilmenite, pyrrhotite, pyrite, chalcopyrite and apatite. The deeper sample has less stilpnomelane and is richer in carbonate, classified as a carbonate-chlorite-quartz-stilpnomelane-ilmenite-anatase-altered dolerite, with accessory apatite, pyrite and rare possible arsenopyrite. These mafic samples have more aluminous minerals, ilmenite and minor apatite than the ultramafic lithologies.

Classification of these rock types according to Streckeisen (1974), as requested in the letter accompanying the samples, would require accurate identification of all primary silicate minerals, but this is not possible, due to ubiquitous advanced alteration. It is also noted that, apart from sample 13764, with recognizable olivine shapes and interstitial aggregates apparently derived from former pyroxene oikocrysts, there is mostly poor textural preservation, also prohibiting precise rock classification.

The accessory to sparse sulphides suggest higher sulphur activities in the shallower samples. The dolerite at 65m (13751) has pyrite-millerite-polydymite-chalcopyrite, suggesting higher fS_2 values than indicated by the pyrite-pentlandite-chalcopyrite at 95m and than the pyrrhotite-pentlandite-chalcopyrite at 130, 180 and 195m. Pyrite at 200m (13779) may be related to the presence of anatase as well as ilmenite, and suggests a reversion to higher fS_2 values.

INDIVIDUAL PETROGRAPHIC DESCRIPTIONS

13751: 65-66m **Dolerite, altered to chlorite-carbonate-actinolite-stilpnomelane-quartz-pyrite. Minor ilmenite-carbonate ex-magnetite and sparse chalcopyrite, millerite and polydymite.**

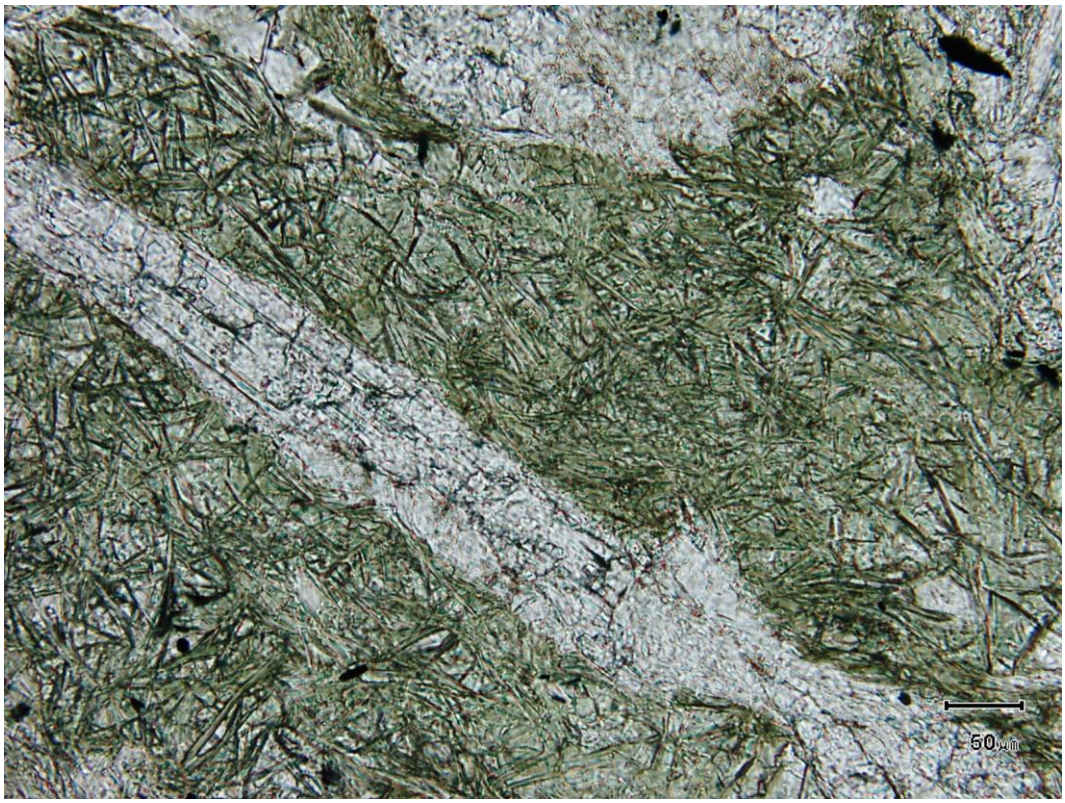
Hand Specimen

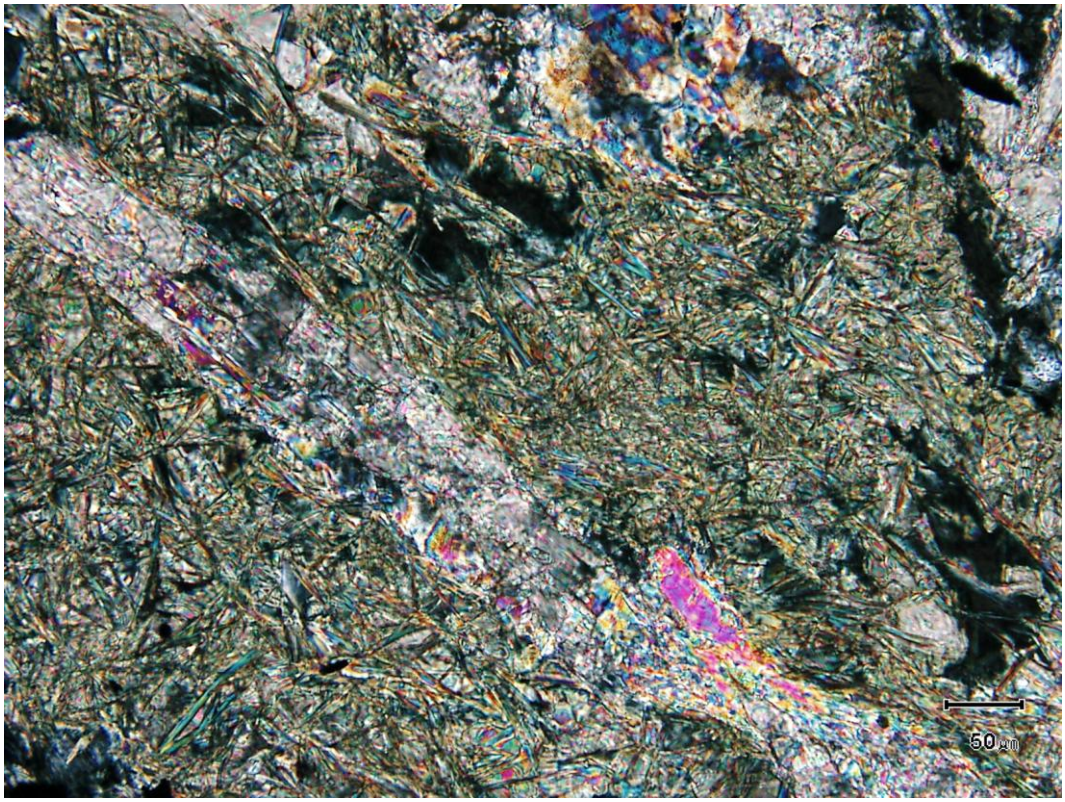
This core segment has fine-grained grey material of uncertain composition.

Thin Section

This sample has various components indicating former dolerite:

1. Abundant lenses of chlorite to 6mm long (~45%) which seem to represent former plagioclase. These lenses are commonly subparallel and contain pale green almost isotropic chlorite.
2. Partly rectangular aggregates to 3mm long (40-45%) contain various proportions of tremolite-actinolite and carbonate, locally with minor to abundant talc and/or stilpnomelane. These aggregates seem to represent pyroxene, probably clinopyroxene.
3. Ilmenite-carbonate aggregates (7-8%) apparently representing altered euhedral magnetite crystals to 0.5mm in size.
4. Small patches rich in microcrystalline quartz are scattered (2-3%) but of uncertain origin.
5. Several clusters of pyrite are scattered irregularly and up to 5mm x 4mm with inclusions of ilmenite, chlorite, carbonate, tremolite-actinolite and stilpnomelane. Sparse very fine-grained sulphide includes chalcopyrite, millerite (NiS) and polydymite (Ni_3S_4).
6. Rare needles of apatite to 0.7mm long occur in chlorite-rich areas.





Figs 1 & 2 **13751: 65-66m** **50 µm**

Thin section (TS), Fig 1: Plane polarised light (PPL). Fig 2: Crossed nicols (Xnic). Magnification (x200). Part of a lens of greenish stilpnomelane, with granular carbonate (top) and a carbonate vein.

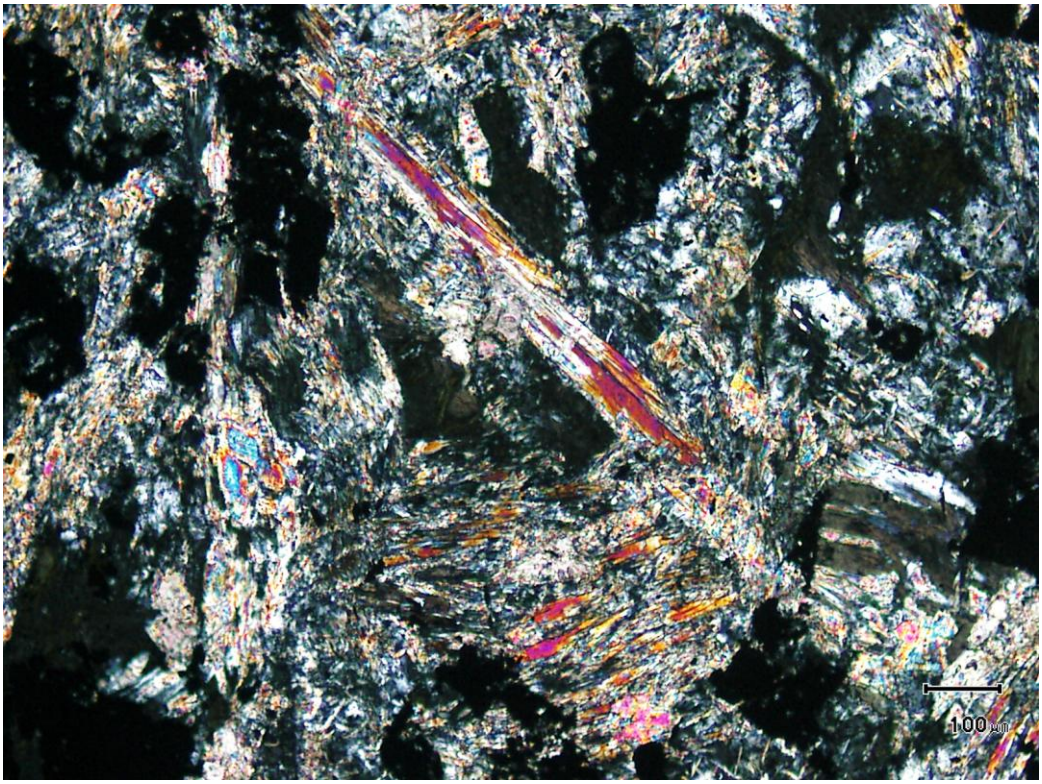


Fig 3 **13751: 65-66m** **100 µm**

TS, Xnic. (x100). Prisms and aggregate of tremolite-actinolite (ex-pyroxene) and black-isotropic chlorite (ex-plagioclase).

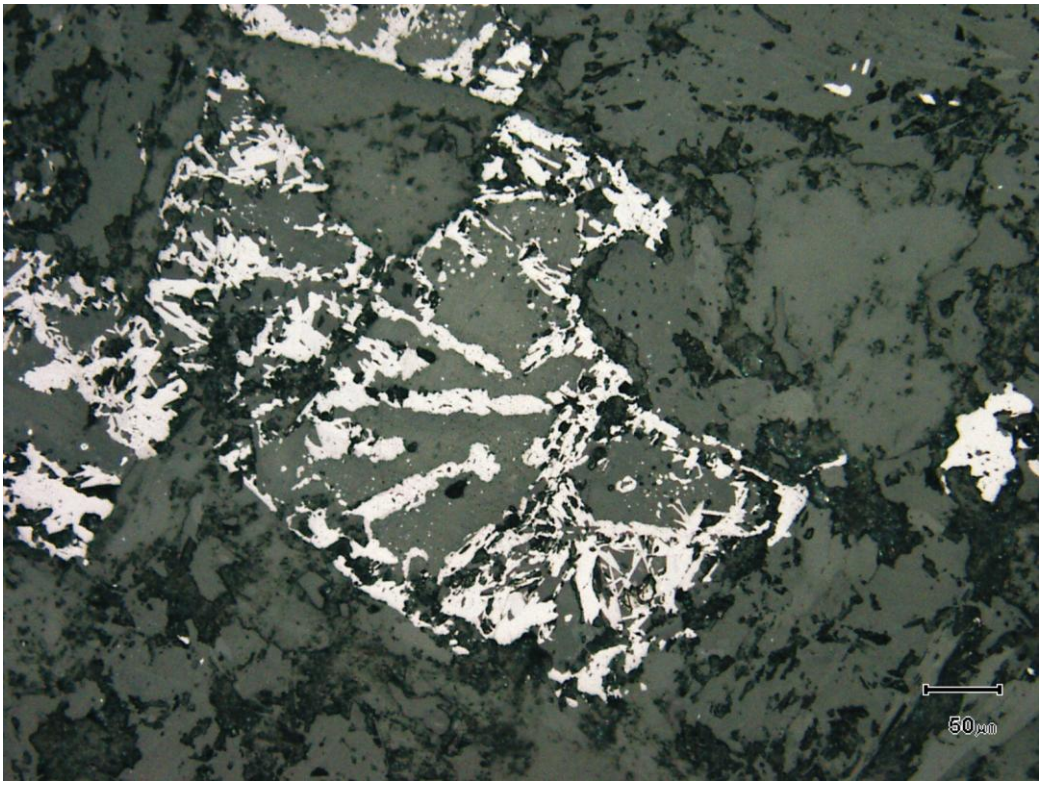


Fig 4 **13751: 65-66m** **50 µm**

Polished thin section (PTS), Reflected plane light (RPL). (x200). Ilmenite and carbonate ex-titanomagnetite, incorporated within carbonate and stilpnomelane alteration.

Fig 5 **13751: 65-66m** **50 µm**

PTS, RPL. (x200). Two small composite grains (circled) of variously blue, brown and yellow millerite grains and scattered small aggregates of grey and black ilmenite in a heterogeneous matrix of carbonate and stilpnomelane.

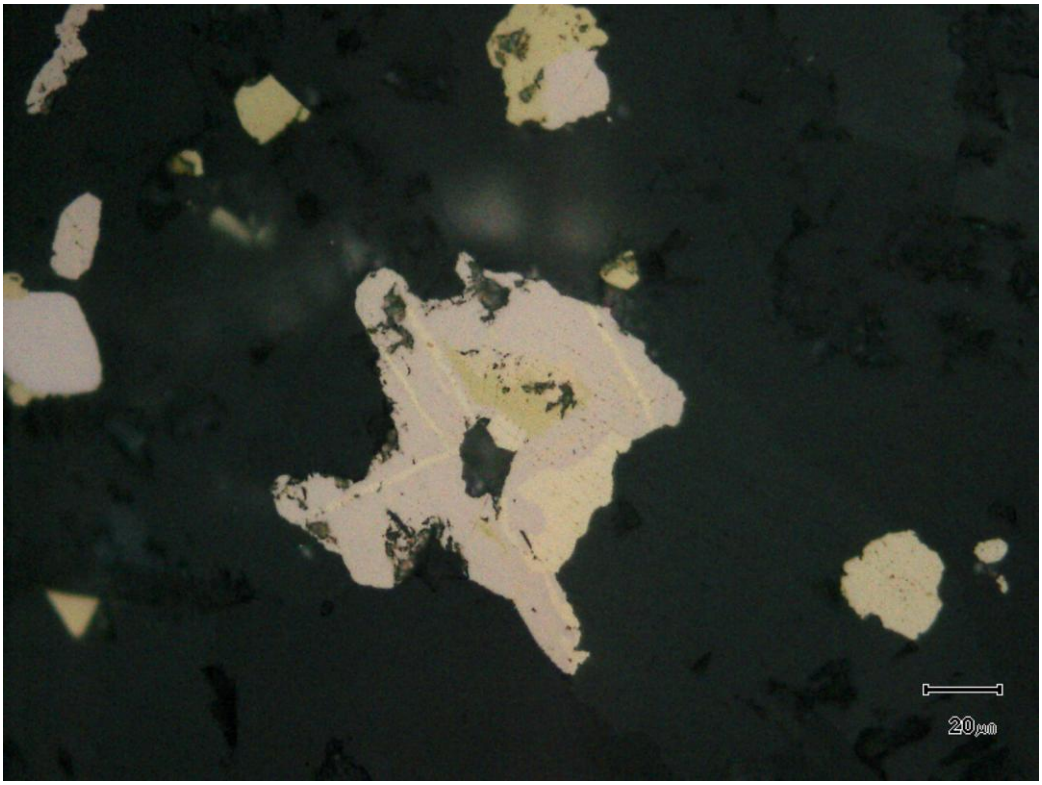


Fig 6 **13751: 65-66m** **20 µm**

TS. RPL. (x500). Very small composite grains of purplish probable polydymite, cream millerite and rare dull yellow chalcopyrite (in the largest central composite).

13757: 95-96m **Mafic or ultramafic lithology, altered to talc-carbonate-chlorite-magnetite-ilmenite. Minor to sparse pyrite, chalcopyrite and pentlandite.**

Hand Specimen

This core segment is paler, more greyish compared to the previous sample.

Thin Section

Lenses of pale green chlorite (15%) scattered through this sample seem to represent former feldspar. However, small elongate patches containing fine disseminated or lamellar ilmenite, suggesting former biotite.

The rest of the thin section has scattered grains of carbonate to 2mm long (~20%) and abundant (~50%) commonly foliated or crenulated talc. Lenses with both talc and chlorite (10%) also occur, but are not as well foliated as talc-rich patches. Inequigranular opaque oxide is disseminated (~5%), including granular magnetite and fine-grained partly foliated ilmenite. There is also accessory disseminated pyrrhotite, locally composite with pentlandite and/or chalcopyrite. Some of the pentlandite occurs as 'flames' in pyrrhotite but some is granular.

This sample may represent an original mafic or ultramafic lithology, with less feldspar compared to the previous sample, as well as minor biotite and abundant possible ex-pyroxene(s) ± olivine.

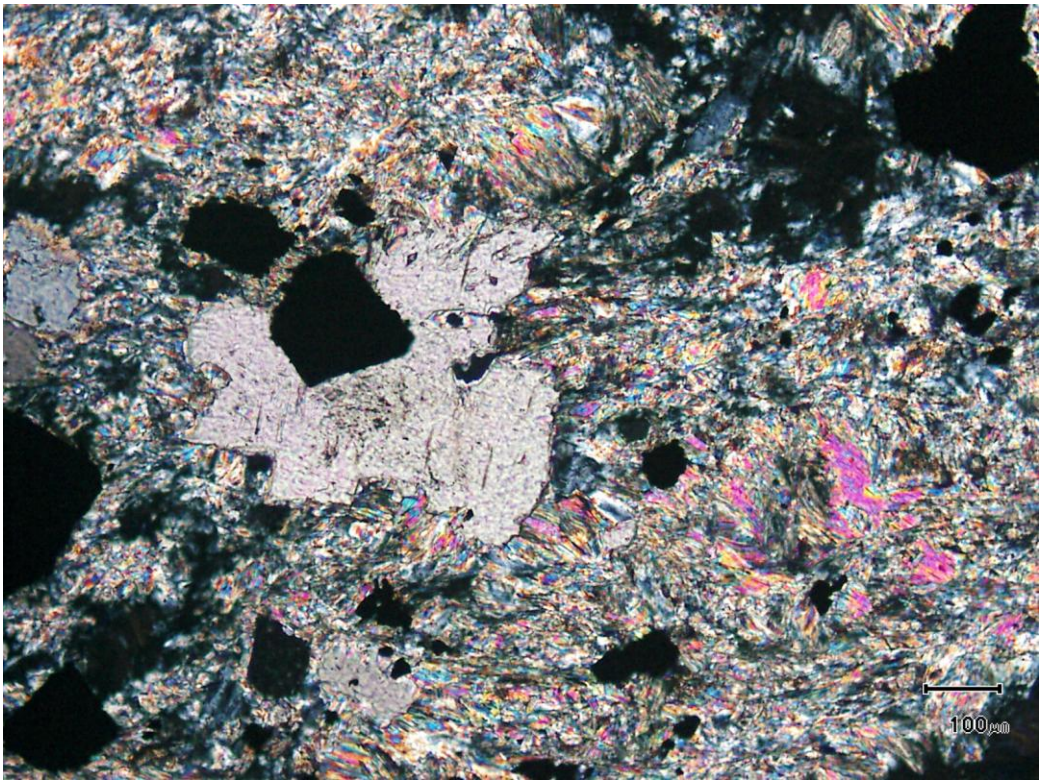


Fig 7 **13757: 95-96m** **100 µm**

TS. Xnic. (x100). Granular carbonate crystals and opaque grains of magnetite, ilmenite and sulphide in massive fine talc.

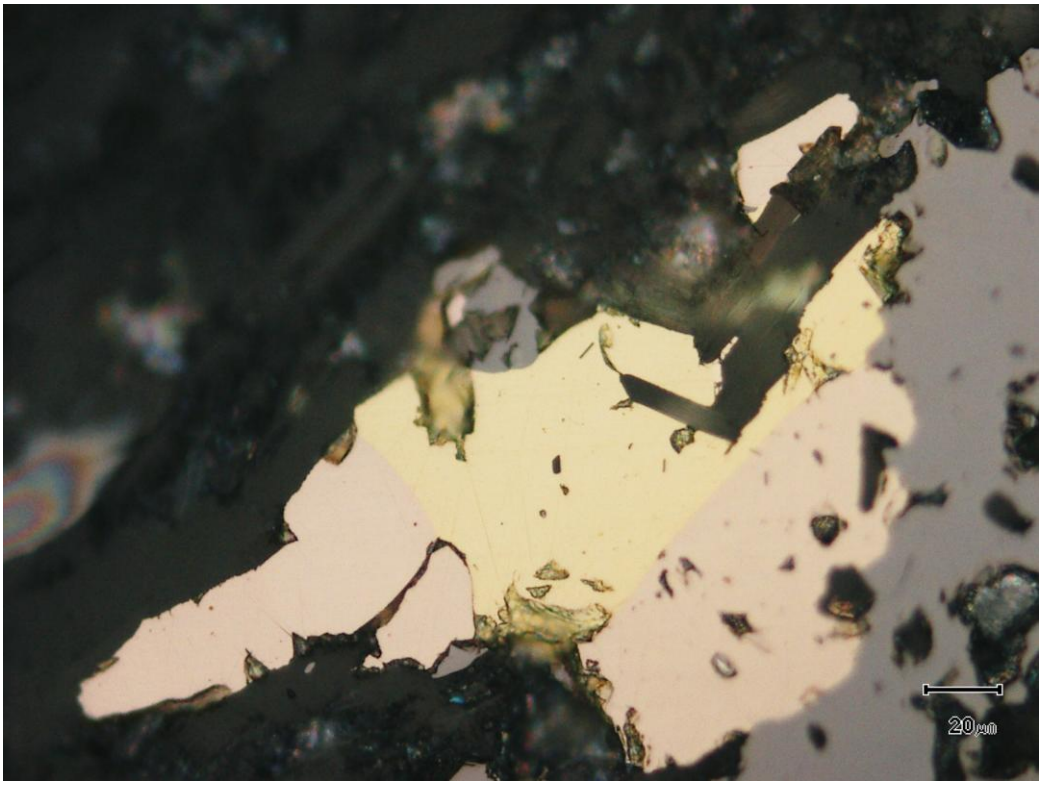


Fig 8 **13757: 95-96m** **20 µm**

PTS. RPL. (x500). Granular carbonate crystals and opaque grains of magnetite, ilmenite and sulphide in massive fine talc.

Fig 9 **13757: 95-96m** **500 µm**

PTS, RPL. (x20). Composite of pyrrhotite with white pyrite crystals and cream pentlandite (granular and as microscopic 'flames')

13764: 130-131m **Talc-chlorite-carbonate-sulphide-magnetite-altered peridotite (olivine cumulate) with disseminated sulphide (pyrrhotite > pentlandite, chalcopyrite)**

Hand Specimen

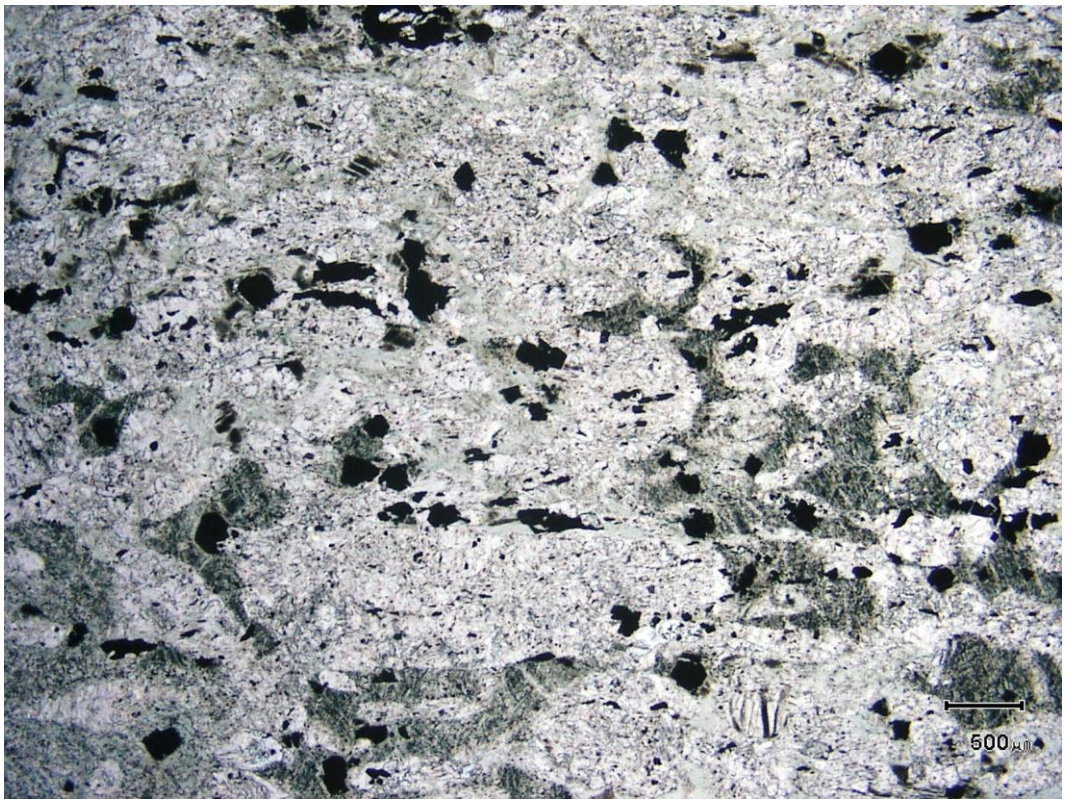
This is a darker grey sample than 13757.

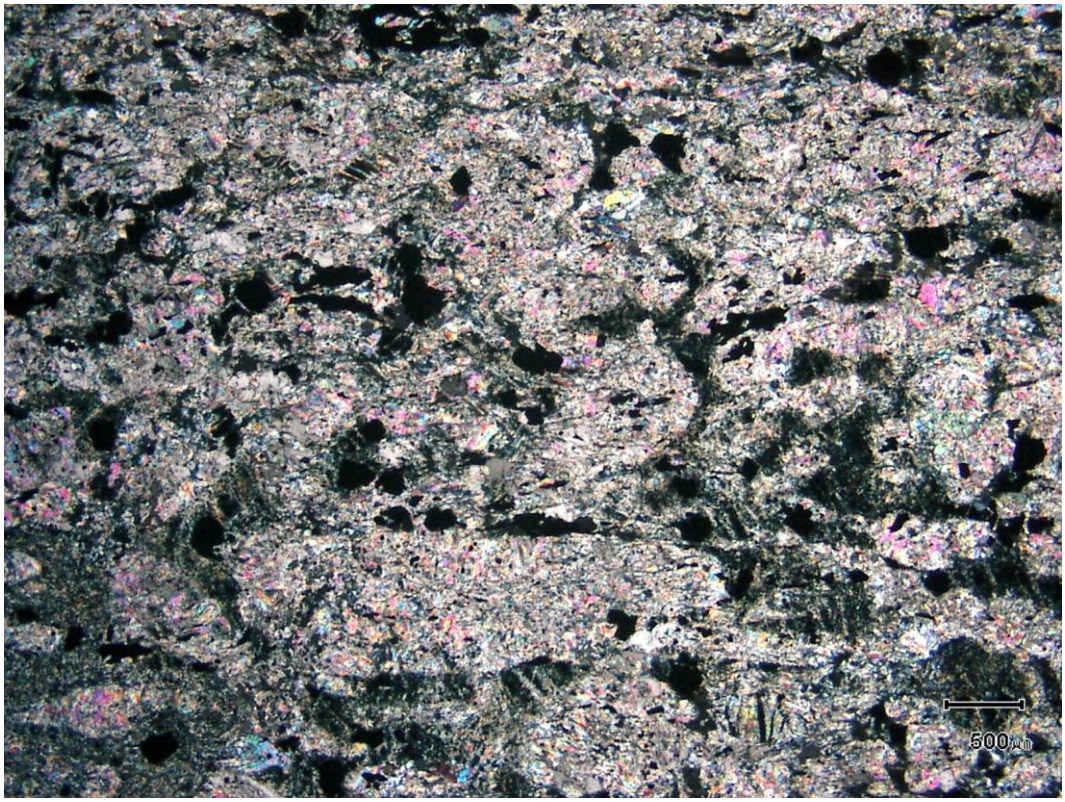
Thin Section

Abundant, commonly parallel aggregates of talc with minor carbonate and sparse opaque oxide that seem to have replaced former cumulus olivine crystals to 4mm long. Interstitial material makes up 25-30% of the thin section and is clouded with microcrystalline opaque oxide. This consists of talc and chlorite in various proportions and may have replaces oikocrysts of pyroxene.

Sparse lamellar talc-opaque oxide aggregate have replaced fine-grained biotite or phlogopite. Sparse possible chrome magnetite is disseminated, about 0.2mm in grainsize, with 3-4% disseminated sulphide in aggregates to 0.8mm long. The main sulphide is pyrrhotite with minor pentlandite and chalcopyrite generally composite with the pyrrhotite.

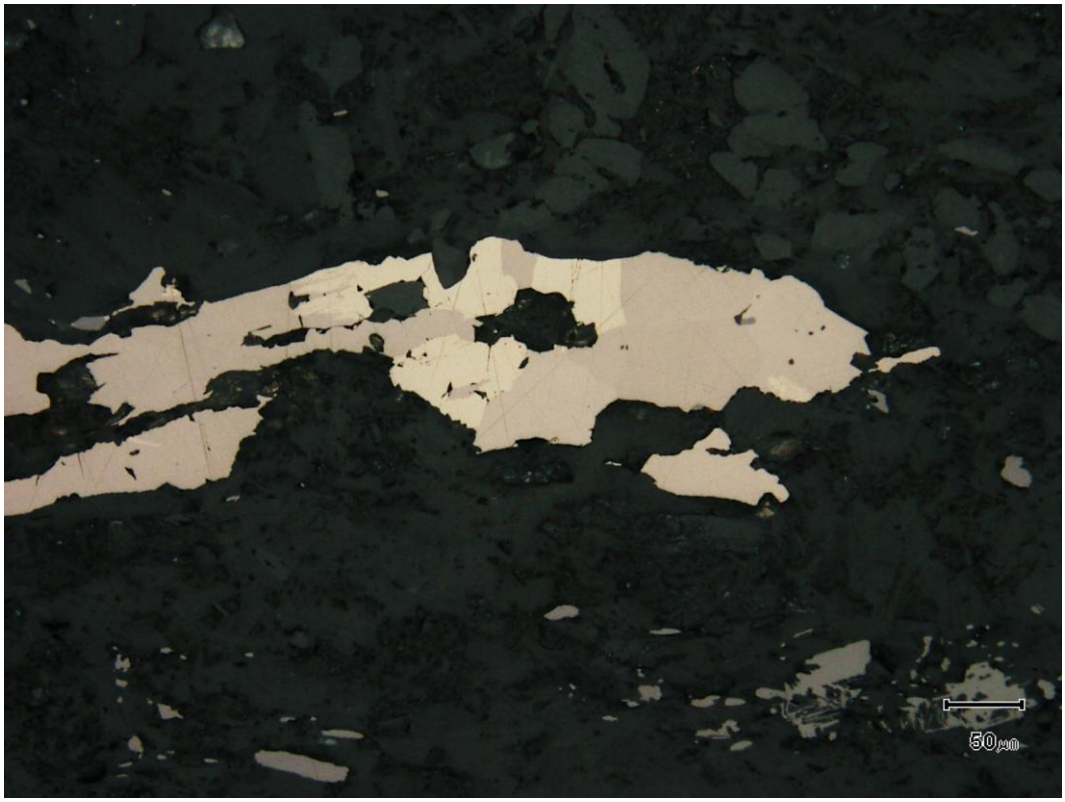
This sample is interpreted to represent olivine accumulative peridotite but the exact nature of interstitial possible pyroxene is uncertain.





Figs 10 & 11 **13764: 130-131m** **500 µm**

TS. Fig 10: PPL. Fig 11: Xnic. (x20). Talc and minor carbonate pseudomorphically replacing olivine grains parallel to the length of the photomicrograph. Accessory black opaque magnetite an sulphide grains, also densely magnetite-clouded talc ex-interstitial pyroxene.



Figs 12 & 13 **13764: 130-131m** **50 µm**

PTS. RPL. Composite grains of pyrrhotite with pentlandite ± chalcopyrite. Grey magnetite with inclusions of pyrrhotite in SE quadrant of Fig 12.

13774: 180-181m **Talc-chlorite-carbonate-altered possible peridotite (wehrlite?) with minor disseminated magnetite, ilmenite and sulphide (pyrrhotite, chalcopyrite and pyrite).**

Hand Specimen

This sample is paler than the previous sample and is pale grey in colour.

Thin Section

This sample has poor textural preservation of apparent ex-clinopyroxene with irregular patches and lenses variously rich in talc and/or chlorite, with less carbonate compared to the previous sample. Poorly defined layering is at about 50º to the core axis. Irregular lenses parallel to the layering have interlaminated talc and chlorite, commonly at a high angle to the layering, but with some lenses parallel to the layering. Some of these lenses, and other apparently interstitial chlorite-rich or chlorite-dominated lenses, are dusted with microcrystalline opaque oxide and could represent postcumulus material.

Small lenses of oxide-free chlorite could represent feldspar, and there are sparse small lamellar chlorite patches, with or without tad, possibly ex-biotite. There are also talc-rich lenses to 2mm long possibly representing olivine. Fine granular opaque oxide grains, mostly magnetite are scattered, together with microcrystalline ilmenite, and locally pulled apart and veined by chlorite. Sparse very fine-grained sulphides include pyrrhotite, pyrite and chalcopyrite.

This sample probably represents altered peridotite. If the interstitial pyroxene was clinopyroxene, this would indicate former wehrlite.

13777: 195-196m **Possible ex-mafic lithology, altered to stilpnomelane-carbonate-chlorite-biotite. Accessory ilmenite > pyrrhotite, pyrite, chalcopyrite and apatite.**

Hand Specimen

This sample is similar in colour to 13774.

Thin Section

This thin section has 25% carbonate as irregular grains to 5mm long. There are also sparse oxide-clouded flakes of biotite to 1mm long, elongate at a high angle to the cleavage. Patches of chlorite are also scattered and contain residual biotite as small patches. Large areas contain or consist of mostly pale green ferrostilpnomelane, partly as rosettes and partly as parallel aggregates with interstitial carbonate ± accessory inequigranular oxide, mostly ilmenite, and sparse pyrrhotite, pyrite and chalcopyrite. Minor small oxide and sulphide aggregates also occur within coarse-grained carbonate, with ilmenite accompanied by pyrrhotite, pyrite and chalcopyrite. Accessory apatite is disseminated as commonly broken crystals to 0.8mm long.

This sample is probably of mafic rather than ultramafic origin.

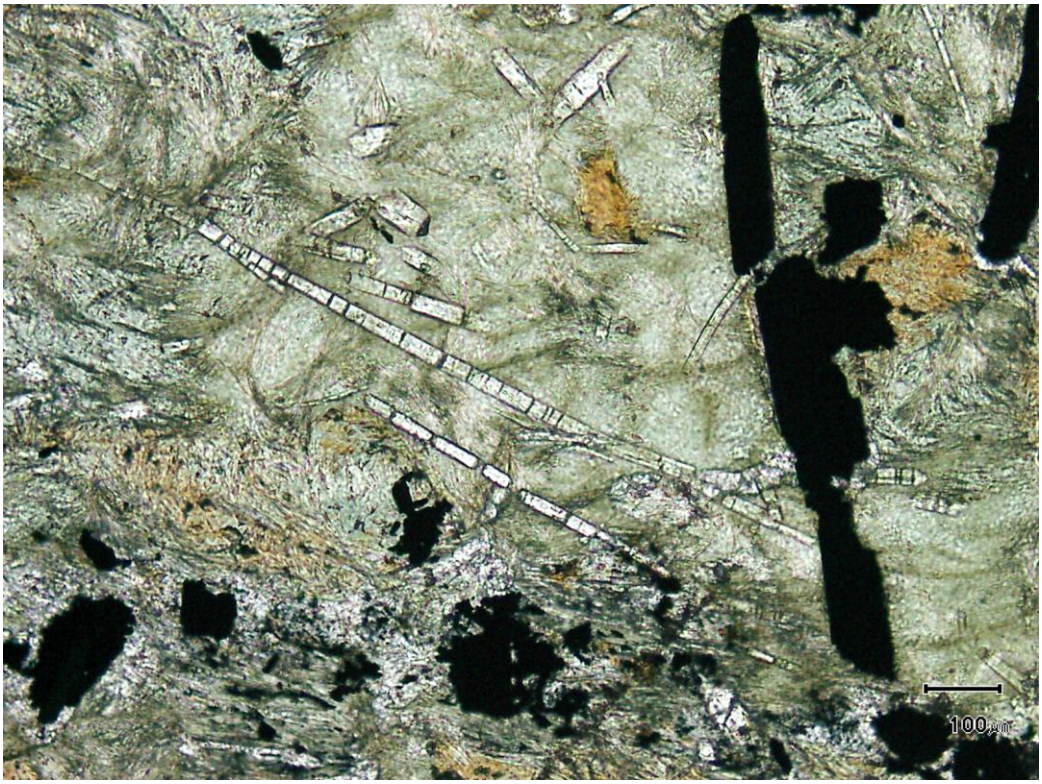


Fig 14 **13777: 195-196m** **100 µm**

TS. PPL. (x100). Background mass of ferrostilpnomelane and sparse tan biotite, black opaque ilmenite crystals and long fractured needles of apatite.

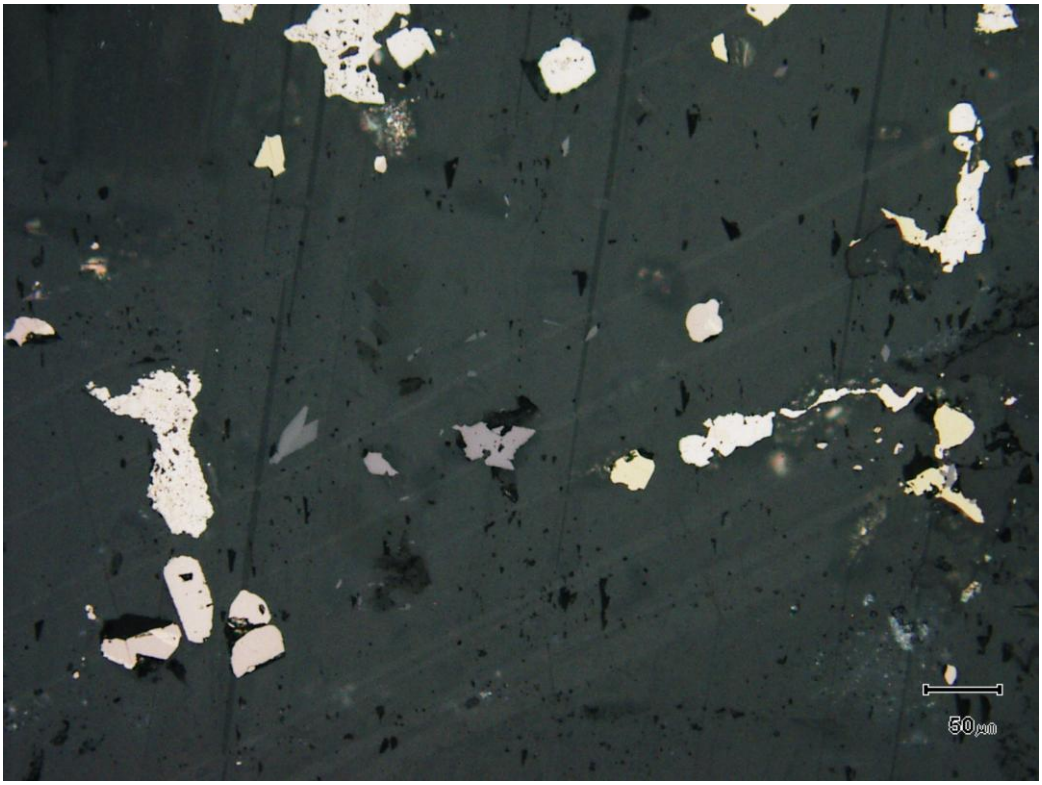


Fig 15 **13777: 195-196m** **50 µm**

PTS. RPL. (x200). Very small scattered grains of pale brown pyrrhotite, white pyrite, pale yellow chalcopyrite and grey ilmenite in carbonate.

13779: 200-201m **Original dolerite, altered to carbonate-chlorite-quartz-stilpnomelane-ilmenite-anatase. Sparse apatite, pyrite and rare possible arsenopyrite.**

Hand Specimen

This sample is also grey in colour.

Thin Section

Irregular masses of carbonate to 4mm long make up 15-20% of this thin section, but there is also 7-8% granular quartz grains to 2mm in size, commonly enclosing minor probable stilpnomelane ± chlorite ± carbonate. There is also abundant chlorite, partly ex-feldspar but also with inclusions of stilpnomelane or lamellae of microcrystalline opaque oxide ± residual biotite.

Minor fine-grained oxide has been partly replaced by ilmenite and anatase and there are broken needles of apatite to 1mm long. Large patches of pyrite, to 1mm in diameter, are accompanied by anatase and ilmenite. Rare possible arsenopyrite is also present.

This sample seems to represent fine-grained dolerite