

YMEP 20-013 GRASSROOTS

STQ Sn \pm Ta – Nb

MINERALIZATION

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INTRODUCTION

The STQ prospect is adjacent to an apophysis of granite that is a satellite stock of the mid Cretaceous Seagull batholith. This stock is the most quartz-rich intrusion of the granite suite and is a product of 'normal' fractionation in a granite cupola. It is in part a zinnwaldite-topaz granophyre: fluorine is present in the granite, but was not in sufficient quantity to shift the fractionation trend towards alkali feldspar (albite) enrichment. Greisen mineralization is to be expected. The region was prospected by AMAX in 1977 and one diamond drill hole intersected greisen and vein tin and tungsten mineralization in the STQ cirque. No substantial work has been performed since.

The 2020 prospecting work originally intended was to drive to the TBMB claims and walk to the STQ cirque for prospecting and mapping. The eastern granite stock of the STQ area was to be prospected using a helicopter for access. Due to the unusually wet summer season vehicular access to the TBMB claims was not possible as the Swift river remained at high levels. The amended prospecting programme consisted of three people (Tim Liverton, Hardy Hibbing and Bill Mann) using a helicopter to travel to the easternmost leucogranite mapped in the original Amax work of the 70s (UTM 377,000E, 6,671,200N). The eastern stock is not well exposed, and is thought to occur in small outcrops exposed in the gentle slope area north of the obvious cliff exposure. None of this stock was located in 2020. The ridge immediately south of that location was examined by Liverton. Ground between the 'boulder-crop' and the STQ cirque was traversed by Hibbing and Mann. The region of the eastern granite was covered by H.H. and T.L., that closest to the cirque by W.D.M. Prospecting this upper part of the valley was abbreviated somewhat by an argument with a bear. WDM was collected by the helicopter and all three of us were transported to the STQ cirque, where we spread out and examined the cliffs on the north side and float in the main scree slope.

GEOLOGY

The ridge exposures above the 'eastern apophysis' showed only hornfels and fine-grained siliciclastic sediments, plus a thin marble, with no obvious mineralization in hand specimen. On the SW side of the valley leading towards the STQ cirque, again, only metasediments were

encountered. The upper part of the valley within 500m of the saddle into the cirque, prospected by Mann, did yield tourmaline bearing quartz-vein material. In the STQ cirque, quartz-tourmaline vein material is scattered throughout the scree, but the source does not crop out.

The western stock area was the main focus of work by Amax in the late 1970s (Hodgson et. al., 1978). This area was mapped at 1:5,000 scale, soil, silt and rock geochemistry was conducted, and the stock target was tested by a single 247m diamond drill hole. The hole intersected 17m of talus, a zone of intense hornfels with weak veinlet mineralization, the quartz monzonite stock and a broad Alaskite dyke. Broad intervals of low grade W and Sn were encountered along with minor Mo in hairline veinlets. Fluorite was common in veins. Arsenopyrite veinlets returned up to 180ppb Au.

The cirque is bisected by an interpreted fault, which cuts roughly east- west under the lakes and passes into the next valley at the notch where sample WDM 037 was collected. The country rock of the cirque is the lower unit of the Carboniferous and older Dorsey Complex (Roots et. al., 2004), which is highly deformed and variably hornfelsed. There is an intense hornfels withing a couple hundred metres of the stock, and a weaker hornfels that include rusty oxide weathering and tourmaline (=/- amphibole) veining. The country rocks are dominantly mapped as meta-siltstone, with a significant component of bleached feldspathic meta-tuff. These rocks are quite fine-grained and non-descript. Despite the steep terrain, there were few actual outcrops. Rocks are mostly exposed as felsenmeer and talus.

Rock samples collected were sawn to allow thin and polished sections to be prepared and material for assay selected. Sample locations are shown on the map (Fig. 1). Hand specimen and brief petrographic descriptions follow:

STQ ROCK SPECIMENS

The specimens collected, other than WDM 037 vein sample, are either meta-volcanics or interbedded (meta-) sandstone and siltstone. They all show deformation to some extent: specimen S1 has obvious kink folding and S2 and STQ2 show a phacoidal geometry in their quartz layers at least in part due to common S-C fabric. These textures are similar to those seen

at the TBMB claims, which likely have the same metavolcanic rock unit as the eastern part of the STQ (lower unit of the Carboniferous and older Dorsey Complex – Roots et. al., 2004). In the volcanics, feldspars are not easy to distinguish, but S1, STQ1, STQ2 and 1540 have obvious phenocrysts (now porphyroblasts). Diopside pyroxene is found in S2 and garnet in S3. Whereas the pyroxene is most likely a product of contact metamorphism the garnet is not. The garnets have ‘snowball’ texture, so they are a product of regional metamorphism. They contain inclusions of the opaques commonly seen in these rocks, so at least some of the pyrite and presumably magnetite is syngenetic, but obviously hydrothermal pyrite is present in specimen STQ 1, where veins contain the sulphide with tourmaline. Opaque clusters, mostly in biotite layers, in several of the rocks contain minerals other than pyrite. One possibility is that some may be fergusonite (α variety = $CeNbO_4$ or β variety = $NdNbO_4$), which is of economic interest and has been identified in both the Seagull batholith and the Ork stock to the NW. Since the STQ stock is considered an apophysis of the Seagull batholith such mineralization is expected. Much of the opaques, however, are clusters of tiny magnetite crystals.

WDM 037 is from quartz-tourmaline vein material. In the STQ cirque boulder float showed frequent 5-10cm thick veins. Material collected in 2019 showed cassiterite (see appendix 1), but this year’s specimen of similar material did not.

A re-examination of the 2019 thin sections has shown that some of what was originally thought to be disseminated cassiterite mineralization in specimen ST7 is more likely to be cerite: $[(Ce, Ca)_9(Mg, Fe)(SiO_4)_3(HSiO_4)_4(OH)_3]$ according to MINDAT. Although of mineralogical interest, a light REE silicate is not of economic interest. The proportion of cassiterite present is uncertain since cerite and red cassiterite as tiny grains are very similar. There may still be a prospect in the volcanic replacement, but analytical and perhaps SEM work is needed to sort out the mineralogy. The obvious tin prospect is the quartz-tourmaline vein system and any possible buried greisen zones.

DISCUSSION: 2020 FIELDWORK

The traversing between the east granite and the STQ cirque revealed that although the metasediments showed signs of contact metamorphism there were only a few microscopic mineralized veins in the hornfels. Closer to the STQ saddle some quartz-tourmaline vein material was found (specimens 1542 and WDM 37). The region within 400m of the saddle may deserve further prospecting, but since this is an alpine meadow, rock exposure is scarce. Digging of pits may be required to obtain specimens for litho geochemistry. It is obvious that at the original STQ prospect the tourmaline-quartz vein material is shedding from below the coarse scree at the head of the cirque, but no outcrop was found.

DISCUSSION: PROSPECTING

Any Nb-Ta mineralization that might occur would best be located with the whole-rock analysis. Since the STQ granite/granophyre carries the highest whole-rock values in Nb for the Seagull suite (and a little fergusonite is seen in thin sections) there should have been Nb-Ta mineralization introduced into the aureole of the stock. The assays performed by Amax on drill core indicate that tungsten is present in the mineralized aureole. No scheelite has been recognized in thin sections (and it is rather obvious optically), so mineralization might be as wolframite. Molybdenum was also reported, so with this element assemblage mineralization similar to Wolfram Camp, Qld. might be possible: massive quartz containing molybdenite and wolframite \pm bismuth.

The whole aureole of the STQ stock has not been prospected thoroughly. According to Charlie Roots' mapping there is a further apophysis north of the cirque. This has not been examined yet, neither has this part of the aureole been prospected.

The approach used by Amax in 1977 was standard soil sampling. Any future systematic geochemical work would best use litho geochemistry on a coarse size fraction material taken somewhat deeper than most attempts at C-horizon sampling.

CONCLUSIONS

The brief 2020 prospecting programme did not discover any spectacular mineralization. Possible cassiterite replacement of metavolcanics above the eastern granite (specimen STQ1) is noted, but at present this represents just a geochemical anomaly. The work did show that the region within 400m SE of the saddle above the STQ cirque does contain quartz-tourmaline veins. This upper part of the SE draining valley is alpine meadow with little rock exposure. Further prospecting is warranted. It would involve systematic sampling of rock below the C-soil horizon for litho-geochemistry. The ridge top to the north of the cirque has not been prospected. It contains a further granite apophysis according to Charlie Roots' mapping and deserves attention. The upper part of the STQ cirque is also mineralized. Detailed mapping of the cirque to delineate the exposures of metavolcanics which show sulphide mineralization and probably cassiterite on the north side, together with distribution of float quartz-tourmaline should yield a better exploration target.

Analyses of the rock samples are not yet available. Those results might guide further work and an addendum to this report will be prepared.



T. Liverton, January 2021

APPENDIX 1: HAND SPECIMEN DESCRIPTIONS

STQ 1

(= thin section Q5)

Black, siliceous aphanitic hornfels with a 15mm wide white to grey layer showing ≥ 0.5 mm white bands ≈ 1 mm apart. One fold is a 90° kink. Under the stereomicroscope the rock appears as saccharoidal quartz of < 0.05 mm grainsize. Some purplish layers may contain biotite.

Assay sample: 1901351

STQ 2

(= Q6)

A brown quartzite. Grainsize ≈ 0.1 mm. Shows a faint banding with occasional distinct 0.5mm dark layers.

Assay sample: 1901364

S1 376763E, 6671259N

(= Q1)

A grey very fine-grained siliceous sediment or perhaps meta-rhyolite. Shows white, 0.2mm bands every 1mm or so and darker 1-3 mm layers every 5-15 mm. Some 1-2mm pink grains in an irregular layer 4 mm thick may be garnet.

Assay sample: 1901352

S2 376654E, 6671200N

(=Q2)

Aphanitic, deep grey ? meta rhyolite. Has dark and light grey layers, the lighter material being from 8-10mm thick and spaced every 20 mm: green-grey minerals. Slightly pink layers may contain garnet and the darker layers amphibole. A few < 0.5mm pyrite grains are visible.

Assay sample: 1901353

S3 Outcrop 376545E, 6671096N

(= Q3)

Fine-grained, well-foliated aphanitic siliceous rock ? meta-rhyolite. Has dark and light layers, the dark material being from 0.5-15 mm thick. The rock breaks along the foliation. It contains a discordant (70° to foliation) black vein. Even at 16x magnification the mineralogy cannot be distinguished, but tourmaline is likely present. The vein shows a bleached selvage that extends 4mm into the rock.

Assay sample: 1901354

S4

(= Q4)

Grey, finely layered aphanitic ? metavolcanic. Dark layers are 0.5 mm thick, spaced up to 3 mm apart. The specimen breaks long the foliation. Muscovite and biotite are found along the foliation surfaces in the darker layers.

Assay sample: 1901355

WDM 037 375946E, 6672088N

(= Q7)

This vein sample site is within a recessive notch on the ridge crest between cirques.

Quartz-tourmaline vein material: a 8cm thick specimen of quartz crystals in a 2.5cm thick vein with black fine-grained country rock containing tourmaline. A few 6 mm vughs in the quartz contain euhedral schorl crystals. One vugh was seen to have pale green actinolite crystals.

Assay sample: 1901356

5271539 376695E, 6671306N

Light grey finely banded (≤ 0.5 mm layers) metavolcanic? Darker layers are micaceous.

Assay sample: 1901357

5271540 376549E, 6671242N

(= Q8)

(a) Mid grey, massive aphanitic rock. Shows some masses of tourmaline crystals to 5 mm across. Tiny (0.1mm) black veins cut the rock at 60° to each other. (b) A more foliated specimen with 0.2 mm layers shows some mica.

Assay sample: 1901358

5271541 376191E, 6671516N

White to grey quartzofeldspathic rock (? metavolcanic). Foliated with some layers to 2 mm thick.

Assay sample: 1901359

5271542 376118E, 6671853N

(a) Finely banded white to grey siliceous rock. Has tiny fractures from 60°-90° to foliation spaced down to 8 mm. (b) A second specimen is of black layers of 0.25 mm tourmaline and some pale green ? amphibole and 15 mm quartz veins.

Assay sample: 1901360

5271543 375550E, 6672228N

Outcrop cut by quartz- tourmaline veinlets.

Foliated white very fine-grained (0.2mm) quartzo-feldspathic rock. ? volcanic.

Assay sample: 1901361

5271544 37529E, 6672237N

Outcrop cut by 1cm quartz-sulphide-oxide vein, possible scorodite, galena.

White, massive, aphanitic quartzo-feldspathic rock.

Assay sample: 1901362

5271545 375692E, 6672124N

(a) White, faintly foliated quartzo-feldspathic rock.

(b) Grey, finely banded quartz-rich ? metavolcanic with 12 mm thick zone of quartz with masses of tourmaline to 5 mm long. Black, very fine-grained veins 0.5 mm thick cut both the quartz vein system and country rock at about 45° to foliation.

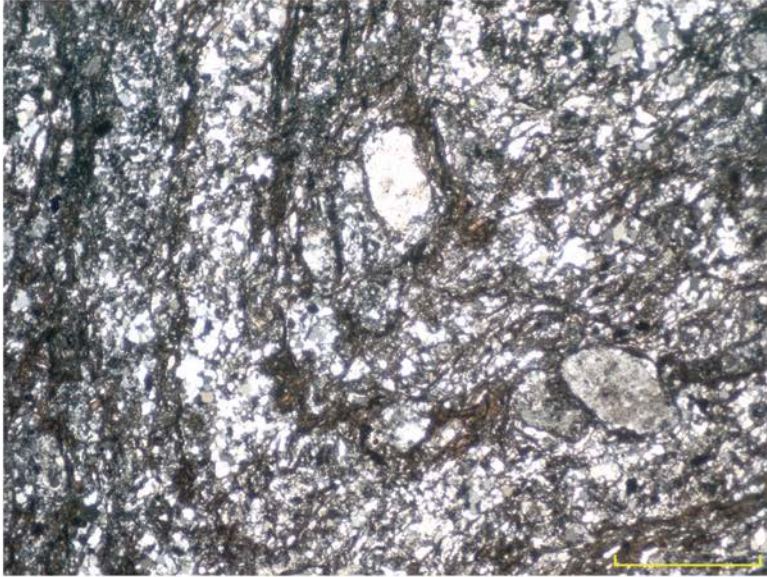
Assay sample: 1901363

APPENDIX 2: PETROGRAPHY

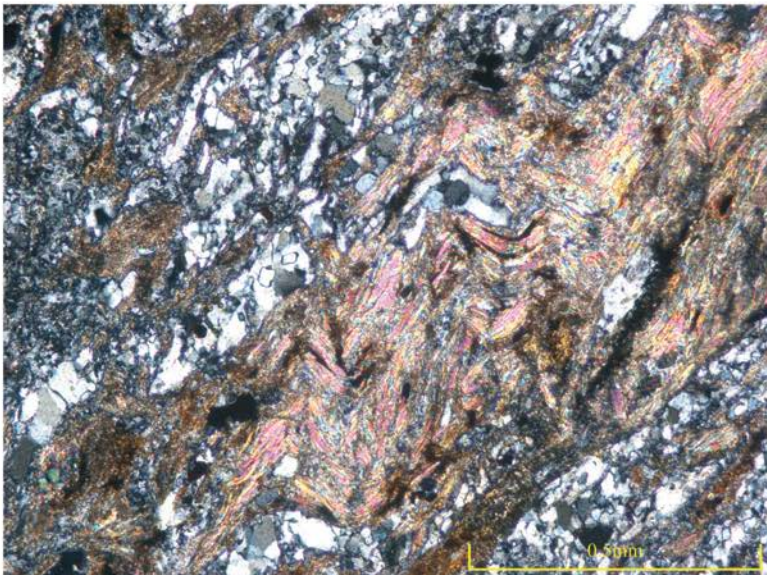
Petrographic descriptions follow:

THIN SECTION Q1 = S1

This is a distinctly layered quartz-rich rock (acid volcanic). Quartz layers contain frequent fine-grained epidote. Quartz-epidote alternates with 0.5mm thick layers of muscovite and opaques (pyrite + others). These are sometimes folded into 0.5mm kink folds. The whole section shows a 2cm scale chevron fold. Remnant feldspars (sericitized) to 1mm long are throughout the section. A 5mm quartz vein is polygonized and strained, but without inclusions.

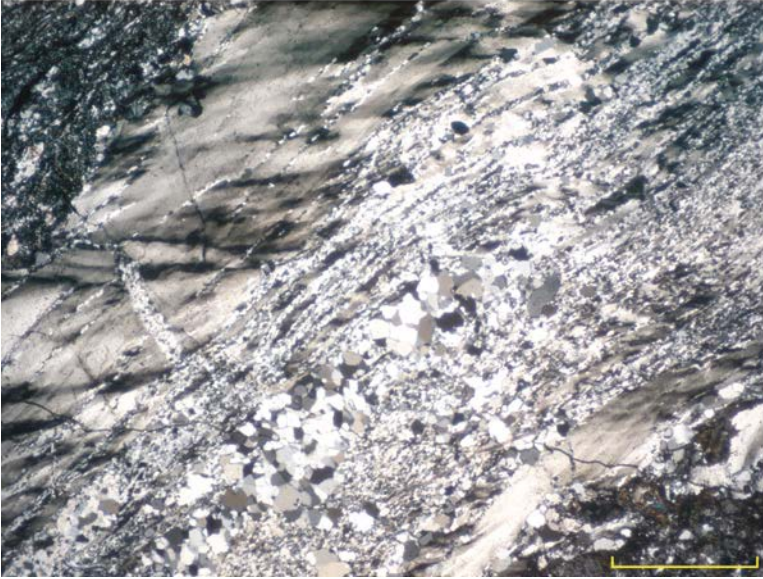


Fold on the scale of the thin section. Crossed polarizers.



Kink-folded muscovite layer. Crossed polarizers.

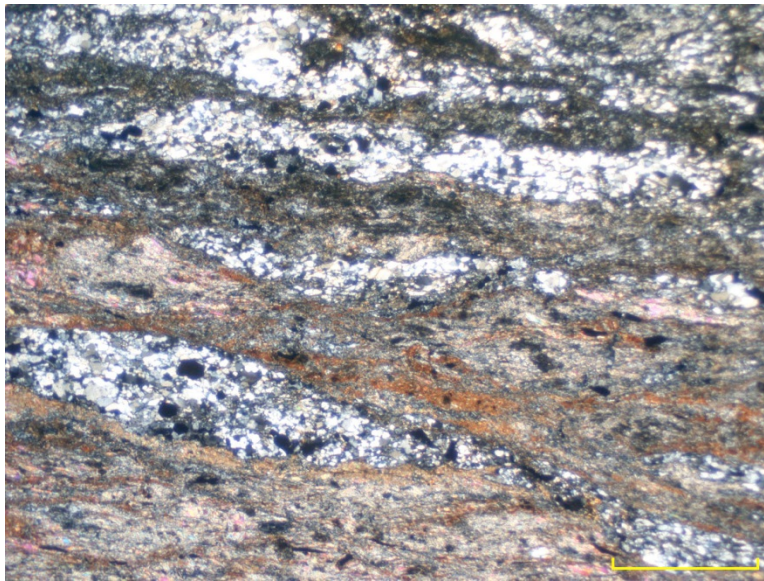
Q1 (continued)



Quartz vein showing
strain zone.
Crossed polarizers.

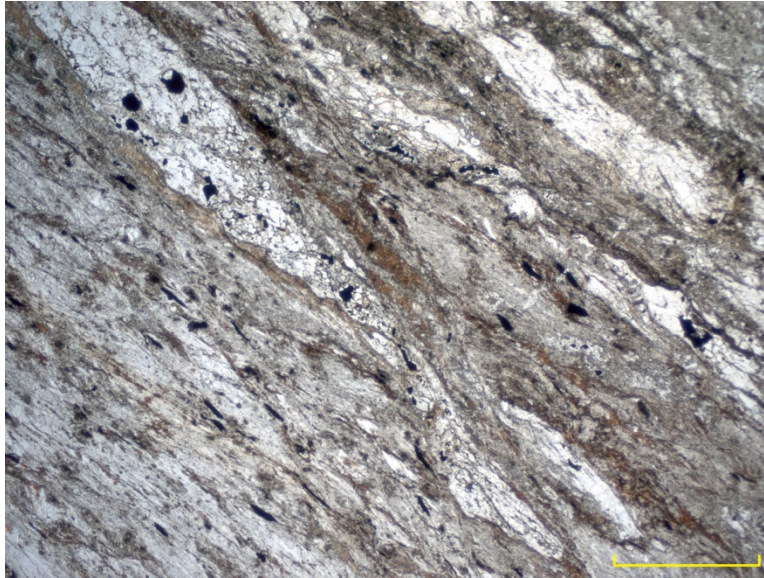
Q2 (SPECIMEN S2)

Possibly a tuff. Has alternating layers of muscovite and biotite, quartz with chlorite, v. fine grained quartz (+ feldspar (?))-epidote-pyrite-opaques, a 3mm layer of coarse diopside with some actinolite and epidote, then biotite and opaques. Some remnant feldspars may be distinguished. A 6mm long quartz mass shows a phacoidal geometry. Throughout the rock a S-C fabric frequently produces this phacoidal geometry on a smaller scale. Opaques are partially found along C-shear planes. No cassiterite noted.

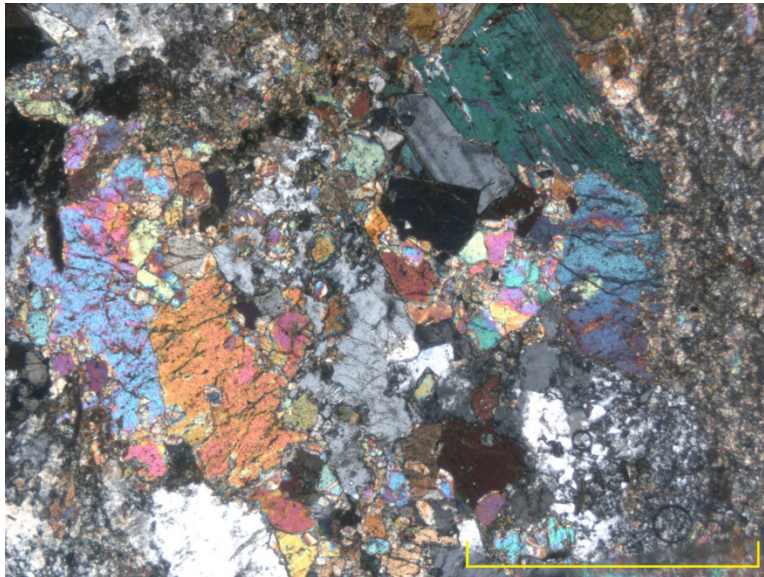


S-C fabric of the quartz-rich layers. Crossed polarizers.

Q2 (SPECIMEN S2) Continued.

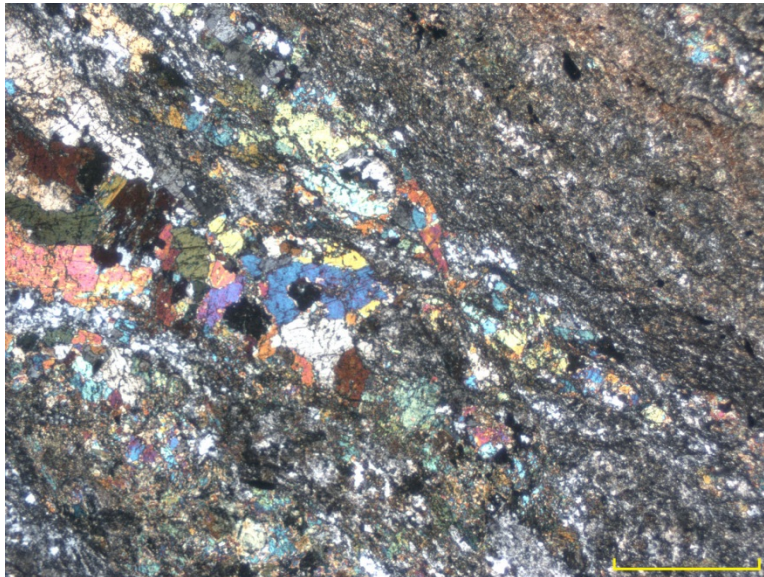


S-C fabric. P.P. light.



Above: detail of the diopside layer. Crossed polarizers.

Q2 (SPECIMEN S2) Continued.

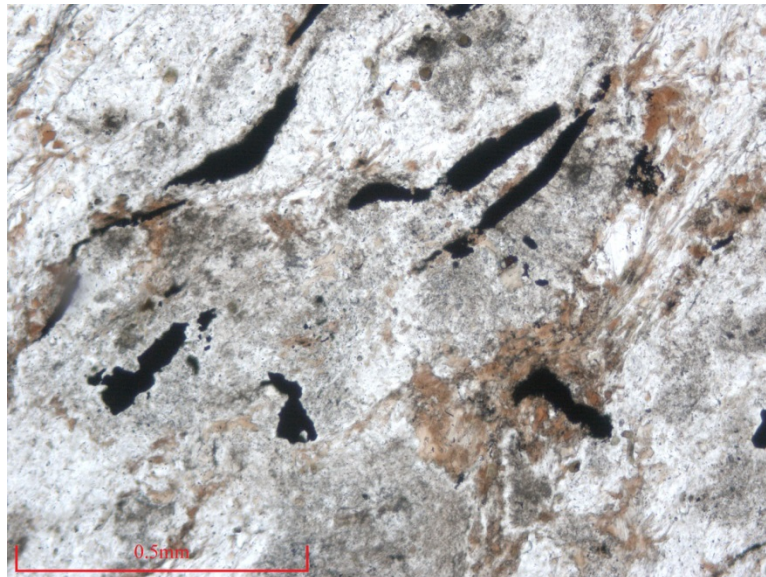


Crossed polarizers. Boudinage of the diopside layer (with one shear plane). It thins drastically to the lower right.

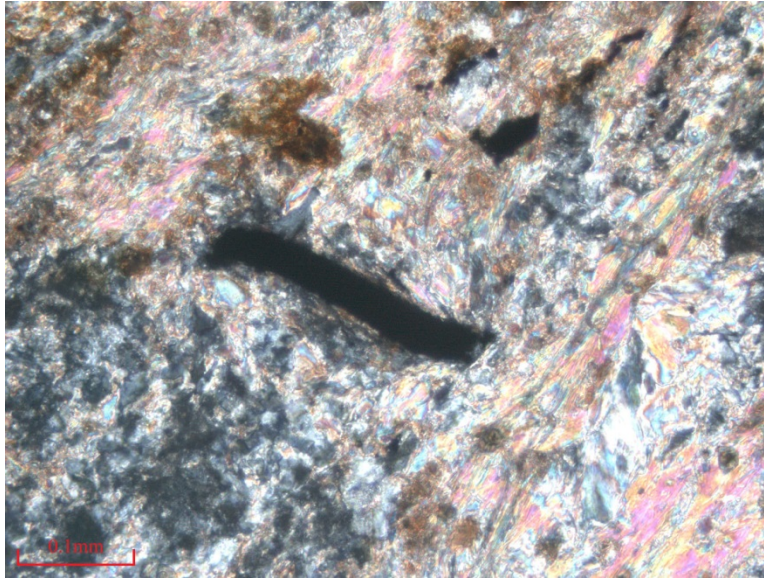


S-C fabric in the micaceous layer. P.P.light. Note opaques
are concentrated along the C-planes.

Q2 (SPECIMEN S2) Continued.



Opaques: probably aggregates of pyrite. (p.p. light).

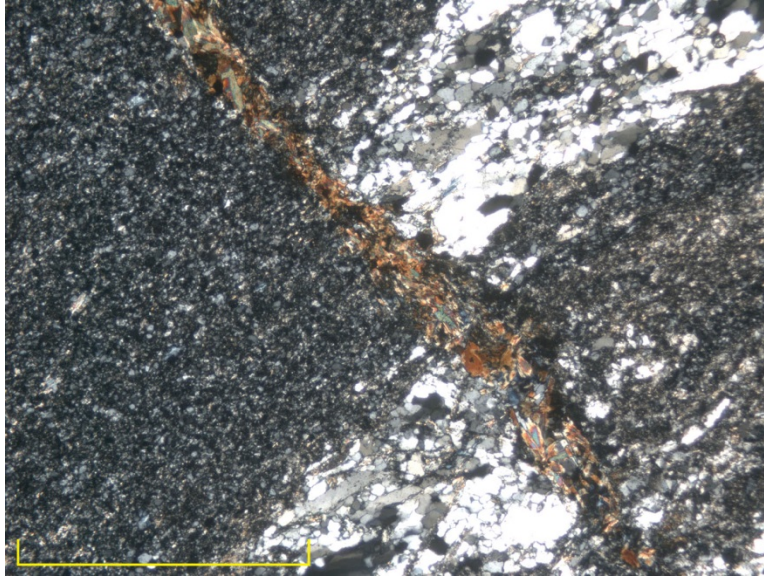


Crossed polarizers: detail of opaque mineral.

Crossed polarizers.

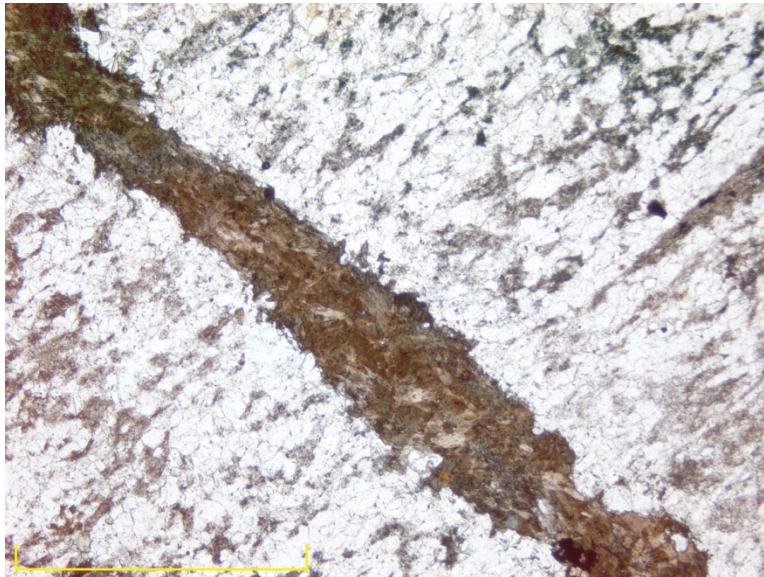
$Q3 = S3$

Well foliated: has layers to 6mm thick. V. fine grained quartz-feldspar-biotite-opaques with frequent chlorite. < 0.05mm grain size alternating with quartz-chlorite-muscovite. A 0.5mm thick actinolite vein cuts at 70° to foliation. This is a microfault. One of the micaceous layers has a line of `snowball` garnets. Probably a tuff.



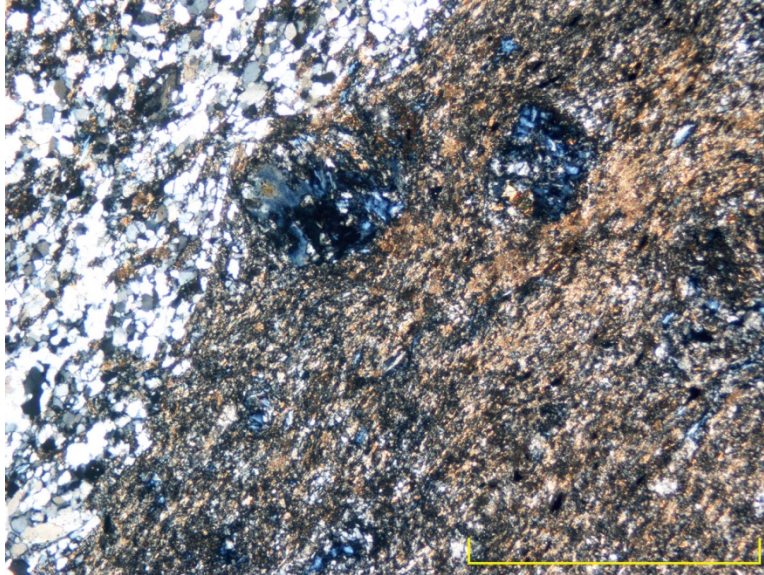
Crossed polarizers. Vein (microfault) displacing quartz layer.

Filled with amphibole and quartz.



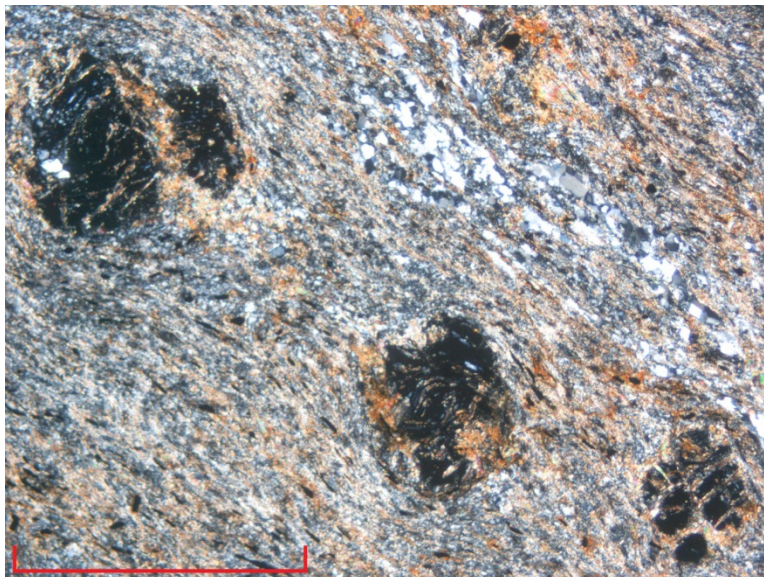
Detail of amphibole in fault. P.P. light.

Q3 = S3 (continued)



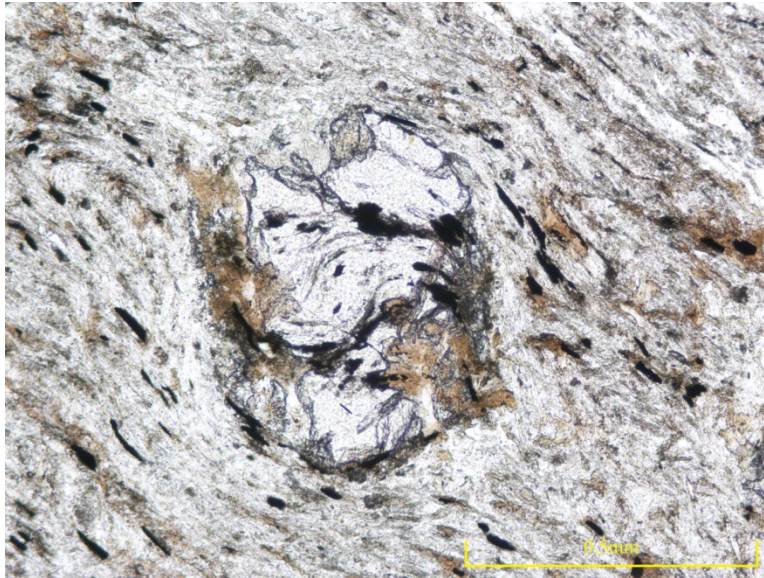
Contact between quartz and micaceous layers.

Crossed polarizers. Retrogressed garnets in the micaceous layer are now chlorite.

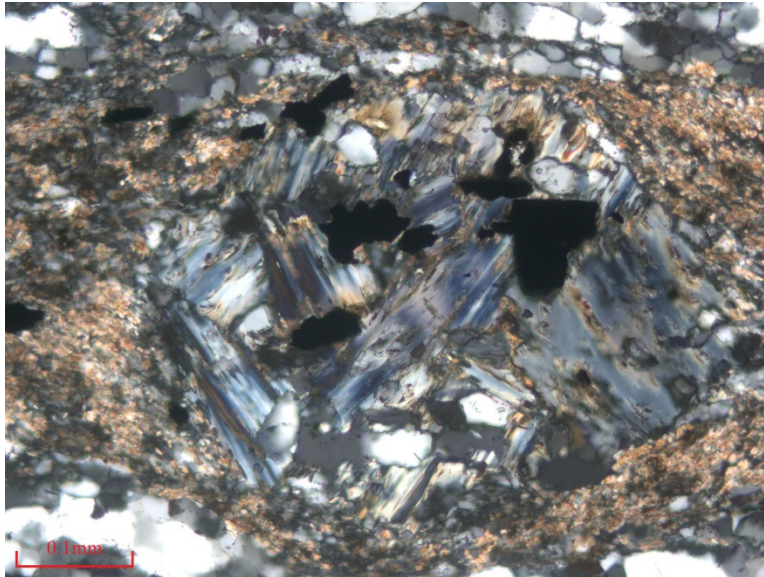


Line of 'snowball' garnets in mica layer. Crossed polarizers.

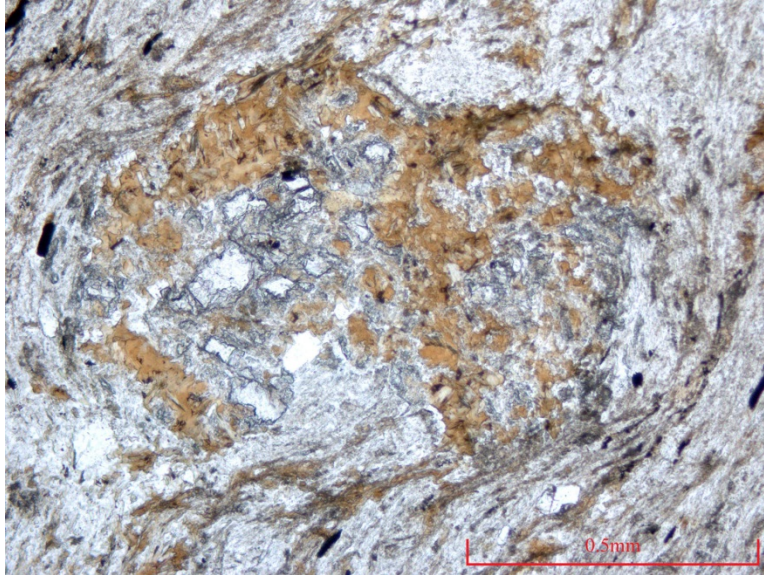
Q3 = S3 (continued)



Detail of one of the garnets. P.P. light.



Garnet replaced by chlorite and magnetite. XP light.

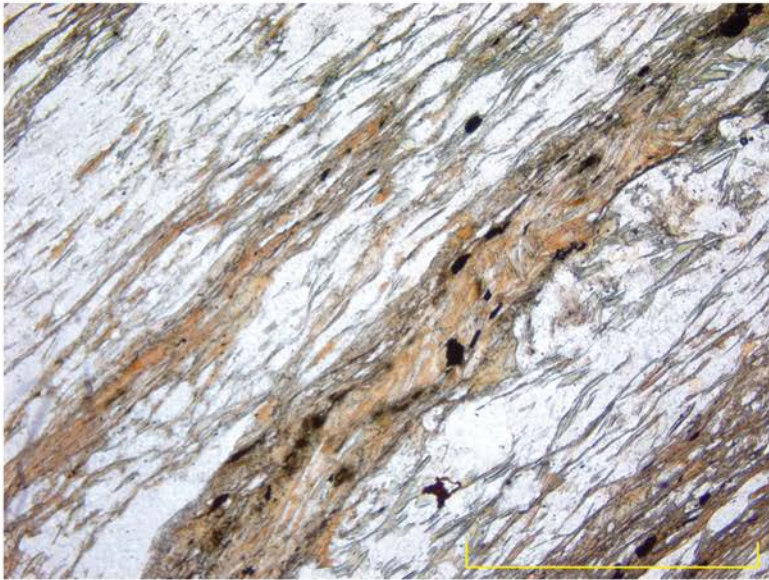


Garnet replaced by biotite, with some remnants

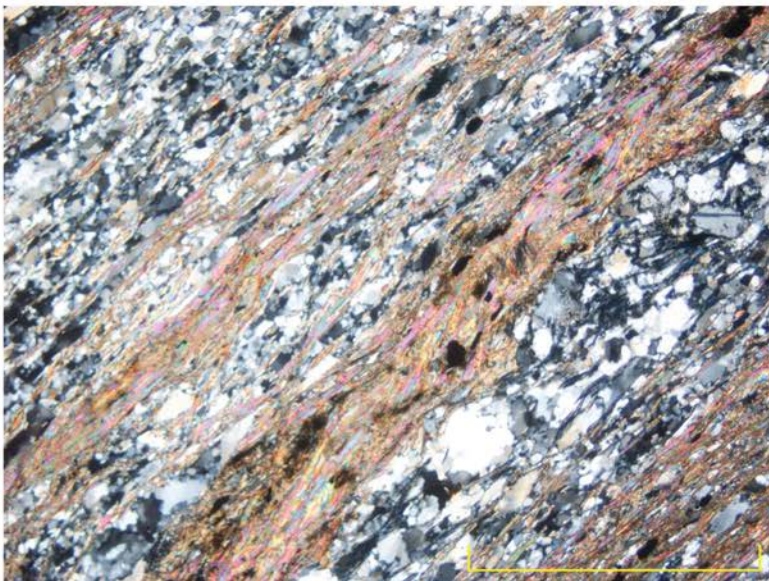
(colourless, high relief). PP light.

Q4 = S4

A sediment, well-foliated consisting of $\leq 0.3\text{mm}$ muscovite-biotite layers alternating with quartz ($< 0.5\text{mm}$ long grains) with $\approx 5\%$ muscovite-biotite to 0.2mm long. A few ($< 1\%$) opaques are present



Plane polarized light. Alternating mica / quartz layers.



Crossed polarizers. Same field.

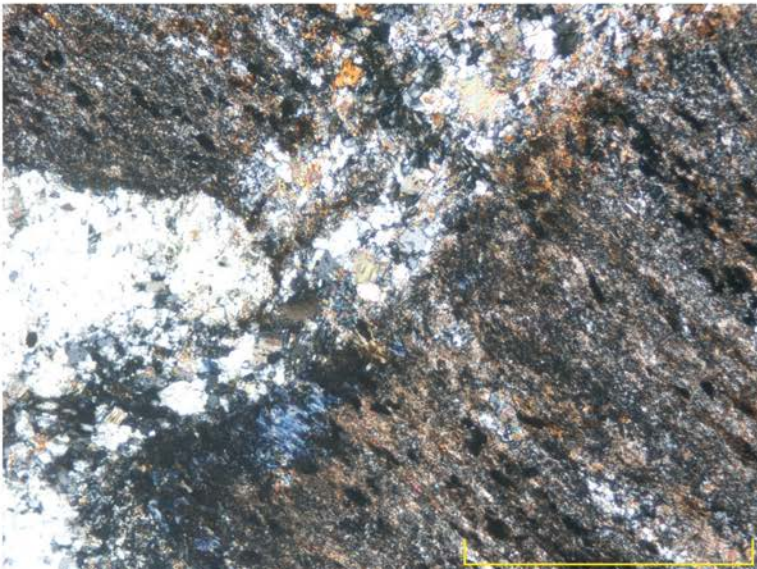
Note the plagioclase at the RH edge of the image.

Q5 = STQ 1

An acid volcanic: meta-lapilli tuff? Much is < 0.08 mm grainsize. Has a few very altered feldspars to 2mm and one cluster of 6mm phenocrysts: sericitized. The groundmass (v. fine grained) has frequent opaques. Biotite may be a replacement: it forms irregular shaped fields with the opaques and some tourmaline (it is difficult to differentiate fine-grained brown tourmaline from the biotite). Quartz forms a boudinaged vein 12mm thick with no other minerals. A 0.1mm thick vein of amphibole cuts at 45° to the weak foliation of the rock. Very fine-grained (?) cassiterite is found with the opaques. A few grains of a high-relief mineral, 0.15mm size, with the feldspars may be topaz.

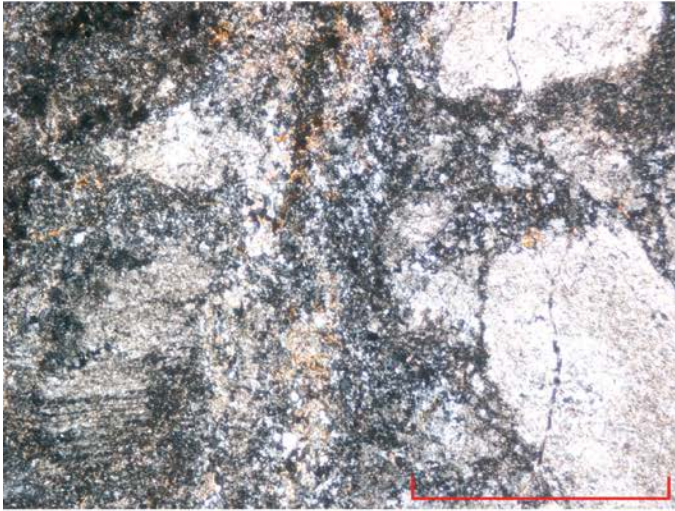


Remnant feldspars.
Crossed polarizers.

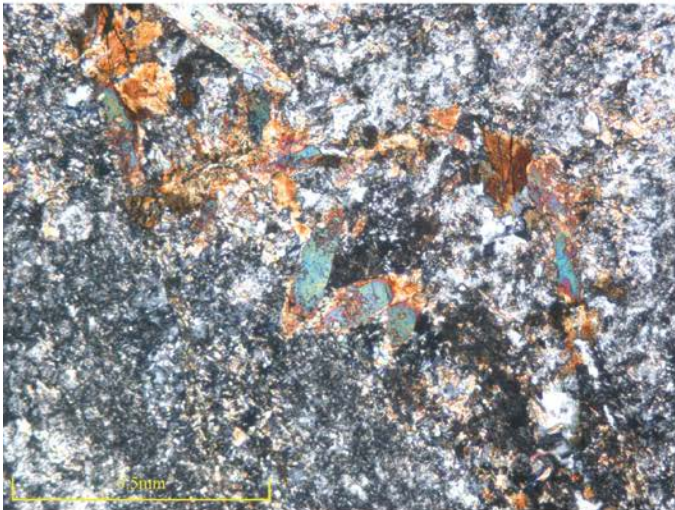


Boudinaged quartz
vein. Crossed
polarizers.

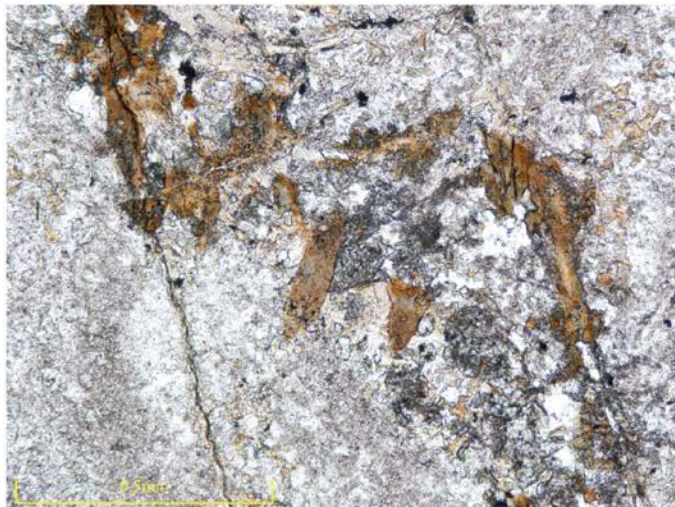
Q5 = STQ 1 (continued)



Crossed polarizers.
Remnant feldspars.
Note altered plagioclase
in lower left corner. 1mm
scale bar.



Crossed polarizers.
Tourmaline-bearing
veins with linking
cross-vein.

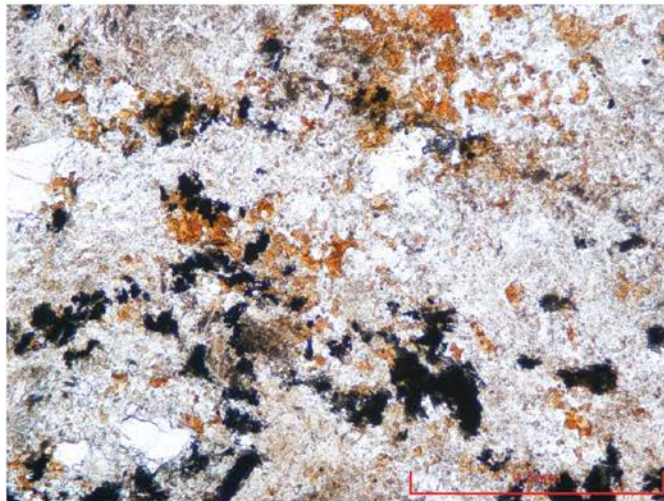


Plane polarized
light. Same field.

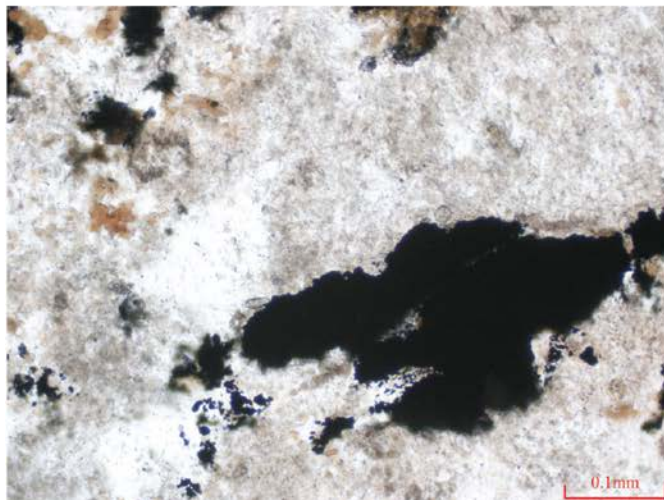
Q5 = STQ 1 (continued)



Plane polarized light. Vein with tourmaline and pyrite.

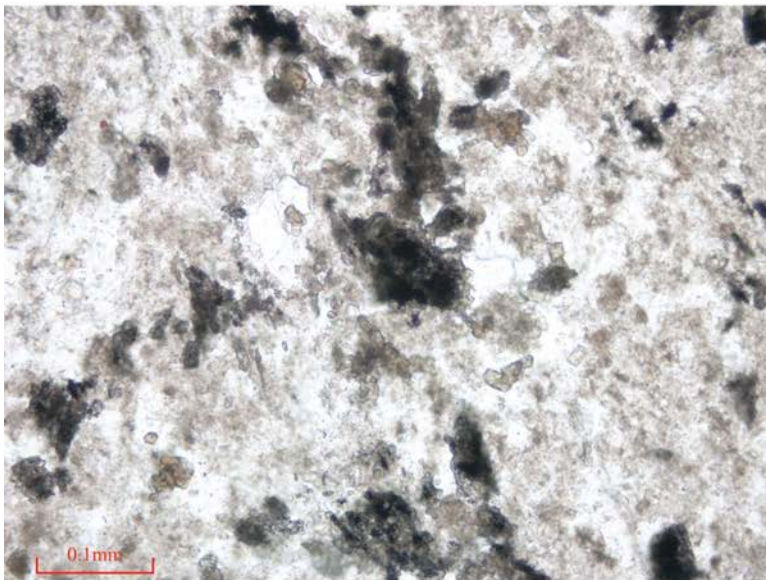


Plane polarized light. Biotite and opaques.

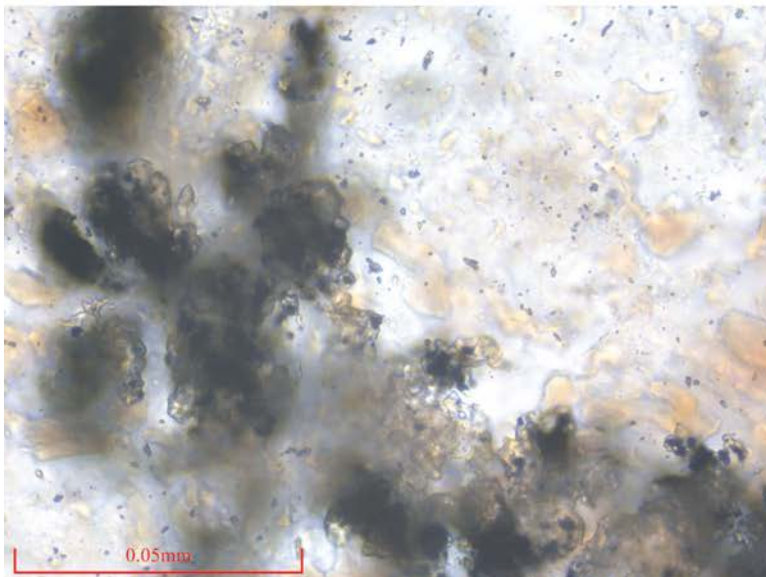


Plane polarized light. Opaques.

Q5 = STQ 1 (continued)



Plane polarized light. Opaques with possible cassiterite.

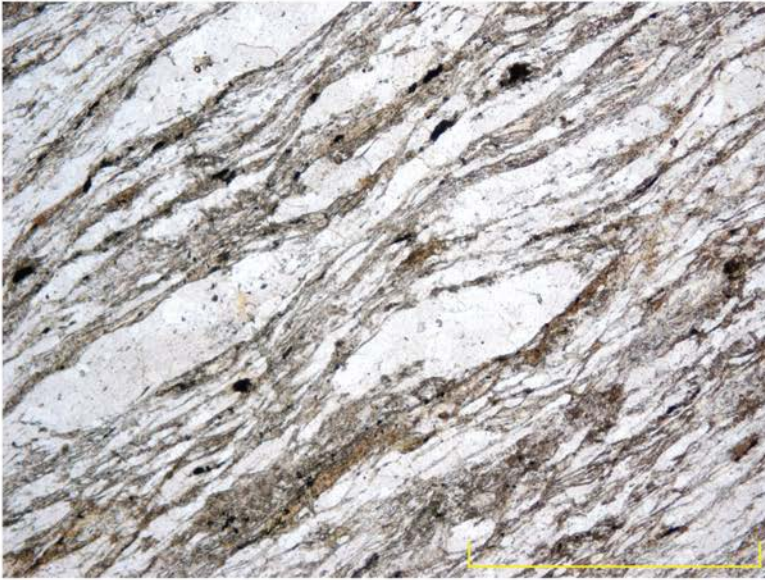


Plane polarized light. Detail of opaques.

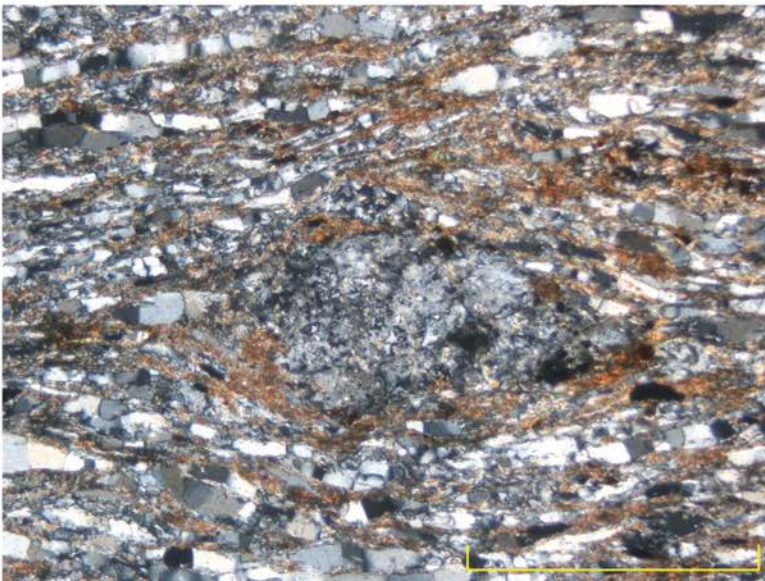
Possible cassiterite surrounds the opaques.

Q6 = STQ 2

A sediment. The rock has a strong foliation with some distinct S-C fabric. Muscovite and biotite layers, 0.05mm thick alternate with quartz. Has a little chlorite. Elongate clusters of opaques are up to 0.25mm long. One possible crystal of cerite was noted. Cross-cutting veins (\ll 1mm) are quartz-chlorite or quartz-biotite with probably amphibole.

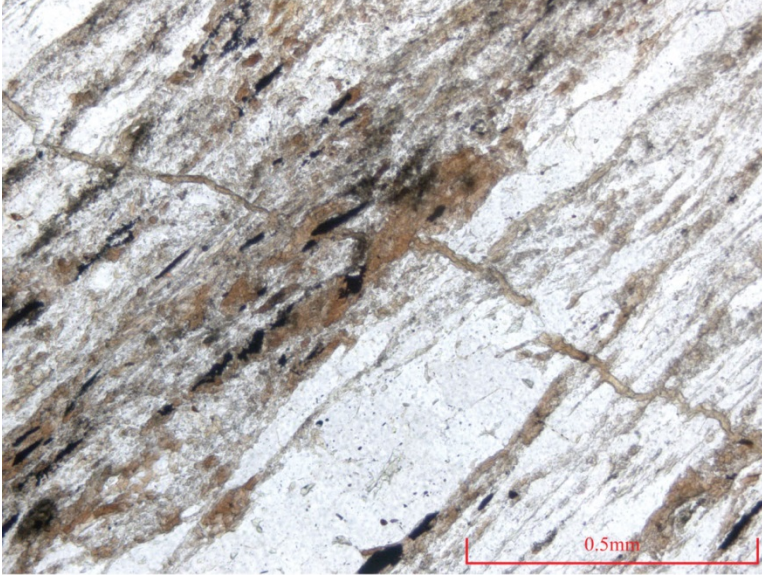


Plane polarized light. Fabric of the rock.

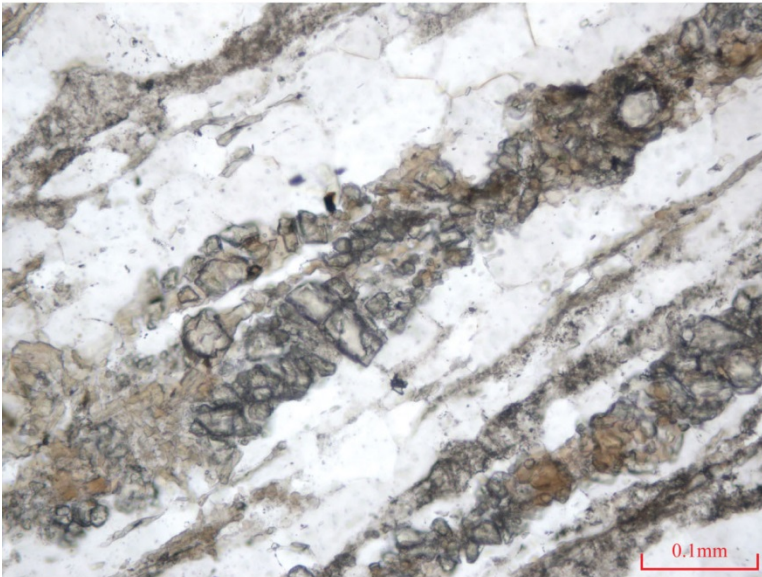


Feldspar porphyroblast. Crossed polarizers.

Q6 = STQ (Continued)



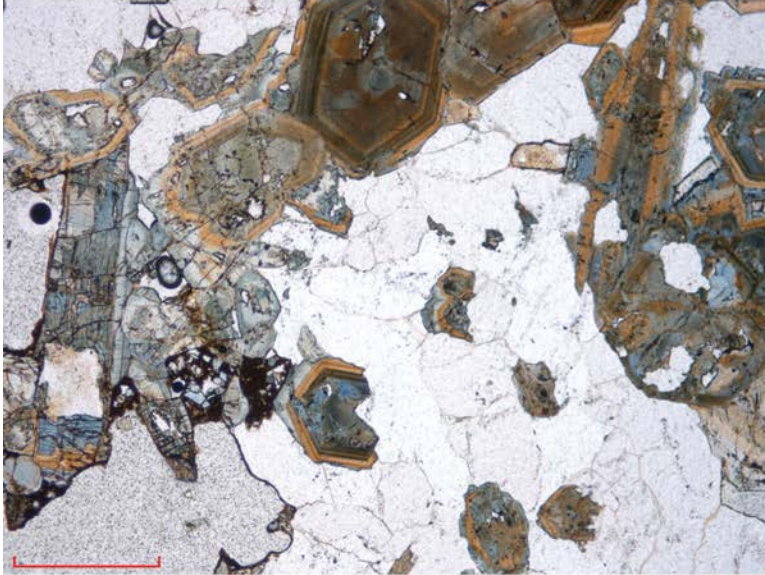
Plane polarized light
quartz biotite vein



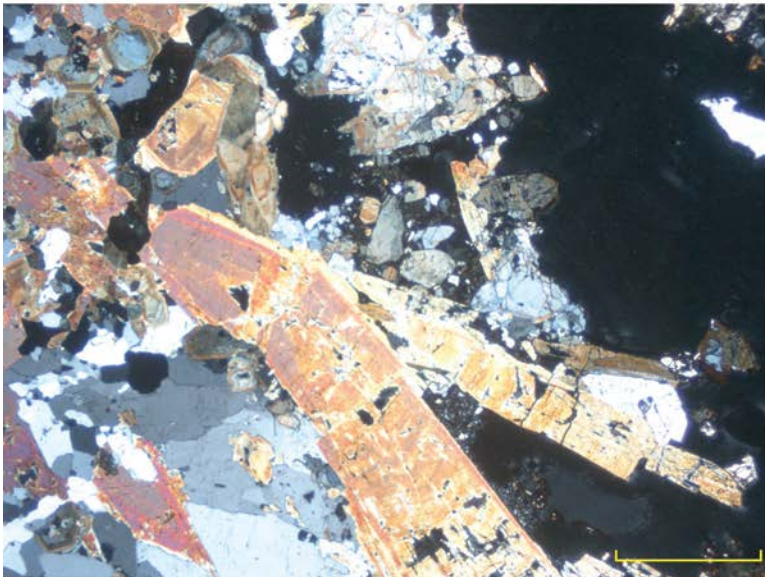
Plane polarized light
biotite layers with
garnet

This rock may well have been a tuffaceous sediment

Q7 = WDM 37

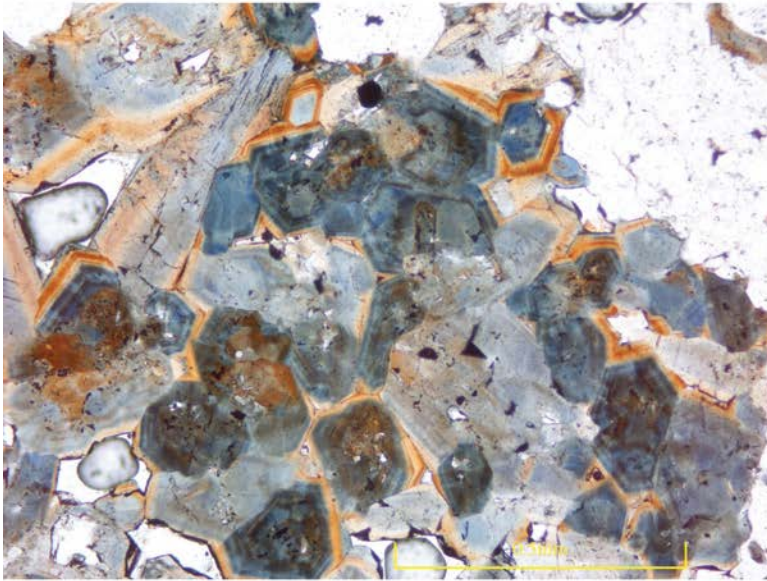


Plane polarized light. Tourmaline in quartz.

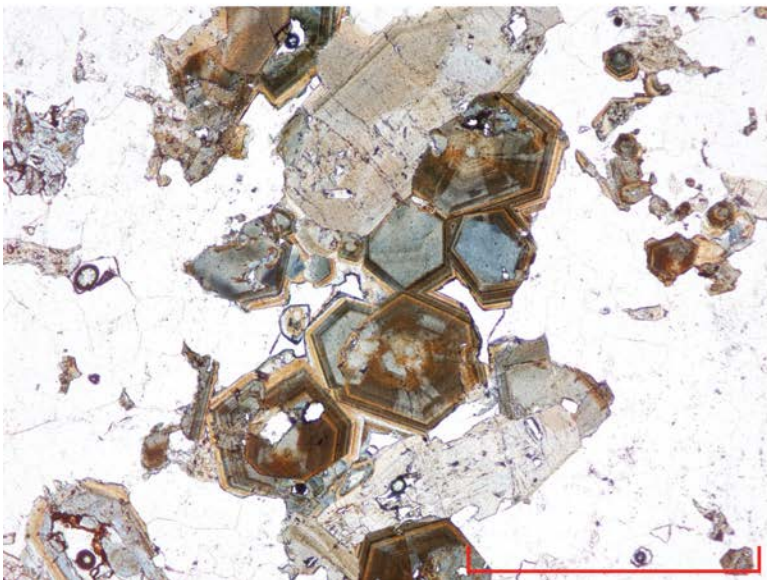


Crossed polarizers. Tourmaline crystals.

Q7 = WDM 37 (continued).



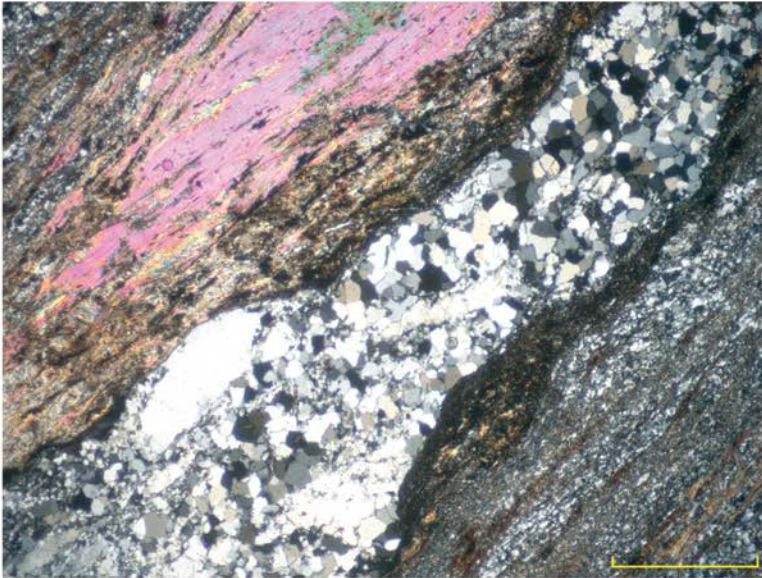
Plane polarized light. Two views of zoned crystals of tourmaline



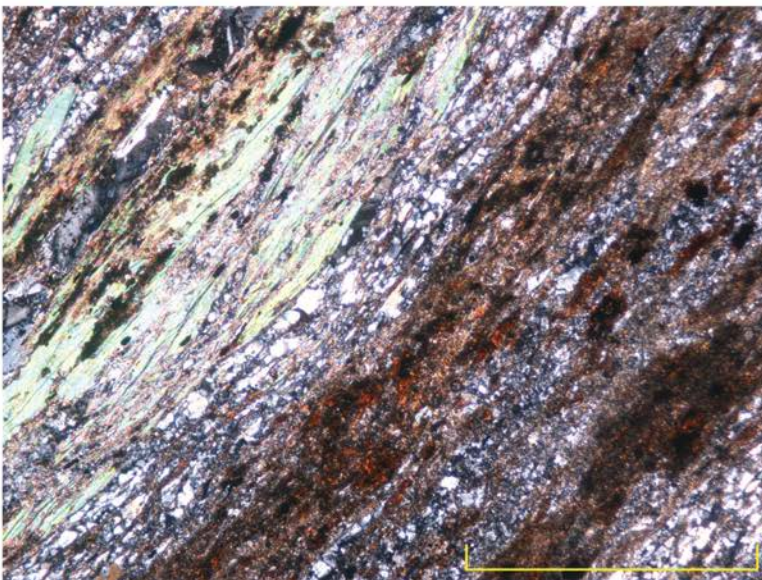
If the tourmalines had not had a brown to black outer zone, a search for gemstones would be warranted.

Q8 = 1540

A well-foliated metasediment. Consists of layers of biotite-muscovite-opaques usually < 0.5mm thick alternating with \approx 1mm quartz layers. Possible cordierite is seen in the micaceous layers and some of the biotite is chloritized. Cross-cutting veins, 0.2mm wide, are mostly quartz and chlorite, but a little tourmaline is present. Layer-parallel tourmaline extends out from the cross-cutting structures for 2mm or so. A few cassiterite crystals were noted in veins.



Crossed polarizers.



Crossed polarizers.

Q8 = 1540 (continued).



Crossed polarizers.
Remnant feldspar.

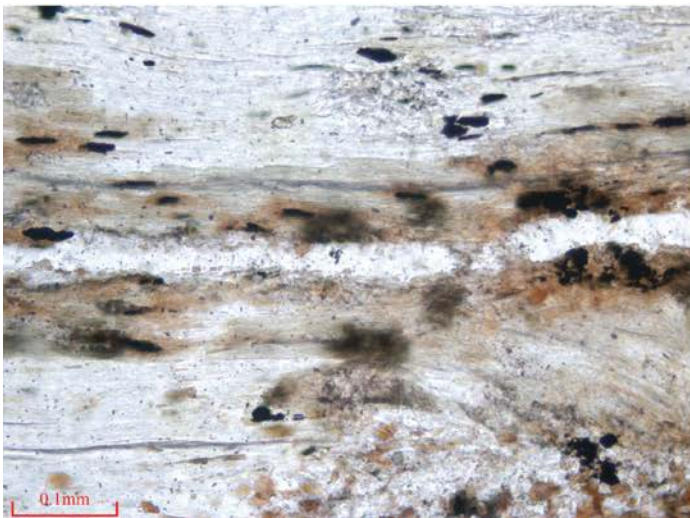
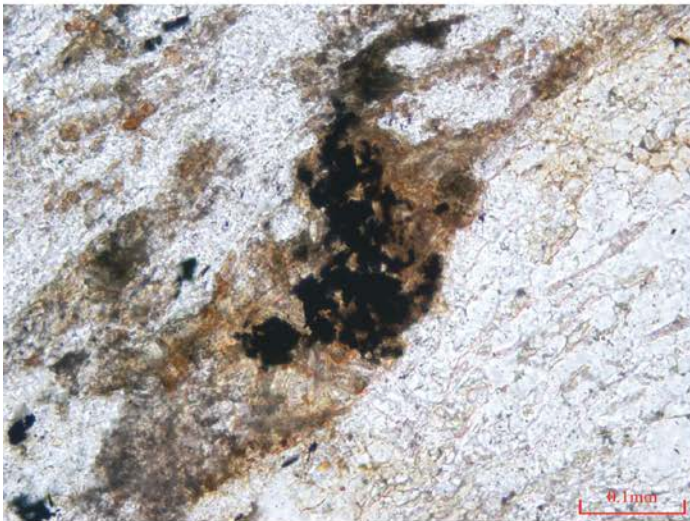
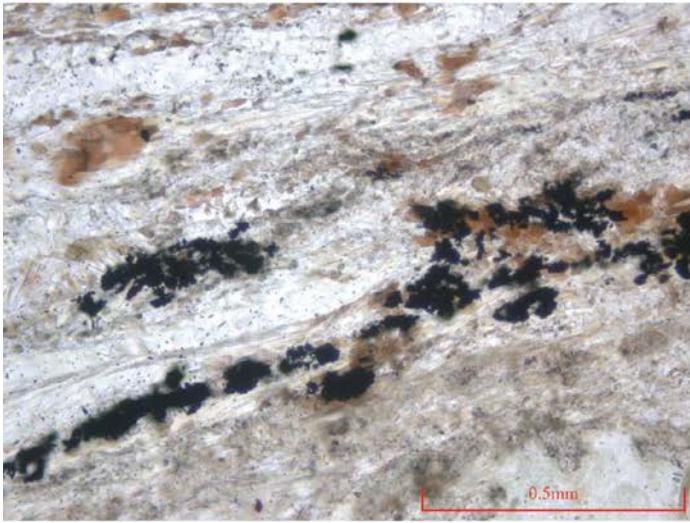


Crossed polarizers.
Solitary tourmaline
crystal.



Plane polarized
light. Cross-
cutting vein:
quartz-chlorite.

Q8 = 1540 (continued).



Three views in plane polarized light. Opaques in biotite layers. Note increasing magnification.

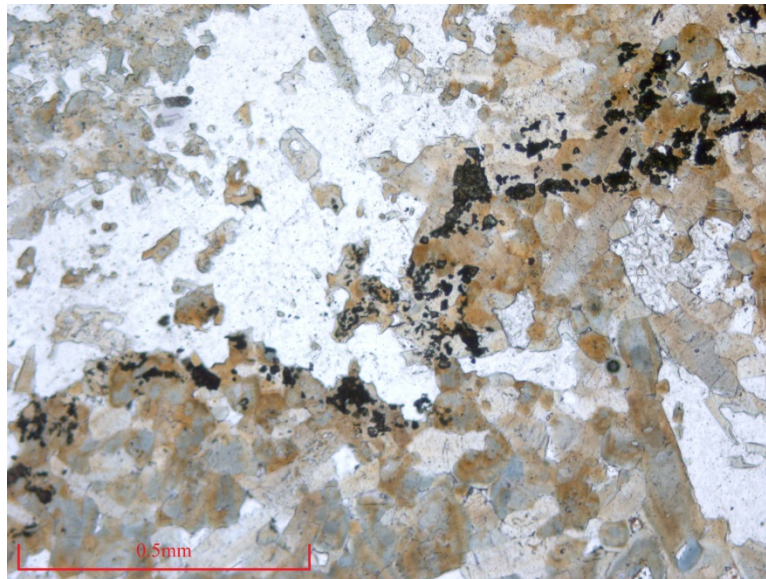
2019 SPECIMENS ST5, ST6 & ST7

(Collected from the STQ cirque)

A re-examination.

ST5

Cassiterite in this specimen is contained close to the margin of the tourmaline vein.

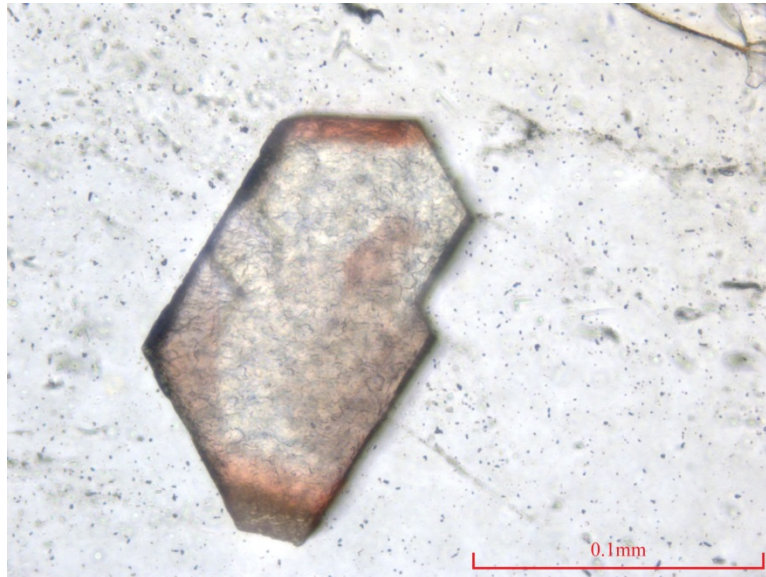


Cassiterite with tourmaline. P.P. light.

Fluorite is also common.

ST6

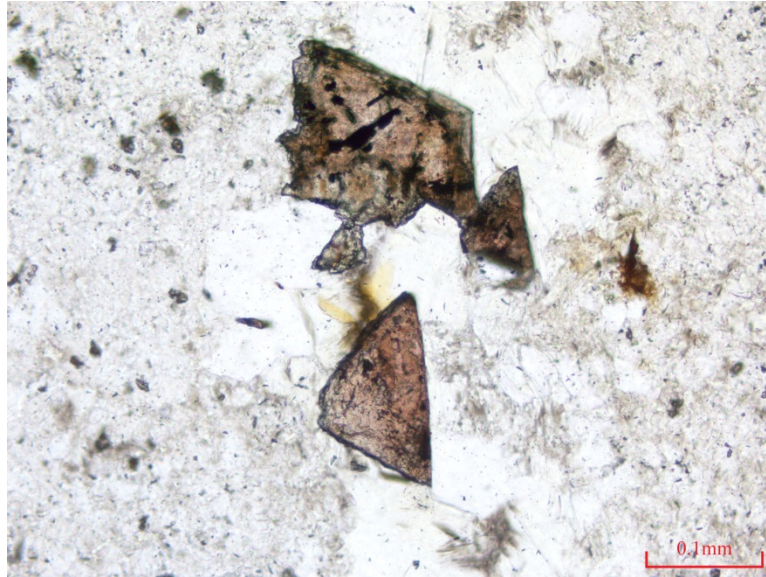
The greisen contains cerite.



Cerite crystal showing red pleochroism. (The mineral is pleochroic from red through colourless to green. In a standard thickness section the green is very faint).

ST7

A careful re-examination of this thin section has shown that the high-relief mineral disseminated throughout the meta-sediment is cerite rather than cassiterite. Tourmaline and fluorite may accompany the cerite.



Cerite crystals with (?) fergusonite inclusions.



Cerite with fluorite (left, with one grain showing purple colour) and tourmaline (lower relief). P.P. light.

APPENDIX 3: EXPENSES

Fireweed Helicopters charter	\$ 7357.77
Vancouver Petrographics (TS)	\$ 216.30
Vancouver Petrographics (PTS)	\$ 115.50
Vehicle to Pine Lake airstrip, 290km @ \$0.	\$ 174.00
Analysis 14 x \$40-45, (estimated)	\$ 594.62
TOTAL:	\$ 8458.19

YMEP 20-013 STQ Tin-tungsten
RESULTS OF ANALYSIS

T. Liverton

February 2021

ANALYSES OF STQ ROCK SPECIMENS

Analyses of the STQ rock specimens have been received. Bureau Veritas performed their LF100 extended analytical package for trace elements, which includes gold. The results are shown in the table that follows this text. Notable values are as follows:

190356, specimen WDM037 gave a value 3001 ppm Sn;

190363, specimen 5271545 gave a result of 543 ppm Sn;

190360, specimen 5271542 gave a result of 2234.5 ppm W, also 15.2 ppb Au.

Other specimens that gave somewhat anomalous metal values are:

190364, specimen STQ2 gave 12.8 ppm Mo, 1247 ppm Pb, 5964 ppm Zn and 12.4 ppm Ag

190362, specimen 5271544 yielded 19.2 ppb Au: elevated, but not greatly anomalous.

These results are plotted on the map below. The first three specimens are from the region of the saddle east of the STQ cirque and within that cirque. Quartz-tourmaline mineralization was noted in outcrop. Specimen STQ2 in thin section showed some layers of very fine-grained opaque minerals. These layers likely contain some sulphide: weak mineralization, but perhaps not too significant.

DISCUSSION

The anomalous tin and tungsten values from the two specimens at the saddle indicate that the vein mineralization within the STQ cirque likely extends beneath the saddle region.

This area deserves some more work. Sampling of rock for similar litho geochemistry is warranted. An area of approximately 300m square would cover the region of interest. Samples would need to be obtained by digging small pits since the area is alpine meadow, but even at 50 metre spacings only 40 localities might need to be dug. It is recommended that this limited programme be attempted.



Timothy Liverton PhD, FGS

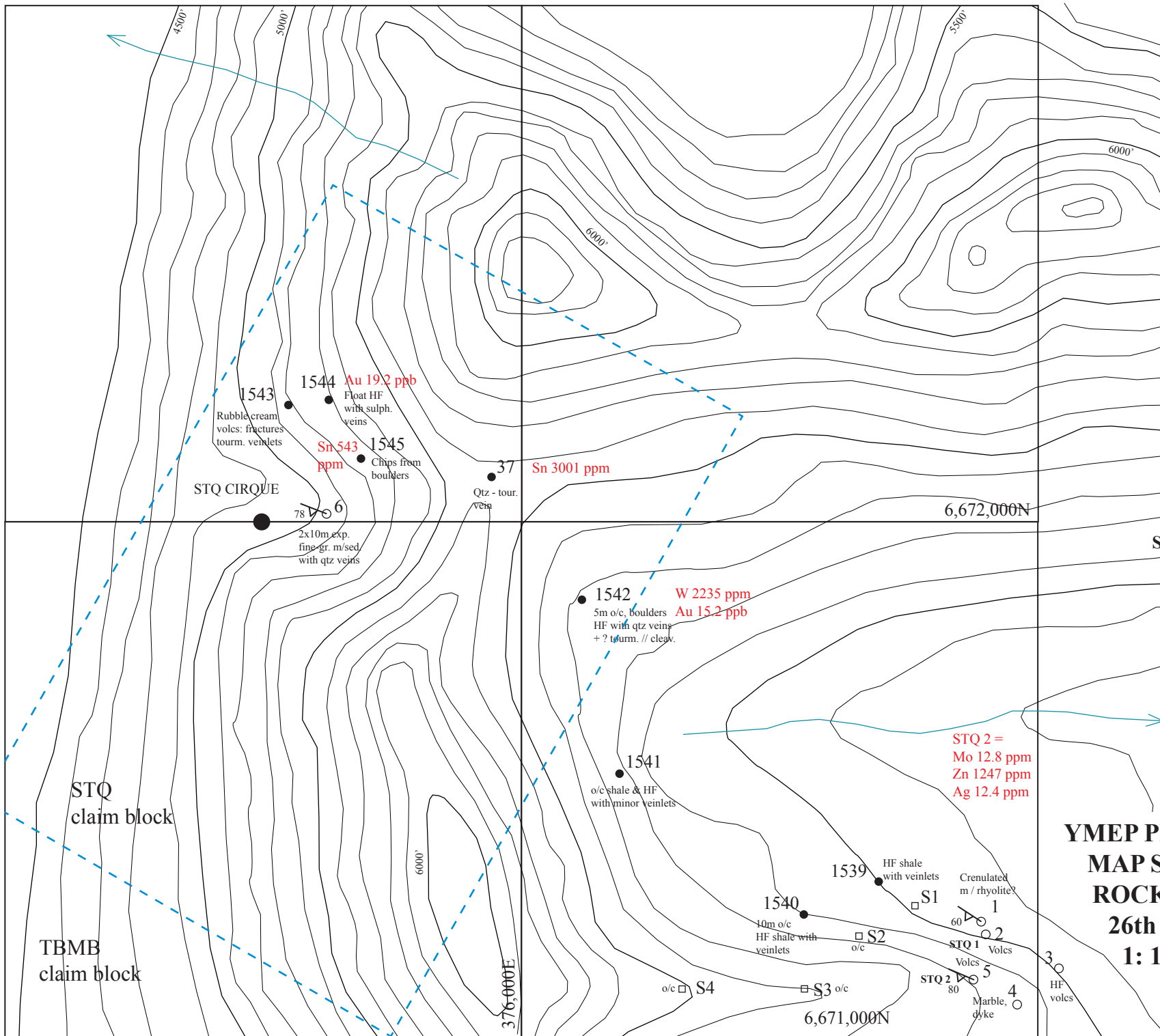
NAD
83-27

375,000E

376,000E

6,672,000N

6,671,000N



SAMPLE POINTS

- WDM
- HH
- TL

YMEP PROJECT 20-013
MAP SHEET 105B-3
ROCK SAMPLING
26th August 2020
1: 10,000 Scale

1543
Rubble cream
volcs: fractures
tourm. veinlets

1544 Au 19.2 ppb
Float HF
with sulph.
veins

Sn 543 ppm
1545
Chips from
boulders

37
Qtz - tour.
vein
Sn 3001 ppm

78
6
2x10m exp.
fine-gr. m/sed.
with qtz veins

1542
5m o/c, boulders
HF with qtz veins
+ ? tourm. // cleav.
W 2235 ppm
Au 15.2 ppb

1541
o/c shale & HF
with minor veinlets

STQ 2 =
Mo 12.8 ppm
Zn 1247 ppm
Ag 12.4 ppm

STQ
claim block

TBMB
claim block

1539 HF shale
with veinlets

1540
10m o/c
HF shale with
veinlets

S1
Crenulated
m / rhyolite?

S2
o/c

STQ 1
Volcs

S4
o/c

S3
o/c

STQ 2
Volcs

3
4
Marble,
dyke
HF volcs

Sample	Method Analyte Unit MDL Type	WGHT Wgt KG 0.01	LF100 Ba PPM 1	LF100 Be PPM 1	LF100 Co PPM 0.2	LF100 Cs PPM 0.1	LF100 Ga PPM 0.5	LF100 Hf PPM 0.1	LF100 Nb PPM 0.1
1901351	Rock	0.36	776	4	7.3	10.7	23	6.7	16.9
1901352	Rock	0.5	595	5	7	3.6	15	7	11.1
1901353	Rock	0.76	473	4	16.4	9.8	25.7	3.9	16.2
1901354	Rock	1.09	364	3	8.2	4	14	5.5	9.1
1901355	Rock	0.48	453	<1	5.1	1.5	4.8	1.2	3.6
1901356	Rock	0.75	8	5	5.2	0.7	13.5	1	3.2
1901357	Rock	0.63	682	8	12.3	20.3	21.1	5.4	16.2
1901358	Rock	0.59	381	4	10.5	6.3	21.1	5.2	12.8
1901359	Rock	0.54	716	5	14.4	8.6	20.3	6.2	18.5
1901360	Rock	0.94	301	12	6.4	4.9	27.7	4.3	12.4
1901361	Rock	0.51	520	15	1.8	6.7	10.4	2.5	6.2
1901362	Rock	0.37	241	8	6.2	9.4	22.9	2.8	8.9
1901363	Rock	0.71	1129	5	4.2	15.2	13.9	5.3	11.6
1901364	Rock	0.06	1002	4	14.5	8.2	16.1	4.7	11.3
Pulp									
Duplicates									
1901353	Rock	0.76	473	4	16.4	9.8	25.7	3.9	16.2
1901353	REP		470	5	15.9	9.4	25.8	3.8	16.2
1901363	Rock	0.71	1129	5	4.2	15.2	13.9	5.3	11.6
1901363	REP								
Ref. Materials									
STD SO-19	STD		462	15	24	4.5	15.2	3.1	68.9
STD SO-19	STD		473	17	23.8	4.4	15.1	3.1	68.4
STD BVGEO01	STD								
STD OREAS262	STD								
BLK	BLK		<1	<1	<0.2	<0.1	<0.5	<0.1	<0.1
BLK	BLK								
Prep Wash									
ROCK-WHI	Prep Blank		772	1	3.4	0.5	14.3	3.2	5.7
ROCK-WHI	Prep Blank		816	<1	3.8	0.5	13.7	3.4	5.8

	LF100	LF10	LF10	LF10	LF10	LF10	LF10	LF10	LF10	LF10	LF10	LF10
	Rb	Sn	Sr	Ta	Th	U	V	W	Zr	Y	La	
	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM
	0.1	1	0.5	0.1	0.2	0.1	8	0.5	0.1	0.1	0.1	
Sample												
1901351	313.2	20	303.4	1.5	23.2	3	77	14.1	247.3	31.1	59.1	
1901352	203	72	197.3	0.8	15.5	3	51	27.9	264.4	19.8	40.5	
1901353	253.1	54	463.7	1.1	18.1	3.6	100	8.6	137.4	30.5	67.5	
1901354	150	24	429.2	0.9	14	3.7	49	2.1	210.6	25.4	37.1	
1901355	41.5	2	33.9	0.3	3.1	0.6	33	1.4	46.3	5.9	6.6	
1901356	5.4	3001	48.2	0.3	3.7	0.8	42	6.6	29.4	3.6	4.7	
1901357	337.2	24	182.4	1.3	21.1	3.8	92	12.9	198.4	26.2	63.8	
1901358	147.1	46	339.2	0.9	17.3	3.5	79	11.1	189.1	23	51.8	
1901359	439.8	26	108	1.3	18.1	3.1	84	21.6	239.6	22.3	51.1	
1901360	159	335	114.4	1	12	2.3	54	2235	170.6	13.5	34.6	
1901361	239.1	146	95.6	0.9	8.9	1.1	<8	8.7	77.7	5.3	6.9	
1901362	454.9	174	27.1	1.3	10.1	3.7	<8	13.2	72.8	12.8	19.9	
1901363	331.5	543	171.8	0.9	15.8	3.2	26	20.5	189.8	13	22.7	
1901364	180.3	84	169.5	0.9	14.8	4.5	91	21.9	164.6	19.1	38.2	
Pulp												
Duplicates												
1901353	253.1	54	463.7	1.1	18.1	3.6	100	8.6	137.4	30.5	67.5	
1901353	252.5	54	470	1.2	18.7	4	103	7.4	140.3	31.6	68.8	
1901363	331.5	543	171.8	0.9	15.8	3.2	26	20.5	189.8	13	22.7	
1901363												
Ref. Materials												
STD SO-19	19.8	19	319.5	4.8	13.1	20.2	158	10.4	111.1	36.2	72.8	
STD SO-19	20	19	313	4.7	13.1	19.9	151	9.3	111.9	36	72.6	
STD BVGEO01												
STD												
OREAS262												
BLK	0.1	<1	1.2	<0.1	<0.2	<0.1	<8	<0.5	0.2	<0.1	0.1	
BLK												
Prep Wash												
ROCK-WHI	35	3	211.2	0.5	3.1	1.5	43	0.5	138.3	17.9	16.2	
ROCK-WHI	37.4	3	217.6	0.5	3.2	1.4	39	0.5	130	18.6	15.6	

	LF100	LF100	LF100	LF100	LF100	LF100	LF100	LF100	LF100	LF100
	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er
	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM
	0.1	0.02	0.3	0.05	0.02	0.05	0.01	0.05	0.02	0.03
Sample										
1901351	114.3	12.77	45.4	7.87	1.22	6.52	1	5.56	1.11	3.28
1901352	78.6	8.28	30.6	5.06	0.92	4.08	0.61	3.55	0.71	2.1
1901353	119.9	14.29	51.8	8.71	1.67	7.26	1.07	5.88	1.22	3.16
1901354	67.1	7.24	27.1	4.87	1.14	4.31	0.7	4.13	0.93	2.73
1901355	14.1	1.46	5.7	1.03	0.2	0.85	0.15	0.96	0.21	0.73
1901356	6.3	0.59	2.4	0.45	0.14	0.42	0.07	0.43	0.1	0.33
1901357	116.7	13.19	46.3	7.56	1.36	5.72	0.86	4.85	0.97	2.78
1901358	97.8	10.83	39	6.57	1.16	5.28	0.77	4.32	0.86	2.48
1901359	99.7	10.56	37.3	6.26	1.16	4.97	0.73	4.23	0.79	2.45
1901360	67	7.07	23.8	4.26	0.69	3.12	0.5	2.88	0.58	1.7
1901361	14.3	1.28	4	0.85	0.17	0.81	0.15	0.93	0.22	0.62
1901362	33.1	3.59	12.7	2.38	0.32	2.13	0.36	2.36	0.48	1.38
1901363	42.6	4.56	16.1	3.02	0.55	2.54	0.39	2.36	0.52	1.46
1901364	67.8	7.64	27.8	4.49	1.13	3.65	0.55	3.34	0.7	2.01
Pulp										
Duplicates										
1901353	119.9	14.29	51.8	8.71	1.67	7.26	1.07	5.88	1.22	3.16
1901353	123.8	14.49	51.5	8.88	1.61	7.07	1.09	6.11	1.11	3.29
1901363	42.6	4.56	16.1	3.02	0.55	2.54	0.39	2.36	0.52	1.46
1901363										
Ref. Materials										
STD SO-19	157.6	18.86	74.6	12.55	3.56	9.94	1.34	7.24	1.35	3.71
STD SO-19	160.6	19.03	74.8	12.64	3.63	10.13	1.33	7.12	1.32	3.78
STD BVGEO01										
STD OREAS262										
BLK	<0.1	<0.02	<0.3	<0.05	<0.02	<0.05	<0.01	<0.05	<0.02	<0.03
BLK										
Prep Wash										
ROCK-WHI	29.9	3.36	13.5	2.54	0.73	2.61	0.44	2.71	0.62	2.03
ROCK-WHI	27.8	3.19	12.7	2.46	0.72	2.63	0.46	2.8	0.63	1.98

	LF100 Tm PPM 0.01	LF100 Yb PPM 0.05	LF100 Lu PPM 0.01	AQ200 Mo PPM 0.1	AQ200 Cu PPM 0.1	AQ200 Pb PPM 0.1	AQ200 Zn PPM 1	AQ200 Ni PPM 0.1	AQ200 As PPM 0.5	AQ200 Cd PPM 0.1
Sample										
1901351	0.49	3.02	0.46	0.7	28.5	128.1	257	17.5	89.6	1.4
1901352	0.3	1.98	0.32	0.4	43.7	53.2	206	12.9	135.1	1
1901353	0.46	2.91	0.46	0.4	59.5	31.7	143	36.2	87.4	0.7
1901354	0.4	2.6	0.38	<0.1	10.6	20.3	95	20.2	9.7	0.5
1901355	0.11	0.69	0.13	<0.1	11.8	14.4	60	10.6	1.8	0.2
1901356	0.06	0.46	0.09	0.2	9.1	15.7	32	0.9	80	0.1
1901357	0.38	2.58	0.4	3	28	10.2	81	31.3	66.7	0.2
1901358	0.34	2.36	0.37	0.5	52.3	17.2	86	19.7	29.1	0.5
1901359	0.37	2.36	0.36	0.7	22.2	14.3	141	31.5	63.8	0.5
1901360	0.25	1.7	0.28	1.5	67.5	15	44	8.7	597.4	0.2
1901361	0.1	0.63	0.1	0.2	25.7	8.1	34	1.7	78.9	0.2
1901362	0.22	1.53	0.23	0.3	84.6	15.4	41	1.3	9367.7	0.7
1901363	0.23	1.6	0.25	0.4	59.7	8.9	73	7.8	67.7	0.2
1901364	0.29	2.02	0.3	12.8	98.9	1247.4	5964	43.2	236.3	41.7
Pulp										
Duplicates										
1901353	0.46	2.91	0.46	0.4	59.5	31.7	143	36.2	87.4	0.7
1901353	0.46	3.01	0.46							
1901363	0.23	1.6	0.25	0.4	59.7	8.9	73	7.8	67.7	0.2
1901363				0.3	57.6	9.5	74	7.3	61.2	0.2
Ref. Materials										
STD SO-19	0.53	3.31	0.51							
STD SO-19	0.54	3.37	0.49							
STD BVGEO01				10.2	4199.1	179.6	1651	156.7	115.2	6.1
STD OREAS262				0.6	104.3	53.3	137	58.7	35.9	0.7
BLK	<0.01	<0.05	<0.01							
BLK				<0.1	<0.1	<0.1	<1	<0.1	<0.5	<0.1
Prep Wash										
ROCK-WHI	0.33	2.24	0.38	0.5	4	75	158	0.5	5.2	0.8
ROCK-WHI	0.3	2.27	0.36	0.5	3	63.5	106	0.6	3	0.4

	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200
	Sb	Bi	Ag	Au	Hg	Tl	Se
	PPM	PPM	PPM	PPB	PPM	PPM	PPM
	0.1	0.1	0.1	0.5	0.01	0.1	0.5
Sample							
1901351	2.4	3.5	0.8	4.4	<0.01	1.9	<0.5
1901352	2.3	2.9	0.4	1.8	<0.01	0.4	<0.5
1901353	1.5	1.1	0.2	0.7	<0.01	1.5	<0.5
1901354	0.4	0.2	0.1	3.4	<0.01	0.8	<0.5
1901355	0.3	<0.1	<0.1	<0.5	<0.01	0.2	<0.5
1901356	0.9	2.9	0.4	1.4	<0.01	<0.1	<0.5
1901357	0.9	4.7	0.1	6.6	<0.01	2.9	<0.5
1901358	0.8	1.1	0.2	3	<0.01	0.9	<0.5
1901359	0.4	1.2	<0.1	3	<0.01	2.7	<0.5
1901360	2.6	25.4	0.5	15.2	*	1.2	1.5
1901361	0.4	7.2	0.1	<0.5	<0.01	0.3	<0.5
1901362	3.3	97.7	3	19.2	0.02	0.6	8.6
1901363	1.9	7.6	0.3	<0.5	<0.01	1.1	<0.5
1901364	52.7	4.3	12.4	0.9	0.25	1.3	0.8
Pulp							
Duplicates							
1901353	1.5	1.1	0.2	0.7	<0.01	1.5	<0.5
1901353							
1901363	1.9	7.6	0.3	<0.5	<0.01	1.1	<0.5
1901363	1.9	7.9	0.3	1.4	<0.01	1.2	<0.5
Ref. Materials							
STD SO-19							
STD SO-19							
STD BVGEO01	2.7	22.9	2.5	208.7	0.08	0.6	4.5
STD OREAS262	3.1	1	0.4	56.9	0.14	0.5	0.6
BLK							
BLK	<0.1	<0.1	<0.1	<0.5	<0.01	<0.1	<0.5
Prep Wash							
ROCK-WHI	1.1	0.1	0.5	1.2	0.01	<0.1	<0.5
ROCK-WHI	0.9	<0.1	0.4	<0.5	<0.01	<0.1	<0.5



BUREAU VERITAS MINERAL LABORATORIES
Canada

www.bureauveritas.com/um

Bureau Veritas Commodities Canada Ltd.
9050 Shaughnessy St Vancouver British Columbia V6P 6E5 Canada
PHONE (604) 253-3158

Client: **Tim Liverton**
Box 393
Watson Lake Yukon Y0A 1C0 Canada

Submitted By: Tim Liverton
Receiving Lab: Canada-Whitehorse
Received: February 05, 2021
Analysis Start: February 10, 2021
Report Date: February 22, 2021
Page: 1 of 2

CERTIFICATE OF ANALYSIS

WHI21000027.1

CLIENT JOB INFORMATION

Project: STQ
Shipment ID:
P.O. Number
Number of Samples: 14

SAMPLE DISPOSAL

RTRN-PLP Return After 90 days
RTRN-RJT Return After 60 days

Bureau Veritas does not accept responsibility for samples left at the laboratory after 90 days without prior written instructions for sample storage or return.

Invoice To: Tim Liverton
Box 393
Watson Lake Yukon Y0A 1C0
Canada

CC: W.D. Mann

SAMPLE PREPARATION AND ANALYTICAL PROCEDURES

Procedure Code	Number of Samples	Code Description	Test Wgt (g)	Report Status	Lab
PRP70-250	14	Crush, split and pulverize 250 g rock to 200 mesh			WHI
LF100-EXT	14	LiBO2/Li2B4O7 fusion ICP-MS analysis	0.2	Completed	VAN
SHP01	14	Per sample shipping charges for branch shipments			VAN
BAT01	1	Batch charge of <50 samples			VAN

ADDITIONAL COMMENTS



This report supersedes all previous preliminary and final reports with this file number dated prior to the date on this certificate. Signature indicates final approval; preliminary reports are unsigned and should be used for reference only. All results are considered the confidential property of the client. Bureau Veritas assumes the liabilities for actual cost of analysis only. Results apply to samples as submitted.
*** asterisk indicates that an analytical result could not be provided due to unusually high levels of interference from other elements.



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Canada

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Bureau Veritas Commodities Canada Ltd.

9050 Shaughnessy St Vancouver British Columbia V6P 6E5 Canada

PHONE (604) 253-3158

Client: **Tim Liverton**
Box 393
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Project: STQ
Report Date: February 22, 2021

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CERTIFICATE OF ANALYSIS

WHI21000027.1

Method	Analyte	WGHT	LF100	LF100	LF100	LF100	LF100	LF100	LF100	LF100	LF100	LF100	LF100	LF100	LF100	LF100	LF100	LF100	LF100	LF100	LF100
		Wgt	Ba	Be	Co	Cs	Ga	Hf	Nb	Rb	Sn	Sr	Ta	Th	U	V	W	Zr	Y	La	Ce
Unit		kg	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
MDL		0.01	1	1	0.2	0.1	0.5	0.1	0.1	0.1	1	0.5	0.1	0.2	0.1	8	0.5	0.1	0.1	0.1	0.1
1901351	Rock	0.36	776	4	7.3	10.7	23.0	6.7	16.9	313.2	20	303.4	1.5	23.2	3.0	77	14.1	247.3	31.1	59.1	114.3
1901352	Rock	0.50	595	5	7.0	3.6	15.0	7.0	11.1	203.0	72	197.3	0.8	15.5	3.0	51	27.9	264.4	19.8	40.5	78.6
1901353	Rock	0.76	473	4	16.4	9.8	25.7	3.9	16.2	253.1	54	463.7	1.1	18.1	3.6	100	8.6	137.4	30.5	67.5	119.9
1901354	Rock	1.09	364	3	8.2	4.0	14.0	5.5	9.1	150.0	24	429.2	0.9	14.0	3.7	49	2.1	210.6	25.4	37.1	67.1
1901355	Rock	0.48	453	<1	5.1	1.5	4.8	1.2	3.6	41.5	2	33.9	0.3	3.1	0.6	33	1.4	46.3	5.9	6.6	14.1
1901356	Rock	0.75	8	5	5.2	0.7	13.5	1.0	3.2	5.4	3001	48.2	0.3	3.7	0.8	42	6.6	29.4	3.6	4.7	6.3
1901357	Rock	0.63	682	8	12.3	20.3	21.1	5.4	16.2	337.2	24	182.4	1.3	21.1	3.8	92	12.9	198.4	26.2	63.8	116.7
1901358	Rock	0.59	381	4	10.5	6.3	21.1	5.2	12.8	147.1	46	339.2	0.9	17.3	3.5	79	11.1	189.1	23.0	51.8	97.8
1901359	Rock	0.54	716	5	14.4	8.6	20.3	6.2	18.5	439.8	26	108.0	1.3	18.1	3.1	84	21.6	239.6	22.3	51.1	99.7
1901360	Rock	0.94	301	12	6.4	4.9	27.7	4.3	12.4	159.0	335	114.4	1.0	12.0	2.3	54	2234.5	170.6	13.5	34.6	67.0
1901361	Rock	0.51	520	15	1.8	6.7	10.4	2.5	6.2	239.1	146	95.6	0.9	8.9	1.1	<8	8.7	77.7	5.3	6.9	14.3
1901362	Rock	0.37	241	8	6.2	9.4	22.9	2.8	8.9	454.9	174	27.1	1.3	10.1	3.7	<8	13.2	72.8	12.8	19.9	33.1
1901363	Rock	0.71	1129	5	4.2	15.2	13.9	5.3	11.6	331.5	543	171.8	0.9	15.8	3.2	26	20.5	189.8	13.0	22.7	42.6
1901364	Rock	0.06	1002	4	14.5	8.2	16.1	4.7	11.3	180.3	84	169.5	0.9	14.8	4.5	91	21.9	164.6	19.1	38.2	67.8



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Method	Analyte	LF100	LF100	LF100	LF100	LF100	LF100	LF100	LF100	LF100	LF100	LF100	LF100	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200
		Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	Mo	Cu	Pb	Zn	Ni	As	Cd	Sb
Unit		ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
MDL		0.02	0.3	0.05	0.02	0.05	0.01	0.05	0.02	0.03	0.01	0.05	0.01	0.1	0.1	0.1	1	0.1	0.5	0.1	0.1
1901351	Rock	12.77	45.4	7.87	1.22	6.52	1.00	5.56	1.11	3.28	0.49	3.02	0.46	0.7	28.5	128.1	257	17.5	89.6	1.4	2.4
1901352	Rock	8.28	30.6	5.06	0.92	4.08	0.61	3.55	0.71	2.10	0.30	1.98	0.32	0.4	43.7	53.2	206	12.9	135.1	1.0	2.3
1901353	Rock	14.29	51.8	8.71	1.67	7.26	1.07	5.88	1.22	3.16	0.46	2.91	0.46	0.4	59.5	31.7	143	36.2	87.4	0.7	1.5
1901354	Rock	7.24	27.1	4.87	1.14	4.31	0.70	4.13	0.93	2.73	0.40	2.60	0.38	<0.1	10.6	20.3	95	20.2	9.7	0.5	0.4
1901355	Rock	1.46	5.7	1.03	0.20	0.85	0.15	0.96	0.21	0.73	0.11	0.69	0.13	<0.1	11.8	14.4	60	10.6	1.8	0.2	0.3
1901356	Rock	0.59	2.4	0.45	0.14	0.42	0.07	0.43	0.10	0.33	0.06	0.46	0.09	0.2	9.1	15.7	32	0.9	80.0	0.1	0.9
1901357	Rock	13.19	46.3	7.56	1.36	5.72	0.86	4.85	0.97	2.78	0.38	2.58	0.40	3.0	28.0	10.2	81	31.3	66.7	0.2	0.9
1901358	Rock	10.83	39.0	6.57	1.16	5.28	0.77	4.32	0.86	2.48	0.34	2.36	0.37	0.5	52.3	17.2	86	19.7	29.1	0.5	0.8
1901359	Rock	10.56	37.3	6.26	1.16	4.97	0.73	4.23	0.79	2.45	0.37	2.36	0.36	0.7	22.2	14.3	141	31.5	63.8	0.5	0.4
1901360	Rock	7.07	23.8	4.26	0.69	3.12	0.50	2.88	0.58	1.70	0.25	1.70	0.28	1.5	67.5	15.0	44	8.7	597.4	0.2	2.6
1901361	Rock	1.28	4.0	0.85	0.17	0.81	0.15	0.93	0.22	0.62	0.10	0.63	0.10	0.2	25.7	8.1	34	1.7	78.9	0.2	0.4
1901362	Rock	3.59	12.7	2.38	0.32	2.13	0.36	2.36	0.48	1.38	0.22	1.53	0.23	0.3	84.6	15.4	41	1.3	9367.7	0.7	3.3
1901363	Rock	4.56	16.1	3.02	0.55	2.54	0.39	2.36	0.52	1.46	0.23	1.60	0.25	0.4	59.7	8.9	73	7.8	67.7	0.2	1.9
1901364	Rock	7.64	27.8	4.49	1.13	3.65	0.55	3.34	0.70	2.01	0.29	2.02	0.30	12.8	98.9	1247.4	5964	43.2	236.3	41.7	52.7



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CERTIFICATE OF ANALYSIS

WHI2100027.1

Method	Analyte	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200
		Bi	Ag	Au	Hg	Tl	Se
Unit		ppm	ppm	ppb	ppm	ppm	ppm
MDL		0.1	0.1	0.5	0.01	0.1	0.5
1901351	Rock	3.5	0.8	4.4	<0.01	1.9	<0.5
1901352	Rock	2.9	0.4	1.8	<0.01	0.4	<0.5
1901353	Rock	1.1	0.2	0.7	<0.01	1.5	<0.5
1901354	Rock	0.2	0.1	3.4	<0.01	0.8	<0.5
1901355	Rock	<0.1	<0.1	<0.5	<0.01	0.2	<0.5
1901356	Rock	2.9	0.4	1.4	<0.01	<0.1	<0.5
1901357	Rock	4.7	0.1	6.6	<0.01	2.9	<0.5
1901358	Rock	1.1	0.2	3.0	<0.01	0.9	<0.5
1901359	Rock	1.2	<0.1	3.0	<0.01	2.7	<0.5
1901360	Rock	25.4	0.5	15.2	*	1.2	1.5
1901361	Rock	7.2	0.1	<0.5	<0.01	0.3	<0.5
1901362	Rock	97.7	3.0	19.2	0.02	0.6	8.6
1901363	Rock	7.6	0.3	<0.5	<0.01	1.1	<0.5
1901364	Rock	4.3	12.4	0.9	0.25	1.3	0.8



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QUALITY CONTROL REPORT

WHI21000027.1

Method	WGHT	LF100	LF100	LF100	LF100	LF100	LF100	LF100	LF100	LF100	LF100	LF100	LF100	LF100	LF100	LF100	LF100	LF100	LF100	LF100	LF100
Analyte	Wgt	Ba	Be	Co	Cs	Ga	Hf	Nb	Rb	Sn	Sr	Ta	Th	U	V	W	Zr	Y	La	Ce	
Unit	kg	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
MDL	0.01	1	1	0.2	0.1	0.5	0.1	0.1	0.1	1	0.5	0.1	0.2	0.1	8	0.5	0.1	0.1	0.1	0.1	
Pulp Duplicates																					
1901353	Rock	0.76	473	4	16.4	9.8	25.7	3.9	16.2	253.1	54	463.7	1.1	18.1	3.6	100	8.6	137.4	30.5	67.5	119.9
REP 1901353	QC		470	5	15.9	9.4	25.8	3.8	16.2	252.5	54	470.0	1.2	18.7	4.0	103	7.4	140.3	31.6	68.8	123.8
1901363	Rock	0.71	1129	5	4.2	15.2	13.9	5.3	11.6	331.5	543	171.8	0.9	15.8	3.2	26	20.5	189.8	13.0	22.7	42.6
REP 1901363	QC																				
Reference Materials																					
STD BVGEO01	Standard																				
STD OREAS262	Standard																				
STD SO-19	Standard		462	15	24.0	4.5	15.2	3.1	68.9	19.8	19	319.5	4.8	13.1	20.2	158	10.4	111.1	36.2	72.8	157.6
STD SO-19	Standard		473	17	23.8	4.4	15.1	3.1	68.4	20.0	19	313.0	4.7	13.1	19.9	151	9.3	111.9	36.0	72.6	160.6
STD SO-19 Expected			486	20	24	4.5	17.5	3.1	68.5	19.5	19	317.1	4.9	13	19.4	165	9.8	112	35.5	71.3	161
STD BVGEO01 Expected																					
STD OREAS262 Expected																					
BLK	Blank		<1	<1	<0.2	<0.1	<0.5	<0.1	<0.1	0.1	<1	1.2	<0.1	<0.2	<0.1	<8	<0.5	0.2	<0.1	0.1	<0.1
BLK	Blank																				
Prep Wash																					
ROCK-WHI	Prep Blank		772	1	3.4	0.5	14.3	3.2	5.7	35.0	3	211.2	0.5	3.1	1.5	43	0.5	138.3	17.9	16.2	29.9
ROCK-WHI	Prep Blank		816	<1	3.8	0.5	13.7	3.4	5.8	37.4	3	217.6	0.5	3.2	1.4	39	0.5	130.0	18.6	15.6	27.8



QUALITY CONTROL REPORT

WHI21000027.1

Method	LF100	LF100	LF100	LF100	LF100	LF100	LF100	LF100	LF100	LF100	LF100	LF100	LF100	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200
Analyte	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	Mo	Cu	Pb	Zn	Ni	As	Cd	Sb	
Unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	
MDL	0.02	0.3	0.05	0.02	0.05	0.01	0.05	0.02	0.03	0.01	0.05	0.01	0.1	0.1	0.1	1	0.1	0.5	0.1	0.1	
Pulp Duplicates																					
1901353	Rock	14.29	51.8	8.71	1.67	7.26	1.07	5.88	1.22	3.16	0.46	2.91	0.46	0.4	59.5	31.7	143	36.2	87.4	0.7	1.5
REP 1901353	QC	14.49	51.5	8.88	1.61	7.07	1.09	6.11	1.11	3.29	0.46	3.01	0.46								
1901363	Rock	4.56	16.1	3.02	0.55	2.54	0.39	2.36	0.52	1.46	0.23	1.60	0.25	0.4	59.7	8.9	73	7.8	67.7	0.2	1.9
REP 1901363	QC													0.3	57.6	9.5	74	7.3	61.2	0.2	1.9
Reference Materials																					
STD BVGEO01	Standard													10.2	4199.1	179.6	1651	156.7	115.2	6.1	2.7
STD OREAS262	Standard													0.6	104.3	53.3	137	58.7	35.9	0.7	3.1
STD SO-19	Standard	18.86	74.6	12.55	3.56	9.94	1.34	7.24	1.35	3.71	0.53	3.31	0.51								
STD SO-19	Standard	19.03	74.8	12.64	3.63	10.13	1.33	7.12	1.32	3.78	0.54	3.37	0.49								
STD SO-19 Expected		19.4	75.7	13.7	3.81	10.53	1.41	7.5	1.39	3.78	0.55	3.55	0.53								
STD BVGEO01 Expected														10.8	4415	187	1741	163	121	6.5	2.2
STD OREAS262 Expected														0.68	118	56	154	62	35.8	0.61	3.39
BLK	Blank	<0.02	<0.3	<0.05	<0.02	<0.05	<0.01	<0.05	<0.02	<0.03	<0.01	<0.05	<0.01								
BLK	Blank													<0.1	<0.1	<0.1	<1	<0.1	<0.5	<0.1	<0.1
Prep Wash																					
ROCK-WHI	Prep Blank	3.36	13.5	2.54	0.73	2.61	0.44	2.71	0.62	2.03	0.33	2.24	0.38	0.5	4.0	75.0	158	0.5	5.2	0.8	1.1
ROCK-WHI	Prep Blank	3.19	12.7	2.46	0.72	2.63	0.46	2.80	0.63	1.98	0.30	2.27	0.36	0.5	3.0	63.5	106	0.6	3.0	0.4	0.9



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Method	Analyte	AQ200	AQ200	AQ200	AQ200	AQ200	AQ200
		Bi	Ag	Au	Hg	Tl	Se
Unit		ppm	ppm	ppb	ppm	ppm	ppm
MDL		0.1	0.1	0.5	0.01	0.1	0.5
Pulp Duplicates							
1901353	Rock	1.1	0.2	0.7	<0.01	1.5	<0.5
REP 1901353	QC						
1901363	Rock	7.6	0.3	<0.5	<0.01	1.1	<0.5
REP 1901363	QC	7.9	0.3	1.4	<0.01	1.2	<0.5
Reference Materials							
STD BVGEO01	Standard	22.9	2.5	208.7	0.08	0.6	4.5
STD OREAS262	Standard	1.0	0.4	56.9	0.14	0.5	0.6
STD SO-19	Standard						
STD SO-19	Standard						
STD SO-19 Expected							
STD BVGEO01 Expected		25.6	2.53	219	0.1	0.62	4.84
STD OREAS262 Expected		1.03	0.45	65	0.17	0.47	0.4
BLK	Blank						
BLK	Blank	<0.1	<0.1	<0.5	<0.01	<0.1	<0.5
Prep Wash							
ROCK-WHI	Prep Blank	0.1	0.5	1.2	0.01	<0.1	<0.5
ROCK-WHI	Prep Blank	<0.1	0.4	<0.5	<0.01	<0.1	<0.5