PROMIN

Drilling Report

Tynset Drilling Fieldwork 2021

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1 Summary

Playfair Mining completed a diamond drilling program near Tynset, a municipality in the Innlandet county of Norway, from September 24 to November 7, 2021. Eleven drill holes totaling 539.7 m were drilled in two areas, Rødalen and Storboren.

The geology of the area is metamorphic rock with some indication for ocean floor volcanism, it consists mostly of schist that vary in composition mostly containing mica, some garnet and some chlorite, some amphibolite and ultramafic layers were also observed.

Scarce mineralization was intersected by the drill holes. The most promising drill hole was STB-21-07. This core alternates between biotite schist and ultramafite-like zones. The layers are several meters thick. 2m of 0.1% copper were found, while this is a very small quantity it confirms that there is copper in the area.

Three hand samples were collected at Storboren from interesting surface locations, their assay results are mostly consistent with the drill core assays, one of the samples has a copper content of 1% but these samples have a high degree of uncertainty since they might not be local.

2 Results of Playfair drilling in 2021 and geological interpretations.

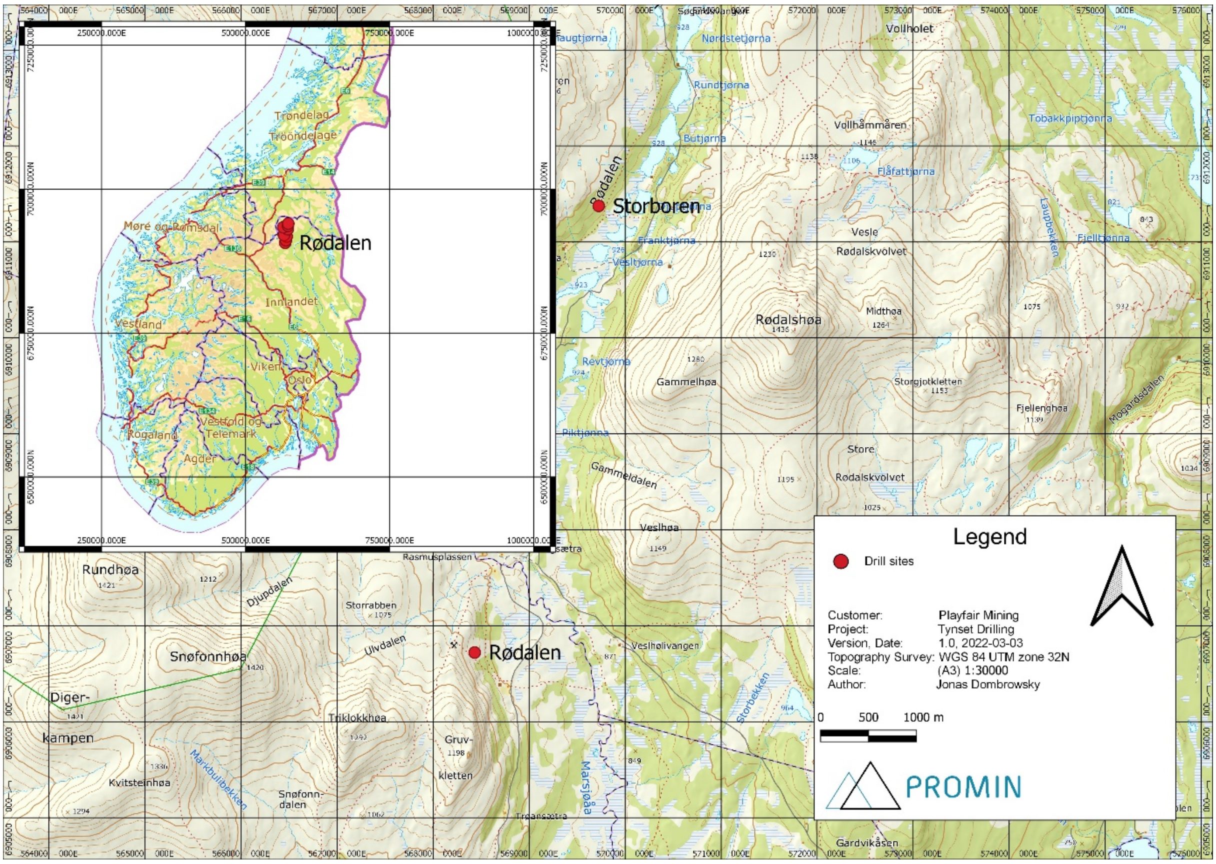

Figure 1: Overview map of drill sites and location within Norway

2.1 Regional geology of Røros area.

The Røros-Trondheim region of central Norway with Caledonian nappe sequences (dominantly Upper Allochthon) represents strata from the Baltoscandian margin of Baltica. They are traditionally divided into two major complexes: the structurally lower Seve Nappes and the overlying Köli Nappes.

The Seve Nappes comprises several thrust-bounded units of a wide variety of lithologies of schist, gneiss, and amphibolite, metamorphosed from greenschist, -amphibolite to granulite facies. The distribution of Seve nappes is mostly restricted to the eastern margin zone south- to southwest of Røros to- Alvdal and by Otta.

The Köli Nappes consist of extensive metavolcanic units with associated tuff-tuffites and schist formations, representing a variety of oceanic floor tectonic environments, interpreted to have developed outboard of the Baltoscandian platform and miogeocline, locally with some input of continental sediments. The metamorphic grade in the Köli Nappes is commonly in greenschist-facies. Nappe sheets and formations of strata bound ocean floor volcanic rocks with several VMS-type Cu+-Zn-Pb occurrences in a few tectonostratigraphic positions and are locally complexly folded and thrusted.

The Vågamo Ophiolite described in the southern corner of Røros field (Sturt, Bjerkgård and Ramsay, 1997), was thrust in above already folded and metamorphosed rocks of the Heidal Group (Seve Nappe) in earliest Ordovician times (Baug, 2018). A number of ultramafic rock bodies representing fragments of ophiolitic mantle and lower cumulate rocks were also thrust in, at this time, along the Seve-/Köli-contact zone in the area between Folldal and Feragen east of Røros (Nilsson, Sturt and Ramsay, 1997) probably on a common thrust plane (Ottadalen Thrust).

The Gula nappes of upper Köli constitute the major central part of the Røros-Trondheim area, covering all the planned drilling sites. The Einunnfjellet-Savalen area, about 2-12 km south of Rødalen drill target, comprises a domal structure exposing several significant nappe contacts within surrounding Gula nappes. The structurally lowest strata are exposed on Einunnfjellet mountain, and higher strata dip away from the core of the dome. Gently to moderately dipping foliation and overturned folds surrounding the dome pass into a series of steep, NE-SW striking folds in the area of Savalen lake (McClellan, 1995).

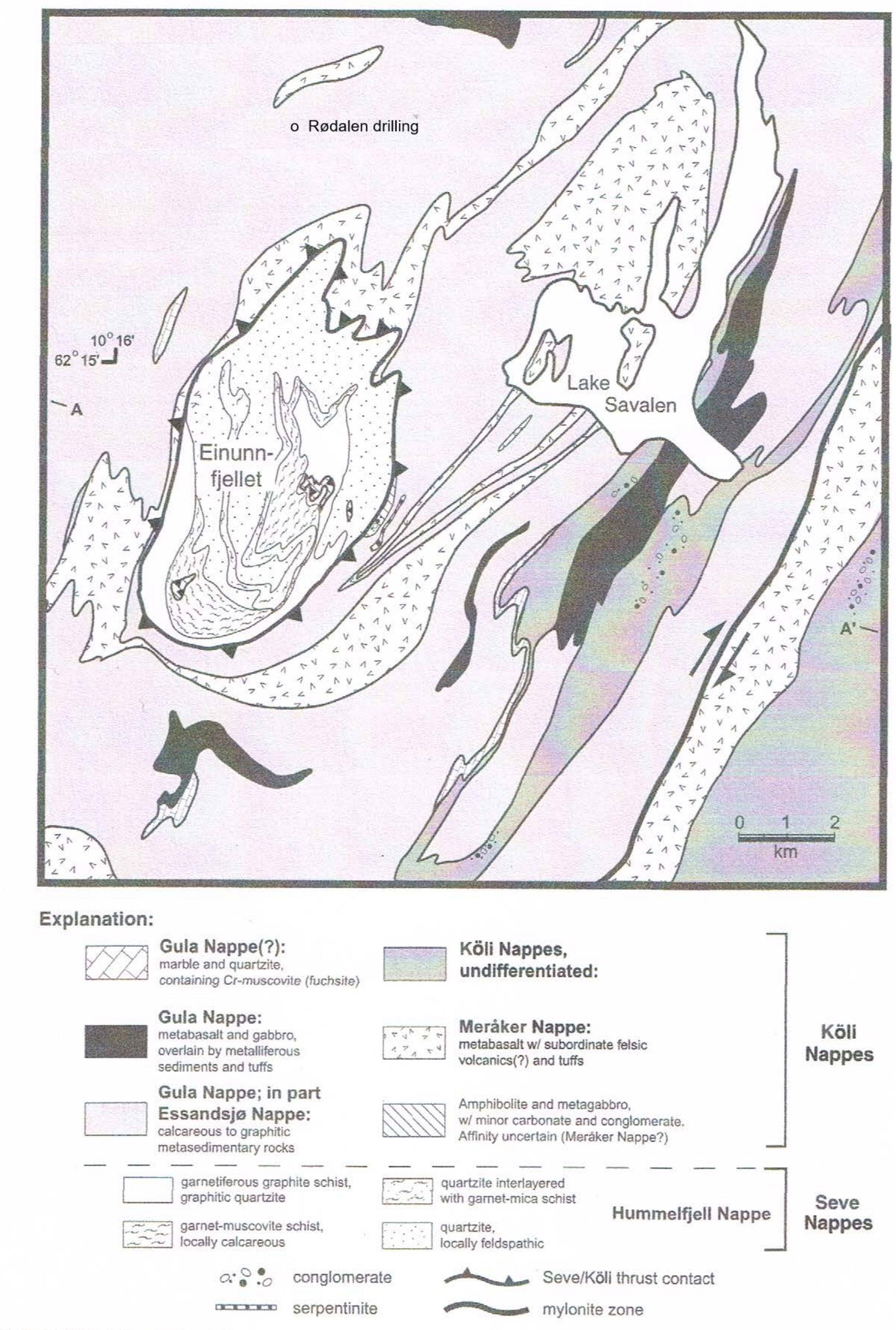

Figure 2: Geological map from Savalen area including added Rødalen drilling site, (McClellan, 2004)

McClellan (1995) interpreted the Einunnfjellet structure as a complex interference dome rather than a simple window, and divided the area into three main tectonostratigraphic units:

1) a lower continental-margin sequence of quartzite and schist in the core of Einunnfjellet dome, equivalent to the Hummelfjell Nappe of Nilsen and Wolff (1989) within Seve nappes of lower amphibolite facies.
2) a middle thrust sheet, the Savalen thrust complex, containing fragments of oceanic crust with metabasalt and amphibolite, along with pelagic, volcaniclastic and turbiditic sediments, and carbonate rock, equivalent to the Meråker-Sel nappe sheet (with several VMS-deposits) in lower part of Köli Nappes.
3) an upper sequence of metaclastic rocks that unconformably overlies the other units, as Gula Nappe with dominating mica schists, biotite-bearing pelites indicating lower greenschist facies.

Based on geochemical data, McClellan (1995) interpreted mafic metavolcanic complexes within the Savalen nappe as a related sequence of boninites and primitive tholeiites of arc/back-arc(?) origin, emplaced onto the continental margin succession as a composite thrust nappe. McClellan (1995) suggested that there is an essentially uninterrupted increase in metamorphic grade, from lower greenschist to lower amphibolite facies, that crosses the Seve-Köli contact. Early Silurian trondhjemites (quartz-dioritic veins/dikes) cut rocks that contain a preexisting metamorphic fabric and related folds.

2.2 Rødalen drilling target

At Rødalen, four diamond drill holes totalling 154.6 meters were drilled (Table 2-1). The drill core diameter was NQ.

Table 2-1: Details of the drill holes completed at Rødalen. All coordinates are in WGS 84.

BHID	Easting	Northing	Elevation (m)	Azimuth (°)	Dip (°)	Final Length (m)
RDL-21-01	568540	6906530	928	0	90	51.4
RDL-21-02	568511	6906518	939	0	90	41.8
RDL-21-03	568506	6906579	939	0	90	31.4
RDL-21-04	568517	6906616	927	0	90	30
						154.6

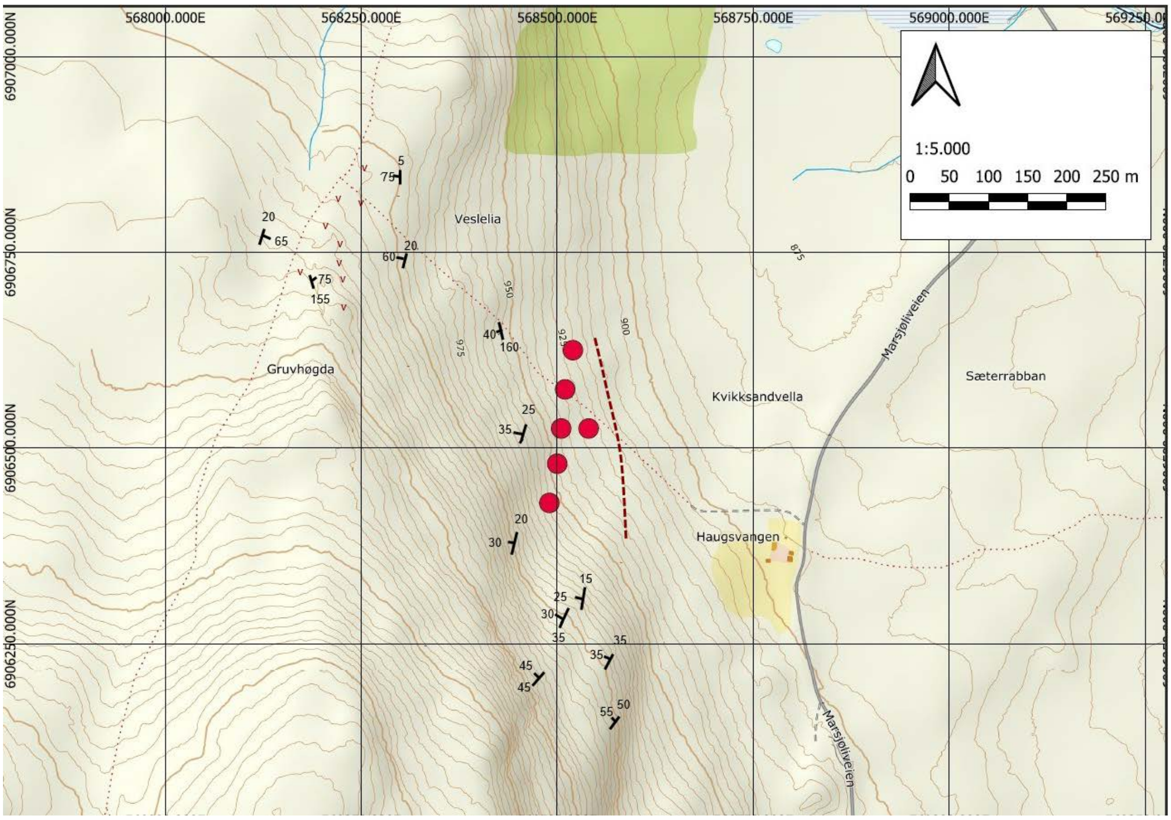

*Figure 3: Planned drillholes and observations with strike and dip of muscovite-biotite-garnet schists; **P**rojection of amphibolite zone up from drill holes. V coarse amphibolite-gabbro around old Rødalen mine.*

Two of the southernmost planned drill holes were not drilled because they were difficult available in steeper lower part of the slope, and the observed mineralization quality in 4 first drill holes gave no promising results.

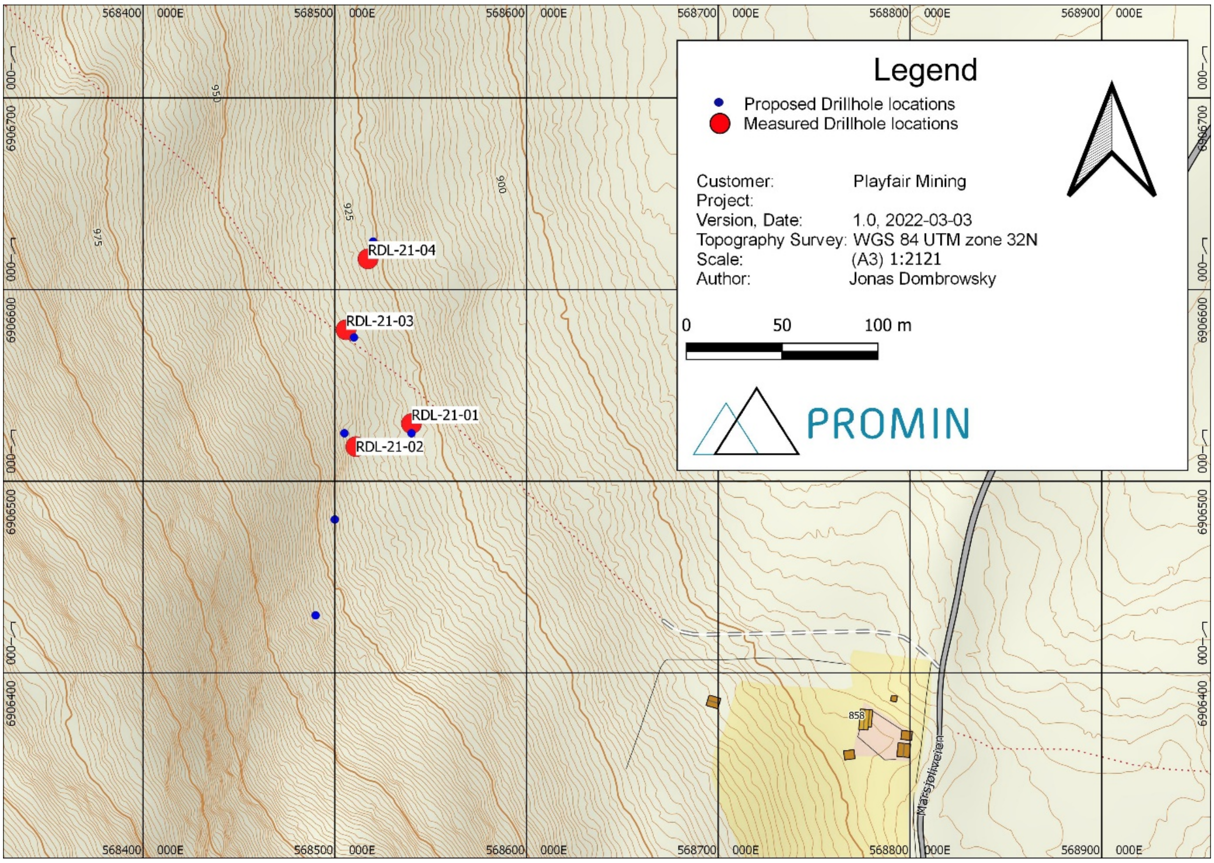

Figure 4: Map showing measured drillholes

The outcrops above the drilling site showed a rather homogenous- to variable banded mica schist with dark brown biotite, bright grey muscovite with silvery luster, widely distributed tiny mm pink-grey garnets (partly altered to soft white carbonate-talc), and partly high portions (< 10- 20 % or more) of cm-dm (< m) bands-veins-veinlets of dioritic-trondhjemite (quartz-diorite) intrusive origin with common intercalated lenses of white feldspar + some quartz and cm grey-green amphibole (hbl) tabular crystals and needles. The dominant strike direction (more- less sheared foliation) observed uphill from drilling sites is about N–S with moderate western dip, turning more NW-SE further southwards. At least 2 phases of folding were observed: meter-wide zones of some mesoscopic irregular wavy folds, and asymmetric Z-folds with < 1 - 5 dm E-W oriented shorter flanks with moderate NE-dipping fold axes.

All 4 holes were drilled through a section of mica-garnet schists with variable, grey- greenish muscovite-brown biotite-garnet and quartz-dioritic veins-lenses. One zone of banded amphibolite about 2-4 m thick is intersected in the drill holes with 25-30^0 W dip (parallel to observed schists). The banded amphibolite consists of mixed cm-layers of dark green-grey amphibole and bluish green chlorite-antigorite (?), dm biotite- mica schist and some quartz ± carbonate layers with epidote. Some cm- < 3 dm (hole 1) pyrrhotite, some pyrite grains are observed in veins but few traces of other sulfides like chalcopyrite. More biotite-rich schist over the amphibolite, like RDL-03 by 20 m depth, have mixed coarse bladed biotite (or cummingtonite?) – cm-size red garnets- quartz lenses and brown-red stained schist possibly indicating a skarn-like zone. Similar extensive thin-bedded amphibolite and skarn is described by Rui (1972), representing tuff layers described within lowermost part of Gula Nappe.

Figure 5: Rødalen hole 1 box 3 and 4 13 to 23m showing amphibole layer between 13.8 and 17.2m

Figure 6: Detailed view of mineralization in box 3

2.3 Storboren drilling target

At Storboren, seven diamond drill holes totalling 385.1 meters were drilled

Table 2-2: Details of the drill holes completed at Storboren. All coordinates are in WGS 84

BHID	Easting	Northing	Elevation (m)	Azimuth (°)	Dip (°)	Total Length (m)
STB-21-01	569659	6911306	961	0	90	63.2
STB-21-02	569629	6911337	971	0	90	72
STB-21-03	569616	6911360	975	0	90	44.1
STB-21-04	569610	6911333	977	0	90	32.9
STB-21-05	569610	6911333	977	193	60	44.3
STB-21-06	569596	6911353	981	0	90	39.1
STB-21-07	569575	6911362	988	50	60	89.5
						385.1

Figure 7: View from drill site 06 towards platform 07 and schist outcrop with rusty zone on right northern side.

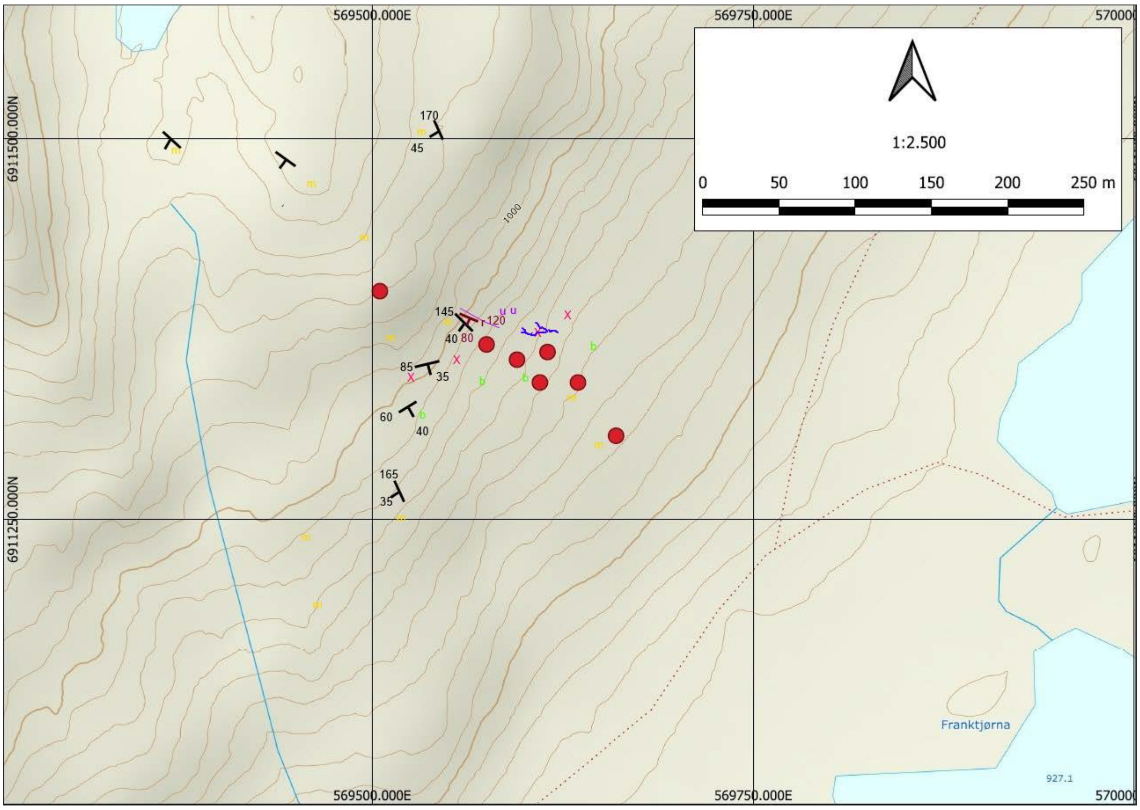

Figure 8: Storboren planned drill holes, Observed schist outcrops with strike and dip, local blocks, and indications from drill holes; M = mica garnet schist, b = biotite- graphite schist, x = tectonic zone, r = rusty zone, -- dead water seep zone, u = ultramafite.

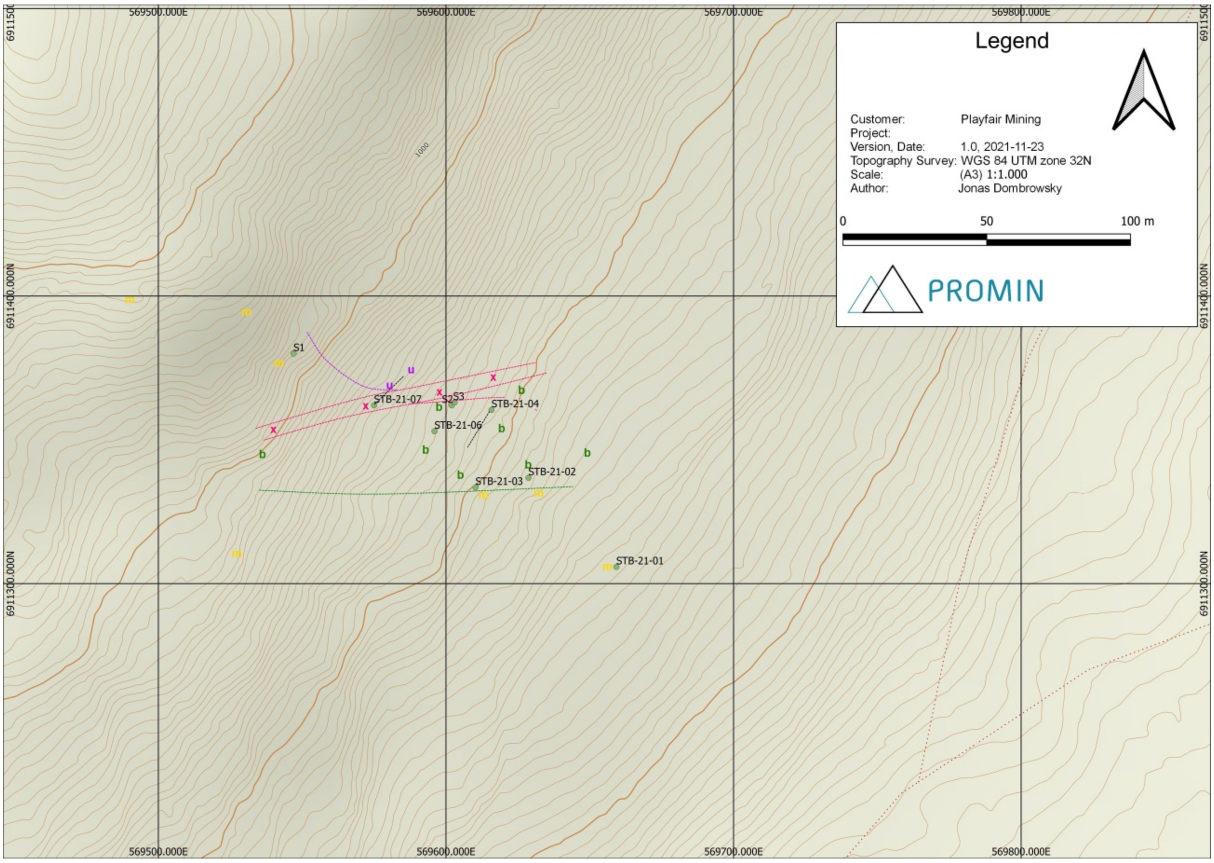

Figure 9: Drill sites. Interpretation of local geology based on drill core data projections and outcrops.

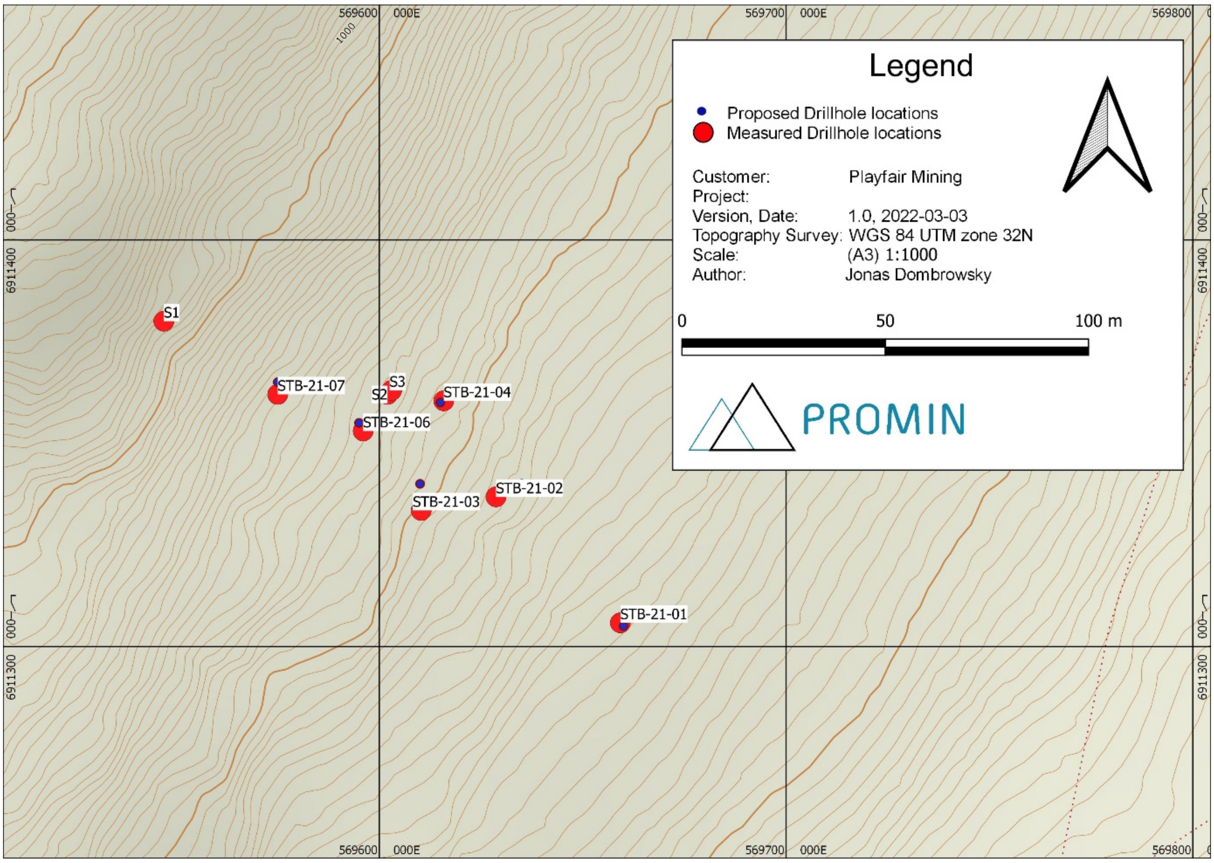

Figure 10: Map showing measured drillholes and hand sample site S1, S2, and S3

2.4 Geology

Mica-garnet schist (MGS). In the Storboren area there are a limited number of outcrops observed in the upper and western part of the slope, dominated by a light grey-greenish mica-quartz-garnet schist with some brownish biotite bands, variable foliation with common strike direction around N- S and a moderate dip to the W – SW (to about 30^0 S around drilling sites as projected from drill hole intersections). The upper meters of the southern drill hole STB-21-01 and -03 consist of a similar mica-garnet schist, but it is absent in holes STB-2104 to -07 further north (continues at deeper levels). The schist is partly complexly folded with lots of cm-wide feldspar-dioritic veins, and quartz, ± garnets and biotite-bands, some scattered < cm-size green amphibole laths-needles and bands with some carbonate.

Biotite schist (BS) is common in the middle parts of the southern holes STB-21-01 to -05. One outcrop of dark grey-brownish schist was observed on the slope 100 m SW of hole 07. Massive, less sheared parts consist of fine- to medium-grained dark brown-grey biotite with cm (pseudo)-idiomorphic tabular short- to long prismatic blasts (cm-long), pale green-grey- bluish (kyanite or sillimanite?) partly altered to rims of soft white talc-calcite? Graphite is partly present in variable amounts, with transition to some cm-size grey black graphite-rich bands, and m-wide zones with probably < 5–10 % graphite (GRS). Cm-dm-wide crosscutting dioritic- trondhjemitic veins are more common in sheared zones and are in places zoned with central quartz- white fine-grained feldspar and a rim of green grey < 1- 2 cm randomly oriented hornblende (hbl) needles, which are in places also further scattered in the matrix (< 10-20 % closer to the veins) and in some hbl-bi rich bands, locally some quartz- garnet- muscovite-richer bands, and random carbonates.

Tectonite (TEC) is here used as a term for a special kind of sheared zone observed in one outcrop 50 m west of (see picture below)- and at the top of drill hole STB-21-07, in shallow levels in drill holes STB-21-06, -05 and -04, in deeper levels of holes -02 and -03 and not in the southern drill hole -01. Due to the strike direction of the outcrop and the drill hole intersections, this zone apparently displays an E-W strike direction with a moderate southern dip, and locally some branches within BS. The zone resembles conglomerate, but consists of fine-grained white feldspar lenses and grey-white quartz, as cm-dm-size elongated, subrounded fragments and tight, isoclinally folded, ductile deformed dioritic veins, partly broken-off. The matrix consists of dark brownish biotite, grey-green cm-size to less than cm-size hornblende needles and some quartz and feldspar. Some remnants of white quartz ± feldspar veins also locally cutting and fading out along the main foliation (see picture of the outcrop), indicating a syn- to post-tectonic shearing event to dioritic intrusive- magmatic activity at relatively high temperatures.

Ultramafite (ULT) is here used as a term for zones of massive, bright green grey-white layers of probable altered ultramafic origin. Drillhole STB-21-07 drilled towards NE, from 17 m to > 90 m (end of hole) hit about 7 zones 2- 6 m wide of bright bluish green rather massive hard rock intercalated with sheared biotite- garnet schist. Preserved massive homogenous parts contain some < =cm more deep green antigorite (?, chlorite- or fuchsite?) in matrix of more fine-grained grey-white quartz-dolomite? Other mineral contents are scarce, but also associated with pyrrhotite-rich schists along preserved contact zones. Some thinner dm-cm bands also occur in adjacent schist as shear-lenses- bands.

Mineralization. The drill holes STB-01-06 displayed only limited zones of thin quartz veins and a few sulfides; pyrite, pyrrhotite and traces of chalcopyrite. Drill hole STB-21-07 hit a few mineralized zones; at around 20-21 m depth with some grains of pyrite, pyrrhotite and grains of chalcopyrite in altered zone with quartz veins between TEC and ULT were observed.

Several pyrrhotite- mineralized zones were observed in hole STB-21-07 from cm-dm in almost massive bands to m-wide, low-grade dissemination in biotite-garnet schist in close association at the contact to ULT-layers-zones, apparently all of them at the footwall side. No other sulfides than small pyrite grains were identified.

2.5 QA/QC Analysis

An industry-standard quality assurance/quality control (QA/QC) program was implemented during the drilling. Certified reference material OREAS 111 and locally procured quartz blank material were inserted into the sample stream. Every tenth sample was replaced by either a CRM or a blank. In addition, every 25th sample was duplicated.

The samples were collected in plastic sample bags together with a pre-numbered sample tag. The samples were shipped to ALS Global Laboratories in Malå, Finland, for preparation and to Loughrea, Ireland, for multi-element and precious metal analysis.

All standards were acceptable for Cu, Zn, Pb, Ag and Co (i.e., they fell within three times the standard deviation from the certified value). An example for Cu is shown in Figure 15. All blanks were acceptable.

Figure 11: Storboren hole 7 box 5 19-25m

Figure 12: Tectonite outcrop 50 m W drill hole STB-21-07. Ductile deformed white feldspar-dioritic veins as lenses in hornblende-biotite matrix. Elongated lenses dipping 40^0 to S.

Figure 13: Rusty zone below the top of Storboren (sample S1), brownish irregular bands in quartz-rich mica schist.

Figure 14: Dead zone without vegetation (sample S2 and S3, 25 m NW drill site STB-21-05), about 20-30 m long, 1-4 m wide tongue-shaped zones from 2 upwelling groundwater sources (cold- or poisoned water, blue line on upper map figure) about 25- 40 m ENE of drill site STB-21-07.

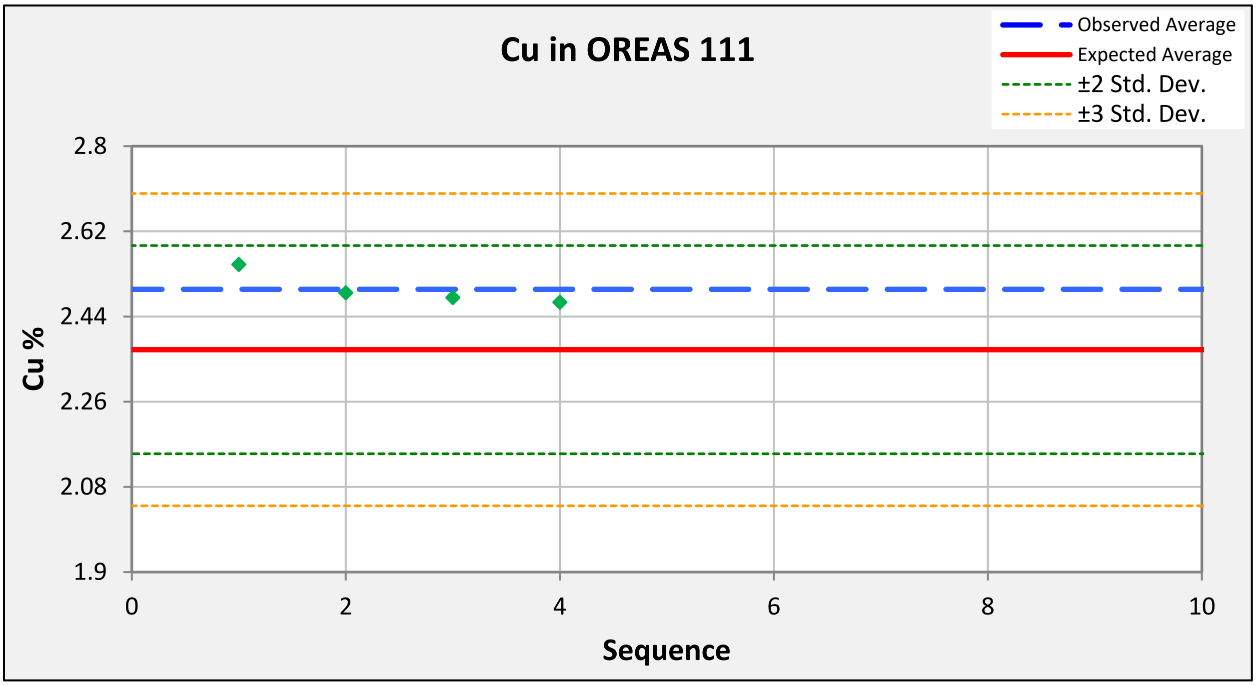

Figure 15: Performance of CRM OREAS 111 for Cu. A slight bias high is observed.

3 Results and interpretations.

Most drill holes from Rødalen and Storboren during the 2021 season targets gave disappointing results, with low grade to very low grade of Cu and Zn (as observed in drill cores by a hand lens, and confirmed by the core assays), and some thinner zones of <1-3 dm pyrrhotite bands and dissemination, and limited zones of quartz veins and fracture fillings with a little pyrite and minor traces of other observed sulfides (chalcopyrite, sphalerite).

The pyrrhotite–sulfide bands and disseminations observed in some of the drillholes are basically settled in biotite-mica schist partly associated with some graphite, but also in close connection to volcanic tuff layers and ultramafic zones, potentially related to some ocean – VMS-like setting.

Comparing the geochemical assays metal grades with S, the metal/S ratios are basically relatively low, indicating some contribution of biologically derived S (like in graphitic schists) in addition to eventual volcanogenic exhalative S sources. The Cu- and Zn- grades mostly display a distinct positive correlation with S, indicating a possible ocean floor setting (like VMS). Other elements like Co, Ni, Cr, Pb, Mo, and Ag have mostly low correlation factors with S (slightly positive to around zero), possibly indicating minor relevant contribution from continental- and ultramafic volcanic derived sources. Comparing the Rødalen and Storboren areas, the main Cr- and Ni background levels are considerable higher in Storboren, indicating contribution of more (ultra)mafic source material.

The last drill hole SB-07 at Storboren appears to be more interesting with many zones of banded-disseminated sulfides. A few intersections of cm- to dm-wide pyrrhotite-richer bands were observed, also in primary contact with massive structure-less ULT zones, and m-wide zones of variable- weaker disseminations in partly sheared biotite-garnets schist.

Several options for the petrogenetic setting with alternative interpretations of the bluish green massive zones (ULT) and relation to pyrrhotite-rich bands are considered:

1) The multiple, repeated sections of rather uniform ULT+ biotite-garnet mineralized schist below the tectonite-fault zone, can represent an imbricated stack of repeated, thrust shear slices/lenses (from probable margin of ultramafic body?). Contamination of sulfides from adjacent rocks into an ultramafic S-poor magma can also lead to precipitation of Ni- and other sulfides. However, the disseminated pyrrhotite appears settled within the biotite schist.
2) Pyrrhotite–sulfide bands and zones may also display (distant) setting of some S-rich deposit (VMS-like?). Mostly barren biogenetic pyrrhotite-concentrations in anaerobic graphitic schist in deep sea ocean settings are rather common and independent of eventual, volcanic activity.
3) In some settings in the Gula nappe (Nilsen, 1978) some of the pyrrhotite paragenesis is regarded as mobilized during a later paragenetic stage. A similar process may explain how the random concentration of oriented hornblende needles closer to dioritic veins and dikes increases the in contribution in the biotite schist as well as in the matrix of the tectonite (indicating fluid migration and alteration processes)
4) The ULT zones may eventually represent (ultra)mafic homogenous lavas, perhaps like boninite (ocean floor ultramafic lavas) described by McClellan (2004) in the Savalen nappe, as well as fuchsite-quartzite. However, obvious lava-textures are apparently not preserved in the ULT-zones.

5) McClellan (2004) also mapped and described green fuchsite-bearing marble-quartzite horizons in the Einunfjellet area south of the drilling targets, similarities with descriptions of Rui (1972).

A detailed study from Gråberget, 5 km SE of Røros, (Austrheim, Corfu and Renggli, 2021) describes a variably serpentinized ultramafic body, surrounded by the Røros schists, transforming from peridotite to quartzite through a sequence of stages involving serpentinization:
- carbonation though the influx of CO_2 forming soapstone
- a more advanced stage listvenite (brownish quartzite-dolomite hematite +-chromite and magnesite)
- to (dolomite)-magnesite-fuchsite-bearing quartzite (bright green birbirite)
Serpentinization also caused the enrichment in fluid-mobile elements. The enrichment is also recorded in the surrounding Røros schists, as massif sulfide deposit hosting assemblages.

The bright green ULT-zones have some similarities to the magnesite-fuchsite quartzite (birbirite) and should eventually be confirmed by further mineral studies. The sample S1 from the irregular banded brown rusty zone NW of drill site STB-21-07, is depleted of most major elements, except Fe, and other trace elements, and moderate Cr-content (108 ppm), to some degree resembles the described listvenite (brown hematite-magnesite quartzite).
The origin of the rich mineralized sample S3 picked from the “dead zone” (see picture above) is considerably different from the more pyrrhotite-rich zones observed in drill hole STB-21-07, but some similarities to other Zn-rich ores further north in the Røros field are present. The collected sample appears within a moraine setting with a mixture of local and transported blocks of uncertain origin. Can some transported, richer mineralized moraine blocks possibly explain the elevated Storboren Cu-in soil, with downhill southwards drainage explain the origin of the anomaly?

4 Recommendations

In addition to the MMI anomaly, the drilling completed at Storboren, and the hand samples collected in this area indicate the potential for base-metal mineralization in the general area. Further exploration followed by compiling the data in a 3d model should give a good overview of the potential viability of the area.

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