Eurasian Minerals Inc.

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FROM: Jeff Edelen
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SUBJECT: Modum Project Reconnaissance

Executive Summary

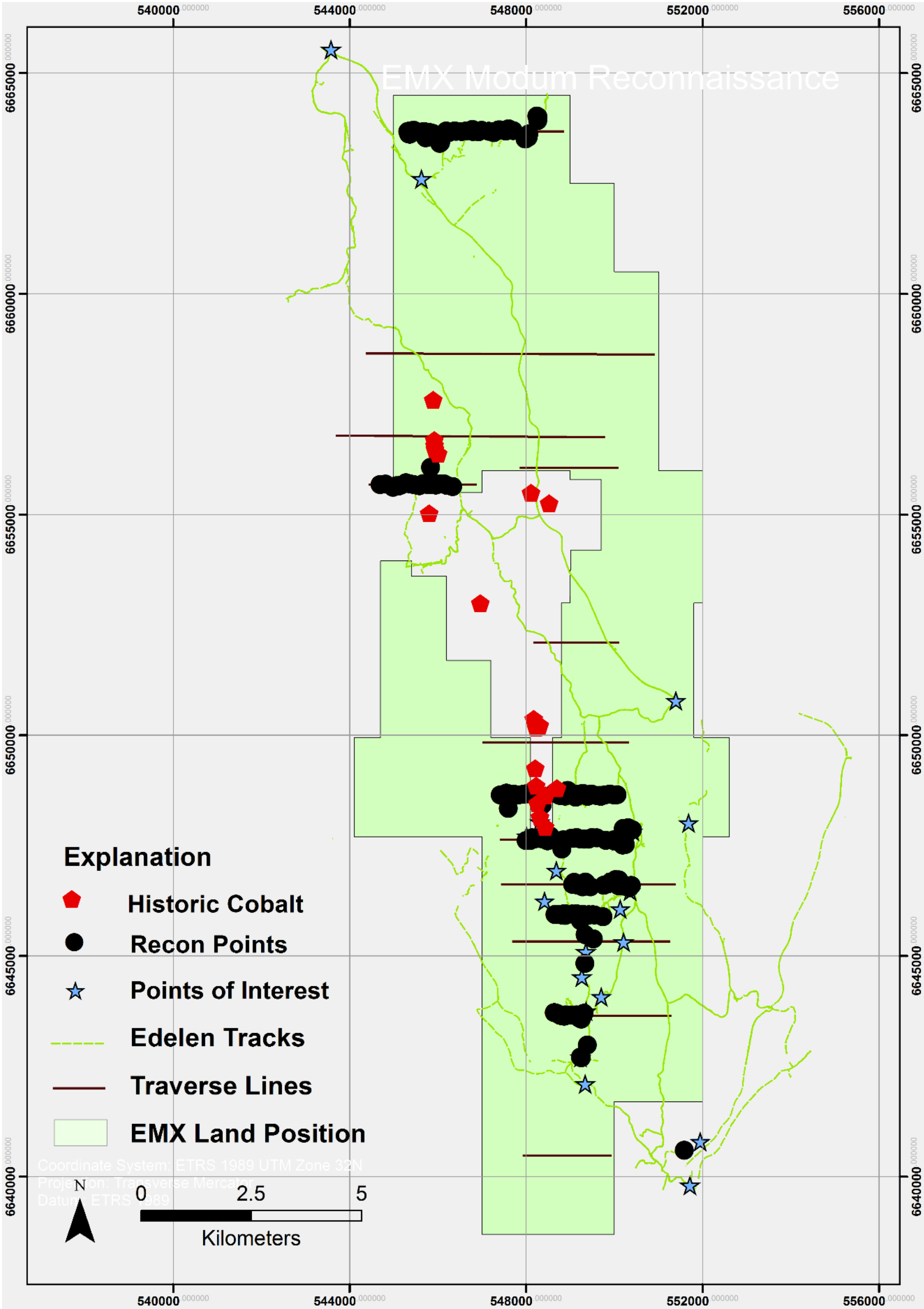
The Modum Project land position surrounds the Blaafarveværket historic cobalt (Cu-Ag-Au) mine (Figure 2; Figure 3 A-D) which is also called Stuterud, the type locality for Skutterudite ($CoAs_3$), and the Modum mine as it is in this report. The Modum Project is a brown fields project due to its proximity to a known cobalt producer. The Project targets exploration opportunities for further, unrecognized Co-Cu-Ag-Au bearing minerals within several kilometers of the Modum mine in the Modum Kommune in south west Norway (Figure 1A) about 60 km west of Oslo.

The principal merits of the project are that A) relatively easily recognized stratigraphic relationships within the Modum Mine are repeated on EMX land positions, B) cobalt-enriched, structurally controlled lenses, as those from which metal was produced at Modum have never been exploration for with modern exploration techniques (since 1898) particularly at depth, and C) cobalt is a rare, in-demand commodity. These factors provide significant upside to justify further exploration activities at the Modum Project.

Introduction

A twelve day field review of the Modum Project was carried out on from May 13-May 25 by J. Edelen in order to asses and design an adequate work program. This includes access, outcrop percentage, mineralization potential, rock relationships, geology, and community relations. Several traverses were designed and carried out based on topology and geological relationships Figure 1B.

Figure 1A: Location map of the EMX claims at the Modum Project, Norway.



Fiure 1B: Recon map of the Modum Project.

Exploration History

According Nordssteien, Cobalt was discovered at Modum in 1772 by a prospector from the Kongsberg silver mines to the south. This led to the establishment of Blaafarveværket as a royal Norweigen, state-run company for the production of the dye "cobalt blue" and related arsenic products with regular production from 1776. Mining continued after 1820 in private ownership, with underground operations beginning in 1827. The mine closed in 1898 after periods in British and German ownership, mainly due to competition from alternative types of dye. At its peak, in the 1820s and 1830s, the company was Norway's largest industrial corporation and produced 80 % of the world's cobalt blue (2000).

From the early 1990's through the mid 2000's Munz and others have performed fluid inclusion and vein formation studies at the Modum area. Selected works are referenced herein and others are available in the EMX database for the Modum Project.

In May of 2013 an Aero Magnetic survey at a line spacing of 200m was performed by SkyTEM. Lastly, in July of 1016, a 100k Geological map was produced by the NGU. Both of these items are also available in the EMX database.

Geology

Modum Complex: Lithology

The Modum Mine (Figure 2 A-D) is within the Modum Complex (Figure 3) occurring on the western margin of the Oslo Rift within the 1500-1270Ma Mesoproterozoic Telemarkian Terrane. Principal lithologies are supracrustal rocks consisting of quartzite, quatzo-felspathic mica shcists, and felsdspathic and granitic gneisses and metamorphosed mafic volacnics as metagabbros, amphibolites, garnet-biote schists, and late basaltic and intermediate dikes. Weakly or unmetamorphosed tonalite to quartz-diorite composition felsic rocks are intruded into the metamorphic package (Modum Field Report; Munz, and Morvic, 1991) (Figure 4 A-F). Supracrustal and metamorphosed mafic volcanic rocks experienced high grade metamorphism (amphibolite-grade) during the Sveconoregian event (Modum Field Report; Munz, 1990; Munz and Morvik, 1991; Eilu, 2012).

Figure 2: A. Looking south along the open cut of the Modum Mine. B. Southern dump pile, contains mineralized boulders. C. Looking south along a steeply dipping underground working, dipping east, 8m wide. D. Western dump pile, contains mineralized boulders (On EMX claims).

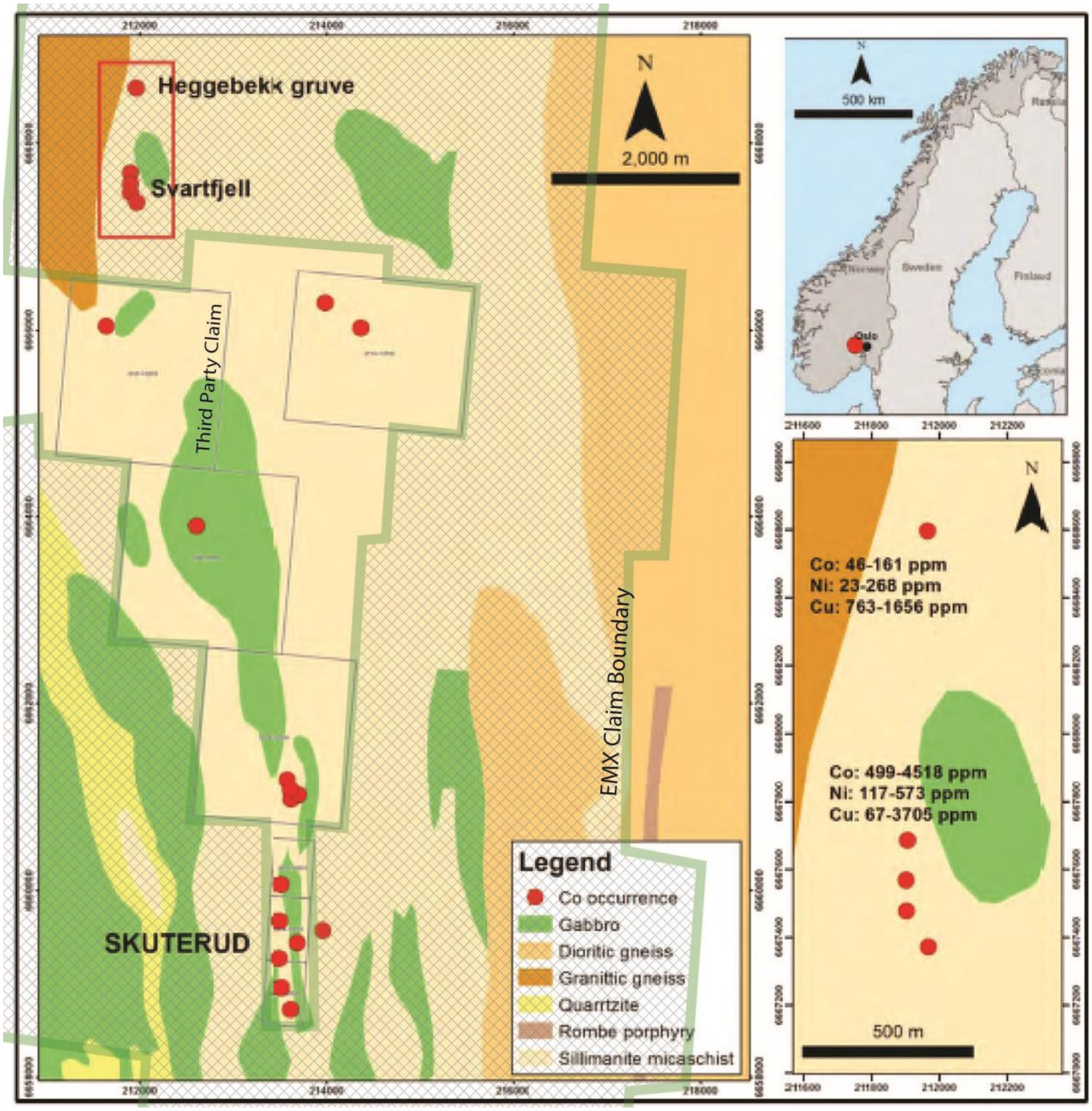


Figure 3: Geological map of the Modum Complex, Norway with the Blaafarveværket historic cobalt mineralized occurrences (exploited pods of mineralization) indicated. Modified from Wagner and Munz 2004.

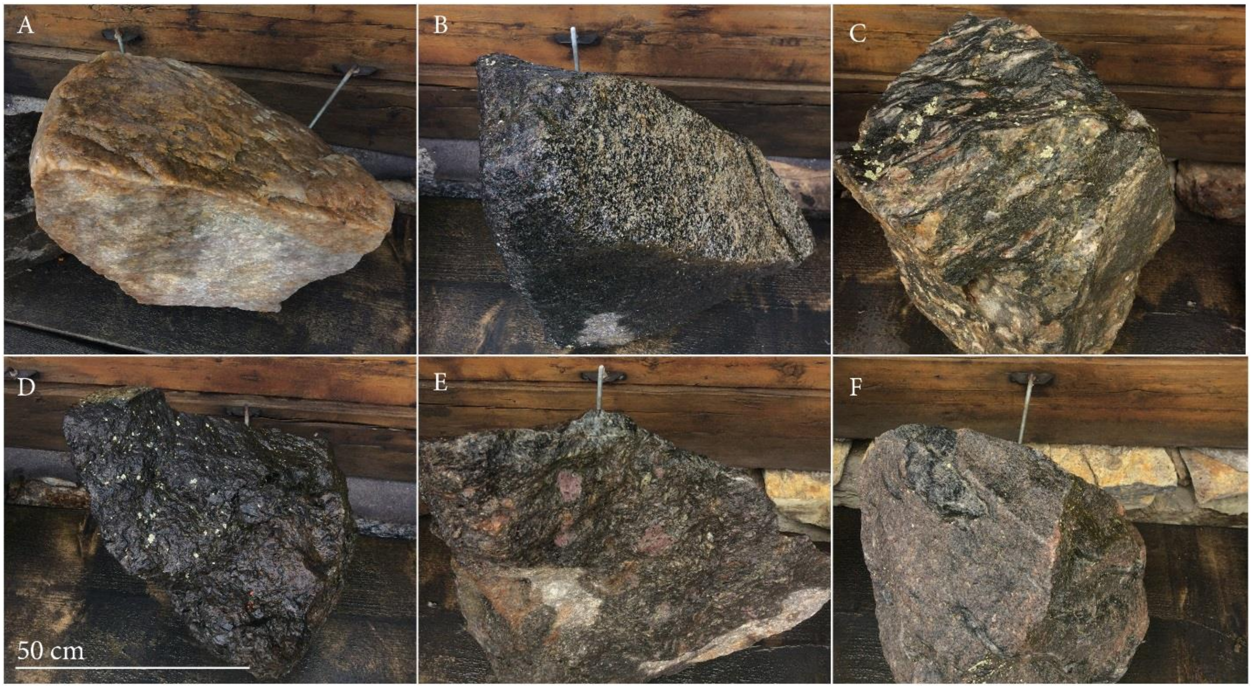


Figure 4: A. quartzite. B. Amphibolite. C. Nodular Granitic Schist (Quartzo-felspathic Geniess). D. Metagabbro. E. Garnet Biotite Schist. F. Granitic Gneiss

Field Observations: Lithology

The rocks in Figure 4 (A-F) are the principle litholigies observed in the field excepting examples of late, coarse-gained granitoids (tonalite to quartz diorite) and late intermediate to mafic fine-grained dikes (m scale andesite to basalt). The common relationship is a tilted-near-vertical package of metasedimentary rocks with interposed slivers (meter to multi meter scale) of mafic metavolcanic gabbros and amphibolites intruded by fresh granitoids with rare cross-cutting fine grained mafic dikes (one was observed in two locations-unrelated to mineralization).

Ubiquitous Sedimentary rocks are chiefly felsic and include quartzites, white mica-bearing quartzo-feldspathic schists, and felsic gneises, for which the protoliths were likely sandstone of variable grain size, greywackes, volcaniclastics, and granioids.

The mafic rocks are commonly uniform in chemistry but can display higher-grade metamorphism with garnet-bearing portions of outcrop usually at the base of a unit or along a structural margin. Higher-grade rock outcrops are usually discontinuous and extend <5m in any direction (Figure 6B, C, D). Where garnets occur they can be mm scale to up to 10cm wide (Figure 6B). In general, more garnet-rich material can be found the north. Metagabbroic rocks are more commonly exposed at the south. The extent to which the rock package may plunge to the north is unknown.

Ubiquitous granitoid rocks in float and outcrop are clearly much more weakly metamorphosed as they typically don't display a rock fabric and are fresh-looking with feldspar crystals unaltered and unstrained. Mica books are intact and chlorite is rare. They are most often unsulfidized and have not been exposed to post-emplacement fluid flow. These bulbous granitoid bodies can be seen in the granite quarries of which there are two on the property (Figure 10D). Fine-grained garnets can be found on the margins of felsic intrusive rocks, likely a result of thermal perturbation as fluid flow from the margins of the granitoids does not seem pervasive at all.

Structure and Veining

Evidence of multiple rock-fluid interaction events is noted as there are multiple generations of fractures (Figure 5H), fracture fill and veining in multiple styles (sheeted quartz and quartz feldspar veins +/- sulfides, mm scale sulfide veinlets, mm scale quartz stockworks, and coarse grained cm-m scale coarse-grained quartz veins (+/- sulfides, +/- white feldspar, +/- metal-bearing and accessory minerals) (Figure 5 A-I).

It is known from literature and the mine tour, that metal enrichment is coincident with quartz veins and can be hosted either in the vein and/ or as disseminations in the wall rock from weak to pervasive outward of the vein margin.

The most common vein type are the syn- to post-mineralization coarse-grained white quartz veins and quartz +/- white mica +/- aphanitic to coarse- grained, hard white feldspar (albite?) veins (Figure 6, Right Figure D). These veins occur near and within all units but chiefly within medisedimentary rocks, often quartzites in close (m scale) proximity to metagabbros or amphibolites. Garnet-bearing lithogies can also be found near quartz veins. These veins can be from cm scale to multi meter scale (Figure 5). Rare sulfides are associated with these veins but when they are found, nearby quartz veins are always present. Quartz veins of all scales are often boudinaged from subsequent compression.

Munz and others have argued that perhaps due to heat and fluid from gabbroic units or from intrusive rocks (although the felsic rocks may well be post-mineral) is the source of cobalt mineralization (1995, 2005).

They also suggest that thermal perturbations and locally sourced silica (metasediments) are the source of quartz veins. This postulation would seem to be reasonable as veins are most often found in or near quartzites in close proximity to metamafic units.

Quartz and quartz-feldspar veins often have “albite” jackets and sometimes have k-spar-enriched flooding where reactive minerals are more available (less so in quartzites). Veins are known to be coincident with metal enrichment at the historic Modum Mine.

Rock Fabric

General NE/SW trending foliation direction derived from 100’s of penetrative rock fabric measurements. Foliation direction was measured of alignment of micas in metasediments, bands of gneissic rocks, axial planer cleavage from fold hinges (mm to cm scale), and general direction of strike from discrete vein sets. These measurements vary within roughly 90 degrees from 045 to 315 with the most common measurements falling between 010 and 340 across all traverses of the EMX land position. All units dip steeply from 65 to 90 degrees with the average dip at ~78 degrees (dipping to the East).

Figure 5: A. Stockwork quartz veins. B. Quartz-feldspar veins in mafic schist. C. Sheeted quartz veins (mm scale). D. massive quartz vein. E. cm scale quartz veins at the Modum Mine site near the southern dumps. F. M scale coarse-grained white quartz vein. G. Quartz-albite vein at the base of outcrop. H. Cross cutting relationships of multigenerations of quartz veining. I. Boudinaged quartz vein in mafic schist.

Mineralization and Alteration

Historic reports estimate the total production from the Modum Mine to be 1 Mt at 0.2 % Co. One of the more productive localities within the Modum Mine complex, Skuterud, contained ore up to 3% Co (upgraded by hand sorting) (Horneman, 1936). Generally, ore contained copper values of up to 1-2% and locally of gold at several ppm. The process of formation for the cobalt deposits is not known, but several theories have been proposed. Bugge (1978a) suggested a syngenetic sedimentary-exhalative to volcanogenic-exhalative formation style. Others, including Gammon (1966), suggest that the cobalt minerals were products from fluids released from the many gabbro bodies in the area. A third theory is that the ore minerals were produced by metasomatic processes, for example, those related to regional albitization (Munz et al. 1995) (Eilu, 2012).

Ore minerals occur in so called “fahlbands”. These zones are the host of an impregnation ore of various cobalt bearing arseno-sulphides. These bands are generally 20-100m thick and can be traced for several kilometers in the field. Co mineralization is strongly associated with aresenopyrite and zones that grade from abundant arsenopyrite at the fringes to Co-rich zones in the center. Zones of greater mica abundance represent lower Co grades.

49 samples were collected for XRF analysis. Most had only weak Co (often confabulated with Fe) and As concentrations. 9 samples of more well-sulfidized material were sent away for assay.

Pink Feldspar: Coincident with each occurrence of the bull or “dry-looking” massive quartz veins is a potassic alteration pattern of pink feldspar either pervasive proximal to the vein margin (from 0-10s of cm away from the vein margin). Its relationship to mineralization is unknown, but it should not be confused with oxidation.

Sulfide mineralization can be in any rock unit but is more common in the presence of quartz vein material at or near the margins of veins. Rare sulfide veinlets are present along foliation. Disseminated sulfides are common in more highly fluidized or more pervasively fractured rocks.

Black/ greasy metallic oxide of sample M_Rec_93 and several others has been sent away for assay. It can be folded in very fine sheets within vein material or it can be massive in very coarse-grained crystals (Figure 8C). It runs about 100-600 ppm Co and 30-200 pm Cu and is of interest. It has been suggested that it is skutterudite, but runs low in arsenic, hematite, but doesn’t streak red, graphite, but isn’t soft. It’s a strange and pervasive if not ubiquitous mineral within late, coarse-grained quartz and quartz-albite veins and has been sent away for assay.

Magnetite and white feldspar occur together where the feldspar is altered to clay. Both minerals are very coarse-grained and occur in one location on the property. It may be that a thin manto of limestone was altered or that a Fe-rich fluid pulse altered a calcium bearing volcanic unit, but this rock does outcrop and would likely present an elevated magnetic signature.

Serpentization is common according to literature review but was only encountered a few times in the field. It represents higher levels of metamorphism and may be a vector towards mineralization. It is of note that there is a small, local serpentine mine and no mention of metal enrichment at that site. Serpentine does however occur at the Modum Mine and is listed as an accessory mineral. Further mapping exercises should focus on this as a possible vector to increased temperature or fluid flow zones.

Higher-grade metamorphism yields garnet and amphibole minerals, mostly in rocks with more mafic protoliths, which can be very fine to very coarse-grained. Only a weak correlation was noticed with very fine grained sulfide minerals and none was noticed with arsenopyire or chalcopyrite.

Generally, there isn't much sulfide in outcrop and when there is it is usually less than 1%. The most pervasive, clearly hydrothermal magmatic – looking alteration can be seen within and just without the vein margins of coarse-grained quartzo-feldspathic veins, vein sets, or stockworks.

Due to the steep tilt of the rock units, only a portion of the units are exposed in outcrop. Fluid –rock interactions can sometimes only be evaluated based on the presence of such features as quartz veins whose timing with respect to mineralization is poorly constrained. Based on the models, the mafic rocks could be a heat source and a metal source. The intrusive units may also be a heat source for the possible upgrading of metal concentration due to chemical and/ or thermal perturbation. More work is needed to determine the source, transport mechanisms, and traps of the Co-Au, and PM- bearing and accessory minerals. In particular, arsenic is something we need to be aware of as a chemical indicator in the field.

Figure 6: **Left Figure**: A. Coarse grained magnetite. B. Coarse grained magnetite and altered-to-clay, felsic crystal sites. C. Very coarse-grained garnets in a garnet-biotite-feldspar gneiss. D. Mm scale garnets in a biotite schist. **Right Figure:** A. biotite dominant vein cross cutting k-spar + quartz vein. B. Amphibolite with disseminated chalcopyrite and pyrite. C. Quartz-Feldspar vein. D. Coarse-grained quartz –albite vein

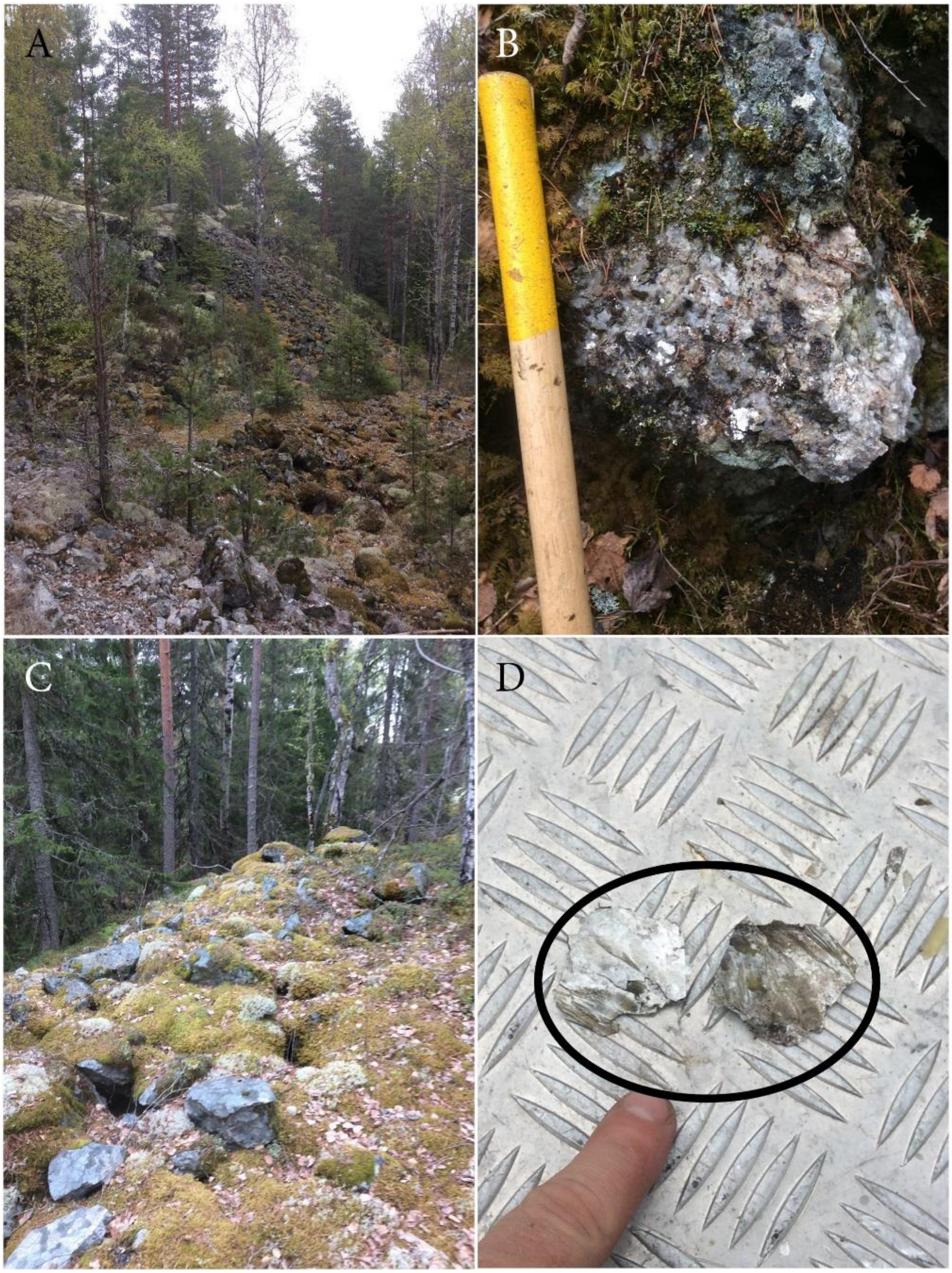


Figure 7: A. Dumps in the forest. B. Very coarse grained white mica and feldspar + quartz vein material. C. Dumps in the forest from Mica mine. D. Cm scale white mica crystals.

Figure 8: A. quartz + py vein cross cutting earlier quartz veins in foliated amphibolite. B. quartz vein with sulfides from Modum Dump. C. Quartz + graphite colored oxide, contains 600 ppm Co and 350 ppm Cu. D. Pyrite and Aresenopyrite in quartzite. E. Chalcopyrite and Pyrite in quartz vein. F. Dark colored feldspathic rock with disseminated sulfides.

Exploration Conditions

Access

The access to the EMX claims is relatively easy. Paved two-lane roads, dirt tracks, and forest access roads provide adequate access. It is of note that a trail system (Figure) winds through the property. Tracks of parts of this trail system are found in the KMZ files exported by J. Edelen in the Modum directory.

Beyond drivable roads, the field area is largely hikable with some cliff terrain providing impediments to direct overland travel to areas of higher topographic relief. The terrain is often hummocky and swamps as well as first and second order (crossable) stream systems are common (Figure 10).

Figure 9: Frame of historic home at the Modum Mine. B. Viking ruins in the forest, off of EMX claim. C. Trail signs for well used local trail system for hikers and bikers, on EMX claim. D. Granite quarry, excellent lithological exposures, on EMX claim.

Social Conditions

[redacted]

[redacted]

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The historic Modum Mine and associated hydrocrusher at the nearby waterfall, is local a landmark and tourist attraction. It is very well-managed and can be accessed in the spring, summer, and fall. Local businesses have a vested interest in this attraction so they take steps to manage the social and environmental factors associated with the mine. There is a lake that is likely an historic mining pit as well as at least 3 small to medium sized dumps on EMX claim ground. Beyond that, they have taken steps to maintain claims that cover most of the old mining activity.

There are well-defined hiking and biking trail systems running through the property. They seem relatively extensive but perhaps not very well-traveled (Figure 9C).

Figure 10: A. Boulders and trees, example of rugged terrain. B. Hummocky terrane with deafall. C. Swampland between 10-20m hummocks. D. 2m wide stream flowing between steep hummocks.

Environmental Consideration

The southern portion of the license was removed for environmental considerations, so our efforts must be focused to the north of the license area. There is no AMD noted emitting into any watershed.

Recommendations

There has been no modern mineral exploration effort since the cessation of mining in the late 1800's. Nor has there been known efforts to trace the known metal-bearing rock association further north and south or testing for a continuation of mineral concentration at depth.

There have been multiple studies detailing the lithologies and fluid chemistries (see References). There have been some state-operated mapping efforts in the late 2010s and a geophysical magnetic survey flown roughly 7 years ago. It is unclear but unlikely that any group has properly evaluated this ground for deeper or extensive cobalt, copper, or precious metal potential. Although it is a well-populated area and the historic mine would be very difficult to acquire, the historic endowment of cobalt was impressive and the precious metal content was multi gram. If a source material was to be found, it could be a valuable land position.

In order to derive exploration vectors, a ridge and spur soil program is recommended. It will also be necessary to take rock chip samples across quartz and quartz albite vein occurrences (especially those in outcrop) in order to assess the potential for accessory chemical concentrations that might indicate proximity to cobalt or PM mineralization (S, Fe, As, Cu, Co, Etc.).

A drone mounted magnetic survey (UAV) would work very well in this location as the terrain is too rough to do an effective man portable survey with consistent results. Lines could be flown at 50m spacing with tighter 20m spacing over extensions of the historic mine workings on EMX ground as well as more far afield. Any data gathered in the field that looks promising at the 50m scale could also be flown at the 20m scale for greater resolution.

It is possible that a stream sediment survey would yield results as the terrain often drains into first and second order streams and has well-defined watersheds that could be mapped out and prioritized.

Geological mapping would benefit the project. This could be done to simply identify mafic vs. felsic (protolith) units. Munz and others have pointed out that the association of metagabbroic rocks near quartzite units may be the source of quartz veins (and Co?) so the spatial coincidence of vein material with the metagabbro and proximal quartzite units may yield some important relationships with respect to the timing of mineralization (1995). Furthermore, serpentinized rocks might be of further use in vectoring towards higher temperature.

Drilling is not yet warranted.

Assays on 9 samples are pending, including rocks acquired from dumps on EMX ground and other sulfide-bearing and quartz vein-bearing material.

Areas of Interest (Figure 11)

Field recon by EMX, in addition to a wealth of on-site historical information and literature review has identified important areas of interest (Figure 11 A-H). Those areas have been claimed by EMX. The zones in Figure 11, represent a general N-S trend of known and only partially exploited mineralization that includes the Modum Mine (not owned by EMX). Several alteration styles (Fahlband-disseminated, Serpentinization, Magnetite-Scapolite, quartz vein-hosted, etc.) are noted in proximity to, or in directly relation with cobalt mineralization.

(A) Historic metal occurrences/ Fahlbands

Several indications of Mineralization including Fe, Ni, Zn, Co, Pb, and Sulfide are indicated in the greater Modum Area. Testing of these boulders or outcrops (which is unclear) is warranted.

(B) Folds along the western portion of Soil Line 13

Folds of varying degrees of width, fold angle, and plunge angle (with a general trend of trend of fold axis running N-S) are noted along this line. Rapid changes in alteration occur here with serpentine, chlorite, garnet, and amphibole minerals occurring in certain beds relative to the degree of alteration that has occurred. Fine-grained sulfides were noted in outcrop. These patterns of rapidly varying thermal perturbations should be further examined.

(C) Colbat Mine dumps along the eastern portion of Soil Line 13 (Figure 2 D)

Dumps here contain abundant sulfides (Commonly on the concentration scale of the dumps at Gumsgruvan in the Bergslagen district in Sweden) as well as numerous limonite species and other alteration products. These rock dumps (2 were noted) are 13-17m tall from the level of tundra and are within the EMX claim block. Assays pending.

(D) The white mica mine (Figure 7)

There are several large (up to 12m high from base of tundra) dumps of quartz and light-colored feldspar dominant material accompanied by very course-grained white mica books. Cobalt mineralization is documented in spatial associated with course-grained mica crystals (Grorud, 1997) reportedly having grown subsequent to micacous mineral growth. These interstitial quartzo-feldpsathic mineral associations are also commonly related with cobalt metal deposition (Grourud, 1997).

(E) Unknown mineral in quartz and quartz + light-colored feldspar dikes (assays pending) (Figure 8 C).

Recon sites 3, 48, 49, 50, 93, 99, 115 and other sights on the property have an unknown black –silver – dark green metallic-looking mineral that is enriched in Co (handheld XRF analysis) up to 600 ppm, Cr up to 1200 ppm, as well as elevated Fe, Ti, and Cu. This mineral seems to be present in blocks and veins within quartzo-feldspatic material at several locations around the property and is in the process of being identified. If it should be of economic importance, its occurrence should be mapped and placed into context.

(F) 2.5 m wide basalt dike

The mafic dike cross cuts all litholgies and is the latest recognized feature on the project. The dike occurs at sites 001 and 147 (continuous over the strike of the project). It is unclear if this feature focuses mineralization and can be used as a marker unit for later rock relationships. In addition to this late mafic dike feature, the exposures around the location of figure F are new exposures and offer a window into the lithology of the project area.

(G) Magnetite/ Scapolite occurrence (Figure 6 A, B)

Abundant float, likely closely related to nearby and covered outcrop (sample 172), might be of interest. Several of the papers referenced herein have noted this style of alteration in relation to copper and cobalt occurrences at Modum.

(H) Serpentine mine

This concentration of alteration (serpetinization) seems to be related to the cobalt mineralization at the Skuterud. This occurrence is <1km away from the main mineralized horizon at the Modum mine. There is no indication that the fluids associated with serpentization are those associated with cobalt mineralization, but the large volume of rock mass affected by rock-fluid interaction mandates further investigation.

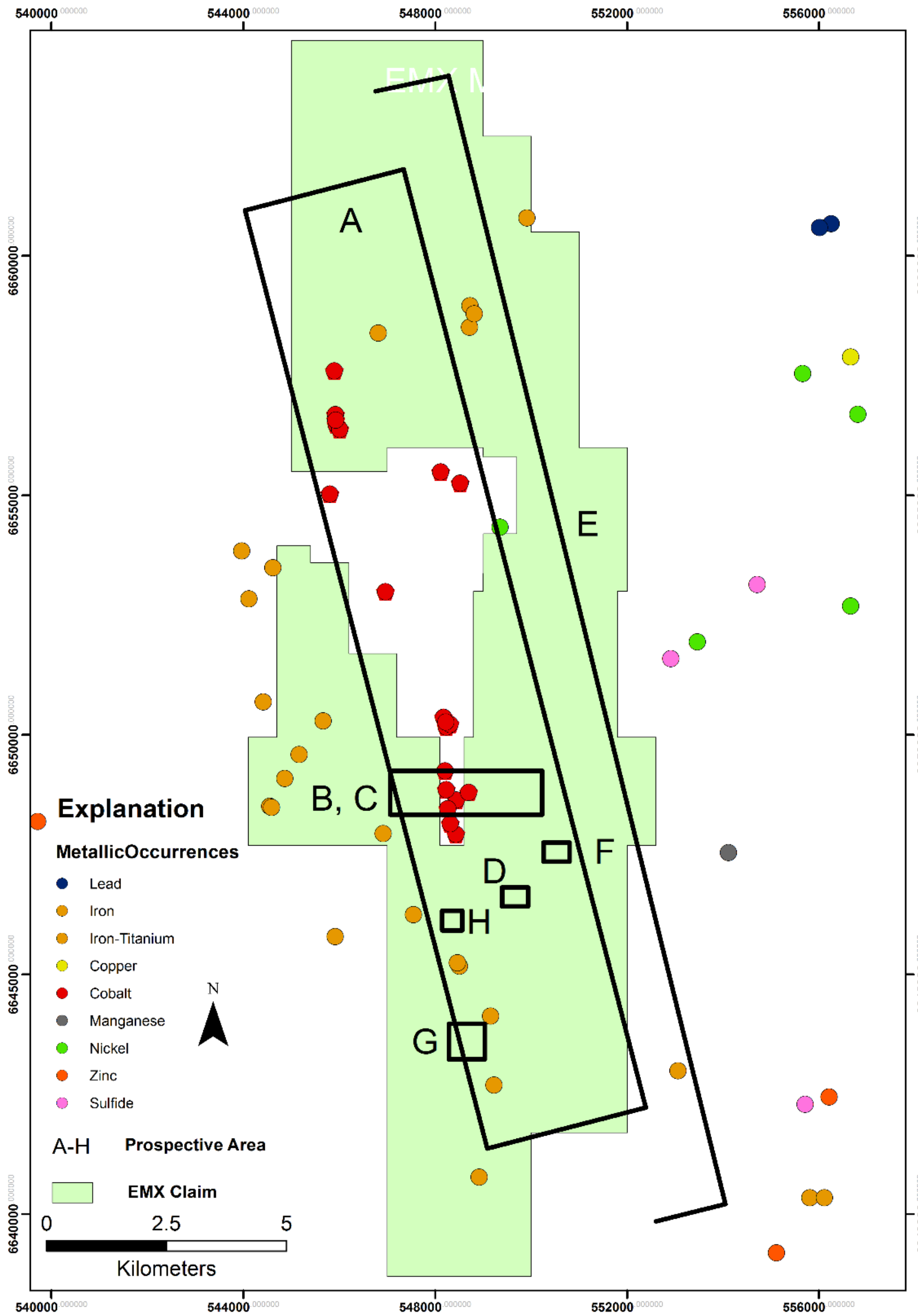

Figure 11: Prospectivity map of the EMX Modum claims. A. Fahlbands and historic metal (notably Co) occurrences. B, C. Cobalt mine dumps and tight folds with sulfide occurrences. D. White mica mine, known to be associated with cobalt-bearing minerals. E. Recognized length of observed metal-bearing quartz veins in outcrop. F. Late mafic dike. G. Magnetite-Scapolite alteration. F. Serpentine mine.

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