Sediment-hosted stratabound copper-silver potential of the Proterozoic Belt-Purcell Supergroup, Southeast British Columbia

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INTRODUCTION

A multi-year field program was commenced in 2007 to examine the sediment-hosted stratabound copper-silver potential of the Belt-Purcell Basin in southeast B.C. Sediment-hosted stratabound Cu deposits are the second most important global source of Cu, lagging only porphyry Cu deposits in total resource. The majority of sediment-hosted Cu deposits are formed within continental rift basins due to fluid mixing within permeable, shallow-water sedimentary.

Major deposits lie within the Kupferschiefer belt of Europe and the Zambian Copperbelt of Africa. Numerous stratabound Cu-Ag occurrences and deposits have also been discovered in the Purcell Basin in Western Montana.

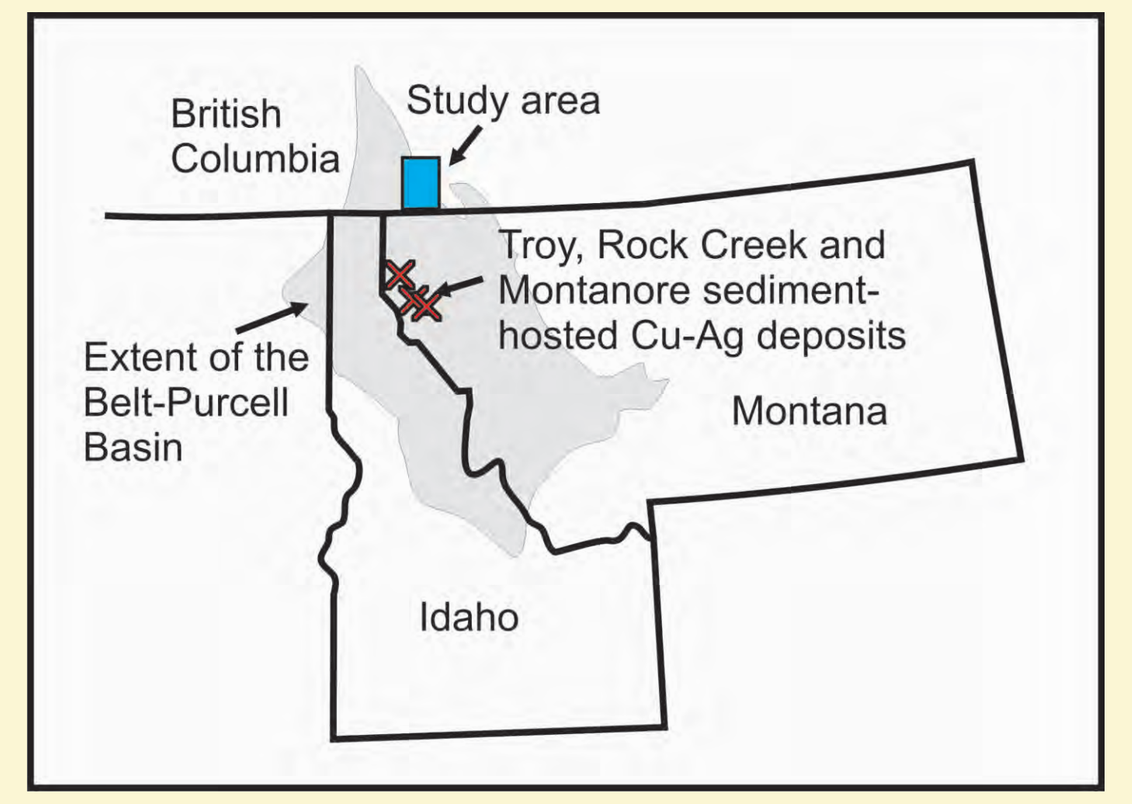
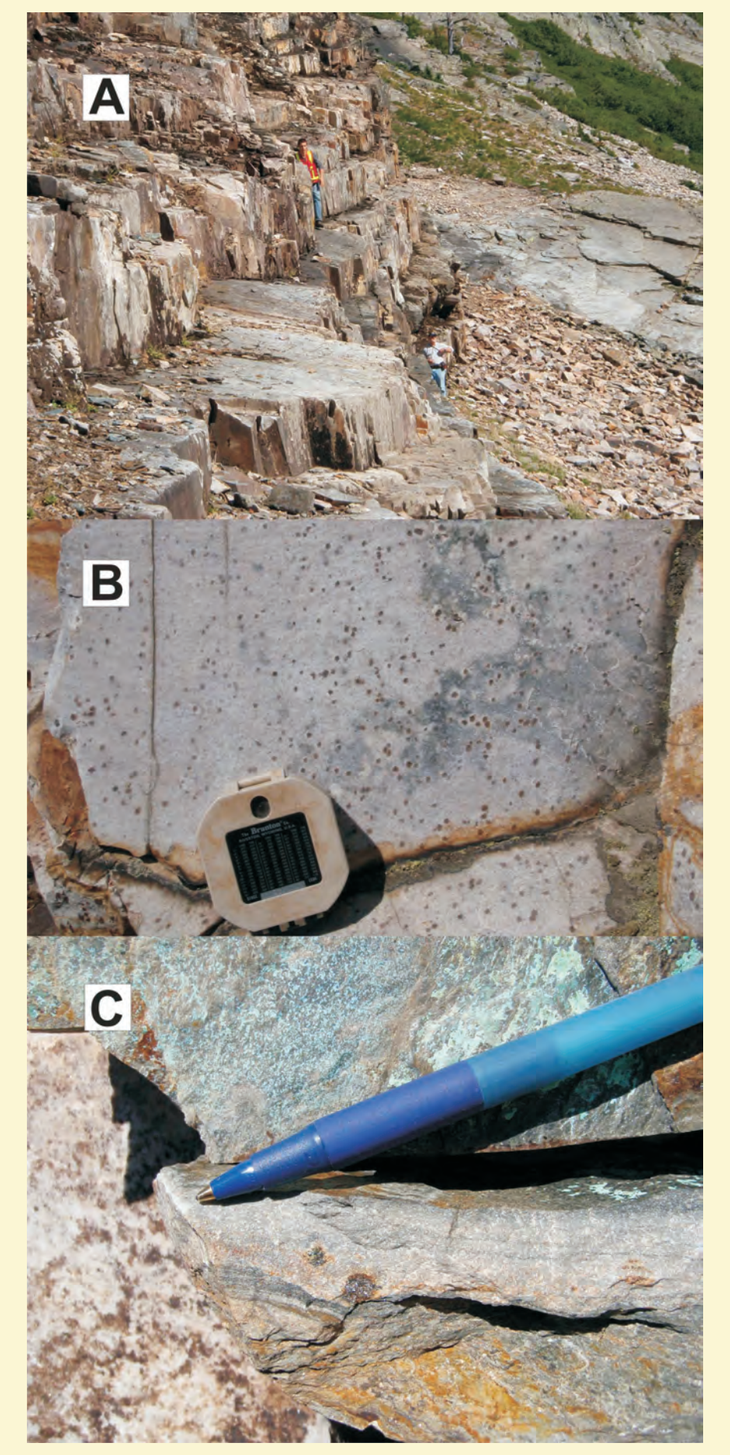
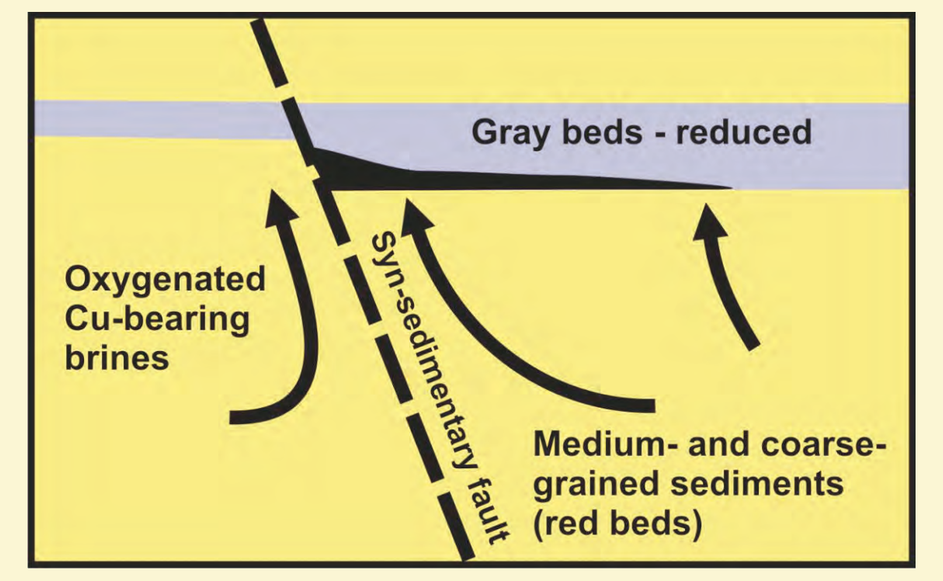


Figure 1: Regional extent of the Purcell Basin.

The three major deposits in Montana (Troy, Montanore, and Rock Creek) are all hosted within the quartzite dominated Revett Formation. The Montanore and Rock Creek deposits hosts more than 400 million ounces of silver and 4 billion pounds of copper combined.

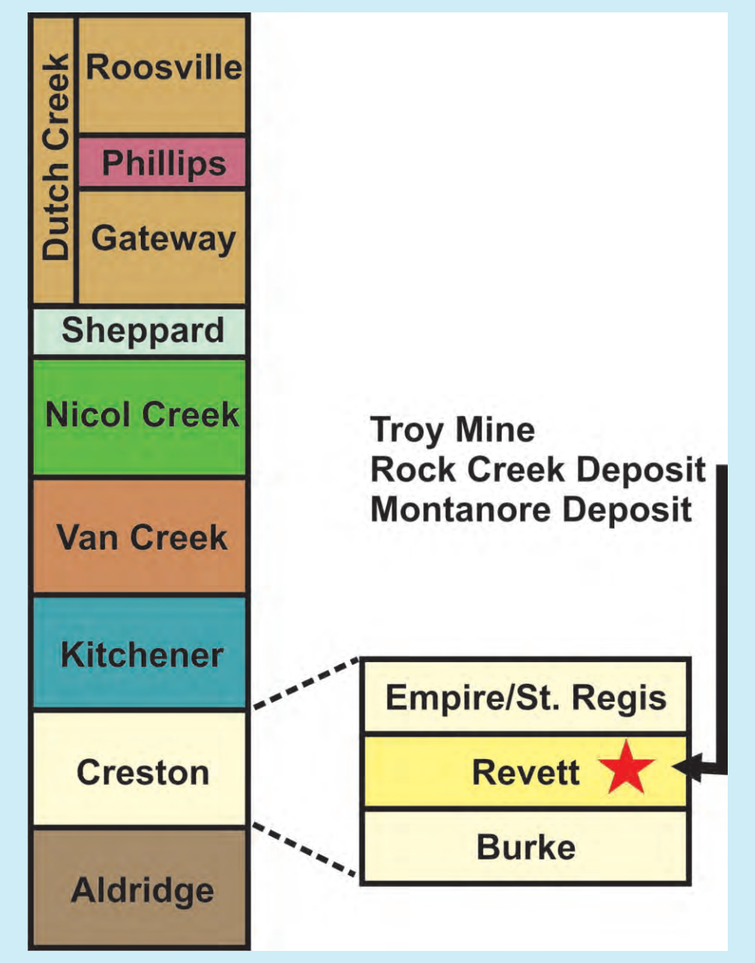


**Photos to the right: A) Thick bedded quartzite of the lower Revett Formation.
B) Limonite spots replacing chalcopyrite in lower Revett Formation quartzite.
C) Detail of limonite spots replacing chalcopyrite and chrysocolla alteration.
All three photos were taken at exposures of the Montanore deposit on the north shore of Rock Lake, Montana.**



The formation of these sediment-hosted stratabound Cu-Ag deposits is thought to be related to the movement of moderately low pH and oxidized fluids within permeable, shallow-water sedimentary and, more rarely, volcanic rocks. Copper, silver, cobalt, lead, and other metals are leached from minerals within the sedimentary and/or igneous rocks and carried elsewhere and precipitated.

The Creston-Revett Conection



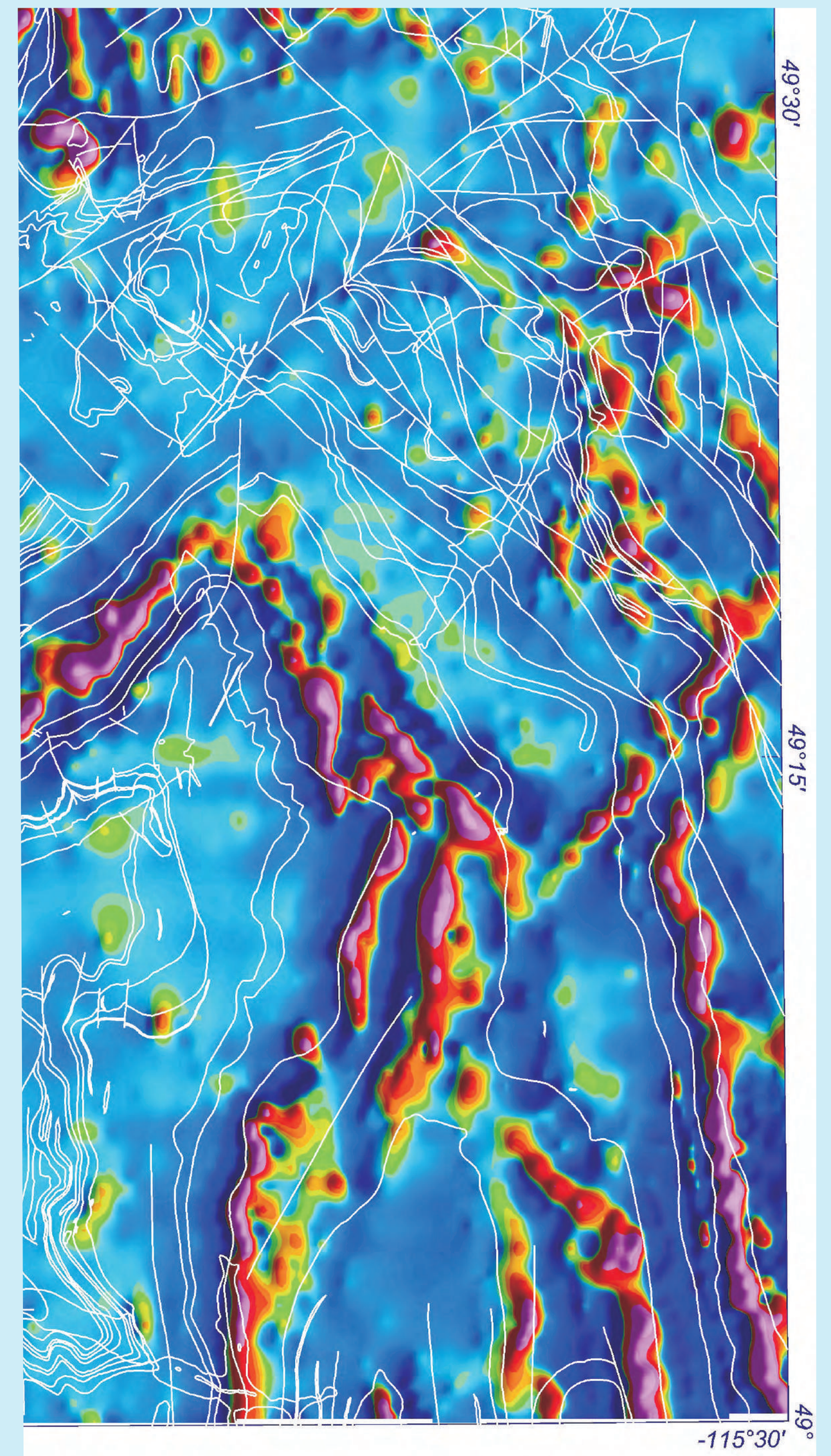
Simplified Stratigraphic column for the Purcell Basin in BC

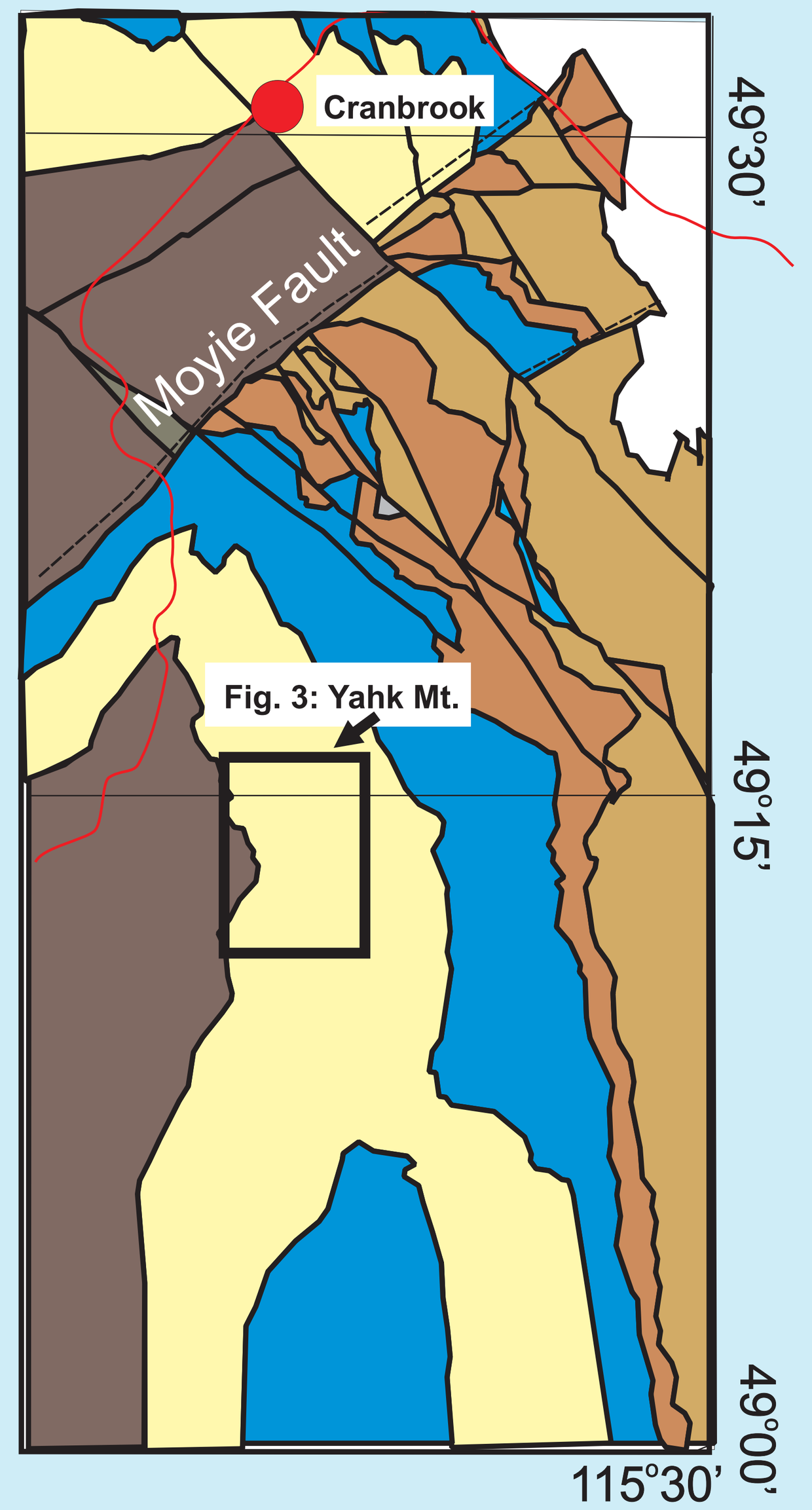
The sandstone and siltstone dominated Creston Formation has been divided into three units based on lithology and environment of deposition (Höy, 1993).

These three subdivisions (C1, C2, and C3) are considered to be roughly equivalent to the Burke, Revett, and St. Regis formations in Montana. It is the middle Creston that is considered to have the highest potential for sediment hosted Cu-Co-Ag.

**Above left: Altered Creston Formation from the Yahk Mountain area
Above right: Altered Revett Formation from the Rock Creek deposit**

Regional Geology and Areomagnetic maps





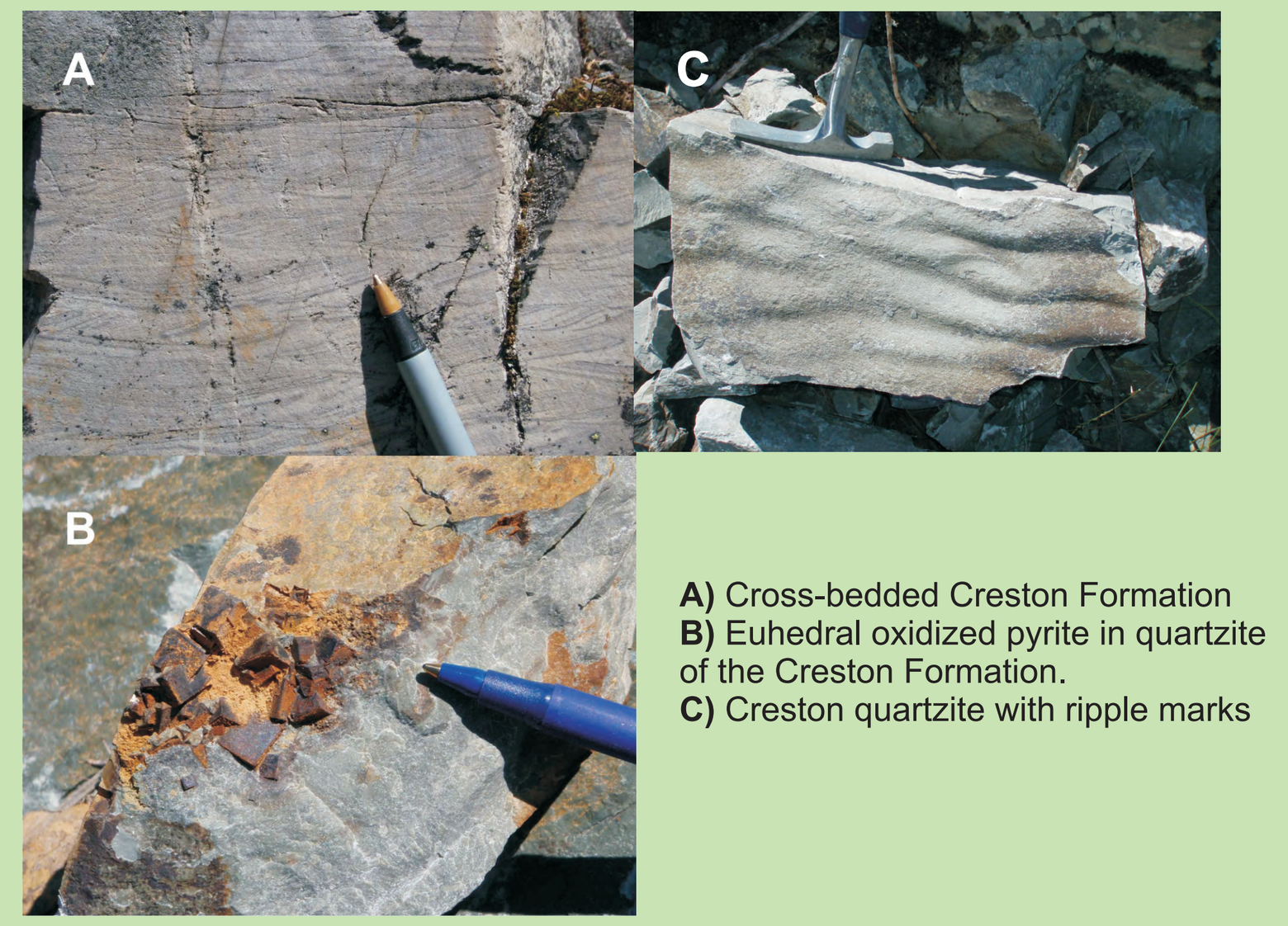
Magnetic susceptibility readings for the Creston Formation (which average ~4x10-3 SI) are much higher than other strata of the Pucell Supergroup. The vertical gradient airborne magnetic map above clearly displays the Creston Formation as a magnetic high. (Canadian Aeromagnetic Data Base)

- Upper Purcell Supergroup: Nicol Creek, Sheppard, Gateway, Phillips and Roosvile
- Van Creek Formation
- Kitchener Formation
- Creston Formation
- Aldridge Formation

OBSERVATIONS: New Cu-Ag occurrences in the Creston Formation

During regional reconnaissance work several new Cu occurrences were discovered within the Creston Formation in the Yahk Mountain area (next panel). This Cu-Ag mineralization is hosted in argilite and siltstone. Active exploration in this area is currently underway by Kootenay Gold Inc. (Silver Fox Property).

The Creston Formation in this area is notable for:
-alternating units of shallow water siltstone, argillite, quartzite, and silty quartzite.
-abundant ripple marks and cross-beds that are consistent with a relatively shallow water, high-energy depositional environment.
-the presence of flame structures, load casts, scour surfaces, rip-up clasts and desiccation structures.
-high magnetic susceptibility readings due to disseminated diagenetic magnetite.



A) Cross-bedded Creston Formation
B) Euhedral oxidized pyrite in quartzite of the Creston Formation.
C) Creston quartzite with ripple marks

OBSERVATIONS: Geological Mapping in the Yahk Mountain Area

A series of new Cu occurrences were discovered within a very poorly exposed section of the Creston Formation near Tepee Creek (Figure 3, below). Variable amounts of green Cu oxidation mark these occurrences. The showings consist of green argillite containing fine bornite and chalcopyrite along the bedding planes and a chrysocolla coating on weathered surfaces. A significant alteration zone is exposed about 1 km south and southeast of the Tepee Creek Cu occurrences.

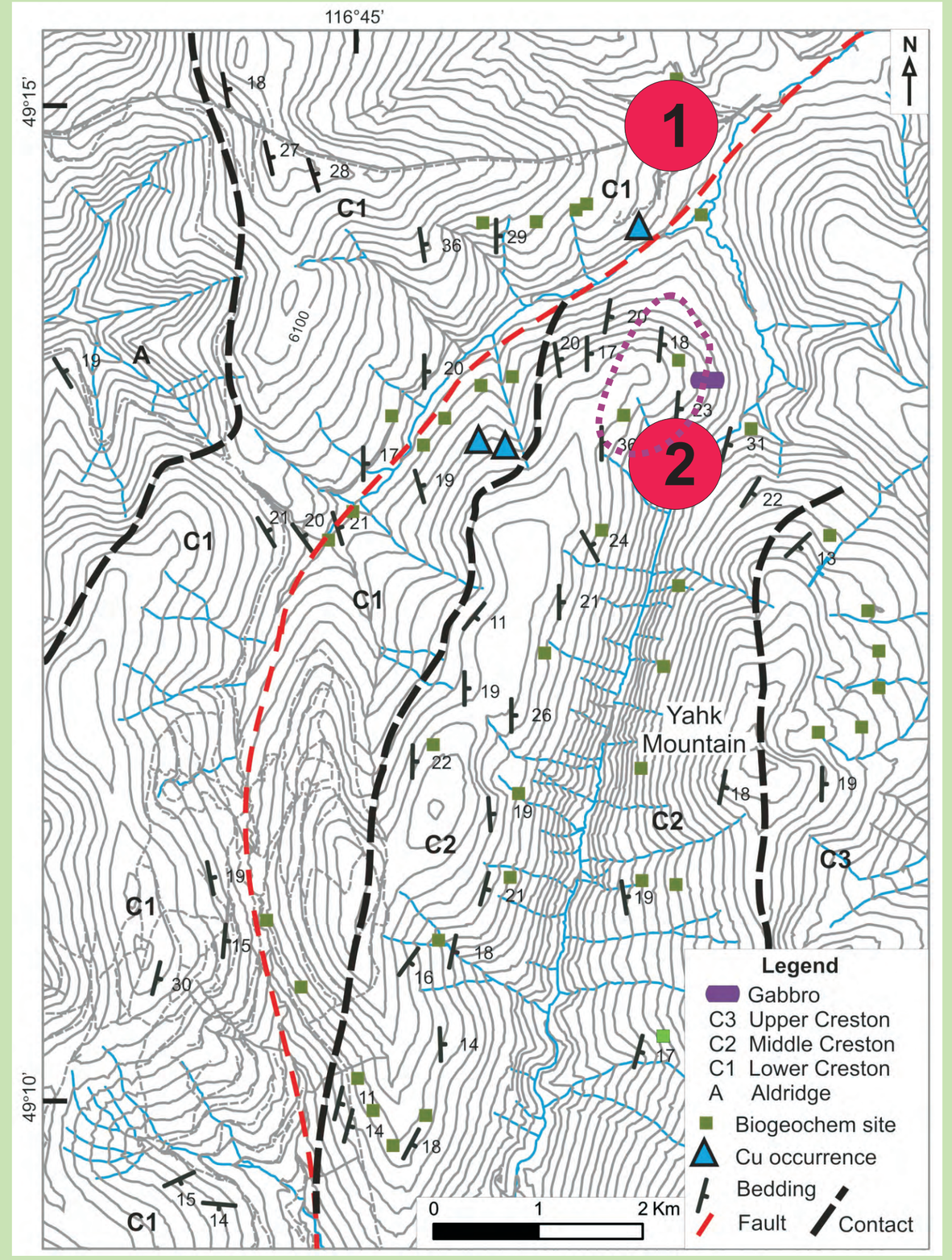


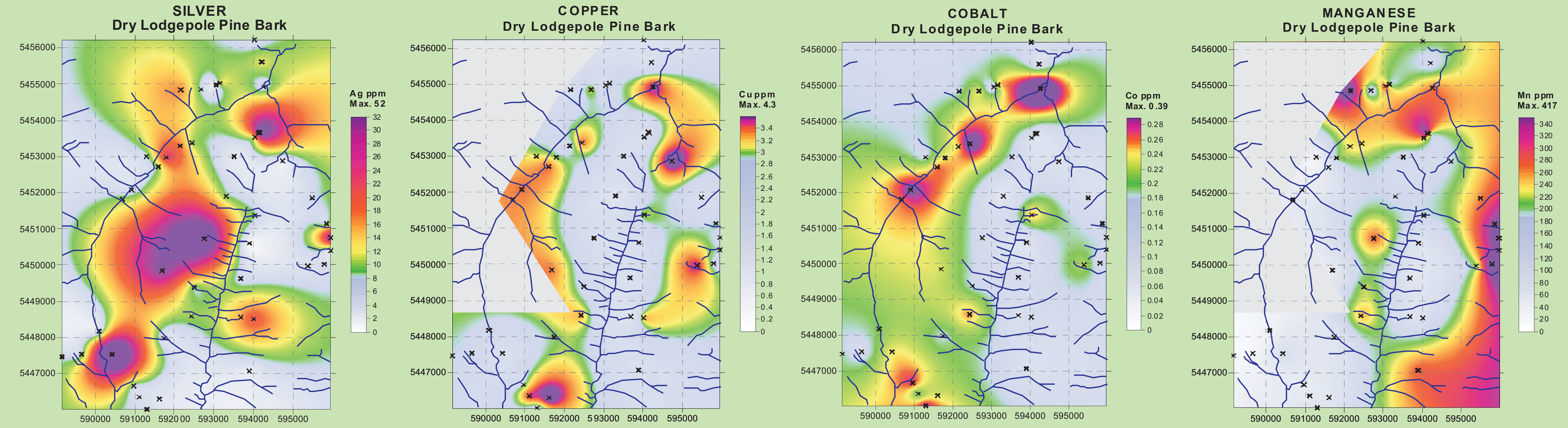
Figure 3: Simplified geological map of the Yahk Mountain area south of Cranbrook (see Fig. 2). Occurrences with copper mineralization, Fe oxidation, and Mn alteration (right) were identified despite the relatively poor bedrock exposure in the area.

Above: Fine bornite and chalcopyrite disseminated in siltite. Two grab samples returned elevated Cu (0.05% and 0.2% Cu) and Ag (2 and 6 ppm). A sample collected in 2008 from a site approximately 1.5 km southwest returned 0.18 % Cu.

**Above left: Red and purple iron-oxide alteration patterns and white bleaching of sandstone from the middle Creston Formation. The alteration is visible evidence for the movement of oxidized (Cu bearing?) diagenetic fluids.
Above right: Manganese oxides from Yahk Mountain area.**

OBSERVATIONS: Biogeochemistry of lodgepole pine bark as an exploration tool

Fifty lodgepole pine bark samples were collected from the Cranbrook area. These samples were processed and analysed for 53 elements by Colin Dunn (Consulting Geochemist). Kriged data plots (below) were created to better examine the element distribution with relationship to geology, known mineral occurrences and drainage patterns. The element patterns appear to be broadly coincident with the mapped geology of the Yahk Mountain area (see figure 3 for a comparison). The Cu and Mn highs locally match the location of the mineral occurrences identified during mapping.



RESULTS: Mineral potential and exploration strategies

Having identified a reasonable potential for sediment-hosted, stratabound Cu±Ag±Co mineralization on the Canadian side of the Purcell Basin, it is useful to note some of the key strategies that may be utilized for future exploration in the region.

1.Stream and biogeochemical sampling

Prospecting stream geochemical anomalies led to initial discoveries at many of the stratabound copper deposits in Montana (Hayes, pers. comm. 2008). Biogeochemical sampling may also help provide targets in areas of poor exposure.

2.Tracing of prospective strata

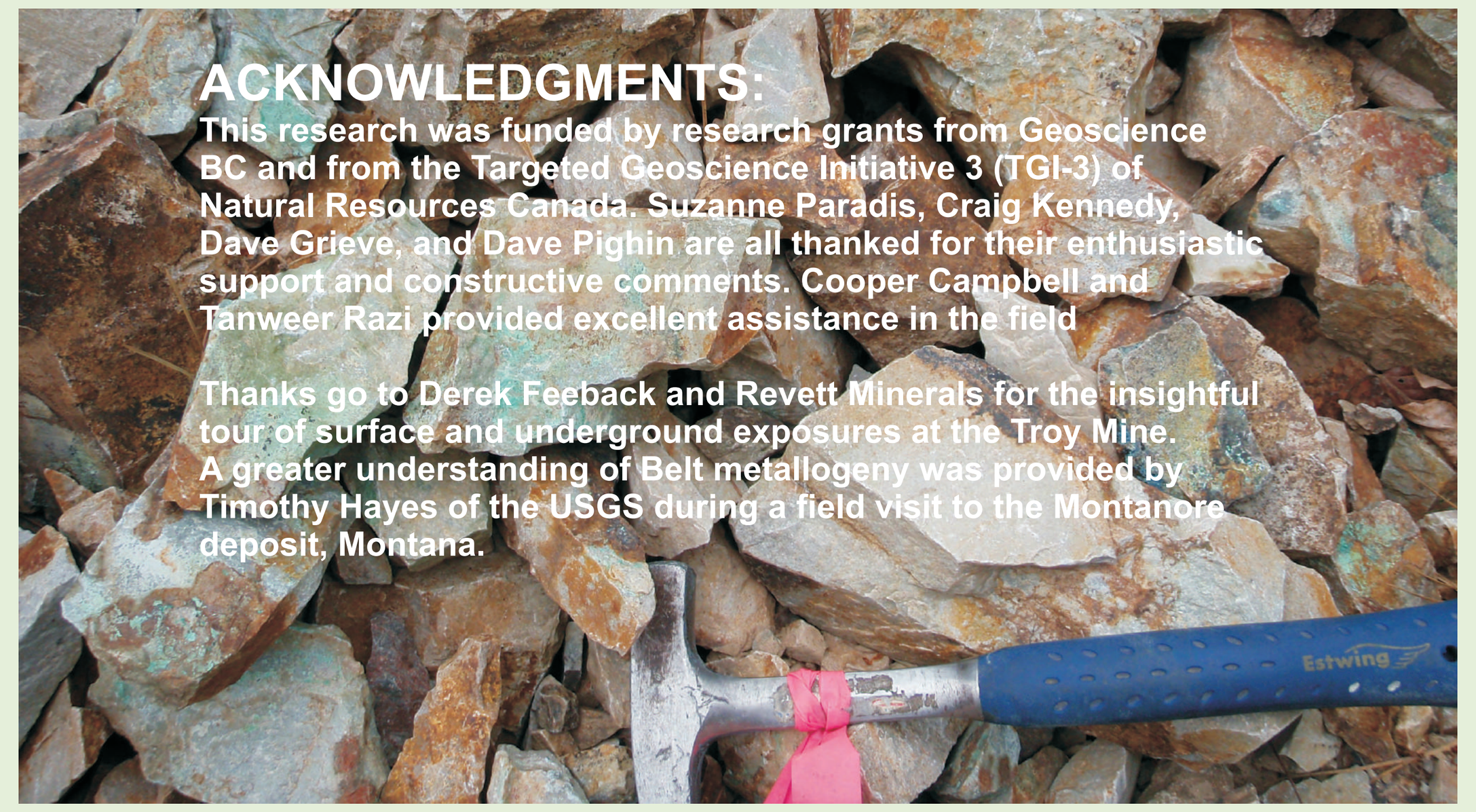
Several of the deposits in Montana were discovered by a simple strategy of tracing along prospective stratigraphic horizons after traces of mineralization were discovered. The disseminated nature of the mineralization is not always apparent, especially where limonite has partially replaced chalcopyrite.

3.Induced polarization studies

Despite the low of concentration of sulphides, stratabound Cu deposits should produce IP anomalies due to the otherwise restricted presence of sulphides and graphite within the Creston Formation.

4.Aeromagnetic mapping

The abundance of magnetite within the Creston Formation indicates that detailed aeromagnetic imagery would be useful for tracing contacts in areas of poor exposure. Both mineralized and non-mineralized Creston Formation rocks may contain magnetite and have similar magnetic susceptibility values.



ACKNOWLEDGMENTS:

This research was funded by research grants from Geoscience BC and from the Targeted Geoscience Initiative 3 (TGI-3) of Natural Resources Canada. Suzanne Paradis, Craig Kennedy, Dave Grieve, and Dave Pighin are all thanked for their enthusiastic support and constructive comments. Cooper Campbell and Tanweer Razi provided excellent assistance in the field

Thanks go to Derek Feeback and Revett Minerals for the insightful tour of surface and underground exposures at the Troy Mine. A greater understanding of Belt metallogeny was provided by Timothy Hayes of the USGS during a field visit to the Montanore deposit, Montana.

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