New till geochemical targets for potential porphyry Cu±Mo±Au mineralization in the Pendleton Bay area

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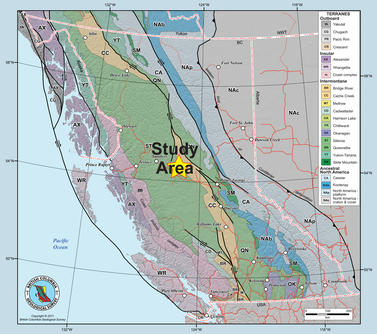
Abstract

Regional till geochemical sampling in the Pendelton Bay area (NTS mapsheet 93K/12) has detected dispersal from known porphyry Cu±Mo±Au mineralization at the Fort showing (MINFILE 93K 093) and identified three new areas of geochemical interest. Situated 30 km southwest of the past producing porphyry Cu±Mo±Au Bell and Granisle mines, the Pendleton Bay area has potential to host new porphyry Cu±Mo±Au mineralization. However, access to the area is limited and glacial sediment cover is extensive. To better assess mineral potential here, 182 subglacial till samples were collected by the British Columbia Geological Survey in 1998 for geochemical analysis of the <63 µm size fraction by inductively coupled plasma emission spectroscopy (ICP-ES) and instrumental neutron activation analysis (INAA). Ice-flow features indicate that glacial dispersal was predominantly towards the east and southeast. The maximum Cu value (522 ppm Cu) is 700 m northeast of the main Fort showing, and anomalous values greater than the 90th percentile (60 ppm Cu) continue for about 2 km down ice (southeast). The Mo footprint in till at the Fort showing is smaller, with the maximum (29 ppm Mo) occurring 300 m to the northeast, and concentrations fall to near detection limit 800 m to the east. Three additional areas have been identified with anomalous values of Cu (up to 167 ppm), Cr (up to 263 ppm), and Ni (up to 101 ppm). These anomalies provide a starting point for future exploration work in the area.



Location of study area. Geology from Colpron and Nelson (2011)

Introduction

- Till sampling in Pendleton Bay area has identified dispersal from Fort porphyry Cu±Mo±Au showing and three new areas of geochemical interest.
- Extensive till cover, and lack of historical exploration, makes the area ideal for the application of drift exploration methods to help discover new metallic mineralization.
- Field work was carried out summer of 1998 (see Levson et al., 1999).
- The Pendleton Bay area has potential to host porphyry Cu±Mo±Au mineralization similar to that at past-producing Bell (MINFILE 093M001) and Grainisle (MINFILE 093L146) mines, 30 km to the northeast.
- The area is host to 3 documented MINFILE showings:

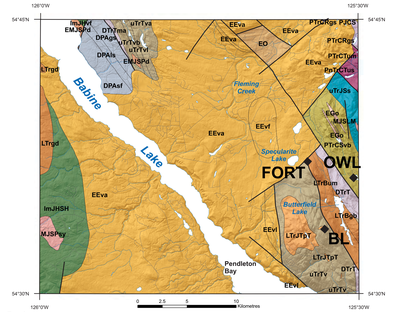
Showing	MINFILE No.	Deposit Type	Commodities
BL	093K054	NA	Cu
Fort	093K093	Porphyry Cu±Mo±Au (L04)	Cu, Ag, Mo, Pb, Zn, Au
OWL	093K103	Cu±Ag quartz veins (I06) Porphyry Cu±Mo±Au (L04)	Cu, Ag, Au, Zn, Pb

Ice-flow history

- Studies northwest of the map area identified that dispersal was predominantly to the southeast (Levson, 2002).
- Ice-flow indicators in the study area suggest ice-flow was mainly to the east and northeast. Topographically controlled flow towards the southeast is observed in parts of the study area, as are late southerly flows.

Till sampling for geochemistry

- 182 samples of subglacial till (2-3 kg) were collected at average depth of 1 m below surface.
- The <63 µm fraction was analyzed by
  - INAA at Actlabs; and
  - ICP-ES at ACME
- This data set is supplemented by 10 subglacial till samples collected by the Geological Survey of Canada (Plouffe and Williams, 2001).
- Geochemical maps were produced using 50th, 70th, 90th, 95th, and 98th percentile class breaks.



Geology (Cui et al., 2015)

Paleogene
- EE — *Nechako Plateau Group - Endako Formation* — va: andesitic volcanic rocks; vl: coarse volcaniclastic and pyroclastic volcanic rocks; vf: rhyolite, felsic volcanic rocks
- EO — *Nechako Plateau Group - Ootsa Lake Formation* — rhyolite, felsic volcanic rocks; va: andesitic volcanic rocks
- EGo — *Goosly plutonic suite* — granodioritic intrusive rocks; granite, alkali feldspar granite intrusive rocks

Jurassic
- lmJHvf — *Hazelton Group* — coarse volcaniclastic and pyroclastic volcanic rocks
- lmJHSH — *Hazelton Group - Saddle Hill Formation* — undivided volcanic rocks
- MJSPsy — *Spike Peak intrusive suite* — syenitic to monzonitic intrusive rocks
- MJSLM — *Endako Batholith - Stag Lake plutonic suite - McKnab phase* — quartz dioritic intrusive rocks
- EMJSPd — *Spike Peak intrusive suite* — dioritic intrusive rocks

Triassic to Jurassic
- uTrTJSs — *Stitka assemblage - clastic unit* — undivided sedimentary rocks
- LTrJTpT — *Topley intrusive suite - Tochcha Lake stock* — dioritic intrusive rocks

Triassic
- uTrT — *Takla Group* — v: undivided volcanic rocks; va: andesitic volcanic rocks; vb: basaltic volcanic rocks; vl: coarse volcaniclastic and pyroclastic volcanic rocks
- LTrgd — *unnamed granodioritic intrusive rocks*
- LTrB — *Butterfield Lake intrusive complex* — gb: gabbroic to dioritic intrusive rocks; um: ultramafic rocks

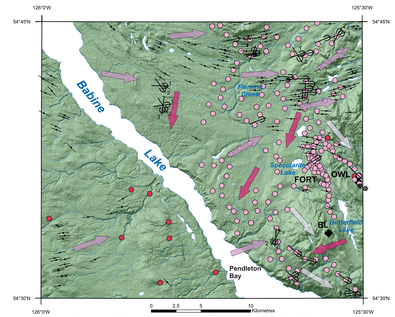
Permian to Jurassic
- PJCS — *Cache Creek complex - Nowchea succession* — mudstone, siltstone, chalk fine clastic sedimentary rocks

Permian to Triassic
- PnTrCTus — *Cache Creek complex - Trembleur ultramafite unit* — serpentinite ultramafic rocks
- PTrCTum — *Cache Creek complex - Trembleur ultramafite unit* — ultramafic rocks
- PTrCSvb — *Cache Creek complex - Sowchea succession* — basaltic volcanic rocks
- PTrCRgs — *Cache Creek complex - Rubyrock igneous complex* — greenstone, greenschist metamorphic rocks

Carboniferous to Permian
- DPA — *Asitka Group* — gs: greenstone, greenschist metamorphic rocks; ls: limestone, marble, calcareous rocks

Devonian to Triassic
- DTrT — *Taltapin metamorphic complex* — lower amphibolite/kyanite grade metamorphic rocks; ma: limestone, marble, calcareous sedimentary rocks

MINFILE Showing
Fault
Road



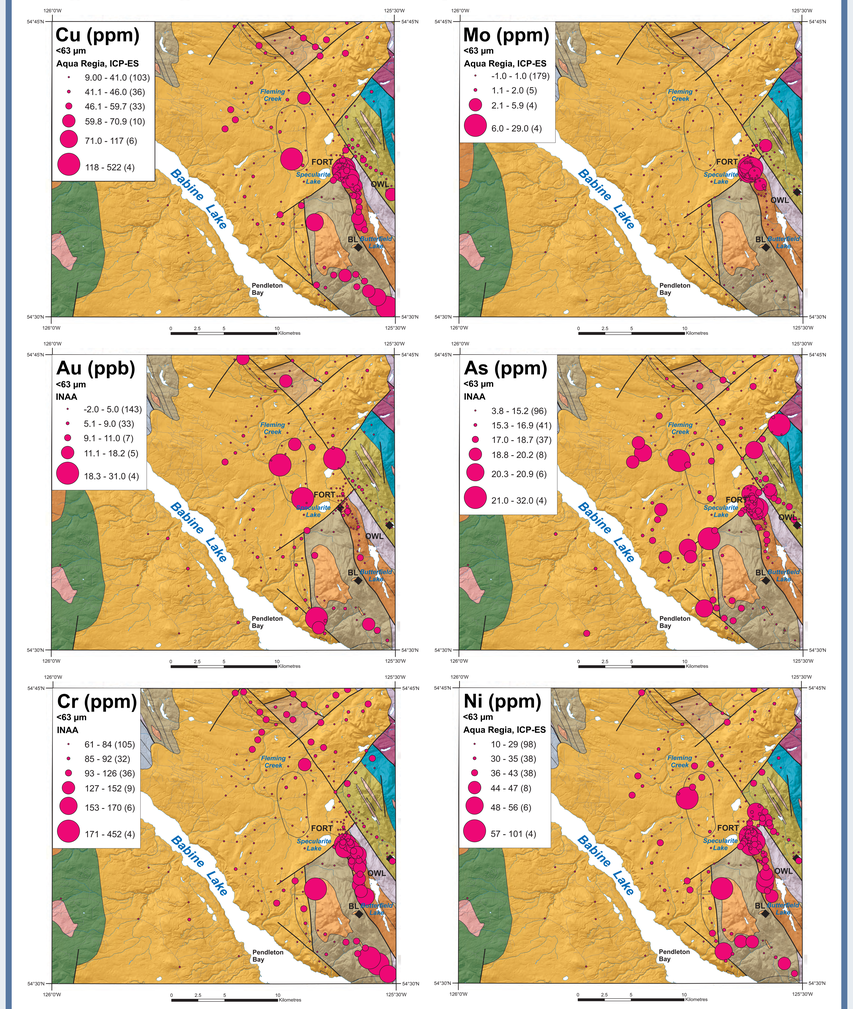
Ice-Flow Indicators
Field Observations (Levson et al., 1999)
- Striation (direction known)
- Striations with age relationship (direction known, 1 is oldest)

Remote-sensing Observations (Arnold et al., 2016)
- Crag-and-tail (direction known)
- Drumlin (direction known)
- Drumlinoid or fluting (direction unknown)
- Striation (direction known)
- Striation or groove (direction unknown)

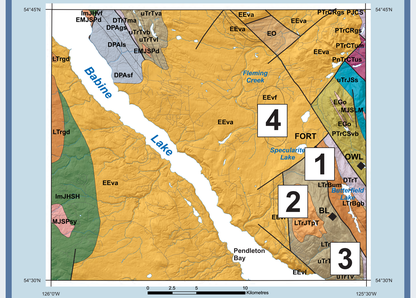
Interpreted Ice-Flow Direction
- Early topographically controlled flows towards the southeast
- Flows due to the development of ice-centre west of study area during glacial maximum
- Southwest flows due to eastward shift of ice-centre during late glacial maximum

Till Sample Locations
2-3 kg, subglacial till
- BCGS (182)
- GSC (10)

Regional geochemical dispersal



Areas of geochemical interest



1. **Fort Showing:** Maximum Cu (522 ppm) and Mo (29 ppm) for study. >98th percentile Zn, Cr, and Ni, and >90th percentile As. >90th percentile Cu continues 2 km southeast and 750 m northeast.
2. **South Specularite Lake area:** Maximum Cr (452 ppm) and Ni (101 ppm) for study. Also contains >95th percentile Cu and >90th percentile Au.
3. **South Butterfield Lake area:** 3 samples over 2.5 km with up to >98th percentile Cu and Cr, >95th percentile Au, and >90th percentile Ni.
4. **Fleming Creek area:** >98th percentile Ni and Au in one sample, >98th percentile Cu in a second.

Summary

- Three new areas of geochemical interest have been identified in Pendleton Bay map area that warrant follow up work.
- Glacial dispersal in the area ranges from northeast to southeast, and dispersal of >90th percentile Cu is observed to extend at least 2 km from the Fort showing.
- Geochemical data will be released in an upcoming Open File report.

References

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