

# REFINING GEOCHEMICAL EXPLORATION TARGETS, BABINE PORPHYRY COPPER DISTRICT, CENTRAL BRITISH COLUMBIA



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## WHY THE BABINE?

### HIGH MINERAL POTENTIAL

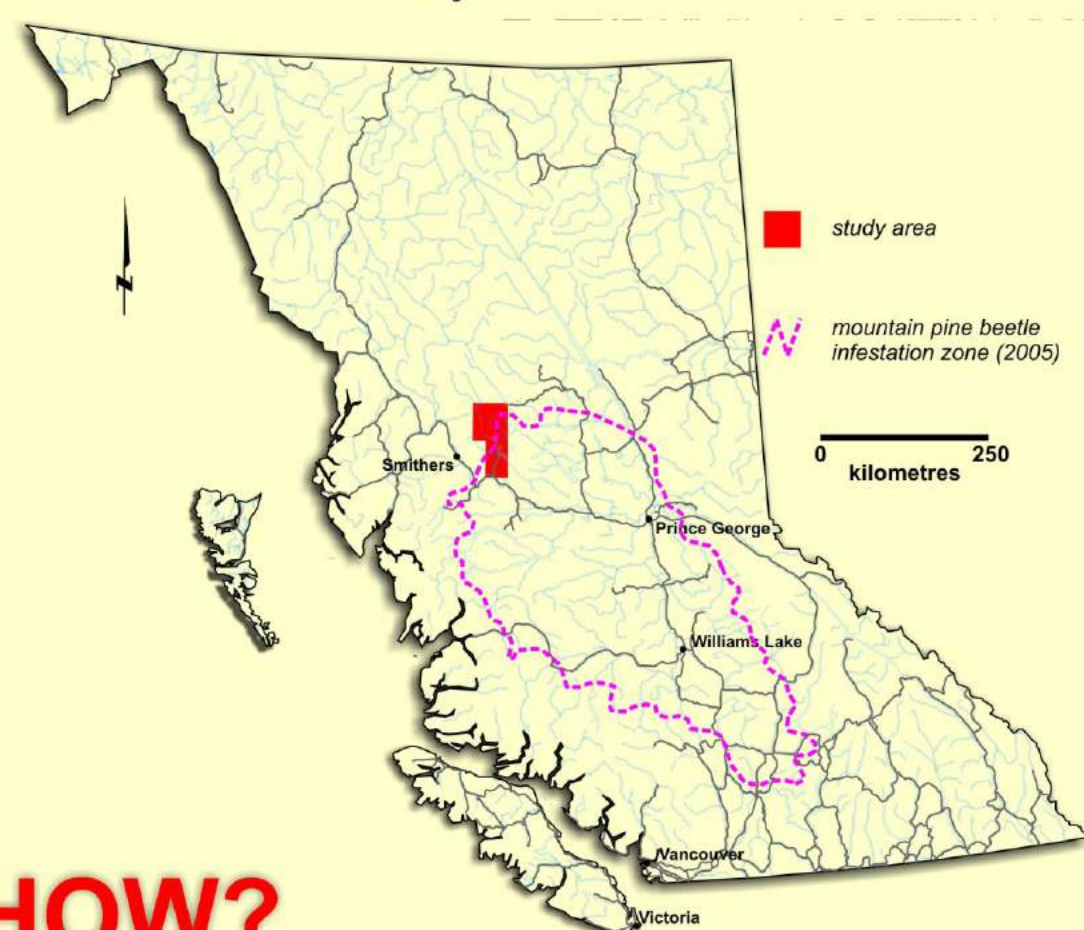
Rich mineral exploration history and host to two past producing porphyry copper mines (Bell and Granisle).

### EXISTING GEOCHEMICAL EXPLORATION TARGETS IDENTIFIED

Analyses of silt+clay fraction (<0.063 mm) of tills has been used to identify 66 areas with elevated metal values (Levson, 2002).

### MORE DATA TO "SQUEEZE" FROM ARCHIVED TILL SAMPLES

Provide more insight into geochemical exploration targets using new, high-quality, geochemical analyses.



## HOW?

### ANALYSIS OF ARCHIVED TILL SAMPLES

ICP-MS determinations for 37 elements on clay fraction (<0.002 mm) of archived till samples from Babine porphyry copper district (Ferbey, 2009).

## DATA RELEASE KEG 2009

## TILL TRACE ELEMENT GEOCHEMICAL DATA



## TILL GEOCHEMISTRY

### SILT+CLAY FRACTION (<0.063 mm)

Silt+clay fraction most commonly used for trace element determinations on till samples.

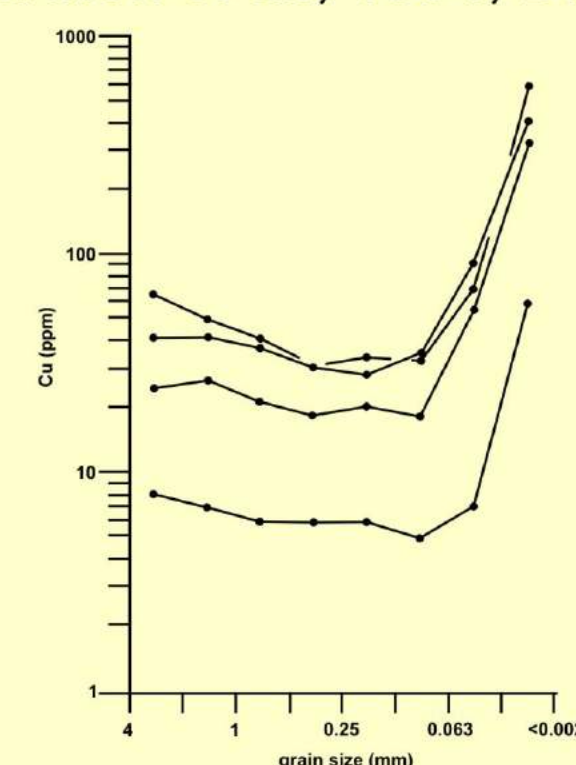
- Can be consistently and rapidly produced at a reasonable cost.
- Provides good geochemical contrast, for a variety of elements, enabling elevated samples to be identified and evaluated.
- Can be used to explore for a variety of mineral deposit types.

### CLAY FRACTION (<0.002 mm)

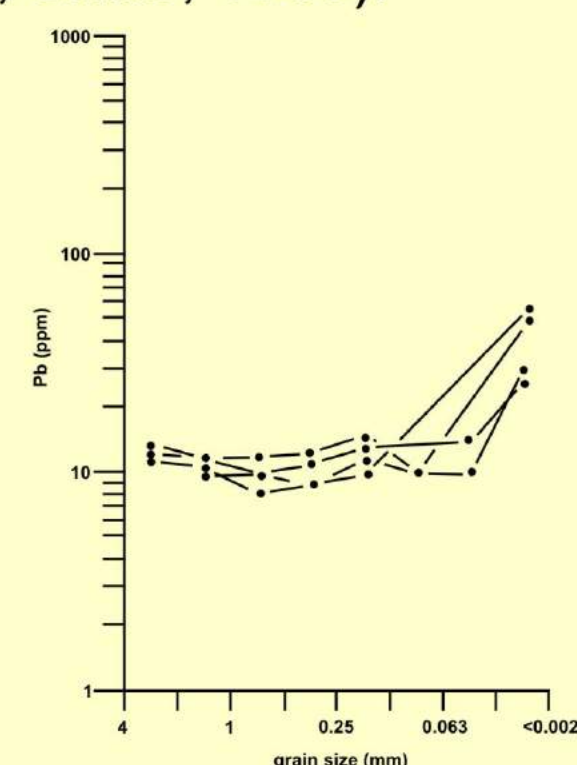
Clay fraction not commonly used for trace element determinations on till samples.

- Until recently, a cost prohibitive size fraction to produce.
- Must follow rigorous laboratory procedures to consistently produce this size fraction.

Due to the large surface area and high cation exchange capacity of clay minerals, some base metals (e.g. Cu, Pb, Zn) and pathfinder elements (e.g. As) can, however, be concentrated in this size fraction (Nikkarinen *et al.*, 1984; DiLabio, 1995; Shilts, 1995).



Abundance of Cu versus grain size. Four samples collected at Fergus Lake, NWT (DiLabio, 1995).



Abundance of Pb versus grain size. Four samples collected at Kazan Falls uranium occurrence, Kazan River, NWT (DiLabio, 1995).

As seen above, elements such as these can be more abundant in the clay-sized fraction. It should be noted that proximity to source can, however, have an influence on this relationship.

Use of clay fraction can be effective for base metal exploration.

Clay fraction is not appropriate for exploring for metals that have a terminal mode >0.002 mm (e.g. Au).

## GEOCHEMICAL EXPLORATION TARGETS

### USING SILT+CLAY FRACTION (<0.063 mm) OF TILL

Geochemical exploration targets have been identified by Levson (2002) based on:

1. Anomaly magnitude
2. Glacial dispersal direction and patterns
3. Multi-element and multi-site anomalies
4. Comparisons with geochemistry around known occurrences
5. Surficial geology controls
6. Bedrock geology

Samples down ice of nearly all known occurrences have >95th percentile metal concentrations.

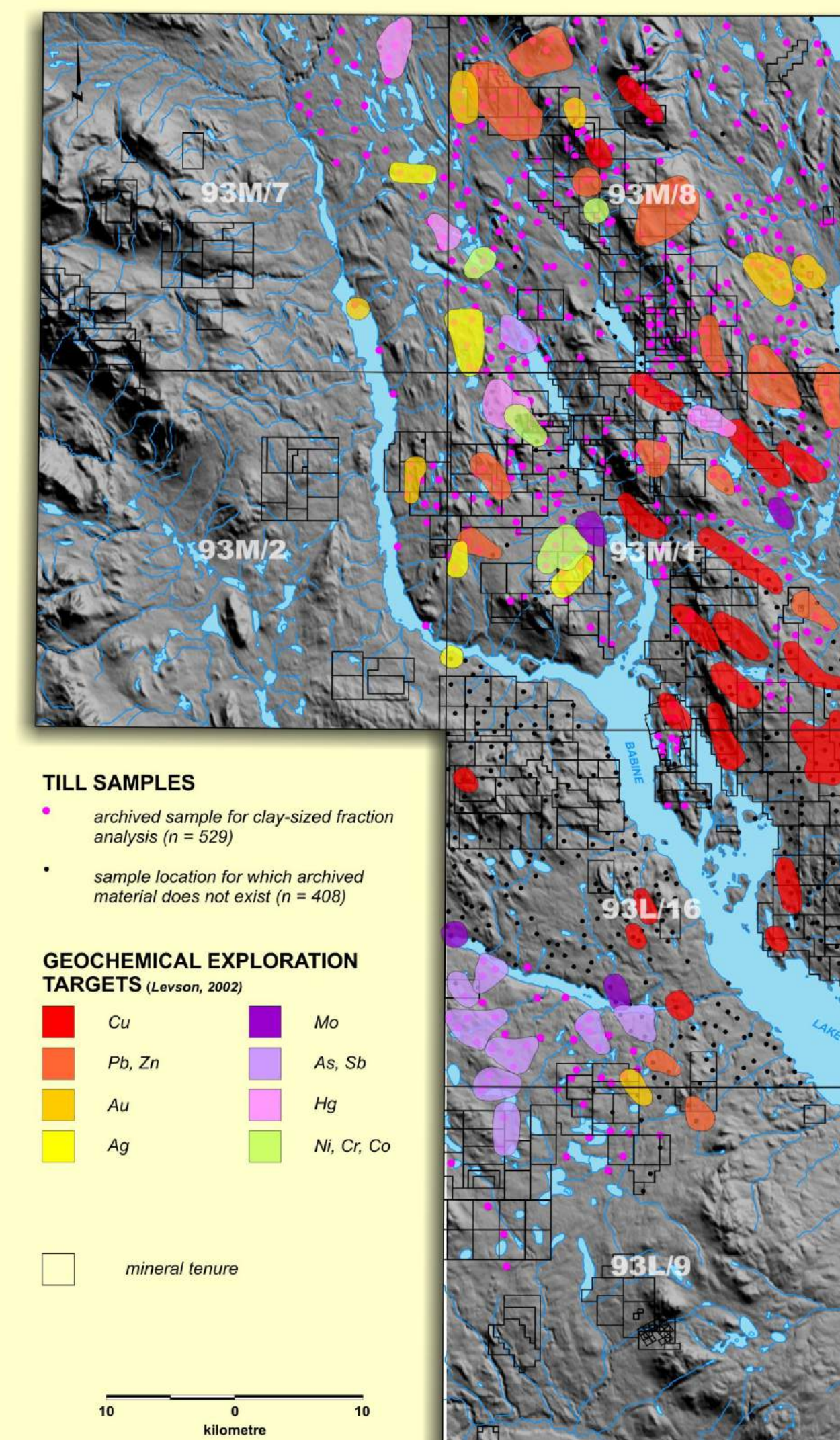
## THIS STUDY

### USING CLAY FRACTION (<0.002 mm) OF TILL

Analysis of clay fraction (0.002 mm) of 529 archived till samples for 37 elements by ICP-MS.

Integration of these new geochemical data with interpretations of existing data.

An increase in geochemical contrast will provide more insight into size, configuration, and significance of geochemical exploration targets identified by Levson (2002) and possibly identify new ones.



**TILL SAMPLES**  
 • archived sample for clay-sized fraction analysis (n = 529)  
 • sample location for which archived material does not exist (n = 408)

**GEOCHEMICAL EXPLORATION TARGETS (Levson, 2002)**

|                  |              |
|------------------|--------------|
| ■ Cu             | ■ Mo         |
| ■ Pb, Zn         | ■ As, Sb     |
| ■ Au             | ■ Hg         |
| ■ Ag             | ■ Ni, Cr, Co |
| □ mineral tenure |              |

## REFERENCES

DiLabio, R. N. W. (1995). Residence sites of trace elements in oxidized till. In *Drift Exploration in the Canadian Cordillera*, P.T. Bobrowsky, S.J. Sibbick, J.M. Newell and P. Matysek (ed.), British Columbia Ministry of Energy, Mines and Petroleum Resources, Paper 1995-2, p. 139-148.

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Levson, V.M. (2002). Quaternary geology and till geochemistry of the Babine Porphyry Copper Belt, British Columbia (NTS 93 L/9, 16, M/1, 2, 7, 8); *British Columbia Ministry of Energy and Petroleum Resources*, Bulletin 110, 278 p.

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