

## FAA- Site # 1: Quesnel Trough-BC-Canada

The Quesnel Terrane (or called the Quesnel Trough) is an Triassic-Jurassic age arc of volcanosedimentary rocks that hosts a number of alkalic Cu-Au porphyry deposits, several of which Mt Milligan and Mt. Polly are currently in production (Fig. 1). In the central part of the terrain, there is a considerable quaternary cover that is an impediment to exploration. Geoscience BC, in conjunction with the BC Geological Survey mounted a major program in 2007 to build up a modern geoscience data base over the Quesnel Trough in order to facilitate the discovery of additional hidden resources. This data set now is likely the most comprehensive of its kind in North America and possibly the work.

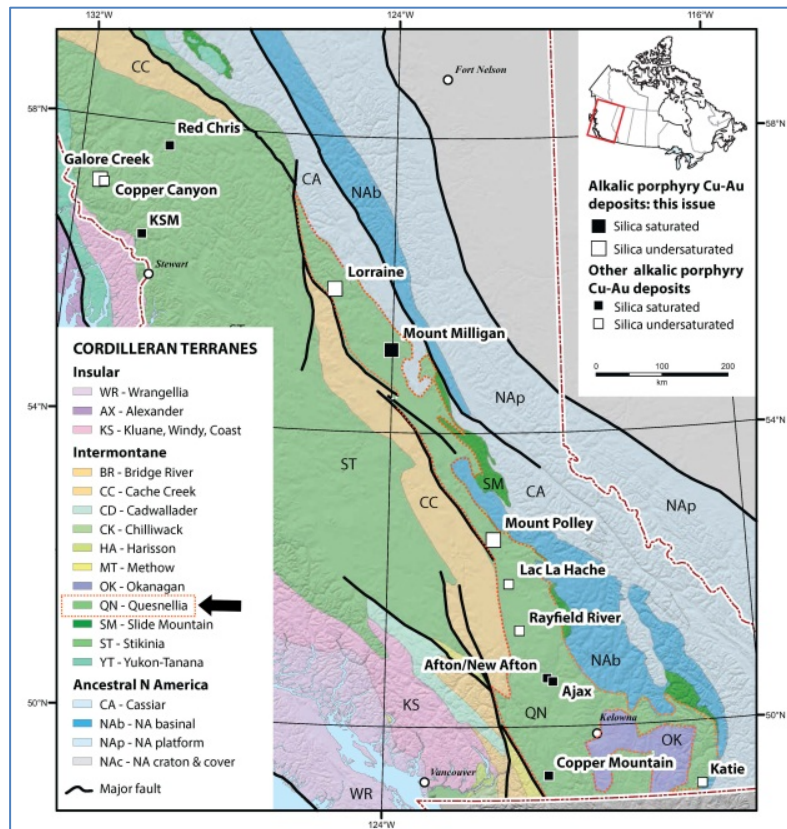


Figure 1: Location of Quesnel Terrane, BC.

## Geological Summary

The Quesnel Terrane, along with the Stikine Terrane, are two Mesozoic age volcanic arcs preserved in western Canada. These parallel arc terranes extend for 2,000 km along the axis of the Canadian Cordillera. They are joined at their northern ends, but are otherwise separated by relics of Tethyan ocean basin and oceanic arc rocks collectively referred to as the Cache Creek Terrane. Porphyry Cu  $\pm$  Au-Mo-Ag deposits are concentrated within the Stikine-Quesnel arc Terranes, with most of their economic metal endowment emplaced in a period within the mineralizing epoch is a 6-m.y. pulse centered on 205 Ma; more than 90% of the known copper endowment was emplaced in this period. Distinct trends of Cu-Au  $\pm$  Ag-Mo mineralization within both arc terranes coincide in time and space with events that are attributed to effects of slab subduction (adapted from Logan and Mihalynuk 2014). In the central part of the terrane, quaternary cover is extensive and is estimated to each a thickness of 50 + m locally. This acts as an impediment to mapping and in some cases, reduces the effectiveness of standard geochemical techniques (Heberlein 2011). There are several active mines in the study area; Mt Milligan in the north and Mt. Polly in the south (see Figure 1).

## **Geophysical Data Summary**

The primary data sets being provided are airborne magnetic, EM and gravity over the study area (Figure 2) acquired by the Geological Survey of Canada and Geoscience BC (GBC). Included with these coverages are a number of value-added products commissioned by GBC. Geological coverage for the area is provided by the BC Geological Survey. An alternative geology map was produced by one of GBC's contractors using a neural network approach to analyzing geochemical data.

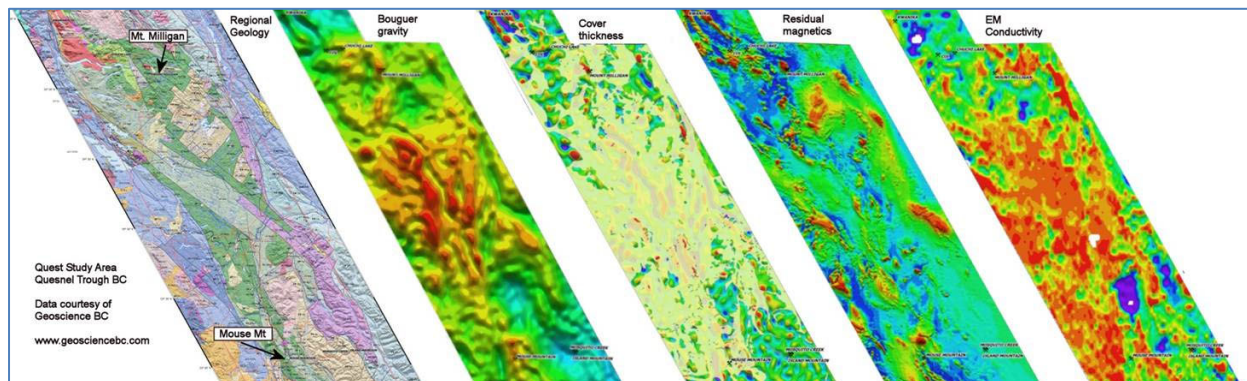


Figure 2: Composite of geology and geophysics for Quest area; Bouguer gravity, cover thickness, residual magnetics and EM conductivity

## **Additional Data/ Previous Work**

**Assessment Data:** In addition to the outlined more regional coverages, there is a large number of company assessment files for exploration work conducted over the study area. These reports are available on-line from the BC government Mines Department. While there is considerable data available in the assessment files, little of this data would be in digital form as this is not a requirement for assessment filing in BC.

**Geochemical Data:** There is an extensive set of geochemical data for the study area that is available in an ArcGIS format. Various assessments of these data have been provided as well (including a neural network analysis mentioned above).

**Deposit Geophysical Catalog:** GBC commissioned a series of focused studies over a number of the major deposits in the belt.

**Mt Milligan:** This deposit was the site over a series of airborne geophysical trials supported by GBC and research carried out by UBC-GIF (geophysics) and MDRU (geology/geochemistry).

## **Exploration Challenge**

While numerous porphyry deposits are known to occur in the terrain, finding new deposits under shallow cover would be economically attractive. Also, if it were possible to identify deposits with higher grades, this as well would be an important component of a new deposit's economics.

## **Data Source Acknowledgments**

The data included with this project has come from Geoscience BC and the Geological Survey of Canada.

**Preferred Projection**

NAD83, UTM zone 10 north

**Reference**

Heberlein, D., 2012, Using Geochemistry in Covered Areas of British Columbia; presented at DMEC-PDAC Workshop, March 7<sup>th</sup>, 2012, Toronto Canada