

VOLCANIC FACIES, DEFORMATION AND ECONOMIC MINERALIZATION IN PALEOZOIC STRATA OF THE TERRACE–KITMAT AREA, BRITISH COLUMBIA , NTS 1031

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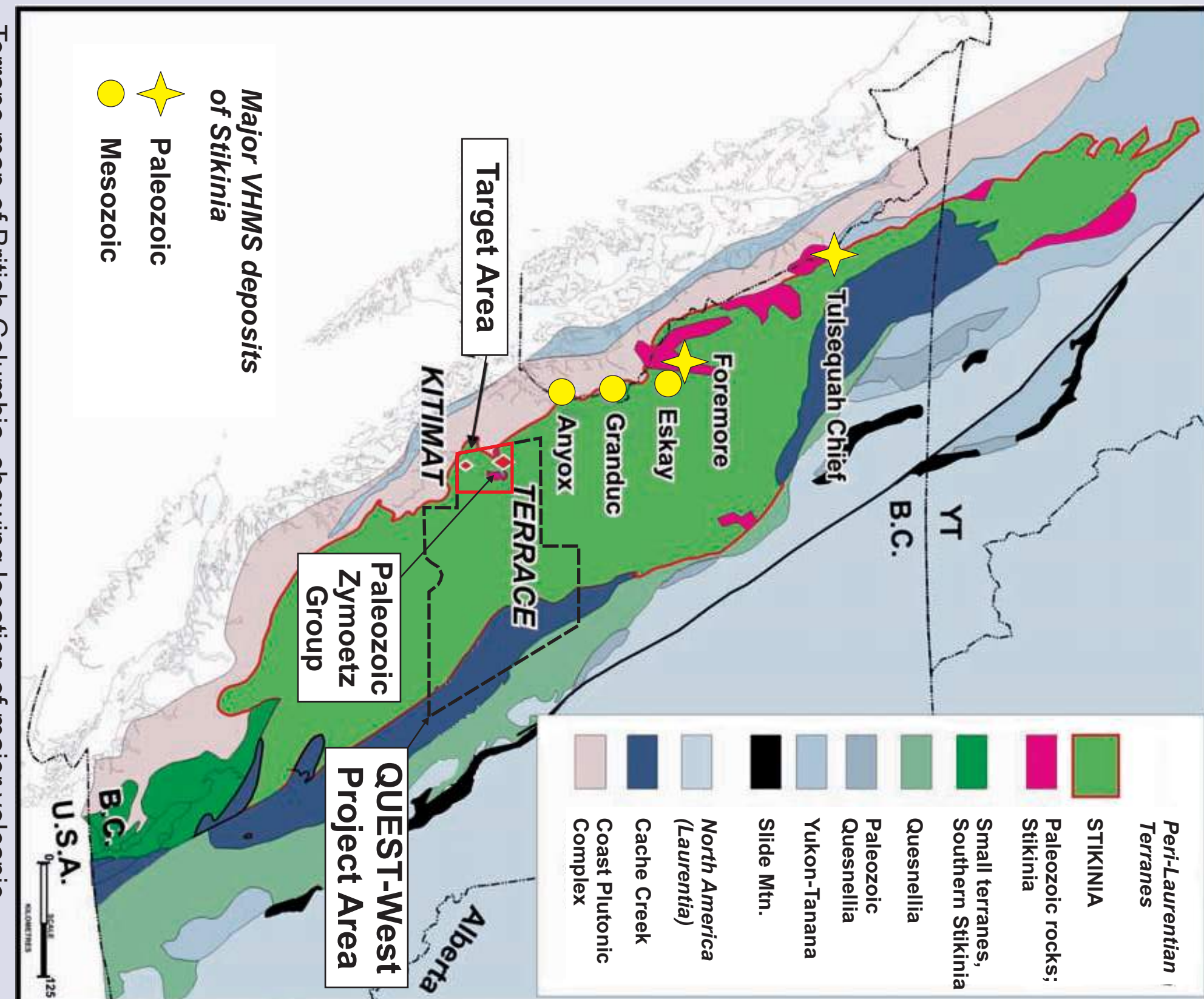


Introduction

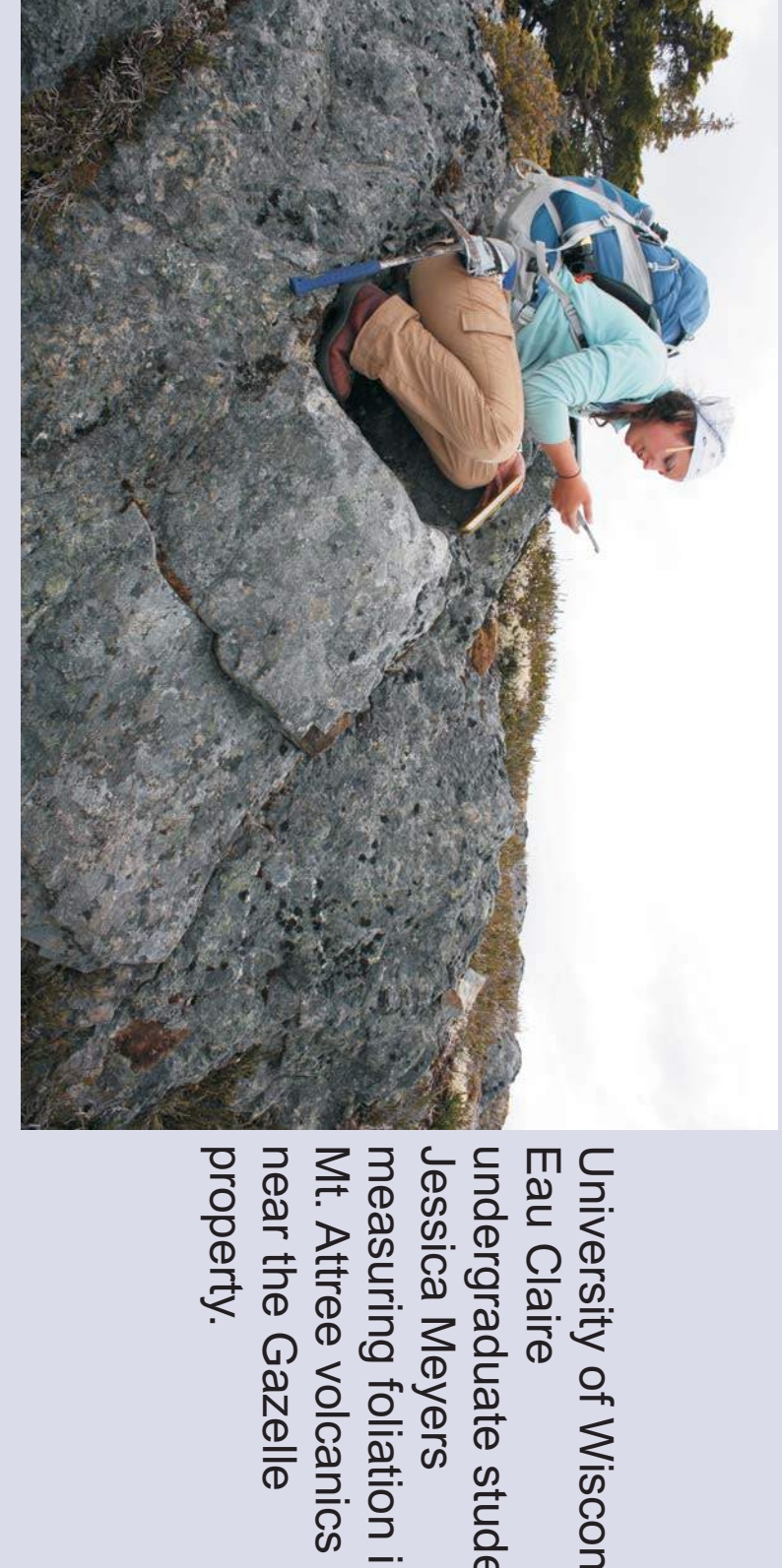
Recent regional mapping by the British Columbia Geological Survey has indicated that a package of Paleozoic volcanogenic strata, the Mt. Attree volcanics, rest potential Volcanic-hosted Massive Sulphide (VHMS) mineralization. (McKewen et al., 2008). The VHMS system is situated within the Terrace-Kitimat area of British Columbia, and is intruded by Jurassic through Eocene plutons of the easternmost Coast Plutonic Complex (CPC). Along strike to the north, Paleozoic and Mesozoic volcanic rocks similar to the Mt. Attree volcanic package host significant VHMS deposits, like the Tulaequah Chief, Foremore, Etlay, Granduc and Arvox (McKewen et al., 2008). The recognition of this economic potential combined with updated regional mapping, geophysical data from the recently completed QUEST-West survey and newly reanalyzed and released RGS stream sediment data from the Terrace-Kitimat area provide a solid foundation from which additional studies of economic potential can be based.

The objective of this work is to complete structural analysis, geochemical and geochronological studies of six targeted localities of potential Paleozoic volcanogenic and mineralized sedimentary strata in the Terrace-Kitimat area. During the summer of 2009, detailed mapping and sample collection was completed in the six target areas outlined below. Data compilation, petrographic, structural, geochemical and geochronologic analyses are in progress. These analyses will constrain the nature and timing of economic mineralization and deformation, establish a geochemical framework for volcanic and plutonic rocks in the area and assess the regional economic potential of these Paleozoic strata.

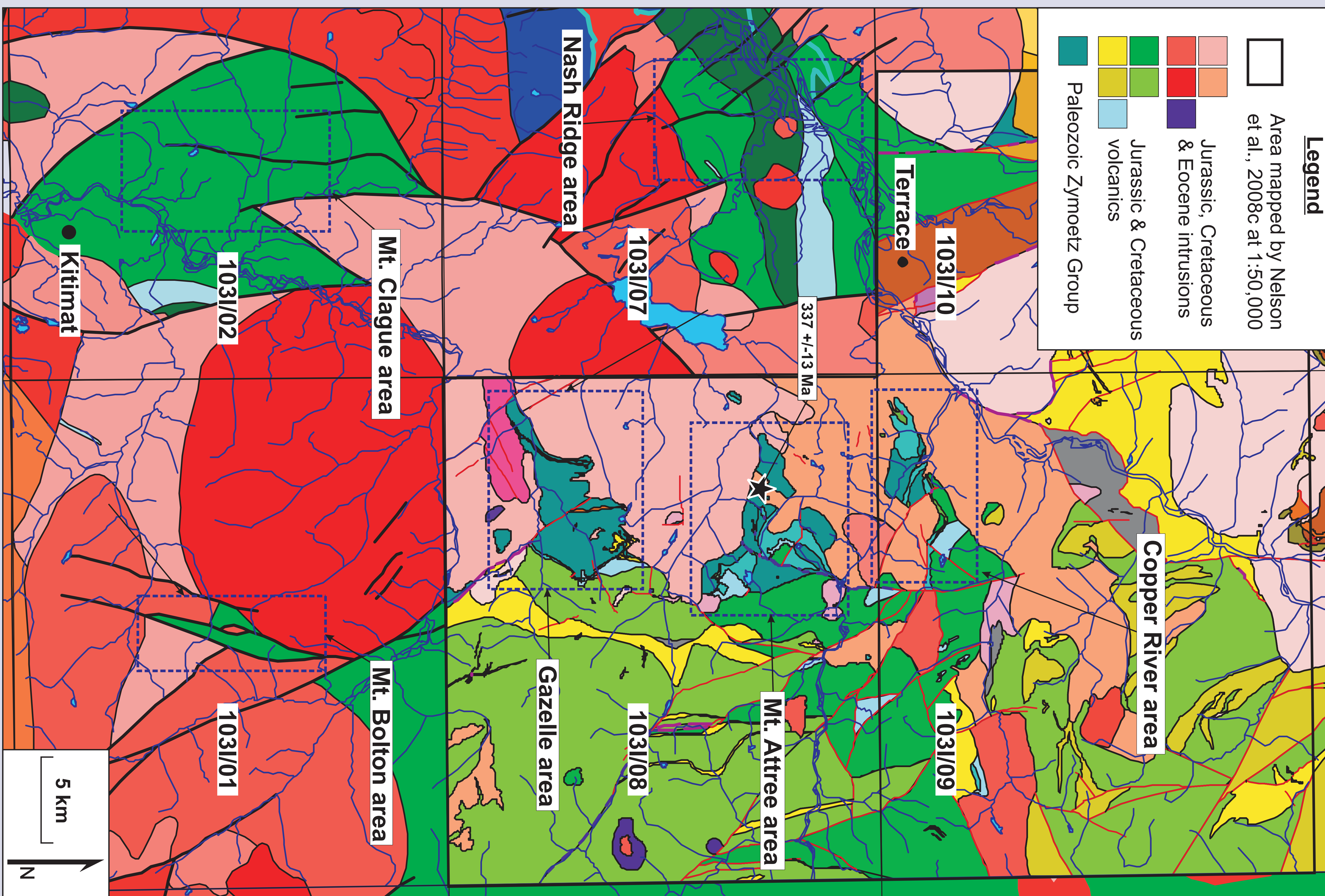
Regional Location



Terrence map of British Columbia showing location of major volcanic-hosted massive sulphide (VHMS) deposits of Skihia. The QUEST-West study area (area outlined in red). Economic mineralization in the Terrace-Kitimat area is concentrated along the intrusive boundary between the eastern margin of the Coast Plutonic Complex (CPC) and supracrustal rocks of Skihia. Devonian to Permian arc volcanics and pluton carterates from the Skihia, and the Skihia. The Skihia is a large, elongated, and irregularly shaped area. These supracrustal assemblages are intruded by Jurassic, Late Cretaceous and Eocene plutonic rocks of the CPC. Map modified from McKewen et al., (2008).



Terrace Mapping and Target Locations



Geology of the Terrace-Kitimat area derived from BC MapPlace (BC Geological Survey, 2008). New geological mapping by Nelson et al. (2008c) falls within the box with the heavy black outline. Boxes with white outline highlight targeted exposures of Paleozoic Mount Attree volcanic rocks. Abbreviations: Mjo, Jurassic Kleanza pluton; Enc, Eocene Williams Creek pluton.

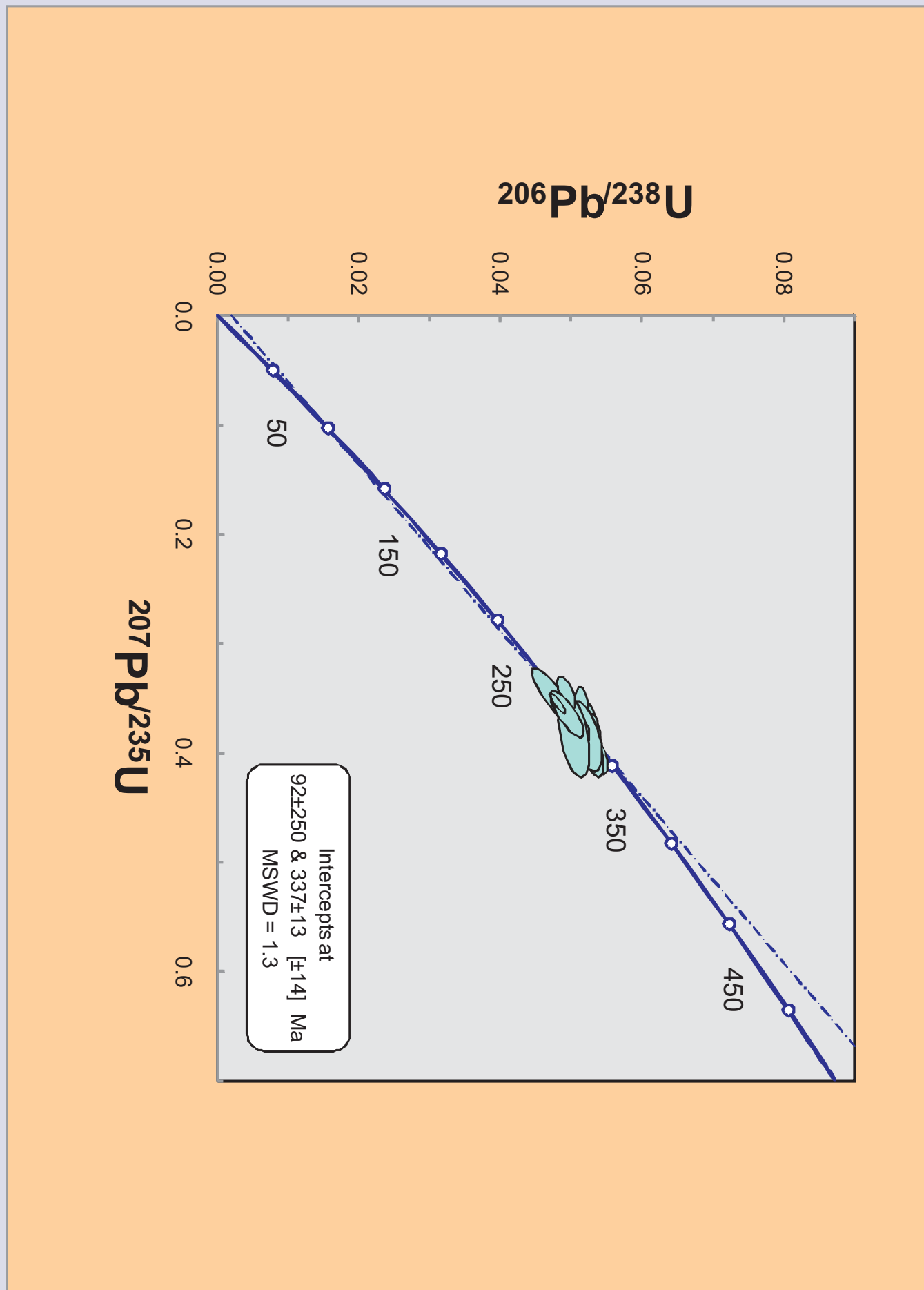
Target Area Summaries

Mt. Attree Area

The Mount Attree area is the type locality for the Mount Attree volcanic complex. Volcanic rocks in this area include a western unit that is dominated by aphanitic andesitic flows, sills and small stocks and crosscutting porphyritic andesite dikes. This transition abruptly to an eastern unit characterized by fine- to medium-grained fragmental volcanoclastic andesite with minor aphanitic andesite flows and sills, and porphyritic andesite dikes. A structural contact between Mount Attree volcanic units and Ambition Formation limestone is exposed in several localities in the Mt. Attree area.



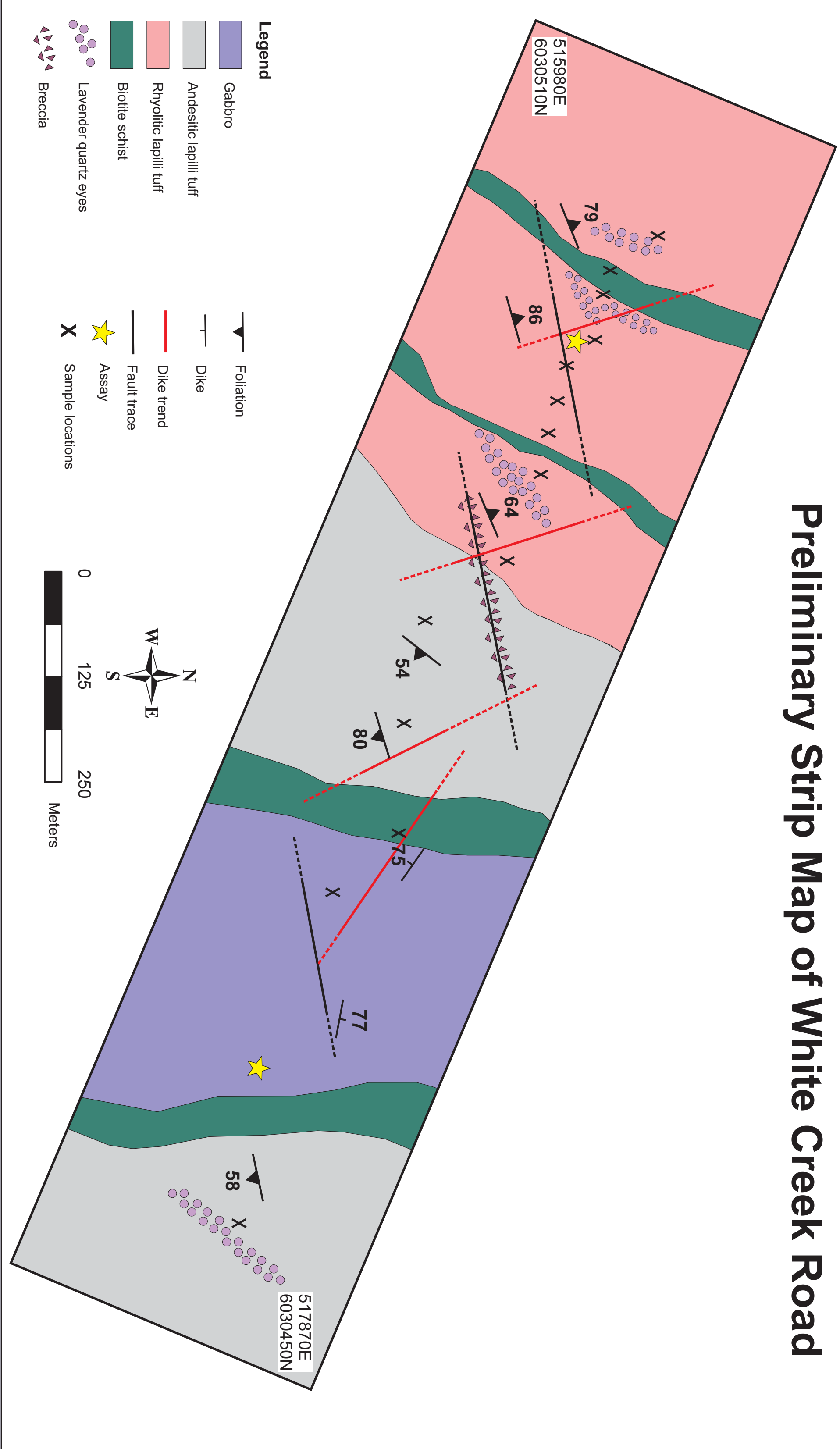
Photo of eastern Mount Attree area with Ambition Formation limestone exposed in saddle and small gossans further east along slope.



Nash Ridge Area

Distinctly different volcanic lithofacies are observed in the Nash Ridge area (and Mount Clague area described below), which is located approximately 10 km due west of type exposures of Mount Attree volcanic rocks. The area consists of a southern region dominated by mixed volcanic units and a northern region (north of the Skeena River) that consists primarily of deformed plutonic rocks. Unique to volcanic units found in the Nash Ridge and Mount Clague areas are spectacular lavender quartz eyes, which distinguish them from all other units to the east.

Preliminary Strip Map of White Creek Road



Detailed mapping was completed where necessary in target areas. The preliminary strip map above was completed primarily by UWEC undergraduate student Bryan HardeI. Geochemical and assay samples have been processed and analyzed. Data evaluation and interpretation is pending. The southern region consists of rhyolitic to dacitic crystal-tuff, porphyritic dacite flows, aphanitic and porphyritic (plagioclase) andesite flows and/or sills, tuff. Rhyolitic to dacite units typically contain abundant lavender quartz eyes, but all rock types and most exposures contained some lavender quartz eyes (See photo below). Intercalated within the volcanic rocks are lenses of coarse-grained, strongly foliated biotite schist. The entire package of volcanic rocks is metamorphosed to upper-greenschist facies. Foliation strikes consistently ENE-WSW and dips steeply.

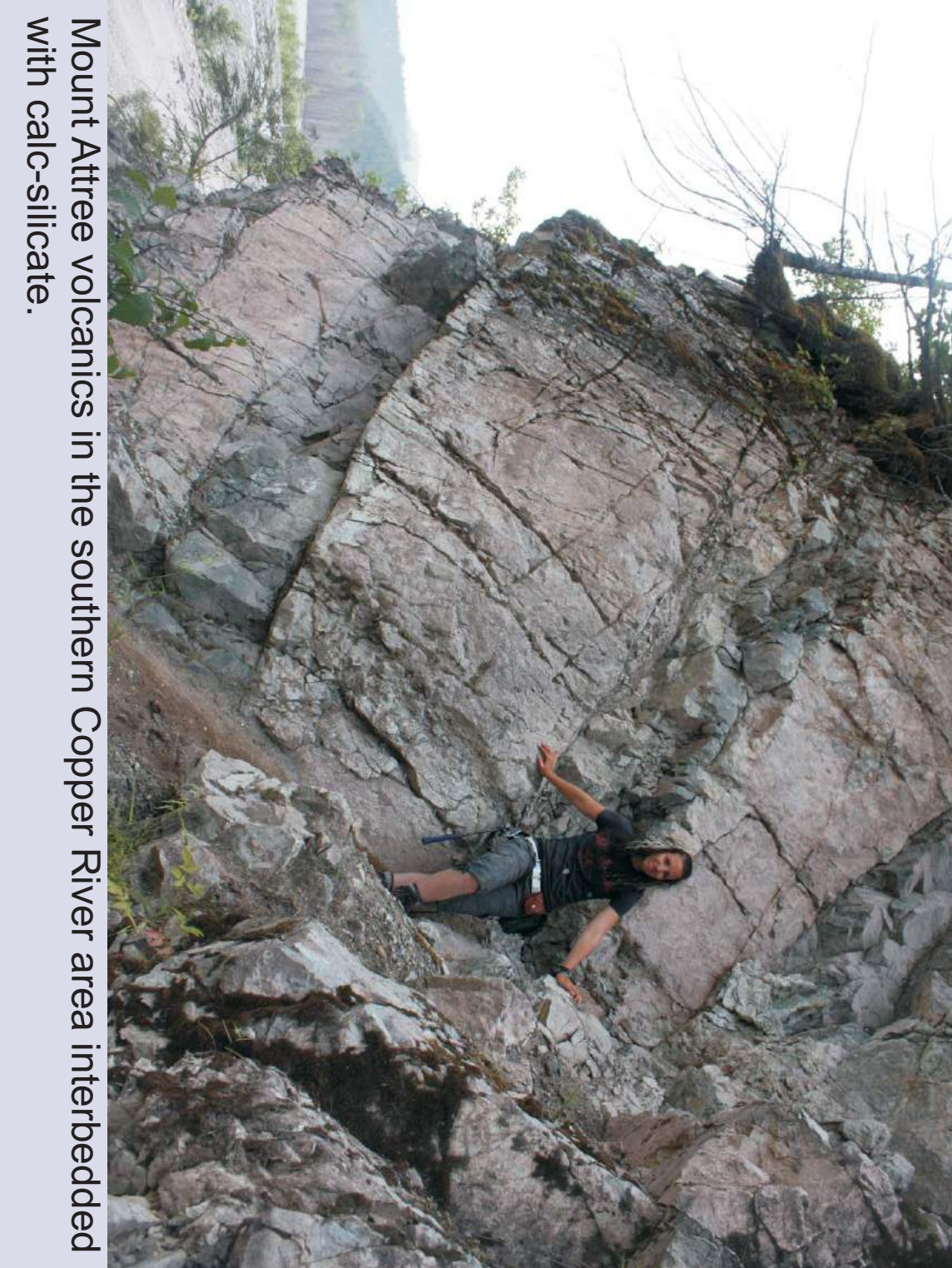


Rhyolite tuff with distinctive lavender quartz eyes characteristic of many units found in the Nash Ridge area and some units in the Mount Clague area located further south near Kitimat. Of note is that in this area the typical Mount Attree fragmental andesites observed both in eastern and western exposures contain lavender quartz eyes.



Copper River Area

Exposures of Mount Attree volcanics in the Copper River are strongly dominated by medium- to coarse-grained nonwelded tuff and upright, generally northwest-striking and moderately north-dipping epistatic volcanic rocks. There is a general trend of increasing clast size in the volcanoclastic rocks from south to north. In the upper part of the northern section, channels that consist of fining-upward sequences of porphyritic pebble conglomerate to felspathic litharenite, cut epistatic volcanic rocks. Notably little economic mineralization observed in this section.



Gazelle Area

The Gazelle area is a primary target because of previously recognized potential for economic mineralization (e.g., MINFILE occurrence 1031-185; MINFILE, 2009), and the interpretation of VHMS-style mineralization in the area (McKewen et al., 2008). Numerous geochemical, assay and geochronological samples were collected from this area to help assess mineral potential and determine genetic and timing relationships. Most mineralization in the Gazelle area occurs in its central region, where the predominantly felsic volcanic rocks are more intensely deformed and metamorphosed, and contain more gossans than surrounding volcanic rocks in the Gazelle area and all exposures of Mount Attree volcanic rocks to the east of Terrace.



Mt. Clague Area

The exposures of Mount Attree volcanic rocks in the Mount Clague area are somewhat similar in character to those found in the Nash Ridge area. Particularly interesting is the presence of lavender quartz eyes in both volcanic and plutonic units found in this area. Volcanic rocks exposed are nearly completely surrounded by a heterogeneous intermediate to mafic intrusive complex. Dominant volcanic rock types include quartz-phryic rhyolite to dacitic tuff, where quartz phenocrysts are both of the lavender and clear variety. Minor occurrences of lithic dacitic tuff and andesitic nonwelded tuff with lavender quartz eyes (xenocrysts?) also noted in the matrix. Most of the area consists of tonalite, diorite and microdiorite intrusions with minor occurrences of granite and gabbro. Felsic plutonic units, in particular granitic intrusions, often contain lavender quartz phenocrysts/xenocrysts (?).

Mt. Bolton Area

The Mount Bolton area was not mapped during the most recent BCGS regional mapping campaign in the Terrace–Kitimat area. It was selected as a target because it is along and across strike of other mapped exposures of Mount Attree volcanic rocks and contains proximal RGS Cu, Mo and Au anomalies. This north-trending, elongate body of volcanic rock was previously mapped as possible lower Jurassic Telkwa Formation by Woodsworth et al. (1985). The northern half of the target area was mapped and sampled for petrographic, geochemical and geochronological analyses. The volcanic units in this area likely belong to the Jurassic Telkwa Formation based on their lower grade of metamorphism and lack of alteration. A sample of quartz-phryic rhyolite welded tuff was collected for dating. Mineralization is lacking in this area, with one exception consisting of minor disseminated pyrite and vein pyrite observed in one rhyolite tuff.

Summary

- There are observable lithofacies trends within the Mount Attree volcanic packages including:
 - 1) Distinct differences between volcanic lithofacies in the areas west of Terrace compared to the eastern areas. Western areas are more felsic, contain more intrusive material, are generally higher metamorphic grade and have ubiquitous lavender quartz eyes, which are completely absent in eastern Mount Attree exposures.
 - 2) Lithofacies trends have also been noted within the individual targeted exposures and are being examined further through petrographic and geochemical analyses.
- 120 geochemical samples collected, processed and analyzed; data analysis and interpretation pending.
- 25 assay samples collected, processed and analyzed; data analysis and interpretation pending.
- 12 samples collected and processed for geochronology; analysis pending.
- Suite of samples prepared for thin section analysis.
- Several detailed maps completed from target areas.
- The Gazelle area has shown the most economic-mineral potential.
- Ongoing petrographic, geochemical and geochronological work will help constrain the ages of the volcanic packages, their genesis and the timing of mineralization with respect to deposition and deformation.

References

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