Reassessment of Triassic and Jurassic Volcanic Strata in the Dease Lake Region, Northern British Columbia

J. Brian Mahoney
University of Wisconsin
Eau Claire, WI

Olivia Iverson
University of Wisconsin
Eau Claire, WI

Jim M. Logan
BC Geological Survey
Victoria, BC, Canada

ABSTRACT
Detailed stratigraphy and sedimentology, petrography, detrital zircon geochronology, and whole-rock geochemistry of volcanic strata mapped in the Triassic Stuhini and Tsimshian Groups in the Dease Lake area indicates that these rocks actually belong to the middle Jurassic Hazelton Group.

This project focused on two well-exposed stratigraphic sections including a reference section north of the Cake Hill pluton first described by Anderson (1980, 1983), and a second section on the north flank of Thehdahk Mountain. The reference section was originally interpreted to be the Late Triassic Stuhini Group in thrust contact with the Late Triassic Cake Hill pluton. Subsequent work suggested that these rocks were correlated with the informal Middle Triassic Tsimshian Group. The detrital zircon analysis of this section indicates that these rocks are much younger than originally interpreted, and are correlated with the Early Jurassic Hazelton Group. This indicates that the Hotahatk thrust fault does not exist and that the entire section is an eruptive stratigraphic sequence of Middle Jurassic strata unconformably overlying the Cake Hill pluton. Stratigraphic similarities between these strata and those exposed on Thehdahk Mountain suggest that the Hazelton Group is much more widespread than previously interpreted in this region.

Whole-rock geochemical analysis, including major and trace elements, was performed on volcanic rocks from the measured sections and regional collections. The objective is to compare and contrast the geochemical character of samples recognized to be Early Jurassic to Middle Jurassic in age with those mapped as the Stuhini and Tsimshian groups.

PURPOSE
This project was originally designed to compare and contrast the Late Triassic Stuhini and the Middle Jurassic Tsimshian Groups to their significant volcanic lithology and coarser clastic lithology and to determine the Jurassic age of the Hazelton Group. Detrital zircon geochronology was undertaken to provide insights into the age, tectonic setting, and tectonic evolution of this part of the Stuhini terrane. However, geochronological results indicate that the rocks correlate with the Jurassic Hazelton Group. Therefore, lithostratigraphic characteristics identified through this project will be used to substitute for comparison to the younger Stuhini section to determine if the Jurassic Hazelton Group is more widespread in the Dease Lake region than originally interpreted.

LOCATION
(a) Location on the QCUST Northwest mapping – British Columbia Geological Survey Dease Lake Geoscience Project; (b) BC Geoscience map (after Massey et al., 2005); (c) detailed view of trap area at Dease Lake; (d) schematic stratigraphic, planar and structural relationships for Stuhini and Cache Creek terrane rocks within the trap area.

STRATIGRAPHY
Measured stratigraphic section north of the Cake Hill pluton, Skm east of Goat Pass

Grenville gray, anhydrous phryic flows and breccias. Flows are locally cataclastically deformed, contain angular, pebbles to boulder augite phryic clasts.

Grenville gray, matrix-supported, medium to coarse-grained volcanic lithic breccias with uncluted clasts of plagioclase, anhydrous phryic with a matrix of course-grained, subangular, lithic feldspathic arrete.

Gray and tan, thin to medium layer of a volcanic lithic breccia with matrix of coarse-grained, subangular, volcanic lithic feldspathic arrete that grades into a granular medium grained angular to subangular angular clastic arkose.

Gray, medium to thick bedded, tabular and laterally continuous, medium to coarse-grained, subangular, well sorted volcanic lithic feldspathic arrete interbedded with thin siltstone. Contains parallel laminations, cross stratification, rip up clasts, water escape structures, synsedimentary folds, and T-z Bouma sequences.

CONTACTS
Flows are locally columnar jointed; breccias contain angular, pebble to boulder augite porphyry clasts. Contains a distinct light gray, 5-7m parallel, tabular and laterally continuous siliceous tuff.

PETROLOGY
Siltstone/siltstone tough granular sandstone/siltstone coarse sandstone coarse grained sandstone to c格力 detrital zircon sample very approximate ammonite locale (Henderson and Perry, 1981)

PHENOCRYSTIC INTERPRETATIONS
• The development of sedimentary structures, including conglomerate beds, Bouma sequences, erosional surfaces and ripple top clay bands suggest relatively rapid deposition.
• The stratigraphic sequence is in a basaltic-upper crustal succession that grades from thin to medium bedded clastic arenites/pelite to coarse volcanic breccias. This sequence may represent a shallow-water depositional setting that accumulated in an anastomosing sedimentary system.
• The presence of volcanic tuff (subaqueously) and coarse volcanic breccias associated with contemporaneously identically related zr-arcs for forsteritic volcanic rocks.

PRELIMINARY INTERPRETATIONS
• Lithostratigraphy: This sequence is dominated by basaltic volcanic rocks inter-stratified with volcanic flows, volcanic debris flows and volcaniclastic fine sandstone and siltstone.

GEOCHEMISTRY
• Geochemical indication of mafic volcanism; the section is dominated by basaltic volcanic rocks interstratified with volcanic flows, volcanic debris flows and volcaniclastic fine sandstone and siltstone.

ACKNOWLEDGEMENTS
We would like to thank BCGS, Geoscience BC and many others for providing guidance and funding for the project. Pacific Western Helicopters Ltd. for safe and courteous flying. A special thanks to Mark Parks and the helpful staff at the University of Arizona-Lincoln Lab, and to Tom Taylor for excellent geochemical analyses.

REFERENCES