

**MAJOR-OXIDE AND TRACE-ELEMENT ANALYSES FOR ROCK SAMPLES
FROM THE HAINES-TAKSHANUK MOUNTAINS-CHILKAT PENINSULA
AREA STATEMAP PROJECT, SOUTHEAST ALASKA**

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MAJOR-OXIDE AND TRACE-ELEMENT ANALYSES FOR ROCK SAMPLES FROM THE HAINES-TAKSHANUK MOUNTAINS-CHILKAT PENINSULA AREA STATEMAP PROJECT, SOUTHEAST ALASKA

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INTRODUCTION

On December 2, 2020, a landslide triggered by an atmospheric river weather phenomenon at Beach Road in Haines, Alaska, claimed two lives. Numerous debris flows were also recorded around town during the same rain event, especially along Lutak Spur Road. As a response, the Haines-Takshanuk Mountains-Chilkat Peninsula area STATEMAP project's goal is to create an updated 1:50,000-scale geologic map in paper and digital GIS formats. A comprehensive, detailed map constructed using modern analytical methods is critical to help land managers and residents make informed decisions when planning future development and evaluating risks to infrastructure. During July 2022, May 2023, and August 2023, geologists from the Alaska Division of Geological & Geophysical Surveys (DGGS) conducted fieldwork supporting surficial and bedrock mapping (Truskowski and others, 2024). The project area includes portions of the Skagway A-1, A-2, B-1, B-2, and B-3 15-minute quadrangles, an area of approximately 300 square miles.

This report provides geochemical results from selected samples the bedrock mapping team collected. Digital data are available as comma-separated value (.csv) files from <https://doi.org/10.14509/31286> and the DGGS Alaska Geochemistry database, <https://maps.dggs.alaska.gov/geochem/index.html#search=RDF%202024-18>.

METHODS

Sample Collection

Rock Samples: We collected representative rock samples for whole-rock major-oxide and trace-element geochemistry to aid in the classification of rock units, correlation of units over the map area, and understanding of the tectonic setting.

Location data: We collected location data using GPS-enabled tablets and smartphones running the Esri Field Maps App, which has a reported error of approximately 10 m. Latitude and longitude are reported in the WGS84 datum.

Sample Preparation

DGGS staff trimmed samples before submission for analysis to remove any weathering rind or altered areas. Bureau Veritas Commodities Canada Ltd. Mineral Laboratories (BV Mineral Laboratories) processed the samples using their PRP70-250 package. The samples were crushed to greater than 70 percent passing 2 mm, and a 250 g split was pulverized to greater than 85 percent passing through a 75-micron screen.

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Analytical Methods

Major-oxide rock samples were analyzed by x-ray fluorescence (XRF) on a fused disc (BV Mineral Laboratories method XF700). A predetermined amount of sample is roasted to determine the loss on ignition (LOI). A second sample split is dried at 105 degrees C, and the sample is then fused in a platinum-gold crucible with a commercial lithium tetraborate flux. The molten material is cast in a platinum mold. The fused discs are analyzed by XRF.

Trace elements, including rare-earth elements, were determined using lithium metaborate fusion (BV Mineral Laboratories method LF100). The prepared sample is mixed with LiBO₂/Li₂B₄O₇ flux, and the sample and crucibles are fused in a furnace. The cooled bead is dissolved in ACS-grade nitric acid and analyzed by ICP and/or ICP-MS.

Ag, As, Au, Bi, Cd, Cu, Hg, Mo, Ni, Pb, Sb, Se, Tl, and Zn were determined by aqua regia digestion and ICP-ES (BV Mineral Laboratories method AQ200). The prepared sample is digested with a modified Aqua Regia solution of equal parts concentrated HCl, HNO₃, and DI H₂O for one hour in a heating block or hot water bath. The sample is made up to volume with dilute HCl and then analyzed by ICP-ES.

Total C and S were analyzed using IR Combustion (BV Mineral Laboratories method TC000) and are attributed to C and S occurring in all forms. Induction flux is added to the prepared sample and ignited in an induction furnace. A carrier gas sweeps up the released C and S, which are measured by adsorption in an infrared spectrometric cell.

In addition to BV Mineral Laboratories' accredited (ISO/IEC 17025) internal quality-control program, DGGs monitored analysis quality with one reference-material standard per batch of 20 analyses.

For each sample, data tables contain either assay values or coded-value placeholders (null = not analyzed; -1 = the element's assay result is less than the lower detection limit for the method; -2 = the element's assay result is greater than the upper detection limit for the method). The detection limits for each reported elemental value obtained by the various methods are documented in the metadata file.

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