MAJOR-OXIDE AND TRACE-ELEMENT ANALYSES OF ROCK SAMPLES FROM THE WEST SUSITNA AREA STATEMAP PROJECT, COOK INLET, ALASKA

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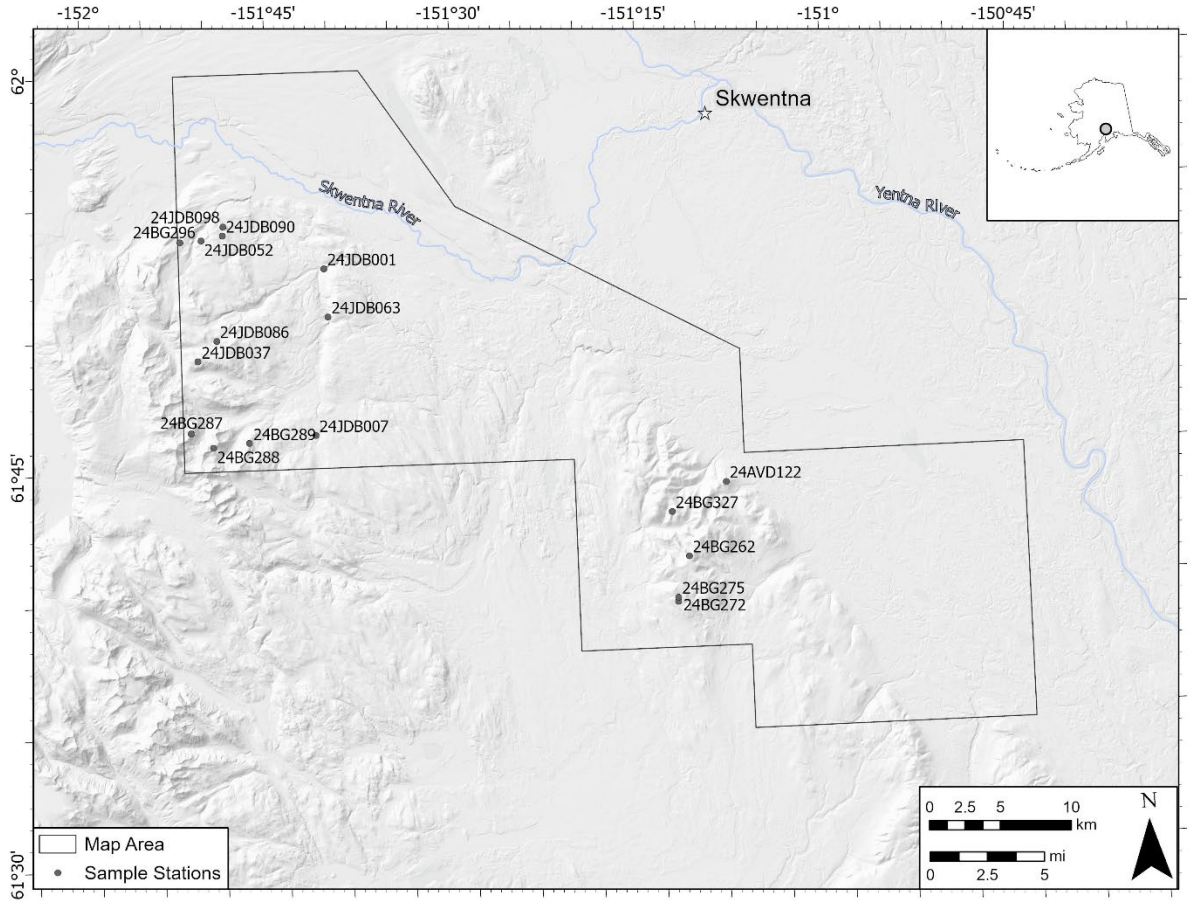
Raw Data File 2025-21



Location map of samples selected for major-oxide and trace-element analysis for the West Susitna STATEMAP project.

This report has not been reviewed for technical content or for conformity to the editorial standards of DGGS.

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MAJOR-OXIDE AND TRACE-ELEMENT ANALYSES OF ROCK SAMPLES FROM THE WEST SUSITNA AREA STATEMAP PROJECT, COOK INLET, ALASKA

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INTRODUCTION

This data release provides whole-rock geochemical analyses, including major-oxide and trace-element concentrations, from bedrock samples that DGGS staff collected during the 2024 field season as part of the Alaska Division of Geological & Geophysical Surveys' (DGGS) West Susitna STATEMAP project. The project is a 1:50,000-scale geologic mapping initiative to characterize geology, assess geologic hazards, and investigate tectonic features within a region of increasing interest for resource development, alternative energy, and recreation. The study area lies in the West Susitna region of southcentral Alaska. It spans approximately 500 mi^2 across the Tyonek C-3, C-4, D-4, and D-5 quadrangles, including ~50 miles of the proposed West Susitna Access Corridor that connects Anchorage to the Happy River Valley on the western margin of the Susitna Basin. Major- and trace-element geochemical analyses were obtained for plutonic and volcanic rocks to define map units and determine the magmatic history of the area. These data are provided as a Raw Data File under an open end-user license and are available on the DGGS website: https://doi.org/10.14509/31725. The DGGS photo database provides images of each sample https://maps.dggs.alaska.gov/photodb/#show=24&search=RDF%202025-21.

METHODS

Sample Collection

DGGS staff collected fist-sized rock specimens for whole-rock major-oxide and trace-element geochemical analysis to support lithologic classification, unit correlation, and interpretation of the regional tectonic framework. They selected the least altered exposures at each site to ensure representative geochemical signatures. Staff recorded geographic coordinates for sample stations using GPS-enabled tablets and smartphones running the ESRI Field Maps application, which typically provides positional accuracy within approximately 10 meters. All location data are reported in latitude and longitude using the NAD83 datum.

Sample Preparation

Before submission, DGGS staff trimmed samples using a rock saw to remove weathering rinds and altered areas. ALS Geochemistry then processed the samples using their PREP-31 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 75 microns. The pulverizers were cleaned with "barren" material between sample processing.

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Analytical Methods

ALS Geochemistry analyzed the samples for major and trace element suites using the following techniques.

- Trace elements, including rare-earth elements, were determined using lithium metaborate fusion digestion and ICP-MS (ALS Geochemistry method ME-MS81).
- Major and minor oxides were analyzed by lithium metaborate fusion digestion and ICP-AES (ALS Geochemistry method ME-ICP06).
- Ag, Cd, Co, Cu, Li, Mo, Ni, Pb, Sc, and Zn were determined by four-acid digestion and ICP-AES (ALS Geochemistry method ME-4ACD81).
- As, Bi, Hg, In, Re, Sb, Se, Te, and Tl were determined by aqua regia digestion followed by ICP-MS (ALS Geochemistry method ME-MS42).
- Total carbon and sulfur concentrations were measured using a Leco furnace, following ALS Geochemistry methods C-IR07 and S-IR08, respectively.

Alongside ALS Geochemistry's ISO/IEC 17025-2005 accredited internal quality-control procedures, DGGS ensured analytical accuracy by including one standard reference material for every batch of 10 samples.

For each sample, the data tables provide 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 accompanying digital data list the detection limits for each reported elemental value obtained by the various techniques.

ACKNOWLEDGMENTS

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