MAJOR-OXIDE AND TRACE-ELEMENT GEOCHEMICAL DATA FROM ROCKS COLLECTED IN 2019 FOR THE EASTERN TANACROSS PROJECT, TANACROSS AND PART OF NABESNA QUADRANGLES, ALASKA

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Raw Data File 2019-8

2019
STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS

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Suggested citation:
Wypych, Alicja, Twelker, Evan, Athey, J.E., Newberry, R.J., Lopez, J.A., Regan, S.P., Sicard, K.R., Wildland, A.D., and Wyatt, W.C., 2019, Major-oxide and trace-element geochemical data from rocks collected in 2019 for the Eastern Tanacross project, Tanacross and part of Nabesna quadrangles, Alaska: Alaska Division of Geological & Geophysical Surveys Raw Data File 2019-8. http://doi.org/10.14509/30267

MAJOR-OXIDE AND TRACE-ELEMENT GEOCHEMICAL DATA FROM ROCKS COLLECTED IN 2019 FOR THE EASTERN TANACROSS PROJECT, TANACROSS AND PART OF NABESNA QUADRANGLES, ALASKA

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INTRODUCTION

During the 2019 field season, geologists from the Alaska Division of Geological & Geophysical Surveys (DGGS) conducted 1:100,000-scale geologic mapping and sampling of a 1,900-square-mile area of the eastern Tanacross Quadrangle. The area lies approximately 15 miles east of Tok and 12 miles north of Northway, Alaska. The area is of present and historical interest for its potential mineral resources, including porphyry copper-molybdenum-gold, intrusion-related gold, volcanogenic massive sulfides, and rare-earth-element-enriched mineralization. It encompasses prospects including Oreo, Ladue, Pushbush, Honks, Goodrich, and Mount Fairplay. The majority of the area was previously mapped at reconnaissance 1:250,000 scale by the U.S. Geological Survey during the 1960s (Foster, 1970). The purpose of this DGGS project is to produce a more accurate and modern geologic map and supporting data that will promote critical and other mineral discoveries in eastern Interior Alaska.

Highlights of this DGGS eastern Tanacross geochemical report include identification, sampling, and characterization of the Oreo and Pushbush prospects as well as the Ladue, Move, Honks, and Mount Fairplay occurrences. This dataset includes six samples with gold in excess of 0.030 parts per million (ppm) in several different locations, including a sample with 0.068 ppm Au (19JEA004) collected near Honks, a sample with 0.064 ppm Au (19RN359) from a silicified and tourmaline- and pyrite-altered dike near Mount Fairplay, and a sample with 0.063 ppm Au and 35.8 ppm Ag (19TJN005) collected about half a mile northeast of Move. Additionally, a sample from a tourmaline-altered dike from a road cut near Mount Fairplay has 66.9 ppm Ag (19RN372), and a sample of a tourmaline-altered wall rock surrounding the dike contains 26.7 ppm Ag and 1,220 ppm Pb (19RN371). Samples collected at Mount Fairplay are particularly enriched in rare earth elements (REE), reaching almost 1,000 ppm total REE (samples: 19KS368, 19AW318). The DGGS map area includes Mississippian to Permian metasedimentary and metavolcanic rocks, as well as Cretaceous to Tertiary intrusive and volcanic rocks. Major- and trace-element geochemistry was obtained for metamorphic rocks to help distinguish between igneous and sedimentary protoliths, and for igneous rocks to characterize and differentiate Mesozoic and Cenozoic magmatic events in the area.

The analytical data tables associated with this report are available in digital format as comma-separated value (CSV) files. All files can be downloaded from the DGGS website http://doi.org/10.14509/30267.

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All samples collected during this project, as well as laboratory sample pulps, will be stored at DGGS for the duration of the project and will be available for public viewing upon request. Once the project concludes, the samples and pulps will be stored at the Geological Materials Center in Anchorage, Alaska.

DOCUMENTATION OF METHODS

SAMPLE COLLECTION

Rock samples were collected for two different purposes. First, samples of visibly mineralized or altered rock were preferentially collected and analyzed for trace-element geochemistry. Second, igneous and metaigneous rocks showing little alteration or weathering were collected for whole-rock major-oxide, minor-oxide, and trace-element analyses to aid in classification and study of petrogenesis and tectonic setting. Most samples are 'grab' samples, which were collected for their overall representation of the outcrop. However, a few samples are 'select' samples, which were more deliberately collected from a specific feature, as noted in the sample's field description.

Location data were collected using GPS-enabled tablets or phones running the ESRI Collector App. Data were merged into an ArcGIS geodatabase. The devices have a reported error of about 10 m. Latitude and longitude are reported in the WGS84 datum.

SAMPLE PREPARATION

Rock samples were processed by ALS Geochemistry 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. After each sample crushing the pulverizers were cleaned with "barren" material. Prior to crushing, samples for whole-rock analysis were trimmed with a rock saw by DGGS staff to remove weathering.

ANALYTICAL METHODS

Samples were analyzed for a variety of suites of major and trace elements depending on the sample type. In addition to ALS Geochemistry's accredited (ISO/IEC 17025–2005) internal quality-control program, DGGS monitored analysis quality with one standard reference material per batch of 20 analyses.

A. Major- and trace-element values for rock samples were determined by ALS Geochemistry method ME-MS61: Four-acid digestion followed by inductively-coupled plasma–atomic emission spectrometry (ICP-AES) and inductively-coupled plasma–mass spectroscopy (ICP-MS); Au values were analyzed using flux digestion and fire assay and ICP-AES (ALS Geochemistry method Au-ICP21).

B. For whole-rock geochemistry samples, major and minor oxides were analyzed by lithium metaborate fusion digestion and ICP-AES (ALS Geochemistry method ME-ICP06). Trace elements, including rare-earth elements, were determined using lithium metaborate fusion digestion and ICP-MS (ALS Geochemistry method ME-MS81). 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); and 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 C and S were analyzed by Leco furnace (ALS Geochemistry methods C-IR07 and S-IR08, respectively).

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). Detection limits for each of the reported elemental values obtained by the various methods are documented in the metadata file.

ACKNOWLEDGMENTS

The DGGS Eastern Tanacross project was funded by State of Alaska general funds and the U.S. Geological Survey under Cooperative Agreement No G19AC00262.

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Foster, H.L., 1970, Reconnaissance geologic map of the Tanacross Quadrangle, Alaska: U.S. Geological Survey Miscellaneous Geologic Investigations Map 593, 1 sheet, scale 1:250,000.