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Abraham M. Emond, MPX Geophysics Ltd., Mark Baigent, Logan A. Fusso,
and Eric I. Petersen

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EAGLE AIRBORNE MAGNETIC AND RADIOMETRIC GEOPHYSICAL SURVEY, ALASKA

Abraham M. Emond¹, MPX Geophysics Ltd.², Mark Baigent³, Logan A. Fusso⁴, and Eric I. Petersen⁴

ABSTRACT

The Eagle airborne magnetic and radiometric geophysical survey covers parts of the Charley River, Eagle, and Tanacross quadrangles near Eagle, Alaska (fig. 1). Magnetic and radiometric data were collected with a fixed-wing aircraft May 24 to June 27, 2021 by MPX Geophysics LTD. A total of 26,926 line kilometers were collected covering 9,731 square kilometers. The magnetometer was mounted to a rear-facing fixed boom (“tail stinger”). The radiometric crystals were located in the cabin of the aircraft. The Eagle survey was flown with a line spacing of 400 meters and a mean ground clearance of 330 meters.

We updated this dataset in 2025 to refine processing, removing artifacts and excess noise present in the final products provided by the original contractor. The raw data were reprocessed by Baigent Geosciences. The International Geomagnetic Reference Field correction was recalculated accounting for aircraft height and the data were relevelled using Baigent Geosciences software. A complete and detailed report on the reprocessing steps undertaken is included in the publication documents. The result of the reprocessing is that leveling artifacts have been removed and the data now display finer features, including well-defined lineaments and other anomalies which were not present in the original contractor grids. The data and metadata are available from the Alaska Division of Geological & Geophysical Surveys website at <https://doi.org/10.14509/31694>.

PURPOSE

The data from the Eagle airborne magnetic and radiometric geophysical survey will improve the understanding of the geology and mineral potential of the area, promote resource exploration, and be a part of the continuous regional magnetic data coverage of the Yukon Tanana Uplands.

SURVEY OVERVIEW DESCRIPTION

This document provides an overview of the survey and includes text and figures of select primary and derivative products for this survey. A list of available data packages (Table 1) provided to assist users in data selection. For reference, a catalog of the available maps (Table 2) is presented in reduced resolution. Please consult the metadata, project report, and digital data packages for more information and data.

¹ Aqua Geo Frameworks, 10848 Ridge Road, Fort Laramie, Wyoming 82212; *formerly DGGs*

² 45 Cranfield Rd Unit 16, East York, Ontario M4B 3H6, Canada

³ Baigent Geosciences Pty. Ltd., 59 Draycott Loop, Canning Vale, Western Australia, Australia 6155

⁴ Alaska Division of Geological & Geophysical Surveys, 3651 Penland Pkwy, Suite 135, Anchorage, AK 99508

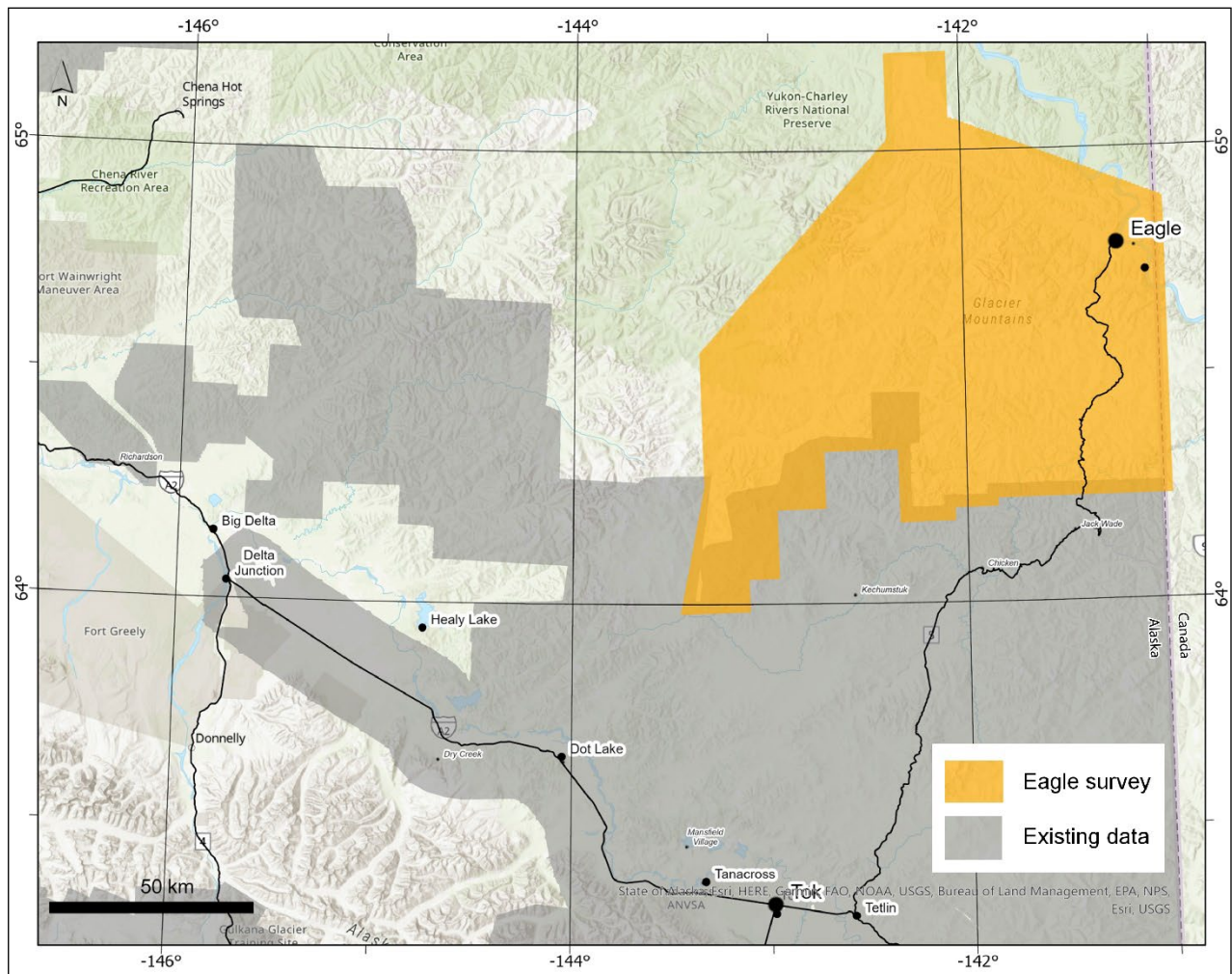


Figure 1. Top. The Eagle airborne magnetic and radiometric survey, Alaska, location map with nearby towns. Right. The Eagle airborne magnetic and radiometric survey, Alaska, location shown in Interior Alaska with relevant 1:250,000-scale quadrangles.



TABLE 1: AVAILABLE DATA

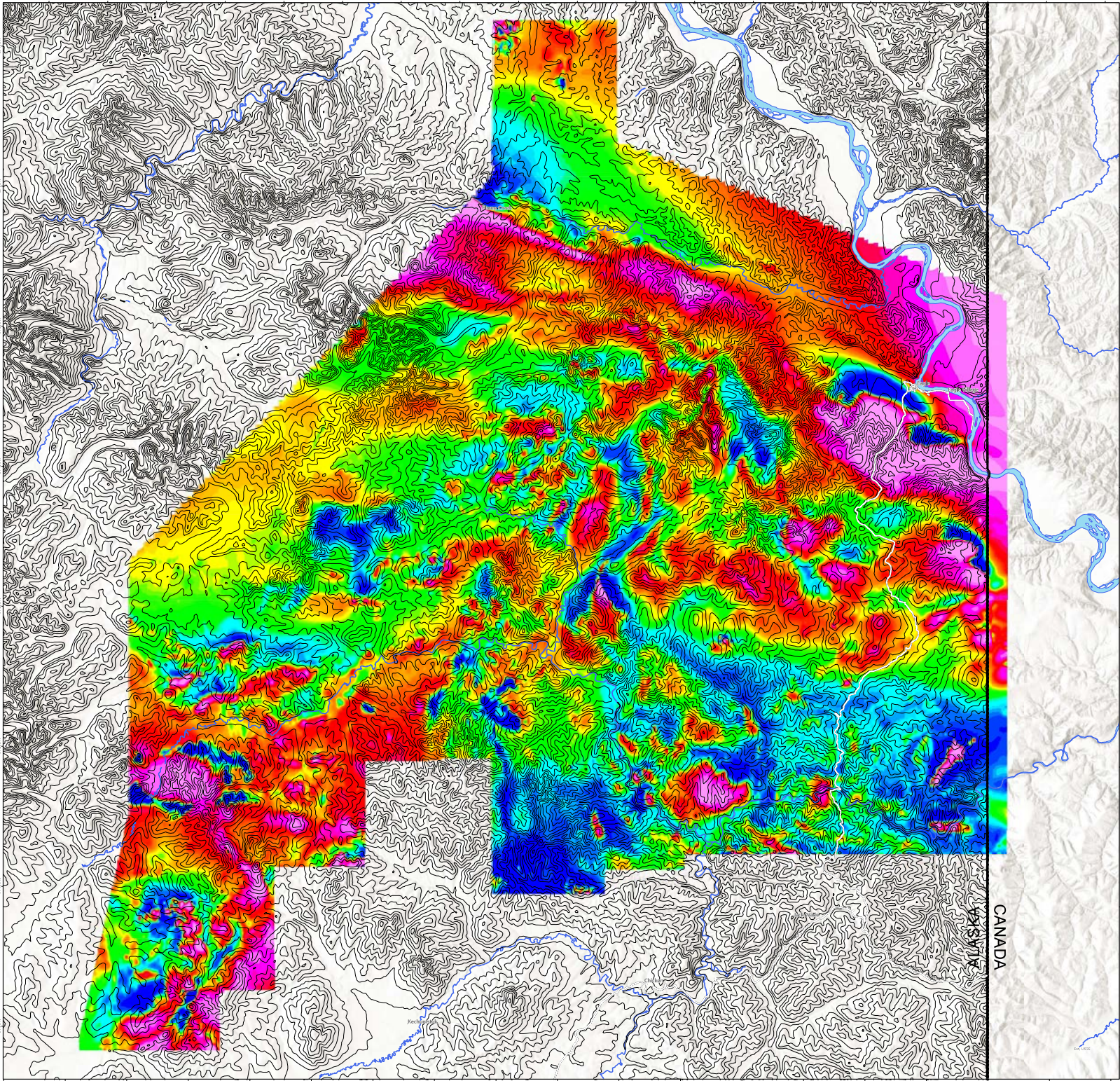
Data Type	Provider	Description
ascii_data	contractor	ASCII format line data, other ASCII data
databases_geosoft	contractor	Geosoft format database of final line data, other Geosoft format databases
documents	contractor	Project report, calibration reports
grids_geosoft	contractor	Oasis montaj Geosoft GRD format gridded data
grids_tif	DGGS	Geographically registered data value rasters of gridded data, GeoTiff format
maps_pdf_format	contractor	Printable and geographically registered maps in pdf format. Compatible with mobile device navigation and desktop mapping applications
video_flightpath	contractor	Survey flight path downward facing video
vector_data	contractor	Line path and survey boundary in Esri shapefile (shp) format

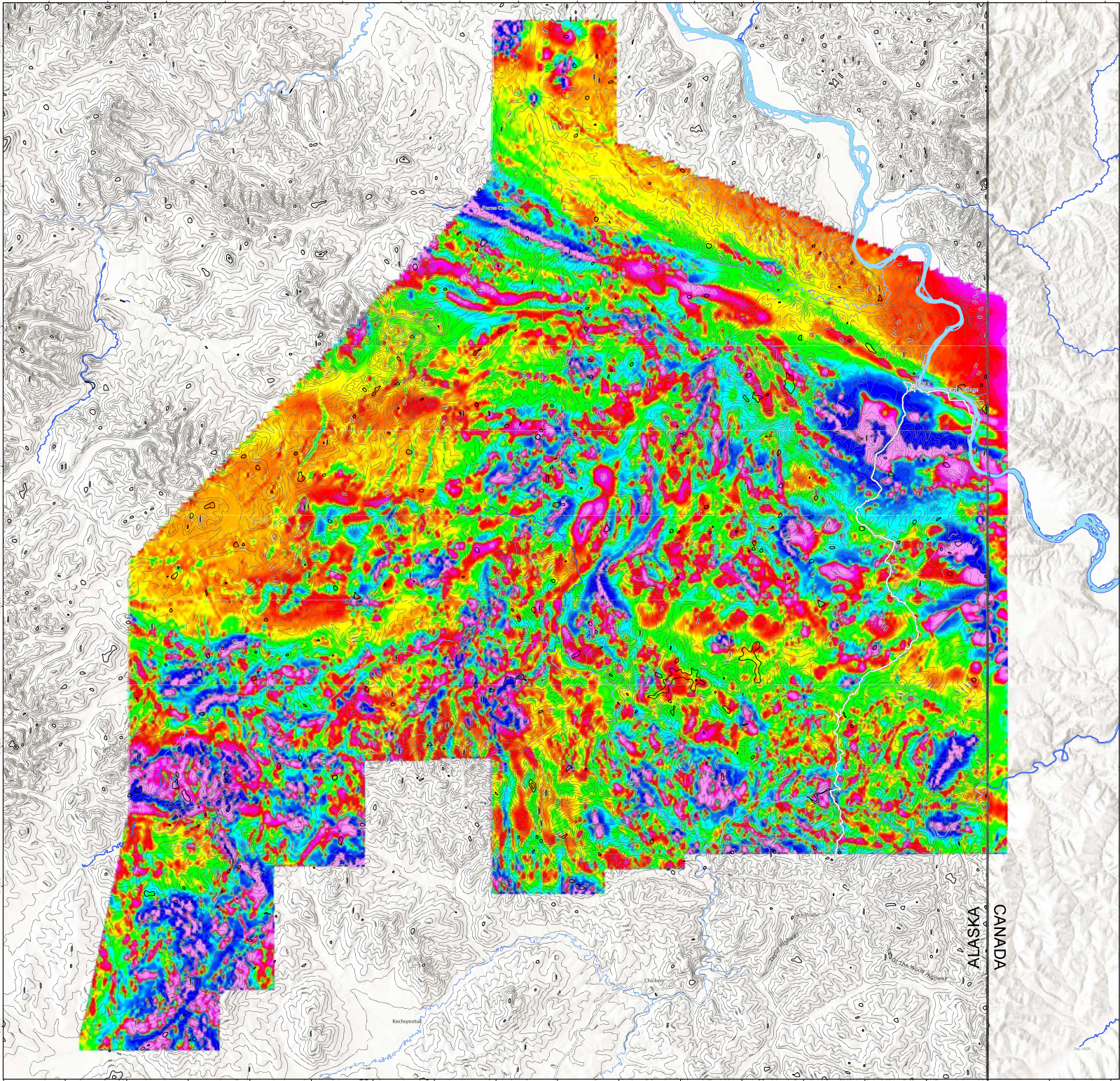
Table 2. The contractor-provided maps are made available as Portable Document Format (*.pdf) formats at a resolution of 300 dpi. All use WGS84 datum and UTM zone 6N projection. Copies of the following maps are included at the end of this booklet. The low-resolution, page-size maps included in this booklet are intended to be used as a search tool and are not the final product. Large-scale, full-resolution versions of each map are available to download on this publication's citation page: <https://doi.org/10.14509/31693>. All maps have a USGS topographic map basemap.

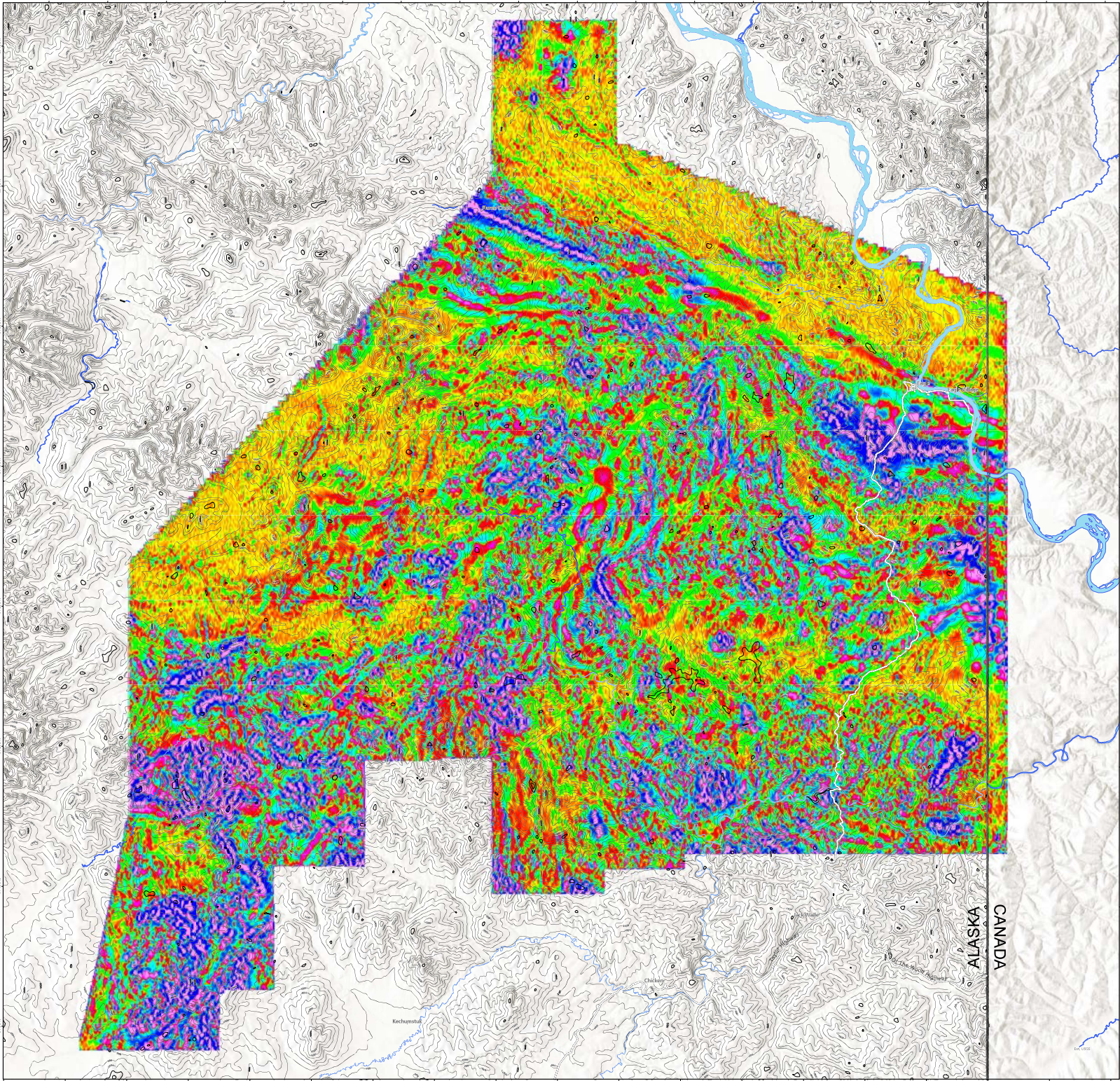
Map Title	File Name
Flight path	eagle_flightpath.pdf
Magnetics	
Analytic Signal	eagle_mag_analyticsignal.pdf
Calculated 1st Vertical Derivative	eagle_mag_c1vd.pdf
Calculated 2nd Vertical Derivative	eagle_mag_c2vd.pdf
Residual Magnetic Intensity	eagle_mag_residual.pdf
Tilt Derivative	eagle_mag_tiltderivative.pdf
Radiometrics	
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Uranium	eagle_rad_equiv_u.pdf
Potassium	eagle_rad_pct_k.pdf
Ratio Thorium/Potassium	eagle_rad_ratio_th_k.pdf
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Total Air Absorbed Dose Rate	eagle_rad_tadr.pdf
Ternary Map	eagle_rad_ternary.pdf

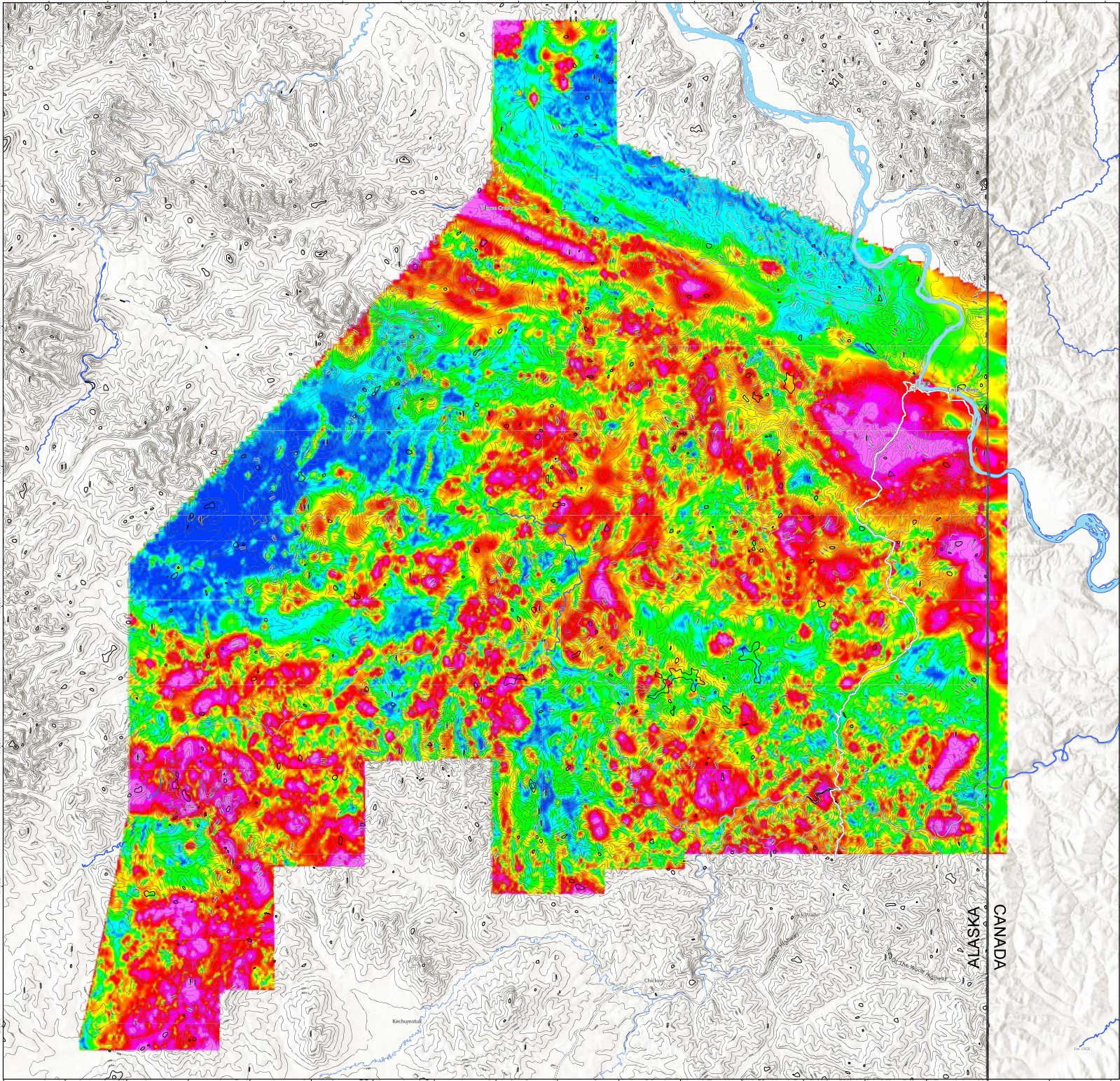
ACKNOWLEDGMENTS

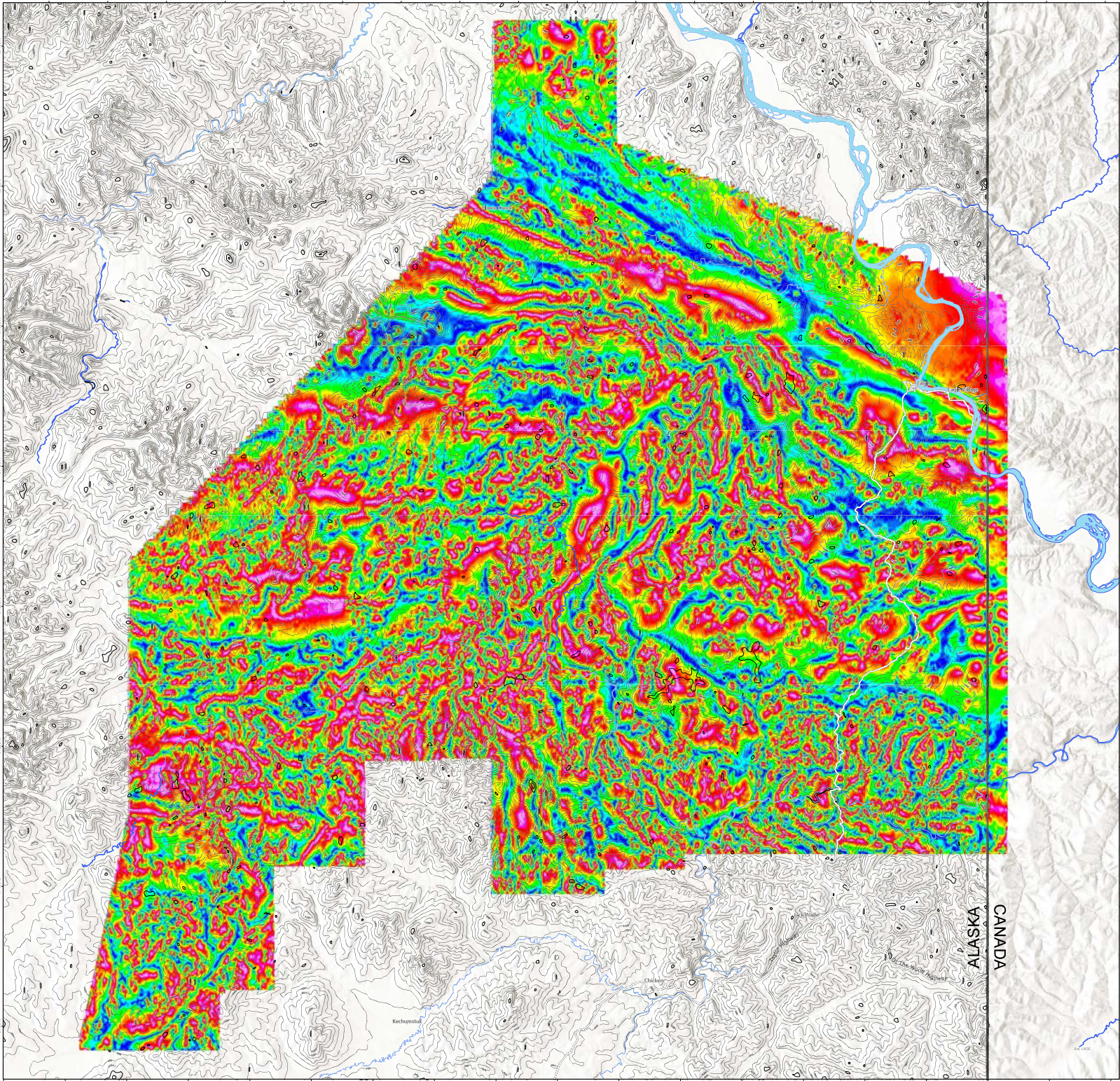
This work was supported by the Bureau of Land Management grant L18AC00019 and the U.S. Geological Survey's Earth MRI program grant G20AC00160. Reprocessing efforts were supported by the State of Alaska, capital improvement project funds. The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. Government.

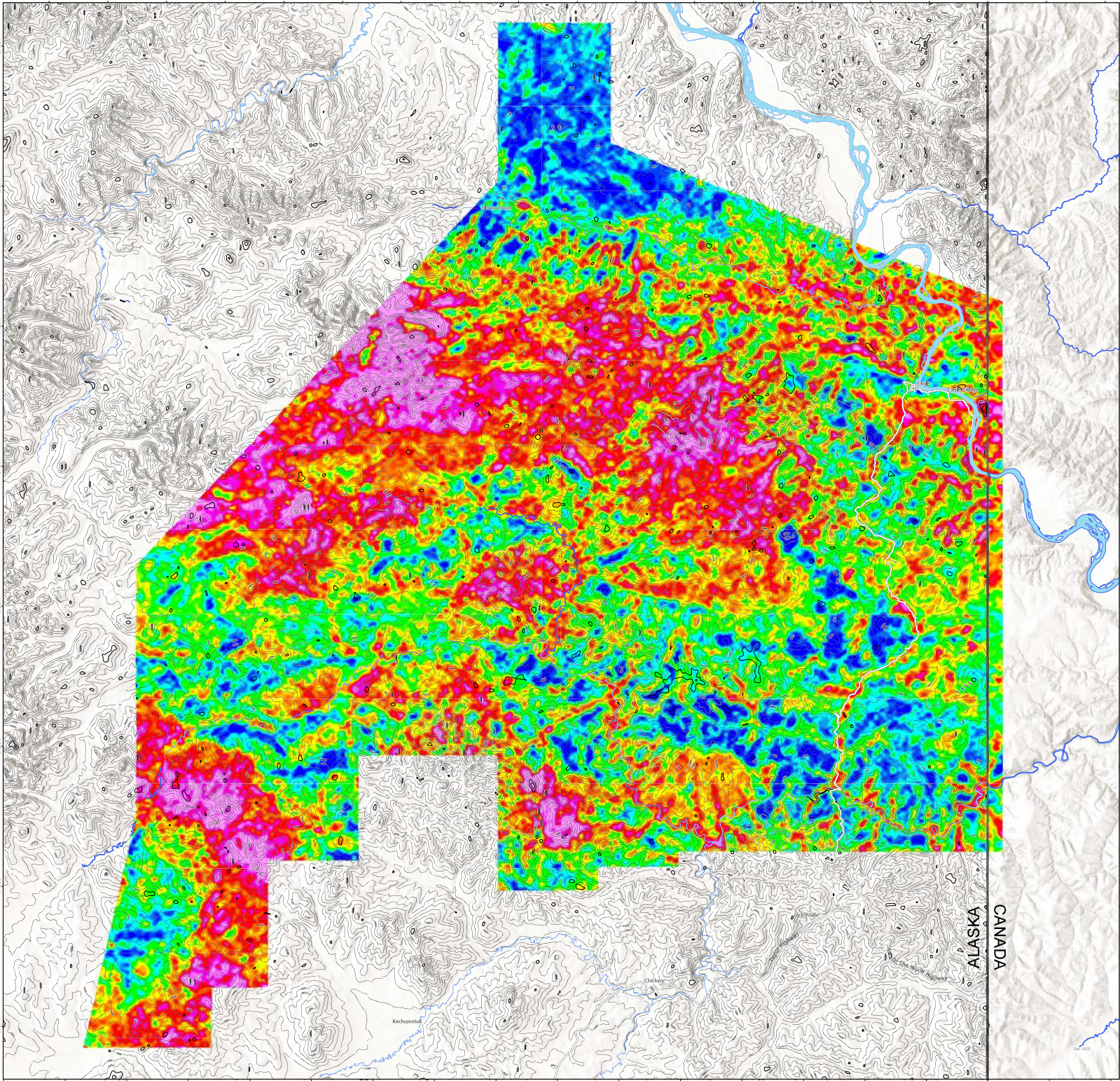


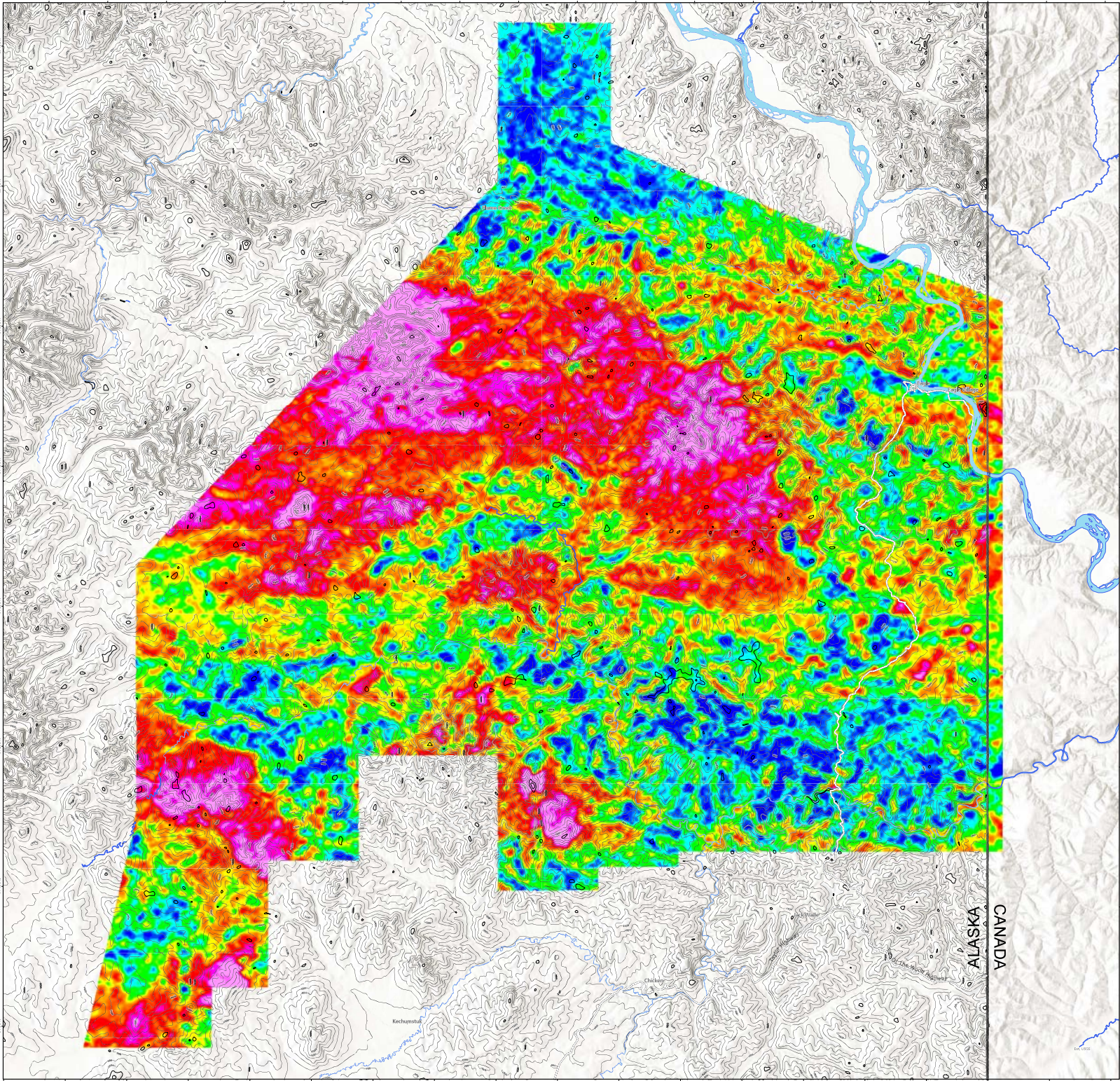


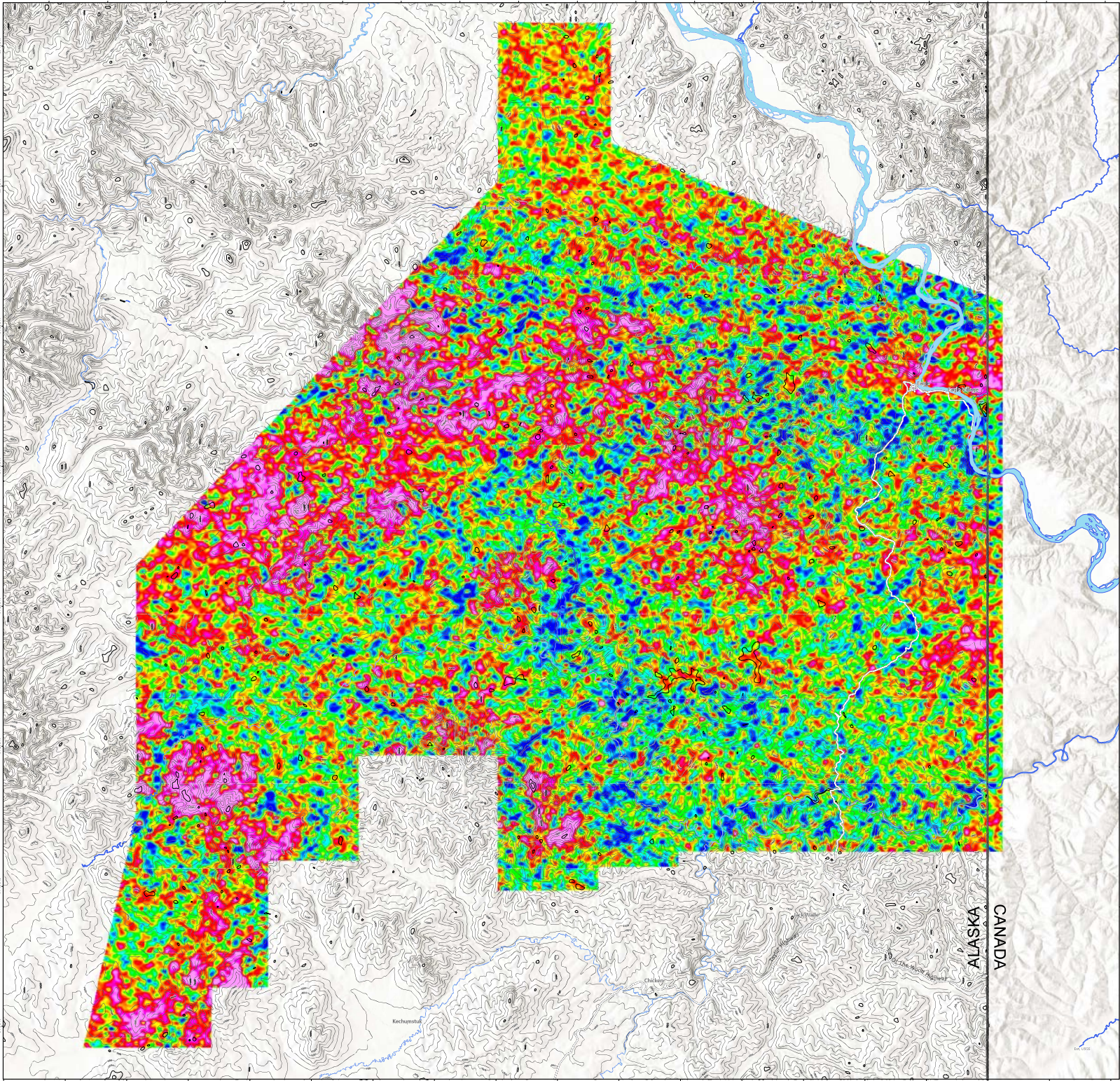












Uranium
Eagle airborne magnetic and radiometric geophysical survey
by
Emond, A.M.¹, MPX Geophysics LTD.², Baigent, M.³, Fusco, L.¹, and Petersen, E.¹
2021 (updated 2020)

Uranium (ngU ppm)
3.47 6.17 6.21 6.40 6.47 6.53 6.58 6.64 6.69 6.76 6.83 6.93 7.08 9.30

Basemap streams and waterbodies from:
National Hydrography Dataset, U.S. Geological Survey, Reston, Virginia, 2002–2016
Basemap hillshade from:
ESRI Basemap - ESRI, USGS
Basemap contours from:
U.S. Geological Survey, EROS Data Center, 2013.
Digital elevation - Interferometric Synthetic Aperture Radar (IFSAR) - Alaska
Projection:
Universal Transverse Mercator Zone 7N
Datum:
NAD 83
Cartography by:
E.I. Petersen and A.E. Macpherson (2020)

STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS
1000 College Road • Fairbanks, Alaska 99775
Phone: 907-451-6100 • Fax: 907-451-6000
Email: alaska@alaska.gov • Website: alaska.gov

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Attribution:
¹Alaska Division of Geological & Geophysical Survey, 2024 College Road, Fairbanks, AK 99709
²Alaska Division of Geological & Geophysical Survey, 2024 College Road, Fairbanks, AK 99709
³MPX Geophysics LTD, 3010 Terry Road, Fairbanks, Alaska, 99709
⁴Baigent Geosciences, 59 Graydon Loop, Cairn Valley, Western Australia, Australia 6155

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