

Kuskokwim airborne magnetic and radiometric survey, Aniak and the Little Taylor Mountains, Alaska

Logan A. Fusso, Eric I. Petersen, and Terraquest LTD.

GPR 2026-5



The runway at Bethel, Alaska airport, which was inaccessible due to snow during a late-season storm, temporarily grounding Terraquest's King Air C-90.

The Geophysical Report (GPR) series provides airborne survey data, maps, acquisition details, and occasionally limited interpretive modeling. These publications are reviewed for clarity and consistency but do not undergo technical peer review.

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Kuskokwim airborne magnetic and radiometric survey, Aniak and the Little Taylor Mountains, Alaska

Logan A. Fusso¹, Eric I. Petersen¹, and Terraquest LTD.²

INTRODUCTION

The Aniak and Little Taylor Mountains segments of the Kuskokwim airborne magnetic and radiometric geophysical survey cover parts of the Russian Mission, Sleetmute, Bethel and Taylor Mountains quadrangles of southwestern Alaska (fig. 1). Terraquest Ltd. collected magnetic and radiometric data with a King Air C-90 from June 12 to November 8, 2025; aircraft maintenance caused a pause in survey activities from June 28 through September 9, 2025. A total of 20,090.5 line kilometers were accepted by DGGs, covering 6,957 km². Magnetic data were collected with a Geometrics Inc G-822A cesium-vapour magnetometer; radiometric data were collected with two (2) Radiation Solutions RS-500 series multi-channel gamma-ray spectrometers, model RS 500, with 512 channels, for a total crystal volume of 33.6 liters downward-looking and 8.4 upward-looking (for atmospheric radon detection). The survey was flown with a line spacing of 400 meters (m) and a nominal ground clearance of 100 m.

The data from this survey will improve understanding of the geology and mineral potential and support resource exploration of the central Kuskokwim River region of Alaska. These data and accompanying discussion are released as a DGGs Geophysical Report and are available from the DGGs website at <https://doi.org/10.14509/32087>.

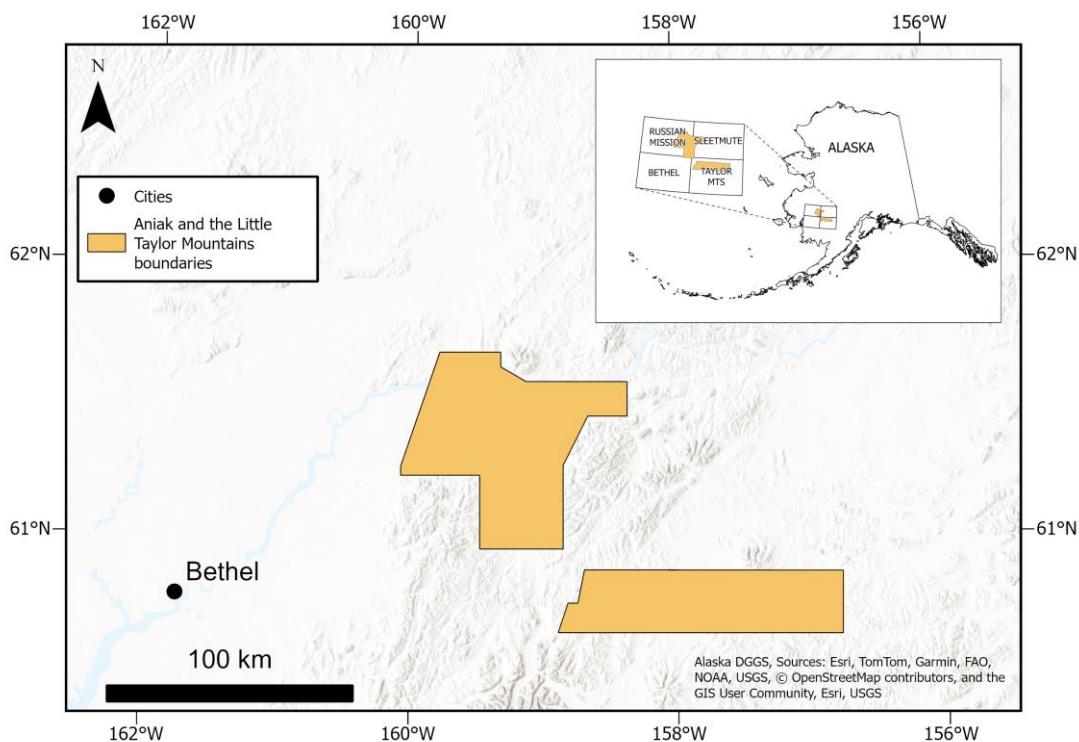


Figure 1. Regional map of survey area. (Inset) Survey location within Alaska with the relevant 1:250,000-scale quadrangles labeled.

¹ Alaska Division of Geological & Geophysical Surveys, 3354 College Road, Fairbanks, AK 99709

² Terraquest LTD. 301-2900 John St, Markham, Ontario, L3R 5G3, Canada

DATA PRODUCTS

This document provides an overview of the survey and includes text and figures of selected primary and derivative products. Table 1 lists available data packages. Table 2 provides a catalog of full-scale maps available for download. Please consult the metadata, project report, and digital data packages for more information and data.

Table 1. Data available for download

| Data Package | Description |
|-------------------|--|
| ascii_data | ASCII format line data, other ASCII data |
| databases_geosoft | Geosoft format database of final line data, other Geosoft format databases |
| documents | Project report, calibration reports |
| grids_geosoft | Oasis montaj Geosoft GRD format gridded data |
| grids_tif | Geographically registered data value rasters of gridded data, GeoTiff format |
| kmz | Kmz file containing grids registered for viewing in Google Earth or similar |
| maps_pdf | Printable and geographically registered maps in PDF format |
| vector_data | Line path and survey boundary in Esri shapefile (shp) format |

Table 2. Full-scale printable maps are available in Portable Document Format (*.pdf) with a resolution of 300 dpi. See Appendix A for previews of these maps in reduced-resolution page-sized format. The page-sized format is intended for reference and search purposes only.

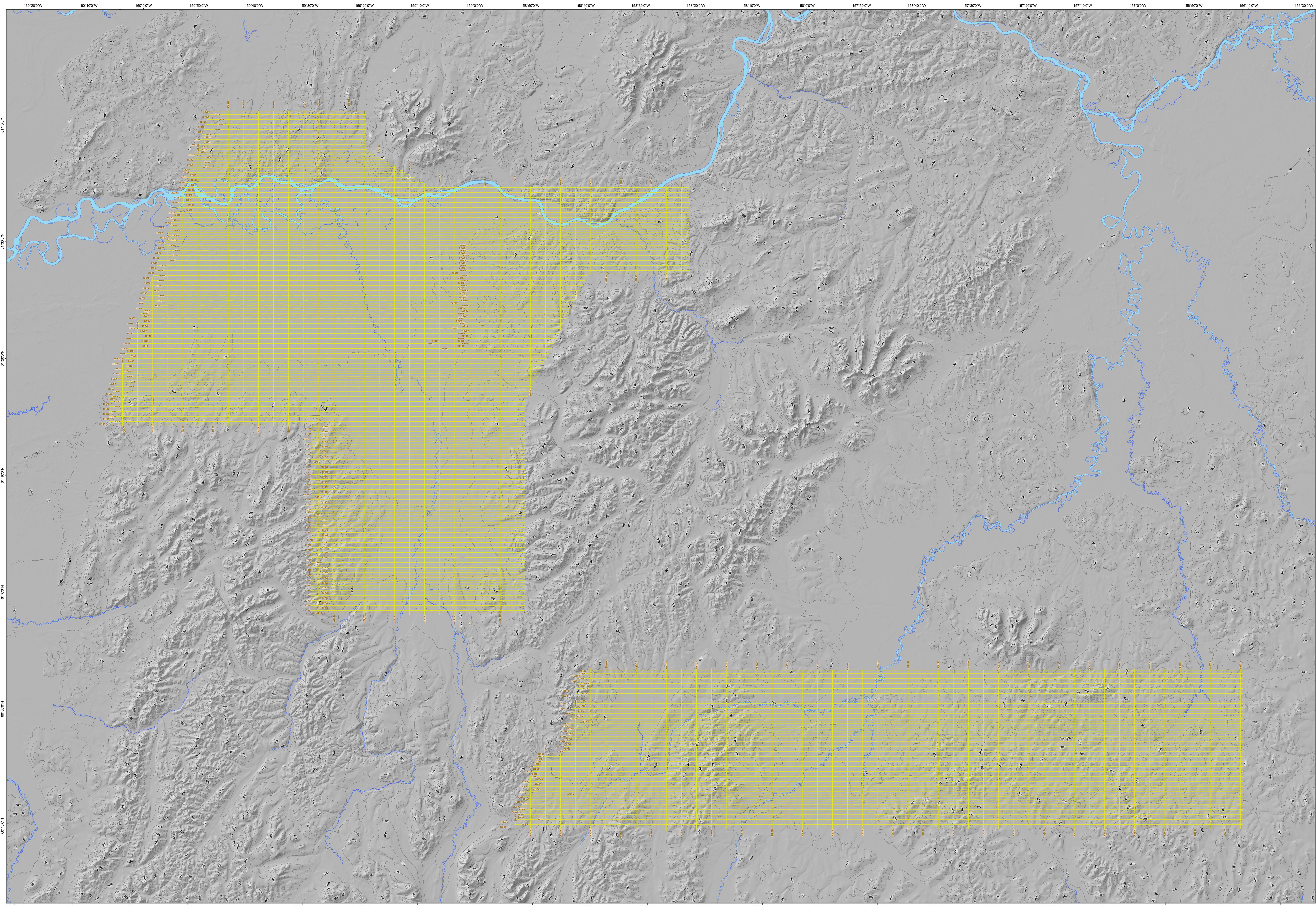
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|------------------------------------|-----------------------------------|
| Flight path | aniak_ltm_flightpath.pdf |
| Magnetics | |
| Analytic Signal | aniak_ltm_mag_analyticssignal.pdf |
| Calculated 1st Vertical Derivative | aniak_ltm_mag_c1vd.pdf |
| Calculated 2nd Vertical Derivative | aniak_ltm_mag_c2vd.pdf |
| Residual Magnetic Intensity | aniak_ltm_mag_residual.pdf |
| Tilt Derivative | aniak_ltm_mag_tiltderivative.pdf |
| Radiometrics | |
| Thorium | aniak_ltm_rad_equiv_th.pdf |
| Uranium | aniak_ltm_rad_equiv_u.pdf |
| Natural Air Absorbed Dose Rate | aniak_ltm_rad_naadr.pdf |
| Potassium | aniak_ltm_rad_pct_k.pdf |
| Ratio Thorium/Potassium | aniak_ltm_rad_ratio_th_k.pdf |
| Ratio Uranium/Potassium | aniak_ltm_rad_ratio_u_k.pdf |
| Ratio Uranium/Thorium | aniak_ltm_rad_ratio_u_th.pdf |
| Ternary Map | aniak_ltm_rad_ternary.pdf |

ACKNOWLEDGMENTS

This work was funded by the United States Geological Survey Earth Mapping Resources Initiative (Earth MRI) grants G23AC00408 and G24AC00629. The views and conclusions contained in this document are those of the authors and should not be interpreted as representing the opinions or policies of the U.S. Geological Survey. Mention of trade names or commercial products does not constitute their endorsement by the U.S. Geological Survey.

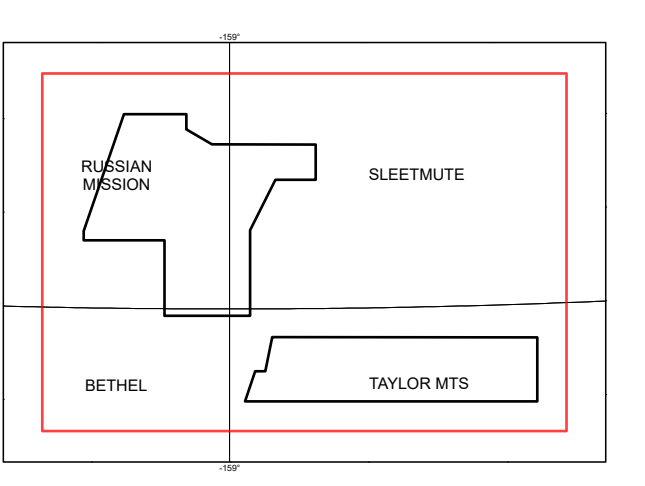
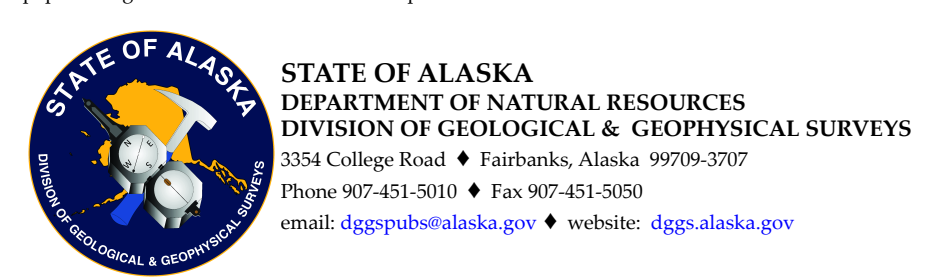


APPENDIX A: PREVIEW MAPS



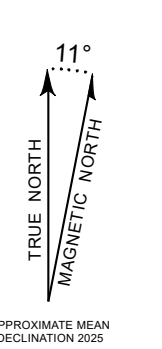
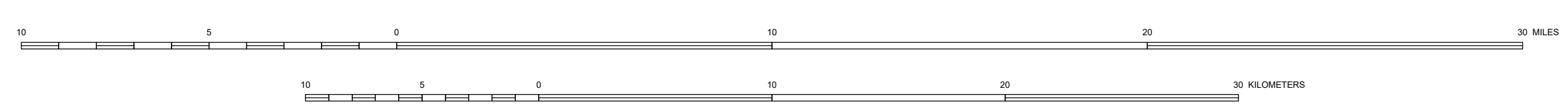
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Flightpath
Kuskokwim airborne magnetic and radiometric survey, Aniak and the Little Taylor Mountains, Alaska

by
Fusso, L.A.¹, Petersen E.L.¹, and Terraquest Ltd.²
2026



— Flight Paths, Survey Line Number Labeled

Note: All survey line numbers are shown. Survey line numbers are displayed at the start of each line, indicating the direction flown. Note that in some cases multiple lines may be oriented along the same line of latitude or longitude, one picking up where the previous line ended. This could be due to incident weather causing magnetic diurnals during collection; or flight paths flown out of contact specification requiring a re-flight.

This work was supported the United States Geological Survey Earth Mapping Resources Initiative (Earth MRI) grants G23AC00408 and G24AC00629.

Basemap streams and waterbodies from:
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Basemap hillshade from:
ESRI Basemaps - ESRI, USGS

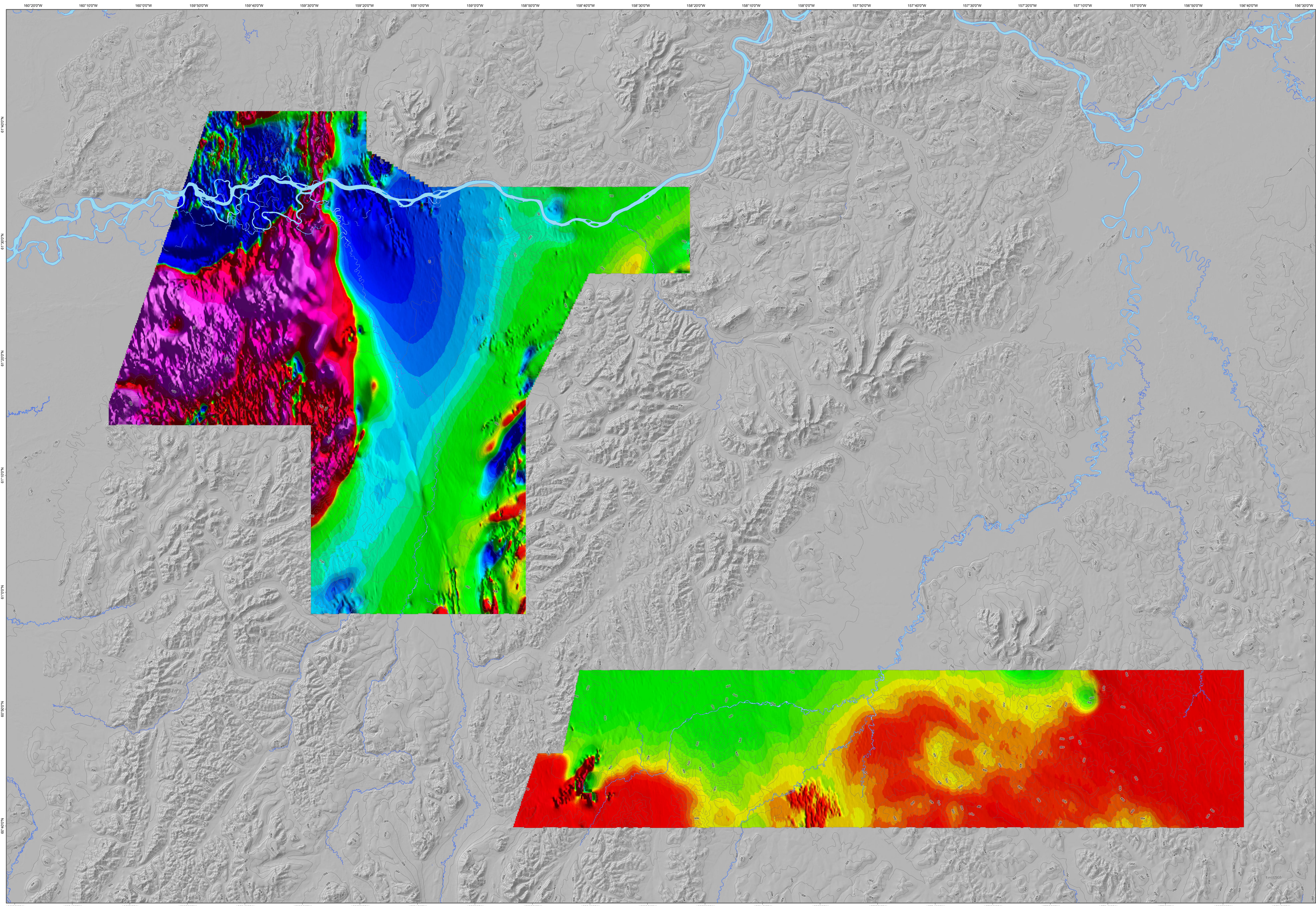
Basemap contours from:
U.S. Geological Survey, EROS Data Center, 2013, Digital elevation - Interferometric Synthetic Aperture Radar (IFSAR) - Alaska

Projection:
Universal Transverse Mercator Zone 4N

Datum:
WGS 1984

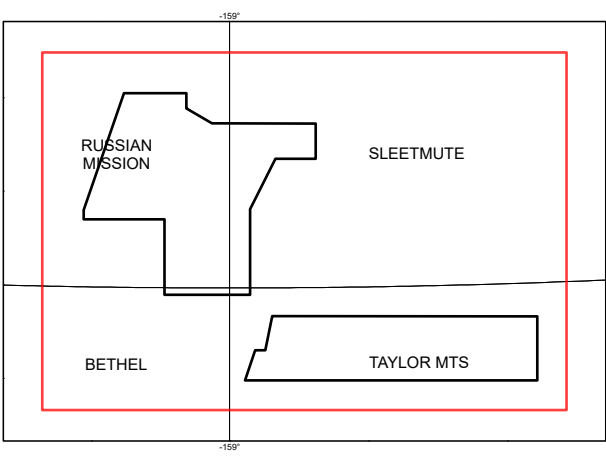
Cartography by:
E.L. Petersen and A.E. Macpherson (2025)

Affiliations:
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² Terraquest Ltd, 301-2900 John St. Markham, Ontario, Canada L3R5G3



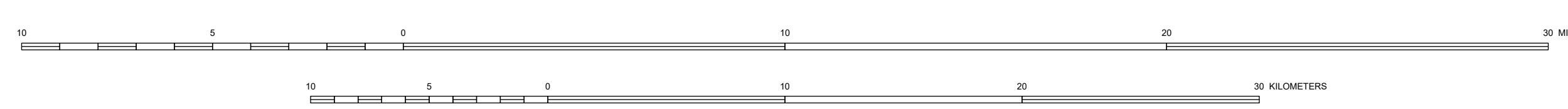
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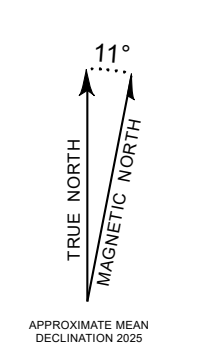
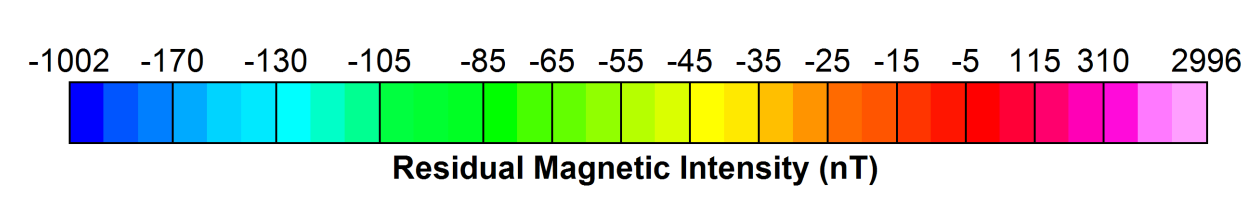


Residual Magnetic Signal
Kuskokwim airborne magnetic and radiometric survey, Aniak and the Little Taylor Mountains, Alaska

by
Fusso, L.A.¹, Petersen E.L.¹, and Terraquest Ltd.²
2026



SCALE 1:200,000
CONTOUR INTERVAL, 100 METERS



Basemap streams and waterbodies from:
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Basemap hillshade from:
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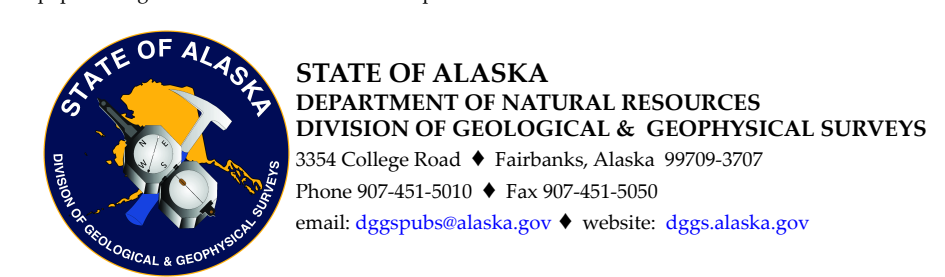
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Projection:
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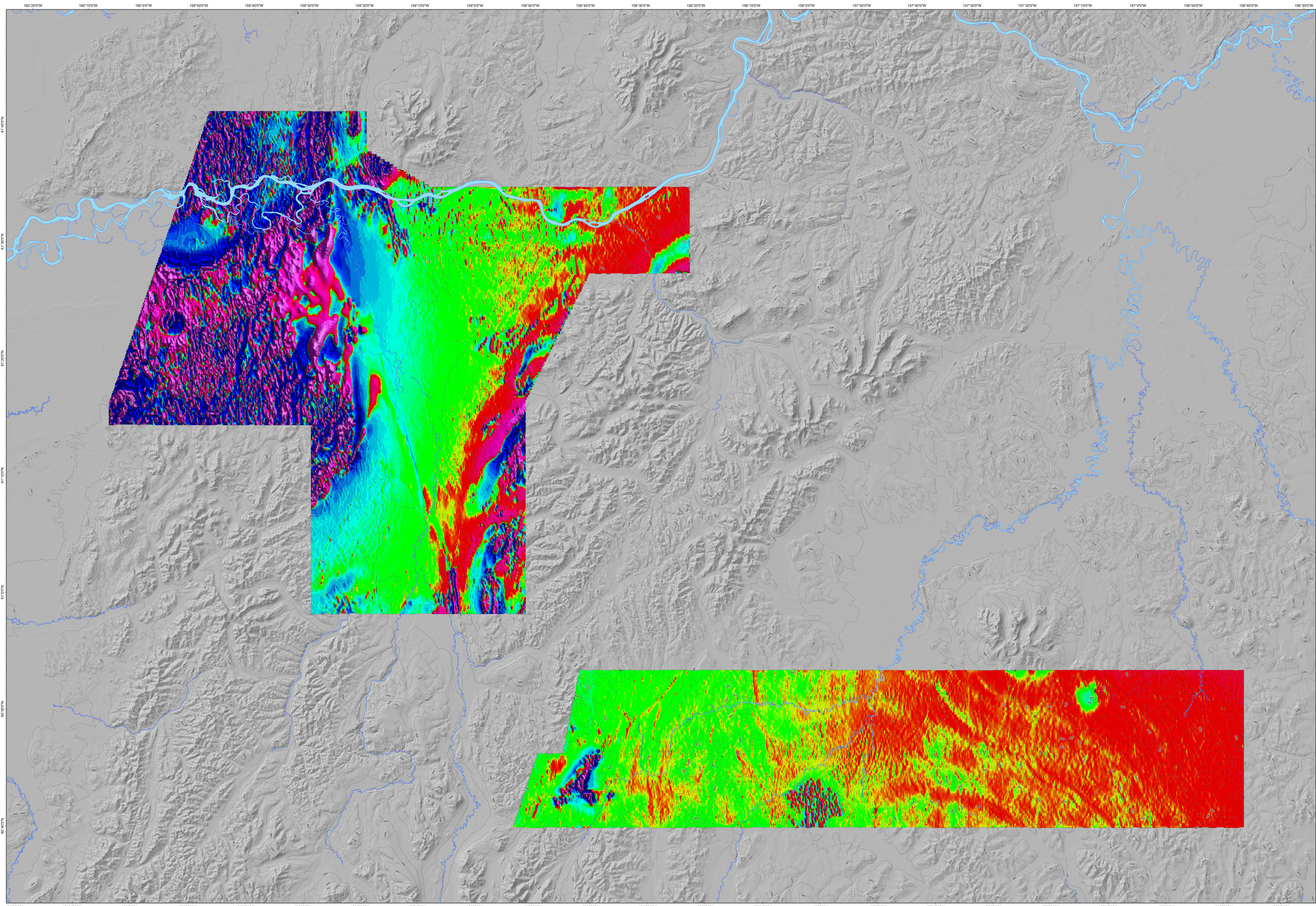
Datum:
WGS 1984

Cartography by:
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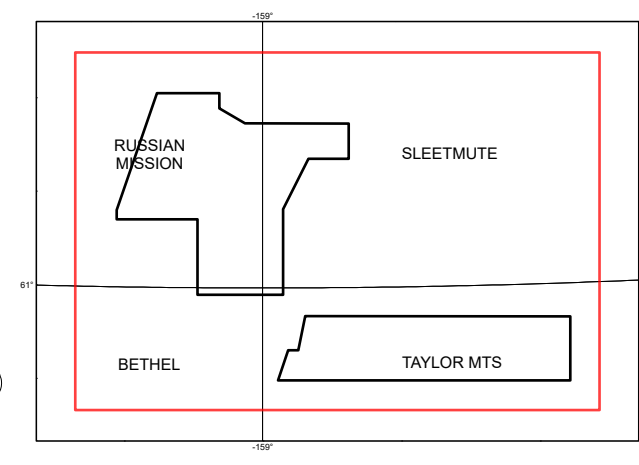


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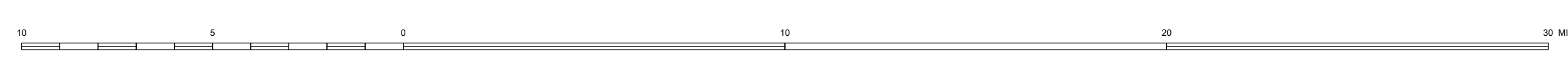
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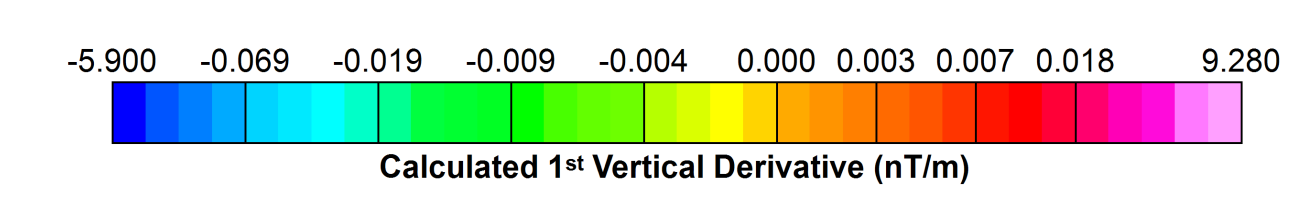
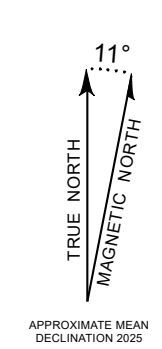


Calculated 1st Vertical Derivative
Kuskokwim airborne magnetic and radiometric survey, Aniak and the Little Taylor Mountains, Alaska

by
Fusso, L.A.¹, Petersen E.L.¹, and Terraquest Ltd.²
2026



SCALE 1:200,000
CONTOUR INTERVAL, 100 METERS



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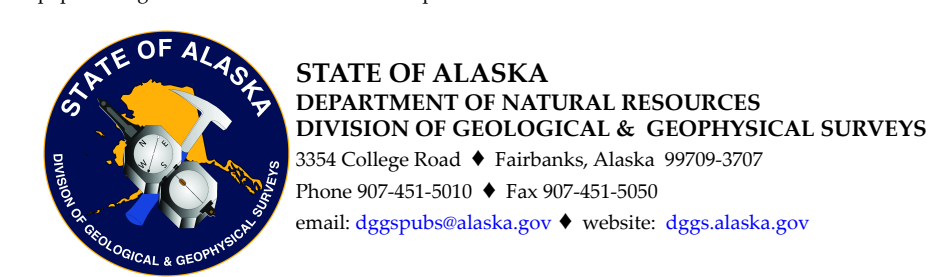
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Datum:
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Cartography by:
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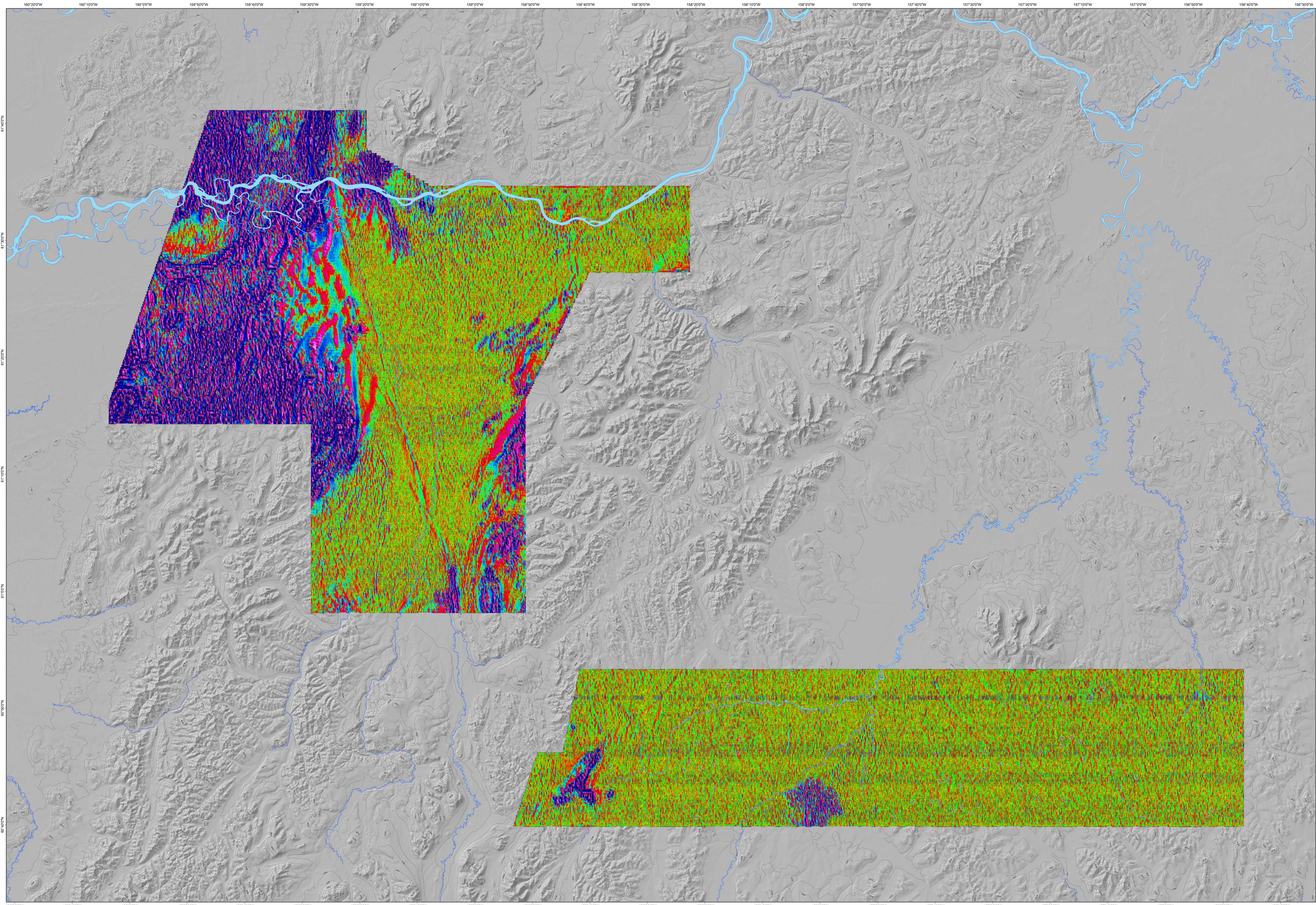
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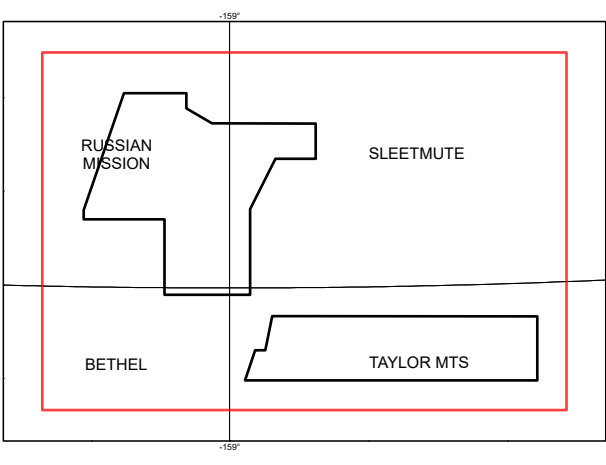


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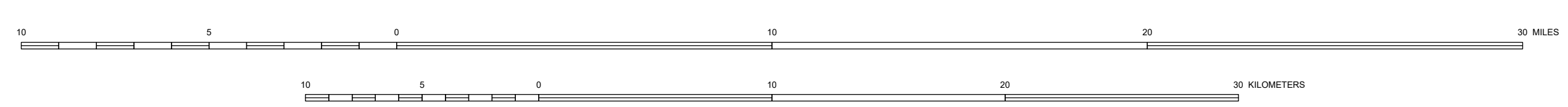
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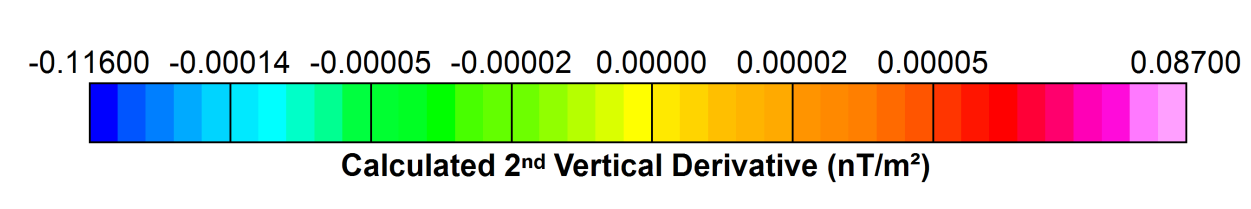
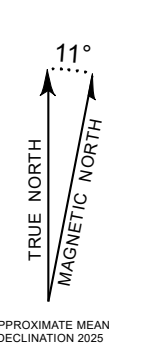
Calculated 2nd Vertical Derivative Kuskokwim airborne magnetic and radiometric survey, Aniak and the Little Taylor Mountains, Alaska

by
Fusso, L.A.¹, Petersen E.L.¹, and Terraquest Ltd.²

2026



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CONTOUR INTERVAL, 100 METERS



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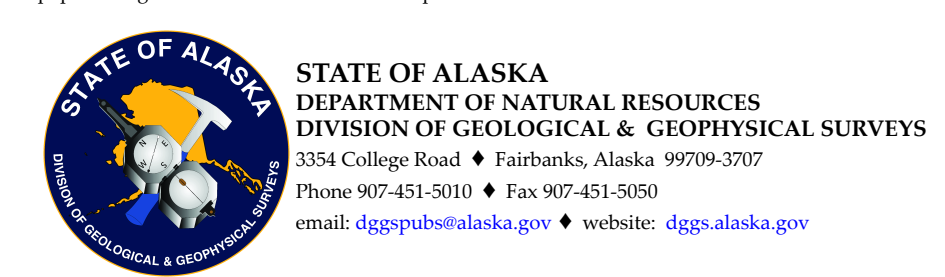
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Projection:
Universal Transverse Mercator Zone 4N

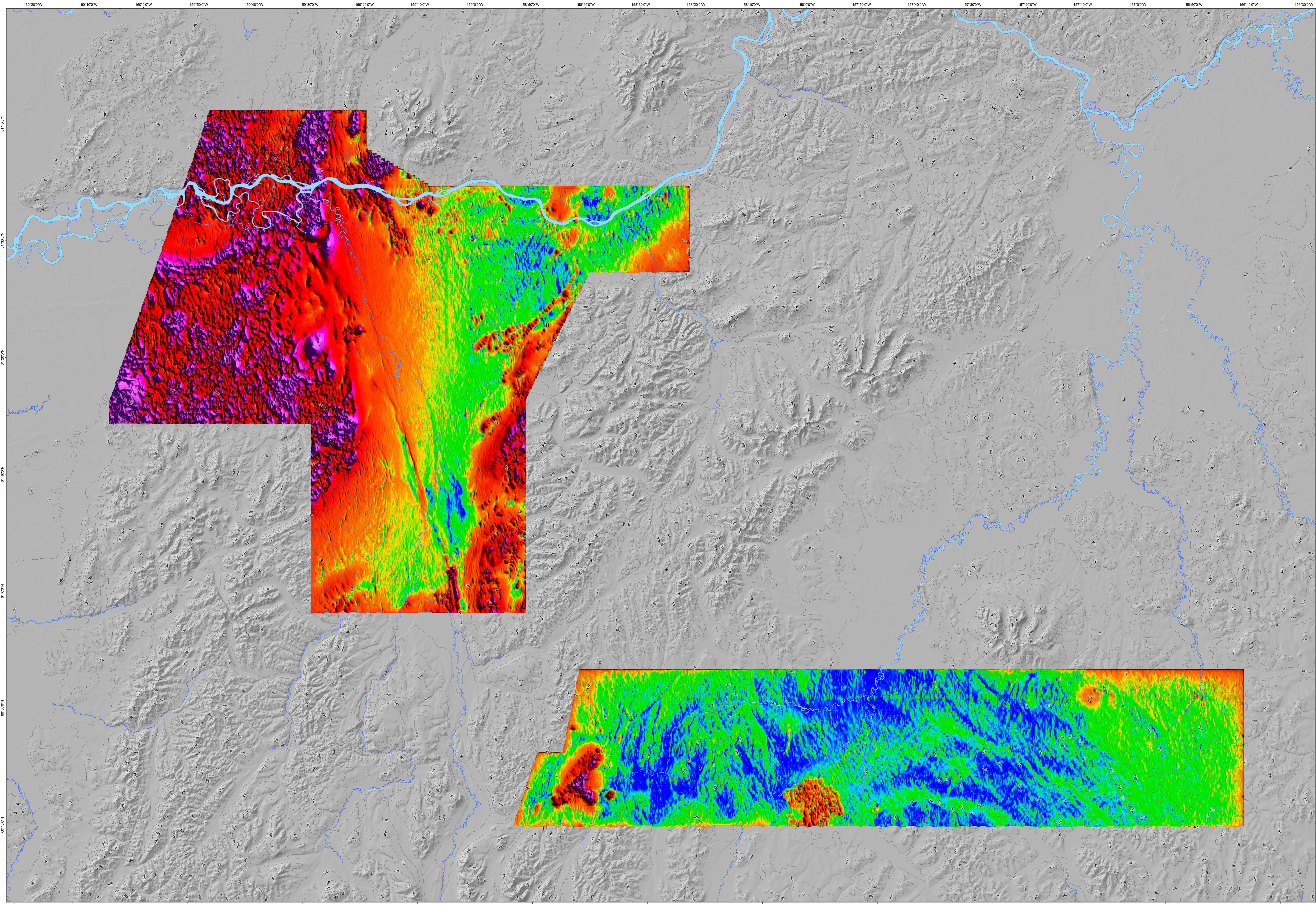
Datum:
WGS 1984

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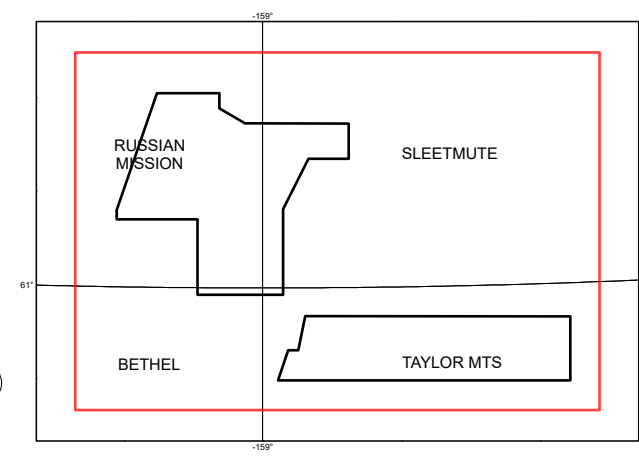


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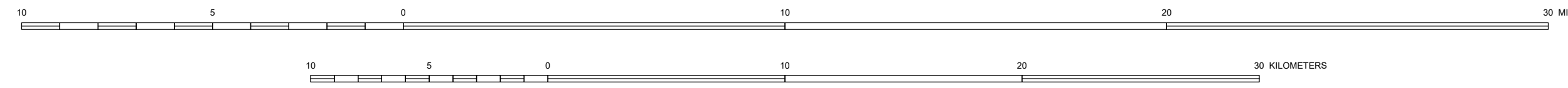
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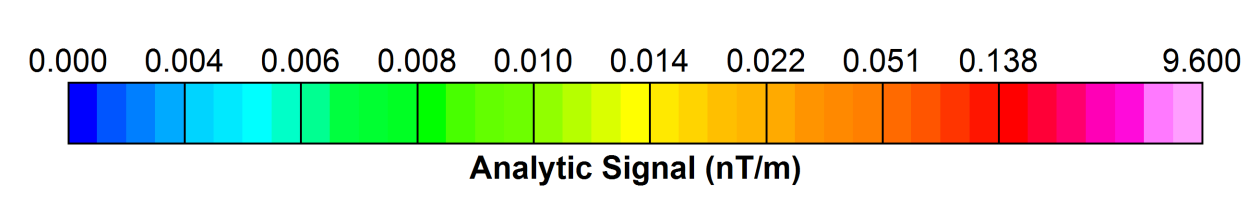
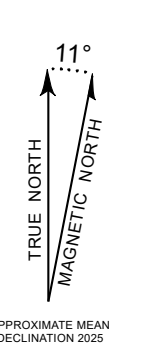
Analytic Signal
Kuskokwim airborne magnetic and radiometric survey, Aniak and the Little Taylor Mountains, Alaska

by
Fusso, L.A.¹, Petersen E.L.¹, and Terraquest Ltd.²

2026



SCALE 1:200,000
CONTOUR INTERVAL, 100 METERS



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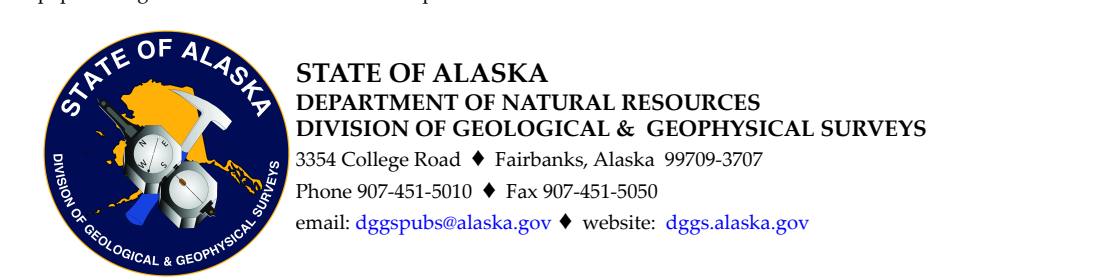
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Projection:
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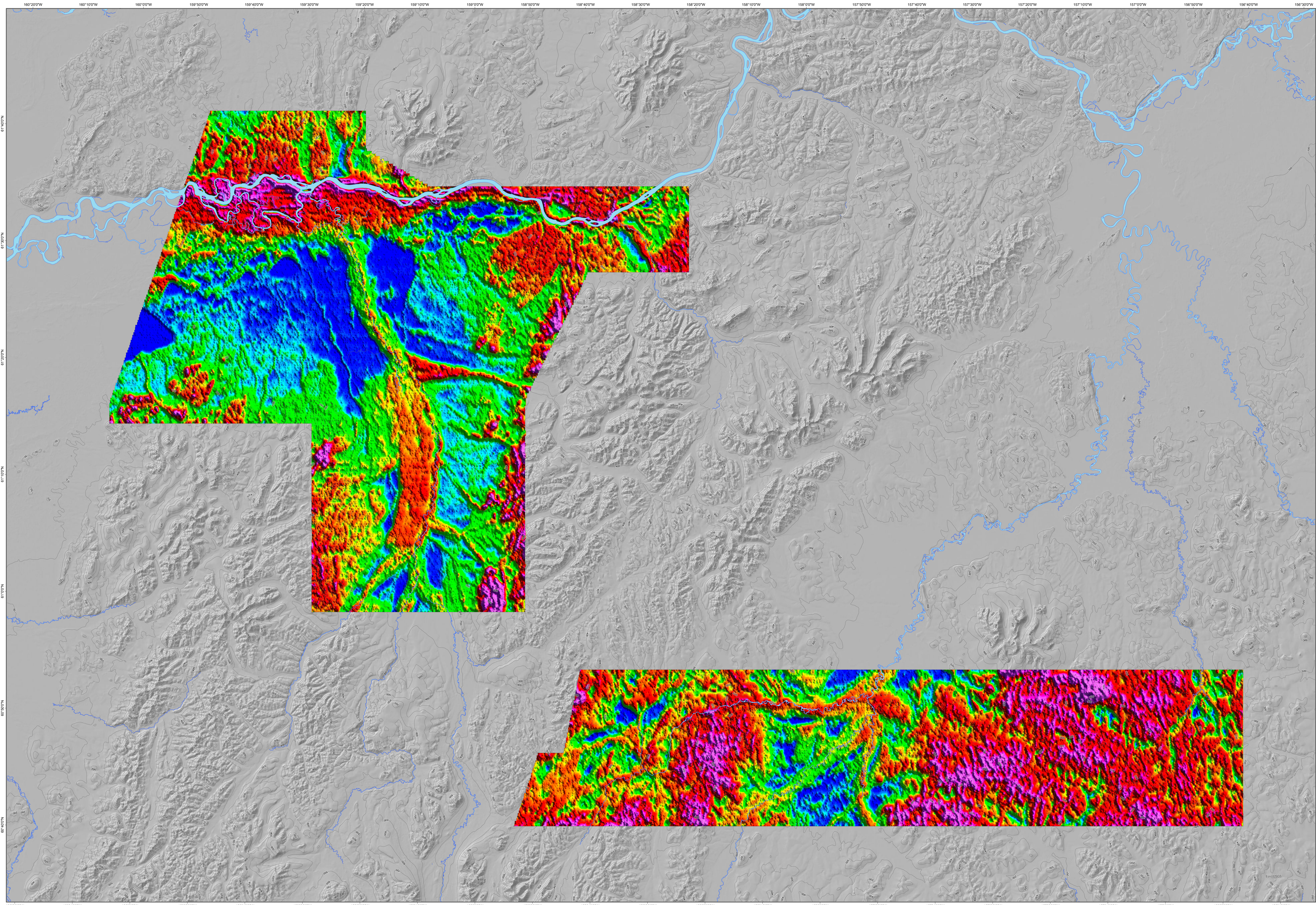
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WGS 1984

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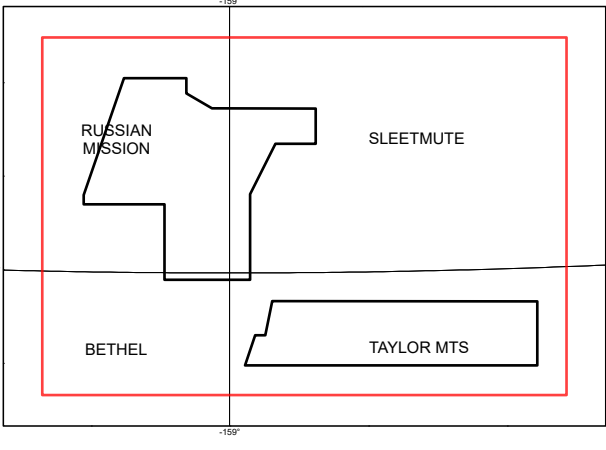
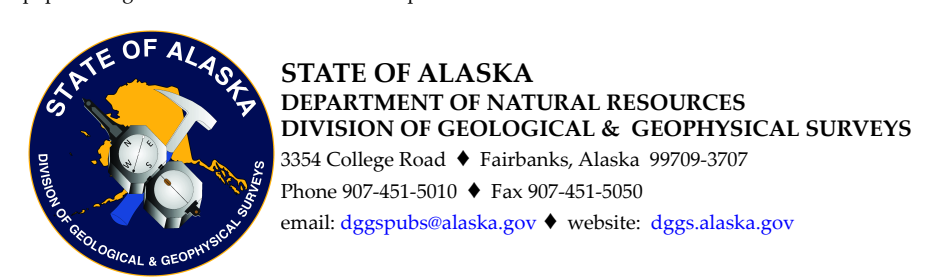


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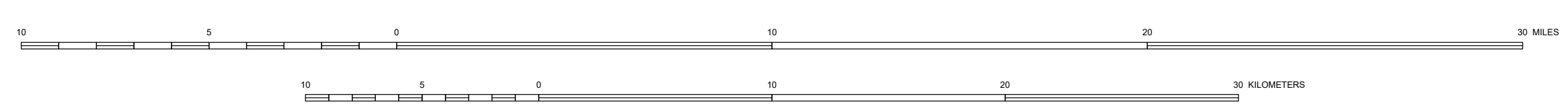
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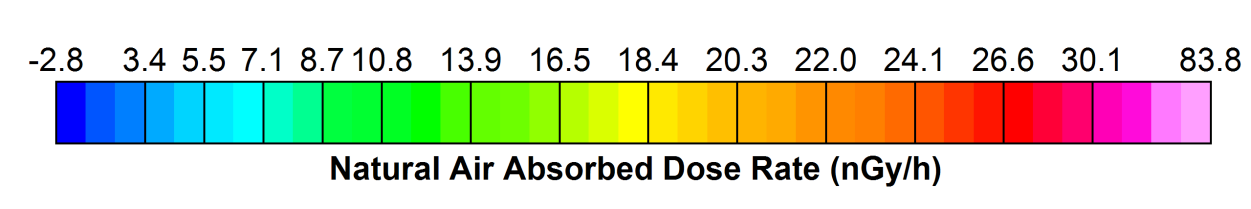
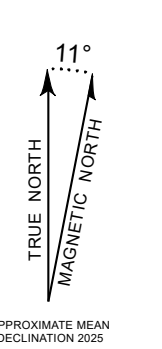


Natural Air Absorbed Dose Rate
Kuskokwim airborne magnetic and radiometric survey, Aniak and the Little Taylor Mountains, Alaska

by
Fusso, L.A.¹, Petersen E.L.¹, and Terraquest Ltd.²
2026



SCALE 1:200,000
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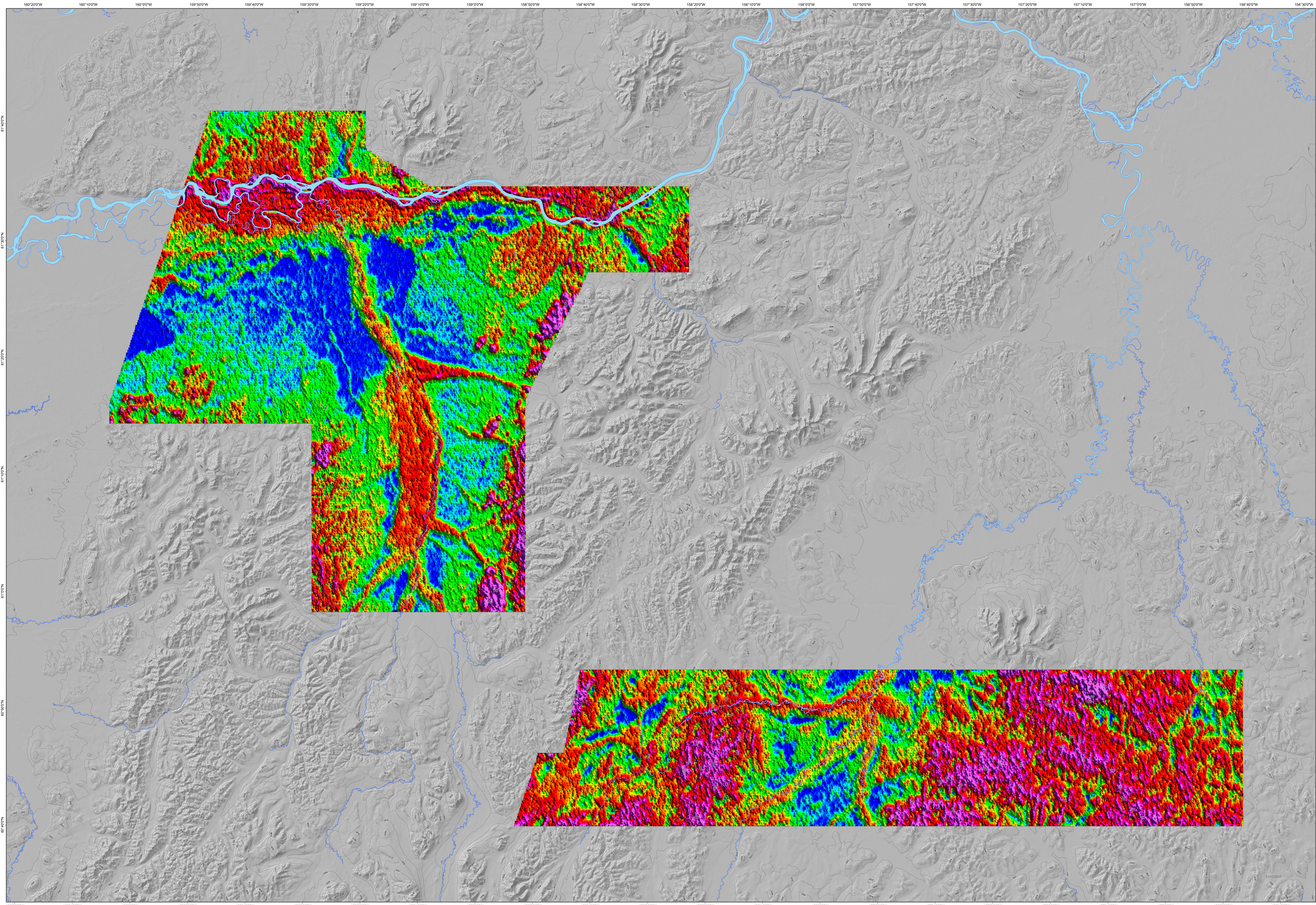
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Projection:
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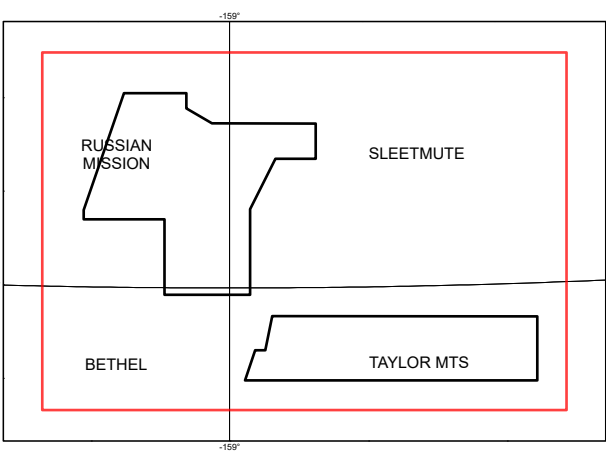
Cartography by:
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¹ Alaska Division of Geological & Geophysical Surveys, 3354 College Rd, Fairbanks, AK 99709
² Terraquest Ltd, 301-2900 John St, Markham, Ontario, Canada L3R5G3



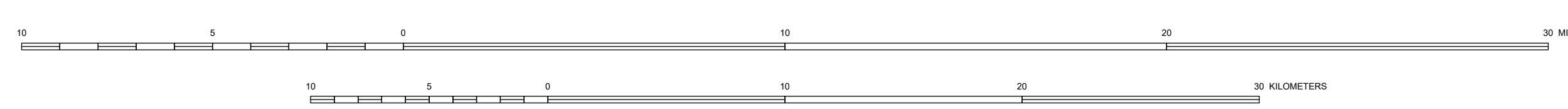
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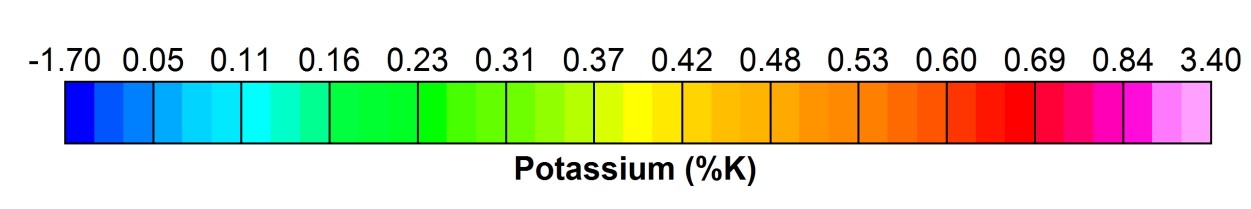
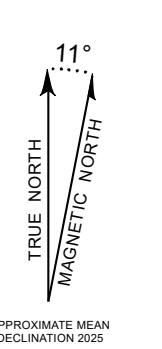


Potassium
Kuskokwim airborne magnetic and radiometric survey, Aniak and the Little Taylor Mountains, Alaska

by
Fusso, L.A.¹, Petersen E.L.¹, and Terraquest Ltd.²
2026



SCALE 1:200,000
CONTOUR INTERVAL, 100 METERS



Basemap streams and waterbodies from:
National Hydrography Dataset, U.S. Geological Survey, Reston, Virginia, 2002–2016

Basemap hillshade from:
ESRI Basemaps - ESRI, USGS

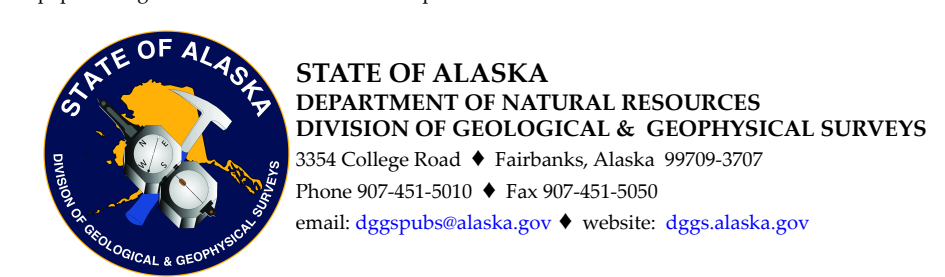
Basemap contours from:
U.S. Geological Survey, EROS Data Center, 2013, Digital elevation - Interferometric Synthetic Aperture Radar (IFSAR) - Alaska

Projection:
Universal Transverse Mercator Zone 4N

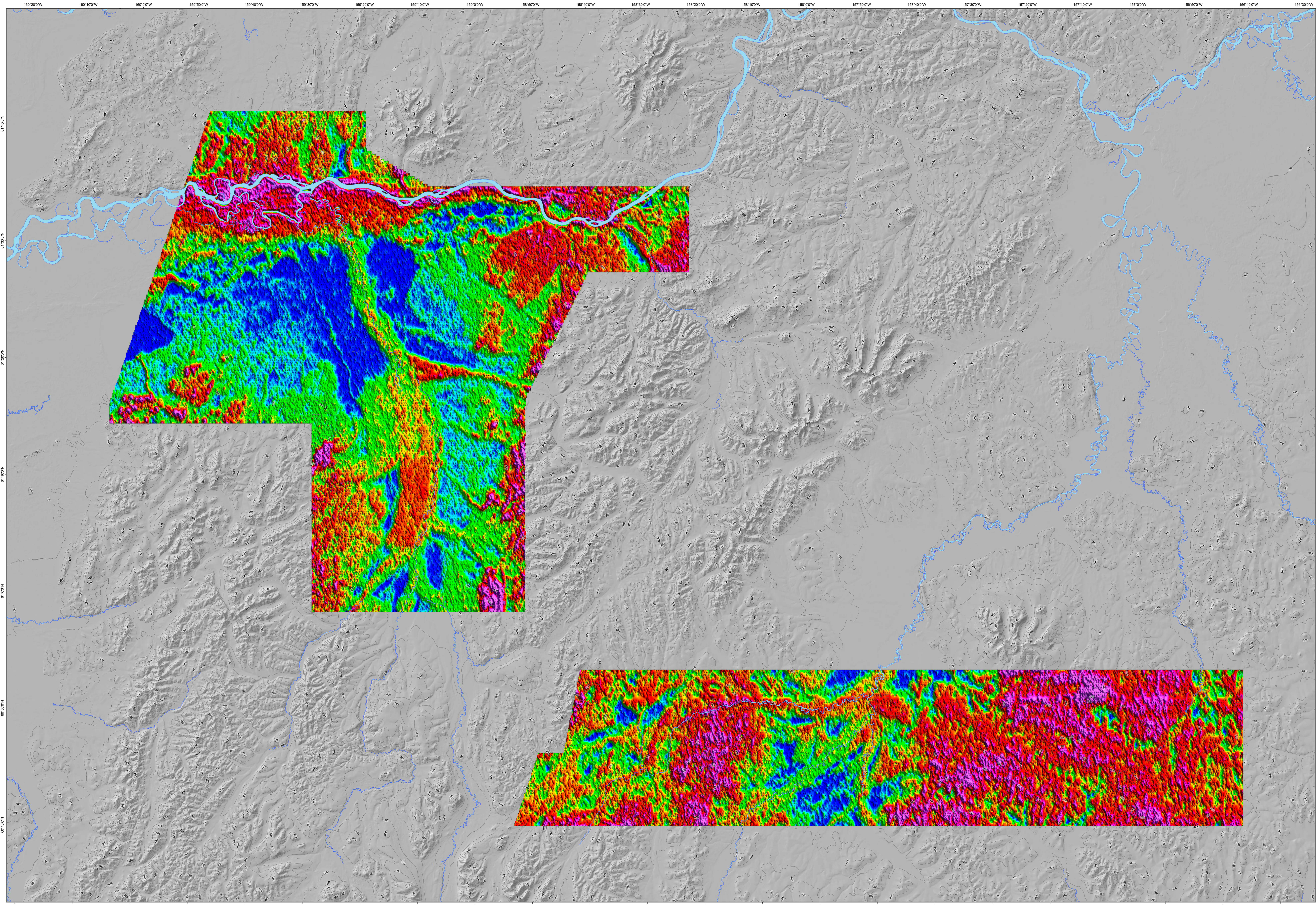
Datum:
WGS 1984

Cartography by:
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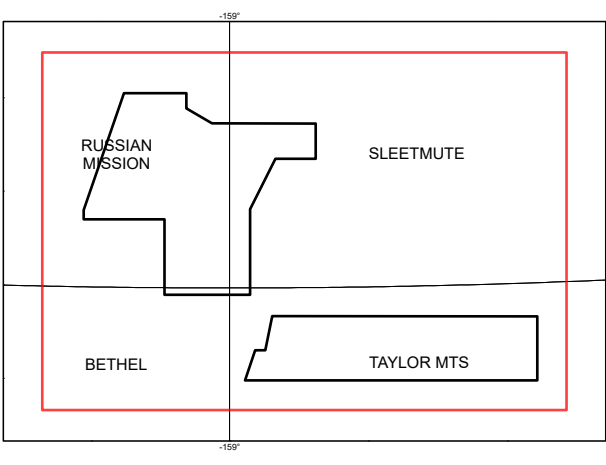
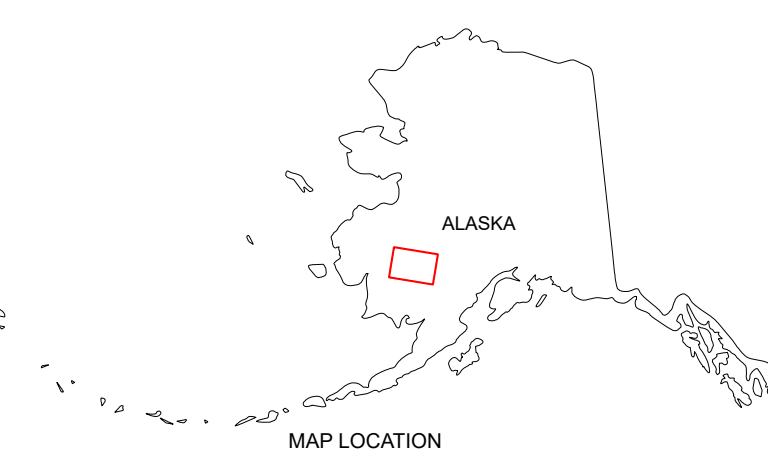


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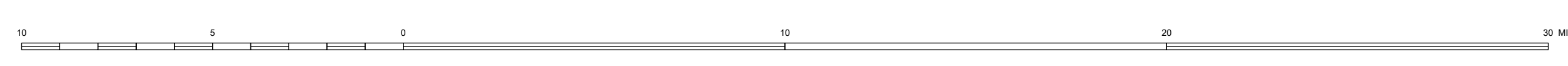
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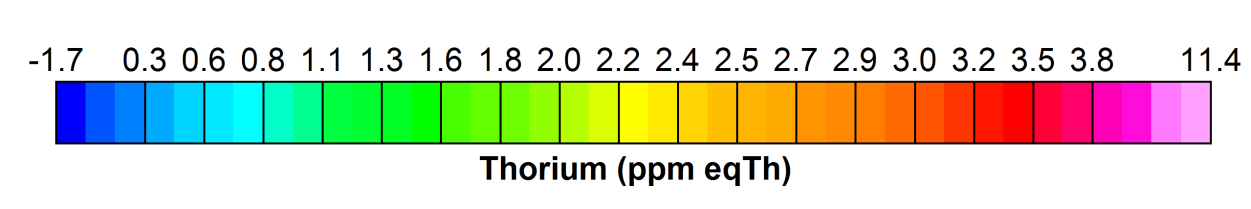
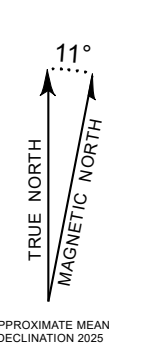


Thorium
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by
Fusso, L.A.¹, Petersen E.L.¹, and Terraquest Ltd.²
2026



SCALE 1:200,000
CONTOUR INTERVAL, 100 METERS



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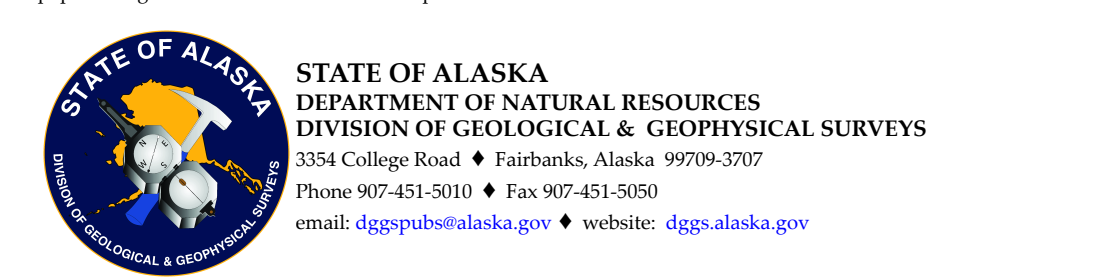
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ESRI Basemaps - ESRI, USGS

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Projection:
Universal Transverse Mercator Zone 4N

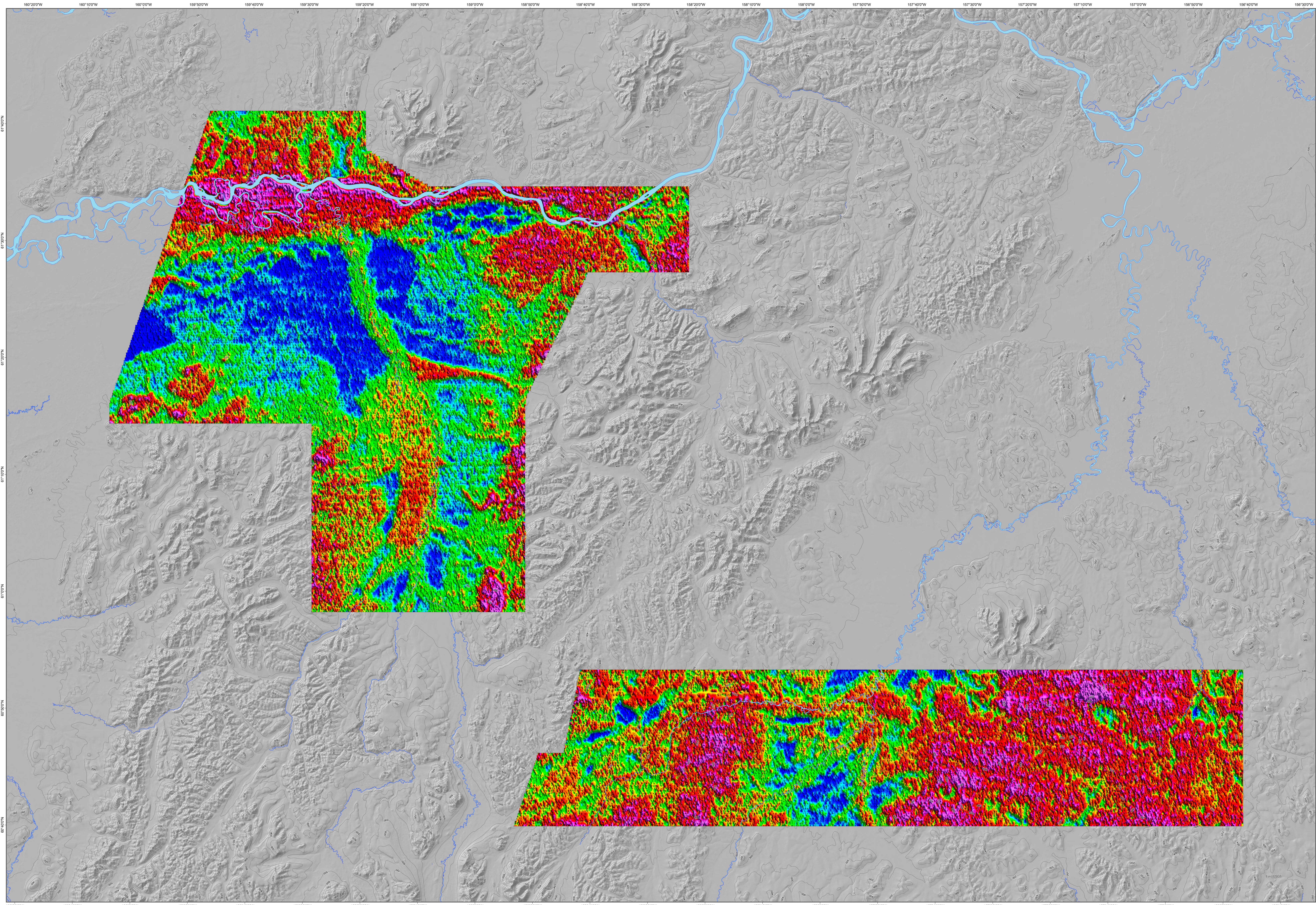
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WGS 1984

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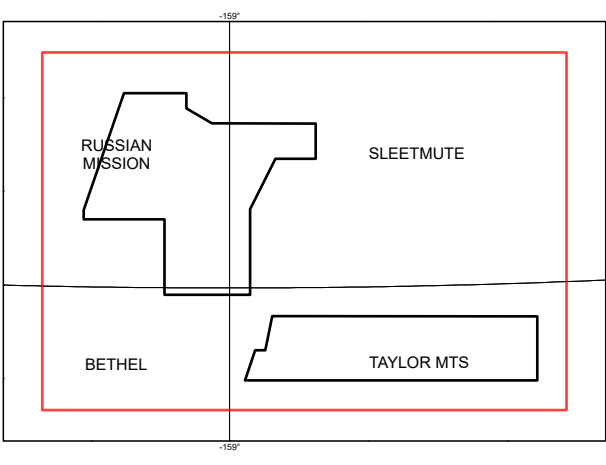
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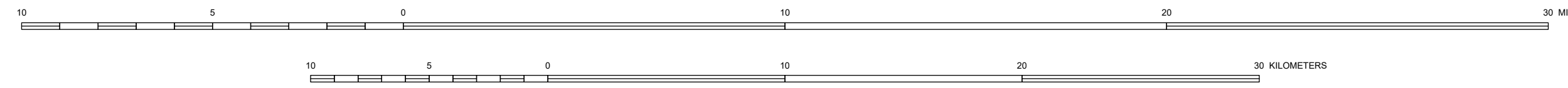
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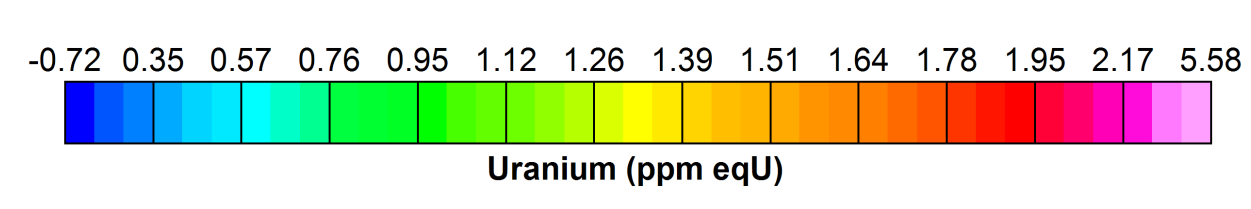
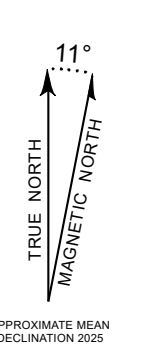
Uranium
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by
Fusso, L.A.¹, Petersen E.L.¹, and Terraquest Ltd.²

2026



SCALE 1:200,000
CONTOUR INTERVAL, 100 METERS



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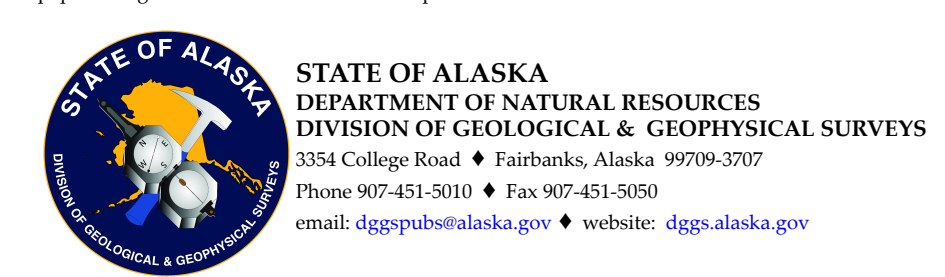
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Projection:
Universal Transverse Mercator Zone 4N

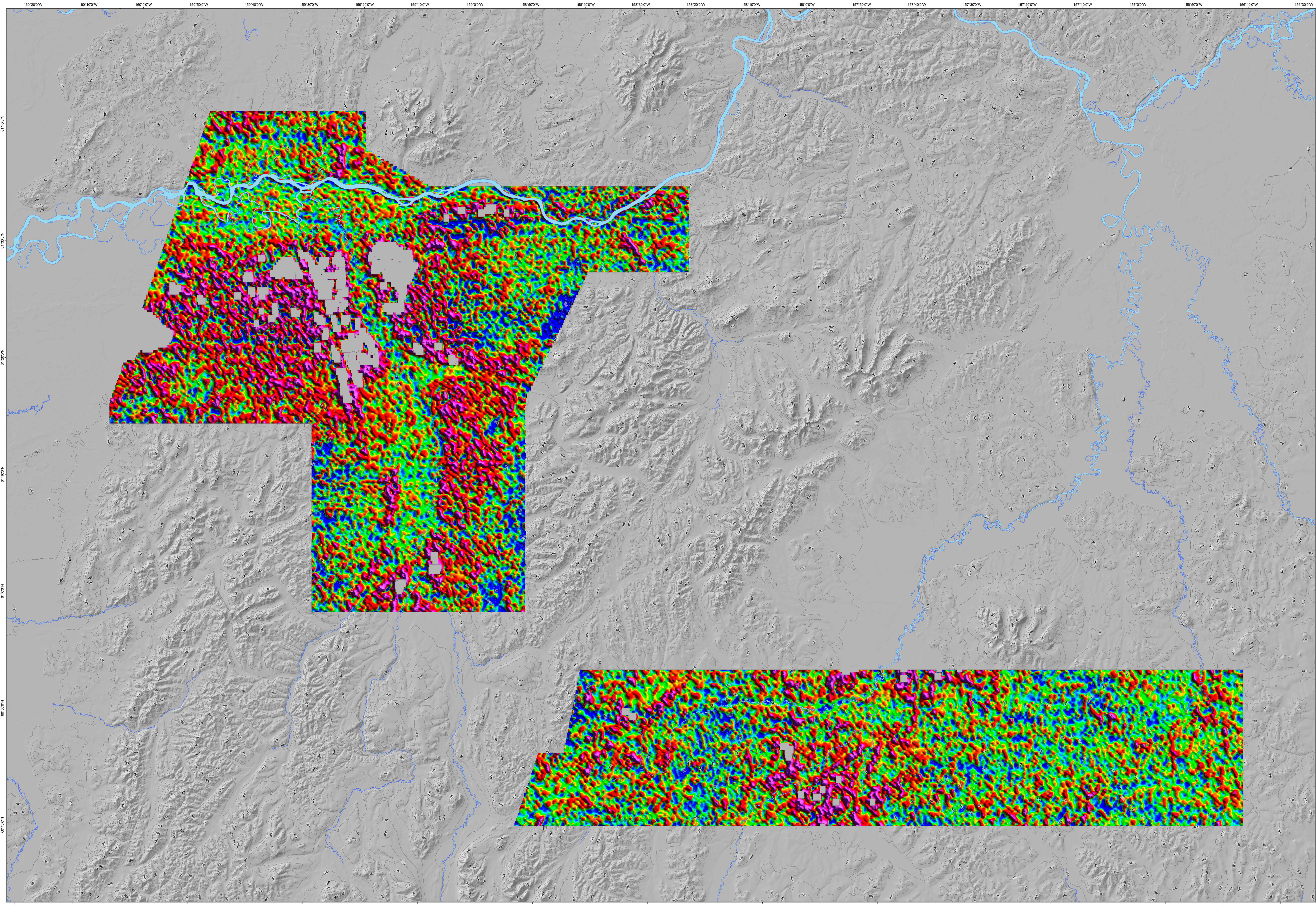
Datum:
WGS 1984

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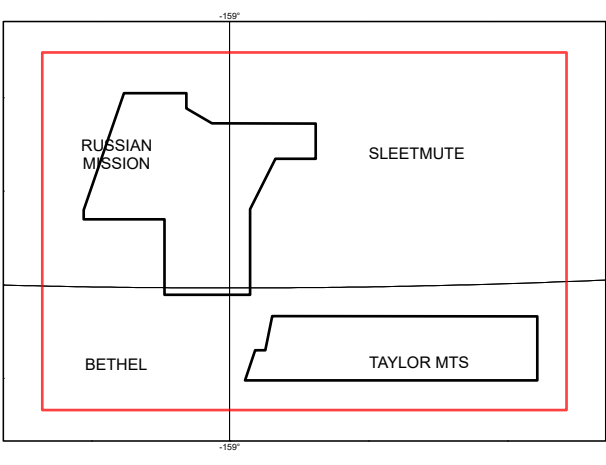


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²Terraquest Ltd. 301-2900 John St. Markham, Ontario, Canada L3R5G3



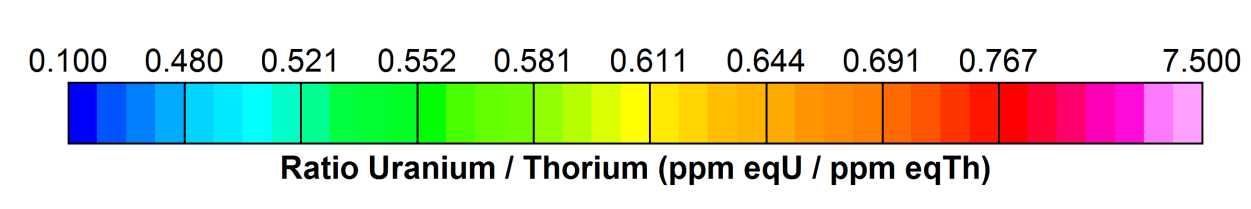
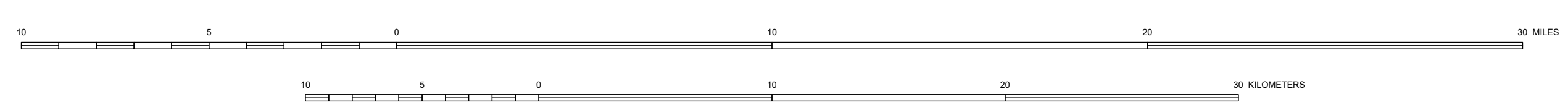
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Ratio Uranium / Thorium
Kuskokwim airborne magnetic and radiometric survey, Aniak and the Little Taylor Mountains, Alaska

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2026



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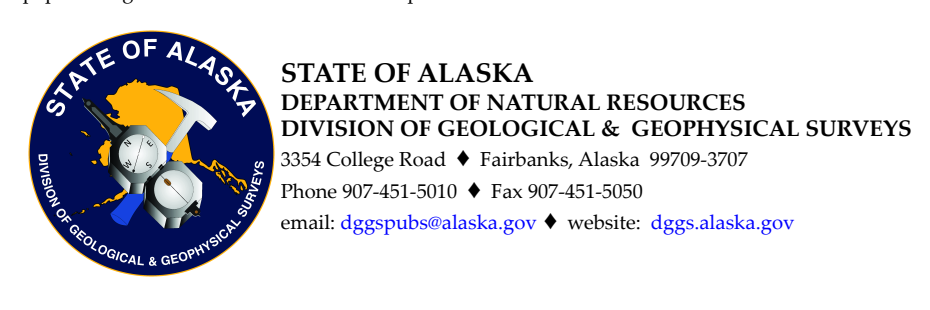
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Projection:
Universal Transverse Mercator Zone 4N

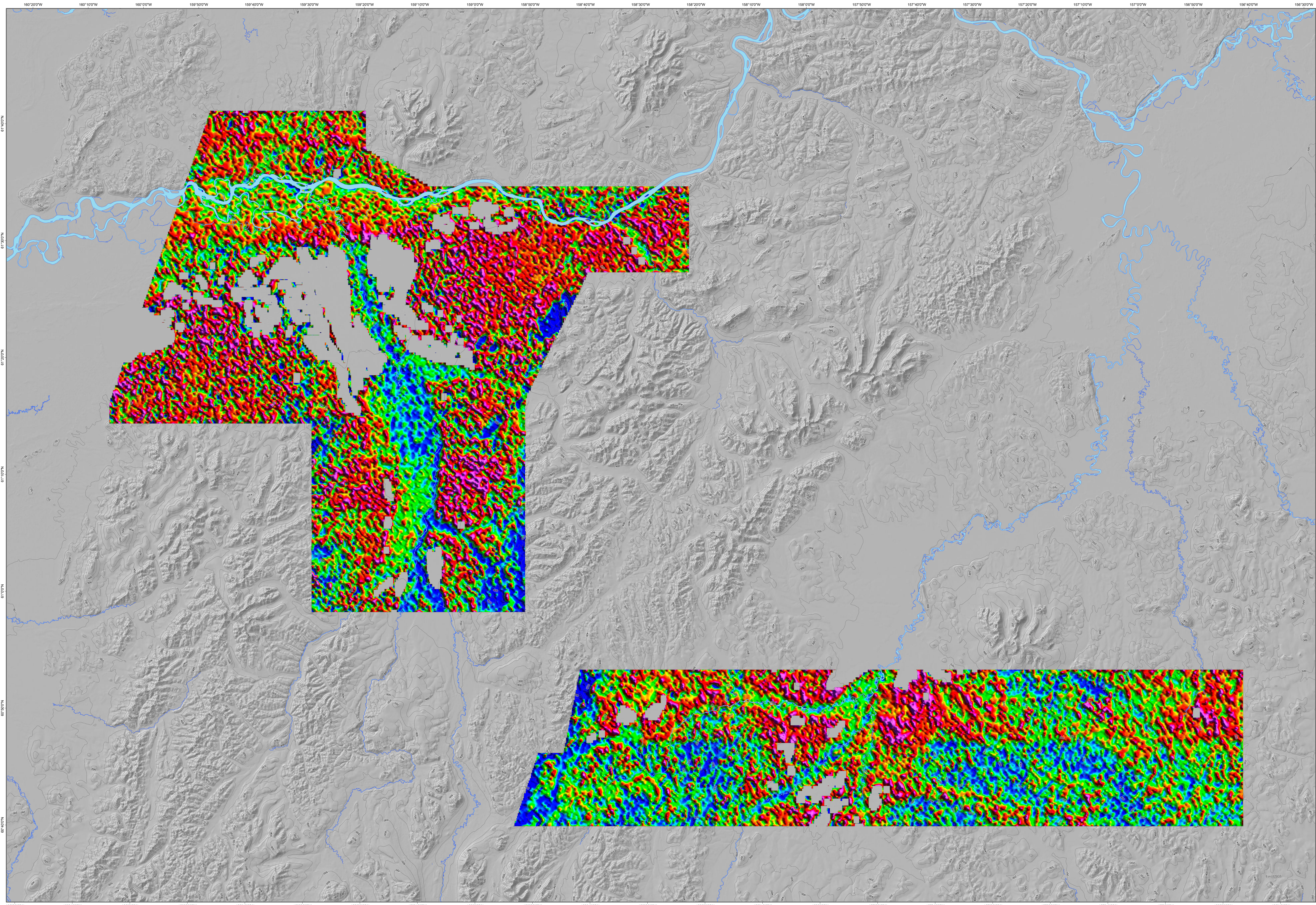
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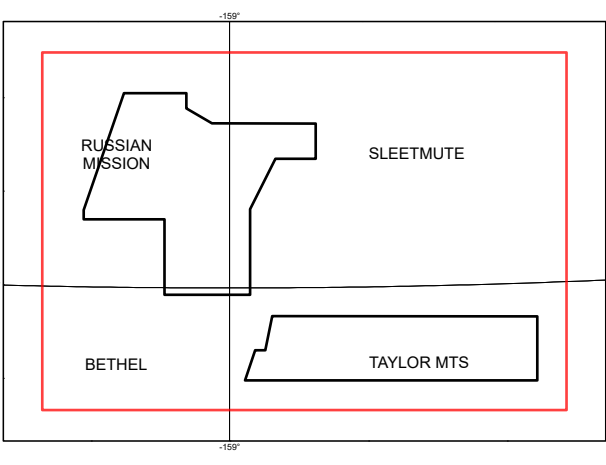
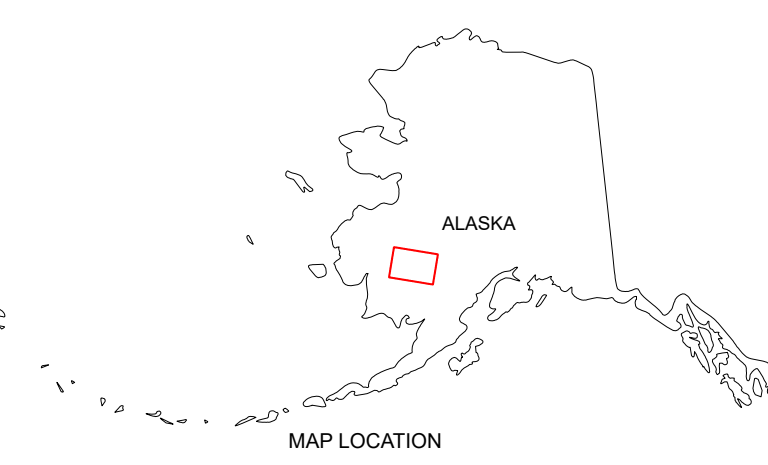
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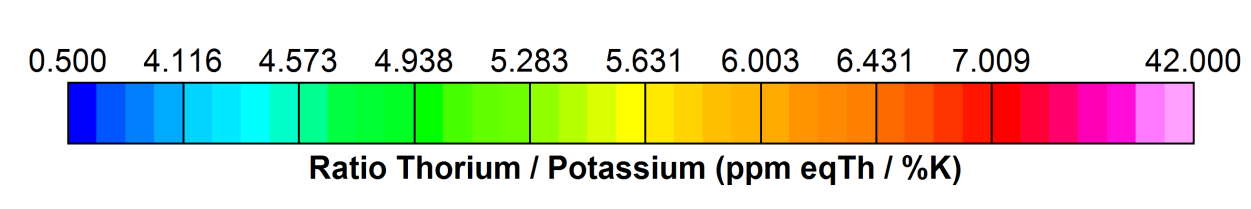
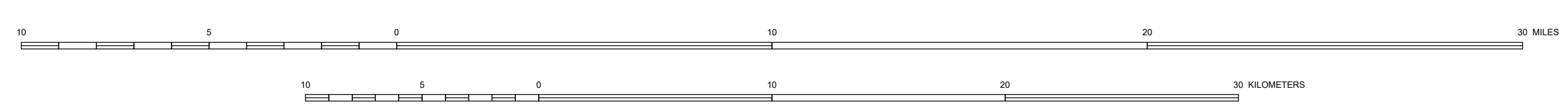
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2026



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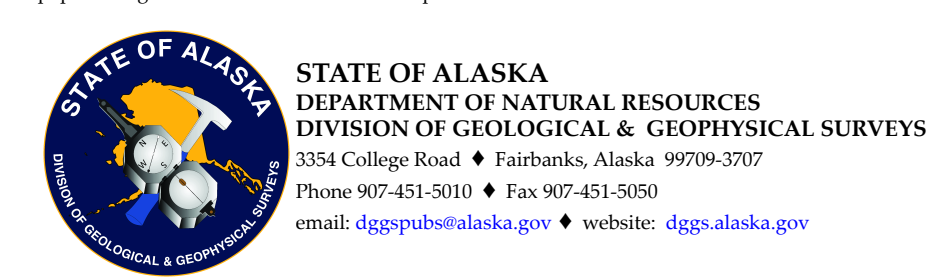
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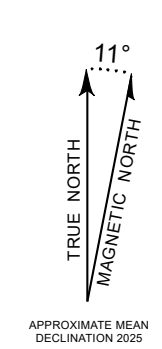
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Datum:
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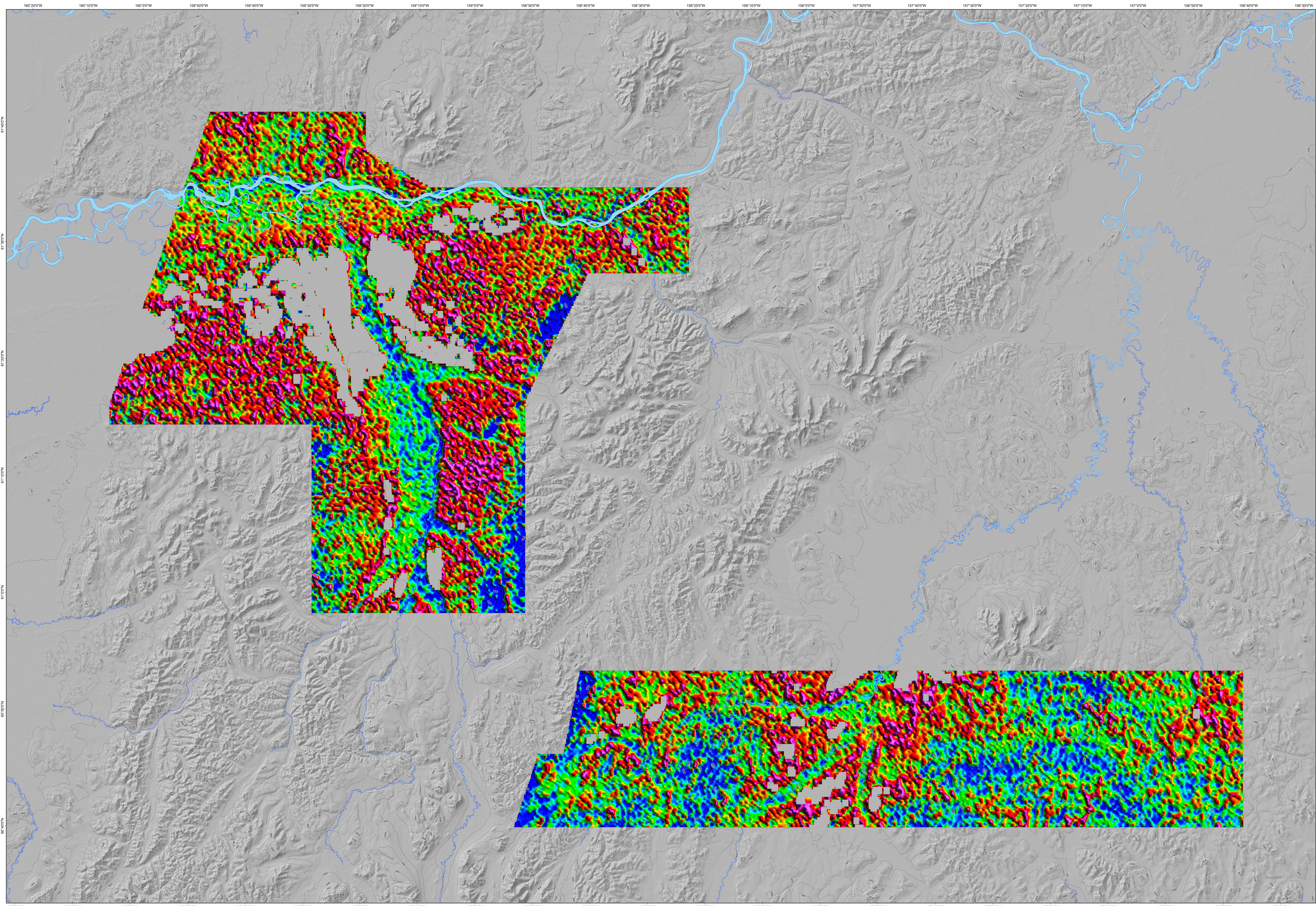
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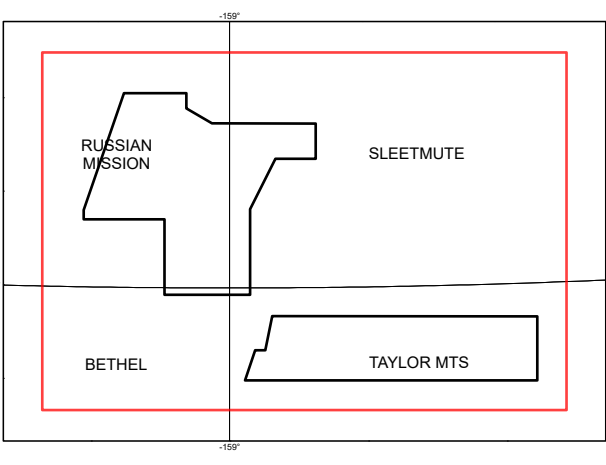
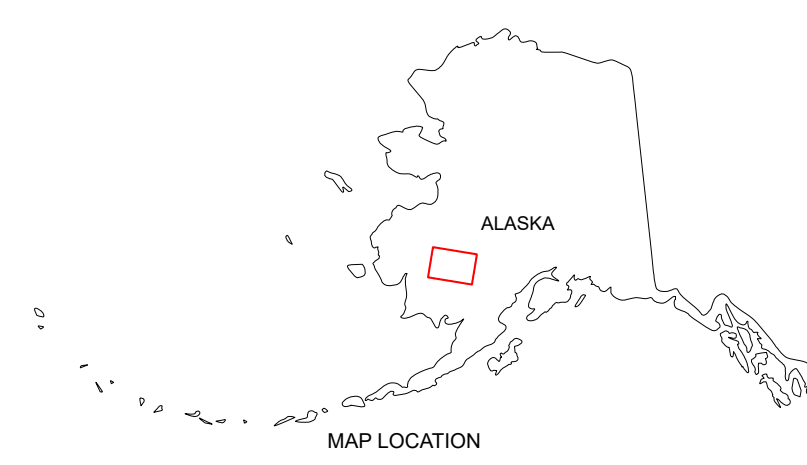


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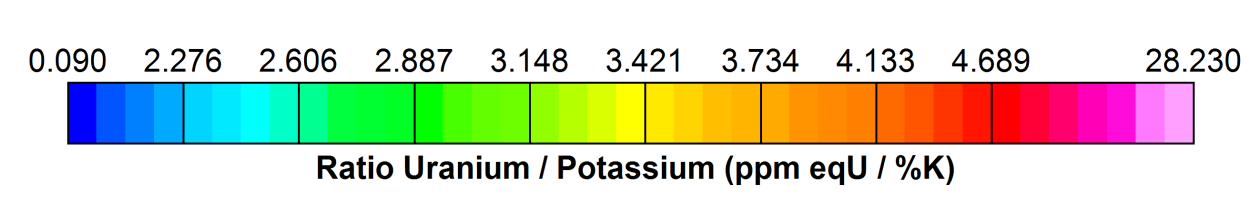
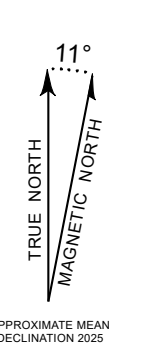
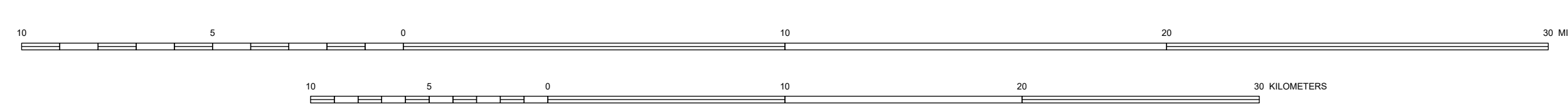
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2026



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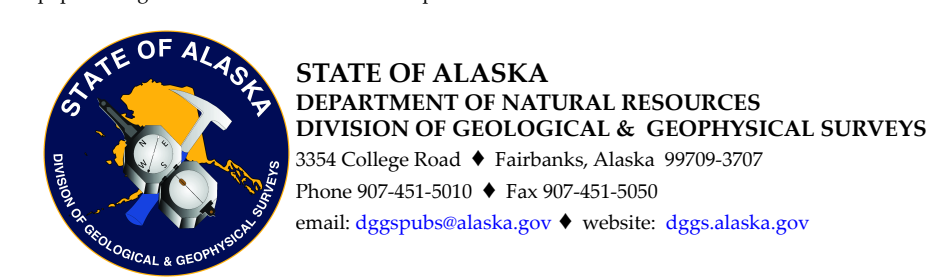
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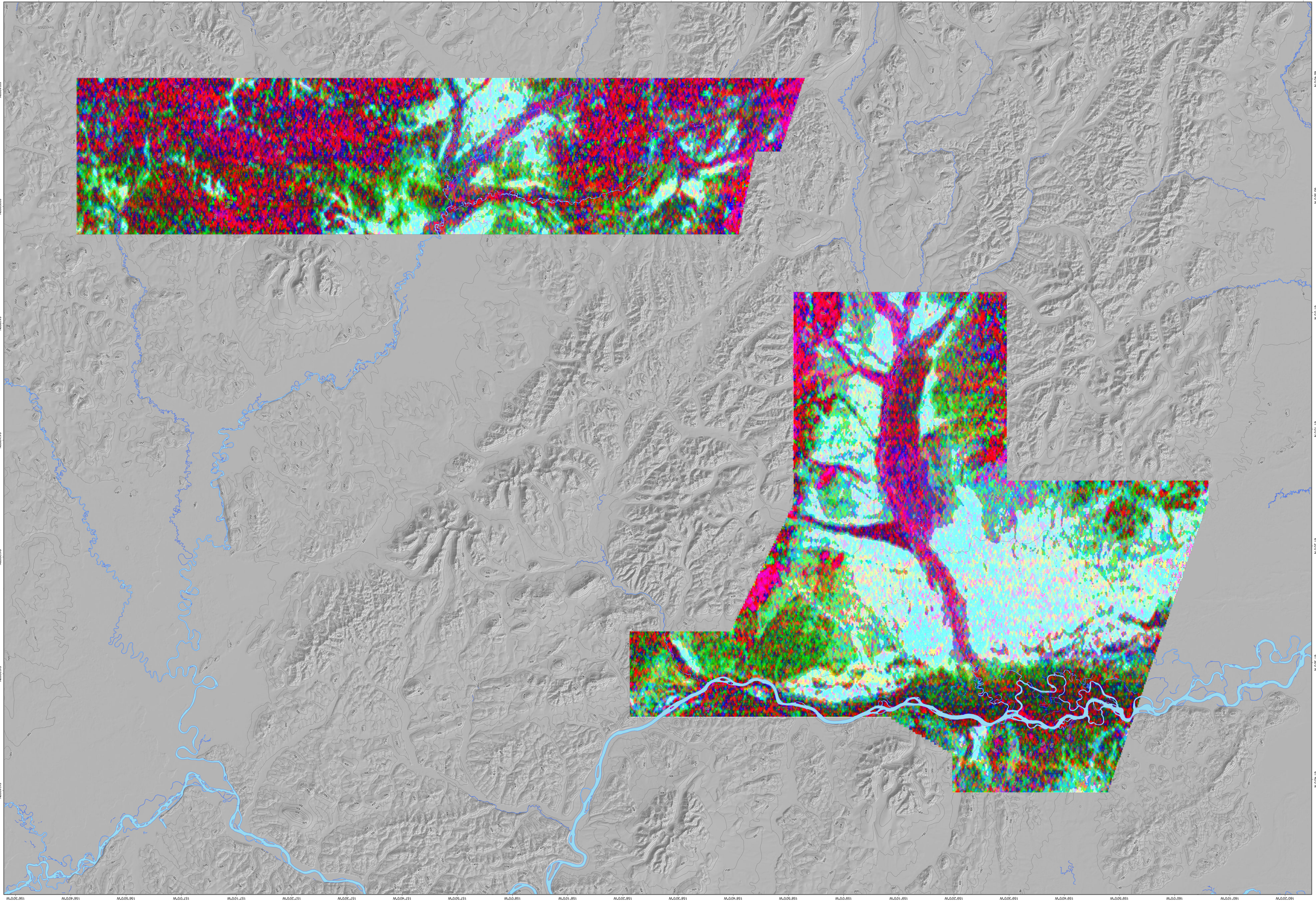
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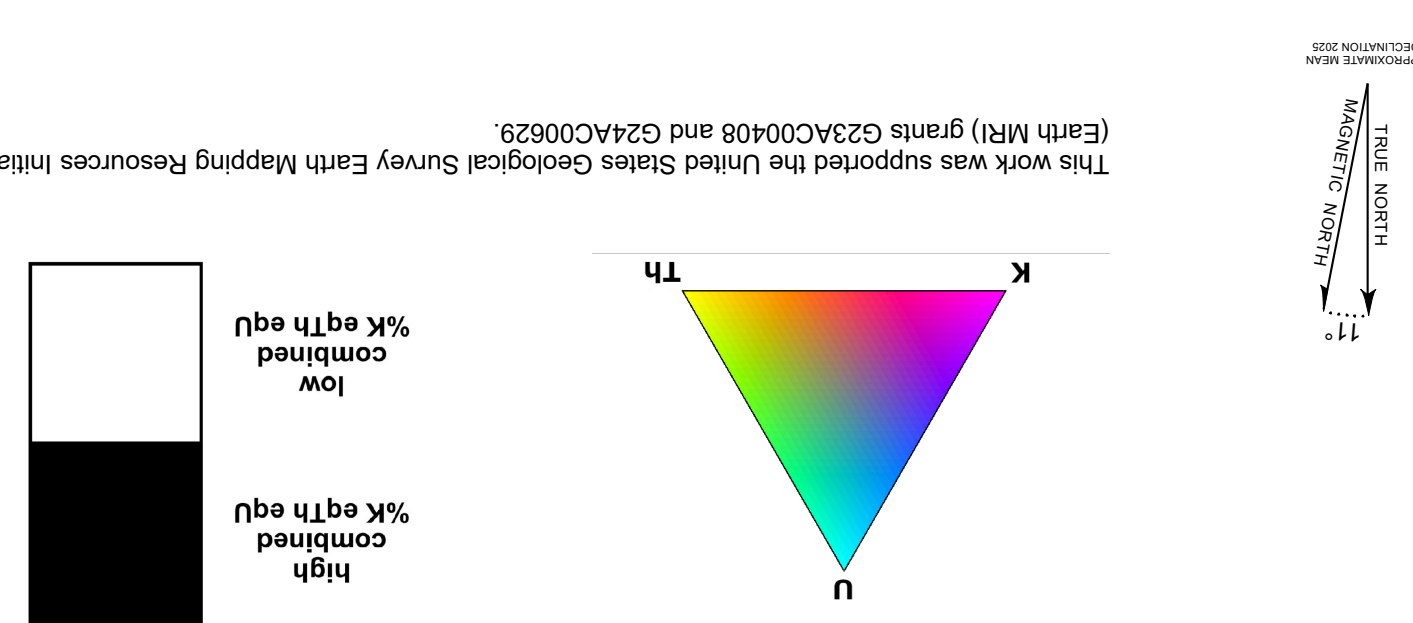
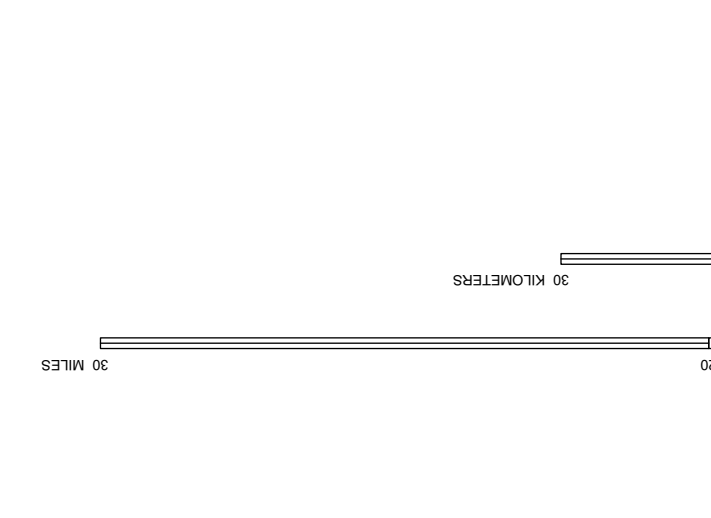




Radiometric Ternary Map Kuskokwim airborne magnetic and radiometric survey, Aniak and the Little Taylor Mountains, Alaska

by
Fusso, L.A., Petersen, E.L., and Terquis, Ltd. ¹

Affiliations:
¹ Terquis Ltd. 301-2900 John St. Markham, Ontario, Canada L3R9C3
Terquis Ltd. 301-2900 John St. Markham, Ontario, Canada L3R9C3
CONTOUR INTERVAL: 100 METERS
SCALE 1:200,000



Basemap streams and waterbodies from:
National Hydrography Dataset, U.S. Geological Survey.
Basemap hillshade from:
Nasion, Virginia, 2002-2016
Basemap contours from:
ESRI Basemaps - ESRI, USGS
U.S. Geological Survey, EROS Data Center, 2013.
Radar (IFSAR) - Interferometric Synthetic Aperture
Digital elevation - Interferometric Synthetic Aperture
Projection:
Universal Transverse Mercator Zone 4N
Datum:
WGS 1984
Cartography by:
E.L. Petersen and A.E. Macpherson (2025)

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