IDITAROD ELECTROMAGNETIC AND MAGNETIC AIRBORNE GEOPHYSICAL SURVEY DATA COMPILATION

L.E. Burns, G.R.C. Graham, J.D. Barefoot. T.J. Naibert, and Fugro Airborne Surveys Corp.

Geophysical Report 2019-15

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DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS

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http://doi.org/10.14509/30222

IDITAROD ELECTROMAGNETIC AND MAGNETIC AIRBORNE GEOPHYSICAL SURVEY DATA COMPILATION

L.E. Burns[1], G.R.C. Graham, J.D. Barefoot, T.J. Naibert, and Fugro Airborne Surveys Corp.

ABSTRACT

The Iditarod electromagnetic and magnetic airborne geophysical survey is located in the Iditarod, Innoko and McGrath mining districts, about 500 km southwest from Fairbanks, Alaska. The survey is adjacent to the Aniak, Beaver Creek, and Southern Dishna River geophysical surveys. Frequency domain electromagnetic and magnetic data were collected with the DIGHEM^{V} system from August to September 2010. A total of 6,223.8 line kilometers were collected covering 2,244.5 square kilometers. Line spacing was 400 meters (m). Data were collected 30 m above the ground surface from a helicopter towed sensor platform ("bird") on a 30 m long line.

PURPOSE

This airborne geophysical survey is part of a program to acquire data on Alaska's most promising mineral belts and districts. The information acquired is aimed at catalyzing new private-sector exploration, discovery, and ultimate development and production. The purpose of the survey was to map the magnetic and conductive properties of the survey area. Whereas the Iditarod, Innoko and McGrath mining districts have a history of placer mining, the discovery of the Donlin Gold lode deposit has kept exploration activity high in the region. Active polymetallic prospects in the survey area are Cirque and Tolstoi. Other gold and base-metal anomalies, altered zones, favorable lithologies, and structural zones are known to exist throughout the survey area.

SURVEY OVERVIEW DESCRIPTION

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

ACKNOWLEDGMENTS

Funding was provided by the Alaska State Legislature as part of the DGGS Airborne Geophysical/Geological Mineral Inventory (AGGMI) program.

[1] Alaska Division of Geological & Geophysical Surveys, 3354 College Road, Fairbanks, Alaska 99709-3707

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 and DGGS	Project and field reports, survey background information, gridded data explanations, other supporting documentation
grids_ermapper	contractor and DGGS	Geographically registered gridded data, ER Mapper ERS format
grids_geosoft	contractor and DGGS	Geosoft-format grids, these grids can be viewed in ESRI ArcMap using a free plugin from Geosoft or the free viewer available from Geosoft
images_registered	DGGS	GeoTiff format images of all gridded data
kmz	DGGS	keyhole markup language (kml) kmz archive files of project data. Viewable in Google Earth and other compatible programs
maps_pdf_format	contractor and DGGS	Printable maps in pdf format. Includes a geographically registered pdf (GeoPDF) for use with mobile devices such as GPS enabled smartphones and tablets, other devices, and programs
maps_prn_format	contractor	Printable maps in HPGL/2 printer file format with extension .prn
profiles_stacked	contractor	Distance-based profiles of the digitally recorded geophysical data are generated and plotted at an appropriate scale. The profiles display electromagnetic anomalies with their respective interpretive symbols. Printable in pdf format
vector_data	contractor and DGGS	Line path, data contours, and survey boundary in ESRI shapefile (SHP) format, ESRI Geodatabase format, and/or AutoCAD dxf format
video_flightpath	contractor	Survey flight path downward facing video

REFERENCES

Akima, H., 1970, A new method of interpolation and smooth curve fitting based on local procedures: Journal of the Association of Computing Machinery, v. 17, n. 4, p. 589–602.

Burns, L.E., Fugro Airborne Surveys Corp., and Fugro GeoServices, Inc., 2011, Iditarod survey area: Magnetic and electromagnetic line, grid, and vector data and maps, Innoko, Iditarod, and McGrath mining districts, Iditarod and Ophir quadrangles, western Alaska: Alaska Division of Geological & Geophysical Surveys Geophysical Report 2011-2, 39 sheets, scale 1:63,360, 1 DVD. http://doi.org/10.14509/22842

Burns, L.E., Fugro Airborne Surveys Corp., and Fugro GeoServices, Inc., 2015, Iditarod survey area: Airborne magnetic and electromagnetic data in line, grid, vector, and map formats, and descriptive project report, Innoko, Iditarod, and McGrath mining districts, Iditarod and Ophir quadrangles, western Alaska: Alaska Division of Geological & Geophysical Surveys Geophysical Report 2011-4, 12 sheets. http://doi.org/10.14509/27081

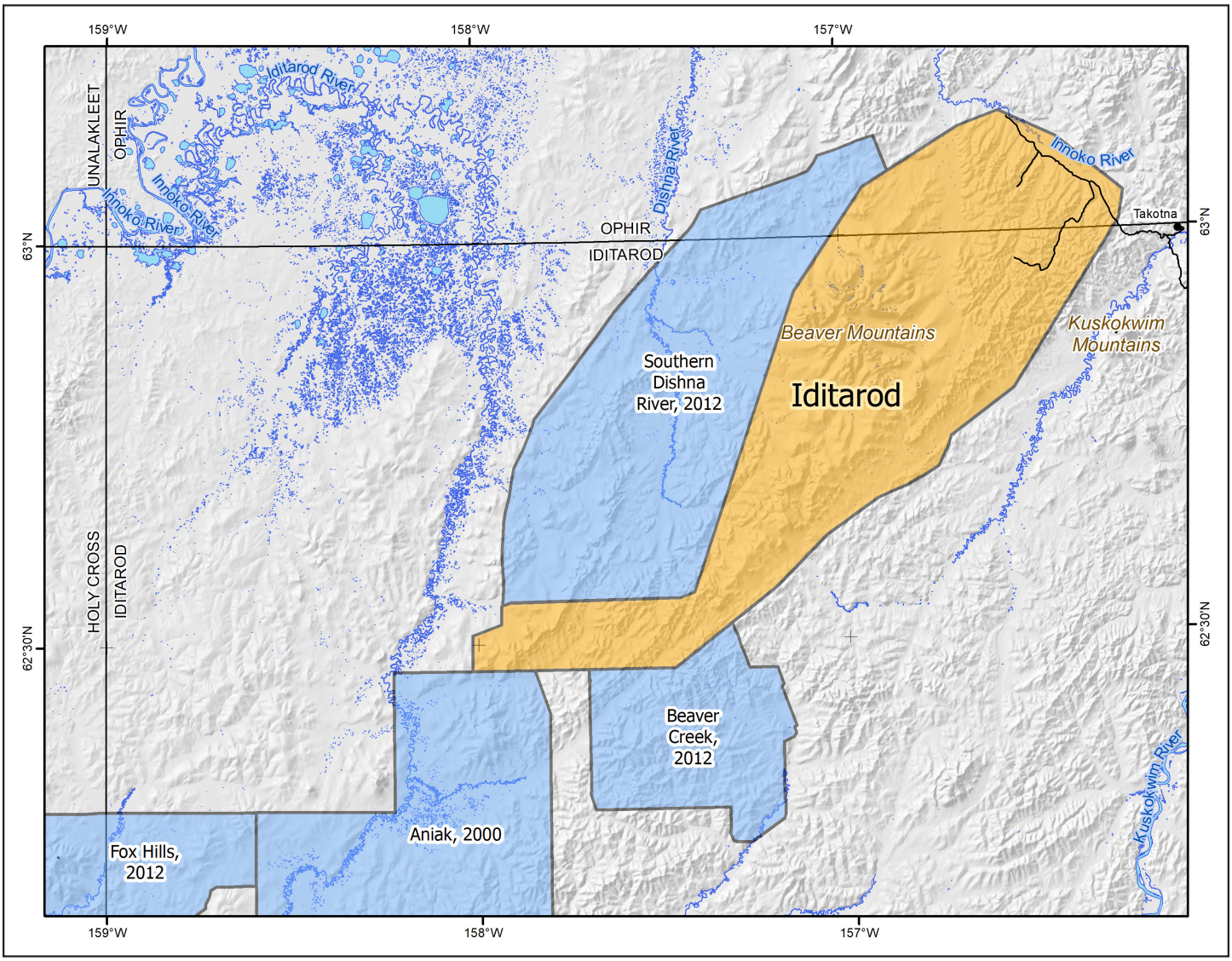
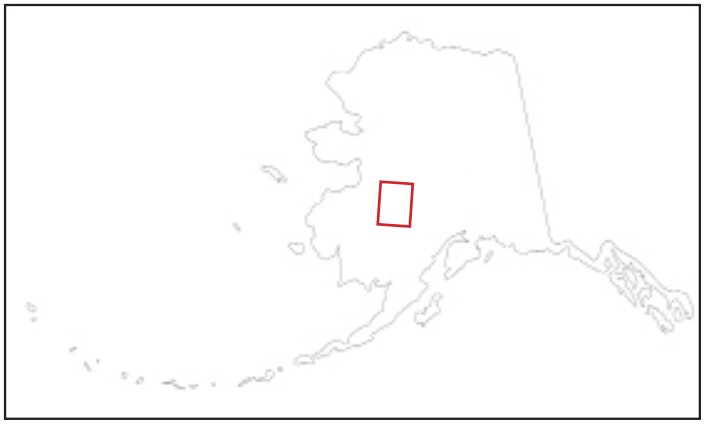


Figure 1. Iditarod electromagnetic and magnetic airborne geophysical survey location shown in interior Alaska (inset). Iditarod survey area shown with adjacent DGGS geophysical surveys, landmarks, relevant 1:250,000-scale quadrangle boundaries, mountain ranges, rivers, glaciers, and elevation hillshade.



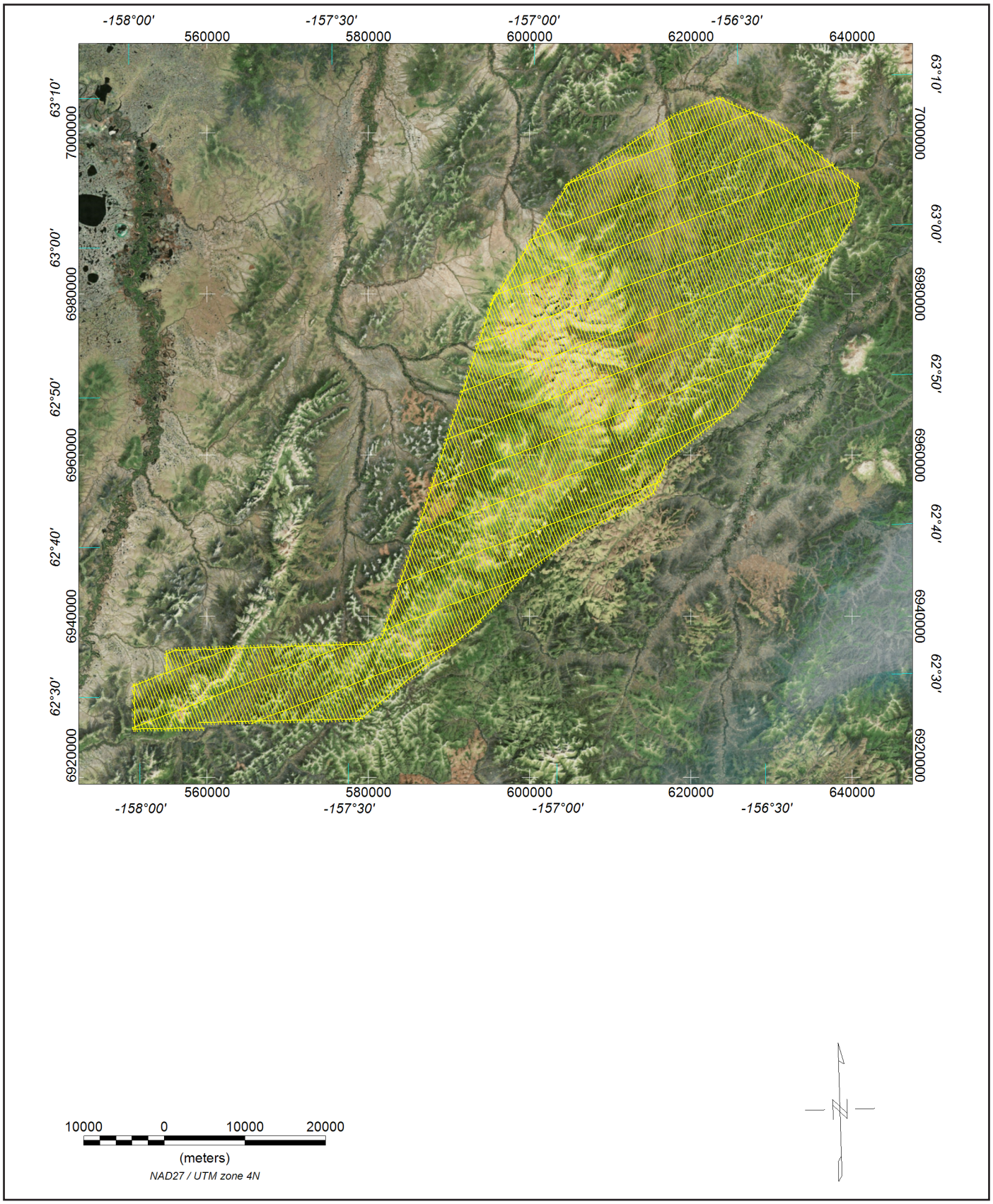


Figure 2. Flight path with orthometric image.

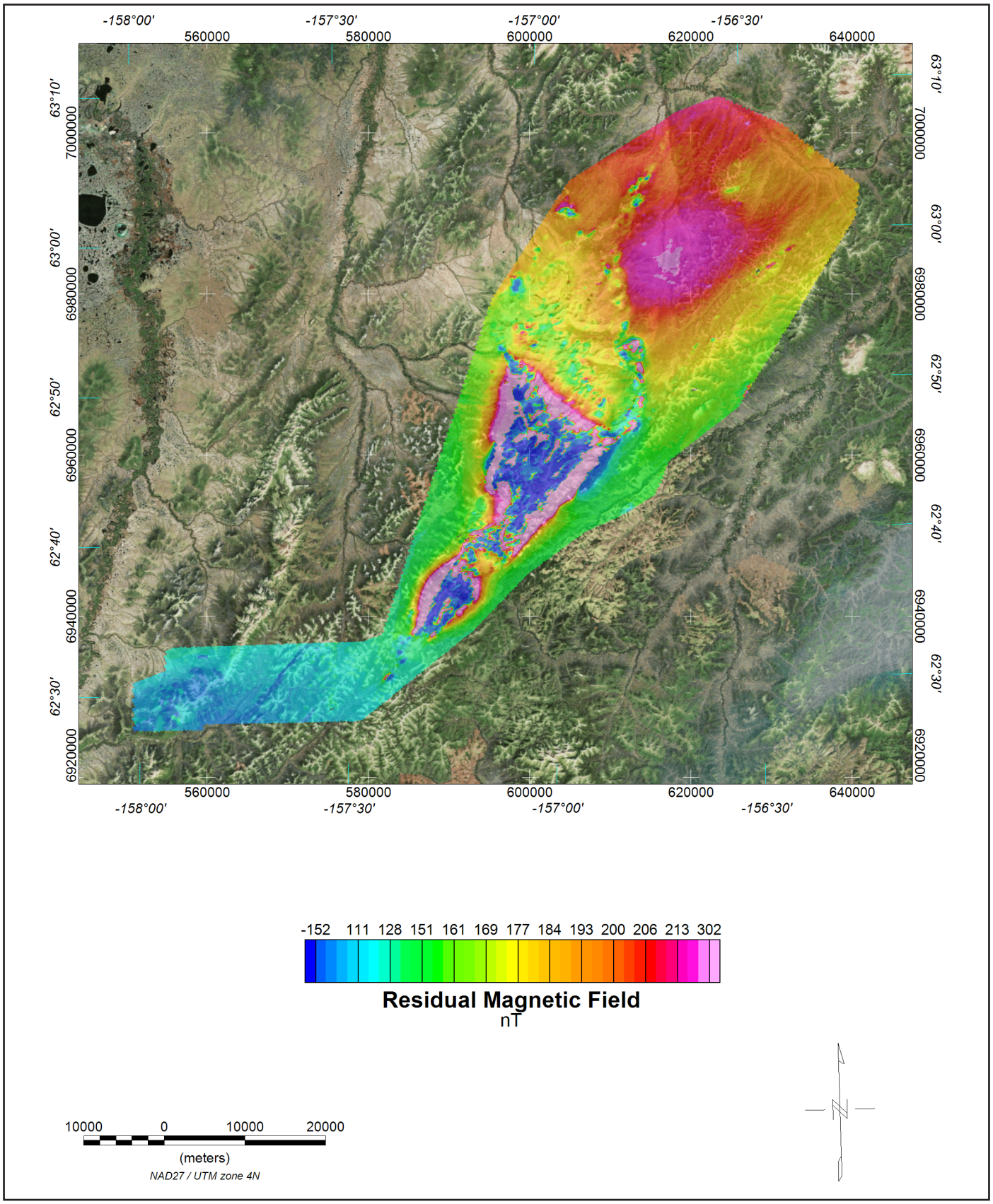


Figure 3. Residual Magnetic Field Grid with orthometric image. The residual magnetic field data were created using digitally recorded data from a Fugro D1344 cesium magnetometer with a Scintrex CS3 sensor. Data were collected at a sampling interval of 0.1 seconds. The magnetic data were (1) corrected for diurnal variations by subtracting the digitally recorded base station magnetic data, (2) IGRF corrected (IGRF model 2010, updated for date of flight and altimeter variations), (3) leveled to the tie line data, (4) a constant value of approximately 57,000 nT was added to all data, and (5) interpolated onto a regular 80 m grid using a modified Akima (1970) technique.

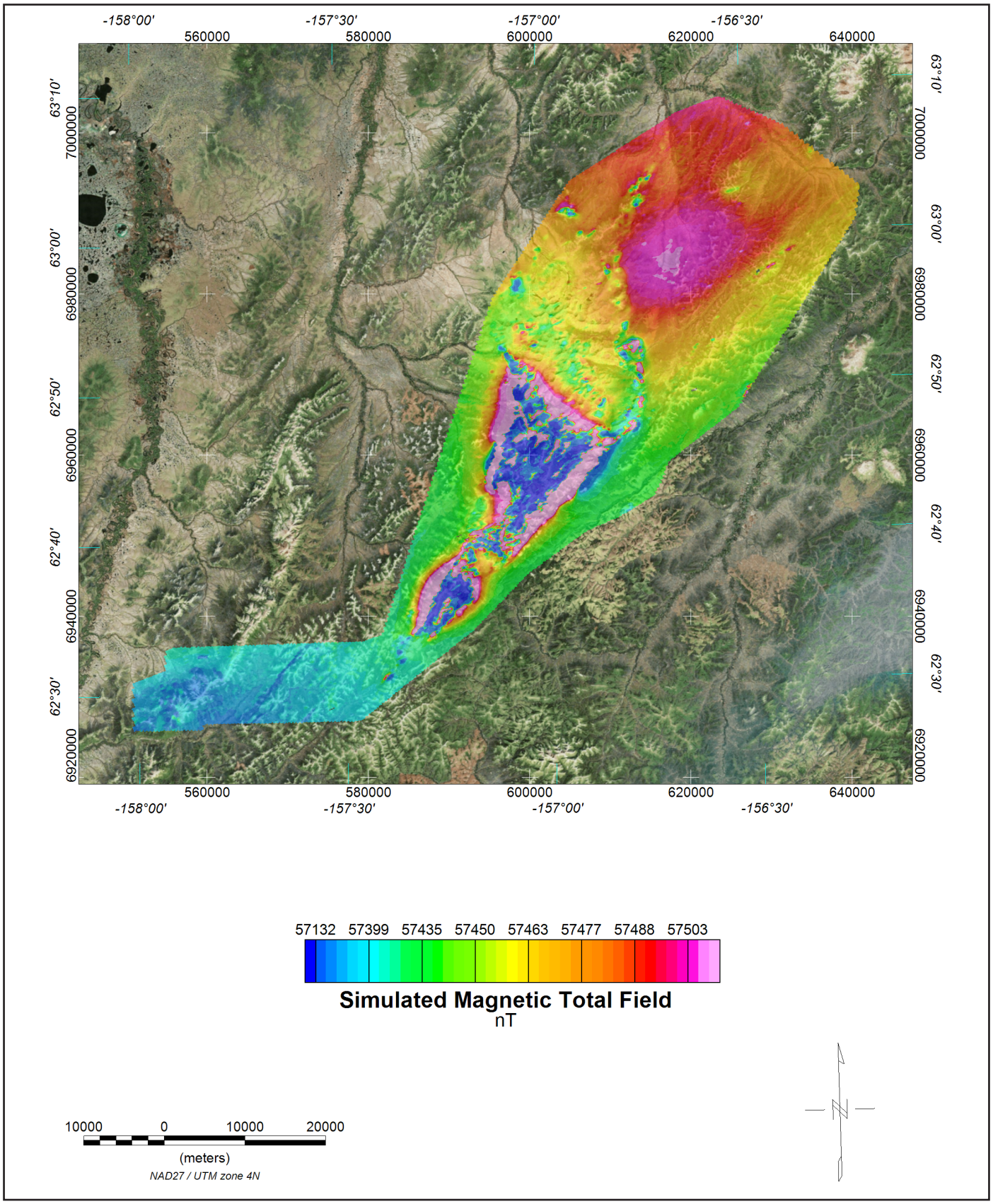


Figure 4. Simulated Magnetic Total Field Grid with orthometric image. The simulated magnetic total field data were created using digitally recorded data from a Fugro D1344 cesium magnetometer with a Scintrex CS3 sensor. Data were collected at a sampling interval of 0.1 seconds. The magnetic data were (1) corrected for diurnal variations by subtracting the digitally recorded base station magnetic data, (2) IGRF corrected (IGRF model 2010, updated for date of flight and altimeter variations), (3) leveled to the tie line data, (4) a constant value of approximately 57,000 nT was added to all data, and (5) interpolated onto a regular 80 m grid using a modified Akima (1970) technique.

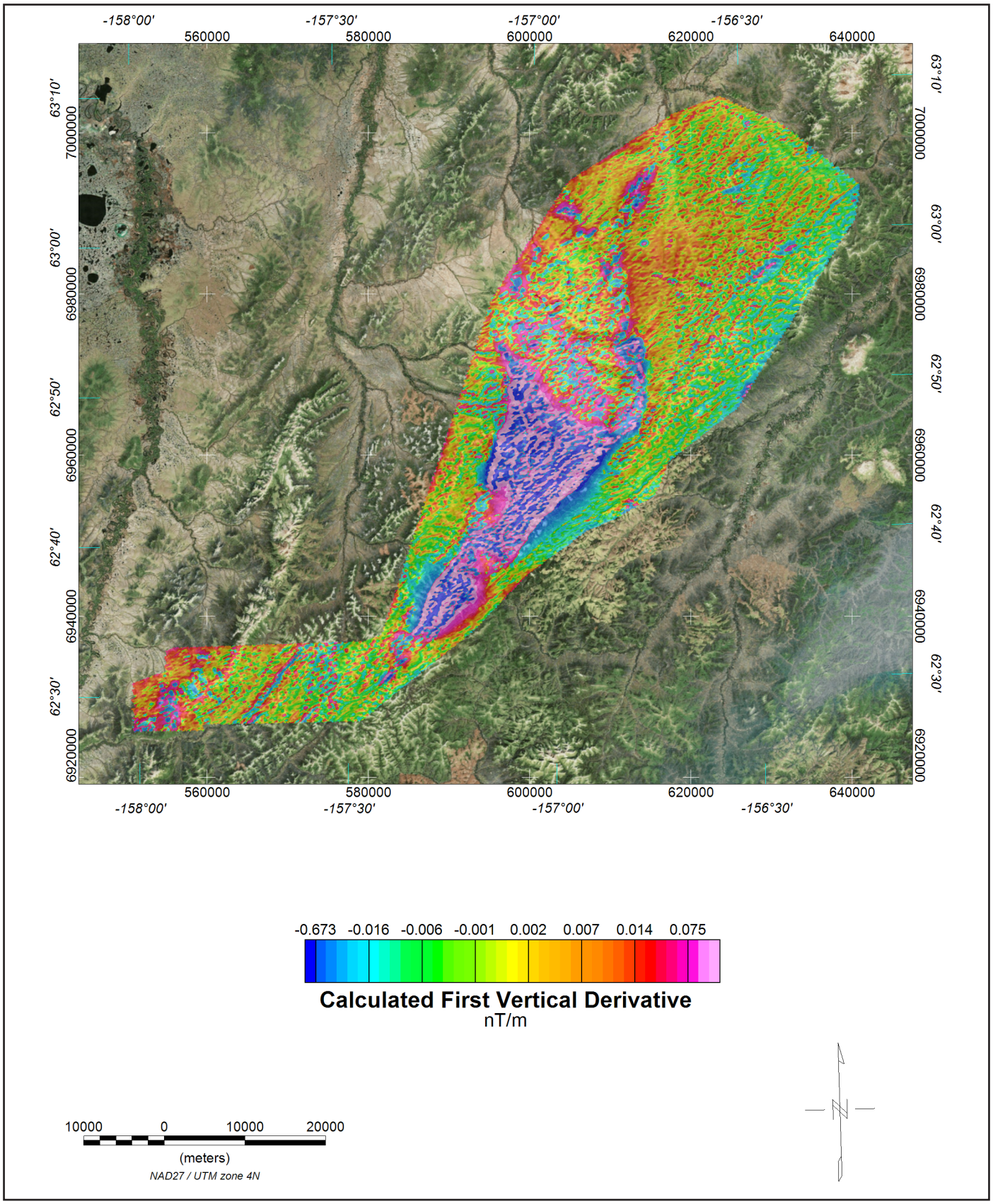


Figure 5. Calculated First Vertical Derivative Grid with orthometric image. The first vertical derivative grid was calculated from the diurnally-corrected, IGRF-corrected total magnetic field grid using a FFT base frequency domain filtering algorithm. The resulting first vertical derivative grid provides better definition and resolution of near- surface magnetic units and helps to identify weak magnetic features that may not be evident on the total field data.

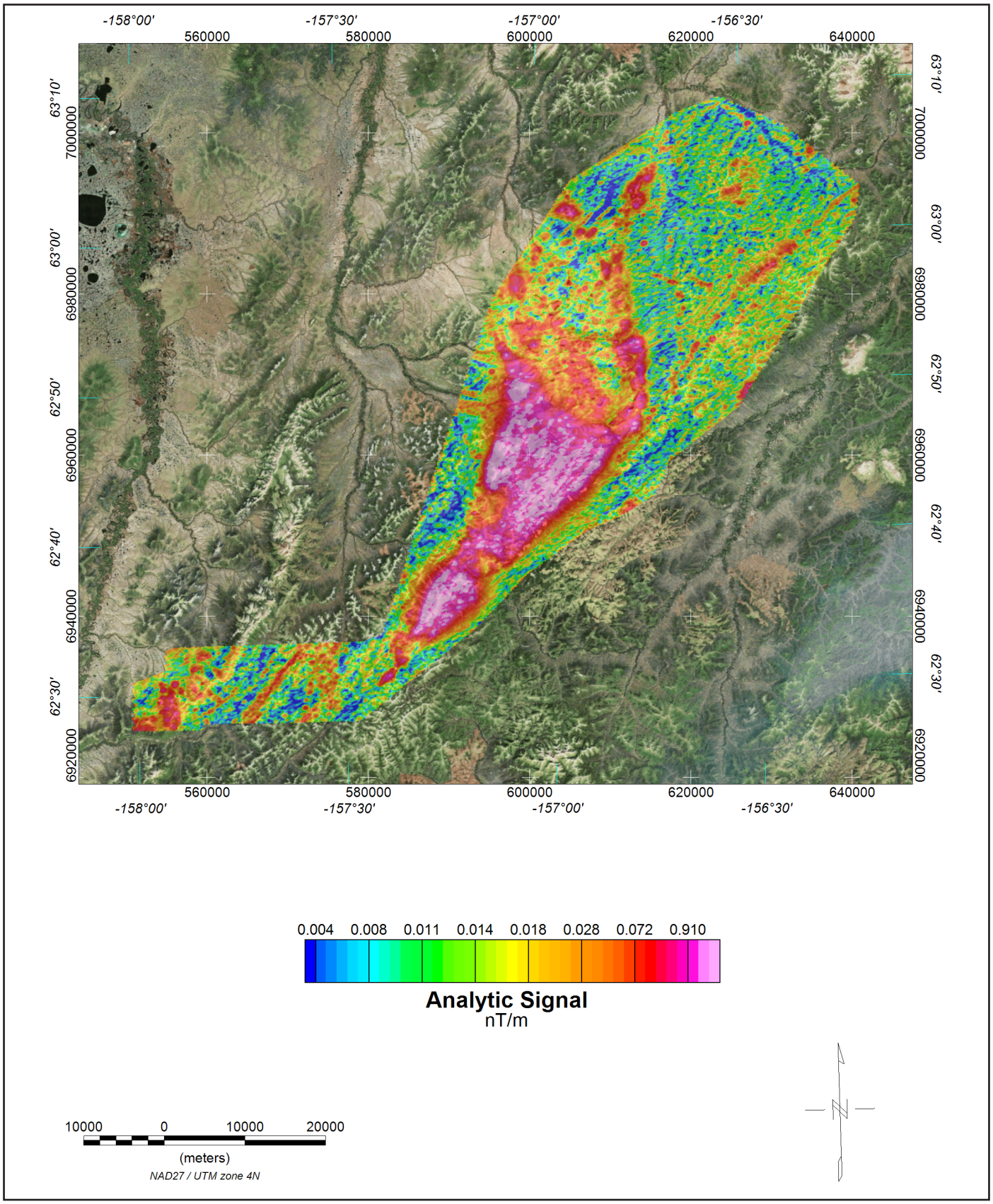


Figure 6. Analytic Signal Grid with orthometric image. Analytic signal is the total amplitude of all directions of magnetic gradient calculated from the sum of the squares of the three orthogonal gradients. Mapped highs in the calculated analytic signal of magnetic parameter locate the anomalous source body edges and corners (such as contacts, fault/shear zones, etc.). Analytic signal maxima are located directly over faults and contacts, regardless of structural dip, and independent of the direction of the induced and/or remanent magnetizations.

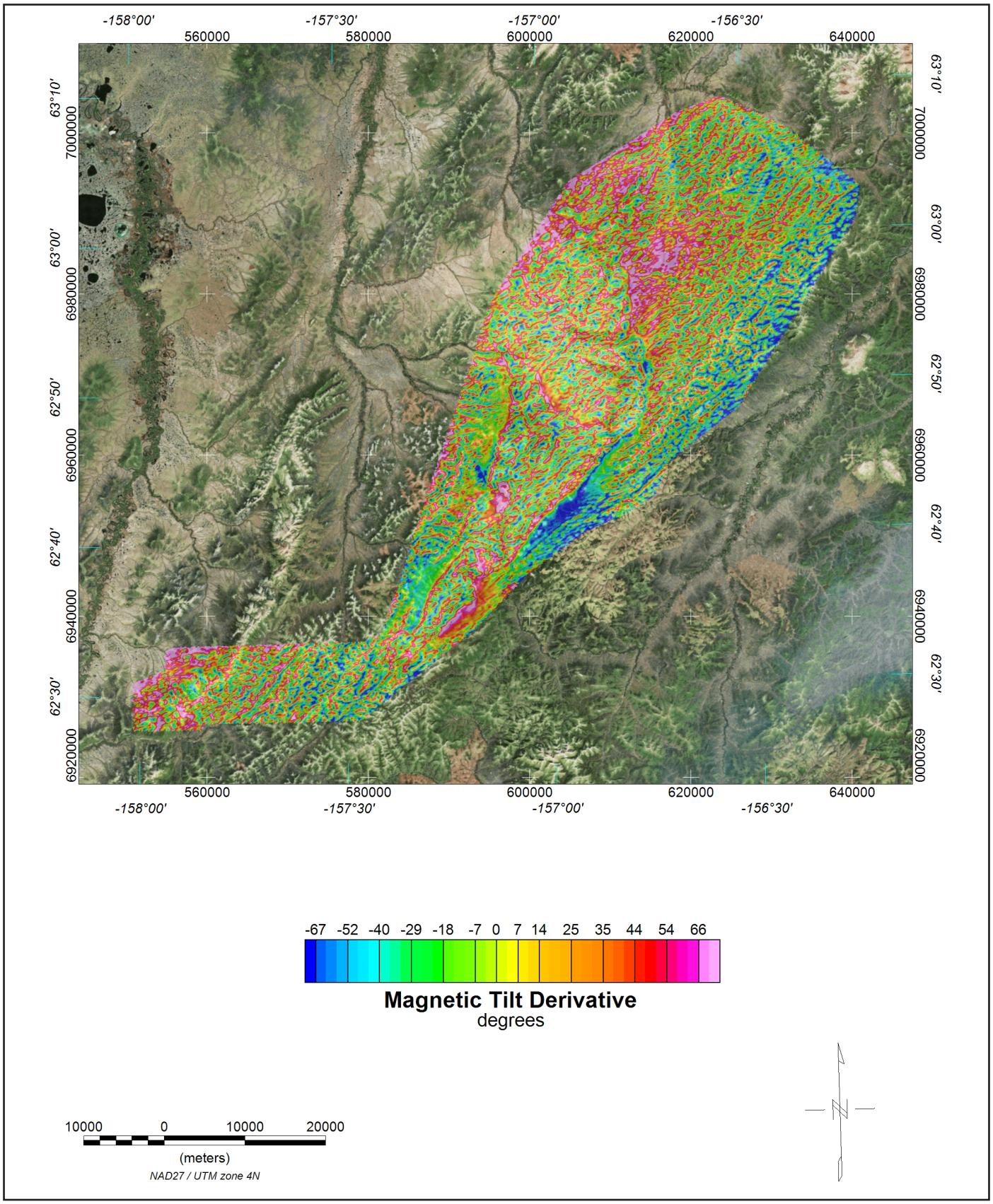


Figure 7. Magnetic tilt derivative grid with orthometric image. The tilt derivative is the angle between the horizontal gradient and the total gradient, which is useful for identifying the depth and type of source. The tilt angle is positive over the source, crosses through zero at, or near, the edge of a vertical sided source, and is negative outside the source region. It has the added advantage of responding equally well to shallow and deep sources and is able to resolve deeper sources that may be masked by larger responses from shallower sources.

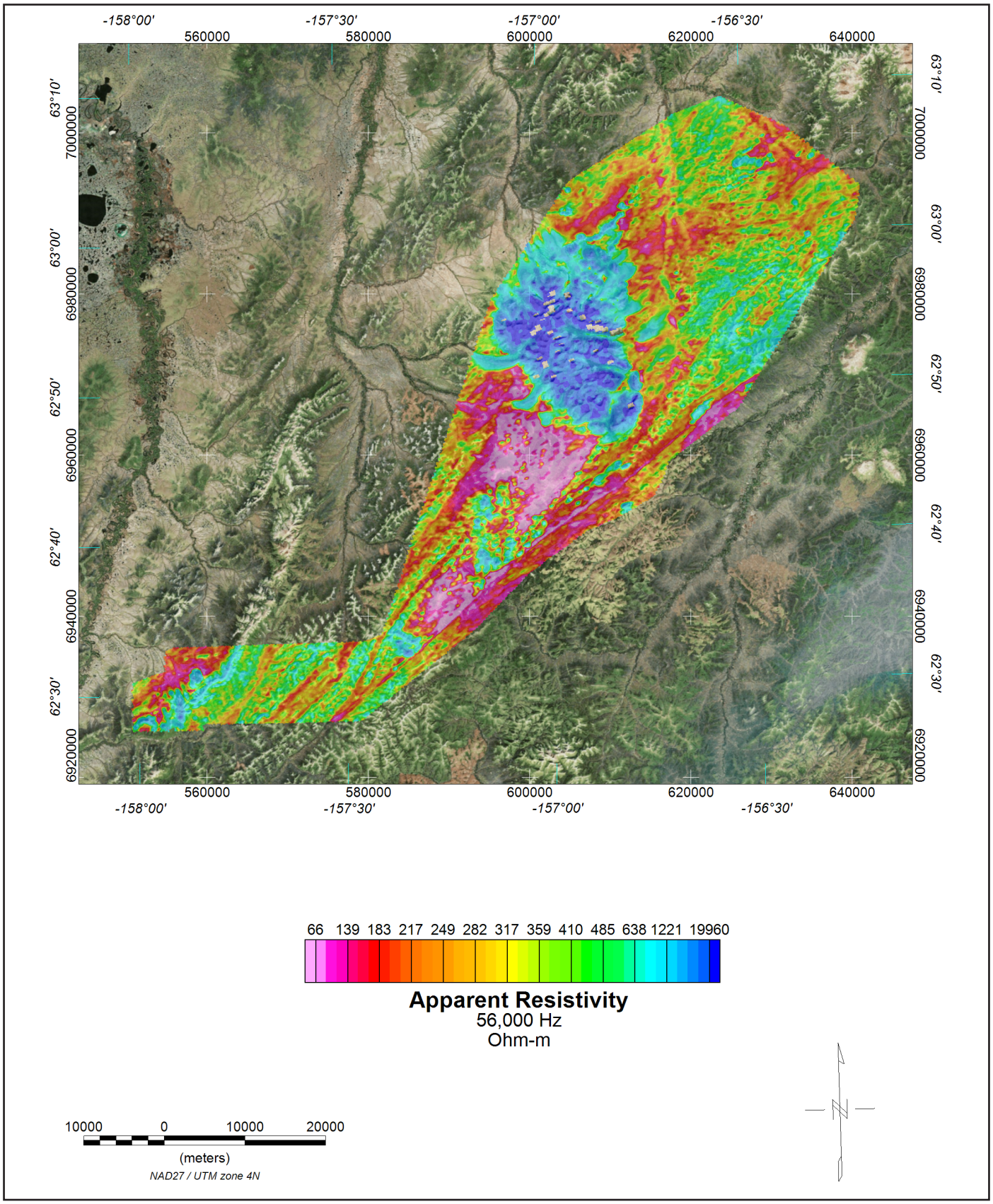


Figure 8. 56,000 Hz coplanar apparent resistivity grid with orthometric image. The DIGHEM^{V} EM system measured inphase and quadrature components at five frequencies. Two vertical coaxial coil-pairs operated at 1000 and 5500 Hz while three horizontal coplanar coil-pairs operated at 900, 7,200, and 56,000 Hz. EM data were sampled at 0.1 second intervals. The EM system responds to bedrock conductors, conductive overburden, and cultural sources. Apparent resistivity is generated from the inphase and quadrature component of the coplanar 56,000 Hz using the pseudo-layer half space model. The data were interpolated onto a regular 80 m grid using a modified Akima (1970) technique.

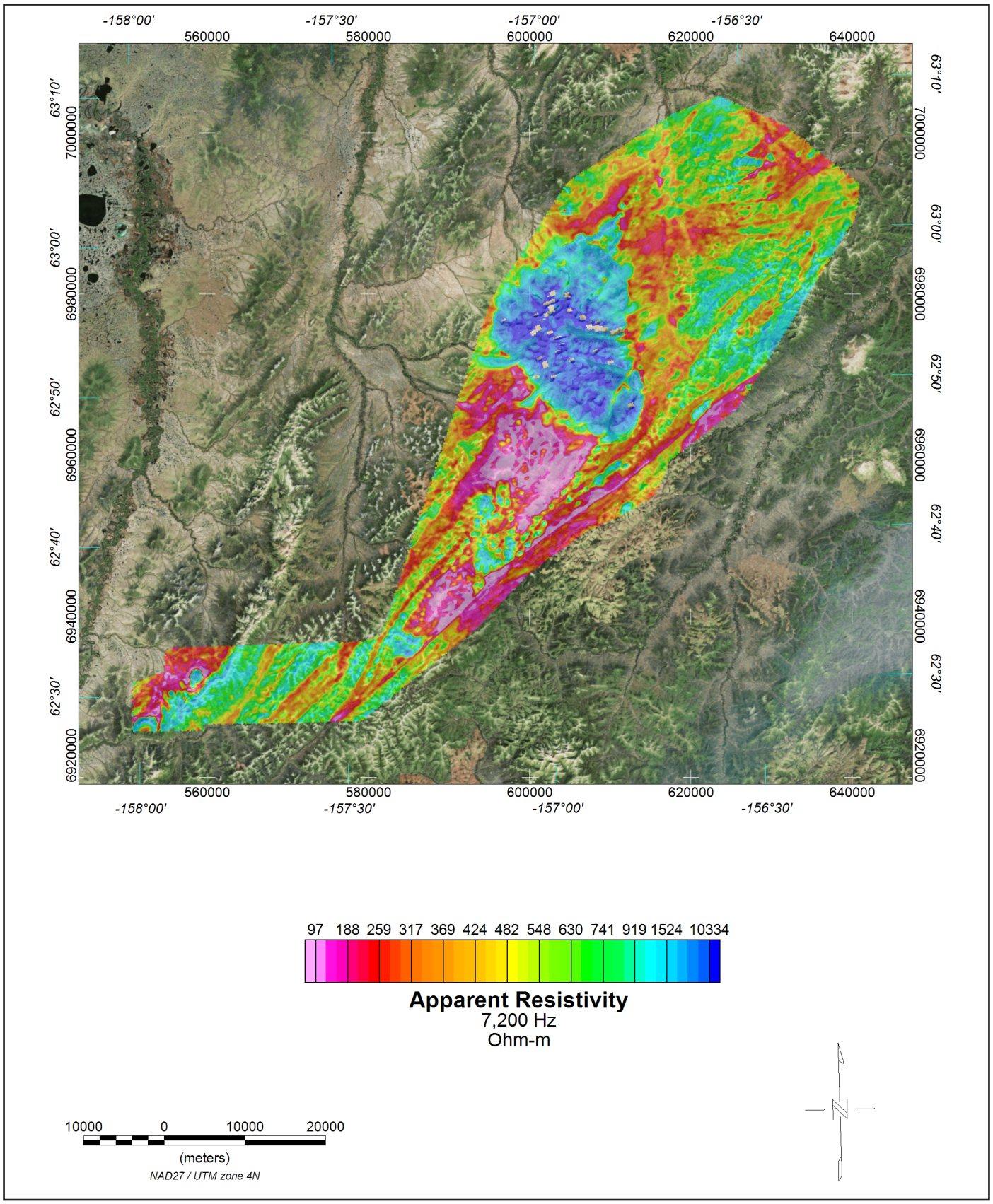


Figure 9. 7,200 Hz coplanar apparent resistivity grid with orthometric image. The DIGHEM^{V} EM system measured inphase and quadrature components at five frequencies. Two vertical coaxial coil-pairs operated at 1000 and 5500 Hz while three horizontal coplanar coil-pairs operated at 900, 7,200, and 56,000 Hz. EM data were sampled at 0.1 second intervals. The EM system responds to bedrock conductors, conductive overburden, and cultural sources. Apparent resistivity is generated from the inphase and quadrature component of the coplanar 7,200 Hz using the pseudo-layer half space model. The data were interpolated onto a regular 80 m grid using a modified Akima (1970) technique.

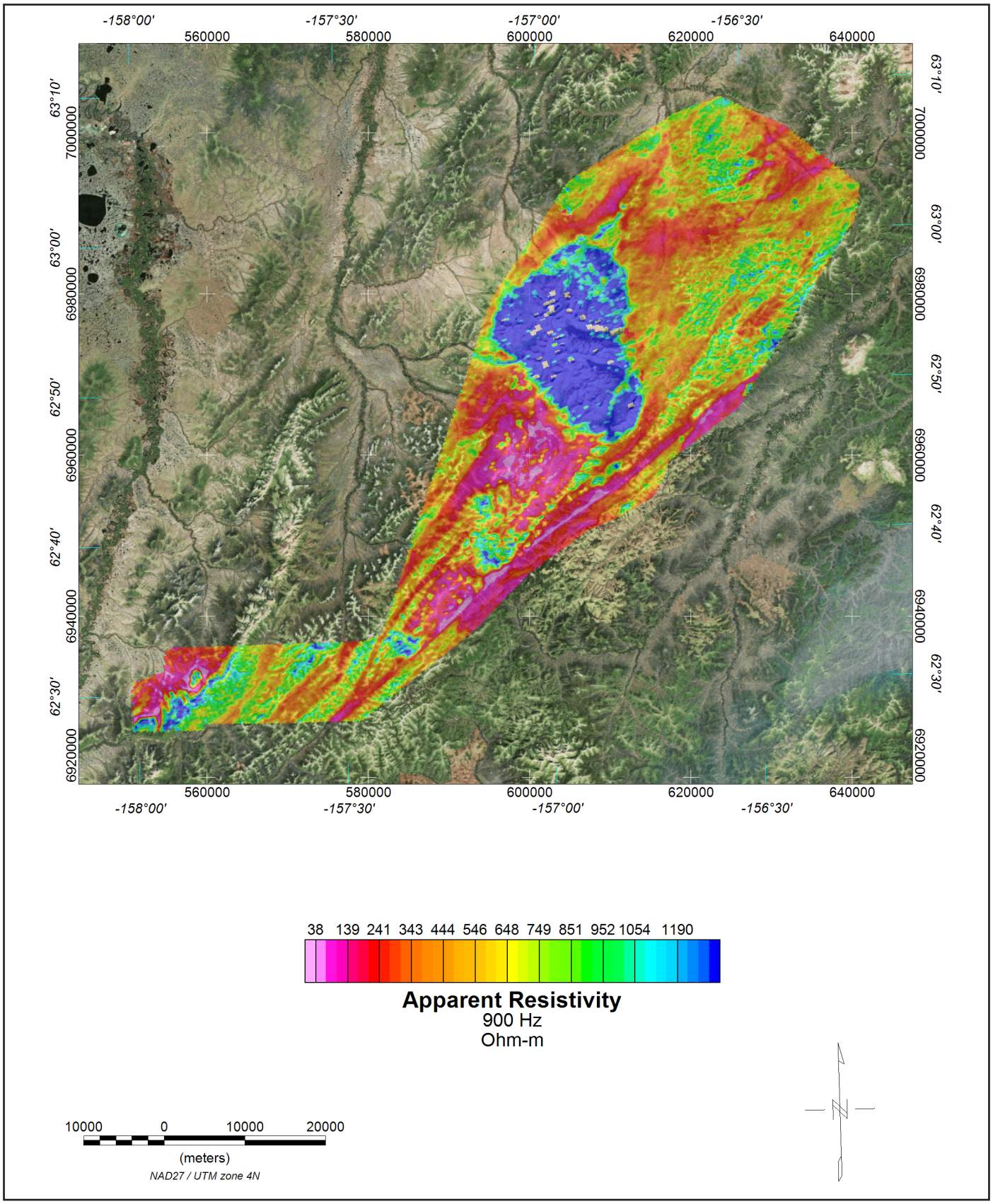


Figure 10. 900 Hz coplanar Apparent Resistivity Grid with orthometric image. The DIGHEM^{V} EM system measured inphase and quadrature components at five frequencies. Two vertical coaxial coil-pairs operated at 1000 and 5500 Hz while three horizontal coplanar coil-pairs operated at 900, 7,200, and 56,000 Hz. EM data were sampled at 0.1 second intervals. The EM system responds to bedrock conductors, conductive overburden, and cultural sources. Apparent resistivity is generated from the inphase and quadrature component of the coplanar 900 Hz using the pseudo-layer half space model. The data were interpolated onto a regular 80 m grid using a modified Akima (1970) technique

Table 1. 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: http://doi.org/10.14509/30222.

Map Title	Description
iditarod_residualmag_topo_map_1of3.pdf	residual magnetic field grid with topographic base map
iditarod_residualmag_topo_map_2of3.pdf	residual magnetic field grid with topographic base map
iditarod_residualmag_topo_map_3of3.pdf	residual magnetic field grid with topographic base map
iditarod_residualmag_contours_plss_map_1of3.pdf	residual magnetic field grid with data contours and public land survey system base layer
iditarod_residualmag_contours_plss_map_2of3.pdf	residual magnetic field grid with data contours and public land survey system base layer
iditarod_residualmag_contours_plss_map_3of3.pdf	residual magnetic field grid with data contours and public land survey system base layer
iditarod_calculated1vd_topo_map_1of3.pdf	calculated first vertical derivative grid with topographic base map
iditarod_calculated1vd_topo_map_2of3.pdf	calculated first vertical derivative grid with topographic base map
iditarod_calculated1vd_topo_map_3of3.pdf	calculated first vertical derivative grid with topographic base map
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iditarod_analyticsignal_contours_plss_map_2of3.pdf	analytic signal grid with data contours and public land survey system base layer
iditarod_analyticsignal_contours_plss_map_3of3.pdf	analytic signal grid with data contours and public land survey system base layer
iditarod_tiltderivative_contours_topo_map_1of3.pdf	magnetic tilt derivative grid with data contours and topographic base map
iditarod_tiltderivative_contours_topo_map_2of3.pdf	magnetic tilt derivative grid with data contours and topographic base map
iditarod_tiltderivative_contours_topo_map_3of3.pdf	magnetic tilt derivative grid with data contours and topographic base map
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iditarod_residualmag_shaded_tiltderivative_contours_topo_map_2of3.pdf	color shaded residual magnetic field grid with magnetic tilt derivative data contours and topographic base map
iditarod_residualmag_shaded_tiltderivative_contours_topo_map_3of3.pdf	color shaded residual magnetic field grid with magnetic tilt derivative data contours and topographic base map
iditarod_res56khz_topo_map_1of3.pdf	56,000 Hz apparent resistivity grid with topographic base map
iditarod_res56khz_topo_map_2of3.pdf	56,000 Hz apparent resistivity grid with topographic base map
iditarod_res56khz_topo_map_3of3.pdf	56,000 Hz apparent resistivity grid with topographic base map
iditarod_res56khz_contours_plss_map_1of3.pdf	56,000 Hz apparent resistivity grid with data contours and public land survey system base layer
iditarod_res56khz_contours_plss_map_2of3.pdf	56,000 Hz apparent resistivity grid with data contours and public land survey system base layer
iditarod_res56khz_contours_plss_map_3of3.pdf	56,000 Hz apparent resistivity grid with data contours and public land survey system base layer

Table 1, continued. 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: http://doi.org/10.14509/30222.

Map Title	Description
iditarod_res7200hz_topo_map_1of3.pdf	7,200 Hz apparent resistivity grid with topographic base map
iditarod_res7200hz_topo_map_2of3.pdf	7,200 Hz apparent resistivity grid with topographic base map
iditarod_res7200hz_topo_map_3of3.pdf	7,200 Hz apparent resistivity grid with topographic base map
iditarod_res7200hz_contours_plss_map_1of3.pdf	7,200 Hz apparent resistivity grid with data contours and public land survey system base layer
iditarod_res7200hz_contours_plss_map_2of3.pdf	7,200 Hz apparent resistivity grid with data contours and public land survey system base layer
iditarod_res7200hz_contours_plss_map_3of3.pdf	7,200 Hz apparent resistivity grid with data contours and public land survey system base layer
iditarod_res900hz_topo_map_1of3.pdf	900 Hz apparent resistivity grid with topographic base map
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iditarod_emanomalies_residualmag_detailed_topo_map_3of6.pdf	detailed electromagnetic anomalies with residual magnetic field grid and topographic base map
iditarod_emanomalies_residualmag_detailed_topo_map_4of6.pdf	detailed electromagnetic anomalies with residual magnetic field grid and topographic base map
iditarod_emanomalies_residualmag_detailed_topo_map_5of6.pdf	detailed electromagnetic anomalies with residual magnetic field grid and topographic base map
iditarod_emanomalies_residualmag_detailed_topo_map_6of6.pdf	detailed electromagnetic anomalies with residual magnetic field grid and topographic base map
iditarod_interpretation_plss_map_1of6.pdf	interpretation based on the geophysical data with public land survey system base layer
iditarod_interpretation_plss_map_2of6.pdf	interpretation based on the geophysical data with public land survey system base layer
iditarod_interpretation_plss_map_3of6.pdf	interpretation based on the geophysical data with public land survey system base layer
iditarod_interpretation_plss_map_4of6.pdf	interpretation based on the geophysical data with public land survey system base layer
iditarod_interpretation_plss_map_5of6.pdf	interpretation based on the geophysical data with public land survey system base layer
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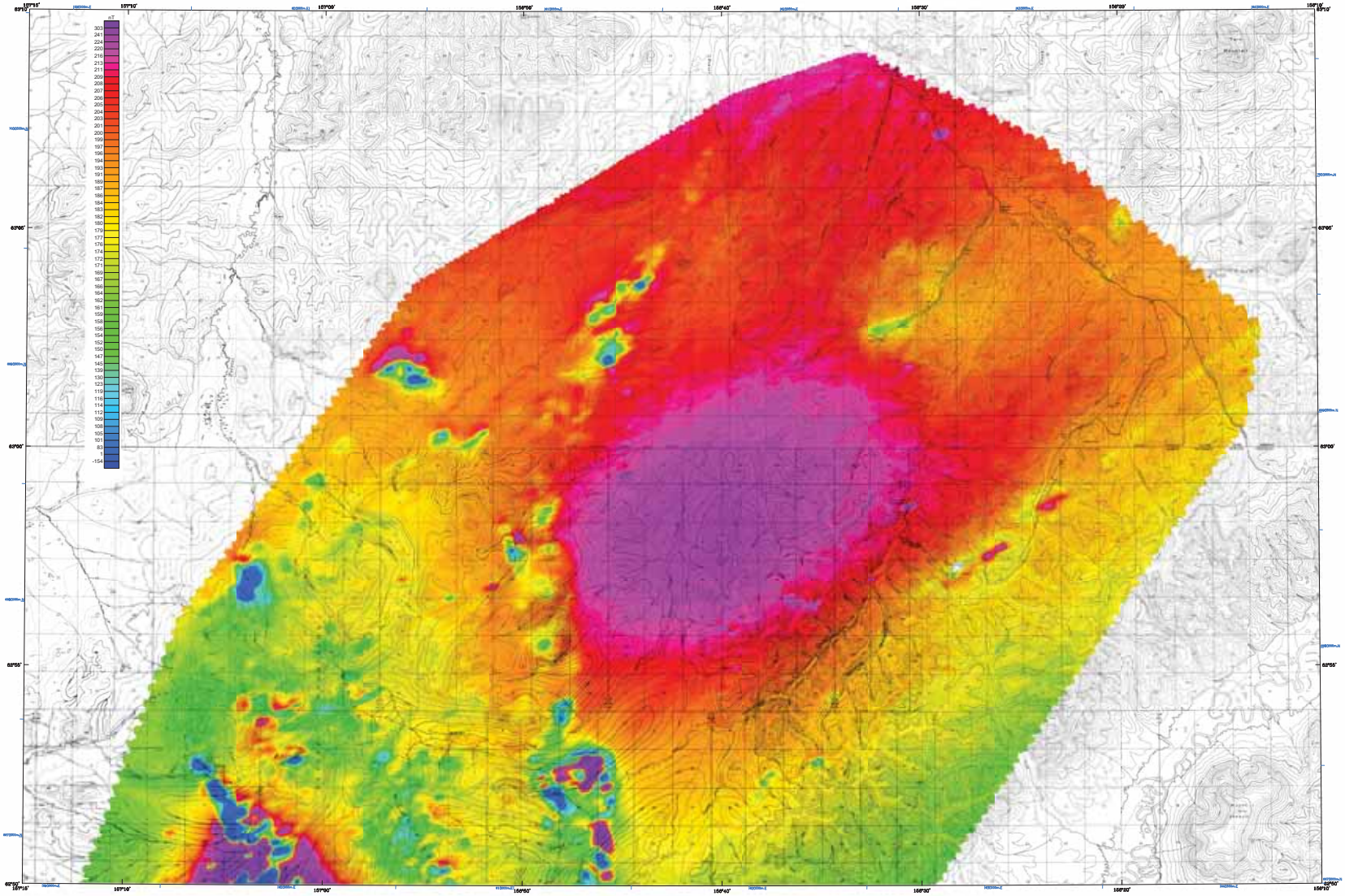


Base from U.S. Geological Survey Bettles D-1, 1950; D-2, 1954; D-3, 1954; Ophir A-4, 1950; A-5, 1950; A-6, 1954; Goodnews, Alaska

SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

CONTOUR INTERVAL 100 FEET
DATUM MEAN SEA LEVEL

APPROXIMATE MEAN DECLINATION, 2010

RESIDUAL MAGNETIC FIELD OF THE IDITAROD SURVEY AREA, INNOKO, IDITAROD, and McGRATH MINING DISTRICTS, WESTERN ALASKA

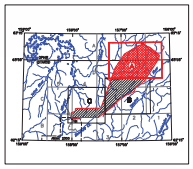
PARTS OF IDITAROD AND OPHIR QUADRANGLES

by

Laurel E. Burns, Fugro Airborne Surveys Corp., and Fugro GeoServices, Inc.

2011

LOCATION INDEX



DESCRIPTIVE NOTES

The geophysical data were acquired with a DIGHEM V Electromagnetic (EM) system and a Fugro D1344 cesium magnetometer with a Scintrex CS3 cesium sensor. The EM and magnetic sensors were flown at a height of 100 feet. In addition the survey recorded data from radar and laser altimeters, GPS navigation system, 50/60 Hz monitors and video camera. Flights were performed with an AS-350-B3 Squirrel helicopter at a mean terrain clearance of 200 feet along NW-SE (340°) survey flight lines with a spacing of a quarter of a mile. Tie lines were flown perpendicular to the flight lines at intervals of approximately 3 miles.

A Novatel OEM4-G2L Global Positioning System was used for navigation. The helicopter position was derived every 0.5 seconds using post-flight differential positioning to a relative accuracy of better than 5m. Flight path positions were projected onto the Clarke 1866 (UTM zone 4) spheroid, 1927 North American datum using a central meridian (CM) of 159°, a north constant of 0 and an east constant of 500,000. Positional accuracy of the presented data is better than 10m with respect to the UTM grid.

RESIDUAL MAGNETIC FIELD

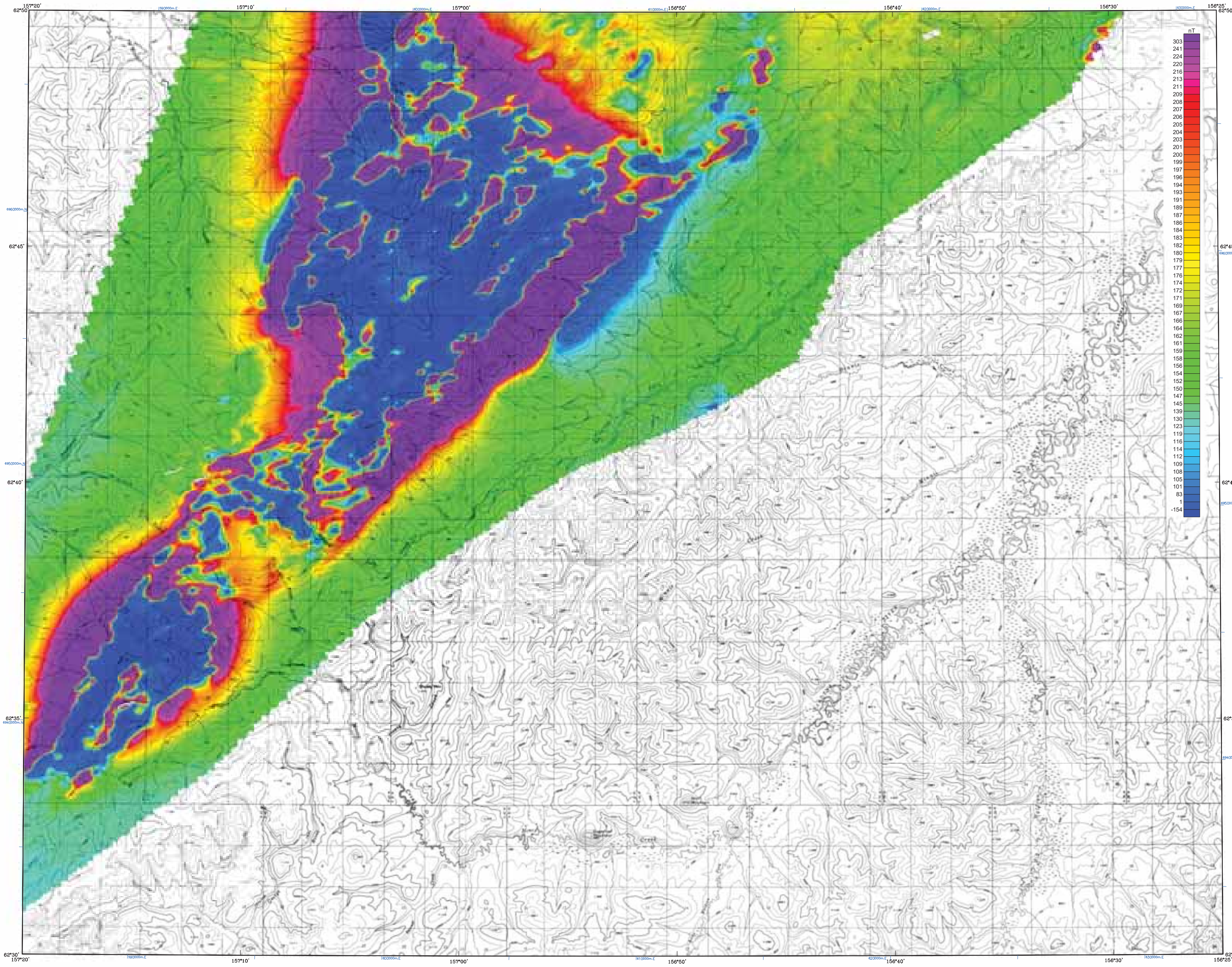
The magnetic total field data were processed using digitally recorded data from a Fugro D1344 magnetometer with a Scintrex CS3 cesium sensor. Data were collected at a sampling interval of 0.1 seconds. The magnetic data were (1) corrected for diurnal variation by subtraction of the digitally recorded base station magnetic data, (2) IGRF corrected (IGRF model 2010, updated for date of flight and altimeter variations), (3) leveled to the tie line data, and (4) interpolated onto a regular 80 m grid using a modified Akima (1970) technique. All grids were then resampled from the 80 m cell size down to a 25 m cell size to produce the maps and final grids contained in this publication.

Akima, H., 1970, A new method of interpolation and smooth curve fitting based on local procedures: Journal of the Association of Computing Machinery, v. 17, no. 4, p. 589–602.

SURVEY HISTORY

This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources, Division of Geological & Geophysical Surveys (DGGS), and Fugro GeoServices, Inc. Airborne geophysical data for the area were acquired and processed by Fugro Airborne Surveys Corp. in 2010 and 2011. Previously flown DGGS surveys adjacent to the current survey are shown in the location map by dashed lines, survey name, and date of publication. The project was funded by the Alaska State Legislature as part of the Alaska Airborne Geological & Geophysical Mineral Inventory Program.

All data and maps produced to date from this survey are available in digital format on DVD for a nominal fee through DGGS, 3354 College Road, Fairbanks, Alaska, 99709-3707, and are downloadable for free from the DGGS website (www.dggs.alaska.gov/pubs). Maps are also available on paper through the DGGS office, and are viewable online at the website in Adobe Acrobat .PDF file format.



Base from U.S. Geological Survey Iditarod C-1, 1971; C-2, 1954; C-3, 1954; D-1, 1966; D-2, 1954; D-3, 1954; Quadrangles, Alaska

SCALE 1:63,360

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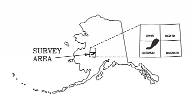
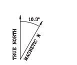
1 0 1 2 3 4 5 KILOMETERS

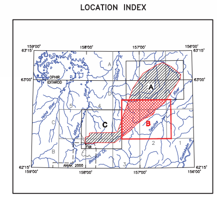
CONTOUR INTERVAL 100 FEET
DATUM MEAN SEA LEVEL





APPROXIMATE MEAN
DECLINATION, 2010

LOCATION INDEX



RESIDUAL MAGNETIC FIELD OF THE IDITAROD SURVEY AREA, INNOKO, IDITAROD, and McGRATH MINING DISTRICTS, WESTERN ALASKA

PARTS OF IDITAROD AND OPHIR QUADRANGLES

by
Laurel E. Burns, Fugro Airborne Surveys Corp., and Fugro GeoServices, Inc.
2011

DESCRIPTIVE NOTES

The geophysical data were acquired with a DIGHEMV Electromagnetic (EM) system and a Fugro D1344 cesium magnetometer with a Scintrex CS3 cesium sensor. The EM and magnetic sensors were flown at a height of 100 feet. In addition the survey recorded data from radar and laser altimeters, GPS navigation system, 50/60 Hz monitors and video camera. Flights were performed with an AS-350-B3 Squirrel helicopter at a mean terrain clearance of 200 feet along NW-SE (340°) survey flight lines with a spacing of a quarter of a mile. Tie lines were flown perpendicular to the flight lines at intervals of approximately 3 miles.

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RESIDUAL MAGNETIC FIELD

The magnetic total field data were processed using digitally recorded data from a Fugro D1344 magnetometer with a Scintrex CS3 cesium sensor. Data were collected at a sampling interval of 0.1 seconds. The magnetic data were (1) corrected for diurnal variations by subtraction of the digitally recorded base station magnetic data, (2) IGRF corrected (IGRF model 2010, updated for date of flight and altimeter variations), (3) leveled to the tie line data, and (4) interpolated onto a regular 80 m grid using a modified Akima (1970) technique. All grids were then resampled from the 80 m cell size down to a 25 m cell size to produce the maps and final grids contained in this publication.

Akima, H., 1970, A new method of interpolation and smooth curve fitting based on local procedures: Journal of the Association of Computing Machinery, v. 17, no. 4, p. 589-602.

SURVEY HISTORY

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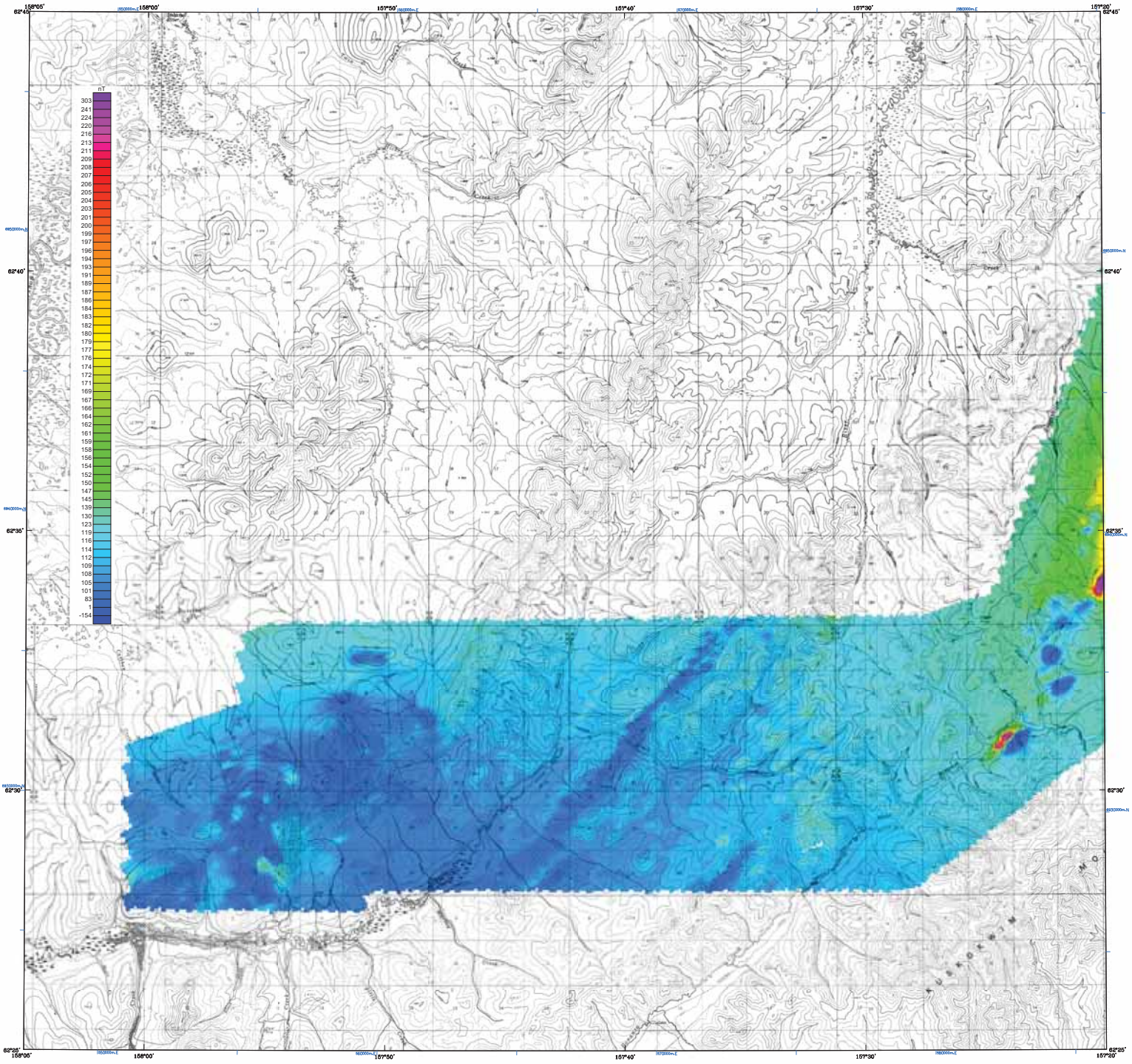

Base from U.S. Geological Survey Bilateral B-3, 1957; B-4, 1954; B-5, 1954; C-3, 1954; C-4, 1954; C-5, 1972; Quadrangles, Alaska

APPROXIMATE MEAN DECLINATION, 2010

SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

CONTOUR INTERVAL 500 FEET
DATUM MEAN SEA LEVEL

RESIDUAL MAGNETIC FIELD OF THE IDITAROD SURVEY AREA, INNOKO, IDITAROD, and McGRATH MINING DISTRICTS, WESTERN ALASKA

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2011

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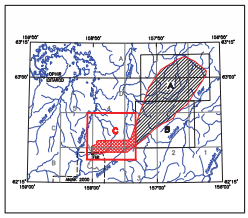

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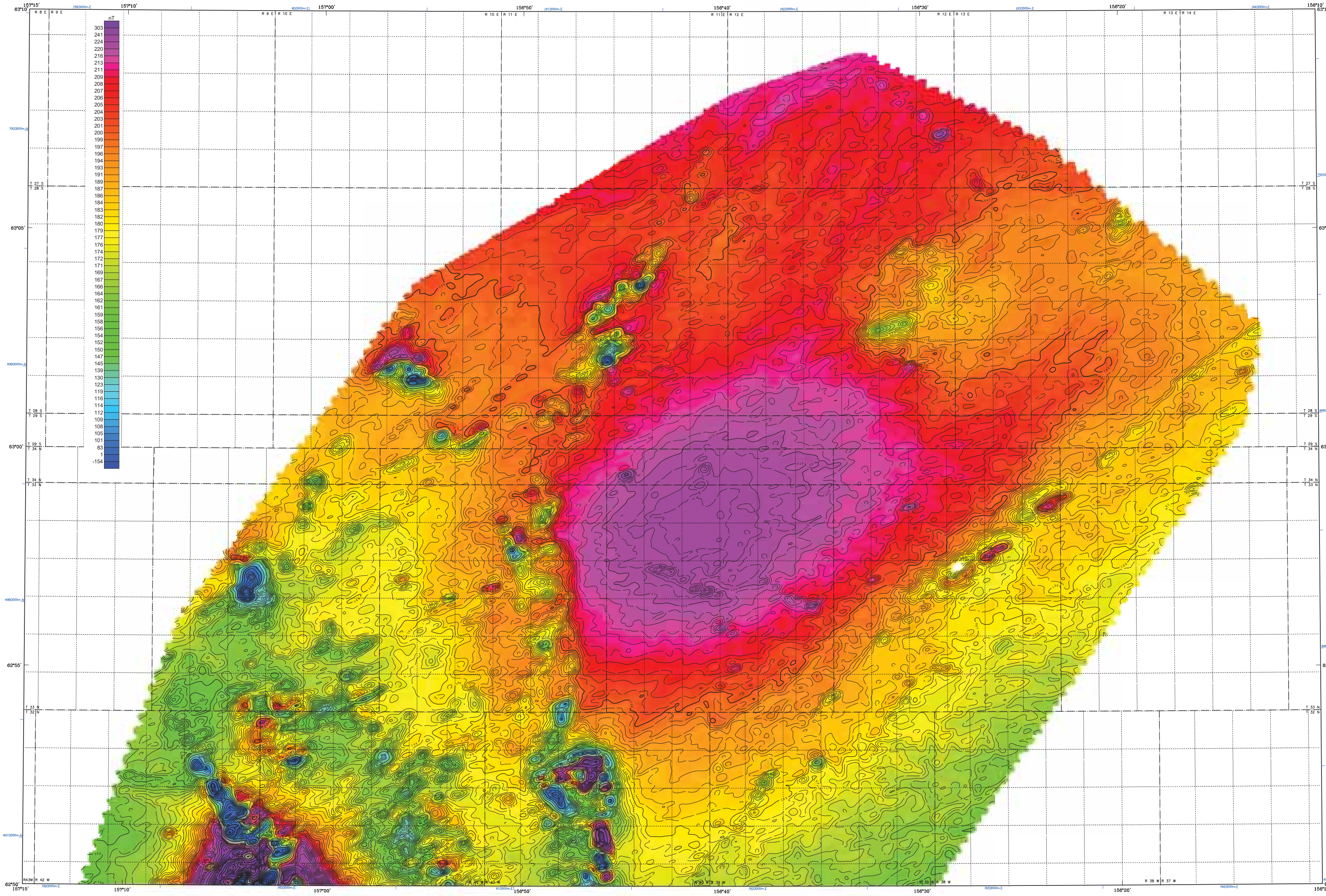
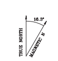
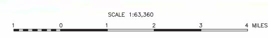


Section outlines from U.S. Geological Survey Iditarod D-1, 1966; D-2, 1954; D-3, 1954; Ophir A-1, 1966; A-2, 1965; A-3, 1954; Quadrangles, Alaska





RESIDUAL MAGNETIC FIELD AND DATA CONTOURS OF THE IDITAROD SURVEY AREA, INNOKO, IDITAROD, and McGRATH MINING DISTRICTS, WESTERN ALASKA

PARTS OF IDITAROD AND OPHIR QUADRANGLES

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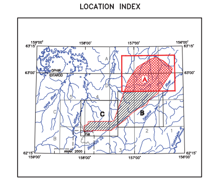

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MAGNETIC CONTOURS

____ (heavy solid)	100 nT
____ (solid)	20 nT
____ (thin solid)	4 nT
— — — (dashed)	2 nT

SURVEY HISTORY

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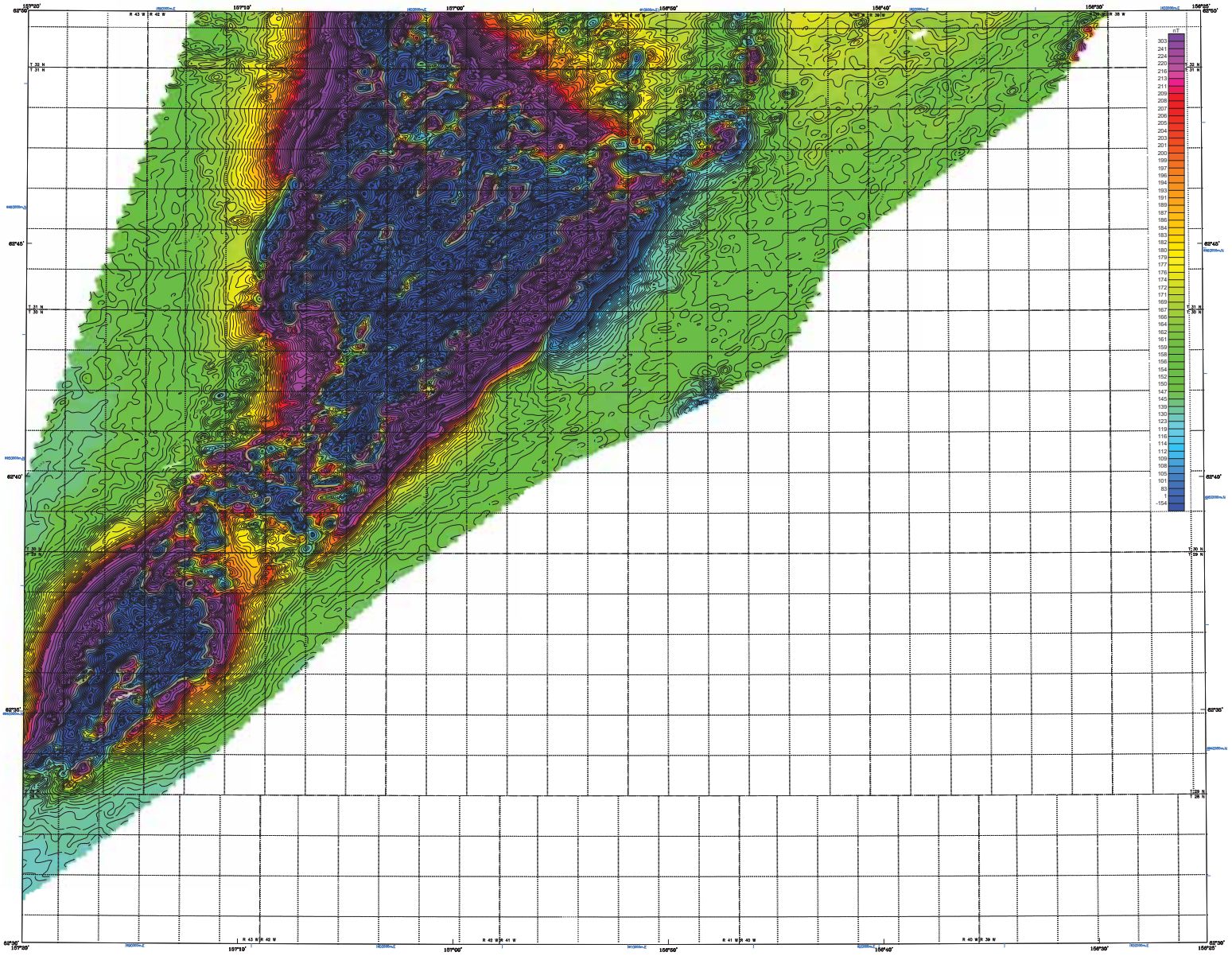

Topo outlines from U.S. Geological Survey Mitarod C-1, 1971; C-2, 1954; C-3, 1954; D-4, 1955; D-5, 1954; D-6, 1954 Quadrangles, Alaska

SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

APPROXIMATE MEAN DECLINATION, 2010

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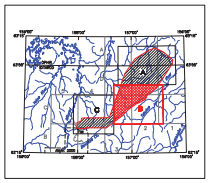

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100 nT

20 nT

4 nT

2 nT

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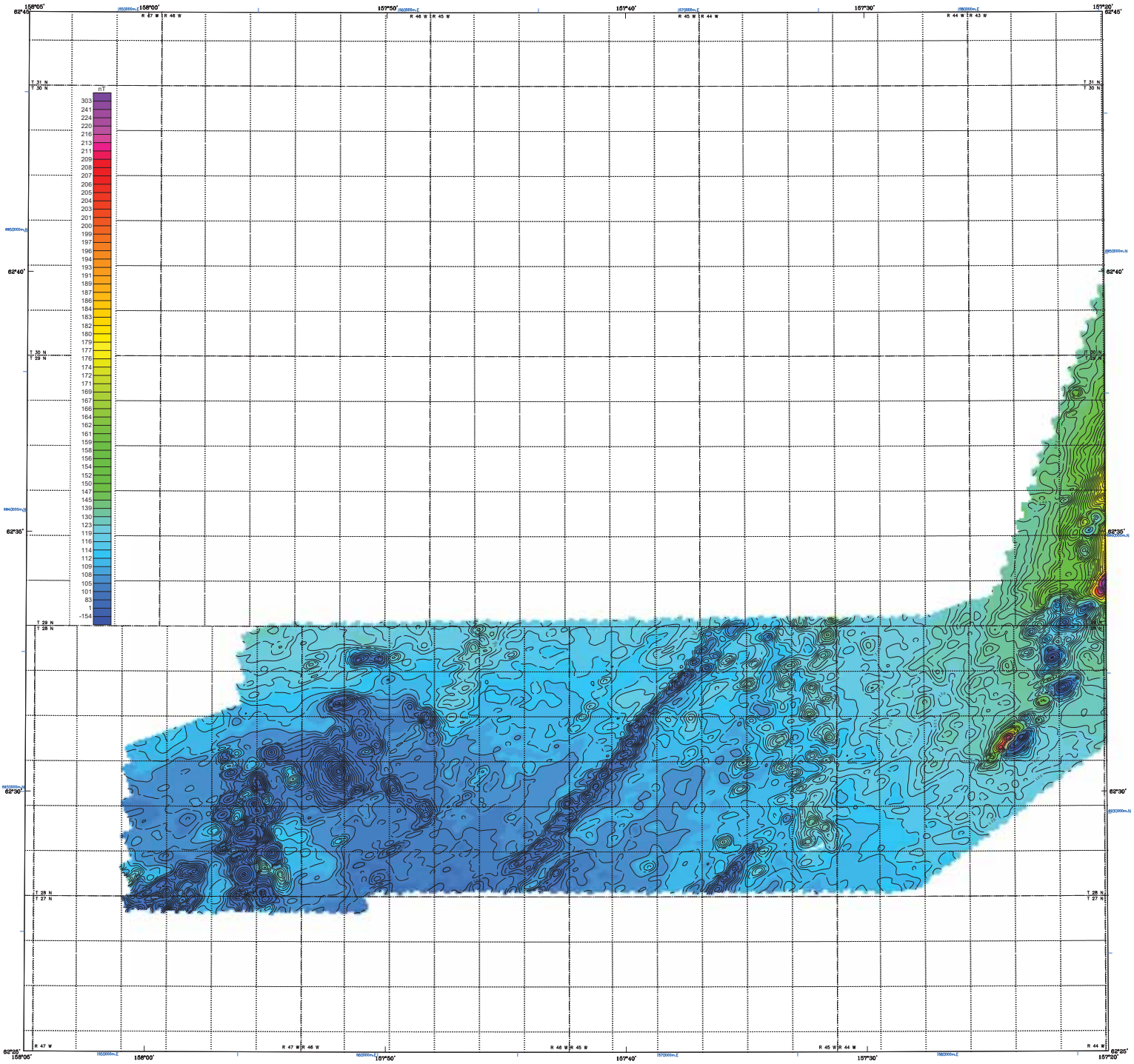

Section outlines from U.S. Geological Survey Mitored D-3, 1957; B-4, 1954; B-5, 1954; C-3, 1954; C-4, 1954; C-5, 1952 Quadrangles, Alaska

SCALE 1:63,360

1 0 1 2 3 4 MILES

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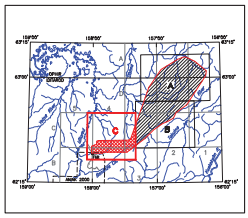

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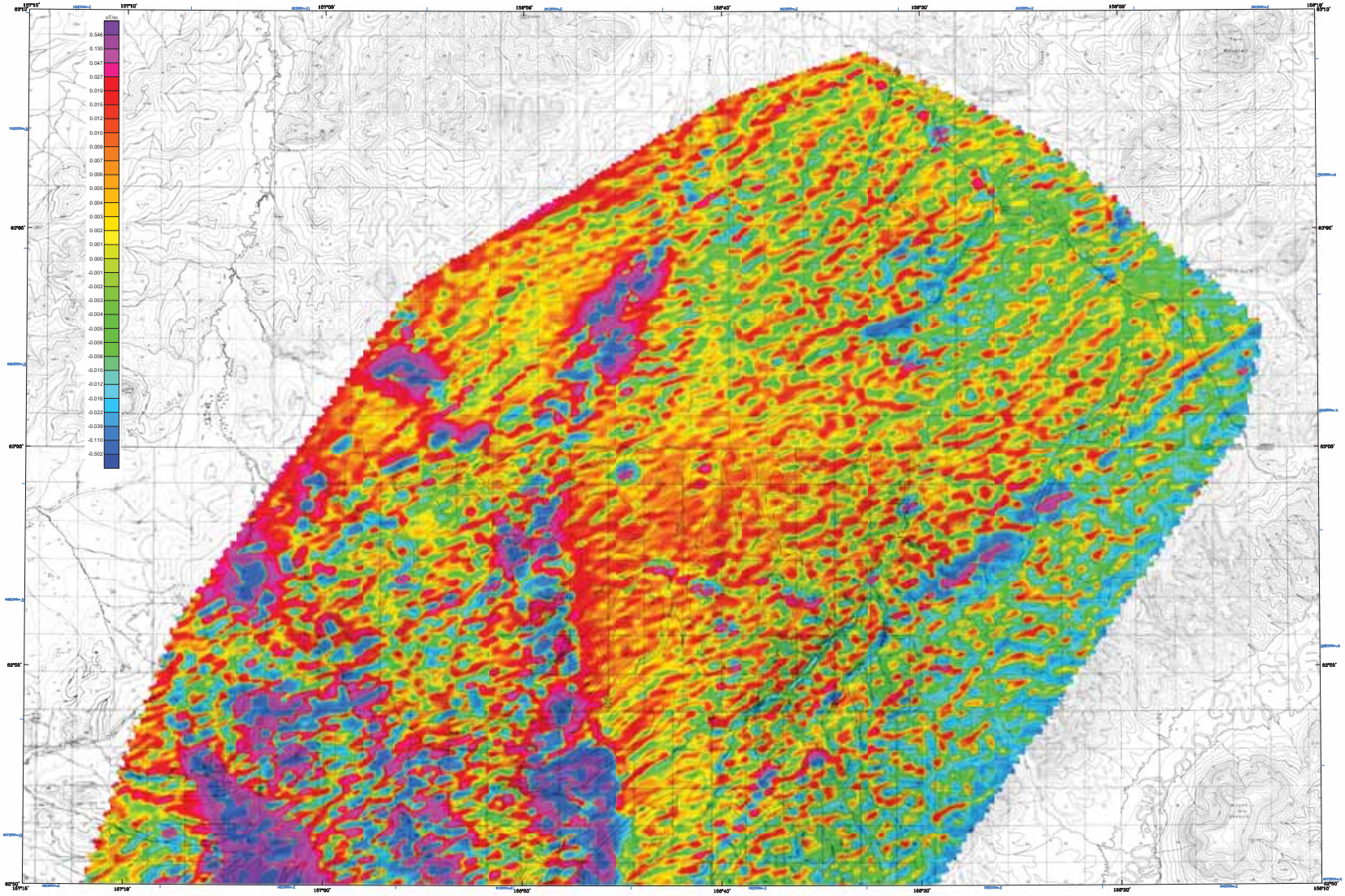

Base from U.S. Geological Survey Bettles B-1, 1956; B-2, 1954; B-3, 1954; Ophir A-4, 1956; A-5, 1956; A-6, 1954; Goodnews, Alaska.

SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

CONTOUR INTERVAL 100 FEET
DATUM MEAN SEA LEVEL

FIRST VERTICAL DERIVATIVE OF THE MAGNETIC FIELD OF THE IDITAROD SURVEY AREA, INNOKO, IDITAROD, and McGRATH MINING DISTRICTS, WESTERN ALASKA

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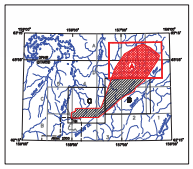

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COLOR BAR HISTOGRAM

Approximately 98% of the first vertical derivative of the magnetic field for the Moran Survey Area dataset fie within the range displayed on the color bar. Data values actually range from −10.337 nT/m (dark blue) to about 9.423 nT/m (magenta).

FIRST VERTICAL DERIVATIVE OF THE MAGNETIC FIELD

The magnetic total field data were processed using digitally recorded data from a Fugro D1344 magnetometer with a Scintrex CS3 cesium sensor. Data were collected at a sampling interval of 0.1 seconds. The magnetic data were (1) corrected for diurnal variations by subtraction of the digitally recorded base station magnetic data, (2) IGRF corrected (IGRF model 2010, updated for date of flight and altimeter variations), (3) leveled to the tie line data, and (4) interpolated onto a regular 80 m grid using a modified Akima (1970) technique. All grids were then resampled from the 80 m cell size down to a 25 m cell size to produce the maps and final grids contained in this publication. The first vertical derivative grid was calculated from the processed total magnetic field grid using a FFT based frequency domain filtering algorithm. The resulting first vertical derivative grid provides better definition and resolution of near-surface magnetic units and helps to identify weak magnetic features that may not be evident on the total field data.

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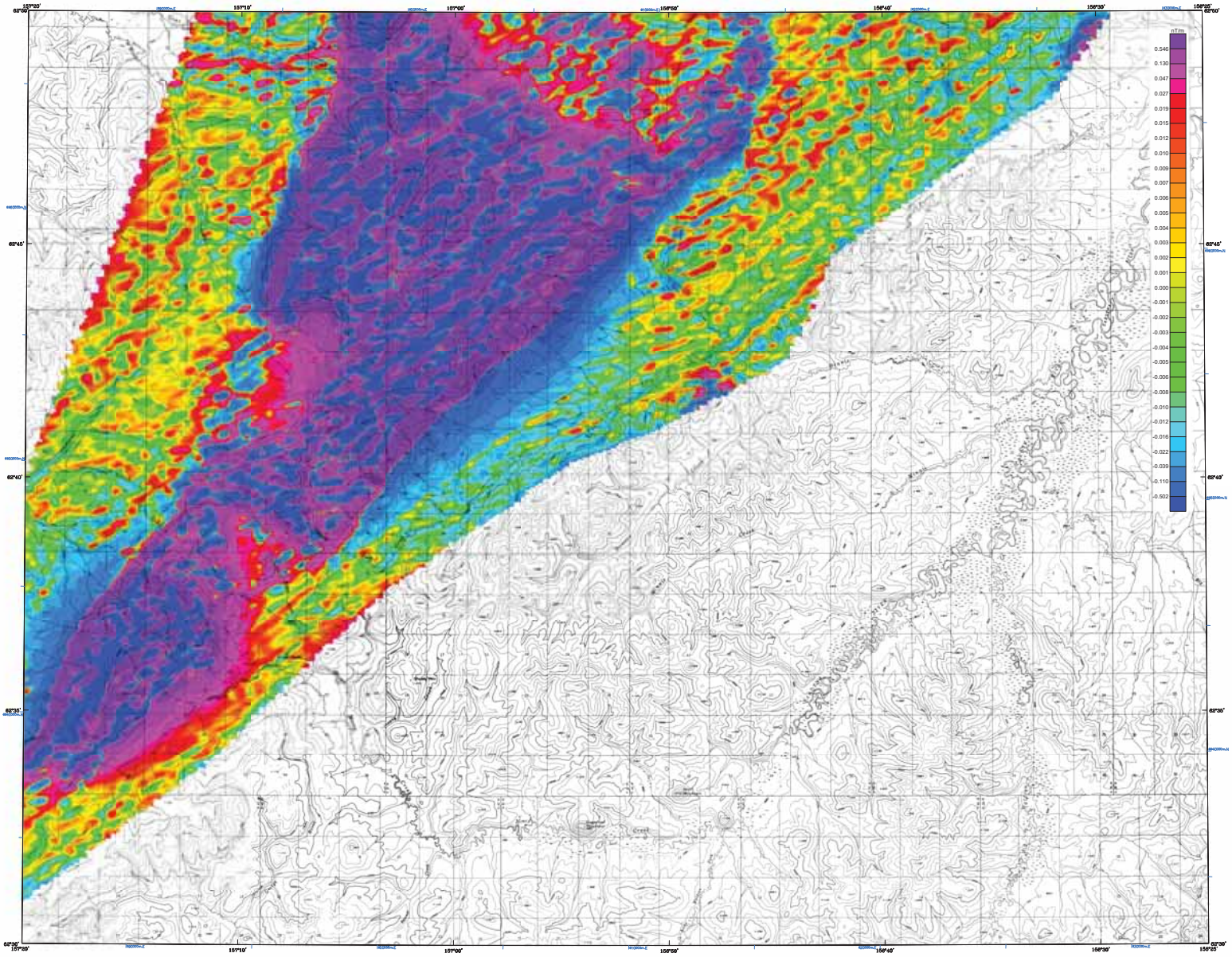

Base from U.S. Geological Survey Mineral O-2, 1971; O-3, 1954; O-3, 1954; O-4, 1955; O-5, 1954; O-6, 1954; Quadrangles, Alaska

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CONTOUR INTERVAL 100 FEET
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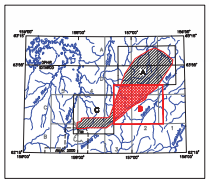

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Akima, H., 1970, A new method of interpolation and smooth curve fitting based on local procedures: Journal of the Association of Computing Machinery, v. 17, no. 4, p. 589-602.

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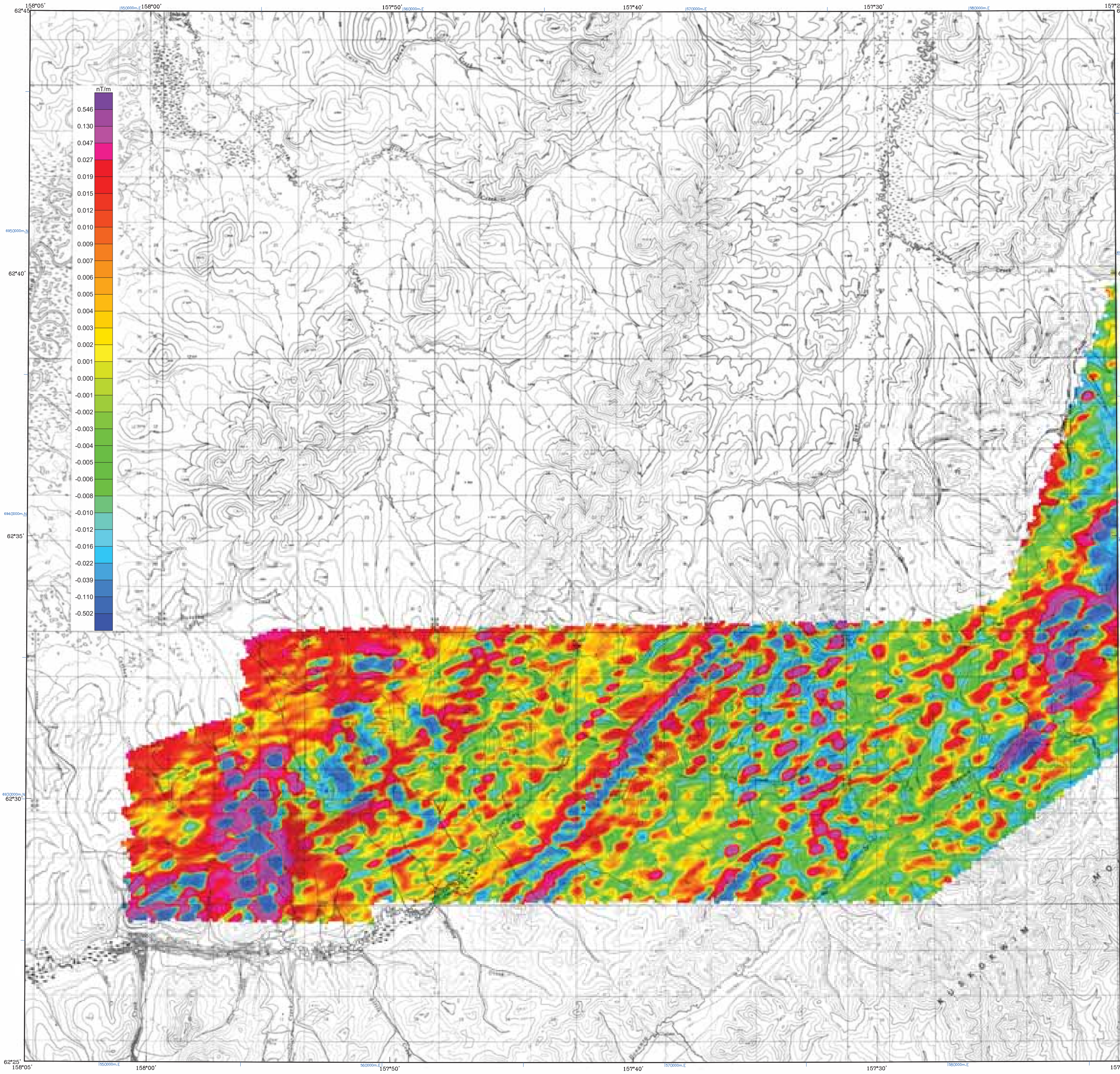
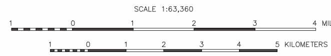
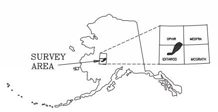
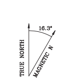


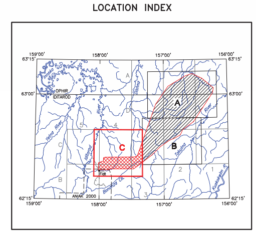
Base from U.S. Geological Survey Iditarod B-3, 1987; B-4, 1954; B-5, 1954; C-3, 1954; C-4, 1954; C-5, 1975; Quadrangles, Alaska







LOCATION INDEX



FIRST VERTICAL DERIVATIVE OF THE MAGNETIC FIELD OF THE IDITAROD SURVEY AREA, INNOKO, IDITAROD, and McGRATH MINING DISTRICTS, WESTERN ALASKA

PARTS OF IDITAROD AND OPHIR QUADRANGLES

by
Laurel E. Burns, Fugro Airborne Surveys Corp., and Fugro GeoServices, Inc.
2011

DESCRIPTIVE NOTES

The geophysical data were acquired with a DIGHEM[V] Electromagnetic (EM) system and a Fugro D1344 cesium magnetometer with a Scintrex CS3 cesium sensor. The EM and magnetic sensors were flown at a height of 100 feet. In addition the survey recorded data from radar and laser altimeters, GPS navigation system, 50/60 Hz monitors and video camera. Flights were performed with an AS-350-B3 Squirrel helicopter at a mean terrain clearance of 200 feet along NW-SE (340°) survey flight lines with a spacing of a quarter of a mile. Tie lines were flown perpendicular to the flight lines at intervals of approximately 3 miles.

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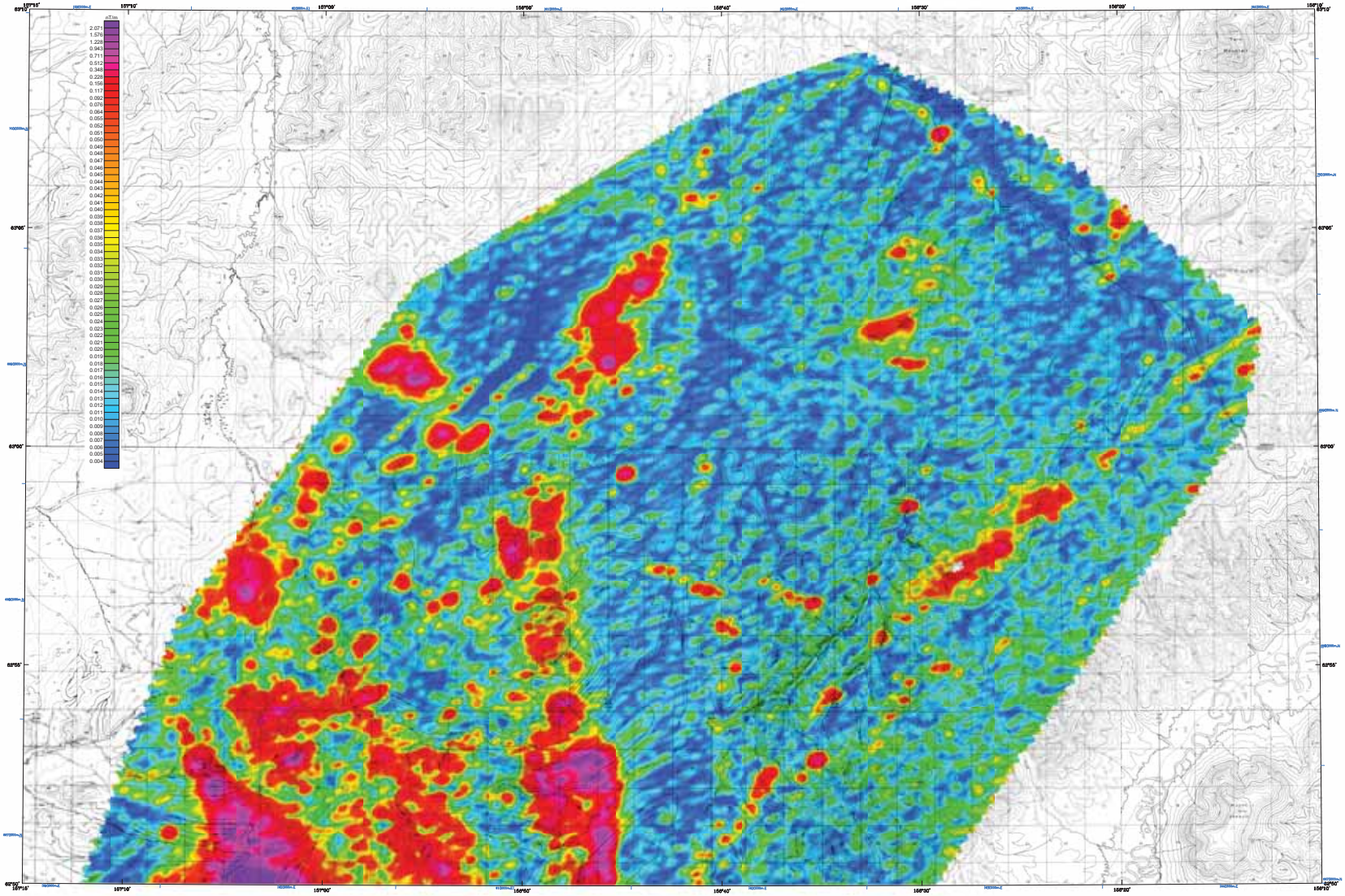

Base from U.S. Geological Survey Bikuni D-1, 1950; D-2, 1954; D-3, 1954; Ophir A-4, 1950; A-5, 1950; A-6, 1954; Quadrangles, Alaska.

SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

CONTOUR INTERVAL 100 FEET
DATUM IS MEAN SEA LEVEL

ANALYTIC SIGNAL OF THE IDITAROD SURVEY AREA, INNOKO, IDITAROD, and McGRATH MINING DISTRICTS, WESTERN ALASKA

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by
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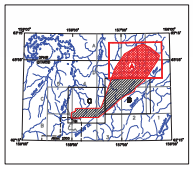
2011

LOCATION INDEX



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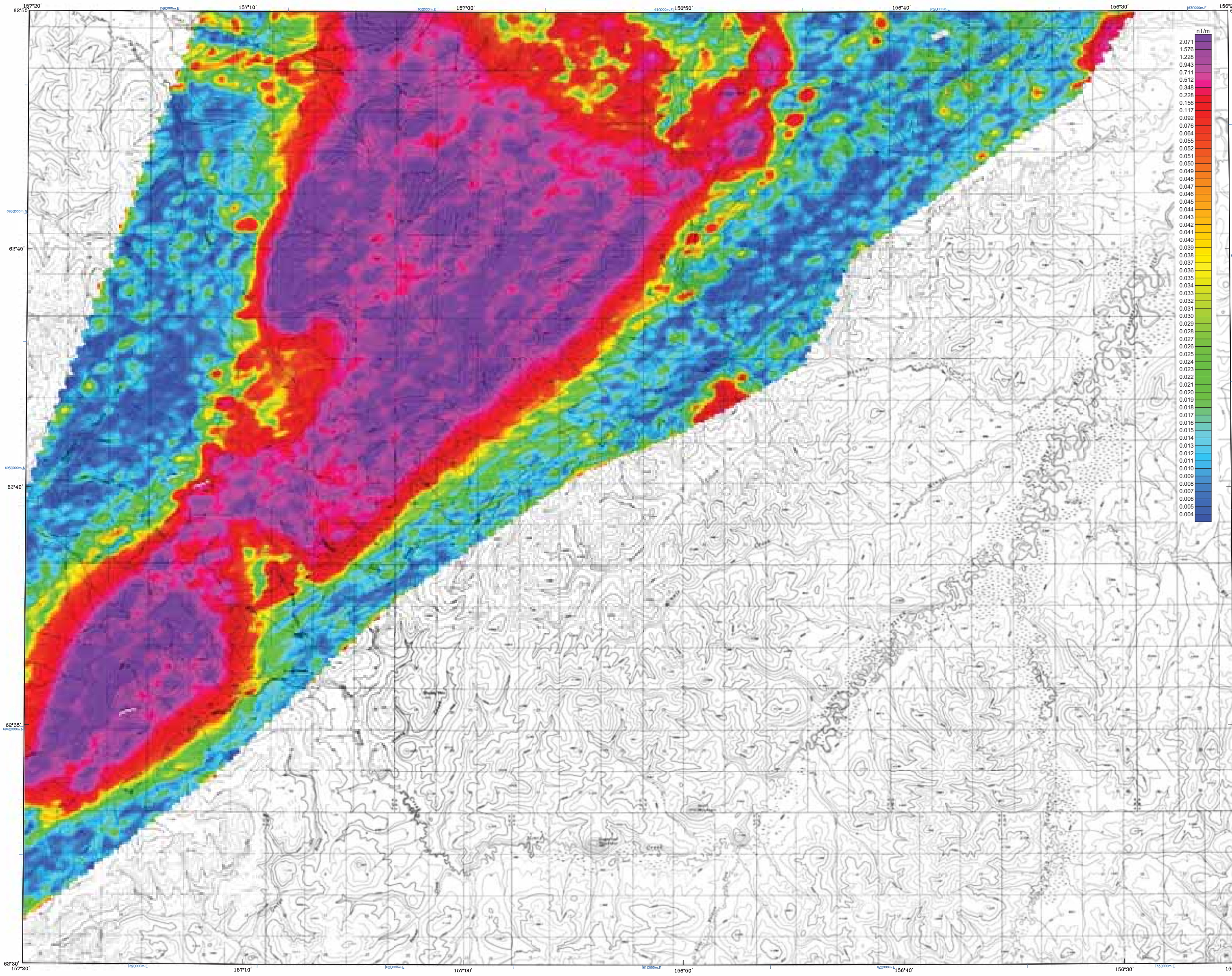


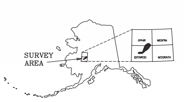
Base from U.S. Geological Survey Iditarod C-1, 1971; C-2, 1954; C-3, 1954; D-1, 1966; D-2, 1954; D-3, 1954; Quadrangles, Alaska

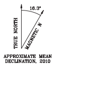
SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

CONTOUR INTERVAL 100 FEET
DATUM MEAN SEA LEVEL





APPROXIMATE MEAN
DECLINATION, 2010

ANALYTIC SIGNAL OF THE IDITAROD SURVEY AREA, INNOKO, IDITAROD, and McGRATH MINING DISTRICTS, WESTERN ALASKA

PARTS OF IDITAROD AND OPHIR QUADRANGLES

by
Laurel E. Burns, Fugro Airborne Surveys Corp., and Fugro GeoServices, Inc.
2011

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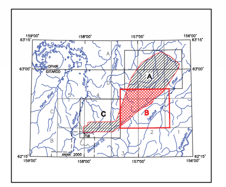

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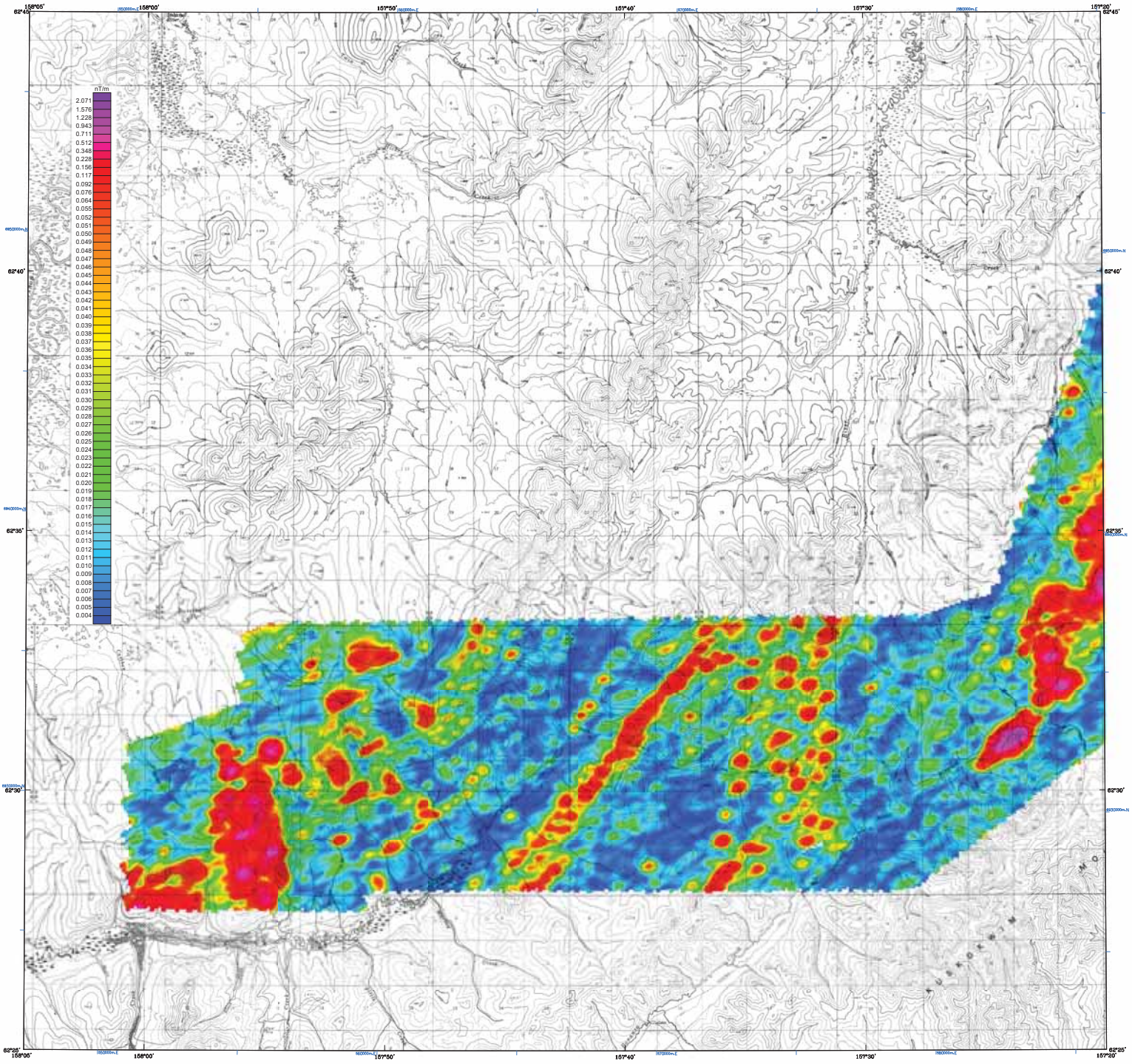

Base from U.S. Geological Survey Bilateral B-3, 1957; B-4, 1954; B-5, 1954; C-3, 1954; C-4, 1954; C-5, 1972, Quadrangles, Alaska

SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

CONTOUR INTERVAL 500 FEET
DATUM MEAN SEA LEVEL

ANALYTIC SIGNAL OF THE IDITAROD SURVEY AREA, INNOKO, IDITAROD, and McGRATH MINING DISTRICTS, WESTERN ALASKA

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2011

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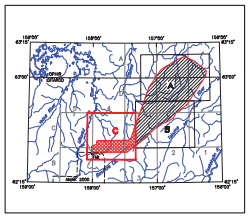

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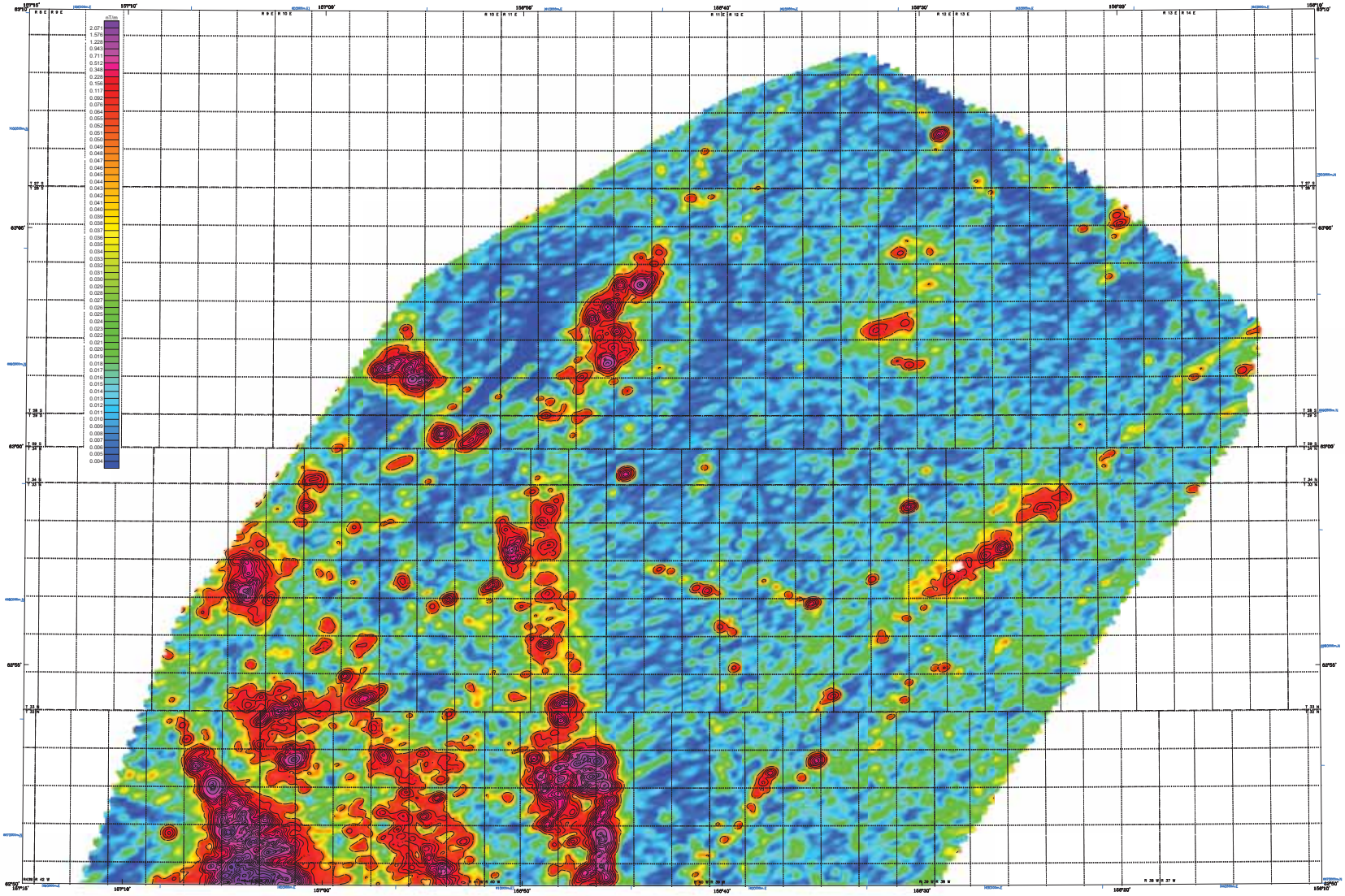

Base map from U.S. Geological Survey Bettles B-1, 1954; D-2, 1954; D-3, 1954; Ophir A-4, 1956; D-2, 1956; D-3, 1954; Goodnews, Alaska.

SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

ANALYTIC SIGNAL AND DATA CONTOURS OF THE IDITAROD SURVEY AREA, INNOKO, IDITAROD, and McGRATH MINING DISTRICTS, WESTERN ALASKA

PARTS OF IDITAROD AND OPHIR QUADRANGLES

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2011

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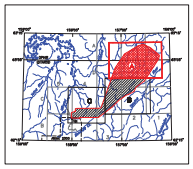

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ANALYTIC SIGNAL CONTOURS

- ..... 2.50 nT/metre
- ..... 0.50 nT/metre
- ..... 0.10 nT/metre
- ..... 0.05 nT/metre

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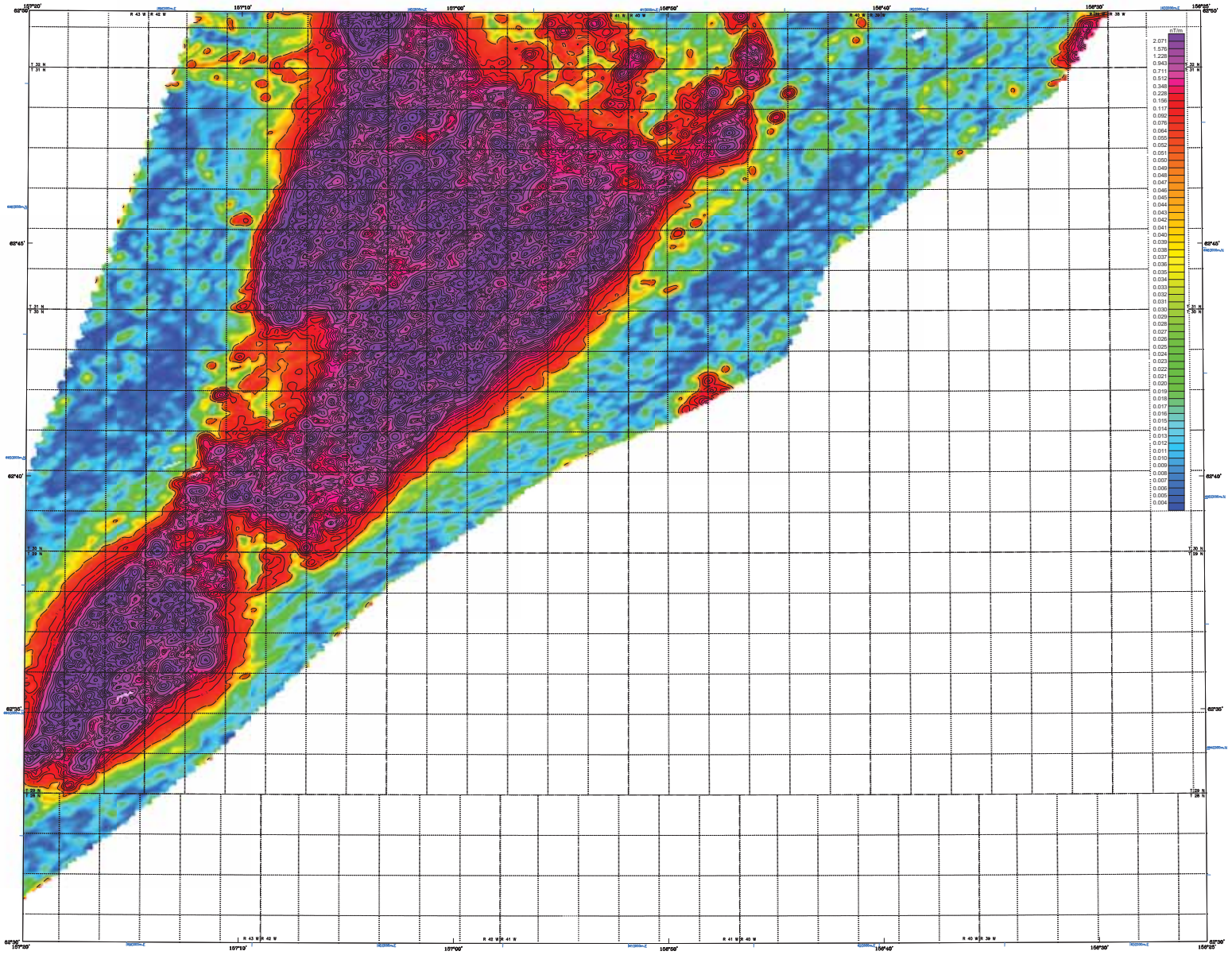

Section outlines from U.S. Geological Survey Mineral C-1, 1971; C-2, 1954; C-3, 1954; D-4, 1955; D-5, 1954; E-5, 1954 Quadrangles, Alaska

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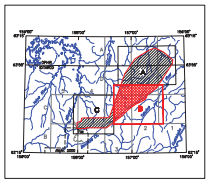

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.....	0.50 nT/metre
.....	0.10 nT/metre
.....	0.05 nT/metre

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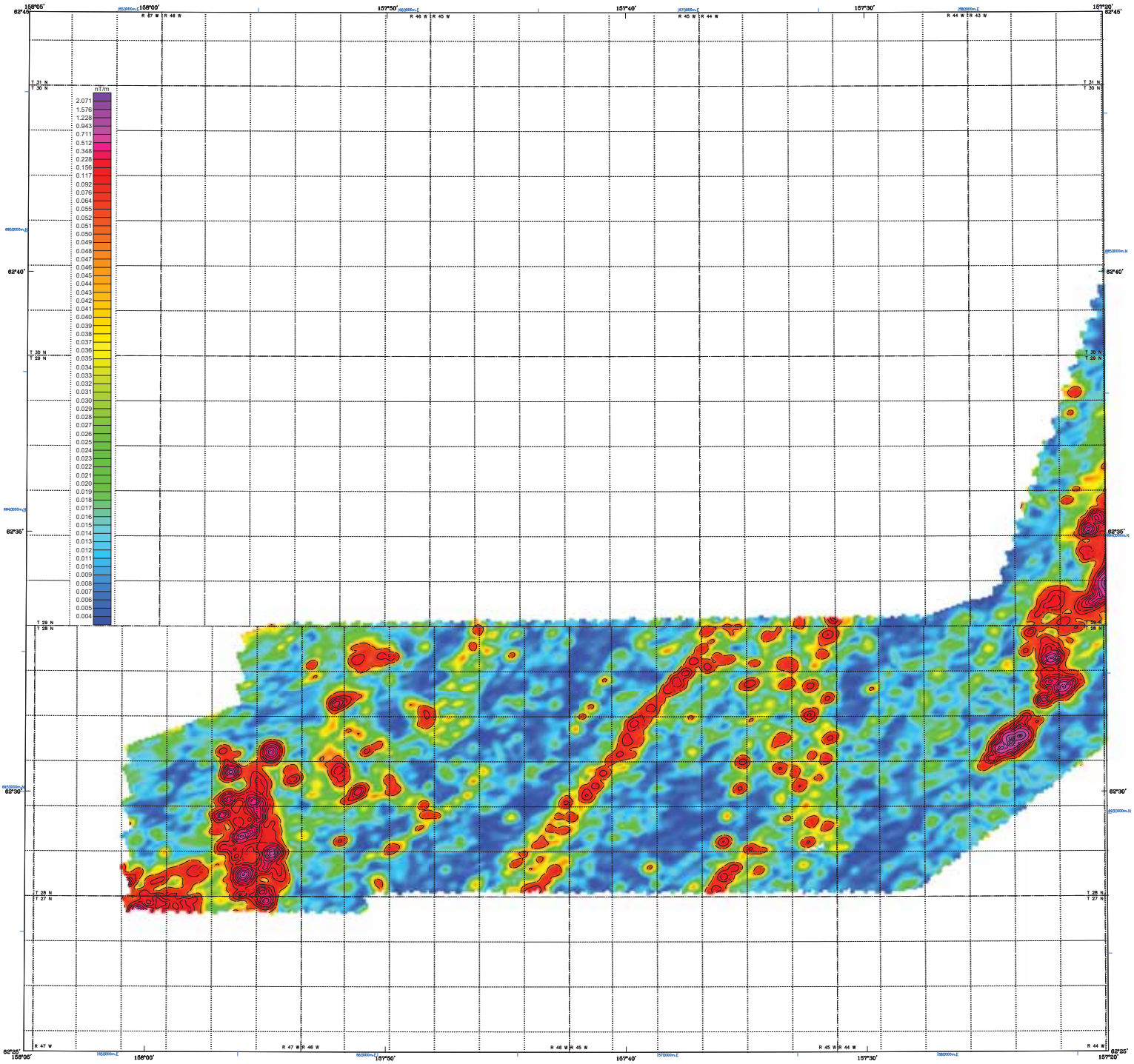

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2011

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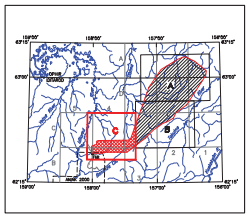

DESCRIPTIVE NOTES

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ANALYTIC SIGNAL

Analytic signal is the total amplitude of all directions of magnetic gradient calculated from the sum of the squares of the three orthogonal gradients. Mapped highs in the calculated analytic signal of magnetic parameter locate the anomalous source body edges and corners (e.g., contacts, fault/shear zones, etc.). Analytic signal maxima are located directly over faults and contacts, regardless of structural dip, and independently of the direction of the induced and/or remanent magnetizations.

ANALYTIC SIGNAL CONTOURS

.....	2.50 nT/metre
.....	0.50 nT/metre
.....	0.10 nT/metre
.....	0.05 nT/metre

SURVEY HISTORY

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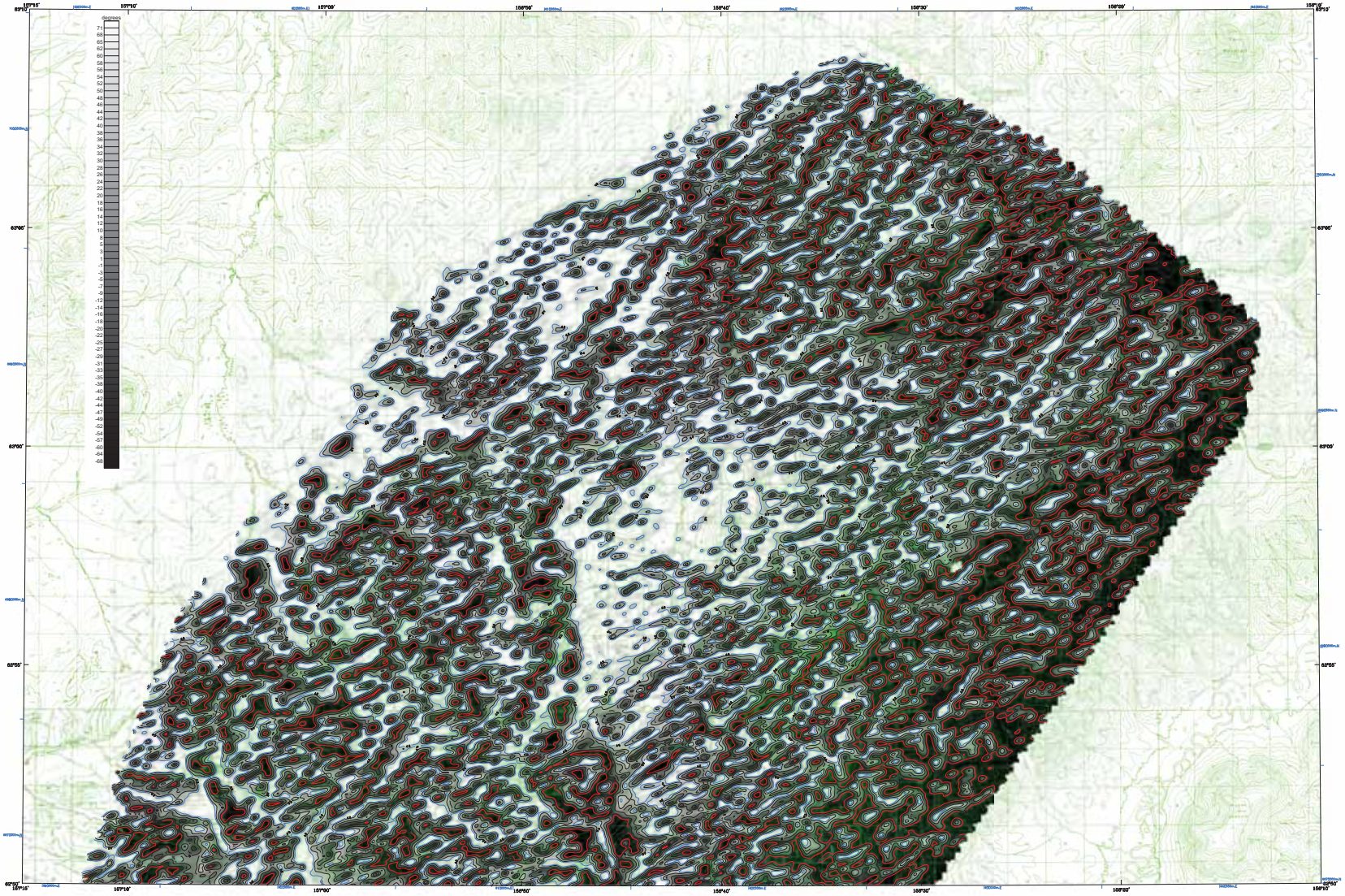


Base from U.S. Geological Survey Bettles D-1, 1950; D-2, 1954; D-3, 1954; Ophir A-4, 1950; A-5 1950; B-4, 1954; Washington, Alaska

SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

CONTOUR INTERVAL AND DATUM
SEE MAGNETIC TILT DERIVATIVE CONTOURS

MAGNETIC TILT DERIVATIVE AND DATA CONTOURS OF THE IDITAROD SURVEY AREA, INNOKO, IDITAROD, and McGRATH MINING DISTRICTS, WESTERN ALASKA

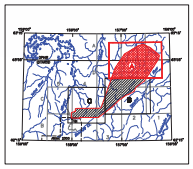
PARTS OF IDITAROD AND OPHIR QUADRANGLES

by

Laurel E. Burns, Fugro Airborne Surveys Corp., and Fugro GeoServices, Inc.

2011

LOCATION INDEX



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MAGNETIC TILT DERIVATIVE CONTOURS

- +45 degrees
- +30 degrees
- +15 degrees
- 0 degrees
- -15 degrees
- -30 degrees
- -45 degrees

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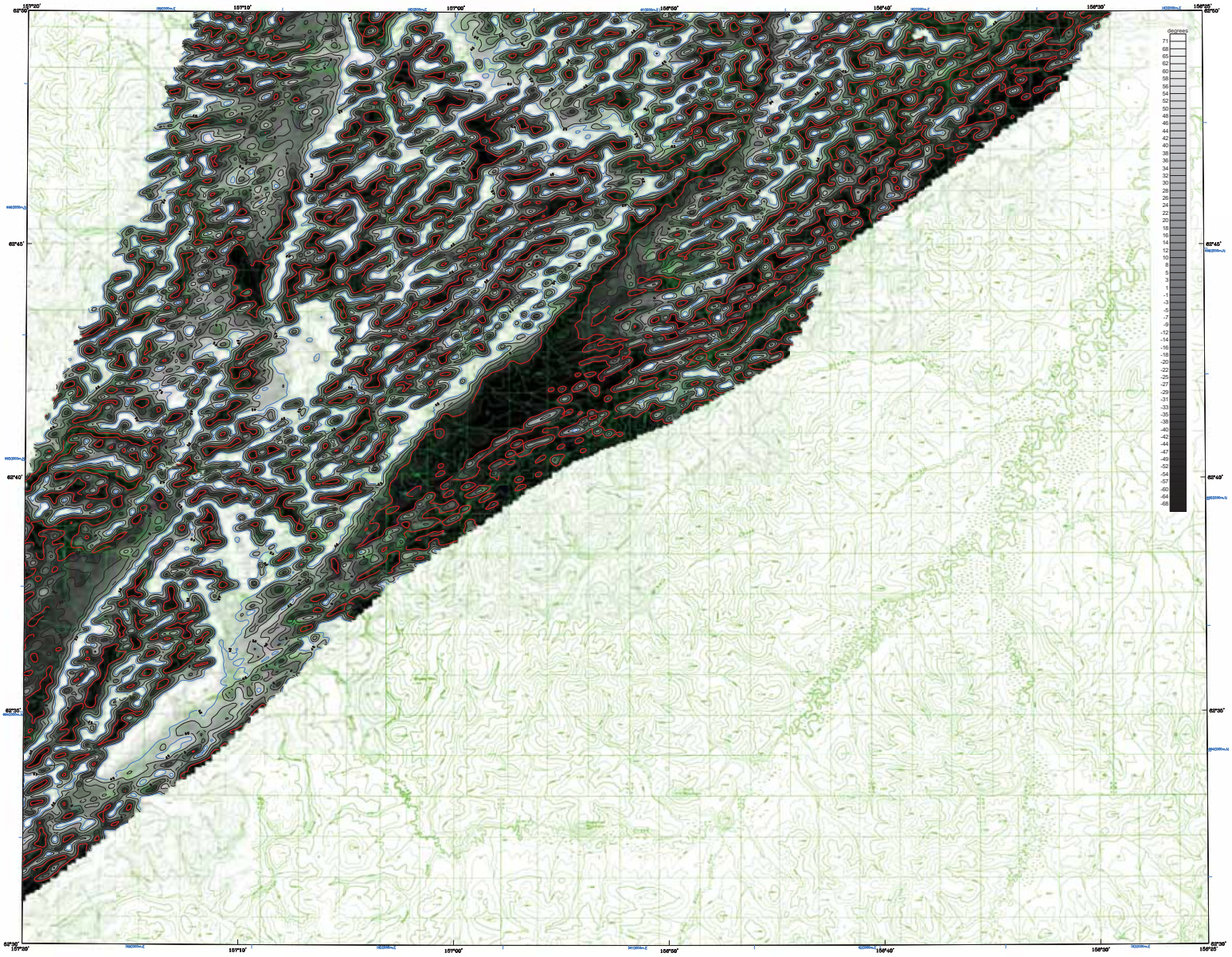

Base from U.S. Geological Survey Bethel C-1, 1973; C-2, 1954; C-3, 1954; D-1, 1955; D-2, 1954; D-3, 1954; Goodnews, Alaska.

APPROXIMATE MEAN DECLINATION, 2010

SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

CONTOUR INTERVAL 100 FEET
DATUM MEAN SEA LEVEL

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2011

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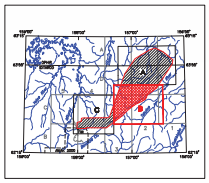

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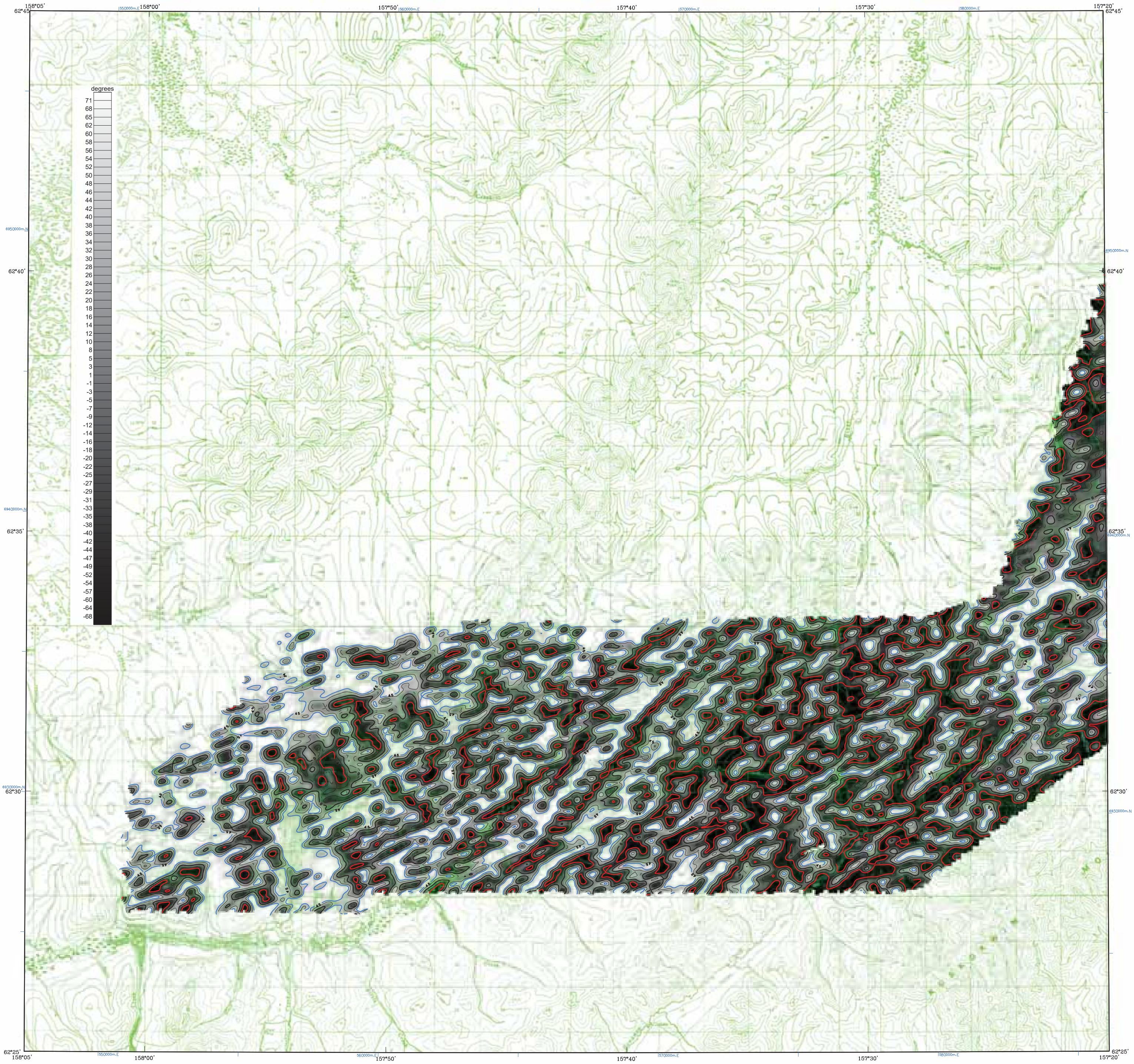


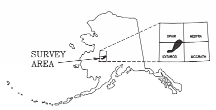
Base from U.S. Geological Survey Iditarod B-3, 1987; B-4, 1954; B-5, 1954; C-3, 1954; C-4, 1954; C-5, 1975; Quadrangles, Alaska

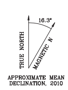
SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

CONTOUR INTERVAL 100 FEET
DATUM MEAN SEA LEVEL





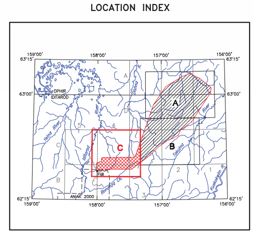
APPROXIMATE MEAN DECLINATION, 2010

MAGNETIC TILT DERIVATIVE AND DATA CONTOURS OF THE IDITAROD SURVEY AREA, INNOKO, IDITAROD, and McGRATH MINING DISTRICTS, WESTERN ALASKA

PARTS OF IDITAROD AND OPHIR QUADRANGLES

by
Laurel E. Burns, Fugro Airborne Surveys Corp., and Fugro GeoServices, Inc.
2011

LOCATION INDEX



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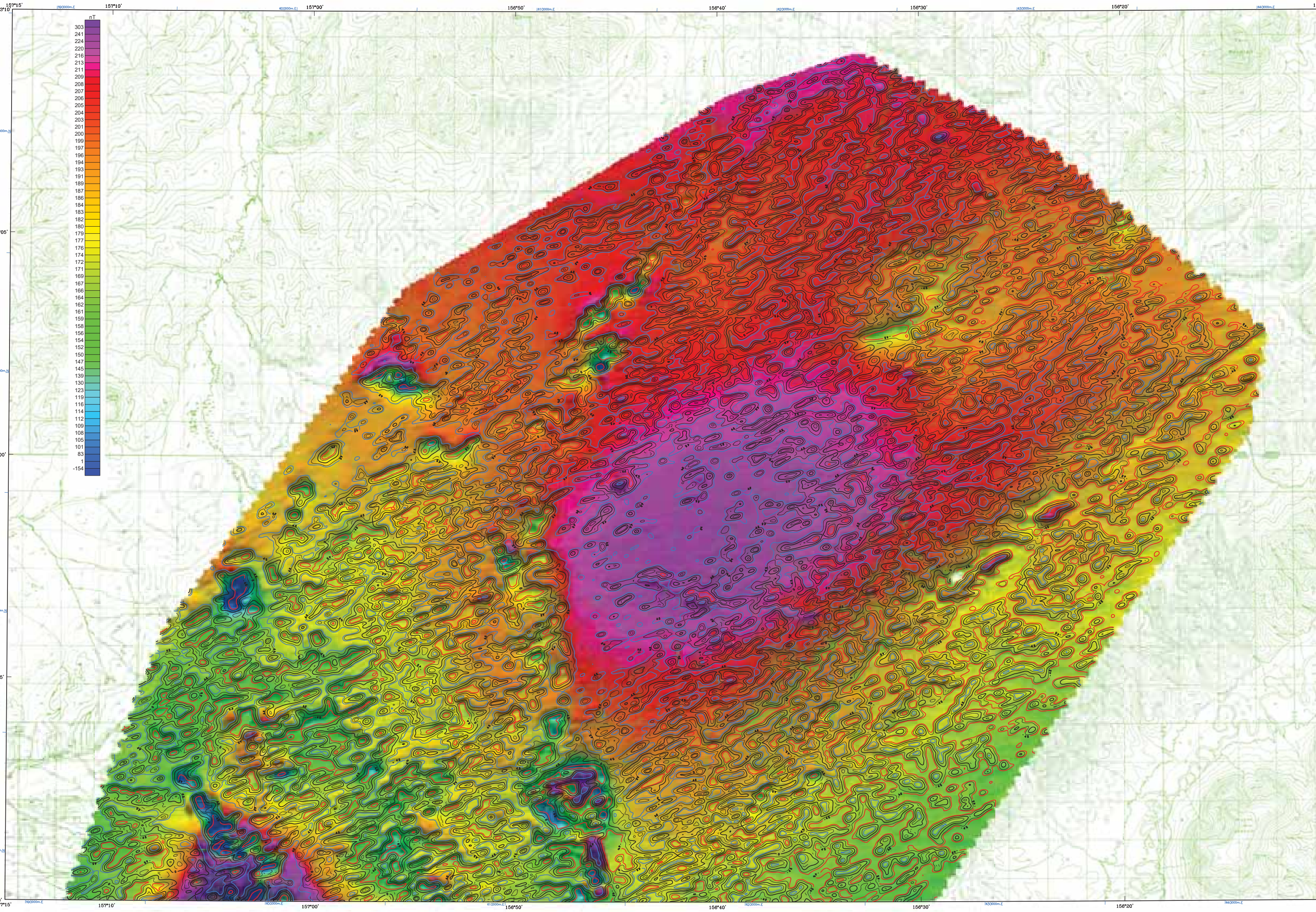


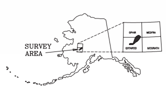
Base from U.S. Geological Survey Iditarod D-1, 1966; D-2, 1954; D-3, 1954; Ophir A-1, 1966; A-2, 1965; A-3, 1954; Quadrangles, Alaska

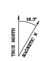
SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

CONTOUR INTERVAL 100 FEET
DATUM MEAN SEA LEVEL





APPROXIMATE MEAN DECLINATION, 2010

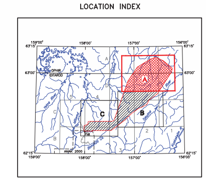
COLOR SHADOW RESIDUAL MAGNETIC FIELD WITH MAGNETIC TILT DERIVATIVE DATA CONTOURS OF THE IDITAROD SURVEY AREA, INNOKO, IDITAROD, and McGRATH MINING DISTRICTS, WESTERN ALASKA

PARTS OF IDITAROD AND OPHIR QUADRANGLES

by
Laurel E. Burns, Fugro Airborne Surveys Corp., and Fugro GeoServices, Inc.
2011

Sun Azimuth: 0 degree
Sun Inclination: 45 degrees

LOCATION INDEX



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Akima, H., 1970, A new method of interpolation and smooth curve fitting based on local procedures: Journal of the Association of Computing Machinery, v. 17, no. 4, p. 589-602.

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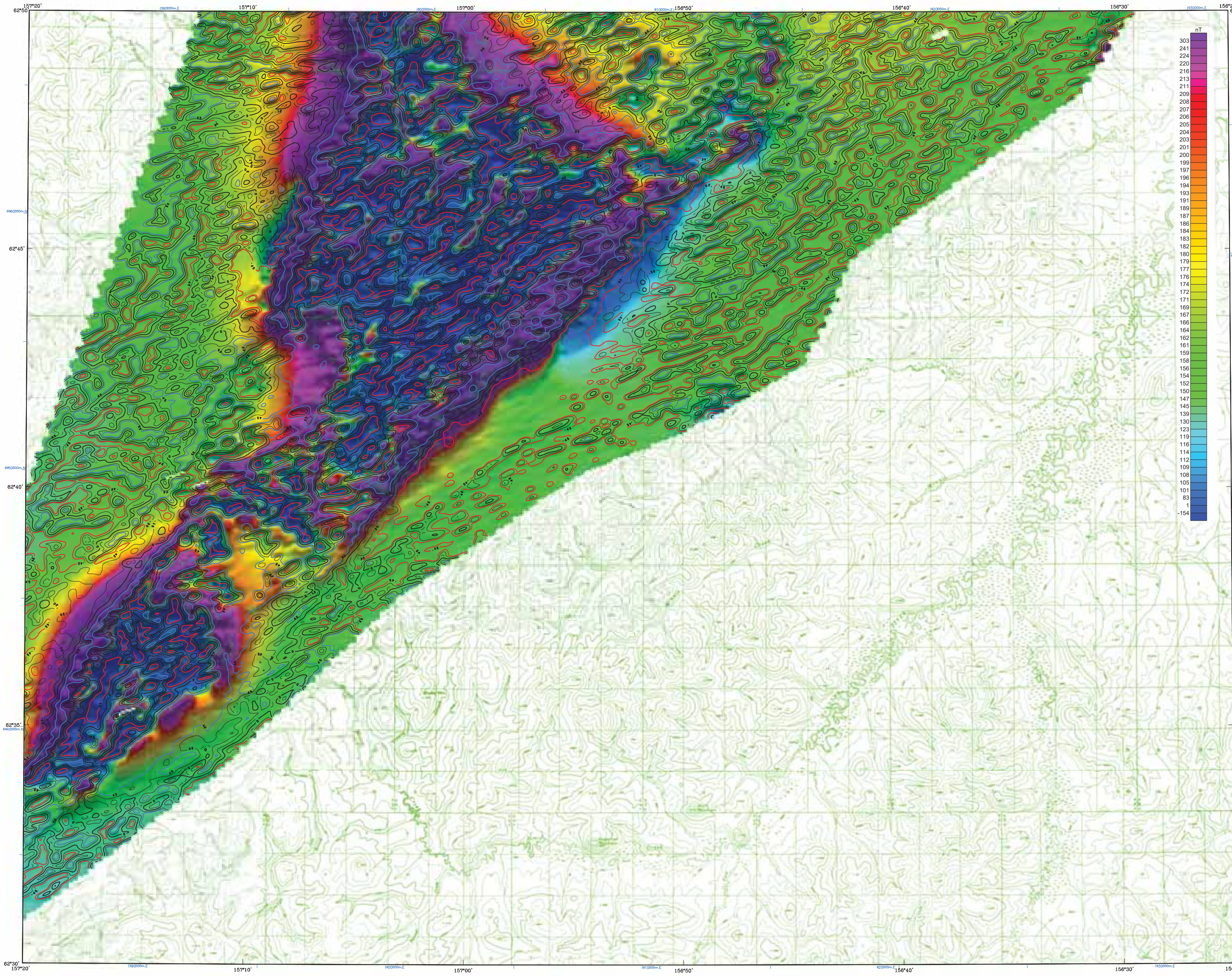

Base from U.S. Geological Survey Iditarod C-1, 1971; C-2, 1954; C-3, 1954; D-1, 1966; D-2, 1954; D-3, 1954; Quadrangles, Alaska

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1 0 1 2 3 4 MILES

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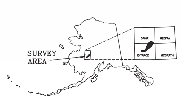
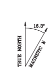
CONTOUR INTERVAL 100 FEET
DATUM MEAN SEA LEVEL





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PARTS OF IDITAROD AND OPHIR QUADRANGLES

by
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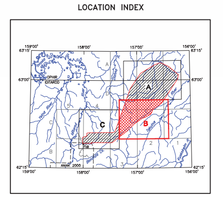
2011

Sun Azimuth: 0 degree

Sun Inclination: 45 degrees

LOCATION INDEX



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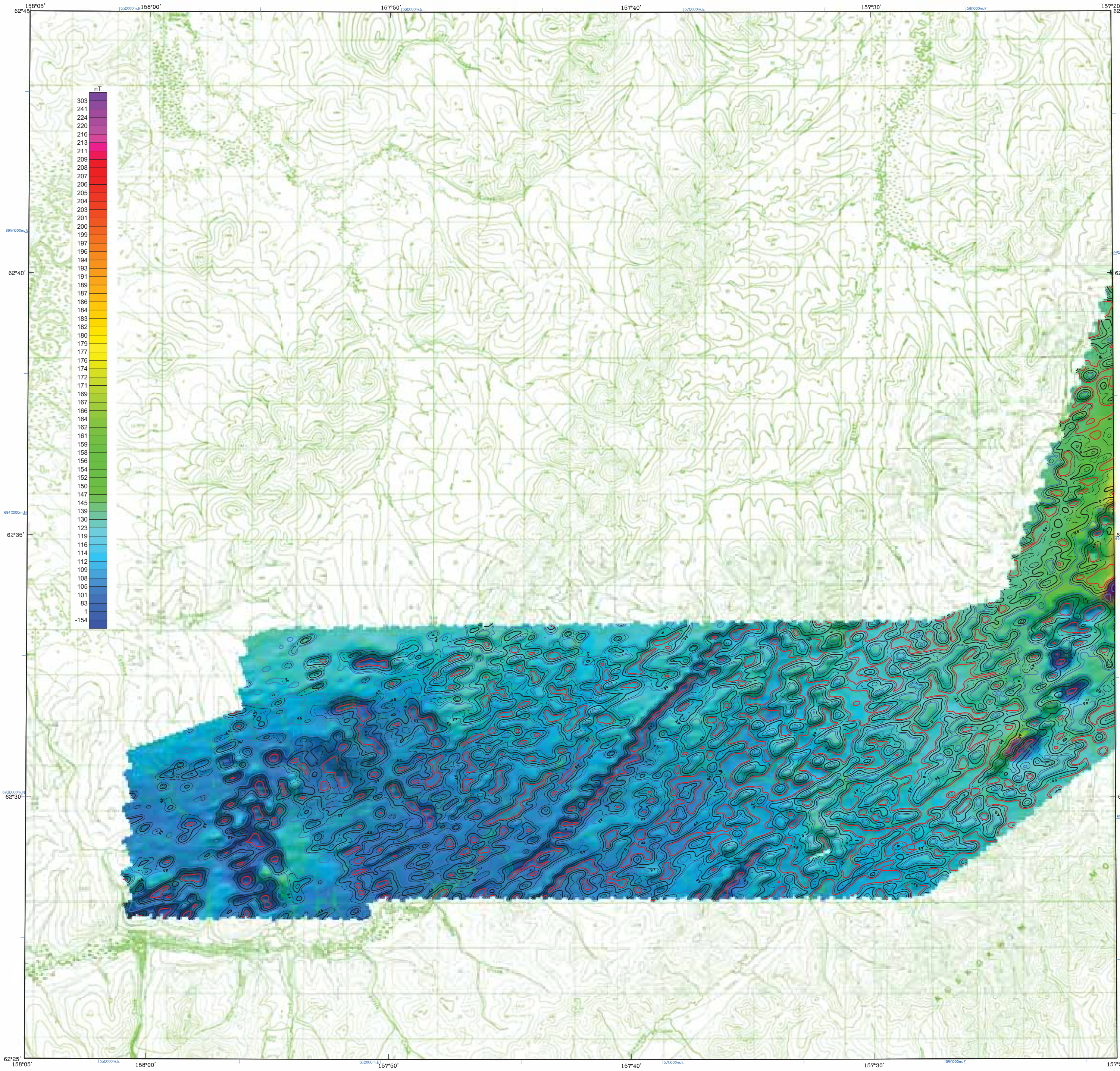

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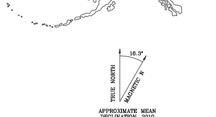

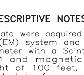

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CONTOUR INTERVAL 100 FEET
DATUM MEAN SEA LEVEL

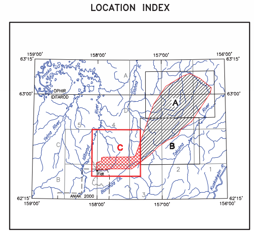
COLOR SHADOW RESIDUAL MAGNETIC FIELD WITH MAGNETIC TILT DERIVATIVE DATA CONTOURS OF THE IDITAROD SURVEY AREA, INNOKO, IDITAROD, and McGRATH MINING DISTRICTS, WESTERN ALASKA

PARTS OF IDITAROD AND OPHIR QUADRANGLES

by
Laurel E. Burns, Fugro Airborne Surveys Corp., and Fugro GeoServices, Inc.
2011

Sun Azimuth: 0 degree
Sun Inclination: 45 degrees

LOCATION INDEX



DESCRIPTIVE NOTES

The geophysical data were acquired with a DIGHEMV Electromagnetic (EM) system and a Fugro D1344 cesium magnetometer with a Scintrex CS3 cesium sensor. The EM and magnetic sensors were flown at a height of 100 feet. In addition the survey recorded data from radar and laser altimeters, GPS navigation system, 50/60 Hz monitors and video camera. Flights were performed with an AS-350-B3 Squirrel helicopter at a mean terrain clearance of 200 feet along NW-SE (340°) survey flight lines with a spacing of a quarter of a mile. Tie lines were flown perpendicular to the flight lines at intervals of approximately 3 miles.

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RESIDUAL MAGNETIC FIELD

The magnetic total field data were processed using digitally recorded data from a Fugro D1344 magnetometer with a Scintrex CS3 cesium sensor. Data were collected at a sampling interval of 0.1 seconds. The magnetic data were (1) corrected for diurnal variations by subtraction of the digitally recorded base station magnetic data, (2) IGRF corrected (IGRF model 2010, updated for date of flight and altimeter variations), (3) leveled to the tie line data, and (4) interpolated onto a regular 80 m grid using a modified Akima (1970) technique. All grids were then resampled from the 80 m cell size down to a 25 m cell size to produce the maps and final grids contained in this publication.

Akima, H., 1970, A new method of interpolation and smooth curve fitting based on local procedures: Journal of the Association of Computing Machinery, v. 17, no. 4, p. 589-602.

MAGNETIC TILT DERIVATIVE

The tilt derivative is the angle between the horizontal gradient & the total gradient, which is useful for identifying the depth & type of source. The tilt angle is positive over the source, crosses through zero at, or near, the edge of a vertical sided source, and is negative outside the source region. It has the added advantage of responding equally well to shallow and deep sources and is able to resolve deeper sources that may be masked by larger responses from shallower sources.

MAGNETIC TILT DERIVATIVE CONTOURS

. . . .+45 degrees
. . . .+30 degrees
. . . .+15 degrees
. . . . 0 degrees
. . . .−15 degrees
. . . .−30 degrees
. . . .−45 degrees

SURVEY HISTORY

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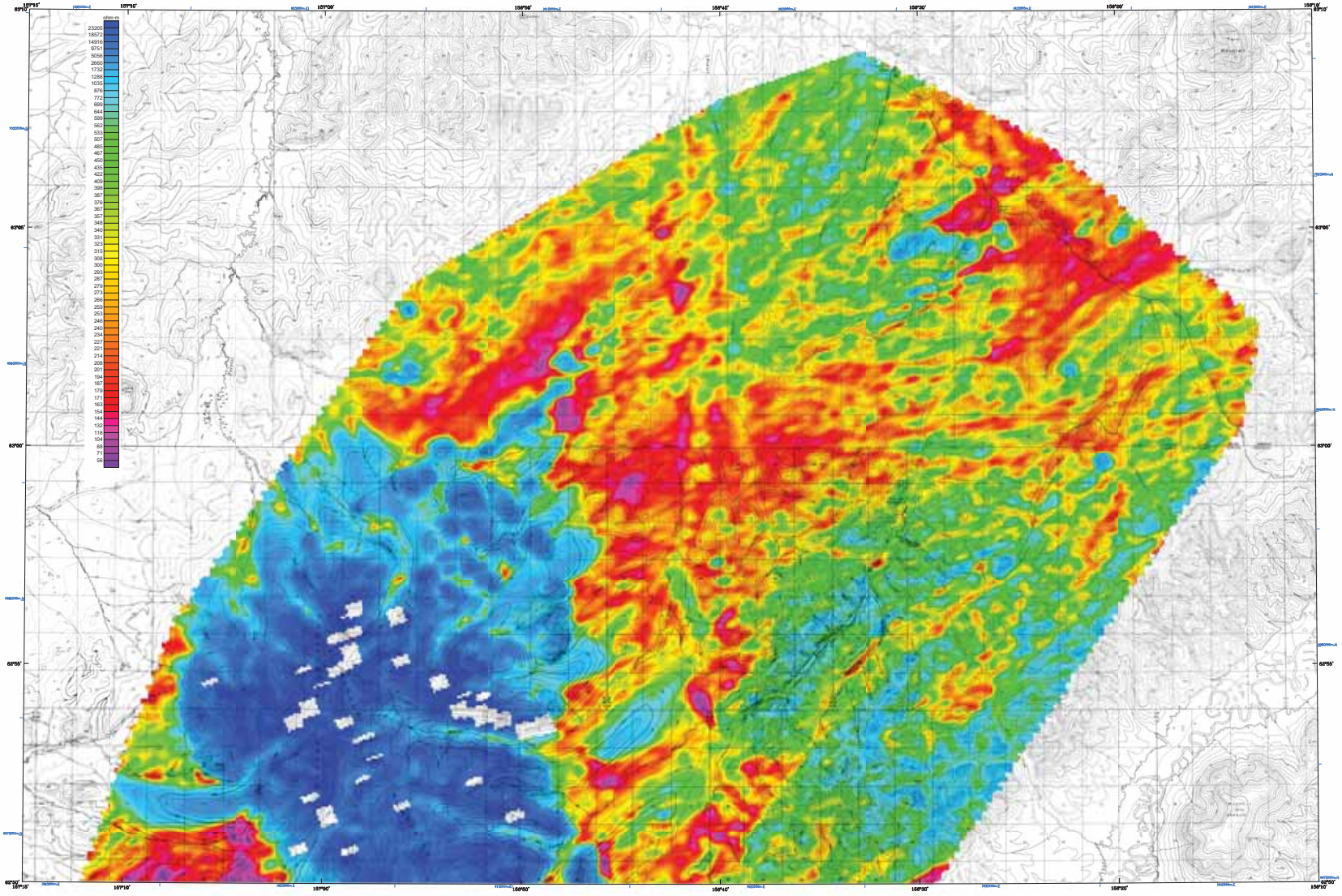

Base from U.S. Geological Survey Bikuni D-1, 1950; D-2, 1954; D-3, 1954; Ophir A-4, 1950; A-5, 1954; Goodnews, Alaska

SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

CONTOUR INTERVAL 100 FEET
DATUM MEAN SEA LEVEL

56,000 Hz COPLANAR APPARENT RESISTIVITY OF THE IDITAROD SURVEY AREA, INNOKO, IDITAROD, and McGRATH MINING DISTRICTS, WESTERN ALASKA

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by

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2011

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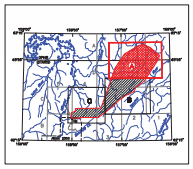

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RESISTIVITY

The DIGHEM^V EM system measured inphase and quadrature components at five frequencies. Two vertical coaxial coil-pairs operated at 1000 and 5500 Hz while three horizontal coplanar coil-pairs operated at 900, 7200 and 56,000 Hz. EM data were sampled at 0.1 second intervals. The EM system responds to bedrock conductors, conductive overburden, and cultural sources. Apparent resistivity is generated from the inphase and quadrature component of the coplanar 56,000 Hz using the pseudo-layer half space model. The data were interpolated onto a regular 80 m grid using a modified Akima (1970) technique. All grids were then resampled from the 80 m cell size down to a 25 m cell size to produce the maps and final grids contained in this publication.

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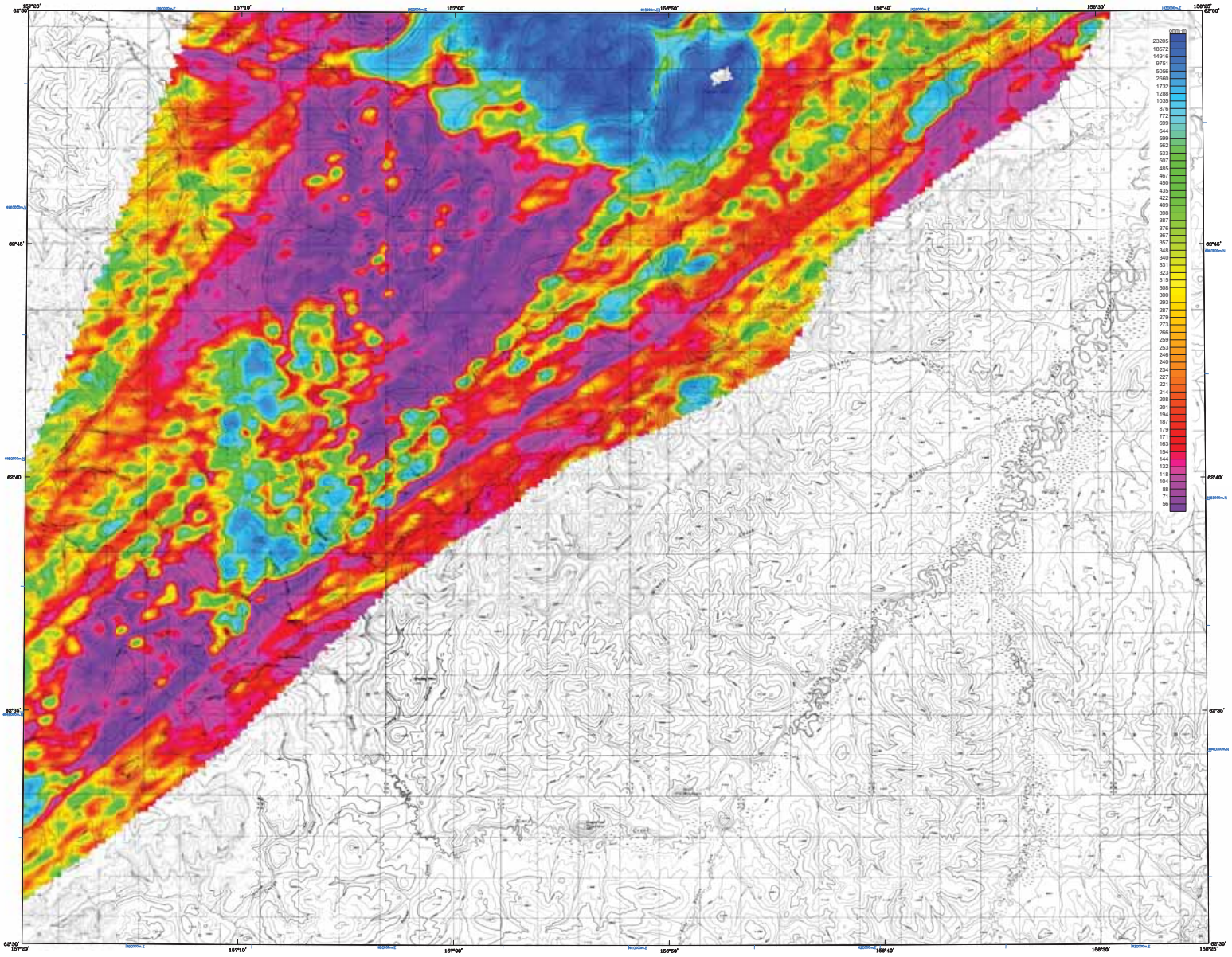

Base from U.S. Geological Survey Mineral O-1, 1971; O-2, 1954; O-3, 1954; O-4, 1955; O-5, 1954; O-6, 1954; Quadrangles, Alaska

SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

CONTOUR INTERVAL 100 FEET
DATUM MEAN SEA LEVEL

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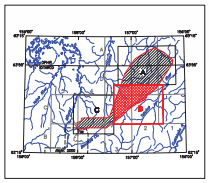

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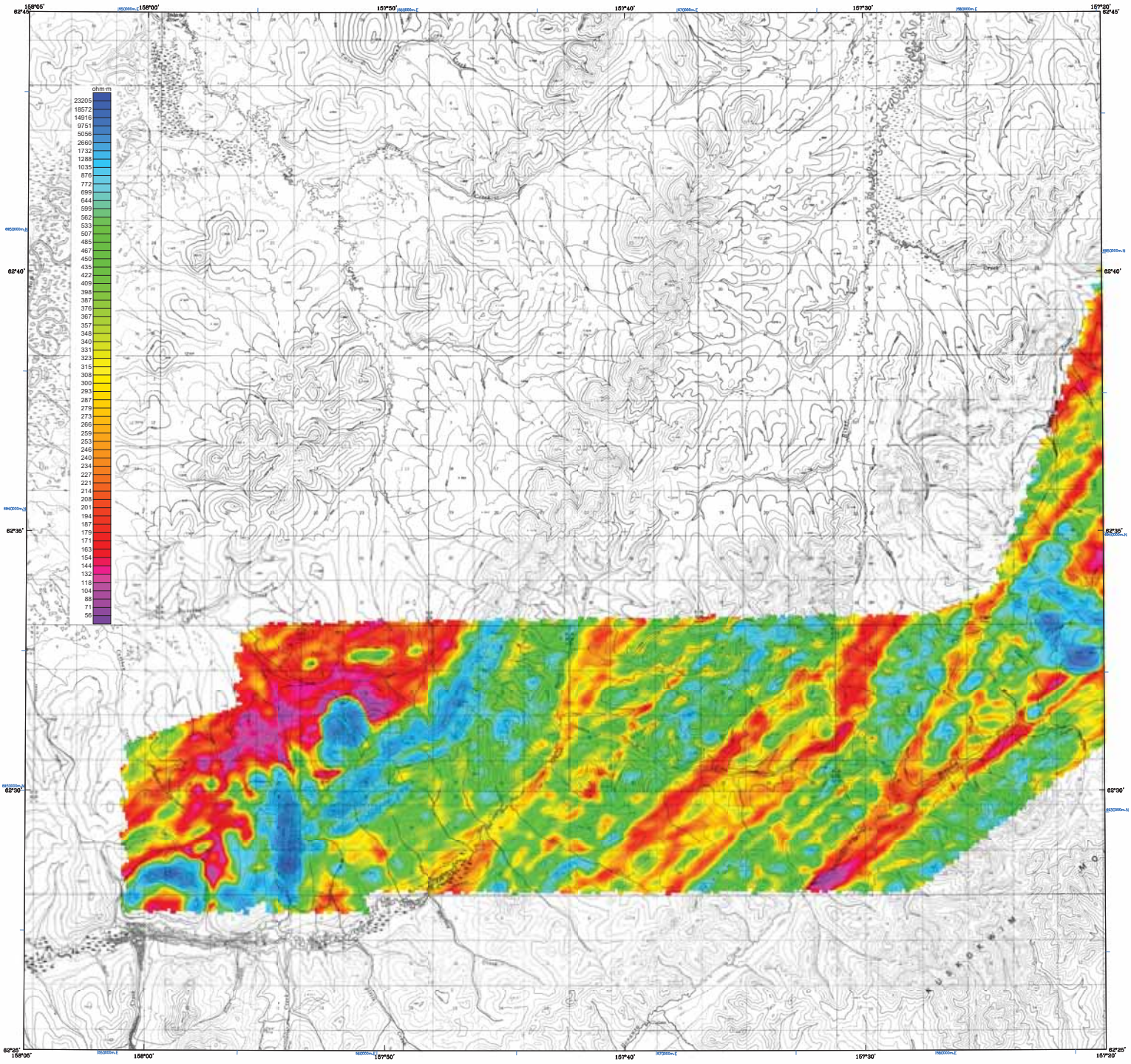

Base from U.S. Geological Survey Bilateral B-3, 1957; B-4, 1954; B-5, 1954; C-3, 1954; C-4, 1954; C-5, 1972; Quadrangles, Alaska

SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

CONTOUR INTERVAL 500 FEET
DATUM MEAN SEA LEVEL

56,000 Hz COPLANAR APPARENT RESISTIVITY OF THE IDITAROD SURVEY AREA, INNOKO, IDITAROD, and McGRATH MINING DISTRICTS, WESTERN ALASKA

PARTS OF IDITAROD AND OPHIR QUADRANGLES

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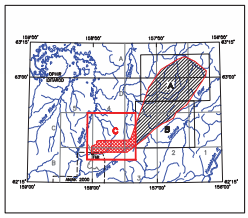

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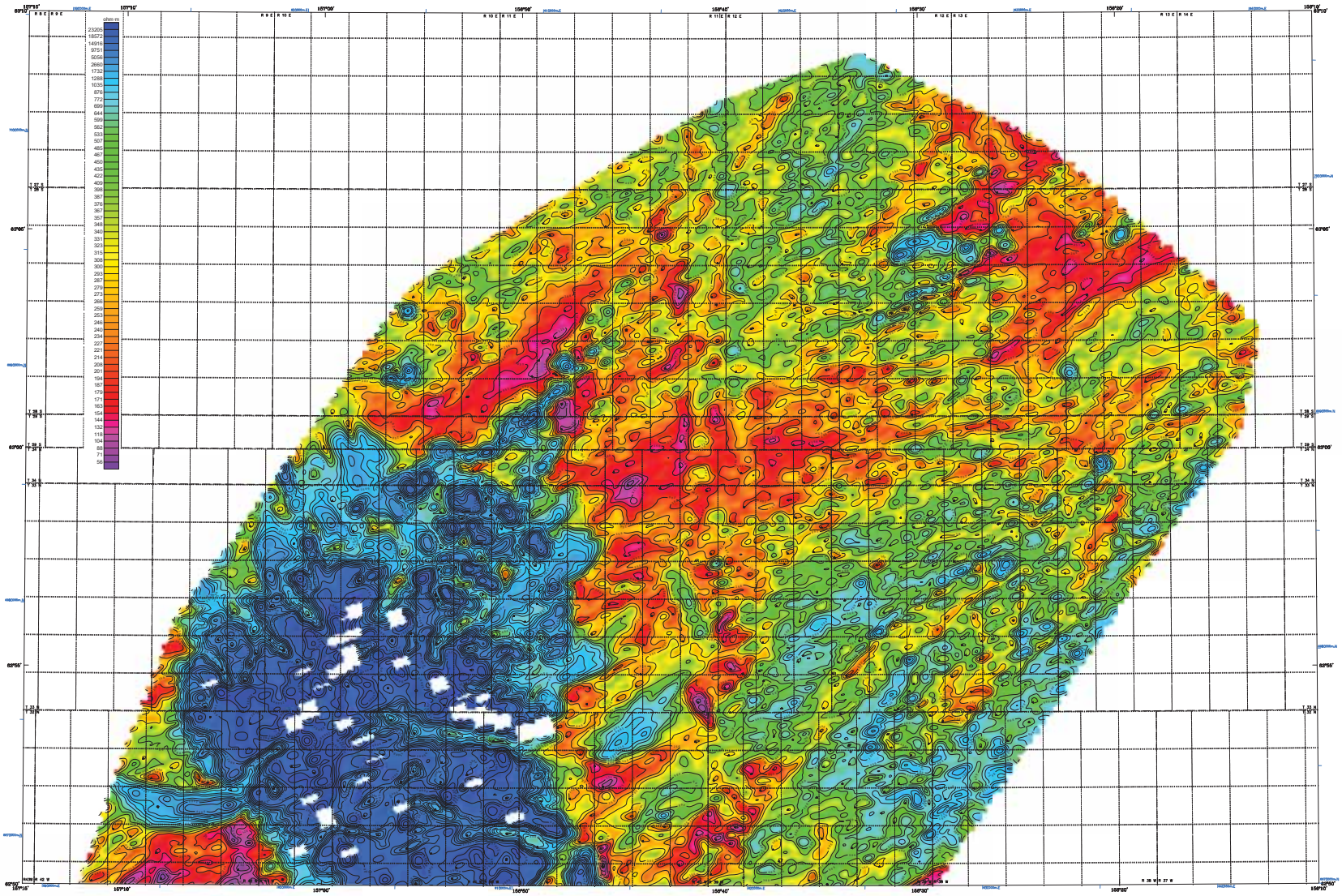

Base map from U.S. Geological Survey Iditarod D-1, 1954; D-2, 1954; D-3, 1954; Ophir A-4, 1956; C-2, 1956; C-3, 1954; Goodnews, Alaska.

SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

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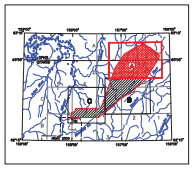

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RESISTIVITY CONTOURS

1000
800
600
500
400
300
250
200
150
125
100

Contours in ohm-m at 10 intervals per decade

. . . . . resistivity low

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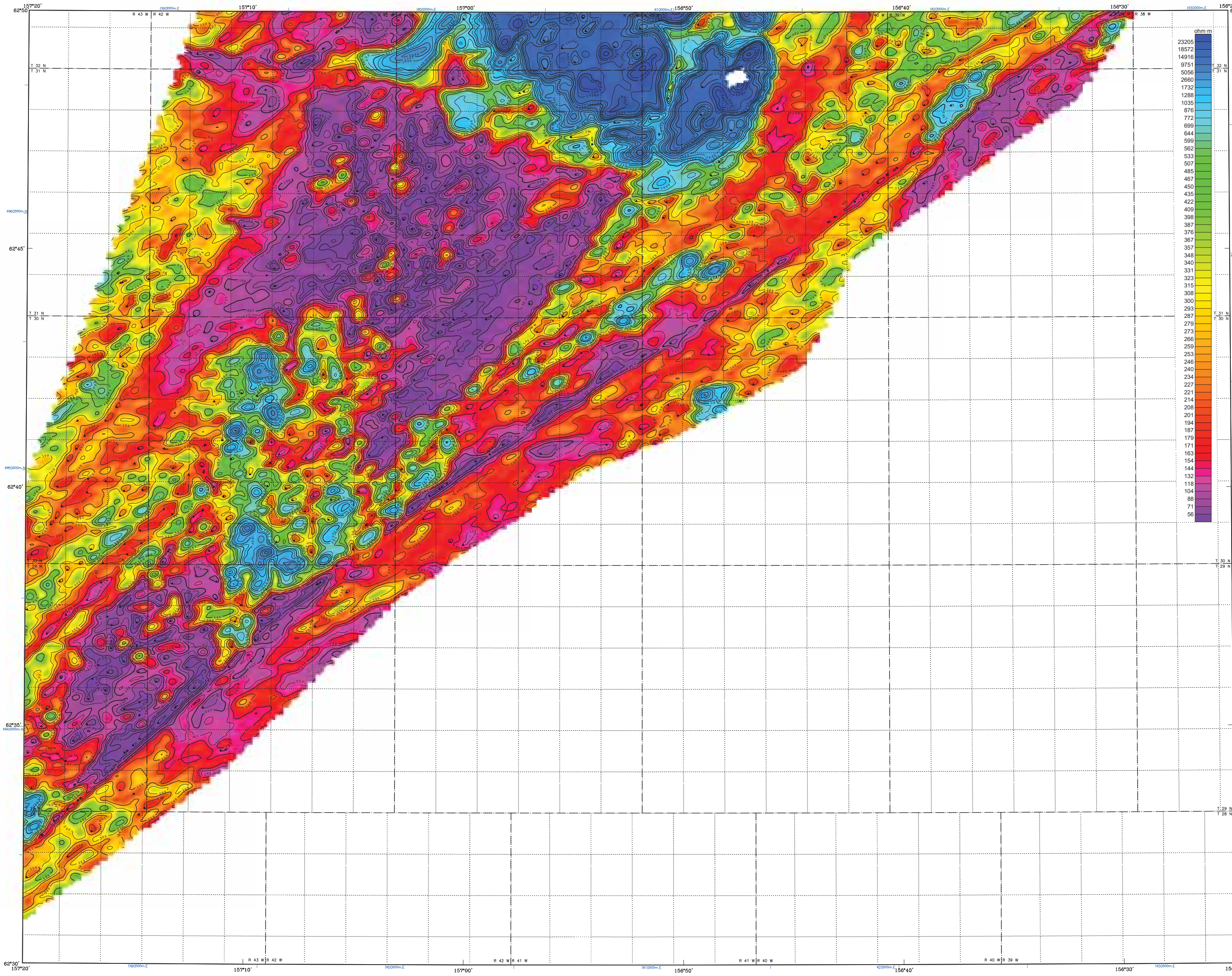
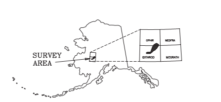


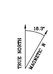
Section outlines from U.S. Geological Survey Iditarod C–1, 1971; C–2, 1954; C–3, 1954; D–1, 1966; D–2, 1954; D–3, 1954; Quadrangles, Alaska

SCALE 1:63,360

1 0 1 2 3 4 MILES

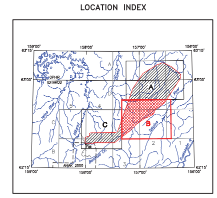
1 0 1 2 3 4 5 KILOMETERS





APPROXIMATE MEAN DECLINATION, 2010

LOCATION INDEX



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RESISTIVITY CONTOURS

1000
800
600
500
400
300
250
200
150
125
100

Contours in ohm–m at 10 intervals per decade

. . . . resistivity low

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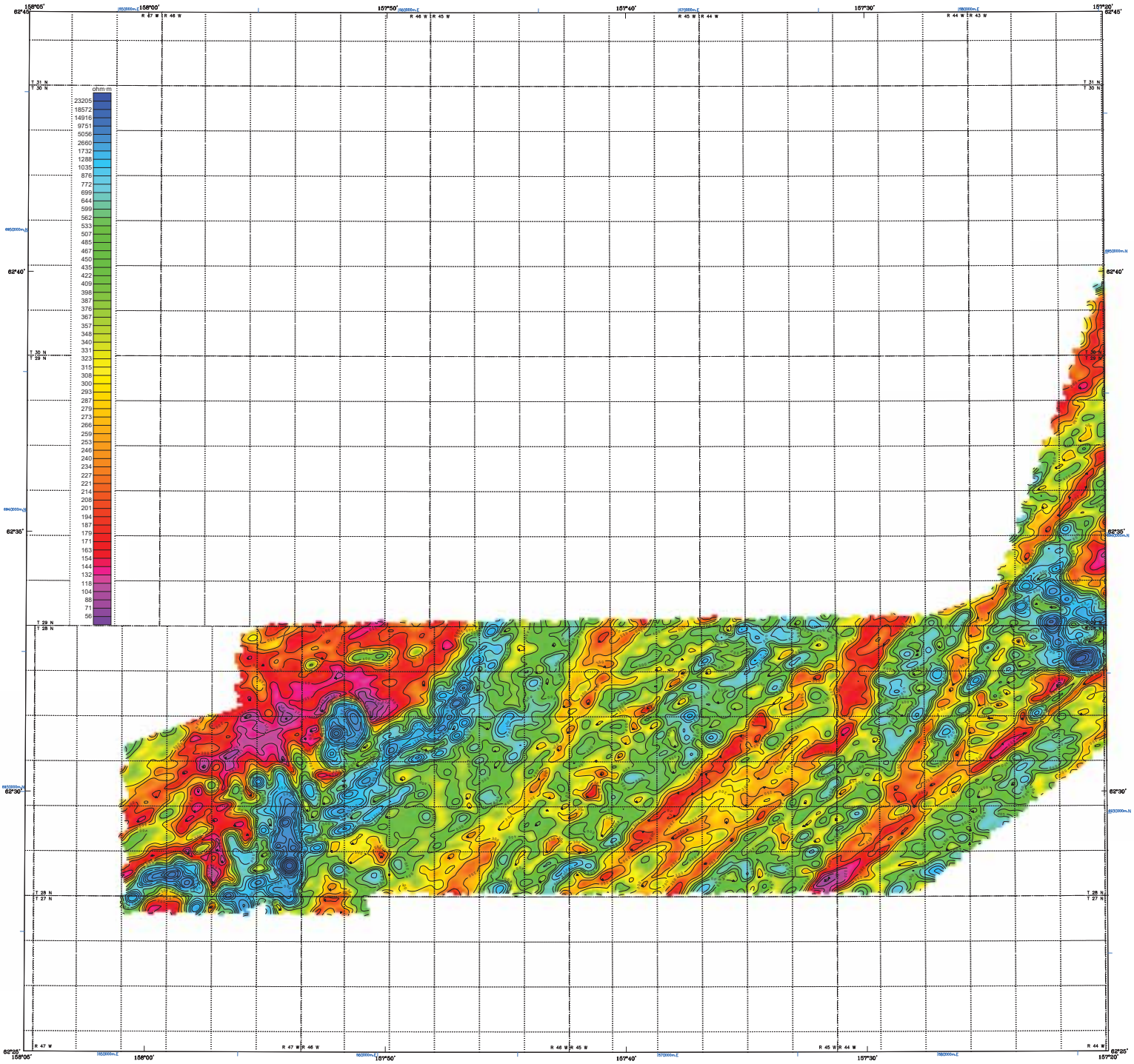

Section outlines from U.S. Geological Survey Mitarod B-3, 1987; B-4, 1954; B-5, 1954; C-3, 1954; C-4, 1954; C-5, 1972; Quadrangles, Alaska

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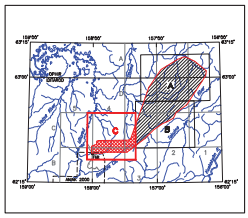

DESCRIPTIVE NOTES

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RESISTIVITY

The DIGHEM^{V} EM system measured inphase and quadrature components at five frequencies. Two vertical coaxial coil-pairs operated at 1000 and 5500 Hz while three horizontal coplanar coil-pairs operated at 900, 7200 and 56,000 Hz. EM data were sampled at 0.1 second intervals. The EM system responds to bedrock conductors, conductive overburden, and cultural sources. Apparent resistivity is generated from the inphase and quadrature component of the coplanar 56,000 Hz using the pseudo-layer half space model. The data were interpolated onto a regular 80 m grid using a modified Akima (1970) technique. All grids were then resampled from the 80 m cell size down to a 25 m cell size to produce the maps and final grids contained in this publication.

Akima, H., 1970, A new method of interpolation and smooth curve fitting based on local procedures: Journal of the Association of Computing Machinery, v. 17, no. 4, p. 589-602.

RESISTIVITY CONTOURS

1000
800
600
500
400
300
250
200
150
125
100

Contours in ohm-m at 10 intervals per decade

. . . . . resistivity low

SURVEY HISTORY

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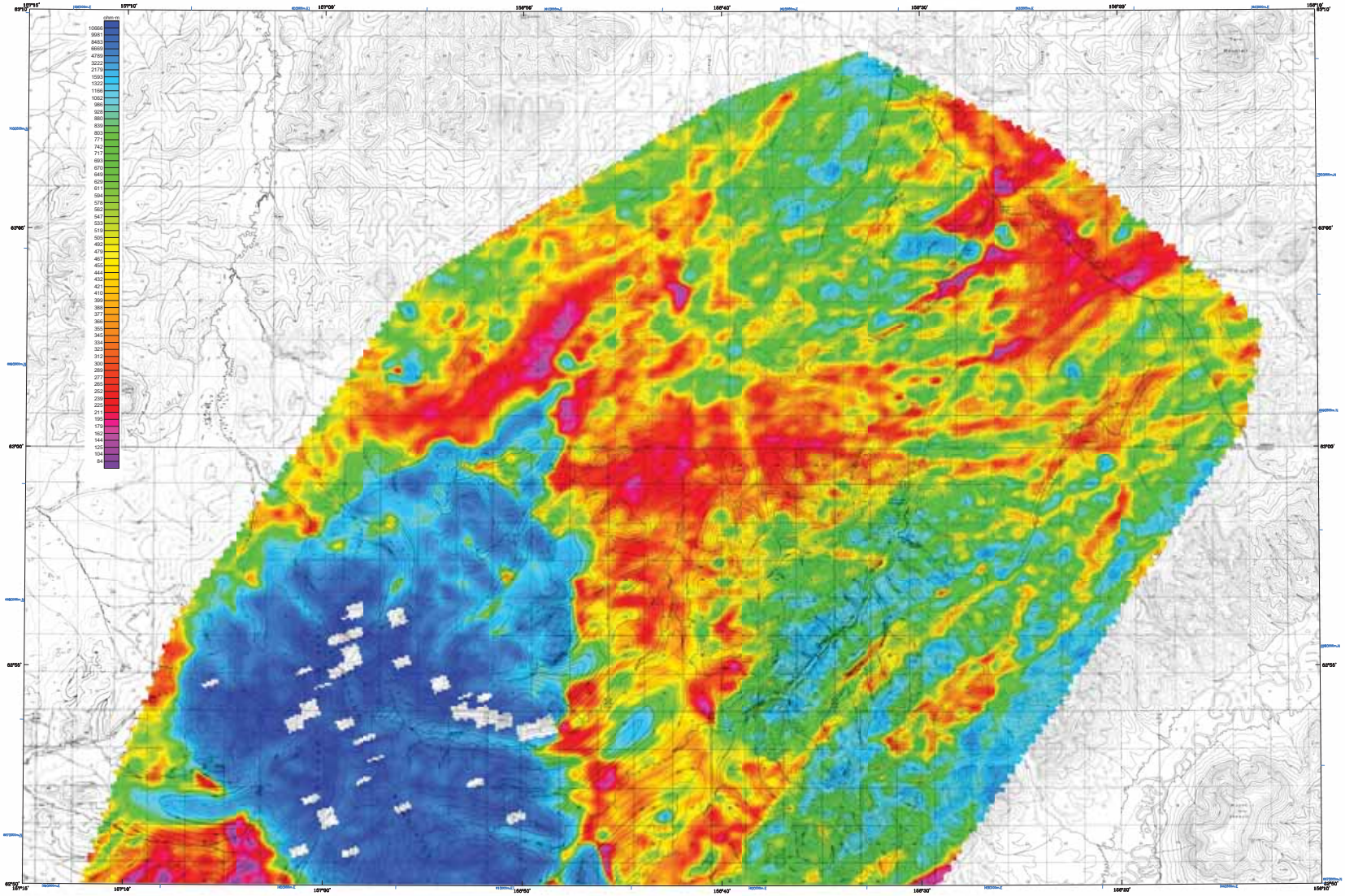

Base from U.S. Geological Survey Bettles D-1, 1956; D-2, 1954; D-3, 1954; Ophir A-4, 1956; A-5 1956; B-4, 1954; Goodnews, Alaska

SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

CONTOUR INTERVAL 100 FEET
DATUM IS MEAN SEA LEVEL

7200 Hz COPLANAR APPARENT RESISTIVITY OF THE IDITAROD SURVEY AREA, INNOKO, IDITAROD, and McGRATH MINING DISTRICTS, WESTERN ALASKA

PARTS OF IDITAROD AND OPHIR QUADRANGLES

by

Laurel E. Burns, Fugro Airborne Surveys Corp., and Fugro GeoServices, Inc.

2011

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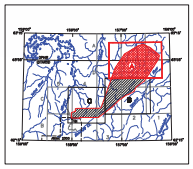

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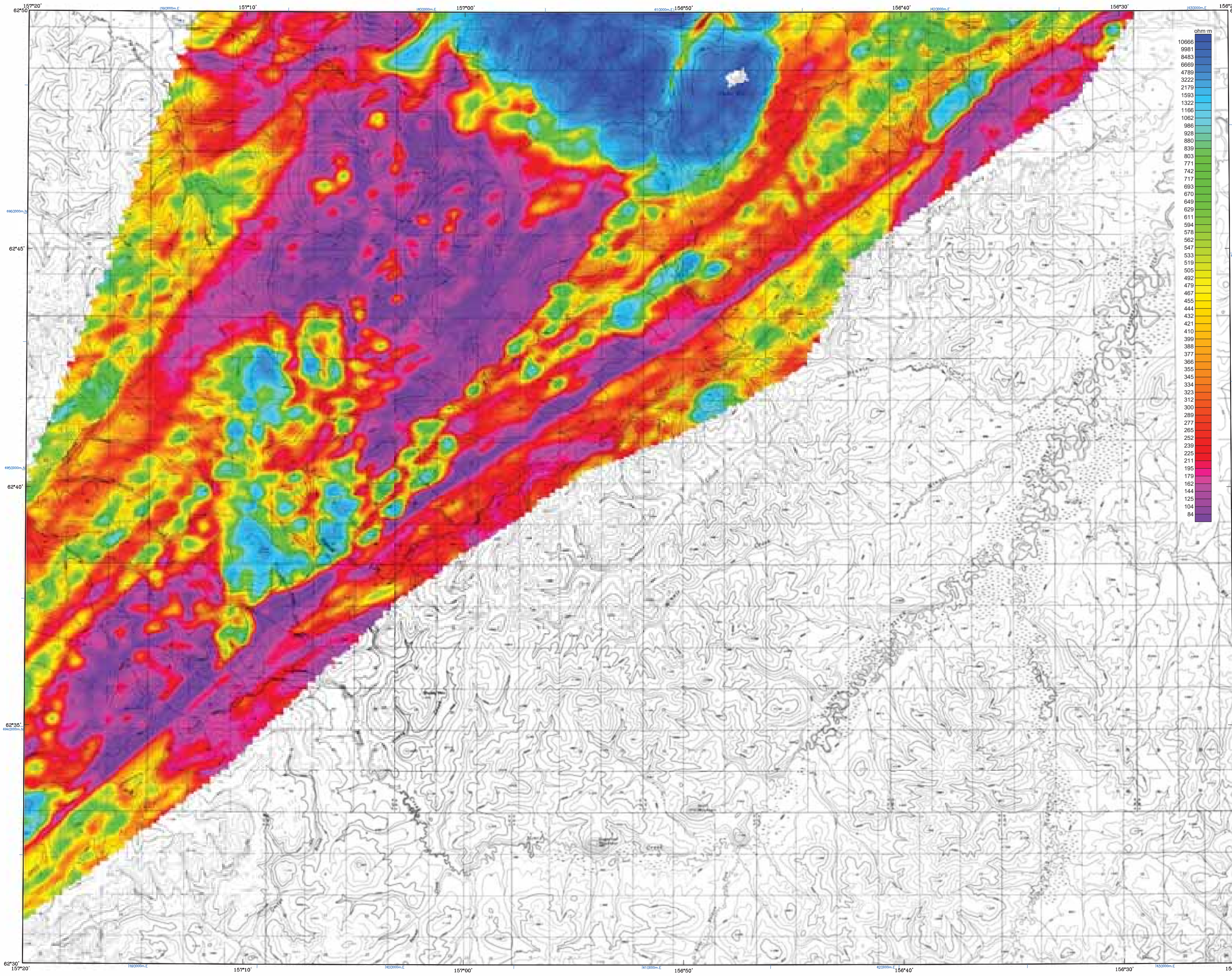


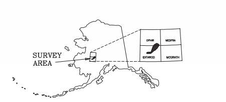
Base from U.S. Geological Survey Iditarod C-1, 1975; C-2, 1954; C-3, 1954; D-1, 1955; D-2, 1954; D-3, 1954; Quadrangles, Alaska

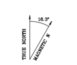
SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

CONTOUR INTERVAL 100 FEET
DATUM MEAN SEA LEVEL





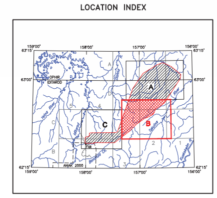
APPROXIMATE MEAN DECLINATION, 2010

7200 Hz COPLANAR APPARENT RESISTIVITY OF THE IDITAROD SURVEY AREA, INNOKO, IDITAROD, and McGRATH MINING DISTRICTS, WESTERN ALASKA

PARTS OF IDITAROD AND OPHIR QUADRANGLES

by
Laurel E. Burns, Fugro Airborne Surveys Corp., and Fugro GeoServices, Inc.
2011

LOCATION INDEX



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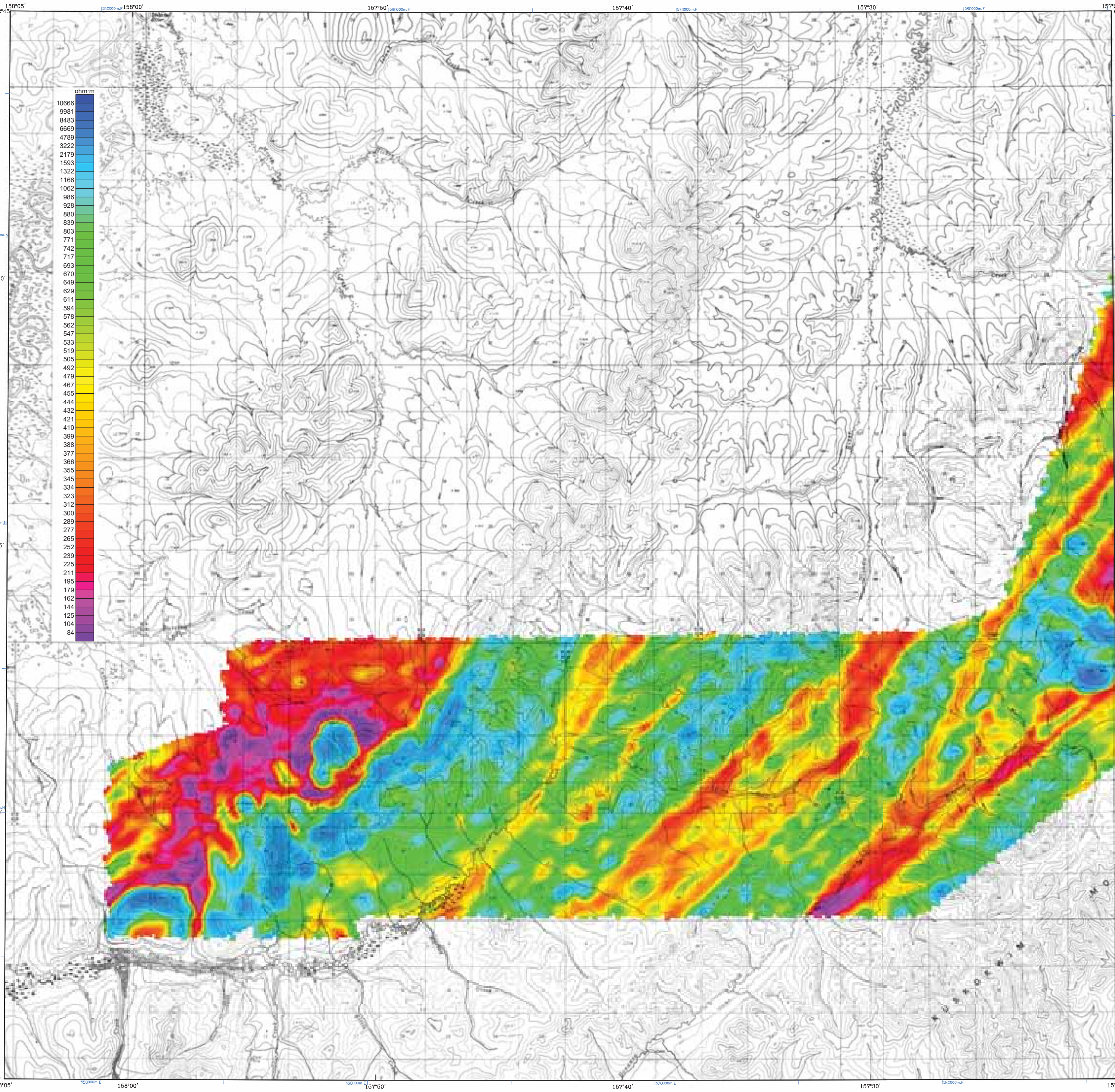


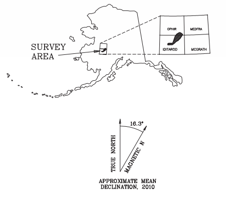
Base from U.S. Geological Survey Iditarod B-3, 1987; B-4, 1954; B-5, 1954; C-3, 1954; C-4, 1954; C-5, 1975; Quadrangles, Alaska

SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

CONTOUR INTERVAL 100 FEET
DATUM MEAN SEA LEVEL



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PARTS OF IDITAROD AND OPHIR QUADRANGLES

by
Laurel E. Burns, Fugro Airborne Surveys Corp., and Fugro GeoServices, Inc.
2011

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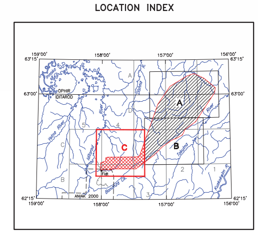

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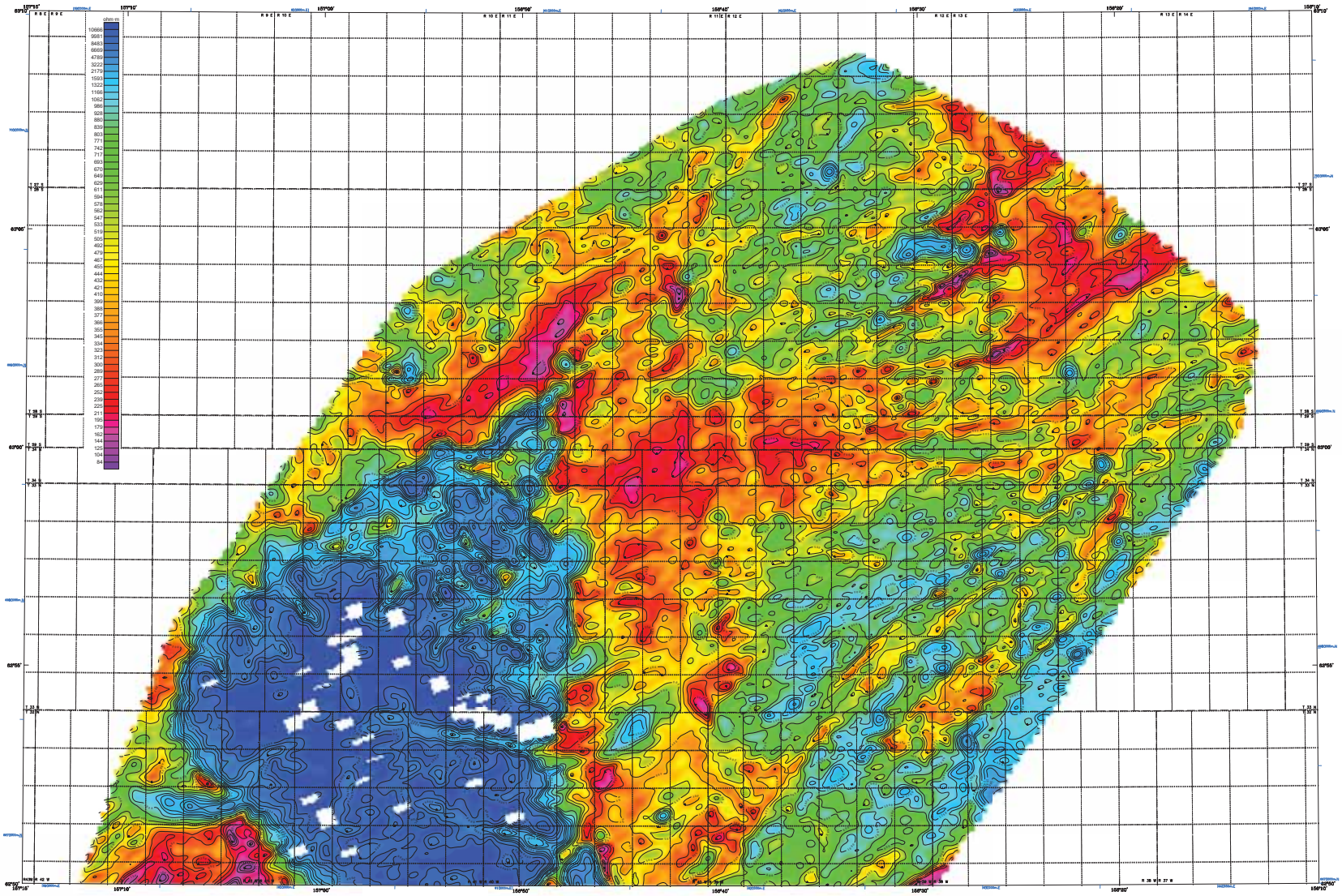

Base map: Topo Map: U.S. Geological Survey Miliard 2-1, 1950; 2-2, 1951; 2-3, 1954; Ophir 1-4, 1956; 2-2, 1950; 2-3, 1954; Quadrangles, Alaska.

SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

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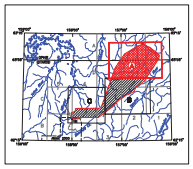

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RESISTIVITY CONTOURS

1000
800
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Contours in ohm-m at 10 intervals per decade

. . . . . resistivity low

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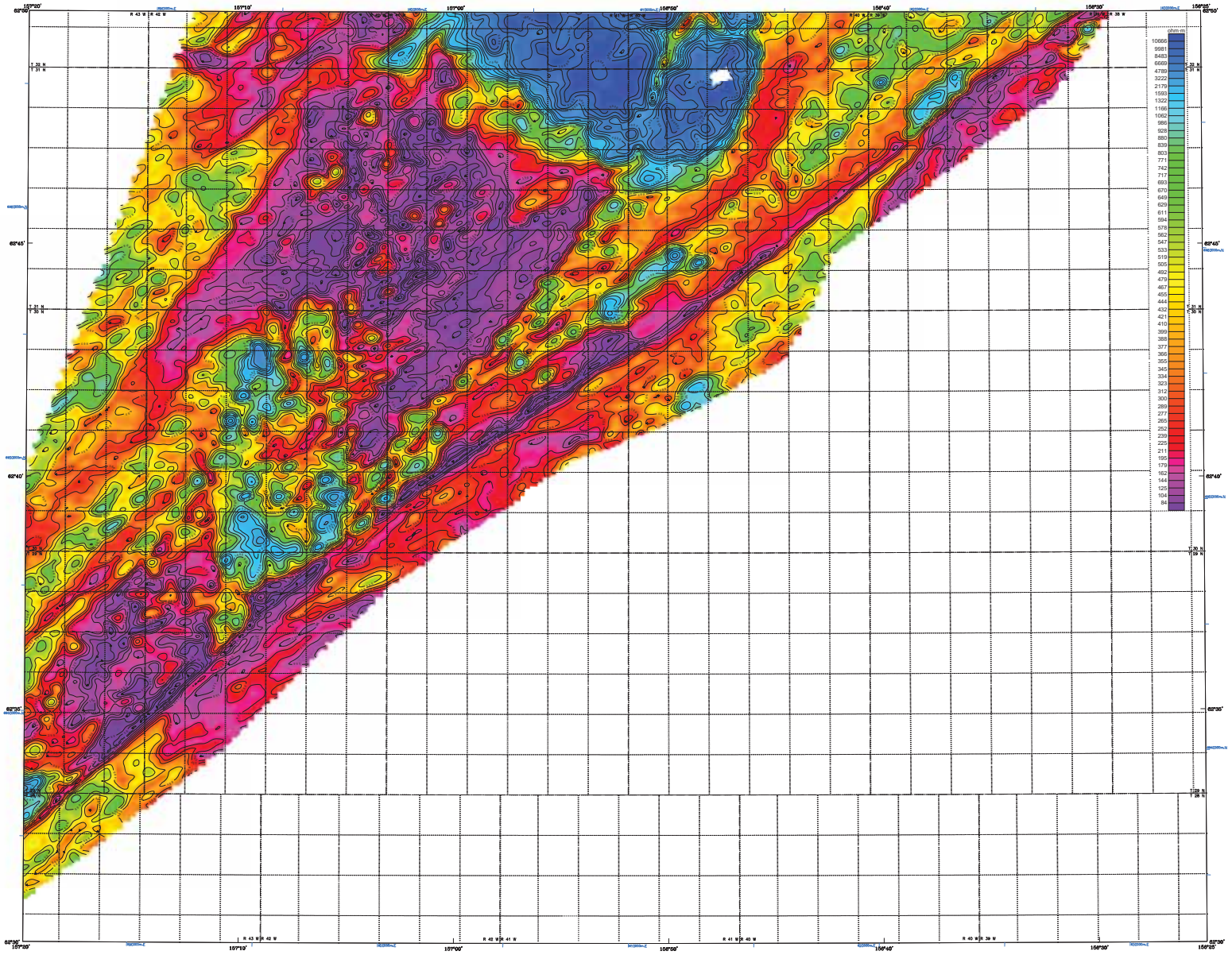

Topo outlines from U.S. Geological Survey Mitarod C-1, 1971; C-2, 1954; C-3, 1954; D-4, 1955; D-5, 1954; D-6, 1954 Quadrangles, Alaska

SCALE 1:63,360

1 0 1 2 3 4 MILES

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SURVEY AREA

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PARTS OF IDITAROD AND OPHIR QUADRANGLES

by

Laurel E. Burns, Fugro Airborne Surveys Corp., and Fugro GeoServices, Inc.

2011

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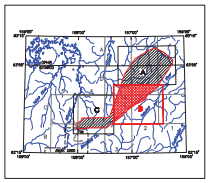

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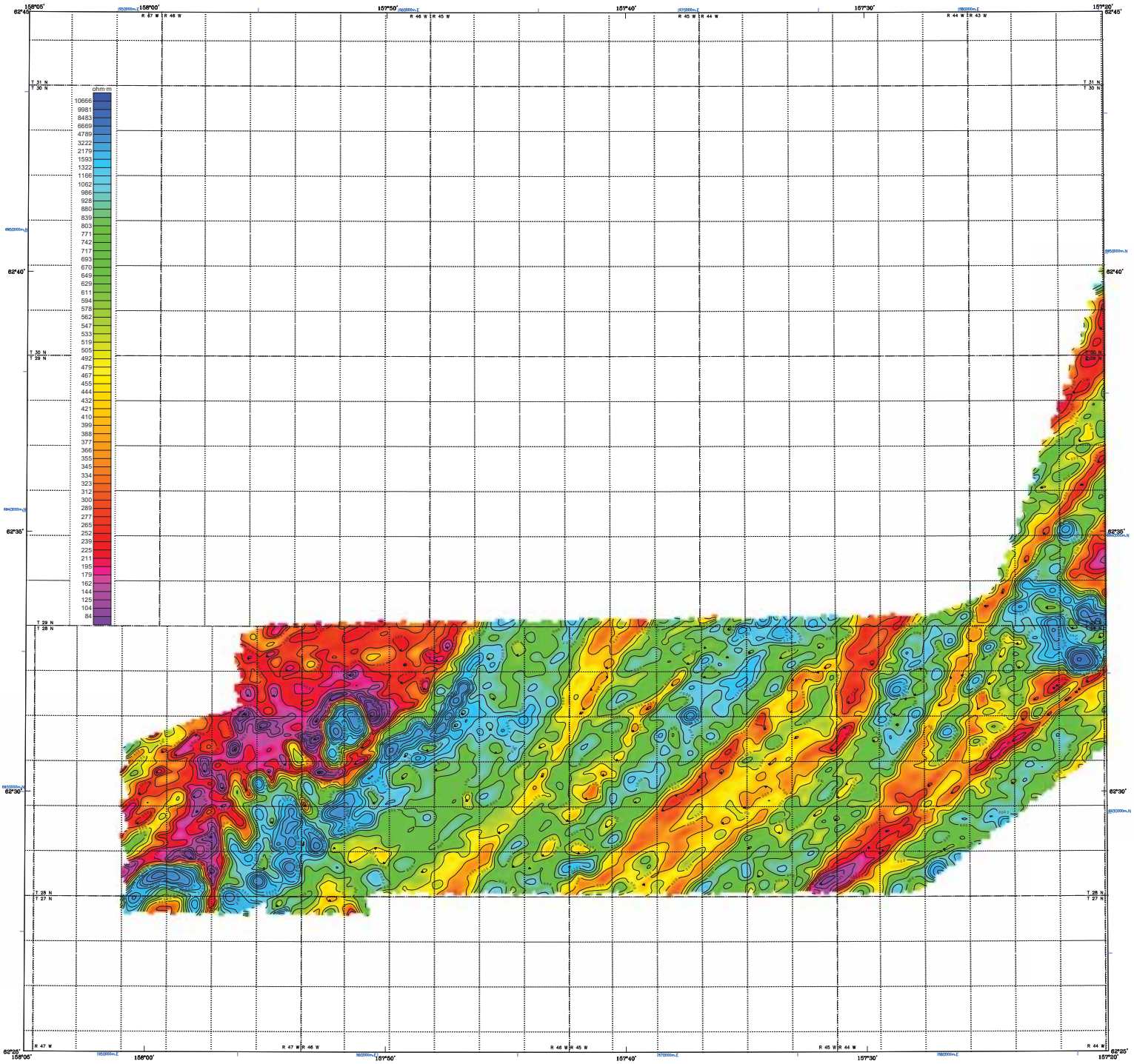

Section outlines from U.S. Geological Survey Mitored B-3, 1957; B-4, 1954; B-5, 1954; C-3, 1954; C-4, 1954; C-5, 1952 Quadrangles, Alaska

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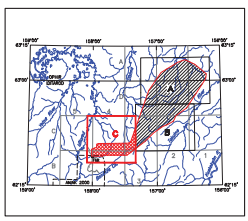

DESCRIPTIVE NOTES

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RESISTIVITY

The DIGHEM^{V} EM system measured inphase and quadrature components at five frequencies. Two vertical coaxial coil-pairs operated at 1000 and 5500 Hz while three horizontal coplanar coil-pairs operated at 900, 7200 and 56,000 Hz. EM data were sampled at 0.1 second intervals. The EM system responds to bedrock conductors, conductive overburden, and cultural sources. Apparent resistivity is generated from the inphase and quadrature component of the coplanar 7200 Hz using the pseudo-layer half space model. The data were interpolated onto a regular 80 m grid using a modified Akima (1970) technique. All grids were then resampled from the 80 m cell size down to a 25 m cell size to produce the maps and final grids contained in this publication.

Akima, H., 1970, A new method of interpolation and smooth curve fitting based on local procedures: Journal of the Association of Computing Machinery, v. 17, no. 4, p. 589-602.

RESISTIVITY CONTOURS

1000
800
600
500
400
300
250
200
150
125
100

Contours in ohm-m at 10 intervals per decade

. . . . . resistivity low

SURVEY HISTORY

This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources, Division of Geological & Geophysical Surveys (DGGS), and Fugro GeoServices, Inc. Airborne geophysical data for the area were acquired and processed by Fugro Airborne Surveys Corp. in 2010 and 2011. Previously flown DGGS surveys adjacent to the current survey are shown in the location map by dashed lines, survey name, and date of publication. The project was funded by the Alaska State Legislature as part of the Alaska Airborne Geological & Geophysical Mineral Inventory Program.

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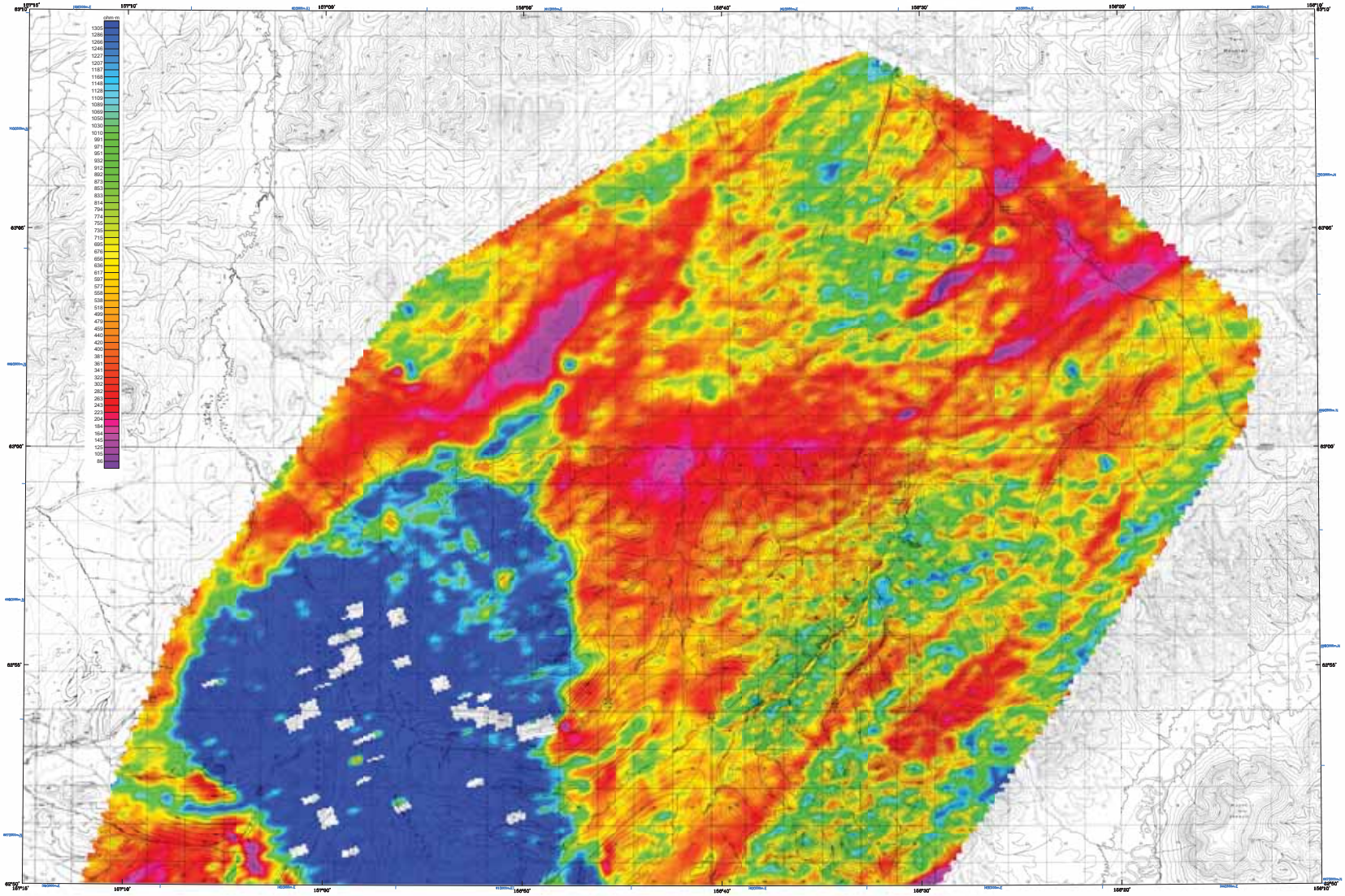


Base from U.S. Geological Survey Bethel B-1, 1950; D-1, 1954; D-2, 1954; Ophir A-4, 1950; A-5, 1950; B-4, 1954; Quadrangles, Alaska

SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

CONTOUR INTERVAL 100 FEET
DATUM MEAN SEA LEVEL

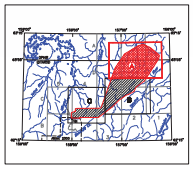
900 Hz COPLANAR APPARENT RESISTIVITY OF THE IDITAROD SURVEY AREA, INNOKO, IDITAROD, and McGRATH MINING DISTRICTS, WESTERN ALASKA

PARTS OF IDITAROD AND OPHIR QUADRANGLES

by

Laurel E. Burns, Fugro Airborne Surveys Corp., and Fugro GeoServices, Inc.
2011

LOCATION INDEX



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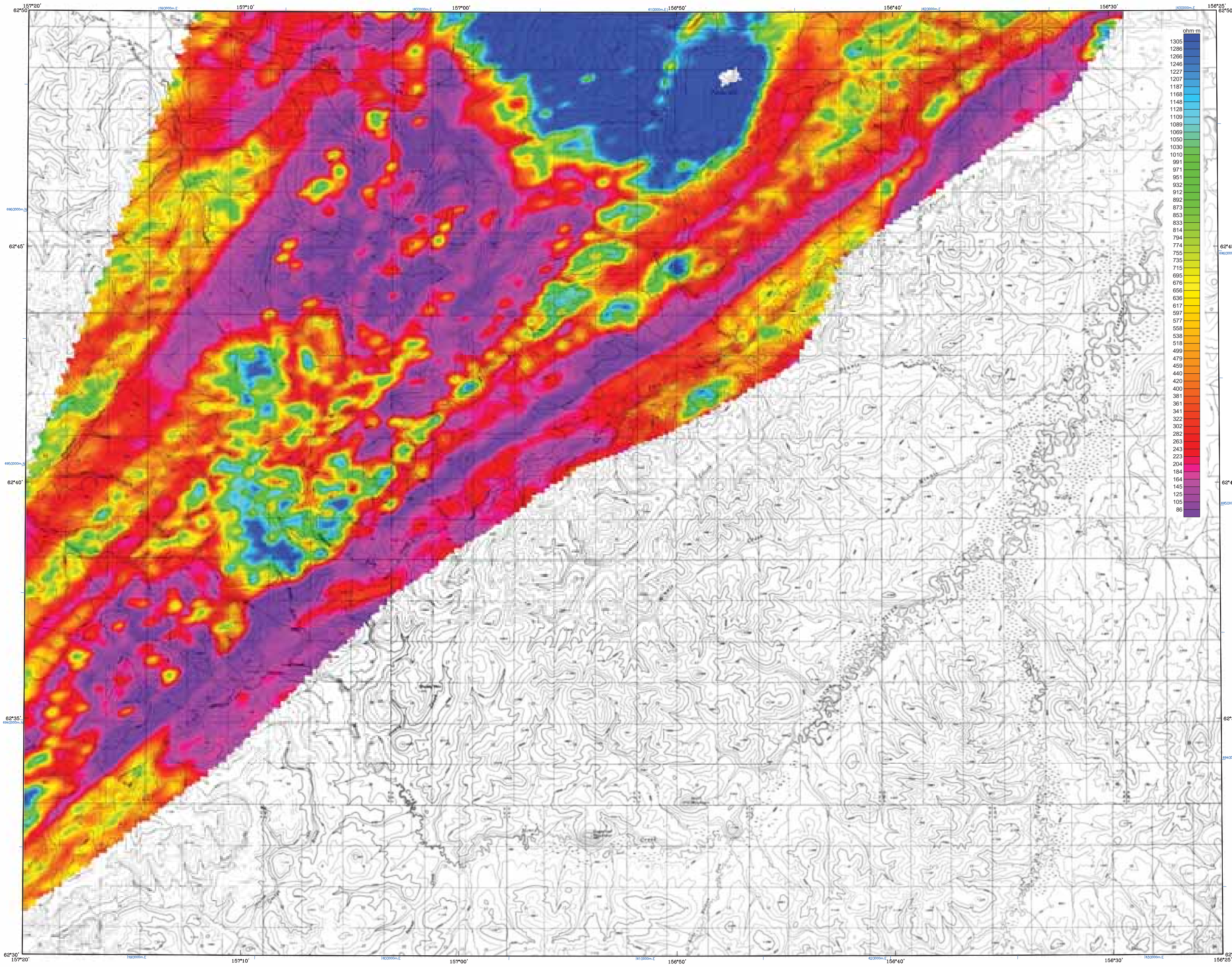
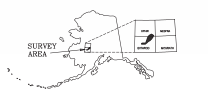
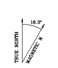


Base from U.S. Geological Survey Iditarod C-1, 1971; C-2, 1954; C-3, 1954; D-1, 1966; D-2, 1954; D-3, 1954; Quadrangles, Alaska





APPROXIMATE MEAN DECLINATION, 2010

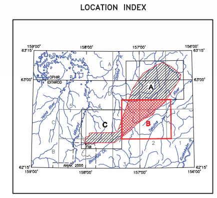
SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

CONTOUR INTERVAL 100 FEET
DATUM MEAN SEA LEVEL

LOCATION INDEX



900 Hz COPLANAR APPARENT RESISTIVITY OF THE IDITAROD SURVEY AREA, INNOKO, IDITAROD, and McGRATH MINING DISTRICTS, WESTERN ALASKA

PARTS OF IDITAROD AND OPHIR QUADRANGLES

by
Laurel E. Burns, Fugro Airborne Surveys Corp., and Fugro GeoServices, Inc.
2011

DESCRIPTIVE NOTES

The geophysical data were acquired with a DIGHEM^{V} Electromagnetic (EM) system and a Fugro D1344 cesium magnetometer with a Scintrex CS3 cesium sensor. The EM and magnetic sensors were flown at a height of 100 feet. In addition the survey recorded data from radar and laser altimeters, GPS navigation system, 50/60 Hz monitors and video camera. Flights were performed with an AS-350-B3 Squirrel helicopter at a mean terrain clearance of 200 feet along NW-SE (340°) survey flight lines with a spacing of a quarter of a mile. Tie lines were flown perpendicular to the flight lines at intervals of approximately 3 miles.

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RESISTIVITY

The DIGHEM^{V} EM system measured inphase and quadrature components at five frequencies. Two vertical coaxial coil-pairs operated at 1000 and 5500 Hz while three horizontal coplanar coil-pairs operated at 900, 7200 and 56,000 Hz. EM data were sampled at 0.1 second intervals. The EM system responds to bedrock conductors, conductive overburden, and cultural sources. Apparent resistivity is generated from the inphase and quadrature component of the coplanar 900 Hz using the pseudo-layer half space model. The data were interpolated onto a regular 80 m grid using a modified Akima (1970) technique. All grids were then resampled from the 80 m cell size down to a 25 m cell size to produce the maps and final grids contained in this publication.

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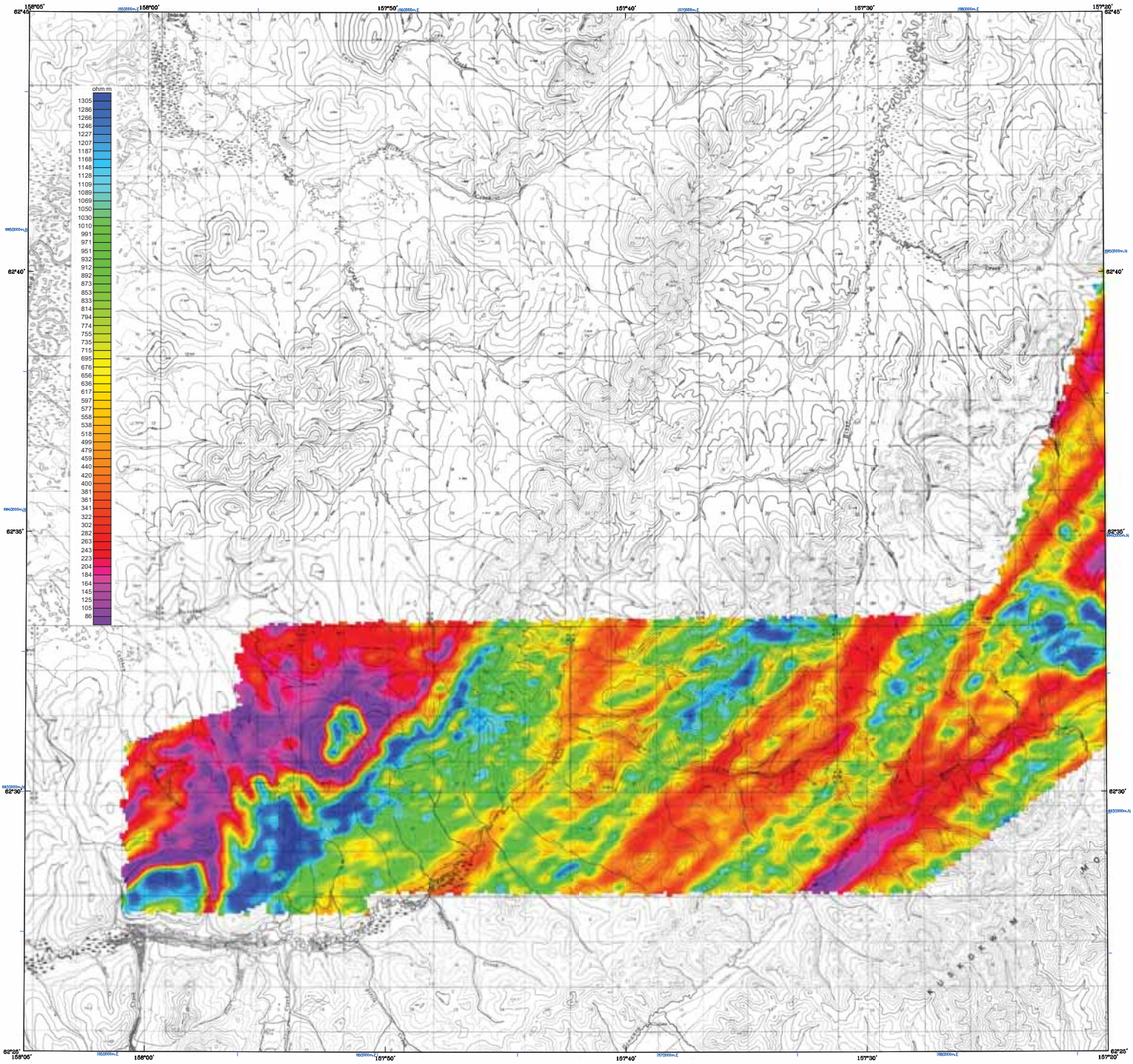


Base from U.S. Geological Survey Bilateral B-3, 1957; B-4, 1954; B-5, 1954; C-3, 1954; C-4, 1954; C-5, 1956; Quadrangles, Alaska

SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

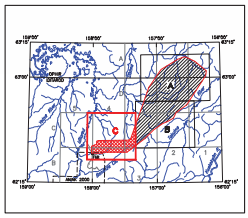
CONTOUR INTERVAL 500 FEET
DATUM MEAN SEA LEVEL

900 Hz COPLANAR APPARENT RESISTIVITY OF THE IDITAROD SURVEY AREA, INNOKO, IDITAROD, and McGRATH MINING DISTRICTS, WESTERN ALASKA

PARTS OF IDITAROD AND OPHIR QUADRANGLES

by
Laurel E. Burns, Fugro Airborne Surveys Corp., and Fugro GeoServices, Inc.
2011

LOCATION INDEX



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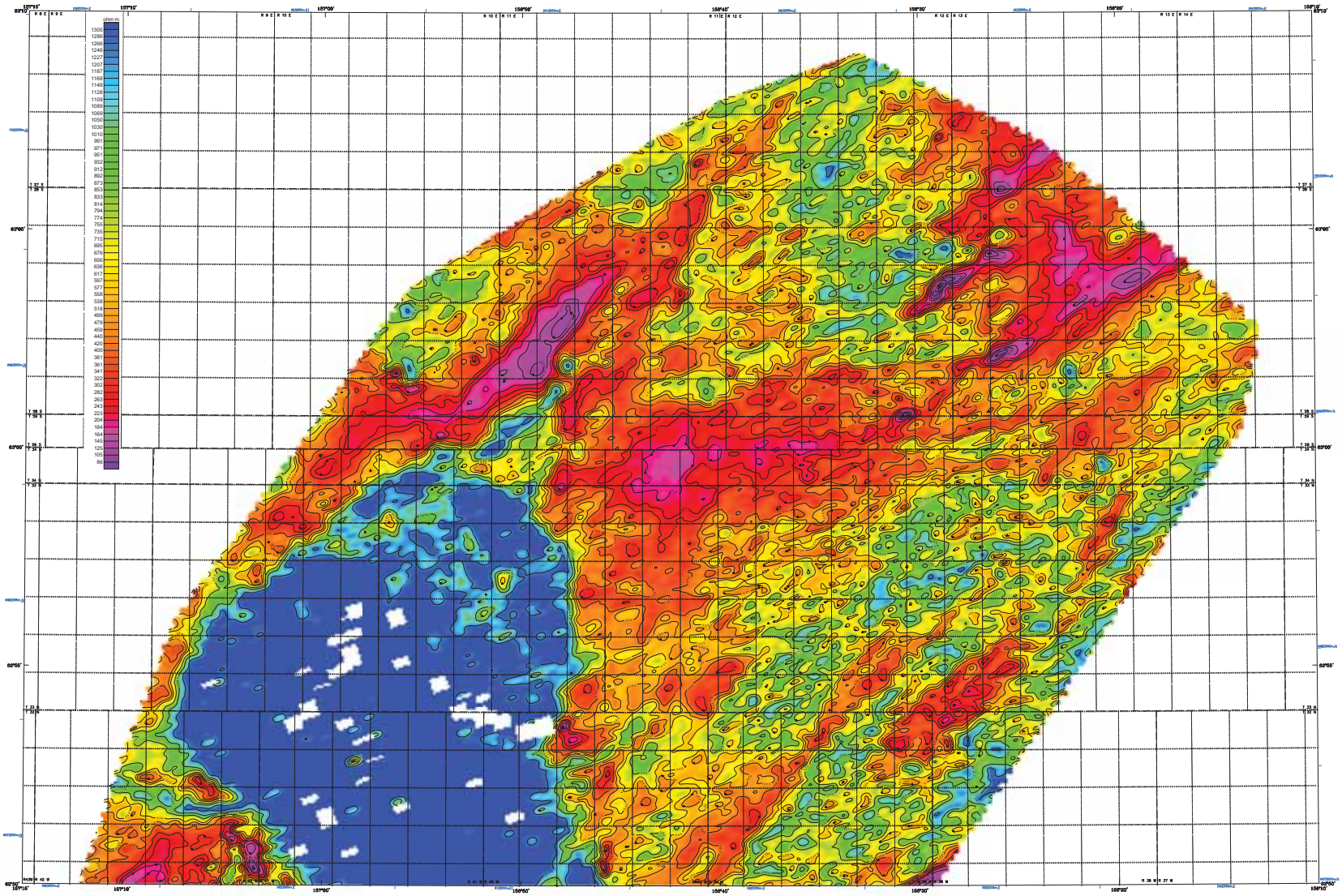

Base map from U.S. Geological Survey Iditarod A-1, 1954; D-2, 1954; D-3, 1954; Ophir A-4, 1956; D-2, 1956; D-3, 1954; Goodnews, Alaska.

SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

900 Hz COPLANAR APPARENT RESISTIVITY AND DATA CONTOURS OF THE IDITAROD SURVEY AREA, INNOKO, IDITAROD, and McGRATH MINING DISTRICTS, WESTERN ALASKA

PARTS OF IDITAROD AND OPHIR QUADRANGLES

by

Laurel E. Burns, Fugro Airborne Surveys Corp., and Fugro GeoServices, Inc.

2011

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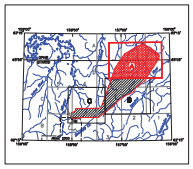

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RESISTIVITY CONTOURS

1000
800
600
500
400
300
250
200
150
125
100

Contours in ohm-m at 10 intervals per decade

. . . . . resistivity low

SURVEY HISTORY

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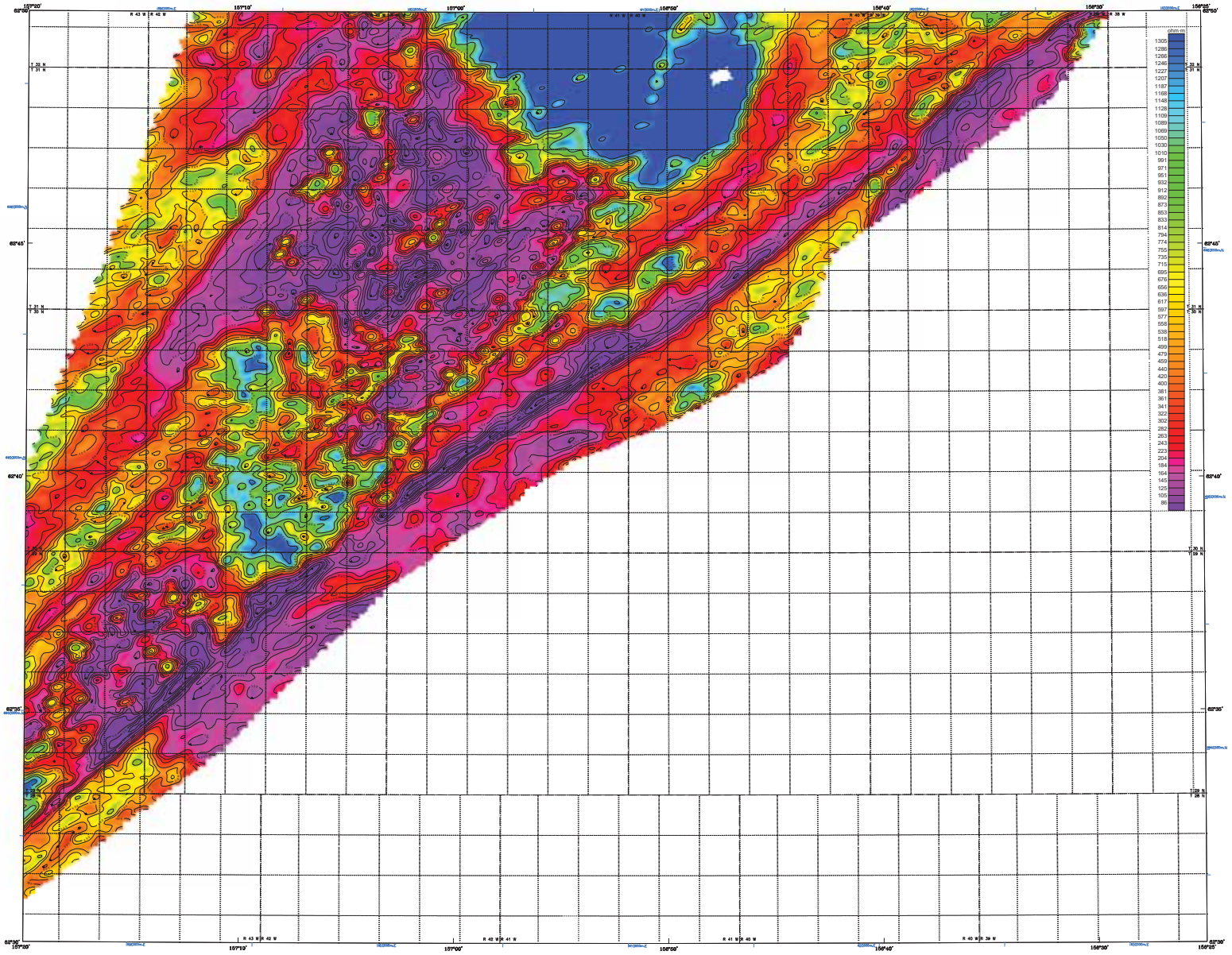

Section outlines from U.S. Geological Survey Mitarod C-1, 1971; C-2, 1954; C-3, 1954; D-1, 1949; D-2, 1954; D-3, 1954 Quadrangles, Alaska.

SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

900 Hz COPLANAR APPARENT RESISTIVITY AND DATA CONTOURS OF THE IDITAROD SURVEY AREA, INNOKO, IDITAROD, and McGRATH MINING DISTRICTS, WESTERN ALASKA

PARTS OF IDITAROD AND OPHIR QUADRANGLES

by

Laurel E. Burns, Fugro Airborne Surveys Corp., and Fugro GeoServices, Inc.

2011

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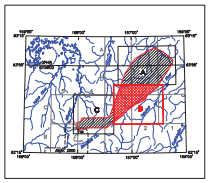

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Contours in ohm-m at 10 intervals per decade

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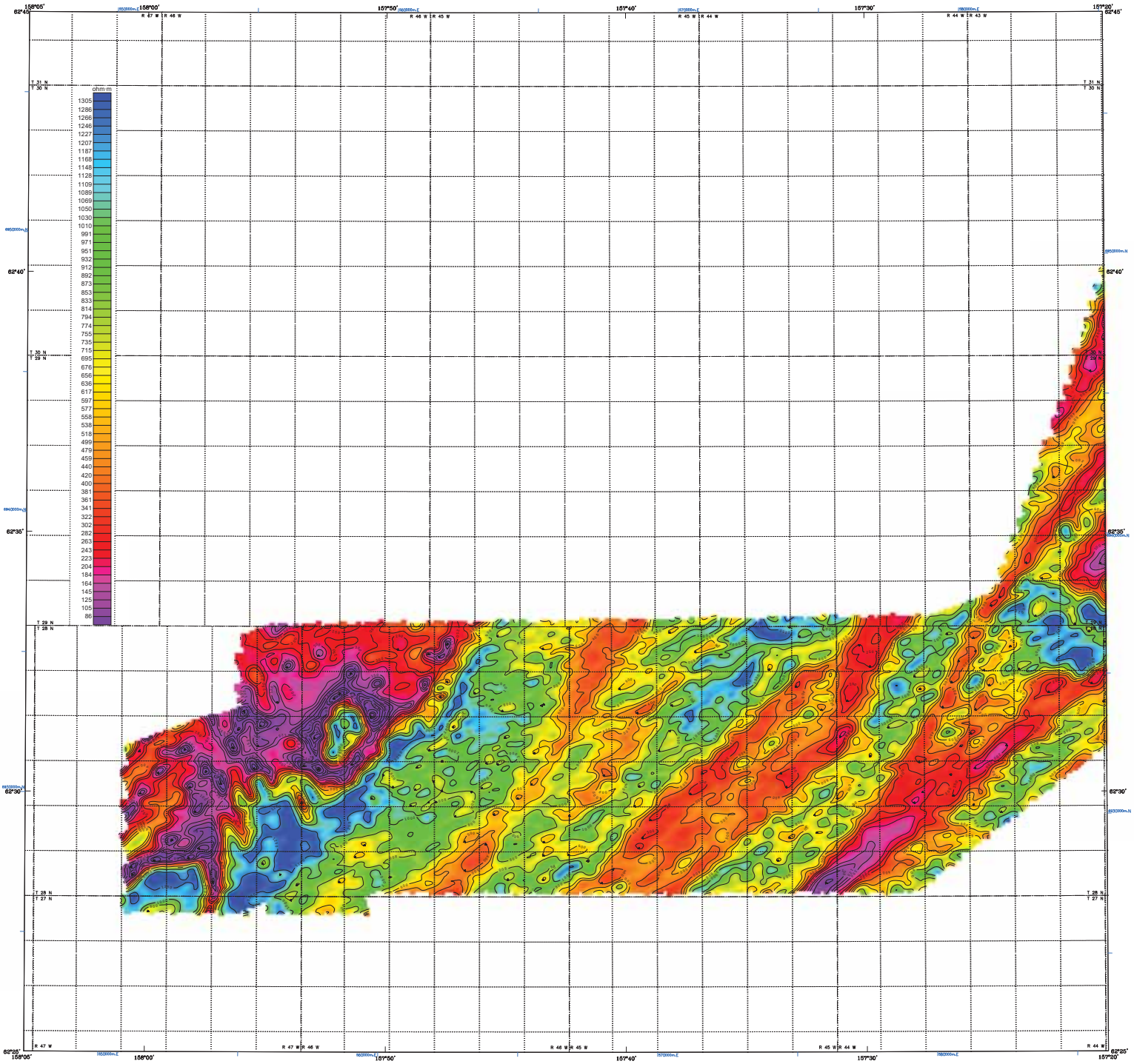

Section outlines from U.S. Geological Survey Mitored D-3, 1957; B-4, 1954; B-5, 1954; C-3, 1954; C-4, 1954; C-5, 1952 Quadrangles, Alaska

SCALE 1:63,360

1 0 1 2 3 4 MILES

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APPROXIMATE MEAN DECLINATION, 2010

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PARTS OF IDITAROD AND OPHIR QUADRANGLES

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2011

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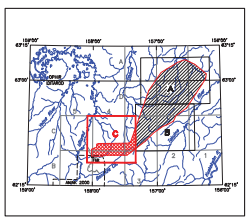

DESCRIPTIVE NOTES

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A Novatel OEM4-G2L Global Positioning System was used for navigation. The helicopter position was derived every 0.5 seconds using post-flight differential positioning to a relative accuracy of better than 5m. Flight path positions were projected onto the Clarke 1866 (UTM zone 4) spheroid, 1927 North American datum using a central meridian (CM) of 159°, a north constant of 0 and an east constant of 500,000. Positional accuracy of the presented data is better than 10m with respect to the UTM grid.

RESISTIVITY

The DIGHEM^{V} EM system measured inphase and quadrature components at five frequencies. Two vertical coaxial coil-pairs operated at 1000 and 5500 Hz while three horizontal coplanar coil-pairs operated at 900, 7200 and 56,000 Hz. EM data were sampled at 0.1 second intervals. The EM system responds to bedrock conductors, conductive overburden, and cultural sources. Apparent resistivity is generated from the inphase and quadrature component of the coplanar 900 Hz using the pseudo-layer half space model. The data were interpolated onto a regular 80 m grid using a modified Akima (1970) technique. All grids were then resampled from the 80 m cell size down to a 25 m cell size to produce the maps and final grids contained in this publication.

Akima, H., 1970, A new method of interpolation and smooth curve fitting based on local procedures: Journal of the Association of Computing Machinery, v. 17, no. 4, p. 589-602.

RESISTIVITY CONTOURS

1000
800
600
500
400
300
250
200
150
125
100

Contours in ohm-m at 10 intervals per decade

. . . . . resistivity low

SURVEY HISTORY

This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources, Division of Geological & Geophysical Surveys (DGGS), and Fugro GeoServices, Inc. Airborne geophysical data for the area were acquired and processed by Fugro Airborne Surveys Corp. in 2010 and 2011. Previously flown DGGS surveys adjacent to the current survey are shown in the location map by dashed lines, survey name, and date of publication. The project was funded by the Alaska State Legislature as part of the Alaska Airborne Geological & Geophysical Mineral Inventory Program.

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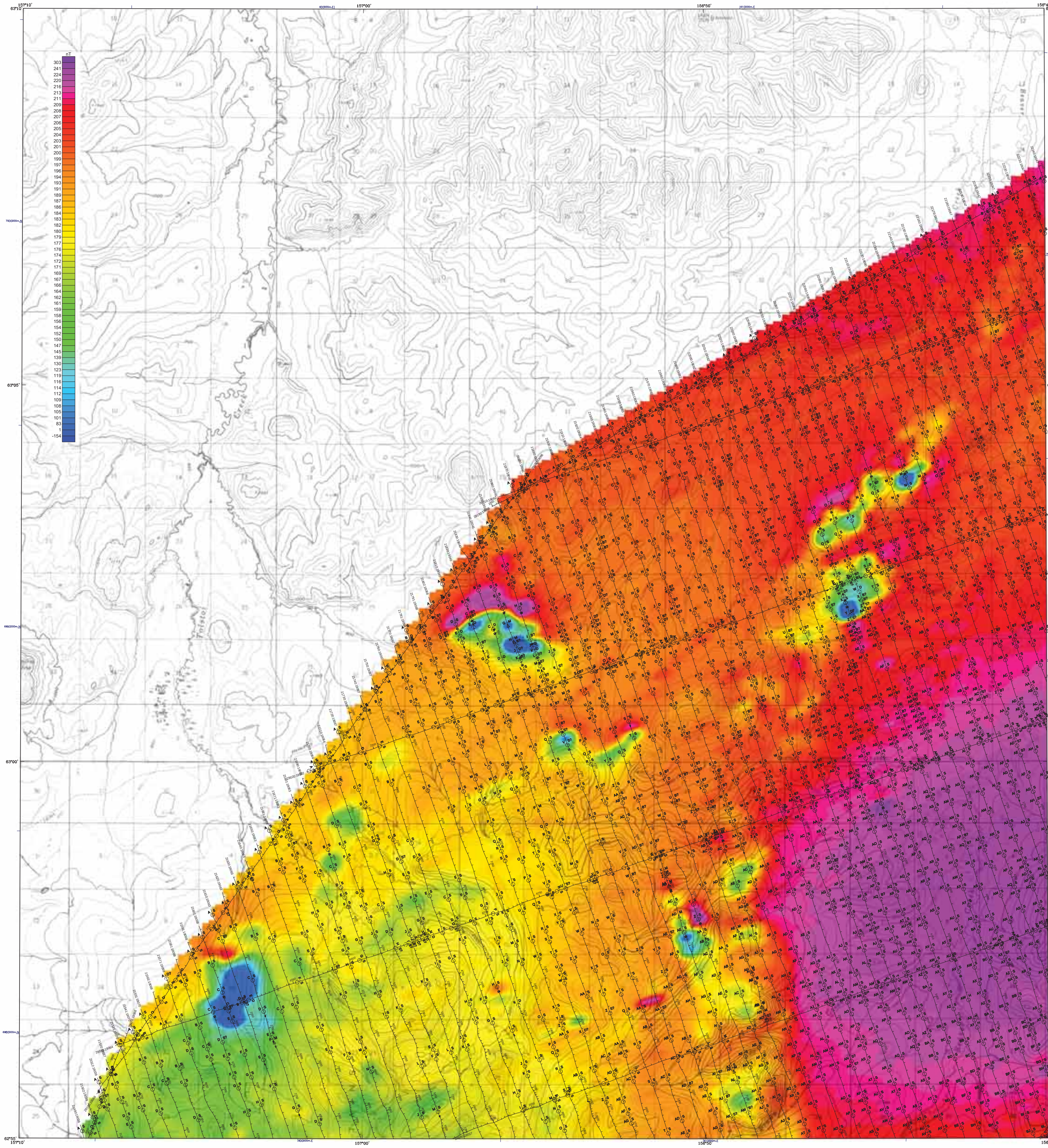


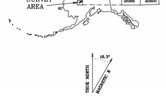
Base from U.S. Geological Survey Iditarod D-2, 1954; D-3, 1954; Ophir A-2, 1965; A-3, 1954; Quadrangles, Alaska

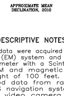
SCALE 1:31,680

0.5 0 0.5 1 1.5 2 MILES

0.5 0 0.5 1 1.5 2 2.5 KILOMETERS

CONTOUR INTERVAL 100 FEET
DATUM MEAN SEA LEVEL





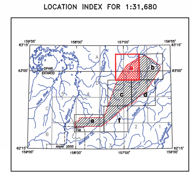
APPROXIMATE MEAN DECLINATION, 2010

RESIDUAL MAGNETIC FIELD AND DETAILED ELECTROMAGNETIC ANOMALIES OF THE IDITAROD SURVEY AREA, INNOKO, IDITAROD, and McGRATH MINING DISTRICTS, WESTERN ALASKA

PARTS of IDITAROD D-2, D-3 and OPHIR A-2, A-3 QUADRANGLES

by
Laurel E. Burns, Fugro Airborne Surveys Corp., and Fugro GeoServices, Inc.
2011

LOCATION INDEX FOR 1:31,680



DESCRIPTIVE NOTES

The geophysical data were acquired with a DIGHEM^V Electromagnetic (EM) system and a Fugro D1344 cesium magnetometer with a Scintrex CS3 cesium sensor. The EM and magnetic sensors were flown at a height of 100 feet. In addition the survey recorded data from radar and laser altimeters, GPS navigation system, 50/60 Hz monitors and video camera. Flights were performed with an AS-350-B3 Squirrel helicopter at a mean terrain clearance of 200 feet along NW-SE (340°) survey flight lines with a spacing of a quarter of a mile. Tie lines were flown perpendicular to the flight lines at intervals of approximately 3 miles.

A Novatel OEM4-G2L Global Positioning System was used for navigation. The helicopter position was derived every 0.5 seconds using post-flight differential positioning to a relative accuracy of better than 5m. Flight path positions were projected onto the Clarke 1866 (UTM zone 4) spheroid, 1927 North American datum using a central meridian (CM) of 159°, a north constant of 0 and an east constant of 500,000. Positional accuracy of the presented data is better than 10m with respect to the UTM grid.

ELECTROMAGNETIC ANOMALIES

Arcs indicate the conductor has a thickness >10m
Dip direction
Magnetic correlation in nT

Anomaly	Conductance
●	>100 siemens
◕	50-100 siemens
◒	20-50 siemens
⊕	10-20 siemens
⊕	5-10 siemens
○	1-5 siemens
◌	< 1 siemens
✳	Questionable anomaly
△	EM magnetite response
□	Culture

Anomaly identifier
Interpretive symbol

Interpretive symbol	Conductor model
B	Bedrock conductor
D	Narrow bedrock conductor ("thin dike")
S	Conductive cover ("horizontal thin sheet")
H	Broad conductive rock unit, deep conductive weathering, thick conductive cover ("half-space")
E	Edge of broad conductor ("edge of half space")
L	Culture, e.g. power line, metal building or fence
M	Magnetite
"?"	Indicates some uncertainty as to the most appropriate EM source model, but does not question the validity of the EM anomaly.

ELECTROMAGNETICS

To determine the location of EM anomalies or their boundaries, the DIGHEM^V EM system measured inphase and quadrature components at five frequencies. Two vertical coaxial-coil pairs operated at 1000 and 5500 Hz while three horizontal coplanar-coil pairs operated at 900, 7200, and 56,000 Hz. EM data were sampled at 0.1 second intervals. The EM system responds to bedrock conductors, conductive overburden, and cultural sources. The type of conductor is indicated on the aeromagnetic map by the interpretive symbol attached to each EM anomaly. Determination of the type of conductor is based on EM anomaly shapes of the coaxial- and coplanar-coil responses, together with conductor and magnetic patterns and topography. The power line monitor and the flight track video were examined to locate cultural sources.

RESIDUAL MAGNETIC FIELD

The magnetic total field data were processed using digitally recorded data from a Fugro D1344 magnetometer with a Scintrex CS3 cesium sensor. Data were collected at a sampling interval of 0.1 seconds. The magnetic data were (1) corrected for diurnal variations by subtraction of the digitally recorded base station magnetic data, (2) IGRF corrected (IGRF model 2010, updated for date of flight and altimeter variations), (3) leveled to the tie line data, and (4) interpolated onto a regular 80 m grid using a modified Akima (1970) technique. All grids were then resampled from the 80 m cell size down to a 25 m cell size to produce the maps and final grids contained in this publication.

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SURVEY HISTORY

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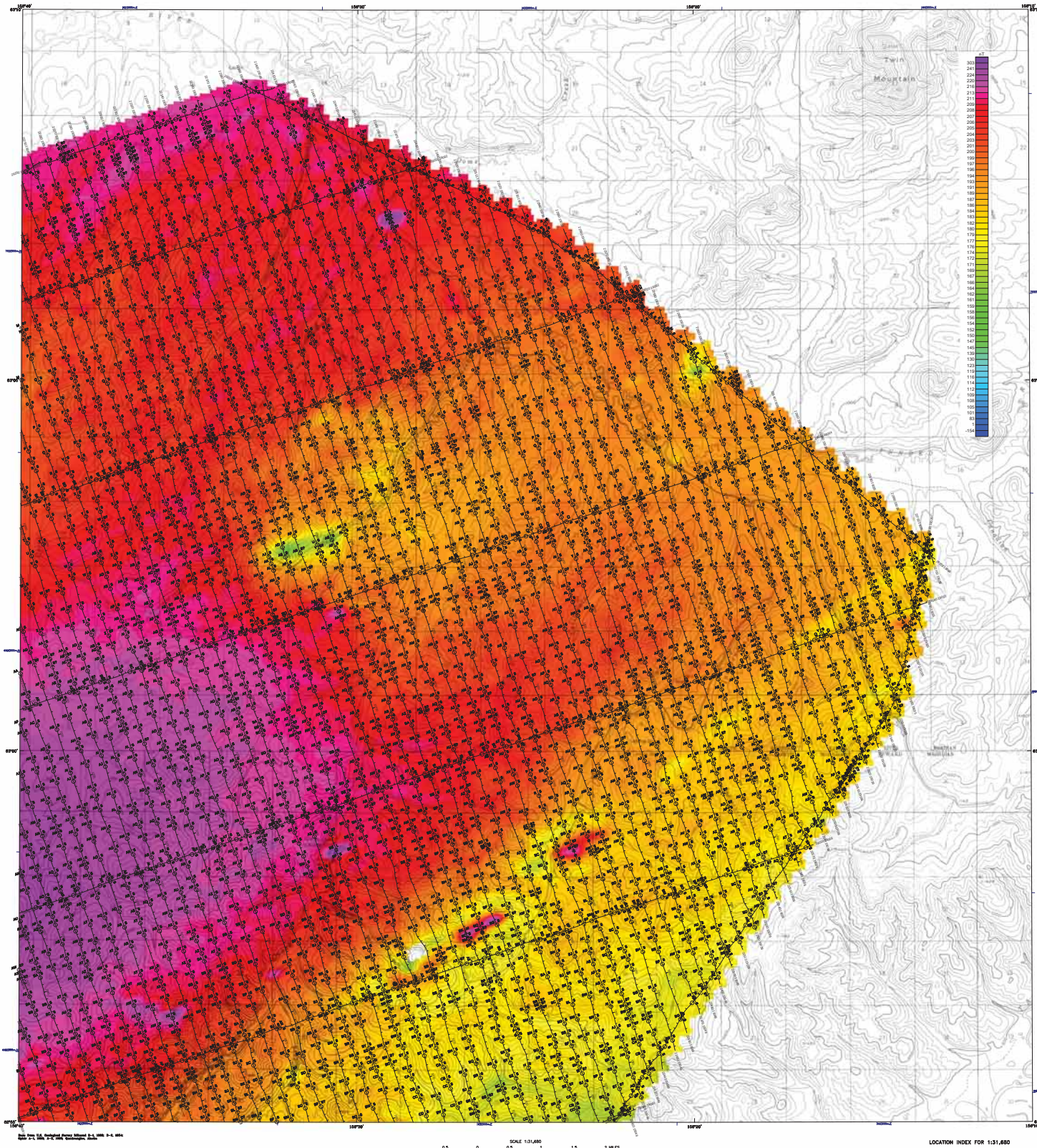


Base from U.S. Geological Survey Iditarod D-1, 1956; D-2, 1956; Ophir A-1, 1956; A-2, 1956 Quadrangles, Alaska

SCALE 1:31,680

0.5 0 0.5 1 1.5 2 MILES

0.5 0 0.5 1 1.5 2 2.5 KILOMETERS

MAGNETIC DECLINATION 19.5° EASTERN MAY 1, 2011

RESIDUAL MAGNETIC FIELD AND DETAILED ELECTROMAGNETIC ANOMALIES OF THE IDITAROD SURVEY AREA, INNOKO, IDITAROD, and McGRATH MINING DISTRICTS, WESTERN ALASKA

PARTS of IDITAROD D-1, D-2 and OPHIR A-1, A-2 QUADRANGLES

by

Laurel E. Burns, Fugro Airborne Surveys Corp., and Fugro GeoServices, Inc.

2011

DESCRIPTIVE NOTES

The geophysical data were acquired with a DIGHEM^{V} Electromagnetic (EM) system and a Fugro D1344 cesium magnetometer with a Scintrex CS3 cesium sensor. The EM and magnetic sensors were flown at a height of 100 feet. In addition the following ancillary data were acquired: radio altimeters, GPS navigation system, 50/60 Hz monitors and video camera. Flights were performed with an AS-350-B3 Squirrel helicopter at a mean terrain clearance of 200 feet along NW-SE (340°) survey flight lines with a spacing of a quarter of a mile. Tie lines were flown perpendicular to the flight lines at intervals of approximately 3 miles.

A Novatel OEM4-G2L Global Positioning System was used for navigation. The helicopter position was derived every 0.5 seconds using post-flight differential positioning to a relative accuracy of better than 5m. Flight path positions were projected onto the Clarke 1866 (UTM zone 4) spheroid, 1927 North American datum using a central meridian (CM) of 159° a north constant of 0 and east constant of 500,000. Positional accuracy of the EM and magnetic data is better than 10m with respect to the UTM grid.

ELECTROMAGNETIC ANOMALIES

Arcs indicate the conductor has a thickness >10m

Dip direction

Magnetic correlation in nT

Anomaly symbol	Conductance
	>100 siemens
	50–100 siemens
	20–50 siemens
	10–20 siemens
	5–10 siemens
	1–5 siemens
	< 1 siemens
	Questionable anomaly
	EM magnetite response
	Culture

Anomaly Identifier

Interpretive symbol

Interpretive symbol	
B	Bedrock conductor
D	Thick bedrock conductor (Depth > 30m)
S	Conductive cover ("horizontal thin sheet")
H	Broad conductive rock unit, deep conductive weathering, thick conductive cover (half-space)
E	Thin sheet conductor ("edge of half space")
L	Culture, e.g. power line, metal building or fence
M	Magnetite
*	Indicates some uncertainty as to the most appropriate EM source model, but does not question the validity of the EM anomaly.

ELECTROMAGNETICS

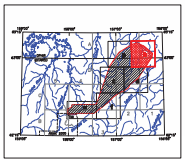
To determine the location of EM anomalies or their boundaries, the DIGHEM^{V} EM system measured inphase and quadrature components at five frequencies. Two vertical coaxial-coil pairs operated at 1000 and 5500 Hz while three horizontal coplanar-coil pairs operated at 900, 7200, and 56,000 Hz. EM data were sampled at 0.1 second intervals. The EM system responds to bedrock conductors, conductive overburden, and cultural sources. The type of conductor is indicated on the aeromagnetic map by the interpretive symbol attached to each EM anomaly. Determination of the type of conductor is based on EM anomaly shapes of the coaxial- and coplanar-coil responses, together with the magnetic and topographic patterns and topography. The video monitor and the flight track video were examined to locate cultural sources.

RESIDUAL MAGNETIC FIELD

The magnetic total field data were processed using digitally recorded data from a Fugro D1344 magnetometer with a Scintrex CS3 cesium sensor. Data were collected at a sampling interval of 0.1 seconds. The magnetic data were: (1) corrected for diurnal variations by subtraction of the digitally recorded base station magnetometer data, (2) corrected for IGRF (IGRF 2010, updated for date of flight; and diurnal variations), (3) leveled to the tie line data, and (4) interpolated onto a regular 80 m grid using a modified Akima (1970) technique. All grids were then resampled from the 80 m cell size down to a 25 m cell size to produce the maps and final grids contained in this publication.

Akima, H., 1970, A new method of interpolation and smooth curve fitting based on local procedures: Journal of the Association of Computing Machinery, v. 17, no. 4, p. 589–602.

LOCATION INDEX FOR 1:31,680



SURVEY HISTORY

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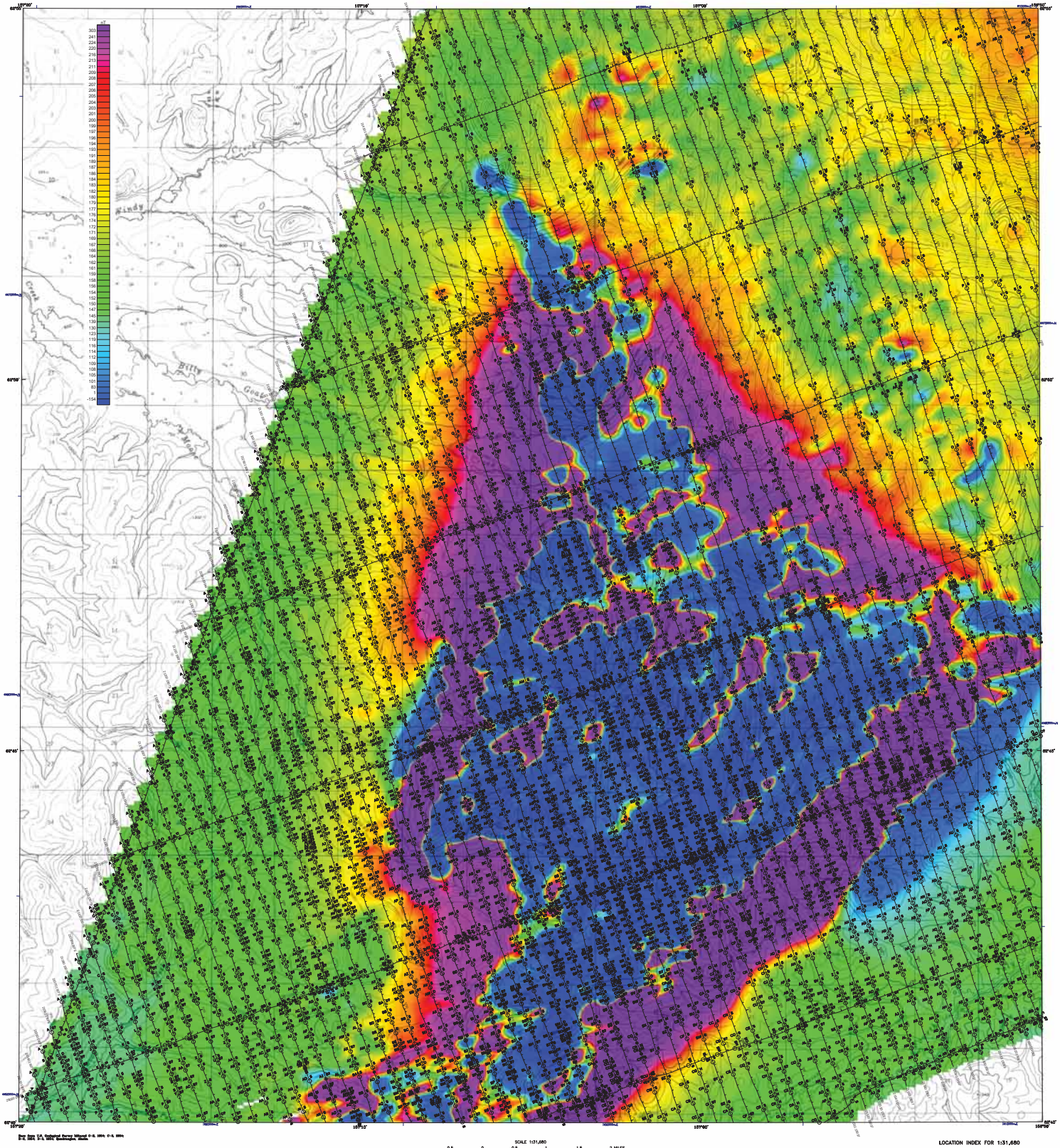

Base from U.S. Geological Survey Miliard C-2, 1954; C-3, 1954; D-2, 1954; D-3, 1954; Bonanza, Alaska

SCALE 1:31,680

0.5 0 0.5 1 1.5 2 MILES

0.5 0 0.5 1 1.5 2 2.5 KILOMETERS

"TRUE NORTH, MAGNETIC NORTH, AND GRID NORTH"

RESIDUAL MAGNETIC FIELD AND DETAILED ELECTROMAGNETIC ANOMALIES OF THE IDITAROD SURVEY AREA, INNOKO, IDITAROD, and McGRATH MINING DISTRICTS, WESTERN ALASKA

PARTS of IDITAROD C-2, C-3, D-2 and D-3 QUADRANGLES

by
Laurel E. Burns, Fugro Airborne Surveys Corp., and Fugro GeoServices, Inc.

2011

ELECTROMAGNETIC ANOMALIES

Arrow indicate the conductor has a thickness >10m

Dip direction

Magnetic correlation in nT

Anomaly	Conductance
	>100 siemens
	50–100 siemens
	20–50 siemens
	10–30 siemens
	5–10 siemens
	1–5 siemens
	< 1 siemens
	Questionable anomaly
	EM magnetite response
	Culture

Anomaly identifier

Interpretive symbol

Interpretive symbol	Conductor model
B	Bedrock conductor
D	Discrete bedrock conductor ("thin sheet")
S	Conductive cover ("horizontal thin sheet")
H	Broad conductive rock unit, deep conductive weathering, thick conductive cover
E	Edge of broad conductor ("edge of half space")
L	Culture, e.g. power line, metal building or fence
M	Magnetite
"?"	Indicates some uncertainty as to the most appropriate EM source model, but does not question the validity of the EM anomaly.

DESCRIPTIVE NOTES

The geophysical data were acquired with a DIGHEM^{V} Electromagnetic (EM) system and a Fugro D1344 cesium magnetometer with a Scintrex CS3 cesium sensor. The EM system operated at 900 Hz and flown at a height of 100 feet. In addition the survey recorded data from radar and laser altimeters, GPS navigation system, 50/60 Hz monitors and video camera. Flights were performed with an AS-350-B3 Squirrel helicopter at a mean terrain clearance of 200 feet along NW-SE (340°) survey flight lines with a spacing of a quarter of a mile. Tie lines were flown perpendicular to the flight lines at intervals of approximately 3 miles.

A Novatel OEM4-G2L Global Positioning System was used for navigation. The helicopter position was derived every 0.5 seconds using post-flight differential positioning to a relative accuracy of better than 5m. Flight path positions were projected onto the Clarke 1866 (UTM zone 4) spheroid, 1927 North American datum using a central meridian (CM) of 159°, a north constant of 0 and a local conversion (UTM). Positional accuracy of the measured data is better than 10m with respect to the UTM grid.

ELECTROMAGNETICS

To determine the location of EM anomalies or their boundaries, the DIGHEM^{V} EM system measured inphase and quadrature components at five frequencies. Two vertical coaxial-coil pairs operated at 1000 and 5500 Hz while three horizontal coplanar-coil pairs operated at 900, 7200, and 56,000 Hz. EM data were sampled at 0.1 second intervals. The EM system responds to bedrock conductors, conductive overburden, and cultural sources. The type of conductor is indicated on the aeromagnetic map by the interpretive symbol attached to each EM anomaly. Determination of the type of conductor is based on EM anomaly shapes of the coaxial- and coplanar-coil responses, together with conductor and magnetic patterns and topography. The power line monitor and the flight track video were examined to locate cultural sources.

RESIDUAL MAGNETIC FIELD

The magnetic total field data were processed using digitally recorded data from a Fugro D1344 magnetometer with a Scintrex CS3 cesium sensor. Data were collected at sampling intervals of 0.1 second. The raw magnetic data were (1) corrected for diurnal variations by subtraction of the digitally recorded base station magnetic data, (2) IGRF corrected (IGRF model 2010, updated for date of flight and altimeter variations), (3) leveled to the tie line data, and (4) interpolated onto a regular 80 m grid using a modified Akima (1970) technique. All grids were then resampled from the 80 m cell size down to a 25 m cell size to produce the maps and final grids contained in this publication.

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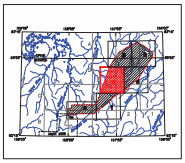
LOCATION INDEX FOR 1:31,680



SURVEY HISTORY

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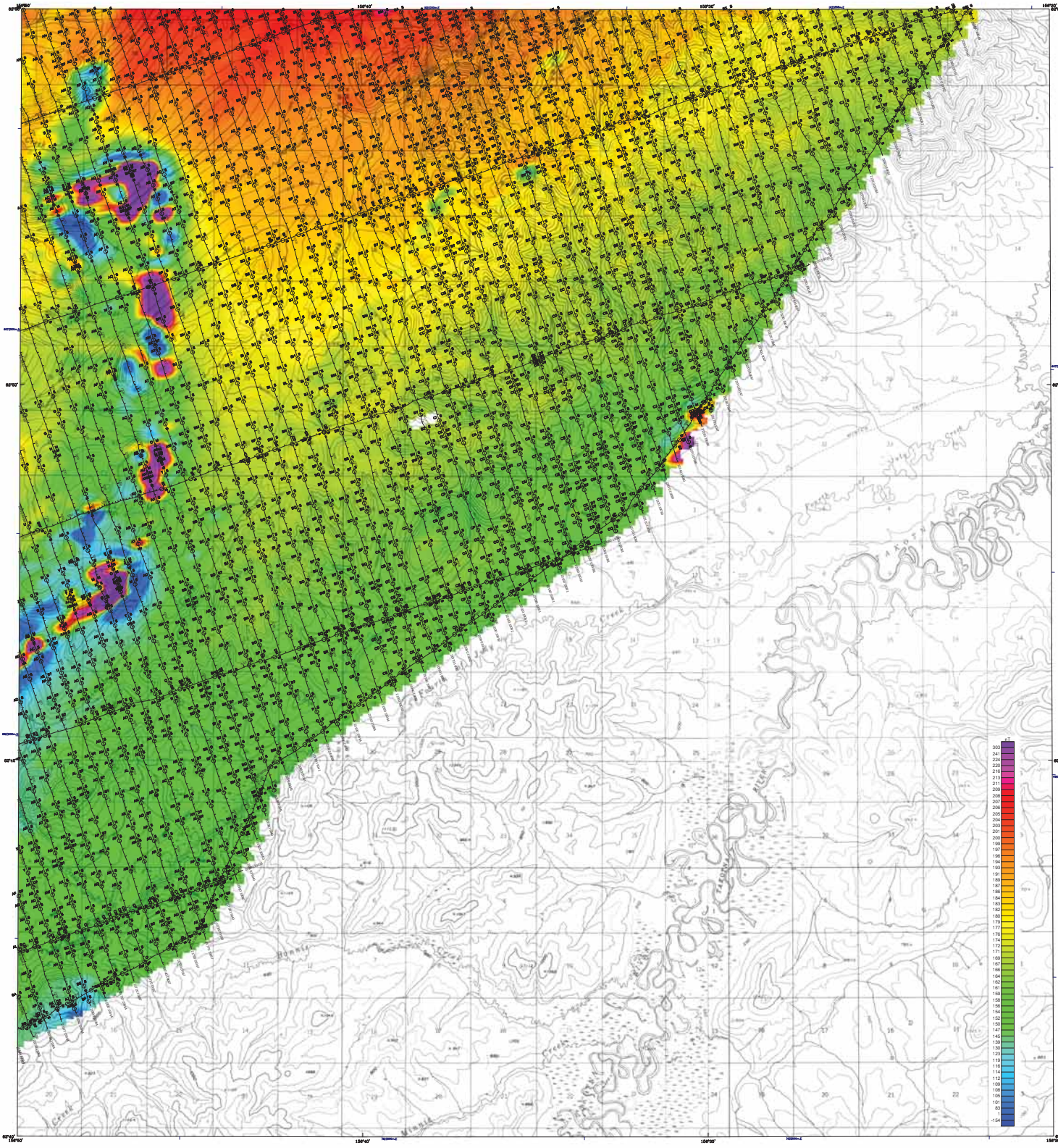


Base: Base U.S. Geological Survey Miliard C-1, 1971; C-2, 1974; D-1, 1974; D-2, 1974 Quadrangles, Alaska

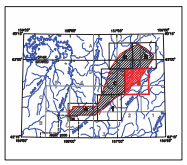
SCALE 1:31,680

0.5 0 0.5 1 1.5 2 MILES

0.5 0 0.5 1 1.5 2 2.5 KILOMETERS

CONTOUR INTERVAL 10 FEET
DATUM IS MEAN SEA LEVEL

LOCATION INDEX FOR 1:31,680



RESIDUAL MAGNETIC FIELD AND DETAILED ELECTROMAGNETIC ANOMALIES OF THE IDITAROD SURVEY AREA, INNOKO, IDITAROD, and McGRATH MINING DISTRICTS, WESTERN ALASKA

PARTS of IDITAROD C-1, C-2, D-1, and D-2 QUADRANGLES

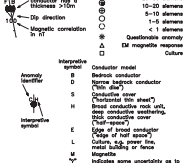
by
Laurel E. Burns, Fugro Airborne Surveys Corp., and Fugro GeoServices, Inc.
2011

DESCRIPTIVE NOTES

The geophysical data were acquired with a DIGHEM V Electromagnetic (EM) system and a Fugro D1344 cesium magnetometer with a Schintrex CS3 cesium sensor. The EM and magnetic sensors were flown at a height of 100 feet. In addition the survey recorded data from radar and laser altimeters, GPS navigation system, 50/60 Hz monitors and video cameras. Flights were performed with an AS-350-B3 Squirrel helicopter flown at an airspeed of approximately 80 knots along NW–SE (340°) survey flight lines with a spacing of a quarter of a mile. Tie lines were flown perpendicular to the flight lines at intervals of approximately 3 miles.

A Novatel OEM4–G2L Global Positioning System was used for navigation. The helicopter position was corrected using a base station and differential processing to a relative accuracy of better than 5m. Flight path positions were projected onto the Clarke 1866 (UTM zone 4) spheroid, 1927 North American datum using a central meridian (CM) of 159°, a north constant of 0 and an east constant of 500,000. Positional accuracy of the presented data is better than 10m with respect to the UTM grid.

ELECTROMAGNETIC ANOMALIES



ELECTROMAGNETICS

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RESIDUAL MAGNETIC FIELD

The magnetic total field data were processed using digitally recorded data from a Fugro D1344 magnetometer with a Schintrex CS3 cesium sensor. Data were collected at a sampling interval of 0.1 seconds. The magnetic data were (1) corrected for diurnal variations by subtraction of the digitally recorded base station magnetic data, (2) IGRF corrected (IGRF model 2010, updated for date of flight and altimeter variations), (3) leveled to the tie line data, and (4) interpolated onto a regular 80 m grid using a modified Akima (1970) technique. All grids were then resampled from the 80 m cell size down to a 25 m cell size to produce the maps and final grids contained in this publication.

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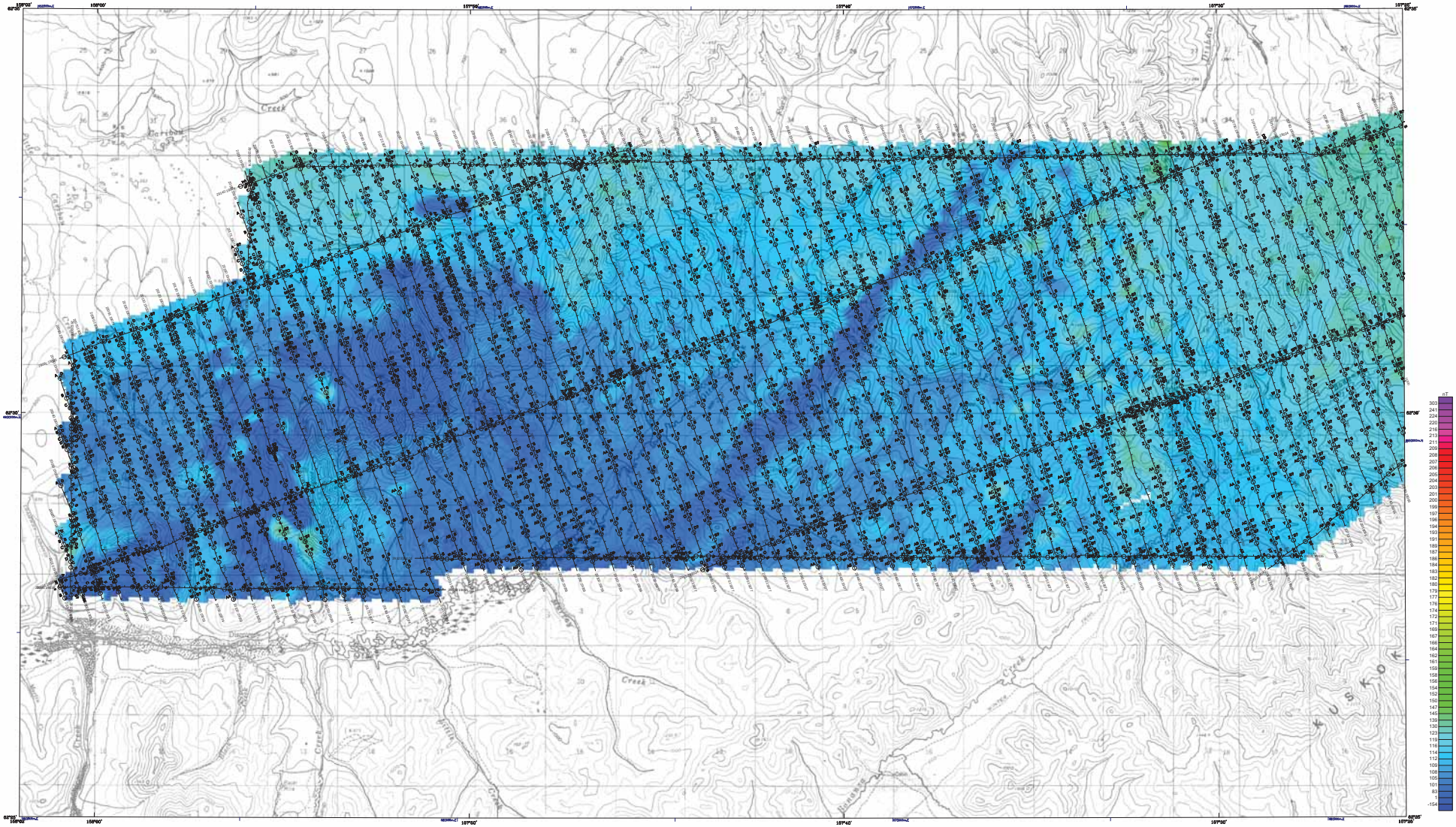

Base from U.S. Geological Survey Iditarod B-3, 1957; B-4, 1954; B-5, 1954; C-3, 1954; C-4, 1956; C-5, 1956 Quadrangles, Alaska

SCALE 1:31,680

0.5 0 0.5 1 1.5 2 MILES

0.5 0 0.5 1 1.5 2 2.5 KILOMETERS

CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL

RESIDUAL MAGNETIC FIELD AND DETAILED ELECTROMAGNETIC ANOMALIES OF THE IDITAROD SURVEY AREA, INNOKO, IDITAROD, and McGRATH MINING DISTRICTS, WESTERN ALASKA

PARTS of IDITAROD B-3, B-4, B-5, C-3, C-4, and C-5, QUADRANGLES

by
Laurel E. Burns, Fugro Airborne Surveys Corp., and Fugro GeoServices, Inc.
2011

DESCRIPTIVE NOTES

The geophysical data were acquired with a DIGHEM V Electromagnetic (EM) system and a Fugro D1344 cesium magnetometer with a Scintrex CS3 cesium sensor. The EM and magnetic sensors were flown at a height of 100 feet. In addition the survey recorded data from radar and laser altimeters, GPS navigation system, 50/60 Hz monitors and video camera. Flights were performed with an AS-350-B3 Squirrel helicopter at a mean terrain clearance of 200 feet along NW-SE (340°) survey flight lines with a spacing of a quarter of a mile. Tie lines were flown perpendicular to the flight lines at intervals of approximately 3 miles.

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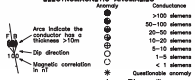
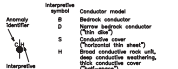
ELECTROMAGNETIC ANOMALIES



Anomaly	Conductance
	>100 siemens
	50-100 siemens
	20-50 siemens
	10-20 siemens
	5-10 siemens
	1-5 siemens
	< 1 siemens
	Questionable anomaly
	EM magnetite response
	Culture



Interpretive symbol	Conductor model
B	Bedrock conductor
D	Narrow bedrock conductor ("tab dike")
S	Conductive cover ("horizontal thin sheet")
H	Broad conductive rock unit, deep conductive weathering, thick conductive cover ("half-space")
E	Edge of broad conductor
L	Linear, e.g. fault, contact
	Culture, e.g. power line, metal building or fence
M	Magnetite
"?"	Indicates some uncertainty as to the most appropriate EM source model, but does not question the validity of the EM anomaly.

ELECTROMAGNETICS

To determine the location of EM anomalies or their boundaries, the DIGHEM^{V} EM system measured inphase and quadrature components at five frequencies. Two vertical coaxial-coil pairs operated at 1000 and 5500 Hz while three horizontal coplanar-coil pairs operated at 900, 7200, and 56,000 Hz. EM data were sampled at 0.1 second intervals. The EM system responds to bedrock conductors, conductive overburden, and cultural sources. The type of conductor is indicated on the aeromagnetic map by the interpretive symbol attached to each EM anomaly. Determination of the type of conductor is based on EM anomaly shapes of the coaxial- and coplanar-coil responses, together with conductor and magnetic patterns and topography. The power line monitor and the flight track video were examined to locate cultural sources.

RESIDUAL MAGNETIC FIELD

The magnetic total field data were processed using digitally recorded data from a Fugro D1344 magnetometer with a Scintrex CS3 cesium sensor. Data were collected at a sampling interval of 0.1 seconds. The magnetic data were (1) corrected for diurnal variations by subtraction of the digitally recorded base station magnetic data, (2) IGRF corrected (IGRF model 2010, updated for date of flight and altimeter variations), (3) leveled to the tie line data, and (4) interpolated onto a regular 80 m grid using a modified Akima (1970) technique. All grids were then resampled from the 80 m cell size down to a 25 m cell size to produce the maps and final grids contained in this publication.

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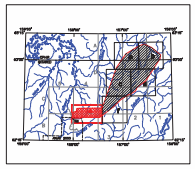
LOCATION INDEX FOR 1:31,680



SURVEY HISTORY

This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources, Division of Geological & Geophysical Surveys (DGGS), and Fugro GeoServices, Inc. Airborne geophysical data for the area were acquired and processed by Fugro Airborne Surveys Corp. in 2010 and 2011. Previously flown DGGS surveys adjacent to the current survey are shown in the location map by dashed lines, survey name, and date of publication. The project was funded by the Alaska State Legislature as part of the Alaska Airborne Geological & Geophysical Mineral Inventory Program.

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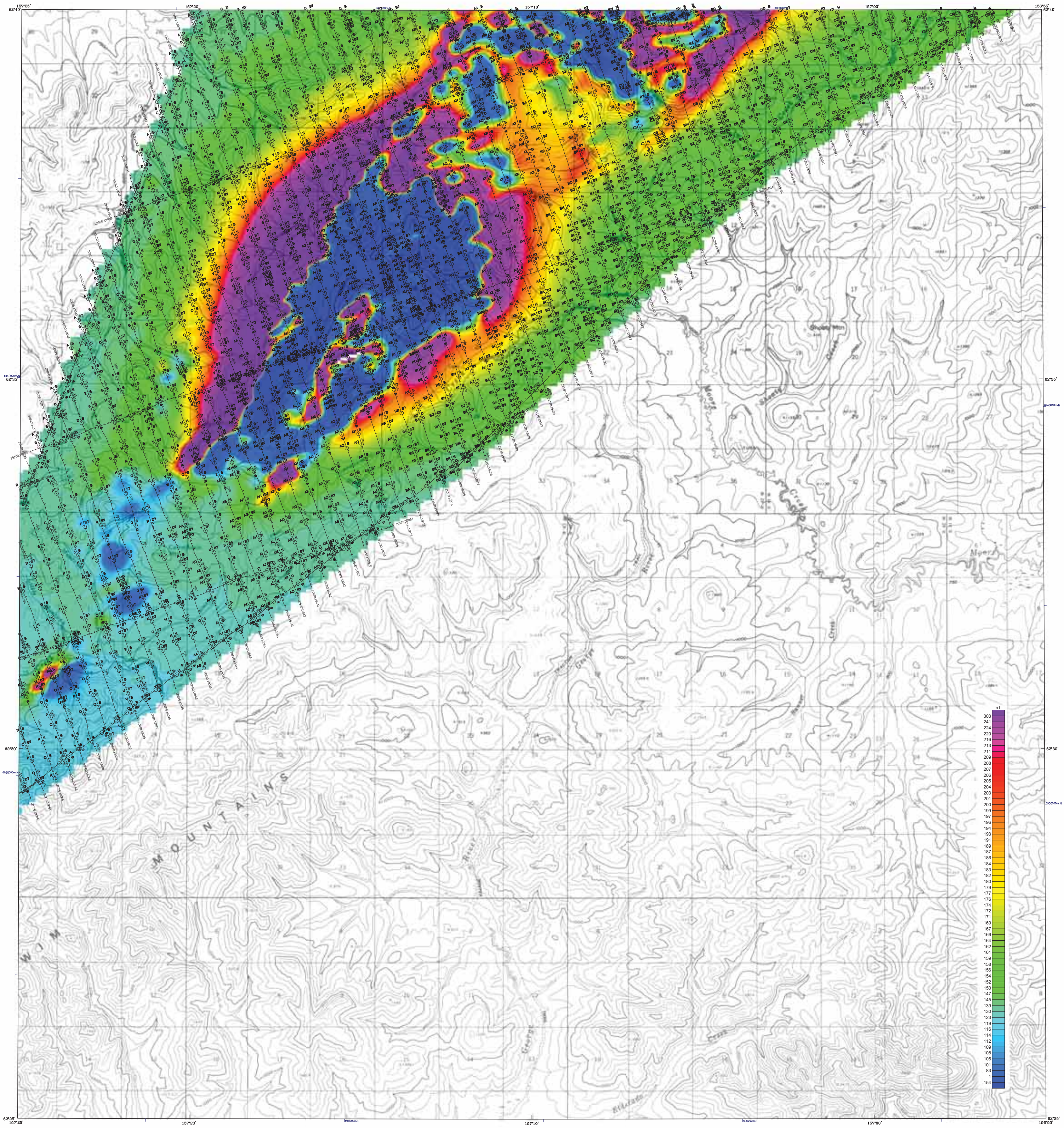


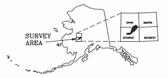
Base from U.S. Geological Survey Iditarod B-2, 1982; B-3, 1987; C-2, 1954; C-3, 1954; Quadrangles, Alaska

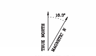
SCALE 1:31,680

0.5 0 0.5 1 1.5 2 MILES

0.5 0 0.5 1 1.5 2 2.5 KILOMETERS

CONTOUR INTERVAL 100 FEET
DATUM MEAN SEA LEVEL





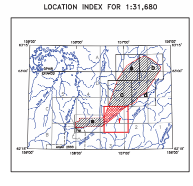
APPROXIMATE MEAN DECLINATION, 2010

RESIDUAL MAGNETIC FIELD AND DETAILED ELECTROMAGNETIC ANOMALIES OF THE IDITAROD SURVEY AREA, INNOKO, IDITAROD, and McGRATH MINING DISTRICTS, WESTERN ALASKA

PARTS of IDITAROD B-2, B-3, C-2, and C-3 QUADRANGLES

by
Laurel E. Burns, Fugro Airborne Surveys Corp., and Fugro GeoServices, Inc.
2011

LOCATION INDEX FOR 1:31,680



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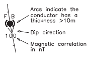

Anomaly	Conductance
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◒	20–50 siemens
⊕	10–20 siemens
⊕	5–10 siemens
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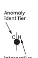
✳	Questionable anomaly
△	EM magnetite response
□	Culture



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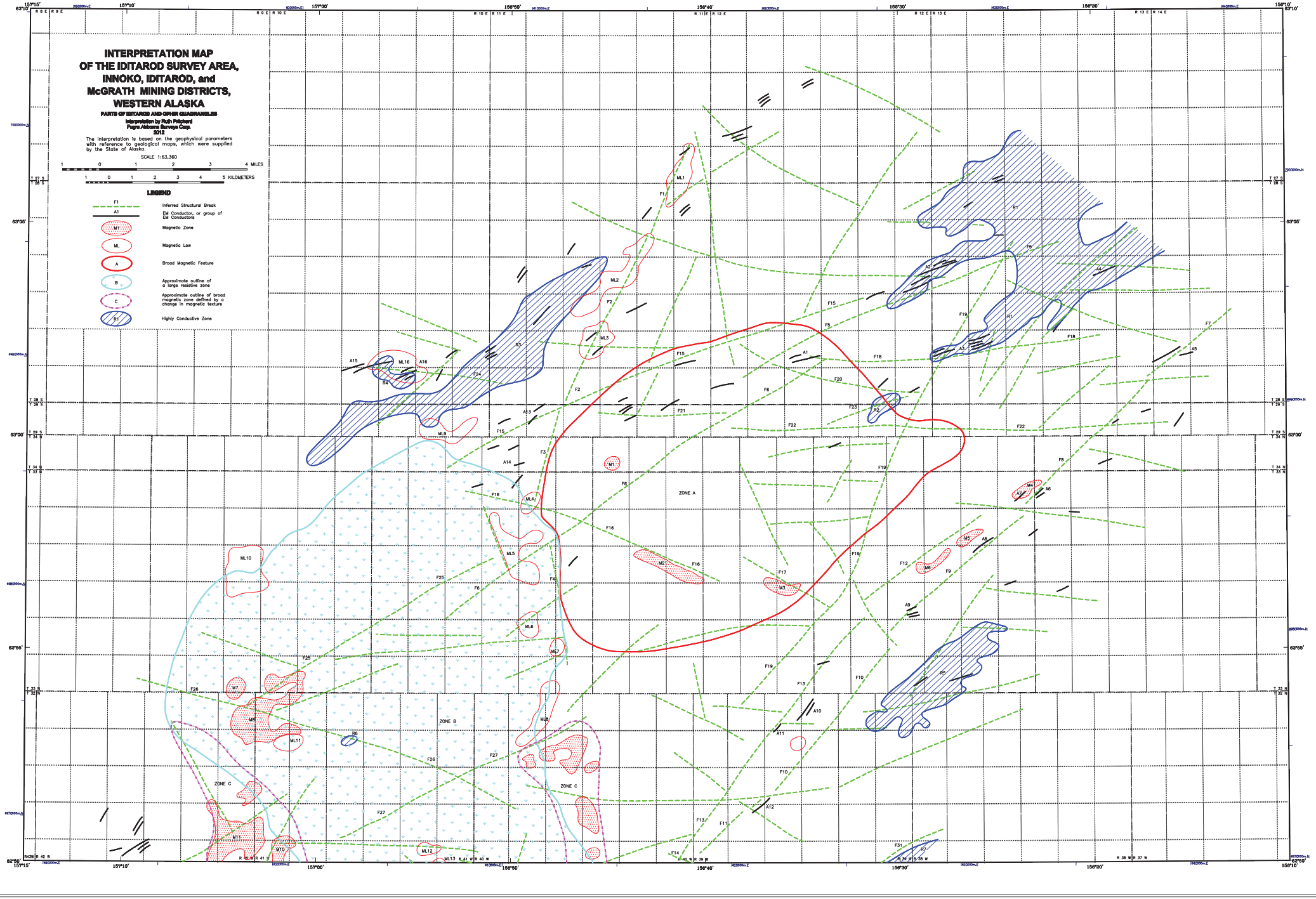
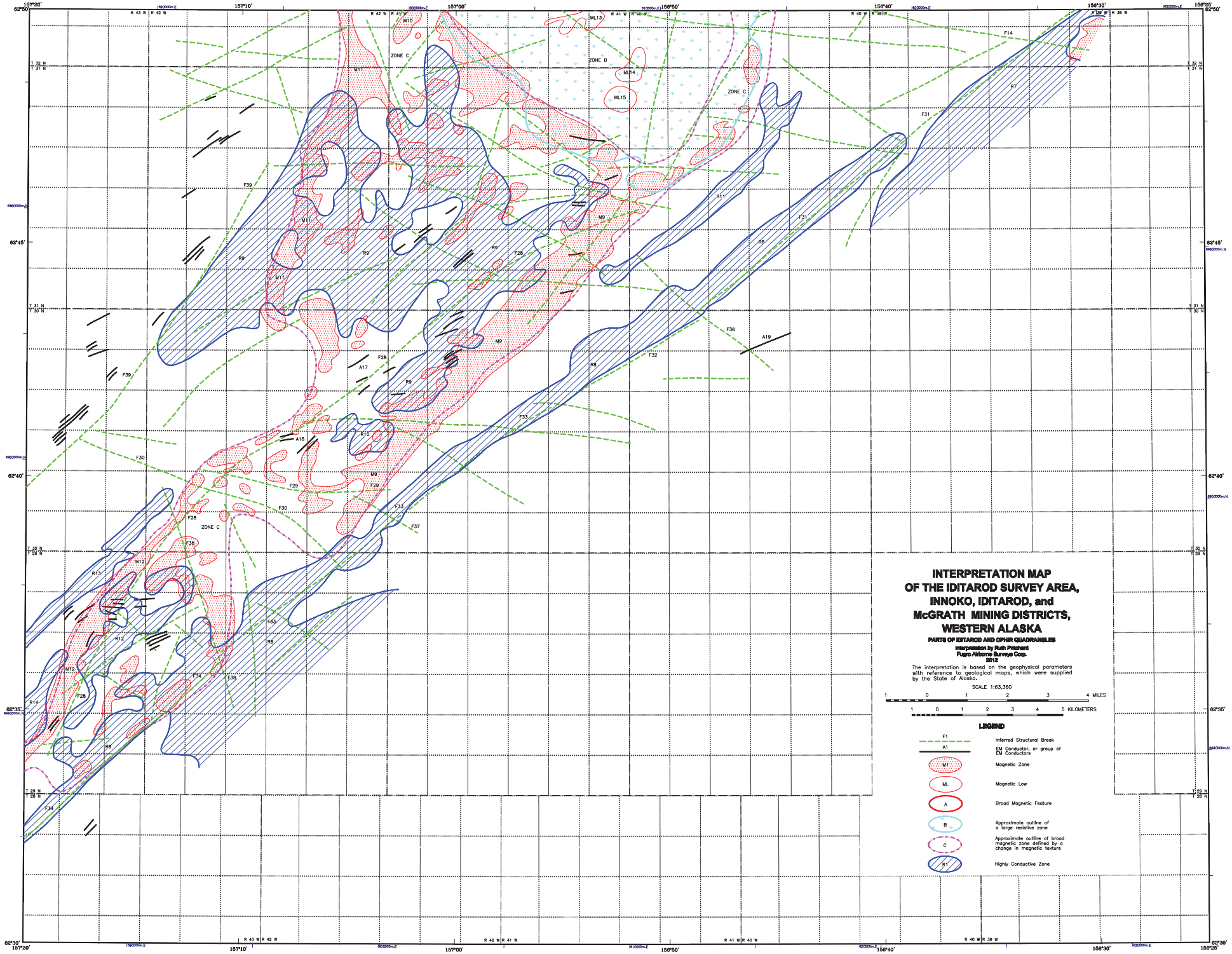

INTERPRETATION MAP
OF THE IDITAROD SURVEY AREA,
INNOKO, IDITAROD, and
McGRATH MINING DISTRICTS,
WESTERN ALASKA
PARTS OF IDITAROD AND GIPHER QUADRANGLES
Interpretation by Ruth Pritchard
Fugro Airborne Surveys Corp.
2012
The interpretation is based on the geophysical parameters with reference to geological maps, which were supplied by the State of Alaska.
SCALE 1:63,360
1 0 1 2 3 4 MILES
1 0 1 2 3 4 5 KILOMETERS
LEGEND
F1 Inferred Structural Break
A1 EM Conductor, or group of EM Conductors
M1 Magnetic Zone
ML Magnetic Low
A Broad Magnetic Feature
B Approximate outline of a large resistive zone
C Approximate outline of broad magnetic zone defined by a change in magnetic texture
R1 Highly Conductive Zone
ZONE A
ZONE B
ZONE C


INTERPRETATION MAP
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PARTS OF IDITAROD AND OPHIR QUADRANGLES
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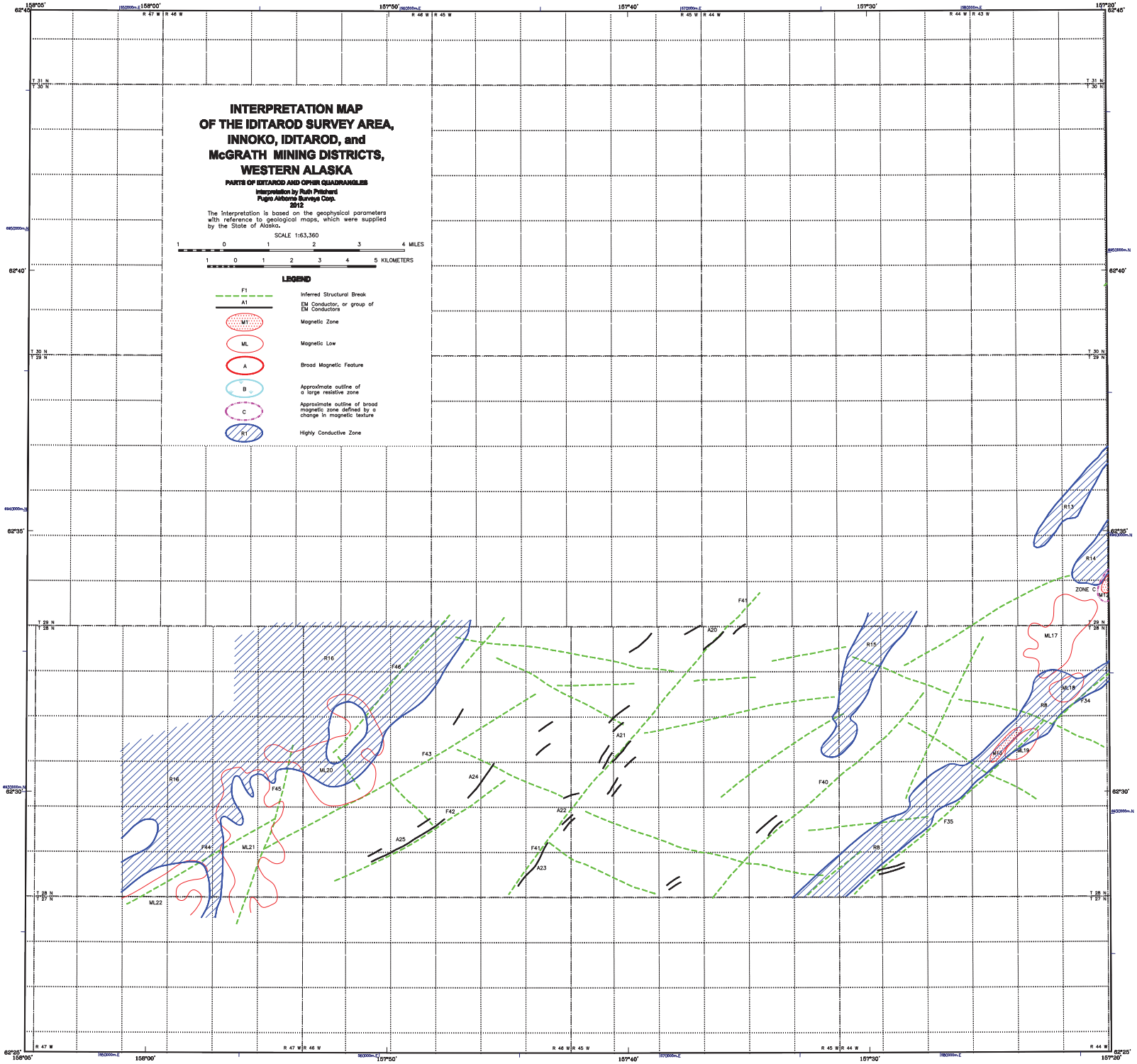
R1 Highly Conductive Zone
ZONE C
ZONE B
157°20'
157°10'
157°00'
156°50'
156°40'
156°30'
156°25'
62°50'
62°45'
62°40'
62°35'
62°30'
T 32 N
T 31 N
T 30 N
T 29 N
T 28 N
R 43 W
R 42 W
R 41 W
R 40 W
R 39 W
R 38 W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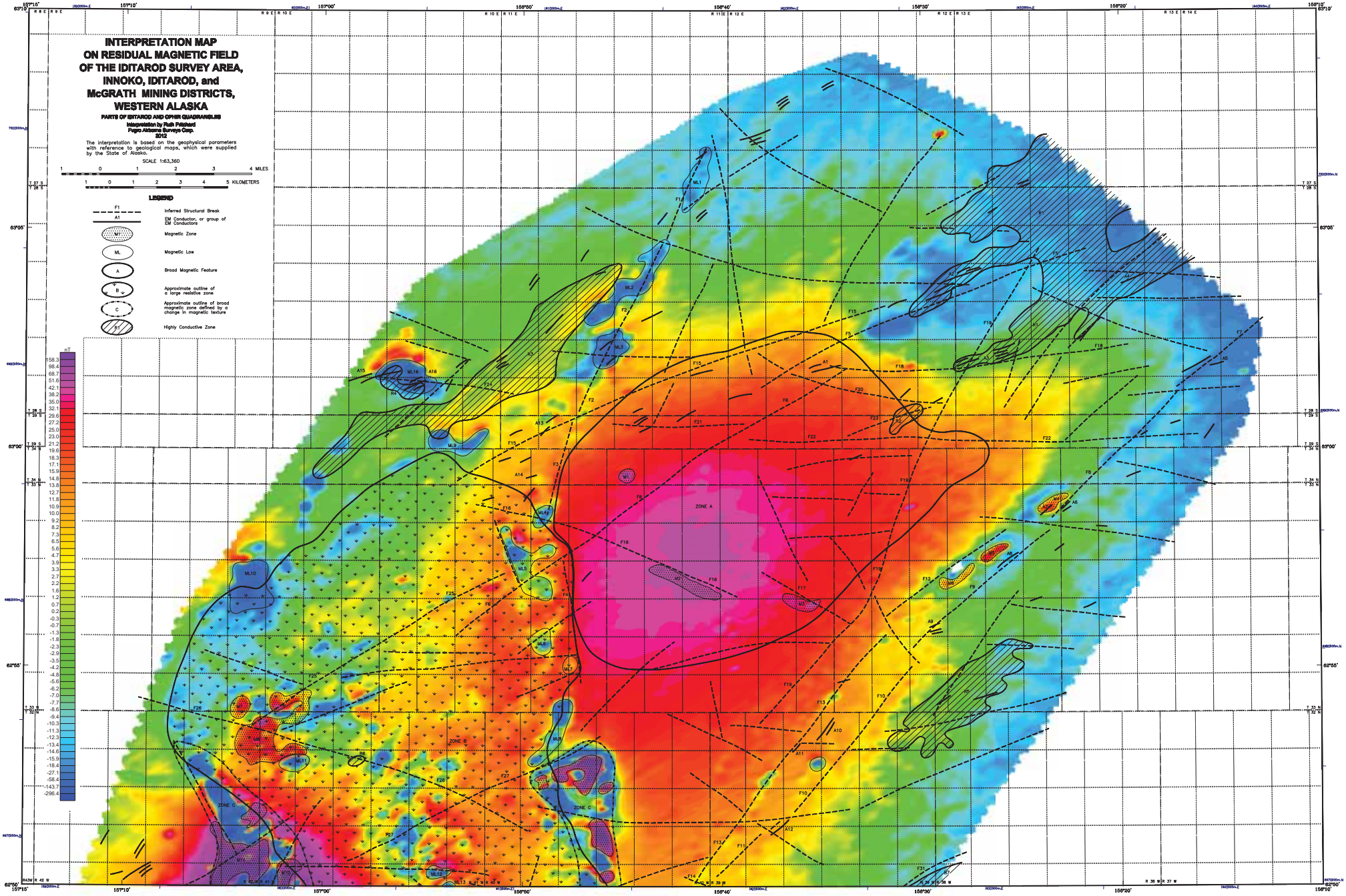
158°05'
158°00'
157°50'
157°40'
157°30'
157°20'
62°45'
62°40'
62°35'
62°30'
62°25'
T 31 N
T 30 N
T 29 N
T 28 N
T 27 N
R 47 W
R 46 W
R 45 W
R 44 W
R 43 W
R16
R15
R13
R14
R8
ZONE C
ML12
ML17
ML18
ML19
ML20
ML21
ML22
F46
F45
F44
F43
F42
F41
F40
F35
F34
A20
A21
A22
A23
A24
A25


INTERPRETATION MAP
ON RESIDUAL MAGNETIC FIELD
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nT
158.3
98.4
68.7
51.6
42.1
38.2
35.0
32.1
29.6
27.2
25.0
23.0
21.2
19.6
18.3
17.1
15.9
14.8
13.8
12.7
11.8
10.9
10.0
9.2
8.2
7.3
6.5
5.6
4.7
3.9
3.3
2.7
2.2
1.6
1.2
0.7
0.2
-0.3
-0.7
-1.3
-1.8
-2.3
-2.9
-3.5
-4.2
-4.8
-5.6
-6.2
-7.0
-7.7
-8.6
-9.4
-10.3
-11.3
-12.3
-13.4
-14.6
-15.9
-18.4
-27.1
-58.4
-143.7
-296.4
ZONE A
ZONE B
ZONE C
ZONE C
157°15'
157°10'
157°00'
156°50'
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156°30'
156°20'
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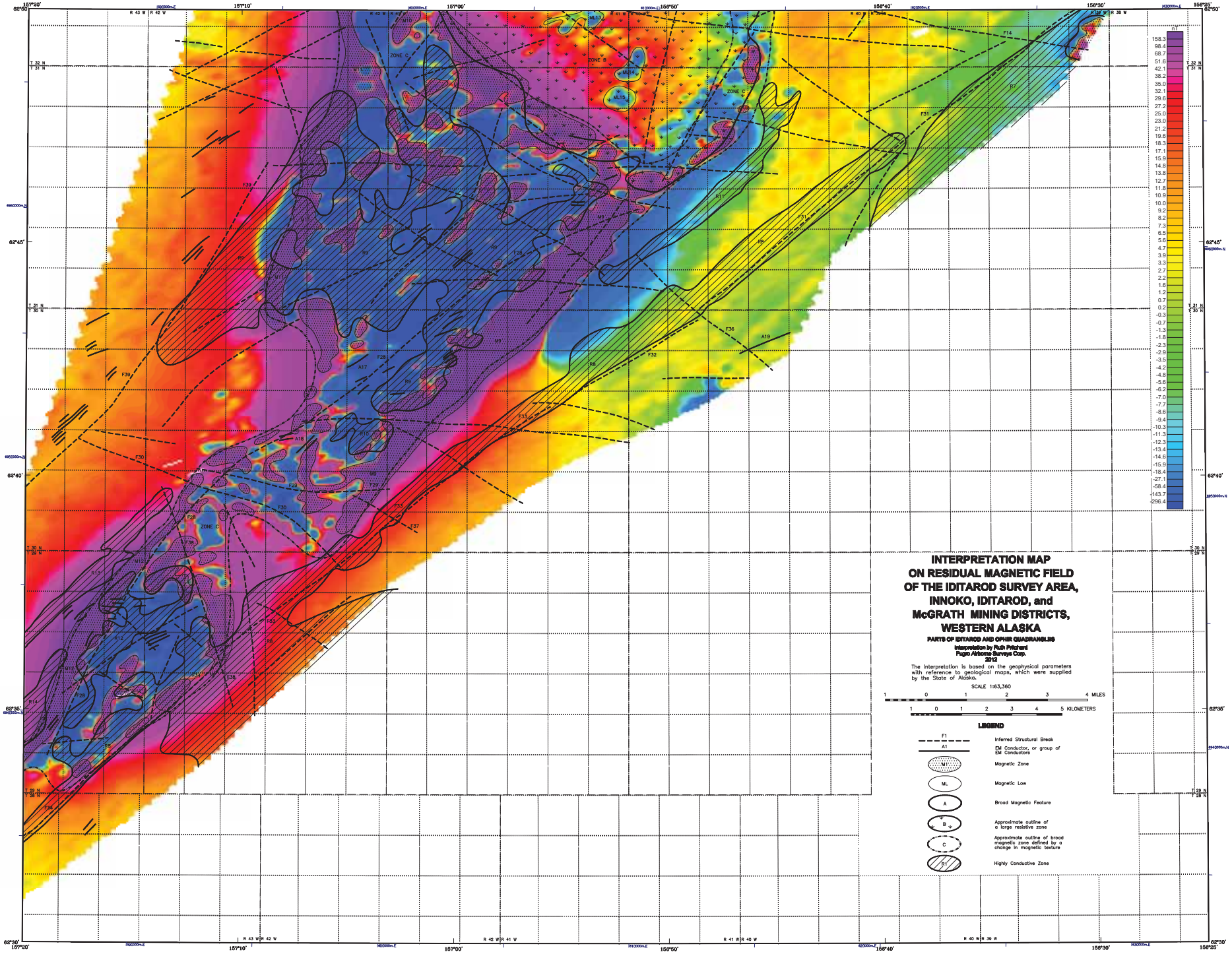
63°05'
63°00'
62°55'
62°50'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ZONE C
ZONE D
ZONE E
ZONE F
ML13
ML14
ML15
F14
F31
F36
A19
F32
F33
F37
F38
F39
F30
F28
F29
F22
F25
A17
A18
R7
R8
R9
R11
R12
R13
R14
R15
M9
M10
M11
M12
M13
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7.3
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5.6
4.7
3.9
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2.2
1.6
1.2
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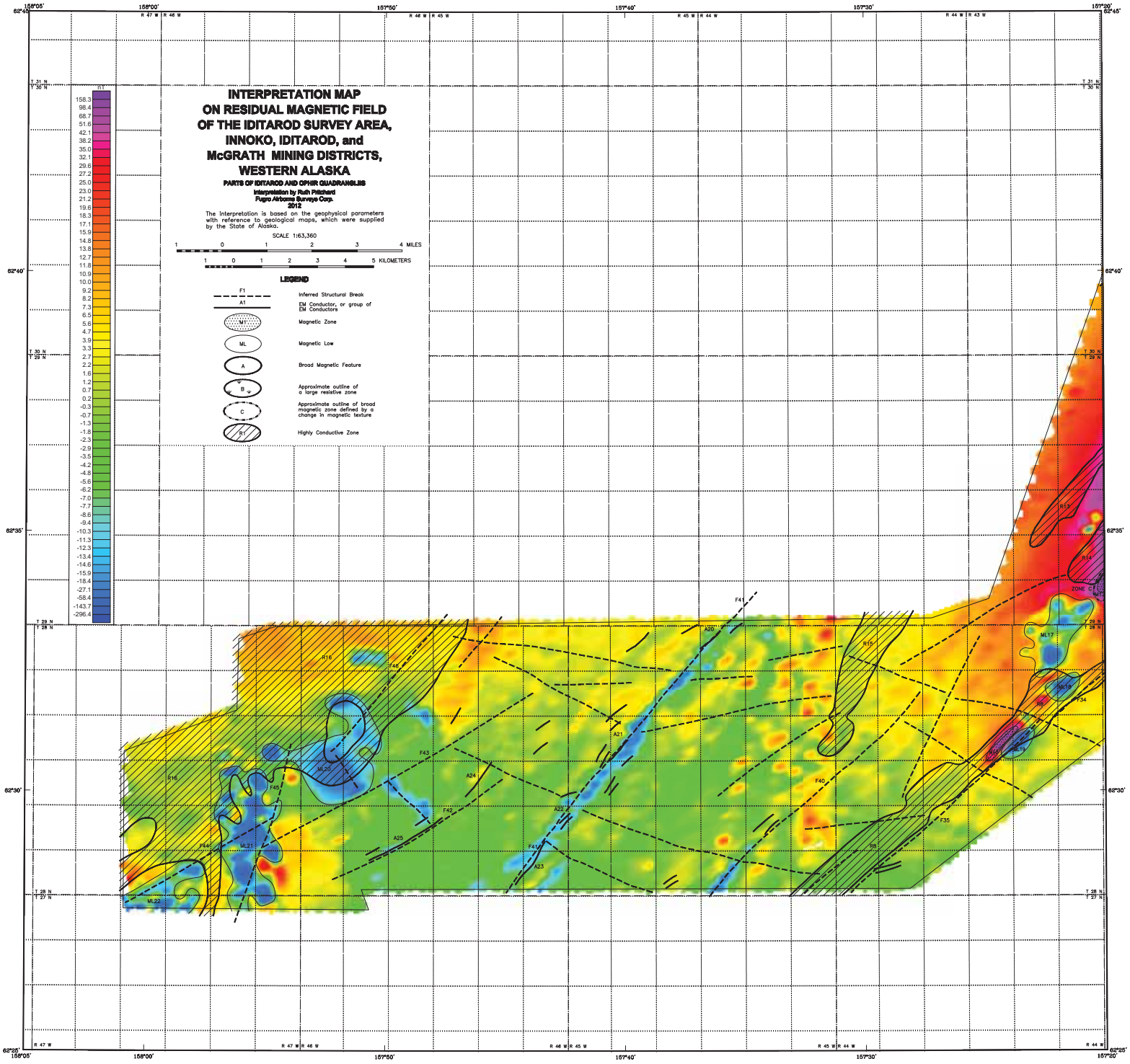
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9.2
8.2
7.3
6.5
5.6
4.7
3.9
3.3
2.7
2.2
1.6
1.2
0.7
0.2
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R 47 W
R 46 W
R 45 W
R 44 W
R 43 W
R16
R15
R14
R13
R8
ZONE C
M17
ML17
ML18
ML19
ML20
ML21
ML22
F41
F42
F43
F44
F45
F46
F40
F35
F34
A20
A21
A22
A23
A24
A25