RAMPART–MANLEY ELECTROMAGNETIC AND MAGNETIC AIRBORNE GEOPHYSICAL SURVEY DATA COMPILATION

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

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RAMPART–MANLEY ELECTROMAGNETIC AND MAGNETIC AIRBORNE GEOPHYSICAL SURVEY DATA COMPILATION

L.E. Burns[1], G.R.C. Graham[1], J.D. Barefoot[1], Rebecca-Ellen Woods[1], Dighem, R.A. Pritchard[2], WGM, Inc., Stevens Exploration Management Corp., and Fugro Airborne Surveys Corp.

ABSTRACT

The Rampart-Manley electromagnetic and magnetic airborne geophysical survey is located in interior Alaska in the Rampart and Hot Springs mining districts, about 110 kilometers northwest of Fairbanks, Alaska. Frequency domain electromagnetic and magnetic data were collected with the DIGHEM^{V} system from September to October 1995, and from August to September 1996. A total of 7510 line kilometers were collected covering 2679.4 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. The Rampart-Manley area hosts many small to medium production placer gold mines, such as Eureka Creek. Lode prospects include Elephant Mountain (gold), as well as the Tofty carbonatite-hosted rare earth element, niobium and yttrium mineralization. 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

[2] Fugro Airborne Surveys Corp.

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 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
maps_prn_format	contractor	Printable maps in HPGL/2 printer file format with extension .prn
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

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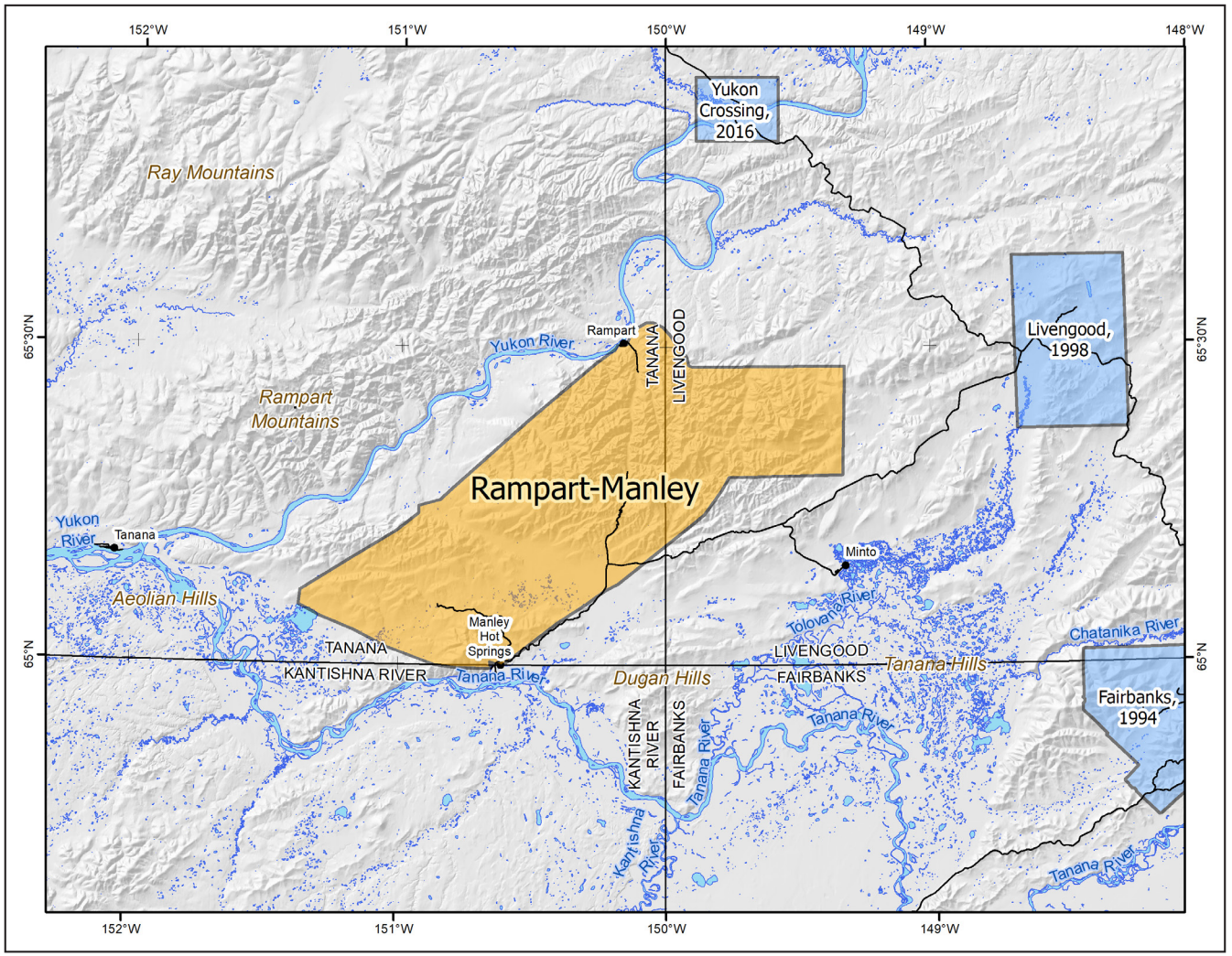


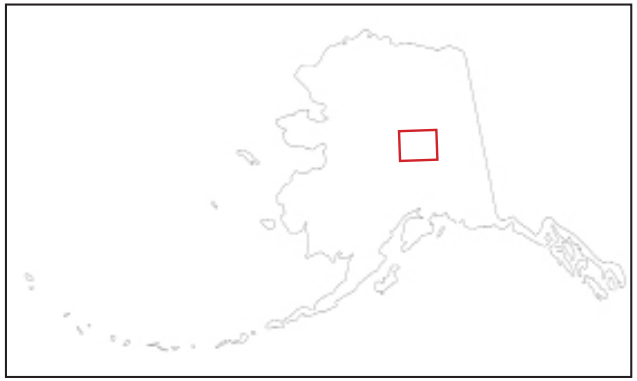


Figure 1. Rampart–Manley electromagnetic and magnetic airborne geophysical survey location shown in interior Alaska (inset). Rampart–Manley survey area shown with adjacent DGGS geophysical surveys, landmarks, relevant 1:250,000-scale quadrangle boundaries, mountain ranges, rivers, and elevation hillshade.

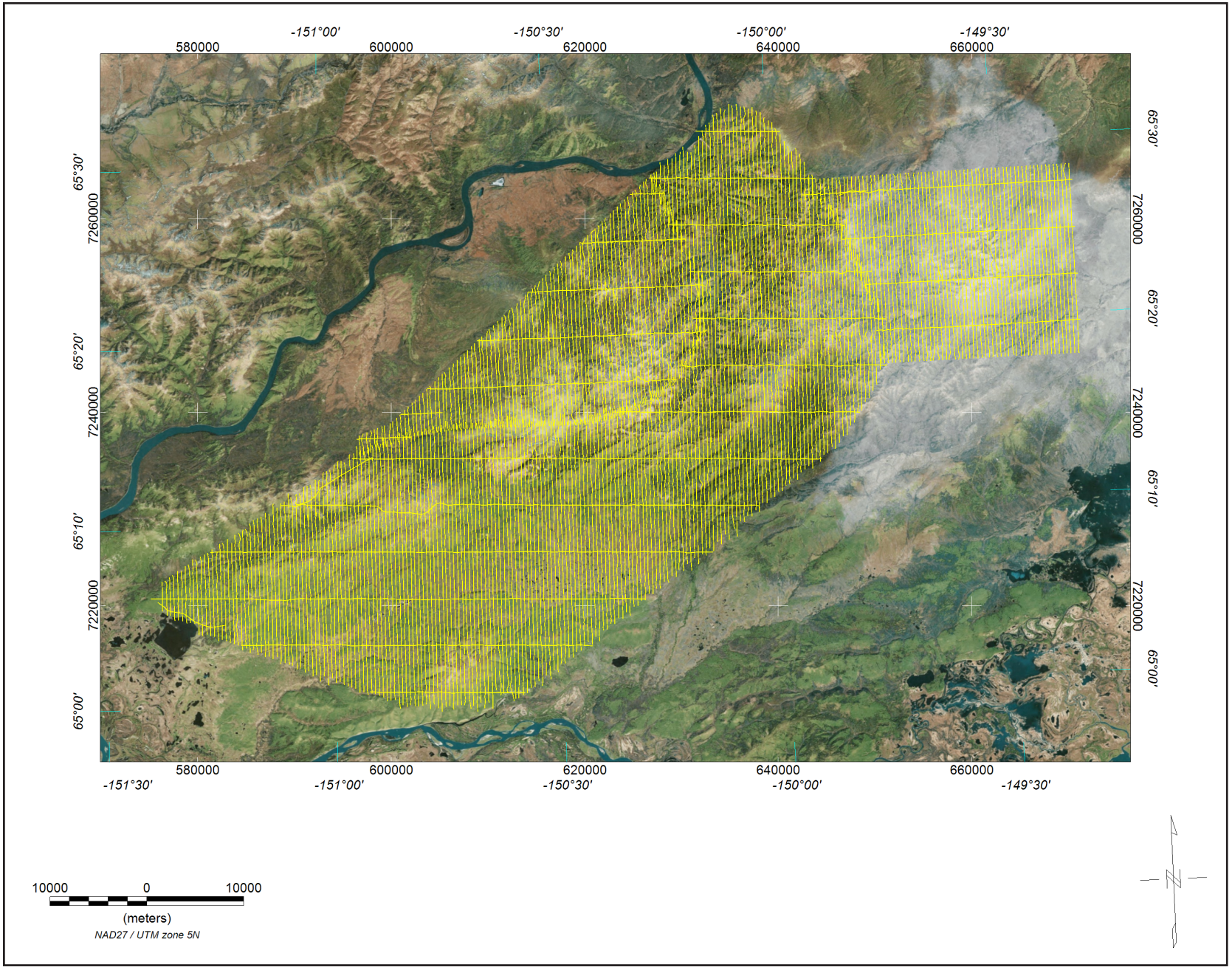


Figure 2. Flight path with orthometric image.

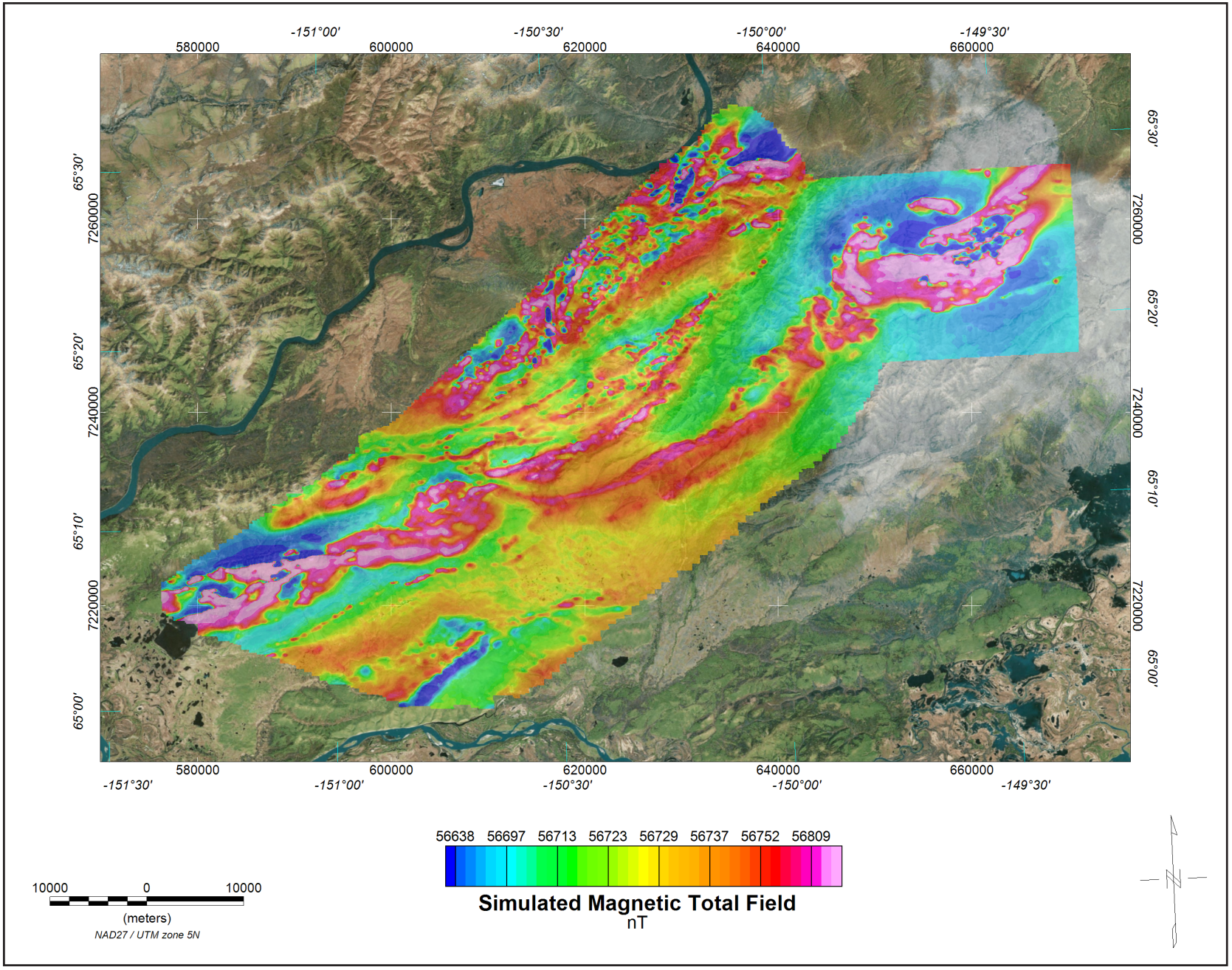


Figure 3. Simulated magnetic total field grid with orthometric image. The magnetic total field data were processed using digitally recorded data from a Scintrex cesium CS2 magnetometer. Data were collected at a sampling interval of 0.1 seconds. The magnetic data were (1) corrected for diurnal variations by subtracting the digitally recorded base station magnetic data, (2) IGRF corrected (IGRF model 1985, updated to October, 1996), (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 100 m grid using a modified Akima (1970) technique

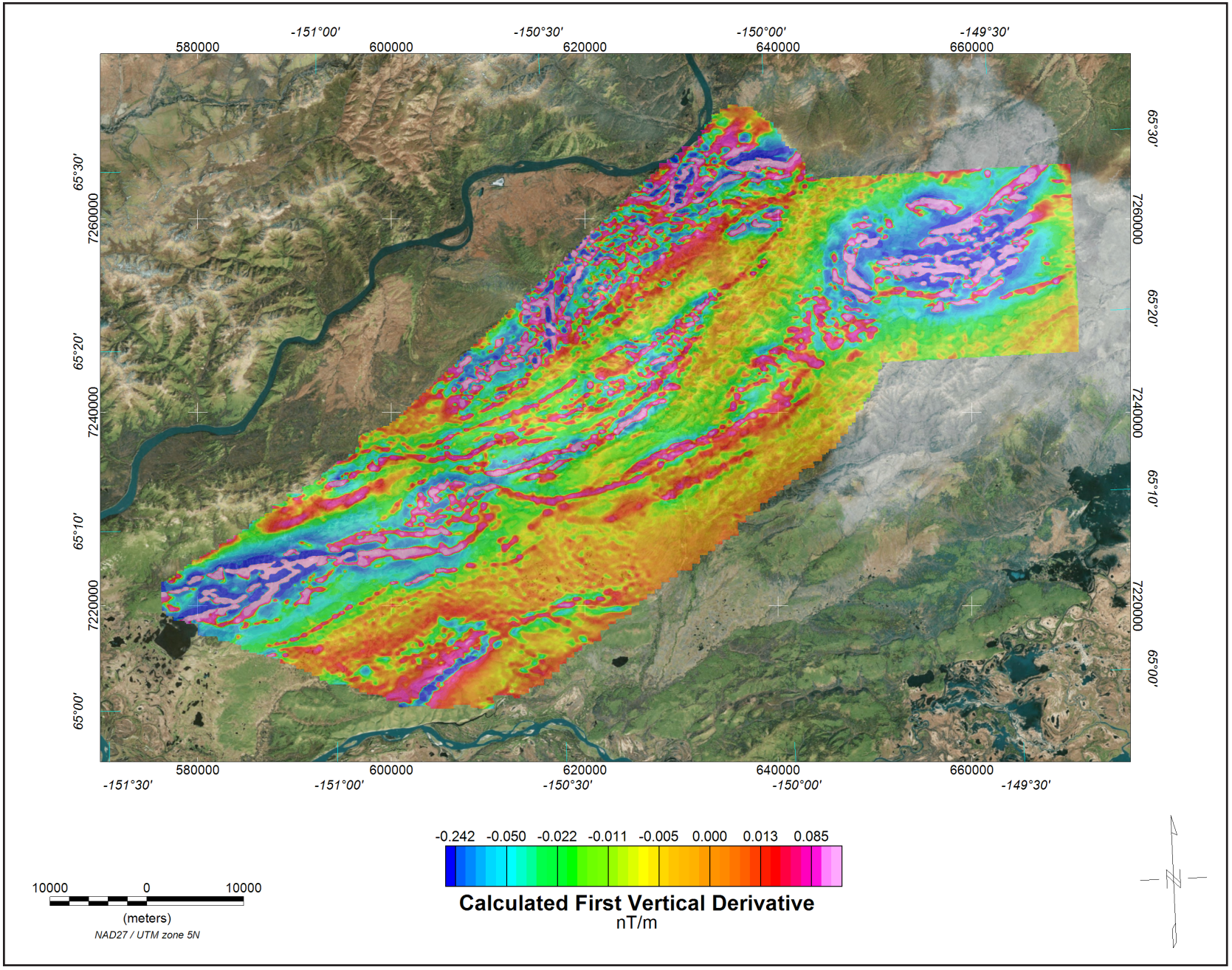


Figure 4. Calculated first vertical derivative grid with orthometric image. The first vertical derivative grid was calculated from the diurnally-corrected, IGRF-corrected total magnetic field grid using a FFT base frequency domain filtering algorithm. The resulting first vertical derivative grid provides 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

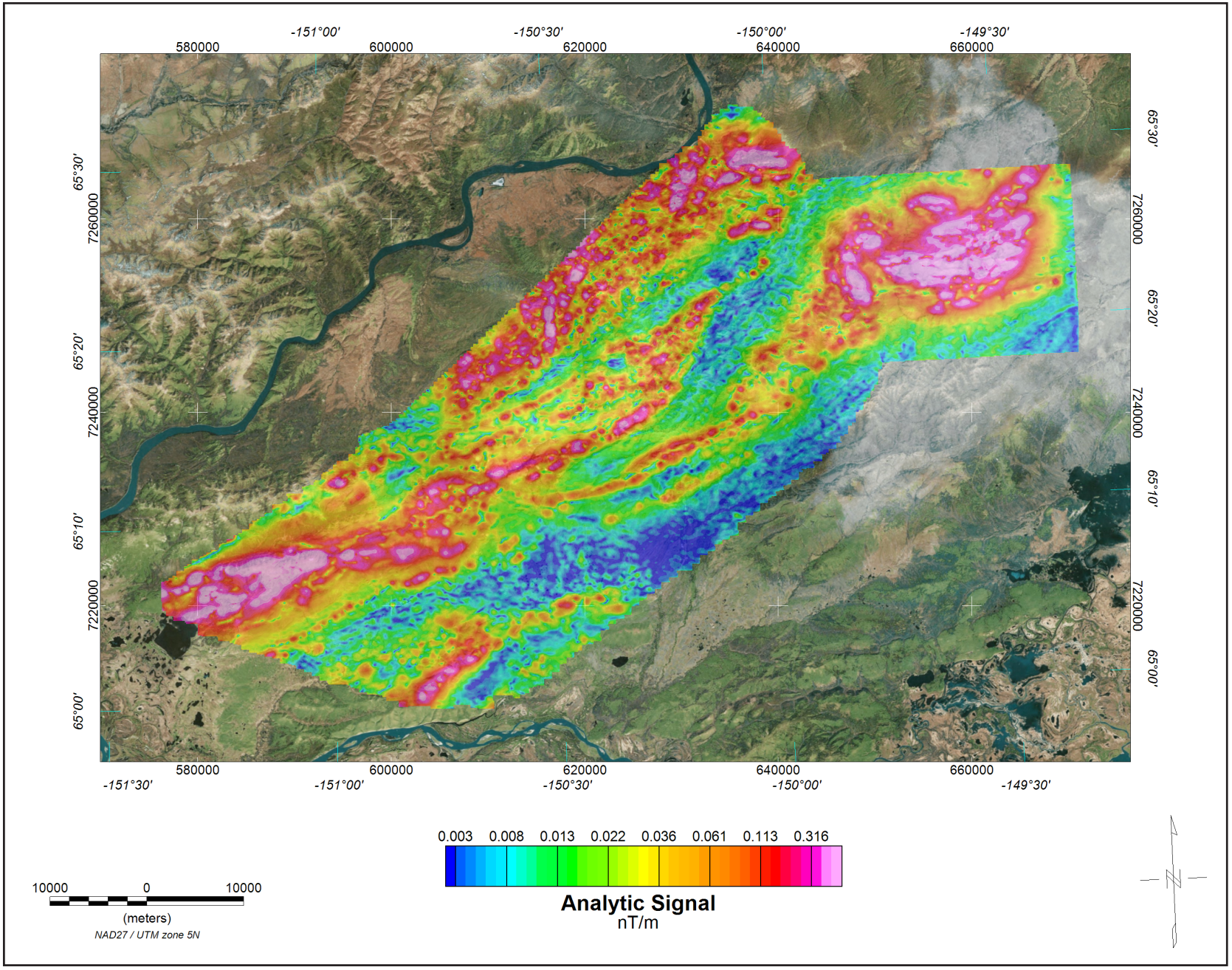


Figure 5. Analytic signal grid with orthometric image. Analytic signal is the total amplitude of all directions of magnetic gradient calculated from the sum of the squares of the three orthogonal gradients. Mapped highs in the calculated analytic signal of magnetic parameter locate the anomalous source 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.

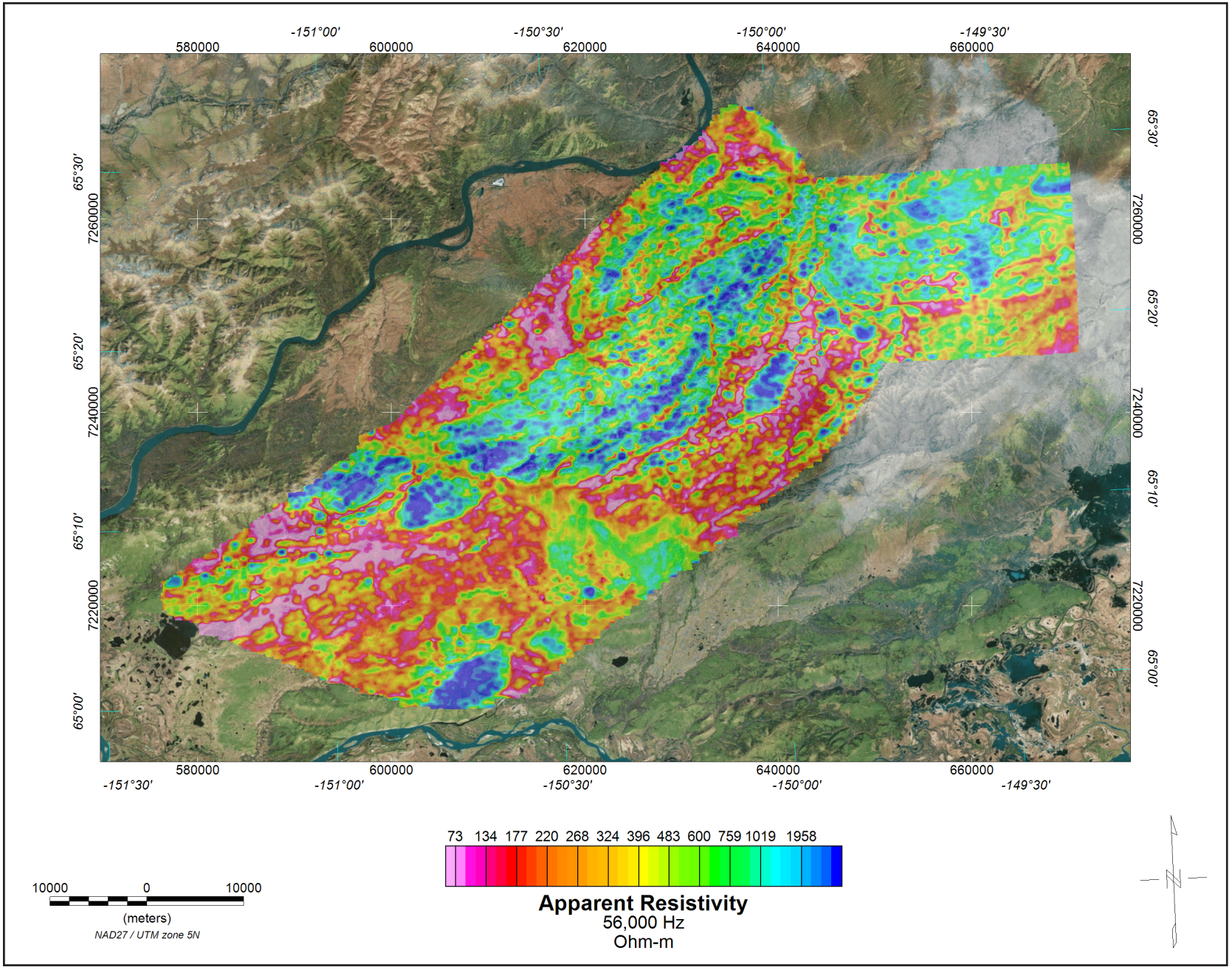


Figure 6. 56,000 Hz coplanar apparent resistivity grid with orthometric image. The DIGHEM^{V} EM system measured inphase and quadrature components at five frequencies. Two vertical coaxial coil-pairs operated at 900 and 5000 Hz while three horizontal coplanar coil-pairs operated at 900, 7,200, and 56,000 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 100 m grid using a modified Akima (1970) technique.

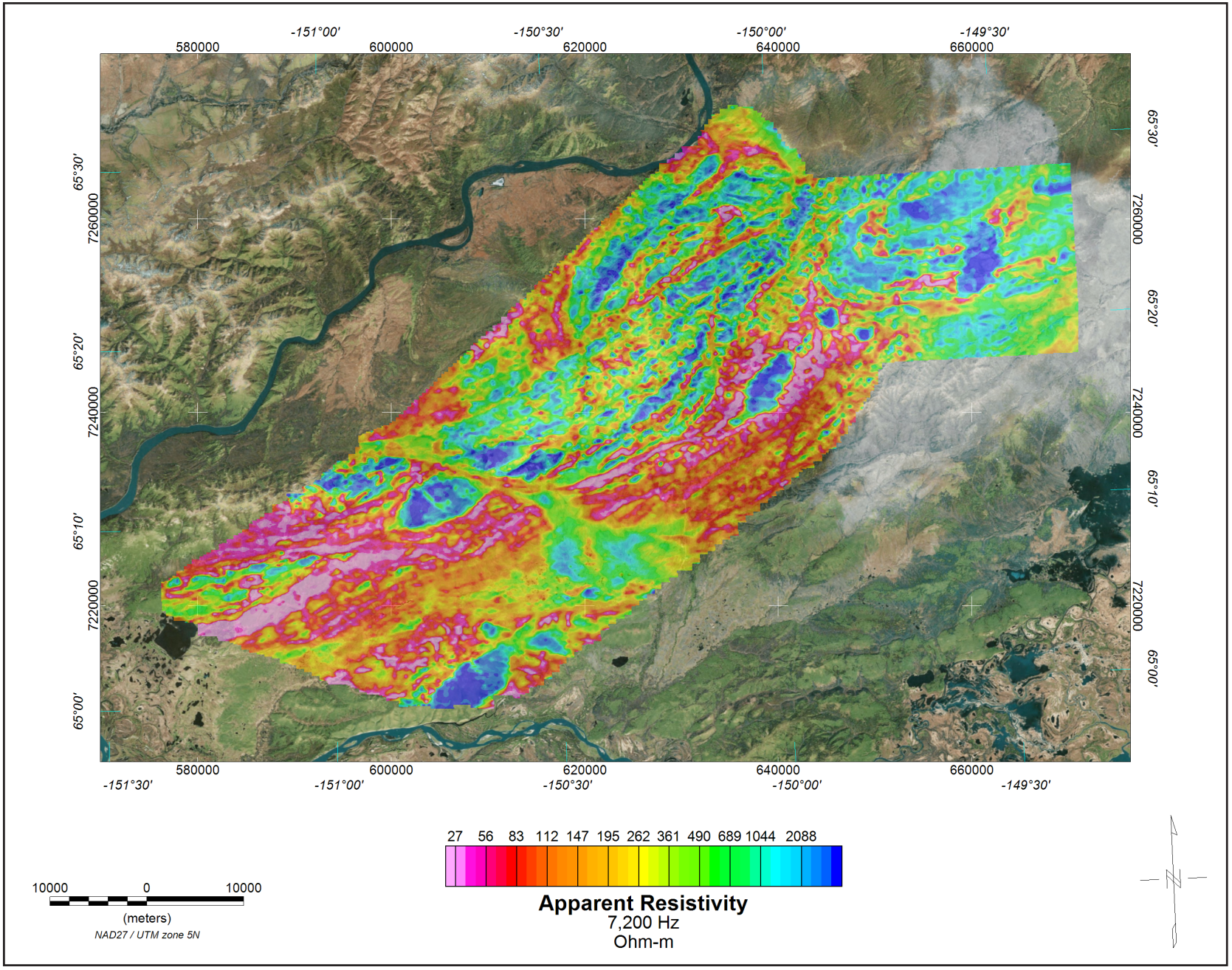


Figure 7. 7,200 Hz coplanar apparent resistivity grid with orthometric image. The DIGHEM^{V} EM system measured inphase and quadrature components at five frequencies. Two vertical coaxial coil-pairs operated at 900 and 5000 Hz while three horizontal coplanar coil-pairs operated at 900, 7,200, and 56,000 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 100 m grid using a modified Akima (1970) technique.

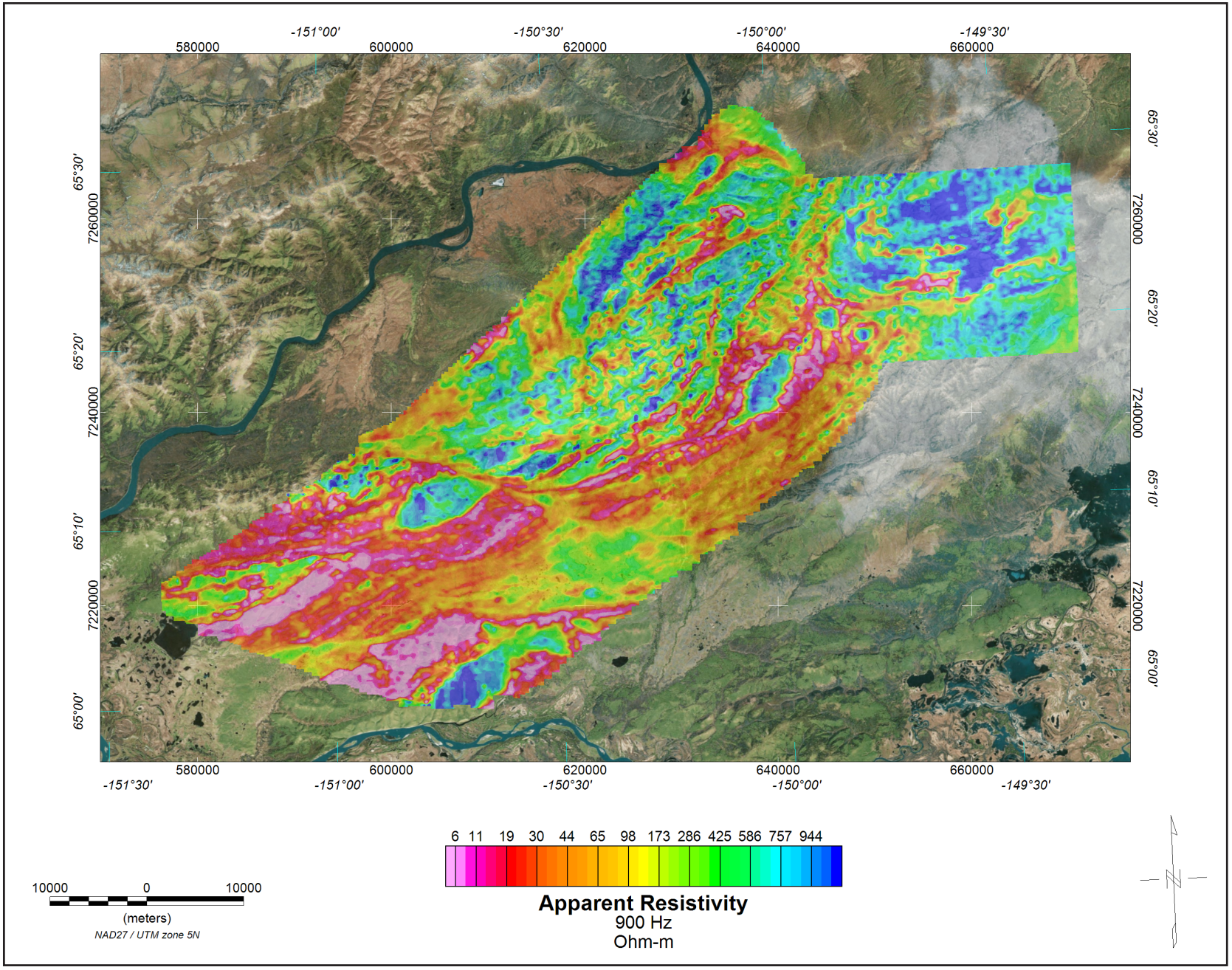
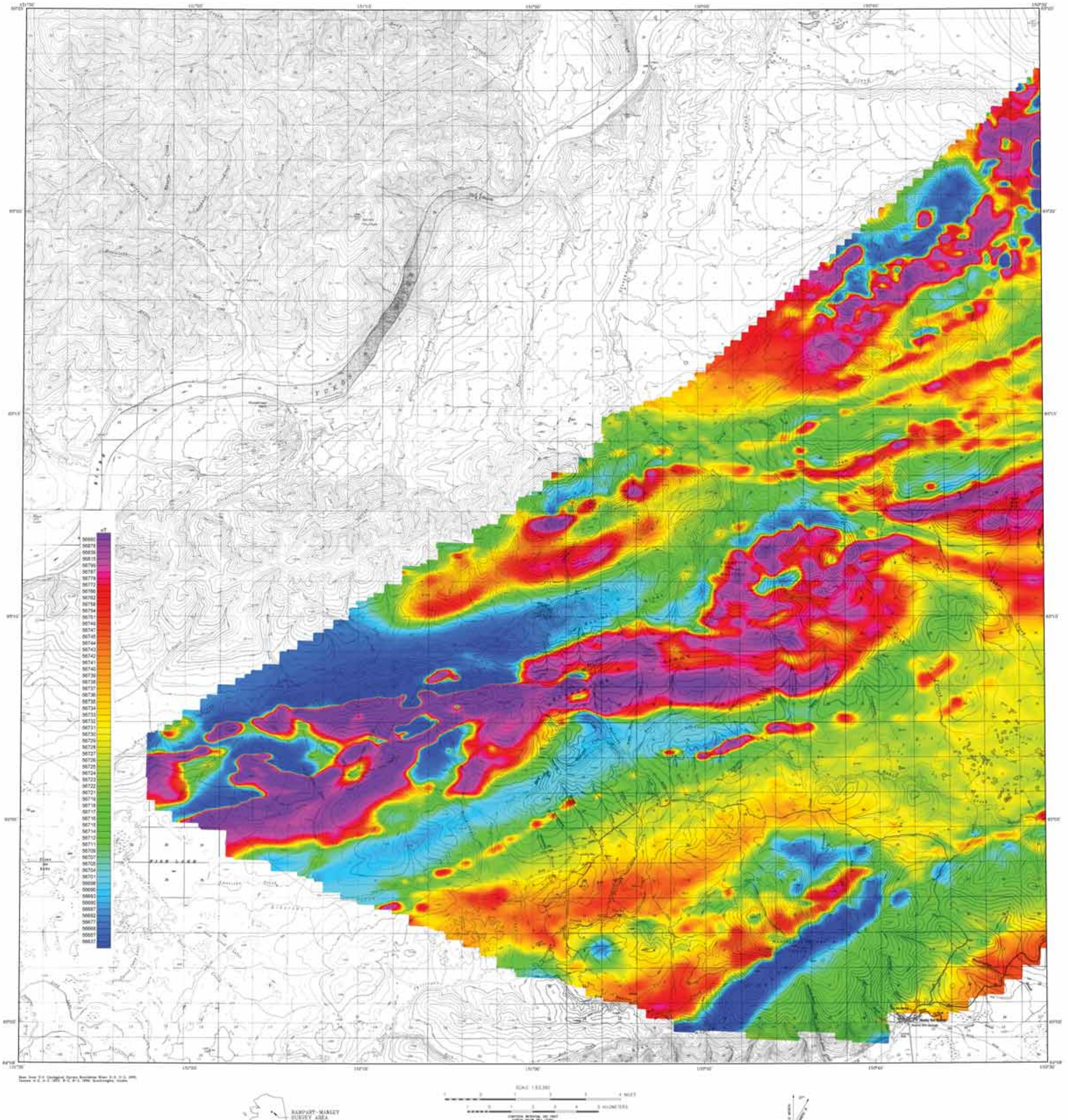


Figure 8. 900 Hz coplanar apparent resistivity grid with orthometric image. The DIGHEM^{V} EM system measured inphase and quadrature components at five frequencies. Two vertical coaxial coil-pairs operated at 900 and 5000 Hz while three horizontal coplanar coil-pairs operated at 900, 7,200, and 56,000 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 100 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/10.14509/30417

Map Title	Description
rampartmanley_sim_magtf_topo_map_1of3.pdf	simulated magnetic total field grid with topographic base map
rampartmanley_sim_magtf_topo_map_2of3.pdf	simulated magnetic total field grid with topographic base map
rampartmanley_sim_magtf_topo_map_3of3.pdf	simulated magnetic total field grid with topographic base map
rampartmanley_sim_magtf_contours_plss_map_1of3.pdf	simulated magnetic total field grid and contours with public land survey system base layer
rampartmanley_sim_magtf_contours_plss_map_2of3.pdf	simulated magnetic total field grid and contours with public land survey system base layer
rampartmanley_sim_magtf_contours_plss_map_3of3.pdf	simulated magnetic total field grid and contours with public land survey system base layer
rampartmanley_res7200hz_topo_map_1of3.pdf	7,200 Hz apparent resistivity grid with topographic base map
rampartmanley_res7200hz_topo_map_2of3.pdf	7,200 Hz apparent resistivity grid with topographic base map
rampartmanley_res7200hz_topo_map_3of3.pdf	7,200 Hz apparent resistivity grid with topographic base map
rampartmanley_res7200hz_contours_plss_map_1of3.pdf	7,200 Hz apparent resistivity grid with contours and public land survey system base layer
rampartmanley_res7200hz_contours_plss_map_2of3.pdf	7,200 Hz apparent resistivity grid with contours and public land survey system base layer
rampartmanley_res7200hz_contours_plss_map_3of3.pdf	7,200 Hz apparent resistivity grid with contours and public land survey system base layer
rampartmanley_res900hz_topo_map_1of3.pdf	900 Hz apparent resistivity grid with topographic base map
rampartmanley_res900hz_topo_map_2of3.pdf	900 Hz apparent resistivity grid with topographic base map
rampartmanley_res900hz_topo_map_3of3.pdf	900 Hz apparent resistivity grid with topographic base map
rampartmanley_res900hz_contours_plss_map_1of3.pdf	900 Hz apparent resistivity grid with contours and public land survey system base layer
rampartmanley_res900hz_contours_plss_map_2of3.pdf	900 Hz apparent resistivity grid with contours and public land survey system base layer
rampartmanley_res900hz_contours_plss_map_3of3.pdf	900 Hz apparent resistivity grid with contours and public land survey system base layer
rampartmanley_emanomalies_sim_magtf_contours_topo_map_1of3.pdf	electromagnetic anomaly map with simulated magnetic total field grid contours and topographic base map
rampartmanley_emanomalies_sim_magtf_contours_topo_map_2of3.pdf	electromagnetic anomaly map with simulated magnetic total field grid contours and topographic base map
rampartmanley_emanomalies_sim_magtf_contours_topo_map_3of3.pdf	electromagnetic anomaly map with simulated magnetic total field grid contours and topographic base map
rampartmanley_interpretation_plss_map_1of3.pdf	interpretation based on geophysical data with public land survey system base layer
rampartmanley_interpretation_plss_map_2of3.pdf	interpretation based on geophysical data with public land survey system base layer
rampartmanley_interpretation_plss_map_3of3.pdf	interpretation based on geophysical data with public land survey system base layer



Base from U.S. Geological Survey Reconnaissance Series ... Quadrangles, Alaska

TOTAL MAGNETIC FIELD OF THE RAMPART-MANLEY MINING DISTRICT, ALASKA

PARTS OF FAIRBANKS, KANTISHNA RIVER, LIVENGOOD AND TANANA QUADRANGLES

by
Laurel E. Burns, Fugro Airborne Surveys Corp., and Stevens Exploration Management Corp.
2004

DESCRIPTIVE NOTES

The geophysical data were acquired with a DIGHEM[V] Electromagnetic (EM) system, a Scintrex cesium CS2 magnetometer, and a Herz VLF system installed in an AS350B-1 Squirrel helicopter. In addition, the survey recorded data from a radar altimeter, GPS navigation system, 50/60 Hz monitors and video camera. Flights were performed at a mean terrain clearance of 200 feet along 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.

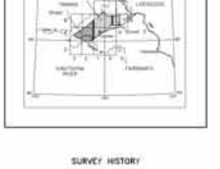
A Sercel Real-Time Differential Global Positioning System (RT-DGPS) was used for both navigation and flight path recovery. The helicopter position was derived every 0.5 seconds using real-time differential positioning to a relative accuracy of better than 10 m. Flight path positions were projected onto the Clarke 1866 (UTM) spheroid, 1927 North American datum using a central meridian (CM) of 153°, a north constant of 0 and an east constant of 500,000. Positional accuracy of the presented data is better than 10 m with respect to the UTM grid.

TOTAL MAGNETIC FIELD

The magnetic total field contours were produced using digitally recorded data from a Scintrex cesium CS2 magnetometer, with 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) leveled to the tie line data, and (3) interpolated onto a regular 100 m grid using a modified Akima (1970) technique. The regional variation (or IGRF gradient, 1985, updated to October, 1996) was removed from the leveled magnetic data.

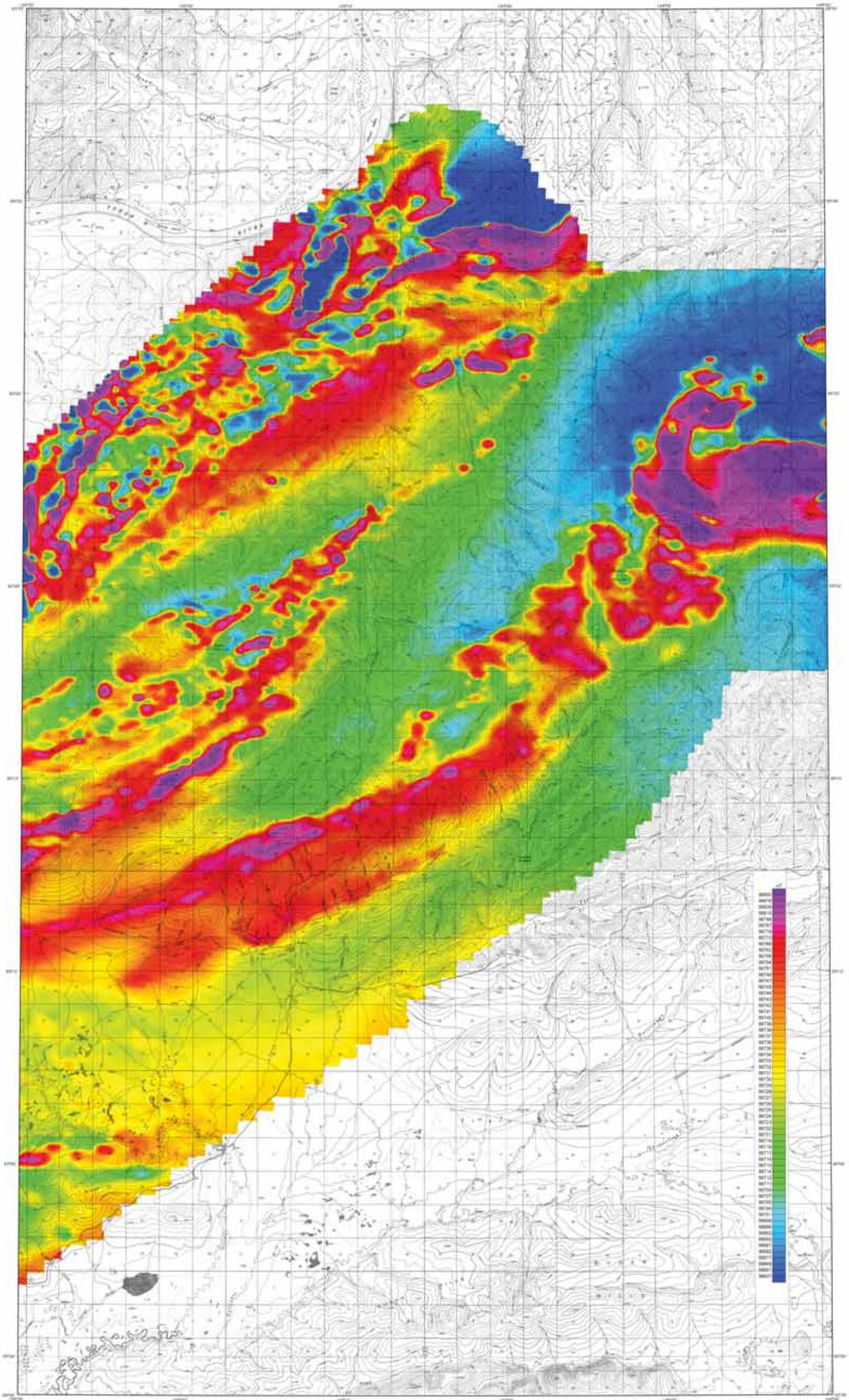
Akima, H., 1970, A new method of interpolation and smooth curve fitting based on local procedures: Journal of the Association of Computing Machinery, v. 17, no. 4, p. 589–602.

LOCATION INDEX



SURVEY HISTORY

The map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources, Division of Geological & Geophysical Surveys, and Stevens Exploration Management Corp. The map was produced by Fugro Airborne Surveys and supersedes the earlier full color version released by DGGS in 1997. Airborne geophysical data for the area were acquired and processed in 1996 under contract between DGGS and WGM, Mining and Geological Consultants, Inc. The subcontractor acquiring and processing the data was DIGHEM, a division of CGG Canada Ltd. Other products from this survey are available from DGGS, 3354 College Road, Fairbanks, Alaska, 99709-3707.



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PARTS OF FAIRBANKS, KANTISHNA RIVER, LIVENGOOD AND TANANA QUADRANGLES

by
Laurel E. Burns, Fugro Airborne Surveys Corp., and Stevens Exploration Management Corp.
2004

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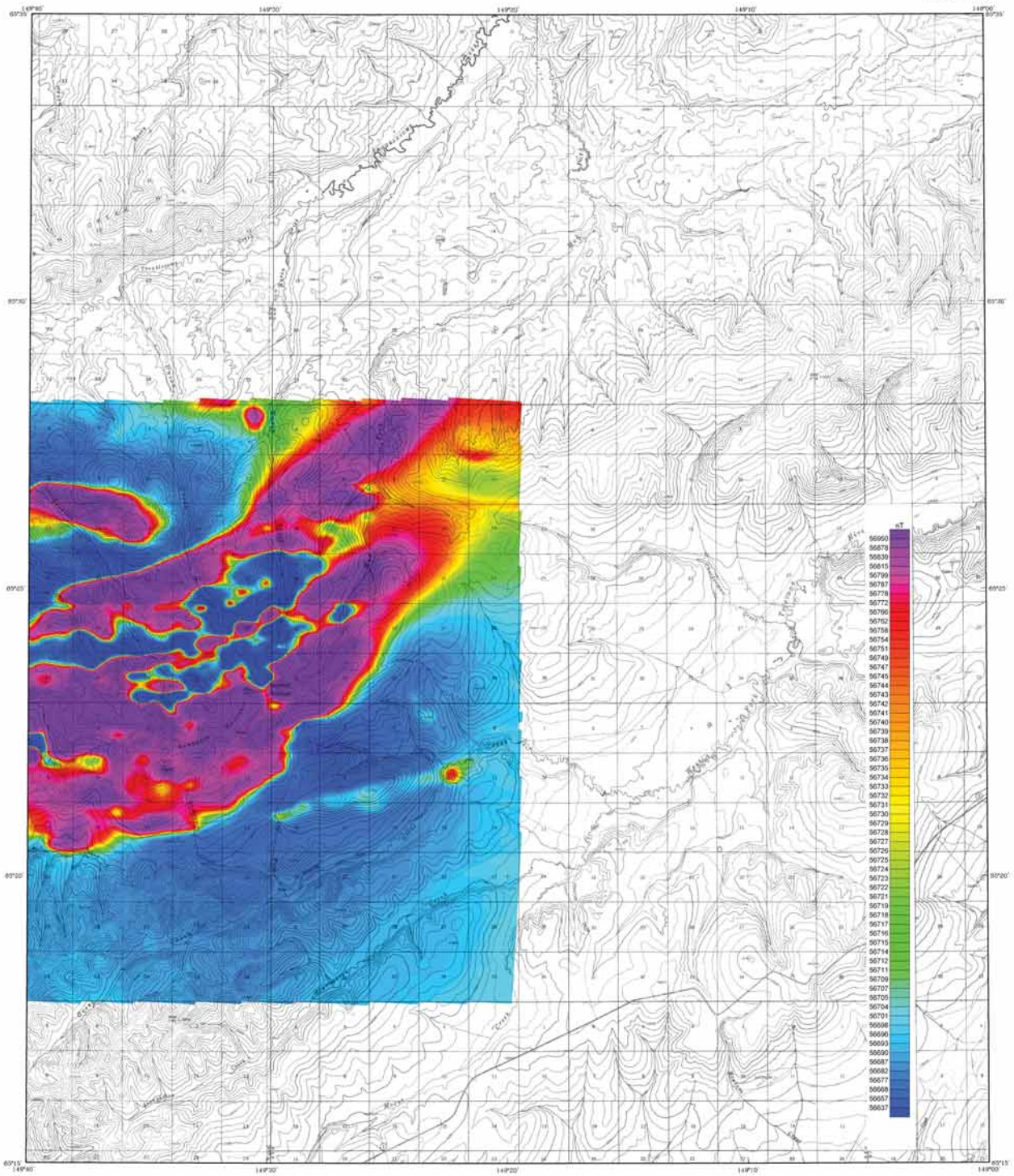

SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

CONTOUR INTERVAL 100 FEET
DATUM MEAN SEA LEVEL

TOTAL MAGNETIC FIELD OF THE RAMPART-MANLEY MINING DISTRICT, ALASKA

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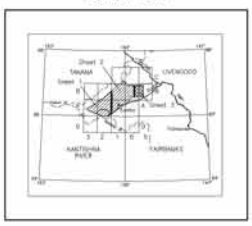
LOCATION INDEX



SURVEY HISTORY

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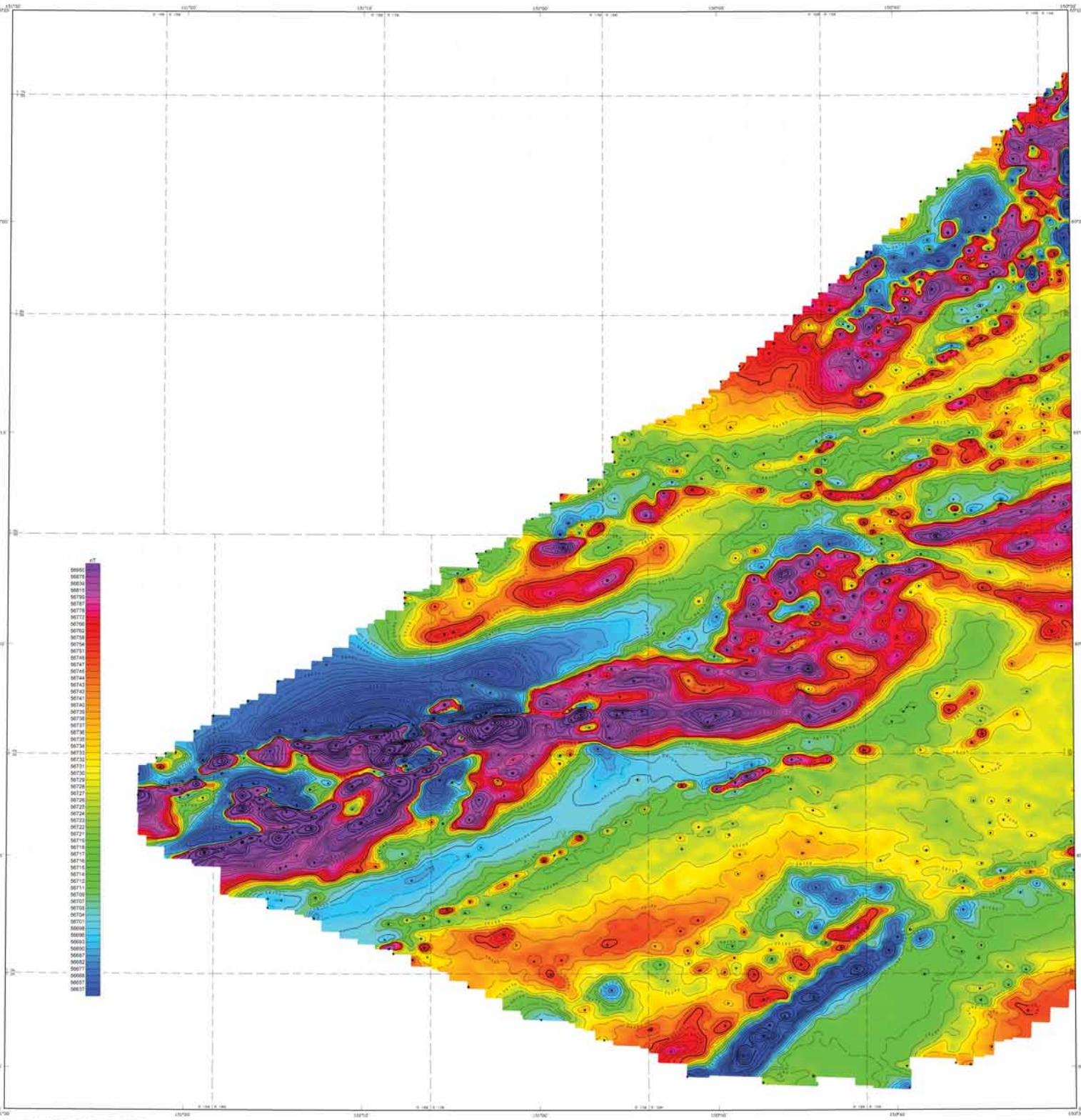


TOTAL MAGNETIC FIELD OF THE RAMPART-MANLEY MINING DISTRICT, ALASKA

PARTS OF FAIRBANKS, KANTISHNA RIVER, LIVENGOOD AND TANANA QUADRANGLES

by
Laurel E. Burns, Fugro Airborne Surveys Corp., and Stevens Exploration Management Corp.
2004

DESCRIPTIVE NOTES

The geophysical data were acquired with a DIGHEM^V Electromagnetic (EM) system, a Scintrex cesium CS2 magnetometer, and a Herz VLF system installed in an AS350B-1 Squirrel helicopter. In addition, the survey recorded data from a radio altimeter, GPS navigation system, 35/70D mono and video camera. Flights were performed at a mean terrain clearance of 300 feet along 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 Sercel Real-Time Differential Global Positioning System (RT-DGPS) was used for both navigation and flight path recovery. The helicopter position was derived every 0.5 seconds using real-time differential positioning to a relative accuracy of better than 10 m. Flight path positions were projected onto the Clark 1866 (UTM) spheroid, 1927 North American datum using a central meridian (CM) of 153°, a north constant of 0 and an east constant of 500,000. Positional accuracy of the presented data is better than 10 m with respect to the UTM grid.

TOTAL MAGNETIC FIELD

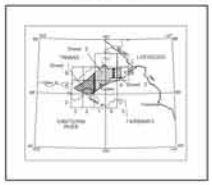
The magnetic total field contours were produced using digitally recorded data from a Scintrex cesium CS2 magnetometer, with a sampling interval of 0.1 seconds. The magnetic data were (1) corrected for diurnal variations by subtraction of the digitally recorded base station magnetic data, (2) leveled to the tie line data, and (3) interpolated onto a regular 100 m grid using a modified Akima (1970) technique. The regional variation (an IGRF gradient, 1985, updated to October, 1995) was removed from the leveled magnetic data.

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 CONTOUR INTERVAL

250 nT
50 nT
10 nT
2 nT
magnetic low
magnetic high

LOCATION INDEX



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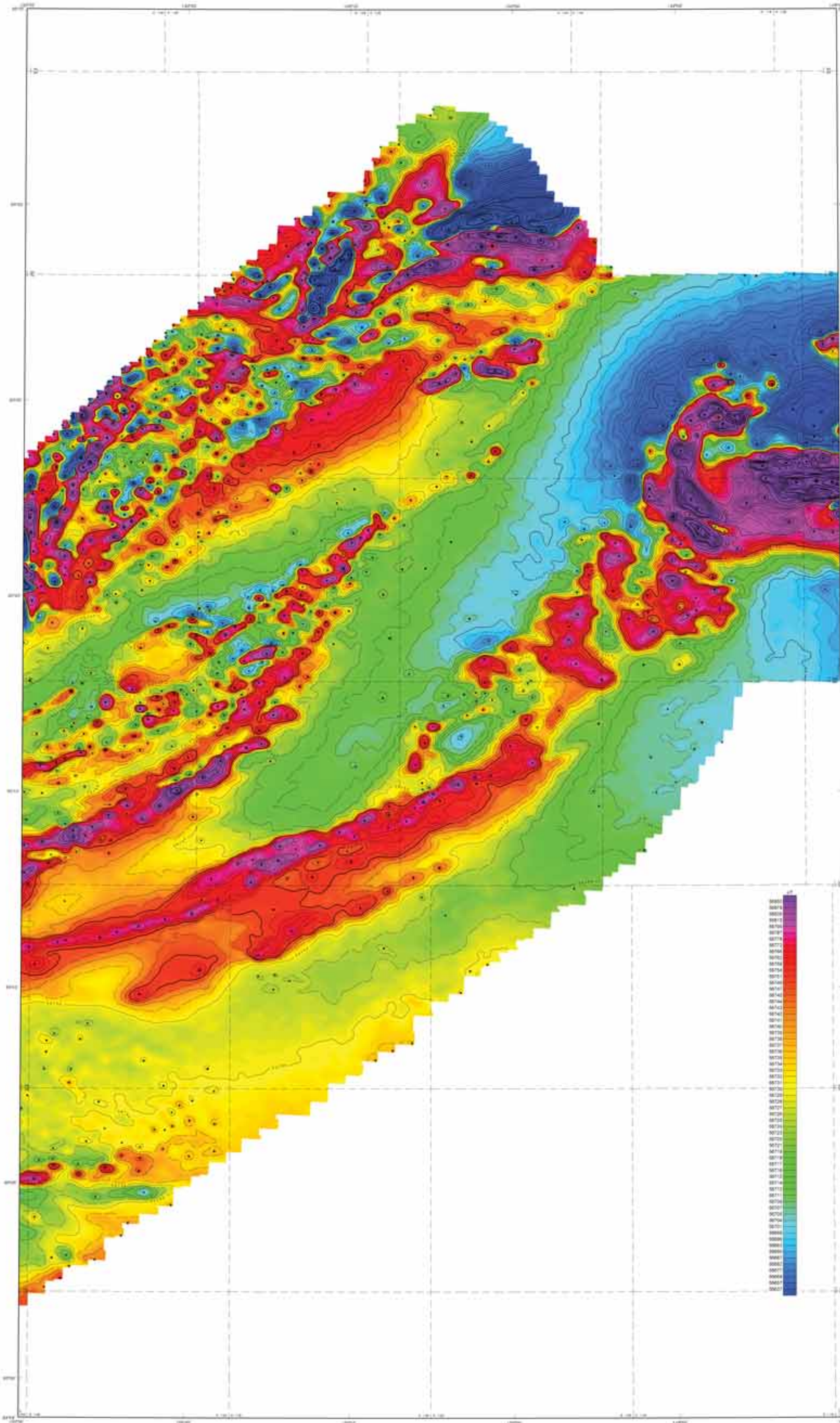
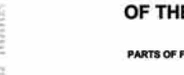




TOTAL MAGNETIC FIELD OF THE RAMPART-MANLEY MINING DISTRICT, ALASKA

PARTS OF FAIRBANKS, KANTISHNA RIVER, LIVENGOOD AND TANANA QUADRANGLES

by
Laurel E. Burns, Fugro Airborne Surveys Corp., and Stevens Exploration Management Corp.
2004

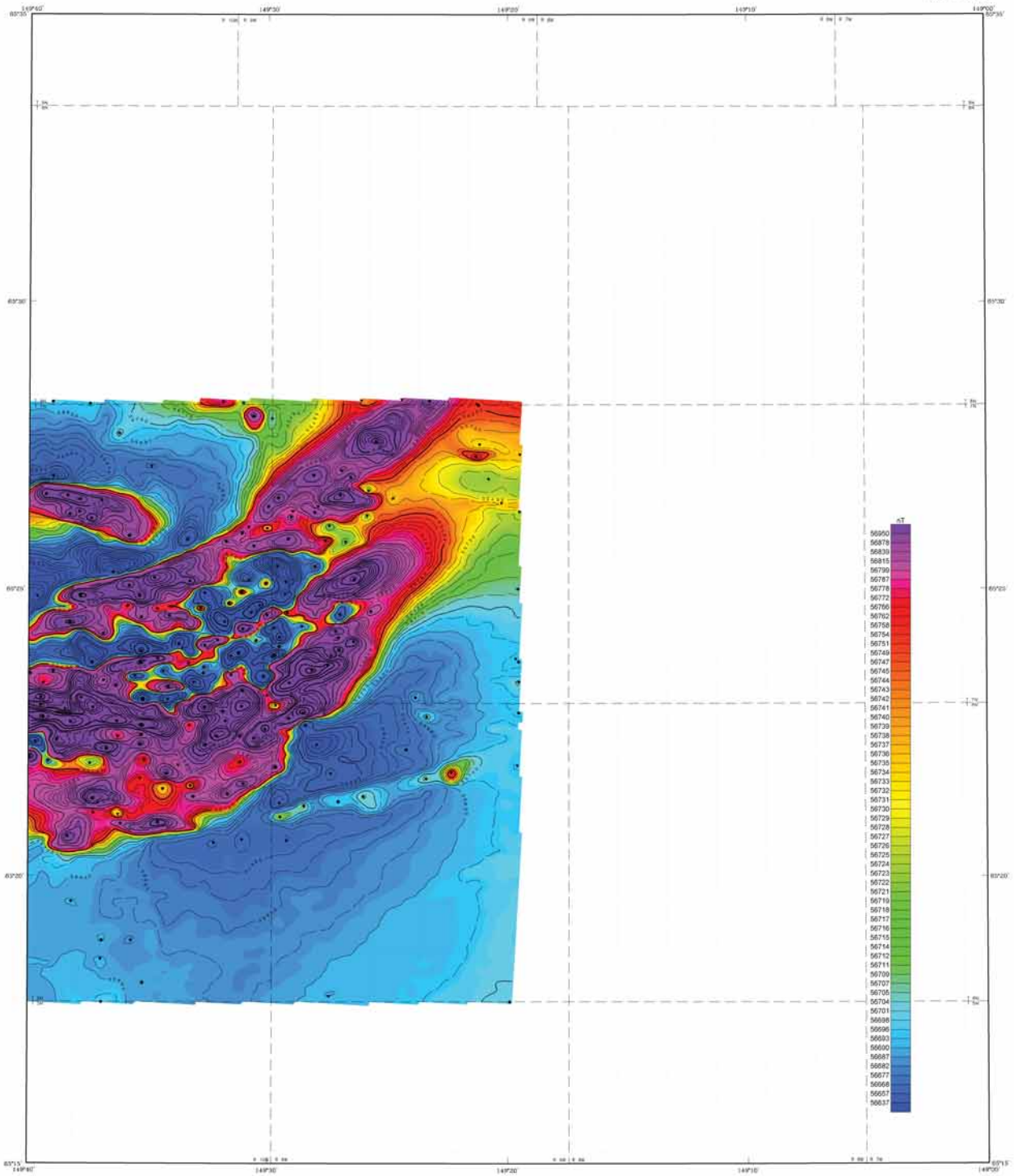
DESCRIPTIVE NOTES

TOTAL MAGNETIC FIELD

MAGNETIC CONTOUR INTERVAL

LOCATION INDEX

SURVEY HISTORY



Section outlines from U.S. Geological Survey Lineament R-5, 1950, R-6, 1950, Lineament C-5, 1950, C-6, 1956, Quadrangles, Alaska.

SCALE 1:63,300

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

TOTAL MAGNETIC FIELD OF THE RAMPART-MANLEY MINING DISTRICT, ALASKA

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by
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2004

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The magnetic total field contours were produced using digitally recorded data from a Scintrex cesium CS2 magnetometer, with 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) leveled to the tie line data, and (3) interpolated onto a regular 100 m grid using a modified Akima (1970) technique. The regional variation (or IGRF gradient, 1985, updated to October, 1996) was removed from the leveled magnetic data.

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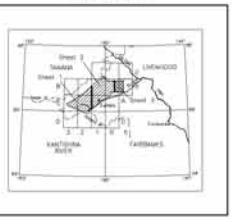
MAGNETIC CONTOUR INTERVAL

250 nT
50 nT
10 nT
5 nT
magnetic low
magnetic high

TRUE NORTH
MAGNETIC
APPROXIMATE MEAN DECLINATION, 1998

LOCATION INDEX



SURVEY HISTORY

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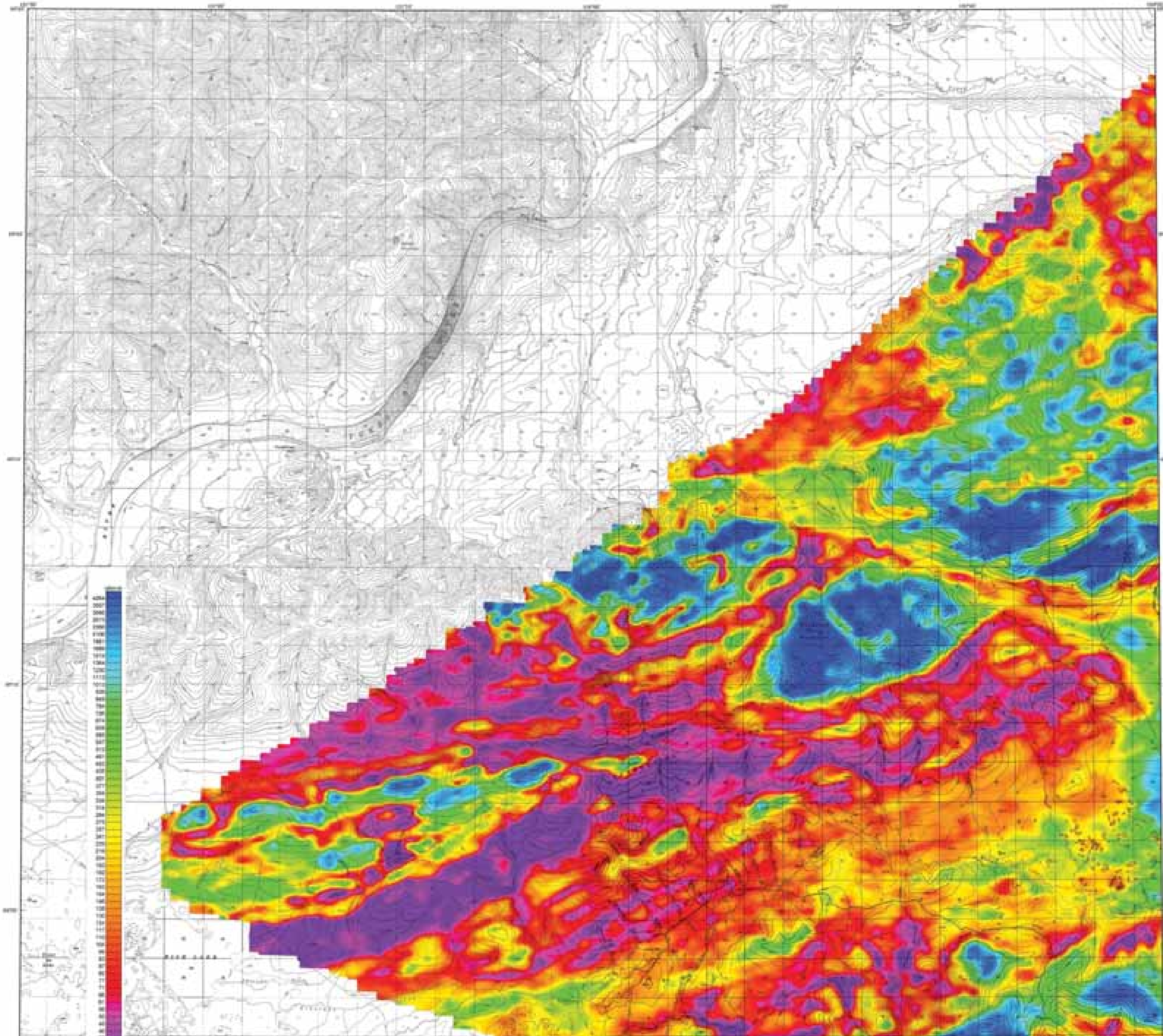


7200 Hz COPLANAR APPARENT RESISTIVITY OF THE RAMPART-MANLEY MINING DISTRICT, ALASKA

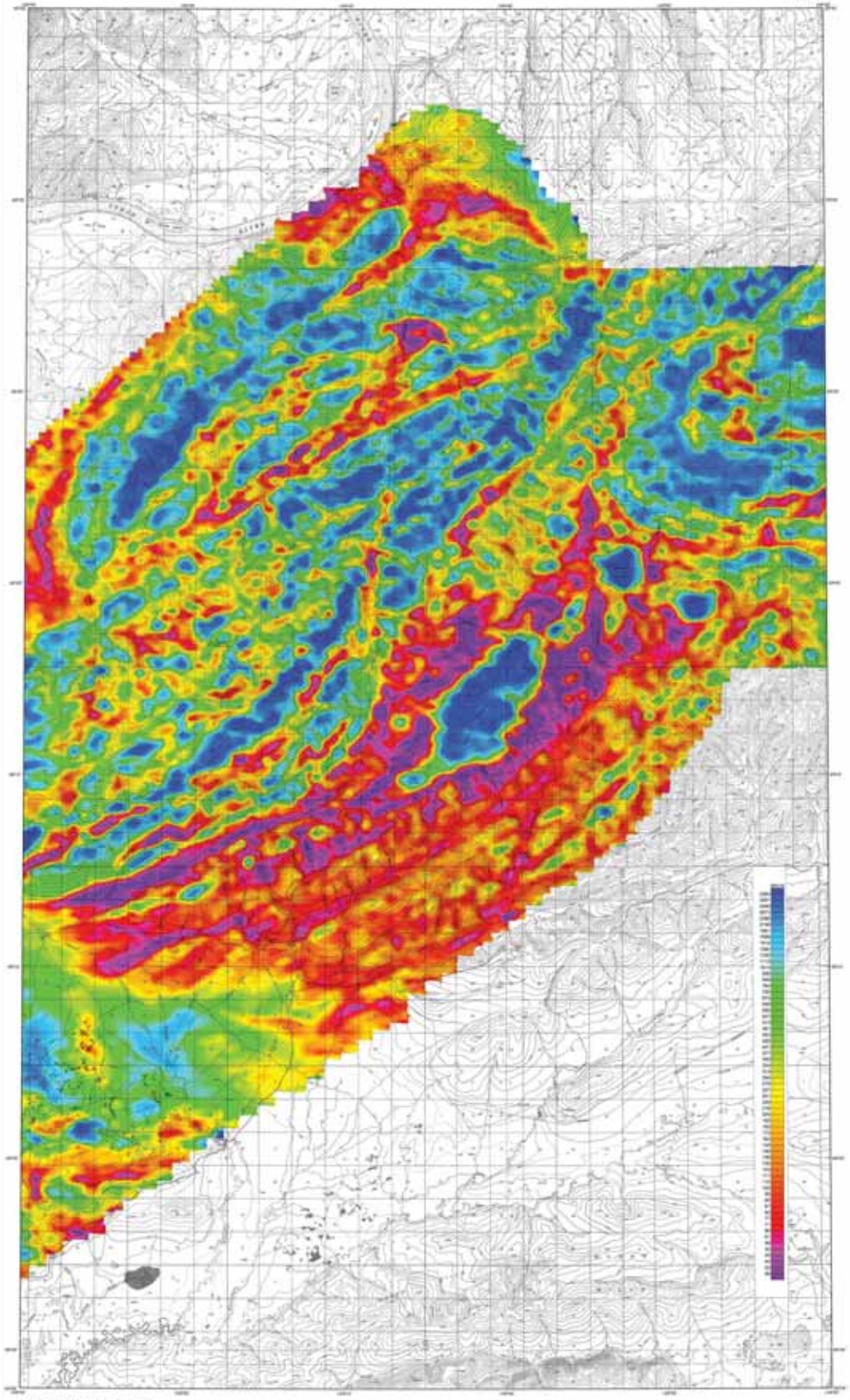
PARTS OF FAIRBANKS, KANTISHNA RIVER, LIVENGOOD AND TANANA QUADRANGLES

by
Laurel E. Burns, Fugro Airborne Surveys Corp., and Stevens Exploration Management Corp.
2004

DESCRIPTIVE NOTES

RESISTIVITY

SURVEY HISTORY



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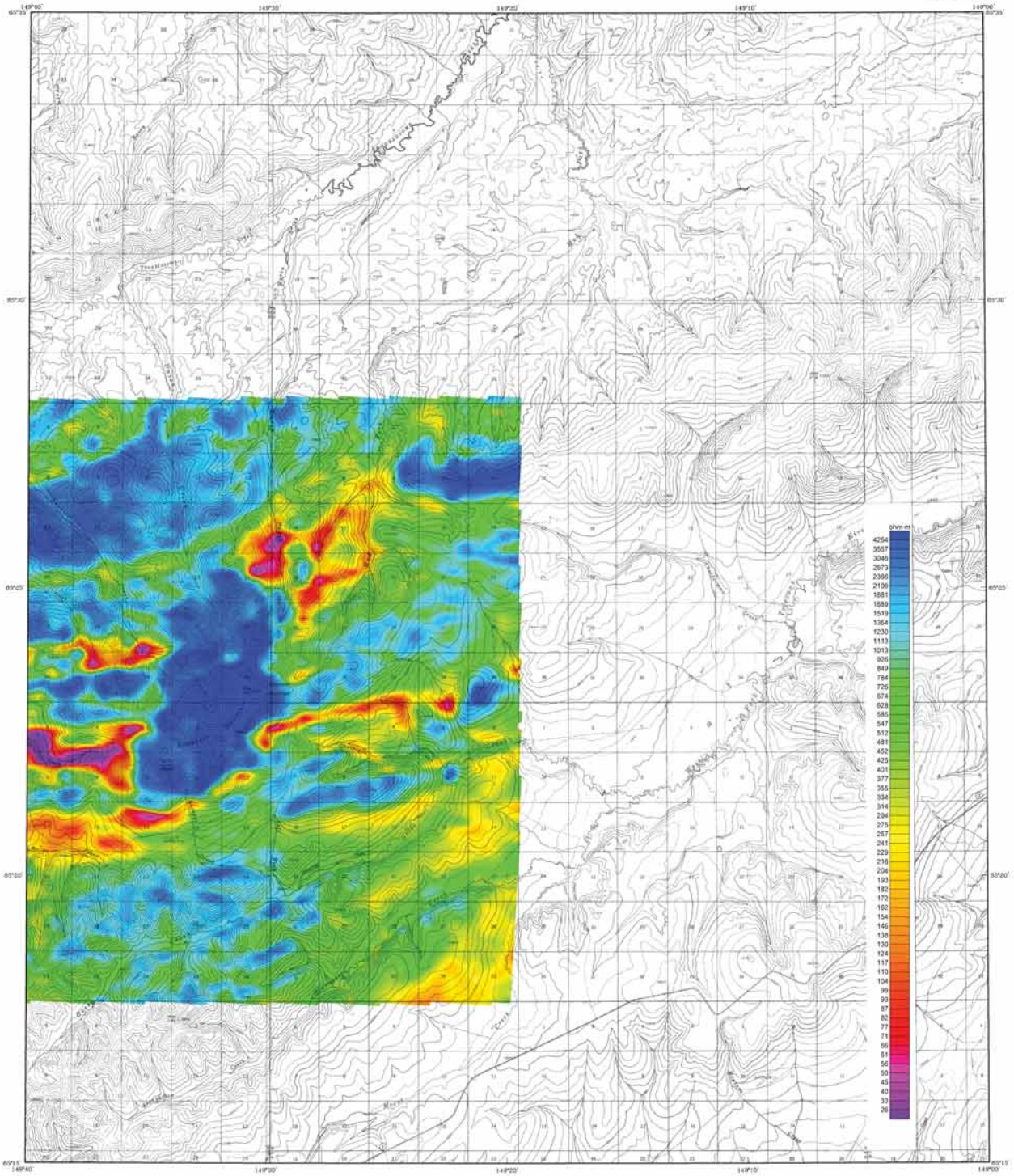

SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

CONTOUR INTERVAL 100 FEET
DATUM MEAN SEA LEVEL

7200 Hz COPLANAR APPARENT RESISTIVITY OF THE RAMPART-MANLEY MINING DISTRICT, ALASKA

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2004

DESCRIPTIVE NOTES

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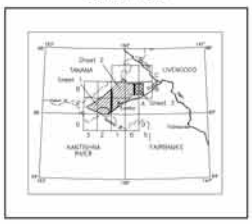
A Geocel Real-Time Differential Global Positioning System (RT-DGPS) was used for both navigation and flight path recovery. The helicopter position was derived every 0.5 seconds using real-time differential positioning to a relative accuracy of better than 10 m. Flight path positions were projected onto the Clark 1866 (UTM) spheroid, 1927 North American datum using a central meridian (CM) of 153°, a north constant of 0 and an east constant of 500,000. Positional accuracy of the presented data is better than 10 m 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 900 and 5000 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 100 m grid using a modified Akima (1970) technique.

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



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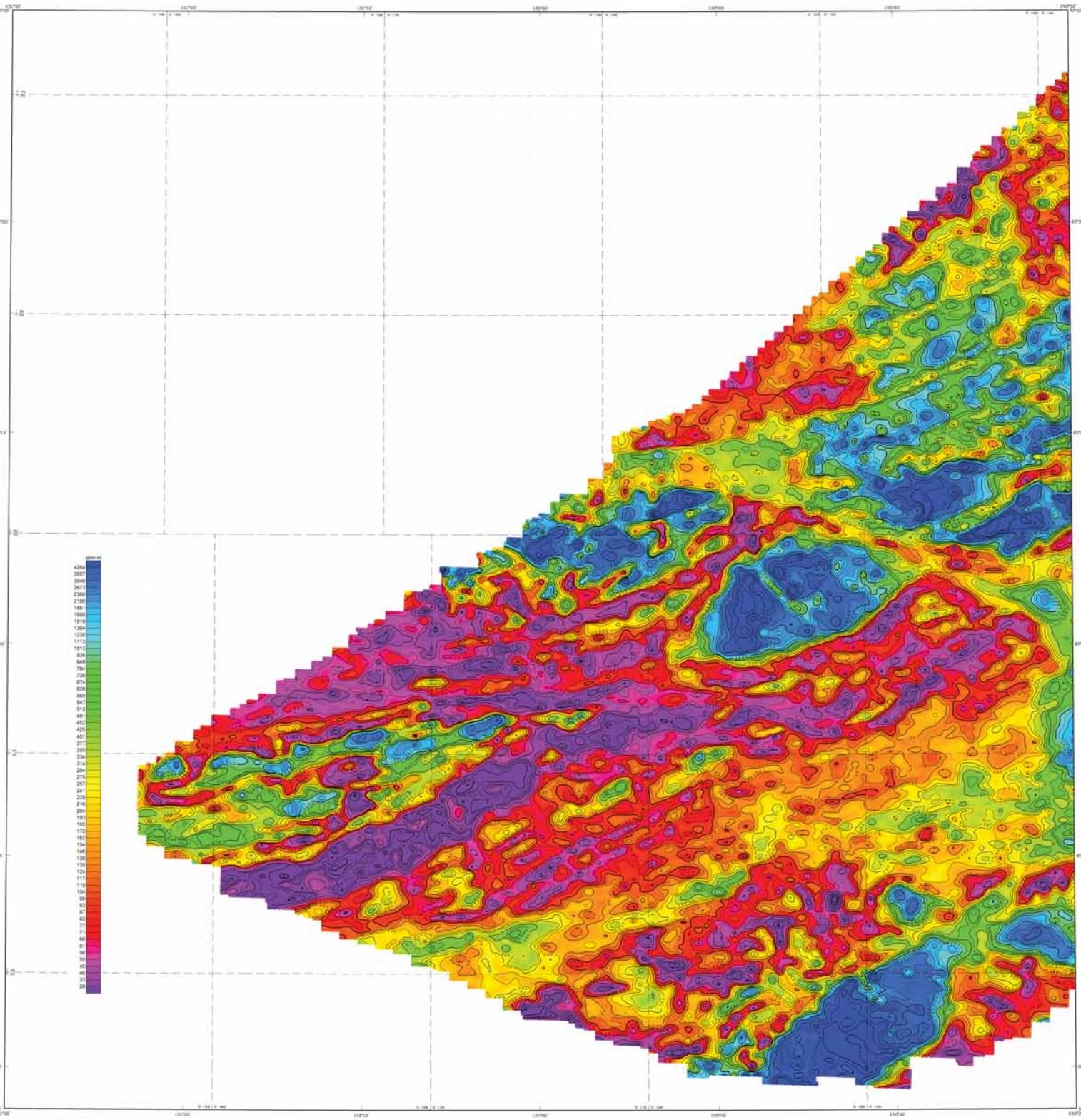

SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

7200 Hz COPLANAR APPARENT RESISTIVITY OF THE RAMPART-MANLEY MINING DISTRICT, ALASKA

PARTS OF FAIRBANKS, KANTISHNA RIVER, LIVENGOOD AND TANANA QUADRANGLES

by
Laurel E. Burns, Fugro Airborne Surveys Corp., and Stevens Exploration Management Corp.
2004

DESCRIPTIVE NOTES

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A Special Resp-i-Time Differential Global Positioning System (SRT-DGPS) was used for both navigation and flight path recovery. The helicopter position was derived every 0.5 seconds using real-time differential positioning to a relative accuracy of better than 10 m. Flight path positions were projected onto the Clark 1866 (UTM) spheroid, 1927 North American datum using a central meridian (CM) of 153°, a north constant of 0 and an east constant of 500,000. Positional accuracy of the presented data is better than 10 m with respect to the UTM grid.

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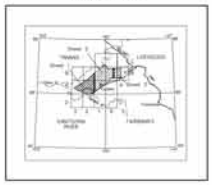
RESISTIVITY CONTOURS

1000
800
600
500
400
300
250
200
150
125
100

Contours in ohm-m at 10 intervals per decade

resistivity low

LOCATION INDEX



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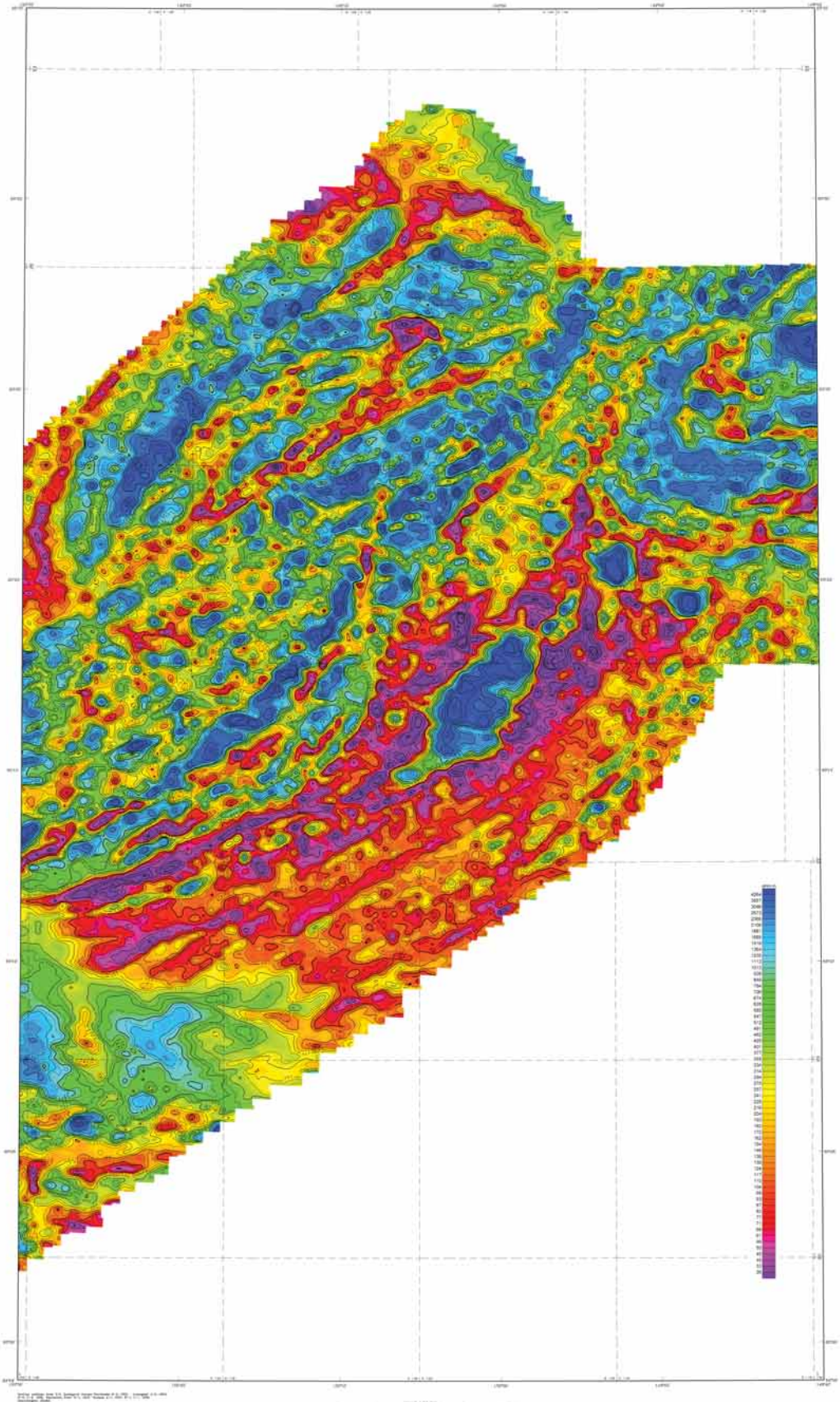


7200 Hz COPLANAR APPARENT RESISTIVITY OF THE RAMPART-MANLEY MINING DISTRICT, ALASKA

PARTS OF FAIRBANKS, KANTISHNA RIVER, LIVENGOOD AND TANANA QUADRANGLES

By
Laurel E. Burns, Fugro Airborne Surveys Corp., and Stevens Exploration Management Corp.
2004

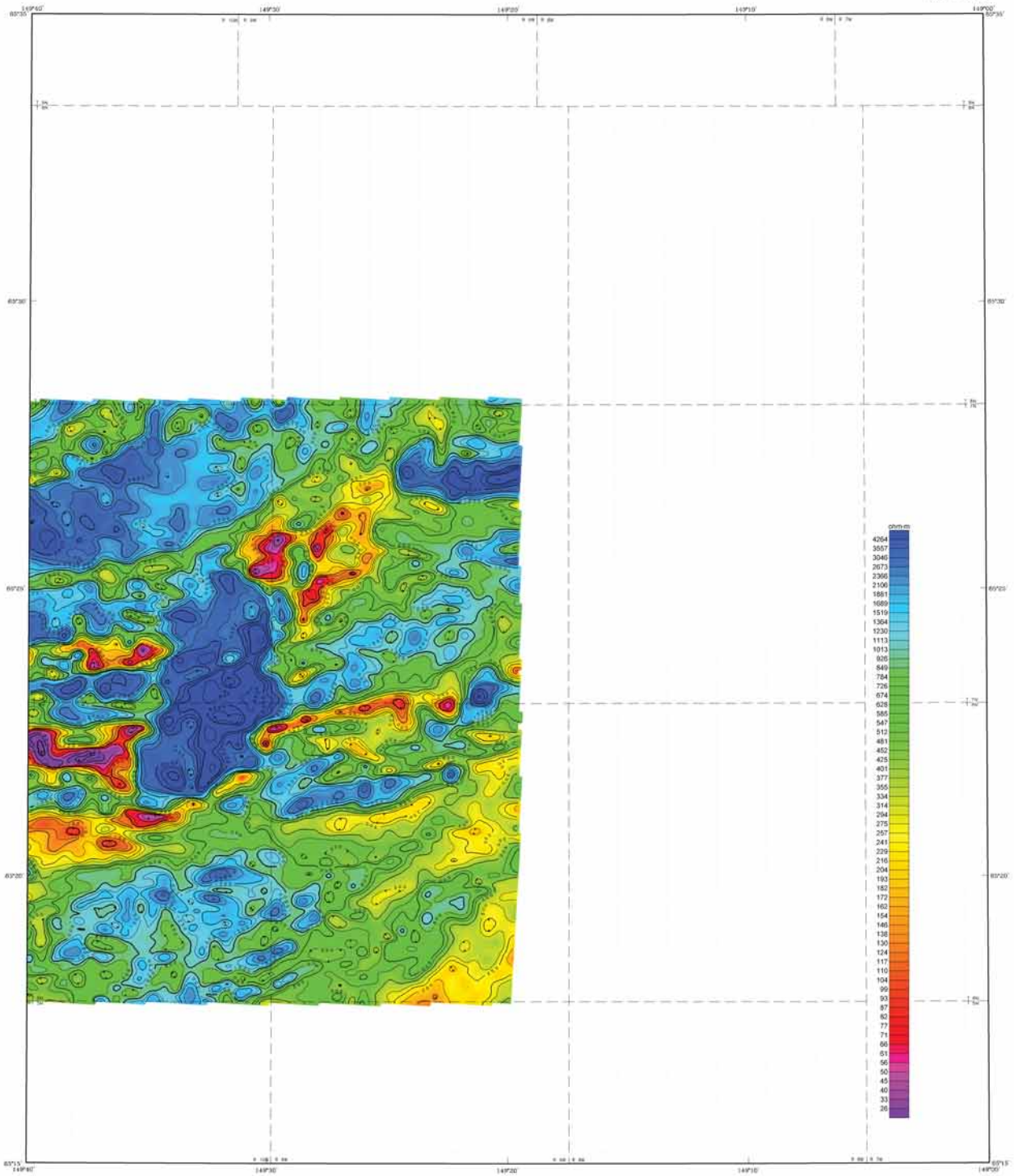
DESCRIPTIVE NOTES

RESISTIVITY

RESISTIVITY CONTOURS

LOCATION INDEX

SURVEY HISTORY



Section outlines from U.S. Geological Survey Livengood D-5, 1950; D-6, 1950; Livengood C-5, 1952; C-6, 1956; Quadrangles, Alaska.

SCALE 1:63,300

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

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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 900 and 5000 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 into a regular 100 m grid using a modified Akima (1970) technique.

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RAMPART-MANLEY SURVEY AREA

RESISTIVITY CONTOURS

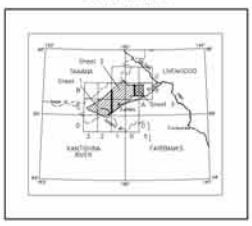
1000
800
600
500
400
300
250
200
150
125
100

Contours in ohm-m at 10 intervals per decade

resistivity low

TRUE NORTH
MAGNETIC NORTH
APPROXIMATE GRID DECLINATION 1998

LOCATION INDEX



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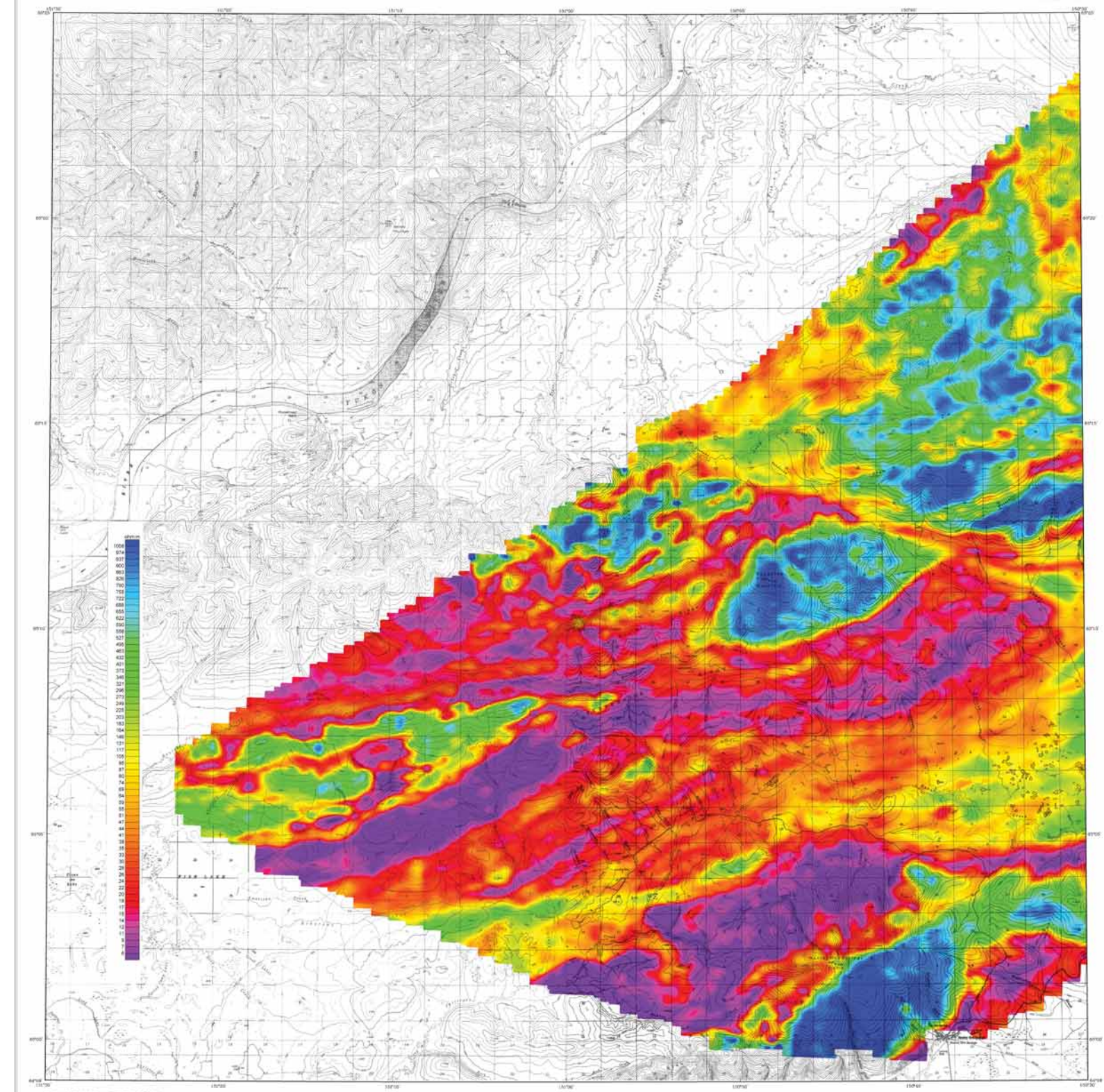

900 Hz COPLANAR APPARENT RESISTIVITY OF THE RAMPART-MANLEY MINING DISTRICT, ALASKA

PARTS OF FAIRBANKS, KANTISHNA RIVER, LIVENGOOD AND TANANA QUADRANGLES

by
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RESISTIVITY

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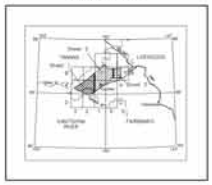

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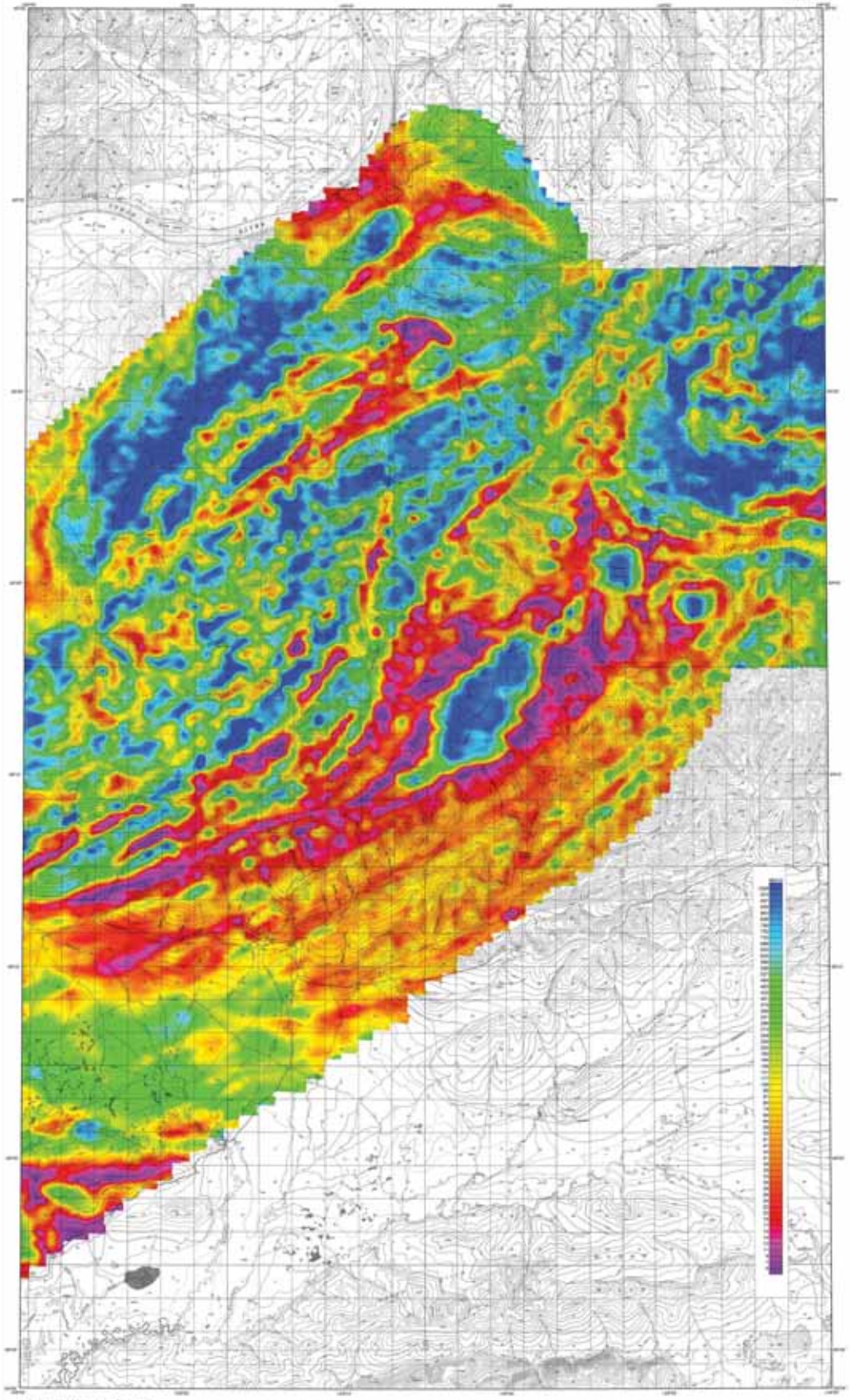

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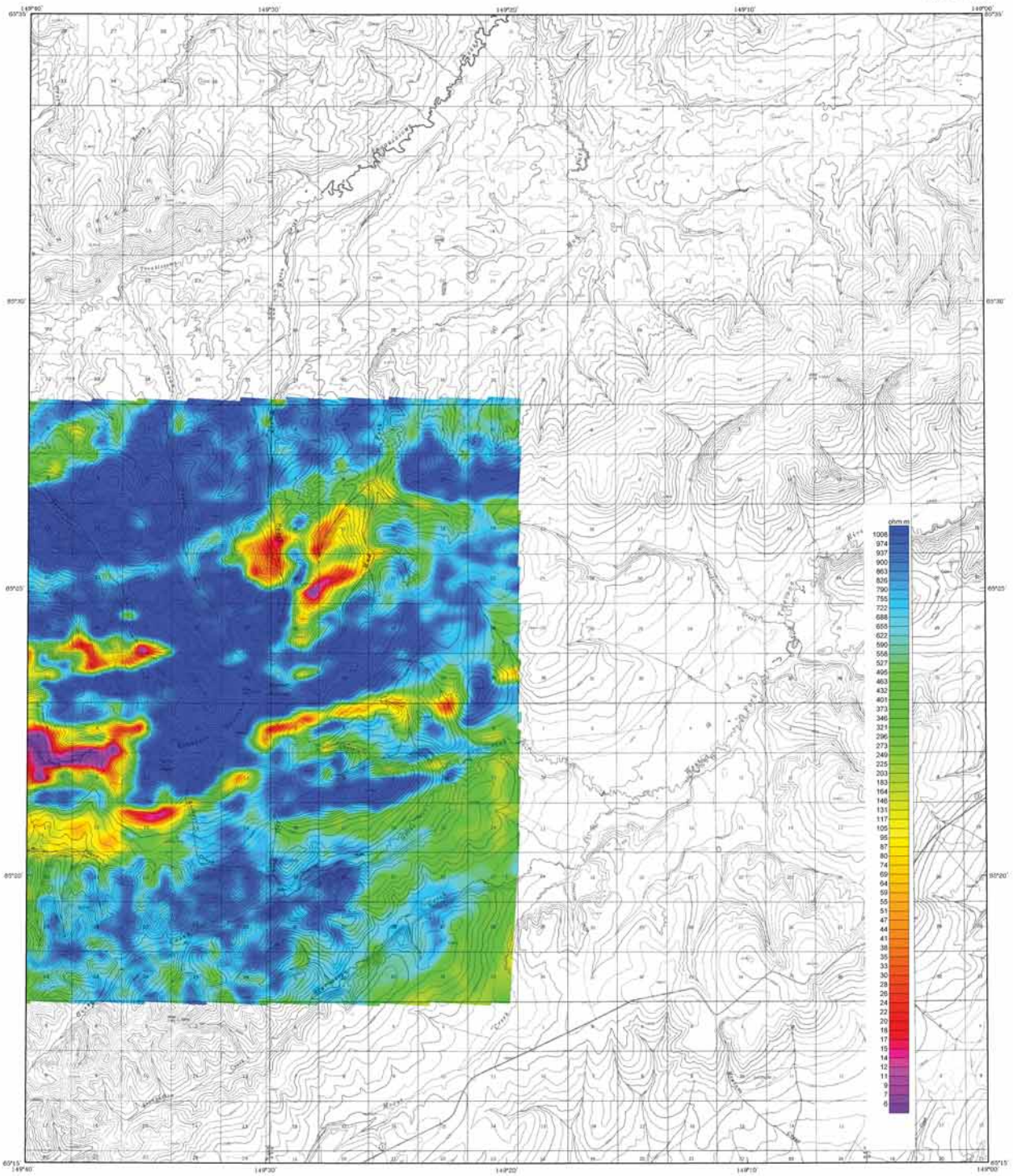
By

Laurel E. Burns, Fugro Airborne Surveys Corp., and Stanava Exploration Management Corp.

2004



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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2004

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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 900 and 5000 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 100 m grid using a modified Akima (1970) technique.

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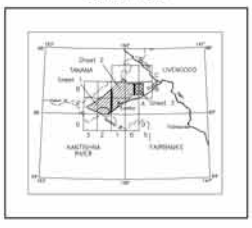
LOCATION INDEX



SURVEY HISTORY

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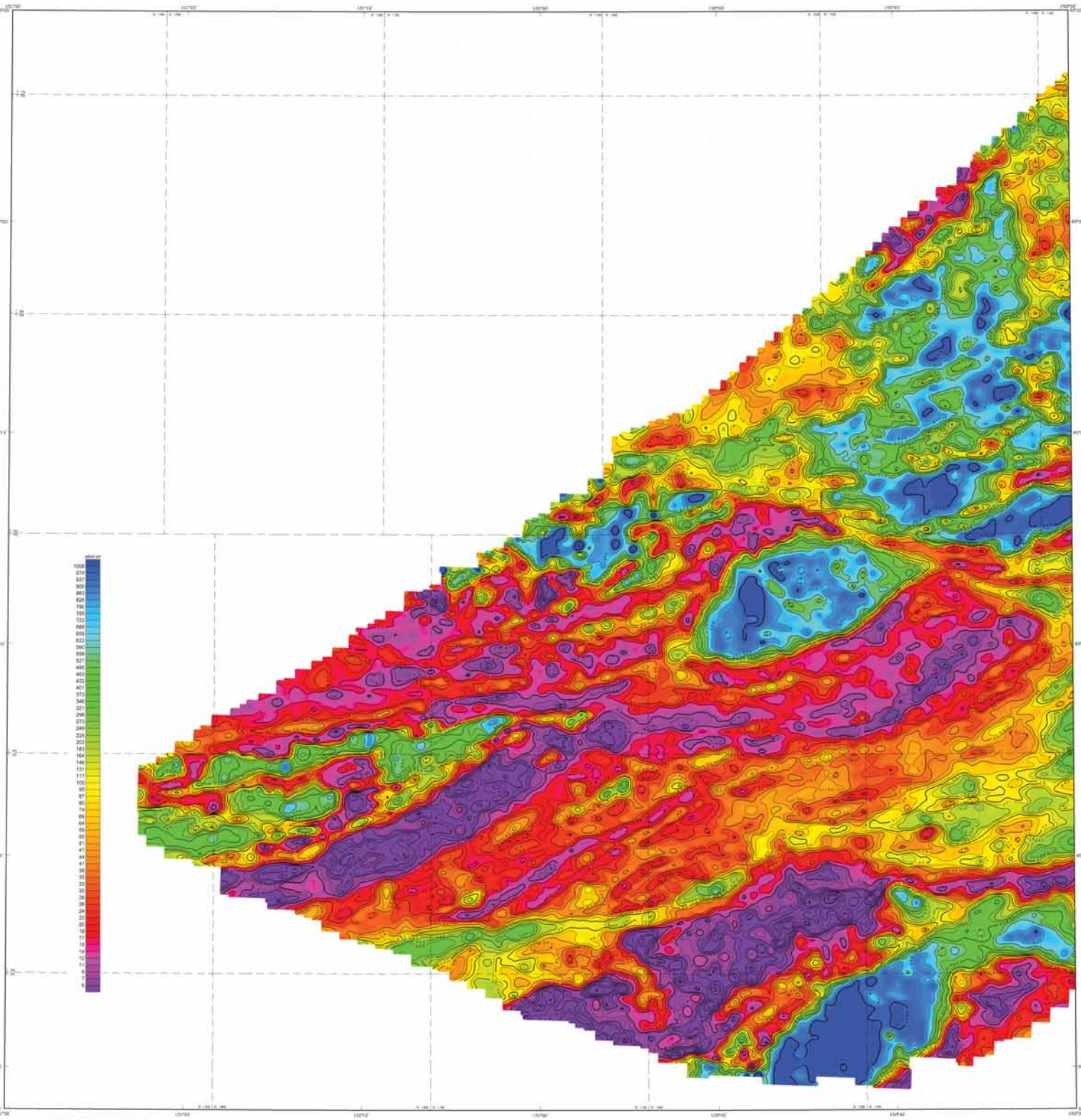

SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

900 Hz COPLANAR APPARENT RESISTIVITY OF THE RAMPART-MANLEY MINING DISTRICT, ALASKA

PARTS OF FAIRBANKS, KANTISHNA RIVER, LIVENGOOD AND TANANA QUADRANGLES

by
Laurel E. Burns, Fugro Airborne Surveys Corp., and Stevens Exploration Management Corp.
2004

DESCRIPTIVE NOTES

The geophysical data were acquired with a DIGHEM^{V} Electromagnetic (EM) system, a Scintrex cesium CS2 magnetometer, and a Herz VLF system installed in an AS.350B-1 Squirrel helicopter. In addition, the survey recorded data from a radio altimeter, GPS navigation system, 35mm mapping and video camera. Flights were performed at a mean terrain clearance of 200 feet along 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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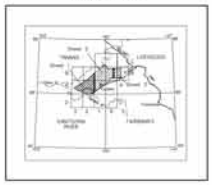
RESISTIVITY CONTOURS

1000
800
600
500
400
300
250
200
150
125
100

Contours in ohm-m at 10 intervals per decade

resistivity low

LOCATION INDEX



SURVEY HISTORY

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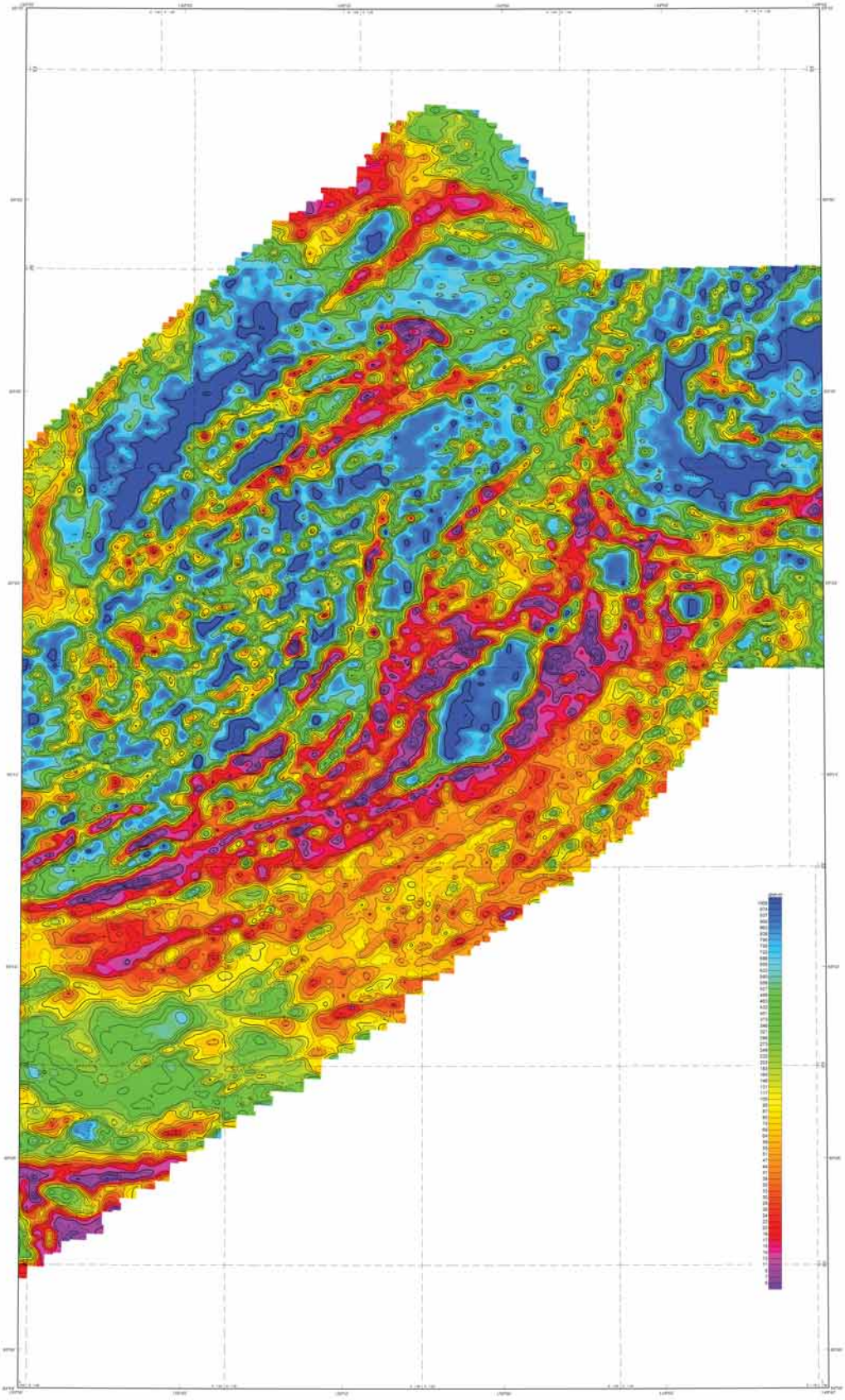


900 Hz COPLANAR APPARENT RESISTIVITY OF THE RAMPART-MANLEY MINING DISTRICT, ALASKA

PARTS OF FAIRBANKS, KANTISHNA RIVER, LIVENGOOD AND TANANA QUADRANGLES

By
Laurel E. Burns, Fugro Airborne Surveys Corp., and Stevens Exploration Management Corp.
2004

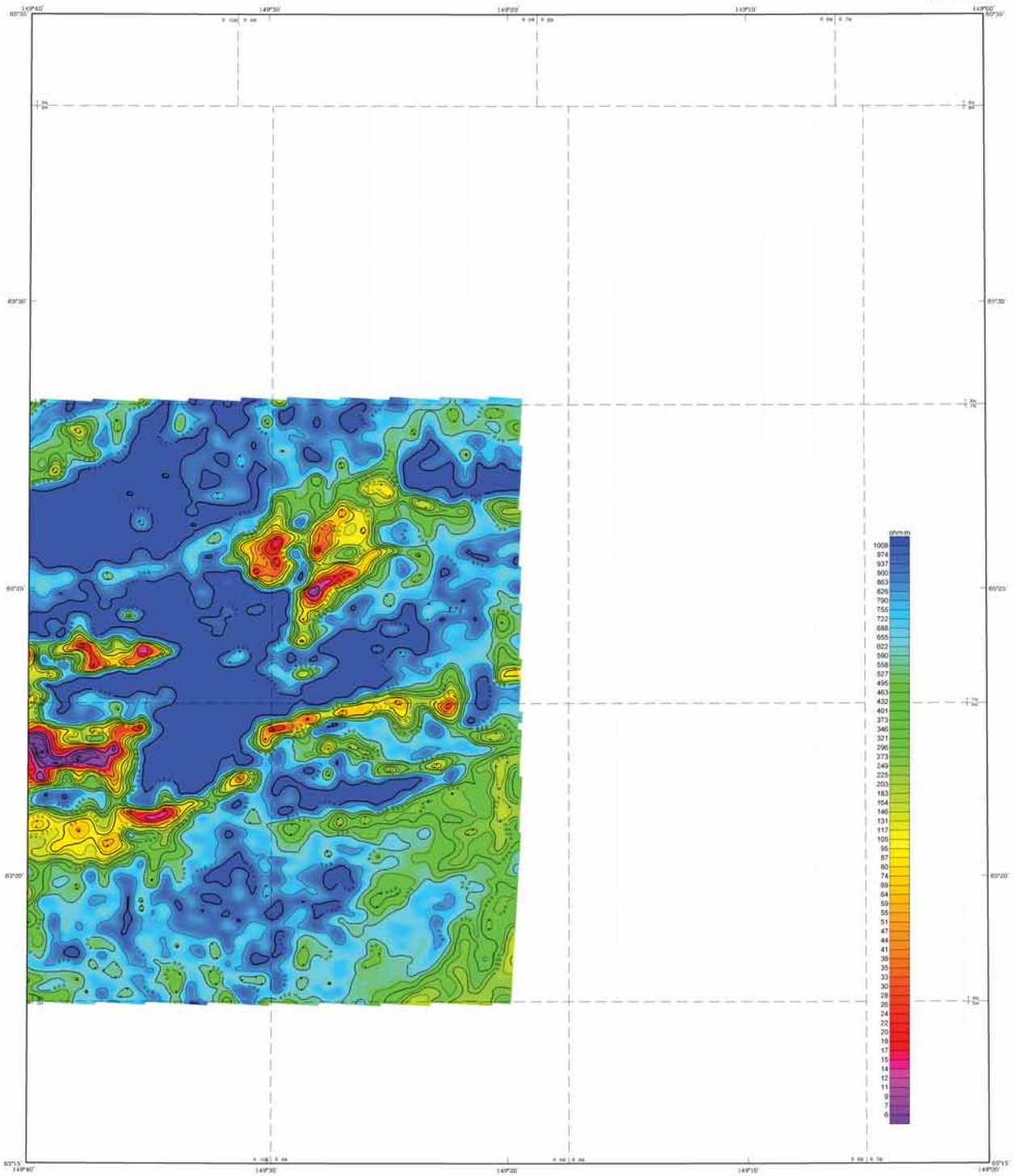
DESCRIPTIVE NOTES

RESISTIVITY CONTOURS

LOCATION INDEX

RESISTIVITY

SURVEY HISTORY



Section outlines from U.S. Geological Survey Livengood D-5, 1950; D-6, 1950; Livengood C-5, 1950; C-6, 1950, Quadrangles, Alaska.

SCALE 1:63,300

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

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RESISTIVITY CONTOURS

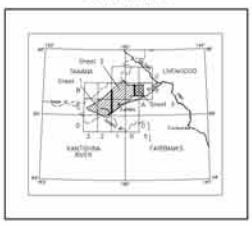
1000
800
600
500
400
300
250
200
150
125
100

Contours in ohm-m at 10 intervals per decade

resistivity low

TRUE NORTH
MAGNETIC
APPROXIMATE GRID DECLINATION (1998)

LOCATION INDEX



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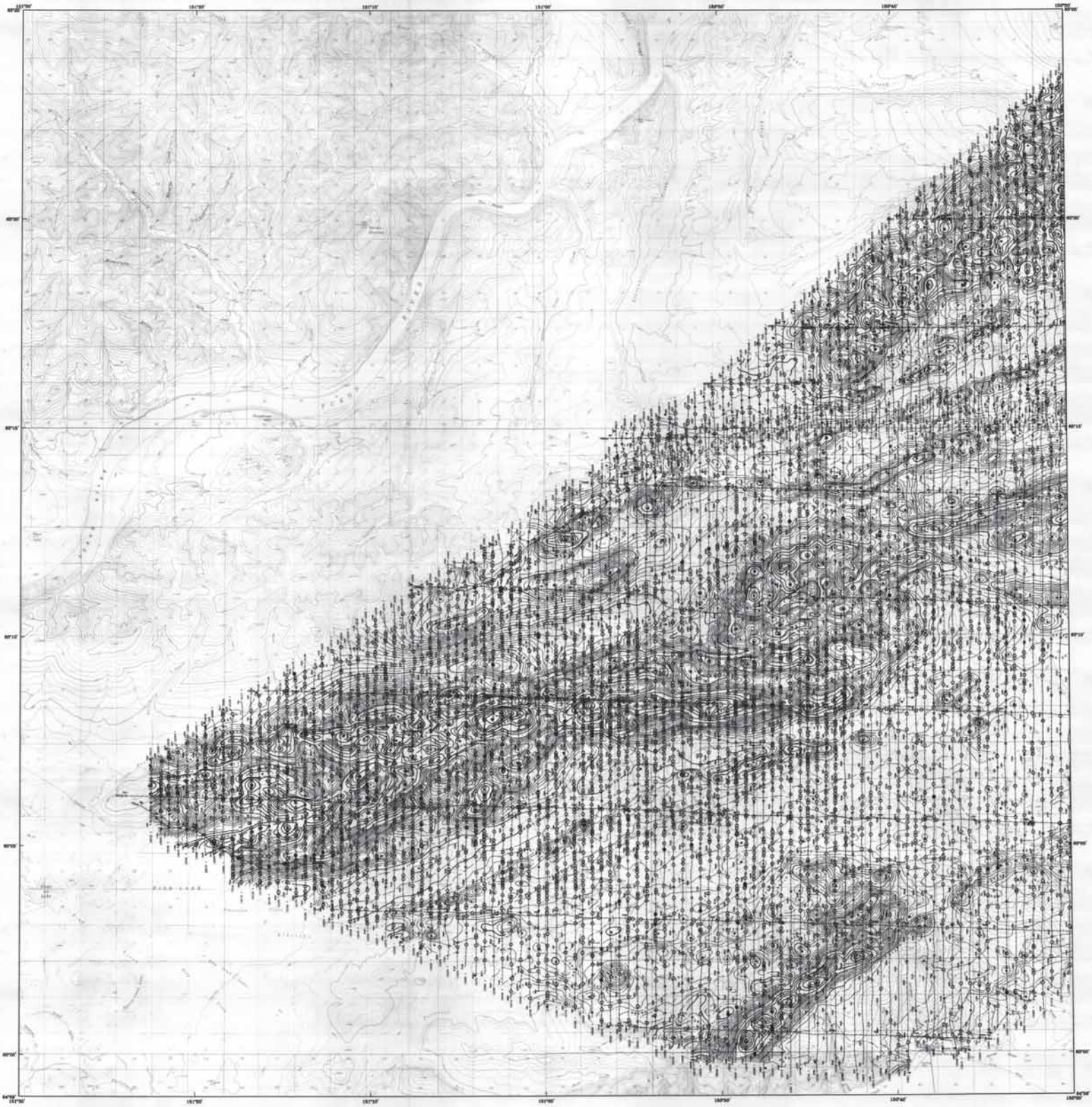


SCALE 1:63,360

1 0 1 2 3 4 MILES

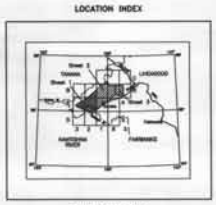
1 0 1 2 3 4 5 KILOMETERS

EXTENDED COVERAGE OF THE TOTAL FIELD MAGNETICS AND ELECTROMAGNETIC ANOMALIES, RAMPART-MANLEY MINING DISTRICT, ALASKA

1997

IGRF GRADIENT REMOVED

LOCATION INDEX



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ELECTROMAGNETICS

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ELECTROMAGNETIC ANOMALIES

Anomaly	Conductance
●	>30 siemens
○	<30 siemens
⊛	Questionable anomaly
△	Weak conductivity associated with an EM magnetite response

MAGNETIC CONTOUR INTERVAL

200 nT

50 nT

10 nT

5 nT

magnetic low

magnetic high

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, and WGM Inc., Mining and Geological Consultants. Airborne geophysical data for the area were acquired by DIGHEM, a division of CGG Canada Ltd., in 1996. Other products from this survey are available from the Alaska Division of Geological & Geophysical Surveys, 794 University Ave., Suite 200, Fairbanks, Alaska, 99709.

TOTAL FIELD MAGNETICS

The total field magnetic data were acquired with a sampling interval of 0.1 seconds, and were (1) corrected for diurnal variations by subtraction of the digitally recorded base station magnetic data, (2) leveled to the tie line data, and (3) interpolated onto a regular 100 m grid using a modified Akima (1970) technique. The regional variation (or IGRF gradient, 1985, updated to October 1996) was removed from the leveled magnetic data.

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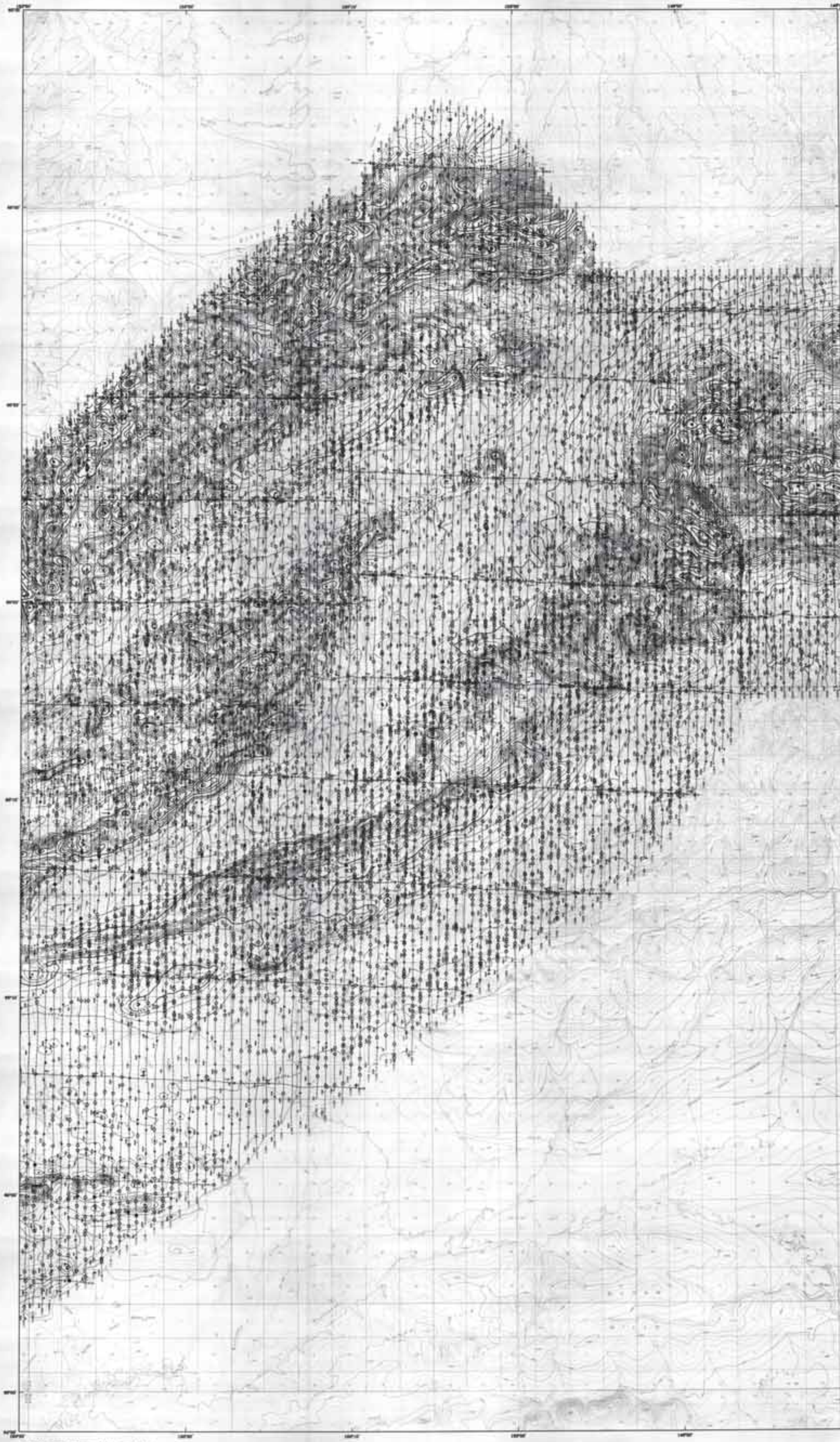
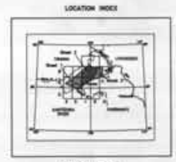


EXTENDED COVERAGE OF THE TOTAL FIELD MAGNETICS AND ELECTROMAGNETIC ANOMALIES, RAMPART-MANLEY MINING DISTRICT, ALASKA

1997

IGRF GRADIENT REMOVED

LOCATION INDEX



DESCRIPTIVE NOTES

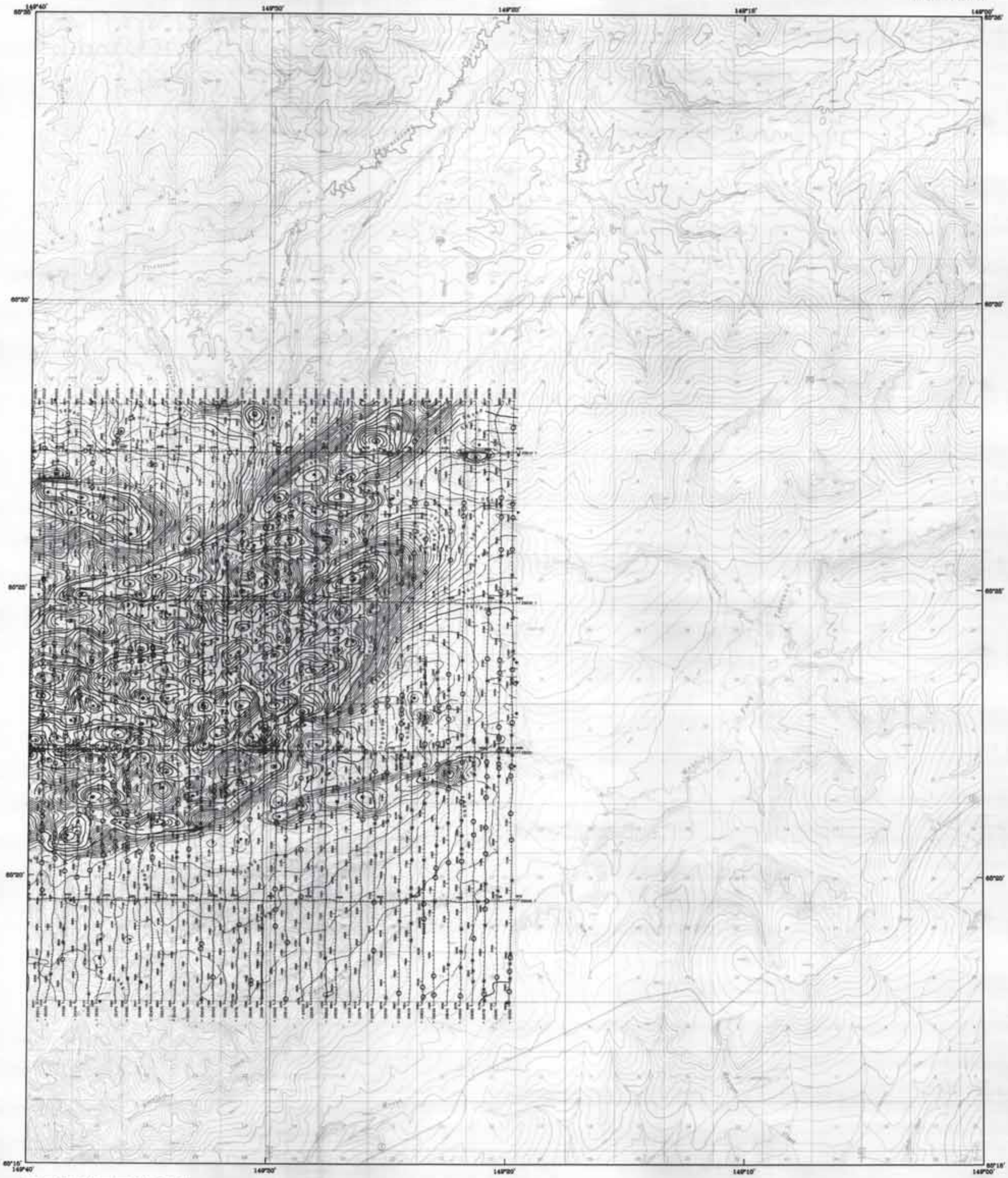
SURVEY HISTORY

MAGNETIC CONTOUR INTERVAL

ELECTROMAGNETICS

ELECTROMAGNETIC ANOMALIES

TOTAL FIELD MAGNETICS



SCALE 1:63,360

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EXTENDED COVERAGE OF THE TOTAL FIELD MAGNETICS AND ELECTROMAGNETIC ANOMALIES, RAMPART-MANLEY MINING DISTRICT, ALASKA

1997

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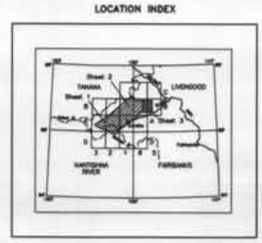

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○	<50 siemens
◉	Questionable anomaly
△	Weak conductivity associated with an EM magnetite response

MAGNETIC CONTOUR INTERVAL

Line	Interval
solid	250 nT
solid	50 nT
solid	10 nT
dashed	5 nT
ellipse with dot	magnetic low
ellipse with dot	magnetic high

SURVEY HISTORY

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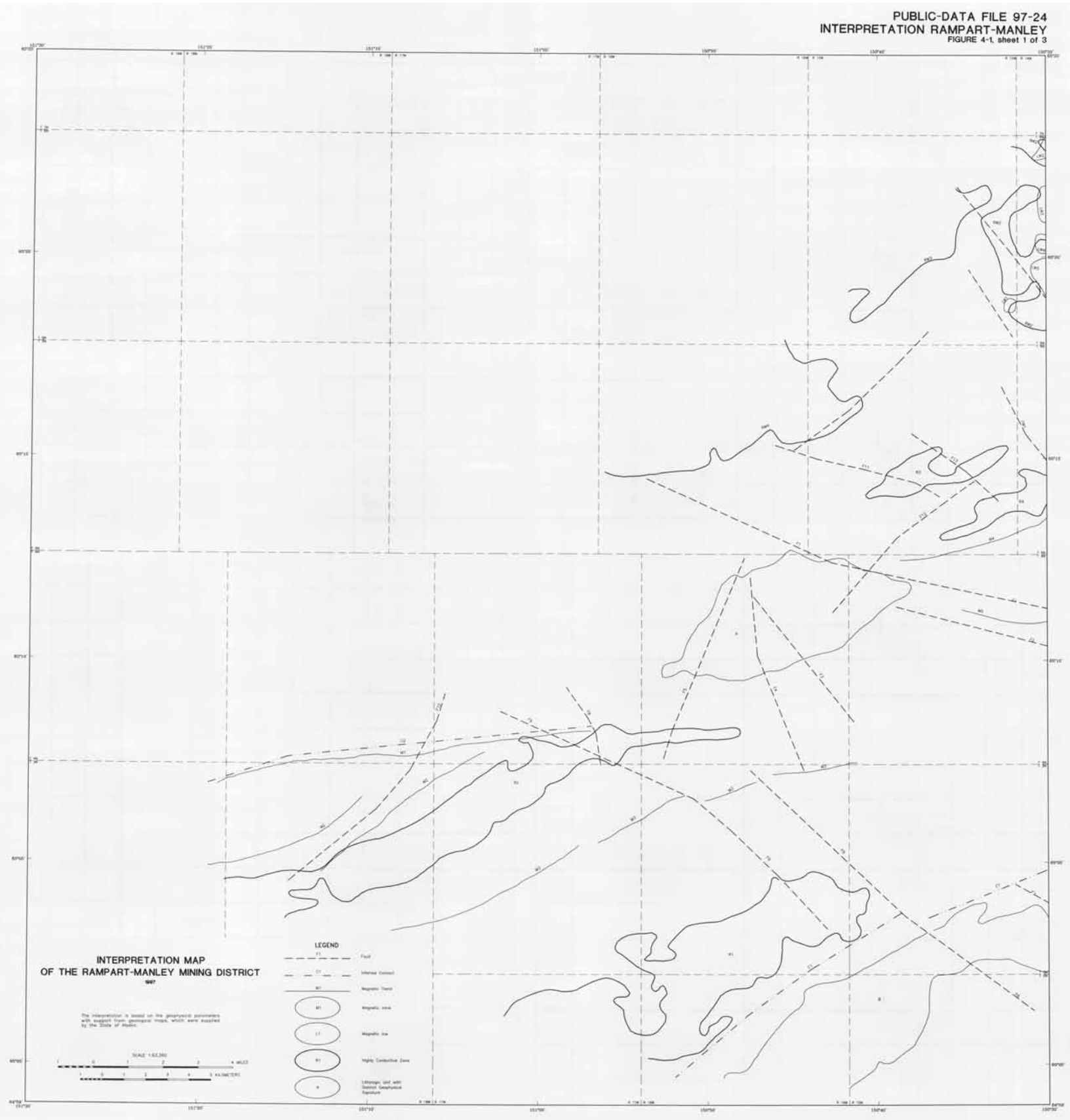
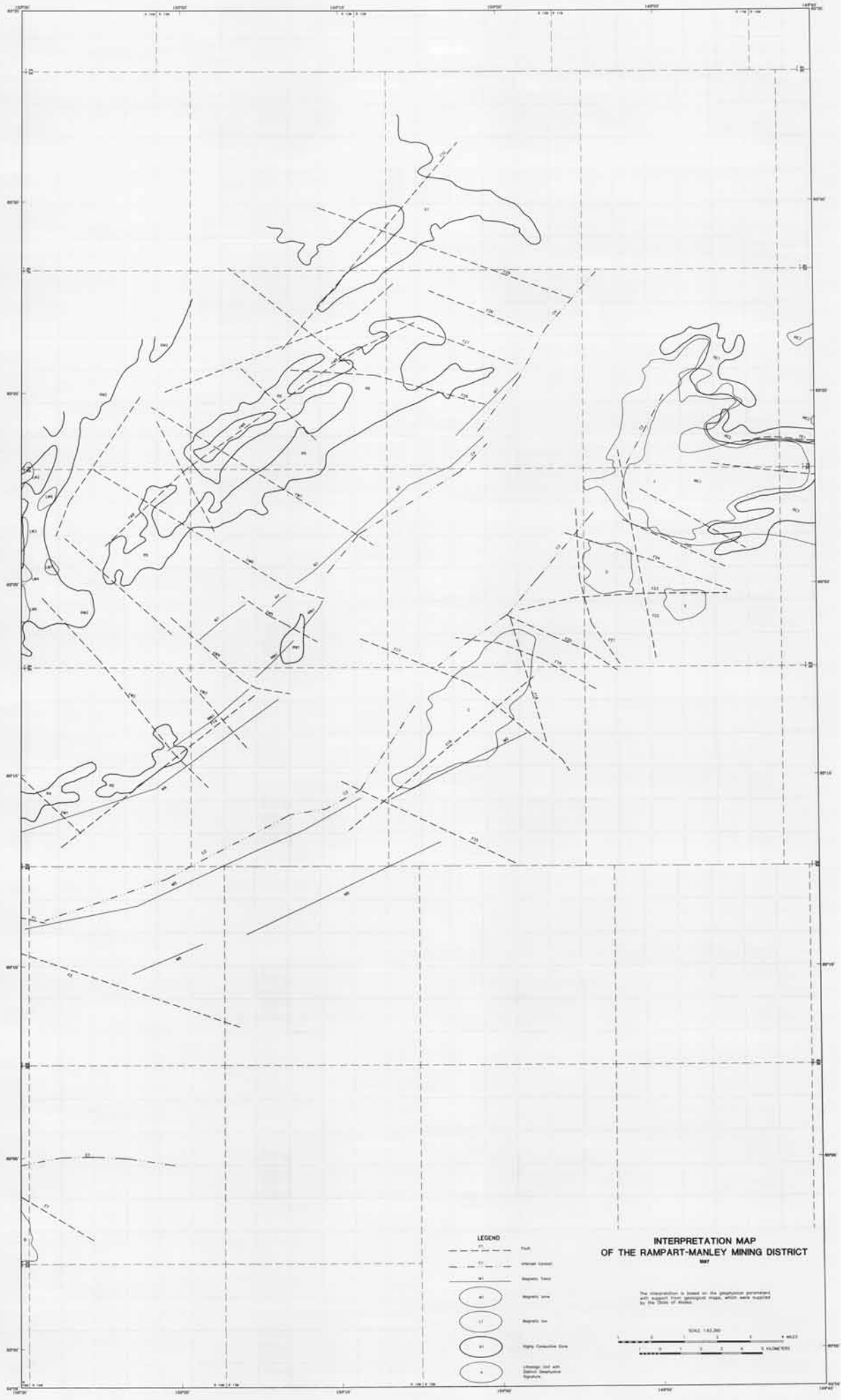
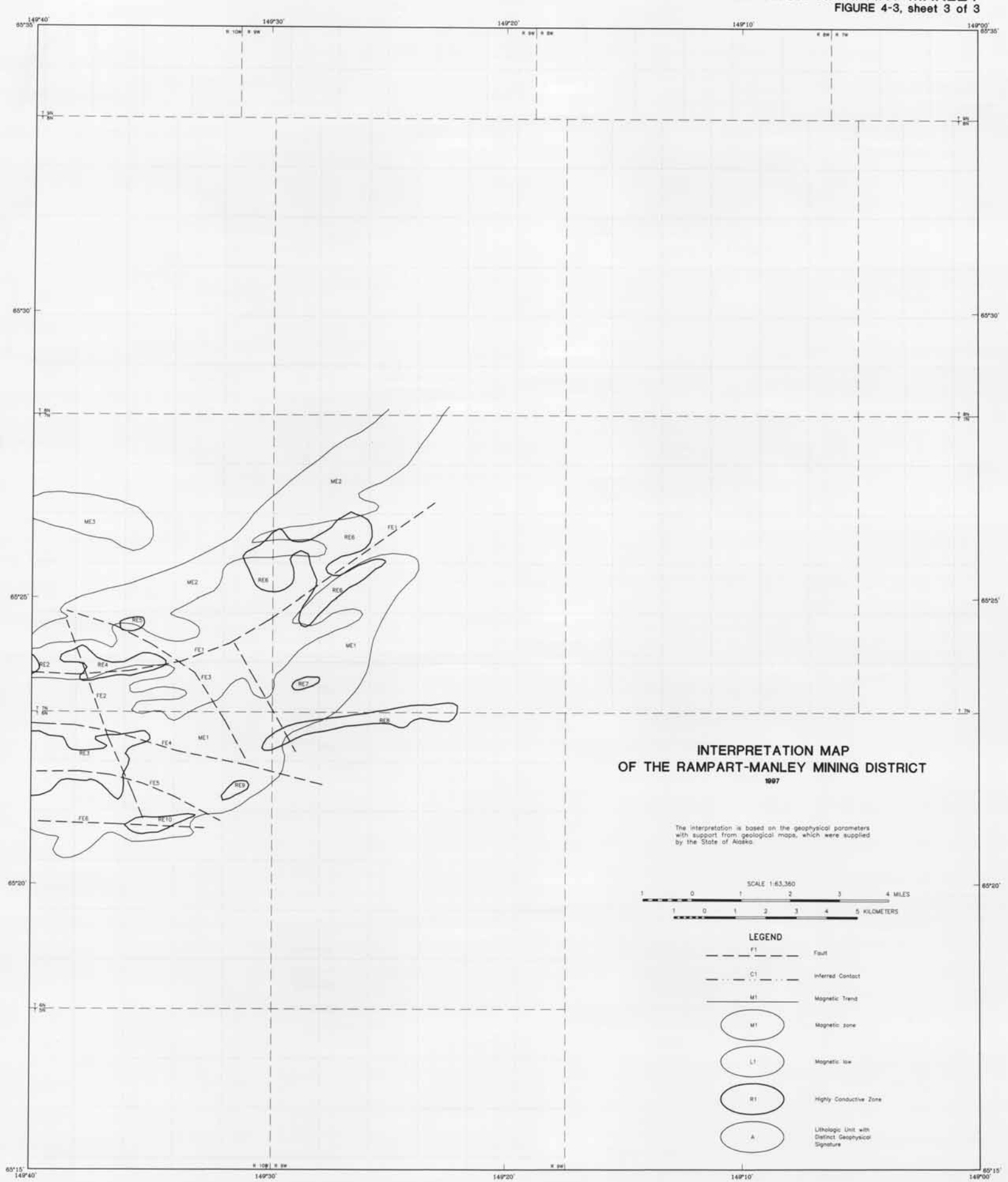
PUBLIC-DATA FILE 97-24
INTERPRETATION RAMPART-MANLEY
FIGURE 4-1, sheet 1 of 3



PUBLIC-DATA FILE 97-24
INTERPRETATION RAMPART-MANLEY
FIGURE 4-2, sheet 2 of 3



PUBLIC-DATA FILE 97-24
INTERPRETATION RAMPART-MANLEY
FIGURE 4-3, sheet 3 of 3



INTERPRETATION MAP
OF THE RAMPART-MANLEY MINING DISTRICT
1997

The interpretation is based on the geophysical parameters with support from 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 — Fault
- C1 — Inferred Contact
- M1 — Magnetic Trend
- M1 — Magnetic zone
- L1 — Magnetic low
- R1 — Highly Conductive Zone
- A — Lithologic Unit with Distinct Geophysical Signature