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Burns, L.E., Graham, G.R.C., Barefoot, J.D., and Aerodat Inc.

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DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS



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NIKOLAI ELECTROMAGNETIC AND MAGNETIC AIRBORNE GEOPHYSICAL SURVEY DATA COMPILATION

Burns, L.E.¹, Graham, G.R.C.¹, Barefoot, J.D.¹, and Aerodat Inc.

ABSTRACT

The Nikolai electromagnetic and magnetic airborne geophysical survey is located in interior Alaska in the Delta River mining district, about 200 kilometers southeast of Fairbanks. Frequency domain electromagnetic and magnetic data were collected with the Aerodat Condor system in 1995. A total of 3412.8 line kilometers were collected covering 660.1 square kilometers. Line spacing was 200 meters (m). Data were collected on a helicopter towed sensor platform (“bird”) on a 30 m long line. The electromagnetic equipment recorded data slightly above 30 m above ground level (AGL), and the magnetometer recorded data slightly above 45 m AGL due to safety considerations. The Nikolai data were provided to DGGS by the U.S. Department of Interior Bureau of Land Management (BLM) and were merged with the Southern Delta River survey (2002) as a contract deliverable. The 2003 release of the Southern Delta River survey included map sheets of the merged data.

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 survey area contains prospects for lode gold, placer gold, and Ni-Cu-PGE deposits. 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

This survey was provided by the U.S. Department of Interior Bureau of Land Management (BLM) for publication with the 2002 Southern Delta River airborne geophysical survey.

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 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
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

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., U.S. Bureau of Land Management, Fugro Airborne Surveys, and Stevens Exploration Management Corp., 2003, Line, grid, and vector data of airborne geophysical survey data for the southern Delta River area, east-central Alaska: Alaska Division of Geological & Geophysical Surveys Geophysical Report 2003-6, 1 DVD. <http://doi.org/10.14509/2973>
- Burns, L.E., U.S. Bureau of Land Management, Fugro Airborne Surveys, and Stevens Exploration Management Corp., 2003, Plot files of the airborne geophysical survey data of the southern Delta River area, east-central Alaska: Alaska Division of Geological & Geophysical Surveys Geophysical Report 2003-5, 1 DVD. <http://doi.org/10.14509/2904>
- Burns, L.E., and Clautice, K.H., 2003, Portfolio of aeromagnetic and resistivity maps of the southern Delta River area, east-central Alaska: Alaska Division of Geological & Geophysical Surveys Geophysical Report 2003-8, 15 p. <http://doi.org/10.14509/2975>
- Fraser, D.C., 1978, Resistivity mapping with an airborne multicoil electromagnetic system: *Geophysics*, v. 43, p. 144-172.
- Pritchard, R.A., and Fugro Airborne Surveys, 2003, Project report of the airborne geophysical survey for the southern Delta River area, east-central Alaska: Alaska Division of Geological & Geophysical Surveys Geophysical Report 2003-7, 252 p., 2 sheets, scale 1:63,360. <http://doi.org/10.14509/2974>

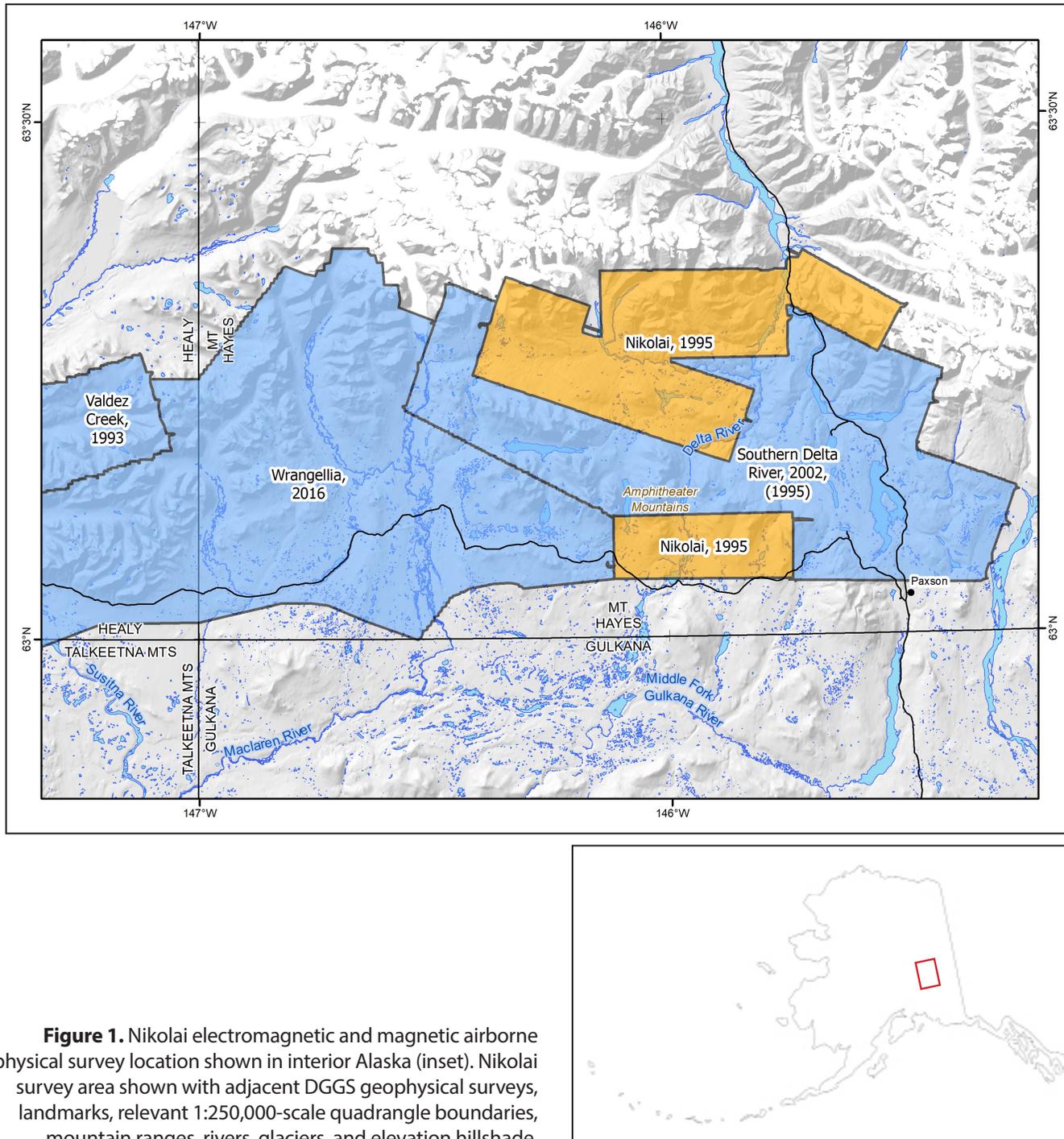


Figure 1. Nikolai electromagnetic and magnetic airborne geophysical survey location shown in interior Alaska (inset). Nikolai survey area shown with adjacent DGGs geophysical surveys, landmarks, relevant 1:250,000-scale quadrangle boundaries, mountain ranges, rivers, glaciers, and elevation hillshade.



Figure 2. Flight path with orthometric image.

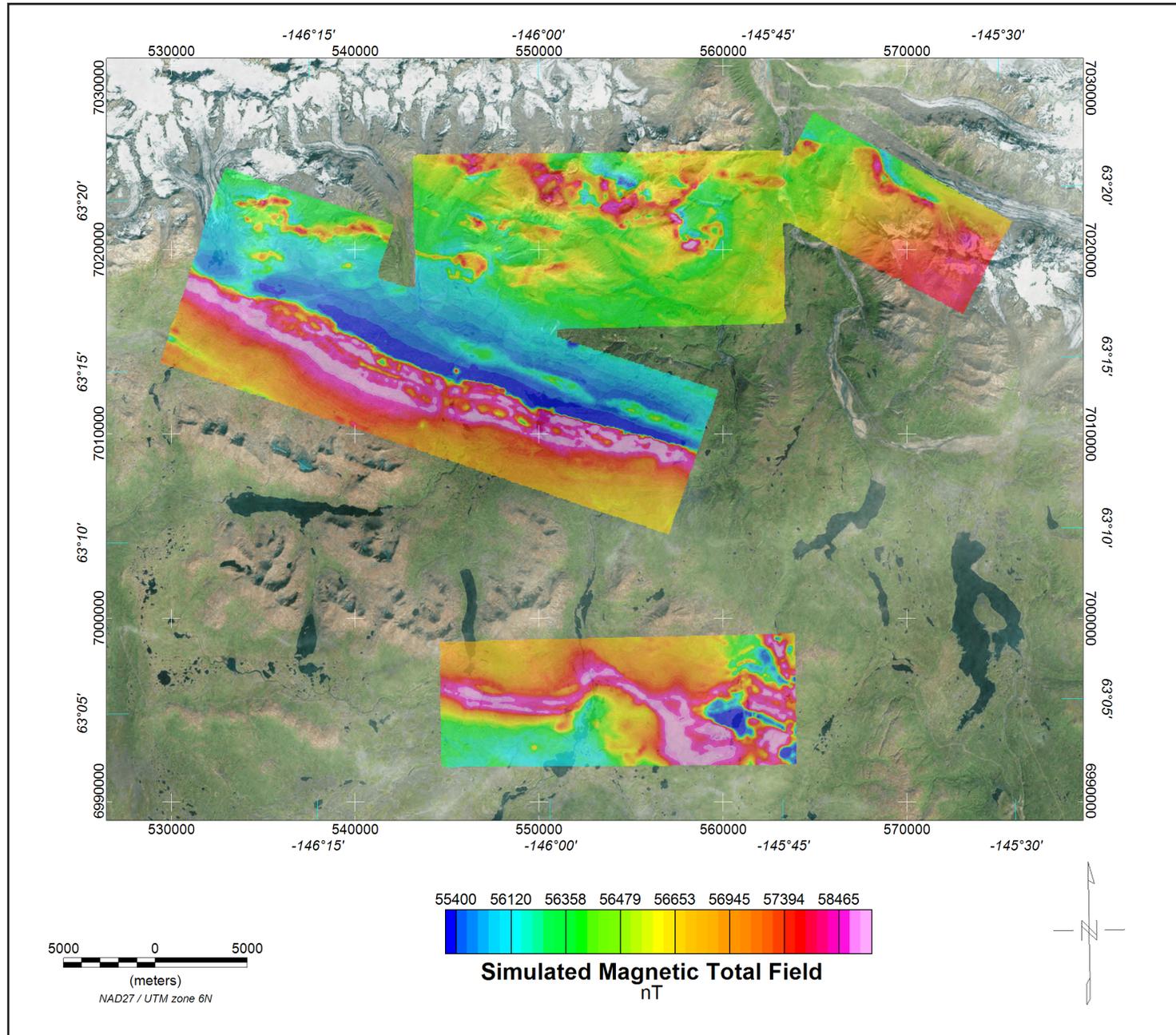


Figure 3. Simulated magnetic total field grid with orthometric image. The simulated magnetic total field data were created using digitally recorded data from a Scintrex cesium magnetometer. Data were collected at a sampling interval of 0.1 seconds. The magnetic data were (1) corrected for diurnal variations by subtracting the digitally recorded base station magnetic data, (2) IGRF corrected (IGRF model 2000, updated for date of flight and altimeter variations), (3) leveled to the tie line data, and (4) a constant value of approximately 57,000 nT was added to all data.

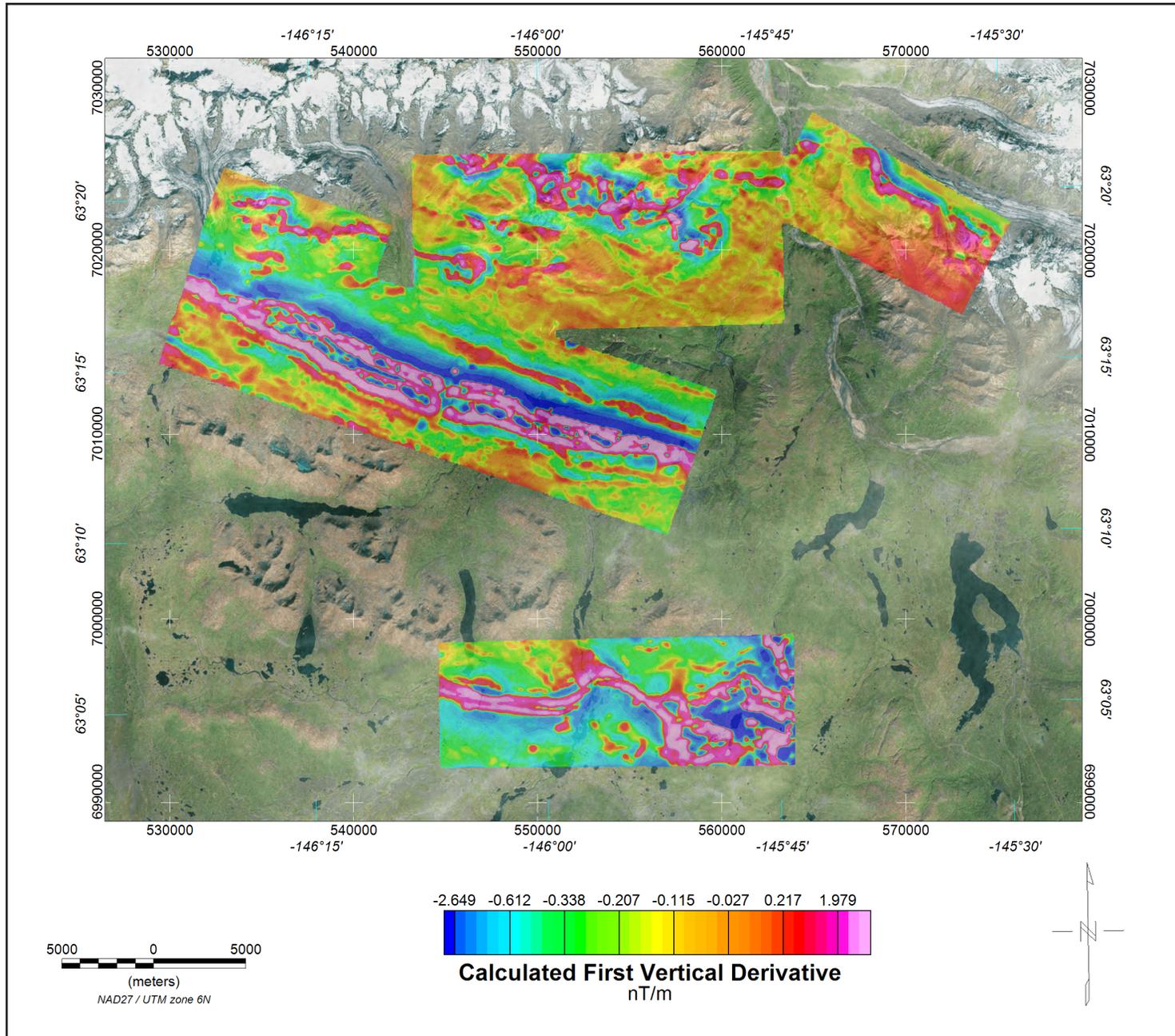


Figure 4. Calculated first vertical derivative grid with orthometric image. The first vertical derivative grid was calculated from the diurnally-corrected, IGRF-corrected total magnetic field grid using a FFT base frequency domain filtering algorithm. The resulting first vertical derivative grid provides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

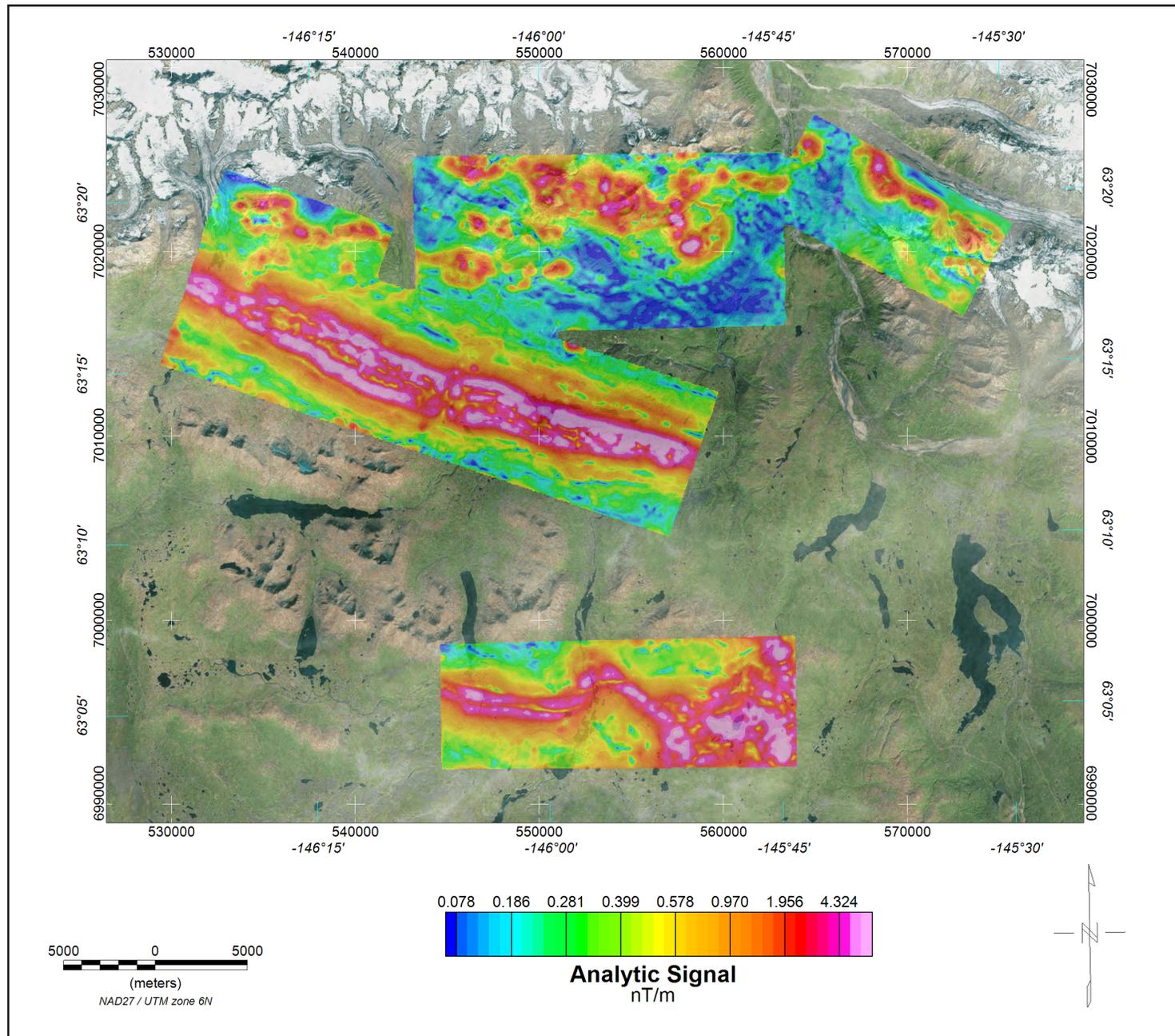


Figure 5. Analytic signal grid with orthometric image. Analytic signal is the total amplitude of all directions of magnetic gradient calculated from the sum of the squares of the three orthogonal gradients. Mapped highs in the calculated analytic signal of magnetic parameter locate the anomalous source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

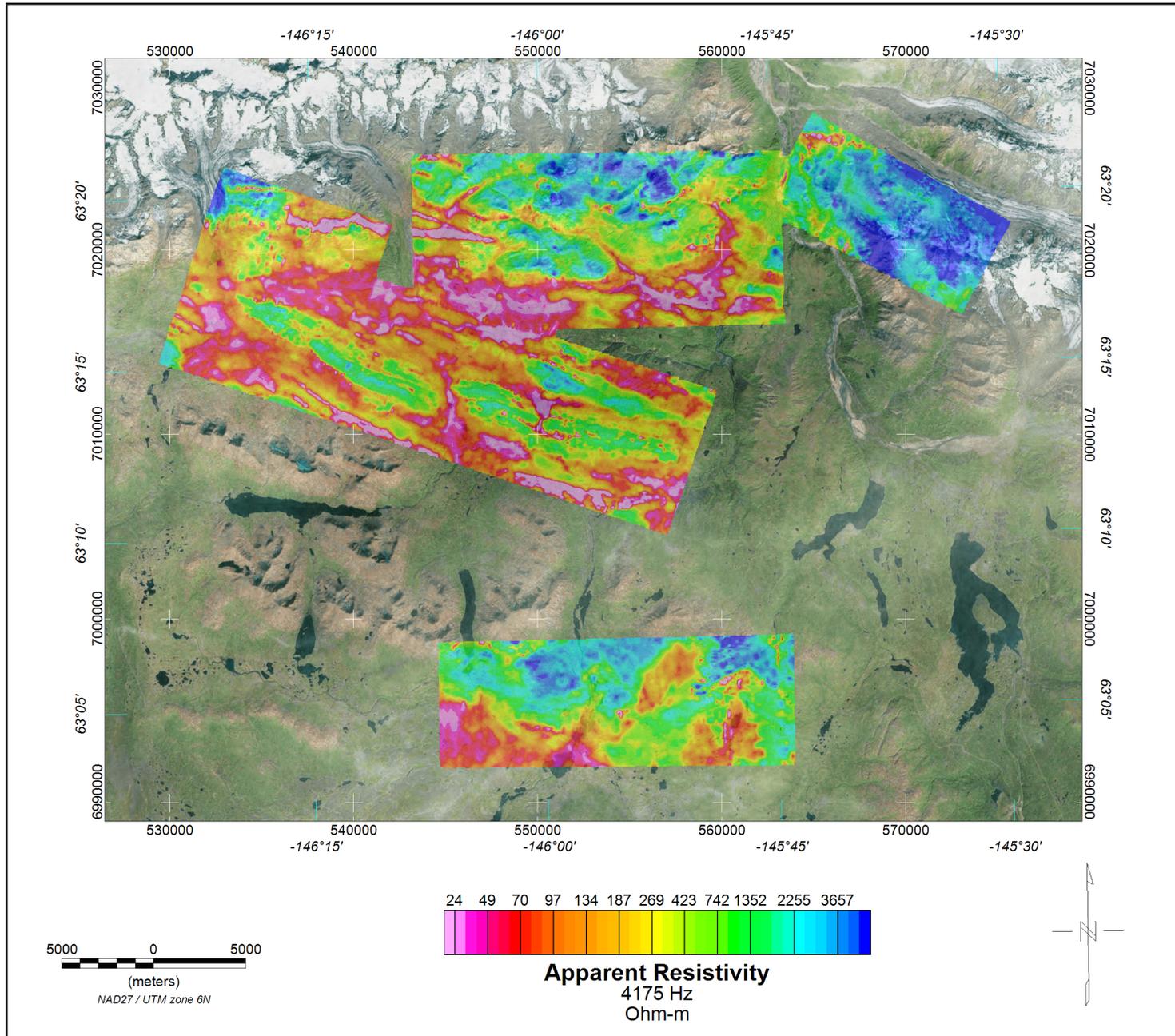


Figure 6. 4,175 Hz coplanar apparent resistivity grid with orthometric image. Analytic signal is the total amplitude of all directions of magnetic gradient calculated from the sum of the squares of the three orthogonal gradients. Mapped highs in the calculated analytic signal of magnetic parameter locate 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.

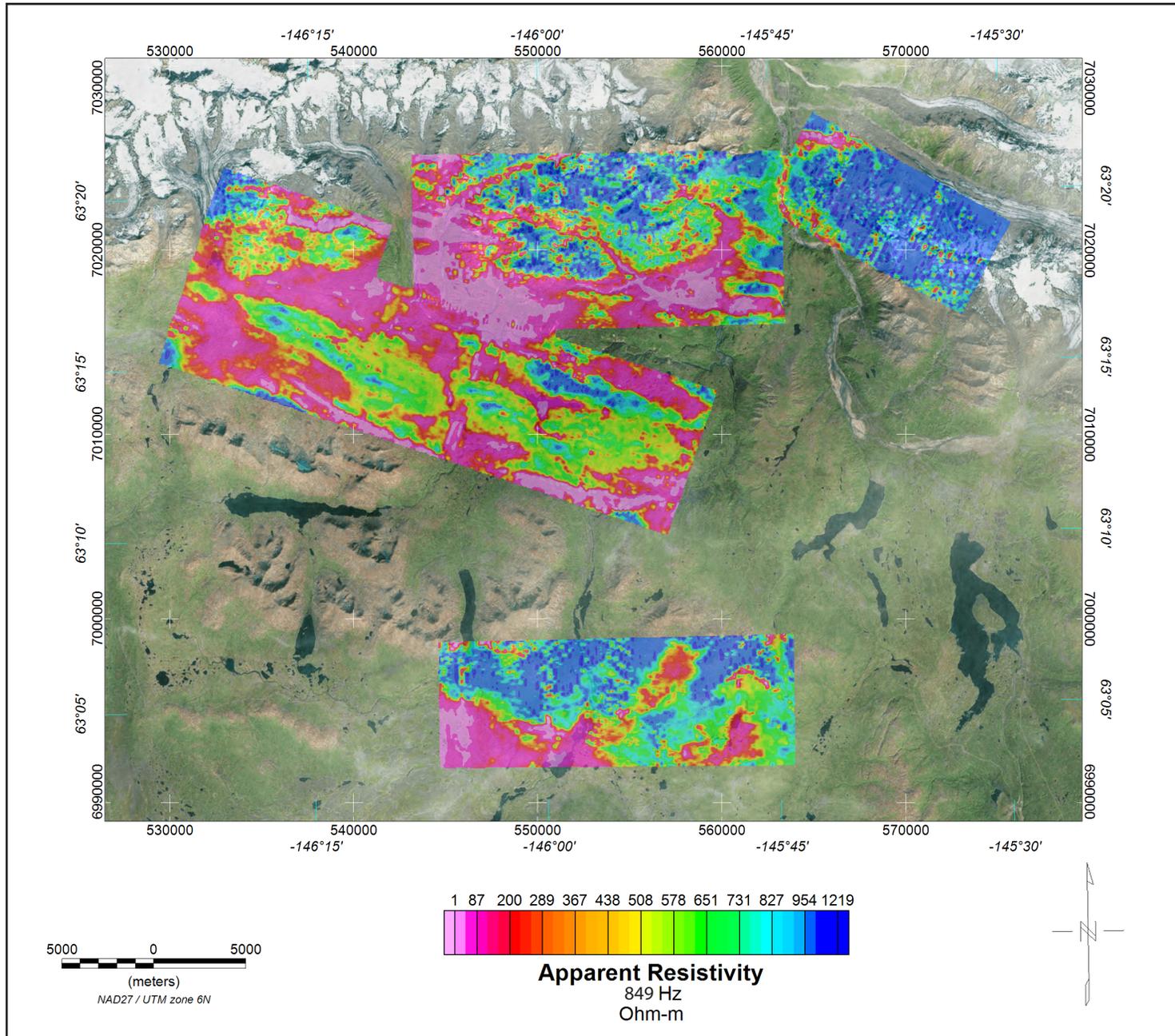


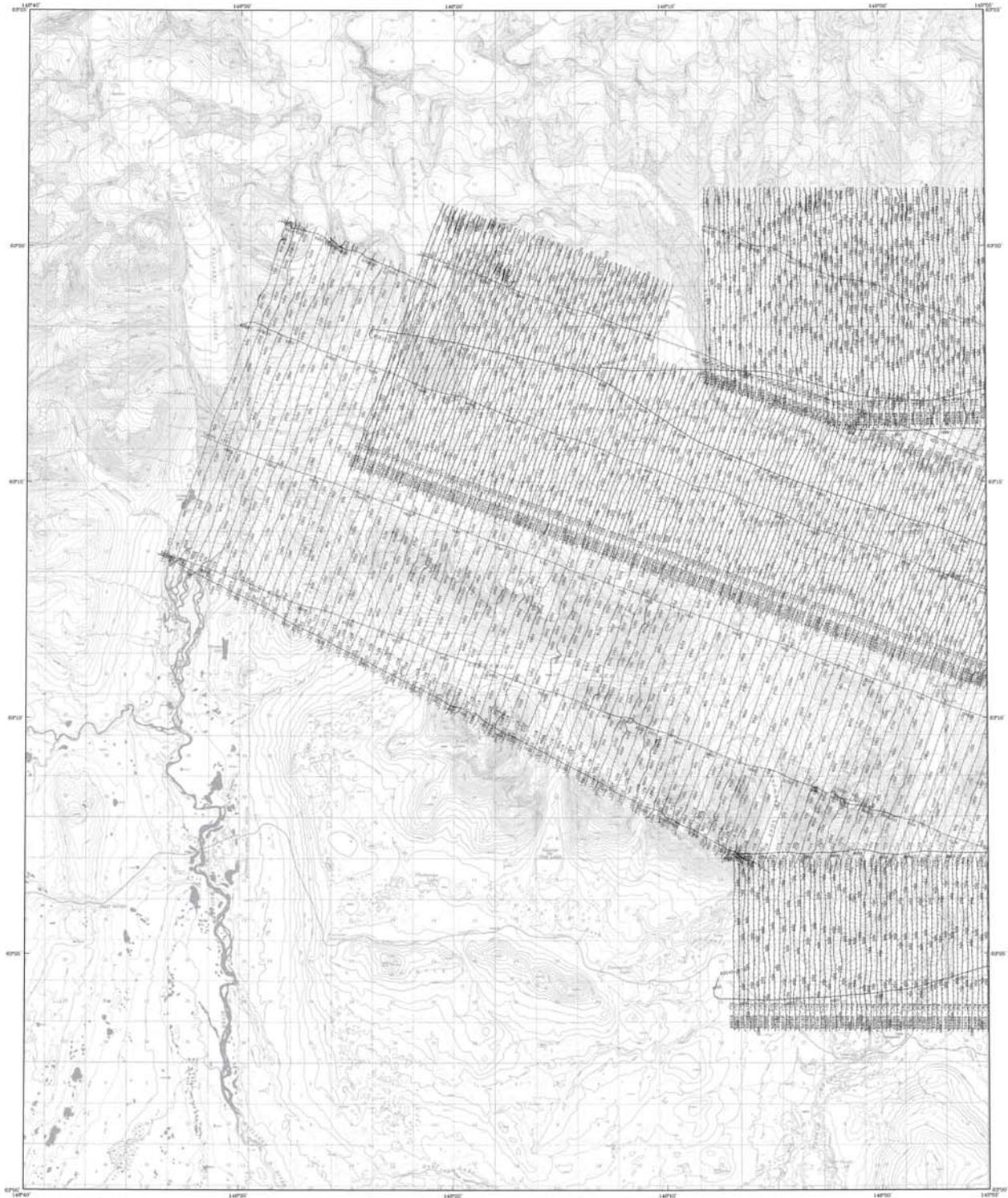
Figure 7. 849 Hz coplanar apparent resistivity grid with orthometric image. The Aerodat Condor EM system measured inphase and quadrature components at five frequencies. Two vertical coaxial coil-pairs operated at 936 and 4,476 Hz while three horizontal coplanar coil-pairs operated at 849, 4,189 and 32,490 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 845 Hz using the pseudo-layer half space model.

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/10.14509/30262>

Map Title	Description
southerndeltariver_flightlines_topo_map_1of2.pdf	flightlines with topographic base map
southerndeltariver_flightlines_topo_map_2of2.pdf	flightlines with topographic base map
southerndeltariver_sim_magtf_topo_map_1of2.pdf	simulated magnetic total field grid with topographic base map
southerndeltariver_sim_magtf_topo_map_2of2.pdf	simulated magnetic total field grid with topographic base map
southerndeltariver_sim_magtf_contours_plss_map_1of2.pdf	simulated magnetic total field grid with data contours and public land survey system base layer
southerndeltariver_sim_magtf_contours_plss_map_2of2.pdf	simulated magnetic total field grid with data contours and public land survey system base layer
southerndeltariver_sim_magtf_shaded_plss_map_1of2.pdf	color shaded simulated total magnetic field grid with public land survey system base layer
southerndeltariver_sim_magtf_shaded_plss_map_2of2.pdf	color shaded simulated total magnetic field grid with public land survey system base layer
southerndeltariver_res7200hz_topo_map_1of2.pdf	7,200 Hz apparent resistivity grid with topographic base map
southerndeltariver_res7200hz_topo_map_2of2.pdf	7,200 Hz apparent resistivity grid with topographic base map
southerndeltariver_res7200hz_contours_plss_map_1of2.pdf	7,200 Hz apparent resistivity grid with data contours and public land survey system base layer
southerndeltariver_res7200hz_contours_plss_map_2of2.pdf	7,200 Hz apparent resistivity grid with data contours and public land survey system base layer
southerndeltariver_res7200hz_bw_contours_plss_map_1of2.pdf	black and white 7,200 Hz apparent resistivity grid with data contours and public land survey system base layer
southerndeltariver_res7200hz_bw_contours_plss_map_2of2.pdf	black and white 7,200 Hz apparent resistivity grid with data contours and public land survey system base layer
southerndeltariver_res900hz_topo_map_1of2.pdf	900 Hz apparent resistivity grid with topographic base map
southerndeltariver_res900hz_topo_map_2of2.pdf	901 Hz apparent resistivity grid with topographic base map
southerndeltariver_res900hz_contours_plss_map_1of2.pdf	900 Hz apparent resistivity grid with data contours and public land survey system base layer
southerndeltariver_res900hz_contours_plss_map_2of2.pdf	901 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/10.14509/30262>

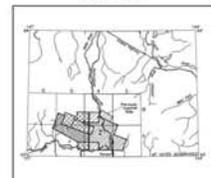
Map Title	Description
southerndeltariver_res900hz_bw_contours_plss_map_1of2.pdf	black and white 900 Hz apparent resistivity grid with data contours and public land survey system base layer
southerndeltariver_res900hz_bw_contours_plss_map_2of2.pdf	black and white 900 Hz apparent resistivity grid with data contours and public land survey system base layer
southerndeltariver_emanomalies_sim_magtf_contours_plss_map_1of2.pdf	em anomalies with simulated total magnetic field grid data contours and public land survey system base layer
southerndeltariver_emanomalies_sim_magtf_contours_plss_map_2of2.pdf	em anomalies with simulated total magnetic field grid data contours and public land survey system base layer
southerndeltariver_emanomalies_sim_magtf_contours_detailed_topo_map_1of7.pdf	detailed em anomalies with simulated total magnetic field grid data contours and topographic base map
southerndeltariver_emanomalies_sim_magtf_contours_detailed_topo_map_2of7.pdf	detailed em anomalies with simulated total magnetic field grid data contours and topographic base map
southerndeltariver_emanomalies_sim_magtf_contours_detailed_topo_map_3of7.pdf	detailed em anomalies with simulated total magnetic field grid data contours and topographic base map
southerndeltariver_emanomalies_sim_magtf_contours_detailed_topo_map_4of7.pdf	detailed em anomalies with simulated total magnetic field grid data contours and topographic base map
southerndeltariver_emanomalies_sim_magtf_contours_detailed_topo_map_5of7.pdf	detailed em anomalies with simulated total magnetic field grid data contours and topographic base map
southerndeltariver_emanomalies_sim_magtf_contours_detailed_topo_map_6of7.pdf	detailed em anomalies with simulated total magnetic field grid data contours and topographic base map
southerndeltariver_emanomalies_sim_magtf_contours_detailed_topo_map_7of7.pdf	detailed em anomalies with simulated total magnetic field grid data contours and topographic base map
southerndeltariver_interpretation_plss_map_1of2.pdf	interpretation with public land survey system base layer
southerndeltariver_interpretation_plss_map_2of2.pdf	interpretation with public land survey system base layer
southerndeltariver_dem_contours_plss_map_1of2.pdf	digital elevation grid with contours and public land survey system base layer
southerndeltariver_dem_contours_plss_map_2of2.pdf	digital elevation grid with contours and public land survey system base layer



See Also U.S. Geological Survey Map No. 1-1000, 4-1000, 5-1000, 6-1000, 7-1000, 8-1000, 9-1000, 10-1000, 11-1000, 12-1000, 13-1000, 14-1000, 15-1000, 16-1000, 17-1000, 18-1000, 19-1000, 20-1000, 21-1000, 22-1000, 23-1000, 24-1000, 25-1000, 26-1000, 27-1000, 28-1000, 29-1000, 30-1000, 31-1000, 32-1000, 33-1000, 34-1000, 35-1000, 36-1000, 37-1000, 38-1000, 39-1000, 40-1000, 41-1000, 42-1000, 43-1000, 44-1000, 45-1000, 46-1000, 47-1000, 48-1000, 49-1000, 50-1000, 51-1000, 52-1000, 53-1000, 54-1000, 55-1000, 56-1000, 57-1000, 58-1000, 59-1000, 60-1000, 61-1000, 62-1000, 63-1000, 64-1000, 65-1000, 66-1000, 67-1000, 68-1000, 69-1000, 70-1000, 71-1000, 72-1000, 73-1000, 74-1000, 75-1000, 76-1000, 77-1000, 78-1000, 79-1000, 80-1000, 81-1000, 82-1000, 83-1000, 84-1000, 85-1000, 86-1000, 87-1000, 88-1000, 89-1000, 90-1000, 91-1000, 92-1000, 93-1000, 94-1000, 95-1000, 96-1000, 97-1000, 98-1000, 99-1000, 100-1000



LOCATION INDEX



FLIGHT LINES OF THE SOUTHERN DELTA RIVER AREA, EAST-CENTRAL ALASKA PARTS OF MT. HAYES QUADRANGLE 2003

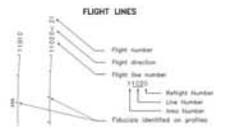
DESCRIPTIVE NOTES

The geophysical data were acquired with a GEODETIC Electromagnetic (EM) system and a Sibley camera magnetometer. Data were flown at a height of 100 feet above the terrain. Flights were performed with an AS350B-2 Squire helicopter at a mean terrain clearance of 200 feet along 1000-foot survey flight lines with a spacing of a quarter of a mile. The lines were flown perpendicular to the flight lines at intervals of approximately 3 miles.

An ANTECH Q224 MAGNETIC or GEODETIC 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 5 m. Flight path locations were projected onto the Clarke 1866 UTM zone 10 westward, 1927 North American datum using a central meridian (CM) of 141° 00' 00" west, a false easting of 500,000 meters, and a scale constant of 500,000. Horizontal accuracy of the coordinate data is better than 10 m with respect to the UTM grid.

PREVIOUSLY SURVEYED AREAS

The previously acquired geophysical data were acquired with an aerial Geometric (EM) system and a Sibley camera magnetometer. The electromagnetic system utilized a 100-foot altitude at 840 Hz and 8475 Hz and three horizontal air points at 840 Hz, 4,170 Hz and 52,450 Hz. Mean terrain clearance for the magnetometer and EM system were slightly higher than 100 and 100 feet, respectively. In addition, the survey recorded data from a radar altimeter, GPS navigation system, 60 Hz magnetic and video camera. The GPS electronic positioning system operated in differential mode. The flight line direction varies from north to south on various courses 1000', 2000', 3000' and 4000'. The flight lines were one-eighth mile apart. Extended to lines were flown with the current survey which cover both the 1988 and 2002 survey areas. The older survey was flown with an AS350B2 helicopter.

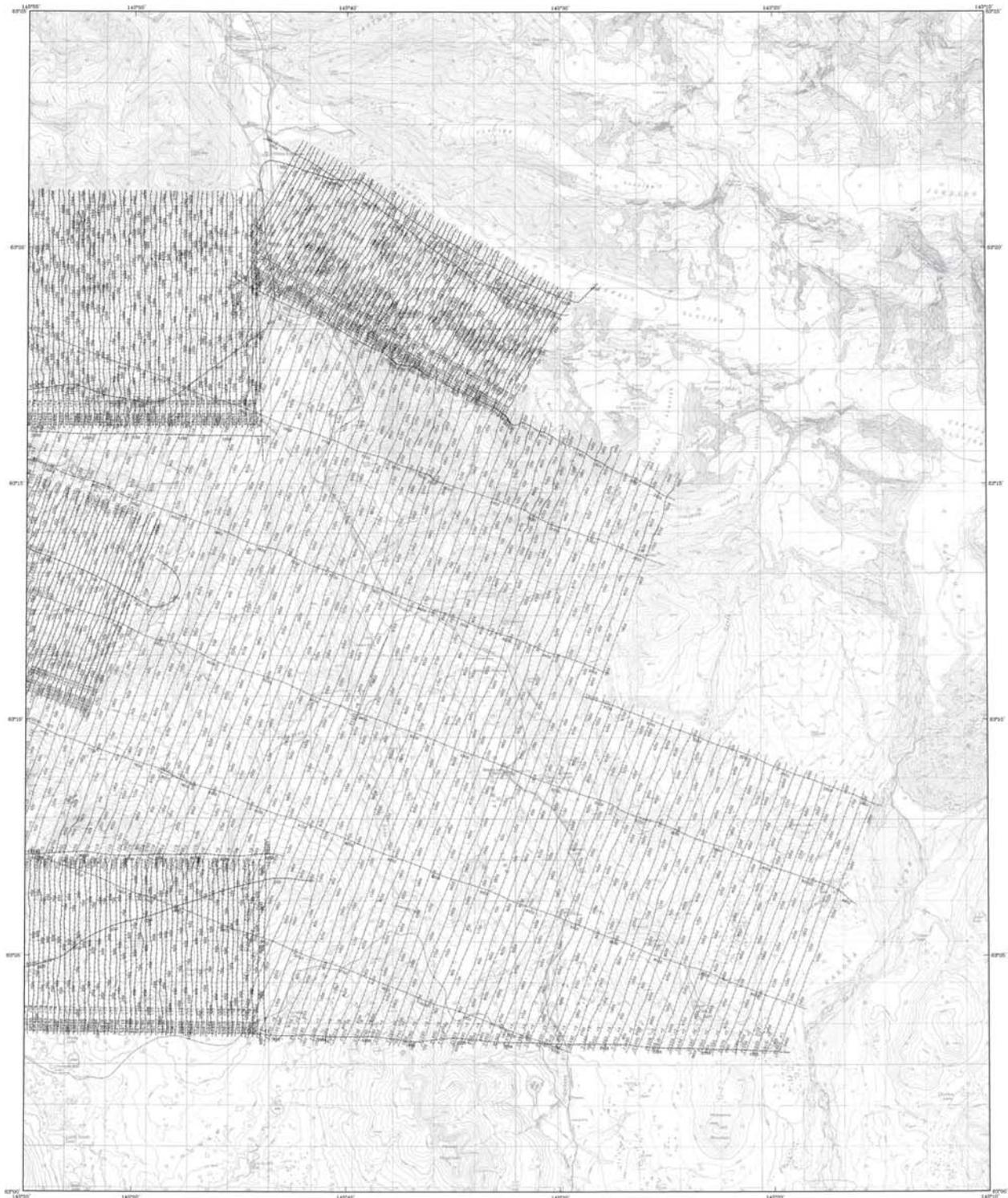


SURVEY HISTORY

This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources, Bureau of Geological & Geophysical Surveys (BGG), and the Bureau of Land Management, U.S. Geological Survey. Geophysical data for the current area were acquired and processed by Fugro Airborne Surveys in 2002. Additional geophysical data for the Central Delta, Fish Lake Basin and Tangle Lake areas were acquired in 1988 by the BGG and were previously funded by the U.S. Department of Interior, Bureau of Land Management (BLM) and conducted in support of its mineral assessment program in the Delta River mining district. Laurel Barnes was the contract manager for BGG.

This map and other products from this survey are available by mail order or in person from: BGG, 714 University Ave., Suite 205, Fairbanks, Alaska, 99701. Some products are also available in person only at the BLM's Junction Mining Information Center, 150 Seward Blvd., Junction, Alaska, 99824.

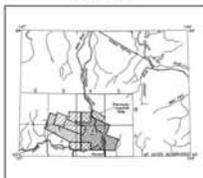




Base from U.S. Geological Survey Map No. 6-1085, 1:40,000
U.S. GEOLOGICAL SURVEY



LOCATION INDEX



FLIGHT LINES OF THE SOUTHERN DELTA RIVER AREA, EAST-CENTRAL ALASKA

PARTS OF MT. HAYES QUADRANGLE
2003

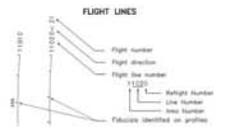
DESCRIPTIVE NOTES

The geophysical data were acquired with a GEODETIC Electromagnetic (EM) system and a Siblex dual magnetometer. Data were flown at a height of 100 feet above the terrain. The EM system consists of a Siblex dual magnetometer, GPS navigation system, 50/50 Hz receiver and transmitter. Flights were performed with an AS350B-2 Super helicopter at a mean terrain clearance of 200 feet above MDT. Survey flight lines with a spacing of a quarter of a mile. The lines were flown perpendicular to the flight lines at intervals of approximately 3 miles.

An ARISTON Q224 INERTIAL / GYROSCOPE Oriented Positioning System was used for navigation. The helicopter was leveled every 2.5 seconds using post-flight differential positioning to a relative accuracy of better than 5 m. Flight path positions were projected onto the Clarke 1866 UTM zone 10 westward, 1927 North American datum using a central meridian (CM) of 147° 00' 00" west longitude and an east constant of 500,000 meters. Accuracy of the projected data is better than 10 m with respect to the UTM grid.

PREVIOUSLY SURVEYED AREAS

The previously acquired geophysical data were acquired with an aerial Geometric (EM) system and a Siblex dual magnetometer. The electromagnetic system utilized four channel dual coils at 845 Hz and 8475 Hz and three horizontal coil pairs at 845 Hz, 4,175 Hz and 21,475 Hz. Mean terrain clearance for the magnetometer and EM system were slightly higher than 100 and 100 feet, respectively. In addition, the survey recorded data from a radar altimeter, GPS navigation system, 50 Hz receiver and transmitter. The GPS electronic positioning system operated in differential mode. The flight line location varies from south to north on profiles. Contour 10000, Contour 11000, and Fish Lake 1027E and Fish Lake and Tongue Lake 10-5. The flight lines were one-eighth mile apart. Extended to lines were flown with the current survey which cover both the 1988 and 2002 survey areas. The older survey was flown with a AS350B2 helicopter.

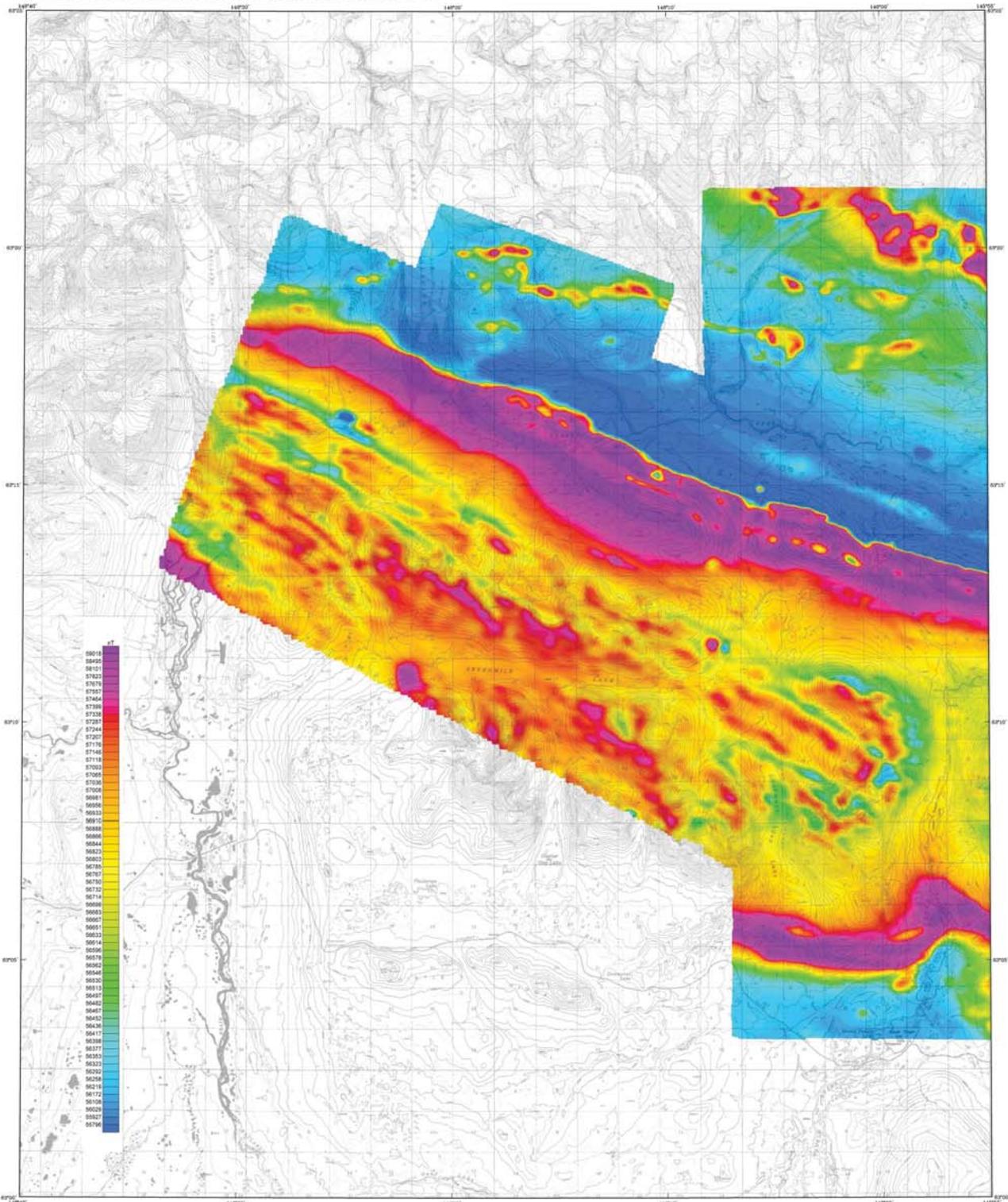


SURVEY HISTORY

This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources, Bureau of Geological & Geophysical Surveys (DGG), and Stevens Exploration Management Corporation. Geophysical data for the current survey were acquired and processed by Fugro Airborne Surveys in 2002. Additional geophysical data for the Colville Delta, Fish Lake Basin and Tongue Lake areas were acquired in 1988 by Aerilog Inc. and were previously funded by the U.S. Department of Interior, Bureau of Land Management (BLM) and conducted as part of its mineral assessment program in the Delta River mining district. Latest BLM file the contract number for DGG.

This map and other products from this survey are available by mail order or in person from DGG, 714 University Ave., Suite 205, Fairbanks, Alaska, 99701. Some products are also available in person only at the BLM's Junction Mining Information Center, 100 Seward Drive, Junction, Alaska, 99824.





Base Data: US Geological Survey, 1:50,000 Scale, 1988, 1:50,000



TOTAL MAGNETIC FIELD OF THE SOUTHERN DELTA RIVER AREA, EAST-CENTRAL ALASKA

PARTS OF MT. HAYES QUADRANGLE
2003

DESCRIPTIVE NOTES

The geophysical data were acquired with a DINGEM[®] Electromagnetic (EM) system and a Scintrex cesium magnetometer. Both were flown at a height of 100 feet. In addition the survey recorded data from a radar altimeter, GPS navigation system, DG/RO Hz magnetic and compass correction. Flights were performed with an AS350B-2 5000 feet empty weight helicopter at a mean terrain clearance of 200 feet using NAD83 survey flight lines with a spacing of a quarter mile. The lines were flown perpendicular to the flight lines at intervals of approximately 2 miles.

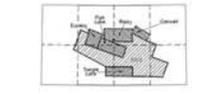
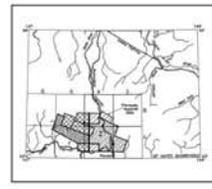
An Ashtech DG24 NAVSTAR / GLOPASS Global Positioning System was used for navigation. The helicopter position was derived every 0.5 seconds using post-flight differential positioning to a real-time accuracy of better than 2 m. Flight 6000 elevations were projected onto the Contour 188 (UTM zone 6) spheroid, 1927 North American datum using a central meridian of 147° 0' 0" and an east constant of 500,000. Positional accuracy of the recorded data is better than 10 m with respect to the UTM grid.

PREVIOUSLY SURVEYED AREAS

The previously acquired geophysical data were acquired with an Aercon Coda Octopus (CO) system and a Scintrex cesium magnetometer. The electromagnetic system used was a 100 Hz and 4.476 Hz and three horizontal coil pairs at 849 Hz, 4.180 Hz and 32.460 Hz. These former operations for the magnetometer and EM system were slightly higher than 100 and 100 feet, respectively. In addition the survey recorded data from a radar altimeter, GPS navigation system, DG/RO Hz magnetic and compass correction. The GPS navigation system consisted of differential mode. The flight line direction varies from north to south to the Contour 188C, Eureka and Fish Lake N207E, and Rano and Tangle Lake N-C. The flight lines were perpendicular to the flight lines with the current survey which cover both the 1905 and 2002 survey areas. The other survey was flown with an AS350B2 helicopter.

TOTAL MAGNETIC FIELD

The total magnetic field 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) windowed to the low end data, and (3) interpolated onto a regular 100 m grid using a modified spline (1970) technique. The regional variation (or IGRF gradient, 2000, updated to August 2002) was removed from the leveled magnetic data.

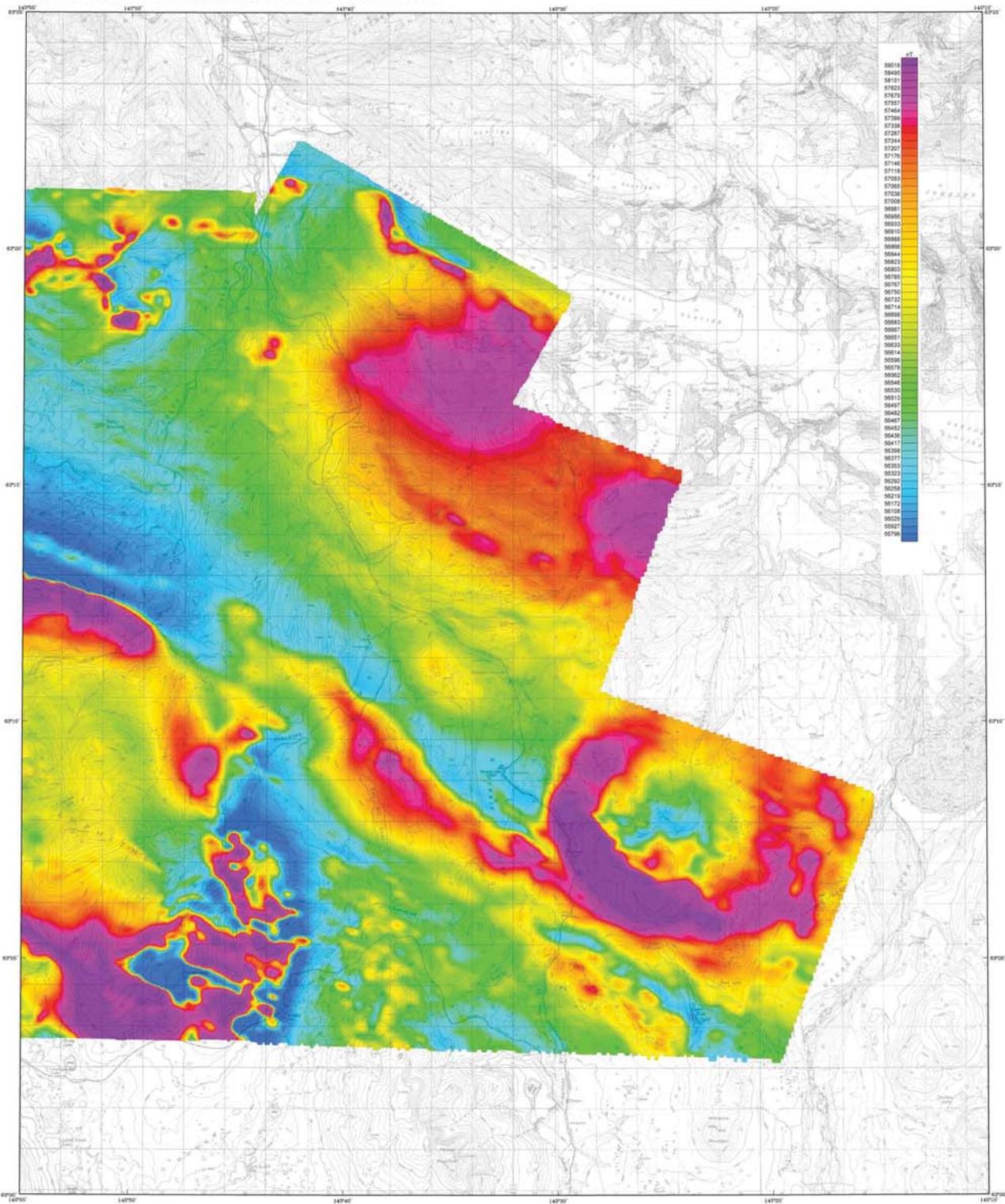


SURVEY HISTORY

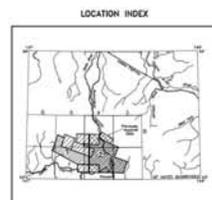
This map has been compiled and derived under contract between the State of Alaska, Department of Natural Resources, Division of Geological & Geophysical Survey (DGGG), and Stevens Exploration Management Corp. Airborne geophysical data for the current area were acquired and processed by Fugro Airborne Surveys in 2002. Airborne geophysical data for the Contour 188C, Eureka, Fish Lake N207E, and Rano Lake areas were provided by the U. S. Department of Interior, Bureau of Land Management (BLM) and conducted in support of its mineral assessment program in the Delta River mining district. Loren Burns was the contract manager for DGGG.

This map and other products from this survey are available by mail order or in person from 2002, 794 University Ave., Suite 200, Fairbanks, Alaska 99709. Some products are also available in person only at the BLM's Juneau Mineral Information Center, 100 Seward Road, Douglas, Alaska 99824.





Base Data: U.S. Geological Survey, 1:50,000 Scale, 1988



TOTAL MAGNETIC FIELD OF THE SOUTHERN DELTA RIVER AREA, EAST-CENTRAL ALASKA PARTS OF MT. HAYES QUADRANGLE 2003

DESCRIPTIVE NOTES

The geophysical data were acquired with a DIGHEM[®] Electromagnetic (EM) system and a Scintrex cesium magnetometer. Both were flown at a height of 100 feet. In addition the survey recorded data from a radar altimeter, GPS navigation system, 50/70 Hz magnetic and compass. Flight was performed with an AS350B-2 Superpuma helicopter at a mean terrain clearance of 200 feet along 120°E survey flight lines with a spacing of a quarter of mile. The lines were flown perpendicular to the flight lines at intervals of approximately 2 miles.

An Ashtech D024 NAVSTAR / GLOPASS 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 2 m. Flight 8000 elevations were projected onto the Contour 188 (UTM zone 6) sphere03, 1927 North American datum using a contour projection (100 of 147) a north constant of 0 and an east constant of 500,000. Positional accuracy of the projected data is better than 10 m with respect to the UTM grid.

PREVIOUSLY SURVEYED AREAS

The previously acquired geophysical data were acquired with an Aeromagnetic Electromagnetic (EM) system and a Scintrex cesium magnetometer. The electromagnetic system used two vertical coil pairs at 4.5 Hz and 4.476 Hz and three horizontal coil pairs at 848 Hz, 4,180 Hz and 32,460 Hz. These former operations for the magnetometer and EM system were slightly higher than 100 and 150 feet, respectively. In addition the survey recorded data from a radar altimeter, GPS navigation system, 50 Hz magnetic and video camera.

The GPS electronic positioning system consisted in differential mode. The flight line direction varies from north to north to Tongue Lake N07E; Luruk and Fish Lake N20°E; and Rainy and Tongue Lake N-C. The flight lines were one-quarter mile apart. Extended to lines were flown with the current survey which cover both the 1905 and 2002 survey areas. The other survey was flown with a AS350B2 helicopter.

TOTAL MAGNETIC FIELD

The total magnetic field 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) windowed to the low end data; and (3) interpolated onto a regular 100 m grid using a modified spline (1970) technique. The regional variation (or IGRF gradient, 2000, updated to August 2002) was removed from the leveled magnetic data.

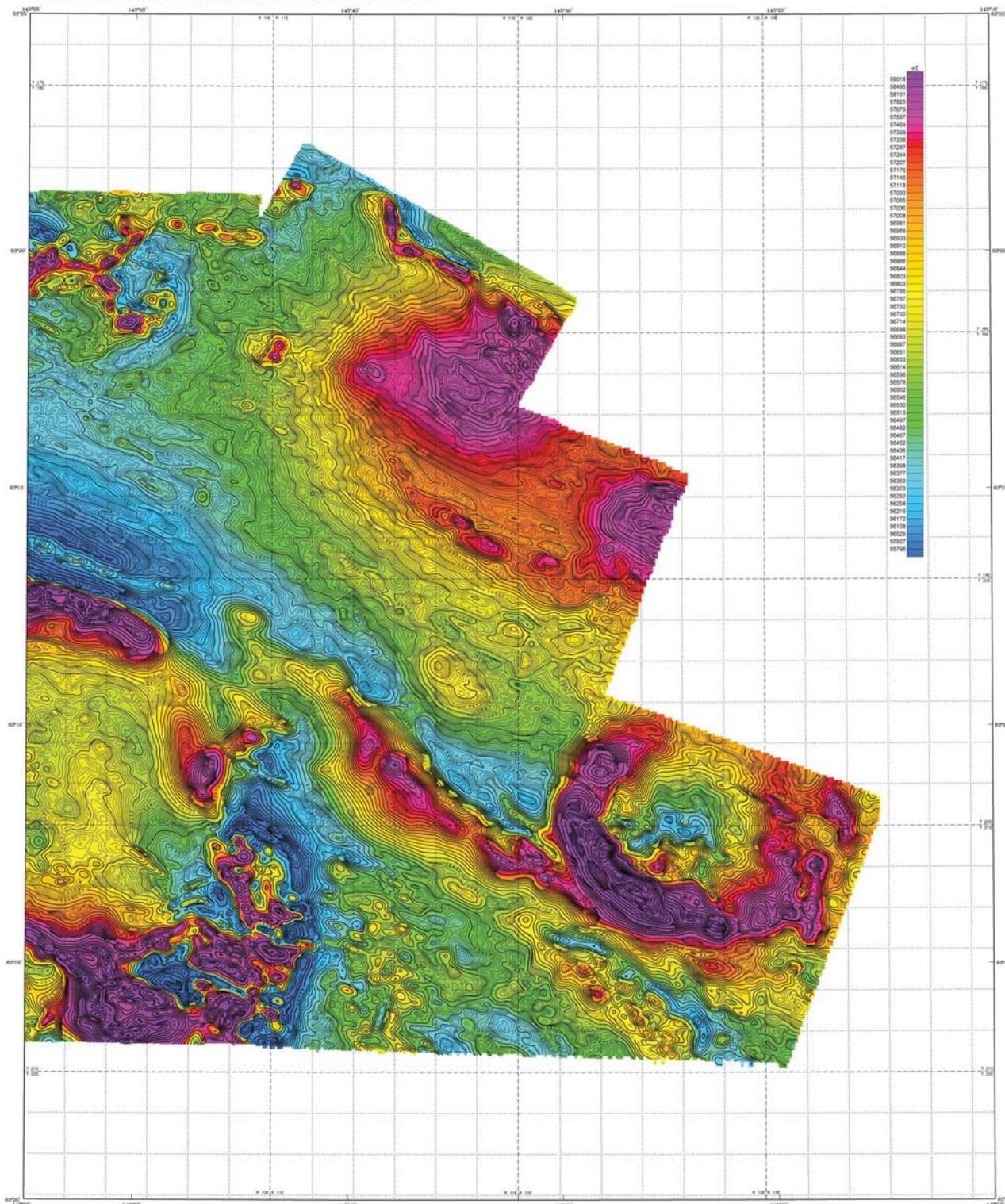
Alaska, U.S. 147°E, a true meridian of observation and altitude data are based on the datum of 1973. The U.S. datum is based on the datum of 1973. The U.S. datum is based on the datum of 1973.

SURVEY HISTORY

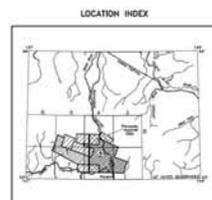
This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources, Division of Geological & Geophysical Survey (DGGG), and Stevens Exploration Management Corp. Airborne geophysical data for the current area were acquired and processed by Fugro Airborne Surveys in 2002. Airborne geophysical data for the Contour 188 area, Fish Lake, Tongue Lake, and Rainy Lake were acquired in 1995 by Aerotech Inc. and were provided for publication by DGGG. The data were collected and funded by the U. S. Department of Interior, Bureau of Land Management (BLM) and conducted in support of its mineral assessment program in the Delta River mining district. Lower Basin was the contract manager for DGGG.

This map and other products from this survey are available by mail order or in person from DGGG, 794 University Ave., Suite 200, Fairbanks, Alaska, 99776. Some products are also available in person only at the BLM's Juneau Mineral Information Center, 100 Seward Road, Douglas, Alaska, 99824.





Source: Alaska State Geological Survey, File No. 1-8-2003-1-4-2003



TOTAL MAGNETIC FIELD OF THE SOUTHERN DELTA RIVER AREA, EAST-CENTRAL ALASKA

PARTS OF MT. HAYES QUADRANGLE
2003

DESCRIPTIVE NOTES

The geophysical data were acquired with a DCHM[®] Electromagnetic (EM) system and a Scintrex cesium magnetometer. Both were flown at a height of 100 feet. In addition the survey recorded data from a radar altimeter, GPS navigation system, 50/70 Hz monitors and cable compass. Flights were performed with an AS350B-2 Squirrel helicopter at a mean terrain clearance of 200 feet along 1420'E survey flight lines with a spacing of 1/4 quarter of a mile. The lines were flown perpendicular to the flight lines at intervals of approximately 3 miles. An Ashtech 0224 NAVSTAR / GLONAVIS Global Positioning System was used for navigation. The helicopter position was derived every 0.5 seconds using post-flight differential positioning to a reference accuracy of better than 2 m. Flight 8000 elevations were projected onto the Clarke 1881 UTM zone 6 northern 1927 North American datum using a world meridian (WGS 84) of 147° 0 north constant of 0 and an east constant of 500,000. Positional accuracy of the projected data is better than 10 m with respect to the UTM grid.

PREVIOUSLY SURVEYED AREAS

The previously acquired geophysical data were acquired with an Aeromagnetic System (AS) system and a Scintrex cesium magnetometer. The electromagnetic system utilized two vertical coil pairs of 150 Hz and 4.476 Hz and three horizontal coil pairs of 849 Hz, 4.188 Hz and 32.640 Hz. These former operations for the magnetometer and EM system were slightly higher than 100 and 150 feet, respectively. In addition the survey recorded data from a radar altimeter, GPS navigation system, 50 Hz monitor and cable compass. The GPS electronic positioning system recorded in differential mode. The flight line direction varies from north to south as shown on the map. Flights were flown over Fish Lake 1420'E, and Rainy and Tongue Lake 1420'E. The flight lines were one-quarter mile apart. Extended to lines were flown with the current survey which cover both the 1905 and 2002 survey areas. The other survey was flown with a AS350B2 helicopter.

TOTAL MAGNETIC FIELD

The total magnetic field data were acquired with a sampling interval of 0.1 seconds, and were (1) corrected for diurnal variations by subtraction of (2) waded to the low tide data, and (3) interpolated onto a regular 100 m grid using a modified spline (1970) technique. The regional variation (or IGRF gradient, 2000, updated to August 2002) was removed from the leveled magnetic data.

Notes: 1. 2003 is a time interval of observation and position error. 2. 1970 is a time interval of observation and position error. 3. 1970 is a time interval of observation and position error.

MAGNETIC CONTOUR INTERVAL

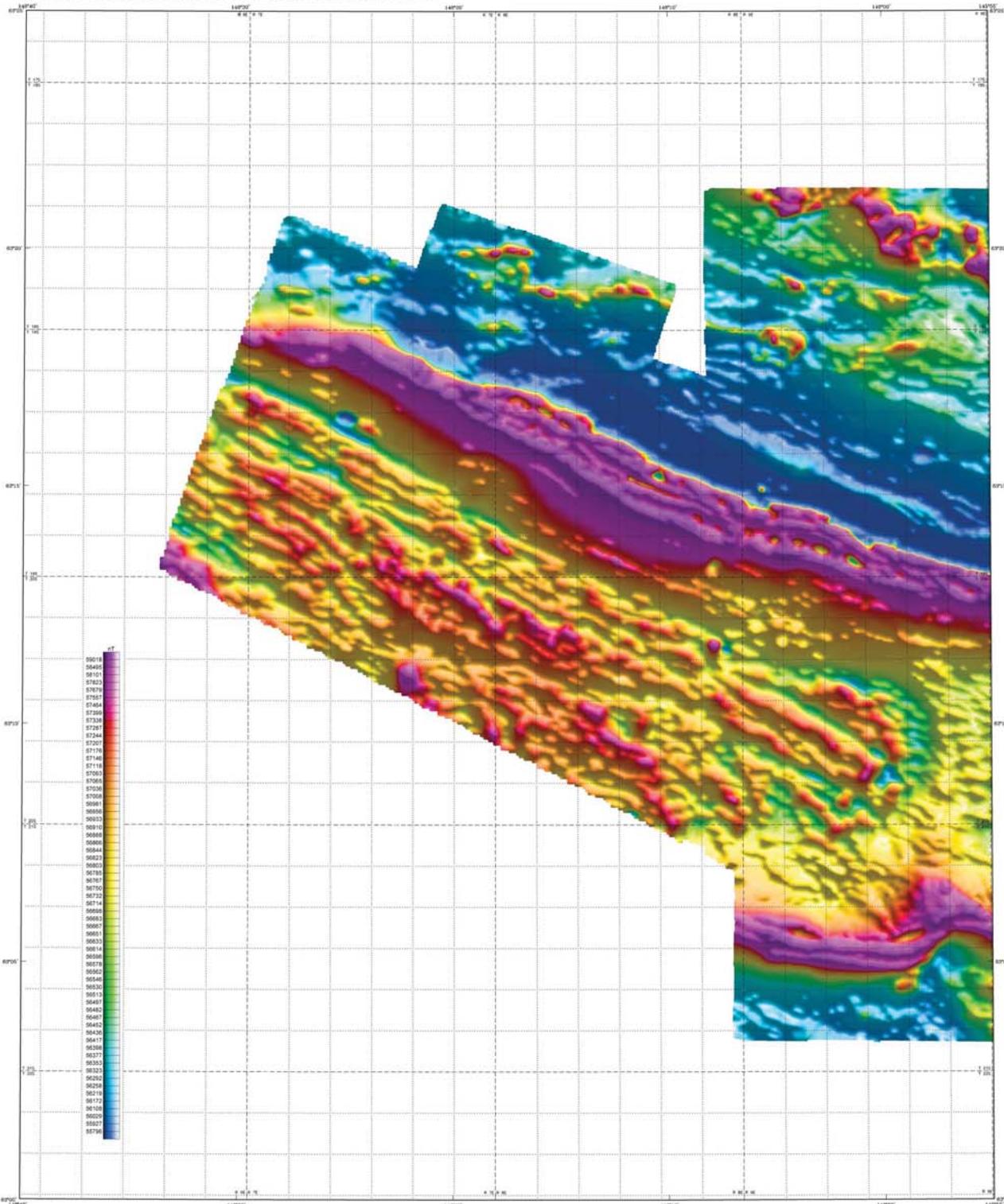
- 250 ft
- 50 ft
- 10 ft
- 5 ft

SURVEY HISTORY

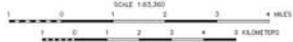
This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources, Division of Geological & Geophysical Survey (DGGS), and Stevens Exploration Management Corp. Airborne geophysical data for the current area were acquired and processed by Fugro Airborne Surveys in 2002. Airborne geophysical data for the Central, Eastern, and Western Delta River areas were acquired in 1995 by Aerotech Inc. and were provided for publication by DGGS. The current survey was funded by the U. S. Department of Interior, Bureau of Land Management (BLM) and conducted in support of its mineral assessment program in the Delta River mining district. Laurel Burns was the contract manager for DGGS.

This map and other products from this survey are available by mail order or in person from DGGS, 794 University Ave., Suite 200, Fairbanks, Alaska, 99776. Some products are also available in person only at the BLM's Alaska Mineral Information Center, 100 Banks Road, Douglas, Alaska, 99824.





Geophysical Data were collected under the supervision of J. L. Burt, Jr. and J. L. Burt, Jr.



LOCATION INDEX



COLOR SHADOW TOTAL MAGNETIC FIELD OF THE SOUTHERN DELTA RIVER AREA, EAST-CENTRAL ALASKA

PARTS OF MT. HAYES QUADRANGLE

2003

Sun Azimuth: 20 degrees
Inclination: 30 degrees

DESCRIPTIVE NOTES

The geophysical data were acquired with a DIXIEH™ Electromagnetic (EM) system and a Geotek cesium magnetometer. Both were flown at a height of 100 feet. In addition to the survey, recorded data from a radar altimeter, GPS navigation system, 50/70 Hz magnetic and video camera. Flights were performed with an AS350B-2 Squirrel helicopter at a mean terrain clearance of 200 feet using 420°E survey flight lines with a spacing of a quarter of a mile. The lines were flown perpendicular to the flight lines at intervals of approximately 2 miles. An Ashtech D224 NAVSTAR / GLONAVIS Global Positioning System was used for navigation. The helicopter position was derived every 0.5 seconds using post-flight differential positioning to a reference station of better than 3 m. Flight 8000 elevations were projected onto the UTM 1880 (UTM zone 6) datum, 1927 North American datum using a control method (3) of 147° north constant of 0 and an east constant of 500,000. Positional accuracy of the recorded data is better than 10 m with respect to the UTM grid.

PREVIOUSLY SURVEYED AREAS

The previously acquired geophysical data were acquired with an Ashtech D224 NAVSTAR / GLONAVIS Global Positioning System and a Geotek cesium magnetometer. The electromagnetic system used for vertical magnetic data at 50 Hz and 4.475 Hz and three horizontal coil pairs at 849 Hz, 4.188 Hz and 32.640 Hz. These three horizontal coil pairs and the magnetometer and EM system were slightly higher than 100 and 100 feet, respectively. In addition to the survey, recorded data from a radar altimeter, GPS navigation system, 50 Hz magnetic and video camera. The GPS navigation system recorded in differential mode. The flight line direction varies from north to south as shown on the map. Locations of Fish Lake 420°E, and Rainy and Tongue Lake N-S. The flight lines were one-quarter mile apart. Extended to the west from the current survey which cover both the 1955 and 2002 survey areas. The other survey was flown with a AS350B2 helicopter.

TOTAL MAGNETIC FIELD

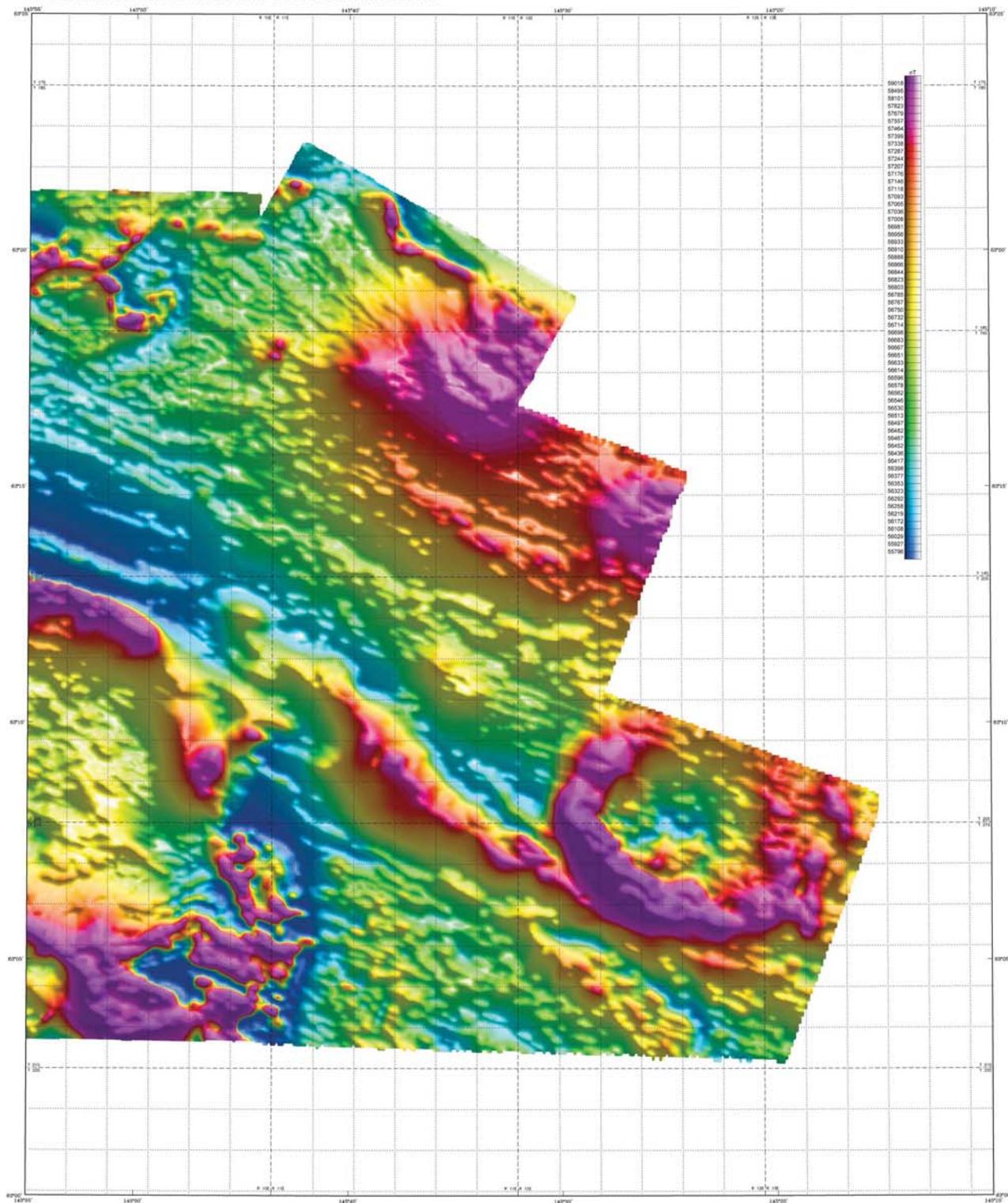
The total magnetic field data were acquired with a sampling interval of 0.1 seconds, and were (1) corrected for diurnal variations by subtraction of the digitally recorded base station magnetic data, (2) waded to the low tide data, and (3) interpolated onto a regular 100-m grid using a modified spline (1970) technique. The regional variation (or IGRF gradient, 2003, updated to August 2002) was removed from the leveled magnetic data.

SURVEY HISTORY

This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources, Division of Geological & Geophysical Survey (DGGS), and Stevens Exploration Management Corp. Airborne geophysical data for the current area were acquired and processed by Fugro Airborne Surveys in 2002. Airborne geophysical data for the Central, Eastern, and Lower Delta River areas were acquired in 1995 by Aerotek Inc. and were provided for publication by the BLM. The current survey was funded by the U. S. Department of Interior, Bureau of Land Management (BLM) and conducted in support of its mineral assessment program in the Delta River mining district. Laurel Burns was the contract manager for DGGS.

This map and other products from this survey are available by mail order or in person from DGGS, 794 University Ave., Suite 200, Fairbanks, Alaska, 99709. Some products are also available in person only at the BLM's Bureau Mineral Information Center, 100 Banks Road, Douglas, Alaska, 99824.

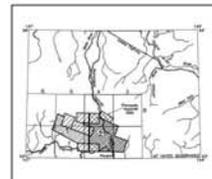




Source: Modified from U.S. Geological Survey, M. Peters et al., 2002, p. 4. USGS



LOCATION INDEX



COLOR SHADOW TOTAL MAGNETIC FIELD OF THE SOUTHERN DELTA RIVER AREA, EAST-CENTRAL ALASKA

PARTS OF MT. HAYES QUADRANGLE

2003

Sun Azimuth: 20 degrees

Inclination: 30 degrees

DESCRIPTIVE NOTES

The geophysical data were acquired with a DINGHY[®] Electromagnetic (EM) system and a SICKLER[®] cesium magnetometer. Both were flown at a height of 100 feet. In addition the survey recorded data from a radar altimeter, GPS navigation system, SO/NO Hs meters and video camera. Flights were performed with an AS350B-2 Super helicopter at a mean terrain clearance of 200 feet along 100% survey flight lines with a spacing of a quarter of a mile. The lines were flown perpendicular to the flight line at intervals of approximately 2 miles. An Ashtech G224 NAVSTAR / GLONAVIS Global Positioning System was used for navigation. The helicopter position was derived every 0.5 seconds using post-flight differential positioning to a reference station at better than 2 m. Flight path elevations were projected onto the Clarke 1880 UTM zone 6 (sphere), 1927 North American datum using a conformal projection (30) of 1470 = north constant of 0 and an east constant of 500,000. Positional accuracy of the projected data is better than 10 m with respect to the UTM grid.

PREVIOUSLY SURVEYED AREAS

The previously acquired geophysical data were acquired with an Ashtech Dinger Electromagnetic (EM) system and a SICKLER cesium magnetometer. The electromagnetic system utilized two vertical coil pairs at 450 Hz and 4.475 Hz and three horizontal coil pairs at 849 Hz, 4.188 Hz and 32.460 Hz. These former operations for the magnetometer and EM system were slightly higher than 100 and 100 feet, respectively. In addition the survey recorded data from a radar altimeter, GPS navigation system, SO Hs meter and video camera. The GPS electronic positioning system consisted of differential mode. The flight line direction varies from north to track to follow Canyon 1202, Lurien and Fish Lake 1202E, and Rainy and Tongue Lake 1202. The flight lines were one-quarter mile apart. Extended to the lines were flown with the current survey which cover both the 1955 and 2002 survey areas. The other survey was flown with a AS350B2 helicopter.

TOTAL MAGNETIC FIELD

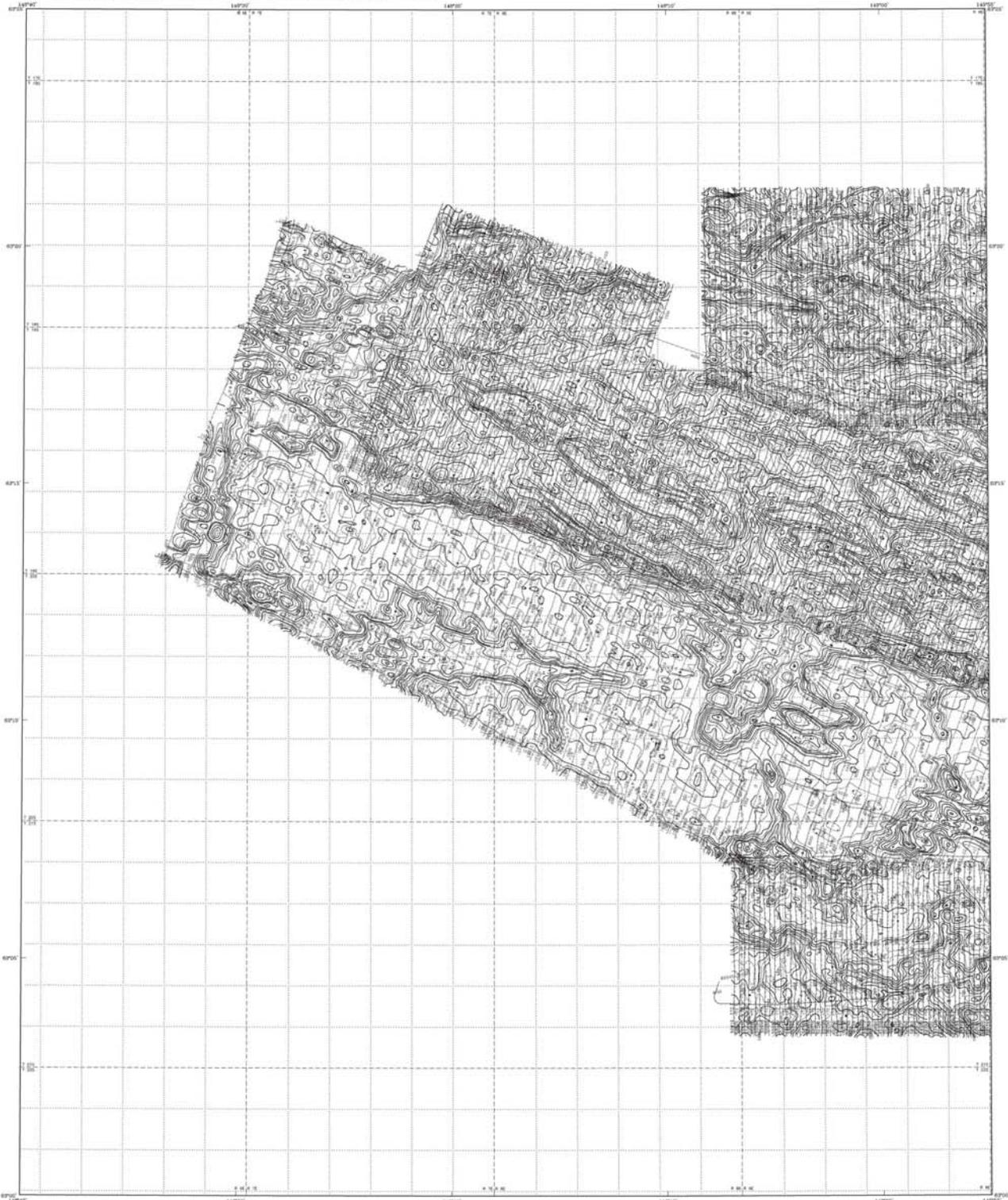
The total magnetic field data were acquired with a sampling interval of 0.1 seconds, and were (1) corrected for diurnal variations by subtraction of the diurnal variation, (2) interpolated onto a regular 100 m grid using a modified spline (1970) technique. The regional variation (or IGRF gradient, 2000, updated to August 2002) was removed from the corrected magnetic data.

Alaska, N. 2003. A new method of interpretation and analysis using 400 Hz Ashtech EM system. Version 1.0. Alaska Division of Geological & Geophysical Surveys, 10/2003. 10/2003.

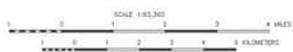
SURVEY HISTORY

This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources, Division of Geological & Geophysical Surveys (DGGG), and Stevens Exploration Management Corp., airborne geophysical data for the current area were acquired and processed by Fugro Airborne Surveys in 2002. Airborne geophysical data for the Central, Eastern, Fish Lake, and Tongue Lake areas were acquired in 1955 by Aerotek Inc. and were provided for publication by the DGGG. The current project was funded by the U. S. Department of Interior, Bureau of Land Management (BLM) and conducted in support of its mineral assessment program in the Delta River mining district. Laurel Burns was the contract manager for DGGG. This map and other products from this survey are available by mail order or in person from DGGG, 794 University Ave., Suite 200, Fairbanks, Alaska, 99776. Some products are also available in person only at the BLM's Juneau Mineral Information Center, 100 Banks Road, Douglas, Alaska, 99824.





Approved for Release by NSA on 05-08-2013 pursuant to E.O. 13526



7200 Hz COPLANAR RESISTIVITY OF THE SOUTHERN DELTA RIVER AREA, EAST-CENTRAL ALASKA

PARTS OF MT. HAYES QUADRANGLE
2003



DESCRIPTIVE NOTES

The geophysical data were acquired with a DIGHEM[®] Electromagnetic (EM) system and a Solaire cesium magnetometer. Both were flown at a height of 100 feet. In addition the survey recorded data from a radar altimeter, GPS navigation system, 50/100 Hz magnetic and cesium compass. Flights were performed with an AS350B-2 Super helicopter at a maximum altitude of 200 feet along 1207E survey flight lines with a spacing of 4 quarter mile a mile. The lines were flown perpendicular to the flight lines at intervals of approximately 2 miles. An Ashtech G22A NAVSTAR / GLONASS Global Positioning System was used for navigation. The helicopter position was derived every 0.5 seconds using post-flight differential positioning to a receiver accuracy of better than 0.1 m. Flight path positions were projected onto the UTM zone 188E (UTM zone 6) UTM zone 1827 North American datum using a conformal projection of 1:250,000 scale and a constant of 0 and an east constant of 500,000. Position accuracy of the recorded data is better than 10 m with respect to the UTM grid.

PREVIOUSLY SURVEYED AREAS

The previously acquired geophysical data were acquired with an Aercon Center Electromagnetic (EM) system and a Solaire cesium magnetometer. The electromagnetic system utilized two vertical magnetic coil pairs at 150 Hz and 4.476 Hz and three horizontal coil pairs at 843 Hz, 4.188 Hz and 32.460 Hz. These former operations for the magnetometer and EM system were slightly higher than 100 and 150 feet, respectively. In addition the survey recorded data from a radar altimeter, GPS navigation system, 50 Hz magnetic and cesium compass, differential mode. The flight line direction varies from north to south or between Cassin 1207E, Laska and Fish Lake 1207E, and Rinky and Tongue Lakes 1207E. The flight lines were one-eight mile apart. Excepted to this area flown with the current survey which cover both the 1955 and 2002 survey areas. The other survey was flown with a AS350B2 helicopter.

RESISTIVITY

The DIGHEM[®] EM system measured inphase and quadrature components at five frequencies. Two vertical coplanar coil pairs operated at 1000 and 5500 Hz while three horizontal coplanar pairs operated at 500, 7200, and 56,000 Hz. EM data were sampled at 0.1 second intervals. The EM system responds to subsurface conductors, conductive overburden, and cultural sources. Apparent resistivity is generated from the inphase and quadrature components of the inphase 7200 Hz using the pseudo-two half space model (Dey and Weidner, 1976). The data were interpreted using the 7200 Hz inphase data from the current survey. The 1000 Hz and 5500 Hz data were interpreted using the 7200 Hz inphase data from the current survey. The 500 Hz data were merged with the 1000 Hz data from the previously surveyed areas. To facilitate the merge between data sets, the resistivity for the pre-instantly acquired 4189 Hz coplanar data was re-interpreted using the pseudo-two half space model.

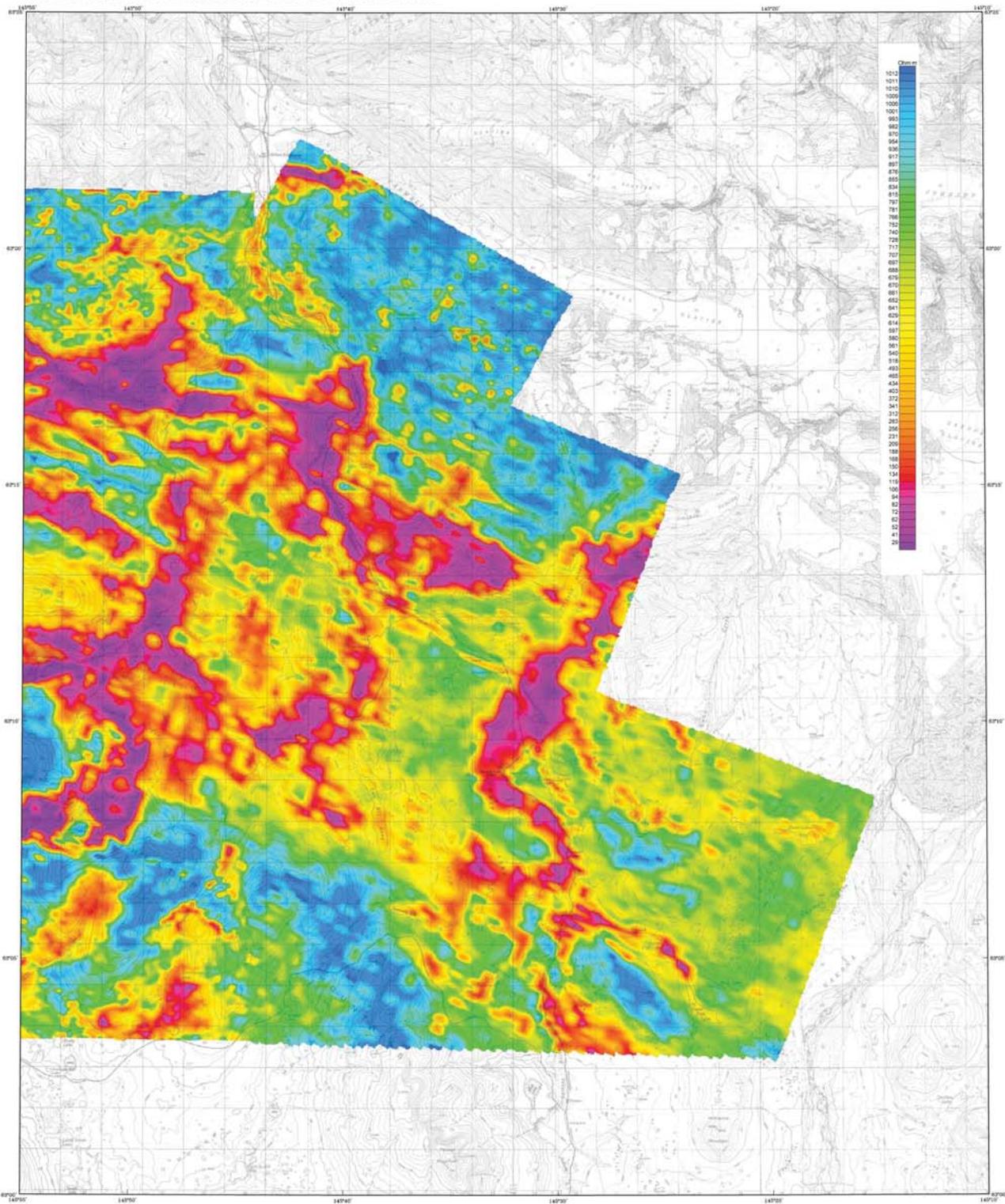
Scale: 1:250,000
Projection: UTM Zone 188E
Datum: NAD 83
Units: Meters
Easting: 500,000
Northing: 1,200,000
False Easting: 0
False Northing: 0
Scale Factor: 0.999999
Units: Meters
Easting: 500,000
Northing: 1,200,000
False Easting: 0
False Northing: 0
Scale Factor: 0.999999



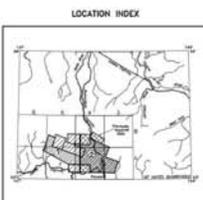
SURVEY HISTORY

This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources, Division of Geological & Geophysical Survey (DGGS), and Stevens Exploration Management Corp. (SEMC). Geophysical data for the current area were acquired and processed by Fugro Airborne Surveys in 2002. Previous geophysical data for the Cassin, Laska, Fish Lake, Rinky and Tongue Lakes areas were acquired in 1955 by Aercon Inc. and were provided for publication by the BLM. The current survey was funded by the U. S. Department of Interior, Bureau of Land Management (BLM) and conducted in support of its mineral assessment program in the Delta River mining district. Loren Burns was the contract manager for DGGS.

This map and other products from this survey are available by mail order or in person from 2002, 794 University Ave., Suite 200, Fairbanks, Alaska 99709. Some products are also available in person only at the BLM's Juneau Mineral Information Center, 100 Banks Road, Douglas, Alaska 99824.



Base Data: U.S. Geological Survey, 1:50,000, 1:62,500, 1:100,000



900 Hz COPLANAR RESISTIVITY OF THE SOUTHERN DELTA RIVER AREA, EAST-CENTRAL ALASKA PARTS OF MT. HAYES QUADRANGLE 2003

DESCRIPTIVE NOTES

The geophysical data were acquired with a DIGHEM[®] Electromagnetic (EM) system and a Scintrex cesium magnetometer. Both were flown at a height of 100 feet. In addition, the survey recorded data from a radar altimeter, GPS navigation system, 50/70 Hz magnetic and compass correctors. Flights were performed with an AS350B-2 5000 feet class helicopter at a mean terrain clearance of 200 feet along 1420E survey flight line with a spacing of 0.25 miles. The lines were flown perpendicular to the flight line at intervals of approximately 3 miles.

An Ashtech 0024 NAVSTAR / GLOPASS 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 0.1 m. Flight 6000 elevations were projected onto the Contour 100 (UTM zone 6) spheroid, 1927 North American datum using a central meridian (CM) of 147° 00' north, constant of 0 and an east constant of 500,000. Positional accuracy of the projected data is better than 10 m with respect to the UTM grid.

PREVIOUSLY SURVEYED AREAS

The previously acquired geophysical data were acquired with an Aercon Counter Electromagnetic (EM) system and a Scintrex cesium magnetometer. The electromagnetic system used two vertical coil pairs at 849 Hz and 4.476 Hz and three horizontal coil pairs at 849 Hz, 4.184 Hz and 32.640 Hz. These former operations for the magnetometer and EM system were slightly higher than 100 and 150 feet, respectively. In addition, the survey recorded data from a radar altimeter, GPS navigation system, 50 Hz magnetic and compass correctors. The GPS electronic positioning system consisted of Fish Lake 1420E, and Rummy and Tangle Lake N-C. The flight lines were cross-ridge, side-scan. Extended to lines were flown with the current survey which cover both the 1905 and 2002 survey areas. The other survey was flown with a AS350B2 helicopter.

RESISTIVITY

The DIGHEM[®] EM system measured in-phase and quadrature components of five frequencies. Two vertical coplanar coil pairs operated at 1000 and 5000 Hz while three horizontal coplanar coil pairs operated at 500, 1000, and 50,000 Hz. EM data were sampled at 0.1 second intervals. The EM system responds to subsurface conductive overburden, and cultural sources. Apparent resistivity is generated from the in-phase and quadrature components of the in-phase 900 Hz using the pseudo-layer half space model (Freyer 1976). The data were interpreted using a The 900 Hz coplanar data from the current survey have been merged with the 900 Hz coplanar data from the previously surveyed areas. To facilitate the merge between data sets, the resistivity for the previously acquired 849 Hz coplanar data was reinterpreted using the pseudo-layer half space model.

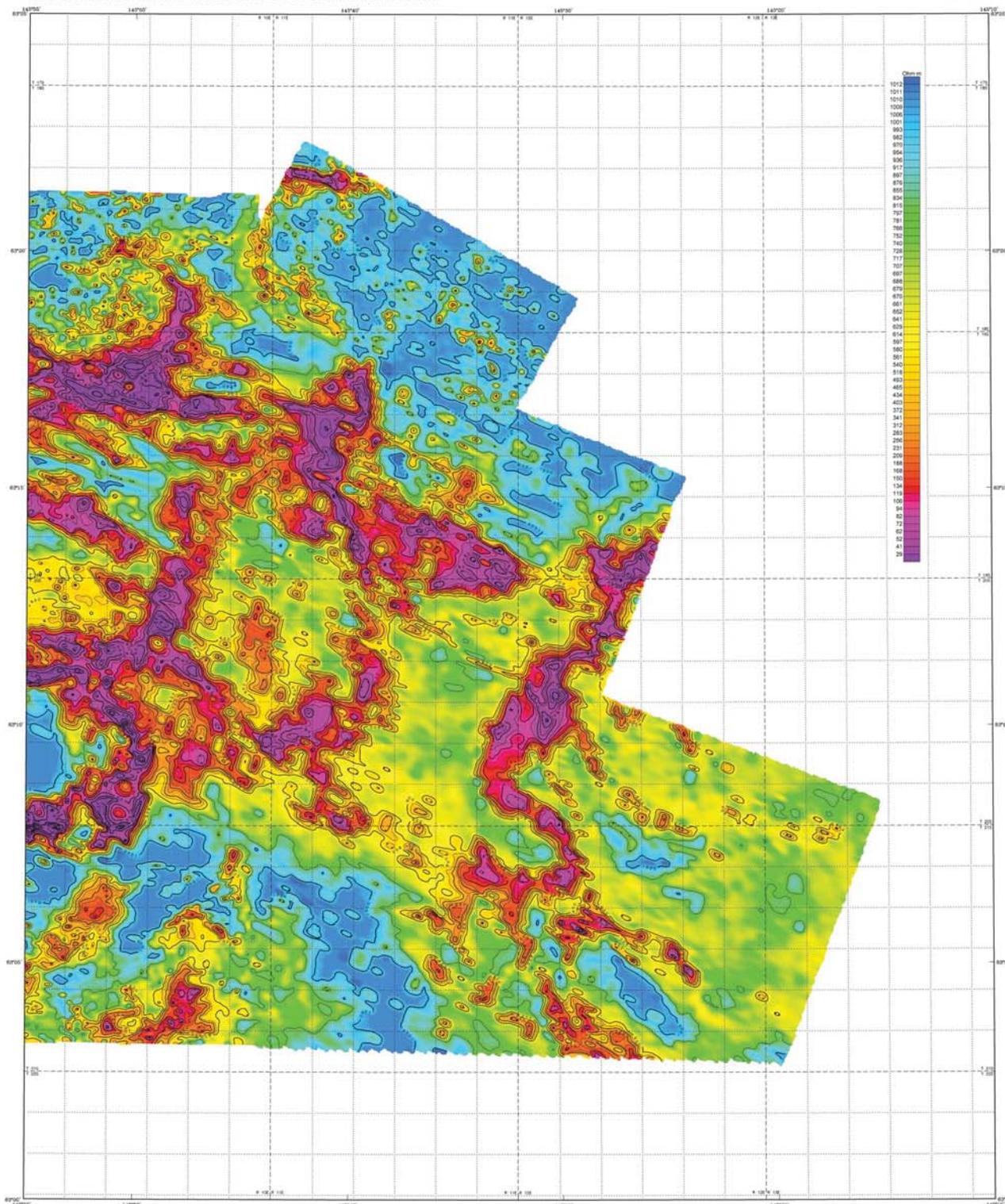
ALASKA DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS
1700 N. P. 98-4000
Finger, B.C., 1976. Resistivity mapping with an airborne magnetometric system (Dighem), v. 41, p. 144-172

SURVEY HISTORY

This map has been compiled and derived under contract between the State of Alaska, Department of Natural Resources, Division of Geological & Geophysical Surveys (DGGG), and Stevens Exploration Management Corp. Airborne geophysical data for the current area were acquired and processed by Fugro Airborne Surveys in 2002. Airborne geophysical data for the Contour 100, Delta River, Fish Lake, and Rummy areas were acquired in 1995 by Aercon Inc. and were provided for publication by the DGGG. The current survey was funded by the U. S. Department of Interior, Bureau of Land Management (BLM) and conducted in support of its mineral assessment program in the Delta River mining district. Loren Burns was the contract manager for DGGG.

This map and other products from this survey are available by mail order or in person from DGGG, 794 University Ave., Suite 200, Fairbanks, Alaska, 99704. Some products are also available in person only at the BLM's Juneau Mineral Information Center, 100 Seward Road, Douglas, Alaska, 99824.





Scale: 1:62,500
North arrow: True, U.S. Geological Survey, 18° North, 1:50,000, 1983



900 Hz COPLANAR RESISTIVITY OF THE SOUTHERN DELTA RIVER AREA, EAST-CENTRAL ALASKA

PARTS OF MT. HAYES QUADRANGLE
2003

DESCRIPTIVE NOTES

The geophysical data were acquired with a DIGHEM[®] Electromagnetic (EM) system and a Scintrex cesium magnetometer. Both were flown at a height of 100 feet. In addition the survey recorded data from a radar altimeter, GPS navigation system, 50/70 Hz magnetic and compass. Flights were performed with an AS350B-2 5000-foot single-engine helicopter at a mean terrain clearance of 200 feet along N207E surveying lines with a spacing of 2 kilometers. The lines were flown perpendicular to the flight line at intervals of approximately 3 hours.

An Ashtech D224 NAVSTAR / GLONAVSS Global Positioning System was used for navigation. The helicopter position was observed every 2.5 seconds using post-flight differential positioning to a relative accuracy of better than 2 m. Flight 8000 elevations were projected onto the Contour 188 (UTM zone 6) spheroid, 1927 North American datum using a contour datum of 100 feet. The datum constant is 0 and an east constant of 500,000. Positional accuracy of the projected data is better than 10 m with respect to the UTM grid.

PREVIOUSLY SURVEYED AREAS

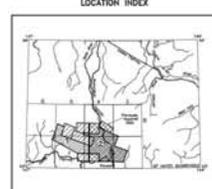
The previously acquired geophysical data were acquired with an Aercon Counter Decimeter (CD) system and a Scintrex cesium magnetometer. The electromagnetic system utilized two horizontal coil pairs at 150 Hz and 4.476 Hz and three horizontal coil pairs at 849 Hz, 4.188 Hz and 52.640 Hz. These lines were flown with the magnetometer and EM system were slightly higher than 100 and 150 feet, respectively. In addition the survey recorded data from a radar altimeter, GPS navigation system, 50 Hz magnetic and compass. The flight lines were flown perpendicular to the flight line with the current survey, which cover both the 1995 and 2002 survey. The other survey was flown with a AS350B2 helicopter.

RESISTIVITY

The DIGHEM[®] EM system measured in-phase and quadrature components of five frequencies. Two vertical coplanar coil pairs operated at 1000 and 3500 Hz with three horizontal coplanar coil pairs operated at 500, 1700, and 5600 Hz. EM data were sampled at 0.1 second intervals. The EM system records the in-phase and quadrature components of the in-phase 900 Hz using the pseudo-bay half space model (Freyer 1976). The data were interpreted using a regular 100 m grid using a modified rule (1976) technique. The 900 Hz coplanar data from the current survey have been merged with the data from the previous survey. To facilitate the merge between data sets, the resistivity for the previously acquired 849 Hz coplanar data was recalculated using the pseudo-bay half space model.

Wagner, R., 1976, A new method of interpretation and smooth curve fitting of EM induction data. *Geophysics*, v. 41, p. 584-593.

Freyer, R.C., 1976, Resistivity mapping of offshore mudflat (electromagnetic system) (Geophysical), v. 41, p. 144-172.

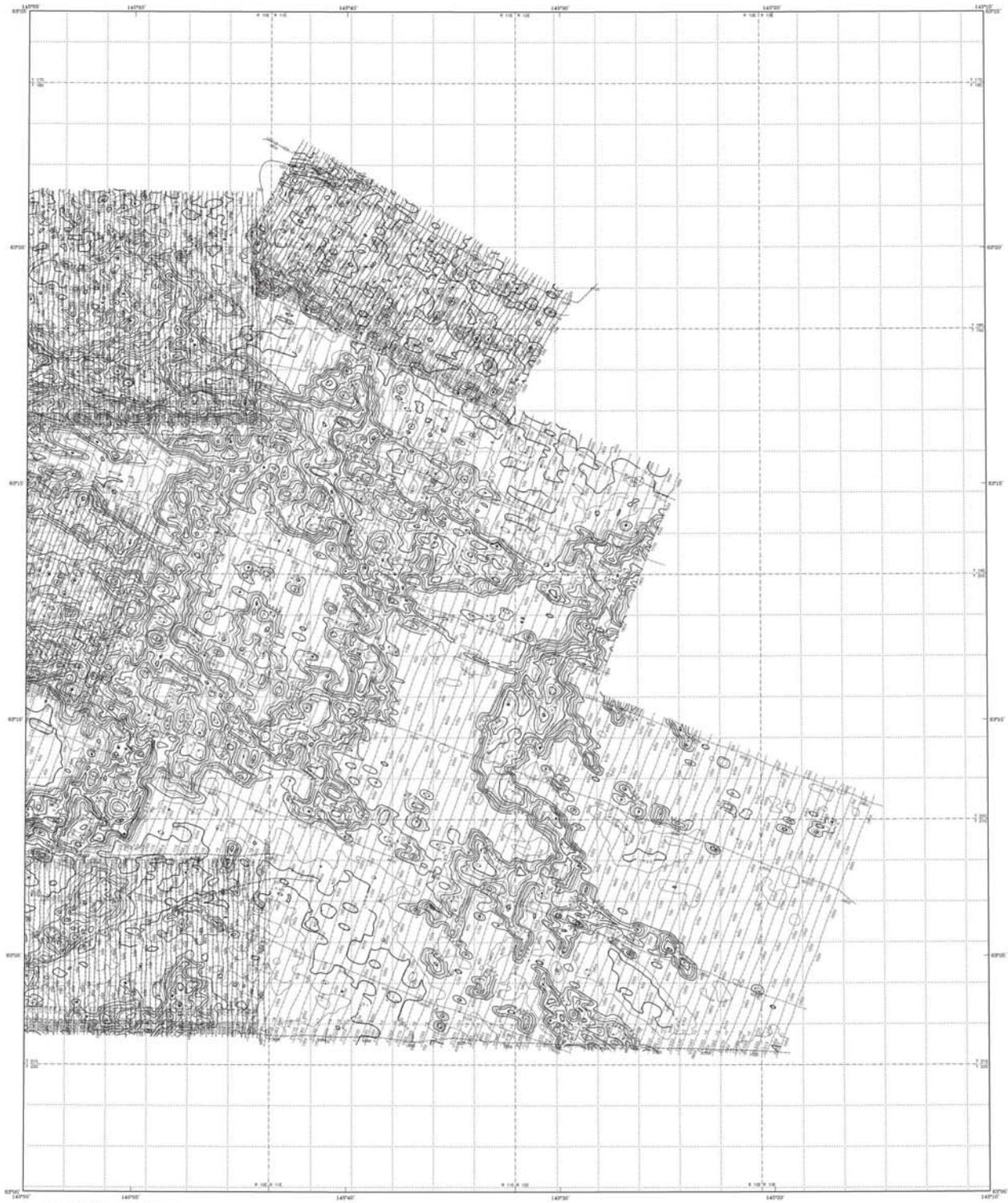


SURVEY HISTORY

This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources, Division of Geological & Geophysical Survey (DGGG), and Stevens Exploration Management Corp. Airborne geophysical data for the current area were acquired and processed by Fugro Airborne Surveys in 2002. Airborne geophysical data for the Contour, Earth, Fish Lake, and Tongue Lake areas were acquired in 1995 by Aercon Inc. and were provided for publication by the BLM. The current survey was funded by the U. S. Department of Interior, Bureau of Land Management (BLM) and conducted in support of its mineral assessment program in the Delta River mining district. Laurel Burns was the contract manager for DGGG.

This map and other products from this survey are available by mail order or in person from DGGG, 794 University Ave., Suite 200, Fairbanks, Alaska, 99774. Some products are also available in person only at the BLM's Juneau Mineral Information Center, 100 Seward Road, Douglas, Alaska, 99824.





Scale: 1:63,360
1 cm = 100 m



LOCATION INDEX



900 Hz COPLANAR RESISTIVITY OF THE SOUTHERN DELTA RIVER AREA, EAST-CENTRAL ALASKA

PARTS OF MT. HAYES QUADRANGLE
2003

DESCRIPTIVE NOTES

The geophysical data were acquired with a DODEM[®] Electromagnetic (EM) system and a Solinst[®] dual-magnetometer. Data were flown at a height of 100 feet. In addition to the recorded data, a flight path, a radar altimeter, GPS navigation system, 50/100 Hz monitors and video camera. Flights were performed with an AS350B-2 Super helicopter at a mean terrain clearance of 200 feet above MSL. Survey flight lines with a spacing of a quarter of a mile. The lines were flown perpendicular to the flight lines at intervals of approximately 3 miles.

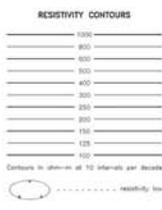
An ASPEN[®] CO224 Navigator[®] Global Positioning System was used for navigation. The helicopter position was derived every 0.5 seconds using post-flight differential positioning to a relative accuracy of better than 5 m. Flight path locations were projected onto the Clarke 1866 UTM zone 18 UTM datum. 102 North magnetic declination using a constant declination of 14.7 degrees north (range of 0 and an error constant of 500,000). Relative accuracy of the recorded data is better than 10 m with respect to the UTM grid.

PREVIOUSLY SURVEYED AREAS

The previously acquired geophysical data were acquired with a Solinst[®] dual-magnetometer. The electromagnetic system utilized dual-magnetometer units at 849 Hz and 4,478 Hz and three subsurface soil points at 849 Hz, 4,478 Hz and 100 Hz, respectively. In addition, the survey recorded data from a radar altimeter, GPS navigation system, 50/100 Hz monitors and video camera. The flight path locations were projected onto the Clarke 1866 UTM zone 18 UTM datum. 102 North magnetic declination using a constant declination of 14.7 degrees north (range of 0 and an error constant of 500,000). Relative accuracy of the recorded data is better than 10 m with respect to the UTM grid.

RESISTIVITY

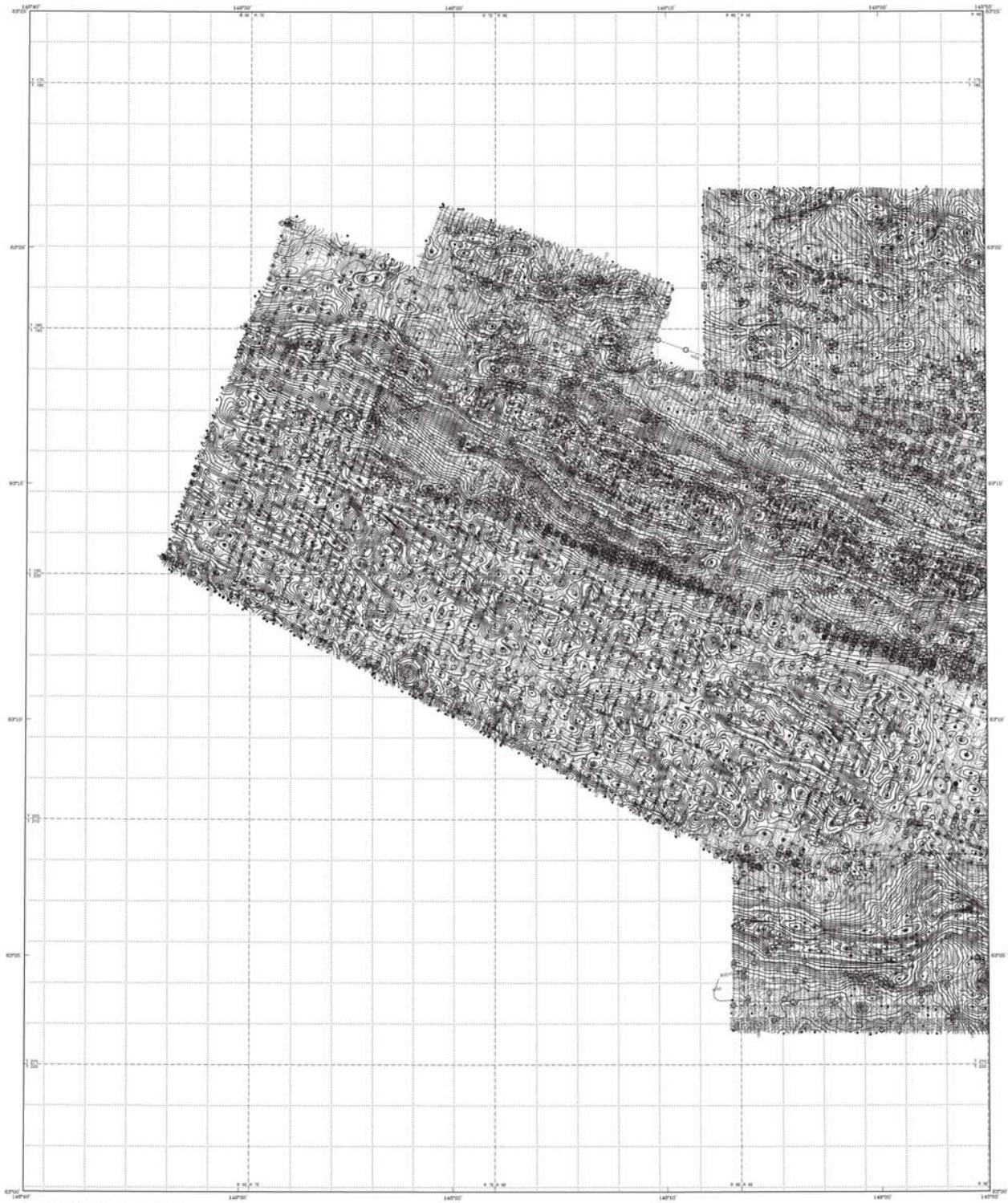
The DODEM[®] EM system measured in-phase and quadrature components of the magnetic field. The surface conductance data were reported at 1000 and 5500 Hz, while three subsurface conductance data were reported at 300, 750, and 18,000 Hz. EM data were reported at 0.1 second intervals. The EM system responds to natural induction, conductive overburden, and cultural sources. Apparent resistivity is generated from the in-phase and quadrature components of the apparent 900 Hz using the pseudo-layer half space model (Foster 1978). The data were interpreted onto a regular 100 m grid using a modified Wenner (1972) technique. The 900 Hz apparent resistivity data from the current survey have been merged with the resistivity data from the previously acquired 849 Hz coplanar EM data. The resistivity for the merged apparent data sets, the resistivity for the previously acquired 849 Hz coplanar EM data was calculated using the pseudo-layer half space model.



SURVEY HISTORY

This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources, Bureau of Geological & Geophysical Surveys (DGG), and the Bureau of Land Management, Geophysical Division (DGG), and the Bureau of Land Management, Geophysical Division (DGG). The geophysical data for this current area were acquired and processed by Fugro Airborne Surveys in 2002. Additional geophysical data for the Colville Delta, Fish Lake Basin and Tongue Lake areas were acquired in 1992 by the Bureau of Land Management, Geophysical Division (DGG) and conducted on behalf of the U.S. Department of Interior, Bureau of Land Management (BLM) and conducted on behalf of its mineral assessment program in the Delta River mining district. Laurel Berry was the contract manager for DGG.

This map and other products from this survey are available by mail order or in person from DGG, 714 University Ave., Suite 205, Fairbanks, Alaska, 99701. Some products are also available in person only at the BLM's Junction Mining Information Center, 100 Seward Street, Seward, Alaska, 99824.



Scale: 1:62,500. UTM Zone 18N, Datum: NAD 83, Spheroid: GRS 1980, Projection: UTM.



LOCATION INDEX



TOTAL MAGNETIC FIELD AND ELECTROMAGNETIC ANOMALIES OF THE SOUTHERN DELTA RIVER AREA, EAST-CENTRAL ALASKA

PARTS OF MT. HAYES QUADRANGLE

2003

DESCRIPTIVE NOTES

The geophysical data were acquired with a GEODETIC Electromagnetic (EM) system and a Sinterex digital magnetometer. Data were flown at a height of 100 feet. The system for surveying consisted of a GPS receiver, a radio altimeter, GPS navigation system, 50/100 Hz magnetic field coils, and a data logger. Flights were performed with an AS350B-2 Super helicopter at a mean terrain clearance of 200 feet using ADS-B survey flight lines with a spacing of a quarter of a mile. The lines were flown perpendicular to the flight lines at intervals of approximately 3 miles. An ASPEN 0224 NAVSTAR/GLOBALVIEW 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 5 m. Flight path locations were projected onto the Clarke 1866 UTM zone 18N datum, 1983 North American datum using a central meridian (CM) of 141° 00' 00" west longitude and an easting constant of 500,000. Relative accuracy of the projected data is better than 10 m with respect to the UTM grid.

PREVIOUSLY SURVEYED AREAS
The previously acquired geophysical data were acquired with an aerial Geometric Electromagnetic (EM) system and a Sinterex digital magnetometer. The electromagnetic system utilized four modified magnetic coil pairs at 830 Hz and 4,470 Hz and three horizontal coil pairs at 840 Hz, 4,150 Hz and 52,400 Hz, respectively. In addition, the survey recorded data from a radio altimeter, GPS navigation system, 50 Hz magnetic field coils, and a data logger. The GPS electromagnetic system operated in differential mode. The flight line location varies from north to south on a regular 1000-foot centerline. The flight lines were approximately one mile apart. Extended to lines were flown with the current survey with other than the 1988 and 2002 survey areas. The older survey was flown with a AS350B helicopter.

ELECTROMAGNETIC ANOMALIES

- Conductivity
- Induction
- Spontaneous anomaly
- △ Area contoured with an EM magnetic response

ELECTROMAGNETICS

To determine the location of EM anomalies or their boundaries, the GEODETIC EM system measured primary and secondary components of EM frequency. Two vertical coil-pair sets oriented at 1000 and 5000 Hz and three horizontal magnetic coils oriented at 800, 2000, and 50,000 Hz. EM data were collected at 0.5 second intervals. The EM system responds to bedrock conductors, conductive pebbles, and cultural structures. The power line monitor and the flight track data were processed to locate cultural sources. The EM responses that are indicated are classified by conductivity.



GEODETIC EM SYSTEM

TOTAL MAGNETIC FIELD

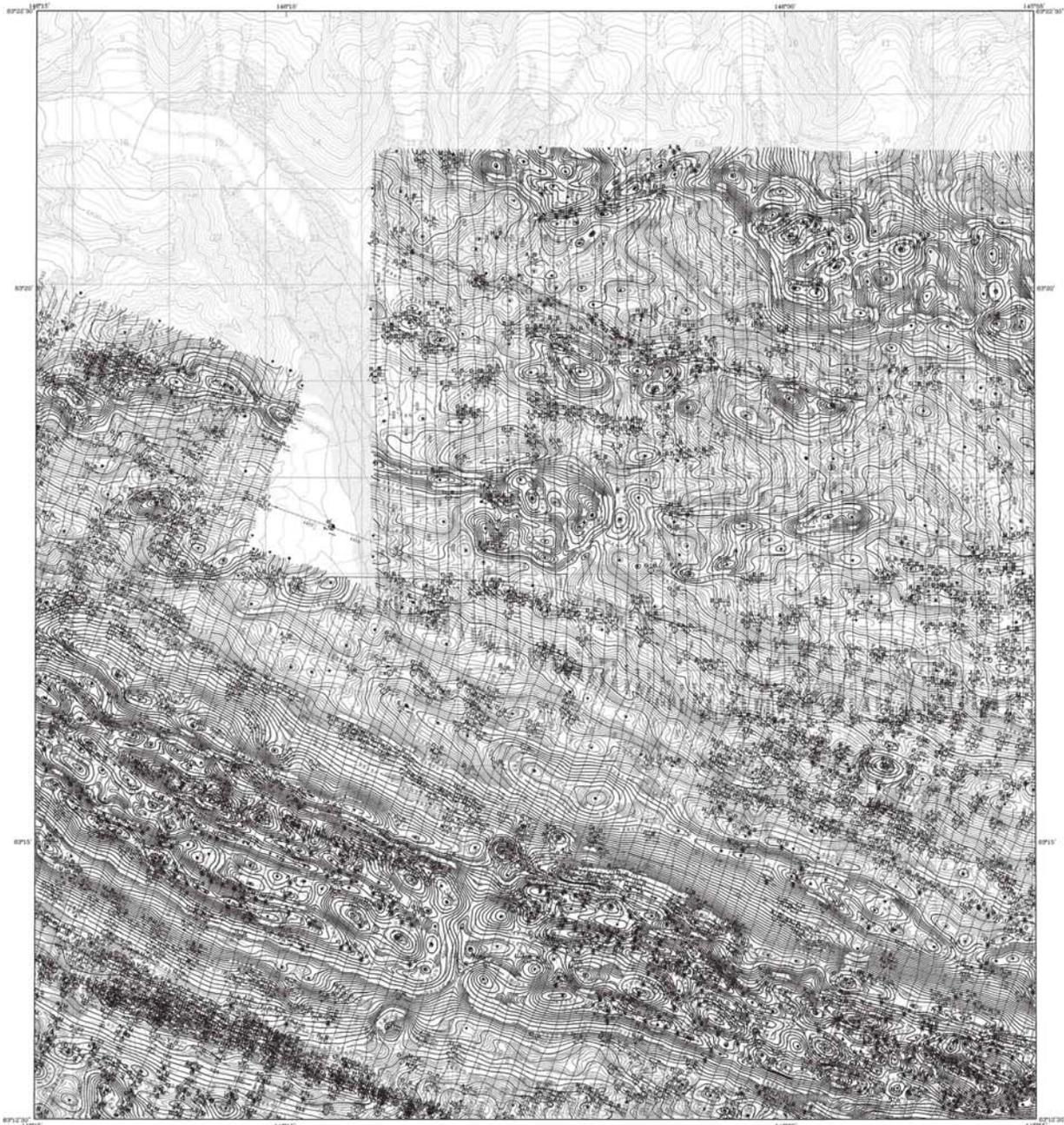
The total magnetic field data were acquired with a sampling interval of 0.1 seconds, and were (1) corrected for diurnal variations by subtraction of the magnetic variation, (2) reduced to the magnetic declination of the time of flight, and (3) interpolated onto a regular 100 m grid using a smoothing spline (SPLINE) technique. The regional correction (or IGRF gradient, 2000, updated by Magnet 2002) was removed from the leveled magnetic data.

MAGNETIC CONTOUR INTERVAL

- 100 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, Bureau of Geological & Geophysical Surveys (DGGG), and Stevens Exploration Management Corporation geophysical data for the current area were acquired and processed by Fargo Airborne Surveys in 2002. Additional geophysical data for the Colville, Delta, Fish Lake, Klamath, and Tongue Lake areas were acquired in 1988 by the Delta River area and were processed by the U.S. Department of Interior, Bureau of Land Management (BLM) and conducted in support of its mineral assessment program in the Delta River area. See the contract number for DGGG. This map and other products from this survey are available by mail order or in person from DGGG, 714 University Ave., Suite 205, Fairbanks, Alaska, 99701. Some products are also available in person only at the BLM's Delta River Mining Information Center, 150 Seward Street, Stearns, Alaska, 99824.



Base Data US Geological Survey 48, Maps A-4, A-5, B-4, B-5
U.S. GPO: 1978 O-350-000-000-000



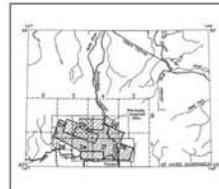
LOCATION INDEX FOR SCALE 1:51,680



TOTAL MAGNETIC FIELD AND DETAILED ELECTROMAGNETIC ANOMALIES OF THE SOUTHERN DELTA RIVER AREA, EAST-CENTRAL ALASKA

PARTS OF MT. HAYES A-4, A-5, B-4 AND B-5 QUADRANGLES

2003



DESCRIPTIVE NOTES

The geophysical data were acquired with a GOMHEM[®] Electromagnetic (EM) system and a Scripps cesium magnetometer. Both were flown at a height of 100 feet. In addition the survey recorded data from a radio altimeter, GPS navigation system, 500-foot retractor and line sensors. Flights were performed with an AC3082-2 Sycamore helicopter at mean terrain elevations of 200 feet above MSL. Survey flight lines were at spacing of a quarter of a mile. The lines were flown perpendicular to the flight lines at intervals of approximately 3 miles.

An AARtech GG24 NAVSTAR / GLOHASIS Global Positioning System was used for navigation. The helicopter position was derived every 0.5 seconds using postflight differential positioning to a relative accuracy of better than 5 m. Flight path positions were projected onto the UTM zone 18UJ zone 61 spheroid, 1927 North American datum using a central meridian (CM) of 147° 0 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.

PREVIOUSLY SURVEYED AREAS

The previously acquired geophysical data were acquired with an aerial Corbis Electromagnetic (EM) system and a Scripps cesium magnetometer. The electromagnetic system utilized two vertical coil pairs at 450 Hz and 1470 Hz and three horizontal coil pairs at 450 Hz, 4.185 Hz and 33,490 Hz. Mean terrain elevations for the magnetic lines were 100 feet, respectively. In addition the survey was flown with a radio altimeter, GPS navigation system, 50 Hz monitor and video camera. The GPS electronic positioning system operated in differential mode. The flight line direction varied from track to track on following Corbis 1827C, Curlew and Fish Lake 1827C, and Rainy and Tongue Lake 18-2, the flight lines were one-eighth mile apart. Excepted to lines were flown with the current survey which cover both the 1995 and 2002 survey areas. The older survey was flown with a AC3082 helicopter.

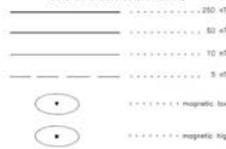
ELECTROMAGNETICS

To determine the location of EM anomalies at their positions, the GOMHEM EM system measured magnetic and quadrature components at five frequencies. Two vertical coil-pair pairs operated at 1000 and 2000 Hz and three horizontal coil-pair pairs operated at 300, 700, and 50,000 Hz. EM data were sampled at 0.1 second intervals. The EM system responds to bedrock conductors, conductive sediments, and cultural sources. The type of conductor is indicated on the geophysical map by the magnetic field and quadrature curves. Differentiation of the type of conductor is based on EM anomaly shapes of the magnetic and quadrature responses. Together with conductor and magnetic patterns and topography, the more the magnetic and the right track view were examined to locate cultural sources.

ELECTROMAGNETIC ANOMALIES



MAGNETIC CONTOUR INTERVAL

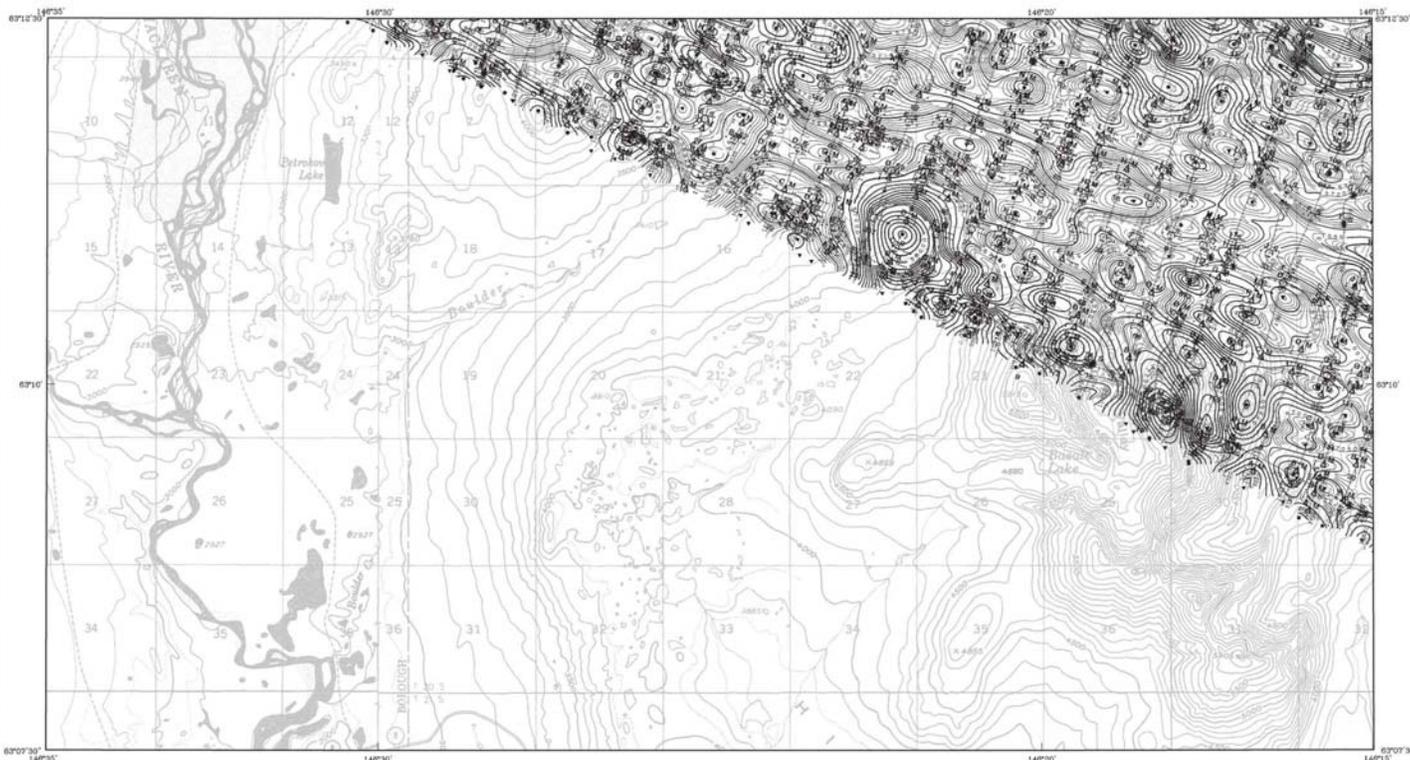


SURVEY HISTORY

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 Geosens Exploration Management Corp. Airborne geophysical data for the current area were acquired and processed by Fugro Airborne Surveys in 2002. Airborne geophysical data for the Corbel, Excess, Fish Lake, Rainy and Tongue Lake areas were acquired in 1995 by a contract program in the Delta River mining district. Laurel Burns was the contract manager for DGGS.

This map and other products from this survey are available by mail order or in person from DGGS, 714 University Ave., Suite 200, Fairbanks, Alaska, 99709. Some products are also available in person only at the BLM's Junctional Information Center, 100 Seward Road, Douglas, Alaska, 99524.

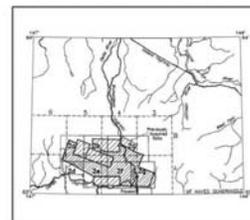
Hess, H., 1970. A new method of interpretation and smooth curve fitting based on error propagation theory at the intersection of Computing Machines, v. 17, no. 4, p. 588-602.



From U.S. Geological Survey W. Stone 4-6, 1978, 4-6, 1979, Geologic Map, Alaska



LOCATION INDEX FOR SCALE 1:51,680



TOTAL MAGNETIC FIELD AND DETAILED ELECTROMAGNETIC ANOMALIES OF THE SOUTHERN DELTA RIVER AREA, EAST-CENTRAL ALASKA PARTS OF MT. HAYES A-5 AND A-6 QUADRANGLES 2003

DESCRIPTIVE NOTES

The geophysical data were acquired with a DIGHEM³ Electromagnetic (EM) system and a Scintrex cesium magnetometer. Both were flown at a height of 100 feet. In addition the survey recorded data from a radar altimeter, GPS navigation system, 50/60 Hz monitors and video camera. Flights were performed with an AS350B-2 Squirrel helicopter at a mean terrain clearance of 200 feet along N207E survey flight lines with a spacing of a quarter of a mile. The lines were flown perpendicular to the flight lines at intervals of approximately 3 miles.

An Aantech G224 NAVSTAR 7 GLONASS 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 5 m. Flight path positions were projected onto the Clarke 1866 (UTM zone 6) spheroid, 1927 North American datum using a central meridian (CM) of 147°, 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.

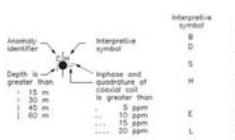
PREVIOUSLY SURVEYED AREAS

The previously acquired geophysical data were acquired with an Aerodot Condor Electromagnetic (EM) system and a Scintrex cesium magnetometer. The electromagnetic system utilized two vertical coaxial coil pairs of 936 Hz and 4.416 Hz and three horizontal coil pairs of 849 Hz, 4.189 Hz and 32,490 Hz. Mean terrain clearance for the magnetometer and EM system were slightly higher than 150 and 100 feet, respectively. In addition the survey recorded data from a radar altimeter, GPS navigation system, 60 Hz monitor and video camera. The GPS electronic positioning system operated in differential mode. The flight line direction comes from block to block as follows: Conwell N207E, Eureka and Fish Lake N207E, and Rainy and Tongue Lake N45E. The flight lines were one-eighth mile apart. Extended tie lines were flown with the current survey which cover both the 1995 and 2002 survey areas. The older survey was flown with a AS350B2 helicopter.

ELECTROMAGNETICS

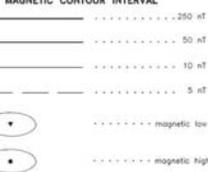
To determine the location of EM anomalies and their boundaries, the DIGHEM³ EM system measured phase and quadrature components of five frequencies. Two vertical coaxial-coil pairs operated at 1000 and 5500 Hz while three horizontal coaxial-coil pairs operated at 900, 7200, and 56,000 Hz. EM data were 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.

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 magnetic response

MAGNETIC CONTOUR INTERVAL



SURVEY HISTORY

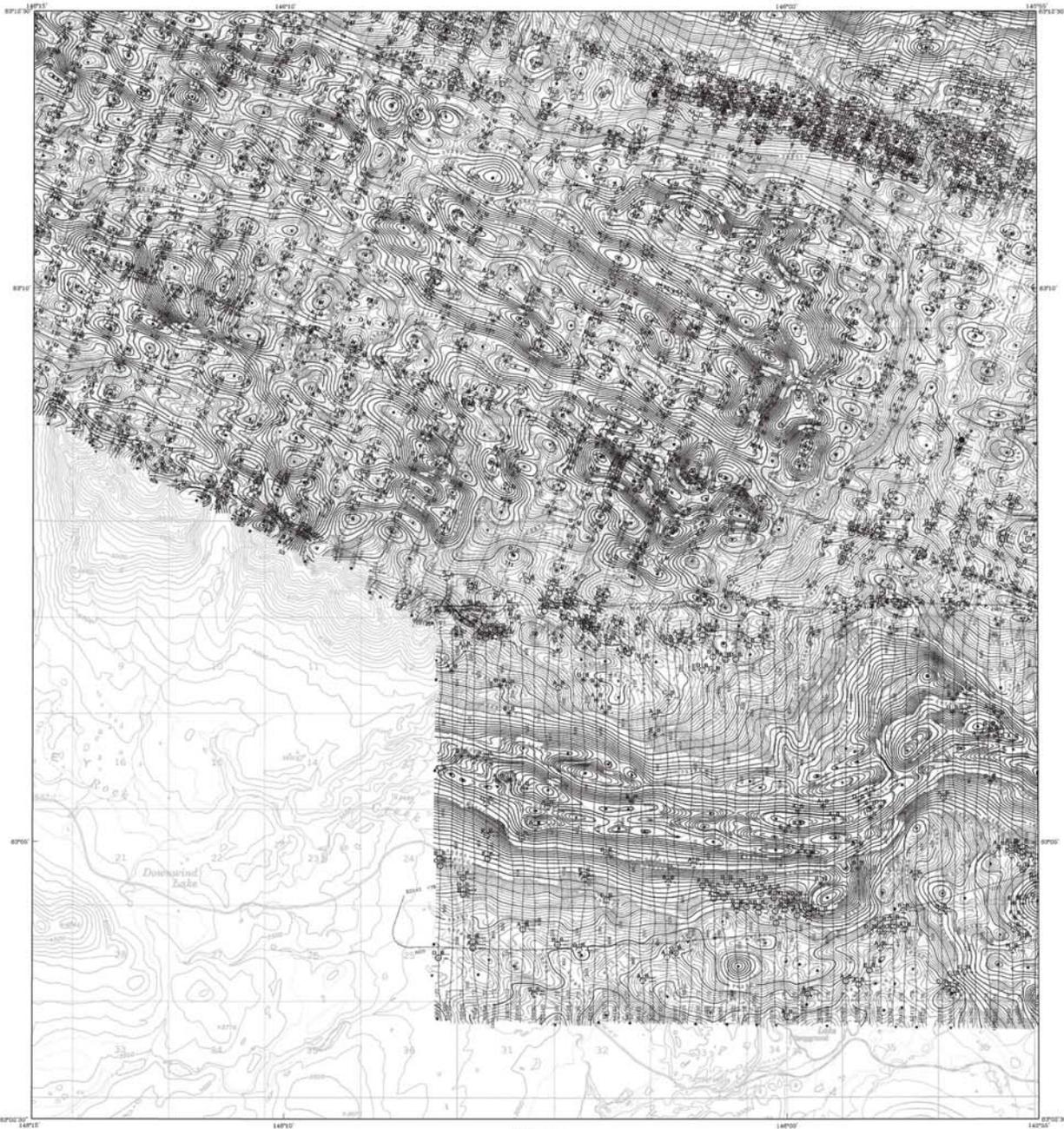
This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources, Division of Geological & Geophysical Surveys (DGG), and Stevens Exploration Management Corp. Airborne geophysical data for the current area were acquired and processed by Fugro Airborne Surveys in 2002. Airborne geophysical data for the Conwell, Eureka, Fish Lake, Rainy and Tongue Lake areas were acquired in 1995 by Aerodot Inc. and were provided for publication by the BLM. The current survey was funded by the U. S. Department of Interior, Bureau of Land Management (BLM) and conducted in support of its mineral assessment program in the Delta River mining district. Laurel Burns was the contract manager for DGG.

This map and other products from this survey are available by mail order or in person from DGG, 754 University Ave., Suite 200, Fairbanks, Alaska, 99709. Some products are also available in person only at the BLM's Juneau Mineral Information Center, 100 Svalikko Road, Douglas, Alaska, 99824.

TOTAL MAGNETIC FIELD

The total magnetic field 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 Simpson (1970) technique. The regional variation (or IGRF gradient, 2000, updated to August, 2002) was removed from the leveled magnetic data.

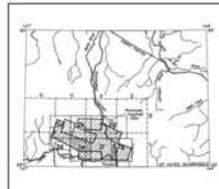
ALASKA, H. 1970. A new method of interpolation and smooth curve fitting based on least squares. *Journal of the Association of Computing Machinery*, v. 17, no. 4, p. 589-602.



From U.S. Geological Survey 60, Sheet A-4, 1950, and 60, Sheet A-5, 1950, Southcentral, Alaska.



LOCATION INDEX FOR SCALE 1:31,880



TOTAL MAGNETIC FIELD AND DETAILED ELECTROMAGNETIC ANOMALIES OF THE SOUTHERN DELTA RIVER AREA, EAST-CENTRAL ALASKA

PARTS OF MT. HAYES A-4 AND A-5 QUADRANGLES
2003



DESCRIPTIVE NOTES

The geophysical data were acquired with a DIOHEM[®] Electromagnetic (EM) system and a Schriev casing magnetometer. Both were flown at a height of 100 feet. In addition the survey recorded data from a rotor antenna, GPS navigation system, 50/70 Hz bandpass and noise canceler. Flights were performed with an AC350B-2 Sikorski helicopter at a mean flight altitude of 200 feet using a mean flight line with a spacing of a quarter of a mile. The lines are flown perpendicular to the flight lines at intervals of approximately 3 miles. An ashtech G24 NADSTAR / OLIVETTI 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 3 m. Flight path positions were projected onto the Clarke 1866 (UTM zone 6) spheroid, 1927 North American datum using a control projection (CA) of 147.0 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.

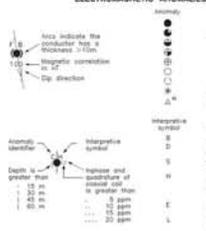
PREVIOUSLY SURVEYED AREAS

The previously acquired geophysical data were acquired with an Aerovis Gamma Electromagnetic (EM) system and a Schriev casing magnetometer. The electromagnetic system utilized four vertical coil pairs at 840 Hz and 4,470 Hz and one horizontal coil pair at 840 Hz, 4,188 Hz and 32,490 Hz. Line terms elements of the magnetometer EM system were slightly larger than 100 and 100 feet, respectively. In addition the survey recorded data from a rotor antenna, GPS navigation system, 80 Hz monitor and noise canceler. The GPS navigation system operated in differential mode. The flight line direction varies from track to track on follow course 1527E, Kuruk and Fish Lake N207E and Rainy and Tangle Lake N1-S. The flight lines were one-way and Tangle Lake N1-S. The flight lines were the current survey which cover both the 1950 and 2003 survey areas. The older survey was flown with a 4233B2 Helicopter.

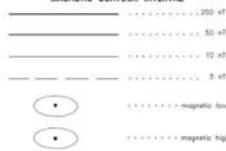
ELECTROMAGNETICS

To determine the location of EM anomalies or their boundaries, the DIOHEM EM system measured phase and quadrature components of five frequencies. Two vertical coil-coil pairs operated at 1000 and 5000 Hz while three horizontal coil-coil pairs operated at 300, 700, and 50,000 Hz. EM data were collected at 0.1 second intervals. The EM system responds to bedrock conductors, conductor anomalies, and cultural sources. The type of conductor is indicated on the geophysical map by the response curve attached to each EM anomaly. Determination of the type of conductor is based on EM response of the resistive and inductive regions, together with conductor and magnetic patterns and topography. The lower the monitor and the flight track lines were extended to locate cultural sources.

ELECTROMAGNETIC ANOMALIES



MAGNETIC CONTOUR INTERVAL



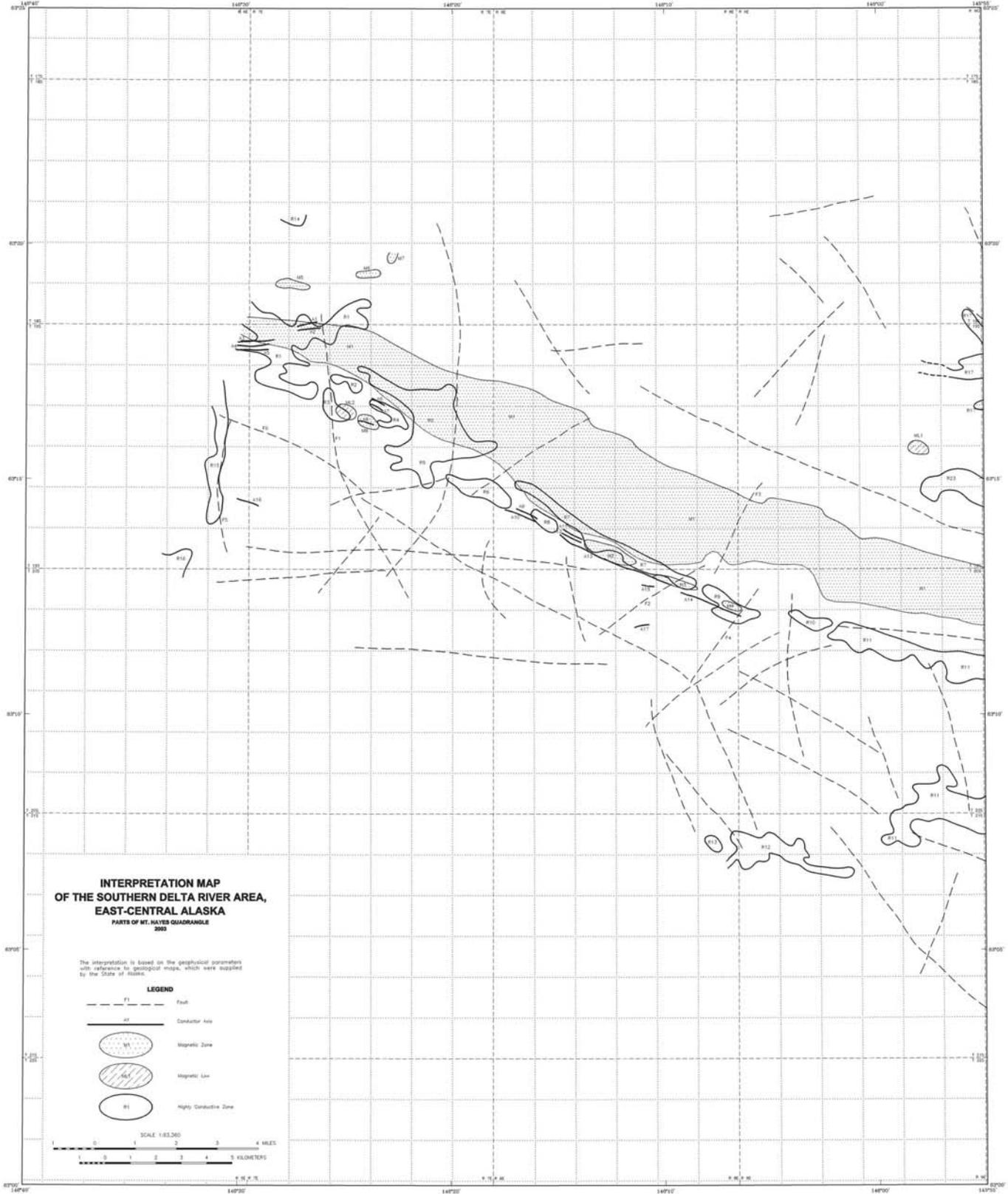
SURVEY HISTORY

This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources, Division of Geological & Geophysical Survey (DGGG), and Stevens Exploration Management Corporation geophysical data for the current area were acquired and processed by Tugis Alaska Surveys in 2002. Airborne geophysical data for the Curlew, Kuruk, Fish Lake, Rainy and Tangle Lake areas were acquired in 1950 by aerobatics and were provided for publication by the BLM. The current survey was funded by the U. S. Department of Interior, Bureau of Land Management (BLM) and conducted in support of the mineral assessment program in the Delta River mining district. Laura Burns was the contract manager for DGGG.

TOTAL MAGNETIC FIELD

The total magnetic field data were acquired with an aerobatics system of 0.1 second interval were (1) corrected for diurnal variations by subtraction of the diurnal variation from the total field, (2) leveled to the sea datum, and (3) interpolated with a minimum 100 m grid using the digital filter (1970) technique. The regional variation (or IGF) gradient, 2000, obtained in August 2002 was removed from the leveled magnetic data.

Heise, H., 1970. A new method of interpretation and smooth curve fitting based on time-averaged curves of the phenomenon of Conducting Waterline. p. 17. In: K. A. 88-89.



**INTERPRETATION MAP
 OF THE SOUTHERN DELTA RIVER AREA,
 EAST-CENTRAL ALASKA**
 PARTS OF MT. HAYES QUADRANGLE
 2003

The interpretation is based on the geophysical parameters
 with reference to geological maps, which were supplied
 by the State of Alaska.

- LEGEND**
- F1 Fault
 - AX1 Conductor Axis
 - M1 Magnetic Zone
 - ▨ ML1 Magnetic Line
 - H1 Highly Conductive Zone



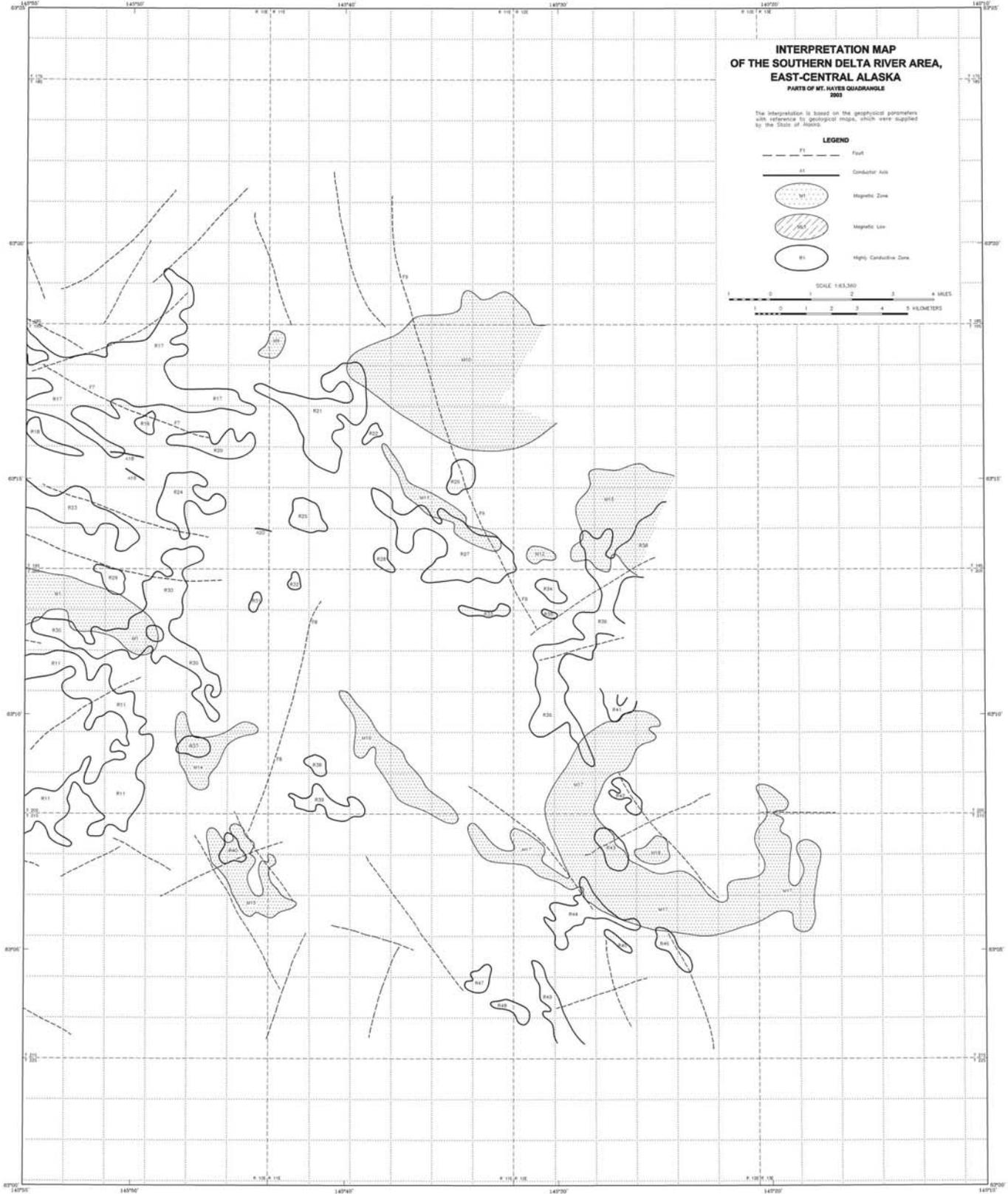
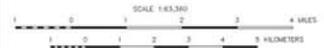
**INTERPRETATION MAP
 OF THE SOUTHERN DELTA RIVER AREA,
 EAST-CENTRAL ALASKA**

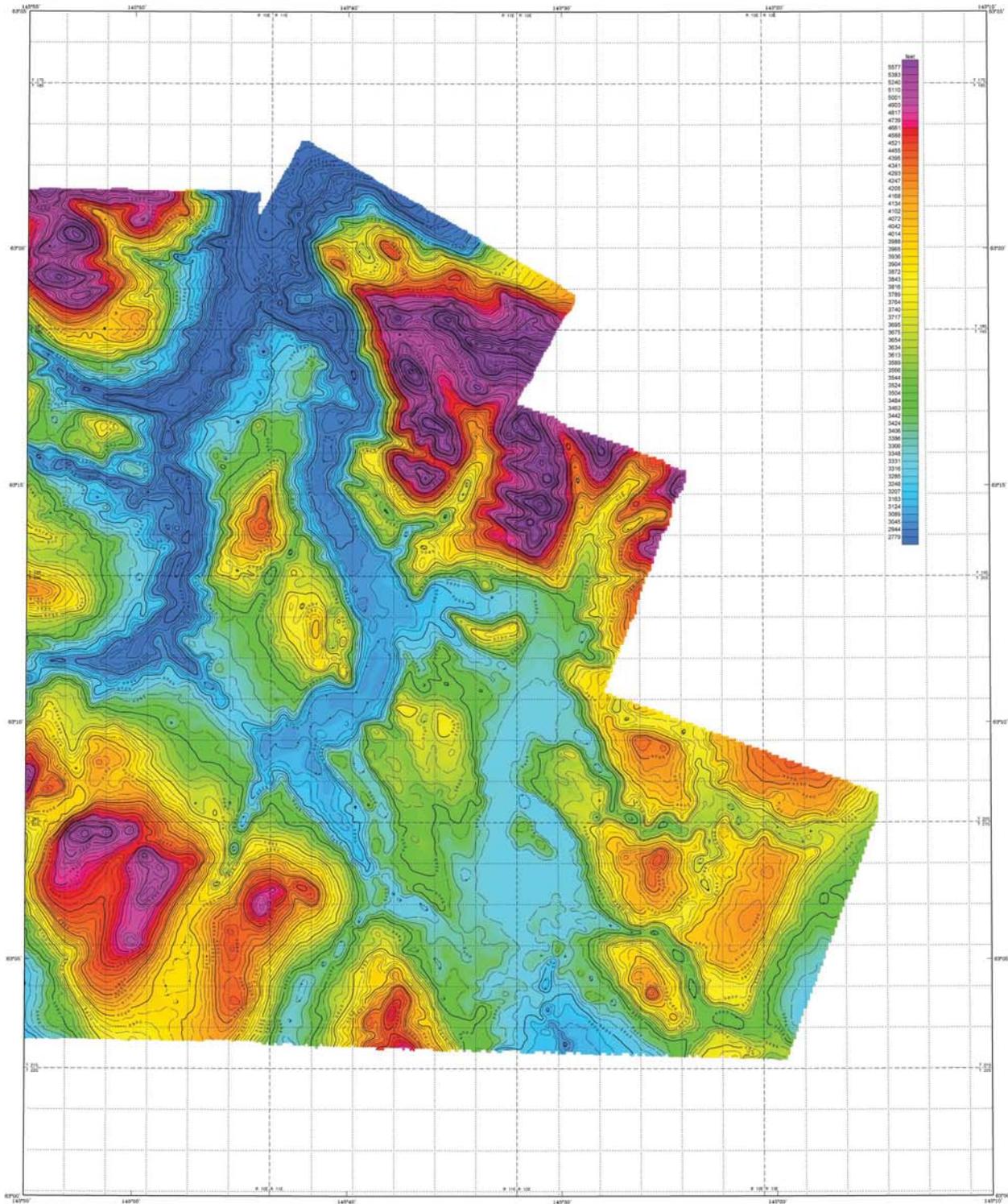
PARTS OF MT. HAYES QUADRANGLE
 2003

The interpretation is based on the geophysical parameters
 with reference to geological maps, which were supplied
 by the State of Alaska.

LEGEND

- F1 Fault
- CL Conductive Axis
- M1 Magnetic Zone
- M2 Magnetic Low
- H1 High Conductive Zone

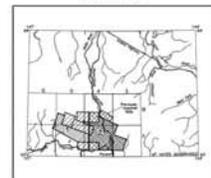




Scale within Area U.S. Geological Survey 60, Sheet 4-1, 600, 4-1, 600
1:62,500 U.S. Geological Survey, 1966



LOCATION INDEX



DIGITAL ELEVATION MODEL OF THE SOUTHERN DELTA RIVER AREA, EAST-CENTRAL ALASKA

PARTS OF MT. HAYES QUADRANGLE
2003

DESCRIPTIVE NOTES

The geophysical data were acquired with a DIMEH1 Electromagnetic (EM) system and a Solitare dual-magnetometer. Data were flown at a height of 100 feet. In addition, the survey recorded data from a radar altimeter, GPS navigation system, SSI/60 Hz monitors and video camera. Flights were performed with an AS350B-2 Squirrel helicopter at a mean terrain clearance of 200 feet above HADE survey flight lines with a spacing of a quarter of a mile. The lines were flown perpendicular to the flight lines at intervals of approximately 3 miles, in a pattern 0224 NAD83/03 GROUNDSPIDER 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 5 m. Flight path positions were projected onto the Clarke 1866 (UTM zone 18) datum, 1927 North American datum using a central meridian (CM) of 143° 30' north-south spacing of 3 and an east constant of 500,000. Relative accuracy of the elevation data is better than 10 m with respect to the UTM grid.

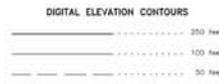
PREVIOUSLY SURVEYED AREAS

The previously acquired geophysical data were acquired with a Solitare dual-magnetometer. The electromagnetic system used was a Solitare dual-magnetometer. Data were flown at a height of 100 feet. In addition, the survey recorded data from a radar altimeter, GPS navigation system, SSI/60 Hz monitors and video camera. Flights were performed with an AS350B-2 Squirrel helicopter at a mean terrain clearance of 200 feet above HADE survey flight lines with a spacing of a quarter of a mile. The lines were flown perpendicular to the flight lines at intervals of approximately 3 miles, in a pattern 0224 NAD83/03 GROUNDSPIDER 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 5 m. Flight path positions were projected onto the Clarke 1866 (UTM zone 18) datum, 1927 North American datum using a central meridian (CM) of 143° 30' north-south spacing of 3 and an east constant of 500,000. Relative accuracy of the elevation data is better than 10 m with respect to the UTM grid.

DIGITAL ELEVATION MODEL

This Digital Elevation Model (DEM) has been compiled from GPS-C values using the ground altimeter data recorded during the course of a helicopter-borne geophysical survey. This is a contour of the ground at a quarter of a mile, azimuth 20 degrees. Elevation values have been interpolated/gridded between survey lines. Every effort has been made to make the model a useful general reference. No guarantee can be made that this model is a true representation of the height above sea level and it may contain minor elevation responses from buildings and in some instances dense timber. Users of the product should be aware of the topographic limitations mapped hereafter.

DO NOT USE THIS MAP FOR NAVIGATION PURPOSES



SURVEY HISTORY

This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources, Bureau of Geological & Geophysical Surveys (DGG), and Shreve Exploration Management Corporation. Geophysical data for this area were acquired and processed by Fargo Airborne Services in 2002. Airborne geophysical data for the Colville, Kupuk, Fish Lake, Kulu, and Tongue Lake areas were acquired in 1992 for the project and were processed by the U.S. Department of Interior, Bureau of Land Management (BLM) and conducted in support of its mineral assessment program in the Delta River mining district. Laine Barnes was the contract manager for DGG.

This map and other products from this survey are available by mail order or in person from DGG, 734 University Ave., Suite 203, Fairbanks, Alaska, 99709. Some products are also available in person only at the BLM's Bureau Mineral Information Center, 100 Seward Road, Douglas, Alaska, 99624.