KOYUKUK ELECTROMAGNETIC AND MAGNETIC AIRBORNE GEOPHYSICAL SURVEY DATA COMPILATION

L.E. Burns, G.R.C. Graham, J.D. Barefoot, SIAL Geosciences, Inc., and On-line Exploration Services, Inc.

Geophysical Report 2020-9

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KOYUKUK ELECTROMAGNETIC AND MAGNETIC AIRBORNE GEOPHYSICAL SURVEY DATA COMPILATION

L.E. Burns[1], G.R.C. Graham[1], J.D. Barefoot[1], SIAL Geosciences, Inc., and On-line Exploration Services, Inc.

ABSTRACT

The Koyukuk geophysical survey is located in interior Alaska in the Koyukuk mining district, about 300 kilometers north of Fairbanks, Alaska. Frequency domain electromagnetic and magnetic data were collected with the SIGHEM-5 system from August to October 1997. A total of 4223.4 line kilometers were collected covering 533 square kilometers. Line spacing was 400 meters (m). Data were collected 30 m above the ground surface from a helicopter towed sensor platform ("bird") on a 30-m-long line.

PURPOSE

This airborne geophysical survey is part of a program to acquire data on Alaska's most promising mineral belts and districts. The information acquired is aimed at catalyzing new private-sector exploration, discovery, and ultimate development and production. The purpose of the survey was to map the magnetic and conductive properties of the survey area. The Koyukuk mining district has many historic and current placer gold mines, as well as copper skarn prospects. 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.

KNOWN ISSUES

Apparent resistivity data is only present in gridded data.

ACKNOWLEDGMENTS

Funding was provided by the Department of the Interior Bureau of Land Management (BLM).

[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. Includes a geographically registered pdf (GeoPDF) for use with mobile devices such as GPS enabled smartphones and tablets, other devices, and programs
vector_data	contractor and DGGS	Line path, data contours, and survey boundary in ESRI shapefile (SHP) format, ESRI Geodatabase format, and/or AutoCAD dxf format
video_flightpath	contractor	Survey flight path downward-facing video

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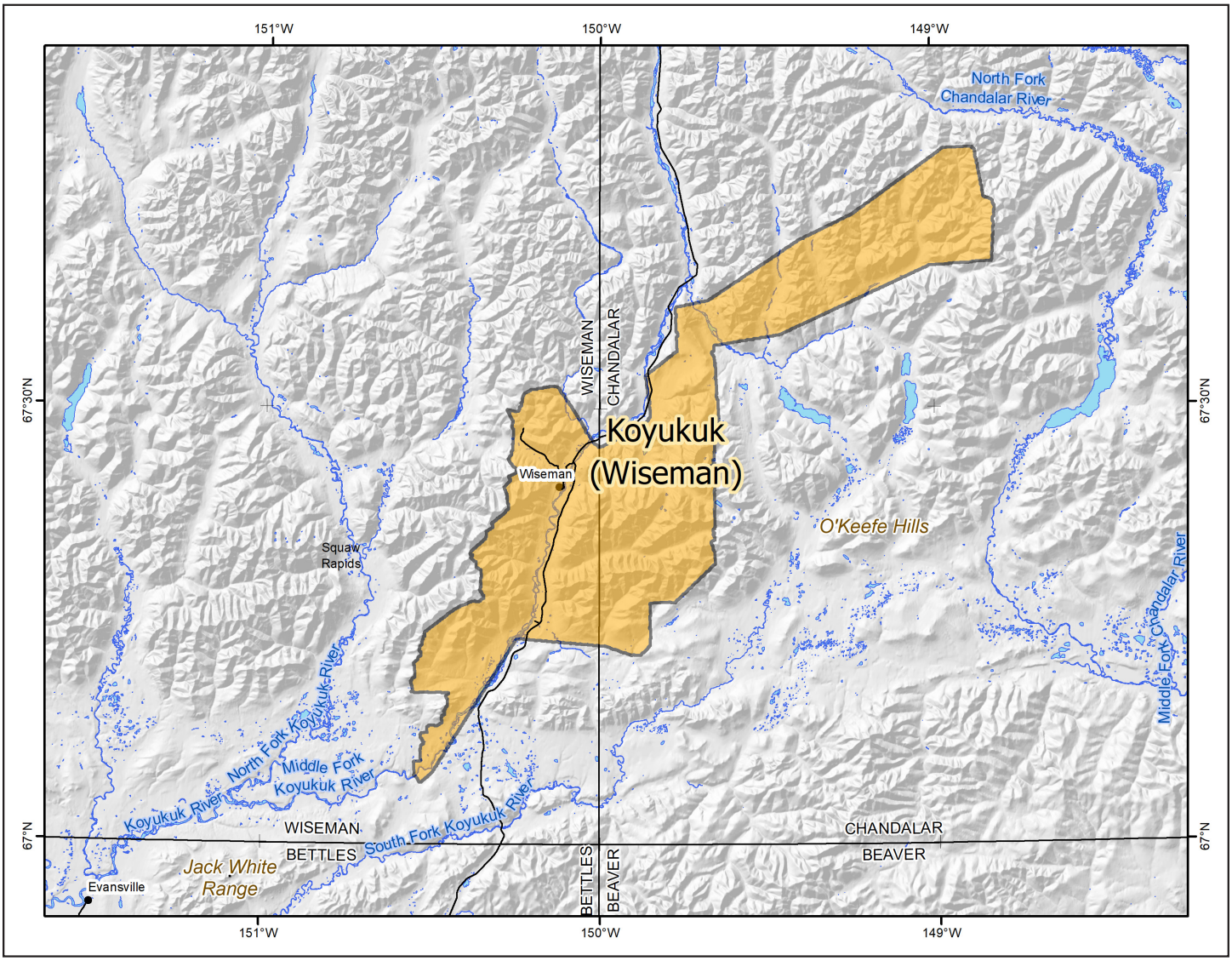


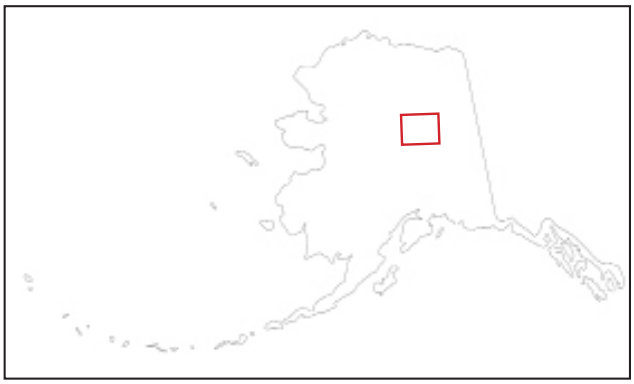


Figure 1. Koyukuk electromagnetic and magnetic airborne geophysical survey location shown in interior Alaska (inset). Koyukuk survey area shown with adjacent DGGS geophysical surveys, landmarks, relevant 1:250,000-scale quadrangle boundaries, mountain ranges, rivers, and elevation hillshade.

Figure 2. Flight path with orthometric image.

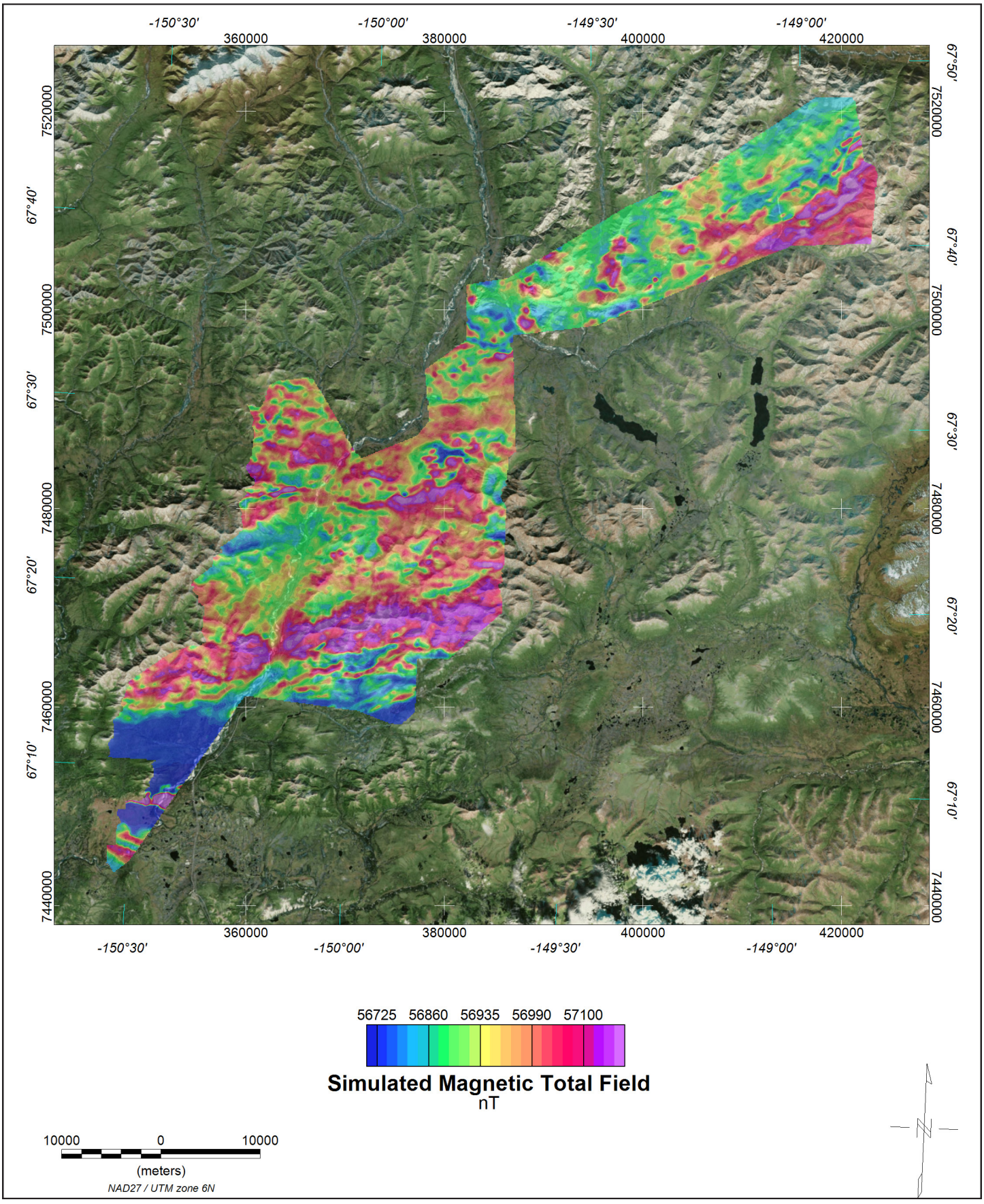


Figure 3. Simulated magnetic total field grid with orthometric image. The magnetic total field data were processed using digitally recorded data from a Scintrex CS2 cesium magnetometer. Data were collected at a sampling interval of 0.1 seconds. The magnetic data were (1) corrected for diurnal variations by subtracting the digitally recorded base station magnetic data, (2) IGRF corrected (IGRF model 1995, updated to August, 1997), (3) leveled to the tie line data, (4) a constant value of approximately 57,000 nT was added to all data, and (5) interpolated onto a regular 80 m grid using a modified Akima (1970) technique.

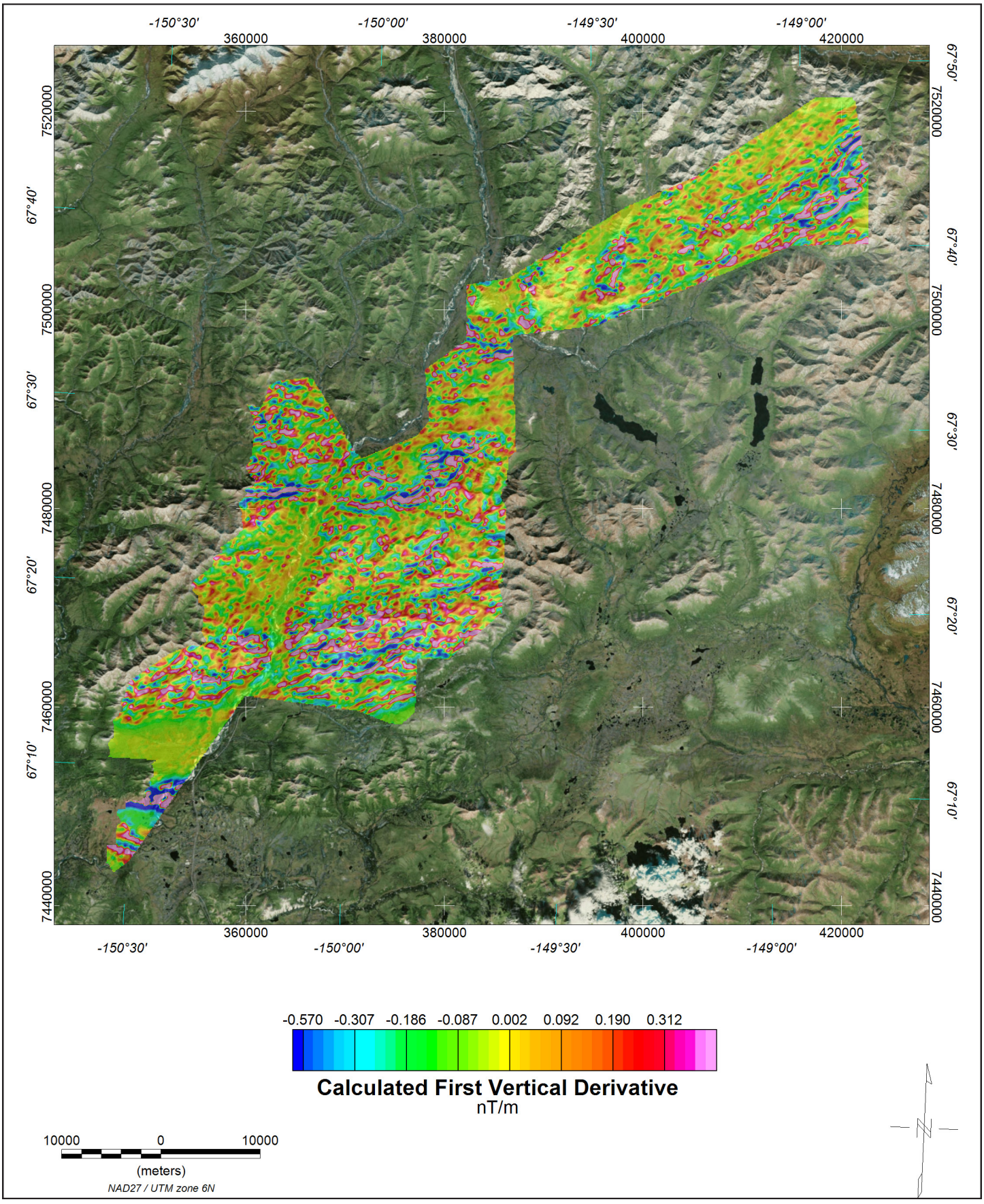


Figure 4. Calculated first vertical derivative grid with orthometric image. The first vertical derivative grid was calculated from the diurnally-corrected, IGRF-corrected total magnetic field grid using a FFT base frequency domain filtering algorithm. The resulting first vertical derivative grid provides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

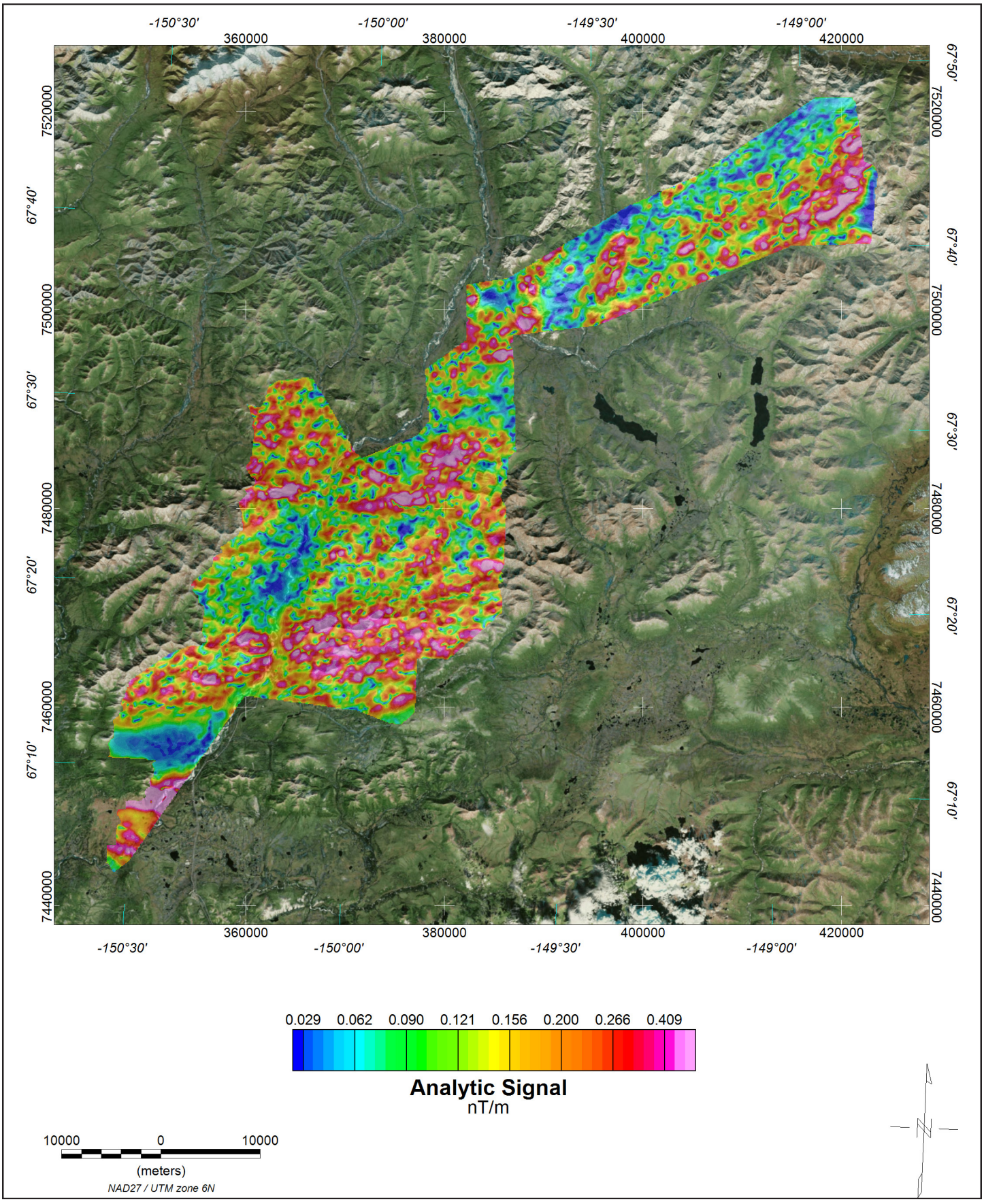


Figure 5. Analytic signal grid with orthometric image. Analytic signal is the total amplitude of all directions of magnetic gradient calculated from the sum of the squares of the three orthogonal gradients. Mapped highs in the calculated analytic signal of magnetic parameter locate the anomalous source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

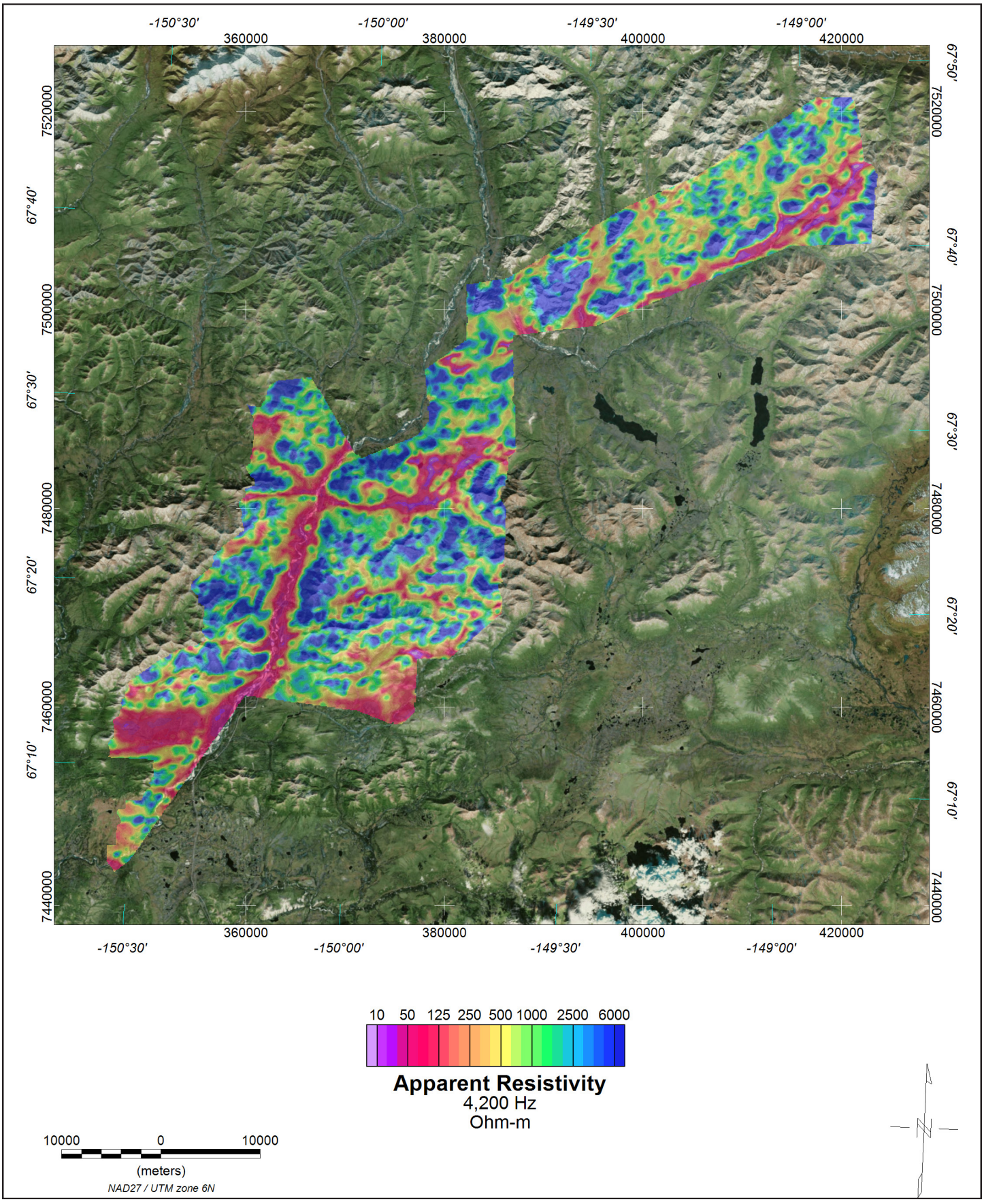


Figure 6. 4,200 Hz coplanar apparent resistivity grid with orthometric image. The SIGHEM-5 EM system measured inphase and quadrature components at five frequencies. Two vertical coaxial coil-pairs operated at 870 and 4785 Hz while three horizontal coplanar coil-pairs operated at 945, 4,212, and 36,360 Hz. EM data were sampled at 0.1 second intervals. The EM system responds to bedrock conductors, conductive overburden, and cultural sources. Apparent resistivity, calculated with leveled inphase and quadrature components, was (1) gridded with bi-directional method using a grid of 100 m, and (2) filtered with a low pass directional filter (decorrugation; Keating, 1994).

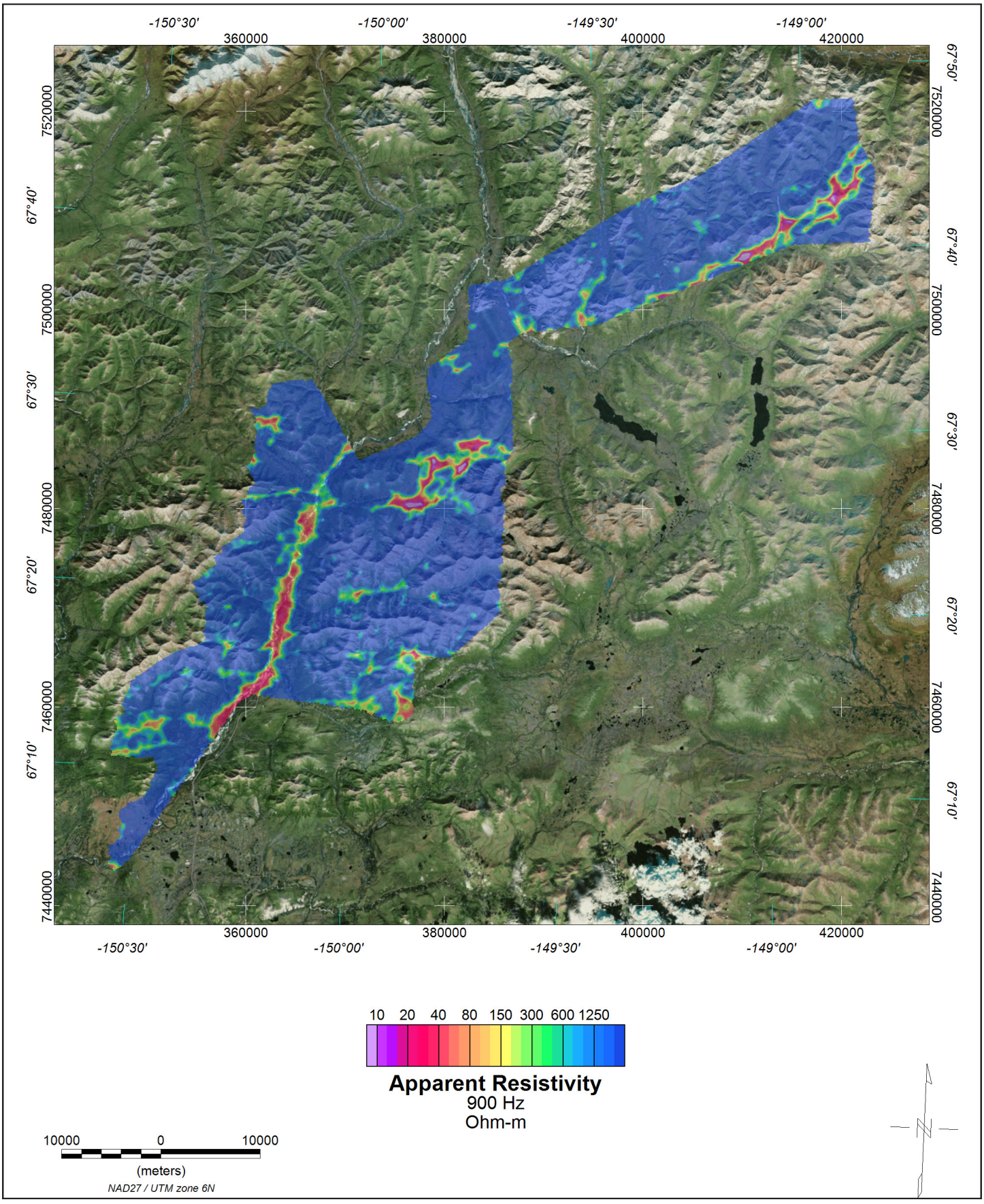


Figure 7. 900 Hz coplanar apparent resistivity grid with orthometric image. The SIGHEM-5 EM system measured inphase and quadrature components at five frequencies. Two vertical coaxial coil-pairs operated at 870 and 4785 Hz while three horizontal coplanar coil-pairs operated at 945, 4,212, and 36,360 Hz. EM data were sampled at 0.1 second intervals. The EM system responds to bedrock conductors, conductive overburden, and cultural sources. Apparent resistivity, calculated with leveled inphase and quadrature components, was (1) gridded with bi-directional method using a grid of 100 m, and (2) filtered with a low pass directional filter (decorrugation; Keating, 1994).

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/10.14509/30434

Map Title	Description
koyukuk_flightpath_topo_map_1of2.pdf	flight lines with topographic base map
koyukuk_flightpath_topo_map_2of2.pdf	flight lines with topographic base map
koyukuk_emanomalies_sim_magtf_bw_contours_topo_map_1of2.pdf	black and white electromagnetic anomaly map with simulated magnetic total field grid contours and topographic base map
koyukuk_emanomalies_sim_magtf_bw_contours_topo_map_2of2.pdf	black and white electromagnetic anomaly map with simulated magnetic total field grid contours and topographic base map
koyukuk_emanomalies_res900hz_contours_plss_map_1of2.pdf	electromagnetic anomaly map with 900 Hz apparent resistivity grid contours and public land survey system base layer
koyukuk_emanomalies_res900hz_contours_plss_map_2of2.pdf	electromagnetic anomaly map with 900 Hz apparent resistivity grid contours and public land survey system base layer
koyukuk_emanomalies_res4200hz_contours_plss_map_1of2.pdf	electromagnetic anomaly map with 4,200 Hz apparent resistivity grid contours and public land survey system base layer
koyukuk_emanomalies_res4200hz_contours_plss_map_2of2.pdf	electromagnetic anomaly map with 4,200 Hz apparent resistivity grid contours and public land survey system base layer
koyukuk_intepretation_map_1of2.pdf	interpretation based on geophysical data
koyukuk_intepretation_map_2of2.pdf	interpretation based on geophysical data
koyukuk_emanomalies_sim_magtf_contours_detailed_topo_map_1of5.pdf	detailed electromagnetic anomaly map with simulated magnetic total field grid contours and topographic base map
koyukuk_emanomalies_sim_magtf_contours_detailed_topo_map_2of5.pdf	detailed electromagnetic anomaly map with simulated magnetic total field grid contours and topographic base map
koyukuk_emanomalies_sim_magtf_contours_detailed_topo_map_3of5.pdf	detailed electromagnetic anomaly map with simulated magnetic total field grid contours and topographic base map
koyukuk_emanomalies_sim_magtf_contours_detailed_topo_map_4of5.pdf	detailed electromagnetic anomaly map with simulated magnetic total field grid contours and topographic base map
koyukuk_emanomalies_sim_magtf_contours_detailed_topo_map_5of5.pdf	detailed electromagnetic anomaly map with simulated magnetic total field grid contours and topographic base map
koyukuk_emanomalies_sim_magtf_contours_topo_map_1of2.pdf	electromagnetic anomaly map with simulated magnetic total field grid contours and topographic base map
koyukuk_emanomalies_sim_magtf_contours_topo_map_2of2.pdf	electromagnetic anomaly map with simulated magnetic total field grid contours and topographic base map
koyukuk_sim_magtf_contours_plss_map_1of2.pdf	simulated magnetic total field grid with public land survey system base layer
koyukuk_sim_magtf_contours_plss_map_2of2.pdf	simulated magnetic total field grid with public land survey system base layer
koyukuk_res900hz_contours_plss_map_1of2.pdf	900 Hz apparent resistivity grid with contours and public land survey system base layer
koyukuk_res900hz_contours_plss_map_2of2.pdf	900 Hz apparent resistivity grid with contours and public land survey system base layer
koyukuk_res4200hz_contours_plss_map_1of2.pdf	4,200 Hz apparent resistivity grid with contours and public land survey system base layer
koyukuk_res4200hz_contours_plss_map_2of2.pdf	4,200 Hz apparent resistivity grid with contours and public land survey system base layer

ALASKA DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS
IN COOPERATION WITH U.S. BUREAU OF LAND MANAGEMENT

Public-data File 98-19
Sheet 1 of 2

FLIGHT LINE PATH OF THE 1997 GEOPHYSICAL SURVEY FOR THE NORTHEASTERN PORTION OF THE KOYUKUK MINING DISTRICT, EASTERN BROOKS RANGE, ALASKA

1998

DESCRIPTIVE NOTES

The geophysical data were acquired with a SIGHEM-3 Electromagnetic (EM) system, a Scintrex Cesium CS2 magnetometer, and a Hard VLF system installed in a UH-1H/B2B1 Squirrel helicopter. In addition, the survey recorded data from a radar altimeter (TERRA), GPS navigation system, 35/70 mm monitors, and video camera. Flights were performed at a mean terrain clearance of 200 ft along survey flight lines with a spacing of ¼ quarter of a mile. Tie lines were flown perpendicular to the flight lines at intervals of approximately three miles.

Two Trimble-4000 SE Differential Post-processing Global Positioning Systems were used for both navigation and flight path recovery. The helicopter position was derived every one second to a relative accuracy of better than 10 m. Flight path positions were projected onto the Clarke 1866 (UTM) spheroid, 1927 North American datum using a Central Meridian (CM) of 147 W, 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.

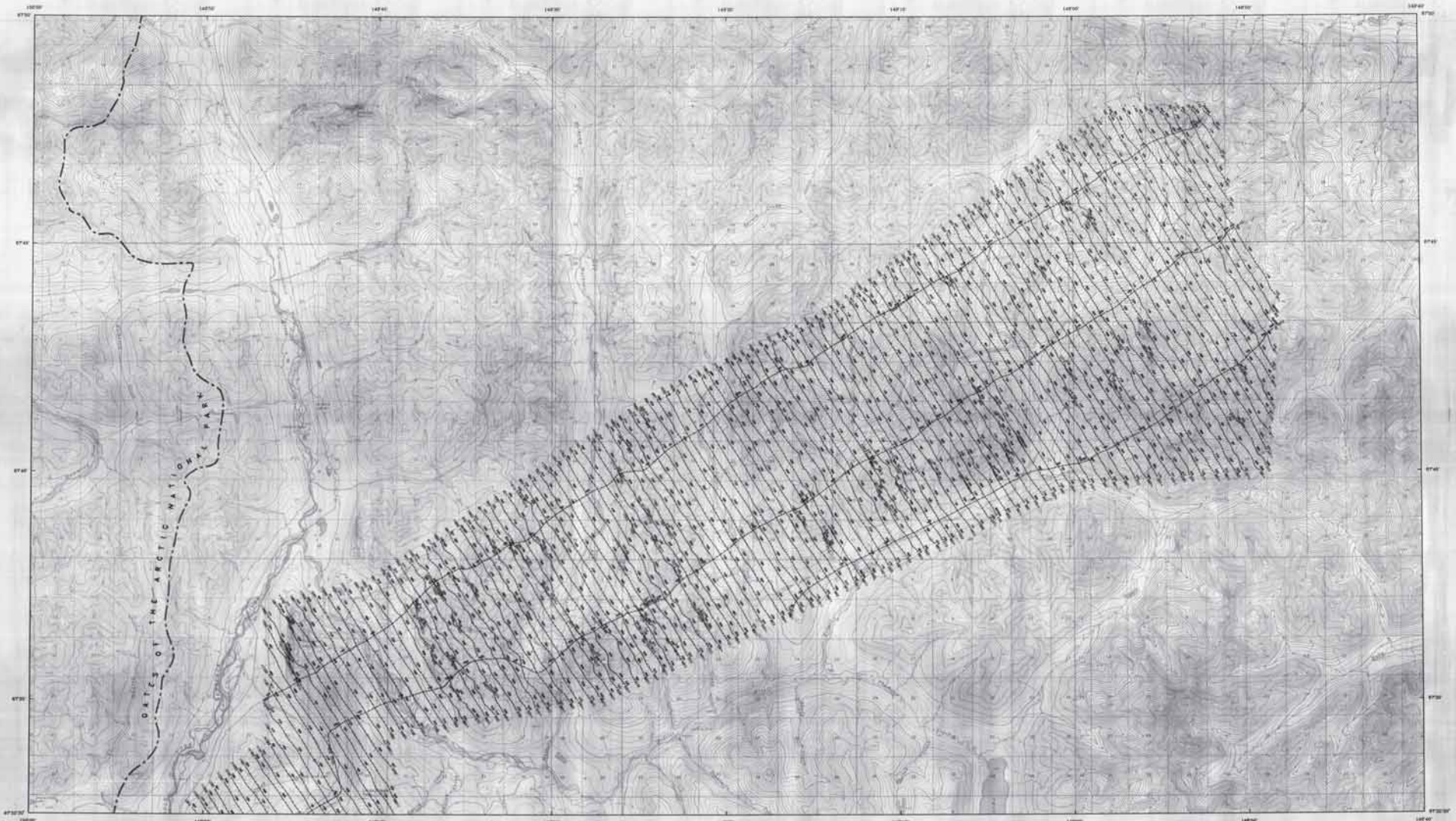
FLIGHT PATH INFORMATION

LOCATION INDEX

SURVEY HISTORY

This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources, Division of Geological & Geophysical Surveys, and On-Line Exploration Services Inc. Airborne geophysical data for the area were acquired by Sial Geosciences, Inc., in 1997. Funding for the project was provided by the U.S. Department of Interior Bureau of Land Management (BLM).

This map and other products from this survey are available from the Alaska Division of Geological & Geophysical Surveys, 794 University Ave., Suite 200, Fairbanks, Alaska, 99709.



SCALE 1:63 360

1 0 1 2 3 4 5 MILES

1 0 1 2 3 4 5 KILOMETERS

CONTOUR INTERVAL 100 FEET
DATUM MEAN SEA LEVEL

APPROXIMATE MEAN DECLINATION, 1997

FLIGHT LINE PATH OF THE 1997 GEOPHYSICAL SURVEY FOR THE NORTHEASTERN PORTION OF THE KOYUKUK MINING DISTRICT, EASTERN BROOKS RANGE, ALASKA

1998

DESCRIPTIVE NOTES

The geophysical data were acquired with a SIGHEM-5 Electromagnetic (EM) system, a Scintrex cesium CS2 magnetometer, and a Herz VLF system installed in a LMA-HABSIB7 Squirrel helicopter. In addition, the survey recorded data from a radar altimeter (TERRA), GPS navigation system, 50/60 Hz monitors, and video camera. Flights were performed at a mean terrain clearance of 200 ft along survey flight lines with a spacing of a quarter of a mile. Tie lines were flown perpendicular to the flight lines at intervals of approximately three miles.

Two Trimble-4000 SE Differential Post-processing Global Positioning Systems were used for both navigation and flight path recovery. The helicopter position was derived every one second to a relative accuracy of better than 10 m. Flight path positions were projected onto the Clarke 1866 (UTM) spheroid, 1927 North American datum using a Central Meridian (CM) of 147 W, 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.

FLIGHT PATH INFORMATION

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This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources, Division of Geological & Geophysical Surveys, and On-Line Exploration Services, Inc. Airborne geophysical data for the area were acquired by Sial Geosciences, Inc., in 1997. Funding for the project was provided by the U.S. Department of Interior Bureau of Land Management (BLM).

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ALASKA DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS
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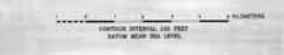
Public-data File 98-20
Sheet 1 of 2



TOTAL FIELD MAGNETICS AND ELECTROMAGNETIC ANOMALIES FOR THE NORTHEASTERN PORTION OF THE KOYUKUK MINING DISTRICT, EASTERN BROOKS RANGE, ALASKA

1998

DESCRIPTIVE NOTES

The geophysical data were acquired with a SIGHEM-3 Electromagnetic (EM) system, a Scintrex cesium (Cs) magnetometer, and a Herz VLF system installed in a UNA-HARDAT Squirrel helicopter. In addition, the survey recorded data from a radar altimeter (TERRA), GPS navigation system, 50/60 Hz monitors, and video camera. Flights were performed at a mean terrain clearance of 200 ft along survey flight lines with a spacing of ¼ quarter of a mile. Tie lines were flown perpendicular to the flight lines at intervals of approximately three miles.

Two Trimble–4000 SE Differential Post–processing Global Positioning Systems were used for both navigation and flight path recovery. The helicopter position was derived every one second to a relative accuracy of better than 10 m. Flight path positions were projected into the Clarke 1866 (UTM) spheroid, 1927 North American datum using a Central Meridian (CM) of 147 W, 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.

ELECTROMAGNETICS

To determine the location of EM anomalies or their boundaries, the SIGHEM–3 EM system measured inphase and quadrature components at five frequencies. Two vertical coaxial coil–pairs operated at 870 and 4785 Hz while three horizontal coplanar coil–pairs operated at 845, 6212 and 26,550 Hz. EM data were sampled at 0.1 second intervals. The EM system responds to bedrock conductors, conductive overburden, and cultural sources. The power line monitor and the flight track video were examined to locate the cultural sources. The EM anomalies that are indicated are classified by conductance.

ELECTROMAGNETIC ANOMALIES

MAGNETIC CONTOURS

FLIGHT PATH INFORMATION

SURVEY HISTORY

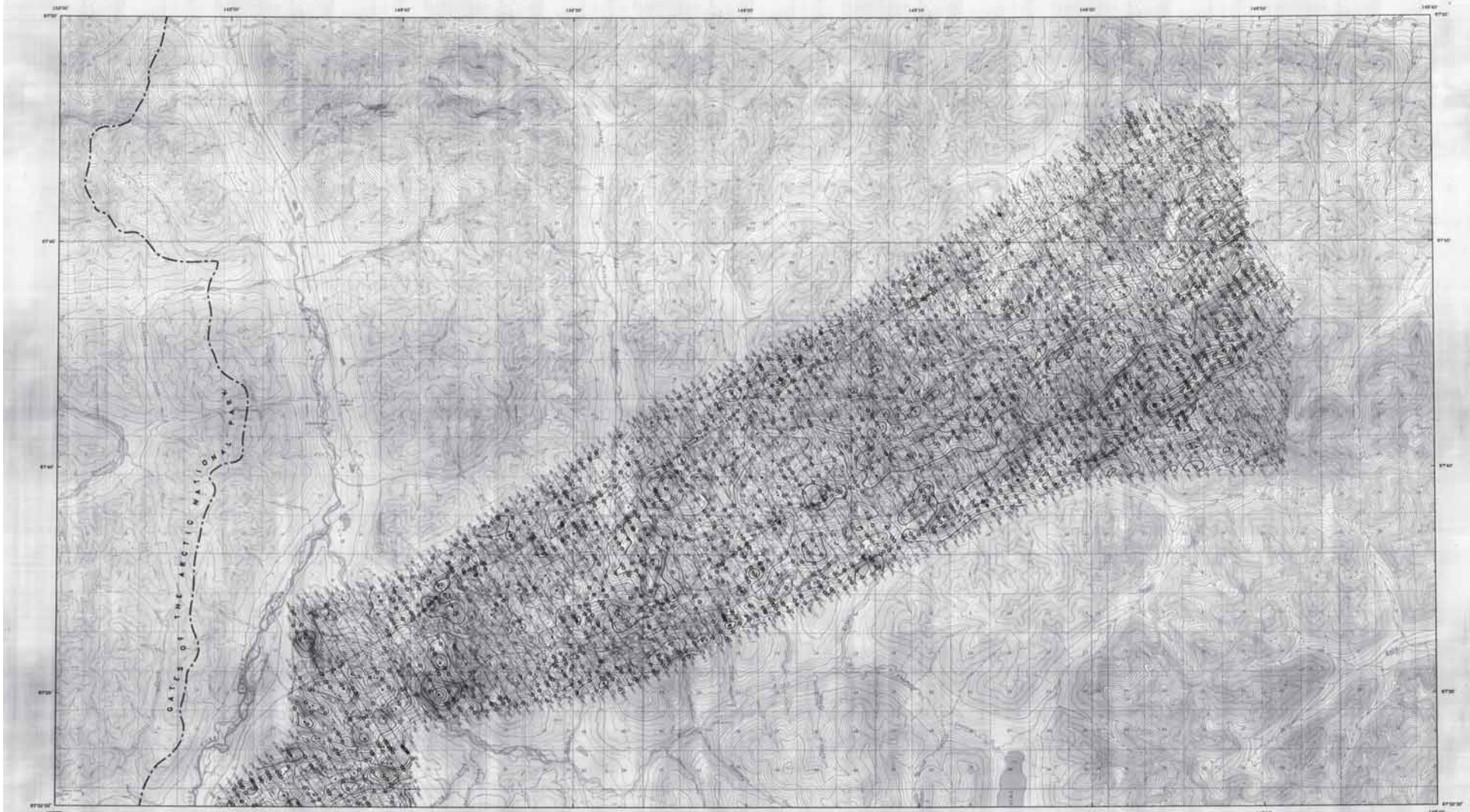
This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources, Division of Geological & Geophysical Surveys, and On-Line Exploration Services Inc. Airborne geophysical data for the area were acquired by Fugro GeoServices, Inc., in 1997. Funding for the project was provided by the U.S. Department of Interior Bureau of Land Management (BLM).

This map and other products from this survey are available from the Alaska Division of Geological & Geophysical Surveys, 794 University Ave., Suite 200, Fairbanks, Alaska, 99709.

TOTAL FIELD MAGNETICS

The total field magnetic data were acquired with a sampling interval of 0.1 seconds, and were (1) corrected for diurnal variations by subtracting from the digitally recorded base station magnetic data, (2) leveled to the tie line data, and (3) interpolated onto a regular 100 m grid using a modified Akima (1970) technique. A regional trend (IGRF 1995, updated to August 1997) was then removed from the leveled magnetic data.

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



SCALE 1:63 360

1 0 1 2 3 4 5 6 MILES

1 0 1 2 3 4 5 KILOMETERS

CONTOUR INTERVAL 100 FEET
DATUM MEAN SEA LEVEL

TOTAL FIELD MAGNETICS AND ELECTROMAGNETIC ANOMALIES FOR THE NORTHEASTERN PORTION OF THE KOYUKUK MINING DISTRICT, EASTERN BROOKS RANGE, ALASKA

1998

DESCRIPTIVE NOTES

The geophysical data were acquired with a SIGHEM-5 Electromagnetic (EM) system, a Scintrex cesium CS2 magnetometer, and a Herz VLF system installed in a LAMA-348087 Squirrel helicopter. In addition, the survey recorded data from a radar altimeter (TERRA), GPS navigation system, 50/60 Hz monitors, and video cameras. Flights were performed at a mean terrain clearance of 200 ft along survey flight lines with a spacing of ¼ quarter of a mile. Tie lines were flown perpendicular to the flight lines at intervals of approximately three miles.

Two Trimble-4000 SE Differential Post-processing Global Positioning Systems were used for both navigation and flight path recovery. The helicopter position was derived every one second to a relative accuracy of better than 10 m. Flight path positions were projected onto the Clarke 1866 (UTM) spheroid, 1927 North American datum using a Central Meridian (CM) of 147° W, 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.

ELECTROMAGNETICS

To determine the location of EM anomalies or their boundaries, the SIGHEM-5 EM system measured inphase and quadrature components at five frequencies. Two vertical coaxial coil-pairs operated at 870 and 4785 Hz while three horizontal coplanar coil-pairs operated at 945, 4212 and 26,360 Hz. EM data were sampled at 0.1 second intervals. The EM system responds to bedrock conductors, conductive overburden, and cultural sources. The power line monitor and the flight track video were examined to locate the cultural sources. The EM anomalies that are indicated are classified by conductance.

ELECTROMAGNETIC ANOMALIES

MAGNETIC CONTOURS

FLIGHT PATH INFORMATION

LOCATION INDEX

SURVEY HISTORY

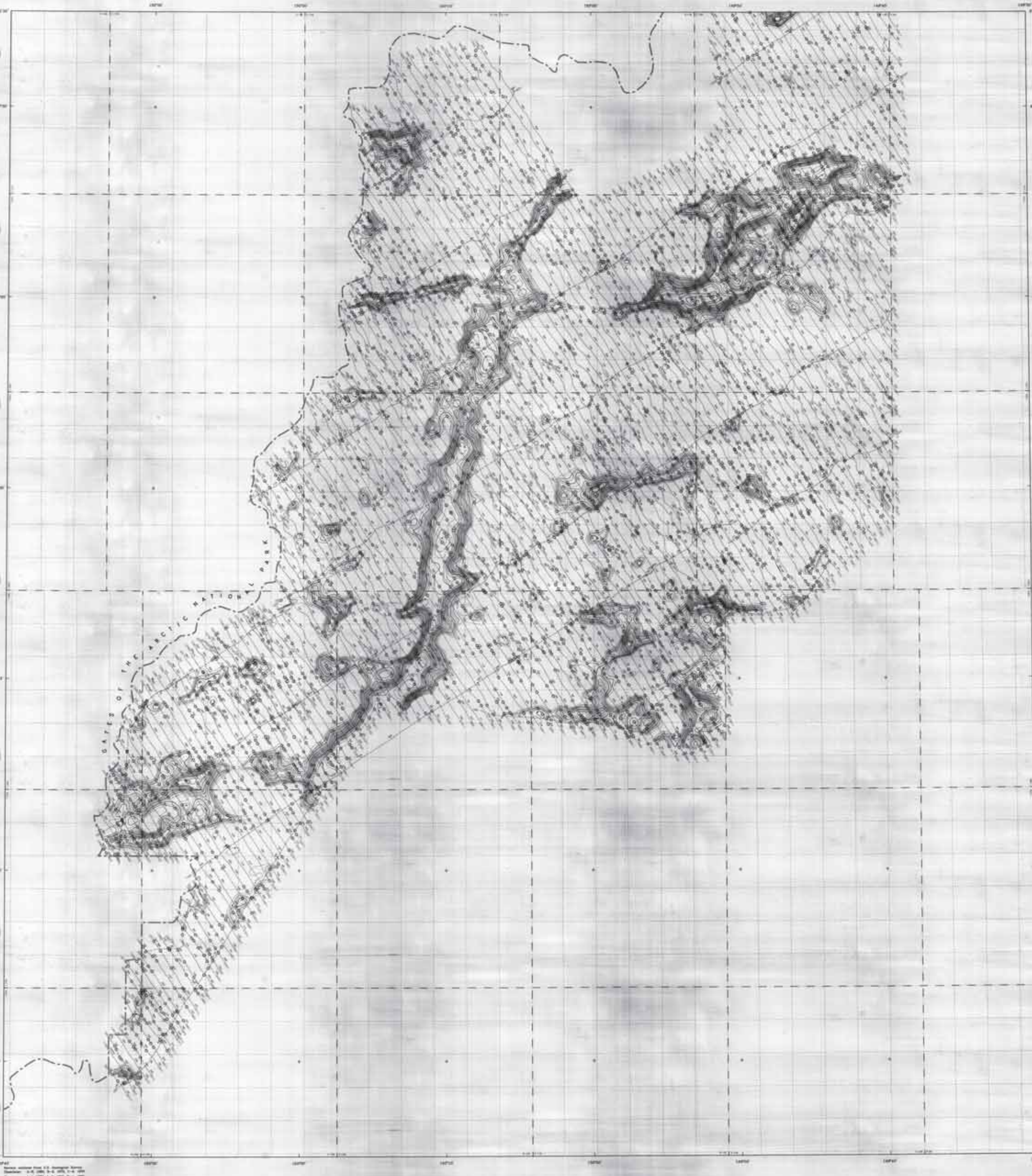
This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources, Division of Geological & Geophysical Surveys, and On-Line Exploration Services, Inc. Airborne geophysical data for the area were acquired by Sial Geosciences, Inc., in 1997. Funding for the project was provided by the U.S. Department of Interior Bureau of Land Management (BLM).

This map and other products from this survey are available from the Alaska Division of Geological & Geophysical Surveys, 794 University Ave., Suite 200, Fairbanks, Alaska, 99709.

TOTAL FIELD MAGNETICS

The total field magnetic data were acquired with a sampling interval of 0.1 seconds, and were (1) corrected for diurnal variations by subtraction of the digitally recorded base station magnetic data, (2) leveled to the tie line data, and (3) interpolated onto a regular 100 m grid using a modified Akima (1970) technique. A regional trend (CNF 1995, updated to August 1997) was then removed from the leveled magnetic data.

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



DESCRIPTIVE NOTES

The geophysical data were acquired with a DIGHEM-V Electromagnetic (EM) system, a Scintrex cesium CS2 magnetometer, and a Herz VLF system installed in a LAMA-N4808? Squirrel helicopter. In addition, the survey recorded data from a radar altimeter (TERRA), GPS navigation system, 50/60 Hz monitors, and video camera. Flights were performed at a mean terrain clearance of 200 ft along survey flight lines with a spacing of a quarter of a mile. Tie lines were flown perpendicular to the flight lines at intervals of approximately three miles.

Two Trimble-4000 SE Differential Post-processing Global Positioning Systems were used for both navigation and flight path recovery. The helicopter position was derived every one second to a relative accuracy of better than 10 m. Flight path positions were projected onto the Clarke 1866 (UTM) spheroid, 1927 North American datum using a Central Meridian (CM) of 147 W, 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.

ELECTROMAGNETICS

To determine the location of EM anomalies or their boundaries, the DIGHEM-V EM system measured inphase and quadrature components at five frequencies. Two vertical coaxial coil-pairs operated at 870 and 4765 Hz while three horizontal coplanar coil-pairs operated at 945, 4212 and 36360 Hz. EM data were sampled at 0.1 second intervals. The EM system responds to bedrock conductors, conductive overburden, and cultural sources. The power line monitor and the flight track video were examined to locate the cultural sources. The EM anomalies that are indicated are classified by conductance.

Apparent resistivity, calculated with leveled inphase and quadrature components, was (1) gridded with bi-directional method using a grid of 100 m, and (2) filtered with a low pass directional filter (decorrugation; Keating, 1994).

900 Hz COPLANAR RESISTIVITY CONTOURS FOR THE NORTHEASTERN PORTION OF THE KOYUKUK MINING DISTRICT, EASTERN BROOKS RANGE, ALASKA

1998

ELECTROMAGNETIC ANOMALIES

RESISTIVITY CONTOURS

FLIGHT PATH INFORMATION

LOCATION INDEX

SURVEY HISTORY

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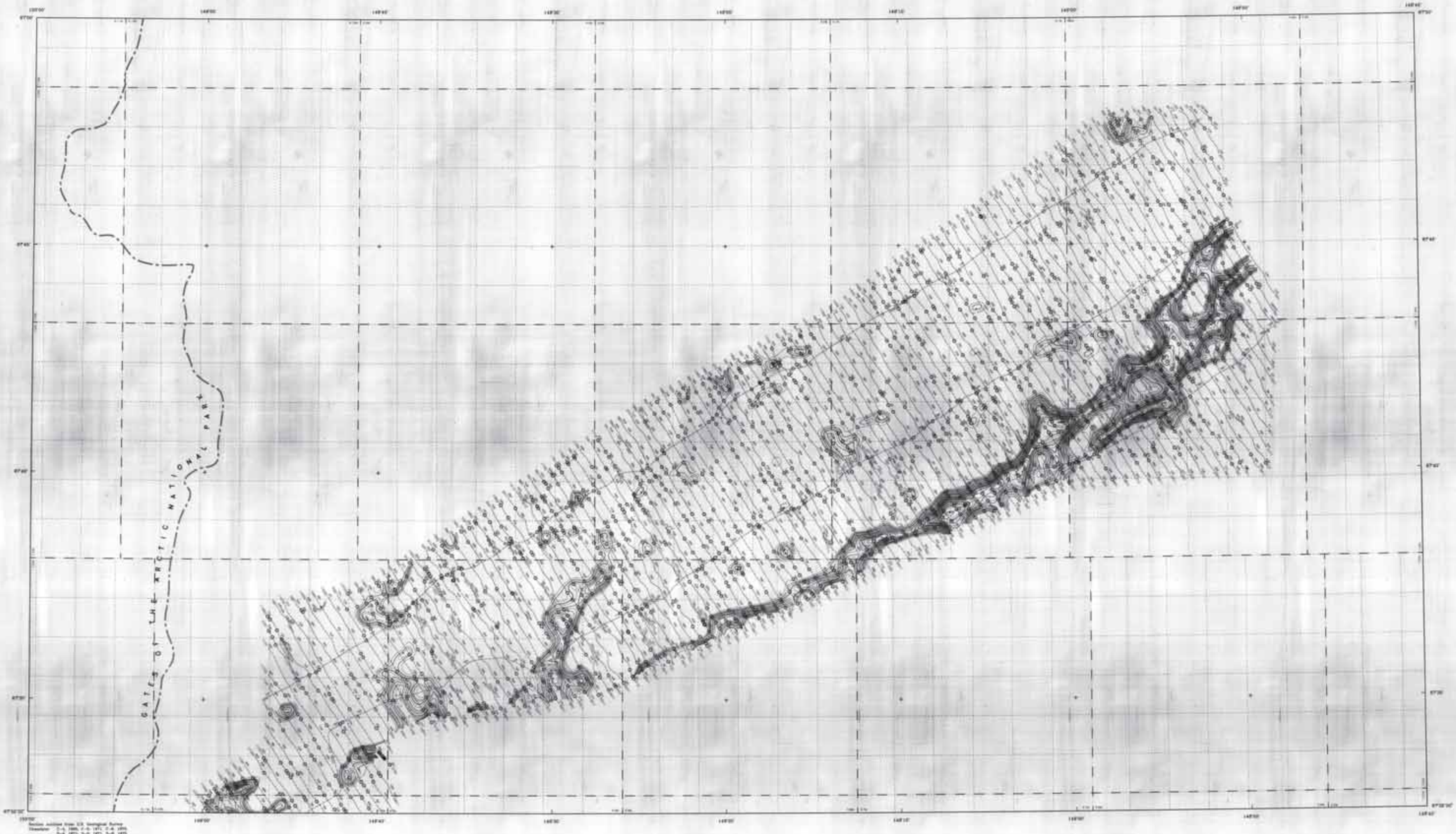
ALASKA DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS
IN COOPERATION WITH U.S. BUREAU OF LAND MANAGEMENT



900 Hz COPLANAR RESISTIVITY CONTOURS FOR THE NORTHEASTERN PORTION OF THE KOYUKUK MINING DISTRICT, EASTERN BROOKS RANGE, ALASKA

1998

DESCRIPTIVE NOTES

The geophysical data were acquired with a SIGHEM-5 Electromagnetic (EM) system, a Scintrex cesium CS2 magnetometer, and a Herz VLF system installed in a LAMA-N4808T Squirrel helicopter. In addition, the survey recorded data from a radar altimeter (TERRA), GPS navigation system, 50/60 Hz monitors, and video camera. Flights were performed at a mean terrain clearance of 200 ft along survey flight lines with a spacing of a quarter of a mile. Tie lines were flown perpendicular to the flight lines at intervals of approximately three miles.

Two Trimble-4000 SE Differential Post-processing Global Positioning Systems were used for both navigation and flight path recovery. The helicopter position was derived every one second to a relative accuracy of better than 10 m. Flight path positions were projected onto the Clarke 1866 (UTM) spheroid, 1927 North American datum using a Central Meridian (CM) of 147° W, 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.

ELECTROMAGNETICS

To determine the location of EM anomalies or their boundaries, the SIGHEM-5 EM system measured inphase and quadrature components at five frequencies. Two vertical coaxial coil-pairs operated at 870 and 4785 Hz while three horizontal coplanar coil-pairs operated at 945, 4212 and 36360 Hz. EM data were sampled at 0.1 second intervals. The EM system responds to bedrock conductors, conductive overburden, and cultural sources. The power line monitor and the flight track video were examined to locate the cultural sources. The EM anomalies that are indicated are classified by conductance.

Apparent resistivity, calculated with leveled inphase and quadrature components, was (1) gridded with bi-directional method using a grid of 100 m, and (2) filtered with a low pass directional filter (decorrugation; Keating, 1994).

Keating, Pierre, 1994. Frequency Domain Filtering: Geological Survey of Canada, Unpublished Fortran Program.

ELECTROMAGNETIC ANOMALIES

RESISTIVITY CONTOURS

FLIGHT PATH INFORMATION

LOCATION INDEX

SURVEY HISTORY

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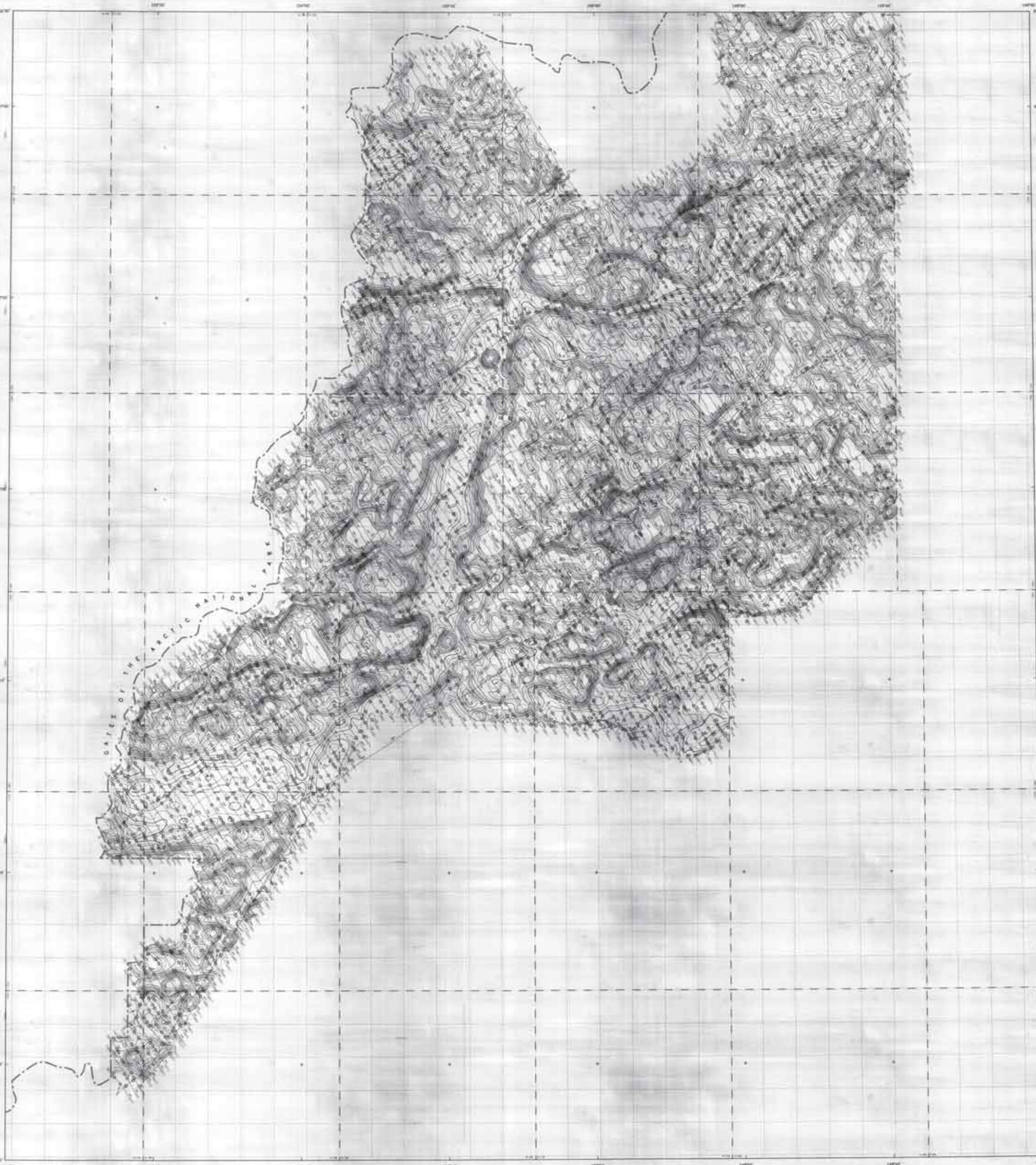

4200 Hz COPLANAR RESISTIVITY CONTOURS FOR THE NORTHEASTERN PORTION OF THE KOYUKUK MINING DISTRICT, EASTERN BROOKS RANGE, ALASKA

1998

DESCRIPTIVE NOTES

The geophysical data were acquired with a DIGHEM-5 Electromagnetic (EM) system, a Scintrex cesium CS2 magnetometer, and a Herz VLF system installed in a [illegible] Squirrel helicopter. In addition, the survey recorded data from a radar altimeter, GPS navigation system, 50/60 Hz monitors, and video camera. Flights were performed at a mean terrain clearance of 200 ft along survey flight lines with a spacing of a quarter of a mile. Tie lines were flown perpendicular to the flight lines at intervals of approximately three miles.

Two Trimble-4000 SE Differential Post-processing Global Positioning Systems were used for both navigation and flight path recovery. The helicopter position was derived every one second to a relative accuracy of better than 10 m. Flight path positions were projected onto the Clarke 1866 (UTM) spheroid, 1927 North American datum using a Central Meridian (CM) of 147° W, 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.

ELECTROMAGNETICS

To determine the location of EM anomalies or their boundaries, the DIGHEM-5 EM system measured inphase and quadrature components of five frequencies. Two vertical coaxial coil-pairs operated at 870 and 4780 Hz while three horizontal coplanar coil-pairs operated at 845, 4212 and 36,860 Hz. EM data were sampled at 0.1 second intervals. The EM system responds to bedrock conductors, conductive overburden, and cultural sources. The power line monitor and the flight track video were examined to locate the cultural sources. The EM anomalies that are indicated are unclassified by conductance.

Apparent resistivity, calculated with leveled inphase and quadrature components, was (1) gridded with bi-directional method using a grid of 100 m, and (2) filtered with a low pass directional filter (decorrugation) Keating, 1994).

Keating, Pierre, 1994, Frequency domain filtering: [illegible]

ELECTROMAGNETIC ANOMALIES

RESISTIVITY CONTOURS

FLIGHT PATH INFORMATION

LOCATION INDEX

SURVEY HISTORY

This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources, Division of Geological & Geophysical Surveys, and Dri-Line Exploration Services, Inc. Airborne geophysical data for the area were acquired by Dighem Geosciences, Inc., in 1997. Funding for the project was provided by the U.S. Department of Interior Bureau of Land Management (BLM).

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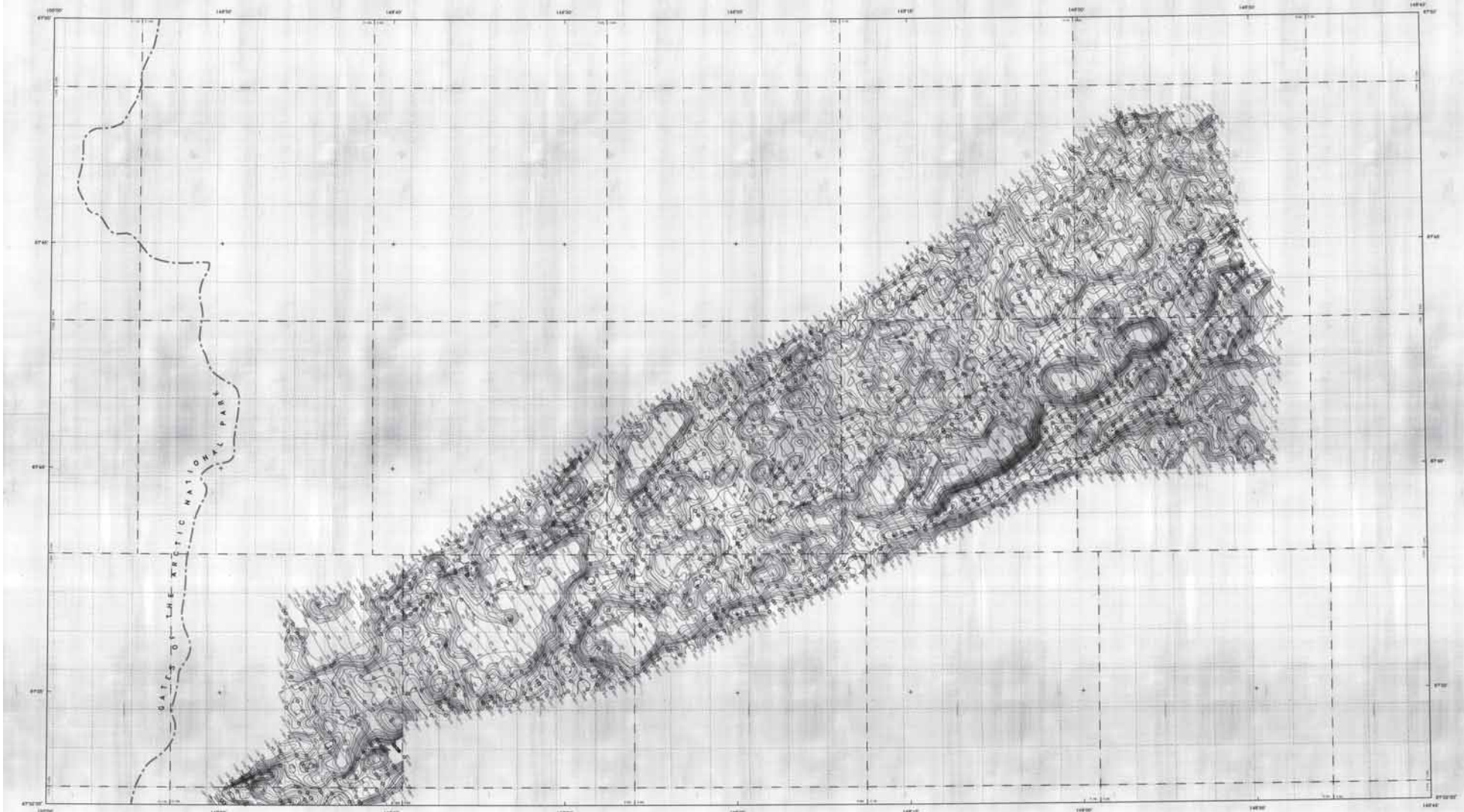

Section outlines from U.S. Geological Survey
Chandalar C-1, 1980; C-2, 1971; C-3, 1979;
C-4, 1971; C-5, 1971; C-6, 1979
Quadrangles, Alaska
Projected in UTM zone 6

ALASKA

SCALE 1:63 360

1 0 1 2 3 4 5 MILES

1 0 1 2 3 4 5 KILOMETERS

4200 Hz COPLANAR RESISTIVITY CONTOURS FOR THE NORTHEASTERN PORTION OF THE KOYUKUK MINING DISTRICT, EASTERN BROOKS RANGE, ALASKA

1998

DESCRIPTIVE NOTES

The geophysical data were acquired with a SIGHEM-5 Electromagnetic (EM) system, a Scintrex cesium CS2 magnetometer, and a Navi-3 VLF system installed in a LAMA-N48087 Squirrel helicopter. In addition, the survey recorded data from a radar altimeter (TERRA), GPS navigation system, 50/60 Hz monitors, and video camera. Flights were performed at a mean terrain clearance of 200 ft along survey flight lines with a spacing of a quarter of a mile. Tie lines were flown perpendicular to the flight lines at intervals of approximately three miles.

Two Trimble-4000 SE Differential Post-processing Global Positioning Systems were used for both navigation and flight path recovery. The helicopter position was derived every one second to a relative accuracy of better than 10 m. Flight path positions were projected onto the Clarke 1866 (UTM) spheroid, 1927 North American datum using a Central Meridian (CM), of 147.W, 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.

ELECTROMAGNETICS

To determine the location of EM anomalies or their boundaries, the SIGHEM-5 EM system measured inphase and quadrature components of five frequencies. Two vertical coaxial coil-pairs operated at 870 and 4785 Hz while three horizontal coplanar coil-pairs operated at 945, 4212 and 36560 Hz. EM data were sampled at 0.1 second intervals. The EM system responds to bedrock conductors, conductive overburden, and cultural sources. The power line monitor and the flight track video were examined to locate the cultural sources. The EM anomalies that are indicated are classified by conductance.

Apparent resistivity, calculated with leveled inphase and quadrature components, was (1) gridded with bi-directional method using a grid of 100 m, and (2) filtered with a low pass directional filter (decorrugation; Keating,1994).

Keating, Pierre, 1994: Frequency Domain Filtering, Geological Survey of Canada, Unpublished Fortran Program.

ELECTROMAGNETIC ANOMALIES

Anomaly Conductance
● 100 siemens
○ 150 siemens

RESISTIVITY CONTOURS

1200
800
600
400
300
250
200
175
150
125
100

Contours in units of 10 intervals per decade
Resistivity low

FLIGHT PATH INFORMATION

LINE DIRECTION
LINE NUMBER
FIDUCIALS
LINE NUMBER
LINE DIRECTION

LOCATION INDEX

SURVEY HISTORY

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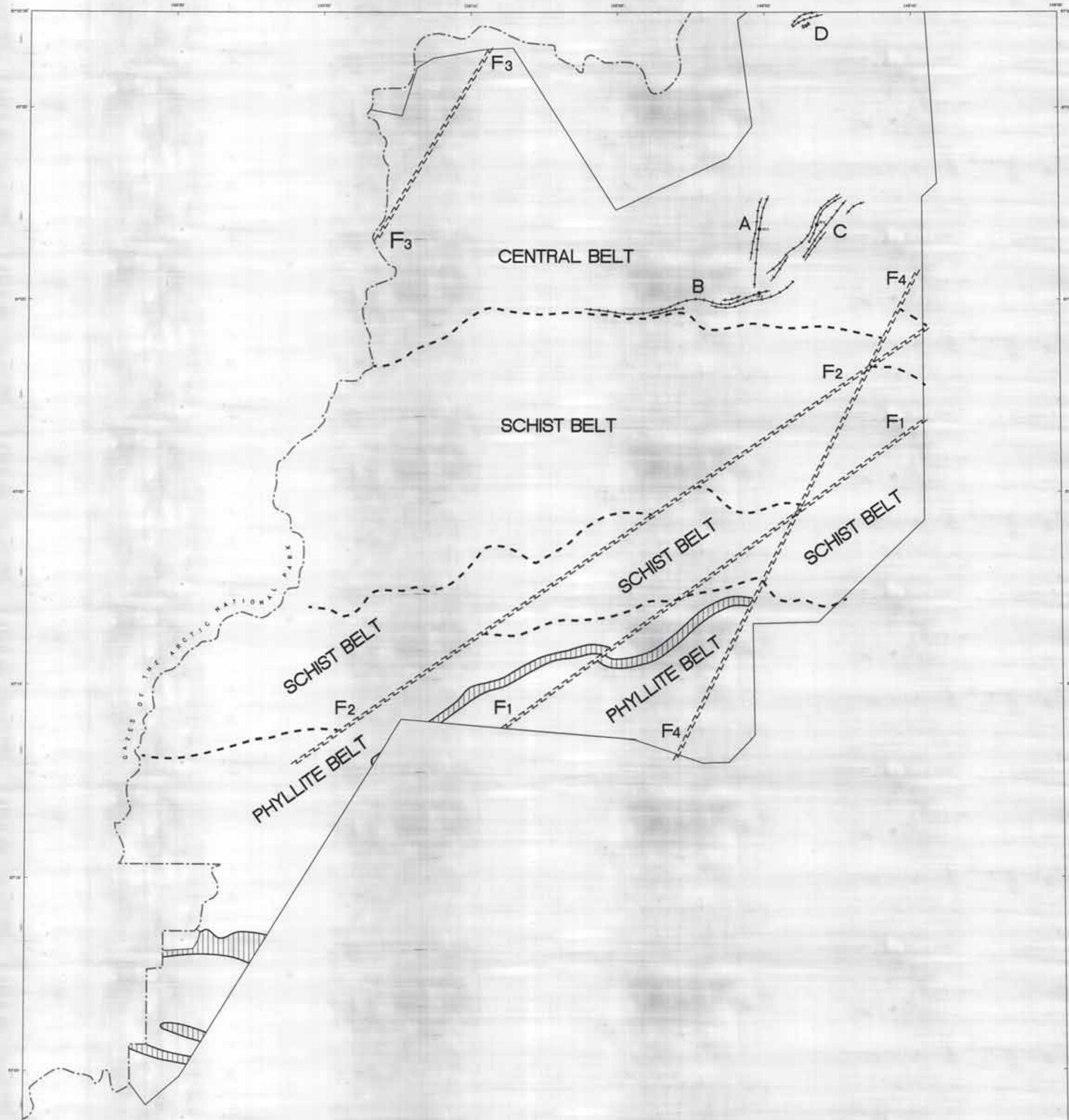
Public-data File 98-25
Sheet 1 of 2



DESCRIPTIVE NOTES

The geophysical data were acquired with a DIGHEM-5 Electromagnetic (EM) system, a Scintrex cesium CS2 magnetometer, and a Herz VLF system installed in a LAMA-AAB087 Squirrel helicopter. In addition, the survey recorded data from a radar altimeter (TERRA), GPS navigation system, 50/60 Hz monitors, and video camera. Flights were performed at a mean terrain clearance of 200 ft along survey flight lines with a spacing of a quarter of a mile. Tie lines were flown perpendicular to the flight lines at intervals of approximately three miles.

Two Trimble-4000 SE Differential Post-processing Global Positioning Systems were used for both navigation and flight path recovery. The helicopter position was derived every one second to a relative accuracy of better than 10 m. Flight path positions were projected onto the Clarke 1866 (UTM) spheroid, 1927 North American datum using a Central Meridian (CM) of 147° W, 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.

INTERPRETATION SKETCH MAP FOR THE NORTHEASTERN PORTION OF THE KOYUKUK MINING DISTRICT, EASTERN BROOKS RANGE, ALASKA

1998

LEGEND FOR GEOPHYSICAL INTERPRETATION

SURVEY HISTORY

This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources, Division of Geological & Geophysical Surveys, and On-Line Exploration Services, Inc. Airborne geophysical data for the area were acquired by Sial Geosciences, Inc., in 1997. Funding for the project was provided by the U.S. Department of Interior Bureau of Land Management (BLM).

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ALASKA DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS
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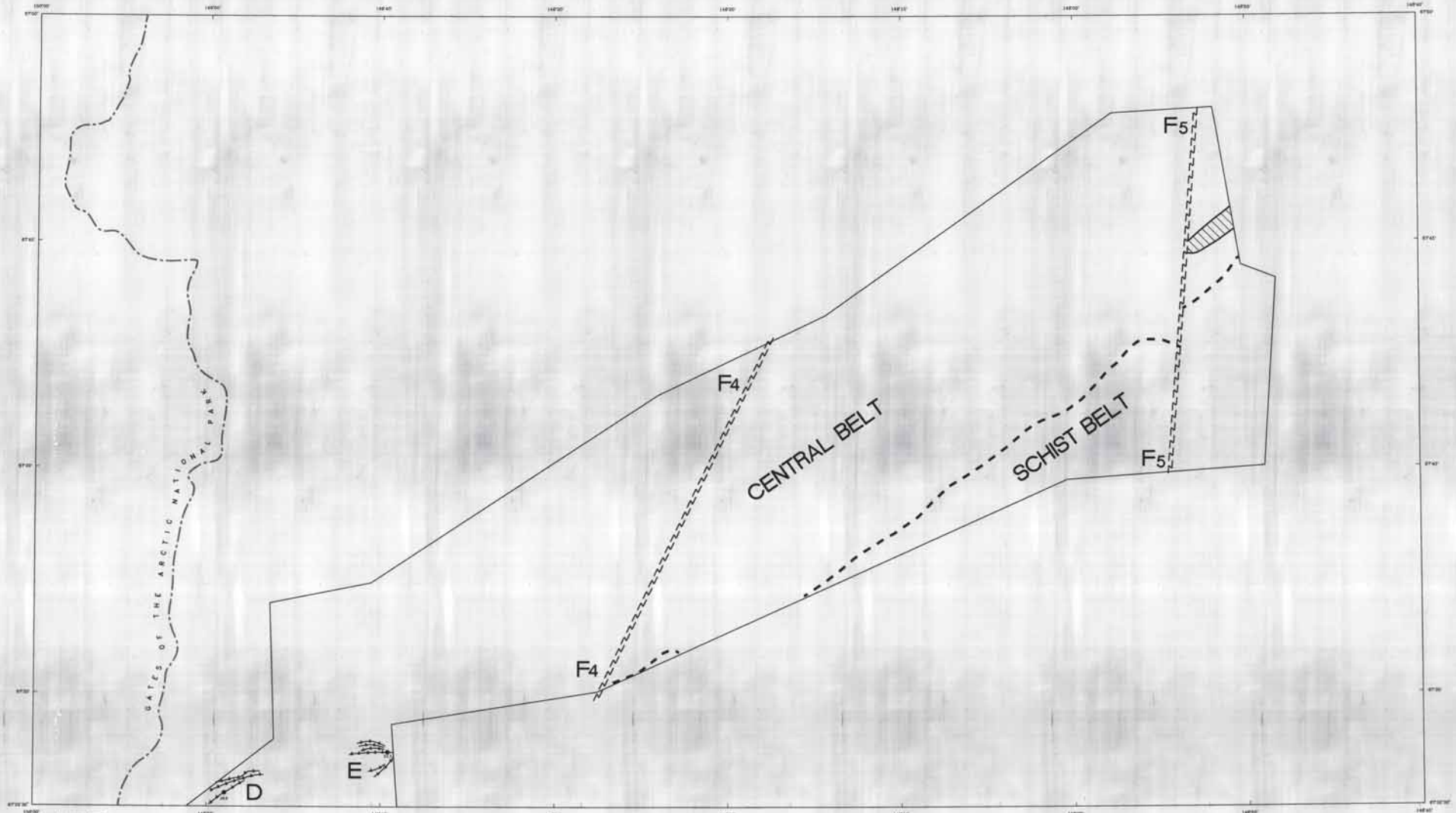

Base from U.S. Geological Survey
Chandalar (1-6, 1952; 7-9, 1971; 10-6, 1975; 11-1, 1971; 11-2, 1971; 11-3, 1975)
Quadrangles, Alaska
Projected in UTM zone 6

DESCRIPTIVE NOTES

The geophysical data were acquired with a SIGHEM-5 Electromagnetic (EM) system, a Scintrex cesium CS2 magnetometer, and a Herz VLF system installed in a LAMA-N48087 Squirrel helicopter. In addition, the survey recorded data from a radar altimeter (TERRA), GPS navigation system, 50/60 Hz monitors, and video camera. Flights were performed at a mean terrain clearance of 200 ft along survey flight lines with a spacing of a quarter of a mile. Tie lines were flown perpendicular to the flight lines at intervals of approximately three miles.

Two Trimble-4000 SE Differential Post-processing Global Positioning Systems were used for both navigation and flight path recovery. The helicopter position was derived every one second to a relative accuracy of better than 10 m. Flight path positions were projected onto the Clarke 1866 (UTM) spheroid, 1927 North American datum using a Central Meridian (CM) of 147 W, 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.

LEGEND FOR GEOPHYSICAL INTERPRETATION

Geologic Contact

F4 Presumed Fault

Dike / Intrusive

D Dip Type 1 Conductor
Maximum Conductance in Siemens

SCALE 1:63 360

CONTOUR INTERVAL 100 FEET
DATUM MEAN SEA LEVEL

INTERPRETATION SKETCH MAP
FOR THE NORTHEASTERN PORTION OF THE KOYUKUK MINING DISTRICT, EASTERN BROOKS RANGE, ALASKA

1998

LOCATION INDEX

SURVEY HISTORY

This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources, Division of Geological & Geophysical Surveys, and On-Line Exploration Services, Inc. Airborne geophysical data for the area were acquired by Sial Geosciences, Inc., in 1997. Funding for the project was provided by the U.S. Department of Interior Bureau of Land Management (BLM).

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Public-data File 98-40A
Parts of Wiseman A-1, A-2 and B-1 Quadrangles

LOCATION INDEX

TOTAL FIELD MAGNETICS AND DETAILED ELECTROMAGNETIC ANOMALIES FOR THE NORTHEASTERN PORTION OF THE KOYUKUK MINING DISTRICT, EASTERN BROOKS RANGE, ALASKA

MAP A

1998

Parts of Wiseman A-1, A-2 and B-1 Quadrangles

DESCRIPTIVE NOTES

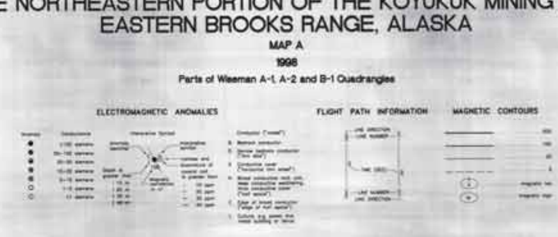
The geophysical data were acquired with a DIGHEM-V Electromagnetic (EM) system, a Scintrex cesium CS2 magnetometer, and a Herz VLF system installed in a LAMA-AS350B Squirrel helicopter. In addition, the survey recorded data from a radar altimeter (TERRA), GPS navigation system, 50/60 Hz monitors, and video camera. Flights were performed at a mean terrain clearance of 200 ft along survey flight lines with a spacing of a quarter of a mile. Tie lines were flown perpendicular to the flight lines at intervals of approximately three miles.

Two Trimble-4000 SE Differential Post-processing Global Positioning Systems were used for both navigation and flight path recovery. The helicopter position was derived every one second to a relative accuracy of better than 10 m. Flight path positions were projected onto the Clarke 1866 (UTM) spheroid, 1927 North American datum using a Central Meridian (CM) of 147 W, 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.

ELECTROMAGNETICS

To determine the location of EM anomalies or their boundaries, the DIGHEM-V EM system measured inphase and quadrature components of five frequencies. Two vertical coaxial coil-pairs operated at 870 and 4785 Hz while three horizontal coplanar coil-pairs operated at 945, 4212 and 26,660 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 electromagnetic map by the interpretive symbol attached to each EM anomaly. Determination of the type of conductor is based on EM anomaly patterns of the coaxial and coplanar coils and calculated conductance. The power line monitor and the flight track video were examined to locate the cultural sources.

ELECTROMAGNETIC ANOMALIES — FLIGHT PATH INFORMATION — MAGNETIC CONTOURS



SURVEY HISTORY

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TOTAL FIELD MAGNETICS

The total field magnetic data were acquired with a sampling interval of 0.1 seconds, and were (1) corrected for diurnal variations by subtraction of the digitally recorded base station magnetic data, (2) leveled to the tie line data, and (3) interpolated onto a regular 100 m grid using a modified Akima (1970) technique. A regional trend (IGRF 1995, updated to August 1997) was then removed from the leveled magnetic data.

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

ALASKA DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS
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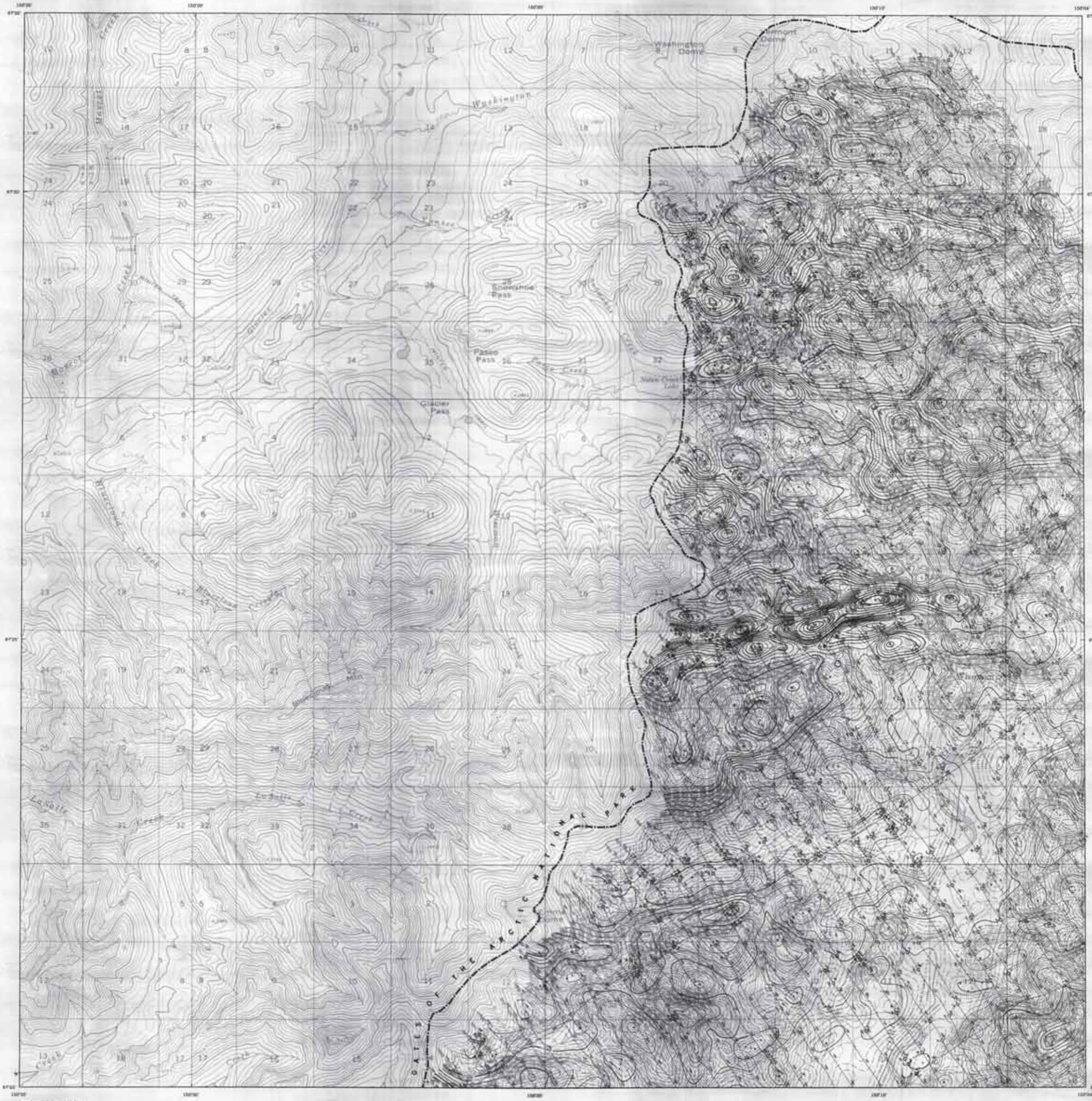
Public-data File 98-40B

Parts of Wiseman B-1 and C-1 Quadrangles



DESCRIPTIVE NOTES

The geophysical data were acquired with a SIGHEM-5 Electromagnetic (EM) system, a Scintrex cesium CS2 magnetometer, and a Herz VLF system installed in a LAMA-N4808T Squirrel helicopter. In addition, the survey recorded data from a radar altimeter (TERRA), GPS navigation system, 50/60 Hz monitors, and video camera. Flights were performed at a mean terrain clearance of 200 ft along survey flight lines with a spacing of a quarter of a mile. Tie lines were flown perpendicular to the flight lines at intervals of approximately three miles.

Two Trimble-4000 SE Differential Post-processing Global Positioning Systems were used for both navigation and flight path recovery. The helicopter position was derived every one second to a relative accuracy of better than 10 m. Flight path positions were projected onto the Clarke 1866 (UTM) spheroid, 1927 North American datum using a Central Meridian (CM) of 147° W, 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.

ELECTROMAGNETICS

To determine the location of EM anomalies or their boundaries, the SIGHEM-5 EM system measured inphase and quadrature components at five frequencies. Two vertical coaxial coil-pairs operated at 870 and 4785 Hz while three horizontal coplanar coil-pairs operated at 945, 4212 and 36360 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 patterns of the coaxial and coplanar coils and calculated conductance. The power line monitor and the flight track video were examined to locate the cultural sources.

TOTAL FIELD MAGNETICS AND DETAILED ELECTROMAGNETIC ANOMALIES FOR THE NORTHEASTERN PORTION OF THE KOYUKUK MINING DISTRICT, EASTERN BROOKS RANGE, ALASKA

MAP B

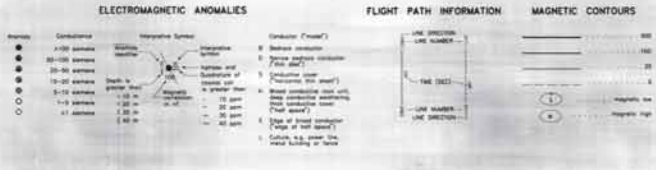
1998

Parts of Wiseman B-1 and C-1 Quadrangles

ELECTROMAGNETIC ANOMALIES

FLIGHT PATH INFORMATION

MAGNETIC CONTOURS



SURVEY HISTORY

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TOTAL FIELD MAGNETICS

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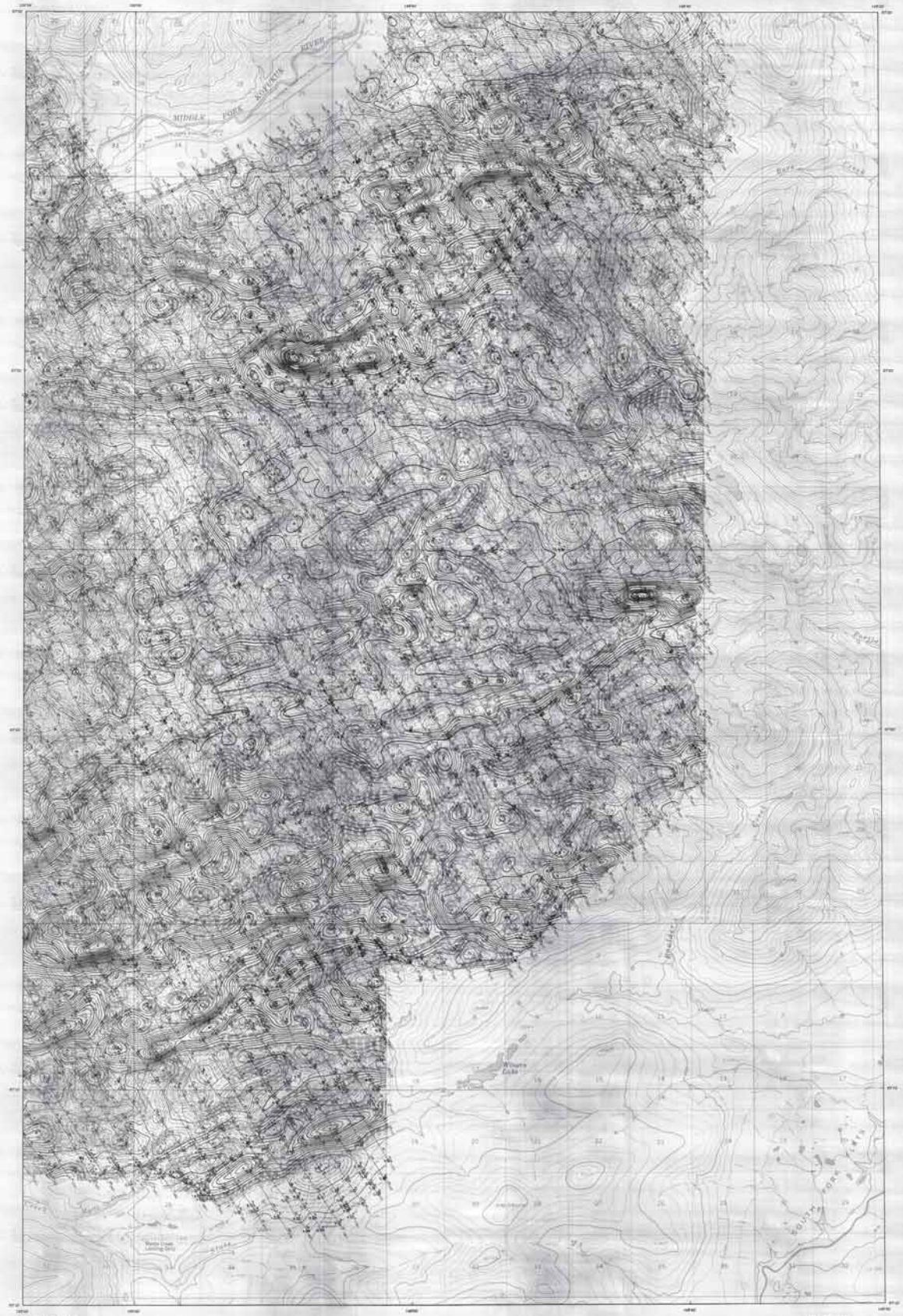
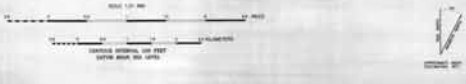
Akima, H., 1970, A new method of interpolation and smooth curve fitting based on local procedures: Journal of the Association of Computing Machinery, v. 17, no.4, p.589-602.

ALASKA DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS
IN COOPERATION WITH U.S. BUREAU OF LAND MANAGEMENT

Public-data File 98-40C

Parts of the Chandalar A-6, B-6, Weeman A-1 and B-1 Quadrangles





TOTAL FIELD MAGNETICS AND DETAILED ELECTROMAGNETIC ANOMALIES FOR THE NORTHEASTERN PORTION OF THE KOYUKUK MINING DISTRICT, EASTERN BROOKS RANGE, ALASKA

MAP C

1998

Parts of the Chandalar A-6, B-6, Weeman A-1 and B-1 Quadrangles

DESCRIPTIVE NOTES

ELECTROMAGNETICS

ELECTROMAGNETIC ANOMALIES

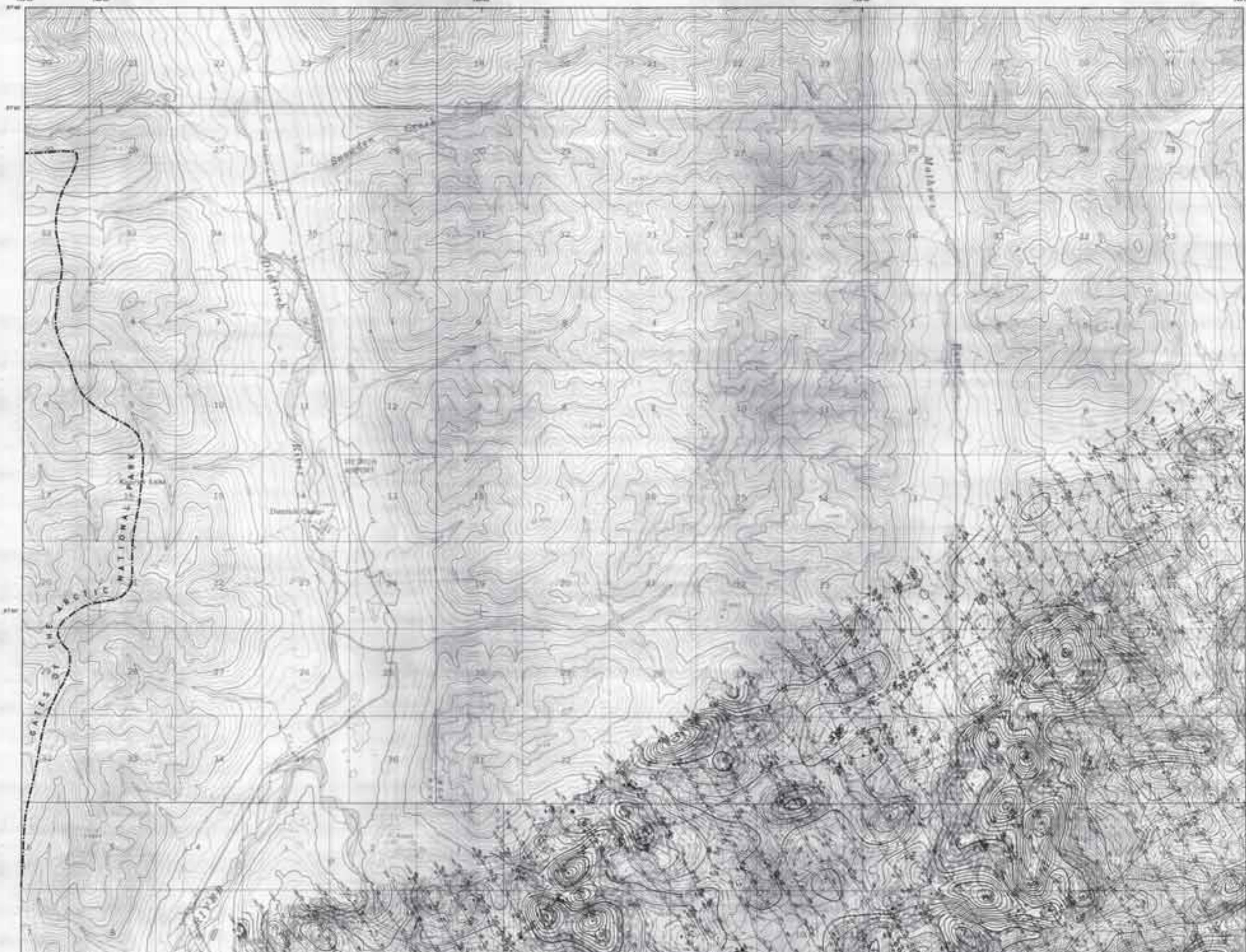
FLIGHT PATH INFORMATION

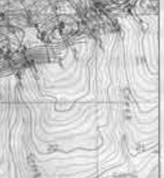
MAGNETIC CONTOURS

LOCATION INDEX

SURVEY HISTORY

TOTAL FIELD MAGNETICS





TOTAL FIELD MAGNETICS AND DETAILED ELECTROMAGNETIC ANOMALIES FOR THE NORTHEASTERN PORTION OF THE KOYUKUK MINING DISTRICT, EASTERN BROOKS RANGE, ALASKA

MAP D

1998

Parts of Chandalar C-5 and C-6 Quadrangles

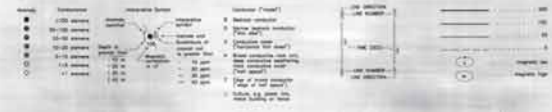
DESCRIPTIVE NOTES

The geophysical data were acquired with a DIGHEM-5 Electromagnetic (EM) system, a Scintrex cesium CS2 magnetometer, and a Herz VLF system installed in a LAMA-SA315B Squirrel helicopter. In addition, the survey recorded data from a radar altimeter (TERRA), GPS navigation system, 50/60 Hz monitors, and video camera. Flights were performed at a mean terrain clearance of 200 ft along survey flight lines with a spacing of a quarter of a mile. Tie lines were flown perpendicular to the flight lines at intervals of approximately three miles.

Two Trimble-4000 SE Differential Post-processing Global Positioning Systems were used for both navigation and flight path recovery. The helicopter position was derived every one second to a relative accuracy of better than 10 m. Flight path positions were projected onto the Clarke 1866 (UTM) spheroid, 1927 North American datum using a Central Meridian (CM) of 147° W, 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.

ELECTROMAGNETICS

To determine the location of EM anomalies or their boundaries, the DIGHEM-5 EM system measured inphase and quadrature components of five frequencies. Two vertical coaxial coil-pairs operated at 870 and 4785 Hz while three horizontal coplanar coil-pairs operated at 845, 4312 and 26,300 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 patterns of the coaxial and coplanar coils and calculated conductance. The power line monitor and the flight track video were examined to locate the cultural sources.



SURVEY HISTORY

This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources, Division of Geological & Geophysical Surveys, and On-Line Exploration Services, Inc. Airborne geophysical data for the area were acquired by Sial Geosciences, Inc., in 1997. Funding for the project was provided by the U.S. Department of Interior Bureau of Land Management (BLM).

This map and other products from this survey are available from the Alaska Division of Geological & Geophysical Surveys, 794 University Ave., Suite 200, Fairbanks, Alaska, 99709.

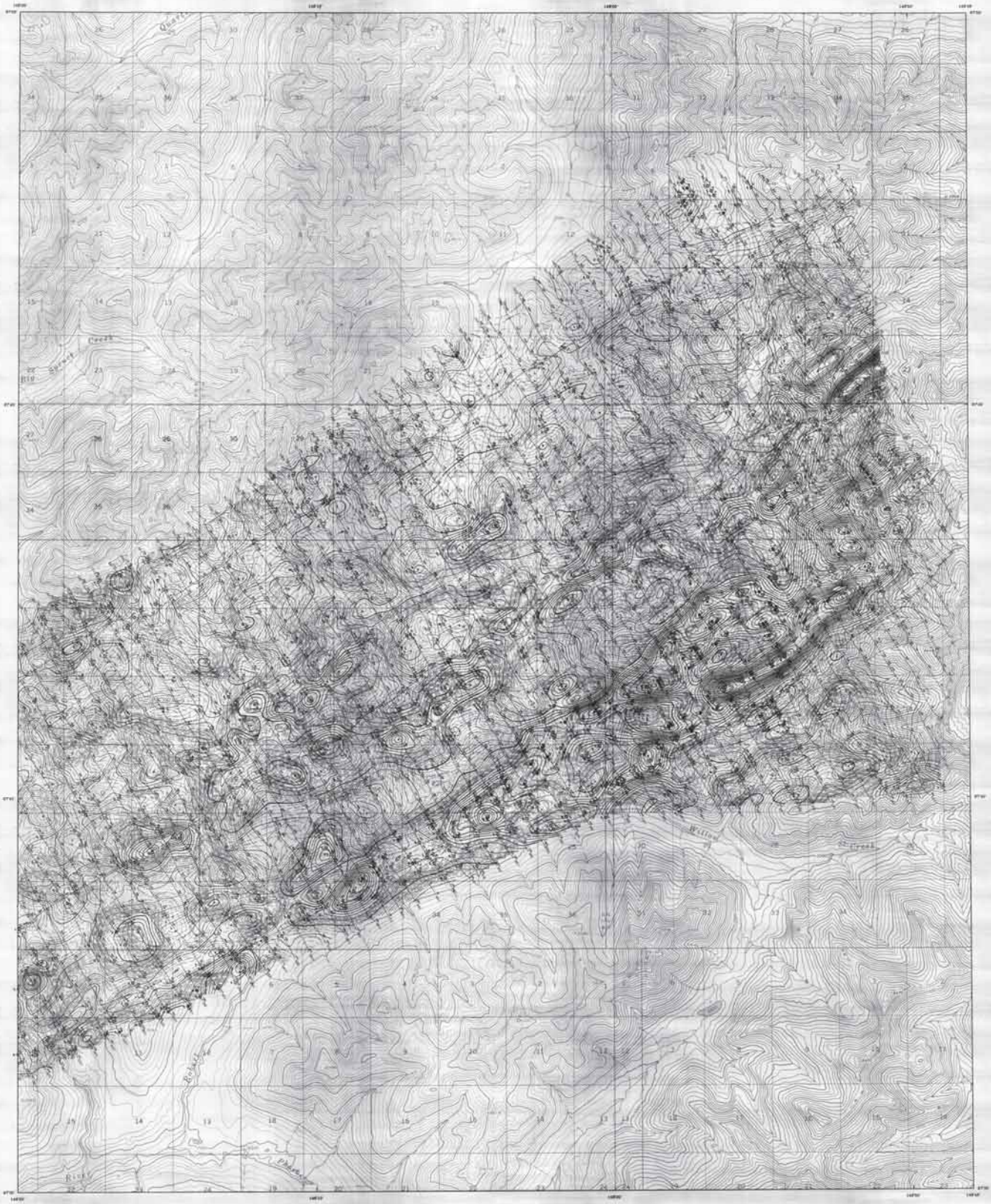
TOTAL FIELD MAGNETICS

The total field magnetic data were acquired with a sampling interval of 0.1 seconds, and were (1) corrected for diurnal variations by subtraction of the digitally recorded base station magnetic data, (2) leveled to the tie line data, and (3) interpolated onto a regular 100 m grid using a modified Akima (1970) technique. A regional trend (IGRF 1995, updated to August 1997) was then removed from the leveled magnetic data.

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

ALASKA DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS
IN COOPERATION WITH U.S. BUREAU OF LAND MANAGEMENT

Public-data File 98-40E
Parts of Chandalar C-4, C-5, D-4 and D-5 Quadrangles



TOTAL FIELD MAGNETICS AND DETAILED ELECTROMAGNETIC ANOMALIES FOR THE NORTHEASTERN PORTION OF THE KOYUKUK MINING DISTRICT, EASTERN BROOKS RANGE, ALASKA

MAP E

1998

Parts of Chandalar C-4, C-5, D-4 and D-5 Quadrangles

DESCRIPTIVE NOTES

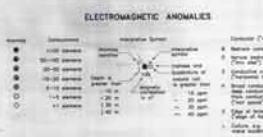
The geophysical data were acquired with a SIGHEM-S Electromagnetic (EM) system, a Scintrex cesium (Cs2) magnetometer, and a Herz VLF system installed in a LAMA-AMRAY Squirrel helicopter. In addition, the survey recorded data from a radar altimeter (TERRA), GPS navigation system, 50/60 Hz monitors, and video cameras. Flights were performed at a mean terrain clearance of 200 ft along survey flight lines with a spacing of a quarter of a mile. Tie lines were flown perpendicular to the flight lines at intervals of approximately three miles.

Two Trimble-4000 SE Differential Post-processing Global Positioning Systems were used for both navigation and flight path recovery. The helicopter position was derived every one-second to a relative accuracy of better than 10 m. Flight path positions were projected onto the Clarke 1866 (UTM) spheroid, 1927 North American datum using a Central Meridian (CM) of 147 W, 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.

ELECTROMAGNETICS

To determine the location of EM anomalies or their boundaries, the SIGHEM-S EM system measured inphase and quadrature components at five frequencies. Two vertical coaxial coil-pairs operated at 870 and 4785 Hz while three horizontal coplanar coil-pairs operated at 645, 4212 and 35340 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 patterns of the coaxial and coplanar coils and computed conductance. The power line monitor and the flight track video were examined to locate the cultural sources.

ELECTROMAGNETIC ANOMALIES



FLIGHT PATH INFORMATION

MAGNETIC CONTOURS

SURVEY HISTORY

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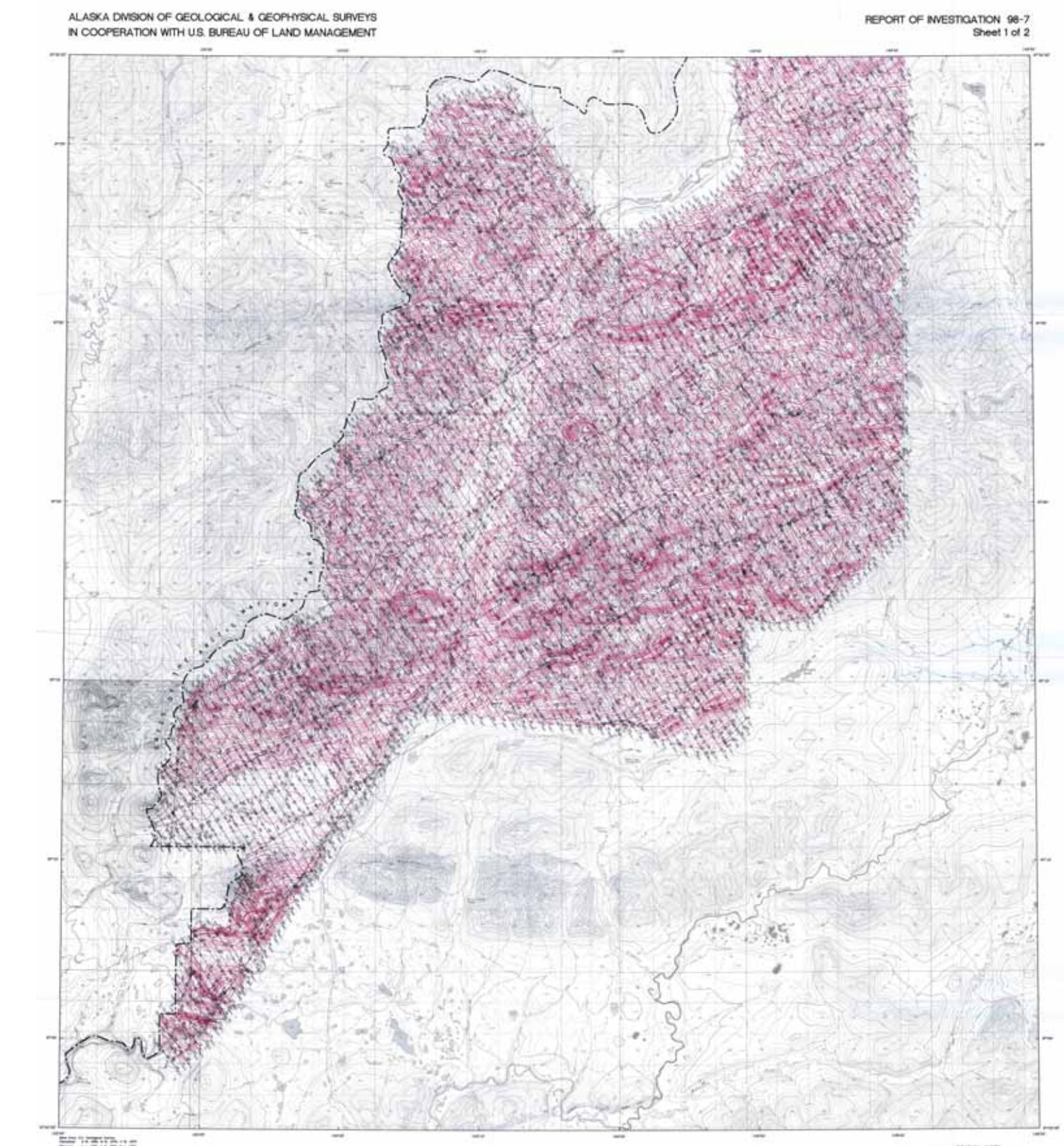
TOTAL FIELD MAGNETICS

The total field magnetic data were acquired with a sampling interval of 0.1 seconds, and were (1) corrected for diurnal variations by subtraction of the digitally recorded base station magnetic data, (2) leveled to the tie line data, and (3) interpolated onto a regular 100 m grid using a modified Akima (1970) technique. A regional trend (IGRF 1985, updated to August 1997) was then removed from the leveled magnetic data.

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

ALASKA DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS
IN COOPERATION WITH U.S. BUREAU OF LAND MANAGEMENT

REPORT OF INVESTIGATION 98-7
Sheet 1 of 2



TOTAL FIELD MAGNETICS AND ELECTROMAGNETIC ANOMALIES FOR THE NORTHEASTERN PORTION OF THE KOYUKUK MINING DISTRICT, EASTERN BROOKS RANGE, ALASKA

1998

DESCRIPTIVE NOTES

ELECTROMAGNETICS

ELECTROMAGNETIC ANOMALIES

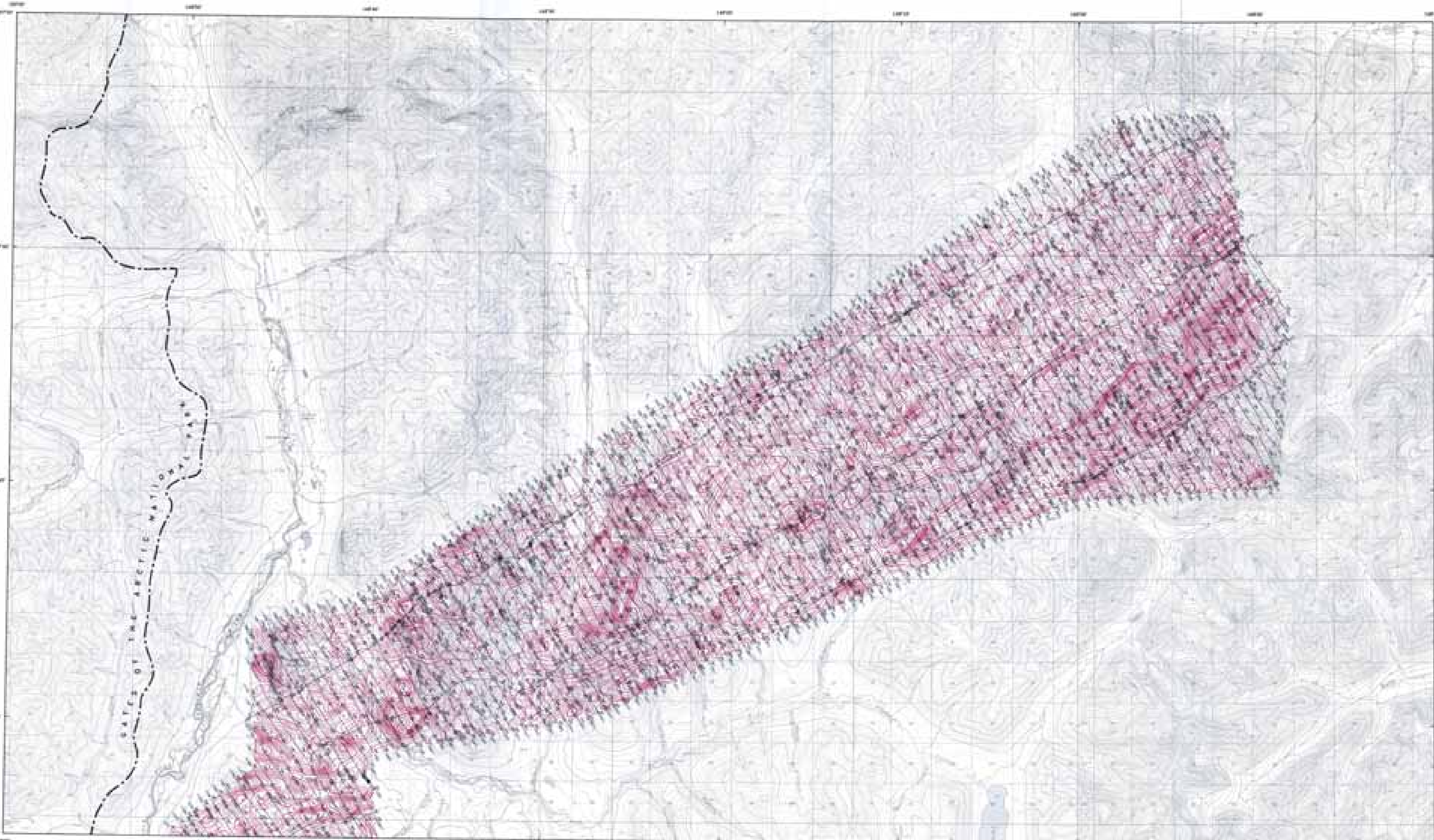
MAGNETIC CONTOURS

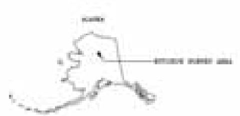
FLIGHT PATH INFORMATION

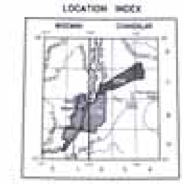
SURVEY HISTORY

TOTAL FIELD MAGNETICS

ALASKA DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS
IN COOPERATION WITH U.S. BUREAU OF LAND MANAGEMENT







LOCATION INDEX

TOTAL FIELD MAGNETICS AND ELECTROMAGNETIC ANOMALIES FOR THE NORTHEASTERN PORTION OF THE KOYUKUK MINING DISTRICT, EASTERN BROOKS RANGE, ALASKA

1998

DESCRIPTIVE NOTES

ELECTROMAGNETICS

ELECTROMAGNETIC ANOMALIES

MAGNETIC CONTOURS

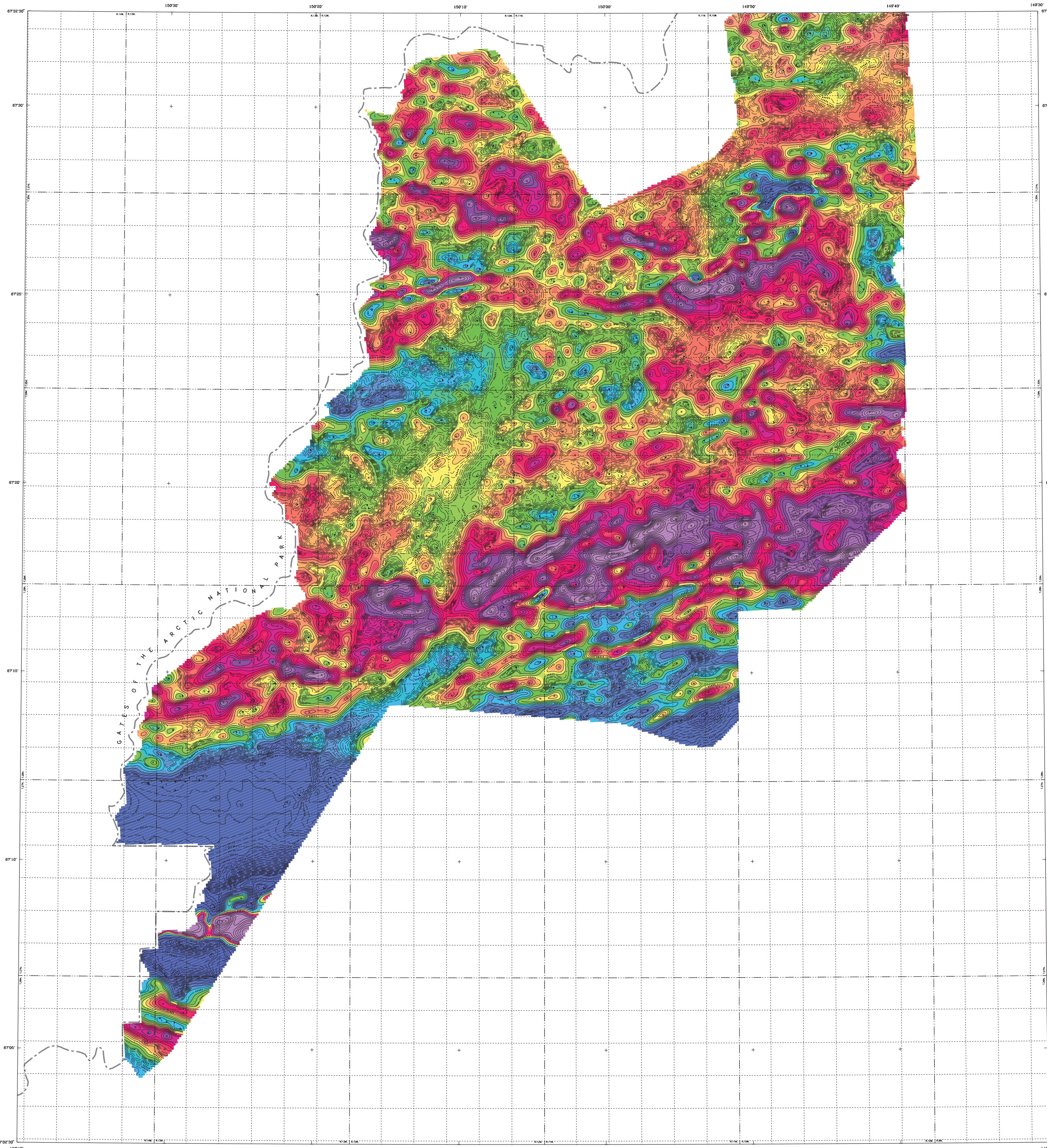
FLIGHT PATH INFORMATION

SURVEY HISTORY

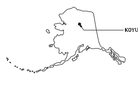
TOTAL FIELD MAGNETICS

ALASKA DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS
IN COOPERATION WITH U.S. BUREAU OF LAND MANAGEMENT

REPORT OF INVESTIGATIONS 98-8



Section lines from U.S. Geological Survey
Chandalar A-6; 1982, B-6; 1975, C-6; 1975
Wiseman A-1; 1975, A-2; 1970, B-1; 1975, B-2; 1971, C-1,C-2; 1971.
Quadrangles, Alaska.
Projected in UTM zone 6

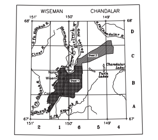


SCALE 1:63 360

1 0 1 2 3 4 5 MILES

1 0 1 2 3 4 5 KILOMETERS

TRUE NORTH
MAGNETIC NORTH
APPROXIMATE MEAN DECLINATION, 1971



DESCRIPTIVE NOTES

The geophysical data were acquired with a SIGHEM-5 Electromagnetic (EM) system, a Scintrex cesium CS2 magnetometer, and a Herz VLF system installed in a LAMA-N48087 Squirrel helicopter. In addition, the survey recorded data from a radar altimeter (TERRA), GPS navigation system, 50/60 Hz monitors, and video camera. Flights were performed at a mean terrain clearance of 200 ft along survey flight lines with a spacing of a quarter of a mile. Tie lines were flown perpendicular to the flight lines at intervals of approximately three miles.

Two Trimble-4000 SE Differential Post-processing Global Positioning Systems were used for both navigation and flight path recovery. The helicopter position was derived every one second to a relative accuracy of better than 10 m. Flight path positions were projected onto the Clarke 1866 (UTM) spheroid, 1927 North American datum using a Central Meridian (CM) of 147° W, 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.

MAGNETIC CONTOURS

. . . . 500
. . . . 100
. . . . 25
. . . . 5
L . . . . magnetic low
H . . . . magnetic high

TOTAL FIELD MAGNETICS
FOR THE NORTHEASTERN PORTION OF THE KOYUKUK MINING DISTRICT, EASTERN BROOKS RANGE, ALASKA

1998

57300
57200
57150
57100
57075
57050
57030
57010
56990
56975
56960
56950
56945
56935
56925
56910
56895
56875
56860
56840
56820
56800
56775
56725

nanoTeslas

SURVEY HISTORY

This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources, Division of Geological & Geophysical Surveys, and On-Line Exploration Services, Inc. Airborne geophysical data for the area were acquired by Sial Geosciences, Inc., in 1997. Funding for the project was provided by the U.S. Department of Interior Bureau of Land Management (BLM).

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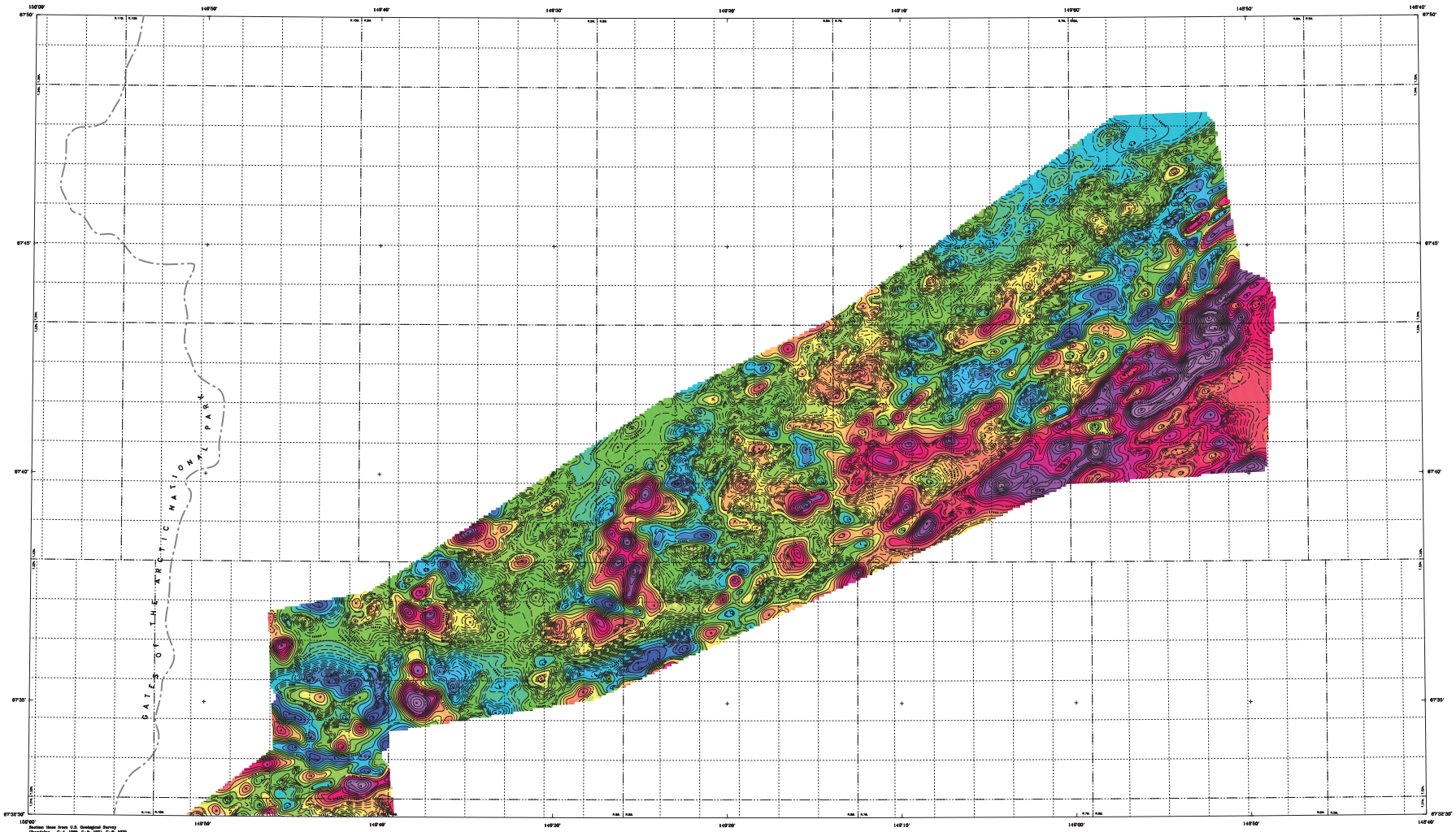
TOTAL FIELD MAGNETICS

The total field magnetic data were acquired with a sampling interval of 0.1 seconds, and were (1) corrected for diurnal variations by subtraction of the digitally recorded base station magnetic data, (2) leveled to the tie line data, and (3) interpolated onto a regular 100 m grid using a modified Akima (1970) technique. A regional trend (IGRF 1995, updated to August 1997) was then removed from the leveled magnetic data.

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



Base map from U.S. Geological Survey
Chandalar D-1, 1956, D-2, 1971, D-3, 1979,
D-4, 1971, D-5, 1971, D-6, 1972
Coordinates, Alaska
Projected in UTM zone 6

SCALE 1:63 360

1 0 1 2 3 4 5 MILES

1 0 1 2 3 4 5 KILOMETERS

ALASKA

KOYUKUK SURVEY AREA

APPROXIMATE MEAN DECLINATION, 1997

TOTAL FIELD MAGNETICS
FOR THE NORTHEASTERN PORTION OF THE KOYUKUK MINING DISTRICT, EASTERN BROOKS RANGE, ALASKA

1998

DESCRIPTIVE NOTES

The geophysical data were acquired with a SIGHEM-5 Electromagnetic (EM) system, a Scintrex cesium CS2 magnetometer, and a Herz VLF system installed in a LAMA-N4808J Squirrel helicopter. In addition, the survey recorded data from a radar altimeter (TERRA), GPS navigation system, 50/60 Hz monitors, and video camera. Flights were performed at a mean terrain clearance of 200 ft along survey flight lines with a spacing of a quarter of a mile. Tie lines were flown perpendicular to the flight lines at intervals of approximately three miles.

Two Trimble-4000 SE Differential Post-processing Global Positioning Systems were used for both navigation and flight path recovery. The helicopter position was derived every one second to a relative accuracy of better than 10 m. Flight path positions were projected onto the Clarke 1866 (UTM) spheroid, 1927 North American datum using a Central Meridian (CM) of 147° W, 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.

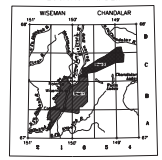
MAGNETIC CONTOURS

500
100
25
5
L ..... magnetic low
H ..... magnetic high

57300
57200
57150
57100
57075
57050
57030
57010
56990
56975
56960
56930
56945
56935
56925
56910
56895
56875
56860
56840
56820
56800
56775
56725

nanoTeslas

LOCATION INDEX



SURVEY HISTORY

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TOTAL FIELD MAGNETICS

The total field magnetic data were acquired with a sampling interval of 0.1 seconds, and were (1) corrected for diurnal variations by subtraction of the digitally recorded base station magnetic data, (2) leveled to the tie line data, and (3) interpolated onto a regular 100 m grid using a modified Akima (1970) technique. A regional trend (IGRF 1995, updated to August 1997) was then removed from the leveled magnetic data.

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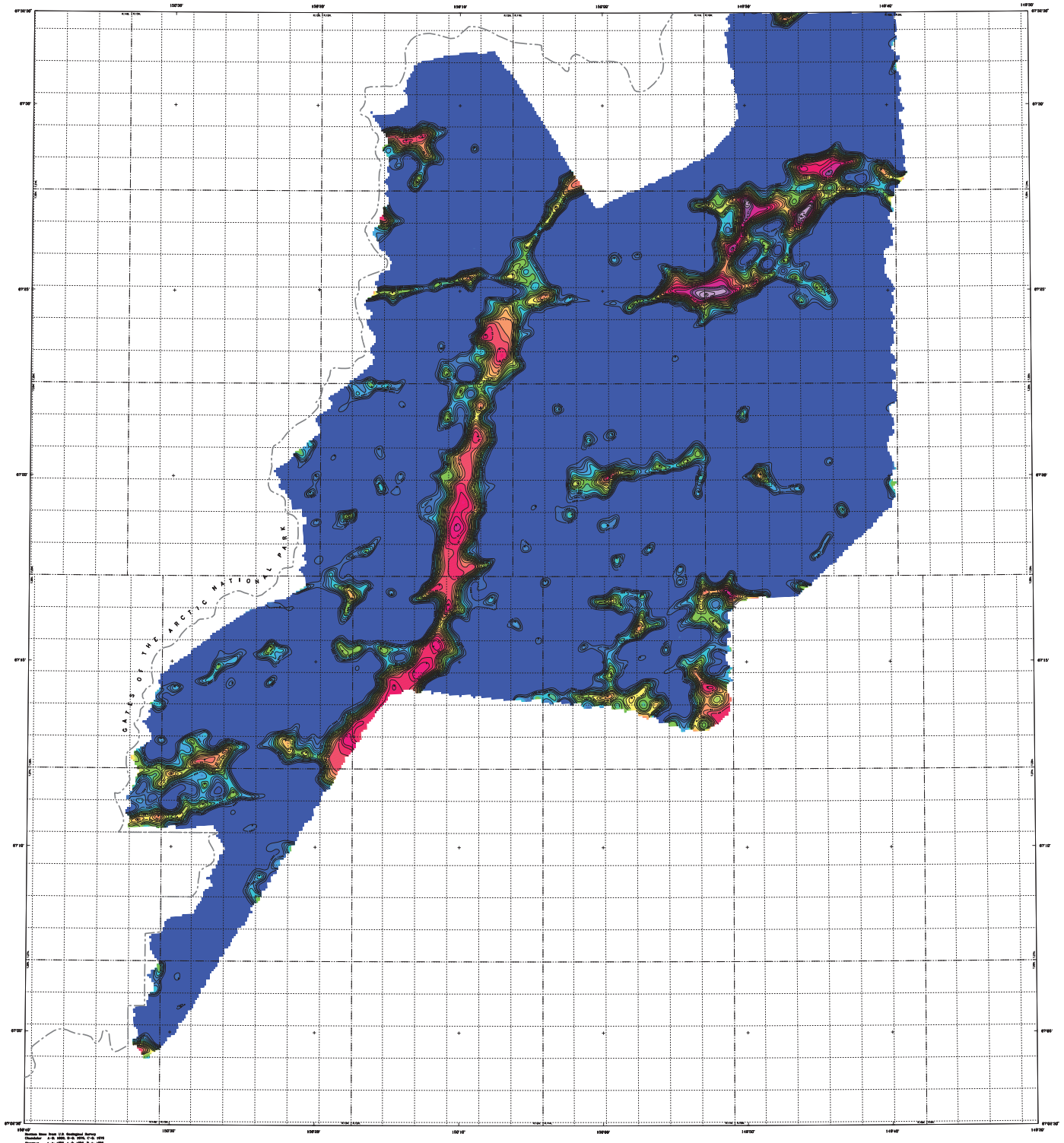


Base Maps from U.S. Geological Survey
Chandalar A-8, 1955, B-8, 1956, C-8, 1956
Wiseman A-8, 1955, B-8, 1956, B-9, 1956, C-8, 1956, C-9, 1956
Bettles/Hughes, Alaska
Projected to UTM zone 6

DESCRIPTIVE NOTES

The geophysical data were acquired with a SIGHEM-5 Electromagnetic (EM) system, a Scintrex cesium CS2 magnetometer, and a Herz VLF system installed in a LAMA-NASO87 Squirrel helicopter. In addition, the survey recorded data from a radar altimeter (TERRA), GPS navigation system, DU/HO Hz monitors, and video camera. Flights were performed at a mean terrain clearance of 200 m and recorded at 0.1 second intervals. A spacing of a quarter of a mile Tie lines were flown perpendicular to the flight lines at intervals of approximately three miles.

Two Trimble-4000 SE Differential Post-processing Global Positioning Systems were used for both navigation and flight path recovery. The helicopter position was derived every one second to a relative accuracy of better than 10 m. Flight path positions were projected onto the Clarke 1866 NAD27 spheroid using a Transverse Mercator with a Central Meridian (CM) of 147° W., 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.

ELECTROMAGNETICS

To determine the location of EM anomalies or their boundaries, the SIGHEM-5 EM system measured inphase and quadrature components at five frequencies. Two vertical coaxial coil-pairs operated at 870 and 4785 Hz while three horizontal coplanar coil-pairs operated at 945, 4212 and 36360 Hz. EM data were sampled at 0.1 second intervals. The EM system responds to bedrock conductors, conductive overburden, and cultural sources. The power line monitor and the flight track video were examined to locate cultural sources.

Apparent resistivity, calculated with leveled inphase and quadrature components, was (1) gridded with bi-directional method using a grid of 100 m, and (2) filtered with a low pass directional filter (deconvolution; Keating,1994).

Keating, Pierre, 1994. Frequency Domain Filtering Geological Survey of Canada, Unpublished Fortran Program.

SCALE 1:63 360

1 0 1 2 3 4 5 MILES

1 0 1 2 3 4 5 KILOMETERS

900 Hz COPLANAR RESISTIVITY CONTOURS FOR THE NORTHEASTERN PORTION OF THE KOYUKUK MINING DISTRICT, EASTERN BROOKS RANGE, ALASKA

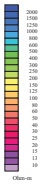
1998

RESISTIVITY CONTOURS

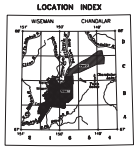
1000
800
600
500
400
300
250
200
150
125
100

Contours in ohm-m at 10 intervals per decade

Resistivity low



LOCATION INDEX



SURVEY HISTORY

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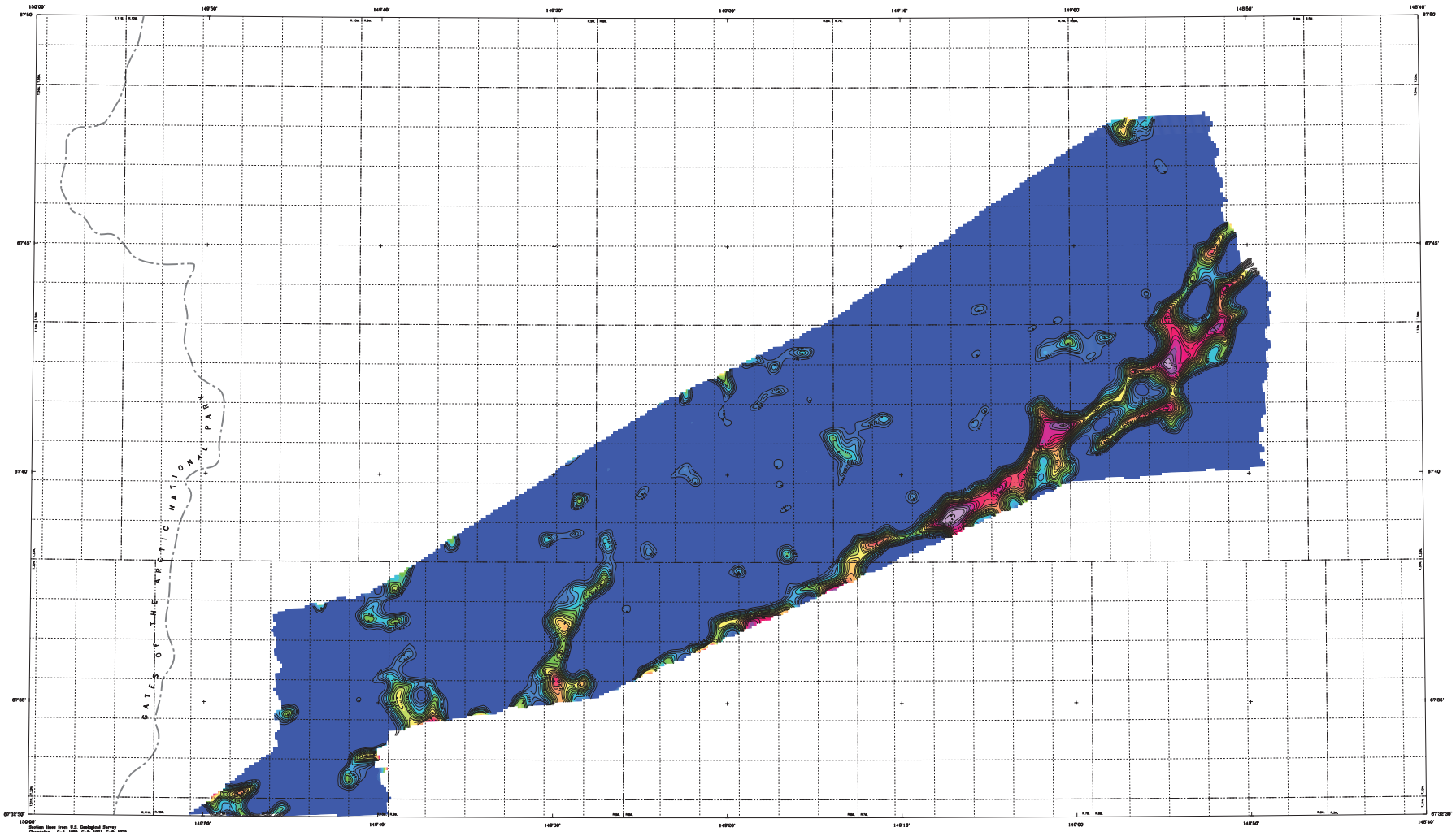

Base map from U.S. Geological Survey
Chandalar D-1, 1956, D-2, 1971, D-3, 1979,
D-4, 1971, D-5, 1971, D-6, 1955
Quadrangles, Alaska.
Projected in UTM zone 6

SCALE 1:63 360

1 0 1 2 3 4 5 MILES

1 0 1 2 3 4 5 KILOMETERS

ALASKA

KOYUKUK SURVEY AREA

900 Hz COPLANAR RESISTIVITY CONTOURS FOR THE NORTHEASTERN PORTION OF THE KOYUKUK MINING DISTRICT, EASTERN BROOKS RANGE, ALASKA

1998

DESCRIPTIVE NOTES

The geophysical data were acquired with a SIGHEM-5 Electromagnetic (EM) system, a Scintrex cesium CS2 magnetometer, and a Herz VLF system installed in a LAMA-N4808J Squirrel helicopter. In addition, the survey recorded data from a radar altimeter (TERRA), GPS navigation system, 50/60 Hz monitors, and video camera. Flights were performed at a mean terrain clearance of 200 ft along survey flight lines with a spacing of a quarter of a mile. Tie lines were flown perpendicular to the flight lines at intervals of approximately three miles.

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ELECTROMAGNETICS

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Keating, Pierre, 1994. Frequency Domain Filtering: Geological Survey of Canada, Unpublished Fortran Program.

RESISTIVITY CONTOURS

1000
800
600
500
400
300
250
200
150
125
100

Contours in ohm-m at 10 intervals per decade

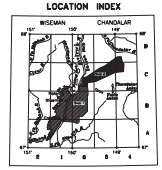
Resistivity low

2000
1500
1250
1000
800
600
500
400
300
250
200
150
125
100
80
60
50
40
30
25
20
15
13
10

Ohm-m

APPROXIMATE MEAN DECLINATION, 1971

LOCATION INDEX



SURVEY HISTORY

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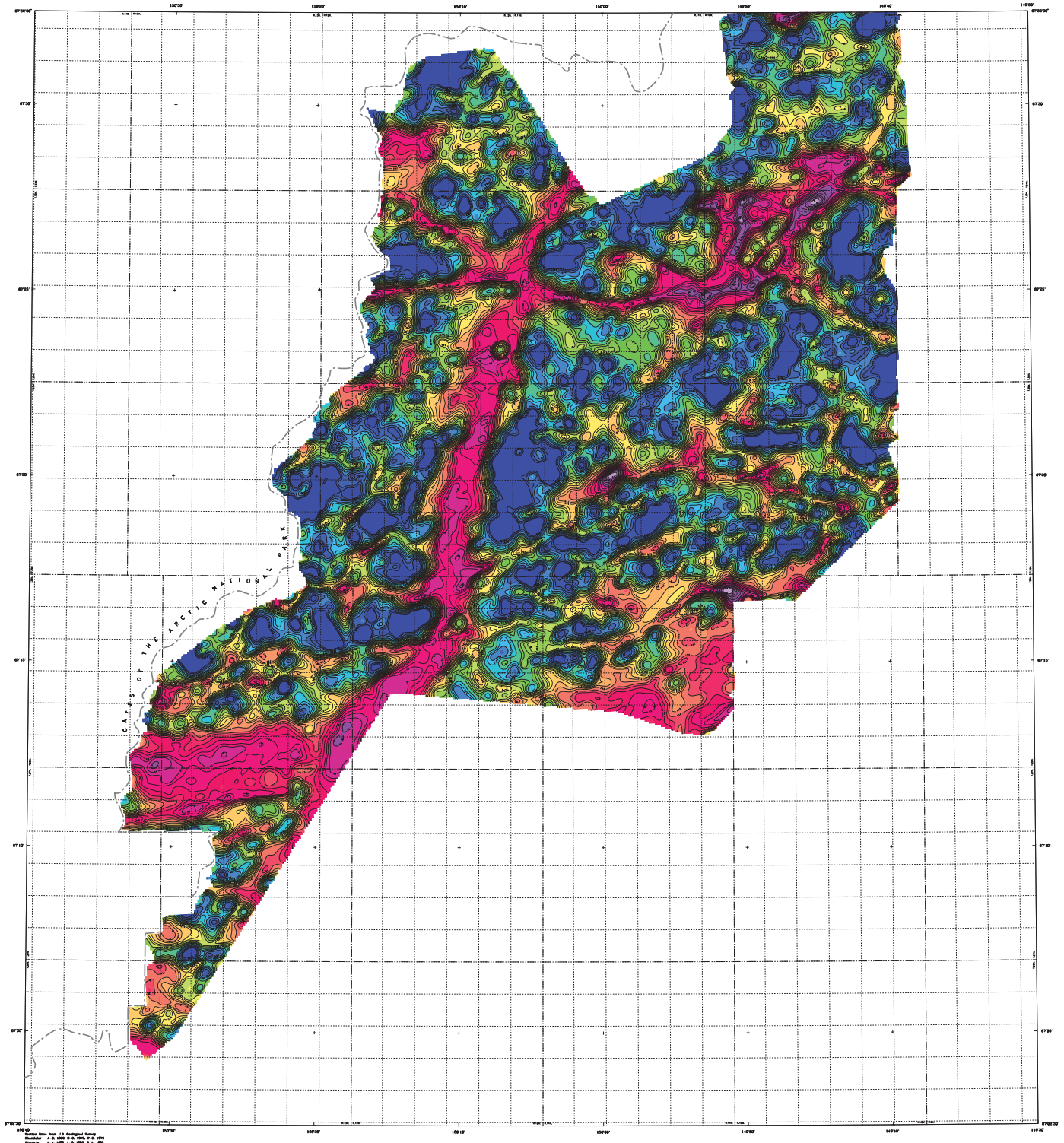


Quadrangle Maps from U.S. Geological Survey
Chandalar A-8, 1955, B-8, 1956, C-8, 1956
Wiseman A-6, 1956, A-7, 1956, B-6, 1956,
B-7, 1956, C-6, 1956, C-7, 1956
Boundaries, Offshore
Proposed as VTR zone 6

SCALE 1:63 360

1 0 1 2 3 4 5 MILES

1 0 1 2 3 4 5 KILOMETERS

ALASKA

KOYUKUK SURVEY AREA

4200 Hz COPLANAR RESISTIVITY CONTOURS FOR THE NORTHEASTERN PORTION OF THE KOYUKUK MINING DISTRICT, EASTERN BROOKS RANGE, ALASKA

1998

RESISTIVITY CONTOURS

1000
800
600
500
400
300
250
200
150
125
100

Contours in ohm-m at 10 intervals per decade

Resistivity low

6000
5000
4000
3000
2500
2000
1500
1250
1000
800
600
500
400
300
250
200
150
125
100
80
60
50
40
30
20
10

Ohm-m

DESCRIPTIVE NOTES

The geophysical data were acquired with a SIGHEM-5 Electromagnetic (EM) system, a Scintrex cesium CS2 magnetometer, and a Herz VLF system installed in a LAMA-NASO87 Squirrel helicopter. In addition, the survey recorded data from a radar altimeter (TERRA), GPS navigation system, 50/60 Hz monitors, and video camera. Flights were performed at a mean terrain clearance of 200 m and a nominal speed of 130 km/h. A spacing of a quarter of a mile Tie lines were flown perpendicular to the flight lines at intervals of approximately three miles.

Two Trimble-4000 SE Differential Post-processing Global Positioning Systems were used for both navigation and flight path recovery. The helicopter position was derived every one second to a relative accuracy of better than 10 m. Flight path positions were projected onto the Clarke 1866 NAD27 spheroid using a Transverse Mercator with a Central Meridian (CM) of 147° W., 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.

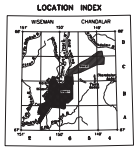
ELECTROMAGNETICS

To determine the location of EM anomalies or their boundaries, the SIGHEM-5 EM system measured inphase and quadrature components at five frequencies. Two vertical coaxial coil-pairs operated at 870 and 4785 Hz while three horizontal coplanar coil-pairs operated at 945, 4212 and 36360 Hz. EM data were sampled at 0.1 second intervals. The EM system responds to bedrock conductors, conductive overburden, and cultural sources. The power line monitor and the flight track video were examined to locate cultural sources.

Apparent resistivity, calculated with leveled inphase and quadrature components, was (1) gridded with bi-directional method using a grid of 100 m, and (2) filtered with a low pass directional filter (deconvolution; Keating,1994).

Keating, Pierre, 1994. Frequency Domain Filtering Geological Survey of Canada, Unpublished Fortran Program.

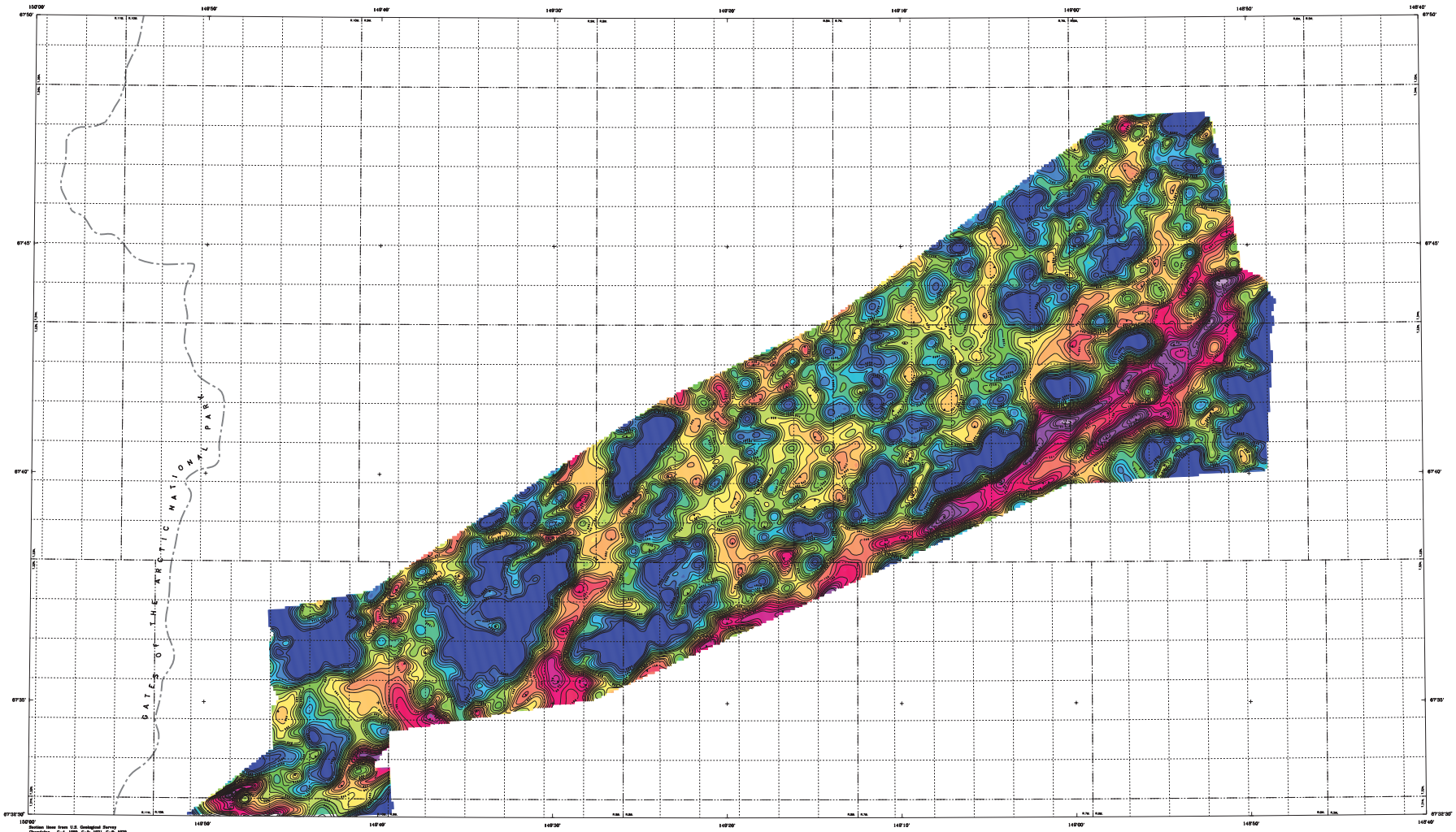
LOCATION INDEX



SURVEY HISTORY

This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources, Division of Geological & Geophysical Surveys, and On-Line Exploration Services, Inc. Airborne geophysical data for the area were acquired by Sial Geosciences, Inc., in 1997. Funding for the project was provided by the U.S. Department of Interior Bureau of Land Management (BLM).

This map and other products from this survey are available from the Alaska Division of Geological & Geophysical Surveys, 794 University Ave., Suite 200, Fairbanks, Alaska, 99709.



Base map from U.S. Geological Survey
Chandalar D-1, 1956; D-2, 1971; D-3, 1979.
D-4, 1971; D-5, 1971; D-6, 1955
Coordinates, Alaska.
Projected in UTM zone 6

SCALE 1:63 360

1 0 1 2 3 4 5 MILES

1 0 1 2 3 4 5 KILOMETERS

ALASKA

KOYUKUK SURVEY AREA

4200 Hz COPLANAR RESISTIVITY CONTOURS FOR THE NORTHEASTERN PORTION OF THE KOYUKUK MINING DISTRICT, EASTERN BROOKS RANGE, ALASKA

1998

RESISTIVITY CONTOURS

1000
800
600
500
400
300
250
200
150
125
100

Contours in ohm-m at 10 intervals per decade

Resistivity low

APPROXIMATE MEAN DECLINATION, 1971

6000
5000
4000
3000
2500
2000
1500
1250
1000
800
600
500
400
300
250
200
150
125
100
80
50
30
20
10

Ohm-m

DESCRIPTIVE NOTES

The geophysical data were acquired with a SIGHEM-5 Electromagnetic (EM) system, a Scintrex cesium CS2 magnetometer, and a Herz VLF system installed in a LAMA-N4808J Squirrel helicopter. In addition, the survey recorded data from a radar altimeter (TERRA), GPS navigation system, 50/60 Hz monitors, and video camera. Flights were performed at a mean terrain clearance of 200 ft along survey flight lines with a spacing of a quarter of a mile. Tie lines were flown perpendicular to the flight lines at intervals of approximately three miles.

Two Trimble-4000 SE Differential Post-processing Global Positioning Systems were used for both navigation and flight path recovery. The helicopter position was derived every one second to a relative accuracy of better than 10 m. Flight path positions were projected onto the Clarke 1866 (UTM) spheroid, 1927 North American datum using a Central Meridian (CM) of 147° W, 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.

ELECTROMAGNETICS

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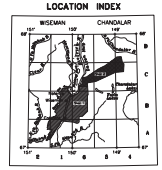

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