

BROAD PASS ELECTROMAGNETIC AND MAGNETIC AIRBORNE GEOPHYSICAL SURVEY DATA COMPILATION

L.E. Burns, G.R.C. Graham, J.D. Barefoot, Fugro Airborne Surveys Corp., R.A. Pritchard, and
Stevens Exploration Management Corp.

Geophysical Report 2020-1

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DEPARTMENT OF NATURAL RESOURCES
DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS



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BROAD PASS ELECTROMAGNETIC AND MAGNETIC AIRBORNE GEOPHYSICAL SURVEY DATA COMPILATION

L.E. Burns¹, G.R.C. Graham¹, J.D. Barefoot¹, Fugro Airborne Surveys Corp., R.A. Pritchard², and Stevens Exploration Management Corp.

ABSTRACT

This Broad Pass electromagnetic and magnetic airborne geophysical survey is located in interior Alaska in the Bonnifield mining district, about 160 kilometers south of Fairbanks, Alaska and about 250 kilometers north of Anchorage, Alaska. Frequency domain electromagnetic and magnetic data were collected with the DIGHEM^V system from July to August 2001. A total of 1970.2 line kilometers were collected covering 689.5 square kilometers. Line spacing was 400 meters (m). Data were collected 30 m above the ground surface from a helicopter towed sensor platform (“bird”) on a 30 m long line.

PURPOSE

This airborne geophysical survey is part of a program to acquire data on Alaska’s most promising mineral belts and districts. The information acquired is aimed at catalyzing new private-sector exploration, discovery, and ultimate development and production. The purpose of the survey was to map the magnetic and conductive properties of the survey area. One placer gold prospect in the survey area is Windy Creek. Other gold and base-metal anomalies, altered zones, favorable lithologies, and structural zones are known to exist throughout the survey area.

SURVEY OVERVIEW DESCRIPTION

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

ACKNOWLEDGMENTS

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

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

² Fugro Airborne Surveys Corp.,

AVAILABLE DATA

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

REFERENCES

- Akima, H., 1970, A new method of interpolation and smooth curve fitting based on local procedures: Journal of the Association of Computing Machinery, v. 17, n. 4, p. 589–602.
- Alaska Division of Geological & Geophysical Surveys, Fugro Airborne Surveys, Stevens Exploration Management Corp., and Burns, L.E., 2002, Grid and vector data of the airborne geophysical survey data for the Broad Pass area, southwestern Bonnifield mining district, central Alaska: Alaska Division of Geological & Geophysical Surveys Geophysical Report 2002-13. <http://doi.org/10.14509/2831>
- Alaska Division of Geological & Geophysical Surveys, Fugro Airborne Surveys, Stevens Exploration Management Corp., and Burns, L.E., 2002, Line, grid and vector data of the airborne geophysical survey data for the Broad Pass area, southwestern Bonnifield mining district, central Alaska: Alaska Division of Geological & Geophysical Surveys Geophysical Report 2002-12, 1 DVD. <http://doi.org/10.14509/2830>
- Alaska Division of Geological & Geophysical Surveys, Fugro Airborne Surveys, Stevens Exploration Management Corp., and Burns, L.E., 2002, Plot files of the airborne geophysical survey data of the Broad Pass area, southwestern Bonnifield mining district, central Alaska: Alaska Division of Geological & Geophysical Surveys Geophysical Report 2002-11, 1 DVD. <http://doi.org/10.14509/2811>
- Burns, L.E., 2002, Portfolio of aeromagnetic and resistivity maps of the Broad Pass area, southwestern Bonnifield mining district, central Alaska: Alaska Division of Geological & Geophysical Surveys Geophysical Report 2002-15, 16 p. <http://doi.org/10.14509/2833>
- 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, 2002, Project report of the airborne geophysical survey data for the Broad Pass area, southwestern Bonnifield mining district, central Alaska: Alaska Division of Geological & Geophysical Surveys Geophysical Report 2002-14, 203 p., 1 sheet, scale 1:63,360. <http://doi.org/10.14509/2832>

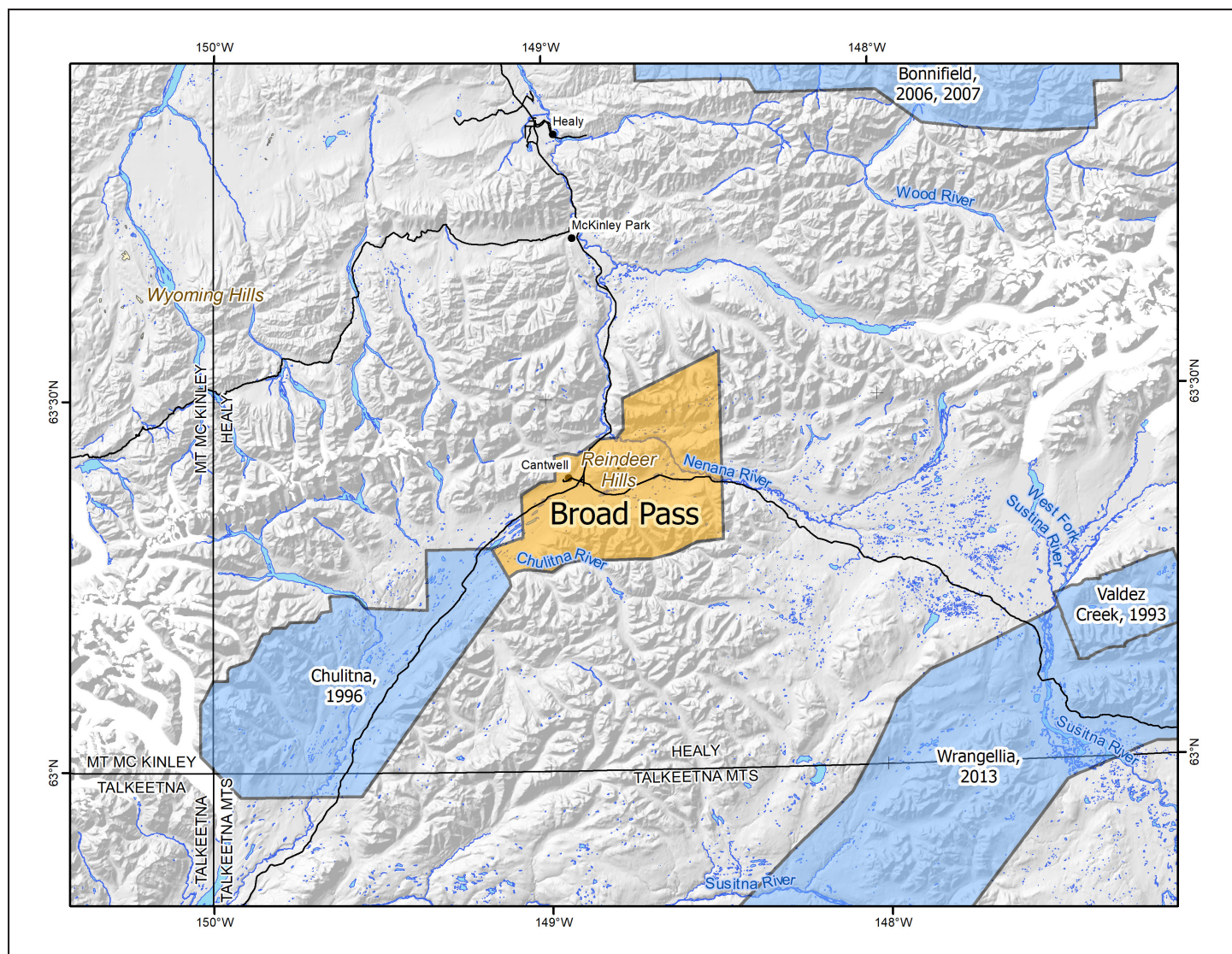


Figure 1. Broad Pass electromagnetic and magnetic airborne geophysical survey location shown in interior Alaska (inset). Broad Pass survey area shown with adjacent DGGs geophysical surveys, landmarks, relevant 1:250,000-scale quadrangle boundaries, mountain ranges, rivers, glaciers, and elevation hillshade.



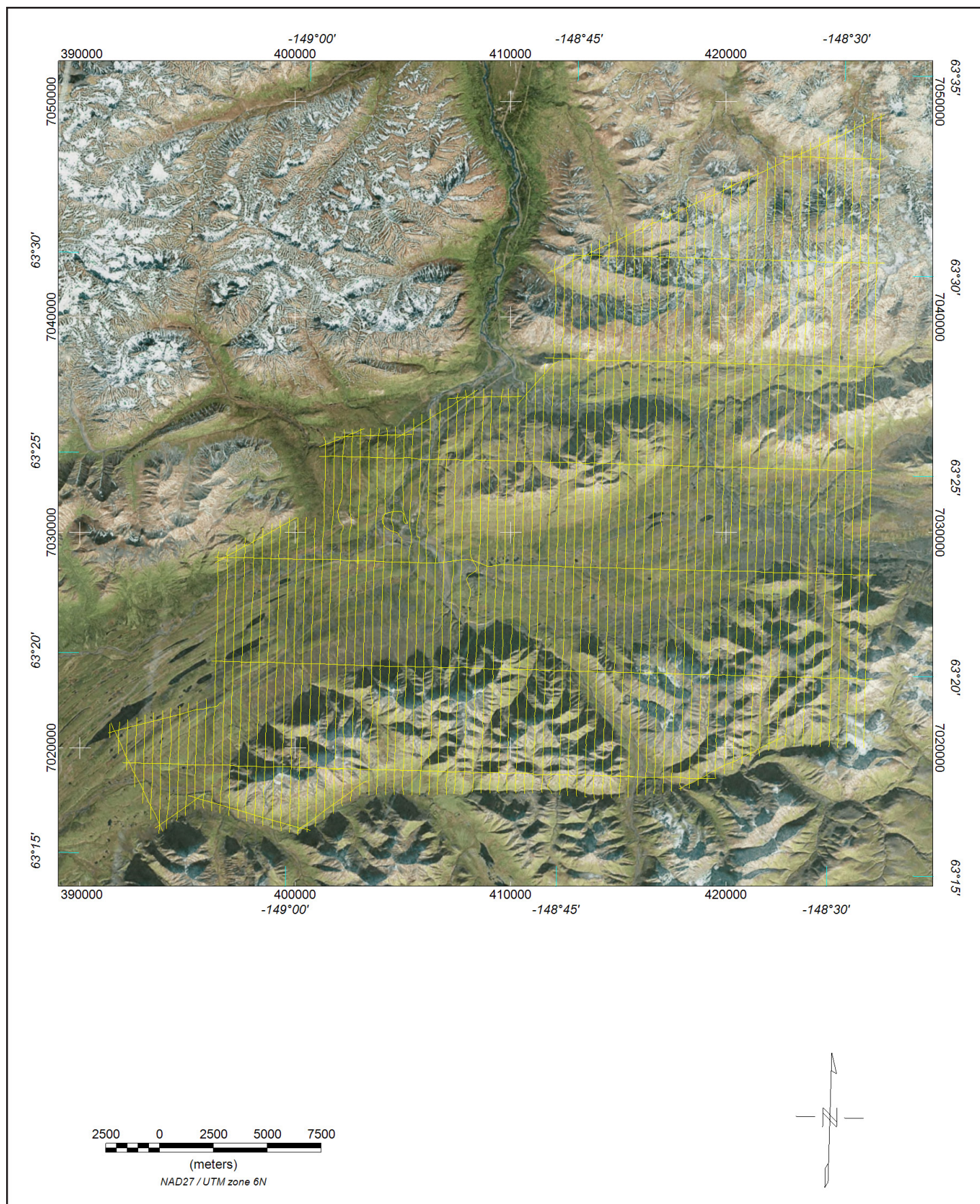


Figure 2. Flight path with orthometric image.

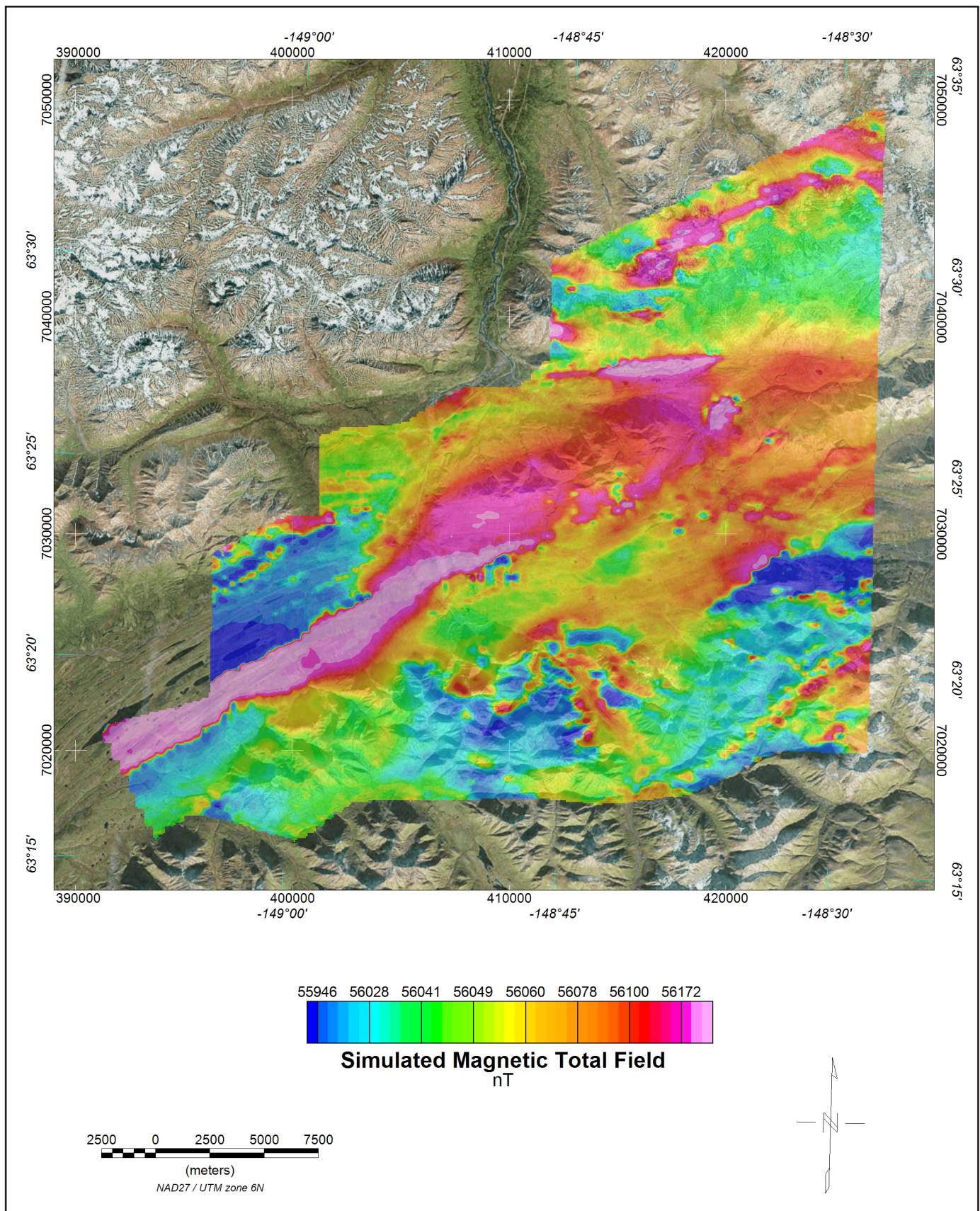


Figure 3. Simulated magnetic total field grid with orthometric image. The simulated magnetic total field data were created using digitally recorded data from a Picodas MEP-710 processor with Geometrics G822 sensor cesium magnetometer. Data were collected at a sampling interval of 0.1 seconds. The magnetic data were (1) corrected for diurnal variations by subtracting the digitally recorded base station magnetic data, (2) IGRF corrected (IGRF model 2000, updated to August 2001), (3) leveled to the tie line data, (4) a constant value of approximately 56,000 nT was added to all data, and (5) interpolated onto a regular 100 m grid using a modified Akima (1970) technique.

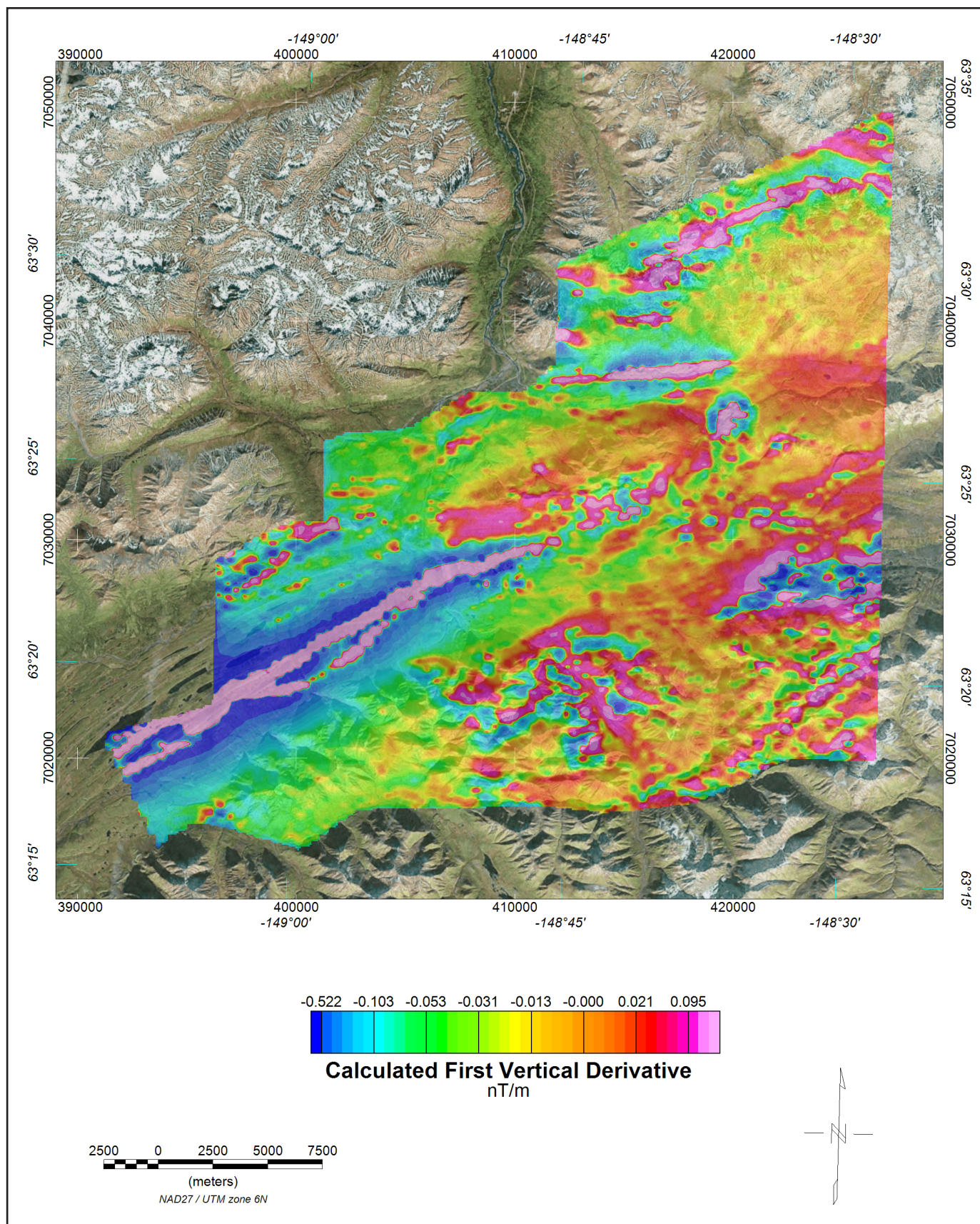


Figure 4. Calculated first vertical derivative grid with orthometric image. The first vertical derivative grid was calculated from the diurnally-corrected, IGRF-corrected total magnetic field grid using a FFT base frequency domain filtering algorithm. The resulting first vertical derivative grid provides better definition and resolution of near- surface magnetic units and helps to identify weak magnetic features that may not be evident on the total field data.

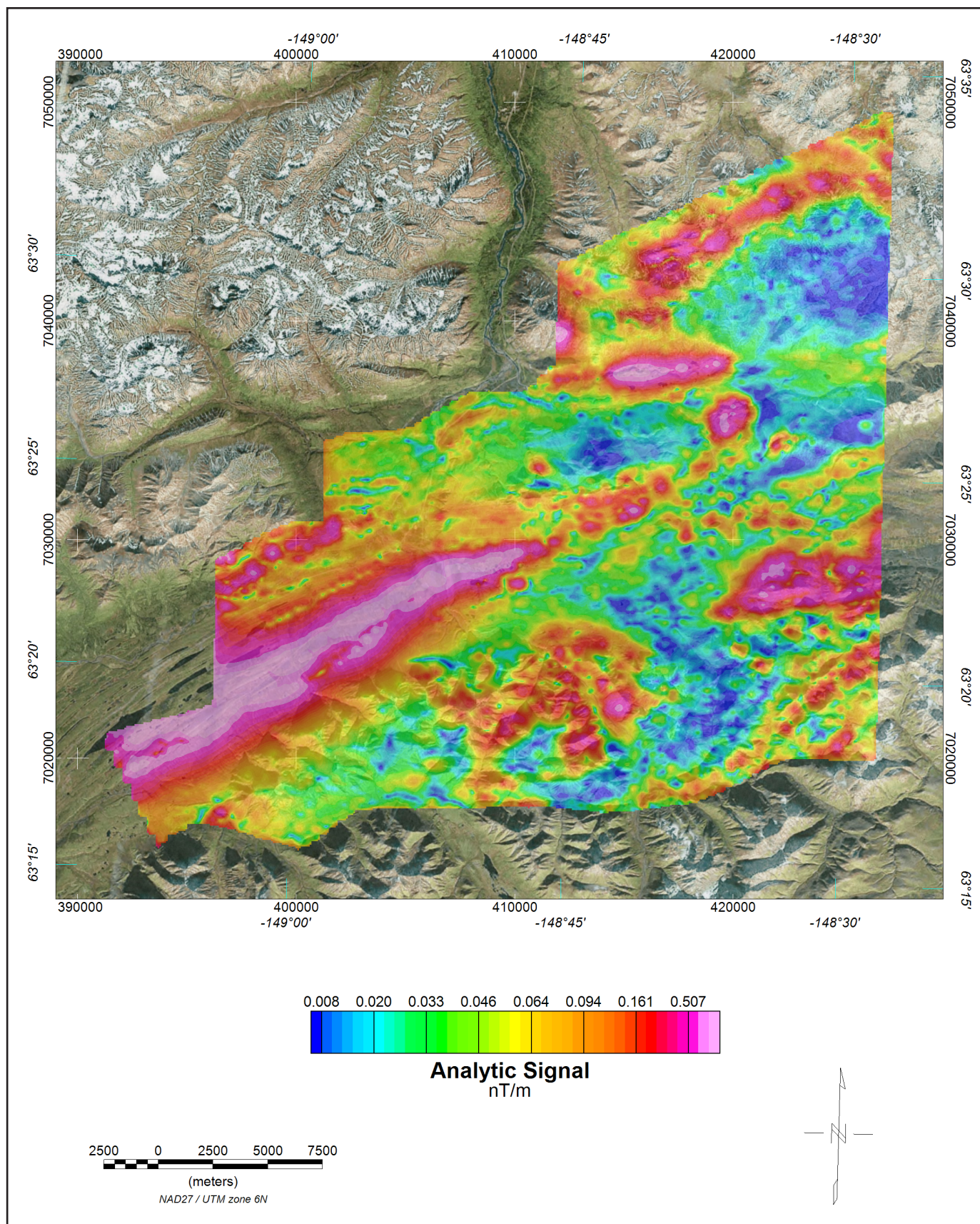


Figure 5. Analytic signal grid with orthometric image. Analytic signal is the total amplitude of all directions of magnetic gradient calculated from the sum of the squares of the three orthogonal gradients. Mapped highs in the calculated analytic signal of magnetic parameter locate the anomalous source body edges and corners (such as contacts, fault/shear zones, etc.). Analytic signal maxima are located directly over faults and contacts, regardless of structural dip, and independent of the direction of the induced and/or remanent magnetizations.

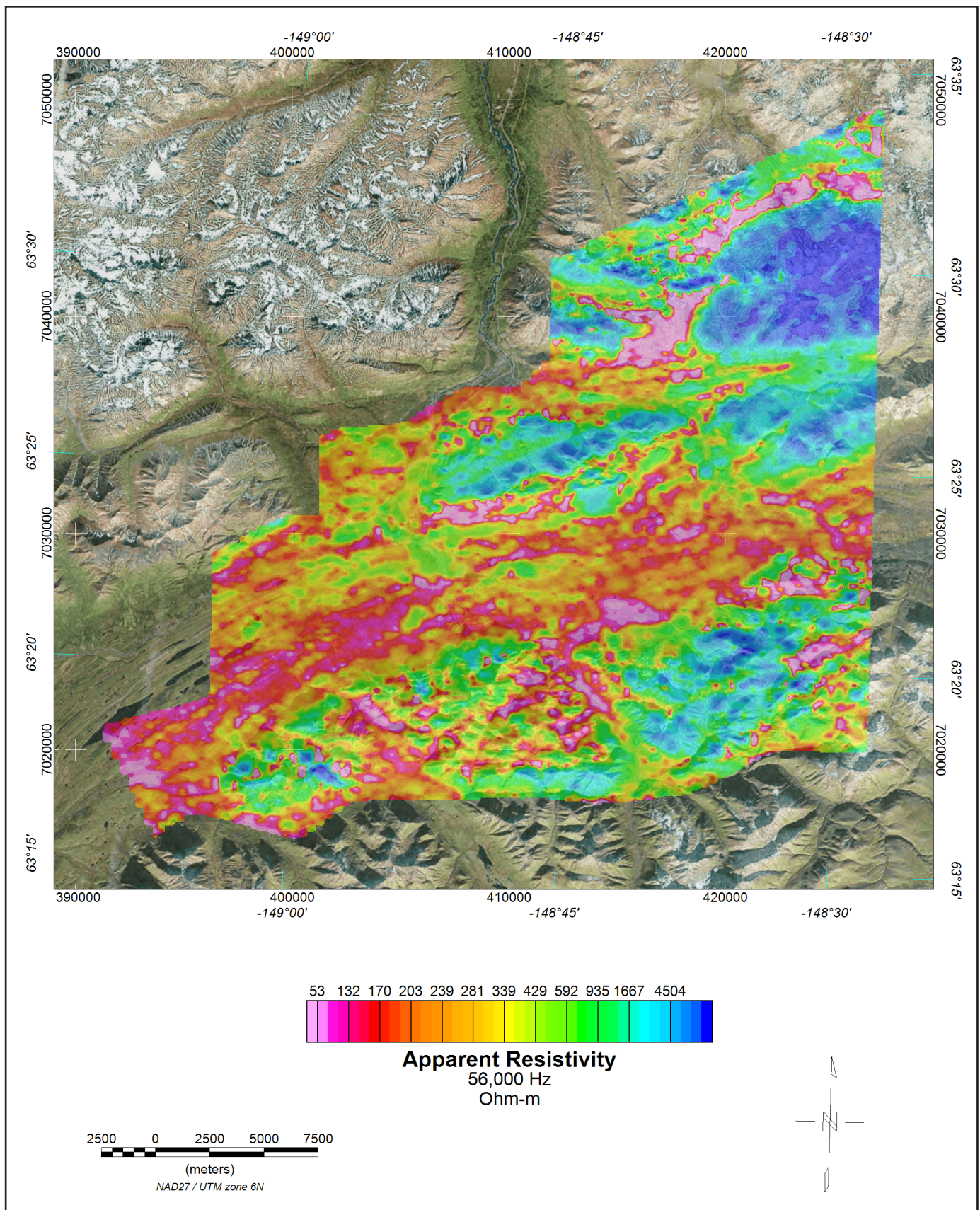


Figure 6. 56,000 Hz coplanar apparent resistivity grid with orthometric image. The DIGHEM[®] EM system measured inphase and quadrature components at five frequencies. Two vertical coaxial coil-pairs operated at 1,000 and 5,500 Hz while three horizontal coplanar coil-pairs operated at 900, 7,200, and 56,000 Hz. EM data were sampled at 0.1 second intervals. The EM system responds to bedrock conductors, conductive overburden, and cultural sources. Apparent resistivity is generated from the inphase and quadrature component of the coplanar 56,000 Hz using the pseudo-layer half space model (Fraser, 1978). The data were interpolated onto a regular 100 m grid using a modified Akima (1970) technique.

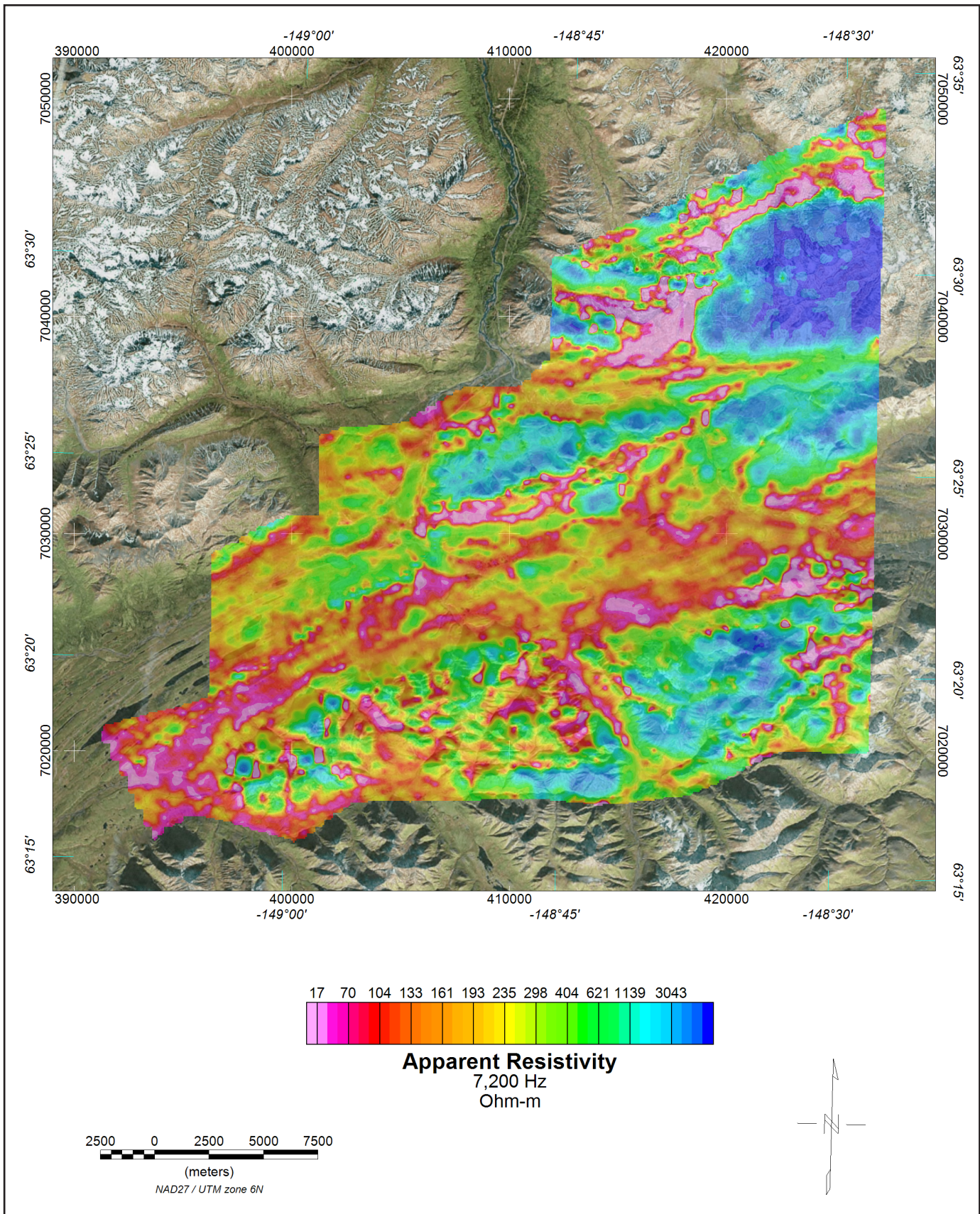


Figure 7. 7,200 Hz coplanar apparent resistivity grid with orthometric image. The DIGHEM[®] EM system measured inphase and quadrature components at five frequencies. Two vertical coaxial coil-pairs operated at 1,000 and 5,500 Hz while three horizontal coplanar coil-pairs operated at 900, 7,200, and 56,000 Hz. EM data were sampled at 0.1 second intervals. The EM system responds to bedrock conductors, conductive overburden, and cultural sources. Apparent resistivity is generated from the inphase and quadrature component of the coplanar 7,200 Hz using the pseudo-layer half space model (Fraser, 1978). The data were interpolated onto a regular 100 m grid using a modified Akima (1970) technique.

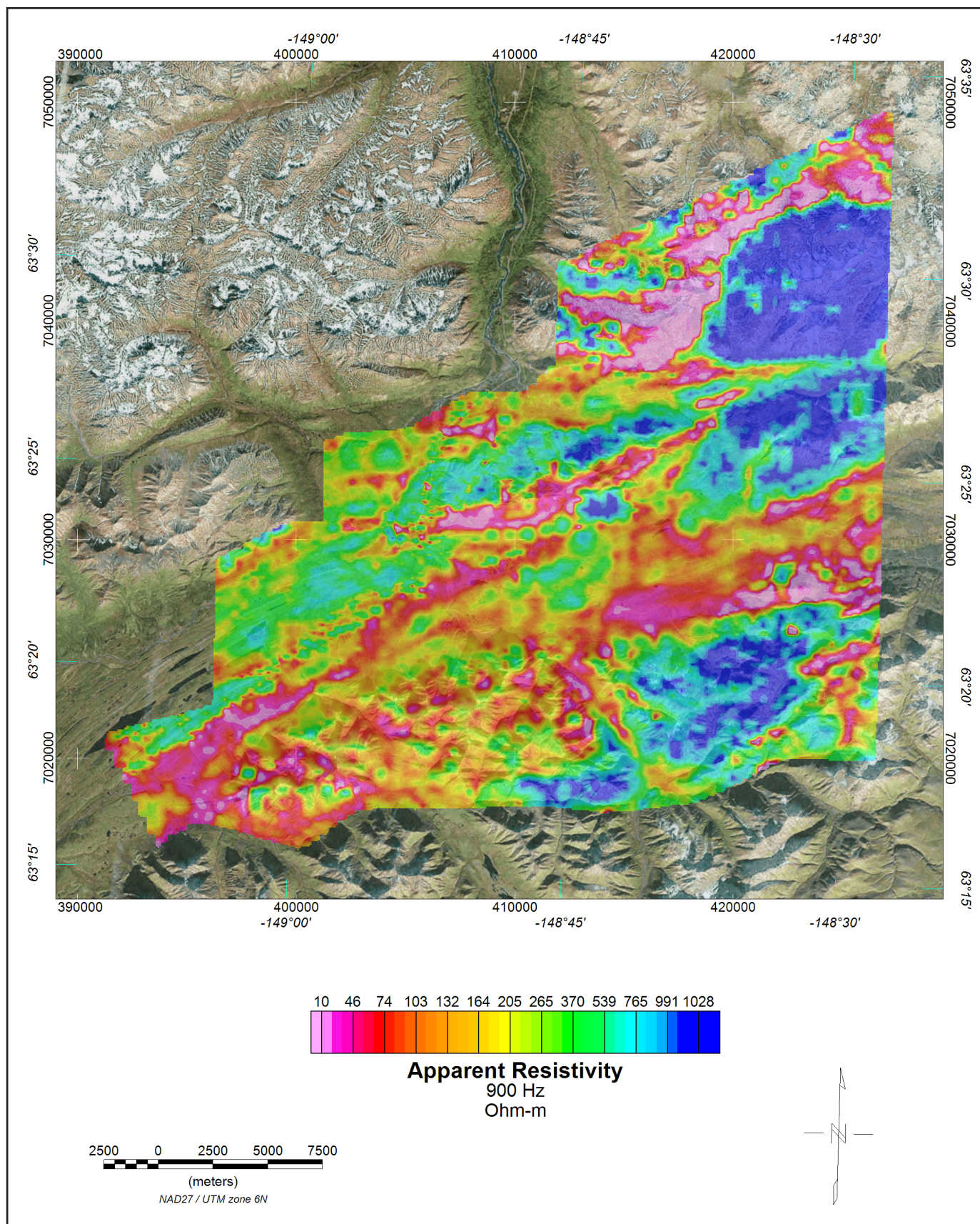
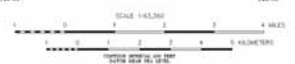


Figure 8. 900 Hz coplanar apparent resistivity grid with orthometric image. The DIGHEM[®] EM system measured inphase and quadrature components at five frequencies. Two vertical coaxial coil-pairs operated at 1,000 and 5,500 Hz while three horizontal coplanar coil-pairs operated at 900, 7,200, and 56,000 Hz. EM data were sampled at 0.1 second intervals. The EM system responds to bedrock conductors, conductive overburden, and cultural sources. Apparent resistivity is generated from the inphase and quadrature component of the coplanar 900 Hz using the pseudo-layer half space model (Fraser, 1978). The data were interpolated onto a regular 100 m grid using a modified Akima (1970) technique.

Table 1. Copies of the following maps are included at the end of this booklet. The low-resolution, page-size maps included in this booklet are intended to be used as a search tool and are not the final product. Large-scale, full-resolution versions of each map are available to download on this publication's citation page: <http://doi.org/10.14509/30415>.

Map Title	Description
broadpass_flightpath_topo_map.pdf	flight path with topographic base map
broadpass_sim_magtf_topo_map.pdf	simulated magnetic total field grid with topographic base map
broadpass_sim_magtf_contours_plss_map.pdf	simulated magnetic total field grid and contours with public land survey system base layer
broadpass_sim_magtf_shaded_plss_map.pdf	shaded simulated magnetic total field grid with public land survey system base layer
broadpass_emanomalies_sim_magtf_contours_plss_map.pdf	electromagnetic anomaly map with simulated magnetic total field grid contours and public land survey system base layer
broadpass_emanomalies_sim_magtf_contours_detailed_topo_map_1of3.pdf	electromagnetic anomaly map with simulated magnetic total field grid contours and topographic base map
broadpass_emanomalies_sim_magtf_contours_detailed_topo_map_2of3.pdf	electromagnetic anomaly map with simulated magnetic total field grid contours and topographic base map
broadpass_emanomalies_sim_magtf_contours_detailed_topo_map_3of3.pdf	electromagnetic anomaly map with simulated magnetic total field grid contours and topographic base map
broadpass_res7200hz_topo_map.pdf	7,200 Hz apparent resistivity grid with topographic base map
broadpass_res7200hz_contours_plss_map.pdf	7,200 Hz apparent resistivity grid with data contours and public land survey system base layer
broadpass_res7200hz_bw_contours_plss_map.pdf	7,200 Hz apparent resistivity data contours with public land survey system base layer
broadpass_res900hz_topo_map.pdf	900 Hz apparent resistivity grid with topographic base map
broadpass_res900hz_contours_plss_map.pdf	900 Hz apparent resistivity grid with data contours and public land survey system base layer
broadpass_res900hz_bw_contours_plss_map.pdf	900 Hz apparent resistivity data contours with public land survey system base layer
broadpass_interpretation_plss_map.pdf	interpretation based on geophysical data with public land survey system base layer



100
100
45°

[illegible]

The diagram illustrates the components of flight lines. It shows a vertical line with several horizontal segments. Labels include: 'Flight number' (pointing to a segment), 'Flight direction' (pointing to an arrow), 'Flight line number' (pointing to a segment), 'Flight number' (pointing to a segment), 'Line number' (pointing to a segment), and 'Radius identified on profile' (pointing to a segment).

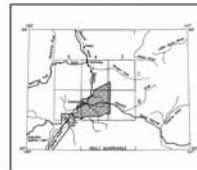
This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources, Division of Geological & Geophysical Surveys (DGGG), and Stevens Exploration Management Corp. Airborne geophysical data for the area were acquired and processed by Fugro Airborne Surveys in 2001. 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, 734 University Ave., Suite 200, Fairbanks, Alaska, 99775.

This report was taken, compiled and where-order corrected
between the Office of Ocean, Department of Fisheries
Resources, Division of Monitoring & Information Systems
(DIMS), and Marine Experiment Management Unit,
including geophysical data for the work have collected
and processed in Pacific Fisheries Service in 2001.
Lloyd Burns was the contact manager for DIMS.



LOCATION INDEX

[illegible]

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 W line data, and (3) interpreted using a regular 150 m grid using a modified Amsch (1973) technique. The magnetic declination (or DGR gradient, 2000, updated to August 2001) was removed from the leveled magnetic data.

NOTE: IN 1970, a new method of interpretation and anomaly curve fitting based on total procedures (Journal of the Association of Geophysicists, v. 17, no. 4, p. 589-603).



MAGNETIC CONTOUR INTERVAL

_____ x 250 nT
_____ x 80 nT
_____ x 90 nT
_____ x 5 nT

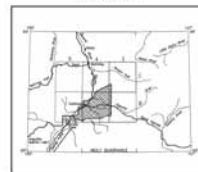
This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources, Division of Geological & Geophysical Surveys (DGGG), and Stevens Exploration Management Corp. Airborne geophysical data for the area were acquired and processed by Fugro Airborne Surveys in 2001. 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, 99775.





LOCATION INDEX



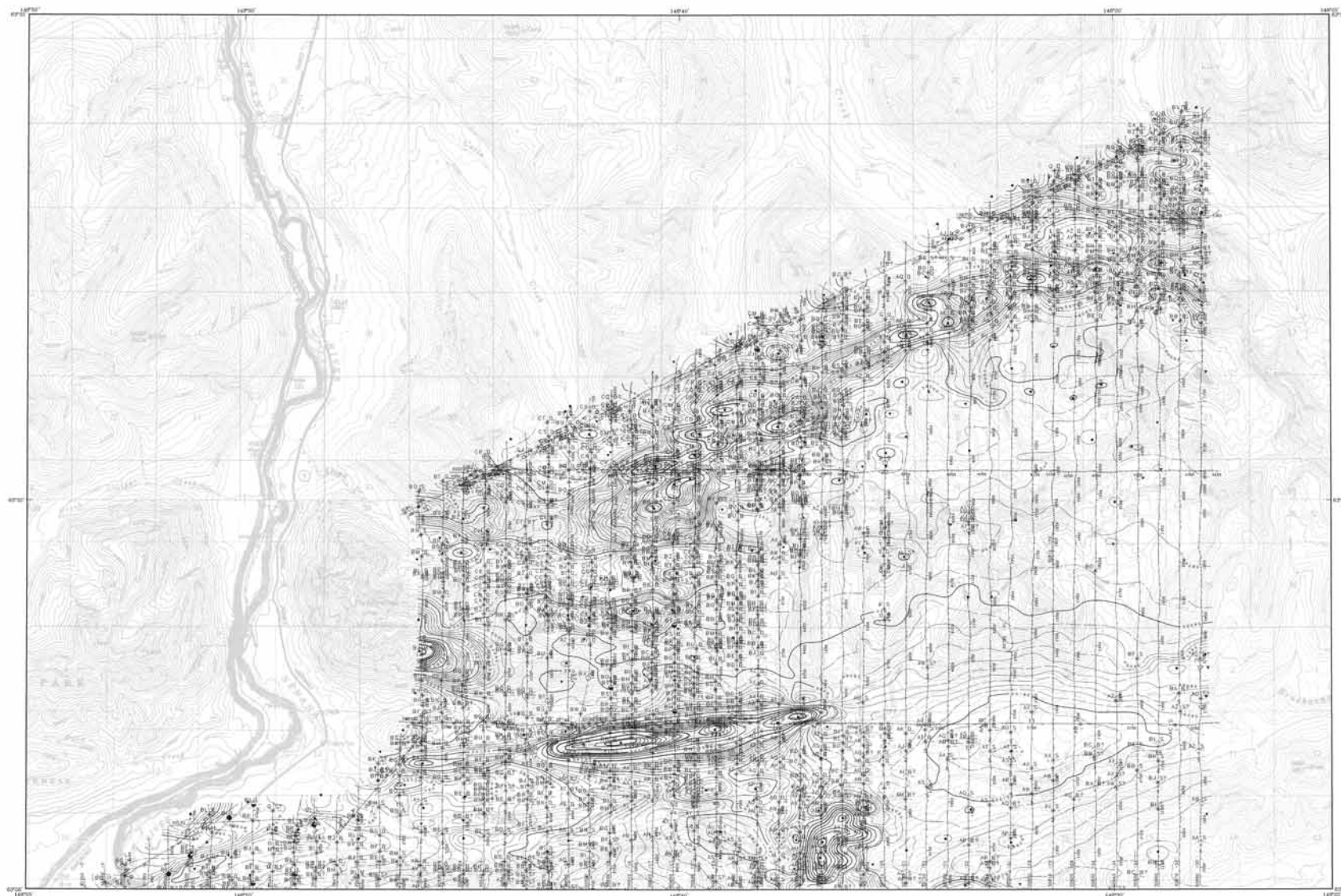
The geographical data were acquired with a DGPS (Trimble) and a Differential Global Positioning System (DGPS) (Trimble) and a Scintrex (Canada) Geophysical Electromagnetic (EG) system and a Scintrex (Canada) Geophysical Electromagnetic (EG) system. The system recorded data from a radar altimeter, GPS navigation system, 800/800 Hz monitors and video cameras. Flights were performed with an A1300B-2 Squire helicopter at a mean terrain clearance of 200 feet along the flight line (10° north of true) and a flight altitude of 1000 feet above the ground. The lines were flown perpendicular to the flight lines at intervals of approximately 3 miles. The data regions include an area where the survey aircraft had to descend around populated areas.

Intensity	Conductance
●	>50 siemens
□	>50 siemens
⊗	Quadrantile anomaly
△	Weak conductivity associated with an air flow suggestive response

To determine the location of EM anomalies or their boundaries, the DDDM-DI system measured phase and quadrature components at five frequencies. Two vertical coil-cable pairs operated at 1000 and 1500 Hz while three horizontal coplanar-coil pairs operated at 300, 7200, and 56,000 Hz. DI data were sampled at 0.1 second intervals. The DI system responds to tectonic conductors, conductive overburden, and cultural sources. The power line monitor and the float track video were examined to locate cultural sources. The DI anomalies that are identified are classified by conductance.

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 (since 1970) technique for regional correction (or GRF gradient, 2000, updated to August 2001) was removed from the leveled magnetic data.

This map and other products from this survey are available by mail and/or in person from GSCS, 734 University Ave., Suite 200, Fairbanks, Alaska 99775.



Scale: 1:51,680. Horizontal Error: 100 ft. Vertical Error: 100 ft.



DESCRIPTIVE NOTES

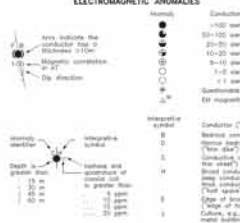
The geophysical data were acquired with a BICORP[®] Electromagnetic (EM) system and a Scintrex vector magnetometer. Both were flown at a height of 100 feet. In addition the survey recorded data from a radio altimeter, GPS, magnetometer system, 100/100 Hz magnetic and pole camera. Flights were performed with an E1350B-2 "Quint" helicopter at a mean terrain clearance of 200 feet using North-South (N-S) profile flight lines with a spacing of a quarter of a mile. The lines were flown perpendicular to the flight lines of intensity of approximately 2 miles. The line segments indicate on areas where the early aircraft had to deliver ground expedition areas.

An ASHKECH G224 HA/STAR / GEOMASS 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 Canada 1986 (11th zone 6) UTM projection. 1947 from American datum using a vertical meridian (AM) of 147° 0' north. Horizontal accuracy of the presented data is better than 10 m with respect to the UTM grid.

ELECTROMAGNETICS

To determine the location of EM anomalies of their boundaries, the BICORP EM system measured point and quadrature components of the frequency, two vertical quadrature coils oriented at 90° and 1000 m used three horizontal vector-coil pairs oriented at 0°, 120°, and 240°. EM data were collected at 0.1 second intervals. The EM system responds to resistive structures, conductive structures, and cultural features. The type of conductor is indicated on the aeromagnetic map by the integrated symbol oriented to each EM anomaly. Orientation of the type of conductor is based on EM anomaly shape of the resistive and conductive responses, together with conductor and magnetic patterns and topography. The cover the resistive and the high resistivity were oriented to North-south courses.

ELECTROMAGNETIC ANOMALIES



TOTAL MAGNETIC FIELD AND DETAILED ELECTROMAGNETIC ANOMALIES OF THE BROAD PASS AREA, SOUTHWESTERN BONNIFIELD MINING DISTRICT, CENTRAL ALASKA

PARTS OF HEALY B-3, B-4, C-3 AND C-4 QUADRANGLES

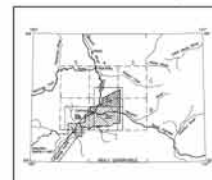
2002

TOTAL MAGNETIC FIELD

The total magnetic field data were acquired with a sampling interval of 0.5 seconds, and were the digital recorded base station magnetic data. The data were collected at a regular 100 m grid using a modified survey (1700) technique. The regional variation (or EM) pattern, 2000, updated to August, 2001, was removed from the lowest magnetic data.

Since 1970, a new method of integration and smooth model of computing magnetic field is used, N. P. G. 000-000.

LOCATION INDEX FOR SCALE 1:51,680



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 Geologic & Geophysical Surveys (2002), and Bureau of Exploration Management (2002), and Bureau of Exploration Management (2002), and provided by the Alaska Division of Geologic & Geophysical Surveys in 2002. The map and other products from this survey are available to the public in print form from 2002, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.



2002

To determine the location of EM anomalies on their boundaries, the DGHM system measured surface magnetic field intensity at 7000 and 3500 Hz. The computer-aided system operated at 13000 and 3500 Hz while three horizontal coplanar coils were oriented at 0.5°, 22.5°, and 36.9°. The EM depth was estimated at 9.1, 18.2, and 27.3 m. The EM system is capable of detecting conductive overburden, and collinear structures. The type of conductor is indicated by the magnetotelluric map by the interpretation of the apparent resistivity curves. The location of the type of conductor is based on EM gradient maps of the apparent- and coplanar-coil responses. Together with conductor and magnetic patterns and topography, the power line location and the flight track data were examined to find a different, rapid, and accurate method.

7.0 — 0112 includes the conductor neg. of business y-12m

1.00 — Marginal contribution of X

[illegible]

Depth to greatest flow	Depth to greatest flow
12 m	5 m
30 m	10 m
45 m	15 m
60 m	20 m

[illegible]

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) revised to the tie-line data, and (3) interpolated onto a regular 100 m grid using a modified kriging (1972) technique. The regional variation (or IGM gradient, 2000, updated to August, 2001) was removed from the located magnetic data.

Shaw, W. 1937. A new method of classification and growth curve fitting based on least squares. *Journal of the American Statistical Association*. - 32, no. 4, p. 550-552.

MAGNETIC CONTOUR INTERVAL

_____ 250 Hz

_____ 50 Hz

_____ 10 Hz

_____ 5 Hz

 magnetic line

 magnetic line

SURVEY HISTORY

This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources, Bureau of Geologic & Geophysical Survey (DGGG), and Sitavene Exploration Management Corp. Airborne geophysical data for the area were acquired and processed by Fugro Airborne Surveys in 2001. Louise Burns was the contract manager for DGGG.

The soap and other products from this survey are available by mail order or in person from ECOS, 784 University Ave., Suite 220, Cambridge, MA 02138.



2002

ELECTROMAGNETIC ANOMALIES

The preyfish and diets were collected with a Benthic Vacuum Suction (BVS) system. Preyfishes were collected in 100-µm mesh sieves. Diets were collected in 100-µm mesh sieves. The preyfish and diets were collected in 100-µm mesh sieves. The preyfish and diets were collected in 100-µm mesh sieves.

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CEN
PARTS OF HE

ALASKA
4 QUADRANGLES

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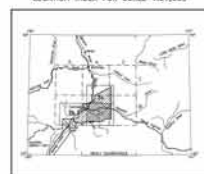
[illegible][illegible]

This camp has
between five
quarters, 20
OGGI, and
other good
and proper
living quarters.

SURVEY HISTORY

under contract
and of National
Ecological Survey
Experiment Corp.
was acquired
in 2001.
for 2002.

LOCATION INDEX FOR SCALE 1:31,680



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 digital, recorded base station magnetic data, (2) binned to the 10-min data, and (3) interpolated onto a regular 100-m grid using a modified spline (1970) technique. The regional variation for IGRF (epoch 2000, updated to August, 2007) was removed from the resulting magnetic data.

Shaw, R., 1970, A new method of classification and growth curve fitting based on least squares, *Journal of the Association of Biometrical Statisticians*, 17, no. 4, p. 389-392.

MAGNETIC CONTOUR INTER



SURVEY HISTORY

This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources, Division of Geology & Geophysical Survey (DGGG), and Stevens Evaluation Management Corp. Airborne geophysical data for the area were acquired and processed by Fugro Airborne Surveys in 2007. Libbie Burns was the contract manager for DGGG.

This map and other products from the survey are available to the public at a cost of \$500 per page. For information, contact the DGGG at 333 East 7th Avenue, Anchorage, Alaska 99501.

 Springer[illegible][illegible]

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2002

The geophysical data were acquired with a DIGHTS[®] Electromagnetic (EM) system and a SolaStar[®] cesium magnetometer. Flights were flown at a height of 100 m above the terrain. The system is composed of a 100 m cable towed behind the aircraft, a 100 m radius 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 North-South (N-S) survey flight lines with a spacing of a quarter of a mile. The lines were flown perpendicular to a 500 ft wide, 100 ft spaced grid system (Fig. 1). The black regions indicate an area where the survey aircraft had to detour around populated areas.

The DICHM™ EM system monitored inphase and quadrature components at five frequencies. Two vertical coplanar coil pairs operated at 1000 and 5000 Hz while three horizontal coplanar-coil pairs operated at 900, 7200, and 56,000 Hz. EM data were sampled at 0.1 second intervals. The EM system responds to conductive conductors, conductive overburden, and cultural sources. Apparent resistivity is generated from the inphase and quadrature components of the coplanar 7200 Hz using the pseudo-telluric loop space model (Freyer 1978). The data were interpreted using a regular 10 s grid using a modified Skidmore (1970) technique.

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 Tevere Exploration Management Corp. Airborne geophysical data for the area were acquired and processed by Fugro Airborne Surveys in 2001. 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, 754 University Ave., Suite 200, Fairbanks, Alaska, 99775.



2002

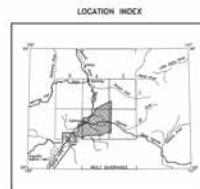
The geographic data were acquired with a DORNIER Electromagnetic (EM) system and a Sixkva Cesium magnetometer. Both were flown at a height of 100 feet above the terrain. The EM system was equipped with a radar altimeter, GPS navigation system, 50/80 kHz magnetic field sensors, and video camera. Flights were performed over the ALCOA area during the summer months. A minimum clearance of 200 feet along North-South (0°) and East-West (90°) flight lines was maintained throughout the survey. The lines were flown perpendicular to the flight lines at intervals of approximately 5 miles. The flight lines were spaced such that the entire aircraft had to descend below populated areas.

An Lockheed DC-24 W/TSTAR or GLOMAPS Global Positioning System was used for navigation. The horizontal accuracy of the GPS system is dependent upon using post-flight differential positioning to a reference station. Stationing information from the reference stations are projected onto the Clarke 1856 (WGS 84) G zone, 142° North American datum. Horizontal accuracy of the GPS data is better than 10 meters as measured to the true

The SIGEN[®] EM system measured inputs and outputs components at five frequencies. Two vertical capacitors (load capacitors) operated at 1500 and 5500 Hz. Two horizontal capacitors (input capacitors) operated at 600, 7200, and 16000 Hz. EM data were sampled at 0.1 second intervals. The EM system responds to feedback components, conductive overburden, and Cultural sources. Apparent resistivity is generated from the conductive and capacitive components of the impedance. "200 m" is the pseudo-depth of investigation (Foster 1978). The data were interpolated onto a regular 100 m grid using a modified spline (1970) technique.

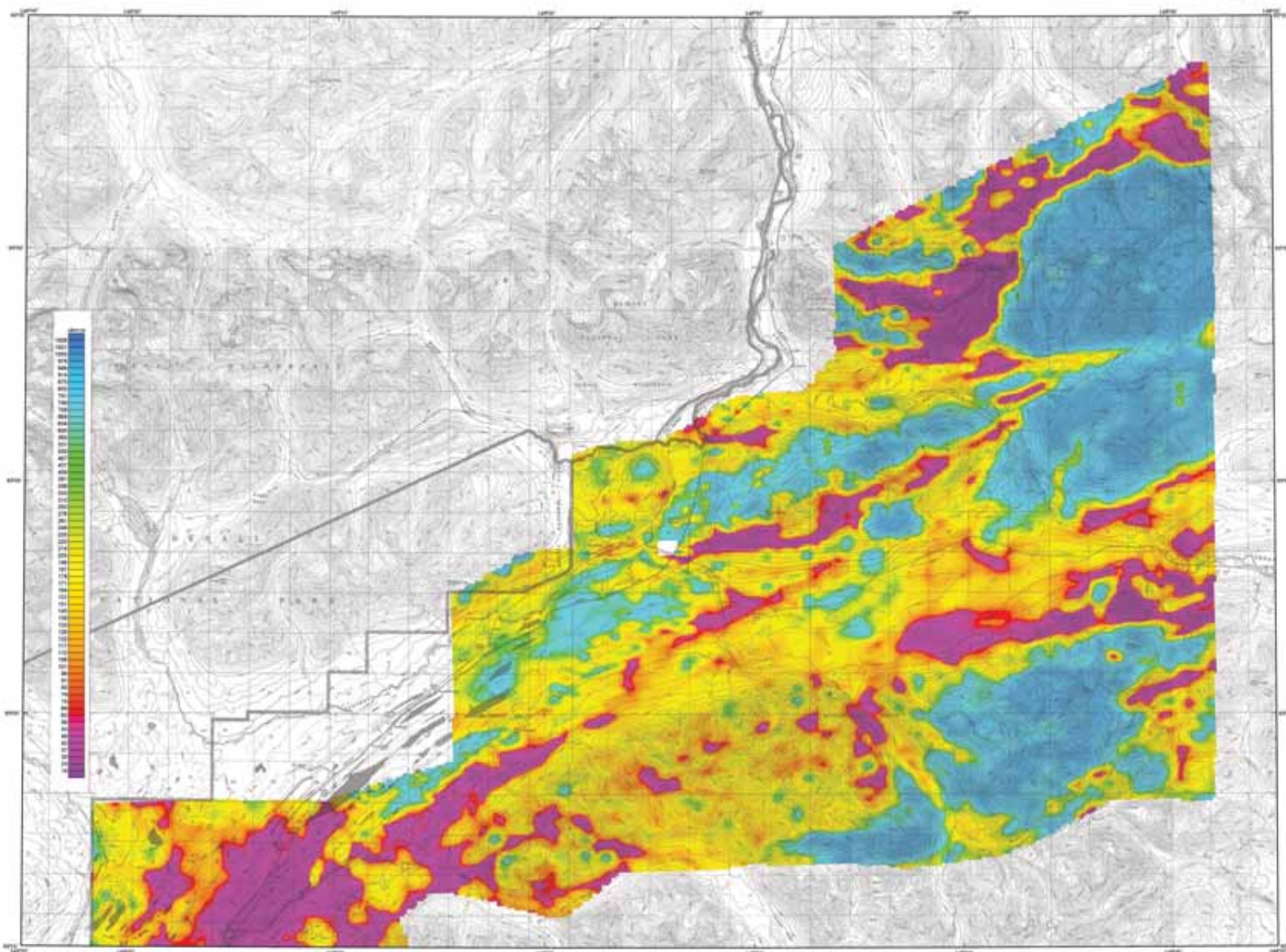
Stewart, M., 1970, A new method of interpolation and smooth curve fitting based on local procedures. *Journal of the Association of Computing Machinery*, v. 17, no. 4, p. 580-592.

Foster, D.R., 1978, Resistivity mapping with an induction coil. *Geophysics*, v. 43, no. 1, p. 15-21.



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RESISTIVITY SCALE: 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 120, 140, 160, 180, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1000



DESCRIPTIVE NOTES

The geophysical data were acquired with a GEOTECH 2000 system and a 900 Hz coplanar resistivity system. The system was configured with a 100 m electrode spacing and a 100 m electrode array. The data were acquired in a 100 m by 100 m grid. The data were processed with the GEOTECH 2000 software and the results were displayed on a color scale from 10 to 1000 ohm-meters.

The data were processed with the GEOTECH 2000 software and the results were displayed on a color scale from 10 to 1000 ohm-meters. The data were processed with the GEOTECH 2000 software and the results were displayed on a color scale from 10 to 1000 ohm-meters.

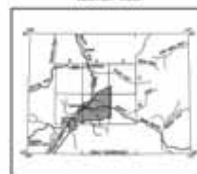
900 Hz COPLANAR RESISTIVITY OF THE BROAD PASS AREA, SOUTHWESTERN BONNIFIELD MINING DISTRICT, CENTRAL ALASKA

PARTS OF HEALY QUADRANGLE
2002

RESISTIVITY

The resistivity data were acquired with a GEOTECH 2000 system and a 900 Hz coplanar resistivity system. The system was configured with a 100 m electrode spacing and a 100 m electrode array. The data were acquired in a 100 m by 100 m grid. The data were processed with the GEOTECH 2000 software and the results were displayed on a color scale from 10 to 1000 ohm-meters.

LOCATION INDEX



SURVEY HISTORY

The map and other products from this survey are available in hard copy or in a format that can be viewed on a computer. The data were processed with the GEOTECH 2000 software and the results were displayed on a color scale from 10 to 1000 ohm-meters.



2002

The geographical data were acquired with a DIGHEP[®] Electromagnetic (EM) system and a SICKSAFE (safety) magnetometer. The EM system has a depth of about 100 feet. In addition, the system recorded data from a radar altimeter, GPS navigation system, 50/60 Hz monomers and video camera. Flights were performed with an EC255B-2 Surocc helicopter at a mean terrain clearance of 200 feet along North-South (N-S) survey flight lines with a spacing of a quarter of a mile. The survey area was divided into 10 flight lines at intervals of approximately 3 miles. The black regions indicate an area where the survey aircraft had to detour around populated areas.

The SIGEM™ EM system measured in-phase and quadrature components at five frequencies. Two vertical coplanar coil pairs operated at 1000 and 5500 Hz while three horizontal coplanar-coil pairs operated at 900, 7200, and 56,000 Hz. Coil 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 in-phase and quadrature components of the topoplacer 900 Hz using the pseudo-telluric loop space model (Voxler 1978). The data were integrated into a regular 10 m grid using a modified skin (1970) technique.

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 Corporation. Airborne geophysical data for the area were acquired and processed by Fugro Airborne Surveys in 2001. 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 Avenue, Suite 200, Fairbanks, Alaska, 99709.



PARTS OF HEALY QUADRANGLE

The geophysical data were acquired with a DSHS[®] Electromagnetic (EM) system and a Seisview[®] magnetometer. The system was flown at a height of 1.5 m and collected 1000 samples per second. The system also added the survey recorded data from a radar altimeter, GPS navigation system, 50/60 Hz monitors and video camera. Flights were performed with an X-220B-2 Squirrel helicopter at a mean terrain clearance of 200 feet above North-South (0°) survey flight lines with spacing of 500 m. The flight lines were flown in a zig-zag pattern. The flight lines at intervals of approximately 3 miles. The black regions indicate an area where the survey aircraft had to detour around populated areas.

The SIGMA™ EM system measured in-phase and quadrature components at five frequencies. Two vertical copper coil pairs operated at 1000 and 5000 Hz while three horizontal copper-coil pairs operated at 600, 7200, and 16,000 Hz. EM data were sampled at 0.1 second intervals. The EM system requires no testbook conductors, conductive overburden, and cultural sources. Apparent resistivity is generated from the in-phase and quadrature components of the capacitor 500 Hz using the pseudo-telluric half space model (Vruess 1978). The data were integrated only at a regular 10 m grid using a modified Stiles (1970) technique.

Continued in increments of 100 intervals per decade







relativity (in)

This map and other products from this survey are available to the public from the Alaska Geological Survey, 734 University of Alaska, Fairbanks, Alaska 99775.

**INTERPRETATION MAP
OF THE BROAD PASS AREA,
SOUTHWESTERN BONNIFIELD
MINING DISTRICT,
CENTRAL ALASKA**
PARTS OF HEALY QUADRANGLE
2002

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

LEGEND

	F1	Fault
	AS	Conductor Axis
	M1	Magnetic Zone
	M2	Magnetic Line
	RH1	Resistive Zone
	R1	Highly Conductive Zone

