BLACK MOUNTAIN ELECTROMAGNETIC AND MAGNETIC AIRBORNE GEOPHYSICAL SURVEY DATA COMPILATION

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

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BLACK MOUNTAIN ELECTROMAGNETIC AND MAGNETIC AIRBORNE GEOPHYSICAL SURVEY DATA COMPILATION

L.E. Burns¹, G.R.C. Graham, J.D. Barefoot, Fugro Airborne Surveys Corp., and Stevens Exploration Management Corp.

ABSTRACT

The Black Mountain electromagnetic and magnetic airborne geophysical survey is located in interior Alaska in the Goodpaster mining district, about 125 kilometers southeast of Fairbanks, Alaska. The survey is adjacent to the Goodpaster and South East Extension of Salcha River Pogo geophysical surveys. Frequency domain electromagnetic and magnetic data were collected with the DIGHEM^V system from September to November 2005. A total of 1735.2 line kilometers were collected covering 621.5 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. The survey area includes the Blue Lead gold mine, and several related prospects, such as the Bou prospect. 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.

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

AVAILABLE DATA

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

REFERENCES

Akima, H., 1970, A new method of interpolation and smooth curve fitting based on local procedures:

Journal of the Association of Computing Machinery, v. 17, n. 4, p. 589–602.

Burns, L.E., 2006, Project Report and Profile data of the 2005 Geophysical Surveys of the northeast

Fairbanks, east Richardson, Liscum, and Black Mountain areas, interior Alaska: Alaska Division of Geological & Geophysical Surveys Geophysical Report 2006-4, 1 p. <http://doi.org/10.14509/14566>

Burns, L.E., Fugro Airborne Surveys Corp., and Stevens Exploration Management Corp., 2006, Line, grid, and vector data and plot files for the airborne geophysical survey data of parts of the east Richardson, Liscum, and Black Mountain areas, interior Alaska: Alaska Division of Geological & Geophysical Surveys Geophysical Report 2006-5, 29 sheets, 1 DVD. <http://doi.org/10.14509/14531>

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

Figure 2. Flight path with orthometric image.

Figure 3. Simulated magnetic total field grid with orthometric image. The magnetic total field data were processed using digitally recorded data from a Scintrex cesium CS2 magnetometer. Data were collected at a sampling interval of 0.1 seconds. The magnetic data were (1) corrected for diurnal variations by subtracting the digitally recorded base station magnetic data, (2) IGRF corrected (IGRF model 2005, updated to November 2005), (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. 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. The data were interpolated onto a regular 80 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. The data were interpolated onto a regular 80 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. The data were interpolated onto a regular 80 m grid using a modified Akima (1970) technique.

Table 1. Copies of the following maps are included at the end of this booklet. The low-resolution, page-size maps included in this booklet are intended to be used as a search tool and are not the final product. Large-scale, full-resolution versions of each map are available to download on this publication's citation page: <http://doi.org/10.14509/29756>.

Map Title	Description
blackmountain_sim_magtf_topo_map.pdf	simulated magnetic total field grid with topographic base map
blackmountain_sim_magtf_contours_plss_map.pdf	simulated magnetic total field grid with data contours and public land survey system base layer
blackmountain_res56khz_topo_map.pdf	56,000 Hz apparent resistivity grid with topographic base map
blackmountain_res56khz_contours_plss_map.pdf	56,000 Hz apparent resistivity grid with data contours and public land survey system base layer
blackmountain_res7200hz_topo_map.pdf	7,200 Hz apparent resistivity grid with topographic base map
blackmountain_res7200hz_contours_plss_map.pdf	7,200 Hz apparent resistivity grid with data contours and public land survey system base layer
blackmountain_res900hz_topo_map.pdf	900 Hz apparent resistivity grid with topographic base map
blackmountain_res900hz_contours_plss_map.pdf	900 Hz apparent resistivity grid with data contours and public land survey system base layer
blackmountain_emanomalies_sim_magtf_detailed_topo_map_1of2.pdf	electromagnetic anomalies and simulated magnetic total field grid and topographic base map
blackmountain_emanomalies_sim_magtf_detailed_topo_map_2of2.pdf	electromagnetic anomalies and simulated magnetic total field grid and topographic base map
blackmountain_interpretation_map.pdf	interpretation based on the geophysical data with public land survey system base layer
blackmountain_interpretation_sim_magtf_plss_map	interpretation based on the geophysical data with simulated magnetic total field grid and public land survey system base layer

PARTS OF BIG DELTA QUADRANGLE

TOTAL MAGNETIC FIELD

The magnetic total field contours were produced using digitally recorded data from a Sinterex cesium CS2 magnetometer, with a sampling interval of 0.1 seconds. The magnetic data were (1) corrected for diurnal variations by subtraction of the digitally recorded base station magnetic data, (2) adjusted for regional variations (or IGRF gradient, 2005, updated to November 2005) using altimeter adjusted IGRF, (3) leveled to the tie line data, and (4) interpolated onto a regular 80 m grid using a modified Akima (1970) technique.

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

The geophysical data were acquired with a DIGHEMY Electromagnetic (EM) system and a Sinterces cesium magnetometer. The EM and magnetic sensors were mounted on the AS350B-2 helicopter. The data collected in the survey recorded data from a radar altimeter, GPS navigation system, 50/60 Hz monitors and a Sinterces cesium magnetometer. The survey was conducted AS350B-2 Saurhel helicopter at a mean terrain clearance of 200 feet along N-S (0°) survey flight lines. The flight lines were flown perpendicular to the flight lines at intervals approximately 3 miles.

An Ashtech GG24 NAVSTAR / GLOSSAR Global Positioning System (GPS) was used to determine the helicopter position was derived every 0.5 seconds using post-flight differential positioning to the nearest centimeter. The GPS data were projected onto the Clarke 1866 UTM zone 6 spheroid, 1927 North American datum. The datum was set to a constant of 0 and an east constant of 500,000. Positional accuracy of the presented data is better than 1 meter.

This map has been compiled and drawn under contract to the State of Alaska, Department of Natural Resources, Division of Geological & Geophysical Surveys (DGGS), and Stevens Exploration Management Corp. Airborne geophysical data for the new area were acquired and processed by Fugro Airborne Surveys Corp. in 2005.

This map and other products from this survey are available by mail order in person from DGGS, 3354 College Road, Fairbanks, Alaska, 99709-5707. Published maps are also available in hard copy or electronically as Adobe Acrobat files (.pdf) on our Web site (<http://www.daas.dr.state.ak.us/pubs/>).

PARTS OF BIG DELTA QUADRANGLE

DESCRIPTIVE NOTES

An Ashtech GG24 NAVSTAR / GLOPASS Global Positioning System was used for navigation. The helicopter position was derived every 0.5 seconds using post-flight differential positioning to a relative accuracy of better than 5 m. Flight path positions were projected onto the Clarke 1866 (UTM zone 6) spheroid, 1927 North American datum using a central meridian (CM) of 147°, a north constant of 0 and an east constant of 500,000. Positional accuracy of the presented data is better than 10 m, with respect to the UTM grid.

TOTAL MAGNETIC FIELD

The magnetic total field contours were produced using digitally recorded data from a Scintrex cesium CS2 magnetometer, with a sampling interval of 0.1 seconds. The magnetic data were (1) corrected for diurnal variations by subtraction of the digitally recorded base station magnetic data, (2) adjusted for regional variations (or IGRF gradient, 2005, updated to November 2005) using magnetometer adjusted IGRF, (3) leveled to the time line data, and (4) interpolated onto a regular 80 m grid using a modified Akima (1970) technique.

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

MAGNETIC CONTOUR INTERVAL

..... 250 nT

..... 50 nT

..... 10 nT

..... 5 nT

SURVEY HISTORY

This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources, Division of Geological and Geophysical Surveys (DGGS), and Stevens Exploration Management Corp. Airborne geophysical data for the new area were acquired and processed by Fugro Airborne Surveys Corp. in 2005.

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PARTS OF BIG DELTA QUADRANGLE

RESISTIVITY

RESISTIVITY

The DIGHEM® EM system measured inphase and quadrature components at five frequencies. Two vertical coaxial 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 bedrock conductors, conductive overburden, and cultural sources. Apparent resistivity is generated from the inphase and quadrature component of the coplanar 56,000 Hz using the pseudo-layer half space model. The data were interpolated onto a regular 80 m grid using a modified Akima (1970) technique.

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.

The geophysical data were acquired with a GEMMY Electromagnetic Induction (EMI) Sirtex cesium magnetometer. The EM and magnetic sensors were flown at a height of 100 feet, in addition to a Global Positioning System (GPS) Trimble 4600 GPS navigation system, 50/60 Hz monitors and a 1000 Hz data logger. The data were collected by an AS350B-2 Saurleur helicopter at a mean terrain clearance of 200 feet along N-S (0°) survey flight lines. The flight lines were spaced at 1000 feet, one mile. The lines were flown perpendicular to the flight lines at intervals of approximately 3 miles.

An Ashtech GG24 NAVSTAR®/GLONASS Global Positioning System (GPS) receiver was mounted on the helicopter position was derived every 0.5 seconds using post-flight differential positioning to a reference station. The reference station was located at positions were projected onto the Clarke 1866 UTM zone 6 spherical, 1927 North American datum. The datum was defined by a semi-major axis constant of 0 and an east constant of 500,000. The datum was defined by a semi-major axis constant of 0 and an east constant of 500,000, with a scale factor of 0.999 999 97, and a false datum of 10 m, with respect to the UTM grid.

SURVEY HISTORY

SURVEY HISTORY

This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources, Division of Geological & Geophysical Surveys (DGGG), and State of Alaska, Department of Management & Enterprise Services, Division of Management & Enterprise Services. Airborne geophysical data for the new area were acquired and processed by Fugro Airborne Surveys Corp. in 2005.

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**56,000 Hz COPLANAR APPARENT RESISTIVITY
OF THE BLACK MOUNTAIN AREA,
GOODPASTER MINING DISTRICT,
INTERIOR ALASKA**

RESISTIVITY

ern measured inphase and quadrature frequencies. Two vertical coaxial at 1000 and 5000 Hz while three oil-pairs operated at 900, 7200 and were sampled at 0.1 second intervals. ends to bedrock conductors, conductive tural sources. Apparent resistivity is inphase and quadrature component of Hz using the pseudo-layer half space are interpolated onto a regular 80 m and Akima (1970) technique.

RESISTIVITY CONTOURS

SURVEY HISTORY

SURVEY HISTORY

This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources, Division of Geological and Geophysical Surveys (DGGS) and Stevens Exploration Management Services. Airborne geophysical data for the new area were acquired and processed by Fugro Airborne Surveys Corp. in 2005.

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PARTS OF BIG DELTA QUADRANGLE

RESISTIVITY

RESISTIVITY

The DIGHEM® EM system measured inphase and quadrature components at five frequencies. Two vertical coaxial 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 bedrock conductors, conductive overburden, and cultural sources. Apparent resistivity is generated from the inphase and quadrature component of the coplanar 7200 Hz using the pseudo-layer half space model. The data were interpolated onto a regular 80 m grid using a modified Akima (1970) technique.

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.

The map shows the Sacramento-San Joaquin River Delta. The Sacramento River flows from the north into the Delta, and the San Joaquin River flows from the south. The Delta is divided into several regions, with the four study sites marked by different patterns: Delta Cross (diagonal lines), Delta Cross (diagonal lines), Delta Cross (diagonal lines), and Delta Cross (diagonal lines). The map also shows the locations of the Delta Cross, Delta Cross, Delta Cross, and Delta Cross.

SURVEY HISTORY

SURVEY HISTORY

This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources, Division of Geological & Geophysical Surveys (DGGG), and Survey Systems, Inc. Management Corp. Airborne geophysical data for the new area were acquired and processed by Fugro Airborne Surveys Corp. in 2005.

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by
Laurel E. Burns, Fugro Alkeme Surveys Corp., and Stevens Exploration Management Corp.
2008

Contours in ohm-m at 10 intervals per decade

SURVEY HISTORY

This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources, Division of Geological & Geophysical Surveys (DGG&S), and Survey Evaluation Management Corp. (SEMC). Geophysical data for the new area were acquired and processed by Fugro Airborne Surveys Corp. in 2005.

This map and other products from this survey are available by mail order in person from DGG&S, 3354 College Road, Fairbanks, Alaska, 99709-3707. Published maps and data are also available in electronic format as Adobe Acrobat files (*.pdf) on our Web site (<http://www.dgg&s.dnr.state.ak.us/pubs/>).

Base Data: U.S. Geological Survey, 1:63,260, A-1, 1988; A-4, 1988; B-1, 1975; B-2, 1975; Geologic Map, Alaska

DESCRIPTIVE NOTES

The geophysical data were acquired with a DIGHEM® Electromagnetic (EM) system and a Selenia cesium magnetometer. The EM and magnetic sensors were flown at a height of 100 feet. In addition, the survey recorded data from a radio altimeter, GPS navigation system, 30/60 Hz monitors and video camera. Flights were performed with an AS350B-2 Squirrel helicopter at a mean terrain clearance of 200 feet along N-S (0°) survey flight lines with a spacing of a quarter of a mile. Tie lines were flown perpendicular to the flight lines at intervals of approximately 3 miles.

An Ahtech G224 NAVSTAR / GLONAVSS 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 10 ft. Flight positions were projected onto the Clarke 1866 UTM zone 6 (central), 1927 North American datum using a central meridian (CM) of 147° a north constant of 0 and an east constant of 500,000. Positional accuracy of the presented data is better than 10 m, with respect to the UTM grid.

900 Hz COPLANAR APPARENT RESISTIVITY OF THE BLACK MOUNTAIN AREA, GOODPASTER MINING DISTRICT, INTERIOR ALASKA

PARTS OF BIG DELTA QUADRANGLE

by
Laurel E. Burns, Fugro Airborne Surveys Corp., and Stevens Exploration Management Corp.
2006

RESISTIVITY

The DIGHEM® EM system measured inphase and quadrature components at five frequencies: the vertical coplanar coil-pairs operated at 1500 and 1000 Hz while three horizontal coplanar coil-pairs operated at 900, 720 and 56,000 Hz. EM data were sampled at 0.1 second intervals. The EM system responds to both conductive (sulfides, overburden, and cultural sources). Apparent resistivity is generated from the inphase and quadrature component of the coplanar 900 Hz using the pseudo-layer half space model. The data were interpolated onto a regular 80 m grid using a modified Akima (1970) technique.

Alaska, 1970. A map method of interpolation not shown some filling details. Washington, D.C.: U.S. Geological Survey.

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 (DGGS), and Stevens Exploration Management Corp. Airborne geophysical data for the new area were acquired and processed by Fugro Airborne Surveys Corp. in 2006.

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

Base Data: U.S. Geological Survey Big Delta B-1, 1976, 1:50,000, scale.

DESCRIPTIVE NOTES

The geophysical data were acquired with a DIGHEM Electromagnetic (EM) system and a Sinterex cesium magnetometer. The EM and magnetic sensors were flown at a height of 100 feet. In addition, the survey recorded data from a radar altimeter, GPS navigation system, 200 Hz radio receiver, and video camera. Flights were performed with an AC350A-2 Survey Helicopter. The helicopter maintained a clearance of 200 feet along N-S (or) survey flight lines with a spacing of a quarter of a mile. The lines were flown perpendicular to the flight lines at intervals of approximately 3 miles.

An Ashtech G24 NAVSTAR / GLONASS Global Positioning System was used for navigation. The helicopter position was derived every 0.3 seconds using post-flight differential positioning to a UTM datum accuracy of better than 5 m. Flight path positions were projected onto the NAD 83 datum (UTM zone 6) spheroid, 1927 North American datum using a central meridian (00°) of 147° and 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.

ELECTROMAGNETIC ANOMALIES

TOTAL MAGNETIC FIELD AND DETAILED ELECTROMAGNETIC ANOMALIES OF THE BLACK MOUNTAIN AREA, GOODPASTER MINING DISTRICT, INTERIOR ALASKA PART OF BIG DELTA B-1 QUADRANGLE

Laurel E. Burns, Fugro Alaboma Surveys Corp., and Stevens Exploration Management Corp., 2006

ELECTROMAGNETICS

To determine the location of EM anomalies or their boundaries, the DIGHEM EM system measured phase and quadrature components at five frequencies. Two vertical coil-coil pairs operated at 1000 and 5500 Hz while three horizontal coil-coil pairs operated at 200, 7200, and 56,000 Hz. EM data were sampled at 0.1 second intervals. The EM system response is derived quadratically, by the type of conductor is indicated on the aeromagnetic map by the line style symbol displayed with EM intensity. Determination of the type of conductor is based on EM anomaly shape of the conductors and topographic information, together with conductor and magnetic patterns and topography. The power line monitor and the flight track video were examined to locate cultural sources.

TOTAL MAGNETIC FIELD

The magnetic total field contours were produced using digitally recorded data from a Sinterex cesium magnetometer, with a sampling interval of 0.1 seconds. The magnetic data were (1) corrected for diurnal variations by subtraction of the digitally recorded base station magnetic data, (2) adjusted for regional variations (or IGRF gradient, 2005, updated to October 2005) using altimeter adjusted IGRF (CS) leveled to the tie line data, and (3) interpolated onto a regular 80 m grid using a modified Adams (1970) technique.

Adams, H. 1970. A new method of interpolation and smooth curve fitting based on the generalized principle of the association of Computing Machinery, v. 17, no. 4, p. 588-605.

LOCATION INDEX FOR SCALE 1:31,680

SURVEY HISTORY

This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources, Division of Geological & Geophysical Surveys (DGGG), and Stevens Exploration Management Corp. Alaboma geophysical data for the new area were acquired and processed by Fugro Alaboma Surveys Corp. in 2005.

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The geophysical data were collected with a GROMEX Electromagnetic Induction (EMI) system, which includes a magnetometer, the EM and magnetic sensors were flown at a height of 100–150 feet. In addition, a GPS navigation system, 50/60 Hz monitors and a data logger were used to collect data from the AS350B-2 Squirrel helicopter at a mean terrain clearance of 200 feet along N-S (G) survey lines. The flight lines were flown perpendicular to the flight lines at intervals of approximately 3 miles.

An Anshen GQ24 NAVSTAR / GLONASS Global Positioning System (GPS) receiver was mounted on the helicopter position was derived every 0.5 seconds using post-flight differential positioning to a base station located at the same site. The GPS coordinates were projected onto the Clarke 1856 (UTM zone 6) spheroid, 1927 North American datum using a datum shift of 1000000.000, a scale factor constant of 0 and an east constant of 500,000.000. Positional accuracy of the presented data is better than 10 m.

Anomaly

- Arcs indicate the conductor has a thickness >10m
- Magnetic correlation
- △ Dip direction

Conductance

- >100 decawu
- 50-100 decawu
- 20-50 decawu
- 10-20 decawu
- 5-10 decawu
- 1-5 decawu
- <1 decawu
- △ Qualitative measure
- △ Magnetic anomaly

Interpretive symbols

- Anomaly identifier
- Depth is greater than:
  - 15 m
  - 30 m
  - 45 m
  - 60 m
- Increase and gradient of magnetic field
- Greater than:
  - 10 ppm
  - 20 ppm
  - 40 ppm

Conductor ("finds")

- Bedrock conductor
- Shallow bedrock conductor (<100 m)
- Conductive cover (North)
- Thin steel
- Broad conductive cover
- Thick steel
- Conductive cover (>100 m)
- E Edge of broad conductor
- L Edge of half space
- Culture, e.g., lower limit of bedrock

PARTS of BIG DELTA A-1, A-2, B-1 AND B-2 QUADRANGLES
by
Leonard E. Burns, Page Abstracts Surveys Corp., and Stevens Exploration Management Corp.
2008

Leand E. Burns, Page Atlantic Surveys Corp., and Stevens Exploration Management Corp.

To determine the location of EM anomalies or their boundaries, the DZHNEP system generates brightest and quadrature EM signals. The system is capable of recording coaxial-coil plots operated at 1050 and 5550 Hz while three horizontal copesier-coil plots operated at 950, 7200, and 56,500 Hz. The EM system responds to bedrock conditions, EM anomalies, EM noise, and EM interference from conductive overburden, and cultural sources. The type of conductor is indicated on the aeromagnetic map by the location of anomalies. The type of conductor is determined by the type of conductor is based on EM anomaly shapes of the coaxial- and copesier-coil responses, together with conductor and magnetic patterns and topography. The system monitor and the flight track video were examined on a computer monitor.

The magnetic total field contours were produced using digitally recorded data from a Schreiber cesium CS2 magnetometer, with a sampling interval of 0.1 seconds. The magnetic data were (1) corrected for diurnal variations by subtraction of the digitally recorded base station magnetic data, (2) adjusted for regional variations (or IGRF gradient, 2005, updated to October 2005) using altitude-adjusted IGRF, (3) leveled to the tie line data, and (4) interpolated onto a regular 80 m grid using a modified Akima (1970) technique.

This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources, Division of Geospatial and Geophysical Surveys (DGGS), and Stevens Exploration Management Corp. All airborne geophysical data for the new area were acquired and processed by Fugro Airborne Surveys Corp. in 2005.

This map and other products from this survey are available by mail order in person from DGGS, 3354 College Road, Fairbanks, Alaska, 99709-3707. Published maps are also available on video or on compact disc as Adobe Acrobat files (.pdf) on our Web site (<http://www.dggs.dnr.state.ak.us/cpub/>).