

HETTA ELECTROMAGNETIC AND MAGNETIC AIRBORNE GEOPHYSICAL SURVEY DATA COMPILATION

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Geophysical Report 2020-8

2020
STATE OF ALASKA
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DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS



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Suggested citation:

Burns, L.E., Graham, G.R.C., Barefoot, J.D., American Copper & Nickel Company, Inc., Geoterrex-Dighem, and WGM, Inc., 2020, Hetta electromagnetic and magnetic airborne geophysical survey data compilation: Alaska Division of Geological & Geophysical Surveys Geophysical Report 2020-8. <http://doi.org/10.14509/30433>



HETTA ELECTROMAGNETIC AND MAGNETIC AIRBORNE GEOPHYSICAL SURVEY DATA COMPILATION

L.E. Burns¹, G.R.C. Graham¹, J.D. Barefoot¹, American Copper & Nickel Company, Inc., Geotrex-Dighem, and WGM, Inc.

ABSTRACT

The Hetta geophysical survey is located in southeast Alaska in the Ketchikan area, about 350 kilometers south of Juneau, Alaska. Frequency domain electromagnetic and magnetic data were collected with the DIGHEM^V system in May 1992. A total of 1,707 line kilometers were collected covering 323.3 square kilometers. Line spacing was 200 meters (m). Data were collected approximately 30 m above the ground cover or tree canopy from a helicopter-towed sensor platform (“bird”) on a 30-m-long line. The large trees and steep terrain resulted in an average ground clearance of 150 m. The Hetta survey was flown for the American Copper & Nickel Company, Inc. and provided to DGGs by the Sealaska Corporation. The data were merged and released with the 1999 Ketchikan geophysical survey maps. Map sheets and some of the other files in this data release contain data from adjacent or nearby surveys.

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 past-producing Jumbo Cu-Au-Ag mine and other Cu-Fe skarn and massive sulfide 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.

ACKNOWLEDGMENTS

Funding and/or data were provided by the U.S. Department of the Interior Bureau of Land Management (BLM), Ketchikan Gateway Borough, Sealaska Corporation, Alaska State Mental Health Trust Land Office, the cities of Thorne Bay and Coffman Cove, and American Copper & Nickel Company, Inc.

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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 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
maps_pn_format	contractor	Printable maps in HPGL/2 printer file format with extension .pn
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

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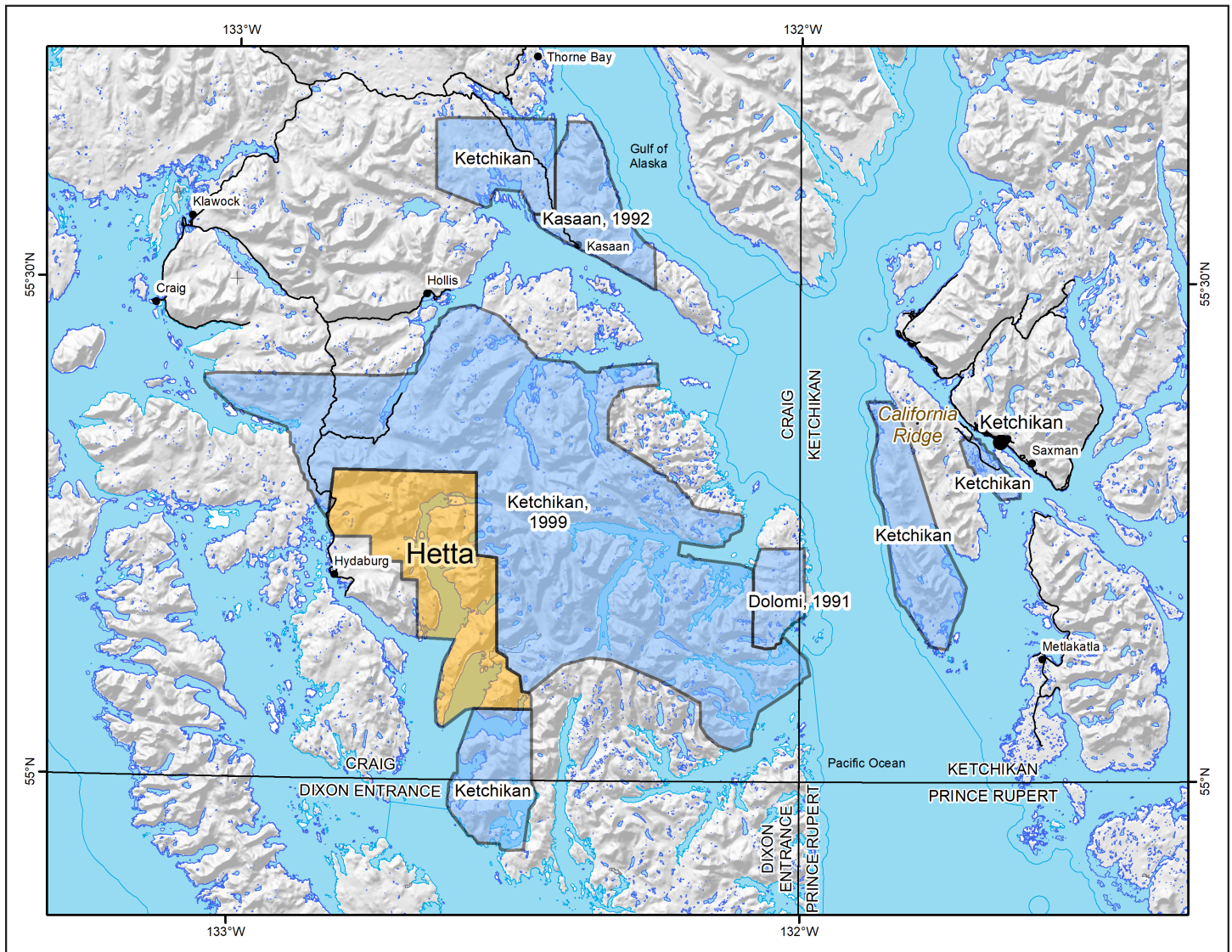


Figure 1. Hetta electromagnetic and magnetic airborne geophysical survey location shown in interior Alaska (inset). Hetta survey area shown with adjacent DGGs geophysical surveys, landmarks, relevant 1:250,000-scale quadrangle boundaries, mountain ranges, rivers, glaciers, and elevation hillshade.



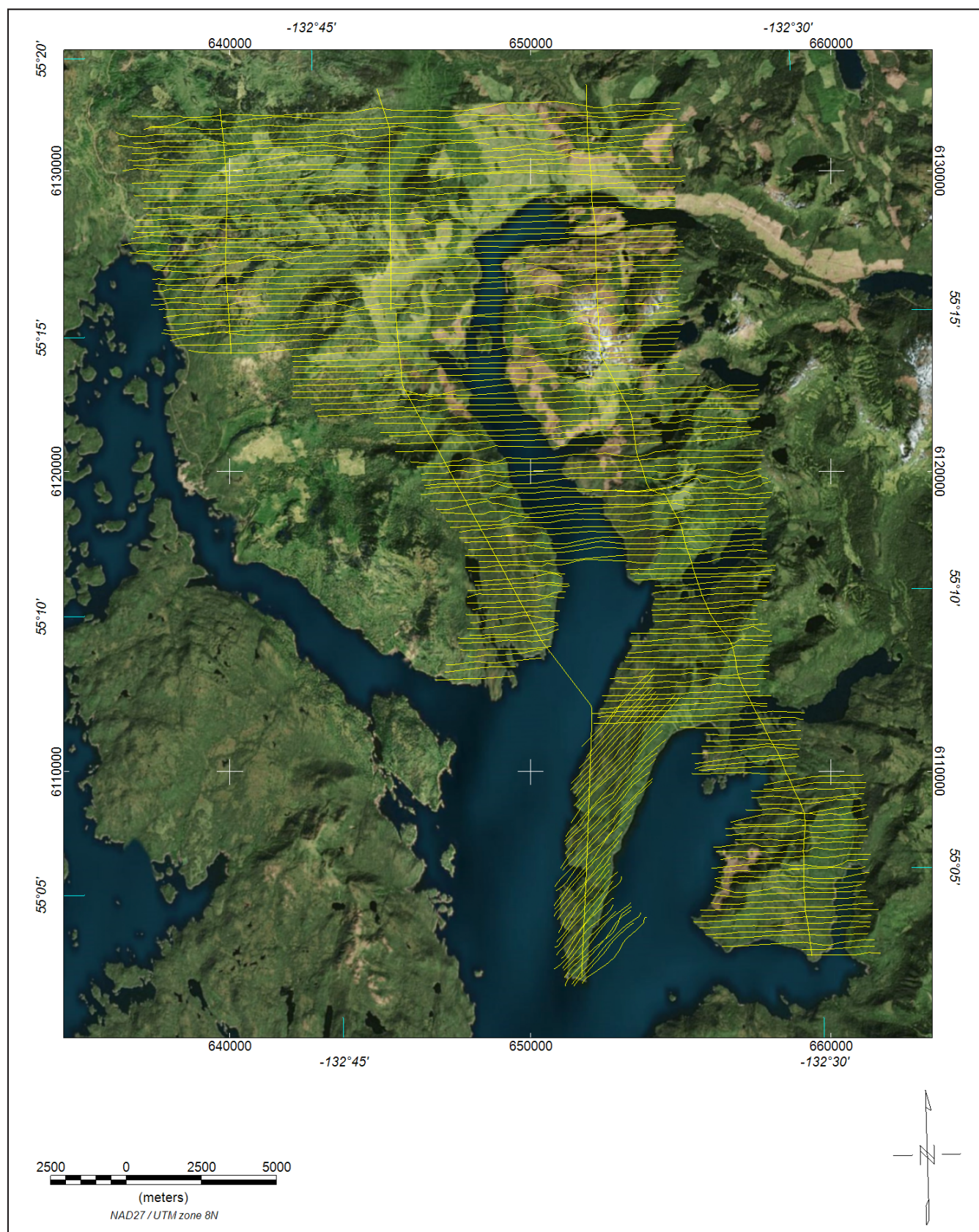


Figure 2. Flight path with orthometric image.

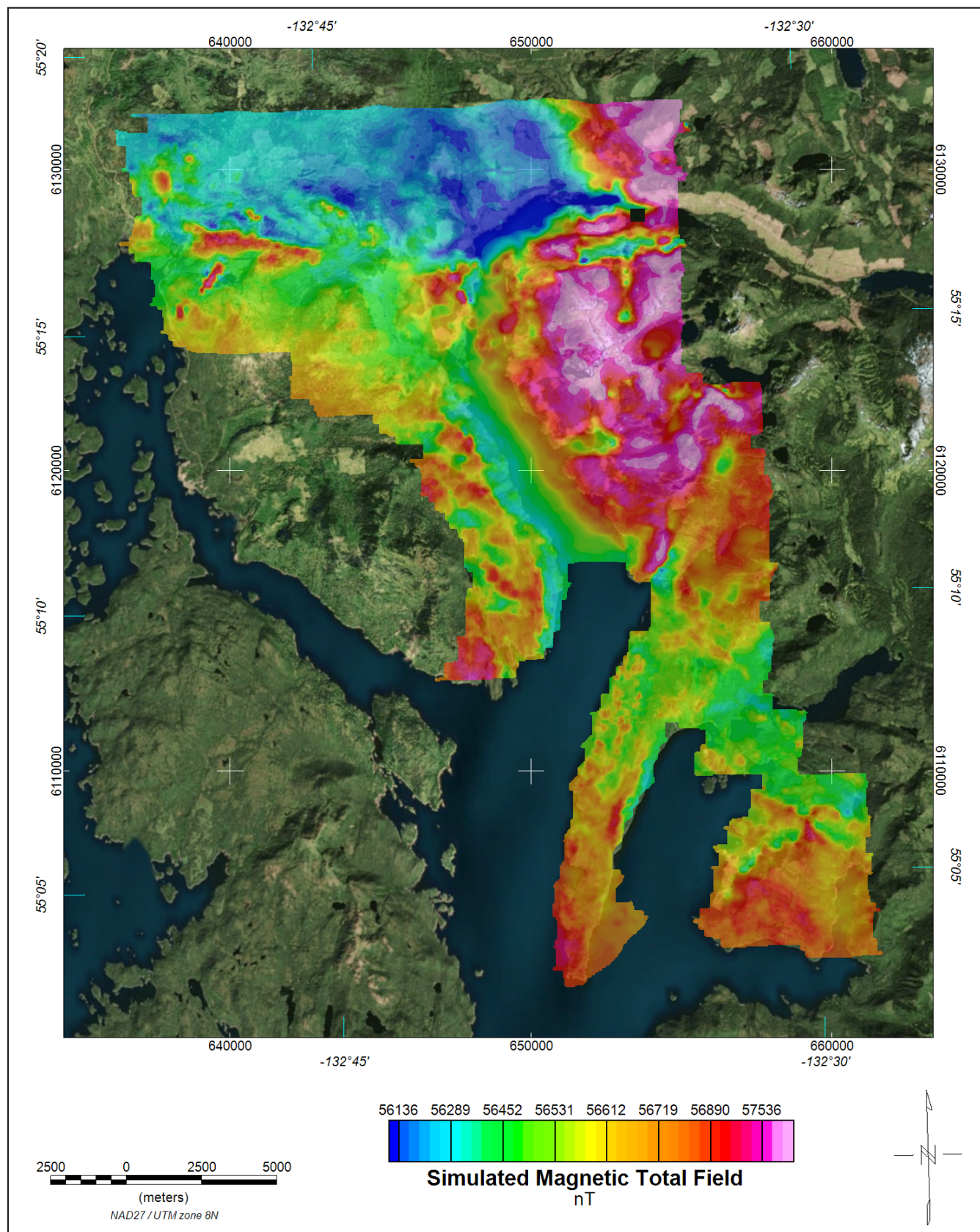


Figure 3. Simulated magnetic total field grid with orthometric image. The magnetic total field data were processed using digitally recorded data from a Scintrex cesium magnetometer. Data were collected at a sampling interval of 0.1 seconds. The magnetic data were (1) corrected for diurnal variations by subtracting the digitally recorded base station magnetic data, (2) IGRF corrected (IGRF model 1995, updated to March 1999), (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 50 m (1991 and 1992 surveys) or 100 m (1999 survey) grid using a modified Akima (1970) technique.

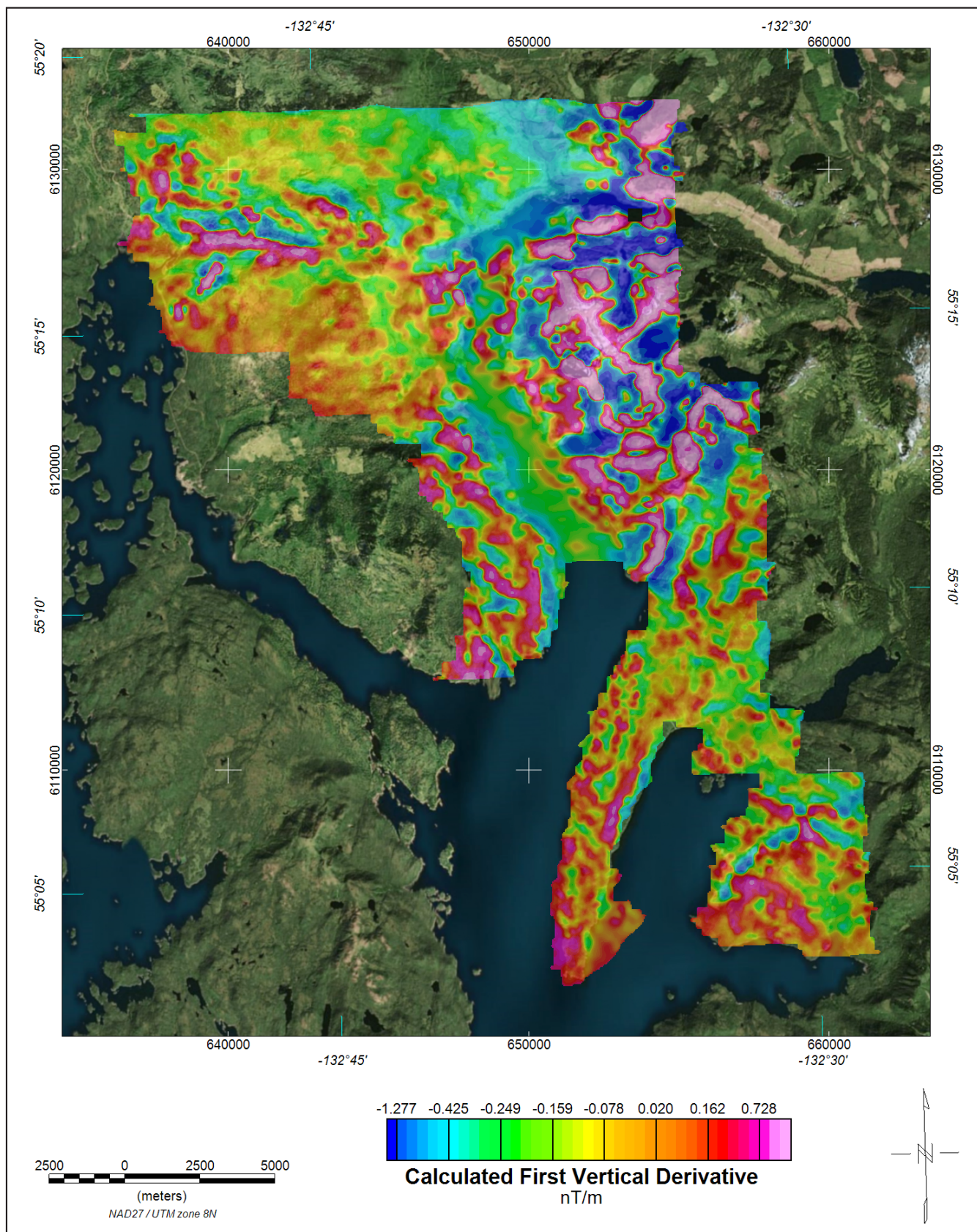


Figure 4. Calculated first vertical derivative grid with orthometric image. The first vertical derivative grid was calculated from the diurnally-corrected, IGRF-corrected total magnetic field grid using a FFT base frequency domain filtering algorithm. The resulting first vertical derivative grid provides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

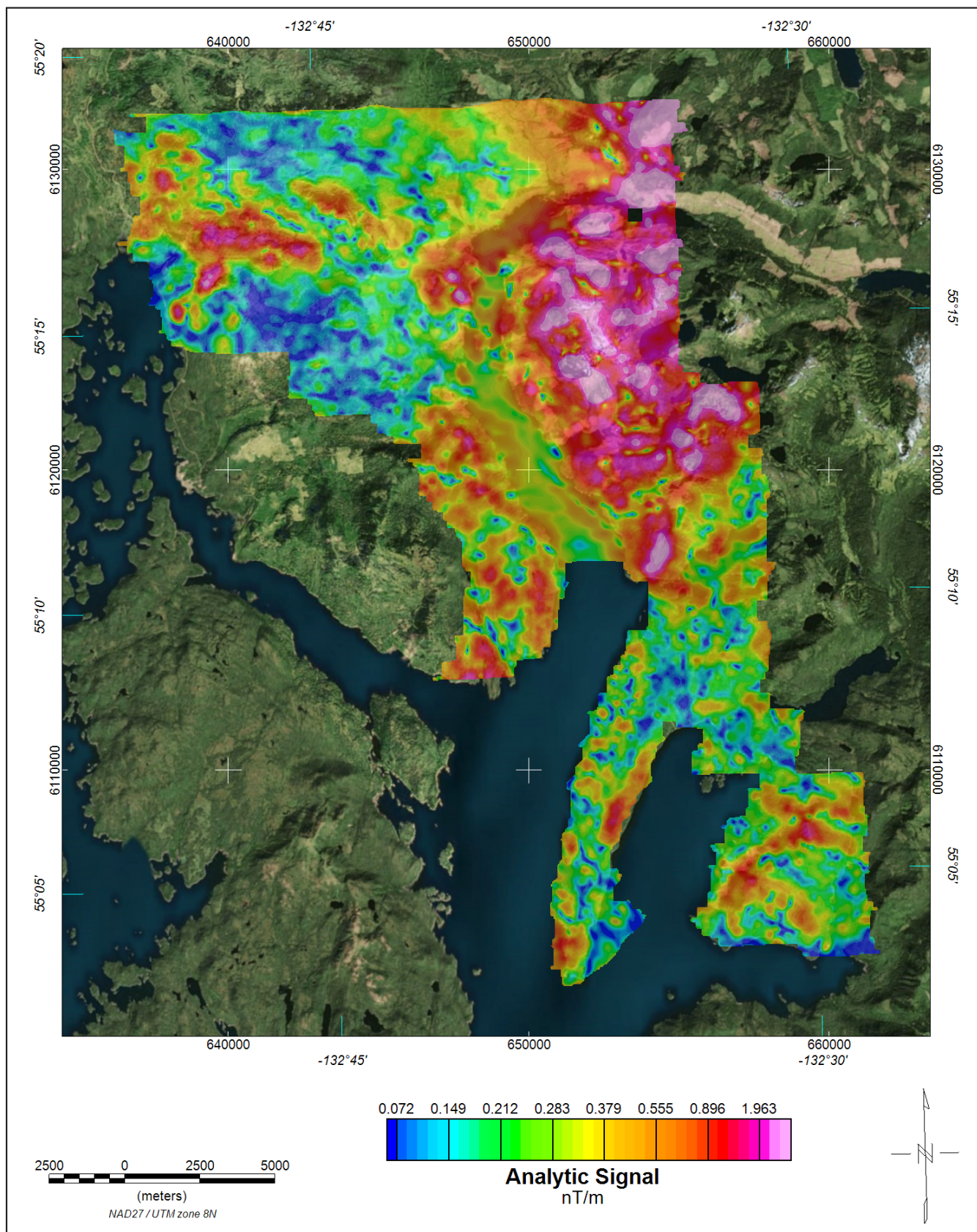


Figure 5. Analytical signal grid with orthometric image. Analytic signal is the total amplitude of all directions of magnetic gradient calculated from the sum of the squares of the three orthogonal gradients. Mapped highs in the calculated analytic signal of magnetic parameter locate the anomalous source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

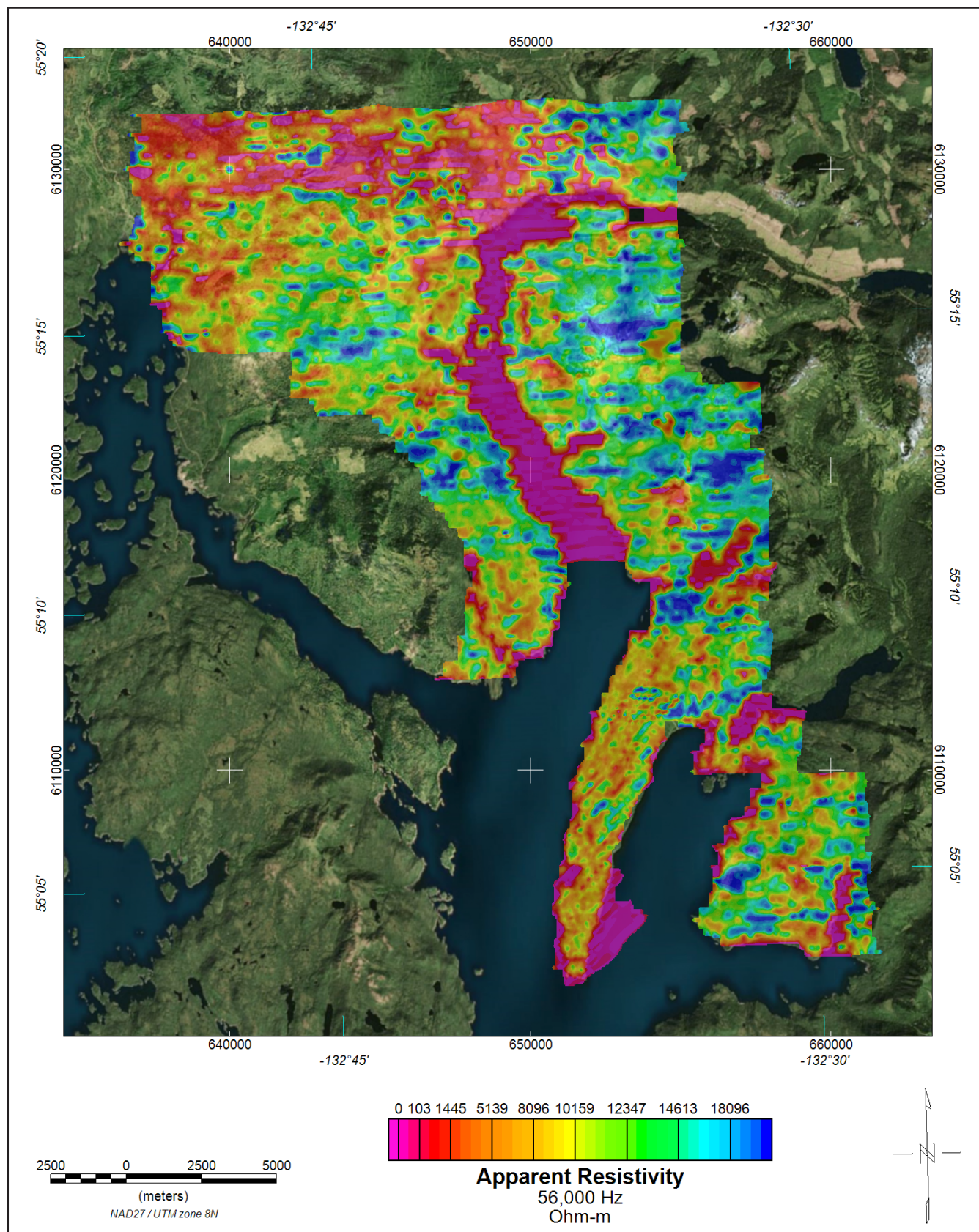


Figure 6. 56,000 Hz coplanar apparent resistivity grid with orthometric image. The DIGHEMI^{IV} EM system measured inphase and quadrature components at five frequencies. Two vertical coaxial coil-pairs operated at 900 and 7,200 Hz while three horizontal coplanar coil-pairs operated at 900, 7,200, and 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 50 m (1991 and 1992 surveys) or 100 m (1999 survey) grid using a modified Akima (1970) technique.

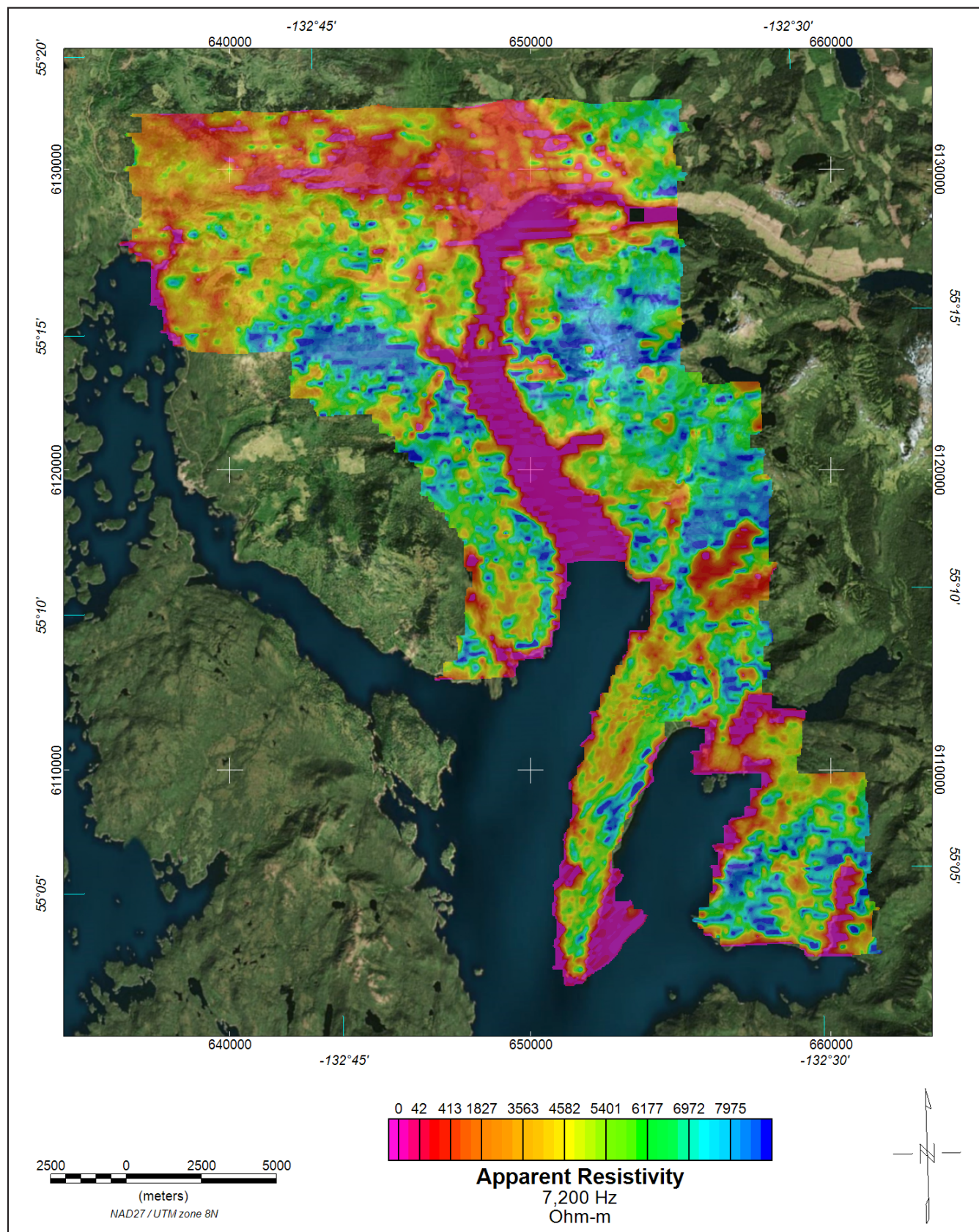


Figure 7. 7,200 Hz coplanar apparent resistivity grid with orthometric image. The DIGHEMI[®] EM system measured inphase and quadrature components at five frequencies. Two vertical coaxial coil-pairs operated at 900 and 7,200 Hz while three horizontal coplanar coil-pairs operated at 900, 7,200, and 56,000 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 50 m (1991 and 1992 surveys) or 100 m (1999 survey) grid using a modified Akima (1970) technique.

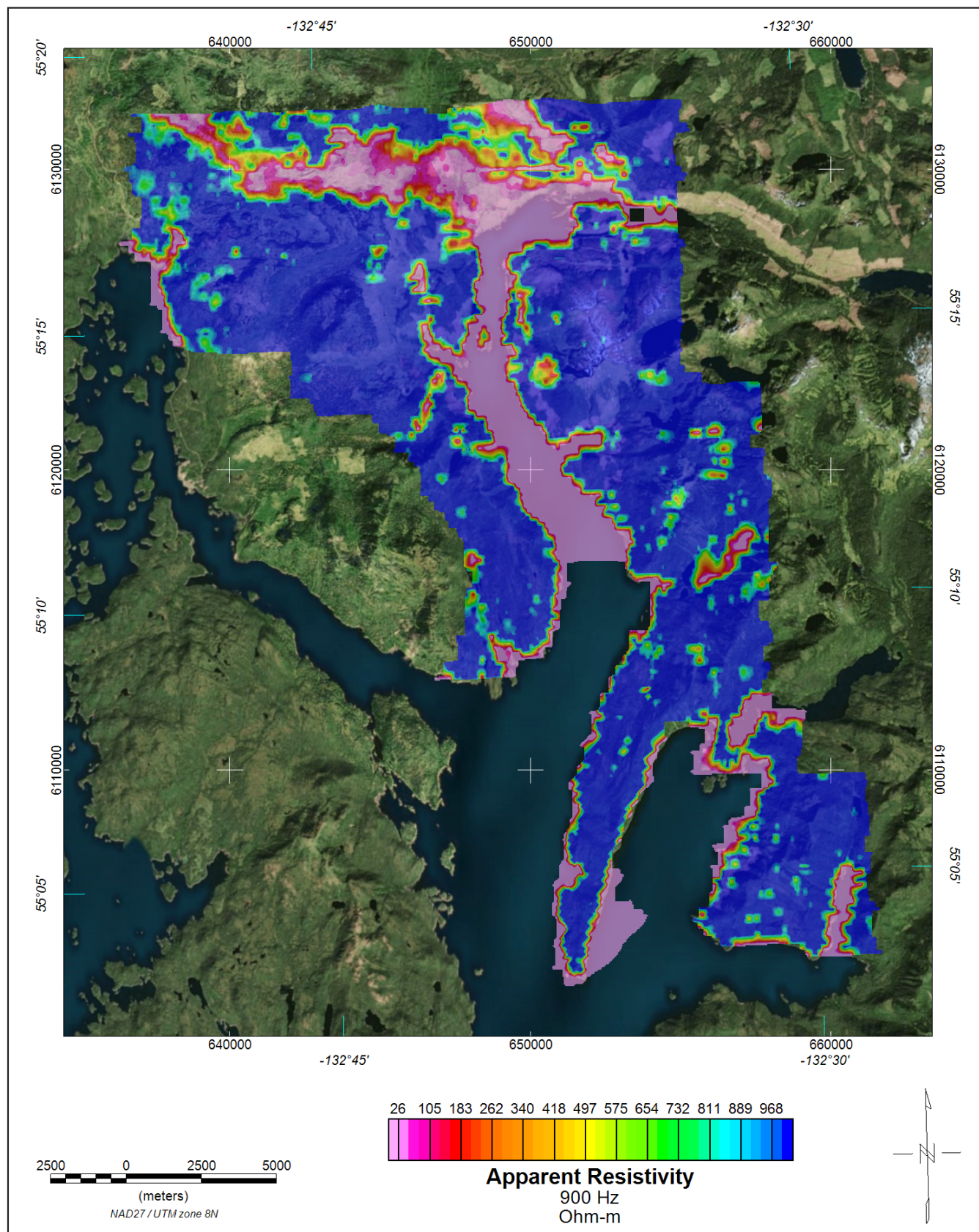


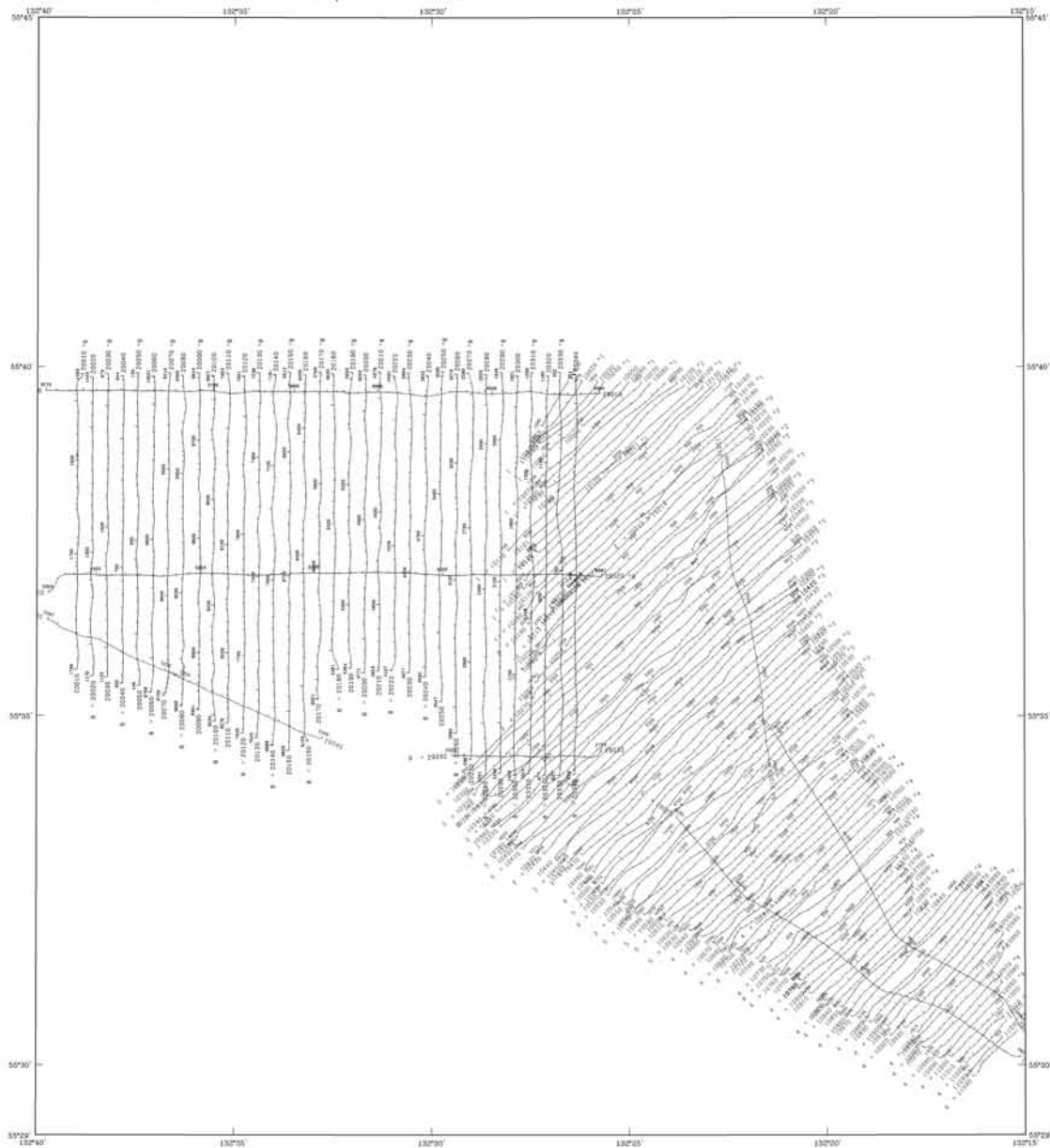
Figure 8. 900 Hz coplanar apparent resistivity grid with orthometric image. The DIGHEMI^{IV} EM system measured inphase and quadrature components at five frequencies. Two vertical coaxial coil-pairs operated at 900 and 7,200 Hz while three horizontal coplanar coil-pairs operated at 900, 7,200, and 56,000 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 50 m (1991 and 1992 surveys) or 100 m (1999 survey) 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/10.14509/30433>

Map Title	Description
kasaan_flightpath_map_1of4.pdf	flight lines
kasaan_flightpath_map_2of4.pdf	flight lines
kasaan_flightpath_map_3of4.pdf	flight lines
kasaan_flightpath_map_4of4.pdf	flight lines
kasaan_sim_magtf_topo_map_1of4.pdf	simulated magnetic total field grid with topographic base map
kasaan_sim_magtf_topo_map_2of4.pdf	simulated magnetic total field grid with topographic base map
kasaan_sim_magtf_topo_map_3of4.pdf	simulated magnetic total field grid with topographic base map
kasaan_sim_magtf_topo_map_4of4.pdf	simulated magnetic total field grid with topographic base map
kasaan_sim_magtf_contours_plss_map_1of4.pdf	simulated magnetic total field grid and contours with public land survey system base layer
kasaan_sim_magtf_contours_plss_map_2of4.pdf	simulated magnetic total field grid and contours with public land survey system base layer
kasaan_sim_magtf_contours_plss_map_3of4.pdf	simulated magnetic total field grid and contours with public land survey system base layer
kasaan_sim_magtf_contours_plss_map_4of4.pdf	simulated magnetic total field grid and contours with public land survey system base layer
kasaan_sim_magtf_shaded_plss_map_1of4.pdf	shaded simulated magnetic total field grid with public land survey system base layer
kasaan_sim_magtf_shaded_plss_map_2of4.pdf	shaded simulated magnetic total field grid with public land survey system base layer
kasaan_sim_magtf_shaded_plss_map_3of4.pdf	shaded simulated magnetic total field grid with public land survey system base layer
kasaan_sim_magtf_shaded_plss_map_4of4.pdf	shaded simulated magnetic total field grid with public land survey system base layer
kasaan_res56khz_topo_map_1of4.pdf	56,000 Hz apparent resistivity grid with topographic base map
kasaan_res56khz_topo_map_2of4.pdf	56,000 Hz apparent resistivity grid with topographic base map
kasaan_res56khz_topo_map_3of4.pdf	56,000 Hz apparent resistivity grid with topographic base map
kasaan_res56khz_topo_map_4of4.pdf	56,000 Hz apparent resistivity grid with topographic base map
kasaan_res56khz_contours_plss_map_1of4.pdf	56,000 Hz apparent resistivity grid with contours and public land survey system base layer
kasaan_res56khz_contours_plss_map_2of4.pdf	56,000 Hz apparent resistivity grid with contours and public land survey system base layer
kasaan_res56khz_contours_plss_map_3of4.pdf	56,000 Hz apparent resistivity grid with contours and public land survey system base layer
kasaan_res56khz_contours_plss_map_4of4.pdf	56,000 Hz apparent resistivity grid with contours and public land survey system base layer
kasaan_res56khz_bw_contours_plss_map_1of4.pdf	black and white 56,000 Hz apparent resistivity data contours with public land survey system base layer
kasaan_res56khz_bw_contours_plss_map_2of4.pdf	black and white 56,000 Hz apparent resistivity data contours with public land survey system base layer
kasaan_res56khz_bw_contours_plss_map_3of4.pdf	black and white 56,000 Hz apparent resistivity data contours with public land survey system base layer
kasaan_res56khz_bw_contours_plss_map_4of4.pdf	black and white 56,000 Hz apparent resistivity data contours with public land survey system base layer
kasaan_res7200hz_topo_map_1of4.pdf	7,200 Hz apparent resistivity grid with topographic base map
kasaan_res7200hz_topo_map_2of4.pdf	7,200 Hz apparent resistivity grid with topographic base map
kasaan_res7200hz_topo_map_3of4.pdf	7,200 Hz apparent resistivity grid with topographic base map
kasaan_res7200hz_topo_map_4of4.pdf	7,200 Hz apparent resistivity grid with topographic base map

Table 1, continued. Copies of the following maps are included at the end of this booklet. The low-resolution, page-size maps included in this booklet are intended to be used as a search tool and are not the final product. Large-scale, full-resolution versions of each map are available to download on this publication's citation page: <http://doi.org/10.14509/30433>

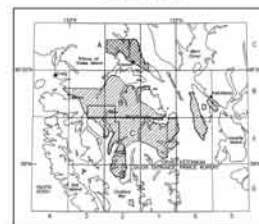
Map Title	Description
kasaan_res7200hz_contours_plss_map_1of4.pdf	7,200 Hz apparent resistivity grid with contours and public land survey system base layer
kasaan_res7200hz_contours_plss_map_2of4.pdf	7,200 Hz apparent resistivity grid with contours and public land survey system base layer
kasaan_res7200hz_contours_plss_map_3of4.pdf	7,200 Hz apparent resistivity grid with contours and public land survey system base layer
kasaan_res7200hz_contours_plss_map_4of4.pdf	7,200 Hz apparent resistivity grid with contours and public land survey system base layer
kasaan_res7200hz_bw_contours_plss_map_1of4.pdf	black and white 7,200 Hz apparent resistivity data contours with public land survey system base layer
kasaan_res7200hz_bw_contours_plss_map_2of4.pdf	black and white 7,200 Hz apparent resistivity data contours with public land survey system base layer
kasaan_res7200hz_bw_contours_plss_map_3of4.pdf	black and white 7,200 Hz apparent resistivity data contours with public land survey system base layer
kasaan_res7200hz_bw_contours_plss_map_4of4.pdf	black and white 7,200 Hz apparent resistivity data contours with public land survey system base layer
kasaan_interpretation_plss_map_1of4.pdf	interpretation based on geophysical data with public land survey system base layer
kasaan_interpretation_plss_map_2of4.pdf	interpretation based on geophysical data with public land survey system base layer
kasaan_interpretation_plss_map_3of4.pdf	interpretation based on geophysical data with public land survey system base layer
kasaan_interpretation_plss_map_4of4.pdf	interpretation based on geophysical data with public land survey system base layer
kasaan_emanomalies_sim_magtf_contours_map_1of4.pdf	electromagnetic anomaly map with simulated magnetic total field grid contours
kasaan_emanomalies_sim_magtf_contours_map_2of4.pdf	electromagnetic anomaly map with simulated magnetic total field grid contours
kasaan_emanomalies_sim_magtf_contours_map_3of4.pdf	electromagnetic anomaly map with simulated magnetic total field grid contours
kasaan_emanomalies_sim_magtf_contours_map_4of4.pdf	electromagnetic anomaly map with simulated magnetic total field grid contours
kasaan_emanomalies_sim_magtf_contours_detailed_map_1of8.pdf	detailed electromagnetic anomaly map with simulated magnetic total field grid contours
kasaan_emanomalies_sim_magtf_contours_detailed_map_2of8.pdf	detailed electromagnetic anomaly map with simulated magnetic total field grid contours
kasaan_emanomalies_sim_magtf_contours_detailed_map_3of8.pdf	detailed electromagnetic anomaly map with simulated magnetic total field grid contours
kasaan_emanomalies_sim_magtf_contours_detailed_map_4of8.pdf	detailed electromagnetic anomaly map with simulated magnetic total field grid contours
kasaan_emanomalies_sim_magtf_contours_detailed_map_5of8.pdf	detailed electromagnetic anomaly map with simulated magnetic total field grid contours
kasaan_emanomalies_sim_magtf_contours_detailed_map_6of8.pdf	detailed electromagnetic anomaly map with simulated magnetic total field grid contours
kasaan_emanomalies_sim_magtf_contours_detailed_map_7of8.pdf	detailed electromagnetic anomaly map with simulated magnetic total field grid contours
kasaan_emanomalies_sim_magtf_contours_detailed_map_8of8.pdf	detailed electromagnetic anomaly map with simulated magnetic total field grid contours



From Sheet 015, Geological Survey Map No. 1-1, 1944, B-2, 1944.



LOCATION INDEX



FLIGHT LINES OF SELECTED AREAS NEAR KETCHIKAN, SOUTHEAST ALASKA

MAP A - SALT CHUCK AND KASAAN
PENINSULA, PRINCE OF WALES ISLAND
1999

DESCRIPTIVE NOTES

KETCHIKAN SURVEY "Area 4" - March 1999

The geophysical data were acquired with a DIGHEM[®] Electromagnetic (EM) system and a Sintered cesium magnetometer. Both were flown at a height of 100 feet. In addition the survey recorded data from a radar altimeter, GPS navigation system, 50/60 Hz monitors and video camera. Flights were performed with an AS350B-2 Squirrel helicopter at a mean terrain clearance of 250 feet along north-south flight lines one-quarter mile apart. The lines were flown parallel to the flight lines of intervals of approximately 3 miles.

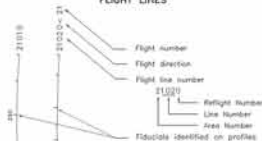
An Ashtech/Racal Real-Time Differential Global Positioning System (RT-DGPS) was used for both navigation and flight path recovery. The helicopter position was derived every 0.5 seconds using real-time differential positioning to a relative accuracy of better than 10 m. Flight path positions were projected onto the Clark 1866 UTM zone 8j spheroid, 1927 North American datum using a central meridian (CM) of 133°, 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.

KASAAN SURVEY "Area 2" - May 1992

The geophysical data were acquired with a DIGHEM[®] Electromagnetic (EM) system and a Sintered cesium magnetometer. Mean terrain clearance for the magnetometer and EM system were approximately 215 and 164 feet, respectively. In addition the survey recorded data from a radar altimeter, UHF navigation system, 50/60 Hz monitors, UHF receiver and video camera. The north-south-southwest flight lines were flown one-eighth mile apart with the lines flown parallel to the survey boundaries. The survey was flown with an AS350B-1 helicopter.

A Del Norte UHF electronic positioning system was used for navigation. Flight path recovery was done with a combination of UHF data and visual recovery. Positional accuracy of the 1992 data should be considered as less accurate, in error on the Crag 1:25,000 topographic map sheet caused distortion of the positioning in the original 1992 data. The data were re-positioned in 1999 using a rubber sheet stretching technique to better match the topography and fit with the 1999 data.

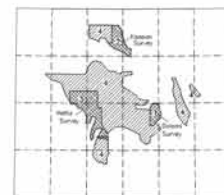
FLIGHT LINES



SURVEY HISTORY

This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources (DNR), Division of Geological & Geophysical Surveys (DGG), and RGM, Mining & Geological Consultants, Inc. Airborne geophysical data for areas 4 were acquired in 1999 by Geoterrac-Digheem, a division of CGG Canada Ltd. Funding for the project was provided by the U.S. Department of the Interior, Bureau of Land Management (BLM), Ketchikan Gateway Borough, Sealaska Corporation, Alaska State Mental Health Trust Land Office, and the cities of Thorne Bay and Coffman Cove. The data for areas 1, 2 and 3 were flown by Digheem in 1991 and 1992. These data were provided for publication by Sealaska Corporation.

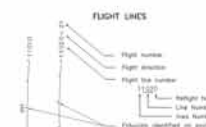
This map and other products from this survey are available by mail order, or in person, from DGG, 784 University Ave., Suite 200, Fairbanks, Alaska, 99709. Some products are also available, in person only, at the BLM's Juneau Minerals Information Center, McIlwain Island, Douglas, AK.



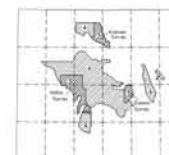
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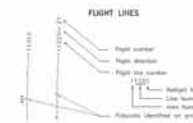
NETA SURVEY Area 3rd May 1992
The geophysical survey was acquired with a digital magnetic (DM) system. Scans caused magnification. Main terrain alteration for the magnetometer and EM system were approximately 1000 nT and 1000 nT respectively. The data was recorded onto a tape recorder, the tape recorder system, 50/60 Hz monitoring, VLF receiver and video camera. The east-west flight line was approximately 1000 m long, with the survey line perpendicular to the flight line. The survey was flown with an A3300-1 helicopter.

© Neil Smith Ltd electronic geophysical system used for navigation. Flight path recovery was done with a combination of DM data and visual data. The survey was flown on 3 May 1992. The survey was flown on 3 May 1992.



MAP B - SURVEYED AREA IMMEDIATELY NORTH OF 55°15'
PRINCE OF WALES ISLAND
1999

[illegible]

[illegible][illegible]

MAP C - SURVEYED AREA SOUTH OF 55°15'
PRINCE OF WALES ISLAND
1999



This map has been compiled and drawn under contract by the U.S. Geological Survey, Department of Natural Resources (DNR), Division of Seawater & Geospatial Science (GSGS) and John Henry & Associates Inc., Seattle, WA. The project was funded by the DNR in 1998 by Grant-DeBenedictis-Eggen, a division of COO Capital LLC. Funding for the project was provided by the U.S. Navy, Office of Naval Operations, Hydrographic Department (HDP), Hydrographic Center through SeaMark Corporation, Alaska State Marine Research Trust Fund and the Alaska Department of Fish and Game. The maps for areas 1, 2 and 3 were flown by Eggen in 1997 and 1998. These maps were shown for publication by the DNR.

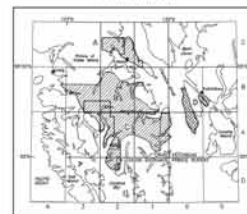
The map and other products from this study are available to the public or, if patent, from GSGS, 160 University Ave., Suite 200, Fairbanks, Alaska, 99709. Some products are also available from the Alaska Department of Fish and Game, Fisheries Information Center, Box 999, Sitka, Alaska.



MAP D - WESTERN and EASTERN PARTS, GRAVINA ISLAND
1999

The geophysical data were acquired with a DIGHEM[®] Electromagnetic (EM) system and a Scintrex passive magnetometer. Both were flown at a height of 100 feet. In addition the survey recorded data from a radar altimeter, GPS navigation system, 50/60 Hz monitors and video camera. Flights were performed using an AS332B-2 Scorpion helicopter at a mean terrain clearance of 200 feet along east-west flight lines one-quarter mile apart. The lines were flown perpendicular to the flight lines of inland surveys at approximately 1 mile.

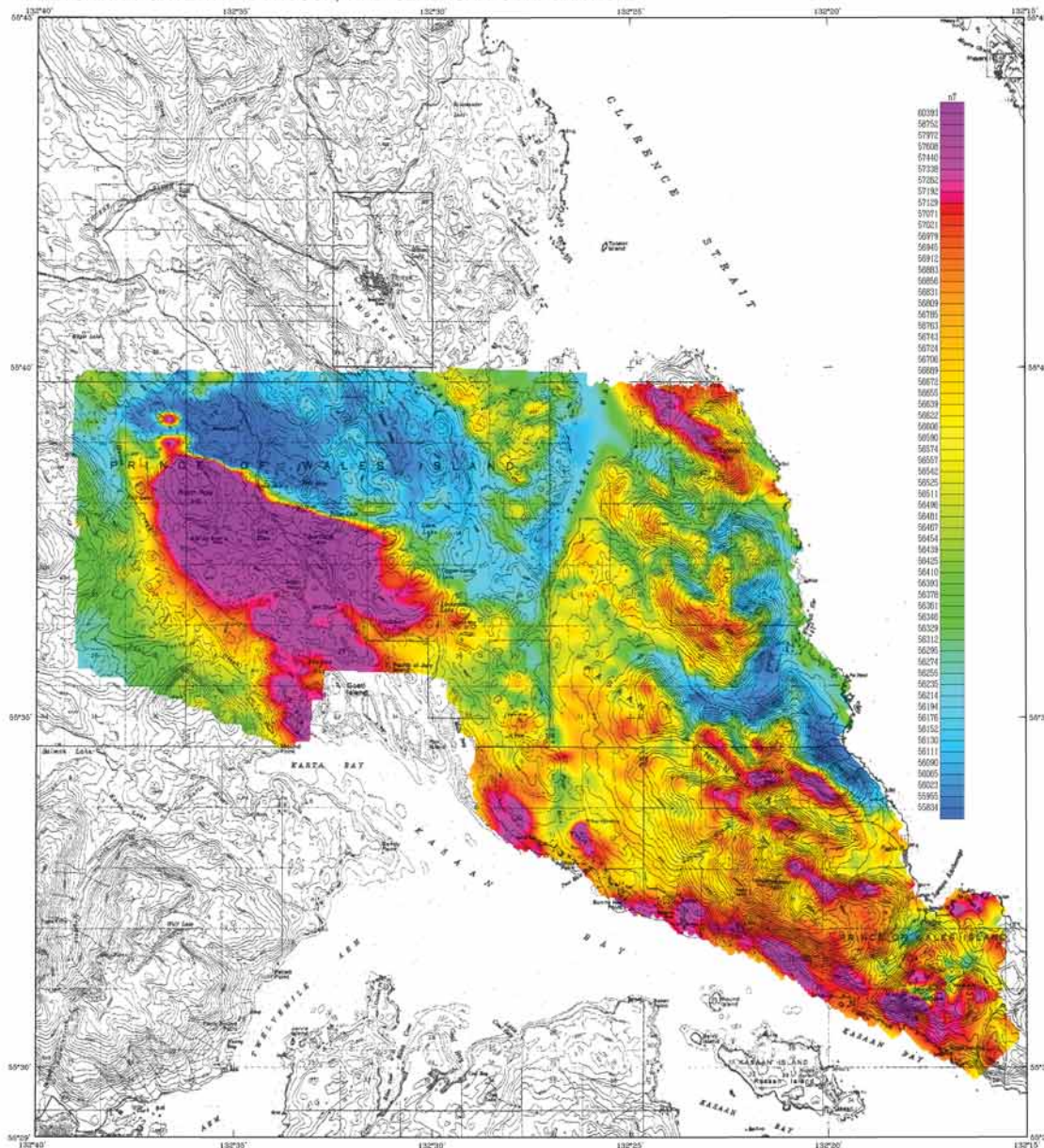
An Aehsteck/Rascal Real-Time Differential Global Positioning System (RT-DGPS) was used for boat navigation and flight path recovery. The helicopter position was derived every 0.5 seconds using real-time differential positioning to a relative accuracy of better than 10 m. Flight path positions were projected onto the Clarke 1886 (UTM zone 9) spheroid, 1927 North American datum using a central meridian (Cm) of 129°, 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.



SURVEY HISTORY

This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources (DNR), and the U.S. Geological Survey (USGS), and NGM Mining & Geological Consultants, Inc. Alaska geographical data for the area were acquired in 1999 by Geotermex-Gloheim, a division of CGC Canada Ltd. Funding for the project was provided by the U.S. Department of the Interior, Bureau of Land Management (BLM), Katikatchan Gateway Borough, Sealaska Corporation, Alaska State Mental Health Trust Land Office, and the cities of Thorne Bay and Coffman Cove.

This map and other products from the survey are available by mail order, or in person, from USGS 754 University Ave., Suite 200, Anchorage, Alaska 99506-0001. Survey data are also available, in person only, at the BLM's Juneau Minerals Information Center, McElroy Island, Douglas, Alaska 99826.



Base Map: U.S. Geological Survey Quad 2-1, 1949, 2-2, 1949.



DESCRIPTIVE NOTES

KETCHIKAN SURVEY "Area 4" - March 1999
The geophysical data were acquired with a DIGHEM[®] Electromagnetic (EM) system and a Schlumberger cesium magnetometer. Both were flown at a height of 100 feet. In addition, the survey recorded data from a radar 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 north-south flight lines one-quarter mile apart. The lines were flown perpendicular to the flight lines at intervals of approximately 3 miles.

An Ashtech/Rapid Real-Time Differential Global Positioning System (RT-DGPS) was used for both navigation and flight path recovery. The helicopter position was derived every 0.5 seconds using real-time differential positioning to a relative accuracy of better than 10 m. Flight path positions were projected onto the Clarke 1866 (UTM zone 8) spheroid, 1927 North American datum using a central meridian (CM) of 130° 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.

KASAAH SURVEY "Area 2" - May 1992
The geophysical data were acquired with a DIGHEM[®] Electromagnetic (EM) system and a Schlumberger cesium magnetometer. Mean terrain clearance for the magnetometer and EM system were approximately 213 and 164 feet, respectively. In addition, the survey recorded data from a radar altimeter, UHF navigation system, 30/60 Hz monitors, VLF receiver and video camera. The northeast-southwest flight lines were flown one-eighth mile apart with line lines flown parallel to the survey boundaries. The survey was flown with an AS350B-1 helicopter.

A Del Norte UHF electronic positioning system was used for navigation. Flight path recovery was done with a combination of UHF data and visual recovery. Positional accuracy of the 1992 data should be considered of low reliability. An error on the Craig 1:25,000 topographic map sheet caused distortion of the positioning in the original 1992 data. The data were re-positioned in 1999 using a rubber sheet stretching technique to better match the topography and fit with the 1999 data.

TOTAL FIELD MAGNETICS

The total field magnetic data were acquired with a sampling interval of 0.1 seconds, and were (1) corrected for diurnal variations by subtraction of the digitally recorded base station magnetic data, (2) leveled to the tie line data, and (3) interpolated onto a regular 100 m grid using a modified Akima (1970) technique. The regional variation (or IGRF gradient, 1995, updated to March 1999) was removed from the leveled magnetic data.

NOTE: In 1970, a new method of interpolation and smooth curve fitting was used. The regional variation (or IGRF gradient) was removed from the leveled magnetic data.



TOTAL FIELD MAGNETICS OF SELECTED AREAS NEAR KETCHIKAN, SOUTHEAST ALASKA

MAP A - SALT CHUCK AND KASAAH
PENINSULA, PRINCE OF WALES ISLAND
1999

LOCATION INDEX

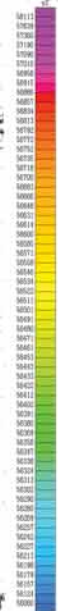


SURVEY HISTORY

This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources (DNR), Division of Geological & Geophysical Surveys (DGG), and W&M Mining & Geological Consultants, Inc. Airborne geophysical data for areas 4 were acquired in 1999 by Geotek-DigheM, a division of DGG Canada Ltd. Funding for the project was provided by the U.S. Department of the Interior, Bureau of Land Management (BLM), Ketchikan Gateway Borough, Sealaska Corporation, Alaska State Mental Health Trust Land Office, and the cities of Thorne Bay and Coffman Cove. The data for areas 1, 2 and 3 were flown by DigheM in 1991 and 1992. These data were provided for publication by Sealaska Corporation.

This map and other products from this survey are available by mail order, or in person, from DGG, 794 University Ave., Suite 200, Fairbanks, Alaska, 99709. Some products are also available, in person only, at the BLM's Juneau Minerals Information Center, Mayflower Island, Douglas, AK.





NOAA	NOAA	NOAA
NOAA	NOAA	NOAA
NOAA	NOAA	NOAA

AEROSOL SURVEY "Wind 4" - March 1999
The photophysical data were acquired with a DCM-2000 Electromagnetic (EM) system and a Scintrex system magnetometer. Both were flown at a height of 100 m above the surface. The survey recorded data from a digital recorder, a GPS location system, DG/DO flight monitors and video cameras. Flights were performed with an A1350C-2000 Squirrel helicopter at a 1000 ft minimum clearance of 200 feet above north-south flight lines one-quarter mile apart. The lines were flown perpendicular to the flight lines of interests of approximately 3 miles.

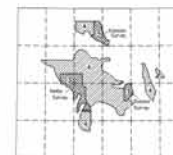
An AirTrack®/Rapid Response™ (RT-DR) system (RT-DR300) was used for both navigation and flight path recording. The helicopter position was derived every 0.5 seconds using real-time differential positioning to a relative accuracy of better than 10 m. Flight path positions were projected onto the Clarke 1886 (UTM zone 9) upraster, 1927 North American datum using a control network (CND) of 135°, a north component of 0 and a east component of 500,000. Positions were rounded to the nearest 0.5 m. Positions better than 10 m from the RTM and RTM

The geophysical data were acquired with a Borex EMU Magnetometric (EM) system and a Sintered calcium magnetometer. Mean terrain distances for the magnetometer and EM system were approximately 215 and 188 feet, respectively. In addition the survey was conducted with a Borex EMU magnetometer system, 50/500 Hz controls, VLF receiver and video camera. The east-west flight lines were flown over roughly one square mile with lines flown perpendicular to the flight line. The survey was flown with an AS350B-1 helicopter.

A Del Norte UHF electronic positioning system was used for navigation. Flight path recovery was done with a combination of UHF data and visual recovery. Positional accuracy of the 1972 data should be considered of low resolution.



MAP B - SURVEYED AREA IMMEDIATELY NORTH OF 55°15'
PRINCE OF WALES ISLAND
1999



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 diurnal recorded base station magnetic data, (2) reduced to the Ge line data, and (3) interpolated onto a regular 100 m grid using a modified Adams (1970) technique. The regional variation (or KRM gradient, 1995, updated to March 1996) was removed from the resulting magnetic data.

Using H. 1970, a new method of interpretation and growth curve fitting based on new procedures, Journal of the American Statistical Association, 67, 4, p. 588-595.



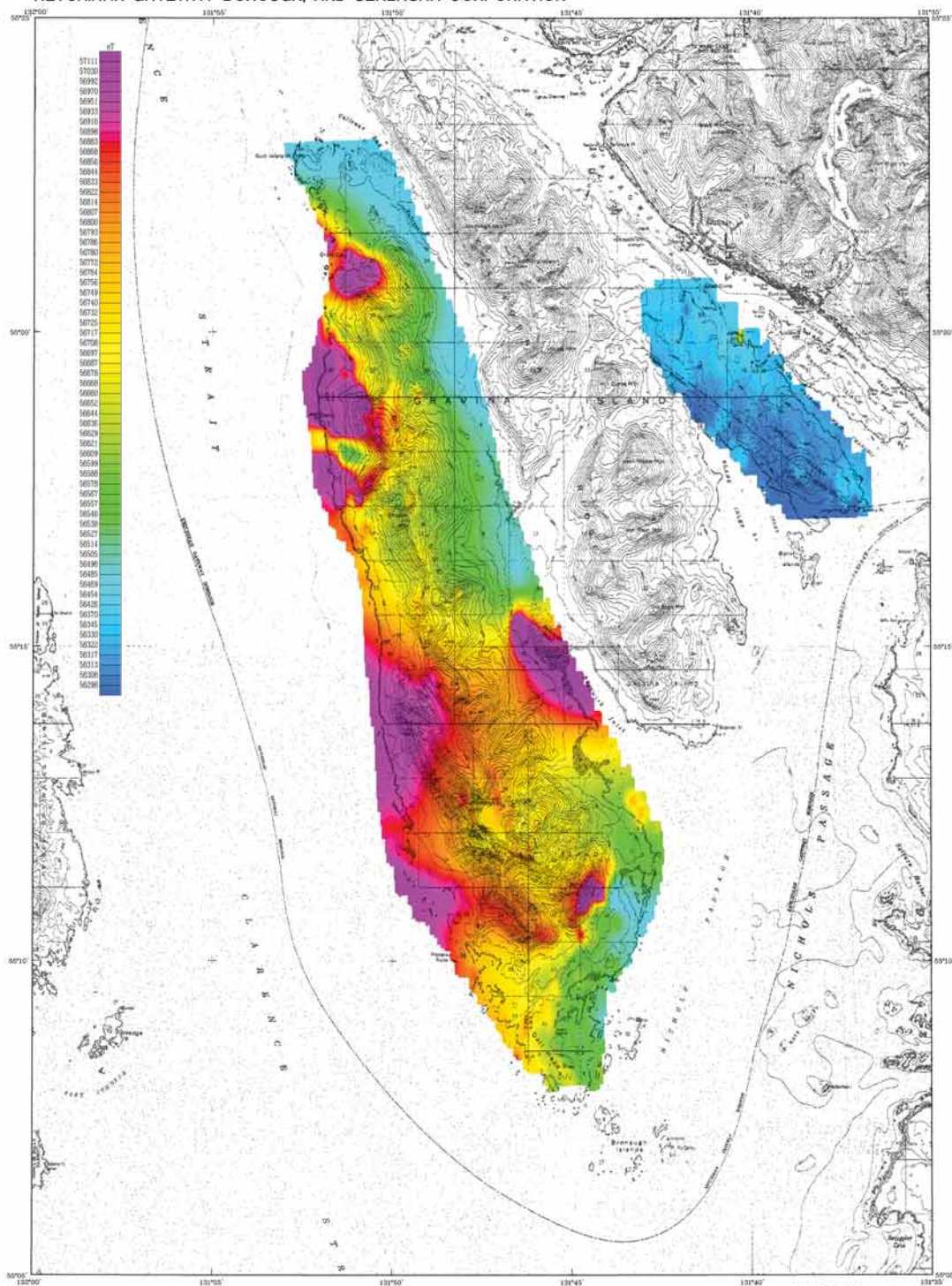
This map has been compiled and drawn under contract between the U.S. Geological Survey, Department of Natural Resources (DNR), Division of Geomorphology & Geospatial Science (DGS), and NGA Mining & Geological Consultants Inc. Airborne geophysical data for areas 4 were acquired in 1993 by Geotek-Engineering, a division of Canadian Air Force, and for areas 1, 2 and 3 were acquired in 1985 by the U.S. Department of the Interior, Bureau of Land Management (BLM), Fairbanks Gateway Borough, Geotek Corporation, Alaska State Mental Health Trust Land Office, and the cities of Thorne Bay and Girdman Cove. The data for areas 1, 2 and 3 were flown by helicopter in 1985. The data for area 4 were flown by quadcopter by Geotek Corporation.

[illegible][illegible]

This map has been corrected and shows water content below 500 ft. The map is available from the National Resources Inventory (NRI), Division of Geological and Geophysical Survey (202)251-4200 and 4200 Waring & Geological Consultants, 10000 Waring Blvd., Suite 100, Anchorage, Alaska 99515, or in 1998 by Geo-Info-Design, a division of GCG Canada Ltd. Funding for the project was provided by the National Science Foundation (NSF), Division of Biological Oceanography (IBO), Kirkpatrick University, Broun, Inc., and the Alaska State Marine Waterways Trust Fund. The data for years 1, 2 and 3 were from Dr. Englem in 1981 and 1982. These data were provided for publication by Englem and the Corporation.

The map and other products from this work are available by mail order or by e-mail, free \$200. (784 University Ave., Suite 2050, Fairbanks, Alaska, 99709). Some products are available for purchase on CD-ROM. For more information, please contact: Alaska Information Center, 9000 E. Highway 12, Anchorage, Alaska 99515.

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 sea station magnetic data, (2) leveled to the sea level data, and (3) reprojected onto a regular 100-m grid using a modified Shinn (1972) technique. The magnetic variation (or IGRF gradient, 1955, updated to March 1995) was removed from the leveled magnetic data.



Base Data: U.S. Geological Survey Database 4-6, 1996, 4-6, 1996.
S-1, 1995, 4-6, 1996, 4-6, 1996.



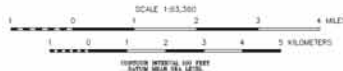
DESCRIPTIVE NOTES

The geophysical data were acquired with a Didiem[®] Electromagnetic (EM) system and a Sinterre cesium magnetometer. Both were flown at a height of 100 feet. In addition the survey recorded data from a motor altimeter, GPS navigation system, 50/500 Hz monitors and video camera. Flights were performed with an R250B-2 Squirrel helicopter at a mean terrain clearance of 200 feet along west-west flight lines one-quarter mile apart. The lines were flown perpendicular to the flight lines at intervals of approximately 3 miles.

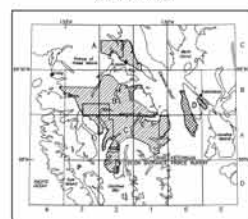
An Ashtech/Real-Time Differential Global Positioning System (RT-DGPS) was used for both navigation and flight path recovery. The helicopter position was derived every 0.5 seconds using real-time differential positioning to a relative accuracy of better than 10 m. Flight path positions were projected onto the Clarke 1886 (UTM zone 9) spheroid, 1927 North American datum using a center meridian (CM) of 135° 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 FIELD MAGNETICS OF SELECTED AREAS NEAR KETCHIKAN, SOUTHEAST ALASKA

MAP D - WESTERN and EASTERN PARTS, GRAVINA ISLAND
1999



LOCATION INDEX



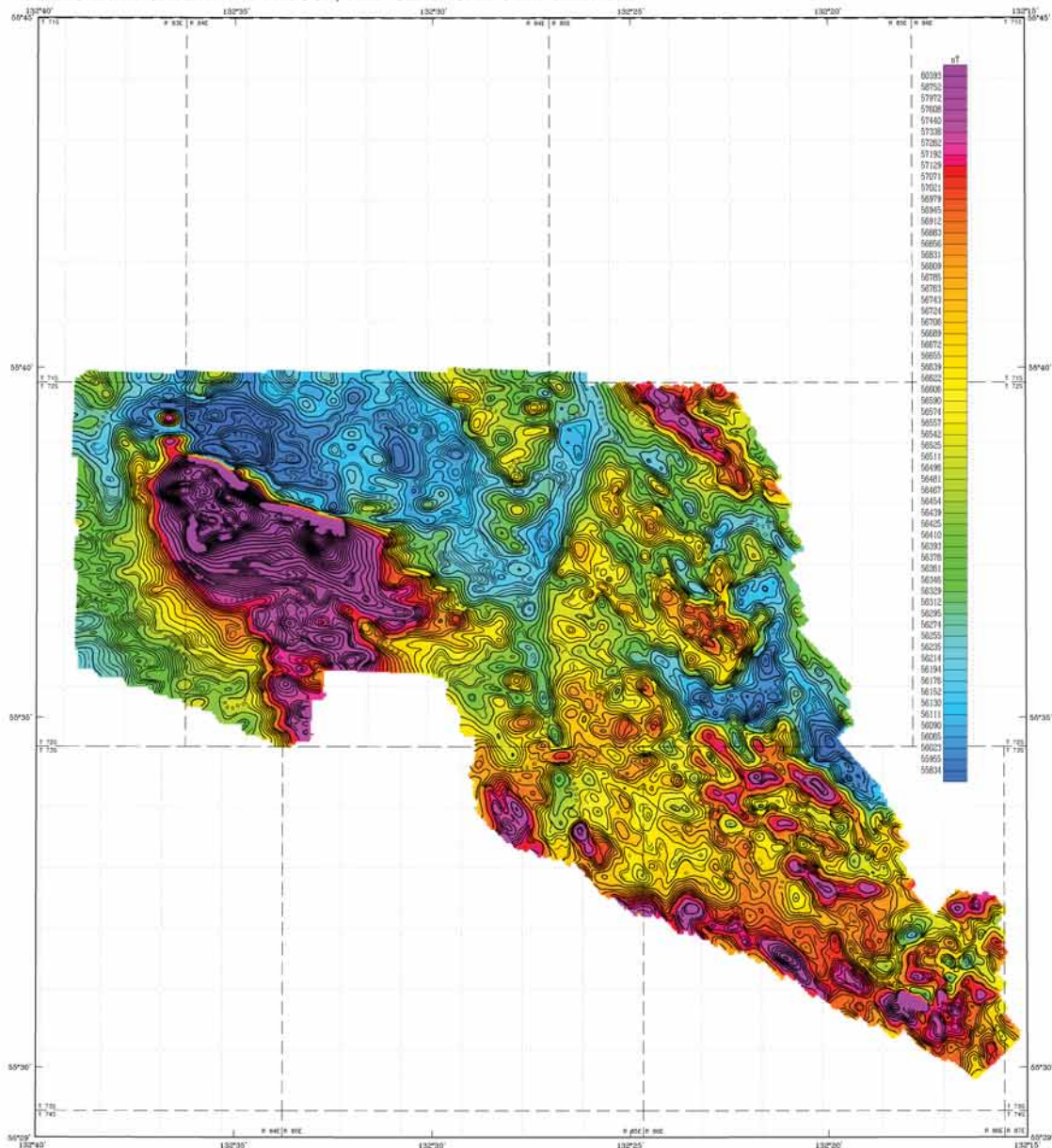
SURVEY HISTORY

This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources (DNR), Division of Geological & Geophysical Surveys (DGG), and NOAA Mining & Geological Consultants, Inc. Airborne geophysical data for the area were acquired in 1999 by Sealaska-Corporation, a division of COSCO Canada Ltd. Funding for the project was provided by the U.S. Department of the Interior, Bureau of Land Management (BLM), Ketchikan Gateway Borough, Sealaska Corporation, Alaska State Mental Health Trust Land Office, and the cities of Homer Bay and Coffman Cove. This map and other products from this survey are available by mail order or in person from DGG, 794 University Ave., Suite 200, Fairbanks, Alaska, 99709. Some products are also available in person only, at the BLM's Junction Minerals Information Center, Mayflower Island, Douglas, AK.

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 sea level data, and (3) interpolated onto a regular 100 m grid using a modified Along (1970) technique. The regional variation (or IGR) gradient, 1995, updated to March 1999) was removed from the leveled magnetic data.

Alaska, 1970, a new method of interpolation and smooth curve fitting based on local procedures. Journal of the Association of Computing Machinery, 17, no. 4, p. 688-693.



Derivative contour lines: 0.5 Geophysical Survey Contour 0.5, 1999, 0.5, 1999



DESCRIPTIVE NOTES

KETCHIKAN SURVEY "Area 4" - March 1999
The geophysical data were acquired with a DIGHEM[®] Electromagnetic (EM) system and a Scintrex cesium magnetometer. Both were flown at a height of 100 feet. In addition, the survey recorded data from a radar altimeter, GPS navigation system, 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 north-south flight lines one-quarter mile apart. The lines were flown perpendicular to the flight lines at intervals of approximately 3 miles.

An Ashtech/Rapid Real-Time Differential Global Positioning System (RT-DGPS) was used for both navigation and flight path recovery. The helicopter position was derived every 0.5 seconds using real-time differential positioning to a relative accuracy of better than 10 m. Flight path positions were projected onto the Clarke 1866 (UTM zone 8) spheroid, 1927 North American datum using a central meridian (CM) of 130° 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.

KASAAN SURVEY "Area 2" - May 1992
The geophysical data were acquired with a DIGHEM[®] Electromagnetic (EM) system and a Scintrex cesium magnetometer. Mean terrain clearance for the magnetometer and EM system were approximately 213 and 164 feet, respectively. In addition the survey recorded data from a radar altimeter, UHF navigation system, 30/60 Hz monitors, VLF receiver and video camera. The northeast-southwest flight lines were flown one-eighth mile apart with the lines flown parallel to the survey boundaries. The survey was flown with an AS350B-1 helicopter.

A Del Norte UHF electronic positioning system was used for navigation. Flight path recovery was done with a combination of UHF data and visual recovery. Positional accuracy of the 1992 data should be considered of low reliability. An error on the Craig 1:25,000 topographic map sheet caused distortion of the positioning in the original 1992 data. The data were re-positioned in 1999 using a rubber sheet stretching technique to better match the topography and fit with the 1999 data.

TOTAL FIELD MAGNETICS

The total field magnetic data were acquired with a sampling interval of 0.1 seconds and were (1) corrected for diurnal variations by subtraction of the digitally recorded base station magnetic data, (2) leveled to the tie line data, and (3) interpolated onto a regular 100 m grid using a modified Akima (1970) technique. The regional variation (or IGRF gradient, 1995, updated to March 1999) was removed from the leveled magnetic data.

Adams, R. 1970, A new method of interpolation and smooth curve fitting based on least-squares approximation of the method of least squares, *Journal of the Association of Computing Machinery*, v. 17, no. 4, p. 549-552.

TOTAL FIELD MAGNETICS OF SELECTED AREAS NEAR KETCHIKAN, SOUTHEAST ALASKA

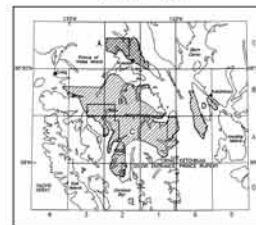
MAP A - SALT CHUCK AND KASAAN
PENINSULA, PRINCE OF WALES ISLAND
1999



MAGNETIC CONTOUR INTERVAL



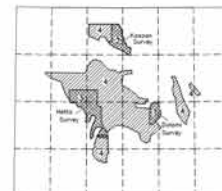
LOCATION INDEX

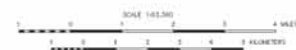
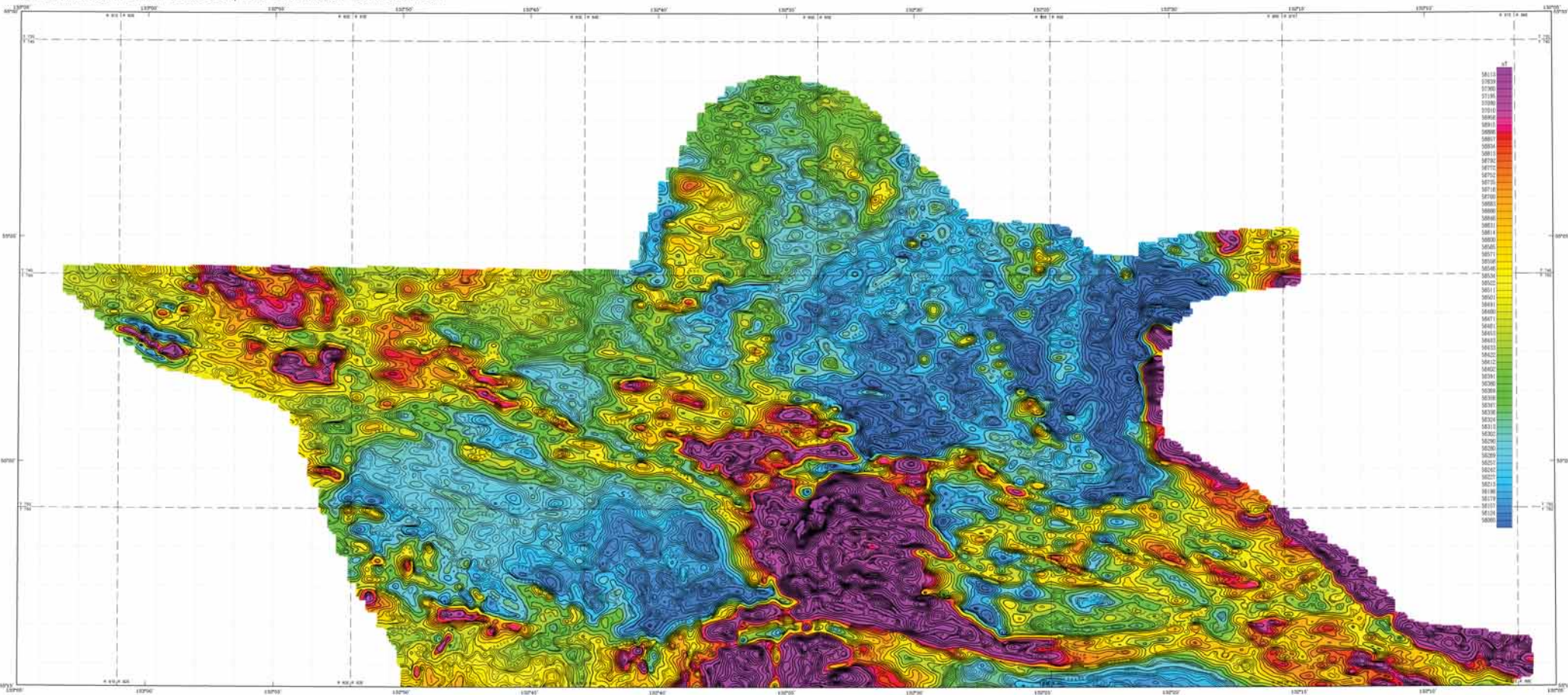


SURVEY HISTORY

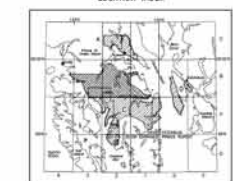
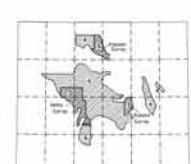
This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources (DNR), Division of Geological & Geophysical Surveys (DGG), and W&M Mining & Geological Consultants, Inc. All geophysical data for areas 4 were acquired in 1999 by Geotek-DigheM, a division of DGG Canada Ltd. Funding for the project was provided by the U.S. Department of the Interior, Bureau of Land Management (BLM), Ketchikan Gateway Borough, Sealaska Corporation, Alaska State Mental Health Trust Land Office, and the cities of Thorne Bay and Coffman Cove. The data for areas 1, 2 and 3 were flown by DigheM in 1991 and 1992. These data were provided for publication by Sealaska Corporation.

This map and other products from this survey are available by mail order, or in person, from DGG, 794 University Ave., Suite 200, Fairbanks, Alaska, 99709. Some products are also available, in person only, at the BLM's Juneau Minerals Information Center, Mayflower Island, Douglas, AK.





TOTAL FIELD MAGNETICS OF SELECTED AREAS NEAR KETCHIKAN, SOUTHEAST ALASKA MAP B - SURVEYED AREA IMMEDIATELY NORTH OF PRINCE OF WALES ISLAND 1999



DESCRIPTIVE NOTES

KETCHIKAN SURVEY "Area A" - March 1999
The geophysical data were collected with a GOMER®
magnetometer. Both were flown at a height of 100
feet. In addition, the survey recorded data from a
radio altimeter (GPS navigation system, 50/60 Hz
magnetic and radio compass). Flights were performed with
an A3000-2 Survey Navigator at a mean terrain
clearance of 200 feet above north-south flight
lines one-quarter mile apart. The lines were
flown perpendicular to the flight line of reference
at approximately 2 miles.

ANALYSIS/RECORDING
The data were processed using Differential Global
Positioning System (DGPS) and were used for both
navigation and flight path recovery. The latitude
position was derived every 0.5 seconds using real-
time differential positioning to a relative accuracy of
better than 10 m. Flight path positions were corrected
onto the ground track (the line of survey) using
the DGPS data. The data were then corrected to a
north constant of 0 and an east constant of 500,000.
Positional accuracy of the processed data is better than
10 m with respect to the UTM grid.

HEATH SURVEY "Area B" - May 1992
The geophysical data were collected with a GOMER®
magnetometer. Both were flown at a height of 100
feet. In addition, the survey recorded data from a
radio altimeter (GPS navigation system, 50/60 Hz
magnetic and radio compass). Flights were performed with
an A3000-2 Survey Navigator at a mean terrain
clearance of 200 feet above north-south flight
lines one-quarter mile apart with the lines flown
perpendicular to the flight lines. The lines were
flown with an A3000-2 helicopter.

DATA PROCESSING
A real-time DGPS navigation system was
used for navigation. Flight path recovery was
done with a combination of DGPS data and visual
recovery. Positional accuracy of the 1992 data should
be comparable to the 1999 data.

MAGNETIC CONTOUR INTERVAL

..... 200 nT
..... 100 nT
..... 50 nT
..... 25 nT

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) reduced to the sea level datum, and (3) converted
into a regular 100 m grid using a modified Gauss
(1970) algorithm. The magnetic variation (or declination)
from 1980 to 1999 was removed from the
magnetic data.

Notes: 1. Data in the shaded area represent the
unprocessed data. 2. Data in the shaded area
represent the processed data.

SURVEY HISTORY

This map has been compiled and drawn under contract
between the State of Alaska, Department of Natural
Resources (DNR), Division of Geological & Geophysical
Survey (DGG), and Sealaska Corporation. The
geophysical data for area A were acquired
in 1999 by Sealaska Corporation, a division of Sealaska
Corporation. Funding for the project was provided by
the U.S. Department of the Interior, Bureau of Land
Management (BLM), Federal Lands Survey, Sealaska
Corporation, Alaska State Natural Heritage Trust Land
Fund, and the State of Alaska, Department of Natural
Resources. The data for areas 1, 2, and 3 were from the
1992 and 1993 surveys. These data were provided for publication
by Sealaska Corporation.

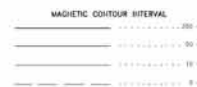
This map and other products from this survey are available
for sale, or in person, from DGG, 100 University Ave.,
Suite 200, Fairbanks, Alaska 99703. Some products are
also available, at a discount, at the State's Internet
Resource Information Center, <http://www.alaska.gov>.

[illegible]

NETS SURVEY "Doris 3" - May 1993
DOLPHIN SURVEY "Tara 1" - March 1992

The geryonids *Doris* were acquired with BIGHORN (Dolphins Survey), and BIGHORN (Herring Survey). The geryonids were collected from the same trawls as the euphausiids. Many larvae (clupeids for the euphausiids and ELO for the geryonids) were approximately 12.5 and 10 mm, respectively. The euphausiid survey was done with a 100 m trawl, while the geryonid survey was done with a 50 m trawl. The euphausiid system, 50/50 m trawls, of random and fixed design. The fixed gear, were flown with a 100 m trawl, while the random gear, were flown with a 50 m trawl. The geryonid survey was flown north-south with an 50/50 m trawl. The euphausiid survey was flown north-south with a 100 m trawl. The geryonid survey was flown north-south with a 50 m trawl. The euphausiid survey was flown north-south with a 100 m trawl. The geryonid survey was flown north-south with a 50 m trawl.

A Del Norte IIR electronic positioning system was used for navigation. Flight path recovery was done with a combination of IIR data and ground recovery. Postflight accuracy of the 1987/88 data should be considered as the result.



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 (1972) technique. The regional variation for IGRF gradient, 1925, updated to March 1990, was subtracted from the leveled magnetic data.

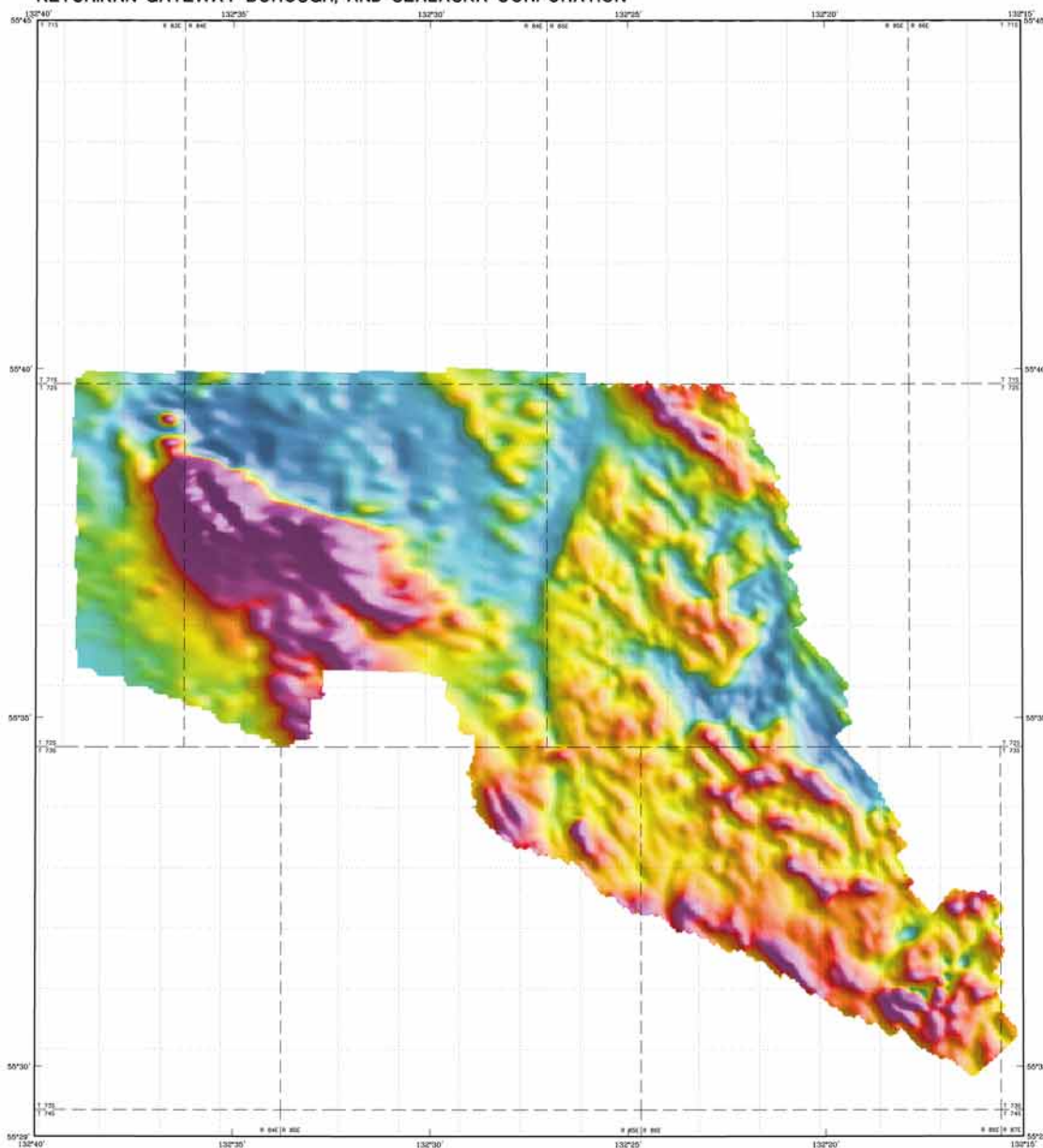
This map and other products from this survey are available by mail order or in person. For 2000, the USGS, 4800 Rte. 20, Suite 200, Fairbanks, Alaska, 99709. Some products are available only in person. For more information, contact the Alaska Information Center, 1000 West 1st, Seward, Alaska 99575.



1999



The total field magnetic data were acquired with a sampling interval of 0.1 seconds, and were (1) corrected for diurnal variations by subtraction of the digitally recorded base station magnetic data, (2) leveled to the tie line data, and (3) interpolated onto a regular 100 m grid using a modified Akima (1970) technique. The residual variation (or IGR gradient, 1995, updated to March 1999) was removed from the leveled magnetic data.



DESCRIPTIVE NOTES

KETCHIKAN SURVEY "Area 4" - March 1999
The geophysical data were acquired with a DigiHem[®] Electromagnetic (EM) system and a Sointrex cesium magnetometer. Both were flown at a height of 100 feet. In addition the survey recorded data from a radar altimeter, GPS navigation system, 50/50 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 flight lines one-quarter mile apart. The lines were flown perpendicular to the flight lines at intervals of approximately 3 miles.

An Ashtech/Rascal Real-Time Differential Global Positioning System (RT-DGPS) was used for both navigation and flight path recovery. The helicopter position was derived every 0.5 seconds using real-time differential positioning to a relative accuracy of better than 10 m. Flight path positions were projected onto the Clarke 1866 (UTM zone 8) spheroid, 1927 North American datum using a central meridian (CM) of 130° 30' 00" west of Greenwich and an east constant of 500,000. Positional accuracy of the presented data is better than 10 m with respect to the UTM grid.

KASAAN SURVEY "Area 2" - May 1992
The geophysical data were acquired with a DigiHem[®] Electromagnetic (EM) system and a Sointrex cesium magnetometer. Mean terrain clearance for the magnetometer and EM system were approximately 213 and 164 feet, respectively. In addition the survey recorded data from a radar altimeter, VLF receiver and video camera. The northeast-southwest flight lines were flown one-eighth mile apart with tie lines flown parallel to the survey boundaries. The survey was flown with an AS350B-1 helicopter.

A Del Norte UHF electronic positioning system was used for navigation. Flight path recovery was done with a combination of UHF data and visual recovery. Positional accuracy of the 1992 data should be considered of low reliability. An error on the Craig 1-2 topographic map sheet caused distortion of the positioning in the original 1992 data. The data were re-positioned in 1999 using a rubber sheet stretching technique to better match the topography and fit with the 1999 data.

TOTAL FIELD MAGNETICS

The total field magnetic data were acquired with a sampling interval of 0.1 seconds, and were (1) corrected for diurnal variations by subtraction of the digitally recorded base station magnetic data, (2) leveled to the tie line data, and (3) interpolated onto a regular 100 m grid using a modified Akima (1970) technique. The regional variation (or IGRF gradient, 1995, updated to March 1999) was removed from the leveled magnetic data.

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

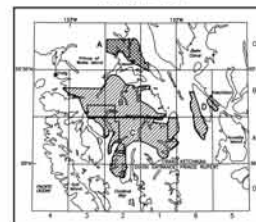


COLOR SHADOW TOTAL FIELD MAGNETICS OF SELECTED AREAS NEAR KETCHIKAN, SOUTHEAST ALASKA

MAP A - SALT CHUCK AND KASAAN
PENINSULA, PRINCE OF WALES ISLAND
1999

Sun Azimuth: 65 degrees
Inclination: 30 degrees

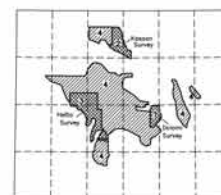
LOCATION INDEX

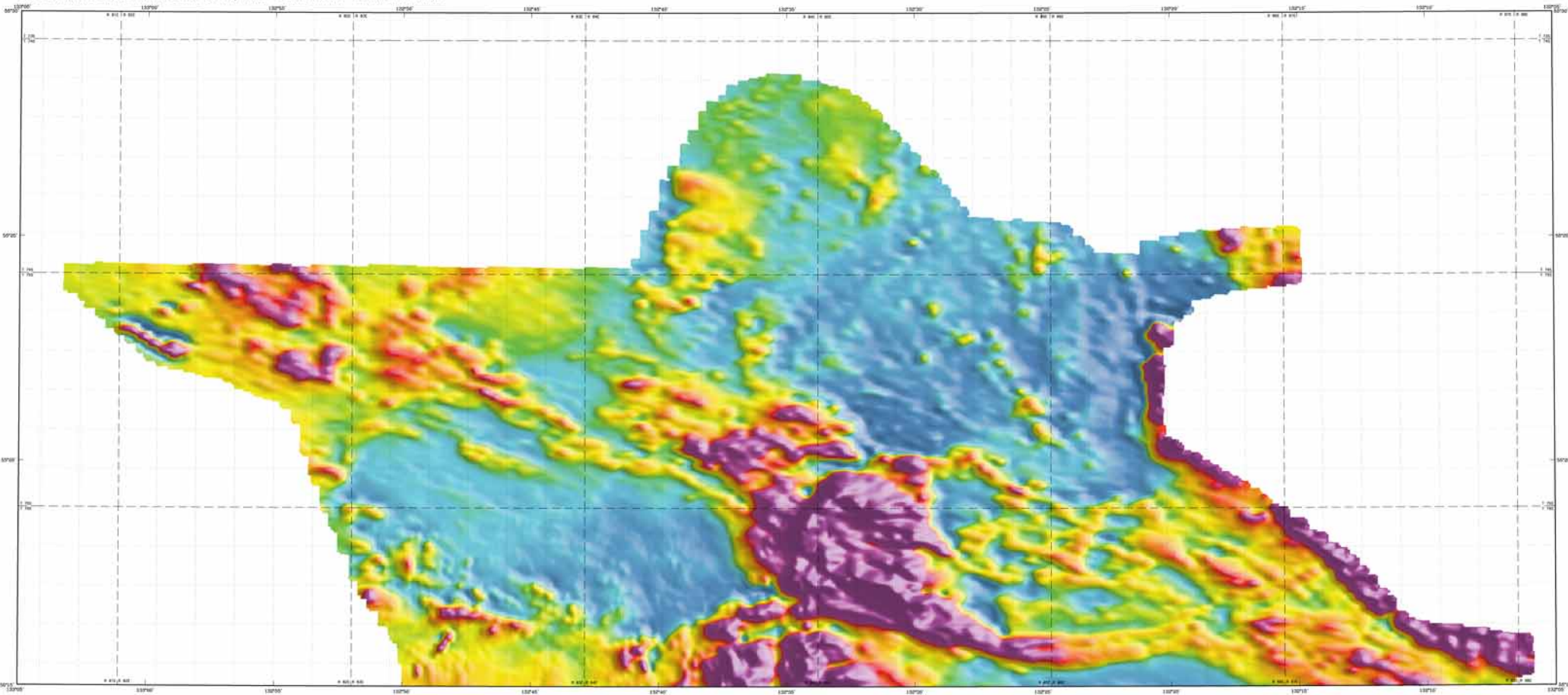


SURVEY HISTORY

This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources (DNR), Division of Geological & Geophysical Surveys (DGG), and WGM, Mining & Geological Consultants, Inc. Airborne geophysical data for area 4 were acquired in 1999 by Geotrex-Digheim, a division of CGC Canada Ltd. Funding for the project was provided by the U.S. Department of the Interior, Bureau of Land Management (BLM), Ketchikan Gateway Borough, Sealaska Corporation, Alaska State Mental Health Trust Land Office, and the cities of Thorne Bay and Coffman Cove. The data for areas 1, 2 and 3 were flown by Digheim in 1991 and 1992. These data were provided for publication by Sealaska Corporation.

This map and other products from this survey are available by mail order, or in person, from DGG, 794 University Ave., Suite 200, Fairbanks, Alaska, 99709. Some products are also available, in person only, at the BLM's Juneau Minerals Information Center, Mayflower Island, Douglas, AK.





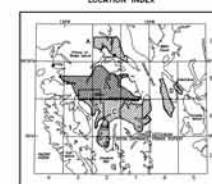
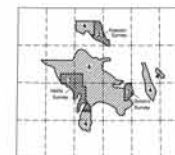
COLOR SHADOW TOTAL FIELD MAGNETICS OF SELECTED AREAS NEAR KETCHIKAN, SOUTHEAST ALASKA

MAP B - SURVEYED AREA IMMEDIATELY NORTH OF 55°15',
PRINCE OF WALES ISLAND

1999

Sun Azimuth: 65 degrees

Inclination: 30 degrees



DESCRIPTIVE NOTES

KETCHIKAN SURVEY "Area A" - April 1999
The geophysical data were acquired with a DGGW[®] magnetometer (500 gauss) and a Sintered ceramic magnetometer. Both were flown at a height of 150 feet. In addition, the survey recorded data from a real-time, GPS navigation system, 50/60 Hz magnetic and video camera. Flights were performed with an AS350B-2 helicopter at a major terrain clearance of 250 feet above maximum flight line elevation from the ground. The lines were flown perpendicular to the flight line at intervals of approximately 3 miles.
An Ashtech/Real-Time Differential Global Positioning System (RT-DGPS) was used for both navigation and flight path recovery. The helicopter position was recorded every 0.5 seconds using real-time differential positioning to a relative accuracy of better than 10 m. Flight path positions were projected onto the Clarke 1886 (Zone 4) spheroid, 1927 North American datum using a datum location (NAD of 1927) with a north constant of 0 and an east constant of 505,000. Position accuracy of the recorded data is better than 10 m with respect to the UTM grid.

KETCHIKAN SURVEY "Area B" - May 1999
The geophysical data were acquired with a DGGW[®] magnetometer (500 gauss) and a Sintered ceramic magnetometer. Both were flown at a height of 150 feet. In addition, the survey recorded data from a real-time, GPS navigation system, 50/60 Hz magnetic and video camera. Flights were performed with an AS350B-2 helicopter at a major terrain clearance of 250 feet above maximum flight line elevation from the ground. The lines were flown perpendicular to the flight line at intervals of approximately 3 miles.
An Ashtech/Real-Time Differential Global Positioning System (RT-DGPS) was used for both navigation and flight path recovery. The helicopter position was recorded every 0.5 seconds using real-time differential positioning to a relative accuracy of better than 10 m. Flight path positions were projected onto the Clarke 1886 (Zone 4) spheroid, 1927 North American datum using a datum location (NAD of 1927) with a north constant of 0 and an east constant of 505,000. Position accuracy of the recorded data is better than 10 m with respect to the UTM grid.

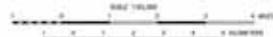
SURVEY HISTORY

This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources (DNR), Division of Geologic & Geophysical Survey (DGG), and BLM Mining & Geological Consultants, Inc. Airborne geophysical data for area A were acquired in 1999 by Geophysical Systems, a division of CGC, Corvallis, OR. Funding for the project was provided by the U.S. Department of the Interior, Bureau of Land Management (BLM), Ketchikan Gateway Borough, Sealaska Corporation, Alaska State Mental Health Trust (ASMH), and the cities of Thayer, Bay and Cushman. The data for areas 1, 2 and 3 were flown by Dugan in 1991 and 1992. These data were provided for publication by Sealaska Corporation.
This map and other products from this survey are available to the public, or in part, from DGG, 334 University Ave., Suite 200, Fairbanks, Alaska, 99709. Some products are also available, in part only, at the BLM's Geologic & Geophysical Information Center, Highway 100, Douglas, AK.

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) reduced to the 1927 datum, and (3) interpreted using a regional magnetic model (see DGG report, 1997) technique. The regional magnetic model (see DGG report, 1997) was removed from the total magnetic data.

Blank, 1997, A new method of magnetic data acquisition using a real-time differential global positioning system (RT-DGPS) for magnetic data acquisition, in "U.S. Geological Survey Bulletin 1047-A".

[illegible][illegible]

MAP C - SURVEYED AREA SOUTH OF 55°16',
PRINCE OF WALES ISLAND
1999

Sun Azimuth- 65 degrees
Inclination- 30 degrees

[illegible][illegible]

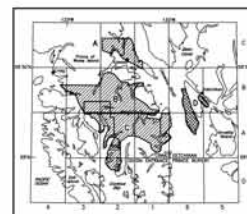


An Ahtech/Racal Real-Time Differential Global Positioning System (RT-DGPS) was used for base navigation and flight path recovery. The helicopter position was derived every 0.5 seconds using real-time differential positioning to a relative accuracy of better than 10 m. Flight path positions were projected onto the Clarke 1866 (UTM zone 9) spheroid, 1927 North American datum using a central meridian (CM) of 123°, 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.

SCALE 1:63,360

0 1 2 3 4 MILES

0 1 2 3 4 5 KILOMETERS

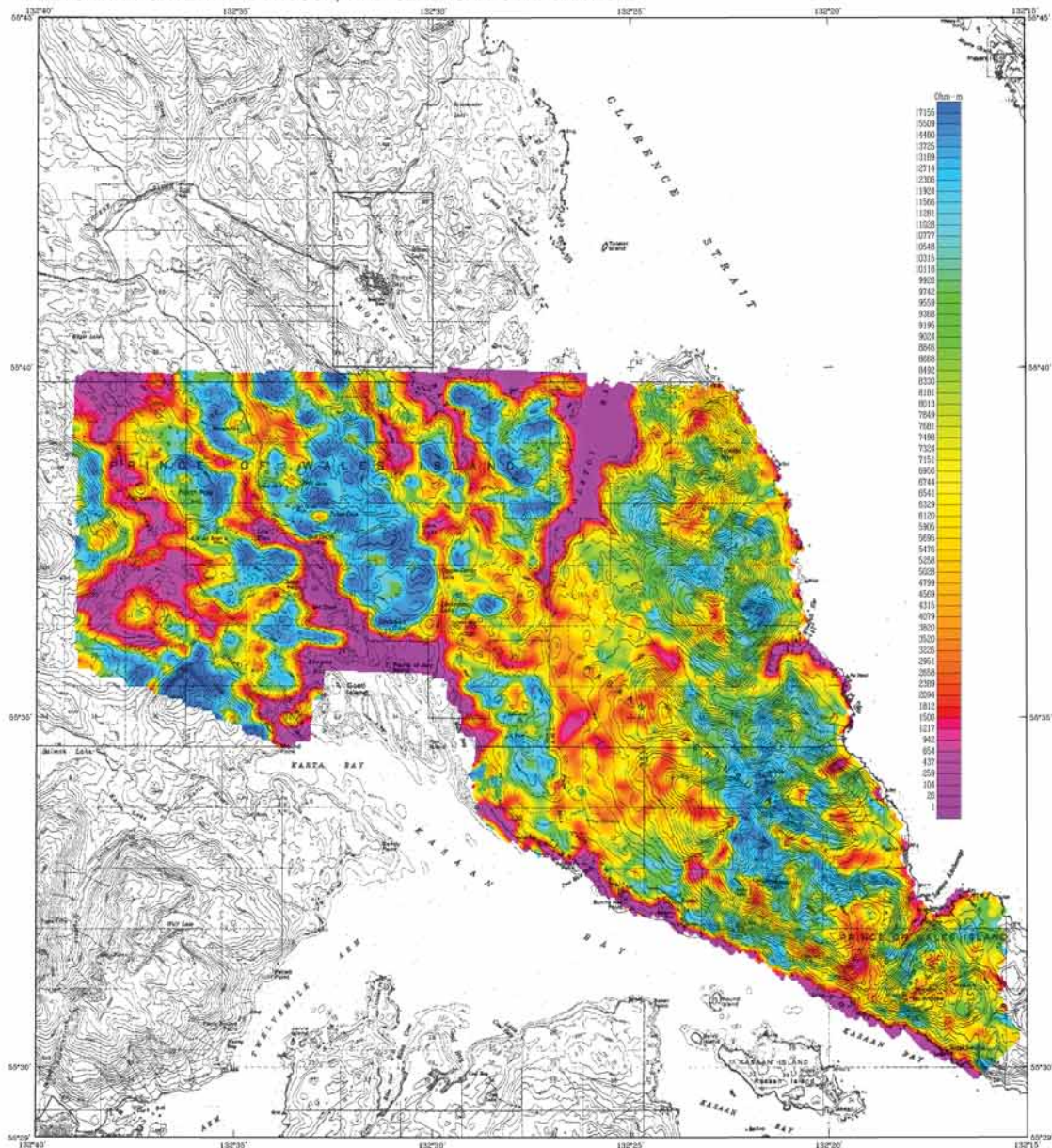


This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources (DNR), Division of Geological & Geophysical Surveys (DGGIS), and WGA Mining & Geological Consultants, Inc. Airborne geophysical data for the area were acquired in 1999 by Geotrex-Digheim, a division of COGIC, Inc. Further information on the project can be found in the U.S. Department of the Interior, Bureau of Land Management (BLM), Ketchikan Gateway Borough, Sealskag Corporation, Alaska State Mental Health Trust Land Office, and the cities of Thorne Bay and Coffman Cove.

This map and other products from this project are available by mail order, or in person, from 206.5, 794 University Ave., Suite 206, Fairbanks, Alaska 99709. The map is also available, in person only, at the BLM's National Minerals Information Center, Mayflower Island, Douglas, AK.

The total field magnetic data were acquired with a sampling interval of 0.1 seconds, and were (1) corrected for diurnal variations by subtraction of the digitally recorded base station magnetic data, (2) leveled to the tie line data, and (3) interpolated onto a regular 100 m grid using a modified Akima (1970) technique. The regional variation (or IGRF gradient, 1995, updated to March 1999) was removed.

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: U.S. Geological Survey Chart 8-1, 1949, 8-2, 1949,
7-1, 1950, 7-2, 1950 Quadrangle, Alaska



56,000 Hz COPLANAR RESISTIVITY OF SELECTED AREAS NEAR KETCHIKAN, SOUTHEAST ALASKA MAP A - SALT CHUCK AND KASAAN PENINSULA, PRINCE OF WALES ISLAND 1999

DESCRIPTIVE NOTES

KETCHIKAN SURVEY "Area 1" - March 1999

The geophysical data were acquired with a DIGHEM[®] Electromagnetic (EM) system and a Sointrex cesium magnetometer. Both were flown at a height of 100 feet. In addition the survey recorded data from a radar altimeter, GPS navigation system, 30/60 Hz monitors and video camera. Flights were performed with an AS350B-2 helicopter at a mean terrain clearance of 200 feet along north-south flight lines one-quarter mile apart. The lines were flown perpendicular to the flight lines at intervals of approximately 5 miles.

An Ashtech/Rascal Real-Time Differential Global Positioning System (RT-DGPS) was used for both navigation and flight path recovery. The helicopter position was derived every 0.5 seconds using real-time differential positioning to a relative accuracy of better than 10 m. Flight path positions were projected onto the Clarke 1866 UTM zone 6 spherical, 1927 North American datum using a central meridian (CM) of 135° 30' 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.

KASAAN SURVEY "Area 2" - May 1992

The geophysical data were acquired with a DIGHEM[®] Electromagnetic (EM) system and a Sointrex cesium magnetometer. Mean terrain clearance for the magnetometer and EM system were approximately 215 and 164 feet, respectively. In addition the survey recorded data from a radar altimeter, UHF navigation system, 30/60 Hz monitors, VLF receiver and video camera. The north-south-southwest flight lines were flown one-eighth mile apart with the lines flown parallel to the survey boundaries. The survey was flown with an AS350B-1 helicopter.

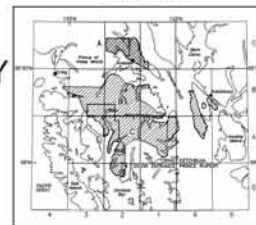
A Del Norte UHF electronic positioning system was used for navigation. Flight path recovery was done with a combination of UHF data and visual recovery. Positional accuracy of the 1992 data should be considered as less reliable. An error on the Craig C-2 topographic map sheet caused distortion of the positioning in the original 1992 data. The data were re-positioned in 1999 using a rubber sheet stretching technique to better match the topography and fit with the 1999 data.

RESISTIVITY

The DIGHEM[®] EM system measured in-phase and quadrature components at five frequencies. Two vertical coplanar-coil pairs operated at 900 and 5500 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 in-phase and quadrature component of the coplanar 56,000 Hz using the pseudo-layer half space model. The data were interpolated onto a regular 100 m grid using a modified Akima (1970) technique.

NOTE: In 1970, A new method of interpolation and smooth curve fitting based on mean principles. *Journal of the Association of Computing Machinery*, 17, no. 4, p. 589-602.

LOCATION INDEX



SURVEY HISTORY

This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources (DNR), Division of Geological & Geophysical Surveys (DGG), and W&M Mining & Geological Consultants, Inc. All geophysical data for areas 1 and 2 were acquired in 1999 by Geotrex-DigheM, a division of DGG Canada Ltd. Funding for the project was provided by the U.S. Department of the Interior, Bureau of Land Management (BLM), Ketchikan Gateway Borough, Sealaska Corporation, Alaska State Mental Health Trust Land Office, and the cities of Thorne Bay and Coffman Cove. The data for areas 1, 2 and 3 were flown by DigheM in 1991 and 1992. These data were provided for publication by Sealaska Corporation.

This map and other products from this survey are available by mail order, or in person, from DGG, 794 University Ave., Suite 200, Fairbanks, Alaska, 99709. Some products are also available, in person only, at the BLM's Juneau Minerals Information Center, Mayflower Island, Douglas, AK.





NEOTOMAN SURVEY *Area 4² - March 1989*
The geophysical data were acquired with a DCH/Earth Electromagnetic (EM) system and a Solitex caesium magnetometer. Both were flown at a height of 100 feet. In addition the survey recorded data from a radio altimeter, GPS navigation system, DG/RSI Hz roll/pitch and heading sensors. Flights were performed with an AL350C-2 Squire helicopter at a mean terrain clearance of 200 feet above north-south flight lines over-sampled side sport. The lines were flown perpendicular to the flight lines at intervals of approximately 3 miles.

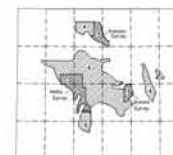
40. Aspregho, R. and R. B. F. (1998) Real-Time Differential Global Positioning System (RT-DGPS) was used for both navigation and flight path recovery. The helicopter position was derived every 0.5 seconds using real-time differential positioning to a relative accuracy of better than 10 m. Flight path positions were reported onto the Corke 1888 (UTM zone 18) upward, 1927 North American datum using a central meridian (CM) of 135°, a north constant of 0 and as east constant of 500,000. Positional accuracy of the presented dots is better than 10 m with respect to the UTM grid.

NETA SURVEY 'Area 3' - May 1992
The geophysical data were acquired with a GEOMAR Electromagnetic (EM) system and a Scintrex ocean magnetometer. The latter was towed at a distance of 100 m from the ship and the EM system was towed at a distance of 215 and 188 feet, respectively. In addition the survey recorded data from a water column, EM navigation system, 50/60 Hz monitors, EM receiver and video camera. The EM system was towed at a distance of 100 m from the ship and the EM system was towed at a distance of 215 and 188 feet, respectively. In addition the survey recorded data from a water column, EM navigation system, 50/60 Hz monitors, EM receiver and video camera. The EM system was towed at a distance of 100 m from the ship and the EM system was towed at a distance of 215 and 188 feet, respectively. In addition the survey recorded data from a water column, EM navigation system, 50/60 Hz monitors, EM receiver and video camera.

The COMET Di system measured in-phase and quadrature components of the frequencies. Two vertical coils (100 pairs) operated at 900 and 2500 Hz above three horizontal companion-coil pairs operated at 900, 2200, and 2600 Hz. Di data were sampled at 0.1 second intervals. The Di system responds to bedrock production, conductive overburden, and cultural sources. Apparent resistivity is calculated from the in-phase and quadrature components of the regional 26,000 ft/s using the pseudo-layer half space model. The data were interpolated onto a regular 100 m grid using a modified kriging (1977) technique.

Amey, H., 1970, A new method of integration and smooth curve fitting based on least-squares solution of the equations of connecting machines, *J. I.T.*, no. 4, p. 588-602.

MAP B - SURVEYED AREA IMMEDIATELY NORTH OF 55°15'
PRINCE OF WALES ISLAND
1999

[illegible]



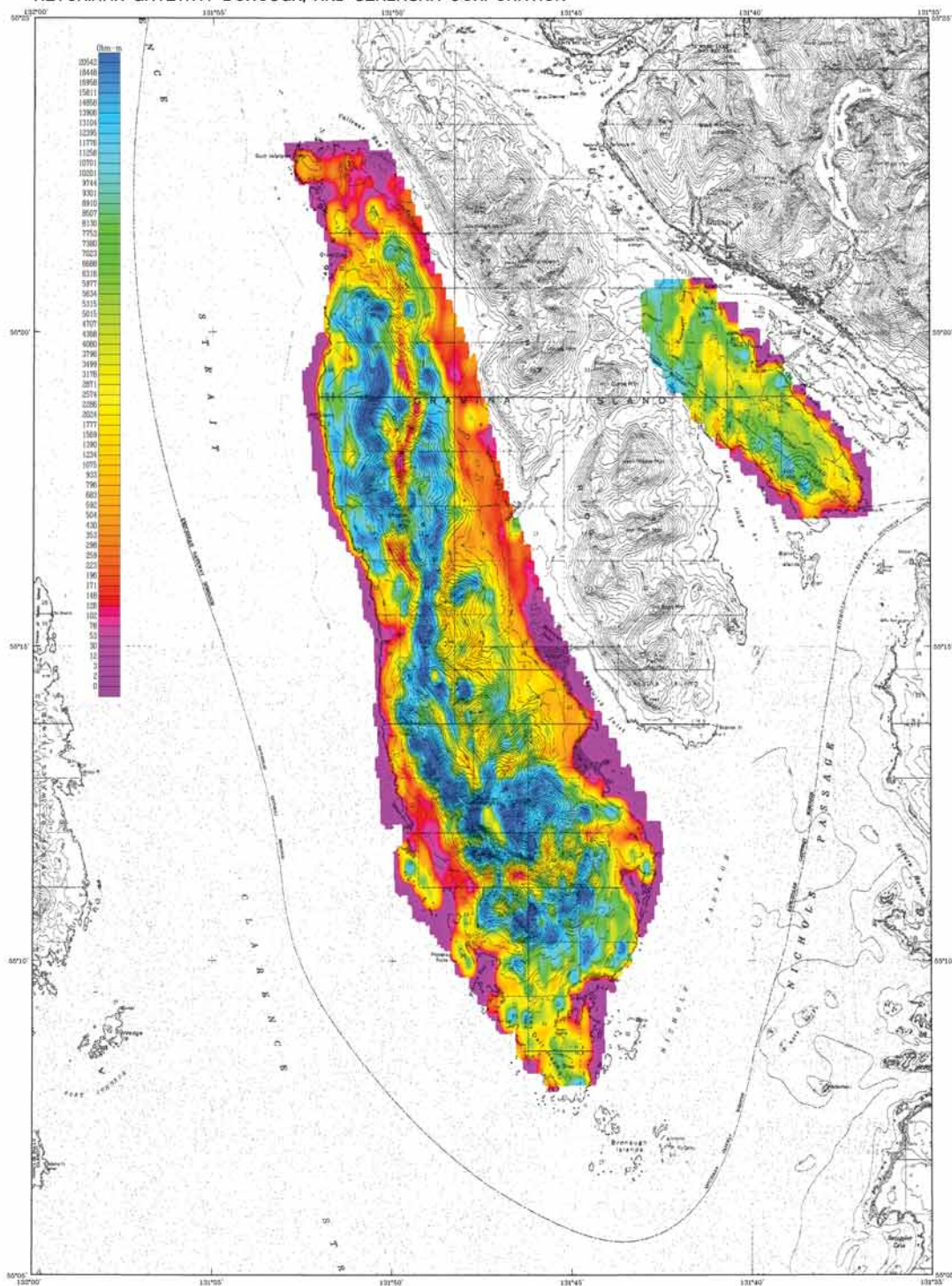
ALTIMETER SURVEY—June 4th – March 1999
The geophysical data were acquired with a DGN01 Electromagnetic (EM) system and a Sine wave magnetometer. Both were flown at a height of 100 feet. To position the survey aircraft, a GPS receiver was mounted on the aircraft. Flights were performed using a KJ250C-2 typical helicopter at a mean terrain elevation of 2000 feet along north-south flight lines for the northern portion and east-west flight lines for the southern portion east-quarter mile square. The lines were flown perpendicular to the river line.

For trajectory reconstruction, Real-Time Differential Global Positioning System (RT-DGPS) was used for both navigation and flight path recovery. The helicopter position was derived every 0.5 seconds using real-time differential positioning. In a statistical accuracy of better than 10 cm, flight path profiles were projected onto the Corps 1980 UTM zone 9, hemisphere 192° North American datum using a datum translation (DRT) of 1320 m north, constant of 0 and an east constant of 560,000 m. Positional accuracy of the projected data is better than 10 cm with respect to the UTM grid.

[illegible]

The DORAD™ EM system measured in-phase and quadrature components of five frequencies. Two vertical induction coils were operated at 500 and 15000 Hz. The five frequencies were 500, 15000, 15000, 15000, 15000 Hz. The data were sampled at 0.1 second intervals. The EM system responds to induced currents, conductive structures, and cultural artifacts. Apparent resistivity is determined from the ratio of the induced magnetic moment of the geophones 15000 Hz using the pseudo-loop half space model. The data are then interpolated onto a regular 100 m grid using a modified least (TW95) technique.

[illegible]



Base Data: 1:250,000 Geological Survey Database 4-4, 1996, 4-4, 1996.
S-1, 1999, 4-4, 1999, 4-4, 1999.



DESCRIPTIVE NOTES

The geophysical data were acquired with a DIGHEM[®] Electromagnetic (EM) system and a Schlumberger caesium magnetometer. Both were flown at a height of 100 feet. In addition the survey recorded data from a radar altimeter, GPS navigation system, 50/60 Hz magnetic and video camera. Flights were performed with an AC250B-2 Control helicopter at a mean terrain clearance of 200 feet along east-west flight lines one-quarter mile apart. The lines were flown perpendicular to the flight lines at intervals of approximately 3 miles.

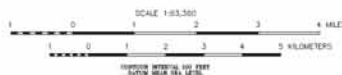
An Ashtech/Racal Real-Time Differential Global Positioning System (RT-DGPS) was used for both navigation and flight path recovery. The helicopter position was derived every 0.5 seconds using real-time differential positioning to a relative accuracy of better than 10 m. Flight path positions were projected onto the Clarke 1886 (NAD 83) spheroid 1927 North American datum using a central meridian (CM) of 129° 30' 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 ITRF 95.

RESISTIVITY

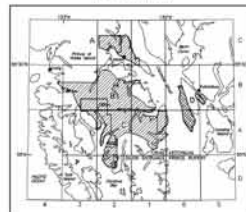
The DIGHEM[®] EM system measured in-phase and quadrature components at five frequencies. Two vertical coplanar coils operated at 800 and 5500 Hz while three horizontal induction coils operated at 300, 7500, and 56,000 Hz. EM data were sampled at 0.1 second intervals. The EM system responds to bedrock conductors, conductive overburden, and cultural sources. Apparent resistivity is generated from the in-phase and quadrature component of the coplanar 56,000 Hz using the pseudo-layer half space model. The data were interpolated onto a regular 100 m grid using a modified Akima (1970) technique.

Adams, W. 1970. A new method of interpolation and smoothing some results from a resistivity survey. In: Proceedings of the Symposium on Computing Geophysics, p. 17, no. 4, p. 261-262.

56,000 Hz COPLANAR RESISTIVITY OF SELECTED AREAS NEAR KETCHIKAN, SOUTHEAST ALASKA MAP D - WESTERN and EASTERN PARTS, GRAVINA ISLAND 1999



LOCATION INDEX



SURVEY HISTORY

This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources (DNR), Division of Geological & Geophysical Survey (DGG), and NOAA Mining & Geological Consultants, Inc. Airborne geophysical data for the area were acquired in 1999 by Geophysical Dynamics, a division of CGC Canada Ltd. Funding for the project was provided by the U.S. Department of the Interior, Bureau of Land Management (BLM), Ketchikan Gateway Borough, Sealaska Corporation, Alaska State Mental Health Trust, Land Office, and the cities of Homer Bay and Coffman Cove.

This map and other products from this survey are available by mail order or in person from DGG, 794 University Ave., Suite 200, Fairbanks, Alaska, 99709. Some products are also available in garnet units, at the BLM's Junction Minerals Information Center, Uptown Island, Douglas, AK.



MAP A - SALT CHUCK AND KASAAN
PENINSULA, PRINCE OF WALES ISLAND

KETCHIKAN SURVEY "Area 4" - March 1999
The geophysical data were acquired with a DIGHEAL[®] Electromagnetic (EM) system and a Schlumberger cesium magnetometer. Both were flown at a height of 100 meters. In addition, we recorded data from a GPS, a radar altimeter, GPS navigation system, 50/60 Hz monitors and video camera. Flights were performed with an AC350B-2 Squirrel helicopter at a mean terrain clearance of 200 feet along north-south flight lines one-quarter mile apart. The lines were flown perpendicular to the flight lines at intervals of approximately 3 miles.

An Ashtech/Racal Real-Time Differential Global Positioning System (RT-DGPS) was used for base navigation and flight path recovery. The helicopter position was derived every 0.5 seconds using real-time differential positioning to a relative accuracy of better than 10 m. Flight path positions were projected onto the Clarke 1866 (UTM zone 8) spheroid, 1927 North American datum using a central meridian (CM) of 135° and a north constant of 0 and an east constant of 506,000 m. Positional accuracy of the presented data is better than 10 m with respect to the UTM grid.

KASABAN SURVEY "Area 2" - May 1992
The geophysical data are acquired with a DIGHEARS Electromagnetic (EM) system and a Scintrex cesium magnetometer. EM terrain clearance for the magnetometer and EM system is approximately 213 and 164 feet, respectively. In addition, the survey recorded data from a radar altimeter, UHF navigation system, 30/60 HZ monitors, VLF receiver and video camera. The northeast-southwest flight lines were flown one-eighth mile apart with the lines flown parallel to the survey boundaries. The survey was flown with an AS350B-1 helicopter.

A Del Norte UHF electronic positioning system was used for navigation. Flight path recovery was done with a combination of UHF data and visual recovery. Positional accuracy of the 1992 data should be considered as low relative to an error on the order of 100 to 200 m that was due to distortion of the positioning in the original 1992 data. The data were re-positioned in 1999 using a rubber sheet stretching technique to better match the topography and fit with the 1999 data.

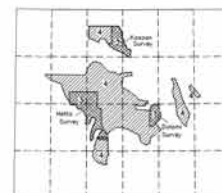
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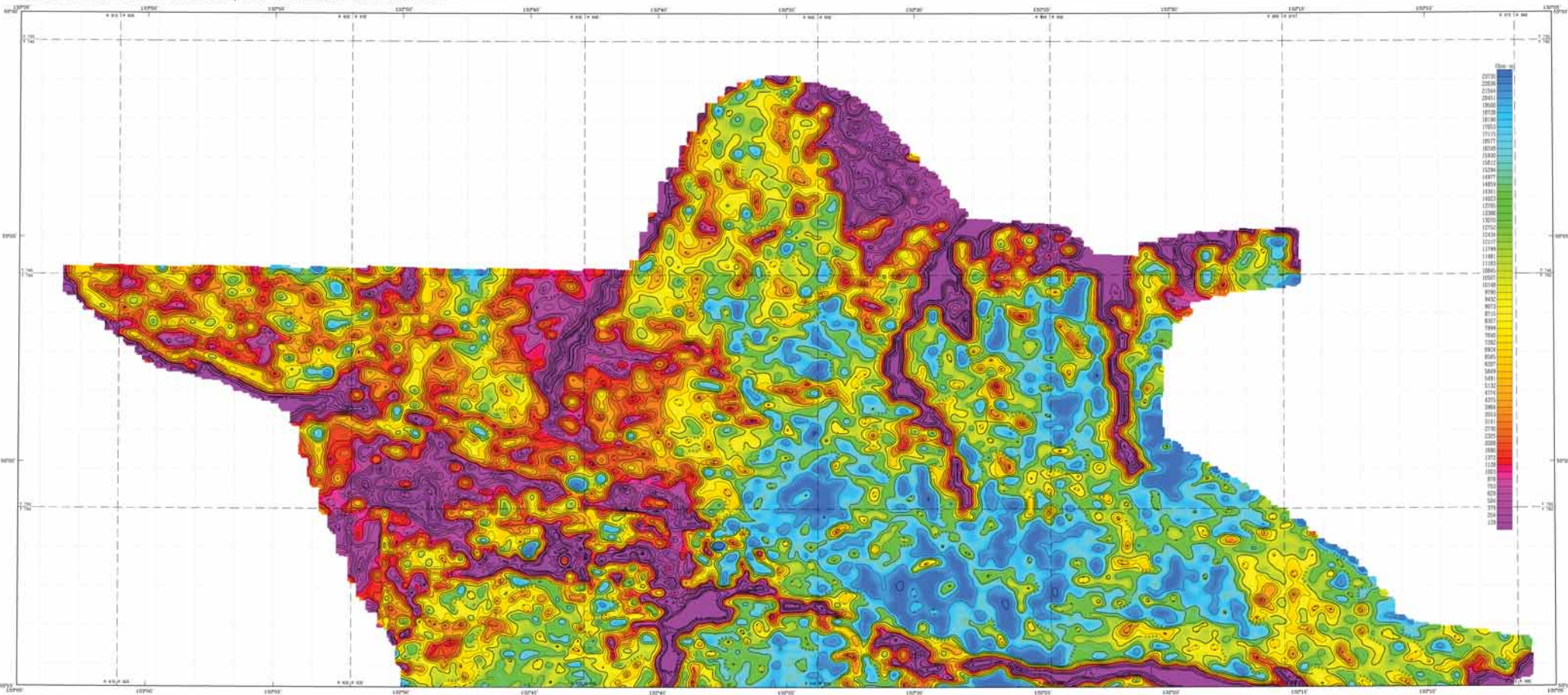
Contours in $\mu\text{km} \cdot \text{m}^{-1}$ at 10 intervals per decade

The DIGHEM[®] EM system measured inphase and quadrature components at five frequencies. Two vertical coaxial coil pairs operated at 900 and 5500 Hz while three horizontal coplanar-coil pairs operated at 900, 7200, and 56,000 Hz. EM data were compiled at 0.1 second intervals. The EM system responds to bedrock conductors, conductive overburden, and cultural sources. Apparent resistivity is generated from the inphase and quadrature component of the coplanar 56,000 Hz using the pseudo-layer half space model. The data were interpolated onto a regular 100 m grid using a modified Akima (1970) technique.

This map has been compiled and drawn under contract by the State of Alaska, Department of Natural Resources (DNR), Division of Geological & Geophysical Surveys (DGGG), and W&M Mining & Geological Consultants, Inc. Airborne geophysical data for area 4 were acquired in 1999 by Geotrex-Digheim, a division of CGG Canada Ltd. Funding for the project was provided by the Alaska Department of Natural Resources, Bureau of Land Management (BLM), Ketchikan Gateway Borough, Cogswell Corporation, Alaska State Mental Health Trust Land Office, and the cities of Thorne Bay and Coffman Cove. The data for areas 1, 2 and 3 were flown by Digheim in 1991 and 1992. These data were provided for publication

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, 99709. Some products are also available, in person only, at the BLM's Juneau Minerals Information Center, Mayflower Island, Douglas, AK.





DESCRIPTIVE NOTES

KETCHIKAN SURVEY "Area 4" - March 1999
The geophysical data were collected with a Doherty® system. Both were flown at a height of 100 feet. In addition, the survey recorded data from a radio altimeter (GPS navigation system, 50/40 Hz) and a dual channel GPS navigation system, 50/40 Hz. The data were collected at a mean terrain clearance of 200 feet along north-south flight lines one-quarter mile apart. The lines were flown perpendicular to the flight lines of interest at approximately 2 miles.

ALASKA SURVEY "Area 5" - May 1992
The geophysical data were collected with a Doherty® system. Both were flown at a height of 100 feet. In addition, the survey recorded data from a radio altimeter (GPS navigation system, 50/40 Hz) and a dual channel GPS navigation system, 50/40 Hz. The data were collected at a mean terrain clearance of 200 feet along north-south flight lines one-quarter mile apart. The lines were flown perpendicular to the flight lines of interest at approximately 2 miles.

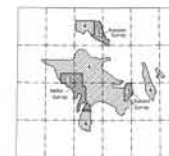
RESISTIVITY

The Doherty® system measured apparent resistivity and phase. The system was flown at a height of 100 feet. In addition, the survey recorded data from a radio altimeter (GPS navigation system, 50/40 Hz) and a dual channel GPS navigation system, 50/40 Hz. The data were collected at a mean terrain clearance of 200 feet along north-south flight lines one-quarter mile apart. The lines were flown perpendicular to the flight lines of interest at approximately 2 miles.

A dual channel GPS navigation system was used for navigation. Flight path recovery was done with a combination of GPS data and visual recovery. Positioning accuracy of the GPS data should be approximately 10 meters.

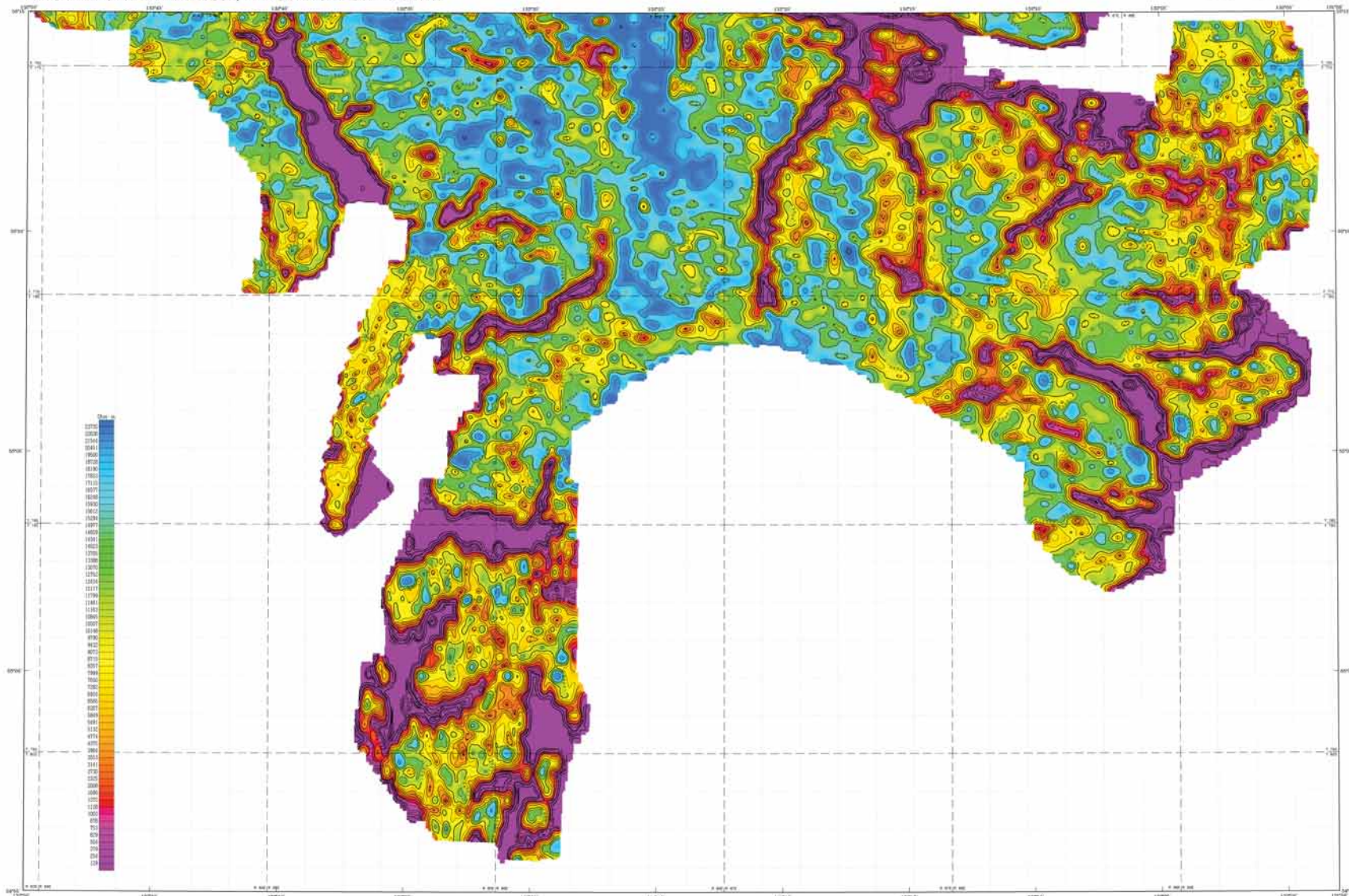


56,000 Hz COPLANAR RESISTIVITY OF SELECTED AREAS NEAR KETCHIKAN, SOUTHEAST ALASKA MAP B - SURVEYED AREA IMMEDIATELY NORTH OF 55°15', PRINCE OF WALES ISLAND 1999



SURVEY HISTORY

This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources (DNR), Division of Geological & Geophysical Survey (DGG), and Sealaska Corporation, Sealaska Corporation. Funding for the project was provided by the U.S. Department of the Interior, Bureau of Land Management (BLM), National Geologic Research and Development (NGRD), and the State of Alaska, Department of Natural Resources (DNR). The data for maps 1, 2 and 3 were flown by Doherty in 1991 and 1992. These data were provided for publication by Sealaska Corporation.



DESCRIPTIVE NOTES

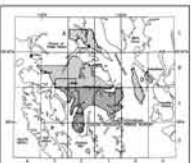
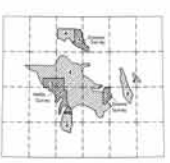
KETCHIKAN SURVEY "Area C" - March 1999
The geophysical data were collected with a DICKINSON (DICKINSON) EM system and a Sonnet (Sonnet) magnetometer. Both were flown at a height of 100 feet. In addition, the survey recorded data from a magnetic compass, GPS, and a digital altimeter. The data were collected in a series of flight lines that were spaced at 0.5 km intervals. The flight lines were oriented in a north-south direction. The data were collected in a series of flight lines that were spaced at 0.5 km intervals. The flight lines were oriented in a north-south direction. The data were collected in a series of flight lines that were spaced at 0.5 km intervals. The flight lines were oriented in a north-south direction.

SEALASKA SURVEY "Area C" - May 1995
The geophysical data were collected with a DICKINSON (DICKINSON) EM system and a Sonnet (Sonnet) magnetometer. Both were flown at a height of 100 feet. In addition, the survey recorded data from a magnetic compass, GPS, and a digital altimeter. The data were collected in a series of flight lines that were spaced at 0.5 km intervals. The flight lines were oriented in a north-south direction. The data were collected in a series of flight lines that were spaced at 0.5 km intervals. The flight lines were oriented in a north-south direction. The data were collected in a series of flight lines that were spaced at 0.5 km intervals. The flight lines were oriented in a north-south direction.

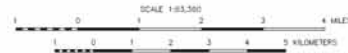


RESISTIVITY
The DICKINSON EM system measured resistivity and conductance. The data were collected in a series of flight lines that were spaced at 0.5 km intervals. The flight lines were oriented in a north-south direction. The data were collected in a series of flight lines that were spaced at 0.5 km intervals. The flight lines were oriented in a north-south direction. The data were collected in a series of flight lines that were spaced at 0.5 km intervals. The flight lines were oriented in a north-south direction.

56,000 Hz COPLANAR RESISTIVITY OF SELECTED AREAS NEAR KETCHIKAN, SOUTHEAST ALASKA MAP C - SURVEYED AREA SOUTH OF 55°15', PRINCE OF WALES ISLAND 1999



SURVEY HISTORY
This map has been compiled and drawn under contract to the State of Alaska, Department of Natural Resources (DNR), Division of Geological & Geophysical Survey (DGGS), and Sealaska Corporation. The map was compiled from data collected by the DNR, DGGS, and Sealaska Corporation. The map was compiled from data collected by the DNR, DGGS, and Sealaska Corporation. The map was compiled from data collected by the DNR, DGGS, and Sealaska Corporation.



MAP D - WESTERN and EASTERN PARTS, GRAVINA ISLAND
1999



This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources (DNR), Division of Geological & Geophysical Surveys (DGG), and TIGA Mining & Geological Consultants, Inc. Airborne geophysical data for the area were acquired in 1989 by Geotekne-Digham, a division of DGG. The data were processed by TIGA. The map was prepared by the U.S. Department of the Interior, Bureau of Land Management (BLM), Ketchikan Gateway Borough, Sealsk Corporation, Alaska State Mental Health Trust Land Office, and the cities of Thorne Bay and Coffman Cove.

This map and other products from this survey are available by mail, in person, or by e-mail. For more information, call 200, Foothill Road, Suite 200, Fairbanks, Alaska 99709. Some products are also available, in person only, at the BLM's Junction Minerals Information Center, Unalaska Island, Douglas, Alaska.

DESCRIPTIVE NOTES

The geophysical data were acquired with a GDIEM™ Electromagnetic (EM) system and a Schöner system. The EM system was mounted on the back of the helicopter. In addition the survey recorded data from a radar altimeter, GPS navigation system, 50/60 Hz interference filter, and a 1000 Hz low-pass filter. The survey was flown on an AS350B-2 Super Puma helicopter at a mean terrain clearance of 100 feet along east-west flight lines. The flight lines were perpendicular to the flight lines at intervals of approximately 3 miles.

An Airtech/Roscol real-time Differential Global Positioning System (DGPS) was used for navigation and flight path recovery. The helicopter position was derived every 0.5 seconds using real-time DGPS. The DGPS accuracy was better than 10 m. Flight path positions were projected onto a map of the study area using the National American datum using a central meridian (CM) of 129° 00' 00" and a constant of 0 and an east constant of 500,000 meters. The map projection was better than 10 m with respect to the UTM grid.

RESISTIVITY

The DICHM[®] EM system measured aphase and quadrature components at five frequencies. Two vertical coeviol-coil pairs operated at 100 and 5500 Hz while three horizontal coeviol-coil pairs operated at 100, 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 aphase and quadrature component of the coeviol 56,000 Hz using the pseudo-layer half space model. The data are interpreted using a second 100 m grid using a modified Aikino (1970) technique.

Aikino, H. 1970. A new method of interpretation and smooth curve fitting based on the principle of the maximum likelihood. *Journal of Computing Machinery*, v. 17, no. 4, p. 588-602.



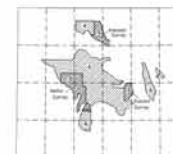
[illegible]

The geophones were secured with a DGE-EM Electromagnetic (EM) system and a Scorpio seismic magnetometer. Magnaflux observance for the magnetometer and EM system were approximately 215 and 168 feet, respectively. In addition the survey recorded data from a water leveler, and a magnetic system, 507-mg/m², 50 m/sec, 50 Hz, 50 m/sec, and 50 m/sec. The water leveler was placed along the line of flow and eight mile apart with the other three perpendicular to the line flow. The survey was flown with an AS-350B-2 helicopter.

A Del Norte-IMF electronic positioning system was used for navigation. Flight path recovery was done with a combination of IMF data and visual recovery. Fuel flow accuracy at the 1002 data should be considered of low reliability.

The *SIGMA*™ E6 system measured high-end and quadrature components at five frequencies. Two methodical constant coil pairs operated at 900 and 5500 Hz while three 18,000-Hz coil pairs operated at 18,000, 7200, and 5600 Hz. The E6 system was designed at 0.1 percent tolerance. The E6 system resulted in reduced production variation (variance) and cultural sources. Apparent resolution is presented from the method and quadrature component of the 18,000-Hz coil using the pseudo-layer half space model. The data were interpreted into a regular 100-

using a modified Aarns (1970) technique.



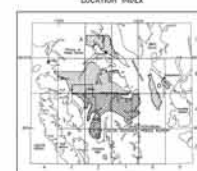
The map has been compiled and drawn under contract between the State of Alaska and the Department of Fish and Resources (DHR), Division of Geological and Geophysical Surveys (DGG), and AGU, through a Geological Canada Project (GCP) grant. The project was initiated in 1979 by Geoscience Canada, a division of G. Canada Ltd. Funding for the project was provided by the U.S. Geological Survey, Department of the Interior, Alaska Division, and the Alaska Department of Fish and Resources (DHR), Fairbanks Gateway Borough, Geoscience Corporation, Alaska Health Research Health Trust, U.S. Geological Survey, and the Alaska Department of Fish and Resources. The map was compiled and drawn by G. Canada Ltd. and AGU, under the supervision of G. Canada Ltd. and AGU, in 1981 and 1982. These data were provided for publication by Geoscience Corporation.

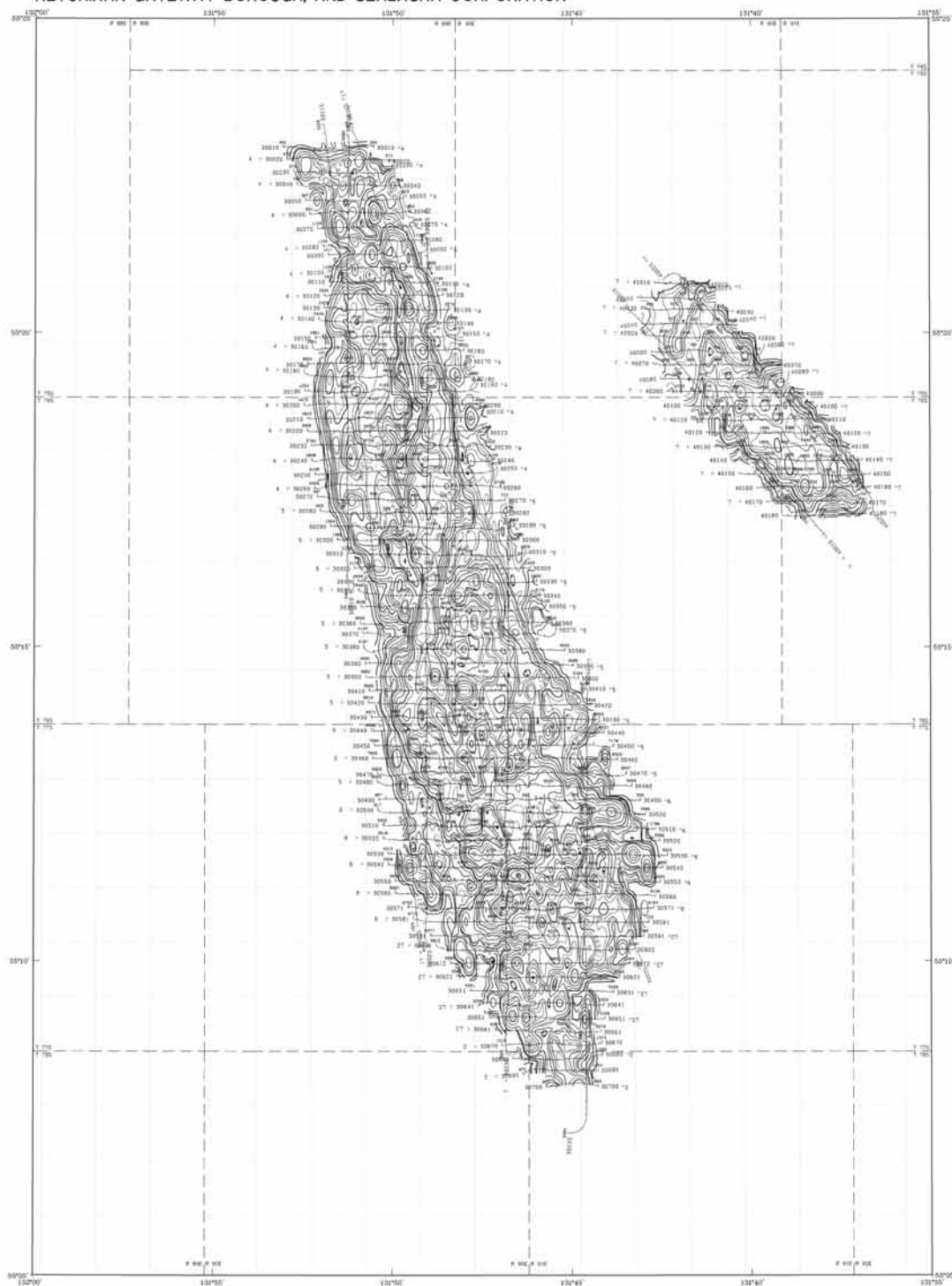
[illegible]

The DODM[®] Di system demands higher and consistent components of five frequencies. Two vector coding can also operated in 300 and 5000 Hz when three components operated can also operated in 300, 1200, and 5000 Hz. 50 data are sampled at 5.1 second intervals. The Di system requires to include conductors, conductive overburden, and cultural sources. Apparent resistivity is generated from the signal and groundwater component of the system 5000 Hz using the pseudo-impedance approach. The data are interpreted using a regular 100 m grid using a modified Slonk (1970) technique.

Wong, W. (1977), a case study of information and research work being based on total procedures: journal of the association of computing machines, v. 17, no. 4, p. 589-612.

Figure 1: A horizontal bar chart showing the distribution of the number of species (n) for different values of the parameter k . The x-axis is labeled n and ranges from 1 to 10. The y-axis is labeled k and ranges from 1 to 10. The bars represent the number of species for each k value. The distribution is highly skewed, with the highest number of species occurring at $k=1$ ($n=10$) and decreasing rapidly as k increases. The total number of species is 10.

[illegible]



Section outline from U.S. Geological Survey Folio 100, 1:50,000, 1946.
8-1, 100, 1:50,000, 1946. Geologic map.



DESCRIPTIVE NOTES

The geophysical data were acquired with a Dighem[®] Electromagnetic (EM) system and a Schlumberger magnetometer. Both were flown at a height of 100 feet. In addition the survey recorded data from a radar altimeter, GPS navigation system, 50/60 Hz miniaturized video camera. Flights were performed with an AS350B-2, Squirrel helicopter at a mean terrain clearance of 200 feet along east-west flight lines, one-quarter mile apart. The lines were flown perpendicular to the flight lines at intervals of approximately 3 miles.

An Ashtech/Real-Time Differential Global Positioning System (RT-DGPS) was used for both navigation and flight path recovery. The helicopter position was derived every 0.5 seconds using real-time differential positioning to a relative accuracy of better than 10 m. Flight path positions were projected onto the Clarke 1886 (UTM zone 9) spheroid, 1927 North American datum using a central meridian (CM) of 120°, a north constant of 0 and a west constant of 300,000. Positional accuracy of the presented data is better than 10 m with respect to the UTM grid.

RESISTIVITY

The Dighem[®] EM system measured apparent resistivity components at five frequencies. Two vertical, coplanar, coil pairs operated at 100 and 1500 Hz while three horizontal, induction-coil pairs operated at 100, 1000, and 50,000 Hz. EM data were sampled at 0.1 second intervals. The EM system responds to bedrock conductance, conductive overburden, and cultural structures. Apparent resistivity is generated from the in-phase and quadrature component of the coplanar 56,000 Hz using the pseudo-layer least squares model. The data were interpolated onto a regular 100 m grid using a modified spline (1970) technique.

Section 10, 1970: A new method of interpolation and smooth curve fitting based on local procedures. Journal of the Association of Computing Machinery, 17, no. 4, p. 589-592.

56,000 Hz COPLANAR RESISTIVITY OF SELECTED AREAS NEAR KETCHIKAN, SOUTHEAST ALASKA MAP D - WESTERN and EASTERN PARTS, GRAVINA ISLAND 1999

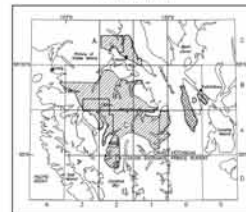
RESISTIVITY CONTOURS



Contours in ohm-m at 10 intervals per decade



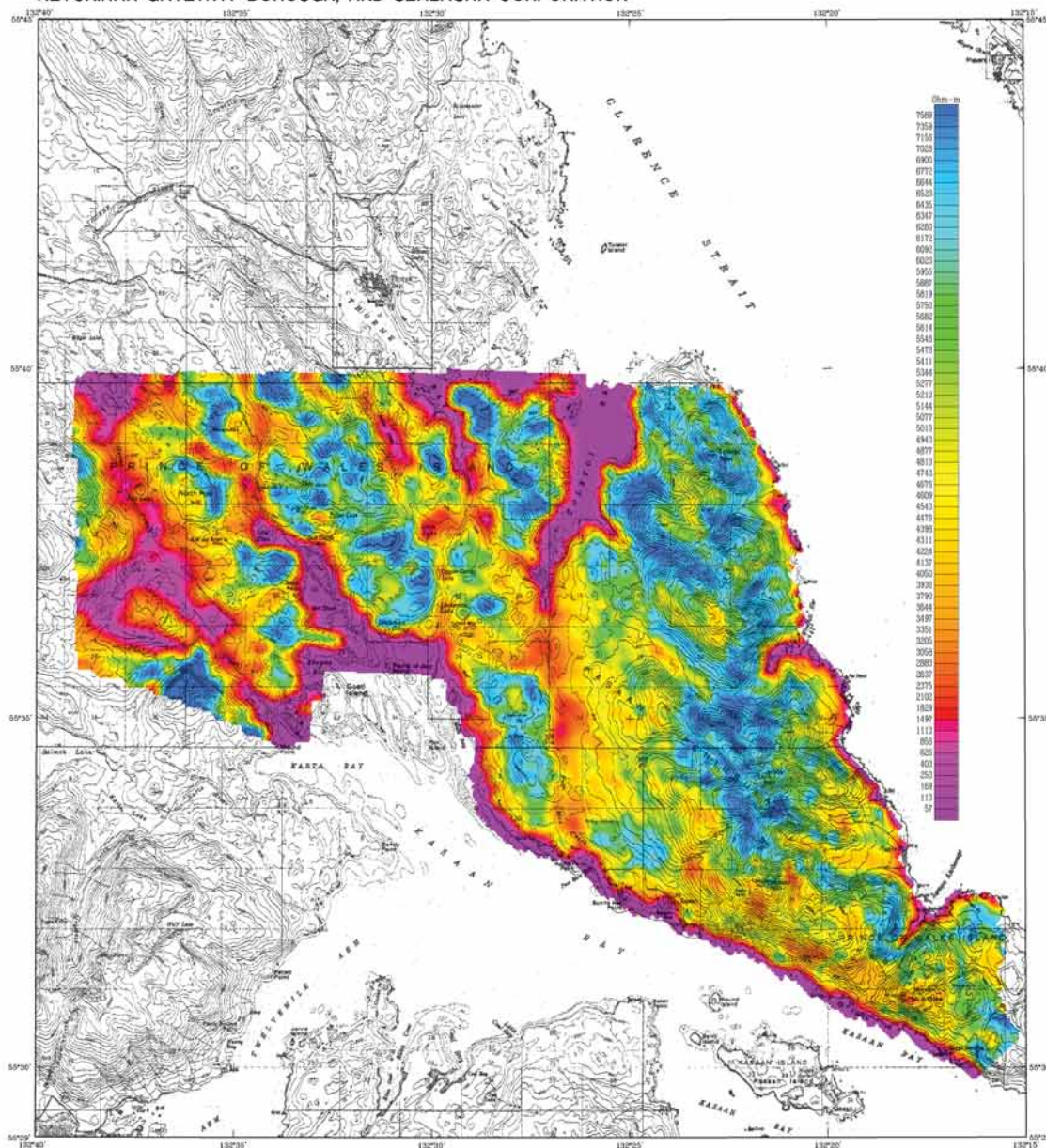
LOCATION INDEX



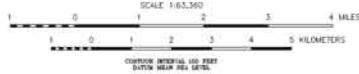
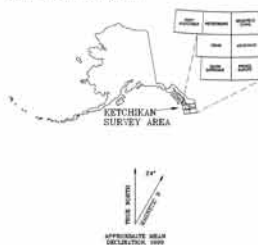
SURVEY HISTORY

This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources (DNR), Division of Geological & Geophysical Surveys (DGGG), and NOAA Mining & Geological Consultants, Inc. (Alaska geophysical data for the area were acquired in 1999 by Geotek/Seismics, a division of CGG Canada Ltd. Funding for the project was provided by the U.S. Department of the Interior, Bureau of Land Management (BLM), Ketchikan Gateway Borough, Sealaska Corporation, Alaska State Health Trust, Land Office, and the cities of Homer Bay and Coffman Cove.

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, 99709. Some products are also available, in graphic form, at the BLM's Cummins Minerals Information Center, Mayflower Island, Douglas, AK.



Base Map: U.S. Geological Survey Chart 8-1, 1949, 8-2, 1949,
7-1, 1961, 7-2, 1961 Quadrangle, Alaska



7200 Hz COPLANAR RESISTIVITY OF SELECTED AREAS NEAR KETCHIKAN, SOUTHEAST ALASKA MAP A - SALT CHUCK AND KASAAN PENINSULA, PRINCE OF WALES ISLAND 1999

DESCRIPTIVE NOTES

KETCHIKAN SURVEY "Area 1" - March 1999
The geophysical data were acquired with a DIGHEM[®] Electromagnetic (EM) system and a Sointrex cesium magnetometer. Both were flown at a height of 100 feet. In addition the survey recorded data from a radar altimeter, GPS navigation system, 30/60 Hz monitors and video camera. Flights were performed with an AS350B-2 helicopter at a mean terrain clearance of 200 feet along north-south flight lines one-quarter mile apart. The lines were flown perpendicular to the flight lines at intervals of approximately 5 miles.

An Ashtech/Racal Real-Time Differential Global Positioning System (RT-DGPS) was used for both navigation and flight path recovery. The helicopter position was derived every 0.5 seconds using real-time differential positioning to a relative accuracy of better than 10 m. Flight path positions were projected onto the Clarke 1866 UTM zone 6) spheroid, 1927 North American datum using a central meridian (CM) of 135°, 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.

KASAAN SURVEY "Area 2" - May 1992
The geophysical data were acquired with a DIGHEM[®] Electromagnetic (EM) system and a Sointrex cesium magnetometer. Mean terrain clearance for the magnetometer and EM system were approximately 215 and 164 feet, respectively. In addition the survey recorded data from a radar altimeter, UHF navigation system, 30/60 Hz monitors, VLF receiver and video camera. The north-south-southwest flight lines were flown one-eighth mile apart with the lines flown parallel to the survey boundaries. The survey was flown with an AS350B-1 helicopter.

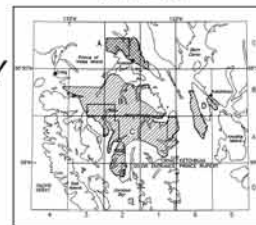
A Del Norte UHF electronic positioning system was used for navigation. Flight path recovery was done with a combination of UHF data and visual recovery. Positional accuracy of the 1992 data should be considered as less reliable. An error on the Craig C-2 topographic map sheet caused distortion of the positioning in the original 1992 data. The data were re-positioned in 1999 using a rubber sheet stretching technique to better match the topography and fit with the 1999 data.

RESISTIVITY

The DIGHEM[®] EM system measured in-phase and quadrature components at five frequencies. Two vertical coplanar-coil pairs operated at 900 and 5500 Hz while three horizontal coplanar-coil pairs operated at 900, 7200, and 36,000 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 in-phase and quadrature components of the coplanar 7200 Hz using the pseudo-layer half space model. The data were interpolated onto a regular 100 m grid using a modified Akima (1970) technique.

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

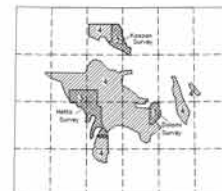
LOCATION INDEX

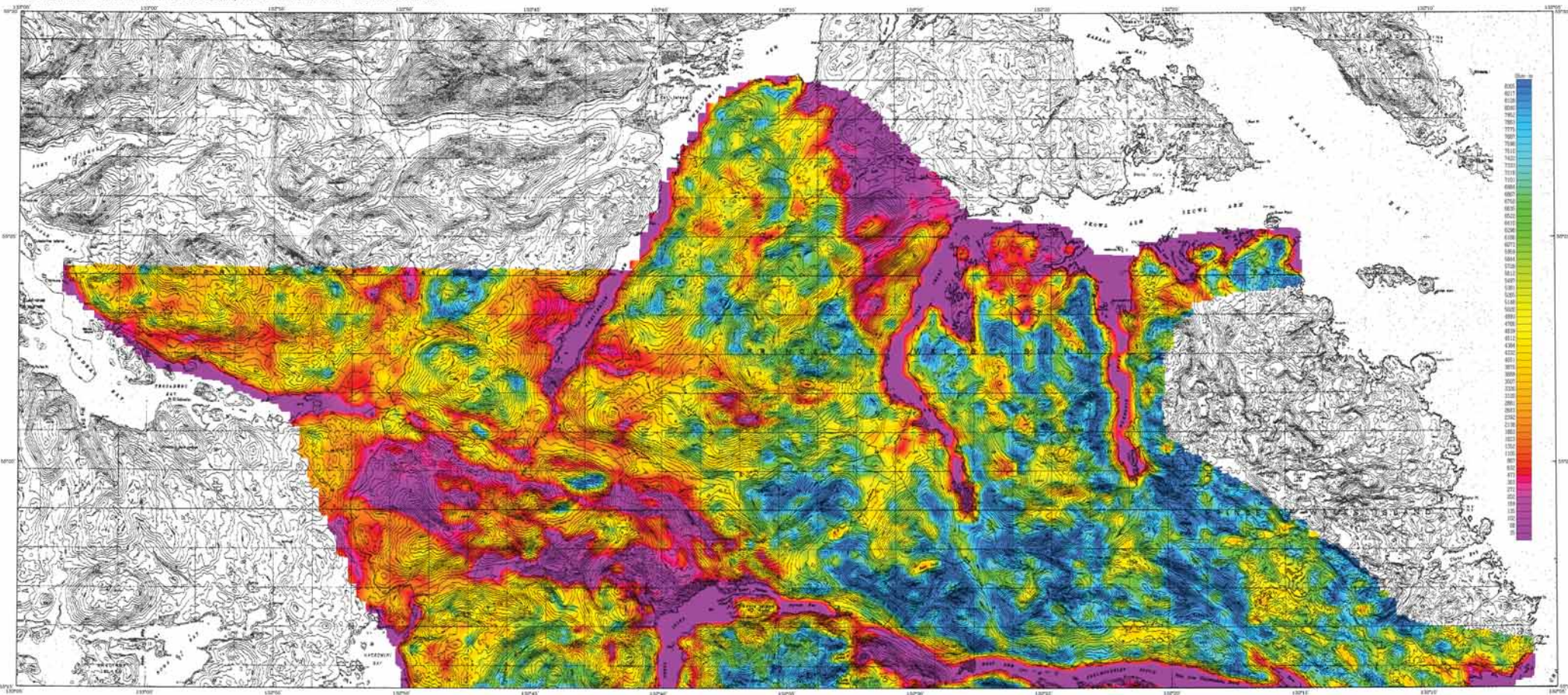


SURVEY HISTORY

This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources (DNR), Division of Geological & Geophysical Surveys (DGGG), and W&M Mining & Geological Consultants, Inc. Some geophysical data for areas 1 and 2 were acquired in 1999 by Geotrex-DigheM, a division of DGG Canada Ltd. Funding for the project was provided by the U.S. Department of the Interior, Bureau of Land Management (BLM), Ketchikan Gateway Borough, Sealaska Corporation, Alaska State Mental Health Trust Land Office, and the cities of Thorne Bay and Coffman Cove. The data for areas 1, 2 and 3 were flown by DigheM in 1991 and 1992. These data were provided for publication by Sealaska Corporation.

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, 99709. Some products are also available, in person only, at the BLM's Juneau Minerals Information Center, Mayflower Island, Douglas, AK.





DESCRIPTIVE NOTES

7200 Hz COPLANAR RESISTIVITY - May 4 - May 1999
The geophysical data were collected with a Doherty® 7200 Hz COPLANAR RESISTIVITY SYSTEM. The system consists of a transmitter and receiver coils, a receiver, and a computer. The transmitter and receiver coils are connected to a receiver, which is connected to a computer. The computer records the data and processes it into a resistivity map. The data were collected in a grid pattern, with the grid cells being 100 m by 100 m. The data were collected in a grid pattern, with the grid cells being 100 m by 100 m. The data were collected in a grid pattern, with the grid cells being 100 m by 100 m.

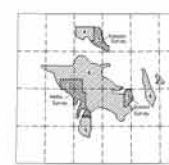
7200 Hz COPLANAR RESISTIVITY - May 1999
The geophysical data were collected with a Doherty® 7200 Hz COPLANAR RESISTIVITY SYSTEM. The system consists of a transmitter and receiver coils, a receiver, and a computer. The transmitter and receiver coils are connected to a receiver, which is connected to a computer. The computer records the data and processes it into a resistivity map. The data were collected in a grid pattern, with the grid cells being 100 m by 100 m. The data were collected in a grid pattern, with the grid cells being 100 m by 100 m. The data were collected in a grid pattern, with the grid cells being 100 m by 100 m.

7200 Hz COPLANAR RESISTIVITY - May 1999
The geophysical data were collected with a Doherty® 7200 Hz COPLANAR RESISTIVITY SYSTEM. The system consists of a transmitter and receiver coils, a receiver, and a computer. The transmitter and receiver coils are connected to a receiver, which is connected to a computer. The computer records the data and processes it into a resistivity map. The data were collected in a grid pattern, with the grid cells being 100 m by 100 m. The data were collected in a grid pattern, with the grid cells being 100 m by 100 m. The data were collected in a grid pattern, with the grid cells being 100 m by 100 m.

7200 Hz COPLANAR RESISTIVITY - May 1999
The geophysical data were collected with a Doherty® 7200 Hz COPLANAR RESISTIVITY SYSTEM. The system consists of a transmitter and receiver coils, a receiver, and a computer. The transmitter and receiver coils are connected to a receiver, which is connected to a computer. The computer records the data and processes it into a resistivity map. The data were collected in a grid pattern, with the grid cells being 100 m by 100 m. The data were collected in a grid pattern, with the grid cells being 100 m by 100 m. The data were collected in a grid pattern, with the grid cells being 100 m by 100 m.

RESISTIVITY
The Doherty® 7200 Hz system measures apparent resistivity and quadrature components of the magnetic field. The system consists of a transmitter and receiver coils, a receiver, and a computer. The transmitter and receiver coils are connected to a receiver, which is connected to a computer. The computer records the data and processes it into a resistivity map. The data were collected in a grid pattern, with the grid cells being 100 m by 100 m. The data were collected in a grid pattern, with the grid cells being 100 m by 100 m. The data were collected in a grid pattern, with the grid cells being 100 m by 100 m.

7200 Hz COPLANAR RESISTIVITY OF SELECTED AREAS NEAR KETCHIKAN, SOUTHEAST ALASKA MAP B - SURVEYED AREA IMMEDIATELY NORTH OF 55°15', PRINCE OF WALES ISLAND 1999



SURVEY HISTORY
This map has been compiled and shown under contract between the State of Alaska, Department of Natural Resources (DNR), Division of Geological & Geophysical Survey (DGG), and NOAA, Office of Coastal Survey, Alaska Division. The data were collected by the DGG, Alaska Division, in 1999. The data were collected in a grid pattern, with the grid cells being 100 m by 100 m. The data were collected in a grid pattern, with the grid cells being 100 m by 100 m. The data were collected in a grid pattern, with the grid cells being 100 m by 100 m.

[illegible][illegible]

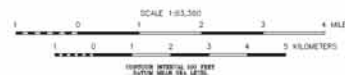
RESISTIVITY

The DORIM™ EM system measured in-phase and quadrature components of five frequencies. Two vertical induction coils, each 10 cm in diameter, were operated at 500 and 5000 Hz. The two horizontal induction coils, each 10 cm in diameter, were operated at 200, 400, 800, and 1600 Hz. EM data were sampled at 0.1 second intervals. The EM system responds to bedrock conductivities, conductive overburden, and cultural structures. Apparent resistivity is calculated from the frequency components of the induced voltage in the capacitor 7200 M Ω using the pseudo-resistivity model equation. The only units interpreted into a regular 100 m grid using a modified Loke (1970) technique.



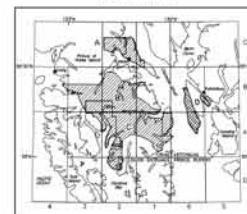
This map has been corrected and drawn under contract by the U.S. Geological Survey, Department of Natural Resources (DNR), Division of Geological & Geophysical Surveys (2002), and RMC Wang & Geological Consultants, Inc. (2002). The map was prepared by the DNR in 1998 by R. G. Gierke & D. Gierke, in addition to CGO Consultants Ltd. Funding for the project was provided by the U.S. Geological Survey, Department of Natural Resources (DNR), Kirkland Geology Branch, Incubator Corporation, Alaska State Master Water Trust fund (2002). The map was prepared by the DNR in 1998. The data for years 1, 2 and 3 were from D. Gierke in 1998 and 1999. These data were provided for publication by Incubator Corporation.

The map was altered slightly from the original and is available by mail order or to parent, from CGO, 734 University Ave., Suite 205, Fairbanks, Alaska, 99708. Some products are available on CD-ROM. For more information, contact the Alaska Information Center, Mail Stop 2000, Sitka, Alaska 99801.



MAP D - WESTERN and EASTERN PARTS, GRAVINA ISLAND

LOCATION INDEX



DESCRIPTIVE NOTES

The geophysical data were acquired with a SIGEM® Electromagnetic Induction (EMI) Solid-state sodium magnetometer. Both were flown at a height of 100 feet in addition the survey recorded data from a digital video camera. Flights were performed with an AC308-22 Squirrel helicopter at a mean terrain elevation of 1000 feet. The flight lines were spaced one-quarter mile apart. The lines were flown perpendicular to the flight lines at intervals of 1000 feet.

The GIGHEM[®] EM system measured inphase and quadrature components at five frequencies. Two vertical coaxial coils operated at 900 and 5500 Hz while three horizontal coils operated at 900, 1000, 1200, and 56,000 Hz. EM data were sampled at 0.1 second intervals. The EM system responds to bedrock conductors, conductive overburden, and cultural sources. Apparent resistivity is generated from the inphase and quadrature component of the coplanar 7200 Hz using the pseudo-layer half space model. The data were interpolated onto a regular 100 m

same, in 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.

This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources (DNR), and the U.S. Geological Survey (USGS). USGS, and NGM Mining & Geological Consultants, Inc. Airborne geophysical data for the area were acquired in 1999 by Geotermex-Digheem, a division of OGG Canada Ltd. Funding for the project was provided by the U.S. Department of Energy, Bureau of Land Management (BLM), Ketchikan Gateway Borough, Sitka, Alaska Corporation, Alaska State Mental Health Trust Land Office, and the cities of Thorne Bay and Coffman Cove.

This map and other products from this survey are available by mail order, or in person, from GOGS, 794 University Ave., Suite 200, Fairbanks, Alaska, 99709. Some products are available on the Internet at <http://www.gogsonline.com>. The U.S. Geological Survey, Mineral Information Center, 98708, Island, Douglas, AK.



MAP A - SALT CHUCK AND KASAAN
PENINSULA, PRINCE OF WALES ISLAND

KETCHIKAN SURVEY "Area 4" - March 1999
The geophysical data were acquired with a DIGHEAL[®] Electromagnetic (EM) system and a Sinterix cesium magnetometer. Both are flown at a height of 100 meters. In addition, we recorded data from a real-time radar altimeter, GPS navigation system, 50/60 Hz monitors and video camera. Flights were performed with an AC350B-2 Squirrel helicopter at a mean terrain clearance of 200 feet along north-south flight lines one-quarter mile apart. The lines were flown perpendicular to the flight lines at intervals of approximately 3 miles.

An Ashtech/Racal Real-Time Differential Global Positioning System (RT-DGPS) was used for both navigation and flight path recovery. The helicopter position was derived every 0.5 seconds using real-time differential positioning to a relative accuracy of better than 10 m. Flight path positions were projected onto the Clarke 1866 (UTM zone 8) spheroid, 1927 North American datum using a central meridian (CM) of 130°W and a scale factor of 0.999 617 3. The horizontal position accuracy of the presented data is better than 10 m with respect to the UTM grid.

KASABAN SURVEY "Area 2" - May 1992
The geophysical data were acquired with a DigiEarth[®] Electromagnetic (EM) system and a Counter Design[®] magnetometer. The terrain clearance for the magnetometer and EM system were approximately 213 and 164 feet, respectively. In addition the survey recorded data from a radar altimeter, UHF navigation system, 50/60 Hz monitors, VLF receiver and video camera. The northeast-southwest flight lines were flown one-eighth mile apart with the lines flown parallel to the survey boundaries. The survey was flown with an AS350B-1 helicopter.

A Del Norte UHF electronic positioning system was used for navigation. Flight path recovery was done with a combination of UHF data and visual recovery. Positional accuracy of the 1992 data should be considered as low relative to an error on the order of 100 to 200 m that was due to distortion of the positioning in the original 1992 data. The data were re-positioned in 1999 using a rubber sheet stretching technique to better match the topography and fit with the 1999 data.

A vertical number line with tick marks and labels from 100 to 1000 in increments of 100.

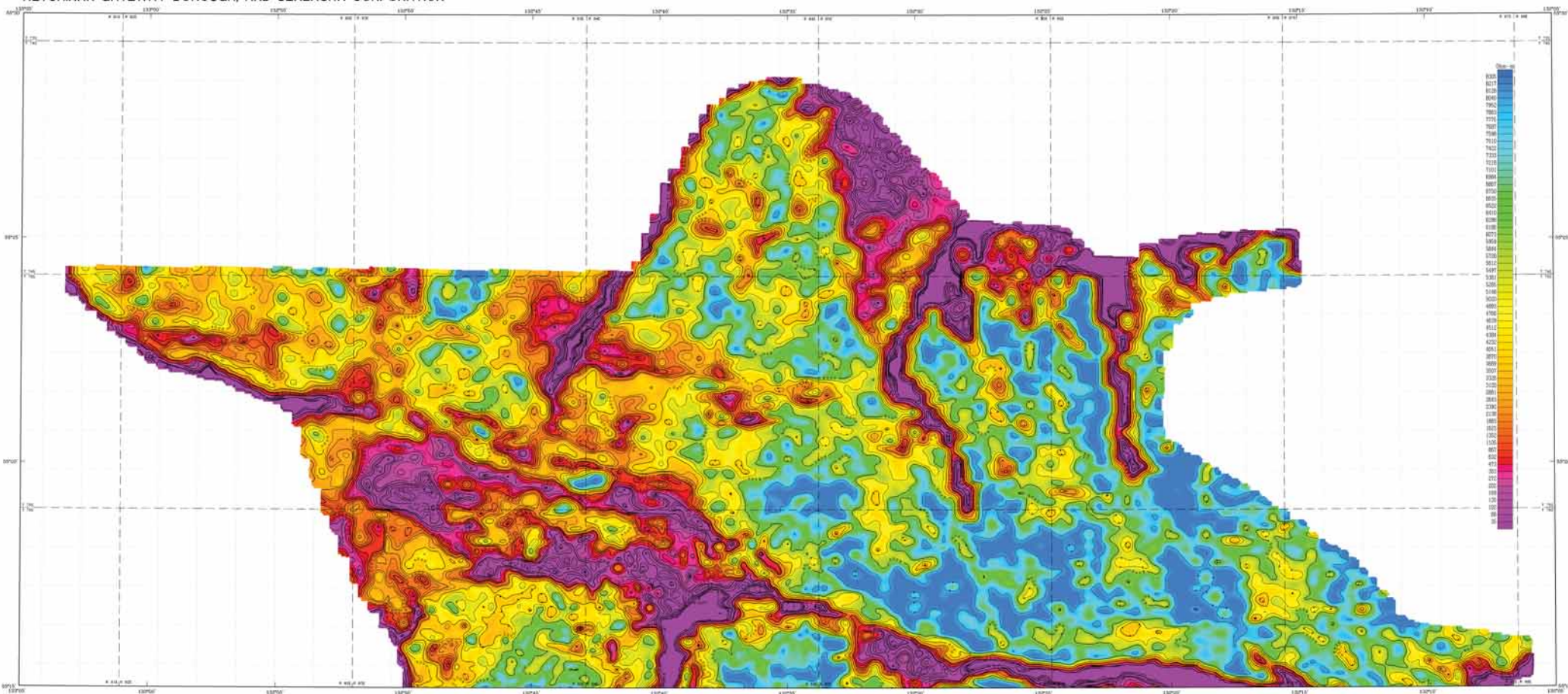
Configure la `gsm+rs` ad 10 intervalli per decodifica.

The DIGHEM[®] EM system measured inphase and quadrature components at five frequencies. Two vertical coaxial coil pairs operated at 900 and 5500 Hz while three horizontal coplanar-coil pairs operated at 900, 7200, and 56,000 Hz. EM data were compiled at 0.1 second intervals. The EM system responds to bedrock conductors, conductive overburden, and cultural sources. Apparent resistivity is generated from the inphase and quadrature component of the coplanar 7200 Hz using the pseudo-layer half space model. The data were interpolated onto a regular 100 m grid using a modified Akima (1970) technique.

This map has been compiled and drawn under contract between the State of Alaska Department of Natural Resources (DNR), Division of Geological & Geophysical Surveys (DGGG), and WGA Mining & Geological Consultants, Inc. Airborne geophysical data for area 4 were acquired in 1998 by Geoteknes-Digheim, a division of CGG Canada Ltd. Funding for this project was provided by the U.S. Department of the Interior, Bureau of Land Management (BLM), Ketchikan Gateway Borough, Sealskwa Corporation, Alaska State Mental Health Trust Land Office, and the cities of Thorne Bay and Coffman Cove. The data for areas 1, 2 and 3 were flown by Digheim in 1991 and 1992. These data were provided for publication by the BLM.

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, 99709. Some products are also available, in person only, at the BLM's Juneau Minerals Information Center, Mayflower Island, Douglas, AK.





SCALE 1:63,500
0 1 2 3 4 5 6 7 8 9 10
KILOMETERS

DESCRIPTIVE NOTES

KETCHIKAN SURVEY "Two 4" - March 1999
The geophysical data were collected with a DIGHV[®] system consisting of a DIGHV[®] system and a DIGHV[®] system. Both were flown at a height of 100 feet, in addition the survey recorded data from a radio altimeter, GPS navigation system, DG/NO² and a real-time kinematic (RTK) receiver. Flights were performed with an AS350B-2 Super helicopter at a mean terrain clearance of 250 feet above north-south flight lines one-quarter mile apart. The lines were flown perpendicular to the flight lines at intervals of approximately 5 miles.

KETCHIKAN SURVEY "Two 5" - May 1992
The geophysical data were collected with a DIGHV[®] system consisting of a DIGHV[®] system and a DIGHV[®] system. Both were flown at a height of 100 feet, in addition the survey recorded data from a radio altimeter, GPS navigation system, DG/NO² and a real-time kinematic (RTK) receiver. Flights were performed with an AS350B-2 Super helicopter at a mean terrain clearance of 250 feet above north-south flight lines one-quarter mile apart. The lines were flown perpendicular to the flight lines at intervals of approximately 5 miles.

A 3d North-South electrical resistivity system was used for navigation. Flight path recovery was done with a combination of GPS data and visual recovery. Processing accuracy of the 1999 data should be approximately 10%.

RESISTIVITY

The DIGHV[®] system measured apparent resistivity components of the subsurface. The apparent resistivity was calculated from the measured data and the DIGHV[®] system. The apparent resistivity was calculated from the measured data and the DIGHV[®] system. The apparent resistivity was calculated from the measured data and the DIGHV[®] system.

RESISTIVITY
The apparent resistivity was calculated from the measured data and the DIGHV[®] system. The apparent resistivity was calculated from the measured data and the DIGHV[®] system. The apparent resistivity was calculated from the measured data and the DIGHV[®] system.

RESISTIVITY CONTOURS



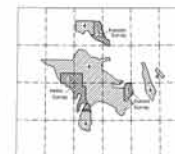
Contours in ohms at 10 intervals per decade

Legend for resistivity contours showing values from 100 to 1000 ohm-meters.

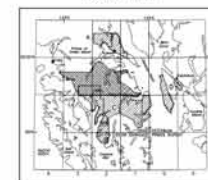
7200 Hz COPLANAR RESISTIVITY OF SELECTED AREAS NEAR KETCHIKAN, SOUTHEAST ALASKA MAP B - SURVEYED AREA IMMEDIATELY NORTH OF 55°15', PRINCE OF WALES ISLAND 1999



APPARENT RESISTIVITY



LOCATION INDEX



SURVEY HISTORY

This map has been compiled and shown under contract between the State of Alaska, Department of Natural Resources (DNR), Division of Geological & Geophysical Survey (DGG), and Sealaska Corporation, a division of Sealaska. Funding for the project was provided by the DNR, Department of Natural Resources, Bureau of Land Management (BLM), Division of Geological & Geophysical Survey (DGG), and Sealaska Corporation. The data for maps 1, 2, and 3 were flown by DGG in 1999 and 2000. These data were provided for publication by Sealaska Corporation.



KEYWORD: *Survey '92 - March 1992*

The geophysical data were acquired with a BENTLEY 4000 system, which consists of a 4000 microcomputer, a 4000 data logger, and a 4000 data acquisition unit. Both were housed in a 19" rack of 100 lbs. In addition the survey recorded data from a radio receiver, GPS navigation system, 50/50 air monitors and also cameras. Flight was performed using a Cessna 441, which is a twin-engine, four-seat, low-wing aircraft. The flight was conducted at an altitude of 1000 feet along north-south flight lines for the northern portion and east-west flight lines for the southern portion over-quarter mile apart. The lines were flown perpendicular to the flight lines of intervals of approximately 3 miles.

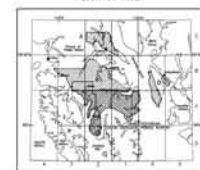
On the right side in minutes or approximately 1 hour. In contrast, Phase Real-Time Differential Global Positioning System (RT-DGPS) was used for both navigation and flight path recovery. The helicopter position was obtained every 0.5 seconds using real-time differential positioning. In a statistical accuracy of better than 10 m, flight path positions were projected onto the Corke 1989 (JFM 2004) jet, laminar, 1927 North American airfoil using a chord division (CD) of 135. A north constant of 0.1 and an east constant of 500,000 m. Precision accuracy of the presenters BGL is better than 10 m with respect to the ITR axis.

[illegible][illegible]

Scale: 1:100,000



Quadrato di lato 10. In ogni vertice è inscritto un quarto di cerchio di raggio 5. Qual è l'area della regione ombreggiata?

[illegible]



RESISTIVITY

The DIGHEM[®] EM system measured inphase and quadrature components at five frequencies. Two vertical coaxial coil pairs operated at 100 and 5500 Hz while three horizontal coils operated at 100, 1000, and 5500 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 calculated from the inphase component of the EM signal. The coplanar 7200 Hz using the pseudo-layer half space model. The data were interpolated onto a regular 100 m grid using a modified Akima (1970) technique.

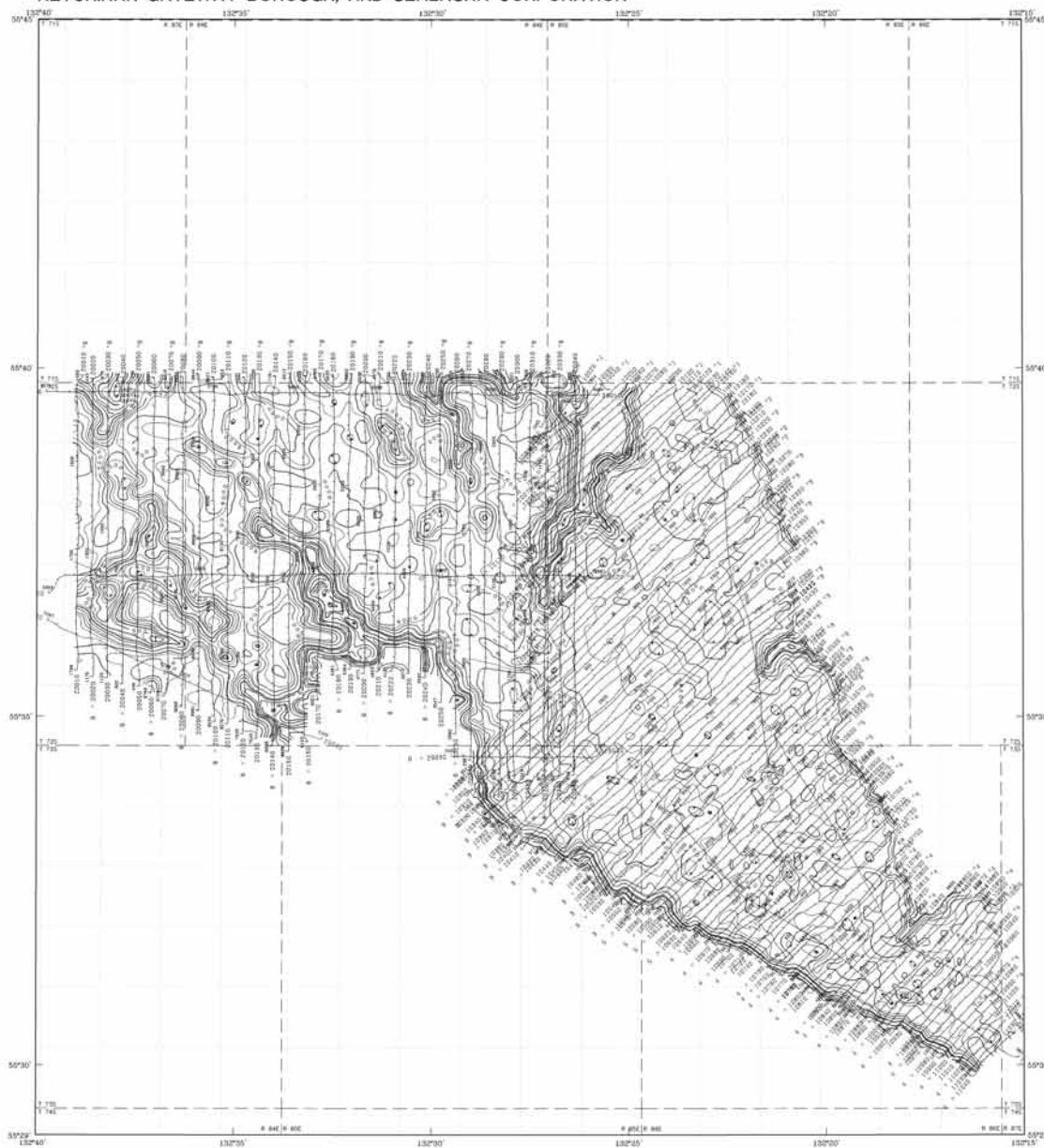
AKIMA, H. 1970: A new method of interpolation and smooth curve fitting based on local procedures. *Journal of the Association of Computing Machinery*, 21: 961-971.



RESISTIVITY CONTOURS



This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources, Division of Geological and Geophysical Surveys (DGGGS), and NGMA Mining & Geological Consultants, Inc. Airborne geophysical data for the area were acquired in 1999 by Geotekma-Digheem, a division of CGG Canada Ltd. Funding for the project was provided by the U.S. Department of the Interior, Bureau of Land Management (BLM), Katikatchuk Gateway Borough, Sealaska Corporation, Alaska State Mental Health Trust Land Office, and the cities of Thorne Bay and Coffman Cove. This map and other products from this survey are available by mail order, or in person, from DGGGS, 794 University Ave., Seward, Alaska 99782. The map is also available on-line, also available, in person only, at the BLM's Junior Minerals Information Center, McPherson Island, Douglas, Alaska.



Section outline from U.S. Geological Survey Crags 9-1, 1449, 9-5, 1448, 9-1, 1449, 9-5, 1448



KETCHIKAN SURVEY AREA



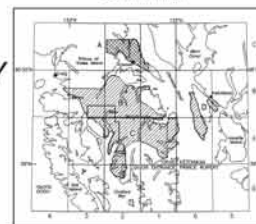
APPROXIMATE SURVEY BOUNDARIES

SCALE 1:63,360
0 1 2 3 4 MILES
0 1 2 3 4 KILOMETERS

7200 Hz COPLANAR RESISTIVITY OF SELECTED AREAS NEAR KETCHIKAN, SOUTHEAST ALASKA

MAP A - SALT CHUCK AND KASAAN
PENINSULA, PRINCE OF WALES ISLAND
1999

LOCATION INDEX



DESCRIPTIVE NOTES

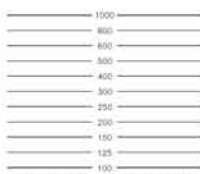
KETCHIKAN SURVEY "Area 4" - March 1999
The geophysical data were acquired with a DIGHEM[®] Electromagnetic (EM) system and a Sintered cesium magnetometer. Data were flown at a height of 100 feet. In addition the survey recorded data from a radar altimeter, GPS navigation system, 40/60 Hz monitors and video camera. Flights were performed with an AS550B-2 Squirrel helicopter at a mean terrain clearance of 250 feet along north-south flight lines one-quarter mile apart. The lines were flown perpendicular to the flight lines at intervals of approximately 3 miles.

An Ashtech/Racal Real-Time Differential Global Positioning System (RT-DGPS) was used for both navigation and flight path recovery. The helicopter position was derived every 0.5 seconds using real-time differential positioning to a relative accuracy of better than 10 m. Flight path positions were projected onto the Clarke 1866 (NAD 83) zone 6 spheroid, 1927 North American datum using a central meridian (CM) of 135°, 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.

KASAAN SURVEY "Area 2" - May 1992
The geophysical data were acquired with a DIGHEM[®] Electromagnetic (EM) system and a Sintered cesium magnetometer. Main terrain clearance for the magnetometer and EM system were approximately 215 and 104 feet, respectively. In addition the survey recorded data from a radar altimeter, UHF navigation system, 40/60 Hz monitors, UHF receiver and video camera. The northeast-southwest flight lines were flown one-eighth mile apart with tie lines flown parallel to the survey boundaries. The survey was flown with an AS550B-1 helicopter.

A Del Norte UHF electronic positioning system was used for navigation. Flight path recovery was done with a combination of UHF data and visual recovery. Positional accuracy of the 1992 data should be comparable to the 1999 data. In error on the Crags C-2 topographic map sheet caused distortion of the positioning in the original 1992 data. The data were re-positioned in 1999 using a rubber sheet stretching technique to better match the topography and fit with the 1999 data.

RESISTIVITY CONTOURS



Contour in ohm-m at 10 intervals per decade

..... resistivity line

RESISTIVITY

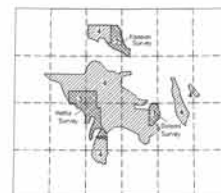
The DIGHEM[®] EM system measured in-phase and quadrature components at five frequencies. Two vertical coaxial-coil pairs operated at 300 and 5500 Hz while three horizontal coplanar-coil pairs operated at 900, 7200, and 36,000 Hz. EM data were sampled at 0.1 second intervals. The EM system responds to bedrock conductors, conductive overburden, and cultural sources. Apparent resistivity is generated from the in-phase and quadrature responses of the coplanar 7200 Hz using the pseudo-layer half space model. The data were interpolated onto a regular 100 m grid using a modified Akima (1970) technique.

Moore, R. 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.

SURVEY HISTORY

This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources (DNR), Division of Geological & Geophysical Surveys (DGG), and RGM Mining & Geological Consultants, Inc. Geophysical data for areas 4 were acquired in 1999 by Geotek-DigheM, a division of CGG Canada Ltd. Funding for the project was provided by the U.S. Department of the Interior, Bureau of Land Management (BLM), Ketchikan Gateway Borough, Sealaska Corporation, Alaska State Mental Health Trust Land Office, and the cities of Thorne Bay and Coffman Cove. The data for areas 1, 2 and 3 were flown by DigheM in 1991 and 1992. These data were provided for publication by Sealaska Corporation.

This map and other products from this survey are available by mail order, or in person, from DGG, 784 University Ave., Suite 200, Fairbanks, Alaska, 99709. Some products are also available, in person only, at the BLM's Juneau Minerals Information Center, Mayflower Island, Douglas, AK.





CELESTIAL GUIDANCE 4th - March 1979
The geophysical data were acquired with a GEOMAG Electromagnetic (EM) system and a Sundin omnibearing antenna. The EM system was used to map the feed. In addition the survey recorded data from a resistivity array, GPS geodetic system, DGPS, a laser altimeter, and a laser range finder. The altimeter was an AS2000-2 Squared helicopter (a mean terrain clearance of 250 feet along a 1000-foot flight line) which was flown in a series of parallel tracks. The altimeter was flown perpendicular to the flight line at intervals of approximately 2 miles.

An Ashbach/Rosco Laser-Time Differential Global Positioning System (LTDGPS) was used for data collection and flight path recovery. The helicopter position was derived every 0.5 seconds using real-time processing. The LTDGPS system was accurate better than 10 m. Flight path locations were plotted using the Cesium 3-D graphics package. LTDGPS accuracy was determined by a survey line at 130° using a north control of 0 and an east control of 100,000. The LTDGPS was accurate to 10 m or better than 10 m on each respect to the UTM grid.

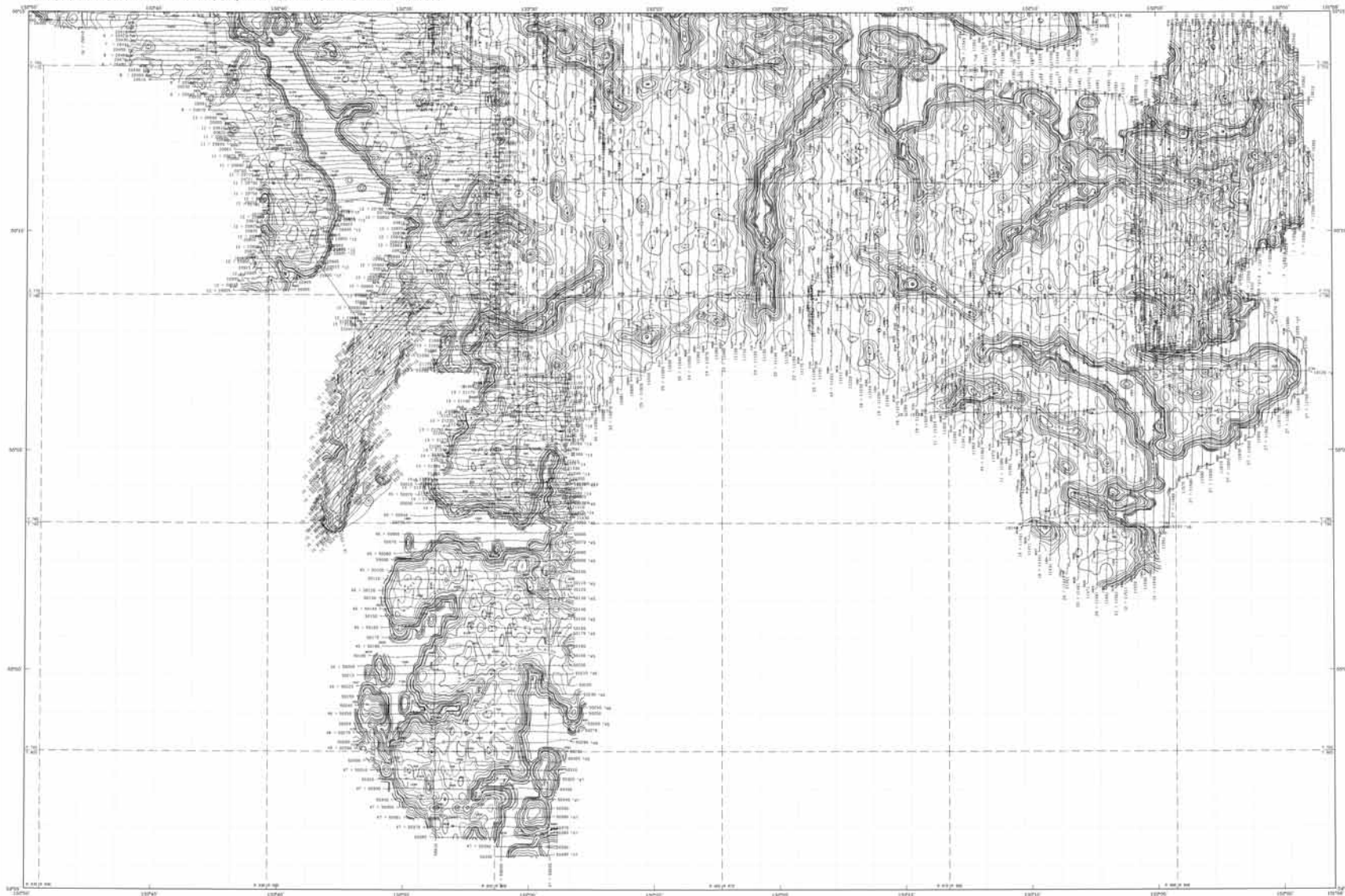
The geophysical data were acquired with a Geophysical Electromagnetic (EM) system and a Scripps Ocean Magnetometer. Each instrument is designed for the magnetometer and EM system were approximately 215 and 164 feet, respectively. In addition the survey extended 400 feet from a radio shoreward. EM acquisition system, 50,000 Hz magnetic VLF receiver and identifier. The west-most-most right line was approximately 100 feet from the shore. The line from perpendicular to the right line. The survey was flown with an L2550B-1 helicopter.

The ZONEM™ EM system measures surface and subsurface components of five frequencies. Two vertical-coil pairs operated at 900 and 2000 KHz while three horizontal-coil pairs are operated at 800, 1200, and 1600 KHz. The system is designed to detect conductive structures such as buried pipes, cables, and other buried objects. The EM system responds to conductive structures, including buried pipes, cables, and other buried objects. The system is designed to detect conductive structures such as buried pipes, cables, and other buried objects. The system is designed to detect conductive structures such as buried pipes, cables, and other buried objects.

being based on first principles. *Journal of the Association of Chemical Engineers*, 17, no. 4, p. 322-332.



This map was then corrected and drawn under contract with the State of Alaska, Department of Natural Resources (DNR), Division of Geological and Geophysical Science (DGG), and NOAA Mining and Geological Consulting Service (MGC). The map was prepared by DGG in 1989 by Geophysics-Diphen, a division of O Canada Ltd. Funding for this project was provided by the DGG, the DNR, the MGC, the Alaska Department of Management (ADM), Kaktavik Gateway Borough, Seacore Corporation, Alaska State Intertribal Health Trust, Laxco, Inc., the Chukotka Regional Health Center, and the ADM. It is based on 1:250,000 scale maps of the Barrow area by sheets 1, 2, and 3, and sheets 1, 2, and 3 of the Barrow area by sheets 1, 2, and 3, and sheets 1, 2, and 3 of the Barrow area by sheets 1, 2, and 3. These data were provided for publication by Seacore Corporation.



DESCRIPTIVE NOTES

KETCHIKAN SURVEY "Area A" - March 1999
The geophysical party was equipped with a DHDENT (Differential Hydrographic Data Entry) system and a Seismic record magnetometer. Both were flown at a height of 100 feet. In addition, the survey required data from a magnetic compass, GPS, and a digital level. The survey was conducted in the Ketchikan Gateway Borough and Sealaska Corporation. The survey was conducted in the Ketchikan Gateway Borough and Sealaska Corporation. The survey was conducted in the Ketchikan Gateway Borough and Sealaska Corporation.

SEALASKA SURVEY "Area B" - May 1999
The geophysical party was equipped with a DHDENT (Differential Hydrographic Data Entry) system and a Seismic record magnetometer. Both were flown at a height of 100 feet. In addition, the survey required data from a magnetic compass, GPS, and a digital level. The survey was conducted in the Ketchikan Gateway Borough and Sealaska Corporation. The survey was conducted in the Ketchikan Gateway Borough and Sealaska Corporation. The survey was conducted in the Ketchikan Gateway Borough and Sealaska Corporation.



RESISTIVITY

The DHDENT (Differential Hydrographic Data Entry) system was used to collect resistivity data. The data was collected in the Ketchikan Gateway Borough and Sealaska Corporation. The data was collected in the Ketchikan Gateway Borough and Sealaska Corporation. The data was collected in the Ketchikan Gateway Borough and Sealaska Corporation.

7200 Hz COPLANAR RESISTIVITY OF SELECTED AREAS NEAR KETCHIKAN, SOUTHEAST ALASKA MAP C - SURVEYED AREA SOUTH OF 55°15', PRINCE OF WALES ISLAND 1999



RESISTIVITY CONTOURS

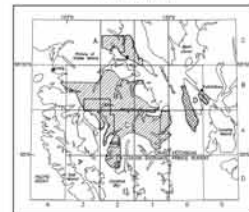


SURVEY HISTORY

This map has been compiled and drawn under contract between the State of Alaska Department of Natural Resources (DNR), Division of Geology & Geophysics (DGG), and the Sealaska Corporation. The map was compiled and drawn under contract between the State of Alaska Department of Natural Resources (DNR), Division of Geology & Geophysics (DGG), and the Sealaska Corporation. The map was compiled and drawn under contract between the State of Alaska Department of Natural Resources (DNR), Division of Geology & Geophysics (DGG), and the Sealaska Corporation.



LOCATION INDEX



The geophysical data were acquired with a DGPS/EM system and a Scripps cesium magnetometer. Both were flown at a height of 100 m and a speed of 10 m/s. The DGPS system was a real-time differential GPS navigation system, 50/60 Hz numbers and video camera. The flights were performed with a 100 m wide track at a 100 m cross-track clearance of 200 feet along east-west flight lines one-quarter mile apart. The lines were flown perpendicular to the flight lines at intervals of approximately 10 minutes.

An Inertial/Global Real-Time Differential Global Positioning System (RT-DGPS) was used for both navigation and flight path recovery. The helicopter position was known to 0.5 meter accuracy. The real-time differential positioning had a relative accuracy of better than 10 m. Flight path positions were projected onto the Curie 1850 (JFM zone 9) sphereid, 1927 North datum, with a north constant of 0 and an east constant of 500,000. Positional accuracy of the projected dots is better than

The CIGHEM[®] EM system measured inphase and quadrature components at five frequencies. Two vertical coaxial coil pairs operated at 800 and 5500 Hz while three horizontal coplanar-coil pairs operated at 900, 7200, and 56,000 Hz. EM data were sampled at 0.1 second intervals. The EM system responds to bedrock conductors, conductive overburden, and cultural sources. Apparent resistivity is generated from the inphase and quadrature component of the coplanar 7200 Hz using the pseudo-layer half space model. The data were interpolated onto a regular 100 m grid using a modified Akima (1970) technique.

A vertical number line with tick marks and labels from 100 to 1000 in increments of 100.

Contours in olive-iv 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 (DNR), Division of Geological & Geophysical Surveys (DGG), and NOAA Mining & Geological Constraints Unit. Alabama geophysical data for the area were acquired in 1959 by Gesteren-Digham, a division of CGC, Federal Geological Survey, which is now part of the U.S. Department of the Interior, Bureau of Land Management (BLM), Ketchikan Gateway Borough, Seatech Corporation. Alaska State Mental Health Trust Land Office, and the cities of Thorne Bay and Coffman Cove.

ALASKA DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS
IN COOPERATION WITH BUREAU OF LAND MANAGEMENT,
KETCHIKAN GATEWAY BOROUGH, AND SEALASKA CORPORATION

GEOPHYSICAL REPORT 1999-17A
Map A - Salt Chuck and Kasaan
Peninsula, Prince of Wales Island

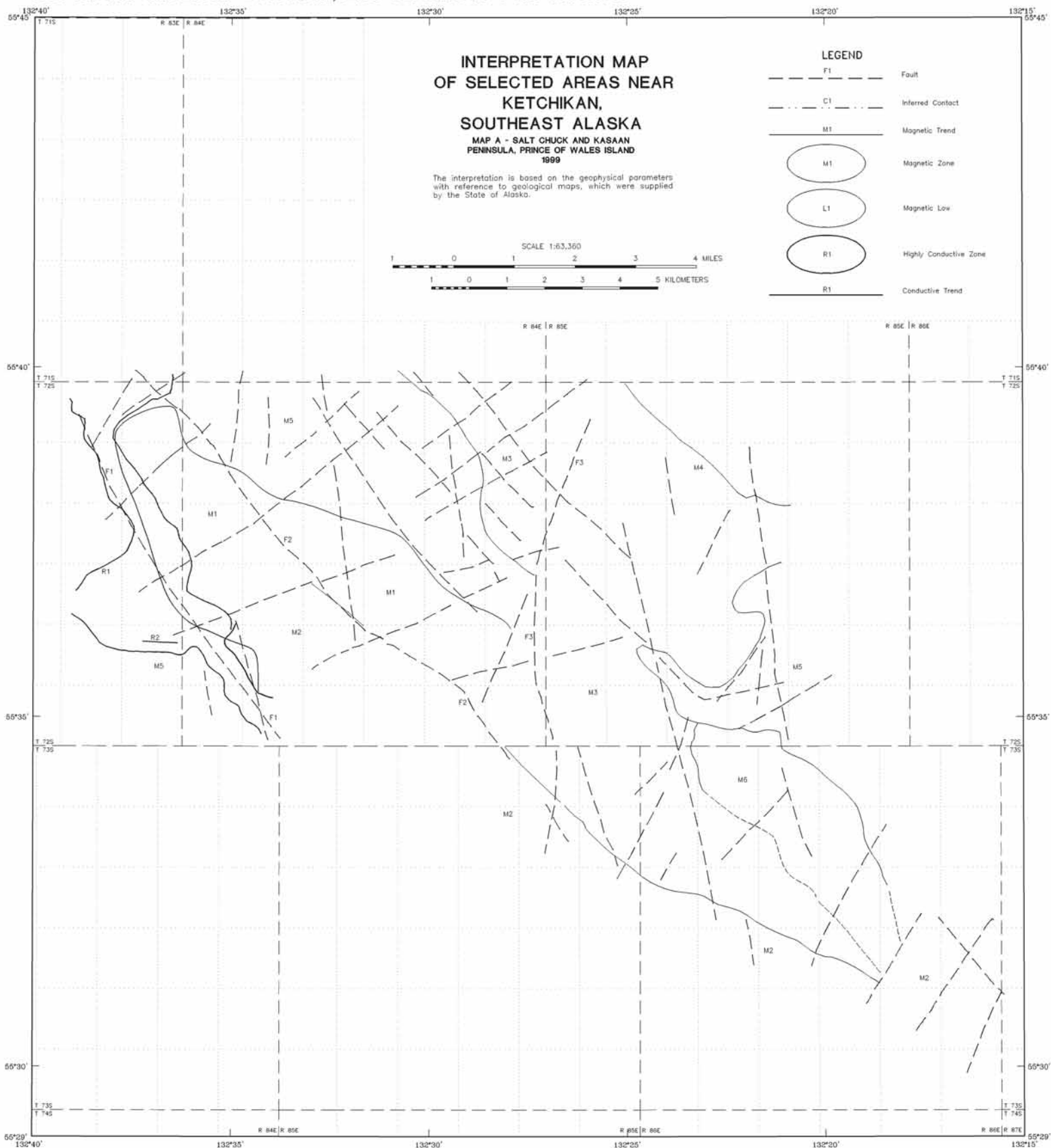
INTERPRETATION MAP
OF SELECTED AREAS NEAR
KETCHIKAN,
SOUTHEAST ALASKA

MAP A - SALT CHUCK AND KASAAN
PENINSULA, PRINCE OF WALES ISLAND
1999

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

LEGEND

	F1	Fault
	C1	Inferred Contact
	M1	Magnetic Trend
	M1	Magnetic Zone
	L1	Magnetic Low
	R1	Highly Conductive Zone
	R1	Conductive Trend

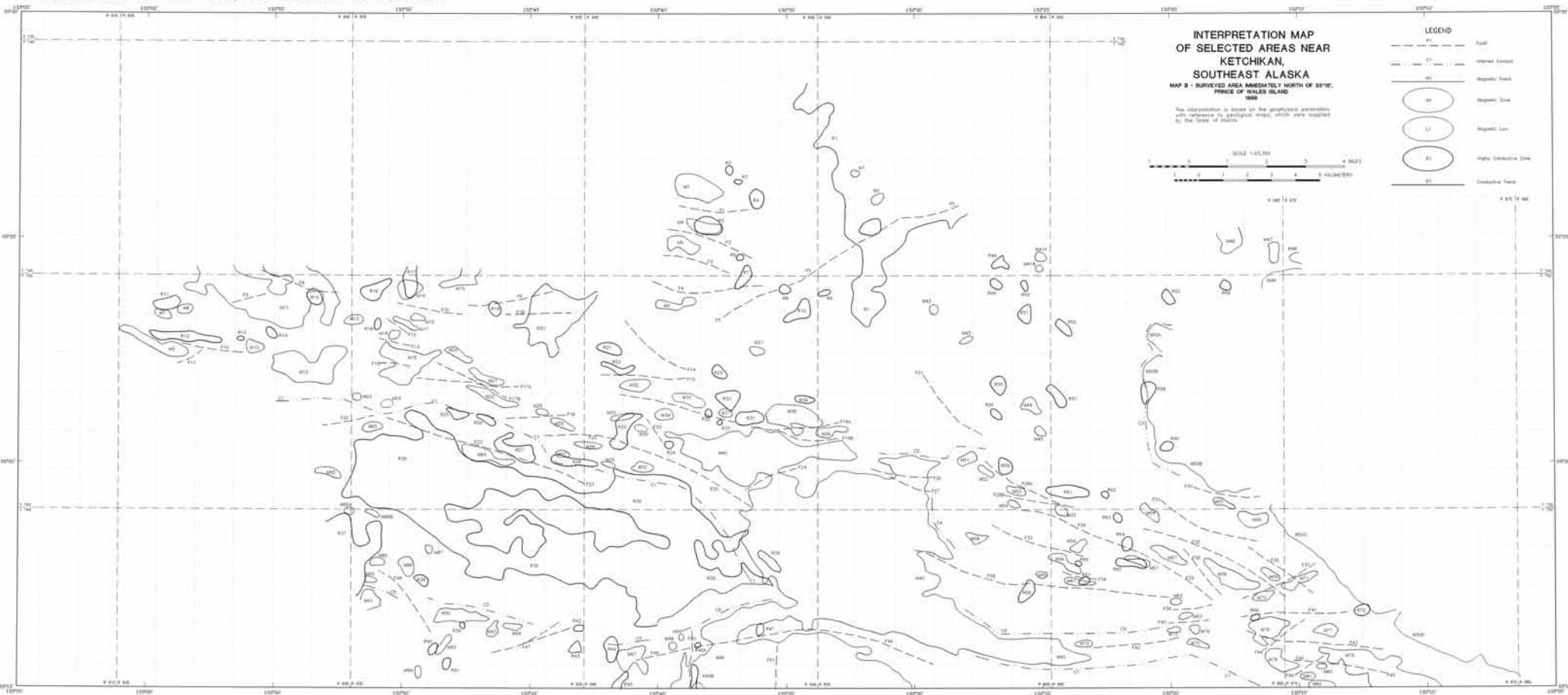


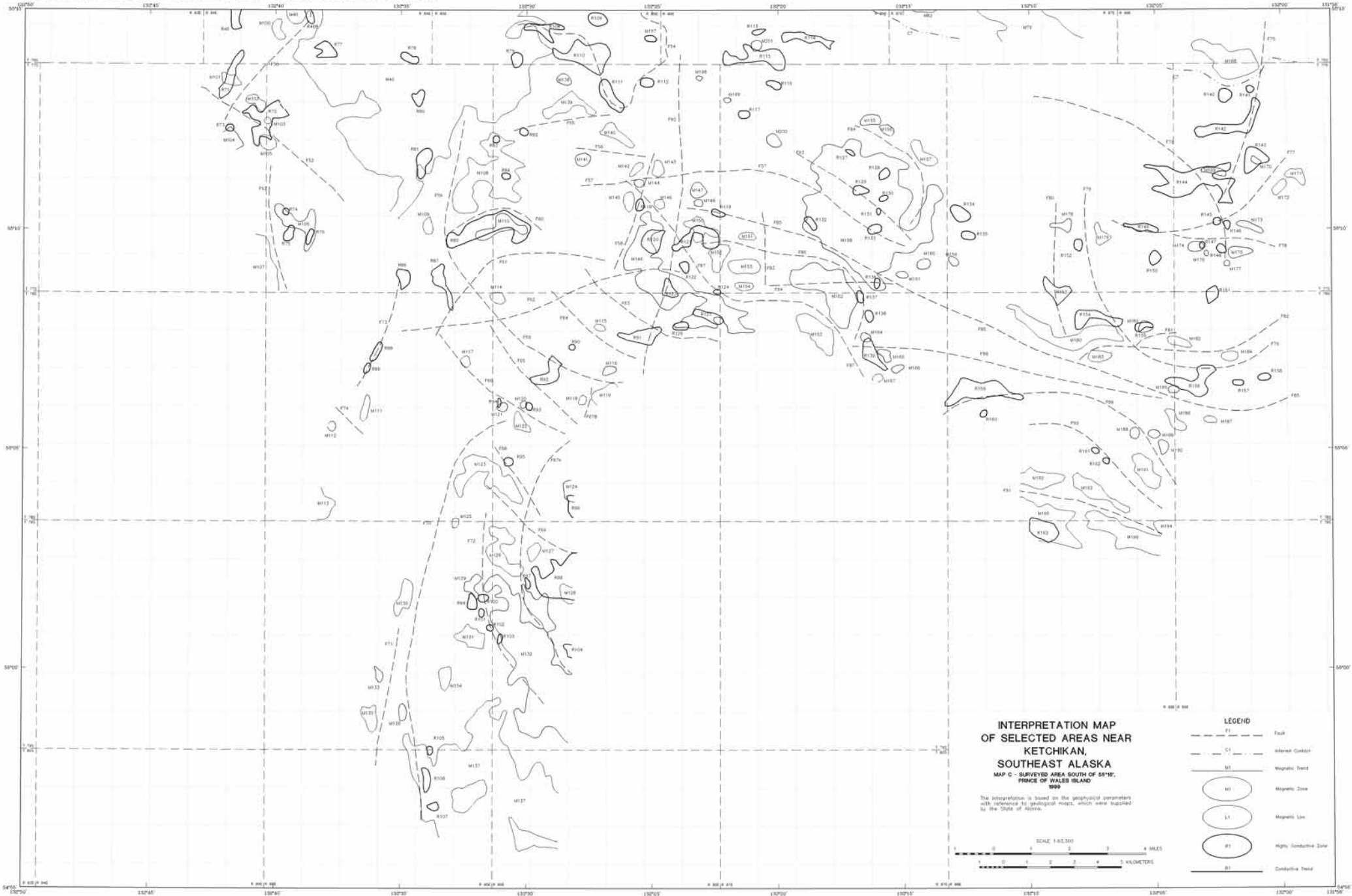
INTERPRETATION MAP
OF SELECTED AREAS NEAR
KETCHIKAN,
SOUTHEAST ALASKA
MAP B - SURVEYED AREA IMMEDIATELY NORTH OF 55°15',
PRINCE OF WALES ISLAND
1999

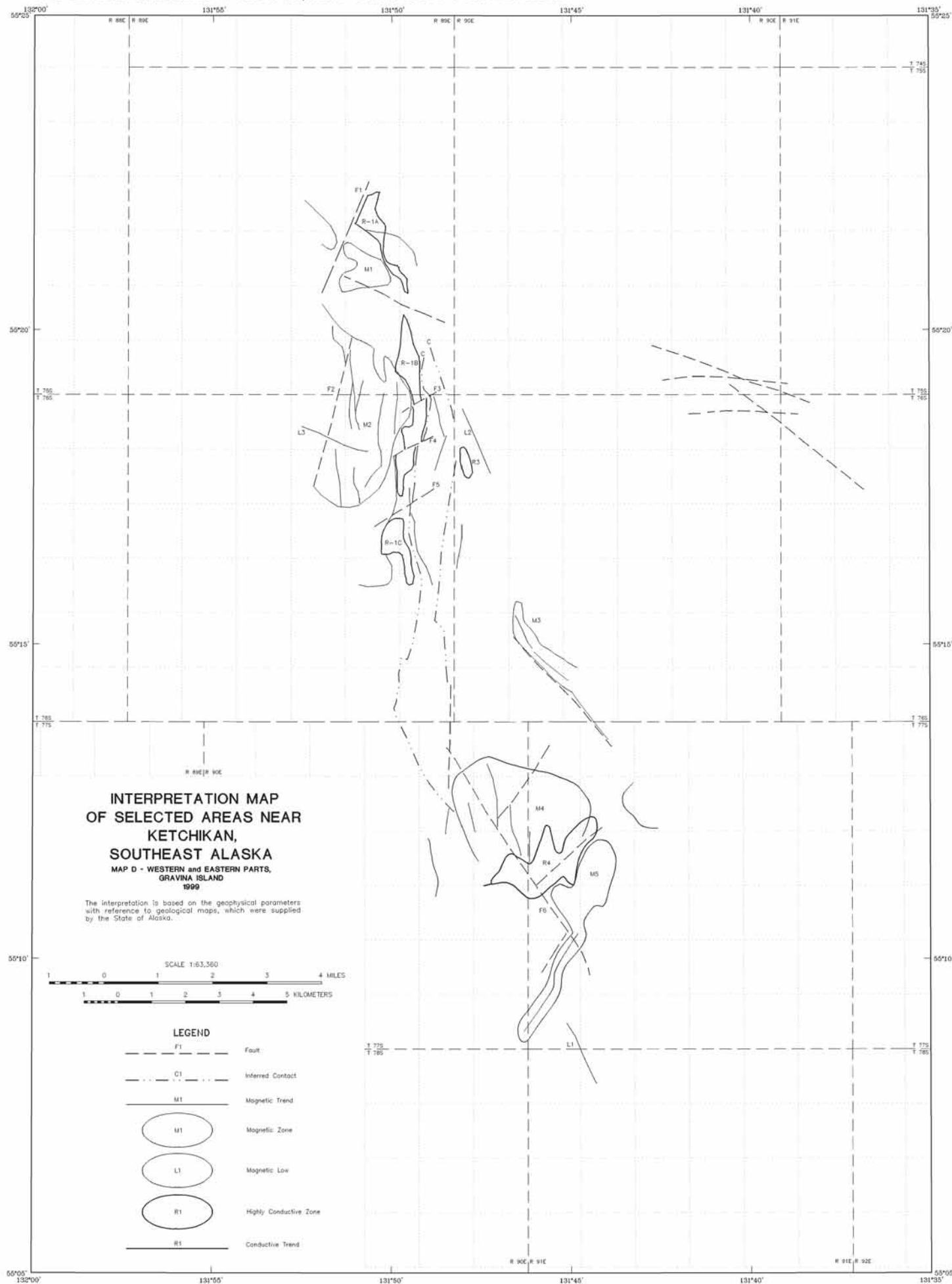
The interpretation is based on the geophysical parameters
with reference to geological maps, which were supplied
by the State of Alaska.

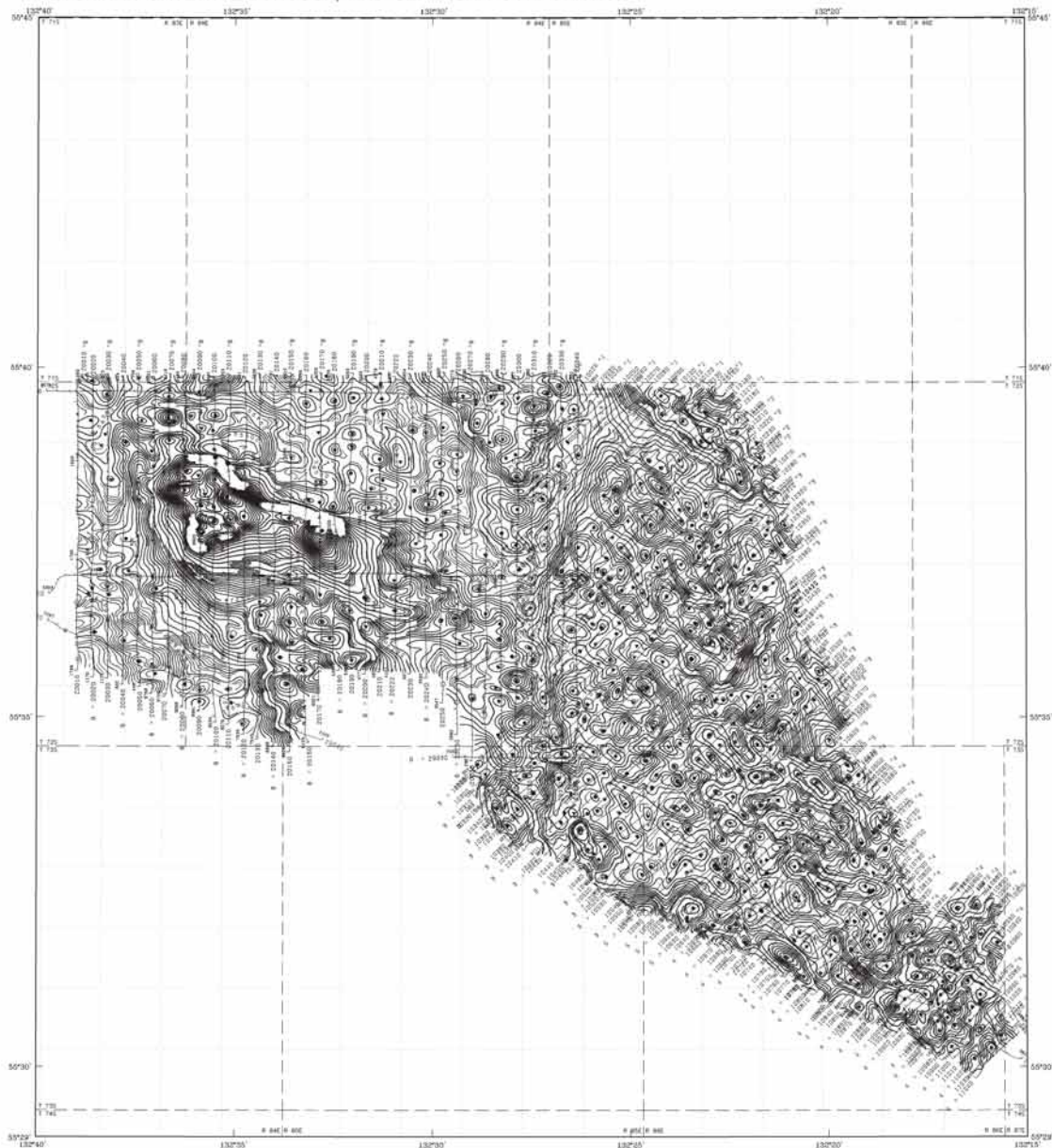


LEGEND	
PT	Point
CT	Intersect Contour
MT	Magnetic Trench
MT	Magnetic Zone
MT	Magnetic Line
MT	High Conductivity Zone
MT	Conductivity Trench









DESCRIPTIVE NOTES

KETCHIKAN SURVEY "Area 4" - March 1999
The geophysical data were acquired with a DIGHU[®] Electromagnetic (EM) system and a Scintrex cesium magnetometer. Both were flown at a height of 100 feet. In addition the survey recorded data from a radar altimeter, GPS navigation system, 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 north-south flight lines one-quarter mile apart. The lines were flown perpendicular to the flight lines at intervals of approximately 5 miles.

An Ashtech/Racal Real-Time Differential Global Positioning System (RT-DGPS) was used for both navigation and flight path recovery. The helicopter position was derived every 0.5 seconds using real-time differential positioning to a relative accuracy of better than 10 m. Flight path positions were projected onto the Clarke 1866 (NAD 83) spheroid, 1927 North American datum using a central meridian (CM) of 130° 0' 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.

KASAAH SURVEY "Area 2" - May 1992
The geophysical data were acquired with a DIGHU[®] Electromagnetic (EM) system and a Scintrex cesium magnetometer. Mean terrain clearance for the magnetometer and EM system were approximately 213 and 184 feet, respectively. In addition the survey recorded data from a radar altimeter, UHF navigation system, 30/60 Hz monitors, VLF receiver and video camera. The north-south flight lines were flown one-eighth mile apart with the lines flown parallel to the survey boundaries. The survey was flown with an AS350B-1 helicopter.

A Del Norte UHF electronic positioning system was used for navigation. Flight path recovery was done with a combination of UHF data and visual recovery. Positional accuracy of the 1992 data should be considered of low reliability. An error on the 1992 map sheet caused distortion of the positioning in the original 1992 data. The data were re-positioned in 1999 using a rubber sheet stretching technique to better match the topography and fit with the 1999 data.

ELECTROMAGNETICS

To determine the location of EM anomalies or their boundaries, the DIGHU[®] EM system measured magnetic and quadrature components at five frequencies. Two vertical coil-coupled pairs operated at 900 and 5500 Hz while three horizontal coil-coupled pairs operated at 900, 2200, and 55,000 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 light track video were examined to locate cultural sources. The EM anomalies that are indicated are classified by conductance.

ELECTROMAGNETIC ANOMALIES



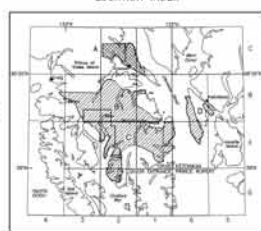
MAGNETIC CONTOUR INTERVAL



TOTAL FIELD MAGNETICS

The total field magnetic data were acquired with a sampling interval of 0.1 seconds, and were (1) corrected for diurnal variations by subtraction of the digitally recorded base station magnetic data, (2) leveled to the tie line data, and (3) interpolated onto a regular 100 m grid using a modified Akima (1970) technique. The regional variation (or IGRF gradient, 1995, updated to March 1999) was removed from the leveled magnetic data.

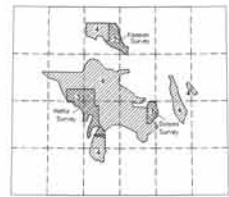
LOCATION INDEX



SURVEY HISTORY

This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources (DNR), Division of Geological & Geophysical Surveys (DGG), and RGM, Mining & Geological Consultants, Inc. Airborne geophysical data for areas 4 were acquired in 1999 by Geotek-Dighe, a division of CGG Canada Ltd. Funding for the project was provided by the U.S. Department of the Interior, Bureau of Land Management (BLM), Ketchikan Gateway Borough, Sealaska Corporation, Alaska State Mental Health Trust Land Office, and the cities of Thome Bay and Coffman Cove. The data for areas 1, 2 and 3 were flown by Dighe in 1991 and 1992. These data were provided for publication by Sealaska Corporation.

This map and other products from this survey are available by mail order, or in person, from DGG, 784 University Ave., Suite 200, Fairbanks, Alaska, 99709. Some products are also available, in person only, at the BLM's Juneau Mineral Information Center, Mayflower Island, Douglas, AK.





ATTORNEY SURVEY "Area 4" - MARCH 1999

The perimeter of the study area was determined by the location of the nearest road, the 1000-ft contour, and the 1000-ft elevation. The perimeter of the study area was determined by the location of the nearest road, the 1000-ft contour, and the 1000-ft elevation. The perimeter of the study area was determined by the location of the nearest road, the 1000-ft contour, and the 1000-ft elevation.

NASA SURVEY "Juno-3" - May 1982

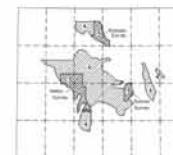
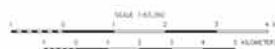
The geophysical data were acquired with a GEOMAG Electromagnetic (EM) system and a Spermac oceanographic magnetometer. Main terrain clearance for the magnetometer and EM system were approximately 100 m. The EM system was configured to record data from a radio altimeter, EM navigation system, 50/60-Hz monitoring, VLF receiver and video camera. The eight-west flight lines were spaced at 10 km intervals and oriented parallel/perpendicular to the flight lines. The survey area spans with an $\pm 25.50^\circ \text{E}$ hemisphere.

A Del Norte VLF electronic positioning system was used for navigation. Flight path recovery was done with a combination of LORAN data and visual observations of the coastline. VLF data must be interpreted w/ caution.

To determine the location of EM anomalies on their boundaries, the DEGRU EM system measured optimum and gradient components at the 100-m intervals, and the computerized data processing system at 500 and 1500 m, while three horizontal coil-spaced pairs operated at 905, 7220, and 56100 Hz. EM data were sampled at 0.1 second intervals. The EM system responds to buried conductors, conductive overburden, and cultural sources. The growing mode of the EM system is a magnetic field induced by the ground surface. The EM anomalies are indicated by

Intensity	Guidance
●	r/d pattern
○	r/d pattern
●	Quadrupole pattern
△	back conductively associated with the magnetic domain

MAP B - SURVEYED AREA IMMEDIATELY NORTH OF 55°15'
PRINCE OF WALES ISLAND
1999



This map has been compiled and drawn under contract with the State of Alaska, Department of Natural Resources (DNR), Division of Geological and Geophysical Surveys (DGGS), and NOAA Mining & Geospatial Consortium Inc. Airborne geophysical data for area 4 were acquired in 1999 by Geophysics-Geology, a division of CGC, Inc., Fairbanks, Alaska. The data were processed by the U.S. Department of the Interior, Bureau of Land Management (BLM), Fairbanks Gateway Borough, Geoscan Corporation, Alaska State Health Records, Trivis Ltd. Office, and the offices of Thomas Ray and Corinne Jones. The data for areas 2 and 3 were acquired by Geophysics-Geology, Inc. These data were provided for publication by Geoscan Corporation.

This map and other products from this survey are available by mail order, or in person, from CGO, 734 University Ave Suite 205, Fairport, Maine 05728. Some products are also available, in person only, at the USGS's James H. Munroe Information Center, 1000 Main Street, Augusta, Maine 04330.

The 1980 field magnetic data were acquired with a sampling interval of 0.2 seconds, and were (1) corrected for diurnal variations by subtraction of the digitally recorded base station magnetic data, (2) leveled to the fix line data, and (3) interpolated onto a regular 100 m grid using a modified least (1970) technique. The regional variation (or ICF gradient, 1975, updated to March 1986) was removed from the leveled magnetic data.

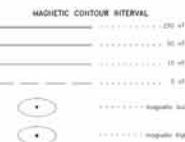
[illegible][illegible]

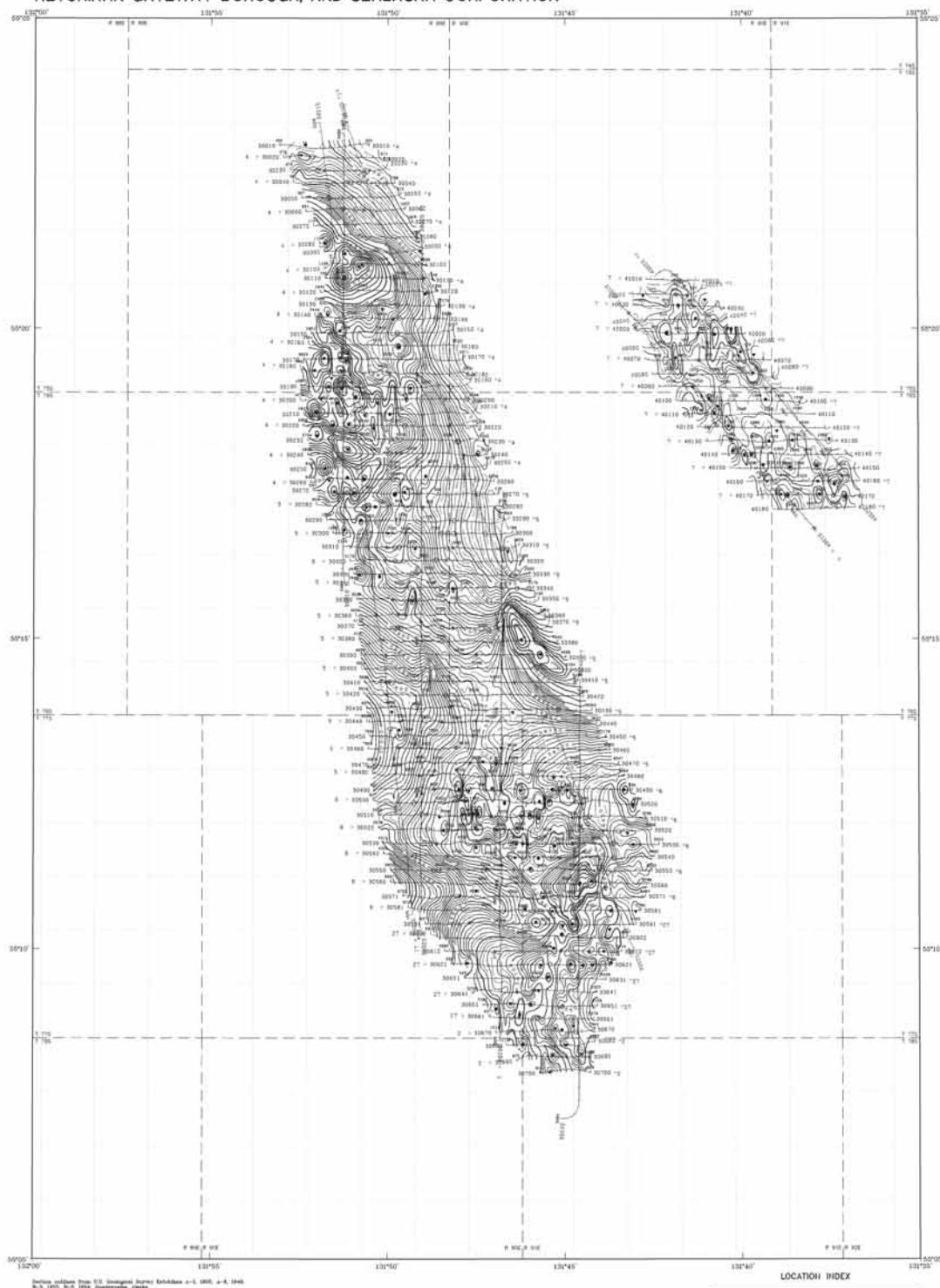
● 1st group
 ○ 2nd group
 * Quantitative analysis
 - Not statistically significant
 - on 3d triplicate response

To determine the location of ZnO nanowires on the substrate, the SEM/EDX data were measured at different quadrature components of the RF frequency. Two vertical cross-section pairs (operated at 200 and 2500 Hz) and three horizontal cross-section pairs (operated at 950, 700 and 55,000 Hz). EDX data were operated at 5.5 kV; whereas, the EDX system responds to electron induced conductive substrates and insulator sources. The probe tip monitor and the spot track sides were examined inside insulator sources. The Zn nanowires that are isolated are attracted to conductance.

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) integrated into a regular 100-m grid using a modified area 1970/0 technique. The regional correction (or IGR gradient, 1985, updated to March 1990) was removed from the leveled magnetic data.

[illegible]



Source: outline from U.S. Geological Survey, Ketchikan 1:50,000, 1964; 1:50,000, 1964; 1:50,000, 1964.



DESCRIPTIVE NOTES

The geophysical data were acquired with a GOMER[®] Electromagnetic (EM) system and a Schlumberger magnetometer. Both were flown at a height of 100 feet. In addition the survey recorded data from a radar altimeter, GPS navigation system, 50/60 Hz magnetic and video camera. Flights were performed with an AS350B-2 Super Helicopter at a mean terrain clearance of 200 feet along most-west flight lines, one-quarter mile apart. The lines were flown perpendicular to the flight lines at intervals of approximately 3 miles.

An Ashtech/Realtek Real-Time Differential Global Positioning System (RT-DGPS) was used for both navigation and flight path recovery. The helicopter position was derived every 0.5 seconds using real-time differential positioning to a relative accuracy of better than 10 m. Flight path positions were projected onto the Clarke 1886 (NAD 83) datum. The datum is a north-south datum using a central meridian (CM) of 120° W, a north constant of 0.6 and an east constant of 300,000. 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 GOMER EM system measured phase and quadrature components at five frequencies. Two vertical coplanar-coil pairs operated at 900 and 5500 Hz while three horizontal coplanar-coil pairs operated at 300, 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 anomalies. The power line monitor and the flight track video were examined to locate cultural sources. The EM anomalies that are indicated are classified by conductance.

TOTAL FIELD MAGNETICS AND ELECTROMAGNETIC ANOMALIES OF SELECTED AREAS NEAR KETCHIKAN, SOUTHEAST ALASKA

MAP D - WESTERN AND EASTERN PARTS, GRAVINA ISLAND
1999



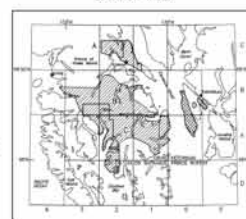
ELECTROMAGNETIC ANOMALIES

- Conductance
- >50 Siemens
- Quasi-static anomaly
- Δ Weak conductivity associated with EM magnetic response

MAGNETIC CONTOUR INTERVAL

- 200 nT
- 50 nT
- 10 nT
- magnetic low
- magnetic high

LOCATION INDEX



SURVEY HISTORY

This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources (DNR), Division of Geological & Geophysical Survey (DGGS), and NOAA Mining & Geological Consultants, Inc. Airborne geophysical data for the area were acquired in 1999 by Geometrics-Eggen, a division of CGG Canada Ltd. Funding for the project was provided by the U.S. Department of the Interior, Bureau of Land Management (BLM), Ketchikan Gateway Borough, Sealaska Corporation, Alaska State Mental Health Trust, Land Office, and the cities of Thorne Bay and Coffman Cove.

This map and other products from this survey are available by mail order, or in person, from DGGS, 794 University Ave., Suite 200, Fairbanks, Alaska, 99709. Some products are also available, in person only, at the BLM's Alaska Minerals Information Center, Mayflower Island, Douglas, AK.

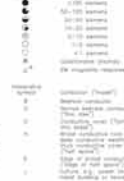
TOTAL FIELD MAGNETICS

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 sea level data, and [3] interpolated onto a regular 100 m grid using a modified Along Profile technique. The regional variation (or GMR gradient, 1995, updated to March 1999) was removed from the leveled magnetic data.

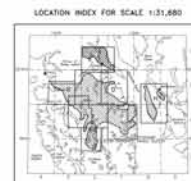
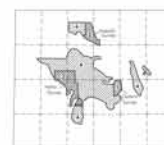
Notes: 0.1930, a new method of interpolation and outlier curve fitting based on local procedures. Journal of the Association of Computing Machinery, 11, no. 4, p. 689-693.



PARTS of CRAIG C-1 and
C-2 QUADRANGLES
1999

[illegible][illegible][illegible][illegible]

The latest two magnetic data were compared with a remaining interval of 0.1 seconds, and were (1) corrected for double counting in addition to the 1000 Hz recorded data stream, magnetic data (2) referred to the 1000 Hz data, and (3) resampled at a regular 100 Hz rate using a modified linear interpolation technique. The magnetic correction for 1000 Hz was updated in March 1992 and referred from the oldest magnetic data.

[illegible]



LOCATION INDEX FOR SCALE 1:31,680



KETCHIKAN SURVEY "Area 4" - March 1999
The geophysical data were acquired with a DIGHEC Electromagnetic (EM) system and a Seintrex cesium magnetometer. Data were flown at a height of 100 feet, with a 100 ft swath. The survey recorded data from a 100 ft diameter, 50% navigation system, 50/60 Hz monitors and video camera. Flights were performed with an AS350B-2 3-bladed helicopter at a mean terrain clearance of 200 feet along north-south flight lines one-quarter mile apart. The lines were flown perpendicular to the light lines at intervals of approximately 3 miles.



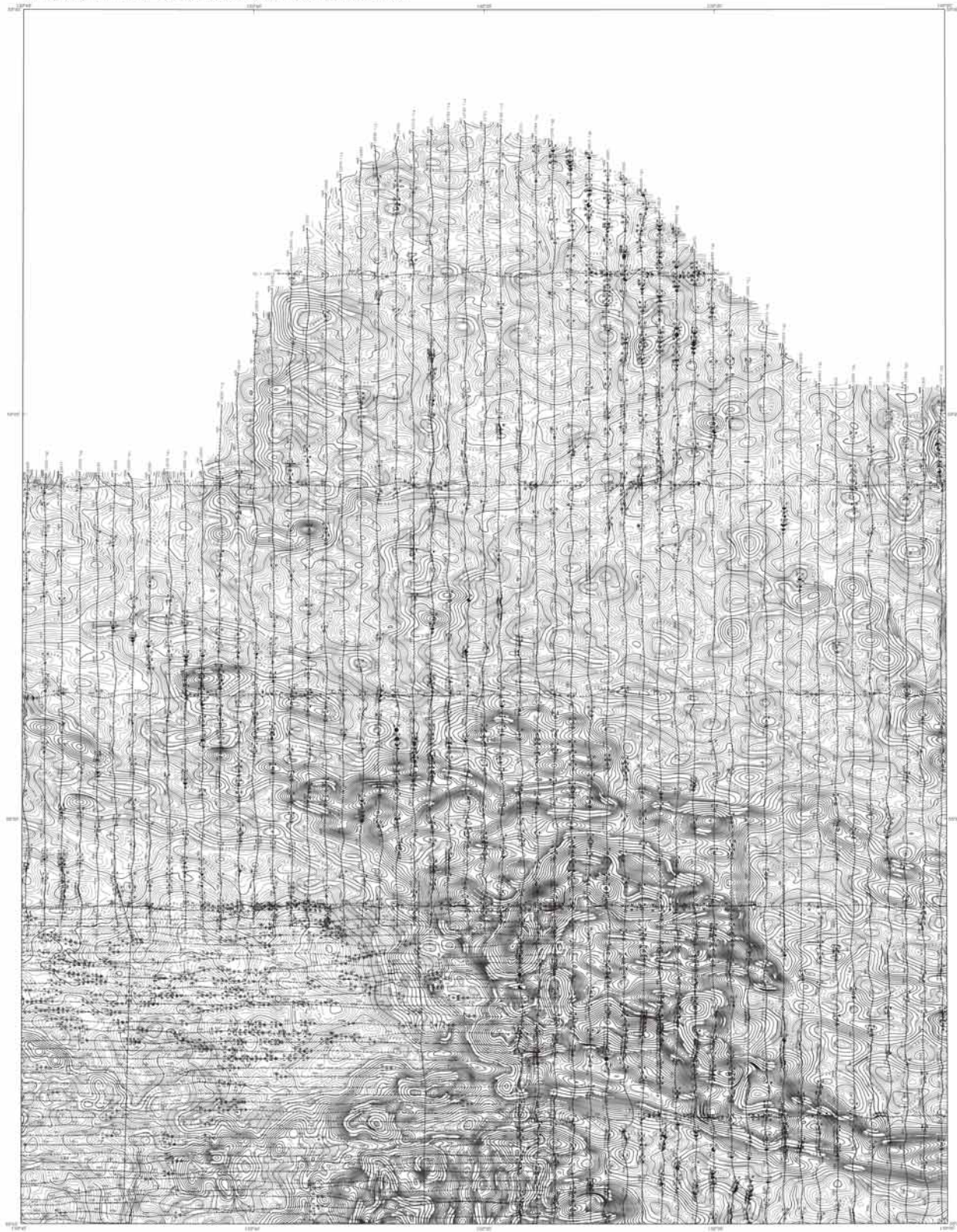
To determine the spectrum of EM disturbances at their boundaries, the ECHM-EM system measured signals and geoelectric components at five frequencies. Two vertical receiver-coil pairs operated at 400 and 5500 Hz while three horizontal receiver-coil pairs operated at 900, 7200 and 18000 Hz. The EM system responds to subsurface conductors, including power lines, buried cables, metallic structures, conductive overburden, and cultural sources. The type of conductor is indicated on the isogeometric maps by the interpretation of the EM system data. The EM system maps the type of the conductor is based on the EM anomaly shapes of the conductor and the apparent resistivity response, together with conductive and magnetic patterns and topography. The power line monitor and the light flash video were connected to the EM system.



This map is based on data collected and shared under contract with the State of Alaska. Department of Natural Resources, Division of Geology and Earth Sciences, Juneau (2005), and Geoscience, Planning & Geospatial Consultants, Inc. (2005). Data were collected by the Division of Geology and Earth Sciences, Juneau, Alaska, in 1989 by the GSCM, Ewing A. Clapp, a division of the U.S. Department of the Interior, Bureau of Land Management, Alaska Division, Anchorage, Alaska. The Alaska Corporation, Alaska State Mental Health Trust Land Administration, Anchorage, Alaska, and the Alaska Division of the U.S. Department of the Interior, Bureau of Land Management, Anchorage, Alaska, provided the data for areas 1, 2, and 3. Data were obtained by GSCM, Ewing A. Clapp, a division of the U.S. Department of the Interior, Bureau of Land Management, Anchorage, Alaska, by Sestrom Corporation.

This map and other products from the Alaska Division of the U.S. Department of the Interior, Bureau of Land Management, Anchorage, Alaska, are available at 907.554.1000 or <http://www.blm.gov>. For more information, contact: Alaska Division, Suite 300, Peninsula, Suite, 99509. Some products are available for purchase. For more information, contact: Alaska Division, Suite 300, Peninsula, Suite, 99509. Some products are available for purchase. For more information, contact: Alaska Division, Suite 300, Peninsula, Suite, 99509.

Minnesota Information Center, Mayfield Square, Douglas, MN 55120.



Map line 10 (vertical) from 100° 00' 00" W to 100° 00' 00" W



DESCRIPTIVE NOTES

KETCHIKAN SURVEY "New 0" - June 1988

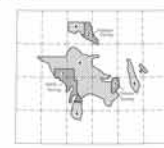
The Ketchikan Survey "New 0" was conducted as a detailed magnetic and electromagnetic survey of the Ketchikan Gateway area. The survey was conducted by the Alaska Division of Geological & Geophysical Surveys in cooperation with the Bureau of Land Management, Ketchikan Gateway Borough, and Sealaska Corporation. The survey area covers approximately 100 square miles and includes the Ketchikan Gateway, the Ketchikan River, and the surrounding waters. The survey was conducted using a combination of ground-based and airborne methods. The ground-based survey was conducted using a proton precession magnetometer and a fluxgate magnetometer. The airborne survey was conducted using a cesium vapor magnetometer. The survey data was processed using a computer program that calculates magnetic intensity and electromagnetic anomalies. The results of the survey are presented in this report.

DATA SURVEY "New 0" - May 1982

The DATA Survey "New 0" was conducted as a detailed magnetic and electromagnetic survey of the Ketchikan Gateway area. The survey was conducted by the Alaska Division of Geological & Geophysical Surveys in cooperation with the Bureau of Land Management, Ketchikan Gateway Borough, and Sealaska Corporation. The survey area covers approximately 100 square miles and includes the Ketchikan Gateway, the Ketchikan River, and the surrounding waters. The survey was conducted using a combination of ground-based and airborne methods. The ground-based survey was conducted using a proton precession magnetometer and a fluxgate magnetometer. The airborne survey was conducted using a cesium vapor magnetometer. The survey data was processed using a computer program that calculates magnetic intensity and electromagnetic anomalies. The results of the survey are presented in this report.



TOTAL FIELD MAGNETICS AND DETAILED ELECTROMAGNETIC ANOMALIES OF SELECTED AREAS NEAR KETCHIKAN, SOUTHEAST ALASKA PARTS OF CRAIG B-2 and B-3 QUADRANGLES 1999



SURVEY HISTORY

The Ketchikan Survey "New 0" was conducted as a detailed magnetic and electromagnetic survey of the Ketchikan Gateway area. The survey was conducted by the Alaska Division of Geological & Geophysical Surveys in cooperation with the Bureau of Land Management, Ketchikan Gateway Borough, and Sealaska Corporation. The survey area covers approximately 100 square miles and includes the Ketchikan Gateway, the Ketchikan River, and the surrounding waters. The survey was conducted using a combination of ground-based and airborne methods. The ground-based survey was conducted using a proton precession magnetometer and a fluxgate magnetometer. The airborne survey was conducted using a cesium vapor magnetometer. The survey data was processed using a computer program that calculates magnetic intensity and electromagnetic anomalies. The results of the survey are presented in this report.

TOTAL FIELD MAGNETICS

The total field magnetic intensity was calculated from the magnetic intensity data. The results of the calculation are presented in this report. The total field magnetic intensity is shown in gamma. The results of the calculation are presented in this report.

ELECTROMAGNETICS

The electromagnetic anomalies were calculated from the magnetic intensity data. The results of the calculation are presented in this report. The electromagnetic anomalies are shown in gamma. The results of the calculation are presented in this report.



LOCATION INDEX FOR SCALE 1:31,850



TOTAL FIELD MAGNETIC

TOTAL FIELD MAGNETICS

The total field magnetic data were obtained as a gridded array of 2.5 km by 2.5 km cells. (1) consisted the fluxgate stations at a distance of the ship's (rounded down) magnetic (magnetic) axis (2) picked to be the flux gate, and (3) integrated area is between 100 to 1000 m by 1000 m (1000 m by 1000 m). The magnetic data were collected from 1970 to 1990. The magnetic data were collected from the period magnetic data.

During 1970, a new method of magnetic and gravity data collection was used (magnetic data) at the station.

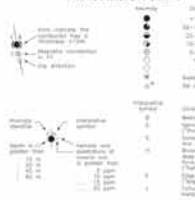
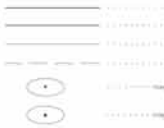


KETCHIKAN SURVEY "New 4" - March 1988
The geophysical data were analyzed with a GEOPRO-2 (Schlumberger) 2D system and a Schlumberger computer workstation. Data were from a depth of 100 feet. In addition, the Schlumberger 2D system 2000 software, 1988 Schlumberger desktop, 50000 sq. meters and other content. Data were performed with a GEOPRO-2 Schlumberger workstation in a main frame computer at 2000 feet using Schlumberger 2000 software. The data were then processed to the final data in Schlumberger 2000 software.

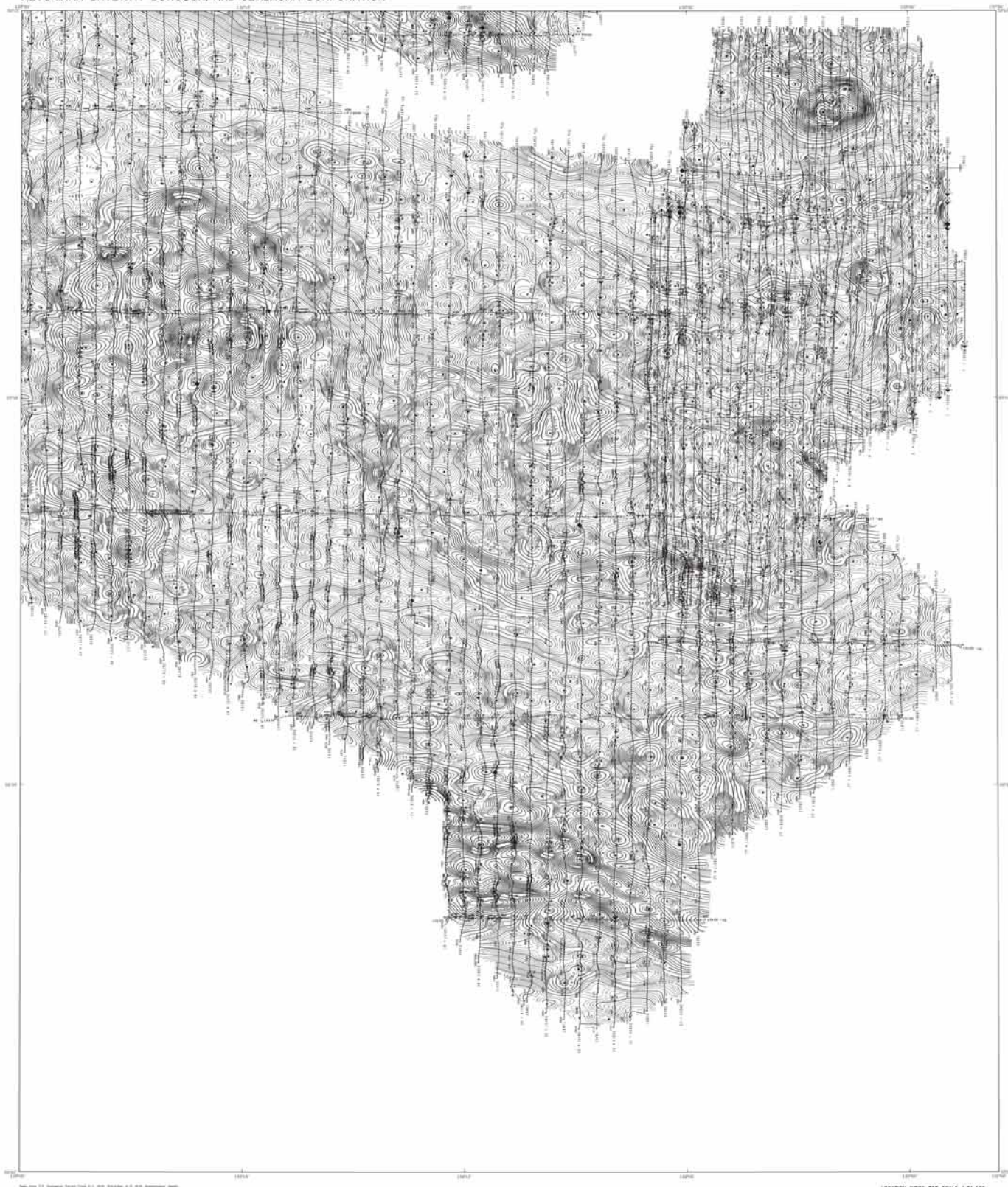
[illegible]



used for diagnosis. Light microscopy was used with a magnification of 100 and about 1000 cells. Fluorescence microscopy of the 1000 cells should be considered of low reliability.

[illegible]

This may be a case unexplored and unmet: a case involving the State of Maine, Department of Natural Resources (DNR), Division of Geology & Earth Sciences (DGES), and USGS, Office of Geological Investigations. The Maine Geological Survey has a 4,000 acre area in 1987, in 1988, in 1989, in 1990, in 1991, in 1992, in 1993, in 1994, in 1995, in 1996, in 1997, in 1998, in 1999, in 2000, in 2001, in 2002, in 2003, in 2004, in 2005, in 2006, in 2007, in 2008, in 2009, in 2010, in 2011, in 2012, in 2013, in 2014, in 2015, in 2016, in 2017, in 2018, in 2019, in 2020, in 2021, in 2022, in 2023, in 2024, in 2025, in 2026, in 2027, in 2028, in 2029, in 2030, in 2031, in 2032, in 2033, in 2034, in 2035, in 2036, in 2037, in 2038, in 2039, in 2040, in 2041, in 2042, in 2043, in 2044, in 2045, in 2046, in 2047, in 2048, in 2049, in 2050, in 2051, in 2052, in 2053, in 2054, in 2055, in 2056, in 2057, in 2058, in 2059, in 2060, in 2061, in 2062, in 2063, in 2064, in 2065, in 2066, in 2067, in 2068, in 2069, in 2070, in 2071, in 2072, in 2073, in 2074, in 2075, in 2076, in 2077, in 2078, in 2079, in 2080, in 2081, in 2082, in 2083, in 2084, in 2085, in 2086, in 2087, in 2088, in 2089, in 2090, in 2091, in 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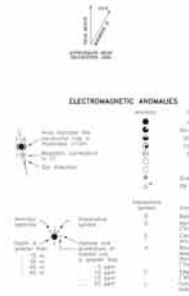


Map from US Geological Survey (1999) 1:50,000 Scale, 1:50,000 Scale, 1:50,000 Scale



DESCRIPTIVE NOTES
KETCHIKAN SURVEY "New 4" - March 1999
The Ketchikan Survey (New 4) was conducted with a Geoscan
EM31-MP (EM31-MP) with a 100m range and a 100m range
to establish the magnetic anomaly field. The survey was
conducted in the Ketchikan area, near the Canadian border.
The survey was conducted in the Ketchikan area, near the Canadian border.
The survey was conducted in the Ketchikan area, near the Canadian border.

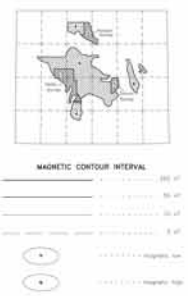
SOUND SURVEY "New 1" - March 1999
The Sound Survey (New 1) was conducted with a Geoscan
EM31-MP (EM31-MP) with a 100m range and a 100m range
to establish the magnetic anomaly field. The survey was
conducted in the Sound area, near the Canadian border.
The survey was conducted in the Sound area, near the Canadian border.
The survey was conducted in the Sound area, near the Canadian border.



TOTAL FIELD MAGNETICS AND DETAILED ELECTROMAGNETIC ANOMALIES OF SELECTED AREAS NEAR KETCHIKAN, SOUTHEAST ALASKA PARTS OF CRAIG A-1 and KETCHIKAN A-6 QUADRANGLES 1999

ELECTROMAGNETIC ANOMALIES
The electromagnetic anomalies were measured with a Geoscan
EM31-MP (EM31-MP) with a 100m range and a 100m range
to establish the magnetic anomaly field. The survey was
conducted in the Ketchikan area, near the Canadian border.
The survey was conducted in the Ketchikan area, near the Canadian border.
The survey was conducted in the Ketchikan area, near the Canadian border.

ELECTROMAGNETICS
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EM31-MP (EM31-MP) with a 100m range and a 100m range
to establish the magnetic anomaly field. The survey was
conducted in the Ketchikan area, near the Canadian border.
The survey was conducted in the Ketchikan area, near the Canadian border.
The survey was conducted in the Ketchikan area, near the Canadian border.



LOCATION INDEX FOR SCALE 1:50,000
The map shows the location of the study area within the state of Alaska. The study area is highlighted in the southeastern corner of the state, near the Canadian border.

SURVEY HISTORY
The map shows the location of the study area within the state of Alaska. The study area is highlighted in the southeastern corner of the state, near the Canadian border.

TOTAL FIELD MAGNETICS
The map shows the location of the study area within the state of Alaska. The study area is highlighted in the southeastern corner of the state, near the Canadian border.



An Antech/Roper Real-Time Differential Global Positioning System (RT-CGPS) was used for both navigation and flight path recovery. The helicopter was equipped with a GPS receiver and a real-time differential positioning to a reference station at least 10 m. Flight path positions were projected onto the Globe 188N GDM (see Fig. 6) appeared. 191°N American datum using a centre meridian (CM) of 123°, a north constant of 0 and air speed constant of 500.500. Positional accuracy of the projected data is better than

ELECTROMAGNETIC

Figure 1 consists of two horizontal lines representing DNA fragments. The top line is labeled '2 kb' at the right end and has tick marks at 0.5, 1, and 1.5. A shaded rectangular region is located between the 0.5 and 1.0 marks, with the text 'SAL1 (17,000)' centered above it. The bottom line is labeled '2.5 kb' at the right end and has tick marks at 0.5, 1, 1.5, and 2. A shaded rectangular region is located between the 0.5 and 1.0 marks, with the text 'SAL1 (17,000)' centered above it.

PARTS of CRAIG A-2 and
DIXON ENTRANCE D-2 QUADRANGLES
1999

ELECTROMAGNETIC ANOMALIES



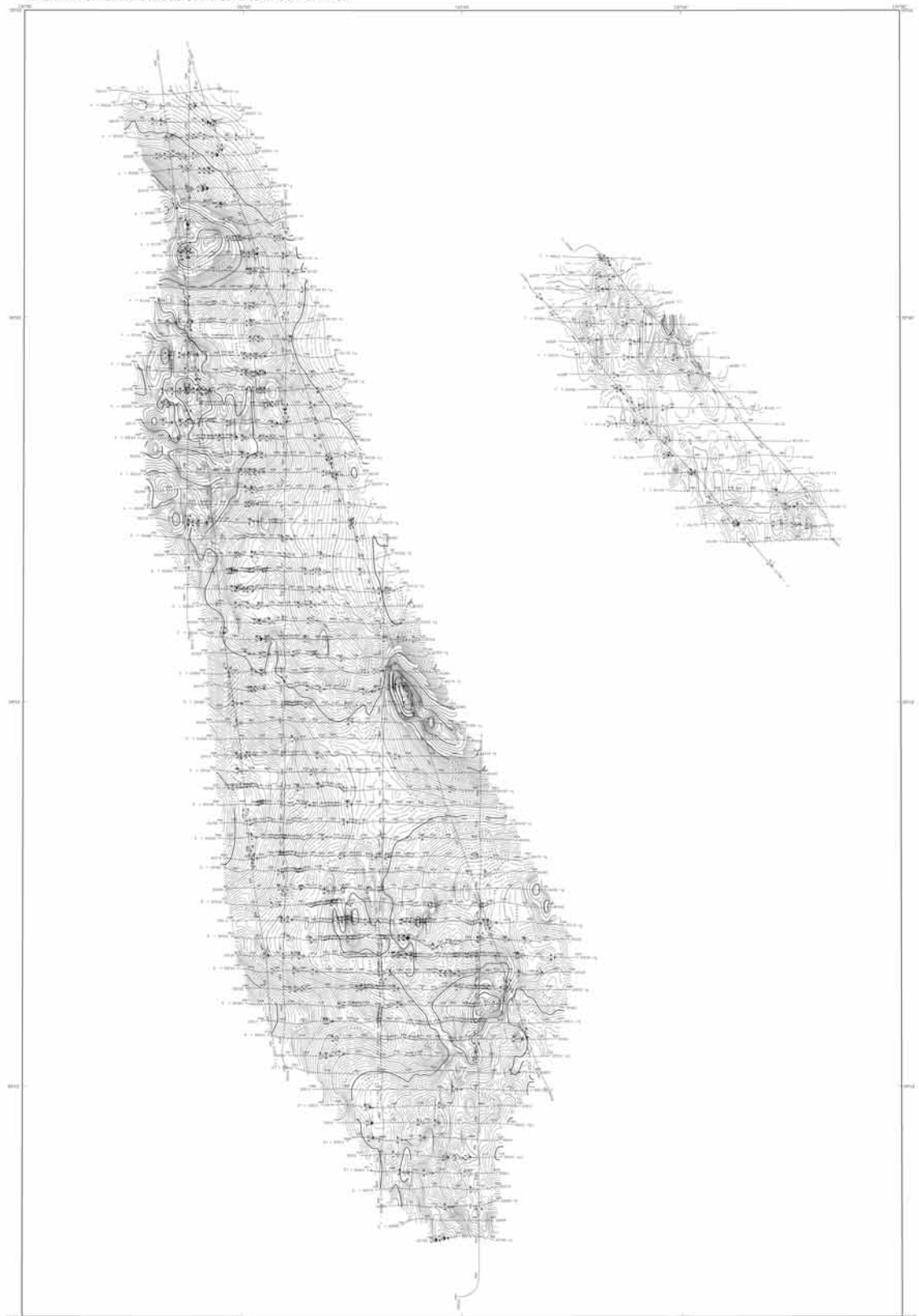
LOCATION INDEX FOR SCALE 1:31,680



TOTAL FIELD MAGNETICS

MAGNETIC CONTOUR INTERVAL



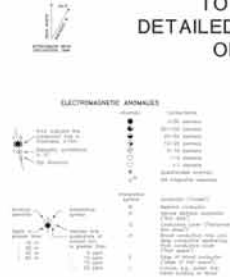


DESCRIPTIVE NOTES

The geophysical data were collected on a 1999 survey of the Ketchikan Gateway Borough and Sealaska Corporation. The data were collected on a 1999 survey of the Ketchikan Gateway Borough and Sealaska Corporation. The data were collected on a 1999 survey of the Ketchikan Gateway Borough and Sealaska Corporation.

ELECTROMAGNETIC ANOMALIES

The electromagnetic anomalies were collected on a 1999 survey of the Ketchikan Gateway Borough and Sealaska Corporation. The data were collected on a 1999 survey of the Ketchikan Gateway Borough and Sealaska Corporation. The data were collected on a 1999 survey of the Ketchikan Gateway Borough and Sealaska Corporation.



**TOTAL FIELD MAGNETICS AND
DETAILED ELECTROMAGNETIC ANOMALIES
OF SELECTED AREAS NEAR
KETCHIKAN,
SOUTHEAST ALASKA
PARTS OF KETCHIKAN A-6, B-5,
AND B-6 QUADRANGLES
1999**



SURVEY HISTORY

The survey was conducted by the Alaska Division of Geological & Geophysical Surveys in cooperation with the Bureau of Land Management, Ketchikan Gateway Borough, and Sealaska Corporation. The survey was conducted in 1999.

TOTAL FIELD MAGNETICS

The total field magnetic data were collected on a 1999 survey of the Ketchikan Gateway Borough and Sealaska Corporation. The data were collected on a 1999 survey of the Ketchikan Gateway Borough and Sealaska Corporation. The data were collected on a 1999 survey of the Ketchikan Gateway Borough and Sealaska Corporation.