U.S. DEPARTMENT OF THE INTERIOR

U.S. GEOLOGICAL SURVEY

Composite and Merged Aeromagnetic Data for Alaska: A Web Site for Distribution of Gridded Data and Plot Files

by

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U.S. Geological Survey, Denver, Colorado

Open-File report 97-520

Thie report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards. Use of brand names is for descriptive purposes and does not constitute endorsement by the U.S. Geological Survey.

1997

Abstract

This report is a listing of the primary information pages in the following web site:

http://minerals.cr.usgs.gov/publications/ofr/97-520/alaskamag.html

This web site describes the results of a USGS project to merge the best available aeromagnetic data into consistent 1-km grids spanning the state of Alaska. The website allows users to download (via FTP) data files (in several formats) and plot files. The anonymous FTP sites are:

ftp://minerals.cr.usgs.gov/minerals/ofr/97-520/data

and

ftp://minerals.cr.usgs.gov/minerals/ofr/97-520/plots

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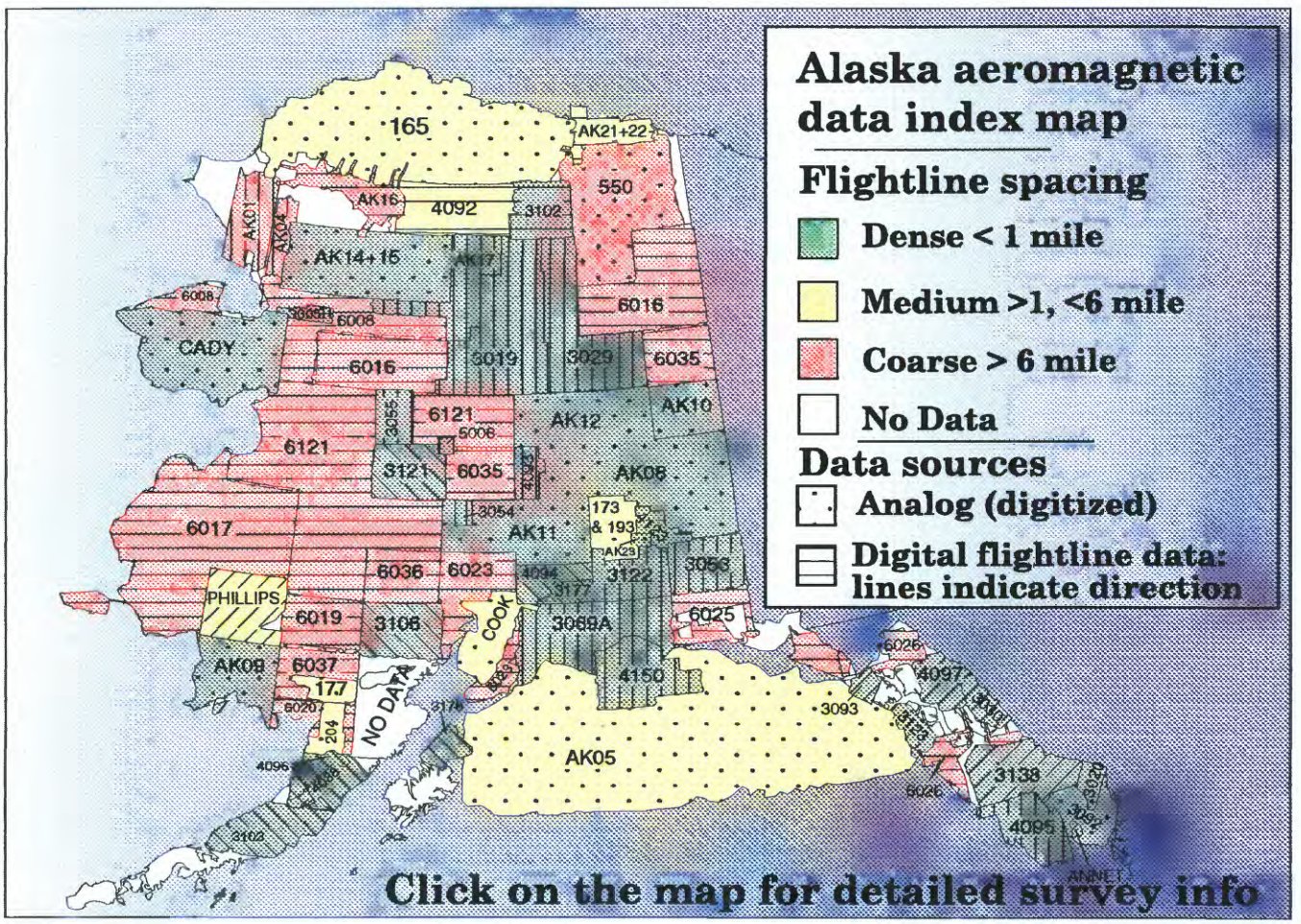
Alaska Aeromagnetic Data Index



The Alaska aeromagnetic compilation maps contain data from 85 separate surveys, digitized maps, and previous gridded compilations. This map is an index to the flightline spacing of the original surveys. Move the mouse around the map and click on the individual surveys for more information. A tabular index (see index) provides a summary of the data sources. The raw data for all these surveys are available from the National Geophysical Data Center (NGDC), Boulder, Colorado.

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URL: http://minerals.usgs.gov/publications/ofr/97-520/web_index.html
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Alaska Aeromagnetic Compilation

These maps show variations in the Earth's magnetic field caused primarily by the uneven distribution of the mineral magnetite in the rocks that make up the upper part of the Earth's crust. The features and patterns of the maps reveal details of subsurface geology including the locations of buried faults, the location of magnetite-bearing rocks (which include many kinds of rocks of interest to mineral exploration), and the thickness of surficial sedimentary rocks.

The maps are constructed from grids that combine information (data processing details). collected in 85 separate aeromagnetic surveys conducted between 1945 and 1982. The data from these surveys are of varying quality; large regions of Alaska are covered only by very coarse surveys. An index plot (see plot) gives an overview of the flightline spacing of the original surveys. A data table (see table) summarizes the detailed specifications of the surveys.

The images displayed here were prepared by Northwest Geophysical Associates under contract to the U.S. Geological Survey. In addition to an overview image of the entire state, 19 separate detailed images display more of the details in the magnetic field. HPGL plot files for these images can be downloaded (download plots) for plotting at true scale (1:2,500,000 for the overview map, 1:500,000 for the detailed maps).

This project was supported by the Mineral Resources Program of the USGS in cooperation with the National Geophysical Data Center (NGDC), The State of Alaska, Department of Natural Resources, Division of Oil and Gas (DOG), and the State of Alaska, Department of Natural Resources, Division of Geological and Geophysical Surveys (DGGS),

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URL: http://minerals.usgs.gov/publications/ofr/97-520/map_desc_text.html
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Alaska Aeromagnetic Data Processing

The assembly of 85 individual aeromagnetic surveys and grids to build the Alaska state-wide compilation was carried out in two stages. (1) A compilation for interior Alaska (spanning from 61 to 66 N latitude and 144 to 159 W longitude) was completed in 1994, (2) the rest of the state-wide compilation was completed in August 1997.

Data processing for the interior Alaska aeromagnetic data compilation was done by Paterson, Grant and Watson, Ltd, under contract to the State of Alaska, Division of Oil and Gas with cooperation from the USGS. Data from 25 aeromagnetic surveys were compiled. Paper maps at a scale of 1:500,000 were published by the USGS (USGS Map GP-1014; reference list). These maps are available from USGS Map Sales (goto USGS Map Sales).

Data processing for the state-wide compilation was done by Northwest Geophysical Associates under contract to the USGS. Data from an additional 60 surveys and previously processed grids were added to the interior Alaska compilation. In addition, some modification of the interior Alaska compilation was done to improve the merge to adjacent surveys in the northwest and southeast corners.

DATA PROCESSING STEPS

1. Grids were constructed from the original aeromagnetic survey data with a cell size of between 1/3 and 1/5 of the flightline spacing of the survey, using a bidirectional gridding algorithm when necessary due to wide flightline spacing. For digitized contour line data, the initial grid was constructed using a minimum curvature algorithm and a spacing appropriate for the scale of the digitized map.
2. Data quality problems were addressed in consultation with the USGS.
3. The Definitive Geomagnetic Reference Field (DGRF) was applied for the date of the original survey (in some cases this required the determination and removal of the original reference field applied).
4. The survey grids were regridded, as necessary, to the final grid cell size of 1 km using a minimum curvature algorithm.
5. The datum levels of adjacent surveys were adjusted (by addition or subtraction of a constant value) to minimize differences at the boundaries.

6. These adjusted grids were combined, leaving a 1 cell gap between surveys, into a composite grid (one of the final products).
7. The original survey grids were upward or downward continued and converted from level to drape as necessary to produce a consistent survey specification of 1000 ft above ground. Upward continuation of the NURE surveys was by standard 2D FFT filtering techniques. Downward continuation and level-to-drape was performed using the COMPUDRAPE technique (as implemented in the GEOSOFT software package).
8. The datum levels of the converted grids were then adjusted to minimize differences at the boundaries.
9. These adjusted grids were combined into a single merged grid (with no data gaps inserted between surveys).

GRID PROJECTION SPECIFICATIONS

- Projection = Albers conical equal-area
- Central meridian = 151 W
- Base latitude = 55 N
- Standard parallels = 55 and 65 N
- Semi-major ellipsoid axis = 6378206.4 m
- Eccentricity squared = 0.0067686579973

URL: http://minerals.usgs.gov/publications/ofr/97-520/proj_desc.html
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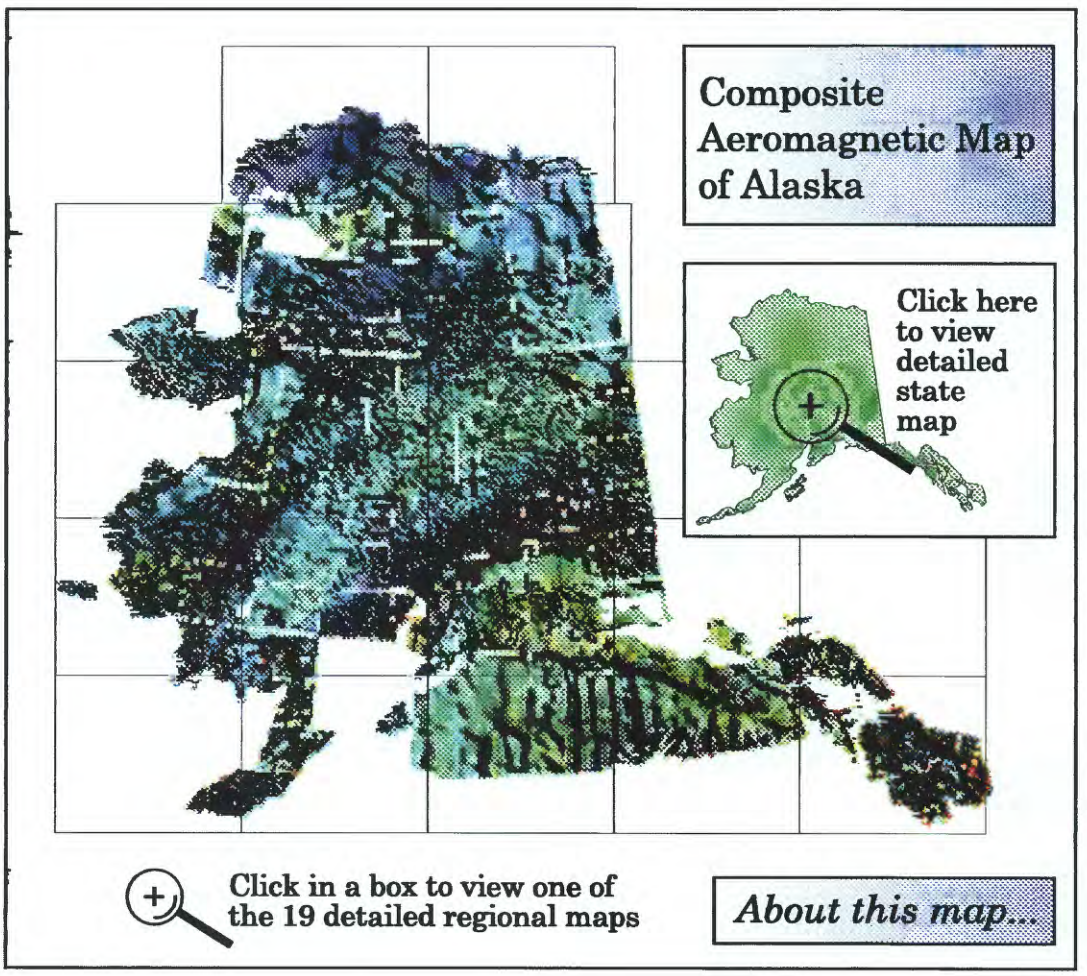
Alaska Aeromagnetic Maps and Data

Get Map Info...

Get Survey Info...

Get Plots...

Get Data...



URL: http://minerals.usgs.gov/publications/ofr/97-520/alaskamag.html
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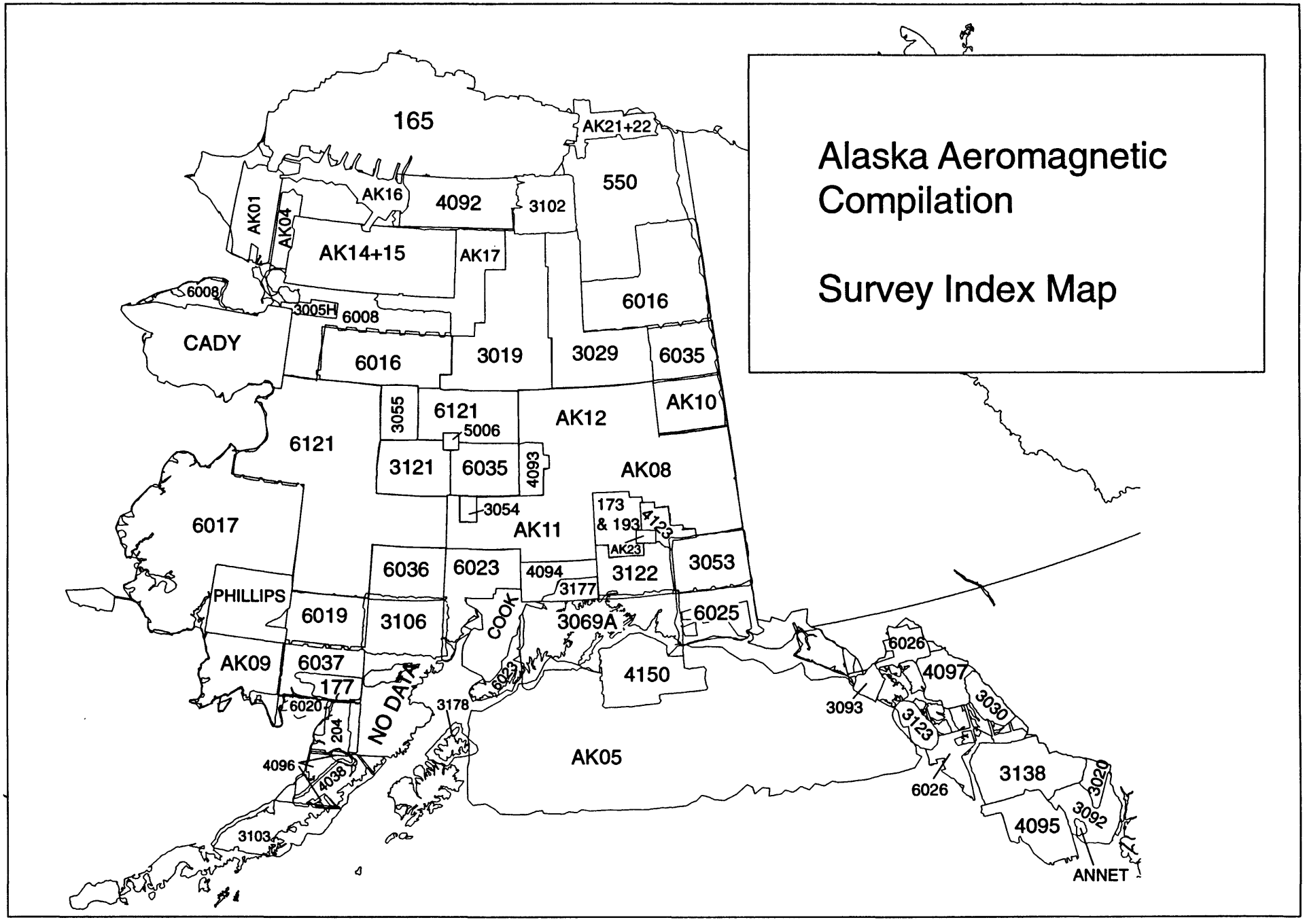


Saltus, USGS 9/97

No.	sect.	Status	Type	Name	Flown By	Date Flown	Spacing	Dir	Altitude (ft)	MxLat	MnLat	MnLg	MxLg	LnMi	Publication
165		digitized	M-A	Naval Pet. Reserve No. 4	USGS,USN	07/45-08/46	2-4 mi.	NE-SW	1000 AG	71.33	68.5	146	163	12600	95-835
173		digitized	M-A	Copper River '54	USGS	Jun-54	2 mi.	N-S	4000 B	63	61.75	145	145.83	1350	GP-156
177		digitized	M-A	Nushagak Basin	USGS	Jun-54	2 mi.	E-W	1500 B	59.5	59	156	158.5	1132	GP-352
193		digitized	M-A	Copper River '55	USGS	Jun-55	1 mi.	N-S	4000 B	63	61.75	145	147.47	4200	GP-156
204	A	digitized	M-A	Ugashik North	USGS	May-55	2 mi.	N-S	1000-1300 B	59	58.08	156.25	157.25	700	GP-353
204	B	digitized	M-A	Ugashik South	USGS	May-55	2 mi.	NW-SE	1000-1300 B	58.33	57.37	155.67	157.5	1300	GP-353,354
291		part of COOK	M-A	Cook Inlet '58	USGS	Jun-58	P, 2-10 mi.	E-W	2500 B	62.4	59.47	149	154.17	500	P-316G
297	A	digitized	M/R-A	Lisburne West	USGS	Jun-58	P, 1 mi.	N-S	500 AG	68.83	66.08	165.5	166.25	900	60-006
297	B	digitized	M/R-A	Lisburne East	USGS	Jun-58	P, 1 mi.	N-S	500 AG	68.92	67.75	164.56	164.75	500	60-006
550		digitized	M-A	Alaska Regional	USGS	Jul-65	10 mi.	N-S	5000 B	70.42	64	141	148.25	9000	B-1271F
3005	A	digitized	M-A	Nome Area	LKB	08/68-10/68	1 mi.	E-W	2500 B	64.92	64.43	163.7	166.48	2000	69-294
3005	D	digitized	M-A	Kougarok	LKB	06/68-10/68	1 mi.	E-W	2500 B	66	65.22	164.23	165.3	1210	69-294
3005	H	digitized	M/R-A	Hogatza Trend	LKB	08/68-10/68	1 mi.	E-W	400 AG	66.5	66.2	158.43	161	1450	69-170
3007	B	digitized	M-A	SW Naval Pet. Reserve	Scintrex	07/70-11/70	P, 6 mi.	N-S	1000 AG	69.5	68.08	155.75	161.75	2840	72-383
3019		ngdc 0260-924	M-D	Northeast Alaska '72	Aero	07/72-06/72	1.2 mi.	N-S	1000 AG	68	65	148.5	153.5	17300	73-305-311
3020		digitized	M-D	SE Alaska (Granite Fiords)	Aero	08/72-09/72	1 mi.	NE-SW	6000 B	56.25	55.38	130	131.17	1700	77-359
3029		ngdc 0260-904	M-D	Northeast Alaska '73	GeoMet.	08/73-09/73	1 mi.	N-S	1000 AG	68	65	144	148.5	15562	74-1101-1104
3030		digitized	M-D	Southeast Alaska '73	GeoMet.	08/73-09/73	1 mi.	N63E	6000 B	58.5	57.42	132.56	133.63	2028	B-1525
3053		ngdc 0260-925	M-D	McCarthy	Expl.Tech	01/75-03/75	1 mi.	N-S	1000 AG	62	61	141	144	7300	76-170
3054		ngdc 0260-907	M-D	Talkeetna	Expl.Tech	01/75-02/75	1 mi.	N-S	1000 AG	63	62.5	151.75	152.5	800	MF-870B
3055		ngdc 0260-928	M-D	Ruby	Expl.Tech	01/75-03/75	1 mi.	N-S	1000 AG	65	64	154.5	156	3300	76-188
3069	A	ngdc 0260-911	M-D	Prince William Sound	GeoMet.	06/75-09/77	1 mi.	N-S	1000 AG	61	59.5	144	150	17100	79-223,MF-880D
3092		digitized	M-D	Ketchikan	LKB	05/76-07/76	1 mi.	NE-SW	6000 B	56	54.72	130	132.33	5300	77-359
3093		ngdc 0260-930	M-D	Glacier Bay	LKB	07/76-08/76	1 mi.	N35E	8-15,000 B	59.27	56.17	135.25	138	5447	78-494
3102		ngdc 0260-903	M-D	Philip Smith Mountains	GeoMet.	10/76-11/76	1 mi.	N-S	1000 AG	69	68	147	150	5755	77-572
3103		ngdc 0260-920	M-D	Chignik-Sutwik	LKB	05/77-07/77	1 mi.	NW-SE	1000 AG	57	56	156.42	160.5	7380	78-262,263
3106		ngdc 0260-910	M-D	Lake Clark	Aero	07/77-08/78	1 mi.	NW-SE	1000 AG	61	60	153	156	7555	78-1086
3121		ngdc 0260-906	M-D	Medfra	LKB	06/78-07/78	1 mi.	N35W	1000 AG	64	63	153	156	6650	79-360
3122		ngdc 0260-909	M-D	Valdez	LKB	07/78-08/78	1 mi.	N-S	1000 AG	62	61	144	147	6465	79-381
3123		ngdc 0260-913	M-D	Sitka	LKB	Aug-78	0.5-1 mi.	N60E	1000 AG	58.25	57.37	135.5	136.67	3440	79-529
3138		ngdc 0260-914	M-D	Petersburg	LKB	08/78-09/78	1 mi.	N60E	1000 AG	57.08	55.83	130.63	134.33	8650	79-832
3177		usgs digital	M-D	Chugach	LKB	06/79-07/79	1 mi.	N50W	1000 AG	61.42	61	147	149.33	1705	80-058
3178		ngdc 0260-917	M-D	Afognak	LKB	06/79-07/79	1 mi.	N50W	1000 AG	58.7	57.92	151.75	153.5	1845	80-057
4038		ngdc 0260-918	M-D	Ugashik-Karluk	Fugro	Oct-80	1 mi.	NW-SE	1000 AG	58	57	155.33	158	3423	81-1158
4092		ngdc 0260-902	M-D	Killik River-Chandler L.	Div.Tech	Jun-82	2 mi.	E-W	4000-8000 B	69	68	150	156	6720	83-607
4093		usgs digital	M-D	Healy	Div.Tech	Jun-82	1 mi.	N-S	1000 AG	64	63	148.67	150	2470	84-295
4094		ngdc 0260-908	M-D	Anchorage	Div.Tech	Jul-82	1 mi.	N30W	1000 AG	81.77	61	147	150	3970	84-352
4095	A	ngdc 0260-921	M-D	Craig	Div.Tech	08/82-09/82	1 mi.	N-S	1000 AG	56.03	54.63	131.83	133.83	5730	64-666
4095	B	ngdc 0260-921	M-D	Northwest Craig	Div.Tech	08/82-09/82	1 mi.	E-W	1000 AG	56	55.83	133.25	134.5	630	84-666
4095	C	ngdc 0260-921	M-D	Southern Craig	Div.Tech	08/82-09/82	1 mi.	N68E	1000 AG	54.95	54.67	132.2	132.75	350	84-666
4096	A	ngdc 0260-919	M-D	Ugashik Northwest	Div.Tech	Jul-82	1 mi.	NW-SE	1000 AG	58.1	57.15	156.03	158	2475	84-351
4096	B	ngdc 0260-919	M-D	Ugashik South	Div.Tech	Jul-82	1 mi.	NW-SE	1000 AG	57.23	56.97	156.5	157.47	350	64-351
4096	C	ngdc 0260-919	M-D	Ugashik Northeast	Div.Tech	Jul-82	1 mi.	NW-SE	1000 AG	58	57.7	154.97	155.87	510	84-351
4097		ngdc 0260-912	M-D	Juneau	Div.Tech	07/82-08/82	1 mi.	N50E	7000 B	59.03	57.97	133.5	135.5	4100	84-296
4123		ngdc 0260-923	M-D	Wrangell Mountains	Airborne	Aug-84	1 mi.	E-W	1000 AG	62.8	61.83	142.92	145.08	2500	85-605
4150		ngdc 0260-927	M-D	Middleton Island	Aero	10/87-11/87	1 mi.	N-S	500 AG	60.25	59	143.25	147	8000	88-505
5006		ngdc 0420-675	M/R-D	Four Corners	Aero	Sep-79	1 mi.	N-S	400 AG	64.18	63.87	152.5	153.32	688	GJBX-116(80)
6008		usgs digital	M/R-D	Seward-Selawik	T.I.	06/75-07/75	6 mi.	E-W	400 AG	67	64	153	168	7630	GJO-1653
6016		ngdc 0420-*	M/R-D	Yukon	T.I.	05/76-08/76	6 mi.	E-W	400 AG	68	65	141	159	9700	GJBX-005(77)
6017		ngdc 0420-*	M/R-D	Bethel	T.I.	05/76-08/76	6 mi.	E-W	400 AG	63.5	59.75	159	166.25	7700	GJBX-005(77)
6018		ngdc 0420-499	M/R-D	Nunivak Island	T.I.	05/76-08/76	6 mi.	E-W	400 AG	60.37	59.67	165.67	167.5	250	GJBX-005(77)
6019		ngdc 0420-539	M/R-D	Taylor Mountains	T.I.	05/76-08/76	6 mi.	E-W	400 AG	61	60	156	159	1400	GJBX-005(77)
6020		ngdc 0420-*	M/R-D	Nushagak Bay	T.I.	05/76-08/76	6 mi.	E-W	400 AG	59	58	156	162	1100	GJBX-005(77)

6023	ngdc 0420-*	M/R-D	Cook Inlet	LKB	06/76-07/77	6 mi.	E-W	400 AG	62	59	147	153	5753	GJBX-108(78)
6024	ngdc 0420-*	M/R-D	Eastern Alaska	LKB	07/76-08/76	6 mi.	E-W	400 AG	64	61	141	144	4037	GJBX-091(78)
6025	ngdc 0420-*	M/R-D	Chugach-Yakutat	LKB	08/76-08/77	6 mi.	E-W	400 AG					4000	GJBX-127(78)
6026	ngdc 0420-*	M/R-D	Southeastern Alaska	LKB	08/76-09/77	6 mi.	E-W	400 AG	59.75	54.75	130	138	7683	GJBX-048(79)
6035	ngdc 0420-*	M/R-D	Eagle-Talkeetna	T.I.	06/77-09/77	6 mi.	E-W	400 AG	66	62	141	153	12392	GJBX-113(78)
6036	ngdc 420-55*	M/R-D	Lime Hills-Lake Clark	T.I.	06/77-09/77	6 mi.	E-W	400 AG	62	60	153	156	2775	GJBX-113(78)
6037	ngdc 0420-538	M/R-D	Dillingham	T.I.	06/77-09/77	6 mi.	E-W	400 AG	60	59	156	159	1509	GJBX-113(78)
6121	ngdc 0420-*	M/R-D	West-Central Alaska	Aero	07/79-09/79	6 mi.	E-W	400 AG	65	61	150	162	13273	GJBX-072(80)+
6169	ngdc 0420-*	M/R-D	Northern Alaska	Aero	07/80-08/80	6 mi.	E-W	400 AG	71.33	69	147	164	8835	GJBX-295(81)+
AK01	digitized	M-A	Western Brooks Range	Aero	?/58	6.5 mi.	N-S	5000 B	69	67	162	164	1120	77-166E
AK04	digitized	M-A	Western Baird Mountains	Scintrex	?/70	var.	var.	5000 B	68.5	67	161	162	1000	77-166E
AK05	digitzed	M-A	Gulf of Alaska	USN	04/70-05/70	0.5-4 mi.	var.	1000 AG	60	57	136.33	152	19200	JGR v.79
AK07	digitized	M-A	Seward Peninsula	LKB	?/71	0.75 mi.	E-W	1000 AG	66.15	64.33	160.5	166.75	15500	AK OF's
AK08 A	digitized	M-A	E Alaska Range - Tanacross	LKB	?/71	0.75 mi.	N-S	1000 AG	64.25	62	141	149	27000	AK OF's
AK08 B	digitized	M-A	E Alaska Range - Nabesna	LKB	?/71	0.75 mi.	N-S	1000 AG	64.25	62	141	149	27000	AK OF's
AK09	digitized	M-A	Goodnews Area	LKB	?/71	0.75 mi.	E-W	1000 AG	60.25	58.5	159	162	12200	AK OF's
AK10	digitized	M-A	Eagle	LKB	?/72	0.75 mi.	N-S	1000 AG	65	64	141	144	7900	AK OF 18
AK11	digitized	M-A	Talkeetna-Anchorage	LKB	?/72	0.75 mi.	N-S	1000 AG	63	61.75	147	153	18000	AK OF 19, 20
AK12	digitized	M-A	Big Delta-Fairbanks	LKB	?/73	0.75 mi.	N-S	1000 AG	65	63.75	144	150	16000	AK OF 8, 17
AK13	digitized	M-A	Healy-Mt. Hayes Fill-in	LKB	?/73	0.75 mi.	N-S	1000 AG	63.7	63.12	144	148	2100	AK OF's
AK14	digitized	M-D	Baird Mtns.-Ambler River	GeoMet.	?/73-?/74	1 mi.	N-S	1000 AG	68	66.75	157.12	161	8900	AK OF's
AK15	digitized	M-D	Survey Pass Area	GeoMet.	?/75	0.75-1 mi.	N-S	1000 AG	68	66.75	153.12	157.12	11000	AK OF's
AK16	ngdc 0010-001	M-D	South NPR '77	GSI	?/77	6-10 mi.	N-S	800 AG	69.5	68	155.5	161.25	1200	80-516
AK17	ngdc 0260-922	M-D	Wiseman-Bettles (DNR)	GeoMet.	?/78	0.75 mi.	N-S	1000 AG	68	66	150.5	156.5	11200	AK OF's
AK21	usgs line leveled	M-D	Prudhoe Bay Region	USGS	?/81	1-3 mi.	N-S	300 AG	70.48	69.33	145.75	148.25	1300	Geoph. v.49
AK22	usgs line leveled	M-D	Arctic Nat. Wildlife R.	USGS	?/81	1-3 mi.	E-W	300 AG	70.17	69.62	142.33	146.25	1445	Geoph. v.49
AK23	digitized	M-D	Eastern Copper River	Ertec	Jun-82	0.5 mi.	N-S	500 AG	62.21	62	144.58	145.32	660	UAG R-302
ANNET	usgs digital	M-D	Annette Island				NE-SW	300 AG					2000	
CADY	usgs grid	M-G	Seward Peninsula comp.	misc.	1995 merge	0.25 km	grid	1000 AG						
COOK	digitzed	M-A	Cook Inlet	misc.				various					1000	
PHILLIPS	usgs grid	M-G	Phillips comp. 1/2 km gd	misc	1992 merge	0.5 km	grid	1000 AG	61.25	60	159	162	5000	

Explanation of columns:

No.	USGS internal identification number (Pat Hill number)
sect.	Section designation for subdivided surveys
Status	Current status of data; all data have been transferred to the National Geophysical Data Center (ngdc) - the ngdc identification code for the survey is given if known.
Type	Type codes: M = map coverage, M/R = widely-spaced (regional) map coverage, A = original data analog, D = original data digital, G = gridded data
Name	USGS identification name (Pat Hill name)
Flown By	Company that flew the original survey: USN = U.S. Navy, LKB = LKB Resources, Aero = Aero Service Corp., GeoMet = GeoMetrics, T.I. = Texas Instruments
Date Flown	
Spacing	Primary flightline spacing
Dir	Primary flightline direction
Altitude	Primary flight altitude; B = barometric (constant elevation), AG = above ground (draped survey)
MxLat	Approximate boundaries of survey
MnLat	
MnLg	
MxLg	
LnMi	Approximate total flightline length of survey
Publication	Brief publication reference. USGS Open-file reports are listed as XX-YYY where XX is the publication year. GJO and GJBX numbers are for Dept. of Energy, Grand Junction Office reports from the NURE program. USGS Bulletins are listed as B-XXXX. USGS GP maps are listed as GP-XXX. USGS MF maps are listed as MF-XXX. JGR is Journal of Geophysical Research. Geoph. is the journal Geophysics. AK OF's refers to the 1:63,360 maps published in the 1970's by the Alaska State Dept. of Natural Resources, Division of Geological and Geophysical Surveys. For more complete references see: Hill, P.L., 1991, Bibliographies and location maps of publications on aeromagnetic and aeroradiometric surveys for Hawaii and Alaska: USGS Open-file 91-370-E, 36 pp.

Rick Saltus
18 September 1997

README.TXT FILE FOR PLOT TRANSFER DIRECTORY

This directory contains binary HPGL format plot files for aeromagnetic maps that span the state of Alaska. See the web site for index maps and more information. These plot files will plot on plotters such as the HP750. The sizes of the resulting maps vary, but are mostly about 2 ft x 3 ft. The state maps are at 1:2,500,000 scale, the regional maps are at 1:500,000 scale.

Listing of plot files:

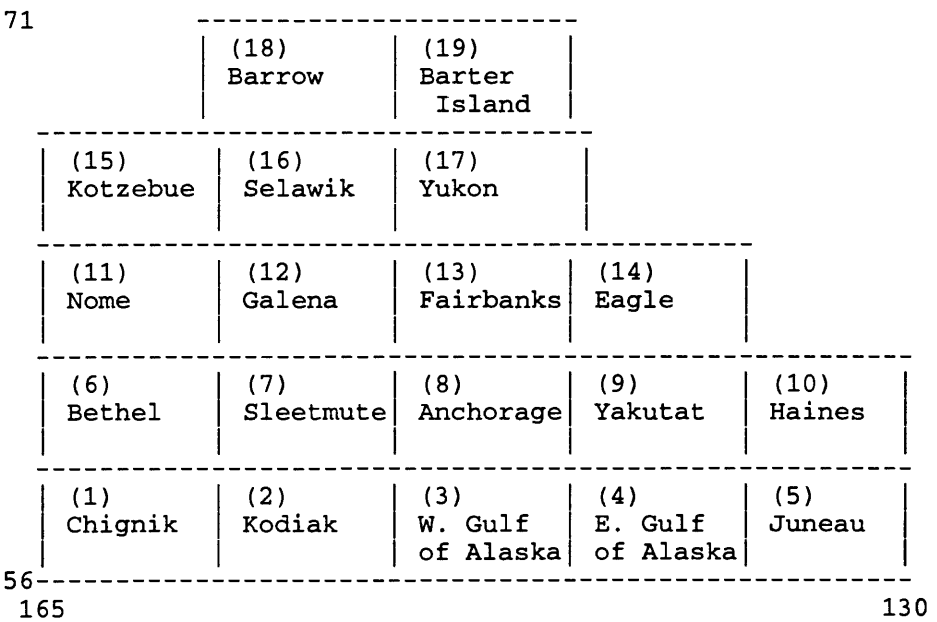
Whole State Maps (scale 1:2,500,000)

akmerge.bin - color contour map of merged aeromagnetic data for Alaska
akcomp.bin - color contour map of composite aeromagnetic data for Alaska

Regional Maps (scale 1:500,000)

map#_m.bin (19 maps) - color contour maps of merged aeromagnetic data
map#_c.bin (19 maps) - color contour maps of composite aeromagnetic data

Regional Map Index



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README.TXT FILE FOR GRIDDED DATA TRANSFER DIRECTORY

This directory contains ascii and binary gridded files for the Alaska composite and merged aeromagnetic data. Each data grid is available in four different data formats:

1. GeoSoft GXF format (an ascii grid transfer format)
2. ER Mapper format (a two-part transfer format)
3. ARC/INFO grid export format (a binary format)
4. USGS ODDF grid format (a binary format)

Each of these formats is discussed briefly below.
If none of these formats are directly readable by software on your system, then your best bet is probably to write a program to input and translate the GXF format.

BASIC GRID STATISTICS (Merged Grids)

Cell Size = 1000.000 meters Data Type: Floating Point
Number of Rows = 1716
Number of Columns = 2216

BOUNDARY		STATISTICS	
Xmin =	-902500.000 meters	Minimum Value =	-1867.067
Xmax =	1313500.000 meters	Maximum Value =	4640.109
Ymin =	109500.000 meters	Mean =	52.478
Ymax =	1825500.000 meters	Standard Deviation =	170.791

COORDINATE SYSTEM DESCRIPTION

Projection	ALBERS		
Units	METERS	Spheroid	CLARKE1866
Parameters:			
1st standard parallel			55 0 0.000
2nd standard parallel			65 0 0.000
central meridian			-151 0 0.00
latitude of projection's origin			55 0 0.000
false easting (meters)			0.00000
false northing (meters)			0.00000

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1. Grid eXchange Format (AKCOMP.GXF, AKMERGE.GXF)

GXF (Grid eXchange File) is a standard ASCII file format for exchanging gridded data among different software systems. Software that supports the GXF standard will be able to import properly formatted GXF files and export grids in GXF format.

Grid Description:
A grid is a rectangular array of points at which single data values define a two dimensional function. Grid point locations are related to a Grid Coordinate System (GCS), which is a right handed Cartesian system with X and Y axis defined by the bottom and left sides of a grid array. The grid point at the bottom, left corner of the array is the origin of the GCS. All distances are in meters.

GCS coordinates are related to a Base Coordinate System (BCS) through a plane translation and rotation. (For these Alaska grids, the base coordinate system is the Albers conical equal-area projection with standard parallels of 55 and 65 degrees, a base latitude of 55 degrees north, a central meridian of 151 degrees west, a semi-major axis of ellipsoid of 6378206.400 meters, an eccentricity of 0.0067686579973.) The origin of the GCS is located at point (x0,y0) in the BCS, and the X and Y grid indices are related to BCS units through the separation between points in the GCS X and Y directions.

Labeled Data Objects and Comments

A GXF file is an ASCII file made up of a number of labeled data objects and comments. Each labeled data object has a label line followed by one or more data lines. A label line is identified by a '#' character in the first column followed immediately by an upper-case label. The data associated with that label are found on one or more lines that follow the label.

Lines

All lines in a GXF file must be less than or equal to 80 characters in length. Any lines that are not part of a labeled data object are ignored and can be used to place comments within a GXF file. Programs that read GXF files will skip such comment lines while they search for the next GXF data object.

GXF Object Definitions

#TITLE
A one line descriptive title of the grid. Some grid formats include textual descriptions of the grid, and this information can be placed in a #TITLE object.
Default: blank title

#POINTS
The number of points in each grid row (horizontal or vertical as defined by the #SENSE object).
Default: no default - this object is required.

#ROWS
The number of rows in the grid. A grid row (or vector) is a collection of consecutive grid points that represent the grid values along a horizontal or vertical line in the grid. The complete grid is then defined by a consecutive sequence of grid rows.
Default: no default - this object is required.

#PTSEPARATION
The separation between points in the grid. This should be in Base Coordinate System units (ground units for geographically based grids).
Default: 1.0

#RWSEPARATION
The separation between rows in the grid. These should be in Base Coordinate System units (ground units for geographically based grids).
Default: 1.0

#XORIGIN
The X location of the bottom left corner of the grid in the Base Coordinate System.
Default: 0.0

#YORIGIN
The Y location of the bottom left corner of the grid in the Base Coordinate

System.
Default: 0.0

#ROTATION
The rotation angle of the grid. This is the counter-clockwise angle of the bottom edge of the grid with respect to the Base Coordinate System X axis. Rotation only has meaning for Base Coordinate Systems that use the same units on the X and Y axis.
Default: 0.0

#SENSE
The first point of the first row of the stored grid can be at any corner of the grid rectangle, and the grid rows can be run vertically or horizontally. The SENSE object defines this storage sense as follows:

±1	first point at bottom left of grid
±2	first point at upper left of grid
±3	first point at upper right of grid
±4	first point at bottom right of grid

A positive SENSE stores rows in a right-handed sense; a negative SENSE stores rows in a left-handed sense. This means that if you were standing at the first grid point and looking into the grid, the first grid row would extend to your right for a right handed grid (positive sense), or to your left for a left handed sense (left-handed grid):
(All grids on this CD have SENSE=+1.)
Default: 1 (first point at bottom left, rows left to right)

#TRANSFORM
This keyword is followed by two numbers on the same line: SCALE and OFFSET, which are used to transform the grid data to desired units:
Z = G * SCALE + OFFSET
where

Z	grid value in the desired unit
G	are grid values as specified in the #GRID object

Default: SCALE = 1.0, OFFSET = 0.0

#DUMMY
The grid must be rectangular (every row must have the same number of points). The dummy value defined by this object is used to define blank areas of the grid. Any grids that include blank areas must define a dummy value.
Default: no dummy value.

#GRID
The grid data is listed point by point and row by row. The #GRID object and data is always the last object in a GXF file.
The first data point is at the location indicated by #SENSE, and is followed by successive points in that row of points (either horizontal or vertical), then the points in the next row, and so on. The points in a row can follow on to the next data line, although each new row must start on a new data line. A GXF reading program can expect #ROWS of #POINTS for a total of #ROWS times

#POINTS data values.
Default: none, must be included as the last object in a GXF file.

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2. ER Mapper grid format (akmerge & akmerge.ers, akcomp & akcomp.ers)

The ER Mapper grid format consists of two files: a binary data file (no file suffix) and a ascii header file (*.ers). These files can be read directly by the ER Mapper software or by other packages such as ERDAS IMAGINE. Note that the header files refer to the projection

called "ALINTAK1". This is not a standard ER Mapper projection. To register the grid properly within ER Mapper you must create a projection entry that corresponds to the parameters listed above for the projection of these data.

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3. ARC/INFO Grid Export format (akc.e00, akm.e00)

This format is readable by ARC/INFO, ERDAS IMAGINE, and other packages. When imported into ARC/INFO, this file will unpack into a directory containing all the components of the registered grid coverage.

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4. USGS ODDF binary grid format (akcomp.gd, akmerge.gd)

This is a binary format with an included ascii header. This format is used by the USGS Geophysics Group within the Minerals Program of the Geologic Division.

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Alaska Aeromagnetic References

- Godson, R.H., 1984, compiler, Composite magnetic anomaly map of the United States, Part B - Alaska and Hawaii: Geophysical Investigations Map GP-954-B, U.S. Geological Survey, scale 1:2,500,000, 2 sheets.

  Previous (analog) aeromagnetic compilation for Alaska. Although the final compilation was digitized, the resolution of the resulting grid was poor.

- Hill, P.L., 1991, Bibliographies and location maps of publications on aeromagnetic and aeroradiometric surveys for Hawaii and Alaska: U.S. Geological Survey Open-file report 91-370-E, 36 pp.

  Full index maps and complete bibliographic data references for public domain aeromagnetic and aeroradiometric surveys known to the USGS.

- Meyer, J.F., and Saltus, R.W., 1995, Merged Aeromagnetic Map of Interior Alaska: U.S. Geological Survey Map GP-1014, scale 1:500,000.

  Color contour maps of the merged magnetic data for interior Alaska (spans from 61 to 66 N latitude and from 144 to 159 W longitude).

- Meyer, J.F., Saltus, R.W., Barnes, D.F., and Morin, R.L., 1996, Bouguer Gravity Map of Interior Alaska: U.S. Geological Survey Map GP-1016, scale 1:500,000.

  Color contour maps of gravity for the same region as the interior Alaska magnetic maps.

- Saltus, R.W., Meyer, J.F., Barnes, D.F., and Morin, R.L., 1997, Tectono-Geophysical Domains of Interior Alaska as Interpreted From New Gravity and Aeromagnetic Data Compilations: in Geologic Studies in Alaska by the U.S. Geological Survey, 1995, Dumoulin, J.A., and Gray, J.E., eds., U.S. Geological Survey Professional Paper 1574, pp. 157-171.

  A preliminary tectonic interpretation of the interior Alaska gravity and magnetic

compilations.

- Saltus, R.W., and Simmons, G.C., 1997, Composite and Merged Aeromagnetic Data for Alaska: A Web Site for Distribution of Gridded Data and Plot Files: U.S. Geological Survey Open-file report 97-520, 14 pp.

  Paper report describing this web site. This report can be used as a bibliographic reference for these data grids in formal publications.

URL: http://minerals.usgs.gov/publications/ofr/97-520/web_refs.html
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