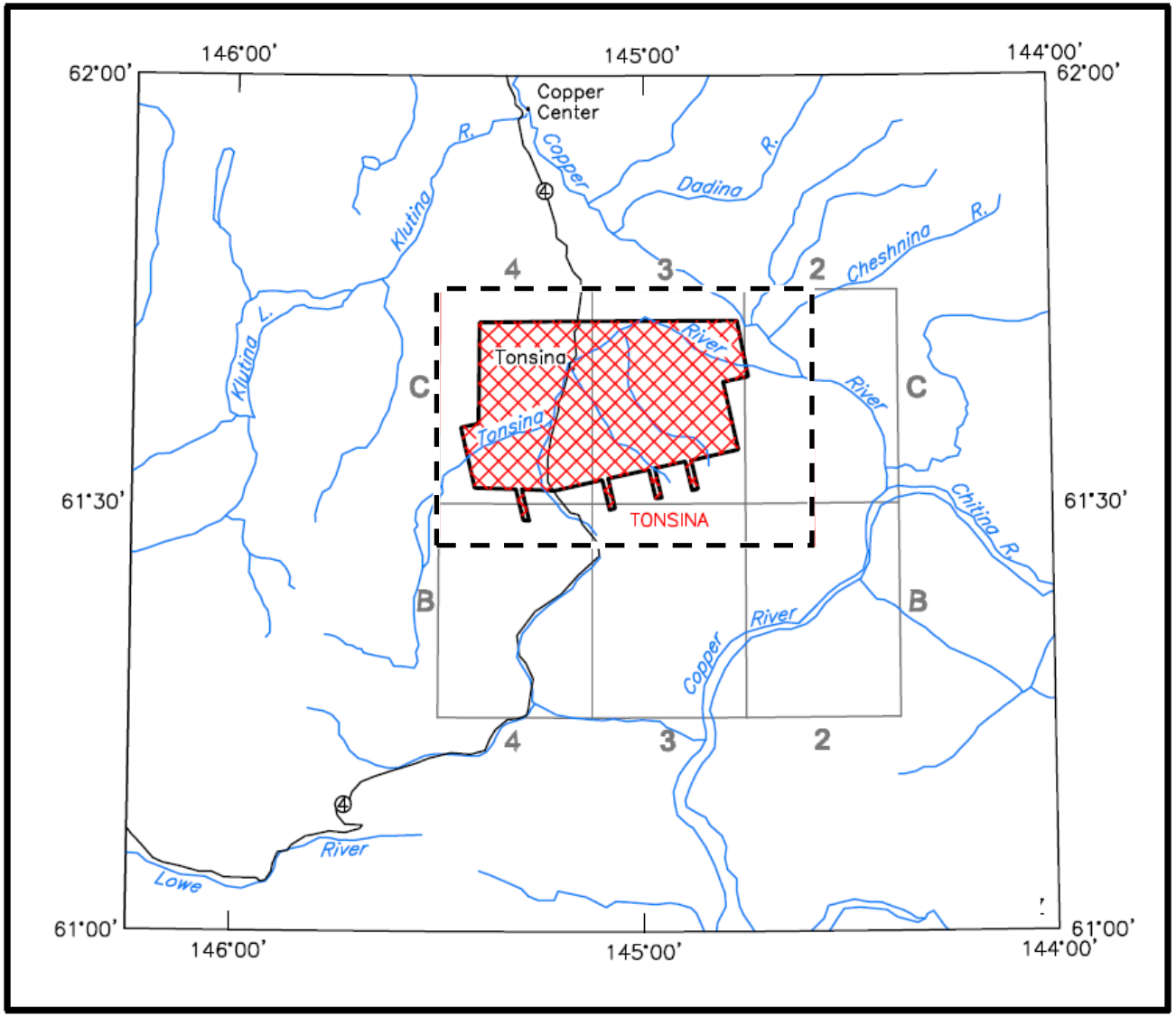
Tonsina Area Electromagnetic and Magnetic Airborne Geophysical Data Compilation

Map Catalog



Tonsina survey location map, showing the survey area (hatched), the Richardson Highway, towns, rivers, and Valdez 1:63,360 Quadrangle boundaries.

State of Alaska,
Department of Natural Resources,
Division of Geological & Geophysical Surveys
-and-
CGG

http://dx.doi.org/10.14509/29169

map boundary

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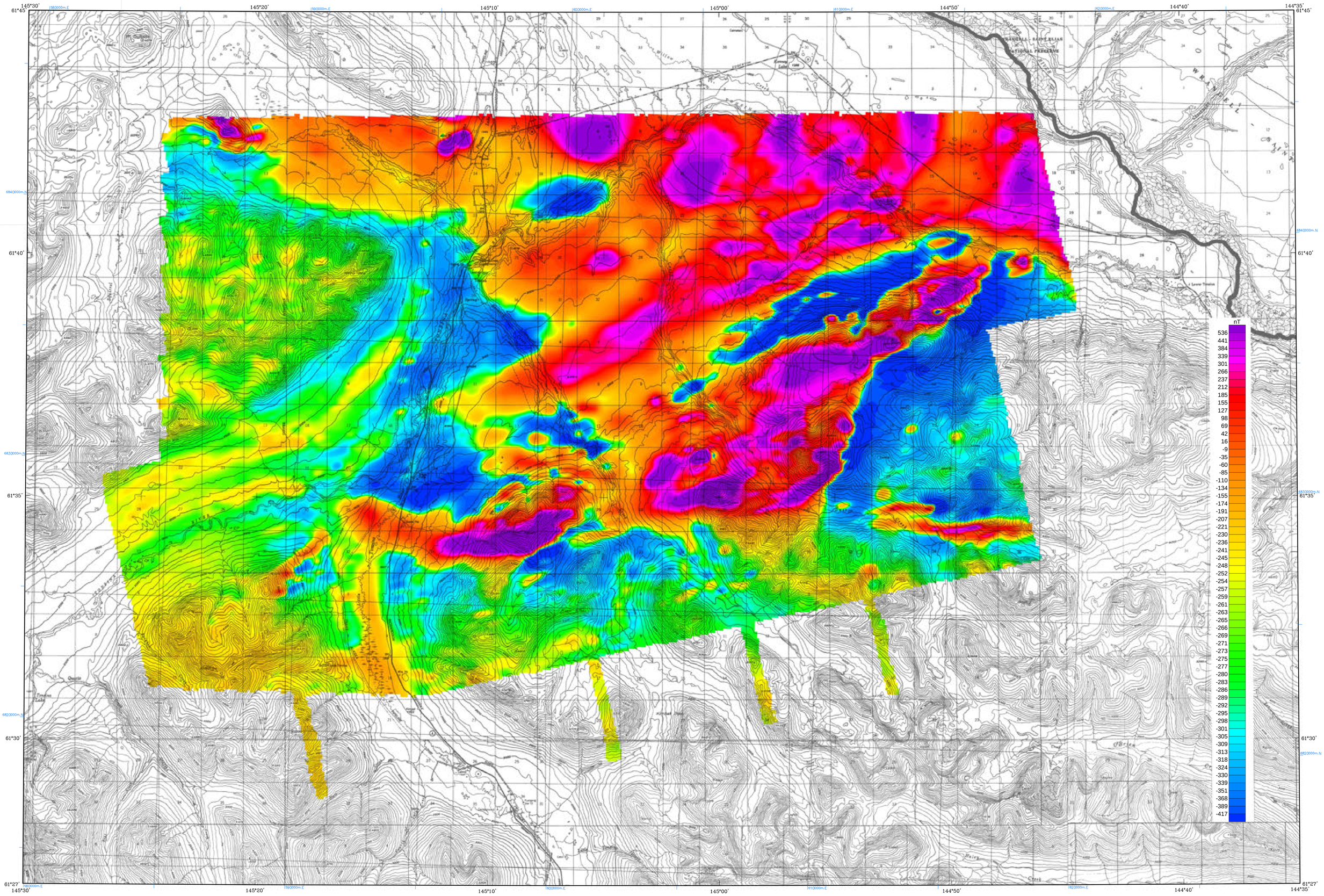
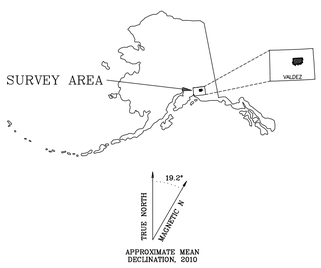


Base from U.S. Geological Survey Valdez B-2, 1972; B-3, 1995; B-4, 1994; Valdez C-2, 1996; C-3, 1996; C-4, 1996; Quadrangles, Alaska



SCALE 1:63,360

1 0 1 2 3 4 MILES

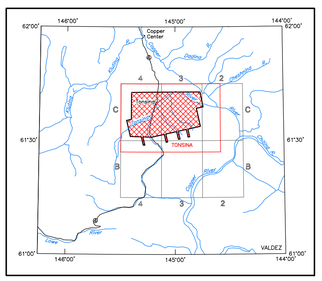
1 0 1 2 3 4 5 KILOMETERS

RESIDUAL MAGNETIC FIELD WITH TOPOGRAPHY, TONSINA SURVEY AREA, SOUTH-CENTRAL ALASKA

PART OF THE VALDEZ QUADRANGLE

by
Abraham M. Emond, CGG, and CGG Land (U.S.) Inc.
2015

LOCATION INDEX OF 1:63,360-SCALE MAP



DESCRIPTIVE NOTES

The geophysical data were acquired with a DIGHEM^{V} Electromagnetic (EM) system and a CGG D1344 cesium magnetometer with a Scintrex CS3 cesium sensor. The EM and magnetic sensors were flown at a height of 30 meters (m). In addition the survey recorded data from radar and laser altimeters, GPS navigation system, 50/60 Hz monitors and video camera. Flights were performed with an AS-350-B3 Squirrel helicopter at a mean terrain clearance of 60 m along NW-SE (345°) survey flight lines with a spacing of 400 m. Tie lines were flown perpendicular to the flight lines at intervals of approximately 4,800 m.

A Novatel OEM5-G2L Global Positioning System was used for navigation. The helicopter position was derived every 0.5 seconds using post-flight differential positioning to a relative accuracy of better than 5 m. Flight path positions were projected onto the Clarke 1866 (UTM zone 6) spheroid, 1927 North American datum using a central meridian (CM) of 147°, a north constant of 0 and an east constant of 500,000. Positional accuracy of the presented data is better than 10 m with respect to the UTM grid.

RESIDUAL MAGNETIC FIELD

The magnetic total field data were processed using digitally recorded data from a CGG D1344 magnetometer with a Scintrex CS3 cesium sensor. Data were collected at a sampling interval of 0.1 seconds. The magnetic data were (1) corrected for diurnal variations by subtraction of the digitally recorded base station magnetic data, (2) IGRF corrected (IGRF model 2010, updated for date of flight and altimeter variations), (3) leveled to the tie line data, and (4) interpolated onto a regular 80 m grid using a modified Akima (1970) technique. All grids were then resampled from the 80 m cell size down to a 25 m cell size to produce the maps and final grids contained in this publication.

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.

SURVEY HISTORY

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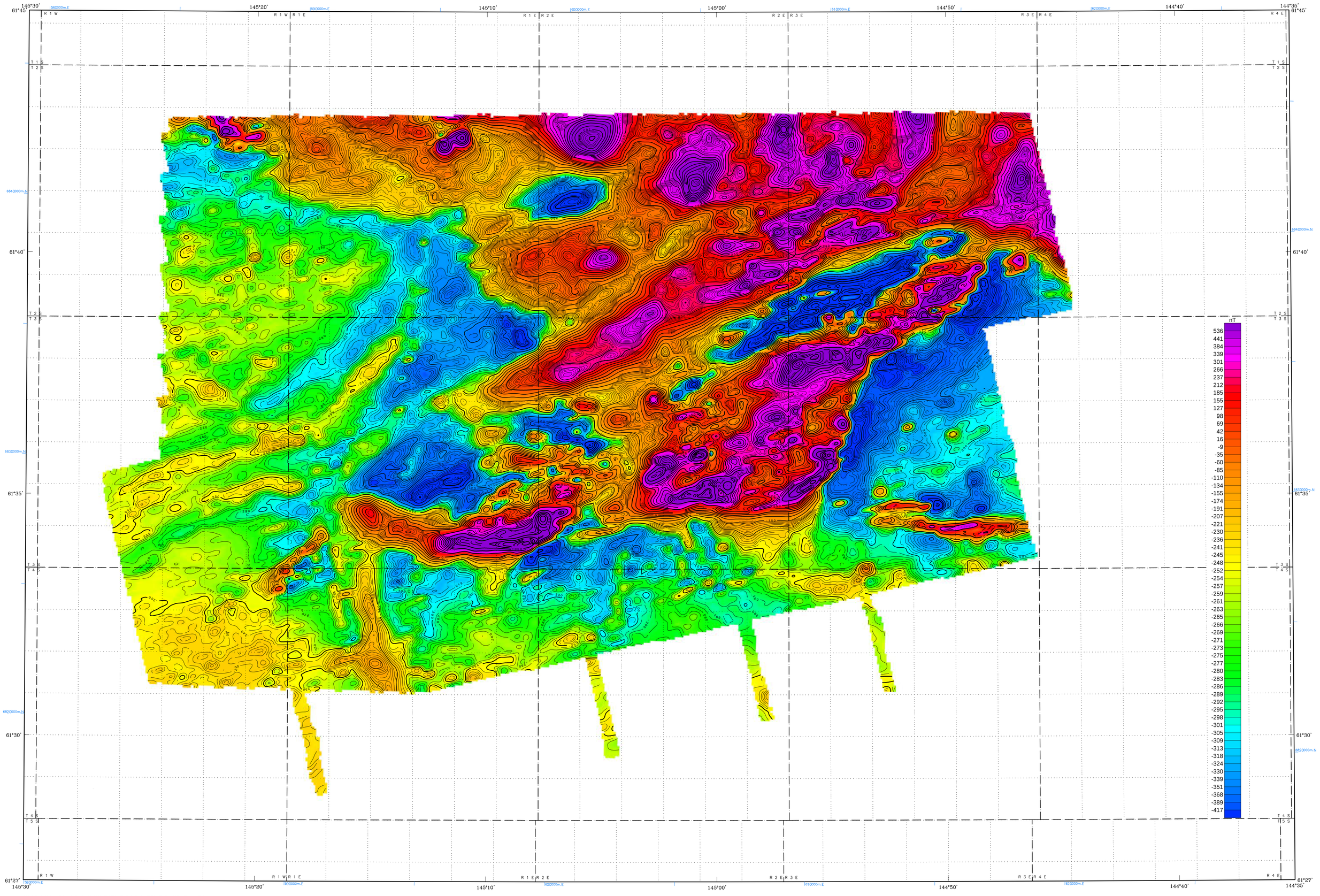

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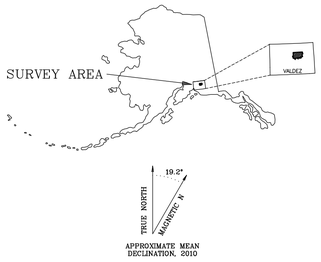


SCALE 1:63,360

1 0 1 2 3 4 MILES

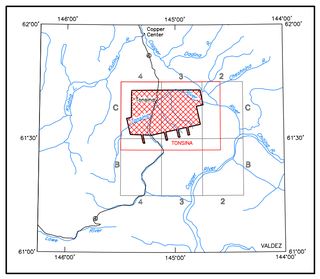
1 0 1 2 3 4 5 KILOMETERS

RESIDUAL MAGNETIC FIELD WITH DATA CONTOURS, TONSINA SURVEY AREA, SOUTH-CENTRAL ALASKA

PART OF THE VALDEZ QUADRANGLE

by
Abraham M. Emond, CGG, and CGG Land (U.S.) Inc.
2015

LOCATION INDEX OF 1:63,360-SCALE MAP



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MAGNETIC CONTOURS

250 nT

50 nT

10 nT

5 nT

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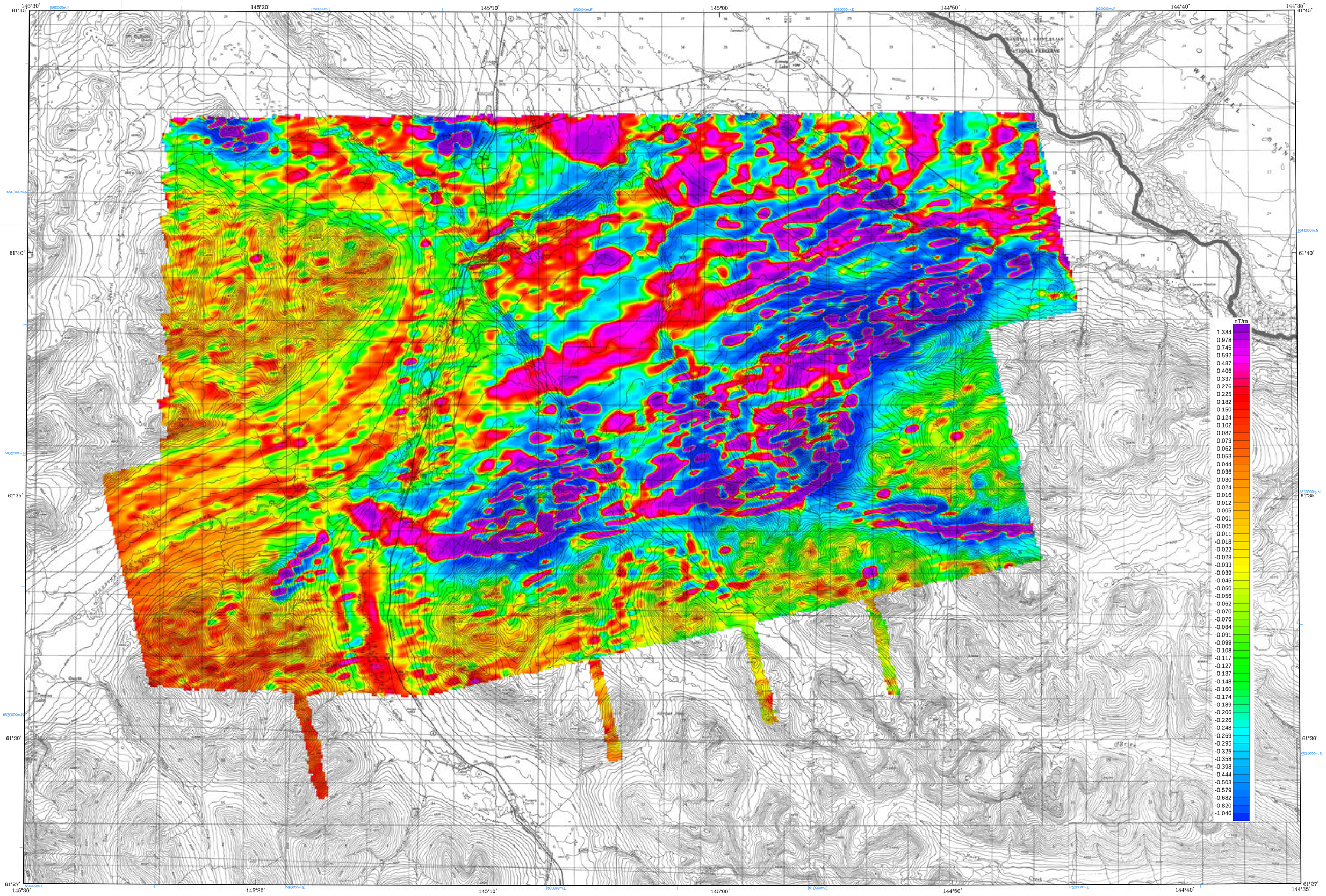

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1 0 1 2 3 4 MILES

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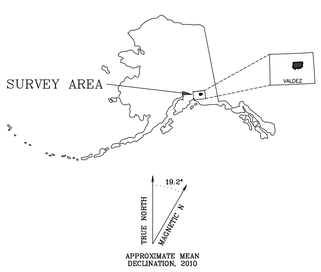
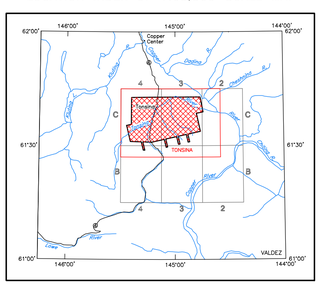


FIRST VERTICAL DERIVATIVE OF THE MAGNETIC FIELD WITH TOPOGRAPHY, TONSINA SURVEY AREA, SOUTH-CENTRAL ALASKA

PART OF THE VALDEZ QUADRANGLE

by
Abraham M. Emond, CGG, and CGG Land (U.S.) Inc.
2015

LOCATION INDEX OF 1:63,360-SCALE MAP



DESCRIPTIVE NOTES

The geophysical data were acquired with a DIGHEM V Electromagnetic (EM) system and a CGG D1344 cesium magnetometer with a Scintrex CS3 cesium sensor. The EM and magnetic sensors were flown at a height of 30 meters (m). In addition the survey recorded data from radar and laser altimeters, GPS navigation system, 50/60 Hz monitors and video camera. Flights were performed with an AS-350-B3 Squirrel helicopter at a mean terrain clearance of 60 m along NW-SE (345°) survey flight lines with a spacing of 400 m. Tie lines were flown perpendicular to the flight lines at intervals of approximately 4,800 m.

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COLOR BAR HISTOGRAM

Approximately 98% of the first vertical derivative of the magnetic field for the Tonsina Survey Area dataset lie within the range displayed on the color bar. Data values actually range from -17.549 nT/m (dark blue) to about 83.029 nT/m (magenta).

FIRST VERTICAL DERIVATIVE OF THE MAGNETIC FIELD

The magnetic total field data were processed using digitally recorded data from a CGG D1344 magnetometer with a Scintrex CS3 cesium sensor. Data were collected at a sampling interval of 0.1 seconds. The magnetic data were (1) corrected for diurnal variations by subtraction of the digitally recorded base station magnetic data, (2) IGRF corrected (IGRF model 2010, updated for date of flight and altimeter variations), (3) leveled to the tie line data, and (4) interpolated onto a regular 80 m grid using a modified Akima (1970) technique. All grids were then resampled from the 80 m cell size down to a 25 m cell size to produce the maps and final grids contained in this publication. The first vertical derivative grid was calculated from the processed total magnetic field grid using a FFT base frequency domain filtering algorithm. The resulting first veritical 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.

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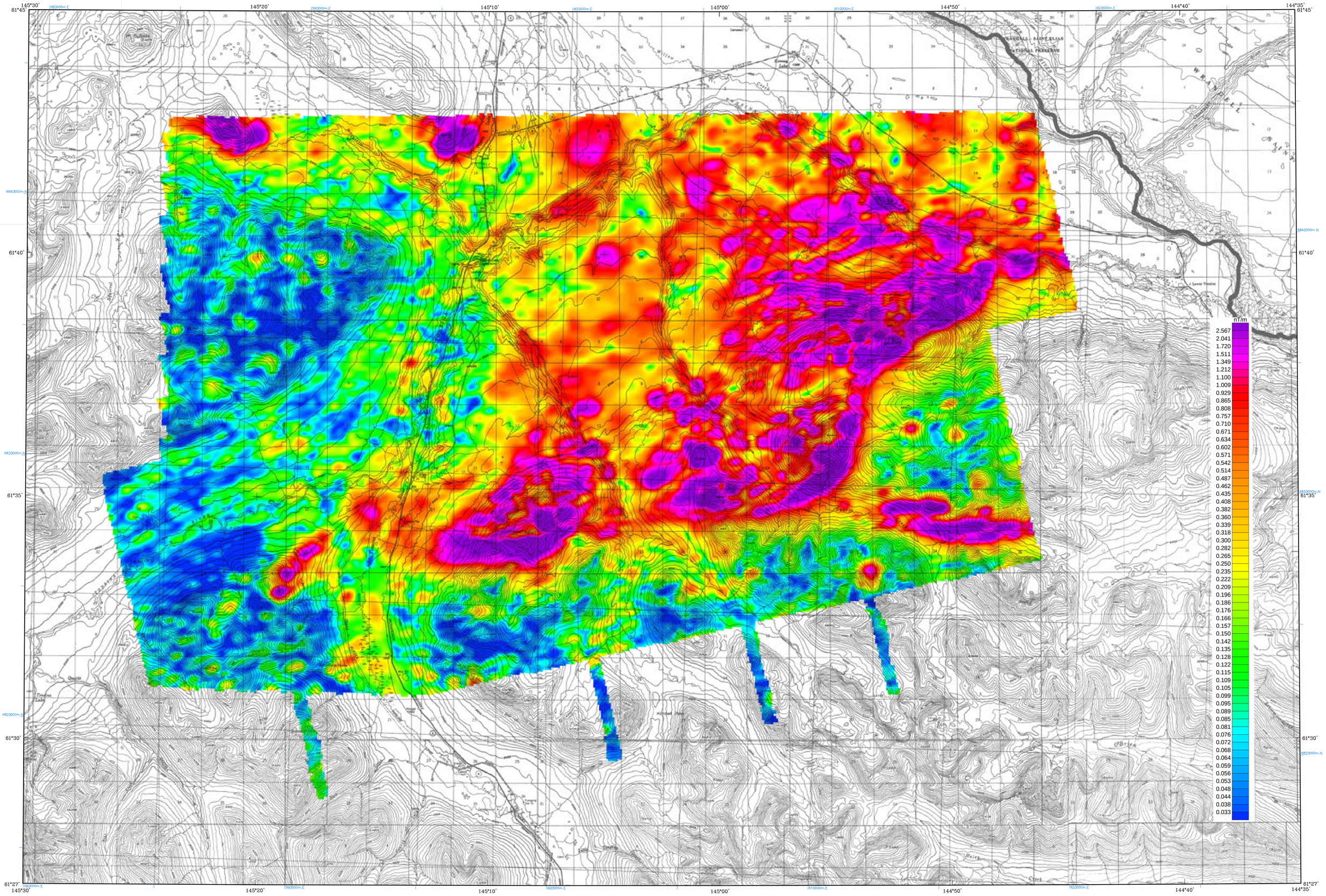

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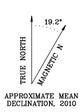
SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS



APPROXIMATE MEAN DECLINATION, 2010

ANALYTIC SIGNAL WITH TOPOGRAPHY, TONSINA SURVEY AREA, SOUTH-CENTRAL ALASKA

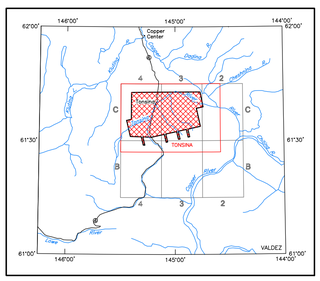
PART OF THE VALDEZ QUADRANGLE

by

Abraham M. Emond, CGG, and CGG Land (U.S.) Inc.

2015

LOCATION INDEX OF 1:63,360-SCALE MAP



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ANALYTIC SIGNAL

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 (e.g., contacts, fault/shear zones, etc.). Analytic signal maxima are located directly over faults and contacts, regardless of structural dip, and independently of the direction of the induced and/or remanent magnetizations.

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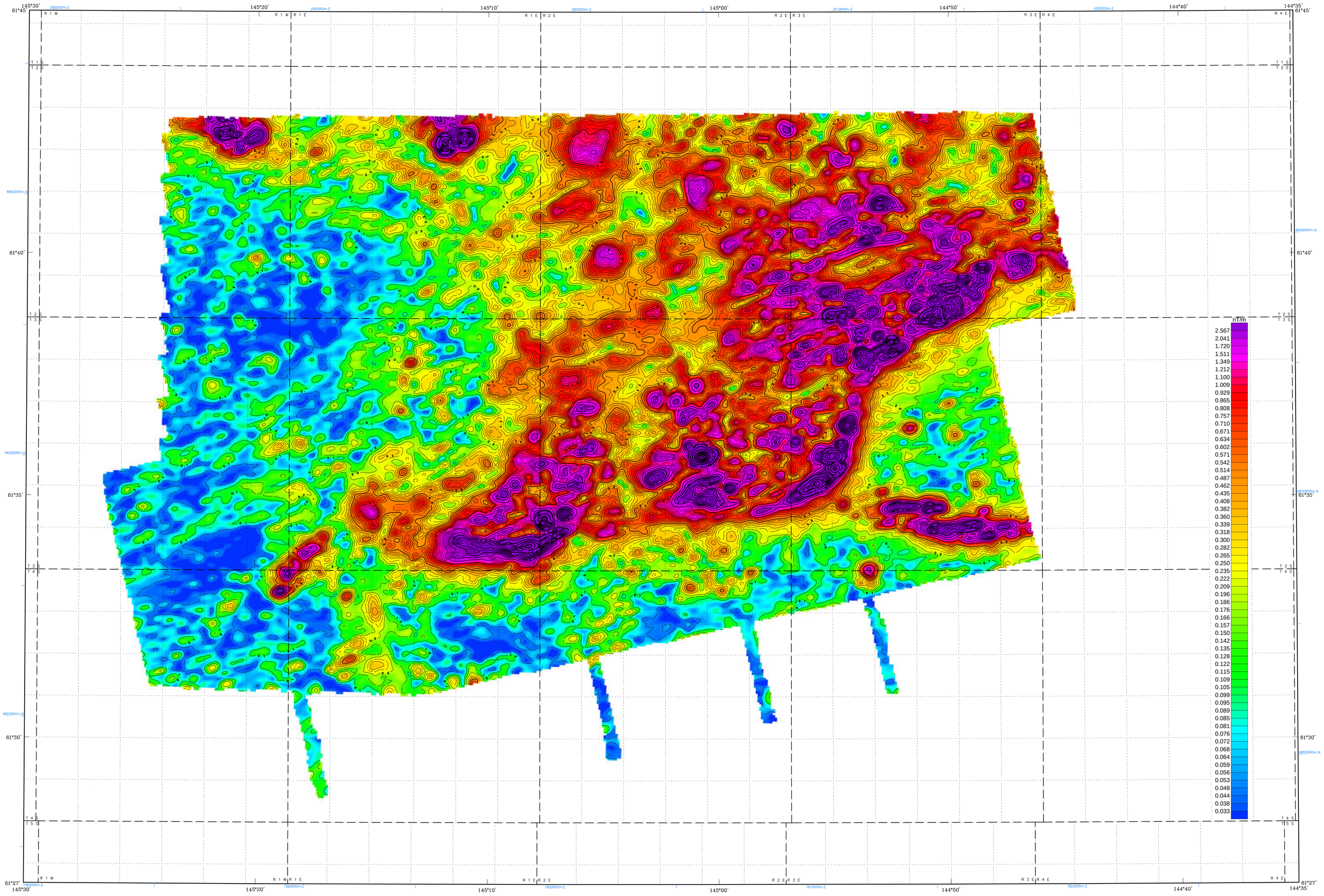

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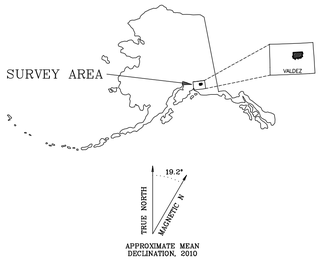

SCALE 1:63,360

1 0 1 2 3 4 MILES

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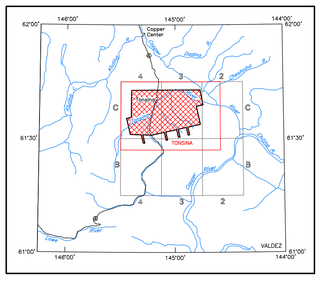

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ANALYTIC SIGNAL CONTOURS

————	2.50 nT/metre
————	0.50 nT/metre
————	0.10 nT/metre
— — — —	0.05 nT/metre

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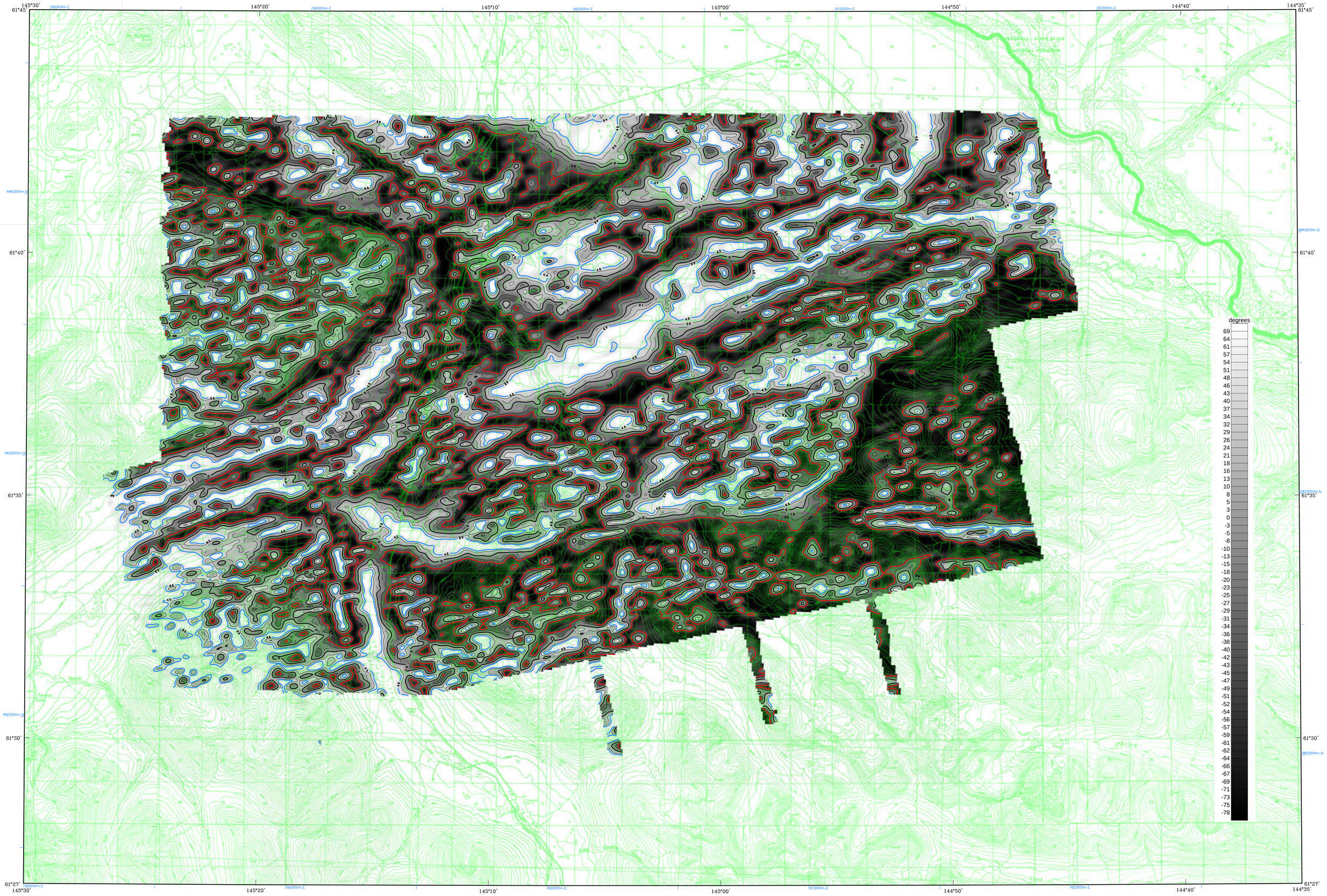

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APPROXIMATE MEAN DECLINATION, 2010

SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

MAGNETIC TILT DERIVATIVE WITH TOPOGRAPHY AND DATA CONTOURS, TONSINA SURVEY AREA, SOUTH-CENTRAL ALASKA

PART OF THE VALDEZ QUADRANGLE

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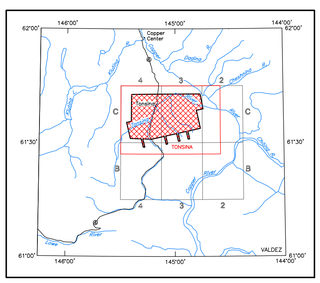

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MAGNETIC TILT DERIVATIVE

The tilt derivative is the angle between the horizontal gradient & the total gradient, which is useful for identifying the depth & type of source. The tilt angle is positive over the source, crosses through zero at, or near, the edge of a vertical sided source, and is negative outside the source region. It has the added advantage of responding equally well to shallow and deep sources and is able to resolve deeper sources that may be masked by larger responses from shallower sources.

MAGNETIC TILT DERIVATIVE CONTOURS

- +45 degrees
- +30 degrees
- +15 degrees
- 0 degrees
- -15 degrees
- -30 degrees
- -45 degrees

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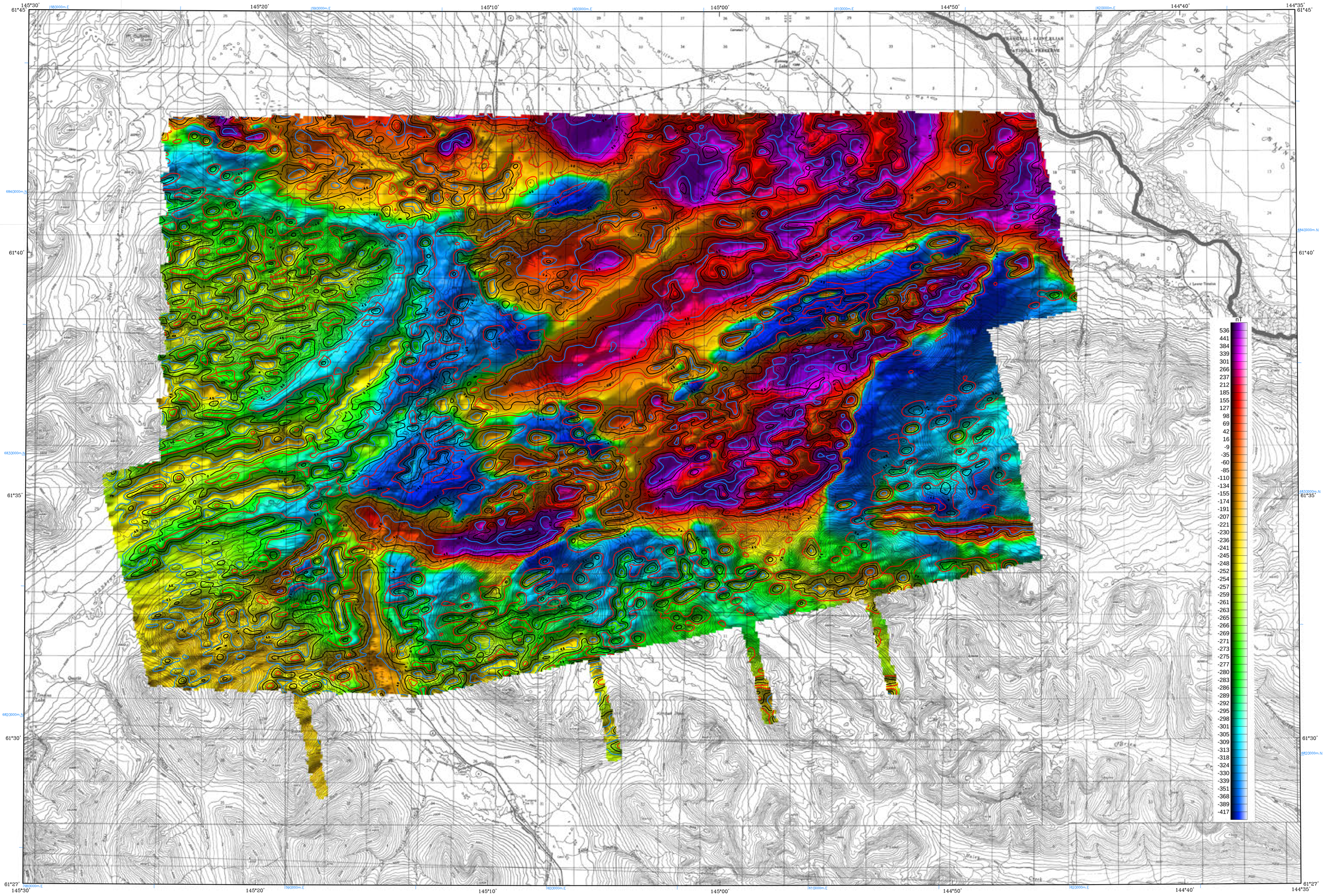
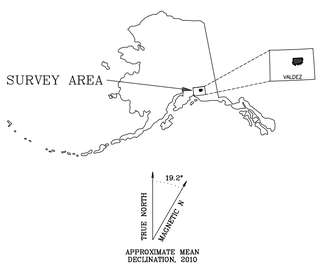


Base from U.S. Geological Survey Valdez B-2, 1972; B-3, 1995; B-4, 1994; Valdez C-2, 1996; C-3, 1996; C-4, 1996; Quadrangles, Alaska

SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS



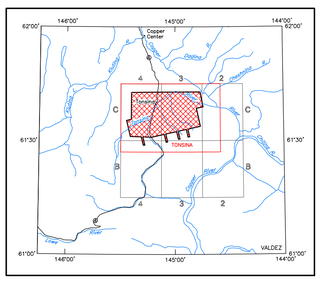
COLOR SHADOW RESIDUAL MAGNETIC FIELD WITH MAGNETIC TILT DERIVATIVE DATA CONTOURS, TONSINA SURVEY AREA, SOUTH-CENTRAL ALASKA

PART OF THE VALDEZ QUADRANGLE

by
Abraham M. Emond, CGG, and CGG Land (U.S.) Inc.
2015

Sun Azimuth: 0 degrees; Sun Inclination: 45 degrees

LOCATION INDEX OF 1:63,360-SCALE MAP



DESCRIPTIVE NOTES

The geophysical data were acquired with a DIGHEM^{V} Electromagnetic (EM) system and a CGG D1344 cesium magnetometer with a Scintrex CS3 cesium sensor. The EM and magnetic sensors were flown at a height of 30 meters (m). In addition the survey recorded data from radar and laser altimeters, GPS navigation system, 50/60 Hz monitors and video camera. Flights were performed with an AS-350-B3 Squirrel helicopter at a mean terrain clearance of 60 m along NW-SE (345°) survey flight lines with a spacing of 400 m. Tie lines were flown perpendicular to the flight lines at intervals of approximately 4,800 m.

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RESIDUAL MAGNETIC FIELD

The magnetic total field data were processed using digitally recorded data from a CGG D1344 magnetometer with a Scintrex CS3 cesium sensor. Data were collected at a sampling interval of 0.1 seconds. The magnetic data were (1) corrected for diurnal variations by subtraction of the digitally recorded base station magnetic data, (2) IGRF corrected (IGRF model 2010, updated for date of flight and altimeter variations), (3) leveled to the tie line data, and (4) interpolated onto a regular 80 m grid using a modified Akima (1970) technique. All grids were then resampled from the 80 m cell size down to a 25 m cell size to produce the maps and final grids contained in this publication.

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.

MAGNETIC TILT DERIVATIVE

The tilt derivative is the angle between the horizontal gradient & the total gradient, which is useful for identifying the depth & type of source. The tilt angle is positive over the source, crosses through zero at, or near, the edge of a vertical sided source, and is negative outside the source region. It has the added advantage of responding equally well to shallow and deep sources and is able to resolve deeper sources that may be masked by larger responses from shallower sources.

MAGNETIC TILT DERIVATIVE CONTOURS

- +45 degrees
- +30 degrees
- +15 degrees
- 0 degrees
- -15 degrees
- -30 degrees
- -45 degrees

SURVEY HISTORY

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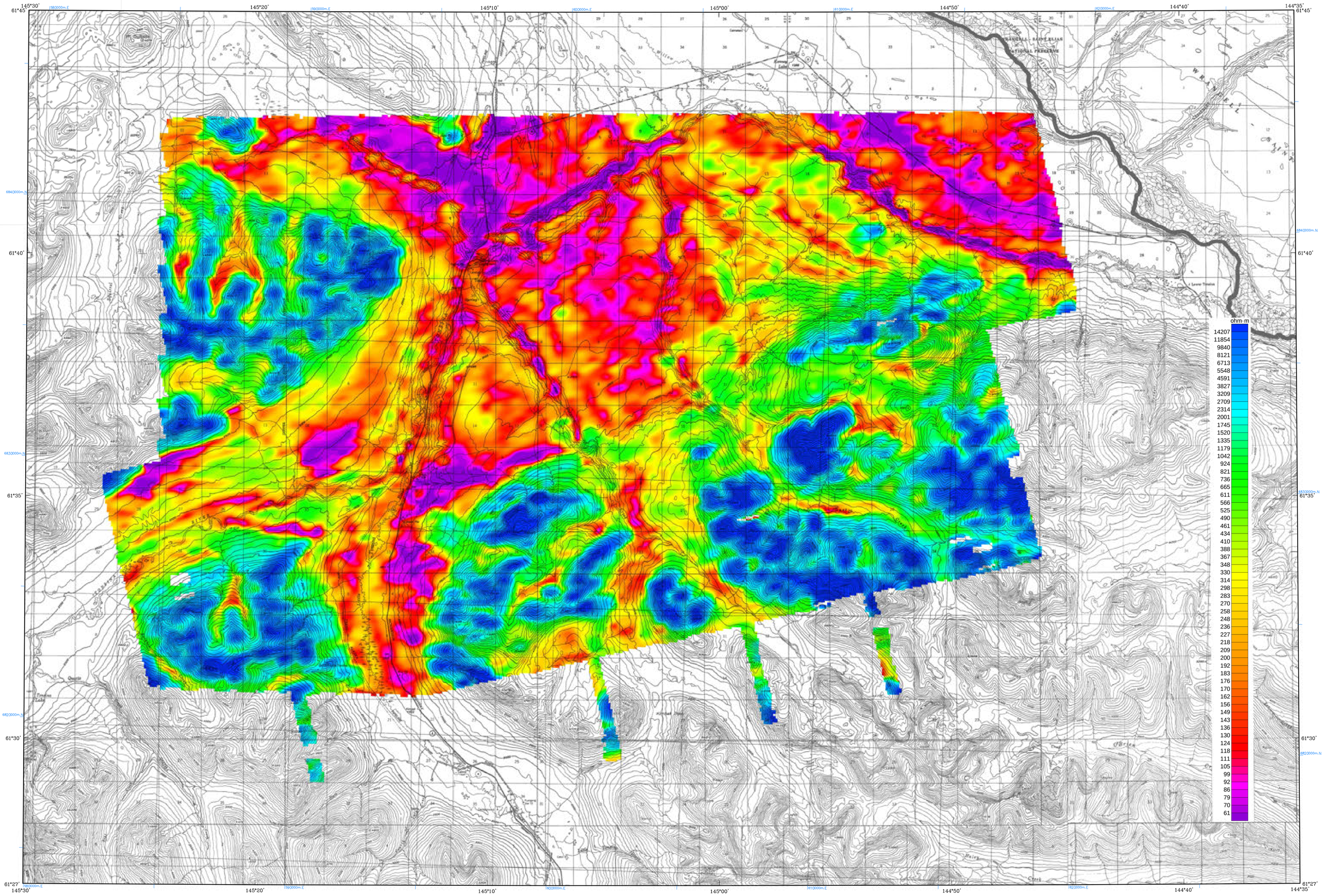
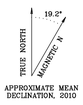


Base from U.S. Geological Survey Valdez B-2, 1972; B-3, 1995; B-4, 1994; Valdez C-2, 1996; C-3, 1996; C-4, 1996; Quadrangles, Alaska

SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS



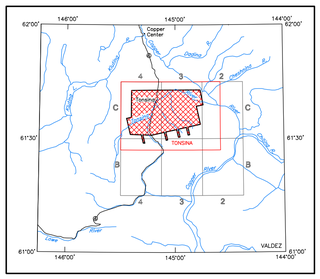
APPROXIMATE MEAN DECLINATION, 2010

56,000 Hz COPLANAR APPARENT RESISTIVITY WITH TOPOGRAPHY, TONSINA SURVEY AREA, SOUTH-CENTRAL ALASKA

PART OF THE VALDEZ QUADRANGLE

by
Abraham M. Emond, CGG, and CGG Land (U.S.) Inc.
2015

LOCATION INDEX OF 1:63,360-SCALE MAP



DESCRIPTIVE NOTES

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RESISTIVITY

The DIGHEM^{V} EM system measured inphase and quadrature components at five frequencies. Two vertical coaxial coil-pairs operated at 1000 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 56,000 Hz using the pseudo-layer half space model. The data were interpolated onto a regular 80 m grid using a modified Akima (1970) technique. All grids were then resampled from the 80 m cell size down to a 25 m cell size to produce the maps and final grids contained in this publication.

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.

RESISTIVITY ALTITUDE LIMITS

In areas where the EM bird height exceeded 150 m, resistivity was not calculated. This avoids meaningless resistivity calculations due to small signals where the helicopter flew higher to avoid cultural objects or for safety reasons. Blank areas in the grids were created where zones of high flying correlated over more than one survey line.

SURVEY HISTORY

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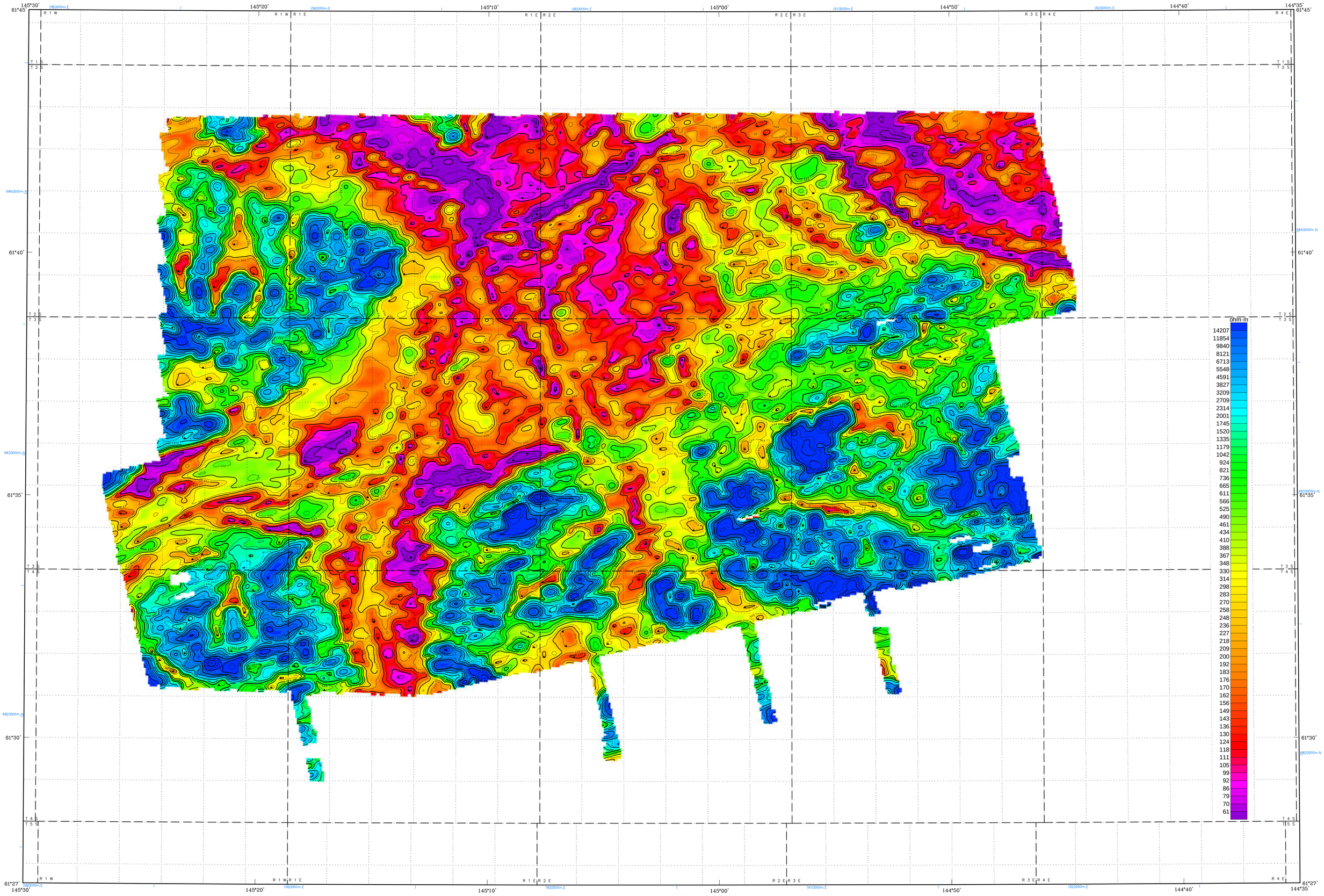
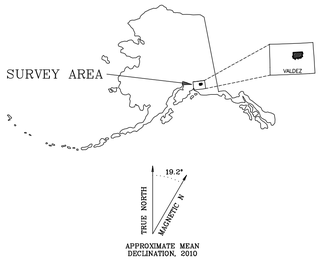


Section outlines from U.S. Geological Survey Valdez B-2, 1972; B-3, 1995; B-4, 1994; Valdez C-2, 1996; C-3, 1996; C-4, 1996; Quadrangles, Alaska



SCALE 1:63,360

1 0 1 2 3 4 MILES

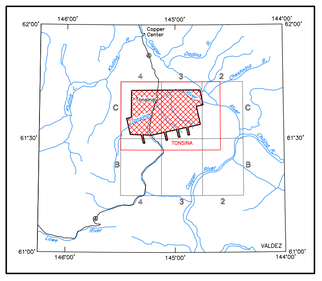
1 0 1 2 3 4 5 KILOMETERS

56,000 Hz COPLANAR APPARENT RESISTIVITY WITH DATA CONTOURS, TONSINA SURVEY AREA, SOUTH-CENTRAL ALASKA

PART OF THE VALDEZ QUADRANGLE

by
Abraham M. Emond, CGG, and CGG Land (U.S.) Inc.
2015

LOCATION INDEX OF 1:63,360-SCALE MAP



DESCRIPTIVE NOTES

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RESISTIVITY ALTITUDE LIMITS

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RESISTIVITY CONTOURS

1000
800
600
500
400
300
250
200
150
125
100

Contours in ohm-m at 10 intervals per decade

. . . . . resistivity low

SURVEY HISTORY

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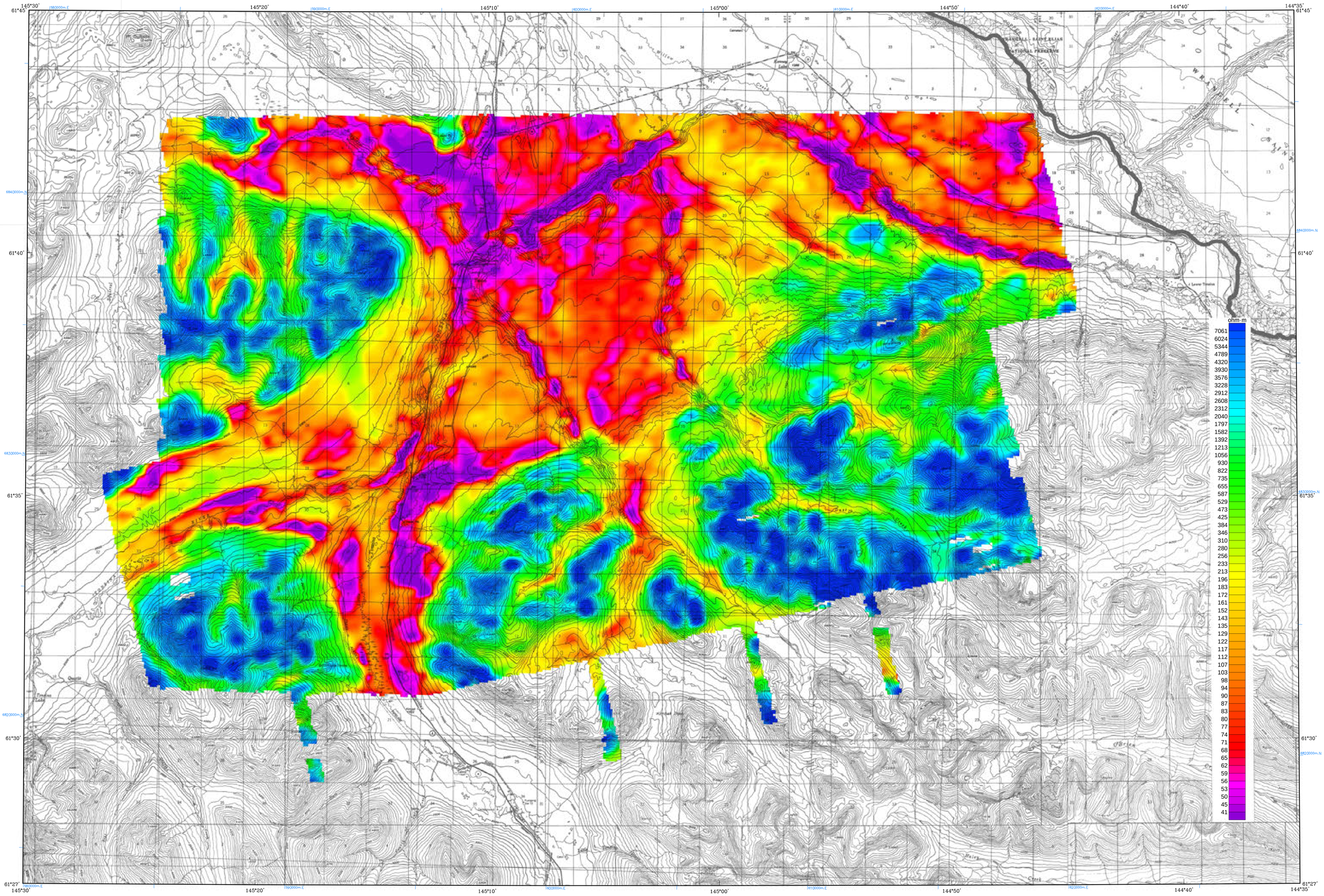
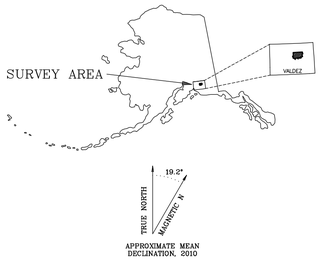


Base from U.S. Geological Survey Valdez B-2, 1972; B-3, 1995; B-4, 1994; Valdez C-2, 1996; C-3, 1996; C-4, 1996; Quadrangles, Alaska

SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

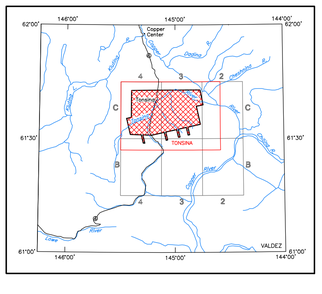


7200 Hz COPLANAR APPARENT RESISTIVITY WITH TOPOGRAPHY, TONSINA SURVEY AREA, SOUTH-CENTRAL ALASKA

PART OF THE VALDEZ QUADRANGLE

by
Abraham M. Emond, CGG, and CGG Land (U.S.) Inc.
2015

LOCATION INDEX OF 1:63,360-SCALE MAP



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RESISTIVITY

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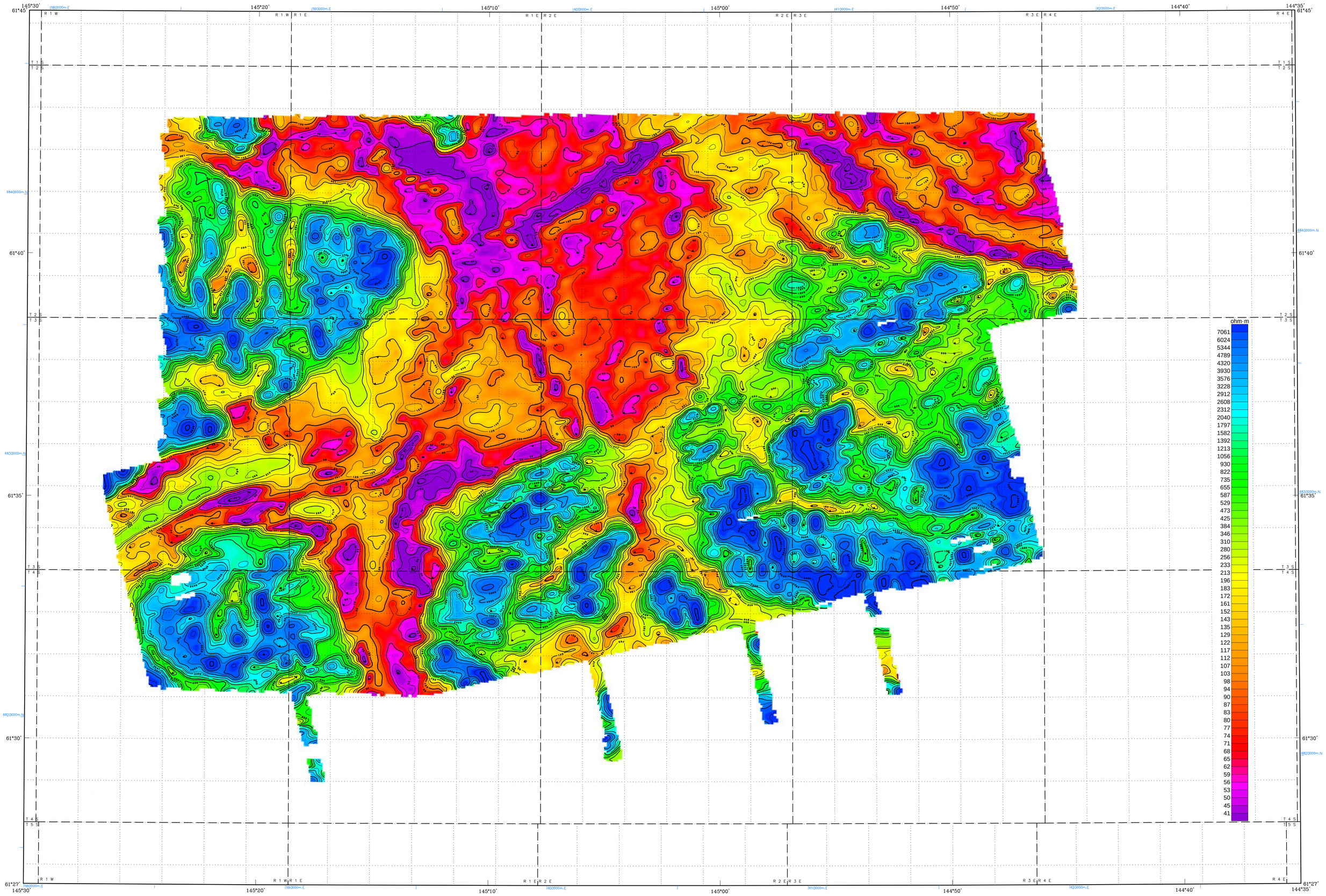

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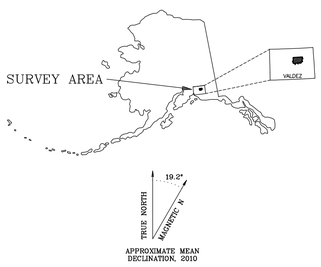
SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

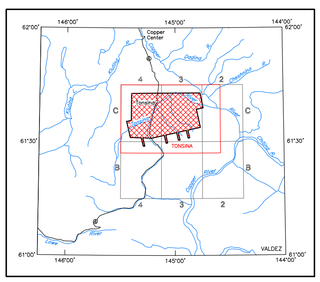


7200 Hz COPLANAR APPARENT RESISTIVITY WITH DATA CONTOURS, TONSINA SURVEY AREA, SOUTH-CENTRAL ALASKA

PART OF THE VALDEZ QUADRANGLE

by
Abraham M. Emond, CGG, and CGG Land (U.S.) Inc.
2015

LOCATION INDEX OF 1:63,360-SCALE MAP



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RESISTIVITY CONTOURS

1000
800
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150
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100

Contours in ohm-m at 10 intervals per decade

. . . . . resistivity low

SURVEY HISTORY

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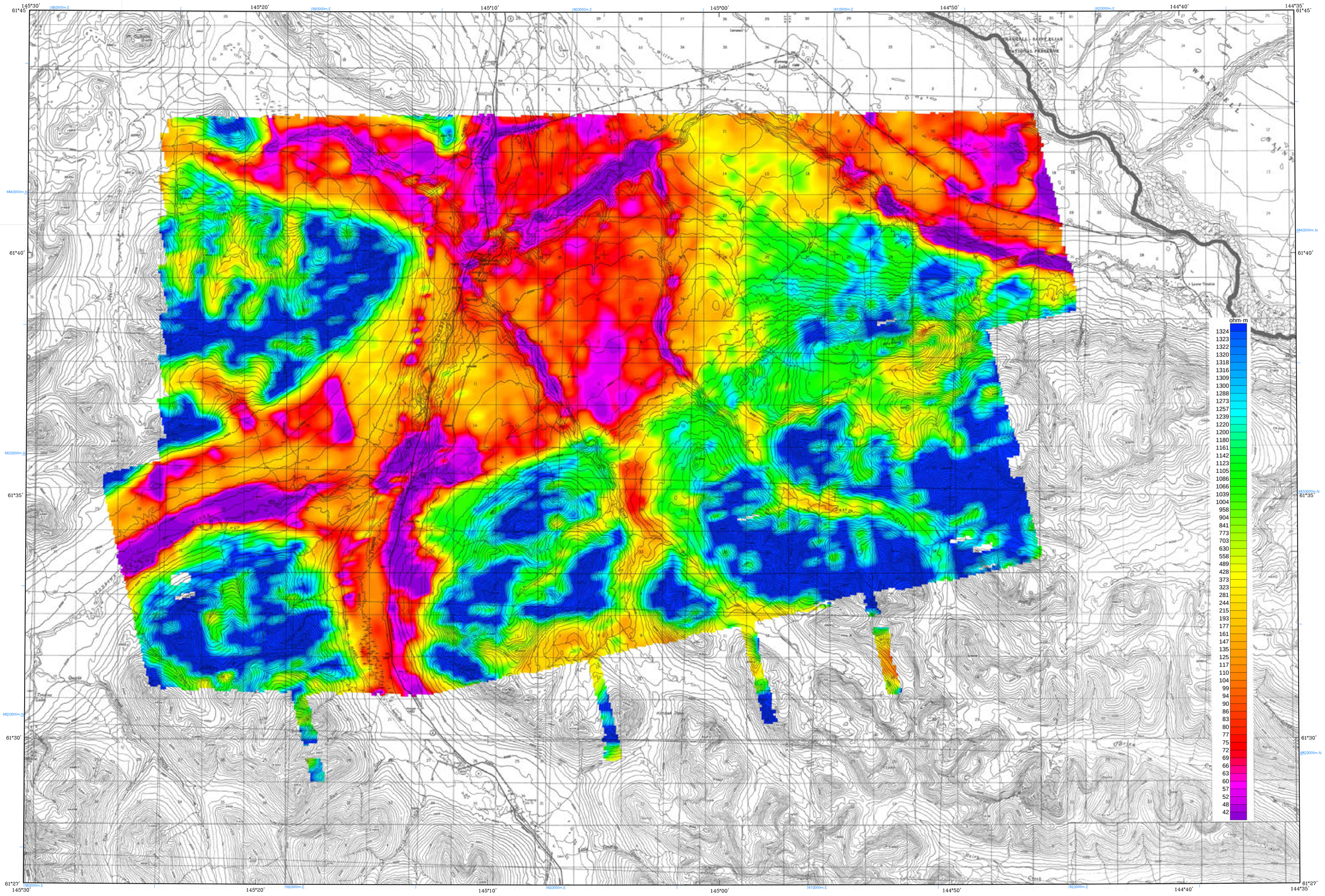

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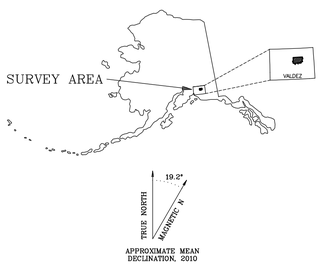
SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

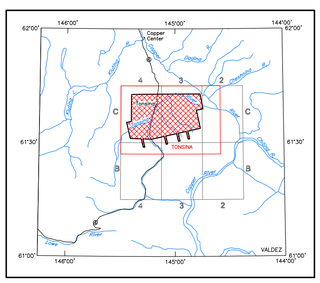


900 Hz COPLANAR APPARENT RESISTIVITY WITH TOPOGRAPHY, TONSINA SURVEY AREA, SOUTH-CENTRAL ALASKA

PART OF THE VALDEZ QUADRANGLE

by
Abraham M. Emond, CGG, and CGG Land (U.S.) Inc.
2015

LOCATION INDEX OF 1:63,360-SCALE MAP



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RESISTIVITY

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

RESISTIVITY ALTITUDE LIMITS

In areas where the EM bird height exceeded 150 m, resistivity was not calculated. This avoids meaningless resistivity calculations due to small signals where the helicopter flew higher to avoid cultural objects or for safety reasons. Blank areas in the grids were created where zones of high flying correlated over more than one survey line.

SURVEY HISTORY

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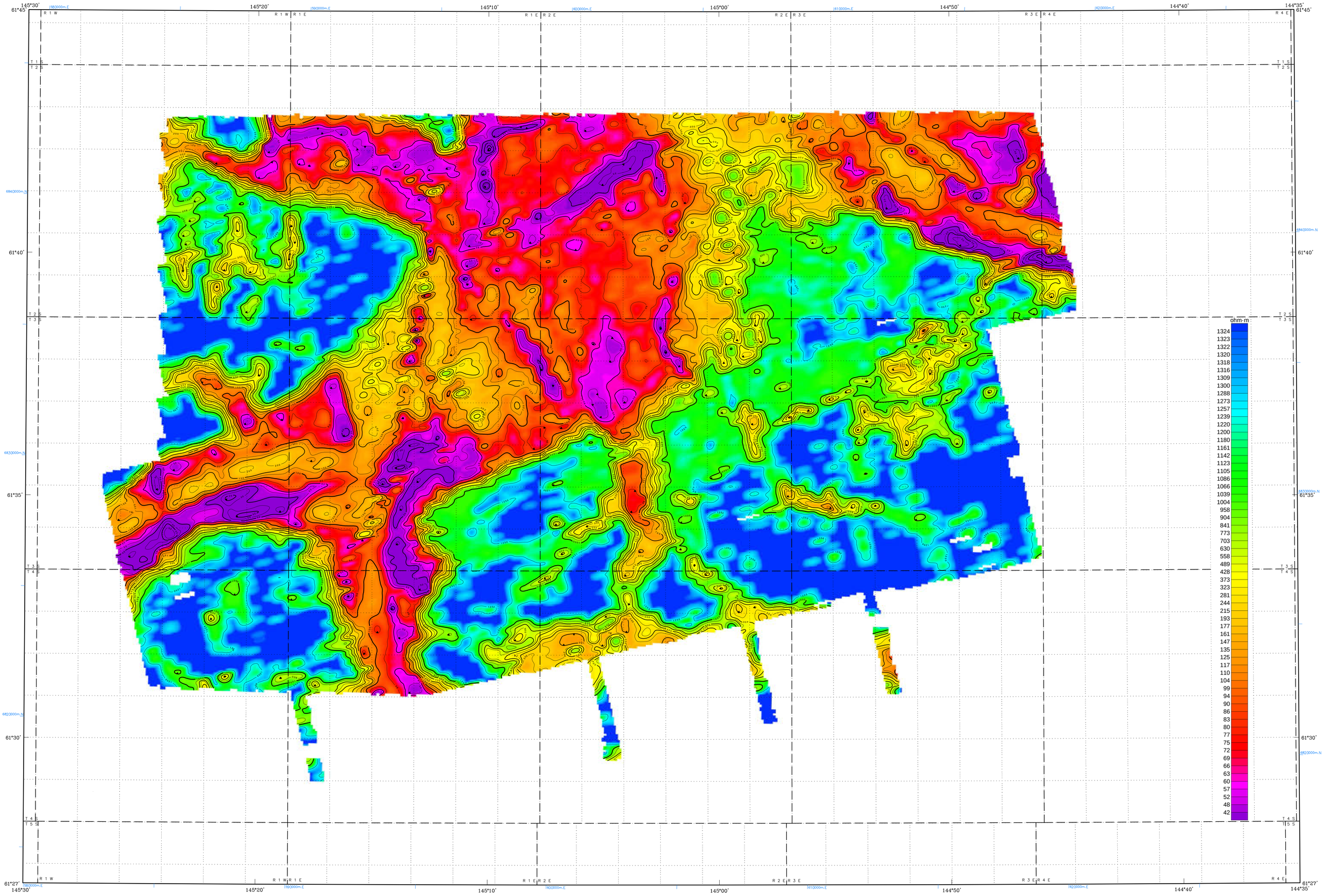
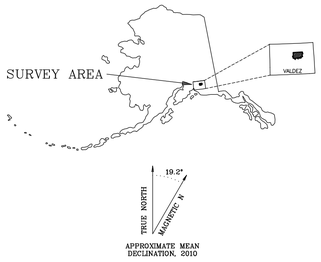


Section outlines from U.S. Geological Survey Valdez B–2, 1972; B–3, 1995; B–4, 1994; Valdez C–2, 1996; C–3, 1996; C–4, 1996; Quadrangles, Alaska

SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

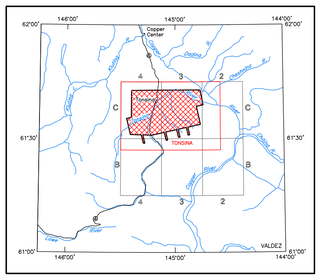


900 Hz COPLANAR APPARENT RESISTIVITY WITH DATA CONTOURS, TONSINA SURVEY AREA, SOUTH-CENTRAL ALASKA

PART OF THE VALDEZ QUADRANGLE

by
Abraham M. Emond, CGG, and CGG Land (U.S.) Inc.
2015

LOCATION INDEX OF 1:63,360–SCALE MAP



DESCRIPTIVE NOTES

The geophysical data were acquired with a DIGHEM^{V} Electromagnetic (EM) system and a CGG D1344 cesium magnetometer with a Scintrex CS3 cesium sensor. The EM and magnetic sensors were flown at a height of 30 meters (m). In addition the survey recorded data from radar and laser altimeters, GPS navigation system, 50/60 Hz monitors and video camera. Flights were performed with an AS–350–B3 Squirrel helicopter at a mean terrain clearance of 60 m along NW–SE (345°) survey flight lines with a spacing of 400 m. Tie lines were flown perpendicular to the flight lines at intervals of approximately 4,800 m.

A Novatel OEM5–G2L Global Positioning System was used for navigation. The helicopter position was derived every 0.5 seconds using post–flight differential positioning to a relative accuracy of better than 5 m. Flight path positions were projected onto the Clarke 1866 (UTM zone 6) spheroid, 1927 North American datum using a central meridian (CM) of 147°, a north constant of 0 and an east constant of 500,000. Positional accuracy of the presented data is better than 10 m with respect to the UTM grid.

RESISTIVITY

The DIGHEM^{V} EM system measured inphase and quadrature components at five frequencies. Two vertical coaxial coil–pairs operated at 1000 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 900 Hz using the pseudo–layer half space model. The data were interpolated onto a regular 80 m grid using a modified Akima (1970) technique. All grids were then resampled from the 80 m cell size down to a 25 m cell size to produce the maps and final grids contained in this publication.

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RESISTIVITY CONTOURS

1000
800
600
500
400
300
250
200
150
125
100

Contours in ohm–m at 10 intervals per decade

. . . . . resistivity low

SURVEY HISTORY

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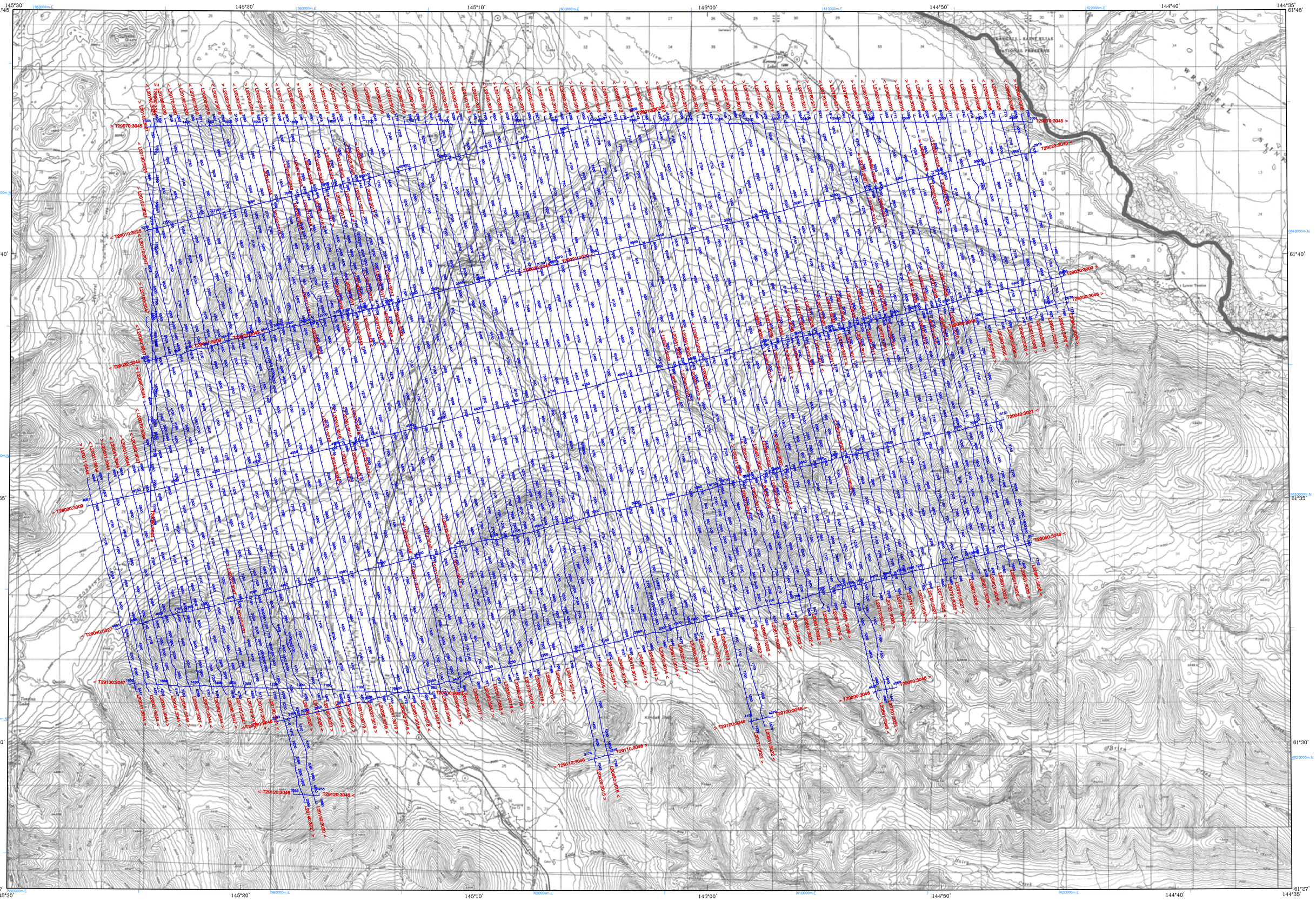

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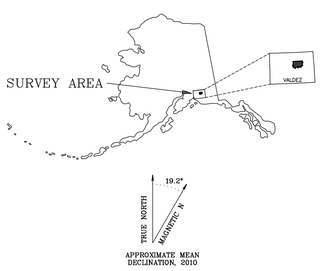


SCALE 1:63,360

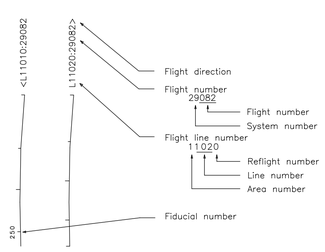
1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

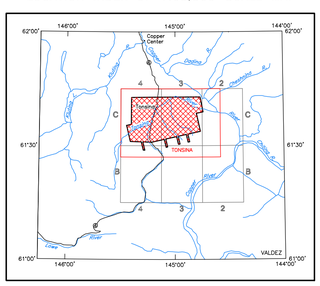
FLIGHT PATH WITH TOPOGRAPHY, TONSINA SURVEY AREA, SOUTH-CENTRAL ALASKA

PART OF THE VALDEZ QUADRANGLE

by
Abraham M. Emond, CGG, and CGG Land (U.S.) Inc.
2015



LOCATION INDEX OF 1:63,360-SCALE MAP



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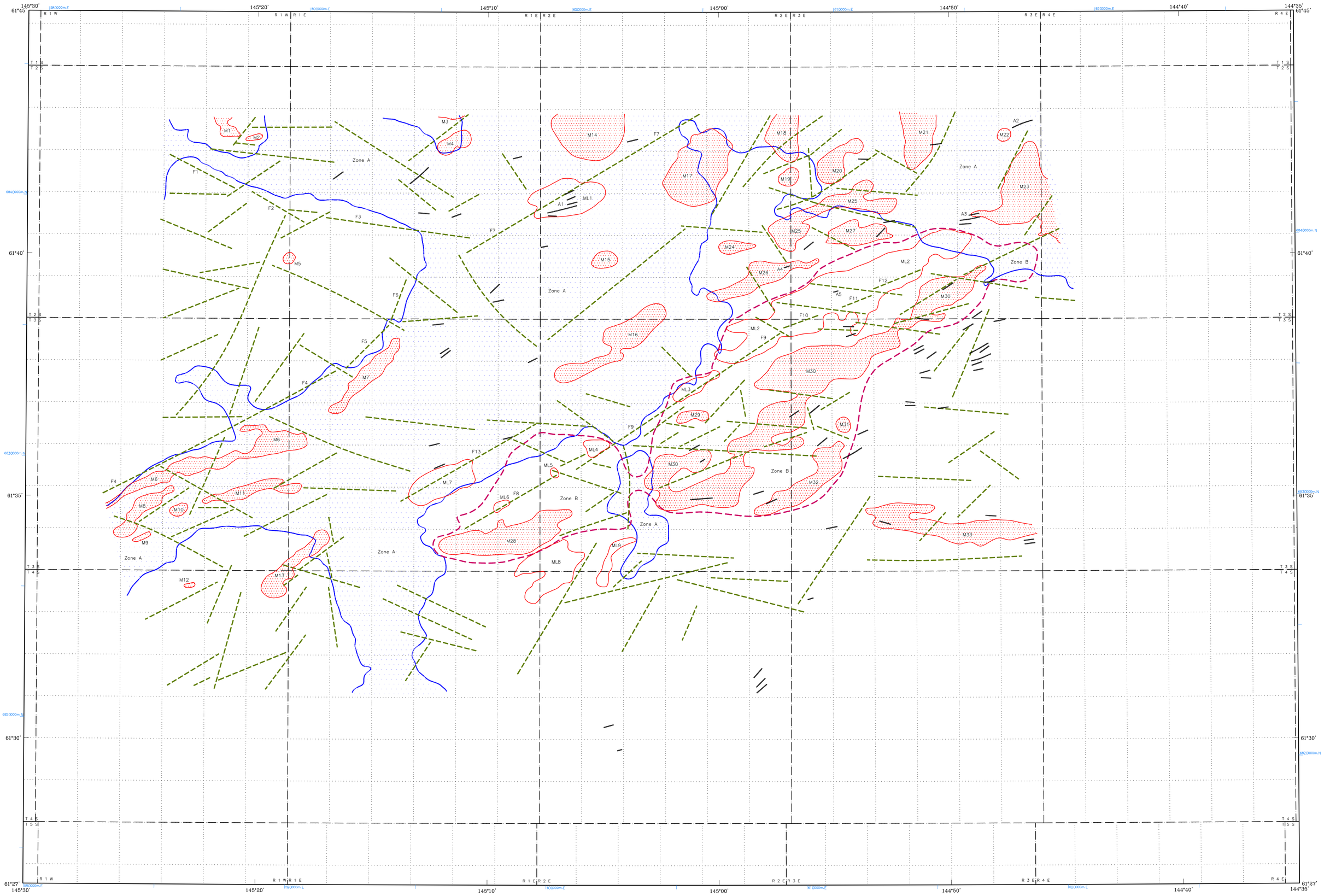

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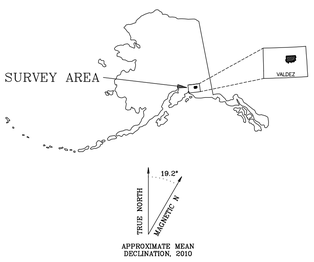


SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

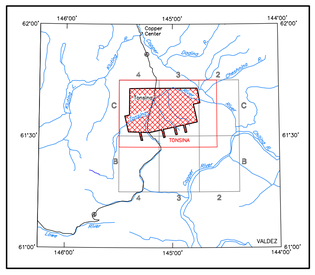
INTERPRETATION MAP, TONSINA SURVEY AREA, SOUTH-CENTRAL ALASKA

PART OF THE VALDEZ QUADRANGLE

Interpretation by CGG
2015

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

LOCATION INDEX OF 1:63,360-SCALE MAP



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LEGEND

F1	Inferred Structural Break
A1	EM Conductor, or group of EM Conductors
M1	Magnetic Zone
ML	Magnetic Low
Zone A	Highly Conductive Zone
Zone B	Approximate outline of broad magnetic zone defined by a change in magnetic texture

SURVEY HISTORY

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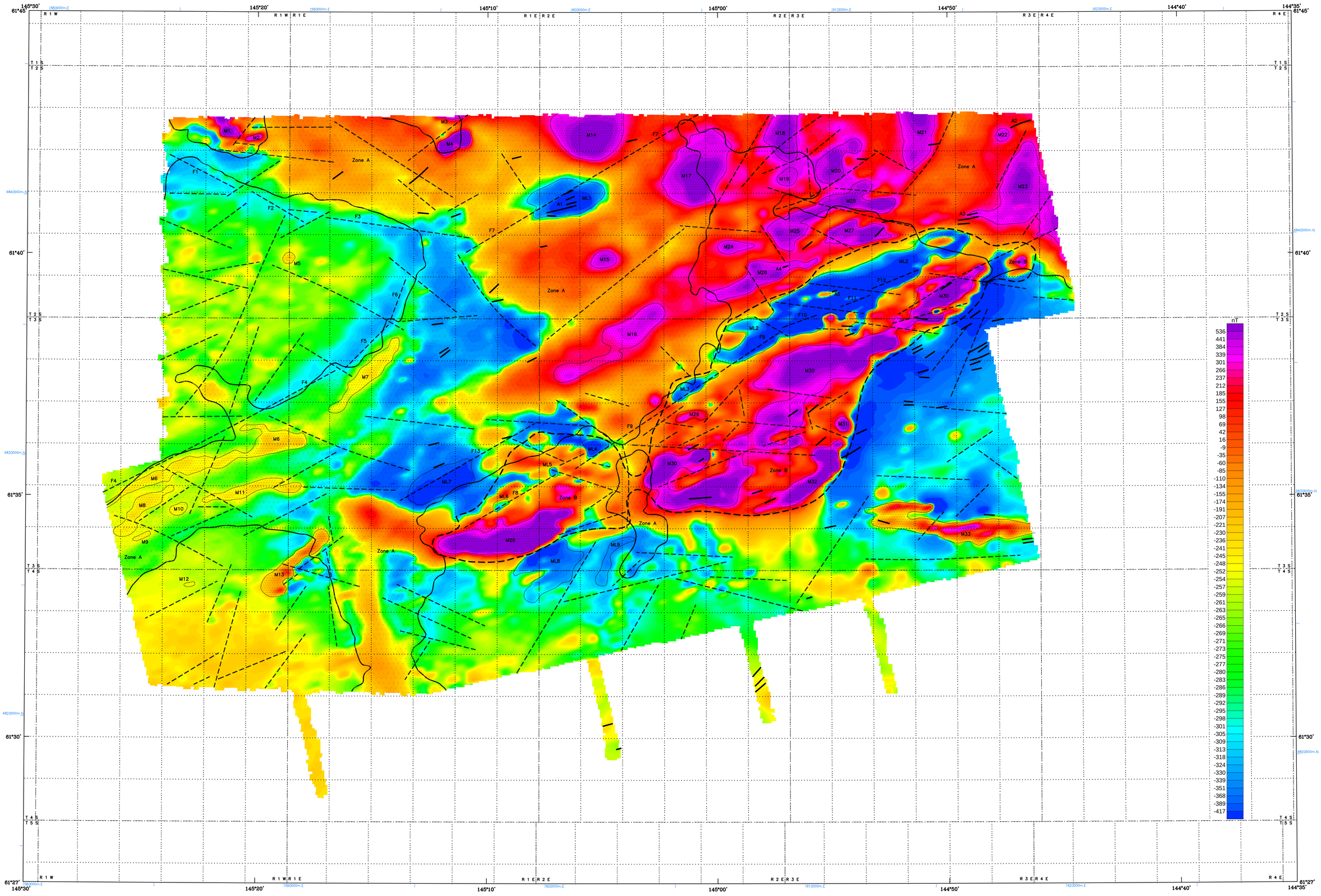

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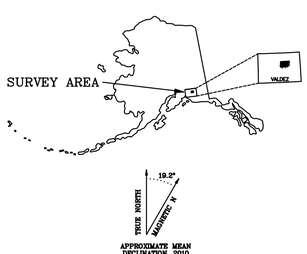

SCALE 1:63,360

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

INTERPRETATION MAP WITH RESIDUAL MAGNETIC FIELD, TONSINA SURVEY AREA, SOUTH-CENTRAL ALASKA

PART OF THE VALDEZ QUADRANGLE

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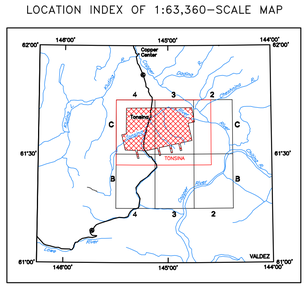

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RESIDUAL MAGNETIC FIELD

The magnetic total field data were processed using digitally recorded data from a CGG D1344 magnetometer with a Scintrex CS3 cesium sensor. Data were collected at a sampling interval of 0.1 seconds. The magnetic data were (1) corrected for diurnal variations by subtraction of the digitally recorded base station magnetic data, (2) IGRF corrected (IGRF model 2010, updated for date of flight and altimeter variations), (3) leveled to the tie line data, and (4) interpolated onto a regular 80 m grid using a modified Akima (1970) technique. All grids were then resampled from the 80 m cell size down to a 25 m cell size to produce the maps and final grids contained in this publication.

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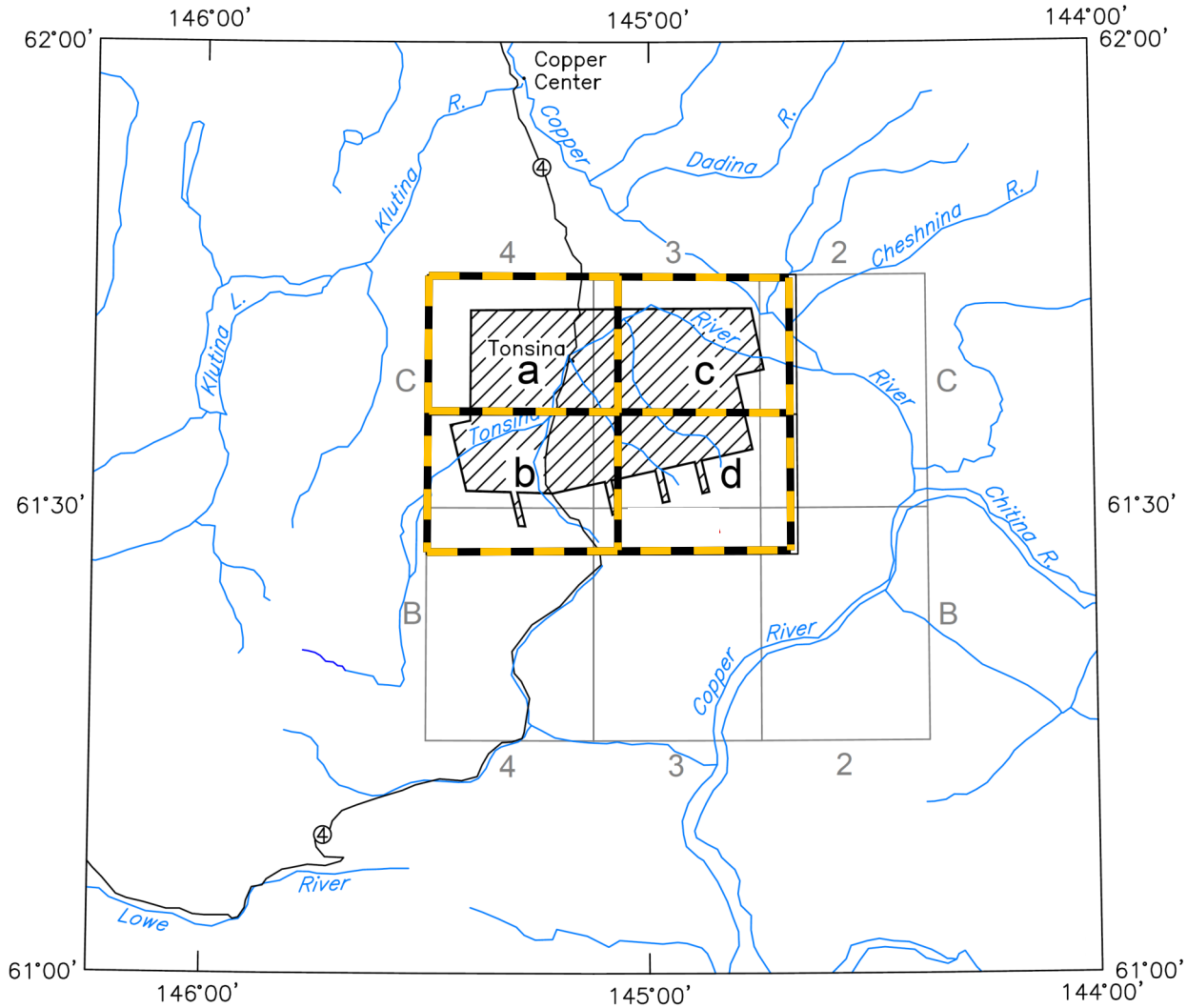
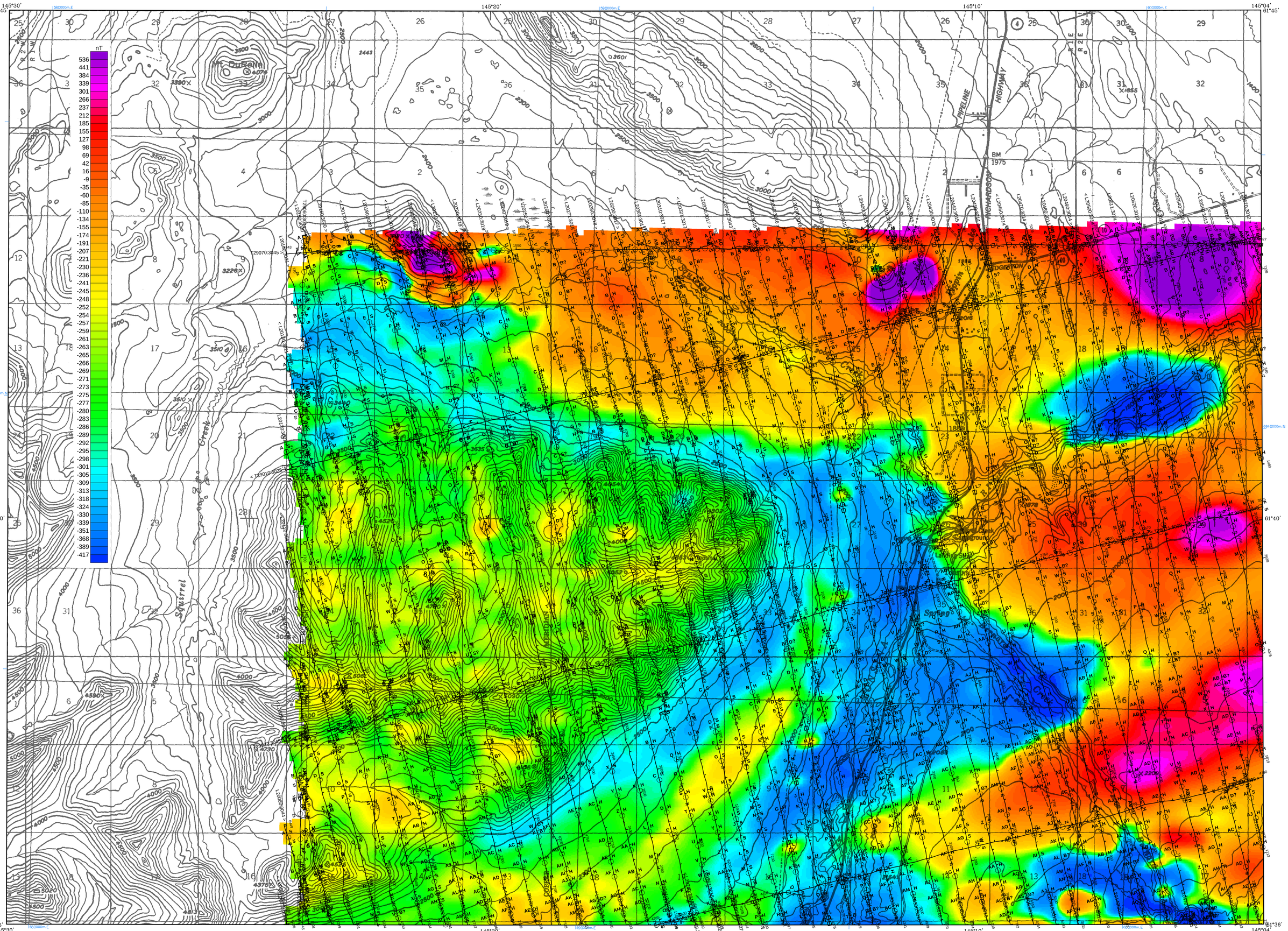
Tonsina Area Electromagnetic and Magnetic Airborne 1:31,680-scale index map



Tonsina survey location map and 1:31,680-scale map index, showing the survey area (hatched), map sheets "**a**" though "**d**" (dashed outlines), the Richardson Highway, towns, rivers, and Valdez 1:63,360 Quadrangle boundaries (grey lines and characters).



Base from U.S. Geological Survey Valdez C-3, 1996; C-4, 1996; Quadrangles, Alaska

SCALE 1:31,680

0.5 0 0.5 1 1.5 2 MILES

0.5 0 0.5 1 1.5 2 2.5 KILOMETERS

CONTOUR INTERVAL 100 FEET
DATUM MEAN SEA LEVEL

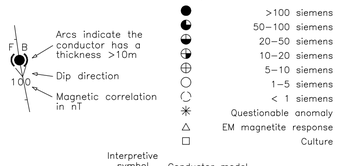
RESIDUAL MAGNETIC FIELD AND DETAILED ELECTROMAGNETIC ANOMALIES WITH TOPOGRAPHY OF THE TONSINA SURVEY AREA, SOUTH-CENTRAL ALASKA

PARTS of VALDEZ B-3, B-4, C-2 C-3, and C-4 QUADRANGLES

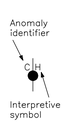
by
Abraham M. Emond, CGG, and CGG Land (U.S.) Inc.
2015

APPROXIMATE MEAN DECLINATION, 2010

ELECTROMAGNETIC ANOMALIES



Anomaly	Conductance
●	>100 siemens
◕	50–100 siemens
◒	20–50 siemens
◔	10–20 siemens
⊕	5–10 siemens
○	1–5 siemens
◯	< 1 siemens
✳	Questionable anomaly
△	EM magnetite response
□	Culture



Interpretive symbol	Conductor model
B	Bedrock conductor
D	Narrow bedrock conductor ("thin dike")
S	Conductive cover ("horizontal thin sheet")
H	Broad conductive rock unit, deep conductive weathering, thick conductive cover ("half-space")
E	Edge of broad conductor ("edge of half space")
L	Culture, e.g. power line, metal building or fence
M	Magnetite
"?"	Indicates some uncertainty as to the most appropriate EM source model, but does not question the validity of the EM anomaly.

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ELECTROMAGNETICS

To determine the location of EM anomalies or their boundaries, the DIGHEM^{V} EM system measured inphase and quadrature components at five frequencies. Two vertical coaxial–coil pairs operated at 1000 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. The type of conductor is indicated on the aeromagnetic map by the interpretive symbol attached to each EM anomaly. Determination of the type of conductor is based on EM anomaly shapes of the coaxial– and coplanar–coil responses, together with conductor and magnetic patterns and topography. The power line monitor and the flight track video were examined to locate cultural sources.

RESIDUAL MAGNETIC FIELD

The magnetic total field data were processed using digitally recorded data from a CGG D1344 magnetometer with a Scintrex CS3 cesium sensor. Data were collected at a sampling interval of 0.1 seconds. The magnetic data were (1) corrected for diurnal variations by subtraction of the digitally recorded base station magnetic data, (2) IGRF corrected (IGRF model 2010, updated for date of flight and altimeter variations), (3) leveled to the tie line data, and (4) interpolated onto a regular 80 m grid using a modified Akima (1970[1]) technique. All grids were then resampled from the 80 m cell size down to a 25 m cell size to produce the maps and final grids contained in this publication.

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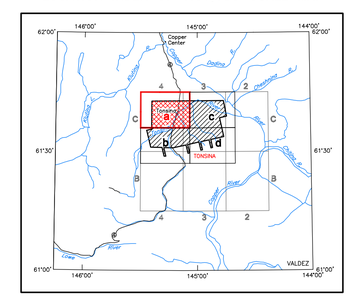
LOCATION INDEX OF 1:31,680–SCALE MAP



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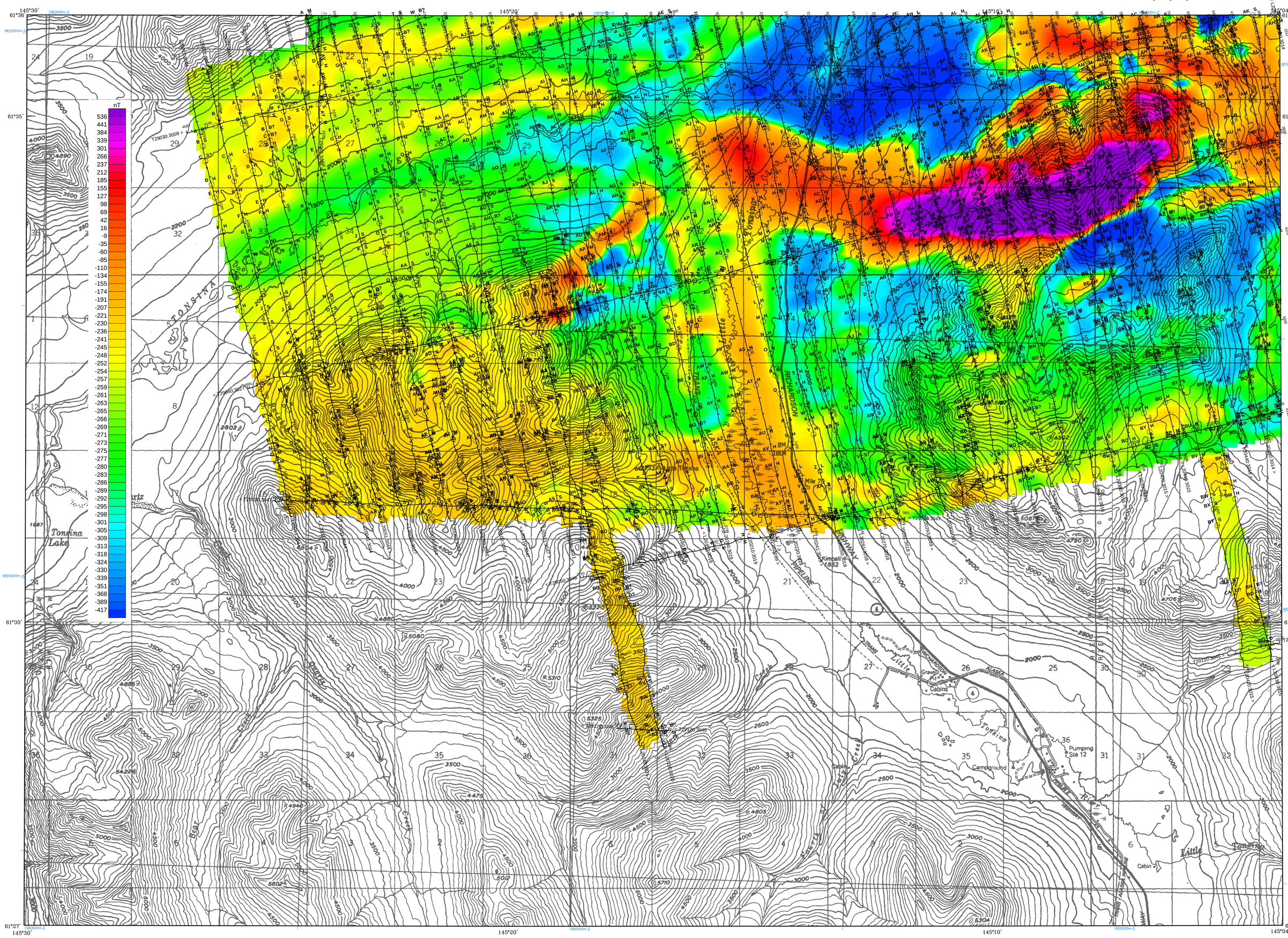

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SCALE 1:31,680

0.5 0 0.5 1 1.5 2 MILES

0.5 0 0.5 1 1.5 2 2.5 KILOMETERS

CONTOUR INTERVAL 100 FEET
DATUM MEAN SEA LEVEL

APPROXIMATE MEAN DECLINATION, 2010

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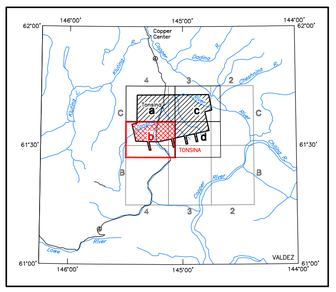

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◒	20–50 siemens
◔	10–20 siemens
⊕	5–10 siemens
○	1–5 siemens
◌	< 1 siemens
✳	Questionable anomaly
△	EM magnetite response
□	Culture

Anomaly identifier: C H — Interpretive symbol

Interpretive symbol	Conductor model
B	Bedrock conductor
D	Narrow bedrock conductor ("thin dike")
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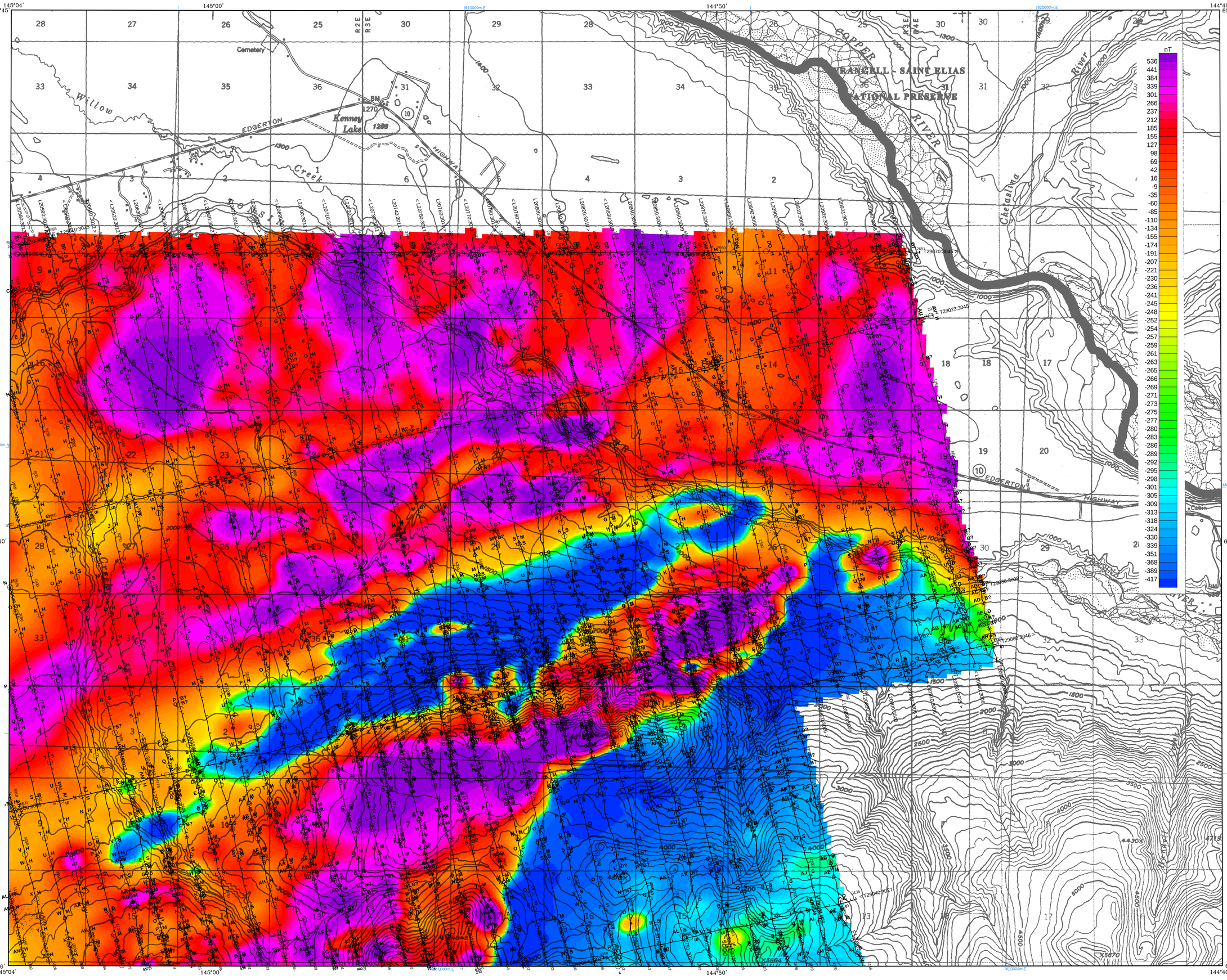


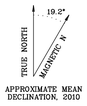
Base from U.S. Geological Survey Valdez C-2, 1996; C-3, 1996; Quadrangles, Alaska

SCALE 1:31,680

0.5 0 0.5 1 1.5 2 MILES

0.5 0 0.5 1 1.5 2 2.5 KILOMETERS

CONTOUR INTERVAL 100 FEET
DATUM MEAN SEA LEVEL



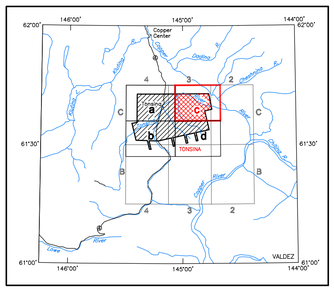
APPROXIMATE MEAN DECLINATION, 2010

RESIDUAL MAGNETIC FIELD AND DETAILED ELECTROMAGNETIC ANOMALIES WITH TOPOGRAPHY OF THE TONSINA SURVEY AREA, SOUTH-CENTRAL ALASKA

PARTS of VALDEZ B-3, B-4, C-2 C-3, and C-4 QUADRANGLES

by
Abraham M. Emond, CGG, and CGG Land (U.S.) Inc.
2015

LOCATION INDEX OF 1:31,680-SCALE MAP



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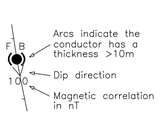

Anomaly	Conductance
●	>100 siemens
◕	50–100 siemens
◒	20–50 siemens
◔	10–20 siemens
⊕	5–10 siemens
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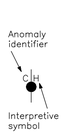

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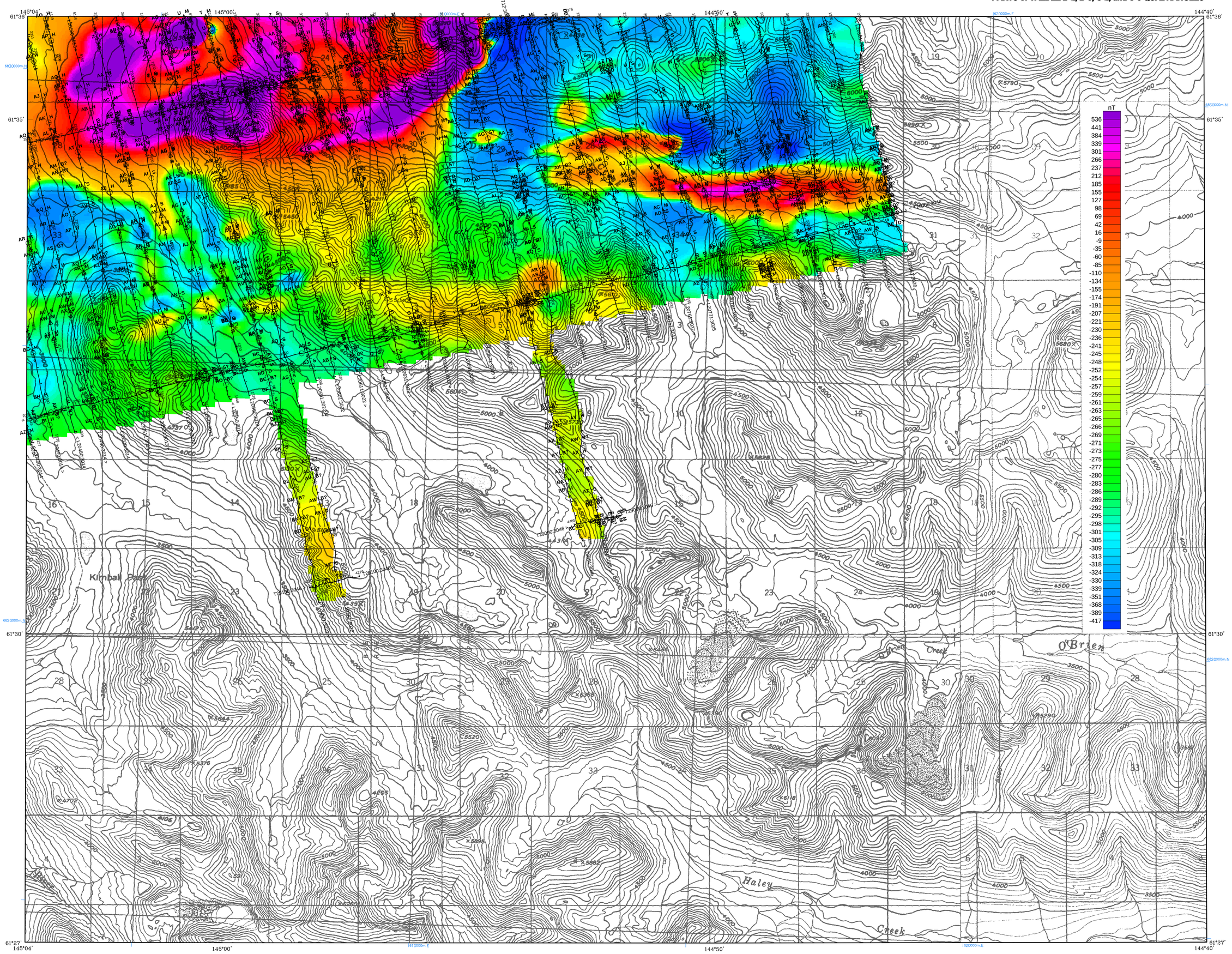

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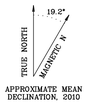

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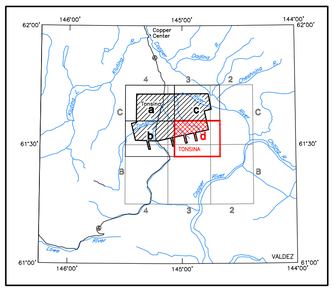

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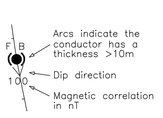

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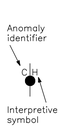

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