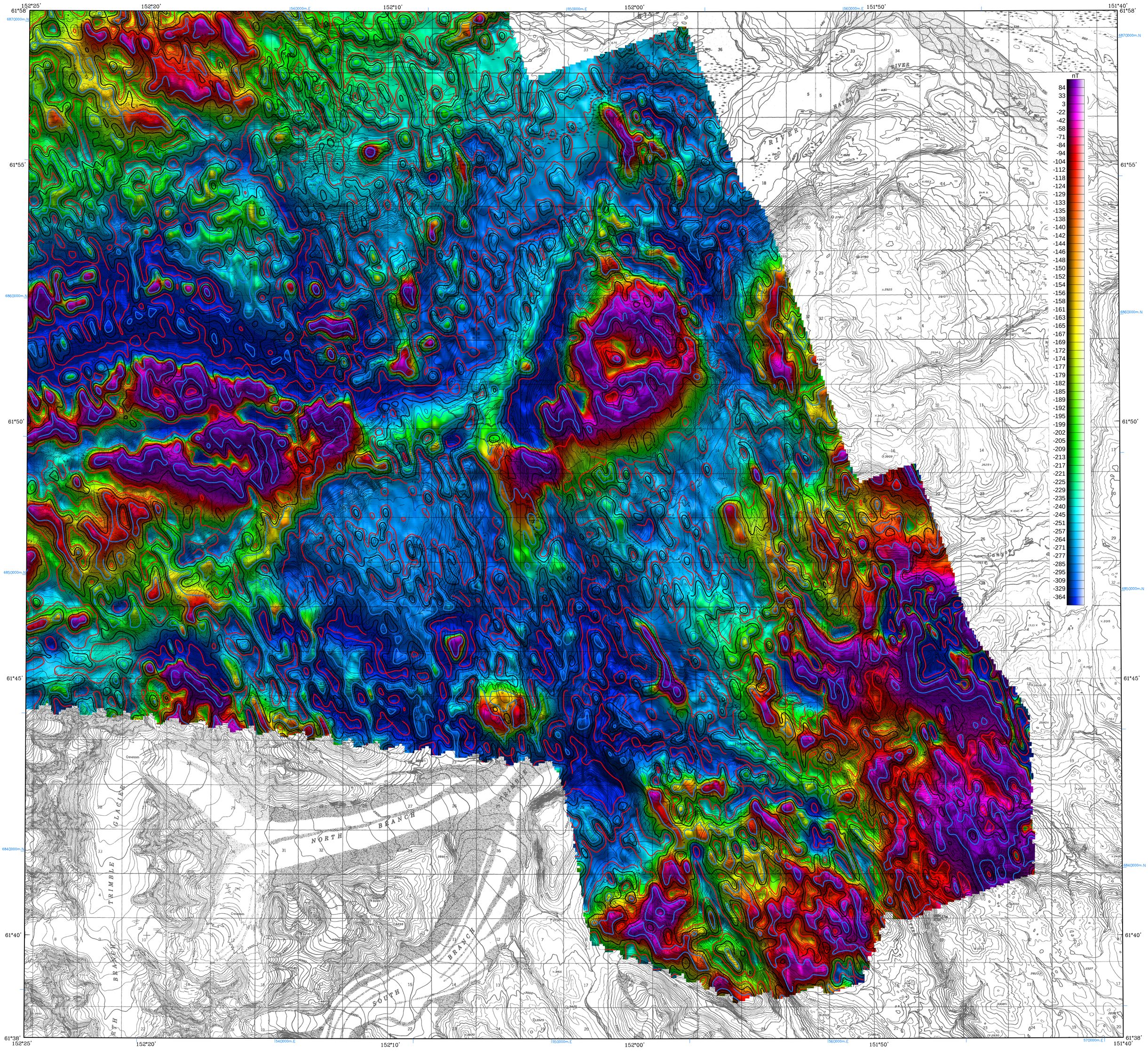
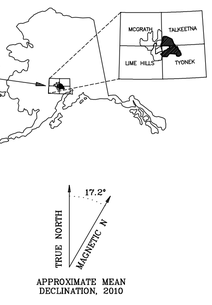


Base from U.S. Geological Survey Tyonek C-5, 1954; C-6, 1958; C-7, 1958; D-5, 1954; D-6, 1958; D-7, 1973; Quadrangles, Alaska

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 EAST STYX SURVEY AREA, SOUTH-CENTRAL ALASKA

PARTS OF THE TALKEETNA, TYONEK, McGRATH AND LIME HILLS QUADRANGLES

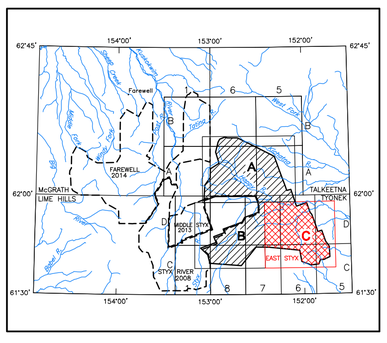
by

Laurel E. Burns, CGG, and Fugro GeoServices, Inc.

2014

Sun Azimuth: 0 degrees; Sun Inclination: 45 degrees

LOCATION INDEX OF 1:63,360–SCALE MAPS



DESCRIPTIVE NOTES

The geophysical data were acquired with a DIGHEM^{V} Electromagnetic (EM) system, a CGG D1344 cesium magnetometer with a Scintrex CS3 cesium sensor, and a Radiation Solutions RS–500 gamma–ray spectrometer. The EM and magnetic sensors were flown at a height of 100 feet. The gamma–ray spectrometer was flown at a height of 200 feet. 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 200 feet along NE–SW (70°) survey flight lines with a spacing of a quarter of a mile. Tie lines were flown perpendicular to the flight lines at intervals of approximately 3 miles.

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 5) spheroid, 1927 North American datum using a central meridian (CM) of 153°, 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.

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

This map has been compiled and drawn under contract between the State of Alaska, Department of Natural Resources, Division of Geological & Geophysical Surveys (DGGS), and Fugro GeoServices, Inc. Airborne geophysical data for the area were acquired and processed by CGG in 2013 and 2014. Previously flown DGGS surveys adjacent to the current survey are shown in the location map by dashed lines, survey name, and date of publication. The project was funded by the Alaska State Legislature as part of the Alaska Airborne Geophysical and Geological Mineral Inventory Program.

All data and maps produced to date from this survey are available in digital format on DVD for a nominal fee through DGGS, 3354 College Road, Fairbanks, Alaska, 99709–3707, and are downloadable for free from the DGGS website (www.dggs.alaska.gov/pubs). Maps are also available on paper through the DGGS office, and are viewable online at the website in Adobe Acrobat .PDF file format.