

Tilt Angle of the Magnetic Field

This map of the tilt angle of the magnetic field was derived from data acquired during an aeromagnetic survey carried out by Geo Data Solutions (GDS) Inc. from March 1, 2017 to April 2, 2017. The survey area consists of three adjoining survey blocks, A, B, and C. Published data (Buckle et al., 2009) originating from a Survey Area by Flight Airborne Survey Corp. supplements the new survey data in block C. Data from all survey blocks were recorded using split-beam cesium vapour magnetometers (sensitivity = 0.001 nT) mounted in each of the tail booms of two GDS Four Seasons and a Cessna 441 aircraft operated by Flight Airborne Surveys Corp.

Survey project specifications

Survey year	Block A	Block B	Block C	Block C (in-fill)
2017	2017	2017	2009	2017
Aircraft registration	C-FVGR	C-FVGR	C-FVGR	C-FVGR
Flight height	Drawn: 100 m	Drawn: 100 m	Drawn: 100 m	Drawn: 100 m
Line spacing	250 m	250 m	400 m	400 m
Line direction	45° / 225°	100° / 280°	100° / 280°	100° / 280°
Tie line spacing	1200 m	1200 m	2400 m	2400 m
Tie line direction	135° / 315°	10° / 190°	10° / 190°	10° / 190°

In block C, the in-fill flight lines and tie lines for the current 2017 survey were offset to provide the denser coverage of 250 m and 1200 m tie line spacing when combined with the 2009 survey.

The flight path was recovered following post-flight differential corrections to the raw Global Positioning System (GPS) data. The survey blocks were flown on a pre-determined flight track surface to minimize differences in magnetic values at the intersections of tie lines and traverse lines. The track surface for the 2009 survey in block C was lowered and the magnetic data were downward continued to the new surface level of the 2017 survey along and before these intersections. Differences were computerized to obtain a mutually aligned set of flight magnetic data. The resulting data were then interpolated to a 62.5 m grid. The International Geomagnetic Reference Field (IGRF) defined at the average 50° latitude at 62.5 m for the current survey date of 2017/01/17 was then removed. Removal of the IGRF, representing the magnetic field of the Earth's core, produces a residual component related almost entirely to magnetization within the Earth's crust.

The tilt angle of the magnetic field (Miller and Singh, 1994) is the arctangent of the ratio of the vertical derivative of the magnetic field over the magnitude of the horizontal derivative of the magnetic field. The amplitude is restricted to -92 to 92 radians, is generally positive over a magnetic source, negative outside the source and is zero at or near the source edge for vertical contacts (Figure 1). The tilt effectively equalizes amplitudes of the magnetic field so weak and strong magnetic anomalies have a similar appearance (Figure 1 - middle panel).

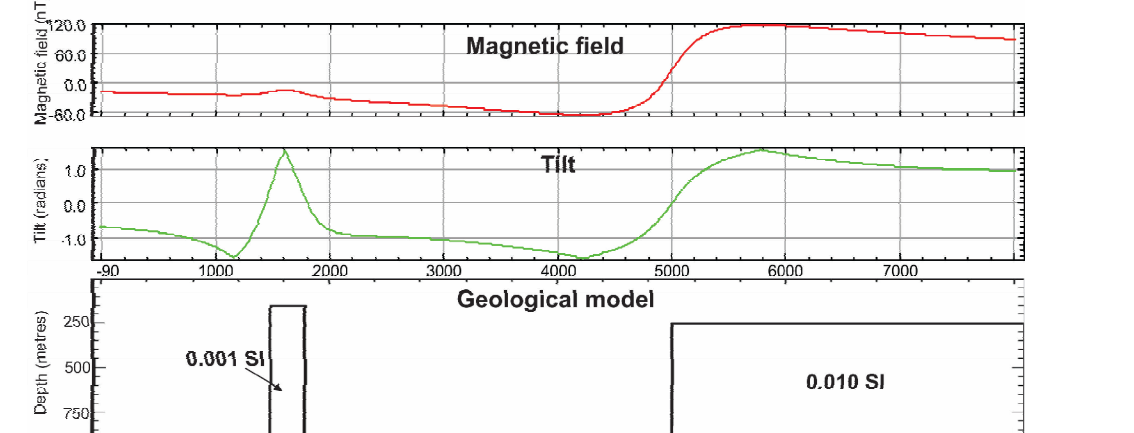
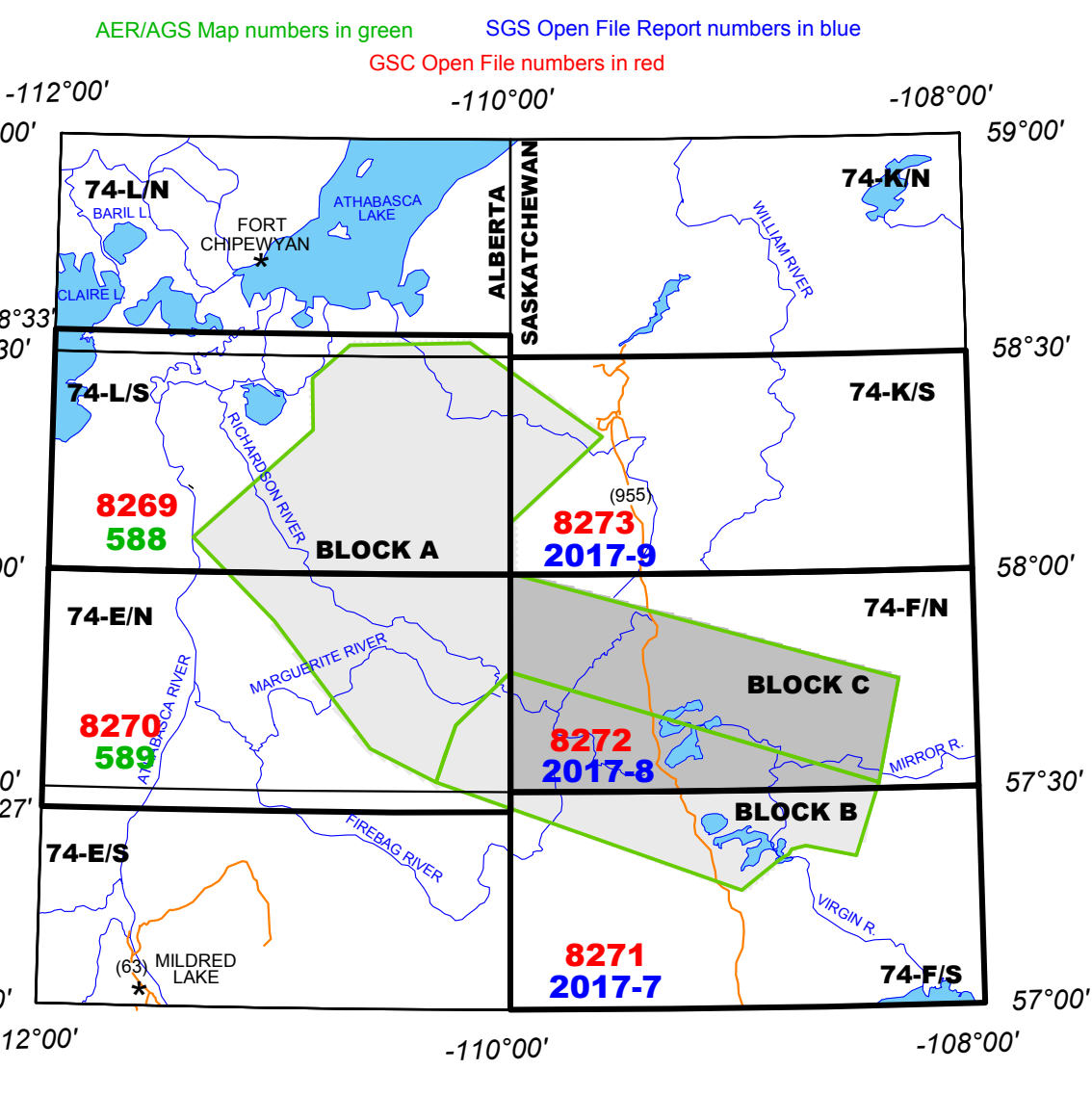
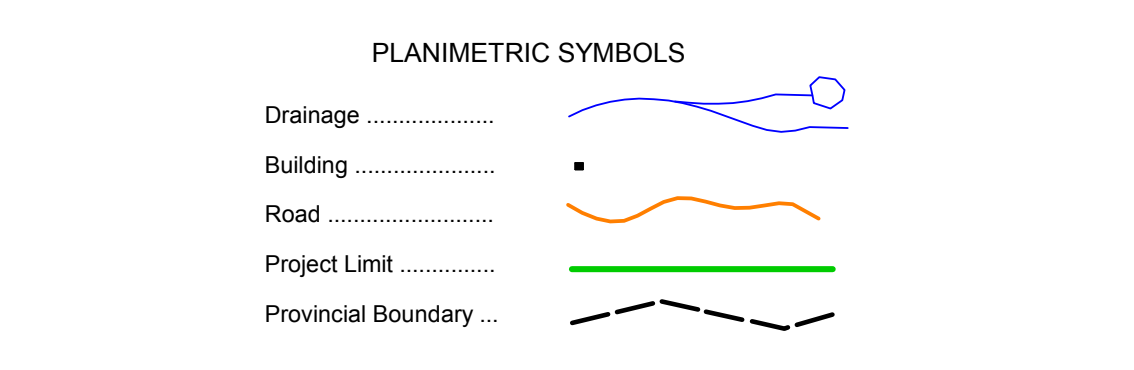


Figure 1. Magnetic field (top panel), tilt angle (middle panel) and geological model (bottom panel). Magnetic susceptibility is labeled and bodies are magnetized in a vertical field.

This publication is available for free download through GDS/CAW (<http://www.gds-ca.com>). Corresponding digital profiles and global geospatial data are available from the Geophysical Survey of Canada, Geological Survey of Canada, Open File 6017, Saskatchewan Ministry of the Economy, Open File 2009-1, scale 1:250,000, <http://www.gds-ca.com>. The same products are also available, for a fee, from the Geophysical Data Centre, Geological Survey of Canada, 601 Booth Street, Ottawa, Ontario K1A 0E8, email: gsd@gsd.ca.

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References
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Miller, H. G. and Singh, V., 1994. Potential field tilt - a new concept for location of potential field sources. *Journal of Applied Geophysics*, v. 32, p. 213-217.



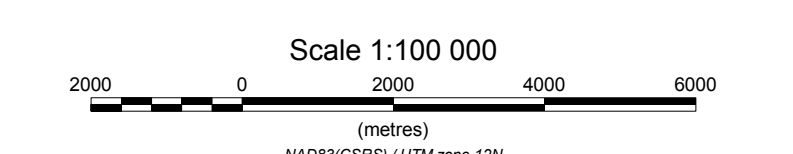
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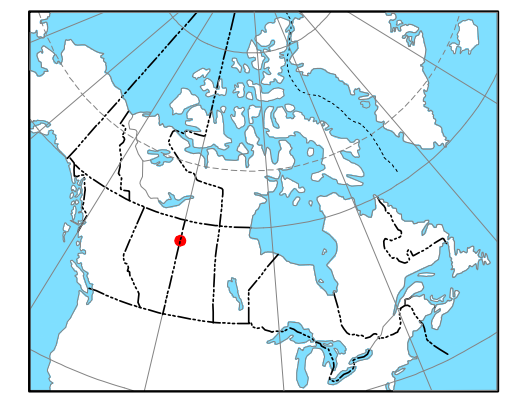
AEROMAGNETIC SURVEY OF THE MARGUERITE RIVER AREA

SASKATCHEWAN
Part of NTS 74-F North



Universal Transverse Mercator Projection
North American Datum 1983
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Base map at the scale of 1:50 000 from Natural Resources Canada, with modifications

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AEROMAGNETIC SURVEY OF THE MARGUERITE RIVER AREA

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