

First Vertical Derivative of the Magnetic Field
 This map of the first vertical derivative of the magnetic field was derived primarily 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 (Block A et al., 2009) originating from a survey flown by Fugro Airborne Surveys Corp. supplements the new survey data in block C. Data from all survey blocks were recorded using split-beam colour vector magnetometers (baseline ± 0.025 nT) mounted in each of the tail booms of two GDS Piper Navajo and a Cessna Titan 404 aircraft operated by Fugro Airborne Surveys Corp.

Survey project specifications

	Block A	Block B	Block C	Block C (in-fill)
Survey year	2017	2017	2009	2017
Aircraft registration	C-FVGG C-FVTL	C-FVGG C-FVTL	C-FVAG C-FVTL	C-FVGG C-FVTL
Flight height	Diaper, 100 m	Diaper, 100 m	Diaper, 125 m	Diaper, 100 m
Line spacing	200 m	200 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 200 m line and 1200 m tie line spacing when combined with the 2009 survey.
 The flight path was corrected following post-flight differential corrections to the way Coastal Mapping System (GPS) data. The survey blocks were flown on a pre-determined flight grid surface to minimize differences in magnetic values at the intersections of the lines and traverse lines. The dip 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 dip surface before their intersection. Differences were computer-analysed to obtain a mutually leveled set of flight line magnetic data. The leveled values were then interpolated to a 62.5 m grid. The International Geomagnetic Reference Field (IGRF) defined at the average GPS altitude of 534 m for the current mid-survey date of 2017/03/17 was then removed. Removal of the IGRF, representing the magnetic field of the Earth's core, produces a residual component related almost entirely to magnetizations within the Earth's crust.

The first vertical derivative of the magnetic field is the rate of change of the magnetic field in the vertical direction. Computation of the first vertical derivative removes the long-wavelength features of the magnetic field and significantly improves the resolution of closely spaced and superposed anomalies. A property of first vertical derivative maps is that they correspond to the zero-value contour with vertical contacts at high magnetic latitudes (Hood, 1965).

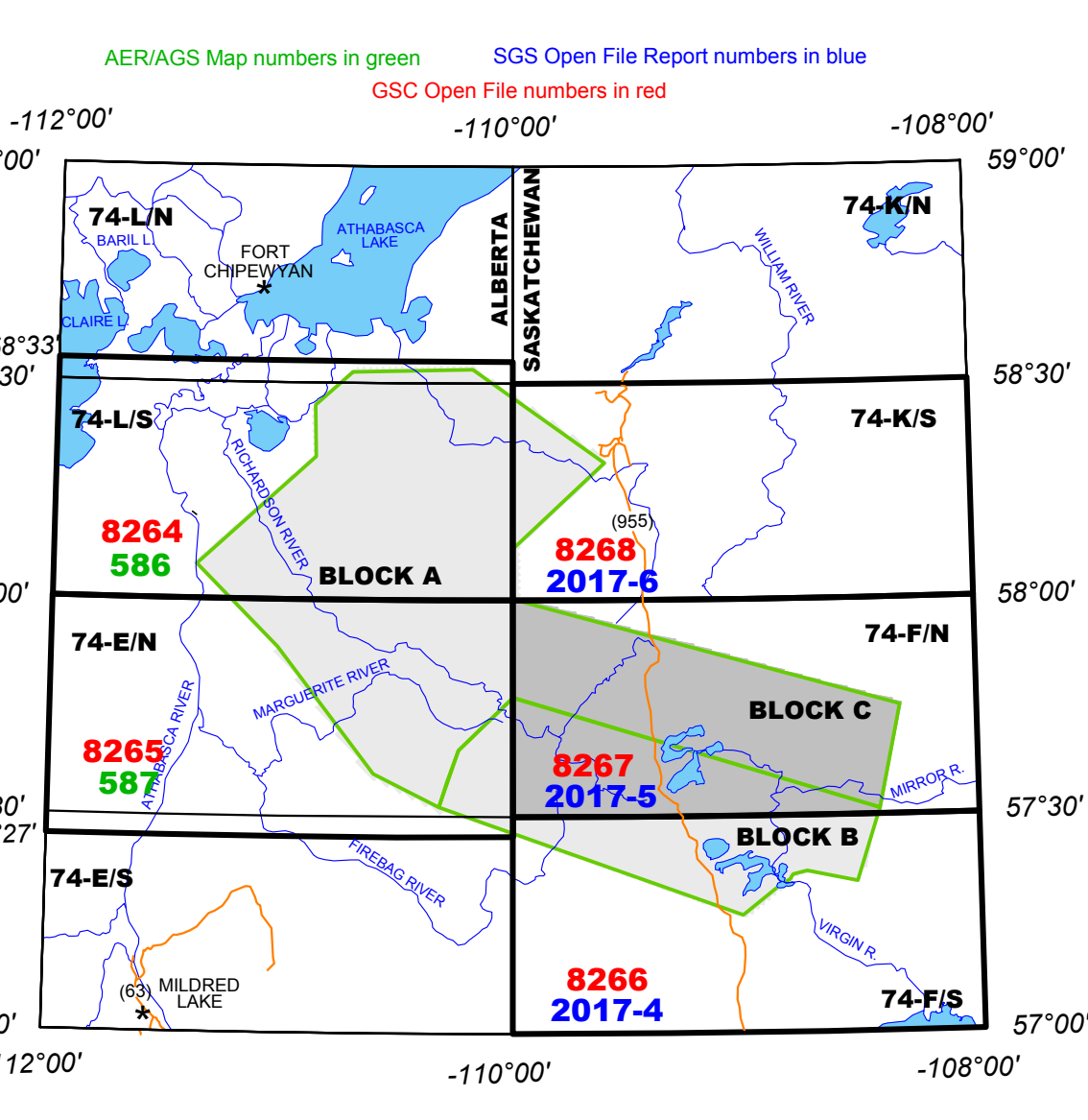
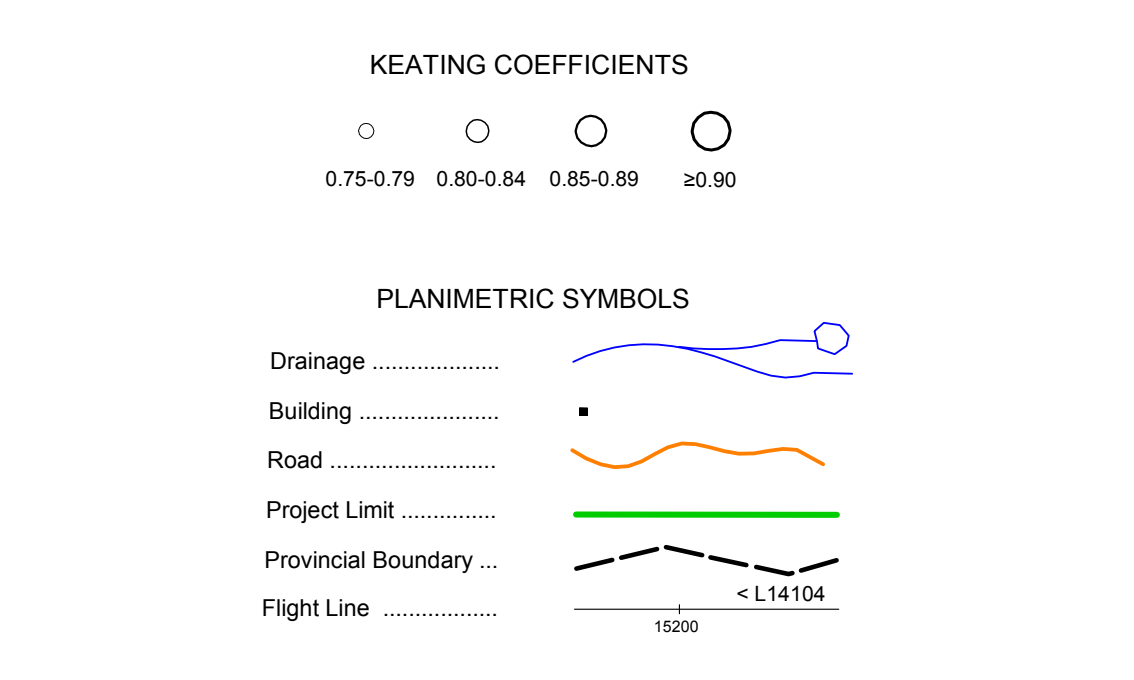
Keating Correlation Coefficients
 Possible kimberlite targets have been identified from the first vertical derivative of the magnetic field based on the identification of nearby circular anomalies. This procedure was performed by using a known pattern recognition technique (Keating, 1995) which consists of comparing, over a moving window, a first-order regression between the anomaly due to a vertical cylinder model (Table 1) and above 0.75 were retained. Only the results where the absolute value of the correlation coefficient is

Parameter	Value
Cylinder radius	75 m
Cylinder length	infinite
Depth of cylinder	(below tail sensor) 147 m
Magnetic inclination	79°N
Magnetic declination	31°E
Window cell size	12 x 12

Table 1. Parameters for vertical cylinder model anomaly.
 This publication is available for free download through GEOCAN (http://www.geocan.ca/). Corresponding digital profile and product data, as well as similar data for adjacent aeromagnetic surveys are available from Natural Resources Canada's Geoscientific Data Repository at <http://www.gdr.nrc.ca> (catalogue # 839). The same products are also available for a fee, from the Geophysical Data Centre, Geological Survey of Canada, 613 Booth Street, Ottawa, Ontario K1A 0E8. Telephone: (613) 995-5326, email: gsd@gsd.nrc.ca

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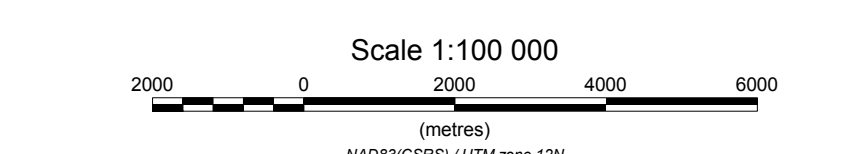
FIRST VERTICAL DERIVATIVE OF THE MAGNETIC FIELD

AEROMAGNETIC SURVEY OF THE MARGUERITE RIVER AREA

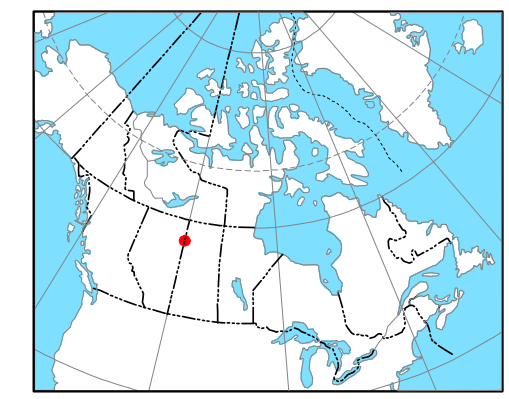
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SASKATCHEWAN
 Part of NTS 74-F North



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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