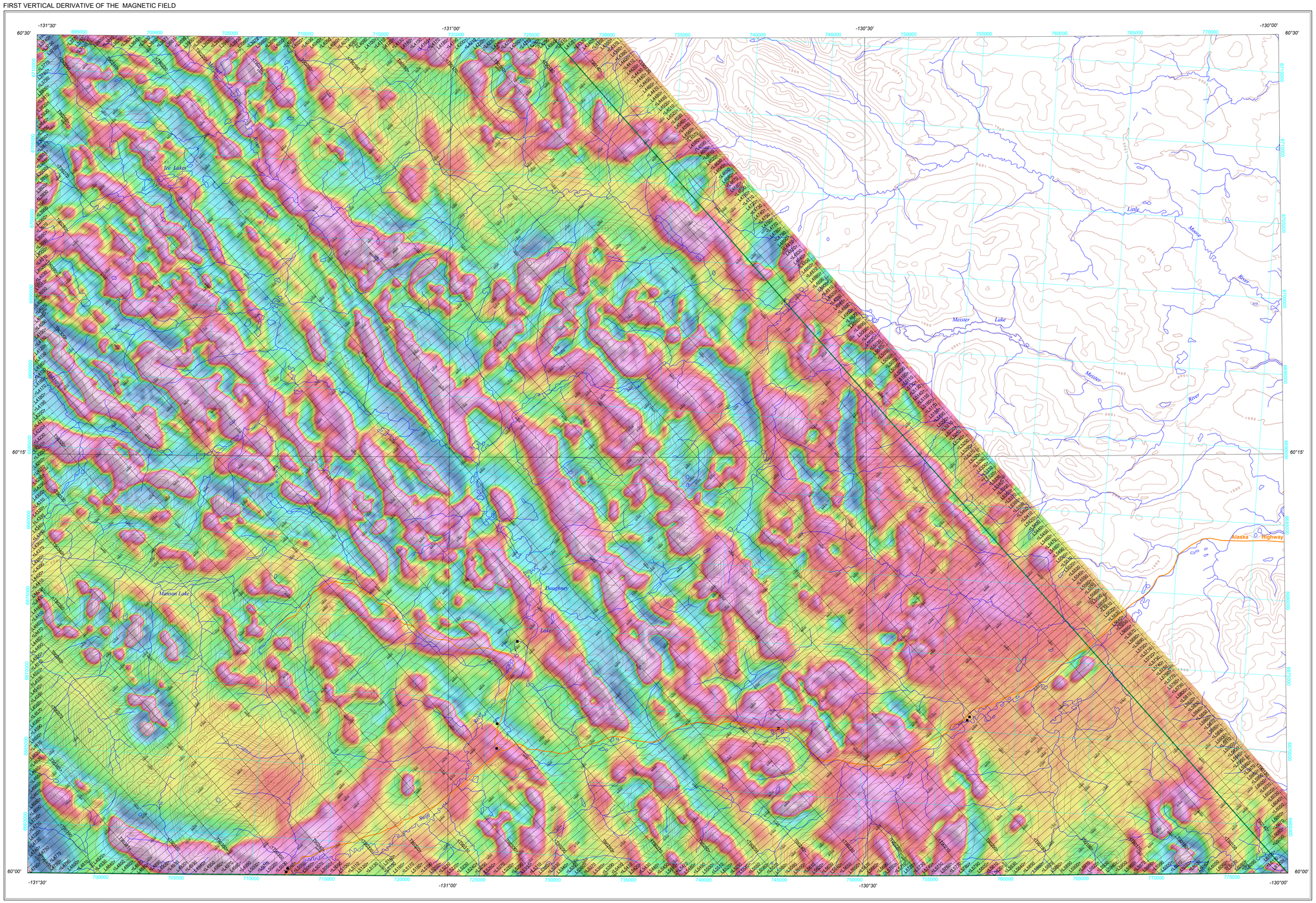
Natural Resources Canada / Ressources naturelles Canada

FIRST VERTICAL DERIVATIVE OF THE MAGNETIC FIELD



This aeromagnetic survey and the production of this map were funded by phase 2 of the Geo-mapping for Energy and Minerals program (GEM-2) of the Lands and Minerals Sector, Natural Resources Canada.

First Vertical Derivative of the Magnetic Field

This map of the first vertical derivative of the magnetic field was derived from data acquired during an aeromagnetic survey carried out by Novatem Inc. from February 23, 2019 to April 2, 2019. The data were recorded using split-beam cesium vapour magnetometers (sensitivity = 0.005 nT) mounted in each of the tail booms of two Piper Navajo aircraft (C-FWNG and C-GJDD). The nominal traverse and control line spacings were, respectively, 400 m and 2400 m, and the aircraft flew at a nominal terrain clearance of 150 m. Traverse lines were oriented N45°E with orthogonal control lines. The flight path was recovered following post-flight differential corrections to the raw Global Positioning System (GPS) data and inspection of ground images recorded by a vertically-mounted video camera. The survey was flown on a pre-determined flight surface to minimize differences in magnetic values at the intersections of control and traverse lines. These differences were computer-analysed to obtain a mutually levelled set of flight-line magnetic data. The levelled values were then interpolated to a 100 m grid. The International Geomagnetic Reference Field (IGRF) defined at the average GPS altitude of 1603 m for the year 2019.2 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 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 the coincidence of the zero-value contour with vertical contacts at high magnetic latitudes (Hood, 1965).

This publication is available for free download through GEOSCAN (http://geoscan.nrcan.gc.ca/). Corresponding digital profile and gridded data as well as similar data for adjacent airborne geophysical surveys are available from Natural Resources Canada's Geoscience Data Repository for Aeromagnetic Data at http://gdr.agg.nrcan.gc.ca/index_e.html. 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. Telephone: (613) 995-5326, email: infogdc@agg.nrcan.gc.ca.

Copies of this map may also be obtained from the Yukon Geological Survey, Energy, Mines and Resources, Government of Yukon, P.O. Box 2703 (K-102), Whitehorse, Yukon, Y1A 2C6. Telephone: (867) 667-3201, email: geology@gov.yk.ca, website: http://www.geology.gov.yk.ca.

Reference

Hood, P.J., 1965. Gradient measurements in aeromagnetic surveying; Geophysics, v. 30, p. 891-902.

Acknowledgements

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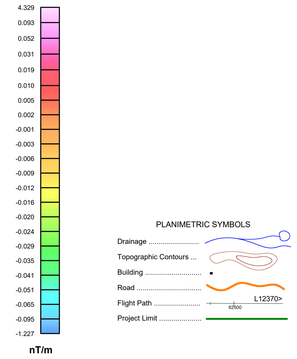

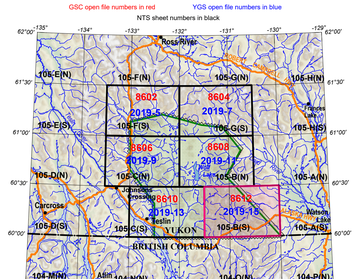

NATIONAL TOPOGRAPHIC SYSTEM REFERENCE AND GEOPHYSICAL MAP INDEX

AEROMAGNETIC SURVEY OF THE WOLF LAKE AREA

GEOLOGICAL SURVEY OF CANADA OPEN FILE 8612
YUKON GEOLOGICAL SURVEY OPEN FILE 2019-15

FIRST VERTICAL DERIVATIVE OF THE MAGNETIC FIELD

AEROMAGNETIC SURVEY OF THE WOLF LAKE AREA

YUKON

Part of NTS 105-B (south half)

Author: F. Kiss

Data acquisition and data compilation by Novatem Inc., Mont-Saint-Hilaire, Quebec

Contract and project management by the Geological Survey of Canada, Ottawa, Ontario

Cartographic design by D. Oneschuk, Geological Survey of Canada

Permanent link: https://doi.org/10.4095/314840

Scale 1:100 000

2 0 2 4 6
(kilometres)

Universal Transverse Mercator Projection Zone 8 North
North American Datum,1983

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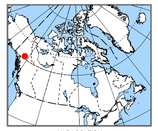
Base map at the scale of 1:250 000 from Natural Resources Canada, with modifications
Elevations in metres above mean sea level



MAP LOCATION

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DOSSIER PUBLIC
8612
GEOLOGICAL SURVEY OF CANADA
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2019

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