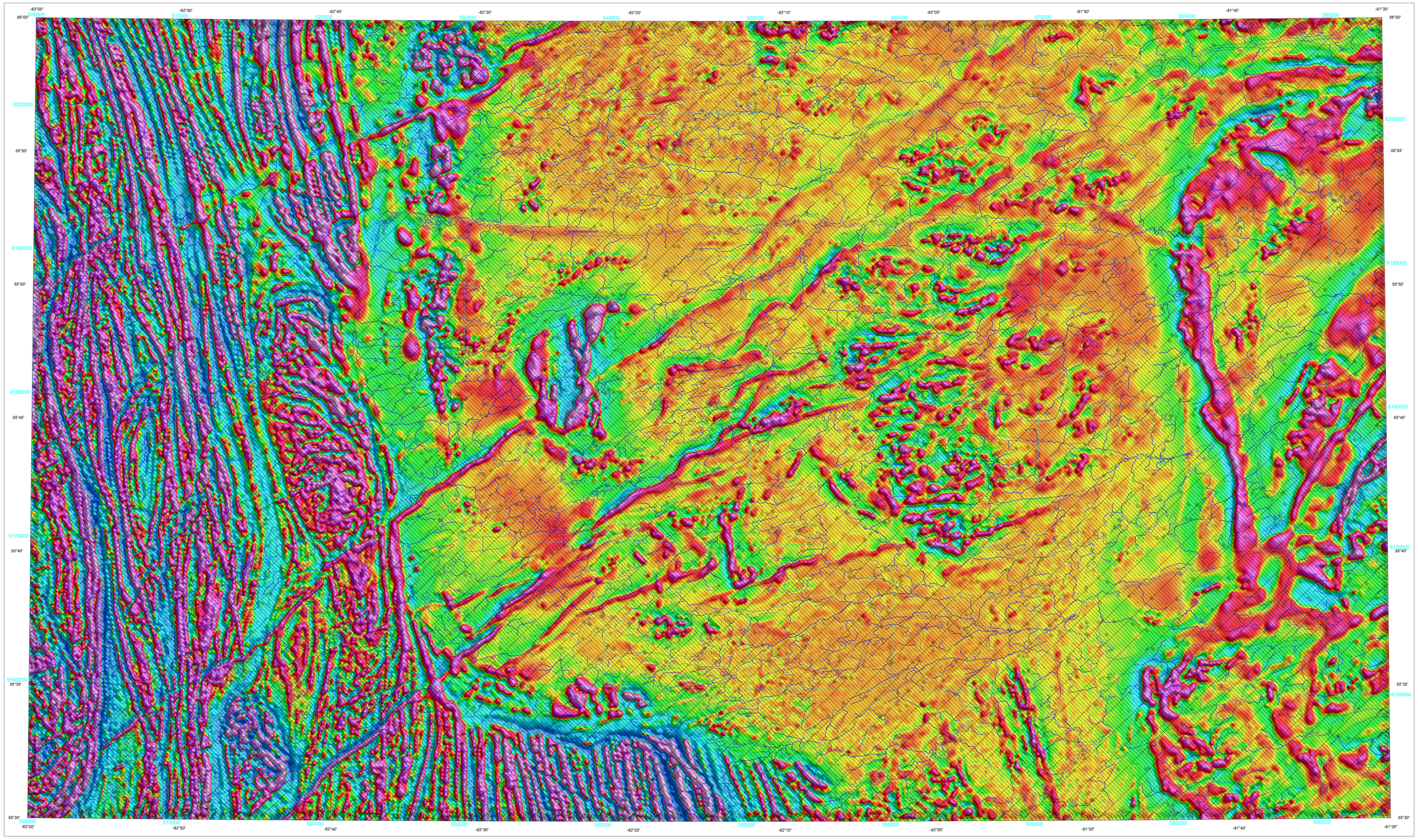
Natural Resources Canada / Ressources naturelles Canada

Newfoundland Labrador — Natural Resources

FIRST VERTICAL DERIVATIVE OF THE MAGNETIC FIELD



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 in the Hopedale area, Labrador by EON Geosciences Inc. (EON), from January 15, 2018 to August 12, 2018 with two Piper Navajo aircraft (C-FEON and C-FION) and a Piper Cheyenne II aircraft (C-GFON). The data were recorded using split-beam cesium vapour magnetometers (sensitivity = 0.005 nT) mounted in each of the tail booms of these aircraft. The nominal traverse and control line spacings were, respectively, 200 m and 1200 m, and the aircraft flew at a nominal terrain clearance of 100 m. Traverse lines were oriented N135°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 50 m grid. The International Geomagnetic Reference Field (IGRF) defined at the average GPS altitude of 490 m for the year 2018.329 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 superimposed 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).

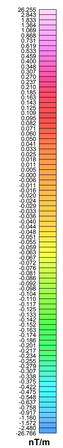
This publication is available for free download through GEOSCAN (http://geoscan.nrcan.gc.ca/). Corresponding digital profile and gridded data as well as similar data for adjacent airborne geophysical surveys are available from Natural Resources Canada's Geoscience Data Repository for Aeromagnetic Data at http://gdr.agg.nrcan.gc.ca/index_e.html. Digital products from this airborne survey are also available from the GSNL Geoscience Atlas at https://geoatlas.gov.nl.ca/Default.htm.

Acknowledgements

The field crew chiefs, Richard Bailey and Khorram Khan (EON), are thanked for their cooperation and their technical assistance during the start-up phase of this survey. We also thank Marc Richard (EON) for his cartographic design expertise.

Reference

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



PLANIMETRIC SYMBOLS

Project Limit .....

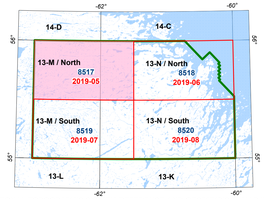
Drainage .....

Flight Path ..... L12370> 62850

NTS map sheet numbers in black

GSC Open File numbers in blue

GSNL Open File numbers in red



NATIONAL TOPOGRAPHIC SYSTEM REFERENCE AND GEOPHYSICAL MAP INDEX

AEROMAGNETIC SURVEY OF THE HOPEDALE AREA

OPEN FILE
DOSSIER PUBLIC
8517
GEOLOGICAL SURVEY OF CANADA
COMMISSION GÉOLOGIQUE DU CANADA
2019

Publications in this series have not been edited; they are released as submitted by the author.

Les publications de cette série ne sont pas révisées; elles sont publiées telles que soumises par l'auteur.

Newfoundland and Labrador Department of Natural Resources
Geological Survey Open File
LAB/1737, Map 2019-05

Recommended citation
Coyle, M., 2019. First Vertical Derivative of the Magnetic Field, Aeromagnetic Survey of the Hopedale Area, Newfoundland and Labrador, Parts of NTS 13-M/North and 13-N/North; Geological Survey of Canada, Open File 8517; Newfoundland and Labrador Department of Natural Resources, Geological Survey Open File LAB/1737, Map 2019-05; Scale 1:100 000. https://doi.org/10.4095/313299

GEOLOGICAL SURVEY OF CANADA OPEN FILE 8517
NEWFOUNDLAND AND LABRADOR DEPARTMENT OF NATURAL RESOURCES, GEOLOGICAL SURVEY OPEN FILE LAB/1737, MAP 2019-05

FIRST VERTICAL DERIVATIVE OF THE MAGNETIC FIELD

AEROMAGNETIC SURVEY OF THE HOPEDALE AREA

NEWFOUNDLAND AND LABRADOR
PARTS OF NTS 13-M/NORTH AND 13-N/NORTH

Author: M. Coyle

Data acquisition and data compilation by
EON Geosciences Inc., St-Laurent, Quebec

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

Digital cartography by M. Richard, EON Geosciences Inc.

Permanent link: https://doi.org/10.4095/313299

Scale 1:100 000

2 0 2 4 6
Kilometres
NAD83(CSRS) / UTM zone 20N

Universal Transverse Mercator Projection
North American Datum 1983

Base map at the scale of 1:50 000 from Natural Resources Canada, with modifications

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.

MAP LOCATION

Canada — Newfoundland Labrador