

# AIRBORNE GEOPHYSICAL DATA COMPILATION, NORTH-CENTRAL NEWFOUNDLAND

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This is a joint publication by the Geological Survey of Canada (GSC) and the Geological Survey of Newfoundland and Labrador (GSNL). Final products of the compilation are four merged data grids and four corresponding open file series maps at 1:200 000 scale. Coordinates are projected in NAD83/UTM zone 21 north.

1. Residual Total Magnetic Field.  
GSC Open File 8844  
GSNL Open File; NFLD/3396, Map 2021-09  
Permanent link: <https://doi.org/10.4095/329227>
2. First Vertical Derivative of the Magnetic Field.  
GSC Open File 8845  
GSNL Open File; NFLD/3396, Map 2021-10  
Permanent link: <https://doi.org/10.4095/329228>
3. Tilt Angle of the Magnetic Field.  
GSC Open File 8846  
GSNL Open File; NFLD/3396, Map 2021-11  
Permanent link: <https://doi.org/10.4095/329229>
4. Analytic Signal of the Magnetic Field.  
GSC Open File 8847  
GSNL Open File; NFLD/3396, Map 2021-12  
Permanent link: <https://doi.org/10.4095/329230>

## Descriptive Notes

Regional aeromagnetic data used in this compilation were acquired from the Geological Survey of Canada Geophysical Data Repository. Digital data from high-resolution surveys flown by mineral exploration companies and the Geological Survey of Newfoundland and Labrador were made available through the Geoscience Atlas, Newfoundland and Labrador Department of Industry, Energy and Technology and the Geological Survey of Canada Geophysical Data Repository.

Results from all high-resolution surveys were levelled to the regional data and to each other using Geosoft GridKnit software. The “suture” method was used, and a static shift was applied to most of the grids to facilitate optimal data merging. In a very few incidences, a slope correction was applied. A target resolution for the final data was a 25m grid cell size; all data were gridded from the magnetic profile data, and if required, re-interpolated to this resolution before merging. Lower resolution data were knitted into the regional data first and the higher resolution data last, so that all areas on the maps and digital datasets show the highest resolution data currently available. Apparent mismatches between survey blocks are a result of differing line spacing, flight altitudes and equipment platforms.

Magnetic field measurements reflect magnetic properties of the underlying bedrock. It provides qualitative and quantitative information used in geological mapping. An improved understanding of the geology assists in mineral exploration activities and provides a valuable reference to communities, aboriginal associations, and government in making informed land-use decisions.

## Magnetic Data and Derivative Maps

The International Geomagnetic Reference Field (IGRF) was removed from the magnetic profile data before gridding. The **first vertical derivative** of the magnetic field enhances higher frequency magnetic anomalies compared to the residual total magnetic field. This tends to accentuate contacts between bedrock lithologies, but can also highlight mismatches at the boundaries between lower and higher resolution datasets. The **tilt angle** (Miller and Singh, 1994) is useful for mapping shallow basement structures and mineral exploration targets. The tilt equalizes the anomalous effects of magnetic sources at different depths. It is defined as  $\arctan(\text{first vertical derivative}/\text{total horizontal derivative})$  of the magnetic field. The **analytic signal** (Roest *et al.*, 1992) is useful in locating the edges of magnetic source bodies in the subsurface and is defined as the square root of the sum of the squares of the derivatives in the x, y, and z directions.

More detailed information about individual surveys can be found within individual contractor survey reports, available through GSNL’s online Geoscience Atlas in the link below.

## Acknowledgements

The authors would like to thank Ian Honsberger for initiating this project and his encouragement and support throughout its progression, and Mark Pilkington (GSC) for his helpful comments and suggestions to improve the maps.

## References

Miller, H.G. and Singh, V., 1994

Potential field tilt - a new concept for location of potential field sources, *J. Appl. Geophys.*, **32** (2–3), pp. 213-217. [https://doi.org/10.1016/0926-9851\(94\)90022-1](https://doi.org/10.1016/0926-9851(94)90022-1)

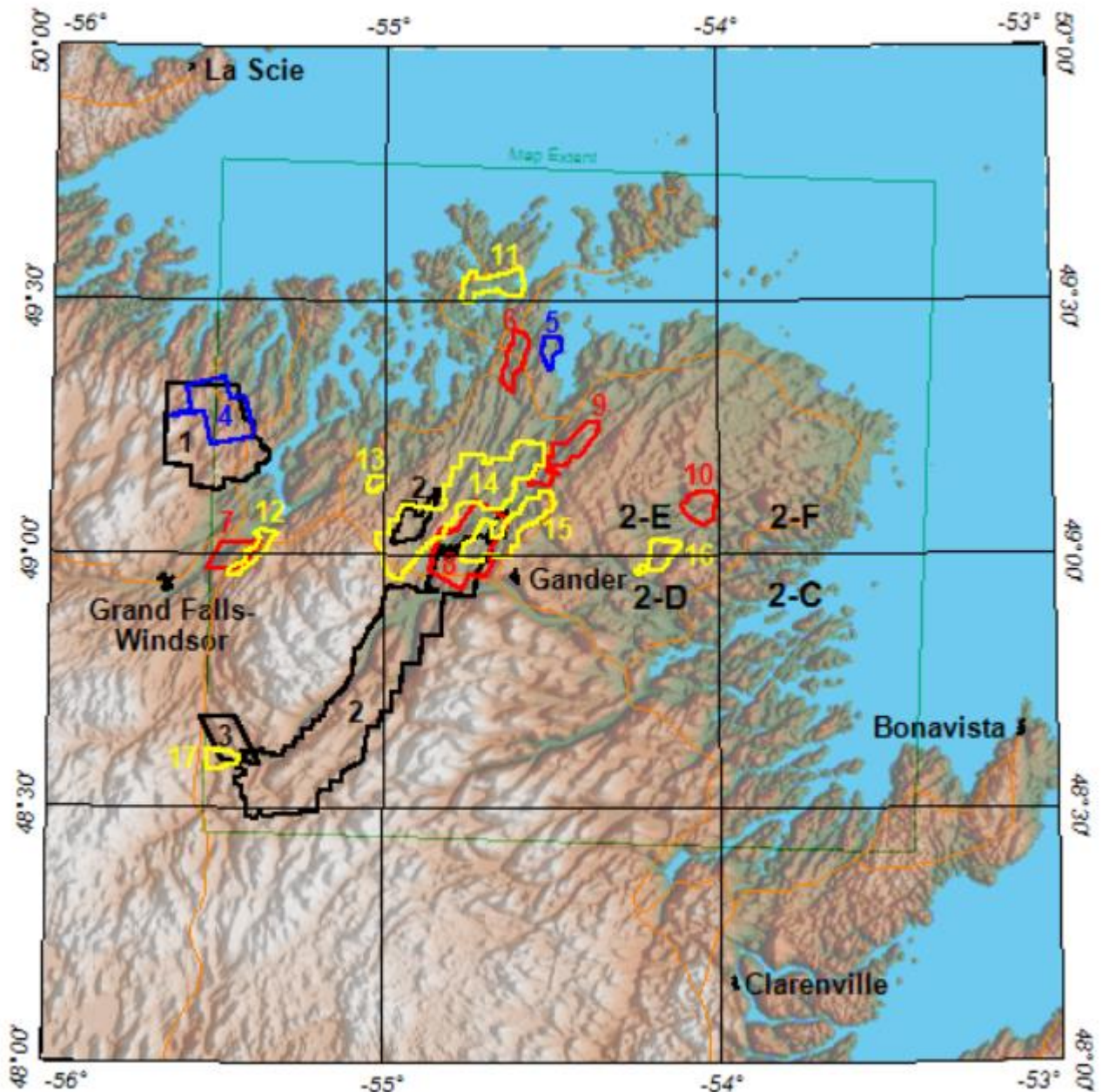
Roest, W.R., Verhoef, J. and Pilkington, M., 1992

Magnetic interpretation using the 3-D analytic signal. *Geophysics* 1992; **57** (1), pp. 116–125. <https://doi.org/10.1190/1.1443174>

The following table and index map provide source and locational information for the industry surveys that were merged in this project. Individual surveys on the index map can be identified by their corresponding colour and number in the table below.

Index Number	Survey ID	Survey Area	Contractor	Client	Year	Line Spacing (m)	Mag Sensor Height (m)	Survey Type	Platform
1	DN12330	Point Leamington	Fugro Airborne Surveys	Calibre Mining Corp.; TLC Ventures Corp.; Paragon Minerals Corp.	2007	200	75	E-M	H
2	DN24569	1 -Gander Lake South	CGG / Fugro Airborne Surveys	Palisade Resources; Krinor Resources; New Found Gold Corp.	2017	200	35	E-M	H
3	DN07724	Rolling	Goldak Exploration Technology Ltd.	Altius Resources Inc.	2002	200	80	M	F
4	DN05435	Lewis Lake	Geotrex-Dighem	Rubicon Minerals Corp	1999	150	73	E-M	F
5	DN05241	Tims Cove - GBA	Aero Surveys Inc	Copper Hill Resources Inc.	1997	150	30	E-M	H
6	DN08784	Duder Lake - Bloc4	Sial Geosciences Inc.	Celtic Minerals Ltd.	1996	100	45	E-M-V	H
7	DN08413	Moosehead	Goldak Exploration Technology Ltd.	Altius Resources Inc.	2002	100	80	M	F
8	DN15698	Appleton/JBP Linear	Goldak Airborne Surveys	Northern Skye Res., True Claim Res., KriASK Synd., ASK Prosp., Krinor Res., Canadian Zinc Corp.	2012	100	80	M	F
9	DN18072	Cripple Creek	Geotech Ltd	Capstone Mining Corporation; 0840559 B.C. Limited; Fancey, D.; LeDrew, D.	2012	100/50	52	E-M	H
10	DN08782	Wing Pond - Bloc2	Sial Geosciences Inc.	Celtic Minerals Ltd.	1996	100	45	E-M-V	H
11	DN10981	New World Island	AeroQuest Ltd	Rubicon Minerals Corp.	2006	75	30	E-M	H
12	DN08259	A - Moosehorn	Fugro Airborne Surveys	Rubicon Minerals Corp.	2002	50	30	M	H
13	DN08262	E - Peyton Satellite	Fugro Airborne Surveys	Rubicon Minerals Corp.	2002	50	30	M	H
14	DN08606	H - Glenwood Break	Fugro Airborne Surveys	Rubicon Minerals Corp.	2003	75	30	E-M	H
15	DN08607	I - Gander Area	Fugro Airborne Surveys	Rubicon Minerals Corp.	2003	75	30	E-M	H
16	DN08350	G - Wing Pond	Fugro Airborne Surveys	Rubicon Minerals Corp.	2003	50	30	M	H
17	DN08292	B - Beaver	Fugro Airborne Surveys	Rubicon Minerals Corp.	2003	50	30	M	H

E=Electromagnetic M=Magnetic V=VLF F=Fixed Wing H=Helicopter



**SURVEY INDEX AND NATIONAL TOPOGRAPHIC SYSTEM REFERENCE**

The maps for this publication are available for free download through GEOSCAN at <https://geoscan.nrcan.gc.ca>. Corresponding digital gridded data can be downloaded from the Geological Survey of Canada's Repository for Geophysical Data at <http://gdr.agg.nrcan.gc.ca>. For more information, please contact the Geophysical Data Centre, Geological Survey of Canada, 601 Booth Street, Ottawa, Ontario K1A 0E8. Telephone 613-995-5326, email: [Infogdc-infocdg@nrcan-nrcan.gc.ca](mailto:Infogdc-infocdg@nrcan-nrcan.gc.ca). Digital data and further information regarding detailed airborne surveys flown in Newfoundland can be accessed or downloaded through the GSNL Geoscience Atlas, at <https://gis.geosurv.gov.nl.ca/>.

These Open Files are a contribution to the Targeted Geoscience Initiative (TGI) program of the Lands and Minerals Sector, Natural Resources Canada.

### **Recommended Citation for Gridded Data**

Airborne Geophysical Data Compilation, north-central Newfoundland,  
 parts of NTS 2-C, D, E and F, Newfoundland and Labrador;  
 Geoscience Data Repository for Geophysical Data,  
<http://gdr.agg.nrcan.gc.ca>.  
 Airborne Geophysics Section,  
 GSC - Central Canada Division,  
 Geological Survey of Canada,  
 Natural Resources Canada