



Energy and Mines

Mines

**GEOCHEMICAL DATA RELATED TO
METALLOGENIC STUDIES OF GRANITE-
RELATED CRITICAL MINERAL OCCURRENCES,
NEWFOUNDLAND (NTS MAP AREAS 1M/10,
2D/03, 10, 11P/11, 13 AND 12A/02)**

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Open File NFLD/3540



St. John's, NL
June 2026

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Recommended citation:

Conliffe, J.

2026: Geochemical data related to metallogenic studies of granite-related critical mineral occurrences, Newfoundland (NTS map areas 1M/10, 2D/03, 10, 11P/11, 13 and 12A/02). Government of Newfoundland and Labrador, Department of Energy and Mines, Geological Survey, Open File NFLD/3540, 8 pages.

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SUMMARY

This Open File release includes lithogeochemical data from 118 drillcore and outcrop samples sites. These samples were collected between 2022 and 2025 as part of an ongoing GSNL project investigating granite-related critical mineral occurrences in southern and central Newfoundland (NTS map sheets 1M/10, 2D/03, 10, 11P/11, 13 and 12A/02; Figure 1). Drillcore samples were collected from historical drillcores located at the Government of Newfoundland and Labrador Core Storage facilities in St. John's and Buchans.

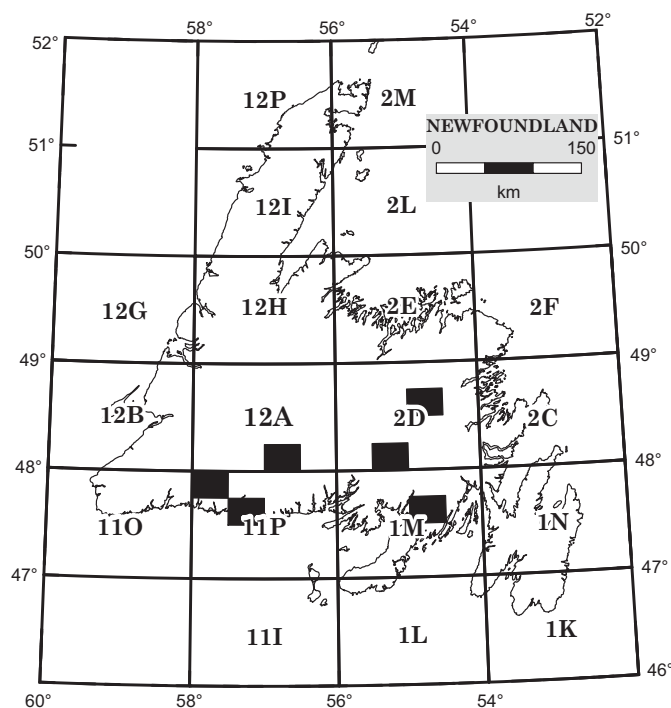


Figure 1. Location of the study area.

The samples included in this Open File primarily consist of samples from known W, Sn, Mo and Pb mineral occurrences in the Avalon and Gander zones but also include samples from a new tungsten occurrence north of Burgeo. This release provides geochemical data with no interpretation.

NOTES ON THE DATABASE

This database includes the results of whole-rock major-element, trace-element and rare-earth-element (REE) analyses of 118 samples. Several different types of sample media are included within the database, these include grab samples from outcrop, float samples representing material collected from boulders of (inferred) local origin, and drillcore samples. The database also includes

sample location data and brief sample descriptions. The location data for samples are presented in Appendix A, with locations reported as Universal Transverse Mercator (UTM) eastings and northings (zone 21, NAD27). The data are available in digital format (*i.e.*, Excel; *.xlsx) in Appendices A to C.

All samples selected for geochemical analysis were prepared at the Geological Survey of Newfoundland and Labrador's (GSNL) geochemistry laboratory in St. John's. Samples were milled using ceramic mills. Most analyses were carried out at the GSNL geochemistry laboratory and analytical methods are described in Finch *et al.* (2018) and summarized in Table 1. Additional analyses (for trace elements including Au) of selected samples were conducted by Bureau Veritas.

Major-element compositions (plus Ba, Be, Cr, Sc and Zr) were analyzed by ICP-OES methods, following lithium tetraborate and metaborate fusion. REE and selected trace elements were determined by ICP-MS analysis following an identical sample digestion procedure, whereas other trace elements (As, Cd, Co, Cu, Li, Mo, Ni, Pb, S, V, and Zn) were analysed by ICP-OES after

Table 1. Analytical methods for the elements (*see* Table 2 for abbreviations)

Element	Analytical Method	Preparation/Digestion	Laboratory
Al ₂ O ₃ , Ba, Be, CaO, Cr, Fe ₂ O ₃ ^T , K ₂ O, MgO, MnO, Na ₂ O, P ₂ O ₅ , Sc, SiO ₂ , TiO ₂ , Zr	ICP-OES	50-50 Lithium Tetraborate Lithium Metaborate Fusion	GSNL
F	ISE	Na ₂ CO ₃ and KNO ₃ fusion in a nickel crucible	GSNL
FeO	Titration	None	GSNL
Fe ₂ O ₃	Calculation	None	GSNL
LOI	Gravimetric at 1000°C	None	GSNL
As, Cd, Co, Cu, Li, Mo, Ni, Pb, Rb, S, V, Zn	ICP-OES- 4-ACID	HF-HCl-HNO ₃ -HClO ₄ (total digestion)	GSNL
Ag	ICP-OES	HNO ₃ digestion	GSNL
Bi, Ce, Cs, Dy, Er, Eu, Ga, Gd, Ge, Hf, Ho, La, Lu, Nb, Nd, Pr, Rb, Sm, Sn, Sr, Ta, Tb, Th, Tl, Tm, U, W, Y, Yb	ICP-MS	50-50 Lithium Tetraborate Lithium Metaborate Fusion	GSNL
Au	INAA	Irradiation	Bureau Veritas

total 4-acid digestion. Volatiles are represented as loss-on-ignition (LOI) at 1000°C, which represents the breakdown of all minerals and release of all volatiles. The ferrous-iron content (FeO) of silicate rocks is determined by the Wilson Method (Wilson, 1960), as outlined by Finch *et al.* (2018). For silver analysis, 0.5 g of sample powder was weighed into a 15 ml digestion tube with 2 ml of concentrated nitric acid, and digested for two hours. The digested sample was analyzed by ICP-OES (Finch *et al.*, 2018).

Two samples were also selected for analyses for trace elements including Au. These were conducted by Bureau Veritas using Instrumental Neutron Activation Analysis (INAA), with laboratory certificates included in Appendix D.

Table 2. List of abbreviations and codes

Abbreviation	Explanation
-99	Samples not analyzed for that element
Avg	Average value
Fe ₂ O ₃ ^T	Total measured iron
GSNL	Geological Survey of Newfoundland and Labrador
Grav.	Gravimetric
%_Diff.	Percent difference between original and duplicate
ICP-MS FUS	Inductively Coupled Plasma-Mass Spectrometry following lithium metaborate/tetraborate fusion
ICP-OES 4-ACID	Inductively Coupled Plasma-Optical Emission Spectrometry following HF-HCl-HNO ₃ -HClO ₄ acid digestion
ICP-OES FUS	Inductively Coupled Plasma-Optical Emission Spectrometry following lithium metaborate/tetraborate fusion
INAA	Instrumental Neutron Activation Analysis
IR	Infrared Absorption
CRM	Certified Reference Material
DL	Detection limit
LCL	Lower control limit
LOI	Loss-on-ignition
N/A	Not available
Below detection limit	Half of the detection limit
ppb	Parts per billion
ppm	Parts per million
Rec_Val	Recommended value
UCL	Upper control limit
wt_pct	Weight percent

Major elements are reported in weight percent (wt. pct), and minor and trace elements are reported in parts per million (ppm), except gold (Au) which is reported in parts per billion (ppb). A negative number indicates the concentration of the specific element in the sample was below the detection limit (*e.g.*, -0.01 indicates the measured value was below the detection limit of 0.01). Columns containing -99 for a given element indicate that it was not analyzed. Detection limits are listed for each element in the Excel files. Several elements exhibit batch-to-batch variation in detection limits across the 2022–2025 analytical campaigns. This variability reflects differences in instrument sensitivity, matrix effects, and reagent batches between runs, and has a direct bearing on how below-detection values should be interpreted when comparing data across years.

A selection of reference standards (Table 3) was analyzed at a frequency of one in 20. The raw, unprocessed data from standards that were run during analysis in 2019 and 2021 is included in Appendix B, and these data can be used by the reader to assess accuracy and precision. Analytical duplicates were also inserted at a frequency of one in 20, with the duplicate selected at random.

Table 3. List of abbreviations for certified reference materials

Abbreviation	Explanation
AGV-1	Andesite, Lake County, OR (USGS)
BHVO-1	Basalt, Hawaii (USGS)
BIR-1	Basalt, Iceland (USGS)
CH-2	CCRMP CH-2 Gold Ore
G-2	Granite, Bradford RI (USGS)
MAG-1	Gray-brown clayey mud, Gulf of Maine (USGS)
MP-1A	MP-1a ore
QLO-1	Quartz Latite, Oregon (USGS)
RGM-1	Rhyolite, California (USGS)
SDC-1	Mica Schist, Washington DC (USGS)
STM-1	Peralkaline nepheline syenite, Oregon (USGS)
SY-4	Diorite gneiss, Brudendell Township ON (NRCAN)
SY-5	Syenite, Township of Admaston/Bromley, ON
W-2	Diabase, Virginia (USGS)
WGB-1	WGB-1: Gabbro, Wellgreen Complex YT (NRCAN)

For duplicates the variation between original and duplicate values was calculated in Appendix C using the following equation:

$$\%_difference = [(Original\ Value - Lab\ Split\ Value)/Original\ Value] * 100.$$

ACKNOWLEDGMENTS

Sample preparation and geochemical analyses were carried out under the supervision of Chris Finch of the GSNL Geochemistry Laboratory. Special thanks go to Noah Slaney, Zsuzsanna Magyarosi, Maria O'Neill and Kiersty Malay for their able assistance in the field. William Oldford and Justin Emberly (Mines Branch) are thanked for access to drillcore. Joyeeta Bhattacharjee and Megan Reardon provided helpful reviews of early drafts of this file.

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APPENDICES

Appendices A–D are included in the OF_NFLD_3540 zip folder as Excel (.xlsx) and Adobe (pdf) files.

APPENDIX A: Major-element and Trace-element Data

APPENDIX B: Major-element and Trace-element Data for Standards

APPENDIX C: Major-element and Trace-element Data for Duplicates

APPENDIX D: External Lab Certificates from Bureau Veritas