



Industry, Energy and Technology

Mines

**GEOCHEMICAL DATA FROM THE HOPEDALE
BLOCK, MAKKOVIK PROVINCE AND
SOUTHEAST CHURCHILL PROVINCE, LABRADOR
(NTS MAP AREAS 13I, J, K, M, N, O AND 14C)**

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Open File LAB/1783



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SUMMARY

This Open File data release consists of whole-rock geochemical data from 219 rock samples collected in NTS map areas 13I, J, K, M, N, O and 14C, from the Hopedale Block, Makkovik Province and Southeast Churchill Province of Labrador. The geological context of these samples and a description of the regional geology are contained in Corrigan *et al.*, 2018; Hinchey and Corrigan, 2019 and Hinchey *et al.*, 2022. Additional geochemistry for the area can be found in (Hinchey *et al.*, 2021). This work was supported by the Geological Survey of Canada's Geo-Mapping for Energy and Minerals in Canada's North (GEM) Program (Geological Survey of Canada, 2018). This research was conducted in part on Labrador Inuit Lands with permission of the Nunatsiavut Government, NGRAC19577773.

NOTES ON THE DATABASE

This data release contains whole-rock geochemical analyses of lithological units collected by the authors between 2017 to 2021. This Open File also includes re-analyzed samples collected in the region in the 1970s to 1990s by Bruce Ryan, Charlie Gower and Andy Kerr of GSNL. This open file places data in the public domain; no interpretation of the data is included in this report.

The compilation includes for each sample the location in UTM coordinates (Zone 20 and 21, NAD27 and NAD83), a brief lithological description, and major-element and trace-element data (Appendix A). Unprocessed data for standards and duplicates are provided (Appendices B and C), and may be used by the reader to assess the accuracy and precision of the analyzed data. The data

are available in comma separated value format (*.csv files) from the Geofiles website link (*see* Appendices). A list of abbreviations used in the report is provided in Table 1.

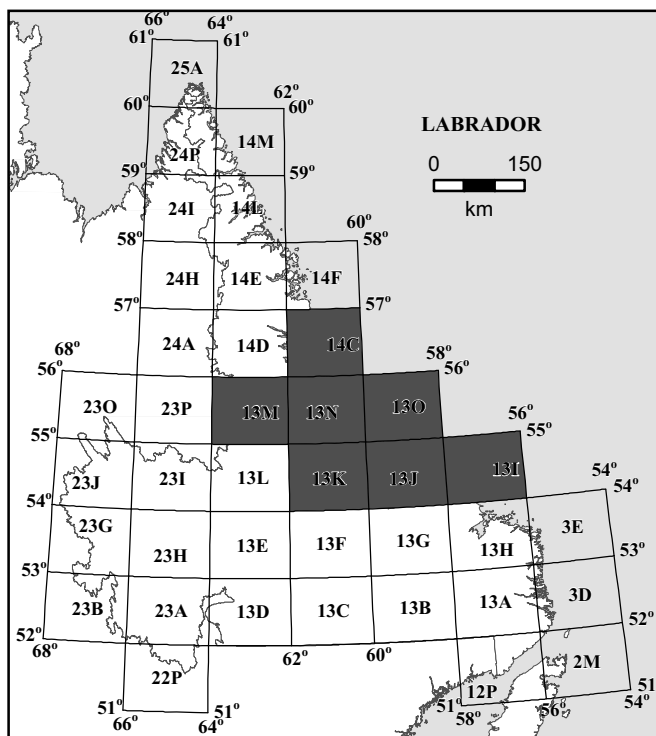


Figure 1. Location map of study area in Labrador.

The analytical methods used for each element are listed in Table 2. The Geochemical Laboratory of the Geological Survey of Newfoundland and Labrador analyzed most of the major elements using ICP-OES following lithium metaborate fusion. FeO was measured by the titration method and LOI by the gravimetric method. Trace elements were analyzed using ICP-OES following four-acid digestion, and by ICP-MS following lithium metaborate/tetraborate fusion; a few samples were analyzed for a longer period of time in the ICP-MS, resulting in lower detection limits. Silver was analyzed using

Table 1. List of abbreviations and codes

Abbreviation or Code	Explanation
-99	Sample not analyzed for that element
Avg	Average value
Dup	Duplicate analysis
Fe ₂ O ₃ T	Total measured iron (III)
FeOT	Total iron (II), calculated from total measured iron (III)
GOI	Gain-on-ignition
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
ICP-OES-HNO ₃	Inductively Coupled Plasma Optical Emission Spectrometry following nitric acid digestion
ICP-MS-FUS	Inductively Coupled Plasma Mass Spectrometry following lithium metaborate/tetraborate fusion
INAA	Instrumental Neutron Activation Analysis
ISE	Ion-selective electrode
LCL	Lower control limit
LOI	Loss-on-ignition
negative detection limit	Below detection limit
pct	Percent
ppb	Parts per billion
ppm	Parts per million
Rec Val	Recommended value
REE	Rare-earth elements
UCL	Upper control limit
wt_pct	Weight percent

ICP-OES following nitric acid digestion. Fluoride was analyzed using ISE. Trace elements were also analyzed using INAA by the external commercial laboratory Bureau Veritas. These analytical procedures are described in (Finch *et al.*, 2018).

Select Geological Survey of Canada samples (*i.e.*, prefix 17CX and 18CX) were analyzed at Activation Laboratories Ltd. (Actlabs). Most of the major and some trace elements were analyzed using ICP-OES and ICP-MS following lithium metaborate fusion. Trace elements were analyzed using ICP-OES and ICP-MS following four-acid digestion. The Fe₂O₃ for the standards is total Fe₂O₃ and has not been adjusted for the FeO with the exception of SY-3, BIR-1 and GBW 07113. LOI2 is the LOI adjusted for the difference in oxygen between FeO and Fe₂O₃. TOTAL2 is the total including LOI2. We recommend using option 4B1 for accurate levels of the base metals Cu, Pb, Zn, Ni and Ag and option 4B-INAA for As, Sb, high W >100 ppm, Cr >1000 ppm and Sn >50 ppm by Code 5D. Values for these elements, provided by Fusion ICP-MS, are order of magnitude only and are provided for general information. Mineralized samples should have the 'Quant' option selected or request assays for values that exceed the range of option 4B1. Total includes all elements in % oxide to the left of that field. Zr is now being reported from FUS-ICP instead of FUS-MS.

Table 2. Analytical methods for the elements

Element	Analytical Method	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-FUS	GSNL
Al ₂ O ₃ , Ba, Be, CaO, Fe ₂ O ₃ T, Fe ₂ O ₃ , K ₂ O, MgO, MnO, Na ₂ O, P ₂ O ₅ , Sc, SiO ₂ , Sr, TiO ₂ , V, Zr	FUS-ICP	GSNL
Fe ₂ O ₃ ,	Calculation	GSNL
FeO	Titration	GSNL, ACTLABS
FeOT	Calculation	GSNL
LOI	Gravimetric	GSNL, ACTLABS
LOI2	Calculation	ACTLABS
As, Cd, Co, Cu, Li, Mo, Ni, Pb, Rb, S, V, Zn	ICP-OES-4-ACID	GSNL
Ag	ICP-OES-HNO ₃	GSNL
F	ISE	GSNL
Bi, Ce, Cs, Dy, Er, Eu, Ga, Ge, Gd, Hf, Ho, La, Lu, Nd, Nb, Pr, Rb, Sm, Sn, Sr, Ta, Tb, Th, Tl, Tm, U, W, Y, Yb	ICP-MS-FUS	GSNL
Ag, As, Bi, Ce, Co, Cr, Cs, Cu, Dy, Er, Eu, Ga, Gd, Ge, Hf, Ho, In, La, Lu, Mo, Nb, Nd, Ni, Pb, Pr, Rb, Sb, Sm, Sn, Ta, Tb, Th, Tl, Tm, U, W, Y, Yb, Zn	FUS-MS	ACTLABS
Ag, Cd, Co, Cr, Cu, In, Li, Mn, Mo, Ni, Pb, Zn	TD-MS	ACTLABS
As, Au, Ba, Br, Ce, Co, Cr, Cs, Eu, Fe, Hf, La, Lu, Mo, Na, Rb, Sb, Sc, Se, Sm, Ta, Tb, Th, U, W, Yb, Zr	INAA	BUREAU VERITAS

A code of -99, reported for a given element, indicates that it was not analyzed. All other negative numbers indicate the concentration of the specific element in the sample was below the detection limit. Major elements are reported in weight percent, and trace elements are reported in ppm or ppb.

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APPENDICES

Appendices A–C are available as digital comma-separated files (.csv) through [this link](#).

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