



Industry, Energy and Technology

Mines

**GEOCHEMICAL DATA FROM THE REE MINERALIZED
FOX HARBOUR VOLCANIC BELT, AND THE
SPATIALLY AND GENETICALLY ASSOCIATED
ROCKS IN SOUTHEASTERN LABRADOR
(NTS MAP AREAS 3D/04, 05, 13A/08 AND 09)**

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Open File LAB/1784



St. John's, Newfoundland
June, 2023

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Recommended citation:

Magyarosi, Z.

2023: Geochemical data from the REE mineralized Fox Harbour Volcanic Belt, and the spatially and genetically associated rocks in southeastern Labrador (NTS map areas 3D/04, 05, 13A/08 and 09). Government of Newfoundland and Labrador, Department of Industry, Energy and Technology, Geological Survey, Open File LAB/1784, 8 pages.

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SUMMARY

This Open File release contains whole-rock geochemical analyses of 571 samples collected in NTS map areas 3D/04, 05, 13A/08 and 09 in southeastern Labrador in 2021 and 2022. The purpose of the sampling was to conduct a detailed study of the Fox Harbour Volcanic Belt (FHVB) and the spatially and genetically associated rocks containing rare-earth-element (REE) mineralization. Two Current Research papers containing results of this study were published in 2022 and 2023 (Magyarosi, 2022; Magyarosi and Rayner, 2023) and additional publications are expected in the coming years.

NOTES ON THE DATABASE

This report consists of geochemical analyses of 571 rock samples collected from NTS map areas 3D/04 (St. Peter Bay), 3D/05 (Fox Harbour), 13A/08 (St. Lewis Inlet) and 13A/09 (Port Hope Simpson) (Figure 1). Sampling concentrated on rocks that are spatially associated with REE mineralization, which include the FHVB, rocks hosting REE mineralization to the south of the FHVB, and a suite of surrounding rocks. The database includes the location of the samples in latitude, longitude (WGS1984) and UTM coordinates (NAD27, Zone 21), the name of the REE occurrence, a brief field description of the samples including lithology, texture, composition, grain size, deformation fabric, and field notes including preliminary mineralogy, colour, scintillometer count measurements and magnetism (Appendix A). The scintillometer count was measured with a RS-120 Super-Scint handheld gamma ray scintillometer, which measures naturally occurring isotopes of K, U and Th in the rocks and has been used worldwide in exploration for REE. The magnetism was determined with a pen magnet. Standards and duplicates are included in separate

tables (Appendices B and C). The databases are in comma-separated value (.csv) format and are available from the GeoFiles website. Table 1 comprises a list of abbreviations used in the open-file report and database.

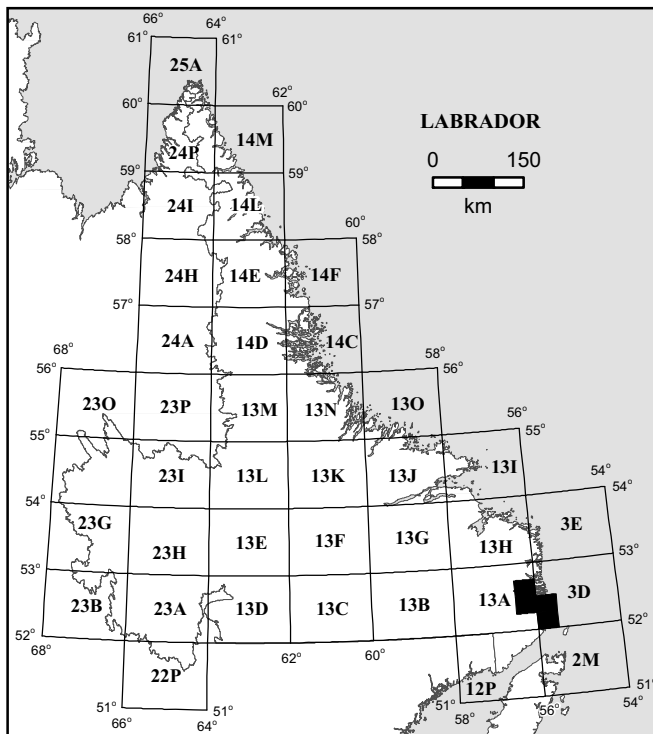


Figure 1. Location map of study area in Labrador.

Samples were analyzed at the geochemical laboratory of the Geological Survey of Newfoundland and Labrador (GSNL) in St. John's. Table 2 includes the analytical methods used for the geochemical analysis of each element. Most of the major elements were analyzed with ICP-OES following lithium metaborate/tetraborate fusion. FeO was measured by the titration method and LOI by the gravimetric method. Trace elements were analyzed using ICP-MS following lithium metaborate/tetraborate fusion and by ICP-OES following four-acid digestion.

Table 1. List of abbreviations

Abbreviation	Explanation
-99	Samples not analyzed for that element or values not available
A. Mean	Arithmetic mean (after the removal of outliers) of a variable number of analyses (<i>see</i> “Count”, below) at the GSNL laboratory
ab	Albite
amp	Amphibole
bt	Biotite
ep	Epidote
fl	Fluorite
fs	Feldspar
GOI	Gain-on-ignition
grt	Garnet
ICP-MS-FUS	Inductively Coupled Plasma Mass Spectrometry following lithium metaborate/tetraborate fusion
ICP-OES	Inductively Coupled Plasma Optical Emission Spectrometry
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
ISE	Ion-selective electrode
kfs	K-feldspar
LCL	Lower control limit. Calculated as the mean minus two standard deviations. Analyses of the Certified Reference Material (CRM) that fall between the UCL and the LCL, and the batch of samples into which it was inserted, are generally considered acceptable
LOI	Loss-on-ignition
mafic	Mafic mineral including amphibole, biotite and pyroxene
mag	Magnetite
ms	Muscovite
negative number	Below detection limit
pl	Plagioclase
ppm	Parts per million
qz	Quartz
Rec Val	“Recommended” or, if asterisked, “information” value for that element, in that CRM, normally derived as the arithmetic mean of multiple analyses (after the removal of outliers), at several laboratories, by the supplier of the CRM
REE	Rare-earth element
ttn	Titanite
UCL	Upper control limit. Calculated as the mean plus two standard deviations, as calculated above
wt_pct	Weight percent

Table 2. Analytical methods for the geochemical analyses

Element	Analytical Method
SiO ₂ , Al ₂ O ₃ , Fe ₂ O ₃ T, MgO, CaO, Na ₂ O, K ₂ O, TiO ₂ , MnO, P ₂ O ₅ , Cr, Ba, Be, Sc, Zr	ICP-OES-FUS
Fe ₂ O ₃	Calculation
FeO	Titration
LOI	Gravimetric
Ga, Ge, Rb, Sr, Y, Nb, Sn, Cs, La, Ce, Pr, Nd, Sm, Eu, Tb, Gd, Dy, Ho, Er, Tm, Yb, Lu, Hf, Ta, W, Tl, Bi, Th, U	ICP-MS-FUS
As, Cd, Co, Cu, Li, Mo, Ni, Pb, Rb, S, V, Zn	ICP-OES-4-ACID
Ag	ICP-OES-HNO ₃
F	Alkaline fusion with ion-selective electrode

Silver was analyzed using ICP-OES following nitric acid digestion. Fluoride was analyzed using ISE. The analytical procedures are described in Finch *et al.* (2018). Major elements are reported in wt_pct and trace elements are reported in ppm. Negative detection limit values represent analyses below the detection limit and -99 represents samples that were not analyzed for that element. Fe₂O₃T is the total measured iron. Quality assurance and quality control (QA/QC) procedures and information on the standards are included in Finch *et al.* (2018).

ACKNOWLEDGMENTS

This study is a contribution to Natural Resources Canada's (NRCan) TGI Program of the GSC. Support for this study was provided through the *Magmatic Ore Systems Project's 'Sub-Activity: Critical minerals within carbonatite, syenite and allied peralkaline-alkaline rocks in the central and eastern parts of the Canadian Shield: where, when and how were they formed'* and by the Geological Survey of Newfoundland and Labrador. I would like to thank Chris Finch for conducting all sample preparation and analyses at the geochemistry laboratory. Lindsay Oldham and Arianna Sheppard are thanked for their assistance in the field. I am grateful to Randy Miller and the crew from Search Minerals Incorporated for their help during the field season. Joanne Rooney and Kim Morgan are acknowledged for typesetting and figure preparation, respectively. John Hinchey is thanked for his support in every aspect of my work.

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APPENDICES

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

APPENDIX A: Sample Locations, Descriptions and Whole-rock Major- and Trace-element Geochemistry

APPENDIX B: Standard Analyses

APPENDIX C: Duplicate Analyses