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Mines

# **GEOCHEMICAL DATA FROM THE FLOWERS RIVER IGNEOUS SUITE (NTS MAP AREA 13N/11)**

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Open File 013N/11/0168



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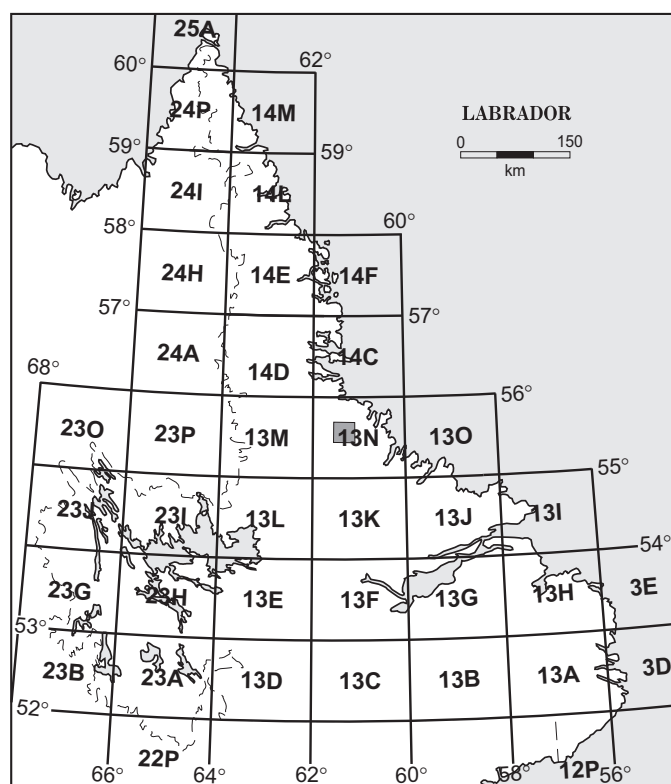
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## SUMMARY

This Open File release consists of whole-rock geochemical data of 248 rock samples collected from lithological units of the Flowers River Igneous Suite in Labrador. Sampling was undertaken by the authors within NTS map area 13N/11 in 2022. It also includes re-analyzed samples collected in the region, in 1991, by R. Miller of the GSNL, and it also supersedes Miller and Kerr (2007). The geological context of these samples and a description of the regional geology are contained in Hinchey *et al.* (2023a). Additional geochemistry data for the area can be found in Hinchey *et al.* (2021, 2023b). This report places data in the public domain; no interpretation of the data is included in this report.



**Figure 1.** Location map of the study area.

## NOTES ON THE DATABASE

The compilation includes, for each sample, the location in UTM coordinates (Zone 20, NAD 1927), 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, respectively), along with Bureau Veritas Laboratory Certificates (Appendix D), and may be used by the reader to assess the accuracy and precision of the analyzed data. The data are available in digital format (*i.e.*, Excel; \*.xlsx).

The analytical methods used for each element are listed in Table 1. The Geochemical Laboratory of the Geological Survey of Newfoundland and Labrador analyzed 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 ICP-OES following nitric acid digestion. Fluoride was analyzed using ISE. Trace elements were also analyzed with INAA by the external commercial laboratory Bureau Veritas. These analytical procedures are described in Finch *et al.* (2018).

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

**Table 1.** Analytical methods for the elements

Element	Analytical Method	Preparation/Digestion	Laboratory
SiO <sub>2</sub> , Al <sub>2</sub> O <sub>3</sub> , Fe <sub>2</sub> O <sub>3</sub> , MgO, CaO, Na <sub>2</sub> O, K <sub>2</sub> O, TiO <sub>2</sub> , MnO, P <sub>2</sub> O <sub>5</sub> , Ba, Be, Cr, Sc, Zr	ICP-OES	50-50 Lithium Tetraborate Lithium Metaborate Fusion	GSNL
FeO	Titration	None	GSNL
Fe <sub>2</sub> O <sub>3</sub>	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 <sub>3</sub> -HClO <sub>4</sub> (total digestion)	GSNL
Bi, Ce, Cs, Dy, Er, Eu, Ga, Gd, Ge, Hf, Ho, La, Lu, Nb, Nd, Pr, Sm, Sn, Sr, Ta, Tb, Th, Tl, Tm, U, W, Y, Yb	ICP-MS-FUS	50-50 Lithium Tetraborate Lithium Metaborate Fusion	GSNL
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	Irradiation	Bureau Veritas
Ag	ICP-OES	HNO <sub>3</sub> digestion	GSNL
F	ISE	Na <sub>2</sub> CO <sub>3</sub> and KNO <sub>3</sub> fusion in a nickel crucible	GSNL

ppm or ppb. Abbreviations used in this report are listed in Table 2, and abbreviations for the standards are presented in Table 3.

Within the Duplicates Table (Appendix C), % difference was determined by the formula:

$$\% \text{ difference} = [\text{ABS}(\text{Original Value} - \text{Lab Split Value}) / (\text{Original Value} + \text{Lab Split Value} / 2)] * 100$$

**Table 2.** List of abbreviations and codes

<b>Abbreviation</b>	<b>Explanation</b>
-99	Samples not analyzed for that element
%_difference	Percent difference between original and duplicate
Avg	Average value
Fe <sub>2</sub> O <sub>3</sub> T	Total measured iron
FeOT	Total iron (II) calculated from total measured iron
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 <sub>3</sub> -HClO <sub>4</sub> acid digestion
ICP-OES-FUS	Inductively Coupled Plasma-Optical Emission Spectrometry following lithium metaborate/tetraborate fusion
ICP-OES-HNO <sub>3</sub>	Inductively Coupled Plasma-Optical Emission Spectrometry following nitric acid digestion
INAA	Instrumental Neutron Activation Analysis
ISE	Ion-selective electrode
LCL	Lower control limit
LOI	Loss-on-ignition
negative detection limit	Below detection limit
ppb	Parts per billion
ppm	Parts per million
Rec_Val	Recommended value
UCL	Upper control limit
wt_pct	Weight percent

**Table 3.** List of standards abbreviations

<b>Abbreviation</b>	<b>Explanation</b>
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	SY-4: Diorite gneiss, Brudendell Township ON (NRCAN)
W-2	Diabase, Virginia (USGS)
WGB-1	WGB-1: Gabbro, Wellgreen Complex YT (NRCAN)

## REFERENCES

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## **APPENDICES**

Appendices A–D are included in the OF\_013N\_11\_0168 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:** Laboratory Certificates – Bureau Veritas