



Industry, Energy and Technology

Mines

# **LITHOGEOCHEMICAL DATA OF SEDIMENTARY ROCKS FROM THE BONAVISTA PENINSULA, AVALON ZONE, NEWFOUNDLAND (NTS MAP AREAS 2C/05, 06, 11 AND 12)**

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Open File 002C/0250



St. John's, Newfoundland  
March, 2024

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### *Recommended citation:*

Mills, A.J. and Mendoza-Marin, D.

2024: Lithogeochemical data of sedimentary rocks from the Bonavista Peninsula, Avalon Zone, Newfoundland (NTS map areas 2C/05, 06, 11 and 12). Government of Newfoundland and Labrador, Department of Industry, Energy and Technology, Geological Survey, Open File 002C/0250, 9 pages.

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## SUMMARY

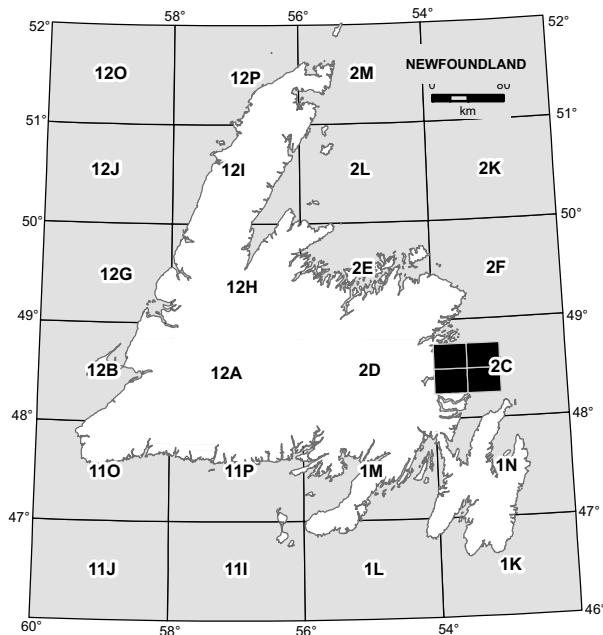
This open file data release consists of whole-rock geochemical data from 368 sedimentary rock samples collected from the Bonavista Peninsula, of the Avalon Zone of Newfoundland (Figure 1; NTS map areas 2C/05, 06, 11 and 12, and subordinate samples from outside this geographic area). Previous bedrock mapping include maps at 1:125 000 scale by Hayes (1948) and by Christie (1950), and at 1:250 000 scale by Jenness (1963). More recent bedrock mapping efforts by the Geological Survey of Newfoundland and Labrador include O'Brien (1994), O'Brien and King (2002, 2004, 2005), Normore (2010, 2011), Mills (2014), Mills *et al.* (2016a, b) and Mills and Sandeman (2021). Samples included in this report were collected by either L. Normore or by A. Mills. The data release provides no interpretation.

## NOTES ON THE DATABASE

For ease of plotting, location data is reported in both latitude/longitude, as well as NAD27, Zone 22 UTM coordinates. Appendix A contains details of the rock type and its interpreted relative stratigraphic position (Group, Formation), location data, as well as major- and trace-element, whole-rock geochemical data for 368 sedimentary rock samples. Analytical duplicates were selected at random and inserted at a frequency of one in 20 (Appendix B). Reference materials (Standards) were also analyzed (Appendix C) as part of the Geological Survey of Newfoundland and Labrador's internal quality control measures. Details of the analytical methods used are provided by Finch *et al.* (2018) and summarized in Table 2.

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 lithium tetraborate and metaborate fusion, whereas other trace elements (As, Ba, Be, Cd, Ce, Co, Cr, Cu, Dy, Fe, La, Li, Mn, Mo, Nb, Ni, Pb, Rb, S, Sc, Sr, Ti, V, Y, Zn) were analyzed by ICP-OES after total 4-acid digestion. Trace elements were also analyzed with INAA by the external commercial laboratory Becquerel, a Maxxam Company. These analytical procedures are described in Finch *et al.* (2018).

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 diges-



**Figure 1.** Location map of study area, Bonavista Peninsula.

**Table 1.** List of abbreviations

Abbreviation	Explanation
-99	Samples not analyzed for that element or values not available
Avg	Average value
Dup	Duplicate analysis
Fe <sub>2</sub> O <sub>3</sub> T	Total measured iron
FeOT	Total iron (II), calculated from total measured iron (III)
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
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 number	Below detection limit
pct	Percent
ppm	Parts per million
Rec_Val	Recommended value
UCL	Upper control limit
wt_pct	Weight percent

tion tube with 2 ml of concentrated nitric acid, and digested for two hours and then analyzed by ICP-OES (Finch *et al.*, 2018). Flouride content is determined as described by Ficklin (1970) and Finch *et al.* (2018).

Major elements are reported in weight percent (wt. %), and minor and trace elements are reported in parts per million (ppm). A negative number indicates that the concentration was below the detection limit (*e.g.*, -0.01 indicates the measured value was below the detection limit of 0.01). Detection limits are listed for each element in the data files. The code -99 indicates the sample was not analyzed for that element.

Within the Duplicates Table (Appendix C):

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

**Table 2.** Analytical methods for the geochemical analyses

Element	Analytical Method	Preparation/Digestion
SiO <sub>2</sub> , Al <sub>2</sub> O <sub>3</sub> , Fe <sub>2</sub> O <sub>3</sub> T, 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
Fe <sub>2</sub> O <sub>3</sub> , FeOT	Calculation	
FeO	Titration	NH <sub>4</sub> VO <sub>3</sub> , HF, H <sub>2</sub> SO <sub>4</sub> , H <sub>3</sub> PO <sub>4</sub>
As, Ba, Be, Cd, Ce, Co, Cr, Cu, Dy, Fe, La, Li, Mn, Mo, Nb, Ni, Pb, Rb, S, Sc, Sr, Ti, V, Y, Zn	ICP-OES	HF-HCl-HNO <sub>3</sub> -HClO <sub>4</sub> (total digestion)
As, Bi, Ce, Cd, Cs, Dy, Er, Eu, Ga, Gd, Ge, Hf, Ho, In, La, Lu, Mo, Nb, Nd, Pr, Rb, Sm, Sn, Sr, Ta, Tb, Th, Tl, Tm U, V, W, Y, Yb	ICP-MS	50-50 Lithium Tetraborate Lithium Metaborate Fusion
F	ISE	Na <sub>2</sub> CO <sub>3</sub> and KNO <sub>3</sub> fusion
Ag	ICP-OES	HNO <sub>3</sub> digestion
LOI	Gravimetric (Grav) at 1000°C	
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	

## ACKNOWLEDGMENTS

Chris Finch and the staff at the Geological Survey of Newfoundland and Labrador geochemical laboratory continually provide high-quality lithogeochemical data in a timely fashion. Monica Squires helped with compilation of a preliminary version of this open file. Thanks also go to Megan Reardon for thorough review of the data for quality assurance.

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## **APPENDICES**

Appendices A–C are included in the OF\_002C\_0250 zip folder as Microsoft Excel (.xlsx) and/or Comma Delimited Value (.csv) files.

**APPENDIX A:** Major-element and Trace-element Data

**APPENDIX B:** Major-element and Trace-element Data for Duplicates

**APPENDIX C:** Major-element and Trace-element Data for Standards, with Certified Reference Materials