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LITHOGEOCHEMICAL DATABASE OF IGNEOUS ROCKS, ISTHMUS OF AVALON, EASTERN NEWFOUNDLAND (NTS MAP AREAS 1N/12, 13, 2C/04 AND 2D/01)

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SUMMARY

This open file release consists of whole-rock geochemical data from 97 rock samples collected on the Isthmus of Avalon, eastern Newfoundland (Figure 1; NTS map areas 1N/12, 13, 2C/04 and 2D/01). The bedrock geology of the region was initially mapped (at 1:50 000 scale) by McCartney (1956), and later compiled, along with adjacent map sheets, covering the central Avalon Peninsula at 1:253 440 scale (McCartney, 1967). Malpas (1972) conducted geological mapping and petrochemical investigations in the area. King (1988) conducted geological mapping in support of his compilation of the bedrock geology of the Avalon Peninsula. Mills *et al.* (2017, 2020) reported on reconnaissance lithogeochemistry and U–Pb (zircon) geochronology. The samples for this report were collected by Sandeman (2018) and Mills (2021). This open file data release provides no interpretation of the data.

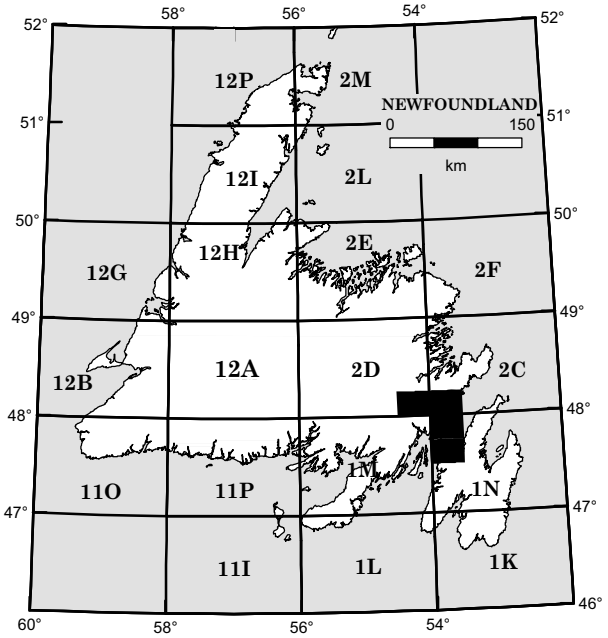

Figure 1. *Location of study area.*

NOTES ON DATABASE

All location data are presented in Universal Transverse Mercator (UTM), eastings and northings (Zone 22, NAD 27) projection. Samples are prefixed by the year and initials of the geologist who collected them. Appendix A contains brief sample descriptions, location data, as well as major-element and trace-element, whole-rock geochemical analytical data of the samples collected. Analytical duplicates were selected at random and inserted at a frequency of one in 20 (Appendix B). In addition, a number of reference materials (Standards) were analyzed for quality assurance (Appendix C and D). Explanation of the abbreviations used are given in Table 1, and details of the analytical methods used are provided by Finch *et al.* (2018) and summarized in Table 2. The data are available in digital format (*i.e.*, comma separated value files; *.csv) through the links provided in the Appendices section.

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

Table 1. List of abbreviations

Abbreviation	Explanation
-99	Sample was not analyzed for that element
Avg	Average value
Dup	Duplicate analysis
Fe_2O_3T	Total measured iron
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
ISE	Ion-selective electrode
LCL	Lower control limit
LOI	Loss-on-ignition
negative detection limit	Below detection limit
pct	Percent
ppm	Parts per million
Rec_Val	Recommended value
UCL	Upper control limit
wt_pct	Weight percent

Table 2. Analytical methods for geochemical analyes

Element	Analytical Method	Preparation/Digestion
SiO_2, Al_2O_3, Fe_2O_3T, MgO, CaO, Na_2O, K_2O, TiO_2, MnO, P_2O_5, Ba, Be, Cr, Sc, Zr	Inductively Coupled Plasma Optical Emission Spectrometry (ICP-OES)	50-50 Lithium Tetraborate Lithium Metaborate Fustion
As, Cd, Co, Cu, Li, Mo, Ni, Pb, Rb, S, V, Zn	Inductively Coupled Plasma Optical Emission Spectrometry (ICP-OES)	Hf-HCl-HNO_3-$HClO_4$ (total digestion)
Bi, Ce, Cs, Dy, Er, Eu, Ga, Gd, Ge, Hf, Ho, La, Lu, Nb, Nd, Pr, Sm, Sn, Sr, Ta, Tb, Th, Ti, Tm, U, W, Y, Yb	Inductively Coupled Plasma Mass Spectrometry (ICP-MS)	50-50 Lithium Tetraborate Lithium Metaborate Fusion
F	Ion Selective Electrode (ISE)	Na_2CO_3 and KNO_3 fusion
Ag	Inductively Coupled Plasma Optical Emission Spectrometry ICP-OES)	HNO_3 digestion
LOI	Gravimetric (Grav) at 1000°C	None

ICP-OES (Finch *et al.*, 2018). Flouride content is determined using methods 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 .csv files. The code -99 indicates the sample was not analyzed for that element.

Mg# was determined by the formula:
$Mg\# = (MgO/40.312)/((MgO/40.312)+(FeO^T/71.847))*100$.

Within the Duplicates Table (Appendix B):
%_difference = [(OriginalValue - Lab Split Value)/Original Value] * 100.

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APPENDICES

Appendices A–D 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 Duplicates

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

APPENDIX D: Details for Certified Reference Materials (Standards)