Newfoundland Labrador

Natural Resources

Mines

GEOCHEMICAL DATA FROM SEDIMENTARY, INTRUSIVE AND METAMORPHIC ROCKS FROM THE DUNNAGE AND GANDER ZONES IN THE ST. ALBAN'S MAP SHEET, SOUTH COAST OF NEWFOUNDLAND (NTS MAP AREA 1M/13)

A. Westhues

Open File 001M/13/0922

St. John's, Newfoundland
July, 2018

NOTE

Open File reports and maps issued by the Geological Survey Division of the Newfoundland and Labrador Department of Natural Resources are made available for public use. They have not been formally edited or peer reviewed, and are based upon preliminary data and evaluation.

The purchaser agrees not to provide a digital reproduction or copy of this product to a third party. Derivative products should acknowledge the source of the data.

DISCLAIMER

The Geological Survey, a division of the Department of Natural Resources (the "authors and publishers"), retains the sole right to the original data and information found in any product produced. The authors and publishers assume no legal liability or responsibility for any alterations, changes or misrepresentations made by third parties with respect to these products or the original data. Furthermore, the Geological Survey assumes no liability with respect to digital reproductions or copies of original products or for derivative products made by third parties. Please consult with the Geological Survey in order to ensure originality and correctness of data and/or products.

Recommended citation:

Westhues, A.

2018: Geochemical data from sedimentary, intrusive and metamorphic rocks from the Dunnage and Gander zones in the St. Alban's map sheet, south coast of Newfoundland (NTS map area 1M/13). Government of Newfoundland and Labrador, Department of Natural Resources, Geological Survey, Open File 001M/13/0922, 8 pages.

Newfoundland Labrador

Natural Resources

Mines

GEOCHEMICAL DATA FROM SEDIMENTARY, INTRUSIVE AND METAMORPHIC ROCKS FROM THE DUNNAGE AND GANDER ZONES IN THE ST. ALBAN'S MAP SHEET, SOUTH COAST OF NEWFOUNDLAND (NTS MAP AREA 1M/13)

A. Westhues

Open File 001M/13/0922

St. John's, Newfoundland
July, 2018

CONTENTS

FIGURE

SUMMARY

This Open File release consists of whole-rock geochemistry data from 152 samples from Baie d'Espoir Group, Gaultois Granite, Northwest Brook Complex and North Bay Granite intrusions and Little Passage Gneiss around St. Alban's on the south coast of Newfoundland. These samples were collected as part of a bedrock mapping study during the summers of 2016 and 2017 from outcrops within the St. Alban's map area (Figure 1). Samples for whole-rock geochemistry were collected from representative sedimentary, igneous and metamorphic rocks. Assay samples were collected from mineralized rocks, sulphide-bearing structurally controlled quartz veins and surrounding altered host rocks.

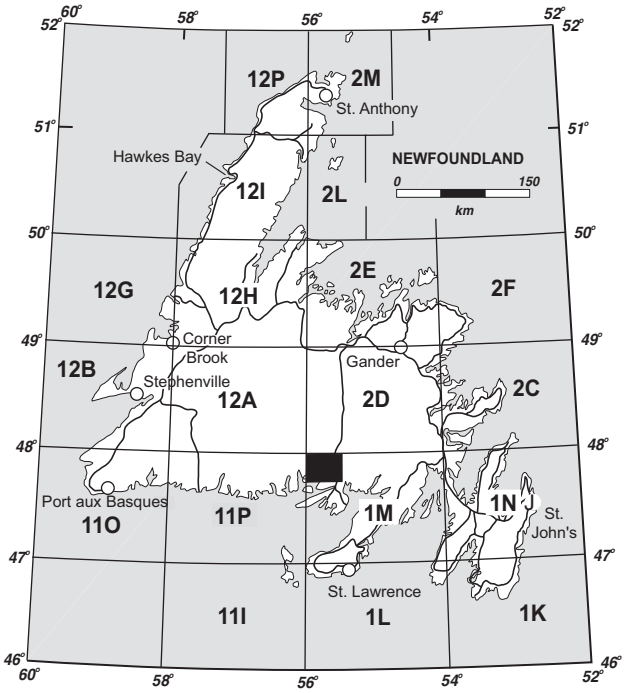

Figure 1. *Location of study area.*

The work was conducted using truck and ATV, as well as helicopter and boat support. The Baie d'Espoir Group, especially the metasedimentary and metavolcanic rocks of the Isle Galet Formation, has been a focus of exploration activities with numerous showings and indications of Au, As, and Sb, and a few prospects, mainly in the Little River area. Two Au showings, True Grit and Golden Grit, are reported within the St. Joseph's Cove Formation. The Riches Island Formation contains several occurrences of Pb and Mo. More information about the regional geology and mineralization of the area can be found in Colman-Sadd (1976), Colman-Sadd and Swinden (1982) and Evans (1996). Details about the current bedrock mapping project and photographs of rock types and mineralization in the St. Alban's area are available in Westhues (2017a) and Westhues and Hamilton (2018). A previous open file release contains the geochemistry data of 30 assay samples (Westhues, 2017b) – these are included in this database as well.

NOTES ON DATABASE

This database includes the results of major, trace elements and rare earth elements (REE) analyses of 87 of representative rock types, generally non-mineralized, collected in 2016 and 2017 (Appendix A). Appendix B contains the whole-rock geochemistry data from 65 mineralized assay samples also collected in 2016 and 2017. The location data for each sample is in Universal Transverse Mercator (UTM), eastings and northings (zone 21; NAD27) and a brief sample description and notes on locations can be found in Appendices A and B. The whole-rock geochemical data are available in digital format (*i.e.*, *.csv comma-separated values files) through the links provided in the Appendices section.

Most analyses were carried out at the Geological Survey of Newfoundland's (GSNL) laboratory in St. John's, following the methods detailed in Finch *et al.* (2018). Assay samples were further analyzed by the neutron activation analysis package (BQ-NAA-1) for selected trace elements at the external commercial laboratory Maxxam (former Becquerel Laboratories; see details of the analytical procedures at http://maxxam.ca/services/radioactivity-testing-trace-element-analysis, and in Finch *et al.*, 2018). In brief, at the GSNL laboratory, major elements (plus Cr, Zr and Ba) were determined by inductively coupled plasma optical emission spectrometry following a lithium tetraborate and metaborate fusion (ICP-OES FUS). Selected trace elements were determined by inductively coupled plasma mass spectrometry following a lithium tetraborate and metaborate fusion (ICP-MS FUS) and dilution by 2% nitric acid. Other trace elements were determined by inductively coupled plasma emission spectrometry following a four acid (HF-HCl-HNO_3-$HClO_4$) total digestion (ICP-OES 4 ACID). Scandium (Sc) and beryllium (Be) were analyzed using the ICP-OES 4 ACID for the 2016 samples, and the ICP-OES FUS method for the 2017 samples. Silver was digested by nitric acid and measured by ICP-OES. Ferrous iron was determined by titration, and volatiles are reported as loss on ignition (LOI) determined through gravimetric methods. Fluoride (F-) was determined using a fluoride ion-selective electrode ion meter after an alkaline fusion. Analytical method of determination is indicated for each element in the Appendices A and B table headers. Note that the release also includes raw, unprocessed data for several standards completed at the GSNL laboratory and at Maxxam (Appendices C, D, E, F, G and H). These may be used by the reader to assess accuracy and were analyzed at a frequency of one in 20. For ICP-OES (major-element) and ICP-MS (trace-element) standards were supplied by the United States Geological Survey (AGV-1, BHVO-1, G-2, MAG-1, RGM-1, W-2) and the Association Nationale de la Recherche Technique, Paris (DR-N). For silver analyses, standards were supplied by the Canadian Certified References Materials Project (CH-1, SU-1A). Two standards were used for ICP-OES (trace-elements) analysis, supplied by the Canadian Certified Reference Materials Project (SY-4, WGB-1). These two standards were also used for BQ-NAA analyses at Maxxam. Standards for fluoride analyses are "in-house" standards andesite (AND-1), basalt (BS-1), granite (GA-1), granodiorite (GD-1 and GD-2), and rhyolite (RY-1). Analytical duplicates were inserted at a frequency of one in 20, with the duplicate selected at random. These are labelled as sample xxx DUP, and are also included in Appendices C, D, E, F, G and H to assess analytical precision.

Major elements are reported in weight percent (wt. %), and minor and trace elements are reported in parts per million (ppm), except gold that is reported in part per billion (ppb). Note that the negative values, -99, -999 or -9999, reported for a given element are codes that indicates it was not analyzed for in the sample, whereas all other negative numbers indicate the concentration of the specific element in the sample 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 Appendices A, B, C, D, E, F, G and H in the table headers. Note that for BQ-NAA analyses, some elements are beyond the upper calibrated range and are reported as the upper range + 1 (*e.g.*, the code 10001 indicates the measured value was above the upper detection limit of 10000). The high contents of Sb, Ba, and As result in highly elevated detection limits for other elements in those samples. In these cases, a negative result denotes "less than" (*e.g.*, "-1730 ppb Au" indicates less than 1730 ppb Au in this sample).

REFERENCES

Colman-Sadd, S.P.

1976: Geology of the St. Alban's map-area, Newfoundland. Government of Newfoundland and Labrador, Department of Mines and Energy, Mineral Development Division, Report 76-04, 22 pages.

Colman-Sadd, S.P. and Swinden, H.S.

1982: Geology and mineral potential of south-central Newfoundland. Government of Newfoundland and Labrador, Department of Mines and Energy, Mineral Development Division, Report 82-08, 109 pages.

Evans, D.T.W.

1996: Epigenetic gold occurrences, eastern and central Dunnage zone, Newfoundland. Government of Newfoundland and Labrador, Department of Mines and Energy, Geological Survey, Mineral Resources Report 9, 135 pages.

C. Finch, R. Roldan, L. Walsh, J. Kelly and S. Amor

2018: Analytical methods for chemical analysis of geological materials. Government of Newfoundland and Labrador, Department of Natural Resources, Geological Survey, Open File NFLD/3316, 24 pages.

Westhues, A.

2017a: Updated geology of the St. Alban's map area (NTS 1M/13), Dunnage and Gander zones. *In* Current Research. Government of Newfoundland and Labrador, Department of Natural Resources, Geological Survey, Report 17-1, pages 87-103.

Westhues, A.

2017b: Geochemical data from the Baie D'Espoir Group, St. Alban's map sheet, south coast of Newfoundland (NTS map area 01M/13). Government of Newfoundland and Labrador, Department of Natural Resources, Geological Survey, Open File 001M/13/0872, 20 pages.

Westhues, A. and Hamilton, M.A.

2018: Geology, lithogeochemistry and U–Pb geochronology of the Baie d'Espoir Group and intrusive rocks, St. Alban's map area, Newfoundland. *In* Current Research. Government of Newfoundland and Labrador, Department of Natural Resources, Geological Survey, Report 18-1, pages 207-232.

APPENDICES

Appendices A–H are available as digital comma-separated files (.csv) through this link.

APPENDIX A: Representative Rock Type Geochemistry

APPENDIX B: Mineralized Sample Geochemistry

APPENDIX C: Standards and Duplicates for Major Elements, ICP-OES FUS

APPENDIX D: Standards and Duplicates for Trace Elements, ICP-OES 4 ACID

APPENDIX E: Standards and Duplicates for Trace Elements, ICP-MS FUS

APPENDIX F: Standards and Duplicates for Trace Elements, INAA

APPENDIX G: Standards and Duplicates for Ag, ICP-OES HNO_3

APPENDIX H: Standards and Duplicates for F, ISE