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Miscellaneous Release—Data 309

Geological, Geochemical, Geophysical and Petrographic Data from the Raglan Hills Area, Central Metasedimentary Belt, Grenville Province, Ontario

by S.J. Magnus[1,2]

This publication can be downloaded from
http://www.geologyontario.mndm.gov.on.ca/mndmaccess/mndm_dir.asp?type=pub&id=MRD309

This release contains field notes, outcrop photographs, whole rock and isotope geochemical data, magnetic susceptibility and scintillometer data collected as part of the Raglan Hills mapping project (Project Unit 11-005) between August 2011 and September 2012, and all related presentations to the public by the author.
The Raglan Hills mapping project was supported by an Ontario Geological Survey–Carleton University Mapping School Agreement; these data are part of an unpublished Master of Science (MSc) thesis. This release comprises 1064 images (as *.jpg* files), 15 Microsoft® Excel® 2010 (*.xlsx*) workbook files and 10 documents in portable document format (*.pdf*). These data augment Preliminary Map P.3774, *Precambrian Geology, Raglan Hills Metagabbro and Environs, Grenville Province*; the marginal notes and the geological legend from the map are also provided.

Data are organized into 7 folders:

1. Field Data
2. Geology
3. Geochemistry
4. Geophysics
5. Petrography
6. Presentations and Publications
7. Thesis Appendices

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[1] Earth Resources and Geoscience Mapping Section, Ontario Geological Survey, Sudbury, Ontario
[2] Department of Earth Sciences, Carleton University, Ottawa, Ontario

1. Field Data. This folder contains 8 Microsoft® Excel® 2010 (*.xlsx*) workbook files. The workbook files in this folder contain raw data collected while working in the field during the summers of 2011 and 2012 using a customized ESRI® ArcPad® application on a portable computer (Trimble® Juno™ SB Handheld).

MRD-309 Alteration Field Notes This file contains 1 worksheet labelled "ALTERATION", in which any features that may have changed the bulk geochemistry of the rock from its original composition are described.

MRD-309 Diamond Drill Core Logs This file contains 4 worksheets labelled "FNB-006", "FNB-007", "FNB-009" and "FNB-010", each containing a report on the rock types, magnetic susceptibility, and samples taken from diamond-drill core supplied by First Nickel Inc.

MRD-309 Lithology Field Notes This file contains 1 worksheet labelled "LITHOLOGY", in which the mineral, rock, and outcrop textures and relationships for each station visited are described.

MRD-309 Mineralization Field Notes This file contains 1 worksheet labelled "MINERALIZATION", in which any ore minerals (particularly sulphide and oxide minerals) are reported, along with their textures, abundances, and associations.

MRD-309 Photograph Field Notes This file contains 1 worksheet labelled "PHOTO", which contains a brief description of each photograph collected in the field.

MRD-309 Sample Field Notes This file contains 1 worksheet labelled "SAMPLE", which contains a brief description of each rock sample collected in the field, along with the purpose for collecting each sample.

MRD-309 Station Field Notes This file contains 1 worksheet labelled "STATION", which contains a brief description of each station visited, including descriptions of the observed outcrops, their surroundings, and the environmental conditions, as well as the date and time of each visit and the geographic co-ordinates for each station (in both Universal Transverse Mercator (UTM) co-ordinates and latitude and longitude in North American Datum 1983 (NAD83), Zone 18).

MRD-309 Structure Field Notes This file contains 1 worksheet labelled "STRUC", in which any planar, linear, and curvilinear (folded) structural features contained within each observed outcrop are reported, including the classification, orientation, and a brief description for each feature. Abbreviations in this worksheet correspond to those listed in Jackson, Muir and Romkey (1995).

The subfolder "**Photographs**" contains 885 field photographs (as *.jpg* files) and 1 Microsoft® Excel® 2010 (*.xlsx*) file. Three (3) sub-subfolders provide another 176 photographs of the Raglan Hills showing (56), the Moccasin Lake showing (65) and a nearby area of stripped outcrops (55). The photographs were taken between 2011 and 2012 as part of the mapping project.

MRD-309 Photo Captions.xlsx provides a brief photo description and identifies the scale used in the photo. Photo file names for the *.jpg* files are based on station location, e.g., 11SJM006-2 is photograph number 2, from station SJM006 in 2011. Additional photo information is provided in Field Data | *MRD-309 Photograph Field Notes.xlsx*. Station location information is provided in Field Data | *MRD-309 Station Field Notes.xlsx*.

2. Geology. This folder contains 2 portable document format (*.pdf*) files.

P3774 Legend.pdf is the legend for Ontario Geological Survey Preliminary Map P.3774, *Precambrian Geology, Raglan Hills Metagabbro and Environs, Grenville Province*. Material in the geochemical files and the photograph captions file are cross-referenced to map codes in the legend.

P3774 Marginal Notes.pdf provides additional information on the study area using a version of the marginal notes, with 2 figures, from Preliminary Map P.3774.

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3. Geochemistry. This folder contains 3 Microsoft® Excel® 2010 (*.xlsx*) files.

MRD-309 Isotope Geochemistry.xlsx consists of 4 worksheets related to samples analyzed for Nd/Sm and Rb/Sr isotopes at the Isotope Geochemistry and Geochronology Research Centre at Carleton University, Ottawa.

"Sm-Nd Input" worksheet contains the raw data collected by thermal ionization mass spectrometry (TIMS) (in red text) and the formulas that reduce the raw data to the final results (the latter are duplicated in "Sm-Nd Results").

"Sm-Nd Results" contains the calculated Sm-Nd values for the samples.

"Sm-Nd 2-sigma Errors" worksheet contains the calculations and values for the 2-sigma (2σ: 95% confidence) errors for the samples.

"Sr-Rb Results" worksheet contains the raw data collected by thermal ionization mass spectrometry (TIMS) (in red text), the data-reducing formulae and the results.

MRD-309 Major and Trace Elements.xlsx contains 1 worksheet.

"Major and Trace Elements" worksheet contains the results of all geochemical analyses performed at the Geoscience Laboratories (Geo Labs), Ontario Geological Survey, Sudbury.
The methods used, lower detection limit for each method, and reported units for each method are included for each element (and oxide) listed. This worksheet also contains location data ("Easting", "Northing", and "Township"), "Rock Type", and stratigraphic information, if known, for each sample collected; UTM co-ordinates are provided in North American Datum 1983 (NAD83), Zone 18.

MRD-309 Microprobe Data.xlsx consists of 1 workbook with 9 worksheets.

The 9 worksheets, labelled "plagioclase", "scapolite", "epidote", "pyroxene", "amphibole", "olivine", "biotite", "titanite", "ilmenite", and "sulphide minerals", each contain raw mineral chemistry data collected using an electron microprobe by the author and Peter Jones at Carleton University. These worksheets also contain the mineral formula calculation formulae for each mineral, as well as the determined mineral name and formula for each analysis.

4. Geophysics. This folder contains 2 Microsoft® Excel® 2010 (*.xlsx*) files.

MRD-309 Magnetic Susceptibility Data.xlsx contains 1 worksheet.

"Magnetic Susceptibility " worksheet provides magnetic susceptibility data from the study area collected between 2011 and 2012 (these data were also published by Muir 2013). Measurements were collected using an Exploranium® KT-9 or KT-10 magnetic susceptibility meter. Magnetic susceptibility is defined as the degree to which a substance can be magnetized and, in this case, is expressed as the ratio of the intensity of magnetization (k) to the ratio of the Earth's magnetic field to magnetic field induced by the susceptibility meter. The readings (k) are expressed as 10^{-3} times the SI unit for susceptibility and are dimensionless. The minimum value that can be recorded by the meter is 0.01×10^{-3} SI units; the largest value is 999×10^{-3} SI units. Sample location information is given in UTM co-ordinates, Zone 18, NAD83.

*MRD-309 Scintillometer Data.xls*x consists of 2 worksheets.

"Scint Data" worksheet contains scintillometer data from the study area collected using a portable gamma-ray scintillometer. Data are reported for several outcrop areas from the study area and include location (in UTM co-ordinates, Zone 18, NAD83) and Rock Type information.

"Pick Lists, Notes" worksheet provides additional information about the pick-lists for fields ("Geological Province", "UTM Zone", "Rock Type", "Dike Swarms", "Metamorphic Grade") used in the workbook.

All data were recorded using an Exploranium® GR-130 MiniSpec gamma-ray spectrometer, serial number 4885 or 4884, both calibrated on February 22, 2006, using an NaI crystal and software version 501GEO. The instrument was stabilized daily, and data were recorded using the assay mode with a 5-minute count time. Quoted accuracy is 0.1% K, 0.4 ppm U, and 0.7 ppm Th for a sample with 2% K, 2 ppm U and 8 ppm Th. Easton (2009) provides precision and reproducibility data for the instrument.

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5. Petrography. This folder contains 2 Microsoft® Excel® 2010 (*.xlsx*) files.

MRD-309 Country Rock Thin Sections.xlsx consists of 1 worksheet.

"Country Rocks" worksheet contains a modal analysis for every sample collected during this study excluding the samples interpreted to represent metamorphosed gabbroic rocks. Notes on the mineral and rock textures and relationships are included for each sample. For samples that contain a modal abundance reported under the column "other", the known or speculated mineral is discussed in the "Notes" column.

MRD-309 Gabbroic Rock Thin Sections.xlsx consists of 1 workbook with 2 worksheets. In both worksheets, notes on the mineral and rock textures and relationships are included for each sample. For samples that contain a modal abundance reported under the column "other", the known or speculated mineral is discussed under the "Notes" column.

"Gabbroic Rocks" contains modal analyses for all samples collected during this study, which were interpreted to represent metamorphosed gabbroic rocks, specifically those located within the Raglan Hills metagabbro. This worksheet includes a unique column, labelled "Felsic Index", which contains a number between 0 and 100 (0 being absolutely melanocratic, 100 being absolutely leucocratic), calculated by the addition of plagioclase, scapolite and epidote modal abundances for each sample. Also, all occurrences of chlorite are highlighted in orange.

"Granitoid Rocks" contains modal analyses for all meta-granitoid rocks collected from within the Raglan Hills metagabbro.

6. Presentations and Publications. This folder contains 4 portable document format *(.pdf*) files for all presentations (oral and poster) produced by the author throughout the two-year span of this project.

MRD-309 March 2012 PDAC Minerals Colloquium.pdf : A poster presented by Seamus Magnus on March 5, 2012, at the student-organized PDAC Minerals Colloquium during the annual Prospectors and Developers Association of Canada (PDAC) Convention held in Toronto, Ontario.

MRD-309 March 2012 AESRC.pdf : An oral presentation given by Seamus Magnus on March 24, 2012, at the 11th annual Advances in Earth Sciences Research Conference (AESRC) held at Queens University in Kingston, Ontario.

MRD-309 May 2012 GAC-MAC.pdf : An oral presentation given by Seamus Magnus on May 27, 2012, at the Geological Association of Canada–Mineralogical Association of Canada joint annual meeting held in St. John's, Newfoundland.

MRD-309 Dec 2012 OCGC.pdf: An oral presentation given by Seamus Magnus on December 5, 2012, at the biannual Ottawa–Carleton Geoscience Centre (OCGC) meeting held at Carleton University in Ottawa, Ontario. This presentation was a requirement of the Earth Sciences MSc program at Carleton University.

MRD-309 SFW 2011.pdf : An article, published in the Ontario Geological Survey *Summary of Field Work and Other Activities, 2011* volume, outlines the activities and results of field work related to the Raglan Hills project (Project Unit 11-005) during the summer of 2011. This report also includes data from 2 geographically related projects.

MRD-309 SFW 2012.pdf : An article, published in the Ontario Geological Survey *Summary of Field Work and Other Activities, 2012* volume, outlines the activities and results of field work for the Raglan Hills project (Project Unit 11-005) during the summer of 2012.

7. Thesis Appendices. This folder contains 2 portable document format *(.pdf*) files created by the author for use in conjunction with his MSc thesis at Carleton University.

Appendix 1 - Sample Descriptions.pdf : A compilation of outcrop and petrographic descriptions, geochemical data and geochronological data for each sample collected from the Raglan Hills metagabbro, including outcrop photos and microphotographs.

Appendix 2 - Mineralized Outcrop Descriptions.pdf : Descriptions of the 3 major mineralized outcrops within the Raglan Hills study area, including outcrop descriptions, petrographic descriptions and geochemical data, supplemented by the 2 outcrop sketches.

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Acknowledgments

This study focussed on the geology and geochemistry of the Raglan Hills metagabbro with the intent of determining the characteristics of the melt source and the potential for nickel-copper mineralization within the Raglan Hills metagabbro and other mafic intrusive rocks within the Central Metasedimentary Belt.

The data presented in this publication were acquired in partial fulfillment of the requirements of a Master of Science thesis by the author at Carleton University under the supervision of Brian Cousens and Michael Easton. This thesis (Magnus 2013) constitutes part of an Ontario Geological Survey–Carleton University Mapping School Agreement, which utilizes the appendices contained within this data release and OGS Preliminary Map P.3774, *Raglan Hills Metagabbro and Environs, Grenville Province*, also produced by the author.

Further information pertaining to this body of work is available through the author.

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