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Miscellaneous Release—Data 391

Geochemical Data from Graphitic Metasedimentary Rocks of the Shebandowan Greenstone Belt, Northwestern Ontario

by M.A. Puumala[1]

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This publication can be downloaded from
http://www.geologyontario.mndm.gov.on.ca/mndmaccess/mndm_dir.asp?type=pub&id=MRD391

This digital data release includes geochemical data collected as part of a project to study the geochemistry of altered graphitic and exhalative metasedimentary rock from various locations in the Shebandowan greenstone belt, located west-northwest of the city of Thunder Bay. A total of 85 samples were collected between 2017 and 2019 by staff of the Thunder Bay Resident Geologist Program Office. In addition, 3 samples collected from the Schreiber–Hemlo greenstone belt (an area where future sampling is planned) are also included with this data set. Analytical methods are described in detail in the Geoscience Laboratories (Geo Labs) brochures included on this release. This release comprises 1 Microsoft® Excel® for Office 365 (*.xlsx*) workbook file and 8 documents in portable document format (*.pdf*).

The purpose of this sampling was to test the applicability of the graphitic argillite gold alteration index method of Barrie (2005) as an exploration targeting tool in the Shebandowan greenstone belt, and to establish a geochemical database for graphitic metasedimentary rocks. Samples were analyzed (2017–2020) by the Ontario Geological Survey Geoscience Laboratories (Geo Labs) in Sudbury for the same comprehensive suite of major, minor and trace elements that were included in the Abitibi greenstone belt studies of Barrie (2005). Preliminary results were presented by Puumala (2019a, 2019b); these documents are included in this data release.

Contents

There are 8 files provided in this release (in addition to the metadata and this Readme document):

MRD391_Graphtic_Argillite_Geochemistry.xlsx consists of 7 worksheets that contain the results of whole-rock geochemical analyses performed at the Geoscience Laboratories (Geo Labs), Ontario Geological Survey, Sudbury. Method codes noted in worksheets 2 to 6 are described in the accompanying GeoLabs Brochures for each analytical year. (Generally, samples were analyzed the year they were collected, except for two 2019 samples that were analyzed in 2020.)

"1. Sample Locations" worksheet provides geographic co-ordinates for all samples collected as part of the project between 2017 and 2019. All Universal Transverse Mercator (UTM) co-ordinates are provided using North American Datum 1983 (NAD83) and are located in either Zone 15 or Zone 16.

"2. XRF-M01, XRF-M02, XRF-T02" worksheet provides the major and selected trace element results for all 88 samples, as well as duplicate samples, analyzed by X-ray fluorescence methods.

"3. IMP-101, IML-101, IRC100" worksheet provides trace element results for all 88 samples, as well as duplicate samples, analyzed by inductively coupled plasma methods as well as total CO_2 and sulphur.

"4. Chittick" worksheet provides calcite and dolomite contents for all 88 samples, as well as duplicate samples, analyzed by the Chittick method. Details on that method can be found in Vander Voet and Riddle (1993, p.395-396).

"5. IML-100" worksheet provides trace element results for all 88 samples, as well as duplicate samples, analyzed by an inductively coupled plasma method.

"6. IMX-CUS" worksheet provides trace element results for all 88 samples, as well as duplicate samples, analyzed by a customized inductively coupled plasma method in which samples were oxidized prior to digestion to prevent dangerous reactions between the organic component and perchloric acid used in the digestion of mineralized samples.

"7. Alteration Index Calculations" worksheet provides calculations of gold and volcanogenic massive sulphide (VMS) alteration index (AI) values for all samples, calculated using the method of Barrie (2005).

2017 Geo Labs Brochure.pdf describes the analytical methods used by the Ontario Geological Survey Geoscience Laboratories for rock samples analyzed during 2017.

2018 Geo Labs Brochure.pdf describes the analytical methods used by the Ontario Geological Survey Geoscience Laboratories for rock samples analyzed during 2018.

2019 Geo Labs Brochure.pdf describes the analytical methods used by the Ontario Geological Survey Geoscience Laboratories for rock samples analyzed during 2019.

2020 Geo Labs Brochure.pdf describes the analytical methods used by the Ontario Geological Survey Geoscience Laboratories for rock samples analyzed during 2020.

MRD391_Sample_Descriptions.pdf provides sample location information and descriptions of all 88 samples used in this study. The sampling program included the collection of both outcrop samples and drill-core samples. All drill-core samples were obtained from the Ontario Geological Survey's Thunder Bay and Conmee Township core repositories.

MRD391_2019_ILSG_Abstract.pdf is a copy of the abstract submitted to the 2019 Institute on Lake Superior Geology (ILSG) conference in Terrace Bay, Ontario (Puumala 2019a). It provides a preliminary interpretation of the data collected in 2017 as part of this study, focusing on gold alteration index values in the Shebandowan greenstone belt.

MRD391_2019_ILSG_Presentation.pdf is the Microsoft® PowerPoint® for Office 365 presentation given orally by M. Puumala at the 2019 Institute on Lake Superior Geology (ILSG) conference in Terrace Bay, Ontario (Puumala 2019b). It provides a preliminary interpretation of the data collected in 2017 as part of this study, focusing on gold alteration index values in the Shebandowan greenstone belt.

Acknowledgments

This data release would not have been possible without the assistance of 2017 and 2018 Summer Experience Program students, B. Ramsay, M. Greco, J. Stewart, M. Hodder and N. Craik, who collected the majority of samples and completed sample descriptions.

References

Barrie, C.T. 2005. Geochemistry of exhalites and graphitic argillites near VMS and gold deposits: An Ontario Mineral Exploration Technologies (OMET) project, final report; *in* Ontario Geological Survey, Miscellaneous Release—Data 173, 126p. [report is dated February 29, 2004, but was not released until 2005].

Puumala, M.A. 2019a. Using graphitic sedimentary rock geochemistry as an indicator of gold potential in the Shebandowan greenstone belt, northwestern Ontario; *in* Abstracts and Proceedings, Institute on Lake Superior Geology, 65th Annual Meeting, Terrace Bay, Ontario, v.65, pt.1, p.72-73.

Puumala, M.A. 2019b. Using graphitic sedimentary rock geochemistry as an indicator of gold potential in the Shebandowan greenstone belt, northwestern Ontario; oral presentation at the Institute on Lake Superior Geology, 65th Annual Meeting, Terrace Bay, Ontario, 19 slides.

Vander Voet, A.H.M. and Riddle, C. 1993. The analysis of geological materials, Volume I: A practical guide; Ontario Geological Survey, Miscellaneous Paper 149, 415p.