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Miscellaneous Release—Data 282
Geological Compilation of the Abitibi Greenstone Belt

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The publication can be downloaded from
http://www.geologyontario.mndm.gov.on.ca/mndmaccess/mndm_dir.asp?type=pub&id=MRD282

Users of OGS products are encouraged to contact those Aboriginal communities whose traditional territories may be located in the mineral exploration area to discuss their project.

CONTENTS

THE ABITIBI SUBPROVINCE

Introduction

The Abitibi Subprovince is an 800 by 300 km Archean “granite-greenstone” domain situated along the southern margin of the Superior Province of the Canadian Shield. It is dominated by supracrustal and granitoid rocks with a range of ages from 2.75 to 2.67 Ga (Jackson and Fyon 1991). Historically, the Abitibi greenstone belt was considered to be that portion of the Abitibi Subprovince extending to the western margin of the extensive granitoid complexes west of Timmins. Mapping and geochronological evidence (Heather et al. 1995) shows that the Swayze greenstone belt contains many of the structures and stratigraphic ages typical of the Abitibi belt in the Timmins–Kirkland Lake area and is now interpreted to represent a deeper erosional level of a once-continuous Abitibi greenstone belt extending to the Kapuskasing Structural Zone. Remnants of this Abitibi greenstone belt stratigraphy have also been detected in the Archean supracrustal inliers within dominantly granitic plutons in the southern Abitibi Subprovince (Ayer et al. 2010). The Abitibi greenstone belt is one of the world's largest, best preserved and most economically productive greenstone belts in the world.

The Abitibi Subprovince map sheet covers the area from the Kapuskasing Structural Zone in the west to the Quebec border in the east, and from the Detour Lake area in the north to immediately north of Sudbury in the south. Rocks are classified on the basis of their dominant lithology using textures, structures and both approximate and specific compositions to refine the classification. Geological information has been primarily compiled from previous mapping. New interpretations of the extent of lithological units, specifically in the areas lacking outcrop, have greatly benefited from the use of the reprocessed geophysical data for this area. As well, geochemical data have allowed for the further subdivision of the metavolcanic rocks.

Within the confines of this map lie the classical Porcupine and Kirkland Lake–Larder Lake mining camps that are two of the pre-eminent lode gold producing districts in the world. A significant number of past-producing silver mines are present in the Cobalt silver mining camp. Significant copper, zinc and silver production has also come from the present-producing Kidd Creek deposit situated in the Porcupine mining camp. Other mines have produced various amounts of iron, bismuth, cobalt, copper, lead, molybdenum, nickel, asbestos, talc and barite.

This geological compilation of the Abitibi greenstone belt compiles 8 separate 1:100 000 scale maps and 8 GIS data sets of the Abitibi Subprovince in Ontario. Preliminary Maps (P.Map) and Miscellaneous Releases—Data (MRD) published to date include: the Timmins area (P.Map 3379, MRD 36); the Lake Abitibi area (P.Map 3398,

MRD 46); the Kirkland Lake area (P.Map 3425, MRD 58); the Swayze area (P.Map 3511, MRD 93); the Matachewan area (P.Map 3527, MRD 94); the Cobalt–Temagami area (P.Map 3581, MRD 214); the Burntbush–Detour lakes area (P.Map 3609, MRD 245); and the Maple Mountain area (P.Map 3620, MRD 272). In 2005, a geological compilation at a scale of 1:250 000 of the first 5 sheets was published (Ayer et al. 2005).

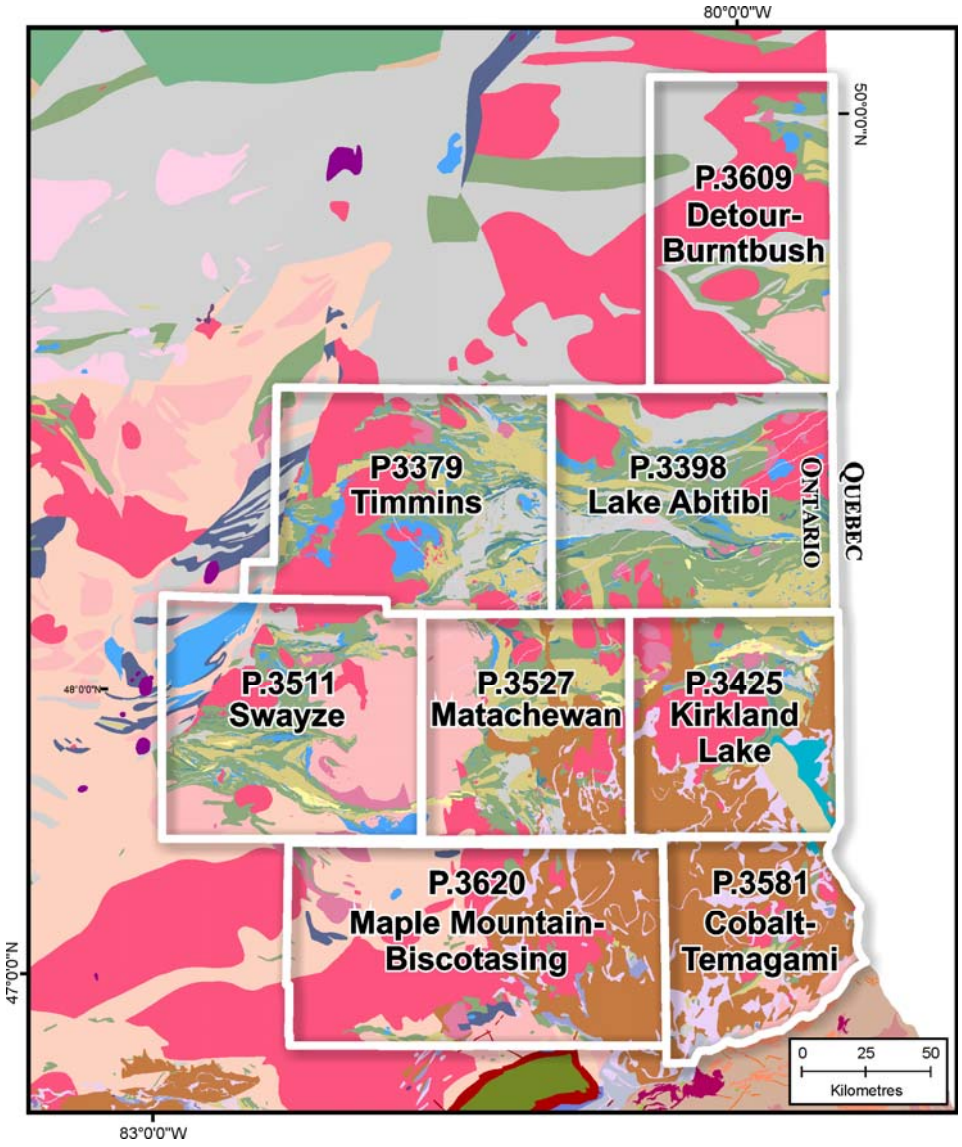

Figure 1. Regional geology showing compilation map areas.

Map Projections, Scale and Base Map Information

This publication contains a complete set of data in the UTM Projection, Zone 17, using North American Datum 1983 (NAD83). The database was compiled from data at various scales. The digital base map was derived from data downloaded from Geogratis, Natural Resources Canada, and Ontario Land Information Warehouse, Land Information Ontario, with modifications by staff of the Ministry of Northern Development and Mines. The scale of the compilation is 1:250 000.

Magnetic declination in June 2011 at the center of the map area was 11°59′W. Mean annual change is 2′ easterly.

Geology not tied to survey lines.

Data Layers and Attributes

The contents of MRD 282 are organized into folders based on data type. Folder names indicate the data type contained in each folder. The **readme** and **metadata** files are located in the root directory. Additionally, a **legend file** (MRD 282 Legend_Abitibi_ compilation.doc) and a PDF of the **compilation map** (*Abitibi_compilation.pdf*) are also located in the root directory. The data can be transferred to the local computer's hard drive, but it is very important to retain the folder names and file structure. The map documents are dependent upon the current file structure. The entire project folder can reside anywhere on the computer.

a) Description of the folder structure and contents

The following table describes the structure and the content of the MRD.

TOP FOLDER	FOLDER	CONTENTS	DESCRIPTION
\\MRD282		MRD 282_Readme.doc (this file) MRD 282 Legend_Abitibi_compilation.doc Abitibi_compilation.pdf contenttable.xls	
	\EXCEL_FILES	MRD 282 Abitibi Hf data.xls MRD 282 ABITIBI_GEOCHEM.xls MRD 282 ABITIBI_GEOCHRON.xls MRD 282 COBALT_GEOCHEM.xls MRD 282 DETOUR_GEOCHEM.xls MRD 282 MAPLE_MNT_GEOCHEM.xls	Files provide geochronology, geochemistry and isotope data for the study area in Microsoft® Excel spreadsheet format.
	\GEODATABASE	AbitibiCompilation.mdb Abitibi_compilationMRD.mxd	This folder houses the geodatabase that contains the geographic data layers to construct the map document (*mxd*). The geodatabase is named *AbitibiCompilation.mdb* and the map file is *Abitibi_compilationMRD.mxd*. The geodatabase is a relatively new data file format by ESRI®. It is a single file that contains spatial and attribute data. Within the geodatabase are 'folders' (feature data sets) that contain the spatial/attribute data (feature classes). Feature classes are very similar to shapefiles. The geodatabase also contains tables for attribute data. Full content of this subfolder is described in the next table.
	\LAYERFILES_FONTS	\FONTS \LAYERFILES \STYLEFILES	This folder contains true type fonts and ESRI® style files and some layer files (*.lyr*) for correct symbolization of GIS data in *Abitibi_compilationMRD.mxd*.
	\SHAPEFILES	\BASE \GEOCHEM \GEOCHRONOLOGY \GEOLOGY \ISOTOPES Abitibi_compilationMRD_83.mxd	Users of older versions of ArcMap can access the map document, which references data in the shapefile format. Full content of this subfolder is described in the next table.

The following table describes the attributes of Feature Data Sets (folders) and Feature Classes (shapefiles) contained in the geodatabase *Abitibi_compilationMRD.mxd* (or in the 'Shapefiles' folders).

Feature Data Set	Feature Class	Feature Class Description	Fields	Attribute Description
ANNOTATION	GEOCHRON ANNO	Labels	TextString	Age labels associated with Geochron points
	LEADERLINE	Labels	no attributes	Cartographic device to link points, lines and polygons with their associated labels.
	TOPONAMES	Labels	TextString	Each label belongs to a class which applies rules to assign font, color and size labels. All labels are classed as: Default, Lakes, Townships, Park or Roads
GEOCHEM	ABITIBI_GEOCHEM, COBALT_GEOCHEM, DETOUR_GEOCHEM, MAPLE_MNT_GEOCHEM	Point feature dataset containing the geochemical analytical data	ROCK_TYPE	General rock type from which sample was taken
			Various elements for which chemical analysis was performed	Geochemical analysis results
GEOCRHON	ABITIBI_GEOCHRON_REVISED	Geochronology (Age Dating) points	Station #	Unique value assigned to station locations where observations were recorded in the field
			Easting	The Universal Transverse Mercator Easting value. Units are in metres. For this project all coordinates are in the UTM Zone 17, using the North American Datum NAD83
			Northing	The Universal Transverse Mercator Northing value. Units are in metres. For this project all coordinates are in the UTM Zone 17, using the North American Datum NAD83
			Rock_type	Sampled rock type
			Age	In millions of years
			Inheritance	Age(s) of inherited zircons, in millions of years
			U_Pb_mineral	Mineral analyzed for U-Pb isotopes
			Assemblage	Stratigraphic package to which the sample is allocated
			Comments	Miscellaneous comments
			Source	Reference for Geochron source of information
ISOTOPES	Hf_DATA	Point feature class containing Hafnium isotope data		Lu-Hf isotopes as determined from zircons
GEOLOGY	DYKES	Line Feature Class		Unit 15 from Legend_Abitibi_compilation.doc
	IRON FORMATION	Line Feature Class		Iron formation units

Feature Data Set	Feature Class	Feature Class Description	Fields	Attribute Description
	GEOLINES	Geological Line features, depicted on the map face using standard OGS line styles	Line Type	Broad classification of Linetypes. Lines in this Feature class are attributed as either Contacts (0), Faults (1) or Folds (2)
			LineCode	OGS Digital Line standard codes for Contacts, Faults and Folds. See OFR 6026 for code descriptions (Muir et al. 2000).
	LITHOPOLYGON		Comp_Rock_code	Geological Unit number code used to classify different rock types.
			Description	General Rock Type [see map legend (*MRD 282 Legend_ Abitibi_compilation.doc*) for geological unit descriptions]
	NEATLINE		no attributes	
	ROCK_CODEPT	Point Feature Class used to display the Rock_code labels	label	Geological Unit codes are described in the legend (*MRD 282 Legend_Abitibi_ compilation.doc*)

b) Description of the map document (*.mxd)* files

1. *Abitibi_compilationMRD.mxd* requires ArcGIS® 9.3 and references data housed in a geodatabase.

2. *Abitibi_compilationMRD_83.mxd* requires ArcGIS® 8.3 and only references data housed in shapefiles.

Using Data with ESRI® ArcGIS® 9.3 and 8.3

The map documents provide a thematic representation of all associated data. Geology polygons are, for example, coloured according to lithology, and geological line features are symbolized as per OGS standards.

Users with ArcGIS® 9.3 have access to a map document (*.mxd*) that references the data in geodatabase format (**P3620.mxd**). Users with ArcGIS® 8.3 have access to a map document (*.mxd*) that only references the data in shapefile format.

Using Data with Earlier Versions of ESRI® Software

Users with older versions of ArcGIS® or ArcView® 3.x can work with the shapefile data in MRD 282, but the map documents or projects will have to be reconstructed. Users will then have to manually symbolize all data in these shapefiles. The lithology polygons (*LITHOPOLYGON* shapefile in the 'Geology' folder) can be manually coloured using the colour chart below.

To display geology polygons (litho-polygon):
- right click LITHOPOLYGON/properties/symbology
- select show/categories/unique values
- select 'ROCKCODE' as the value field and hit 'add all values'
- change the colour boxes for each lithology with the r/g/b values in the table below, double-click a colour box/fill colour/more colours and enter in the r/g/b values.

ROCK CODE	ROCK DESCRIPTION	RED	GREEN	BLUE
1	Archean, Ultramafic (to Mafic) Metavolcanic Rocks/Intrusions	198	193	253
2	Archean, Mafic (to Intermediate) Metavolcanic Rocks/Intrusions	97	158	104
3	Archean, Intermediate (to Felsic) Metavolcanic Rocks/Intrusions	219	253	193
4	Archean, Felsic (to Intermediate) Metavolcanic Rocks/Intrusions	255	255	115
5	Archean, Alkalic and Subalkalic Metavolcanic Rocks/Intrusions	247	194	254
6	Archean, Clastic Metasedimentary Rocks	179	179	179
7	Archean, Chemical Metasedimentary Rocks	104	104	104
8	Archean, Timiskaming-Type Clastic Metasedimentary Rocks	123	84	63
9	Archean, Ultramafic Intrusive Rocks	88	136	167
10	Archean, Mafic Intrusive Rocks	147	226	228
11	Archean, Porphyry Suite	253	90	90
12	Archean, Felsic to Intermediate Intrusive Suite	253	179	173
13	Archean Alkalic Intrusive Suite	253	216	183
15	Proterozoic, Diabase Dikes	253	122	65
16	Proterozoic, Sedimentary Rocks	175	149	128
17	Proterozoic, Mafic Intrusive Rocks	103	97	157
18	Paleozoic, Ordovician, Sedimentary Rocks	145	172	198
19	Paleozoic, Silurian, Sedimentary Rocks	205	198	148

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Credits

The map was produced as follows:
- geological compilation and interpretation by J.A. Ayer
- preparation of base map by J.E. Chartrand
- GIS compilation of data by J.E. Chartrand