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Miscellaneous Release—Data 233

Precambrian Geology and Aeromagnetic Data of the Hudson Bay and James Bay Lowlands Region with Precambrian Basement Depth Estimates and Related Tables of Geochronology and Diamond-Drill Hole Data

by G.M. Stott, S.D. Josey, D.R.B. Rainsford and S.J. McIlraith

The publication can be downloaded from
http://www.geologyontario.mndm.gov.on.ca/mndmaccess/mndm_dir.asp?type=pub&id=MRD233

Introduction:

This digital data release comprises GIS-compatible versions of a set of 3 maps (P.3597—Revised, P.3598—Revised and P.3599) that show an interpretation of the Precambrian geology underlying the Hudson Bay and James Bay lowlands, a broad area of Paleozoic to Mesozoic cover that extends over a significant portion of the Precambrian rocks in northern Ontario and which has impaired our knowledge of the Precambrian geology and tectonic framework in this part of the province. The interpretation is based mainly on an analysis of available re-processed aeromagnetic data and limited diamond-drill hole information. Much of the interpretation is anchored by comparing similar aeromagnetic features in the exposed portions of the Archean Superior Province and the Paleoproterozoic Trans-Hudson Orogen in Ontario, Manitoba and Quebec. The results provide a general framework of interpreted supracrustal belts, plutonic subdivisions, major faults and Proterozoic dikes, and locations of geochronology samples, kimberlite pipes and estimates of depth to Precambrian bedrock. This DVDs are released in conjunction with the hard copy maps, and is available separately.

Digital files of various related data are also contained on this DVD release, including:

- shapefiles;
- coverages of selected layers;
- a seamless GIS version of all 3 maps;
- seamless aeromagnetic and gravity maps of the region encompassing the Hudson Bay and James Bay lowlands;
- aeromagnetic data from the regional coverage, supergrid and eastern Fort Hope datasets, provided as coloured total field and first vertical derivative with 4 shaded directions;
- Landsat images and digital elevation models (DEM) of the lowlands;
- the results of estimated depth to Precambrian basement under the James Bay Lowland interpreted from aeromagnetic data;
- a table of diamond-drill hole sites, depths to Precambrian basement, and rock type, where available;
- a table and location map of kimberlite pipes; and
- a table of geochronology of Precambrian rocks within the lowlands area.

The geological interpretation is presented in geodatabase, shapefile and portable document (.pdf) formats, with explanatory notes. The results of a study to estimate depths to basement are presented in shapefile, GeoTiff and .pdf formats, along with explanatory notes. Tables of geochronology and kimberlite pipes are presented in Microsoft® Excel® 2003 (.xls) spreadsheets. The text of the marginal notes from the hard copy maps are provided in Microsoft® Word® 2003 (.doc) and .pdf formats. The maps' legend, symbols, credits and sources of information are in provided in .pdf format.

Files related to the digital versions of the hard copy maps are found in the folder titled "Geology" on V.1, and subfolders therein.

Files related to the geophysical data are found in the folder titled "Geophysics" on V.2, and subfolders therein.

Landsat images and DEM models are found in the folder titled "Images and Models" on V.1, and subfolders therein.

Files related to the estimates of depth to Precambrian basement are found in the folder titled “Precambrian Basement Depth Estimates” on V.1, and subfolders therein.

Files comprising the information presented in or related to the marginal material to the hard copy maps, including table and location map of kimberlite pipes, table of geochronology results, Marginal Notes, legend, symbols, sources of information, etc., are found in the folder titled “Marginal Material” on V.1.

Using the data with ArcGIS® software:

The data may be accessed with ESRI® ArcGIS® 8.x, 9.x software.

- Copy the MRD233 data folder to your hard drive from DVD v.1. Copy the Geophysics folder from DVD v.2 to the MRD233 data folder on your hard drive. Alternately, make a new folder on your hard drive and copy all folders from both DVDs to your new folder.

- For each newly copied folder right-click and uncheck the “read-only” option check box.

- The \\MRD233 data\Geology\Fonts folder provided on DVD v.1 contains font files required by ArcGIS® for symbolizing some of the features on the map. The fonts must be installed prior to viewing the data sets in ArcMap®. These can be installed by simply copying them to your \\Windows\Font directory.

- Use ArcGIS® to open the any of the project files (*.*mxd*), found on the DVD. Please note that at full map extent, regeneration time for some layers may be slow.

- The annotation is stored in a Geodatabase and therefore, if using ArcGIS® 8.3, it can not be viewed and will have to labeled or recreated.

Contents of the DVD–ROMs, map projections, scale and base map information:

All spatial data on the DVDs are projected in decimal degrees (geographic coordinate system North American 1983, Datum North American 1983), with the exception of the Fort Hope geophysical images which are in NAD83, UTM zone 16. The *.*mxd* data frames are projected in Lambert Conic Conformal projection for display and printing purposes.

The base map, with the exception of the Lakes and Rivers, is the Ministry of Natural Resources’ Land Information Ontario / Natural Resources and Values Information System base map. The rivers were digitized from LandSat images and the Lakes are combined from Ministry of Natural Resources’ Land Information Ontario / Natural Resources and Values Information System base map, LandSat images, and Natural Resources Canada.

Table 1: Contents of DVDs

Top Folder	Folder	Sub-Folder	Contents
MRD233 Data			
	Geology		DEPTH TO PRECAMBRIAN PDFs, Fonts, LayerFILES, LOWLAND_NE, LOWLAND_NW, LOWLAND_SE, LOWLAND_SEAMLESS; PDFs of hard copy Maps P. P.3597–Revised, P.3598—Revised and P.3599 and a seamless merged of all three maps.
		Fonts	Contains fonts used to symbolize the ArcMap project file.
		LayerFILES	Contains layer files of all shape files used in the ArcMap projects.
		LOWLAND_NE	Contains the ArcMap project file and all shape files and annotation associated with the North East Lowlands map sheet.
		LOWLAND_NW	Contains the ArcMap project file and all shape files and annotation ssociated with the North West Lowlands map sheet.
		LOWLAND_SE	Contains the ArcMap project file and all shape files and annotation associated with the South East Lowlands map sheet.
		LOWLAND_SEAMLESS	Contains the ArcMap project file and all shape files and annotation associated with the seamless version of all 3 Lowlands map sheets.
	Geophysics (on V.2)	FORTHOPE	Contains Geophysical images for the Fort Hope area.
		LOWLANDS	Contains Geophysical images that cover the entire Lowlands map area.
		SUPERGRID	Contains Geophysical images for the detailed James Bay Magnetic SuperGrid area
	Images_and_Models	Hillshade	Contains a Hillshade of the Digital Elevation Model for the area
		Landsat	Contains a LandSat Image of the area
	Marginal Material		Contains legend, marginal notes and Tables 1 and 2 from Maps P.3597–Revised, P.3598—Revised and P.3599
	Precambrian_Basement_Depth_Estimates		Contains files images and shapefiles associated with the Precambrian Depth Estimate calculations
	Tables		Contains Excel® file versions of the Depth to Precambrian, Geochronology and Kimberlite tables. Derived from the Shape files.

Data layers and attributes:

There are 4 project files (*.*mxd*) that are located in \\MRD233 data\Geology subfolders. Each of these project files has also been saved as LOWLANDS_xx_83 for ArcMap® version 8.3 and LOWLANDS_XX_90_91, which is the ArcMap® version 9.0 or 9.1.

- \\MRD233 data\Geology\LOWLAND_NE\LOWLANDS_NE.mxd is the project file for the North East Lowlands map sheet P3598.
- \\MRD233 data\Geology\LOWLAND_NW\LOWLANDS_NW.mxd is the project file for the North West Lowlands map sheet P3597.
- \\MRD233 data\Geology\LOWLAND_SE\LOWLANDS_SE.mxd is the project file for the South East Lowlands map sheet P3599.
- \\MRD233 data\Geology\LOWLAND_SEAMLESS\LOWLANDS_FINAL.mxd is the project file the seamless version of all 3 map sheets.

Table 2: Map layers and attributes

Shapefile	Field	Attribute	Description
Kimberlites.shp	FEATURE	KIMBERLITE ALKALIC ULTRAMAFIC DIATREME BRECCIA CARBONATITE/ALKALIC COMPLEX	Describes the type of point feature
	TYPE	KIMBERLITE ALKALIC ULTRAMAFIC DIATREME BRECCIA CARBONATITE/ALKALIC COMPLEX	Code used to symbolize the data
	LABEL	Name of point feature	Used to label kimberlite inset map
	LABEL_ID	number used to associate feature with table	Labeled kimberlite locations on map face
	AKA_NAME		Alternate name of point feature
	AGE		Age of point feature where present
GEOCHRONOLOGY.shp	FEATURE	GEOCHRONOLOGY LOCATION	Describes the type of point feature
	TYPE	GEOCHRON	Code used to symbolize the data
	LABEL_ID	number used to associate feature with table	Labeled Geochonology location on map face
	SAMPLE_ID		Sample identification where present
	LOCATION		Location information
	ROCKTYPE		Rock type geochonology sample was taken from
	GREENSTONE		Greenstone belt sample was located in where present
	ASSEM_SUIT		Assemblage suite sample was located in where present
	UPb_CRYSTA		U Pb crystallization age (Ma)
	UPb_Max_DP		Maximum Deposition age (Ma)
	Upb_INHERT		Inherited age (Ma)
	Upb_METAM		Metamorphic age (Ma)
	SmNd_MOD		εND and DePaolo Nd Model age (Ga)
	COMMENT		Any comments associated with the point feature
	PROBLEM		Any problem associated with point
	UTM_EAST		UTM easting of point feature
	UTM_NORTH		UTM northing of point feature
	UTM_ZONE		UTM zone of point feature
	DATUM		Datum

	METHOD		Geochronology analysis method
	REFERENCE		References
DEPTH_TO_PRECAMBRIAN.shp	FEATURE	DRILLHOLE	Describes the type of point feature
		OUTCROP	
		GEOPHYSICAL SURVEY	
		DEPTH	
	TYPE	OUTCRP	Code used to symbolize the data
		GEOPHYSICAL	
		DRILLHOLE	
	LABEL		Labeled Depth (m) locations on map face
	SAMPLE_ID		Sample identification where present
	COMPANY		Company who drilled the site
	ROCKTYPE		Rock type present in drill hole used to determine whether drill log reached Precambrian
	HOLE_D_VRT		Vertical depth of drill hole (m)
	HOLE_D_OVB		Vertical depth of overburden (m)
	HOLE_D_BED		Vertical depth to bedrock (m)
	AZIMUTH		Azimuth of hole
	DIP		Dip angle of hole
	ELEVATION		Elevation of hole above sea level (m)
	LOCATION		Location information
	COMMENT		Any comments associated with the point feature
	SOURCE		Source of data
	AFRI_ID		Assessment File Research Imaging identification number
	UTM_EAST		UTM easting of point feature
	UTM_NORTH		UTM northing of point feature
	UTM_ZONE		UTM zone of point feature
	DATUM		Datum
	UTM_E_ORIG		original UTM easting of point feature
	UTM_N_ORIG		original UTM northing of point feature
	DATUM_ORIG		original Datum
	TO_PRECAMB	YES	Indicates if the drill hole reached Precambrian bedrock or not
		NO	
TREND_IRON_DIKE.shp	FEATURE	TRENDLINE	Describes the type of line feature
		IRON FORMATION	
		DIKE	
	TYPE	TRENDLINE	Code used to describe the data
		IRON FORMATION	
		DIKE	
	AGE		Age of line feature (Ma)
	DIKE_TYPE		Type of Mafic dike swarm
	DIKE_CODE		Geological unit number
	TREND		Trend of dike where present
	MAGNETISM	NORMAL	Indicates normal or reverse magnetism of dike
		REVERSE	
	MAP_SOURCE		Indicates map source or reference information where present
	SOURCE		Source of data where present
GEOLINES.shp	FEATURE		Describes the type of line feature
	TYPE		Code used to symbolize the data
	BOUNDARY	TERRANE BOUNDARY	Indicates if the line feature is a terrane boundary
	LABEL		Labeled geological line features on map face
GEOPOLY.shp	FEATURE	GEOLOGICAL UNIT	Describes the type of point feature

TYPE		Geological unit number
FACIES	GRANULITE	Indicates whether unit is of granulite facies or not
LABEL		Indicates any name present for feature
AREA_BD_OV	Area of inferred Trans Hudson Oregen overprint on Archean crust	Indicates if unit is THO or area of Sutton Inliers
	Area of bedrock outcrop of “Sutton Inliers”	