GEOLOGICAL SURVEY OF CANADA
OPEN FILE 7446

Geo-mapping Frontiers: Updated information on the regions covered by Operations Baker, Bathurst, Keewatin, Northern Keewatin, Thelon and Wager; Nunavut and Northwest Territories: National Reference Collection Maps and Tables, NTS 65

J.R. Harris, E.M. Hillary, J.A. Percival, G. Buller, R. Buenviaje, D. Bazor, S. Baer, G.M. Kiessling, S.J. Pehrsson, W. Davis, R.G. Berman, N. Wodicka, M. Beauchemin, M. Coyne, and A.M. Therriault

2013

Natural Resources Canada Ressources naturelles Canada

Canada

GEOLOGICAL SURVEY OF CANADA
OPEN FILE 7446

Geo-mapping Frontiers: Updated information on the regions covered by Operations Baker, Bathurst, Keewatin, Northern Keewatin, Thelon and Wager; Nunavut and Northwest Territories: National Reference Collection Maps and Tables, NTS 65

Harris, J.R., Hillary, E.M., Percival, J.A., Buller, G., Buenviaje, R., Bazor, D., Baer, S., Kiessling, G.M., Pehrsson, S.J., Davis, W., Berman, R.G., Wodicka, N., Beauchemin, M., Coyne, M., and Therriault, A.M.

2013

©Her Majesty the Queen in Right of Canada 2013

doi:10.4095/292756

This publication is available for free download through GEOSCAN (http://geoscan.ess.nrcan.gc.ca/)

Recommended citation
Harris, J.R., Hillary, E.M., Percival, J.A., Buller, G., Buenviaje, R., Bazor, D., Baer, S., Kiessling, G.M., Pehrsson, S.J., Davis, W., Berman, R.G., Wodicka, N., Beauchemin, M., Coyne, M., and Therriault, A.M., 2013. Geo-mapping Frontiers: Updated information on the regions covered by Operations Baker, Bathurst, Keewatin, Northern Keewatin, Thelon and Wager; Nunavut and Northwest Territories**:** National Reference Collection Maps and Tables, NTS 65: Geological Survey of Canada, Open File 7446. doi:10.4095/292756

Publications in this series have not been edited; they are released as submitted by the author.

ABSTRACT

The Geo-mapping Frontiers project was initiated to improve geoscience knowledge in the least understood parts of Canada's north. Open File 7446 is part of a series of open files, 7434 to 7448, produced during the Geo-mapping Frontiers project. The series contains legacy geology data and remote predictive mapping information for a large part of eastern mainland Nunavut, collected over 2 years.

The derived data products from this work are presented in 15 separate thematic packages to keep the downloads to a manageable size, between 1 and 4 GB. ArcGIS users (version 9.3 and above) can download OF 7434 and any of the georeferenced raster data in the rest of the series. Users not interested in geodatabases will find data in shape files in Open Files 7434 and 7435, or in georeferenced raster data in the rest of the series. Open File 7446 contains scanned and georeferenced maps and tables from the Geological Survey of Canada (GSC) that identify legacy samples that have been preserved as part of the GSC's National Reference Collection, in NTS sheet 65. This is not a complete collection for the area. More NRC maps in GSC archives remain to be scanned.

This series of publications represents a compilation of available data sets for four regions, and their surrounding areas, that encompass a large part of eastern mainland Nunavut. Several interpretive Remote Predictive Mapping (RPM) layers are included. The data sets include airborne geophysics, Landsat 7 imagery, lake sediment analyses, as well as legacy mapping and sample data from the GSC archives.

This series is the first of a group of reports for the Geo-mapping Frontiers project, and is intended to provide a basis of knowledge for the entire region.

TABLE OF CONTENTS

ABSTRACT
TABLE OF CONTENTS
LIST OF OPEN FILE TITLES IN THIS SERIES
LIST OF FIGURES
INTRODUCTION
DIGITAL DATA
DESCRIPTION of DATA LAYERS
A. Base layers
B. Legacy geologic data
C. Raw and enhanced geophysical data
D. Regional Landsat imagery
E. Digital Elevation Model (DEM)
F. Regional lake sediment data
G. Regional published geology maps
H. Mineral occurrences
I. RPM geological and geophysical maps
CONCLUSIONS
REFERENCES
APPENDIX 1. REFERENCES FOR GEOPHYSICAL SURVEYS in STUDY AREA (published by GSC, 2012 and 2013)

LIST OF OPEN FILE TITLES IN THIS SERIES

Harris, J.R., Hillary, E.M., Percival, J.A., Buller, G., Buenviaje, R., Bazor, D., Baer, S., Kiessling, G.M., Pehrsson, S.J., Davis, W., Berman, R.G., Wodicka, N., Beauchemin, M., Coyne, M., and Therriault, A.M., 2013. Geo-mapping Frontiers: Updated information on the regions covered by Operations Baker, Bathurst, Keewatin, Northern Keewatin, Thelon and Wager; Nunavut and Northwest Territories: GIS components: Geological Survey of Canada, Open File 7434. (3 GB)

Harris, J.R., Hillary, E.M., Percival, J.A., Buller, G., Buenviaje, R., Bazor, D., Baer, S., Kiessling, G.M., Pehrsson, S.J., Davis, W., Berman, R.G., Wodicka, N., Beauchemin, M., Coyne, M., and Therriault, A.M., 2013. Geo-mapping Frontiers: Updated information on the regions covered by Operations Baker, Bathurst, Keewatin, Northern Keewatin, Thelon and Wager; Nunavut and Northwest Territories: Photos of Archived Samples: Geological Survey of Canada, Open File 7435. (3.2 GB)

Harris, J.R., Hillary, E.M., Percival, J.A., Buller, G., Buenviaje, R., Bazor, D., Baer, S., Kiessling, G.M., Pehrsson, S.J., Davis, W., Berman, R.G., Wodicka, N., Beauchemin, M., Coyne, M., and Therriault, A.M., 2013. Geo-mapping Frontiers: Updated information on the regions covered by Operations Baker, Bathurst, Keewatin, Northern Keewatin, Thelon and Wager; Nunavut and Northwest Territories: Landsat: Geological Survey of Canada, Open File 7436. (2.1 GB)

Harris, J.R., Hillary, E.M., Percival, J.A., Buller, G., Buenviaje, R., Bazor, D., Baer, S., Kiessling, G.M., Pehrsson, S.J., Davis, W., Berman, R.G., Wodicka, N., Beauchemin, M., Coyne, M., and Therriault, A.M., 2013. Geo-mapping Frontiers: Updated information on the regions covered by Operations Baker, Bathurst, Keewatin, Northern Keewatin, Thelon and Wager; Nunavut and Northwest Territories: Geophysics: Geological Survey of Canada, Open File 7437. (2.3 GB)

Harris, J.R., Hillary, E.M., Percival, J.A., Buller, G., Buenviaje, R., Bazor, D., Baer, S., Kiessling, G.M., Pehrsson, S.J., Davis, W., Berman, R.G., Wodicka, N., Beauchemin, M., Coyne, M., and Therriault, A.M., 2013. Geo-mapping Frontiers: Updated information on the regions covered by Operations Baker, Bathurst, Keewatin, Northern Keewatin, Thelon and Wager; Nunavut and Northwest Territories: Legacy Fieldnotes: Geological Survey of Canada, Open File 7438. (0.5 GB)

Harris, J.R., Hillary, E.M., Percival, J.A., Buller, G., Buenviaje, R., Bazor, D., Baer, S., Kiessling, G.M., Pehrsson, S.J., Davis, W., Berman, R.G., Wodicka, N., Beauchemin, M., Coyne, M., and Therriault, A.M., 2013. Geo-mapping Frontiers: Updated information on the regions covered by Operations Baker, Bathurst, Keewatin, Northern Keewatin, Thelon and Wager; Nunavut and Northwest Territories: Legacy Traverse Maps North of 68 degrees: Geological Survey of Canada, Open File 7439. (2 GB)

Harris, J.R., Hillary, E.M., Percival, J.A., Buller, G., Buenviaje, R., Bazor, D., Baer, S., Kiessling, G.M., Pehrsson, S.J., Davis, W., Berman, R.G., Wodicka, N., Beauchemin, M., Coyne, M., and Therriault, A.M., 2013. Geo-mapping Frontiers: Updated information on the regions covered by Operations Baker, Bathurst, Keewatin, Northern Keewatin, Thelon and Wager; Nunavut and Northwest Territories: Legacy Traverse Maps, NTS 46: Geological Survey of Canada, Open File 7440. (2.4 GB)

Harris, J.R., Hillary, E.M., Percival, J.A., Buller, G., Buenviaje, R., Bazor, D., Baer, S., Kiessling, G.M., Pehrsson, S.J., Davis, W., Berman, R.G., Wodicka, N., Beauchemin, M., Coyne, M., and Therriault, A.M., 2013. Geo-mapping Frontiers: Updated information on the regions covered by Operations Baker, Bathurst, Keewatin, Northern Keewatin, Thelon and Wager; Nunavut and Northwest Territories: Legacy Traverse Maps, NTS 55 and 56: Geological Survey of Canada, Open File 7441. (3.9 GB)

Harris, J.R., Hillary, E.M., Percival, J.A., Buller, G., Buenviaje, R., Bazor, D., Baer, S., Kiessling, G.M., Pehrsson, S.J., Davis, W., Berman, R.G., Wodicka, N., Beauchemin, M., Coyne, M., and Therriault, A.M., 2013. Geo-mapping Frontiers: Updated information on the regions covered by Operations Baker, Bathurst, Keewatin, Northern Keewatin, Thelon and Wager; Nunavut and Northwest Territories: Legacy Traverse Maps, NTS 65: Geological Survey of Canada, Open File 7442. (3.1 GB)

Harris, J.R., Hillary, E.M., Percival, J.A., Buller, G., Buenviaje, R., Bazor, D., Baer, S., Kiessling, G.M., Pehrsson, S.J., Davis, W., Berman, R.G., Wodicka, N., Beauchemin, M., Coyne, M., and Therriault, A.M., 2013. Geo-mapping Frontiers: Updated information on the regions covered by Operations Baker, Bathurst, Keewatin, Northern Keewatin, Thelon and Wager; Nunavut and Northwest Territories: Legacy Traverse Maps, NTS 66: Geological Survey of Canada, Open File 7443. (3.8 GB)

Harris, J.R., Hillary, E.M., Percival, J.A., Buller, G., Buenviaje, R., Bazor, D., Baer, S., Kiessling, G.M., Pehrsson, S.J., Davis, W., Berman, R.G., Wodicka, N., Beauchemin, M., Coyne, M., and Therriault, A.M., 2013. Geo-mapping Frontiers: Updated information on the regions covered by Operations Baker, Bathurst, Keewatin, Northern Keewatin, Thelon and Wager; Nunavut and Northwest Territories: Legacy Traverse Maps, NTS 75 and 76: Geological Survey of Canada, Open File 7444. (2.8 GB)

Harris, J.R., Hillary, E.M., Percival, J.A., Buller, G., Buenviaje, R., Bazor, D., Baer, S., Kiessling, G.M., Pehrsson, S.J., Davis, W., Berman, R.G., Wodicka, N., Beauchemin, M., Coyne, M., and Therriault, A.M., 2013. Geo-mapping Frontiers: Updated information on the regions covered by Operations Baker, Bathurst, Keewatin, Northern Keewatin, Thelon and Wager; Nunavut and Northwest Territories: National Reference Collection Maps and Tables, NTS 55 and 56: Geological Survey of Canada, Open File 7445. (2.8 GB)

Harris, J.R., Hillary, E.M., Percival, J.A., Buller, G., Buenviaje, R., Bazor, D., Baer, S., Kiessling, G.M., Pehrsson, S.J., Davis, W., Berman, R.G., Wodicka, N., Beauchemin, M., Coyne, M., and Therriault, A.M., 2013. Geo-mapping Frontiers: Updated information on the regions covered by Operations Baker, Bathurst, Keewatin, Northern Keewatin, Thelon and Wager; Nunavut and Northwest Territories: National Reference Collection Maps and Tables, NTS 65: Geological Survey of Canada, Open File 7446. (2.8 GB)

Harris, J.R., Hillary, E.M., Percival, J.A., Buller, G., Buenviaje, R., Bazor, D., Baer, S., Kiessling, G.M., Pehrsson, S.J., Davis, W., Berman, R.G., Wodicka, N., Beauchemin, M., Coyne, M., and Therriault, A.M., 2013. Geo-mapping Frontiers: Updated information on the regions covered by Operations Baker, Bathurst, Keewatin, Northern Keewatin, Thelon and Wager; Nunavut and Northwest Territories: National Reference Collection Maps and Tables, NTS 66: Geological Survey of Canada, Open File 7447. (1.8 GB)

Harris, J.R., Hillary, E.M., Percival, J.A., Buller, G., Buenviaje, R., Bazor, D., Baer, S., Kiessling, G.M., Pehrsson, S.J., Davis, W., Berman, R.G., Wodicka, N., Beauchemin, M., Coyne, M., and Therriault, A.M., 2013. Geo-mapping Frontiers: Updated information on the regions covered by Operations Baker, Bathurst, Keewatin, Northern Keewatin, Thelon and Wager; Nunavut and Northwest Territories: National Reference Collection Maps and Tables, NTS 75 and 76: Geological Survey of Canada, Open File 7448. (2.1 GB)

LIST OF FIGURES

Figure 1. Four primary study areas for Geo-mapping Frontiers project.

Figure 2. Additional surveys done before or during the 2012 field season (geology base map: Harrison et al, 2011). (a) Note that the stream sediment survey was done during the 2012 field season. The lake sediment geochemical surveys were done in 1976, but re-analyzed in 2011. (b) Data points collected from information available from operations Keewatin, Thelon, Baker, Bathurst, Keewatin North, and Wager.

Figure 3. (a) Table of content (TOC) for ArcGIS mxd file, (b) Required data directory structure for ArcGIS mxd.

Figure 4. Distribution of the scanned and georeferenced traverse maps that are included in Open Files 7439 to 7444. Red dots are field stations digitized from these maps, included in the geodatabase and as a shape file in 7434. Irregular purple polygons are protected areas.

Figure 5. Distribution of the scanned and georeferenced National Reference Collection maps that are included in Open Files 7445 to 7448.

Figure 6. RPM layers included in Open File 7434.

Figure 7. Statistical summary of radio-element domains based on K-means clustering of eU, eTh and %K

INTRODUCTION

In the final phase of the Geomapping for Energy and Minerals (GEM) Program, a project entitled Geo-mapping Frontiers (http://www.nrcan.gc.ca/earth-sciences/about/current-program/geomapping/minerals/11975) (originally called Operation GEM) was initiated to improve geoscience knowledge in the least understood parts of Canada's north. An inventory was first conducted to evaluate the state of knowledge in parts of Nunavut, NWT and Yukon shown as having insufficient knowledge to support decision-making. Criteria included: 1) mapped at 250K scale or coarser; 2) mapped prior to aeromagnetic coverage; 3) lacking modern U-Pb age information on major units; 4) lacking Nd-Sm model age data; 5) lacking thermochronological data; 6) lacking a stratigraphic framework for supracrustal rocks; 7) lacking subdivision of granitic rocks; and 8) mineral potential unconfirmed. Eleven areas identified during a preliminary scan were discussed with territorial geological surveys in the spirit of the Intergovernmental Geoscience Accord. In light of the consultation process, four geographic areas were prioritized for investigation from a minerals perspective (Chantrey, Ennadai, South Rae and Tehery transects), and two topics were selected for Energy research.

The project activities include consolidating and improving existing information (data mining, compilation and remote predictive mapping), acquiring new data (e.g. geophysical, geochemical surveys), testing emerging models through targeted field work, contributing to completion of the Tri-territorial database, and advancing planning with regard to future work. Activities are aimed at stimulating direct industry interest through timely delivery of maps, reports, compilations and datasets.

Data mining was initiated by geo-locating archived samples from the helicopter-borne reconnaissance operations of the 1950s and 1960s: Operation Keewatin (fieldwork in 1952, Lord, 1953, and Waugh 1959), Operation Baker (fieldwork in 1954, Wright, 1955 and Waugh 1959), Operation Thelon (fieldwork in 1955, Wright 1957, and Waugh 1959), Operation Northern Keewatin (fieldwork in 1960, Heywood 1961, 1962), Operation Bathurst (fieldwork in 1962, Fraser et al, 1963) and Operation Wager (fieldwork in 1964, Heywood, 1966), along with those from individual map-sheets of similar vintage. Samples were photographed and measurements taken for magnetic susceptibility. Some rocks were analyzed with a portable XRF analyzer, and a few samples were dated through U-Pb zircon SHRIMP geochronology.

For this series of Open Files, the Geo-mapping Frontiers project has produced a compilation of available data sets for the four regions shown in Figure 1, and for some of the surrounding terrain. Additional surveys done before or during the 2012 field season are displayed in Figure 2.

.

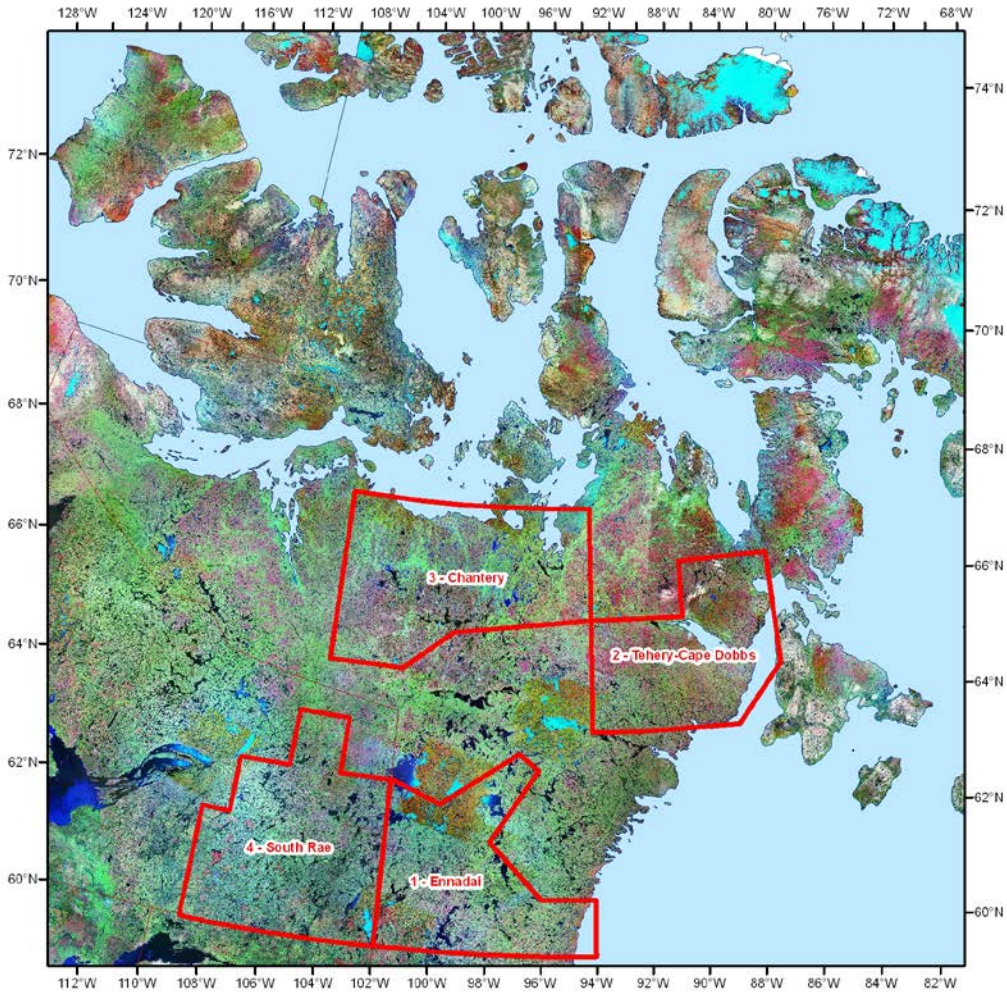

Figure 1. Four primary study areas for Geo-mapping Frontiers project

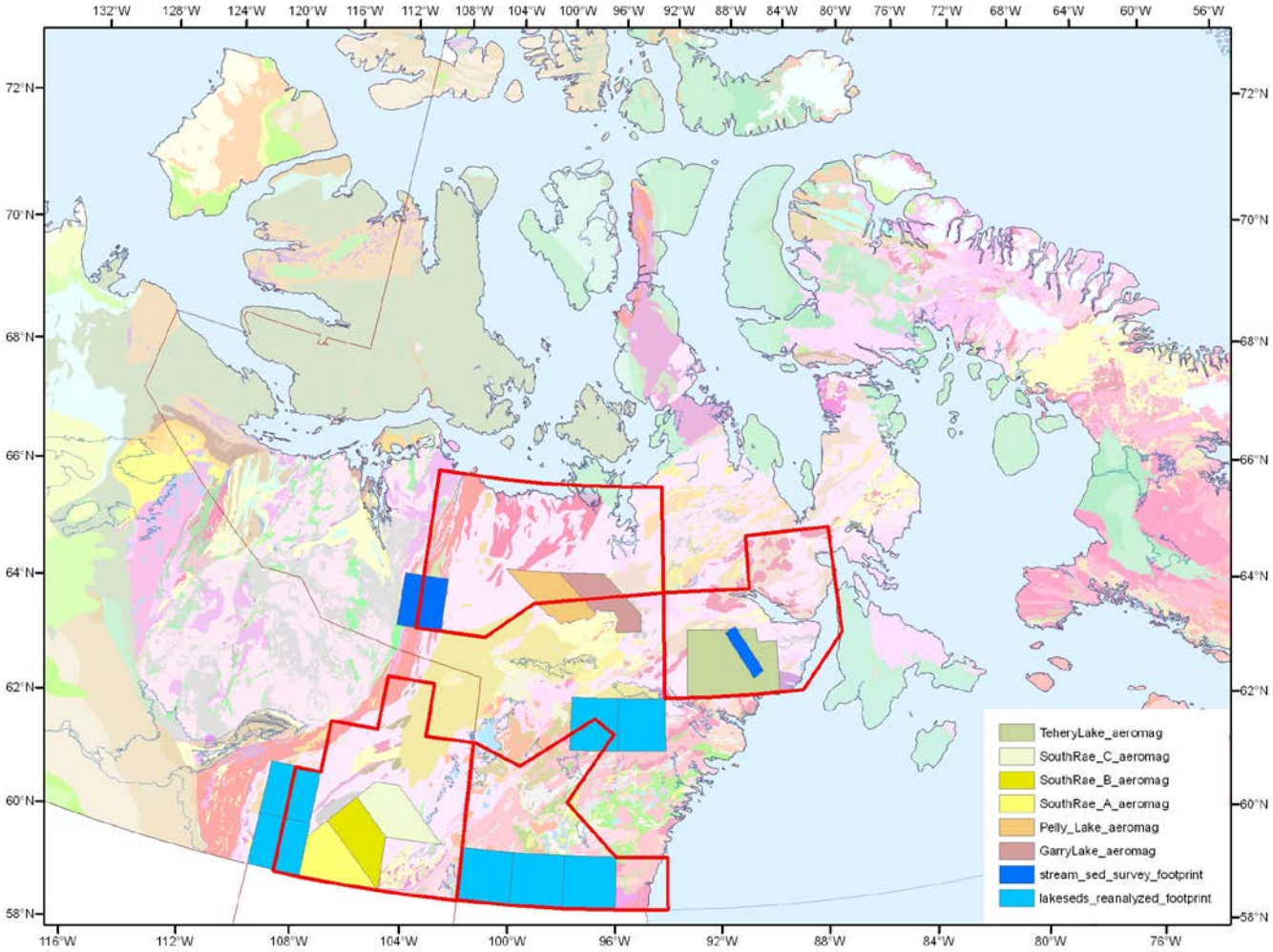

Figure 2a. Regional geophysical, lake sediment and stream sediment surveys done before or during the 2012 field season (geology base map, Harrison et al, 2011). Note that the lake sediment geochemical surveys were done in 1976, but re-analyzed in 2011 (data in OF 7434 and OF 7437).

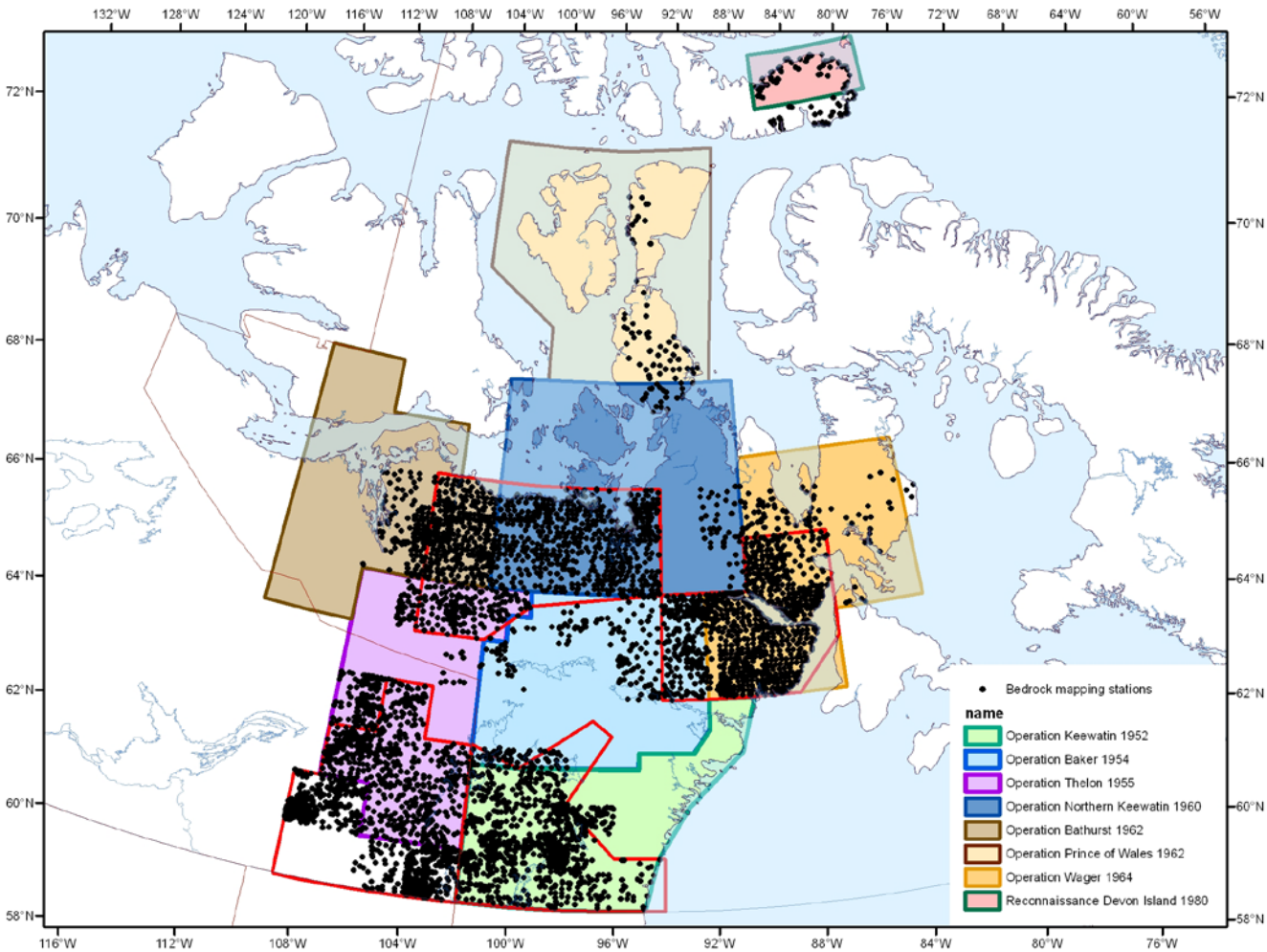

Figure 2b. Bedrock outcrop data were compiled from archived notes, traverse maps and samples from GSC operations Keewatin, Thelon, Baker, Bathurst, Keewatin North, Wager and 1980 reconnaissance work on Devon Island.

DIGITAL DATA

This Open File series is the first of a number of reports for the Geo-mapping Frontiers project. It provides the framework geological information that was available before the 2011 field season. These compiled data include:

- Legacy geological information mined from GSC archives
- Regional raw and enhanced geophysical data (airborne magnetic, gravity and gamma ray spectrometer)
- Regional orthorectified Landsat data produced by the Canada Centre for Remote Sensing (CCRS)
- Regional remote predictive (RPM) maps of magnetic and radio-element domains and geologic structures
- Regional geochemical lake sediment data (stream sediment data will be published in the upcoming individual Chantrey and Tehery area reports).

This Open File series represents over 30 GB of data. Most of the volume comes from the scanned and georeferenced legacy maps from the GSC archives. To make it possible to publish this large amount of data, the data products are presented in 15 separate thematic packages, to keep the downloads to a manageable size, between 1 and 4 GB. ArcGIS users (version 9.3 and above) can download OF 7434 and any of the groups of georeferenced vector or raster data layers in the series. GIS users not interested in geodatabases can also download OF 7434 and 7435, with their data in shape or image files, and/or any of the other groups of georeferenced vector or raster data layers in the series (see list of Open Files at beginning of this report).

An ArcGIS mxd file (version 9.3) has been included for ArcGIS users in the *root* directory in each Open File. This file opens with ArcGIS software, and data will be displayed in grouped layers. However, to have ALL the data in this study appear properly linked in ArcGIS, ALL 15 Open Files must be downloaded, and their contents arranged as in Figure 3. The table of contents (TOC) for the ArcGIS mxd must be as shown in Figure 3a, and the data directory structure in must be as shown in Figure 3b. Any combination of data from the Open File series may be used, but links for missing layers will be broken in the resulting ArcGIS workspace. The same data directory structure and mxd file are included in each download of the series.

For users of other GIS software, all the data in Open Files 7434 to 7448 are georeferenced, except for the Legacy Fieldnotes, which do not have a single GIS reference, but provide much useful geological information about the legacy field stations.

The mxd data frame uses a Lambert Conformal Conic projection with the following parameters:

Clarke_1866_Lambert_Conformal_Conic
Projection: Lambert_Conformal_Conic
False_Easting: 0.000000
False_Northing: 0.000000
Central_Meridian: -95.000000
Standard_Parallel_1: 49.000000
Standard_Parallel_2: 77.000000
Latitude_Of_Origin: 49.000000
Linear Unit: Meter
GCS: Clarke_1866
Datum: D_Clarke_1866

Figure 3a. ArcGIS mxd Table of Contents (TOC)

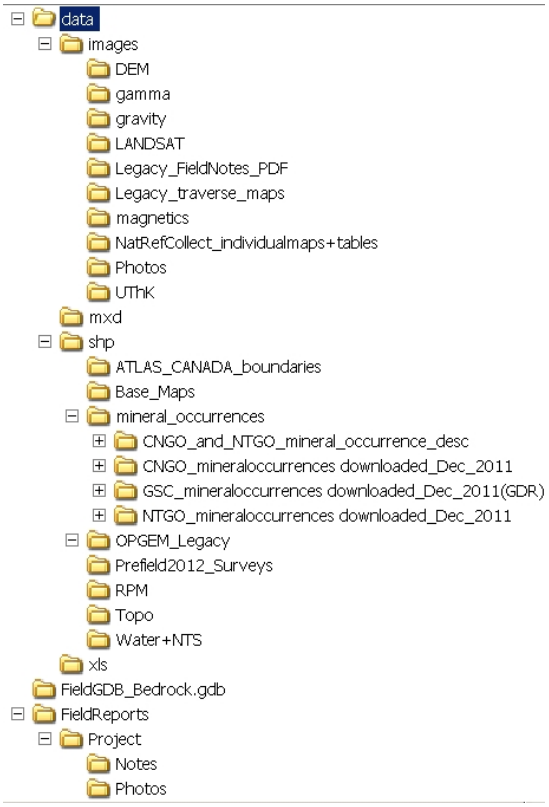

Figure 3b. Required data directory structure for ArcGIS mxd.

DESCRIPTION of DATA LAYERS

A. Base layers

Base data are included in group layers as part of the mxd file as follows. The generalized water layers and NTS sheets layer are included in each Open File to provide a framework for the data.

- *water (generalized)* – this layer includes an ocean mask from GSC map 1860A and generalized lakes (hydrology) derived from the GSC IPY map 2159A.

- *water (detailed)* - this includes 1:50,000 scale vector data of hydrology (Watercourse_Cours_d_eau_line) and a detailed 1:50,000 polygon coverage of waterbodies (Waterbody_Etendue_d_eau_polygon). Other detailed topographic layers are stored in data/shp/*Topo directory*.

- *NTS_sheets_250K*

- *province_territory_boundaries*

- *OPGEM_2012_project_areas* – This layer shows the four Geo-mapping Frontiers mapping areas: Ennadai, Tehery-Cape Dobbs, Chantrey and South Rae. Separate Open Files reports are presently being prepared by the GSC for these individual areas.

- *GSC_bedrock_geology_publications* – This layer summarizes major GSC publications (Open Files, A-series maps) for the project area: it is not a complete list.

- *OPGEM_Old_Operations* – This layer shows some legacy GSC mapping areas from the 1950's and 1960's.

B. Legacy geologic data

An excel file ***(****Geo-frontiers_datasources.xls)* is included in each Open File, which itemizes the layers and sources of the legacy data from the GSC data collections at the Tunney's Pasture, Ottawa data archive. This includes both raster and vector data summarized below. With respect to the ArcGIS mxd, the legacy raster data files are included in the *Field_stations_and_samples_digitized_from_legacy_traverse_maps*, and *Legacy_scanned_maps* grouped layers. Note that these Open Files are not yet a complete compilation of the legacy information available from the GSC archives for these areas, as much more early material remains to be digitized.

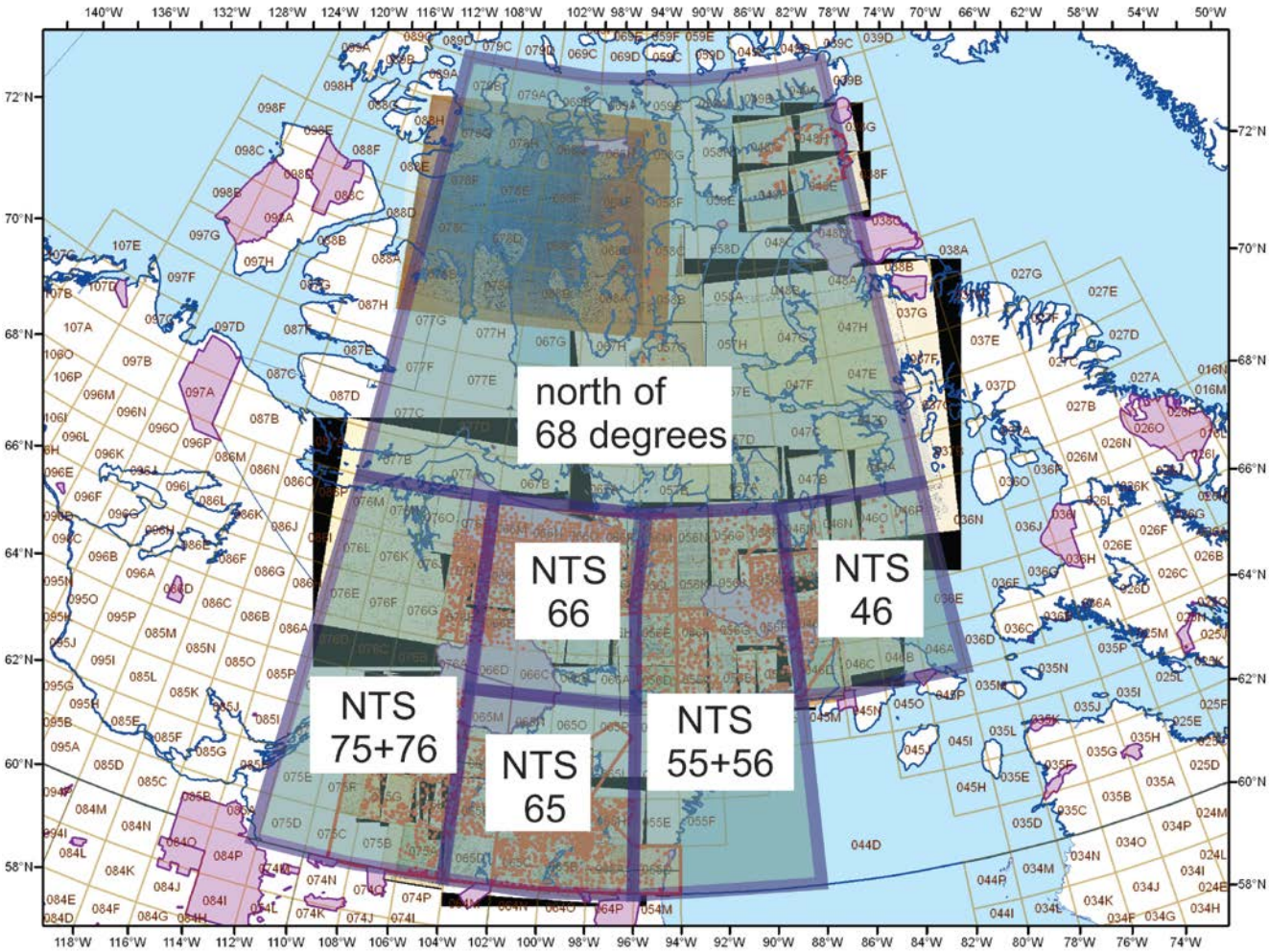

Figure 4. Distribution of the scanned traverse maps in Open Files 7439 to 7444. Red dots are field stations digitized from these maps. Irregular purple polygons are protected areas.

Raster data

- scanned traverse maps from 1950's to 1980's (georeferenced tiffs) are housed in Open Files 7439 (maps north of 68 degrees), 7440 (NTS 46), 7441 (NTS 55 and 56), 7442 (NTS 65), 7443 (NTS 66), and 7444 (NTS 75 and 76). Figure 4 indicates the current distribution of the scanned traverse maps in this series of Open Files.

- scanned maps and tables that describe legacy samples that were preserved as part of the GSC's National Reference Collection (NRC) as georeferenced tiffs, with accompanying tables, are stored in Open Files 7445 (NTS 55 and 56), 7446 (NTS 65), 7447 (NTS 66) and 7448 (NTS 75 and 76). Figure 5 indicates the current distribution of the scanned NRC maps in this series of Open Files.

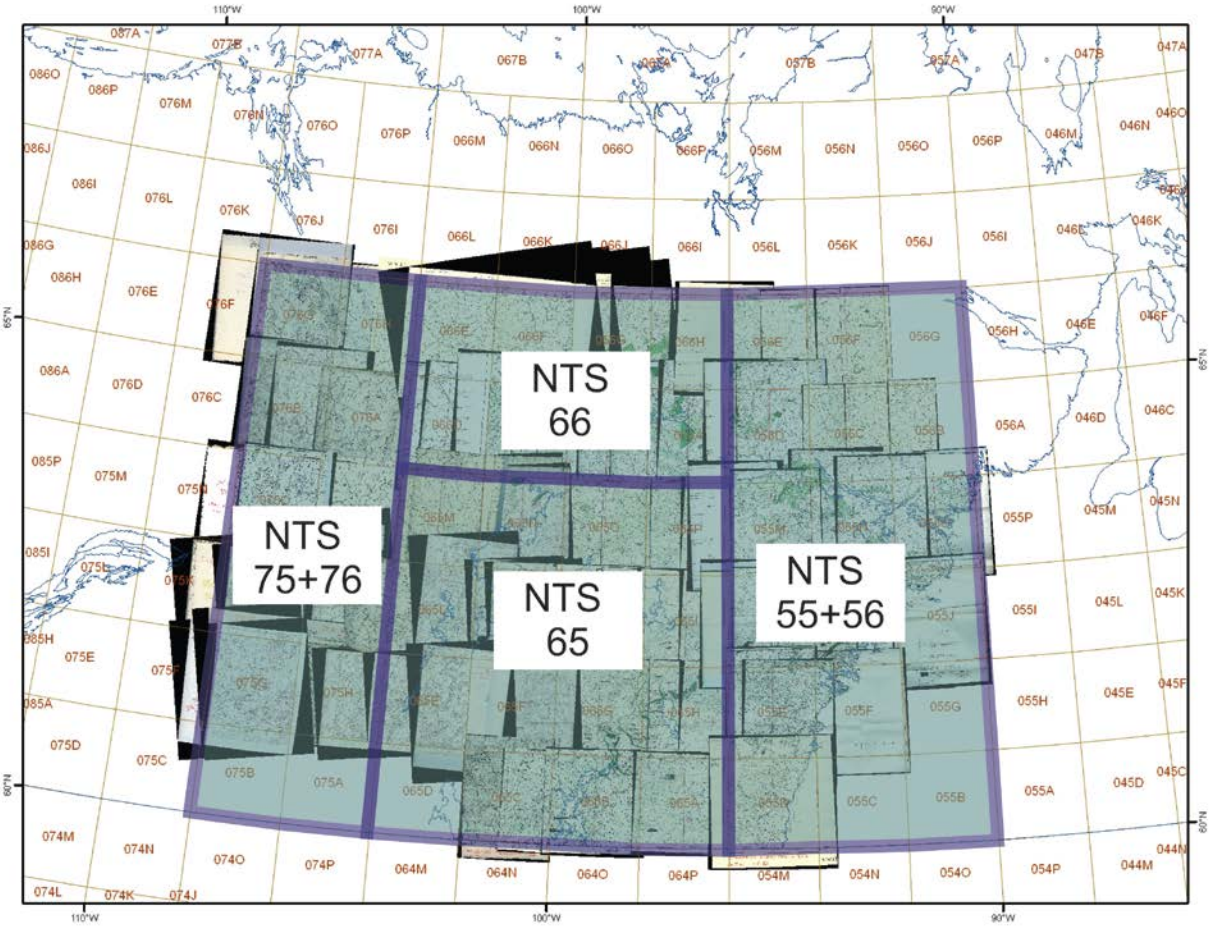

Figure 5. Distribution of the scanned and georeferenced National Reference Collection maps that are included in Open Files 7445 to 7448.

- scanned legacy fieldnotes and fieldcards (as pdf's) are in Open File 7438.

- photographs of rock samples that were collected at legacy stations, and are still stored in the GSC collection (at the Tunney's Pasture, Ottawa location), are in the *\FieldReports\Project\Photos*directory,and linked to the geodatabase, in OF 7434. For GIS work without using an ArcGIS geodatabase, they are also stored in *\data\images\Photos* in OF 7435. In the mxd's, the photos are hyperlinked to the STATION layer, and can be viewed by clicking on the hyperlink icon (lightning bolt symbol). Note that the original hierarchy of the photo directories must be maintained, relative to the mxd file, for the hyperlinks to work.

Vector data

All of the data below are stored separately as shape files in the *\data\shp\OP-GEM Legacy* directory in OF 7434.

- digitized traverses from legacy traverse maps from the Tunney's Pasture collection

- digitized stations from legacy traverse maps from the Tunney's Pasture collection

- new magnetic susceptibility measurements from samples collected at legacy stations that are still stored in Tunney's Pasture collection. Five measurements were taken on each sample, and a mean was calculated: all measurements are recorded here, to indicate variability. Note that the KT-10 magnetic susceptibility meter that was used for this project is 20-25% high on low to normal values, and up to 50% high on more magnetic materials. This does not affect relative values too much, but values will need to be corrected if they are going to be compared to other magnetic susceptibility data.

- geochronology from legacy samples stored in Tunney's Pasture collection, downloaded from GSC website **http://gdr.ess.nrcan.gc.ca/geochron/e/explorer.htm**

- mineral occurrences downloaded from Nunavut, Northwest Territories and GSC websites. Mineral occurrence information in the *mineral_occurrences* group layer comprises 3 separate compilations extracted from online databases: (1) the Northwest Territories Geoscience Office (http://ntgodata.nwtgeoscience.ca/showingsQuery.html), (2) Nunavut Geoscience Office (http://nunavutgeoscience.ca/apps/showing/showQuery.php?l=e), and (3) Geological Survey of Canada (http://apps1.gdr.nrcan.gc.ca/gsc_minerals/index.phtml?language=en-CA). Mineral occurrence information and location, including a short description of each occurrence and a weblink to open the relevant point data in the online database tools, are included in the mxd. More information on the GSC mineral occurrence database can be found in Chorlton (2011).

C. Raw and enhanced geophysical data

These data are included as separate files (in *data\images*) in OF 7437 (geophysics). They are included in the ArcGIS mxd files in grouped layers.

Regional airborne magnetics

These data are displayed under the *Airborne_magnetic_data* group layer. The raster images are found in the *data\images\magnetics* directory in *Envi.dat* format.

Total field

This image of the magnetic total field, produced by the Geological Survey of Canada covers a large area Canada's North of 60°. A histogram equalization look-up-table (LUT) has been applied to the data which has been displayed in a colours ranging from blue through green to red. The patterns of colours depicted on the map show the strength of the measured magnetic field and hence reflect how magnetic the rocks are. Trends in the anomalies, therefore, represent trends caused by the distribution of magnetic minerals which reflect the geological make-up of the area.

Vertical gradient

This image of the magnetic vertical gradient, produced by the Geological Survey of Canada, covers the same area as the total field. A standard deviation stretch has been applied to the data using a black and white LUT. The image shows the 1st vertical derivative of the magnetic field and serves to enhance near-surface geologic structure.

Tilt

The tilt (which is related to the instantaneous phase) black and white image is defined as the arctangent of the ratio of the vertical gradient to the magnitude of horizontal gradient of the magnetic field. The horizontal gradient achieves a maximum near or over source edges and tends to zero elsewhere. The vertical gradient is positive over the source, zero over or near source edges, and negative elsewhere. As a result, the instantaneous phase of the magnetic field tends to be positive over sources bodies, zero over source edges, and negative elsewhere. One advantage of the use of the tilt is that, being a ratio, anomalies due to both weak and strongly magnetized sources are given equal weight. Hence, subtle (and often short-wavelength) anomalies are enhanced. Linear and quasi-linear geological features, such as faults, appear as lows whereas dykes often appear as maxima in the tilt map. The disadvantage is that, since the tilt is based on a ratio, all the original amplitude information in the magnetic field is lost, so strongly magnetized sources may produce the same tilt response as weakly magnetized sources. More information on magnetic tilt can be found in Pilkington et al (2008).

Shaded relief magnetic images

The process simulates the effects of light directed on the three-dimensional surface defined by the grid of magnetic anomaly values. The intensity of light reflected back from a slope on the surface will vary according to the steepness of the slope. The proportion of illuminating light reflected back is known as the reflectance, and attains a maximum for slopes that are perpendicular to the direction of the light. The overall effect is one of areas of varying brightness and areas of shadow, an effect very similar to that created by the sun shining over a range of hills. The light direction and its inclination from the horizontal can be varied, thereby providing different images of the same data set. Depending on the direction and inclination, certain features may be enhanced or suppressed. Generally, magnetic features are enhanced when the light direction is oriented at right angles to them.

Three shaded magnetic images of the total field are provided, shaded from 45, 135 and 315 directions using a sun elevation of 40°.

Regional gamma ray spectrometer (spectrometry or spectrometer data)

Gamma-ray spectrometry (GRS) is a surface remote sensing technique only, providing a direct measurement of the surface of the Earth, with no significant depth of penetration. The source of most gamma radiation is limited to the top 30 centimetres of the Earth's surface. This surface- only characteristic allows us to reliably relate the measured radioactive element contrasts to mapped bedrock and surficial geology, and alteration associated with mineral deposits.

A ternary RGB colour composite comprising equivalent uranium, equivalent thorium and % potassium, respectively is an effective method of displaying variations in total radioactivity and the relative abundances of the three radioactive elements displayed as added mixtures of red, blue and green hues. The intensity of the colours is a measure of the total radioactivity.

A ternary red-green-blue (eU –band1, eTh – band 2, %K –band 3) has been included in the *Airborne_gamma_ray_data* group layer and the *data\images\gamma* directory. The image is a mosaic of data of variable line spacing (250 m – 25km) and 250 m grid cell resolution.

Regional gravity data

The Bouguer gravity anomaly map is the most common form of gravity map. Gravity anomalies are produced by differences in the density in the crust. Granitic rocks typically produce negative anomalies, whereas mafic and ultramafic rocks are associated with positive anomalies. Consequently, in many cases, distinct anomalies can be linked to such rock types, particularly in crystalline terrains where these rocks generally represent end members in terms of the density spectrum. Naturally, many other rock types, having intermediate density characteristics, may produce anomalies that are not as distinct or prominent and may be more difficult to tie to a particular lithology without first "calibrating" the anomalies in an area of good exposure (Pilkington et al., 2007).

A shade-enhanced coloured Bouguer gravity anomaly image is included under the *Gravity_data* group layer and the *data\images\gravity* directory.

D. Regional Landsat imagery

This Landsat image (in OF 7436) is a false colour composite image in which bands 7,4,2 have been input to red, green and blue colours, respectively. The pixel (grid) size has been reduced to 100 m. The full resolution image (30 m) was produced by the Canada for Remote Sensing (CCRS) and is available for the entire area north of 60 on the Geogratis web-site.

The Landsat data is listed as Landsat_mosaic.dat in the mxd file and in the *\data\images\Landsat* directory.

The green hue in this image represents vegetation and the reddish hue represents exposed and weathered bedrock.

E. Digital Elevation Model (DEM)

A 1:250,000 mosaic of Canadian Digital Elevation Data CDED data showing elevation values for the area north of 60° along with 2 shaded relief images (45 and 315 directions – 45° elevation) is included in the *Digital_elevation_data (DEM)* group layer and *\data\images\DEM* data directory in OF 7437.

F. Regional lake sediment data

The lake sediment geochemical data include 8079 samples derived from various GSC Open File reports and is under the *Lake_sediment_geochemical_data* in the table of contents of the mxd and the

data\shp directory in OF 7434 and OF 7437. The point data comprises new analytical data for up to 12 elements from the reanalysis of archived lake sediment samples are available in Geological Survey of Canada (GSC) open file releases. Original field observations and analytical data are included with these reports, as well as data for uranium and fluoride in corresponding lake waters, where available. The Open Files are listed in Appendix 1 (McCurdy et al, 2011, 2012).

G. Regional published geology maps

Base_Geology_maps – This layer provides two regional geology maps:

(1) Geology_of_the_Arctic – GSC Map2159A (IPY). This includes lithologic unit polygons and faults.
(2) Geology of Canada 1996 (based on GSC map 1860A by Wheeler.

Both polygon outlines and filled polygons showing lithologic units are included in OF 7434 in the d*ata\shp\Base_Maps* directory. Both maps are available from the GSC (Harrison et al., 2011; Wheeler et al., 2006).

Data sources

(see also Geo-frontiers_datasources.xls in each Open File in this series).

***Aeromagnetic data* -** Canadian Aeromagnetic Data Base, Airborne Geophysics Section, GSC - Central Canada Division, Geological Survey of Canada, Earth Sciences Sector, Natural Resources Canada
Contact: http://gdcinfo.agg.nrcan.gc.ca/contact_e.html#DataCentre

Gamma ray spectrometer data – National Gamam-Ray Spectrometry Program Data Base, Airborne Geophysics Section, GSC – Central Canada Division, Geological Survey of Canada, Earth Sciences Sector, Natural Resources Canada

Contact : http://gsc.nrcan.gc.ca/gamma/contact_e.php

***Landsat data* -** Website: http://www.geobase.ca/geobase/en/index.html

DEM data - http://www.geobase.ca/

I. RPM geological and geophysical maps

Several Remote Predictive Mapping (RPM) interpretations have been included under the *RPM interpretive maps* group layer (Figure 5). These shape files are stored in the *data\shp\RPM* directory in Open File 7434. Further information on RPM can be found in Harris (2007). All raster files in this section are in OF 7437 (geophysics).

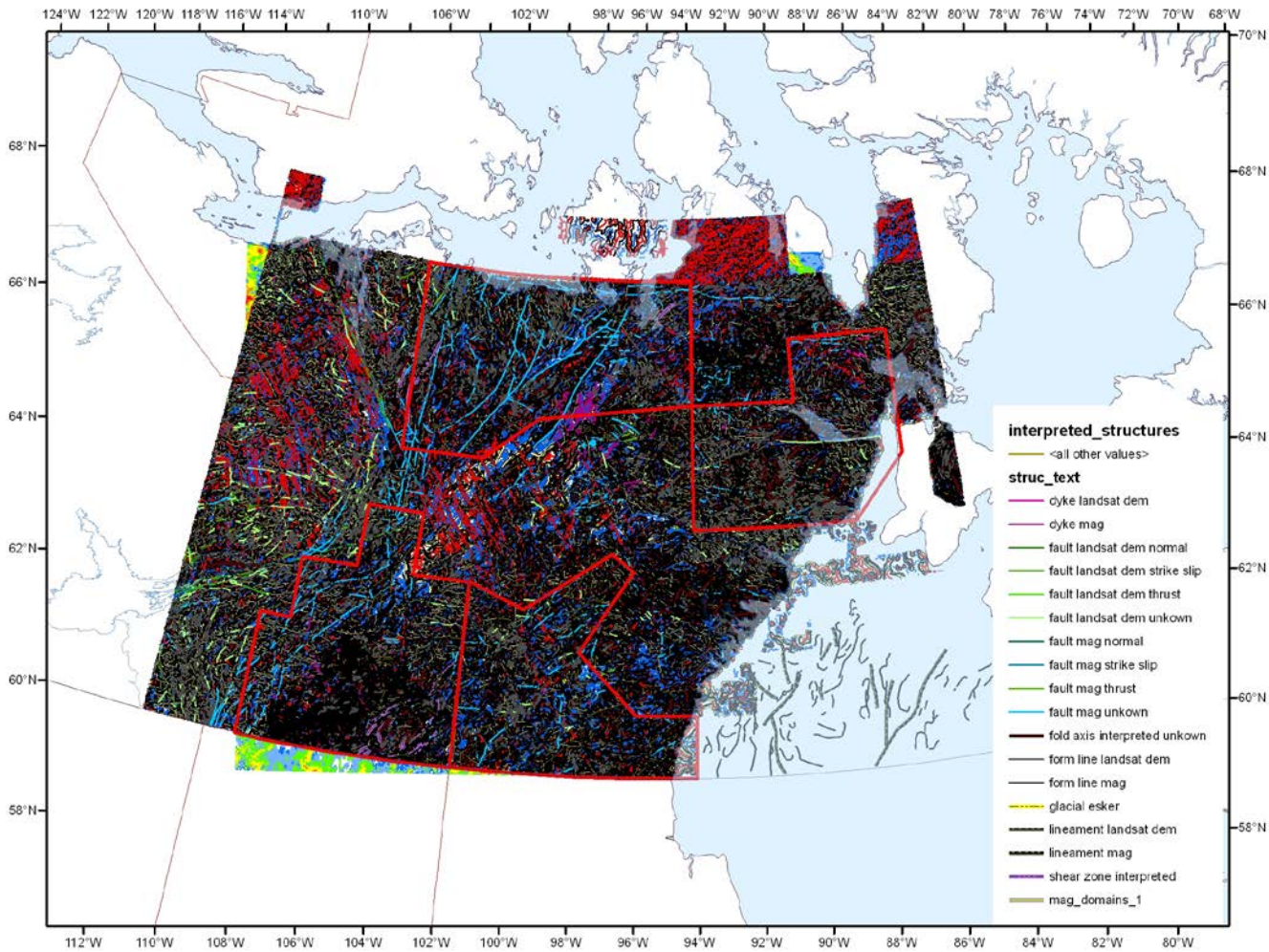

Figure 6. Remote predictive maps (RPM) in OF 7434. Red polygons are 2012 field study areas.

Magnetic domains

The delineation of magnetic anomalies patterns (*mag_domains_1*) was derived from automatic segmentation results. The objective was to subdivide the total field magnetic image into non-overlapping areas made of distinctive spatial patterns and intensities (see, e.g., Saltus et al. 2011). The publicly available system EDISON[a] was used. EDISON implements the mean shift algorithm for image segmentation (Comaniciu and Meer, 2002; Christoudias et al., 2002). The algorithm has two main free parameters that control the quality of the segmentation: the spatial and the color (grey level) resolution parameters, h_s and h_r respectively. A third parameter, M, constrains regions of size smaller than M pixels to merge with similar ones until no region smaller than M pixels remains. For the present application, the tuning of these parameters was guided by experimentation. The magnetic data was first equalized and subsequently quantized into 8-bits. EDISON was then applied with different parameter values and the quality of the resulting segmentation (boundaries) was evaluated visually by overlapping them on the magnetic image. Values of h_s=16, h_r= 3.5, and M=512 were ultimately selected. With an image size of approximately 2200 by 11200 pixels, the algorithm produces about 5800 regions. A second step was necessary to further reduce the number of regions. Hierarchical

[a] http://coewww.rutgers.edu/riul/research/code/EDISON/index.html

region merging was performed to progressively fuse spatially connected regions according to the Kullback-Leibler similarity criterion (Calderero and Marques, 2010). For that purpose, the equalized image was quantized into 2^3 levels (instead of 2^8) using the k-means algorithm. Then, within each region, the total number of pixels at each of the 8 levels was transformed into probabilities through region size normalization. The merging process was done on the resulting probability distributions. The merging process was performed until the number of regions reached 1000 regions.

Magnetic contacts

Mapping the locations of lateral magnetization contrasts (*mag_contacts_1*), i.e. the edges of magnetic sources, is one of the most basic and useful applications of magnetic survey data in geological mapping. Delineating the extent of units with similar magnetic properties follows the geological mapping approach of dividing the surface into rocks having similar properties. Whether or not the magnetization changes exactly mimic lithological ones, mapping such contrasts provides valuable information on deformation styles and trends. The potential contacts have been extracted from the magnetic tilt data (tilt horizontal gradient magnitude (TI-hgm)) and represent zones of significant contrast in magnetic susceptibility and represent structures (i.e dykes, faults) and possible lithologic contracts. Further details on this method can be found in Pilkington et al, 2007.

Magnetic lineaments

Magnetic linear highs (form lines, dykes) (*mag_tilt_high_1*) and lows (form lines, faults) (*mag_tilt_low_1*) where automatically extracted from the magnetic data using a combination of histogram thresholding followed by line-thinning and a raster-vector conversion within a GIS environment (unpublished internal RPM processing technique). These lineaments help to define and map the surface geologic fabric of the Geo-mapping Frontiers mapping area.

Radioelement domains

A map showing radioelement domains (*Radioelemnt_domains* in mxd TOC*) (data\imagse\UthK directory* in OF 7437*)* produced from the moderate resolution data (5 km spacing) is included in the mxd file. This map shows high concentrations of eU, e Th and %K in cool to warm colours. The six classes (clusters) were producing by employing a K-means cluster algorithm to the 3 channels resulting in statistically distinct divisions of the data. Figure 7 summarizes the statistics for each cluster. The red class primarily represents igneous rocks. A large NW –SE trending surficial anomaly (meltwater channels?) truncates the generally NE strike of lithologies the northeastern portion of the map. Further details on the clustering of gamma ray data and it usefulness for defining potential radioelement domains and their relationship to underlying bedrock and surficial cover can be found in Ford et al. (2008) and Harris (1989).

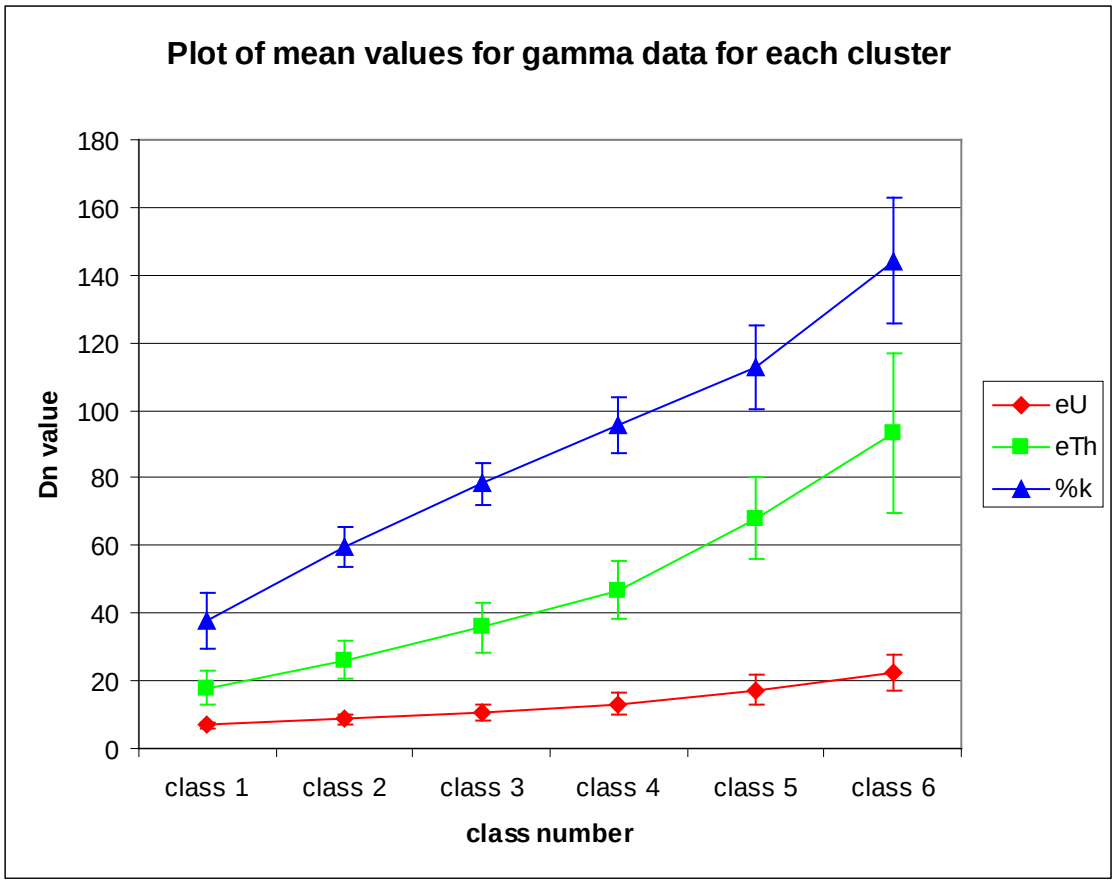

Figure 7. Statistical summary of radio-element domains based on K-means clustering of eU, eTh and %K

Geologic Structures

A geological structural layer (*interpreted_structures*) visually interpreted from airborne magnetic and Landsat data within the GIS using a heads-up interpretation process employing a touch sensitive screen and pen is provided that covers the entirety of the Geo-mapping Frontiers area. The structures have been attributed according to what the feature represents and the data source the structure was derived. The individual attributes can be selected separately and/or merged to allow the user to create a structural map that highlights individual or grouped structures. This interpretation is a sub-set of a complete structural coverage for the entire area north of 60 produced by Geofirma and the GSC (GSC Open File by Behnia and Harris, in press). This dataset is useful for not only defining the structural fabric of the entire Geo-mapping Frontiers area but also provides useful structural information for mineral exploration activity in the area.

Eskers

The compilation of eskers is derived from GSC Open File 7047 (Aylsworth et al., 2012).

CONCLUSIONS

This publication series presents a compilation of available data sets, for an area that encompasses a large part of eastern mainland Nunavut. The data sets include airborne geophysics, Landsat 7 imagery, lake sediment analyses, RPM interpretations and legacy mapping and sample data from the archives of the GSC.

This compilation, released in 15 related Open Files, is the first of a group of reports for the Geo-mapping Frontiers project, to provide a basis of knowledge for the whole region, available up to the field season of 2011.

REFERENCES

Aylsworth, J M; Shilts, W W; Russell, H A J; Pyne, D M.; 2012. Eskers around the Keewatin Ice Divide: Northwest Territories and Nunavut Geological Survey of Canada, Open File 7047, 2012; 14 pages; 1 CD-ROM, doi:10.4095/290075

Behnia, P. and Harris, J., 2013. Remote predictive mapping of structural features in Canada north of 60, using satellite imagery, DEM, and aeromagnetic data, in press.

Chorlton, L.B., 2011. World Mineral Geoscience Database Project, Geological Survey of Canada, http://apps1.gdr.nrcan.gc.ca/gsc_minerals/index.phtml, last updated: 2011-12-14

Christoudias, C., Georgescu, B., Meer, P., 2002. Synergism in low-level vision, 16th International Conference on Pattern Recognition, Quebec City, Canada, vol. IV, 150-155.

Calderero, F., Marques, F., 2010. Region merging techniques using information theory statistical measures, IEEE Trans. IP, 19, 6, 1567-1586.

Comaniciu, D., Meer, P., 2002. Mean shift: a robust approach toward feature analysis, IEEE Trans. PAMI, 24, 5, 603-619.

Eade, K.E. 1965. Reconnaissance Mapping, Kognak River area [65g East Half,65h West Half], p19, In Jenness, S.E., Report of Activities: Field, 1964, Geological Survey of Canada, Department of Mines and Technical Surveys, Ottawa, Paper no. 65-1.

Ford K., J.R. Harris, R. Shives, J. Carson, and J. Buckle, 2008. Gamma Ray Spectrometry 2007, in Remote predictive mapping: an aid for northern mapping, Ch. 4, Harris. J.R. (ed), GSC Open File 5643

Fraser, J A; Donaldson, J A; Bostock, H H; Poole, W H., 1963. Operation Bathurst, in Jenness, S.E., 1963, Summary of Research: Field, 1962, Geological Survey of Canada, Paper no. 63-1, p 10-11.

Harris J. R. (ed), 2008. Remote predictive mapping: an aid for northern mapping, GSC Open File 5643; 306 p, 1 DVD.

Harris, J.R. 1989. Clustering of Gamma Ray Spectrometer Data Using a Computer Image Analysis System in Statistical Applications in the Earth Sciences, ed. F.P. Agterberg and G.F. Bonham-Carter; Geological Survey of Canada, Paper 89-9., pp. 19-32.

Harrison, J C; St-Onge, M R; Petrov, O V; Strelnikov, S I; Lopatin, B G; Wilson, F H; Tella, S; Paul, D; Lynds, T; Shokalsky, S P; Hults, C K; Bergman, S; Jepsen, H F; Solli, A., 2011. Geological map of the Arctic; Geological Survey of Canada, "A" Series Map 2159A, 9 sheets; 1 DVD.

Heywood, W.W., 1967. Geological Notes northeastern District of Keewatin and southern Melville Peninsula, District of Franklin, Northwest Territories, Geological Survey of Canada, Paper 66-40.

Heywood, W.W., 1966. Geological Notes on Operation Wager, Northwest Territories; Geological Survey of Canada, Paper 66-10.

Heywood, W.W., 1965. Operation Wager, Northeast District of Keewatin, and Melville Peninsula, District of Franklin; in Jenness, S.E., Report of Activities: Field, 1964, Geological Survey of Canada, Paper no. 65-1, 166p.

Heywood, W.W., 1962. Northern District of Keewatin; Geological Survey of Canada, Preliminary Map 28-1961, 1 sheet.

Heywood, W.W., 1961. Geological Notes, northern District of Keewatin, Geological Survey of Canada, Paper 61-18

Jenness, S.E., 1965. Report of Activities: Field, 1964, Geological Survey of Canada, Department of Mines and Technical Surveys, Ottawa, Paper no. 65-1.

Jenness, S.E., 1963. Summary of Research: Field, 1962. Geological Survey of Canada, Department of Mines and Technical Surveys, Ottawa, Paper no. 63-1.

Lord, C.S. and Jenness, S.E., 1961. Field work 1960, Geological Survey of Canada Information Circular No. 4, Department of Mines and Technical Surveys, Ottawa.

Lord, C.S., 1960. Field work 1959, Geological Survey of Canada Information Circular No. 3, Department of Mines and Technical Surveys, Ottawa.

Lord, C.S., 1958. Field work 1958, Geological Survey of Canada Information Circular No. 2, Department of Mines and Technical Surveys, Ottawa.

Lord, C.S., 1958. Field work 1957, Geological Survey of Canada Information Circular No. 1, Department of Mines and Technical Surveys, Ottawa.

Lord, C.S., 1953. Geological Notes on southern District of Keewatin, Northwest Territories; Geological Survey of Canada, Paper 53-22.

McCurdy, M.W., Day, S.J.A., McNeil, R.J., and Pehrsson, S.J., 2011. Regional lake sediment and water geochemical data, Baker Lake Area, Nunavut (NTS 55M and 65P); Geological Survey of Canada, Open File 6985, doi:10.4095/289584

McCurdy, M.W., McNeil, R.J., Day, S.J.A., and Pehrsson, S.J., 2011. Regional lake sediment and water geochemical data, Nueltin Lake Area, Nunavut (NTS 65A, 65B and 65C); Geological Survey of Canada, Open File 6986, doi:10.4095/289888

McCurdy, M.W., McNeil, R.J., Abramovitch, Y.E. and Day, S.J.A., 2012. Regional lake sediment and water geochemical data, Nonacho Basin – East Arm of Great Slave Lake Region, Northwest Territories (NTS 75C and 75F); Geological Survey of Canada, Open File 7232, doi:10.4095/292064

Pilkington, M, Keating, P.B, and Thomas, M.D., 2008, Geophysics, in Remote predictive mapping: an aid for northern mapping, Ch. 3, Harris. J.R. (ed), GSC Open File 5643

Saltus, R. W., Miller, E.L., Gaina, C., Brown, P.J., 2011. Regional magnetic domains of the circum-arctic – a framework for tectonic interpretation , in : Spencer, A., Embry, A., Gautier, D., Stoupakova, A. & Sørensen, K. (eds). Arctic Petroleum Geology. Memoir of the Geological Society of London No. 35.

Waugh, F.W., 1959. Helicopter Operations of the Geological Survey of Canada, Geological Survey of Canada, Bulletin 54, 60p.

Wheeler, J O; Hoffman, P F; Card, K D; Davidson, A; Sanford, B V; Okulitch, A V; Roest, W R., 2006. Geological map of Canada; Geological Survey of Canada, "A" Series Map 1860A; 3 sheets; 1 CD-ROM.

Wright, G.M., 1967. Geology of the southeastern Barren Grounds, parts of Mackenzie and Keewatin, Operations Keewatin, Baker, Thelon; Geological Survey of Canada, Memoir 350; 91 p.

Wright, G.M., 1957. Geological Notes on Eastern District of Mackenzie, Northwest Territories (Report and Map 17-1956). Geological Survey of Canada, Paper 56-10, Department of Mines and Technical Surveys, Ottawa, 23p and 2 maps.

Wright, G.M., 1955. Geological Notes on Central district of Keewatin, Northwest Territories (Report and Map 17-1956). Geological Survey of Canada, Paper 55-17, Department of Mines and Technical Surveys, Ottawa, 17p and 2 maps.

APPENDIX 1.
REFERENCES FOR GEOPHYSICAL SURVEYS in STUDY AREA (published by GSC, 2012 and 2013)

1) GARRY LAKE

Residual total magnetic field, aeromagnetic survey of the Garry Lake area, parts of NTS 56-E/SE, 56-E/SW, 56-E/NW and 56-E/NE, Nunavut / Composante résiduelle du champ magnétique total, levé aéromagnétique de la région du Lac Garry, SNRC parties de 56-E/SE, 56-E/SW, 56-E/NW et 56-E/NE, Nunavut
Coyle, M; Kiss, F; Geological Survey of Canada, Open File 7211, 2012; 1 sheet, doi:10.4095/291734

Residual total magnetic field, aeromagnetic survey of the Garry Lake area, parts of NTS 66-H/SE, 66-H/SW, 66-H/NW and 66-H/NE, Nunavut / Composante résiduelle du champ magnétique total, levé

aéromagnétique de la région du Lac Garry, SNRC parties de 66-H/SE, 66-H/SW, 66-H/NW et 66-H/NE, Nunavut
Coyle, M; Kiss, F; Geological Survey of Canada, Open File 7212, 2012; 1 sheet, doi:10.4095/291735

Residual total magnetic field, aeromagnetic survey of the Garry Lake area, parts of NTS 66-H/SW, 66-G/SE, 66-G/NE and 66-H/NW, Nunavut / Composante résiduelle du champ magnétique total, levé aéromagnétique de la région du Lac Garry, SNRC parties de 66-H/SW, 66-G/SE, 66-G/NE et 66-H/NW, Nunavut
Coyle, M; Kiss, F; Geological Survey of Canada, Open File 7213, 2012; 1 sheet, doi:10.4095/291736

Residual total magnetic field, aeromagnetic survey of the Garry Lake area, parts of NTS 66-G/SW, 66-F/SE, 66-F/NE and 66-G/NW, Nunavut / Composante résiduelle du champ magnétique total, levé aéromagnétique de la région du Lac Garry, SNRC parties de 66-G/SW, 66-F/SE, 66-F/NE et 66-G/NW, Nunavut
Coyle, M; Kiss, F; Geological Survey of Canada, Open File 7214, 2012; 1 sheet, doi:10.4095/291737

Residual total magnetic field, aeromagnetic survey of the Garry Lake area, parts of NTS 66-F/NE, 66-F/NW, 66-K/SW and 66-K/SE, Nunavut / Composante résiduelle du champ magnétique total, levé aéromagnétique de la région du Lac Garry, SNRC parties de 66-F/NE, 66-F/NW, 66-K/SW et 66-K/SE, Nunavut
Coyle, M; Kiss, F; Geological Survey of Canada, Open File 7215, 2012; 1 sheet, doi:10.4095/291738

Residual total magnetic field, aeromagnetic survey of the Garry Lake area, parts of NTS 66-G/NE, 66-G/NW, 66-J/SW and 66-J/SE, Nunavut / Composante résiduelle du champ magnétique total, levé aéromagnétique de la région du Lac Garry, SNRC parties de 66-G/NE, 66-G/NW, 66-J/SW et 66-J/SE, Nunavut
Coyle, M; Kiss, F; Geological Survey of Canada, Open File 7216, 2012; 1 sheet, doi:10.4095/291739

Residual total magnetic field, aeromagnetic survey of the Garry Lake area, parts of NTS 66-H/NW, 66-G/NE, 66-J/SE and 66-I/SW, Nunavut / Composante résiduelle du champ magnétique total, levé aéromagnétique de la région du Lac Garry, SNRC parties de 66-H/NW, 66-G/NE, 66-J/SE et 66-I/SW, Nunavut
Coyle, M; Kiss, F; Geological Survey of Canada, Open File 7217, 2012; 1 sheet, doi:10.4095/291740

Residual total magnetic field, aeromagnetic survey of the Garry Lake area, parts of NTS 56-E/NW, 66-H/NE, 66-I/SE and 56-L/SW, Nunavut / Composante résiduelle du champ magnétique total, levé aéromagnétique de la région du Lac Garry, SNRC parties de 56-E/NW, 66-H/NE, 66-I/SE et 56-L/SW, Nunavut
Coyle, M; Kiss, F; Geological Survey of Canada, Open File 7218, 2012; 1 sheet, doi:10.4095/291741

First vertical derivative of the magnetic field, aeromagnetic survey of the Garry Lake area, parts of NTS 56-E/SE, 56-E/SW, 56-E/NW and 56-E/NE, Nunavut / Dérivée première verticale du champ magnétique, levé aéromagnétique de la région du Lac Garry, SNRC parties de 56-E/SE, 56-E/SW, 56-E/NW et 56-E/NE, Nunavut
Coyle, M; Kiss, F; Geological Survey of Canada, Open File 7219, 2012; 1 sheet, doi:10.4095/291742

First vertical derivative of the magnetic field, aeromagnetic survey of the Garry Lake area, parts of NTS 66-H/SE, 66-H/SW, 66-H/NW and 66-H/NE, Nunavut / Dérivée première verticale du champ magnétique, levé aéromagnétique de la région du Lac Garry, SNRC parties de 66-H/SE, 66-H/SW, 66-H/NW et 66-H/NE, Nunavut

Coyle, M; Kiss, F; Geological Survey of Canada, Open File 7220, 2012; 1 sheet, doi:10.4095/291743

First vertical derivative of the magnetic field, aeromagnetic survey of the Garry Lake area, parts of NTS 66-H/SW, 66-G/SE, 66-G/NE and 66-H/NW, Nunavut / Dérivée première verticale du champ magnétique, levé aéromagnétique de la région du Lac Garry, SNRC parties de 66-H/SW, 66-G/SE, 66-G/NE et 66-H/NW, Nunavut
Coyle, M; Kiss, F; Geological Survey of Canada, Open File 7221, 2012; 1 sheet, doi:10.4095/291744

First vertical derivative of the magnetic field, aeromagnetic survey of the Garry Lake area, parts of NTS 66-G/SW, 66-F/SE, 66-F/NE and 66-G/NW, Nunavut / Dérivée première verticale du champ magnétique, levé aéromagnétique de la région du Lac Garry, SNRC parties de 66-G/SW, 66-F/SE, 66-F/NE et 66-G/NW, Nunavut
Coyle, M; Kiss, F; Geological Survey of Canada, Open File 7222, 2012; 1 sheet, doi:10.4095/291745

First vertical derivative of the magnetic field, aeromagnetic survey of the Garry Lake area, parts of NTS 66-F/NE, 66-F/NW, 66-K/SW and 66-K/SE, Nunavut / Dérivée première verticale du champ magnétique, levé aéromagnétique de la région du Lac Garry, SNRC parties de 66-F/NE, 66-F/NW, 66-K/SW et 66-K/SE, Nunavut
Coyle, M; Kiss, F; Geological Survey of Canada, Open File 7223, 2012; 1 sheet, doi:10.4095/291746

First vertical derivative of the magnetic field, aeromagnetic survey of the Garry Lake area, parts of NTS 66-G/NE, 66-G/NW, 66-J/SW and 66-J/SE, Nunavut / Dérivée première verticale du champ magnétique, levé aéromagnétique de la région du Lac Garry, SNRC parties de 66-G/NE, 66-G/NW, 66-J/SW et 66-J/SE, Nunavut
Coyle, M; Kiss, F; Geological Survey of Canada, Open File 7224, 2012; 1 sheet, doi:10.4095/291747

First vertical derivative of the magnetic field, aeromagnetic survey of the Garry Lake area, parts of NTS 66-H/NW, 66-G/NE, 66-J/SE and 66-I/SW, Nunavut / Dérivée première verticale du champ magnétique, levé aéromagnétique de la région du Lac Garry, SNRC parties de 66-H/NW, 66-G/NE, 66-J/SE et 66-I/SW, Nunavut
Coyle, M; Kiss, F; Geological Survey of Canada, Open File 7225, 2012; 1 sheet, doi:10.4095/291748

First vertical derivative of the magnetic field, aeromagnetic survey of the Garry Lake area, parts of NTS 56-E/NW, 66-H/NE, 66-I/SE and 56-L/SW, Nunavut / Dérivée première verticale du champ magnétique, levé aéromagnétique de la région du Lac Garry, SNRC parties de 56-E/NW, 66-H/NE, 66-I/SE et 56-L/SW, Nunavut
Coyle, M; Kiss, F; Geological Survey of Canada, Open File 7226, 2012; 1 sheet, doi:10.4095/291749

2) PELLY LAKE

First vertical derivative of the magnetic field, aeromagnetic survey of the Pelly Lake area, parts of NTS 66-K/SW and 66-K/SE, Nunavut / Dérivée première verticale du champ magnétique, levé aéromagnétique de la région du Lac Pelly, SNRC parties de 66-K/SW et 66-K/SE, Nunavut
Coyle, M; Jones, A; Geological Survey of Canada, Open File 7268, 2013; 1 sheet, doi:10.4095/292343

First vertical derivative of the magnetic field, aeromagnetic survey of the Pelly Lake area, parts of NTS 66-L/SW and 66-L/SE, Nunavut / Dérivée première verticale du champ magnétique, levé aéromagnétique de la région du Lac Pelly, SNRC parties de 66-L/SW et 66-L/SE, Nunavut
Coyle, M; Jones, A; Geological Survey of Canada, Open File 7269, 2013; 1 sheet, doi:10.4095/292344

First vertical derivative of the magnetic field, aeromagnetic survey of the Pelly Lake area, parts of NTS 66-E/NE and 66-F/NW, Nunavut / Dérivée première verticale du champ magnétique, levé aéromagnétique de la région du Lac Pelly, SNRC parties de 66-E/NE et 66-F/NW, Nunavut
Coyle, M; Jones, A; Geological Survey of Canada, Open File 7270, 2013; 1 sheet, doi:10.4095/292345

First vertical derivative of the magnetic field, aeromagnetic survey of the Pelly Lake area, parts of NTS 66-F/NE and 66-G/NW, Nunavut / Dérivée première verticale du champ magnétique, levé aéromagnétique de la région du Lac Pelly, SNRC parties de 66-F/NE et 66-G/NW, Nunavut
Coyle, M; Jones, A; Geological Survey of Canada, Open File 7271, 2013; 1 sheet, doi:10.4095/292346

Residual total magnetic field, aeromagnetic survey of the Pelly Lake area, parts of NTS 66-K/SW and 66-K/SE, Nunavut / Composante résiduelle du champ magnétique total, levé aéromagnétique de la région du Lac Pelly, SNRC parties de 66-K/SW et 66-K/SE, Nunavut
Coyle, M; Jones, A; Geological Survey of Canada, Open File 7272, 2013; 1 sheet, doi:10.4095/292347

Residual total magnetic field, aeromagnetic survey of the Pelly Lake area, parts of NTS 66-L/SW and 66-L/SE, Nunavut / Composante résiduelle du champ magnétique total, levé aéromagnétique de la région du Lac Pelly, SNRC parties de 66-L/SW et 66-L/SE, Nunavut
Coyle, M; Jones, A; Geological Survey of Canada, Open File 7273, 2013; 1 sheet, doi:10.4095/292348

Residual total magnetic field, aeromagnetic survey of the Pelly Lake area, parts of NTS 66-E/NE and 66-F/NW, Nunavut / Composante résiduelle du champ magnétique total, levé aéromagnétique de la région du Lac Pelly, SNRC parties de 66-E/NE et 66-F/NW, Nunavut
Coyle, M; Jones, A; Geological Survey of Canada, Open File 7274, 2013; 1 sheet, doi:10.4095/292349

Residual total magnetic field, aeromagnetic survey of the Pelly Lake area, parts of NTS 66-F/NE and 66-G/NW, Nunavut / Composante résiduelle du champ magnétique total, levé aéromagnétique de la région du Lac Pelly, SNRC parties de 66-F/NE et 66-G/NW, Nunavut
Coyle, M; Jones, A; Geological Survey of Canada, Open File 7275, 2013; 1 sheet, doi:10.4095/292350

3) SOUTH RAE

Residual total magnetic field, aeromagnetic survey of the south Rae Craton, NTS 65 E/4 and parts of E/2, 3, 5, 6, Northwest Territories / Composante résiduelle du champ magnétique total, levé aéromagnétique de la partie sud du Craton de Rae, SNRC 65 E/4 et parties de E/2, 3, 5, 6, Territoires du Nord-Ouest
Kiss, F; Coyle, M; Geological Survey of Canada, Open File 7120, 2012; 1 sheet, doi:10.4095/291795

First vertical derivative of the magnetic field, aeromagnetic survey of the south Rae Craton, NTS 65 E/4 and parts of E/2, 3, 5, 6, Northwest Territories / Derivée première verticale du champ magnétique, levé aéromagnétique de la partie sud du Craton de Rae, SNRC 65 E/4 et parties de E/2, 3, 5, 6, Territoires du Nord-Ouest
Kiss, F; Coyle, M; Geological Survey of Canada, Open File 7121, 2012; 1 sheet, doi:10.4095/291796

Residual total magnetic field, aeromagnetic survey of the south Rae Craton, NTS 75 A/3, 4, 5, 6, Northwest Territories / Composante résiduelle du champ magnétique total, levé aéromagnétique de la partie sud du Craton de Rae, SNRC 75 A/3, 4, 5, 6, Territoires du Nord-Ouest
Kiss, F; Coyle, M; Geological Survey of Canada, Open File 7122, 2012; 1 sheet, doi:10.4095/291797

First vertical derivative of the magnetic field, aeromagnetic survey of the south Rae Craton, NTS 75 A/3, 4, 5, 6, Northwest Territories / Derivée première verticale du champ magnétique, levé aéromagnétique de la partie sud du Craton de Rae, SNRC 75 A/3, 4, 5, 6, Territoires du Nord-Ouest
Kiss, F; Coyle, M; Geological Survey of Canada, Open File 7123, 2012; 1 sheet, doi:10.4095/291798

Residual total magnetic field, aeromagnetic survey of the south Rae Craton, NTS 75 A/11, 12, 13, 14, Northwest Territories / Composante résiduelle du champ magnétique total, levé aéromagnétique de la partie sud du Craton de Rae, SNRC 75 A/11, 12, 13, 14, Territoires du Nord-Ouest
Kiss, F; Coyle, M; Geological Survey of Canada, Open File 7124, 2012; 1 sheet, doi:10.4095/291799

First vertical derivative of the magnetic field, aeromagnetic survey of the south Rae Craton, NTS 75 A/11, 12, 13, 14, Northwest Territories / Derivée première verticale du champ magnétique, levé aéromagnétique de la partie sud du Craton de Rae, SNRC 75 A/11, 12, 13, 14, Territoires du Nord-Ouest
Kiss, F; Coyle, M; Geological Survey of Canada, Open File 7125, 2012; 1 sheet, doi:10.4095/291800

Residual total magnetic field, aeromagnetic survey of the south Rae Craton, NTS 75 B/1, 2, 3, 4, 5, 6, 7, 8, Northwest Territories / Composante résiduelle du champ magnétique total, levé aéromagnétique de la partie sud du Craton de Rae, SNRC 75 B/1, 2, 3, 4, 5, 6, 7, 8, Territoires du Nord-Ouest
Kiss, F; Coyle, M; Geological Survey of Canada, Open File 7126, 2012; 1 sheet, doi:10.4095/291801

First vertical derivative of the magnetic field, aeromagnetic survey of the south Rae Craton, NTS 75 B/1, 2, 3, 4, 5, 6, 7, 8, Northwest Territories / Derivée première verticale du champ magnétique, levé aéromagnétique de la partie sud du Craton de Rae, SNRC 75 B/1, 2, 3, 4, 5, 6, 7, 8, Territoires du Nord-Ouest
Kiss, F; Coyle, M; Geological Survey of Canada, Open File 7127, 2012; 1 sheet, doi:10.4095/291802

Residual total magnetic field, aeromagnetic survey of the south Rae Craton, NTS 75 B/9, 10, 11, 12, 14, 15, 16 and part of B/13, Northwest Territories / Composante résiduelle du champ magnétique total, levé aéromagnétique de la partie sud du Craton de Rae, SNRC 75 B/9, 10, 11, 12, 14, 15, 16 et partie de B/13, Territoires du Nord-Ouest
Kiss, F; Coyle, M; Geological Survey of Canada, Open File 7128, 2012; 1 sheet, doi:10.4095/291803

First vertical derivative of the magnetic field, aeromagnetic survey of the south Rae Craton, NTS 75 B/9, 10, 11, 12, 14, 15, 16 and part of B/13, Northwest Territories / Derivée première verticale du champ magnétique, levé aéromagnétique de la partie sud du Craton de Rae, SNRC 75 B/9, 10, 11, 12, 14, 15, 16 et partie de B/13, Territoires du Nord-Ouest
Kiss, F; Coyle, M; Geological Survey of Canada, Open File 7129, 2012; 1 sheet, doi:10.4095/291804

Residual total magnetic field, aeromagnetic survey of the south Rae Craton, NTS 75 G/1, 2, 8 and parts of G/3, 4, 6, 7, Northwest Territories / Composante résiduelle du champ magnétique total, levé aéromagnétique de la partie sud du Craton de Rae, SNRC 75 G/1, 2, 8 et parties de G/3, 4, 6, 7, Territoires du Nord-Ouest
Kiss, F; Coyle, M; Geological Survey of Canada, Open File 7130, 2012; 1 sheet, doi:10.4095/291805

First vertical derivative of the magnetic field, aeromagnetic survey of the south Rae Craton, NTS 75 G/1, 2, 8 and parts of G/3, 4, 6, 7, Northwest Territories / Derivée première verticale du champ magnétique, levé aéromagnétique de la partie sud du Craton de Rae, SNRC 75 G/1, 2, 8 et parties de G/3, 4, 6, 7, Territoires du Nord-Ouest
Kiss, F; Coyle, M; Geological Survey of Canada, Open File 7131, 2012; 1 sheet, doi:10.4095/291806

Residual total magnetic field, aeromagnetic survey of the south Rae Craton, NTS 75 H/1, 2, 3, 4, 5, 6, 7, 8, Northwest Territories / Composante résiduelle du champ magnétique total, levé aéromagnétique de la partie sud du Craton de Rae, SNRC 75 H/1, 2, 3, 4, 5, 6, 7, 8, Territoires du Nord-Ouest
Kiss, F; Coyle, M; Geological Survey of Canada, Open File 7132, 2012; 1 sheet, doi:10.4095/291807

First vertical derivative of the magnetic field, aeromagnetic survey of the south Rae Craton, NTS 75 H/1, 2, 3, 4, 5, 6, 7, 8, Northwest Territories / Derivée première verticale du champ magnétique, levé aéromagnétique de la partie sud du Craton de Rae, SNRC 75 H/1, 2, 3, 4, 5, 6, 7, 8, Territoires du Nord-Ouest
Kiss, F; Coyle, M; Geological Survey of Canada, Open File 7133, 2012; 1 sheet, doi:10.4095/291808

Residual total magnetic field, aeromagnetic survey of the south Rae Craton, NTS 75 H/11, 12, 14, and parts of G/9, 10, 16, H/13, Northwest Territories / Composante résiduelle du champ magnétique total, levé aéromagnétique de la partie sud du Craton de Rae, SNRC 75 H/11, 12, 14, et parties de G/9, 10, 16, H/13, Territoires du Nord-Ouest
Kiss, F; Coyle, M; Geological Survey of Canada, Open File 7134, 2012; 1 sheet, doi:10.4095/291809

First vertical derivative of the magnetic field, aeromagnetic survey of the south Rae Craton, NTS 75 H/11, 12, 14, and parts of G/9, 10, 16, H/13, Northwest Territories / Derivée première verticale du champ magnétique, levé aéromagnétique de la partie sud du Craton de Rae, SNRC 75 H/11, 12, 14, et parties de G/9, 10, 16, H/13, Territoires du Nord-Ouest
Kiss, F; Coyle, M; Geological Survey of Canada, Open File 7135, 2012; 1 sheet, doi:10.4095/291810

Residual total magnetic field, aeromagnetic survey of the south Rae Craton, NTS 75 H/10, and parts of 75 H/9, 15, 16, 65 E/12, Northwest Territories / Composante résiduelle du champ magnétique total, levé aéromagnétique de la partie sud du Craton de Rae, SNRC 75 H/10, et parties de 75 H/9, 15, 16, 65 E/12, Territoires du Nord-Ouest
Kiss, F; Coyle, M; Geological Survey of Canada, Open File 7136, 2012; 1 sheet, doi:10.4095/291811

First vertical derivative of the magnetic field, aeromagnetic survey of the south Rae Craton, NTS 75 H/10, and parts of 75 H/9, 15, 16, 65 E/12, Northwest Territories / Derivée première verticale du champ magnétique, levé aéromagnétique de la partie sud du Craton de Rae, SNRC 75 H/10, et parties de 75 H/9, 15, 16, 65 E/12, Territoires du Nord-Ouest
Kiss, F; Coyle, M; Geological Survey of Canada, Open File 7137, 2012; 1 sheet, doi:10.4095/291812

4) TEHERY

Residual total magnetic field, aeromagnetic survey of the Tehery Lake area, NTS 56-A/SW, 56-B/SE, and parts of 56-A/NW and 56-B/NE, Nunavut / Composante résiduelle du champ magnétique total, levé aéromagnétique de la région du Lac Tehery, SNRC 56-A/SW, 56-B/SE et parties de 56-A/NW et 56-B/NE, Nunavut
Coyle, M; Kiss, F; Geological Survey of Canada, Open File 7203, 2012; 1 sheet, doi:10.4095/291780

Residual total magnetic field, aeromagnetic survey of the Tehery Lake area, NTS 56-B/SW, 56-C/SE, and parts of 56-B/NW and 56-C/NE, Nunavut / Composante résiduelle du champ magnétique total, levé aéromagnétique de la région du Lac Tehery, SNRC 56-B/SW, 56-C/SE et parties de 56-B/NW et de 56-C/NE, Nunavut
Coyle, M; Kiss, F; Geological Survey of Canada, Open File 7204, 2012; 1 sheet, doi:10.4095/291781

Residual total magnetic field, aeromagnetic survey of the Tehery Lake area, parts of NTS 56-B/NW, 56-C/NE, 56-F/SE and 56-G/SW, Nunavut / Composante résiduelle du champ magnétique total, levé aéromagnétique de la région du Lac Tehery, SNRC parties de 56-B/NW, 56-C/NE, 56-F/SE et 56-G/SW, Nunavut
Coyle, M; Kiss, F; Geological Survey of Canada, Open File 7205, 2012; 1 sheet, doi:10.4095/291782

Residual total magnetic field, aeromagnetic survey of the Tehery Lake area, parts of NTS 56-A/NW, 56-B/NE, 56-G/SE and 56-H/SW, Nunavut / Composante résiduelle du champ magnétique total, levé aéromagnétique de la région du Lac Tehery, SNRC parties de 56-A/NW, 56-B/NE, 56-G/SE et 56-H/SW, Nunavut
Coyle, M; Kiss, F; Geological Survey of Canada, Open File 7206, 2012; 1 sheet, doi:10.4095/291783

First vertical derivative of the magnetic field, aeromagnetic survey of the Tehery Lake area, NTS 56-A/SW, 56-B/SE, and parts of 56-A/NW and 56-B/NE, Nunavut / Dérivée première verticale du champ magnétique, levé aéromagnétique de la région du Lac Tehery, SNRC 56-A/SW, 56-B/SE et parties de 56-A/NW et 56-B/NE, Nunavut
Coyle, M; Kiss, F; Geological Survey of Canada, Open File 7207, 2012; 1 sheet, doi:10.4095/291784

First vertical derivative of the magnetic field, aeromagnetic survey of the Tehery Lake area, NTS 56-B/SW, 56-C/SE, and parts of 56-B/NW and 56-C/NE, Nunavut / Dérivée première verticale du champ magnétique, levé aéromagnétique de la région du Lac Tehery, SNRC 56-B/SW, 56-C/SE et parties de 56-B/NW et de 56-C/NE, Nunavut
Coyle, M; Kiss, F; Geological Survey of Canada, Open File 7208, 2012; 1 sheet, doi:10.4095/291785

First vertical derivative of the magnetic field, aeromagnetic survey of the Tehery Lake area, parts of NTS 56-B/NW, 56-C/NE, 56-F/SE and 56-G/SW, Nunavut / Dérivée première verticale du champ magnétique, levé aéromagnétique de la région du Lac Tehery, SNRC parties de 56-B/NW, 56-C/NE, 56-F/SE et 56-G/SW, Nunavut
Coyle, M; Kiss, F; Geological Survey of Canada, Open File 7209, 2012; 1 sheet, doi:10.4095/291786

First vertical derivative of the magnetic field, aeromagnetic survey of the Tehery Lake area, parts of NTS 56-A/NW, 56-B/NE, 56-G/SE and 56-H/SW, Nunavut / Dérivée première verticale du champ magnétique, levé aéromagnétique de la région du Lac Tehery, SNRC parties de 56-A/NW, 56-B/NE, 56-G/SE et 56-H/SW, Nunavut
Coyle, M; Kiss, F; Geological Survey of Canada, Open File 7210, 2012; 1 sheet, doi:10.4095/291787