GEOLOGICAL SURVEY OF CANADA
OPEN FILE 7686

Canadian Iron Formation database

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CANADIAN IRON FORMATION DATABASE

G. A. Gross and E. M. Hillary

This publication comprises a database of Canadian Iron Formation deposits compiled from the data files of Gordon A. Gross (Gross, 2009, Appendices) collected over the 50 year span of his career. The majority of the deposits in this database are stratified siliceous iron formations classified by Gross (2009) as Lake Superior type, formed in craton margin or continental shelf environments, and Algoma type, associated with greywacke, volcanic arcs-backarcs, spreading ridges and rifts. Several examples of the more aluminous stratified, oolitic Clinton type and Minette type deposits, and one Rapitan type iron formation, are included. The remaining, non-stratified deposits consist of intrusion-associated magmatic and skarn deposits.

It should be noted that most of the data imported into the Canadian Iron Formation database was collected between 1950 and 1990 when computers were slow, storage space was limited, and reports generated were simple paper listings. Therefore, while data elements such as location, names, country (province), commodities, NTS area, and deposit type are relatively complete, many of the other possible data elements are scantly populated or missing altogether. Referencing is incomplete for the many occurrences which have not been updated since the data were originally imported in 1999. Resource data[1] for the large northern deposits, Mary River and Roche Bay, and several Labrador trough deposits have been added recently because of a revived interest in direct shipping ore.

The database schema used for this database (Chorlton et al, 2007) was developed for the World Minerals Geoscience Database Project (WMGDP: 1998-2004), a project sponsored jointly by the Geological Survey of Canada and exploration companies[2]. The web-style **Documentation** folder, modified from Laramée (2004), contains a thorough description of the GlobalDB System schema and supporting data management interfaces included with it in the folder **GlobalDBSystem321**, and can be read using an internet browser by clicking on the file **default.htm**. During the WMGDP, compilers (deposit specialists) and company sponsors suggested topics to be included in the schema. They also provided helpful feedback for the functionality of the data management interfaces. This resulted in incremental updates between releases to company sponsors. World and Canadian lode gold databases (Gosselin and Dubé ,2005a, b) were released in schema 3.19, the version used for the final release 3.6 to company sponsors in 2004. The schema, now at version 3.21, release 3.7, is a major update of version 3.19, with the addition of extra tables required for Canada-only deposits for compilations under the Northern Resource Development and Northern Mineral Resource Development programs.

The GlobalDB System database schema (diagram page 6) includes sets of tables that can be used to describe six entities (things): deposits/occurrences, deposit groups, mines, production figures, resource figures, and references. The deposits and deposit groups modules describe locations, deposit type and subtype, names, country and province, commodities, geological ages, host rocks, related igneous rocks, mineralization styles, coincident features, radiometric dates, tectonic settings, shape and dimensions, NTS areas, qualified comments, links to other databases, geophysical /geochemical signature, sample data, and compilation stage and progress. The service tables: entities, tabledoc, links, columndoc, tabpages, and lookup explicitly define the entities, tables, links between tables, fields, interface tab pages, and the lookup tables, to completely define the schema. Two additional service tables: dbversion and unitcvsn, provide the title, version and authors of the current database, and conversion factors (to metric) for the production and resource figures, respectively. Resource figures are considered historical and have been reported exactly as given in the data source[1], commonly in non-metric units. The service tables, described above, should be consulted before transferring this data across database management programs and platforms, or rebuilding the data management applications when the application interfaces supplied with this Open File can no longer be used because of changes to the Windows® operating system.

Standalone custom Windows® application interfaces, developed by Robert M. Laramée[3], enable a user with a 32 bit computer equipped with the Windows operating system to browse, filter, and obtain output from this database. They are included in this Open File in the folder **GlobalDBSystem321**. All applications require an ADO connection file, or Microsoft® data link, to each database for which they are to be used, created in the folder under the same folder that houses the application interfaces[4]. By convention, WMGDP compilers installed a folder GlobalDBSystem under Program Files on the local C: drive, but the GlobalDBSystem321 folder and files can be saved anywhere and no installation is required. Instructions for creating the mandatory Microsoft data link file are included under "**Defining database aliases**" in the **Documentation\default.htm** and in the standalone file **HowtoADO.rtf**.

GShellBrowser allows a user to browse the database record by record, and offers the same tab page view of the data offered by the original data entry interface, GShellADO, known in short form as **GShell**. The latter only works under the Windows® XP and earlier Windows operating systems, and has been included in this package for users that still have a Windows XP computer (disconnected from the Internet because Microsoft no longer supports it by supplying Security updates), or have an XP emulator installed. GQueryADO, known as **GQuery** for short, provides a user the means to filter the occurrences based on attribute values, to build a template for a custom spreadsheet and export this spreadsheet or a default summary spreadsheet, and to create folders of occurrence reports for the full set or subsets of the deposits in the database. Both GShellBrowser and GQuery work under Windows 7, once the pre-requisite ADO connection file has been created.

There are three additional programs in GlobalDBSystem321: **GQ_ADO_XtraTables**, **Documenter**, and **GBDSTools**. The program GQ_ADO_XtraTables builds or rebuilds summary tables for the use of GQuery, which improved performance over an older method of creating these summary tables on the fly. The program Documenter allows users to examine each table and field of each category of table (Data, Junction, Lookup, and Service depending on their roles), which complements the more general web page style documentation. Finally, GDBSTools provides a database manager with utilities that can check the internal integrity of the database,

time stamp a new release and export SQL data scripts of the contents of the connected database. These SQL scripts can be used to populate a new database created with GlobalDBSchema321.sql in one of many SQL-enabled relational database management systems available today[5].

REFERENCES

Chorlton, L.B., Laramée, R.M., Sinclair, W.D., and Hillary, E.M., 2007. Digital Inventory of Bedrock and Mineral deposit Geology; *in* Proceedings for a workshop on deposit modeling, mineral resource assessment, and their role in sustainable development; (ed.) Briskey, J. A. and Schulz, K. J., Proceedings of a workshop that followed the 31st International Geological Congress, Rio de Janeiro, Brazil, August 18–19, 2000, USGS Circular 1294, p. 101 – 113.

Gosselin, P., and Dubé, B., 2005a. Gold deposits of the world: distribution, geological parameters and gold content; Geological Survey of Canada, Open File 4895, 271 p., 1 CD-ROM, doi:10.4095/220379

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FOOTNOTES

[1]DISCLAIMER – RESOURCE/RESERVES DATA

Her Majesty the Queen in Right of Canada, represented by the Minister of Natural Resources (NRCan), does not warrant or guarantee the accuracy, completeness or fitness for any purpose of Reserve and Resource information (Data) contained in this database, including whether the Data is compliant with any securities regulations or standards, and NRCan does not assume any liability with respect to any damage or loss incurred as a result of the use made of the Data.

Resource and reserve figures are historical in nature. The Data source provided with each set of figures should be cited if the Data are re-reported.

[2]ACKNOWLEDGEMENTS

The World Minerals Geoscience Database Project (WMGDP) was carried out by the former Mineral Resources Division, Geological Survey of Canada (now Ore Systems, Central Canada Division, Geological Survey of Canada), with the support of the following industry sponsors: Anglo American plc, Barrick Gold Corporation, BHP Billiton Group, Cyprus Amax Minerals Company, Inco Ltd., Metal Mining Agency of Japan, North Ltd., Phelps Dodge Exploration Corporation, Placer Dome Exploration Inc., Randgold Resources Ltd., Rio Tinto Mining and Exploration Limited, Teck Cominco Limited and Western Mining Corporation. W.D. Sinclair managed this project on behalf of the Geological Survey of Canada, L.B. Chorlton coordinated schema, tool development, and compilation, and R.M. Laramée implemented the schema and developed the applications for GlobalDBSystem.

Prior to the WMGDP and related projects, deposit specialists, including G.A. Gross, in the Mineral Resources Division maintained databases of their own special commodities and deposit types. Their files originated in a centralized database set up in the 1970s, which was split up for individual geologists when personal computers became common and when provinces began developing their own occurrence databases. Dr. Gross received technical support from R. McLeod, R. Burke, and R. Laramée.

[3] DISCLAIMER – APPLICATIONS AND DATABASE

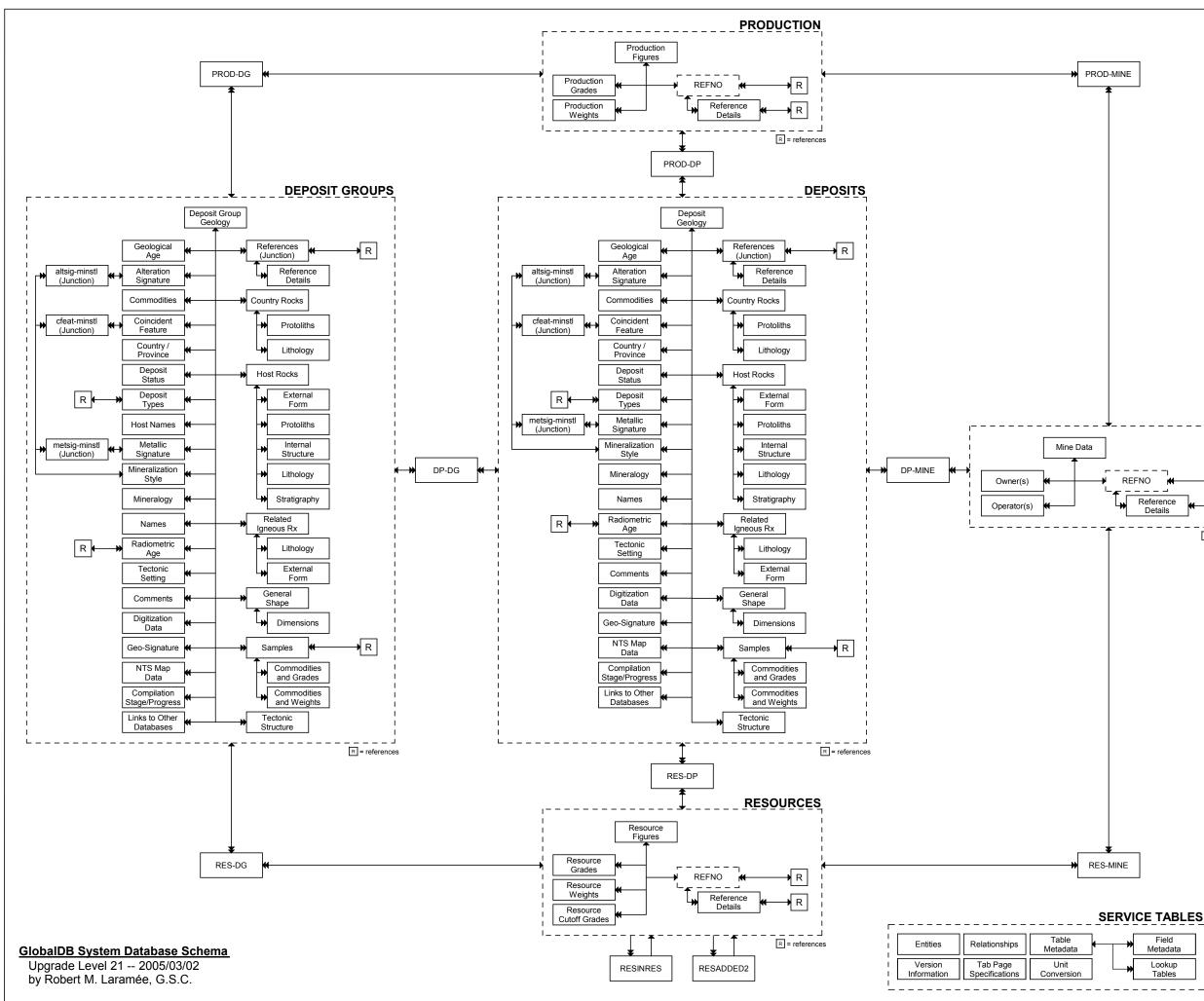The Geological Survey of Canada (GSC) has endeavored to develop and produce this product with a minimum of errors. GSC does not, however, warrant that the product is error free nor will GSC or its Minister and officials accept liability for any loss of profits or revenue, or any other form of loss or damage relating to the use of this product.

[4] CAUTION: UTILITIES MAY NOT WORK ON SOME WINDOWS COMPUTERS

While the WMGDP and successive projects have been successfully using Global DBSystem since the year 2000, there are now imitations due to the evolution of the Windows operating system and the introduction of 64 bit computers. In order to use GShellBrowser.exe, GQueryADO.exe, GQ_ADO_XtraTables.exe, Documenter.exe, and GDBSTools.exe, you must first create a data link file to allow connection between the program and the database (see "Defining database aliases" under Documentation). It is known that these instructions will not work on Windows 64 bit computers, and the interfaces will not work on computers with operating systems other than Windows®. At present, the data entry and browsing program GShellADO (GShell) will not work under Windows Operating Systems greater than XP, but is included here for anyone who might have an older operating system on a computer disconnected from the Internet or who has an XP emulator.

[5] LOADING A WMGDP DATABASE USING SQL SCRIPTS

SQL scripts are provided here for anyone with an SQL-enabled database management system (DBMS) and the technical skill to modify the scripts according to the requirements of their software. We have loaded the data onto InterBase and PostgreSQL for the use of applications that emulate GQuery for the Internet and the contents of folders for loading the schema reflect our own processes. There are subtle differences in the scripts for loading the database schema among DBMSs, and some tweaks applied to the schemas supplied in this publication were specific to the Query applications. The scripts for inserting the data into the empty database schema are standard, and only one insert script is supplied per database.

PRODUCTION

PROD-DG

Production Figures
Production Grades
Production Weights

REFNO
R
Reference Details
R

PROD-MINE

R = references

PROD-DP

REFERENCES

Reference Main Data

Authors
Available Information
Digital Data
Map
News
Journal
Journal Article
Report
Symposium Volume
Symposium Article
Book or Volume

DEPOSIT GROUPS

Deposit Group Geology

altsig-minstl (Junction)
cfeat-minstl (Junction)
metsig-minstl (Junction)

Geological Age
Alteration Signature
Commodities
Coincident Feature
Country / Province
Deposit Status
Deposit Types
Host Names
Metallic Signature
Mineralization Style
Mineralogy
Names
Radiometric Age
Tectonic Setting
Comments
Digitization Data
Geo-Signature
NTS Map Data
Compilation Stage/Progress
Links to Other Databases

References (Junction)
R
Reference Details

Country Rocks
Protoliths
Lithology

Host Rocks
External Form
Protoliths
Internal Structure
Lithology
Stratigraphy

Related Igneous Rx
Lithology
External Form

General Shape
Dimensions

Samples
R

Commodities and Grades
Commodities and Weights
Tectonic Structure

R
R

R = references

DEPOSITS

Deposit Geology

altsig-minstl (Junction)
cfeat-minstl (Junction)
metsig-minstl (Junction)

Geological Age
Alteration Signature
Commodities
Coincident Feature
Country / Province
Deposit Status
Deposit Types
Metallic Signature
Mineralization Style
Mineralogy
Names
Radiometric Age
Tectonic Setting
Comments
Digitization Data
Geo-Signature
NTS Map Data
Compilation Stage/Progress
Links to Other Databases

References (Junction)
R
Reference Details

Country Rocks
Protoliths
Lithology

Host Rocks
External Form
Protoliths
Internal Structure
Lithology
Stratigraphy

Related Igneous Rx
Lithology
External Form

General Shape
Dimensions

Samples
R

Commodities and Grades
Commodities and Weights
Tectonic Structure

R
R

R = references

DP-DG

DP-MINE

MINES

Mine Data

Owner(s)
Operator(s)

REFNO
R
Reference Details
R

R = references

RES-DP

RESOURCES

Resource Figures
Resource Grades
Resource Weights
Resource Cutoff Grades

REFNO
R
Reference Details
R

R = references

RES-DG
RES-MINE

RESINRES
RESADDED2

LOOK-UP TABLES

activity	estsize	objloc
agetsma	farunits	product
altcat	formatos	proglevel
anmethod	formatsw	protolth
appliesto	genlith	provstate
category	grdunits	realm
cfeat	hdepset	rescat
commodity	hform	response
component	hostrock	rform
compstage	howloc	rigneous
concentrat	hseries	samptype
contctry	hstruc	settingof
ctryhost	journal	sigtype
ctryrock	lithcomp	sourcerock
datatype	mdepset	srctp
datum	medium	stratlevel
dbcode	metgrade	tecqual
depclan	method	tectobj
depstat	metsig	tonunits
deptype	mineral	tstruc
dfregime	minstyl	wgtunits
dgstat	mseries	whatdated
dimcat	nametype	who
dimunits	newsname	yearsum
dshape	ntsmaps	
EPSG_Canada	objdated	

SERVICE TABLES

Entities
Relationships
Table Metadata
Field Metadata

Version Information
Tab Page Specifications
Unit Conversion
Lookup Tables

GlobalDB System Database Schema
Upgrade Level 21 -- 2005/03/02
by Robert M. Laramée, G.S.C.