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GEOLOGICAL SURVEY OF CANADA
OPEN FILE 9208

Geological Survey of Canada field data model

G. Huot-Vézina, É. Girard, and R. Cocking

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Canada

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Summary

The Geological Survey Canada (GSC) has an in-house on-site data collecting application for geologists (Huot-Vézina, 2024). The application was built upon a simple, yet effective field data model for either bedrock geology or surficial geology. This model is the result of many previous iterations, FieldLog in the 1990s (Brodaric, 1997) up until the start of 2000 and then GanFeld (Shimamura, Williams, & Buller, 2008) in 2008 through 2016 as well as collaboration with scientists working at the GSC throughout the years. Specifically, it is a relational GIS database in the form of a GeoPackage, which is an open geospatial format supported by the Open Geoscience Consortium (OGC). The model aims to collect information for regional mapping.

Sommaire

La Commission géologique du Canada (CGC) possède une application interne pour la collecte d'information sur le terrain, pour les géologues (Huot-Vézina, 2024). L'application a été développée à partir d'un modèle simple et efficace de géologie de roche en place ainsi que des dépôts de surface. C'est le résultat d'une série d'itérations à commencer par FieldLog dans les années 1990 (Brodaric, 1997) jusqu'au début des années 2000 et GanFeld (Shimamura, Williams, & Buller, 2008) entre 2008 et 2016 toujours en collaboration avec les scientifiques de la CGC. Spécifiquement, c'est un modèle de base de données relationnelle à référence spatiale sous la forme d'un GeoPackage, soutenu par le Consortium des géosciences ouvertes (CGO). Le modèle vise à permettre la collecte de données pour la cartographie rég

Conceptual Data Model

The Geological Survey of Canada (GSC) field data model tries to mimic the flexibility and ease of use of a field paper notebook, without the caveats of paper. Geologists having access to customizable, predefined digital forms, along with a documented set of approved scientific terms will assist geoscientists in the field and we will see note-taking time reduced. This will allow more time for assessing the geological features and attributes of what the geoscientist sees around them. When data collection is finished, the geoscientist will have access to an already compiled dataset along with validated data that can be quickly transferred to other internal and corporate database system.

Conceptual Data Model diagram

Figure 1 showcases the different components of the GSC Field Work database. All components are mandatory and most of them will need a proper User Interface (UI) for end users to properly edit the tables and their attributes.

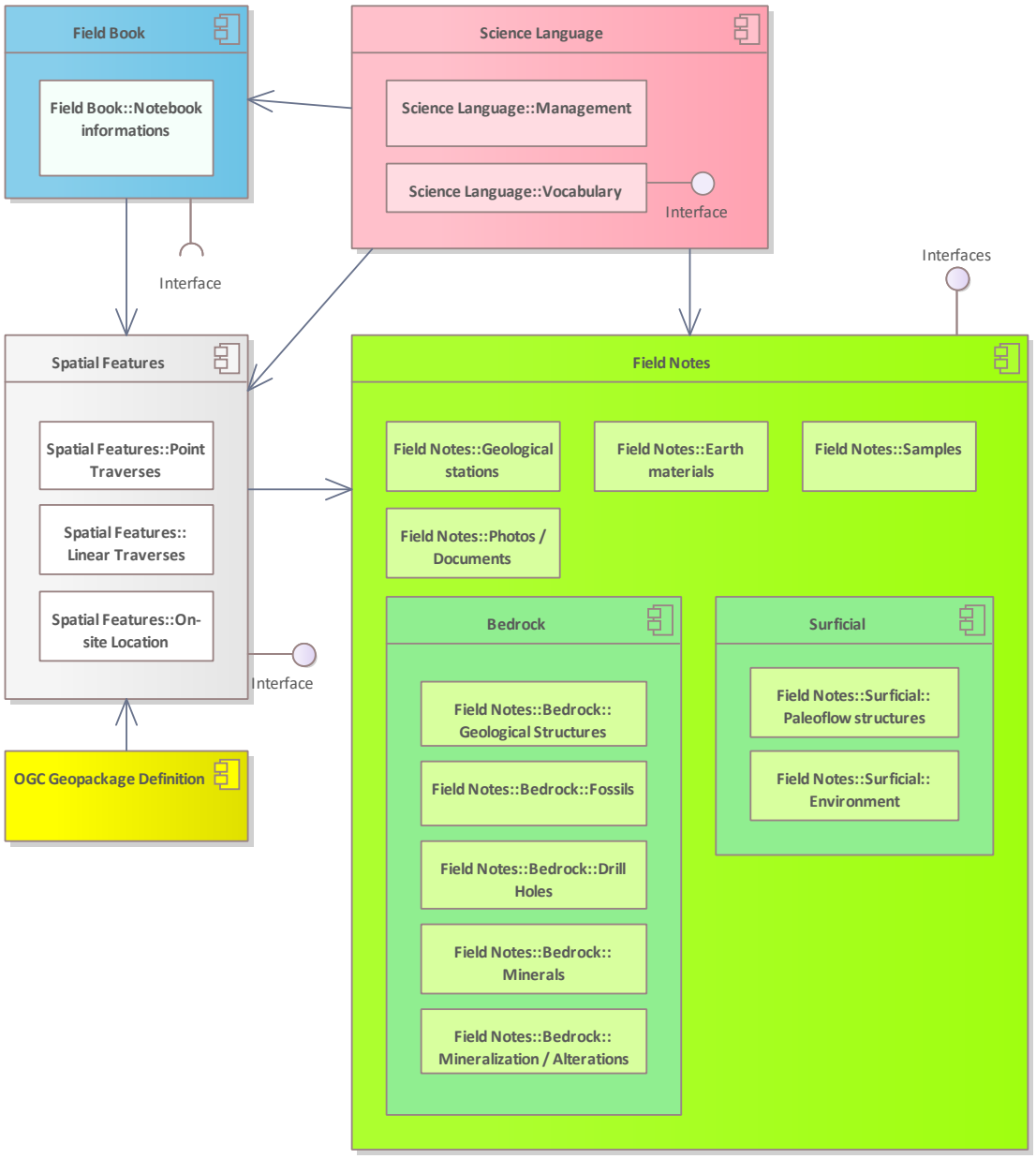

Figure 1: Conceptual Data Model

Field Book

From the beginning of the GSC, geologists were taking notes in a paper notebook and were adding at least some basic information in the inner cover, in case the notebook was lost or added to a pile of other notebooks. Digital datasets are no different and each of those needs to be retraceable to its original owner and accurately depict the who, what, when, where, why and how. Using a field book as a digital form is an advantage over paper notebooks, being it's easier to copy and have some redundant datasets for safety measures.

Interface

This field book component is designed to provide an interface for collecting necessary data, along with additional information that might be missing from paper notes, such as the associated project and activity details.

The interface will also enable users to create, manage (including delete and backup), and maintain new field books with all required information.

Field Notes

The sum of all observations and notes are gathered here in the most imposing block that is Field Notes, green component in figure 1 . Each child component (lighter green) such as Earth Material or Photo presents a specific type of observation that will be presented to the user in the interface. Some of them are common to the two main types of field survey, bedrock and surficial (darker green). Some others are only meant for one of these types.

Interfaces

Optional interfaces meant for end users to fill out all elements in the field notes components.

Bedrock

A subcomponent that includes all bedrock specific field notes. Some other bedrock specificities, like some attributes, can also be found in the common tables.

Surficial

A subcomponent that includes all surficial specific field notes. Some other surficial specificities, like some attributes, can also be found in the common tables.

OGC GeoPackage Definition

Open Geospatial Consortium (OGC) has a GeoPackage design component. Mostly hidden in some software (ArcGIS®, ArcGIS Pro®), but exposed in others (QGIS, DBeaver).

Science Language

The science language component needs to account for all literal string values that end users can select or interact with during a field survey. These values will need to be easily managed and accessible for end users via an interface in case of user error or device failure. In case of such a failure, science language should be transferable onto another device from a backup dataset. This can also be used to share a customized science language with other team members.

This is mostly needed for flexibility purposes on-site. In a fully disconnected environment (no Wi-Fi, no cellular network and such), the end-user needs to adapt the science language if something unexpected presents itself. Having the ability to do so, will increase the efficiency of data collection.

Spatial Features

A spatial component that will hold geometries associated to observed information and measurement. This component needs to be able to collect information regarding any location from an available Global Navigation Satellite System (GNSS) from which notes will be associated to.

The traverse planning side also needs to be available. If the user has a Geographic Information System (GIS) and a GNSS to follow their movement, the end user will be able to know where the next observation will occur, and the planning component will help guide the geoscientist to that location. Planning some traverses, and following their leads is part of any successful field survey.

Interface

Optional interfaces meant for end users to fill out all elements in the spatial features components.

Field Work Database Diagram

The GSC Field App Database schema is mainly intended to be used within GIS applications that enables the end user to collect information on regional geology in a predefined environment and with a set of data collection rules. The associated diagram, figure 2 , is tightly coupled with the in-house developed application (GSC Field App, Huot-Vézina, G., 2024) in that the tables have been segregated between different types of information found within the application.

The blue table (F_METADATA) is intended to store metadata information on who is taking the notes and why. In the application context, it is being called a Field book. Data such as project information, the names of geoscientists who worked on the project are stored here.

The green-coloured tables are basically all available forms within the GSC Field App that an end user can fill in. They cover both bedrock and surficial geology themes.

The pink tables can be used in two ways. A user interface has been created to hold and modify all the vocabulary (generic and scientific) that will be displayed in all the drop-down lists in the field application. They are also made available to the end user for editing purposes and tracks all changes throughout the years. This is meant for transparency and flexibility on-site.

The grey tables relate to GIS datasets, which hold geometries that will be created by the user. The datasets, F_TRAVERSE_LINE and F_TRAVERSE_POINT are for traverse planning while F_LOCATION is the actual drill hole or station location, taken as a manual entry or from a GNSS feed.

Lastly, the yellow tables are core tables defining the open format that is the GeoPackage. For more information regarding these, refer to the official web site: https://www.geopackage.org/

Further in the text, some notes and descriptions are available for all tables and their attributes. For some key attributes, extra notes will explain if some predetermined science language is available with the GeoPackage, if the attribute can hold multiple values or if it is meant for validation. For the general effectiveness and speed of note taking, while on-site, we targeted some key fields that would need to be set as "not nullable" in the database structure but we prefer to not force the end-user to fill those in. Validation can take place later in the process or later during a field day. Restraining the end user in their work was never an objective behind the model. Any post-processing tool or visual cue within an application can take care of informing the end user that a record did not validate, rather than being a blocker.

Figure 2: Field Work Database Diagram

F_DOCUMENT

This table is intended to manage any documents (mostly field photos, photos of samples, PDF documents, scanned documents, etc.) that can be linked to any records of most useful tables.

Attributes

Name	Attribute Type	Notes
DOCUMENTID	INTEGER	Auto-generated integer primary key.
DOCUMENTIDNAME	TEXT	Unique human readable identification of a document (most common format is "STATIONIDNAME + P + 3 digits"; e.g., 23ABC001P001). Letter P stands for Photo.
DOCUMENTTYPE	TEXT	Document type or format (e.g., IMG_.jpg Canon, IMG_.jpg Nikon, *PDF, *.DOCX). **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'DOCTYPE'*
CATEGORY	TEXT	Category or themes relevant to the document (e.g., sample site, outcrop, texture, red book, etc.). The entry of more than one value separated by a pipe is allowed. **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'DOCCATEGORY'* **Concatenation** This field can hold multiple values that will be concatenated using a pipe character. **Validation** This field is deemed important and for a document record to be valid, it must be filled.
FILENAME	TEXT	Filename of the document (e.g., IMG_001.jpg, fieldbook_1.pdf, etc.) **Validation** This field is deemed important and for a document record to be valid, it must be filled.
FILENUMBER	INTEGER	File number (essentially used when the document is an image file generated by the camera, e.g., IMG_001.jpg. In that case, the File Number is 001).
DIRECTION	INTEGER	Used when the document is an image file generated by the camera, this field holds the direction (value in degrees) toward which the photograph was taken.

Name	Attribute Type	Notes
DESCRIPTION	TEXT	A short description of the document (this field is typically used for photo captions but can also be used to document the content of a PDF or DOCX file).
HYPERLINK	TEXT	Relative path location of the document on a desktop computer, a network, etc.
OBJECTLOCX	NUMERIC	X-coordinate of the observed feature on a photo as opposed to the observer location.
OBJECTLOCY	NUMERIC	Y-coordinate of the observed feature on a photo as opposed to the observer location.
SCALE_DIRECTION	TEXT	Approximate cardinal orientation of the object that serves as a scale on the photo. **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'CARDINAL_DIRECTION'*
STATIONID	INTEGER	Foreign key to F_STATION.
EARTHMATID	INTEGER	Foreign key to F_EARTH_MATERIAL.
SAMPLEID	INTEGER	Foreign key to F_SAMPLE.
DRILLHOLEID	INTEGER	Foreign key to F_DRILL_HOLE.

F_DRILL_HOLE

This table is intended for notes regarding drill holes and its core that will be sampled and logged by a geologist.

Attributes

Name	Attribute Type	Notes
DRILLHOLEID	INTEGER	Auto-generated integer primary key.
DRILLHOLEIDNAME	TEXT	Unique human readable identification of a drill hole (most common format is "YY + GEOLCODE + 4 digits + DH"; e.g., 23ABC0001DH; Starts with the two digits of the current year, followed by the officer code, an increasing set of number and finally DH stands for Drill Hole.).

Name	Attribute Type	Notes
DRILLHOLE_ORIGINAL_NAME	TEXT	The original name of the drill hole, usually named by the company. **Validation** This field is deemed important and for a drill hole record to be valid, it must be filled.
COMPANY	TEXT	Name of the company that drilled the hole.
DRILLHOLE_TYPE	TEXT	Type of drill hole. **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'DRILLHOLE_TYPE'* **Validation** This field is deemed important and for a document record to be valid, it must be filled.
AZIMUTH	REAL	Azimuth angle of the drill hole.
DIP	REAL	Dip angle of the drill hole.
DH_LENGTH	REAL	Length of the drill hole.
UNIT	TEXT	Unit of measurement, metre or feet.
DRILHOLE_DATE	TEXT	The date when the hole was drilled.
DRILLHOLE_SIZE	REAL	The size of the hole e.g., BQ, NQ, HQ. **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'DRILLHOLE_SIZE'*
DRILLCORE_SIZE	REAL	Size of the core, in mm, dependent on the hole size value. **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'DRILLCORE_SIZE'*
RELOG_TYPE	TEXT	Type of log being done on the drill hole e.g., Full, Partial, Recon. **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'RELOG_TYPE'*

Name	Attribute Type	Notes
RELOG_BY	TEXT	Name of the geologist doing the logging. Defaulting to geologist name available in F_METADATA.
RELOG_INTERVALS	TEXT	Intervals From/To values of the logging.
RELOG_DATE	TEXT	Date at which the logging notes were taken.
LOG_SUMMARY	TEXT	Log summary for the drill hole.
RELATEDTO	TEXT	ID to another record that could be related to the drill hole, e.g., a station id or some other legacy ids.
NOTES	TEXT	Other notes meant to be kept with the drill hole record.
LOCATIONID	INTEGER	Foreign key to F_LOCATION where the geometric point is stored.

F_EARTH_MATERIAL

This table contains the lithological observations made at each station or on a drill core.

Attributes

Name	Attribute Type	Notes
EARTHMATID	INTEGER	Auto-generated integer primary key.
EARTHMATIDNAME	TEXT	Unique human readable identification of an Earth Material (most common format is "STATIONIDNAME + 1 letter"; e.g., 23ABC0001A). The last letter is "increased" for each lithological record, going from A to Z then AA, AB, and so on.
STATIONID	INTEGER	Foreign Key to F_STATION.
LITHGROUP	TEXT	General grouping of rocks according to the processes that resulted in their formation (e.g., plutonic, sedimentary, volcanic, tectonic). **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'LITHGROUP'*
LITHTYPE	TEXT	Subdivision used to group together LITHDETAIL that shares common differential elements. (e.g., felsic intermediate, mafic)
LITHDETAIL	TEXT	Detailed rock name. This is the functional rock name of an Earth Material. **Science language** Bedrock values available with query *M_DICTIONARY.CODETHEME = 'LITHDETAIL'* Surficial values available with query *M_DICTIONARY.CODETHEME = 'LITHDETAIL_S'* **Validation** This field is deemed important and for an earth material record to be valid, it must be filled.

Name	Attribute Type	Notes
LITHQUALIFIER	TEXT	Modifier(s) (e.g., qualifier) to more accurately name or describe an Earth Material. For example, in the case of a felsic gneiss, the LITHQUALIFIER could have the value “granitic | granodioritic”, specifying the composition range of the gneiss. **Science language** Values available with query *M_DICTIONARY.CODETHEME = ‘MODCOMP'* **Concatenation** This field can hold multiple values that will be concatenated using a pipe character.
METAFACIES	TEXT	Metamorphic facies of the Earth Material being described (e.g., greenschist, granulite). **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'METAMORPH_FACIES'*
METAINTENSITY	TEXT	Qualifier to calibrate the intensity of the metamorphic facies (e.g., low, high, retrograde). **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'METAMORPH_INTENSITY'*
MAPUNIT	TEXT	Map unit to which, the described Earth Material, belongs to. **Science language** Bedrock values available with query *M_DICTIONARY.CODETHEME = 'MAPUNITB'* Surficial values available with query *M_DICTIONARY.CODETHEME = 'MAPUNITS'*
OCCURAS	TEXT	Nature of the occurrence of the earth material (e.g., pluton, dyke). **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'OCCURAS'*
EM_PERCENT	INTEGER	The estimate of the percentage occupied by the Earth Material being described on the whole outcrop.

Name	Attribute Type	Notes
TEXTSTRUC	TEXT	Qualifier(s) relating to textural and structural properties of the Earth Material. The entry of more than one value separated by a pipe character is allowed. **Science language** Bedrock values available with query *M_DICTIONARY.CODETHEME = 'TEXTSTRUC'* Surficial values available with query *M_DICTIONARY.CODETHEME = 'TEXTSTRUC_S'* **Concatenation** This field can hold multiple values that will be concatenated using a pipe character.
GRCRYSIZE	TEXT	Earth material grain size. **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'GCSIZE'* **Concatenation** This field can hold multiple values that will be concatenated using a pipe character.
DEFFABRIC	TEXT	Deformational fabrics of the Earth Material. **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'DEFFABRIC'* **Concatenation** This field can hold multiple values that will be concatenated using a pipe character.
BEDTHICK	TEXT	Bedding thickness. **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'BEDTHICK'* **Concatenation** This field can hold multiple values that will be concatenated using a pipe character.

Name	Attribute Type	Notes
COLOURF	TEXT	Earth material fresh colour. The colour can be expressed as a single colour (e.g., "grey") or as a colour, its colour intensity and a qualifier (e.g., "grey | medium | greenish"). **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'COLOUR_GENERIC'* Values available with query *M_DICTIONARY.CODETHEME = 'COLOUR_INTENSITY'* Values available with query *M_DICTIONARY.CODETHEME = 'COLOUR_QUALIFIER'*
COLOURW	TEXT	Earth Material weathered colour. The colour can be expressed as a single colour (e.g., "grey") or as a colour, its colour intensity and a qualifier (e.g., "grey | medium | greenish"). **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'COLOUR_GENERIC'* Values available with query *M_DICTIONARY.CODETHEME = 'COLOUR_INTENSITY'* Values available with query *M_DICTIONARY.CODETHEME = 'COLOUR_QUALIFIER'*
COLOURIND	INTEGER	Earth material index colour from 0 to 100.
MAGSUSCEPT	REAL	Magnetic susceptibility value of the Earth Material (in SI units).
MAGQUALIFIER	TEXT	Empirical evaluation of the magnetic intensity of a lithology in the field using a magnet (e.g., weak, strong). **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'STRUCSTRAIN'*
RELATED_CONTACT_NOTE	TEXT	Description of the nature of the relation between the current contact and other contact records on the same station. (e.g., Earth material C is intrusive compared to Earth Material A and has a disconformity compared to B. **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'CONTACT'* **Concatenation** This field can hold multiple values that will be concatenated using a pipe character.

Name	Attribute Type	Notes
CONTACTUP	TEXT	The nature of the upper contact (e.g., faulted, gradational, intrusive). **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'CONTACT'*
CONTACTLOW	TEXT	The nature of the lower contact (e.g., faulted, gradational, intrusive). **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'CONTACT'*
CONTACT_NOTE	TEXT	Free text field allowing general description of the observed relationship and/or contact between Earth Materials.
INTERP	TEXT	Interpretation of the genetic origin or protolith of the Earth Material.
INTERPCONF	TEXT	Levels of confidence with the Earth Material interpretation. **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'INTERPCONF'*
SORTING	TEXT	Type of sorting of the material composition (e.g., well sorted, poorly sorted). **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'SORTING'*
H2OCONTENT	TEXT	Qualitative value describing moisture content of the material (e.g., dry, moist, wet, saturated). Mostly used for surficial projects. **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'H2OCONTENT'*
OXIDATION	TEXT	Qualitative value describing material oxidation (e.g., unoxidized, weak, moderate, strong). Mostly used for surficial projects. **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'OXIDATION'*

Name	Attribute Type	Notes
CLASTFORM	TEXT	Qualitative value describing the material clast form type (e.g., angular, well rounded, sub-angular). Mostly used for surficial projects. **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'CLASTFORM'*
NOTES	TEXT	Additional notes and remarks regarding the Earth Material.
DRILLHOLEID	INTEGER	Foreign key to F_DRILL_HOLE.

F_ENVIRONMENT

This table is used to describe the environment surrounding the station.

Attributes

Name	Attribute Type	Notes
ENVIRONID	INTEGER	Auto-generated integer primary key.
ENVIRONIDNAME	TEXT	Unique human readable identification of an Environment record (most common format is "STATIONIDNAME + E + 2 digits"; e.g., 23ABC0001E01; Letter E stands for Environment).
RELIEF	TEXT	Qualitative value describing the landscape relief at the current station (e.g., flat, rolling, sloping). **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'RELIEF'* **Validation** This field is deemed important and for an environment record to be valid, it must be filled.
SLOPE	INTEGER	Quantitative value indicating the slope percentage of the landscape at the current station.
AZIMUTH	INTEGER	The azimuthal value of the landscape slope, in degrees.
DRAINAGE	TEXT	Qualitative value describing the terrain drainage (e.g., poor, moderate, good). **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'DRAINAGE'*
PERMAFROST_INDICATOR	TEXT	Qualitative value describing an indicator of the terrain permafrost (e.g., rock blister, palsa, pingo, ground ice). **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'PERMAFROST'*
GROUND_PATTERN	TEXT	Qualitative value describing any ground pattern (e.g., sorted circles, ice-wedge polygons, sand-wedge polygons). **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'GROUND_PATTERN'* **Concatenation** This field can hold multiple values that will be concatenated using a pipe character.

Name	Attribute Type	Notes
GROUND_ICE	TEXT	Qualitative value describing the ground ice type (e.g., segregated ice, glacier ice). **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'GROUND_ICE'*
GROUND_COVER	TEXT	Qualitative value describing the ground cover (e.g., boulders, grass, lichen, trees). **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'GROUND_COVER'*
ACTIVE_LAYER_DEPTH	REAL	Quantitative value of the terrain active layer depth layer in metres.
BOULDER_FIELD	TEXT	Qualitative value describing the landscape boulder field (e.g., frost-shattered rock, boulder lag, glaciofluvial eroded lag). **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'BOULDER_FIELD'*
EXPOSURE	TEXT	Qualitative value describing the terrain exposure type (e.g., cliff, hillside). **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'EXPOSURE'*
NOTES	TEXT	Additional notes and remarks regarding the Environment record.
STATIONID	INTEGER	Foreign Key to F_STATION.

F_FOSSIL

This table contains the list of fossils identified in each earth material of a station.

Attributes

Name	Attribute Type	Notes
FOSSILID	INTEGER	Auto-generated integer primary key.
FOSSILIDNAME	TEXT	Unique human readable identification of a fossil record (most common format is "EARHMATIDNAME + 2 digits"; e.g., 23ABC0001E01).
FOSSILTYPE	TEXT	Qualitative value describing the fossil type (e.g., bone, peat, shell, algae). **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'FOSSILTYPE'* **Validation** This field is deemed important and for a fossil record to be valid, it must be filled.
NOTES	TEXT	Additional notes and remarks regarding the fossil
EARTHMATID	INTEGER	Foreign Key to F_EARTH_MATERIAL.

F_LOCATION

Stores information related to the type of observation as well as the time of the visit, the quality, and the physical environment of the observed feature.

The type of observation is quite wide-ranging from an outcrop, an aerial observation to a field camp location and more.

Attributes

Name	Attribute Type	Notes
LOCATIONID	INTEGER	Auto-generated integer primary key.
geometry	INTEGER	GeoPackage-encoded geometry of the station or the drill hole, as it is received from the initial project, without transformation of coordinates.
LOCATIONIDNAME	TEXT	Unique human readable identification of a location records (most common format is "STATIONIDNAME + XY"; e.g., 23ABC0001XY).
EASTING	REAL	Original X-coordinate.
NORTHING	REAL	Original Y-coordinate.
EPSG_PROJ	TEXT	Spatial reference of the original XY coordinates. Only the EPSG numeric code is accepted. **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'EPSG'*
LATITUDE	REAL	Latitude expressed in decimal degree using the national spatial reference EPSG 4326. **Validation** This field is deemed important and for a location record to be valid, it must be filled.
LONGITUDE	REAL	Longitude expressed in decimal degree using the national spatial reference EPSG 4326. **Validation** This field is deemed important and for a location record to be valid, it must be filled.
EPSG	TEXT	Explicit indication of the reference system used in storing the geometric data, for the lat-long fields. **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'EPSG'*

Name	Attribute Type	Notes
ELEVATION	TEXT	Elevation in metres.
ELEVMETHOD	TEXT	Method of elevation capture. **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'ELEVMETHOD'*
ELEVACCURACY	REAL	Elevation accuracy in metres.
ENTRYTYPE	TEXT	Method of location entry (satellite, manual coordinate entry, screen tap, digitized from paper map, etc.). **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'ENTRYTYPE'*
PDOP	REAL	Position dilution of precision. Describes the error caused by relative position of the GPS satellites.
ERRORMEASURE	REAL	In most cases, estimated error value for the accuracy of a point location. Unit of the value is stored in ERRORTYPEMEASURE.
ERRORTYPEMEASURE	TEXT	Unit of measure related to the value stored in ERRORMEASURE (e.g., PDOP, meter). **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'ERRORTYPEMEASURE'*
NTS	TEXT	This field captures the name of the 50K National Topographic Sheet (NTS) in which the current location occurs.
NOTES	TEXT	General notes on the location.
REPORT_LINK	TEXT	Link to an external document (usually XML document) which is a summary of the field observations at the location. This is usually being filled by a post-processing tool after any field trips.
METAID	INTEGER	Foreign Key to F_METADATA.

F_METADATA

A collection of metadata that provides essential metadata information. This table is used as a definition of a field book within GSC Field App.

Attributes

Name	Attribute Type	Notes
METAID	INTEGER	Auto-generated integer primary key.
PRJCT_CODE	TEXT	Administrative project code.
PRJCT_LEAD_FIRSTNAME	TEXT	Scientific lead / project lead first name.
PRJCT_LEAD_MIDNAME	TEXT	Scientific lead / project lead middle name.
PRJCT_LEAD_LASTNAME	TEXT	Scientific lead / project lead last name
PRJCT_TYPE	TEXT	Identification of the type of project. **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'METADATATYPE'* **Validation** This field is deemed important and for a metadata record to be valid, it must be filled.
PRJCT_NAME	TEXT	Project name as define by the organization (e.g., GEM1-Meville, Operation Wager).
FIRSTNAME	TEXT	Geologist first name. **Validation** This field is deemed important and for a metadata record to be valid, it must be filled.
MIDDLENAME	TEXT	Geologist middle name.
LASTNAME	TEXT	Geologist last name. **Validation** This field is deemed important and for a metadata record to be valid, it must be filled.
GEOLCODE	TEXT	Geologist code as provided by the Sample Management System (SMS) administrators. Otherwise, the geologist code should be defined by using the Project Leader GeolCode + first letter of the geologist last name. This code will be used throughout the whole database to

Name	Attribute Type	Notes
		come up with unique human readable ID. This is usually three to four letters defining the geologist. **Validation** This field is deemed important and for a metadata record to be valid, it must be filled.
STNSTARTNO	INTEGER	Integer number representing the initial station number that will be increased throughout all new records creation. Defaults to 1. This can be useful for starting a field trip from a past year or project without starting back at station 1. **Validation** This field is deemed important and for a metadata record to be valid, it must be filled.
VERSION_APP	TEXT	This field is used to track the field application version. **Validation** This field is deemed important and for a metadata record to be valid, it must be filled.
VERSIONSCHEMA	TEXT	This field is used to track the database version, no matter the format (e.g., 1.8). **Validation** This field is deemed important and for a metadata record to be valid, it must be filled.
ISACTIVE	TEXT	Boolean text-based value that represents the current metadata record being used/worked on in a Geographic Information System (GIS). DEPRECATED.
START_DATE	TEXT	Starting date of the current field book.
ACTIVITY_NAME	TEXT	Activity name as define by the organization (e.g., Field Summer 2023, Legacy 1971). **Validation** This field is deemed important and for a metadata record to be valid, it must be filled.
NOTES	TEXT	General notes on the field book.

F_MINERAL

This table contains the list of minerals identified in each earth material of a station.

Attributes

Name	Attribute Type	Notes
MINERALID	INTEGER	Auto-generated integer primary key.
MINERALIDNAME	TEXT	Unique human readable identification of a Mineral (most common format is "EATHMATIDNAME + M + 2 digits"; e.g., 23ABC0001AM01).
MINERAL	TEXT	The name of the mineral being described. **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'MINERAL'* **Validation** This field is deemed important and for a mineral record to be valid, it should be filled.
FORM_HABIT	TEXT	Qualifier(s) relating to the form and the habit of a mineral. The entry of more than one value separated by a pipe is allowed. Combining the former form and habit fields. **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'FORM_HABIT'* **Concatenation** This field can hold multiple values that will be concatenated using a pipe character.
OCCURRENCE	TEXT	Nature of the occurrence of the mineral within the Earth Material (e.g., accessory, constituent, clot, phenocryst, porphyroblast). **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'OCCUR'*
COLOUR	TEXT	Colour of the mineral. **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'COLOUR'*
SIZEMINMM	INTEGER	The minimum size of the mineral in mm.

Name	Attribute Type	Notes
SIZEMAXMM	INTEGER	The maximum size of the mineral in mm.
M_MODE	TEXT	Proportion of rock units comprised by the mineral (value ranges 0-100). **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'MODE'* **Validation** This field is deemed important and for a mineral record to be valid, it must be filled.
NOTES	TEXT	Additional notes and remarks regarding the Mineral.
EARTHMATID	INTEGER	Foreign Key to F_EARTH_MATERIAL.
MAID	INTEGER	Foreign key F_MINERALIZATION_ALTERATION.

F_MINERALIZATION_ALTERATION

This table includes elements relevant to the identification of mineralization and/or alteration. Observations related to the mineralization and/or alteration may be associated with either the whole outcrop visited (F_STATION), one or more lithologies (F_EARTH_MATERIAL).

Attributes

Name	Attribute Type	Notes
MAID	INTEGER	Auto-generated integer primary key.
MAIDNAME	TEXT	Unique human readable identification of a Mineral (most common format is "STATIONIDNAME+ X + 2 digits"; e.g., 23ABC0001X01).
MA	TEXT	Type of feature (alteration or mineralization). **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'MINERALIZATIONMA'* **Validation** This field is deemed important and for a mineralization/alteration record to be valid, it must be filled.
UNIT	TEXT	Rock type or unit name in which the alteration or mineralization occurs. **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'MAUNIT'*
DISTRIBUTE	TEXT	Nature of the distribution of the alteration mineral or economic mineral (e.g., pervasive, replacement). The entry of more than one value separated by a pipe is allowed. **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'DISTRIBUTEALTERATION'* **Concatenation** This field can hold multiple values that will be concatenated using a pipe character.
PHASE	TEXT	Description of the phase of the alteration. **Science language**

Name	Attribute Type	Notes
		Values available with query *M_DICTIONARY.CODETHEME = 'MA_PHASE'*
TEXTSTRUC	TEXT	Qualifier(s) relating to textural and structural properties of the mineral. The entry of more than one value separated by a pipe is allowed.
ALTERATION_FACIES	TEXT	Description of the facies of the mineral alteration. **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'MA_FACIES'*
NOTES	TEXT	Further explanatory notes on the alteration or mineralization.
EARTHMATID	INTEGER	Foreign key to F_EARTH_MATERIAL.
STATIONID	INTEGER	Foreign key to F_STATION.

F_PALEO_FLOW

Collection describing any paleoflow evidence of deposited sediments.

Attributes

Name	Attribute Type	Notes
PFLOWID	INTEGER	Auto-generated integer primary key.
PFLOWIDNAME	TEXT	Unique human readable identification of a Mineral (most common format is "EARTHMAIDNAME + 2 digits"; e.g., 23ABC0001A01).
PFCLASS	TEXT	Qualitative value describing the paleoflow class (e.g., paleowind, paleocurrent, ice flow). **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'PFCLASS'* **Validation** This field is deemed important and for a paleoflow record to be valid, it must be filled.
PFSENSE	TEXT	Qualitative value describing the paleoflow direction sense (e.g., known, unknown). **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'PFSENSE'* **Validation** This field is deemed important and for a paleoflow record to be valid, it must be filled.
PFTYPE	TEXT	Qualitative value describing in more detail the type of paleoflow class, such as a subclass value (e.g., ice flow - striations, ice flow - grooves). **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'PFTYPE'*
METHOD	TEXT	Qualitative value describing the method used to work out the relative age of current paleoflow.
PFAZIMUTH	INTEGER	Azimuthal direction value of the current paleoflow, in degrees.
MAINDIR	TEXT	Boolean text-based value stating if Azimuth and Dip values are the main paleoflow direction.

Name	Attribute Type	Notes
RELAGE	INTEGER	Relative number that serves to place the relative age of a given paleoflow compared to the other ones at the same station. **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'PFAGE'*
PFDIP	REAL	Dip direction value of the current paleoflow, in degrees.
NUMINDIC	TEXT	Approximate number of indicators relative to the current paleoflow (one, few, several, many, etc.) **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'PFNUMINDICATOR'*
PFQUALITY	TEXT	Qualitative value describing the quality of current paleoflow (e.g., poor, moderate, good). **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'PFQUALITY'*
RELATION	TEXT	Qualitative value describing the relative position between current record and the other ones on the same station (e.g., cross-cutting, low relative position, top). **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'PFRELATIONSHIP'*
BEDSURF	TEXT	Qualitative value describing the bedrock surface on which the observation is being conducted (e.g., top, lee slope, flat, on side). **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'PFBEDSURF'*
CONFIDENCE	TEXT	Indicates the probability with which the estimation of the paleoflow is good. **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'PFCONFIDENCE'*
NOTES	TEXT	Further explanatory notes on the paleoflow record.
EARTHMATID	INTEGER	Foreign key to F_EARTH_MATERIAL.

F_SAMPLE

This table contains the list of samples collected for each earth material of a station.

Attributes

Name	Attribute Type	Notes
SAMPLEID	INTEGER	Auto-generated integer primary key.
SAMPLEIDNAME	TEXT	Unique human readable identification of a Sample (most common format is "EARTHMAIDNAME + 2 digits"; e.g., 23ABC0001A01).
SAMPLETYPE	TEXT	Type of sample type (e.g., hand oriented; chip sample; core). **Science language** Bedrock values available with query *M_DICTIONARY.CODETHEME = 'SAMP_TYPE'* Surficial values available with query *M_DICTIONARY.CODETHEME = 'SAMP_S_TYPE'* **Validation** This field is deemed important and for a sample record to be valid, it must be filled.
PURPOSE	TEXT	Purpose(s) regarding why the sample was collected (e.g., geochemistry, thin sections). **Science language** Bedrock values available with query *M_DICTIONARY.CODETHEME = 'SAMP_PURPOSE'* Surficial values available with query *M_DICTIONARY.CODETHEME = 'SAMP_S_PURPOSE'* **Concatenation** This field can hold multiple values that will be concatenated using a pipe character. **Validation** This field is deemed important and for a sample record to be valid, it must be filled.
FORMAT	TEXT	Measurement format for oriented samples (e.g. RHR (right-hand rule), DDD (dip direction, dip), TRND-PLNG (trend and plunge)).
AZIMUTH	INTEGER	Strike, dip direction or trend measurement of oriented samples (in degrees).

Name	Attribute Type	Notes
DIPPLUNGE	INTEGER	Dip or plunge measurement of oriented samples (in degrees).
SURFACE	TEXT	Indication on whether the upper or lower surface of the oriented sample was marked in the field. **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'SAMPSURFACE'*
NOTES	TEXT	Additional notes and remarks regarding the Sample.
CURATIONID	TEXT	Sample's curation number provided by the Sample Management System (SMS).
SMID	INTEGER	Sample's SM number provided by the Sample Management System (SMS).
EARTHMATID	INTEGER	Foreign Ket to F_EARTH_MATERAIL.
QUALITY	TEXT	Qualitative value describing the sample state quality (e.g., excellent, good, poor). **Science language** Bedrock values available with query *M_DICTIONARY.CODETHEME = 'SAMP_QUALITY'* Surficial values available with query *M_DICTIONARY.CODETHEME = 'SAMP_S_QUALITY'*
HORIZON	TEXT	Surficial sample values for describing the ground material horizons (e.g., LF, H, A). **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'SAMP_HORIZON'*
DEPTHMIN	REAL	Minimal depth value of samples, in centimetres. Mostly used for surficial.
DEPTHMAX	REAL	Maximal depth value of samples, in centimetres. Mostly used for surficial.
DUPLICATE	INTEGER	Boolean text value representing if current sample is a duplicate or not.
DUPLICATENAME	TEXT	The sample duplicate name to differentiate from original.
STATE	TEXT	Qualitative value describing the sample state (e.g., leached, oxidized, weathered). **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'SAMP_QUALITY'*

Name	Attribute Type	Notes
WAREHOUSE_LOCATION	TEXT	Free text field describing where the sample can be found when stored in a warehouse or somewhere else.
BUCKET_OR_TRAY_NO	TEXT	Free text field describing in which bucket or tray number can be found the current sample. For on-site sample management for shipping or long-term archiving.
ISBLANK	TEXT	Boolean text value representing if current sample is a blank or not.
CORE_FROM	REAL	Core samples beginning value measurement on the original core itself.
CORE_TO	REAL	Core samples ending value measurement on the original core itself.
CORE_LENGTH	REAL	Core samples total length value measurement on the original core itself.
CORE_SAMPLE_SIZE	TEXT	Qualitative value describing the core sample proportion size compared to the original core in quarters (e.g., 1Q, 2Q, 3Q, 4Q). **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'CORE_SAMPLE_SIZE'*
SAMPLED_BY	TEXT	Name of whomever sampled the core. Defaults to field book geologist.

F_STATION

Stores information related to the type of observation as well as the time of the visit, the quality, and the physical environment of the observed feature.

The type of observation is quite wide-ranging from an outcrop, an aerial observation to a field camp location and more.

Attributes

Name	Attribute Type	Notes
STATIONID	INTEGER	Auto-generated integer primary key.
STATIONIDNAME	TEXT	Unique human readable identification of a station (most common format is "YY + GEOLCODE + 4 digits "; e.g., 23ABC0001; Starts with the two digits of the current year, followed by the officer code and an increasing set of number.).
TRAVNO	INTEGER	Traverse number
OCQUALITY	TEXT	Quality of the observed outcrop. The entry of more than one value separated by a pipe character is allowed (e.g., subcrop | weathered). **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'OUTCROPQUAL'*
VISITDATE	TEXT	The date at which the observations were made (format: YYYY-MM-DD).
VISITTIME	TEXT	The time at which the observations were made (format: HH:MM:SS AM/PM).
OBSTYPE	TEXT	Type of observation (e.g., visited outcrop, stratigraphic section, aerial observation). **Science language** Bedrock values available with query *M_DICTIONARY.CODETHEME = 'OBSTYPEB'* Surficial values available with query *M_DICTIONARY.CODETHEME = 'OBSTYPES'* **Validation** This field is deemed important and for a station record to be valid, it must be filled.
OBSSOURCE	TEXT	Qualitative value describing station origin sources (e.g., ground observation, remote). **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'OBSSOURCE'*

Name	Attribute Type	Notes
OCSIZE	TEXT	Outcrop size estimate.
PHYSENV	TEXT	The physical environment of the station. The entry of more than one value separated by a pipe character is allowed (e.g., open ground | top of a hill). **Science language** Bedrock values available with query *M_DICTIONARY.CODETHEME = 'PHYSENV'* Surficial values available with query *M_DICTIONARY.CODETHEME = 'LANDFORM'*
LEGENDVAL	TEXT	Original legend value from legacy data set (mostly used for surficial dataset).
LNDINTERP	TEXT	Landform interpretation (mostly used for surficial dataset).
NOTES	TEXT	General notes or remarks about the station.
SLSNOTES	TEXT	Notes or remarks on what has been seen between this station and the previous one. Since Last Station (SLS).
RELATEDTO	TEXT	This field links the current station to a previous station. Can be used when an existing station is revisited by another geologist.
AIRPHOTO	TEXT	Air photo number.
LOCATIONID	INTEGER	Foreign key F_LOCATION.

F_STRUCTURE

This table contains the structural data measured or compiled for each Earth Material of a station.

Attributes

Name	Attribute Type	Notes
STRUCID	INTEGER	Auto-generated integer primary key.
STRUCIDNAME	TEXT	Unique human readable identification of a Sample (most common format is "EARTHMAIDNAME + 2 digits"; e.g., 23ABC0001A01).
STRUCCLASS	TEXT	Class of the structural feature (linear or planar). **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'STRUCCLASSTYPE'*
STRUCTYPE	TEXT	Subdivision of the structural feature (e.g., primary planar fabric, fault plane, primary lineation). **Validation** This field is deemed important and for a station record to be valid, it must be filled.
DETAIL	TEXT	Detailed structural measurement names (e.g., bedding, cleavage). **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'STRUCDETAIL'* **Validation** This field is deemed important and for a station record to be valid, it must be filled.
METHOD	TEXT	Method of acquisition (e.g., measured at the station, calculated from data). **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'STRUCMETHOD'*
FORMAT	TEXT	Measurement format (e.g., strike/dip, right-hand rule). **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'STRUCFORMAT'* **Validation** This field is deemed important and for a station record to be valid, it should be filled.

Name	Attribute Type	Notes
ATTITUDE	TEXT	Attitude of planar features (e.g., upright, overturned). **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'STRUCATTITUDE'*
YOUNGING	TEXT	Confidence in attitude of primary layering as assessed from evidence for younging direction (e.g., known, sedimentary structure; inferred, stratigraphic order; assumed, no evidence). **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'STRUCYOUNGING'*
GENERATION	TEXT	Generation phase. **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'STRUCGENERATION'*
STRAIN	TEXT	Strain intensity (e.g., no strain, weak, moderate, intense). **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'STRUCSTRAIN'*
FLATTENING	TEXT	Relative intensity of planar (S) fabric over linear (L) fabric (e.g., L tectonite, L>S, L=S, L<S, S tectonite). **Science language** Values available with query *M_DICTIONARY.CODETHEME = 'STRUCFLATTENING'*
RELATED	INTEGER	The unique identifier (Structure ID) of the related planar or linear measurement.
FABRIC	TEXT	Fabric defining elements within the observed Earth Material (e.g., muscovite (schistosity), flattened or stretched quartz (mylonitic foliation), crenulations (cleavage)).
SENSE	TEXT	Sense of movement indicated by the feature (e.g., sinistral, down to the northeast).
AZIMUTH	INTEGER	Strike, dip direction or trend of measurement in degrees [Range=0-360]
DIPPLUNGE	INTEGER	Dip value of the planar feature or plunge value of the linear feature in degrees. [Range=0-90].
SYMANG	INTEGER	Rotational angle for plotting symbols.

Name	Attribute Type	Notes
NOTES	TEXT	Additional notes and remarks regarding the structure.
EARTHMATID	INTEGER	Foreign Key to F_EARTH_MATERIAL.

F_TRAVERSE_LINE

Contains planned geological linear traverses.

Attributes

Name	Attribute Type	Notes
TRAV_ID	INTEGER	Auto-generated integer primary key.
geometry	INTEGER	GeoPackage encoded geometry.
TRAV_DATE	TEXT	Date of traverse (numerical YY-MM-DD).
PILOT	TEXT	Helicopter pilot designated for the traverse.
ORDER_FLIGHT	INTEGER	Traverse flight order number. Meant for days when multiple back and forth trips for fueling are needed.
ORDER_VISIT	INTEGER	Traverse order visit number from a given order flight.
GEOLOGIST	TEXT	Traverse designated geologist name.
PARTNER	TEXT	Traverse partner.
PLANNED_BY	TEXT	Name of whomever planned this traverse beforehand.
LABEL	TEXT	A label text for usage on GIS or printed maps.
NOTES	TEXT	Remarks or notes on the traverse.
TRAV_LENGTH	REAL	Calculated traverse line length (in metres).
X_UTM_START	INTEGER	Projected X-coordinates of the traverse line starting node.
Y_UTM_START	INTEGER	Projected Y-coordinates of the traverse line starting node.
X_UTM_END	INTEGER	Projected X-coordinates of the traverse line ending node.
Y_UTM_END	INTEGER	Projected Y-coordinates of the traverse line ending node.
X_DMS_START	TEXT	Degrees Minutes and Seconds X-coordinates of the traverse line starting node.
Y_DMS_START	TEXT	Degrees Minutes and Seconds Y-coordinates of the traverse line starting node.
X_DMS_END	TEXT	Degrees Minutes and Seconds X-coordinates of the traverse line ending node.

Name	Attribute Type	Notes
Y_DMS_END	TEXT	Degrees Minutes and Seconds Y-coordinates of the traverse line ending node.
X_DD_START	REAL	Decimals Degrees X-coordinates of the traverse line starting node.
Y_DD_START	REAL	Decimals Degrees Y-coordinates of the traverse line starting node.
X_DD_END	REAL	Decimals Degrees X-coordinates of the traverse line ending node.
Y_DD_END	REAL	Decimals Degrees Y-coordinates of the traverse line ending node.
NM	REAL	Nautical mile distance between each traverse. Calculated from the end point of a traverse to the start of the next one, from ORDER_VISIT then ORDER_FLIGHT.
NM_TO_CAMP	REAL	Distance, in nautical miles, from the traverse end node back to field camp.
NTS	TEXT	The National Topographic Sheet (NTS) value in which the traverse falls in.
AIR_PHOTO	TEXT	Air photo number associated with the traverse.
MAG_DECLIN	TEXT	The map magnetic declination the traverse is associated with.

F_TRAVERSE_POINT

Contains planned geological point locations for traverses. Mostly used for helicopter bopping.

Attributes

Name	Attribute Type	Notes
TRAV_ID	INTEGER	Auto-generated integer primary key.
geometry	INTEGER	GeoPackage encoded geometry.
TRAV_DATE	TEXT	Date of traverse (numerical YY-MM-DD).
PILOT	TEXT	Helicopter pilot designated for the traverse.
ORDER_FLIGHT	INTEGER	Traverse flight order number. Meant for days when multiple back and forth trips for fueling are needed.
ORDER_VISIT	INTEGER	Traverse order visit number from a given order flight.
GEOLOGIST	TEXT	Traverse designated geologist name.
PARTNER	TEXT	Traverse partner.
PLANNED_BY	TEXT	Name of whomever planned this traverse beforehand.
LABEL	TEXT	A label text for usage on GIS or printed maps.
NOTES	TEXT	Remarks or notes on the traverse.
X_UTM	INTEGER	Projected X-coordinates of the traverse point.
Y_UTM	INTEGER	Projected Y-coordinates of the traverse point.
X_DMS	TEXT	Degrees Minutes and Seconds X-coordinates of the traverse point.
Y_DMS	TEXT	Degrees Minutes and Seconds Y-coordinates of the traverse point.
X_DD	REAL	Decimals Degrees X-coordinates of the traverse point.
Y_DD	REAL	Decimals Degrees Y-coordinates of the traverse point.
NM	REAL	Nautical mile distance between each traverse. Calculated from ORDER_VISIT then ORDER_FLIGHT.

Name	Attribute Type	Notes
NM_TO_CAMP	REAL	Distance, in nautical miles, from the traverse end node back to field camp.
NTS	TEXT	The National Topographic Sheet (NTS) value in which the traverse falls in.
AIR_PHOTO	TEXT	Air photo number associated with the traverse.
MAG_DECLIN	TEXT	The map magnetic declination the traverse is associated with.

M_DICTIONARY

Table used to track all scientific and generic vocabulary and literal string used within an application for filling out the database fields.

Attributes

Name	Attribute Type	Notes
OBJECTID	INTEGER	Auto-generated integer primary key.
TERMID	TEXT	A unique calculated GUID value to keep track of all different vocabulary values through database schema changes.
CODETHEME	TEXT	A human readable ID used to group a set of values used as an application drop down list.
RELATEDTO	TEXT	A field describing the relation of a given set of values. Used to filter down groupings based on a parent given value (e.g., CODETHEME = 'TEXTSTRUC' can have different values based on a lithologic group/type value, like hydrothermal, metaplutonic).
CODE	TEXT	The actual vocabulary code that will be saved within the database.
DESCRIPTIONEN	TEXT	A textual description of the vocabulary code, in English. This can be used to add capital-cased values or more elaborate description for visual purposes only.
DESCRIPTIONFR	TEXT	A textual description of the vocabulary code, in French. This can be used to add capital-cased values or more elaborate description for visual purposes only.
ITEMORDER	REAL	For a given group of vocabulary, this attribute can be used to order values within it for User Interface (UI) management.
DEFAULTVALUE	TEXT	For a given group of vocabulary, this attribute can be used to pre-select a default value. For User Interface (UI) management.
CREATOR	TEXT	The name of the committee or the person that created the vocabulary value.
CREATEDATE	TEXT	The date at which the value was created.
EDITOR	TEXT	The name of the committee or the person that edited the vocabulary value.
EDITDATE	TEXT	The date at which the value was edited.
USERREMARKS	TEXT	Any remarks or comments regarding the vocabulary value.

Name	Attribute Type	Notes
SYMBOL	TEXT	Attribute to store a mapping symbol associated with value. For User Interfaces (UI).
EDITABLE	TEXT	A boolean text-based field representing if the value can be edited by the end user.
VISIBLE	TEXT	A boolean text-based value representing if the value can be viewed in a User Interface (UI).
VERSION	REAL	The database schema version at which the value was introduced or modified.

M_DICTIONARY_MANAGER

Table that tracks which set of vocabulary needs to be used with which Field table (F_*) and also within which attributes. For example, vocabulary for F_STATION.OBSTYPE attribute needs to use a given set of values if used in a bedrock project, or another list of values if used in a surficial one.

Attributes

Name	Attribute Type	Notes
OBJECTID	INTEGER	Auto-generated integer primary key.
LINKID	TEXT	A human readable identifier that defines the group of values they are related to.
CODETHEME	TEXT	A human readable ID used to group a set of values used as an application drop down list. They can be used by one or more LINKID. They are used as a link to M_DICTIONARY for a block select.
SPECIFICTO	TEXT	A definition type of a field book current set of vocabulary is related to (e.g., Bedrock, Drill Hole, Surficial).
ASSIGNTABLE	TEXT	The assigned table name for the current vocabulary set of values.
THEMEDESC	TEXT	A little description of the set of vocabulary values and what they are meant for.
OUTPUTFILE	TEXT	Deprecated: name of the output text file containing the vocabulary values in the older system (GanFeld, 2008).
ASSIGNTOFIELD	TEXT	The field name assigned to a vocabulary set of values.
CAN_EDIT	TEXT	Boolean text value representing if the current vocabulary set is editable or not.
VERSION	REAL	The database schema version at which the value was introduced or modified.

Conclusion

In closing, the described data model is a good fit between reliable open-source practices and the ever-growing need of data collecting during field surveys. Usage of a relational database in the form of a GeoPackage gives the opportunity to have a light, SQL- and GIS-based model that can be transferred and used in the most major GIS software. This also adds to our legacy of field data collecting applications (Brodaric, 1997; Shimamura, K. et al., 2008) without tossing aside all the previous works done in the past by simply adding more themes to them.

This model will see some future releases and we are already planning on having more tables and features available to the end user after the related application GSC Field App has undergone major development changes.

This data model can be downloaded from the GSC Field Application Github website.

References

Brodaric, B. (1997). *Field Data Capture and Manipulation Using GSC Fieldlog v3.0.* US Geological Survey (US).

Huot-Vézina, G. (2024, 01 01). *Geological Survey Canada on site data collection for geologists.* Retrieved from GitHub, The complete developer platform to build, scale, and deliver secure software.: https://github.com/NRCan/GSC-Field-Application

Shimamura, K., Williams, S., & Buller, G. (2008). *GanFeld user guide: a map-based field data capture system for geologists.* Canada: Natural Resources Canada. doi:10.4095/226214