



Geomining Information
System of Québec



Step-by-step User Guide

Mastering the SIGÉOM Data

Énergie et Ressources
naturelles

Québec



STEP-BY-STEP USER GUIDE

Mastering the SIGÉOM Data

This document describes three ways to access the data in SIGÉOM using the same functions in three different work environments. Reading this document is like reading a cookbook: step by step. At the end of this exercise, you will be able to master the SIGÉOM data.

<http://sigeom.mines.gouv.qc.ca>

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Ministère de l'Énergie et des Ressources naturelles
General Direction of Géologie Québec

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1. Introduction

SIGÉOM data is a rich Quebec heritage. They cover more than 150 years of geoscience surveys and combine information and surveys from government, mining exploration companies, academic researchers and other sources. We estimate that this collective wealth represents an undiscounted value of \$4.4 billion.

SIGÉOM, whose first map was produced in 1993, has changed over the years, as have the formats for accessing and processing data provided. The 1993 customer offer, although not exhaustive, was published in Bentley's digital DGN format. Today, this offer has evolved into formats and modes of consultation that enable the acquisition and visualization of all the information available in SIGÉOM in terms of descriptive and geometric data. Information can also be accessed using the latest Internet technologies such as the Web Map Service (WMS) or the Interactive Map.

The purpose of this document is to guide the user in the choice of different access modes to the data so that they can compare them, understand the advantages and limitations of each technology (format) available. This guide is intended for all users of SIGÉOM, from the occasional user looking for general information on the geology of Quebec, through the geomatics professional who wants to compare data access technologies.

A summary table at the end of this guide compares the results obtained for the various functions presented. We designed this guide as a recipe book so that the reader could follow the steps and repeat them. We also recognize that we do not address all aspects of each technology and hope to improve this guide based on user feedback and enrich it over time.

The territory chosen for this guide covers NTS sheet 32F02, an area northeast of Val-d'Or near the town of Lebel-sur-Quévillon. This territory contains enough data to provide good examples, particularly for mineralization research. We have included some data that are available on the *Ministère de l'Énergie et des Ressources naturelles* FTP site, with the exception of sheet 32F02 geology data that can be obtained from the SIGÉOM website.

It is our hope that this guide will allow you to discover the richness of SIGÉOM geoscientific data and make it your own by choosing the format and/or technology that works for you.

2. The Interactive Map

The interactive map is Géologie Québec's web mapping application. This interactive map, available free of charge, allows you to locate and visualize a multitude of geological and mining data on the Quebec territory (geological units, mineral deposits, diamond drillings, mines and projects, etc.) and to link it to mining information (mining activities, mining titles) and geographic information (satellite images, hydrography, topography, etc.).

The use of the interactive map does not require any installation.

This map is compatible with Microsoft Internet 8+, Google Chrome 20+, Firefox 14+ Windows and Mac OS browsers.

During this demonstration, the Google Chrome 34 browser in Windows XP is used.

2.1 Access to Data

Consultation of the interactive map is free and does not require any authentication.

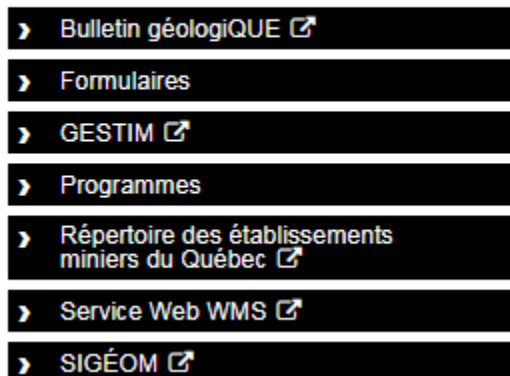
Direct URL: <http://carte-geomine.mrn.gouv.qc.ca>

OR

From the *Ministère* page: <http://www.mern.gouv.qc.ca/>

- in the horizontal menu bar, click the **mines** tab: **MINES**
- in the right section, under **Quick links**, click **SIGÉOM**

Liens rapides



- on the SIGÉOM home page, click on **Access** to open the interactive map.



INTERACTIVE MAP

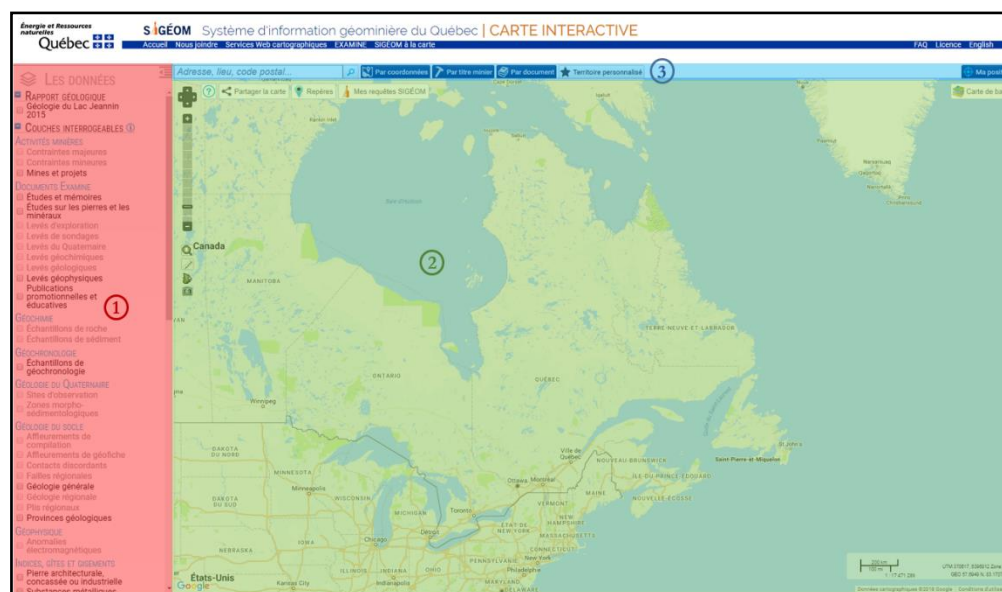
A friendly interface which gives a global overview of the SIGÉOM database.

[Access](#)



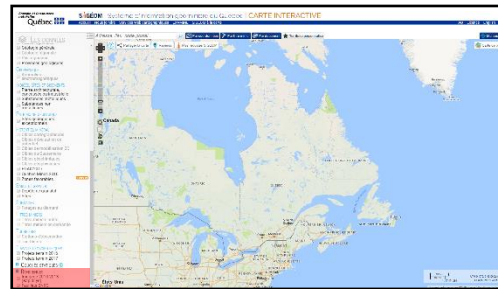
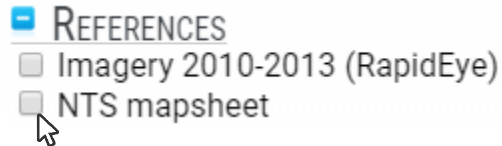
The page is divided into three sections:


- ① The menu
- ② The map section
- ③ The location section



2.2 Layer Display


1. From the **References** menu, check the **NTS mapsheet** layer.

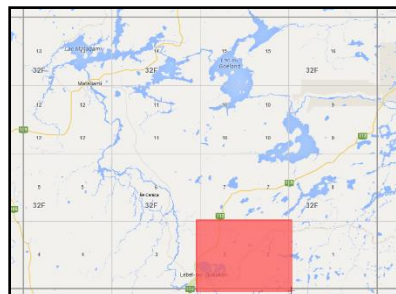


2. Click the **Zoom in**  tool for a larger view of the selected area.

3. Expand the area of sheet **32F**. To do this, hold the left mouse button to delimit the contour of the area of interest.



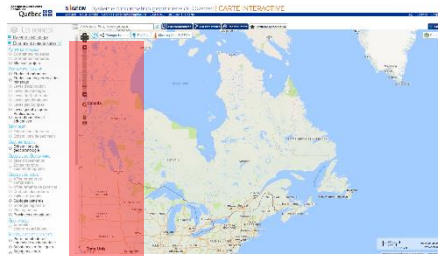
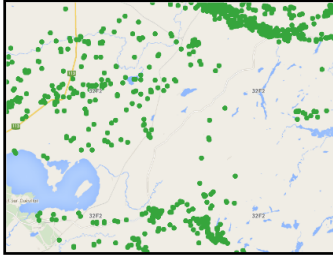
4. Click the **Zoom in**  tool again and frame sheet **32F02** to outline the enlargement contour.



5. In the **Data layers** menu

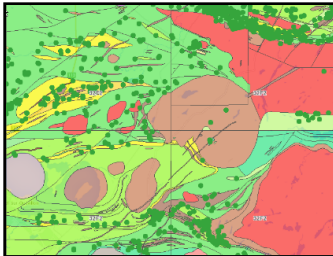
Check off the following layers:

☒ Diamond drillings



The interactive map offers simplified symbolization compared to that used in *SIGÉOM à la carte*.

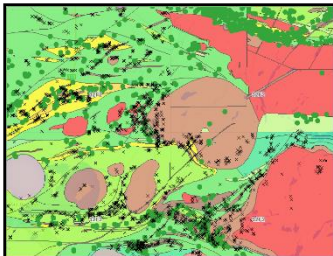
☒ Regional geology



Use the slide bar to adjust the transparency of the layer.



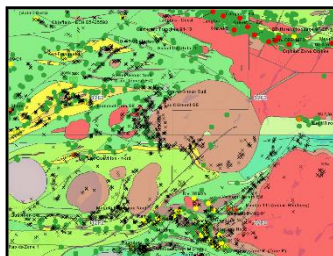
☒ Geofiche outcrops (GO)




The download icon creates a png image of the legend.



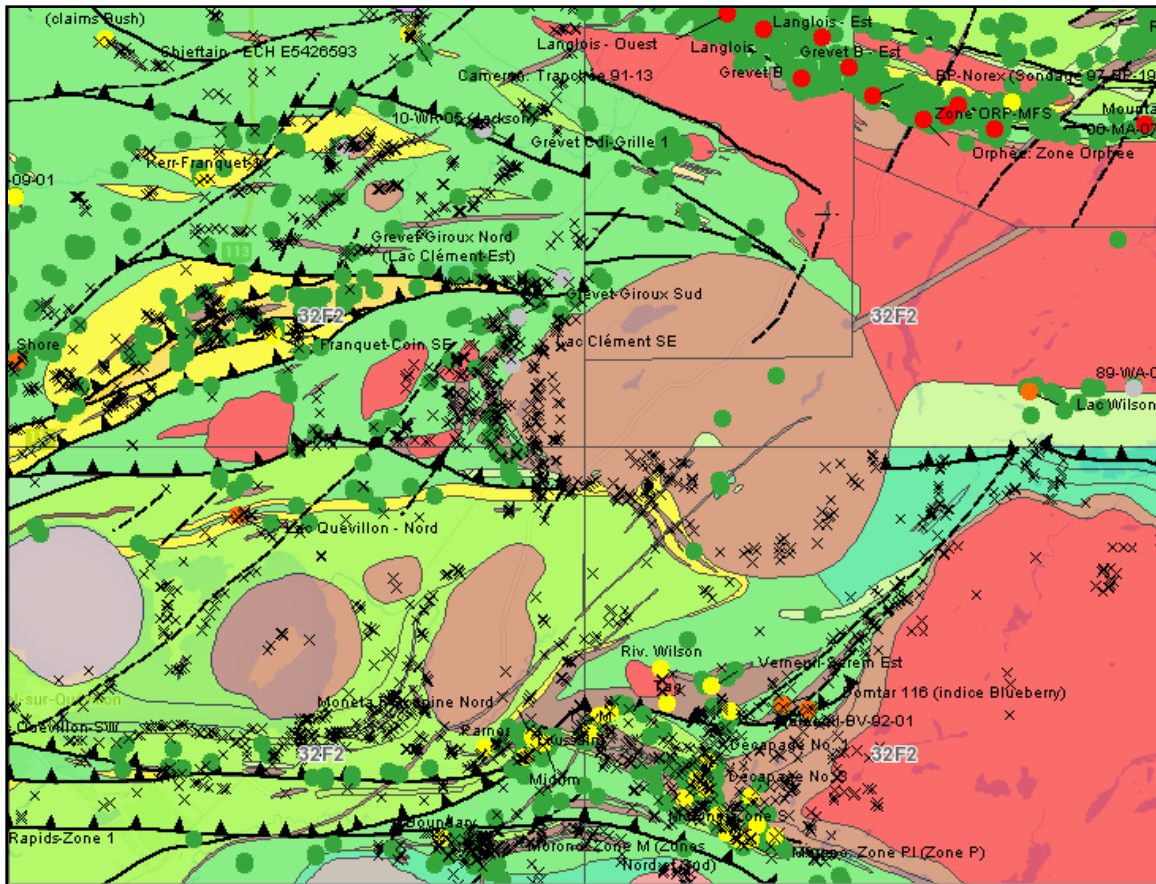
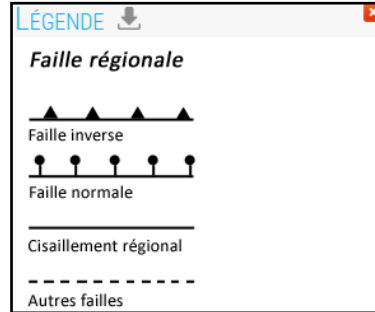
☒ Metallic deposits



The  icon opens the legend at the top of the map on the right. To close the legend, click on the  in the window.



☒ Regional faults



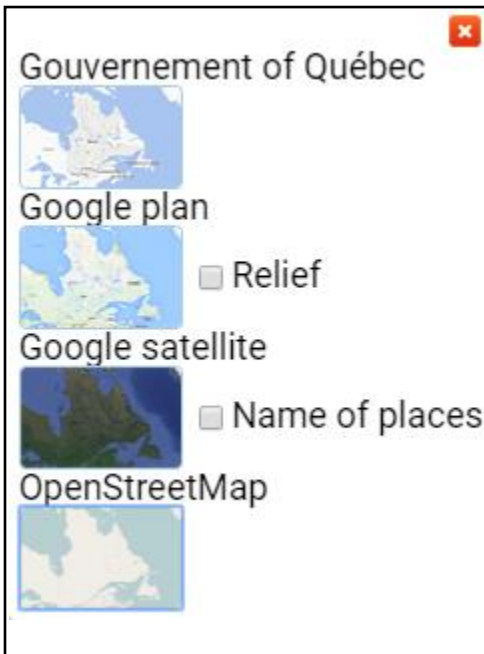
2.4 Adding Data from External Sources

It is not possible to add external data layers of your choice.

However, a choice of basic maps is available for the topographic background. This data comes from Google and OpenStreetmap.

1. In the **Static layers** menu, uncheck the **Vertical gradient of high resolution residual total magnetic field** layer.

2. Click the button



3. Click on the image  to activate the **Google satellite** layer.

4. Check the option ☒ Name of places to display the names of cities, roads, etc.

To return to the initial baseline map, click on the image



*to activate the layer **Google plan**.*

2.5 Relational Data Model

Not represented. Data is simplified.

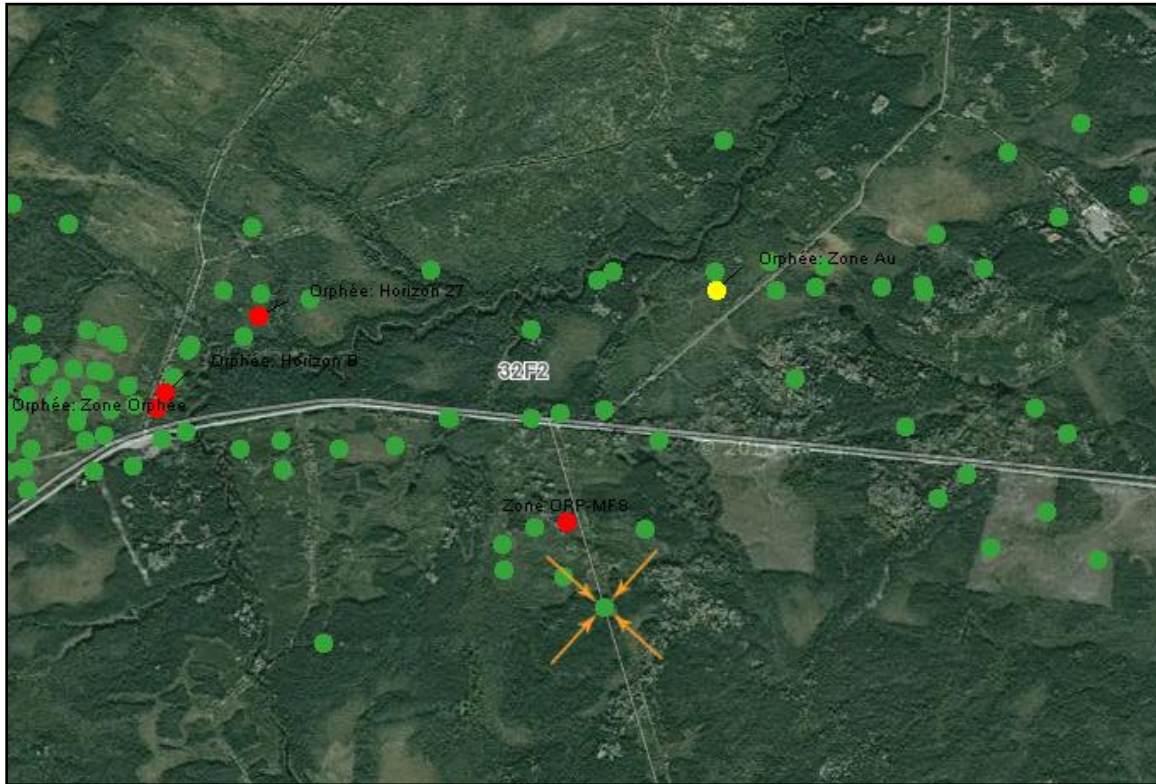
To query an item, simply click on an item on the screen using the left mouse button and view the information in the dialogue box.

1. In the **Data layers** menu, uncheck the **Geofiche outcrops (GO)** and **Regional faults** layers to lighten the map.

- 

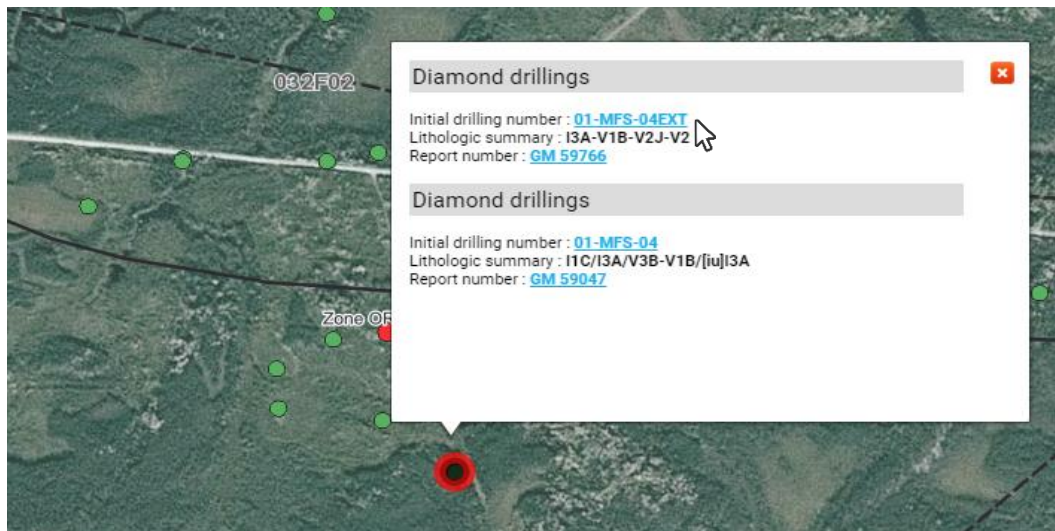


4. Click on the **Diamond drillings** item , identified by orange arrows on the image below.



Note that the system displays information for all active layers and overlaid data.

5. In the information box, click on the **01-MFS-04EXT** link of the second diamond drilling.



*At this stage of the guide, we want to demonstrate the links that exist with SIGÉOM à la carte. A drilling other than **01-MFS-04EXT** could be selected.*

A new window opens and directs you to the corresponding item in *SIGÉOM à la carte*.


The screenshot shows the SIGÉOM web interface. On the left is a sidebar with the 'GÉOLOGIE Québec' logo and a 'QUERY 1' section containing links like 'New query', 'Refine query', and 'List of queries'. Below this is a 'RESULTS OF THE QUERY' section with links for 'View an interactive map', 'KML download', 'Download of GDS/RSR', 'Checkout', 'DISPLAY FORMAT', and 'complete'. The main content area is titled 'Diamond drilling' and contains a list of metadata fields: NTS map-sheet number (32F02), Report number (GM 59766), Initial drilling number (01-MFS-04EXT), Year drilling (2002), Name document holder (9069-0900 QUEBEC INC. BREAKWATER RESOURCES LTD. RESSOURCES METCO INC. SCORPION MINERALS INC), Company author (CHIMITEC LTEE, LABORATOIRE D'ANALYSE BOURLAMAQUE LTEE), Lithologic summary (I3A-V1B-V2-JV2), Diamond drilling comment (TOWNSHIP/seigneurie: MOUNTAIN), Rank number, Lot number, Location specification (High precision of location), Quadrant 1, Quadrant 2, Zone (18), Easting (385656), Northing (5452215), Starting azimuth (344), End azimuth (10), Plunge start (53), Plunge finish (41), Extra-EXAMINE document (GM 59047), and Date of release (20040727). Below this is a 'Lithologic unit' section with a table for 'Mineralization sequence'.

Chemical element	Minerals	Grade	Grade unit	Length
Zn		7200	ppm	1
Ag		7.1	ppm	1

Below the table, there are two more lithologic units listed: V2J,CL,SPY,P0-V1B,SI+,CL+,GA,PYP0-13 and V2,CL,SI-13,PYP0.

This page displays all the information available in SIGÉOM. It provides, among other things, access to Examine documents related to this drilling. A hyperlink is available pointing to GM59766 and allows access to the original document.

6. Close the page **Géologie Québec – Results of the query**.

When you return to the interactive map page, you can close the information box by clicking .

2.7 Data Editing

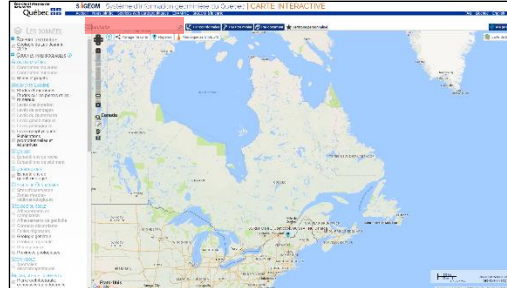
Data editing is not possible.

2.8 Dynamic Location

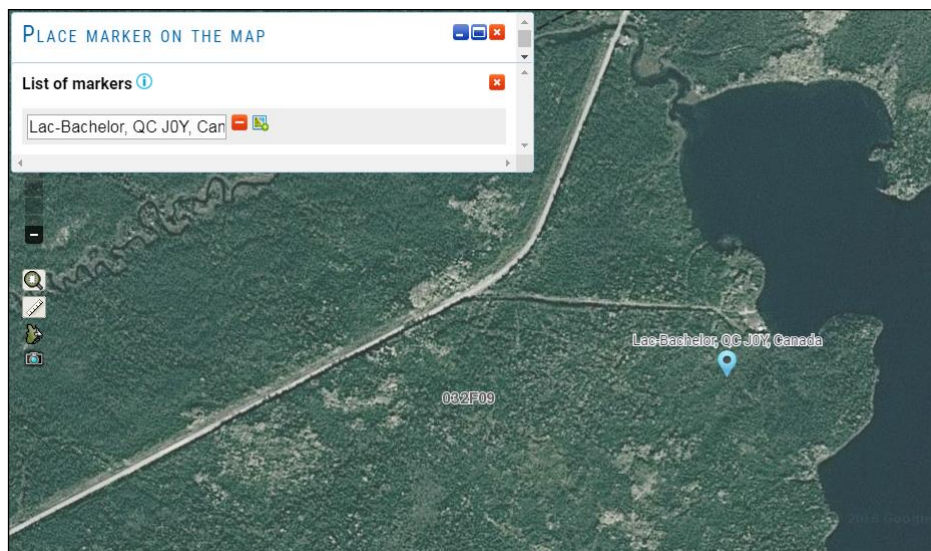
Text can be freely entered in the search field to look for a place, city, address or postal code.

1. In the **Address, place, postal code** field located in the Location section, type: **bachelor** and click on .





The system zooms in on **Lac Bachelor, Baie-James** and creates a **marker**. Push the “Markers” button  to access the markers' information box. Note that a **List of markers** is available.

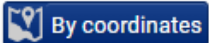


*A **marker** is a point created on the map with wording (name). Markers are retained as long as the internet browser is open.*

*It is possible to change the name, delete a marker  or zoom in on a marker  from the **List of markers** information box.*

2.9 Location with a Coordinate

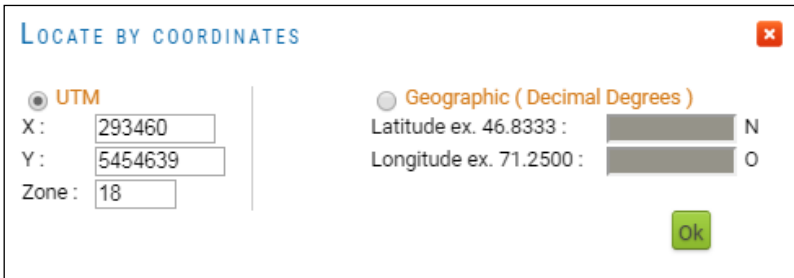
It is possible to locate a point on the map from its coordinates. The system will zoom in on this location and place a marker.

1. Click on the button  **By coordinates**
2. Type the following values in the UTM section and click the **Ok** button (example of coordinates from document GM 59766):

X: 293460

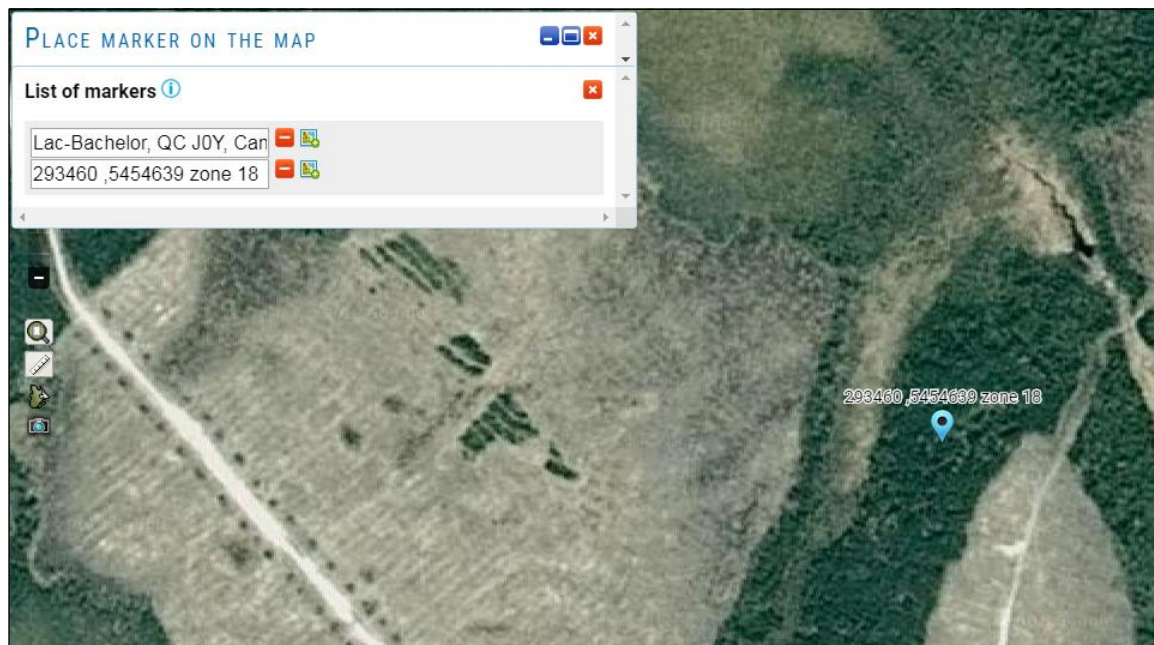
Y: 5454639

Zone: 18

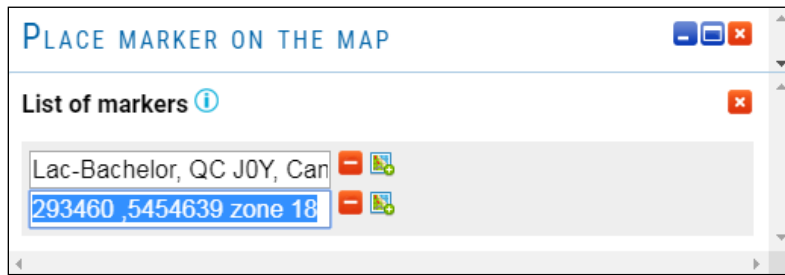


The dialog box titled "LOCATE BY COORDINATES" has a close button (X) in the top right. It contains two sections: "UTM" and "Geographic (Decimal Degrees)". The "UTM" section is selected with a radio button and contains three input fields: "X:" with the value "293460", "Y:" with the value "5454639", and "Zone:" with the value "18". The "Geographic" section is unselected and contains two input fields: "Latitude ex. 46.8333 :" and "Longitude ex. 71.2500 :", each followed by a unit selector (N and O respectively). A green "Ok" button is at the bottom right.

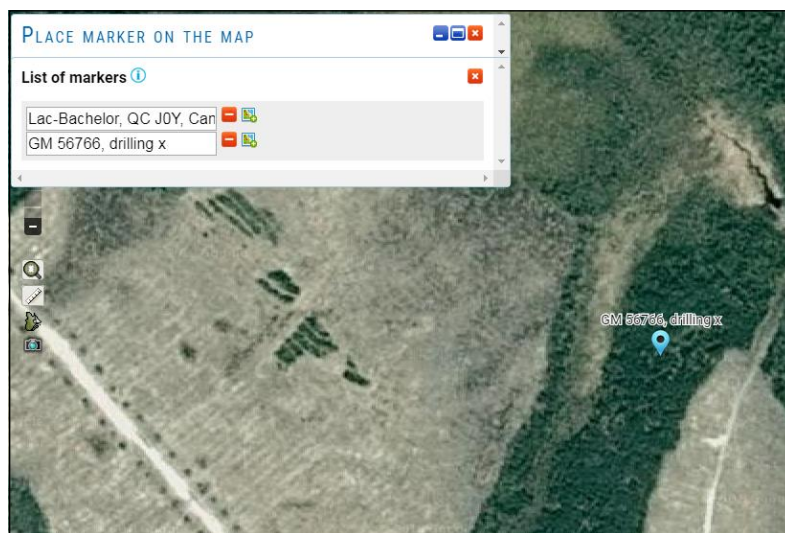
A new marker is added to the **List of markers**.



3. Select the default text from the last marker and delete it.


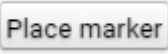



4. Replace the default name with **GM 56766, drilling x** by typing in the text box of the marker.

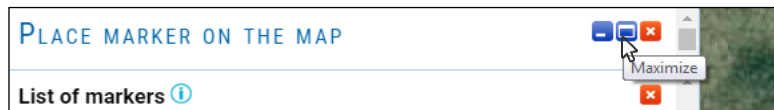


The wording (name) is automatically changed on the map.

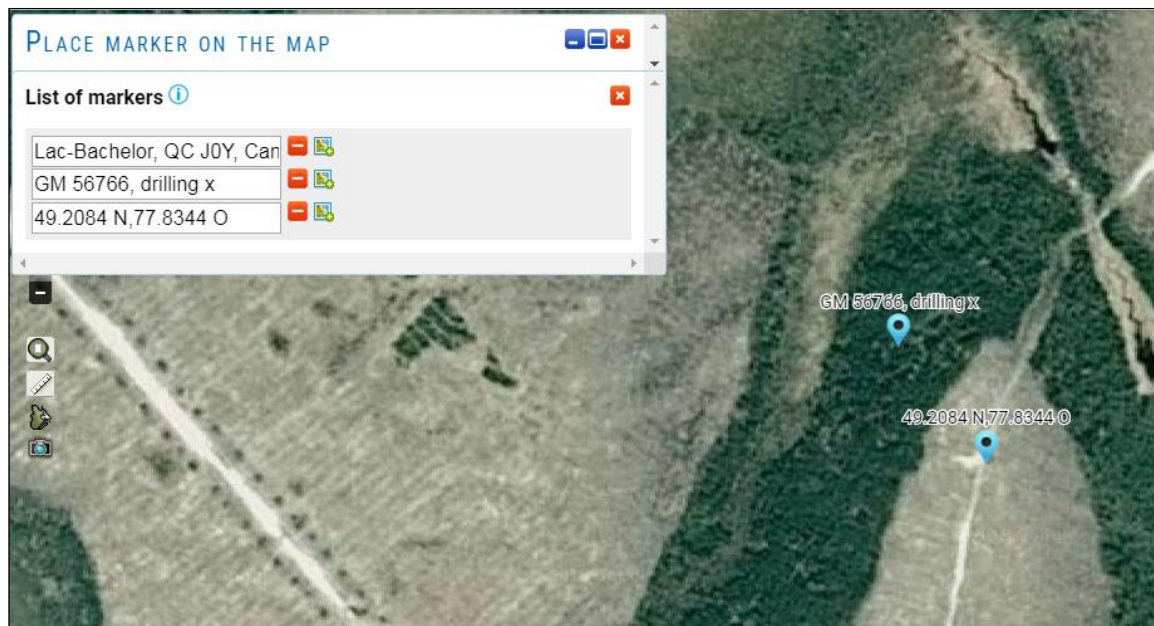
2.10 Placing a Freehand Marker

1. Click the button  if the markers' information box is not visible.
2. In the **Freehand on the map** section, click the button . The information box closes and the cursor is replaced by .

*If you do not see the **Freehand on the map** section, click on the button  to expand the window.*




3. Place a marker somewhere by clicking on the map. This new marker is added to the **List of markers**.

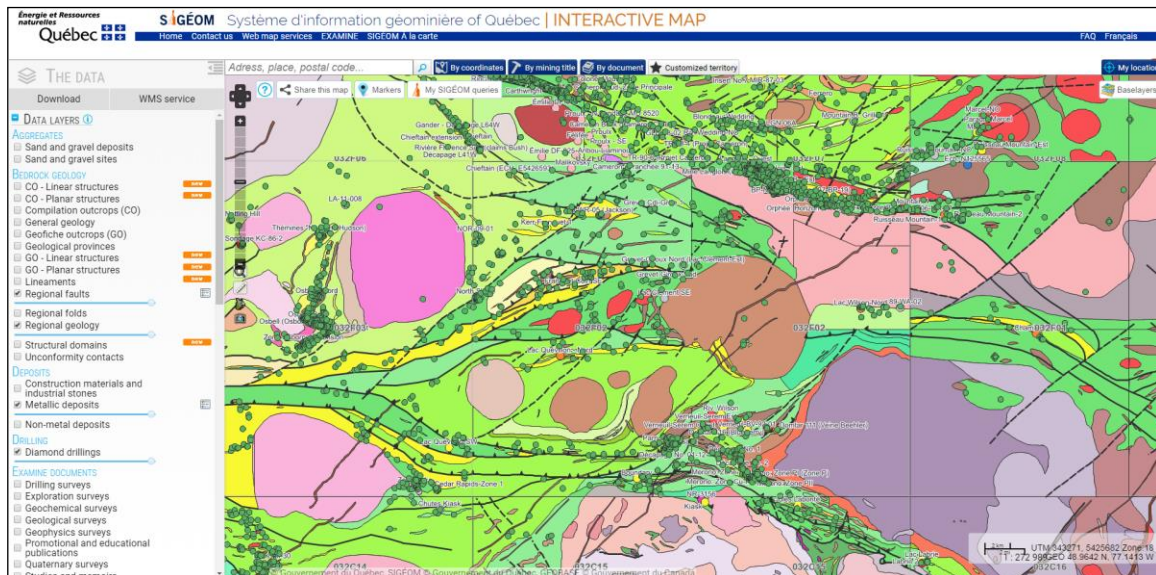


2.11 Sharing the Map

It is possible to share your map as it appears on the screen with other users.

1. If necessary, close information boxes on the map by clicking on .
2. Zoom out to get an overview of the data and markers. To do this, use the slide bar of navigation tools or simply the mouse wheel.

In this example, the **Regional geology**, **Regional faults**, **Metallic deposits** and **Diamond drillings** layers were activated.



3. Click the button  and select the first link.

SHARE MAP

 Facebook  Twitter  Google+

Copy/paste the links below in mail, browser to share this map.

Standard version
http://sigeom.mines.gouv.qc.ca/signet/classes/11108_afchCarteIntr?l=A&m=B&ll=48

Light version
http://sigeom.mines.gouv.qc.ca/signet/classes/11108_afchCarteIntr?l=A&m=B&ll=48

Paste HTML to embed in website

`<iframe width="425" height="350" frameborder="0" scrolling="no" marginheight="0"`

4. Copy the selected link to a new web window to see the result. The map opens as it appears in the source window.

This example shows that the result is similar in both windows. These sharing links can be used to share information among collaborators, add a map to a blog, wiki or web page, etc.

Several ways to share the map

- sharing links via Facebook, Twitter and Google+

- Copy and paste a link: this field contains an URL that you can copy and paste into an email, an instant message (Facebook, Twitter, LinkedIn, etc.) or add to a collaborative tool (blog, wiki).

- *Paste the HTML code to a website: you can copy and paste this HTML code to add the map to your website.

The image displays a composite of three elements illustrating map sharing options:

- Top Left:** A screenshot of a web browser showing a map titled "Mines actives" (Active Mines) in Quebec. The map is part of a website with a header "Industrie minière". Below the map is a table with the heading "MINES ACTIVES" and columns for "Projet", "Promoteur", "Substance", and "Région".
- Bottom Left:** A screenshot of a Twitter post from the account "MERN - Québec @MERN_Quebec". The tweet includes the text "Découvrez les mines actives du Québec" and a link to the interactive map: http://siggeom.mrn.gouv.qc.ca/signet/classes/11108_afchCarteIntr?m=B&ll=53.53000,-69.24000&z=5&c=map100&op=pehyla11.
- Right:** A "New Message" dialog box from an email client. The "Subject" field is empty. The body of the message contains the text "À voir sur la carte interactive Sigéom" followed by the same URL as in the tweet: http://siggeom.mrn.gouv.qc.ca/signet/classes/11108_afchCarteIntr?m=B&ll=53.53000,-69.24000&z=5&c=map100&op=pehyla11.

2.12 Searching for Gold Anomalies in Drilling

Using the search functions of *SIGÉOM à la carte*, gold anomalies in drilling can be identified. In this example, we will select drillings that contain an intermediate volcanics (V2) description with geochemical analysis exceeding a threshold of 1000 ppb (1 g/t) gold.

1. From the [SIGÉOM à la carte](http://sigeom.mines.gouv.qc.ca) homepage [http://sigeom.mines.gouv.qc.ca], click on the highlighted title in the **Drilling/Diamond drilling** section. You will be directed to the right place in the list of themes belonging to SIGÉOM.



Click on the desired topic of the theme (**Diamond drilling**) to submit the subject's query form.

DRILLING



2. Enter the following values in the appropriate fields.

NTS map-sheet number	is equal to ▼	32F02	> Values
Report number	starts with ▼		> Values
Initial drilling number	is equal to ▼		
Year drilling	is equal to ▼		
Name document holder	is equal to ▼		> Values
Company author	is equal to ▼		> Values
Lithologic summary	is equal to ▼		
Township/seigneurie	is equal to ▼		> Values
Date of release	is equal to ▼		

Lithologic unit			
Lithology	includes ▼	V2	> Values
Depth	is equal to ▼		

Mineralization sequence			
Chemical element	is equal to ▼	Au	> Values
Minerals	is equal to ▼		> Values
Grade	is greater than ▼	1000	
Length	is equal to ▼		

3. Click the **Search** button on the left hand menu to run the query.

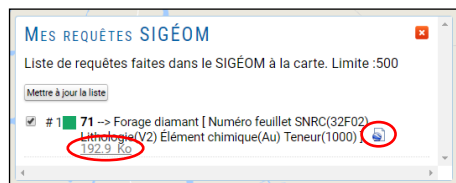
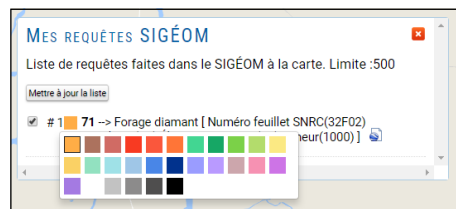
	Initial drilling number	Year drilling	Report number	NTS map-sheet number	Lithologic summary	Diamond drilling comment
1	06-GRM-174	2006	GM.65016	32F02	I2J/V2J/I3A/V1/V1B/I1N/V1D	
2	07-GRM-176	2007	GM.65016	32F02	V2/V1/V3/I1N/I1D	
3	07-GRM-206A	2007	GM.65016	32F02	V2/TUJ/I1N/I1/I2/M25/V1/TUJ/F2	
4	07-ORP-109B	2007	GM.63517	32F02	V2J/I3A/F1	
5	08-GRM-262	2008	GM.65016	32F02	V3/TUJ/V2/TUJ-V1/TUJ-F1	
6	10-ORP-155A	2010	GM.66733	32F02	V3B/V1/TUJ/V2J/V2/V3/V3/V4/I1B	
7	97-BP-19	1997	GM.55922	32F02	V2/M8/V1/I3A	
8	CA2013503	2013	GM.68891	32F02	V3/V2-I1/IJ	
9	CA2013504	2013	GM.68891	32F02	V3/V3/I3/V3/V2	
10	CA2014505	2014	GM.69173	32F02	V2J	
11	M-23-87	1987	GM.45323	32F02		
12	M-24-87	1987	GM.45323	32F02		
13	M-25-87	1987	GM.45323	32F02		
14	M-26-87	1987	GM.45323	32F02		
15	M-27-87	1987	GM.45323	32F02		
16	M-31-87	1987	GM.45323	32F02		
17	M45-87	1987	GM.47624	32F02		
18	NOR-09-01	2009	GM.65735	32F02	S/V1/V2/S6A/I3	
19	NOR-10-04	2010	GM.65735	32F02	V3/V2-S	
20	NOR-10-08	2010	GM.65735	32F02	V3/V2/S/I2	

4. Click the button **View on interactive map** on the left menu.

A new tab opens and the query generation is initiated. When completed, a zoom is applied to the elements of the **Diamond drilling** query.

By default, the symbol used to identify drillings that meet the criteria is an orange circle. You can change the colour of the queries by clicking on the button **My SIGÉOM queries**.

For the **Diamond drilling** query, click on the orange square and select a new colour.



A KML file (Keyhole Markup Language) is generated for each query made in *SIGÉOM à la carte*. However, results of the query must not exceed a limit.

2.13 Printing

To print the interactive map, use the **Printscreen** function on your keyboard.

There are several freewares available to save screenshots in different formats (PDF, jpeg, gif, png, etc.). Here are some links:

Picpick: <http://www.picpick.org/en/>

FastStone capture: <http://www.faststone.org/FSCaptureDetail.htm>

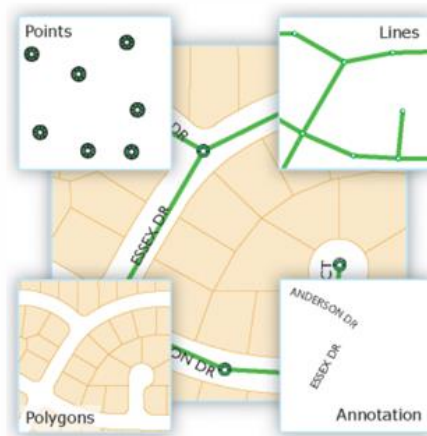
However, the Ministère de l'Énergie et des Ressources naturelles and Géologie Québec does not endorse or support these freeware programs in any way.

3. Data Layer

3.1 Types of Geometric Layouts of Layers

Entity classes represent homogeneous sets of common entities, all with the same spatial representation (such as points, lines or polygons) and a common set of attribute columns (descriptive).

The four most commonly used types of layouts are points, lines, polygons and annotations (name of map text in geodatabases).



Entity Class Type



Points

Entities too small to be represented as lines or polygons, and point locations (e.g. GPS observations).



Lines (polylines)

Represent the shape and location of geographic objects too narrow to be displayed as surfaces. Lines can also represent entities that have a length but no surface, such as isolines and boundaries.



Polygons

A set of surface features with many sides representing the shape and location of homogeneous entity types such as states, departments, parcels, soil types and land use zones.



Annotations

Map text including text rendering properties. Annotations can also be linked to entities and contain subclasses.

3.2 Extracting Data Layers from SIGÉOM

Extracting SIGÉOM data is free and requires no authentication. For a layer order, please refer to the “Vector data and web Service” stream by clicking “*SIGÉOM à la carte*” on the home page.

Products offered via SIGÉOM:

- Quebec-wide SIGÉOM database in FGDB format;
- Quebec-wide SIGÉOM database in Shapefile (shp) format;
- database by entity (*à la carte* data) with the ability to filter results using a query.

Products available through the Government of Quebec’s open data site (<https://www.donneesquebec.ca>):

- Quebec-wide SIGÉOM database by entity group in FGDB format;
- Quebec-wide SIGÉOM database by entity group in Shapefile (shp) format;

Note that within each entity group, a layer exists for each of the SIGÉOM entities.

3.3 Symbolology of Layers

Symbols are graphic elements used in map views. There are four basic types of symbols:

- Point symbols are used to display the position of points or embellish other types of symbols.
- Linear symbols are used to display linear boundaries and features.
- Fill symbols are used to fill polygons or other surfaces such as map backgrounds.
- Text symbols are intended for the font, size, colour and other properties of label and annotation text.

The value of specifying the symbology of a layer in the project (not in the database) is to be able to modify it based on representation needs. ArcMap offers you the opportunity to use the information contained in the layer database to define how entities will be represented.

A layer used in two different projects may have a different representation in each. A layer used several times in the same project may also have several different representations for each of its occurrences.

The aspect you give your data will be very important in how the user may understand and use it. Symbols can be used to meet two needs:

- The first, the most obvious, is the need for representation to produce a printed document (a map). The choice of symbolization should allow the user to understand the message the map is intended to convey.
- The second need would be to facilitate various data work. For example, symbolization may be modified to facilitate editing (adding or deleting entities), validations or data inspections.

When retrieving data from SIGÉOM, symbology is unique to each of the layers of the .mxd project extraction. The information in this symbology is stored in the **SIGEOM.style** file in the extraction **Symbolization** folder. In the same folder, refer to the **Installation.txt** files for the use of this style file.

3.4 Coordinate System

SIGÉOM spatial data is designed in a system of specific coordinates, whether points, lines or polygons. It is therefore possible to consult the geometric information precisely using the coordinate system on Quebec territory.

Data extracted from SIGÉOM in SHAPEFILE and FGDB format are recorded in geographic coordinates in the geodetic reference system NAD83 based on the ellipsoid GRS80. It is possible to change the coordinate system at the data source or only when viewing the data in a GIS.

Refer to Annex 2 for different ways of doing this using ArcGIS and QGIS GIS softwares.

4. QGIS – Free GIS Software (Geographical Information System)

QGIS provides the ability to visualize, create, edit, generate, explore and analyze data, and integrates many vector, matrix, database and other formats. It manages matrix image formats (GRASS GIS, GeoTIFF, TIFF, JPG, etc.) and vector data (Shapefile, ArcInfo, FGDB, Mapinfo, GRASS GIS, etc.) as well as databases.

4.1 Cost

QGIS is free and distributed under the [GNU General Public Licence](http://fr.wikipedia.org/wiki/Licence_publicque_generale_GNU) [http://fr.wikipedia.org/wiki/Licence_publicque_generale_GNU].

4.2 Installation

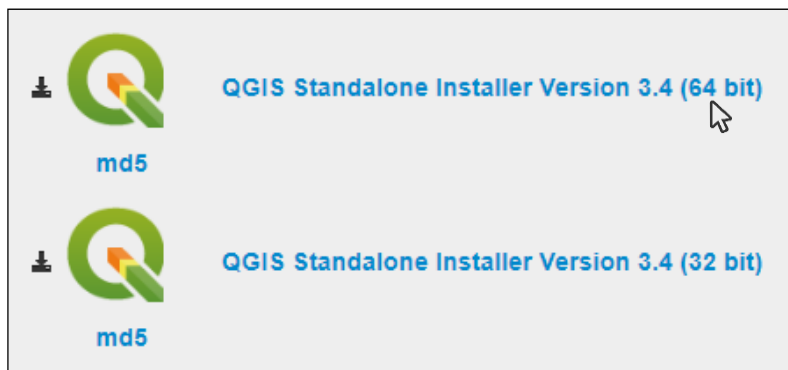
QGIS is software designed to operate on multiple platforms. It is compatible with Windows, Linux, Unix, Mac OS X and Android.

For this demonstration, version 2.18 (Las Palmas) is used on Windows 7 Professional.

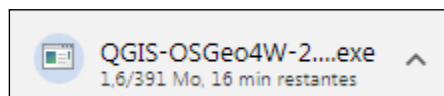
1. To download the software, go to:

<https://www.qgis.org/fr/site/forusers/download.html>

2. Select the download for your operating system, make sure you have the correct version.



Wait until the installation run file is uploaded to your station.



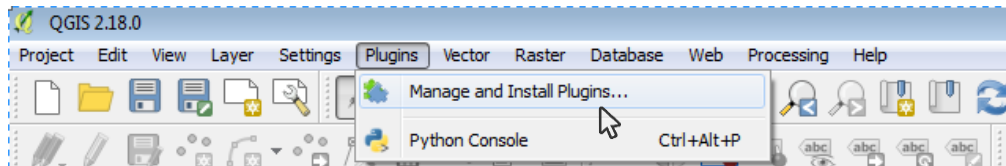
3. Select **Run** and follow the installation steps.

4. Start **QGIS Desktop**

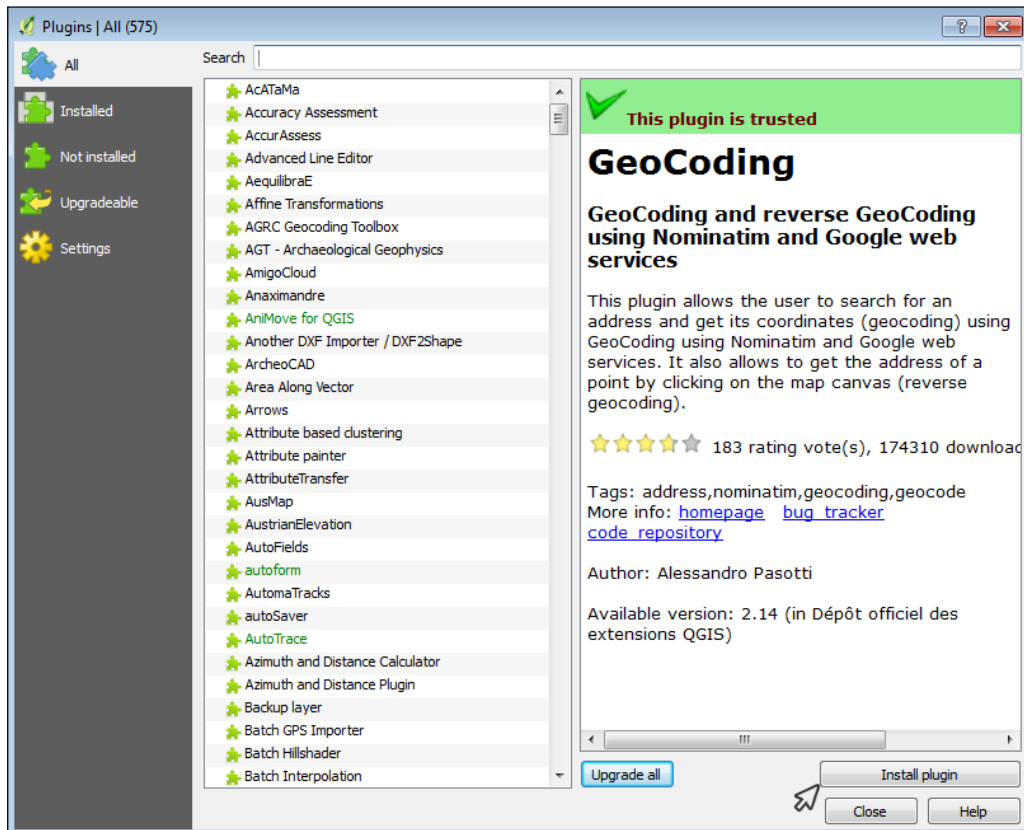
5. You need to install the following extensions for the next demonstration:

- **GeoCoding** (to find an address, a place)
- **Pin Point** (to manually place a point)
- **ZoomToCoordinates** (to zoom in on a coordinate area)

6. From the top menu of the window, click **Plugins** and **Manage and Install Plugins...**



7. For each extension, you must select it from the list and click **Install plugin** at the bottom right of the window.



8. When all three extensions are installed, close the window.

Access to SIGÉOM geomatics data (FGDB and Shapefile) is available at the following address:
http://sigeom.mines.gouv.qc.ca/signet/classes/I1102_aLaCarte?l=A

Vector data are available individually via **Data retrieval with SIGÉOM à la carte**, or **by NTS-sheet number**.

Énergie et Ressources naturelles Québec

Sigéom

Système d'information géométrique de Québec | SIGÉOM À LA CARTE

FAQ Français

DATA DOWNLOAD

The SIGÉOM database for the province of Québec is organized by themes. The data can be downloaded below in ArcGIS File Geodatabase (FGDB) and Shapefile formats.

Last update: 01 February 2019.

FGDB (ARC GIS FILE GEODATABASE) FOLDER

SHAPEFILE FOLDER

Before downloading data, please read the [conditions of access and use relative to our products](#).

DATA RETRIEVAL WITH SIGÉOM À LA CARTE

This tool allows to consult available geoscientific and descriptive data by using various search criteria applied to themes or to NTS 1:50,000 map sheets. Files are delivered in ArcGIS File Geodatabase (FGDB), ShapeFile and KML formats. Note that available data are [continuously updated](#).

BY NTS-SHEET NUMBER

It is possible to search available data for each NTS 1 : 50,000 map sheet in Québec.

BY THEMES

AGGREGATES	BEDROCK GEOLOGY
Sand and gravel deposits / Sable and gravier site	Structural domains / Structural domain / Geological area / Lineament / Regional fault / Geological contact / Compilation outline / Bedrock outcrop / Regional fold / Outcrop outline
DEPOSITS	Diamonds
Construction materials, crushed, industrial stone / Nonmetallic deposit / Metallic deposit	Diamond drilling
GEOCHEMISTRY	GEOCHRONOLOGY
Rock sample / Sediment sample	Geochronology
GEOPHYSICS	MINERAL POTENTIAL
Electromagnetic anomaly / Isoline	Mineral exploration targets / Favorable area
Mining Activities	Mining titles
Mines and projects	Mining rights / Mining rights on demand
PLATEAU ENVIRONNEMENTS	Quaternary Geology
Peatlands	Morpho-sedimentological zone / Surficial landform / Erratics boulders / Glacial erosional forms / Observation sites


1. Click the button **BY NTS-SHEET NUMBER** on the **SIGÉOM à la carte** page. In the search environment, enter the **32F02** NTS sheet number. Then, click **Search** from the menu on the left.

By NTS-sheet number

NTS map-sheet number	
Date première diffusion produit	is equal to
	is equal to

32F02

2. Click on **Download (FGDB/SHP)** from the left menu.



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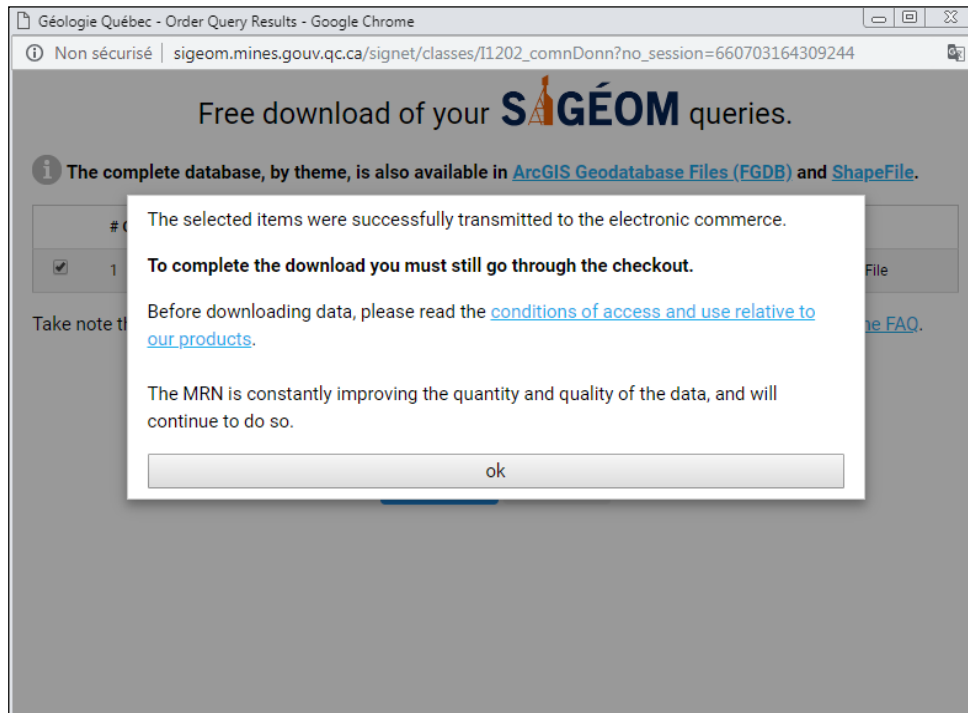
SIGÉOM

Menu

- Query 1
- New query
- Refine query
- List of queries
- Download (PDF, CSV, etc.)**
- Checklist

By NTS-map-sheet number		NTS map-sheet number : 32F02		1 of 1	
		Date première diffusion produit : 2019-01-25 00:00:00			
				Produit Atlas Couche	
Provenance	Compte	Date première diffusion couche			
Completion outcrop	67	2013-11-12 09:00:55			
Géotiche outcrop	2005	2017-12-20 11:11:22			
Anomaly	4303	2010-09-16 00:00:00			
Outcrop outline	418	2015-08-25 11:29:49			
Exploration target	107	2016-11-22 09:00:58			
Geological contact	706	2018-02-20 13:23:15			
Rock sample	4414	2016-06-13 00:00:00			
Sediment sample	871	2014-11-18 09:00:00			
Diamond drilling	1551	2019-01-25 00:00:00			
Regional fault	79	2018-02-20 13:23:15			
Geochronology	2	2012-02-10 00:00:00			
Metallic deposit	55	2017-07-14 00:00:00			
Glacial erosional forms	2	2015-04-23 14:32:27			
Non-metallic deposit	1	1978-01-01 00:00:00			
Isoiline	1089	1995-10-15 00:00:00			
Geomining survey	801	2018-12-20 02:00:00			
Mines ans projects	1	2012-09-01 00:00:00			
Regional fold	5	2018-02-20 13:23:15			
Pest	64	2016-06-10 00:00:00			
Geological zone	286	2018-02-20 13:23:15			

3. In the order window, select a coordinate system from the drop-down menu. Similarly, select a zone if necessary.
4. Click **Confirm** to add the product to the *Ministère* shopping cart. Click **OK** in the confirmation message.

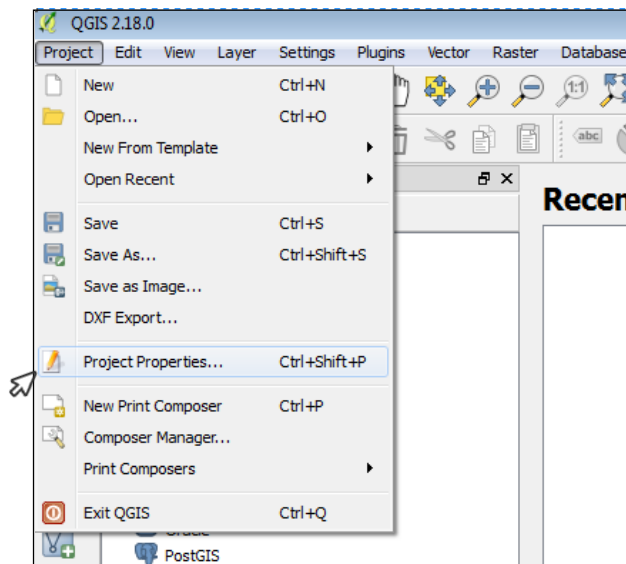


5. Click **Checkout** on the left menu to perform the payment steps. Following your payment, you will receive a secure email to confirm your purchase.
6. Once the file is ready, another email will be sent to you with a link to the download page. Click on the link.
7. On the download page, click on the product and save the zipped file to your computer. The zipped file contains both data formats in the Shapefile and FGDB subfolders.
8. Close your browser windows.

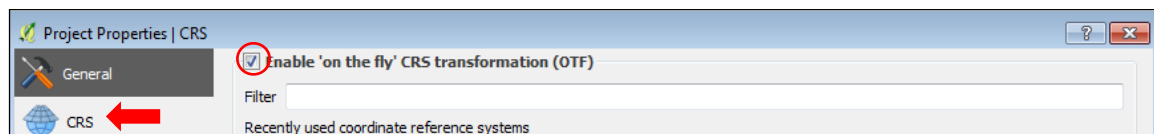
4.4 Layer Display in QGIS

4.4.1 Project Preparation

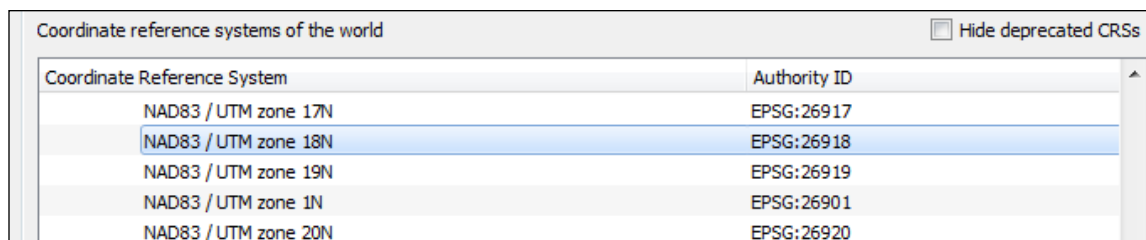
1. From the menu bar, click on **Project** → **Project Properties...**



2. In the left menu, click **CRS** and check the **Enable 'on the fly' CRS transformation (OTF)** option at the top of the right section.



3. In the right section, under **Coordinate Reference System**, select from the tree structure **Projected coordinate system** → **Universal Transverse Mercator (UTM)** → **NAD83 / UTM zone 18N (EPSG: 26918)** and click **OK**.




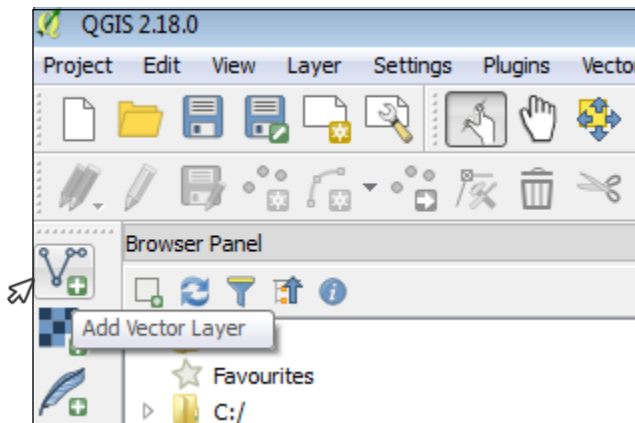
By activating this option, we ensure that all added layers are in the right projection, that is, the project.

4.4.2 Import Shapefiles (Form Files) and an Entity Class from a FGDB

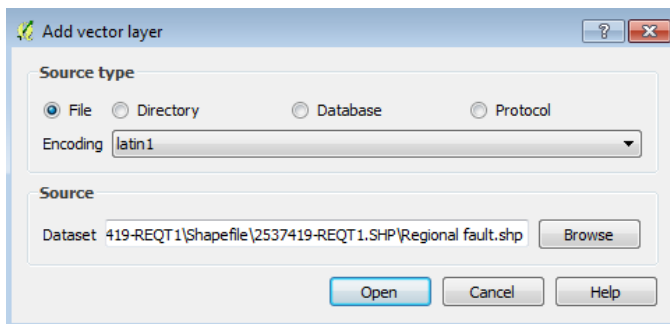
For the demonstration we will use the following layers:

- Geofiche outcrop
- Diamond drilling
- Regional fault
- Metallic deposit
- Geological zone
- 1:50 000 NTS sheet

1. To add data in Shapefile format, click on the button  (**Add Vector Layer**).

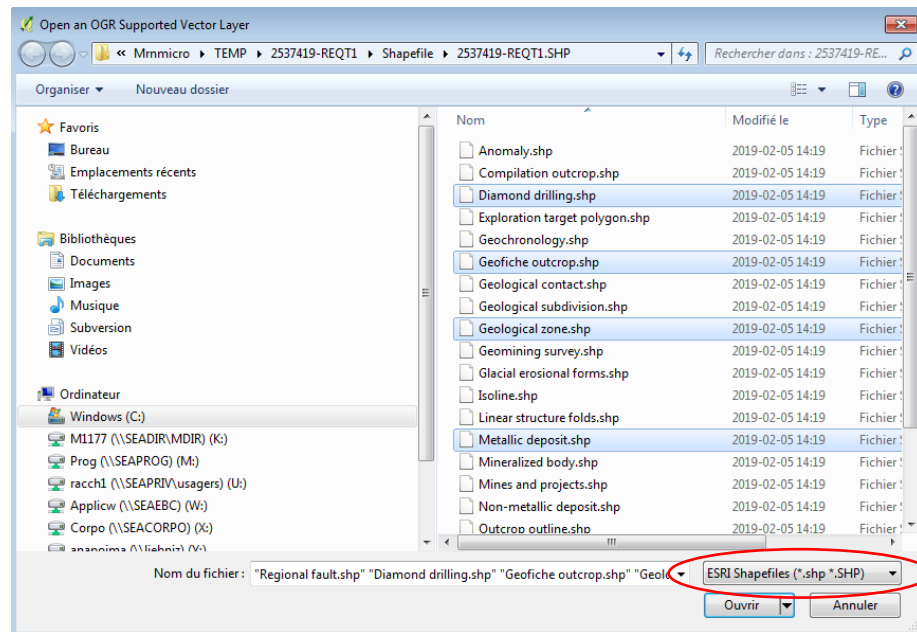


2. For the **Encoding** field, select **Latin1** (accented characters) from the drop-down menu.




3. In the same window, click **Browse** and select data of the **Shapefile** subsystem 32F02 from your folder. To do so:

- Select from the drop-down menu **Type files**, ESRI Shapefiles (*.shp *.SHP)
- Hold CTRL on the keyboard and select the desired layers.

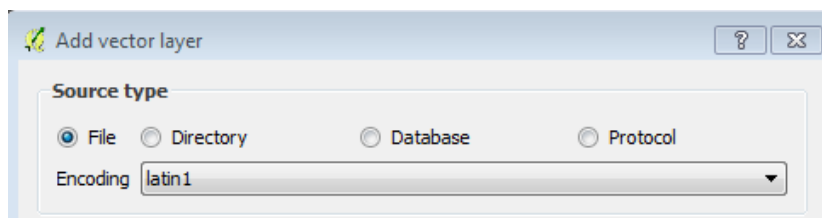


4. Click **Open** to confirm the file choice.

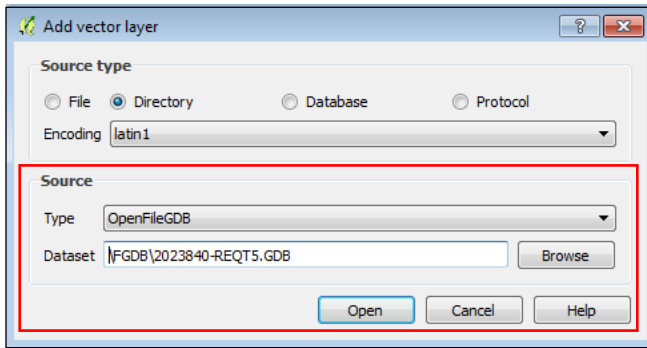
5. Click **Open** in the **Add vector layer** window to add layers to your project.

6. In extracting your data from sheet 32F02, an entity class of the 50k map index is located within the geodatabase file. Click the  (**Add vector layer**) button to add this layer.

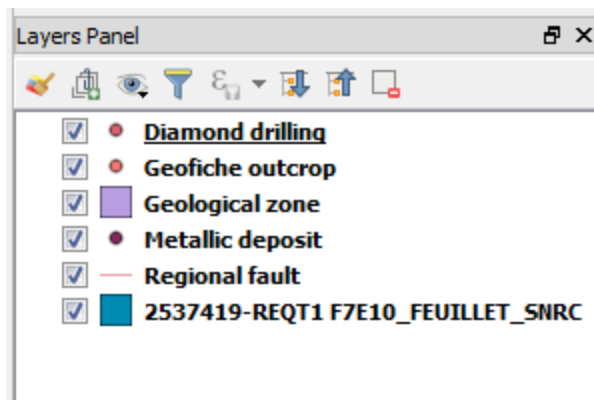
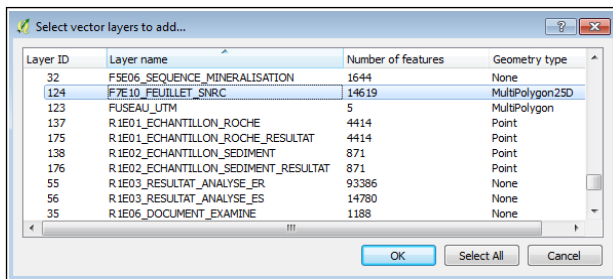
7. For the **Source Type**, click on **Directory** and for the **Encoding** field, select **Latin1** (accented characters) from the drop-down menu.



8. For the **Source**, click on the drop-down menu to select the OpenFileGDB **Type**. Note that this type of pilot does not allow you to edit the FGDB, only to consult the data. Click **Browse** to select your work folder and click the **Open** button.

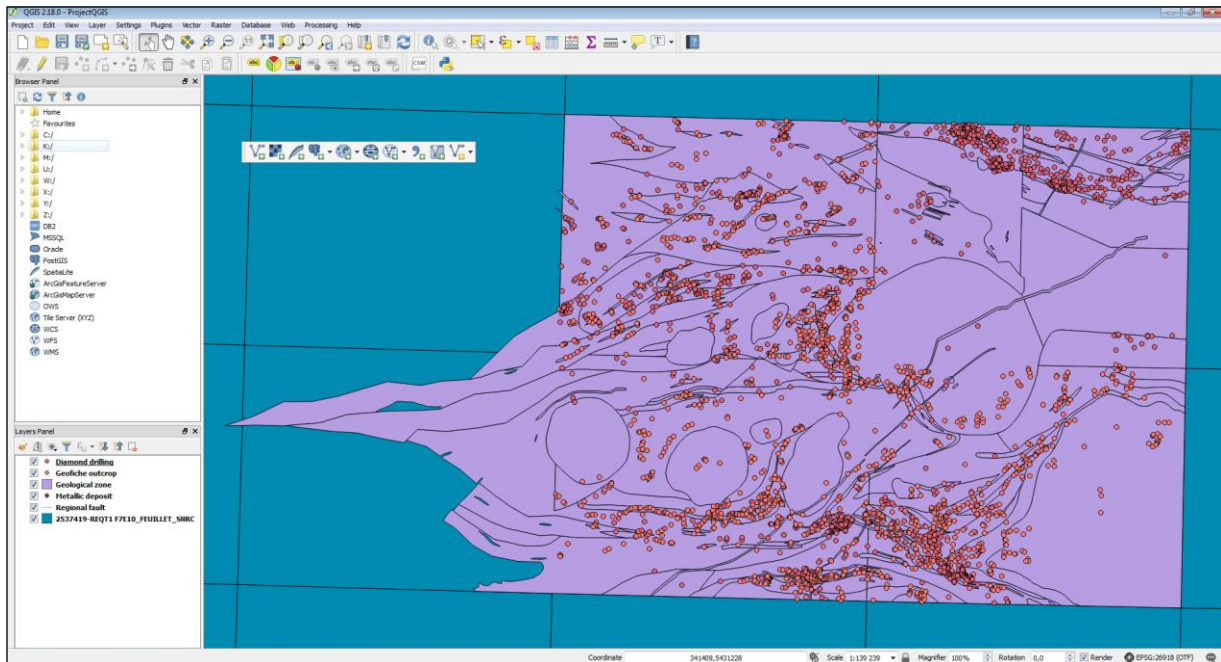


9. A list of all layers of your geodatabase file appears. To add this layer to your project, click on the 50k map index layer “**F7E10_FEUILLET_SNRC**” and then **OK**.



Each layer is added to the Layers Panel. If it is not open, click on the menu bar on View → Panels and click on Layers Panel

10. For better visualization, place the layers in the order shown on the previous figure. To do this, for example, select the **Geological zone** layer and, by holding down the left mouse button, slide the layer to the end of the list.

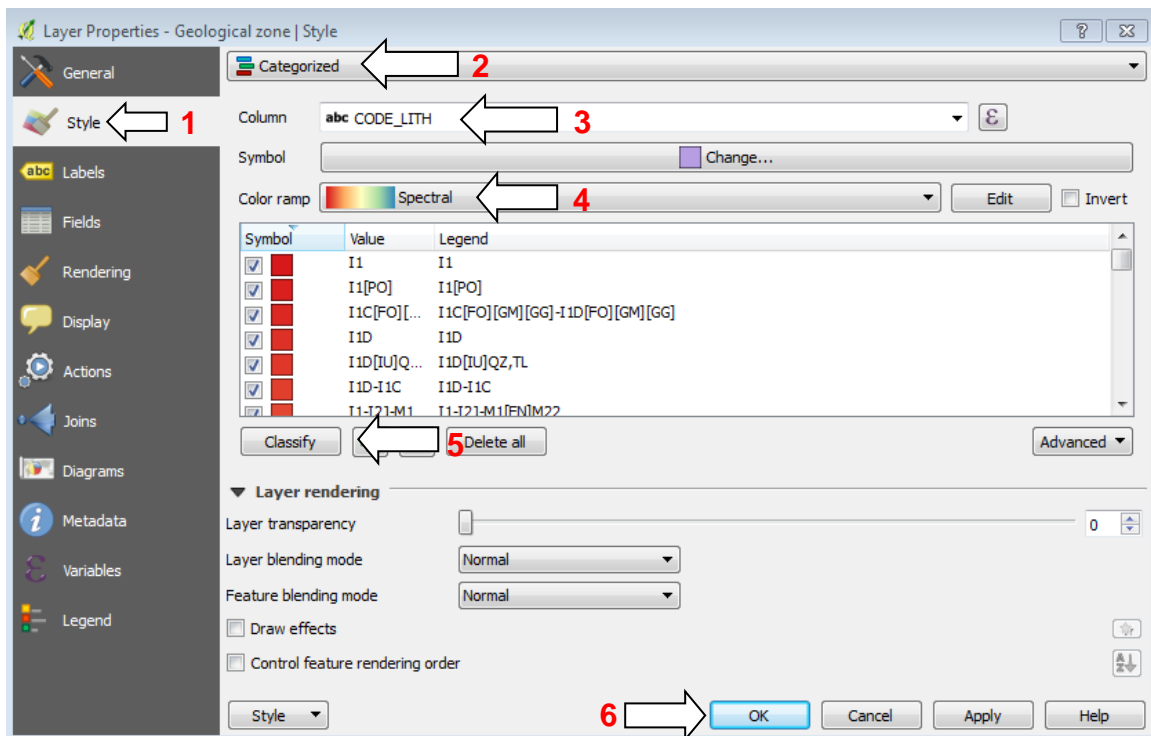


4.4.3 Changing the Colours of Geological Zones

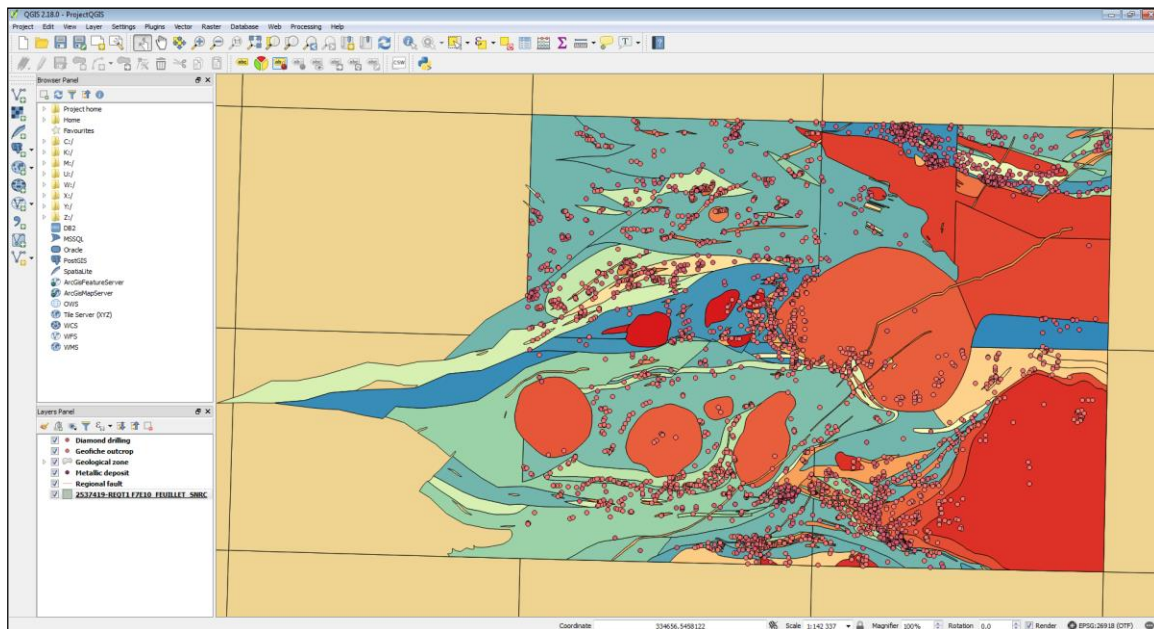
To change the colour of geological zones, you can do two things:

A) QGIS Solution – Random Colours

1. Double-click on the **Geological zone** layer (list on the left) to open the **Layer Properties – Geological zone** window and click on the **Style** menu.
2. Choose **Categorized** from the first drop-down list.
3. Select **CODE_LITH** from the **Column** drop-down list.
4. Choose **Spectral** from the **Color ramp** drop-down list.
5. In the middle section, click the **Classify** button.
6. Click the **OK** button.




You will get the following result:



B) QGIS Solution – Default SIGÉOM Colours

For some information layers, it is possible to apply the different SIGÉOM colours when the “RGB” field is present in the layer. The values in this field reconstruct a colour by additive synthesis from three primary colours, red (R), green (G) and blue (B).

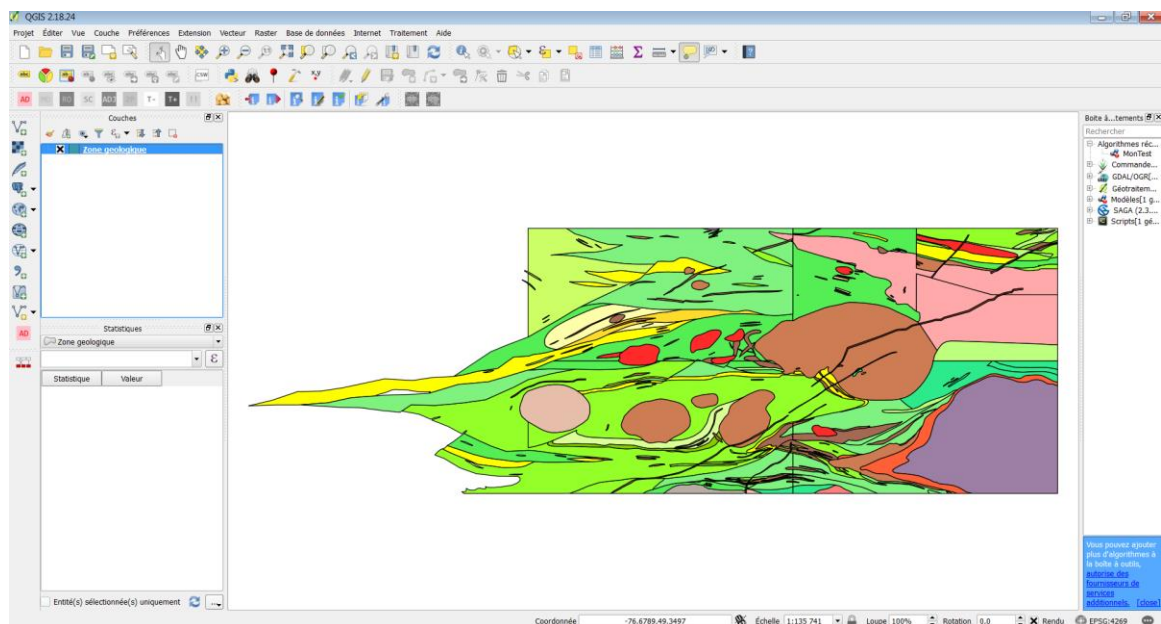
Beforehand, apply the SIGÉOM colours to the **Geological zone** layer, following these steps:

1. Double-click on the **Geological zone** layer (list on the left) to open the **Layer Properties – Geological zone** window and click on the **Style** menu.
2. At the top of the window, select **Single Symbol** from the first drop-down list.
3. For the **Symbol layer type** property, click **Simple fill** to change the values on the right.
4. Click the  icon to access the data-defined value options for filling the symbol:



4. Click on the **Field type: string** option and click on the **RGB (string)** field to associate each value in that field to the colour that will be given to the records in that layer.
5. Click the **Apply** button.

Your project will look like this image:

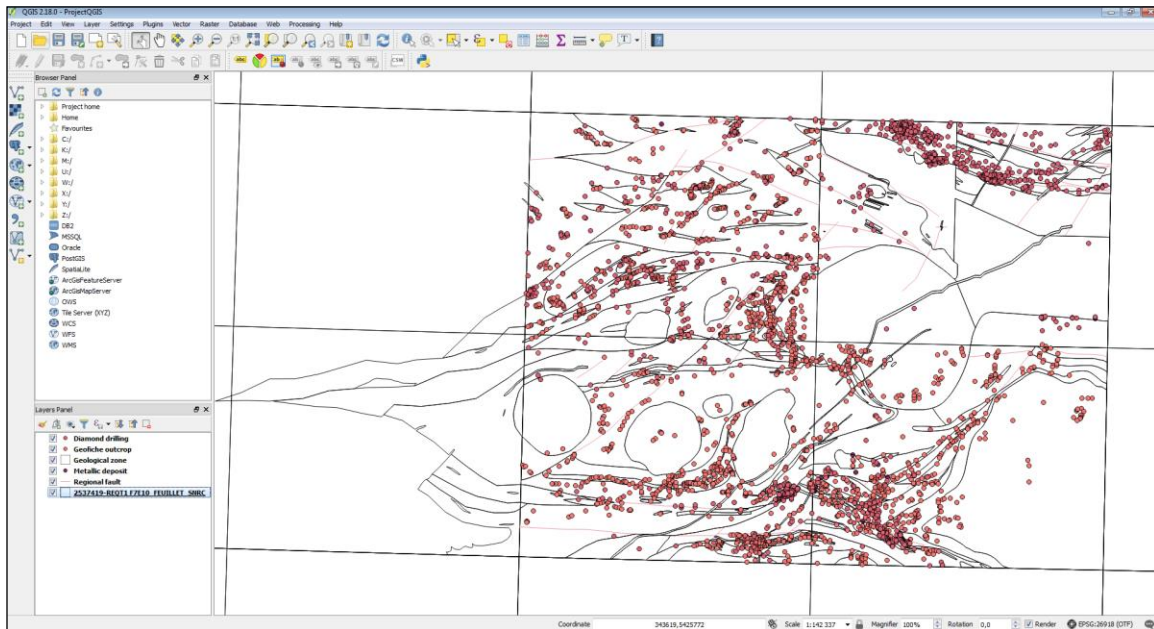


C) WMS Sigéom Solution (Searchable) – Palette of the Geological Map of Quebec

First, apply transparency to the **Geological zone** layer by following these steps:

1. Double-click on the **Geological zone** layer (list on the left) to open the Layer **Properties – Geological zone** window and click on the **Style** menu.
2. At the top of the window, select **Single Symbol** from the first drop-down list.
3. For the **Fill** property, click **Single fill** to change the values on the right.
4. Select **No brush** from the **Fill style** drop-down list.
5. Click the **OK** button.
6. Repeat these steps to apply transparency to the “**F7E10_FEUILLET_SNRC**” layer.

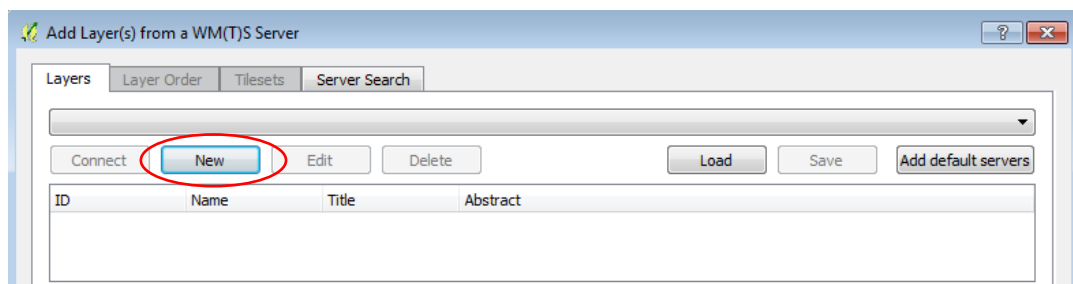
Your project will look like this image:



To reference the geological map layer, with the *Ministère's* official colour palette, from the **WMS SIGÉOM (searchable) service**, follow these steps:



1. Click the  button (**Add WMS/WMTS Layer**) and in the window displayed, click the **New** button to create a WMS connection.



2. In the **Create a new WMS Connection** window, enter the following values:

Name = “WMS SIGÉOM interrogeable”

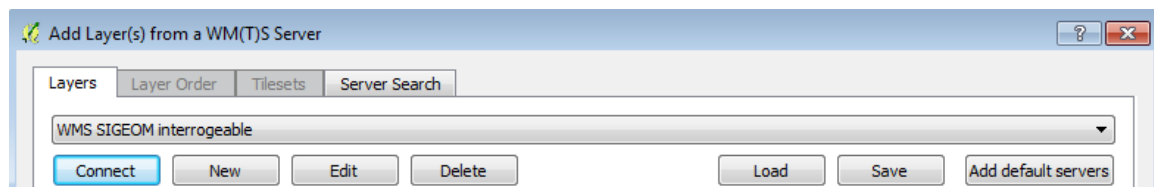
URL = http://sigeom.mines.gouv.qc.ca/SIGEOM_WMS/service.svc/get?

For more information on SIGÉOM web services, please visit

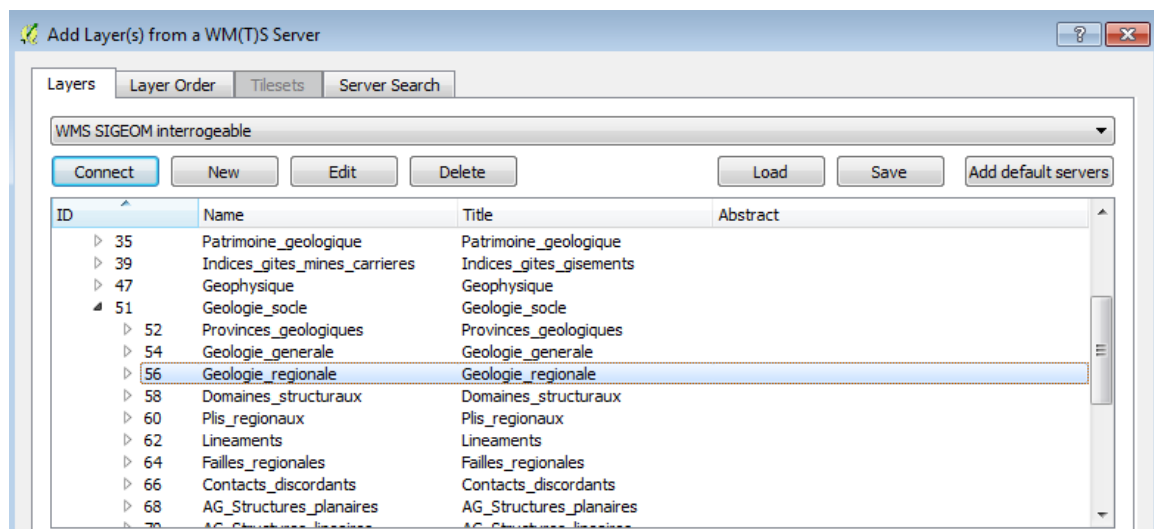
http://sigeom.mines.gouv.qc.ca/signet/classes/I0000_serviceWeb

3. Click the **OK** button.

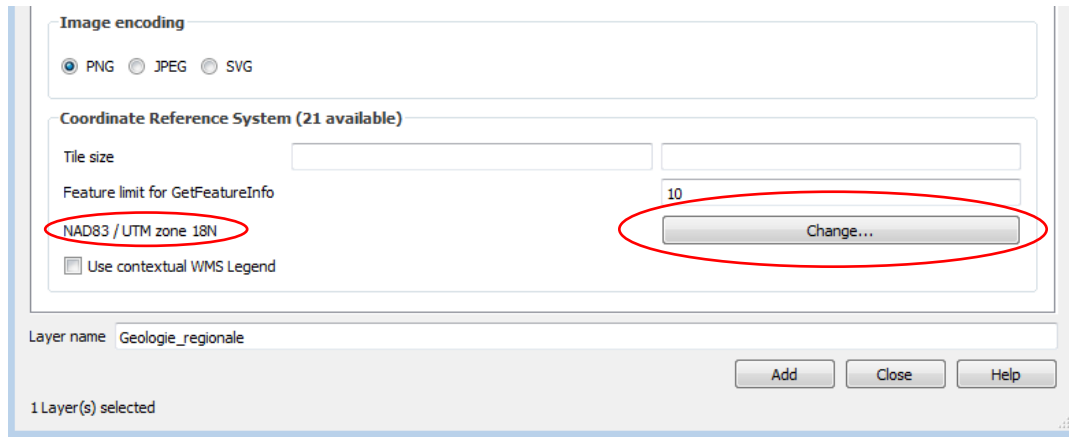
4. Select the “**WMS SIGÉOM interrogeable**” connection from the drop-down list and click the **Connect** button to display the list of available layers.



5. Select the data to be displayed. To do this, double-click on **Geologie_Socle** to display the sub-list and select “**Geologie_régionale**”.



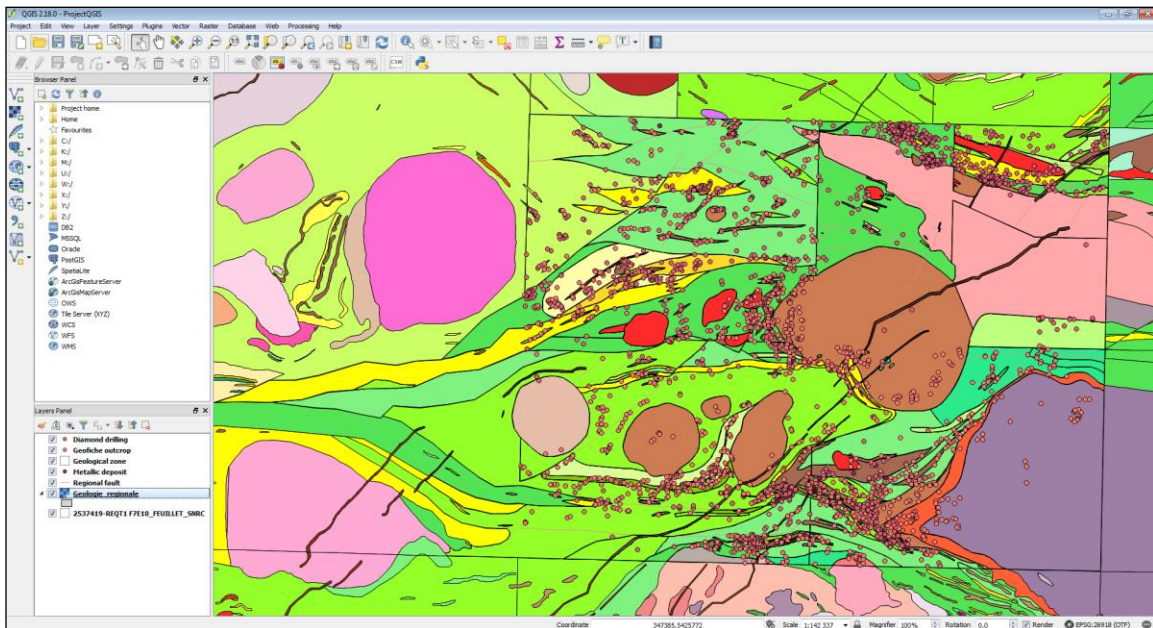
6. Make sure that the coordinate system is the same as the project system: **NAD83 / UTM zone 18N**. If this is not the case, click the **Change...** button and select the contact system from the list.



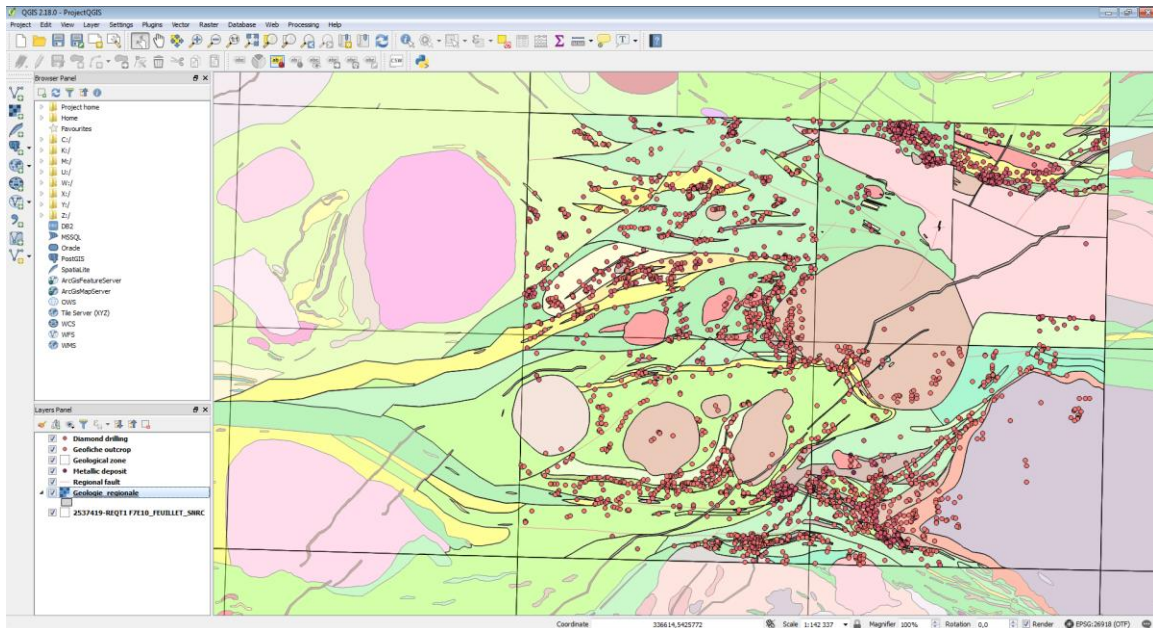
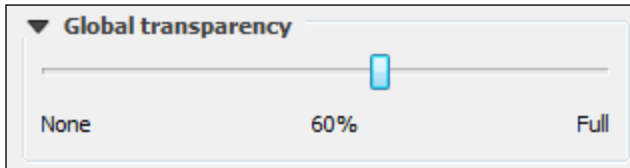
7. Click the **Add** button to add the “**Geologie_regionale**” layer to your project.

8. Click the **Close** button to close the window.

9. Place the WMS layer between the **Geological zone** and “**F7E10_FEUILLET_SNRC**” layers.



10. Double-click on the “**Geologie Regionale**” layer to open the **Layer Properties** window and click on the **Transparency** menu. Use the slide bar to apply a value of **60%**.



Simultaneously, the project layer preview can be modified to reflect the symbolization parameters of the different data formats (BSDf, Shapefile and WMS).

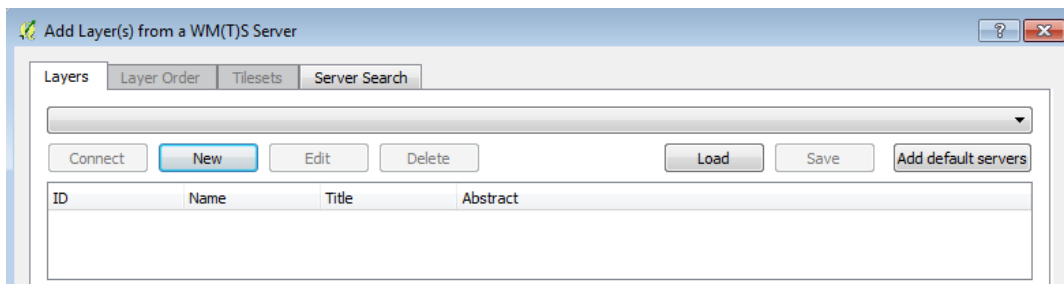
4.5 Display of Geophysics

There are two types of geophysical data provided by SIGÉOM (vector data):

- 1) Total magnetic field isovalue curves (from the Geological Survey of Canada magnetic maps). – **Isovalue curve.shp**
- 2) Punctual geophysical anomalies from the *Ministère's* surveys and assessment works (input anomalies and Megatem anomalies). – **Anomaly.shp**

The provincial and federal **WMS web services** are also available to view geophysical maps in matrix format. To do this, follow these steps:

1. Click the  button (**Add WMS/WMTS Layer**) and in the window displayed, click the **New** button to create a WMS connection.



2. In the **Create a new WMS connection** window, enter the following values:

Name = “WMS SIGEOM geophysique”

URL=

http://sigeom.mines.gouv.qc.ca/ApolloCatalogWMSPublic/service.svc/get?version=1.3.0&layers=CARTE_INTERACTIVE

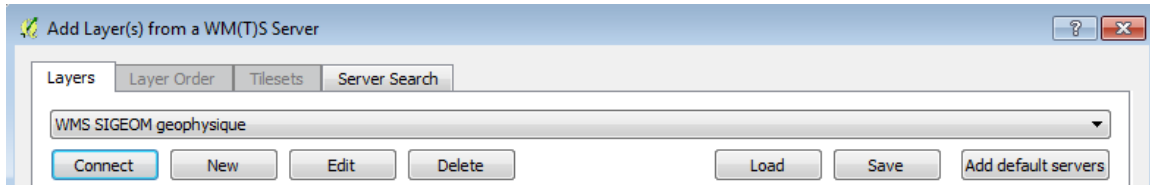
For more information on SIGÉOM web services, please visit
http://sigeom.mines.gouv.qc.ca/signet/classes/I0000_serviceWeb

Federal Geophysical WMS Web Service

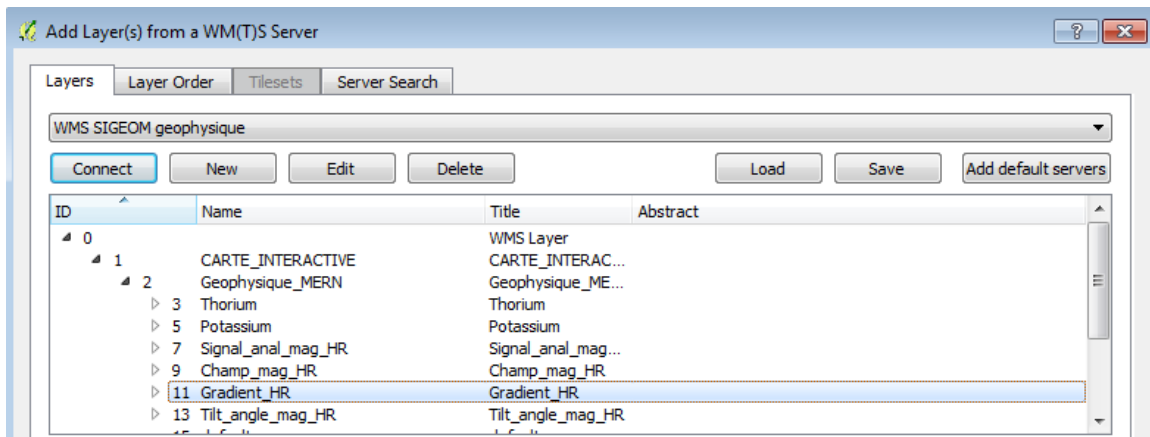
URL :<http://wms.agg.nrcan.gc.ca/wms2/wms2.aspx?request=GetCapabilities>

3. Click the **OK** button.

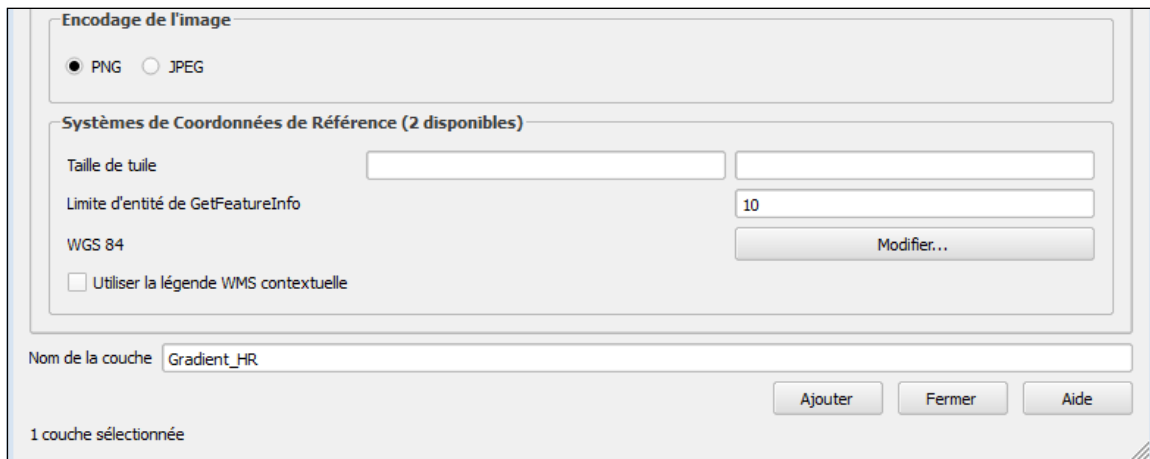
4. Select the “**WMS SIGEOM geophysique**” connection from the drop-down list and click the **Connect** button to display the list of available layers.



5. Select the data to be displayed. To do this, double-click on “**Carte interactive**” to display the sub-list, double-click on “**Geophysique_MERN**” and select “**Gradient_HR**”.

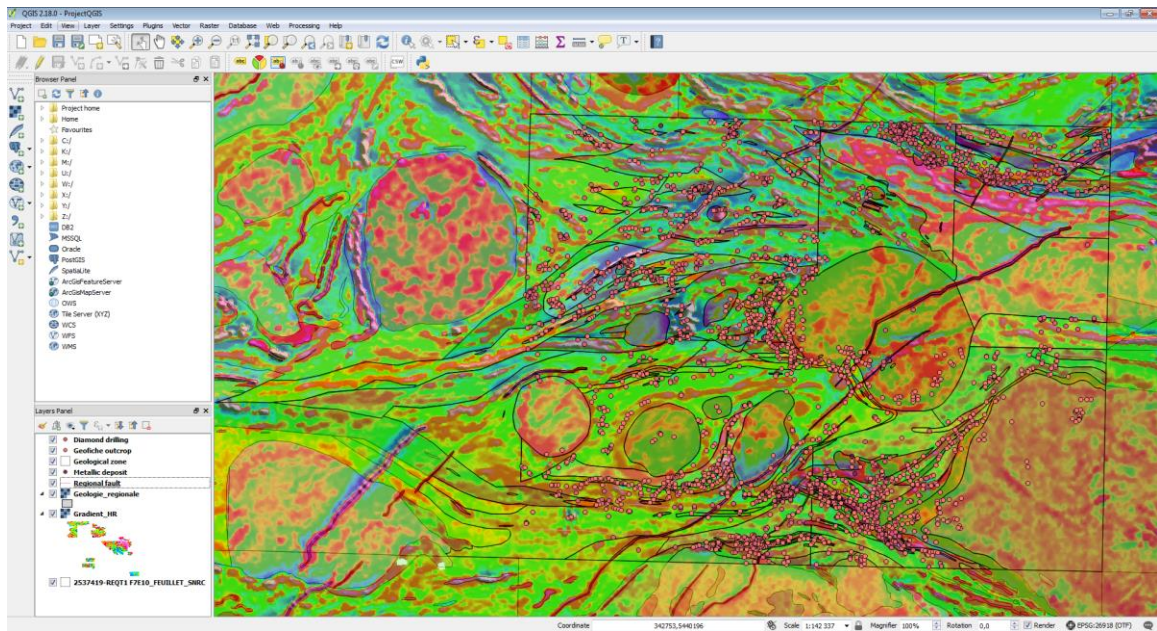


6. Make sure that the coordinate system is the same as the project system: **NAD83 / UTM zone 18N**. If this is not the case, click the **Change...** button and select the contact system from the list.



7. Click the **Add** button to integrate the **Gradient_HR** layer into your project and click the **Close** button to close the window.

8. Place the WMS layer between the “**Geologie_detailee_Quebec_50k**” and “**F7E10_FEUILLET_SNRC**” layers.



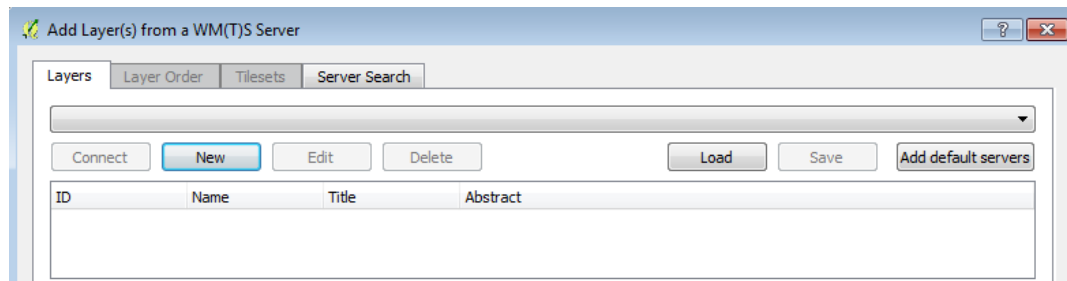
4.6 Adding Data from External Sources

4.6.1 Import a Map Background to the Project

A topographic background can be easily integrated into your project. To do this, use the “**Carte de Base du Canada (CBC)**” map WMS service.

1. Uncheck the “**Geologie_Regionale**” and “**Gradient_HR**” layers.

2. Click the  button (**Add WMS/WMTS Layer**) and in the window displayed, click the **New** button to create a WMS connection.



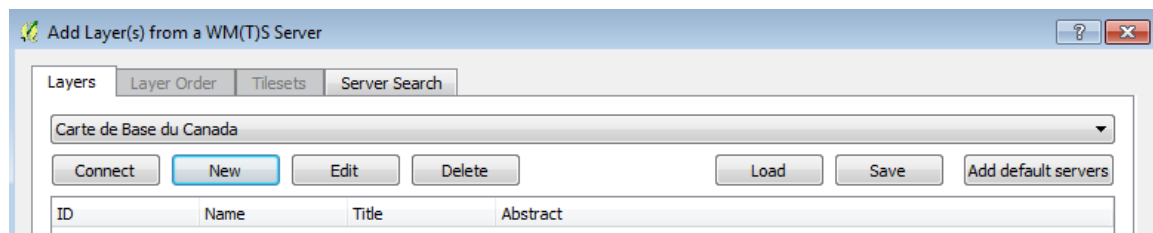
3. In the **Create a new WMS connection** window, enter the following values:

Name = “Carte de Base du Canada”

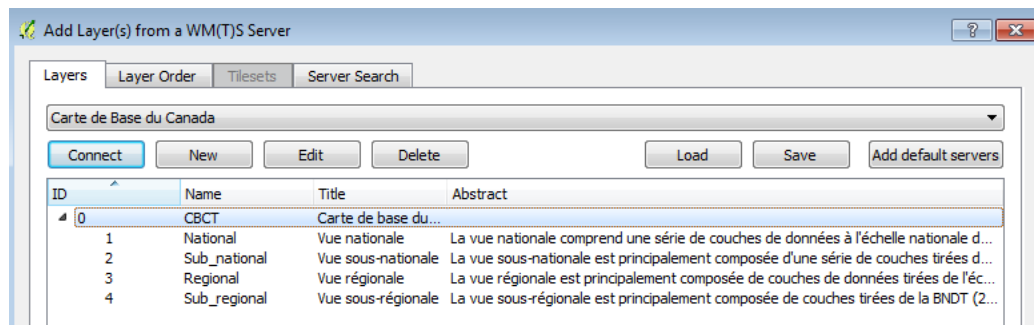
URL = <http://geogratis.gc.ca/cartes/CBCT?>

4. Click the **OK** button.

5. Select the “**Carte de base du Canada**” connection from the drop-down list and click the **Connect** button to display the list of available layers.



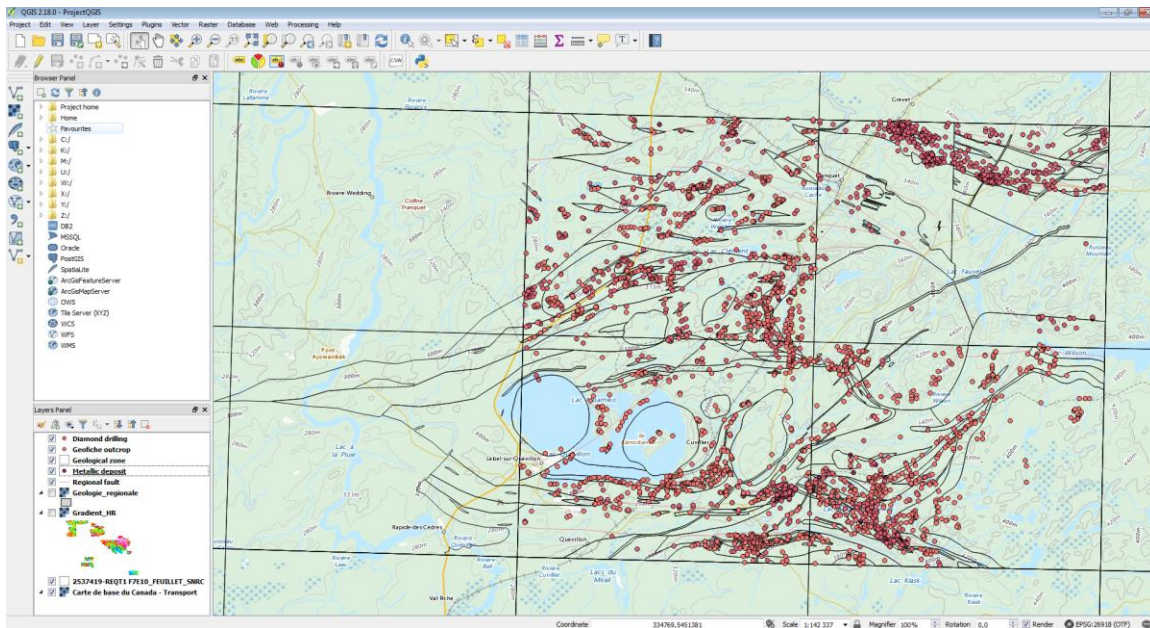
6. Select the data to be displayed. To do so, click on “**CBCT**”



7. Make sure that the coordinate system is the same as the project system: **NAD83 / UTM zone 18N**. If this is not the case, click the **Change...** button and select the contact system from the list.

8. Click the **Add** button to include the “**Carte de base du Canada - Transport**” layer in your project and click the **Close** button to close the window.

9. Place the layer at the end in the list of layers.




4.6.2 Import Data from a Microsoft Excel Spreadsheet

We will describe the method for importing data from a Microsoft Excel spreadsheet (for example, data from outcrops with geochemical analyses). First, your spreadsheet must be well organized in rows and columns.

For this demonstration we will use the data (fictitious) from the file [Data_ex.xls](ftp://ftp.mrn.gouv.qc.ca/public/Geologie/Sigecom_Internet_FICHIERS/Guide_pas_a_pas/). [ftp://ftp.mrn.gouv.qc.ca/public/Geologie/Sigecom_Internet_FICHIERS/Guide_pas_a_pas/]

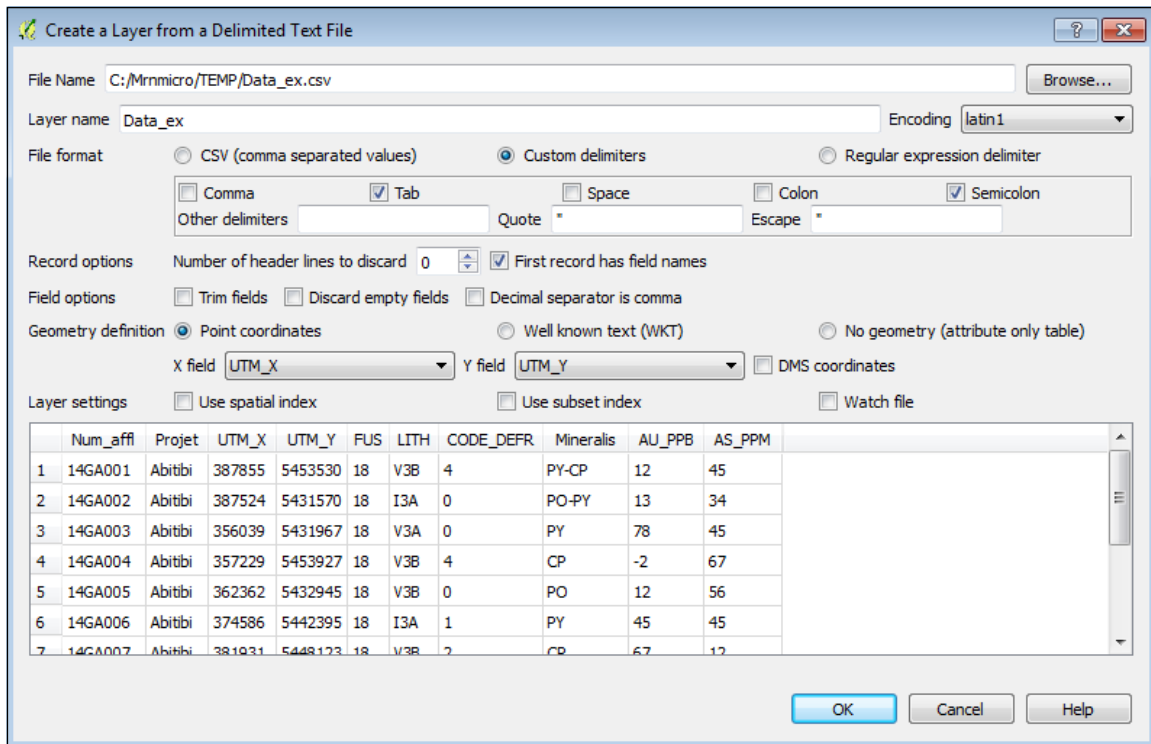
1. Open the **Data_ex.xls** file in Excel and save it in the **CSV format** (separator: semicolon, *.csv).

2. In QGIS, click on the button  (**Add Delimited Text Layer**) to import the CSV file.

3. In the **Create a layer from a delimited Text File (CSV)** window, click the **Browse...** button to the right of the **File name** field.

4. Open the **Date_ex.csv** file saved in Step 1.

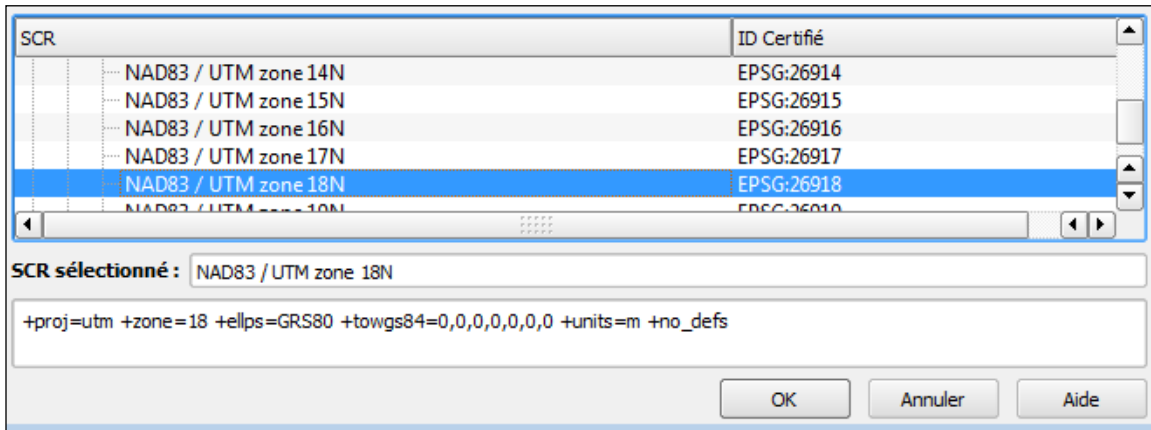
5. For **File format**, check the **Custom delimiters** and make sure **Semicolon** is checked.



	Num_aff	Projet	UTM_X	UTM_Y	FUS	LITH	CODE_DEFR	Mineralis	AU_PP	AS_PPM
1	14GA001	Abitibi	387855	5453530	18	V3B	4	PY-CP	12	45
2	14GA002	Abitibi	387524	5431570	18	I3A	0	PO-PY	13	34
3	14GA003	Abitibi	356039	5431967	18	V3A	0	PY	78	45
4	14GA004	Abitibi	357229	5453927	18	V3B	4	CP	-2	67
5	14GA005	Abitibi	362362	5432945	18	V3B	0	PO	12	56
6	14GA006	Abitibi	374586	5442395	18	I3A	1	PY	45	45
7	14GA007	Abitibi	381931	5448123	18	V3B	2	CP	67	12

6. Click **OK**.

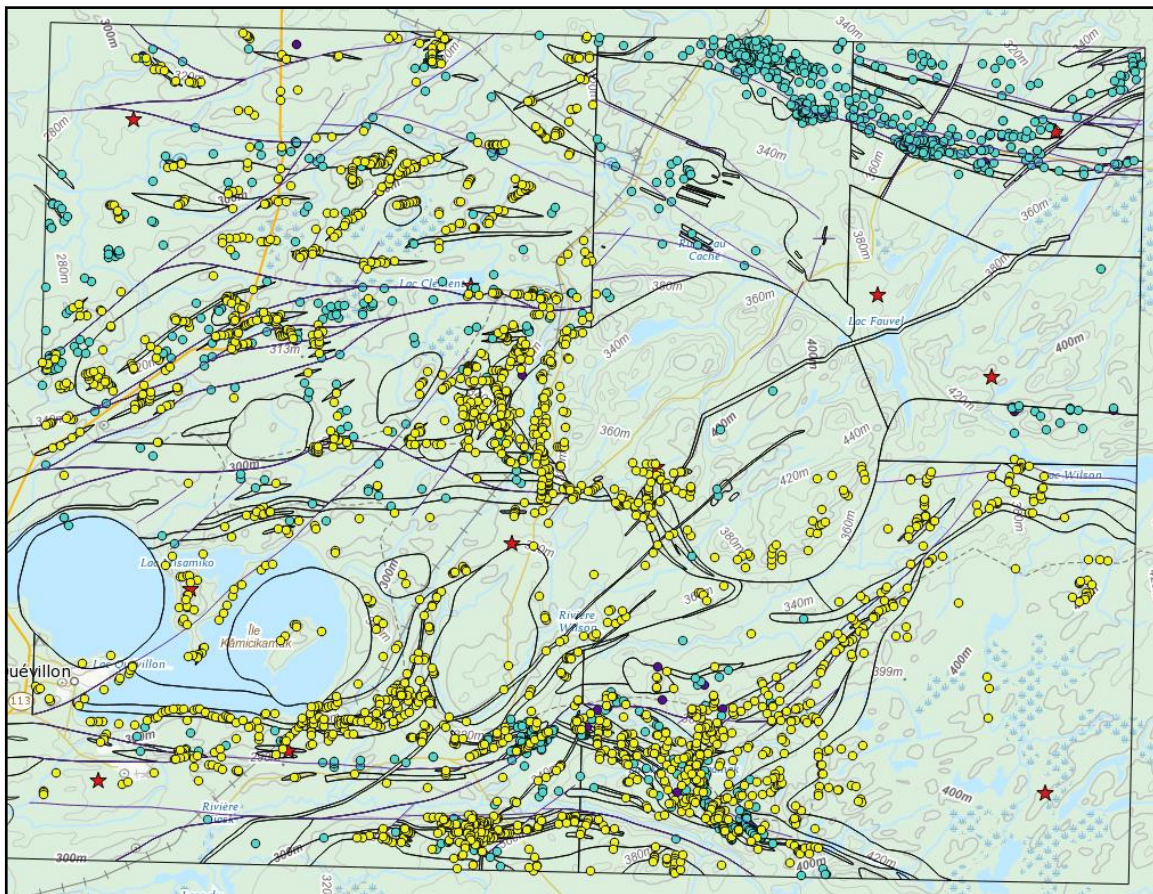
7. Select the **NAD83 / UTM zone 18N** coordinate system and click **OK**.



8. Place the **Data_ex** layer before the **Geological zone** layer in the list of layers.

9. You can change the symbol. To do this, double-click the **Data_ex** layer to open the **Layer Properties** window and click the **Style** menu. Choose the symbol of your choice. For this demonstration, the symbol being used is ★.

You can change the color of the other layers in order to differentiate them.



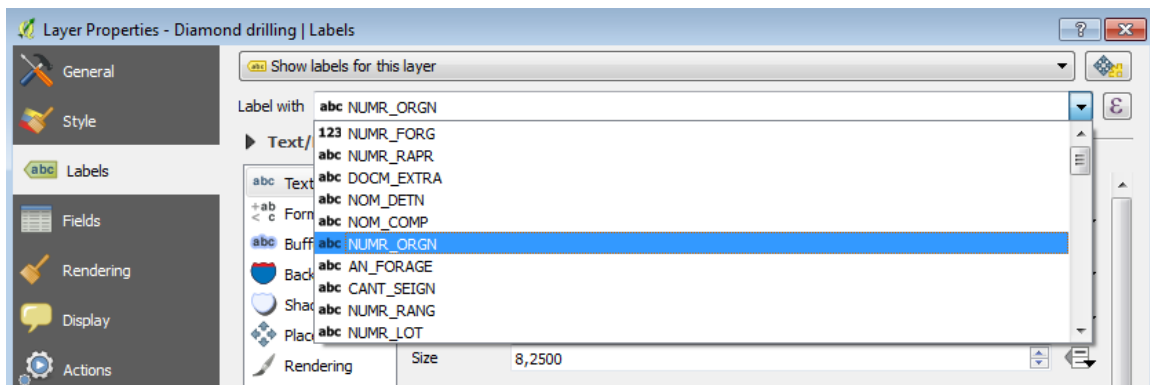
4.7 Relational Data Model

Not represented. Data is simplified.

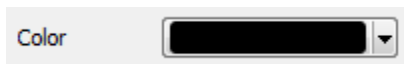
4.8 Querying Data

Before doing so, add **labels** to the **Diamond drilling** layer by following these steps:

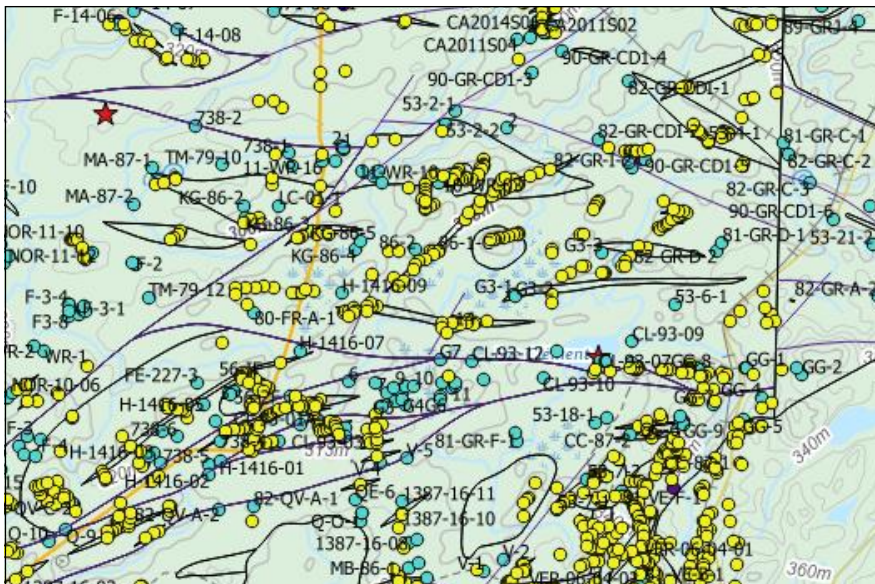
1. Double-click on the **Diamond drilling** layer to open the **Layer Properties** window and click on the **Labels** menu.
2. At the top, select from the first drop-down menu **Show labels for this layer** and select from the second drop-down menu **NUMR_ORGN** that represents the name of the field to be labeled.



3. Click the **Color** button to open the **color palette** and choose black.




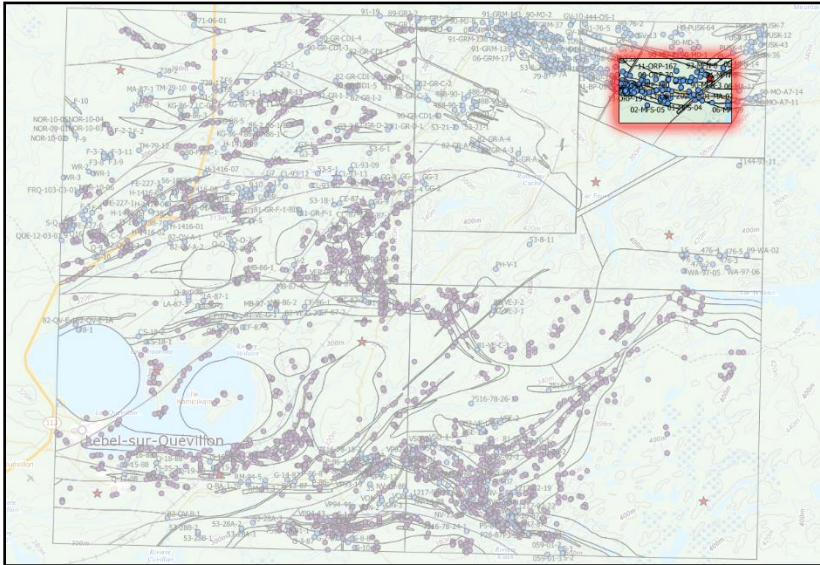
4. Click **OK**.




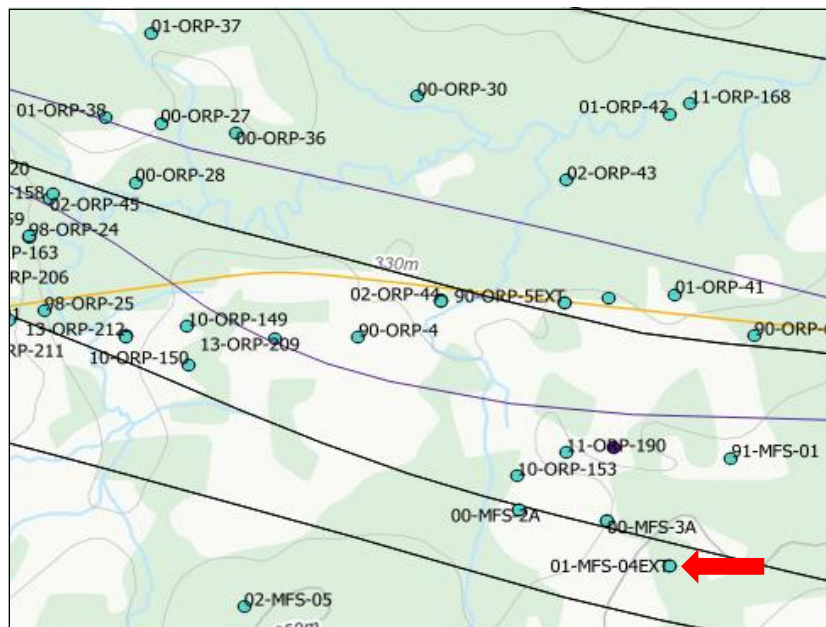
Querying drilling 01-MFS-04EXT

1. Select the **Diamond drilling** layer.

2. Select the tool  (**Zoom +**) to zoom into the top right corner of the project.

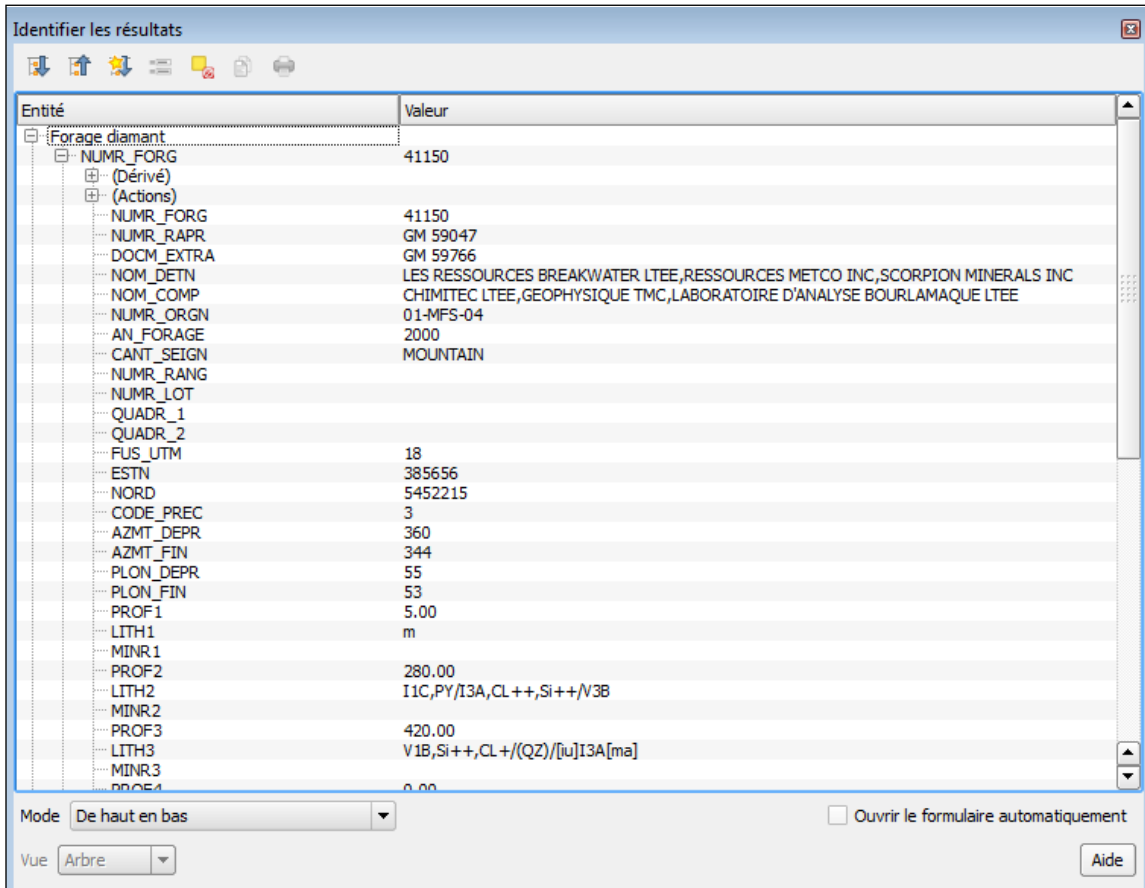


3. Select the tool  (**Identify Features**) in the menu bar and click on drilling **01-MFS-04EXT**.



If the item in another layer is also identified, remove this layer by unchecking its checkbox in the “Layers” tab  **Geological zone**.

4. The **Identify Results** window displays the drilling information.



Entité	Valeur
Forage diamant	
NUMR_FORG	41150
(Dérivé)	
(Actions)	
NUMR_FORG	41150
NUMR_RAPR	GM 59047
DOCM_EXTRA	GM 59766
NOM_DET	LES RESSOURCES BREAKWATER LTEE,RESSOURCES METCO INC,SCORPION MINERALS INC
NOM_COMP	CHIMITEC LTEE,GEOPHYSIQUE TMC,LABORATOIRE D'ANALYSE BOURLAMAQUE LTEE
NUMR_ORGN	01-MFS-04
AN_FORAGE	2000
CANT_SEIGN	MOUNTAIN
NUMR_RANG	
NUMR_LOT	
QUADR_1	
QUADR_2	
FUS_UTM	18
ESTN	385656
NORD	5452215
CODE_PREC	3
AZMT_DEPR	360
AZMT_FIN	344
PLON_DEPR	55
PLON_FIN	53
PROF1	5.00
LITH1	m
MINR1	
PROF2	280.00
LITH2	I1C,PY/I3A,CL++,Si++/V3B
MINR2	
PROF3	420.00
LITH3	V1B,Si++,CL+/(QZ)/[Iu]I3A[ma]
MINR3	
PROF4	0.00




Mode: De haut en bas

☐ Ouvrir le formulaire automatiquement

Vue: Arbre

Aide

4.9 Editing Data

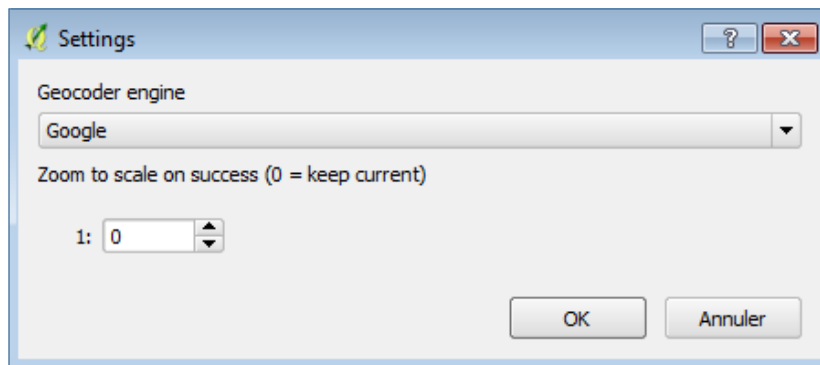
QGIS allows for data editing. For example, you can add objects to a layer (e.g., drilling, outcrop, etc.). This can be done by selecting the layer to be edited from the table of contents and clicking  to toggle to **Edit** mode. You will then be able to add entities , move entities  and more.


When you are finished, simply **Save Layer Edits**  and **Quit** the update session.

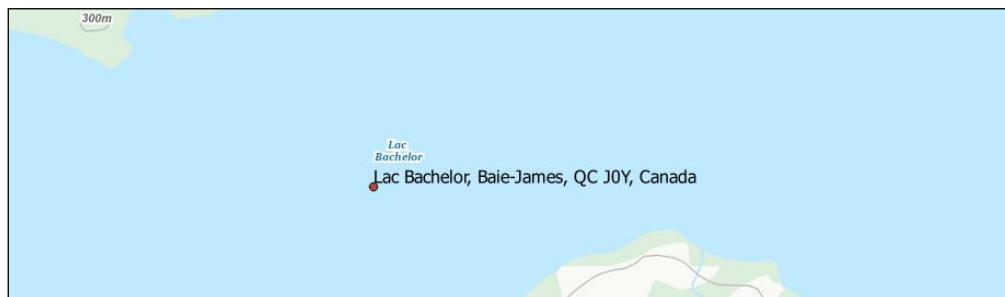
4.10 Dynamic Location

Text can be freely entered in the input field and searched for a place, city, address or postal code. To do this, use the **Geocoding** extension installed in section [3.2 Installation](#).

1. From the menu bar, click on **Extension** → **GeoCoding** → **Settings**. For **Geocoder engine**, select **Google** from the drop-down list and click **OK**.




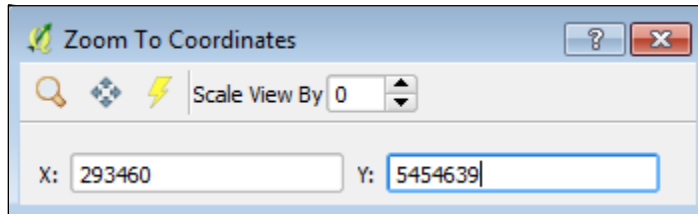
2. Click on the tool  (**GeoCoding**) and enter in the **Address** field: Lac Bachelor.
3. Select the **NAD83 / UTM zone 18N** coordinate system and click **OK**. The **Geocoding Plugin Results** layer is added to the list of layers.
4. Change the colour of the label. To do this, double-click on the **Geocoding plugin Results** layer to open the **Layer Properties** window and click on the **Labels** menu. At the top, check the **Show labels for this layer** option and choose black as the colour.




4.11 Location with Coordinates

The window can be centred on XY coordinates. To do this, use the **ZoomToCoordinates** extension installed in section [3.2 Installation](#).


1. Click on the tool  (**Zoom To Coordinates**) and enter coordinates X: 293460 and Y: 5454639.

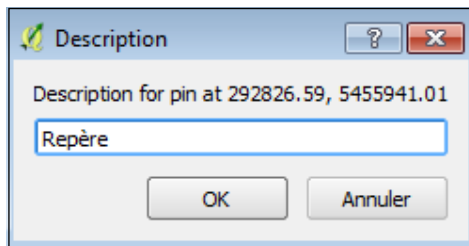


2. Click on  (**Pan to**) of the tool to center the project on this coordinate.

4.12 Place a Freehand Marker

It is possible to manually place a marker somewhere in your project. To do this, use the **Pin Point** extension installed in section [3.2 Installation](#).

1. Click on the tool  (**Place a Pin**).
2. Choose the **NAD83 / UTM zone 18N** coordinate system, click **OK** and place your marker somewhere in your project.
3. Enter a short description and click **OK**. The **Pins** layer is added to the layers menu.



You can customize your **Marker**. To do this, double-click on the **Pins** layer to open the **Layer Properties** window and click on the **Labels** menu. At the top, select the **Label this layer with** and choose the colour of your choice.

4.13 Sharing a Map

Does not apply.

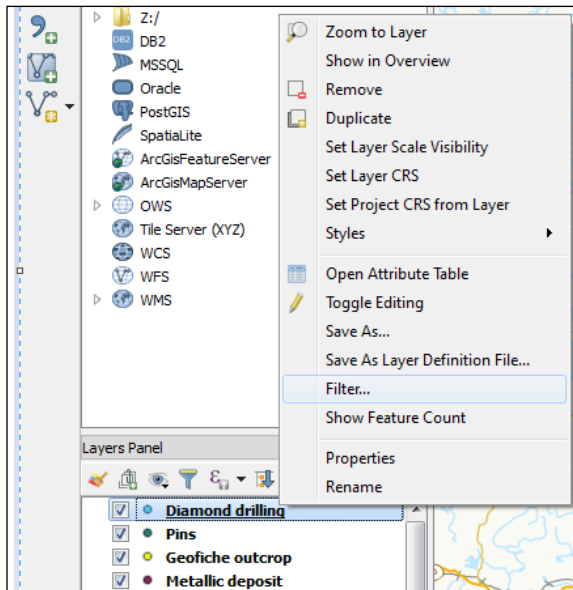
4.14 Looking for Gold Anomalies in Drillings

Gold anomalies in drillings can be identified. Two methods are demonstrated in this guide.

4.14.1 With QGIS

We will only display drillings that contains an intermediate volcanics (V2) description and gold geochemical analysis.

1. From the list of layers, select **Diamond drilling**, right click and select **Filter...**



In the **Query Builder window**, it is possible to select a subset of drilling data using a SQL query. The first `SELECT * FROM` part of the SQL is already automatically provided to you and is not visible in the QGIS software.

For simple queries, the following general form is used:

<field_name> <operator> <value or chain>

For composite queries, the following form is used:

**<field_name> <operator> <value or chain> <connector>
<field_name> <operator> <value or chain>**

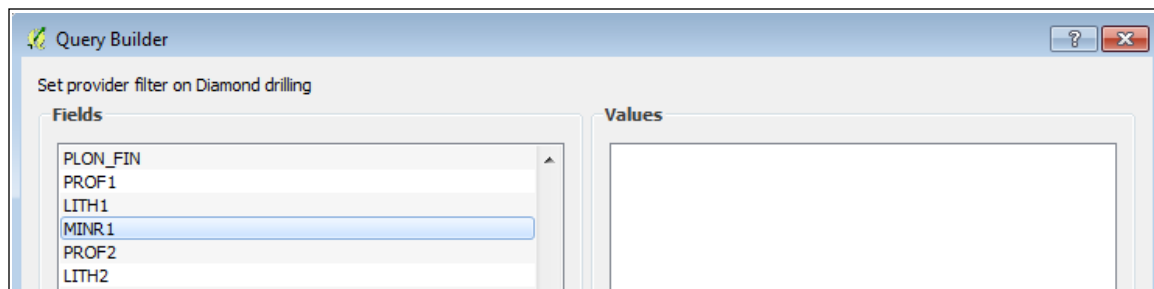
You can use parentheses () to define the order of operations in composite queries.

To perform filtering, use the **Fields**, **Values** and **Operators** sections to construct the following expression:

```
("MINR1" LIKE '%Au%' OR "MINR2" LIKE '%Au%' OR "MINR3" LIKE '%Au%' OR  
"MINR4" LIKE '%Au%' OR "MINR5" LIKE '%Au%' OR "MINR6" LIKE '%Au%' OR  
"MINR7" LIKE '%Au%' OR "MINR8" LIKE '%Au%' OR "MINR9" LIKE '%Au%' OR  
"MINR10" LIKE '%Au%') AND ("LITH1" LIKE '%V2%' OR "LITH2" LIKE '%V2%' OR  
"LITH3" LIKE '%V2%' OR "LITH4" LIKE '%V2%' OR "LITH5" LIKE '%V2%' OR "LITH6"  
LIKE '%V2%' OR "LITH7" LIKE '%V2%' OR "LITH8" LIKE '%V2%' OR "LITH9" LIKE  
"%V2%" OR "LITH10" LIKE '%V2%')
```

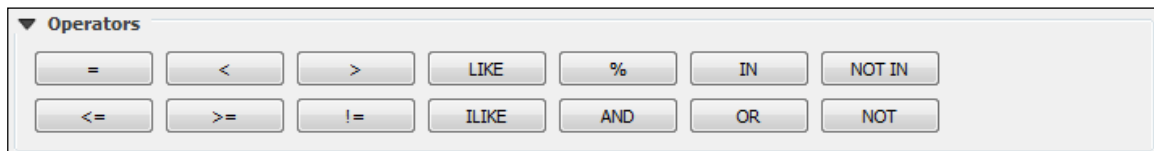
[Translation: Mineralization fields contain gold \(Au\) and lithology fields contain the expression V2 \(Intermediate volcanics\).](#)

2. In the **Fields** section, double-click **MINR1** (mineralization 1) to add it to the **Provider specific filter expression** section.

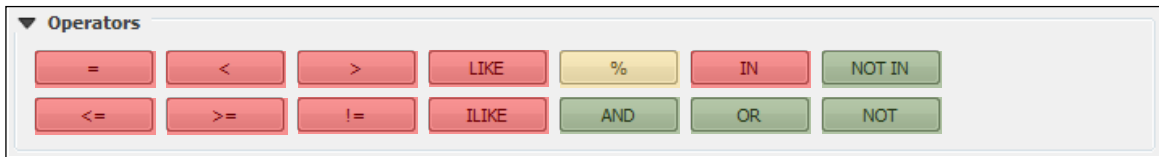


To specify a field in a SQL expression, it is best to place its name between delimiters. A delimiter is a character placed before and after a command to identify it as such and to separate it from the rest of the expression. The QGIS software automatically places these delimiters when the user double-clicks on the desired query field.

3. In the **Operators** section, click the **LIKE** button.



Here are the possible operators to use when filtering SQL in QGIS:



Yellow: Generic characters used to search by partial string

Red: comparison operators

Green: logical operators

Operator	Description
= x	Selects a record if it has a value equal to x for the specified attribute.
< x	Selects a record if it has a value less than x for the specified attribute.
<= x	Selects a record if it has a value less than or equal to x for the specified attribute.
> x	Selects a record if it has a value greater than x for the specified attribute.
>= x	Selects a record if it has a value greater than or equal to x for the specified attribute.
!= x	Selects a record if it has a different value of x for the specified attribute. This is equivalent to the following operators: NOT =
IN (x, y, z)	Selects a record if it contains an element in a field from several chains or values (x, y or z).
LIKE	To search using a partial string, use the LIKE operator and add generic characters. The percentage symbol (%) means that it can be replaced by anything: one character, a hundred characters or no characters. However, to perform a search with a generic character representing a single character, use the underscore character (_). LIKE works with character-type data on both sides of the expression. * Operator of this query *
ILIKE	Unlike LIKE, chain correspondence is case-insensitive.
%	Represents zero, one or more characters that are not part of the partial chain when using the LIKE or ILIKE operator. * Operator of this query *
NOT	Selects a record if it does not match the expression.

AND	Combines two conditions together and selects a record if both conditions are true.
OR	Combines two conditions together and selects a record if at least one condition is true. * Operator of this query *
NOT	Selects a record that has no value.
IN	

4. In the **Provider specific filter expression** section, enter, following the LIKE, **'%Au%'**. Thus, the display filter will be on items that contain this part of the text as a value.

The screenshot shows a text input field with the text: "MINR1" LIKE '%Au%'. The field is titled "Provider specific filter expression".

5. In the **Operators** section, click the **OR** button.

6. Repeat steps 1 to 6 for MINR2, MINR3 fields up to MINR10.

7. Put the mineralization expression in parentheses.

The screenshot shows a text input field with the text: - ("MINR1" LIKE '%Au%' OR "MINR2" LIKE '%Au%' OR "MINR3" LIKE '%Au%' OR "MINR4" LIKE '%Au%' OR "MINR5" LIKE '%Au%' OR "MINR6" LIKE '%Au%' OR "MINR7" LIKE '%Au%' OR "MINR8" LIKE '%Au%' OR "MINR9" LIKE '%Au%' OR "MINR10" LIKE '%Au%'). The field is titled "Provider specific filter expression".

8. In the **Operators** section, click the **AND** button.

9. In the **Fields** section, double-click **LITH1** (lithology 1) to add it to the **Provider specific filter expression** section.

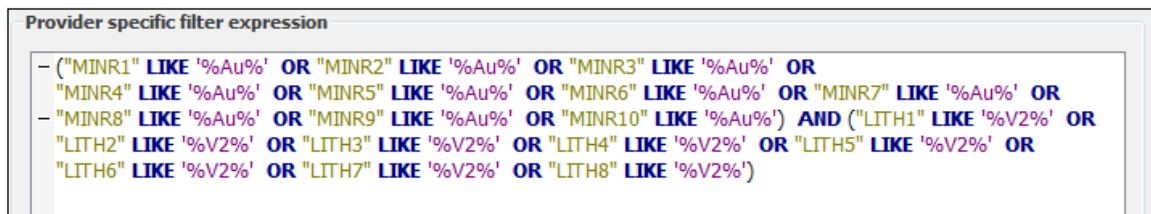
10. In the **Operators** section, click the **LIKE** button.

11. In the **Provider specific filter expression** section, enter, following the LIKE, **'%V2%'**.

12. In the **Operators** section, click the **OR** button.

13. Repeat steps 10 to 13 for LITH2, LITH 3 fields, up to LITH 10.

14. Put the second part of the expression on the lithologies in parentheses.



15. Click **OK**.

16. To validate the result of your query, right click on the **Diamond drilling** layer and then click on **Open Attribute Table**. The number of entities filtered based on your query is displayed in the attribute table dialogue box header:

	NUMR_FORG	NUMR_RAPR	DOCM_EXTRA	NOM_DET	NOM_COMP
1	28595	GM 45323		CLAIMS GERVAIS	SERVICES EXPL E...
2	28596	GM 45323		CLAIMS GERVAIS	SERVICES EXPL E...

If you want to see the total number of entities in your layer without filtering, you must open the **Filter** tool again, delete the entered query and click **OK**. Note the total number of entities without filters in the column header of the attribute table dialogue box.

Note:

Shapefile geometric data is always associated with a dbf file that contains descriptive information. The dbf format has several limitations, including the total number and length of fields, as well as a limit on the total volume of data. In order to integrate the SIGÉOM data into this data format, a de-normalization of the relational model of the data was performed to present it in the form of a single table instead of several linked tables as is the case in a relational model. Some descriptive information from several tables in the relational model is used to complete a single table in the Shapefile data format.

This has an impact on the ability to make requests, in particular to select drillings with a certain content. The following example comes from a drilling with several intersections.

The search for drillings with a gold content greater than 1000 ppb is not possible since it is a text field. We propose the following method for dealing with this limitation.

4.14.2 With **SIGÉOM à la carte**

A drilling KML file containing a description of intermediate volcanics (V2) and geochemical analysis exceeding a threshold of 1000 ppb (1 g/t) gold can be obtained by [SIGÉOM à la carte](#).

1. On the [SIGÉOM à la carte](#) homepage, click on **Drilling** to be directed to its entities and descriptions. Then click on the **Diamond drilling** entity.



2. Enter the following values in the appropriate fields.

Diamond drilling			
NTS map-sheet number	is equal to	32F02	> Values
Report number	starts with		> Values
Initial drilling number	is equal to		> Values
Year drilling	is equal to		> Values
Name document holder	is equal to		> Values
Company author	is equal to		> Values
Lithologic summary	is equal to		> Values
Township/seigneurie	is equal to		> Values
Date of release	is equal to		> Values

Lithologic unit			
Lithology	starts with	V2	> Values
Depth	is equal to		> Values

Mineralization sequence			
Chemical element	is equal to	Au	> Values
Minerals	is equal to		> Values
Grade	is equal to	1000	> Values
Length	is equal to		> Values

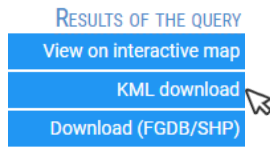
Search territory			
Customized territory	Define		> Values
Geoscientific works area			> Values

3. Click the button **Search** on the left menu to run the query.

DIAMOND DRILLING						
Afficher 20 éléments						
	Initial drilling number	Year drilling	Report number	NTS map-sheet number	Lithologic summary	Diamond drilling comment
1	06-GRM-174	2006	GM.65016	32F02	I2J/V2J/I3A/V1/V1B/I1N/V1D	
2	07-GRM-176	2007	GM.65016	32F02	V2/V1/V3/I1N/H1D	
3	07-GRM-206A	2007	GM.65016	32F02	V2/TUJ/I1N/I1A2/M25/V1/TUJ/F2	
4	07-ORP-109B	2007	GM.63517	32F02	V2J/I3A/F1	
5	08-GRM-262	2008	GM.65016	32F02	V3/TUJ-V2/TUJ-V1/TUJ-F1	
6	10-ORP-155A	2010	GM.66733	32F02	V3B/V1/TUJ-V2J/V2/V3/V3/V4/I1B	
7	97-BP-19	1997	GM.55922	32F02	V2/M8/V1/bu/V/I3A	
8	CA2013S03	2013	GM.68891	32F02	V3/V2-I1B/J	
9	CA2013S04	2013	GM.68891	32F02	V3/V3/I3/V3/V2	
10	CA2014S05	2014	GM.69173	32F02	V2J	
11	M-23-67	1967	GM.45323	32F02		
12	M-24-67	1967	GM.45323	32F02		
13	M-25-67	1967	GM.45323	32F02		
14	M-26-67	1967	GM.45323	32F02		
15	M-27-67	1967	GM.45323	32F02		
16	M-31-67	1967	GM.45323	32F02		
17	M45-87	1967	GM.47624	32F02		
18	NOR-09-01	2009	GM.65735	32F02	S/V1/V2/S6A/I3	
19	NOR-10-04	2010	GM.65735	32F02	V3/V2-S	
20	NOR-10-08	2010	GM.65735	32F02	V3/V2/S/I2	


1 à 20 sur 85 éléments

Précédent 1 2 3 4 5 Suivant



A KML (Keyhole Markup Language) file is generated for each query made in *Sigéom à la carte*. However, query results must not exceed a limit.

5. Save the KML file to your computer and close the browser window.

6. Add the KML file in your QGIS project. To do this, click on the button  (**Add Vector Layer**).


7. In the **Encoding** field, select **Latin1** (accented characters) from the drop-down menu.

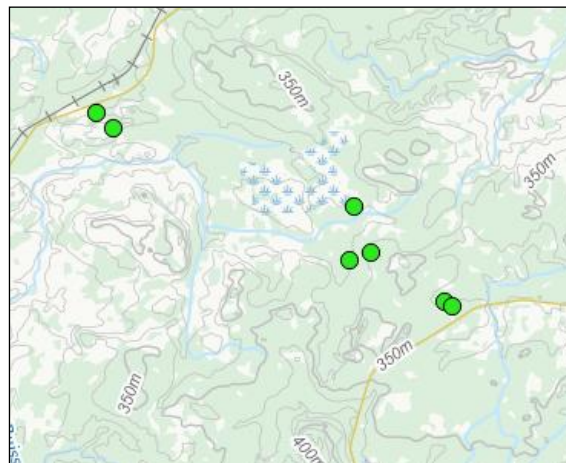
8. In the same window, click **Browse** and select the saved KML file from your folder. To do this:

- Select from the **Type files** drop-down menu, Keyhole Markup Language (KML) (*.kml *.KML).

9. Click **Open** to confirm.

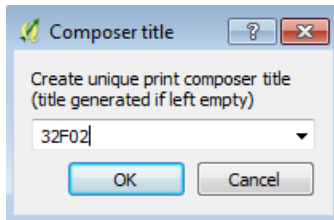
10. Click **Open** in the **Add vector layer** window to add the layer to your project.


11. You can change the symbol. To do this, double-click on the layer to open the **Layer Properties** window and click the **Style** menu. Choose the symbol of your choice. For this demonstration the symbol used is .

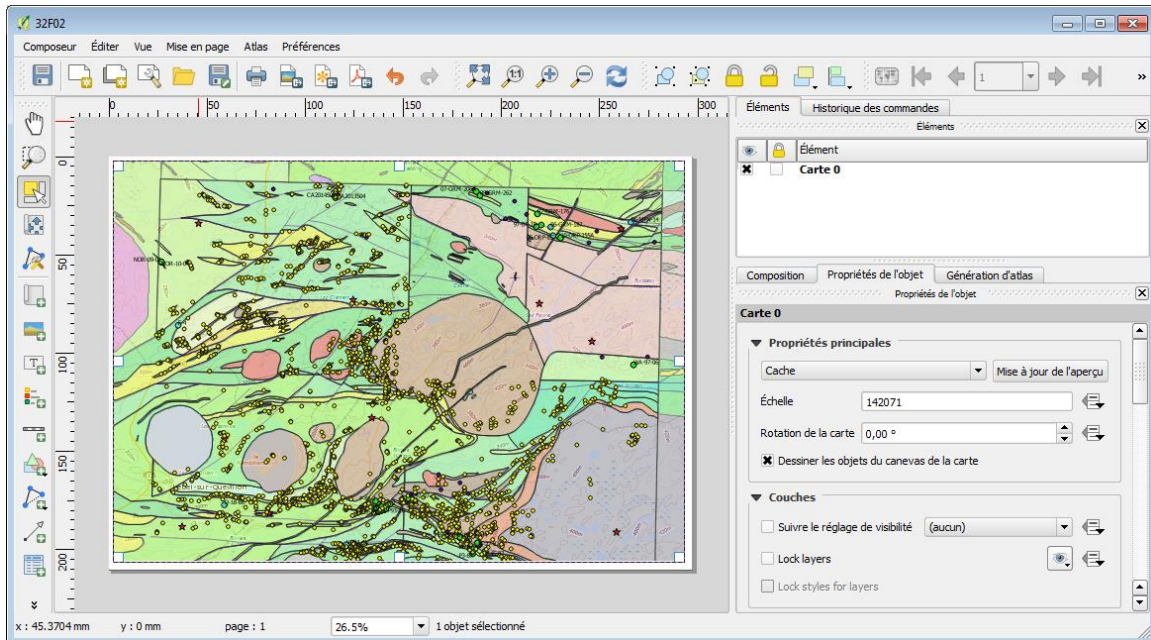


4.15 Printing

To print your project, click on **Project** → **New Print Composer**, enter a title and click **OK**.



1. Click the button  (**Add new map**) and draw a perimeter using the left mouse button to plot the portion of the map on the page.



2. Print by clicking the button  (**Print**) on the menu bar.

5. ESRI FGDB Format

In this example, we use the ArcGIS 10 software from ESRI.

5.1 Cost

Paid use. Refer to ESRI Canada website: <https://www.esri.ca/fr>.

5.2 Access to Data

You can access geoscientific data via the SIGÉOM home page. You must follow the steps outlined in Section [4.3 Access to Data](#) to download the Atlas data in FGDB and Shapefile.

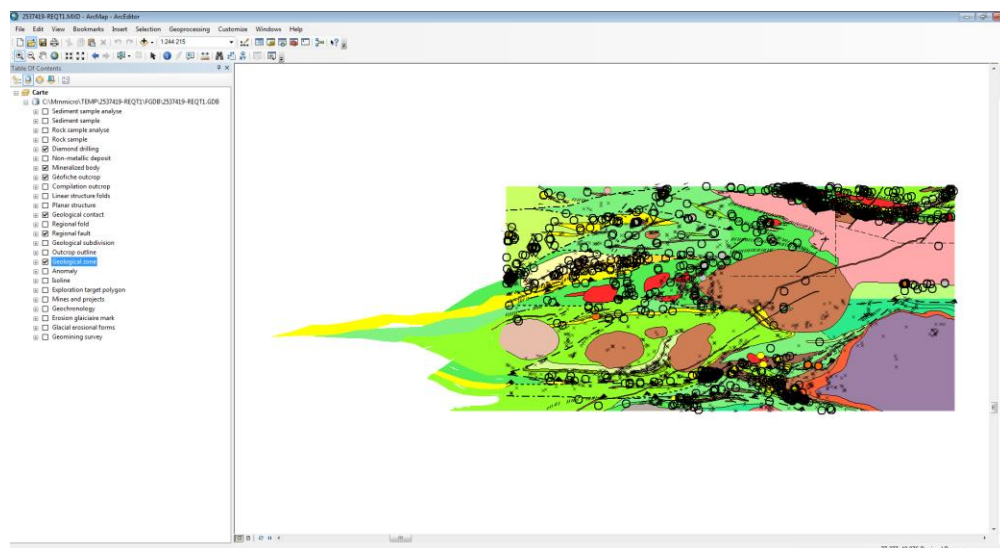
Following your order, you will receive a secure email to download your data.

Then, by opening the .MXD file (example: [1017030-REQT1.MXD](#)), geological data should be displayed with the specific symbolization of each entity type. Note that a .MXD file exists for each data types, FGDB and Shapefile.

5.3 Layer Display

After opening the .MXD, all the layers of the FGDB will be displayed in the ArcMap session and in the **Table of Contents** list. If the table of contents is not visible, click on **Windows** in the pop-up menu and then **Table of Contents**. You can then turn on or off the layers of your choice.

Hold the **CTRL** key down and uncheck the first layer of the table of contents. All layers will now be turned off. Then check only the following layers: Diamond drilling, Mineralized body, Geofiche outcrops, Geological contact, Regional fault and Geological zone. Then right click on the Geological zone layer and click **Zoom to layer**. You should have on screen an image similar to the following figure:




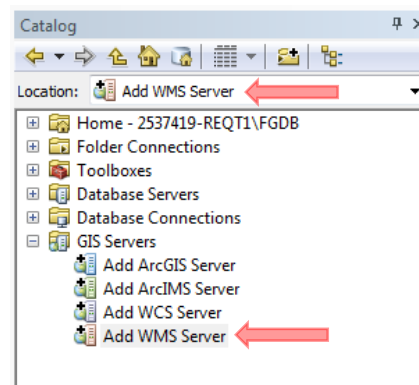
To apply transparency to a layer, go to the layer's property (right click on the layer – **Properties...**). Then, under the **Display** tab, apply the desired transparency percentage.

5.4 Display of Geophysics

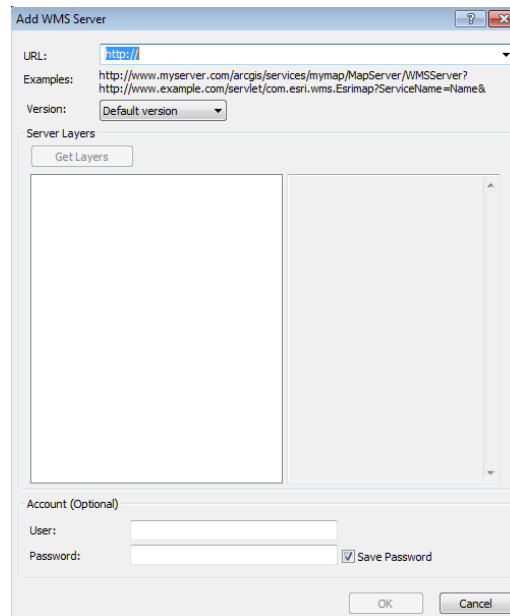
There are two types of geophysical data provided in SIGÉOM FGDB (vector data):

- 1) Total magnetic field iso value curves (from the Geological Survey of Canada's magnetic maps).
- 2) Punctual geophysical anomalies from the *Ministère's* surveys and assessment works (input anomalies and Megatem anomalies).

However, it is also possible to access the provincial and federal WMS servers to display geophysical maps in matrix format. To do this, you must open the **ArcCatalog**  utility and open the **GIS Server** tab in the **Location** window.



Then double-click on the **Add WMS Server** tab and the following window appears:



Finally, simply insert the desired web service address in the URL box:

Provincial Geophysical Web Service (MERN):

URL:

<http://sigeom.mines.gouv.qc.ca/ApolloCatalogWMSPublic/service.svc/get?request=getcapabilities&service=wms>

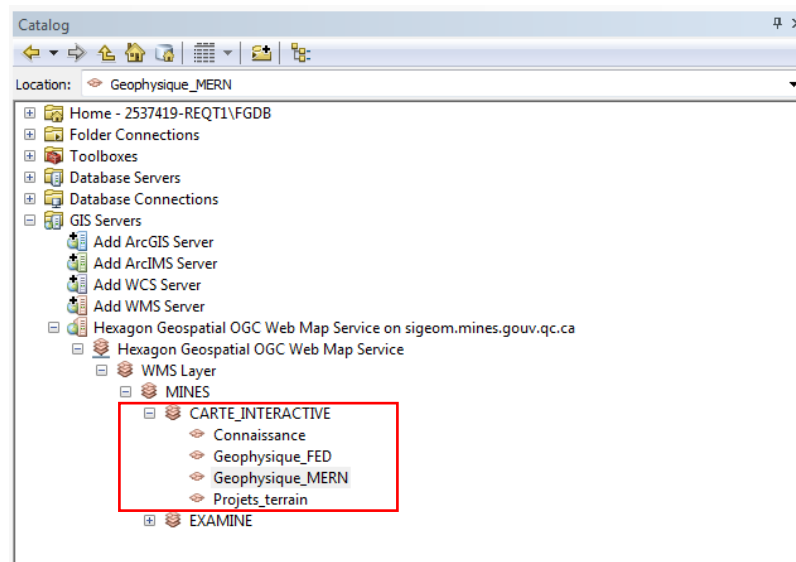
For more information on the SIGÉOM web services, please visit:

http://sigeom.mines.gouv.qc.ca/signet/classes/I0000_serviceWeb?l=a


Federal Geophysical WMS Web Service

URL : <http://wms.aggr.nrcan.gc.ca/wms2/wms2.aspx?request=GetCapabilities>

Leave other fields by default. Click **OK**. Once ArcCatalog is connected to the web service, you will be able to open the service tree and manually drag the data into your ArcMap session.




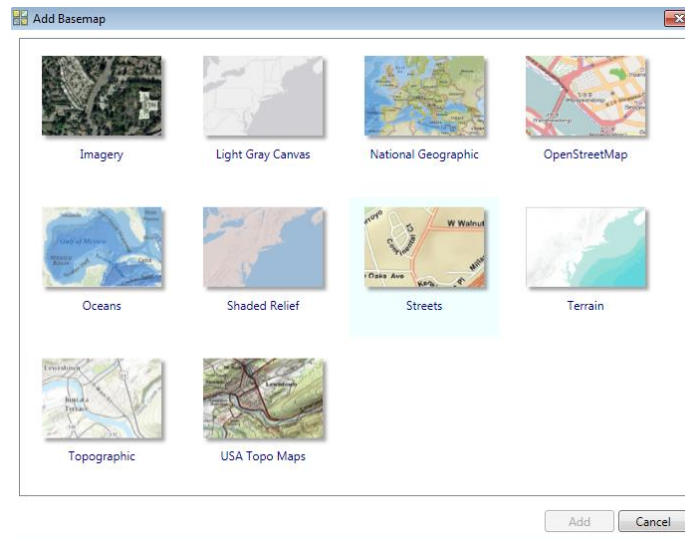
5.5 Adding Data from External Sources

To add data from external sources, simply use the **Add Data** button:  .

One can thus include a variety of file types, such as Shapefile, entity classes, rasters, images, Microsoft Excel spreadsheets, Microsoft Access databases, text files (txt), etc.

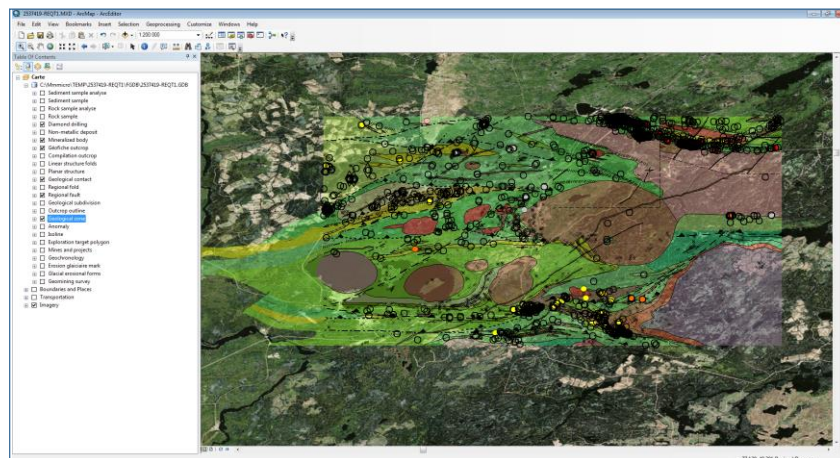
Import a map background to the ArcMap project:

To import a map background to the project, click the black arrow to the right of the **Add Data**  button and click **Add Basemap**.



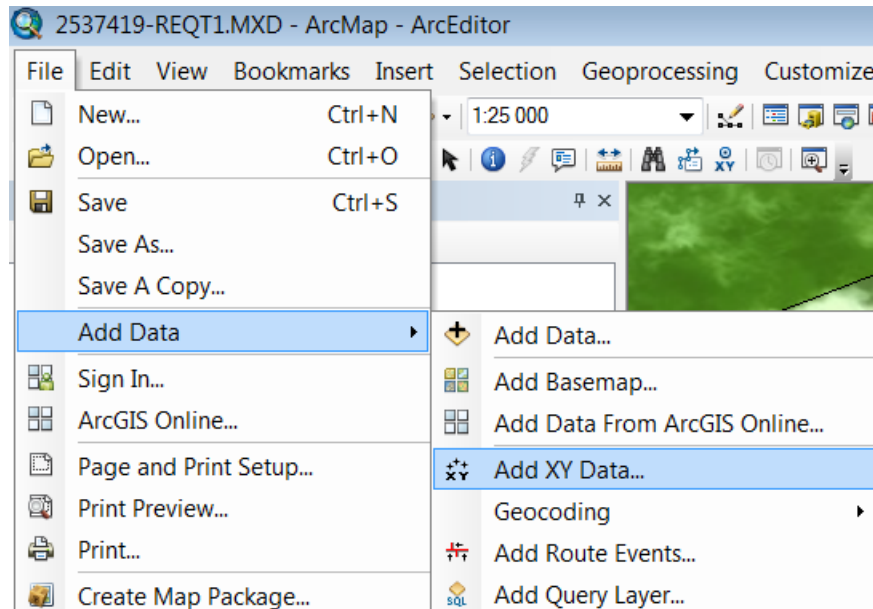
You can then add imagery, streets, topography, etc.

Click on the desired map background and click **Add**. Next, you can apply transparency to your **Geological zone** layer:

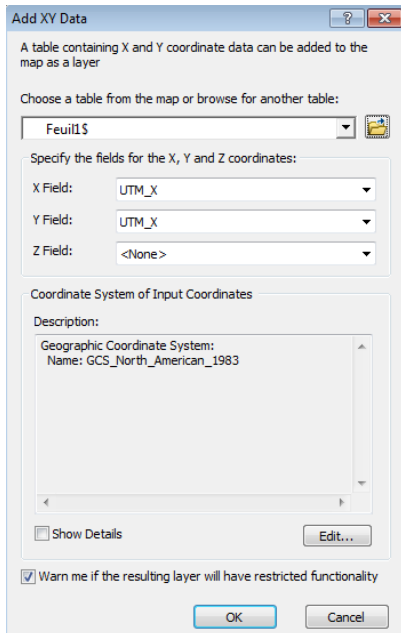


5.6 Import Data from a Microsoft Excel Spreadsheet

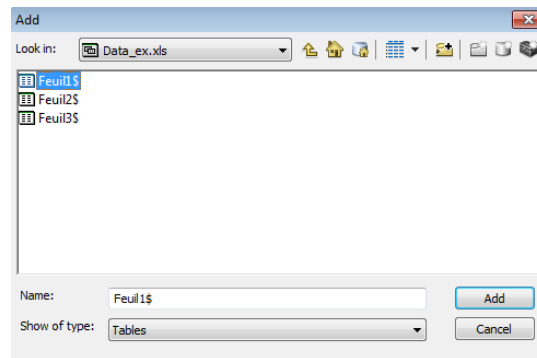
We will detail how to import data from a Microsoft Excel spreadsheet (for example, outcrop data with geochemical analyses). First, your spreadsheet must be well organized in rows and columns. Click on **File – Add data and Add XY data**.



Then navigate to the Excel file in question by clicking on the button with the small yellow folder.

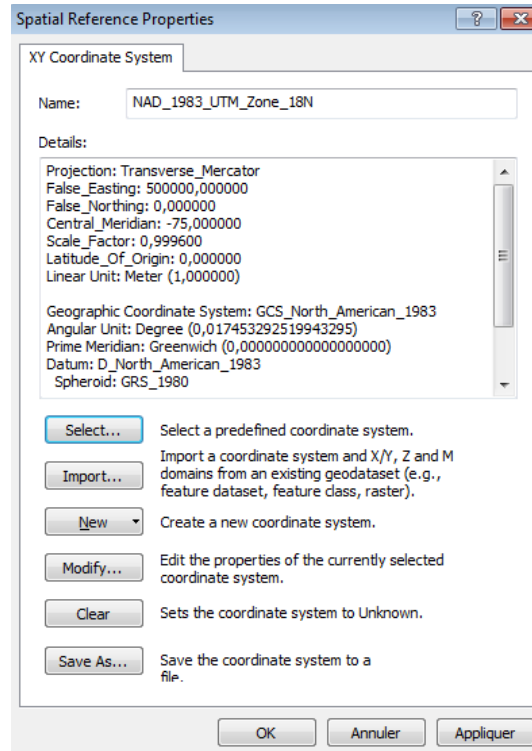


If your table contains multiple sheets, you must specify which one contains data to import into your project.



Select Sheet 1 and click **Add**.

Afterwards, you must specify which column of your spreadsheet contains the X coordinates (**X Field**) and which contains the Y coordinates (**Y Field**). Then you have to specify to the software what geographic projection it is. To do so, click **Edit...** and select the correct projection from the **Spatial Reference Properties** window.

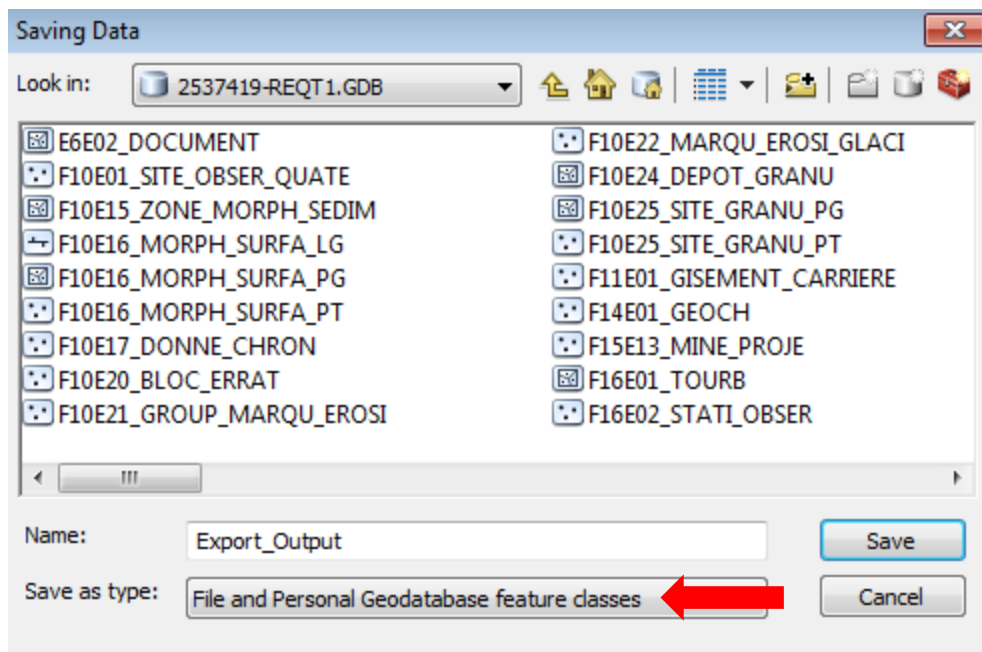
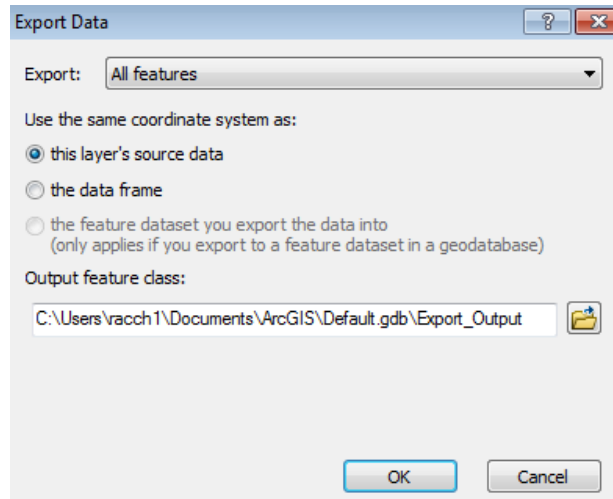


Click **OK** and also click **OK** in the **Add XY data** window.

The selected sheet now appears in the table of contents (e.g. [Événements Feuil1\\$](#)) and corresponding points on the map.

To export the file to a Form file or geodatabase, right click on the layer, click on **Data** and **Export Data...**

Click the button with the yellow folder to select the directory where you want to save your geodatabase file. Then you will have the option to save your file as a Form file or entity class (for a geodatabase).

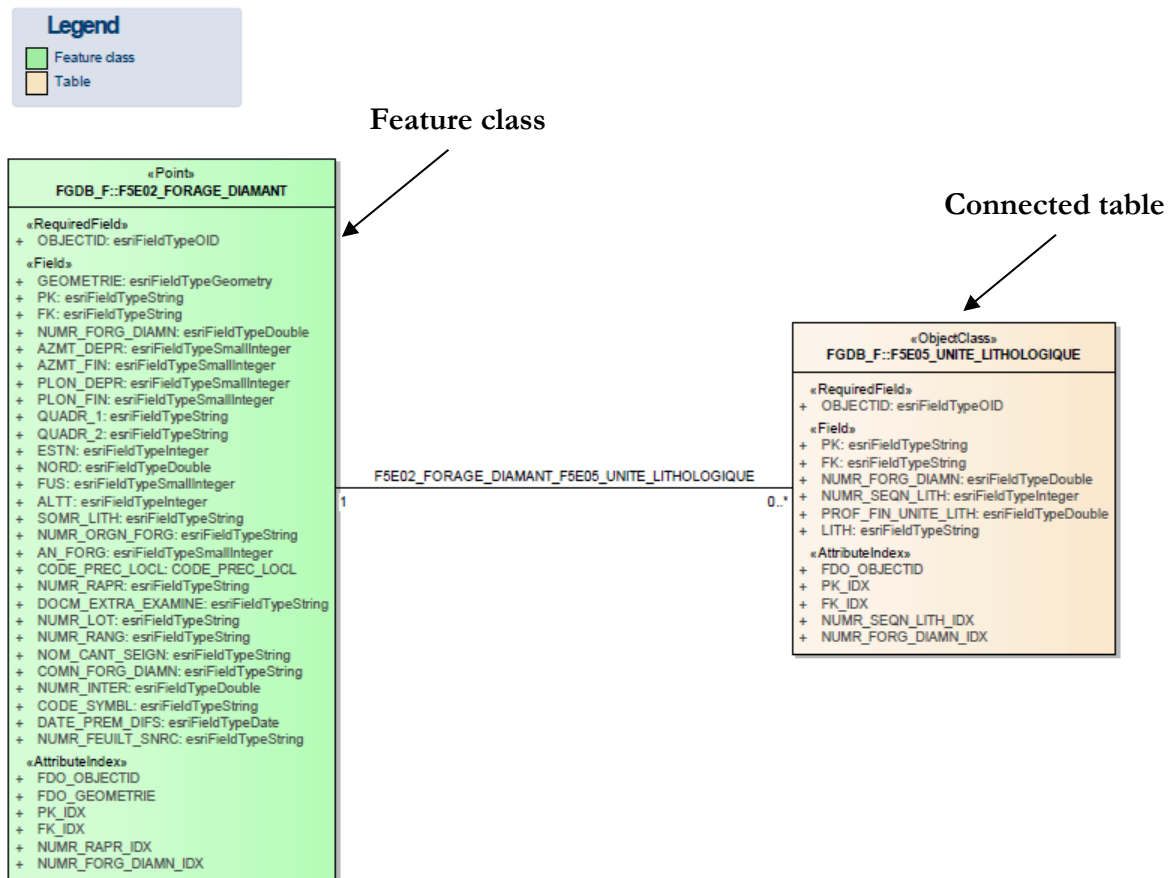


5.7 Relational Data Model

SIGÉOM data relational models are illustrated in PDF documents which are provided when ordering data from “SIGÉOM à la carte”. A PDF document is available for each entity. As an example, we will be detailing here the **Diamond drilling** entity to better understand the data structure.

Data model - Diamond drilling

Diamond drillings are mostly executed by mining companies. These drillings allow for the collection of rock samples (cores), by rotating a diamond bit string.



The entity class (green) contains basic diamond drilling information such as azimuth, dip, coordinates, altitude, year, source, comment, etc.

The linked tables contain detailed information on lithology. As drilling can contain several lithological types, the information is contained in separate tables. Each lithology is associated with a drilling by a unique number.

In addition, the PDF document of the relational model provides, where applicable, the value domains including the specific description of each value:

«Domain value - F5E02_FORAGE_DIAMANT»

Champ: CODE_PREC_LOCL


- 0 = Indeterminate precision of location
- 1 = Low precision of location
- 2 = Medium precision of location
- 3 = High precision of location

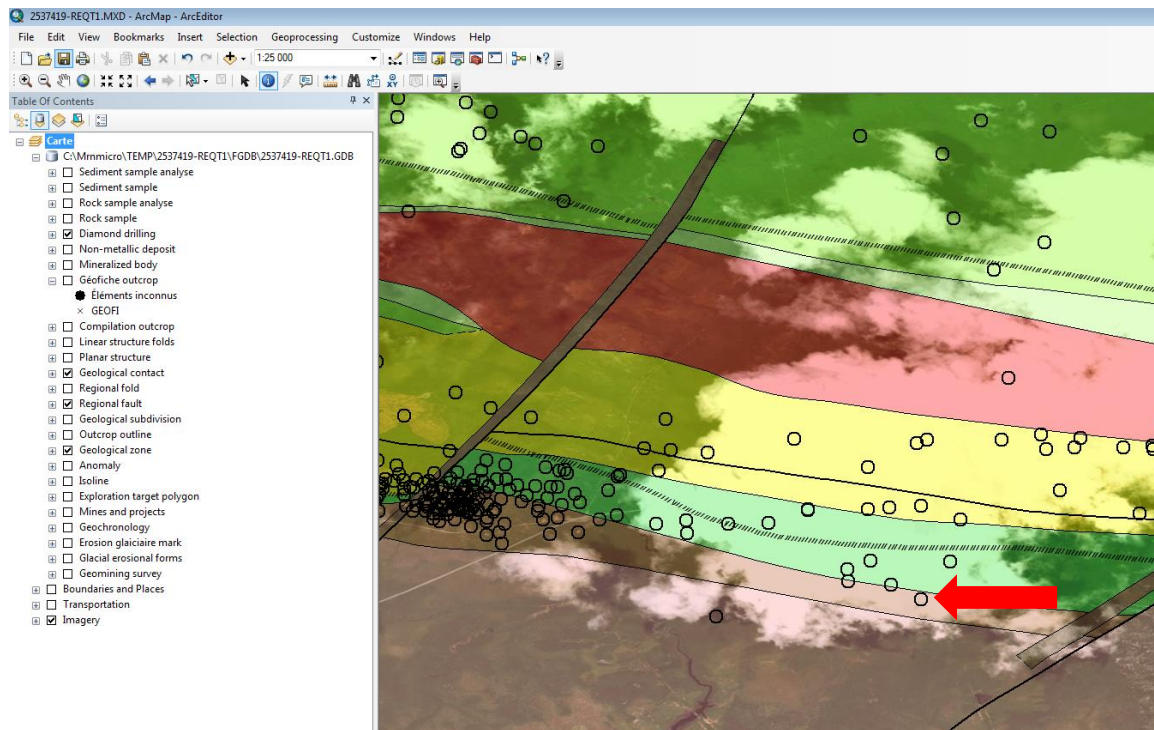
In the example above, values in the “CODE_PREC_LOCL” field must contain one of the values displayed in the list. For each of these values, it is possible to see their description (the assignment).

5.8 Querying Data

Here are three simple ways to query data in the ArcGIS environment: by using the **Identify** button, by looking at the entity class tables and by using SQL queries.

1) By using the **Identify** button:

You can query data directly using the **Identify** button: .



By clicking on the object, a window appears with the object information contained in the entity class or form file table.

You can view the information in the linked tables by clicking on the **+** on the left of the drill number.

This will allow you to view the tables containing lithological information (F5E05_UNITE_LITHOLOGIQUE) and mineralization information (F5E06_SEQUENCE_MINERALISATION).

Identify

Identify from: <Top-most layer>

MOUNTAIN
 MOUNTAIN
 F5E05_UNITE_LITHOLOGIQUE
 2511
 F5E06_SEQUENCE_MINERALISATION
 2513
 F5E06_SEQUENCE_MINERALISATION
 2510
 F5E06_SEQUENCE_MINERALISATION
 2512
 F5E06_SEQUENCE_MINERALISATION

Location: -76,570008 49,212049 Decimal Degrees

Field	Value
Northing	5452215
Zone	18
Altitude	<null>
Lithologic summary	I3A-V1B-V2J-V2
Initial drilling number	01-MFS-04EXT
Year drilling	2002
Location specification	High precision of location
Report number	GM 59766
Extra-EXAMINE do...	GM 59047
Lot number	<null>
Rank number	<null>
Township/seigneurie	MOUNTAIN
Diamond drilling co...	<null>
Internet number	41193
Symbolization code	COLLET
Date of release	2004-07-27
NTS map-sheet nu...	32F02

Identified 2 features


**SIGÉOM
Fields
column**

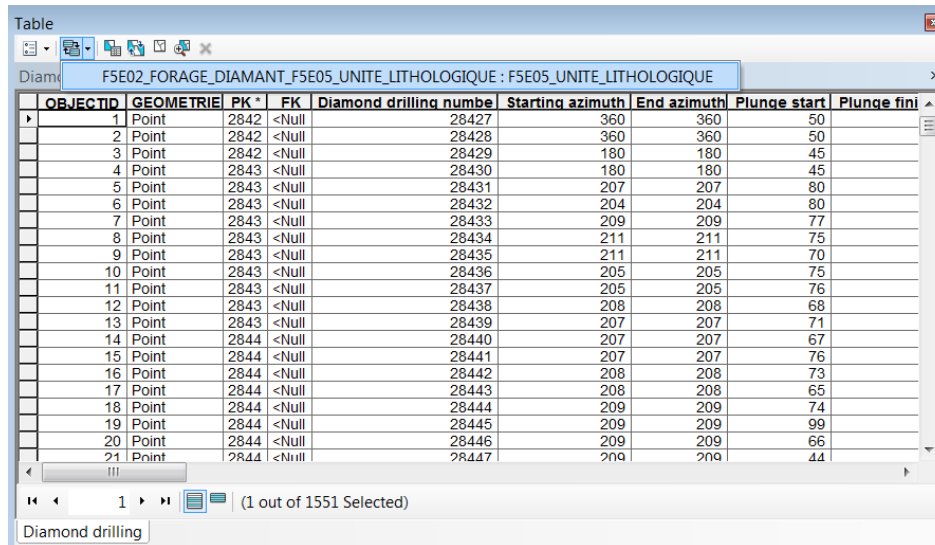
**Layer
informations
column**

Information on the field definition can be found in the SIGÉOM field glossary at:

http://sigeom.mines.gouv.qc.ca/signet/classes/I3202_glosElmnDonn?l=a

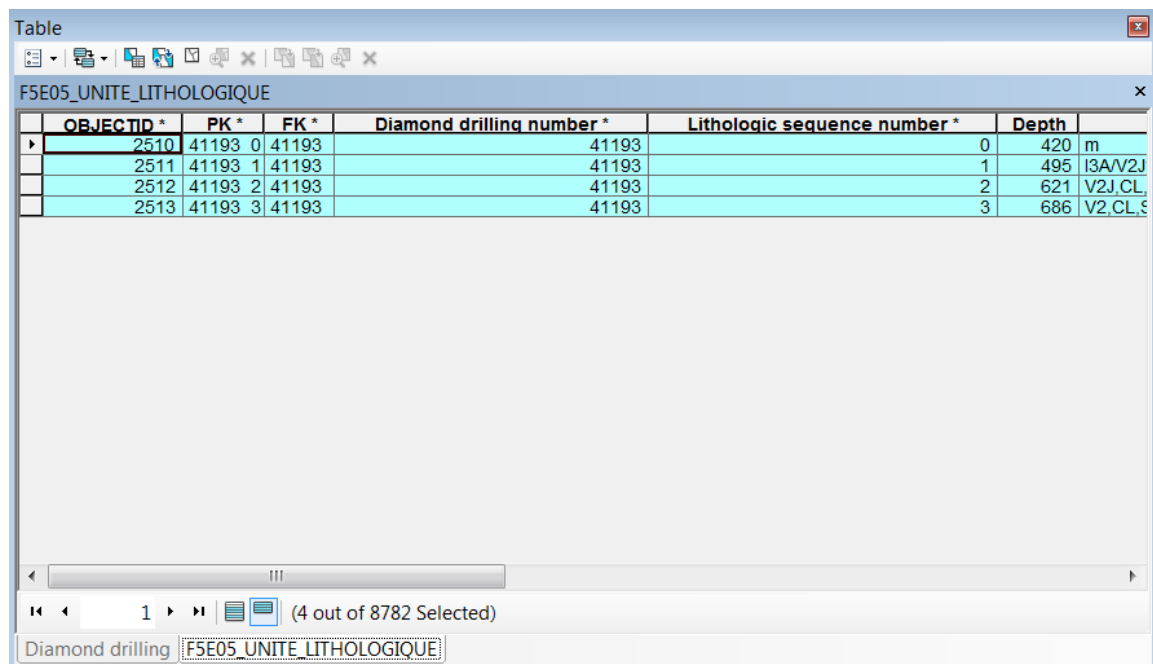
2) By consulting the entity class tables:

For each layer, you can also consult the entity class table and linked tables associated with that layer. To do this, right click on the **Open Attribute Table** layer. All layer information is then displayed. You can also access the linked table information by clicking on the **Related Tables** button .



OBJECTID	GEOMETRIE	PK *	FK	Diamond drilling number	Starting azimuth	End azimuth	Plunge start	Plunge fini
1	Point	2842	<Null	28427	360	360	50	
2	Point	2842	<Null	28428	360	360	50	
3	Point	2842	<Null	28429	180	180	45	
4	Point	2843	<Null	28430	180	180	45	
5	Point	2843	<Null	28431	207	207	80	
6	Point	2843	<Null	28432	204	204	80	
7	Point	2843	<Null	28433	209	209	77	
8	Point	2843	<Null	28434	211	211	75	
9	Point	2843	<Null	28435	211	211	70	
10	Point	2843	<Null	28436	205	205	75	
11	Point	2843	<Null	28437	205	205	76	
12	Point	2843	<Null	28438	208	208	68	
13	Point	2843	<Null	28439	207	207	71	
14	Point	2844	<Null	28440	207	207	67	
15	Point	2844	<Null	28441	207	207	76	
16	Point	2844	<Null	28442	208	208	73	
17	Point	2844	<Null	28443	208	208	65	
18	Point	2844	<Null	28444	209	209	74	
19	Point	2844	<Null	28445	209	209	99	
20	Point	2844	<Null	28446	209	209	66	
21	Point	2844	<Null	28447	209	209	44	

By clicking on the link below the button, you can access the table containing lithological information (F5E05_UNITE_LITHOLOGIQUE).



OBJECTID *	PK *	FK *	Diamond drilling number *	Lithologic sequence number *	Depth
2510	41193	0	41193	0	420 m
2511	41193	1	41193	1	495 I3A/V2J
2512	41193	2	41193	2	621 V2J.CL
2513	41193	3	41193	3	686 V2.CL.S

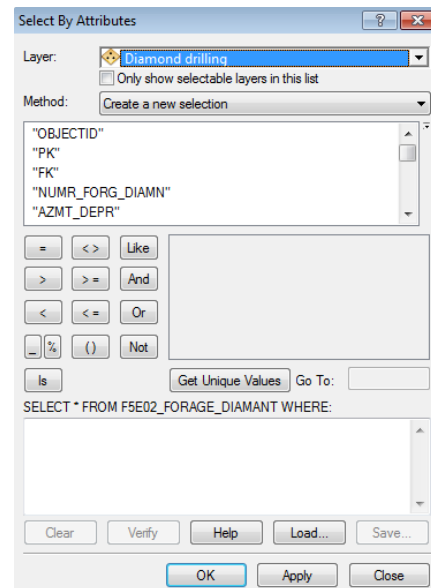
Once in table F5E05_UNITE_LITHOLOGICAL, you have the option to display table F5E06_SEQUENCE_MINERALISATION by clicking on the **Related Tables** button or you can return to the original drilling table.

3) Using SQL queries :

It is also possible to query data using SQL queries. Click **Selection** from the pop-up menu and **Select by attribute...**. The following window will appear:

The SQL query operation in ArcMap is similar to that of QGIS (Section 4.14).

First, you must choose which entity you want to query using the **Layer** drop-down menu. Then, at the bottom of the window, in the white field, you can query data using SQL operators such as LIKE, AND, OR, =, +, -, etc.



The SQL query operation in ArcMap is similar to that of QGIS

<field name> <operator> <value or chain>

The **Select by attribute** tool interface from the **Selection** menu:

Select the target layer, i.e. the layer you want to select from.

You can limit ☒ the list of target layers to only selectable layers, but by default, all layers are available.

You can choose the type of selection to be made based on your needs: Sélectionner les entités dans
ajouter aux entités courantes sélectionnées dans
supprimer à partir des entités courantes dans
Sélectionner à partir des entités courantes dans

List of fields in the target layer; double-click on a field to insert it into the query expression.

List of unique values of the selected field; double-click on a value to insert it into the query expression.

Key operator dial; click once on an operator to insert into the query expression.

Click the *Get Unique Values* button to view the selected field's values when creating an expression.

Compose a query expression using the following methods:

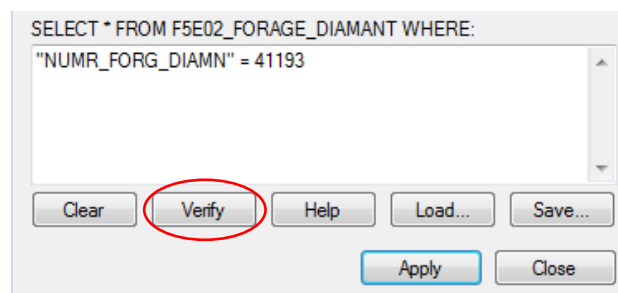
- Create a query using expression creation tools;
- compose a query in the selection window;
- Load a record.

The **Select by attribute** tool interface from the **Table**:

The screenshot shows the 'Select by Attributes' dialog box. At the top, a table header is visible with columns: OBJECTID, GEOMETRIE, PK *, FK, and Diamond d. The dialog box has a title bar 'Select by Attributes' and a subtitle 'Enter a WHERE clause to select records in the table window.' Below this, there is a 'Method' dropdown set to 'Create a new selection'. A list of fields is shown, with 'NUMR_FORG_DIAMN' selected. To the right of the field list is a list of unique values: 41188, 41189, 41190, 41191, 41192, and 41193. Below the values is a 'Key operator dial' with buttons for '=', '<>', 'Like', '> >=', 'And', '< <=', 'Or', '%', '()', 'Not', and 'Is'. At the bottom, there is a text area containing the query: 'SELECT * FROM F5E02_FORAGE_DIAMANT WHERE: "NUMR_FORG_DIAMN" = 41193'. Below the text area are buttons for 'Clear', 'Verify', 'Help', 'Load...', 'Save...', 'Apply', and 'Close'. Annotations with arrows point to various parts of the dialog box:

- You can choose the type of selection to be made based on your needs: Sélectionner les entités dans, ajouter aux entités courantes sélectionnées dans, supprimer à partir des entités courantes dans, Sélectionner à partir des entités courantes dans
- List of fields in the target layer; double-click on a field to insert it into the query expression.
- List of unique values of the selected field; double-click on a value to insert it into the query expression..
- Key operator dial; click once on an operator to insert into the query expression.
- Click the *Get Unique Values* button to view the selected field's values when creating an expression.
- Compose a query expression using the following methods:
 - Create a query using expression creation tools;
 - compose a query in the selection window;
 - Load a record.

You can check the validity of the expression at any time.

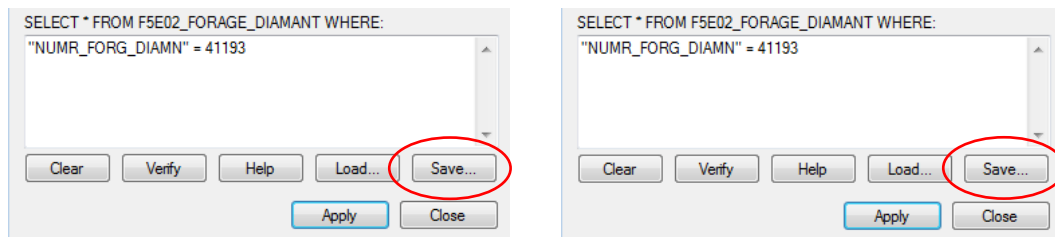


The possible results are:

An error was detected in the expression. SQL instruction used is not valid...	There is a syntax error in the request expression.	Red light
The expression was successfully processed but no records were found.	There are no errors in the expression syntax, but no record meets the criteria and will therefore not be selected.	Yellow light
The expression was successfully processed.	There are no errors in the expression syntax and at least one record meets the criteria and will be selected.	Green light

RECORD AND LOAD A QUERY EXPRESSION

You can save and reload selection expressions using the **Save** and **Load** buttons at the bottom of the **Apply** tool. This option allows you to quickly recreate a selected set of records by loading a saved expression.



The format of an expression recorded using ArcMap is .EXP.

Examples of queries (in the **Diamond drilling** layer):

1) "NUMR_ORGN_FORG" = '01-MFS-04EXT'

Translation: The original Drilling number is equal to 01-MFS-04EXT.

2) "NUMR_ORGN_FORG" LIKE '%MFS%'


Translation: The original Drilling number contains the term "MFS".

3) "AN_FORG" > 2003 AND "NUMR_RAPR" = 'GM 66733'

Translation: The drilling's year of publication is greater than 2003 and the drilling comes from the Examine GM 66733 report.

5.9 Data Editing

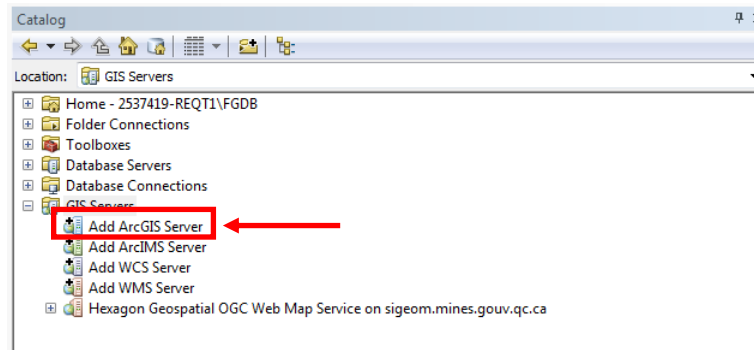
Unlike the interactive map and server, WMS and ArcGIS allow data editing. You can add objects (e.g., drilling, outcrop, etc.), remove objects or modify objects (e.g., geological polygons). To do this, the editing bar must be added. Simply right-click in a grey space above the data page and add the **Editor** toolbar. Then click the **Editor** button and **Start Editing**.

To create or add objects, simply click on the **Create Features**  button from the toolbar, select the entity to be added/edited from the **Create Features** window and plot/add the object directly to the map. When you are finished, simply **Save Edits** (under **Editor**) and **Stop Editing**.

5.10 Dynamic Location

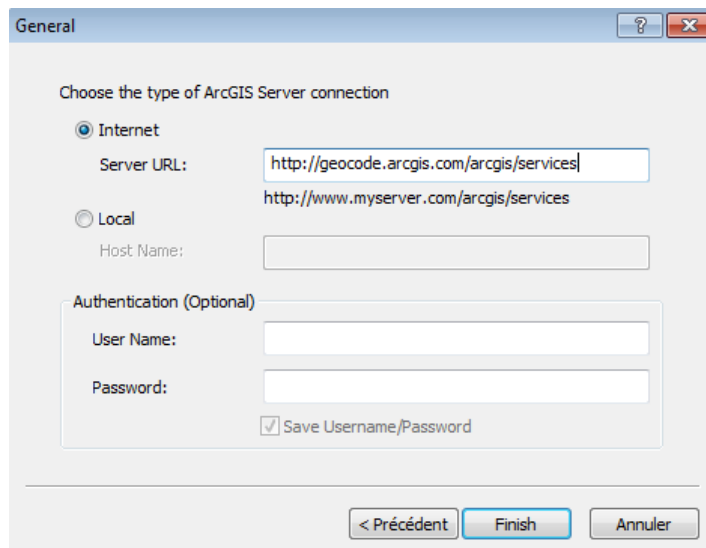
You can search by address, postal code, city, province or country in your ArcGIS session. For dynamic location, the **Geocoding** tool must be added. To do this, click in a grey space above the data page and add the **Geocoding** toolbar. This tool includes a series of default address locators.

However, it is easier to use ArcGIS Server services. You must open the **ArcCatalog** utility  and open the **GIS Server** tab.

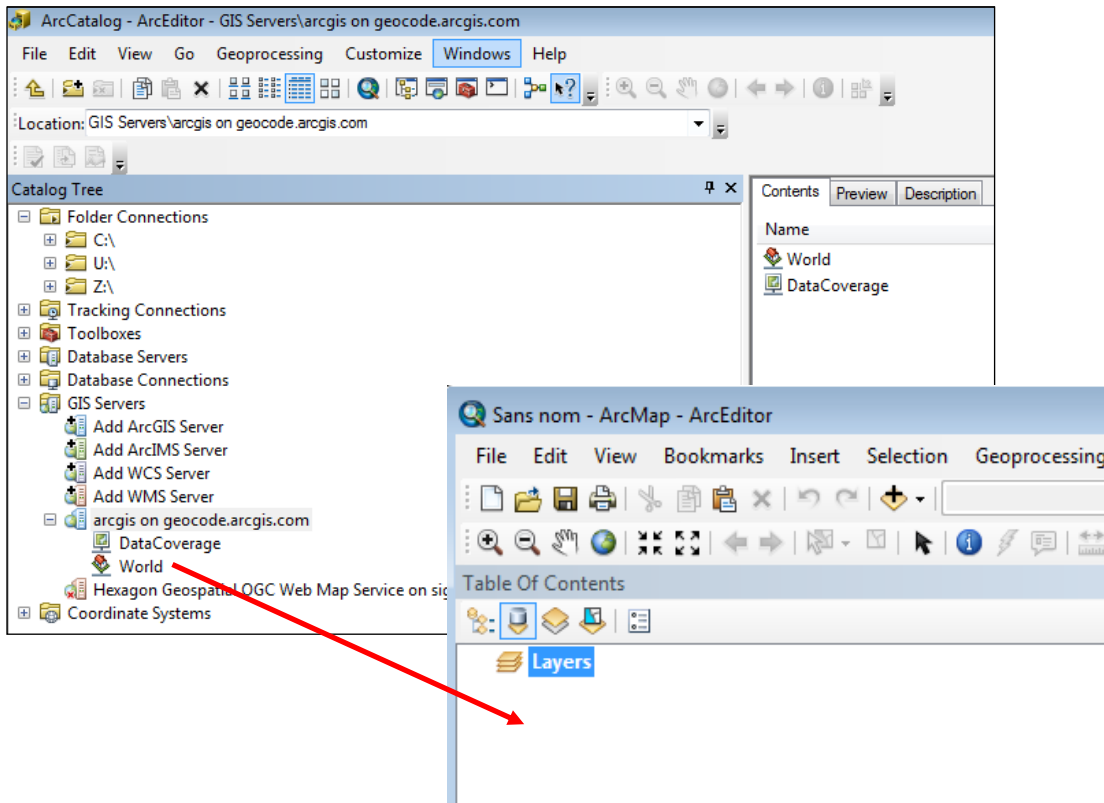


Simply **Add ArcGIS Server**, select **Use GIS Services** and paste the address below into the server URL box (leave other fields by default):

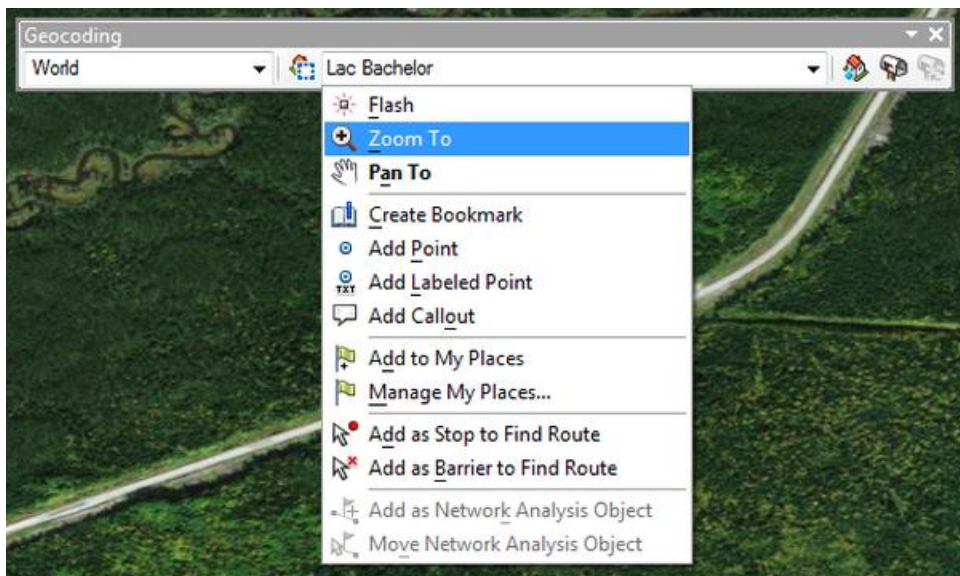
<http://geocode.arcgis.com/arcgis/services>



Then, in ArcCatalog, open the [arcgis on geocode.arcgis.com](http://geocode.arcgis.com) server tree and drag the **World** file into the ArcMap table of contents.




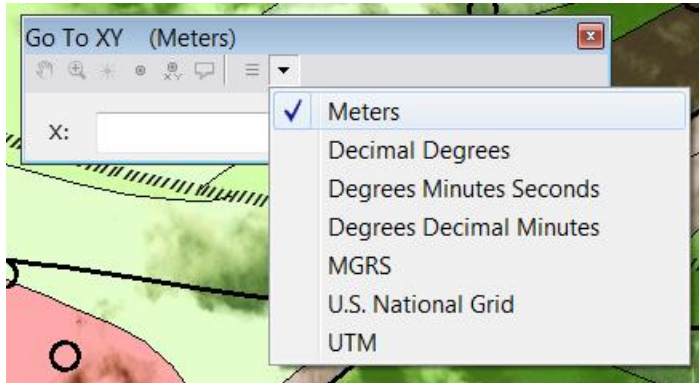
Then, simply select **World** from the **Geocoding** tool and enter the desired address:



Then, with a right click on the address, you have the option to create the point, locate the address on the map (Zoom To) or add a geomarker to that location.

5.11 Location with Coordinates

You can search by coordinates by clicking on the tool **Go to XY** . This tool allows you to enter coordinates to locate a point on the map. You must select the unit **Meters** to enter UTM coordinates.



There is also a dynamic locator at the bottom right of the screen. Coordinates for your mouse pointer is provided. To change the locator view, simply click on **Display – Data block properties – General – Units**. You will then be able to select the unit of your choice.

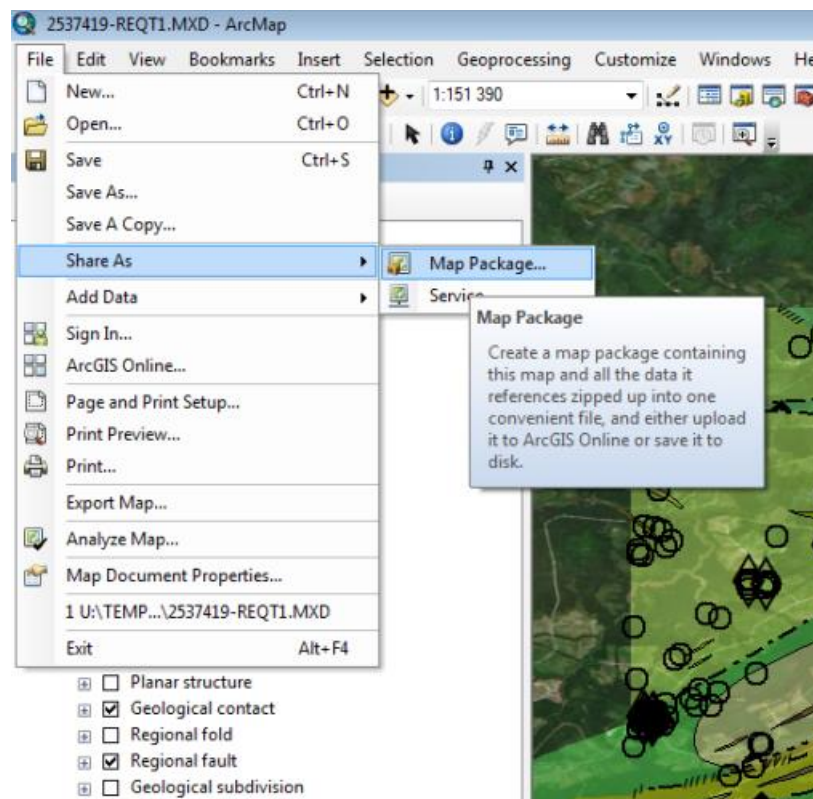
5.12 Sharing a Map

In the ArcGIS environment, there are different ways to export and share a map:

1) You can export your map in a georeferenced image format. This way, other users will be able to view your map in the ArcGIS environment, but will not be able to edit it (this is an image file). To do this, you must click on the **File** and **Export Map...** menu. Next, you will need to select the file type and **Save**. Your map is then saved in a georeferenced image format.

2) You can send all of your data (GDF, Shapefile, etc.) with a MXD file. However, by sharing your map this way, you run the risk of forgetting data or files. In addition, other users will only be able to open your ArcMap project if they use the same version of ArcGIS as you (or a newer version). **Map Package** are preferred (option #3).

3) You can create a **Map Package**. To do so, click on **File** from the pop-up menu and **Share As** and **Map Package...**



Then, in the **Map package** window, click **Save package to file** and indicate where to save this file to your station. You must also check **Include company geodatabase data instead of referencing the data**.

Map Package

Analyze Share

Map Package

Item Description

Additional Files

Upload package to my ArcGIS Online account

2537419-REQT1

Save package to file

U:\TEMP\2537419-REQT1\FGDB\2537419-REQT1.mpk

Include Enterprise Geodatabase data instead of referencing the data

[About creating a map package](#)

Then, you must open the **Item Description** tab in the left menu.

Map Package

Analyze Share

Map Package

Item Description

Additional Files

Item Description

Summary (required):

Summary

Tags (required):

Tags

Choose Your Tags...

Description:

Description

Access and Use Constraints:

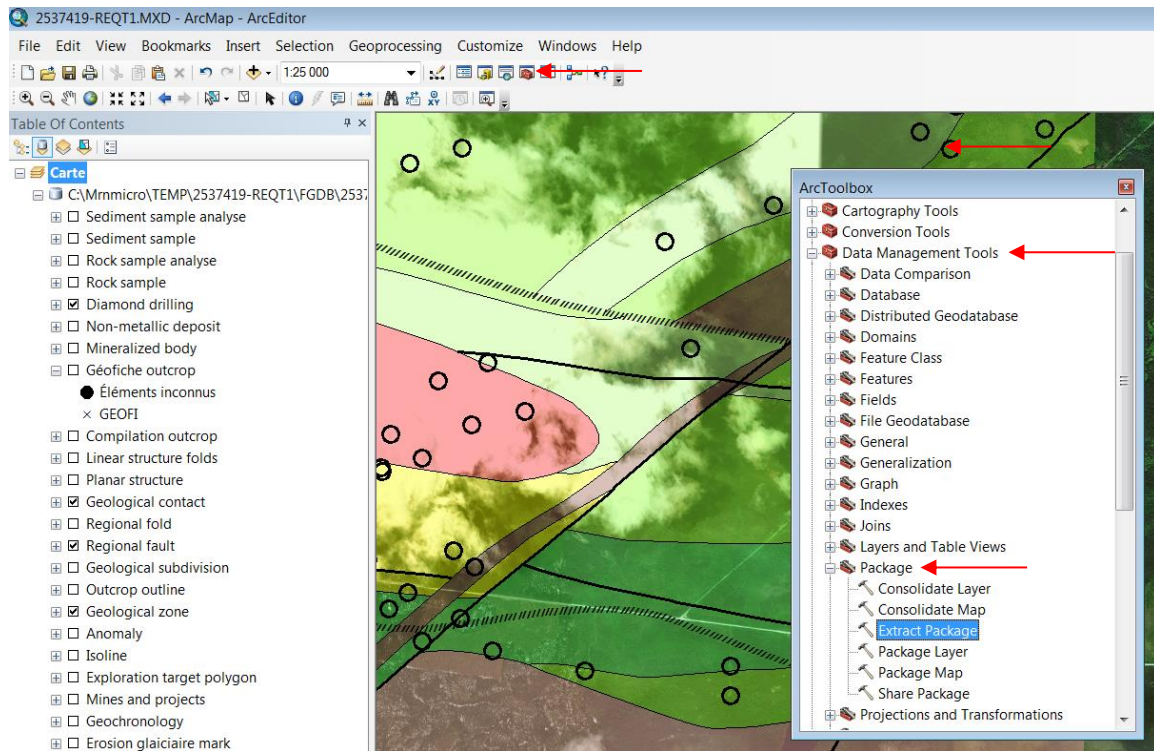
Credits:


Update missing metadata in document based on item description.

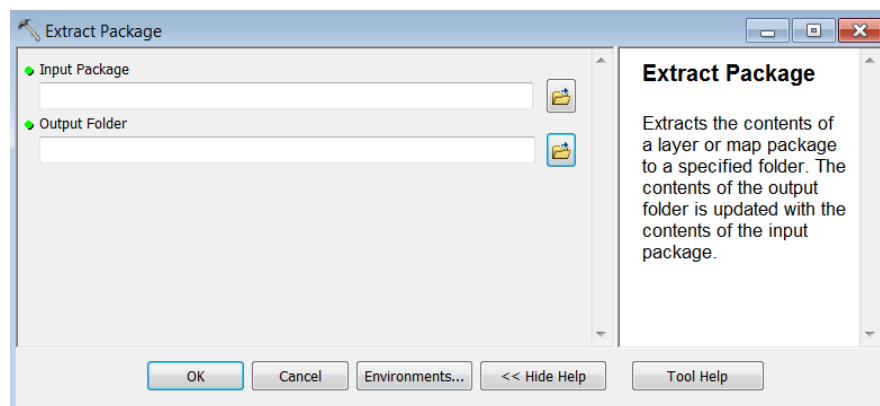
Item description fields (abstract, tags and description) are mandatory fields to create the map package. Check the **Update missing metadata** option. You can add **Additional files** (if any) with the package.

You can then click on the **Share** button at the top right. The layer package is then exported to your station. This is an **MPK** extension file, a zipped file format. You can now send this package to other users.

To open a layer package (**MPK** file), you must use the **Extract a package** tool.



To do this, click **ArcToolbox**  and open the **Data management tools** toolbox. In this box, open the **Package** toolset and finally the **Extract package** tool. The following window will appear:



Indicate in the **Input package** space where the MPK compressed file is located on your station and in the **Output Folder** where you want to extract the data. Click **OK**. You will find the MXD file and the geodatabase in the **Output Folder**.

5.13 Looking for Gold Anomalies in Drillings

The ArcGIS environment allows for much more specific and detailed queries than the interactive map and QGIS freeware.

Here we will detail an example of a SIGÉOM data query to better understand the relational model of these data. First, we will identify drillings that are within 100 metres of a regional fault or shear zone. Of these, we will then select those that contain an intermediate volcanic (V2) description whose geochemical analysis exceeded a 1000 ppb (1 g/t) gold threshold.

Method:

1) First, you must select drillings within 100 metres of a regional fault or shear zone. To do this, in the **Selection** menu, click **Select by location**. In the window that appears, you must select the selection method by selecting **select feature from** and select **Diamond drilling** as the target layer (this is the layer you want to select from). Then select **Regional fault** as the source layer. For the spatial selection method, you must select **Target layer(s) features intersect the Source layer feature**. The search distance here will be 100 metres. Click **OK**. Drillings within 100 metres of a regional fault or shear zone are now selected.

Select By Location

Select features from one or more target layers based on their location in relation to the features in the source layer.

Selection method:
select features from

Target layer(s):

- Geochemistry
- Drilling
 - ☒ Diamond drilling
- Deposits
- Bedrock geology
- Geophysics
- Mineral Potential
- Mining activity
- Geochronology
- Quaternary geology
- Examine

☐ Only show selectable layers in this list

Source layer:
Regional fault

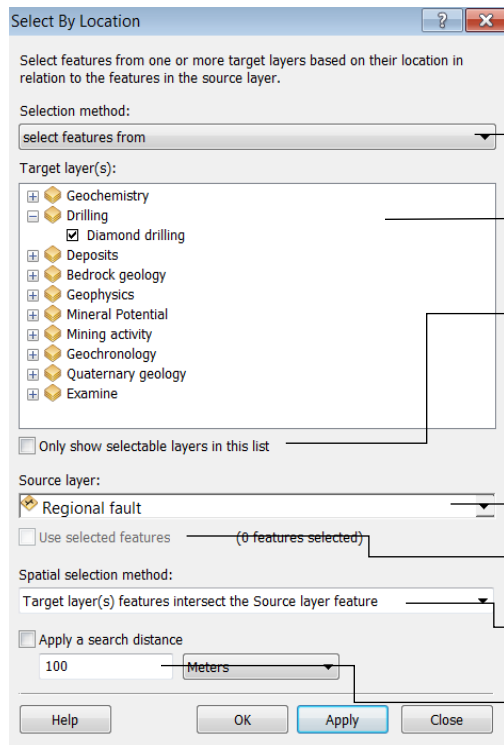
☐ Use selected features (0 features selected)

Spatial selection method:
Target layer(s) features intersect the Source layer feature

☒ Apply a search distance
100 Meters

Help OK Apply Close

The **Select By Location** tool allows you to select entities based on their relative position in another layer.



Select By Location

Select features from one or more target layers based on their location in relation to the features in the source layer.

Selection method:
select features from

Target layer(s):

- ☐ Geochemistry
- ☐ Drilling
- ☒ Diamond drilling
- ☐ Deposits
- ☐ Bedrock geology
- ☐ Geophysics
- ☐ Mineral Potential
- ☐ Mining activity
- ☐ Geochronology
- ☐ Quaternary geology
- ☐ Examine

☐ Only show selectable layers in this list

Source layer:
Regional fault

☐ Use selected features (0 features selected)

Spatial selection method:
Target layer(s) features intersect the Source layer feature

☐ Apply a search distance
100 Meters



Annotations:

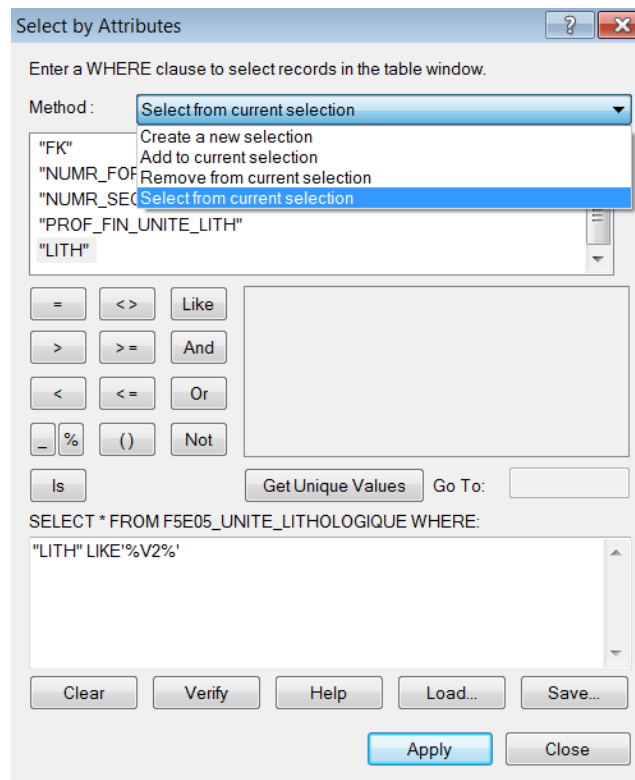
- You can choose the type of selection to be made based on your needs:
 - select features from
 - add to the currently selected features in
 - remove from the currently selected features in
 - select from the currently selected features in
- Select ☒ **target layer(s)** from which entities will be selected – you understand this, you can perform a spatial selection over multiple layers at the same time.
- You can limit ☒ the list of target layers to only selectable layers, but by default, all layers are available.
- Select the **source layer** to be used to select entities in the target layer. For example, if you want to select diamond drillings that cut regional faults, the target layer would be diamond drillings and the source layer would be regional faults.
- You can use all the entities in the source layer ☐ or only the previously selected entities ☒.
- Select the selection method (spatial relationship rule) to use for selection.
- You can also use a search distance, i.e. extend the reference surface of your source layer by a certain distance (buffer zone, tolerance).

About selection methods



The proposed spatial selection methods depend on the type of data (points, lines, polygons) in the target layer and source layer. The Search distance option is available only with certain selection methods. All methods can be found in Appendix 1 of this document.

2) From drillings selected in Step 1, you must now find drillings that contain an intermediate volcanic (V2) description. To do this, you must open the **Diamond drilling** layer attribute table and go to the linked table: **Lithological unit**. In the attribute table, click once on the **Related Tables**  button to go to table F5E05_UNITE_LITHOLOGIQUE. Once in the table, to select V2 lithologies, you must click on **Table Options**  and **Select By Attribute**.



Select by Attributes

Enter a WHERE clause to select records in the table window.

Method: **Select from current selection**

- "FK" Create a new selection
- "NUMR_FOF" Add to current selection
- "NUMR_SEC" Remove from current selection
- "LITH" Select from current selection**
- "PROF_FIN_UNITE_LITH"

Buttons: =, <>, Like, >, >=, And, <, <=, Or, %, (), Not, Is, Get Unique Values, Go To:

SELECT * FROM F5E05_UNITE_LITHOLOGIQUE WHERE:
 "LITH" LIKE '%V2%'



Buttons: Clear, Verify, Help, Load..., Save..., Apply, Close

For the selection method, choose **Select from current selection** because you want to select only from the entities already selected (within 100 m of a fault). Now write this query in the white space at the bottom of the window:

"LITH" LIKE '%V2%'

Meaning: The lithology column contains the expression V2 (Intermediate volcanics).

Click **Apply**.

3) From drillings selected in Steps 1 and 2, you must now find drillings that contain >1000 ppb of gold (1 g/t). To do this you have to go to the linked table **Mineralization sequence**. Click once on the **Related Tables**  button to go to table F5E06_SEQUENCE_MINERALISATION. Once in the table, to select gold levels above 1000 ppb, you must click on **Table Options**  and select by attributes.

Select by Attributes

Enter a WHERE clause to select records in the table window.

Method : **Select from current selection**

- "LONGR" Create a new selection
- "TENR" Add to current selection
- "CODE_ELMN_CHIM" **Select from current selection**
- "CODE_MINR" Remove from current selection
- "NUMR_SEQN_LITH"

Buttons: =, < >, Like, >, >=, And, <, <=, Or, -, %, (), Not, Is, Get Unique Values, Go To:

SELECT * FROM F5E06_SEQUENCE_MINERALISATION WHERE:
 "CODE_ELMN_CHIM" = 'Au' AND "TENR" >= 1000

Buttons: Clear, Verify, Help, Load..., Save..., Apply, Close

For the selection method, choose **Select from current selection** because you want to select only from entities already selected (within 100 m of a fault and containing V2 lithology). Now write this query in the white space at the bottom of the window:

"CODE_ELMN_CHIM" = 'Au' AND "TENR" >= 1000

Meaning: Chemical element equals Gold and content is greater or equal to 1000.

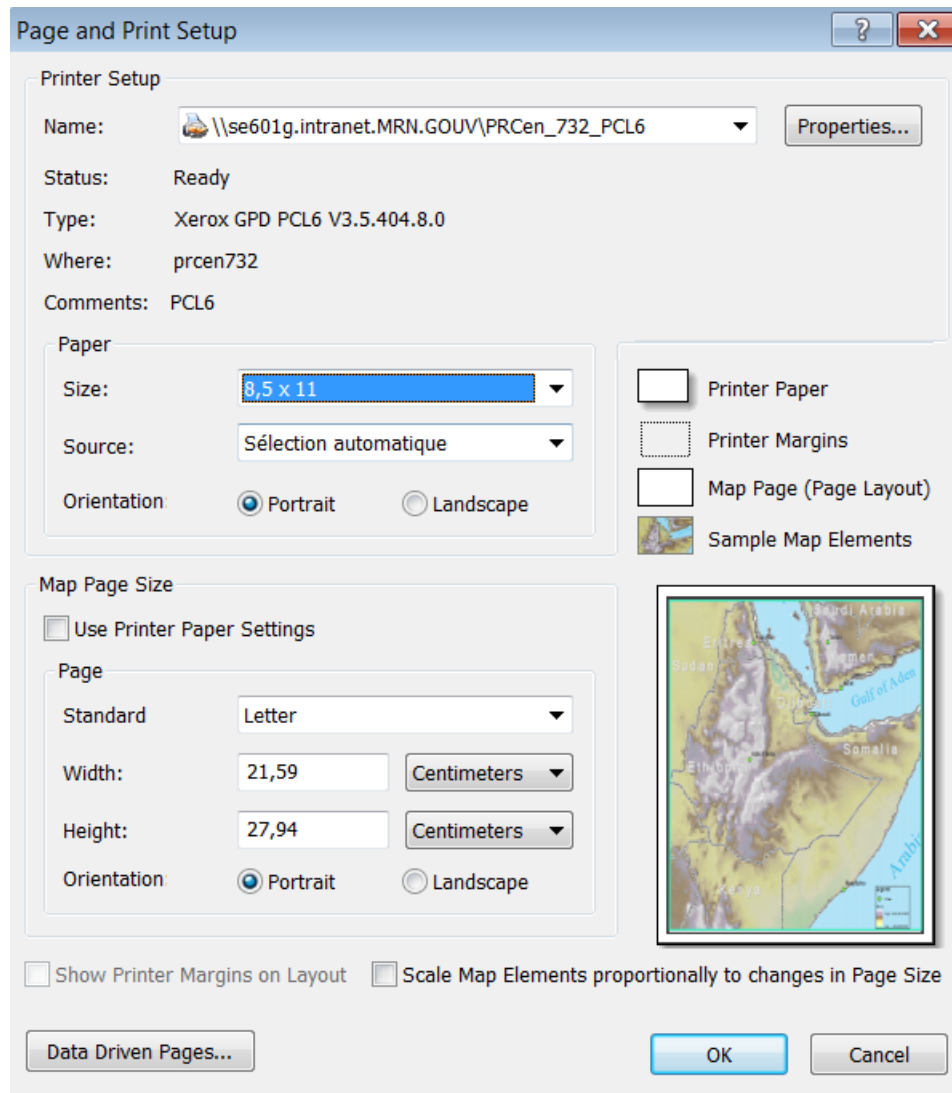
Click **Apply** and **Close** the window.

Drillings located less than 100 metres from a fault or shear zone and that contain an intermediate volcanic (V2) description, whose geochemical analysis exceeded a threshold of 1000 ppb of gold, are now selected.

5.14 Printing

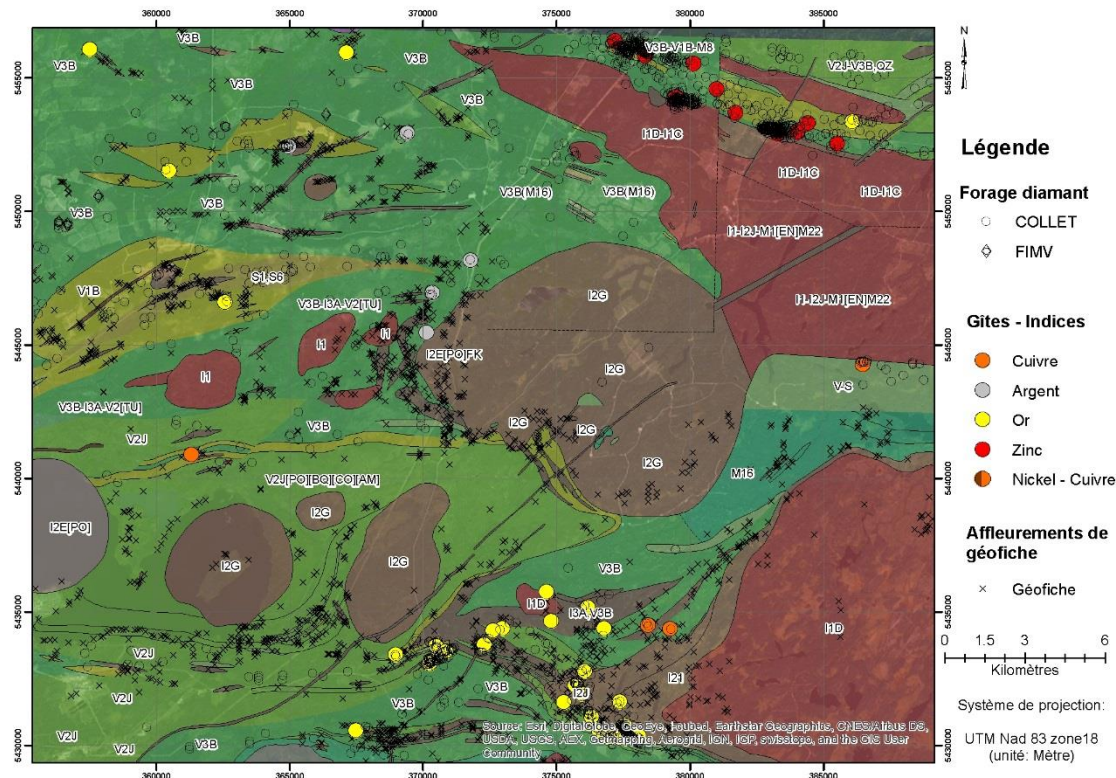
To print a map, it is best to put ArcMap into **Layout mode**. To add a legend, the ArcMap session must be formatted (**View – Layout View**). Then, under the **Insert** tab, you can add a legend, north arrow, scale bar, etc. In **Layout mode**, you can also adjust the scale of the map.

Once the layout is complete, click on **File – Page and Print Setup**.



The **Page and Print Setup** window allows you to select the printer, print area size (Paper) and map size. Once the layout is complete, click **File – Print** to start printing. You can also install a PDF utility (e.g., PDFCreator) to create a PDF file.

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5.15 Difference Between Shapefile and FGDB

A shapefile is a simplified format for storing vector data to archive the location, shape and attributes of geographic features. It can only contain point, linear (line) or surface (polygon) entities. A shapefile is very limited in terms of file size (2 GB), the number of objects it can contain and the number of possible fields.

A geodatabase is a package of files in a folder that allow to store, query and manage spatial and non-spatial data. It stores many types of objects (entity classes, many raster types, images, tables, etc.). Geodatabases are used to process and manipulate very large data sets.

Geological data from SIGÉOM are stored in a geodatabase.

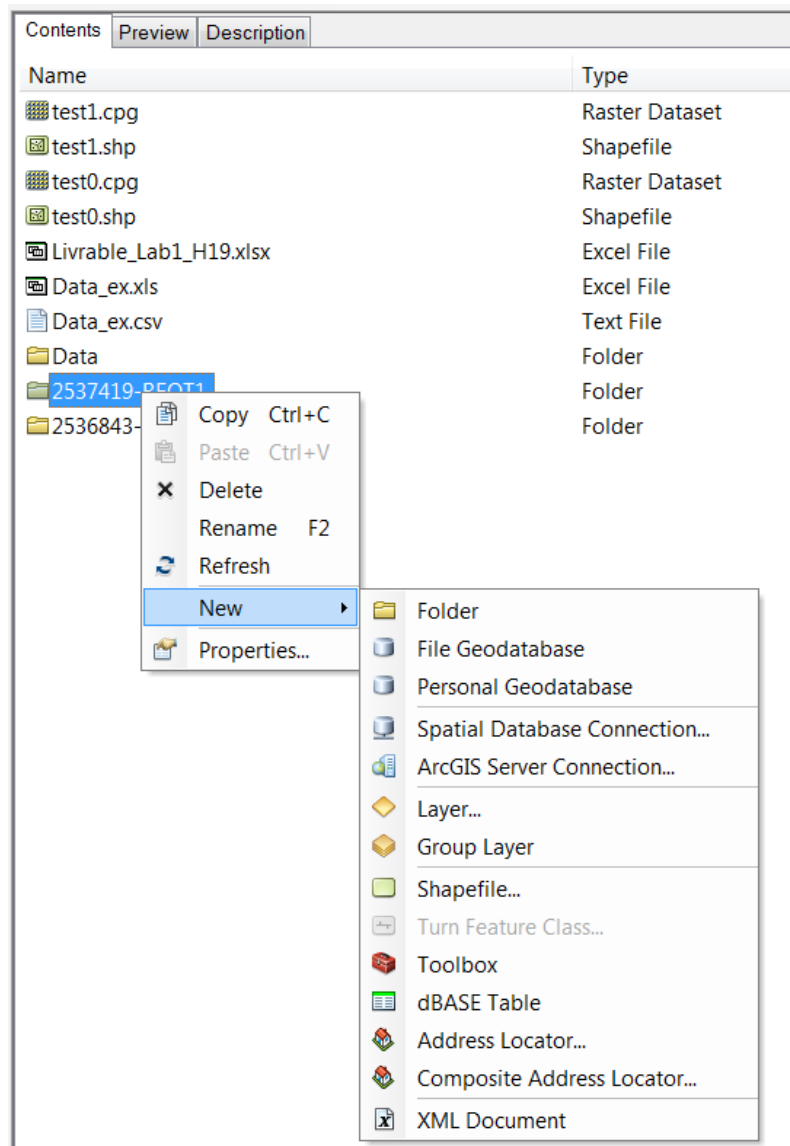
There are two types of geodatabase:

- File Geodatabase.gdb
- Personal Geodatabase.mdb

The personal geodatabase (MDB) is based on a Microsoft Access structure. It is limited in size (based on the Windows operating system version), but allows for the transfer of Microsoft Office data (Excel, Access). In addition, MDB can also be used to process lithochemical data from other software (e.g. GCD kit, Lithomodeleur, Geointerpreter, etc.). It is only used on Windows platforms.

The file geodatabase is based on an ArcGIS structure. It is virtually unlimited in size (1 TB). This limit can be as high as 256 TB for large image sets. Each entity class in a FGDB can contain more than 2 billion vector entities per dataset. The FGDB is a unique tool that allows for optimal organization of data. It allows a multitude of files to be grouped into a single database (one file). It can be used on multiple platforms. This type of geodatabase uses about one third of the storage space for the same information with respect to personal geodatabases or shapefiles.

To create a shapefile, a personal geodatabase or a file geodatabase file, you must open the **ArcCatalog** utility and navigate to the folder of your choice. Then right click on the folder and select **New**.



Conclusion

We have shown you how to access, analyze and edit SIGÉOM data using three technologies that use different formats. Our objective was to guide you so that you could use Quebec geoscientific data managed by the *Ministère*.

Highlights related to each technology are:

1. **Interactive map:** The map allows different geoscientific layers to be viewed using Internet Explorer, Firefox or Google Chrome. Active and in-demand mining titles linked to the GESTIM system are also available. The interactive map is free of charge and we receive about 30 000 visits a year. This approach is aimed at the general public and geoscientists. The interactive map has been available since late 2012.
2. **Web Map Service (WMS) informatics service:** The service provides the ability to display SIGÉOM geoscientific information layers. This service can be used with freeware such as **QGIS** – which is used in this guide – or other software such as MapInfo (used by several exploration companies). Use of the WMS service is free of charge. This approach is aimed at a clientele with more specific consultation needs (mining exploration, academia, government departments, etc.). WMS service has been available since 2012.
3. **File Geodatabase (FGDB) data:** It is a format that can be exploited in the ArcGIS environment or with other software. Data are sold to the customer. This format allows analysis and modelling of SIGÉOM data by applying filters and selecting and discriminating the information they want to process. Because data format is more complex, prior knowledge is required to exploit it. This format has been available since 2010.

The following table provides a summary of the functions that were exploited during the demonstrations. The major differences between the interactive map environment and QGIS are that the interactive map data model is simplified and the addition of external data – including WMS services – is not possible. In terms of the differences between ArcGIS and QGIS, there are many. ArcGIS is a sophisticated software program that allows the entire SIGÉOM geometric and descriptive data model to be used at home. It requires a significant financial investment for its acquisition and for user training. Before acquiring ArcGIS, we have to realize that we will find ourselves in an environment designed by geomatics specialists for geomatics users. For QGIS, it's a freeware that never ceases to amaze us. This version announces the possibility of opening a FGDB. The software has faults in its qualities, like all open source software that requires a fair amount of user resourcefulness.

In conclusion:

Free **consultation** of SIGÉOM data - **Interactive map**;

Pooling of SIGÉOM data, other data sources and ours - **QGIS and others** via the SIGÉOM **WMS** service.

Editing, data relational model and sophisticated spatial data queries - **ArcGIS**.

Comparison Table

Demonstration Object	Different Work Environments		
	MAP	QGIS	ARCGIS
Layer display (drilling, geology, outcrop, deposit and fault)	✓	✓	✓
Display of geophysics	✓	✓	✓
Adding data from external sources	✗	✓	✓
Querying data	✓	✓	✓
Data editing	✗	✓	✓
Dynamic location	✓	✗	✓
Location with coordinates	✓	✓	✓
Placing a freehand marker	✓	✓	✓
Map sharing with web link	✓	✗	✓
Looking for gold anomalies in drillings	✓	✓	✓
Data relational model	✗	✗	✓
Difference between shapeFile and FGDB	✗	✗	✓
Printing	✗	✓	✓

Contact us

If you have any questions or comments, please do not hesitate to contact us.

Email: service.mines@mern.gouv.qc.ca

Mines Service Centre

Telephone: (418) 627-6278

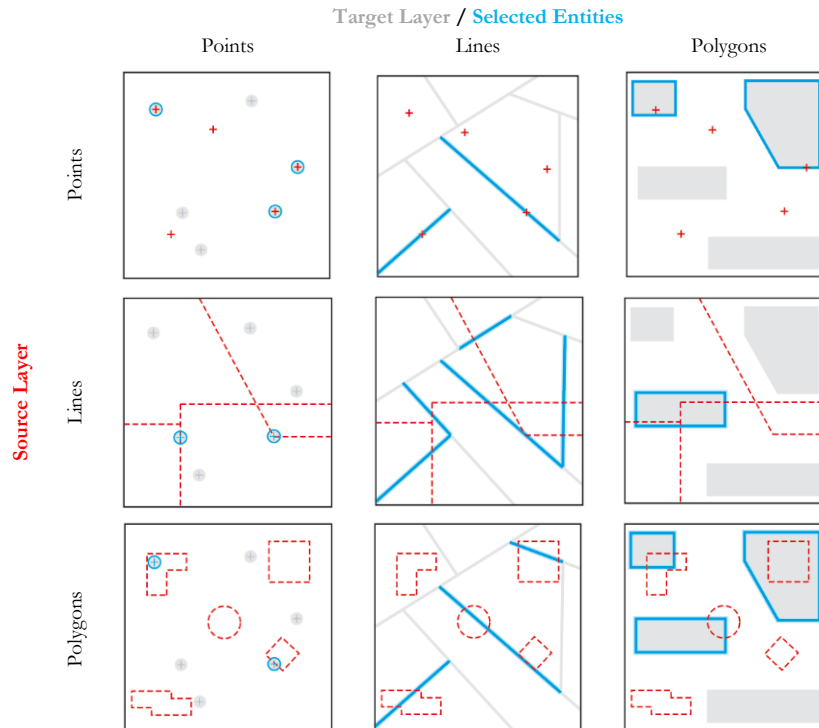
Toll-free line: 1-800-363-7233

Fax: (418) 643-2816

Appendix 1 – Site Selection Methods (Spatial Queries)

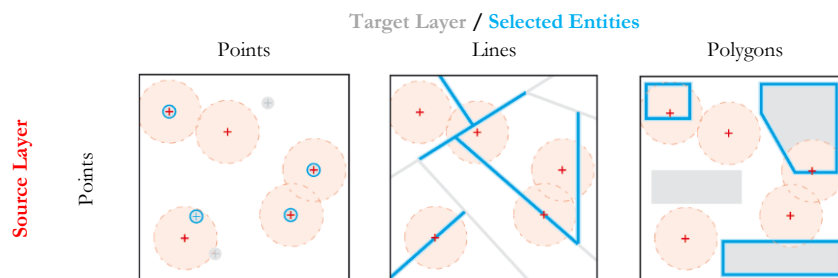
INTERSECT

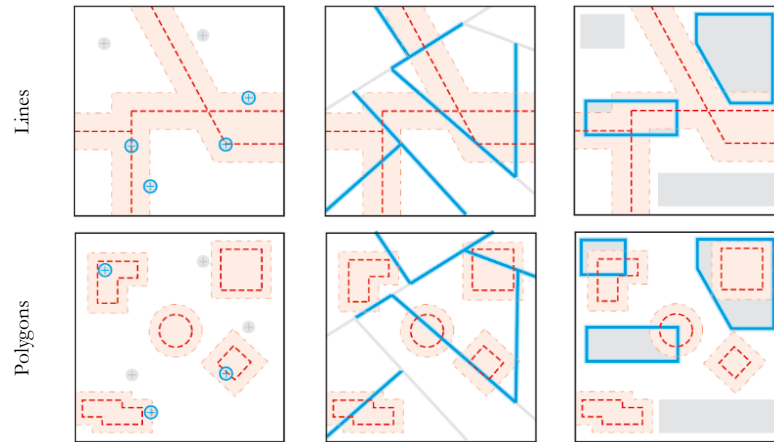
An intersection refers to any entity that performs a full or partial overlay of the source entity(ies).



ARE LOCATED A DISTANCE FROM

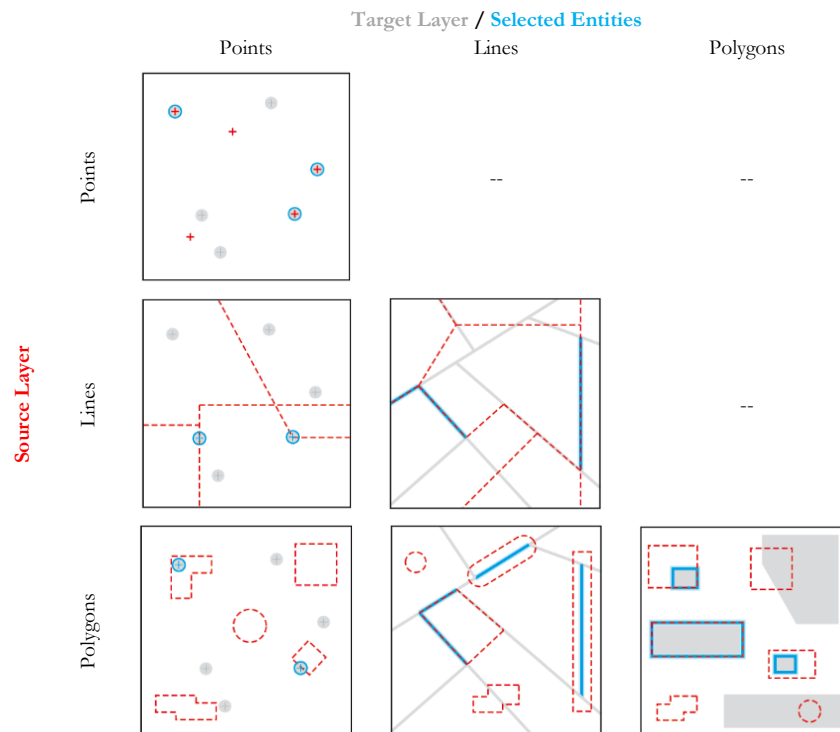
This operator creates buffer zones using the buffer zone distance around source entities and returns all entities that intersect the buffer zones. This operation is equivalent to using the spatial query “Intersect” with a search distance.





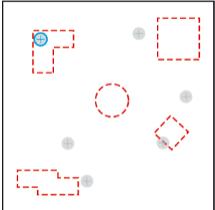
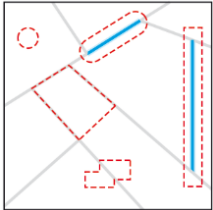
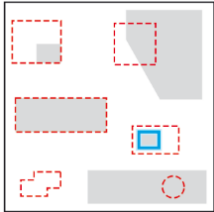
ARE CONTAINED IN

To be selected, the geometry of the target entity must be within the geometry of the source entity. Selected entities and source entities may have overlapping boundaries.



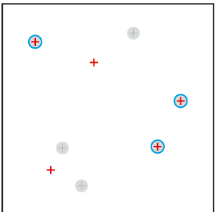
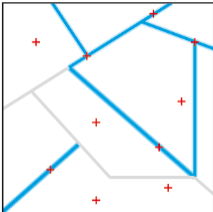
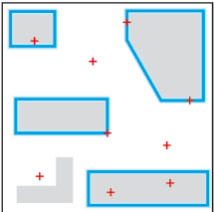
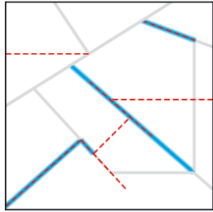
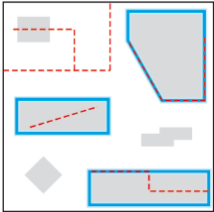
ARE COMPLETELY CONTAINED IN

To be selected, all parts of target entities must be within the source entity(ies) geometry and cannot touch the source boundary. The source entity must be a polygon, where you must apply a buffer zone around point and linear entities to use that operator. This operator is the reverse of "*Contain completely*".

		Target Layer / Selected Entities		
		Points	Lines	Polygons
Source Layer	Points	--	--	--
	Lines	--	--	--
	Polygons			

CONTAIN

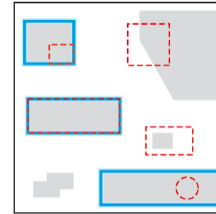
To be selected, the geometry of the source entity must be within the geometry of the target entity that includes its boundaries. This is the reverse of the operator "*Are in*".

		Target Layer / Selected Entities		
		Points	Lines	Polygons
Source Layer	Points			
	Lines	--		

Polygons

--

--



CONTAIN COMPLETELY

To be selected, all parts of the target entity must contain the complete geometry of the source entity. In addition, the source entity cannot touch or superimpose on the boundaries of the target. The source entity must be a polygon, where you must apply a buffer zone around point and linear entities to use that operator.

Source Layer

Points

Lines

Polygons

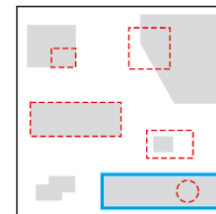
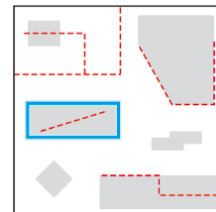
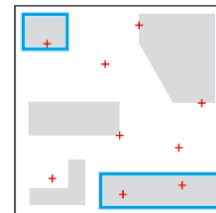
Points

--

Lines

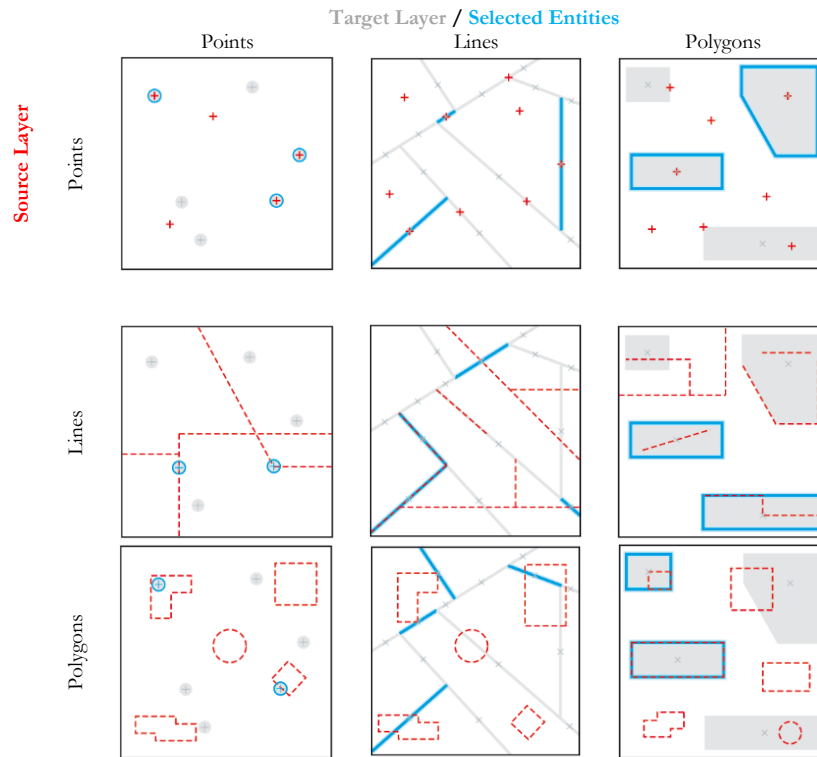
--

Polygons



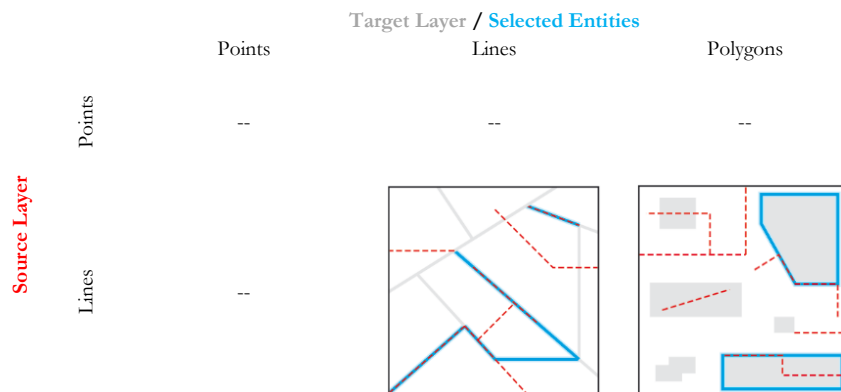
HAVE THEIR CENTROID IN

A target entity is selected by that operator if the centroid of its geometry is in the geometry of the source entity or its boundaries.



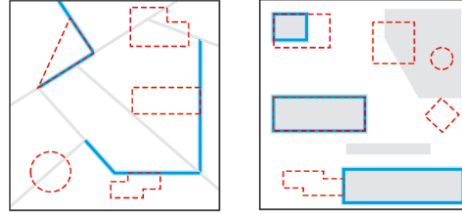
SHARE A LINE SEGMENT WITH

With this method, source and target entities are considered to share a line segment if their geometries share at least two contiguous apexes in common. The source and target entities must be lines or polygons.



Polygons

--



ARE BORDERING THE LIMIT OF OF

A target entity is selected if the intersection of its geometry with the source entity geometry is not empty while the intersection of their interiors is empty. This is the definition of the touch operator Clementini. Therefore, if the target entity touches the source entity, it is selected. Clementini indicates that the limit of a polygon is distinct from its interior and exterior. The source and target entities must be lines or polygons.

An additional case is also supported - an inner line or polygon wholly contained in a polygon is selected if its geometry shares segments of line, apexes or ends with the polygon boundary.

Target Layer / **Selected Entities**

Source Layer

Points

Points

Lines

Polygons

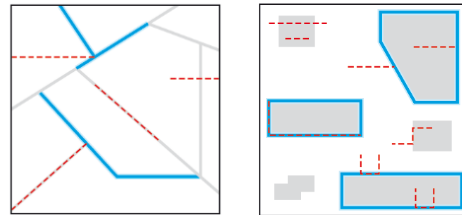
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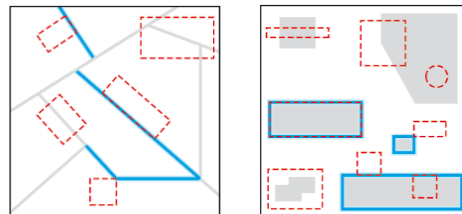
Lines

--



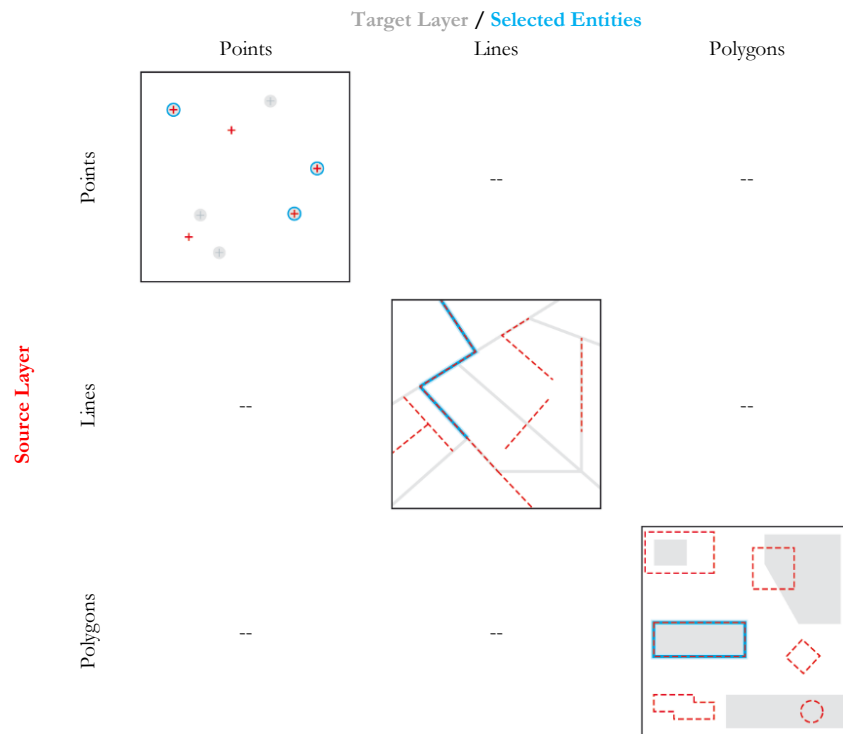
Polygons

--



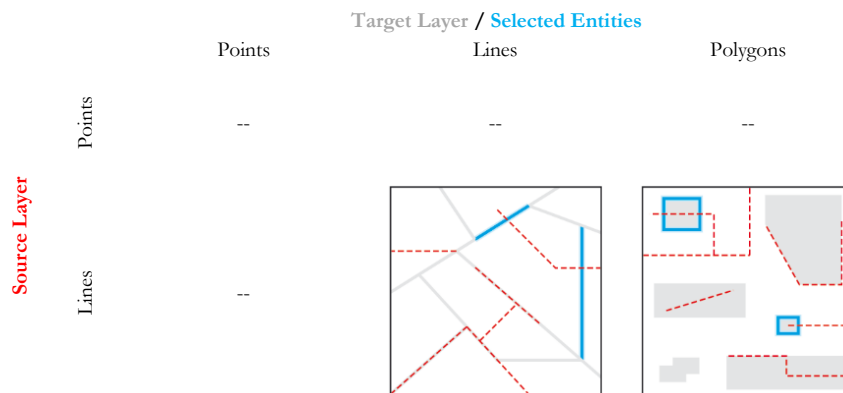
ARE IDENTICAL TO

Two entities are considered identical if their geometries are strictly equal. Entity types must be the same.



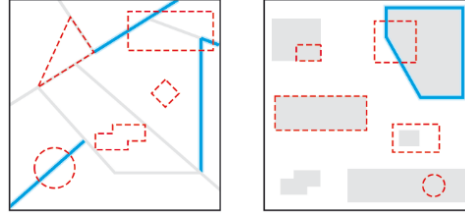
ARE CROSSED BY THE CONTOUR OF

With this operator, the boundary of the source and target entities must have at least one common segment, apex or end, but must not share a line segment. The source and target entities must be lines or polygons.



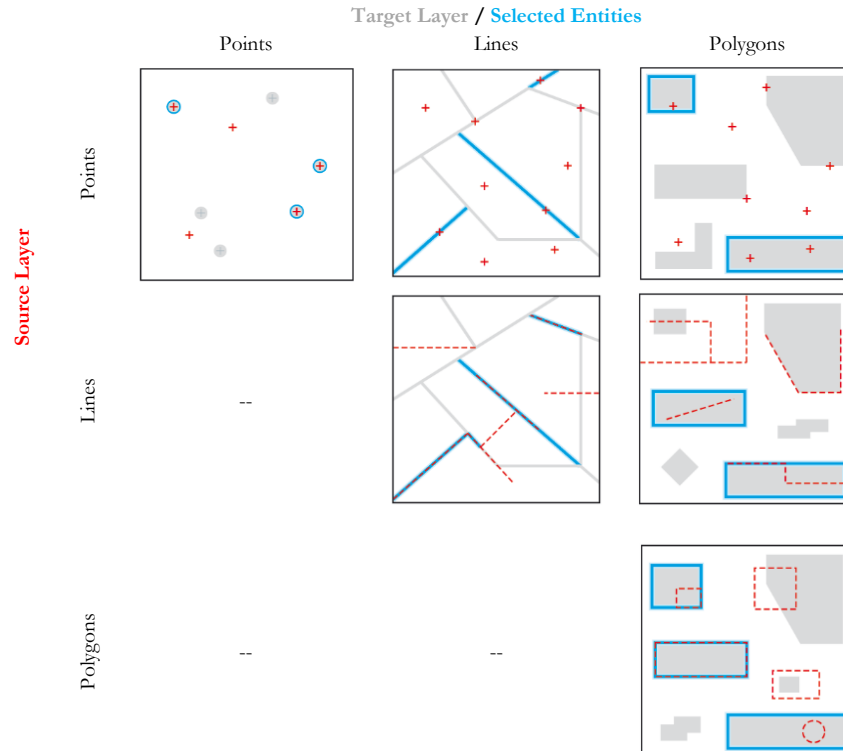
Polygons

--



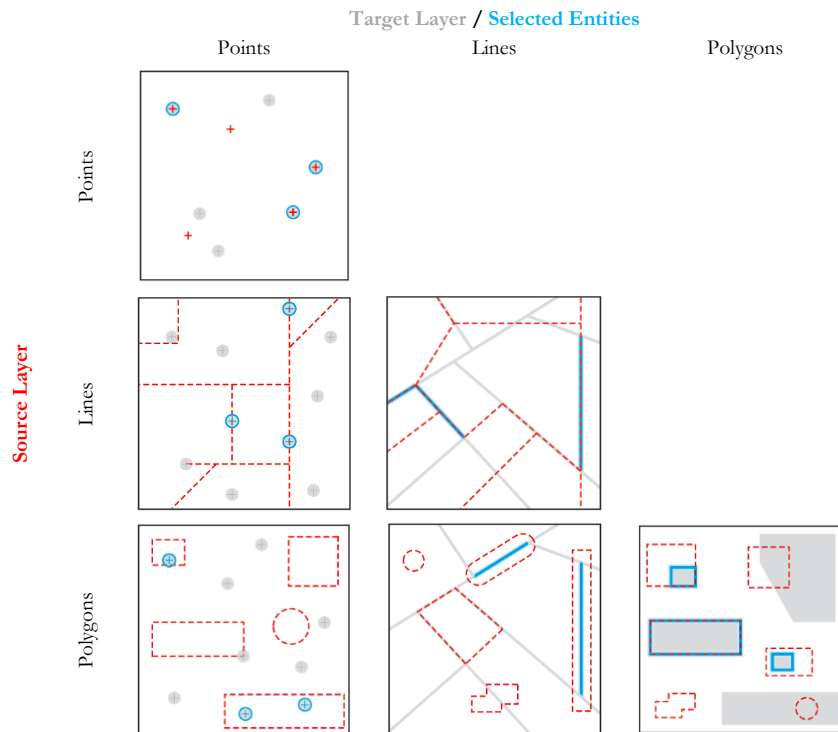
CONTAIN (CLEMENTINI)

This operator gives the same results as the operator *Contain* unless the source entity is entirely located on the target entity boundary and no part of the source entity is within the target entity. In this case, the operator *Contain (Clementini)* does not select the target entity, unlike the operator *Contain*. Clementini indicates that the polygon boundary is distinct from its interior and exterior.



ARE CONTAINED IN (CLEMENTINI)

This operator provides the same results as the operator “*Are contained in*” unless the target entity is entirely located on the source entity boundary and no part of the target entity is within the source entity. In this case, the operator *Are contained in (Clementini)* does not select the target entity, unlike the operator *Are contained in*. Clementini indicates that the polygon boundary is distinct from its interior and exterior.



Appendix 2 – Data and Coordinate System

Data extracted from SIGÉOM in “SHAPEFILE” and “FGDB” format are recorded in geographic coordinates in the geodetic reference system NAD83 based on the GRS80 ellipsoid. It is possible to change the coordinate system at the data source or only when viewing the data in a GIS. This annex outlines the different ways in which this can be achieved using ArcGIS and QGIS GIS software.

ArcGIS Software

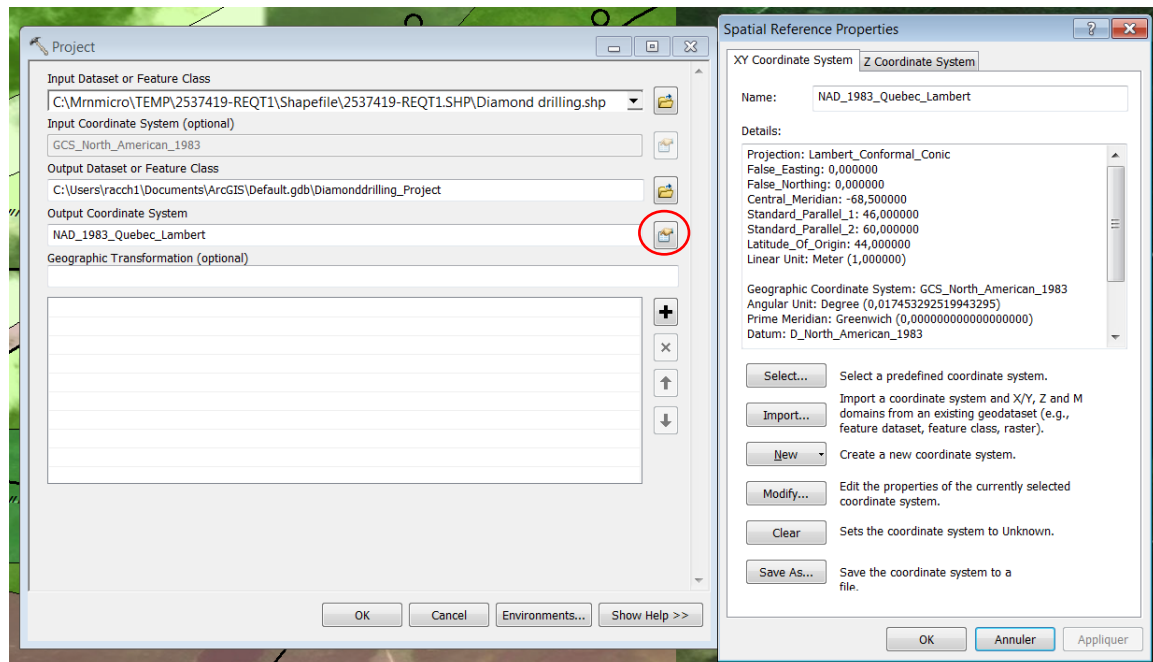
Change the coordinate system at the source

1st solution:

In ArcCatalog, double-click on the appropriate Shapefile or entity class (FGDB) to access the properties. On the **XY Coordinate System** tab, click the **Select...** button. If you want to project your data into Modified Transverse Mercator (MTM), Universal Transverse Mercator (UTM) or Lambert concordant conic projection, then click on **Projected Coordinate Systems \ National Grids \ Canada** and select the desired coordinate system.

2nd solution :

Using ArcToolbox’s **Data Management Tools\Projections and Transformations\Feature\Project**, set up the tool with the desired coordinate system:



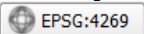
Change the coordinate system for viewing

When your data are displayed in ArcMap, it is possible to change the coordinate system only to view it without changing the system at the source. To do this, the coordinate system must be modified in the properties of the data block. Double-click on the data block to access properties. In the **Coordinate system** tab, click **Modify...** and project your data only into the ArcMap view by selecting the desired coordinate system.


QGIS Software

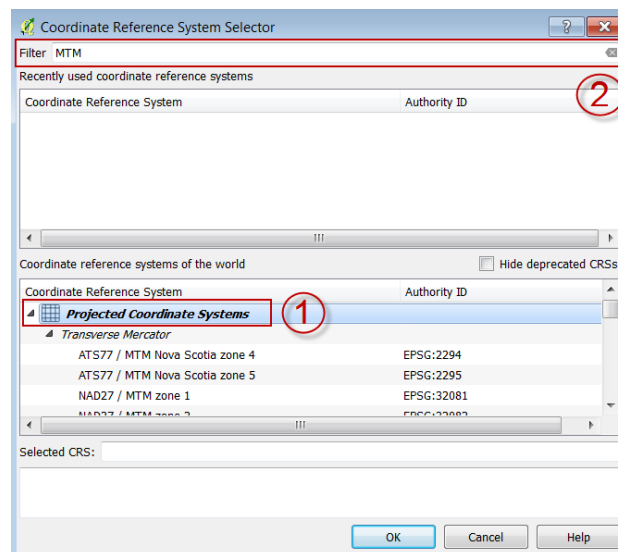
Change the coordinate system for viewing

Overall specification of a project coordinate system:

The coordinate system for a QGIS project can be changed in its properties. It can be accessed through the **Project** menu and then clicking on **Project properties...** or simply by clicking on the button  at the bottom right of the software interface. Once in the **Project properties**, the **Enable “on the fly” CRS transformation (OTF)** checkbox must be activated, and it is possible, afterwards, to access the different coordinate systems for the change.

Coordinate system specification for a layer:

The coordinate system of a layer found in a QGIS project can be changed in its properties. It can be accessed by right-clicking on the layer and clicking on **Properties** or double-clicking on the layer. In the **General** tab of the layer properties and in the **Coordinate Reference System** section, click on the button  to open the **Coordinate Reference System Selector** window. If you wish to project your data into Modified Transverse Mercator (MTM), Universal Transverse Mercator (UTM) or Lambert Concordant Conic Projection, select the desired system under **Projected Coordinate systems** (1) of the **Coordinate Reference System** section. Also, the system list can be filtered to the appropriate location (2).



Appendix 3 – List of Links

Ministère's website: <http://www.mern.gouv.qc.ca/>

Interactive map: <http://carte-geomine.mrn.gouv.qc.ca>

SIGÉOM à la carte: http://sigecom.mines.gouv.qc.ca/signet/classes/I1102_aLaCarte?l=F

Definition of SIGÉOM fields:

http://sigecom.mrn.gouv.qc.ca/signet/classes/I3202_glosElmnDonn

FTP site of files related to this document:

ftp://ftp.mrn.gouv.qc.ca/public/Geologie/Sigecom_Internet_FICHIERS/Guide_pas_a_pas/

WMS Mapping Services

Web Mapping Services (WMS) for SIGÉOM data:

http://sigecom.mrn.gouv.qc.ca/signet/classes/I0000_serviceWeb

WMS SIGÉOM (Queryable):

http://sigecom.mrn.gouv.qc.ca/SIGEOM_WMS/Request.aspx?

WMS SIGÉOM (Matrix):

http://sigecom.mines.gouv.qc.ca/ApolloCatalogWMSPublic/service.svc/get?version=1.3.0&layers=CARTE_INTERACTIVE

Federal geophysical web service (GSC):

<http://wms.agg.nrcan.gc.ca/wms2/wms2.aspx?request=GetCapabilities>

Canada Basic Map (CBM):

<http://geogratis.gc.ca/cartes/CBCT?service=wms&version=1.1.1&request=GetCapabilities>

Geobase (NTS sheet, hydrography...): <http://www.nrcan.gc.ca/sciences-terre/geographie/information-topographique/donnees-gratuites-geogratis/services-web-geogratis/17294>

Others

QGIS: <http://www.qgis.org/fr/site/>

Esri Canada: <https://esri.ca/fr>

ArcGIS geocoding service: <http://geocode.arcgis.com/arcgis/index.html>

Picpick: <http://www.picpick.org/en/>

FastStone capture: <http://www.faststone.org/FSCaptureDetail.htm>