GGIS Viewers - User manual

The Global Groundwater Information System (GGIS) is an interactive, web-based portal to groundwater-related information and knowledge. The main mandate of the system is to collect, analyse and disseminate information on groundwater resources globally to help communicating groundwater related issues to water experts, decision makers as well as the general public. This user manual provides basic information on the GGIS viewers and its functionalities.

Within the GGIS multiple viewers are available, containing variety of data depending on the project or theme of the viewer. Although content varies, the structure and functionalities are the same for each viewer. This user manual is therefore applicable for all public and private viewers of the GGIS, including Global Overview (GO), Transboundary Water Assessment Programme (TWAP) and the Groundwater Resources Governance in Transboundary Aquifers (GGRETA).

Contents

Viewer Interface

The user interface consist of four main components (see Figure 1)

1. **Layer panel**
   - Catalog, containing all map layers with data structured in a systematic way
   - Active layers panel, indicating which layers are currently visible and the associated legends

   The layer panel can be opened or closed by using [«] in the upper left corner

2. **Main menu and tools**
3. **Map view** to visualize the selected data on a geographic location
4. **Features panel** provides tabular output of the selected data. The feature panel can be opened or closed by using [«] in the upper right corner.
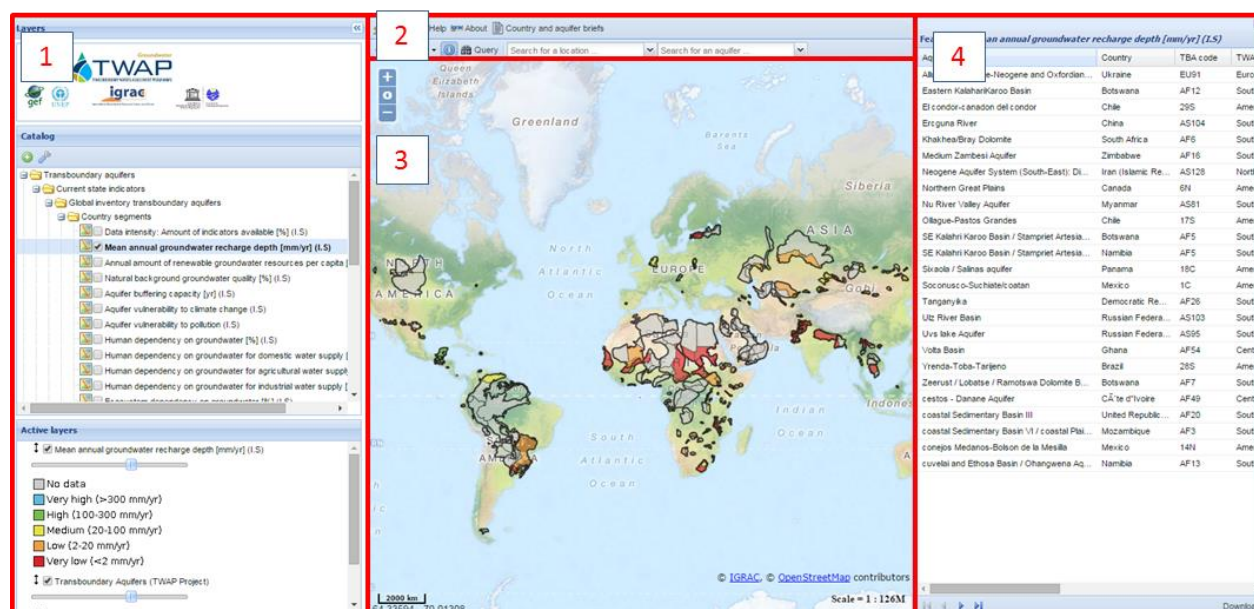

Figure 1. Viewer interface of the GGIS

1. Layer panel

The layer panel is located on the left side of the viewer. The layer panel can be opened or closed using [«]. The layer panel consists of two components, **the catalog** contains all map layers structured in a systematic way and the **active layers** panel indicates which layers are currently visible in the viewer with the associated legends.

Catalog

The catalog contains a folder structure with all map layers. The icon in front of the layername provides information on the layer type (see table 1). To visualise data on the map, simply activate the layer by checking the little box in front of the name and the data are shown on the map. The legend of the map layer will be shown in the lower left section of the screen the '**Active layers'.**

Icon	Layer type
	Raster layers (WMS)
	Tiled layers (mostly background layers; WMTS or TMS)
	Vector layers (not used at present)
	Other layers

Table 1. Information on the layer types in the GGIS

Active layers

The active layer window indicates which layers are currently visible. For each layer it shows the layer title and the corresponding legend. Within the active layers there are controls to adjust how data is displayed in the map view.

Icon	Tool	Description
	Up/down arrows	Can be dragged to change the display order of the layers. The upper layer will also appear as the upper layer in the viewer. The up/down arrows can be used for creating clear map overlays.
	Checkbox	The checkbox in the active layer can be used to make the layer not visible; note that this will remove the layer from this panel. To make the layer active again, you have to select it again from the catalog.
	Transparency slider	The transparency slider changes the layer opacity from 0% (left) to 100% (right); by default an overlay layer has 65% opacity.

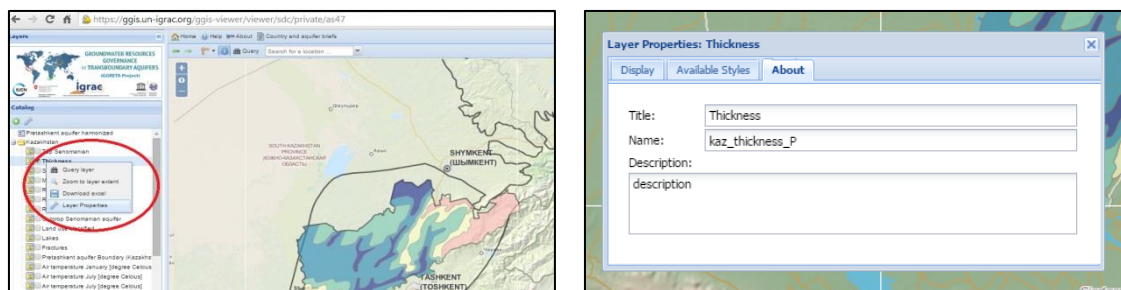Table 2. Controls in the active layer panel

Figure 2. a) right mouse click context menu; b) example of a pop-up window of layer properties

Additional functionalities

A right mouse click on a layer in the catalog will open a context menu (see Figure 2a). In table 3 a description is given for the 4 different options available in this context menu.

Tools	Description
a. Query	Information on query data will be discussed in Chapter 2. (Main menu and tools).
b. Zoom to layer extent	This function will zoom to the extent of the selected map layer.
c. Download excel	The data can be downloaded as excel file for further processing offline (Note: Currently download of shapefiles is not available).
d. Layer properties	Provides meta information on the layers. More information is given below.

Table 3. Tools and description of the context menu

Layer properties

The layer properties provide meta-information on the layer and display of the data. Within the display you can filter data, thereby making it possible to only display data on the screen that corresponds with the filter. Available styles provide an overview of the legend connected to the layer. And the 'About' provides the metadata on the data such as title and description of the data. In Figure 3 you can see an example of a filter on the data of population density. The filter limits data where population density > 7 hab/km2. Only polygons that match these statements are displayed in the map.
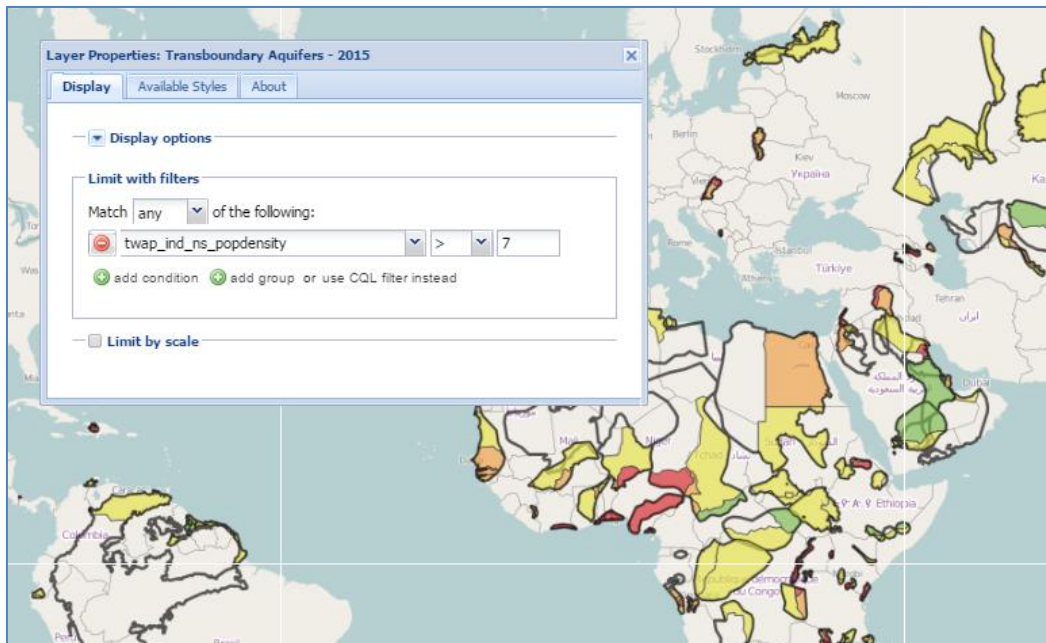
Figure 3. Within the layer properties > display there is a functionality to filter the display of the data. This figure provides an example of a filter on the population density > 7 hab/km2

2. Main menu and tools

The main menu is located on the top above the map view. It consists of the following tools:
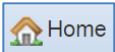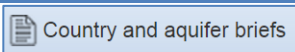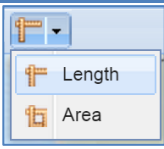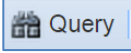
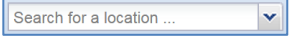| Icon	Tool	Description
Home	Home	Select *'Home'* to go back to the start screen of the Global Groundwater Information System.
Help	Help	Select '*Help'* to find manuals and video's on the GGIS. FAQ can also be found here.
About	About	*'About'* provides information on the GGIS platform (development, contact information).
Country and aquifer briefs	Link to briefs	Link to the information briefs on the groundwater situation per country and per transboundary aquifer.
	Zoom to extent	← Zoom to previous extent. → Zoom to next extent.
Length Area	Measure	Tool to measure a length or an area. - Measuring length on the ground with a line or path. - Measuring area with a polygon.
	Feature info	Activate this tool and then click a point on the map to return information about the features at that point.
Query	Query	Activate this tool and build advanced queries on attributes tables.
Search for a location ...	Search location	'Search for a location' will zoom to the location you are looking for. You can search for cities, provinces and countries.
Catalog	Add layers	The 'add layers' tool, visualized with, can be used to add WMS layers from other sources.

Table 4. Functionalities within the main menu

ⓘ **Feature info**

The feature info is activated by default. When clicking on a point on the map, the feature info pop-up window will appear to return information about the features at that point (Figure 4). Depending on the data, the feature info also provides links to information sheets and/or links to the meta information of the layer stored in the Meta- Information Module.

By default the feature info will return information on the upper layer. However, if there is multiple feature info on the selected point, the information per layer will appear below each other in the screen. You can toggle between the layers information by simply opening (+) or closing (-) the layer in the feature info screen (Figure 5).
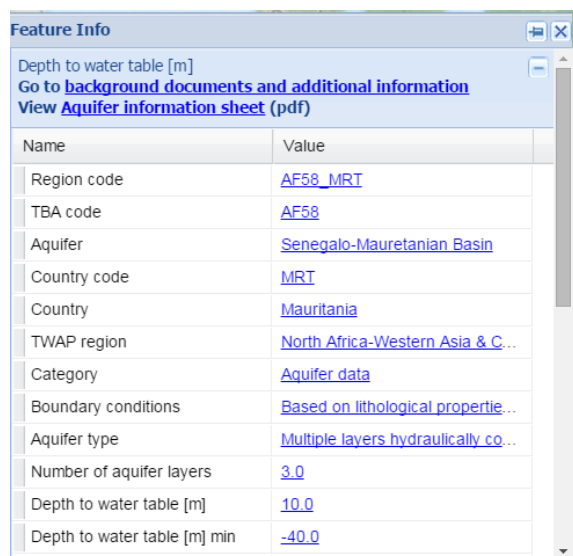

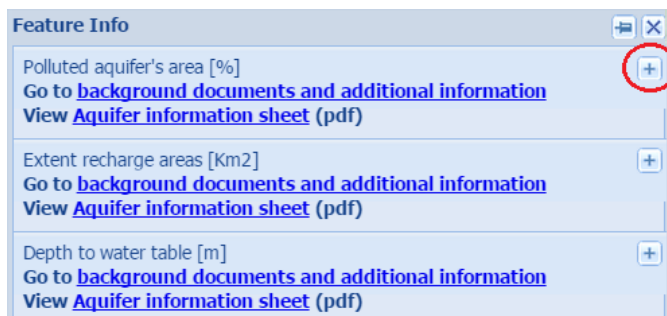**Figure 4. Example of a feature info pop-up screen**

**Figure 5. Example of multiple active layers in feature info screen**

Query **Query**

Make a query on the data; you can see which countries match a specific condition or create new data by combining different attributes. The query can be activated in two ways: by selecting 'query' in the main menu and tools (Query) above the map panel or by right-mouse click on the layer in the catalog. The query is only available when there is a layer active (selected from the catalog)
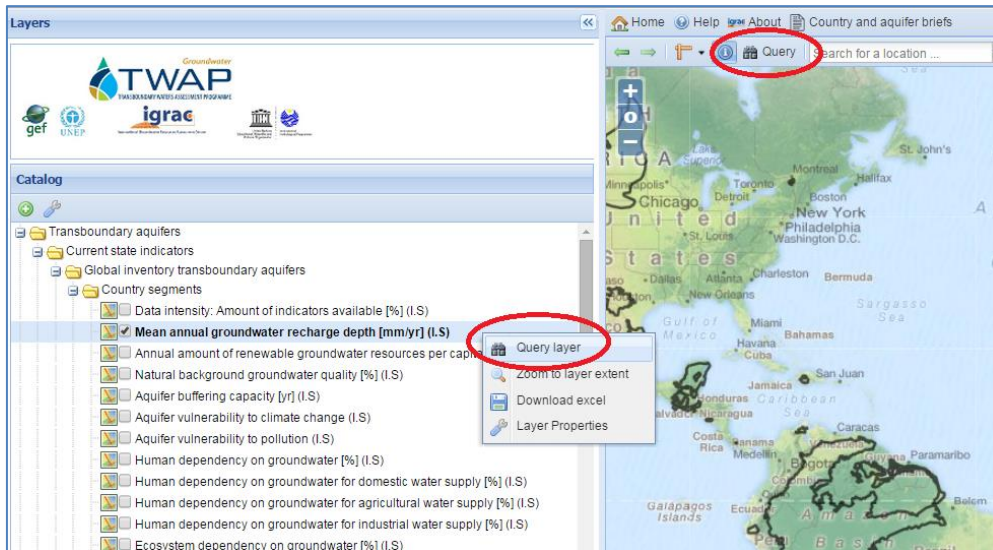
Figure 6. Location where to start 'query'

The query window will appear. Here you can select one or more attributes to see which countries/aquifers or regions match a specific condition:
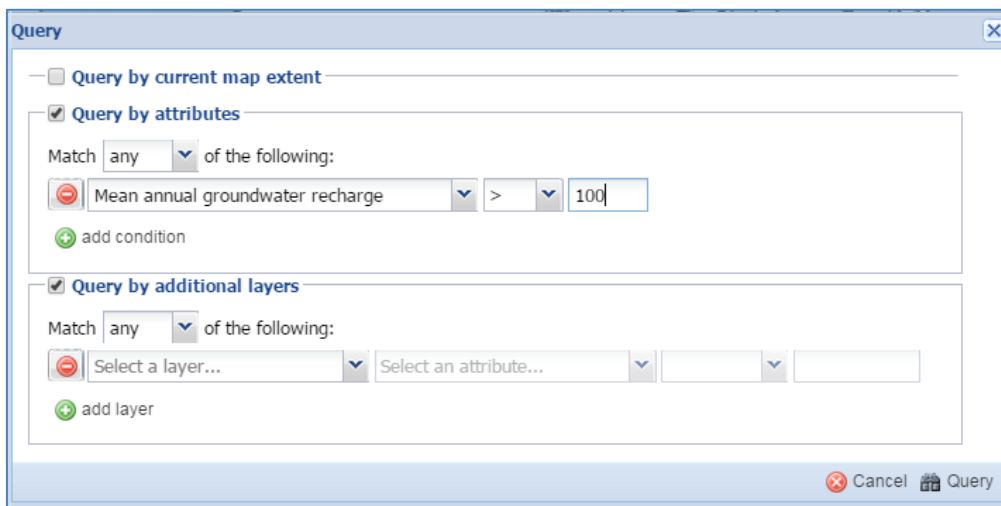
Figure 7. Query window

Add WMS layers

Because the system is using Open Geospatial Consortium (OGC) standards, it is very easy to add map layers from external sources to the viewer making use of WMS layers. WMS (Web Map Service) is a standard protocol for serving georeferenced map images over the internet generated by a map server.

1. To add a map layer click on the green button 'add layer' in the left corner
2. Select 'Add a new server' from the dropdown menu 'View available data from'.
3. Enter the valid WMS server link (e.g. https://example.com/geoserver/wms).
4. Select 'Add server'.
5. Select one or more layers you would like to visualize, and select 'Add layers' .
6. The layers will be added to the catalog in the folder 'other overlays'
7. Select 'Done' to close the WMS window

If the system supports the type of WMS layer, you can find the data within the folder 'other overlays'. Note: data added as a WMS layer can be displayed in the GGIS viewer. However, the WMS layer can only be displayed, functionalities, such as query, filter, download or feature info is not available for these layers.

3. Map View

The Global Groundwater Information System uses the Mercator projection. As on all 2D map projections, shapes or sizes are distortions of the true layout of the Earth's surface. The Mercator projection exaggerates areas far from the equator.

Navigation tools allow you to zoom in and out and pan around maps. These tools are located in the corners of the Map View or by using the mouse. The map view is by default zoomed to maximum extent. The (+) and (-) allows you to zoom in and zoom out. The (o) will zoom to maximum extent.

In the lower right corner of the map you can find the scale. In the lower left corner of the view the scale bar is displayed with below the coordinates (longitude, latitude) of the location of the point of your mouse.

Useful shortcuts
SHIFT-Drag allows zooming in.
Double-click allows zooming in.
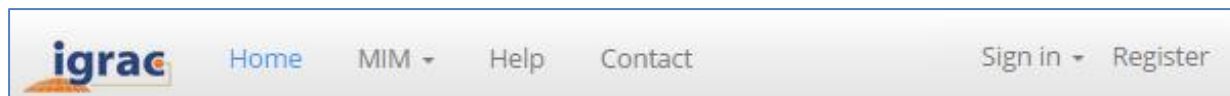Mouse-scroll zooms in with a forward scroll, or out with a reverse scroll.

4. Feature panel
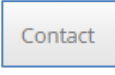
The feature panel is located right of the map view. The feature panel can be opened or closed by selecting ⊠ in the upper right corner. Here the data of the selected layer will be shown in a tabular form. Note that the feature panel will be empty if there is no data selected.

Only 25 items (countries/regions) can be shown at the same time in the feature panel. You can find more data by going to the next page. (⊞ ◁ ▷ ⊟). It is also possible to sort data on alphabetical or numerical order, or to reshuffle the order of the columns. This can be done simply by selecting the column name and drag it left/right. The data can be downloaded by using the download button in the lower left corner (Download). Note: if there is a query on the data, only the data that meets the query will be displayed in the feature panel.

GGIS Start screen

Icon	Description
igrac	Redirects you to the IGRAC website. www.un-igrac.org.
Home	'*Home*' redirects you the GGIS start screen.
MIM ▾	MIM is the meta-information module. It contains all references documents of the GGIS, other interesting groundwater related documents and meta information on groundwater specialists and water organizations.
Help	Select '*Help*' to find manuals and video's on the GGIS. FAQ can also be found here.
Contact	You can contact us using the contact form.
Sign in ▾ Register	Register and create a user profile to share your contact information with others.