

GGRETA Information Management System

Manual for registered users

This document provides a manual on how to work with the protected aquifer workspaces (for registered users only, like national experts and regional coordinators).

Introduction to GGRETA Information Management System

The main objective of the GGRETA Information Management System (IMS) is to have an online platform to collect, organize, disseminate and analyze in a consistent way the information collected for the transboundary aquifers' assessment. The availability of a common information system facilitates cooperation between aquifer states and provides a tool to all stakeholders involved in the governance of the aquifer. The centralization of data and information in an IMS will help aquifer states to exchange data and to develop a common understanding of the resource.

The Groundwater Information Management System has two view modes: the *public view*, freely accessible to anyone with internet access, and the *protected workspace*, a password protected environment which is only available to registered and authorized users.

In the first one, the *Public View*, the general public will be able to navigate through a map view and search for information related to the transboundary aquifer by clicking directly on the geographical units of interest. Information such as aggregated values or spatially distributed data of parameters and indicators values derived from the assessment will be displayed in an interactive map view. All meta-information is accessible to facilitate interpretation of the assessment results. In addition, a query tool allows to select/filter geographical units based on parameter and/or indicator values. Data can also be downloaded as excel files.

The protected aquifer workspace is only accessible for registered GGRETA users. In the *protected workspace*, registered users have access to a password protected environment, to manage the groundwater information related to the aquifer or region they are responsible for. The Protected workspace has two main functionalities: 1) it allows registered users to upload / update data themselves (map information and documents) and 2) it allows registered users involved in the project to share, visualise, analyze and discuss results before making the data publically available. In the current set-up it is the 'regional coordinator' who has the authority to move data and maps from the protected workspace to the public view.

The IMS is designed, implemented and maintained by IGRAC, and is accessible via <https://ggis.un-igrac.org>. For any further questions, comments or suggestions please contact IGRAC (info@un-igrac.org)

1 Protected Aquifer Workspace

Anyone with internet access can browse the maps and data in the public GGRETA viewers (no registration needed).

To upload data and to view data in the protected aquifer workspace of GGRETA, a user needs to have a GIS user account and have the correct role assigned by IGRAC - the system administrator (see section 1.1). Various roles with different authorizations have been defined in the system¹:

1. GGRETA national expert

- has access to view the data in the protected aquifer workspace
- can upload map data (Excel, Shape, GeoTIFF) and upload documents to the MIM module (see MIM user guide).

2. GGRETA regional coordinator

- has the same authorizations as the national expert, and
- can accept/delete data uploaded by national experts
- can move data from the protected workspace to the public viewer

3. System Administrator

- The System Administrator has the same authorization as the GGRETA national expert and the GGRETA regional coordinator in order to assist the team with the IMS where necessary

The authorizations are limited to the aquifer someone is working on. This means for example that a GGRETA national expert for the Stampriet aquifer does not have access to the protected workspace of the Pretashkent aquifer.

¹ More roles for registered users have been defined in the system, like Aquifer level GIS Specialist and Regional Technical Advisor, and it is also possible to define new specific roles. For the purpose of this brief manual the explanation is limited to the roles of national experts and regional coordinator.

1.1 Access the protected workspace

1. Go to <https://ggis.un-igrac.org>

2. Sign in to the system (see image below)






Global Groundwater Information System (GGIS)

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, analyze and disseminate information on groundwater resources globally to help communicating groundwater related issues to water experts, decision makers as well as the general public.

3. If you are not registered yet, you can create an account in the Global Groundwater Information System (register). Please inform the IGRAC administrator (Nienke.ansems@un-igrac.org) once you are successfully registered in the GGIS, the system administrator will provide you the appropriate access rights to the GGRETA workspace.

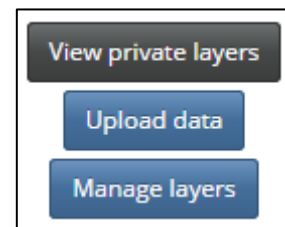
4. On the <https://ggis.un-igrac.org> you can select 'explore GGRETA viewer'. You will be redirected to a new page. Depending on your access rights different functionalities are available.



Project	Sharing Countries	More Information	Workspace	Actions
 The Esquipulas-Ocotepeque-Citalá (Trifinio) Aquifer	El Salvador, Guatemala, Honduras	It is well representative of the many intermountain alluvial aquifers that overlie fractured hard rock basements, with complex permeability distribution linked to both fractures and primary porosity. The Trifinio Aquifer is a complex hydrogeological system essentially consisting of an alluvial, mostly unconfined aquifer made of the recent quaternary continental sediments of the Upper Rio Lempa valley, overlying an ancient (Tertiary) volcanic basement of andesitic lavas and pyroclastic rocks. The recharge of the alluvial aquifer appears to be mostly due to the rainfall in the valley floor, and from surface drainage. The shallow alluvial aquifer system contains good quality freshwater, but is highly vulnerable to contamination by anthropogenic activities on the surface, like agricultural practices and industrial and domestic discharges.	sdc_14c_protected	View private layers Upload data Manage layers
 The Kalahari-Karoo (Stampriet) Aquifer	Botswana, Namibia, South Africa	The Stampriet Kalahari/Karoo Aquifer System is situated within the southern part of the Kalahari and lies in the Lower Orange River Basin. It forms a huge shared aquifer system that straddles the border between Botswana, Namibia and South Africa, which is so far only marginally exploited. The quality of the water in the aquifers decreases in the flow direction towards South-western Botswana and the North-western Cape in South Africa. There are two confined regional artesian aquifers in the Karoo sediments, overlain by the Kalahari sediments that often contain an unconfined aquifer system. In Namibia this aquifer system is the main source of water supply for agricultural development as well as for the five urban centres within the region. In Botswana the area overlying the aquifer is sparsely populated although further development is envisaged and water is required for stock watering, game, and smaller villages that are in need of increased water supply.	sdc_af5_protected	View private layers Upload data Manage layers
 The Pretashkent Aquifer	Kazakhstan, Uzbekistan	Pretashkent aquifer represents the artesian basin, the structure of which includes several aquifers and complexes separating their by aquitards. Pretashkent aquifer is located on the territory of Uzbekistan and Kazakhstan. The smaller south-eastern part of the aquifer is located in the Tashkent province of Uzbekistan, and the bigger, the north-west part in the Chymkent province of Kazakhstan. The study area is highly populated, especially on the Uzbek part. By geomorphology, the area is divided into three zones: mountain zone, foothills and valleys. As a transition zone between the foothill zone and the valley, Pretashkent steppes form buffer zone between the foothill zone and the valley. The climate of the study area is sharp continental, dry.	sdc_as47_protected	View private layers Upload data Manage layers

1.2 View private layers

The 'view private layers' gives you access to browse and visualize all data that has been uploaded by national experts/ regional coordinators to the protected aquifer workspace. The option 'view protected layers' will only appear once you are signed in as a national expert or a regional coordinator for one of the GGRETA projects. Access is only granted to projects in the region of the user. In other words, a national expert for Stampriet aquifer, can only access the 'view private layers' of the Stampriet aquifer and not for Pretashkent aquifer.



1.3 Manage layers

The 'manage layers' option is only available to the regional coordinator (and administrator). The regional coordinator has the task to accept, delete and/or make data publically available. By selecting "Manage Layers" you are redirected to see screen giving an overview of all data which have been uploaded:

List of layer uploads

In the table below you can see the uploaded layers for the project **The Pretashkent Aquifer**.

You can accept or decline the uploaded data. By accepting the data, the map will be visible in the public SDC viewer. By declining the data it will be removed from the database.

Show entries Search:

Workspace	Layer	User	Status	Modified	Actions
sdc_as47_protected	kaz_thickness_P	nienke.ansems@un-igrac.org	PUBLISHED	2015-02-19 17:38:23.430277	<input type="button" value="Make protected"/> <input type="button" value="Delete"/>
sdc_as47_protected	kaz_Fracture_L	nienke.ansems@un-igrac.org	NEW	2015-02-19 17:57:14.411157	<input type="button" value="Make public"/> <input type="button" value="Delete"/>
sdc_as47_protected	kaz_salinity_P	nienke.ansems@un-igrac.org	PUBLISHED	2015-02-19 17:51:01.369212	<input type="button" value="Make protected"/> <input type="button" value="Delete"/>
sdc_as47_protected	kaz_relief_L	nienke.ansems@un-igrac.org	PUBLISHED	2015-02-19 18:02:28.700917	<input type="button" value="Make protected"/> <input type="button" value="Delete"/>
sdc_as47_protected	kaz_groundwater	salybekova_v@mail.ru	NEW	2015-02-23 21:53:49.805741	<input type="button" value="Make public"/> <input type="button" value="Delete"/>
sdc_as47_protected	kaz_lakes	nienke.ansems@un-igrac.org	PUBLISHED	2015-02-22 16:10:44.062594	<input type="button" value="Make protected"/> <input type="button" value="Delete"/>

The overview shows the layername, the name of user who uploaded the data, the status (Published means public and NEW means protected view only) and the date of the upload. By default the data is only available in the protected workspace. By selecting (make public) data will be published in the public GGRETA viewer. If you would like to make the data only available in the protected workspace because data needs further consultation in the project group you can select (make protected). If the data is not correct or has not sufficient quality, the data can also be completely deleted from the system (delete data).

1.4 Upload map data

National experts, regional coordinators and system administrator can upload data (project results) into the system. The system makes a difference between map data (georeferenced data, based on locations and coordinates) and other documents and images (reports, tables, images, etc.). This section describes the upload of map data. Upload of documents and images will be described in the next chapters (1.5 upload documents).

Data format of georeferenced data that can be uploaded into the system

A user can upload these file types into the IMS:

- Excel Spreadsheet (version 97 or higher)
 - *Can be used to upload point data. Examples include borehole data or groundwater monitoring data. Minimum requirement is that the excel file contains the coordinates of the point data.*
- ESRI Shapefile (.zip archive)
 - *Can be used to upload polygon and line data. Examples include delineation of the aquifer, recharge zones, contour lines (for example aquifer thickness)*
- GeoTIFF raster file
 - *Can be used to upload georeferenced images. Examples include satellite images of the region or a Digital Elevation Model*

The GGIS makes use of international standards to be compatible with all geographic Information System globally. Therefore, before attempting to upload, it is important to check if your data meets the following requirements.

Requirements EXCEL FILES

- File extension must be xls/xlsx (excel version 97 or higher)
- The first row of the spreadsheet determines the column names
- The column names (= headers) can only be letters, numbers or underscore ‘_’. Use of diacritical marks (like á, è) or symbols (@, #, €) is NOT supported.
- The column name may not be empty and it may not contain any spaces
- The column name must be of cell type “text”
- For no data value it is not allowed to use “NULL” . Use ‘-9999’ instead to indicate that there is no data in a cell
- The coordinate values must use a point for decimals and a semicolon ‘;’ or a space ‘ ’ as separator. latitude; longitude (see image below)

STATION_NUMBER	COUNTRY	STATION_IDENTIFIER	wgs84	NO3_mgL
31003	KAZ	Well	68.20259;41.72396	13.13284
31015	KAZ	Well	68.20139;41.72182	5.7795036
31016	KAZ	Well	68.20019;41.71968	28.818468
31019	KAZ	Well	68.19899;41.71754	22.8637896
31022	KAZ	Dug well	68.19779;41.7154	4.9410466
31026	KAZ	Dug well	68.19659;41.71326	7.08288
31027	KAZ	Drilled Well	68.19539;41.71112	10.03408

Requirements for the ESRI SHAPE FILES

- The GGIS only accepts shapefile as a zip archive
- A valid shape archive has to contain at least the three main files:
 - shape definition (.shp),
 - index (.shx) and
 - dBASE-table (.dbf).
 Optional are the projection (.prj) or a spatial index (.qix, .sbn or .sbx).
- The geographical coordinate system must be WGS_84. To convert from another system, use the 'Projection' tool, a function available in most GIS software. For questions please contact GGIS system administrator
- All text should be in English. Columns names in the 'Attribute Table' (=headers) are capital sensitive. Only use small caps!
- The use of diacritical marks and symbols in the filenames causes errors. (á, è, ' , " , ^, /, &, -, ~, ~, , , " . Use of the 'underscore' _ is allowed (example: 1103_boundary_aquifer)
- Realize that all data from the attribute table will be uploaded to the system. Therefore make sure that all column names have logical names and remove irrelevant columns prior to uploading the data.
- The Upload limit is 100 MB.

Requirements GEOTIFF FILES

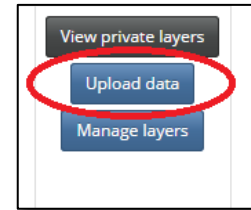
- The file extension must be .TIFF
- The file must be a valid GeoTIFF file, coordinate system WGS_1984.
- The Upload limit is 100 MB

Meta data (documents in general see chapter 1.5)

- No specific requirements, any file can be uploaded.

1.4.1 Upload process

The upload process can be started by selecting 'upload data'. You will be redirected to the upload form. This chapter will describe step by step what you have to fill in in each column to publish your data. The fields with an asterisk (*) are mandatory to finish the upload process. The other fields can be used to provide additional information on your data:



Choose your filetype	<input checked="" type="radio"/> Excel Spreadsheet <input type="radio"/> ESRI Shapefile (in a ZIP archive) <input type="radio"/> GeoTIFF (raster)
Workspace	<input type="text" value="sdc_af5_protected"/>
Layer name (without spaces)	<input type="text" value="The unprefixd layername which identifies the data in the WM! *"/>
Metadata title of the layer	<input type="text" value="Human readable title"/>
Metadata keywords	<input type="text" value="Comma separated keywords"/>
Metadata description	<input type="text"/>
Label column	<input type="text"/>
Name of value column	<input type="text" value="The column that contains the values on which a legend must be *"/>
Name of geographic columns	<input type="text" value="The column with codes that can be geocoded into geometries *"/>
Choose the geocoder	<input type="text" value="IGRAC region code"/>
Email address	<input type="text" value="nienke.ansems@un-igrac.org"/>
Choose the file containing the data	<input type="button" value="Select an Excel spreadsheet"/>
	<input type="button" value="Upload this form"/>

1. choose your file type:

Choose your filetype

Excel Spreadsheet

ESRI Shapefile (in a ZIP archive)

GeoTIFF (raster)

- Select the correct file type for the data you want to upload (Excel spreadsheet, ESRI Shapefile or GEOTIFF).

2. Workspace (*mandatory):

Workspace

Choose the workspace into which the data should be uploaded. The pull-down menu will list the workspace(s) you have access to. In principal as a registered national expert or regional coordinator you will only have authorization to upload to the workspace of your aquifer:

- Sdc_af5_protected = Stampriet aquifer
- Sdc_as47_protected = Pretashkent aquifer
- Sdc_14c_protected = Trifinio aquifer

3. Layer name (* mandatory):

Layer name (without spaces)

The layer name is used to save the data in the database. The layer name may not contain any spaces or special characters (only the underscore “_” is allowed). The maximum number of characters for the layer is 63 characters. It is advisable to use logical names (include name of the aquifer and/or country, include theme, type of data). For example for a shapefiles with polygons of the recharge areas in the stampriet aquifer: Stampriet_Botswana_rechargezones_polygon

5. Metadata of the layer name (not mandatory):

Provide here the title of the layer how it should be visualized in the viewer. Use short, but easy to understand names and include the units. For example: Mean Temperature July (°C)

6. Metadata keywords (not mandatory):

Here you can provide keywords on the data you will upload. This can be used in a later stage to find relevant maps using search functionality. For example layername: Stampriet_Botswana_recharge_polygon can contain keywords: Stampriet, recharge, Botswana

7. Metadata description (not mandatory):

Here you can provide a description of your data, which will be displayed in the system. For example the reference to the source of the data or a short description explaining the data.

8. Label column (not mandatory):

The label column is the column in the excel file that should be used for labeling. For instance region name from the example excel can be used. The labels will be shown in the map

9. Name of value column (* only for excel and shapefiles)

Name of value column

The 'value column' is the column from which the data should be used to draw the map (map layer). All other data columns are only shown as "attribute" data in the table linked to the map. In the example below, we want to visualize the Nitrate concentrations on a map (column "NO3_mgL"). This name should be filled in in 'name of value column'. The other columns from the excel file will also be uploaded to the system as attribute data to NO3_mgL columnname.

The same applies for upload of shapefiles. The column name selected in 'name value column' will be published as a map layer. All other data from the attribute table in the shapefile will be available as 'attribute' data.

STATION_NUMBER	COUNTRY	STATION_IDENTIFIER	wgs84	NO3_mgL
31003	KAZ	Well	68.20259;41.72396	13.13284
31015	KAZ	Well	68.20139;41.72182	5.7795036
31016	KAZ	Well	68.20019;41.71968	28.818468
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31027	KAZ	Drilled Well	68.19539;41.71112	10.03408

ESRI shape files and GeoTIFF files are already georeferenced file types. For excel files a column is needed that can be used to map the data to a geographical location. The example excel spreadsheet used above shows for example the columnname 'wgs84' as the geographic column (coordinate data should be provided as 'longitude and latitude separated by a semi-colon ;)

11. Email address

Email address

This e-mail address is used to notify the user if the update was successful or not. By default the email address used to sign into the system is used.

9. Choose the file containing the data

Choose the file
containing the data

Select an Excel spreadsheet

Here the actual file for the upload is selected. Note that this field is emptied by the browser after an error occurred. Browse on the computer for correct file to select it.

10. Upload this form

Upload this form




Select Upload this form to finalize the upload. Depending on the size of the file and speed of your internet connection this can take a little while (sometimes more than 3 minutes). After the upload you will get redirected to the start screen. An automatically generated email notification will be send to you to confirm the upload.

1.4.2 Styling (SLD)

Because the system is based on international standards and should be compatible with all other GIS systems, legends of the system can only be uploaded as a Styled Layer Descriptor (SLD). SLDs are a standard for visualizing geospatial data. Using map terminology one could say that SLDs are primarily used for legend design (cartography) and filtering. You can make an **export** from QGIS or ArcGIS and send the SLD file to IGRAC system administrator to finalize the styling of the data. If there are any difficulties regarding obtaining the SLD please contact IGRAC system administrator. Important note for ArcGIS users: sending the layer file is not enough. ArcGIS layer files can only be used in ArcGIS software and is therefore not compatible with other GIS information systems.

1.5 Upload documents (.doc / .jpeg/ .pdf)

To upload documents you need to be logged in. For upload of documents the GGIS 'Meta Information Module' (MIM) is used. As a registered GGRETA user you will see a button 'upload document to MIM' in the lower left corner of your screen.

Project	Sharing Countries	More Information	Workspace	Actions
 <p>The Esquipulas-Ocotepeque-Citalá (Trifinio) Aquifer</p>	El Salvador, Guatemala, Honduras	It is well representative of the many intermountain alluvial aquifers that overlie fractured hard rock basements, with complex permeability distribution linked to both fractures and primary porosity. The Trifinio Aquifer is a complex hydrogeological system essentially consisting of an alluvial, mostly unconfined aquifer made of the recent quaternary continental sediments of the Upper Rio Lempa valley, overlying an ancient (Tertiary) volcanic basement of andesitic lavas and pyroclastic rocks. The recharge of the alluvial aquifer appears to be mostly due to the rainfall in the valley floor, and from surface drainage. The shallow alluvial aquifer system contains good quality freshwater, but is highly vulnerable to contamination by anthropogenic activities on the surface, like agricultural practices and industrial and domestic discharges.	sdc_14c_protected	View private layers Upload data Manage layers
 <p>The Kalahari-Karoo (Stampriet) Aquifer</p>	Botswana, Namibia, South Africa	The Stampriet Kalahari/Karoo Aquifer System is situated within the southern part of the Kalahari and lies in the Lower Orange River Basin. It forms a huge shared aquifer system that straddles the border between Botswana, Namibia and South Africa, which is so far only marginally exploited. The quality of the water in the aquifers decreases in the flow direction towards South-western Botswana and the North-western Cape in South Africa. There are two confined regional artesian aquifers in the Karoo sediments, overlain by the Kalahari sediments that often contain an unconfined aquifer system. In Namibia this aquifer system is the main source of water supply for agricultural development as well as for the five urban centres within the region. In Botswana the area overlying the aquifer is sparsely populated although further development is envisaged and water is required for stock watering, game, and smaller villages that are in need of increased water supply.	sdc_af5_protected	View private layers Upload data Manage layers
 <p>The Pretashkent Aquifer</p>	Kazakhstan, Uzbekistan	Pretashkent aquifer represents the artesian basin, the structure of which includes several aquifers and complexes separating their by aquitards. Pretashkent aquifer is located on the territory of Uzbekistan and Kazakhstan. The smaller south-eastern part of the aquifer is located in the Tashkent province of Uzbekistan, and the bigger, the north-west part in the Chymkent province of Kazakhstan. The study area is highly populated, especially on the Uzbek part. By geomorphology, the area is divided into three zones: mountain zone, foothills and valleys. As a transition zone between the foothill zone and the valley, Pretashkent steppes form buffer zone between the foothill zone and the valley. The climate of the study area is sharp continental, dry. The study and monitoring aimed at the sustainable joint utilization of groundwater resources is an very important factor since the Pretashkent artesian aquifer in the main source of fresh and mineral water in the region.	sdc_as47_protected	View private layers Upload data Manage layers

Upload Documents to [MIM](#)