



Deliverable

List of prioritized Information Products for the GeoERA Information Platform

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GENERAL INTRODUCTION

This technical note describes the requirements and requests for EGDI functionality for data delivered from each VoGERA work package to the GeoERA Information Platform (EGDI) in order to efficiently visualize data and make data and information accessible according to the FAIR (Findable, Accessible, Interoperable and Reusable) principles of Horizon 2020.



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1 INTRODUCTION

The requirements from the VoGERA project to the GIP-P project regarding the contents and functionality of the GeoERA Information Platform / European Geological Data Infrastructure (EGDI) have to be clearly defined in order to develop a common understanding of the information products delivered from VoGERA to EGDI and further to all relevant stakeholders. These requirements are very important in order to ensure that we make VoGERA data and tools of relevance to sustainable management of water resources in Europe and EU policy in general “FAIR” (Findable, Accessible, Interoperable and Reusable) according to guidelines of the European Commission.

The project “Vulnerability of shallow groundwater resources to deep sub-surface energy-related activities (VoGERA)” will gather scientific evidence to investigate the relationship between industrial activities in the deep sub-surface and shallow groundwater resources in the European context. The project will consider the possible impacts on groundwater from a range of sub-surface energy activities (geothermal energy, unconventional oil and gas exploitation, sub-surface storage and disposal of wastes) in a consistent manner. An approach for evaluating groundwater vulnerability from sub-surface activities that can be applied across Europe will be developed using this evidence, and the in-depth understanding gained will be used to improve awareness of these issues with decision makers and the public. This will improve sub-surface planning and policy development for deep sub-surface energy-related activities in relation to groundwater, preserving groundwater resource for future generations whilst recognizing the need for economic development. A strong link with stakeholders will ensure an approach that is fit-for-purpose with maximum impact.

Conceptual models of shallow groundwater vulnerability to deep sub-surface energy activities will be developed using existing data, information, and experience of the GeoERA partners and from previous projects. These models will be validated at a number of pilot sites in different hydrogeological settings across Europe, which will use a range of physical, chemical, isotopic and intercalibrated geophysical methods to identify and characterize contaminant pathway properties and their influence on groundwater vulnerability.

The main results from the VoGERA project will be integrated in the European Geological Data Infrastructure (EGDI), through the GeoERA Information Platform project. The GeoERA project continues the development of EGDI as the most comprehensive information platform for dissemination of up-to-date, comprehensive, reliable and harmonised subsurface data for Europe within and beyond GeoERA.

This report describes the products from all technical work packages in VoGERA and includes information of relevance to assess groundwater vulnerability from deep energy related activities. More information about the research data can be found in the Data Management Plan (Task 2.1).



2 DATA TYPES FOR EGD FROM AND POTENTIALLY RELEVANT FOR ALL VOGERA WORK PACKAGES

2.1 Descriptions of the products

Title and description		Pilot sites location	Five study reports Data collection plan TR(M12) Pilot investigations and data analysis TR(M24) Vulnerability assessment at pilot sites TR(M32) Conceptual models of pathways TR(M12) Develop vulnerability methodology - Methodology evaluation TR(M36)	Common tool with a methodology for characterizing the vulnerability of shallow groundwater to deep industrial activities
Product Type	Structured Data (Vector, raster, etc)	X (vector)		
	Unstructured data		X	X
Data sources			Report contribution from partners	The five study reports
Spatial dimension		Polygon	NA	NA
Temporal dimension	static	Yes	NA	NA
	dynamic: real time (yes/no)	No	NA	NA
Scale		Varying	NA	
Coverage		Sites in countries participating	Sites in countries participating	Sites in countries participating
Projection system.		As requested by GIP based on standardized projection systems	NA	NA
Delivery Format to EGD	OGC web services (WMS, WFS, WCS, etc.)		NA	NA
	Uploading GIS files (ESRI shapfiles or GeoPackage.)	ESRI shapefiles	NA	NA
	Unstructured data (PDF, JPG; TXT, etc.)		PDF reports	A spreadsheet, most probably made in Excell
Metadata:	Metadata provider (IGME, GBA etc.)	All VoGERA partners except GEUS	All VoGERA partners except GEUS	All VoGERA partners except GEUS
	Metadata collection (Harvesting/direct editing)	Direct editing	Direct Editing following EGD instructions	Direct Editing following EGD instructions



2.2 Description of attributes for each product

2.2.1 Pilot Sites Locations

Name of the attribute	Description	Unit	Data type
ID	Identification number		Number
Shape	Polygon of the study area		Polygon
Name	Name of the study area		Text
Country	Name of the country in which the study area is situated		Text
Research institute	Name of the main research institute that studies this pilot area		Text

2.3 Use cases and requirements associated to each product

2.3.1 Use cases.

2.3.1.1 Pilot sites location

The ESRI shape file point to the location of the four pilot studies and it includes four polygons, one each pilot site (i.e. one for the area around the Rauw Fault in Belgium, one for the area around the Peel Boundary Fault in the Netherlands, one for the Vale of Pickering in the U.K. and one for the Pannonian Basin in Hungary).

2.3.1.2 Study reports

People can read for which deep industrial activities and at which pilot site the methodology for characterizing the vulnerability of shallow groundwater is tested and what the results are.

People can read the possible vulnerabilities of shallow groundwater to deep industrial activities.

People can read the results of testing the methodology for characterizing the vulnerability of shallow groundwater

The reports should be findable and downloadable.

2.3.1.3 Common tool with a methodology for characterizing the vulnerability of shallow groundwater to deep industrial activities

By providing few variables in the spreadsheet, users should be able to have, at any place in Europe, an indication of the vulnerability of shallow groundwater to deep industrial activities.

The tool should be findable and downloadable.

2.3.2 Requirements:

Product title	Nr	Requirement	Description
Pilot study location	7	Web page with all services	
	12	Overview panel	
	13	Legend with tree view/hierarchical on/off switching	
5 study reports & 3D Groundwater Vulnerability (3D GWV) assessment for subsurface hydrocarbon activities report and spreadsheet	2	Search Documents (require a doc repository)	
	9	Download (no access control)	



APPENDIX I – OGC WEB SERVICES IDENTIFY BY WP3 GIP-P PROJECT(INFORMATION EXTRACTED FROM GIP-P- D3.1 ”DATA MODELS, STANDARD GUIDELINES AND TOOLKITS “

Open Geospatial Consortium (OGC) web services offer a cost efficient and open source technology that permits transfer of standardized data from distributed sources, removing the need for data to be regularly uploaded to a centralized database. When combined with community defined exchange standards or schemas, OGC services offer the ability to access the latest data from source agencies in a consistent format.” (O Raymond, B Simmons, E Boisvert, 2010. Information Models for the Australian Geoscience Community: GeoSciML, EarthResourceML and GroundWaterML)

1. SPARQL Endpoint

“SPARQL is an RDF query language—that is, a semantic query language for databases—able to retrieve and manipulate data stored in Resource Description Framework (RDF) format. It was made a standard by the RDF Data Access Working Group (DAWG) of the World Wide Web Consortium, and is recognized as one of the key technologies of the semantic web. On 15 January 2008, SPARQL 1.0 became an official W3C Recommendation, and SPARQL 1.1 in March, 2013.” (<https://en.wikipedia.org/wiki/SPARQL>)

“A SPARQL Endpoint is a Point of Presence on an HTTP network that’s capable of receiving and processing SPARQL Protocol requests. It is identified by a URL commonly referred to as a SPARQL Endpoint URL.” (<https://medium.com/virtuoso-blog/what-is-a-sparql-endpoint-and-why-is-it-important-b3c9e6a20a8b>)

A SPARQL endpoint could be implemented for all GeoERA projects/applications.

2. 1.1.3.2 X3D

X3D is an ISO-ratified, royalty-free open standards file format and run-time architecture to represent and communicate 3D scenes and objects. X3D has evolved from its beginnings as the Virtual Reality Modeling Language (VRML) to the considerably more mature and refined ISO X3D standard. X3D provides a system for the storage, retrieval and playback of real time 3D scenes in multiple applications, all within an open architecture to support a wide array of domains and user scenarios.

As an open standard X3D can run on many platforms, but importantly can render 3D models in most web browsers without the requirement for additional or proprietary applications. Further, once models are developed utilizing X3D, these easily port to alternative platforms like holographic, head-mounted or other display devices.

(<http://www.web3d.org/x3d/what-x3d>)

3. Catalogue Service (Catalogue Service for the Web – CSW)

“Catalogue services support the ability to publish and search collections of descriptive information (metadata) for data, services, and related information objects. Metadata in catalogues represent resource characteristics that can be queried and presented for evaluation and further processing by both humans and software. Catalogue services are required to support the discovery and binding to registered information resources within an information community.



OGC Catalogue interface standards specify the interfaces, bindings, and a framework for defining application profiles required to publish and access digital catalogues of metadata for geospatial data, services, and related resource information. Metadata act as generalized properties that can be queried and returned through catalogue services for resource evaluation and, in many cases, invocation or retrieval of the referenced resource. Catalogue services support the use of one of several identified query languages to find and return results using well-known content models (metadata schemas) and encodings.”

Full documentation available at: <https://www.opengeospatial.org/standards/cat>

4. Sensor Observation Service (SOS)

“The SOS standard is applicable to use cases in which sensor data needs to be managed in an interoperable way. This standard defines a Web service interface which allows querying observations, sensor metadata, as well as representations of observed features. Further, this standard defines means to register new sensors and to remove existing ones. Also, it defines operations to insert new sensor observations. This standard defines this functionality in a binding independent way; two bindings are specified in this document: a KVP binding and a SOAP binding.”

Full documentation available at: <https://www.opengeospatial.org/standards/sos>

5. SensorThings API

“The OGC SensorThings API provides an open, geospatial-enabled and unified way to interconnect the Internet of Things (IoT) devices, data, and applications over the Web. At a high level the OGC SensorThings API provides two main functionalities and each function is handled by a part. The two parts are the Sensing part and the Tasking part. The Sensing part provides a standard way to manage and retrieve observations and metadata from heterogeneous IoT sensor systems. The Tasking part is planned as a future work activity and will be defined in a separate document as the Part II of the SensorThings API.”

It is built on O&M and, as summarized in D5.2 section “1.3 Observation features OGC services strategy”, is often wrongly reduced to the REST binding of SOS 2.0.

Full documentation available at: <https://www.opengeospatial.org/standards/sensorthings>

6. Web Feature Service (WFS)

The Web Feature Service (WFS) represents a change in the way geographic information is created, modified and exchanged on the Internet. Rather than sharing geographic information at the file level using File Transfer Protocol (FTP), for example, the WFS offers direct fine-grained access to geographic information at the feature and feature property level.

This International Standard specifies discovery operations, query operations, locking operations, transaction operations and operations to manage stored, parameterized query expressions.

Discovery operations allow the service to be interrogated to determine its capabilities and to retrieve the application schema that defines the feature types that the service offers.

Query operations allow features or values of feature properties to be retrieved from the underlying data store based upon constraints, defined by the client, on feature properties.



Locking operations allow exclusive access to features for the purpose of modifying or deleting features.

Transaction operations allow features to be created, changed, replaced and deleted from the underlying data store.

Stored query operations allow clients to create, drop, list and described parameterized query expressions that are stored by the server and can be repeatedly invoked using different parameter values.

This International Standard defines eleven operations:

- GetCapabilities (discovery operation)
- DescribeFeatureType (discovery operation)
- GetPropertyValue (query operation)
- GetFeature (query operation)
- GetFeatureWithLock (query & locking operation)
- LockFeature (locking operation)
- Transaction (transaction operation)
- CreateStoredQuery (stored query operation)
- DropStoredQuery (stored query operation)
- ListStoredQueries (stored query operation)
- DescribeStoredQueries (stored query operation)

In the taxonomy of services defined in ISO 19119, the WFS is primarily a feature access service but also includes elements of a feature type service, a coordinate conversion/transformation service and geographic format conversion service.

Full documentation available at: <https://www.opengeospatial.org/standards/wfs>

7. Web Map Service (WMS)

The OpenGIS® Web Map Service Interface Standard (WMS) provides a simple HTTP interface for requesting geo-registered map images from one or more distributed geospatial databases. A WMS request defines the geographic layer(s) and area of interest to be processed. The response to the request is one or more geo-registered map images (returned as JPEG, PNG, Vector tiles, etc) that can be displayed in a browser application. The interface also supports the ability to specify whether the returned images should be transparent so that layers from multiple servers can be combined or not.

Full documentation available at: <https://www.opengeospatial.org/standards/wms>

8. Web Map Tile Service (WMTS)

A WMTS enabled server application can serve map tiles of spatially referenced data using tile images with predefined content, extent, and resolution.

Full documentation available at: <https://www.opengeospatial.org/standards/wmts>

9. Web Coverage Processing Service (WCPS)

“The OGC® Web Coverage Processing Service (WCPS) defines a protocol-independent language for the extraction, processing, and analysis of multi-dimensional coverages representing sensor, image, or statistics data.”



Full documentation available at: <https://www.opengeospatial.org/standards/wcps>

10. Web Coverage Service (WCS)

“A Web Coverage Service (WCS) offers multi-dimensional coverage data for access over the Internet. WCS Core specifies a core set of requirements that a WCS implementation must fulfill. More information on spatio temporal coverage / datacube standards can be found at <http://myogc.org/go/coveragesDWG>, including tutorials and webinars, conformance testing, background information, and updates on standardization progress.”

Full documentation available at: <https://www.opengeospatial.org/standards/wcs>



APPENDIX II – MATRIX OF REQUIREMENTS DERIVED FROM GIP-P D2.2.1

These are the project-specific requirements.

Additional basic requirements are described in chapter 2 of deliverable D2.2.1 (page 7)

All requirements were derived from deliverable D2.2.1

This document is intended to give insight in the various requirements that were harvested from the projects and as the basis for decisions about prioritization towards development of requested functionalities.

A more detailed description for each requirement is available in the "Description" field.

Potential questions for clarification of the requirements are written in the "Questions" column

The requirements currently earmarked as "High Priority" are colored **bright green** in the Number column (Column 1) requirements marked with **bright red** in column 1 is too complex and time consuming for GeoERA.

Red letters: functionalities/questions that need special attention from projects.

Colour codes in column two and four of the table indicate:

Green = 2D functionality

Blue = 2.5D functionality

Red = 3D functionality

No	Functionalities (2D, 2.5D, 3D)	Equivalences with functionalities analysed in GIP-P D2.3.1 "Extensions to EGD"	Description	Questions & comments	Other comments derived from D2.3.1
1	Search based on location	Go to location by typing city or coordinates in the search field	This search is intended to work either by entering an address, city or geographical coordinates. Zoom to the location will occur when pressing enter.	EGDI uses Lat/Long in decimal degrees (WGS84) for coordinate searches. Is that compatible with your project?	
2	Search Documents (require a doc repository)	Search through metadata, datasets and documents directly from the EGD portal + Search through documents + Ranking of search results based on relevance + Interface to upload documents and metadata to a document repository + Interface to MICKA	Allow users to search documents like in Minerals4EU, where metadata and indexed documents can be found by users (documents can even be georeferenced)	1. Do you have resources to achieve this metadata task? 2. Will the metadata and/or documents be harvested from other knowledge bases (e.g., KINDRA/EIGR, HIKE, etc.) or	To make searching better, layers defined in the EGD portal must also be stored in MICKA. Searching documents directly from EGD requires a document handling system, which is a



No	Functionalities (2D, 2.5D, 3D)	Equivalences with functionalities analysed in GIP-P D2.3.1 "Extensions to EGD"	Description	Questions & comments	Other comments derived from D2.3.1
				databases? Or, do the project require that the documents and metadata are stored in MiCKA database? 3. Will the project provide georeferenced documents to be archived/visualized in EGD? 4. Should the documents be findable directly from EGD or only through MiCKA?	complex thing to do. However, it can be created if projects required so.
3	Searching for maps	Searching for maps	With time, many thematic maps will be defined by every project. It should thus be possible to search among the maps. When a map is selected from the search tool, the map will open with a selection of predefined active layers and with a predefined zoom level.		
4	Interface to upload and thematize GeoPackages	Enhanced interface to upload and thematize Shapefiles and GeoPackages	Shapefile uploader in EGD 1.1 must be extended by allowing the upload of GeoPackages with tools to thematize the layers and add metadata.	Would you be delivering data in GeoPackage format?	Data delivered in GeoPackage format (supported by ArcGIS, QGIS and others) may be accepted by EGD. However, <u>ArcGIS Geodatabase file format (*.gdb or *.mdb) will not be</u>



No	Functionalities (2D, 2.5D, 3D)	Equivalences with functionalities analysed in GIP-P D2.3.1 "Extensions to EGD"	Description	Questions & comments	Other comments derived from D2.3.1
5	Enhanced interface to upload and thematize Shapefiles		Shapefile uploader in EGD 1.1 will be extended with tools to thematize the layers and add metadata.		accepted. Meaning that all projects producing data with ArcGIS should provide them to EGD either as GeoPackages or as individual shapefiles.
6	Interface to knowledge base and related documents	Interface to knowledge base (existing from HIKE)	Like No.2, but documents are stored in the knowledge base that is to be developed in the framework of the HIKE project	Are there other knowledge-based systems, apart from Kindra/EIGR (see No 25) and that to be created by HIKE, to which the GIP should create interfaces?	The feasibility of this functionality has not been evaluated yet due to a lack of details on the architecture, etc. of the HIKE knowledge base. If it has not been done yet, HIKE and GIP WP6 must contact each other to solve this issue.
7	Web page with all services	Web page with a list of all services comprised in the platform, including both the services directly available from EGD platform and those drawn from the thematic projects	A viewer where each project can see all the web map services that the project decides to show. It consists of a webpage with a list of all services comprised in the platform, including both the services directly available from EGD platform and those drawn from the thematic projects	Is the project producing the services (WMS, WMTS, WCS)? 2. Do you have resources to achieve this metadata task? 3. Someone that could complete metadata following EGD metadata catalogue indications? 3. Do you have a metadata catalogue	



No	Functionalities (2D, 2.5D, 3D)	Equivalences with functionalities analysed in GIP-P D2.3.1 "Extensions to EGDI"	Description	Questions & comments	Other comments derived from D2.3.1
				where metadata can be harvested? Metadata for the pilot studies could potentially be uploaded to the KINDRA / EIGR database	
8	Download data+access control	Download of data with or without access control	The access control is intended to restrict the access to certain documents and data repositories (e.g., those under embargo) to only certain people (e.g., partners and stakeholders).	Information to provide when sending the data to EGDI concerning this functionality: 1. Specify which data should be downloadable and which should not. Do not forget to mention all the information that should be included in the downloadable data files. 2. In what format would you like the data/documents to be downloaded? 4. Do you want the download to be possible for all users? Otherwise, please, make sure that the data that will require access control are clearly highlighted when you provide	



No	Functionalities (2D, 2.5D, 3D)	Equivalences with functionalities analysed in GIP-P D2.3.1 "Extensions to EGD"	Description	Questions & comments	Other comments derived from D2.3.1
9	Download data (no access control)		Open access to a document/data repository.	them to EGD. 6. For the downloadable data, please, specify if the access to certain datasets should be partially restricted or fully available. 8. If the data are spatial, do they have to be downloaded in the same projections that they are shown? If not, please specify the projection system (EPSG). 10. If you are requiring access control for some datasets, please, state the reason (e.g., embargo, etc.).	
10	Identify+follow link	Not comprised in D2.3.1, as it already exists in EGD	After a getfeatureinfo request, a pop-up window appears with a link to access the requested documents or URL. The files must be stored in the data repository and metadata database. The documents must be stored in EGD repository.		This functionality already exists in EGD



No	Functionalities (2D, 2.5D, 3D)	Equivalences with functionalities analysed in GIP-P D2.3.1 "Extensions to EGDl"	Description	Questions & comments	Other comments derived from D2.3.1
11	Specific projection	Display data in different projections + Projections	EDGI official projections for visualization are EPSG 3034 Lambert Conformal Conic projection.	1. Do you require the use of another projection for visualization purposes? If so, could you specify which one and why? 2. If the project is providing data as webservices (WMS, etc.); would it be a problem to provide them in EPSG:3034? 3. If possible, specify the projection system (EPSG) in which you would like to deliver the various data the project will generate.	<u>GIP-P does not recommend the use of several projections for visualization. In principle, all data will be visualized in EGDl by using EPSG:3034. It is however possible to perform calculations in other projections (e.g., EPSG:3035) by transforming them into EPSG:3034. Projects can provide data in whichever projection they want as long as its conversion to EPSG:3034 is straight forward. However, Web services must be delivered to the EGDl platform in EPSG:3034. Otherwise, EGDl and web services from all projects would have to support all the required projections. If projects require other projections for visualization, please, send us an email specifying which projection you need and why the use of EPSG:3034 for visualization purposes is not</u>



No	Functionalities (2D, 2.5D, 3D)	Equivalences with functionalities analysed in GIP-P D2.3.1 "Extensions to EGDI"	Description	Questions & comments	Other comments derived from D2.3.1
					<u>convenient for your project.</u>
12	Overview panel	Small overview map	A window that allows the user to locate the position of the viewer window within a larger zoom (e.g., within a political map of Europe).		A basic version of this functionality already exists in EDGI
13	Legend with tree view / hierarchical on/off switching	Legend with hierarchy/tree view + Switching layers on / off	Panel to see and choose the available layers and services that can be displayed in the viewer, including switching on/off layers classified in hierarchical groups.		



No	Functionalities (2D, 2.5D, 3D)	Equivalences with functionalities analysed in GIP-P D2.3.1 "Extensions to EGDI"	Description	Questions & comments	Other comments derived from D2.3.1
14	Export map	Export current view as a high-resolution image for publication.	It allows users to export the map (comprising objects and layers) displayed in the viewer as images.	1. Is there a specific format you would like the maps to be exported in (PDF, JPG, PNG...)? 2. Specify, if any, which auxiliary elements do you want to appear in the output format (graphical/numerical scale, arrow indicating north, etc.). 3. Should the images be georeferenced? 4. Specify the size (A4, A3...) 5. Can you provide a template?	
15	Handling time component	Handling of time component	Functionality for displaying/interacting with time series datasets and to display grids and layers that change over time.	1. What interaction is needed with the data? 2. Could you provide an example?	



No	Functionalities (2D, 2.5D, 3D)	Equivalences with functionalities analysed in GIP-P D2.3.1 "Extensions to EGDl"	Description	Questions & comments	Other comments derived from D2.3.1
16	Display a graph with time series data (piezo levels, rain....)	Display a graph with time series data	Functionality to display a graph showing the evolution of time series. It either displays an existent graph after a getfeatureinfo or it builds the graph based on data extracted from tables/attributes associated with the layers displayed.	Specify what types of graphs are required. Could you provide an example or template? Information to provide when sending the data to EGDl concerning this functionality: 1. If the graphs are generated "on the fly" from EGDl, please, specify to which objects, layers, etc. and data (tables, attributes, etc.) they should be generated from. 2. If the graphs are harvested from data archived in a database or document repository, please, specify to which objects, layers, etc. they should be linked and from where EGDl should harvest them.	If necessary, it is possible to include links to external services that deliver time series. Is the data construct on the fly from a data base? Is the graph a document to be linked to a record? Specify what types of graphs are required? –
17	Multiscaling	Multiscaling; showing more and more details when user zoom in to an area	Functionality that interactively adapts the resolution of the map, objects' sizes and the layers displayed in the viewer when the user zooms in and out. Layers and/or objects should therefore contain information on the suitable scale from which they should start	Information to provide when sending the data to EGDl concerning this functionality: 1. Please, provide scale range within which each layer should be displayed.	



No	Functionalities (2D, 2.5D, 3D)	Equivalences with functionalities analysed in GIP-P D2.3.1 "Extensions to EGDI"	Description	Questions & comments	Other comments derived from D2.3.1
			appearing/disappearing in the viewer.	2. Is clustering desirable?	
18	Transparency	Transparency of layers	It allows users to adapt the percentage of transparency of a layer		
19	Display (virtual) logs	Displaying virtual logs through models	it either displays a previously defined log or it builds one based on the layer/s displayed. The location is defined by the user with a getfeatureinfo request.	1. Specify what type of logs (format, etc.) should be generated/displayed? 2. Specify the format the project will use to deliver the logs and the format the project expects EGDI to display them. 3. When sending the data to EGDI, please, specify the layers that should be used to generate virtual logs, as well as the datasets, tables or attributes from where the data should be retrieved. 4. Is there a template that EGDI should follow? Could you provide an example? 5. If the logs are to be displayed as documents/images (hyper)link to georeferenced	
20	Create virtual logs from table data or 2.5d layers		Similar to No. 19, although it creates the log from a database or a 2.5D layer		



No	Functionalities (2D, 2.5D, 3D)	Equivalences with functionalities analysed in GIP-P D2.3.1 "Extensions to EGD"	Description	Questions & comments	Other comments derived from D2.3.1
				objects/layers, please, specify to which elements the logs should be linked and from where EGD should harvest them.	
21	Display (virtual) cross sections	Display virtual cross sections	It either displays cross sections previously constrained or it builds one based on the layer/s displayed. The location is defined by the user with a getfeatureinfo request or by drawing a trace on the map.	1. Specify in which format the project will provide the cross-section documents and in which format they should be displayed. 2. if you want EGD to create the cross-section "on the fly", please, specify, when providing the data to EGD, which tables, attributes, etc. should be used for that.	
22	Create virtual cross section 2.5d layers from a user defined geometry		Similar to No. 22, but the cross section is created from lines/polylines and/or curves drawn by the users.	3. could you provide an example of the cross section you are expecting EGD to show? 4. If the cross-sections are to be displayed as documents/images (hyper)link to georeferenced objects/layers, please, specify from	



No	Functionalities (2D, 2.5D, 3D)	Equivalences with functionalities analysed in GIP-P D2.3.1 "Extensions to EGDI"	Description	Questions & comments	Other comments derived from D2.3.1
				where EGDI should harvest them. Specify also which element/s the cross-section will be linked to; e.g., one or several records of a database, an information layer, georeferenced object/s, etc.	
23	Creation of statistical diagrams, rose diagrams, histograms...	Creation of statistical diagram, rose diagrams, histograms...	Functionality to display a graph showing diagrams. It displays either an existent graph or it builds one based on table values associated with the selected layers/objects.	1. Do you expect EGDI to calculate the diagrams or you will deliver prebuild diagrams? 2. If EGDI must calculate the diagrams, then answer the following questions: i. Build based on which information? ii. Specify which type of statistical diagram should be displayed. iii. Specify database, fields and template of the statistical diagram. Please, provide examples. iv. Specify to which elements (e.g., to each record of a database, an information layer)	The feasibility of this functionality has not been evaluated yet. GIP needs more information on what the projects requiring it are expecting. Projects intending to use this functionality should provide examples/guidelines to GIP, clearly specifying how this functionality should work according to their needs. They can send them directly to GIP WP6 coordinator (cc: GIP WP2 coordinator). WP6/WP2 will organise a conf. call with the concerned projects if further information is needed.



No	Functionalities (2D, 2.5D, 3D)	Equivalences with functionalities analysed in GIP-P D2.3.1 "Extensions to EGDI"	Description	Questions & comments	Other comments derived from D2.3.1
				the diagram will be related.	
24	Metadata compatible with other EU inventories	Metadata compatible with other EU inventories	Enable harvesting from metadata catalogues other than EGDI/MiCKA.	1. If Metadata is to be harvested from catalogues other than MiCKA, please, provide a template and information on the vocabularies and standards followed by those catalogues. 2. Harvesting data from external metadata repositories is possible, but the data provider must guarantee that the database will be properly maintained and regularly updated after the	Preferentially, metadata archived in other catalogues should have similar formats to those use by MiCKA and be compliant with the same international standards (INSPIRE).



No	Functionalities (2D, 2.5D, 3D)	Equivalences with functionalities analysed in GIP-P D2.3.1 "Extensions to EGD"	Description	Questions & comments	Other comments derived from D2.3.1
				end of the project. Otherwise the metadata may become outdated after some time. Would the projects be able to guarantee this service?	
25	Integration of KINDRA thesaurus	Integration of the KINDRA thesaurus	This functionality builds on and further develops the thesaurus and groundwater research classification of the European Inventory of Groundwater Research (KINDRA).	Projects utilizing KINDRA/EIGR thesaurus must decide together with EGD developers what is the most efficient way of doing its integration in EGD, who is going to participate in the governance workflow...	The feasibility of this functionality has not been evaluated yet. GIP needs more information on what the projects requiring it are expecting. Projects intending to use this functionality should provide examples/guidelines to GIP, clearly specifying how this functionality should work according to their needs. They can send them directly to GIP WP6 coordinator (cc: GIP WP2 coordinator). WP6/WP2 will organise a conf. call with the concerned projects if further information is needed.



No	Functionalities (2D, 2.5D, 3D)	Equivalences with functionalities analysed in GIP-P D2.3.1 "Extensions to EGDI"	Description	Questions & comments	Other comments derived from D2.3.1
26	Create simple queries and filters from the webGIS interface	Create simple queries and filters from the web GIS interface	It performs simple queries or filter on a layer of information. Both predefined queries and free queries require that the database is hosted in EGDI infrastructure.	Information to provide when sending the data to EGDI concerning this functionality: 1. Specify layers and fields to query 2. Do you need free or predefined queries? More than one condition?	
unsafe	27 SQL query directly to the database	SQL query directly to the database	Performs free queries on databases. This requires that databases are hosted in EGDI infrastructure.	Information to provide when sending the data to EGDI concerning this functionality: 1. Specify table and fields involved in the queries 2. More than one condition?	Unsafe. It is not recommended opening the databases for users to execute SQL directly from the user interface. This can however be done when setting up the layers that query data stored in the EGDI database.
29	From getfeatureinfo creation of an automatic report querying a selection of layers	Not comprised in D2.3.1; this functionality already exists in EDGI	This functionality creates reports when clicking on a specific location of the map with the getfeatureinfo tool. These reports provide important values extracted from all layers that are switched on in the viewer and that contain information for that location. E.g., layers "topography" and "gravimetry" are switched on, when clicking in a location covered by both layers, a report will be generated, providing the elevation and the gravimetric measurement for that location.	When providing the data to EGDI, please, specify the layers to which this functionality will be applied and the attributes, tables, etc. from where the data included in the report will come from. Do you want EGDI to use a specific template for these reports? If so, please, send an example.	A basic version of this functionality already exists in EDGI



No	Functionalities (2D, 2.5D, 3D)	Equivalences with functionalities analysed in GIP-P D2.3.1 "Extensions to EGD"	Description	Questions & comments	Other comments derived from D2.3.1
30	Handling and displaying 3D models	Handling and displaying 3D models + 3D model importers + 3D model exporters + Interface to upload 3D models and metadata	In the 2D viewer, the extent of the 3D model is displayed as a shape. By clicking on that shape, the user can access the 3D model. Note that EGD might only handle one format for 3D data.	Please, specify the software used to generate 3D data and the formats in which the data will be provided to EGD.	
31	Transparency of 3D	Transparency	It allows users to adapt the percentage of transparency.		
32	Quasi 4D viewer	Quasi 4D viewer	Quasi 4D viewers show the variation of the reality shown by 3D models based on different values of a given variable, which is different to the 3 spatial dimensions; e.g., time.	1. Could you provide an example for this functionality? 2. How (format, etc.) would Quasi 4D models be delivered to EGD? 3. Would the 4D models be stored in EGD? Or, should they be harvested from an external database?	The feasibility of this functionality has not been evaluated yet. GIP needs more information on what the projects requiring it are expecting. Projects intending to use this functionality should provide examples/guidelines to GIP, clearly specifying how this functionality should work according to their needs. They can send them directly to GIP WP6 coordinator (cc: GIP WP2 coordinator). WP6/WP2 will organise a conf. call with the concerned projects if further information is needed.
33	Virtual borehole	Display virtual logs	Like No. 19 and 20 but based on 3D data. It provides borehole information by using the getfeatureinfo.	Questions as in No.19 and 20.	



No	Functionalities (2D, 2.5D, 3D)	Equivalences with functionalities analysed in GIP-P D2.3.1 "Extensions to EGDI"	Description	Questions & comments	Other comments derived from D2.3.1
34	Virtual cross section	Create virtual cross section through models	Like No.21 and 22 but based on 3D data. It generates a cross section from a location selected with the getfeatureinfo or from a trace drawn by the user	Questions as in No. 21 and 22	
35	Virtual (horizontal) slice	Virtual (horizontal) slice	Like No. 35 but providing horizontal slices instead of vertical cross sections. For example, horizontal slices extracted from 3D seismic reflection data by selecting a range of values of two-way travel times.	Questions as in No. 21 and 22	
36	Handling uncertainty	Handling uncertainty	Descriptions for this functionality are not available yet. Defining the specifications for this is one of the outcomes of the 3DGEO-EU project.	Can you specify what type of data are to be expected (point clouds, voxels, points, reports) to show the uncertainty of models, etc.? Please, provide examples/templates.	3DGEO-EU must send guidelines to EGDI developers when they have more information on the way the uncertainty should be displayed.
37	Compass	Compass	Interactive compass rose indicating the orientation of the 3D model in the viewer		
38	Color / Alpha mapping functions to render attributes	Color / Alpha mapping functions to render attributes	color and transparency that is set based on attribute values. It allows the user to set the amount of transparency or the color that different areas will show based on values defined in the attributes of the selected layer.	Please, specify which attributes should be used for this. Could you provide an example?	



No	Functionalities (2D, 2.5D, 3D)	Equivalences with functionalities analysed in GIP-P D2.3.1 "Extensions to EGDI"	Description	Questions & comments	Other comments derived from D2.3.1
39	Glyphs for data representation	Glyphs for data representation	Visualization of data (points) as glyphs	1. Can you provide the glyphs that will be used? 2. Please, specify format for displaying them. 3. could you, please, send examples?	The feasibility of this functionality has not been evaluated yet. GIP needs more information on what the projects requiring it are expecting. Projects intending to use this functionality should provide examples/guidelines to GIP, clearly specifying how this functionality should work according to their needs. They can send them directly to GIP WP6 coordinator (cc: GIP WP2 coordinator). WP6/WP2 will organise a conf. call with the concerned projects if further information is needed.



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40	Visualize of different models at same time	Visualize different models at same time	it displays different 3D models simultaneously in the same viewer	Can you provide an example of how you expect this functionality should work?	The feasibility of this functionality has not been evaluated yet. GIP needs more information on what the projects requiring it are expecting. Projects intending to use this functionality should provide examples/guidelines to GIP, clearly specifying how this functionality should work according to their needs. They can send them directly to GIP WP6 coordinator (cc: GIP WP2 coordinator). WP6/WP2 will organise a conf. call with the concerned projects if further information is needed.
too complex to be developed within the scope of the GIP-P project.	41	Fly through (recordable)	Fly through (recordable)		
	42	Steering camera via geocoded locations	Steering camera via geocoded locations		



No	Functionalities (2D, 2.5D, 3D)	Equivalences with functionalities analysed in GIP-P D2.3.1 "Extensions to EGDI"	Description	Questions & comments	Other comments derived from D2.3.1
43	Predefined viewpoints	Predefined viewpoints	Navigation of the camera position and direction based on predefined locations.		
44	Possibility to display objects	Possibility to display objects	This functionality allows the displaying of 3D objects, e.g., buildings.	Can you specify which 3D objects should be displayed?	The EGDI 3D model database can store points, surfaces and closed volumes. <u>We need however to have examples of the objects the projects will generate and how they expect to have them visualized. Examples can be sent directly to GIP WP6 coordinator (cc: GIP WP2 coordinator).</u>
45	Grid lines	Grid lines	It displays grid lines in order to get a feeling for scale in the 3D perspective.		
46	API	API to extend the viewer	Advanced Programming Interface to all functionalities of the viewer, so that the viewer can be reused in the future (e.g., see Google Maps API)		
47	Exploded views of detailed part of 3D model	Exploded views of detailed part of 3D model (like the Polish viewer)	The inverse of an overview window (No.12): it provides details on part of the model while the user is navigating across it.	1. Should these detailed parts be predefined or user-changeable? 2. Could you provide an example?	<u>Could you confirm that what it is written in the description of this functionality is what you expect from EGDI? The name of the functionality is ambiguous, as it could also be interpreted as: taking</u>



No	Functionalities (2D, 2.5D, 3D)	Equivalences with functionalities analysed in GIP-P D2.3.1 "Extensions to EGDI"	Description	Questions & comments	Other comments derived from D2.3.1
					the model apart by "lifting" layers...