

EIGR USER MANUAL v1.1

INDEX

PREFACE	page 2
KINDRA Summary	
EIGR: European Inventory for Groundwater Research	
 BASIC CONCEPTS	page 3
Metadata: Concepts, definitions, standards, Schemas or Templates.	
Geonetworks: Metadata catalogue	page 4
 OPERATING THE EIGR	page 5
Accessing the EIGR	
User Profiles	page 6
Catalogue Based Search Tools	page 7
Creating a Metadata	page 11
Identification Information	page 14
Data Identification	
Point of Contact	page 16
Descriptive keywords	page 17
Resource Constraints	page 21
Topic Categories	page 21
Extent	page 23
Distribution Information	page 25
Data Quality Information	page 28
Metadata Information	page 31
Editing Metadata and Additional Categories	page 33
Category Updating	page 34
Privilege Updating	page 35

PREFACE

KINDRA Summary

Hydrogeology-related research activities cover a wide spectrum of research areas at EU and national levels. The European knowledge-base on this important topic is widespread and fragmented into wider programs generally related to water, environment or ecology.

In order to achieve a comprehensive understanding on the groundwater theme, The KINDRA project (Knowledge Inventory for Hydrogeology Research) seeks to carry out an accurate assessment of the state of the art in hydrogeology research and to create a critical mass for scientific knowledge exchange of hydrogeology research, to ensure wide applicability of research results, including support of innovation and development, and to reduce unnecessary duplication of efforts.

The KINDRA project has focused its efforts in developing the Harmonized Terminology and Methodology for Classification and Reporting Hydrogeology related Research in Europe (HRC-SYS) as well as the European Inventory of Groundwater Research (EIGR).

Both tools, the HRC-SYS and the EIGR, are fundamental to achieve the main aim of the KINDRA project, in creating an overview of the scientific knowledge covering European countries, by an accurate assessment of hydrogeology research in various geographical and geo-environmental settings, allowing for a direct comparison and exploitation of existing synergies. At the same time, the scope of the project includes identification of future trends, critical challenges and research gaps, to improve management and policy development for groundwater resources on a EU level coherently with the Water Framework Directive (WFD) and Groundwater Directive (GWD).

EIGR: European Inventory for Groundwater Research

More specifically, the purpose of the EIGR is to achieve the following three goals:

To become a repository on groundwater research and other available knowledge provided by National Experts cooperating with the EFG (KINDRA Project Third Parties);

To serve as a consultation tool during and after the project by experts and organizations dealing with groundwater research, as well as by non technical users;

To analyze the collected data and stored information in order to help identify trends, challenges and gaps related to Groundwater Research on behalf of the KINDRA partners.

By using and modifying an existing Open Source platform, already being exploited by the REDIAM, the EIGR is being developed as a Data Catalogue with geographical references.

The EIGR will not contain data itself, but **metadata** of research efforts and topic related knowledge deliverables (scientific reports, articles, projects, etc...) illustrating and providing links to research efforts carried out through Europe since 2000, indicating where they can be found, and at the same time allowing their classification according to the proposed HRC-SYS.

The information inserted in the EIGR must be as complete as possible, as this will allow the search engines and future user consultations carry out thorough information analysis. The EIGR will serve as a repository of this knowledge, functioning as a tool that will allow for queries and searches to be carried out by selecting keywords, generating statistics, diagrams and other functions to help support the exploitation of the catalogued information.

The present EIGR version delivered is intended as a Beta version, to be tested and checked during the trial phase which will take place during 2016 with the cooperation of the KINDRA project partners and the EFG National Experts.

After this period, once a considerable amount of records have been included into the system and these have been assessed, a version which includes a variety of tools and applications which will serve for the exploitation of the information uploaded into the EIGR will be released at a later stage of the project.

The ultimate purpose of the EIGR is to be deployed as a permanent public access service dedicated to ongoing hydro geological research and innovation across Europe.

The following technical guide is conceived as a user manual for all those whom will contribute and make use of the European Inventory of Groundwater Research (EIGR).

The concept of Metadata

The clearest definition we can find for the concept of metadata is «data about data ».

Metadata is a crucial element for any kind of Data Catalogue. In our specific case, dealing with information which refers to works and efforts carried out by different organizations and working groups, it is essential to be able to account for the information on how these resources have been obtained and according to what procedures.

Metadata allow for a better understanding of a set of data which has been recollected or developed by another. The more details that are available regarding a set of data, the more useful the data will be for future exploitation and treatment. It will even allow for a better sharing of information with others.

Definitions: What are Metadata?

Metadata describe the contents, the quality, the format and other characteristics linked to specific resources allowing users to properly identify precise information and services available as well as on how to locate them.

They provide the answers to the basic questions, Who, What, When, Where, Why and How providing users with the characteristics of the data registered in a catalogue. They provide information concerning:

The title and overall description of the data.

The purpose of the data and their usefulness.

The date of creation of the data set and, whenever applicable, the update process it is subject to.

The geographical extension of the data set.

The owner of the data set

The criteria and constraints, or restrictions, that applies to their use and exploitation.

The quality of the data set.

With all this information, users have further access on the data available and are able to locate and select data sets which are more suited to their needs and requirements. This allows for a more efficient exploitation of data sets.

The purpose for creating metadata is to organize and maintain the information created by institutions; they seek to promote the availability and use of data.

When resources are published by means of a data catalogue, this provides other organizations the opportunity to find and use the information; it allows them to identify other organizations with which they can share information, share the efforts of maintaining information and develop clients for users to be able to access and use the information in a more efficient manner.

Metadata should always accompany a resource as they provide information for accessing and obtaining it and making it interoperable. They help users and organizations in better processing, interpreting and storing data in their own internal registers.

Metadata are the responsibility of who create the data sets, of who provide the data sets and of the users of the data sets.

Metadata Standards

A metadata standard is a document which identifies the required contents for the description of the resources of a catalogue. The standards are generally supported by common national or international regulations.

The standards concerning metadata are those included in the ISO 19115, which belongs to the ISO 19100 family. It provides the metadata schema and establishes common terminologies, definitions and procedures all related to metadata. (http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=26020)

The ISO 19139 standard provides a series of XML templates which define the XML format for the inclusion of the required details concerning metadata according to the ISO 19115 metadata standard.

Additionally to the standards there are also some rules which help determine the minimum required elements for a metadata to be properly characterized and described. One example is the Dublin Core schema which is a small set of vocabulary terms that can be used to describe web resources (video, images, web pages, etc.), physical resources such as books or CDs, and objects like artworks. It is an example which is very suited for the simplest and most basic metadata.

Metadata Schema or Template

The key issue regarding metadata is: is it necessary to create a new template for the metadata or are there any templates available that may be adapted to our needs? Generally it is preferable that few templates exist for metadata. We turn to standards in order to improve interoperability and reduce the amount of useless differences. It is preferable and much easier to employ something which already exists, which is well conceived and internationally recognized. If we build a new template, we will also be required to manage and maintain it during the duration of the catalogue. This also includes updating compatibility issues for past and future resources, the metadata contents themselves as well as their registration into the catalogue and the infrastructure employed.

The ISO 19139 Geographic information Metadata XML schema: This standard provides the XML implementation schema for ISO 19115 specifying the metadata record format and may be used to describe, validate, and exchange geospatial metadata prepared in XML. It includes information about the identification, constraints, extent, quality, spatial and temporal reference, distribution, lineage, and maintenance of the dataset. The EIGR will be employing a metadata template based on the ISO 19139 metadata schema.

GeoNetwork: Metadata Catalogue

A metadata catalogue is a set of metadata which describes elements which are available from a wide variety of sources. These catalogues usually must follow a standard or schema as any information which is standardized is more easily susceptible to be understood, shared, used and employed by different communities and countries.

The KINDRA EIGR is a data catalogue based on Geonetwork 2.10.4. GeoNetwork is a decentralized geographical information management system based on different standards. It is designed to allow users to access different information sources through the internet by means of the metadata.

The main purpose of this software is to promote the collaboration amongst organization in order to reduce information duplicity, improve the consistency and quality of geographical information. This product allows for a standardized organization of information, which is an essential step for sharing information between different institutions

It provides services which allow users to search within metadata information and details ranging from keywords, authors, legal constraints concerning the use of information and resources available. The main characteristics of Geonetwork are:

- Catalogue based Search tools

- Upload and download of data and other contents

- An integrated map viewer

- An online tool to export in PDF format

- A metadata editor tool with an extensive range of templates

- A timer for programmed metadata harvesting and synchronizing with other catalogues

- A user and group based management system access control

- Multilingual availability

- Integrated metadata templates (ISO 19139, Dublin Core, etc...)

- Possibility of creating and assigning different metadata editor profiles

- CWS services

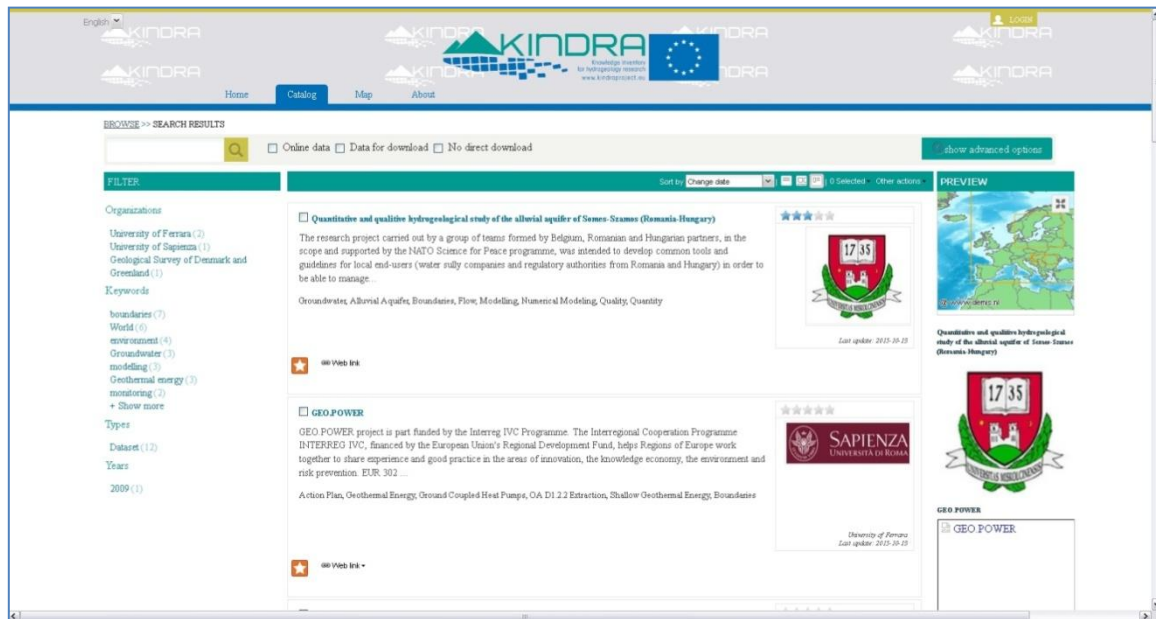
- Java Servlets technology

OPERATING THE EIGR

Accessing the EIGR

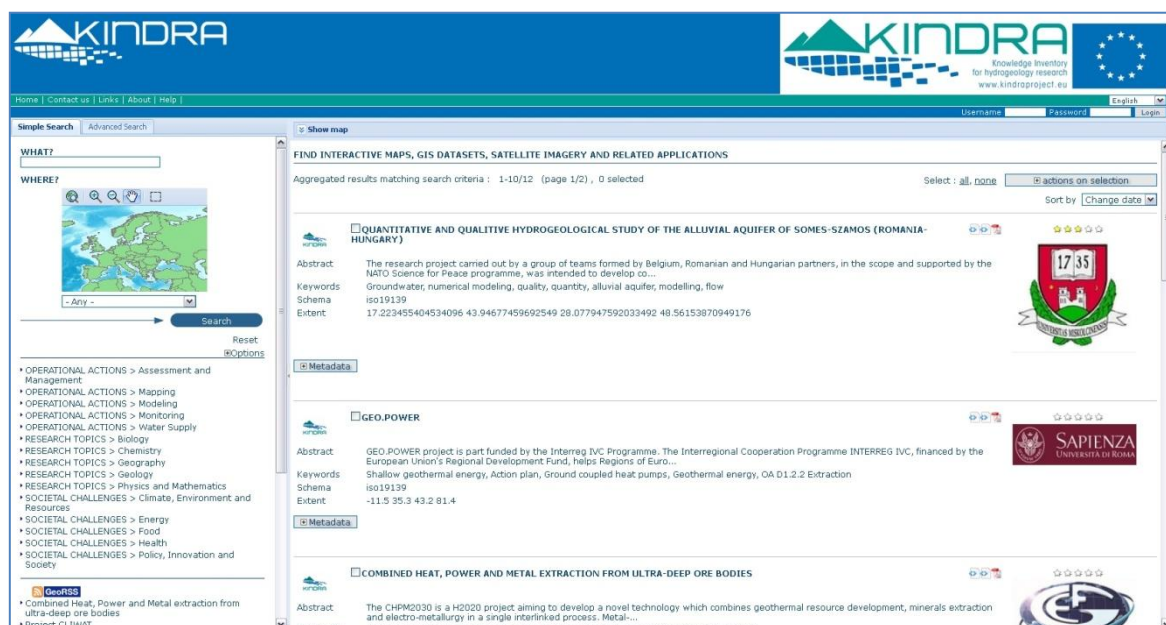
As it is based on Geonetwork, the EIGR offers two possibilities for browsing the catalogue; one which is the default viewer in HTML5 which all users find when accessing the catalogue through the following address:

<http://kindra.kindraproject.eu/geonetwork/srv/eng/search>



The other option for viewing and browsing the catalogue is accessing the traditional Geonetwork interface. For users already familiar with the Geonetwork web catalogues you will recognize it immediately. When you access the catalogue's administration through the HTML5 view, it will switch to this one. It can also be accessed through the following address:

<http://kindra.kindraproject.eu/geonetwork/srv/eng/main.home>



The steps to access and operate the KINDRA EIGR will be described for the traditional Geonetwork interface, as it offers a clearer and more organized view of the template tags for which users will need to be providing information when completing the metadata of the resources which will be added to the EIGR.

<http://kindra.kindraproject.eu/geonetwork/srv/eng/main.home>

The following sections of the document will provide users a step by step walkthrough of the EIGR functionalities and operability for searching and browsing metadata as well as for including new metadata records in the EIGR. In case any assistance should be required you can contact eigr@kindraproject.eu

User Profiles

A user may be assigned one or more profiles, all depending on the roles they hold within the Geonetwork system. The profile determines the tasks that may be carried out by each user. User profiles are hierarchical and heritage based, which means that a user with an "editor profile" can create and modify new metadata registries, but at the same time can access all the same functions just as any other registered user.

The rights and privileges associated with each profile are detailed in the following list:

1. Administrator

The Administrator holds special privileges which provide access to all the functions available. These include:

- Full rights to create new user groups and new users
- Rights to modify user groups and/or user profiles
- Full rights to create/edit/delete new/old metadata
- Carry out system administration and configuration tasks.

2. User Administrator

The User Administrator is allowed to administrate his own profile or group profile with the following privileges:

- Full rights to create new users in his group
- Rights to modify user profiles within his group
- Full rights to create/edit/delete new/old metadata within his own group

3. Content Reviewer

The Content Reviewer is the only person authorized to give the final approval for the publication of a metadata on the intranet and/or internet:

- Rights to review the metadata contents within his group and can authorize their publication

4. Editor

The Editor Works with the metadata according to the following privileges:

- Full rights to create/edit/delete new/old metadata within his group (Profile assigned to EFG National Experts).

5. Registered User

The Registered User has more access rights than non registered users, who simply access the catalogue as guests:

- Right to download protected data.

Each metadata register which is included in the EIGR will be linked to a group as well.

Each user is provided with a user name and password, which will be necessary for metadata including new metadata entries or editing metadata purposes.

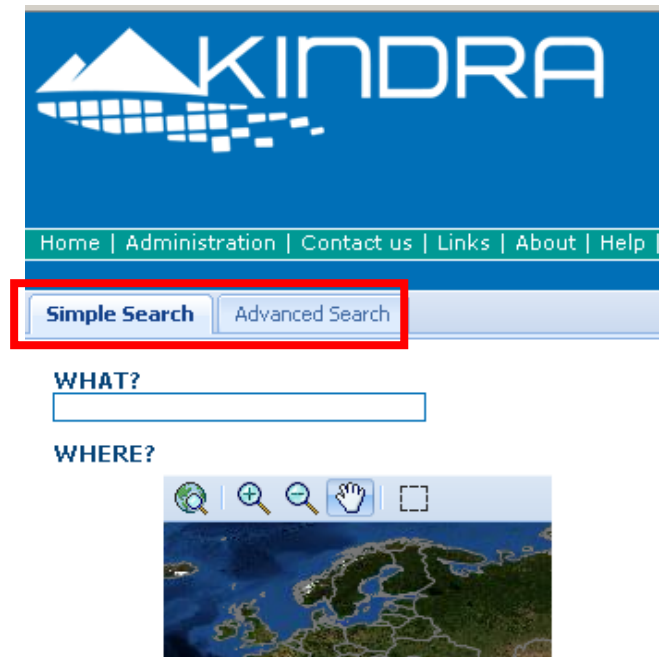


Catalogue based Search tools

As mentioned in the description of the EIGR, its main characteristic is that it will serve as an Online Data Catalogue for Hydrogeological Research resources throughout the EU. As such, it will constitute a single repository of Knowledge on the topic.

The contents of the EIGR can be accessed at any given moment by users by means of different search tools and functionalities which the Geonetwork platform offers to users.

In order for any user to proceed and carry out a search or query within the EIGR, they must first click on one of the search tabs they will find at the EIGR Home page: Simple Search or Advanced Search.



The Simple Search tab is as its name indicates, simple! A user must simply type in the text of a topic of interest in the empty below the text indicating WHAT? in capital letters and clicking on the search button afterwards.

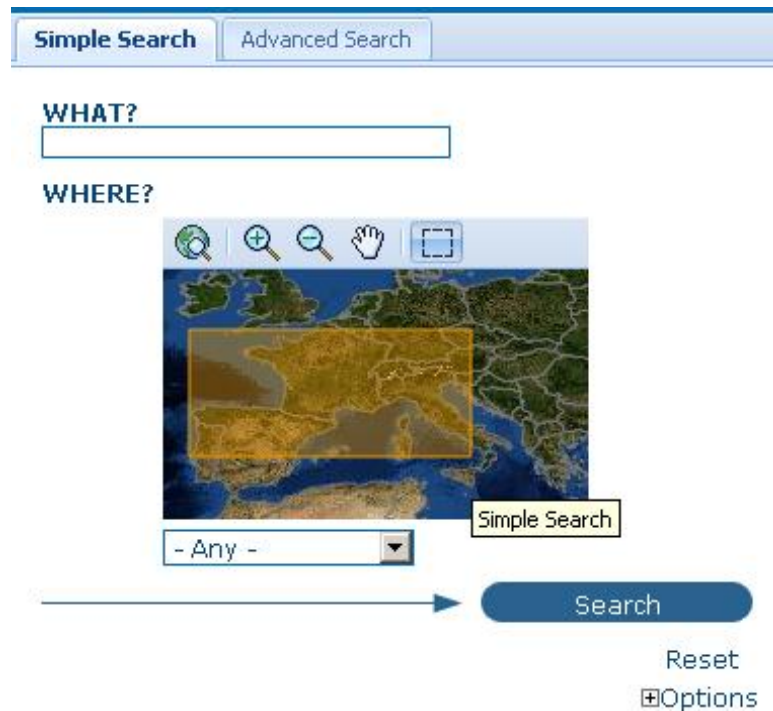


WHAT?

WHERE?

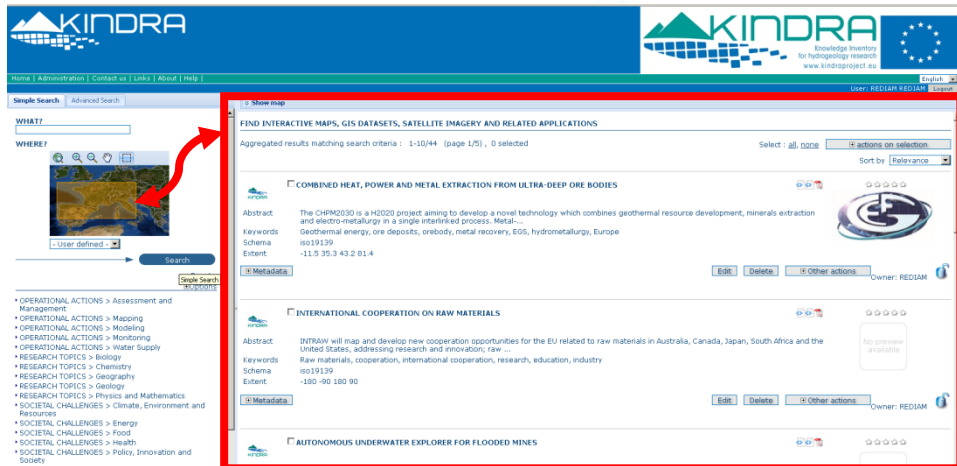


There is also a map function which allows for users to select an extension on the map and the search results will bring back any resource which has been identified cartographically in it's metadata. The map can be zoomed in and out.



This detailed view of the search interface shows the 'Simple Search' tab selected. It includes a 'WHAT?' search box, a 'WHERE?' section with a map and search tools, a dropdown menu set to '- Any -', and a 'Simple Search' button. Below these is a large blue 'Search' button, and further down are 'Reset' and 'Options' links.

Clicking on the search button will bring back all the resources which have been cataloged within the map area:



The screenshot shows the KINDRA web application interface. The 'Advanced Search' tab is selected, displaying a search results page. On the left, there is a 'WHERE?' section with a map and a 'User defined' bounding box. The main area shows a list of search results, including 'COMBINED HEAT, POWER AND METAL EXTRACTION FROM ULTRA-DEEP ORE BODIES' and 'INTERNATIONAL COOPERATION ON RAW MATERIALS'. A red box highlights the search results area, and a red arrow points from the 'WHERE?' section to the map.

If we select the advanced search tab, it will open up a menu with more options, allowing us to be able to query the EIGR according to specific terms concerning title, abstract or keywords, either by typing in specific coordinates in the map bounding box or even by specifying a precise time interval which may be either according to the metadata change date or its temporal extent.



The screenshot shows the 'Advanced Search' form in the KINDRA web application. The form is divided into three main sections: 'WHAT?', 'WHERE?', and 'WHEN?'. The 'WHAT?' section includes fields for 'Any - with one of these words', 'Title', 'Abstract', and 'Keywords'. The 'WHERE?' section includes a map with a bounding box and fields for 'lat (max)', 'long (min)', 'lat (min)', and 'long (max)'. The 'WHEN?' section includes fields for 'Type', 'Region', 'WHEN?', 'Anytime', 'Metadata change date', 'From', 'To', 'Temporal Extent', 'From', and 'To'. The 'Advanced Search' tab is highlighted with a red box.

Below the Simple Search menu we find a list of the Overarching categories which have been defined by the KINDRA Hydrogeological Research Classification System (HRC-SYS: 5 Operational Actions, 5 Research Topics and 5 Societal Challenges) and according to which resources should be classified. When selecting one of the categories listed, this will bring back as a result all the resources which have been classified according to the indicated category.



Home | Administration | Contact us | Links | About | Help |

Simple Search Advanced Search

WHERE?

- User defined -

Search

Reset

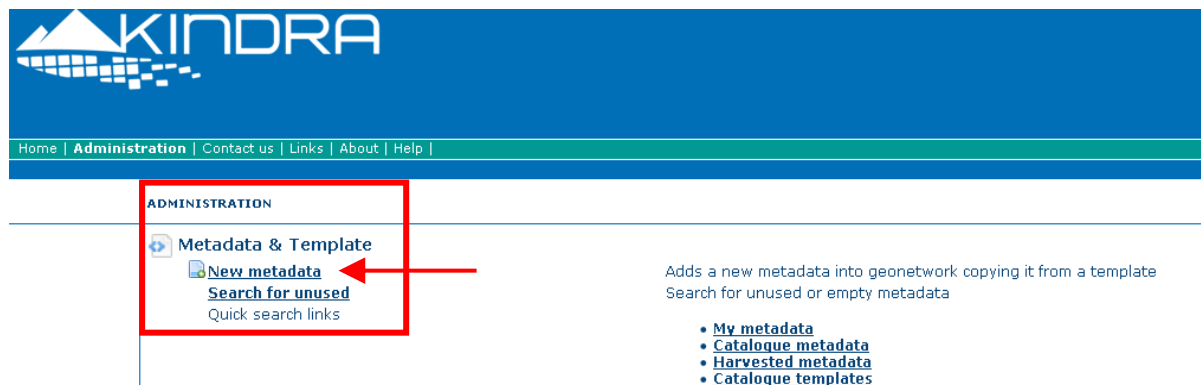
- OPERATIONAL ACTIONS > Assessment and Management
- OPERATIONAL ACTIONS > Mapping
- OPERATIONAL ACTIONS > Modeling
- OPERATIONAL ACTIONS > Monitoring
- OPERATIONAL ACTIONS > Water Supply
- RESEARCH TOPICS > Biology
- RESEARCH TOPICS > Chemistry
- RESEARCH TOPICS > Geography
- RESEARCH TOPICS > Geology
- RESEARCH TOPICS > Physics and Mathematics
- SOCIETAL CHALLENGES > Climate, Environment and Resources
- SOCIETAL CHALLENGES > Energy
- SOCIETAL CHALLENGES > Food
- SOCIETAL CHALLENGES > Health
- SOCIETAL CHALLENGES > Policy, Innovation and Society

Creating a Metadata

To be able to access the main functionality for which the EIGR has been designed and developed, Cataloging Resources linked to Hydrogeological Research throughout Europe, users will have to proceed to click on the Administration tab. Remember, only Editors and higher profiles can Create and Edit metadata.



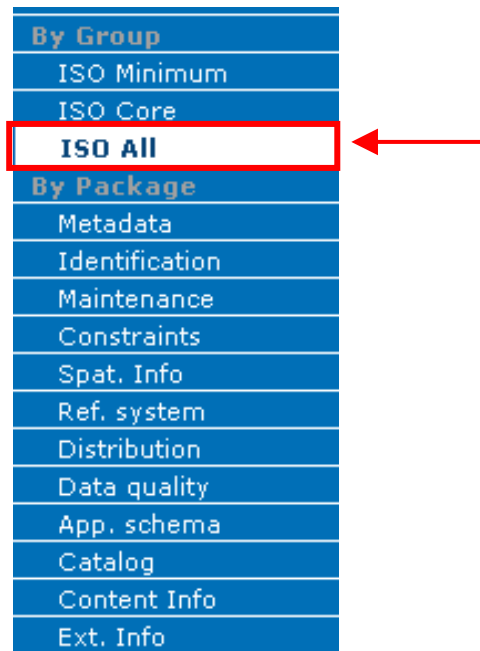
Doing so will take us to a new screen where we will be able to view a new menu which offers us the chance to add a new metadata to the EIGR.



The interface will offer us a new window in which the Template for the EIGR will be automatically selected as well as the group. We simply must then click on the create button in order to proceed to the insertion of a new resource to the EIGR.



Once reached this step we will come to the interface where users need to fill out the information requested by the EIGR in order to upload new contents. **THE INFORMATION INCLUDED MUST BE IN ENGLISH!** The first step to take is to select the ISO ALL VIEW from the menu which is on the left side of the screen, as this will deploy all the necessary and possible tags which might be of use for cataloguing the resource into the EIGR. The other ISO views are less detailed.



Users will find that when filling out the different tags with the relevant information, some fields will be marked by a red asterisk * which comes to indicate that the tag is **mandatory** and must not be left blank. At the same time, users will be able to observe that many tags also include the following symbols:



Allows users to duplicate the tags multiple times in case further details or information of the same type needs to be added



Allows users to delete a tag which is unnecessarily duplicated or that has been added by mistake.

The information to be included in the EIGR for resource metadata is organized according to four different sections, which appear on the left side menu **“By Package”**. These are the only ones we will work with.

By Group
ISO Minimum
ISO Core
ISO All
By Package
Metadata
Identification
Maintenance
Constraints
Spat. Info
Ref. system
Distribution
Data quality
App. schema
Catalog
Content Info
Ext. Info

IDENTIFICATION INFORMATION:

This section includes all relevant information regarding the resource title, acronym (when applicable), abstract, authors and their contact details, collaborating organizations and/or programs, funding sources and amounts, geographical extent covered as well as other relevant details which help identify or provide information regarding the resource (e.g. ISBN, ISSN, etc...) and if there might exist any legal restrictions or limitations to access the information.

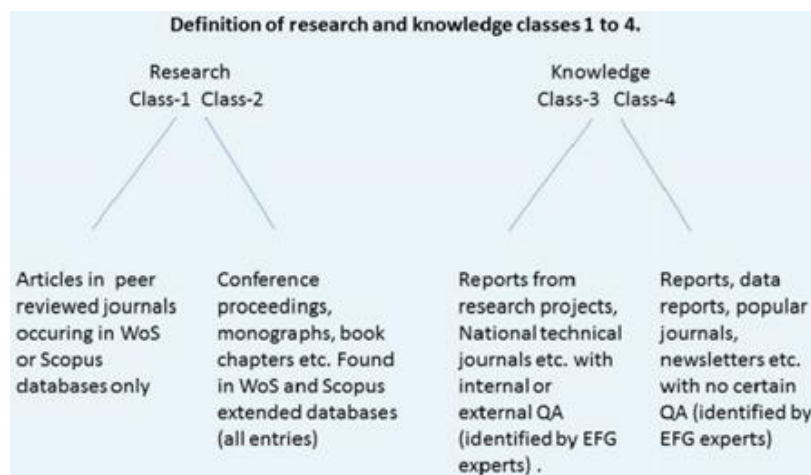
In this section is where the KINDRA HRC-SYS Keywords and Overarching Categories (Societal Challenges, Operational Actions and Research Topics) are defined and indicated for the resources which are being uploaded into the EIGR

DISTRIBUTION INFORMATION:

This section indicates users the delivery or distribution methods available for the resource. It describes if there are any online or physical distribution methods that exist for the resource. Contents distributed online may be downloadable.

DATA QUALITY INFORMATION:

This section provides an overall assessment on the quality of the resources by classifying the work according to Research and Knowledge classes defined by KINDRA, as specified below. Also other indicators as TRL and PRL are included in this section.



METADATA INFORMATION:

This final section is dedicated to the overall information concerning the metadata, i.e. about the people/organization who insert the record related to the research/knowledge product.

The interface provides the exact same fields and tags to be completed as in the Resource Identification Information

An appendix is included at the end of the manual with a checklist of the most relevant fields to be completed for the most recurrent types of resources to be included in the EIGR.

IDENTIFICATION INFORMATION:

It is the first section we encounter when we access the metadata template: It in turn is also divided into different subsections:

- DATA IDENTIFICATION
- POINT OF CONTACT
- DESCRIPTIVE KEYWORDS
- RESOURCE CONSTRAINTS
- TOPIC CATEGORIES
- EXTENT

DATA IDENTIFICATION

▼ IDENTIFICATION INFO

▼ Data identification

▼ Citation

▼ Citation

Title *

Alternate title

Alternate title

▼ Date ☒ ☐

▼ Date

Date *

Date type *

Title (mandatory)	Title of the resource, name in English.
Alternative title	In case the resource has an acronym and the name in its original language
Date (mandatory)	Reference date for the resource; It can be according to one of the following options <ul style="list-style-type: none"> Creation: when the resource was created Publication: when it was published Update: if it is an updated version

If only one date is applicable, the other date tags can be eliminated by clicking on the ☒ icon as indicated previously. This applies to all tags which have no information available or the user might consider as not necessary.

When the resource to be included in the EIGR is a publication of some sort (e.g. scientific article) and bibliographic references are available, the following fields are to be completed with the relevant details.

▼ Series <input type="checkbox"/>	
▼ Series	
Name <input type="checkbox"/>	<input type="text" value="Name (Series)"/>
Issue identification <input type="checkbox"/>	<input type="text" value="Issue identification (Series)"/>
Page <input type="checkbox"/>	<input type="text" value="Page (Series)"/>
Other citation details <input type="checkbox"/>	<input type="text" value="Text (gco:CharacterString)"/>
Collective title <input type="checkbox"/>	<input type="text" value="Collective title"/>
ISBN <input type="checkbox"/>	<input type="text" value="ISBN"/>
ISSN <input type="checkbox"/>	<input type="text" value="ISSN"/>

The following group of tags is very important as they provide the basic frontline information which describes the resources included in the EIGR

Abstract *	<input type="text" value="Abstract template KINDRA V4"/>
Purpose <input type="checkbox"/>	<input type="text" value="Purpose"/>
Credit <input type="checkbox"/>	<input type="text" value="Credit"/>
Credit <input type="checkbox"/>	
Status <input type="checkbox"/>	

- Abstract (mandatory)** Brief summary which describes the resource
- Purpose** Reason for which the resource was created
- Credits** This is a tag which can be repeated as many times as necessary, it serves to indicate relevant information concerning any contributions to the resource, Program funding, Budgets, cooperation on behalf of and between different organizations or parties, individuals. **Each item must be included independently, one per credit!**
- Status** Serves to indicate if the resource is in development, is in progress, has been finalized, etc...

POINT OF CONTACT

Information concerning the person and/or organization responsible for creating the resource has to be specified in this section.

▼ **Point of contact** + ✕

Individual name ✕

Organisation name ✕

Position name ✕

Role *

Name Person to contact concerning the resource

Organization Organization to which the person belongs to (mandatory for KINDRA purposes).

Position Name Functions or Position of the person at the organization

Role (mandatory) Here is where the role must be indicated, according to the options offered by the drop down menu: Author, Owner, Point of contact, etc.

▼ **Contact Information** ✕

▼ **Contact**

▼ **Phone** ✕

▼ **Telephone**

Voice + ✕

Voice +

Facsimile + ✕

Facsimile +

▼ **Address** ✕

▼ **Address**

Delivery point + ✕

Delivery point +

City ✕

Administrative area ✕

Postal code ✕

Country ✕

Electronic mail address + ✕

Electronic mail address +

▼ **Website** ✕

▼ **OnLine resource**

▼ **Linkage**

URL *

Protocol (Suggestions:)

Application profile +

Name of the resource

Description +

Function +

Hours of service +

Contact instructions +

The information for the tags indicated in the previous image is self explanatory, but mention must be made to the website and online resource linkage. Should there be a website associated to the organization; the information must be completed as follows:

- URL (mandatory)** Web address of the organization or person of contact
- Protocol** From the drop down menu, we proceed to select the option "**Related link (URL)**".
- Name of the resource** Indicate the name of the website

DESCRIPTIVE KEYWORDS

The descriptive keywords which are to be employed when uploading a resource into the EIGR are the ones defined the HRC-SYS. The list of keywords has been included in the KINDRA THESAURUS. A thesaurus is a list of words (or concepts) from a specialized field of knowledge. These keywords are associated to a specific "**Type**", this refers to the subject matter used to group similar keywords. In the case of the EIGR, all keywords are thematic, and for this reason **Theme** will always appears as the default value for the **Type** field box concerning the KINDRA THESAURUS keywords list.

In a metadata catalog, words from a thesaurus can be assigned to a metadata record (as keywords) as a way of associating it with one or more concepts from a field of knowledge. For example, a record may be assigned a keyword 'MAPPING – remote Sensing' meaning that the record describes a resource or activity relating to remote Sensing in the field of Mapping.

The user must choose words from the KINDRA thesaurus to associate the resource with the concepts described by those words. There is no a maximum number of keywords that may be assigned to a resource.

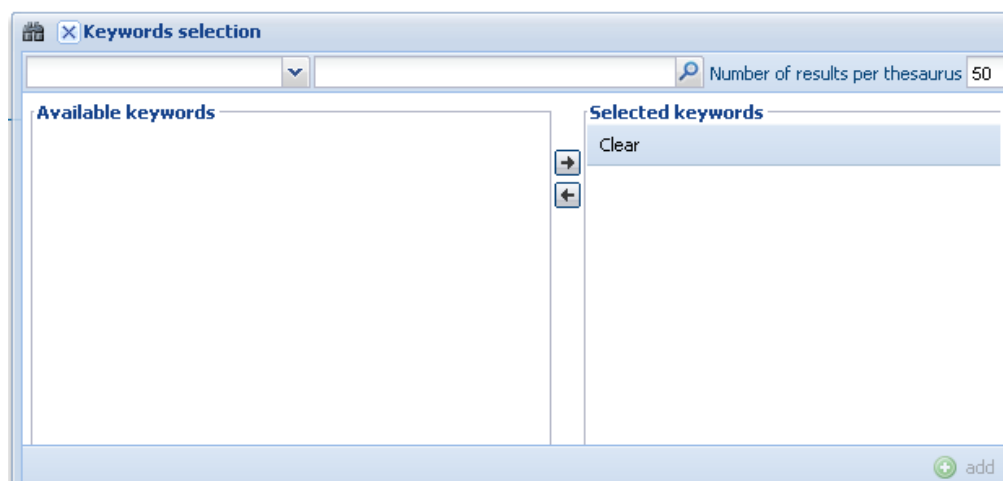
Concepts within a field of knowledge or in different fields of knowledge may be related or even be equivalent. For example, in the KINDRA thesaurus, the concept of Water Supply Extraction can refer to the Energy Production sector or to the Drinking Water sector, as an example of overlapping concepts in different fields.

To assign a keyword, users must simply click on the binocular icon

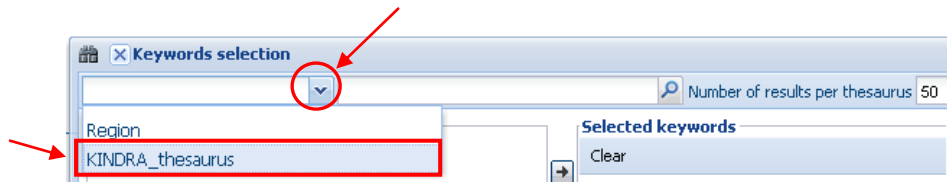


▼ Descriptive keywords  + × —

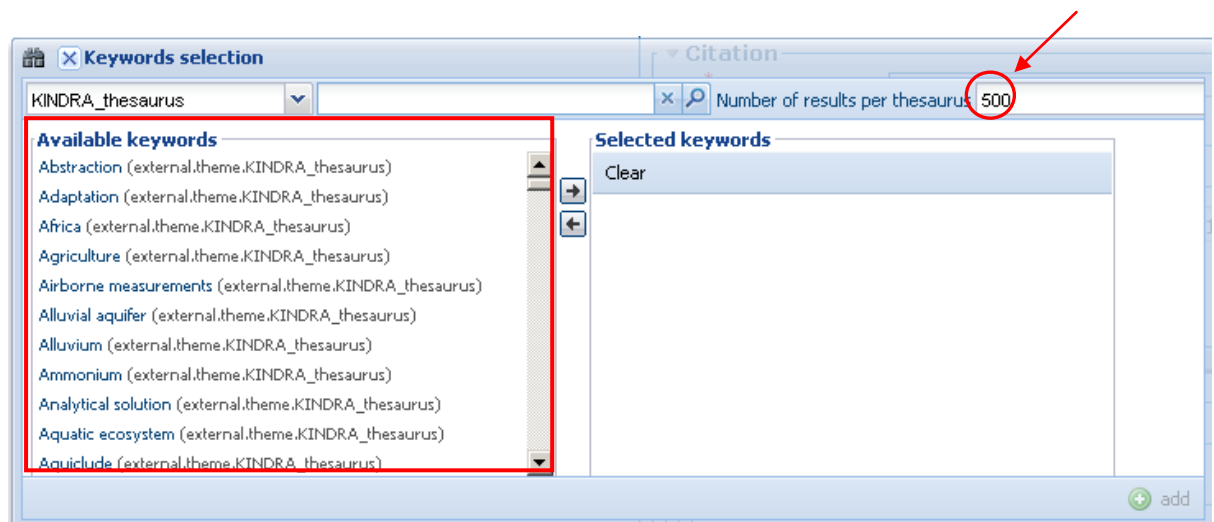
This will deploy the following dialog box, which will offer us the possibility to define the keywords to associate to the resource.



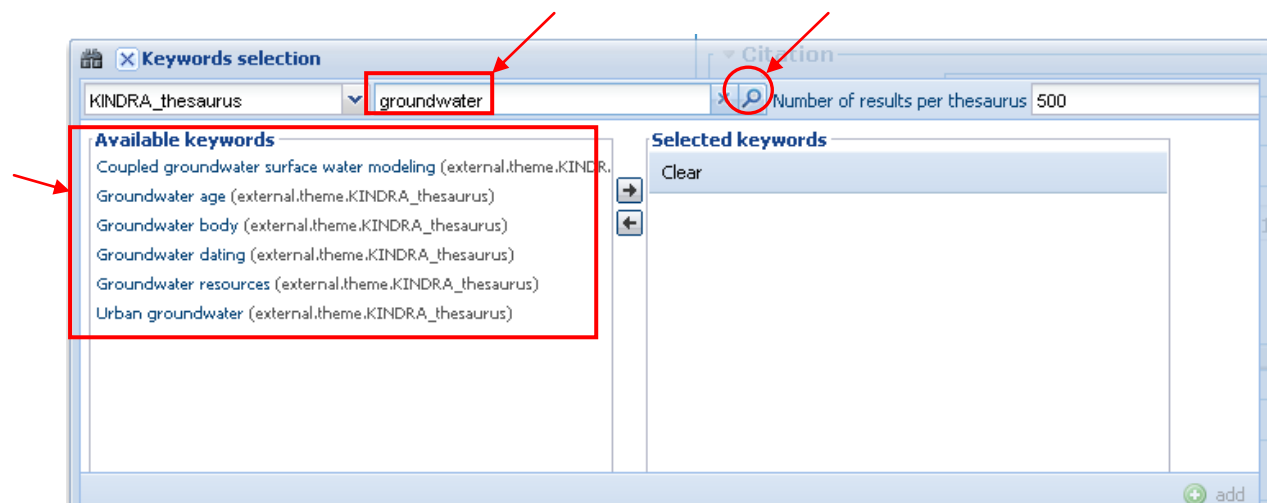
But first the drop down menu must be deployed and the KINDRA Thesaurus must be selected.



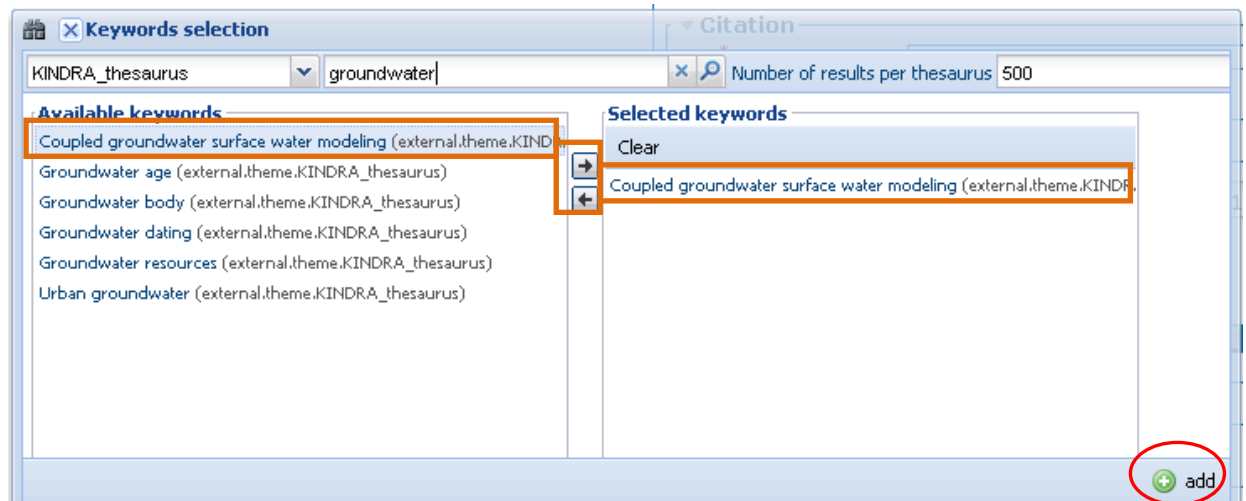
Doing so will load the list of keywords which are included in the Thesaurus. In order to be able to view the complete list of keywords, simply change the number of results per Thesaurus to a value of 500. As the Thesaurus accounts for a total of keywords no greater than 320 terms, by setting the value to a greater number we ensure that all the keywords appear in the list.




Keywords can also be added from the Thesaurus by searching specific terms, for example, should we want to search for keywords related to groundwater, by typing "groundwater" into the blank field to the right of the Thesaurus selection tab and clicking on the magnifying glass icon, the dialog menu will bring back all keywords with the word groundwater.



To add the keyword to the metadata, simply double click on the keyword and it will pass to the selected screen.



This can also be done by selecting the keyword and clicking on the arrows between both windows, , to either add or remove the keyword from the selected dialog box.

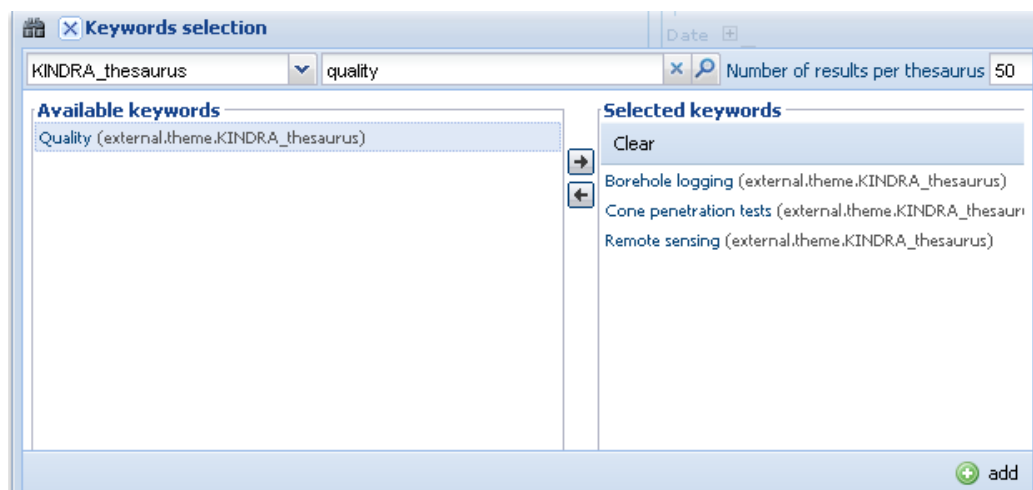
Then, when all the keywords that the user wants to assign from the KINDRA thesaurus have been included in the Selected Keyword window, the user simply needs to click on the add icon which is on the lower right corner of the dialog box, as indicated in the previous image.

Once the keywords have been added to the metadata template, they will appear as follows:




















As indicated previously, **Theme** will be defined as the default **Type**.


Additional keywords may be added afterwards or at a later stage, independently, following the same procedure:








Bearing the same result as described for the previous example

▼ **Descriptive keywords**    

Keyword *	 	<input type="text" value="Borehole logging"/>
Keyword *	  	<input type="text" value="Cone penetration tests"/>
Keyword *	  	<input type="text" value="Remote sensing"/>
Keyword *	  	<input type="text" value="Quality"/>
Keyword		
Type		<input type="text" value="Theme"/>

Should a user desire **to add a keyword which is not found in the list of keywords included in the KINDRA THESAURUS**, all they need to do is click on the  symbol and it will deploy a new tag where we simply need to include the keyword we wish to add to the resource in the red box that will appear.

▼ **Descriptive keywords**    

Keyword *		<div style="border: 2px solid red; height: 20px; width: 400px;"></div>
Type		<input type="text" value=""/>

Then specify the “**Type**” field by selecting from the drop down menu the term “**Theme**”

Discipline
Place
Stratum
Temporal
Theme

RESOURCE CONSTRAINTS

This provides information about any possible constraints that might apply to the resources loaded to the EIGR, such as legal restrictions or prerequisites for accessing the resource, use limitations indicating privacy or intellectual property. In this section is where we must include or indicate if there are any patents existing or pending, copyrights or licenses concerning the resource.

▼ Resource constraints

▼ Legal constraints

Use limitation
Access constraints
Use constraints
Other constraints

Legal constraints: Restrictions and legal prerequisites for accessing and using the resource or metadata.

Use limitations: Limitation affecting the fitness for use of the resource, for example if it is not apt to be employed for further research efforts due to specific conditions.

Access constraints: Restrictions to assure the protection of privacy or intellectual property, and any special restrictions or limitations on obtaining the resource: License, Patent, Pending Patent, restricted, Trademark, Copyright. (Dropdown menu)

Use constraints: Restrictions to assure the protection of privacy or intellectual property, and any special restrictions or limitations on using the resource: License, Patent, Pending Patent, restricted, Trademark, Copyright. (Dropdown menu)

Other constraints: Other constraints or legal prerequisites for accessing and using the resource.

TOPIC CATEGORIES

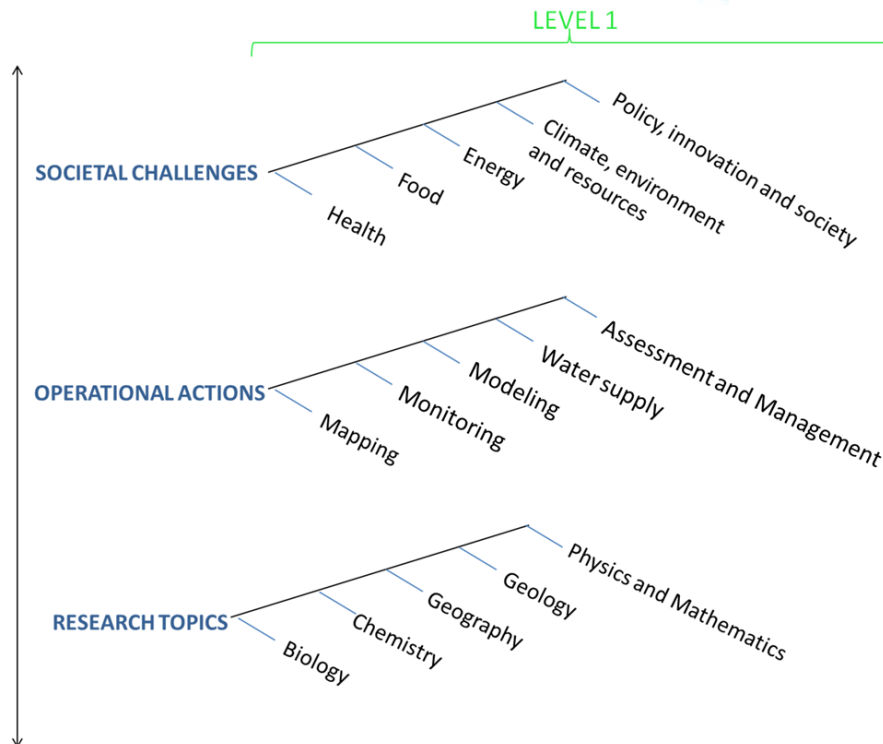
The main feature of the classification system developed by KINDRA is the grouping of relevant research according to the overarching categories which consist of 5 societal challenges - 5 operational actions and 5 research topics.

The selection was based on the most important general research topics and operational actions in relation to the major natural science disciplines or research topics to which groundwater research primarily belongs and relates: 1. Biology, 2. Chemistry, 3. Geography, 4. Geology, 5. Mathematics and Physics (alphabetical order).

For operational actions, the selection was made according to keyword searches in Web of Science, Scopus, Google Scholar, selected groundwater science journals and EU directives and guidances; primarily the Water Framework Directive, the Groundwater Directive and the Blueprint to Safeguard Europe's Water Resources as well as the KINDRA questionnaires completed by the 20 experts of national geological societies / the European Federation of Geologists. The overarching operational actions selected were: 1. Mapping, 2. Monitoring, 3. Modeling, 4. Water supply, 5. Assessment and Management

For societal challenges the references were taken from the Horizon 2020 EU Framework Program for Research and Innovation, in order to make the classification as relevant as possible to the main challenges of the EU research programs, and to facilitate the evaluation of groundwater research importance within the context of the Horizon 2020 challenges and visions.

There are 7 societal challenges in Horizon 2020, but SC4 is dedicated to transport which KINDRA has determined bears no groundwater relevance and SC6 and SC7 have many overlapping issues of relevance concerning groundwater research and KINDRA decided to merge them. This has resulted in the following five societal challenges for groundwater research classification and evaluation: 1. Health, 2. Food, 3. Energy, 4. Climate/Environment/Resources (corresponds to SC5 of H2020), 5. Policy/Innovation/Society (corresponds to SC6 and 7 of H2020).



As most of the current and future research efforts should fit into at least one of the overarching societal challenges, operational actions and research topics, these will constitute the main classification reference in the EIGR. It is in this section of the EIGR is where we assign to each resource uploaded the main three topic categories, as defined by the HRC-SYS. **Please be aware that these Three Topic Category Codes are MANDATORY!!!**

Topic category code *	<input type="text" value="Operational actions - Assessment and Management"/>
Topic category code *	<input type="text" value="Societal challenges - Climate, Environment and Resources"/>
Topic category code *	<input type="text" value="Research topics - Biology"/>

There are three tags, and in each one the **user must select one Operational Action, one Societal Challenge and one Research Topic**. By clicking on the drop down menu you can select one of the according categories.

For each tag, one of the Overarching categories has been selected by default, but please take caution, each tag offers the possibility to select one of the 15 options, not just the five options of each Overarching category. This requires for users to extreme care in selecting the topic categories for each resource.

In cases where we find that more than one of each Topic category could be assigned to a resource, later on in the manual (Editing Metadata and Additional Categories, page 30) this possibility is discussed and detailed. But this section is reserved to identifying the most relevant topic categories which are linked to the resource.

EXTENT

This section allows users to assign a geographical reference to the resource uploaded to the EIGR. This can be either carried out by drawing a rectangle on the MAP, or by indicating the coordinates of the bounding box specifying the area of interest. It is highly recommended that all resources be geographically referenced.



To select a specific region or area by employing the map tool, users must in first place click on the clear button to avoid having any preselected default area appear on the map.

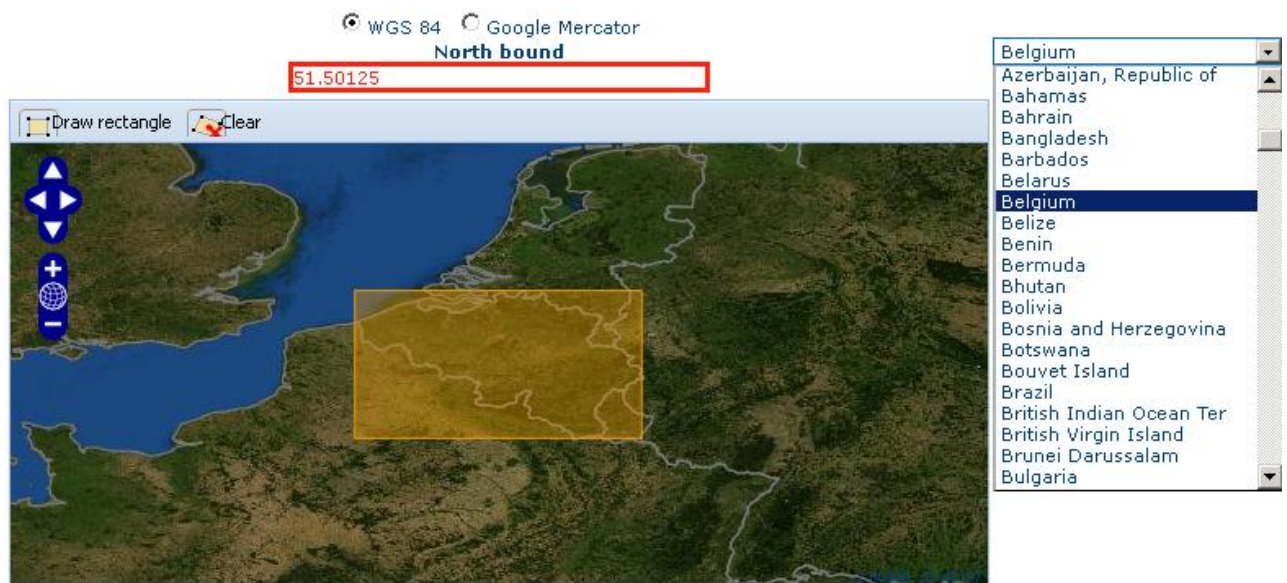


Once the map has been cleared, you can place the cursor on the map and use the mouse to both zoom in or out and drag the cursor in order to move around the map in order to search for the desired area.

Then simply proceed to click on the “Draw rectangle” button in order to be able to draw a rectangle on the area of your choice by clicking on the map and dragging the cursor to select the area of your choice.



An additional option is to select a predefined area which is included in the drop down menu that can be found on the upper right hand of the map.



An additional tag is included in this section:

Supplemental Information ☒

Supplemental information: Additional descriptive information regarding the resource location or area.

DISTRIBUTION INFORMATION

This section specifies how the resource is made publicly available or under which format it is distributed or may be obtained. Resources may account for a **DOI (Digital Object Identifier assigned by the publisher)**, or have links to written reports, digital reports, and PDF files.

Other formats may also apply depending on the nature of the resource (Maps and cartography, shapefiles, images, etc.).

The first step is to assign a format to the information. The most recurrent type is text, but a dropdown menu offers various choices as a **Suggestion**. If a user is unsure then it is advisable they leave the default option **Text**.

▼ **DISTRIBUTION INFORMATION** [X]

▼ **Distribution**

▼ **Distribution format** [X]

▼ **Format**

Name * (Suggestions: [dropdown])

Version *

Amendment number [X]

Specification [X]

File decompression technique [X]

Format distributor [X]

Name (mandatory): Name of the data format, options may range from a variety of options which can be found in the suggestions drop down menu which can be found to the right (PDF, Text, ZIP, etc.)

(Suggestions: [dropdown])

- Text
- ESRI Shapefile
- Mapinfo MIF/MID
- Mapinfo TAB
- KML
- GML
- GeoTIFF
- TIFF
- ECW
- JPEG2000
- ZIP
- PDF**
- PNG
- JPEG
- OGC:WMC
- OGC:OWS Context

Version: Version of the format. Generally refers to the version of the software which supports the distribution form. Although it is indicated as **mandatory**, simply include this information if it is accessible or leave the default value.

The **Linkage** information is where the user indicate the access to the resource Online,

URL (mandatory): The Uniform Resource Locator for accessing the resource on the web, or what is most commonly known as the web address. The protocol is selected from the drop down menu offered by the suggestion box, if one is unfamiliar, the most recommendable option is to select Related link (URL).

▼ **OnLine resource** [X]

▼ **OnLine resource**

▼ **Linkage**

URL *

Protocol (Suggestions: [dropdown])

Application profile [X]

Name of the resource

Description [X]

Name of the resource: Name of the resource, usually matches the title of the resource

Description: Detailed text description of what the online resource is/does

When the **DOI (Digital Object Identifier assigned by the publisher)** is available, we can find ourselves with two possible situations:

The direct DOI link to the resource is available.

Only the DOI reference number is available

If the direct DOI link to the resource is available, the user must simply include the link in the URL field and provide the name of the resource as well as the description:



▼ Linkage

URL *

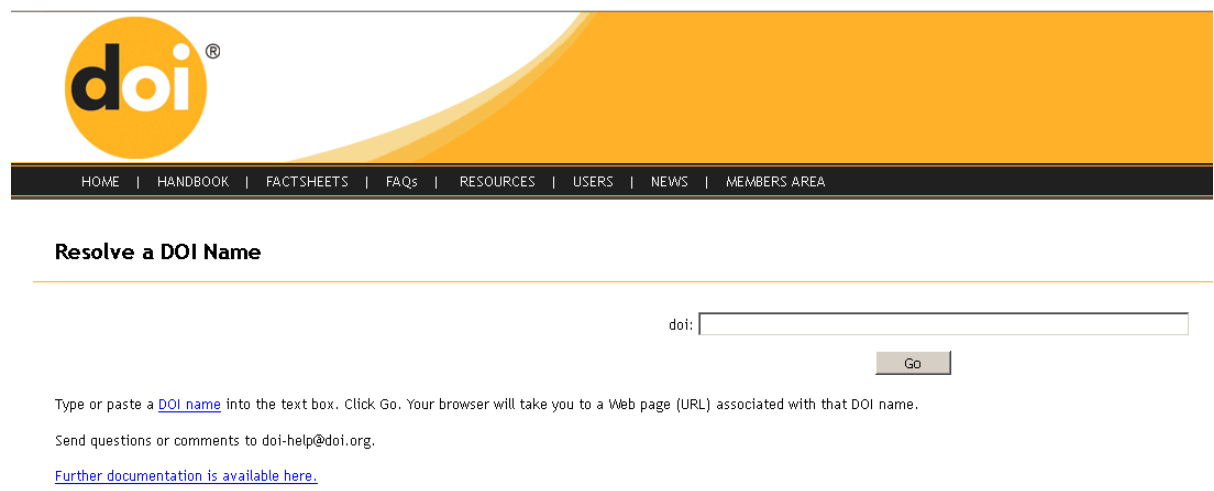
Protocol (Suggestions:)

Application profile +

Name of the resource

Description x

In case that only the DOI reference number is available, to obtain the DOI link the user can visit the following link <http://www.dx.doi.org/>:



doi®

HOME | HANDBOOK | FACTSHEETS | FAQs | RESOURCES | USERS | NEWS | MEMBERS AREA

Resolve a DOI Name

doi:

Go

Type or paste a [DOI name](#) into the text box. Click Go. Your browser will take you to a Web page (URL) associated with that DOI name.

Send questions or comments to doi-help@doi.org.

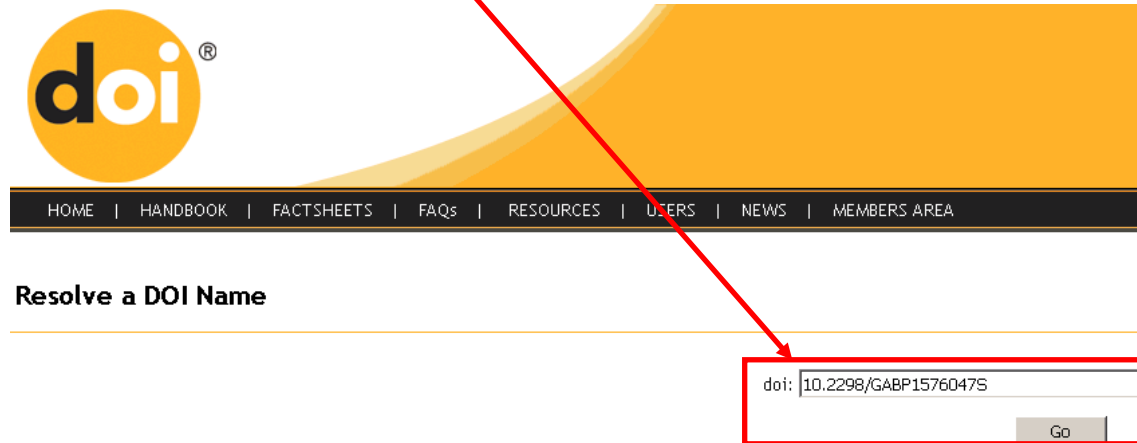
[Further documentation is available here.](#)

[DOI System Proxy Server Documentation](#)

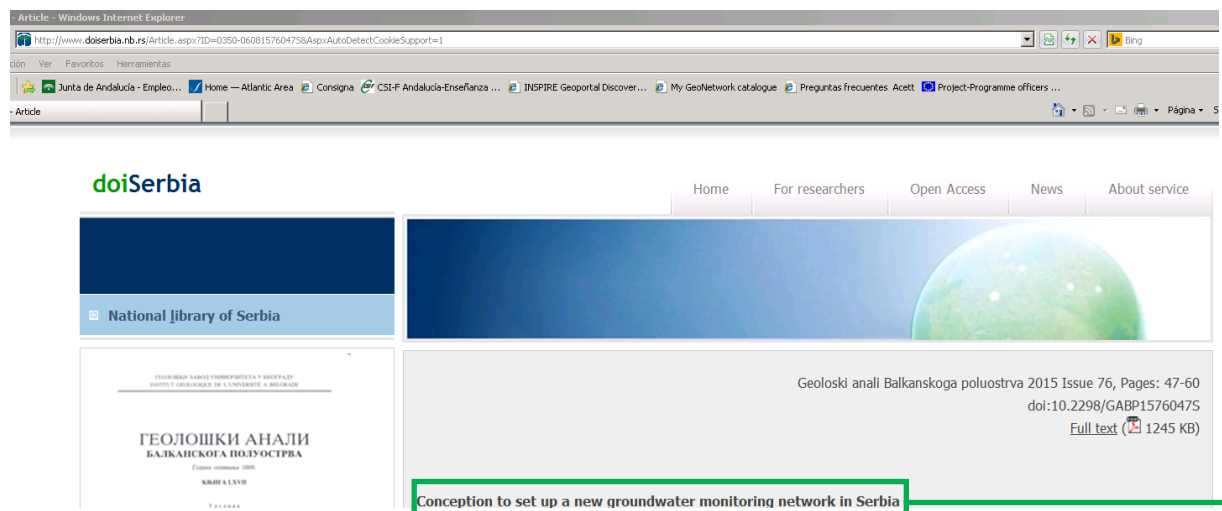
 DOI®, DOI.ORG®, and shortDOI® are trademarks of the International DOI Foundation.

The next step requires for the user to include the DOI reference in the search field:

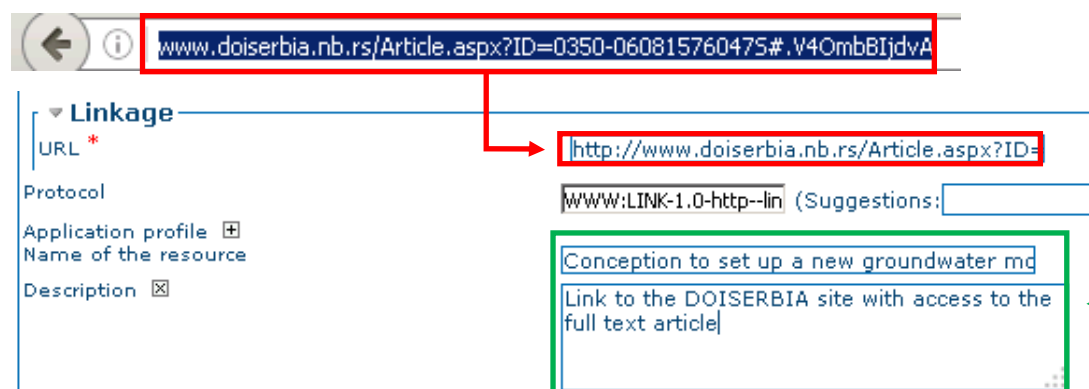
Example: **DOI: 10.2298/GABP1576047S**



By clicking on the **Go** button it takes us to the URL of the resource:



From there we obtain the URL, the complete the name and description which we use to complete the necessary fields of the metadata .



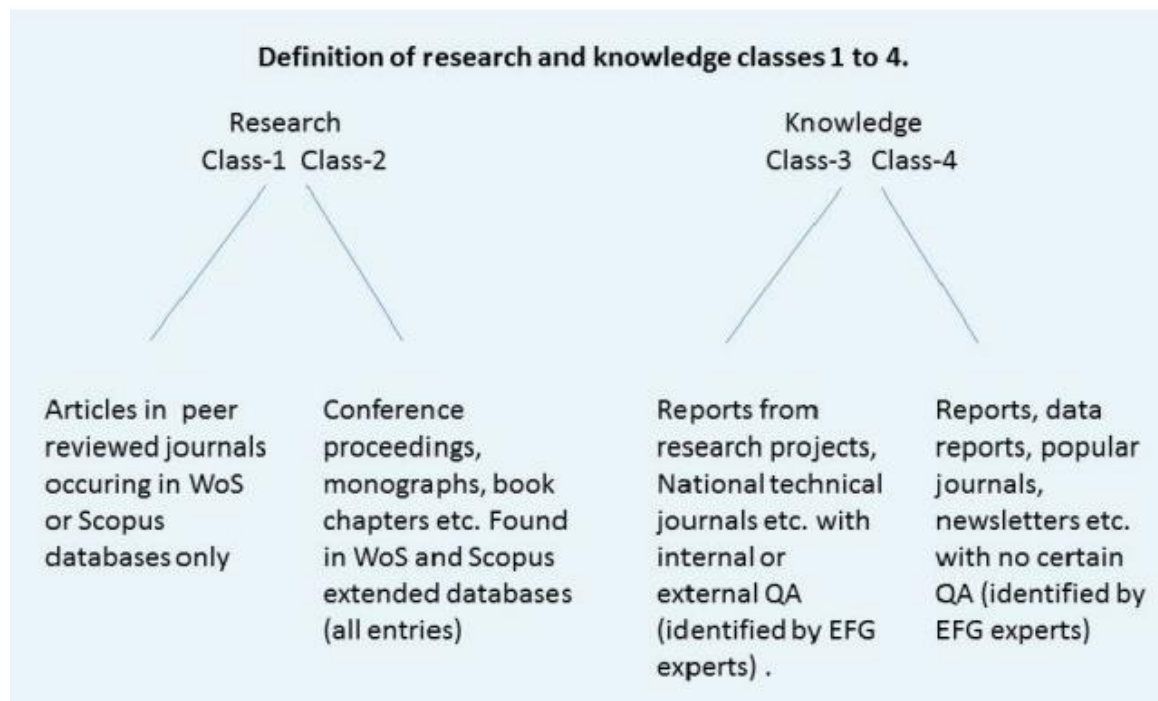
DATA QUALITY INFORMATION

This is the next section which is directly linked with the **Hydrological Research Classification System, to the Technological Readiness Levels (TRL) and Policy Readiness Levels (PRL)**. It is here where users will indicate the type of knowledge classes, TRL and PRL to which the resource belongs to according to the following categories:

KNOWLEDGE CLASSES

Class-1)	Research: Peer-reviewed papers (in Web of Science or Scopus and High Quality Assessment)
Class-2)	Research: Non-Peer-reviewed papers (Books, Proceedings and others searchable in Web of Science or Scopus and High Quality Assessment)
Class-3)	Knowledge: Quality assured or reviewed papers (not included in WoS or Scopus but Quality Assessed)
Class-4)	Knowledge: Non reviewed papers (Projects, Maps, others)

These classes have been specifically identified for this project, and it is **mandatory** to identify the class of your product. Class identification can be resumed by the following scheme:



TECHNOLOGICAL READINESS LEVELS (TRL)

Description of the Technology Readiness Level (from TRL1 to TRL9, as classified by the European Community) can be included as additional indicator for estimating technology maturity of a product. It is **recommended** to include this indicator. The product to be inserted has to be assigned to one of the following levels:

TRL 1: basic principles observed

TRL 2: technology concept formulated

TRL 3: experimental proof of concept

TRL 4: technology validated in lab

TRL 5: technology validated in relevant environment (industrially relevant environment in the case of key enabling technologies)

TRL 6: technology demonstrated in relevant environment (industrially relevant environment in the case of key enabling technologies)

TRL 7: system prototype demonstration in operational environment

TRL 8: system complete and qualified

TRL 9: actual system proven in operational environment (competitive manufacturing in the case of key enabling technologies; or in space)

POLICY READINESS LEVELS (PRL)

This is another indicator has been identified for the EIGR concerning resources included in the inventory. With it we seek to assess the conceptual maturity of a resource regarding how it can bring added value to the policies drafted by the European Commission, in this specific case focusing on the Water Framework Directive. The following are the different levels which have been defined as PRL:

PRL 1: Not relevant for EU policy implementation

PRL 2: Potentially relevant for EU policy but additional research needed

PRL 3: Relevant for implementation of EU policy, basic research conducted but guidance need to be developed

PRL 4: Guidance available: ready for implementation of EU policy (e.g. in river basin management plans)

This is the **information that must be included** in the section indicated as **Lineage**, filling out the tag indicated as **Statement**, the tag is to be completed in text, typing which class the resource belongs to (e.g. **CLASS 4, TRL 2, PRL 2**):

DATA QUALITY INFO

Data quality

Scope

Scope

Hierarchy level *

Extent

Level description

Dataset

Report

Absolute external positional accuracy (gmd:DQ_AbsoluteExternalPositionalAccuracy)

Lineage

Lineage

Statement

CLASS 4

TRL 2: technology concept formulated

PRL 2: Potentially relevant for EU policy but additional research needed

A brief description on the reason for including the resource in the specific classes should be described in section **Process step**, in the tag indicated as **Description** (e.g. **Private and Public Research Project, technological concept developed**):

▼ **Process step** + ×

▼ **Process step**

Description *

Research Project born from the Private and Regional Public Sectors.
Development of new sensors for G.W.B. detection

METADATA INFORMATION

The final section of the metadata template is dedicated to provide further details on the metadata and identifying the party who is responsible for including the resource into the KINDRA EIGR. For the EIGR users will simply have to fill out the tags related to the Contact section. Just as in the Identification Information section which was discussed in detail, the information which is requested to be completed is rather simple and self explanatory:

METADATA

File identifier: d96352f4-7b25-45a1-b16b-8266005774b0

Metadata language: English

Character set: UTF8: 8-bit variable size UCS Transfer Format, based on ISO/IEC 10646

Parent identifier: Scope code (gmd:MD_ScopeCode)

Hierarchy level: Hierarchy level name: 2016-03-28T12:37:20

Date stamp: Metadata standard name: ISO 19115:2003/19139

Metadata standard version: 1.0

Contact

Individual name: Organisation name: Position name: Role: Point of contact

Contact Information

Contact

Phone

Telephone

Voice: Voice: Facsimile: Facsimile:

Address

Address

Delivery point: Delivery point: City: Administrative area: Postal code: Country: Electronic mail address: Electronic mail address: Website: Hours of service: Contact instructions: Text (gco:CharacterString)

Individual name: Individual name

Organisation name: Organisation name

Position name: Position name

Role: Originator

Name Editor responsible for creating the metadata record of the resource.

Organization Organization to which the Editor belongs to.

Position Name Functions or Position of the Editor at the organization

Although none of the previous three fields are marked as mandatory, the EIGR will require for the users who are editing a resource metadata to include the above information.

Role (mandatory) Here is where the role must be indicated, according to the options offered by the drop down menu: Author, Owner, Point of contact, etc.

▼ **Contact Information** ☒

▼ **Contact**

▼ **Phone** ☒

▼ **Telephone**

Voice ☒ ☒

Voice ☒

Facsimile ☒ ☒

Facsimile ☒

▼ **Address** ☒

▼ **Address**

Delivery point ☒ ☒

Delivery point ☒

City ☒

Administrative area ☒

Postal code ☒

Country ☒

Electronic mail address ☒ ☒

Electronic mail address ☒

▼ **Website** ☒

▼ **OnLine resource**

▼ **Linkage**

URL *

Protocol (Suggestions:)

Application profile ☒

Name of the resource

Description ☒

Function ☒

Hours of service ☒

Contact instructions ☒

URL (mandatory) Web address of the organization or person of contact

Protocol From the drop down menu, we proceed to select the option Related link (URL).

Name of the resource Indicate the name of the website

When all the available information there exists for the resource has been provided according to the previous steps, the Editor simply needs to proceed to click on the **Save and Close** button.

Type

In this case, the **Type** option is set to Metadata; this must not be modified by Editors.

The **Reset** button offers Editors to clear all the information they have included into the Metadata template so they may proceed to begin anew. The **Check** button allows for the system to verify if the template is being completed accordingly and in case any errors are being made, these will be highlighted by the system. **Cancel** simply takes the user out of the Edition mode, bringing them back to the Administration menu.

The **Other actions** are not functions of use for the uploading of resources to the EIGR.

Editing Metadata and Additional Categories


Once a metadata is created, in order to complete its inclusion into the EIGR users will have to assign the privileges it has. In order to proceed to do so, users will simply have to select a metadata record which has been created and completed according to the different information sections which have been detailed in the previous sections of this document.



The screenshot shows the KINDRA web interface. At the top, there is a header with the KINDRA logo and the European Union flag. Below the header, there is a navigation bar with a "Show map" button. The main content area displays a list of metadata records. The first record, titled "KNOWLEDGE INVENTORY FOR HYDROGEOLOGY RESEARCH", is selected, indicated by a red circle around the checkbox. The record details include an abstract, keywords, schema, and extent. On the right side of the record, there is a "Select : all, none" button and a "Actions on selection" button. The "Actions on selection" button is highlighted with a red circle. Below the record details, there are buttons for "Edit", "Delete", and "Other actions". The user is identified as "admin" and the owner is "admin".

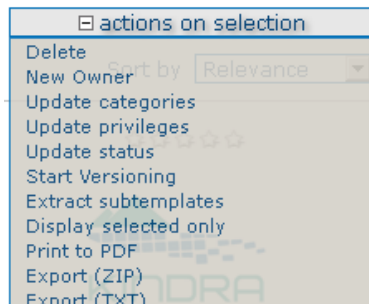
The selection of a metadata record is carried out by ticking the checkbox which can be found on the upper left side of its title, marked by a red circle in the image above.

The next step consists in selecting the action which we will take next by choosing it from the drop down menu that is indicated by the actions on selection button, on the far right side of the screen.



The screenshot shows the KINDRA web interface. The "actions on selection" button is highlighted with a red circle. Below the button, there is a dropdown menu with the following options: Delete, New Owner, Update categories, Update privileges, Update status, Start Versioning, Extract subtemplates, Display selected only, Print to PDF, Export (ZIP), and Export (TXT). The user is identified as "admin" and the owner is "admin".

The options displayed indicate all the actions which can be taken for editing a metadata record in the EIGR:



The screenshot shows the "actions on selection" dropdown menu. The options are: Delete, New Owner, Update categories, Update privileges, Update status, Start Versioning, Extract subtemplates, Display selected only, Print to PDF, Export (ZIP), and Export (TXT).

Related to the task of incorporating new contents and records into the EIGR, users will be dedicated to the following actions:

Delete: Eliminates the metadata record included in the EIGR. Each user is directly responsible for the metadata they insert and create. Users with an Editor profile can only edit their own metadata and can do so at any time. The only other users who can modify metadata for other users are those who have the Reviewer or Administrator privileges

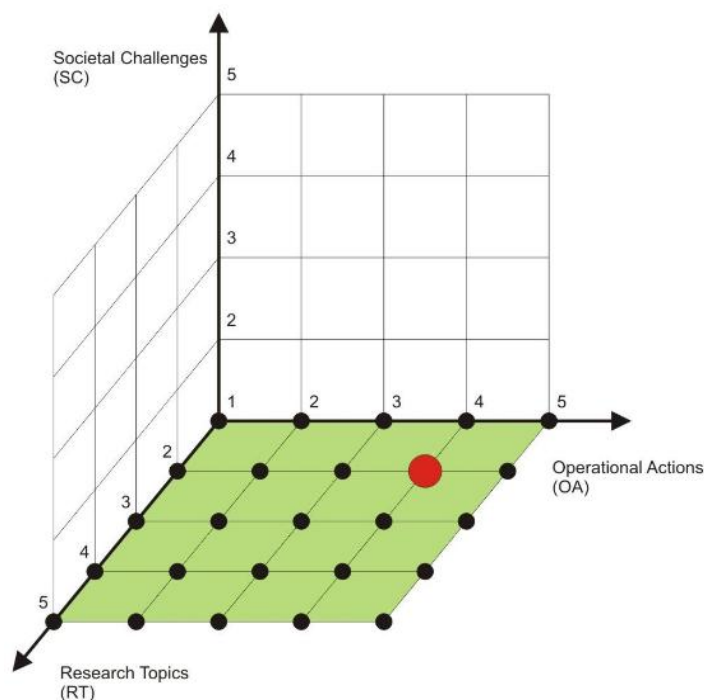
Update categories: Allows a user to assign multiple categories to the metadata resources uploaded

Update privileges: Allows a user to designate the kind of access the resource will have through the EIGR

The first action needs no further clarification but further details must be provided to clarify the remaining two actions.

CATEGORY UPDATING

As indicated in the Metadata creation, the main feature of the classification system developed by KINDRA is the grouping of relevant research according to the overarching categories, but in the creation only the three most relevant or representative categories are selected. This is to situate the resource within the 3D structure according to which the classification system is structured following the relation between the three main categories (CUBE).



In many cases a resource is liable to fall into more than one of the overarching categories which have been defined by the KINDRA HRC-SYS. And in order to include these possibilities, this is the section where users can assign multiple categories to a resource which is included in the EIGR.

The user selects the action from the menu indicated as Update categories and this will result in a new box opening up where the user can select the three categories previously included in the metadata record for the resource as well as those which are also related. This is done by checking the empty boxes on the right side of the menu:

Batch Update Categories Operation

☐ RESEARCH TOPICS > Geography

☐ RESEARCH TOPICS > Geology

☐ RESEARCH TOPICS > Physics and Mathematics

☐ SOCIETAL CHALLENGES > Climate, Environment and Resources

☐ SOCIETAL CHALLENGES > Energy

☐ SOCIETAL CHALLENGES > Food

☐ SOCIETAL CHALLENGES > Health

☐ SOCIETAL CHALLENGES > Policy, Innovation and Society

☐ SOCIETAL CHALLENGES > Policy, Innovation and Society

Once all the categories desired have been selected, the user must click on the submit button and should get a confirmation message indicating if the operation has been successful or not:

Batch Update Categories Operation	
Metadata Records that had their categories updated	1
Metadata Records that did not have categories updated because you are not the owner	0
Metadata Records not found	0

PRIVILEGE UPDATING

Through this section we allow for other registered users to view and access the resources we have uploaded into the EIGR. For Project purposes, and because we are describing the tasks of including resources into the EIGR, once an Editor has finished including a resource into the EIGR, the next step requires activating the “**Publish**” box for the KINDRA group of users. The Editor will finalize the operation by clicking on the submit button. Then, a reviewer from the KINDRA Project will need to validate the metadata.

Batch Update Privileges Operation

Groups	Publish	Download	Interactive Map	Featured	Editing	Notify		
All	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="button" value="Set All"/>	<input type="button" value="Clear All"/>
Intranet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="button" value="Set All"/>	<input type="button" value="Clear All"/>
Guest	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="button" value="Set All"/>	<input type="button" value="Clear All"/>
KINDRA *	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="button" value="Set All"/>	<input type="button" value="Clear All"/>

* User groups