



# KINDRA Project – Hydrogeological Research Classification System (HRC-SYS)

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# Aims of the project (2015-2017)

To create an **Inventory of European Groundwater Research and knowledge (EIGR)** and use the inventory to identify critical research challenges in line with the implementation of the WFD and new innovation areas within integrated water resources management based on the latest research.

## Classification

- Joint Panel of Experts

## Inventory

- 20 third parties (national representatives of EFG network)

## Dissemination

- EFG dissemination capacity
- Collaboration with JPE, CIS WG-C, IAH, WssTP, ICT4water cluster, etc.



## Project partners



including:

- A Joint Panel of Experts (10 members)
- 20 third parties (associations acting as national members of EFG network)

# Project organisation

## WP4 - Dissemination and communication (LPRC)

Dissemination and management  
 Dissemination and support services  
 Leveraging dissemination and dialogue

### WP1 - Methodology framework development (SAPIENZA)

harmonised framework for reporting hydrogeology-related research and innovation (programmes, projects, results, agendas, etc) in Europe:  
 -Hydrogeological Research Classification System – HRC – SYS  
 -European Inventory of Groundwater Research- EIGR

2015



### WP2 - Data collection and processing (EFG)

EU- wide assessment of existing practical and scientific knowledge on hydrogeology-related research and innovation in Europe:  
 - National workshops on Hydrogeology  
 - Data collection and processing  
 - country reports

2016



### WP3 - Research gaps and recommendations (GEUS)

Identify research gaps in hydrogeology research that have relevance for the implementation of the Water Framework and Groundwater Directives (WFD and GWD)  
 -Hydrogeology research evaluated  
 -Research gaps identified  
 -Recommendations formulated

## WP5 - Project management (SAPIENZA)

Quality Assurance and Risk Management  
 Project Coordination  
 Project management  
 Exploitation of results and IPR



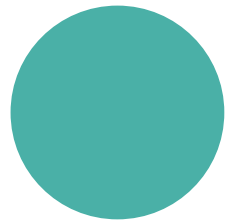
25-29<sup>th</sup>  
 September 2016

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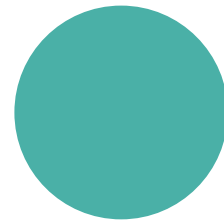
43<sup>rd</sup>  
 IAH  
 congress



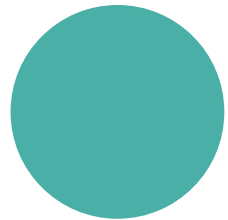
# Resource types to be classified during population of the European Inventory of Groundwater Research (“EIGR”), (only metadata about the resources are uploaded in EIGR):



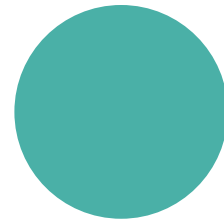
**Research and applied research projects (e.g. EU and Interreg projects)**



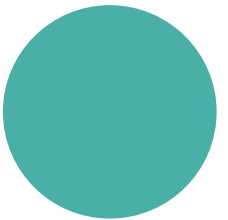
**Technical reports and guidances**



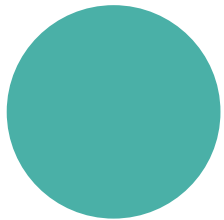
**Surveys including relevant data and maps**



**Books and book chapters**



**Consulting reports for ministries and other authorities**



**Monographs etc., etc.,**

# How to classify European groundwater research and knowledge?

Keywords



Research topics

Societal challenges

EU policies

Actions

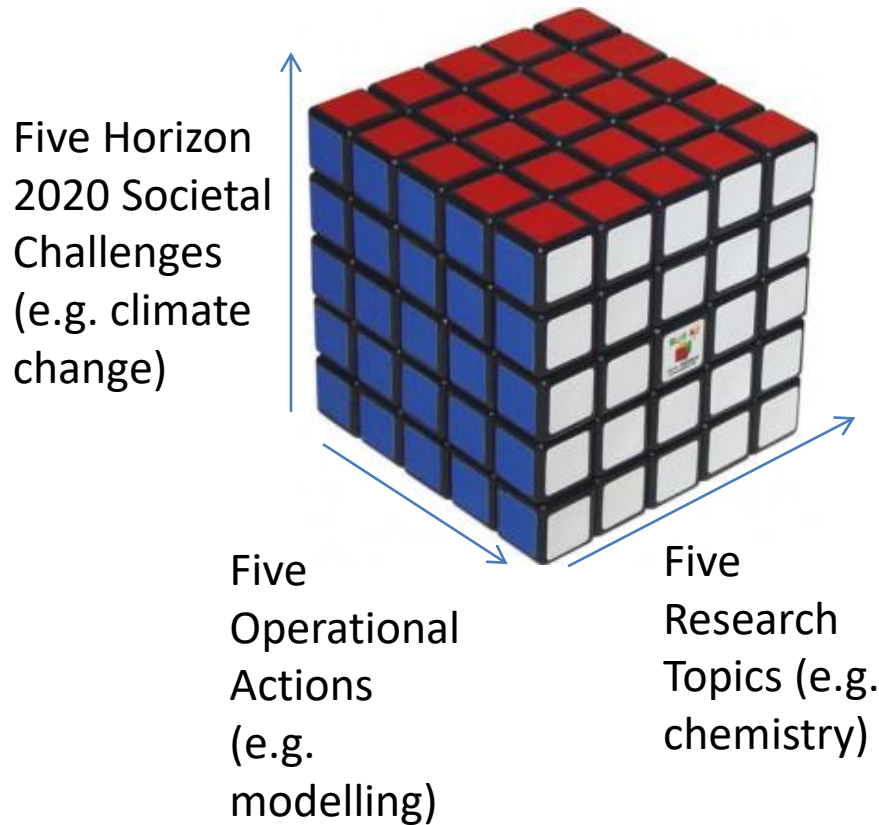
Other ????

# More than 200 main keywords were selected from:

1. 20 key groundwater science journals
2. Scopus / Web of Science / Google Scholar
3. EU policy documents (Water Framework and Groundwater directives, Blueprint to Safeguard Europe's Water Resources)

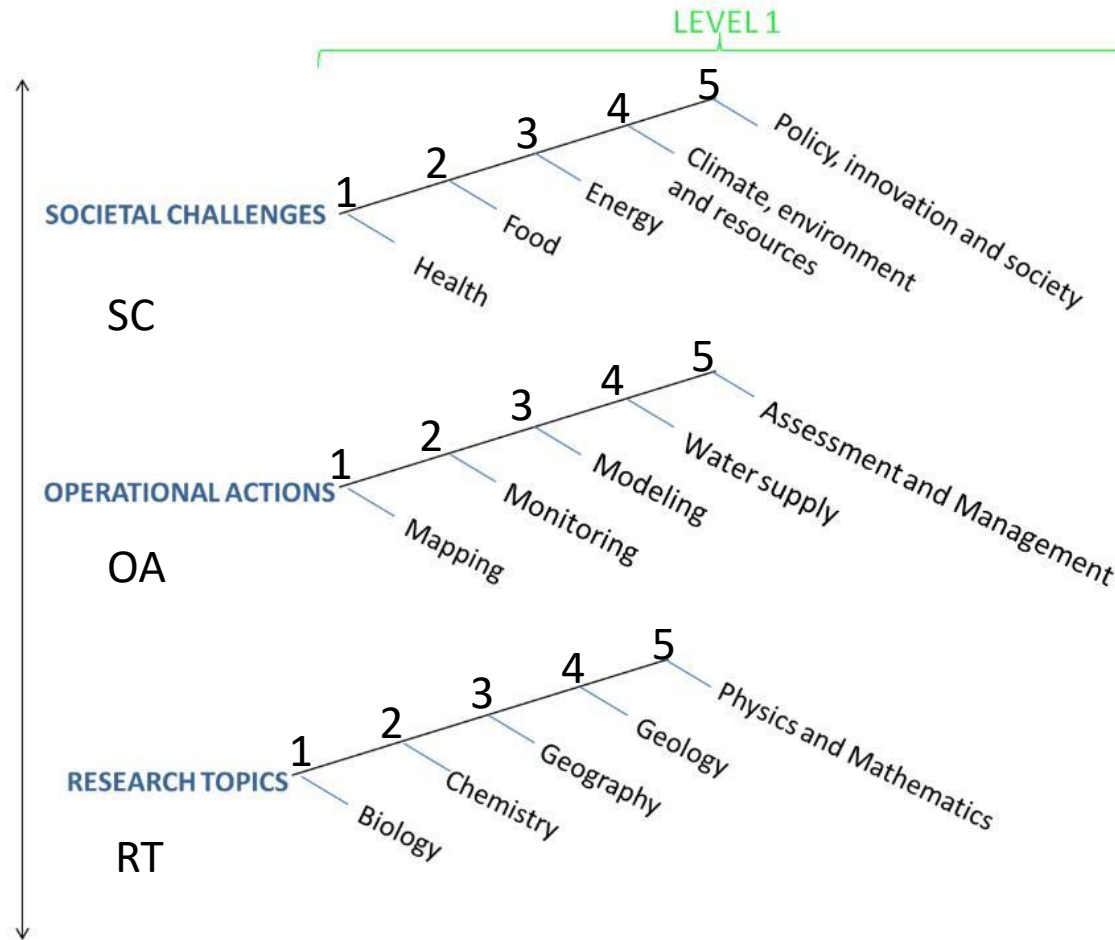
***NOTE! The keywords list is provided in the EIGR and reporters have to select the most relevant ones from the list - in case of missing keywords they may suggest new ones to be later approved by the KINDRA project.***

# The classification system for European groundwater research and knowledge – in 3D inspired by a 5 x 5 x 5 version of Rubiks cube





# Definition of 3 main categories for groundwater research classification within "Rubik's cube"



# 3D conceptual illustration of main categories of the HRC-SYS groundwater research classification system

(125 research combinations defined at the intersections – size of circles indicate amount of publications / the scientific output)

## Societal challenges

Policy & innovation

Climate & environ.

Energy

food

health

Mapping

monitoring

modelling

Water supply

Assessment and Management

Biology

Chemistry

Geography

Geology

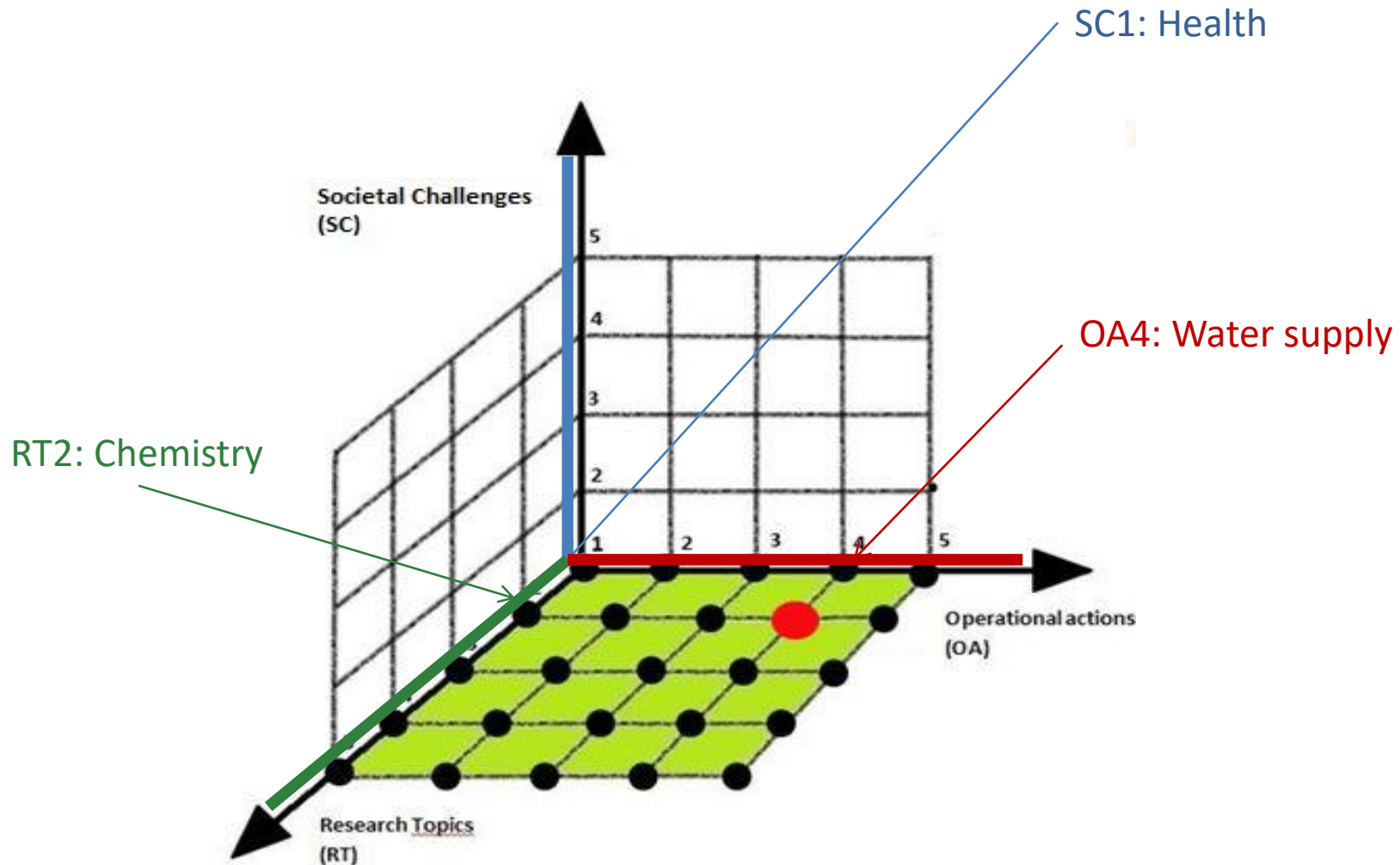
Math & phys

## Operational actions

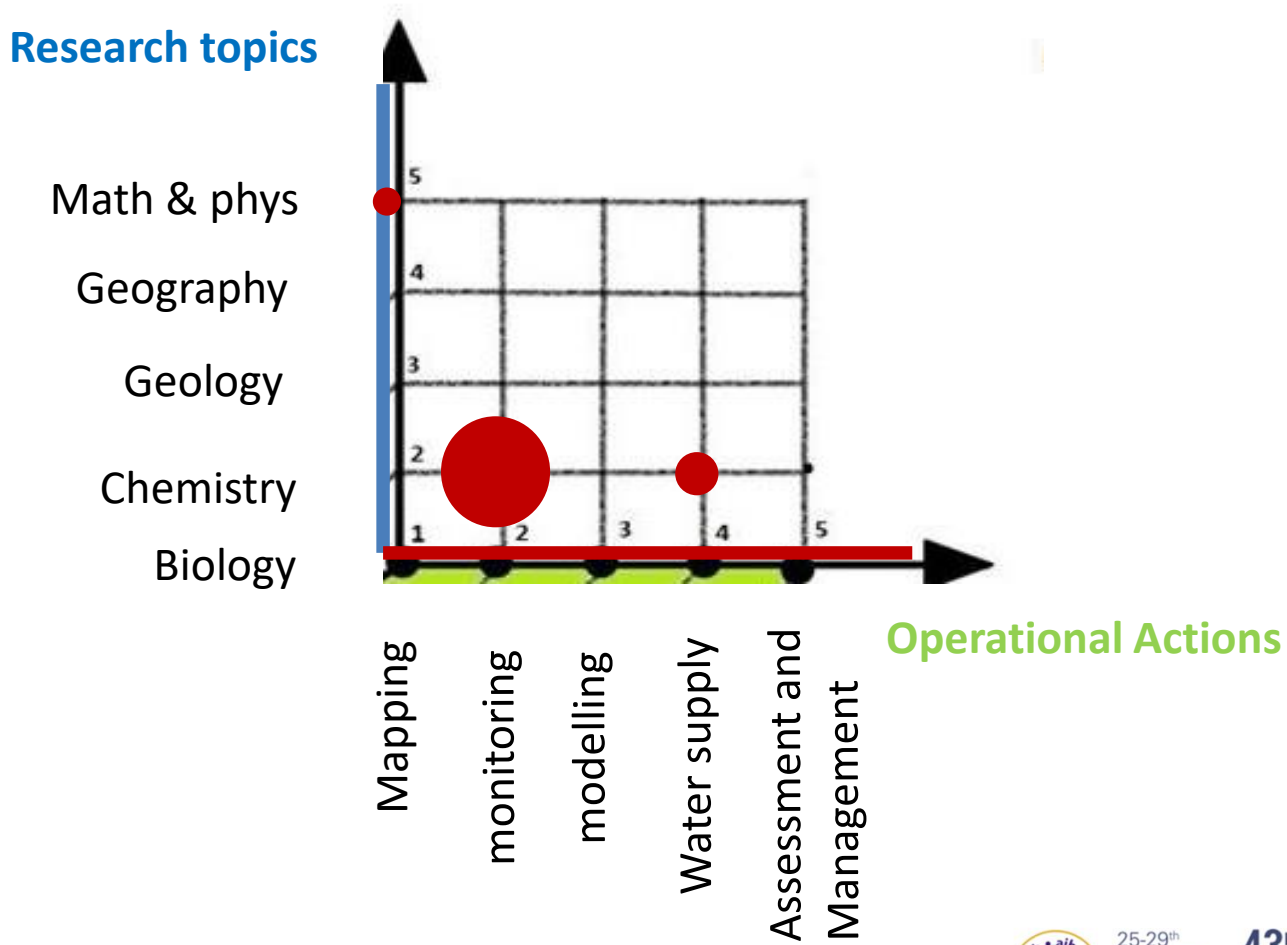
## Research topics



# Example: 2D PLOT FOR SC1: HEALTH – e.g.: As in groundwater and drinking water

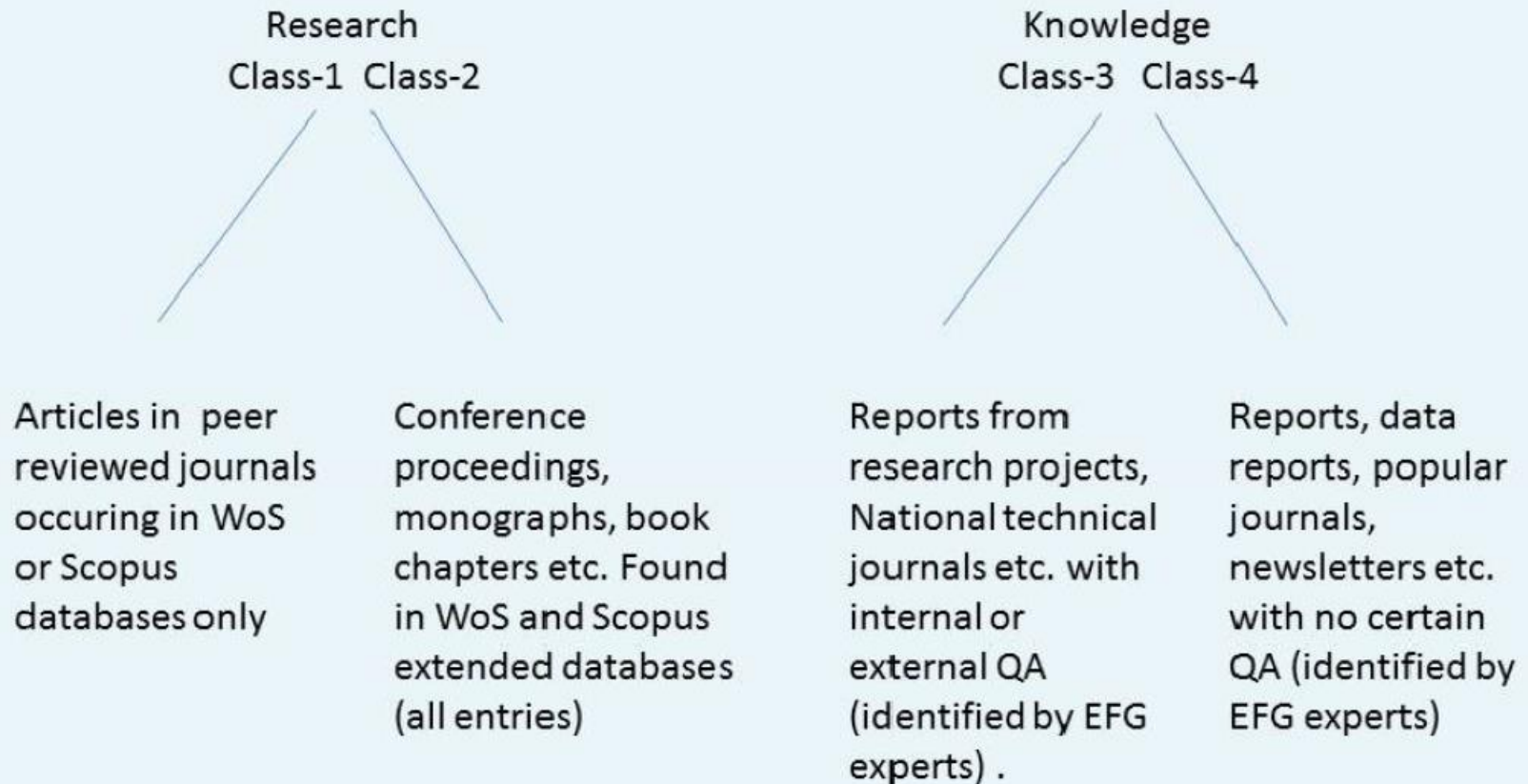


# Example: 2D PLOT FOR SC1: HEALTH –



# ***Classification of 'research' and 'knowledge' based on the degree of Quality Assurance***

## Definition of research and knowledge classes 1 to 4.



# The EIGR user interface - for groundwater research upload and viewing

The screenshot displays the KINDRA web application interface. At the top, the KINDRA logo is accompanied by the text "Knowledge Inventory for hydrogeology research" and the website URL "www.kindraproject.eu". A navigation bar includes links for Home, Contact us, Links, About, and Help, along with user options for Learn more, Password, and Login.

The main content area is titled "FIND INTERACTIVE MAPS, GIS DATASETS, SATELLITE IMAGERY AND RELATED APPLICATIONS". It shows search results for the query "WHAT?". The results are displayed in a list format, with the first result being "QUANTITATIVE AND QUALITATIVE HYDROGEOLOGICAL STUDY OF THE ALLUVIAL AQUIFER OF SOMES-SZAMOS (ROMANIA-HUNGARY)".

The search results list includes the following details for the first entry:

- Abstract:** The research project carried out by a group of teams formed by Belgium, Romanian and Hungarian partners, in the scope and supported by the NATO Science for Peace programme, was intended to develop co...
- Keywords:** Groundwater, numerical modeling, quality, quantity, alluvial aquifer, modeling, flow
- Schema:** iso19139
- Extent:** 17.223455404534095 43.94677459692549 28.077947592033492 46.56153870949176

Below the abstract, there is a "Metadata" button and a small map icon. The second result is "GEO-POWER", with the following details:

- Abstract:** GEO-POWER project is part funded by the Interreg IVC Programme. The Interregional Cooperation Programme INTERREG IVC, financed by the European Union's Regional Development Fund, helps Regions of Euro...
- Keywords:** Shallow geothermal energy, Action plan, Ground coupled heat pumps, Geothermal energy, CA D1.2.2 Extraction
- Schema:** iso19139
- Extent:** -11.5 35.3 43.2 61.4

The third result is "COMBINED HEAT, POWER AND METAL EXTRACTION FROM ULTRA-DEEP ORE BODIES", with the following details:

- Abstract:** The CHPM2030 is a H2020 project aiming to develop a novel technology which combines geothermal resource development, minerals extraction and electro-metallurgy in a single interlinked process. METAL...

On the left side of the interface, there is a "Simple Search" and "Advanced Search" section. Below it, there is a "WHERE?" section with a map of Europe and a search button. A sidebar on the left contains a list of categories under "OPERATIONAL ACTIONS" and "RESEARCH TOPICS", including "Assessment and Management", "Mapping", "Modeling", "Monitoring", "Water Supply", "Biology", "Chemistry", "Geography", "Geology", "Physics and Mathematics", "Climate, Environment and Resources", "Energy", "Food", "Health", and "Policy, Innovation and Society".

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



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# Thank You



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[www.kindraproject.eu](http://www.kindraproject.eu)



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