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KINDRA Project: classification and inventory of groundwater research and knowledge in Europe

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Hydrogeology-related research activities cover a wide spectrum of research areas at EU and national levels, but they are widespread into several projects, plans, actions, fragmented into wider programs generally related to water, environment or ecology. At the same time, the management of groundwater brings additional challenges to the implementation of the Water Framework Directive (WFD) and the Groundwater Directive (GWD). An accurate assessment of the state of the art in hydrogeology research and knowledge is the main aim of the KINDRA project (Knowledge Inventory for hydrogeology research, Grant Agreement 642047, www.kindraproject.eu), funded by the European Commission's HORIZON2020 Framework Programme.

In the first year, a terminology and classification methodology on groundwater research and knowledge based on a keyword list has been realized. The Hydrogeological Research Classification System (HRC-SYS) has been developed by categorizing groundwater research in three main categories: 1) Societal Challenges, 2) Operational Actions and 3) Research Topics. Each of these three main categories include 5 overarching sub-categories for an easy overview of the main research areas.

The complete merged list of keywords, selected from the Water Framework and Groundwater directives and from high impact scientific journals has been organized in a tree hierarchy. The classification system maps the relation between the three main categories through a 3D approach, where along each axis the 5 overarching groups are plotted (Figure 1).
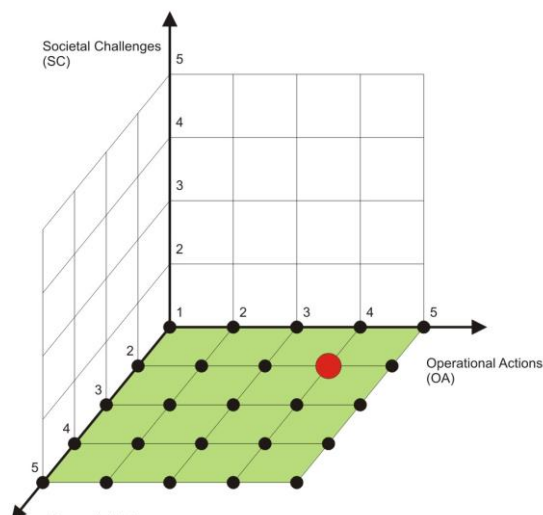

To facilitate analysis and report of relationships, this approach also allows for a 2D representation for each of the Societal Challenges, where in Operational Actions and Research Topics intersect in a 5x5 matrix.

Successively, an European Inventory of Groundwater Research (EIGR), to be populated by metadata, has been created with the following aims: i) for insertion of information pertaining to groundwater research and knowledge; ii) for consultation during and after the project by people and organizations dealing with

Fig.1: 3D classification of the main categories

groundwater research, and iii) for analysing collected and stored information to identify trends, challenges and gaps in groundwater research in Europe.