



KINDRA project – knowledge inventory for hydrogeology research

Проект KINDRA – инвентаризация на познанията за хидрогеоложки изследвания

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Groundwater, despite its importance as a renewable, high-quality and naturally protected but still vulnerable resource, tends to remain rather hidden and does not receive the attention it deserves when the hydrologic cycle and its components are viewed. This was one of the initial reasons for launching the KINDRA project (EC Framework Programme H2020, Grant 642047), whose main objective is to compile an inventory of recent information (after the year 2000) about hydrogeological research conducted across Europe (**KINDRA project – knowledge inventory for hydrogeology research**). The project is coordinated by La Sapienza University – Rome and project participants, along with a number of institutions, include the European Federation of Geologists and many European geological associations, such as the Belgo-Luxembourg Union of Geologists, Croatian Geological Society, Czech Association of Economic Geologists, Geological Society of Denmark, Finnish Union of Environmental Professionals, French Geological Society, Professional Association of German Geoscientists, Association of Greek Geologists, Hungarian Geological Society, Institute of Geologists of Ireland, Italian National Council of Geologists, Royal Geological and Mining Society of the Netherlands, Polish Association of Mineral Asset Valuers, Association of Portuguese Geologists, Slovenian Geological Society, Serbian Geological Society, Official Spanish Association of Professional Geologists, Swiss Association of Geologists, Ukrainian Association of Geologists and Geological Society of London.

KINDRA focuses on the creation of an inventory of hydrogeological research and knowledge, aimed at increasing the visibility of groundwater. The project was launched at the beginning of 2015 (1st January) for a period of 3 years. In order to ensure universal and readily recognizable hydrogeological terminology, it was necessary to identify and define key words. This was done during the first year. Two sources were

used: (i) important European documents and directives related to groundwater and water resources, and (ii) leading scientific journals that deal with groundwater. The compiled list of key words currently has more than 350 entries. The list is hierarchically organized into categories: Social Challenges, Operational Actions, and Research Topics. Under each category there are five comprehensive groups defined in such a way as to facilitate future searches:

- **Social Challenges** includes: (1) health, (2) food, (3) energy, (4) climate, environment and resources, and (5) policies, innovation and society.

- Experts and papers published in major scientific journals were consulted to define the groups under the **Operational Actions** category, which is also comprised of 5 components: (1) mapping, (2) monitoring, (3) modeling, (4) water supply, and (5) assessment and management.

- The last category, **Research Topics**, was not easy to delineate and define because more than 150 areas were identified on the basis of the compiled database of key words. Still, considering the fact that hydrogeological, like hydrological, research is a natural science discipline, the following five areas were considered to be the most significant: (1) biology, (2) chemistry, (3) geography, (4) geology, and (5) physics and mathematics.

The classification system can be depicted by a 3D diagram, where the three main axes represent the three main categories, and each axis shows the various groups (Fig. 1). Also, a single group can be highlighted, for example **Health** under the *Social Challenges* category. In that case we get a 2D analysis, where the groups of *Operational Actions* and *Research Topics* constitute a 5×5 matrix (Fig. 1).

In the second year (2016), national experts organized national workshops to promote the KINDRA project but also train attendees how to upload materials relevant to hydrogeological research into the database and how to search for items of interest us-

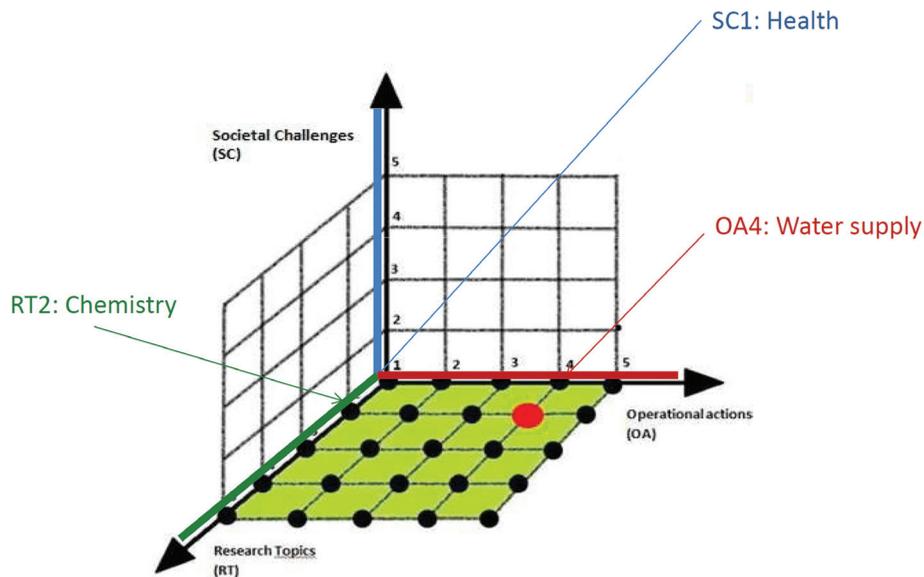


Fig. 1. Two- and three-dimensional diagram of HRC-SYS (Petitta et al., 2015)

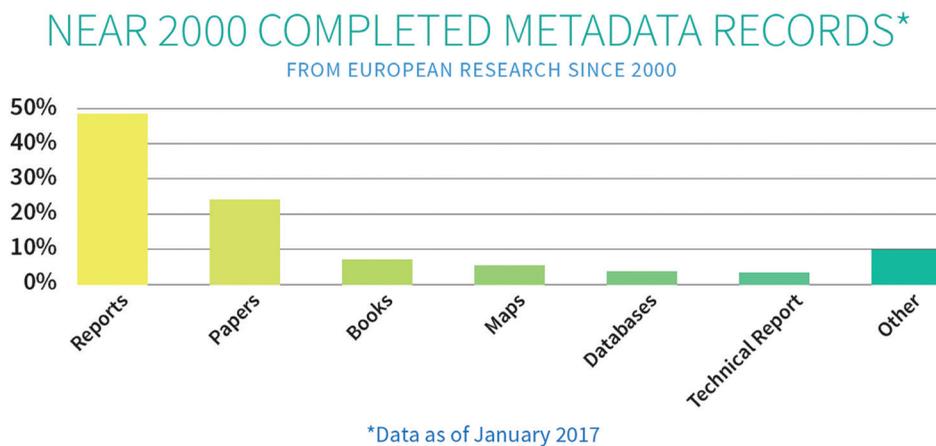


Fig. 2. Proportions of different types of information contained in the KINDRA hydrogeological inventory (<http://kindraproject.eu/information-material/>)

ing available tools. In addition to the workshops, national experts presented and acquainted a broader public with KINDRA objectives and tasks, at conferences, symposia and similar events. During the same year national experts made arrangements for entry of a minimum of 50–100 queries into the KINDRA database. There are nearly 2000 completed metadata records (as of January 2017, Fig. 2). What remains is for the inventory of hydrogeological research to become open for all interested users and be a live, expandable system. Detailed information on the

KINDRA project is available at <http://kindraproject.eu/> and in Petitta et al. (2015).

References

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