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The KINDRA H2020 Project: a knowledge inventory for hydrogeology research

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Hydrogeology-related research activities cover a wide spectrum of research areas at EU and national levels. This fact is due to the intrinsic nature of the "water" topic, representing a key-aspect of the modern society: water is not only necessary for human, biological and environmental requirements, but it is one basic "engine" of several interconnected research topics, including energy, health, climate, food, security and others as exemplified by the water-food-energy-climate nexus described by e.g. the World Economic Forum. With respect to the water cycle, the management of groundwater brings additional challenges to the implementation of the Water Framework Directive (WFD) and climate change adaptation (such as integrated transboundary management of groundwater resources). This fact is related to the nature of groundwater, which represents the "hidden" part of the water cycle, difficult to evaluate, communicate and appreciate, although it sustains the health of both humans and ecosystems as well as industrial and agricultural production. In general, groundwater has been considered mainly for its relationships with surface waters, influencing river flow, e-flows, GDE (groundwater-dependent ecosystems), pollutant fate, agricultural practices, water scarcity and others. In this framework, the importance of groundwater inside the WFD has been reinforced by the daughter directive on groundwater. In the last years, particular insights have been developed on surface waters/groundwater interactions and several related research projects have been carried out. Nevertheless, a specific focus on hydrogeology, the science branch studying groundwater, has not looked into until now, despite of its utmost importance as renewable, high-quality, naturally protected (but still vulnerable) resource. At the same time the European knowledge-base that has been acquired on this important topic is widespread into several projects, plans, actions, realized at national and fragmented into wider programs generally related to water, environment or ecology. In order to have a comprehensive understanding on the groundwater theme, it is necessary to create a “snapshot” of our scientific knowledge as of 2015/2016 covering as many European countries as possible. Such comprehensive coverage will result in an accurate assessment of the state of the art in hydrogeology research in various geographical and geo-environmental settings, allowing for direct comparison and the exploitation of synergies. The KINDRA project (Knowledge Inventory for hydrogeology research, Grant Agreement No. 642047, www.kindraproject.eu) seeks 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. KINDRA is funded by the European Commission’s HORIZON2020 Framework Programme. The project started on 1 January 2015 with the overall objective to take stock of our contemporary knowledge of hydrogeology with the help of an inventory of research results, activities, projects and programmes, and then use the inventory to identify critical research challenges and gaps, with a view to avoiding overlaps. This approach takes into account the implementation of the WFD and new innovation areas within integrated water resources management, allowing at EU scale the future correct management and policy development of groundwater.