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Socio-Hydrogeology: uncovering the hidden connections within the Human-Groundwater Cycle

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Socio-hydrogeology has been recently proposed as a new approach in the field of human-water research, focusing on the assessment of the reciprocity between people and groundwater. Notwithstanding some obvious similarities with socio-hydrology, there are notable, and indeed important differences; while socio-hydrology aims to investigate and understand the dynamic interactions and feedbacks between (surface)water and people, due to the more private and local nature of groundwater in many instances, socio-hydrogeology seeks to understand individuals and communities as a primary source, pathway and receptor for potable groundwater supplies, including the role of (local) knowledge, beliefs, risk perception, tradition/history, and consumption. In essence, the “socio” in socio-hydrology might be said to represent society, while its counterpart within socio-hydrogeology embodies sociology, including social, cognitive, behavioural and socio-epidemiological science. Moreover, while socio-hydrology tends towards examination of human-water interactions at relatively large scales via coupled modelling, socio-hydrogeology is often focused at a significantly smaller scale (e.g. individual household or community supplies), and as such, employs a wide range of mixed methods, including modelling, albeit to a lesser degree. Being at its early development stage, the discipline is still being defined and formalized. Nevertheless, several researchers are currently implementing this approach worldwide.

By presenting a comparative analysis of the approaches and outcomes from several socio-hydrogeological studies undertaken across a range of socio-demographic and climatic regions including Canada, Italy, India, Ireland, Myanmar and Tunisia, this presentation will highlight the benefits and shortcomings of going beyond classical hydrogeological and hydrogeochemical investigations targeted to assess the impact of human activities on groundwater quality and quantity, and indeed, the effects of these impacts on associated individuals and communities (i.e. humans frequently represent the issue, the receptor and the solution). By shedding light on the added value of understanding the cause-effect relations between people and the hidden component of the water cycle (e.g. to jointly assess how scarce and polluted groundwater affect human/social wellbeing), socio-hydrogeology can provide evidence-based solutions to regionally bespoke problems. Similarly, otherwise neglected local or regional information can add value to scientific outcomes and contribute to foster new groundwater management actions tailored on

the needs of local populations as well as on the overall achievement of long-term sustainability. Socio-hydrogeology can therefore provide new insights useful for socio-hydrological modelling, and, together, they can effectively underpin successful Integrated Water Resources Management plans at local and regional scale. Perhaps most importantly, it is hoped that by initiating discussion between practitioners of both sub-disciplines, experiences, expertise and perspectives can be shared and employed (e.g. more “technical” modelling within socio-hydrogeology, increased integration of “non-expert” knowledge within socio-hydrology) in order to bolster both areas of study, with an overarching objective of protecting the entire hydrological cycle, and the people supplied and impacted by it.