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Assessing the vulnerability of shallow groundwater resources to deep subsurface energy activities (VoGERA)

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Society is increasingly looking to the subsurface for our energy needs, be that for extracting geothermal energy, shale gas, or buffering heat, gas, or storing by-products of energy production. An increasingly crowded subsurface presents risks to groundwater relied on for water supply, since subsurface activities can introduce or release contaminants and alter subsurface properties. The VoGERA project is investigating the vulnerability of shallow groundwater from a range of subsurface energy technologies across different hydrogeological and geological settings within Europe. A suite of conceptual models compares the intrinsic vulnerability for different geological (crystalline, poorly consolidated and well consolidated sedimentary basins) and hydrogeological (basin centre and margins) conditions. They also consider the impacts of different subsurface activity types broadly categorised as those processes including injection, abstraction and a neutral fluid balance. Potential contamination pathways are being investigated at four case study sites; the Rauw Fault in Belgium, Panonian Basin in Hungary, The Peel Boundary Fault in the Netherlands and the Vale of Pickering in the UK. Geophysical, hydrological and hydrochemical data from these sites will be assessed in order to improve contamination pathway process understanding in a European setting. Findings from the case study sites will be used to evaluate the conceptual models and to develop a tool for decision makers and the public to assess the vulnerability to shallow groundwater from subsurface energy activities depending on the activity, and geological and hydrogeological conditions at a specific location. The VoGERA project is funded as part of the European Union's Horizon 2020 GeoERA network of projects under the Groundwater theme (Grant agreement number 731166).

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