RECENT ADVANCEMENTS AND APPLICATIONS OF LOGGING AND SURFACE MAGNETIC RESONANCE FOR GROUNDWATER INVESTIGATIONS

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Enhancing groundwater investigations, nuclear magnetic resonance (NMR) geophysics allows direct measurement of hydrogen in pore fluids and characterization of groundwater flow and storage parameters, including porosity, pore size, and permeability. In the field, NMR can be applied both downhole, with logging NMR tools, and non-invasively with surface NMR methods. We present recent technical advancements in logging and surface NMR, all of which are aimed to improve measurement flexibility, efficiency, and accuracy. These advancements include hardware development as well as adaptation of survey methodologies. We present applications of current logging and surface NMR technology from a range of international sites as part of practical groundwater investigations. Applications considered include characterization of the vadose zone, determination of aquifer hydrogeologic properties, detection of hydrocarbon contaminants, and imaging of thaw water in artic environments.