

Session Title

Hydrogeology of karst and fractured systems: From field studies to quantitative characterization

Description

Understanding, predicting, and managing groundwater in karst and fractured-rock environments requires approaches that go far beyond those used for porous-media aquifers. Karst systems are defined by pronounced heterogeneity, strong anisotropy, and the coexistence of multiple flow domains: Diffuse matrix flow and rapid conduit drainage. These characteristics arise from the high solubility of the host rock and the development of conduit networks, which together shape the unique hydrodynamic behaviour of karst aquifers generally called as the duality of karst. This session brings together new techniques, methodological advances, and field-based studies aimed at improving our understanding of karst and fractured rock hydrogeology. Topics include, but are not limited to: conduit flow, karst hydrodynamics, the karstification process, flow and transport modelling, characterization of karstic networks, hydrograph analysis, recharge dynamics, epikarst processes, hydrodynamics of fractured systems, and contaminant transport in strongly heterogeneous media. While many karst and fractured systems share common principles, each aquifer remains a unique case, making generalization challenging. For this reason, the exchange of experience, data, and conceptual approaches across different regions is essential for improving the sustainable use and protection of these groundwater resources worldwide.

Keywords

karst, hydrodynamics, modelling, time-series, karstification, conduit network, caves, carbonates, fractured rock, tracing, concentrated flow, baseflow, epikarst

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