Evaporitic aquifer structure identification: inverse stochastic approach

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The characterization of the spatial variability of aquifer attributes is crucial in subsurface hydrology where well-organized geological bodies or structures with high permeabilities can form strong preferential channels that can potentially concentrate flow and drive contaminant migration. Such preferential channels dramatically control evaporitic geological systems with well developed wormholes at different scales. The identification of these features is seen crucial for instant in the aquifers of the Central Andes, where the hosted brine is susceptible to lithium exploitation for the generation of future car batteries. Stochastic inversion of the spatial variability of transmissivity in groundwater models can potentially identify geological structures depending on the type and quality of information provided. We investigate whether these methods are capable to describe wormholes as well as small and large high permeability structures in a Salar basin of the Central Andes. Data used come from a sequence of several large-scale pumping tests continuously monitored in numerous observation wells, leading to cross information.