



Seismoelectric field measurements in unconsolidated sediments

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Seismoelectric (SE) prospecting has the potential of determining hydraulic permeability in situ. However, the SE response of geological interfaces (IR) is influenced also by porosity, saturation and salinity. We present examples of SE surveys of near-surface unconsolidated sediments showing clear IR arrivals from the shallow groundwater table and laterally consistent IR arrivals from interfaces inside the vadoze zone. These measurements are complemented by seismic, GPR and geoelectric surveys for constraining bulk porosity, water saturation and salinity. They show that porosity and water content change at the interfaces generating IR arrivals. The combination of these methods enables us to estimate permeability contrast associated with major IR arrivals via numerical modeling of SE waveform amplitudes. In case of the analyzed field example this contrast is estimated to be of the order of 10 within the vadoze zone and of 100 at the aquifer-aquitard interface.