

Relationships Between Water Flow Rate and Geophysical Measurements in an Alluvial Aquifer

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A b s t r a c t

Our study focuses on the potential usefulness of surface geophysical data to constrain the water content within an alluvial aquifer. On a study area where two wells have been drilled, we have performed several geophysical measurements, including ground penetrating radar, DC resistivity prospecting, seismic refraction survey and magnetic resonance soundings. From these data, we estimated several parameters, namely, the water height in the deposits, the effective porosity, the water content, the permeability, and the transmissivity of alluvial deposits. These physical parameters allow us to characterize the alluvial deposits in order to constrain the estimation of the potential water flow. The lithology and water flow rate known from the wells enabled us to compare geophysical results obtained in a high water flow rate zone to those in a low water flow rate zone. Correlation has been found between the water flow rate observed in both wells and the geophysical data obtained in the vicinity of these wells.

Key words: hydrogeophysics, GPR, DC resistivity, seismic refraction, magnetic resonance sounding.