

عنوان مقاله:

Time lapse monitoring of the vadose zone response of a granitic aquifer in experimental hydrogeological park: a case study in south India

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خلاصه مقاله:

Introduction: The faults and fractures of the granite are, according to their position in relation to the plane of deformation, hypothetically interpreted as tension and shear faults. The faults in shear position are supposed to be tight and have very little groundwater. The tension faults, on the other hand, are supposed to be open and to be capable of a high yield of groundwater. The electrical conductivities of rocks and soils are highly dependent of the water saturation. Variations in electrical resistivity are monitored by time lapse electrical resistivity tomography (TLERT) during a long duration pumping test. Rocks such as granite and schist are generally poor aquifers because they have a very low porosity. However, if these rocks are highly fractured, they make good aquifers. A well is a hole drilled into the ground to penetrate an aquifer. Normally such water must be pumped to the surface. Material and methods: Climate of South India is mostly tropical. The study of climate is very important from many aspects. It is predominantly important for crops, tours, vegetation etc. Henceforth necessary to understand the working and eating habits, also. In fact the study of climate is correlated to Topography and Temperature of the region. In fact the region has a tropical climate and depends on monsoons for rainfall. This region includes Karnataka, inland Tamil Nadu and western Andhra Pradesh. Most importantly it gets between ۴۰۰ and ۷۵۰ millimetres (۱۵.۷ and ۲۹.۵ in) of rainfall annually. The summers are hot and dry. But the winters are cool with temperatures around ۲۰-۲۴°C (۶۸-۷۵°F). This experiment is carried out in the Experimental Hydrogeological Park (EHP) located in Choutuppal, ۴۵ km south-east of Hyderabad. Vadose zone of EHP comprises an uppermost thin layer of red soil (<1m), sandy regolith (1m-۳m), saprolite (۳m-۱۵m), and then the fissured granite. The pumping test lasts for ۵ days and the piezometric variations are between ۱۳ m and ۱۸ m during pumping in CH-۳ borehole. This fissured granite is characterized by an important horizontal fracture density controlling the flow. An East West profile was laid with ۴۸ electrodes and ۳ m spacing interval. CH-۳, pumping well, was in the center of the profile covering ۸ observation wells in both directions. ۲۷ time-lapse datasets were inverted using Res2Dinv adopting least square inversions. The inverted resistivity datasets seem to be correlated with weathered profile and the variations of resistivity may be correlated with variation of hydraulic ... head. The variations of resistivity are more important close

کلمات کلیدی:

Granitic Aquifer, Groundwater Productivity Vadose Zone, Time Lapse Electrical Resistivity Tomography

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