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Aquifer Characteristics in Hard Rock Terrain of GP-8 Watershed, Aurangabad District, Maharashtra Using Vertical Electrical Sounding Method

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Abstract

Vertical electrical resistivity soundings (VES) were executed in demarcating groundwater potential zones in GP-8 (Godavari Purna-8) mini watershed area of Phulambri river basin in Aurangabad district, Maharashtra. Total 31 VES using Wenner configuration of electrode array have been conducted to map the groundwater potential zones. The field measurements were processed and interpreted by IPI2win software. The pseudo and resistivity cross-sections for the study area have been processed. The study area of GP-8 watershed covers Deccan Trap basaltic rock formations of Cretaceous to lower Eocene age. Interpretations of VES using Wenner arrangement had been carried out to create Dar Zarrouk parameters specifically: longitudinal conductance and coefficient of anisotropy of sub-surface aquifer using SURFER-9 software and the resistivity results had been compared with the lithology. Good, average and poor zones are categorized with the avail of making aquifer unit(s) thickness map. The study reveals that the weathered and fractured horizons that occur in the northernmost part of the area constitute suitable groundwater potential aquifers with a thickness of >3.8m. The fracture porosity calculated from the geophysical parameters suggests different degrees of water saturation within the basaltic strata. The excessive porosity regions substantiate with the high anisotropy values, indicative of most importantreserves of utilizablegroundwater.

Keywords: Vertical electrical sounding (VES), Groundwater, Aquifer unit(s) thickness, Hard rock, GP-8 watershed, Maharashtra