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Estimation of Aquifer Transmissivity Using Dar Zarrouk Parameters Derived from Surface Resistivity Measurements: A Case History from Parts of Enugu Town (Nigeria)

PDF (Size: 1582KB) PP. 993-1000 DOI: 10.4236/jwarp.2012.412115

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ABSTRACT

Many investigation techniques are commonly employed with the aim of estimating the spatial distribution of transmissivity. Unfortunately, the conventional methods for the determination of hydraulic parameters such as pumping tests, permeameter measurements and grain size analysis are invasive and relatively expensive. A geoelectric investigation involving vertical electrical sounding was carried in parts of Enugu town, Enugu state, Nigeria. The survey was aimed at extrapolating the result of pumping tests over an area. Using the Dar Zarrouk parameter, a β constant of 0.32 was found to translate resistivity to transmissivity with clay content as the primary factor controlling the hydraulic conductivity. Results of the study show a strong correlation between aquifer transmissivity and longitudinal conductance ($R^2 = 0.82$). Estimation of aquifer transmissivity values based on the results of the resistivity measurements also made it possible to demarcate area with good groundwater potential in parts of Enugu town, Nigeria.

KEYWORDS

Resistivity; Transmissivity; Dar Zarrouk Parameters; Longitudinal Conductance; Pumping Tests

Cite this paper

A. Utom, B. Odoh and A. Okoro, "Estimation of Aquifer Transmissivity Using Dar Zarrouk Parameters Derived from Surface Resistivity Measurements: A Case History from Parts of Enugu Town (Nigeria)," *Journal of Water Resource and Protection*, Vol. 4 No. 12, 2012, pp. 993-1000. doi: 10.4236/jwarp.2012.412115.

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