



Geo-electrical Investigation of Mullusi Aquifer, Rutba, Iraq

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ABSTRACT

The geophysical study was performed east of Rutba town due to vertical electrical sounding in a net of forty points between Dhalaa and Dhabaa valleys. Geophysical electrical model applied using Winsev6 program to determine the geo-electrical layers. Three geo-electrical layers were derived from geophysical survey. These layers are composed of four sediment types, such as clays, marls, marly carbonates, carbonates (dolomitic limestone), characterized by resistivity less than 20 ohm-m, 20 - 100 ohm-m, 100 - 350 ohm-m and more than 350 ohm-m, respectively. The thickness of the geo-electrical horizons are increased in Dhabaa Fault zone which characterized by multi karst shapes reflected as karst topography on the surface, which represents subsurface structural boundary for Mullusi aquifer, where this aquifer considered as main water supply for Rutba people in drinking water throughout 17 water wells located in Dhabaa site. Two empirical relation between Formation Factors (F) and Hydraulic Conductivity (K) obtained using linear and Polynomial regression techniques. The first equation of linear fit ($F = 11.82 + 116.45 K$; with a Correlation Coefficient of 0.94) represents the contribution between formation factor and hydraulic conductivity of a 2nd layer in Mullusi aquifer. The second equation of 3rd degree Polynomial Fit ($F = 20.32 - 203.33 K + 1554.99 K^2 - 3127.30 K^3$; with a Correlation Coefficient of 0.75) represents the contribution between formation factor and hydraulic conductivity of a 3rd layer in Mullusi aquifer.

KEYWORDS

Geo-Electrical; Layer; Hydraulic Conductivity; Mullusi Aquifer; Iraq

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