

Evaluation of Aquifer Protective Capacity and Soil Corrosivity Using Geoelectrical Method

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Abstract : A geoelectric survey was carried out in some parts of Angwan Gwari, an outskirts of Lapai Local Government Area on Niger State which belongs to the Nigerian Basement Complex, with the aim of evaluating the soil corrosivity, aquifer transmissivity and protective capacity of the area from which aquifer characterisation was made. The G41 Resistivity Meter was employed to obtain fifteen Schlumberger Vertical Electrical Sounding data along profiles in a square grid network. The data were processed using interpex 1-D sounding inversion software, which gives vertical electrical sounding curves with layered model comprising of the apparent resistivities, overburden thicknesses and depth. This information was used to evaluate longitudinal conductance and transmissivities of the layers. The results show generally low resistivities across the survey area and an average longitudinal conductance variation from 0.0237 Siemens in VES 6 to 0.1261 Siemens in VES 15 with almost the entire area giving values less than 1.0 Siemens. The average transmissivity values range from 96.45 $\Omega.m^2$ in VES 4 to 299070 $\Omega.m^2$ in VES 1. All but VES 4 and VES14 had an average overburden greater than 400 $\Omega.m^2$, these results suggest that the aquifers are highly permeable to fluid movement within, leading to the possibility of enhanced migration and circulation of contaminants in the groundwater system and that the area is generally corrosive.

Keywords : geoelectric survey, corrosivity, protective capacity, transmissivity

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