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Geoelectrical Exploration for Groundwater in Shales: A Case Study of Ikwo and Environs, South Eastern Nigeria

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An assessment of the groundwater potential of IKWO and environs was carried out by combining datasets from geographic information system (GIS), geology and geophysics. The area is underlain by the Asu River Group. Geologically, Asu River Group of Albian age comprises of Shales, Limestones and Sandstone lenses of the *Abakaliki Formation* in the Abakaliki and Ikwo areas. The shales are generally weathered, fissile, thinly laminated and highly fractured and varies between greyish brown to pinkish red in colour. Seventeen (17) vertical electrical sounding (VES) results, using the Schlumberger method were acquired for the study area. A maximum current electrode spacing (AB) of 300 meters was used for data acquisition. Six (6) of the soundings were carried out near existing boreholes for comparative purposes between the geological and geoelectric sections. Curve matching techniques and computer iterative modelling were integrated and used in data processing. The layer parameters thus obtained from the analysis were combined with borehole logs and pumping test data from existing boreholes to estimate aquifer hydraulic parameters. Results show that the depths to the water table range between 22.1-59.4m at Ekpelu and Odeligbo respectively while aquifer thicknesses varies from 17.5m at Onu Nnode market square to 95.3m at Ndufu Inyimagu Ikwo. Hydraulic conductivity varies between 0.004m/day at Community School Ohatekwe and 0.04 m/day at Onyikwa Playground while transmissivity varies between 0.117m^2/day at Ndufu Alike 1 and 3.113 m^2/day at Ndufu Inyimagu Obeagu Playground.

Keywords: Aquifer parameters, Vertical Electrical Sounding, Fractures, Groundwater

Biography:

Dr. Amobi Chigozie Ekwe is a Senior Lecturer at the Department of Geology and Geophysics, Federal University Ndufu Alike Ikwo. He obtained a Bachelor of Technology (B.Tech) degree in Geosciences (Geophysics) from the Federal University of Technology, Owerri (Nigeria); MSc. and PhD degrees in Applied Geophysics from the University of Nigeria, Nsukka. He is the Faculty Adviser of FUNAI Student Chapters of the American Association of Petroleum Geologists (AAPG) and the Society of Exploration Geophysicists (SEG). He has published many papers both at local and international journals and his research interest spans through Seismic inversion and Hydrogeophysics.