



Regional Hydro-geophysical Study of the Groundwater potentials of Imo River Basin Southeastern Nigeria, using Surficial Resistivity Data

Terhemba Theophilus Emberga
Federal University of Technology, Nigeria.

Abstract:

The Imo River Basin lies between Latitudes 4° 38'N and 6° 01'N and between Longitudes 6° 53'E and 7° 32'E and covers an area of about 9100 km². The litho-stratigraphic units within the study area include the Ajali, Nsukka, Imo Shale, Ameki, Ogwasi and Benin Formations. Regional hydro-geophysical evaluation of groundwater potentials in Imo River Basin has been carried out with the objective of delineating the aquifer units in the area of study. A total of five hundred and sixty-nine (569) Vertical Electrical soundings (VES) were carried out using the ABEMTM Terrameter (SAS) 4000. The VES data were acquired using the Schlumberger electrode configuration with a maximum current electrode spacing of 1000m. Out of the 569 VES data, twenty (20) parametric soundings were done at the vicinity of existing boreholes for correlative and quality control purposes. The acquired VES data were processed using the 1-D WINRESISTTM computer iterative software. Geo-electric curve types interpreted from the study area revealed a predominance of the AK-type with about 3-10 geo-electric layers identified from the various formations. The mean values of aquifer resistivity and conductivity are 1963.2Ωm and 0.00186sm⁻¹ respectively with the aquifer materials mainly made up silt, sand and coarse sandstones. Similarly, the mean depth to the aquifers across the study area is 115.5 m while the mean aquifer thickness is 39.8 m. The findings of this result revealed that the aquifer potentials of the study area is variable with the aquifer properties generally controlled by the underlying geology of the study area. It was revealed that the southern part of the study area has a high aquifer potential when compared to the northern part. In conclusion, the Benin Formation was delineated as the formation with the highest aquifer potentials in the study area. It is therefore recommended



that a detailed groundwater exploration should be carried out before siting a borehole.

Publication of speakers:

1. Osaki, L. J., Opara, A. I., Okereke, C. N., Adiola, U. P., Njoku, I. O., Emberga, T. T., & Eluwa, N. (2016). 3-D seismic interpretation and volumetric estimation of "Osaja Field" Niger Delta, Nigeria. 10.18052/www.scipress.com/ILNS.59.14
2. Emberga Theophilus T, Inyang Godwin Edet, Nwachukwu Helen Gloria, et al : Geophysical Appraisal of the Aquifer Geomaterials of Ugep and Environs, Southeastern, Nigeria Using Resistivity Data. February 2017 : 10.9734/JGEESEI/2017/30349
3. Udoka Ubong Paulinus, Nwankwor Godwin Ifedilichukwu, Ahirakwem Cosmas Ahamefula, Opara Alex Iheanyichukwu, and Emberga Terhemba Theophilus, "Morphometric Analysis of Sub watersheds in Oguta and Environs, Southeastern Nigeria Using GIS and Remote Sensing Data." (2016) : 10.12691/jgg-4-2-1
4. Terhemba Theophilus Emberga, et al., Regional Hydro-geophysical Study of the Groundwater potentials of the Imo River Basin Southeastern Nigeria using Surficial Resistivity Data. 2019 August : 10.22587/ajbas.2019.13.8.12

Webinar On Earth & Planetary Science | July 22, 2020 | Toronto, Canada

Citation: Terhemba Theophilus Emberga; Regional Hydro-geophysical Study of the Groundwater potentials of Imo River Basin Southeastern Nigeria, using Surficial Resistivity Data; Geology 2020; July 22, 2020; Toronto, Canada