IJG> Vol.2 No.4, November 2011

OPEN ACCESS

Geostatistical Correlation of Aquifer Potentials in Abia State, South-Eastern Nigeria

PDF (Size:615KB) PP. 541-548 DOI: 10.4236/ijg.2011.24057

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ABSTRACT

In this paper, a collection of statistical correlation methods is used in the study of aquifer potentials in Abia State of south-eastern Nigeria. The Physiology, geomorphology and hydrogeology of the area are first presented. Sixty-six Vertical Electrical Sounding (VES) data sets are used to determine the aquifer. Demographic studies are then carried out in 220 communities in order to determine the relationship between population size on one hand and a unit draw-down of wells due to groundwater abstraction on the other. The relationship between geological Formation, aquifer potentials and depth of boreholes are then calculated using Pearson ' s correlation matrix. Results show that the mean population of persons appears to be higher in Bende-Ameki Formation (of Eocene-Oligocene age) and the late Tetiary-Early Quaternary Coastal Plain Sands, than in the Cretaceous shale Formation of Asata Nkporo. The mean population of persons sitting on these Formations is 31,200, 18,370 and 5400 respectively. Furthermore, it is observed that a population increase of about 50 persons in a community in Abia State is accompanied by a unit volume (1 m3) draw-down of wells due to groundwater abstraction. It is therefore concluded that population size is positively correlated with groundwater abstraction, aquifer potentials and geological Formation favouring aquifer in Abia State.

KEYWORDS

Geostatistics, Pearson ' s Correlation, Groundwater, Krigging, Aquifer, Bende-Ameki Formation, Coastal Plain Sands.

Cite this paper

M. Igboekwe and C. Nwankwo, "Geostatistical Correlation of Aquifer Potentials in Abia State, South-Eastern Nigeria," *International Journal of Geosciences*, Vol. 2 No. 4, 2011, pp. 541-548. doi: 10.4236/ijg.2011.24057.

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