EVALUATION OF GROUNDWATER QUALITY IN SHAKWATU COMMUNITY, PART OF SHEET 164 SW, CENTRAL NIGERIA

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ABSTRACT

Geology, mineralogical composition of rocks and geotechnical properties (grain size and permeability) of the soil within the river in Shakwatu and environs part of Sheet 164 SW were studied. Physico-chemical characteristics of groundwater collected from boreholes, hand dug wells and river were also determined. Statistical techniques where applied to the groundwater samples to determine hydro-geochemical parameters in order to establish the relationship among the measured parameters and their sources. Results shows that the area is part of the Kushaka schist belt that have been intruded by faulted gneiss, granites and quartzite. Minerallogic composition of the rocks include biotite, feildspar and quartz. The soils falls under A – C group that consist of poorly sorted sand with low fines and are of medium to high permeability as shown from the result ($2.434x10^{-02}$). The permeability of the soil could aid in the infiltration of harmful wastes from the illegal mining activities that is prevalent in the area. From various statistical analysis the cations (Ca^{2+}, Mg^{2+}, Na^{+}, K^{+}) and anions (Cl^{-}, HCO_3^{-}, CO_3^{2-}, SO_4^{2-}, F^{-}, NO_3^{-}, NO_2^{-}, PO_4^{3}) fell within WHO and NSDWQ recommended standards. The dominant water type is $CaHCO_3$ followed by $CaNaHCO_3$ water type. Rock weathering and cation exchange are the major geochemical processes responsible for the water chemistry in the study area. The quality of the groundwater need to be monitored from time to time as well as improving the mining method in order to ensure safety of the groundwater.

Keywords: Geology, groundwater, permeability, Nigeria standard of drinking water quality