



GHANA INSTITUTION OF GEOSCIENTISTS
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GHIGCON-2019-28**EVALUATION OF GROUNDWATER QUALITY IN ONITSHA, SOUTHEASTERN NIGERIA USING WATER QUALITY INDEX AND METAL POLLUTION INDEX**

Benjamin A. Igbomor and Akobundu N. Amadi*

*Department of Geology, Federal University of Technology, Minna, Nigeria***Abstract**

Groundwater quality investigation was carried out in this study. The water quality data set obtained from Onitsha shows the overall concentration pattern of major ions are $\text{Cl}^- \rightarrow \text{HCO}_3^- \rightarrow \text{Ca}^{2+} \rightarrow \text{Mg}^{2+} \rightarrow \text{Na}^+ \rightarrow \text{SO}_4^{2-} \rightarrow \text{K}^+$. The major ions are within the permissible limits when compared to WHO standard except for chloride that showed elevated concentration in some locations. This is an indication of possible marine source for the groundwater system. The hydrochemical facie classified the water as Ca-Cl and mixed Ca-Mg-Cl type. The pH values are slightly low when compared to WHO standard signifying acidic condition. The heavy metals show that zinc and copper are within the maximum permissible limit in all locations. However, the concentration of iron, manganese, chromium, cadmium and lead was detected in the water sample with 73.3%, 20%, 10%, 13.3% and 23.3% respectively above the maximum recommended standard by WHO. Based on the WQI value, the water in the area are categorized into 5 groups ranging from excellent water (24%), good water (27%), poor water (17%), very poor water (24%) and water unsuitable for drinking (10%). Heavy metals content in the water are the reason for observed high WQI which can be traced to the huge anthropogenic activities in the area. The spatial distribution of WQI revealed that boreholes with high WQI values are those in proximity with dumpsites and factories signifying pollution. The computed Metal pollution index (MPI) shows moderate pollution by iron and lead while copper, manganese, chromium, cadmium and zinc are showing light pollution. The results obtained from this study suggest a significant health risk in the future if the current practice of waste discharge continues unabated. Due to their toxicity and accumulative capacity, waste treatment and management is advocated in the area.

Keywords: Water quality index, pollution index, metals, groundwater, Onitsha, Southeastern Nigeria

*Corresponding author. Tel.: +234-7030579700.

E-mail address: ahliigbomor@gmail.com or geoama76@gmail.com.
