



**GHANA INSTITUTION OF GEOSCIENTISTS**  
"To the Earth for its wealth and preservation"



## **Programme and Abstract Volume**

2019 Annual National Conference of the  
Ghana Institution of Geoscientists,

**Geoscience, Environmental Stewardship and Society**

13-16 AUGUST, 2019  
UNIVERSITY OF MINES AND TECHNOLOGY, TARKWA, GHANA

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**GHIGCON-2019-26****COMPARATIVE ANALYSIS OF FLUORIDE OCCURRENCE IN GROUNDWATER SYSTEMS OF HONG AND ZANGO AREA, NORTHERN NIGERIA**Akobundu N. Amadi<sup>1\*</sup>, Tukur Aminu<sup>2</sup>, Samson S. Maspalma<sup>3</sup>, Ajani O. Ipoola<sup>4</sup>, Christopher I. Unuevho<sup>1</sup>, Peter Ibikunle Olasehinde<sup>1</sup>, Mark Igoche Ameh<sup>1</sup>, Isah Shauibu<sup>5</sup>*<sup>1</sup>Department of Geology, Federal University of Technology, Minna, Nigeria**<sup>2</sup>Katsina State Rural Water Supply and Sanitation Agency, Nigeria**<sup>3</sup>Nigerian Geological Survey Agency, Abuja, Nigeria**<sup>4</sup>Department of Chemical and Geological Sciences, Alhikmah University, Ilorin, Nigeria**<sup>5</sup>Department of Geological Sciences, Federal University Gusau, Zamfara State, Nigeria.***Abstract**

Groundwater can be contaminated through rock-water interaction, anthropogenic activities or a combination of both factors. Fluoride when taken in small quantities (less than 0.5 mg/L) causes dental caries, non-formation of dental enamel and deficiency of mineralization of bones among children below the age of 5. When taken in excess of 1.5 mg/L, it could lead to dental and or skeletal fluorosis. The presents study examines fluoride occurrence in groundwater systems in Hong and Zango area, northern Nigeria and the view of establishing the source and degree of pollution of the groundwater in these area. The geological mapping of Hong and Zango communities revealed that the area is partly underlain by granitic rock as well as other rock types. Petrographic study of the granitic rock domiciled in Hong and Zango areas showed quartz, feldspar, mica and some accessory minerals while the laboratory analysis using XRD indicates the presence of nacaphite ( $\text{Na}_2\text{CaPO}_4\text{F}$ ) in the granite sample. Interestingly, the nacaphite, which is a fluoride bearing mineral was conspicuously absent in the other rock samples analyzed. An integration of the results of laboratory analysis from Hong and Zango areas against the respective geology further revealed that water samples collected from areas underlain by granitic rock showed higher concentration of fluoride ( $> 2.0$  mg/L) compared to the water samples obtained from areas underlain by other rock types. This implies that the high fluoride concentration in groundwater system in Hong and Zango communities are from natural source due to bedrock dissolution and weathering processes. Gibbs plot also confirmed that rock-water interaction and precipitation are the geochemical processes responsible for groundwater evolution and composition in these areas. They use of water in the granite dominated zone for drinking and domestic purposes in Hong and Zango communities should discontinue and alternative source of water should be provided for inhabitants in the interim pending when remediation processes targeted at extracting the fluoride from the groundwater systems in these settlements are executed.

Keywords: Fluoride concentrations, groundwater system, Hong and Zango communities, Northern Nigeria.

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