

Interpretation of Airborne Radiometric data for possible hydrocarbon presence over Bornu basin and its environs, Northeast Nigeria using Thorium normalisation method

Taiwo Adewumi*^{1,2}, Kazeem Adeyinka Salako ², Usman Defyan Alhassan ², Abbass Adebayo Adetona ², Rafiu Adewuyi Abdulwaheed², Emeka Emmanuel Udensi ²

1. Department of Physics, Faculty of Science, Federal University of Lafia, Nigeria

2. Department of Geophysics, School of Physical Science, Federal University of Technology, Minna, Nigeria

A new exploration technique called Thorium Normalisation Method has been applied on the airborne radiometric data of the Bornu basin and its environs to delineate favourable zones for hydrocarbon accumulations within the study area. This method is significant because it indicates the probable presence of hydrocarbon in a sedimentary basin. Separation of the radiospectrometric measurements over each lithologic unit and the estimation of the characteristic statistics of these units were carried out. The statistical treatment applied on the radioelements (K, eTh and eU) of the study area shows a relatively low coefficient of variability (CV%) value for K, eTh and eU signifying their high degree of homogeneity. The mean value of the radioelements (K ranging from 0.6 to 2.0 %; Th ranging from 9.6 to 15.9 ppm and U ranging from 2.2 to 3.8 ppm) obtained from the statistical analysis correlates with the mean of natural radioelement (K ranging from 0.1 to 2.7 %; Th ranging from 0.4 to 11.2 ppm and U ranging from 0.1 to 3.7 ppm) content of sedimentary rocks which corresponds to shale, the main source rock for hydrocarbon accumulation in the study area. The DRAD (delineation of radioactive anomalies) result ranges from -0.77 to 1.83. The positive values are indicators of favourable zones for the presence of hydrocarbon accumulations. These results suggest that the preliminary information obtained from the use of the thorium normalisation method will guide the exploration of hydrocarbon in the study area. DOI: 10.30495/ijes.2021.682863

Keywords: Airborne radiometric data, Bornu basin, Hydrocarbon accumulation, DRAD, Homogeneity, Radioelements