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Data Article

Data on the radiometric survey over a kaolinitic terrain in Dahomey Basin, Nigeria

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ABSTRACT

This article consists the in situ data sets of activity concentrations of radionuclides (K-40, Th-232 and U-238) and gamma radiation dose rates measured about 1 m above a kaolinitic terrain in Ifonyintedo, Dahomey Basin, SW Nigeria. Nineteen (19) data points were randomly occupied at the lower axis of the kaolin field using a hand-held detector known as Super-Spec (RS 125). At each data point, the measurements were taken four times, while their averages and standard deviations were estimated in order to ensure accuracy. The radiometric survey was carried out between December, 2017 and January, 2018. The data sets were processed and analyzed via a descriptive statistics. The data can be explored further by estimating the radiological risks to the miners on the field, and to correlate the activity concentrations of the data with the activity concentrations of the tiles that are produced from the kaolin deposits in Ifonyintedo. Furthermore, the data from this article could be compared with other data acquired over a kaolinitic terrain across the globe.

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Specifications Table

Subject area	<i>Geophysics</i>
More specific subject area	<i>Environmental Geophysics</i>
Type of data	<i>Table and figure</i>
How data was acquired	<i>Super-Spec hand-held Spectrometer (RS 125), Global Positioning System</i>
Data format	<i>Raw and analyzed</i>
Experimental factors	<i>Radiometric measurements were conducted randomly across a kaolin deposit field in Ifonyintedo using Super-Spec (RS 125)</i>
Experimental features	<i>Activity concentrations of Potassium (^{40}K), Thorium (^{232}Th), and Uranium (^{238}U), as well as Dose Rates of all occupied locations were determined</i>
Data source location	<i>Ifonyintedo, Ipokia Local Government, Ogun State, Nigeria</i>
Data accessibility	<i>All the data are in this article</i>

Value of the data

- The data could be used to estimate the radiological risks associated with the overexposure of the miners to the radionuclides on kaolin deposit field.
- The method employed here can be replicated on kaolin deposit field across Nigeria for radiological assessment on miners, and correlation between the kaolin's activity concentrations, and the radioactivity concentrations in tiles that were produced from the deposits.
- For educational purposes in courses such as: geophysical field works, ground radiometric method, and radiological hazard assessment. Some of the recent data articles of this format can be explored in [1–3].

1. Data

The data sets contain the in situ measurement of K-40, Th-232, U-238 and the gamma dose rates over kaolin deposits in Ifonyintedo, Dahomey Basin, SW Nigeria. The data were randomly occupied at the lower axis of the field from nineteen (19) locations as presented in Table 1. The coordinate and elevation of each location were determined with the aid of global positioning system (GPSMAP 78). All soils are radioactive as a result of cosmogenic or and primordial radionuclides being available naturally. Hence, the products or materials that are derived from these soils are radioactive. Exposure to more than required activity concentrations and the gamma dose rates have been attributed to some acute health problems such as: "Chronic lung diseases, mouth necrosis, anemia, acute leucopenia, teeth fracture, cataract, cancer, hepatic failure and leukemia" [1]. The statistical analyses were further carried out on the data sets for further exploration.

2. Experimental design, materials and methods

Kaolin is one of the mineral resources that are available in commercial quantity in Nigeria. Kaolin is one of the types of clay found in nature, with the chemical composition of $\text{Al}_2\text{Si}_2\text{O}_5(\text{OH})_4$. Its economic importance are found in plastic, paper, ceramics, food additives, cosmetics, paint, medicine, agriculture, construction and cement industries. The main component in ceramic tile body is kaolin clay. In construction industry, all the available raw materials derived from soils or and rocks are products of kaolin, clay, limestone, gypsum and pumice, which contain natural radionuclides such as U-238 and Th-232 and their decay series as well as the radioactive isotope of K-40 [4]. As a result of the chemical, physical and mineralogical composition of clays, they are considered in the production

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