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Data Article

Geostatistical exploration of dataset assessing the heavy metal contamination in Ewekoro limestone, Southwestern Nigeria



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ARTICLE INFO

Article history:

Received 22 May 2017

Accepted 18 July 2017

Available online 21 July 2017

Keywords:

Ewekoro limestone

MPAS

Heavy-metal contamination

Cluster analysis

Pearson correlation coefficient

Kendall tau

Spearman rho

ABSTRACT

The dataset for this article contains geostatistical analysis of heavy metals contamination from limestone samples collected from Ewekoro Formation in the eastern Dahomey basin, Ogun State Nigeria. The samples were manually collected and analysed using Microwave Plasma Atomic Absorption Spectrometer (MPAS). Analysis of the twenty different samples showed different levels of heavy metals concentration. The analysed nine elements are Arsenic, Mercury, Cadmium, Cobalt, Chromium, Nickel, Lead, Vanadium and Zinc. Descriptive statistics was used to explore the heavy metal concentrations individually. Pearson, Kendall tau and Spearman rho correlation coefficients was used to establish the relationships among the elements and the analysis of variance showed that there is a significant difference in the mean distribution of the heavy metals concentration within and between the groups of the 20 samples analysed. The dataset can provide insights into the health implications of the contaminants especially when the mean concentration levels of the heavy metals are compared with recommended regulatory limit concentration.

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Specification Table

Subject area	<i>Earth, Environment and Planetary science</i>
More specific subject area	<i>Environmental Science</i>
Type of data	<i>Table and Figure</i>
How data was acquired	<i>Microwave Plasma Atomic Absorption Spectrometer.</i>
Data format	<i>Raw, Analysed</i>
Experimental factors	<i>The collected samples went through a drying process in bid to make it air free, it was grounded and sieved again. 2 g of the samples was placed in a beaker, 2.5 ml of concentrated HNO₃ and 10 ml of concentrated HCl was added to them and then covered with a watch glass. The beaker was then placed on a hot plate for 15 min to heat. The digestate from the heated sample was filtered using a Whatman No. 41 filter paper into a 100 ml volumetric flask. The digestate was later diluted to a volume of 100 ml and then analysed using a Microwave Atomic Absorption Spectrometer.</i>
Experimental features	<i>Determination of Arsenic (As), Mercury (Hg), Cadmium (Cd), Cobalt (Co), Chromium (Cr), Nickel (Ni), Lead (Pb), Vanadium (V) and Zinc (Zn) elemental contaminations.</i>
Data source location	<i>Ewekoro limestone formation in the eastern Dahomey basin, Southwestern Nigeria</i>
Data accessibility	<i>All the data are in this data article.</i>

Value of the data

- The data could be used to determine the level of heavy metal contamination in limestone formations.
- The methods can be replicated to other rock formations. For example to other two key lithostratigraphic units of the eastern Dahomey Basin namely; Abeokuta and Akinbo Formations.
- For educational purposes, environmental pollution studies especially in the study of heavy metals in fossiliferous limestone. Similar data articles can be found in [1–13].
- Findings can be extended to other metal or non-metal elements not considered in this article.
- The dataset can provide insights on the health implications of the contaminants on the ground-water especially when the mean concentration levels of the heavy metals are compared with recommended regulatory limit concentration.

1. Data

The data contains geostatistical analysis of twenty (20) samples of limestone obtained from the Ewekoro limestone Formation in the eastern Dahomey basin, Southwestern Nigeria. The samples were purified and analysed for heavy metal concentrations using the MPAS. The heavy metals detected from the samples are Arsenic (As), Mercury (Hg), Cadmium (Cd), Cobalt (Co), Chromium (Cr), Nickel (Ni), Lead (Pb), Vanadium (V) and Zinc (Zn). The detailed composition is shown in Table 1. The presence of these heavy metals causes contamination. The descriptive statistics is shown in Table 3. Further analysis was conducted to deepen our understanding on the statistical relationships of the samples. The analysis can be replicated on other limestone Formations and the mean heavy metal concentrations can be compared with the recommended limits.

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