

Abstract

Observations of natural gamma radiation were made in the Above Rocks region; throughout the entire island and of the granodiorite plutons of eastern Jamaica. Gamma-ray spectrometry was found to be a useful tool in the geological mapping of uranium and CR-39 autoradiography was found to be a useful tool for determining the location and distribution of radioactive minerals in rocks, alluvium, bauxite, terra rossa, and lignite.

The results of the autoradiography and petrography studies indicate that the accessory mineral phases (sphene, apatite and zircon) contained within the major mineral phases of the igneous rocks are the major source of the radioactivity.

The weathering of the igneous rocks of Jamaica may account for the occurrence of apatite, sphene and zircon within the sediments on this island.

The major source of radioactivity in bauxite and terra rossa are discrete uranium bearing minerals such as zircon, and iron-bearing coatings on clay minerals.

There is a direct relationship between the average level of gamma radiation emitted by each rock type, and the concentration of uranium within these rocks, as determined by radiometric assay on whole rock samples and CR-39 autoradiography on mineral phases contained within these rocks.

The combined results of the geochemical analyses and radiometric assays indicate that the concentrations of

potassium, uranium and thorium in the volcanic and plutonic rocks of Jamaica appear to be higher in rocks belonging to the calc alkaline series than those of the tholeiitic series. The Th/U ratio is generally higher in the volcanic rocks of the tholeiitic series than those of the calc alkaline series, and varies from one pluton to another among the granodiorite plutons in the eastern section of Jamaica.