SEDIMENTOLOGY, MINERALOGY AND RADIOLOGY OF HEAVY MINERAL SEDIMENTS AND THEIR SPATIAL DISTRIBUTION IN ESPÍRITO SANTO/BRAZIL

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Previous radiometric studies showed that in the state of Espírito Santo, Brazil, especially in the Guarapari region, heavy mineral beach deposits may exhibit highly enhanced radiation levels due to the content of the radioactive mineral monazite. The aim of this study is to discover the sources and to determine the movement of the monazitic sands. It comprises sedimentology, mineralogy, radiology, and spatial distribution of beach sediments and rocks in the region between the cities of Maratraízes and Fundão (South and North of the capital Vitória). The gamma radiation was measured in situ, samples were taken and detailed maps were prepared. Grain size distribution, magnetic separation, mineral determination and separation under the microscope, X-ray diffractometry, and electronic microscope scanning were carried out. For comparison samples from the states of São Paulo, Rio de Janeiro and Salvador were studied accordingly.Granulometric distribution shows that all sediments have an unimodal distribution and are poorly sorted. The main minerals in these sediments, normally black sand deposits, are ilmenite, magnetite, garnet, and monazite, less frequently zircon, tourmaline, rutile, ilmenorutile, andalusite, and corundum. There are two main types of monazite, one rounded without and the other with crystal faces. The monazite grains are normally light to dark yellow but also brown to dark brown.The results show evidence that the monazites have at least two different sources, one being certainly derived from the Barreiras Group, the other from the Espírito Santo magmatic arc.