Survey Of Background Radiation Dose Rates And Radioactivity In Tanzania

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Abstract

Potential terrestrial sources of naturally occurring elevated radiation levels have been identified in Tanzania. Thus, efforts are currently being undertaken to create a natural radiation database, in the form of a radiation level map of natural radioactivity, to be used to assess the associated radiation risk to public and workers. Background radiation dose rate was determined with thermoluminescent dosimeters for 7 y (1993–1999) in five stations. The average background radiation dose rates for these stations were as follows: Tropical Pesticides Research Institute (TPRI) (102 ± 7 nGy h−1), Same (98 ± 2 nGy h−1), Namanga (98 ± 5 nGy h−1), University of Dar Es Salaam (99 ± 2 nGy h−1), and Kilimanjaro Christian Medical Center (121 ± 3 nGy h−1). These stations were found convenient from an economic point of view since the project has no funds to cover wider and/or more remote areas in Tanzania. For the sake of comparison, similar measurements were made for the same period at Minjingu phosphate mine. The mine was one of the suspected areas with elevated levels of natural radioactivity. The radiation dose rate measured in this mine was about fourteen times higher (1,415 ± 28 nGy h−1) than the average value obtained in northern Tanzania (98 nGy h−1). The high average activity levels of phosphate (5760 ± 107 Bq kg−1 for 226Ra, 497 ± 5 Bq kg−1 for 228Ra, 350 ± 6 Bq kg−1 for 228Th, and 280 ± 5 Bq kg−1 for 40K) and radiation dose rate recorded show that Minjingu phosphate mine has higher values than the highest radioactivity in phosphate compiled by the United Nations Scientific Committee on the Effect of Atomic Radiation. In view of these findings, a comprehensive risk-management strategy for reduction of radiation risk to the public and mine workers should be put in place. Efforts are currently being made to seek support to improve the background radiation database for subsequent assessment of radiation risk to miners and the societies in the vicinity of these mines in Tanzania.