Radiological safety assessment inside ancient Egyptian tombs in Saqqara

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Abstract

Many archaeological sites in Egypt are unique worldwide, such as ancient tombs and pyramids, because they document fundamental developments in human civilization that took place several thousands of years ago. For this reason, these sites are visited by numerous visitors every year. The present work is devoted to provide a pre-operational radiological baseline needed to quantify occupational radiation exposure at the famous Saqqara region in Cairo, Egypt. A hyperpure Ge detector has been used in the ɔ-ray spectrometric analysis while the (222)Rn concentration was measured using a portable radon monitor RTM 1688-2, SARAD. The mean specific activities of (226)Ra, (232)Th and (40)K in the samples collected from the interior walls of the Saqqara tombs were determined and found to show average values of 16, 8.5 and 45 Bq kg(-1), respectively. The concentration of radon was measured inside the tombs Serapeum, South tomb and the Zoser Pyramid (fifth level) and an associated average working level of 0.83 WL was obtained. In order to avoid the health hazards associated with the exposure to radon during the long period of work inside these tombs, proposed solutions are introduced.

Isotopes in Environmental and Health Studies 2016, March

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