

Abstract

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Seasonal variation of radon level and radon effective doses in the Catacomb of Kom El-Shuqafa, Alexandria, Egypt

Abstract. Inhalation of radon has been recognized as a health hazard. In the present work radon concentration was measured, in the atmosphere of the archaeological place, namely Catacomb of Kom El-Shuqafa, in Alexandria, Egypt, which is open to the public, using time-integrated passive radon dosimeters containing LR-115 solid-state nuclear track detector. The measurements were performed throughout winter and summer. Seasonal variation of radon concentration, with the maximum in summer ranging from 243 to 574 Bq m⁻³; minimum in winter ranging from 64 to 255 Bq m⁻³ was observed. Because of the variations of the catacomb ventilation system, the equilibrium factor between radon and its progeny ranges from 0.14 to 0.48. The tour guides are exposed to an average estimated annual effective dose ranging from 0.21 to 0.52 mSv y⁻¹; the visitors from 0.88 to 2.28 mSv y⁻¹. The effective doses the catacomb workers are exposed to ranged from 0.20 mSv y⁻¹ in winter to 4.65 mSv y⁻¹ in summer which exceeds the lower bound of the recommended level (3–10 mSv y⁻¹) (ICRP, 1993).