Soil radioactivity comparison in three different regions of Greece

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The present work focuses on comparing the natural radioactivity results obtained from samples taken from three different environments in Greece. In total,, 23 soil samples from urban parks of metropolitan areas of Athens, 10 soil samples from the remote areas of Pogoni and Zagori (Northwestern Epirus), and 50 coastal and inland samples from Lemnos Island (North Aegean Sea) were collected. All samples were prepared and measured with high-resolution gamma spectroscopy at the γSPEC station of the University of Athens. Bulk reference samples were used to calibrate the spectrometer. Specific activities for five naturally occurring (^{40}K, ^{214}Pb, ^{212}Pb, ^{208}Tl, and ^{214}Bi) and one artificial radioisotope (^{137}Cs) were deduced.

Based on the measurements of specific activities, the absorbed dosage and index of external hazard (H_{ex}) have been additionally calculated using UNSCEAR models. Additionally, the ^{137}Cs/^{40}K and U-series/Th-series ratios have been estimated. The specific activities of ^{40}K reach values up to 271(8) Bq/kg in Pogoni and Zagori, 331(37) Bq/kg in urban parks of Athens, and 1214(30) Bq/kg in Lemnos Island. All results are correlated to the geological background, as well as the geodynamics of each area.

A newly developed, openly available data repository has been created at the University of Athens to incorporate the present results using a state-of-the-art GIS platform. The repository will be upgraded to a risk-informational system in the near future.

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