

Correlation analysis between the in-situ measured and estimated annual gamma-dose values

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Some of the natural background radiation is from cosmic sources, and the majority comes from radionuclides on Earth. Among the terrestrial radionuclides, gamma-emitting isotopes are responsible for external exposure, while alpha and beta emitting isotopes are the most important for internal exposure. The most significant gamma-emitting natural radioisotopes in soil are Ra-226, Th-232, U-238 and K-40. The radiation exposure they cause can be measured by dose rate meters or can be estimated using different formulae.

In this study, gamma dose rate values were determined for 900 points in the Transdanubian region, Hungary. At the measurement locations soil samples were collected. The soil samples were dried, pulverized and homogenized, and then analyzed by gamma spectrometry to determine the main gamma emitting radioisotopes. Based on the activity concentrations of gamma-emitting radionuclides, the annual dose to the environment has been calculated

The aim of this study is to investigate the correlation between the measured and estimated annual gamma dose values and to determine the dependence of the estimation accuracy on different parameters (for example soil type, soil physical parameters).