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Compilation of geogenic radon potential map of Pest County, Hungary

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222Rn and its effect on the human health have recently received major importance in environmental studies. This natural radioactive gas accounts for about 9% of lung cancer death and about 2% of all deaths from cancer in Europe due to indoor radon concentrations. It moves into the buildings from the natural decay chain of uranium in soils, rocks and building materials. Radon mapping regionalizes the average hazard from radon in a selected area as a radon risk map. Two major methods (concerning the applied radon data) have been used for mapping. One uses indoor radon data whereas the other is based on soil gas radon data. The outputs of the second approach are the geogenic radon potential maps.

The principal objective of our work is to take the first step in geogenic radon mapping in Hungary. Soil samples collected in Pest County (Central Region of Hungary) in the frame of a countrywide soil survey (Soil Information and Monitoring System) were studied to have empirical information of the potential radon risk. As the first two steps radium concentration of soil samples, collected at 43 locations sampling soil profiles by genetic horizons from the surface level down to 60-150 cm, were determined using HPGe gamma-spectroscopy technique, as well as measurement of radon exhalation on the soil samples were carried out applying closed radon accumulation chamber coupled with RAD7 radon monitor detector. From these data the exhalation coefficient was calculated, which shows how many percent of the produced radon can come out from the sample. This rate strongly depends on the depth: at circa 100 cm a drastic decrease have been noticed, which is explained by the change in soil texture. The major source of indoor radon is the soil gas radon concentration (Barnet et al., 2005). We estimated this value from the measured radon exhalation and calculated soil porosity and density. The soil gas radon concentration values were categorized after Kemski et al. (2001) and then the geogenic radon potential map was created for the pilot area.

References:

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