

Identification of high radon dwellings, risk of exposure, and geogenic potential in the mining area of the “TREPČA” complex

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Abstract

This study was performed to investigate radon levels in dwellings in the mining area near the town of Kosovska Mitrovica. The Passive radon technique based on the charcoal canister test kit conducted in summer and autumn 2019 showed unexpected results. The reference level of 300 Bq/m³ for indoor radon concentration was exceeded in 15 of 26 dwellings. Preliminary measurements of gamma dose rate in some dwellings built from local stone showed values from 0.30 to 0.45 μSv/h, while 75% of measurements in dwellings with stone foundations had radon above the reference level. The highest radon concentration (22 500 ± 220 Bq/m³) was measured in the cellar of one family house. The RAD7 device (DurrIDGE Company, Inc.) was used to measure radon concentrations in water and nearby soil of some dwellings. Indoor radon concentration fluctuated significantly over two days; over a one-day time scale, radon varied from 2843 ± 217 Bq/m³ at midnight to 1449 ± 104 Bq/m³ in the morning at one site, and abruptly decreased from a maximum of 2146 ± 262 Bq/m³ in one day to a minimum of 21 Bq/m³ the next day at another site. The influence of geological substrate on radon exposure was discussed through the estimation of geogenic radon potential, which varies from low to high radon index despite to high permeability of soil.

KEYWORDS

charcoal canister, exposure, geogenic radon potential, RAD7, radon, radon prone area