



Long-term measurements of radon, thoron and their airborne progeny in 25 schools in Republic of Srpska



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ABSTRACT

This article reports results of the first investigations on indoor radon, thoron and their decay products concentration in 25 primary schools of Banja Luka, capital city of Republic Srpska. The measurements have been carried out in the period from May 2011 to April 2012 using 3 types of commercially available nuclear track detectors, named: long-term radon monitor (GAMMA 1)- for radon concentration measurements (C_{Ra}); radon-thoron discriminative monitor (RADUET) for thoron concentration measurements (C_{Th}); while equilibrium equivalent radon concentration (EERC) and equilibrium equivalent thoron concentrations (EETC) measured by Direct Radon Progeny Sensors/Direct Thoron Progeny Sensors (DRPS/DTPS) were exposed in the period November 2011 to April 2012. In each school the detectors were deployed at 10 cm distance from the wall. The obtained geometric mean concentrations were $C_{Ra} = 99 \text{ Bq m}^{-3}$ and $C_{Th} = 51 \text{ Bq m}^{-3}$ for radon and thoron gases respectively. Those for equilibrium equivalent radon concentration (EERC) and equilibrium equivalent thoron concentrations (EETC) were 11.2 Bq m^{-3} and 0.4 Bq m^{-3} , respectively. The correlation analyses showed weak relation only between C_{Ra} and C_{Th} as well as between C_{Th} and EETC. The influence of the school geographical locations and factors linked to buildings characteristic in relation to measured concentrations were tested. The geographical location and floor level significantly influence C_{Ra} while C_{Th} depend only from building materials (ANOVA, $p \leq 0.05$). The obtained geometric mean values of the equilibrium factors were 0.123 for radon and 0.008 for thoron.

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