

# Results from time integrated measurements of indoor radon, thoron and their decay product concentrations in schools in the Republic of Macedonia

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## Abstract

As part of a survey on concentrations of radon, thoron and their decay products in different indoor environments of the Balkan region involving international collaboration, measurements were performed in 43 schools from 5 municipalities of the Republic of Macedonia. The time-integrated radon and thoron gas concentrations ( $C_{Rn}$  and  $C_{Tn}$ ) were measured by CR-39 (placed in chambers with different diffusion barriers), whereas the equilibrium equivalent radon and thoron concentrations (*EERC* and *EETC*) were measured using direct radon-thoron progeny sensors consisting of LR-115 nuclear track detectors. The detectors were deployed at a distance of at least 0.5 m from the walls as well as far away from the windows and doors in order to obtain more representative samples of air from the breathing zone; detectors were exposed over a 3-month period (March-May 2012). The geometric mean (GM) values [and geometric standard deviations (GSDs)] of  $C_{Rn}$ ,  $C_{Tn}$ , *EERC* and *EETC* were 76 (1.7), 12 (2.3), 27 (1.4) and 0.75 Bq m<sup>-3</sup> (2.5), respectively. The equilibrium factors between radon and its decay products ( $F_{Rn}$ ) and thoron and its decay products ( $F_{Tn}^{>0.5\text{ m}}$ ) were evaluated:  $F_{Rn}$  ranged between 0.10 and 0.84 and  $F_{Tn}^{>0.5\text{ m}}$  ranged between 0.003 and 0.998 with GMs (and GSDs) equal to 0.36 (1.7) and 0.07 (3.4), respectively.