

Abstract

Mgr. Viktória Benková: *Radon in houses: variations, models and seasonal correction factor*
[Dissertation thesis].

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Radon is a significant natural source of ionizing radiation in indoor environments (such as houses, buildings, work places) , and long-term exposure to elevated indoor radon concentration (IRC) is associated with an increased risk of lung cancer. Accurate estimation of the annual average IRC is essential for radon risk assessment. Due to the seasonal variability of indoor radon concentrations, short-term measurements require adjustment using various models. One of the current models is based on the calculation of seasonal correction factors (SCFs).

This dissertation focuses on the study of indoor radon concentration in residential buildings in Slovakia, with a particular emphasis on seasonal variations and their modeling. The primary objective was to derive and validate seasonal correction factors, that would enable reliable estimation of the annual average IRC based on three-month measurements conducted during each season.

Based on experimental data from 151 rooms across different Slovak regions, the seasonal correction factors were verified through various approaches, including averaging of IRC values from two rooms within a single house. The results demonstrated a strong agreement between calculated and directly measured annual IRC values, confirming the practical applicability of the proposed method. The work also proposes a simple model for predicting annual IRC, discusses the limitations of SCF application in buildings with atypical seasonal radon behavior, and presents recommendations for optimizing measurement strategies. The findings support the use of seasonal correction factors as an effective tool in radon diagnostics, and their correct implementation can significantly improve the efficiency of radon surveys on a national scale.