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Tentative Spatio-Temporal Correlation Between Indoor Radon Concentration Variations and Moderate Earthquakes in Albania: A Case-Based Statistical Approach

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This study investigates the potential correlation between long-term indoor radon concentration changes and moderate seismicity (Mw ≥ 4.0) in Albania. Radon measurements conducted during three independent campaigns (1999–2000, 2014, and 2022) were analyzed at repeated sites to assess temporal variations, and were matched with seismic events within a 50 km radius and within a 0.2-year temporal window. Among 50 repeated radon measurement points, only one site (Zall Bastar, NE of Tirana) demonstrated a compelling spatio-temporal correlation with a local earthquake (Mw 3.7, June 2022). This case suggests that, under specific conditions of dense spatial coverage and improved temporal resolution, radon anomalies may offer valuable insights into crustal stress variations. However, the overall weak correlation across the dataset highlights the limitations of campaign-based measurements and reinforces the need for continuous monitoring in active tectonic zones. The findings support the integration of geochemical and seismological observations to enhance earthquake hazard assessments in Albania.

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