

Indoor radon in the city of Rome: active measurements survey in residential dwellings

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In the territory of the Municipality of Rome, soils outcropping represent products of both exogenous activity and volcanic activity released from the complex of the Sabatini Mountains to the NW, and the Alban Hills to the SE.

In particular, the eruptions of the Albani Hills volcanic complex, located 20 km southeast of Rome, have led to the placement of numerous and extensive pyroclastic formations which as a whole cover most of the territory of the Municipality of Rome and which develop mostly in the east and south of the city.

Local volcanic rock was the primary stone building material of ancient Rome from its initial settlement through the Early Imperial Age. The use of tuff as a building material continued until recent times: this extensive use is due to its intrinsic properties (easy to cut, resistant to weathering, efficient thermal insulators). However, alongside the qualities mentioned above, tuffs are known for their radioactivity usually higher than other rocks, leading to higher exposures to population in this part of Italy.

Here we present a rare indoor radon measurement survey carried out through active measurement devices, inside some dwellings located in the territory of the municipality of Rome.

In the first experiment, 25 apartments were monitored for a period of about two weeks each, finding alarming levels of radon concentration even at high floors. This motivated us to deepen the analysis by monitoring such houses for a longer time. In the second experiment 5 radon detectors were placed in 3 apartments (2 of which in 2 different rooms) for a period ranging between 2 and 7 months.

We show here the first results of this complex investigation including evidence that most radon concentrations are higher than the reference threshold recommended by the World Health Organization (100 Bq m³). The very different gas concentration measured in different rooms of the same apartment indicates that radon concentration not only depends on the apartment's floor but may be strongly affected by the use of a heating system or to different ventilation conditions.