

## **Radon monitoring and hazard prediction in Ireland**

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Radon is a naturally occurring radioactive gas which forms as a decay product from uranium. It is the largest source of natural ionizing radiation affecting the global population. When radon is inhaled, its short-lived decay products can interact with lung tissue leading to DNA damage and development of lung cancer. Ireland has among the highest levels of radon in Europe and eighth highest of an OECD survey of 29 countries. Every year some two hundred and fifty cases of lung cancer in Ireland are linked to radon exposure.

This new research project will build upon previous efforts of radon monitoring in Ireland to construct a high-resolution radon hazard map. This will be achieved using recently available high-resolution airborne gamma-ray spectrometry (radiometric) and soil geochemistry data (<http://www.tellus.ie/>), indoor radon concentrations (<http://www.epa.ie/radiation>), and new direct measurement of soil radon. In this regard, legacy indoor radon concentrations will be correlated with soil U and Th concentrations and other geogenic data. This is a new approach since the vast majority of countries with a national radon monitoring programme rely on indoor radon measurements, or have a spatially limited dataset of soil radon measurements.

Careful attention will be given to areas where an indicative high radon hazard based on geogenic factors does not match high indoor radon concentrations. Where such areas exist, it may imply that some parameter(s) in the predictive model does not match that of the environment. These areas will be subjected to measurement of radon soil gas using a combination of time averaged (passive) and time dependant (active) measurements in order to better understand factors affecting production, transport and accumulation of radon in the natural environment.

Such mapping of radon-prone areas will ultimately help to inform when prevention and remediation measures are necessary, reducing the radon exposure of the population. Therefore, given that an estimated 250,000 people in Ireland are exposed to high radon levels, the findings of this research stand to make a considerable positive impact in enhancing the quality of life and long-term health for a significant proportion of inhabitants.