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The traceRadon project

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Accurate knowledge of the low-level atmospheric radon activity concentration and radon fluxes are key parameters in the evolution of climate observations as well as radiation protection.

The need for traceable low-level atmospheric radon concentration measurement of two communities –climate observation and radiation protection –are joined under the EMPIR project traceRadon¹. This project includes the development of a metrological capacity to measure low levels of radon in the environment (new sources, reference monitors, transfer instruments and robust methodology), and the validation of process-based maps for radon flux from the soil.

For the first time ever traceable methods for measuring low-level atmospheric radon activity concentrations in the range of 1 Bq·m⁻³ to 100 Bq·m⁻³ with uncertainties below 10 % applying traceable radon emanation sources as well as transfer standard instruments, are available.

Development of a radon flux calibration infrastructure, along with a transfer standard for radon flux, is another important aim of the project. This calibration infrastructure provides traceability from the laboratory to field measurements of radon fluxes, which is an essential step before applying the Radon Tracer Method (RTM) for indirect greenhouse gases fluxes retrieval.

Traceable measurements of atmospheric radon and radon fluxes are combined to validate current radon flux maps and inventories and to improve process-based radon flux models. This validation is further extended by using dosimetric and spectrometric data from the radiological early warning networks in Europe.

The use of reliable radon flux data and maps for the identification of Radon Priority Areas (RPA) has never been attempted before, due to a lack of robust data. It will therefore be possible to support the European member states in the identification of RPA, for example by extending the Radon Hazard Index through inclusion of dynamic data. This data will be available online for scientists, policy makers and end users. By this EURAMET is supporting regulation with metrology according to the EURAMET strategy 2030.

The concept and aims of the traceRadon project are presented, achieved results for traceability chains, uncertainties and data evaluation are discussed and the transfer of results from lab to field at the mid-term of the project is sketched.

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