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Towards the forecast of false positives in nuclear network monitoring due to atmospheric radon

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Radon-222 is a progeny of Uranium-238, naturally present in the Earth's crust. After its migration through the soil, it reaches the atmosphere. As a noble gas, it does not interact with other gas or aerosol particles whereas its progenies do. These progenies can concentrate in rain drops and lead to gamma dose rate peaks occurring during rainfall events. This may trigger alarms of emergency monitoring networks.

These peaks can be used as a suitable radiological case study for model validation and improvement. Hundreds of gamma dose rate monitoring stations are available in France, recording data each five minutes all year round.

Atmospheric dispersion models used for emergency purposes are usually meant to simulate the atmospheric transport of radioisotopes released from a damaged nuclear installation. The quality of this response is a critical issue and has to be constantly improved. However, long-range measurement campaigns for model validation are scarce, especially for radioactive pollutants.

We built a Radon-222 atmospheric transport modelling calculation chain, from input data to model-to-measurement comparisons on a national scale. Preliminary results of these comparisons are presented. The final objective is to discriminate, on a gamma dose rate monitoring network, false alarms due to natural radioactivity from real nuclear incidents in a forecast mode.