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European ^{222}Rn flux map for atmospheric tracer applications

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Observations of atmospheric ^{222}Rn are widely used in the evaluation of climate models simulating transport, transformation and removal processes of gases and aerosols. Used in inverse mode, these models can provide information on location, extent and strength of sources and sinks of greenhouse gases based on the measurement of changes in their atmospheric concentrations. Currently, the effective use of ^{222}Rn in this context is limited by the accuracy of the ^{222}Rn source function.

The aim of this project is the development of a radon flux map for Europe, based on a widely measured proxy, because direct measurements of ^{222}Rn flux over large areas and longer time scales would be very costly. Of all widely measured environmental parameters, gamma dose rate has been found to be most closely related to ^{222}Rn flux. Parallel measurements of radon flux and gamma dose rate have been made to describe a correlation between these two values. The results show a correlation where more than 70% of variance in radon flux is described only by gamma radiation. Additionally, geological, soil texture and informations on radionuclides in soil have shown to be useful in interpreting outliers. A first model of a ^{222}Rn flux map for Switzerland has been established as a draft, that has to been verified before it can be extended for Europe.