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Receptor-oriented dispersion modelling of ^{222}Rn in Spain as a natural tracer for model validation

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Naturally occuring radionuclides have been widely used to study atmospheric processes. In particular, ^{222}Rn gas has been used as a natural passive tracer to validate atmospheric transport models mostly on the long-range scale. For this sort of studies a constant radon flux over land of 1atomcm^{-2}s^{-1}, and zero over water bodies, is often taken despite it is well know that radon fluxes can vary within a wide range due to the influence of several factors such as geological properties of soil, soil moisture and pressure. At best, latitudinally varying fluxes are considered. Model validation can be done by comparison of the measured radon concentrations with those obtained by the model. A case study is being performed for the radiological station in Barcelona belonging to the Institute of Energy Technologies (INTE) to evaluate how different assumptions for radon flux affect the modelled values. The INTE station provides hourly radon concentrations in air as well as meteorological variables. Due to the complex orography of the site together with the often well-developed mesoscale circulations under summer conditions, a model that it is able to resolve these features is needed. In this study, for the dispersion modelling, it is used the Lagrangian particle dispersion model MM5-V3.7-FLEXPART(V6.2), which uses the meteorologial fields produced by the MM5 model. Receptor-oriented dispersion calculations are being done to obtain the source-receptor relationships for a typical summer episode. Once the S-R relationship is available it is combined with different emission patterns to get the temporal series of radon concentration at the site, first with a simple constant radon flux and then with more complicated patterns including spatial variation according to the

geology of the surroundings. Results will be then compared with observations.