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Abstract title: Input values for model validation of dry and wet deposition models based on the environmental measurements after the Ru-106 release in the fall of 2017

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Abstract text

Anthropogenic ^{106}Ru has been detected in the environment over the period from late September to early October 2017 by several European environmental radiological monitoring networks. The temporal distribution and spatial localization of the contaminated plume was studied with backward trajectory simulations, which were performed with the Hybrid Single-Particle Lagrangian Integrated Trajectory model (HYSPLIT) developed by the National Oceanic and Atmospheric Administration (NOAA). The transport and dispersion of air parcels was studied to interpret the ^{106}Ru measurements at ground-level and also to locate the possible origin region of the contaminated air masses. On the basis of the inverse dispersion modelling, the travel time from the release at the source location and residence time of the contaminated plume over a certain area was also estimated.

Following the release of ^{106}Ru to the atmosphere, several measurements of various environmental compartments (airborne particulates, deposition, terrestrial indicators) were performed both on a national and international basis. Based on the ^{106}Ru deposition measured in the environment, assessment of the values of dry deposition velocity and wash out coefficient was performed with account taken of the occurrence, duration and intensity of precipitation during the radioactive plume residence. The assessed parameters of deposition and wash out were compared to the default values used by operational

models. The comparison between the measured and calculated ^{106}Ru deposition provided input values, which can be used for the validation of the dry and wet deposition models.

Motivation

The work discusses the determination of input values based on deposition calculations and direct environmental measurements, which have been implemented following the ^{106}Ru release in the fall of 2017. These input values can be used for model validation of the operational dry and wet deposition models, thereby the findings of this research could facilitate the harmonisation within deposition modelling.