

COMPARISON OF DIFFERENT METHODOLOGIES FOR CALCULATION OF NUCLEAR INTERVENTION ZONES USING ATMOSPHERIC DISPERSION MODELS

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In case of a nuclear emergency, the Dutch National Institute for Public Health and the Environment (RIVM) relies on the atmospheric dispersion model NPK-PUFF to calculate the spread of radioactive material released during such an emergency.

The current version of this model allows for the forecasting of both long-range and short-range atmospheric transport of radionuclides. The advection and diffusion are calculated using real-time meteorological input (HIRLAM and ECMWF) from KNMI, the Royal Netherlands Meteorological Institute.

The preparation for nuclear emergencies requires an estimate of the area around the source where predefined intervention levels are exceeded.

Recently, the model NPK-PUFF was used to determine these so-called nuclear intervention zones. These areas are evaluated in relation to variable weather conditions and different source terms. The assessment of the size of these areas for different scenarios leads to a classification of nuclear intervention zones, to be used by local and national policy makers.

We present a number of different methodologies to account for variable weather conditions. In some studies this is done in a probabilistic manner.

Another method involves employing a strategy where all possible meteorological conditions in a typical year are taken into account. Here, an a posteriori statistical analysis is performed on the results to calculate the extent of nuclear intervention zones.

In this paper we compare different approaches for calculation of nuclear intervention zones. The implications of these different approaches from the perspective of the use in emergency preparations are presented and discussed.

EXTENDED ABSTRACT NOT SUPPLIED