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Atmospheric Dispersion Modelling - The Urban Building Scenario

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Atmospheric dispersion simulations play an important role in determining potential pollution areas in case of regularly emitted pollutants as well as accidental releases. This can be of major importance in highly populated urban areas, where the air flow is highly influenced by large building structures, especially if the released material has toxic or radioactive properties.
The German Federal Office for Radiation Protection (BfS) currently has two operational Lagrangian particle models that can consider the influence of urban structures in their dispersion calculations. The Atmospheric Radionuclide Transport Model (ARTM) is a long-term release simulation model, and the Lagrange Simulation of Dispersion and Inhalation of Radionuclides (LASAIR) is used for short-term releases.
Both models were applied for a simple fictive release scenario with the aims to
a) understand and compare their behaviour if building structures are introduced into the simulation and to
b) find a good way of approximation to handle very complex building structures.
In eight sub-scenarios, a continuously increasing complexity of buildings was studied. One reference scenario without buildings to compare the models with each other, five scenarios with large simplified building blocks, and one scenario with a realistic urban structure were simulated. The eighth sub-scenario represents an improved approximation to the realistic scenario.
Here we would like to present the results of the comparison between the models and recommendations for the application in complex urban structures, which we gained from this study scenario.