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Approach to Localization of Atmospheric Release with Demonstration on the Case of Ruthenium-106 Release in 2017

Localization of an unintended atmospheric release is crucial in atmospheric monitoring as well as in verification strategy of organizations such as CTBTO or national authorities. To find the location is, however, complex task with many involved uncertainties composed in measured data and technique, usage of an atmospheric transport model, selected weather reanalysis, and used inversion technique. In continental scale, the localization can be formulated as the linear inverse problem on a grid and solved as an optimization problem. We study the Bayesian formulation where the uncertainties can be incorporated directly into the model and thus can be estimated together with all other parameters. It is shown that the quality of the resulting estimates strongly depends on quality of measurements and their spatial and temporal distributions. These findings will be demonstrated on the case of the ruthenium-106 observation in the fall of 2017 over the Europe and Asia.

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