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1.3-P02. A comparison of traditional and new inverse modelling techniques for source term identification in atmosphere

Inverse modelling plays an important role in identifying the amount of substances released into atmosphere during power plant accidents, volcano eruptions or CO2 emissions. The problem leads to minimization of the discrepancy between the measurements in atmosphere during a particular time period and the model predictions. First, we review the standard methods based on Tikhonov regularization and Bayesian modelling. Then, we propose several optimization techniques which can be used to find sparse solutions and discuss their modifications to handle selected constraints such as nonnegativity and simple linear constraints, for example the minimal or maximal amount of total release. These techniques range from successive convex approximations to solution of mixed-integer programming problems. Finally, the new methods are applied on the European Tracer Experiment (ETEX).

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