



Inverse modelling of atmospheric tracers : theoretical developments and applications to real dispersion events

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In a previous EGU assembly, an account was given on a methodology aiming at the reconstruction of an atmospheric tracer at continental scale, using the principle of maximum entropy. Its main asset was to take into account complex background information and devise objective functions generalising the 4D-Var approach to inverse modelling. Further theoretical developments have been carried out since then. New specialised priors and related cost functions have been designed for an accidental pollutant release. An l_∞ -norm optimisation cost function whose construction still relies on purposeful priors allows for a different treatment of errors and generalises the simplex method approach. Besides, a unified treatment of prior sources and prior errors has been formalised.

A second aim of this report is to present attempts to a full-scale reconstruction of a real tracer release. In the case of the ETEX experiment, dozens of thousand of degrees of freedom in the source should be retrieved from thousands of concentration observations. Considerations on the modelling of prior error statistics (model error peculiar to accidental dispersion) is expected to help in the reconstruction.