Geophysical Research Abstracts, Vol. 7, 05716, 2005 SRef-ID: 1607-7962/gra/EGU05-A-05716 © European Geosciences Union 2005



Superdiffusive behaviour of an atmospheric tracer and its impact on sensitivity and source inversion problems

M. Bocquet and Y. Roustan

CEREA, Research and Teaching Center in Atmospheric Environment, ENPC / EDF R&D, (bocquet@cerea.enpc.fr)

This work aims at presenting several consequences of the wind fields temporal and spatial variability on problems related to the inverse modelling of an atmospheric tracer.

The issue came across in the study of the continental transport of heavy metals. Sensitivities of an annual mean concentration at site i to forcings such as : emissions, incoming pollutant from the domain boundaries, and so on, are computed through the adjoint solutions of the transport equation. The adjoint solution attached to site i is forced by a point-wise continuous source located at site i. The effective superdiffusive behaviour of the solution makes influential regions less extended than naively expected. The magnitude of the sensitivity away from the observation site was estimated as well as its anomalous scaling. It is consistent with previous theoretical works.

Further consequences of this fact arise when inverting the source of an atmospheric tracer. In particular the performance of a tracer source reconstruction may depend on the mesh resolution though the critical scaling of the adjoint solutions.