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Interactive comment on "Adjoint backtracking for the verification of the Comprehensive Test Ban Treaty" *by* J.-P. Issartel and J. Baverel

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M. Seibert argues that Eulerian models suffer numerical diffusion and other errors probably due to the finite resolution of grid meshes. Tracer would artificially spread of the length of one grid cell per time step. Such problems are of course avoided by numerical schemes that have been proposed long ago and are now considered classical (Tiedtke, Bott...). From the point of view of numerical quality Eulerian models are not worse or better than Lagrangian models. As our paper is not aimed, anyway, at comparing models, we shall give some further explanations in order to avoid further misunderstanding.

We propose ideas concerning backtracking that have to be organised with respect to previous ideas related to the same topic. We introduce a new diagnostics for localising tracer sources. It is based on the use of retroplumes calculated back in time with an inverse diffusion shown to be equal to the standard diffusion. Traditionnally, only the advection is reversed, diffusion is not which results into the calculation of an average

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line of current departing back in time from the detector. We think that the second idea excludes a part of the physics. It is important to explain this and to show calculation results. The first approach may be called Eulerian and the traditionnal one Lagrangian but this is not a reference to the kind of model that has to be used for the calculations. For instance the Eulerian retroplume can be calculated with a Lagrangian model by introducing a large number of particles. It is to be noticed nevertheless that the number of particles should be very large to offer enough accuracy for implementing the simplex algorithm on a large area.

When comparing the two approaches of backtracking it is probably better to make all the calculations with one model, even if adaptations are required. M. Seibert can surely reproduce most of our results with her Lagrangian model. The use of the same model for calculating a retroplume and the average line of current is indeed the best way to be sure that the comparison is not between models.

Interactive comment on Atmos. Chem. Phys. Discuss., 2, 2133, 2002.

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