

## ***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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Received and published: 13 January 2003

Answer to referee 1:

It is usual when investigating the origin of an anomalous detection of atmospheric tracer to look for a point source in the neighborhood of an average current line considered a "backtrajectory". As the position of the source is certainly on the ground, this line of current is calculated by integrating back in time the average wind at ground level. We contest this approach and do agree referee 1 noting that the wind is weaker close to the ground. This means that in reality this diagnostic is ill defined as it does depend on the altitude above the ground, between a few tenths up to a few hundreds of meters, where integration will be performed. Anyway it seems inappropriate to use the term "backtrajectory" as the motion of a real particle is not constrained at a fixed level and, which is more embarrassing, because this "backtrajectoriy" may fail to be representative of the real transport subject to 3D processes, even for consequences at ground

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level.

We tried to reproduce this approach with POLAIR using wind interpolated at 32 m above ground or sea level. Because of the numerical diffusion of the model and its finite resolution it is of course not possible to compute a pure advection. Nevertheless the horizontal extension of the cloud obtained this way is much less, one order of magnitude, than the extension of the retroplume obtained with appropriate modelling of vertical physics. As far as we trust the advection module of transport models such as POLAIR, it is reasonable considering the center of the little cloud as a satisfactory achievement of the criticized diagnostics. The initial stagnation of our "lagrangian" backtrajectory may correspond to a change of the direction of the wind occurring between 1 and 2 February. Unfortunately our institution does not have a lagrangian tool.

As for the six-hour time step of the ECMWF data we think that it is sufficient for a problem at continental scale. It is the point of view of the meteorological agencies who do not propose a lower time resolution. In Polair the meteorological data are interpolated purely linearly during the six hour time gaps between analysed data.

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

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