**Atmospheric
Chemistry
and Physics
Discussions**

Interactive
Comment

Interactive comment on "Forecasting for a Lagrangian aircraft campaign" *by* A. Stohl et al.

Anonymous Referee #1

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General Comments

This article presents a new powerful forecasting tool that has been specifically designed to enable the successful execution of a long-range Lagrangian experiment. The campaign for which it was designed, ICARTT, will take place in July and timely publication of this article will help their collaborators use the forecast tool. Furthermore, it will be useful for future campaigns involving several aircraft platforms. Although an ideal Lagrangian experiment to evaluate this forecast model has never taken place, its performance has been partially evaluated using results from the NARE97 campaign where the same air masses were intercepted with an intervening delay of 2-3 days. The results show that if the closest approach to the downwind aircraft of an air parcel, already sampled by the upwind aircraft, is less then the difference in CO and ozone concentrations measured by the two aircraft is also less. The importance of matching

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the altitude of an air mass with the aircraft position is particularly clear for ozone. It also demonstrates that the FLEXPART model must be accurate in calculating the vertical component of trajectories so that the error in vertical position (away from convection) is less than 250m on average. I recommend publication of this well written article in ACP essentially as it is.

Specific Comments

On p.13 it was stated that from the whole NARE97 campaign only 65 cases are selected as matches between the upwind and downwind aircraft. What were these matches? Did they occur along just one flight of each aircraft? When did the matches occur, where were the aircraft and what were the trajectories between them? This information would be useful to compare with other publications analysing data from NARE97. Also, these 65 cases fitting the matching criteria were selected out of how many air parcels from the flight tracks?

Technical Corrections

p.6: 100.000 particles should be "100,000 particles".

p.7: Replace "where a parcel travels across a strongly divergent region of the wind fields" with "where particle trajectories diverge rapidly" because the trajectories typically diverge where there is strong deformation rather than horizontal divergence.

p.13: Cohen and Kreitzberg identify "air mass boundaries" as regions where the exponential rate of separation of neighbouring trajectories is large (departing air parcels will experience large time-integrated strain). These are not locations where horizontal

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wind divergence is large.

Fig.3: Replace "measurements of CO in dependence of the" with "measurements of CO and its dependence on the"

Interactive comment on Atmos. Chem. Phys. Discuss., 4, 2405, 2004.

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