**Atmospheric
Chemistry
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Discussions**

Interactive
Comment

Interactive comment on "Case studies of ozone transport between North America and Europe in summer 2000" *by* G. Guerova et al.

G. Guerova et al.

Acpd-2005-0203: Impact of transatlantic transport episodes on summertime ozone in Europe

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Final respond to comments of Ref#3

" The very ambitious title of the first version of the manuscript was changed to reflect

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better what has been achieved. However, I think it is too modest now. The manuscript aims at more than just another series of case studies. It should reflect the key purpose and that a complete summer was analysed which is a substantial achievement."

We propose the following title: "Impact of transatlantic transport episodes on summertime ozone in Europe"

" P. 6131, lines 10 and 11: The number of references should be extended. A few more papers on observations of trans-Atlantic transport to Europe have been published in recent years focussing on the issues of the manuscript, such as: A. Stohl et al., A backward modelling study of intercontinental pollution transport using aircraft measurements, J. Geophys. Res. 108 (2003) 4370, doi: 10.1029/2002JD002862, T. Tricdkl et al., Intercontinental transport and its influence on the ozone concentrations over central Europe: Three case studies, J. Geophys. Res. 108 (2003), 8530, doi: 10.1029/2002JD002735, H. Huntrieser et.at, Intercontinental air pollution transport from North America to Europe: Experimental evidence from airborne measurements and surface observations, J. Geophys Res. 110 (2005) D01305, doi: 10.1029/2004JD005045. Some of the findings of the earlier work should be discussed whereever suitable in the text.
P. 6131, line 20: "Li et al. recently investigate": There are many publications on the pollution export from North America. Please, rephrase this sentence to make clear that Li et al. are not the first in this field."

This point is well taken and the suggestions concerning the introduction have been taken into account. The introduction has been revised to include a number of suggested references.

" P. 6131, lines 24-25: "4 events per month in summer 2000": I could not find anything on this interesting result in the manuscript. Two cases of ozone import from the midwest are described by Trickl et al. (see above)."

This point was mentioned in the Li et al. (2005)'s paper before the final revision.

" P. 6136-6137: The text suggests ("the model overestimates", "underestimates") that the satellite data are highly accurate which is not the case. Suggestion: "The model yields higher/lower concentrations than...". The intercomparison with the MOZAIC data is more meaningful."

This point is well taken and we do not discuss anymore the comparison of the model with satellite observations in a quantitative way. A comparison of simulated CO columns to MOPITT and simulated NO_2 columns to GOME are discussed elsewhere (Li et al. 2005; Martin et al.2003)

" P. 6138, lines 3-4: The statement "the Azores anticyclone is present only to the south of the North Atlantic." is not very clear, in part trivial! It might be a good idea to start with the second part of the following sentence, e.g., "Key parameters that drive the pollution transport from North America to Europe are the position and the strength of the Azores anticyclone. In 2000, this anticyclone was shifted more to the south which lead to...."""

Section 4 has been shorten to avoid the trivial statements. Now the nine LRT episodes are summarised in a Table 1 (section 4).

" P. 6142: The almost missing correlation with the ozone peaks at JFJ is disappointing. I strongly suggest to add graphs of other tracers better suitable to visualise the influence of the long-range transport than ozone. Ozone, because of its high values related to other sources, is not the best choice. If possible, also chemical correlations indicative of aged air masses should be discussed. It is obvious that an intercomparison with data from mountain stations requires a careful analysis of the advection conditions. There is a host of literature on the Alpine wind system. The influence of the local wind system on the data registered at the mountain top stations was an issue, e.g., for the data selection during the TOR subproject of EUROTRAC in the early 1990s. I did not examine if the work by Li et al. cited is the most adequate choice, but I suggest a closer look at the relevant literature. The statements about Foehn events and fronts are misleading since they have nothing to do with trans-Atlantic transport. The respective time periods and can be easily excluded by a simple analysis."

We agree that the model does not compare too well at the JFJ. We believe nevertheless that the model (and in particular the model sensitivity simulations) can provide meaningful insights about the relative contribution of different processes which contribute to shape the O_3 concentrations at JFJ. The same is true for the MOZAIC profiles, even if the daily variability is not always represented in great detail. Therefore section 5 has been entirely rewritten and includes now additional analyses/data sets, which i.) help to better discuss the major uncertainty in the model (e.g. stratospheric input at JFJ) and ii.) confirm the results provided by the model in term of contribution of different processes (e.g. back trajectories).

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