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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.

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We are much grateful to the Referees for their valuable comments on this manuscript. The critical remarks and comments will help to improve the quality of the work. Here is a summary of our intentions and responds to the questions raised by the three anonymous Referees (Ref#1, Ref#2 and Ref#3).

Reply to general comments of Ref#1, Ref#2 and Ref#3

Title:

Based on remarks of Ref#2 and Ref#3 we will change the title to reflect better the focus of the work.

Introduction:
We agree with the suggestion to extend the introduction. The suggested manuscripts as well as others will be taken into account.

Section 2, 4:
We will rewrite sections 2 and 4 to avoid unnecessary lengthen of the manuscript. In particular, we will rewrite section 4 following Ref#2's suggestions, and will introduce a table to summarize our findings on individual events.

Section 5.1:
We agree that the model is not capable to reproduce very well the ozone observed at Jungfraujoch (JFJ). Unfortunately, our model does not offer a better representation of this site. To our knowledge there is no tracer continuously observed at JFJ which could be used to identify easily long range transport (LRT) events. CO observations were initially included in our work, but this did not help to identify clearly the LRT events. This section will be however improved, as further detailed in the following.

Section 6:
This section will be rewritten to include a more detailed discussion on the results and uncertainties.

Reply to the specific comments of Ref#1

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“p. 6139, lines 16-20: What about the NO2 enhancements in the mid-Atlantic at around 40deg N and 60 deg N seen in fig 5d?”

The GOME enhancement seems to be local rather than large scale implying the stratospheric contribution may not be to blame. One possible reason for the discrepancy could be related to clouds affecting the GOME retrieval, or an upper tropospheric enhancement from lightning that is not resolved by the model. However, we do not have a clear answer for this question.

“p. 6141, lines 14-15: How did the pollution get to Iceland? And why did it accumulate there?”

The pollution was transported at the periphery of the Azore anticyclone, displaced to the north and located east of Nova Scotia/ Gulf of St. Lawrence at 45 W 45 N on July 29.

“p. 6142, section 5.1: Figure 9 shows also the GEOS-CHEM stratospheric ozone contribution, but I miss a discussion of this contribution in the text.”

The impact of the stratospheric air at JFJ cannot be evaluated easily due to the lack of Be7 observations during this period. However, the stratospheric contribution will be further discussed in the new version of the manuscript.

Interactive comment on Atmos. Chem. Phys. Discuss., 5, 6127, 2005.