

## ***Interactive comment on “A multi-model analysis of vertical ozone profiles” by J. E. Jonson et al.***

**J. E. Jonson et al.**

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We would like to thank the referee for valuable comments and suggestions.

Comments to Referee 1

It should be emphasised that this paper is one of several papers already published, or planned for publication, analysing the model results in the TF HTAP database. In the process of analysing the model data, the main responsibility of the different aspect of the model results has been divided between several groups. The intension from TF HTAP is that other papers should follow. We feel that it is difficult to include material originally intended to be analysed in separate paper(s). As an example, papers looking at other species as CO, focusing on a comparison of CO from the SR experiment (the data used in this publication) and CO like tracers from a separate tracer model experiment, are also planned. Including an analysis of additional species should thus

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be reserved additional papers, and would be beyond the scope agreed for this paper.

Abstract 1. Line 16

The point we are trying to make is that at the surface ozone is to a much larger extent influenced by regional effects, and not so much by intercontinental transport. For events having a "history" of a few days the models perform much better. This sentence is now rephrased as: This possibly explains that statistical relationships between models and ozone sonde measurements are far less satisfactory than previously shown for surface measurements at all seasons in other studies.

Abstract 2. Line 25

We have added that differences are based on ensemble calculations as suggested by the reviewer.

Introduction 3. Page 26098, line 23

As suggested we have added that the SR relationships are calculated comparing reference model runs with model runs perturbing all emissions by 20% in the individual continents.

Introduction 4. Page 26101, line 2-4

This has been rephrased, and the reference to Huntrieser et al. (2005) is included. The point we want to make is that even though plumes from individual sources/events can be identified/followed over long distances, (and in some cases between continents) this will eventually not be possible. However each individual source/event contribute to the general increase in ozone in the northern mid latitudes that has been observed over the last century.

Points 5 - 7 are mainly spelling mistakes.

Ozone sonde measurements 8. Page 26102, lines 19 - 20

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This part will be changed: ..... the measurements were generally within 2%, increasing to 4-5% near the surface, in the tropopause region and where ozone gradients were large.

Model results 9. Page 26105, line 7

The figures show the daily range of concentrations of the individual models at 12 UTC, averaged over the pressure intervals (calculated from the sigma/etta layers) falling within the lower middle and upper troposphere. The range refers to the lowest and highest ozone mixing ratios calculated by the individual models.

Model results 10. Page 26106, line 10

Yes, the range in model results are much larger than the perturbations in ozone caused by the 20% changes in ozone precursor emissions.

Model results 11. Page 26107, line 2

We have added that the trans continental contribution is mostly dominant compared to the contributions from domestic sources.

Model results 12. Page 26107, line 12

"ensemble model means" has been added in this sentence.

Model results 13. Page 26109, line 9

This sentence has been removed.

Model results 15. Page 26111, line 13

the text pertaining to point 4 (Page 26101, line 2-4) is changed (see above). As a result there should be no inconsistency between these two statements.

Model results 16. Page 26111, line 23

We have omitted the word relatively. We have written that the spread is up to a factor

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of two.

Model results 17. Page 26112, line 8

This part of the text is changed. Reference here is made to a new figure included as a response to comments from reviewer 2. We now say that the enhancement in ozone here is caused by emissions in East Asia.

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Interactive comment on Atmos. Chem. Phys. Discuss., 9, 26095, 2009.

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