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Interactive comment on “MIPAS measurements of upper tropospheric C₂H₆ and O₃ during the Southern hemispheric biomass burning season in 2003” by T. von Clarmann et al.

T. von Clarmann

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We would like to thank the reviewer for the helpful comments. In this reply, the original comments are inserted in *italics*.

The paper by von Clarmann et al. presents some useful new atmospheric measurements from MIPAS satellite instrument. In particular, they provide the first global distribution of ethane, with clear enhancements due to biomass burning in the Southern Hemisphere. Although the observation of C₂H₆ in biomass burning plumes is hardly new, the paper makes some interesting observations about ozone enhancements (and

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their lack of strong correlation with C₂H₆). The paper is generally clear and well written. The major weakness of the paper is that it works with only with a small number of tracers although MIPAS produces a considerable number of potentially useful species.

Analysis of other species is beyond the scope of this paper. For the main focus of this paper (O₃/C₂H₆ ratios) the other species are not essential for the moment.

The choice of CFC-11 as a tracer to determine stratospheric contamination is also a bit surprising given that MIPAS also provides temperature and water vapour profiles.

For this purpose low tropospheric variability is essential. Both temperature and water vapor are quite variable in the troposphere and, while for both quantities there is a large vertical gradient within the troposphere, the contrast between the upper troposphere and the lower stratosphere is sub-optimal. When using either temperature or water vapour as a tracer, one should use the change of gradient as criterion rather than the values themselves. In our application the change of gradient can only be determined by finite differences, resulting in an altitude resolution of the inferred quantity quite different from that of our target species. Contrary to that, CFC-11 is measured with an altitude resolution quite similar to that of the target species and thus allows assessment of stratospheric influences via the limited altitude resolution of the retrieval in quite a straightforward manner.

Detailed comments: 1. pg. 12068, l. 19, "2004 and 2005...seasons"

Agreed and corrected.

2. pg. 12071, l. 1. The discussion about spectroscopic line parameters is not satisfactory. As a reasonably reliable set of line parameters for the 820 cm⁻¹ band is now available from the work of Vander Auwerra et al., I am tempted to say that the retrievals

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should be redone!

If we had a balloon instrument of another quite limited data set, we certainly would have redone the retrievals. The large amount of data and the large effort of processing makes it impossible to do the reprocessing within any reasonable time. Our data processor already is booked out for months before this reprocessing could even be started.

Given the extensive experience of the three authors of the Vander Auwerra et al. paper, I don't think that the comment that the laboratory data for this band are "currently under debate" should be included.

Agreed; this will be rewritten.

If the authors do not want to redo the retrievals, then they should provide a reasonable estimate for a correction factor to bring their retrieved VMRs in line with what would be obtained with the new lab data. The corrected values should then be used in the comparisons with other C₂H₆ data.

Agreed; will be done.

3. *pg. 12071, l. 25, "Although these measurements were made in 1992,"*

Agreed; will be corrected.

4. *pg. 12087, 12090, 12092 and 12093, the x and y axes should be labelled in the figures.*

Agreed; will be done.

5. *pg. 12093 something is wrong with the white lines in the figure.*

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We will convert the figures from *.ps to *.eps at higher resolution.

6. pg. 12076, l. 25, “contributes to convection”

Agreed; will be corrected.

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 12067, 2007.

ACPD

7, S6260–S6263, 2007

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