

Interactive comment on “Global distributions of acetone in the upper troposphere from MIPAS–E spectra” by D. P. Moore et al.

Anonymous Referee #2

Received and published: 14 December 2010

In this paper, the authors report on the first global acetone observations using data from the MIPAS-E instrument. They briefly discuss the retrieval and uncertainties, show global maps for August 2003 at two altitudes and the zonal distribution for the same month. They also report on a systematic decrease of acetone at Northern mid to high latitudes over the month of August and attribute this to reductions in biogenic emissions.

The paper reports on an interesting new data set which should be published. However, in its current form it lacks important aspects of the retrieval and contains only a very superficial and not very convincing discussion of the results. I therefore recommend publication only after major revisions as suggested below.

General Comments:

C11067

1) The paper is in parts not written very clearly, and cannot be understood without first reading Moore and Remedios (2010). While all the details on the retrieval do not need to be repeated here, a brief summary of the analysis is needed to make the paper more readable. Also, the error discussion should follow after the method was described.

2) Reference is made to the detection of acetone in MIBAS-B balloon data, but another fitting window is used and the fit results look much less convincing than in Remedios et al., 2007. Please explain a) why only a small window was used, b) what the background correction is and why you apply it only for the red curve shown in Fig. 3 and c) how you can exclude interference by other species

3) Why are the acetone results not shown also on the lowest (and arguably most interesting) layer in Fig 4?

4) The zonal distribution in Fig. 5 looks odd to me – there is no clear separation between troposphere and stratosphere in the acetone distribution which needs to be explained or at least discussed. Why should acetone which is released at the surface show a smooth transition into the lower stratosphere? Could this be linked to the averaging kernels of the measurements?

5) There is no discussion of vertical resolution and information content – please add typical averaging kernels and a short discussion.

6) In the summary, it is stated that acetone enhancements “linked to biomass burning” are observed in several regions – this is not discussed in the paper and I don’t see any evidence for that in the figures. Please remove or provide support for the statement.

7) In several places, the paper reads like a draft with repetitions and mixed up sentences. Please reread and edit

Detailed Comments:

page 23540

C11068

l4: in August

l9: you report “up to 3000 ppt in the upper troposphere” here but in line 11, you give 20000 ppt as upper limit

l9: what are “high distributions”?

l11: reversible transport between troposphere and stratosphere not discussed in the paper page 23542

l5: “during the nearly continuous first two years of flight” – I assume that ENVISAT flight was not only “nearly continuous” – do you mean continuous measurements?

l23: gives confidence

l26: mention that these were balloon measurements

p23545:

l13: retrieval is performed

l15: of the remaining

l20: within the MIPAS-E noise

page 23546:

l9: this sentence is odd, please check

p23543:

l27: designed to be able

Caption Fig. 5:

zonal distribution of acetone

Caption Fig. 6:

C11069

Why are there only 6 points if daily averages are shown?

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 23539, 2010.

C11070