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Comment

***Interactive comment on “***

**Ethane, ethyne and carbon monoxide  
concentrations in the upper troposphere and  
lower stratosphere from ACE and GEOS-Chem: a  
comparison study” by G. González Abad et al.**

**G. González Abad et al.**

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Received and published: 27 June 2011

Response to Anonymous Referee #1

Thank you very much for all your constructive comments.

Figs. 3 and 4. The contribution of the least relevant factors is barely visible. The abscissa scale in the relative errors graphs should be changed up to a maximum of

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100 % for C<sub>2</sub>H<sub>6</sub> and less than that for C<sub>2</sub>H<sub>2</sub>. Even the absolute errors graphs could be scaled to smaller maximum values for both molecules. There is not much point in showing up to 0.4 ppbv for C<sub>2</sub>H<sub>2</sub> when the highest retrieval does not pass 0.2 ppbv. Besides, it is not quite clear how the effective total error is calculated. Should it not be the sum of all contributions? Please add a comment on this in Section 2.

Response: The abscissa scale has been change in all 4 plots. A comment in section 2 explaining the calculation of the total systematic error has been included in section 2.

Figs. 5 and 6 are very faint, or at least they appear very faint in the available version of the manuscript. It should be easy to redraw them using thicker sets for lines, letters and numbers.

Response: The figures have been redrawn.

Total budget values for ethane and ethyne are given in Tg C units in Section 4. This is perhaps obvious for the specialized readers, but not to everyone.

Response: A comment has included in section 4 explaining what Tg C stands for.

Fig. 8 is very clear and shows seasonal CO concentration variations and hemispherical asymmetry. However, the figures of 17 % and 15 % quoted for low estimations in Southern hemisphere and Northern hemisphere respectively, are mentioned (lines 307 and 313 of the manuscript) but they do not seem to match the results depicted on the right hand panels of Fig. 8. It would seem that the model overestimates Southern hemisphere results in many cases, unless I am misinterpreting the graphs. This calls again for further explanation.

Response: The 17% underestimation in the Southern Hemisphere is linked to the fire season. A new comment tries to explain the situation with the fire emissions and the otherwise general overestimation of the concentrations in the Southern Hemisphere.

Figs. 12 to 14 are very good, as are Tables 2 to 4. There is a comment in the Conclusions about agreement being good, which is true, and mean bias values being smaller

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than 40 % for all three molecules in all regions, which does not seem to conform to some values in Table 4 for C<sub>2</sub>H<sub>2</sub>, especially in North America and Antarctic.

Response: The conclusions now include a specific comment on the ethyne high bias over Antarctica.

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Interactive comment on Atmos. Chem. Phys. Discuss., 11, 13099, 2011.

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