

## ***Interactive comment on “Validation of ozone measurements from the Atmospheric Chemistry Experiment (ACE)” by E. Dupuy et al.***

**E. Dupuy et al.**

Received and published: 16 September 2008

We thank Anonymous Referee #2 for his/her valuable comments, which we feel have helped improve the manuscript. We hope to have replied to each comment to the satisfaction of the Anonymous Referee. We have made efforts to implement almost all the suggested changes, including possible additions to the manuscript, while trying not to add to its length. The responses are detailed below, with the original comments indicated in italics.

This is part 3 of our response to Anonymous Referee #2 addressing the Minor Comments (Figures and Tables). Because of the maximum length allowed, the General and Major Comments from Referee #2 and the Minor Comments (on the text) will be addressed in separate author comments.

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## Tables:

### Table 1:

*The latitude coverage given for a few of the coincidence data sets are confusing:*

*\* SAGE II has observations in two small latitude bands: 75-80S and 75-80N. Table 1 suggests that there are also coincidences between 75S and 75N.*

*\* SAGE III has observations in two latitude bands: 45-80N and 25-60S. Table 1 suggests coincidences between 25S and 45N.*

*\* POAM III has observations in two latitude bands: 55-71N and 63-88S. Table 1 suggests coincidences between 63S and 55N.*

The above statement for SAGE II is not correct. Over one day the instrument samples two narrow latitude circles, but because of the precession of the orbit the maximum latitude coverage achieved over the course of one month is  $\sim 80^{\circ}\text{S}$  to  $80^{\circ}\text{N}$ . Coincidences with ACE were indeed found at all latitudes between  $70^{\circ}\text{S}$  and  $66^{\circ}\text{N}$ . The latitude ranges for the other satellite datasets have been clarified when needed.

*\* The approximate number of events do not always match the number of events in the text, why not give the actual number?*

*\* The number of events should be split in SR and SS*

Table 1 now lists the actual total number of events, matching the text. Table 7 shows the results with the SR and SS information provided separately. The numbers for each of the SR/SS cases are also provided in the figures as required.

*\* The column distance should not have the mean and standard deviation, but instead the distance within which 50% or 68% of the coincidences are falling.*

We prefer to use the mean and standard deviation to describe the distances for consistency with other papers in the ACP Special Issue on ACE validation.

*Table 6: The version numbers of the satellite data used in the MWR comparisons are not always the same as those used for the ACE comparisons: GOMOS (6.0a in section 5.4.1), MIPAS (only 4.62 in section 5.4.2), Lidar (none mentioned in section 6.6). Explain in caption what a range in the number of coincident pairs means.*

This is because the comparisons were done by different groups with access to different data versions. The number of coincident pairs varies with altitude so a range is given. This has been clarified in the table footnotes.

*Table 7:*

*\* This table should have an extra column for version number and an extra column for bias of the correlative instrument*

Because of space constraints, no more columns can be added to Table 7. As mentioned earlier, the version number information is now given in Table 1, as well as in the text. We feel that description of the biases for the correlative measurements is best given in the text.

*\* The column 'typical difference' should be replaced by 'average relative difference'.*

*\* The whole table will probably change when the more rigorous statistical significance has been performed.*

As mentioned earlier, the typical differences have been replaced by average values of the mean relative differences and the table has been updated in the revised manuscript.

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## Figures:

*Figure 1, caption: 'symbols and colors correspond to those in the top panel': symbols are '+' in the bottom panel, 'o' in the top panel. Colors and symbols are not explained. Color seems to be indicating the time??*

Figure 1 was removed from the manuscript.

*Figures with difference profiles:*

*\* An extra line should be added indicating the uncertainty estimate of the correlative instrument.*

We prefer to provide this information in the text.

*\* The error bars should be the standard deviation divided by the square root of the number of INDEPENDENT pairs MINUS one.*

The statement above is incorrect. As mentioned earlier, the error bars as given on the plots are the correct standard error.

*Figure 12: Plot should go up to 55 km, according to the text no measurements above 55 were taken.*

There are measurements above 55 km for Odin/SMR but with a low signal-to-noise ratio, as stated in the ACPD text (p.2541, l.21). We have modified Figures 12 and 13 (11 and 12 in revised manuscript) accordingly.

*Figure 16: The middle and right figure are exactly the same except for the x-axis.*

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This figure has been corrected (now Figure 15 in revised manuscript).

*Figure 17: It is not clear from the caption whether the difference profiles use the convoluted and photochemically corrected profile (black dashed) or only the photochemically corrected one (blue).*

The convolved profile was not used in the quantitative analysis. This has been clarified in the revised manuscript and the figure caption was reworded. This is now Figure 16 in revised manuscript.

*Figure 17: Change 'extrapolated' and 'ext' to, e.g., 'corrected' and 'corr'*

Caption was modified to explain the terms used.

*Figure 29: Error bars are missing in the middle and right plot. Error bars in the left plot are never smaller than the width of the symbol, so this can be left out of the caption.*

We have added error bars on the difference plots in Figure 29 (28 in revised manuscript) and removed the comment on the error bars in the left panel.

*Figure 36 and 37 miss information on uncertainty. This can either be given in the caption or by plotting for example only those points for which the  $2\sigma$  values are smaller than the absolute value.*

This information has been discussed in the revised text.

*Figure 40: The dotted lines are confusing. Suggestion: make one solid line for  $y=0$ , a dashed line for the average value, and two dotted lines indicating the standard deviation. Leave out the lines at 10% intervals.*

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The grid lines every 10% have been removed for clarity in Figures 40 and 41 (now 39 and 40 in revised manuscript). The latitude and longitude of the ground-based station have also been indicated on each subplot. (also see reply to Anonymous Referee #1).

*Figure 42: It seems that Kiruna and Thule are giving deviating results. Please discuss in text.*

This has been discussed in the text (ACPD, p.2568, l.11-17).

We thank Anonymous Referee #2 for the technical corrections and suggestions and we have corrected the manuscript accordingly. For brevity, these are not listed.

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Interactive comment on Atmos. Chem. Phys. Discuss., 8, 2513, 2008.

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