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Comment

Interactive comment on “Global and long-term comparison of SCIAMACHY limb ozone profiles with correlative satellite data (2002–2008)” by S. Mieruch et al.

Anonymous Referee #2

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Global and long-term comparisons of SCIAMACHY limb ozone profile with correlative satellite data (2002–2008)

S. Mieruch et al.

This paper has been written in order to place the SCIAMACHY limb scatter ozone data product into context with other satellite produced ozone data sets that span a time period similar to that of SCIAMACHY. The main findings are that the SCIAMACHY ozone data set is consistent with SAGE II, SABER, MLS, ACE-FTS and HALOE throughout most of the stratosphere and that the SCIAMACHY data has a negative trend in the

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Interactive Discussion

Discussion Paper



upper stratosphere that is significant but likely not real. This is a useful paper and provides assurance that the SCIAMACHY limb scatter ozone is of value for inclusion in future studies like the SPARC Data Initiative and the ozone_cci.

General Comments

Although I am not convinced that the average over large amounts of data truly reflects the biases associated with any given ozone retrieval I believe it is very difficult to go much further. Limb data sets by their nature are sparse and any overlap with tight coincidence between two data sets is hard to find. Therefore, to properly breakdown a limb scatter data set based on things like scattering angle, solar zenith angle, season, latitude, time of day etc. and do a complete and thorough comparison based on all these things that may introduce systematic bias is statistically impossible as the comparison sets get smaller and smaller with the inclusion of more and more restrictions. For these reason I will accept that this work has indicated that there are no serious flaws with the SCIAMACHY limb ozone and this significant finding should be published.

I am curious to know why the authors chose not to compare with other ENVISAT and ESA Third Party Mission data sets such as MIPAS, GOMOS, OSIRIS and the Odin-SMR. I find this odd as MIPAS and GOMOS are onboard the same spacecraft as SCIAMACHY and OSIRIS uses the same limb-scatter technique.

This paper duly warns users that SCIAMACHY ozone should likely not be used for trend analysis and this is also an important result. This nicely sets up a follow-on paper where the pointing issue is addressed and the significant trends not found in other data sets disappear.

Specific Comments

The abstract should be more clear in stating the statistically significant trends mentioned within the paper are likely not real. The way the abstract is worded may cause confusion. Line 18-Page 4870: the statement that coincidence searching takes time

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should be removed from here and other places within the paper. I understand what the authors truly mean but the statement wrongly makes them appear lazy. The scale associated with the percent difference axes of the plots seen in Figures 1 through 5 should be changed to better reflect the significant detail contained within these plots. It is clearly understood that the SCIAMACHY ozone has significant bias below 20 km and this is likely due to the improper handling of clouds. Expanding the scale to visualize these biases hides the truly significant information between 20 and 50 km. I would like to see the range for these plots be adjusted to no more than plus or minus 15 percent. The authors should address their choice of 400 km and 4hr as their coincidence criteria. Is this good enough to call two ozone measurements coincident or is it chosen to increase the number of coincident profiles included with the average? In the discussion that starts on Line 7-page 4879 the authors need to be more specific about the figure associated with each of their statements. There is a lot of information in these figures and the discussion. Some guidance as to which figure to look at would be helpful. The biases seen around 30 km in the tropics should be highlighted in the abstract and the summary and conclusion. It is important for users of SCIAMACHY ozone to be well aware of such biases.

Summary

This paper should be published with only minor revisions.

Interactive comment on Atmos. Meas. Tech. Discuss., 4, 4867, 2011.

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