

Interactive comment on “Global validation of improved SCIAMACHY scientific ozone limb data using ozonesonde measurements” by J. Jia et al.

Anonymous Referee #1

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This paper presents a review of the algorithm developments for version 3.0 of the Bremen SCIAMACHY limb ozone retrievals as well as an intercomparison of versions 2.9 and 3.0 with the WOUDC ozone sonde database. Some details in the study are lacking and several comments below need to be addressed. Overall the language of the manuscript needs to be improved.

Specific comments:

Title: why use the descriptor “scientific”? Also, it might be helpful to mention the version(s) in the title.

4818-19: At least provide references for the list of satellite instruments, and consider expanding the acronym to the full instrument name.

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4819: Include the specific version for which Raphoe et al. provided the error budget. Is there any change in the error budget due to the changes in the algorithm for Versions 2.9 and 3.0?

4819: Are there any differences in forward model parameter assumptions between the two versions, i.e. surface albedo, aerosol, etc.?

4819: What does “+5%” mean?

4819: Previous comparisons to ozone sondes are mentioned – what is the reference to this work? It should be referenced in detail here.

4819: The effect of the stray light is speculative, which is interesting, but please provide some rationale as to how this is actually affecting the retrieval. It is not clear why the DOAS approach would necessarily be better in this scenario. Did the authors test the effect of the assumed aerosol load? This would also be sensitive to changing solar azimuth angles and have the strongest effect for small scattering angles. This needs to be addressed, and a systematic study on this is likely warranted.

4821: An additional figure showing the relative azimuth angle as a function of angle along the orbit track would be helpful (in the text the angles are only referred to “small” and “large”), as this is an important aspect of understanding the biases in the retrieval. Also, “solar light” is not a typically used phrase.

4822: What are the “issues” near the boundary of channel 3? Specific calibration problems?

4822: How is the extra-terrestrial solar spectrum obtained? Is it measured, or from a standard database?

4823: How is the wavelength dependence of the surface albedo known?

4824: At what altitude does the UV information begin to have a significant effect in the version 3.0 retrieval?

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4824: What is a “ground pixel”? This is confusing.

4825: How sensitive are the results of this study to the choice of coincidence criteria?

4826: Section 3.1.1 is not rigorously explained and the wording is confusing. Please revise. Particularly, the sentence beginning “This represents the profiles. . . “ is unclear and confusing.

4827: What is an “averaged altitude between January 2003 and December 2011”? Also very confusing. 4841: Why is the altitude range so different between versions 2.9 and 3.0?

4828: It is unclear if the statistical comparisons (Figs 2-8) are done on the average profile or on the set of coincident profiles. Please clarify.

4829: Why is the overestimation at the ozone peak in the tropics not shown?

4830: What is the main reason for doing the partial column comparison in addition to the vertical profile study? Is there really any information to be gained? Please specify.

4832: Is it possible to show a plot of the radiances to identify the stray light contamination? Again, could the authors explain how the stray light could impact the peak value (only?) of the retrieved profile? Did the testing with synthetic retrievals including a full range of forward model parameters, including a range of aerosol, surface reflectance, etc.?

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