

Interactive comment on “Ozone profile retrieval from limb scatter measurements in the HARTLEY bands: methodology, algorithm description, sensitivity studies, and validation” by G. J. Rohen et al.

G. J. Rohen et al.

Received and published: 26 November 2007

Response on the general comments of the reviewer: The main focus of the reviewers comments addresses to the already published results. At least one of the already published papers has no focus on the retrieval with a short description on one and a half page, and the other paper shows first results of an old processor generation version 2.17. Besides the error table, no figures are shown repeatedly in the paper. A more detailed description of both the methodology and the sensitivity studies is essential to assess the validation results. Therefore, this paper is essential for reproducing the retrieval. The different results of the comparisons with MIPAS are caused by the fact

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that MIPAS data have been processed with the ESA processor (Rohen, 2006) or with the IMK processor for the presentation in this submission. I agree with the reviewer that the phrasing was insufficient. I reorganized the paper and added a figure for better description. The phrasing was proof-read in terms of phrasing by a co-author. Basically, the paper did undergo a major revision in terms of phrasing and partly in terms of factual issues.

Response on the specific comments of the reviewer: I added the remark, that the large errors may prevent a precise retrieval. The stray light has no significant impact on the retrieval results because the sensitivity of the methodology (see the averaging kernels in Rohen, 2006, and in the weighting functions in the submitted paper) becomes small although the stray light is as already recognized - quite enormous above e.g., 60 km (see Fig. 10). The stray light is indeed significant and the rough estimation of the stray light contribution in Fig. 10 agrees with findings the SRON study (van Soest, 2005). The residuals in Fig. 7 agree also fairly well with the estimation of stray light by SCIA-RAYS although residuals of same sample measurements at different wavelengths may show more or less stronger stray light influences. I fear there will be no large improvements of the retrieval using two wavelengths instead of thirteen. The altitude coverage is much worse in this case and the errors will certainly larger. It is one advantage of the retrieval using wavelengths of large ozone absorption cross sections, but not to overload the specific information from one wavelength. The TRUE method was extensively described in the cited publications and maximum errors have been given properly herein. We used orbit-wise tabulated correction factors derived by TRUE. It is in fact a deficit to have only correction values for tropical zones, and this was mentioned in the conclusions but this could introduce larger errors outside of the tropics. We now give an additional remark in the text and in the error overview that there is a potentially larger deduced error. Since a new processor was planned to be introduced this year, we didn't force the investigations in terms of TRUE. This was also remarked in the end of the paper in the conclusions. TRUE will therefore not be implemented in the next processor in all likelihood if the new processed SCIAMACHY L1 data are hopefully well

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tangent-height improved.

The imprecise sza is not a random error, but more an averaging effect due to the spread of the sza during a vertical scan and along the LOS of the SICAMACHY field-of-view. It is of course possible to reduce the errors which are fairly small at small sza. The advantage of a more spatially resolved retrieval must be investigated because most of the measurements are made with a sza below 80° and the impact on the retrieval results is not clear. But this change should be implemented in the next planned versions since there this all results, e.g., validation results are revised.

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 12097, 2007.

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