

Interactive comment on “Validation of ozone monthly zonal mean profiles obtained from the Version 8.6 Solar Backscatter Ultraviolet algorithm” by N. A. Kramarova et al.

Anonymous Referee #2

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General comments:

The authors present the Monthly Zonal Mean (mzm) profiles from the SBUV retrieval algorithm version 8.6. The profiles are validated against satellite instruments (Sage II and UARS/Aura MLS) and ground based measurements (microwave, lidar, Umkehr and ozone sondes). The validation results are limited to 50°S~ 50°N and 25~1 hPa. I recommend publication of the paper after the following comments have been addressed.

Specific comments:

- page 2553, line 24: 'PMF' is used here for the first and only time in this paper. In
C153

such a case, don't use an abbreviation, but write it out fully.

- p. 2553, l. 29: “The mzm profiles are calculated ...”. How are they calculated? Is the mzm profile the mean of all individual retrievals, or is it retrieved using the monthly mean radiances? It's probably explained in the algorithm description by Bhartia (2012, see paper reference list), but a small explanation would be useful.
- p. 2555, l. 4–5: Some explanation on the 'Integrated Kernels' would be welcome. Later on p. 2560 averaging kernels are briefly mentioned. How are integrated kernels and averaging kernels related, and how would you calculate an AK for a monthly mean profile?
- p. 2558, l. 16: the lidars are operated only at night, while the SBUV instruments measure backscattered solar light. Doesn't this introduce errors due to the diurnal variation?
- p. 2559, l. 12: include a line on how many pressure levels the SBUV retrievals are performed and what the altitude of those levels is.
- p. 2559, l. 13–14: if there are errors given on the vmr profiles, how are they translated into errors on the layer amounts?
- p. 2560–2561, section 2.4.2 “Vertical resolution”. Smoothing errors are discussed in Bhartia (2012) and Kramarova (2013), but the latter paper is in preparation. So a little more explanation on why the 1–2% limit for the smoothing error is used would be useful.
- p. 2571, l. 14: “recommended layer combinations”, recommended where?
- p. 2572, l. 18–21: it's not $\pm 5\%$, but it should be $\pm 6\%$ (see page 2571, line 16 an figure 9). But more importantly, I disagree with this conclusion for two reasons. The first is that looking at plots 10-11, it's the thick black line (12 month moving

average) that doesn't exceed the $\pm 5\%$ reach values of $\pm 15\%$ for the Umkehr instruments and $-10\pm 15\%$ for the sonde stations. Second, the column from the surface up to 31.6 hPa is only validated for northern hemisphere stations between 40°N and 52°N . It is correctly described in the conclusions section on p. 2577, l. 8–11, although line 11 should read " $\pm 5\%$ for the 12 month moving average".

Technical corrections:

- p. 2556, line 18–19: "In this section we provide a brief description of each independent dataset." i.e. add "a" and delete the "s" from datasets.
- p. 2571, l. 15: replace "...biases are 0-2% outside..." with "...biases are between 0 and -2% outside...".
- p. 2572, l. 1: replace "SBUV and MLS" with "SBUV and Aura MLS" like in the first part of section 4 on page 2571.

Interactive comment on Atmos. Chem. Phys. Discuss., 13, 2549, 2013.