**Atmospheric
Chemistry
and Physics
Discussions**

Interactive comment on "A global climatology of tropospheric and stratospheric ozone derived from Aura OMI and MLS measurements" by J. R. Ziemke et al.

Anonymous Referee #2

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This study presents a six-year climatology of TCO and SCO derived from of OMI/MLS data using the interpolation-based tropospheric ozone residual method. This climatology can be useful for both model evaluation and satellite retrievals. It is generally well organized and written and is suitable for publication on ACP. However, the authors don't provide adequate comparisons with previous studies when describing the features of TCO and SCO climatology. Some of the explanations (e.g., differences with relative to LLM climatology) seem to contradict to their results. I recommend this paper to be published after addressing the following specific comments:

1. Page 17882, line 6: I think that a TES retrieval paper will be a better reference than

Zhang et al. (2010).

2. Page 17882, line 10, "this remains to be shown . . .." This might be true for deriving monthly mean TCO and SCO, but certainly not true for deriving accurate daily measurements. It should be noted that SCO from MLS has a precision of 2-3% (4-8 DU). The study by Stajner et al. [2008] shows better agreement even in the tropics with ozonesonde measurements than results from trajectory mapping and 2D-interpolation methods as shown in Schoeberl et al. (2007). I think that all the sentences except for the first sentence can be removed without affecting the paper and the first sentence can be moved to the end of the previous paragraph.

3. In summary, page 17892, line 17 and page 17888, line 8: Does OMTO3 really use the LLM climatology? I think that it uses a different climatology [Bhartia and Wellemeyer, 2002]. 4. Page 17885, Line 27 and page 17886, line 7: since "rebinned" usually mean averaging to degrade the spatial resolution, I suggest changing it to "interpolated" 5. Page 17888, line 25: I don't think that MLS retrievals based on microwave emission is not affected by high solar zenith angles.

6. Section 3, a reference/link to SHADOZ and WOUDC data would be good. Also in acknowledgements, it is good to acknowledge SHADOZ, WODUC, and NCEP for the data.

7. Does the number profiles in Table 1 really refer to daily measurements? The number of profiles seems to too small (at most 56). Maybe you means the number of monthly mean values? Why ozonesonde data from Hohenpeisenberg, where there are lots of observations, are not used?

8. In Figure 3, it would be better to separate the two panels by latitude ranges, 30S-30N, and 30N-90N.

9. Page 17888, line 10-20: the LLM and OMI/MLS is attributed to the ozonesonde spatial sampling (mainly over land) and land/ocean differences (more ozone over land).

The authors also refer to Figure 5 for more discussion. First of all, no discussion is provided with respect to land/ocean differences in Figure 5. Second, from figure 5, it is clear that there is often more ozone over ocean that over land for most of the northern middle latitude, opposite to what the authors argued. Please clarify this. 10. Page 17889, line 28: It might be good to separate tropical South Atlantic and tropical south middle latitudes as STE is probably not important for ozone in the tropical South Atlantic, where lightning and dynamics are also as important [Martin et al., 2002].

11. Page 17890, line 8: it is not good to call "the standard RMS error of the mean" as uncertainty, which normally refers to the error of the measurements. Note that this RMS error is not the quantity of a priori standard deviations to be used in satellite retrievals. To make the data more useful, can you provide the standard deviations (computed from daily measurements)?

12. Page 17891, line 4, you can refer to Liu et al. [2002] about the shift from spring to summer with latitude.

13. Page 17891, line 23-24: do you mean Figures 8a and 8c instead of Figures 7a and 7c? 14. In sections 5 and 6, how does this climatology of TCO and SCO compare to previous studies (e.g., Fishman et al., 2003, previous studies by the authors, Liu et al. (2006)), including similarity and especially major differences.

15. In summary, abstract, and the context, it was said that the climatology is available from the TOMS web site. But from the website, only tropospheric ozone column or mixing ratio on 1x1.25 degree grid can be found. By the way, please mention in the text about whether mean tropopause is also provided with the TCO and SCO climatology.

References

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