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Atmospheric Chemistry and Physics Discussions

# *Interactive comment on* "Trends in Global Tropospheric Ozone Inferred from a Composite Record of TOMS/OMI/MLS/OMPS Satellite Measurements and the MERRA-2 GMI Simulation" *by* Jerry R. Ziemke et al.

**Jerry R. Ziemke et al.**

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Main Comments: You need to improve the connection between the main article and supporting material. Specifically, you need to refer to sections A, B, C, and D of the supporting material separately and to restate (in one or two sentences) the main conclusion of these sections in the main bod (e.g.., the magnitude of the various constant offsets

Thanks – this is an important point. In the revision we mention each section A-D



individually in the main text including their main conclusion(s).

More information on the likely cause(s) of the increase in tropospheric ozone column over central Africa would be useful.

We added further discussion of the Heue et al. (2016) results that indicated increases in biomass burning as the likely cause of positive trends over that region. Their analysis suggested that positive trends in ozone over central Africa maximized for the months of June-August which coincides with the peak burning season in that region.

Comments:

L66: How different is a 28 Tg from what you find? If significantly, different, the cause could be discussed around lines 372-377.

We have added more discussion in the revision.

L126: Remind readers why the CCD product is limited to the tropics

Done.

L350-352: What drifts have been observed in the MERRA-2 meteorological fields during the TOMS period that might affect the trends in the GMI simulation?

We have added discussion on this point regarding changes in the observing system input to MERRA-2 and impact on long record ozone.

Minor Comments:

L28: is include to evaluate –> is used to aid in the interpretation of

Done.

L60: effects on tropospheric ozone from these changes in emissions –> effects of these changes in emissions on tropospheric ozone

L92: was determined –> was constructed

Done.

L203: v2.3 climatology –> v2.3 lightning climatology

Done.

L220: that include –> and includes

Done.

L286: tropospheric NO –> tropospheric NO emissions

Done.

Supporting Material L15: Remind reader why you use only rows 3-18 here.

Done.

L23: Figure S1. What do you mean by “Overkill” TCO?

Done.

L23: You may want to include the mean trend by decade for each region as these trends were used as a guide when choosing -1.0 DU decade-1 as the OMI/MLS TCO adjustment.

Done.

L29: (indicated) –> beginning with 40N-60N (upper left) and ending with 40S-60S (lower right).

Done.

L64: Likely fine but confirm that change and uncertainty are identical.

Done.

L98-103: Make sure that this information is in main paper too.



Added this also to main text.

L107: An important yet small –> A small but important

Done.

L107: is to show some –> is an

Done.

L167: “Most all”. Can you be more specific?

Re-written / added text to clarify. Detailed in main text Section 2.3.

L199: Why did you integrate from the ground to 8km as opposed to from the ground to the thermal tropopause as done elsewhere in the article?

Sonde ground-to-8 km column ozone has now been replaced with sonde TCO for the analyses.

Figure S10: The captions for A and B are identical. I believe the caption for B should refer to GMI as opposed to OMI/MLS.

We have corrected this in the new Figure S10.

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