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Atmospheric Chemistry and Physics Discussions

Interactive comment on "The Tropical Tropopause Layer 1960–2100" *by* A. Gettelman et al.

A. Gettelman et al.

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Replies to Reviewer #2

We thank the reviewer for their comments. We have made many substantial changes to the paper to try to improve it, and we think we are able to address the reviewer’s concerns as noted below.

1. We have not included the MRI data in our trend calculations, and we note that interpolation is only a problem for a few models. The real issue is when interpolation is done without some of the vertical information present in the original model (which happened for the GEOS data). 2. TTL variables: actually we have done a detailed comparison between calculations using 2D zonal mean temperatures and using 3D instantaneous or monthly mean temperatures, and have compared means as well as trends. This is contained in section 2.3, with a figure showing results for WACCM. Similar analyses were preformed for CMAM (no figure). 3. This is a good point and we have tried to ad-

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dress it further in the discussions and conclusion sections, performing a new analysis on diagnostics looking at changes in the vertical gradient of potential temperature. We have already done some of this, showing that there is a correlation between models ozone and temperature. We have also done a multiple linear regression analysis to show that near surface temperatures, ozone and stratospheric temperatures can affect tropopause temperatures. 4. We now discuss the change in trends in the paper. It is likely that some of the recent trends may be due to ozone changes, and ozone recovery is likely to alter these trends. It is complex, and we are not able to fully disentangle the effect. 5. Based on the lack of significance and noise in the analysis, we have minimized the discussion of tropical width in the paper and leave this for further work.

Minor Comments:

L225. Use italic instead of capital ALWAYS.

>> Done

L270. Delete pressure in front of LRTP

>>Done

L293. I don’t think that Fig. 7a is coherent with Fig. 7d. While Fig. 7d shows ENSO-like dipole pattern, Fig. 7a does not. Need further discussion.

>>Discussion has been modified to make this clearer. It is also clearer in the revised figure, which uses a more consistent treatment of years.

L296. Use western Pacific instead of W. Pacific. Same to other sentences.

>>Done

L296. Authors argue that SPCZ shifts equatorward. But, I do not see that in Fig. 7. Need further clarification.

>>Discussion has been reworded here to clarify

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L468. Replace SVMR with Qsat.

>>Done

Fig.1c. Replace minlrp with lrmp at the panel top.

>>Done

Fig. 4 and others. Why don’t you use full model name: e.g., UMLIM -> UMSLIMAC

>> The names often don’t fit, so they have been abbreviated. We are thinking of setting a length limit on model names for the next CCMVal intercomparison.

Fig. 12. CCSRNIES and MRI do not have interannual variability but have linear fit. Plotting error?

>>This has been corrected.

Fig. 16. Make HALOE/ERA40 bigger.

>>Done

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 1367, 2008.

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