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Atmospheric Chemistry and Physics Discussions

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Interactive Comment

# *Interactive comment on* “Effects of the 2006 El Niño on tropospheric ozone and carbon monoxide: implications for dynamics and biomass burning” *by* S. Chandra et al.

**S. Chandra et al.**

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We greatly appreciate the comments of referee #1 and for suggesting to “expand the frontiers of knowledge to a much greater degree”. We have made a number of changes in the manuscript based on the comments of Referee #1. They are discussed in the following:

A reference to the paper by *Fishman et al.* (JGR, 2005) has been added.

Tropospheric $O_3$ from both the GMI model and OMI/MLS measurements are calculated using the same tropopause pressure from NCEP analyses. The tropopause pressure is defined using the World Meteorological Organization (WMO) 2K-km$^{-1}$ lapse rate definition.

Validation of TCO and SCO measurements from OMI/MLS has been discussed in a number of papers (e.g., *Ziemke et al*., 2006; 2009). The validation of MLS v2.2 $O_3$ and CO measurements are discussed by *Froidevaux et al*. [2008] and *Livesey et al.* [2008]. For both v2.2 data products, the suggested lowest retrieved level for scientific use is 215 hPa which is below the tropopause height ($\sim$100 hPa) in tropical and subtropical latitudes.

A validation of the GMI global model of TCO used in this study is given in the Appendix and is discussed in section 3. It compares the zonal and seasonal variability of TCO derived from the model with observed variability from OMI/MLS. The comparisons show that the measurements and model agree well in temporal and spatial variability from the tropics out to the subtropical wind jets at around $\pm 30^\circ$-$35^\circ$ latitude.

Unfortunately, this is not the case for SCO. There are significant differences between the modeled and observed values of SCO in the tropics. The modeled SCO in the tropics shows a large zonal variability of $\sim$30 DU or greater in monthly averages. In comparison, the zonal variability in SCO inferred from MLS is generally less than 5 DU. These differences are due to errors in the GEOS-4 assimilated wind fields caused by excessive subtropical transport (involving mixing and entrainment rates) in the stratosphere [*Tan et al*., 2004]. We feel that a discussion on this issue is beyond the scope of this paper.

References:

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Interactive comment on Atmos. Chem. Phys. Discuss., 9, 2735, 2009.



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