

## Review of 'Global O<sub>3</sub>-CO Correlations..' by Hyun-Deok Choi et al.

### General comments

This is a very well written manuscript describing a thorough analysis of the model O<sub>3</sub>-CO correlations in the free troposphere, as a means to analyze origins of model biases. The authors analyze various meteorological drivers, and the relative contribution of different emission sources to the modeled correlations, and evaluate them against TES observations at 618hPa.

Overall I have very few comments, hence I recommend this manuscript for publication.

### Specific comments

In the manuscript I miss a comment regarding the spinup-time of the individual model runs.

Also for GMI/fvGCM you use meteorology from the year 1995, while for the other two simulations you take 2005 meteorology. Did you analyze any potential systematic differences between these two years? I understand this has no impact on the general conclusions drawn from this work.

The authors analyze the impact of three meteorological drivers. Here I think it would be very interesting if they would have included, or will include in future work, ECMWF-based meteorology (ERA-Interim) in their analysis.

The authors blame an over-estimate of O<sub>3</sub> in the SH subtropics in GMI/MERRA due to too shallow tropical deep convection. Even though the contribution of this process is clearly illustrated by the <sup>222</sup>Rn-based analysis, I wonder if the conclusion is correct: is there a possibility of compensating errors? Is there independent evidence that MERRA tropical deep convection is too shallow?

The authors also analyze the contribution of STE to tropospheric O<sub>3</sub>. Here, it would be useful to see budget numbers of their (annual mean) STE, to be able to intercompare with other systems.

### Technical corrections

Pp11, line 10: **The** tropopause...

Pp17, line 13: ...previously suggested that **the** O<sub>3</sub> maximum...

Pp19, line 12: ...found **a** multi-model...

Pp29, line 23: ...simulated ~~in~~ downwind ...