Atmos. Chem. Phys. Discuss., 12, C6122–C6124, 2012
www.atmos-chem-phys-discuss.net/12/C6122/2012/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Interrelated variations of O_3, CO and deep convection in the tropical/subtropical upper troposphere observed by the Aura Microwave Limb Sounder (MLS) during 2004–2011" *by* N. J. Livesey et al.

Anonymous Referee #1

Received and published: 24 August 2012

Interrelated variations of ozone, CO, and deep convection in the tropical/subtropical upper troposphere observed by the Aura MLS during 2004-2001 (Livesey, 2012)

Author presents 7 years of 215 hpa MLS ozone, CO, and IWC data in a compact fashion through the use of novel plots. Possible causes of interannual and seasonal variations in regional amounts are discussed with plentiful references to more detailed analyses. Data set is of great interest to scientific community.

18672L26: Lofting of ozone poor lower –> Lofting of lower

18674L10: Why are Microwave signals less affected by clouds?

18675L1: "Identifies some behavior not previously reported" These new findings do not stand out in the text. Consider recapping any new findings in a discussion section or the final summary. This "unanswered questions" section can also be used to advertise this data set.

18675L19: 10-20% agreement –> 10-20% biases

18676-18677: Different terminology is used in describing the vertical resolution of the ozone, CO, and IWC values. Be consistent. What do you mean by "full width at half maximum of 3 km" for ozone, 5 km vertical resolution for CO, and "effective vertical resolution of 4 km" for IWC.

18677: What an exciting data set! Are these bi-weekly data sets available to the scientific community? If yes, make this clear, if no, double check and make sure enough information is available in this paper and its predecessor for others to reconstruct this data set

Figures 1-4. Flipping between the various Figures was tedious. I suggest you change Figures 1-4 into Figures 1-6 with Figure 1a/1b and Figure 4a/4b being ozone, Figure 2a/2b and Figure 5a/5b being CO etc. This change would make it much easier to look at wave one variations for eg. Of course it would make it harder to compare cross-species variations but most of these comparisons are also shown with the correlation plots.

18681: When comparing with sondes, you do not apply an averaging kernel to the sondes. What should users do when comparing to upper tropospheric model output?

18678L14-18: Why do you compare the sub-tropical sonde observations of Thompson to tropical MLS data here? Where were the sub-tropical observations taken? Why do they show a different timing?

Are MLS data available at higher pressures (lower altitudes) than 215 hPa or is this the

highest pressure for which reasonably accurate values are possible?

18684: Anti-correlations between ozone and convection. Might be useful to summarize these regional correlations with a plot or table. Tedious work moving back and forth between the plots.

18684: Difference in correlations between adjacent regions. You binned the MLS observations into rigid longitude/latitude regions. How much additional insight could be obtained by more judicious partitioning? Thoughts?

18685: Doesn't 6Nb show non-negligible values of IWC?

18687L5: This presumably new finding is an example of something that could be revisited in discussion/summary section.

18690L2: The IWC ellipse in 3SB is mostly horizontal. Doesn't that contradict your comment?

Figure 6/7. I would suggest removing cloud ice information from this plot. It is not discussed in the text and adds confusion.

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 18671, 2012.