Atmos. Chem. Phys. Discuss., 9, S45–S47, 2009
www.atmos-chem-phys-discuss.net/9/S45/2009/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Evaluation of CLaMS, KASIMA and ECHAM5/MESSy1 simulations in the lower stratosphere using observations of Odin/SMR and ILAS/ILAS-II" *by* F. Khosrawi et al.

Anonymous Referee #2

Received and published: 22 January 2009

Review of "Evaluation of CLaMS, KASIMA and ECHAM5/MESSy simulations in the lower stratosphere using observations of Odin/SMR and ILAS/ILAS-II" by F. Khosrawi et al.

This paper applies diagnostics of (a) O3 sorted by N2O and (b) O3 by latitude 2 CTMs and one CCM, and evaluates them against 2 ozone and N2O data sets. This manuscript is generally well written and the figures are clear. It could use a little more rigor, a bit more discussion, and I am concerned that the use of only one year of data is problematic for the analysis as noted below. This paper should be publishable in ACP with major revisions along the lines noted below.

Full Screen / Esc
Printer-friendly Version
Interactive Discussion
Discussion Paper

My major concerns are:

1. The N2O-O3 diagnostic is a function of the descent, and using one year may not be very good at assessing the fidelity of chemistry and transport. What is being tested? Just chemistry? This should be clarified. You note in the description of the diagnostic that it is related to descent, so it should be strongly sensitive to transport.

2. I think it would be better to discuss average ozone first (section 5.5 figure 8 & 9) since it is a simpler metric to understand.

Specific Points:

L70: using only a few months seems problematic.

L203: Fig 1: it would be better to show actual data here. Why do you use ATMOS and not the more comprehensive satellite data here (ODIN/ILAS)?

L219: I am confused. Here you say that the slope is positively correlated, yet above in the previous paragraph it is negatively correlated at the same altitudes? Is this a function of latitude? It seem so, but this text is confusing.

L224: How wide are the N2O bins? It is stated much later but should probably be put in here.

L264: it would be better to state the agreement in terms of within 1 and 2 sigma in the observations.

L269: Antarctic winter would be a better place to look at ozone loss wouldn't it?

L275: Regarding major point above: can you explain here better why it is okay to look at different years and the diagnostic is not sensitive to variability in descent rates? Perhaps another sentence at the end of the paragraph explaining how this is analyzed in your previous work.

L284: it would be good to try to show some of the model standard deviations on the

ACPD

9, S45–S47, 2009

Interactive Comment

plots. Maybe for just one model? maybe just error bars from the lines at one or two points?

L352: one way to analyze the resolution effect is to degrade N2O, O3 and T in a model to 3km vertical resolution and then re-calculate the diagnostic to simulate ODIN resolution. What do you get?

L355: state the size of the N2O bins earlier?

L407: How much does the inflection point vary? Is it significant?

L415: underestimated polar ozone loss ="higher o3"? Are we sure the climatologies are the same between model and observations?

L400: you might state why the Tilmes result in WACCM occurs: too warm polar temperatures. This should not be an issue in the CTMs.

L428: why is ILAS variability so much smaller?

L470: are the differences in inflection point location in N2O mixing ratio significant?

L482: section 5.5 might be better to discuss first.

L535: can you explain why the differences exist between models and observations? The tropical differences are dynamics or boundary conditions? The CCM does poorly. Why?

L567: As noted, the paper might be easier to understand with the average ozone first.

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 1977, 2009.