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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Hemispheric ozone variability indices derived from satellite observations and as diagnostics for coupled chemistry-climate models" *by* T. Erbertseder et al.

Anonymous Referee #1

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The authors are formalising an approach based on amplitudes of hemispheric quasi-stationary planetary waves in ozone to assess and compare the performance of the DLR CCM against satellite observations. Even though the results are very interesting the paper is let down by a poor structure and presentation. I suggest that the authors restructure and rewrite the paper to some extend, but I do not believe that new work has to be carried out. I will give a detailed assessment below.

1) Title: There is only one model presented here and the focus is on the applicability of a measure for ozone variability to compare a CCM and satellite observation: A comparison of satellite observed and CCM modelled ozone variability using wave-related

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hemispheric ozone indices (or similar) sounds more appropriate to me.

2) The paper starts with the discussion of the TOMS data (index 1 and mean in figures 1 and 2) only later when introducing E2000 and T2000 the full motivation is presented why this index might be a useful metric. The motivation is required earlier in the context of a model data comparison. I would suggest an alternative structure (using the figure numbers as they are as a guideline):

a. Reworked introduction (shorter and automatically stronger motivation, details below).

b. Explanation of the methodology used.

c. Introduction of the key data sets: Immediate focus on E2000 and T2000, mentioning the relation between T2000 and the full TOMS time series.

d. Delete figures 1 and 2 and indicate the results for the full TOMS time series in the following text/figures.

e. Figure 3 (and relate T2000 to the longer time series by words/numbers)

f. Figure 4 (illustrating the hemispheric means and their biases)

g. Figure 5 (discussion of the latitudinal distribution of wave amplitudes)

h. Figure 7 (further discussion of the latitudinal distribution for wave 2)

i. Figure 6 (the hemispheric average for wave 1) - here the authors could include the results for the full TOMS time series as well (maybe as a dashed line)

j. Figure 8 (the hemispheric average for wave 2) - here the authors could include the results for the full TOMS time series as well (maybe as a dashed line)

k. Summary and Conclusions

3) The repeated use of "manifold" is unusual in this context; just say "many".

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4) The use of "coincidence" is unusual; the authors are obviously using it synonymously with "agreement", which is wrong (see Webster or OED).

5) 5674, line 1: "This explains that ..." should read "Is in agreement with the too stable polar vortex in ..."

6) 5674, line 16: This sentence does not make sense. Maybe the authors are trying to say that "ozone variability can support our understanding of the atmospheric circulation" or is "important for chemistry-climate interactions".

7) 5674, line 15 "Northern" should read "North". The authors should take the sentence apart and divide it between "dynamics" and "chemistry".

8) Page 5675, lines 23-26: This statement should come earlier in conjunction with page 5676, lines 7-14.

9) As mentioned earlier, section 2 should start with the methodology, taking up the points made in the introduction about why something like this is useful, followed by the description of the data used in this particular study.

10) Page 5681, lines 1-3: This statement is central to the introduction, even though you may want to repeat it in this context.

11) I will not go through the following text, because it should change quite a lot to reflect the restructuring of the paper. I cannot see any scientific problems with the content of the paper - but the presentation is hard to follow and the wording is often insufficient.

12) "Discussion and Conclusion" section should follow the new structure as well. The first two paragraphs should basically become two short sentences.

13) Page 5692, line 16: The authors are not discussing "ozone budgets" here; they discuss averaged total ozone values (sometimes split into contributions by different wavenumbers).

14) Page 5694, line 21: I do not know what the authors are saying here ("conditions

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...").

In summary, I do not think the paper should be published as it stands. Nevertheless I believe that no more material is required to form a good paper. I would encourage the authors to review the structure of the paper and improve the outline, the flow of the presentation, and to clarify their arguments. This would make the paper more accessible to future readers and could avoid possible misunderstandings.

Interactive comment on Atmos. Chem. Phys. Discuss., 6, 5671, 2006.