Atmos. Chem. Phys. Discuss., 5, S2948–S2951, 2005
www.atmos-chem-phys.org/acpd/5/S2948/
European Geosciences Union

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Radiative forcing since preindustrial times due to ozone change in the troposphere and the lower stratosphere" *by* M. Gauss et al.

Anonymous Referee #2

Received and published: 29 September 2005

Review of "Radiative forcing since preindustrial times due to ozone change in the troposphere and the lower stratosphere"

The model results shown are valuable and clearly presented but the analysis needs to focus more precisely on the ozone signal and associated radiative forcing. As it is, section 2 includes many statements about dynamical/transport processes which are not supported by the global mean diagnostics presented in this study. Because of the quality and the novelty of the information presented, I would recommend its publication following some minor revisions.

General comments: ————————

Would suggest to summarize the main results at one single place. The information in sections 2.4 and 3.4 could be moved in section 4 and elsewhere. The information in section 4 should focus on the details of the model results. The abstract is more focus in that regard.

Specific comments: ————————

page 11 - first paragraph: It is not convincing that ozone biases for UIO_CTM2 are restricted to low latitudes. Figure 2 indicates large ozone losses at higher latitude throughout the year in both hemispheres.

page 12 - Last sentence: This is a surprising comment since the majority of models show an ozone increase below 10km in both hemispheres. The authors might consider showing horizontal maps of column ozone to support it.

page 13 - 2nd paragraph: About UIO_CTM2 –> see previous comment.

Page 13 - 3rd paragraph: This paragraph is far too long and repetitive and the discussion refers to table 5 without mentioning it. Also, ULAQ appears to be the only model showing a significant impact of the halogen chemistry on the tropospheric signal (-2.6 vs 7.9) whereas the last sentence suggests a more robust signal from the different models.

page 15 - First paragraph: It may not be necessary to refer systematically to ozone changes as a perturbation on the top of another perturbation. For example, the discussion about Figure 5 could be referring to ozone decrease/increase instead of "tropospheric increase becomes larger". Such substitution there and elsewhere in the text when appropriate would facilitate the reading.

page 15 - line 3: Would be more specific about the impact of increase meridional circulation on ozone changes in different regions. For example, DLR_E39C shows an ozone decrease throughout the lower stratosphere which will not necessarily lead to

ACPD

5, S2948–S2951, 2005

ozone fluxes increase in the extra tropical region.

page 15 - line 6: For DLR_E39C, I would replace : "more depletion in the lower tropical stratosphere" by "ozone decrease in the lower stratosphere" since the signal is not restricted to the tropics.

page 15 - last sentence : The author relates the ozone signal on Figure 5 caused by the SST forcing (1c-1) with the temperature changes on Figure 4 (2-1) which is caused by chemistry+SST. So, I would not directly associate ozone increase on figure 5 to stratospheric cooling. Unless the authors refer to Figure 2? please clarify.

page 16. - section 2.4 - "An important finding...": Only need to mention the significance of the climate forcing on the results.

page 19. - section 3.1.2 - last sentence: It underlines the importance of surface forcing (not necessarily STE).

page 24. First sentence: Figure 2 shows mainly an ozone decrease (not increase?) throughout the lower stratosphere for all models - clarify. Also, the impact of "transport of enhanced tropospheric ozone and precursors" has not been clearly described in section 2 (almost appears like a new element in the study).

Further suggestions: ————————

Table 4 is not really necessary.

Figure 4 could be removed or replaced by one panel showing annual mean profiles for the various models.

Figure 7 : the choice for the color scale is not appropriate to differentiate positive/negative radiative forcings.

Information in table 1 could be condensed. Informations about transport schemes, GWD and convective schemes could be mentioned in the text when needed.

ACPD

5, S2948–S2951, 2005

Interactive comment on Atmos. Chem. Phys. Discuss., 5, 5751, 2005.

ACPD

5, S2948–S2951, 2005

Interactive Comment