Atmos. Chem. Phys. Discuss., 10, C2661–C2663, 2010
www.atmos-chem-phys-discuss.net/10/C2661/2010/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Impacts of mechanistic changes on HO_x formation and recycling in the oxidation of isoprene" *by* A. T. Archibald et al.

A. T. Archibald et al.

atmos.chem@btinternet.com

Received and published: 14 May 2010

We are very grateful to referee 2 for reviewing our paper, and for providing a clear and supportive summary of its aims, content and output. It is very gratifying that the referee has fully recognised the purpose of the study, how it builds upon previously reported work, and its value in helping to inform ongoing studies in this field.

The referee raises a number of minor points, which have all be attended to in the revised version of the manuscript, in line with the referee's suggestions. Three of the comments include queries, which are now answered.

Ref 2: comment 5:

Page 5880, line 5: "was calculated to be significant". Calculated by whom?

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

Response to comment 5:

The reversibility of O2 addition was calculated to be significant in the study of Peeters et al. (2009), and this is now stated in the revised manuscript.

Ref 2: comment 7:

Page 5888, line 10: so do k24 and k25 vary in your model with NO concentration or not?

Response to comment 7:

Non-varying values of k24 and k25 were applied, because the results for OH recycling were found to be almost identical with those simulated with the more complex expressions. This point has been clarified in the revised text.

Ref 2: comment 8:

Section 5: Butler et al. (2008) also present the results of global modelling studies performed with a parameterised source of OH in high-isoprene low-NOx environments based on model-measurement comparisons from the GABRIEL campaign. How do your simulations compare with theirs?

Response to comment 8:

The impacts on OH simulated by both Lelieveld et al. (2008) and Butler et al. (2008) show the same general distribution as those simulated by us, i.e., with the largest effects in the high-isoprene low-NOx regions. The previous studies report larger changes, by virtue of using models which are able to resolve regions with lower NOx. We have expanded the previous discussion on page 5890 to include a statement of comparison.

References

Butler, T. M., Taraborrelli, D., Brühl, C., Fischer, H., Harder, H., Martinez, M., Williams,

ACPD

10, C2661–C2663, 2010

J., Lawrence, M. G. and Lelieveld, J.: Improved simulation of isoprene oxidation chemistry with the ECHAM 5/MESSy chemistry-climate model: lessons from the GABRIEL airborne field campaign, Atmos. Chem. Phys., 8(16), 4529-4546, 2008.

Lelieveld, J., Butler, T. M., Crowley, J. N., Dillon, T. J., Fischer, H., Ganzeveld, L., Harder, H., Lawrence, M. G., Martinez, M., Taraborrelli, D. and Williams, J.: Atmospheric oxidation capacity sustained by a tropical forest, Nature, 452(7188), 737-740, 2008.

Peeters, J., Nguyen, T. L. and Vereecken, L.: HOx radical regeneration in the oxidation of isoprene, Phys. Chem. Chem. Phys., 28, 5935-5939, 2009.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 5863, 2010.