

Interactive comment on “Sensitivity studies of oxidative changes in the troposphere in 2100 using the GISS GCM” by J. L. Grenfell et al.

N. Savage (Referee)

nick.savage@atm.ch.cam.ac.uk

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General comments

This paper presents the results of a modelling study of the changes in atmospheric chemical composition in 2100 based on the IPCC Ox_Comp scenario. The model has limited chemistry but runs have been performed for 10 years and examines individual components of the changes (NO_x, methane etc). The model used here included sea ice and lightning calculated interactively.

This is overall a very good paper with original elements to it and should be published. However the authors need to highlight the original elements of work in abstract and intro more.

Specific comments

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Abstract - this should mention that all runs were integrated for 10 years and that lightning and sea ice were not fixed.

Section 3 - in the model description the top boundary of the model should be described (this is currently done in section 4.10) As the authors admit their treatment of the stratosphere is 'very limited' they should comment on the potential impact of this on their results.

Section 4 It has been shown by Lawrence et al (ACP 1, 37-49,2001) that differences in the way global mean OH is calculated can lead to differences of 30% or more. I would recommend that at least the method of calculating global mean OH concentrations is calculated. If possible the OH for regional mean air-mass weighted values in the 12 sub domains recommended by Lawrence et al should be presented for runs 1 and 10.

Section 4.6.1 It would be useful to know not only the increase in NO_x emissions from lightning but the increase in concentrations.

Another issue which this manuscript does not mention and is probably worth some further comment is whether the greater length of the runs here significantly changed their results compared to what would have been found by just using the second year of their simulation. This information would be of interest to modellers using more detailed chemistry and higher resolution who at present often use very short spin up periods. However this may require another paper to consider in detail.

Technical corrections

section 4.6.1 paragraph 3 mean surface temperatures are presumably degrees C not Kelvin.

Interactive comment on Atmos. Chem. Phys. Discuss., 3, 1805, 2003.

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