

Interactive comment on “A model study of the impact of source gas changes on the stratosphere for 1850–2100” by E. L. Fleming et al.

Anonymous Referee #2

Received and published: 17 June 2011

This is a comprehensive paper which investigates the impact of changing ODSs and GHGs on stratospheric ozone from 1850-2100. A number of interesting 2-D model experiments are performed to separate the impacts of different gases. The computationally cheap 2-D model is evaluated against a more detailed 3-D model for the base run.

Overall, I think this is a clear and useful study which should be published as is.

I have only a few very minor comments:

1) Abstract. Line 10 on. You could briefly state the mechanisms by which the GHGs and ODSs are impacting O₃. In particular, make it clear that the impact of CO₂ is via cooling.

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2) Introduction Line 7. 'leadingtotal'?

3) Introduction Line 8' 'Increase in N₂O and the odd nitrogen..'. This makes it sound like they are two separate processes. The increase in N₂O causes the increase in NO_y which then affects O₃...

4) Page 11213. Line 18. Is the radiative cooling impact of CH₄ important at all?

5) Page 11216. Line 11. The experiments with perturbed CH₄ affecting only a subset of the chemistry are interesting but I am not clear on how this was done. Please give more details. Does the model run have two CH₄ tracers? If so are both of these destroyed by the full chemical terms?

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 11205, 2011.

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