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
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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.

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 NOy 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.