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Interactive comment on “An updated analysis of the attribution of stratospheric ozone and temperature changes to changes in ozone-depleting substances and well-mixed greenhouse gases” by A. I. Jonsson et al.

A. I. Jonsson et al.

andreas.jonsson@utoronto.ca

Received and published: 16 October 2009

Thank you for the review and the suggested improvements to our paper. We have addressed your concerns point by point below.

* “The paper is fairly technical in nature, but adds an interesting level of detail to the original paper. The paper as it stands is suitable for publication in ACP as a technical note”.

While we agree that the correction of our radiation scheme is technical in nature, we

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think that the paper also communicates some important new scientific results — in particular, the realization that the CO₂ effect on heating rates over multi-decadal time scales is significantly nonlinear, and that unless this is treated correctly (as we show) the attribution of stratospheric temperature trends will have significant errors. We would like to draw the attention of the community to this new result, as traditionally a linear relation between temperature and CO₂ has been assumed in attribution analysis. In our opinion this is not simply a technical issue, and so we would prefer to see the paper published as regular paper rather than as a technical note.

To better reflect the scientific contribution of our paper we would suggest changing the title to: “The effect of nonlinearity in CO₂ heating rates on the attribution of stratospheric ozone and temperature changes”.

* “Given the length of the paper, the authors might want to consider shortening the abstract”.

We agree that it was too long. We have shortened it. It has also been reworded so as to focus more clearly on the new results.

* “An additional sentence in the discussion mentioning the role of ODSs as greenhouse gases might be appreciated as well”.

Yes, we agree. We added the following sentence to the Discussion: “It is also worth mentioning that while the main effect of ODS changes is a chemical modulation of ozone mixing ratios, ODSs also have a direct radiative effect. However, in the global-mean upper stratosphere, this contribution is negligible (Forster and Joshi, 2005)”.

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 14857, 2009.

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