

## ***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.***

**Anonymous Referee #1**

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General: The authors reassess the question of attribution of modelled stratospheric temperatures to CO<sub>2</sub> and ODS changes. The paper is a follow-up on a previous analysis (SJ08), by the same authors, that assesses this question. However, in the old analysis, inadequate interpolation used in the radiation scheme led to inaccurate results there. The problem has been corrected here, and the results updated.

The paper is necessary considering that SJ08 based their analysis on a model with an incorrect representation of heating rates due to CO<sub>2</sub>. It does so by concisely stating what the differences are between the CCMVal-1 integration which formed the basis of

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SJ08, and the newer CCMVal-2 integration with the updated radiation scheme. The results presented here are not fundamentally different from the earlier paper, but quantitatively more correct and bringing the CMAM model closer to observations. The authors make the point that for purposes of attribution of temperature trends to CO<sub>2</sub> and ozone, using multilinear regression with CO<sub>2</sub> abundance as an explanatory variable is dangerous because the CO<sub>2</sub> induced heating is a non-linear function of CO<sub>2</sub>. A considerably larger fraction of cooling over the period of 1975-1995 is explained by ozone depleting substances if CO<sub>2</sub>-heating and not CO<sub>2</sub> is used as the explanatory variable.

The paper is somewhat technical in nature, focussing on numerical details of the radiation scheme used by the CMAM, and a few other, models, and on a more robust way of attribution. As a publication format a technical note in ACP may be appropriate, but this is for the authors and the editor to decide.

I think the length of the publication is about right, namely just a few pages and 5 small figures. The references are concise. The paper is well-written; apart from the too long and detailed abstract I can't think of ways to improve the presentation. I thus recommend the paper for publication in ACP with minor changes.

Detailed comments:

Affiliation: T. Shepherd is also at U. Toronto, not at “3” which is unspecified.

Abstract: Usually abstracts are just one paragraph. I would consider shortening the abstract, especially since the remainder of the paper is also fairly short.

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