

Interactive comment on “Attribution of ozone changes to dynamical and chemical processes in CCMs and CTMs” by H. Garny et al.

Anonymous Referee #1

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Garny et al. outline a new method to separate the contributions of chemistry and transport to changes in ozone concentrations in regions of the atmosphere. This is a well written paper and the method it introduces is likely to be very useful. I would recommend publication subject to the minor alterations noted below.

Minor comments:

p.17, lines 10–12: You state “What is less well known is the finding that transport does not act in one direction only but a considerable exchange of air masses takes place.” There are various papers by Neu / Plumb / Strahan discussing this two-way mixing and you should reference one or two of them here.

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p.20, lines 10–11: You talk about the RHS and LHS of an equation that has three “sides” to it. Please be clearer that LHS refers to the middle term in the equation.

p.21: In Figure 11 you refer to regions by numbers and you do not define which is which. I’d suggest that you use the abbreviations in Table 1 rather than numbers.

p.21, lines 23–25: Please add a sentence or two explaining the following. Does mass flux from southern mid-latitudes to the pole also decrease, indicating that the increased Brewer-Dobson circulation mainly causes more downwelling in mid-latitudes, or do ozone mass mixing ratios change such that import of ozone decreases whilst mass flux increases?

p.22, lines 17–20: A stratosphere resolving model is not just desirable for correctly simulating the upper part of the ozone layer, it is essential for correctly simulating stratospheric transport.

p.23, lines 18–21: When applying your method to different models, do you not need to take into account the different tropopause heights and different polar vortex sizes in the models? You do talk about using dynamical boundaries but I think that is particularly relevant here.

Interactive comment on Geosci. Model Dev. Discuss., 4, 1, 2011.

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