

Interactive comment on “The origin of ozone” by V. Grewe

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I have a few critical remarks and questions about the STE calculations presented in section 5 (Fig. 6).

- The applied method is not clear: Does Fig. 6a show the net mass flux? What vertical coordinate has been chosen to apply the Wei method?
- The discussion and motivation for the use of the Wei method is very brief and ignores a lot of work in this field during the last decade (see e.g. Stohl et al. 2003, for an overview). Several studies (e.g. Wirth and Egger 1999) question the suitability of the Wei method with pressure or potential temperature as vertical coordinate. Other studies, using for instance a Lagrangian methodology (e.g. Sprenger and Wernli 2003, Fig. 8) have derived zonally integrated net STE mass fluxes that differ substantially

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from the ones shown in Fig. 6 (much stronger net downward mass flux in the region 40–60N). I am not saying that the mass fluxes shown in Fig. 6a are wrong, but they differ from recent reanalysis-based estimates and therefore a much more careful discussion is required before it can be concluded that "In Sect. 5 it has been shown that the exchange of ozone into the troposphere is reasonably simulated, at least within the ranges of uncertainty" (p. 9653, line 24). Also, given the critical discussion in the literature, the use of the Wei method is not straightforward and - if still used - should be motivated in more detail.

- If I understand correctly, then Fig. 6 shows a diagnostic calculation of the STE mass flux in the model simulation. How well does this estimate correspond to the actual STE produced by the model?

- The global integral of the STE mass flux shown in Fig. 6 seems to be strongly unbalanced. Is this a problem for the model simulations?

References:

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