

Interactive comment on “Interannual-to-decadal variability of the stratosphere during the 20th century: ensemble simulations with a chemistry-climate model” by A. M. Fischer et al.

A. M. Fischer et al.

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1.) The reviewer asked us to provide more specific information on the mass-fixing procedure for ozone and to explain the effects of it seen in figure 4. We have added a section to the model description (Section 2.1) detailing the reasons for restricting a global mass fixer to a certain latitude band. In section 3.1 (after the description of figure 4) we explain why the restriction of the mass fixer leads to a more realistic seasonal cycle. We agree with the reviewer that not enough information is given to prove that the underestimation of the high-latitude maxima in total ozone is due to mass-fixing problems and that it could also be related to a too weak wave forcing. Yet, Schraner et al. (2008) showed in sensitivity runs (i.e. when switching off the fixer completely) that the underestimation of the seasonal cycle is at least partly caused by the fixer. We

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have replaced the sentence above by this argument which is added to the text after the description of figure 4.

2.) Concerning the sentence on page 14384, line 16-17: we understand that this sentence was very confusing from a reader's point of view. We have rephrased it mentioning now the dominant pattern (reduction of seasonal cycle) seen in figure 4.

3.) The reviewer suggested that we consider adding new graphs (ozone difference SO-COL 1901-1969 and 1970-1999 / residual meridional circulation). Although we agree that this might partly help to clarify the findings when reading the text, we believe that the paper at the current stage contains already a large number of supporting graphical material. In our opinion, additional plots would distract the reader from the essential existing ones, which is why we decided not to include new plots.

4.) We have added some more information on the EP flux and ozone trend calculation as suggested by the reviewer. We think that this will help in better understanding the plots.

5.) The reviewer recommended that we take the model ensemble mean as the reference line in figure 12 instead of the median of ERA40. We agree and have modified the figure accordingly and slightly changed the corresponding text.

6.) We have tackled all minor points such as typos and clarifications.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 14371, 2008.

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