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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Analysis of recent lower stratospheric ozone trends in chemistry climate models" *by* Simone Dietmüller et al.

Anonymous Referee #2

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This paper addresses the recently reported (Ball et al. 2018) widespread decline in lower stratospheric ozone at low and mid-latitudes. This is a high profile topic in ozone-layer science. The paper presents a comprehensive analysis of state-of-the-art CCM simulations to investigate if, and to what extent, different simulations capture the observed trends. The models show some agreement in the tropics but generally fail to capture the combined tropical and mid-latitude trends. Although the paper does not resolve the cause of the observed trends, it does show the ability of current CCMs and point the way to further studies. Overall I think that the paper is a very useful contribution to this topic and well suited for ACP. I recommend publishing after addressing the minor comments below.

1) There are a lot of minor editorial issues, especially missing hyphens (e.g. 'free-

frunning') and missing commas. I assume that the editorial office will sort these out if the authors don't find them.

2) Page 1. Line 10-11. It is not clear what the 'systematic change' relates to. The sentence mentions 'different analysis periods', but for the change to be systematic the period would have to be changing in a particular direction?

3) Page 2. Line 4. Need to say '1987 Montreal Protocol and later Adjustments/Amendments'. Also, different ODSs started to decline at different times. Some (e.g. HCFCs) might still be growing. You mean the total halogen loading from ODSs.

4) Page 2. Line 8. There were still ODSs in atmosphere in 1980. Need to say 'pre-1980' or similar.

5) Page 3. Line 12. Put references in chronological order.

6) Page 4. Line 14. Ball et al (2018) also included some SD runs which showed very poor agreement with the observed trends. That could be mentioned here.

7) Page 5. Footnote. 'fourth'.

8) Page 8. Line 22. Please state which model was used by Stone et al. Is that one of the CCMI models?

9) Page 9. Caption (and elsewhere). Post 1998 is not the 'post ODS' period. ODSs are still present and different ones have different trends. Total chlorine and bromine are declining, which is not the same thing. You should find another description.

10) Page 12. Line 3. 'depend'.

11) Page 12. Line 11. 'low not significant'. This reads strangely. Maybe it is a lack of a comma, but could also be better to say 'non-significant'.

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