

Review: Effects of Ozone-Climate Interactions on the Temperature Variation in the Arctic Stratosphere

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I appreciate the authors efforts to include more ensemble members and to adapt the ozone climatology according to my previous suggestions. I think these changes have considerably improved the results of the paper. However, I think this paper needs some restructuring and rewriting in some places before it can be presented to the audience of this journal. Specifically, I suggest:

- Removing the equations on pages 4-6. The long equations hamper the flow of the paper. The interested reader can refer to the mentioned references.
- More clearly highlighting the main pathway by which ozone trends affect temperature and circulation. In the paper, the authors make it sound as if ozone had a direct impact on the circulation and the order of the Figures is confusing. However, the actual pathway by which ozone affects the circulation is via changes of the stratospheric temperature. Therefore, I suggest moving Fig. 11 (short- and longwave heating) forward (after Fig. 4), and build the mechanistic explanation from there.
- I think a schematic outlining the proposed mechanism would help the reader to better follow the arguments made. My understanding is that in early winter, an increase of the BDC between 1980-2000 led to more ozone being transported to the pole, which decreased stratospheric temperatures during Nov-Dec due to an increase in longwave emission. This then probably leads to an increase in the BDC (mechanistic link from temperature decrease to an increase in BDC is not entirely clear to me from the manuscript), because the positive temperature difference between the control and clim_O3 run can only be due to adiabatic heating due to circulation changes (which outweighs the longwave cooling), as shown in Fig. 5.
- Are Figures 8, 9 and 10 needed for the mechanistic explanation? Otherwise move it to the supplement for better readability. I would also consider expanding Fig. 8 to include March and April.

In addition:

- In Fig. 2 it looks like in b) and c) you show twice ERA5 instead of CESM? Could this be a data error?
- Does your 1980-clim experiment use fixed SSTs? If so, which years were used to produce the SST climatology? Using only SSTs from a specific year (e.g. 1980) might skew the ozone climatology.