

Interactive comment on “Indicators of Antarctic ozone depletion: 1979 to 2019” by Greg E. Bodeker and Stefanie Kremser

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Overall Remarks

This is a comprehensive and well written paper on the long-term evolution of the Antarctic ozone hole using a number of measures. It is well suited for publication in ACP, and I have only a few minor suggestions.

We thank the reviewer for taking the time to review the paper.

If at all possible, it would be great to also include the 2020 ozone hole, which was rather on the large size again.

C1

We appreciate the reviewers comment but, unfortunately, this won't be possible. The analysis reported on in the paper is based on the BS-filled database that extends from 1979 to 2019. Updating the database by just a single year is a significant amount of work that we are not currently resourced for. There will always be a desire to have 'just one more year added'.

Comments

line 4: "Antarctic" should be "Antarctica", or "the Antarctic"

Thanks for catching that. Now changed to 'Antarctica'.

line 28: replace "has led" by "should lead". Even in 2020, we are still far from "recovered".

Agreed. We have now changed this to 'is expected to lead'.

line 56: delete "a continuous body of"?

Agreed and replaced 'a continuous body of' with 'extant'.

line 91: The correlation between ozone mass deficit and EEASC is the same, no matter how you scale the axes. What you did, is obtain the axis scaling from a linear fit of EEASC to mass deficit. So: delete "selected", replace "maximizes ... between" by "is obtained from fitting", replace "deficit and EEASC" by "deficit to EEASC"

Very good point. Thanks and we have made the suggested changes.

C2

lines 93, 94: Yes, it is really interesting that the data points scatter so much more after 2000, compared to before. Did Southern Hemisphere meteorology become much more variable? Does that have anything to do with the shift of climate patterns / jet streams in the Southern Hemisphere due to climate change and the ozone hole? You might want to add some text and cite a few references (e.g. recent ozone assessments)?

We have now added some text and citations to provide context for the observation of anomalously smaller AVP mean ozone mass deficit after 2000.

Figs. 1, 3, 4, 8: it might be useful to show / mention the correlation of the different time series with EEASC (overall correlation over the entire time series). Is there one measure that correlates best with EEASC? That might be the best measure to capture a dependence of the Antarctic ozone hole on ozone depleting substance loading.

Excellent idea and now done. Ozone hole area below 220DU has the highest correlation against EEASC. Additional commentary has been added to each of those figures and to the conclusion of the paper to that effect.

A well written paper! It is very rare that I have so few comments on a paper

Thank you again for the feedback.

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2020-1095>, 2020.