

Interactive comment on “Antarctic Ozone Depletion between 1960 and 1980 in Observations and Chemistry-Climate Model Simulations” by Ulrike Langematz et al.

Anonymous Referee #2

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This paper quantifies the amount of ozone loss that happened prior to 1980 using several chemistry-climate models. The 1980 return level is a widely used and policy-relevant metric, but these results show comprehensively that while this metric is useful it does not give a good indication of complete stratospheric ozone recovery. Overall the paper is well written and structured. Below are some comments that could be addressed to further improve the paper.

General comments:

1. It would be very interesting to run a similar analysis on the newer CCMI (Chemistry-Climate Modelling Initiative) simulations. This probably wouldn't change the main conclusions of the paper, but it might be good to use some newer simulations. One could

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even compare the results of the CCMVal simulations with the CCMI models to investigate whether the differences between the two ensembles are smaller/larger.

2. P3L2: Why specify 'stratospheric winter' is it different from tropospheric winter? Is it specifically the Southern Hemisphere winter?

3. P4L19: How were the systematic differences between Syowa and Faraday corrected? Perhaps a sentence or two about this might be useful.

4. P5L14-16: How do the ground-based measurements compare to the satellite observations post 1978? Figure 2 shows just one line for both – how were they linked to form one time series? Were the satellite data averaged over the entire 60-90°S region?

5. P6L15-17: Why is there such a large range in the model simulated ESC-induced ozone loss (min 54DU and max 182DU from 1960-2000 (even more extreme differences between models pre-1980))? Is this a result of the different dynamics between models? Or are there differences in the chemistry?

6. P6L28-30: Why do so few models show an ozone loss within the observational uncertainties? Is there a reason that so many of them underestimate the loss? (i.e. is there a particular bias that needs to be addressed?)

Minor technical issues:

P1L29: Wuebbels -> Wuebbles

P4L6: Please spell the acronym 'GHG' out.

P4L23: and were and corrected -> and were corrected.

P4L16: in 65.3°S -> at 65.3°S (as well as the other latitude specifications in this line and the next).

P6L1: 3.1 -> 3.2

P6L3: 'shows as an example the results of' -> 'shows an example of the results of'

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