

## ***Interactive comment on “Total ozone trends from 1979 to 2016 derived from five merged observational datasets – the emergence into ozone recovery” by Mark Weber et al.***

### **Anonymous Referee #2**

Received and published: 30 October 2017

Review for “Total ozone trends from 1979 to 2016 derived from five merged observational datasets - the emergence into ozone recovery”

#### General comments

Here authors use five merged data to determine ozone trends before and after ODS peak in the stratosphere. Since last few years, there are various studies claiming to have detected signs of ozone recovery. So this is a timely study showing that although stratospheric ozone is no longer decreasing, positive ozone trends in the observational data are still statistically insignificant. This is not unexpected due to large dynamical variability but ozone observations are necessary to monitor the evolution of

C1

stratospheric ozone as well as improve our understanding of complex ozone-climate feedbacks.

Overall this is well-written manuscript and I strongly recommend it for the publication.

#### Minor comments:

Line 13: other--: others

line 18: “Do you mean “dynamical variability”

line 22: “outside the tropics ozone profile peaks

line 164: please mention the number of outliers in percentage

Line 191-195- please mention the data sets with largest biases for few latitude bands along with absolute biases In DU.

Line 224: “deep total ozone minimum→ large ozone decrease

Line 228: confusing.. those two references are about Pinatubo eruption. Also, it is not only dynamics but vertical distribution of SAD caused increase in SH mid- stratospheric ozone (e.g. Dhomse et al., 2015)

Line 228: SAD= area density but SAOD= stratospheric aerosol optical depth

Line 229: Can't understand why you are using WACCM simulated SAD, which is still data. I think CMIP6 recommended SAD data (or AOD@550nm) until 2014 would have been much more realistic [ftp://iacftp.ethz.ch/pub\\_read/](ftp://iacftp.ethz.ch/pub_read/) For remaining two years, WACCM-based or any other data would be OK.

Line 250: what about tropics? Did you try to use mean heat flux from both the hemispheres (BDCn +BDCs)/2.?

Line 280: reword "roughly equally contributed"

line 283: "emerging signs of ozone recovery"

C2

line 289: Volcanically enhanced stratospheric aerosol

line 310: with an uncertainty just less than (delete of)

line 314: I think "Osprey et al, 2016" would be a better reference.

line 382: Again. What happens if you combine EP fluxes from both the hemispheres?

Line 397: Do you Mt. Pinatubo eruption? Or add correct references for El Chichon.

Line 460: Chipperfield et al. used chemical transport model simulations. Eyring et al., 2010 would be the correct reference.

#### References

1. Revisiting the hemispheric asymmetry in midlatitude ozone changes following the Mount Pinatubo eruption: A 3D model study SS Dhomse, MP Chipperfield, W Feng, GW Mann, ML Santee *Geophysical research letters* 42 (8), 3038-3047

2. An unexpected disruption of the atmospheric quasi-biennial oscillation Scott M. Osprey, Neal Butchart, Jeff R. Knight, Adam A. Scaife, Kevin Hamilton, James A. Anstey, Verena Schenzinger, Chunxi Zhang, *Science* 23 Sep 1424-1427

3 Eyring et al., assessment of stratospheric ozone return dates and ozone recovery in CCMVal-2 models, *Atmos. Chem. Phys.*, 10, 9451-9472, <https://doi.org/10.5194/acp-10-9451-2010>, 2010.

---

Interactive comment on *Atmos. Chem. Phys. Discuss.*, <https://doi.org/10.5194/acp-2017-853>, 2017.