Atmospheric
Chemistry
and Physics
Discussions

Open Access

ACPD

Interactive
comment

Interactive comment on "How robust are stratospheric age of air trends from different reanalyses?" *by* Felix Ploeger et al.

Eric Ray (Referee)

eric.ray@noaa.gov

This paper uses the CLaMS model driven by meteorology from three different reanalysis products to investigate stratospheric age of air trends over the past few decades. The use of pulsed tracer releases allows the computation of age spectra at all locations and times in the stratosphere and this provides a powerful additional diagnostic to give insight into age of air trends beyond mean age. The paper is well written and the results are a significant contribution to our current understanding, or lack of understanding, of the recent variability in the circulation and mixing in the stratosphere. The lack of agreement in the decadal variability of the stratospheric age of air produced by the different reanalysis products is disturbing, especially in the most recent period when, as the authors mention, we would expect the reanalyses to come into better agreement. This

[Printer-friendly version](#)

[Discussion paper](#)

study adds to a growing body of literature pointing out important discrepancies in the representation of transport and mixing in the stratosphere and troposphere between reanalyses.

I recommend publication with consideration of the grammatical comments below.

Specific comments:

Pg. 1, line 17: change 'with' to 'of'

Pg. 2, line 17: add comma after 'scales'

Pg. 3, line 14: add comma after 'periods'

Pg. 3, line 25: add comma after 'time'

Pg. 4, lines 6-7: 'The results presented here are based...'

Pg. 4, line 14: change 'against' to 'compared to'

Pg. 5, lines 21-22: 'As the full age spectrum is the probability distribution of transit times, it is in general normalized to unity.'

Pg. 5, line 27: remove 'for' before MERRA-2. Should change 'stronger' to something else, perhaps 'flatter'.

Pg. 6, line 30: '...analysis to begin in 1979 (in 1980 for MERRA-2)...'

Pg. 7, line 8: remove 'finally'

Pg. 9, line 25: there is no Fig. 2f

Pg. 12, line 2: remove 'already', change 'clearer' to 'more clear'

Pg. 12, line 4: '...consistent with the comparison of reanalysis...'

Pg. 12, line 14: remove 'also'

Pg. 14, line 2: add 'a-c' after 'Fig. 7'

Pg. 14, line 6: add 'to be' after 'appear'

Pg. 15, line 3: add 'a-c' after 'Fig. 7'

Pg. 15, line 8: '...age spectrum can shed more light on the processes involved during each period.'

Pg. 15, line 9: change 'lowest' to 'lower'

Pg. 15, line 28: change to 'particularly'

Pg. 16, line 4: '...taken as representative of long-term trends.'

Pg. 16, line 8: change 'long' to 'longer'

Pg. 17, line 2: add 'the' before '2-3 years'

Pg. 19, line 4: change 'stronger' to 'more'

Pg. 19, line 16: add comma after 'SH'

Pg. 20, line 17: add 'regarding' after 'possible'

Pg. 20, line 29: 'This longer tail decay time scale causes the finite tail...'

Pg. 20, line 30: change 'has' to 'to have'

Pg. 24, line 20: add comma after 'percent'

Pg. 25, line 19: change 'explaining' to 'to explain'

Pg. 26, line 2: '...to not be robustly...'