

Review of “Multidecadal increases in global tropospheric ozone derived from ozonesonde and surface site observations: Can models reproduce ozone trends?” by A. Christiansen, et al.

-Review by Ryan Stauffer, NASA/GSFC, as a follow-up to public comment <https://doi.org/10.5194/acp-2022-330-CC1>

General Comments:

I sincerely thank the authors for addressing all of our public comments, as well as the two formal reviews provided to ACPD. The authors invested significant effort to ensure that the most up to date and accurate versions of available (i.e., homogenized) ozonesonde data were used. For example, the Canadian station trends in Figure S4 show changes that I expected based on experience working with both non-homogenized and homogenized versions of those data. The additional discussion, analyses, and arguments certainly satisfy all of my comments and concerns. I only have a few remaining minor/technical comments, and I think this paper is well-suited for publication in ACP.

Minor Comments:

Table 1: Wallops Island ozonesonde data have only been homogenized back to 1995 (<https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2018JD030098>), so please double check these date ranges and/or specify when stations have not completely homogenized their records.

Line 204 and Figure S1: The Japanese stations certainly appear to have a notable step-change and increase associated with the move from CI to ECC ozonesondes around 2010. Is there also a step-change in stratospheric ozone at these stations at the same time, indicating a large overall change in sensor response? If so, then indeed caution should be used in interpreting these large positive trends in the troposphere.

Line 351: “I other simulation...” looks like a typo

Line 847: “negligible” rather than “negligent”

A note on the Stauffer et al., (2020) study on the ozonesonde “dropoff”: An updated analysis is now in press with Earth and Space Science. However, no additional stations are considered “affected” by the dropoff, so this is purely for your information:

Stauffer, R. M., Thompson, A. M., Kollonige, D. E., Tarasick, D. W., Van Malderen, R., Smit, H. G. J., et al. (2022). An Examination of the Recent Stability of Ozonesonde Global Network Data. Earth and Space Science, 9, e2022EA002459. <https://doi.org/10.1029/2022EA002459>