

February 12, 2025

Comments by Owen R. Cooper (TOAR Scientific Coordinator of the Community Special Issue) on:

Intercomparison of global ground-level ozone datasets for health-relevant metrics

Hantao Wang, Kazuyuki Miyazaki, Haitong Zhe Sun, Zhen Qu, Xiang Liu, Antje Inness, Martin Schultz, Sabine Schröder, Marc Serre, and J. Jason West

EGUsphere [preprint], <https://doi.org/10.5194/egusphere-2024-3723>

Discussion started Jan. 3, 2025

Discussion closes Feb. 14, 2025

This review is by Owen Cooper, TOAR Scientific Coordinator of the TOAR-II Community Special Issue. I, or a member of the TOAR-II Steering Committee, will post comments on all papers submitted to the TOAR-II Community Special Issue, which is an inter-journal special issue accommodating submissions to six Copernicus journals: ACP (lead journal), AMT, GMD, ESSD, ASCMO and BG. The primary purpose of these reviews is to identify any discrepancies across the TOAR-II submissions, and to allow the author teams time to address the discrepancies. Additional comments may be included with the reviews. While O. Cooper and members of the TOAR Steering Committee may post open comments on papers submitted to the TOAR-II Community Special Issue, they are not involved with the decision to accept or reject a paper for publication, which is entirely handled by the journal's editorial team.

Comments regarding TOAR-II guidelines:

TOAR-II has produced two guidance documents to help authors develop their manuscripts so that results can be consistently compared across the wide range of studies that will be written for the TOAR-II Community Special Issue. Both guidance documents can be found on the TOAR-II webpage:

<https://igacproject.org/activities/TOAR/TOAR-II>

The TOAR-II Community Special Issue Guidelines: In the spirit of collaboration and to allow TOAR-II findings to be directly comparable across publications, the TOAR-II Steering Committee has issued this set of guidelines regarding style, units, plotting scales, regional and tropospheric column comparisons, and tropopause definitions.

The TOAR-II Recommendations for Statistical Analyses: The aim of this guidance note is to provide recommendations on best statistical practices and to ensure consistent communication of statistical analysis and associated uncertainty across TOAR publications. The scope includes approaches for reporting trends, a discussion of strengths and weaknesses of commonly used techniques, and calibrated language for the communication of uncertainty. Table 3 of the TOAR-II statistical guidelines provides calibrated language for describing trends and uncertainty, similar to the approach of IPCC, which allows trends to be discussed without having to use the problematic expression, “statistically significant”.

General comments:

Line 23

Is there any reason to report 60.8% with one decimal place? Would 61% be better, given the uncertainty in the estimate?

Line 24

The following statement is not very clear:

“These differences are large enough to impact health and other applications.”

I suggest:

“These differences are large enough to impact assessments of health impacts and other applications.”

Line 34

Please also provide the uncertainty range, along with the estimate of mortality.

Line 38

Make it clear that these ozone increases refer to ozone above the surface (surface ozone was not reported in this study because the surface observations were from airport runways, which are not representative of typical conditions). When mentioning population-weighted metrics, Gaudel et al. (2020) is not a correct reference as it does not address these metrics. Please provide a different reference. It would be helpful to list some references that provide recent updates on surface ozone trends. One such paper is Chang et al. (2024), submitted to the TOAR-II special issue, which focuses on long-term surface ozone trends across the USA.

Line 243-244

It is an oversimplification to say that ozone is typically increasing in the northern hemisphere over 2005-2016. First you need to specifically state that you are talking about the OSDMA8 metric, which is very different from the metrics reported by Gaudel et al (2018) and Fleming et al. (2018). These earlier studies showed a range of increasing and decreasing ozone trends that varied by region. The recent trend update by Chang et al. (2024) shows decreasing ozone in the eastern and western USA over the period 2005-2016. I recommend that you refer to studies that have focused on OSDMA8, such as Becker et al., 2023, and Malashock et al., 2022 (see Figure 1 and Figure 2 of Malashock et al., 2022; note that this is the second paper by Malashock, published in 2022; see the reference listed below).

Line 509

According to the TOAR data use policy (<https://toar-data.fz-juelich.de/footer/terms-of-use.html>), the TOAR data also needs the following citation:

Schröder et al; TOAR Data Infrastructure;

<https://doi.org/10.34730/4d9a287dec0b42f1aa6d244de8f19eb3>

Figure 1

Following the TOAR-II statistical guidelines, all trends need to be reported with their 95% confidence intervals and *p*-values.

Figure 7

These figures need to be reoriented, with the TOAR-II observation being the independent variable on the x-axis, and the model output being the dependent variable on the y-axis.

References

- Chang, K.-L., McDonald, B. C., and Cooper, O. R. (2024), Surface ozone trend variability across the United States and the impact of heatwaves (1990–2023), EGU sphere [preprint], <https://doi.org/10.5194/egusphere-2024-3674> (submitted to ACP as a contribution to the TOAR-II Community Special Issue)
- Malashock, Daniel A., Marissa N. Delang, Jacob S. Becker, Marc L. Serre, J. Jason West, Kai-Lan Chang, Owen R. Cooper, Susan C. Anenberg (2022), Global Trends in Ozone Concentration and Attributable Mortality for Urban, Peri-Urban and Rural Areas between 2000 and 2019: A Modelling Study, The Lancet Planetary Health, Volume 6, Issue 12, Pages E958-E967, [https://doi.org/10.1016/S2542-5196\(22\)00260-1](https://doi.org/10.1016/S2542-5196(22)00260-1)