

January 19, 2025

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

Ozone pollution may limit the benefits of irrigation to wheat productivity in India

Gabriella Everett, Øivind Hodnebrog, Madhoolika Agrawal, Durgesh Singh Yadav, Connie O'Neill, Chubamenla Jamir, Jo Cook, Pritiha Pande, and Lisa Emberson

EGUsphere [preprint], <https://doi.org/10.5194/egusphere-2024-3371>

Discussion started Nov. 15, 2024

Discussion closes Jan. 24, 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:

Please provide some justification for selecting the period 1996-2005 as being representative of the current climate. The mid-point of this 10-year time-slice is 2000, and it is now 2025, so we are 2.5 decades past this period. The latest estimate from NASA (<http://www.columbia.edu/~mhs119/Temperature>) is that Earth's surface temperature is increasing at the rate of 0.18 C per decade. Therefore, the planet has warmed by 0.45 C since the year 2000. Given the clear warming of the Earth since the year 2000, the period 1996-2005 does not seem to be representative of the current climate. The CEDS emissions inventory has been updated to include recent years (Hoesly et al., 2024), so a more current period could be used.

Regarding Section 3.3 (Effect of climate change on O3 sensitivity), please make clear the type of climate impact(s) that you are investigating. Several studies have explored the impact of the "climate change penalty", which is the impact of a future climate on ozone levels if emissions are held constant (Wu et al., 2008; Zanis et al., 2022). Your analysis does not seem to be addressing the "climate change penalty", and to avoid any confusion, please make this point clear. But please consider the impacts of the climate change penalty on your study region, as Zanis et al. (2022) concluded that India and China would be the regions with the strongest impacts.

References

Hoesly, R., Smith, S. J., Prime, N., Ahsan, H., Suchtya, H., O'Rourke, P., Crippa, M., Klimont, Z., Guizzardi, D., Behrendt, J., Feng, L., Harkins, C., McDonald, B., Mott, A., McDuffie, A., Nicholson, M., & Wang, S. (2024). CEDS v_2024_07_08 Release Emission Data (v_2024_07_08) [Data set]. Zenodo. <https://doi.org/10.5281/zenodo.12803197>

Wu, S., Mickley, L. J., Leibensperger, E. M., Jacob, D. J., Rind, D., and Streets, D. G.: Effects of 2000–2050 global change on ozone air quality in the United States, *Journal of Geophysical Research: Atmospheres*, 113, D06 302, <https://doi.org/10.1029/2007JD008917>, 2008.

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