

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

Performance evaluation of UKESM1 for surface ozone across the pan-tropics

Flossie Brown, Gerd Folberth, Stephen Sitch, Paulo Artaxo, Marijn Bauters, Pascal Boeckx, Alexander W. Cheesman, Matteo Detto, Ninong Komala, Luciana Rizzo, Nestor Rojas, Ines dos Santos Vieira, Steven Turnock, Hans Verbeeck, and Alfonso Zambrano

EGUsphere, <https://doi.org/10.5194/egusphere-2023-2937>, 2024

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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.

General Comments:

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, tropopause definitions and best statistical practices.

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".

Major Comments:

This manuscript provides a thorough evaluation of the UKESM1 model's ability to simulate surface ozone across the tropics. Overall the findings are consistent with the papers from TOAR-I and with the papers submitted so far to the TOAR-II Community Special Issue. Two papers that are currently under review with the TOAR-II Community Special Issue report surface or boundary layer ozone observations across the tropics. It would be helpful if the authors could briefly discuss how their findings are relevant to these other new results:

Gaudel, A., Bourgeois, I., Li, M., Chang, K.-L., Ziemke, J., Sauvage, B., Stauffer, R. M., Thompson, A. M., Kollonige, D. E., Smith, N., Hubert, D., Keppens, A., Cuesta, J., Heue, K.-P., Veefkind, P., Aikin, K., Peischl, J., Thompson, C. R., Ryerson, T. B., Frost, G. J., McDonald, B. C., and Cooper, O. R.: Tropical tropospheric ozone distribution and trends from in situ and satellite data, EGU sphere [preprint], <https://doi.org/10.5194/egusphere-2023-3095>, 2024.

Seguel, R. J., Castillo, L., Opazo, C., Rojas, N. Y., Nogueira, T., Cazorla, M., Gavidia-Calderón, M., Gallardo, L., Garreaud, R., Carrasco-Escaff, T., and Elshorbany, Y.: Changes in South American Surface Ozone Trends: Exploring the Influences of Precursors and Extreme Events, EGU sphere [preprint], <https://doi.org/10.5194/egusphere-2024-328>, 2024.

As stated in the *TOAR-II Community Special Issue Guidelines*, TOAR and Copernicus journals are committed to open data practices and all submitted manuscripts will follow COPDESS (Coalition on Publishing Data in the Earth and Space Sciences) principles: <http://www.copdess.org>. In particular all papers submitted to Copernicus journals must abide by FAIR data practices. Therefore, the authors need to demonstrate that all observations shown in their manuscript are archived in open-access, community-approved FAIR-aligned repositories (PANGAEA, for example). The Data Availability statement indicates that some of the surface station data are available from the TOAR database, but it's not clear where the data from some of the other sites can be found. For example, the Congo site is not in the TOAR database; the paper by Sibret et al. (2022) states that the Congo data are available upon request, but such a statement does not comply with COPDESS principles. It would be helpful if a table can be provided in the Supplement, which lists all monitoring sites and the associated links to the open-access data repositories.

Minor Comments:

Throughout the paper there are several statements that treat the word “data” as singular (e.g. line 467), in other places it is treated as plural. Please be consistent and treat “data” as plural.

Figure S1 is difficult to read because the panels are too small. To make the figure more legible, please expand the panels and spread it across two pages.