

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

Measurement report: Long-term measurements of ozone concentrations in semi-natural African ecosystems

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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-II 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.

Guidance note on best statistical practices for TOAR 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”.

Specific Comments:

TOAR-II Steering Committee member, Dr. Erika von Schneidemesser is an expert on small sensors, and she has independently posted a few comments on this paper to the EGU sphere discussion webpage.

Discussion of trends:

The expression “statistically significant” is used throughout the submitted manuscript, however this expression is now recognized as being problematic and it should be abandoned and replaced by the more useful method of reporting all trends (with uncertainty, e.g. 95% confidence intervals) and all *p*-values, followed by a discussion of the trends and the author’s opinion regarding their confidence in the trend values. This advice comes from a highly influential paper by Wasserstein et al. (2019), published in the journal, *The American Statistician*, that has already been cited over 1800 times (according to Web of Science). This advice was adopted by the first phase of TOAR (Tarasick et al., 2019) and is also used by TOAR-II. Some other recent papers on ozone trends that have taken this advice are: Chang et al., 2020; Cooper et al., 2020; Gaudel et al., 2020; Chang et al., 2022; Wang et al., 2022. Because these papers report all trend values, uncertainties, and all *p*-values, and also discuss the trend results, there is no confusion regarding the findings, and one does not even notice that the term “statistically significant” is not used at all. Table 3 of the TOAR-II statistical guidelines provides calibrated language for describing trends and uncertainty, similar to the approach of IPCC. In particular, Figure 16 only shows trend values that were deemed “significant” based on the *p*-value; this approach is inconsistent with the TOAR guidelines and the figure needs to report trend values from all sites, with 95% confidence intervals and *p*-values. Another TOAR guideline is that trends be reported in units of ppbv per decade so that trends can be compared between different studies. It’s fine if you want to report your trends in units of % yr⁻¹, but please also report the trends in ppbv decade⁻¹.

The “Data Availability” statement provides links for each of the monitoring stations, allowing the observations to be downloaded. However, it’s not clear which link belongs to which station. It would be helpful if the links can be listed in a table, which also provides the station name and country.

References:

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