



EGUsphere, author comment AC2
<https://doi.org/10.5194/egusphere-2022-365-AC2>, 2022
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Reply on RC1

John Douros et al.

Author comment on "Comparing Sentinel-5P TROPOMI NO₂ column observations with the CAMS regional air quality ensemble" by John Douros et al., EGU sphere,
<https://doi.org/10.5194/egusphere-2022-365-AC2>, 2022

The authors thank the reviewer for reviewing the manuscript and for the useful suggestions for improving it. Here are some replies on the comments provided.

General comments.

1. The text of the revised manuscript has been improved to describe better what the CAMS ensemble product is, how it has evolved in time and which of the CAMS products were used in this study.
2. Elements of the comparison between ENSEMBLE and TROPOMI as well as between ENSEMBLE and the individual models are presented in figure 9 and table 3, as well as through figures 7 & 8 which include a representation of the model spread. By spread, we refer to the range of values provided by all individual models, i.e. the distance between the minimum and the maximum values. We consider however that a comparison between the CAMS ENSEMBLE and the individual models as such is beyond the scope of this work. Elements of such a comparison can be found (in interactive form) in:

<https://regional.atmosphere.copernicus.eu/evaluation.php?interactive=cdf>

or in the form of quarterly reports in the "validation of CAMS regional services" reports in <https://atmosphere.copernicus.eu/publications>

3. Quantities (and their nomenclature) used in the comparisons in the paper are presented in figure 1 and their description can be found in section 4.1. The text of the revised manuscript has been improved to clarify how each product is used.

Specific comments.

All comments are appreciated and the text of the manuscript has been adapted to take them into account, including clarification of terms and sentence clarity.

As regards specific comment 7, the text in the manuscript actually mentions that "ship tracks are generally more prominent in the CAMS fields", not that they are completely absent in the TROPOMI fields, where they appear to be not as easily discernible. It is now documented that TROPOMI can in fact not only detect ship lanes but also individual ship tracks (Aristeidis K Georgoulas et al 2020 Environ. Res. Lett. 15 124037, <http://dx.doi.org/10.1088/1748-9326/abc445>) under certain favourable conditions i.e. stable, calm wind conditions with limited dispersion of ship plumes. It would however be beyond the scope

of this work to investigate whether the prevailing conditions during the days shown in figures 4 and 5 were favourable in this respect. Potential reasons for the apparent difference between modelled and TROPOMI fields in this particular respect include the inherent noise in the TROPOMI fields and unrealistically low dispersion characteristics of the modelled plumes.

As regards specific comment 11, the reviewer is correct that the wording is somewhat misleading. Our work does not claim a new methodology as such, but a scheme (outlined in Figure 1) to guide interested parties as regards the recommended approaches towards satellite-model comparisons and to point to the correct steps in order to apply them. The text in the conclusions is adapted accordingly in the revised version of the manuscript.