

Atmos. Chem. Phys. Discuss., referee comment RC2 https://doi.org/10.5194/acp-2022-110-RC2, 2022 © Author(s) 2022. This work is distributed under the Creative Commons Attribution 4.0 License.

Comment on acp-2022-110

Anonymous Referee #1

Referee comment on "Peculiar COVID-19 effects in the Greater Tokyo Area revealed by spatiotemporal variabilities of tropospheric gases and light-absorbing aerosols" by Alessandro Damiani et al., Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2022-110-RC2, 2022

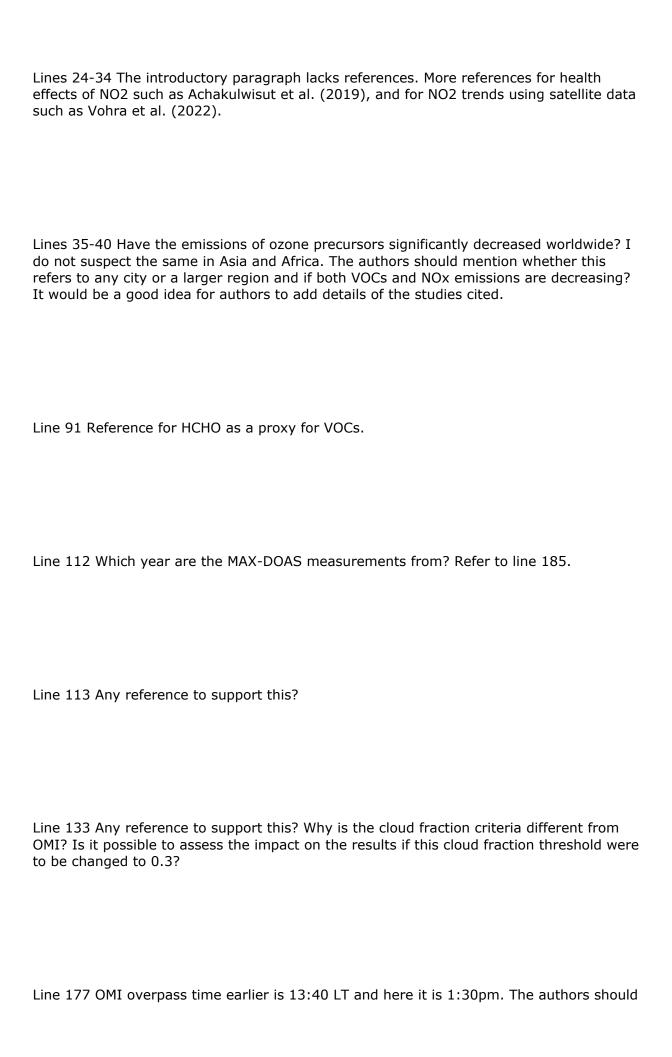
The authors focus on the spatiotemporal variability of gases and light-absorbing aerosols in the Greater Tokyo Area during the COVID19 lockdown and the resulting changes in mobility. In general, I find this manuscript to be of interest for publication and appropriate for Atmospheric Chemistry and Physics. The manuscript is well written and would benefit from some additional details in the methods and discussion sections. Consequently, I can only recommend this paper for publication after major revisions.

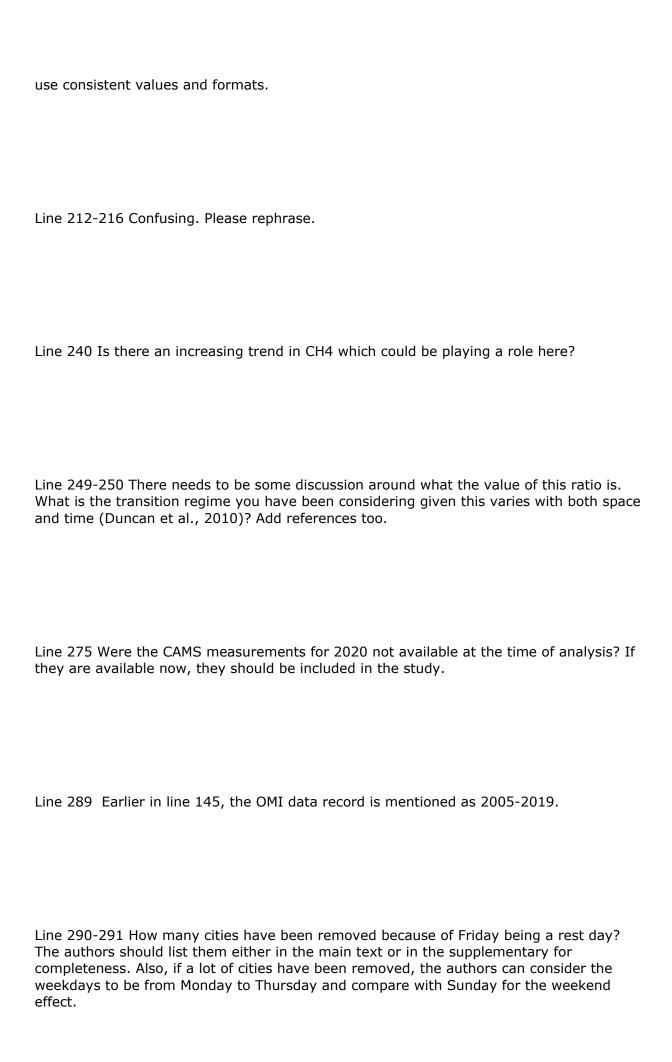
Major comments

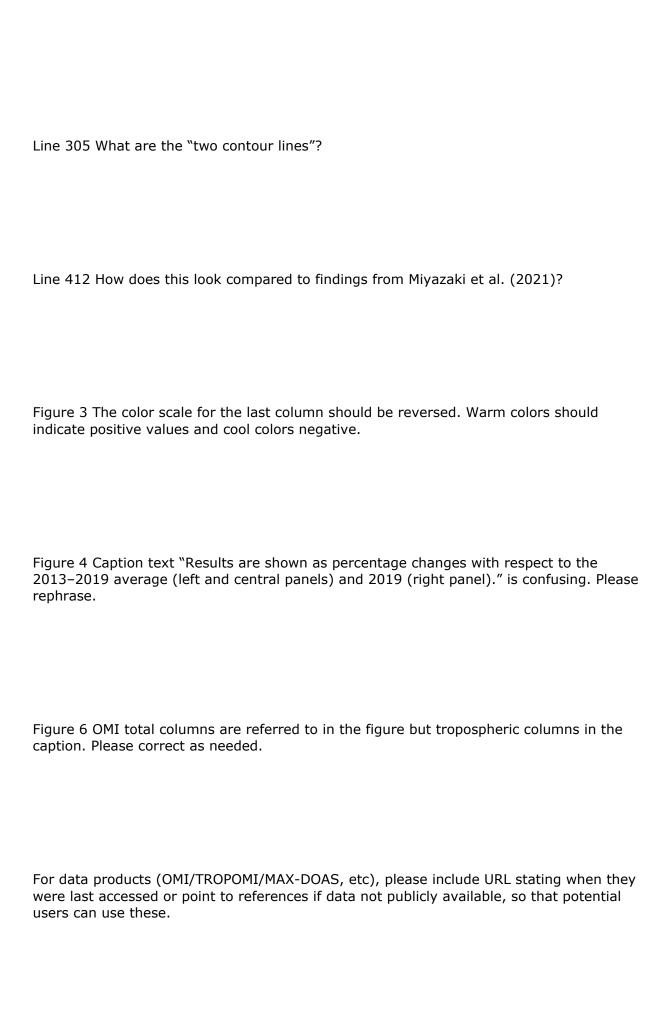
The content of the manuscript needs to be backed by more references. I have mentioned some instances under minor comments.

The authors also need to provide an overview of other studies which have investigated the impact of COVID19 lockdown. The authors should also compare their findings with existing literature (Cooper et al., 2022, Miyazaki et al., 2021).

| Line 128 There may have been a version change in TROPOMI products in this time period. If yes, the authors should briefly mention this and discuss how did they go about it. Also, what do the authors mean by 'interpolation' here? Do they mean 'oversampling'? How have the uncertainties been considered? Are the TROPOMI columns shown in Figure 3 and referred to in line 235 error-weighted averages? |
|---|
| Line 240-245 I would recommend the authors to also perform a sensitivity check if they considered median and error-weighted mean (if not already) of the TROPOMI HCHO columns and see if the interpretation of the results changes. |
| Can the authors use existing literature to comment on the relative contribution of biogenic and anthropogenic sources to HCHO and interpret the current findings of no apparent changes in TROPOMI HCHO? |
| Figure 5 It is difficult to read and interpret sub-figure (a) because of the image resolution. Also, the figure caption needs to describe that the NO2 mean is shown in grey. Can the authors consider an alternative way to present the data in this figure? For example, have the data as a table (supplementary material) and only show the top 10 or 20 cities in a figure (main text). The contours in sub-figure (c) are also complex to interpret as the color legend is only for population density. Please describe in the caption how the contours should be interpreted. |
| Minor comments |







References

Achakulwisut et al., doi: 10.1016/S2542-5196(19)30046-4, 2019.

Cooper et al., doi:10.1038/s41586-021-04229-0, 2022.

Duncan et al., doi: 10.1016/j.atmosenv.2010.03.010, 2010.

Miyazaki et al., doi: 10.1126/sciadv.abf7460, 2021.

Vohra et al., doi:10.1126/sciadv.abm4435, 2022.