

Editor comments on Manuscript egosphere-2024-3758

Natural and anthropogenic influence o tropospheric ozone variability over the Tropical Atlantic unveiled by satellite and in situ observations by Okamoto et al.

The manuscript has been improved in terms of data sets being used and the kind of data analyses done. However, with the revision the manuscript became even longer and the point of critique that has not been solved is that the manuscript is still not concise. The manuscript is in many places quite lengthy and there are several repetitions as e.g. Section 3.4.1-3.4.3. Exactly the same has already been discussed/described in the sections before.

The entire manuscript needs to be thoroughly revised so that it has a clear focus and only presents and describes what is necessary in a clear and concise way. Note, the abstract and conclusions are not in agreement with the new ACP guidelines for preparing these parts of the manuscript. Please check their guidelines

https://www.atmospheric-chemistry-and-physics.net/policies/guidelines_for_authors.html

and prepare these parts accordingly. I will provide more detailed suggestions for improvement of your manuscript below.

General comments:

1. The reanalysis are also an essential data set for this study. Why are these not mentioned in the title?
2. What is/are the main data set(s) of this manuscript. The data sets are used for intercomparison and for analysis. What is your intention with using exactly these data sets? Why have you picked a combination between satellite, in-situ and reanalysis data? My problem here is that the motivation is missing what has been done and why.
3. What is the intention of the intercomparison and why does it take such a large part in the manuscript if according to the title the focus is on the ozone variability over the tropical Atlantic? I think the way of writing in these sections is wrong. If your goal is to analyze these processes and check how these are represented in the different data sets, I think you first should describe the phenomena and then how these compare in the data sets.
4. The data and method section could also be shortened. I had the feeling that here details on the data sets were provided that were not of importance for your study and thus could be omitted.
5. The figure title and y-label fonts for most of the figures are too large (especially Fig 1-5, for the others only the titles are too large). The fonts should be decreased to a normal size and all figures should be have a similar layout concerning font size.
6. Section 3.4.1-3.4.3 are a repetition of what has been described and discussed before. Please adjust your manuscript that there is a clear line for presenting the results and not too many repetitions. Also jumping back and forth between the figures makes the manuscript hard to read. If there is something that has been discussed or written in the sections before rather that section should be referenced. Here and there you can also refer to a previous figure, but not to the extent as it is done currently.
7. Section 4 is a much too long and too detailed conclusion section. There is a lot of repetition of detailed descriptions of the results that have been presented before. Please shorten the conclusion section and follow the ACP author guidelines (see link provided above).

Specific comments:

P1, L28: A statement on what is the importance and implications of your results is missing.

P5, L125: I am bit astonished about the term “multispectral satellite approach”. Isn’t that a merging of satellite data sets that you have done here? Even if you already have used this data set in other studies and it is thus described elsewhere, I would appreciate if you could add here a few sentences describing how these data sets have merged and why this is possible despite the different observation techniques.

P6, Table 1 caption: I would suggest to remove “in 2017” since you provide here the information on the data which is valid for all years and not solely 2017.

P9, L226: Abbreviation “ER” introduced? Do you mean with ER the emission ratio? Nevertheless, I would suggest not to use an abbreviation for this.

P9, L239: Interpolated to what?

P9, L234: What parameter is this? Or do you mean that you are checking if the trajectories passed through the boundary layer?

P9, L245: “between models and thus uncertainties” does not make any sense. Please correct the sentence.

P10, L280: So far it has nowhere clearly been described which time period has been considered and why.

P10, L281: Here you state that the analysis of ozone distribution is the focus of the following sections, however, there mainly the differences between the data sets are discussed and it rather reads like an intercomparison (which is however not the focus of this study). Thus, what is the focus? Looking at the remainder of the manuscript, it would be really important to focus on the ozone distribution and not on the differences between the data set. These can of course be discussed, but this should be done to a much lesser extent as it is done now.

P10, L284: This statement needs a reference.

P11, L289: Why are you starting the result section with the supplementary figures instead of the figures that are presented in the main text?

P11, L293: You mean the wind vectors are added to the figure? Thus, you should write “Therefore, wind vectors at 10 km of altitude have been added.....”

P11, L293: If you discuss Fig. S2 in detail here, it should be moved to the main text. Checking the figures here and in the supplement I came to the conclusion that a wrong referencing of the figures has been used in the main text. This comes from the revision you made due to the referee and community comments. However, the referencing should have been adjusted before resubmission, because this makes reading your manuscript really tough.

P13, L322: Has the abbreviation “SD” been introduced?

P13, L336: Here I was wondering If the figures were also in the wrong order in the manuscript or if this is due to the wrong referencing of the figures. Fact is that here the figures are not discussed in a consecutive order, but without any order. First Fig. S2 and S3, then Fig. 2 and 3 and then Fig. 1.

P13, L348ff: Here you describe what is shown in Fig. 2, but Fig. 2 has already been discussed in the paragraph above. It should be first described what is shown in the figure and then the discussion should follow, thus this paragraph should be moved higher up (to L318).

P13, L349: Instead of referring here to Fig. S4 I would suggest to write which period is considered.

P13 and P17, Figure 2 and 3 caption: Sentence "Black rectangles indicates the region to calculate average ozone and coefficient of variation in Fig. S4". Sentence need to be corrected. I think it should read "is shown" in Fig. S 4 and it this is the region "for which" the average ozone and coefficient of variation have been calculated.

P18, L390: It should be described in one or two sentences what ATom is. Are these instruments or were these measurement campaigns?

P18, L401-2: Isn't that a contradiction? Both times you state that higher ozone concentrations are found. It is not clear which of the data sets has higher ozone concentrations.

P18_L402: Do you mean that IASI+GOME2 has everywhere higher ozone concentrations except in the St. Helena anticyclone?

P18, L406: Isn't that a repetition of L401-402?

P21, L431: which values? Please be more precise.

P22, L445, Figure 6 caption: What is actually shown here are vertical cross sections with vertical profiles of ATom overplotted. I would suggest to move the first two sentence at the end of the figure caption. Same holds for P25, Figure 7 caption.

P22, L455: Which region? Please be more precise.

P24, L498-499: Sentence "At about 5°S, the CO maximum underestimated by the reanalysis are located at 2-3 km altitude." not clear, please rephrase.

P24, L499: Please don't start the sentence with "It". Clearly state what you mean with "it".

P25, L511: "indicated in Fig. 4 and 5" You mean "as shown by the bold lines in Fig. 4 and 5"?

P25, L514: Why "might". You are comparing the data sets and thus you should be able to clearly see if they reproduce the shape or not.

P25, L515: "IASI+GOME2 and TCR-2 show such enhancement. Only CAMS reanalysis shows this enhancement." This sounds for me like a contradiction. Please check and rephrase these sentences.

P26, Figure 8 and Figure 8 caption: I would suggest to only write the time period in the figure title since also other data is shown. As for Figure 6 and 7, here vertical cross sections are shown. Move the first two sentences at the end of the caption.

P27, L533. Shouldn't it read Fig. 8c and e?

P27; L539-540: Also here I could not follow. Either the sentence is not correct or the reference to the figure is wrong.

P27, L545 and 546: And also Fig. 10. Here you should mention both figures and add also ATom-3.

P27, L555-556: Sentence grammatically not correct and needs to be revised.

P28 and 30, Figures 9 and 10: Adjust font size or frequency of tick labelling so that the x-axis labels are not overlapping.

P31, L574 and 586: grey triangles? I do not see any triangles. Do you mean the black squares in panel a?

P32, L594ff: Clearly write which data sets and not just “satellite” and “reanalysis”.

P33, L611: Instead of referring to Fig. 9 a and 10a you should refer to the respective section.

P33ff: Section 3.4.1-3.4.3 are a repetition of what has been described and discussed before. See my general comment on this above.

P33, L614: It should read “one satellite and two reanalysis” and not “three satellite and reanalysis”. Rather in referring to the number of reanalysis and satellite data you should rather use the instrument names.

P35, L638: “It” please rephrase and be more precise.

P38, Section 4: This is a too long and too detailed conclusion. Don’t discuss the details of the comparison here once again, just shortly state how good or bad the data sets compare with each other.

P39, L758: “CO plume caused by biomass burning from the Congo Basin and Brazil and is located between 20°S and the equator”. This sentence need to be corrected.

P40, L786: As mentioned before the conclusions are much too long and should be considerably shortened. What are the implications of your result?. A clear statement on this is missing in the conclusions (see ACP guidelines for authors).

Technical corrections:

P1, L21: Add CAMS2 in parenthesis.

P1, L25: is ~13 ppbv -> of about 13 ppbv

P2, L53: were over -> were found over

P3, L82: See S1 in the Supplement -> see Fig. S1

P5, L148: remove comma and add “are” after “this paper” and also remove the second comma in L149 and add “and” before “are”.

P7, L186. Precursors -> precursor

P8, L214: literature -> studies

P8, L219: delete “following”

P9, L248: has -> have

P9, L249: neither -> not

P9, L253: Add “resolution” after “spatial” and “and” so that it reads “spatial resolution and with daily and monthly temporal resolution”?

P10, L271: rather “processes” than “elements”.

P12, L311: Has the abbreviation “FRP” introduced in the text?

P13, L326: One closing parenthesis is obsolete.

P15, Figure 2 caption: Remove space between “variation” and full stop.

P17, Figure 3 caption: Same here.

P18, L390: ATom or Atom? Use a consistent writing throughout the manuscript.

P18, L393: space between “to” and “7” missing.

P18, L406: compared with -> in comparison with the

P19 and 20, Figure 4 and 5 caption: Make a full stop after reanalysis and move “Black bold lines” before “indicate” so that it reads “Black bold lines indicate.....”.

P21, L430: compare -> intercompare?

P21, L431: omit “indicated by black bold lines in Figs. 4 and 5”.

P21, L443: until? Do you mean “except for” or from the lower stratosphere onwards?

P32, Figure 11 caption: Scatterplots -> scatter plot

P33, Figure 12 caption: Full stop after “Figure 12” should be a colon and move “respectively” after “IASI+GOME2” and delete “(idem as Figs. 9a and 10a)”.

P37, L677: stratosphere -> stratospheric

P37, L689: “in a lower clearly lower magnitude” -> please check and correct

P38, L709: omit “reanalysis” after “CAM5”.

P38, L714: form -> from

P38, L727-728: If you provide the time period of ATom once again it should be done rather in L710.

P39, L756: link -> linked