

We are grateful to the editor for dedicating valuable time and effort to reviewing our manuscript. The comments raised by the editor have significantly improved the quality and clarity of our work. We agree with all of the provided feedback.

Please note that the editor's comments are in black italic, while our responses are in blue. Any modified or additional text in the revised manuscript is highlighted in red.

Editor comments on Manuscript egosphere-2024-3758

P4, L129: reanalyses -> reanalyses

P5, L131: is -> are

Response: Corrected.

P5, L131: Add "Sect. 4" in parentheses.

Response: Agreed and added (line 131 on page 5).

"Conclusions are given in the last section (Sect. 4)."

P5, L139: In your reply to my comments you stated that the term multispectral satellite approach was used in several previous publications. However, when I searched this term with google, I rather found that the term "multispectral synergism of IAS and GOME2" is used. Wouldn't it then be better to write "multispectral synergism of IAS and GOME2" instead of "multispectral satellite approach"?

Response: We have rewritten it using "synergism" (line 18 on page 1, line 108 on page 4, line 140 and 141 on page 5)

P5, L142: The sentence is misleading and should be rephrased. The time given has nothing to do with the global coverage, I guess this is the equator crossing time of the satellite and it should also be written like that.

Response: Agreed and revised (line 142–145 on page 5).

"Both instruments are onboard the MetOp satellite series. MetOp-B (in orbit since 2006) offers global coverage every day with a relatively fine ground resolution (12 km diameter pixels spaced by 25 km for IASI at nadir and ground pixels of 80 km × 40 km for GOME-2). The MetOp-B has an Equator crossing time of 09:00–09:30 LT (local time) in the descending node."

P5, L145: "on" a vertical grid

Response: Corrected.

P5, L147: It should read either "is provided by the French data centre" or "can be retrieved from the French data centre".

Response: Agreed and revised (line 150 on page 5 and line 161 on page 6).

"The IASI+GOME2/MetOp-B ozone product...is provided by the French data centre AERIS..."

P5, L150: Which layer? It is not clear what is meant. Do you mean the "horizontal" layer?

P5, L160: Also here "layer" not clear.

Response: We agree that it is not clear. We have used “column” instead of “layer” (line 152 on page 5 and line 163 on page 6).

P5, L158: “from” instead of “an”.

Response: Corrected.

Data and Method introduction: Mentioning of Atom (sect.2.3), meteorological data (Sect. 2.4) and other data (Sect 2.5) missing.

Response: Agreed and added (line 136–138 on page 5).

“This section provides an overview of the datasets used in this study, including satellite data (Sect. 2.1), atmospheric chemistry reanalyses (Sect. 2.2), in situ airborne measurements (Sect. 2.3), meteorological data (Sect. 2.4) and other data (Sect. 2.5).”

P10, L268: Change “It” to “The ITCZ”.

P10, L281: Introduce SD here once again since you introduced it long before on P2.

P10, L283: minima “are” seen

P13, L318: Instead of “in period shown in Figure. 1” write the year, thus it should read “in 2017”.

P13, L324: is -> are

P13, L330: Add “the” so that it reads “the three reanalyses products”.

Response: Corrected.

P14, Fig. 3 caption: Add “the” and “altitude” so that it reads “from the surface to 3 km altitude” and in the last sentence it should read “that are shown in Fig. 1” and move the coordinates behind “rectangle”

Figure 4 caption: See my comments on Figure 3 caption. Same changes should be made here.

P18, Fig 5 caption: See my suggestion for corrections on Figs 3 and 4 captions.

Response: Corrected.

“Figure 3: Distribution of monthly mean ozone from the surface to 3 km altitude in February and October 2017. (a and e) IASI+GOME2, (b and f) TCR-2, (c and g) CAMS reanalysis and (d and h) coefficient of variation. Winds at 3 km altitude from ERA5 are indicated by black arrows. Black rectangle (25° S–25° N, 34° W–18° W) indicates the region for which the average ozone and coefficient of variation that are shown in Fig. 1.”

P15, L344: Add “the” so that it reads “the ozone distribution”.

Response: Corrected.

P15, L349: With what? Which data sets are compared? Please be more clear.

Response: Agreed and revised (line 351–352 on page 15).

“In this upper layer of the troposphere, more similarity can be observed between TCR-2 and CAMS reanalysis (Fig. 4).”

P15, L350: Sentence not clear. Please check and revise.

Response: Agreed and revised (line 353–356 on page 15).

“The previous intercomparison of four chemistry reanalyses by Huijnen et al. (2020) suggests the large SD at 350 hPa over South America, Central Africa, and over the Arctic and Antarctic regions could reflect different representations of deep convection along with biomass burning emissions at low latitudes and polar vortex, stratospheric ozone intrusions and chemistry treatment at high latitudes among the systems.”

P15, L354: Add “the” so that it reads “the two”.

P15, L356: Change “which” to “where” so that it reads “where IASI+GOME2 concentrations are low”.

P17, L373: Change to “covers the regions from.....”

P17, L377: Figs. -> Figures

P17, L377: Add “the” so that it reads “show the horizontal distribution”

P17, L381: Add “the” so that it reads “the St. Helena anticyclone”.

P19, L402: Add “the” so that it reads “the two reanalyses”.

P25, L469: Delete “the” before transport.

Response: Corrected.

Fig 11 and 12 caption: I guess the dots are showing the vertical profiles of Atom. Thus, I would suggest to rephrase the last two sentences as follows: “Dots show vertical profiles of CO concentrations from ATom-2 and ATom-3 observations for the periods from 13 to 15 February and from 17 to 20 October 2017”.

Response: Agreed and revised.

“Figure 11: The ozone concentrations of (a–b) IASI+GOME2, (c–d) TCR-2 and (e–f) CAMS reanalysis are averaged for the period from 13 to 15 February 2017 and from 17 to 20 2017, respectively, and are extracted along the ATom flight tracks. Dots show vertical profiles of ozone concentrations from ATom-2 and ATom-3 observations for the periods from 13 to 15 February and from 17 to 20 October 2017.”

P27, L509: Add “the” so that it reads “the two reanalyses”.

P27, L514: Add “the” so that it reads “the St. Helena anticyclone”.

P27, L516: Add “the” so that it reads “the two reanalyses”.

P28, L520: Write here “the satellite and the two reanalyses”

Response: Corrected.

P27, L500: Fig. 1a? I guess this is wrong since Fig 1 has no panels.

P28, L540: Fig 1c?

P28, L550: Fig 1a? Please check figure reference, This should be done throughout the entire sections since you referring here to many figures and it is very important that the referencing is done here correct.

Response: These were errors in Fig. 2. We have checked to ensure that the correct figures are referenced throughout the text.

P29, L576: low -> lower, so that it reads “lower-to-upper”

P30, L595: Delete “in the” so that it reads “seen north of”

P30, L600: low -> lower, so that it reads “lower-to-upper”

Response: Corrected.

P31, L612: Which study? The reference of Burgeois at the end of the sentence? The sentence should read “A previous study” or write “The previous study by Burgeois.....”

P32, L661: See my comment on P31, L612: It should read either “A study “ or “The study by Bourgeois et al.”

Response: Agreed and revised (line 616–617 on page 31 and line 664–666 on page 32).

“The previous study of the ATom campaign by Bourgeois et al. (2020) concluded that three global chemical transport models systematically underpredicted the observed influence of biomass burning on tropospheric ozone.”

“The previous study by Bourgeois et al. (2020) revealed that models systematically underpredict the observed influence of biomass burning on tropospheric ozone based on the estimates using classical four seasons.”

P31, L619: Sentence needs to be revised. What do you mean with evaluating here? Do you mean that you are evaluating the re-analyses by these comparisons? Correcting the sentence with deepL write I got the following suggestion: “Our results suggest that, in the context of intercomparison studies of tropospheric ozone over the Atlantic, the seasonal variability of biomass burning in Africa must be considered when evaluating model source uncertainties.”

Response: Agreed and revised (line 621–622 on page 31).

“Our results suggest that the seasonal variability of biomass burning in African should be considered when evaluating model uncertainty of tropospheric ozone over the Atlantic.”

P32, L631: “and” instead of a comma? “Gulf of Guinea (over the Ocean) and Central and Southern Africa”?

P32, L652: Add “the” so that it reads “the two reanalyses”

Response: Corrected.

P32, L662-665: I would suggest to split the last sentence into two sentences and rephrase as follows: “Our findings suggest that intercomparison studies over the Atlantic should be carried out using seasons based on the location of active biomass burning areas as well as the influence of anthropogenic precursors over the Northern Atlantic. Such studies will improve the accuracy of chemistry-transport models in this region.”

Response: Agreed and revised (line 666–669 on page 32).

“Our findings suggest intercomparison studies over the Atlantic should be carried out using seasons based on the location of active biomass burning areas as well as the influence of anthropogenic precursors over Northern Atlantic. Such studies will improve the accuracy of chemistry-transport models in this region.”