

Atmos. Chem. Phys. Discuss., author comment AC1
<https://doi.org/10.5194/acp-2021-115-AC1>, 2021
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Reply on RC1

Victor Lannuque et al.

Author comment on "Origins and characterization of CO and O3 in the African upper troposphere" by Victor Lannuque et al., Atmos. Chem. Phys. Discuss.,
<https://doi.org/10.5194/acp-2021-115-AC1>, 2021

We thank the reviewers for their comments and suggestions on the manuscript. We outline below responses to the points raised by each referee and summarize the changes made to the revised manuscript. We have also provided a revised version of the manuscript with changes appearing highlighted in yellow in the text.

Reponses to RC1

> *Generally speaking, titles don't have a period at the end. Please correct.*

Titles were modified

> *The abstract is too long and has redundant information. For example, L31-34 is basically repeated in L37-39. I would suggest to rework the abstract to make it more concise.*

The abstract was modified to be shorter and redundant informations were removed.

> *P9 L254 I would refer to easterly winds rather than to 'Zonal winds < 0' in the second sentence of this line. I would also add units (m/s) to the 0.*

The text was modified.

> *P10 L264 The transition period is sometimes written as April-May and sometimes as AM (e.g. L265). I would suggest to use only the abbreviation after the definition in L246.*

AM (and N for November) are not used in the text. We have decided not to use the abbreviations for the April-May and November transition periods in the text to avoid misunderstandings (with AM from AM-PM and N for North which are more commonly used in literature). The abbreviations are however used in the figures and are therefore now presented in the text with the mention: "in the tables and figures".

> *Fig. 2 presents relative humidity as a fraction of 1, while other plots shows it as percentage. Please correct to improve consistency. I would also remove the ticks on the y axis of panels i,j,k and l, as they are not coincident with the boxes shown. It might also be a good idea to show the NCEP output as a grey shading in the same way IASI is*

introduced in Fig. 4. That would provide a more quantitative comparison between the IAGOS in-situ met data and NCEP.

As recommended, figure 2 was modified: relative humidity is now presented in percentage, y-axis ticks was removed for panels i, j, k and l, and the NCEP data range are now represented by grey areas.

> P22 L508 – *LiNO_x is lightning NO_x? Please clarify (e.g. add abbreviation description)*

The abbreviation is now presented where the lightning NO_x are first clearly mentioned in the text in section 6.

> P22 L487 *'(which may be relevant????? should maybe mention "this)'* looks like a comment added by the authors during writing process.

You are right. The comment was removed.

> Fig. 5. *Please make the labels larger (specially the lat, lon ones).*

Figure 5 was modified as requested.

> *Figs. 7, 8 and 9 show several levels in the troposphere and just one between 11 and 50 km. Does this level intend to show the stratospheric contribution (i.e. stratospheric intrusions)? Does it correspond to the average of several levels? 11 km doesn't seem to correspond to the stratosphere in the tropical region. Please clarify.*

Referee makes a good point, as this part was not clear enough. We do not intend to show stratospheric contribution here because it would request a deep investigation to determine the tropopause altitude, which could be complicated at the tropics using for instance potential vorticity. The goal is just to determine upper tropospheric transport. To go a little further in the analysis, we see that the contributions of the "11km and above" layer does not extend beyond the tropics (+/- 25 ° approximately). This means that we mainly have contributions from the UT because the Stratosphere to Troposphere exchanges are negligible in the tropics, or there is on the contrary troposphere to stratosphere transport. Text and figures 7, 8 and 9 were modified to mention that and to consider only altitude higher than 11km.

> P28 L617 *Join (iii) to the previous paragraph.*

The text was modified.

> P33 L846-849 *"Thouret, V., Marengo, A., Sabatier, P., Logan, J. A., Ndec, P. and Grouhel, C.: Comparisons of ozone measurements from the MOZAIC airborne program and the ozone sounding network at eight locations Goose is obviously one important to its has followed by a recent impact and Marerico greenhouse Staehelin Copyfight by the American Geophy, J. Geophys. Res., 103, 1998." -> (?) Please revise this citation.*

The citation was corrected.

> *I would suggest the authors to carefully proof-read the document and look for consistency issues. For example, figures are referred as Fig., fig, Fig, etc. without consistency.*

The text was proof red to correct these inconsistencies and to follow the Copernicus guidelines (only "Figure" and "Fig." are conserved).