Editor’s comments:

Dear authors,

Thank you for providing your responses to the referees' comments and submitting your revised manuscript. I believe that the IAGOS-CARIBIC measurements and your dataset are valuable to the scientific community, therefore I am recommending that your manuscript be published after minor revisions.

Specifically, please address in your manuscript the concerns brought up by referee 2 regarding,

1) The selection of time period used for calculating the trends: In particular, how would the linear trend be affected if you selected a different time period (i.e. before or after the 2009/2010 minimum).

2) Expand section 3.4 on Limitations to include a discussion on the selection of regions. Why were these regions selected (i.e. are they considered homogeneous in terms of latitudinal variability?) How might selecting different regions (e.g. smaller areas) affect the UTLS trends?

Please don't hesitate to contact me directly if you have any questions or would like me to provide feedback on a proposed draft before you submit the revised version.

Best regards,

Nellie

Authors' response:

Dear Editor,

We really appreciate your time and effort in editing our manuscript and providing helpful comments. We have carefully addressed the concerns from referee 2 and our replies are shown below.

For 1), we now calculate the trends of all regions listed in Table 2 without the data in 2009 and 2010, and the values are listed in Table S2. The difference between trends with all data and trends without 2009/2010 for all the regions listed in Table 2 are 10.7% (ethane), 3.1% (methane), and 24.7% (propane) (median). The difference reflects the atmospheric variability (propane highest, methane lowest). We now add the following text in the limitation section to address this point:

"(d) Growth rates are different when choosing different time periods. Excluding data collected in 2009 and 2010 when trend anomalies were seen in some regions shows 10.7% (ethane), 3.1% (methane), and 24.7% (propane) difference (median) (Table S2) compared with the growth rates calculated with all 2006-2016 data (Table 2). The difference is associated with the atmospheric variability of trace gases, but not the quality of data."

For 2), we now add the following text in the limitation section:

"(e) Selection of regions. Regions of interest are selected at continental scale to ensure enough number of observations (>95) in each region. The spatial variability within each region is considered homogeneous. This might introduce uncertainty but its quantification requires more observations or model simulations. The typical transport time from surface to tropopause is about 1-3 months, assuming a wind speed of 1m/s, air travels 2,592-7,776 km within 1-3 months which is larger than continental coverage. Thus the assumption of homogeneous spatial variability at continental scale may not have large uncertainty."

Best regards,

Mengze on behalf of team