

Interactive comment on “Pollution trace gases C₂H₆, C₂H₂, HCOOH, and PAN in the North Atlantic UTLS: observations and simulations” by Gerald Wetzel et al.

Anonymous Referee #1

Received and published: 1 February 2021

General comments:

This manuscript presents observations of multiple trace gases from the GLORIA instrument over the North Atlantic. It describes the GLORIA instrument and data analysis method, and then uses model simulations to interpret the observations and relate them to the Asian Monsoon and to identify underestimates in the emission inventory. This is an interesting and useful multi-species dataset and the modeling provides a robust tool for analysis. However, the combination of retrieval description and model analysis left the main focus of the manuscript a bit unclear to me. If the primary objective is to present the GLORIA retrieval and data analysis, I would like to see this section

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expanded and more validation included. If the goal is instead to interpret the observations, the discussion of the driving scientific questions and what new insights are found should be clarified/strengthened.

Specific comments:

Line 60: This lifetime is still long enough to allow long-range transport

Line 132: Is radiative transport the same as radiative transfer?

Section 2.2: Is this the first description of this method, or are there other papers that could be referenced for the GLORIA retrievals and validation?

Line 216: All biomass burning or just “anthropogenic” biomass burning?

Line 275: specify the instrument/satellite

Conclusions: Last paragraph: The importance of emission inventories is well-known. Please make the conclusions more specific and emphasize what is new from this study.

Figure 6: Is this figure the same as the first column of figure 7?

Fig. 9 caption: Does “Coloured encircled areas” mean the cyan dots/circles?

Editorial comments:

Lines 46-50: please reword this sentence for better clarity

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2020-1215>, 2020.

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