Atmos. Chem. Phys. Discuss.,
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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Seasonal evaluation of tropospheric CO_2 over the Asia-Pacific region observed by the CONTRAIL commercial airliner measurements" *by* Taku Umezawa et al.

Anonymous Referee #2

Received and published: 1 August 2018

General comments:

This paper addresses the long-term tropospheric distributions of CO2 over the Asia-Pacific region obtained from the commercial airliner measurements under CONTRAIL project. High quality tropospheric CO2 data in general are sparse and such data specially the rapid developing Asian regions are specially limited. These long-term observations can contribute to constrain the emission patterns for the rapid developing Asian region that is critically important to the global carbon budget. The text provides a good summary of upper tropospheric CO2 distributions and role of the responsible factors for the seasonal distribution over Asia-Pacific region. I acknowledge the large amount

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Discussion paper

of work provided by the authors and interesting information issued from this study. This work is interesting to be published and is fully within scope of ACP

Technical Comments:

Abstract: Please include 2-3 sentences for highlighting the importance of the study.

Abstract: Line 18: “It is found. . .. season” – The sentence is long and not clear to me. Please reformulate it.

Introduction: Line 27: “China is now . . ..nations” – The sentence is not clear. Please reformulate it.

Figure1: Please tag the climatological mean CO2 concentrations along with the flight tracks in “a” panel if possible.

Figure 3. Please mentioned the source of wind vector data in the caption.

Figure 3 and 4. Please remove the wind vectors at the boundaries of each boxes. Also reduce the wind vector density. The anticyclonic feature from the wind vectors is not very clearly. The author could try to plot the wind vectors at 215 hPa or 200 hPa for better visualization of anticyclone if possible. The following study can be refer for example

Park, M., W. J. Randel, L. K. Emmons, and N. J. Livesey (2009), Transport pathways of carbon monoxide in the Asian summer monsoon diagnosed from Model of Ozone and Related Tracers (MOZART), J. Geophys. Res., 114, D08303, doi:10.1029/2008JD010

Chandra, N., Hayashida, S., Saeki, T., and Patra, P. K.: What controls the seasonal cycle of columnar methane observed by GOSAT over different regions in India?, Atmos. Chem. Phys., 17, 12633-12643, https://doi.org/10.5194/acp-17-12633-2017, 2017.

Figure 3 and 4. The histogram panel looks too messy. The author can consider 10o latitudinal band instead of 5o for plotting histogram.

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