

Interactive comment on “The efficiency of transport into the stratosphere via the Asian and North American summer monsoon circulations” by Xiaolu Yan et al.

Anonymous Referee #1

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1 General comments

The paper is an interesting and important contribution for assessment of the monsoon influence on the global stratosphere and should be published in ACP. New against earlier studies (e.g. Ploeger et al., 2017) is the analysis of NASM effects. However, the paper would gain a lot if simulations on the sensitivity of results on the positions of the boundaries of the monsoon boxes are included, especially the southern edge of ASM, which appears to be rather close to the equator, and the eastern edge of NASM (too far east). The position of the southern edge of ASM (e.g. 20N instead of 15N) might be critical for transport to the tropical pipe and to the southern hemisphere

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as indicated in Yu et al. (2017). This should be included in Figures 8 and 9. Also some sentences should address the differences to the method where the monsoon air masses are separated using PV instead of a rectangular box and if results are different to Garny and Randel (2016).

2 Specific comments

In Figure 1 it would be more useful to show CO for 350 or 360K. At 340K the reader is distracted by the large effects of biomass burning in the tropics.

Line 110: For clarity say 'tracer is reset to zero every...'. This should also go into the caption of Fig. 5.

Line 129ff: Please define more clearly on what the percentage mass fraction is based. Are the masses in the monsoon boxes during July and August 100%?

Line 199: What is annual mean here? Is there each year different or is the mean of the 4-year time series meant? It might be sufficient just to show the MLS-data.

3 Technical corrections

Line 17: Remove 'in contrast'.

Figure 1a: The rather arbitrary spacing of contours and colors should be more systematic (e.g. linear or a function mentioned in the caption) and fit to each other. Here also less colors are more.

Figure 3 and 4: Enhance sizes for legends and labels.

Figure 5 and 6: Avoid smoothing artefact when tracer is reset, include 'zonal' in caption.

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Check 'Competing interests'.

References: Correct Latex errors and remove second link for several entries.

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2019-586>, 2019.