

# ***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 #3**

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### General Comments

Overall this is an important and well written paper that will be a serious contribution to the literature about the role of the monsoon transport in the UTLS region. I really liked the idea that there are two pathways and that the model statistics support those pathways

I think it would be helpful to summarize the efficiencies of the pathways and the differences in the models in a Table instead of text. Also Figure 11 should have the efficiency of the UT pathway to the base of the tropical pipe. The authors might also connect the efficiency of transport to the containment in the monsoons (see Pan et al, 2016, Trans-

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port of chemical tracers from the boundary layer to stratosphere associated with the dynamics of the Asian summer monsoon, *J. Geophys. Res. Atmos.*, 121, 14,159–14,174, doi:10.1002/2016JD025616.) who showed that the ASM is not as leaky as the NASM.

My major problem with this paper is I really don't understand the percentage argument used by the authors. Page 5 line 110 on the model set up confuses me. If I understand what the authors are doing is that they are starting up the model with some kind of uniform grid of parcels inside monsoon domain and the tropics. The model is running forward trajectories and then estimating the tracer ends up in each region. But as the system evolves, air from the SH will enter the tropics and air outside the monsoons will enter the monsoon region. The authors don't say how they account for this outside air in the estimates of the percentages after August 1. To be clear, I am not saying that the authors have done this wrong, but this paragraph gives me the impression that the CLaMS parcels are initiated over a limited domain. If this is true then it seems like the percentage estimates will be incorrect.

A second issue is that the authors initialize on July 1 of each year assuming that the monsoon develops about that time and then they stop tagging parcels after August 1. This seems like a limitation since the monsoon circulation can persist through early September. It seems to me some additional runs of the model would put to rest the sensitivity of their results to the limited tagging period.

Clearly Page 5 needs a lot of clarification. Since all of the rest of the paper is a function on how CLaMS was used here, I suggest the authors spend a little more time on the model set up and the assumptions behind it.

Minor comments: You don't need to tell us you used Python to make a figure.

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

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