

This paper presents a climatological trajectory study for the air transport from atmospheric boundary into tropopause layer over Asian monsoon regions on the basis of a Lagrangian data set. Main results focused on the distribution of boundary layer sources and their relative contributions, as well as transport time-scales. The paper is well structured and provides a valuable set of quantitative analysis, together with a careful consideration of the uncertainties involved. The results can possibly facilitate the evaluation of the impacts of Asian air pollutions on the global stratosphere. However, the writing of the paper could be improved and the authors ought to be more careful with their discussion at some points. I therefore recommend publication of the paper in ACP after the following major and minor comments have been addressed.

Major comments:

1) Some aspects of the method may however deserve to be addressed or clarified. Firstly, the definition of PBL height in modeling (Pg. 9, L35) and determination of the altitude of tropopause is ambiguous, since there are many definitions from the aspects of dynamical, thermal or atmospheric compositions. I think the references might be needed. Secondly, the trajectories methodology has to be clear and unambiguous. For example, what are the time steps for the FLEXPART model integration? Also, the time period of modeling for every summer (15, May to 31, Aug) does not seem to be consistent with the analysis time period as claimed

in the paper (the whole boreal summer season).

2) In the general sense, the period of modeling is too short to make any conclusions on the representativeness of the results for climate. Author should be tentative to draw the conclusion on the point of climate. Judging from your conclusions, the impact of using a different year is not significant, however, the Fig 10 show that the source distribution is sensitive to inter-annual variability. Could you explain this discrepancy?

3) Another issue relates to the choice of input data. The FLEXPART used NCEP/NCAR GFS as input data in this study. Are the results sensitive to the choice of other input data (for example, ERA-Interim or GMAO MERRA)? I do not expect the authors to repeat all the simulations with different input data but I think they should be clearly mentioned and at least comment on.

4) The writing of the paper needs some improvement. Some sentences are unnecessarily complicated and redundant. This paper also can be shortened by eliminating some details especially in section 1 and the cited references.

Specific comments:

Pg. 1, L21: What meaning the word “firstly”? Do you mean “for the first time”?

In the abstract (Pg.2, L 4) and many times in the text, the definite Article “the” is omitted.

Pg. 2, L7: misspelling word 'form'

Pg. 2, L49: 'datasets' might be 'data sets'.

Pg. 2, L49: change the reference "Enhanced Water Vapor Transport to the Stratosphere by Pollutants in Asia", as it might have been published.

For whole paper: "timescales" seems better to replace "time scales" or "time-scales".

Pg. 2, L14: I would like the words "on a timescales of 1-2 days" to be replaced by "within 1-2 days", because parts of convection transport may be transport into stratosphere in several hours.

Pg. 4, L13: word by might omitted before TST.

I would think the figure(s) describing the patterns of atmospheric circulation might be useful to illustrate and confirm the transport pathways.

Pg. 11, L8: I would prefer to change "height" to "altitude"

Pg. 13, L1-2: This sentence seems to needs some revisions.

Pg. 19, L12: the first 'summer' should be deleted.

Pg. 19, L23-24: some redundant existed in the sentence.

Pg. 20, L17: there should be a space after word '2'.

The specific grammatical and writing issues listed above is given for illustration. It is not exhaustive.