

Interactive comment on “Impact of different Asian source regions on the composition of the Asian monsoon anticyclone and on the extratropical lowermost stratosphere” by B. Vogel et al.

Anonymous Referee #2

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This paper reports characteristics of monsoon anticyclone, impact of emissions from India, China and Southeast Asia on the composition of anticyclone and transport pathways to the lower stratosphere. The results from CLaMS model are supported by MLS observations. This paper highlights new and important findings. I recommend the paper to be published in ACP after the following minor comments are addressed.

1. P9945, L27. The reason for choice of year 2012 should be mentioned. Was it El-Niño/La-Nina year? Or normal monsoon? Or QBO Easterly/westerly phase? These phenomena affect the monsoon circulation and therefore transport into monsoon anticyclone.

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2. Section 3.1.1 is very lengthy and should be shortened. The discussion on eddy shedding is not clear. ‘The second anticyclone moves towards Pacific Ocean along subtropical westerly jet’? Consider revising this.

3. P9957, L26. “On 20 September 2012 (see Fig. 7, bottom), the anticyclone is shifted to the south”. Is this related to monsoon withdrawal?

4. P9960 L10-11. Temporal evaluation of tracers in the anticyclone and its oscillation with 30-60 days periodicity show connections with movement of monsoon trough. This indicates that the lower level convergence (monsoon trough) and upper level divergence (anticyclone) vary coherently. The two anticyclones (Tibetan and Iranian mode) observed in MLS, which are simulated by CLaMs too, should have corresponding two low pressure areas in the lower troposphere. The figure depicting this will support your results.

5. P9961 L8-9. Statement ‘however the contributions of the different emission tracers are in general lower’ is not clear.

6. Mean values of contributions of emission tracers for India/China, Southeast Asia, and Western Pacific etc should be mentioned in the conclusion section.

7. P9968 L15-19. The high contribution from SE Asia in early May-June and late monsoon period (Sep-Oct) may due to migration of monsoon trough. During this period it is generally over SE Asia. Authors should confirm this and make an assertive statement.

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