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Interactive comment on “Trends in Peroxyacetyl Nitrate (PAN) in the upper troposphere and lower stratosphere over Southern Asia during the summer monsoon season: regional impacts” by S. Fadnavis et al.

Anonymous Referee #1

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Fadnavis et al. presents analysis results to examine the temporal trends of peroxyacetyl nitrate (PAN) during 2002–2011 over the Asian summer monsoon region using satellite PAN measurements from MIPAS and the ECHAM5-HAMMOZ model. Overall, this is a well-designed model experiment and the analysis results are presented well. I recommend the paper be published in ACP after the following minor comments are addressed, mostly editorial.

1. P19057, L17: To be more accurate, maybe it is better to say “NO_x-limited regime

for ozone photochemical production”?

2. P19060, L11: delete “the south Asian countries”

3. P19061, L21: O1D -> O(1D), 1 should be superscript, not subscript

4. Section 3.1: The model-aircraft comparisons are hard to see. May be add some quantitative comparison information, e.g. correlation, mean bias...

5. P19064, L8: variation -> distribution

6. P19065, L8: should be “distribution of PAN”

7. P19066, L16: monsoons -> monsoon

8. P19066, L19: “The boundary layer PAN transport” -> The boundary layer lofting of PAN

9. P19068, L13: “to the ASM anticyclone”?? What in the ASM anticyclone?

10. P19069, L13: increasing trend -> an increasing trend

11. Please use “the Himalayas” throughout the text. At many places, “the” is missing or Himalaya is used instead.

12. Section 5: I wonder if it is also good to add one more subsection/figure to discuss the impact on total NOy (NOx+PAN+HNO3). This will offer information on the net impact after combining changes due to transport and wet scavenging, without worrying about NOy speciation. Just a thought.

13. P19070, L27-28. This sentence is awkward. Consider rephrase.

14. P19071, L15: Nearer -> Closer

15. Please use “the Bay of Bengal” and “the western Pacific” throughout the text. “The” is missing at many places.

16. P19073, L11: The reference to the Brewer-Dobson circulation is very vague, or

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perhaps inaccurate. To many atmospheric scientists, the Brewer-Dobson circulation refers to the mean atmospheric circulation, including its tropical ascending branch and the extra-tropical descending branch, etc. Please be more specific.

17. P19073, L22: "latitude-longitude cross-section of ozone" -> ozone distribution
18. Section 5.3: In addition to ozone percentage changes, you may consider add ppb changes as well to be more informative.
19. P19076, L13: "vice-a versa" -> vice versa
20. P19088, figure caption: describe which season.
21. P19090, Figure 4. I think Figure 4 is a very important figure for this study. Although the current form is ok, I think it can use some improvements for easy comparison for the readers. My suggestion is to use the same color (or same color groups) for each model-MIPAS set for ASM, CHINA, and IND, respectively. I would also suggest highlight ASM with thicker lines.

Interactive comment on *Atmos. Chem. Phys. Discuss.*, 14, 19055, 2014.

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