

Re-evaluation of "A PV-based determination of the transport barrier in the Asian summer monsoon anticyclone", by Ploeger et al.

Recommendation: Suitable for publication, with a few minor comments to consider

Overall the authors have done a thorough job of addressing the comments in my initial review, and I believe the paper is suitable for publication in ACP. There are just a few places where I think the paper would still benefit from some clarification, and a few remaining minor comments/corrections (the line numbers refer to the tracked changes version in the acp-2015-113-author_response-version1.pdf file), given in order of appearance in the text. These are all very minor (most are simply typos or wording suggestions).

Line 82, Suggest deleting "already."

Lines 83 and 85, Perhaps "cross-gradient transport" would be clearer than just "cross-transport".

Lines 173-184, Unless I missed it, you don't say here which version of MLS data you use -- if it is version 3, then you should also cite the MLS data quality document (available at http://mls.jpl.nasa.gov/data/v3_data_quality_document.pdf), since Livesey et al (2008) validated version 2.

Line 347, "PV-anomaly" -> "PV anomaly"

Line 354, "PV-gradients" -> "PV gradients"

Line 356, "PV-values" -> "PV values"

Line 365 "PV-gradient based transport barrier" -> "PV-gradient-based transport barrier"

Lines 380-380, and again on lines 485-486 and 585-590, In what way does convection affect the PV gradients/transport barrier? That is, does more convection lead to a stronger or weaker transport barrier? (I'm sure Randel and Park say this, but the reader doesn't want to have to stop and look that up to get this essential piece of information.)

Line 417, for -> of

Line 438, mid of June -> mid-June

Line 443 mid September -> mid-September

Line 443-445, Suggest rewording sentence as "Hence, the degree of confinement...to be detected only during the main monsoon season"

Line 461 well coinciding -> coinciding well

Line 462, Only -> However,

Line 475-478, What is the justification for using only positive heating rates? I do understand that the positive values are indicative of deep convection, and thus by using them only you do get information on the intensity of the lofting from convection where it does exist, but it seems to me that you lose information on how extensive the convection is (that is, how much of the monsoon region it covers).

Figure 12, The black/grey diamonds are much easier to see, but the blue crosses are still very difficult to discern. Also, it would help to point out in the caption that the righthand y-axis values in (e) run from highest to lowest so the reader doesn't have to stop and figure out why the correlation coefficient is negative when the lines vary together!

Figure 13, I assume that the cyan line in (b) is the 0.5 PVU contour for the average field, but it would be good to put this explicitly in the caption. It would also help to give the values for the red contours in the caption, as the numbers on the contour lines are impossible to read.

Lines 522-526, These statements are unclear (this is part of what I was saying was unclear in my review, but I guess *I* wasn't clear about that). I can't visualize what you mean by "area of lowest PV rotates clock-wise [sic] with the anticyclonic flow" -- where is the minimum PV with respect to the center of the "closed" anticyclonic circulation? Isn't it near the center where the winds are near-zero? And is the following sentence (about the children's roundabout) some sort of angular momentum argument? And then it is not clear how this picture relates to being "projected onto the longitude axis"? Perhaps I'm missing something obvious, but I just do not understand this argument.

Line 593, Suggest "...measure of *the degree of* confinement..."

Line 598, to separate -> for separating

Line 610, taifoons -> typhoons

Line 626, as in in -> to

Line 627, "Both reliably agree" is not very clear -- suggest something like "Maximum ozone and PV gradient agree well..." (if that is what you mean).

Line 631-634, If this is comparing Figure 14 with Figure 12c, this should be stated explicitly. Assuming this is the case, is the comparison also affected by using the simple PV coordinate in Figure 14?

Lines 634-636, My question on the previous version still stands: What would highly localized in situ measurements provide that would help understand these issues, given that not only is higher vertical resolution important but also better spatial coverage? In fact, it seems contradictory to argue in the following lines that the horizontal spatial sampling of satellite instruments is inadequate when the sampling of the supposedly desirable in situ measurements would be much more limited.

Appendix A, While I agree that it is appropriate to move this material to an appendix, I still think it would be good to add some additional references on the PDF method as I suggested in my original review.