

Interactive comment on “Variability of subtropical upper tropospheric humidity” by J.-M. Ryoo et al.

J.-M. Ryoo et al.

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We thank both reviewers for their comments and have modified the manuscript in response to these comments. Below are our specific responses to their comments.

Reviewer 1

Major Points

1. The $PV=1.5$ PVU contours were used just to illustrate the location of the tropopause, and not define its exact location. We now use 2 PV contours in the maps, and refer to them as PV contours rather than the tropopause.
2. There is nothing special about $PV=1.5$ PVU for identifying the intrusions. If a higher PV is used there will be less intrusions, but the results are not sensitive for PV around 1.5 to 2.5 PVU. We use $PV=1.5$ PVU in fig 3 but when forming the intrusion composites we use 2.5 PVU.

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3. We have not examined the drop in RH, but it is probably due to mixing as well as subsidence.

Minor Points

We have made the suggested changes to the text, and tried to make the figures clearer.

Reviewer 2

Major Points

1. We have expanded the analysis/discussion to now consider RH in winter southern subtropics as well as winter northern subtropics. We don't consider the summer subtropics as the dynamics then is very different because of summer monsoons, and is beyond the scope of this paper. We now state the need for examination of the summer subtropics in the final section.

2. The Introduction has been rewritten. We have also reduced section 4.1 a little.

3. We have made the figures clearer. For example, we have reduced the number of wind vectors and made them larger. Only one winter is shown in figure 3. The horizontal lines have been removed from figure 7.

4. We have clarified what is shown in figure 7. In particular, that the RH and v are averaged over 120-140E and are not zonal means. Also, an MJO index of -1 was chosen to isolate stronger events than an index of 0. However, qualitatively similar results are obtained if index < 0 is used.

5. We agree that the correlation in the tropics shown in figure 8 is not a surprise and that main result is the subtropical correlations. We have tried to make this clearer.

6. We have decided not to discuss differences in the SSTs between the eastern and western Pacific.

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Minor Points

1. We have corrected the one place where we had pure E notation.
2. We have clarified that the text is discussing broad regions where PDFs are similar, and figure shows examples.
3. Discussion of variability relative to tropopause is clarified.
4. We now refer to PV contour rather than tropopause. Also, we show 2 PV contours, as there was nothing significant about the contour shown.
5. We have corrected the noted language errors.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 1041, 2008.

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