Atmospheric Chemistry and Physics Discussions

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Comment on acp-2021-345

Anonymous Referee #2

Referee comment on "Water vapor anomaly over the tropical western Pacific in El Niño winters from radiosonde and satellite observations and ERA5 reanalysis data" by Minkang Du et al., Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2021-345-RC2, 2021

Review of Du et al. "Water vapor anomaly over the tropical western Pacific in El Nino winters from radiosonde and satellite observations". This study uses a combination of radiosonde, reanalysis, and satellite measurements to better understand how tropospheric water vapor changes over the tropical western Pacific during boreal winter. It is very helpful that this works seeks to pull apart the contributions from the Hadley, Walker, and monsoon circulations in these water vapor anomalies. It is a useful analysis but the difficult part is that over this 15 years there are only a few events and some are different types so there is a real struggle to determine what responses are most robust. The grammar is not clear in many places in the text and could use additional work. I have some suggestions for the authors to consider in order to recommend publication but it should be of interest to the ACP readership.

The title indicates using radiosonde and satellite observations but the abstract talks about radiosonde and reanalysis with a brief mention of satellite observations at the end, maybe adding reanalysis to the title would be best or include some big picture details related to the satellite analysis in the abstract.

The authors present a nice set of measurements that are included in the analysis. As I mentioned the main struggle is that in 15 years there are just a handful of events and some are different types. It is more difficult to gauge the robustness in the details because of this. The use of reanalysis does go back to much earlier time periods

While it is nice to see the analysis in trying to pull apart the contributions related to Hadley, Walker, and monsoon circulations a better explanation of the methodology and how it is applied here would be helpful.

line 197 how consistent is the delay between ONI and CWV, do event types make the delay differ.

Figure 6 which dataset(s) does this derive from and include in caption

Figure 9 - Why is the monsoon contribution so large in 2009/10 is it coupled to Indian Ocean Dipole changes or something else.

Related to lines 338-341 did you examine this with respect to Indian Ocean Dipole changes

More analysis related to different monsoon circulation contributions would be helpful.

Lines 346 -348 Is there too few events in this short record to understand if these differences in events are robust.

lines 351-353 I think more quantitive analysis could be done rather then speculate here.

Section 5 - It seems like additional useful analysis could be done here to look at high cloud anomalies and their relationship to the position of the SST anomalies in these different event types. You are still dealing with single or few cases but worth looking at.

Is there a particular reason the 5 radiosonde locations were chosen, are there others in this region that would be helpful for the analysis. If you look at figure 2 while they are close, areas a bit to the west exhibit larger integrated water vapor anomalies.

A few example to work to improve grammar and clarity

line 34 and line 385 change supper to super

line 36 change less cloud amount to something like "lower cloud amounts"

line 40 need to reword "variable trace composition"

line 45 change to region of abundant water vapor

line 45 change anomaly to anomalies

line 88 change has the important to had important

line 197 add sign after opposite

line 270 need to reword "meaning the divergence center and the sinking motion over there"

line 362 change cloudy to clouds