We thank reviewer Richard Allan for reviewing our revised manuscript and providing helpful comments. We revised the manuscript accordingly. For clarity, reviewer's original comments are included in black, our responses are written in blue, and the revision in the updated manuscript is marked with green.

Author response to Reviewer # 1, Richard Allan, on the revised manuscript

Thank you to the authors for their careful resposnes. The new quantification is useful (I suggest using "(-0.42 to -0.64)" for ranges may avoid the problem of similarity with the minus sign) and the discussion of relationship between humidity, precipitation and other variables during ENSO is interesting. My only other comments are:

Thank you for the helpful comments and suggestions. All the ranges regarding correlation values are now written in the format of (value1 to value2).

1) the other part of how close is "close to each other" in the context of their use I meant was what accuracy is needed for the user (is 0.5% within uncertainty for example).

The GCOS required measurement uncertainty for the upper tropospheric humidity is 5% (https://gcos.wmo.int/en/essential-climate-variables/upper-vapour/ecv-requirements). While the differences among the several datasets of UTH anomalies are generally in the range of approximately 0.5%, indicating the likelihood of meeting the required uncertainty, the consistency analysis in this article does not address the absolute accuracy of the measurements. To do so, it would require comparison with measurements that can be traced to the International System of Units (SI), and it would be beyond the scope of our present study.

2) new material around Fig.4 - are the anomalies relative to a fixed multi-annual mean value over 20°S-20°N or for each grid point. Is it deseasonalised? Some more clarification would help. Since the paper is quite long now and this seems more complicated to explain and interpret than a simple proportion of low humidity and high humidity regions I recommend the new text and figure 4 and associated discussion is removed.

We think that the recommendation to produce the new figure (Figure 4) from the first round of reviews was helpful. In particular the figure adds more insight into why the tropical-domain averaged anomalies are negative during El Nino events by quantifying the proportion of negative and positive anomalies, and therefore, we'd keep the figure in the article. The anomalies are relative to each of the grid points and deseasonalized. We edited the text for more clarification as below:

To quantify the changing proportion of dry and humid regions derived from the different datasets, we calculate the percentage of grids with anomaly values greater or less than several selected values over 20°S-20°N (Figure 4). The anomalies are relative to each of the grid points and deseasonalized before the percentages are calculated.