

General comments:

The paper analyses the impact of two case studies of tropical cyclones (Corentin and Enawo) over the Indian Ocean on the TTL composition, with a particular focus on the water vapor consequent anomalies. In both cases, the authors identified positive anomalies of water vapor in the upper troposphere that could be traced back to the convective activities linked with the tropical cyclones. In the Corentin case the balloon launch revealed also a dry layer around 100hPa and a wet anomaly at 68 hPa (linked to transport of wet El Nino influenced-air from the South East Indian Ocean) while the second balloon launch did not reveal any significant perturbation near or above the tropopause from the tropical cyclone Enawo. The paper presents a detailed description of the hydration/dehydration impact of the two events making use a variety of observations and trajectory studies and gives a comprehensive analysis of the possible contributing processes. I agree on the publication of the paper in ACP with some revisions required.

One main concern is on the structure of the paper that, at the present state, makes very difficult to follow the logic of the work. The paper in fact is made of several long and detailed sections that sometimes are missing a clear statement on which is the main information to retain. The sections are therefore hard to connect and this is also made more difficult by their organization itself. I would advise to put in an uninterrupted sequence all the sections regarding the profile measurements for the two events, including the FLEXPART study (that is indeed supporting the analysis and is instead put toward the end of the paper). The monthly and climatological water vapor distributions and the CFH and MLS comparison can be on separated sections or moved elsewhere in a way to not interrupt the logic of the two events analysis. Some sections are very long as well, like the 4.4. that puts together the RHice analysis, the temperature anomalies and the distribution of deep convective clouds, it may be worth to separate them in subsections.

The abstract is lacking a highlight on the scientific impact from the main findings. What can we conclude on the TTL hydration by deep convection from the two events analysis?

In addition, I found that the figures are often not referenced when due, and that implies an extra effort for the reader to figure out which panels or which figure the statements are referring to. I would advise to check in the data description paragraphs and add a precise reference to the plot (and panel) that is being described.

Specific comments:

Line 54 page 2: can you add few references?

Line 107 page 4: Do you identify the convection from the Lagrangian forecasting tool in the forecast mode in the same way as explained later for the analysis? How do you use the meteosat-7 information (that are in the "past") for the forecast of the storm position?

Figure1 and/or line 202 page 7: Can you give a brief definition of what you mean by "best track"?

Line 204 page 8: How do you get the pressure at the TS center?

Line 242 page 8: You should rephrase here. Looking to the upper left panel of Figure 3 and the lower left one (January 2016) the mixing ratios do not really seem in agreement, with differences in the whole longitude band between 50 and 150 E.

Line 257 page 9: Add reference to the panels you are comparing. If you are talking about the two upper panels this difference of 0.43 ppmv is not visible (as instead between the two lower panels). How do you compute this difference?

Line 263 page 10: Why are you specifically mentioning here just December 2015? Is it because it corresponds to the maximum anomalies in water vapor?

Lines 282-284 page 10: This statement is not very convincing. Can we really say that the 9-14 km layer is a moist one when the observations show only a small peak around 10 km?

Line 320 page 12: I would really help to have a plot of the brightness temperature with the CALIOP track and the wind direction / geopotential to show the mean circulation pattern, same for the March case.

Lines 505-508 page 18: The sentence, as is presented now, is not really giving an indication on the capability of the trajectory method in the convective origin study. Do you have some references indicating the quality of ECMWF 0.15x0.15 analysis in resolving vertical velocities for tropical cyclones? Also, I think this paragraph is better fitting in the method presentation of section 3.

Lines 577 – 579 page 20: This sentence is confusing. Do you mean the difference averaged between 316 and 261 hPa is -20% for both days and for both CFH and MLS mean? That does not seem correct.

Line 650 page 22: “The QBO easterlies can be observed at 70 hPa”...from where?

Technical corrections:

Line 15 page 1: It’s worth to specify also in the abstract what CFH stands for.

Line 57 page 2: the upper 700m of what, the sea surface?

Line 58 page 2 : .. that convection deeper than 15 km...

Line 156 page 6: Do you mean: “..cross section. More details are given in the CALIOP Algorithm ...”?

Line 229 page 8: Latitude / longitude grid (5°x20° resolution)

Line 230 page 8: at 215 hPa (figure 3) and 100 hPa (figure 4) for January 2016 (lower left panel) as March 2017 (lower right panel)

Line 269 Page 10: The red and purple lines...

Lines 340-341 page 12: This is one example of a needed figure reference. Does it refer to figure 7?

Line 354 page 12: reference to bottom left panel of figure 7?

Line 650 page 22: ...the impact OF the 2016 strong ..

Figure1: The green star on the grey background is not very easy to spot! Similarly for the dates label that are black and with a small font.

Figure 5: Please, add a legend for the lines, it will ease the reading of the plot.

Figure 10: The so called “brown dots” are difficult to distinguish from the red ones. The light pink is instead not very visible.

Figure 11: The panels notation must be homogeneous. I would suggest indeed to reference the panels with letters, as done here, since it makes the reading more fluid. Same thing with the label “-1 day” “-2 days” that are missing on figure 10.