Anonymous Referee #3:

We appreciate the thoughtful and constructive comments from the reviewers. Their helpful suggestions and attention to detail have made this a substantially better paper, and we greatly appreciate the time they put into the manuscript.
Please see below our responses (in bold) to the individual detailed comments. Numerous figures are shown in our response to illustrate our points but some are not included in the revised manuscript.
We have addressed all the reviewers 'comments and modified the manuscript and figures accordingly.

Minor comments:

- The authors could put their results a bit more into context, in particular when describing the seasonality of humidity and ozone in the subtropical region. For instance, the dry values in JJA as compared to DJF are connected to the ITCZ movement. Similarly, for the ozone only biomass burning is considered to explain the seasonality. But is there a role of other mechanisms such as transport from the stratosphere or from middle latitudes? This seems to be the case for the high ozone – low water vapour layers, which are ubiquitous over Reunion Island in JJA.

Using ozonesonde and LIDAR from Réunion Island from 1998 to 2006, Clain et al. (2008) showed that the influence of stratospheric-tropospheric exchange induced by the subtropical jet stream is maximum in austral winter (June to August) when the jet moves closer to the island. They established that the 4-10 km and 10-16 km altitude ranges can be directly influenced by biomass burning and stratosphere-troposphere exchange. The influence of stratospheric-tropospheric exchange is in agreement with high ozone-low water vapor layers, which are ubiquitous over Réunion Island in austral winter. This discussion has been added in section 2.1 of the manuscript.

- Given the important role of the MJO for deep convection over the Indian Ocean, its possible influence on convective activity deserves more discussion: you could at least identify the phases in the period under study and try to establish a connection.

We have added some discussion in the text about the MJO status during the 3 austral summer periods studied. To define the state of the MJO, we used the Real-time Multivariate MJO (RMM) indices RMM1 and RMM2 data from the Australian Bureau of Meteorology (http://www.bom.gov.au/climate/mjo/graphics/rmm.74toRealtime.txt).
RMM1 and RMM2 are based on a combined empirical orthogonal function analysis of 15°S to 15°N averaged Outgoing Longwave Radiation in addition to zonal winds at 850 and 200 hPa (Wheeler and Hendon, 2004). The MJO cycle, as defined by RMM1 and RMM2, can be split up into eight phases with phases 2 and 3 corresponding to a MJO convective center over the Indian Ocean. The square root of the square summation of RMM1 and RMM2 represents the MJO amplitude. The MJO is defined as active when its amplitude is greater than 1.
During the 3 austral summers studied, the MJO was active over the Indian Ocean for a similar number of days (14%, 18%, 18% of the time in austral summers 2014, 2016 and 2016 respectively). The averaged upper tropospheric RH for an active MJO over the Indian Ocean is 30%, almost the same as the climatological RH over the period November 2013 to April 2016 (cf. Figure 5 of the manuscript). During some of these MJO events there was an increase in RH, e.g. 5-11 December 2013 (50%), 3-5 November 2015 (46%), 13-20 January 2016 (52.4%) and 1-3 February 2016 (54.8%). Garot et al. (2017) studied the evolution of the distribution of upper-tropospheric humidity (UTH) over the Indian Ocean with regard to the phase of the Madden–Julian oscillation (active or suppressed). They used RH measurements from the Sounder for Atmospheric Profiling of Humidity in the Intertropics by Radiometry (SAPHIR)/*Megha-Tropiques* radiometer, RH measured by upper-air soundings, dynamic and thermodynamic fields produced by the ERA-Interim model and the cloud classifications defined from a series of geostationary imagers to assess changes in the distribution of UTH when the development of MJO takes place in the Indian Ocean. There is a strong difference in the distribution of UTH according to the phase of MJO (active or suppressed). During active (suppressed) phases, the distribution of UTH measured by SAPHIR was moister (drier). However, their study focused on the equatorial (8°S-8°N) Indian Ocean region whereas we are investigating upper-tropospheric RH distribution over a subtropical site. The MJO is the main driver of the fluctuations of tropical weather on weekly to monthly time scales over the

Indian Ocean. Thus, it can influence convective activity (e.g. tropical cyclones) over the basin and the subsequent cloudiness and upper tropospheric RH (via transport of moisture).
A clearer explanation on the interplay between MJO and upper tropospheric humidity over a subtropical site would require the analysis of additional years, but this is out of the scope of this study.

This text has been added in section 3.1 of the revised manuscript.

Technical corrections:
We took all technical corrections into account.

- L13: verb tense concordance: in general you use past tense, but sometimes present. This should be homogenized. For example here "are analyzed" should be "were analyzed"
- L168-170 and L175-176: These two sentences are almost exactly the same, no need to repeat.
- L183: remove 'several'
- L184: 'Correlated' should be 'Consistent'?
- L185: The outflow from two tropical cyclones
- L186-189: This was already said before (L172-174)
- L203: tropical free troposphere
- L219: in the tropical marine…
- L225: In the Solomon et al. Study…
- L231: This explains…
- L250: Remove comma after Although
- L268: was the advected eastward
- L289: estimated by FLEXPART
- L 293 Swap letters G and H
- L293: missing letters C and D

References

Clain, G., Baray, J. L., Delmas, R., Diab, R., Leclair de Bellevue, J., Keckhut, P., Posny, F., Metzger, J. M., and Cammas, J.P.: Tropospheric ozone climatology at two Southern Hemisphere tropical/subtropical sites, (Reunion Island and Irene, South Africa) from ozonesondes, LIDAR, and in situ aircraft measurements, Atmos. Chem. Phys., 9, 1723–1734, https://doi.org/10.5194/acp-9-1723-2009, 2009.

Garot, T., Brogniez, H., Fallourd, R. And Viltard, N.: Evolution of the Distribution of Upper-Tropospheric Humidity over the Indian Ocean: Connection with Large-Scale Advection and Local Cloudiness. J. Appl. Meteor. Climatol., 56, 2035-2052, https://doi.org/10.1175/JAMC-D-16-0193.1, 2017

Wheeler, M. C. and Hendon, H. H.: An all-season real-time multivariate MJO index: Development of an index for monitoring and prediction, Mon. Weather Rev., 132, 1917–1932, https://doi.org/10.1175/1520-0493(2004)132<1917:AARMMI>2.0.CO;2, 2004.