



EGUsphere, author comment AC2  
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## Reply on RC2

Miguel M. Lima et al.

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Author comment on "Upper-ocean response to the passage of tropical cyclones in the Azores region" by Miguel M. Lima et al., EGU sphere,  
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We would like to thank the reviewer for the constructive comments on our study, they were appreciated and will certainly improve the overall quality of this article. Some points of the manuscript have suffered major revisions to answer the criticisms/suggestions made by the reviewers, including:

- Some steps of the methodology have been revised to take into account the characteristics of each Tropical Cyclone (TC), thus, we have considered the climatological situation for each individual storm and compared it to the condition when the TC occurred. This change allowed us to individually study the responses for each TC more accurately while at the same time separating the SST and Chl-a response completely.
- The uncertainty surrounding the interpolated data was addressed in this revision. For this, we incorporated two types of analysis: 1) we showed the approximated errors associated with the analyzed data and for various time periods surrounding TCs; 2) we used the previously shown two study cases (Nadine and Ophelia) as evaluation cases for non-interpolated data. Overall, the interpolated datasets appear to provide consistent data that delivered good results, either not showing a large uncertainty (particularly for SST) and showing good relations to non-interpolated data (particularly for Chl-a).
- Finally, some small but important changes were made in the results section, with the addition of individual 6-hour observation analysis, which corroborated the analysis made in the original manuscript; and in the Nadine (2012) study case, which was not clear enough in the original version.

Overall, we are confident that these changes contributed to clarify some issues not sufficiently clear in the original manuscript. In this regard, the observations made by the reviewers were greatly appreciated and have certainly helped to improve the quality of the revised manuscript.

### Answer to major comments:

- The areas studied before and after the cyclone passed over the area are the same and greatly reduced from the initial study region (red box in Fig. 1 of the original manuscript). More direct examples are the study cases seen in Figs. 6 and 7 (original manuscript), where the areas shown in subplots (a) represent the area of study for each of the cases inside the study region. This reduction cuts the heavy computational

cost of analyzing the entire study region and all the TCs individual observations. For this, we used the provided approximated quadrant radius for the 34-kt isotach (the limit to be considered a tropical storm) and largely reduced the study area. This not only reduced the computational burden but also removed parts of the grid that did not have any influence from the TCs, thus improving the analysis we can provide.

- The impact area was chosen based mainly on two factors: the lack of studies regarding the ocean response to TCs; and the fact that the TCs that usually pass through this region are much less intense in comparison to what we can normally see in the rest of the North Atlantic basin. Additionally, this is a region where TCs still maintain some tropical characteristics (warm core, symmetry, etc.) but often start suffering transition to post-tropical storms (with loss of symmetry, increased baroclinicity, overall loss of intensity). We chose these limits based on the general location of this transition, not to consider many post-tropical observations (not too much extended to the north and east) and not many purely and intense tropical storms (not too much extended to the south and west). Finally, this region is well-studied oceanography wise, with some literature exploring the main characteristics of the Azores regions in terms of SST and Chl-a (Amorim et al., 2017 (doi: 10.3389/fmars.2017.00056); Caldeira & Reis, 2017 (doi: 10.3389/fmars.2017.00037)). The exact number for the limits of the region was purely a compromise between the aforementioned points and the available data for this study.

**Answer to other points:**

- We will clarify.