

Initial Statement / Relevant changes to the manuscript:

We would once more like to acknowledge the effort of the reviewers in improving the quality of this work. The main points to suffer some minor revisions were:

- A paragraph in the methodology, which was addressed by both reviewers, has been clarified to better reflect the methodology used.
- Minor corrections in the text.
- Changed the unit of SST from Kelvin to degree Celsius.
- Colour schemes and symbols in figures have been updated to ensure readers with colour vision deficiencies can correctly interpret the results.

The minor revisions made according to the suggestions presented have decidedly improved the clarity and quality of this final version of the manuscript. Following, are the point-to-point responses to the reviewers.

Report #1 – Reviewer 1

L155-156. Does this sentence mean that missing values are estimated using a simple linear regression?

Yes, we have made the sentence clearer.

L161-165. Can you explain how the daily standard deviation is calculated. Is it the spatial RMS of the anomaly of SST and Chl-a from the climatology over the TC's area?

We understand that the daily standard deviation mentioned in the previous version of the manuscript was not clearly explained. To ensure the readability of this issue, we have changed this paragraph to make it clearer: First, we calculated the climatological mean and associated standard deviation of both Chl-a and SST values for the region that is impacted by each TC on the day of analysis. This is achieved considering the 3 days before and 3 days after the day of analysis, totalling one week that is then retrieved from the entire study period of 22 years, thus ensuring a larger sample and a smoother continuous curve. Then, we compute the mean value in the same area (in which only the TC area was considered) for the day of analysis, and finally, we calculate the normalized anomaly from the climatology on that day. For example: After a certain TC passed, we have the area with a mean SST of 300 K. The climatology for the same area is 305 K with a standard deviation of 5 K. Therefore, the mean daily value after the TC is one standard deviation below the climatology.

L379. 'it was generally identified' should be removed

Changed accordingly.

Report #2 – Reviewer 3

Detailed comment

Although I acknowledge the efforts made by the authors to improve the presentation of their methodology to estimate the TC-related Chl-a and SST anomalies, I still find this part confusing in the revised manuscript. In particular, the authors mention that they “computed for each storm the daily standard deviation of both Chl-a and SST over their respective grids relative to the climatology over the same area” (l. 161-163). What exactly is a standard deviation relative to the climatology? The associated figure, Figure 2, presents negative standard deviations, which is not mathematically correct, as standard deviations are always positive. I suspect that the authors estimated, for each pixel in the area affected by the TC, the anomaly with respect to climatology, which they averaged over that area. If that is the case, this term should not be called “standard deviation above climatology”, but “anomaly with respect to the climatology”. In order to avoid confusion, the term “anomaly” that is currently used in the manuscript, which represents the anomaly between before and after the TC passage, can be named “TC-related anomaly”. This is just a suggestion. In any case, this part (l. 160-182) needs to be clarified.

We understand that the part of the methodology regarding the daily standard deviation was not explained sufficiently well. To make it clear, we have changed that paragraph to make it entirely clear: First, we calculated the climatological mean and associated standard deviation of both Chl-a and SST values for the region that is impacted by each TC on the day of analysis. This is achieved considering the 3 days before and 3 days after the day of analysis, totalling one week that is then retrieved from the entire study period of 22 years, thus ensuring a larger sample and a smoother continuous curve. Then, we compute the mean value in the same area (in which only the TC area was considered) for the day of analysis, and finally, we calculate the normalized anomaly from the climatology on that day. For example: After a certain TC passed, we have the area with a mean SST of 300 K. The climatology for the same area is 305 K with a standard deviation of 5 K. Therefore, the mean daily value after the TC is one standard deviation below the climatology.

Nonetheless, we made an effort to change several appearances of the word “anomaly” to TC-related anomaly or induced anomaly to make clear that we are referring to anomalies that are induced by the TC and not anomaly in the regular sense of the word.

Suggestions

- l. 34, “shallow layers”: it should be “deeper layers”.

Changed accordingly.

- l. 48: vary, not varies.

Changed accordingly.

- l. 49: “that the most impactful phenomena are intense and slow TCs”.

Changed accordingly.

- l. 97-98: “Similarly to the previous CMEMS interpolated Chl-a product, the SST field etc.”

Changed accordingly.

- l. 128: TCs, not TCs’.

Changed accordingly.

- l. 134: the tracks of all the TCs (not the tracks for all the TCs).

Changed accordingly.

- l. 155: “and, in order to correct for those, a simple linear regression etc.”

Changed accordingly.

- l. 186-187, “(i.e., that pixel is no longer inside the radius of influence of the TC)”: this is not clear, as only the pixels under the TC are supposed to be used.

This was not well explained; we meant that the observations in that pixel during the days when the TC is still over the area are discarded. We have changed the phrase accordingly.

- l. 191/Figure 2: A standard deviation cannot be negative, please see my main comment.

We have changed the paragraph that is associated with this explanation accordingly to make it clearer. Full response in the long answer to the detailed comment.

- l. 208-209: “-1.615K”, rather than “negative 1.615K”. I also suggest presenting SST results in deg. C.

Changed accordingly.

- l. 225: I suggest “remarkable” rather than “expressive”.

Changed accordingly.

- l. 226-227: “with slower TCs having a slightly stronger impact etc.”

Changed accordingly.

- l. 233-234: “zero value in a grey line”.

Changed accordingly.

- l. 240: -0.3 is not a high value for a linear regression.

We agree and changed this phrase accordingly.

- l. 250: “... requires a different approach. Fig. 5 shows similar etc.”

Changed accordingly.

- l. 255-256: “This caveat was not present in Fig. 4 since we considered the TC lifetime as a whole and could then disregard the days of superposition”: It is not clear why the authors cannot discard the exact same days for the present analysis.

We could not discard the exact same days because the analysis is not the same for both cases. When we consider a single 6-hour observation we do not take into account

possible observations before or after, therefore analysing if that observation included pixels which had been affected becomes problematic. Additionally, superposition of pixels is not very common, as only about 10% or less of pixels have superposition from one observation to the next (see example of Ophelia's track). There are nonetheless the cases where it is problematic, like Nadine, which is the reason for the case study and why (for the general response) we removed this superposition.

- I. 261: "with respect to the time of year".

Changed accordingly.

- Figure S1: The SST is usually expressed in deg.C and not in K.

We kept Kelvin in this figure since the associated uncertainty is given for Kelvin and changing it to deg.C would require either further explanation or percentages relative to deg.C.

- I. 275-276, "as both variables were correlated with both latitude and longitude, and only negligible and non-significant relations were found". There is a contradiction here: if the relationship is not significant, there is no correlation.

We agree and have changed accordingly.

- I. 279: "uncertainty for the used Chl-a and SST datasets. Thus, we have explored etc."

Changed accordingly.

- I. 291: I suggest "likely" instead of "maybe", and "larger" instead of "higher".

Changed accordingly.

- I. 291: "cloud-covered area in that situation. After the storm etc."

Changed accordingly.

- I. 294: "Additionally, the variation that has been identified before, with Chl-a increasing and the SST decreasing, is noticeable in both variables."

Changed accordingly.

- I. 296: Remove "are marked".

Changed accordingly.

- I. 300: insert, not inset.

Changed accordingly.

- Figure S2: There is a mistake in the caption. It is Fig. 6, not Fig. 5.

Changed accordingly.

- I. 330: Fig. S2, not Fig. S3.

Changed accordingly.

- I. 332: "marker type to Fig. 6. These plots exceed etc."

Changed accordingly.

- l. 335: "storm's intensity. As Ophelia etc."

Changed accordingly.

- l. 348: 0.040 mg.m⁻³ is not a large anomaly, as it is lower than the mean value from Fig. 3.

We meant when comparing to the less superposed areas, we have changed accordingly to make this idea clearer.

- l. 349: It is very common in academia to use parentheses to present two opposite results in the same sentence, as is done here, but this habit is very confusing, and thus counter-productive. The reader has to read the same text twice or three times to make sure they understand it correctly. In particular, in this case, parentheses were first used earlier in the same sentence to provide additional details about the anomalies, whereas at the end they are used to mention opposite results. This is totally confusing. I can only recommend the authors to read Robock (2010, <https://eos.org/opinions/parentheses-are-not-for-references-andclarification-saving-space>). Please, join the movement!

Thank you! We have changed this phrase accordingly as it does indeed make more sense this way.

- Figure 8: Again, the SST is usually expressed in deg.C and not in K. Here it is necessary to match the analysis made by the authors, who use deg.C and not K.

We have changed thoroughly from Kelvin to deg.C in the entire manuscript, except for Fig. S1 since the associated uncertainty is given for Kelvin.

- l. 366: I suggest "does not differ much", rather than "too much".

Changed accordingly.

- l. 368: "despite both TCs presenting etc."

Changed accordingly.

- l. 372, "Nonetheless, interpolated SST data does show the less uncertainty as verified before as the process of interpolating the data fixes this issue (Fig. S1)": This sentence is not clear at all and needs to be rephrased.

The last part of the phrase was an attempt at justifying the differences seen. However, these are two different datasets therefore this attempt makes little sense. We have thus decided to remove that and rephrase the beginning of the sentence accordingly.

- l. 379: I suggest removing "it was generally identified".

Changed accordingly.

- l. 392: Larger, not increased.

Changed accordingly.

- l. 392: "... with significant relation in both variables. This may etc.".

Changed accordingly.

- l. 393-394, “this may be due to the seasonal variability of the variables themselves, as the normal climatological values for that time of the year is exceeded in exceptional TC conditions (Amorim et al., 2017; Lima et al., 2021)”: This sentence is not clear at all and needs to be rephrased.

Changed accordingly for more clarity.

- l. 394-395, “the oceanic response may help the impacted area return to expected values in both variables, in respect to that time of the year”: This sentence is not clear at all and needs to be rephrased. Do the authors mean: “the oceanic response may help the impacted area return to values that are closer, for both variables, to values expected from the climatology at that time of year”?

Changed accordingly for more clarity.