

Again all of the co-authors would like to thank the referee for the time which he/she has allocated to the detailed revision of this paper and the constructive comments. We hope our responses and the improved version of the manuscript will meet the expectations.

Please, find below our point-to-point response with comments of the referee in **black** and our response in **blue**.

## Abstract

“Summer 2022 was a memorable and record-breaking event, ranking as the second hottest summer in France since 1900, with a seasonal surface air temperature average of 22.7°C”: This is not an event, it is a whole summer/season.

“Summer 2022 was memorable and record-breaking, ranking as the second hottest summer in France since 1900, with a seasonal surface air temperature average of 22.7°C.”

“SSTs beyond the climatological maximum”. What is a climatological maximum?

“The studied areas experienced between 4 and 22 days where the basin-averaged SSTs exceeded the maximum recorded basin-averaged SSTs from 1982 to 2011.”

“Our results are in line with previous studies, and demonstrate that even if the 20 Mediterranean is known as a climate change hotspot, all the studied maritime areas are affected by a continuous warming of surface water and responded to extreme synoptic conditions.” Unclear sentence, please rewrite. I can't see the connection between Med being a hotspot and the SST warming and the response to synoptic conditions.

“Our study findings are consistent with previous research and demonstrate the vulnerability of the Mediterranean Sea to the increasing frequency of extreme weather events resulting from climate change. Furthermore, our investigation reveals that the recurring heatwave episodes during the summer of 2022 had an undeniable impact on all the surveyed maritime areas in France.”

## Introduction

“However, the operational and climatic needs for observations require a spatial and temporal coverage that cannot be achieved by in situ measurements alone”.

Here we justify the use of satellite data and the fact that these data play a key role in responding to the operational forecasting and climatic projections needs.

## Data & Methods

### Study Sites

All of the reviewers comments have been addressed.

### Atmospheric reanalysis

“We also used an atmospheric forcing climatology to test the heat flux sensitivity”. What does an atmospheric forcing climatology mean? From ERA5 data? Any other source.

We agree with the reviewer that the sentence is unclear. We modified the sentence as follow:

“We also used ERA5 data as atmospheric forcing climatology to test the heat flux sensitivity the each variable in the model experiments.”

## **Sea surface temperature data**

The title has been modified.

## **Daily sea surface temperature evolution over the 2022 meteorological summer**

In particular, the missing data does not permit a systematic analysis of the response of the three 260 basins to the early heatwave in June 2022 (June 15th to 19th) and the July 2022 (July 11th to 25th) heatwave. However, the response of the July 2022 heatwave is conceivable for the BB and NWM areas. Is this not contradictory? Is it possible to address the July event or not? Please, state which basin is possible to assess in each HW.  
Sentences have been modified to address the need for clarity.

“In particular, the missing data does not permit a systematic analysis of the response between the three basins to the early heatwave in June 2022 (June 15th to 19th) heatwave. The response of the July 2022 (July 11th to 25th) heatwave is individually conceivable for the BB and NWM areas. Only the response to the August 2022 heatwave is feasible for all three basins. Therefore, the analysis of the SST response to heatwaves in this study focuses on the August 2022 event.”

“Notably, there were no days at the basin scale where temperatures were within the normal temperatures range or below.” I assume it is in the NWM.

“Notably, there were no days at the NWM basin scale where temperatures were within the normal temperatures range or below.”

“The summer of 2022 also a record for this basin with an average temperature of 26.1°C.”  
A verb is missing.

Verb has been added.

“The summer of 2022 also set a record for this basin with an average temperature of 26.1°C.”

## **Observed variability of the atmospheric variables**

“As presented in the Figure 5a, we looked, in the first place” should it be just “figure 5”?  
The reference to the Fig5a has been modified to Figure 5.

“The daily anomaly during the period of the heatwave is significantly correlated to the anomaly of SSTs in the NWM area with a Spearman coefficient of 0.8”. What about BB and EC? Additionally, what do you correlate? Mean surface solar radiation over whole France? Over NWM domain? It is not clearly stated.

Sentence has been modified as follow:

“The daily anomaly over the NWM domain during the period of the heatwave is significantly correlated to the anomaly of SSTs in the area with a Spearman coefficient of 0.8”

## Conclusions

The magnitude of anomalies can also be attributed to anthropogenic forcing, which can be quantified using singular event<sup>5</sup> detection and attribution cutting-edge approaches (Ribes et al., 2020; Faranda et al., 2022). Not a conclusion from the authors. In a single sentence paragraph?

Lines 522-531 are not discussion or conclusions

The page break is due to formatting caused by the end of the page in the PDF. This has been corrected.

In the context of our study, and as it represents a starting point for analyzing SSTs during the summer of 2022, we wanted to construct our discussion and conclusion section by including perspectives on future work that could address the limitations of our study while also anticipating various factors that could improve and enrich our conclusions. This explains the discussions on the attribution to anthropogenic forcing as well as lines 522-531.

## Other

You could suppress Table 1. It does not add much information, model experiments are well described in the text.

Table removed.

Figure 3. Having the same dimension/limits in the the y axis will make all plots comparable and illustrate the different intensities of the SST anomaly.

We understand the point raised by the reviewer, however we prefer to keep the figure as it is in order to help the analysis of the response of each basin. Having the same limits will result in a shrinkage of the EC and BB SSTs which will, in our opinion, reduce the readability of the figures.

Figure 5. It is not necessary to repeat the same scales and titles in the x axis. I suggest moving the color legends to a vertical legend located at the right side of the plot and only use one x title at the bottom of each column. It will gain space, improve readability offering the same information.

We assume that this comment refers to Figure 4 rather than Figure 5. In this case, we have taken the comments into account, but we still prefer to keep a horizontal colorbar at the bottom of each column.

Figures 6, 7 and 8.

Figures captions have been corrected.

Parenthesis missing in lines 389 and 390.

Corrected.

Line 395. If SSR is an acronym for “surface solar radiation” should have been introduced in the first appearance. I could not find before.

The use of SSR was a typo, we defined the acronym for surface solar radiation on the line 222. However, we prefer here to use ‘surface solar radiation’ here to increase readability.