

Title: Response of the sea surface temperature to heatwaves during the France 2022 meteorological summer

Author(s): Thibault Guinaldo, Aurore Voldoire, Robin Waldman, Stéphane Saux Picart, and Hervé Roquet MS No.: egusphere-2022-1119

Minor comments

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

Introduction

- *“However, the operational and climatic needs for observations require a spatial and temporal coverage that cannot be achieved by in situ measurements alone”*. I can't get the meaning/context of this sentence in the paragraph.

Data and methods

Study sites

- Change *“we focus on the response”* to *“we focus on SST response”*
- *“as presented in Figure 4.”*. Usually this type of information is presented in figure 1 to let the reader have a clear idea of the study area/domain before any data analysis or consideration. Figure numbers must follow a numbering correlative to their appearance in the text. It should be easy and possible to add the domains to actual fig 1.

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.

Sea surface temperature data

- *“2.3.1 Operationnal SST product”*

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

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 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.*

Conclusions

- *The magnitude of anomalies can also be attributed to anthropogenic forcing, which can be quantified using singular event⁵ 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*

Other

- You could suppress Table 1. It does not add much information, model experiments are well described in the text.
- 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
- 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.
- Figures 6, 7 and 8. Please, in the captions explain sequentially the different plots; (b) plot is not for SST, it should say (c). Using the same colors. Do sensitivity tests relate to experiments in Table 1? Are line colors in plot (b) the same than in (d)? If there are colors there has to be a legend. If there is a common legend place it adequately. Maybe place the “sensitivity tests” plots as (c) and (d)
- Parenthesis missing in lines 389 and 390
- Line 395. If SSR is an acronym for “surface solar radiation” should have been introduced in the first appearance. I could not find before.