Reply to RC2: 'Comment on essd-2024-394', Anonymous Referee #2, 17 Dec 2024

We are grateful for the review work carried out by reviewer #2. We have meticulously addressed each of your comments and suggestions to enhance the quality of our manuscript, the figures and the ReefTEMPS database in general. Please find our replies are shown in red font below.

Evaluation of the MS "ReefTEMPS: The Pacific Islands Coastal Temperature Network" by Le Gendre et al.

General comments:

The manuscript reports on the ReefTEMPS observation network and focuses on coastal high-frequency seawater temperature time series acquired in 16 Pacific Island Countries and Territories since 1997 and historical daily series back to 1958 for the older. The MS is well written, and embraces a wide scope, which is very much appreciated: from historical context to network and database description, key applications and opening development and perspectives. Section 2 on network description, and section 4 on data processing and quality control are sometimes rather vague or too general to provide a direct and fair vision on current/past sampling effort and data quality.

The data set is impressive and unique by the spatial (mostly intertropical, from roughly 140°E to -178°E) and temporal extent covered (pluri-annual to multi-decadal HF measurements and daily historical time series). Acknowledging the very nice collaborative effort and important work achieved for data aggregation, quality check and dissemination, I also find the dataset of very high relevance. Examples of key scientific applications are well developed (section 6). Such in situ temperature time series are indeed required to accurately characterize local conditions and marine heatwave stress in highly diverse and sensitive coral reef ecosystems, as well as to analyze fine scale coastal processes and dynamics poorly captured by satellite SST. Warming trend analysis carried out at climatic time scale after homogenization of the long-term series is another asset of the MS.

However, some information is missing or lacking precision in the presentation of the network/dataset and regarding the quality check. By adding precise information on total and yearly sampling effort and major breakdown of data series (in particular the proportion still active), authors could greatly ease the understanding and potential reuse of dataset.

The data are available by different means and in different formats (csv, NetCDF), with a dedicated visualization service. Some data series from the NetCDF archive are not shown on the ReefTEMPS portal and the reason why is not clear to me. This should be quantified and explained. Also, the archive comprises 481 nc files in total + one ascii file. For the variable TEMP, there are 185 files with both raw and validated data.

I find the presence of "duplicated" data series with different quality levels in the same directory confusing.

Exploring the dataset itself, 95 files follow the naming convention indicated in section 4.1 (with depth indication), among which 21 raw data series, 57 visually checked (0C) and 17 reduced data sets (3A or 3B). Plotting the visually QC'ed series, I found obviously bad values remaining and flat Quality Flag values at 0. These bad data may fragilize the confidence in the entire data series and impede direct use of the data set, e.g. for satellite data validation. The database needs to be systematically and carefully double-checked and updated by the authors to remove all spurious values and achieve the highest possible number of series visually checked, which to my opinion, and according to Section 4.1. and Figure 3, should be a minimal requirement for dissemination and for publication in ESSD.

We are grateful to reviewer #2 for spending time ensuring quality of the database and pointing out these problems. A great deal of work has been done to remedy these deficiencies (see Introduction part). All the temperature time series has been qualified, and the processing states have been modified accordingly. The introductory paragraph of this response to comments clearly explains the procedure put in place for this. For now, no more "duplicated" series co-exist, all data have been thoroughly checked multiple times and have associated QC flags. This extensive work has significantly improved the quality of the database, which now corresponds much more to the standards required for scientific dissemination and publication.

Specific comments:

Section 2. The description of the data set is sometimes too vague or general. Complementary information should be provided on the total number of series, equivalent in total year of observation, on the proportion (and quantity) of active vs interrupted data series and major breakdown by origin (sensor type, e.g. tide gauge vs benthic loggers), depth (please consider indicating 0-10 m available as ground-truth for satellite SST), single vs. multiple depth (verticals).

Complementary information has been added in the section 2. More information are now provided about the total number of series, files and stations, the proportion of active and interrupted. The depth categories have been revised to show the proportion of stations between 0-10m, 10-20m and greater than 20m. Information on multiple depth stations has also been added.

Figure 1. Consider showing the number of series available for each year on the timeline.

Appendix A, Table A1. Please consider presenting the table differently, starting with active series and followed by past/interrupted ones. A supplementary summary figure showing data availability by site since 1997 would ideally complement Table A1.

In order not to overload Figure 1, but to provide the information needed to be clarified following the two previous comments, we have added a Gantt style chart in Appendix B1 describing the Sensor Activity Timeline by country since 1997.

Page 6 line 87. Indicate the amount/proportion of stations/series stopped.

The number of interrupted stations has been added.

Page 6 line 93 “and the longest time series” please indicate the number of series with a minimum duration of 10 years

A sentence has been added to specify the number of stations with more than 10 years of data (26 monitoring stations).

Figure 2. Consider using different symbols on the map for ongoing vs. interrupted series (e.g. circles vs. squares).

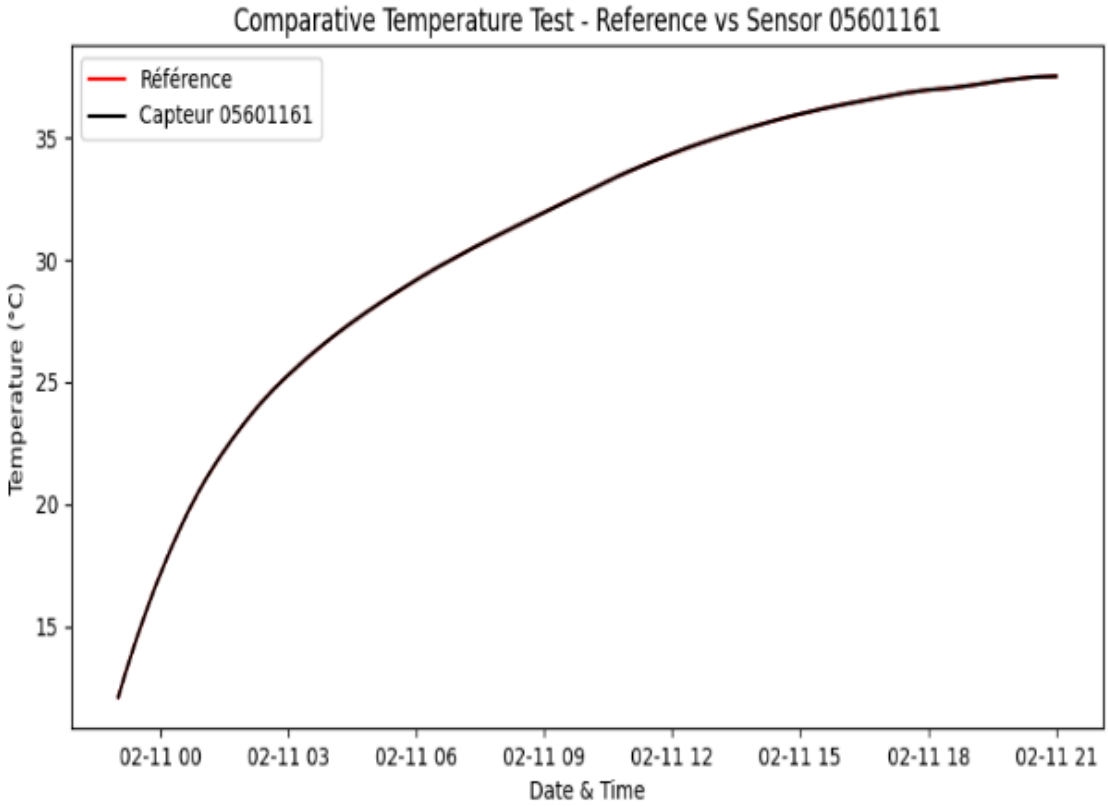
Figure 2 has been updated to show the status of the stations. Circles represent ongoing time series whereas triangles show interrupted stations.

Section 4 & 5. These sections describe the data life cycle, quality control, management and dissemination in a very general way. The total number of data files and major breakdown by QC level should be quantified and explained somewhere, potentially in section 4.1 or in section 5.

The text of section 4.1 has been improved to be more precise and in line with the major update carried out on the database (see introductory paragraph).

Line 73. Indicate the time interval at which maintenance and recalibration were performed, either systematically or in general with some exceptions. If possible, provide feed-back on typical stability and results from intercomparison.

More general information on maintenance has been added. The maintenance/recalibration procedure might evolve throughout the years, devices and countries so it can be difficult to be exhaustive because of so many different cases. Typically, in New Caledonia, an inter-comparison procedure is now applied (since 2021) where sensors are tested against a reference sensor (a brand new SBE56). The tolerated threshold for the deviation from the reference sensor has been set at 0.005°C (see image below).

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Min difference : -0.0028000000000058
Max difference : 0.0041000000000001103
Mean difference : -0.00030818181818188583
Standart Deviation : -0.00030000000000285354

Max. Deviation Tolerance : 0.005
Comparative Test Result :   PASSED
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Section 6.1. Marine heatwaves refer to discrete events with significant deviation to a baseline or climatology. Please consider showing some pluriannual or climatological mean in Figure 5(b,c) and indicate anomaly/intensity in the text in order to figure out how extreme were those events.

Since calculating a robust climatology requires a large number of monitoring years, we were only able to calculate it for the Anse Vata station. It is now displayed in Figure 5.b and the text has been adapted to mention the intensity of the thermal anomaly during the 2016 event in New Caledonia (between 2.5° and 3°C above climatological values during 20 consecutive days).

Page 14 line 66. “Played a key role…”. Replace by something more explicit like “negatively impacted the health of ecosystems…”.

Sentence has been rephrased using reviewer #2’s suggestion.

Page 14 line 90. “large biases (more than 2°C)…”. The text on satellite SST vs. in situ comparison is a bit short and should be extended from analysis of Figure 5.

We believe that the aim here is not to be exhaustive on the comparison between in-situ and satellite SST and that the reader can make his own analysis. We decided to keep the text in the original version.

Technical corrections:

Page 8 line 21. Repetition of “1977”, the sentence should start by “At the Amédée …”

Done.

Figure 5. Consider indicating color legend above panel “a” for New Caledonia, Fiji and French Polynesia, as in Figure 6. Indicate sampling depth directly in panels.

Done.

Figure 6. Indicate depth in panels. The Y-label Temperature (°C) is missing. Consider inserting the legend for the black curves “elevation” and “wind speed” in panels “a” and “c” directly. Satellite SST data in panel “d” are hardly visible.

Figure 6 has been modified accordingly. We agree that it could be difficult to distinguish satellite SST data on this plot but decided to keep the same scale, as the aim of the plot is to show mainly the inter-annual variability observed.

Figure 7. Legend on the trend on yearly warmest months could be removed as it is not showed.

Done.
End of Reply to RC2.