

## **Author's reply to Comment on essd-2022-466 by Anonymous Referee #2**

### **General Comments**

This study presents some high-quality high-resolution physical oceanographic data in an interesting area in the Mediterranean Sea that is not highly accessible and hosts a cold water coral community. Given that the data collection will continue and future data be accessible to the scientific community, it certainly meets the ESSD criteria for data availability. The presentation of the instruments, data collection, processing as well as quality control is very detailed and I believe in the quality of the data (although I may not have the most appropriated expertise to judge that).

AR: We really thank the reviewer for taking the time to review this manuscript, and for these positive comments and statements about the fulfilment of the ESSD criteria. Please see below how we have implemented and addressed your suggestions. Specified line numbers refer to the original document.

However, I end up reading through the manuscript feeling unsatisfactory in certain aspects. I agreed to review this manuscript mainly because my personal research interest in cold water corals. This manuscript is instead mainly a technical report on the physical oceanographic data only, without presentation of the biogeochemical or sediment trap data. While I understand the additional data collection and processing may take more time, I do not see a logical plan from the authors as to how these additional data can be integrated into the current physical oceanographic data. Even if the biogeochemical and sediment trap data are not ready, I would at least like to see in what aspects the current physical oceanographic data can help up better monitor the growth environment of the coral community. I think the dataset will have higher impacts in the scientific community and the general public if these points can be addressed.

AR: Dear referee, thanks for your comments, we understand and see your point. In this paper we present a long-term dataset of hydrological and dynamical observations in the Levante Canyon, in the Eastern Ligurian Sea. We believe this is the first important step to understand the hydrological dynamics along the water column in this area. Certainly those data are particularly relevant as they are collected in a deep canyon, which hosts vulnerable marine species such as the CWC that we identified in previous investigations. Here the main goal of the paper is the presentation of the long-term dataset in such a peculiar environment. We believe these observations can well support sound investigations about the deep canyon dynamics and consequently the CWC habitat conditions (for example the current velocity in the proximity of the sea bottom). Shortly we'll proceed with a second publication dedicated to the sediment trap data collected on this mooring station, with the focus on the sediment input to the sea bottom morphology and the corals growing conditions related to the sediment input.

### **Specific Scientific Comments**

Line 114 & 119: Just out of curiosity, why is the precision for the two temperature sensors on the ADCPs so different? Also 0.4°C uncertainty seems pretty large for temperature measurements.

AR: The reported precision value for the RDI QuarterMaster ADCP is correct. ADCPs use the temperature at its transducer to calculate sound speed and its temperature values should be only taken into account as environmental monitoring data if quality controlled against reference data. In our manuscript temperatures recorded by the RDI have been considered reasonable as comparable to the

closest CTD measurements. Despite its smaller uncertainty, temperature data recorded by the NORTEK ADCP were instead considered not reliable after the analogous quality control check.

Line 180: For this paragraph, I am not sure about how the authors are integrating sediment trap and geochemical data with the physical oceanography data given the current description. I think a more logical description of how all these different datasets are related and will be used together is needed.

AR: We have modified the manuscript there, at the beginning of the Results paragraph, according to your comments, thanks.

So we clarify that the hydrodynamic data presented here constitute the fundamental basis for a deep understanding of the ecological conditions that allow the hotspot of deep water corals along the Levante Canyon. For the first time we present here a 2 years data of temperature, salinity and water currents along the water column. So we understand the seasonal variability of hydrological conditions, the temperature range and so on. With a future work, we will focus on the sediment input that arrives down at the sea bottom of the Canyon (thanks to the sediment trap at 582 m depth) where CWC live and we'll understand the interactions among oceanography, sediment input, biogeochemistry and spatial distribution of CWC biological communities, for a deep understanding of the Levante Canyon system functioning.

Figure 5: I am not sure what all the different symbols mean for this plot.

AR: Noted. Please consider that the Figure has been revised as it was not correct as regards sigma values (i.e. water density anomalies).

Line 262: I am not sure what “interest” means here

AR: The word “interest” has been replaced by “affect” in the new version of the manuscript.

Line 315: This is one of the more interesting observations that the effect of the heat wave was not significant at the station. I feel like it warrants a slightly more detailed analysis as to why that is, given the current knowledge about the circulation patterns in the area, although I understand the ESSD journal is more focused on the presentation of the data.

AR: Agreed, this result is really interesting but out of the scope of the ESSD journal. As soon as additional long term time-series will be available for the site, we will certainly add more results for this topic in a future publication intended for a dedicated oceanographic Journal.

### **Technical Comments**

AR: All text corrections about Technical Comments have been edited as detailed below.

Line 14 and 18: “2-year” instead of “2 years”

AR: Corrected.

Line 63: “Panel (c)” instead of “the panel (c)”

AR: Corrected.

Line 66: “generate” instead of “originate”

AR: Corrected.

Line 69–72: This is an incomplete sentence without a verb. Either rewrite it, or connect it with the previous sentence with a colon.

AR: Corrected adding a colon.

Line 83: “temporal-spatial” instead of “time-spatial”

AR: Done.

Line 91 & 142: “first” instead of “firstly”

AR: Done.

Line 128: remove “respectively”

AR: Done.

Table 1: In the rows corresponding to Flags 2 and 4, the description sentences are broken in two lines awkwardly

AR: Corrected. Please note that we have also removed coloured cells from the Table as they were not suitable for HTML conversion of the paper, as raised by the editorial support team.

Line 179: “presented” instead of “proposed”, “shows” instead of “is well shown as well”

AR: Done.

Line 181: “trap” instead of “traps”

AR: Done.

Line 223: “With regards to” instead of “As regards”

AR: Done.

Line 278: I don’t know what “NC” means here and cannot find previous mentions of the abbreviation.

AR: NC stands for Northern Current as mentioned at Line 70. The mention has been repeated in the revision to enhance the readiness.

Line 318: “reached” instead of “was reached”

AR: Done.