

First of all, we would like to sincerely thank both reviewers for their very thorough and, above all, constructive reviews. We have followed most of their suggestions whenever possible and honestly believe that the revised version has been significantly improved.

The main changes include the removal of some parts of Section 4, as they were somewhat repetitive. We have also moved Figure 5 to the Supplementary Material and revised several figures to improve their clarity. In addition, we have expanded Sections 5 and, in particular, Section 6, where we review the current organizations devoted to the coordination and promotion of observing systems and discuss their strengths, weaknesses, and future perspectives.

We have made a brief bibliographic survey of the MonGOOS impact and included a glossary in supplementary material.

We have carefully reviewed all references and incorporated additional ones suggested by the reviewers.

One of the most interesting points raised by the reviewers was the possibility of carrying out Observing System Experiments (OSEs) and Observing System Simulation Experiments (OSSEs). Although this is beyond the scope of the present work and would deserve a dedicated study, we fully agree that it is an important line of research. In our opinion, this is one of the key activities that MonGOOS and its Steering Committee should promote in the near future. We have acknowledged this point in the revised manuscript.

In addition to these general comments, please find below our responses to the main and detailed comments. Our replies are highlighted in bold.

The paper 'The Mediterranean observation systems: MonGOOS analysis of present capabilities, weaknesses and perspectives' by Vargas-Yanez et al. presents a complete and detailed inventory of the ocean observation capabilities in the Mediterranean. The analysis was conducted within the framework of MonGOOS, an international organization dedicated to the coordination of Mediterranean ocean observing systems. The paper provides a detailed and accurate snapshot of the Mediterranean observing systems, highlighting the strengths and weaknesses of the current system.

I really appreciated the paper, as such inventories are difficult to realize due to the fragmentation of observation efforts in Europe. The method is robust, well-explained, and helps non-expert users find their way in the intricate and somewhat incomprehensible world of ocean observation. Additionally, they provide a complete explanation of the governance and organizational framework, which, even for an expert, can sometimes be hard to appreciate.

However, I expected the conclusions to go a little further. Some of the suggestions, derived from the weaknesses identified by the analysis, are certainly true, although somewhat rather generic (e.g., “increase observations in the eastern part of the basin, augment funding and personnel involved, etc.”). Such messages are essential, and there is no doubt that they must be addressed. However, from a consortium of more than 30 scientists, I expected a little more.

We fully agree with the reviewer. We have added new comments and ideas both in section 5: Organizations involved in the governance of the observing systems and in section 6: Discussion: Strengths, weakness and future perspectives. You can follow these changes in the changes –track version of the new manuscript.

We have also added some new comments on future perspectives and the need for better coordination or the suggestion of making OSEs and OSSEs in the future.

I sketch below some points that could be addressed by the authors. They are not mandatory for final publication, but I strongly suggest, at least, treating them partially, as the final relevance of the paper will, in my opinion, be strongly augmented.

I also suggest substantially reducing the initial part of the paper, where definitions and descriptions of the platforms are provided. Although I found it very interesting and well done, this section is not essential for the rest of the paper and could be moved to supplementary material, retaining only the main messages (and Figure 1) in the main text.

We also agree with the reviewer that some parts of the manuscript are too lengthy. This concern was also raised by Reviewer #2.

To address this issue, we have made the following changes. We have retained Section 2, which provides a description and classification of the different observing systems. As stated in the manuscript, one of the main objectives of this work is to make it useful to the broadest possible audience. In many cases, researchers, stakeholders, and policymakers may not be familiar with some observing platforms and instruments that are considered commonplace by specialists in the field.

However, we acknowledge that Section 4 contained some repetition. We have therefore revised and shortened this section by removing explanations that were not strictly necessary and by moving some content to Section 6.

In relation to this point, reviewer #2 also suggested removing Figure 5 and including it as supplementary material. We have followed this recommendation and believe that the manuscript has improved as a result and is now less repetitive, despite the large amount of information and the diversity of sources that needed to be synthesized.

Here are some suggestions to improve manuscript relevance:

1. It would be really informative to have a bibliographic study of the MonGOOS system as a whole, as well as for each sub-system. An interannual evolution of some bibliographic parameters would also be highly informative. The idea here is not to rank the "best" systems, but to inform non-expert users that MonGOOS systems are real scientific tools, essential not only for data collection but also for advancing ocean knowledge.

We agree with the reviewer. In the first paragraph of section “5. Organizations involved in the governance of observing systems” we have included a brief description of the history and evolution of MonGOOS from MedGOOS and MOON.

We also agree that it is interesting to show the impact of MonGOOS on the oceanographic community by means of some bibliometric indicators. A detailed bibliometric study is out of the scope of this work as it would be quite long. However, we have followed the reviewer’s suggestion and included at the beginning of section 5 a brief bibliometric research based on google scholar.

2. I understand that most observing systems are developed at the national (or sometimes laboratory) level, and that basin-scale coordination is only possible a posteriori rather than a priori. Nonetheless, I was surprised that an objective analysis of the systems was not included. OSSE and OSE methods provide scientific and effective tools to assess the relevance and usefulness of observing systems. Other approaches (e.g., bioregionalization, correlation analysis, temporal and spatial scale analysis, etc.) could also be used to evaluate the performance (and, more importantly, the weaknesses) of a system and to provide guidance for future improvements. Again, the goal here is not to prioritize systems, but to offer insights for further enhancements.

We honestly believe that this is a very interesting point, and we fully agree with the reviewer. If each country designs its own observing system according to its own criteria, there is a real risk that the combination of all these systems may not fully meet the requirements of a Mediterranean-wide observing system. The same argument could be extended to any other regional observing system worldwide. OSEs, OSSEs, and bio-regionalization exercises could be extremely valuable for identifying gaps and weaknesses in current observing capabilities. However, we believe that such analyses would constitute the basis for a separate and highly interesting study in their own right. For this reason, in Section 6, which discusses strengths, weaknesses, and future perspectives, we have added a new paragraph highlighting that

the coordination efforts carried out by organizations such as MonGOOS, EuroGOOS, and EOOS should also include this type of exercise. The results could then be used to formulate recommendations for national observing systems, thereby contributing to the development of a more coherent and effective Mediterranean observing network.

3. Similarly, apart from generic statements (e.g., "increase biogeochemical observations"), no specific indications are provided regarding the evolution of the system in terms of parameters. Cost is clearly the most significant limiting factor, preventing the expansion of parameters in observing systems. However, even if no additional resources are allocated in the coming years, I believe it is important that such analyses be performed in papers like this one.

We agree. Furthermore, there are several approaches that could help improve current observing capabilities, such as the OSEs and OSSEs mentioned above. In addition to continuing the present effort by identifying observing platforms that may not yet have been documented (as already stated in the manuscript, this is intended to be a living work), future studies could also assess whether all the observing platforms described here effectively contribute data to EMODnet. These additional research directions have now been included in Section 6.

Again, these are only suggestions, as I consider the paper ready for **publication with minor revisions**:

Line 395: As mentioned earlier, I suggest reducing the chapter "Current observation capabilities" and moving most of the text to the appendix or supplementary material.

We have tried to shorten this and we have moved Figure 5 to supplementary material.

Line 275: For the sake of completeness, also cite surface autonomous devices.

Ok! We have included these devices and also a reference to allow the reader to obtain more information.

Figure 2: I have some issues with the legend: where are the blue dots? The colors of the bars are not clearly explained.

The reviewer is right. The dots inside the bars could not be seen. We have changed the colors to make this clearer and also trying to make this better for color-blinded people. Now the bars are black, white and grey. The figure

and the legend have been modified accordingly. The main text has also been corrected.

General comment on figures and tables: I am not convinced that systems not yet deployed (even if funded) should be included in the figures and tables. The future is always uncertain, especially for ocean operations, and secured funding does not guarantee that observing systems will ultimately be deployed. Adding planned systems/points to the figures could be misleading for non-expert readers. I strongly suggest removing them.

We are sorry, but in this case we do not fully agree with the reviewer. As can be seen from the manuscript, this work is the result of a collective effort involving more than 70 researchers from over 50 institutions. Naturally, different contributors had different views and criteria, and reaching a consensus was not always straightforward.

In this particular case, some institutions requested that their forthcoming deployments be included because they were already fully planned and confirmed. We believe this justifies their inclusion in the inventory. Future deployments were only included when the responsible institutions confirmed with a high degree of certainty that they would take place.

Table 5, Second row: The entry should be “Ajaccio” (not “AJACCIOL”). Unless the authors opt to use Corsican, in which case the correct form is “Aiacciu”.

Ok! This has been corrected.

Table 6: I strongly suggest indicating in the table the maximum depth of the stations available for each cruise. Sometimes, even if the bottom depth is great, data are only obtained at the surface or at intermediate depths. For non-expert readers seeking information, this detail could be useful in identifying the most suitable systems for their scientific purposes. Another useful indicator could be the number of stations exceeding 1000 meters depth.

The reviewer is correct. Information regarding whether the stations are coastal or deep-water is important. However, this is all the information that we have been able to obtain so far. As already acknowledged in the manuscript and in our response to this review, this should be considered an ongoing process, and the MonGOOS Observations Working Group should continue updating and completing the available information.

Future templates circulated within the MonGOOS community will include a dedicated field for this information.

In addition, we have revised Figure 10 to include the 200 m and 1000 m isobaths, allowing readers to better assess the shallow or deep-water character of the stations. We hope that this provides the information requested by the reviewer until further updates become available.

Table 7, Third row: "CNRS/IFREMER" is repeated three times.

Ups! You are right. It has been corrected!

Line 821: It would be really informative for non-expert readers to explicitly explain the difference between EOOS and EuroGOOS.

We had explained in the previous version what EOOS is: "EOOS is defined as "an alliance of voluntary partnerships including public and private sector" (<https://www.eoos-ocean.eu>) and has no legal status. The EOOS is considered as the set of platforms and means for the observation of European waters. This set, once coordinated, constitutes itself an observation system, being a component of GOOS and GEOSS (Global Earth Observation System of Systems). Therefore, it includes those platforms from MonGOOS located in the European waters of the Mediterranean Sea, but not those in the southern riparian countries. As in the case of MonGOOS, it does not have a budget and is funded through the in-kind contributions of its members. EOOS is structured by a steering group, and advisory and operations committees, aimed at fostering coordination and development of existing capabilities." After this paragraph we include another one explaining what EuroGOOS is. Certainly, both organizations overlap and we already explain in the first version of the manuscript that they share objectives. One of the differences is the legal status of EuroGOOS as a non-profit organization. Besides this, we have emphasized this overlapping and the need for coordination in the new section 6.

Line 880: Maybe I missed something (it is true that the paper is full of acronyms, a glossary would be really useful), but I am surprised that the authors, in their comprehensive overview of the puzzling governance framework, did not cite specific national coordination initiatives such as Fr-OOS (froos.fr) or It-IOOS (it-ioos.eu). It would also be important to somehow mention the GOOS reform project (goosocean.org/news/call-for-proposals-global-ocean-observing-system-reform-consultancy), which will likely impact the governance of all sub-regional and regional systems, such as MonGOOS.

I agree. We have mentioned these initiatives in the new section 6.