

General comments

The manuscript proposed by G. Petihakis et al. aims giving a detailed overview of the POSEIDON observing system.

The article introduces this observing system for the Eastern Mediterranean sea. Following this aim, no specific scientific question is addressed in the manuscript but it is more dedicated to the description of the POSEIDON objectives and components.

The manuscript is well written and describes briefly each components of the network, including links with ongoing European and international initiatives on Ocean Observing Systems. A specific focus also appears on the representativeness of the Cretan Sea to monitor Eastern Mediterranean Sea.

As general comments, I suggest that the manuscript would benefit from some illustrations/examples of POSEIDON recent measurements. There are very few examples in the manuscript and it doesn't highlight the potential of such observing system. Furthermore, authors take care of showing the interest of this observatory in this region. It would be interesting to mention how past measurements have contributed to the scientific knowledge of processes in the region.

As the paper aimed to be published in Ocean Science with a wide reading audience, it would be important to be more explicit in acronyms as a lot of projects, initiatives, programs are mentioned in the manuscript. As I'm familiar with this community, I can follow the ideas but for a reader less familiar with those initiatives, it can be difficult to follow in some parts.

Considering the limited needed improvements included in general and specific comments, I recommend this paper for potential publication after minor revisions more related to illustrating more the paper contents.

Specific comments

Abstract

p. 1 / first sentence – The first sentence is mixing as the same kind of “object” processes (air-sea interactions and coastal-open ocean) and parameters. It would be more accurate if authors mentions either processes (physical and biogeochemical) or parameters.

p. 1 / l. 22 – Bio-Argo systems are not measuring Chlorophyll concentrations but fluorescence. I recommend using the latest parameter in the text.

1. International need for observations

p. 2 / l. 11 – EuroGOOS is the first example of the acronyms or notations not defined in the manuscript (as for example and without classification: C_T, A_T, GCOS, HCMR, NRT, POEM, PELAGOS, ...).

2. A strategic location to study the unknowns of the eastern Mediterranean

p. 3 / l. 9 – “... depending on the parameter”. I did not understand to which parameter the author is referring to.

3. Aims and mission

p. 7 / l. 4 – The reference to Perivoliotis EuroGOOS extended abstract is misleading as it sounds as it is describing the same content as the present paper. Please consider referring to this abstract for more specific points.

p. 7 / l. 6 – 9 – Reading this part, we wonder about the POSEIDON activity between 2011 and 2017. We understand a bit more in the following sections but it is possible to be more explicit at this stage on this temporal gap ?

p. 7 / l. 29-35 – This “b” topic sounds to me included in “a” topic. Please consider rephrasing those scientific objectives to be more explicit.

4.4 Ferrybox

p. 10 / l. 14-24 – The figure given for FerryBox does not highlight the long term FB activity. Please consider a figure including more track (and recent) for example to illustrate those platforms.

4.7 Gliders

p. 11 / l. 10-15 – A figure showing glider tracks and data would support this subsection in the manuscript.

5.3 Derived biochemical-ecosystem parameters and model state variables

p. 14 / l. 24 – The figure 9 seems very interesting but there is a lack of explanation in the manuscript. Please consider adding more information on this figure or if you consider that it would need too much details, you can consider removing this figure and replacing by model results examples.

6. Metadata and data handling

p. 15 / l. 1 – Are ADCP and sediment traps available on a different portal ?

Minor and technical corrections

1. International need for observations

p. 2 / l.5 – “ocean bottom” could be replace by “bottom ocean”

p. 2 / l.15 and l.22 – In the manuscript, both terms are used: “biochemical” and “biogeochemical”. Even if those terms are used often without distinction, this is not the same definition. Please, consider to be more homogeneous in the whole manuscript.

p. 2 / l. 24 – Authors cite “recently” for a study from 2015. Please consider rephrasing the introduction of the sentence.

2.1 Coupling of biochemistry with circulation patterns

p. 3 / l. 34 – To keep the paper understood for the next century, I would suggest to use “1970s” instead of “70s”.

2.4 Basin to global anthropogenic impact

p. 6 / l. 25 – The reference to EEA is 2006 and not 2015 in the reference list. Please double check the reference.

4. Components-Platforms

p. 8 / l. 20-31 – A reference to the map in Figure 1 is missing in this section introduction.

Tables

Table 1

+ pCO₂ and ADCP are missing in the list.

+ Please consider adding the sampling frequency range for each parameter.

+ The sensor replacement frequency would also benefit readers interested in managing an observing system.

Figures

Figure 1

- + The figure 1 is a key figure for the paper. I think that a green less dark to highlight the are would help to see other system locations.
- + Please add a depth scale/colorbar

Figure 3

- + this figure is tricky to read. Please consider splitting in 4 subplots (cruises, FB, buoy, sed trap + ADCP) for clarity.