

The manuscript by Salgado-Hernanz et al. describes the costal primary production of the Mediterranean Sea, estimated using satellite data, deepening on its spatial and temporal distribution and analyzing trends and possible link with NAO and/or MOI indexes. In general, I consider primary production an interesting topic, especially in the Mediterranean Sea, but in this paper is particularly interesting since it is analyzed in those areas highly impacted by anthropogenic pressure.

The paper is well organized, quite clear and English is good.

I admit I was amazed to observe that the primary production of the eastern compartment of the Mediterranean Sea is higher than the western compartment and to the Adriatic Sea. This result it is not only linked to the greater surface of the eastern sub-basin since it is also evident in the productivity per unit of volume. This result should be analyzed in depth by the authors.

About the trends estimated in the paper, I found some inconsistencies and I think the authors should better explain their observations. In general, it should be better defined how the quantities are calculated (i.e.  $\Sigma PP$ ,  $PP_{\text{annual}}$ ,  $PPVOL_{\text{annual}}$ ,  $CV_{PP}$ , etc.) in such a way as to put the reader in the best conditions to understand the obtained results.

Once these issues I underlined are solved, I think the paper could be considered for the publication.

### **Other Comments**

Lines 89-102: Are satellite data (chl, sst etc.) used at daily frequency? In the paper the authors cited monthly or 8days means but in this paragraph there is not any reference. Could you clarify?

Line 106: "Only values at depths exceeding 5 m depth were considered..." is there any reference for this assumption? As you know the layer that could influence remote sensing measurements depends on the sea water bio-chemical conditions. Based on my experience I believe that satellite measurements could be influenced by the bottom seagrass also for depths greater than 5 m. Maybe the authors could investigate, in some way, in order to give to the reader an idea of how much final results could be influenced by this issue.

Line 130: Is PP estimated on daily satellite images? Graphics and images in the paper show monthly data. Could the authors describe the exact technique used? Did they average input satellite data (i.e. CHL, sst, PAR etc.) and then compute PP? Or did they computed PP on daily satellite data and then averaged PP data?

Line 152-155: this point could also be investigated analyzing the mixing layer depth of the study area. Probably the chlorophyll uniform profile assumption may not be wrong in many cases, but having an idea of where this assumption is wrong could help to better understand the results of the study.

Line 169-170: Please define exactly how you computed annual PP ( $\Sigma PP$ ). Afterwards, in the text, the authors analyze the results for  $\Sigma PP$ ,  $PP_{\text{annual}}$ ,  $PPVOL_{\text{annual}}$ , etc. but I cannot find any definition of these parameters. I think it is crucial to define exactly the quantities used in the analysis.

Line 179-180: has this alongshore regionalization been done with SOM (or other technique), or has it been done by the authors observing the results of the SOM regionalization?

Line 217-218: How did the authors deseasonalize the data?

Line 226: Is annual carbon fixation per surface area the PP daily average multiplied by 365? If no, how is it estimated?

Line 237-239: from tab 1, annual carbon fixation is quite similar between eastern and western sub-basins. Since the area of east shelf is about twice of west shelf, it is obvious that the eastern annual integrated PP is approximately double of the west sub-basin. On the other hand, it is not absolutely obvious why the “productivity per unit volume” of eastern compartment is more than double of the western one (and even higher than the Adriatic Sea). I’m a little bit surprised...

Line 239-241: I suggest starting the sentence by citing the figure you are referring to instead of citing it at the end.

Line 243. “...the coefficient of variation of primary production ( $CV_{PP}$ )...” how did you calculate this coefficient? Defining this “coefficient of variation of primary production” would also clarify why there are 2 different “coefficient of variation of primary production”, one in figure 2c and another in figure 3b.

Tab 1: Could you please insert the exact reference (product ID as for satellite daily data described above) for the 8-days e 4km resolution data taken from CMEMS? I cannot find them. Why is \*\*\* only for “Mediterranean Sea”? shouldn’t it also be on “Open ocean waters”?

Line 290-291: How did you estimate this interannual variability?

Line 298-299: How did you calculate the “the filtered low frequency signal” for PP and CHL?

Line 306-307: “Most of these regions presented declining PP trends...”. This sentence does not seem so evident observing fig 5a. The only evident negative trend is in the Gulf of Gabes as underlined by the authors. Moreover I believe that fig 5a and graphs in fig4 are quite inconsistent. In fig 4 trends are negative for Mediterranean Sea, west and east sub-basin, while for Adriatic Sea there is no evident trend. From fig 5a I’d say that on average Mediterranean Sea trend is quite positive (red areas are greater than blue ones). For west and east sub-basin the negative trend shown in fig 4a is not so evident, especially for the eastern compartment. About Adriatic Sea fig 5a shows a clear positive trend. Could the authors explain this apparently discrepancy and how a reader should interpret it?

Fig 6: line 324: it is not specified (here or in the text) what blue lines meaning. Are they annual PP anomalies?

Line 327-336: R1 to R9 are represented in fig 7 as PP in  $gC\ m^{-2}\ d^{-1}$ , but in tab 3 there are mean annual PP values. Again, it should be defined how you estimate mean annual PP starting from daily PP.

Line 392: “...whereas Case-2 waters are reduced to less than 5% of the whole basin.”. Is there any reference for this statement?

Fig 8: Caption of the figure refers to another type of figure (seasonal PP). Fig 8a has a different color palette (and range) with respect to other 2 (b and c) images.