

First of all, we would like to thank the associate editor Dr. Silvio Pantoja for his decision and its review about our manuscript. We have modified the manuscript according to his comments. We think that the new version of the manuscript has been accordingly improved.

5 General comments:

-“Thanks for providing a second version of your article. Your paper provides consistent results to identify phenology of phytoplankton in the Med Sea, evaluated for more than a decade. There are several comments from both reviewers that were responded satisfactorily but corrections were not included in version 2 (please see below).”

10 -“Several other minor changes suggested by both reviewers were not included in version 2 of article, and some of them make a more clear presentation of your work.”

Author’s response:

> A marked-up manuscript version (track changes in Word) is provided after the responses of the following comments, as well as a new version of the manuscript in support of this document.

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Specific comments:

1) “Check missing reference:

Han, J., Kamber, M. and Pei, J.: Data Mining: Concepts and Techniques, third Edn., The Morgan Kaufmann Series in Data Management Systems, Morgan Kaufmann, Boston, 2011.”

20 Author’s response:

> Included in the new version of the manuscript (see after), Page 17, line 10: “Han, J., Kamber, M. and Pei, J.: Data Mining: Concepts and Techniques, third Edn., The Morgan Kaufmann Series in Data Management Systems, Morgan Kaufmann, Boston, 2011.”

25 2) “Where is the following text you mentioned in response to reviewer K. Tsiaras?

The referee is right. We changed: Page 14948, line 25 – “. . .whereas the dates of the minimum rate of change (i.e. the date of the lowest first derivative of the nChl time series). . .” with “. . .whereas the dates of the minimum rate of change (i.e. the date of the lowest first derivative of the nChl time series, the most negative value). . .”

Author’s response:

> Included in the new version of the manuscript (see after), Page 5, line 16: “whereas the dates of the minimum rate of change (i.e. the date of the lowest first derivative of the nChl time series, the most negative value)”.

3) “Page 13, line 28. I agree with Reviewer K Tsiras. Why bimodal pattern? Term “bimodal pattern” is still in v2
5 of manuscript.”

Author’s response:

> Modified in the new version of the manuscript (see after), Page 10, line 9: “The unimodal pattern”.

4) “Considered separately is still in version 2. Interannual approach is more accurate”

10 Author’s response:

> Modified in the new version of the manuscript (see after), Page 13, line 21: “...the new interannual approach demonstrates...”.

5) “I agree with comment of reviewer asking for rephrasing paragraph “13) K. Tsiras: “P14960, L2 “..more than
15 the deep convection events, the permanent cyclonic circulation in this region was the primary factor inducing favorable conditions for phytoplankton bloom, by bringing the nitracline depths close to surface. Relatively shallow mixed layers..” Usually deep convection sites are found in areas with cyclonic circulation due to the dome shape of the density that favours deep mixing and I think the phytoplankton bloom mechanism is mostly related to the vertical mixing. Therefore, the “relatively shallow mixed layers” might be misleading. I suggest you rephrase
20 this.”

Version should include modified sentence (““This uplift of the nitracline by the cyclonic circulation should allow an efficient replenishment of nitrate at the surface.””).”

Author’s response:

> Included in the new version of the manuscript (see after), Page 12, line 8: “This uplift of the nitracline by the
25 cyclonic circulation should allow an efficient replenishment of nitrate in surface,...”

6) “I agree with comment: Page 14945, Line 20 : Replace “respectively 8 days and 9Km” with “9 Km and 8 days respectively”.”

Author’s response:

> Modified in the new version of the manuscript (see after), Page 3, line 16: "...at spatial and temporal resolution of 9 km and 8 days respectively...".

7) "Idem "-Page 14947, Line 12 : Replace "from of all" with "from all""

5 Author's response:

> Modified in the new version of the manuscript (see after), Page 4, line 20: "...(from all the 16 years combined)...".

8) "Idem "-Fig1: Replace "all years combined" with "all years combined""

10 Author's response:

> Modified in the new version of the manuscript (see after), Fig 1 - Page 22.

9) "Idem "-Page 14960, Line 23 : Replace "is confirmed as be strongly impacted" with "is confirmed to be strongly impacted""

15 Author's response:

> Modified in the new version of the manuscript (see after), Page 12, line 23: "...is confirmed to be strongly impacted...".

10) "Idem, "-Page 14962, Line 8 : Replace "have been hide" with "have been hidden" or "have been masked"."

20 Author's response:

> Modified in the new version of the manuscript (see after), Page 13, line 17: "...have been hidden...".

11) "Idem "-Page 14962, Line 8 : Replace "artifactual regime produce" with "artifactual regime produced""

Author's response:

25 > Modified in the new version of the manuscript (see after), Page 13, line 24: "...artifactual regime produced...".

12) "< We agree with all technical corrections made by K. Tsiaras and modified the manuscript and all the figures by considering all these corrections. The manuscript was also proofread by an English native speaker. "

Version 2 does not contain some of those changes"

30 Author's response:

> Modified in the new version of the manuscript. All the modifications not mentioned in the documents named “Response to K Tsiaras” and “Response to G Volpe” correspond to the corrections made to revise the English grammar (see after the marked-up manuscript version).

5 13) “You agreed with Reviewer Dr. Volpe responding “We agree with the referee. We modified the discussion (Sect. 4.2.1 and 4.2.2) by adding comments on the influence of the intracellular chlorophyll adjustments on the surface chlorophyll-a concentration. We also add some estimations of this influence when available in the literature.

We added after the line 8, Page 14957 – “However, in winter the daily Photosynthetically Available Radiation (PAR) at sea surface is also reduced. In response, the intracellular chlorophyll content in the phytoplankton cells increases (i.e. photoacclimation process), which leads to an increase in the chlorophyll to carbon biomass ratio (e.g. Behrenfeld et al., 2005), and could in part contribute to the observed variations of the nChl in these “No Bloom” bioregions.”

15 We re-wrote the paragraph at line 27, Page 14959 – “However recent results from profiling floats measuring the [Chl] and the particle mass concentration, suggest also that in this region the photoacclimation process could contribute to the change in the observed [Chl]_{surf} (up to 70%, Mignot et al., 2014).”.”

Those new paragraphs never made it to version 2 of your article. Please check”

Author’s response:

> Included in the new version of the manuscript (see after),

20 - Page 10, line 14: “However, in winter the daily Photosynthetically Available Radiation (PAR) at sea surface is also reduced. In response, the intracellular chlorophyll content in the phytoplankton cells increase (i.e. photoacclimation process), which increase the ratio of chlorophyll to carbon biomass (e.g. Behrenfeld et al., 2005), and could in part contributes to the temporal variations of the nChl observed in these “No Bloom” bioregions.”.

25 - Page 12, line 3: “However recent results from profiling floats measuring the [Chl] and the particle mass concentration, suggest also that in this region the photoacclimation process could contribute to the change in the [Chl]_{surf} observed (up to 70%, Mignot et al., 2014).”.

14) “New references were not added to proper section (Behrenfeld et al. and Mignot et al.)”

30 Author’s response:

> Included in the new version of the manuscript (see after),

- Page 18, line 18: “Mignot, A., Claustre, H., Uitz, J., Poteau, A., D’Ortenzio, F., and Xing, X.: Understanding the seasonal dynamics of phytoplankton biomass and the deep chlorophyll maximum in oligotrophic environments: A Bio-Argo float investigation, *Global Biogeochem. Cy.*, 28, 856-876, doi:10.1002/2013GB004781, 2014.”

5 - Page 15, line 15: “Behrenfeld, M. J., Boss, E., Siegel, D. A., and Shea, D. M.: Carbon-based ocean productivity and phytoplankton physiology from space, *Global Biogeochem. Cy.*, 19, GB1006, doi:10.1029/2004GB002299, 2005.”

15) “Fig. 1. What is “statistically pertinent”? Do you mean statistically significant? If that, please use proper
10 statistical nomenclature”

Author’s response:

> Removed in the new version of the Fig. 1 (Page 22), and explained in detail in the manuscript, Page 4, line 23:
“Then, the stability of the resulting clusters was assessed by comparing them (using the Jaccard coefficient) with
clustering results obtained after a modification (i.e. adding an artificial noise), or a subset of the dataset (Hennig,
15 2007, see also DR09). Only clusters with a Jaccard coefficient greater than 0.75 are considered stable.”.

16) “I agree with reviewer Dr. Volpe regarding unclear sentence “G. Volpe: “Page 14947, line 15 - (. . .which is a
criterion based on. . .) is unclear and should be rephrased””

Author’s response:

20 > Modified in the new version of the manuscript (see after), Page 4, line 22: “...this index compared the within
and between cluster variance...”.

17) “Idem for comment “G. Volpe: “Page 14950, line 2 – substitute compare with compared”

(Author’s response: Page 14950, line 2 – We replaced “...compare to the “No Bloom #2”...” with “. . . compared
25 to the “No Bloom #2”.)

This change is not in version 2”

Author’s response:

> Modified in the new version of the manuscript (see after), Page 6, line 7: “...compared to the “No Bloom #2”...”.