

Interactive comment on “Interannual variability of the Mediterranean trophic regimes from ocean color satellites” by N. Mayot et al.

N. Mayot et al.

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First of all, we would like to thank Dr. Gianluca Volpe for his true evaluation of our paper and his encouraging comments. We have modified the manuscript according to his comments. We think that the new manuscript has been accordingly improved.

General comment:

G. Volpe: “Photoacclimation is known to play an important role in regulating the chlorophyll variability at the temporal scale considered in this work. The paper would surely benefit if the authors would mention how much of the observed variability is presumably given by real phytoplankton growth and how much due to the intracellular chlorophyll adjustments to light and nutrients.”

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Author’s response:

> 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.”

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).”

The two references added are:

- 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.

- 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.

Minor comments:

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G. Volpe: "Authors are encouraged to revise the English grammar of the manuscript, which contains several typo-like errors; a non-exhaustive list is provided below."

Author's response:

> The new version of the manuscript and all the figures were proofread by an English native speaker.

G. Volpe: "Since the time series underwent a three weeks moving average, it would be more appropriate if dates throughout the manuscript are replaced with relevant months only (perhaps even with seasons): see for example section 3.1, 3.2 and Table 1."

Author's response:

> We agree with the referee. Dates throughout the manuscript and in Table 1 were replaced with relevant months, and the terms early/mid-/late are used when needed.

G. Volpe: "Page 14947, line 12 - substitute (from of all..) with (from all..)"

Author's response:

> Page 14947, line 12 – We replaced "...time series (from of all the 16 years combined)..." with "...time series (from all the 16 years combined)..."

G. Volpe: "Page 14947, line 15 - (...which is a criterion based on...) is unclear and should be rephrased."

Author's response:

> Page 14947, line 15 – We changed "...which is a criterion based on the ratio of the within and between cluster variance..." with "...this index compared the within and

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between cluster variance..."

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 to the "No Bloom #2"..."

G. Volpe: "Page 14956, lines 19 to 25 – This paragraph is unclear and needs rewording."

Author's response:

> Page 14956, lines 19 to 25 – The text was substituted with "Finally, it is important to note that, as suggested by DR09, each bioregion (even the "Anomalous" bioregions) is directly related to a specific range of [Chl]surf (see Table 1). This point suggests that the shape of the nChl time series could be related to the annual phytoplanktonic biomass stock that the system could support. Based on the analysis of satellite surface data, this observation is certainly partial, although indicating a real pattern that merits further investigation."

G. Volpe: "Page 14957, line 2 – bimodal? From Figure 2 and throughout the manuscript, except for Coastal #7, and the two "Anomalous" #3 and #4, all regimes show unimodal distributions, including No Bloom."

Author's response:

> We agree with the comments. Page 14957, line 2 – The expression "bimodal distribution" was changed with "unimodal distribution".

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G. Volpe: “Page 14958, line 7 – substitute Figure 5, lower panel with Figure 5c”

Author’s response:

> Page 14958, line 7 – We replaced “. . .(Fig. 5, lower panel). . .” with “. . .(Fig. 5c). . .”

G. Volpe: “Page 14959, line 2 (and elsewhere) – substitute associated to with associated with”

Author’s response:

> Done. The expression “associated to” was changed throughout the manuscript with “associated with”.

G. Volpe: “Page 14961, line 17 – please, eliminate 2007 from the list of maps classified as Bloom #5 in the S. Adriatic, or better add Intermittently #4 in brackets next to 2007.”

Author’s response:

> Done

Please also note the supplement to this comment:

<http://www.biogeosciences-discuss.net/12/C9292/2016/bgd-12-C9292-2016-supplement.pdf>

Interactive comment on Biogeosciences Discuss., 12, 14941, 2015.