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Interactive comment on "The Mediterranean subsurface phytoplankton dynamics and their impact on Mediterranean bioregions" *by* Julien Palmiéri et al.

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I would like to thank the referee #3 for his/her effort in reviewing this study, for the suggested text suggestions and comments. These are very helpful and will be all included in the next submission of the corrected/improved version of the study.

Although the paper will be rejected, I would like to answer some of your comments.

– The analysis is more qualitative because the clustering process used for the bioregionalization, only looks at the variation of chlorophyll. So phenology is what matter for our study, so I didn't want to add any extra plots: 1- because there are already a lot of

plots in this paper, and 2- because (i think) we provide all needed values to appreciate how close/far is the model compare to both satellite and BGC-ARGO floats.

– Why compare model chlorophyll to satellite estimates ? There are several reasons, of which 1- it is not that bad. Of course we have to keep in mind they are estimates, there are errors, but these errors remain low compare to BGC model chlorophyll. Chlorophyll is probably the least well modelled variable (Kwiatkowski et al., 2014). 2- Satellite estimates are basin wide, and high frequency (every 8 days), what is extremely useful for model comparison and diagnostics.

– model surface Chl is the first level concentration.

– "My suspects lie in the nutrient "compartment" (is the adoption of the Redfield ratio OK?)" - that's what I think as well. The circulation model is to be blamed for part of the problem (see the appendix), and I think Redfield ratio is to be blamed in the organic matter remineralization, not necesseraly in phytoplankton production (see my PhD thesis – if you read French – Palmieri (2014)).

– " the inadequacy of the model is also expressed by the important differences between satellite and model clusters, such as the North Ionian" - About the North Ionian there is a full paragraph in the discussion to explain this difference in the modelled Bloom cluster. That's the part where the circulation model is to be blamed.

Hope the revised/corrected version will not be too long to do. Next step is to find a Mediterranean BGC model with a more realistic chlorophyll field.

– References:

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Palmiéri, J.: Biogeochemical modelling of the Mediterranean Sea, with the NEMO-MED12/PISCES coupled regional model, Ph.D. thesis, Université de Versailles-Saint Quentin en Yvelines, https://tel.archives-ouvertes.fr/tel-01221529, 2014.

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