

## ***Interactive comment on “New insights into the organic carbon export in the Mediterranean Sea from 3-D modeling” by A. Guyennon et al.***

### **Anonymous Referee #2**

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The paper tries to describe and understand the dynamics of DOC and POC in the Mediterranean Sea. It fails to do so since it does not analyze the carbon pathways in the food web and does not explain how this carbon export is produced by microbial and/or higher trophic components of the model.

It is too long of a paper, with many details and comparisons that do not shed light in the processes under investigation. Especially the comparison with chlorophyll shows much larger productivity than in the satellite data and this is not commented properly. In addition this larger primary productivity will enhance the DOC pool and there is no cautionary statement about this, especially for the Eastern Mediterranean where the malfunctioning bacterial pump will allow the DOC to accumulate if the primary production is large.

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The authors start to talk about the POC and DOC pools at page 21, and actually the discussion of the ratio starts at page 30. This is too far from the main aim of the paper, as stated in the introduction.

I believe the paper should be totally re-written and shortened with the addition of the study of the carbon flux pathways. If the POC/DOC small ratio means that the Mediterranean is dominated by the microbial food web processes, this should be spelt out clearly from the beginning. I do not believe this is a ground breaking result for the Mediterranean Sea but it could be worth to show given the full Mediterranean scale of the study.

Few detailed comments

Line 152. Chosen value of 2 m d<sup>-1</sup> is not credible and this will favor the production of large pools of DOC. Larger values up to 200 m d<sup>-1</sup> were found from sediment traps in the Ionian Sea (Patara et al. Biogeosciences, 6, 333-348, 2009).

Line 191. The choice of initializing from an initial condition corresponding to 20 years before the 1996 is not discussed nor justified.

Line 280-281. Mislocation of anticyclonic eddies is given as the reason for the difference in nutrient pools between model and data, this should be demonstrated by the analysis of model outputs.

Line 385. Authors mention that there is agreement between spatial patterns of chlorophyll concentration between model and satellite obs. This is really difficult to accept! Values are 5 to 10 times larger in the model than observations.

Line 707. The main result of the paper is not explained. Authors say that:” One of the main results of this study is that DOC export exceeds POC export in the whole Mediterranean Basin” But they never show the food web structure that creates such POC/DOC flux ratio.

Line 804 Again the authors say that POC and DOC export is attributable to the differ-

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ences between the processes involved but they do not analyze them.

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Interactive comment on Biogeosciences Discuss., 12, 6147, 2015.

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