

## ***Interactive comment on “Modelling biogeochemical processes in sediments from the north western Adriatic Sea: response to enhanced POC fluxes” by Daniele Brigolin et al.***

### **Anonymous Referee #2**

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#### General Comments

First let me apologies for the late submission of these comments as I lose the original document with the formal comments. This is a quick summary of what I remember by going through the draft again. Additionally let me add to this that my experience is with physical marine numerical modelling and data analysis, and I am not particularly familiar with the application on mussel farming. These aspect will be noticed by the focus of my comments.

The approached ideas and objectives are interesting, however I see issues (disagree) with some of the method and ways that the data was used. This could be as I am

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unfamiliar to this particular application and a good answer could quickly clarify these aspects (see specific comments). At this point I will not recommend to publish this work if not further improvements are completed.

It was difficult to follow the document at the beginning (until section 2.3), after this it was easier to follow the structure. However improving figures 1 and 2 will help to create a clear big picture at the start (please, see specific comments).

The specific comments and technical corrections start with the page (P) number and line (L) number to indicate the specific place in the text that is commented.

#### Specific Comments

P4 L38: How reliable is the Chla and SST data when the study area is near the coast (at ~2km and the data resolution is 4km)? If you imply that the average of certain number of Chl-a and SST data points is representative of the study area, Where is explain in the methodology? For the coordinates mentioned in P4 L37 the number can be guessed, but it will be better to see the number. And finally, Is it representative for the 2km<sup>2</sup> study area the Chla and SST time series if they were constructed based on an area of app. 100Km<sup>2</sup>?

P4 L38: How do you address the problem of color particulate matter, optical shallow waters and water turbidity, where the river could have a major role to play? As example please see: \* Cannizzaro and Carder (2006) [optical shallow waters]

P5 L6: Could you show the current meter data?, as you say that you are using the residual current edited. Why did you add storms? How many storms did you add in this random process? (You say that this method should be preferred for forecasting, however you are reproducing a period where you have data to validate and calibrate, Is not this closer to a hind-casting than a forecasting)

Why you are not using the current due to tides? Tidal currents will have an impact on particles that represent the faeces and pseudofaeces

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P6 L11: Please explain further in the method section that the mean of Chl-a and SST is spatial and temporal, resulting in a mean or characteristic year for each variable. This means that strong events of Chla are smooth as shows figure A1b, which means implication for the model individual growth and population model.

P6 L34: If you are going to use cm here, then please use cm in the figure.

P7 L36: Are the features and methods of Weise et al, (2009) comparable to yours? Depth of the study area, mean velocity (if they are considering residual current or not), size of the farm, etc The same comment goes of the Hatstein and Steven (2005) reference.

Figure 1 : The figure does not explain itself. It is not possible to know the meaning of the rectangle and and points in the figure. In my first look at the figure, the river was a road and I have to google the river to find out where it was.

Figure 2 : The figure caption is not good. Please give to the reader enough information for the "Information flow". Please add to the boxes in the diagram the reference to each represented/used model. Why are you using the word reanalysis for the current input in the particle tracking model (faeces and pseudofaeces)?

Figure 3 : What is the meaning of the sharp changes shown by graph a? It will better If the caption has more information about the figure. As example, if this represented data are modeled results or measurements.

Figure 5: Squares and triangles without legend. Y-axis without label just units.

Figures in general: Improve caption for the figures to stand by themselves.

P6 L23: Does this agree with the mean current velocity, mean vertical velocity for the particles to sink and mean depth?

Technical Corrections P3 L27: Define acronym POC earlier. There are few times before this where the acronym is used.

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P4 L16: Reference Cappellen and Wang, 1996 is not listed in the references

P5 L 26: Define the acronym PVC.

P6 L6: Define acronym HPLC

Boudreau (1996) and Sanchez-Jerez et al (2016) listed in the reference but I did not find them in the text

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