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Biogeosciences Discussions

Interactive comment on "OUTPACE long duration stations: physical variability, context of biogeochemical sampling, and evaluation of sampling strategy" *by* Alain de Verneil et al.

Anonymous Referee #2

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The paper assesses the Lagrangian nature of drifting sediment traps using physical data collected on a drifters and from ship observations of the surrounding waters. While the motivation of the study is sound I found the presentation difficult to follow. If the intention is to both assess the Lagrangian nature of the OUTPACE deployments and provide a generic method for such an assessment then the presentation of the method needs to be improved to enable the reader to clearly follow the approach. I consider the paper requires major revisions to address this point and hence be acceptable for publication. In revising the paper the authors need to address:

1. The way the method section is written it is not clear that you are assessing the

Lagrangian nature of the SedTrap drifter and how you use the collected data to do this. I like the use of Spice in the analysis but how is the baseline data profile determine - first hour, day ? of the SedTrap measurements? something else? Need to clearly define the data that went into the baseline definition before I can assess the validity of the method. Sounds like you used the CTD data but I would think you should use the initial profile of the SedTrap drifter and then look at changes in the water properties of the SedTrap Drifter to determine whether the float is Lagrangian.

2. The second step to the method is also not clear "evaluation of whether that scale was surpassed by the SedTrap Drifter ... ". What does this mean, why is it useful, how is it determined, and why does it differ from looking at the changes in the water properties of the SedTrap Drifter? Please expand this discussion so I can follow how the current data collected on the different platforms are used to assess the Lagrangian nature of the SedTrap drifters. The trajectories from the different velocity datasets appear significantly different and not consistent with the drift of SedTraps, what does this mean?

3. The method section also provides much additional information that does not help clarify what you are doing. What is the value in comparing to climatology for the Lagrangian assessment? Why discuss water mass breakdown if it is not used? Why even show the remotely sensed maps and evolution if they are not used to assess the Lagrangian nature of the SedTrap Drifters?

4. Is the Lagrangian nature satisfied for all depths in the SedTrap drifter deployment? One may expected a surface drifter may not represent the flow at depth. Please discuss.

5. The SedTrap drifters all drift less than 5.6 km - hard to think it is not Lagrangian since it barely moved. Why do analysis out to 1000 km when the drifter barely moves? Need to provide some context as to why you extend the analysis to much larger scale.

Some specific comments.

Abstract. l1-5 - not clear what a quasi-Lagrangian drifter approach is - deploy a drifter and follow it. Add a sentence to explain what this is.

pg3 line 23 - state how close the production line was to the SedTrap drifter?

pg4. How is the remote sensing data used to assess the Lagrangian nature of the SedTrap drifters?

- where do you use Mixed Layer depth in your analysis?

pg5 line 8 - to make it easier to follow say you are assessing the SedTrap Drifters since it is confusing when you use the quasi Lagrangian drifting mooring.

line 14 -how is comparing to climatology useful for you analysis? line 18-25 - again interesting information but not relevant here. Could go in the introduction as a way of testing Lagrangian nature of the sampled water. It is not part of your method.

pg 6 line 14-25 - Z scores are functions of density do they vary significantly with density line 34 -does the SedTrap Drifter have greater variability than TSG

pg8 why is the satellite data needed?

Table 2 variation in Dist(z=2) is huge what does this mean? It implies the calculations are very dependent on the data source? or you have not used the data appropriately

Figure 1. state it is a weighting of the 42 days of data based on inverse distance squared from the ship track. What remotely sensed data is used and what is it resolution in time and space?

Figure 2. Is there weighting of the remotely sensed data? If you need to show remotely sensed data I would use figure 2 only.

Figure 3. why show this plot? it is not a Lagrangian view of the data. It simply shows the variability in the region around the time of drifter deployment. How do you use it in your assessment?

Figure 4. Spice is not orthogonal to density - why not?

Figure 6. How do you measure distance for SedTrap drifter? How is distanced defined for the other data? Why go out to 1000 kms when the acceptable distance is less than 100 km?

Figure 7. Why are there such large differences between velocities in h, i, k, l panels?

Figure 8. rewrite caption to clarify what you are showing. What are the 3 rows showing? The trajectories appear quite different between the rows, why? and what implications does this have for the Lagrangian assessment?

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