

Interactive comment on “Carbon Export and Fate Beneath a Dynamic Upwelled Filament off the California Coast” by Hannah L. Bourne et al.

Giorgio Dall’Olmo (Referee)

gdal@pml.ac.uk

Received and published: 18 November 2020

This manuscript presents results from an intensive process study that was conducted on a filament off the California coast. The main dataset object of the study was collected by carbon flux explorers (CFEs) that are autonomous Lagrangian drifting platforms equipped with instruments that collect and image sinking particles over a size range spanning from ~ 30 μm to ~ 1 cm. This autonomous dataset is complemented by ship-based transects of water column physical and biogeochemical properties and water currents. The objective of the study is to describe the fluxes of different particles and investigate what processes control carbon flux variability with depth. More specifically, the author invested a lot of time in trying to understand the reasons why these fluxes from those reported in the classic study by Martin (Martin et al., 1987). Results

C1

show that different particle characteristics and water column features could be invoked to explain the observed flux variability at different sites and that the exponents of power law fits to the flux data were different from the average one reported by Martin.

Overall I think this manuscript presents a unique dataset that contributes to understanding the complexity of carbon fluxes in coastal upwelling regions. My main concern with this work is that uncertainties have not been estimated. I fear that once uncertainties will be properly estimated, some of the results and conclusions could change. For example, some of the slopes of fits to the data in Fig 16 (presenting the main results) could not be significant.

I consider adding the uncertainty estimation as a major revision, because it would require new calculations and an in-depth description of which input sources of uncertainty have been identified and how they were estimated. To avoid making the text too heavy to read, this detailed description could be added as a supplementary material.

I also have concerns with how the results have been presented. I would make an effort to synthesise the results more: there are 20 figures in the main text and most of them containing multiple plots. The text could also potentially be shortened (e.g., section 3.1 may be summarised in a table)

Please find several specific comments in the attached pdf file.

I hope you’ll find this review helpful.

Best regards, Giorgio Dall’Olmo (gdal@pml.ac.uk)

Please also note the supplement to this comment:
<https://bg.copernicus.org/preprints/bg-2020-342/bg-2020-342-RC1-supplement.pdf>

Interactive comment on Biogeosciences Discuss., <https://doi.org/10.5194/bg-2020-342>, 2020.

C2