

Interactive comment on “Global Ocean Particulate Organic Carbon Flux Merged with Satellite Parameters” by C. B. Mouw et al.

C. B. Mouw et al.

cbmouw@mtu.edu

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Referee: The manuscript "Global Ocean Particulate Organic Carbon Flux Merged with Satellite Parameters" by Mouw et al combines an effort to update the global database of sinking organic carbon fluxes from Honjo, Dunne, and Henson, with an expanded comprehensiveness in including multiple particle depths and data types but also uniquely combines these data with supporting satellite estimates of physical and biological parameters. The manuscript is well written.

Reply: We would like to thank John Dunne for his helpful comments on the manuscript and for subsequent correspondence sharing the dataset from Dunne et al. 2005.

Referee: I only have two concerns:

C1

1) In looking at the data coverage from EqPac, it appears that the dataset includes only the Buesseler et al 234Th estimates from in-situ pumps for the upper water column. This is unfortunate for two reasons, first because it seems to ignore the large sediment trap-234Th dataset of:

Murray, J W., J Young, J Newton, J P Dunne, T Chapin, and B Paul, 1996: Export flux of particulate organic carbon from the central equatorial Pacific determined using a combined drifting trap-234Th approach. Deep-Sea Research, Part II, 43(4-6), DOI:10.1016/0967-0645(96)00036-7.

and second because those pump-based fluxes were later shown to underestimate carbon fluxes by a factor of two (Quay, Paul. "Was a carbon balance measured in the equatorial Pacific during JGOFS?" Deep Sea Research Part II: Topical Studies in Oceanography 44.9 (1997): 1765-1781.) probably due to either the filtered particles not sinking and/or direct absorption of 234Th onto the filters.

Similarly, the database does not seem to include the FLUPAC and Zonal Flux data of:

Dunne, J P., J W Murray, M Rodier, and D Hansell, May 2000: Export flux in the western and central equatorial Pacific: zonal and temporal variability. Deep-Sea Research, Part I, 47(5), DOI:10.1016/S0967-0637(99)00089-8.

Both datasets were used in the Dunne et al., 2005 synthesis. I would encourage the authors to double-check that other particle flux datasets synthesized in the Dunne et al 2005 study are not missing from the present one.

Reply: We have added POC flux estimates from the dataset of Murray et al. 1996 and Dunne et al. 2000. We have also collected and added sediment trap and Th-234 based POC flux estimates from references in the Dunne et al. 2005 compilation. This added 265 measurements to the dataset. Reply: We have added a sentence highlighting the discussion of the accuracy of both sediment trap and Th-234 methodologies throughout the literature so that future users will recognize there are potential limitations.

C2

Referee: 2) If possible, it would be helpful to add the ^{234}Th fluxes associated with the POC fluxes that used the ^{234}Th method. One could then use the ^{234}Th fluxes to recalculate POC fluxes for the extensive pump-based estimates to be consistent with C: ^{234}Th ratios from other sources (e.g. sediment traps in the equatorial Pacific tend to have C: ^{234}Th around 3 $\mu\text{mol/dpm}$). However, I do not know if this is a particularly reasonable request and would not want the authors to delay publication if the data are not readily available.

Reply: While we agree including raw Th-234 activities has potential utility, collecting these values for our dataset is not practical at this point. If the dataset is updated in the future, we will keep this in mind. Thank you for the suggestion.

Referee: Beyond that, I suggest that the authors change the first sentence in the abstract and introduction from "Particulate organic carbon (POC) flux estimated from POC concentration observations..." to "Field estimates of particulate organic carbon flux..." to remove the phrase "from POC concentration observations" as the sediment traps do not measure concentrations, per se.

Reply: We have changed the language throughout the paper to refer to "POC flux estimates" or "field estimates of POC flux".

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