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Interactive comment on “Microphytobenthos and benthic macroalgae determine sediment organic matter composition in shallow photic sediments” by A. K. Hardison et al.

Anonymous Referee #1

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Anonymous Referee

General Comments: The aim of this manuscript was to quantify the influence of microphytobenthos on estuarine sediment organic matter quantity and quality in response to macroalgal blooms. The authors used a three treatment experimental approach to quantify the role of macroalgae on sediment organic matter dynamics. Using a suite of sediment organic matter quality metrics, the authors conclude that macroalgal blooms decrease the amount of microphytobenthos, likely due to light limitation. Increased frequency and duration of macroalgal blooms could therefore have implications in regards to carbon cycling, sediment stability, and other ecosystem processes. Overall,

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the focus of the manuscript is relevant given the threats of eutrophication in coastal waterways.

There is a lot of data presented in the manuscript. Several times, the authors mention that significant differences were not found between treatments due to high variability among the 4 replicates for each treatment. Was there any consideration for analyzing the data using statistical approaches that can account for a low 'n'? Bootstrapping? Or a Bayesian approach?

The expectation is that the Macro treatment was to negatively affect the microphytobenthos because of shading and/or competition for nutrients. Did the authors consider the potentially labile DOM leached or produced by the Macros added to the treatments? Does increased DOM from macroalgal blooms (likely labile DOM) feedback to SOM dynamics similar to what one would expect with the presence microphytobenthos? Is this plausible given that the Macro and Light treatments for sediment C, N, and some of the PLFA results are more similar to one another than the Dark treatment?

Specific Comments: 1. I understand microphytobenthos is a long word, but I don't think it is necessary to use an acronym, especially given the high number of acronyms throughout the manuscript. 2. Page 2804, line 14: Just to stay consistent throughout the manuscript – I assume 'light treatments' are both Light and Macro. Give the large amount of data presented here, it would be helpful to always refer to the treatments by "Light", "Macro", and "Dark". 3. The use of PCA can be useful to elucidate patterns in large data sets with multiple independent factors. However, looking at Figure 7, I don't see any clear patterns between treatments and time. The PCA results could be found to be more meaningful or helpful to the reader if the variables that make up the various components (or the bulk of the components) were reported in the figure (or within the figure legend). As the figure and the description within the text, stand now – I'm not able to follow any discernable pattern.

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