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Discussions

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

Anonymous Referee #2

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Microphytobenthos and benthic macroalgae determine sediment organic matter composition in shallow photic sediments.

A.K. Hardison et al

This manuscript uses a complex array of molecular markers to look at the potential role that eutrophication can have on sediment organic matter composition through changes in primary producer community composition (i.e. a shift from MPB to macroalgae). This is a very well designed and detailed study, and the use of various biomarker types to track changes in SOM composition over time provides for an excellent analysis of the differences between MPB and macroalgae on benthic carbon cycling.

I really only have a couple of points to raise. Firstly I am curious as to how sediment TOC and TN increase in the dark (Fig. 2), in the absence of any new carbon production (i.e. primary production). Could this be due to bacteria utilizing water column DOC? Some discussion on the potential of water column DOM driving benthic carbon metabolism might be useful. For example Maher and Eyre (2010, 2011) suggest water column DOC may contribute to benthic bacterial production, and also suggest a diel cycle of benthic DOC production/consumption. Was there any analysis on the diel differences in the 'Light' treatments (MPB and macroalgae)?

Secondly, what are the implications for benthic-pelagic coupling of nutrient/carbon cycling with the reported changes in SOM composition associated with a shift from MPB to macroalgae. While I understand that this was not the focus of this study, the benthic and pelagic systems are tightly coupled in these shallow productive systems, so I think some discussion on the implications and potential feedback mechanisms is warranted. Other than these minor points, I find this manuscript to be extremely well written, the design and analysis thorough, and the subject matter very relevant considering the ever-growing problem of coastal eutrophication.

Maher, D. and Eyre, B. D., 2010. Benthic fluxes of dissolved organic carbon in three temperate Australian estuaries: Implications for global estimates of benthic DOC fluxes. J. Geophys. Res. (G Biogeosci.) 115. Maher, D. and Eyre, B. D., 2011. Insights into estuarine benthic dissolved organic carbon (DOC) dynamics using δ13C-DOC values, phospholipid fatty acids and dissolved organic nutrient fluxes. Geochim. Cosmochim. Acta 75, 1889-1902.

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