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Interactive comment on "Contributions of the direct supply of belowground seagrass detritus and trapping of suspended organic matter to the sedimentary organic carbon stock in seagrass meadows" *by* Toko Tanaya et al.

Anonymous Referee #2

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General comments

This study aims to assess the mechanisms constraining organic carbon storage at two sites in Japan colonised by seagrass meadows quantifying the different pools of organic carbon that contribute to sediment organic carbon stock in seagrass sediments (and unvegetated sediments). The study demonstrates that seagrass structure and detritus constrain sediment organic carbon stores at the study sites. The manuscript is well written. However, I have some comments that I list in detail below.

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Discussion paper

Specific comments

Introduction. Page 3, line 33/Page 4, line 1. It is not clear in this sentence if the authors mean organic carbon or carbonate of calcareous organisms.

Introduction. I suggest to re-write the last paragraph of the introduction to highlight the novel aspects of the study.

Methods. Study site. The first paragraph could be moved to the introduction.

Methods, page 4 last paragraph and Fig. 1. The location of the river mouth of Todoroki River relative to the sampling site is not clearly shown in the figure. This prevents to understand why the terrestrial input in this site is low. Similarly, the location of the small river discharging into the estuary is not clear in the image.

Methods. Page 5. It is not clear the type of organic material included in the fraction OCcsed. If it contained the carbonate from skeletons of corals, foraminifera, and other calcareous organisms it should not be considered in the organic carbon pool.

Methods. Page 5. Line 24. "We merged dead plant structures attached to live seagrass bodies into OCbio". How much did dead plant structures attached to living biomass weight? How much was it in comparison to mass of the seagrass dead compartment? Could this affect the OC results across compartments?

Methods. Page 5, last paragraph. At each site, samples were collected in vegetated, unvegetated patches within the meadows and bare sediment. However the results in the box plots (Figs. 4 and 5) are presented per site, without indicating if they correspond to vegetated, unvegetated patches or bare sediment. I think it would be relevant to present these results indicating if the sediments were vegetated or not.

Table 2. In this table the density of dead plant material is 0.00 $\pm$ 0.00 g cm-3. I believe that these components did have some dry density but lower than 0.00 g cm-3. I order to be able to provide their dry density, the units could be expressed in mg cm-3.

Discussion. How much was the OC sediment stock at the studied seagrass meadows and at the bare sites? How do the OC stocks in the seagrass sediments found in this study compare with global seagrass OC sed stocks?

Discussion. What is the contribution of the different potential OC sources (seagrass, algae, corals, suspended POM and terrestrial POM) to OC in the sediment at both sites (and discriminating between vegetated and bare sediment)? The fraction of the different sources to the compartments of coarse and fine sediment could be estimated using mixing models. These estimates could be incorporated in a revised Fig. 8.

Conclusions. Kennedy et al 2010 and several other papers demonstrate that the contribution of particle trapping and seagrass material to sediment organic carbon widely varies across seagrass meadows, from meadows where allochthonous carbon is the main source to others where the sediment organic carbon pool is dominated by seagrass material. Therefore, there is evidence in the literature that seagrass carbon can be an important source to sediment organic carbon.

Minor comments Abstract- line 7. It should say that the stable carbon isotope ratio was measured in OC sources as well as in OCsed.

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