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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.

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The study by Tanaya et al. reports findings in the context of blue-carbon science,

specifically as a representation for the Indo-Pacific region. The authors demonstrated meticulous planning for the study and the manuscript is generally well-written. Our group is similarly involved in blue carbon studies and we draw some corollary between this study and our findings. In addition, we suggest some recommendations that may improve the authors' present and future outlook in this field.

One of the highlights of this study is the argument on the contribution of biomass-derived organic carbon (OC bio) to the organic carbon pool (OC total) as the highest globally (P2L8). The data is presented in percentages (i.e. 19% OC bio and 81% OC sed) rather than the actual organic carbon stocks. It may be apt to complement such comparisons with actual global stock values (in equivalent measures as grams C per meter squared or megagrams C per hectare). They then rounded off their study by stating below-ground biomass is a driver for sediment OC storage (P2L14-15). It may hold true for this specific study, which is represented by findings from two sites. The authors rightly indicated past studies (e.g. Kennedy et al., 2004; 2010 and Howard et al. 2017 – P11L14) showed no relationships between seagrass biomass and sediment OC stocks. This is consistent with our recent study as well (Rozaimi et al. 2017). However, our other studies suggest otherwise whereupon biomass is indeed important in driving sediment OC stocks (Serrano et al. 2016; Rozaimi et al. 2013). Tanaya et al. provided possible explanations on why they had different outcomes (P11) but alternatively, it may be plausible that their study sites may simply have exceptional sediment OC storage characteristics compared to other Indo-pacific seagrass meadows.

Further to the above, it has to be clearly noted this study reports findings from surficial sediments (up to 16 cm depth: P5L5). This depth is within the range of vertical rhizomal growths for Indo-pacific seagrass rhizomes (especially T. hemprichii). So clearly autochthonous inputs play an important role in retaining seagrass-derived OC within this depth layer. However, the context of the authors' findings within 15 cm sediment depths up-scaled to 1 m, on the assumption that sediment OC density is constant (P10L18) may be too broad an assumption. In our published results (Rozaimi et al.

2017), we found variability in surficial downcore OC content (up to 30 cm sediment depth, albeit as %OC) as well as changing δ13C sediment signatures with increasing sediment depth. In other studies (Rozaimi et al. in preparation), we did not find consistency in downcore OC content or OC density in cores up to 1 m. Conventionally, the scaling-up approach is employed (and admittedly we have used scaling-up approaches to model sediment OC stocks up to 1 m) to contextualise findings relative to regional and global estimates as that in Fourqurean et al. (2012). The authors' assumption in this regard may be corroborated if other evidence can be presented to support the notion of past seagrass occurrences in their study site (re: Serrano et al. 2016; Belshe et al. 2017). Or simply, such investigations may be room for improvements in the authors' future work.

On a final note, it is particularly interesting the authors have data (though not apparently analysed as yet) that can be used in stable isotope mixing models. Mixing models have been increasingly used to account for the contributions of seagrass derived-OC to bulk sediment organic pool and could thus offer alternative insights to the authors' findings. We do wonder how the authors' approach in this study hold up compared to approaches such as stable isotope analysis in R (SIAR; e.g Watanabe and Kuwae 2015; Rozaimi et al. 2017) or eDNA approaches (Reef et al 2017). The lack of reference to SIAR, at least, is somewhat peculiar since there are co-authors in this current study, who are familiar with SIAR (i.e. Watanabe and Kuwae 2015).

Overall, we view this study as interesting and may well be citable in future blue carbon endeavours.

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General technical comments:

Seagrass "bodies" is a peculiar term to use

On the use of "enrichment": conventionally, communications in this regards may con-

strue the presence of higher quantity of 13-C atoms (i.e. enriched samples) relative to non-enriched samples. In the text, readers may find some confusion on whether the authors refer to 13-C enrichment, or simply linguistic reference to higher amounts of a particular entity.

P4L14-22: Content more suited in the Introduction section

P11L14: A word missing after OC (perhaps OC stocks?)

P21 Table 2: On data entries as 0.00 $\pm$ 0.00: do these data refer to nil values, or data values less than 0.001?

P28 Figure 5: Axis labels are too small

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