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Discussions**

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Interactive comment on "Dissolved organic carbon release by marine macrophytes" *by* C. Barrón et al.

Anonymous Referee #2

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This paper attempts to quantify the DOC flux from coastal macrophyte (seagrass and macroalgae) communities, and the importance of light, community metabolism and temperature in controlling the flux, using new and previously published data. This area of research is important and has received relatively little attention (for example the authors only list one previous estimate of DOC flux from macroalgae communities). While I like the idea of this paper there are several issues that need to be resolved. My main concern is the rather haphazard way a global value for the macrophyte DOC flux is derived. Firstly, there are essentially only a couple of estimates for macroalgae, making any kind of global upscaling effort somewhat dubious. Secondly just averaging all the values in Table 1, and assigning the error based on the averages, when the errors for these averages are presented is wrong. For example, if I just calculate the average of the errors (as what was doone to estimate the average DOC flux), the average error

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is $\sim$ 7 mmolC m -2 d -1 or by calculating the proportional error for each individual measurement (i.e. error/mean) and average these for all the individual measurements, the proportional error is $\sim$0.53 or 53%. This leads to a much larger error than that presented ($\sim$6 mmolC m -2 d -1). A better way to estimate the error is through standard propagation of error methods. Another issue is how are these daily rates scaled to annual rates? If they are simply just multiplied by 365, I think this is a serious error, particularly in light of the relationships presented in 2, 4, and 5. The upscaling to annual rates needs to be better explained.

In Table 1 and Table 2 why is there temperature data missing from the authors own published and unpublished data? Is this left out because it will render the temperature versus DOC flux regression presented in Figure 2 insignificant. Please present this data or explain why it is excluded.

Specific Comments

P1530 L7 All most should be almost

P1531 L4-L9 This sentence does not make sense, you start by saying the release of dissolved organic matter accounts for . . . then you say that the form of this release (i.e. particulate or dissolved) is unknown. Please check

P1532 L15-L16. This paper does not present the first assessment of global DOC flux from macrophytes as Maher and Eyre 2010 previously estimated this.

P1533 L28 to P1534 L5. There appear to be two sets of sampling protocols used here, please specify which experiments used which protocol (acidified and kept at room temperature, versus frozen)

P1534 L7 I assume the 2 should not be here?

P1536 L13 As discussed above, I think the error in this value has been determined incorrectly, and should be much higher.

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P1539 L15-L20 What about Maher and Eyre 2010 you use the values from that paper in Table 2.

P1541 L1-8 Maher and Eyre 2011 discuss the source of DOC in macrophyte communities (i.e. autochthonous versus allochthonous) using changes in stable isotope ratios of the DOC pool over an incubation. This paper may be relevant to this section.

P1541 L9 and L10 DOM should be DOC

P1541 Check the units used. For example when talking about yearly DOC fluxes use molC/m2/yr and why present global figures as 0.015 ± 0.003 Pg C/yr when you can present the sam values as 15 ± 3 Tg C/yr. Also as mentioned previously, the error is actually much larger than the value presented here.

Table 1 Present temperature data for all of the authors own data.

Table 1 The total error calculation is wrong

Table 1 Seasonal values for the Maher and Eyre study can be presented rather than annual values (i.e. an additional 21 values)

Table 2 As with Table 1 the error estimate is not right

Figure 2 How does this figure look with all the available temperature data?

Figure 3a The different regressions need to be easily identifiable (i.e. without having to look for the line slopes in the caption text)

Figure 4 Do not show non-significant regressions.

Figure 5 Do not show non-significant regression

Figure 6 Why not present this in the same way as Figure 5, with 2 data sets (one for 2 days and one for 6 days of shading). Also in the caption why present the relationship if it is not significant?

References

Maher, D., and B. D. Eyre (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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