

Author response to RC1, Florian Cesbron

This manuscript is addressing relevant scientific questions within the scope of Biogeoscience focusing on interactions between biological and chemical processes in restored seagrass environments. It combines benthic chamber, aquatic eddy covariance measurements and benthic fauna analysis on a chronosequence of four stages of seagrass development since restoration located within the same sheltered bay. It is well-written, and the methods seem adequate as does the analysis.

We thank Dr. Cesbron for his constructive and detailed review. Please see our response to each of the comments below.

Nevertheless, to better compare your different stages of seagrass development, do you have any complementary information concerning their photosynthesis activity (e.g., PAM fluorescence analysis)?

We did not measure photosynthesis in any other way and have no information on the photosynthesis carried out specifically by the seagrass. This would indeed have been beneficial in discriminating between fluxes due to the seagrass itself as compared to other components of the community.

My technical comments, mostly minor, are provided below:

Is your in-text citations based on relevance? Your preference isn't so clear, sometimes your citations order seems to be chronological but not every time.

We thank the reviewer for catching this error. References have now been updated to chronological order throughout the manuscript.

Methods: Explain more in details your alternative experiment location with your EC/ BC deployments to better understand your operating process (date, distances between EC and BC...): add more information, for example in a table, about when and where (GPS data) you deployed your EC/BC systems.

We have added a new Table S1 including the location, start, end and duration of EC and BC deployments. In addition, a new Fig. S1 shows a detailed schematic illustrating the positioning of BC's relative to EC together with schematic illustrations of the respective systems. In section 2.2.1 of the Methods, we have added the distances between each deployment location, as measured *a posteriori* using the distance measuring tool in the GIS software QGIS 3.6. We have also added the BC deployments to new Fig. S2 illustrating that BC deployments occurred during EC deployments.

Figure 1: Identify your subdivision a and b on your figure and describe your "Nat" abbreviation as it is described for the first time in a figure.

A figure describing your benthic chamber system could be added or at least a citation using the same system.

We have added a new Figure S1 in the supplementary material which shows a schematic illustration of the EC and BC deployments in addition to detailing the components of the EC and BC.

Modify your “bare” data color coding, e.g., fig3 not the same with your fig 2 and not so visible. Keep your color coding from your fig 2 and modify it even in your supplementary figure.

We thank the reviewer for catching this error and we have updated the color coding throughout the manuscript and supplementary figures.

Line 100: Don't you think you should also add Rodil et al., 2022 (<https://doi.org/10.1002/ecy.3648>), Rodil et al., 2020 (<https://doi.org/10.1007/s10021-019-00427-0>)?

We thank the reviewer for these suggestions. We have included Rodil et al., 2022. The reference ‘Rodil et al., 2020’ was mistakenly named ‘Rodil et al., 2019a’ in the original manuscript. This reference has now been updated.

Figure 3: delete “of” in your sentence: Linear regression between of oxygen and dissolved inorganic carbon (DIC)”

We have corrected this.

Line 381: A supplementary table showing all detailed PQ and RQ could be added to illustrate your explanation on high-variability.

A specific value for each chamber would not be meaningful since the calculation in Eq. (4) includes fluxes in both light and dark chambers. Calculating chamber-specific PQ and RQ would thus require an arbitrary choice of which dark chamber to subtract from which light chamber. To clarify this, we have added to the section 2.4.1 that we use the average absolute fluxes of light and dark chambers. We also removed the “within-site variability” from section 3.3 which was mistakenly included.

Line 475: Quote your figure 6.

OK, done.

Table 3: You never quote this table in your text except in your discussion (line 522). You could either move it to your supplementary document or delete it.

We have added a sentence referring to table 3 right above the table: “As such, the model that best explained changes in daily benthic metabolism across the four different stages of seagrass development was a logarithmic model (Table 3).”

Table 4: adapt your units as described in your methods part: molC m⁻².

OK, done.

Line 524: not useful to first compare your data with only one publication without the same methodology. Especially when few sentences later, you are doing a comparison with similar methodology.

We understand the reviewer's point but Duarte et al. 2010 is still a widely used reference for global estimates and we argue that these high values are being increasingly challenged as methods improve (e.g. EC) and more seagrass meadows are sampled. We therefore choose to keep this reference to be able to build that argument in the following text.

Line 572: *Z. noltii* is now called *Z. noltei*

This has now been corrected.

Line 605: a word is missing "to have a large range of photosynthetic pigments".

We have changed to "to have a wide range of photosynthetic pigments"

Figure 7: Lateral import and export need to be documented or delete.

We have removed the arrows for lateral import and export.

Homogenize your reference's part, e.g. (line 767) do not use journal abbreviations.

This has been corrected.

Figure S1: add your site legend on your figure or into your legend. Homogenized your unit's typography: modify wind speed unit m/s by m s^{-1} and flow speed unit cm/s by cm s^{-1} .

The figure now has legends and units are corrected. It is now called Fig. S2 after we added a new Fig. S1 describing the methodology (see above).

Figure S2: Add subscripts to your O₂ legend in y axis.

Fig. S2 (now Fig. S3) has been updated and subscripts have been corrected.