Revision round #1

Decision for round #1 : *Revision needed*

A insteresting study that needs some revision

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three referees have read the manuscript, and suggest a number of improvements which are fairly consistent, and which will, I think, significantly improve the document.
I therefore suggest that the authors give serious consideration to these comments, which will undoubtedly improve the document.

*by **gudrun bornette**, 16 May 2024 08:44*
Manuscript: **https://doi.org/10.5281/zenodo.10425141**
version: 1

Dear recommender and referee,
Thank you for reviewing our preprint in PCIEclogy. We really appreciate the constructive feedback, which helped us to improve the manuscript.
We have now completed the revision process. Below are our responses to the reviewers and how we have modified our original version accordingly. The line numbers correspond to the revised version. We have also provided a validated version of the manuscript.

Review by anonymous reviewer 1, 08 Feb 2024 12:54

The publication of scientific data in open access is always an important contribution to the knowledge of the community. I'm just adding some minor comments for the authors consideration. I recommend this MS for publication.

Comments (MS line and comment)

43 Missing reference: Thank you, reference added

50 I do not understand this sentence, please rephrase. The sentence has been rephrased.

65 – 76 I recommend adding the tidal range for all the sites, not only for AC.
Please unify units, you used ha and km2

Surface in ha everywhere. Tidal range has been removed for Arcachon, general regime has been added for other sites (missing information).

Fig.1 Indicate lat/lon in the detailed maps and North direction

Map updated

88 is bare modality a bared spot in the moment of the sample or are historically bared spots?

We add details. The observation period considered (available records) is about 10 years.

131-143 Can you indicate a reference with details of this method? How is the chamber? Is it rigid or flexible? It would be interesting for other scientist to use similar a similar protocol.

This method has been used for a long time in the measurement of benthic fluxes and is quite "classical". References to studies using similar methods have been added and the photo (Fig. 3) provide some information also.

147-148 I think you described the sensors in opposite order than the measured variables.

Amended.

163 Please add a table caption and cite the table in the text.

Table caption added and table cited in the text.

Fig.3 Do you have a picture of dark incubation? It would be interesting too.

Unfortunately we don't have a picture. We just specify that dark chambers are the same as in the picture (Fig. 3), but black.

Section 4 It will be nice if you add an initial sentence indicating in which tables is the information presented on each subsection.

Thanks for the suggestion. The correspondence with the tables of the database has been added.

214 Modality A is abscence of seagrass. I do not understand what do you mean with near Z. marina and Z. noltei?

There is one modality A for each habitat, near *Z. marina* patches and near *Z. noltei* patches in each site, as shown in Fig. 1.

Section 4.4 Is it almost always positive the net production of the community even in A modality? I think it is interesting to comment about this.

This section is not intended to interpret the results (see discussion with other referees), but to give an overview of the values. A specific paper on benthic metabolism is in preparation.

Review by Sara PUIJALON, 05 Apr 2024 14:45

The manuscript presents a dataset consisting of measurements collected on Zostera marina and Zostera noltei seagrass meadows at 4 sites along the French coasts (English Channel, Atlantic Ocean and Mediterranean Sea) and during 5 seasons. Within each site, 3 areas (called modalities) are defined according to the dynamics of the 2 seagrass species: areas where the seagrass meadows are stable over time (S), areas where the meadows fluctuate over time (D) and areas not colonised by the 2 seagrass species (A). In each modality, sampling and measurements were carried out at 3 replicated stations. The dataset consists in environmental data (e.g. temperature, light, chlorophyll a, nutrient concentrations in water, sediment organic matter, sediment grain size...), general properties of seagrass beds (e.g. canopy height, shoot density, relative cover of bare areas, algae and the 2 seagrass species...), seagrass properties and traits (e.g. number of leaves per shoot, below-ground and aboveground dry mass...), density and biomass of epifauna in seagrass meadows and underwater benthic metabolism (e.g. primary production and respiration). The dataset covers complementary aspects of structure and functioning of seagrass beds. Sampling was conducted at four study sites over the course of more than one year, enabling investigation of the spatial and temporal variations of seagrass bed structure and functioning.

Specific comments

Title: It would be interesting to include a term like seagrass meadows (or beds) in the title because the dataset goes beyond the 2 species and also but characterizes part of the functioning of the meadows.

Seagrass meadows is in the keywords. We feel that this data is very specific to these 2 species and prefer to keep the actual title.

Context and general description:

At the end of this part, it may be relevant to introduce briefly the rapid data representation (§4. Quick data description) that is presented in the manuscript.

L43: Indeed, add a reference instead of “ref” !

The two comments have been considered. L55-57: “The author has chosen to provide a brief graphical representation of each dataset in order to facilitate visualization and appropriation of the data by readers and potential data users.”

Experimental design and sampling procedure

Throughout the text, figures and tables and data files, I recommend using always the same terms for the different types of data collected (environmental data, measurements on seagrasses, epifauna, benthic fluxes...). For instance, the data collected on seagrasses appear under the titles “Habitat characterization” in the methods section, “Seagrass bed structure and plant biometry” in the results section, “Visual estimation” and “biometry cores” in Tables 1 and 2 and “Quadrat table” and

“Core Table” in the data set or the data on benthic fluxes appear under the titles “Benthic fluxes and associated macrofauna” in the methods, “Benthic metabolism” in the results section, “Incubation” in Tables 1 and 2 and “Benthic fluxes” in the data files. The same problem is observed for environmental data and epifauna data.

Good point, the titles have been harmonised.

Study site description:

L82-85: I suggest moving this paragraph after the following one (L86-92) to end up with the spatial dimension of the sampling design before presenting the temporal dimension.

Paragraph has been moved as suggested.

L87-90: according to Tables 1 and 2, there is no D modality for the site AC. This information should be included in the text.

A sentence has been added.

L86-90: can give you a rough timeframe for estimating the stability of the beds (10y? 50y?)?

L84: there are also many missing values for winter 2021

The two comments have been considered.

Fig. 1: Can an additional small map be produced for each site to show on the same map the relative positions of the areas colonised by Z. noltei and Z. marina? Currently, they are presented in different panels with different scales, making it difficult to determine their relative positions in the field.

We did not find it very useful to add another map since the 2 habitats are considered to be distinct. However, the updated map gives coordinates that make it easier to locate the beds.

Environmental data

L99-103: water analyses should be added to tables 1 and 2.

The sampling design for the environmental data was quite different (only 1 point per site, continuous sampling for light and temperature). Therefore, a specific table has been added (Table 2 p17).

L107-108: Looking at Table 1, it looks as though grain size analysis was done in winter 2021 (not 2020) for Z. marina. Moreover, there are many missing data (GM modality A in winter, AC modality A in winter, TH in winter for Z.marina, GM modality D in winter, TH in winter for Z. noltei). The sentence could be reworded to take better account of this.

The sentence has been modified.

Habitat characterization

The title “Habitat characterization” is a bit reductive and does not reflect what the measures can achieve. A title that includes the notion of seagrass bed structure (as in the results section) would probably be more relevant.

Title changed to "Seagrass bed structure and plant biometry".

L121: how were measured length and width of leaves (manually? By image analyses?) ?

The figure 6 and the data table show that leaf areas were measured (per shoot or per surface unit): how were these areas measured? The method should be added.

Thank you for raising this point. We specify that the leaves were measured manually and how total surface was calculated per core **in** m^2 and not **per** m^2. This was a mistake.

L123 (and throughout the text in tables and figure): biomass should be replaced by dry mass t o make it clear that the mass data are dry masses.

Biomass has been replaced by dry mass where appropriate.

Epifauna

L127: “in winter and autumn 2020…”: Looking at Table 1, it looks as though it was done analysis was done in winter 2019 for the site TH.

Correct, changed in the new ms.

Benthic fluxes

L141-143: The figure 5 shows that the cover (by algae, the 2 species of Zostera, or bare sediment) may be very diverse between sites, modalities and season. How were the benthic chambers positioned relatively to these different elements in sites with heterogeneous covers?

This heterogeneity was deliberately taken into account in our sampling by randomly setting up the benthic chambers in each area. The seagrass habitat is considered in all its complexity, with its associated flora and fauna.

The data tables indicate that fluxes of ammonium, nitrate, nitrite and phosphate were measured, please indicate how.

The analytical method is described in section 2.2: "Nutrient concentrations were quantified by segmented continuous flow analysis using colourimetric (NOx and PO43-) and fluorimetric (NH4+) detectors (Aminot and Kérouel 2007)". The calculation of nutrient fluxes is presented in section 2.5: "Finally, fluxes were estimated from the slope

of the linear regression for oxygen **or from the difference between the initial and final concentrations for nutrients** and carbon, expressed per unit time and surface area.

Quick data description

The presentation of the data may make sense in this data paper, but it is sometimes a little confusing. The sampling design is complex, with several factors, and the way the variations in the parameters and variables measured are described differs greatly from one parameter to another (for some variables, the authors place more emphasis on seasonal variations, for others, on the difference between sites, or even between modalities). It is sometimes a little difficult to follow the flow of these data.

The clarity of the figures 4 to 8 may be improved. First, for all these figures, sub-panels (a, b, c...) may be added which would make it easier to read the legend and quote the figure in the text. The figures are also rarely cited in the text: it would help citing them (figure and sub-panels) more often to make the text easier to read.

Secondly, for figures 5 to 7, it would make the figure easier to read if the bars were separated into groups corresponding to the x-axis legend, for instance, as in figure 8, where the bars are grouped by site, with a space between the sites.

In figure 5, the legend of the X-axis may be repeated on the panel corresponding to Zostera noltei (as in figures 6 and 8).

Figure 4. In the legend, what does the “near each habitat” refer to?

Figure 6: in the title of the panels, replace “shoot biomass” by “shoot biomass per m2”

And “shoot density per m2” should be either “shoot density” or “number of shoots per m2”

Figures 7 and 8 : why are some bars of the plot wider than the other ones? If data are missing, there should be an empty space as in the other plots.

Figure 8: in the figure, put the 2 in subscript in O2

L209-210: the Z. marina cover “could decrease to 0% in winter in AC”: unclear where this result comes from

L223: to which plot does “mean leaf size” correspond to ?

All figures have been changed in the new MS, so we hope that all these comments are now included. Where possible (not for Figs. 4 and 5) sites are shown separately, abscise represent seasons and color represents modality. The number of variables presented has therefore been reduced to avoid overloading the manuscript.

Table 1. why are the missing data of epifauna in white and not in red?

What does the value +1 without brackets correspond to?

Red boxes correspond to missing values (due to field or meteorological constraints). Epifauna were planned to be sampled over 2 seasons, so it is not missing values but a time lag between sampling at Thau and other sites. Bracket correspond to samples for granulometry as indicated in the title MO (+ granulometry).

Table description: in the description of variables, put the 2 in superscript in m2 and in subscript in O2

Review by Antoine Vernay, 29 Mar 2024 12:29

Dear recommander and authors,

I carefully read the manuscript entitled « A dataset of Zostera marina and Zostera noltei structure and functioning in four sites along the French coast over a period of 18 months. » by Lacoste et al.

I have found the manuscript very interesting, providing a source of information for two species, associated with a large ecosystem data.

It will certainly help, in a long-term perspective, to build a community dynamic, for instance.

I have some comments that may help to improve the clarity of the manuscript

Globally, the authors have proposed some preliminary data analysis, comparing some sites, modalities, and species without defining a clear question to answer. In my opinion, it is not the main goal of a data paper, therefore I got something lost in my reading, trying to understand why some data were analyzed and some others not. Maybe a more descriptive table gathering the data (mean, sd, max, min,...) would be sufficient if the authors think it is useful.

Moreover, the authors used a lot of terms such as « most », « mostly », « mainly », « some », and « high » without giving numbers or range so I was not sure how to interpret the sentence. I suggest removing or adding some details to give more sense to those descriptions.

I would be happy to discuss with you if you disagree with my opinion. Again, I find this data paper very interesting, I just think that it goes sometimes a bit beyond its initial goal. Feel free to comments my review to further enhance your paper.

We decided to keep the (improved) figures but agreed that data analysis was not the aim of this paper. The text has been changed to give an overview of the range of data without any comparison. We hope that this improvement will make the reading clearer. We add a sentence to introduce the approach: L55-57 “. The author has chosen to provide a

graphical representation of each dataset and a brief description in order to facilitate visualisation and appropriation of the data by readers and potential data users."

L43: can you explain what you mean by « poor conservation status » ? Do you miss one ref in « (ref) »?

We add the reference so "poor and bad" status are those defined in the original publication (European Environmental Agency).

L 69: can you explain more precisely « high hydrodynamics »?

The phrase has been modified and range values have been added.

L82: it is not clear what you mean here and elsewhere in the text with « parameter »

L83: « With some hiatuses », I propose to refer to your tables 1 and 2 to make a more accurate statement.

Modifications added.

L99: « once during each seasonal campaign », is it enough once measurement per season?

It's important to recognise the scale of this sampling effort: at four sites over five seasons, with numerous in situ measurements (including diving) that are rarely undertaken. The implementation of this study required the mobilisation of a large number of people over several months. Therefore, we believe that even one sampling per season is a significant undertaking.

L113-116: I was not sure to understand if you quantified cover and/or abundance.

Both: % cover was first estimated visually with quadrat, and shoot abundance (i.e density) was then estimated in the quadrat for *Z. marina* and from subsampling (cores) for *N. noltei*.

L116: are the six quadrats the same as before ($0.16 m^2$)?

L117: why do you use this special method for TH?

L118: Can you give a volume of your PVC core? Is there any reason why the area is different for the two species

The paragraph has been amended to provide more information. There is no tide in Thau, so plants are always submerged. This method is often used to get the same view of flattened leaves on sediment and to get the same estimate of cover as in tidal areas. The volume of the core is not of particular interest as we only used the surface to estimate shoot density. The cores for *Z. marina* are larger due to the size of the plant.

L131: If I read well your file, it seems that you have at least the genus of the species, do you? I think it's worth adding it in the text instead of writing « lowest taxonomic level ».

L145: « PAR », do you mean active instead of « available »? If so, I think PPFD (according to the unit you present) may be more relevant.

Thank you, active is correct, with unit in quanta.

L153: even if you cite the paper where the whole method is described, a few sentences summarizing it would help the reader to understand what is behind it.

L157: I would rephrase the sentence starting to say « fluxes » of what.

The different fluxes (oxygen, nutrients, carbon) were not calculated using the same method so the statement is not general and we prefer to keep the sentence unchanged.

L191: add the unit « 31 PSU

Ok

L203: Fig 4 you present « Light intensity in water and you write in the caption that « For Z. noltei [...] during immersion periods », was it not the case for Z. marina?

Opposite to Z. marina, Z. noltei loggers were sometimes above water (low tide). These values were excluded. But the legend has been simplified.

L207-224: The comment here may fit also other paragraph. I'm not sure you have to start analyzing the data. You describe some variables in some sites but not all, you compare some seasons in some sites but without explaining why. I was a bit lost because I did not know to which question we tried to answer with this comparison. I guess it would maybe fit better in your other article submission in PCI. I expected something more operational to allow any users to make their own analysis as they want.

L231: Maybe Fig 5 and 6 might be built in the same way. It is personal but I prefer when the name of the y-axis and the unit are vertical near the axis rather than in the « title » of each facet.

L248-249: for me, this sentence summarizes what I tried to explain in paragraph 4.2, you have two species, 4 sites with 3 modalities and different seasons so it seems tricky to draw large tendencies without going into deeper analysis. I'm sure to know what to do with the information you give here.

L255: « induced variability » Do you have any order of magnitude?

Fig 8: y-axis of the first graph as an issue with « 05 ». Put « 2 » of « O2 » in subscript

As discussed above, we agreed that we had gone beyond our original aim of describing the data. In the new MS, we have modified the figures and only give some clues for the

reader to appropriate the data. We add a sentence to introduce the approach: L55-57 “. The author has chosen to provide a graphical representation of each dataset and a brief description in order to facilitate visualisation and appropriation of the data by readers and potential data users.”