

Replies indented in blue

Affiliation superscript 2 is repeated

Reply: Correct, the third affiliation should be 3 (Marilles), changed. Thank you for noticing

Methods

Include, in the section for stats, the analysis over time

Reply: we added a sentence to the end of the statistical analysis section “Finally, we evaluated if trends in metabolic rates over time were apparent with simple linear regressions.”

L340 specify that

Reply: “that” was part of the sentence structure “confirming that”, with the second part of the sentence the confirmation. We have clarified the sentence, it now reads: “confirming the general assumption that seagrass meadows normally tend to be autotrophic ecosystems with a mean P/R ratio above 1”

Results

All the stats for lmer are reported as contrasts of the fixed part ($t_{df} = \dots = \dots$, $p = \dots$) which is the outcome of the summary() function in the lme4 package in R. However, this does not show the significance of the fixed effect being assessed in the model, just if there are specific differences between the intercepts and the factor categories (for categorical variables such as Region, Species, Season). In most of the analysis in this manuscript the fixed factors only have 2 categories, and so, this is likely not a problem as the stats reported are already showing differences between the two categories. However, in the case of Season there are 4 categories, and when the authors report “NCP was lower in spring ($t_{df=23.89} = -3.69$, $p < 0.01$)” they are not reporting that there are differences among seasons. What they report is that spring is different from the intercept (I assume the intercept will be determined by Fall based on alphabetical order, although I am not sure what order the authors used in the code) and that the other categories are not different from the intercept.

I would recommend including the results table for the fixed factors, which can be obtained by using anova() function in R. For instance, in a model like “ $m1 = \text{lmer}(\text{metabolic rate} \sim \text{Region} + \text{Depth} + \text{Season} + (1|\text{Site}))$ ” use anova(m1) to report:

Region (DF=1, sum squares, mean squares, F-value, $p = \dots$)

Depth (as continuous) (DF=1, , sum squares, mean squares, F-value, $p = \dots$)

Season (DF=3, sum squares, mean squares, F-value, $p = \dots$)

And then use summary(m1) to report which specific categories are showing these differences, as it is already done.

I hope the following picture helps:

```

> sensors=subset(data,data$Methodology=="sensors")
> s=lmer(NCP~Region+Depth+Season+(1|Site),data=sensors)
> anova(s)
Type III Analysis of Variance Table with Satterthwaite's method
      Sum Sq Mean Sq NumDF   DenDF F value    Pr(>F)
Region  71404   71404     1    3.925  11.3725 0.0288098 *
Depth    3712    3712     1   10.293   0.5912 0.4592277
Season 197898   65966     3   25.649  10.5064 0.0001091 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
> summary(s)
Linear mixed model fit by REML. t-tests use Satterthwaite's method [lmerModLmerTest]
Formula: NCP ~ Region + Depth + Season + (1 | Site)
Data: sensors

REML criterion at convergence: 415.6

Scaled residuals:
   Min       1Q   Median       3Q      Max
-3.5728 -0.4169  0.0610  0.5374  1.6511

Random effects:
 Groups Name          Variance Std.Dev.
 Site   (Intercept)  10704    103.46
 Residual                6279     79.24
Number of obs: 40, groups: Site, 7

Fixed effects:
              Estimate Std. Error    df t value Pr(>|t|)
(Intercept)  -244.314    125.738    5.585  -1.943  0.10360
RegionWEST    408.704    121.194    3.925   3.372  0.02881 *
Depth         6.531      8.493    10.293   0.769  0.45923
SeasonSpring -302.430     82.321   20.276  -3.674  0.00148 **
SeasonSummer  -41.255     68.630   20.695  -0.601  0.55428
SeasonWinter  -21.470     89.843   27.650  -0.239  0.81289
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation of Fixed Effects:
      (Intr) RgWEST Depth  SsnSpr SsnSmm
RegionWEST -0.829
Depth      -0.183 -0.092
SeasonSprng -0.153  0.082 -0.569
SeasonSummr -0.238  0.129 -0.602  0.814
SeasonWintr -0.128  0.087 -0.536  0.651  0.736
> |

```

I am positive, based on the plots and the data in the tables that the results will be similar to what is already written, but the missing information is essential for readers to follow the process that the authors went through. If it is easier for the authors, they can add the results table from anova() and summary() in supplementary.

Reply: We thank the reviewer for this suggestion, which we have incorporated. Adding an ANOVA did not change the statistic outcome, for instance for the first test looking at differences between methods, that had only 1 fixed effect. In fact, where we reported χ^2 values before, we had compared our lmer model with a model where the fixed effect was set to the value 1 and then we ran an ANOVA on both models to obtain the significance. This was not clearly explained in the methods and the suggested solution is far more practical.

We have revised the method and the results sections accordingly and produced a summary table in the supplementary material for statistics.

Other minor issues:

Table 2:

Missing depth in Alcanada ID 21.

Reply: we thank the reviewer for noticing this detail, we have added the missing value.

Explain in the caption the difference between Yearly and Av. Year

Reply: Yearly represents average values for different years. We agree with the reviewer this is confusing as there is only 1 dataset with repetitive measurements and the range is given in the column "year". We have changed "Yearly" to "Av. Year" for consistency.

Table 3: There is an empty cell in the first column of benthic chambers - *Cymodocea nodosa* that I suspect corresponds to "Winter". Please add the missing label.

Reply: actually, we did not find data for *C. nodosa* for winter and the line behind the species name is the average of all measured values for *C. nodosa*. As we only found values for the Western Mediterranean these overall averages are the same as the average for the Western Mediterranean and the first line is equal to the second line where that is summarized. We have clarified the Table by removing this obsolete line of data but left the repeated information for the sensors in the East, where we only had one season (summer) and the overall values repeat the seasonal values.

Figure 4: write the species names in italics

Reply: we have successfully changed the code for the graphs and species names are now in italics in the figures.

L235 pH sampling information can be removed

Reply: removed

L369 replace statement "with as only factor methodology and as random effect study" with "with methodology as fixed factor and publication as random"

Reply: sentence changed according to indications

Fig S2a and S2b: Annual is missing an "n"

Reply: Thank you for noticing. Also Table S2 contained the same error. We have changed "Annual" to "Annual" in all appendix material.

L380 typo in the p-value

Reply: we have used $p < 0.01$ as well as $p < 0.001$ to indicate different confident intervals with as limit for significance $p < 0.05$.

L547 typo in "*Cymodcea nodosa*". Actually, the species name can be abbreviated

Reply: correct, abbreviated.

L560 R or CR?

Reply: CR as defined in line 76 (of the last submitted version): "Community Respiration (CR)." We have changed the mistake (R to CR).

L581. There is (again) a reference to an inexistent appendix. Please check the text carefully to avoid these types of mistakes.

Reply: This figure in the appendix has changed in numbering from A6 to S3. It is an existing Figure, however the reference to the appendix was mistaken. We have changed this reference and revised the text

L624 remove capital letters in Eddy Covariance

Reply: changed to normal font

L705 check that all species names are in italics

Reply: changed in the reference of Gacia et al., 2012, and revised the rest of the list.

Along the text sometimes the authors use the term “study” and others “publication” to describe on of the random factors. I would suggest keeping consistency in the terms

Reply: changed in two occasions to clarify and unify the text.

Along the text there is inconsistent use of acronyms. For instance, in L576 “Gross Productivity and Community Respiration” are used while GPP and CR have been already used before.

Reply: We had repeated the full wording to remind the reader of the terminology in the discussion section. As we indeed had specified the abbreviation before we have now included the abbreviations as well at first mention of the full wording in the discussion so it is absolutely clear we are referring to the same concept.