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Comment

***Interactive comment on* “Structural and functional responses of harpacticoid copepods to anoxia in the Northern Adriatic: an experimental approach” by M. De Troch et al.**

**Anonymous Referee #1**

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**General comments**

This is a very interesting study combining a field and a laboratory experiment in order to determine the effects of anoxia on meiobenthic communities. The manuscript suits well within the focus of Biogeosciences and uses novel approaches (fatty acids, stable isotopes) to answer the questions addressed. The conclusions are well supported by the results and overall the paper is well written. However, there are a few flaws in the design and the presentation of the results which need to be taken into account before the manuscript can be accepted for publication.

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## Specific comments

The main weakness of this study lies in the uneven design of the field and lab experiments, which makes the manuscript quite difficult to follow and the results at times irrelevant to the aims of the study. Differences between the two experiments include the different vertical sampling scheme, the fact that survival rates, diversity and chlorophyll was only measured in one (not always the same) experiment, different statistical tests applied (e.g. two-way vs. one-way Anova's) and so on. To overcome this situation I think the authors should try to unify the analyses and presentation of results between the two experiments by following the following simple steps:

- Leave out the vertical distribution part of the study. Many such, more carefully designed studies, exist and most of them show what you have also found, namely that the vertical depth plays a significant role in the distribution of meiofauna. Moreover, your aim, as seen in the Title, Abstract and Introduction was to investigate the short effects of anoxia and in my opinion you have done enough to support your case without the vertical distribution part (i.e. clear effects of anoxia on copepods, effects of feeding behaviour etc.). Finally, since you have only detailed vertical distribution on the field experiment this part only complicates matters (see specific comment on ANOVA interactions) and confuses the reader.
- Whenever possible do the same analyses and present the same results for both studies as this would be very helpful to assess whether the effects of anoxia are persistent in both the field and lab experiment or driven by experimental design artifacts. For example, diversity was only estimated and discussed for the field experiment. Survival rate and chlorophyll was only measured for the lab experiment. Multivariate analysis was only done for the field experiment and so on. I understand that the two experiments may not have been designed together there-

**BGD**

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fore some analyses, such as survival rate or chlorophyll, are only possible for the lab experiment, however, other analyses such as diversity and multivariate can be performed for both.

## Technical comments

1. (Page 2484, Line 14). When where the normoxic samples taken at the beginning or at the end of the experiment?
2. (Page 2486, Line 20 and Fig. 2). Figure 2 and the way the experimental design is presented is a bit confusing. Try to make a better Figure by presenting the time points linearly and sequentially and including  $T_0$  (start of the experiment).
3. (Page 2487, Line 4). Ccores should read Cores
4. (Page 2487, Line 16). Why did you use a different extraction method? This is rather strange since the cores were collected from the same area and I wonder if this had some effect on the results (see also point 12 below)
5. (Page 2490, Line 13). What were the initial H<sub>2</sub>S values?
6. (Page 2491, Lines 4-5). Did you do any post-hoc tests? Did treatment differed in all depths or only at the surface? Its difficult to see from the figure.
7. (Page 2491, Line 13). This sentence needs rephrasing as I do not understand it. You probably mean something like this: "For all these taxa there was both a treatment (anova ...) and a depth (anova ...) effect."
8. (Page 2491, Lines 15-16). This is not true and I cant' figure out any such grouping on the MDS. Both the normoxia top layers (i.e. white and light gray triangles) and

- anoxia (i.e. white and light gray circles) are far away and on both sides of the dashed line
9. (Page 2492, Lines 10-14). Something is wrong with this sentence. Please rephrase.
  10. (Page 2492, Lines 18 and 23). Try to be consistent. Sometimes you refer to the 0-1 cm layer (line 18) and sometimes to the 0-0.5, 0.5-1 cm layers (line 23). You do not have a 0-1 cm layer for the field experiment.
  11. (Page 2492, Line 26 but also throughout the manuscript). I wonder if there were any interactions with these two-way ANOVA's. You should mention this explicitly because if you had interactions then you should have taken measures against them.
  12. (Page 2493, Line 8-9). The  $T_0$  community appears to be quite different from the community of the field experiment (i.e. different families are dominant). I would like to see this discussed. Could this be an effect of the different extraction techniques used or is it a matter of temporal change after a year?
  13. (Page 2493, Line 13). I would be careful with your phrasing here as you can not say that anoxia was successful when you had (even low) evidence of oxygen presence.
  14. (Page 2493, Lines 17-end of paragraph). This paragraph is rather difficult to follow. Please try to make a Table with the Chl values including maybe also the other measured parameters.
  15. (Page 2495, Lines 3-5). Something is wrong here. First of all, from the graph it seems that normoxia increased to about 1200 and not 952 as stated in the text. Moreover, in Figure 7 legend there is a statement that the Figure consists of (A), (B) and (C) but I got only one graph (probably only the (A) part) in my pdf copy.

16. (2497, Lines 7-9). This sentence is incomplete as it misses a verb. Maybe you intended to have this sentence together with the previous one as one sentence?
17. (Page 2497, Line 26). Please rephrase. Its no wonder you found effects at lower taxonomic level only for copepods since this is the only group you looked at lower level!
18. (Page 2498, Line 1). "by see Grego..." should probably read "but see Grego..."
19. (page 2500, Line 27) The "a" in the "a for copepods" is a typo
20. (Table 1). Explain in the caption that this is only for the field experiment. However, I would also like to see the diversity values from the lab experiment. I do not understand why these were not calculated and discussed. Also, I would suggest to make the table a bit more easy to read by removing the second "Depth" column and by adding another row caption on top indicating the normoxic and anoxic part of the table.
21. (Figure 4). What are the dashed lines? Why is not MDS done for the lab experiment? The different gray symbols are difficult to distinguish. Maybe use numbers?

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