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Interactive comment on "Macrofaunal colonization across the Indian Margin oxygen minimum zone" *by* L. A. Levin et al.

Anonymous Referee #2

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General Comments: This is a novel investigation of rapid benthic settlement across OMZ gradients, with the addition of phytodetritus as an experimental treatment. The results reveal that rapid settlement of invertebrate communities is strongly impacted by OMZ hydrographic regions. The authors provide the caveat that these results are preliminary, because of the lack of experimental replications. I would agree that the results should be considered as a preliminary view into a potentially rich avenue of research. That being said, the preliminary nature of the investigation, and the lack of replication due to ship time constrains, does not negate the usefulness of the findings.

I would argue that the manuscript could be strengthened with clear language regarding the potential for future deoxygenation of the ocean interior in a future of rapid anthropogenic warming. There are a plethora of GCM (General Circulation Model) results

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that indicate ocean deoxygenation is a fundamental feature of a rapidly warming planet. Therefore, this investigation is not only relevant to modern slope community structure; it is also relevant as a window into future slope settlement processes. Couching the language used in both the introduction and conclusion in a broader conceptual and scientific framework would strengthen this contribution.

I found a couple instances where it was unclear if the OMZ features discussed were regional characteristics or ubiquitous global characteristics. I think it's important to properly nest these unique properties together, such that you can clearly state what is relevant to global OMZ ecology, and more narrowly about the North Indian Ocean ecology.

Additionally, I would take time to reformat many of the figures. I would consider the usefulness of color, rather than texture, in distinguishing fauna. I have enumerated line edits below to aid the editing process for both text and figures.

Specific Comments:

Page 9452, Line 4-6: OMZ impact on slope benthic community structure is studied in every global Eastern Boundary Current. It may be worthwhile to expand this standment to be more broadly inclusive and less regionally specific.

Page 9452, Line 9: You could clarify that these are horizontal transects, rather than vertical transects.

Page 9452, Line 15: There may not be an appropriate replacement for the term "background", i.e. source, macrofauna. However, I find this term distracting. Potentially, you could consider ambient or adjacent?

Page 9453, Line 12-15: Is this high density at the lower OMZ boundary a regional feature of your study site? If so, stipulate this community structure correlates to the unique hydrographic structure of this regions, rather than a ubiquitous OMZ feature.

Page 9454, Line 11-13: It would be appropriate to cite publications here that have doc-

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umented OMZ shoaling hydrographic data, such as Bograd et al., 2008 and McClatchie et al., 2010.

Page 9455, Line 8-11: I would partition these two hypotheses. They are important enough to stand alone, and separating the hypotheses would reflect how the data is subsequently presented and analyzed.

Page 9455, Line 20-22: This sentence needs clarification. State that these are results from colonization trials.

Page 9456, Line 5: Qualify the term unique. This would be an appropriate place to clearly state what is unique about your study and approach.

Page 9457, Line 3: The sentence starting with "The 817. . ." is unclear and could be rewritten.

Page 9465, Line 11-14: It seems more appropriate to cites these manuscripts in the introduction and conclusion, in order to provide context for the motivation behind this research, as well as context for the implications of your findings.

Page 9466, Line 16-18: This sentence is a key feature of why this manuscript is a unique contribution. I suggest emphasizing this.

Page 9466, Line 20-25: First sentence on this line requires a reference. Second sentence in unclear at to what location the statement is referring to.

Page 9472, Line 6-7: OMZ expansion onto new shelf environments will also create scenarios where colonization will occur, a process which is occurring now in the modern ocean and is predicted to dramatically increase in the near future. This should be mentioned here to give context to the relevance of this investigation.

Technical Corrections

Page 9455, Line 5: Add comma after "margin".

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Page 9466, Line 3: Extra space within density numbers

Figure 1. Zoom into the location of the transect for visual clarity, provide a subset map of the larger area. If you zoomed in close enough, could you add the locations of the background faunal collections?

Figure 2. Remove gridlines and lines around figure and key. Superscript Mˆ2.

Figure 3. Some of the points on this figure do not seem to be complete circles. Double check formatting.

Figure 4. Remove boxes around figure. Change fauna to colors rather then textures. Use the same color scheme across all figures for visual clarity.

Figure 5. Remove boxes around figure and key, change fauna to colors rather than textures.

Figure 6. Very difficult to see textures – change to colors?

Figure 7. Remove Bray Curtis text and add that to figure label. Remove stress and add to figure label, or make this text large enough to read. The point labels are very small, could these be one or two points larger?

Figure 8a. Remove boxes and gridlines. Clarify that the numbers refer to colonization trays.

Figure 8b. Use colors rather than textures

Figure 9: Remove keys from within the figure, you have plenty of space to let the figures stand-alone; this is especially important because the N-15 axis scales are not the same between figures. Make figure key text larger. Remove figure label "Colonizer Isotope Signatures", this text should go in your figure label. Reword figure label: you are showing the same data types here, with different organisms and experimental treatments. Clarify the differences between the plots.

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Interactive comment on Biogeosciences Discuss., 10, 9451, 2013.