

Interactive comment on “Vertical distribution of planktonic foraminifera in the Subtropical South Atlantic: depth hierarchy of controlling factors” by Douglas Lessa et al.

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Lessa and co-authors analyzed the planktonic foraminifera fauna in vertical plankton tows along a transect crossing the subtropical South Atlantic where a dearth of such data exists. They correlate the faunal observations to physical and chemical water column data to unearth water mass specific assemblages and environmental properties controlling species presence/abundance. In addition, they infer average living depths for the foraminifera species encountered. This study is an important contribution to our understanding of planktonic foraminifera diversity and environmental conditions controlling their presence and abundance in different regions of the world oceans.

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The paper is well written and well-structured and I do not have any major comments. My comments -listed below- just point out small improvements. There are a few grammatical issues in the listed that I marked in the uploaded pdf file. Many of them occur in the Appendix with the species description. One important correction is in the first paragraph of the Conclusions: it needs to say "assess" instead of "access".

Specific comments: 1) Figure call-outs/ order of Figures: a) Figure 4 (p. 4, line 28; p. 5, line 30) before Figure 3 (p. 5, line 51). b) Figure 6 is only referred to in the discussion (p. 9, line 21) and thus after all the others.

2) For the reader it would be helpful if the Results would have sub-headers, i.e. the lengthily text gets subdivided.

3) relationship between pH values and planktonic foraminifera: this relationship or better said the indirect relationship that you infer between organic carbon degradation, microbial respiration and pH needs more explanation and references supporting this. In general, I am missing a text "justifying" why including pH in the CCA makes scientific sense (and is not just done because the parameter was measured).

4) p. 2 lines 26-27: it would be helpful (for future studies), if you could specify which are the relevant environmental parameters and depth ranges a study should cover.

5) p. 3 1st paragraph: please provide details on the CTD manufacturer (Seabird??) and the sensors used to measure oxygen, chlorophyll a and pH. Identifying the particular sensor is also relevant information for the data uploaded to Pangea, so that other uses (or oceanographic databases like GLODAP) can judge the quality of the data.

6) p. 3 lines 28 and following: include here references to the appendix and the plates. The same could be done in the first paragraph of the Results.

7) p. 5 line 7: you are not delimitating water mass boundaries, but the mixed layer and the permanent thermocline.

8) p. 5 line 10: DO anomaly: mention here why you calculated it and how (just mention

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the "how" in the figure caption is not enough).

9) p. 5 line 12: I would point out that station 202 is in the Benguela upwelling, i.e. make it easier for the reader.

10) p. 6 line 1: List the names of the cold water species and specify if you mean the adult or total fauna. I have trouble following your argument/ seeing this in Fig. 3b.

11) p. 6 line 15: refer to Fig. 4 at the end of the paragraph.

12) p. 6 last paragraph: please refer to Cluster numbers for the different oceanographic provinces/faunas. Relating Table 3 to Figure 7 is not easy. I would also recommend to provide the province/fauna information together with the cluster number in Table 3, especially as subsequent cluster numbers do not necessary refer to the same province/fauna.

13) p. 6 line 52: it would be good if you sometimes specified again that you mean the permanent thermocline when you write thermocline.

14) p. 7 line 15: correct/complete the Morey references. In line 17, can you provide a reference for the influence of temperature on respiration and growth rates?

15) p. 7 line 49: specify here (or earlier; see comment 3) how respiration contributes to pH and in which direction the change is – does higher respiration cause a lower pH?

16) I would have liked to see in the manuscript short comments on/references to:
a) how does the Agulhas leakage fauna you identify compare to the one defined by Peeters et al. (2004; Science) or seen in the Loncaric (2006) paper you are citing?
b) may be highlighting that your Benguela upwelling fauna includes few *G. bulloides*, the species most often associated with upwelling.
c) can you specify/distinguish if the shape of (some of) your *G. truncatulinoides* specimens agrees with the shape of sp. 3 (or others) defined by de Vargas et al., 2001. Pleistocene adaptive radiation in *Globorotalia truncatulinoides*: genetic, morphologic, and environmental evidence. *Paleobiology* 27, 104-125. It looks to me as if the specimens depicted in the plate

could belong to sp. 3. However, the presence of right coiling specimens in your samples would point to the presence of sp. 2 as well. You could mention that in your species description in the appendix.

Please also note the supplement to this comment:

<https://www.biogeosciences-discuss.net/bg-2019-355/bg-2019-355-RC1-supplement.pdf>

Interactive comment on Biogeosciences Discuss., <https://doi.org/10.5194/bg-2019-355>, 2019.

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