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Biogeosciences Discussions

Interactive comment on "Sediment core fossils in ancient Lake Ohrid: testing for faunal change in molluscs since the Last Interglacial period" *by* C. Albrecht et al.

C. Albrecht et al.

christian.albrecht@allzool.bio.uni-giessen.de

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We highly appreciate the comments of Frank Wesselingh and take his comments as compliment for our work. Following his suggestion, here are our replies.

(1) We completely agree with the referee and acknowledge that the question of long-term stability vs. rapid changes as ultimate cause for diversification events is among the most intensively discussed issues in ancient lake research. Therefore we expand on this topic in our revised MS. It is, however, extremely difficult to discuss the issue of stability of Lake Ohrid as compared to other ancient lake systems. The upcoming deep drilling program will hopefully shed more light particular on this issue.

(2) Using this arbitrary and flexible threshold, we may introduce only a systematic error for all species. Moreover, difference in shell thickness between species results in a different degree of shell degradation. Whereas unambiguous determination of some species is possible based on partial shell outline, other species require other characters. Thus, we think that our flexible concept accounts for these differences. Bivalve valves and valve fragments were counted as half, but do not seem to affect the estimated abundances in core Co1200. Rare species would still be rare and the highly abundant Dreissena presbensis would also not change in frequency, because it exceeds the threshold of 50 specimens by far. We will change the MS accordingly.

(3) Ordination techniques like non-metric multidimensional scaling (NMDS) or detrended correspondence analysis (DCA) are often used for explorative data analysis and hypothesis finding. After preliminary explorative analyses, we applied a one-factorial PERMANOVA which was able to test our hypothesis of variable similarities of the gastropod thanatocoenosis with the three different depth layers of Lake Ohrid. However, we followed the suggestion of Frank Wesselingh and performed a NMDS, because of its robustness as compared to other ordination methods. In order to estimate a possibly depth range, we apply a posteriori vector fitting to the ordination result. The vector fitting algorithm of the R package vegan (Oksanen et al., 2010) is able to handle missing data of the fossil gastropod assemblage, thus, giving an estimation of depth range and depth layer. The three-dimensional NMDS had a stress value of 15.4. According to vector fitting, the thanatoecoenosis is well nested within the ellipse with one standard deviation of the Intermediate Layer and the depth estimation equals 10 m. We will modify Fig. 4 in the MS and introduce a Fig. 4b showing the results of the abovementioned NMDS.

(4) We will add MIS 5e to the text where we use "Last Interglacial Period". However, since our depth estimate from ESR dating is somewhat imprecise we prefer to use "Last Interglacial Period" which is not as precisely defined as marine oxygen isotope stages with respect to its duration. (5) We are aware of the limitations of this method,

because most of the species have a frequent recent occurrence in Lake Ohrid (Tab. 1) with a variable depth range (Fig. 5). Thus, we only present conservative depth estimations. But NMDS and subsequent vector fitting also suggested the occurrence of the thanatocoenosis in the upper part of the Intermediate Layer. We will modify the figure also clarify the boundaries between different depth layers in Fig. 5.

Christian Albrecht on behalf of the authors

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