

Interactive comment on “Calibration of $\delta^{18}\text{O}$ of laboratory-cultured deep-sea benthic foraminiferal shells in function of temperature” by C. Barras et al.

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The authors are grateful for all the constructive comments made by the referees that greatly contributed to improve the manuscript. Each of their comments was address separately.

[Comment] - Introduction, page 337, line 6: you mention a microhabitat effect for $\delta^{18}\text{O}$, referring to McCorkle et al. (1997). I am not aware of a significant microhabitat effect in the $\delta^{18}\text{O}$ signal of benthic foraminifers. If temperature and salinity remain more or less constant in the upper few centimeters of the surface sediment, how can the microhabitat affect the $\delta^{18}\text{O}$ signal of infaunal taxa? Are you referring to a carbonate

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ion effect? [Answer] The reviewer is right, we were referring to the carbonate ion effect that is changing depending on the depth in sediment (foraminiferal microhabitat). We removed our mention of microhabitat effect for $\delta^{18}\text{O}$ since it is already included in the carbonate ion effect.

[Comment] - Material and methods, page 340, lines 3-5: The choice of linear or quadratic equations should be addressed in a few sentences (in addition to referring to Bemis et al., 1998) [Answer] An explanation of the choice of linear equations has been added in the text (last paragraph of part 2.2).

[Comment] - Results and discussion, page 342, lines 2-10 and Figure 2: the presented $\delta^{18}\text{O}$ data versus shell size indicate a more or less linear ontogenetic trend, that is similarly expressed at different culture temperatures. Although the data are convincing, I wonder why *B. marginata* does not show an asymptotic approach to a specific isotopic composition as observed in other studies (Schmiedl et al., 2004, McCorkle et al., 2008). Are you sure that your *B. marginata* specimens reached the maximum adult size or were they still growing at the termination of experiments? When comparing the observed ontogenetic slopes of *B. marginata* and *Uvigerina mediterranea*, you should consider that the average size of adult *B. marginata* is considerably smaller than that of adult *U. mediterranea*. Therefore, metabolism may have slowed down in adult *B. marginata* at test sizes similar to juvenile *U. mediterranea* with still maximum metabolic rates. It would be nice to have the discussion on this issue a bit more extended in the revised version of the manuscript. You may also address the potential reasons for the presence and species-specific expression of ontogenetic effects. Do you think that addition of food changes metabolic rates? If so, inter-specific differences in feeding strategy may result in characteristic ontogenetic isotopic trends. [Answer] It is important to note that the dataset of size vs $\delta^{18}\text{O}$ of *B. marginata* have been fitted to a linear regression (as it is presented in Figure 2) but logarithmic regression leads to equally good determination coefficient. We think that *Bulimina marginata* actually didn't reach an adult size at the end of the experiments (either they did not finish to grow or they

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died before attaining an adult stage) since adult specimens in natural environments measure around 600 μm . We think that this can explain why we do not observe an asymptotic value around which the larger specimens cluster. We think that at present, too few data are available to speculate about eventual interspecific differences in the relationship between isotopic composition and growth stage. We agree with the reviewer that the addition of food may cause higher metabolic rates. However, such food additions can not explain the differences in $\delta^{18}\text{O}$ between the different size classes in our study.

[Comment] - The raw data ($\delta^{18}\text{O}$ values, culture environmental data) of this study should be provided as an electronic supplement to this paper. As an alternative, data could be also made available through an internationally accessible data base. [Answer] We combined in a table the $\delta^{18}\text{O}$ data of foraminiferal calcite according to the different size fractions as well as the number of shell produced and the averages of physico-chemical parameters controlled for each temperature experiment.

[Comment] - page 338, line 4: replace "adults" by "adult" [Answer] The text has been changed.

[Comment] - page 339, line 18: you mention "spectrometers". Did you use different spectrometers? If not please write "spectrometer" [Answer] We actually used 2 different spectrometers.

[Comment] - page 339 line 21: replace "were" by "was" or write "Seawater $\delta^{18}\text{O}$ ($\delta^{18}\text{O}_w$) values were. . ." [Answer] The text has been changed.

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