Biogeosciences Discuss., 7, C15–C17, 2010
www.biogeosciences-discuss.net/7/C15/2010/

Biogeosciences Discussions

Interactive comment on "Calibration of δ^{18}O of laboratory-cultured deep-sea benthic foraminiferal shells in function of temperature" *by* C. Barras et al.

G. Schmiedl (Referee)

gerhard.schmiedl@uni-hamburg.de

Received and published: 1 February 2010

Dear Editor,

the authors present the oxygen isotope composition of benthic foraminiferal shells (Bulimina marginata) that calcified under controlled laboratory conditions over a large temperature difference. The new results confirm previous results from in situ (field) observations of living deep-sea foraminifers, validating the use of stable oxygen isotope curves for temperature reconstructions in paleoceanographic studies. The manuscript is well organized and concisely written. The number of data points is relatively low, particularly for the larger test sizes (>200 μm). Nevertheless, I don't think that this weakens

the conclusions of this study. Providing the fact of successful reproduction and growth of B. marginata in culture, I am looking forward to see the results of forthcoming studies that may also include other geochemical measurements (trace elements, δ13C), based on a much higher number of tests and various experimental setups. The manuscript may profit from a few minor changes prior to publication. Below, I am summarizing my specific and technical comments:

Specific comments

- Introduction, page 337, line 6: you mention a microhabitat effect for δ18O, referring to McCorkle et al. (1997). I am not aware of a significant microhabitat effect in the δ18O 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 δ18O signal of infaunal taxa? Are you referring to a carbonate ion effect?

- 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)

- Results and discussion, page 342, lines 2-10 and Figure 2: the presented δ18O data versus shell size indicate a more or less linear onthogenetic 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 onthogenetic 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 iuvenile 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 onthogenetic effects. Do you think that addition of food changes metabolic rates? If so, inter-specific differences in feeding strategy may result in characteristic onthogenetic isotopic trends.

- The raw data (δ18O 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.

Technical comments

- page 338, line 4: replace “adults” by “adult” - page 339, line 18: you mention “spectrometers”. Did you use different spectrometers? If not please write “spectrometer” - page 339 line 21: replace “were” by “was” or write “Seawater δ18O (δ18Ow) values were. . ..”

I hope that my comments will be useful in the discussion and revision process of the manuscript and I am looking forward to seeing this manuscript published in Biogeosciences.

Interactive comment on Biogeosciences Discuss., 7, 335, 2010.