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## ***Interactive comment on “A culture-based calibration of benthic foraminiferal paleotemperature proxies: $\delta^{18}\text{O}$ and Mg/Ca results” by H. L. Filipsson et al.***

**G. Schmiedl (Referee)**

gerhard.schmiedl@uni-hamburg.de

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Dear Editor,

the authors present an extensive data set on the stable oxygen isotope and Mg/Ca composition of benthic foraminiferal test carbonate added under controlled laboratory conditions, at different temperatures and otherwise more or less constant conditions. Similar to the study of Barras et al. (2010), *B. aculeata* and *B. marginata* were most successful in adding chambers and reproducing in the laboratory. The manuscript is well organized and written in a concise and straightforward way. Chapter 2 contains an elaborate and extensive description of the laboratory methodology. The data are

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critically discussed, providing an important contribution to the ongoing discussion of the significance and applicability of  $\delta^{18}\text{O}$  and Mg/Ca in paleoceanographic studies. I think that the manuscript can be published after only minor revision. My comments and suggestions are listed below:

#### Specific comments

- Introduction, page 352, lines 15-26: you should add a few selected references of important studies here. - Methods, page 354, last paragraph: why do you not refer to *Uvigerina* and *Cibicidoides* on the species level? Although these genera do not play a significant role in your study, stable isotope measurements on tests collected during field studies show significant inter-specific variability. - Methods, page 356, lines 21-26: while the culturing procedures and Mg/Ca measurements are extensively described, you refer to an internet source concerning the precision of the mass spectrometer used for the stable oxygen isotope measurements. At least the precision of the used instrument should be provided in the manuscript.
- Results, page 359, lines 8-9: why are you assuming that most calcification occurred in the final months of the experiment (referring to the study of McCorkle et al., 2008)? Since the timing of calcification is important in the interpretation of results, you should shortly summarize the reasons for your assumption.
- Discussion, page 363, lines 4-14 and Figure 4: Your data reveal a clear ontogenetic trend in the  $\delta^{18}\text{O}$  of *B. aculeata* / *B. marginata*. The larger tests seem to exhibit more scattering at higher culturing temperatures. At 7°C culturing temperature, this taxon reveals a linear ontogenetic trend. Similar results have been obtained by the study of Barras et al. (2010). I cannot see an asymptotic approach to a maximum isotope composition in *B. aculeata* / *B. marginata* as reported in previous studies and for other taxa (Schmiedl et al., 2004; McCorkle et al., 2008). I recommend addressing this difference (and the potential reasons for it) in the discussion chapter in a bit more detail. - Discussion, page 366, lines 1-5: Are there any observations on ontogenetic

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effects in the Mg/Ca values of cultured planktonic foraminifers that could support your interpretation? If so, you may add this here.

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#### Technical comments

- page 357, lines 9-12: I would write this text in two sentences. - page 360, line 6: it should read “barleeanum” instead of “barleanum” - Figures 5 and 8 could be easily combined in order to avoid duplication. - Table 2. You should add standard deviations for average water chemistry parameters given.

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.

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Interactive comment on Biogeosciences Discuss., 7, 351, 2010.

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