Biogeosciences Discuss., 11, C1192–C1194, 2014
www.biogeosciences-discuss.net/11/C1192/2014/

Biogeosciences
Discussions
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Interactive comment on "Experimental evidence for foraminiferal calcification under anoxia" *by* M. P. Nardelli et al.

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Received and published: 21 April 2014

The authors have maintained three benthic foraminiferal species under anoxic environments what are reconstructed in Laboratory for 60 days long. Their major achievements are; 1. chamber formation (calcification) are identified under anoxic condition; 2. the energy sauce should be not denitrification because the lack of nitrate in interstitial water.

The experimental designs are clearly described to reproduce the result. The applied methods are enough appropriate to realize their purpose by the scientifically right participants. Then, I basically agree the indicated results and authors' conclusion.

I have some questions and comments. I hope these considerations are valuable to

improve this work.

The calcification and dissolution of calcium carbonate can be expected by calcite saturation state (Ω). I try to calculate Ω by CO2SYS program (Lewis and Wallace, 1998). According to Figs. 3, 4, A1 and A2, factors are assumed as T=17°C, Sal=35, pH=6.2, Alk=10000μM for experiment 1 and factors are assumed as T=12°C, Sal=35, pH=7.5, Alk=5500μM. Ω of experiment 1 was much lower than 1 (0.2) meanwhile Ω of experiment 2 shows more than 2. It means calcite including fossils and newly calcified foraminifera chamber tend to be dissolved in the environment of experiment 1. Even it is not so strange that foraminifera can calcify their test under unsaturated condition for calcite, calcified crystal should be affected by the environment. According to Fig. 2, the test seems thinner than other older chambers. I wonder the preservation of test and surface textures of them. Further, the vertical pH profile are not measured below 3 cm in experiment 1. Though we can not estimate the Ω, some specimen must add chambers. Some SEM photos may support to evaluate the effect of the lower pH environment. I am very interested the surface structures of the test what is precipitated under anoxic period.

In terms of growth rate, one to two chamber for 60 days would be slower. The oxygen concentration may not affect the metabolism of *A. tepida* according to the author. Perhaps culture temperature (16.5-20°C) might not so bad temperature for their growth (Bradshaw, 1957). I can guess the specimens were already matured size from the beginning/The food materials are not enough for them. Do you have some consideration about the reason of slow growth?

The other hand, this 12°C will be higher than temperature of in-situ environment of *Bulimina* and *Cassidulina*. Is there some reason about it?

Could you find any changes of sediment (e.g. color, smell and others)?

>Our observations of calcification under anoxia and in different redox conditions may 20 also have important consequences for paleo-proxy interpretations, especially in set-

tings with intermittent anoxia.

Could you tell some morphological and/or geochemical features of newly added chamber under anoxic condition? The information must be useful for vast of users of proxy interpretations.

small questions

The legend might be uniformed between Fig A1 and A2. Even I understand the idea of δpH, what was the actual pH of top water?

Lewis, E., and D. W. R. Wallace. 1998. Program Developed for CO2 System Calculations. ORNL/CDIAC-105. Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tennessee. Bradshaw, J. 1957. Laboratory studies on the rate of growth of the foraminifer, "*Streblus beccarii* (Linné) var. *tepida* (Cushman)". *J. Paleontology*, 31, 1138-1147.

Interactive comment on Biogeosciences Discuss., 11, 4669, 2014.