Biogeosciences Discuss., 12, C5085–C5087, 2015
www.biogeosciences-discuss.net/12/C5085/2015/

Biogeosciences Discussions Open Access

Interactive comment on "Technical Note: Towards resolving in situ, centimeter-scale location and timing of biomineralization in calcareous meiobenthos – the Calcein-Osmotic pump method" *by* J. M. Bernhard et al.

J. M. Bernhard et al.

jbernhard@whoi.edu

Received and published: 8 September 2015

We thank Dr. de Nooijer for his comments and generally positive assessment. We would be pleased to include a short addition to our manuscript discussing how researchers could go about determining their particular diffusion gradients (i.e., he wrote "include in the discussion the necessity to control the diffusion gradient on a scale that is relevant. . ."). If required, we would add a paragraph something like the following, probably between lines 8 and 9 on page 9455 (or we would rewrite and expand the paragraph currently on page 9455 lines 4-8):

The radius of calcein dispersion into sediments will depend on all sediment properties as well as the presence / absence and activities of bioturbators. Diffusion coefficients can be measured directly in sediments (e.g., Jorgensen 1979 Geomicrobiol J) or they can be estimated from the sediment's formation resistivity factor, which can be estimated from sediment porosity and other sedimentary characteristics (e.g., Ulmann and Aller 1981 L&O).

Responses to Minor Comments:

We corrected the improperly cited 2014 paper (it was indeed intended to be the Earth-Science Review).

Regarding page 9450 lines 7-10, we are not entirely clear what Dr. de Nooijer is asking because our point was to remove the osmopump so that the clams would grow additional calcite that was not fluorescent. However, in an attempt to explain, we note that visual inspection of an osmopump does not allow confident assessment of contents. To check if an osmopump continues to dispense calcein, it can be placed overnight, for example, in a clean beaker of seawater. The next day, an aliquot of the water can be analyzed in a spectrophotometer using the appropriate excitation wavelengths. We did such tests early in our investigations to establish accuracy of our calculated estimated dispensation times; results indicated our calculations were adequate (i.e., at our temperature and salinity, the pumps lasted as we expected). We did not include this information in the manuscript, but we could do so if necessary. If a short passage were added, it would likely be inserted on page 9455 between the two sentences on line 10 or, potentially, in the Methods.

Not being bivalve biomineralization experts, we do not know why there are a few thin lines of the shell that do not fluoresce as brightly as adjacent materials in Figs 2B, D. These lines appear to correspond to the thicker ridges. We might surmise that there are more organics in those thick ridges of the shells. The organics may act to mask or "dilute" the fluorescence. We feel this issue is beyond the scope of this short Technical

BGD
12, C5085–C5087, 2015

Note.

Interactive comment on Biogeosciences Discuss., 12, 9443, 2015.