Biogeosciences Discuss., 12, C4675–C4676, 2015
www.biogeosciences-discuss.net/12/C4675/2015/

Biogeosciences Discussions
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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.

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Received and published: 25 August 2015

Dear Editor,

The novel method presented by Bernhard and co-authors as described in their Technical Note may well prove to be a new tool to determine the in-sediment calcification depth of (amongst others) benthic foraminifera. As the authors explain, this is necessary to refine carbonate-based proxies, especially those for redox-conditions, since availability of elements (and hence their incorporation) varies with sediment depth. As

noted by the other reviewer too, the relation between calcein concentration (higher closer to the dispenser's port) and intensity of foraminiferal/ bivalve fluorescence was not determined and therefore prevents proving whether bivalves and foraminifera not showing any fluorescence were located too far away from the pump's opening. Since the vertical and lateral extent of the calcein diffusion into the sediment was not directly measured, I wonder how this technique can be applied to determine the (average) living depth of foraminiferal species/ specimens (as suggested in section 3.3). To do this, the diffusion gradient of the released calcein should be sharp enough to label forams (e.g.) in the top cm, but not those living below the top cm, or vice versa. This makes that the calcein-diffusion gradient should be under (some) control by those applying this technique in the future. I think the authors should include in their discussion the necessity to control the diffusion gradient on a scale that is relevant in determining in-sediment living depths.

Sincerely,

Lennart de Nooijer

Minor comments: The reference to my 2014-paper (page 9446, line 10), is probably meant to be that in Earth-Sci Rev, and not that in MarMic.

Page 9450, lines 7-10: were the osmotic pumps inspected and checked whether they were (almost) empty? The time to empty for these pumps may be different in the setup employed here than they were originally designed for.

It might be beyond the scope of this paper, but why is not all newly formed shell from the quahogs stained equally brightly? Is the calcein not incorporated in the thin bands that are not fluorescent (fig 2B and D) or is there something present in these layers that 'shades' the fluorescence?

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