

Interactive comment on “Manganese incorporation in living (stained) benthic foraminiferal shells: A bathymetric and in-sediment study in the Gulf of Lions (NW Mediterranean)” by Shauna Ní Fhlaithearta et al.

Anonymous Referee #1

Received and published: 2 April 2018

This study looks at the potential for the Mn/Ca of benthic foraminiferal calcite to act as a proxy for pore water oxygenation and labile organic matter. In order to do this, the authors have measured the pore water chemistry as well as the Mn/Ca geochemistry of 4 species of benthic foraminifera from a depth transect of cores in the Mediterranean. Analysis focuses on the living foraminifera recovered from the upper 10 cm of each of these core sites. Ni Fhlaithearta et al., find that the Mn/Ca of benthic foraminifera reflects the pore water environment from which they calcified and the flux of organic material to the site. However, the amount of incorporation and variability in Mn/Ca

C1

incorporation is governed by species specific KD as well as ecological and depth preferences in addition to environmentally controlled pore-water conditions.

Overarching comments/questions: The authors analyzed select foraminifera species from specific core depths, however much of the article relies on speculation and inferences from existing literature as to the calcification or habitat depth of these same species. This is clearly extremely relevant to the interpretation of any pore water proxy. Is there a reason that species abundances with depth (at least for the relevant species) has not been included here? It would seem that inclusion of this could clarify some questions of habitat preference, and the degree to which this varies between sites.

It seems to me that the greatest barrier to application of these results to the fossil record is the issue of preservation. The authors discuss this clearly. However, I wonder if the research could not be even more impactful with a statement as to how this could be circumvented (at least in some environments). For example, did the authors undertake any comparative analyses of non-living and potentially altered specimens from the same cores? Could Mn-rich coatings be identified using the same LA techniques applied here to living foraminifera?

27 – and 52-53 – “surface and bottom water” – consider rephrasing surface (pelagic or near-surface?), as most planktic foraminifera do not actually reflect surface conditions
262 – What was the detection limit and how was it established?
367 – peregrina
407 – what is the p value? If the correlation is not significant, is it still meaningful? Also for Fig. 7, can you include the p values?
412-413- where was *U. peregrina* actually found in these sample? In relation to *U. mediterranea*?

Interactive comment on Biogeosciences Discuss., <https://doi.org/10.5194/bg-2018-42>, 2018.

C2