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Comment

Interactive comment on “Copper incorporation in foraminiferal calcite: results from culturing experiments” by L. J. de Nooijer et al.

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This paper reports partitioning data for Cu in benthic foraminifera and as Cu incorporation in foraminiferal calcite has not received significant attention since 1981 (Boyle, 1981, Earth Planet. Sci. Let. 53, 11-35) this paper is a valuable contribution worthy of publication.

There is one main point to be considered when interpreting the data presented in this paper. The authors analyse the Cu/Ca ratio of calcite chambers which have incorporated calcein (visible by fluorescence) and it should be noted that this could influence Cu incorporation and the LA-ICP-MS measurements. Previous workers utilising calcein, label shells directly before culturing, then culture the benthic foraminifera in a calcein free solution, and only analyse the calcein free calcite (Hintz et al., 2006, Geochim.

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Cosmochim. Acta 70, 1952-1963). Although Hintz et al. 2004 (Limnol. Oceanogr.: Methods 2, 160-170) report "...initial measurements of minor-element:calcium ratios (Mg/Ca, Sr/Ca) in calcein-labeled field-collected specimens do not indicate variation in the expected-element:calcium ratios..." such data remains unpublished and it is unclear if only calcein labelled calcite was analysed. The potential impact of calcein incorporation on trace element partitioning remains uncertain and this should be considered when interpreting the data of de Nooijer and others. Additionally, by analysing the calcein labelled calcite it is unclear if they are analysing 'pure' calcium carbonate and the assumption of constant Ca concentration made for internal standardisation of the LA-ICP-MS signals may not hold true.

Minor points:

Segev and Erez 2006 (Geochem. Geophys. Geosyst. 7, Q02P09, doi:10.1029/2005GC000969) reports the influence of seawater Mg/Ca and biomineralization on benthic foram shell Mg/Ca but not temperature, salinity or pH.

Cu (in a form benthic forams could incorporate) is not likely to be transported from hydrothermal vents as it is removed from hydrothermal plumes with iron as polymetallic sulphides (e.g. German and Von Damm, 2003, Chapter 7 In The Oceans and Marine Geochemistry (ed. H. Elderfield), Vol. 6 Treatise on Geochemistry, Elsevier-Pergamon, Oxford).

Mason and Kraan 2002 (J. Anal. At. Spectrom. 17, 858-867) do not report Cu data for the non-matrix-matched calibration of a carbonate standard reference material.

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