Robustness of marine biomineral clumped isotope thermometry

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Introduction

Estimates of ocean temperatures based on clumped isotopes of marine biominerals can be biased by unidentified vital efects. Growh rate-related offsets are a possible type of vital effect in brachiopods [1]. However the extent to which such biological influence occurs across the structural and chemical diversity of marine bimoinerals is not well understood. This work analyses clumped stable isotopes of a selcted suit of 11 different marine biminerals from 5 modern species, belonging to 3 phyla and reports related temperature estimates.

Results and Discussion

Despite structural differences, biominerals of the same species do not differ in clumped isototopes. For bivalve species clumped isotopes were in good agreement with water temperature (Fig. 1). The reliability of brachiopods depends on the species, with non-growth related vital effects causing offsets in the brachiopod *T. retusa*. The studied coralline algae *L. glaciale* also showed offset temperature reconstruction, likely due to calcification at the boundary layer (Fig. 1).

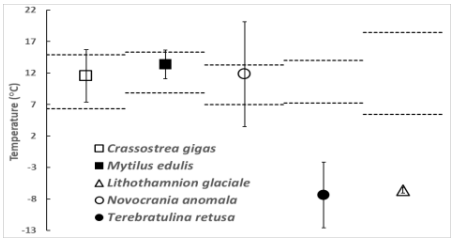

Figure 1. Calcification temperatures from clumped isotope values (Δ_{47}) of selected biominerals (averages per species). Horizontal lines are environmental temperature boundaries.

[1] Bajnai (2018) Sci. Rep. 8: 533.