

Interactive comment on “A universal carbonate ion effect on stable oxygen isotope ratios in unicellular planktonic calcifying organisms” by P. Ziveri et al.

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The study focuses to evaluate the effect of carbonate ion concentration on the stable isotopic composition of oxygen by laboratory culture experiments and simple model simulations. Their suggested model tries to describe $\delta^{18}\text{O}$ fractionation among ambient water, calcification vesicle and CaCO_3 product.

During this decade, even laboratory culture approach become popular, still we can know only the empirical relationship of geochemical proxies. Much fundamental mechanism should be understood for constitutional understanding of the geochemical fingerprints. However the biological processes are complex, I believe the model approach like

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this study is alternative possibility.

I describe individual questions below.

P3L6: I think some explanations are necessary about difference of calcification mechanism among coccolithophores, dinoflagellates and planktonic foraminifers. Can the difference of calcification be counted to explain the variable f and slope of $\delta^{18}\text{O}/[\text{CO}_3^{2-}]$ (around P8L26)?

P4L6: Kurihara et al. (2008MEPS 373, 275-584) reports that biological reactions against pH variation are difference between CO_2 method and HCl method. Some biological consideration about two way of CO_3^{2-} variation of this study will be mentioned.

P9L10: How do *T. heimii* organism maintain low salinity in the vesicle? I think water shall soak into the low salinity vesicle by osmosis.

Mg/Ca influence: The magnesium contents are variable among the species. Even magnesium is also working as calcification inhibitor, there are no consideration about magnesium effect on calcification process. Will the effect of Mg be appeared on relation between carbonate ion and $\delta^{18}\text{O}$? How much is Mg/Ca range of *T. heimii*?

Small points. Only "3. EXPERIMENTAL RESULTS AND DISCUSSION" seems bit long as one section. Some division of section 3 can be entitled for easy reading. Fig. 1: Labels of x-axis, y-axis are necessary. Fig. 2: I think "coccolith vesicle (V)" will be changed to "calcification vesicle (V)" in schematic figure if the figure can be applied on both *C. leptoporus* and *T. heimii*. The accuracy of temperature will be indicated. Are the flasks situated in some incubators?

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