

# ***Interactive comment on “Reconsidering the role of carbonate ion concentration in calcification by marine organisms” by L. T. Bach***

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I would like to thank Lennart de Nooijer for his comment concerning the importance of CO<sub>2</sub> as inorganic carbon substrate for calcification in some taxa. His thoughts are considered in the revised version of the manuscript.

I changed the headline of section 3.6.5 from “Inorganic carbon from respiratory sources” to “CO<sub>2</sub> as inorganic carbon source for calcification”. The section itself was expanded and addresses Lennart’s comments. I wrote:

“Some organisms receive significant amounts of inorganic carbon used for calcification from respiratory sources (Erez, 1978; Furla et al., 2000; Pearse, 1970; Sikes et al., 1981; Tanaka et al., 1986). Here, organisms do not exclusively rely on direct inorganic

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carbon utilization from seawater but supplement calcification to a variable degree with CO<sub>2</sub> gained intracellularly from respired biomass. This CO<sub>2</sub> utilization may be further strengthened (1) when metabolic CO<sub>2</sub> is ‘trapped’ inside the organisms through the establishment of pH gradients which limit the diffusive loss of CO<sub>2</sub> passively (Bentov et al., 2009; Glas et al., 2012) or (2) when CO<sub>2</sub> is transported actively towards the site of calcification (de Nooijer et al., 2014). CO<sub>2</sub> which can subsequently react with H<sub>2</sub>O to form HCO<sub>3</sub><sup>-</sup> and H<sup>+</sup> (catalyzed by the enzyme carbonic anhydrase) could therefore be an alternative inorganic carbon source for calcification in particular taxa. Thus, the potential control of seawater [HCO<sub>3</sub><sup>-</sup>]/[H<sup>+</sup>] on calcification may be weakened by the degree to which calcifiers utilize CO<sub>2</sub> as inorganic carbon source.”

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