

Interactive comment on “Calcification in a marginal sea ndash; influence of seawater [Ca²⁺] and carbonate chemistry on bivalve shell formation” by Jörn Thomsen et al.

Anonymous Referee #1

Received and published: 8 November 2017

This manuscript deals with the effects of concentrations of calcium and dissolved inorganic carbon species on early shell developments in the mussels. The formation of the prodissoconch I are considered in terms of environmental conditions and, importantly in the context of ontogeny. The strength of the manuscript is a precise experimental design, that it deals with this biological process in detail in the environmental, onogenetic and genetic contexts, providing important insight for ocean acidification. The authors present detailed discussion on this phenomenon by way of the chemistry of calcification space indicating thresholds of the calcification responses to carbonate undersaturation. Thomsen et al. provide important data, serving to motivate more detailed future experiments/monitoring studies.

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Some points: The critical $[Ca^{2+}]$ and saturation thresholds are well characterized from the larval shell length. Is shell morphology likely to relate to tolerance to lowered $[Ca^{2+}]$ and DIC in prodossoconch I? Please provide the relationship between environmental factors, the number and the presence of abnormal individuals.

Line 70: Is there any similar environmental influence on the formation of prodossoconch II? Please provide some information.

The variation of seawater Mg/Ca are also known to have influence on marine biological calcification. Please discuss about the potential impact of varying seawater $[Mg^{2+}]/[Ca^{2+}]$ of this experiments on bivalve shell formation. Suggested reading: Ries, J.B. (2010) Review: geological and experimental evidence for secular variation in seawater Mg/Ca (calcite-aragonite seas) and its effects on marine biological calcification, *Biogeosciences*, 7, 2795–2849.

Upper- and lower-cases in captions and figures should be unified (e.g., 2A, 2a)

Interactive comment on *Biogeosciences Discuss.*, <https://doi.org/10.5194/bg-2017-342>, 2017.

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