

Interactive comment on “Key Arctic pelagic mollusc (*Limacina helicina*) threatened by ocean acidification” by S. Comeau et al.

Anonymous Referee #1

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This manuscript reports on a study that investigates the affect of different pH and aragonite saturation levels on the calcification rates of the Arctic pteropod *Limacina helicina*. The study uses two methods to do this, Calcein staining and the uptake of the radioisotope ^{45}Ca . The latter was first employed by Fabry 1990 (Journal of Marine Research 48:209-222). Using ^{45}Ca the study identified a 28% decrease in calcification rates of *L. helicina* at pH values predicted for 2100, although a positive calcification rate was maintained. Calcein staining provided qualitative evidence to support the observations from ^{45}Ca uptake. Pteropods are key components of many marine ecosystems, and having aragonite shells they may be strongly impacted by ocean acidification. However, experimental studies to quantify aspects of their biology (e.g. feeding rates) as well as their response to decreasing ocean pH, have proved to be extremely difficult to perform due the difficulty in maintaining live populations under laboratory conditions.

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The application of ^{45}Ca by the authors of this study to investigate calcification rates provides a valuable tool, particularly as it can be effectively employed over short time intervals (6 hours in this study), and the animals are therefore subject to lab conditions for only short periods of time. The second method, that of Calcein staining, is difficult to assess the way the data are currently presented (Figure 2). Although Calcein staining, based on the author description of a darker portion of the shell, is apparent in Figure 2c, it is not obvious in Figure 2b. Where does staining start and end in Figure 2b? This needs to be clear in order for the reader to be able to assess this qualitative result. What was the condition of the animals after 5 days of incubation? What was their survival rate? Only two animals are illustrated in Figure 2. Were observations of faster growth rates at high pH consistent for animals in the calcein experiment? Even if these data are qualitative I recommend the inclusion of a plot of shell growth under the two conditions, with measurements from all animals. In addition, please provide plots and slopes of calcification rates for the individual pteropods measured at time 0, 2, 4, and 6 hours, rather than just descriptions. I recommend this manuscript for publication after these revisions.

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