

Effects of elevated sea water pCO_2 on two species of euphausiids: *Meganyctiphanes norvegica* and *Nyctiphanes couchii*: Effects on moulting and survival.

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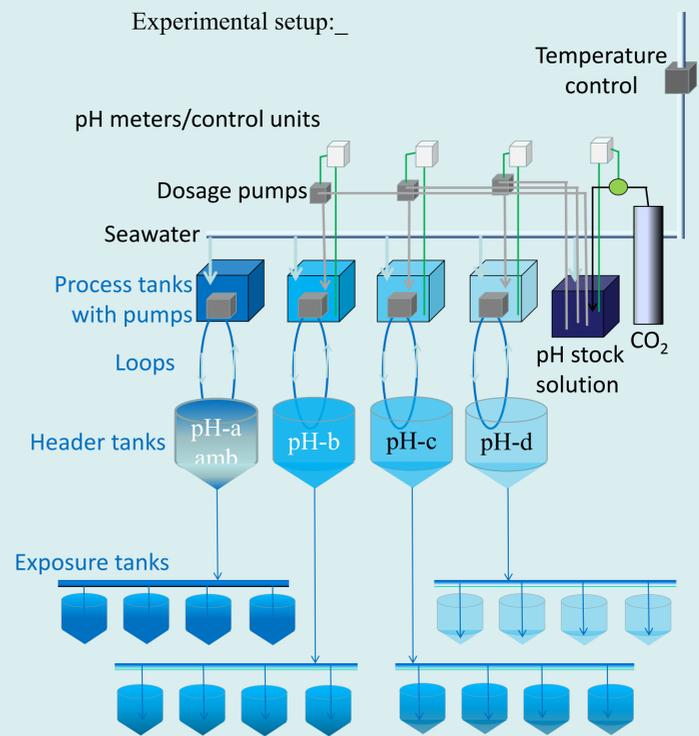


The two species used in the experiments A: *Nyctiphanes couchii*, B: *Meganyctiphanes norvegica*

Euphausiids (krill) are ecological key species low in the food chain and represent a vast biomass predated on by fish and marine mammals. Krill are to a some degree calcifiers and deposit calcium carbonate to reinforce their exoskeleton. Effects of long term exposure to increased pCO_2 was investigated.

Material and methods

Two species of North Sea krill, *Meganyctiphanes norvegica* and *Nyctiphanes couchii*, were sorted and stocked into 1 liter jars each supplied with flow through of experimental water. The different water qualities were produced by adding highly enriched CO_2 water to mixing tanks under control of feedback pumps. The target values were set to $[pCO_2] = 1000$ ppm (pH 7,4) and $[pCO_2] = 1700$ ppm (pH 7,6) in addition to untreated control water (pH= 7,9 $[pCO_2]= 430$ ppm). A total number of 24 krill were used at each pCO_2 regime. During the experiment moults were collected from each jar to assess growth and moulting frequencies.



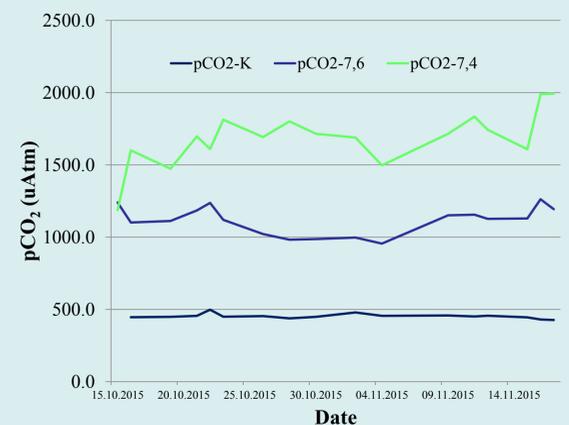
Schematic figure of the water treatment system. The different water qualities are prepared in a separate room adjacent to the bio lab, and pumped in closed circuits securing high turnover of water in the process tanks.



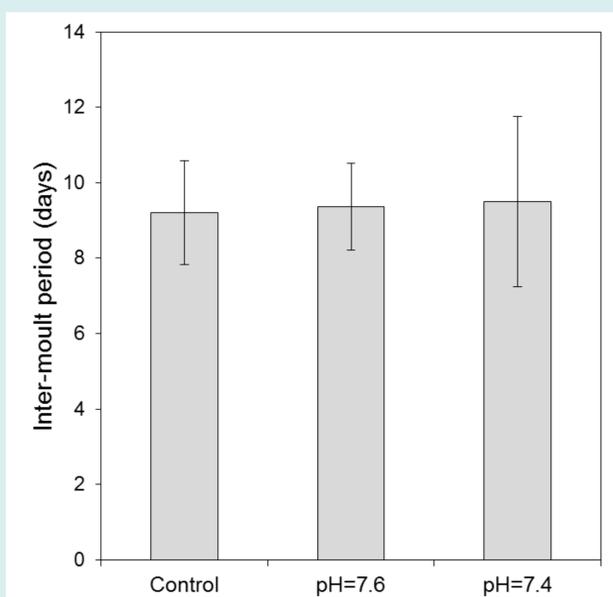
The Biolab consists of 3 rigs each containing 12 tanks with individual water supply.



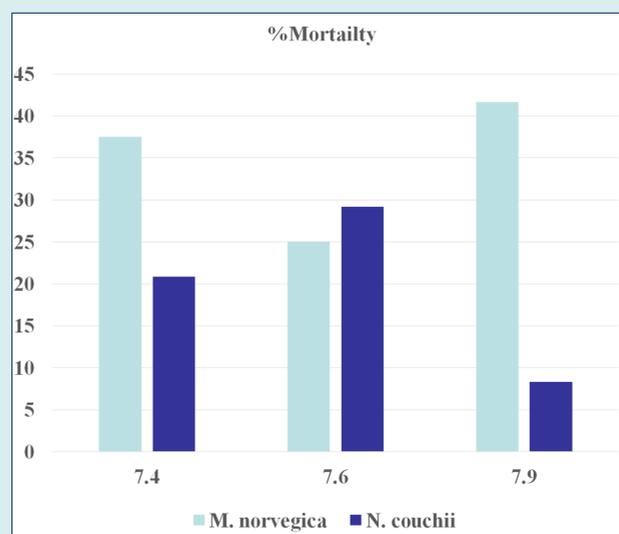
Each tank contain up to 8 separate chambers for individual krill.



Levels of pCO_2 in the exposure tanks during the experiment. pCO_2 was determined daily from photometric pH analysis, alkalinity, salinity and temperature.



Moulting frequencies of *Meganyctiphanes norvegica* exposed to increased pCO_2 . The results reveal no differences between groups within the experimental limitations.



Per cent mortality during the experimental period. N=24 individs/treatment. Mortality did not seem to correlate with water CO_2 content.

Conclusions:
Increased pCO_2 did not show any significant effects on survival or intermolt periods for the two species of krill investigated. The highest mortality was recorded among the *M. norvegica* in the control group, indicating that increased pCO_2 was not the cause of high mortality.