Talk

Rapid Change

Clam feeding plasticity alleviate herbivore sensitivity to ocean warming and acidification

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Anthropogenic carbon dioxide emissions are rapidly changing seawater pH and carbonate chemistry with vast repercussions on marine biodiversity. Direct effects of both phenomena on species populations are well documented, but how interactions within communities are affected and how this affect ecosystem functioning and resilience is poorly understood. In this presentation we demonstrate how the soft-sediment community interaction network between porewater nutrients, primary producers, herbivores and bioturbating invertebrates significantly restructures in response to experimental warming and acidification (+ 3°C, - 0.4 pH units).
Under unmanipulated conditions microalgal freshness was influenced by top-down control of the epifaunal grazer *Peringia ulvae* and the omnivorous ragworm *Hediste diversicolor*, while the peppery furrow shell *Scrobicularia plana* reduced porewater nutrient availability to primary producers and inhibited population biomass of *H. diversicolor*. Under warming and acidification *S. plana* did not influence porewater nutrients, promoted microalgal freshness and no longer affected *H. diversicolor*. Using porewater hydraulic signatures we demonstrate that such change in community interactions is linked to behavioral plasticity in *S. plana*. This key species shifted from predominant filter feeding under ambient conditions to almost exclusive deposit feeding under high pCO_2 conditions, with cascading effects on nutrient supply to primary producers. Surface-dwelling microalgal consumers were more tolerant to warming and acidification in the presence of *S. plana*, most likely due to stimulatory effect of the clam on their food resources.
In summary, this study demonstrate that predicting population resilience to climate change is limited when non-lethal effects such as key species behavioral change are not considered.

Key words: behavioral plasticity, ecosystem interaction network, benthic community, ocean acidification and warming