



NExUS Ongoing Projects and Activities Fri Nov 16 02:53:15 EST 2018

Name	Ocean Acidification - Effects of Ocean Acidification on <i>Emiliana huxleyi</i> and <i>Calanus finmarchicus</i> ; Insights Into the Oceanic Alkalinity and Biological Carbon Pumps
Description	From the project abstract available at nsf.gov: The overall goal of this research is to parameterize how changes in pCO ₂ levels could alter the biological and alkalinity pumps of the world ocean. Specifically, the direct and indirect effects of ocean acidification will be examined within a simple, controlled predator/prey system containing a single prey phytoplankton species (the coccolithophore, <i>Emiliana huxleyi</i>) and a single predator (the oceanic metazoan grazer, <i>Calanus finmarchicus</i>). The experiments are designed to elucidate both direct effects (i.e. effects of ocean acidification on the individual organisms only) and interactive effects (i.e. effects on the combined predator/prey system). Interactive experiments with phytoplankton prey and zooplankton predator are a critical starting point for predicting the overall impact of ocean acidification in marine ecosystems. To meet these goals, a state-of-the-art facility will be constructed with growth chambers that are calibrated and have highly-controlled pH and alkalinity levels. The strength of this approach lies in meticulous calibration and redundant measurements that will be made to ensure that conditions within the chambers are well described and tightly monitored for DIC levels. Growth and calcification rates in coccolithophores and the developmental rates, morphological and behavioral effects on copepods will be measured. The PIC and POC in the algae and the excreted fecal pellets will be monitored for changes in the PIC/POC ratio, a key parameter for modeling feedback mechanisms for rising pCO ₂ levels. In addition, ¹⁴ C experiments are planned to measure calcification rates in coccolithophores and dissolution rates as a result of grazing. These key experiments will verify closure in the mass balance of PIC, allowing the determination of actual dissolution rates of PIC within the guts of copepod grazers.
Sector	- Natural Ecosystems - Biota
Focus Area	- Sustainability of Marine Ecosystems
Region	- Regional Or State -- New England -- Mid-Atlantic
Status	- Ongoing
Timelines	2012-2015 (estimated)
Lead Agencies	National Science Foundation (NSF) Division of Ocean Sciences (OCE) and Directorate for Geosciences (GEO); Bigelow Laboratory for Ocean Sciences, East Boothbay, ME
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