Geophysical Research Abstracts
Vol. 13, EGU2011-8004, 2011
EGU General Assembly 2011

The combined effect of global warming and ocean acidification on the coccolithophore *Gephyrocapsa oceanica*

Scarlett Sett, Mario Lebrato, Ulf Riebesell, and Kai G. Schulz
Leibniz Institute of Marine Sciences (IFM-GEOMAR), Düsternbrooker Weg 20, 24105 Kiel, Germany (ssett@ifm-geomar.de)

Increasing atmospheric CO_2 concentrations are expected to impact pelagic ecosystem functioning in the near future by driving ocean acidification and increasing global average temperatures. We examined the effects of these two processes on the growth rate and carbon production of the calcifying coccolithophore *Gephyrocapsa oceanica*. 12 pCO$_2$treatment levels ($\sim$20-2500 μatm) at three temperatures (15, 20 and 25°C) were established in artificial seawater by combined additions of Na_2CO_3 and HCl (total alkalinity constant in all treatments). Specific growth rate, particulate inorganic carbon (PIC) and particulate organic carbon (POC) production rates showed an optimum curve response to increasing pCO$_2$ at all temperatures. Optima were found between pCO$_2$ levels of $\sim$250-650 μatm with a tendency to higher pCO$_2$ levels at higher temperatures. Carbon production rates increased with temperature but sensitivity to increasing pCO$_2$ remained similar at all temperatures. The PIC:POC ratio was temperature-independent and linearly decreased with increasing pCO$_2$. The results obtained here contribute to a better understanding of the responses of coccolithophores to changing environmental conditions and may help to parameterize synergistic effects of ocean warming and acidification in marine biogeochemical models.