

Effects of ocean acidification on the calcification of coccolithophores – Evidence from experimental studies

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Anthropogenic CO₂ emissions, and a concomitant decrease in seawater pH, a process termed ‘ocean acidification’, have attracted much attention in the last decade. Results from experimental studies on corals and foraminifera have led to the hypothesis that calcification of coccolithophores might be hampered at elevated concentrations of CO₂ in seawater. This was indeed found to be true in an initial study using the bloom-forming species *Emiliana huxleyi* and *Gephyrocapsa oceanica*. The relationship between calcification rate and CO₂ concentration was described by linear regression. However, the question whether the observed response is typical for the group of coccolithophores, remained unanswered. Therefore, the two productive calcite producers *Calcidiscus leptoporus* and *Coccolithus pelagicus* were tested. The latter species was insensitive over the CO₂ range tested, while *C. leptoporus* showed an optimum curve with the highest calcification rate at present day CO₂ levels. This study clearly demonstrated that species-specific effects play a role in coccolithophore response to altered carbonate chemistry of seawater. More experimental studies using species of different phylogenetic origin are clearly warranted to obtain detailed information about the possible effect of ocean acidification on coccolithophores. Considering the different timescales of laboratory experiments, and change of carbonate chemistry in the oceans, it will certainly be necessary to investigate the potential of adaptation in these algae.