

Has atmospheric CO₂ decreased over the last 11 million years?

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Coccolithophores are single celled marine phytoplankton that use inorganic carbon acquired from seawater for calcification and photosynthesis. Due to this high carbon demand, coccolithophores have robust carbon allocation strategies (termed “vital effects”) that take bicarbonate away from calcification and into photosynthesis at low aqueous CO₂ concentrations. Stable carbon isotopic composition measurements of large and small coccolith tests from the Mid-Miocene to present have provided support for this hypothesis in the Atlantic. By generating a similar record in the warmest surface waters of the world, this project will test the hypotheses that the reallocation of bicarbonate to photosynthesis and away from calcification is the result of a reduction in atmospheric CO₂ over the past twelve million years. This will be tested by measuring the stable isotopic carbon composition of coccoliths found in ODP site 806 (9°N, 156°E) and measuring the magnesium calcium ratio of planktonic foraminifera *G. sacculifer* to measure sea surface temperature.