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Coccolithophorid calcification and isotope fractionation in relation to seawater Mg/Ca ratios

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The Mg/Ca ratio of seawater changed throughout Phanerozoic time. In the Late Cretaceous the molar Mg/Ca ratio was $<$1 with Ca concentrations of 25-30 mM. The modern ocean has a Mg/Ca ratio of $\sim$5, with an absolute Ca concentration of $\sim$10 mM. Recent findings (Stanley, 2005) indicate that a low Mg/Ca ratio in the Cretaceous could have caused a high reproduction rate of coccolithophores in the water column what could be a reason for the massive chalk deposition. The physiological pathway by which a changing Mg/Ca ratio affects the process of biogenic calcification is still under discussion. Here we investigate the process of calcification on a cellular level with respect to the Mg/Ca ratio of seawater in the cosmopolitan coccolithophore *Emiliania huxleyi* in controlled lab experiments. Additionally, we analysed the elemental composition (Mg/Ca) and isotopic fractionation (δ^{25}Mg, $\delta^{44/40}$Ca) of the coccolith calcium carbonate. Changing the Mg and Ca concentration has an effect on the cellular process of coccolithophorid calcification. Preliminary results based on scanning electron microscopy indicate that a structural malformation of the coccoliths appeared at Mg/Ca ratios $\leq$1 and at a high ratio of 10. The results give new insights into biogenic calcification and its response to changing seawater chemistry.