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Cell cycle of *Emiliania huxleyi* under enhanced atmospheric CO_2 and its relation to calcification

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Calcification in coccolithophores is strongly influenced by the projected decrease of future ocean pH. The physiological pathway by which ocean acidification affects the process of biogenic calcification is still not clear. Here we investigate the process of calcification on a cellular level with respect to the cell cycle of the cosmopolitan coccolithophorid *Emiliania huxleyi* in controlled lab experiments. The cell cycle can be distinguished in three phases (G1, S and G2 + M). Using DNA staining and flow cytometry it is possible to follow each phase of the cell cycle in a synchronized *E. huxleyi* population during a light:dark cycle. In parallel with cell cycle analysis we measured calcification rates in two hour intervals. This data set indicates that calcification occurs predominantly in the G1 phase of the cell cycle. Thus, changing environmental conditions, which alter the cell cycle, may also have an effect on the degree of calcification. In addition to the lab experiments, we studied the cell cycle under future CO_2 conditions during the PeECE III mesocosm field study in a Norwegian fjord. A combination of lab and mesocosm experiments provides further insight to biogenic calcification of coccolithophores.