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Calcification and transparent exopolymer particles (TEP) production in batch cultures of *Emiliania huxleyi* exposed to different pCO_2

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Coccolithophores, among which *Emiliania huxleyi* (*E. huxleyi*) is the most abundant and widespread species, are considered to be the most productive calcifying organism on Earth. They play a key role in the marine carbon cycle because of their calcite production (in the form of coccoliths) and their subsequent sinking to the ocean floor. Like other phytoplanktonic species, the coccolithophores produce transparent exopolymer particles (TEP) that promote the aggregation of biogenic particles produced in surface oceans, and therefore contribute to the export of carbon to deep waters. The rise of atmospheric pCO_2 and the consequent ocean acidification could modify the ecology of coccolithophores, which in turn would have an impact on the production, transformation and fate of carbon in the surface layer of the ocean.

We conducted batch experiments with monospecific cultures of *E. huxleyi* under different initial pCO_2 (490, 630 and 930 ppmV) conditions. The cultures were monitored over a period of around 50 days and various parameters related to primary production and calcification (chlorophyll a concentration, nutrient dynamics, total alkalinity, pH, TEP, etc.) were followed.

The results show that the onset of phytoplankton growth and calcification are delayed in time with increasing initial pCO_2. The timing and the general feature of calcification dynamics are closely related to the saturation state of seawater with respect to calcite. The production of TEP is also delayed in time when the initial pCO_2 increases and the production continues after the decline of phytoplankton growth. After nutrient exhaustion, the particulate organic carbon (POC) concentration increases linearly with increasing TEP concentration. The production of $CaCO_3$ is also strongly correlated with that of TEP, suggesting that calcification may be considered as a source of TEP.