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A NEW CHEMOSTAT SYSTEM TO INVESTIGATE COMBINED TEMPERATURE AND CO_2 EFFECTS ON MARINE PHYTOPLANKTON SPECIES

In order to better understand the consequences of global change on marine plankton and biogeochemical cycling we established a new continuous culture facility that enables the investigation of combined temperature and CO_2 effects. The facility consists of five independent chemostats to cultivate algae in physiological steady-state under a controlled temperature, pCO_2, nutrient and light regime. Each chemostat is surrounded by a water jacket that controls temperature within a deviation of 0.2°C. In the incubators, the cultures are continuously aerated with gas of preset CO_2 concentrations. Distinct pCO_2 conditions, ranging from 0 to more than 5000 µatm (± <1.8%) can be created using a two-step CO_2 regulation system. To test the stability of the system and to asses the suitability for investigation of temperature and CO_2 effects on phytoplankton, we followed the growth of a calcifying strain of *Emiliania huxleyi* under three different CO_2 concentrations (180, 380 and 750 µatm) and two different temperatures (14°C and 18°C) simulating glacial, present day and future climate conditions. We will discuss the suitability of this system to investigate different scenarios of ocean warming and acidification.