



Responses of marine microorganisms to ocean acidification during a mesocosm study in the Arctic (Svalbard)

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Responses to ocean acidification in plankton communities were studied during a CO₂-enrichment experiment in the Arctic Ocean, accomplished in the framework of EPOCA from June to July 2010 in Kongsfjorden, Svalbard (78°56,2'N, 11°53,6'E). Enclosed in 9 mesocosms (volume: 43.9-47.6m³), plankton was exposed to a range of different CO₂ concentrations, representative for glacial and projected mid-next-century levels. Fertilization with inorganic nutrients at day 13 of the experiment supported the accumulation of phytoplankton biomass, as indicated by two periods of high Chl a concentration.

Comparison of treatments revealed significantly higher CO₂-uptake due to primary production of phytoplankton cells at high pCO₂. Organic carbon was partly released from phytoplankton cells by exudation processes and stimulated bacterial growth. Activities of bacterioplankton were closely coupled to primary production throughout the study, and suggested an efficient carbon cycling in the Arctic microbial food web. We conclude that bacterial activity will counteract enhanced primary production, and may limit the prospects of the Arctic Ocean to become an increased sink for CO₂ in the future.