



## Carbon fluxes in Arctic plankton communities under elevated CO<sub>2</sub> levels: a stable isotope labelling study

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The potential impact of rising CO<sub>2</sub> on carbon fluxes in natural plankton communities in the Arctic Ocean was investigated during the 2010 EPOCA mesocosm study in Ny Ålesund, Svalbard. Nine mesocosms were set up with a range in initial pCO<sub>2</sub> levels from  $\sim 180 \mu\text{atm}$  to  $\sim 1400 \mu\text{atm}$  for 5 weeks. <sup>13</sup>C labelled bicarbonate was added to follow the transfer of carbon from dissolved inorganic carbon (DIC) into phytoplankton and subsequently into dissolved organic carbon (DOC), heterotrophic bacteria, zooplankton, and settling particles. Isotope ratios of group-specific polar lipid fatty acids (PLFA) were used to infer the biomass and production of different groups of phytoplankton and heterotrophic bacteria. Phytoplankton PLFA showed enrichment within one day after label addition, but label incorporation in green algae and cryptophyte PLFA was much faster than that in diatom and dinophyte PLFA. Bacteria PLFA showed enrichment within 2 days, indicating a tight phytoplankton-bacteria coupling. Both PLFA label incorporation and concentrations did not reveal a clear CO<sub>2</sub> effect on algal and bacterial dynamics. Modelling will be applied to analyze possible CO<sub>2</sub> effects on carbon transfer within the plankton community.