

Long-term summertime investigations of pelagic and benthic realms with continuous observations of vertical particle flux in the Fram Strait and the central Arctic Ocean

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Sea ice volume and extent currently experience massive reduction in the Arctic Ocean due to climate change. Our long-term study aims at tracing effects of environmental changes in pelagic and benthic systems and investigate accompanying impacts on the fate of organic matter produced in the upper water column on its way down to the seafloor. Since the start of our observations in 1999, we have already seen some effects and will present selected data sets from the upper water column and benthic data during summer expeditions as well as results from vertical particle flux measurements that were obtained from annually deployed sediment traps at the LTER (Long-Term Ecological Research) observatory HAUSGARTEN in the eastern Fram Strait (79°/4°E) and on fewer occasions in the central Arctic Ocean (CAO).

Highest biomass was found in the eastern Fram Strait and lowest in the heavily ice-covered regions in the CAO. Flux rates of POC were at least one order of magnitude lower in the CAO than in the eastern Fram Strait. While in the CAO ice algae dominate the recognizable flux fraction, faecal material prevailed in eastern Fram Strait traps. This points towards different systems of organic matter production and modification and, thus, different mechanisms determine the efficiency of the biological carbon pump. These differences are also reflected in the benthic communities in the CAO and in the eastern Fram Strait.

These first results have shown the importance of long-term observations and encouraged the continuation of the Arctic Ocean Observing System FRAM (FRontiers in Arctic marine Monitoring) to record environmental and biological data at high temporal and spatial resolution.