Canoe

Fjords are Aquatic Critical Zones of regional and global importance by supporting highly productive and diverse food webs, while they play an important role as CO_2 sinks. At the same time, global warming significantly impacts these systems through the accelerated melting of ice.

Especially fjords in Greenland are sensitive to the effects of global warming. Here, like in other polar areas, coastal glaciers either terminate in the fjord (= marine-terminating glaciers; MTGs) or on land, resulting in proglacial rivers draining to the fjord (= land-terminating glaciers; LTGs).

Fjords typically display a seasonally dynamic, stratified circulation with an outward-flowing surface layer of brackish or fresh water and an inward-flowing deeper layer of marine waters that compensates for the loss of water entrained offshore. The transport patterns and residence time of this glacial meltwater in the fjord depend on, among other factors, whether the meltwater is supplied by LTG or MTG. In many parts of Greenland, MTGs might become LTGs in the near future.

Whereas there is increasing evidence that shifts in glacier types cause major differences in the physical, biogeochemical and ecological processes in the associated fjord systems, the consequences for carbon transfer, food-web structure, mineralization, and long-term burial into the sediment are currently poorly resolved. As a result, the impacts of further warming on the provisioning of ecosystem services by Arctic fjords (e.g. food provisioning, nutrient recycling, climate regulation) remain unknown.

Therefore, with this project, we aim to investigate to what extent a shift from marine-terminating to land-terminating glaciers in Arctic fjords leads to lower primary productivity, lower mineralisation rates, and relatively higher carbon burial, and by that supports a less rich and diverse food web.

Partners:

Marine Biology Research Group (Ghent University), Protistology & Aquatic Ecology Lab (Ghent University), Estuarine & Delta Systems (Royal Netherlands Institute for Sea Research), Ecosystems Data Processing and Modelling (Royal Belgian Institute of Natural Sciences), Aquatic & Terrestrial Ecology (Royal Belgian Institute of Natural Sciences).