

Project information

Project title

The impact of oceanic inflow and glacial runoff on the carbon budget in Kongsfjorden using field and modell data (KongCarbon)

Year

2017

Project leader

Melissa Chierici

Geographical localization of the research project in decimal degrees (max 5 per project, ex. 70,662°N and 23,707°E)

Kongsfjorden, Svalbard

Participants

Participants: M. Chierici, IMR (PI), A. Sundfjord, NPI and A. Fransson, NPI, J. Skarðhamar, IMR, F. Nilsen, UNIS

Flagship

Fjord and Coast

Funding Source

KLD and NFD

Summary of Results

Summary of Results 2017

In 2017, we focused on covering data gaps and obtained more data on the physical and chemical environment in the fjord along specific cross transects. During field studies in Kongsfjorden on 1-3 day's trips in April, May and July 2017 (Figure 1), we collected water samples and obtained detailed data on salinity and temperature to be used in the model. In addition to detailed CTD transects, water samples were collected and analysed during fall 2017 for total dissolved inorganic carbon and total alkalinity. Using the CTD data, model volume together with the information on the carbon concentrations we have initiated calculations to estimate the volume transport of carbon in the Kongsfjorden. We found clear seasonality in the carbon concentrations depending mainly on changes in biological processes and water mass exchanges. Extraction of volume fluxes from the model has been initiated. Model results from salinity changes due to increased glacial runoff shows that the location of meltwater plumes largely influences the salinity in the fjord (see Figure 2), hence circulation.

Brief summary of achievements in 2017:

- Intensive field activity in Kongsfjorden April, May, July
- Water samples for determination of inorganic carbon and total alkalinity, nutrients and O₂
- Detailed CTD transects for physical oceanography data to improve model and carbon budget
- Used model K160 (Sundfjord et al., 2017) investigate the role of freshwater addition Initiated work on extraction of modelled volume fluxes (still ongoing)

- Collocated with previously collected data 2012-2016 (annually April and July)

Master and PhD-students involved in the project

not in 2017

For the Management

The project will increase knowledge on the effect of climate drivers such as increased glacial melt water on the physical circulation and carbon uptake in the fjord. This has relevancy for estimates of ocean acidification trends and explore ecosystem effects due to freshwater additions.

Published Results/Planned Publications

Published Results/Planned Publications 2017

Publications are planned in 2018

Communicated Results

Communicated Results 2017

The KongCarb project was presented at ESSAS OSM, June 2017

Miljødirektoratet 14 September, Oslo (Fagdag)

Interdisciplinary Cooperation

The project is a collaboration between physical and chemical oceanographers, modellers and observers. The project also benefit from the OADRIVER project in the FRAM centre OA flagship where collaboration involves biologists and socio-economics.

Budget in accordance to results

yes as expected, with both field work, data collection and analysis and modelling

Could results from the project be subject for any commercial utilization

No