

## Project information

### Project title

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

### Year

2018

### 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, Spitsbergen

### Participants

**Participants: M. Chierici, IMR (PI), Agneta Fransson, NPI, Tomas Torsvik, NPI, and Arild Sundfjord, NPI, Jofrid Skarðhamar, IMR, Frank Nilsen, UNIS**

### Flagship

Fjord and Coast

### Funding Source

50% FRAM and 50% IMR in kind

### Summary of Results

#### **Summary of Results 2018**

In 2018 the focus was on collecting all data obtained on the physical and chemical environment in the fjord along specific across transects. We also participated during field studies in Kongsfjorden in May (UK collaborator) and July 2018 (Figure 1), to collect water samples for carbonate chemistry, nutrients and salinity and temperature to be used in the model. 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 2018:*

- Intensive field activity in Kongsfjorden May, July
- Water samples for determination of inorganic carbon and total alkalinity, nutrients and  $\delta^{18}\text{O}$
- Collocated with previously collected data 2012-2016 (annually April and July)
- Initiated validation of NORWECOM.E2E model (bgc and ecological) by estimating and comparing seasonal variability of carbonate chemistry

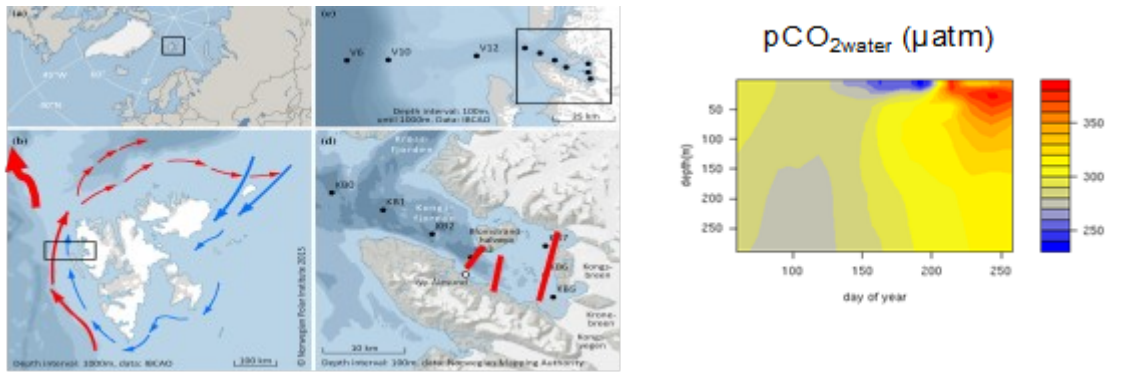


Figure 1: The Kongsfjorden study area and data obtained during the KongCarb study (red thick lines) and historical data (black dots). The right panel shows the seasonal variability of pCO<sub>2</sub> from the NORWECOM.E2E model at Kb3 station obtained in KongCarb-II project

Master and PhD-students involved in the project

Not in 2018

For the Management

Ekspirer har vist at havforsuring har negativ påvirkning på flere ulike organismer. Klimaendring så som oppvarming gir en forsterkningseffekt på havforsuringen og påvirker spesielt kalkskallsdannende organismer. Dessuten gir økt ferskvann fra elveavrenning, smeltevann fra is og breer økt havforsuring, direkte gjennom å minke pH og karbonationer og indirekte gjennom å øke mulige CO<sub>2</sub> opptaket i ferskere vann. Det kan gi dårligere livsforhold for ulike arter og kystøkosystem, gyteområder og påvirke muligheter til akvakultur og dyrking av for eksempel skjell og skalldyr, fisk. Kysten er spesielt påvirket av disse klimaendringer i tillegg til shipping og forurensing.

Kongsfjorden er vår modellfjord der endring skjer med minkende isdekke og breer, og varmere vann. Vi gjør nye observasjoner på fysiske og kjemiske variabler som kombineres med biogeokjemiske og fysiske modeller for å se hva smeltevann gjør med karbontransport, CO<sub>2</sub> utveksling og havopptak. Dette gir verdifull kunnskap på havforsuringstilstand ved ulike klimascenarier.

We started on manuscript in 2018 with planned submission in 2019 year with tentative title:

*The effect of glacial runoff on physical and chemical environment in Kongsfjorden.*

Communicated Results

Chierici, M., A. Fransson., Y. Ericsson., E. Falck., S. Kristiansen. 2018. Influence of glacial water on carbonate chemistry and biogeochemical processes in Svalbard fjords with different characteristics, Poster Abstract AGU OSM, 11-16 February 2018, Portland, USA

Interdisciplinary Cooperation

Modellers and observationalists:

Physical oceanographers/modellers/marine chemists.

Budget in accordance to results

Yes

Could results from the project be subject for any commercial utilization

No