

## Project information

### Project title

The role of Arctic sea ice as a carbon pump observed in Fram Strait / Characterize CO<sub>2</sub> fluxes from sea ice (2011)

### Year

2011/2012

### Project leader

Mats Granskog, NPI

### Participants

- Mats Granskog (NPI)
- Agneta Fransson (NPI, project post doc)
- Edmond Hansen (NPI)
- Paul Dodd (NPI)
- Daiki Nomura (NPI)
- Melissa Chierici (IMR)
- Colin Stedmon (NERI/DTU, DK)
- Gerhard Dieckmann
- Gernot Nehrke (AWI, DE)

### Flagship

Ocean acidification, Theme: Processes related to the Arctic and the sea ice

## Summary of Results

This was the first year of the project (with part of the project being continued in 2012) due to reorganizing of the flagship into workpackages and tasks), and much time was spent on initiating the first activities in the short time available. The hiring process of a post doc that will work on the physical/chemical aspects of OA at NPI within the OA flagship took much longer than expected, and the candidate chosen could only start at the beginning of 2012. To make best use of available resources field work for this project was done during a cruise of the ICE Centre at NPI (April/May 2011), and a monitoring cruise by NPI (September 2011). There is need for more time to integrate the research within the flagship to a coherent programme, as interaction with other projects/institutions was largely non-existent, partly this is due to the fact that no OA personnel was hired in the course of the year, due to time constraints. However, work was initiated, and planning for the research programme took up much of the time, as did purchasing of new equipment to be used for OA research the coming years. Major contribution was to procure autonomous water samplers that can aid in sampling for seasonal variability in OA state in the forthcoming years.

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Collection the first set of samples to assess the state of ocean acidification in water across the Fram Strait in ten years, these water samples will be analyzed for alkalinity and dissolved inorganic carbon, whereof the saturation states of calcium carbonate species can be evaluated. Coincidentally samples for nutrients and oxygen isotopes were collected, and these will be used to evaluate the contribution from sea ice formation and ice melt, and river runoff, to the status of calcium carbon saturation in waters exiting the Arctic Ocean with the East Greenland Current. Results will be available in the early half of 2012 and published in late 2012/early 2013.

We observed and measured the CO<sub>2</sub> flux from first-year Arctic sea ice north of Svalbard in spring 2011, and also found copious evidence solid calcium carbonate (CaCO<sub>3</sub> as ikaite) precipitates in Arctic first-year sea ice, which shows that the role of sea ice in surface ocean calcium carbonate saturation states needs to be examined closer. This is work in progress and results will be published in 2012.

A post doc was hired in the project from 1 Jan 2012 onwards. To work jointly on this and another project in the Fram Centre OA flagship.

## Published Results/Planned Publications

Planned publications; Quantification calcium carbonate in first-year Arctic sea ice, Nomura et al. (to be submitted in May 2012) Current status of calcium carbonate saturation and relation to water masses in the East Greenland Current; Chierici et al.

## Communicated Results

OA flagship workshop, 30 Sep 2011 (presented prelim results from 2011 work). ICE workshop, 14-15 Nov 2011 (presented preliminary results from 2011 work). Planned presentations of results from 2011 include presentations at SOLAS workshop in May 2012 and IGS conference in June 2012

## Interdisciplinary Cooperation

The project has brought together people from different institutions and fields of expertise, and has indeed advanced collaboration across institutes and disciplines within the Fram Centre institutions, and external institutes. However, there is still need to improve the collaboration between the physical-chemical sciences and life sciences.

## Budget in accordance to results

The funding through Fram Centre was essential to start OA work at NPI, and also link us up with the other partners at the Fram Centre. Much of the resources for 2011 were used to acquire instrumentation that is needed in the coming years to do the research proposed, as we have now hired a post doc to work with OA from January 2012 onwards. However, the budget is limited and does not allow for us to achieve everything as planned, and for 2012 there is much need for in-kind contributions from institutions and other ongoing projects to fulfill the scientific aims.

Could results from the project be subject for any commercial utilization

No