

## Project information

### Keywords

Arctic, sea ice, progress report

### Project title

Developing Modelling Tools to Understand the Role of Solar Radiation to Sea Ice Mass Balance in a Seasonally Ice Covered Arctic (SOLICE)

### Year

2015

### Project leader

Mats Granskog

### Participants

Mats Granskog (NPI), project lead

Tore Hatterman (Akvaplan-niva)

Anthony Doulgeris (UiT)

Keguang Wang (MET.no)

Caixin Wang, Alexey Pavlov, Sebastian Gerland (NPI)

Ole Anders Nøst (Akvaplan-niva)

### **International partners/collaborators;**

Donald K. Perovich (Donald.K.Perovich@erdc.drem.mil), at Cold Regions Research and Engineering Laboratory (CRREL), Hanover, USA

Marcel Nicolaus (marcel.nicolaus@awi.de), at Alfred Wegener Institute (AWI), Germany

Jeremy Wilkinson, British Antarctic Survey (EU FP7 project ICE-ARC)

### Flagship

Arctic Ocean

### Funding Source

Fram Centre and significant in-kind contributions through personnel time through partner institutions, and data through instruments deployed through external projects (NFR and EU). Salary for C. Wang (project researcher) also funded through external project.

### Summary of Results

The following tasks were planned to be carried out in 2015 according to the project plan. Most of these have proceeded as planned, and are to be completed by the end of the year.

Task 1.1. In the second-year phase of the project, according to the project plan, examine existing autonomous observations from the high-Arctic has been continued. The work led to one manuscript about the influence of atmospheric conditions in the central Arctic in 2012 and 2013 (Wang et al., 2015) has been submitted to JGR-Atmosphere. At the present stage, the manuscript is in revision.

To collect new data, the hired researcher Caixin Wang joined the N-ICE 2015 Arctic expedition for collecting sea ice mass balance data.

Task 1.2 Kinds of existing parameterization schemes have been collected. Verification of the existing parameterization schemes has progressed according to project plan, which included verification of the parameterization schemes with observational data and

with 1D HIGHTSI and CICE models.

One paper relevant to the project of SOLICE has been published in Polar Research. This paper investigated the formation of snow ice and superimposed ice (two types of ice formed at the snow/ice interface) in Kongsfjorden Svalbard and how the albedo scheme of Flato and Brown (1996) influenced the sea ice mass balance during the melt season using 1D HIGHTSI model.

Task 2.1 Development new parameterization schemes for partition of solar radiation is in progress, and one manuscript is in preparation.

Task 2.2 The validation of the new parameterization using 1D models is initiated and will be the main task in the last quarter of 2015.

Task 3.1 To validate CICE-ROMS coupled model, the new parameterization scheme will begin to be implemented into the CICE-ROMS at the end of 2015.

#### For the Management

N/A

#### Published Results/Planned Publications

Manuscript published;

WANG, Caixin et al. Modelling snow ice and superimposed ice on landfast sea ice in Kongsfjorden, Svalbard. Polar Research, 34, 2015. doi: 10.3402/polar.v34.20828.

Manuscript in revision;

WANG, Caixin et al. Atmospheric conditions in the central Arctic Ocean through the melt seasons of 2012 and 2013: Impact of surface conditions and solar energy deposition into the ice-ocean system. Submitted to Journal of Geophysical Research-Atmosphere.

An abstract about "Analysis of ice mass balance buoys and radiative fluxes in summers 2012 and 2013 in the central Arctic Ocean" written by Wang, Caixin et al. Arctic Frontier, 18-23 January 2015, Tromsø, Norway

An abstract about the published paper of "Modelling snow ice and superimposed ice on landfast sea ice in Kongsfjorden, Svalbard" has been submitted to the Ny-Ålesund seminar, 23-25 September, Tromsø, Norway.

#### Communicated Results

One poster of "Analysis of ice mass balance buoys and radiative fluxes in summers 2012 and 2013 in the central Arctic Ocean" written by Wang, Caixin et al. has been presented on Arctic Frontier, 18-23 January 2015, Tromsø, Norway.

One poster about the published paper of "Modelling snow ice and superimposed ice on landfast sea ice in Kongsfjorden, Svalbard" will be presented on the Ny-Ålesund seminar, 23-25 September, Tromsø, Norway.

A news item about the published paper of "Modelling snow ice and superimposed ice on landfast sea ice in Kongsfjorden, Svalbard" was in the September social media <http://instagram.com/oceanseaicenpi>

#### Interdisciplinary Cooperation

N/A

#### Budget in accordance to results

More or less. Project plan is annually adjusted depending on resources allocated and available from other sources.

#### Could results from the project be subject for any commercial utilization

No

If Yes

N/A

Conclusions

N/A - progress report