QSIWO

The Qaanaaq sea ice winter observatory

Principal investigator

Steffen M. Olsen
smo@dmi.dk
Danish Meteorological Institute

Other contact

Gorm Dybkær (gd@dmi.dk), Rasmus T. Tonboe (rtt@dmi.dk), Jacob L. Høyer (jlh@dmi.dk)

Areas of contribution

Oceanic processes
Observations
Sea ice processes

Summary

Objective: To establish a winter observatory on the fjord ice in Inglefield Fjord, NW Greenland, December 2017 to June 2018, in part as a direct contribution to the Year of Polar Prediction (YOPP) including the first coordinated Special Observing Period of intensified observations across the Arctic in winter 2017/2018.

Applications of data include sea-ice and snow processes, calibration and verification of satellite remote sensed data products, fjord circulation, stratification and mixing, ocean-glacier interactions, local or fjord scale meteorology and model verification.
Description

Background and motivation:
The Danish Meteorological Institute (DMI) has developed a unique Arctic monitoring capacity and established a data record on the interplay between atmosphere, sea-ice and oceanographic conditions in NW Greenland. The success of the program can be attributed on the engagement of the local Inuit community in all phases including design, planning and execution.

The city of Qaanaaq is located on the northern coast of the broad, deep Inglefield Fjord in NW Greenland open to the Northern Baffin Bay and is the main settlement in the region. The fjord is typically ice covered from December through June. The local community relies on the ability to travel, fish and hunt on the winter sea-ice and have a strong interest in observations of weather, snow and sea ice; for their planning of fishing and hunting trips and, for understanding the nature and implications of the climatic changes they are witnessing in their environment. Experiences from this engagement of the community have been valuable in order to reach an integrated understanding across social, natural and anthropological sciences of sea-ice, resources and livelihoods in Northwest Greenland (EU-FP7 ICE-ARC). Through this collaboration, a range of scientists have obtained easy and safe access to high arctic marine environments which has accelerated the development of new novel systems for arctic monitoring applications including proving them fit-for-purpose as components in future community based observatories.

The monitoring program has been developed and funded partly within the now ended FP7 ICE-ARC project. In this proposal, DMI continue this winter observatory on the fjord ice December 2017 until June 2018, in part as a direct contributing to the Year of Polar Prediction (YOPP) including the two coordinated Special Observing Periods of intensified observations across the Arctic in winter 2017/2018. Data will also be used to quantify and improving the skill of DMI’s weather services for the region including a new local scale NWP system for the Qaanaaq region and be integrated in the ongoing research at the institute.

Monitoring program:
Individual components of the on-ice observatory will be installed in December 2017 together with local Inuit hunters which will be securing the systems and its maintenance until recovery in June 2018. This includes:

An on-ice Automated Weather Station 15 km off Qaanaaq (AWS, delayed mode data incl. radiation)
An Ice-Mass Balance Buoy system in connection to the AWS (IMB, real-time data)
Two ice-tethered oceanographic moorings on either side of the fjord (0-300 m depth, delayed mode data).
Three ocean current profilers, one in connection to the AWS and IMB system (ADCP, under ice 0-60 m)
Two ice surface temperature, drift and pressure buoy systems (iSVP, real time on GTS).

Primary location: 77.47N 68.70W and 77.40N 68.07W

After recovery planned in June 2018, delayed mode data will be made public available for process studies and verification though YOPP recommended data portals. iSVP buoys will not be recovered but are expected to drift into the Baffin Bay summer and fall 2018.

Data applications
Include sea-ice and snow processes, calibration and verification of satellite data products, fjord circulation, stratification and mixing, ocean-glacier interactions, local or fjord scale meteorology and verification. The
Copernicus Arctic Regional ReAnalysis project CARRA has already expressed interest in the data.

Options:
Additional measurements will likely be made during recovery in late May or early June 2018 connected to the recovery of systems. This includes full depths water column CTD profiles across the fjord. Depending on capacity, suggestions from the YOPP community for additional sampling may be incorporated.

Timeline

2017-12-18 - 2018-06-06

Regional emphasis

Northern hemisphere: Yes
Southern hemisphere: No

Further specification

Primary location: 77.47N 68.70W and 77.40N 68.07W

Key project deliverables

Dataset: After recovery planned in June 2018, delayed mode data will be made public available for process studies and verification though YOPP recommended data portals.

Data management

To be determined, public.

Is data provided to WMO Global Telecommunication System

Yes
Real-time provision

iSVP data on GTS December 2017 onwards