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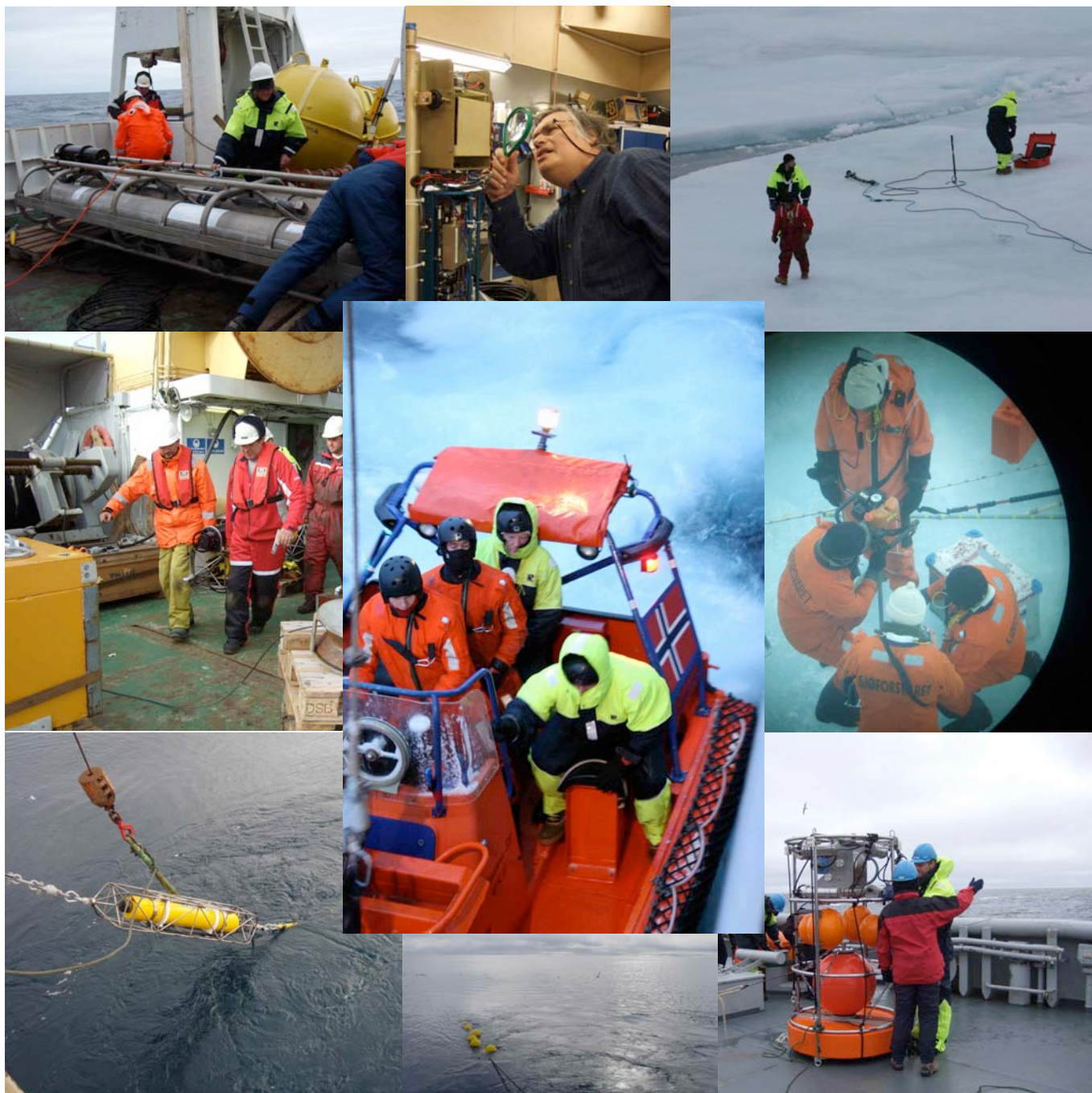
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N-5006 Bergen,  
Norway  
<http://www.nersc.no>*

## Summary

# THE FRAM STRAIT TOMOGRAPHY EXPERIMENT 2008

**Project Leader: Prof. Stein Sandven, Nansen Environmental and Remote Sensing Center/UNIS**

**Chief scientist: Dr. Hanne Sagen, Nansen Environmental and Remote Sensing Center**



## Executive summary.

Two field experiments have been carried out in connection with the tomography experiment in the Fram Strait.

In the first Cruise, during 14-18 August 2008, the acoustic tomography system was successfully deployed from RV Håkon Mosby. In addition we deployed 7 transponders, a McLane profiling CTD mooring near the tomographic source mooring, and 9 CTD stations were taken between the source and the receiver mooring. The deployment cruise in 2008 was preceded by a couple of months of careful testing at laboratory at the Geophysical Institute, at the University of Bergen, and one week of preparation work in Longyearbyen. Upgrading and testing of experiment schedules was carried out in Bergen. Final assembly, checkout of the instruments and placing experiment schedules in instrument flash memory was carried out in the Lab at UNIS in Longyearbyen. During the four day long cruise with RV Håkon Mosby two tomographic moorings, 7 acoustic transponders and a MMP mooring (IOPAN) was successfully deployed. In addition an oceanographic section, consisting of 9 CTD stations, was obtained between the source and the receiver.

In Figure 1,2 the positions of the tomography moorings are shown in two SAR images. They clearly show how close the receiver mooring was deployed the ice edge, and how a vortex pair was developing the next 48 hours. This indicates clearly the dynamics in the area and how interesting the acoustic data will be to analyze. The CTD section in Figure 16 is obtained from west to east during the 17-18 August along the acoustic track. Positions of the CTD stations are indicated in Figure 15 by yellow squares.

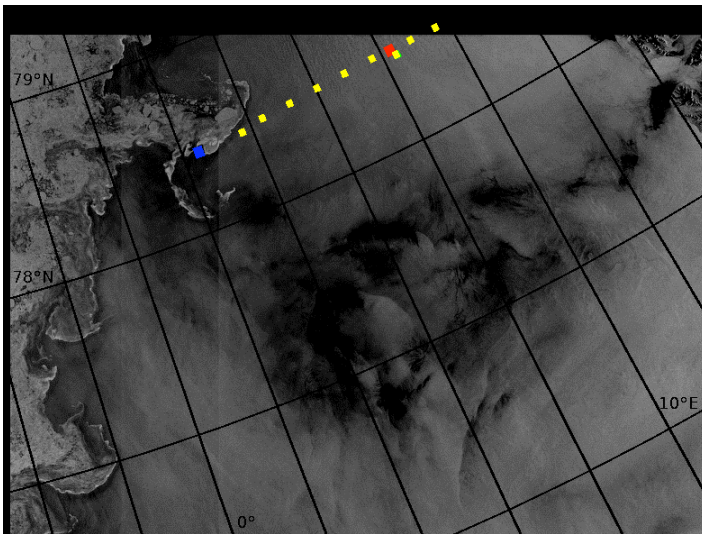


Figure 1. Source mooring in red, receiver mooring in blue, and CTD stations in yellow are overlaid the ASAR image from 16 August 2008.

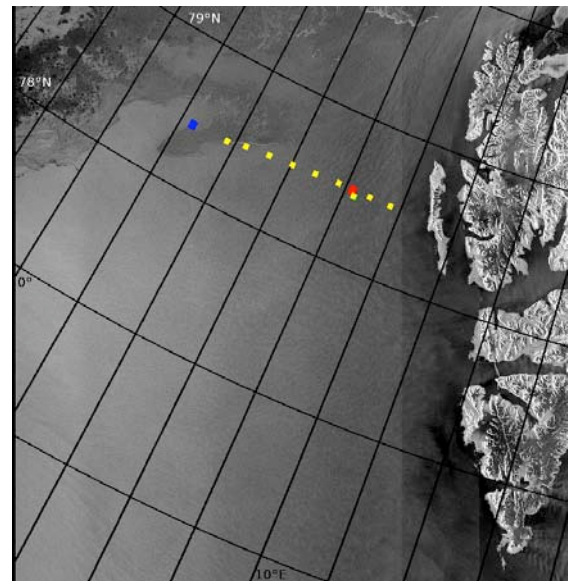


Figure 2. Source mooring in red, receiver mooring in blue, and CTD stations in yellow are overlaid the ASAR image from 18 August 2008.

During 19-26 September 2008 the Nansen Environmental and Remote Sensing Center (NERSC) and collaborators conducted a 7 days long scientific field experiment in the Fram Strait between Greenland and Svalbard.

On this cruise it was confirmed that the tomography system is working according to transmission schedules, 20 acoustic listening stations were obtained, 16 XBTs were obtained along the acoustic track, AWI's sea glider was recovered, UPMC Moored Ocean Profiler (MOP) mooring and AWI winch mooring were recovered, and finally 3 ice stations were visited. Figure 3 shows the ship track and the field activities. To plan the field activities we used ASAR data covering our area in combination with weather forecasts. Some changes in the planned time schedule was made, but all tasks were carried out with minor deviations from plan..

To summarise, the two cruises were successfully carried out with the exception that we were not able to download the acoustic data using acoustic modems.

As part of the “Bridge building” project between NERSC-WHOI-SIO, funded by the Norwegian Research Council, Peter Worcester from SIO and Andrey Morozov from WHOI were visiting Svalbard and Bergen for testing, preparation and participating in the first field experiment. To ensure exchange of expertise and competence building young scientists, experienced scientists and representatives from companies participated in the two cruises. After the RV Håkon Mosby cruise, a workshop was held at NERSC where Peter Worcester and Andrey Morozov gave lectures.

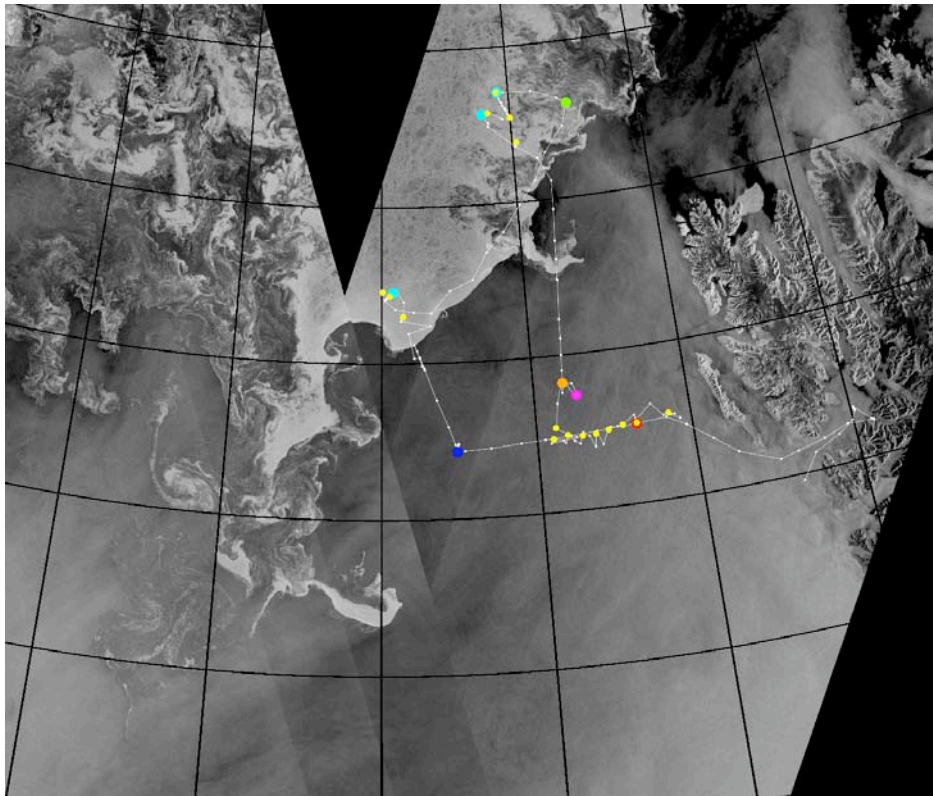


Fig 3. Ship track during the cruise plotted with white dots every four-hour with a line between plotted on the ASAR image from 20 September 2008. Source position is marked by red, blue is the receiver location, yellow is the acoustic listening positions, green is the UPMC-MOPS mooring position, turquoise is the ice station positions, orange is the AWI mooring position, and lilac is the glider retrieval position.

## Acknowledgement.

Thank you to all the scientists and engineers from several institutions taking part in the preparation of all the instrument components and participating in the two cruises. Furthermore, we thank the excellent crews onboard the RV Håkon Mosby and KV Svalbard for their outstanding help during our field experiments. Special thanks to the Coast Guard for providing 17 XBTs. We are also grateful to the Geophysical Institute, University in Bergen for their contribution during cruise preparation and the field experiments, and for letting NERSC personnel using their nice laboratory facilities in Bergen. Thanks to NAXYS AS for providing the short vertical hydrophone array used for listening to the source during the KV Svalbard cruise. Finally, we will thank the logistics department at UNIS for helping us with preparation of the equipment before the cruise started.

These field experiments were part of the DAMOCLES integrated project which is financed by the European Union in the 6th Framework Programme for Research and Development" and the Norwegian Research Council through SAM-EU. The acoustic tomography experiment is also funded by the StatoilHydro and Aker Solutions.

## Acoustic tomography experiment in the Fram Strait RV Håkon Mosby 14-18 August 2008

**Project Leader: Prof. Stein Sandven, Nansen Environmental and Remote Sensing Center (NERSC)/UNIS**

**Chief scientist: Dr. Hanne Sagen, Nansen Environmental and Remote Sensing Center (NERSC), Norway  
Norway**

**Investigators:**

**NERSC, Norway: Svein Arild Haugen and Johan Wåhlin**

**Geophysical Institute, University of Bergen, Norway: Steinar Myking**

**BJORGE AS – NAXYS, Norway: Jens Abrahamsen**

**StatoilHydro, Norway: Kjersti Bruserud**

**IOPAN, Poland: Piotr Wieczorek**

**Aquatec, United Kingdom: Carla Hubbard**

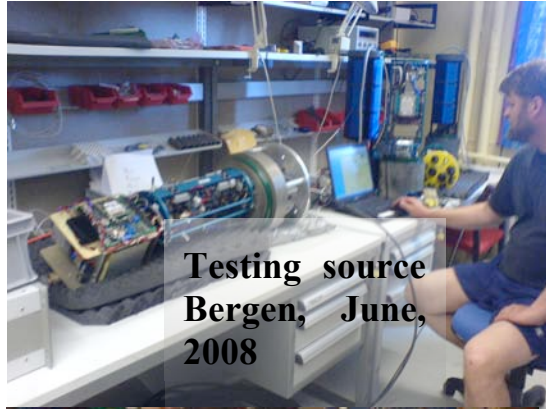
**Scripps Institution of Oceanography, CA, USA: Peter Worcester**

**Webb Research Corporation/Woods Hole Oceanographic Institution, MA, USA: Andrey Morozov**





# Field preparations and deployment of acoustic tomography moorings from RV Håkon Mosby.



Testing source  
Bergen, June,  
2008



Equipment  
arrived  
Longyearbyen  
August, 2008



STAR/Modem test,  
Longyearbyen, 2008



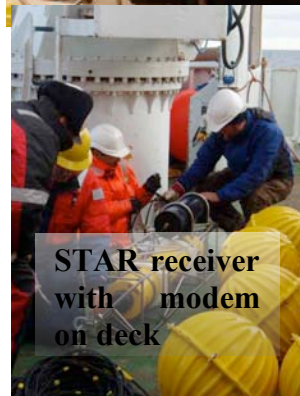
Equipment ready to go!



Cleaning o-rings..



Loading batteries



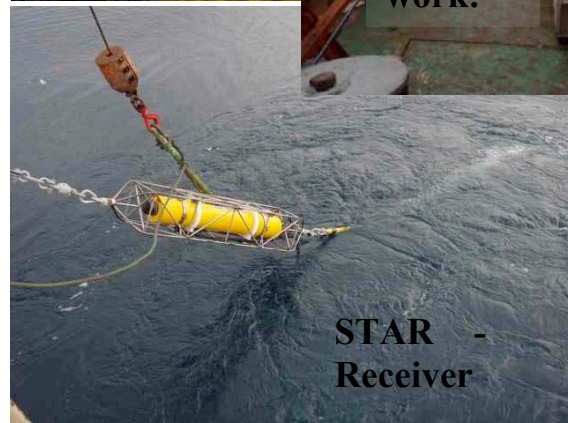
STAR receiver  
with modem  
on deck



Team  
work!



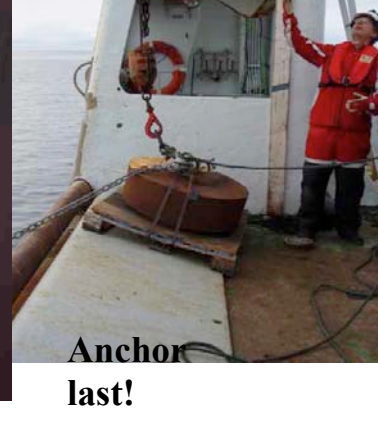
Final preparations Acoustic Source



STAR -  
Receiver



Acoustic  
releases



Anchor  
last!



*Acoustic tomography experiment 2008*



## **Acoustic tomography experiment in the Fram Strait KV Svalbard 19-26 September 2008**

**Project leader: Stein Sandven, Nansen Environmental and Remote Sensing Center (NERSC), Norway**

**Chief scientist: Hanne Sagen, Nansen Environmental and Remote Sensing Center (NERSC), Norway**

### **Investigators:**

**NERSC, Norway:** Svein Arild Haugen, Johan Wahlin and Sigrid Lind Johansen

**Aquatec, United Kingdom:** Carla Hubbard

**Alfred Wegners Insitute, Germany:** Agnieszka Beszczynska-Moelle, Olaf Strothmann

**Université Pierre et Marie Curie, France :** Herve Legoff

**Aker Solutions, Norway:** Kenneth Johansen

**Department of Physics, University of Bergen, Norway:** Halvor Hobæk

**Universidad Politecnica de Valencia, Spain:** Victor Espinosa Rosello



