

**ARCTIC OCEAN SCIENCES BOARD: NATIONAL REPORT 2009  
FINLAND**

***General Remark:***

Most of the Finnish Arctic activities have been done at the Finnish Meteorological Institute (FMI). However, with respect to field activities 2009 has been a quiet year.

***Remote sensing, sea-ice.***

PI: Ari Seinä, Finnish Meteorological Institute [ari.seina@fmi.fi](mailto:ari.seina@fmi.fi)

Time frame: Ongoing

Sponsoring Organisations: FMI, ESA (2005-)

**Activity:**

Ari Seinä has worked mainly under ESA's GMES project Polar View. The project is coordinated by C-Core (Canada) and it has about 40 partners from Europe and Canada. The overall goal for Polar View is to be the World's leader providing EO services and products for environmental monitoring and security for the Polar Regions. That goal will be reached by building a cohesive international network meeting the following objectives: 1) engage a wide spectrum of end users who can be convinced of the value of the services and products, 2) provide a suite of desirable EO-related services and products to governmental users, 3) provide additional EO-related services and products to industrial users, 4) interface in a mutually beneficial way with the cryospheric science and climate change community; and 5) generate revenues, either directly or indirectly, from the provision of the suite of services to sustain Polar View.

Polar View structure has nodes for the Baltic (land and sea ice), Europe and Russia (the Euro-Arctic Node), and North America. Each node is a consortium in itself and managed by a Node Manager. Operational Service Providers report to the Node Managers in their region; the Node Managers report to the Program Manager who in turn reports to ESA. Pan-Arctic activities were initiated within the International Programs. Baltic Node is lead by Ari Seinä, FMI.

***Meteorology***

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Time frame: Ongoing

Sponsoring Organisations: FMI, EU (DAMOCLES (2005-2009))

**Activity:**

The Arctic atmospheric moisture budget was analysed on the basis of ERA-40 data in collaboration with the University of Tartu (Jakobson and Vihma, submitted).

Boundary-layer processes during a flow parallel to the sea-ice edge in the Barents Sea were studied on the basis of aircraft observations (AWI) and modelling.

Studies on the atmospheric forcing on the drift of Arctic sea ice were continued.

Studies on the meteorological factors controlling the inter-annual variability of the spring onset of snowmelt on the Arctic sea ice together with University Pierre et Marie Curie, Paris were continued.

***Sea ice dynamics and thermodynamics.***

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Time frame: Ongoing

Sponsoring Organisations. FMI, EU (DAMOCLES (2005-2009))

**Activity:**

Sea ice group of FMI have continued analysis of the Tara measurements, in particular examination of seasonal changes of physical properties of ice cover and effect of the atmospheric cyclones on ice dynamics.

### ***Oceanography***

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Time frame: Ongoing

Sponsoring Organisations: FMI, Department of Physics, University of Helsinki, EU (DAMOCLES (2005-2009), THOR (2008-2012))

#### **Activity:**

During 2009 the main Arctic activity at FMI was to analyse observations from DAMOCLES cruises and from the Chinese IPY expedition CHINARE2008.

The research has been concentrated on four themes: 1) The freshwater and heat storage in the Arctic Ocean, 2) the exchanges of freshwater and heat between the Arctic Ocean and the North Atlantic, 3) the circulation and transformation of the Atlantic water in the Arctic Ocean, and 4) the impact of the Barents Sea branch on the water mass characteristics of the Arctic Ocean.

FMI participated in one THOR field expedition to Denmark Strait to study the characteristics of and the entrainment into the Denmark Strait overflow plume.

#### ***Publications:***

Jakobson, E. and T. Vihma, Atmospheric moisture budget over the Arctic on the basis of the ERA-40 reanalysis. Submitted to *Int. J. Climatol.*,

Marnela, M., Rudels, B. and Eriksson, P. (2009) Circulation and water mass transformation in the Arctic Ocean, *Geophysica*, 45, 147-162.

Rudels, B. (2009) Arctic Ocean Circulation, in *Ocean Currents*, a derivative of *Encyclopedia of Ocean Science* 2nd. Ed, Eds J. Steele, S. Thorpe and K. Turekian. Academic Press, 217-231.

Rudels, B., Kuzmina, N., Schauer, U., Stipa, T. and Zhurbas, V. (2009) Double-diffusive convection and interleaving in the Arctic Ocean – Distribution and importance, *Geophysica*, 45, 199-213.

Rudels, B. (2010) Constraints on exchanges in the Arctic Mediterranean – Do they exist and can they be of use? *Tellus*, 62A, 109-122.

Sankelo, P., Haapala, J., Heiler, I. and Rinne, E. (2010) Melt pond formation and temporal evolution at drifting station Tara during summer 2007. *Polar Research* (in press).