JCOMM Expert Team on Sea Ice

Finland Member Report

March 2010

Introduction

1. Operational ice service started in Finland in 1915 under the Finnish Scientific Society. In 1919-2008 the Finnish Ice Service has operational under the Finnish Institute of Marine Research, and since 2009 under Finnish Meteorological Institute. The Service is responsible for charting and forecasting of the Baltic Sea ice conditions. The main purpose of the service is to secure smooth marine transportation and decrease risk of ship accidents during the Baltic Sea ice season.

Operational support

Drivers and users

2. Marine transport is the main driver when ice services are developed. Marine transportation in Finland has grown about 33% in last ten years, and the trend seems to continue at the same level. In Finland more than 100 million tonnes were marine transported in 2009 of which about 40-45% during winter months. In the Baltic Sea about 800 million tonnes were marine transported in 2009 of which about 40% during winter months. Marine transportation is expected to grow into 1.2 billion tonnes by 2020.

3. The users of operational ice information are vessels, icebreakers, pilots, icebreaking leaderships, maritime authorities, ports, shipping companies, export and import companies, etc. The main users are Finnish and Swedish icebreakers, Finnish and Swedish icebreaking authorities (Finnish Transport Agency [ex Finnish Maritime Administration] and Swedish Maritime Administration), and Arctia Shipping Ltd (operator of Finnish icebreakers, ex Finstaship Ltd). Since October 2005 ice charts and ice reports have been available free-of-charge at Internet. In 2009 more than 300,000 requests were for ice charts, and about 40,000 requests for ice reports. From 2007 Finnish ice service has also provided ice information to Baltic Icebreaking Management (BIM) via its web pages.

Coverage, products and services

4. Ice monitoring area covers the Baltic Sea, Kattegat, Skagerrek, and Swedish lakes of Vanern and Malaren. Ice season starts in mid October with sea surface temperature charts published twice a week, followed by daily ice charts normally between mid of November and end of May.

5. Sea surface temperature charts updated on Mondays and Thursdays including means of 1970/1971-1999/2000 for comparation. SSTs are included the ice charts. Ice charts on daily basis covering the Baltic Sea, Kattegat, Skagerrek, and Swedish lakes Vanern and Malaren (about 53º 20'N 9º 00'E -66º20'N 31º00'E). The B&W and colour coded ice charts include ice conditions in WMO ice symbols, icebreakers, restrictions to navigation and traffic control information. Ice reports in plain language are published in Finnish, Swedish and English on daily basis. They include description of ice conditions, information of Finnish icebreakers, restrictions to navigation and traffic control information. Ice conditions in Baltic Sea Ice Code are provided on daily basis. All SAR images and useful Modis images are sent in near real time to Finnish and Swedish icebreakers. High-resolution ice thickness charts based on SAR data are published with the spatial resolution of 500m always when SAR data is available. Ice forecasts for 45h are published on daily basis in 3h time-steps and with 7 parametres.

Products and services are available free-of-charge

Ice charts and ice reports:
http://www.itameriportaali.fi/html/icef/jaakartta.pdf
http://www.baltice.org
http://www.bsis-ice.de

High-resolution ice thickness charts at:
http://polarview.fimr.fi
http://www.baltice.org
http://www.polarview.org

45h Ice forecasts at:
http://polarview.fimr.fi
http://www.baltice.org
http://www.polarview.org

Selected Modis data at:
http://www.baltice.org

Other services and products are available on request.

Data sources

6. Main data sources are satellite data and in situ measurements. Main space-borne data are Wide Swath SAR data from RADARSAT and Envisat. About 240 images were used in ice season of 2008-2009 (in 2010 this is expected to grow into 400-700 images). Noaa AVHRR data is used on daily basis, and 8-12 images used in a day. Modis data has been used operational since 2007. AMSR is used as background information because of poorer spatial resolution. In situ data consists of icebreaker observations delivered by both Finnish and Swedish icebreakers many times a day (edges, boundaries, thickness, pressure fields, deformation, drift, etc.); about 20 ships are providing both ice information and they are also measuring sea surface temperatures. FMI has about 25 ice observation stations, where black ice, snow ice and snow thickness are measured and observation on ice conditions are recorded on daily or weekly basis.

Validation

7. Main validation data of products and services are collected on regular basis from icebreakers (edges, boundaries, thickness, drift), and during various field campaigns.

Medium range forecasting

8. Medium range ice forecasts are provided to Finnish icebreakers, Finnish icebreaking authorities (Finnish Transport Agency, ex Finnish Maritime Administration), Arctia Shipping Ltd, and shipping companies. This service includes 7-10 day forecasts of development of ice conditions.

Training

9. Training of icebreaker personnel is done in 1-2 times a year by organizing workshops. Main purpose is to exchange ideas for developing new services and products, and develop present services and products to user friendly. Training of other user groups is not frequent.

Research and development

10. Over the intersessional period, FMI has developed high-resolution ice thickness charts and ice forecasts into operational phase. This was done under finance of ESA's GSE programme in Polar View project. FMI is participating EU's GMES My Ocean project, where e.g. in Sea Ice and Wind Tactical Assembly Center (SIW TAC) providing all ice information to My Ocean Forecasting

Centers. Transferring the method from Baltic Sea to the Arctic first year ice, where high-resolution ice thickness charts are produced by using SAR data, is under development.

International activities

11. FMI has been active in Baltic Sea ice Meeting (BSIM).

12. FMI has been active in International Ice Charting Working Group.

13. FMI is the founding member of European Ice Services (EIS), and in 2009-11holding it's chairmanship.

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