SMHI

26th Baltic Sea ice meeting
September 19th-21st
Norrköping, Sweden 2016

Final Report BSIM-26

Norrköping, Sweden 2016

Photo: Tuomas Niskanen

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1. Introduction

The 26th Baltic Sea Ice Meeting was hosted by the Swedish Meteorological and Hydrological Institute (SMHI) in Norrköping, Sweden. It was the third time the meeting was held in Norrköping. The meeting was opened on Monday 19th of September 2016 and closed on Wednesday the 21st of September 2016. Following the meeting was an ice analyst workshop 21-22nd of September. A total of 20 participants joined the meeting and workshop; ice analysts and icebreaker management from Sweden, Finland, Latvia, Poland, Germany and Denmark.

1.1 Organisation of the meeting

Emma Grönkvist, as new manager for the oceanographic forecast & warning services at SMHI, took over as chair from Anna Geidne and earlier Torbjörn Grafström who both have left their occupation at SMHI. Isabella Grönfeldt, SMHI had been chosen as secretary of the meeting.

BSIM-26 startup. Photo: Tuomas Niskanen.

2. Opening of the meeting

General Director of SMHI Rolf Brennerfelt greeted all the participants of the BSIM-26 welcome to Norrköping and wished for a productive meeting. For list of participants see Appendix 1.

Chair Emma Grönkvist opened the meeting, and started with an around the table presentation round. The meeting adopted the Agenda presented in Appendix 2.

2.1 BSIM chair

Presentation by Emma Grönkvist, SMHI, Appendix 3.

2.2 Action items from BSIM-25.

Full specification of the action items from BSIM-25 is presented in Appendix 4.

1. BSIC: 25 fairways could be removed from the list of Swedish fairways. Discussion lead by Jürgen.
2. Chart symbols: discussion lead by Jouni.
3. Navtex: Sweden is in charge of the international navtex. The international navtex is already full with meteorology so it's not possible to fit in any ice information. Meteorology area 1 is the North Atlantic, the Baltic is a subarea.
4. S100 symbols: closed since the subsequent S101 is approved.
5. Indicator of sea ice condition: need to keep the calculation of the maximum ice extent as a clear climate indicator. As it has been calculated before the extent is different, likely due to

different landmasks. Need to be further discussed, since there is a lot of new ice charting systems as well. Ongoing during the meeting.

6. Prep of meeting: closed.

3. National reports

3.1 Poland

Presentation by Ida Stanislawczyk, IMGW-PIB,Appendix 5.

Instytut Meteorologii i Gospodarki Wodnej.

Last three winters were mild and very mild, no charts or reports at all 2014/2015. Not much ice along the polish coast.

Ice extent is not a sufficient measurement for the winter severity, total days below freezing is a better way of deciding whether the winter has been mild, normal or severe.

There is usually no problem for navigation in Gulf of Gdansk even during severe winters. On Firth of Szczecin on the other hand there is usually ice and obstructions for the navigation.

3.2 Germany

Presentation by Jürgen Holfort, BSH, Appendix 6.

Finalized the climatological ice atlas of the North Sea, have distributed them to the fellow ice services.

Sandra Schwegmann replaced Natalia Schmelzer who was retired.

The new Sentinel data is much appreciated and makes work easier.

The operational model including sea ice requires a little bit more work, but they are optimistic for the future of sea ice models and would like to incorporate them more into future sea ice products.

The work with S-411 is proceeding. Anticipating Sigrid-3 format from the new ice charting system in Sweden and Finland.

3.3 Sweden

Presentation by Magnus Larsson, SMHI, Appendix 7.

Last season, 2015/2016, the maximum sea ice extent was calculated to 111 000 km^2 on 23rd of January, which was earlier than usual. Mild ice winter, but close to normal (based on the sea ice extent) during a short period.

Produces ice charts, reports and weather and ice forecasts for the icebreaker management and other commercial customers.

In total 8 people on the ice service during the season.

Joint production between SMHI and FMI planned for next season, share systems and databases.

3.4 BIM

Presentation by Ulf Gullne, SMA, Appendix 8.

Common operation between Finland and Sweden for 5 seasons.

Kontio started the season 15/16, just before New Year, due to maintenance on Ale which was planned to start the season. Oden was the last icebreaker to leave port and assist, but only for a short period of time.

All the 5 Swedish icebreakers were in operation last season, not the multipurpose icebreakers.

Have been a lot of mild winters, but the number of assisted vessels have increased the last 4 years, though mild winters results in the wind packing the (movable) ice to the coast. A severe winter might be an easier winter for the icebreakers and the winter traffic, as the ice is more stable.

The average waiting time should be no more than 4 hours, last season it was 2.5 h but 90% of the vessels were assisted without waiting.

1A and 4000 dwt is the minimum ice class for the Bay of Bothnia even though it's a mild winter.

Ulf Gullne presenting the report from the Baltic Icebreaking Management (BIM). Photo: Anders Söderberg.

3.5 Latvia

Presentation by Andrejs Zubaničs, LEGMC, Appendix 9.

First winter for Andrejs, with ice reports and research. At LEGMC there is a total of 3 hydrologists that manage the ice.

First ice on 4th of January, in Gulf of Riga, and on the 8th of February all ice was gone again.

Gets a forecast for the next 48h from Copernicus.

Have an application for snow and ice observations that were given to the local police of Riga, and as they were driving around town the police took measurements of the snow and ice at specific locations. The observations were instantly available for the analysts.

3.6 BSIS Website

Presentation by Jürgen Holfort, BSH.

http://bsis.eisdienst.de/

The Baltic Sea Ice Services webpage is managed by BSH. It receives data via GTS from all the ice services.

Haven't changed much, but tries to keep it up to date. Would like information if anyone changes address or information of some kind.

Observers: Latvia and Germany dependent on observers, Finland have up to 25 observers, Sweden have 2-4 and are planning to expand.

3.7 Finland

Presentation by Jouni Vainio, FMI, Appendix 10.

3 mild winters in a row.

More than 1 million downloads of the pdf ice chart.

Started using a new ice charting system called Vanadis last season, which is developed and used together with SMHI. Vanadis is another name for the Norse goddess Freyja, the goddess of love and fertility. Vanadis is an ArcGIS based system and can output shapefiles, soon Sigrid3 (Jürgen will be notified when the files are ready so that the conversion to S411 can be initiated).

Combined production with SMHI is planned to start season 17/18. The production is going to shift between SMHI and FMI.

The ice service is developing a new application called the Seawiki, that is used for crowdsourcing, so that people can share their observations. The application should be used for both weather and ice observations.

3.8 Denmark

Presentation by Jens Jakobsen, DMI, Appendix 11.

The Greenland ice service makes ice charts for the Greenland coast. Based in Narsarsuaq. 4 people working in the ice service at DMI. For ice charting ArcGIS system 9.3 is used, not yet 10.

The Greenland glaciers spit out a lot of icebergs in the fjords, there is also both first and multiyear ice present.

The ice service gets a lot of satellite imagery! Sentinel 1A, 1B, 2A and Radarsat 2, Cosmoskymed, Modis Aqua/Terra. HH/HV and medium/high resolution. Available is also webcamera from vessels and helicopter images from the Ice Patrol.

Ice Patrol Narsarsuaq distributes their images in an open group on Facebook (and dropbox), very popular, everyone has a smartphone these days! Over 2000 members. Dropbox was more used before, but have moved over to Facebook as it is much lighter and quicker. 50% are just members in the group to look at the uploaded images, a lot of people in Denmark have a connection to Greenland.

No official observers. Communication with ships, harbours and the public (e.g. through facebook) can result in images or measurements.

All the Greenland coast is charted Mondays and Thursdays using the egg code. Daily charting is done for smaller areas; east, west and Kap Farvel.

Started putting ice information in the maritime forecast last season.

Sends a Quick Look, satellite image with comments/marks from the analyst, to (paying) ships before start working on the ice chart, the ice chart is sent when it's ready about 2h later. Commercial product.

Have developed a product that spots the icebergs in open water. In open water the icebergs give a clear signal, but not when they are stuck in the ice.

Supports seismic surveys in NE Greenland and supplies to Antarctica with Quick Look and ice charts.

Uses the speed of the vessels to analyze the ice conditions.

Question how understandable are the Quick Looks: The Quick Looks are well understood by the public, people have no trouble to interpret them. It's clear for marine traffic to see what paths are the best to take. It's a good way to show the satellite images, which is very important to do.

Question about the glaciers and sea ice reaction to warmer summers: the sea ice retrieved early after warm spring and summer.

Suggestion: create an observation application for the entire Baltic

Jens Jakobsen presenting the national report from DMI. Photo: Tuomas Niskanen.

4. WMO-sea ice nomenclature

Discussion lead by Jouni Vainio, FMI, Appendix 12.

1. **Floebergs** (no more than 10 m across and 2 m above sea level): **decision** the symbol must have a background in the chart and is to be placed in an open water polygon and not ice free. Use floebergs/floebits only when spotted on the satellite images, or reported by observers. Be sure to use Navtex to warn the users if there is a floeberg, especially if it's in an otherwise ice free area.

2. **Strips and patches**: always in open water polygon, see Floebergs above.

3. **Brash ice barrier**: uses a point symbol which isn't accurate as it's a line feature. Should the point of the symbol point towards the ice edge or southwards? Should the symbol change, should it be a line? Lifted to ETSI. Sweden and Finland are going against the WMO standard, uses only a single triangle symbol (pointing southwards) with no line underneath, matter of interpretation. The WMO name is jammed brash barrier.

4. **Number of symbols**: to avoid too many symbols in the chart there is a suggestion to add it as a polygon feature and it's automatically visualized in the chart with a fixed distance between the symbols. If the polygon is too small for a symbol there is no visualized symbol.

5. **Thickness**: in the Baltic we use a range, the most convenient way.

6. **Compact ice**: 9+/10 to 10/10 compact ice, good color code.

7. **Rotten ice**: unclear color and easy to miss, therefor the thickness measurements will be removed and replaced by a ROTTEN ICE sign.

8. **Colored or black and white charts**: Finland has decided not to publish black and white charts. Denmark creates both as the file sizes of the black and white charts are smaller and a lot of the vessels only have a black and white printer. How will it look like in the future, with the younger generation?
   There has been no complains of the black and white raster format with the new consolidated and rotten ice types. If we hear anything we must evaluate the rasters and lift the issue to ETSI.

5. Baltic Sea Ice Code

Discussion lead by Antti Kangas, FMI.

Denmark, Germany and Poland get ice code observations from their observers. Germany uses the codes to give statistics to the navigation management at the end of the season.

Finland don't see any user for the ice codes. If observations were provided it would be important to mark in the metadata of the codes whether they are analyzed from the chart or actual observations, perhaps add a fifth number to the code or just save it in the metadata in the database, not show it to the users.

The main users of the ice codes may be the ice services themselves. Such detailed information along the coast is also valuable for e.g. marine life research such as fishing, fish larvae and seal research but also for decision making regarding coastal constructions.

SMA and FTA use the codes as foundation for the restrictions, and provide and receive the ice code to vessels/pilots. Pilots and icebreakers can report the codes in situ. The new system IBNext can be developed so that they can report in the system. The codes are detailed and valuable information for the ice condition in the leads, it should not be outside of the leads such as information taken from the ice charts.

FTA pilots fill in a report after each journey, including the ice conditions in the fairways.

There is value in the ice codes if there is someone observing, it's more detailed than the chart, a valuable long term climate statistical record. If the information is taken from the ice chart there is no real point of the codes, could be possible to create a first guess.

Decision: The codes will remain. FTA/SMA will provide observations from pilots and icebreakers.

Action point: FTA/SMA will have further discussions with FMI/SMHI.

Discussion about the Baltic sea ice code lead by Antti Kangas. Photo: Anders Söderberg.

6. Severity of the ice winter

Open discussion.

Today maximum ice extent is mainly used as a measurement of the severity of the ice winter, it's agreed however that this is not the best method. One suggestion is to use accumulated volume.

One question is where to draw the physical line for the calculations? For example the Swedish west coast should not be included, since it is often just thin ice. Sweden and Finland have the border at Skagen, including Kattegatt.

SMA suggest to divide the coast areas for the calculations of the maximum ice extent. Germany have a specific index for the German boarders, calculating the accumulated areal ice volume using data from ice observation stations.

There are big differences between the countries what is considered a mild/normal/severe ice winter, depending on e.g. the location and distribution of the sea ice. There are differences between the definitions of the ice services and the icebreakers and pilots. FTA states that the last mild winters have been very harsh for the pilots, with a lot of obstructions and delays. There is also a difference between the methods of the ice services.

It is concluded that when calculating volume the average thickness should be used. Denmark and Germany states that they have only looked at level/not ridged ice in their volume calculations. Denmark also suggest that freezing degree days is a good indicator of the severity of the ice winter.

It is decided to continue this discussion at the next BSIM, and share calculations of maximum ice extent and maximum ice volume after the season 2016/2017.

7. Ice drift in operational products and ice charts from numerical model output

Discussion lead by Jürgen Holfort, BSH.

Denmark has had discussions with their users and they have a demand for ice drift for the next 24h. Displays wind vectors on the ice chart due to user needs.

SMA: The need in Greenland is very different to the need in the Baltic Sea. It might be too much information for the users. SMA would like the information themselves but they already have the model information in the IBNet system. Don't think that the public have use for the information in the chart. File size is important there are vessels entering the Baltic Sea with no internet connection at all, they only have phone and fax. The level of detail in the models aren't sufficient, the traffic planning is dependent on the forecasts from the ice analysts. The end users don't have the patience for an insufficient product, the time is not here yet.

Finland shares their model data in open data. Suggests a chart product with selectable layers; ice, wind arrows and ice drift, would result in a large file. Would be good to gather all the information in one place. See the future in the proposition. However the traffic in the Baltic Sea is very restricted so the need or use might not be there yet. A combined product should be updated continuous, every time there is new model data.

Sweden are not sure if the models are good enough. The forecast provided to the SMA is not based on the models but rather on meteorological factors and ice analyst experience. FMI calculate satellite derived ice displacement, that could be a start, and incorporating the models more in the future. At the moment the ice forecasts are very different, the initial conditions in the models are not as good as they need to be. Who is the user, the icebreaking management or the public? There is a big difference. The ice forecasts and ice drift from the models are already displayed on the webpages as an own product. The forecasts shouldn't be mixed with the ice chart which should be seen as the truth. SMHI is planning to visualize the written forecast to the SMA, but not to combine it with the model data.

Germany suggests to show the forecasts right away, a lot of money are put into the models and they will be sufficient in time but we can't wait for that to happen. However, it's important to mention in the product that the model is not the only or strict truth.

Summary: The available sea ice forecast models are very different.

8. Visit to the production area

Tour lead by Isabella Grönfeldt and Mattias Lindh, SMHI.

The ice analyst working station was presented, with IBNet system, ice report (Ice Editor from FMI) and ice chart programs (Vanadis in cooperation with FMI) and meteorological aid for forecasting (ECMWF clusters and eCharts).

Mattias Lindh presenting the ECMWF material used for the 15 days weather and ice forecasts issued by SMHI. Photo: Anders Söderberg.

9. NEMO-Nordic ice and temperature

Presentation by Patrik Ljungemyr, SMHI.

NEMO is a new 3d oceanographic model with 56 vertical layers and 1 M horizontal resolution. It's a wildly used model all over the world and it's one of the most used oceanographic models in Europe.

Latest version LIM3.6 has 5 ice categories and a separate snow layer.

NEMO-Nordic is operational since May 2016.

Comparisons of measured and modelled SST have been good and after comparisons of sea ice extent between models and observations it's concluded that NEMO-Nordic is better than Hiromb. NEMO-Nordic captures the sea ice extent well.

Output netcdf and grib, data will be uploaded to open data (with a manual fee for distribution) during the winter, currently it's available at ftp.

60h forecast 4 times a day, 10 day forecast twice a day.

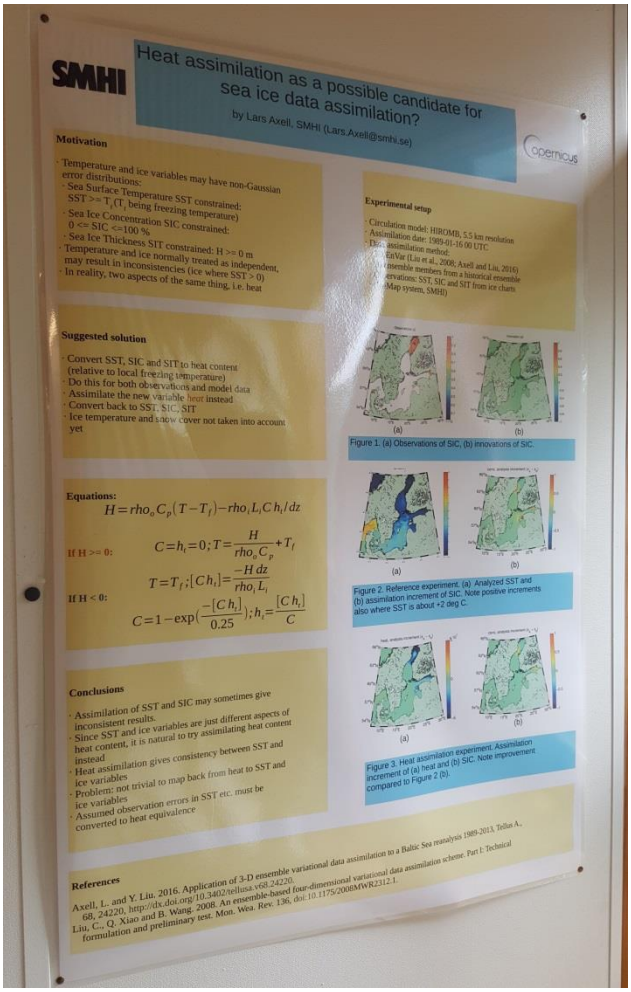
Estimate to get sea ice assimilation starting from sea ice charts (the latest chart) before the start of the ice season.

Patrik Ljungemyr giving a presentation about Nemo-Nordic. Photo: Isabella Grönfeldt.

10. Heat assimilation as a possible candidate for sea ice data assimilation

Poster by Lars Axell, SMHI.

By changing the ice assimilation from sea ice concentration to heat content the assimilation is more accurate.



Poster titled Heat assimilation as a possible candidate for sea ice data assimilation by Lars Axell.

11. Meteorological and ice forecasts

Presentation by Amund Lindberg, SMA.

Information about the needs of the icebreaker management concerning meteorological and ice forecasts.

Meteorological forecast parameters: wind, temperature, sea level

Up to 10 m/s no problem, 15 m/s every vessel needs assistance, 20 m/s start to discuss closing of ports in the northern Baltic. The southern and especially the northern Quark, due to topography, are the worst areas. 25 m/s no assistance into harbours.

Icebreakers are built so that the ice should pass under them smoothly, the bottom is egg shaped. Therefore the icebreakers are sensitive to wavy or windy conditions.

It's about 1-2 m between the maximum and minimum sea level, there is a security zone all along the coast at 12 m depth.

Ice forecast parameters: drift, growth, melting, ridging, SST

10-15 days to hire extra ships for icebreaking, therefore the longterm forecasts are very important for planning.

There are several ways of getting forecasts, the icebreaker management are trying to limit it for the captains of the icebreakers, would prefer them to just use IBNet/IBNext.

Time steps for the forecasts:

- 0-2 days here and now
- 3-5 days relocation of icebreakers
- 6-15 days larger relocations or decision to hire extra icebreaking ships

Often the time step 0 can be inaccurate in the forecast compare to in the field, especially for the wind parameters. Better to have a larger wind range than to have an inaccurate single value.

Since 2001 the Swedish icebreakers are stationed in Luleå and have 48 hours' notice.

Addition from FTA: works much or less in the same way on the Finnish side but the biggest difference is that the icebreakers are stationed in Helsinki, takes 2 days to travel up to the north, plus 1 day for supplies etc. gives a minimum of 3 days to insert a new icebreaker.

Amund Lindberg presenting important aspects of the weather and ice forecasting from the icebreaking management point of view. Photo: Isabella Grönfeldt.

12. European maritime safety agency (EMSA)

Jürgen suggested that EMSA should have the ice charts in their system, and it was decided that when the Sigrid-3 and S-411 files are ready every ice service shall contact their national EMSA representative so that they can add the data into the system. Germany was the first country to provide EMSA with their files.

13. Future possibilities for BSIM

The meetings are valuable, it is important to get to know your colleges from neighboring countries and share ideas and experiences.

Decided to have the meeting every 2 years, the best time of the year would be in June or September.

Action list the working email addresses in the final report. See Appendix 13.

Earlier Russia has participated and the Polish coastguard. The icebreaking managements are valuable members of the meeting. The maritime services are invited to lift any problems and needs in these meetings. It would be good to include other users of the ice services, for example shipping companies. The hosting country usually invites some local users. It is also valuable to have someone from the outside that doesn't operate in the Baltic, like Jens Jakobsen in this meeting, who can give a new perspective and fresh ideas. Jens valued the meeting himself and will recommend DMI to continue to participate in the meetings. It was suggested to invite modelers to the meetings.

It was concluded that 2 days of meeting with a mixture of presentations and discussions is preferably.

Regarding the BSIS webpage Jürgen stated that it's always open for suggestions and new ideas. It is important to have updates such as agendas from previous meetings and to make sure that email addresses are up to date.

The workshop was an appreciated addition to the meeting. It is very good to get introduced to the systems of the other institutes. It is convenient with a forum where you can have workshops alternating with the IICWG ice analyst workshop.

DMI have customer meetings in Copenhagen every 2nd year and the management travel to Greenland to meet the users there. This results in good communication with the users and a flowing email communication between the meetings.

14. Next meeting

Latvia was elected as the new chair country and the next Baltic Sea Ice Meeting will be held in Latvia in 2018.

14.1 Topics

Suggested topics for next meeting was:

- IBNext – SMA/FTA
- Common production FMI/SMHI
- Cooperation between the service
- Common products
- Severity of the ice winter

14.2 Theme

It was suggested to have a theme for next meeting, and the suggestions where modeling or cooperation.

15. Action items BSIM-26

Review of the final action items for BSIM-26, presented in Appendix 14.

15.1 Suggestions and decisions during the meeting

During the meeting it was suggested to:

- Develop an observation application for the entire Baltic.
- Develop the ice symbols as a polygon feature.

During the meeting it was decided that:

- Ice symbols are to be drawn only within open water polygons never only on ice free.
- When the ice is rotten the thickness signs will be removed and replaced with a ROTTEN ICE textbox.
- The 4 digit ice code will remain.
- FTA and SMA will provide observations from pilots and icebreakers.
- Every ice service should provide EMSA with up to date Sigrid-3 and S-411 data.
- BSIM should be held every 2 years, best time is in June or September.
- Continue discussion about measurement of the severity of the ice winter, and share calculations after the season 2016/2017.

16. Closing of the meeting

Chair Emma Grönkvist thanked all the participants for an excellent meeting and wished those who were not staying for the workshop a safe journey back home.

The meeting was closed at noon on Wednesday the 21st of September.

BSIM-26 participants as well as specially invited dinner guests on a guided tour in Norrköping. From the left Torbjörn Grafström, Jan-Erik Lundqvist, Andrejs Zubaničs, Magnus Larsson, Sandra Schwegmann, Jens Jakobsen, Amund Lindberg, Emma Grönkvist, Antti Kangas, Isabella Grönfeldt, Jürgen Holfort, Anna Kubicka, Tuomas Taivi, Ida Stanislawczyk, Anni Montonen and Anders Söderberg.

Appendix 1

Participants

Name	Country	Organisation
Emma Grönkvist	Sweden	SMHI
Magnus Larsson	Sweden	SMHI
Isabella Grönfeldt	Sweden	SMHI
Anders Söderberg	Sweden	SMHI
Amund Lindberg	Sweden	SMA
Ulf Gullne	Sweden	SMA
Antti Kangas	Finland	FMI
Jouni Vainio	Finland	FMI
Tuomas Niskanen	Finland	FMI
Anni Montonen	Finland	FMI
Tuomas Taivi	Finland	FTA
Andrejs Zubaničs	Latvia	LEGMC
Jürgen Holfort	Germany	BSH
Sandra Schwegmann	Germany	BSH
Ida Stanislawczyk	Poland	IMGW-PIB
Anna Kubicka	Poland	IMGW-PIB
Jens Jakobsen	Denmark	DMI

Appendix 2

Agenda

Monday, 19th of September

12.00-13.00	Non hosted lunch at SMHI restaurant
13.00-13.30	**Opening and presentation round**
13.30-14.30	**Report BSIM Chair** **National reports: Finland, Poland, Germany**
14.30-15.00	Coffee break
15.00-16.15	**National reports: Sweden, Denmark, Latvia, BIM.** **Report from website (Jürgen Holfort)**
17.00	Icebreaker reception at Grand hotel

Tuesday, 20th of September

8.30-9.30	**WMO- sea ice nomenclature: Discussion about colors for consolidated and rotten ice in ice chart (Jouni Vainio)** **Discussion regarding the future for Baltic Sea Ice code (Antti Kangas)**
9.30-10.00	Coffee break
10.00-12.00	**Ice charts from numerical model output (Jürgen Holfort)** **Ice drift in operational products (Jürgen Holfort)**
12.00-13.00	Non hosted lunch at SMHI restaurant
13.00-13.30	**Visit to weather service and ice service production area**
13.30-14.30	**Ice/SST modelling NEMO-Nordic (Adam Nord and Patrik Ljungemyr)**
14.30-15.00	Coffee break and information/poster about a new possible method for ice data assimilation. (Lars Axell)
15.00-16.00	**Ice forecasts (Amund Lindberg)**
17.00-18.00	Guided city tour
18.00	Non hosted dinner at restaurant Vila

Wednesday, September 21st

8.30-9.30	**Future possibilities for BSIM**
9.30-10.00	Coffee break
10.00-12.00	**Election of Chair** **Next Meeting** **Review of Final action items** **Close of Meeting**
12.00-13.00	Non hosted lunch at SMHI restaurant

Agenda EIS training for ice analysts

Wednesday, September 21st

13.00-17.00	**Exercise: Using different satellite information in ice charting (Antti Kangas)**
14.30-15.00	Coffee break

Thursday, September 22nd

08.30-12.00	**Exercise: Freezing in fjords (Trond Robertsen)**
09.30-10.00	Coffee break

Appendix 3

Report from chair

Torbjörn Grafström retired during spring 2015 and handed over the chairmanship to Anna Geidne, and when she left last fall I took over. As far as I can understand this is the 3 time the BSIM is in Norrköping. The meeting was organized here in October 1977 and in May 1992.

Action item 1 an examination was done and for Swedish waters the conclusion was that 25 fairways could be taken away from Baltic sea ice codes, in total fairways 278. We have an agenda point tomorrow morning regarding the future for Baltic sea ice code and I think that we after that discussing can decide if any more work should be done with this action item.

Regarding **action item 2**, revive of chart symbols, work has been done but is not finished. Jouni will discuss this during his session tomorrow morning.

Action item 3, content of NAVTEX, I am not sure what was supposed to be done.

Action item 4, S100 symbols, is done, S411 in now approved.

Action item 5, indicator of sea ice condition, comparison between Ice volume and max extent of ice cover. To HELCOM it is decided we continue with extent for the sake of the long time series. A question is if the new systems calculations can be compared to the old systems. So maybe we should leave this action item open for further investigation.

Action item 6, preparation of meeting, done.

Appendix 4

Action list BSIM-25

Item	Subject	Action	Responsibility	Date	
1	Baltic Sea Ice Code	Examination of geographical distribution of new fairway sections and harbours	Torbjörn Grafström, Magnus Larsson SMHI M.Sztobryn IMGW All services	Next meeting	Ongoing
2	Chart symbols	Review of chart symbols	Patrick Eriksson FMI Juergen Holfort BSH All services	Next meeting	Ongoing
3	NAVTEX	Content	Torbjörn Grafström, Magnus Larsson SMHI	As soon as possible	
4	S100 symbols	BSIM took notice	Alexander Benke Juergen Holfort BSH	October 2013	Done
5	Indicator of Sea Ice condition	Comparison of Ice Volume and Max extent of ice cover	Natalija Schmelzer Juergen Holfort BSH Patrick Eriksson Jouni Vainio FMI	2014	Ongoing
6	BSIM-26	Preparation of the Meeting Official invitation Meeting arrangements	Emma Grönkvist SMHI	Sep. 2015	Done

Appendix 5

National report Poland

Instytut Meteorologii i Gospodarki Wodnej
Państwowy Instytut Badawczy

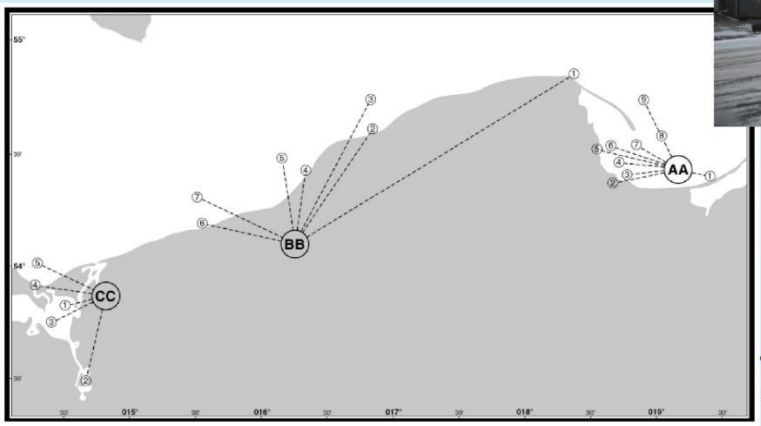
Ice winters 2013/14, 2014/15, 2015/16 on the Polish Baltic Sea coast

Ida Stanisławczyk

BSIM 2016, Ice Winters of 2013-2016 on the Polish coast, Polish Ice Service

Instytut Meteorologii i Gospodarki Wodnej
Państwowy Instytut Badawczy

Ice observing regions over Polish Baltic Sea Coast
(www.bsis-ice.de/fairway_areas/poland.pdf)



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Instytut Meteorologii i Gospodarki Wodnej
Państwowy Instytut Badawczy

The ice winters

2013/14 mild winter

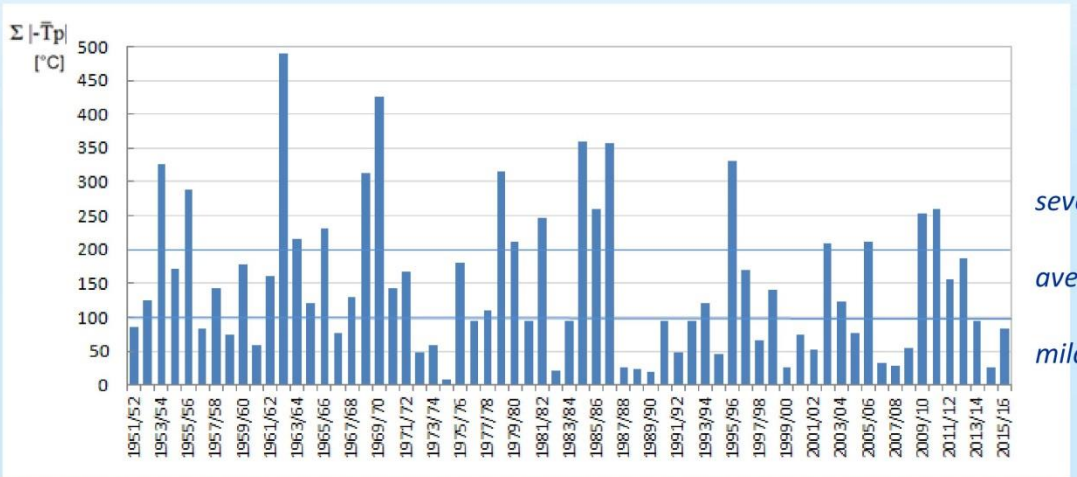
2014/15 very mild winter

2015/16 mild winter

BSIM 2016, Ice Winters

Instytut Meteorologii i Gospodarki Wodnej
Państwowy Instytut Badawczy

Totals of negative daily mean air temperature - sum of coldness - on the Polish coast, 1951-2016



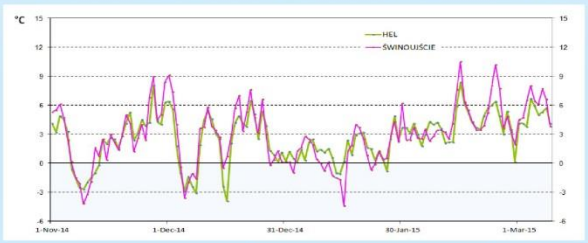
BSIM 2016, Ice Winters of 2013-2016 on the Polish coast, Polish Ice Service

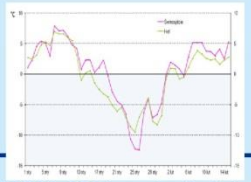
Instytut Meteorologii i Gospodarki Wodnej
Państwowy Instytut Badawczy

Daily mean air temperatures in Świnoujście and Hel during winter season

2015/2016

2014/2015



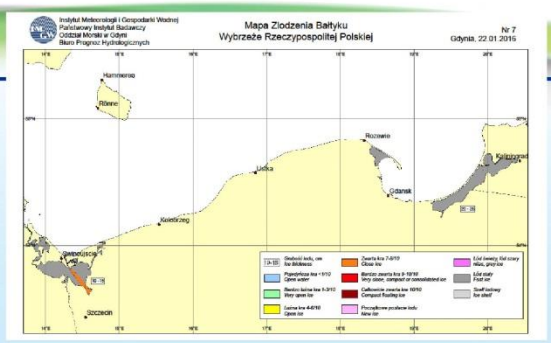


2013/2014

BSIM 2016, Ice Winters of 2013-2016 on the Polish coast, Polish Ice Service

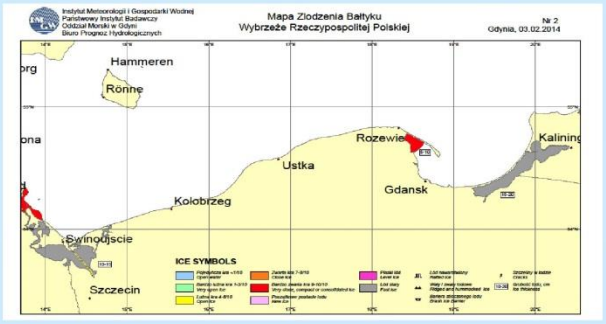
Instytut Meteorologii i Gospodarki Wodnej
Państwowy Instytut Badawczy

Maximum ice extent in the Polish Baltic coastal zone



2015/2016

2014/2015
no ice charts
no ice raports



2013/2014

BSIM 2016, Ice Winters of 2013-2016 on the Polish coast, Polish Ice Service

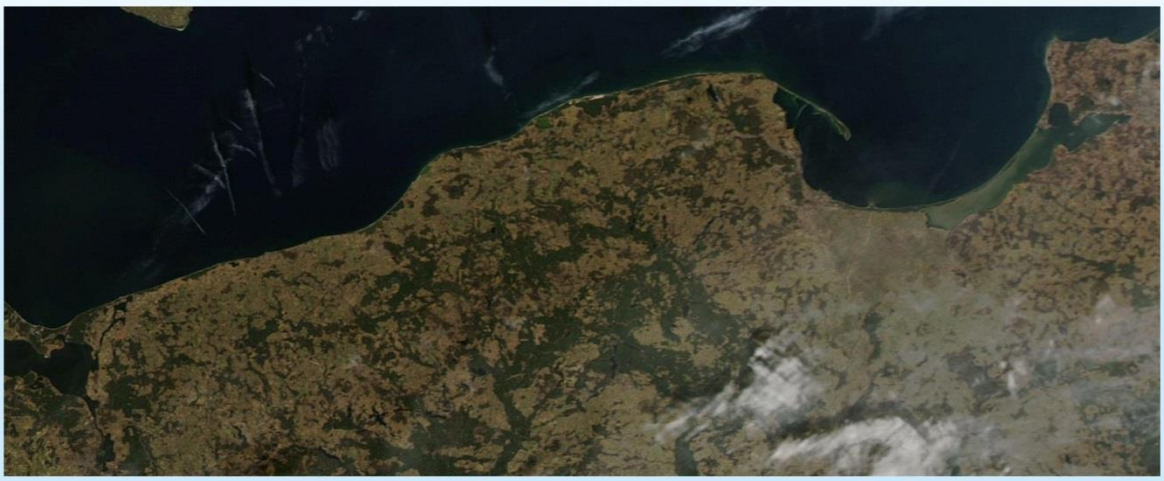
Instytut Meteorologii i Gospodarki Wodnej
Państwowy Instytut Badawczy

2013/14

BSIM 2016, Ice Winters of 2013-2016 on the Polish coast, Polish Ice Service

Instytut Meteorologii i Gospodarki Wodnej
Państwowy Instytut Badawczy

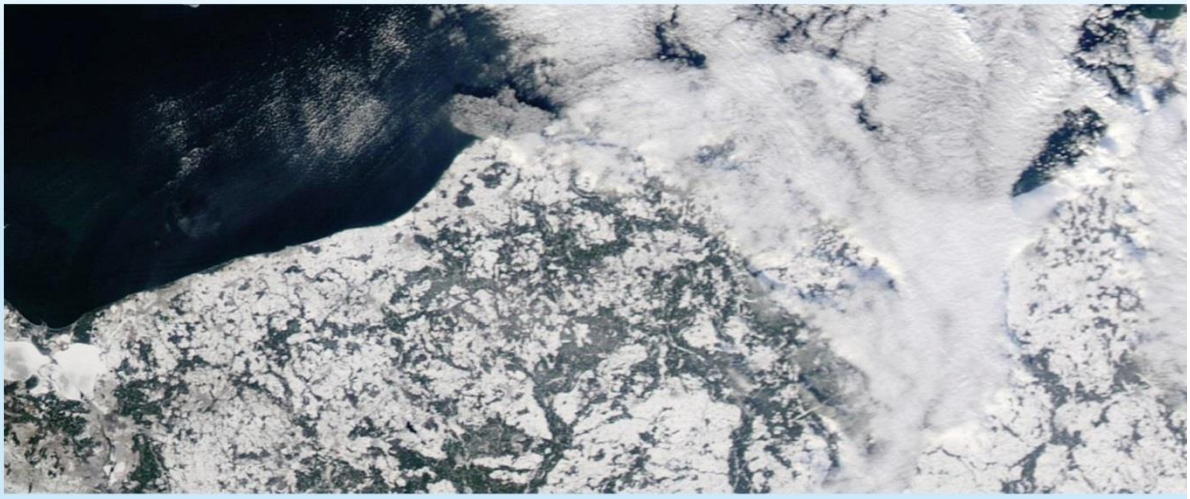
2014/15



BSIM 2016, Ice Winters of 2013-2016 on the Polish coast, Polish Ice Service

Instytut Meteorologii i Gospodarki Wodnej
Państwowy Instytut Badawczy

2015/16



BSIM 2016, Ice Winters of 2013-2016 on the Polish coast, Polish Ice Service

Instytut Meteorologii i Gospodarki Wodnej
Państwowy Instytut Badawczy

Information about the ice situation in the ice winters 2013/14, 2014/15, 2015/16

Winter season	Ice Reports	Ice bulletins	Ice charts
2015/2016	32	38	19/11
2014/2015	no ice reports	37	19
2013/2014	34	43	22/7

(General ice charts/Polish Sea Coast)

All current reports and charts are published on the Internet:
www.baltyk.pogodynka.pl//index.php?page=2&subpage=64

BSIM 2016, Ice Winters of 2013-2016 on the Polish coast, Polish Ice Service

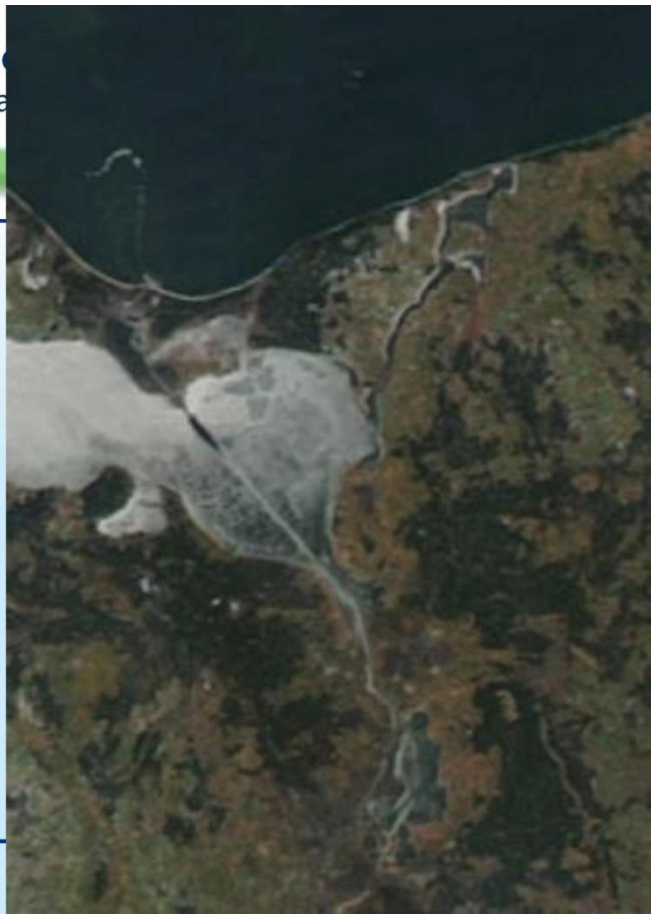
Instytut Meteorologii i Gospodarki Wodnej
Państwowy Instytut Badawczy

Gulf of Gdańsk

Gulf of Gdansk

Instytut Meteorologii i
Państwowy Instytut Bada

Firth of Szczecin and Szczecin –Świnoujście Fairway



Szczecin –Świnoujście Fairway

Szczecin –Świnoujście Fairway

Szczecin –Świnoujście Fairway

Instytut Meteorologii i Gospodarki Wodnej
Państwowy Instytut Badawczy

Szczecin –Świnoujście Fairway

Instytut Meteorologii i Gospodarki Wodnej
Państwowy Instytut Badawczy

Thank you for attention

BSIM 2016, Ice Winters of 2013-2016 on the Polish coast, Polish Ice Service

Appendix 6

National report Germany

BUNDESAMT FÜR SEESCHIFFFAHRT UND HYDROGRAPHIE

Report Germany

19.9.2016

Summary: no larger changes

BUNDESAMT FÜR SEESCHIFFFAHRT UND HYDROGRAPHIE

* After the Ice Atlas of the western and southern Baltic we finalized the climatological ice atlas of the „North Sea“

* Natalia Schmelzer retired last year.. Sandra Schwegmann is now on that position.

* Not much change in daily working practice. Sentinel data makes work easier, but now sometimes we have t look at to much data (taken together with the other satellite data) to see which data fits our needs.

* The operational numerical mdel is still not deemed good enough for the daily operational service.

Appendix 7

National report Sweden

SMHI

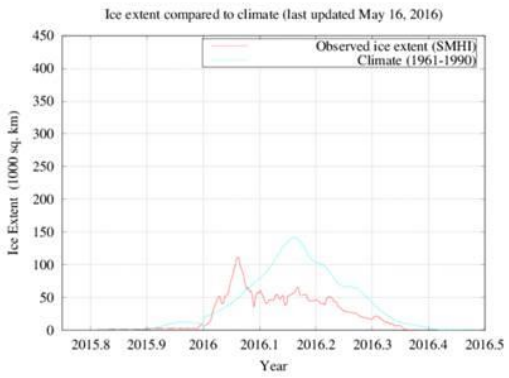
Baltic Ice Season 2015 - 2016

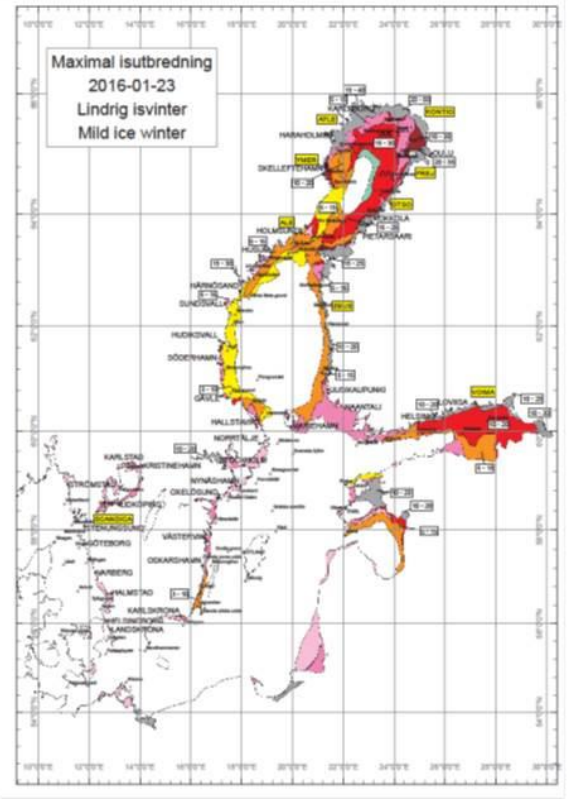
- Mild start of the winter. First ice chart 14 December.
- In January cold periods with ice formation and ice growth.
- Maximum ice extent 23 Jan, about a month earlier than the normal.
- New cold period in February and entire Bay of Bothnia and the Quark covered with ice 24 Feb, lasting into the beginning of March.
- Around 23 March Bay of Bothnia almost covered with ice once more.
- Rapid melting of the ice in April.
- Last ice chart 12 May.

SMHI

Maximum Ice Extent 2016

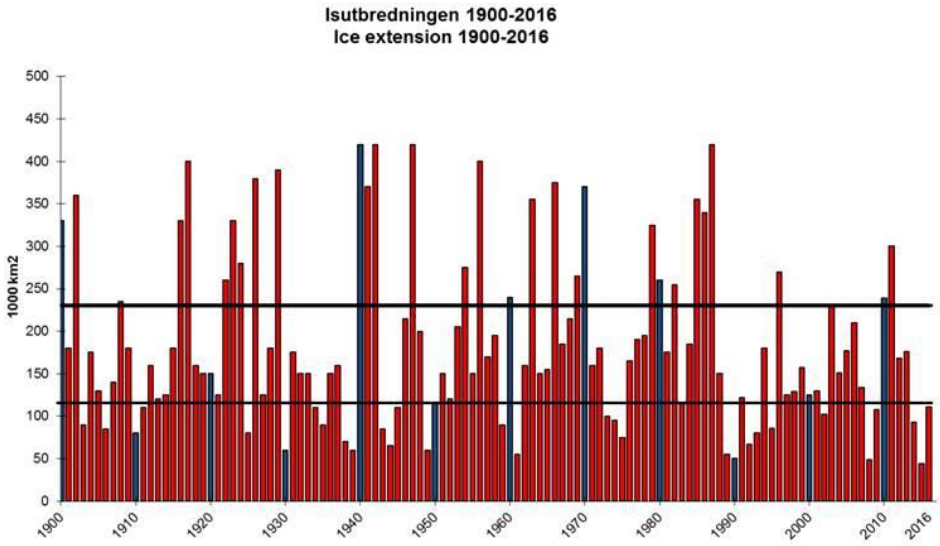
- Mild ice winter, but close to normal extent for a few days 22-23 Jan.
- Maximum ice extent 111 000 km2





SMHI

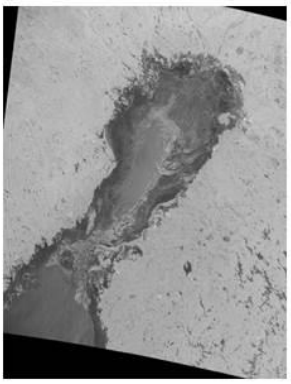
Maximum Ice Extent 1900-2016

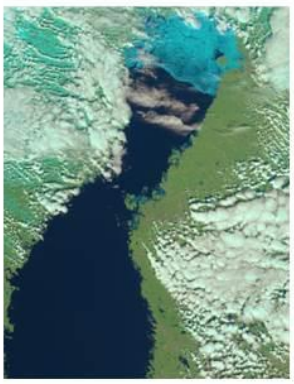


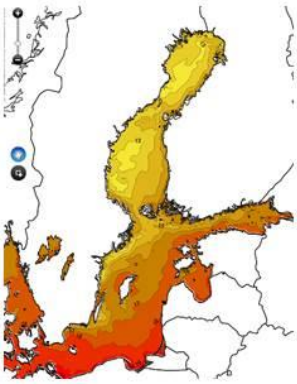
SMHI

Data Sources

- SAR images, both RADARSAT and Sentinel
- Visual images, when weather permitting, from Metop and SUOMI-NPP
- Ice observations in ice breaker reports
- Ice thickness, measured at 2-4 stations
- Baltic Sea Ice Code from observers (Conc, ice thickness and form of ice)
- Weather and Oceanographic models, up to 15 days







SMHI

Products

Ice charting:

- Daily ice chart B/W and Colour
- SST Monday and Thursday
- Ice report in SWE and ENG
- Baltic Sea Ice Code, daily summary of Swedish and Baltic fairways
- Restrictions to navigation, daily summary of SWE and FIN restrictions

Forecasts (twice a week):

- 10-14 day weather and ice forecast for Swedish Maritime Administration
- 10-14 day weather and ice forecast for the Navy and the Coastal Guard
- 10-14 day weather and ice forecast for commercial shipping companies

SMHI

Ice Service personnel 2016/2017

Emma Grönkvist	Head of the Ice service
Magnus Larsson	Ice specialist
Isabella Grönfeldt	Ice specialist
Jörgen Öberg	Ice analyst (part time during winter)
Berndt Möller	Ice analyst (part time during winter)
Anna Belking	Ice analyst (part time during winter)
Mattias Lindh	Ice analyst and forecasts (part time during winter)
Anders Söderberg	Trainee

SMHI

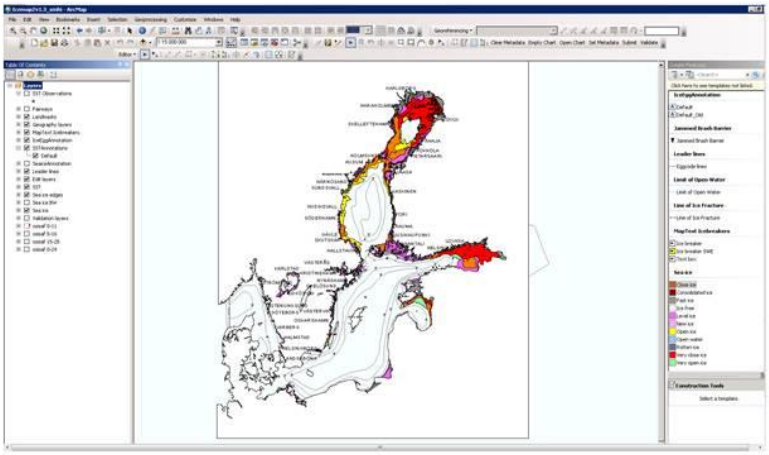
Training and education

- Icebreaker trips every winter
- At least 2 persons, 4-7 days
- Also testing daily forecast production onboard
- Ice kick-off with FMI

SMHI

New Ice charting tool Vanadis

- Together with FMI developing a new ArcGIS based Ice charting tool Vanadis.
- SMHI used this system both 2015 and 2016.
- Further on planning for joint production between Sweden and Finland.



SMHI

Joint production SMHI - FMI

- Planning for joint production between Sweden and Finland. (Ice Services)
- Have developed new Ice charting tool in cooperation with FMI.
- Planning for common database
- Planning for common production (ice charts, ice reports, fairway codes, etc.)
- Starting winter 2017/2018

SMHI

New products?

- The product portfolio nearly unchanged for several years
- Work in progress of new presentation/new products on the websites on smhi.se
- New browsable chart archive
- Icedata in shape format deliverable on Opendata (Sigrid3)
- Model data Ice drift/Ice concentration (NEMO) presented on smhi.se

Appendix 8

Report BIM

BSIM-Meeting 2016

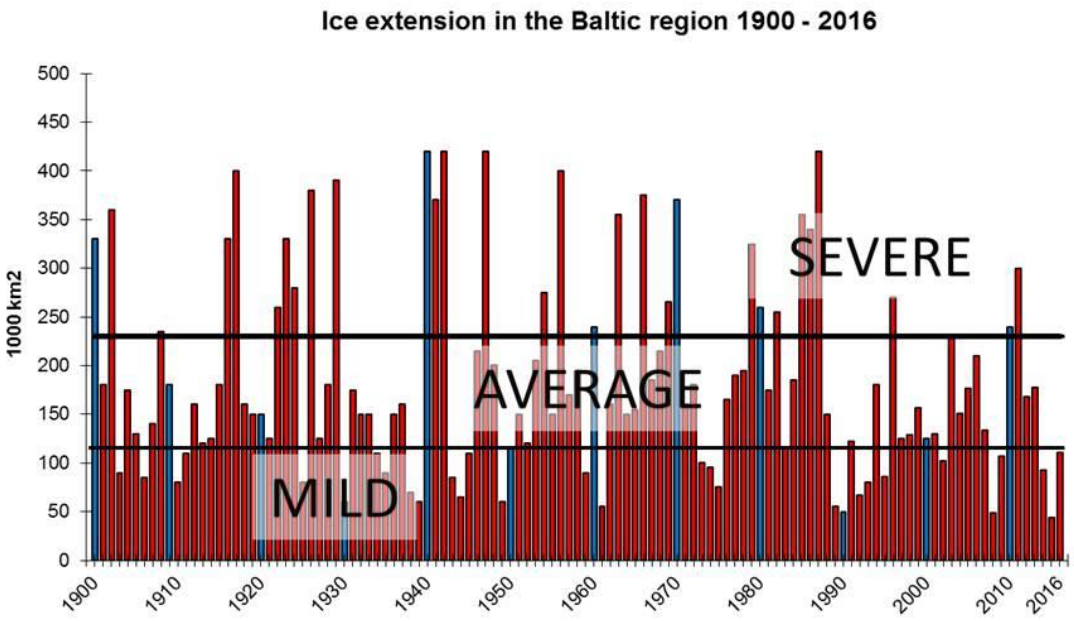
SUMMARY OF THE OPERATION 2015-2016

Summing up.

The ice winter can as a whole be described as an mild winter with minor obstacles for winter navigation.

BIM

SWEDISH MARITIME ADMINISTRATION



SWEDISH MARITIME ADMINISTRATION

BSIM-Meeting 2016

PLANNING THE COMMON OPERATION FINLAND/SWEDEN 2015-2016

1. The common operations starts with icebreaker ALE, responsible for both Finnish and Swedish port up in north.
2. After that the two Finnish icebreakers KONTIO and OTSO are put in action.
3. As the winter gets more harsh the Swedish icebreakers YMER and ODEN starts to operate
4. Then URHO or SISU and FREJ/ATLE
5. The last traditional icebreakers ATLE also starts to operate
6. Finally the Finnish and Swedish multipurpose come in action if it is an severe winter

SWEDISH MARITIME ADMINISTRATION

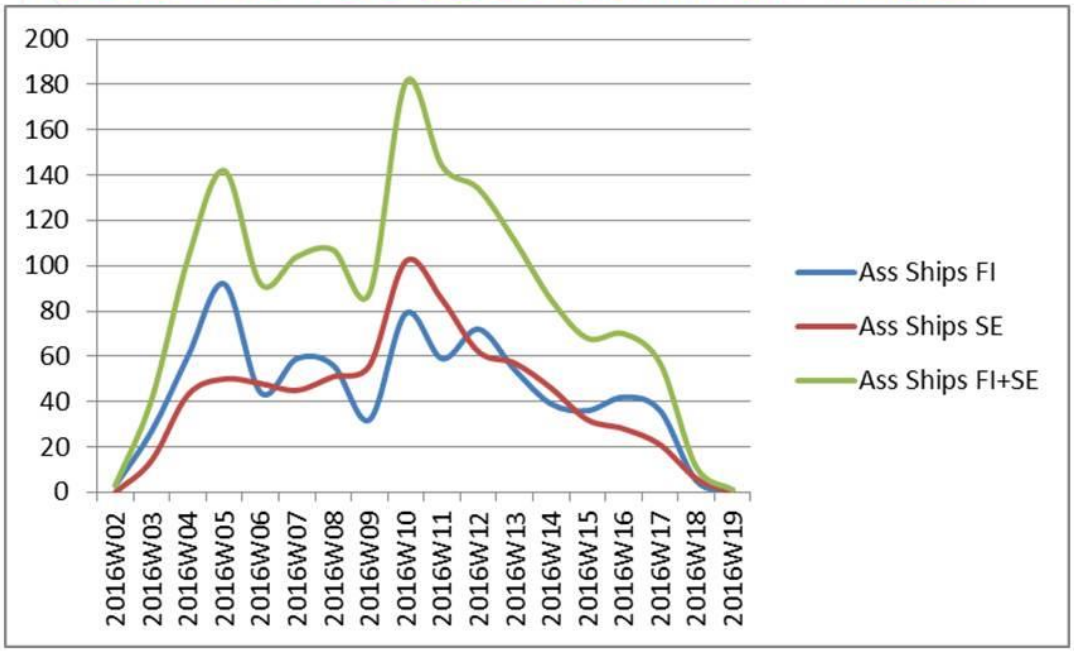
PLANNING AS IT BECAME 2015-2016

1. KONTIO (due to delayed maintenance on Ale)
2. ALE
3. OTSO
4. YMER
5. FREJ
6. ATLE
7. SISU (replaced by NORDICA in the end of the season)
8. ODEN

SWEDISH MARITIME ADMINISTRATION

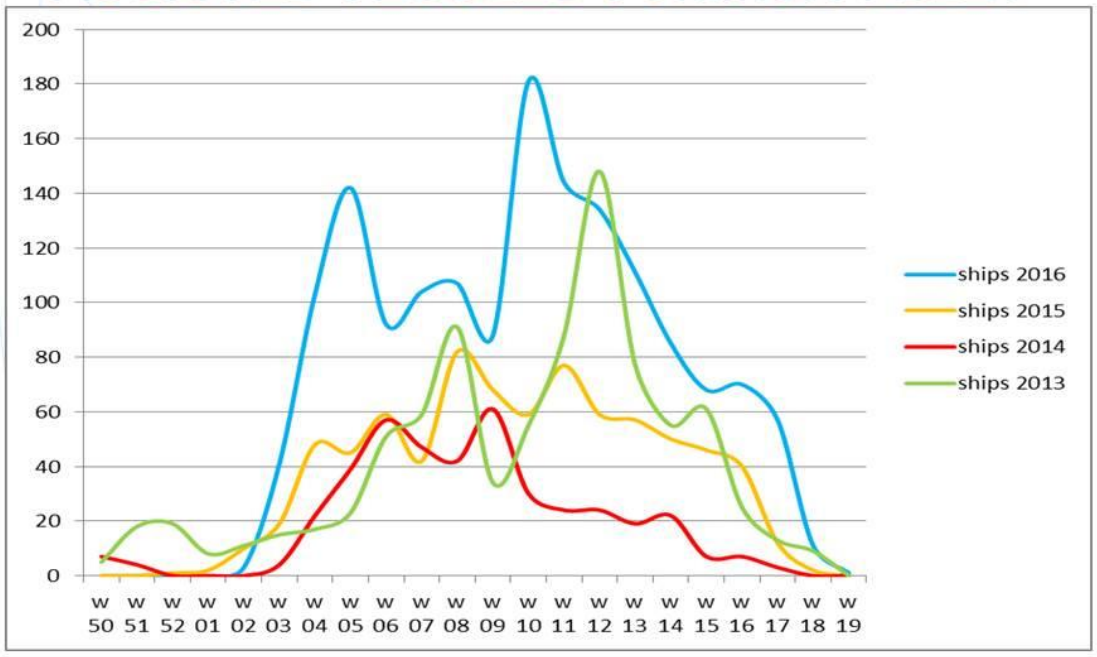
BSIM-Meeting 2016

ASSISTED VESSELS COMMON FLEET



SWEDISH MARITIME ADMINISTRATION

ASSISTED VESSELS COMMON FLEET



SWEDISH MARITIME ADMINISTRATION

BSIM-Meeting 2016

ACTIVITIES

All 5 icebreakers of the Swedish Maritime Administration were in operation during this winter.

We didn't have to use any Viking-icebreakers due to the mild winter and the cooperation with our Finnish colleges.

Icebreaking season between
2015-01-06 until 2015-05-08

Swedish icebreakers in operations between
2015-01-11 until 2015-04-27

SWEDISH MARITIME ADMINISTRATION

TRAFFIC RESTRICTIONS

Traffic restrictions has been in force during following times:

Bay of Bothnia
4/1 — 8/5

Sea of Bothnia (northern part)
10/1 — 28/4

Sea of Bothnia (southern part)
25/1 — 23/3

Lake Mälaren
13/1 — 20/3

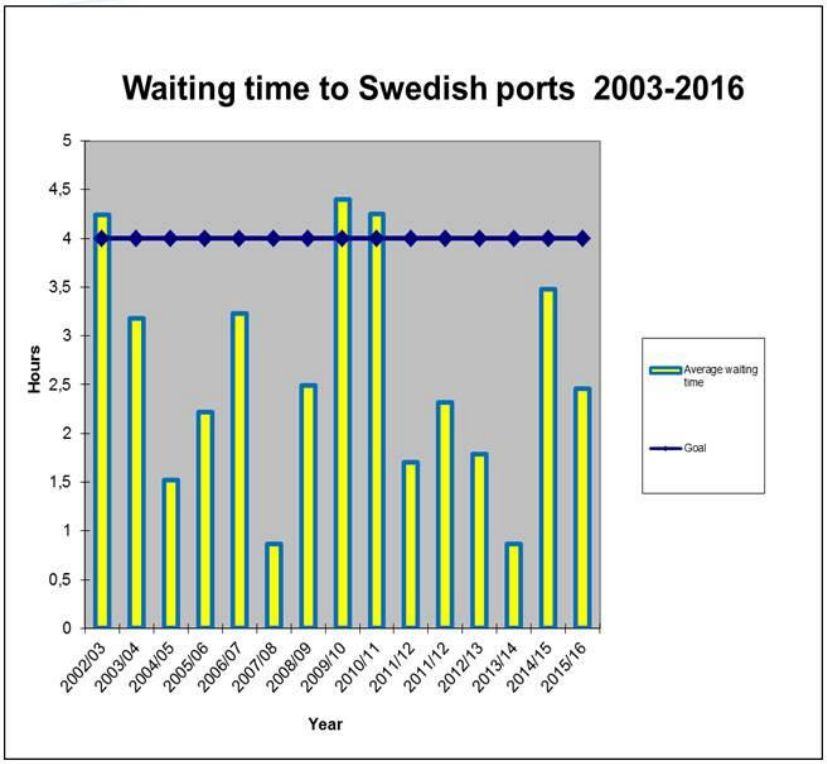
Lake Vänern
18/1 — 7/3

SWEDISH MARITIME ADMINISTRATION

BSIM-Meeting 2016

GOAL

- Average waiting time 4 h
- 90% merchant vessels assistance without any waiting time



SWEDISH MARITIME ADMINISTRATION

RESUMÉ

This season the Swedish icebreakers carried out a total of 404 escort missions including 17 towing operations during 268 working days.

Chartered tugs carried out 31 escort missions during 62 working days

A mild and easy winter for the winter navigation system

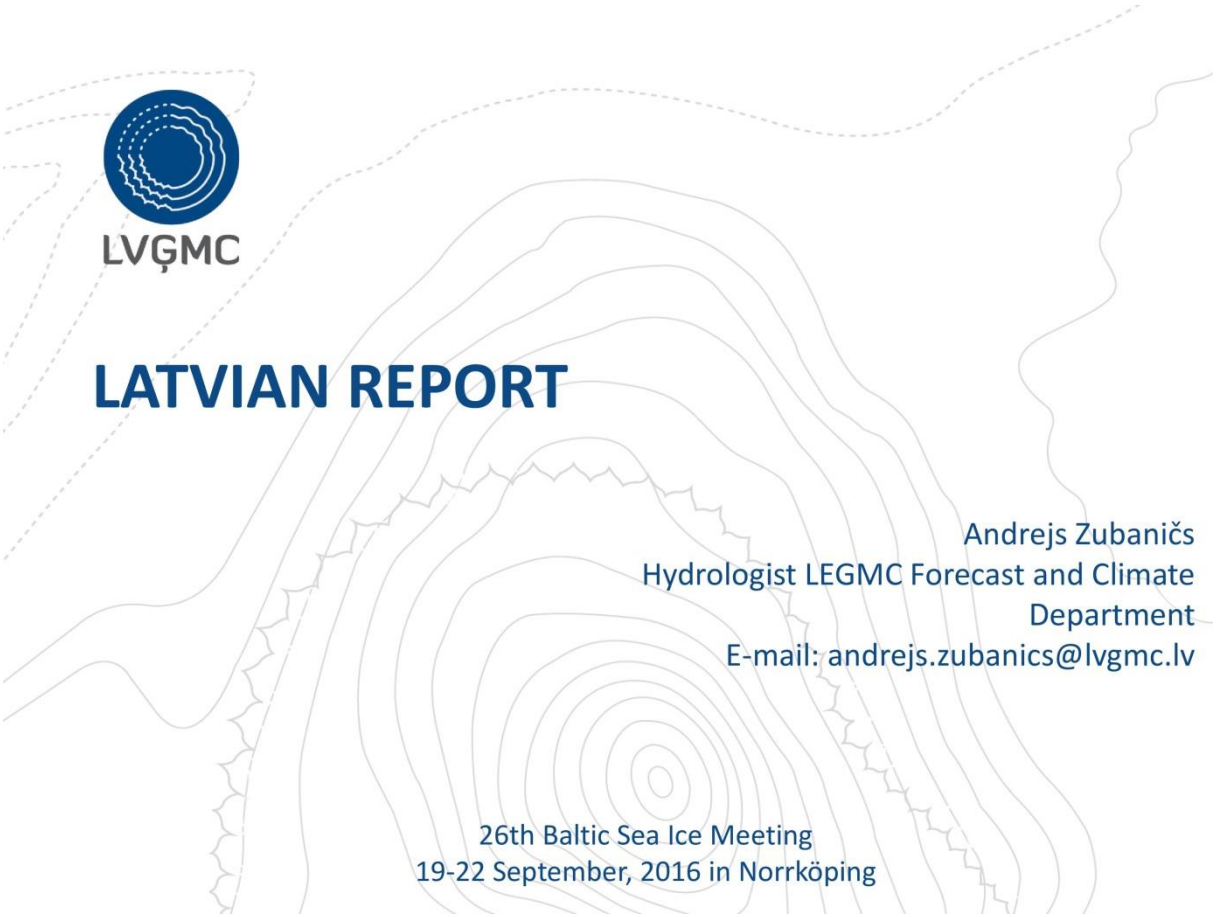
SWEDISH MARITIME ADMINISTRATION

BSIM-Meeting 2016

SWEDISH MARITIME ADMINISTRATION

Appendix 9

National report Latvia



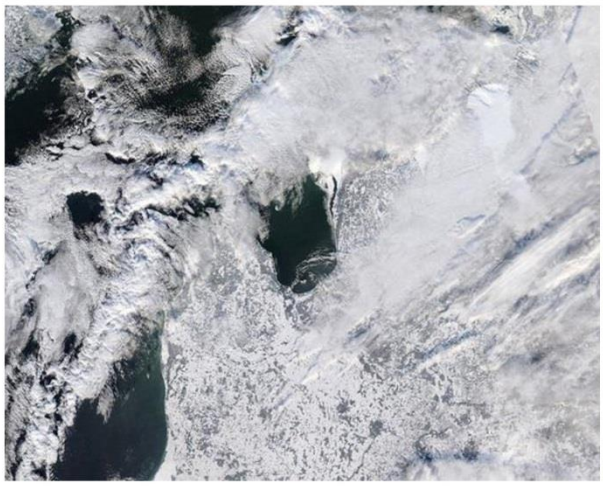
HYDROLOGICAL OBSERVATION NETWORK

- 80 observation stations (9 coastal stations)

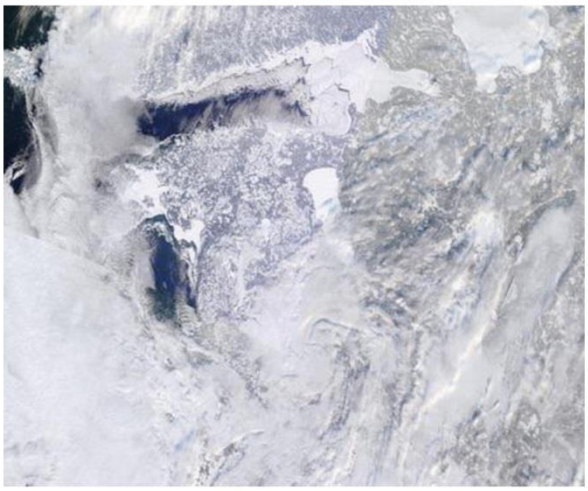
ICE CONDITIONS IN WINTER 2015/2016

- First ice formations were observed only on January 4, 2016. (both eastern and western parts of the Gulf of Riga
- On January 8 few ice formations were observed in Port of Liepāja.
- The longest period of time in this winter ice formations were observed near Salacgrīva.
- On February 8, 2016 Gulf of Riga and the Baltic Sea coastline were free of ice.

ICE CONDITIONS IN JANUARY 2016



January 21, 2016



January 22, 2016

https://lance.modaps.eosdis.nasa.gov/imagery/subsets/?subset=BalticSea

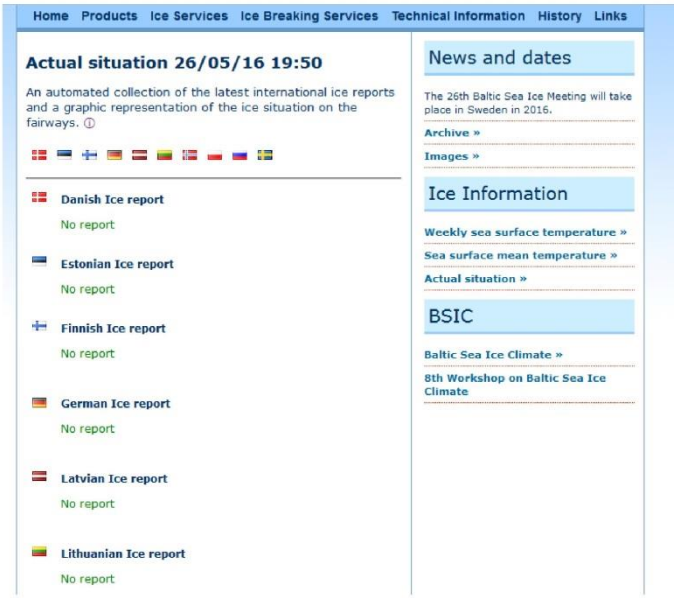
ICE REPORT

Baltic Sea ice service

STLV41 UMRR 270900
LATVIAN ICE REPORT
2016-01-27

AA 10//0 20//0 30//0 40//0
BB 10//0 20//0
CC 10//0 20//0 30//0

IN THE PORTS OF RIGA, VENTSPILS AND LIEPAJA IS ICE FREE.
ALSO ON THE FAIRWAY PORT OF RIGA TO THE LITHUANIAN SEA BORDER IS ICE FREE. IN AREA OF OUR RESPONSIBILITY
THERE ARE NO ICE FORMATIONS
THEREFORE WE ARE STOPPING INFORMATION SENDING.
WE WILL SEND INFORMATION WHEN WILL BE ICE FORMATIONS.



OVERVIEW OF ICE CONDITIONS FOR LATVIAN COASTLINE AND GULF OF RIGA WITH FORECAST FOR NEXT TWO DAYS

LATVIJAS VIDES, ĢEOLOĢIJAS UN METEOROLOĢIJAS CENTRS

Baltijas jūras Latvijas piekrastes un Rīgas līča ledus apstākļu apskats 31.03.2016. un gaidāmās tendences 01.04.2016–02.04.2016.

Pērnavas līcī gar piekrasti šaura cieša dreifējoša ledus josla. Kuģu ceļi tālāk brīvi.
Arī Monzundā brīvs no ledus.

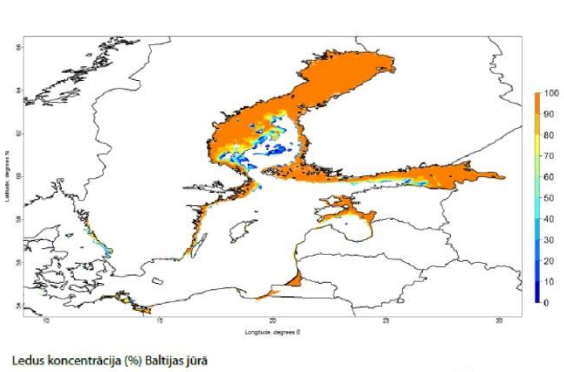
1. aprīlī pūtīs rietumu vējš 4-9 m/s, brāzmās līdz 15 m/s. 2. aprīļa naktī vējš iegriezīsies no ziemeļrietumiem, rietumiem, dienā rietumu, dienvidrietumu vējš 4-9 m/s, vietām brāzmās līdz 15 m/s.

Šis ir pēdējais Baltijas jūras Latvijas piekrastes un Rīgas līča ledus apstākļu apskats 2015./2016. gada sezonā.

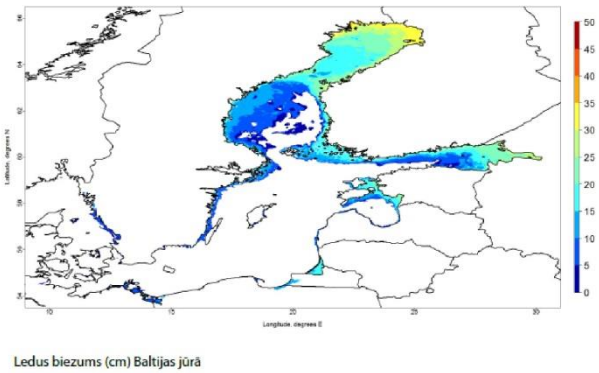
- Every working day to The Freeport of Riga Authority

BALTIC SEA ICE MAPS

LATVIJAS VIDES, ĢEOLOĢIJAS UN METEOROLOĢIJAS CENTRS 18.01.2016



Ledus koncentrācija (%) Baltijas jūrā



Ledus biezums (cm) Baltijas jūrā

- Twice a week on Monday and Thursday

Riga Shipping
Freeport of Riga Authority

10 DAYS ICE CONDITION DEVELOPMENT FORECAST

Three times - on every 8th, 18th and 28th date of the month

LATVIJAS VIDES, ĢEOLOĢIJAS UN METEOROLOĢIJAS CENTRS

ICE CONDITION FORECAST 09.04.2016 – 18.04.2016

The air temperatures will mostly rise above the freezing point, in nights stay around +3...+8 ºC, but in days +5...+14 ºC. The wind blow mostly light to moderate, in first part of the period in gusts up to 13 m/s, from north, northeast direction. In Parnu bay, northern part of the Gulf of Riga and in Estonian archipelago ice free.

Region	Situation
Bay of Parnu	Ice free
Northern part of the Gulf of Riga, Estonian archipelago	Ice free
Eastern part of the Gulf of Riga	Ice free
Southern part of the Gulf of Riga	Ice free
Western part of the Gulf of Riga	Ice free
Riga – Kolka fairway	Ice free
Irbes Strait	Ice free
Irbes Strait – Ventspils fairway	Ice free
Ventspils – Lithuanian sea border fairway	Ice free

Thank you!

Appendix 10

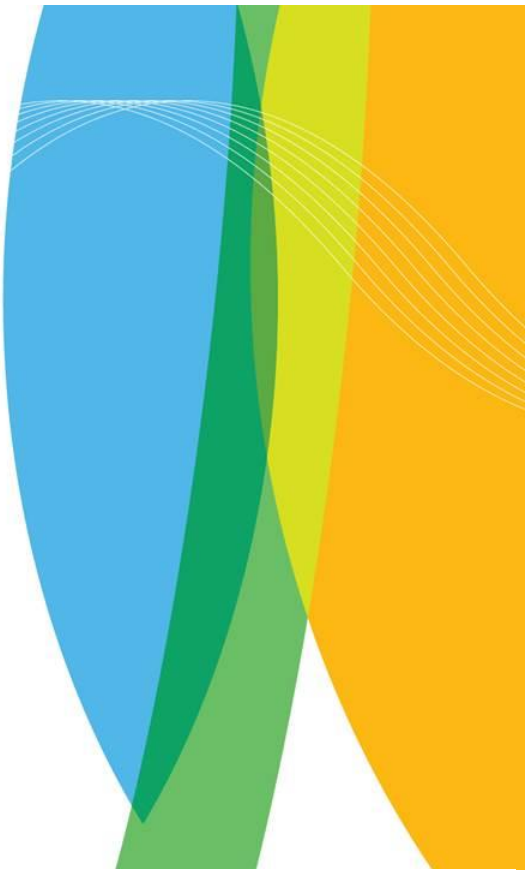
National report Finland

ILMATIETEEN LAITOS
METEOROLOGISKA INSTITUTET
FINNISH METEOROLOGICAL INSTITUTE

BSIM-26
Finland,
National Report

Jouni Vainio
Senior Ice Expert
Finnish Meteorological Institute

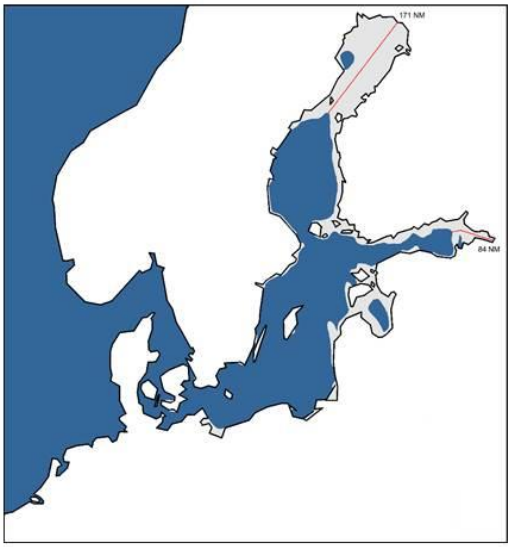
19.9.2017



ILMATIETEEN LAITOS
METEOROLOGISKA INSTITUTET
FINNISH METEOROLOGICAL INSTITUTE

Ice winter 2013-2014

- **mild, 100 000 km² 7.2.2014**
- **first ice report 5.12.2013 ; last 14.5.2014**
- **first daily ice chart 9.12.2013 ; last 14.5.2014**
- **first icebreaker started 13.12.2013 and last finished 14.5.2014; working days 394 by 6 icebreakers**
- **distance to navigate through ice from St. Petersburg 84 nautical miles and from Kemi 171 nautical miles to ice edge.**
- **Staff: Antti, Jouni, Patrick, Tuomas, Niko, Anni (from spring 2014 – ARAJÄÄ-project), Tuula**

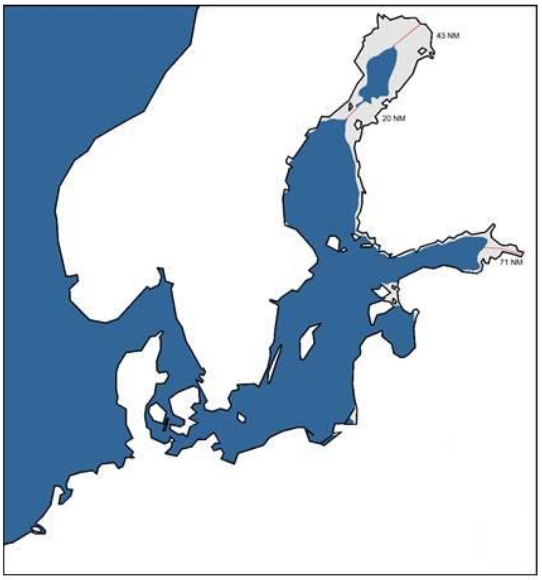


Ilmatieteen laitos / Jouni Vainio 19.9.2017 2

ILMATIETEEN LAITOS
METEOROLOGISKA INSTITUTET
FINNISH METEOROLOGICAL INSTITUTE

Ice winter 2014-2015

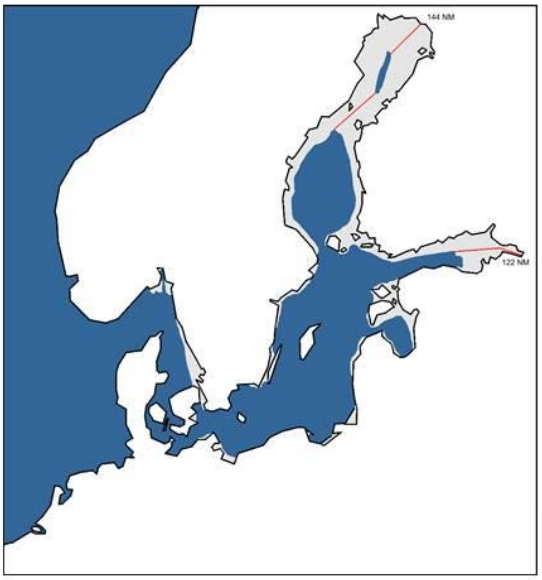
- **mild, 51 000 km² 23.1.2015**
- **first ice report 18.12.2014 ; last 7.5.2015**
- **first daily ice chart 18.12.2014 ; last 7.5.2015**
- **first icebreaker started 25.12.2014 and last finished 7.5.2015; working days 310 by 4 icebreakers**
- **distance to navigate through ice from St. Petersburg 71 nautical miles and from Kemi 63 nautical miles to ice edge.**
- **Staff: Marja-Liisa (Antti - paternity leave), Jouni, Patrick, Tuomas, Niko, Anni, Tero (from spring 2015), Tuula (retired autumn 2015)**



ILMATIETEEN LAITOS
METEOROLOGISKA INSTITUTET
FINNISH METEOROLOGICAL INSTITUTE

Ice winter 2015-2016

- **mild, 110 000 km² 22.1.2016**
- **first ice report 23.12.2015 ; last 12.5.2016**
- **first daily ice chart 28.12.2015 ; last 12.5.2016**
- **first icebreaker started 29.12.2015 and last finished 8.5.2016; working days 501 by 7 icebreakers**
- **distance to navigate through ice from St. Petersburg 122 nautical miles and from Kemi 144 nautical miles to ice edge.**
- **Staff: Antti, Jouni, Patrick, Tuomas, Niko, Anni, Tero**
- **Charts drawn by using VANADIS !**



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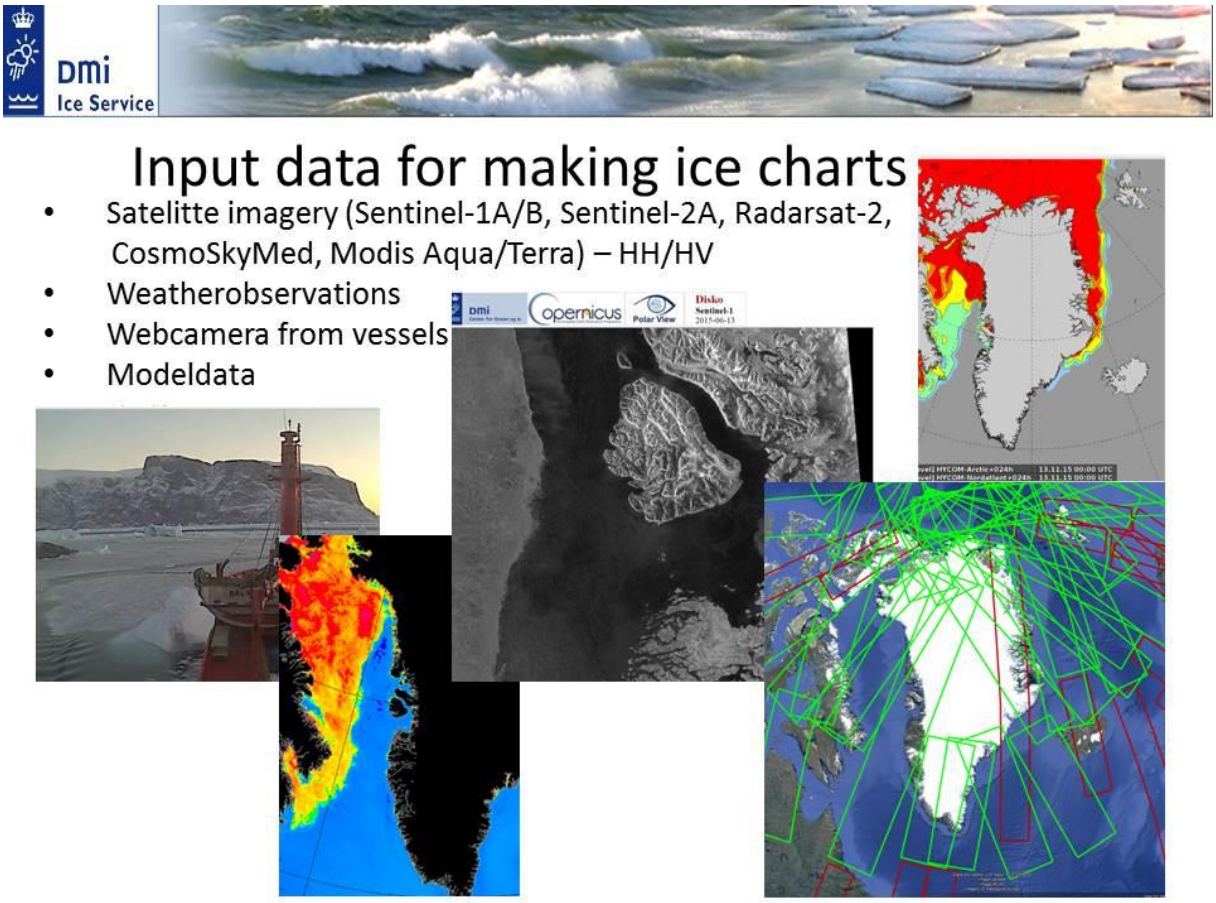
Ice winter statistics

	2013-2014	2014-2015	2015-2016
Maximum extent	100 000 km²	51 000 km²	110 000 km²
First ice report	5.12.	18.12.	23.12.
First daily ice chart	9.12.	18.12.	28.12.
First icebreaker	13.12.	25.12.	29.12.
Day of maximum ice extent	7.2.	23.1.	22.1.
Last icebreaker	14.5.	7.5.	8.5.
Last ice chart and report	14.5.	7.5.	12.5.
Icebreaking days / icebreakers	394 / 6	310 / 4	501 / 7

Appendix 11

National report Denmark



DMI Ice Service

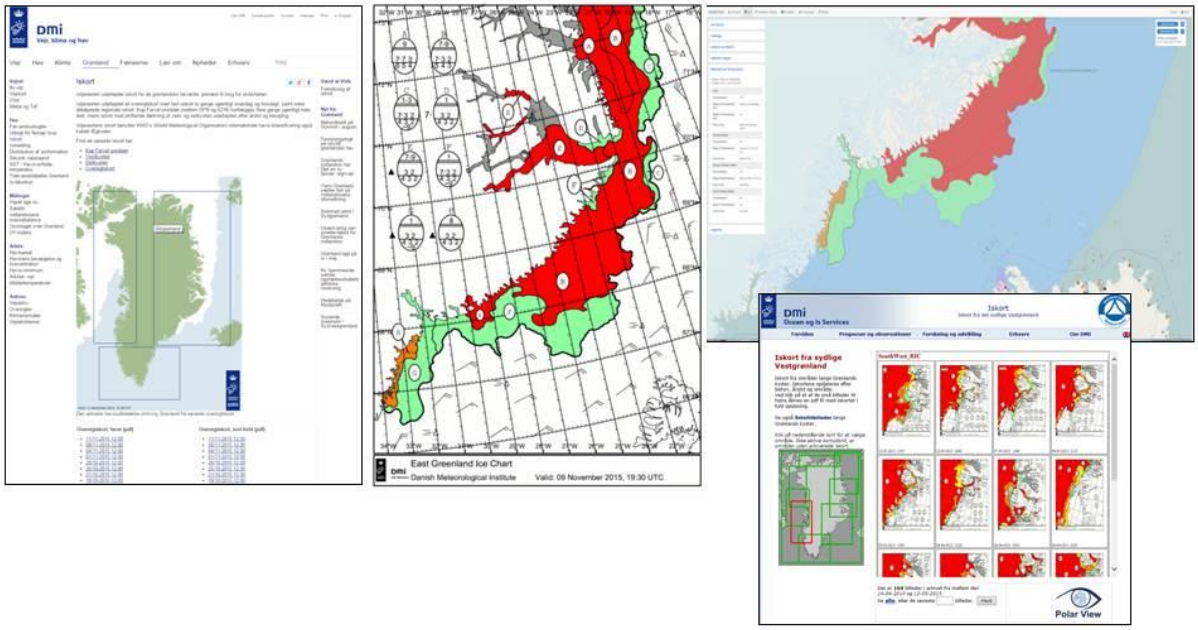
Recent acces to Sentinel-2A
14 April 2016 (Narsarsuaq)

DMI Ice Service

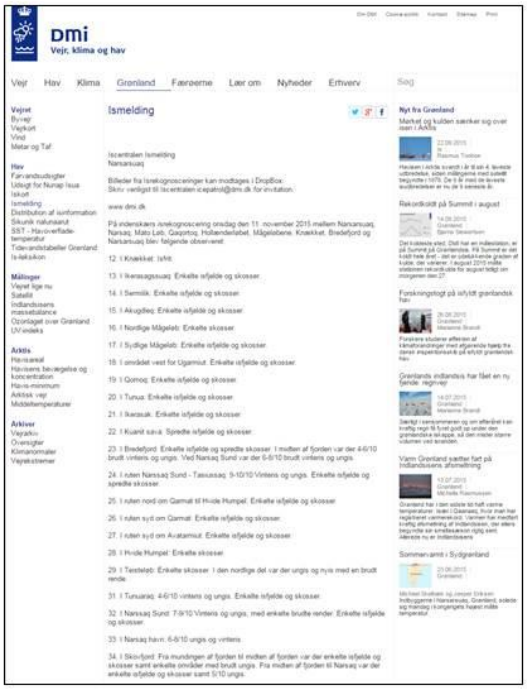
Recent acces to Sentinel-2A
23 May 2016 (Qaanaaq)

Ice Charts

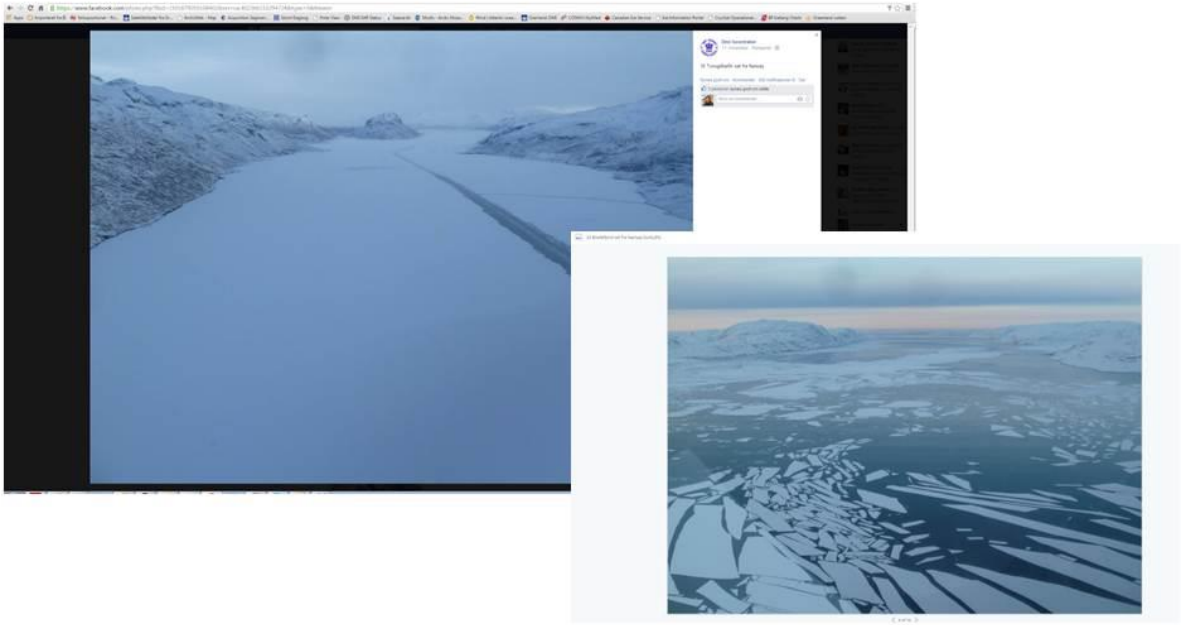
- Ice charts – available on dmi.dk, via email or ArcticWeb



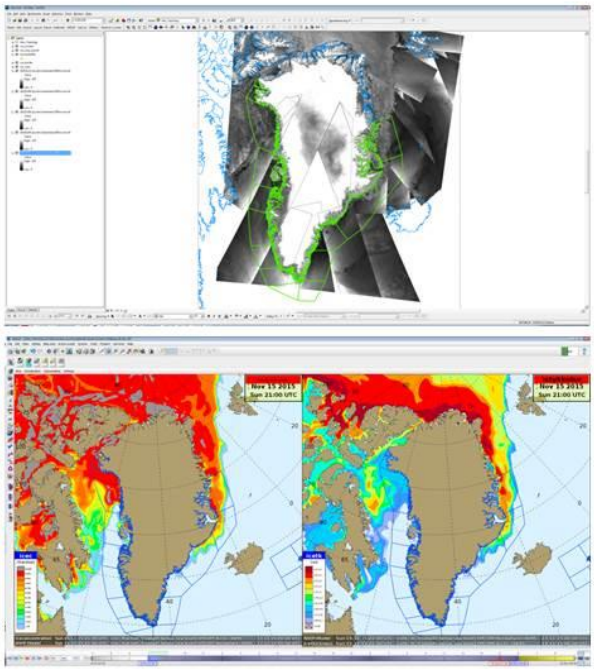
In shore ice reports



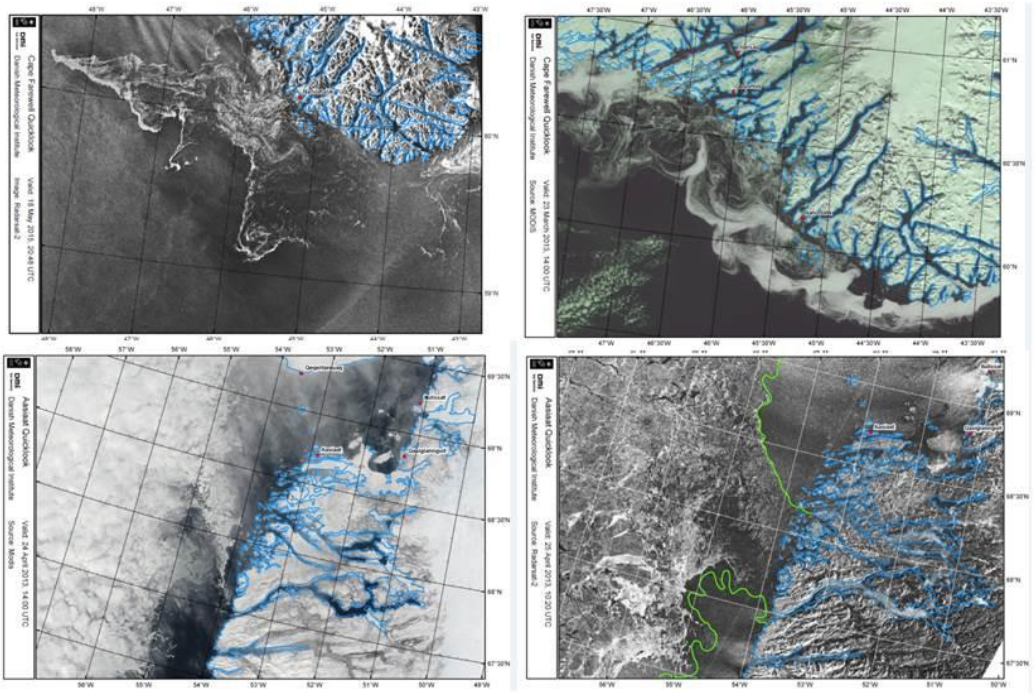
Photos from icerecces on Facebook and Dropbox – more than 2000 members on Facebook



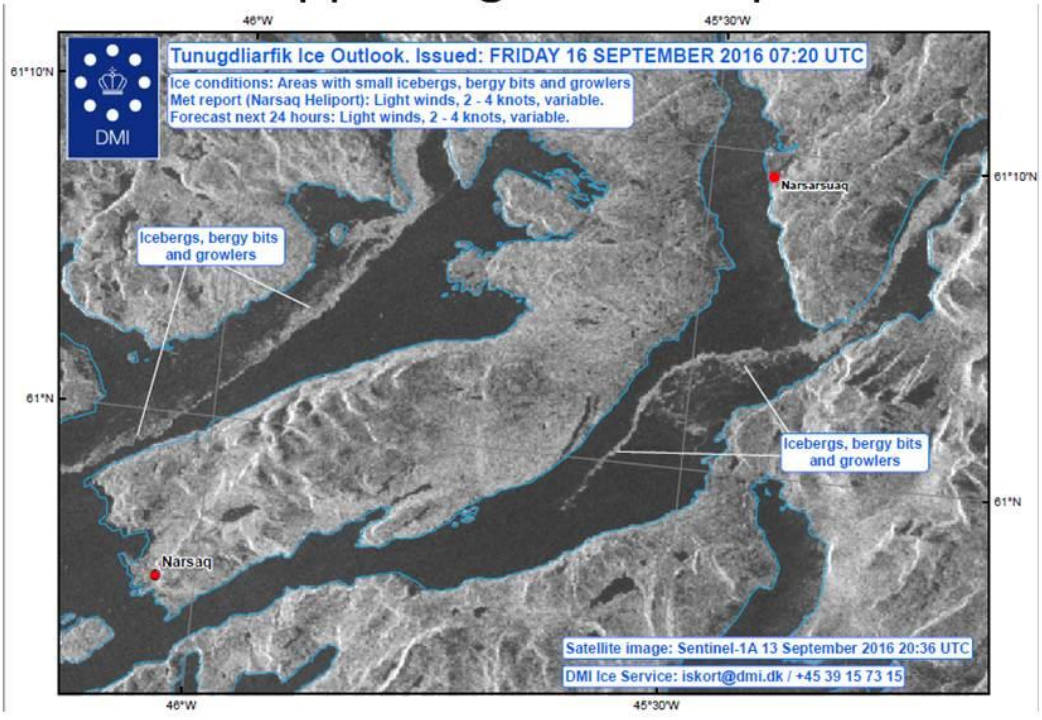
Ice information in maritme forecasts



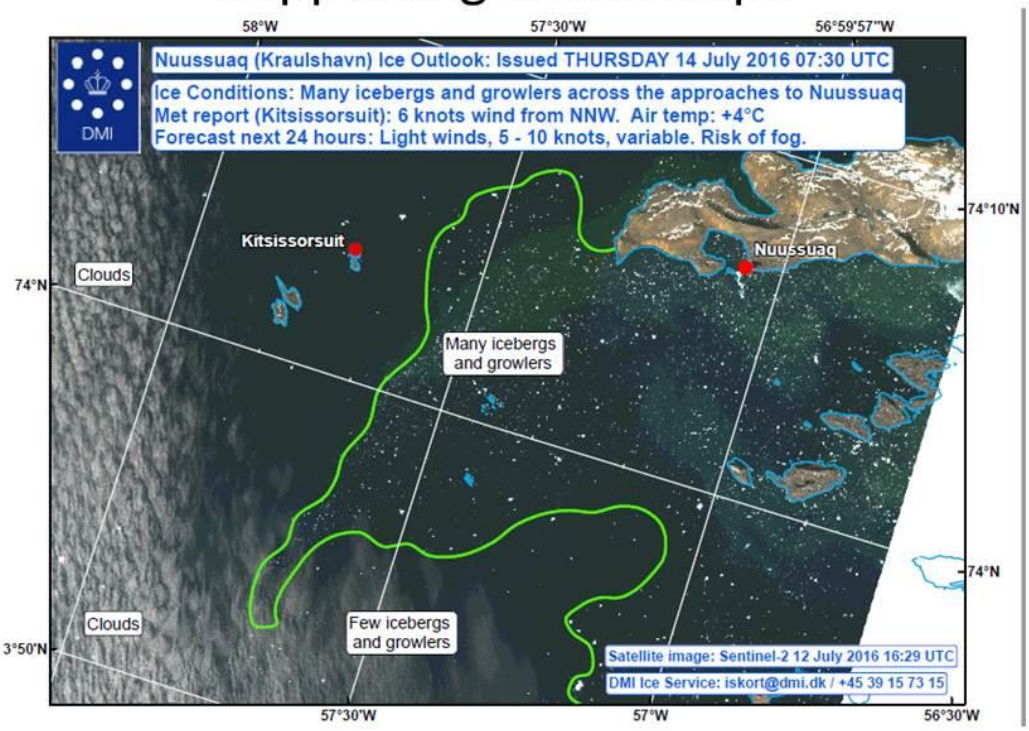
Quicklooks



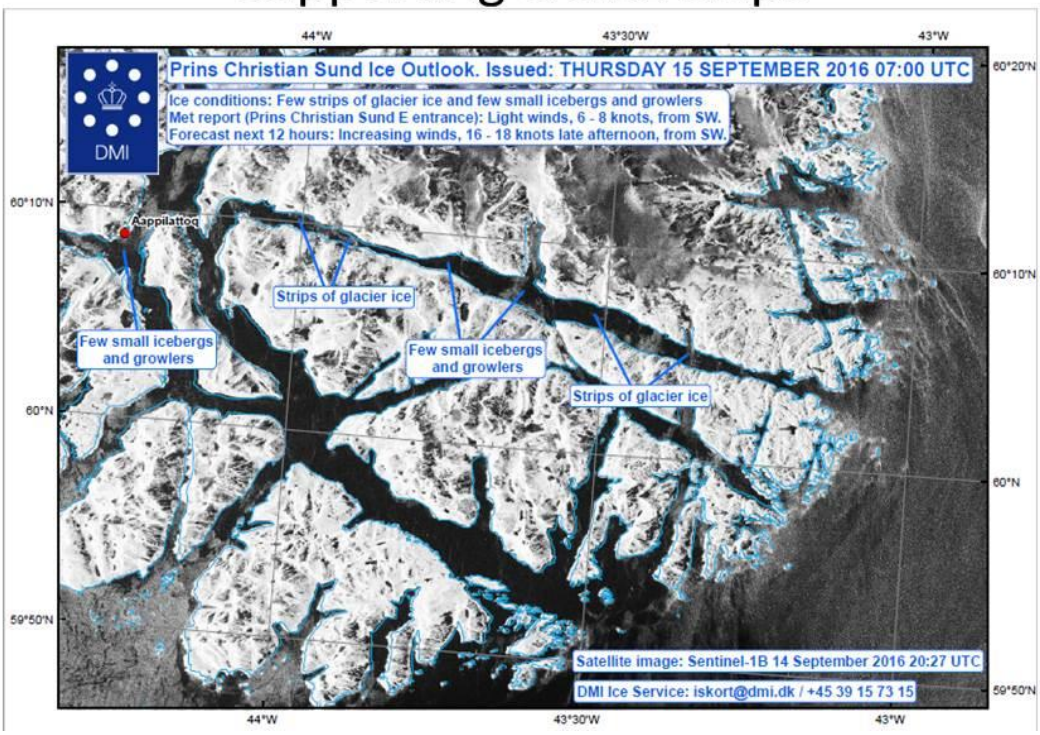
Supporting cruise ships

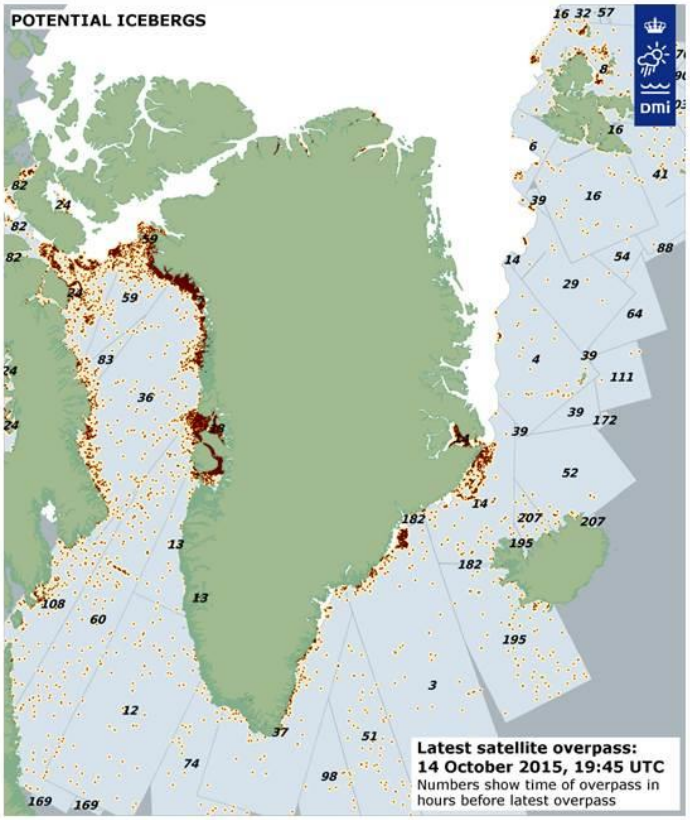


Supporting cruise ships



Supporting cruise ships





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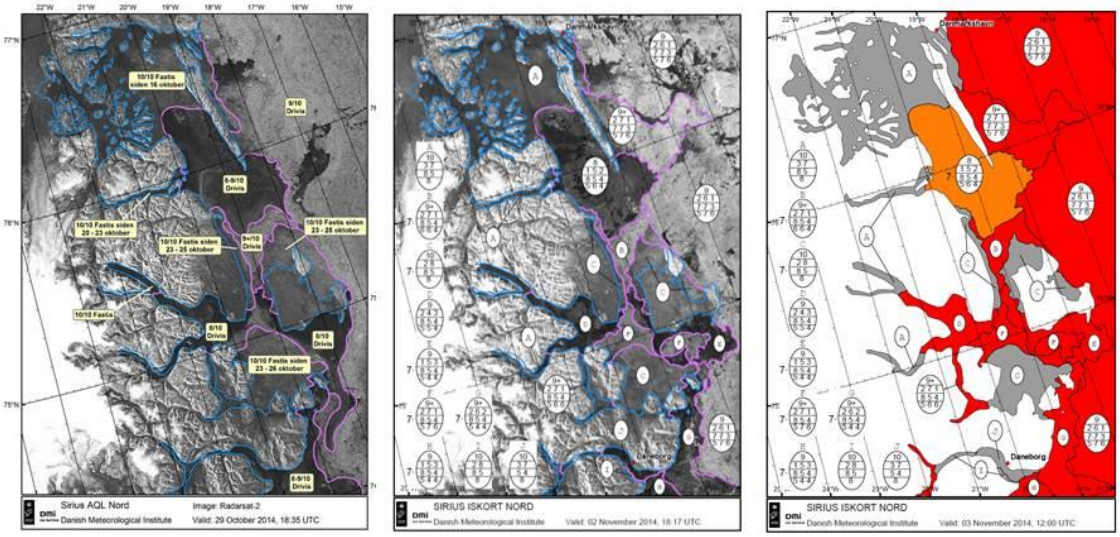
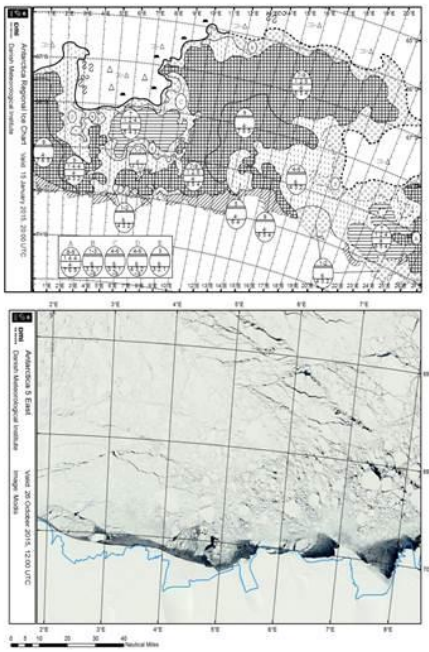
Sirius Patrol

- Oktober 2015 – January 2016



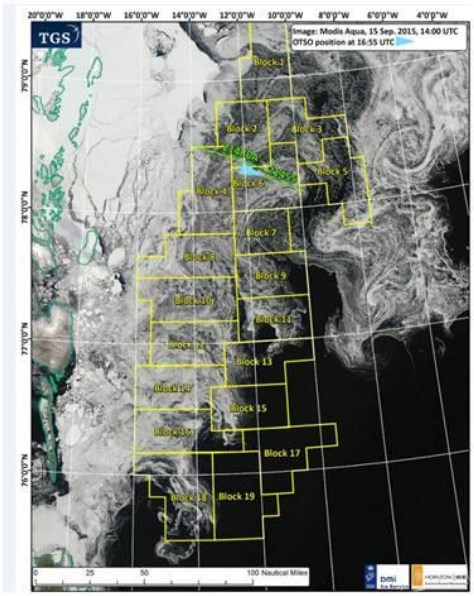
Mary Arctica - Antarctica

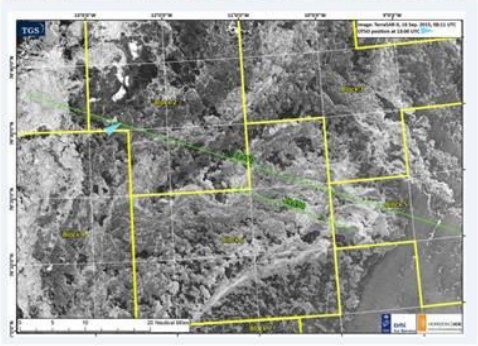
- January og february 2016



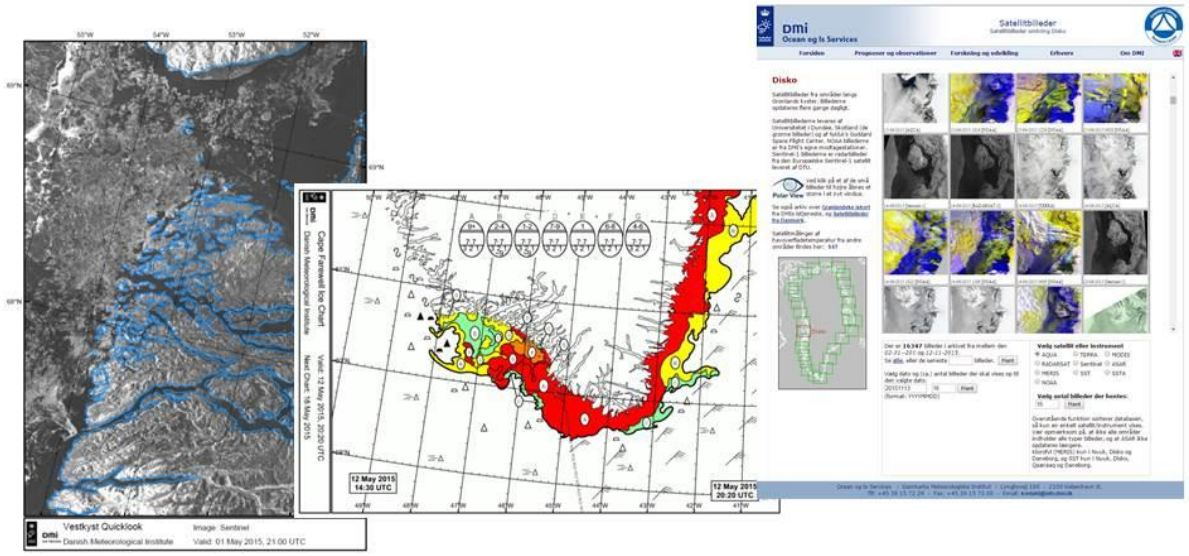
Seismic Surveys in NE Greenland

- August – Oktober 2015





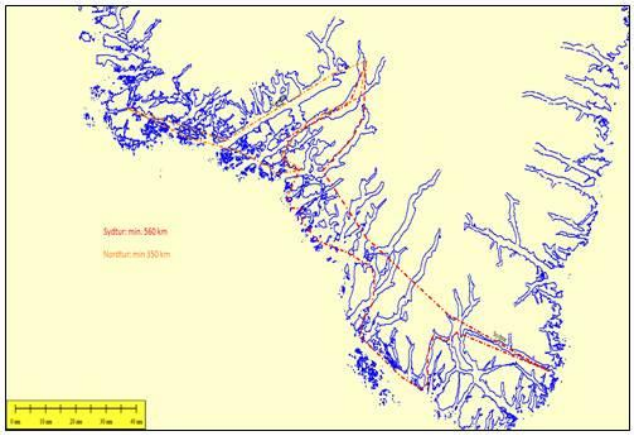
Products and Services from Greenland Ice Service



Baltic Sea Ice Meeting September 2016

Ice Patrol in South Greenland

Based in Narsarsuaq
4 navigators from Royal Arctic Line
Full time charter of helicopter
Cape Farewell ice charts
84 ice recces (Jan-Oct 2015)



DMI Ice Service

Qaqortoq Havn

Ice Patrol Narsarsuaq:
- In shore ice reports
- Helicopter available
- Facebook for distribution
- Ice Charts of Kap Farvel
- Quicklooks (satelitte imagery)
- Satelitte data for all Greenland
- 24 hours/ 7 days a week

Greenland Ice Service, DMI
- Ice charts for all Greenland
- Quicklooks (satelitte imagery)
- Ice in maritime forecasts
- Planning of sateliite data
- Satelitte data for all Greenland
- Monday – Friday operation








Sea ice and glacier ice

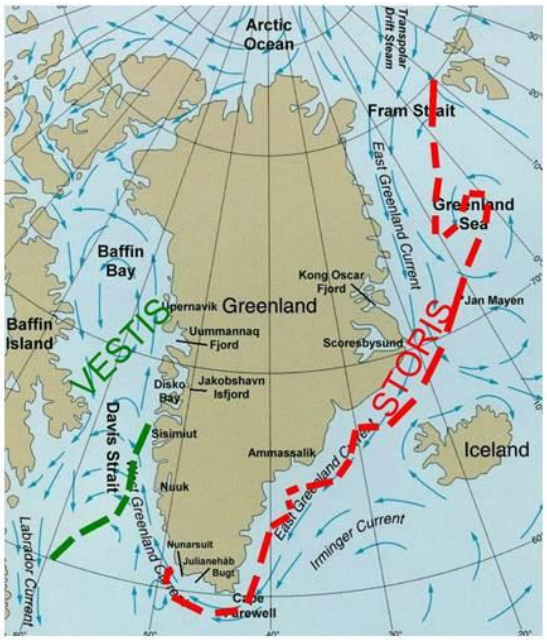
- First-year ice
- Multi-year ice
- Icebergs and growlers

Vestisen

- Mainly first-year ice

Storisen

- Mix of multi-year ice and first-year ice



Main products from Ice Service and Ice Patrol

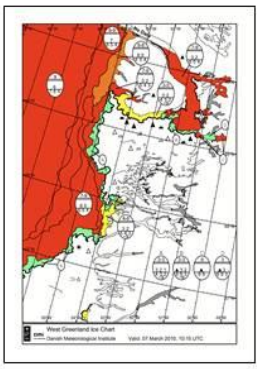
- Ice Charts – available on dmi.dk, via email og ArcticWeb
- Inshore ice reports – available on dmi.dk, via email and ArcticWeb
- Photos from heli recces available on Facebook and via Dropbox – more than 2000 users
- Quicklooks – satelitte images sent to individual ships/users
- Ice information in maritime forecasts

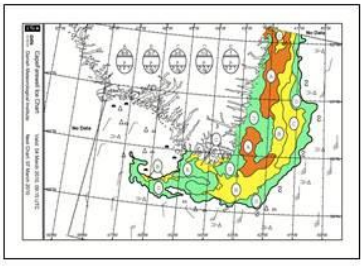
Staff at Greenland Ice Service, Operations, DMI:

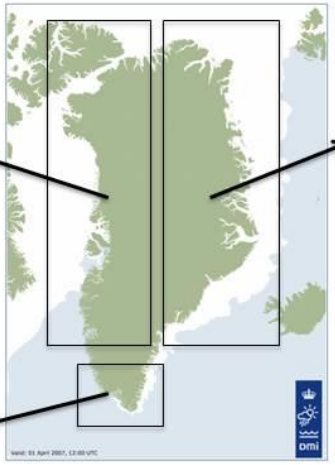
- Henrik Matthiesen (navigator), Gert Andersen (navigator), Flemming Geisler-Skou (meteorologist), Jens Jakobsen (M.Sc in Geography) – starting up with Erik Hansen (meteorologist) late September

Ice Charts

Vestgrønland
~130 kort / år

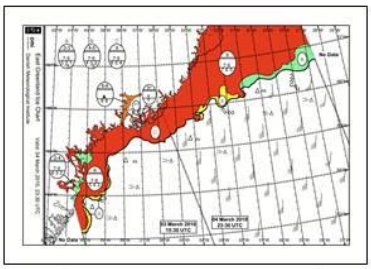




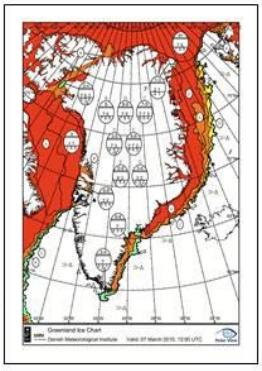


Kap Farvel
~190 kort / år

Østgrønland
~120 kort / år



Oversigtskort
2 kort om ugen



6

Appendix 12

WMO-sea ice nomenclature

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WMO Sea Ice Nomenclature - Discussion

Jouni Vainio

26 th Baltic Sea Ice Meeting
19 - 21.9.2016
Finnish Meteorological Institute

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Session 2.3 Using Sea Ice Symbology

Patrick Eriksson

4th Ice Analyst Workshop
9 - 11.6.2014
Finnish Meteorological Institute

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Floeberg

Definition
(WMO-259 Sea-Ice Nomenclature)

Massive piece of sea ice composed of a hummock, or a group of hummocks frozen together, and separated from any ice surroundings. It may typically protrude up to **5m above sea level**

Now

- Generally not used in the Baltic (at FMI occasionally)
- How to use?
- Floebit: same definition but smaller size (not more than 10m across and 2m above sea level)

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Strips and patches

Definition
(WMO-259 Sea-Ice Nomenclature)

C – concentration in tenths of ice within the area of strips and patches (optional)

Now

- Not used in the Baltic
- Always in an “open water” polygon?

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Brash Ice Barrier

Definition
(WMO-259 Sea-Ice Nomenclature)

A strip or narrow belt of new, young or brash ice (usually 100-5000 m wide) formed at the edge of either drift or fast ice or at the shore. … **This is also known as a windrow in the Baltic Sea**.

Now

- Symbol ”arrow” pointing south.
- Should it point towards the ice edge?
- Technical handling…
- Name:
  - ”Windrow”?
  - Topic for BSIM

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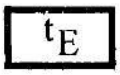
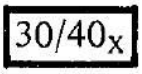
Thickness

Definition
(WMO-259 Sea-Ice Nomenclature)

measured 

estimated 



When more than one measurement has been taken, both mean and maximum thicknesses are reported

Now

- In the Baltic only solid line boxes are used, also for estimated thicknesses.
- Instead of mean/max, ranges are shown:

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Compact Floating Ice

Definition
(WMO/TD-No. 1215 Ice Chart Colour Code Standard, Version 1.0) JCOMM Technical Report No. 24

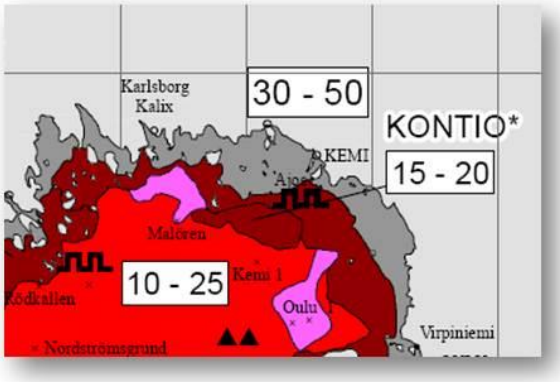
Concentration 10/10 (WMO Nomenclature):

4.2.1 Compact ice: *Floating ice* in which the *concentration* is 10/10 and no water is visible.

4.2.1.1 Consolidated ice: *Floating ice* in which the *concentration* is 10/10 and the *floes* are frozen together.

Now in ice reports

- 'Compact ice'
- Also 'Consolidated ice' possible?



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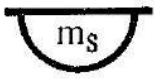
Stages of melting

Definition
(WMO-259 Sea-Ice Nomenclature)



DESCRIPTION	COVERAGE	CODE
No melt		0
Few puddles	1-3/10	1
Many puddles	>3/10	2
Flooded ice		3
Few thaw holes	1-3/10	4
Many thaw holes	>3/10	5
Dried ice		6
Rotten ice		7
Few frozen puddles		8
All puddles frozen		9
Undetermined or unknown		X

Now

- Only statement "ROTTEN ICE" is shown in stead of thickness values (FIN, SWE)
- What is the demand for this information?
- Alternative:
  - Color code

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Discussion

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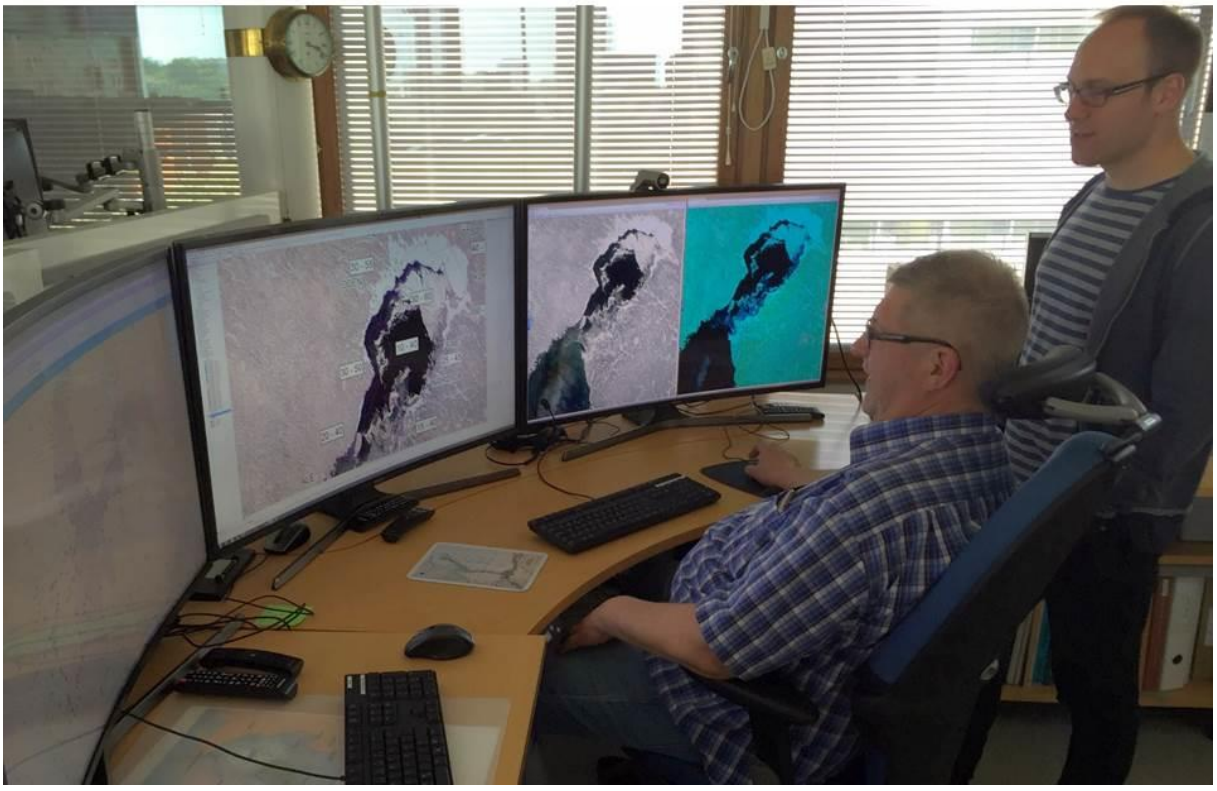

Appendix 13

BSIM email list

Name	Country	Organisation	Email adress
	Denmark	SOK	mas@sok.dk
	Denmark	SOK (Forsvaret)	vfk@mil.dk
Jens Huulgard	Denmark	SOK (Forsvaret)	vfk-m-msp311@mil.dk
Jens Jakobsen	Denmark	DMI	jjk@dmi.dk
Søren Olufsen	Denmark	DMI	seo@dmi.dk
Keld Qvistgaard	Denmark	DMI	kqh@dmi.dk
	Denmark	DMI	iskort@dmi.dk
Helve Meitern	Estonia	ENVIR	helve.meitern@emhi.ee
Jekaterina Služenikina	Estonia	ENVIR	jekaterina.sluzenikina@envir.ee
	Estonia	ENVIR	mere@emhi.ee
	Estonia	ENVIR	mere@envir.ee
Taimi Paljak	Estonia	ENVIR	taimi.paljak@emhi.ee
Urmas Lips	Estonia	MSI TTU	urmas.lips@msi.ttu.ee
Martin Kaarjärv	Estonia	VTA	martin.kaarjarv@vta.ee
	Estonia	VTA	winternavigation@vta.ee
Antti Kangas	Finland	FMI	antti.kangas@fmi.fi
Jouni Vaino	Finland	FMI	jouni.vainio@fmi.fi
Patrick Eriksson	Finland	FMI	patrick.eriksson@fmi.fi
Anni Montonen	Finland	FMI	anni.montonen@fmi.fi
Ice service	Finland	FMI	iceservice@fmi.fi
Tuomas Taivi	Finland	FTA	Tuomas.Taivi@liikennevirasto.fi
Jürgen Holfort	Germany	BSH	juergen.holfort@bsh.de
Sandra Schwegmann	Germany	BSH	sandra.schwegmann@bsh.de
Ice service	Germany	BSH	ice@bsh.de
Jörg Kuchta	Germany	WSV	joerg.kuchta@wsv.bund.de
Theodor Hervarsson	Iceland	IMO	teddi@vedur.is
	Latvia	LEGMC	hidro@lvgmc.lv
	Latvia	LEGMC	synop@lvgmc.lv
	Latvia	LEGMC	marine@lvgmc.lv
Andrejs Zubaničs	Latvia	LEGMC	andrejs.zubanics@lvgmc.lv
Vida Auguliene	Lithuania	LHMS	vida.auguliene@meteo.lt
Vida Raliene	Lithuania	LHMS	vida.raliene@meteo.lt
	Netherlands	RWS	infocentrum@rws.nl
Harm Bruins Slot	Netherlands	RWS	harm.bruins.slot@rws.nl
Helge Tangen	Norway	Met.no	helge.tangen@met.no
Nick Hughes	Norway	Met.no	nick.hughes@met.no
	Norway	Met.no	istjenesten@met.no
	Norway	NCA	ismelding@kystverket.no
	Norway	KSAT	rolft@ksat.no
Ida Stanisławczyk	Poland	IMGW	Ida.Stanislawczyk@imgw.pl
Anna Kubicka	Poland	IMGW	Anna.Kubicka@imgw.pl
	Poland	IMGW	hydrologia.gdynia@imgw.pl
	Poland	UMGDY	kpgdynia@umgdy.gov.pl

	Poland	UMS	szczecintraffic@ums.gov.pl
Oleg Folomeev	Russia	AARI	o.folomeev@aari.ru
Polona Sol	Russia	AARI	polinasol@aari.ru
Vasily Smolyanitsky	Russia	AARI	vms@aari.nw.ru
	Russia		sea@meteo.nw.ru
Amund Lindberg	Sweden	SMA	amund.lindberg@sjofartsverket.se
Emma Grönkvist	Sweden	SMA	emma.gronkvist@sjofartsverket.se
Icebreaking management	Sweden	SMA	opc@sjofartsverket.se
Lisa Lind	Sweden	SMHI	lisa.lind@smhi.se
Isabella Grönfeldt	Sweden	SMHI	isabella.gronfeldt@smhi.se
Magnus Larsson	Sweden	SMHI	magnus.larsson@smhi.se
Ice service	Sweden	SMHI	ice@smhi.se

Appendix 14

Action items BSIM-26

Item	Subject	Action	Responsibility	Date	
1	Baltic Sea Ice Code	Examination of geographical distribution of new fairway sections and harbours	Magnus Larsson SMHI M.Sztobryn IMGW All services	Next meeting	Closed
2	Chart symbols	Review of chart symbols	Patrick Eriksson FMI Juergen Holfort BSH All services	Next meeting	Closed
3	NAVTEX	Content. Short ice information, similar to the Arctic, come up with a suggestion	Magnus Larsson SMHI, Jürgen Holfort BSH	Next meeting	Ongoing
4	Indicator of Sea Ice condition	Comparison of Ice Volume and Max extent of ice cover. Share statistics after season 2016/2017.	Sandra Schwegmann BSH, Patrick Eriksson FMI, Jouni Vainio FMI, Magnus Larsson SMHI	Sep. 2017	Ongoing
5	Chart symbols	Jammed brash barrier symbol, point or line feature, line underneath, tip pointing, lift to ETSI.	Antti Kangas, FMI Jürgen Holfort, BSH	Feb. 2017	New
6	Chart symbols	Jammed brash barrier symbol, SMHI and FMI deviating from the WMO standard, continue discussions.	Antti Kangas FMI, Emma Grönkvist SMHI	Sep. 2018	New
7	Baltic sea ice code	Get observations from pilots and icebreakers.	Amund Lindberg SMA, Tuomas Taivi FTA, Emma Grönkvist	Nov. 2017	New

			SMHI, Antti Kangas FMI		
8	Baltic sea ice code	Open the BSH database of the Baltic sea ice codes to the other services.	Jürgen Holfort BSH, Magnus Larsson SMHI	Sep. 2017	New
9	Observation application	FMI are developing a new application, Seawiki, will share info.	Antti Kangas FMI	Dec. 2016	New
10	BSIM-26	Finalize and share the final report of the BSIM-26.	Emma Grönkvist SMHI	Oct. 2016	New
11	BSIM-27	Preparation of the Meeting Official invitation Meeting arrangements	Andrejs Zubaničs LEGMC	Sep. 2018	New