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Ice Service

Ari Seinä

Head - Ice Research and Ice Service

Outline

- **Drivers for better ice information**
- **Ice service: Available services and information**
- **Case: Sea of Åland in March 2010**

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Drivers for better ice information

The Baltic Sea has heavy marine transportation

2000 large vessels are sailing any given time in the Baltic Sea

>800 million tons of goods are transported every year

Marine transportation growing 30-40% in 10 years

© Finnish Institute of Marine Research, 2006

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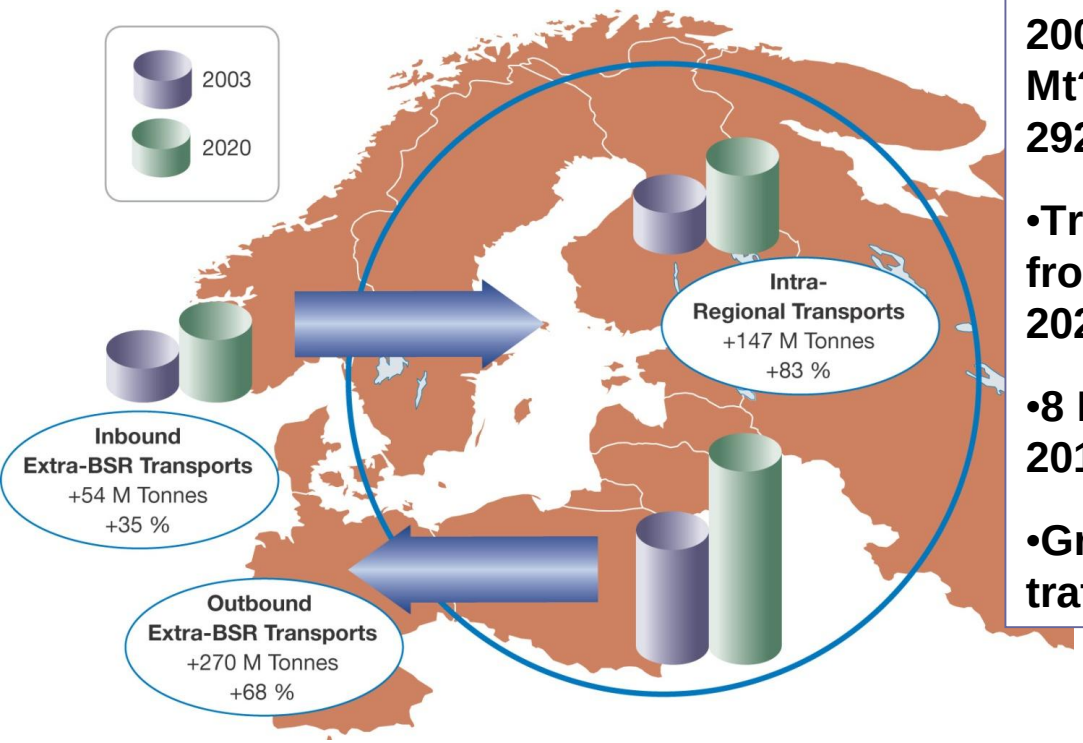
Why services: Baltic Sea maritime growth

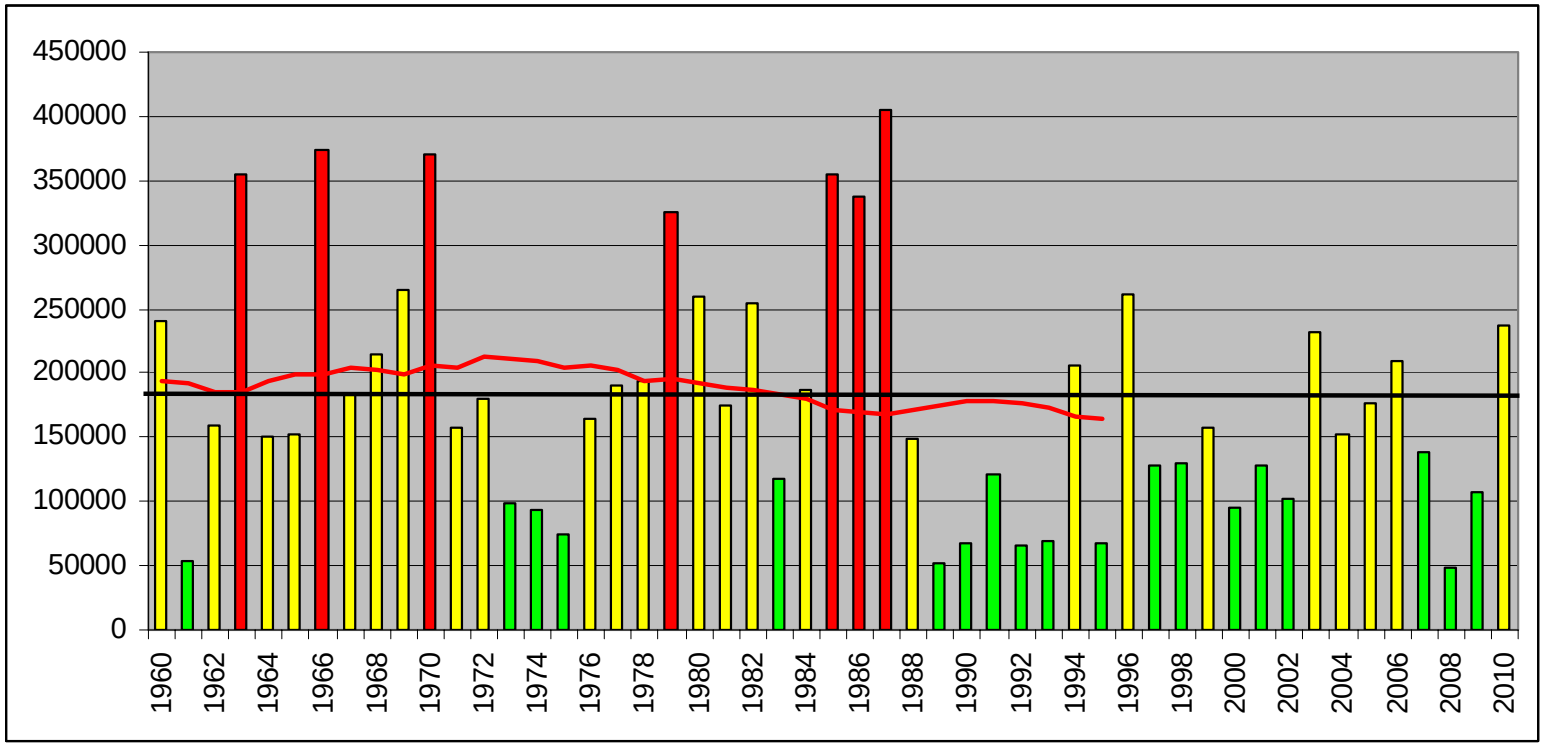


Future scenarios

- **Total maritime transport at Baltic Sea in 2003 was 731 Mt, in 2020 expected 1,202 Mt? (During winter months growth from 292 Mt to 481 Mt)**
- **Transport of German ports will grow from 294 Mt to 759 Mt between 2004 and 2025?**
- **8 B containers in Baltic Sea ports in 2010?**
- **Growth of 450% in Russian container traffic by 2015?**

Source: Baltic Maritime Outlook 2006

Baltic Sea max ice extent 1960-2010



Red= severe season

Yellow= average season

Green= mild season

Min. 49,000 sq, km

AVG, 180,000 sq. km

Max. 405,000 sq.km

Red line= 30y running average

1990s 130,000 sq. km

2000s 150,000 sq. km

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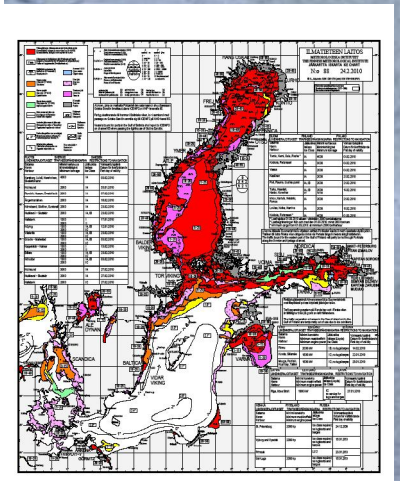
Ice service: services and products



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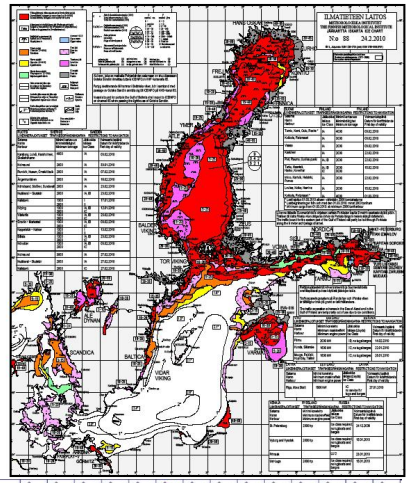
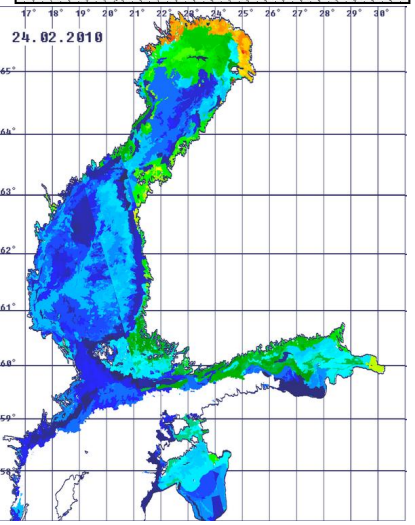
Finnish Ice Service

- Started operationally in February 1915
- Hosted by
  - Finnish Scientific Society 1915-1918
  - Finnish Institute of Marine Research 1918-2008
  - Finnish Meteorological Institute 2009->
- Provides services to the Baltic Sea
- Main R&D ongoing projects
  - MyOcean (EU) => marine core services
  - Polar View (ESA) => ice model, ice thickness maps
  - KaraX (Tekes) => ice thickness maps to Arctic





Products & services

Daily

- Ice charts over the Baltic Sea, Kattegat & Skagerrak
- Ice reports (plain text & coded) in Finnish, Swedish and English
- Numerical ice forecasts (+45h)
- SAR based products
- Satellite data service to Finnish and Swedish icebreakers
- Services to Baltic Icebreaking Management
- Services to Finnish icebreaking

1-3 times a week

- SST
- Long term forecasts

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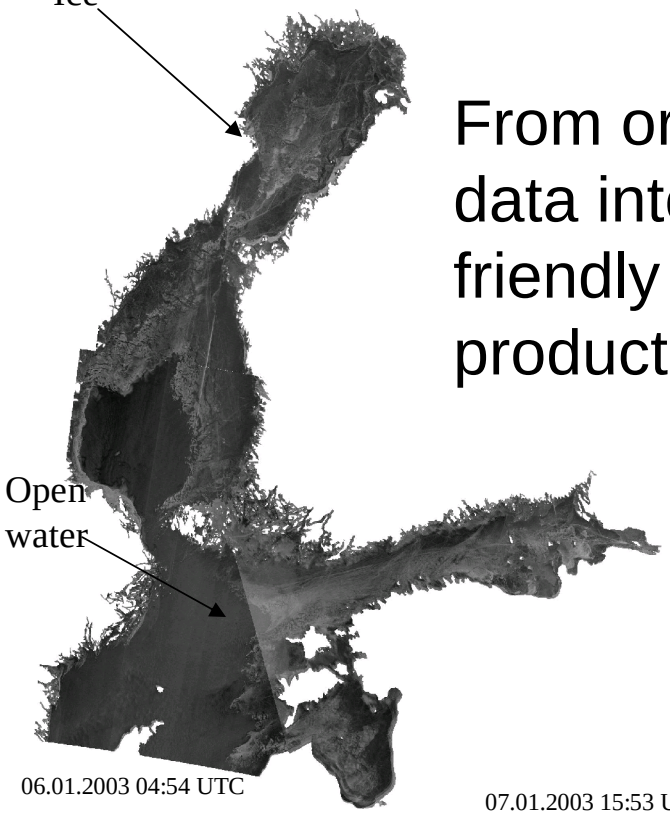
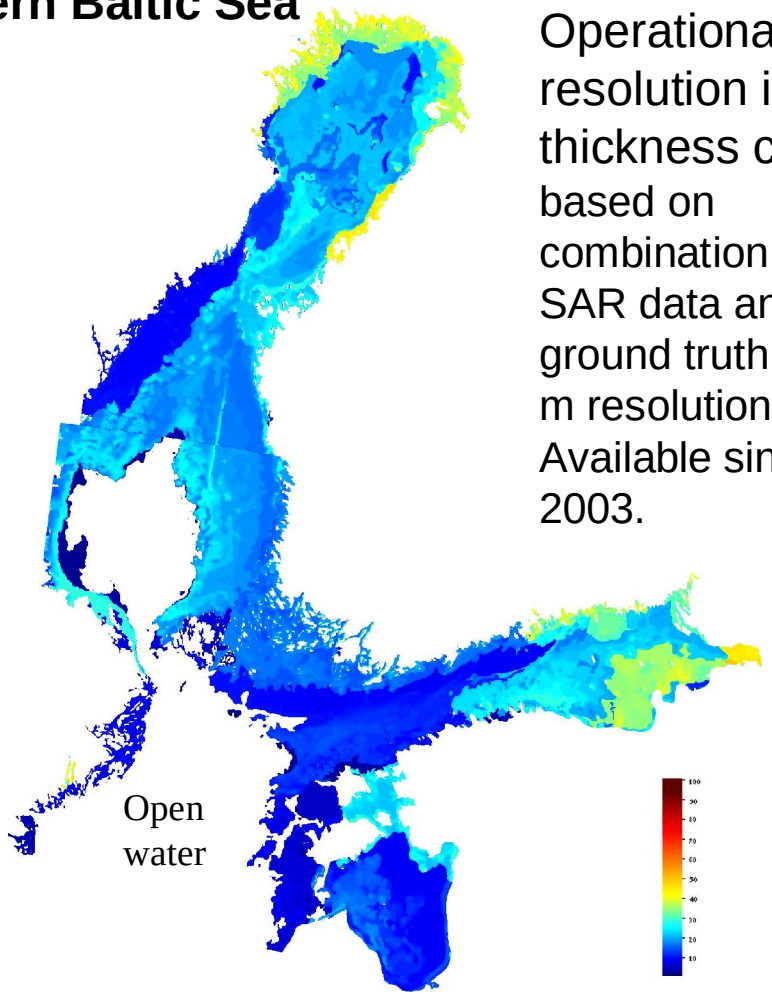
RADARSAT ScanSAR Wide image combination and high-resolution ice thickness classfication chart over the northern Baltic Sea

Original images: 6-7 January 2003



From original data into user-friendly products



Operational high resolution ice thickness chart based on combination of SAR data and ground truth in 500 m resolution. Available since 2003.

© RADARSAT International, Vancouver – Canada

Processed by Kongsberg Satellite Services, Tromso – Norway

Reproduction by Finnish Institute of Marine Research, Helsinki - Finland

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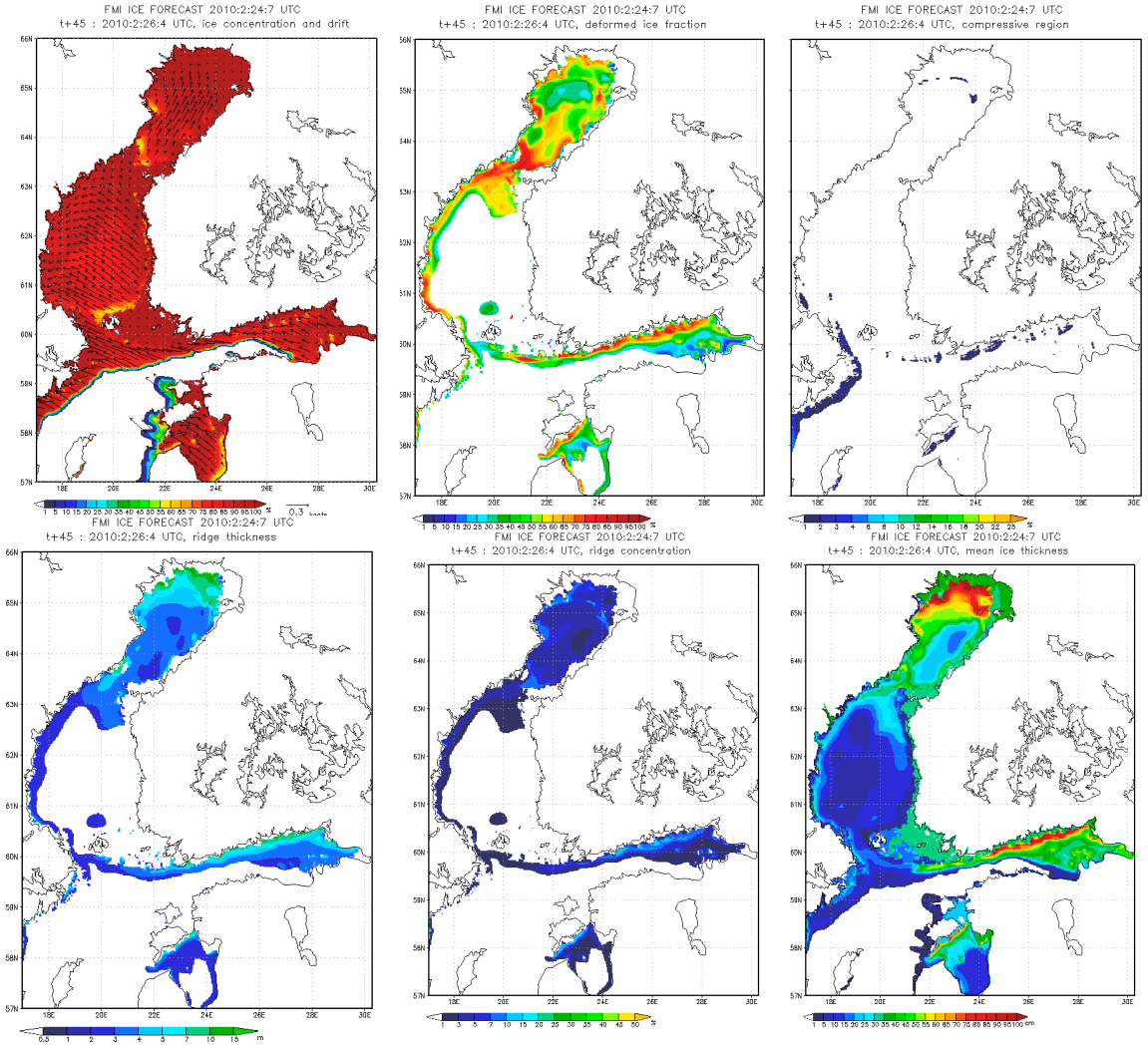
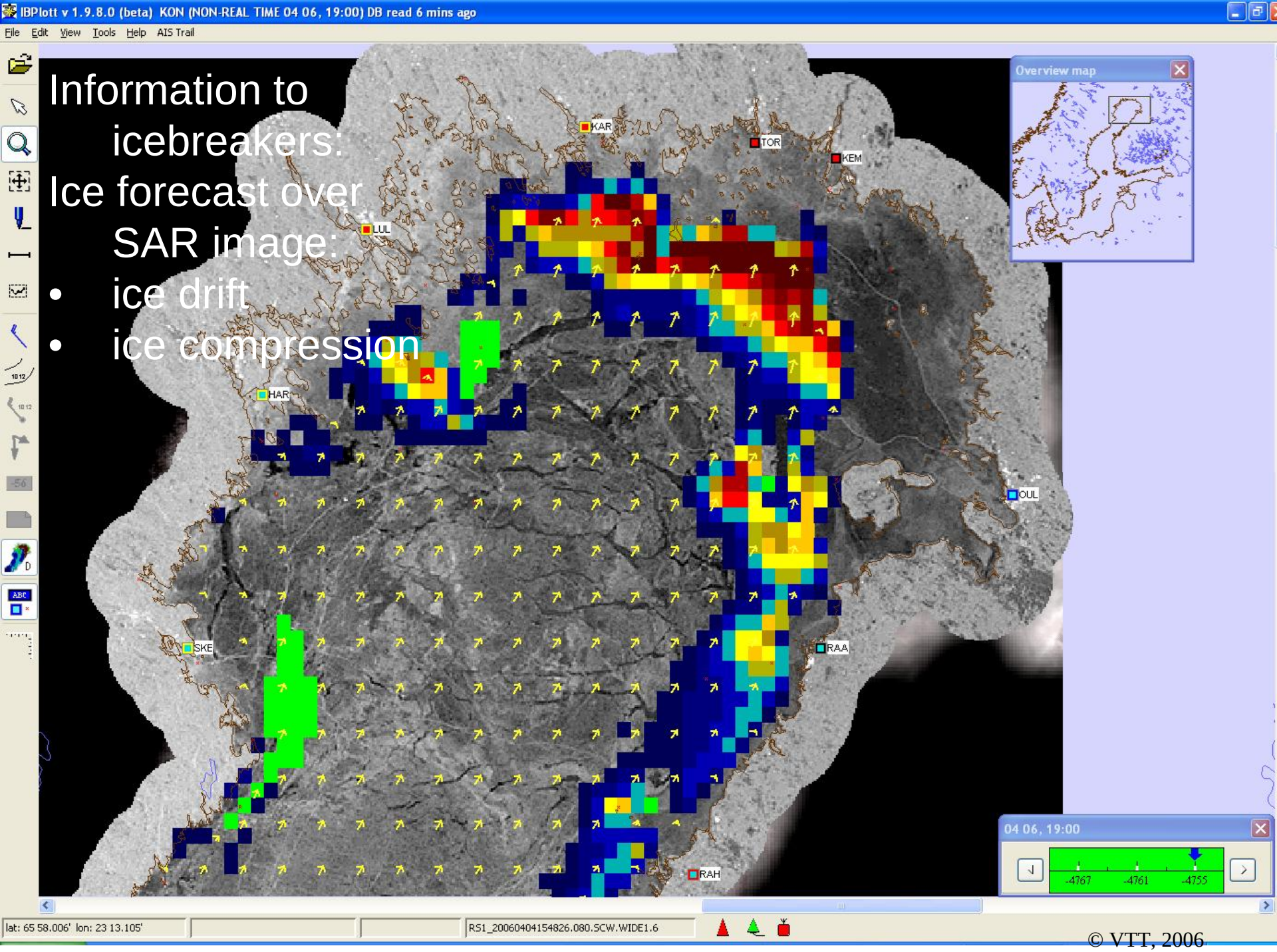
FMI's operational ice model



FMI's ice forecasts

- Covering the Baltic Sea
- +45 h in 3 h steps
- resolution 1 nautical mile
- 6 parametres
- published once a day


IBPlott v 1.9.8.0 (beta) KON (NON-REAL TIME 04 06, 19:00) DB read 6 mins ago
File Edit View Tools Help AIS Trail
Information to icebreakers:
Ice forecast over SAR image:
• ice drift
• ice compression
KAR
TOR
KEM
LUL
HAR
OUL
SKE
RAA
RAH
Overview map
04 06, 19:00
-4767
-4761
-4755
lat: 65 58.006' lon: 23 13.105'
RS1_20060404154826.080.SCW.WIDE1.6

© VTT, 2006

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Case: Sea of Åland in March 2010

Service provider: FINNISH METEOROLOGICAL INSTITUTE

Technological partner: VTT

http://www.polarview.org

http://polarview.fimr.fi

Polar View

esa

CSA ASC

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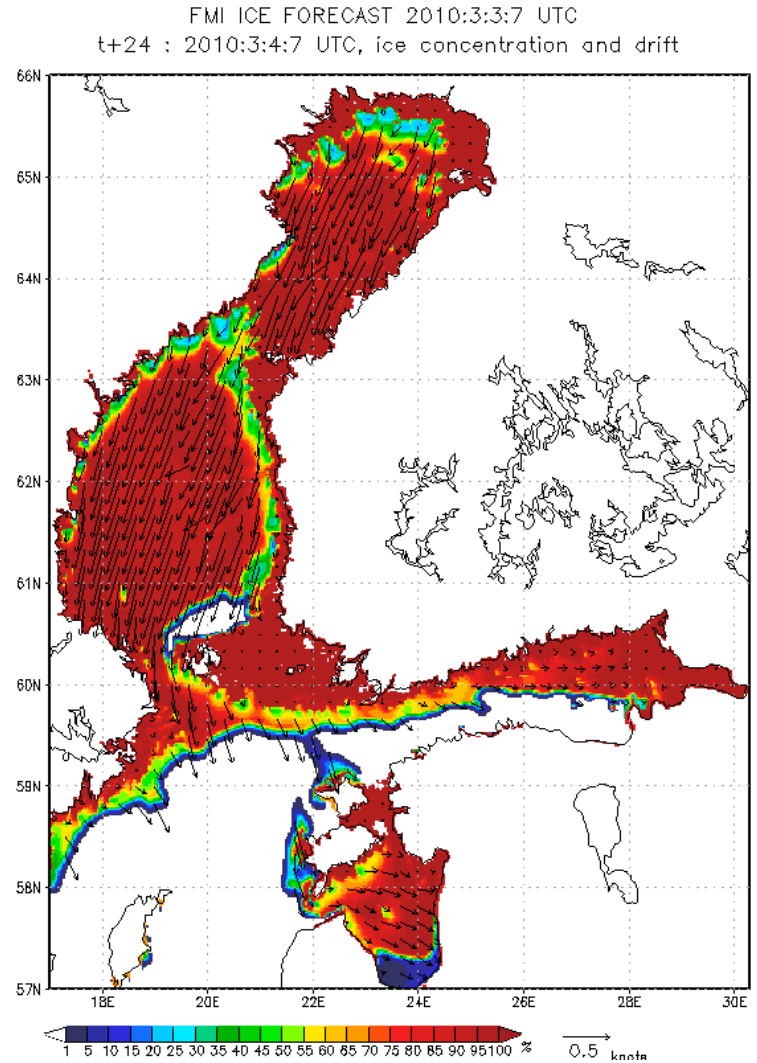
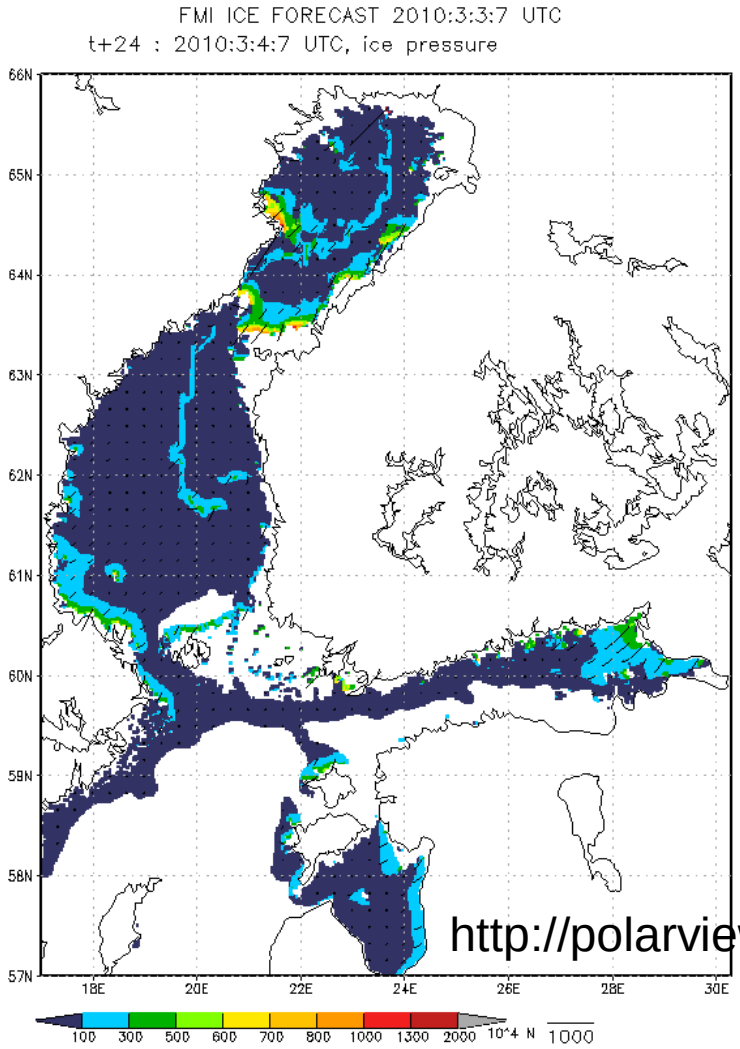
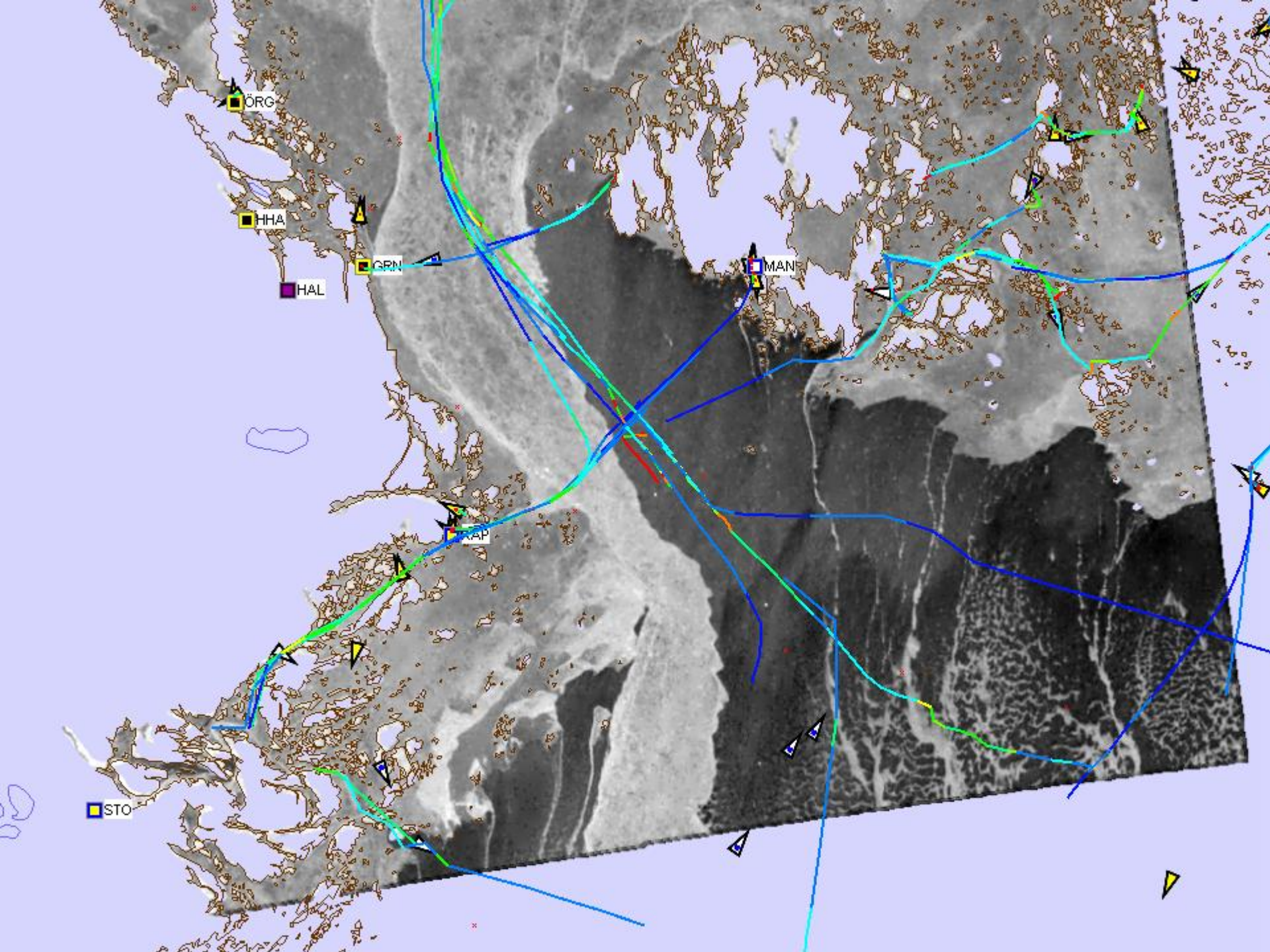
Ice forecast: March 4, 2010 7UTC, drift&pressure





http://polarview.fimr.fi


ÖRG
HHA
GRN
HAL
MAN
STO

4 - 5 March 2010
- ms Viking Amorella stuck in ice
- collision with ms Finnfellow

MAN
KAP
STO

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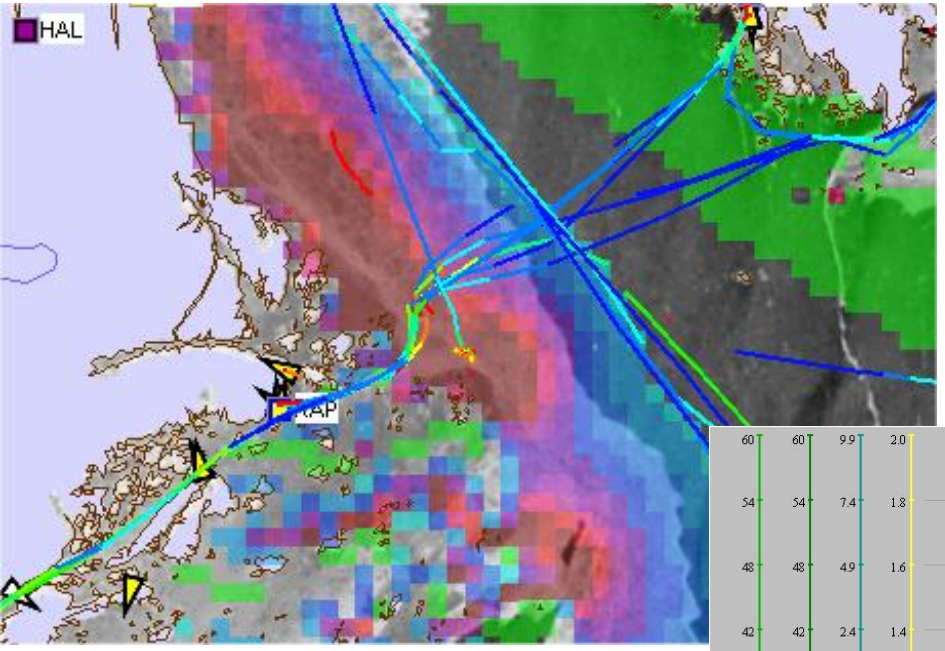
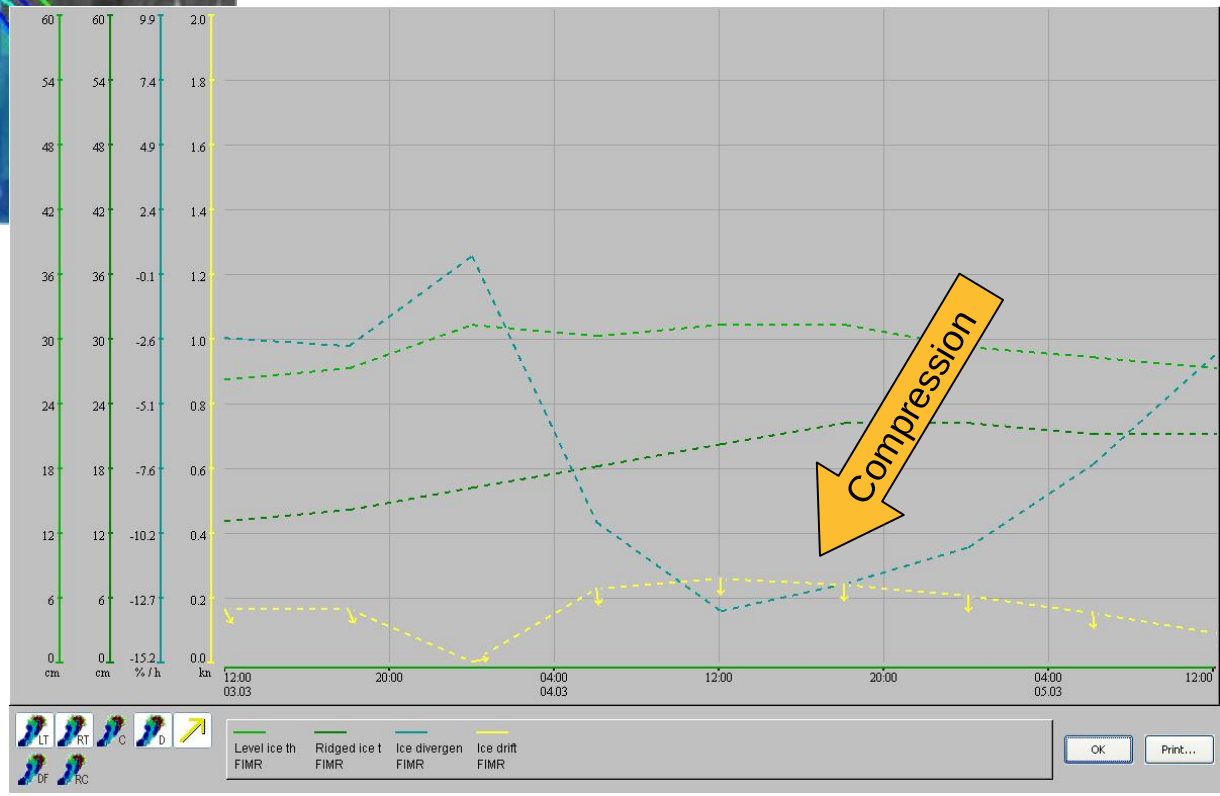


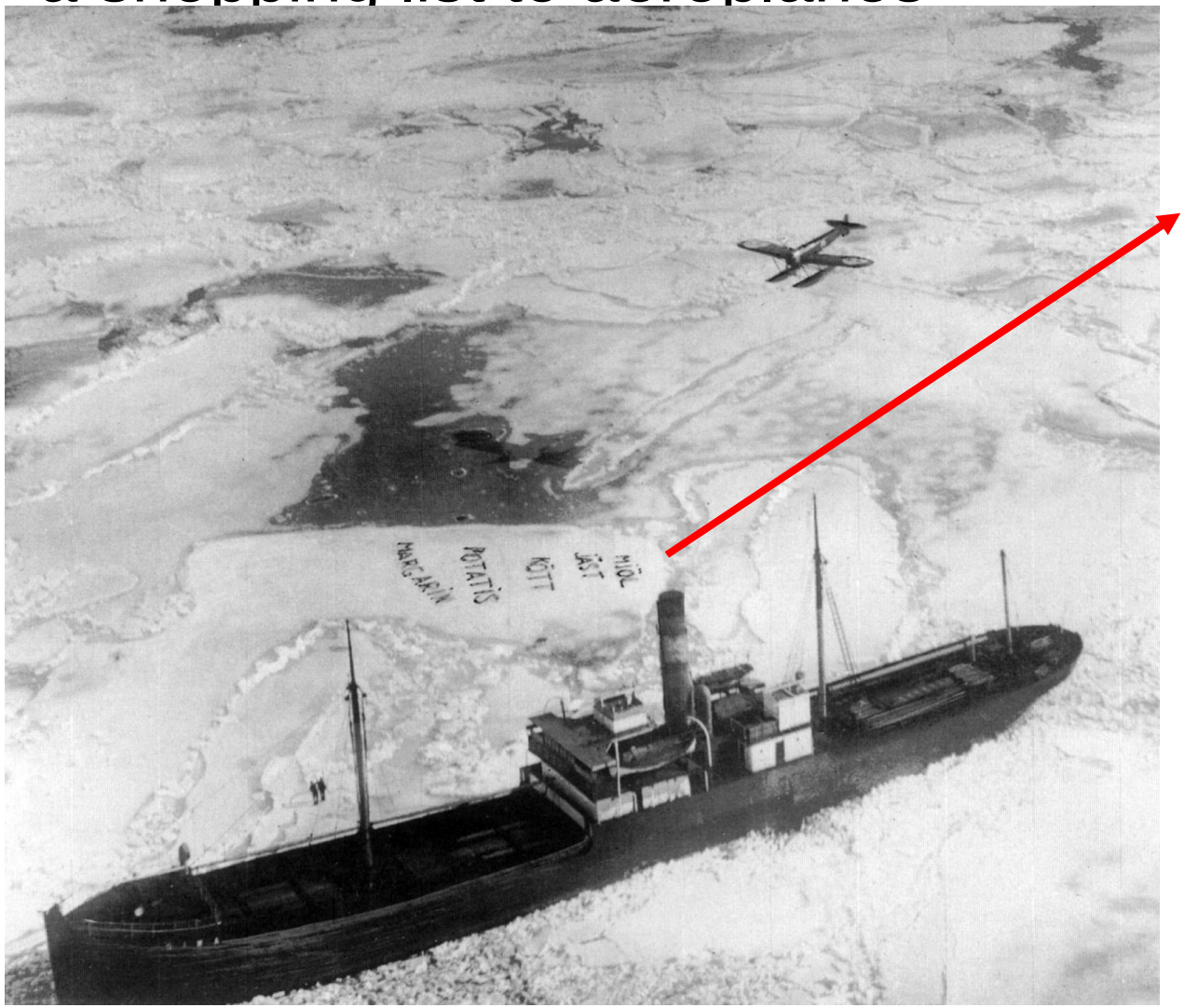
Ice divergence

The situation could have been avoided…
if forecast information would have been used/reached the users



Numerical
ice model: FMI
Background image:
Radarsat -2
IBPlott system
used by icebreakers

Communication in 1920s: a beset vessel is sending a shopping list to aeroplanes



FLOUR

YEAST

MEAT

POTATOS

MARGARIN

Foto: Statens sjöhistoriska museum, Sweden

Lessons

Challanges

- **Information was available**
  - Warnings from Finland & Sweden
  - Ice forecasts (in net & icebreakers)
- **Warnings were not understood / were ignoded?**
- **With low connection speed communication districtions detailed information is destrected to users at sea**

Solutions

- **Training?**
- **Detailed information to the ships (for hot spots)?**

Conclusions (1)

Challanges:

- **Baltic Sea has a heavy, growing marine transportation**
- **Ice plays an important role also in the future**

Availability:

- **Ice services are providing services and information**
- **New products and services have been developed**
- **Continious R&D**

Conclusions (2)

Requirements:

- **Information must reach the users**
- **Development of low connection speed products**
- **Higher resolution (tailored) products are needed**
  - In ”Ship’s scale”
  - In situ & forecasts
- **Longer reached forecasts**
  - R&D needed

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THANK YOU

www.fmi.fi

Ice charts: http://www.itameriportaali.fi/html/icef/icemap_c.pdf

Ice forecasts: http//polarview.fimr.fi