

# Operational sea ice services in the polar regions

Andrew Fleming  
British Antarctic Survey  
June 2014



Polar View



## Current missions (just) - Sentinel-1



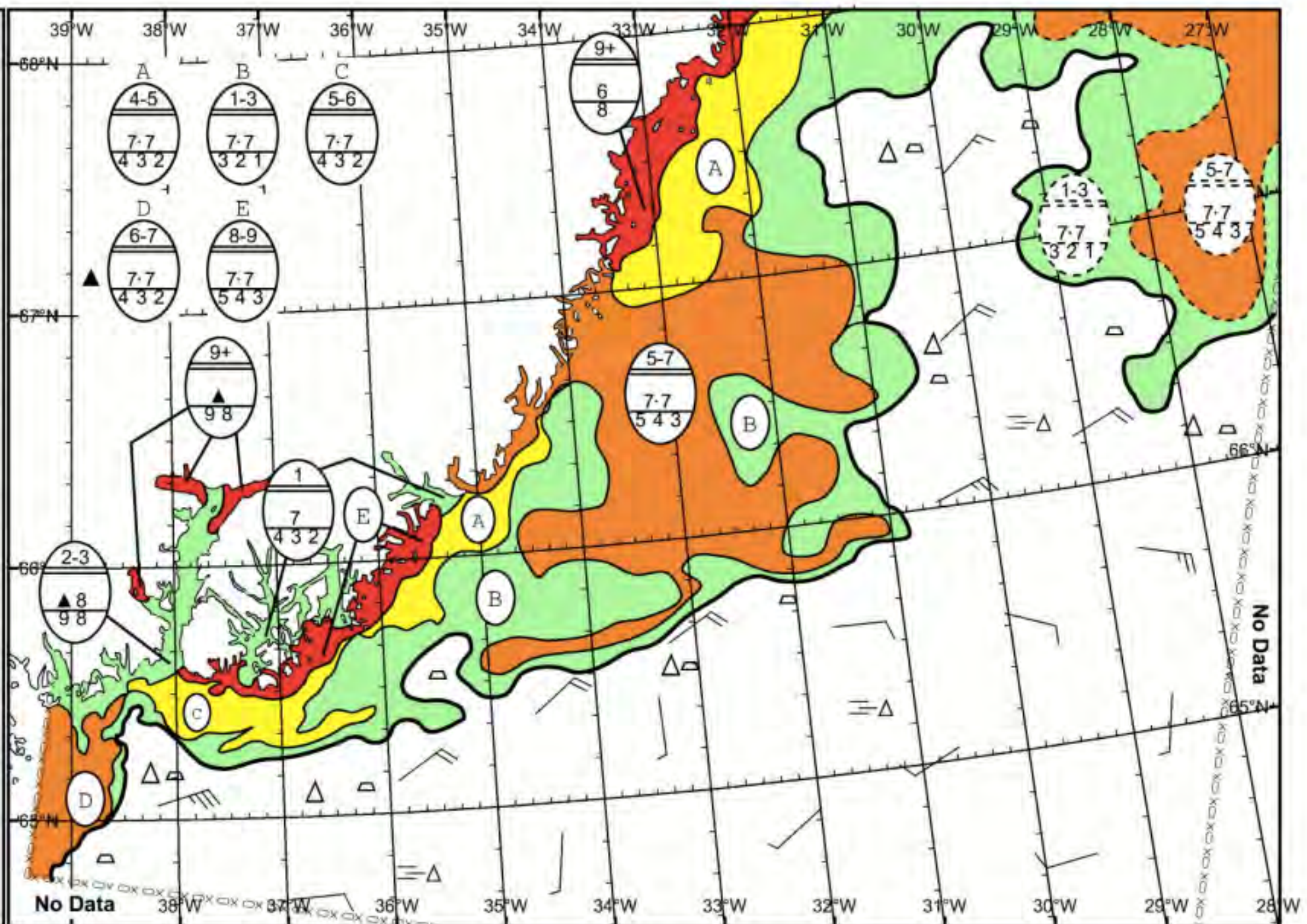




DMI  
Ice Service

East Greenland Ice Chart  
Danish Meteorological Institute

Valid: 24 June 2014, 08:45 UTC



No Data



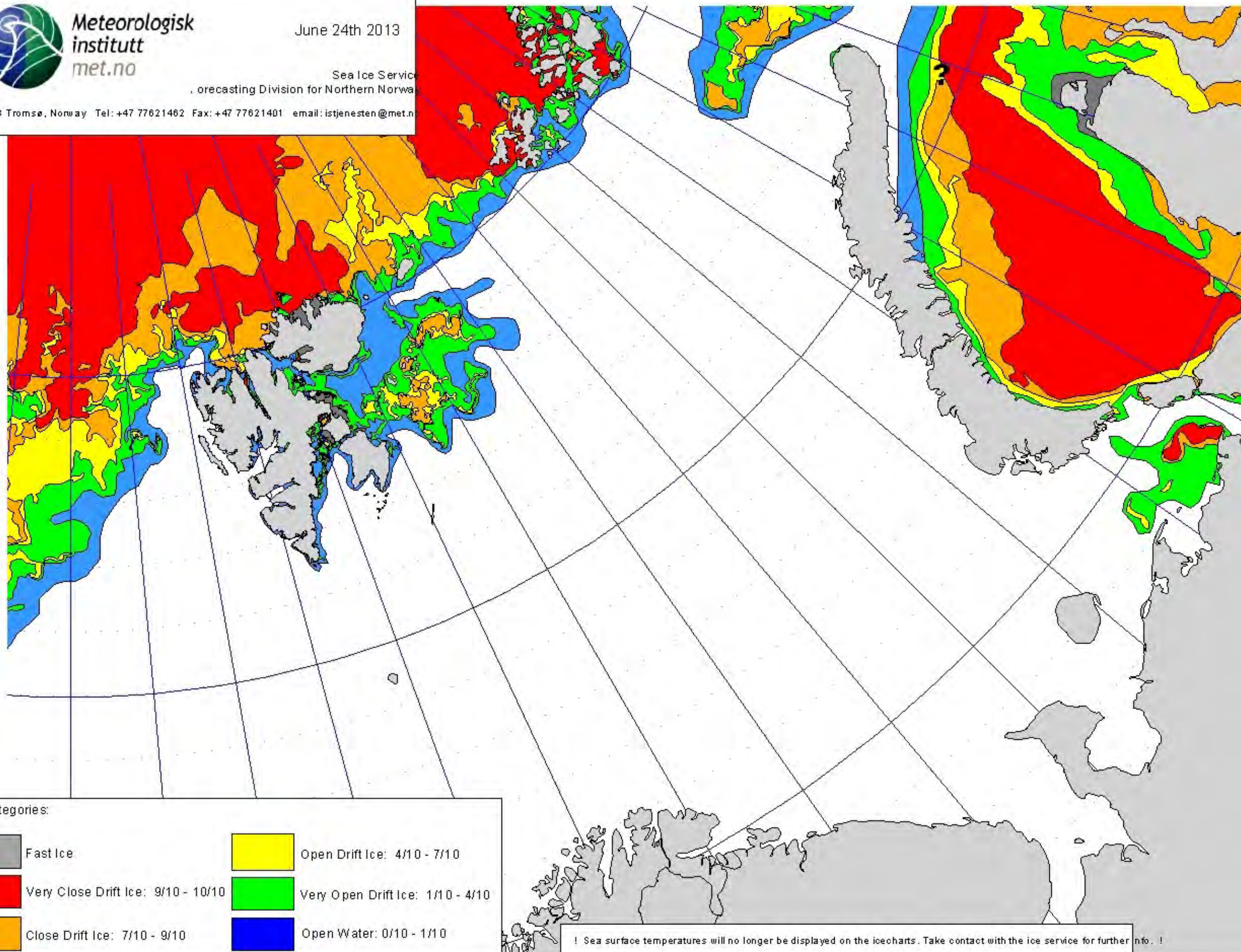


Meteorologisk  
institutt  
met.no

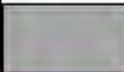





June 24th 2013

Sea Ice Service  
Forecasting Division for Northern Norway

N-9293 Tromsø, Norway Tel: +47 77621462 Fax: +47 77621401 email: istjenesten@met.no



Ice Categories:

 Fast Ice	 Open Drift Ice: 4/10 - 7/10
 Very Close Drift Ice: 9/10 - 10/10	 Very Open Drift Ice: 1/10 - 4/10
 Close Drift Ice: 7/10 - 9/10	 Open Water: 0/10 - 1/10

! Sea surface temperatures will no longer be displayed on the icecharts. Take contact with the ice service for further info. !



# Increased efficiency



RRS James Clarke Ross & RRS Ernest Shackleton



## Increased safety



Tour ship MV Explorer, Bransfield Strait, Antarctic Peninsula, November 2007



# SAR support



Russian fishing vessel Sparta, Ross Sea, Antarctica, December 2011



# Arctic gold rush?

25 August 2011 Last updated at 17:42

## Arctic sea routes open as ice melts



By Richard Black  
Environment correspondent, BBC News

**Two major Arctic shipping routes have opened as summer sea ice melts, European satellites have found.**

Data recorded by the European Space Agency's (Esa) Envisat shows both Canada's Northwest Passage and Russia's Northern Sea Route open simultaneously.

This summer's melt could break the 2007 record for the smallest area of sea ice since the satellite era began in 1979.

Shipping companies are already eyeing the benefits these routes may bring if they remain open regularly.

The two lanes have been used by a number of small craft several times in recent years.

But the Northern Sea Route has been free enough of ice this month for a succession of tankers carrying natural gas condensate from the northern port of Murmansk to sail along the Siberian coast en route for Thailand.

"They're often open at the same time in the sense that with some ingenuity you can get through them," observed Peter Wadhams, an Arctic ice expert from the University of Cambridge.



Last year, the Peter 1 yacht sailed using both passages

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## Thawing Arctic opens up new shipping routes on the 'roof of the world'

An increasing amount of seaborne traffic is moving along a new Siberian coastal route, cutting journey time and boosting trade prospects

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Terry Macalister  
guardian.co.uk, Tuesday 5 July 2011 15:50 BST  
Article history



The MV Nordic Barents leaves Kirkenes harbour, northern Norway to China via the Northern Sea Route. Photograph: Helge Sterk

Cold is the new hot in shipping circles as melting sea ice prospects for trade between China and the west to move of the world.

An increasing amount of seaborne traffic is beginning to call Northern Sea Route which traverses the Siberia also hopes of opening up more of the North West Passage Canada.

The attraction of the voyage is that it is one-third of the traditional routes through the Suez Canal. This means dioxide (CO<sub>2</sub>) emissions and less fuel. It also means le

**The Economist**

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Charts, maps and infographics  
**Daily chart**

Melting Arctic sea-ice and shipping routes

## Northern exposure

Sep 22nd 2011, 17:59 by The Economist online

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**Within four years, Arctic sea-ice cover has twice reached record lows**

IN THE 16th century English navigators, cut off from the riches of the Indies by the growing Spanish and Portuguese empires, sought to reach Asia by sailing close to the North Pole. They failed, because so much of the Arctic ocean was frozen. No longer. Global warming is opening summer sea lanes through the ice, along the north-west passage sought by Martin Frobisher and the north-east one sought by Hugh Willoughby. Both have now been navigated—the north-east (or northern route, as it is known to Russians) most recently in August by a Russian supertanker, assisted by two icebreakers, as our [Science & Technology article](#) explains. In later life Barnes Wallace, the designer of the bouncing bombs used in the Dambuster raid by the RAF on Germany



Arctic Council  
**Arctic Marine Shipping  
Assessment 2009 Report**



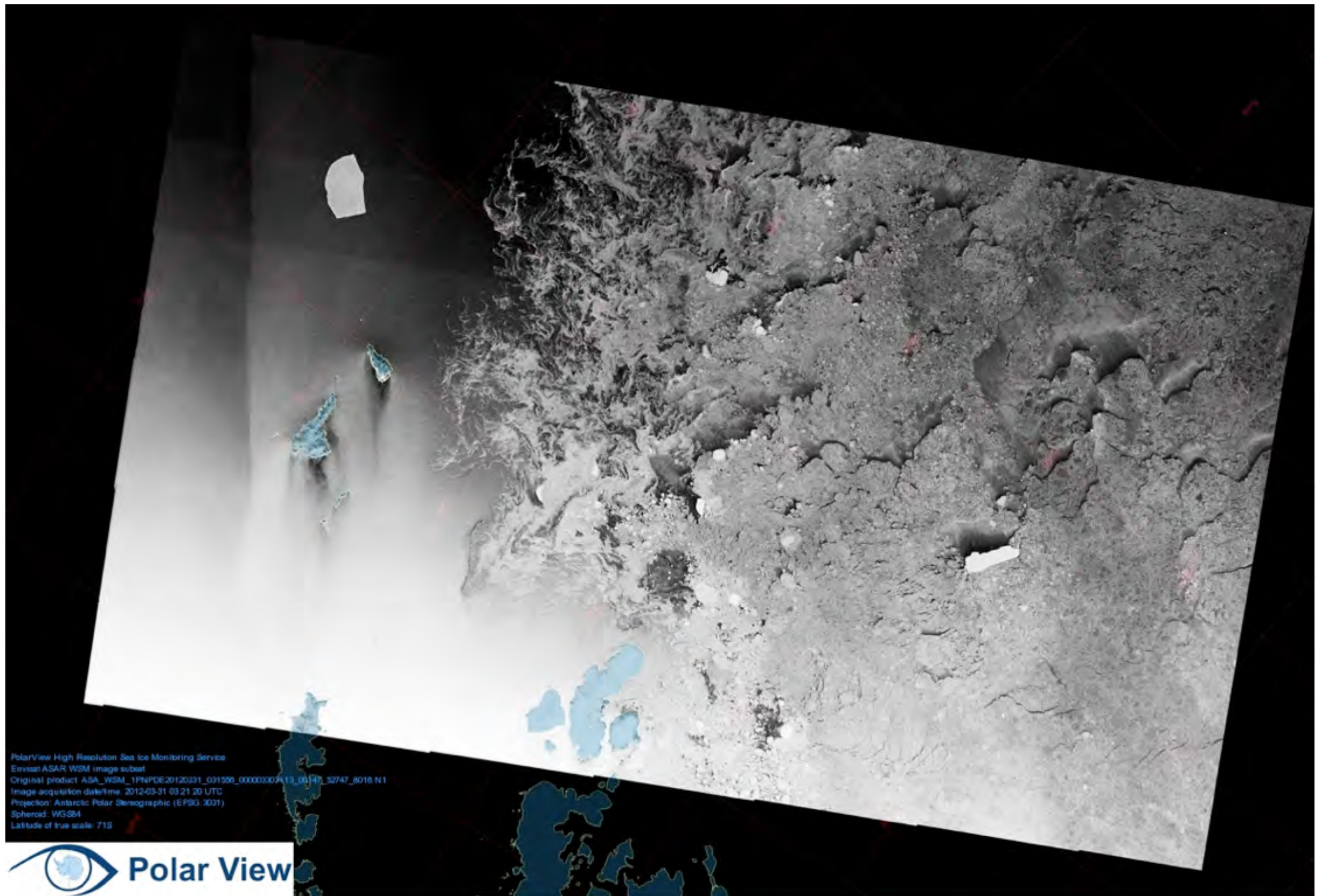


# Current missions - Sentinel-1





# SAR imagery

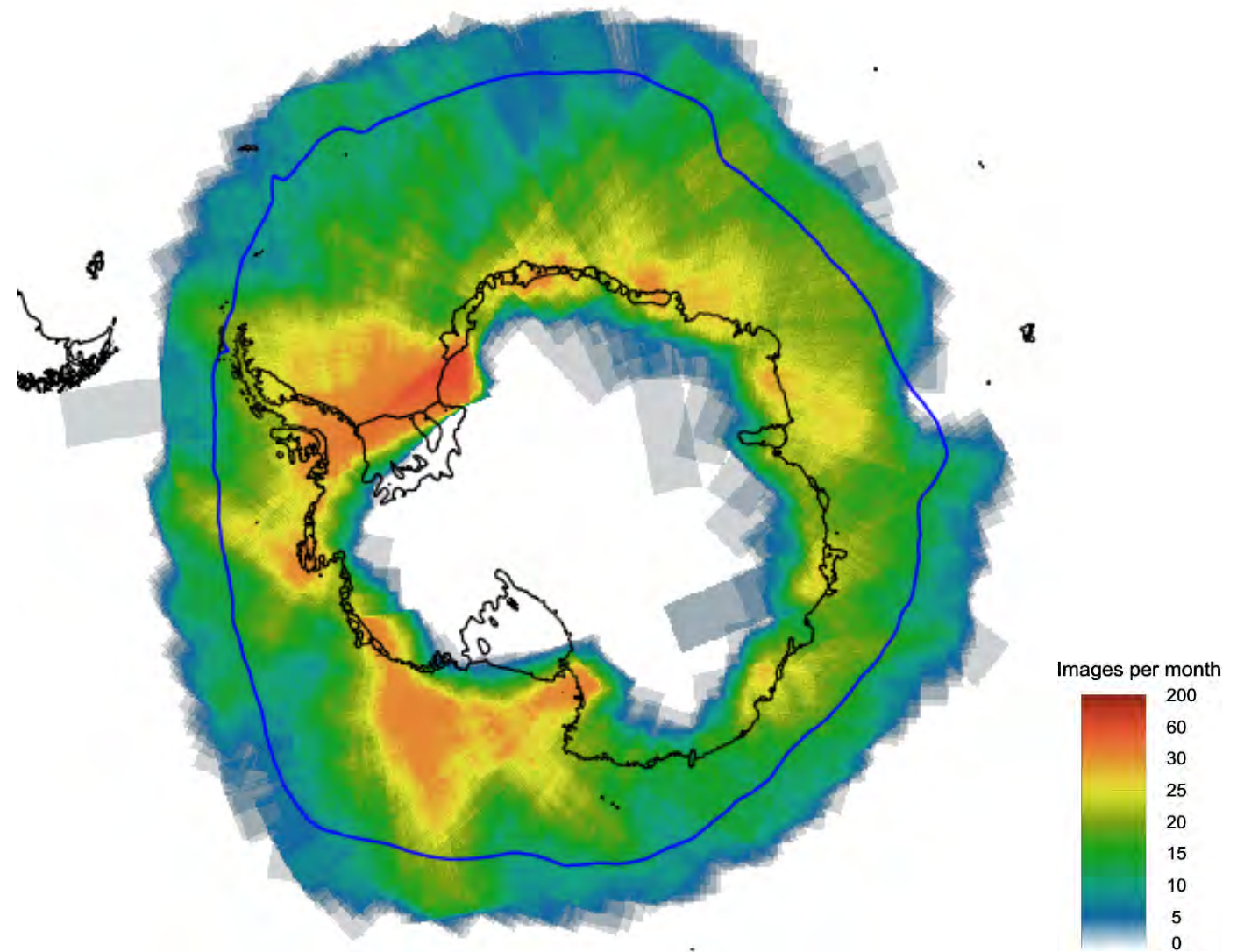
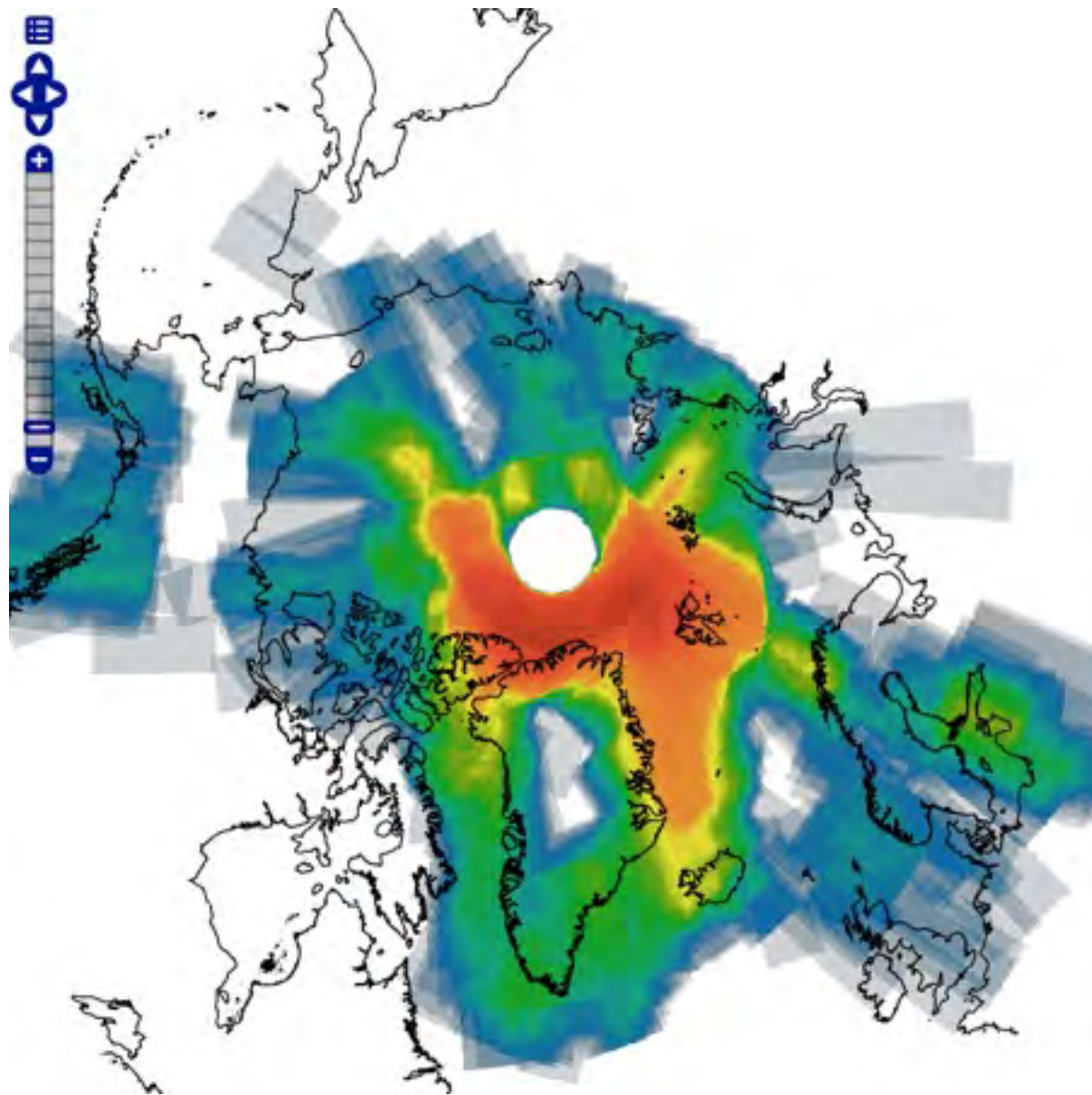




Photograph of the ice-covered ice shelf, showing the  
ice shelf and ice shelf. The ice shelf is a large, flat, white area  
that extends from the coast of Antarctica. The ice shelf is  
covered in a thick layer of ice, which is broken up by  
small, dark, rocky islands. The ice shelf is a large, flat,  
white area that extends from the coast of Antarctica. The  
ice shelf is covered in a thick layer of ice, which is broken  
up by small, dark, rocky islands. The ice shelf is a large,  
flat, white area that extends from the coast of Antarctica.  
Spheroid: WGS84  
Latitude of true scale: 71S

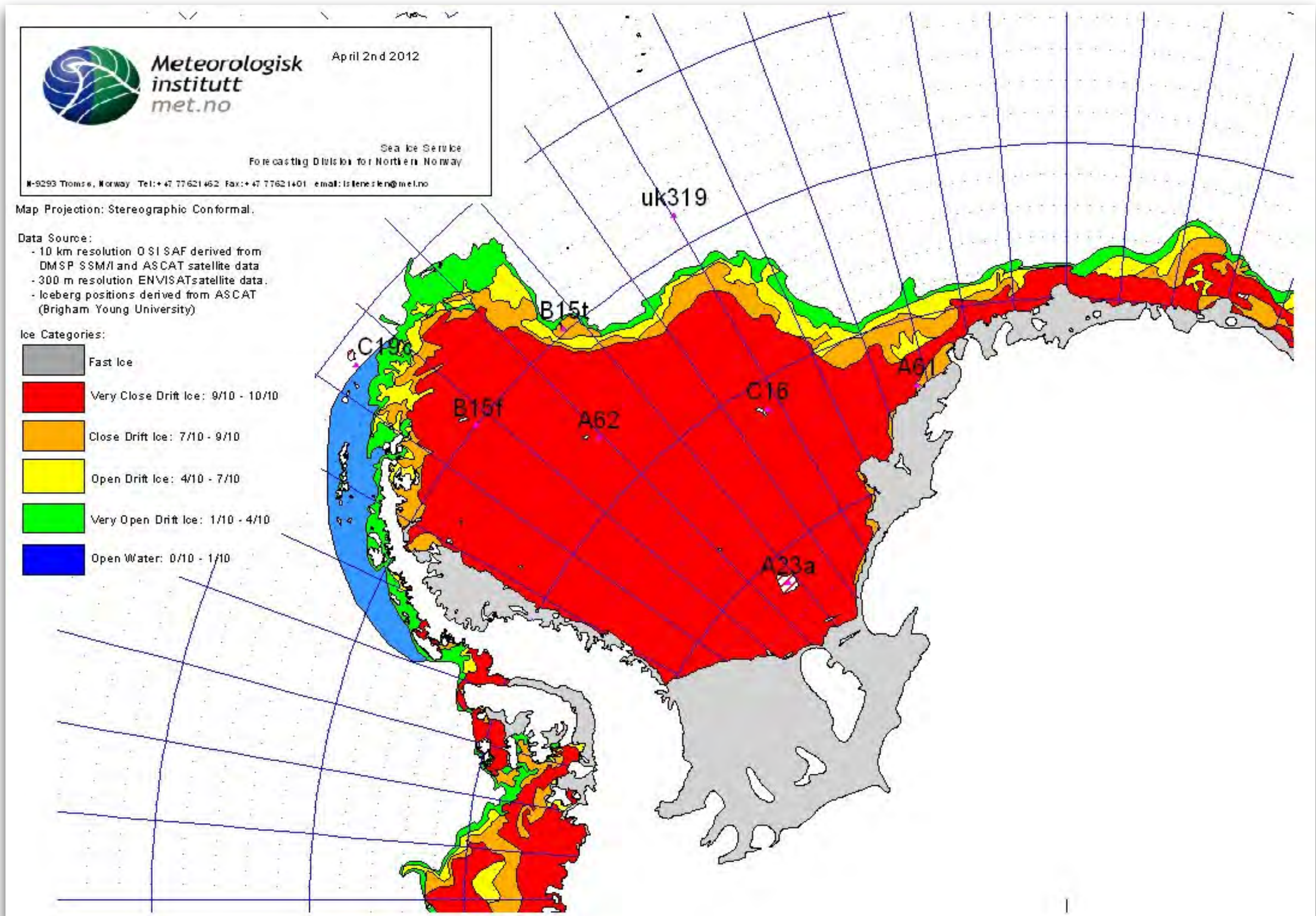


# ENVISAT ASAR Data



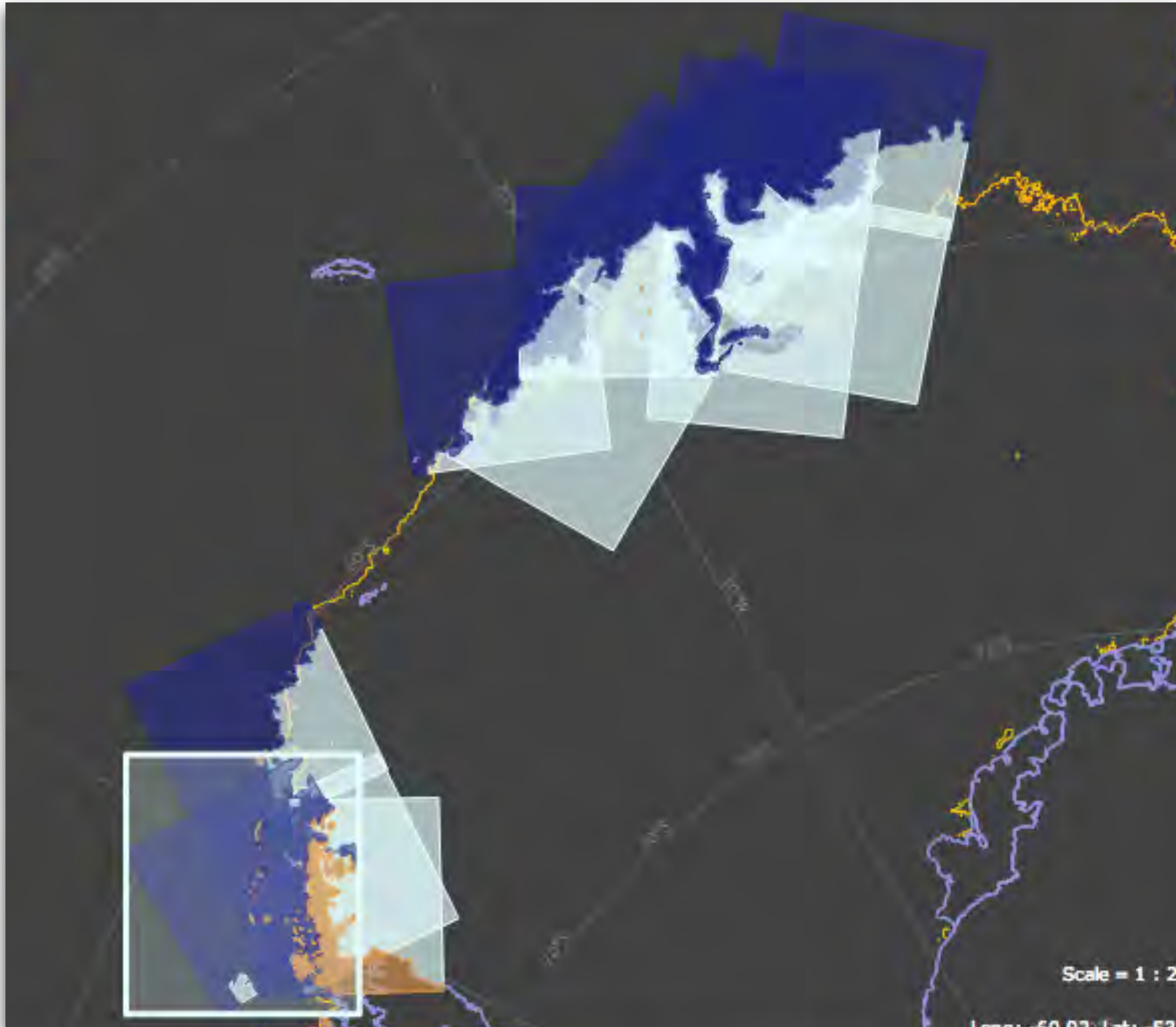


# Polar View Antarctica





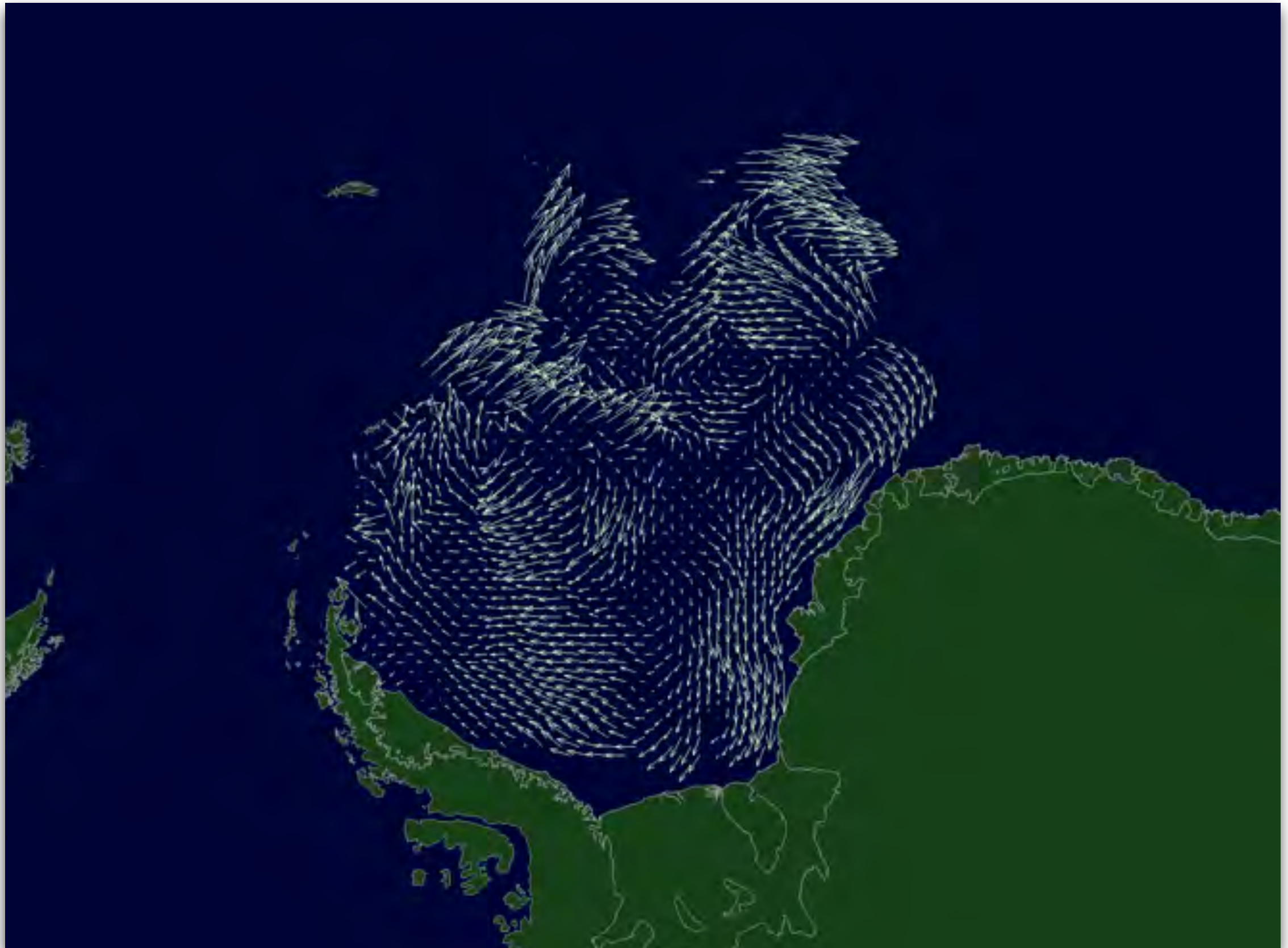
## Detailed sea ice limits information



High-resolution sea ice edge (from MyOcean project) used to validate models and OSISAF products



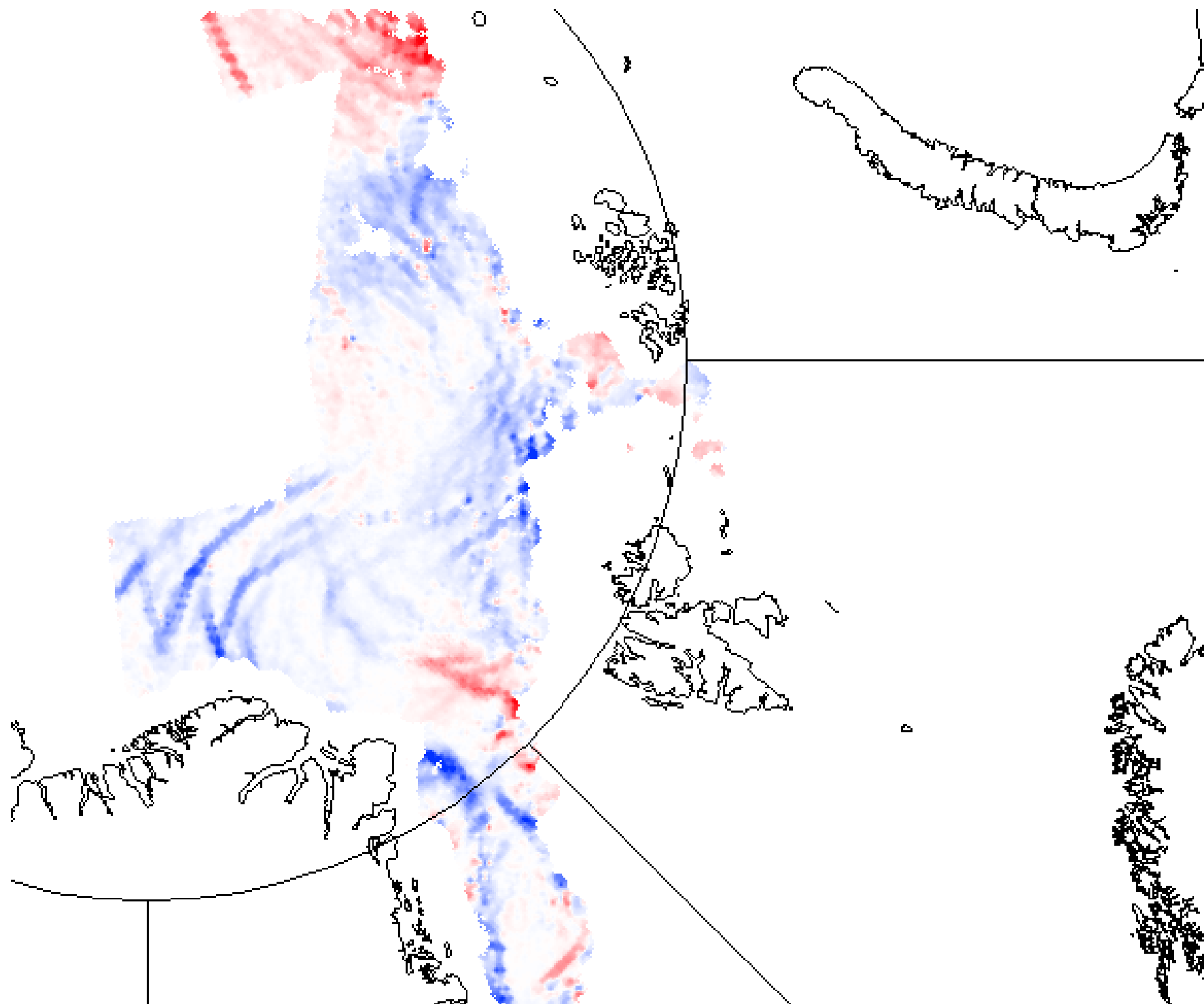
# Sea ice motion



Sea ice motion product (from MyOcean project)



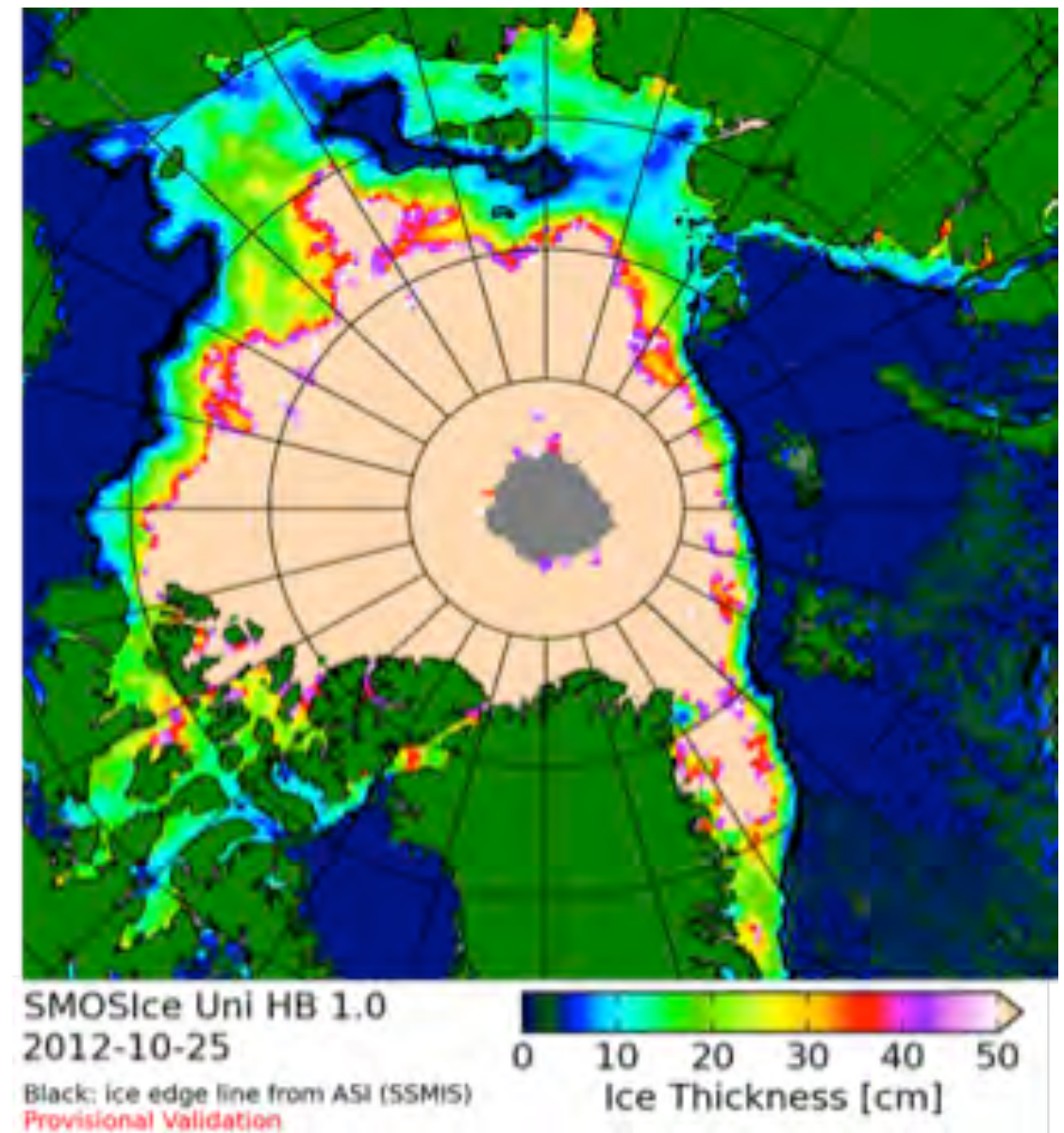
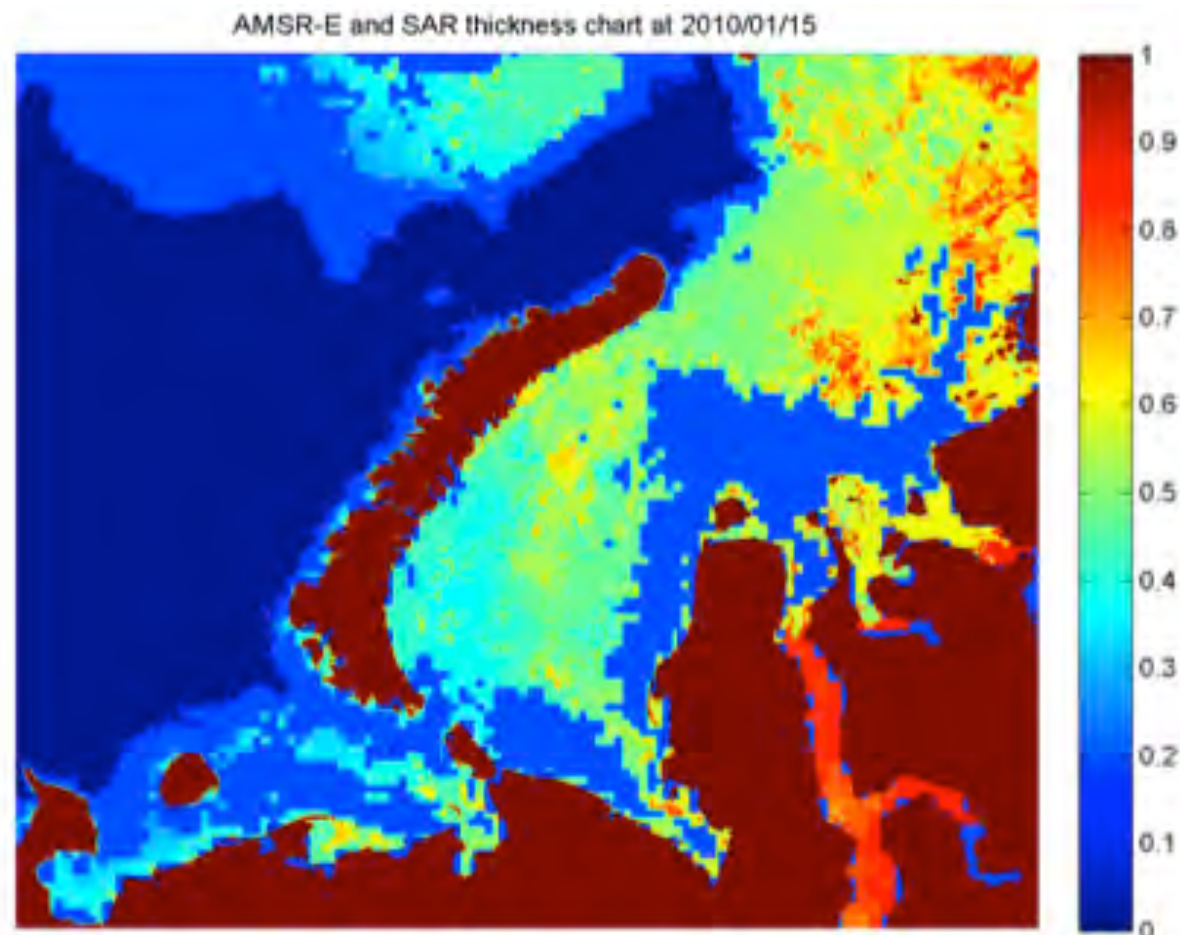
# Sea ice deformation pattern



Calculated from MyOcean ice drift data. Blue is divergence (openings) and red is convergence (pressure ridge formation)



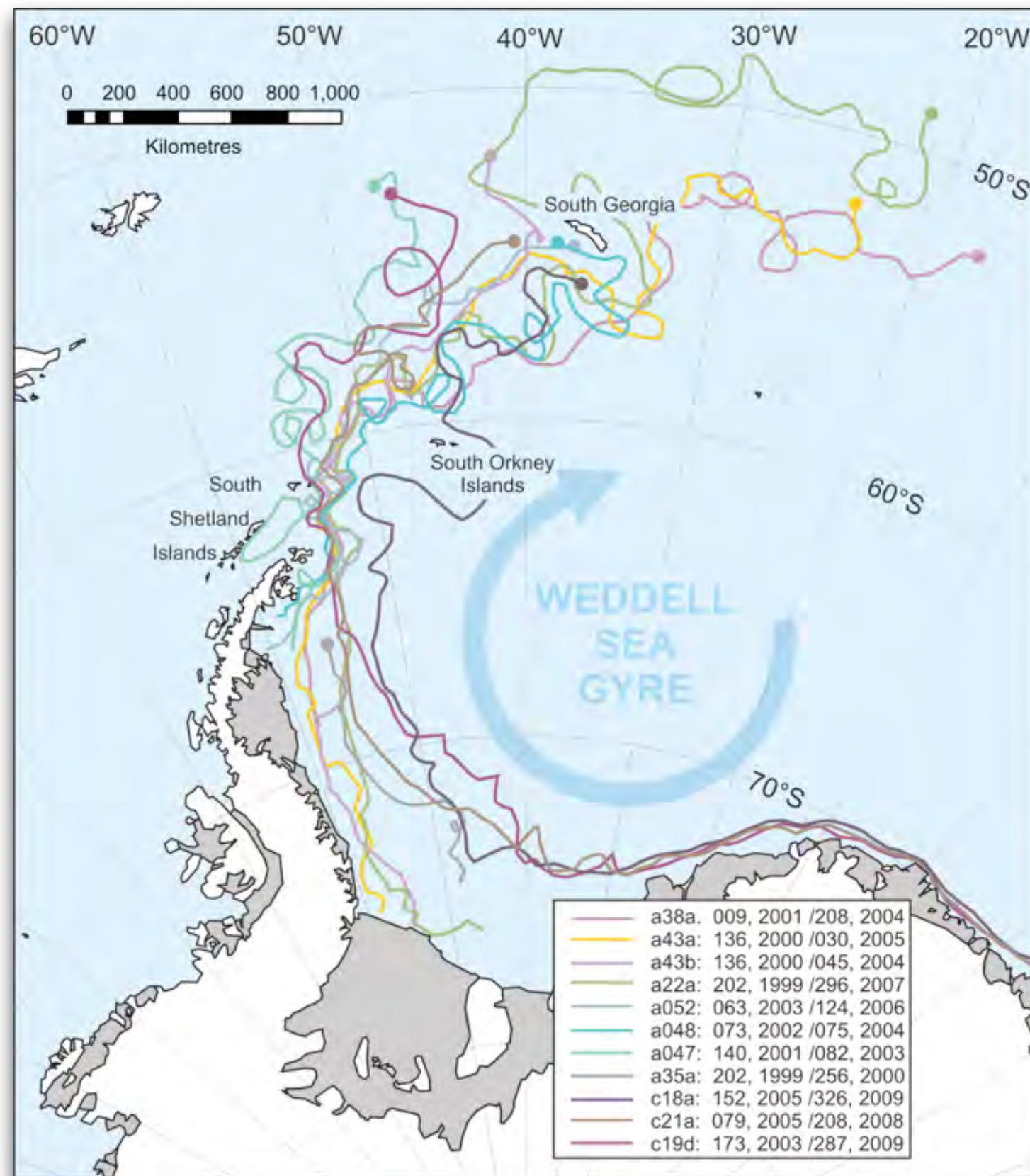
# Sea ice thickness



Thin ice products, winter only



# Iceberg tracking

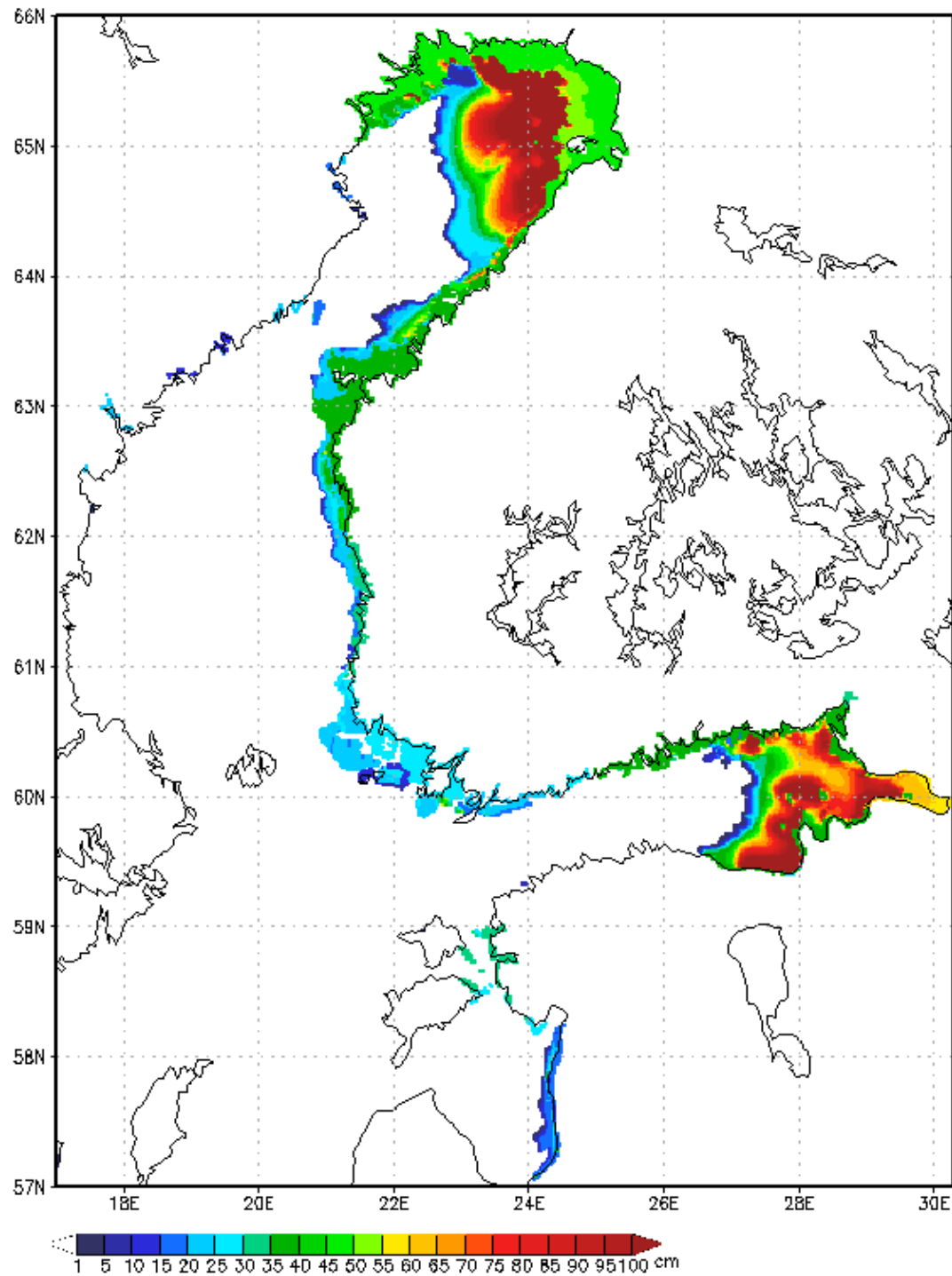


Long time series and long range tracking both important for ice management

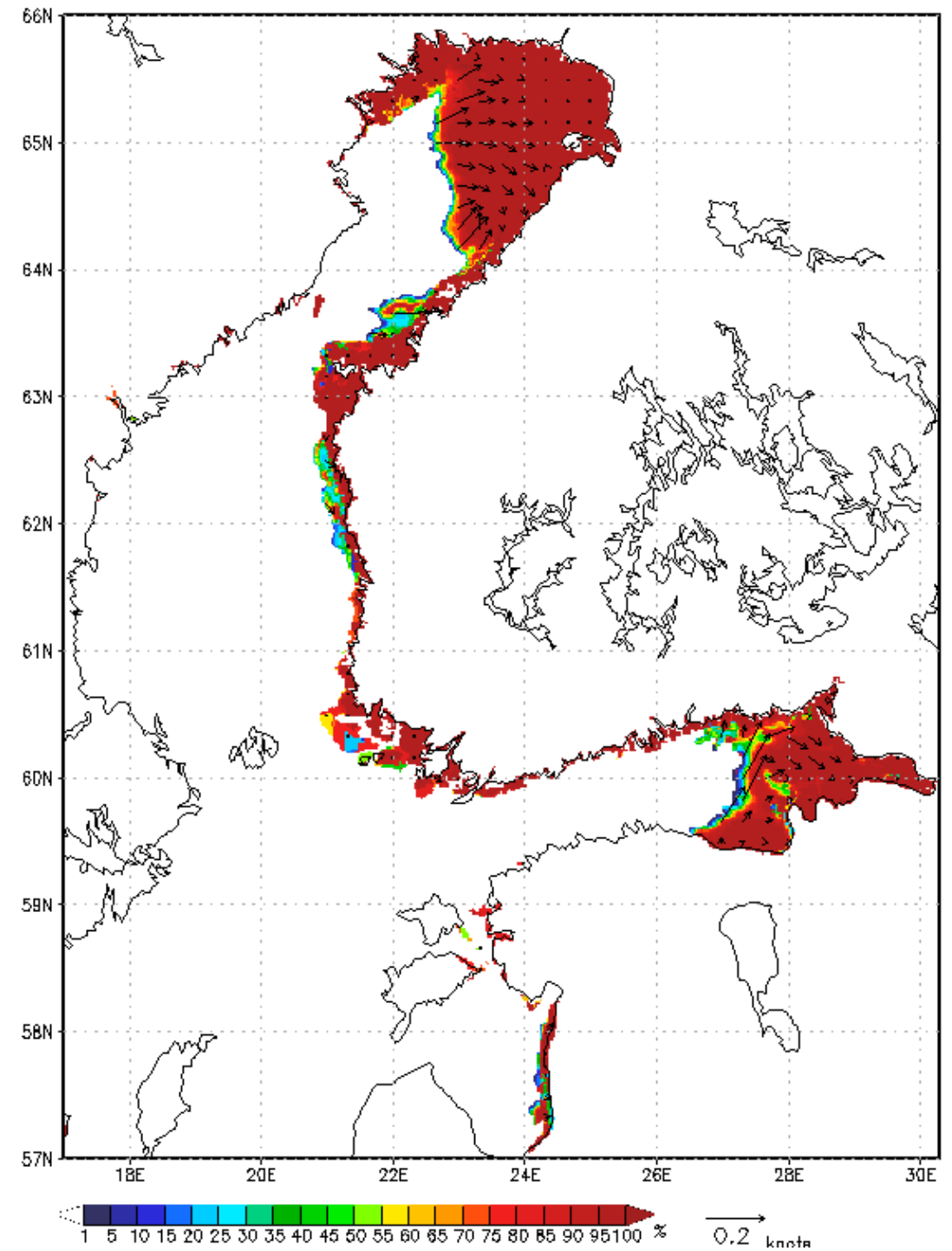


# Baltic sea ice forecasts - SMHI & FMI

FMI ICE FORECAST for 2012:4:4:6 UTC  
Mean ice thickness



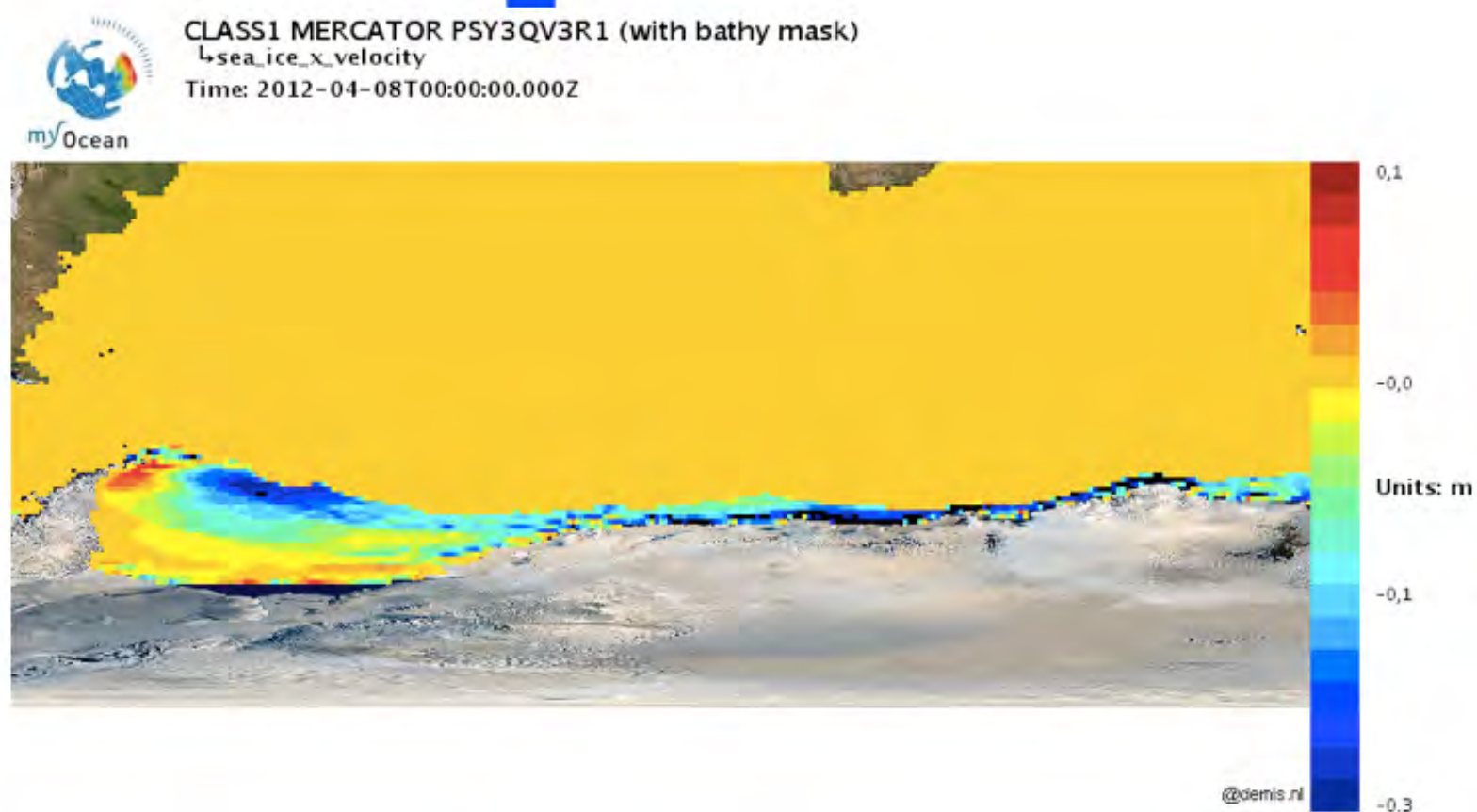
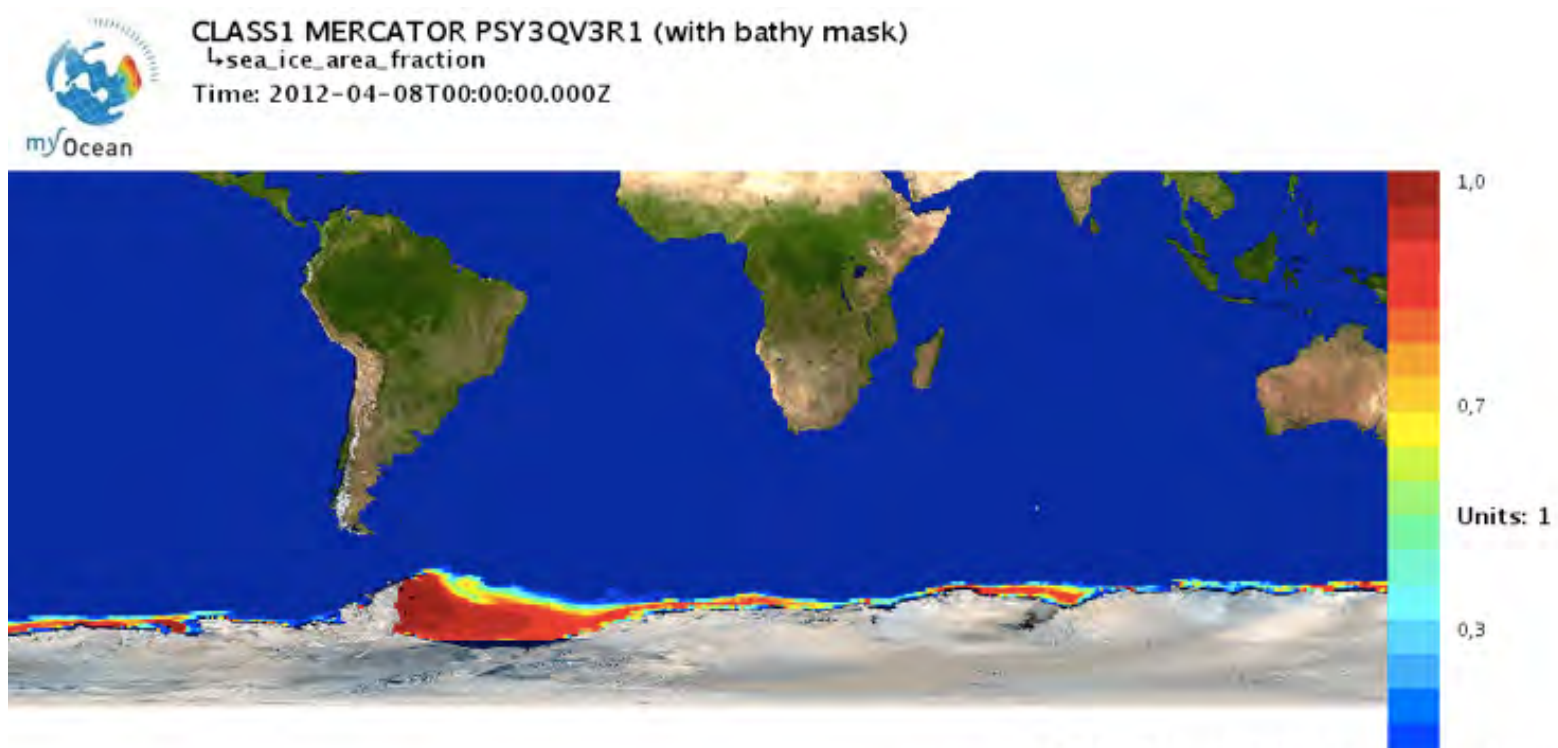
FMI ICE FORECAST for 2012:4:4:6 UTC  
Ice concentration and drift



Relatively little development - even in Arctic - limited to Baltic and parts of North America



# Global sea ice forecasts



Global ocean forecasts (MyOcean – Mercator) now include sea ice





# Polar View

