



# Metocean services of the Finnish Meteorological Institute for Arctic conditions



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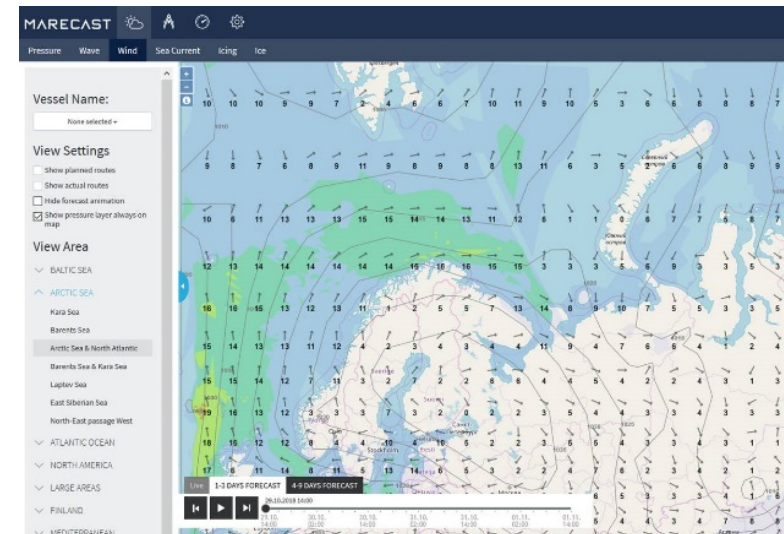
11/7/2018

[www.fmi.fi](http://www.fmi.fi)



# User groups

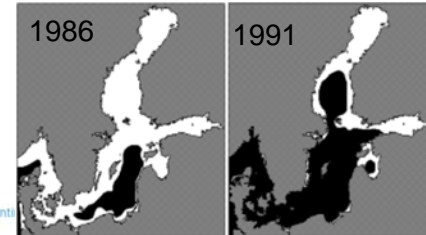
- Wintertime navigation, icebreaking, commercial shipping
- Service and software companies and integrators
- Vessel and infrastructure designers
- Authorities
- Research institutes, R&D projects



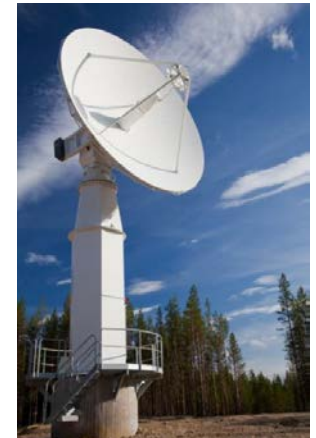
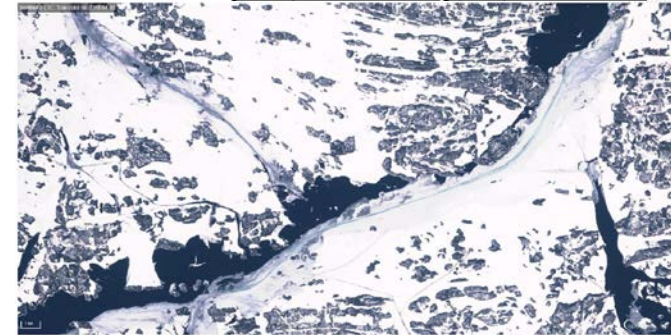


# Radar satellites as backbone of ice services

- FMI focus areas: Baltic Sea, Kara and Barents Sea
- Baltic Sea and Northern Arctic seas
  - Sentinel-1, S-2, S-3
  - COSMO SkyMed
  - Radarsat-2
  - TerraSAR-X/TanDEM-X
  - MODIS
  - Cryosat-2
- Data available from
  - FMI Sodankylä National Satellite Data Centre (NSDC)
  - Copernicus Marine Environment Monitoring Service (CMEMS)



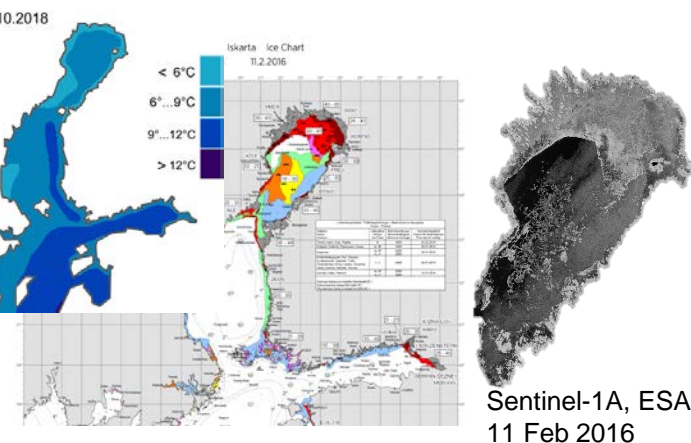
Airismaa - Lövsjär on 3.4.2018 (Sentinel-1)





# Ice navigation products for the Baltic Sea

## Daily ice analysis charts

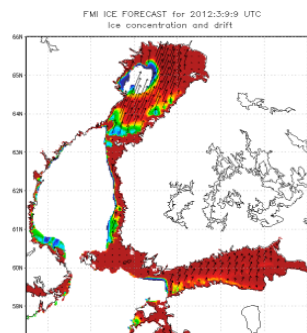


**SAR-based:**  
Ice thickness analysis  
Ice concentration  
Fast ice  
Ice drift

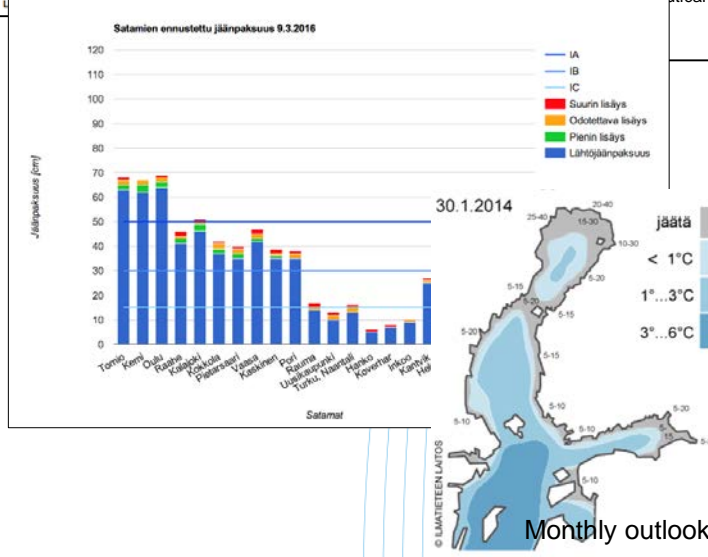
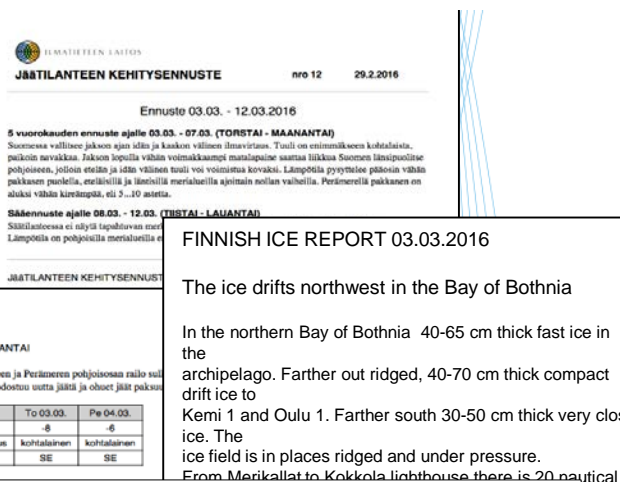


## Ice forecast +54h

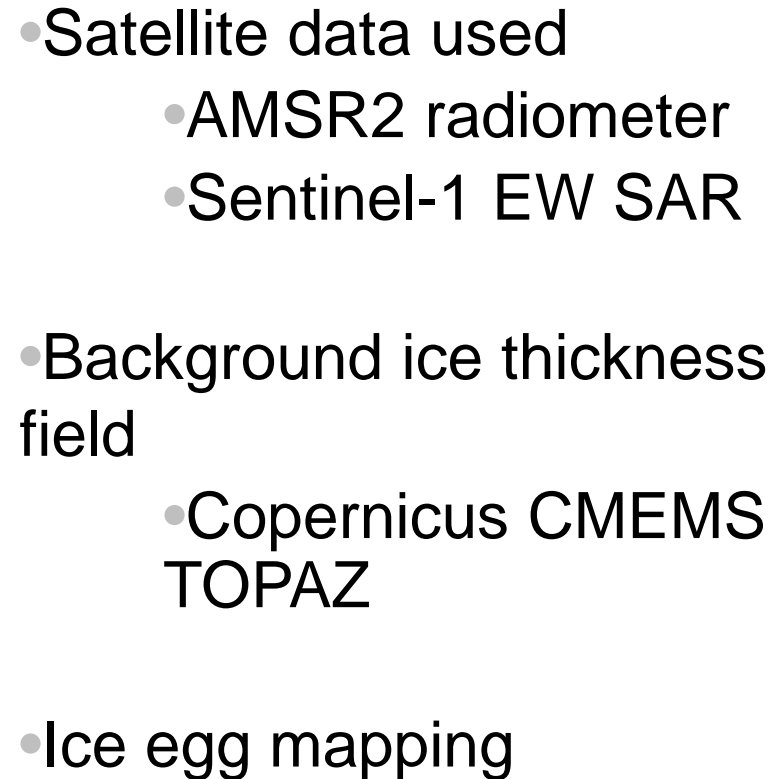
(drift, coverage, thickness, ridges, deformation, pressure)



## Ice Forecasts and reports



16.4.2017





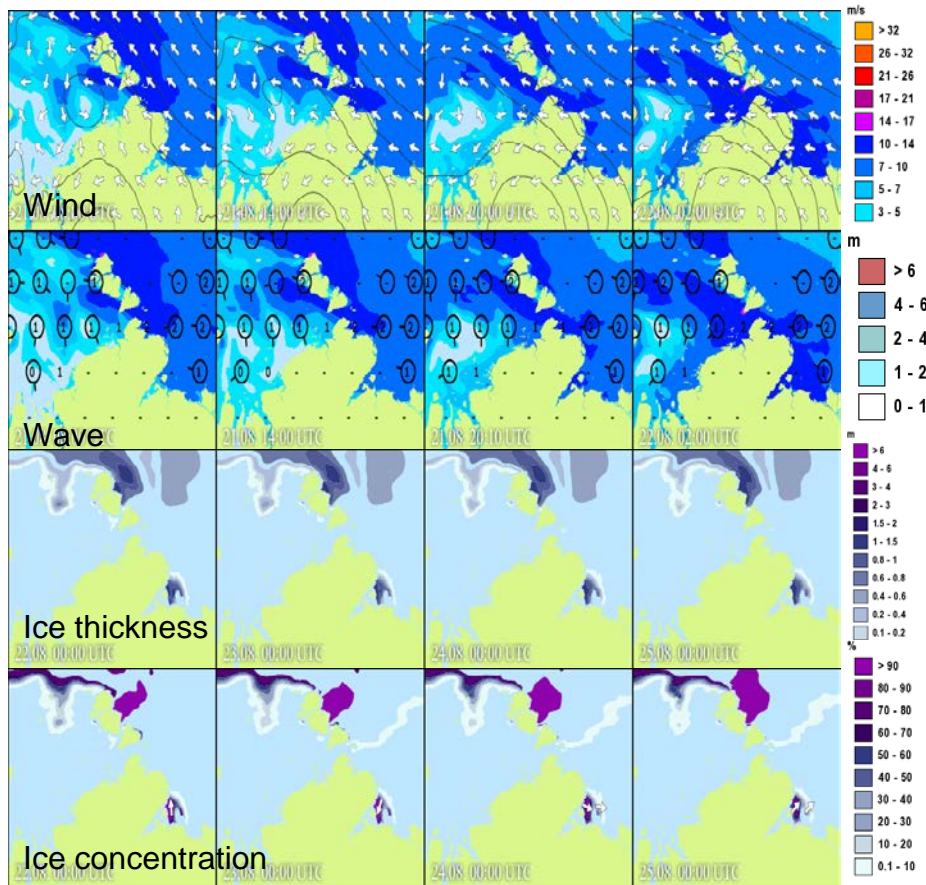


# Arctic product examples

## Emailed maps for narrow bandwidth connections

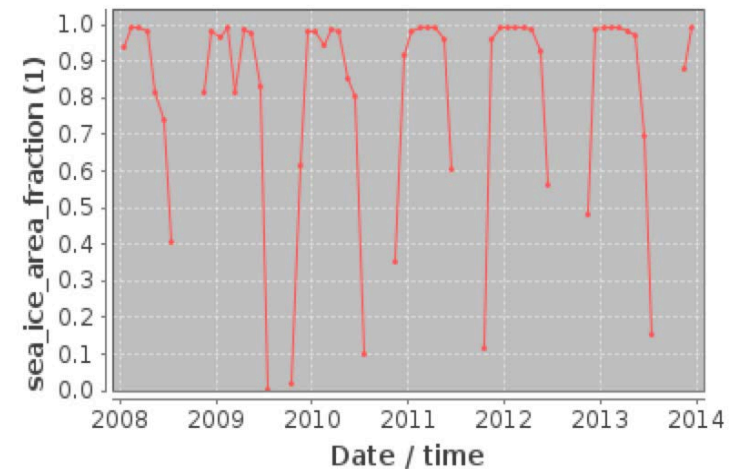
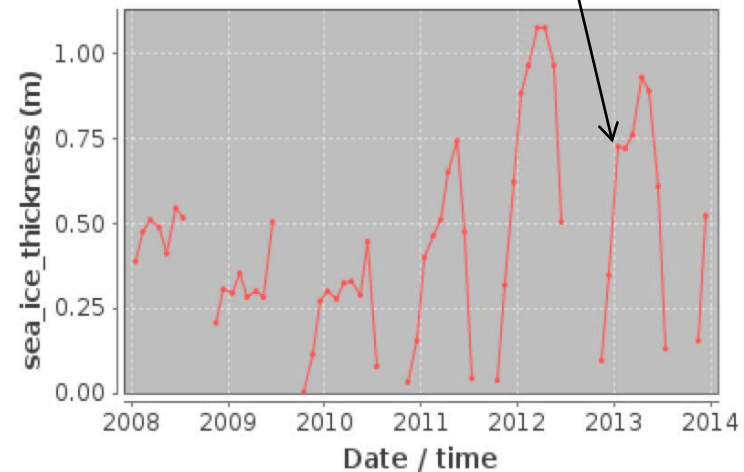
Laptev Sea example. Customer requested 16 map collection (<1MB) for selected Arctic sea regions.

Parameters: wind, waves, ice thickness, ice concentration, up to 4 days.



## TOPAZ4 based statistical ice analyses

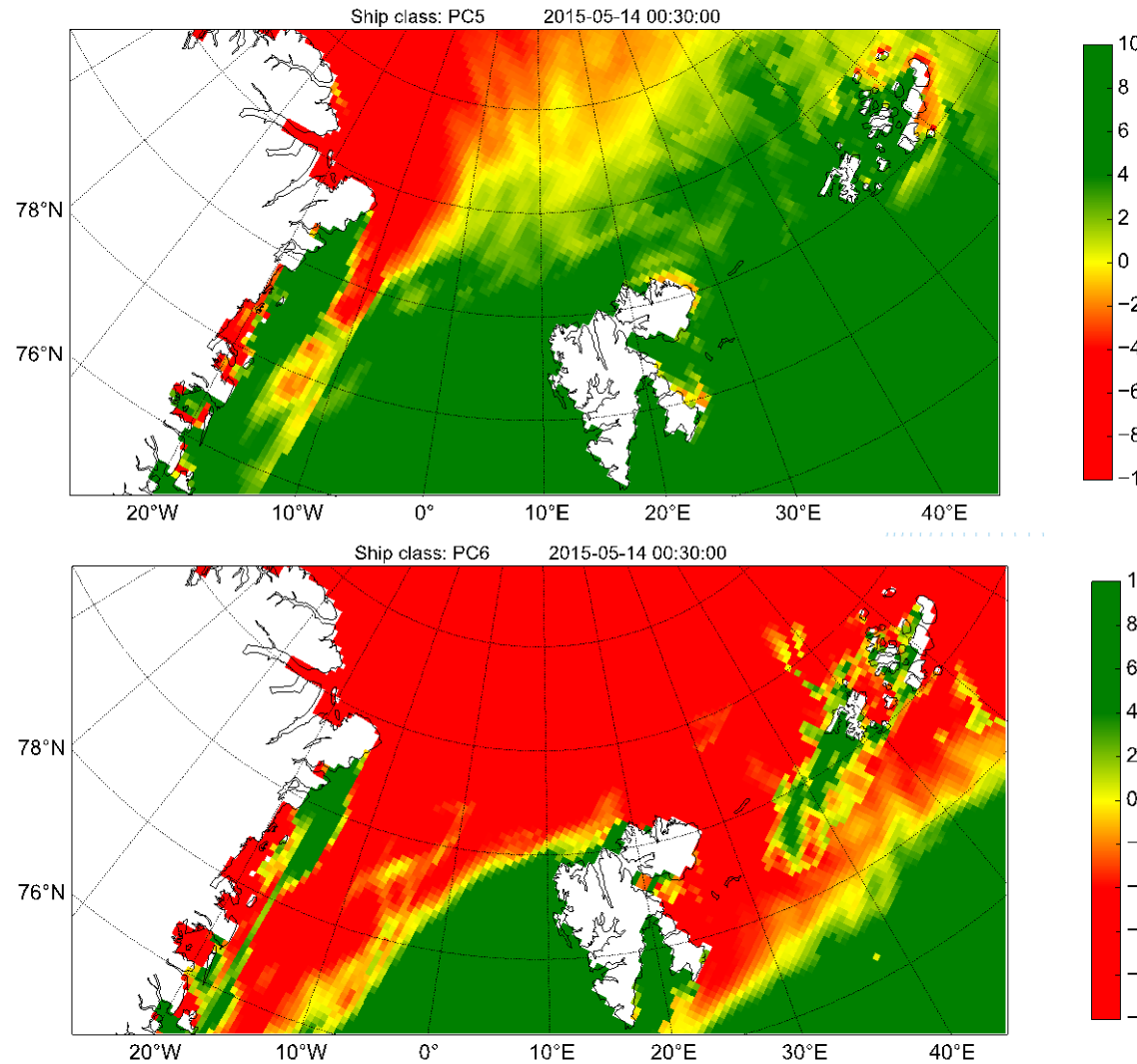
Monthly mean is given at 15<sup>th</sup> of each month, at given Arctic location. For example January 2013.





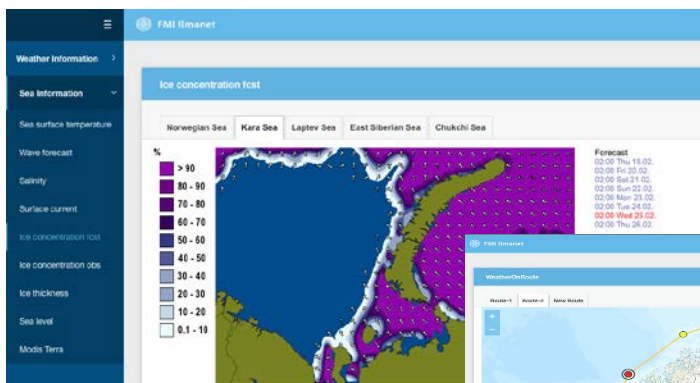
# Arctic analysis products: Polaris in IMO Polarcodes

- Polar Operational Limit Assessment Risk Indexing System
- RIO (Risk Index Outcome) is the quantity which gives the decision whether ship operations are possible or not.
- $\text{RIO} > 0$ : GO,  $\text{RIO} < 0$ : STOP
- Ice model based maps

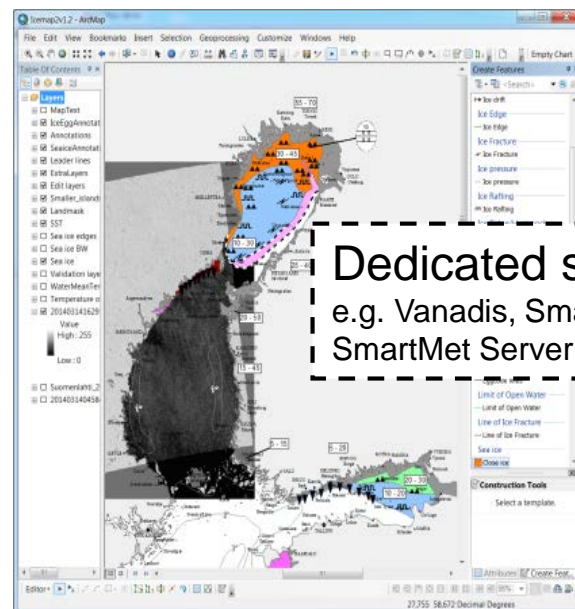
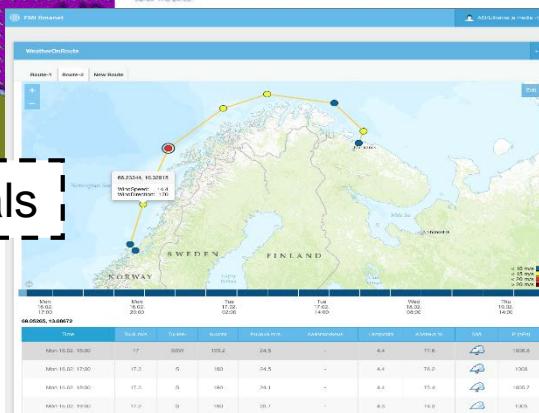




# FMI service delivery channels



Extranet web portals



Dedicated software  
e.g. Vanadis, SmartMet,  
SmartMet Server



Data submission directly to customers' and integrators' systems e.g.

- Machine-readable interfaces
- Tailored products, contents, formats etc.
- Open data

Consulting metocean and ice expert  
Consulting meteorologist  
Chat service and on-line briefings

