

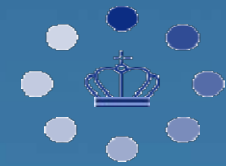
DMI

EfficienSea2 Conference: **GETTING CONNECTED TO THE FUTURE**

8-9 November 2016



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Weather prognosis for route optimization

Weather, ocean and sea ice services provided by the Danish Meteorological Institute

08-11-2016

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Metocean data – Usage for mariners

- Go/No go zones
 - Low water level
 - Ice infested waters
 - Ice bergs
- Restricted zones
- Improve route guidance

Polar code and its implementations

- The polar code provide guidelines for mariners in sea ice covered oceans and in the proximity of these.
- It sets requirements for use of historical, nowcast and forecast of sea ice conditions
- This is not all new.
 - Attempt to standardize



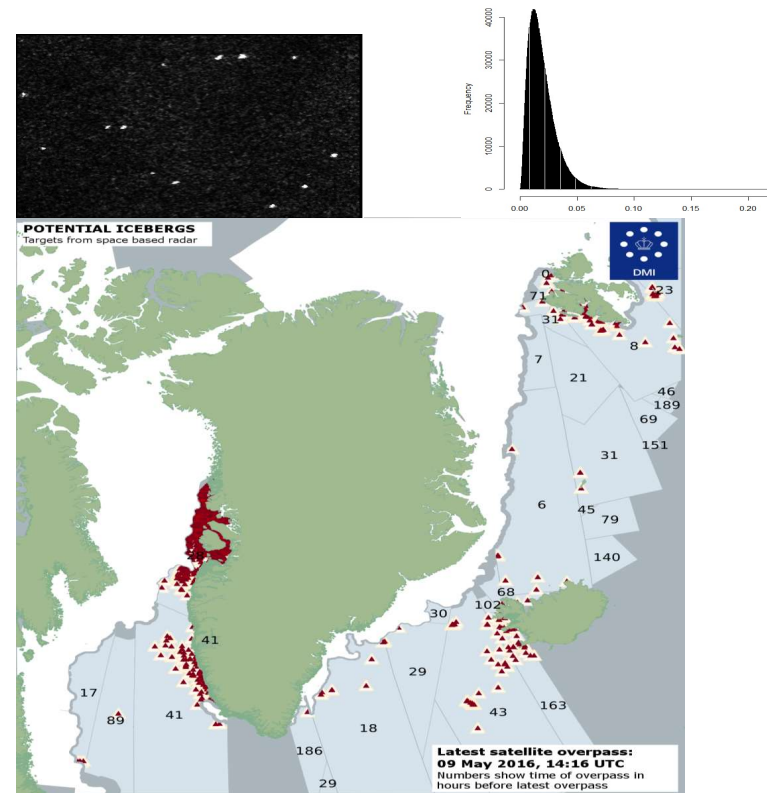
Polar code and its implementations



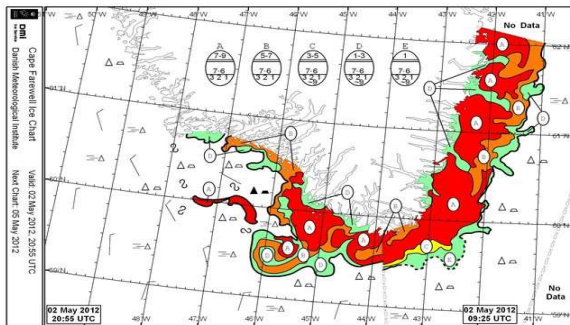
- Sets go/no go zones for a ship with a given ice class
- Aim at using best practice
- Commercial interest are not always aligned with security
 - tourist would like to see sea ice and icebergs. Is the cruise ship ready?

Overview of Baltic and Arctic Services - Icebergs

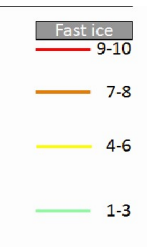
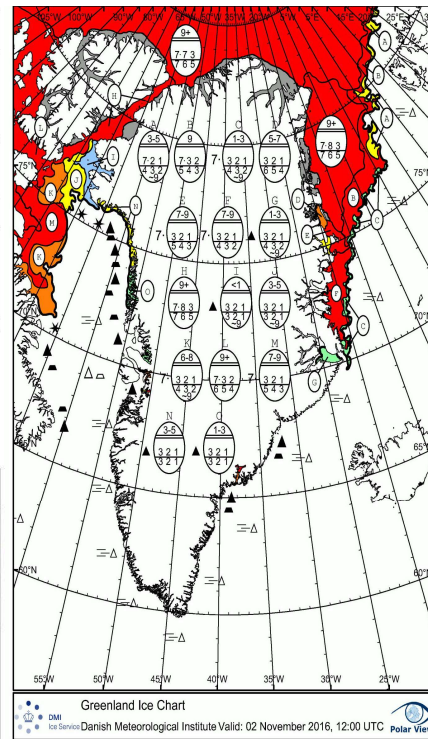
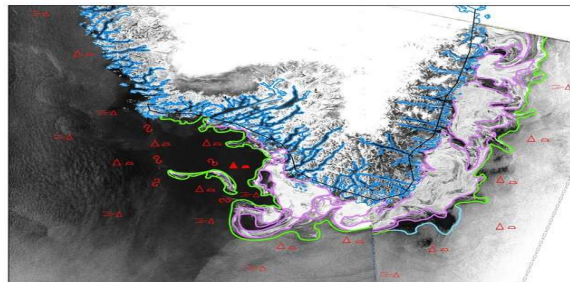
- Red dots are ice bergs
- White is sea ice
- No detection within sea ice
- Gray zone near sea ice is potential ice covered. Thus no detections are made
- Detections are based on a statistical methods
- Potential go/no go zones
- Based on Sentinel images



Overview of Baltic and Arctic services

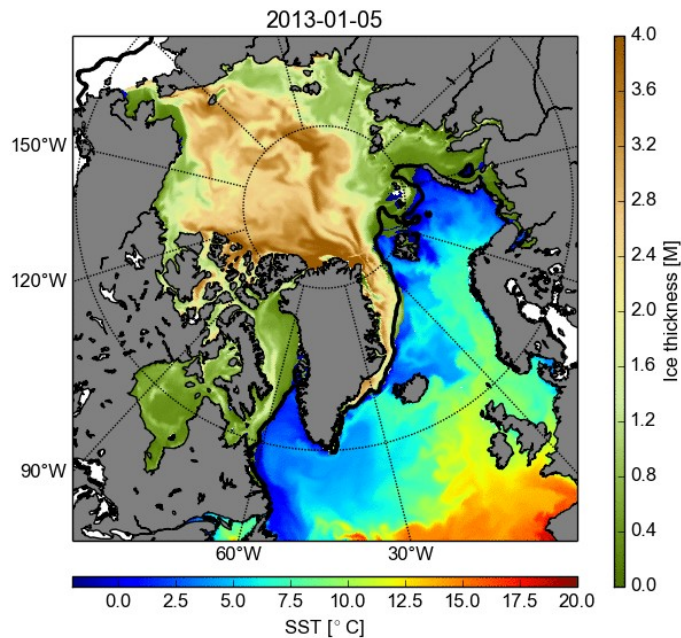


Top regional ice chart.
Bottom data background.
Right provided ice charts



- Greenlandic ice charts provided to Efficiensea 2
- Sentinel 1 from Copernicus is the main data source
- Manually created

Overview of Baltic and Arctic services

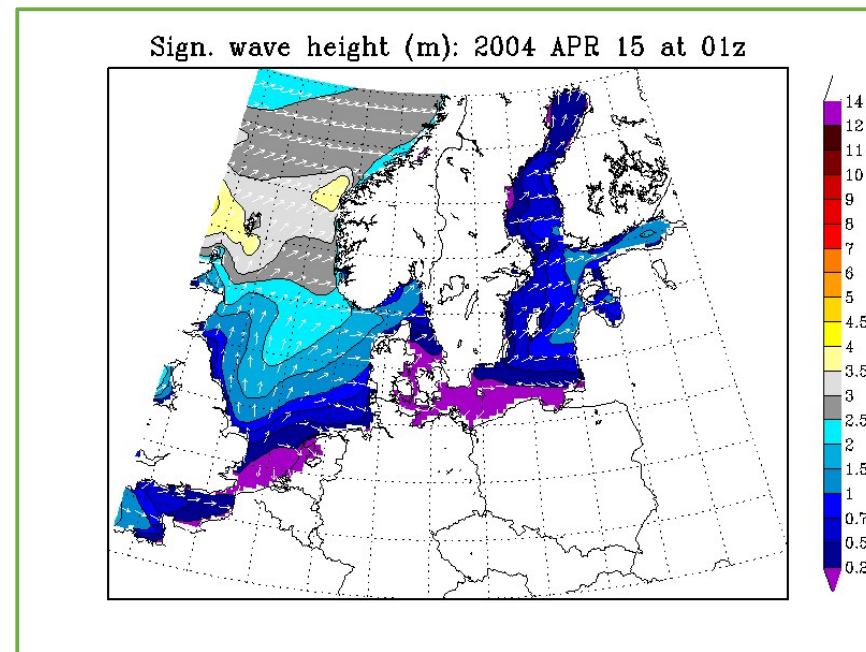


Observed sea ice extent

- Sea ice forecasts based on a physical model.
 - Ice thickness
 - Ice concentration
 - Ice drift
- Weather
 - Winds included in all model based fields

Overview of Baltic and Arctic services

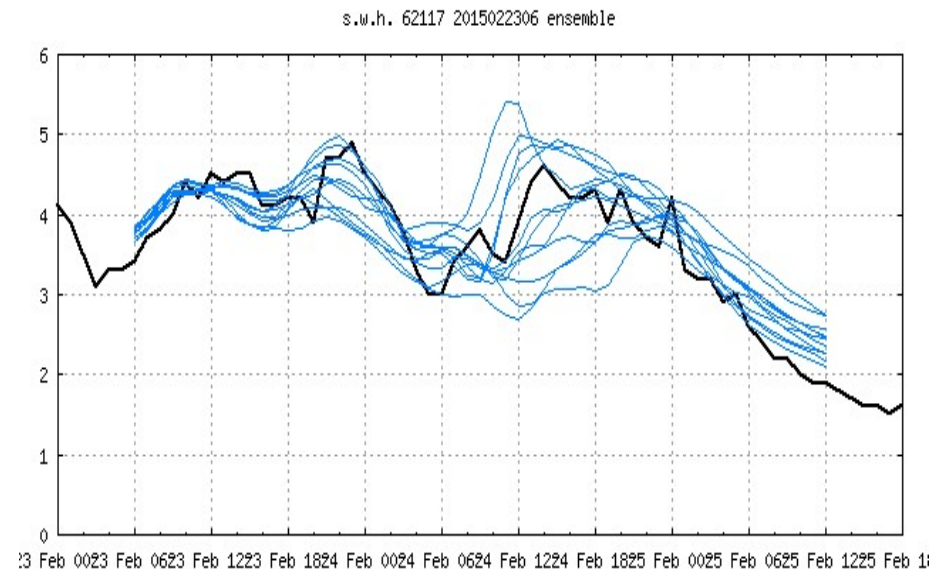
- Ocean
 - Currents
 - Sea surface temperatures
 - Waves
 - Significant wave height
 - Mean wave period
 - Also available global





New developments Uncertainties – Wave ensembles Baltic region

- Assumption: Forecast are not 100% accurate
- Use multiple weather forecast to force wave model in order to estimate the uncertainty of wave heights
- Based on ensemble of weather predictions

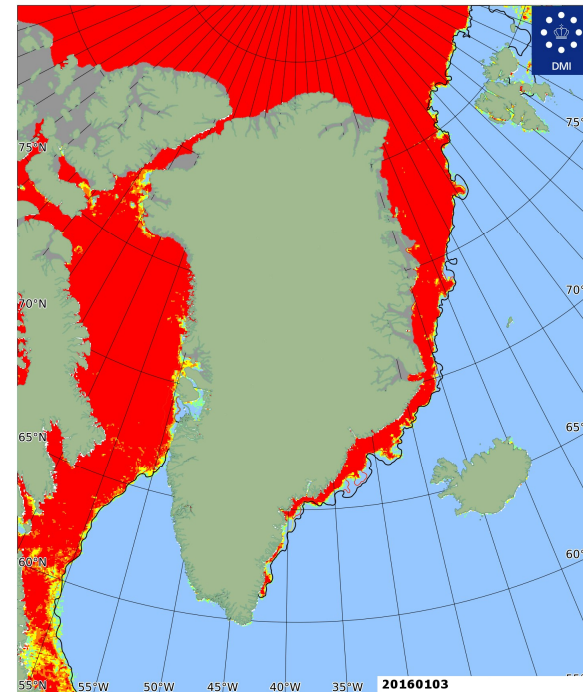


Significant wave height and spread of ensembles (blue) and observation (black)

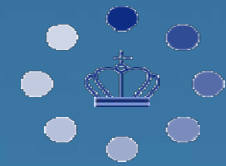


New developments Include ice charts in forecast

- Use ice charts to set fast ice and the ice edge
- Use automated retrieval of sea ice to set concentration where there is ice
- Test using automated ice thickness



Bremen AMSR2 and ice edge from ice chart



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Thank you for your attention

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