SIW TAC
Sea Ice and Wind
Thematic Assembly Centre
IICWG-X, Geneva, October 2009
Outline

- Background, marine core service
  - A brief update of what was presented last IICWG

- Sea ice in MyOcean
  - SIW TAC consortia
  - SAR data in MyOcean
  - Products available today
  - Products at next version
  - Arctic Marin Forecasting system
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A European Marine “core” service defined by the EC GMES Implementation Group

MyOcean is a pan-European capacity for Ocean Monitoring and Forecasting.
The MyOcean service aims at providing “core” information on the ocean through one single access point.
12 PRODUCTION UNITS

- 5 TAC: Thematic Assembly Centers
  - “Observations”

- 1 global and 6 regional MFC: Monitoring and Forecasting Centers
  - “Model / Assimilation”

- Each Production Unit
  - under operational commitments to deliver a service
  - Conducting R&D, Integration, Operations, and Assessment
MFC and regions

- 1. Global
- 2. Arctic
- 3. Baltic
- 4. NWS
- 5. IBI
- 6. Med Sea
- 7. Black Sea

Arctic
North West Shelf
Global
Iberian Ocean
Mediterranean Ocean
The service

- Centrally: defining and maintaining the « list of products »
- The « producers » in MFCs and TACs are producing and assessing
- The service desk will provide access to the products:
  - A « central desk » (one only) to download the core product
  - A « viewing tool » to have a look at the ocean
MyOcean shall make oceanographic data available on standard formats through an open distribution system.

MyOcean has for this adapt an **open data policy** following INSPIRE requirements.

Data access will be free, regular data service will be established following Service Level Agreements between MyO and users.

Satellite input data, e.g. SAR data for sea ice, are constrained by the providers, e.g. ESA.
Web Portal is the main sub-system that delivers the Service. It consists of a Web platform that includes:

- **Product Search Facility**
  - Products are discovered and viewed: both near real-time and historical products are part of the self-help knowledge base on the Service Desk web portal.

- **New Products Request**: register and redirect any request for a service or a product.

- **Access to Products**: the desk ensures that each user can get the products and associated services using sFTP and OPeNDAP technology.
Marine Core Service

MyOcean service will evolve during the project’s live, due both to system improvement and to URD evolution.

- **Kick off (1st April 2009):**
- **V0-T0+6 (October 2009):**
  - 129 products, gathered in 46 Product Lines
  - Service Desk operational (working hours for telephone and email)
- **V1-T0+18 for stream1 (October 2010) or V1-T0+24 for stream 2 (March 2011):**
  - 210 products, gathered in 81 Product Lines
  - Centralized access to product (via MIS)
  - Service Desk operational (24/7)
- **V2-T0+30 (October 2011):**
  - MyOcean Service validation reached
  - 234 products, gathered in 94 Product Lines
  - New functionalities
  - V1 Bugs corrected (if any)
The SIW TAC is a single unique entry point for satellite derived gridded sea ice data for use in operational ice analysis and forecast.

The main users will be the Marine Forecast Centers; Arctic, Baltic and Global.

The main use will be in assimilation and validation of operational ocean and sea ice models.

Data will also be available to outside users through the service desk.
## SIW TAC Sea Ice product portfolio

<table>
<thead>
<tr>
<th>Products</th>
<th>Input satellite data</th>
<th>Responsible partner</th>
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</thead>
<tbody>
<tr>
<td>Global Sea Ice conc</td>
<td>SSMI, AMSR</td>
<td>Met.no, OSI SAF</td>
</tr>
<tr>
<td>Global Sea Ice edge</td>
<td>SSMI, scatterometer</td>
<td>Met.no, OSI SAF</td>
</tr>
<tr>
<td>Global Sea Ice type</td>
<td>SSMI, scatterometer</td>
<td>Met.no, OSI SAF</td>
</tr>
<tr>
<td>Regional Sea Ice products</td>
<td>SAR, AVHRR (+)</td>
<td>FMI, DMI, Met.no</td>
</tr>
<tr>
<td>Global Sea Ice drift</td>
<td>SAR</td>
<td>DTU</td>
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<tr>
<td>Sea Ice temperature</td>
<td>AVHRR, VIRS, Sentinel</td>
<td>DMI</td>
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<tr>
<td>Antarctic products</td>
<td>SAR</td>
<td>BAS</td>
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<tr>
<td>High resolution ice edge</td>
<td>SAR</td>
<td>NERSC</td>
</tr>
<tr>
<td>Ice berg detection</td>
<td>SAR</td>
<td>DMI</td>
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<tr>
<td>Time series, climate (cons and drift)</td>
<td>SSM/I, scatterometer</td>
<td>IFREMER</td>
</tr>
</tbody>
</table>
Envisat monthly coverage

September coverage

Mars coverage
 Confirmation or changes of the area shall be communicated to ESA on the 15th of the current for the following month.

To provide feedback about the final plan before 25th
Radarsat coverage

- Monthly order to ESA
- Data delivered by KSAT
- Svalbard area
  - Approx 500 scenes per year
- Baltic
  - Approx 300 scenes per year
AP mode data

- 50 scens per year
- Data must be ordered through the EOLI-SA on-line catalogue and ordering tool
- A MyOcean user account for ordering data is established at the ESA order-desk
SAR delivery status

Status of received SAR data

This page gives an overview of SAR data received at met.no as part of the data delivery for the MyOcean project.

Envisat data are received and processed at the ESrin ground station and the Kiruna ground station. The data are downloaded via ftp to the met.no production system. All data available are downloaded, but only data covering the area of interest are processed at met.no. The ftp sites are checked for new data every five minutes.

RadarSat data are received and processed at the ESIRF ground station. A mail notification is sent when new data is available, and data is downloaded via ftp to the met.no production system. At the moment only two RadarSat-2 scenes in wide swath dual polarization mode are requested each working day.

Latest data received:

RadarSat  Envisat  Envisat mosaic

Indicates data available on disk less than 3 hours after aquisition.
Indicates data available on disk 3 to 4 hours after aquisition.
Indicates data available more than 4 hours after aquisition.

<table>
<thead>
<tr>
<th>Status and name</th>
<th>Acquisition time</th>
<th>Disk time</th>
<th>Time diff (min)</th>
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<tr>
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<td>Esrin</td>
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<td>September</td>
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</table>
Sea Ice production, Functional Architecture V0

Marine Core Service

SIW TAC, V0- day 1, sea ice -system

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NetCDF format

Producer

- XML
- GRID

SIW TAC

Convert to netCDF

MyOcean web

CF 1.4 standarden
Global ice concentration products from OSI SAF(V0)

Ice concentration October 8, 2009
Global ice edge products from OSI SAF(V0)

Ice edge October 8, 2009

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Global sea type products from OSI SAF (V0)

Ice type October 8, 2009
The operational sea ice service at DMI produces sea ice concentration charts based on a manual interpretation of satellite data.

The satellite data used are Synthetic Aperture Radar data from Radarsat and Envisat and visual and infrared data from MODIS and AVHRR.

The scenes are mainly focused around southern and western Greenland.

The operator uses the latest available satellite data and draws the ice chart in an ArcGIS production system.

A new girded sea ice concentration product is available irregularly depending on ship traffic and data availability. The ice chart coverage depends on data availability.
The operational sea ice service at FMI produces sea ice parameters based on a manual interpretation of satellite data and ground truth.

The satellite data used are Synthetic Aperture Radar data from Radarsat-2 and Envisat and visual and infrared data from MODIS and NOAA. Ground truth is origin from Finnish and Swedish icebreakers, ships, ice observation.

The scenes are mainly focused to the Baltic Sea, Kattegat and Skagerrak east of 9° E.
The operational sea ice service at met.no produces sea ice concentration charts based on a manual interpretation of satellite data.

The satellite data used are Synthetic Aperture Radar data from Radarsat and Envisat and visual and infrared data from MODIS and NOAA.

The Radarsat data are in scansar wide mode dual polarization resampled to a spatial resolution of 150 meter.

The scenes are mainly focused around the Svalbard area.
FMI: Ice thickness from SAR data (V1)

- Ice thickness chart based on SAR and ground truth.
- Spatial resolution 500 by 500m.
- Published when SAR data available after ½ h data received.
FMI: Ice drift from SAR data (V1)

- Ice drift from SAR, when SAR data available, in 3,5 km res. V1

RADARSAT
200803241548=>
200803271600
Customize dataflow and write the operational code

Set up a method using buoy data to derive the algorithm coefficients similar to SST pathfinder: pending

Set up validation procedure with buoy data: pending

Investigate the use of microwave data as background: ongoing
DMi: Ice berg density product (V1)

- A production based on SAR data and the CFAR detection algorithm is now running at DMI. The entire archive and all new SAR scenes are processed.
- Additional data are sea ice extent or concentration data.
- The challenge will be to fine-tune the set-up and adapt the processing to the operational standards in MO.
- A strategy for validation must be outlined
NERSC: High resolution ice edge (V1)

1. Corrected Envisat ASAR image

2. Texture features calculation

3. Input data into trained Neural Network

4. Neural Network’s application
   - Level first-year ice
   - Deformed first-year ice
   - Multiyear ice
Based on Envisat ASAR WSM swaths rendered to 300 m resolution

Max correlation coeff. engine with 10 km gridded, ascii output

Swath pairs nominally 24 hrs apart, in reality 1-47 hrs

All available swaths matched

Accuracy better than 500 m (depending on swath geocoding)

Timeliness, 2-8+ hrs from satellite to DTU + 20 min typ for MCC processing.
Sea ice drift data at low resolution

F. GIRARD-ARDHUIN, D. CROIZE-FILLON

- IFREMER/CERSAT products (V1 product): Arctic sea ice drifts datasets, daily, in winter, 3, 6 and 30 days lag, 62.5 km resolution

QuikSCAT, Merged (QuikSCAT & SSM/I)  
ASCAT, Merging ASCAT & SSM/I

Products in PolarView-GMES

New products

Products « yearly updated »

Products are ready, available or soon available at IFREMER/CERSAT FTP
TOPAZ prediction

- Installed at met.no
- Arctic Ocean analysis and forecast system providing 10 days of 3D Arctic ocean forecast including Sea Ice as well as 7 days of ocean analysis.
- Currently runs once a week
- Upgraded to run each day at V1
Summary

- MyOcean will deliver gridded sea ice products: analysis and forecasts, based on satellite data and model simulations.
- Data are delivered on netCDF formats through ftp and OPeNDAP services.
- The data is free, based on Service Level Agreements with users.
- SAR data for MyO sea ice analysis are provided by ESA as a part of European Core Service.