MAREANO program
Detailed mapping of seabed topography, sediments, bottom fauna and pollutants in Norwegian waters
MAREANO program - Detailed mapping of seabed topography, sediments, bottom fauna and pollutants in Norwegian waters

Hanne Hodnesdal
Norwegian Mapping Authority Hydrographic Service (NHS)

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MAREANO – Dataflow

- Bathymetry data collection by NHS
- Geological and biological surveys by Geological survey of Norway (NGU) and Institute of Marine research (IMR)
- Distributed databases
- Results are made accessible through [www.mareano.no](http://www.mareano.no)
From bathymetry surveys to digital terrain models (DTM)

Bathymetry survey with multibeam echosounder

Additional acquisition:
- Backscatter (echosounder)
- Water column data (echosounder)
- Gravity (separate sensor)
Depth data from different sources: Defence, gas- and oil industri, other projects, own vessel and purchase of bathymetry surveys
## FINANCING AND PROGRESS

<table>
<thead>
<tr>
<th>Year</th>
<th>Granted [NKR]</th>
<th>NHS</th>
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<tr>
<td>2005</td>
<td>5.0 mill</td>
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<td>2006</td>
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<td>2008</td>
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<td>2009</td>
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<td>2010</td>
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<td>2011</td>
<td>52.4 mill</td>
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Coverage – detailed DTM
Norwegian sea areas

- Large areas (2.1 mill km²)
- Only partly covered by MBE data
- Bathymetry data collection is expensive
- Important to use data from other sources: Defence, oil- and gas industry etc.
Detailed depth data are classified inside the territorial border

- The territorial border is 12 nautical miles outside the baseline
- Inside the territorial border DTM with grid size < 50m is classified. Also limitations on depth contours

- Area Hola with coral reefs has been declassified by the Norwegian Defense
DIGITAL TERRAIN MODELS WITH DIFFERENT RESOLUTION

- Example: ca 200m depth, Norwegian Sea west of Lofoten

2 m grid

25 m grid
What we are looking for in the seabed topography

**Corals**

- Depth 40m to 450m
- Height up to 35m
- Reefs can be more than 100m long
What are we looking for in the seabed topography

- Sand waves with different dimensions at varying depths
- There exist ripples with height 10 cm and large waves with height up to 7 m

5m grid, 150m depth
What are we looking for in the seabed topography

Pockmarks

Example 30m diameter

5m grid, 370m depth
What are we looking for in the seabed topography

- Iceberg plough marks
- Other terrain details ....
- General topography

Example 100m wide and 12 m deep

Iceberg plough marks

5m grid, 270m depth
TECHNICAL SPECIFICATIONS FOR MAREANO SURVEYS

- Challenge
  - Cover as large area as possible
  - with as detailed data as possible
  - at the lowest cost as possible

  "Seeking the ideal compromise!"

- Survey strategy
  - Surface vessel with multibeam echosounder

- The technical specification is available on
RESULTS – POCKMARKS, ICE BERG PLOUGH MARKS

- Example from Barents sea
- Noisy data

5m grid, 320m depth

HYDROGRAPHIC DATA – FOR BENEFIT OF THE SOCIETY
RESULTS – POCKMARK WITH AN “EYE”

Example from Troms III
- “bump” in a pockmark
- 6m high
- 60m in diameter

5m grid, 370m depth
GEOLOGICAL AND BIOLOGICAL SURVEYS
Marine Habitats - Video Analysis

- Muddy sediments. Flat, smooth seabed with pockmarks. Typical fauna: Pelosina arborecens (foraminifera), Shrimps (Caridea), and Asbestopluma pennata (Hexactinellida).
- Sandy sediments with mud and gravel. Moderately rough, flat seabed with iceberg ploughmarks. Typical fauna: Styloconchylina borealis (Hexactinellida), Stichopus tremulus (Holothuroidea), and Trisopterus esmarkii (Teleostei).
- Various sediment types, sandy mud and coarser. Moderately rough, flat seabed with iceberg ploughmarks. Typical fauna: Tethya sp. (Demospongia), Hymedesmia cf. paupertas (Demospongia), and Ophiuroidea.
- Gravelly sediments with sand, cobbles and boulders. On ridges with moderate slopes; moderately rough seabed. Typical fauna: Ponierea encrusting (Demospongia), Serpulidae (Polychaeta), and Axinella influnduliformis (Demospongia).
PLANS FOR FUTURE

- 2011: Nordland VI outside Lofoten
- Further areas in Barents sea and in Norwegian sea
Questions?