



# WP 2

## The marine landscapes and habitats of the Baltic Sea



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# Problems to be addressed

An integrated BS management approach comes to a halt due to technical constraints (lack of data, transnational habitat maps, inconsistent data formats etc.)

The production of habitat distribution maps for the whole Baltic Sea is hindered by the lack of information

# Why the marine landscape approach?

- allows broad scale classification of the marine environment on a regional basis based on available geophysical and hydrographical data
- classification of recurrent/consistent geophysical features predict biological communities in open seas where ground-truthed bio-information is absent
- geophysical features can be used as surrogates for marine communities
- marine landscape features are defined at an ecological relevant scale applicable for management of human activities

# Data requirements for marine landscapes (agreed formats into GIS-layers)

## geophysical data

- depth
- bottom relief/slope/curvature
- bedforms
- substrate type
- roughness
- gas seeps

## Oceanographic/hydrographical data

- sea surface temperature
- salinity
- current
- wave exposure
- stratification
- frontal systems (permanent or seasonal)
- vertical salinity
- ice coverage
- Secchi depths



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## References:

1. J.C. Roff & M.E. Taylor (2000): National framework for marine conservation - a hierarchical geophysical approach.
2. J.C. Roff, M.E. Taylor & J. Laughren (2003): Geophysical approaches to the classification, delineation and monitoring of marine habitats and their communities.
3. N. Golding, M.A. Vincent & D.W. Connors (2004): Irish Sea Pilot -Report on the development of a Marine Landscape classification for the Irish Sea. JNCC.
4. The MESH project: Development of a framework for Mapping European Seabed Habitats (MESH)

# WP2 participants

- P1**      **The Danish Forest and Nature Agency (SNS), Denmark**
  - P2**      **The Geological Survey of Denmark and Greenland (GEUS), Denmark**
  - P3**      **The National Environmental Research Institute (NERI), Denmark**
  - P4**      **The Danish Institute of Fisheries Research (DIFRES), Denmark**
  - P7**      **Institute of Aquatic Ecology (IAE), University of Latvia**
  - P8**      **Estonian Marine Institute (EMI), Estonia**
  - P9**      **Coastal and Planning Institute, Klaipeda University (CORPI), Lithuania**
  - P11**     **The Finnish Environmental Institute (SYKE), Finland**
  - P12**     **The Geological Survey of Finland (GSF)**
  - P14**     **The Swedish Environmental Protection Agency (SYKE), Sweden**
  - P15**     **National Board of Fisheries, Dep. of Research and Development (NBF-DRD),S**
  - P16**     **The Geological Survey of Sweden**
- Sub-contractors: NGU, Metria, NIVA**

# WP 2 Strategic focus

Identification of Baltic marine landscapes and habitat distribution for use in the spatial planning and nature conservation



# WP 2 Planned results

An agreed approach to identification and mapping of Baltic Sea marine landscapes and habitats through development of maps.

For areas with little biological information habitat predictive models will be developed and validated.





# WP 2 Milestone 1

## Activities

- Literature review on marine landscapes
- Modelling of wave exposure and currents
- Determination of criteria and data requirements for identifying marine landscapes (establishing template)
- Determination of criteria and data requirements for habitat mapping by combining data
- Evaluation of remote sensing as a mapping tool for marine habitats



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# WP 2 Milestone 2

## Activities

- Compilation of physical data in GIS-format in order to define the BS marine landscapes
- Modelling of bottom salinity
- Correlation of sediment maps with video and seabed samples (phase 1)
- Development of draft habitat maps in case study areas by development of predictive models

# WP 2 Milestone 3

## Activities

- Identification of habitats associated with marine landscapes based on pilot area data
- Correlation of sediment maps with video and seabed samples (phase 2)
- Predictive habitat models/spatial and temporal models/habitat maps for each pilot area with confidence ratings

# WP 2 Milestone 4

## Activities

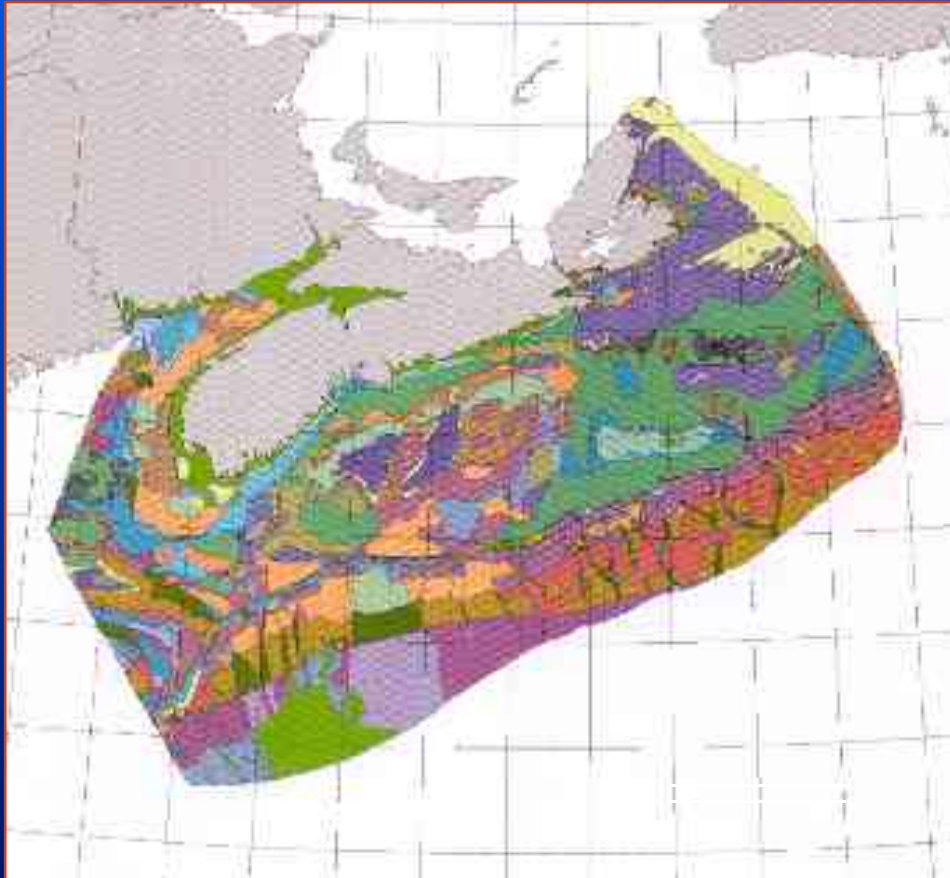
- Validation of identified habitats within the BS and their compatibility with the EUNIS classification
- Final modelling of benthic habitats and ass. fish habitats
- Presentation and evaluation of marine landscapes and ass. habitat by stakeholder involvement

# WP 2 Milestone 5

## Activities

- Validation of the developed models
- Testing the applicability of models and habitat maps against inventory data in and outside pilot areas
- Confidence ratings of the accuracy of the habitat models
- FINAL report on marine landscape and habitat distribution within the BS
- Preparing guidelines for updating ML and Hab. maps

# Background to Marine Landscapes



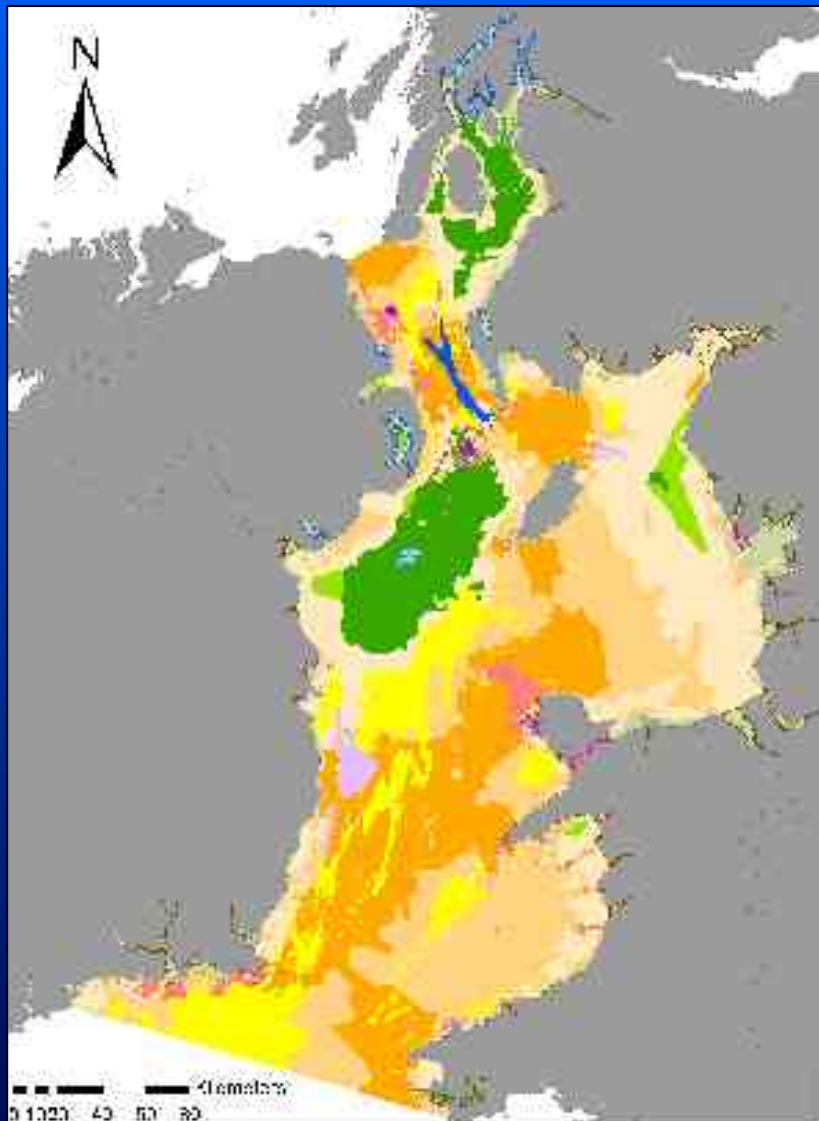
Scotian shelf off the Eastern  
Canadian seaboard Roffet *al*  
(2003)

A broad scale classification

Well suited for offshore areas

Applicable to seabed and water  
column

# Seabed marine landscapes

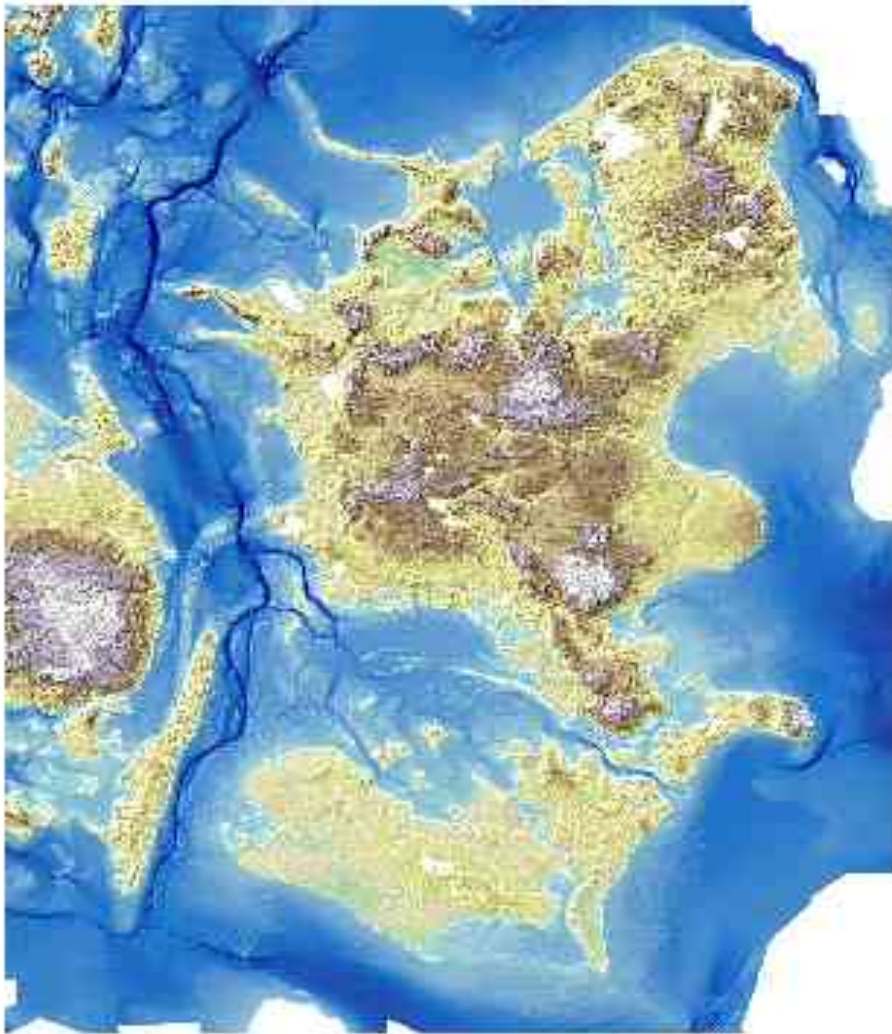


## Marine Landscapes

- Photic Reefs
- Aphotic Reefs
- Deep-water channel
- (Irish) Sea Mounds
- Sand/Gravel banks
- Sediment wave/megaripple field
- High bed-stress coarse sediment plains
- Low bed-stress coarse sediment plains
- Fine sediment plains
- Coastal Sediment
- Deep-water mud basins
- Shallow-water mud basins
- Gas structure
- Estuary
- Ria
- Saline Lagoon
- Sea loch
- Sound

*The Irish Sea Project (Golding et al., JNCC, 2004)*

*Topographic / bathymetric map of Eastern Denmark.*



*Compiled by Frants von Platen, GEUS. Bathymetry by courtesy of The Royal Danish Administration of Navigation and Hydrography.*

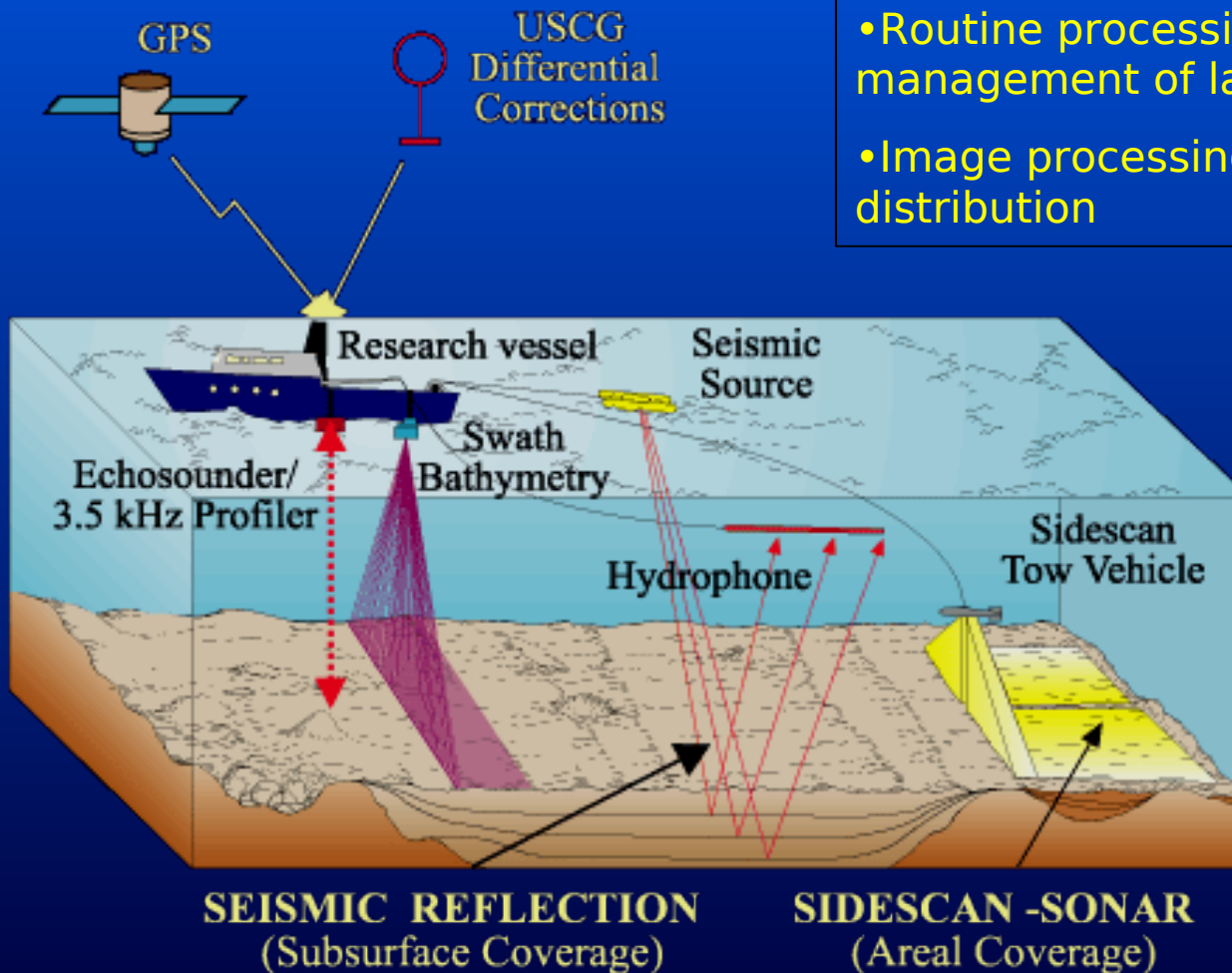
## Remote sensing

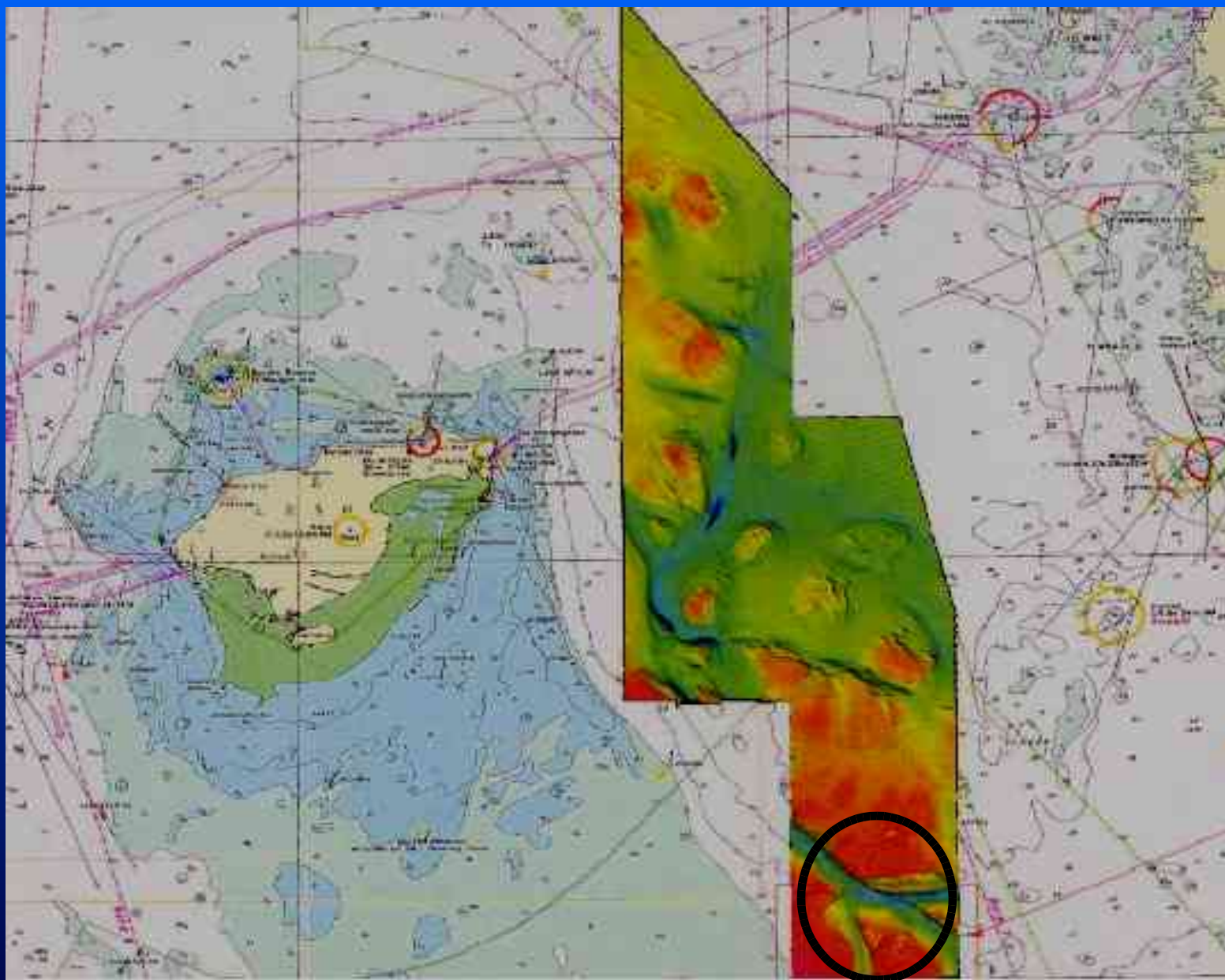
- A useful tool for mapping landscapes on-shore and off-shore
- Image processing allows delimitation of landscape features



# Geophysical mapping

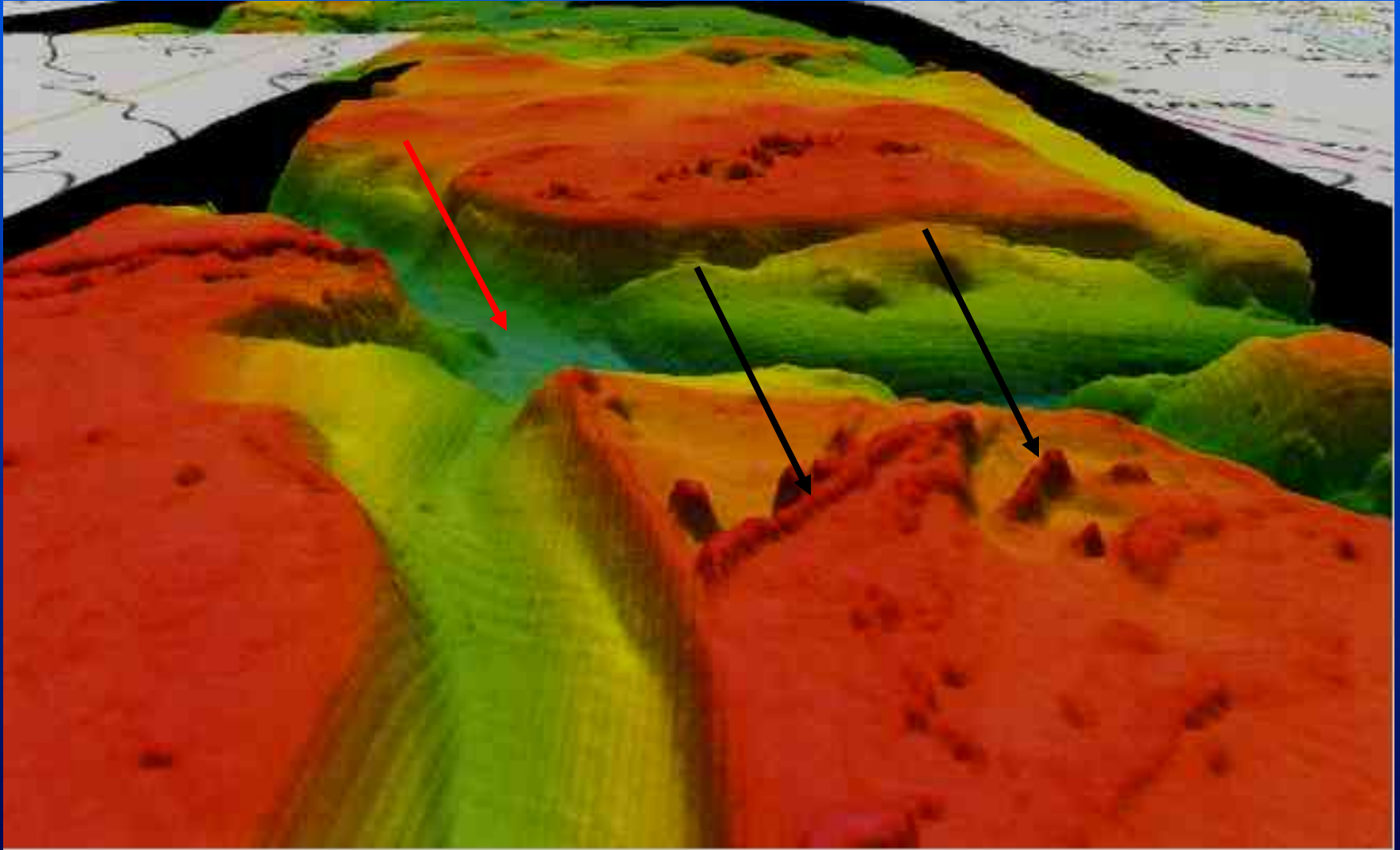
- GPS precise positioning
- Swath sounding coverage of the seabed replacing line soundings
- Routine processing and management of large data sets
- Image processing and digital data distribution





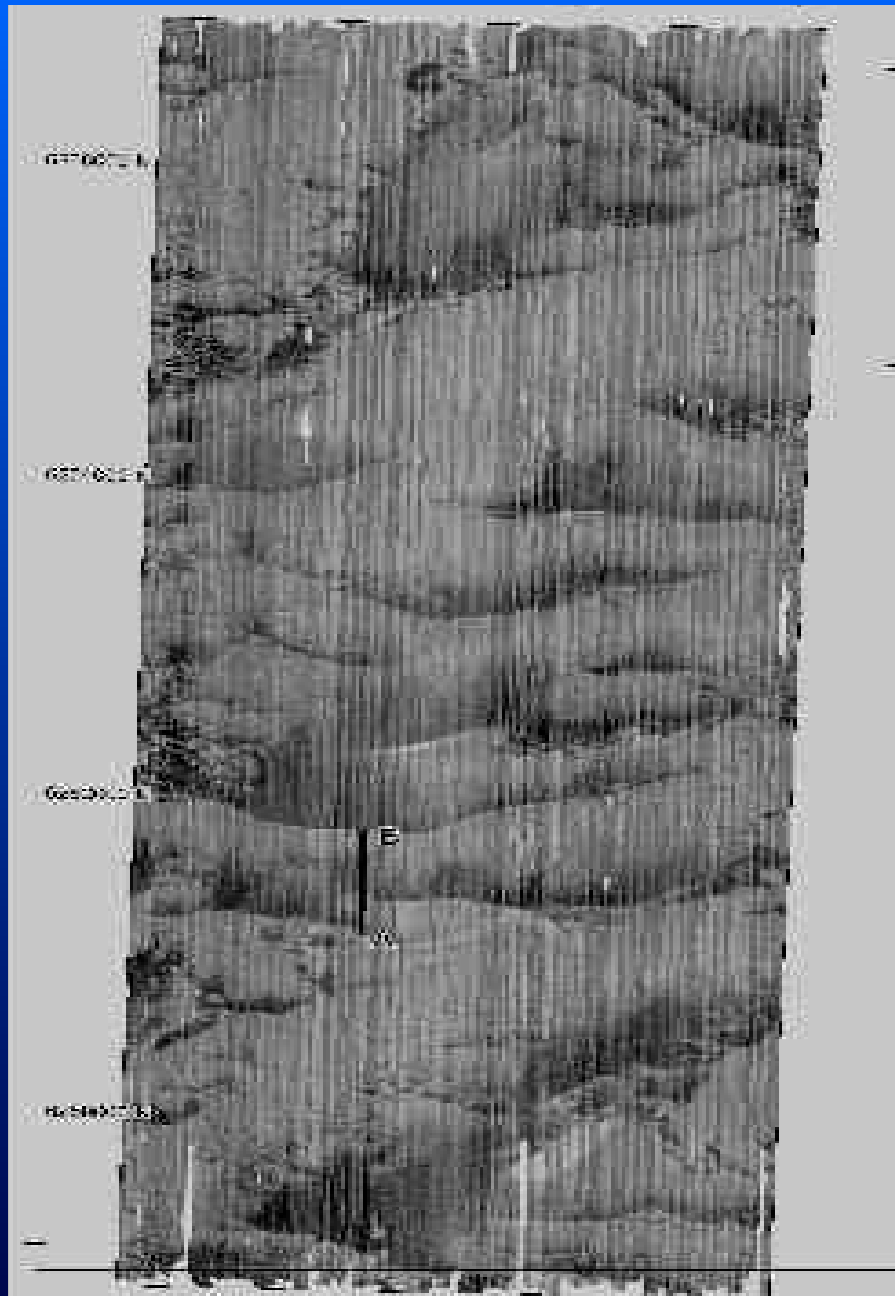
Example from Kattegat, Denmark. By courtesy of The Royal Danish Administration of Navigation and Hydrography.

# Multibeam echosounder 3-D bathymetry



*Example from Kattegat, Denmark. By courtesy of The Royal Danish Administration of Navigation and Hydrography.*

# Side scan sonar mosaic



# Seabed sediments

