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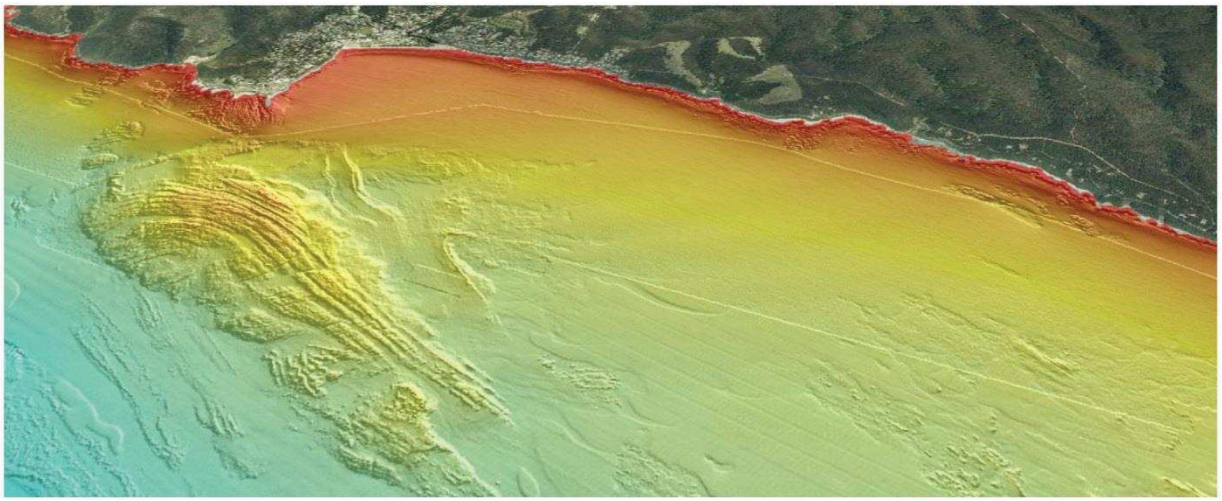

ABSTRACT VOLUME

GEOHAB
Marine Geological and Biological Habitat Mapping

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Integrated approach for Habitat Mapping in Wadden Sea and North Sea (Lower Saxony, Germany)

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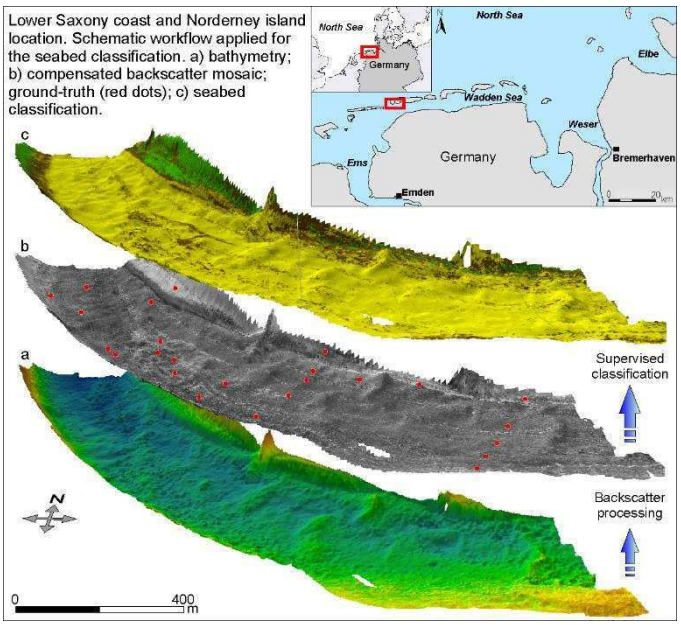
The Lower Saxony coastal and marine area is a meso-tidal environment, with a maximum depth of about 25 m, including marine waters of North Sea, coastal waters and tidal flats of the Wadden Sea, transitional waters of the Ems, Weser and Elbe estuaries. Abiotic and biotic features are the result of a close interaction between intense natural processes and human-induced actions. The same processes influence the morphology and sedimentary regime, acting in different temporal and spatial scales and controlling the distribution of seabed marine habitats.

In order to implement European Directives, NLWKN is working on a strategy to provide full-coverage habitat mapping using hydro-acoustic methods. The concept aims to supervise the whole mapping workflow, from survey planning to reliable habitat mapping products. The collection of high quality data is guaranteed by an integration of high-standard multi-beam echosounder, multi-beam phase-measuring echosounder, and ancillary sensors. The raw data are processed to obtain high resolution bathymetry and compensated backscatter products that will be used for supervised classification, which will reduce human factor, ensuring repeatability and reliability during the whole process.



Lower Saxony coast and Norderney island location. Schematic workflow applied for the seabed classification. a) bathymetry; b) compensated backscatter mosaic; ground-truth (red dots); c) seabed classification.

An initial assessment has been realized in the western part of Norderney Island. The instruments collected high-quality bathymetric and backscatter data simultaneously. Analysis of elevation data identifies the geometrical characteristics of the main morphological features, like dunes, ripples and bottom roughness.

Bathymetrical data were used for compensating the raw backscatter values. Compensated backscatter was verified and calibrated by grab samples ground-truth, analysed in order to identify sediments and biological features. The combined interpretation of all the morphological, geological and biological features, allowed classifies the different kinds of habitats.

Within this integrated approach, it was possible to map the main abiotic and biotic features of the seabed and relate them to the habitats of a dynamical environment, with productive survey in very shallow areas up to 2-3 meters depth.

Further tests are necessary to optimise the methodology and to calibrate results obtained by different devices and interpretation criteria. To characterise the 3-D habitats distribution and their evolution, an integration of surficial data with subsoil data will be accomplished, using high resolution sub-bottom profiler data calibrated with corings.