

MAPPING THE SEABED OF THE BELGIAN PART OF THE NORTH SEA TO ASSIST IN A SCIENCE-BASED APPROACH TO MANAGEMENT

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Knowledge of the spatial distribution of sediments, the impact of human activities on the seabed and the natural evolution of the seabed is important to assist in a more sustainable management of the Belgian Part of the North Sea (BPNS). Sediments are an essential part of any aquatic system and are the key for a better understanding of the marine ecosystem; moreover, they are a valuable socio-economic resource for construction material and beach nourishment; therefore, they are extracted increasingly. Research on sediment nature and processes are important also for the optimisation of dredging and dumping activities, the implantation of windmill farms, seabed constructions, cables and pipelines, the designation of marine nature reserves and, generally, any spatial planning initiative.

Related to the BPNS research, the Renard Centre of Marine Geology (RCMG) of Ghent University has been/is actively involved in various inter- and multidisciplinary projects. Throughout these projects, a research strategy is followed that balances between process/modelling studies, and the optimisation of the use of various acoustical and sampling techniques.

Results from three research projects, related to the mapping of the seabed of the BPNS, will be presented.

During the Marebasse project (Belspo, SPSDII; <http://users.ugent.be/~vvanlancke/Marebasse/>), significant new sampling and acoustical data was acquired in typically mud-, sand- and gravel-dominated areas (Van Lancker *et al.*, 2007). On the scale of the BPNS, new thematic maps, related to the bathymetry, sedimentology and morphology, were produced. Automated modelling of these physical data layers, based on advanced geostatistical methods, have resulted in physical habitat maps with ecological relevance. On a smaller scale, impact studies of aggregate extraction and dumping of dredged material were performed on selected sites, integrating results from geo-acoustical surveys and terrain verifications. Results have shown that, on a short- to medium-term, the effects seem relatively localised. All results are integrated into a Geographical Information System GIS@SEA (*The physical seabed GIS to support Studies and Environmental Applications*).

As the Marebasse project focussed on the spatial variability of the seabed nature and the short- to medium-term impact of human activities, knowledge of the natural evolution of the seabed, its response to sea-level rise and the long-term anthropogenic impact remains poor. These issues are investigated now in the QUEST4D project (Belspo, SSD; <http://www.vliz.be/projects/Quest4D/>). Through quantification of erosion/sedimentation patterns, the natural evolution will be compared against the impact of human activities. Results will be presented of the area north of the Vlakte van

de Raan, including the dumping ground Br&W S1. Acoustical maps of the seabed reveal different sedimentation and erosion patterns, originating from natural processes and human-induced activities (Van Lancker *et al.*, 2008).

The socio-economic importance of seabed resources is further dealt with in the RESOURCE-3D project (Belspo Targeted Action), in which a 3D reconstruction of the internal structure of sandbanks is aimed at. A case study on the Kwinte Bank will be presented.

References

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