

COSA – A New Marine Project Funded by the European Community

Markus Hüttel, Justus van Beusekom, Ronnie Glud, Jaroslaw Jaszewski, Adolf Kellermann, Stanislaw Massel, Jack Middelburg, Jan-Marcin Weslawski

The first of November 2002 saw the launch of a new RTD Project funded by the European Community: COSA – Coastal sands as biocatalytical filters. Seven institutions from four European Countries participate in this project that focuses on the ecological role and management of near-shore marine sandy sediments.

Sandy sediments are the dominant sediment types along European coasts, and a closer look reveals that these deposits are of significant socio-economical value. They provide productive fishing grounds, they are major sources for a variety of raw materials (oil, gas, water, and minerals), and form the most popular recreational beaches. At the same time coastal zones are seriously affected by habitat destruction, eutrophication and water contamination. Despite their importance, permeable coastal sands have been poorly studied with respect to their role in the coastal cycles of matter. The main goal of COSA is the improvement of the sustainable use of sandy coastal environments in Europe. This can only be achieved by generating a solid base of knowledge. Without a thorough mechanistic understanding

of the system the formulation of recommendations and management concepts would be neither possible nor convincing.

In order to achieve this goal a wide array of investigations ranging from the analysis of historical data to physical, chemical and biological measurements is necessary. This is accomplished by the interdisciplinary combination of complementary expertise provided by the participants of COSA (Fig. 1).

The Nadmorski Park Krajobrazowy Park on the Polish coast and the Nationalpark Schleswig-Holsteinisches Wattenmeer have accumulated a wealth of information on the two representative field sites that will be investigated within COSA: The "Hausstrand" off the List Biological Station of the AWI in Germany and the equivalent off the Hel Marinebiological Station in Poland. The Institute of Oceanology, the Polish Academy of Sciences and the Alfred-Wegener Institute which did scientific research at these field sites over the last five decades will integrate this knowledge into COSA. The Institute of Oceanology, the Nederlands Instituut voor Oecologisch Onderzoek, the Univer-

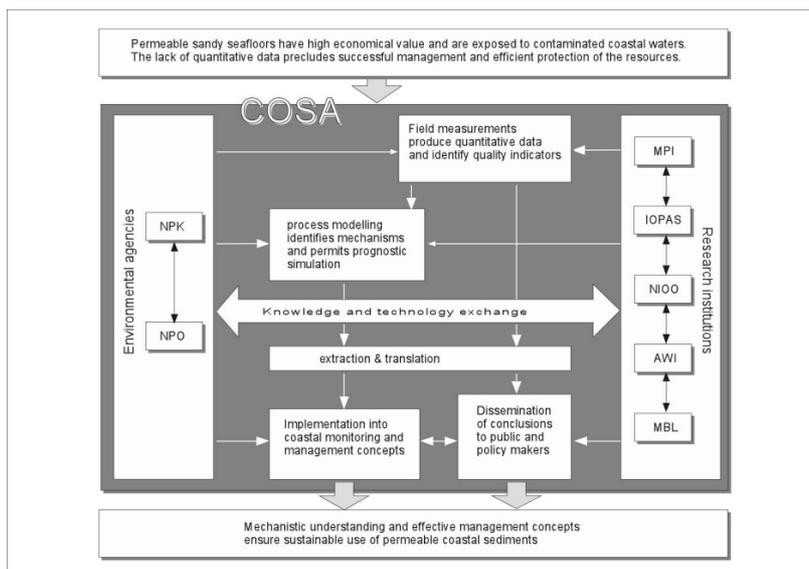


Figure 1: The concept of COSA. Research institutions and environmental agencies are integrated in the project to ensure optimal implementation of the scientific results into environmental objectives. (MPI) Max Planck Institute for Microbiology, Germany (IOPAS) Institute of Oceanology, Polish Academy of Sciences, (NIOO) Nederlands Instituut voor Oecologisch Onderzoek, Netherlands, (AWI) Alfred-Wegener Institut, Germany University of Copenhagen, (MBL) Marine Biology Laboratory, (NPK) Nadmorski Park Krajobrazowy (Seaside Landscape Park), (NPO-SHW) National Park Office Schleswig-Holstein Wadden Sea.

sity of Copenhagen Marine Biology Laboratory and the Max Planck Institute for Marine Microbiology are active in the fields of benthic processes, diagenetic modeling, sedimentological processes, microbial ecology and pore water transport. Bringing together this knowledge and expertise will have a multiplicative effect and facilitate an in-depth assessment of the processes governing coastal sands.

Research in COSA will investigate processes in sand sediments at two field sites located on the Polish and German coasts that represent typical sandy environments of the North Sea and Baltic. Due to their shallow water depths, densely populated coasts and high input of nutrient-rich polluted water from rivers, terrestrial run-off and atmosphere, the North Sea and Baltic are among the most vulnerable European seas. Because in the shallow water the majority of suspended particles can settle to the sea floor, North Sea and Baltic sediments are important sites for processing and storage of organic matter, and they function as sinks and sources for nutrients and contaminants. The project field sites were chosen not only for their respective importance to the local environments and their link to environmental agencies, but also because they represent "type" environments that will allow for the broadest, practical range of study within the context of this project.

COSA has a two-pronged concept combining scientific research and implementation of the results by end-users participating in the project. This combination ensures efficient conversion of the scientific results into community environmental objectives. The research tasks include intensive field campaigns and time series measurements of key parameters. Special attention will be given to the filtration processes and fluxes of dissolved and particulate matter, and the impact of animals, plants and microorganisms on biogeochemical reactions. The data on filtration and mineralization rates in permeable coastal sands provide crucial information for nutrient, contaminant and waste management. The investigations will produce quantitative data of transport, geochemical and microbial processes for the development and validation of a transport-reaction model. Such models are important tools that coastal management agencies employ to evaluate impacts of nutrient and carbon loading on the marine environment and the establishment of monitoring regimes. The participating local environmental agencies add the broad data basis and historical data that are essential for the interpretation of the re-

sults and successful modelling, and implement the research conclusions and model results into their coastal management concepts. What is more, COSA may fill one of the most significant gaps in the Trilateral Monitoring and Assessment Program (TMAP) which is the microbiological activity in the context of remineralization processes in the sediments of the tidal flats. Consequently, among the most prominent results of COSA will be a conceptual framework for a routine monitoring program of biogeochemical processes in sediments. This product is thought to be transported into the Trilateral Cooperation for the Protection of the Wadden Sea. There it will be considered for implementation as integral part of the TMAP.

COSA will quantitatively show how sandy sediments react on changes in the water column composition. The project results will indicate where the limitations of sandy ecosystems are reached and thereby provide essential information necessary for the preservation of this environment and its important resources. A better understanding of the sandy coastal seafloors will not only help to preserve a healthy coastal ecosystem but also ensure the quality of life, health and safety in the coastal zone and human population.

Markus Hüttel

Max Planck Institute for Marine Microbiology,
Bremen, Germany
mhuettel@mpi-bremen.de

Justus van Beusekom

Alfred Wegener Institut für Polar- und
Meeresforschung, Wadden Sea Station, List/Sylt, Germany

Ronnie Glud

University of Copenhagen, Denmark

Jaroslav Jaszewski,

Nadmorski Park Krajobrazowy, Poland

Adolf Kellermann,

Nationalpark Schleswig-Holsteinisches Wattenmeer

Stanislaw Massel,

Institute of Oceanology Polish Academy of Sciences

Jack Middelburg,

Netherlands Institute of Ecology, Yerseke, The Netherlands

Jan-Marcin Weslawski,

Institute of Oceanology Polish Academy of Sciences,
Sopot, Poland