

NAME Project

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Interaction Between Nitrate-Bearing Groundwater and the Marine Ecosystem

Introduction to the NAME Project

High amounts of nutrients leaking from areas with intense agriculture characterize large parts of Europe. It is well-known that periods of eutrophication in our coastal waters cause algae blooms, deterioration of water quality, disappearance of biological niches, and derived declines in species variety and seafood production. Most of the nutrients presumably reach the sea via rivers and streams, but an unknown quantity reaches the sea through the seabed as nitrate-bearing groundwater.

The overall task of the EU-financed project NAME (an acronym for: Nitrate from Aquifers and influences on the carbon cycling in Marine Ecosystems) is to resolve the importance of this nutrient input from nitrate-bearing groundwater. In the project, six institutes from four different European countries participate. The project has a duration from 2002 to the end of 2004 and is financed by the European Commission with a grant of approximate 1.7 M Euro.

Project Objectives

At present it is not possible to state a scientifically reliable explanation of the nitrate flux to the marine ecosystem through the leaking groundwater. There are no quantitative studies of the physical and chemical processes involved in the groundwater leakage through the sea bed. The NAME Project integrates the groundwater system with the marine ecosystem with a view to exclude the unknown interactions between the carbon and the nitrate cycles that arise in a complex coastal

environment that is influenced by groundwater leaking through the sea bed. The information and experience obtained through the NAME Project will later be used to develop the procedures now lacking to secure the future monitoring of leaching nutritive salts that is directly linked to the groundwater leaching from the sea bed.

The Field Site

The site studied through this project is close to Hjerting in Denmark in the northern Wadden Sea. The location is sheltered by Skallingen and has a beach fronting Ho Bay. This site was chosen for the project part because the groundwater at multiple test sites at this location is influenced by nitrate leaching and part because the groundwater reservoir that leaks groundwater directly to the marine ecosystem. This groundwater reservoir consists of Pleistocene sands that are as thick as up to 30 meters. The reservoir floor is fat impermeable Pleistocene age clay.

Participants

The project is a highly multi-disciplinary project combining a broad selection of scientific disciplines. The project is headed by Environment & Resources at the Technical University of Denmark, which is also responsible for the groundwater geochemistry and modelling. Ribe County represents the end-user and is responsible for the hydrogeology. The University of Lausanne carries out the geophysics to clarify the geological structure and the fresh/seawater distribution. The Netherlands Institute of Ecology studies the denitrification in the marine environment and biogeochemical process modelling. The Max Planck Institute for Marine Microbiology studies the biogeochemical processes related to the organic matter degradation in the marine environment. Finally DHI Water & Environment will perform integrated modelling of groundwater reactive transport and marine ecosystems.

Further information

Project website: www.natur.ribeamt.dk/name
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Figure 1:
Nitrate-bearing groundwater infiltrates from areas with intense agriculture and discharges through the shoreface and seabed.

