

MOCHA

MUD ORIGIN, CHARACTERISATION AND HUMAN ACTIVITIES

Duration of the project: 15/12/2003 – 30/04/2006
Budget: € 174.790
Keywords: Mud, Reference Framework, Human Activities

CONTEXT

The MOCHA (Mud Origin, Characterisation and Human Activities) project is part of the research on "Global Change, Ecosystems and Biodiversity" of the Second Scientific Support Plan for a Sustainable Development Policy (SPSD II) with a priority towards "Evaluation of new methodologies and technologies for studies of sediment transport" as well as "Definition of a zero-point reference framework for the marine ecosystem in the North Sea".

PROJECT DESCRIPTION

Objectives

The MOCHA project is focusing on the cohesive sediment transport system occurring on the Belgian continental shelf (BCS). The presence of mud fields and high turbidity in such an energetic environment has been the subject of various studies, the origin of the mud in the area remains however still controversial. The project aims therefore at presenting evaluation tools and strategies in order to study the different sources of mud. Mud is transported by natural processes, but also human activities (dredging and dumping) have an influence, the project is therefore structured around two entities:

1. Investigating the contribution of the different possible sources of mud by collecting and critically analysing existing data, by carrying out sediment transport measurements and by analysing sediment strength, erosion behaviour, clay mineral associations, microfossils, geochemical and geological characteristics.
2. Influence of human activities is investigated by determining how dredging and dumping operations and harbour constructions have changed the cohesive sediment transport system.

Accurate knowledge of the cohesive sediment distribution and transport system and the different sources is especially important because of its effect on economy (dredging and dumping), environment and for setting up a framework of sustainable management of the North Sea. The project will supply information that is part of the general and permanent duties of monitoring and evaluation of the effects of all human activities on the marine ecosys-

tem to which Belgium is committed following the OSPAR-convention (1992). The construction and extension of the Zeebrugge harbour and its connections to the open sea have created these efficient sedimentation places and have thus changed the natural system. Harbour extensions, deepening of navigation channels and other large scale projects (windmill farms) will continue in the future and thus the choice of efficient dumping sites with a low environmental impact is an essential part of sustainable management. It needs also emphasis that the second goal – the determination of the human impact – will lead to the definition of the zero-point reference framework of the fine grained sediment system, a situation of strongly reduced human influence. Knowledge of this reference framework is needed for the the North Sea "Quality Status Report" an objective of the OSPAR "Joint Assessment and Monitoring Programme".

Methodology

The project relies on the expertise of researchers with different backgrounds (geology, mineralogy, sedimentology, engineering, numerical modelling) to collect, measure and analyse all relevant data. It is important to underline that the project aims at understanding the transport system on a regional, i.e. Belgian scale. In these the MOCHA project is coupled with and can rely on the ongoing SPSP II - MAREBASSE project, which is focussing on specific local areas.

Expected results and/or products

A very important product of the project is the definition and classification of the mud. Data will be provided on the transport processes, which are essential in order to answer questions on the composition, origin and residence of these sediments on the BCS, the alterations of sediment characteristics due to dredging and dumping, the effects of the natural variability, the estimation of the net input of hazardous substances and the possibilities to decrease this impact as well as this input.

The specific expected research results of the project are the following:

- Review of cohesive sediment distribution and characteristics.
- Establishing a classification of the bottom and suspended cohesive sediments following their clay mineral association, their grain sizes and their geological characteristics.
- Establishing a classification of the muddy sediments following their erosion behaviour.
- Detailed analysis of the different possible sources of mud.
- Recalibration of the 2D sediment transport model using the new collected results.



- Simulation of the cohesive sediment transport as it is today (including human impact such as harbours, channels, dumping) and as it was before the human activities were so significant (about 100 years ago). The human impact on the cohesive sediment transport will be quantified using the numerical model and historical data (Gilson collection).
- Establishing of a zero-reference framework (i.e. a situation of strongly reduced human influence) of the marine ecosystem in the muddy parts of the Belgian coastal zone.

PARTNERS

Activities

MUMM

The research of the Management Unit of the North Sea Mathematical Models is progressing continuously in understanding marine phenomena by using the numerical models. Its research is guided by questions from the government and is conform with international commitments. The research implicates that numerical simulation results are verified and validated. Therefore, MUMM is involved in measuring programs at sea to ensure the best possible agreement between model results and observations.

KULeuven

The laboratory of Historical Geology (KULeuven) is a sub-contractor of MUMM and uses its expertise on clay analysis to unravel the geology of clay deposits.

RCMG

The research team of the Renard Centre of Marine Geology is specialised in the use and validation of geo-acoustical techniques (a.o. for the prospection of marine aggregates and habitat mapping).

CONTACT INFORMATION

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