News of the German Coastal Engineering Research Council

KFKI aktuell

Editorial

The range of information provided by the KFKI

The amalgamation of the Federal and State authorities involved in coastal research in the KFKI aims to support the transfer of knowledge in coastal engineering with appropriate data and information technology. This applies in particular to the KFKI research projects funded by the Federal Ministry of Education and Research (BMBF). Initially, this task was performed by publishing the "DIE KÜSTE" periodical. Meanwhile a wide range of information is available from the KFKI office in the framework of its PR activities.

KFKI Library

The KFKI Library holds more than 18,000 media units referring to coastal engineering and to the coastal zone. Corresponding searches are possible online in the Central Hydraulic Engineering Library (VZB). Other literature stocks are featured in the catalogue of Germany's marine and maritime libraries of the Consortium of Maritime Libraries (AMB), to which the KFKI Library also belongs.

DIE KÜSTE

The German-language periodical DIE KÜSTE has been published since 1952 with papers from research and engineering on the North Sea and on the Baltic Sea. Through to 1972, it was published by the North Sea and Baltic Coastal Committee, which was then merged in the KFKI. Today it has a circulation of 650 copies and is available as a scientific publication in the member authorities of the KFKI, in libraries and universities with a focus on coastal engineering. As well as publishing the results of the KFKI projects, it also presents the results of the Committee for Coastal Protection Engineering (FAK) in the form of reference works. Special feature issues in English provide the international context.

KFKI Seminar

The 15th KFKI Seminar on Coastal Research is being held this year. This has become a well-attended information event, presenting current or completed KFKI projects and research projects funded by other sources, and reporting about the work of the authorities. Every autumn about 100 interested participants from the authorities, science and business come together for lectures and to share their experiences in the lecture theatre of the German Maritime Museum in Bremerhaven.

KFKI-aktuell

For 10 years now, the KFKI-aktuell newsletter has been published with reports from current coastal research projects funded by the BMBF through the Jülich project management (PTJ). Meanwhile it has achieved a circulation of around 1,000 copies which are sent to the universities with coastal research activities, and to the authorities amalgamated in the KFKI. An English version is made available on the KFKI website and can be obtained by e-mail from the office.

Website www.kfki.de

The full range of information available from the KFKI is provided online on the new ***www.kfki.de*** website on a server run by the Federal Waterways Engineering and Research Institute (BAW) in Karlsruhe. It stands out with a full-text search function that gives access to all electronic documents and publications from more than 200 research projects, from DIE KÜSTE and the newsletter. Furthermore, meta data searching is possible to access the geo data published jointly in NOKIS from 14 Federal and State authorities for waterways engineering, coastal protection, nature conservation and water management. The public section of the website is rounded off with a compilation of documents and links to current issues in coastal engineering.

The internal section of the website acts as a central information hub for the transfer of knowledge regarding all current coastal research projects. Representatives and employees of all KFKI bodies and the current projects can use these documents and materials for their studies.

Dr.-Ing. Rainer Lehfeldt
Managing Director

BAW-Colloquium: Research and Development in Coastal Waterways Engineering

Dr.-Ing. Harro Heyer

Federal Waterways Engineering and Research Institute (BAW), Hamburg

The BAW's annual waterways engineering seminar is held in dialogue with the Federal Waterways and Shipping Administration, construction companies, engineering firms and academia. It looks at complex issues regarding hydraulic engineering and shipping at and on the federal waterways on the basis of current or completed projects and pools the constantly evolving internal and external expert know-how on selected topics in each particular event. In 2010, under the overall title of "Research and Development", the BAW offered two separate colloquiums for inland waterways and coastal waterways, in order to permit a detailed approach to current or finished research projects together with an outlook to planned projects and how they will be integrated in the BAW's new research strategy. The aim is not only to enhance the internal R&D activities but also to foster extra-mural involvement in the complex research topics of waterways engineering and to enhance interdisciplinary exchange among the experts.

The research colloquium for coastal waterways was held on 26 and 27 April 2010 in Hamburg. In his introduction, Prof. Dr.-Ing. Christoph Heinzelmann looked at research and development in coastal waterways engineering. Following evaluation by the Science Council, the BAW will focus more on this core task with additional internal and external communication in the future. To this end, the BAW would like to increase the R&D share of its total workload to about 15%. This will need additional research funds for departmental research with scientific staff on limited contracts.

BAW's waterways engineering research programme is geared to the objectives of the Federal Government's third traffic research programme entitled "Mobility and Transportation Technology" and was presented by Dipl.-Ing. Claus Kunz. It is part of the waterways engineering research initiative of the Federal Ministry of Transport, Building and Urban Affairs (BMVBS) in association with the Federal Institute of Hydrology (BfG) and the Federal Maritime and Hydrographic Agency (BSH). As far as the coastal area is concerned, the programme includes for example new ecologically oriented construction methods, the erosion behaviour of cohesive soils, future river engineering strategies for long-term concepts at tidal estuaries, optimisation of sediment management, the national marine and coastal information system, improvement of dynamic model procedures and the detailed investigation of the effects of climate change including conceivable options for adapting to the expected hydrological changes.

Following these introductory overviews, 13 expert papers were presented and discussed on various different focal issues. Dr.-Ing. Holger Weilbeer spoke on the necessary methods and procedures for complex suspended matter dynamics in the estuaries. In order to reach a comprehensive understanding of the systems involved, further R&D activities are necessary for special field measurements in combination with supplementary developments of mathematical simulation procedures and models. The estuaries as open systems are also affected by processes in the German Bight, so that a KFKI cooperative project also looks to make progress in setting up integrated model systems for analysing the long-term morphodynamics in the German Bight (AufMod). Together with the BSH and the BAW, this project also involves participation from Christian Albrechts University Kiel, Senckenberg Research Institute, Bremen University (MARUM), Munich University of the Armed Forces and smile consult GmbH. A new functional IT-based ground model provides the fundamental principles for mathematical simulation models based on different model procedures. The aim of the project is to provide general principles for management of the coastal regions in the long term.

With regard to research into the climate impacts on the shipping routes, Dr. Norbert Winkel explained the BAW's approach currently being implemented in the cooperative projects KLIWAS and KLIMZUG-NORD. Regarding the process chain that begins with the emission scenarios and leads to regional and local process models, it was possible to reveal how a global climate signal causes changing water levels, for example at the gauge in Hamburg-St. Pauli. The studies illustrate possible future situations with

regard to sea levels, river discharge, wind and topographical scenarios. The first results of studies on the effects of rising sea levels were presented by Dipl.-Ing. Ingrid Holzwarth for the Ems, Weser and Elbe estuaries. Identical tidal characteristics' analysis procedures revealed an interesting comparison for the changes in water levels, currents and salinity. Dr. Guntram Seiß at the BAW is developing a Baltic Sea model with high spatial resolution in the port entrances to look into climate change and how it affects the port entrances on the German Baltic coast. The cooperative project "Marine data infrastructure MDI-DE" is setting up an integrated national marine and coastal information system by merging the already existing NOKIS (metadata from Federal and State agencies) and GDI-BSH (spatial data infrastructure at the BSH) information systems. Dr.-Ing. Rainer Lehfeldt and Johannes Melles explained the objective of providing all available marine data and information through a joint portal in an interdisciplinary network with a coordinated working environment based on metadata and services. The project includes sub-projects such as coastal engineering and coastal water protection, marine environmental protection, marine nature conservation and accompanying scientific/technical research.

The second day of the colloquium started off with the interaction between shipping and the shipping routes. Dr.-Ing. Klemens Uliczka presented the research fields and strategies being pursued in the context of optimising parameters for design shipping routes. The scientific focus concentrated on ship-generated loads (shore loads), the dynamics of moving ships (squat and trim behaviour) and the improvement in ship handling simulation in laterally constrained shallow water areas (bank and ship/ship effects). Dr.-Ing. Carl-Uwe Böttner took a detailed look at the necessary developments for ship handling simulation as a tool for design and navigability analysis. This explained the significance of the dynamic models and their physical principles, together with methods for ascertaining dynamic coefficients. The aim is for improved ship handling simulation procedures to result in further optimised design for the access channels in coastal areas.

Dr.-Ing. Martin Pohl presented the objectives and results of numeric simulation of revetment in tidal areas. The project is in the hands of the Geotechnical Institute of TU Freiberg in cooperation with BAW. The objective consists in reliable, economic design that is adapted to local circumstances, while analysing fundamental damage mechanisms, creating basic principles for probabilistic design and gaining findings for generalised design principles. Four papers looked at the durability of building structures. Dr.- Ing. Thorsten Reschke illustrated the need to investigate the chloride penetration resistance of concrete as made apparent by the damage that has occurred to various building structures as a result of corrosion induced by chloride. Here there is a need for investigation into the reliable estimation of service life depending on prevailing material properties. The aim of the project is to supplement the corresponding requirements for waterways engineering structures and to revise the BAW leaflet "Chloride penetration resistance".

Dipl.-Ing. Kai Osterminski presented selected results of the project for representative design situations (underwater and spray exposure) together with the approach for validating modelled chloride profiles. Looking at frost resistance of cement-based building materials, Dipl.-Ing. Frank Spörel gave an overview of frost/grit loads on waterway engineering structures. And finally, Dr.-Ing. Helmut Fleischer took up the topic of optimising the reinforcement of reinforced concrete cladding slabs. The R&D project aims to optimise crack formation and includes numeric analysis and on-site measurement. Dr.-Ing. Uwe Zerrenthin from the Ground Dynamics Department looked at consolidation during pile driving work. As the literature fails to describe any practical prediction methods for quantitative estimation of dynamic ground deformation caused by pile driving, the research project carried out elementary trials and model tests in the laboratory and as field tests under natural conditions, with the corresponding results then being used to produce an empirical model for consolidation prediction.

Scientific/Technical Cooperation (WTZ) - Brazil

Prof. Dr.-Ing. habil. Andreas Malcherek

Bert Putzar

Munich University of the Armed Forces, Institute for Water Management

When it comes to research into the System Earth, Brazil is Germany's most important partner in South America for scientific/technical cooperation (WTZ). Cooperation in marine research was agreed in May 2003 during a bilateral scoping seminar in Recife. In the framework of WTZ, focal topics were stipulated, dealing with coastal zone management, marine pollution, living resources and ports. In April 2005, the selection committee recommended funding for three projects that have now come to an end:

1. Health Status of Marine Ecosystems: Immunocompetence of Aquatic Invertebrates as a Novel Target for Biomonitoring and Bioprospecting – Immunophilin Inhibitors
2. Impact of Pollutants from Sugar Cane Monoculture on Estuaries and Coastal Waters of NE-E Brazil: Transport, Fate and Sustainable Management Strategies
3. Development of a Strategy for Sustainable Harbour Development

In the context of the third project, the Institute for Water Management at Munich University of the Armed Forces (IfW) developed and set up an integrated modelling system for the lagoon of Patos and the port of Rio Grande in Brazil.

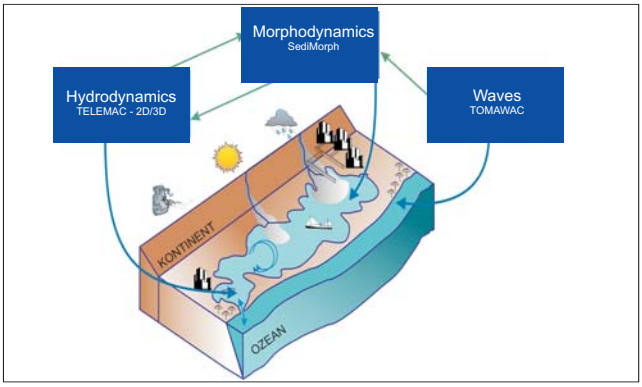

Figure 1:
Diagram of the Patos lagoon in Brazil and the integrated modelling system.

The system consists of individual modules for simulating currents (depth-averaged and 3D), for waves, salinity, solid matter transport and for morphodynamics under the driving influence of fresh water discharge, wind and tides (Figure 1). It is used for sustainable management of environment resources respectively for integrated coastal zone management, and for the expansion and maintenance of the entrances to the port of Rio Grande.

The integrated modelling system has been developed on the basis of the TELEMAC software package developed by Électricité de France and using the morphodynamic SediMorph model developed and operated jointly by Munich University of the Armed Forces and the Federal Waterways Engineering and Research Institute.

The results obtained and methods developed during the project are also of considerable interest to German coastal research: in strict geomorphological terms, the Bodden waters of the Baltic coast constitute lagoons (Figure 1) with narrow openings to the open sea. While the Patros lagoon is far larger with tidal influence in the lower reach, currents caused by wind and waves over complex geometries are the key influences on the system in both cases.

The results of this project are published in Communiqué No. 108 of the IfW series (Shaker-Verlag: ISBN 978-3-8322-9244-7), which features detailed descriptions both of the Patos lagoon as a natural system and cultural zone, and of the program modules that were used and corresponding applications in sustainable coastal zone management (Figure 2).

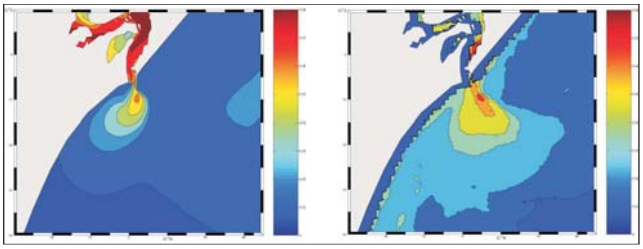

Figure 2:
Application of the integrated modelling system, illustrated by the example of suspended matter concentrations in the mouth of the Patos lagoon with intensive tourist usage. The picture on the left shows the results of numeric simulation for 19 July 2002, the picture on the right shows the evaluation of a satellite photo at the same point in time.

Hamburg Symposium "Spatial Information for the Coastal Zone"

Prof. Dr. Karl-Peter Traub
Dipl.-Ing. Carlos Acevedo-Pardo
HafenCity University Hamburg (HCU), Geomatics
Dipl.-Geogr. Jörn Kohlus
Schleswig-Holstein's Government-Owned Company for Coastal Protection, National Parks and Ocean Protection (LKN), Tönning
Dr. Thomas Lüllwitz
Federal Institute of Hydrology (BfG),
Spatial Information and Remote Sensing GRDC

For the third time since 2006, the "Spatial Information for the Coastal Zone" symposium was held on 6 and 7 October 2010 at Hamburg's HafenCity University (HCU). The symposium takes up issues of the coastal regions from the point of view of many disciplines – from coastal engineering via geomatics and biology through to management, giving participants an opportunity to share their information and experience, establishing contacts going beyond the horizons of their own areas of expertise. The two days were filled with more than 20 papers on current issues.

The symposium was accompanied by an exhibition of specialist companies in the field of geoinformatics and remote sensing. In the past, the event has been well attended, with scientists and users from administration and practice welcoming the opportunity for intensive sharing. This time again, the scientific papers have been published in a book following the event. It is organised by the Schleswig-Holstein's Government-Owned Company for Coastal Protection, National Parks and Ocean Protection (LKN), National Park and Marine Protection (National Park Schleswig-Holstein Wadden Sea) together with the Federal Institute of Hydrology (BfG). Directly after the Spatial Information for the Coastal Zone symposium, on 8 October 2010 the 8th workshop on using remote sensing at the BfG / WSV was also held in the HafenCity University. Bringing together remote sensing and geoinformatics for non-terrestrial applications in this way had already proven to be a successful concept at the last event in 2008. Registration forms for attending both events and the programme of papers were available online at

www.geomatik-hamburg.de/kuestensymposium/2010.

Storm Surges Congress 2010 - Risk and Management of Current and Future Storm Surges

13 - 17 September 2010, Hamburg University

Hartwig H. Kremer PhD
Ellen-Barbe Goldberg
LOICZ International Project Office
Geesthacht Centre for Materials and Coastal Research (GKSS)

Storm surges account for a large share of natural disasters on earth and regularly cause high death tolls and huge financial losses. The risk is exacerbated by the impacts of climate change and intensive human use of the coastal areas.

How is it possible to cope with these changes today and in future? How can the fragmented discussion on this global issue be overcome jointly by researchers, coast users and planners? Answers need an interdisciplinary approach. The aim of the event was to present both the scientific and the social perspective and to illuminate regional aspects. To overcome the traditional dichotomy between coastal scientists and coastal users, a holistic discussion was fostered in the aim of finding interdisciplinary solutions.

Alongside international scientists from many different disciplines, the congress organisers also wanted to encourage players, decision makers, lobbyists, coast users and in particular young experts to get involved in the discussion, contributing their know-how and experience.

Plenary sessions, panel discussions, chaired poster presentations for topic areas, a joint boat trip on the Elbe river around Hamburg's tidal port and a conference dinner were intended to encourage lively sharing between the disciplines.

The objective was also to facilitate widespread dissemination of the information and results after the congress. Supported by numerous regional, national and international partners, Land Ocean Interaction in the Coastal Zone (LOICZ) and the Geesthacht Centre for Materials and Coastal Research (GKSS) were pleased with the lively participation at the Storm Surges Congress 2010 in the main building of Hamburg University.

http://www.loicz.org/calender/Congress/index.html.en

List of contents "Die Küste" 75 – MUSTOK

Contents "Die Küste" 76

International Conference on Hydro-Science and Engineering

Madras / India 02.-05.08.2010

Dr.-Ing. Peter Mewis

Technical University Darmstadt, Section of Hydraulic Engineering

The ninth International Conference on Hydroscience and Engineering ICHE 2010 was held in India.

It was organised by Professor V. Sundar from the Department of Ocean Engineering of the "Indian Institute of Technology (IIT) Madras" in Chennai. The Department of Ocean Engineering was set up in 1982 among others also with German aid, and is well equipped with various testing facilities, also including a large 2D wave basin. The conference was organised jointly with the Department of Civil Engineering and held in four comfortable, air-conditioned lecture rooms at the Centre for Industrial Consultancy and Sponsored Research. Most of the papers referred to estuarine and coastal hydrodynamics, together with

experimental and computational hydraulics and were on a high scientific level, with many having practical relevance.
The event attracted 175 participants from 19 countries, including internationally renowned specialists for hydrology, IT and hydraulic engineering. The wide range of topics also led to interesting discussions with scientists from adjoining disciplines. For the first time, a Best Student Paper Award was presented to doctoral candidates. The award went to Dipl.-Ing. Tim Berthold from Hanover University for his paper on determination of network topology for ANN-Bathymetric models. We would like to take this opportunity once again to extend our congratulations. A half-day technical excursion took participants to the coast to see the Mahabalipuram Shore Temple which dates back to the 5th to the 8th century and is a UNESCO world cultural heritage site. This temple had already been partly underwater and is now protected from flooding by coastal defences. The whole region was severely affected by the tsunami of December 2004. Organisation of the conference and the support provided for participants by Prof. V. Sundar and his large team was excellent. The next ICHE will be held in 2012 at the University of Central Florida, USA and organised by Prof. S. Hagen, Director of the CHAMPS laboratory.

Joint BMBF project - Coastal Futures

Final symposium 4. March 2010 – Hamburg Chamber of Skilled Trades

Marcus Lange
Dr. Andreas Kannen
Kira Gee
Geesthacht Centre for Materials and Coastal Research (GKSS)

Dr. Hermann Lenhart
Hamburg University, Centre for Marine and Atmospheric Science (ZMAW)

Dr. Benjamin Burkhard
Dr. Wilhelm Windhorst
Dr. Stefan Garthe
Christian Albrechts University Kiel

Over a period of six years, the Coastal Futures research project has developed tools and methods for analysing changes along the coast and in the sea. The focus is on the large-scale expansion of offshore wind power in the German North Sea. The result consists of an overall approach that makes it possible to estimate the changes and risks of this new marine use while also giving recommendations for the future. The joint project team presented the results of their studies on 4 March 2010 to an audience made up of a good 100 representatives from science and research, the authorities, the state departments, the political sector and journalists in Hamburg Chamber of Skilled Trades.

Chances and risks of offshore wind power

Analysis focussed on the impact of all planned farms rather than on the effects of individual offshore wind farms. The risks include impacts on the marine environment. The risk of collisions and the barrier impact for sea and migrating birds are two areas where detrimental effects can be expected according to the results of the project studies. Other problems also include changes in social areas, such as destroying the aesthetic appeal of the landscape. They will play a crucial role in acceptance or rejection of offshore wind power. In the end, offshore wind power makes a contribution to protecting the climate.

Research approach and results

In order to estimate the overall impact of offshore wind power, the team turned to the methods and approaches used in ecological, social and economic research, including among others the DPSIR and Ecosystem Services approach, which each acted as structuring aid for linking the individual results. The ecological sub-studies examined the effects of offshore wind turbines both in the sea and above the sea and were then combined in an overall ecological assessment. Wind fields changed by wind farms were modelled, for example, and the resulting changes in the stratification of the sea were displayed, which would trigger changes in biological processes. Social analysis addressed general public debate in society at large on the issue of offshore wind farms.

Social perspective and new forms of governance

One conclusion of the project indicates that in view of the current diversity of human activity in the sea, altogether the cumulative impacts of many different marine users will have to be involved to a far greater

extent and much earlier in the whole planning process. Popular opinions and values should be integrated in the decision-making processes and the corresponding decisions must be made transparent. Experience gained with the project indicates that the case study can also be applied to other issues and regions.

Panel discussion

The symposium was chaired by Prof. Franciscus Colijn (Director of the Institute for Coastal Research at Geesthacht Centre for Materials and Coastal Research (GKSS) and FTZ West Coast Büsum). He also chaired the subsequent panel discussion, where the impacts of offshore wind power, future challenges facing science and coastal management were discussed by Wulf Hülsmann (regional environment planning, Federal Environmental Agency), Dr. Nico Nolte (regional planning, Federal Maritime and Hydrographic Agency), Heinz Glindemann (Department Tidal Elbe and Hydrology, Hamburg Port Authority) and Prof. Alexander Proelss (Professor for Maritime Law at Walther Schücking Institute for International Law at Kiel University).
The role of science as information provider was emphasised. Manifold uses in coastal and marine areas together with newly emerging problems such as climate change demand balanced political decisions and foresighted planning. Integrated coastal zone management as an informal instrument for bringing about such decisions can act here as an appropriate addition to existing planning instruments. The issue of cross-border cooperation was also discussed with regard to use of the seas and also in terms of implementing EU Directives. Science should not only get involved in political dialogue but also prepare scientific findings in an understandable fashion so as to support social dialogue.
Comprehensive documentation of the results from Coastal Futures together with the analytical system approach taken in this project have been published in English as "LOICZ R & S Report No. 36" and will be featured in one of the next EUCC Coastline Reports.

www.coastal-futures.de

Information from the KFKI office

New senior editor for DIE KÜSTE

As of 1 July 2008, Dipl.- Ing. Detlef Schaller from Husum is the new senior editor for DIE KÜSTE. He works together with the authors and reviewers who appraise every article and ensures that the manuscripts sent by the office to the printers are indeed ready for printing.

Until he retired, Mr. Schaller was Head of Hydrology, Measurement and Observation Service in the Schleswig-Holstein State Authority Coastal Protection, National Park and Marine Protection (LKN), where he worked particularly on issues relating to the morphology of the Wadden Sea and coastal research. He was also involved in national research projects and a member of the KFKI advisory group.

Events

October 27, 2010	**KFKI-Seminar**, Deutsches Schifffahrtsmuseum, Bremerhaven info: http://www.kfki.de

Imprint

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