



## Risk Management in Coastal Engineering – Applied Research Projects for the German Wadden Sea

T. Woeffler (1), C. Grimm (2), D. Bachmann (3), J. Jensen (4), C. Mudersbach (5), P. Froehle (6), F. Thorenz (7), and H. Schuettrumpf (8)

(1) Institute of Hydraulic Engineering and Water Resources Management (IWW), RWTH Aachen University, Germany (woeffler@iww.rwth-aachen.de), (2) Institute of Hydraulic Engineering and Water Resources Management (IWW) , RWTH Aachen University, Germany (grimm@iww.rwth-aachen.de), (3) Institute of Hydraulic Engineering and Water Resources Management (IWW) , RWTH Aachen University, Germany (bachmann@iww.rwth-aachen.de), (4) Research Institute for Water and Environment (fwu), University of Siegen, Germany (juergen.jensen@uni-siegen.de), (5) Research Institute for Water and Environment (fwu), University of Siegen, Germany (christoph.mudersbach@uni-siegen.de), (6) Institute of Environmental Engineering, Coastal Engineering Group, University of Rostock, Germany (peter.froehle@uni-rostock.de), (7) Lower Saxony Water Management, Coastal Defence and Nature Conservation Agency (NLWKN), (8) Institute of Hydraulic Engineering and Water Resources Management (IWW) , RWTH Aachen University, Germany (schuettrumpf@iww.rwth-aachen.de)

Several islands in the northfrisian part of the UNESCO – World Natural Heritage Wadden Sea are exposed to extreme storm surges due to climate change and sea level rise. Existing coastal protection measures in this area do not consider the future sea state and are mainly based on tradition and expert knowledge. The two projects HoRisK and ZukunftsHallig (supported by the German Coastal Engineering Research Council) focus on this area and implement the requirements defined in the Directive 2007/60/EC on the assessment and management of flood risk. The main objects of the projects are the design and evaluation of new coastal protection techniques for the investigation area. With numerical simulations hydrological parameters are investigated in order to design new coastal protection- and management strategies. The decision support system PROMAIDES (Protection Measure against Inundation Decision Support) developed at the Institute of Hydraulic Engineering and Water Resources Management of the RWTH Aachen University analyzes the effects and reliability of new coastal protection techniques and evaluates inundation areas and economic damages for different hydrological boundary conditions. As a result flood risk and hazard maps are shown in this work. Furthermore sensitivity analyses expose possible variations in future storm surges and illustrate the difference in significant wave heights for varying wind climates. This risk based approach of both projects is a suitable way to ensure life for further generations on these islands under sustainable ecological und economic conditions.

### Acknowledgments

This work was supported by the KFKI (German Coastal Engineering Research Council) and the German Federal Ministry of Education and Research (BMBF) (Project No. 03KIS094 and 03KIS078)