The COHERENT Project

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Publication date: 2017

Document Version
Publisher's PDF, also known as Version of record

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Citation (APA):
Main project output

Coastal Adaptation Decision Support System

WP 1 - Physical pressures on the coastal system – hazards and impacts, Lead: Bo B Christensen (DHI)

WP 1 aims to develop novel approaches with the aim of improving estimates of 1) the probability distribution curve for storm surge events, as well as 2) the probability of breaching coastal barriers. Improving probability estimates will involve analysis of the meteorological drivers for historical events and modelling of the storm surge consequences, including impacts on barriers.

WP 2 - Hydrology-land use interactions in the coastal zone, Lead: Morten A D Larsen (DTU)

WP 2 addresses current and future interactions between the combined effects of physical impacts from the hydrological side, flooding from the sea and anthropogenic practices concerning land use, management, development and planning in the coastal zone. This will provide a framework for assessing the impact and associated social and economic costs of a certain hazardous event on the basis of a matrix of interconnected natural and human-made conditions reflecting a complex environment for the planning and management of current and future planning and decision-making.

WP 3 - Hazard management, response capacities and human dimensions, Lead: Carlo Sørensen (The Danish Coastal Authority)

WP 3 will engage civil society in the management of coastal hazards by development and sharing of shared strategies and integrated coping capacity through transdisciplinary work with national and municipal administrations, emergency management, universities, and private enterprises. The work includes structured studies in terms of interviews and dialogues with national and local governments, emergency operational units, and civil society in order to reveal risk perceptions, and strengths and limitations facing coastal flooding. Case study experiences will be shared and related to the international context. The potential efficiency improvements and learning aspects of risk reduction will be assessed and tested in experiments and through “learning-by-doing”.

WP 4 - Dynamic damage curves reflecting coping options and human capacities, Lead: Kirsten Halvanes (DTU)

WP 4 will develop a dynamic flooding damage curve tool for cost reduction calculations depending on physical protective measures, response capacity and vulnerabilities reflecting physical assets, society and hydrological systems. Climate change adaptation and increased and more efficient emergency capacity efforts will be reflected in including warning systems, human behavior, and operational management.

WP 5 - Risk reduction options, intelligent planning, warning systems and business strategies, Lead: Nils Drønen (DHI)

WP 5 will develop an easy-to-use planning and early warning system framework and software tool for testing “do-nothing” and different risk reduction strategies, technologies, and management options for flooding. The system is open-ended in the sense that hydraulic models and economical models can be added to the system, where flood hazard simulations and the economic model results are synthesized into relevant information that the end-user can access. Input from WP1+WP2 constitutes the “plug-in” for the coastal flooding hazard part. Damage cost functions from the models developed in WP4 constitute the “plug-in” for the economic part. The connection between the external software and the generic framework will be developed streamlining the transfer of data to the framework. The interface (features and accessibility) is developed in the dialogue facilitated in WP3 and feed-back from the end-user is integrated into the user-interface.

Kick-off meeting 29-30 Nov. 2017, DTU campus

Case studies

Four diverse case studies still reflecting common Danish (German) conditions and problems:

- Søllerød, flood flooding, urban development.
- Aabenraa, surge.
- Emden, human dimensions, coping strategies.

WP 6 - Project management and dissemination, Lead: Kirsten Halvanes/Morten A D Larsen (DTU)

Project management and dissemination.

The COHERENT project
Coastal hazard risk reduction and management
2017-2020, Innovation Fund Denmark (project no. 7048-00004A)

General project description

The aim of COHERENT is demand-driven knowledge co-creation regarding coastal hazard risk reduction and management by professionals, governments, and the business sector. The project is positioned in the value chain between research to innovation, integrating new and established research in science, economics and the social sciences and confronting it with the needs of decision-makers, civil society, operational hazard managers and business.

Research

- New approach for estimating most severe storm-surge events and costs
- Integrated modelling of ocean, land-use and inland hydrology
- Dynamic damage cost curves
- Updating of warning system, hazard development and management
- Behavioural experiments and studies linking research, governance and risk

Business products

- Adaptation/decision software toolkit, covering all major decision gates, combining technologies + human behavior available for consultants, SMEs, municipalities + exports
- Software suite expected to reach market quickly (1–3 months after project) Data, models and methods combined + integrated into ICT-based framework

Key impacts to society

- Efficiency in hazard management
- Improved technical basis for coastal, land-use and hydrological planning
- Learning-based system for damage costs and insurance
- Knowledge creation/leading technologies + hazard management supporting business/exports
- Improved governance of national and local authorities

WP 2 addresses current and future planning and decision-making reflecting a complex environment for the planning and management of matrix of interconnected natural and human-made conditions and economic costs of a certain hazardous event on the basis of a framework and software tool for testing “do nothing” and different risk reduction strategies, technologies, and management options for flooding. The system is open-ended in the sense that hydraulic models and economical models can be added to the system, where flood hazard simulations and the economic model results are synthesized into relevant information that the end-user can access. Input from WP1+WP2 constitutes the “plug-in” for the coastal flooding hazard part. Damage cost functions from the models developed in WP4 constitute the “plug-in” for the economic part. The connection between the external software and the generic framework will be developed streamlining the transfer of data to the framework. The interface (features and accessibility) is developed in the dialogue facilitated in WP3 and feed-back from the end-user is integrated into the user-interface.

Morten A D Larsen (DTU)
WP 2 - Hydrology-land use
Carlo Sørensen, The Danish Coastal Authority
Freja B Kristensen, Smith Innovation

WP 3 - Hazard management, response capacities and human dimensions
Lead: Carlo Sørensen (The Danish Coastal Authority)

WP 4 - Dynamic damage curves reflecting coping options and human capacities
Lead: Kirsten Halvanes (DTU)

WP 5 - Risk reduction options, intelligent planning, warning systems and business strategies
Lead: Nils Drønen (DHI)

WP 6 - Project management and dissemination
Lead: Kirsten Halvanes/Morten A D Larsen (DTU)

Key personnel
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Freja B Kristensen, Smith Innovation