

Technical University of Denmark



Flooding hazards from sea extremes and subsidence

Sørensen, Carlo Sass; Vognsen, Karsten; Broge, Niels; Knudsen, Per

Published in:
Program og præsentationer

Publication date:
2015

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

[Link back to DTU Orbit](#)

Citation (APA):
Sørensen, C., Vognsen, K., Broge, N., & Knudsen, P. (2015). Flooding hazards from sea extremes and subsidence. In Program og præsentationer (pp. 123)

DTU Library

Technical Information Center of Denmark

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Flooding hazards from sea extremes and subsidence

Carlo Sørensen¹, Karsten Vogensen², Niels Broge² & Per Knudsen¹

1) DTU Space (carlos@space.dtu.dk/pk@space.dtu.dk)

2) Danish Geodata Agency (kv@gst.dk/nihbr@gst.dk)

If we do not understand the effects of climate change and sea level rise (SLR) we cannot live in low-lying coastal areas in the future. Permanent inundation may become a prevalent issue but more often floods related to extreme events have the largest damage potential, and the management of flooding hazards needs to integrate the water loading from various sources. Furthermore, local subsidence must be accounted for in order to evaluate current and future flooding hazards and management options.

We present the methodology (Figure) and preliminary results from the research project “Coastal Flooding Hazards due to Storm Surges and Subsidence” (2014-2017) with the objective to develop and test a practice oriented methodology for combining extreme water level statistics and land movement in coastal flooding hazard mapping and in climate change adaptation schemes in Denmark. From extreme value analysis of tide gauge records, statistics that allow also for projections of SLR, meteorological variability, and extremes with a very low probability of occurrence are provided. Land movement is researched with a focus on short term surface height variability in the groundwater-ocean interface that, together with longer term processes, may cause substantial subsidence and impact future water management and adaptation strategies in flood prone coastal areas. Field studies’ results from repeated precise levelling, GPS setups, and ocean and groundwater level monitoring in Thyborøn and Aarhus are integrated into geological and geophysical data and modelling work to explore the nature and causes of the subsidence encountered, and to explore new ways of utilizing data in relation to coastal flooding hazard mapping. Here, preliminary results from the study sites show local subsidence in the order of up to 5-10 mm/y; rates that thus currently exceed SLR by far. The combined effects of storm surges and subsidence may then e.g. be projected in a Digital Elevation Model (DEM) to give more realistic future surface and flooding level representations.

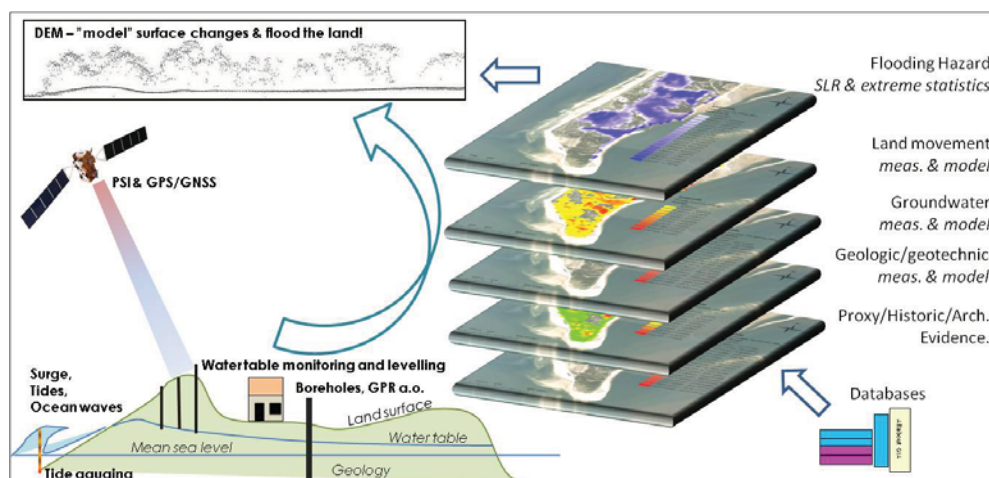


Figure. Sketch of the research setup. Field studies, statistics and existing measurement and modelling efforts are combined to yield more detailed information on land subsidence and to improve flooding hazard assessments.