

A toolkit to reduce coastal vulnerability

Every few years Europe is hit by a high-impact storm event that may cause damage amounting to millions of euros. Levels of damage are likely to increase due to higher sea levels and more intense storms as a result of climate change. Ongoing coastal development is also making coasts more vulnerable to storms and so coastal authorities need to take steps to prevent or mitigate damage in the future. They need information about where the coastal areas exposed to most risk are situated, what measures are possible, how effective these solutions are, and how to communicate with stakeholders.

The RISC-KIT (Resilience-increasing Strategies for Coasts) Toolkit was developed by a consortium of eighteen partners led by Deltares. It includes five tools. **The storm impact database** contains the impacts of recent and historical storms in Europe. One of the discoveries resulting from the archive data mining was that a large number of storms in the past had simply been “forgotten” and that storms are more frequent than previously thought. The **Coastal Risk Assessment Framework (CRAF) tool** pinpoints the highest-risk areas along the coast in a two-step approach. In the first step, potential hotspots are selected using simple rules, for instance by linking wave heights to coastal erosion. The second step uses the more detailed XBeach and vulnerability models to identify the area of highest risk.

The **web-based management guide** provides coastal managers with an overview of possible ways of reducing risk levels in the hotspots such as dune restoration or marsh creation. After a measure has been selected, effectiveness in terms of damage reduction can be assessed with the hotspot tool for Disaster



Ten case-study sites in Europe

Risk Reduction (DRR) assessment. This tool is based on the FEWS platform and allows the incorporation of the coastal managers’ own surge, wave and morphodynamical software. The results of the analysis are stored in a Bayesian network, which is a probabilistic model that connects waves, water levels, properties of the coast, measures and resulting damages. The results are shown in a web viewer. The **multi-criteria analysis (MCA) guide** helps coastal managers to conduct discussions with end users and stakeholders about the feasibility and acceptability of DRR measures.

All the tools have been tested at ten case-study sites in Europe, at least one on every regional sea in Europe. The characteristics of these sites vary in terms of coastal type (barrier islands in Portugal, salt marshes in the UK), land use (urbanised coast in Belgium), tidal range and dominant hazard (coastal erosion, flooding). The tools were found to be applicable to all these different coastal locations.



Damage in Faro, Portugal, in 2016

Further reading:
www.riskkit.eu

Damage in Tordera, Spain, in 2017