Innovative coastal technologies for safer European coasts in a changing climate

Result in Brief

Project information

THESEUS

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Project website

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ALMA MATER STUDIORUM - UNIVERSITA DI BOLOGNA

Making European coastlines safer

A warming climate may result in rising sea level together with stronger and more frequent storms. An EU-funded initiative advanced the state of the art in applying innovative technological and non-technological solutions to reduce risks on coasts.

Europe's coastline is under threat from erosion, flooding and long-term habitat deterioration. The situation may worsen due to the effects of climate change, which may increase the likelihood of damage from extreme weather events and accelerate habitat decline. Current approaches for coastal management and defence based on present conditions therefore need to be re-examined.

The 'Innovative technologies for safer European coasts in a changing climate' (THESEUS) project was established to meet this challenge. It developed a holistic, participatory and interdisciplinary approach to
understanding the physical, ecological, economic and social components of the coastal system.

Researchers improved the design of coastal defence structures and delivered advanced technologies and best practices based on the lessons learnt at study sites. They tested the performance of both innovative and traditional defences, such as floating energy converters, submerged reefs, dikes and breakwaters, and nourishment operations in the context of increasing sea-level rise and extreme weather events. To increase coastal resilience THESEUS also examined a wide range of ecologically based strategies, such as maintenance and reinforcement of wetlands, dunes and biogenic reefs, and cost-effective non-technological solutions, such as insurance, land-use plans, business recovery actions and promotion of risk awareness.

Project outcomes were synthesised in a book of guidelines and in a GIS-based decision support system (DSS). The guidelines detail the best practices and advances of engineering, ecologically based, social and economic strategies for sustainable defence planning. The DSS is an exploratory tool allowing the users to perform an integrated coastal risk assessment and to scope different combinations of adaptation options, across short, medium and long-term scenarios, taking into account physical and non-physical drivers such as climate change, subsidence, population and economic growth.

THESEUS has developed a systematic approach in assessing and managing European coasts that have become growing erosion and flood risks, as well as in delivering safer coastal habitats.

**Keywords**

Coastal areas, erosion, flood, climate change, extreme events, risk assessment, risk management, coastal ecosystems, social awareness, resilient economies

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