

Coastal Flood Atlas for the Spanish Coast - ES

1. Policy Objective & Theme

- ADAPTATION TO RISK: Managing impacts of climate change and safeguarding resilience of coasts/coastal systems
- ADAPTATION TO RISK: Preventing and managing natural hazards and technological (human-made) hazards
- ADAPTATION TO RISK: Integrating coherent strategies covering the risk-dimension (prevention to response) into planning and investment

2. Key Approaches

- Knowledge-based

3. Experiences that can be exchanged

A flood atlas for the entire national coast which is a useful tool to predict the effects of climate change and sea level rise, with the aim of promoting a better long-term coastal planning.

4. Overview of the case

The Spanish coastal zone has been analysed to develop a tool to statistically predict the maximum flooding level of Spanish beaches. This work has been compiled into the Coastal Flood Atlas. The determination of the maximum flood level is essential to develop an adequate long term coastal planning.

5. Context and Objectives

a) Context

The Spanish coast has high ecological and landscape values, and nowadays 32% of the total population is living in coastal areas with the consequent enormous presence of socio-economic activities.

The problems and issues for which this tool has been developed are related to flood risks on the Spanish coast affecting populations, ecosystems, economic activities and infrastructures. These risks could be associated to climate change effects, such as the increase of sea level rise and extreme events, as well as their frequency of occurrence. The determination of the maximum flooding level in a beach is essential for security reasons, infrastructure design (overtopping, erosion) and for the determination of the Maritime-Terrestrial Public Domain.

This tool has been implemented at the national scale.

b) Objectives

The goal of the initiative was to develop a methodology to determine the increased flood level in each specific location of the Spanish coast and combine this information with several coastal instrumental databases to finally produce a coastal flood atlas for the Spanish coast.

The specific objectives to be achieved through this tool were (1) to precisely assess the coastal systems dynamics, (2) to reliably design the necessary strategies, (3) to establish a common methodology for the design, execution and monitoring of coastal actions, and (4) to compile in one tool all the Spanish experience in the field of coastal engineering. The timescale

associated with implementation and goals achievement was 1 year, 1999.

6. Implementation of the ICZM Approach (i.e. management, tools, resources)

a) Project Management

The Spanish Ministry of Environment promoted and funded the initiative. The University of Cantabria, through its Environmental Hydraulics Institute, conducted the technical design and implementation.

b) ICZM tools

The category of this initiative is a planning and technical tool.

The Coastal Flood Atlas is an essential technical tool as it determines the maximum flooding level, providing basic information to develop an adequate long term coastal planning considering and promoting the security of populations, ecosystems, economic activities, infrastructures, etc. This tool also helps to protect the future existence of the Maritime-Terrestrial Public Domain by identifying critical areas that require setbacks or any other specific measures. This tool has been based on other specific tools:

- Numerical models that enable us to study coastal processes and assess any changes in a beach due to natural events or human actions on the coast. It includes assessments of the bathymetric information, wave and dynamics, modal and morphodynamic states, terrain modelling and equilibrium beach, beach morphodynamic evolution, beach cross profile evolution and flood level determination.
- Databases with all the required information, including wave and current data, nautical charts, etc.;
- Factsheets summarizing the information to understand the prediction for each coastal stretch, resulting in 13 factsheets covering the entire Spanish coast. They include geographical location, wave direction, instrumental information location (buoys, tidal gauge, etc), medium and extreme tidal regimes, medium and extreme beach flood level regimes, etc.

7. Cost and resources

The budget for this initiative was €150.000. The manpower used for the implementation of the tool was 7 people.

8. Effectiveness (i.e. were the foreseen goals/objectives of the work reached?)

All the defined objectives were achieved in the timescale defined, as a methodology was developed, through the compilation of all the previous Spanish experiences, in order to assess the coastal dynamics and the increased flood level in each specific location of the Spanish coast, and to design the necessary strategies to solve the problem. The Coastal Flood Atlas was created, which is a useful tool for coastal managers as it provides all the needed information to tackle this problem in the long-term as well as providing factsheets to easily handle the information.

9. Success and Fail factors

Factors that were helpful in achieving the objective were: the support and the willingness of the Directorate General for the Coast to develop this tool and the availability of budget and the growing social awareness on climate change and sea level rise effects.

10. Unforeseen outcomes

The Coastal Flood Atlas for the Spanish Coast was awarded the National Environment Award "AQUA" (1999) by the Spanish Ministry of the Environment. Others were (1) The definition of a methodology to study the coastal processes based on long term assessments; (2) the definition of the corresponding numerical methods and models which are nowadays of common use

in Spain; (3) the creation of several databases for the tool, including wave and current data, nautical charts etc.; (4) the initiative was extremely innovative being ahead of its time (the Flood Directive 2007/60/CE required the Member States to assess the flooding risks of their coastal zone and have the results in 2011; Spain already had it in 1999, 12 years before) therefore, Spain automatically fulfilled the Flooding Directive in 2007 as the work was already done.

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13. Sources

- Cota de inundación: atlas de Inundación en el Litoral Peninsular español (1999). Ministerio de Medio Ambiente y Universidad de Cantabria
- <http://www.smc.unican.es/recursos/archivos/descargas/Documento%20tematico%20de%20cota%20de%20inundacion.PD>



Spanish Flood Atlas (7.65 MB) 