

MOSAIC.PT FLOOD RISK FRAMEWORK TO SUPPORT MANAGEMENT IN COASTAL ZONES

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ABSTRACT

Extending for more than 900 km with diverse geomorphologies and land-use occupations, the Portuguese coastal zone is highly vulnerable to overtopping and flooding. The project Mosaic.pt developed a flood risk framework to support management in coastal zones taking the territorial diversity into account. The framework delivers improved hazard prediction strategies and guidelines for spatial planning and increased coastal community resilience.

Key words: Coastal flooding; Critical typologies; Real-time prediction and monitoring; Vulnerability; Safe communities

1. INTRODUCTION

The continental Portuguese coast is exposed to oceanographic and weather conditions promoting extreme high water levels and leading to inland flooding occurrences. As flooding processes and related impacts depend on the natural and anthropogenic territorial characteristics, accurate hazard and risk analyses should take into account the coastline diversity. This abstract presents the main results of the project Mosaic.pt, which aimed at developing an innovative framework to support coastal flood risk management.

2. METHODOLOGICAL APPROACH

Two different spatial scales were considered. At a regional scale (continental Portuguese coast) historical data supported spatial and temporal characterisation of flood occurrences and impacts. Indicators, integrating historical occurrences, coastline geomorphology, elements at risk and hazard forcings, were treated with statistical techniques to identify critical coastal typologies. Based on historical flood records, three observatories located on the Portuguese central west coast showing different territorial contexts (Costa Nova, Cova-Gala and São Pedro de Moel) were used for comprehensive local studies: hazard and territorial vulnerability analyses, and forecasting tools improvement by integrating numerical models (SCHISM and XBeach) with multi-source data (e.g. images from video cameras, Sentinel images).

3. MAIN ACHIEVEMENTS

A new flood risk framework considering the territorial diversity was developed. It provides strategies for accurate real-time flood hazard predictions, based on local scale assessments, to support emergency planning and response, and guidelines for spatial planning and to improve the

resilience of local communities (Figure 1). Specific results include: 1) a database of coastal flooding occurrences for the period 1980-2018 (Tavares *et al.*, 2021); 2) critical coastal typologies to flooding for the continental Portuguese coast; 3) flood hazard and territorial vulnerability assessments at the observatory scale (Freire *et al.*, 2020); 4) the implementation and validation of hydrodynamic forecasts at the observatory scale (Oliveira *et al.*, 2020, 2021); 5) the implementation and testing of the model XBeach within the Water Information and Forecast Framework (WIFF, Fortunato *et al.*, 2017) at the observatory scale for 48 hour flood predictions; and 6) a dedicated WebGIS platform to access multi-source data, hydrodynamic and morphodynamic predictions, and historical information (Rocha, *et al.*, 2021).

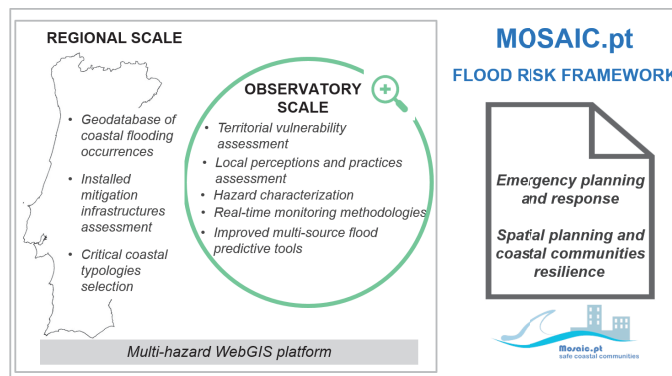


Figure 1. Mosaic.pt Flood Risk Framework

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