DEFINITION OF COASTAL TYPOLOGIES CONSIDERING FLOODING OCCURRENCES, IMPACTS AND THE TERRITORIAL COMPLEXITY

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ABSTRACT

Continental Portugal presents an extensive and diversified coastal zone. This diversity gives rise to the existence of a wide range of geomorphologic features, namely sand beaches, sand/rocky beaches, gravel/sand beaches, high cliffs and low-lying rocky shores, coastal lagoons and barrier islands, which support distinct levels of human occupancy. To identify and distinguish the different coastal typologies, a cluster analysis was used based on a set of variables, expressing the territorial complexity, as well as the occurrences and impacts resulting from coastal flooding.

Keywords: Coastal typologies; cluster analysis; occurrences; impacts; territorial complexity

1. INTRODUCTION

A coastal zone is characterized by its dynamics, complexity, and constant interactions between the terrestrial and oceanic systems. In the last two decades, several studies and different techniques related to the identification and definition of coastal typologies have been carried out (Buddemeier *et al.*, 2008) with the existence of several methodologies for its definition (Dürr *et al.*, 2011). The scale of the analysis, the objective of the study and the variables that support the definition of the are crucial aspects in the development of the most appropriate methodology.

2. METHODOLOGICAL APPROACH

Based on the history of occurrences and impacts related to floods and coastal overtopping (Tavares *et al.*, 2021), the Portuguese continental coast was divided into 53 sectors. A set of 17 variables that represent the territorial complexity were selected to characterize the sectors, as well as the occurrences and impacts resulting from coastal flooding. These variables were grouped into 5 distinct subsets (Table 1). The coastal typologies were defined using cluster analysis.

3. MAIN ACHIEVEMENTS

The application of a cluster analysis made possible to extract 4 clusters for representing the natural and territorial diversity and complexity of the Portuguese continental coastal zone. The classification differentiates the clusters considering their impacts, occupation, susceptibility, and coastal protection. Thus, the following coastal typologies are identified: a) natural systems with few impacts showing equilibrium with forcing factors; b) natural systems with impacts in disequilibrium with forcings; c) artificial areas, predominantly without coastal protection, with impacts; and d) predominantly artificial areas with coastal protection, showing multiple impacts.

Table 1. Variables used in the cluster analysis

VARIABLES GROUP	NUMBER OF VARIABLES
SUSCEPTIBILITY TO COASTAL FLOODING	3
COASTAL PROTECTION	3
COASTAL FLOOD OCCURRENCES	1
TERRITORIAL OCCUPATION	2
IMPACTS	8

4. CONCLUSIONS

The selection of variables and the methodology adopted proved to be suitable to identify different coastal typologies, representing the diversity and complexity that characterizes the continental Portuguese coastal zone, for flood risk assessment. Within the scope of the Mosaic.pt project, the selection of these typologies, combined with the history of flood occurrences and impacts, can offer an important contribution informing a comprehensive coastal flood risk assessment and management.

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