

## CHARACTERIZATION OF THE DESIGN STORM PROFILES IN THE SOUTH OF THE CATALAN MEDITERRANEAN

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Waves are a key element of the maritime engineering. This has a great influence on the coast and therefore is determining in the coastal morphology, due so much to the erosion as the deposition of sediments. Also it is a fundamental piece in the design, the planning, the exploitation and maintenance of the maritime works, the industry offshore, the routes of navigation and the security in the sea. The action of the waves is one of the most important on the maritime works and therefore is from vital importance when designing the structures that are near the sea and can be exposed to the wave.

The mentioned activities are some of those that benefit from the study of the waves, but they are not the only ones. The society in general every day claims a better knowledge of our environment and of the environment that surrounds us, in all aspects. The measures of the waves and the analysis of the obtained datum allows, day by day, to keep on improving and developing the knowledge about this subject. For all these reasons this dissertation focuses on the study of a part of the waves, the storms, and more precisely, in the study of its design storm profiles from real data obtained by the wave buoy of Cap Tortosa. So, the main purpose of this dissertation is to foresee the type profiles of the storms that allow predicting their action on the Catalan coast.

To be able to fulfil this general goal it is necessary to break down the study into several parts. The main tasks carried out are the following ones:

- To obtain storms recorded by the directional wave buoy of Cap Tortosa and study of their directionality. This is a work carried out in the dissertation of *Directional typification of the sea storms on the Catalan coast (Mas, 2007)*. In the present dissertation has been carried out the summary of the basic procedures and of the most relevant results for the characterization of the growth and shape of the storms.
- Analysis in deep of these storms in order to find erroneous data.
- Definition of the essential parameters of a storm: total duration of the storm, height of maximum wave and instant in which this height is produced. Analysis of these parameters.
- Classification of the storms according to their basic parameters in order to be able to find a certain pattern of behaviour. The goal of this classification of the storms is to group them so that they present similar characteristics, and therefore, also that they can have a behaviour and a similar evolution. Combinations will also be carried out among the different classifications that allow to relate the essential characteristic features of the storms and to start to obtain patterns of behaviour like this.
- Definition of the most representative groups of the storms, from which we will work to characterize the growth and the shape of the storms.
- Determination of the outline that describes the profile of a storm. For making it, we gauged the speed of rise of the storms, from their beginning until their maximum value, and the speed of slope, from this maximum value to the final value. These speeds allow to represent the slopes of rise and slope and to schematize the storms like this.
- Study in the ways of rise and of slope of a storm. For making it the form of the storms of the several representative groups has been observed and it has been attempted to find a representative profile that describes the form of the storms approximately. This is a complex study that can be full of indetermination, by which it is not intended to obtain a definition in the way through mathematical functions, but general behaviours that are descriptive have been searched.

From the storm classification according to their essential parameters, it's possible to identify different trends in the behaviours of the analyzed storms. Interesting results can be extracted through the study of the slopes, for example, the relation among the evolution of the height of significant wave with the form of the storm. Finally, from the analysis of the shapes it can be said that it is a complex study of which a first descriptive step has been carried out. The obtained results make think that for finding the shapes another kind of classification according to other parameters, for example meteorological parameters, study that can be a future line of research.