ANALYSIS OF THE IMPACT OF A PILOT ZONE FOR WAVE ENERGY CONVERSION
OFFSHORE PORTUGAL

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ABSTRACT

The present study aims at studying the impact of energy absorption by wave farms on the nearshore wave climate. The study was applied to the Maritime Pilot Zone recently created by the Portuguese government to support the deployment of offshore wave energy prototypes and farms. This Zone is located off the west coast between the 30 m and 90 m bathymetric lines, with an area of 320 Km². The present study aims at establishing a methodology to analyse how the pilot zone will potentially affect the nearshore wave climate. In fact, the objective is to estimate the change of the wave characteristics (wave height and wave direction) at the nearshore when wave farms are deployed in the pilot zone. In this study the REFDIF model was adapted in order to model the energy extraction by wave farms.

KEY WORDS: Wave farms, wave energy extraction, Portuguese Pilot Zone; sea-wave propagation; numerical modeling.

INTRODUCTION

A Maritime Pilot Zone for wave energy extraction off the Portuguese coast was created by the Portuguese Government, to support the deployment of offshore wave energy prototypes and farms. This maritime zone is located at the West coast off S. Pedro de Muel, between 30 m and 90 m water depth, with an area of about 320 km². The Pilot Zone has been selected in an area with low environmental sensitivity. Global environment impacts are expected to be small in the initial phase where only a small number of devices will be deployed. Since environmental impacts are yet unknown, the main objective is to monitor and then to learn from field results, and ultimately to integrate the knowledge into Portuguese (and international) regulations (Huertas-Olivares, 2007).

For this pilot zone, several wave farms for wave energy exploration are planned. However, before the installation of those devices, it is recommended to consider and study several aspects: the number and position of those wave farms, the characteristics of the devices and the impact of the energy absorption by the wave farms on the nearshore wave field and morphodynamics.