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Title*	Hydrodynamic response of the WEC sub-system of a novel hybrid wind-wave energy converter
Authors*	Carlos Perez-Collazo; Deborah Greaves; Gregorio Iglesias
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Subject keywords	Wave Energy; Offshore Wind; Hybrid wind-wave; Physical modelling; Hydrodynamic response
Abstract	Multiple marine resources are usually available in the same area and synergies between the different users of these resources exist. Multipurpose platforms, which combine more than one of these renewable resources, have been proposed as a sustainable approach. One type of multipurpose platforms is the hybrid wind-wave systems, in which a single platform combines the exploitation of offshore wind and wave energy. In this paper a novel hybrid system that integrates an oscillating water column (OWC) wave energy converter (WEC) with an offshore wind turbine on a monopile substructure is considered. The main objective of this paper is to define and test a simplified version of the WEC sub-system of this hybrid energy converter. An experimental campaign was carried out to characterise the hydrodynamic response of a 1:37.5 scale model of the WEC sub-system under regular and irregular waves. On the basis of the data from the experimental campaign, the hydrodynamic response of the WEC sub-system is characterised in four steps: (i) through an incident and reflected wave analysis (IRWA), to characterise the interaction between the device and the waves; (ii) through the capture width ratio, to study the performance of the device; (iii) through response amplitude operators (RAOs) of the free surface elevation and pneumatic pressure inside the OWC chamber, to study the effects of the incident waves on the device response; and (iv) through the wave run-up on the device. The results from this multifaceted analysis lead to the proof of concept of this novel hybrid system, supporting its feasibility to be combined with offshore wind substructures; but also to characterise its behaviour and interaction with the wave field, essential to full understanding of the benefits of hybrid systems.
Additional information	This metadata are supplementary to the journal paper “Hydrodynamic response of the WEC sub-system of a novel hybrid wind-wave energy converter”
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