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Novel Experimental Modelling of the Hydrodynamic Interactions of Arrays of Wave Energy Converters

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Abstract

Wave energy converters (WECs) range significantly in respect of concepts, technologies and design maturation, with the majority of devices at an early commercial stage. To date, most large scale deployments have been conducted with a single WEC. However, there is a necessity to expand these to ‘arrays’ or ‘farms’ in the future in order to reduce both installation and maintenance cost per unit as well as harnessing maximum energy at a given site. There are complex hydrodynamic and environmental implications which require consideration when moving from a single device installation to an array of devices. Many theoretical and numerical studies exist in this domain, however, limited experimental investigations have been performed due to the cost and size related to testing facilities as well as the complexity of the experiment and related instrumentation.

This paper presents a novel experimental approach, performed as part of a larger project, aiming to address a critical knowledge gap: understanding the performance of WEC arrays, and to develop a methodology to accurately model an array of WECs. The experimental investigation utilised Australia’s most technically advanced wave basin at the Australian Maritime College, spe-

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