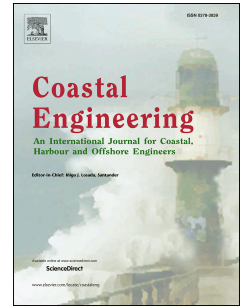


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In situ observations and simulations of coastal wave field transformation by wave energy converters

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1 **In situ observations and simulations of coastal wave field transformation by wave**
2 **energy converters**

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8

9 **Abstract**

10 Wave energy is a potential emerging contributor to future global low-emission energy needs.

11 If wave energy is to become a significant part of renewable energy portfolios, then wave

12 energy converters (WECs) will need to be installed in large numbers in array configurations.

13 The environmental effects of wave energy extraction to date has relied on physical (i.e., tank)

14 and numerical modelling studies.

15 In this study, a network of in situ wave measurement devices were deployed around an array

16 of three submerged point absorber WECs, operating intermittently, each with a nominal 240

17 kW peak capacity. The study site was 3 km offshore (in approximately 24 m water depth) and

18 the field campaign was conducted over approximately one year, with a primary goal of

19 studying 'down-wave' effects of the WECs. The observations were used to calibrate and

20 validate a numerical spectral wave model which can represent frequency-dependent

21 absorption by WECs within the model. For the purpose of a straightforward analysis, we

22 focus on a period when only one WEC was operating. Measurements show a decrease in

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