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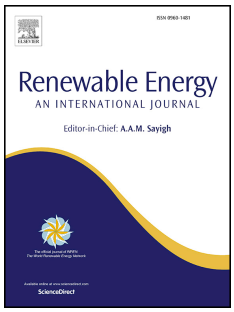

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Modelling tidal stream turbines in a three-dimensional wave-current fully coupled oceanographic model

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Abstract

A tidal turbine simulation system is developed based on a three-dimensional oceanographic numerical model. Both the current and turbulent controlling equations are modified to account for impact of tidal turbines on water velocity and turbulence generation and dissipation. High resolution mesh size at the turbine location is assigned in order to capture the details of hydrodynamics due to the turbine operation. The system is tested against comprehensive measurements in a water flume experiment and results of Computational Fluid Dynamics (CFD) simulations. The validation results suggest that the new modelling system is proven to be able to accurately simulate hydrodynamics with the presence of turbines. The developed turbine simulation system is then applied to a series of test cases in which a standalone turbine is deployed. Here, complete velocity profiles and mixing are

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