

Abstract Submitted
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Interactions of steep and breaking waves with winds and solid bodies ZIXUAN YANG, LIAN SHEN, University of Minnesota — The interactions of steep and breaking waves with winds and solid bodies at sea surface is important to many problems in ocean science and engineering. In this study, we perform large-eddy simulations using a finite-difference code with high-performance parallel computing. The air-water interface is captured using a coupled level set and volume of fluid method. A sharp interface immersed boundary method is applied to capture the effect due to the presence of solid bodies. A wall layer model is employed to address high Reynolds numbers. A numerical wave generator is utilized to accurately produce waves with specified parameters. The results are validated for a number of canonical problems, and the performances of different wall-layer model schemes are evaluated using a priori and a posteriori tests. Based on the simulation data, the flow details and interaction mechanisms are analyzed.

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