

Abstract Submitted  
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**Sharp Interface LES of Breaking Waves in Orthogonal Curvilinear Coordinates**<sup>1</sup> ZHAOYUAN WANG, JUNGSOO SUH, JIANMING YANG, FREDERICK STERN, University of Iowa — A sharp interface large-eddy simulation (LES) methodology in orthogonal curvilinear coordinates for the breaking waves produced by a body at high Reynolds number is presented. Both gas and liquid phases are considered for the strong interactions between two phases, such as spray dispersion and bubble entrainment. The level-set based ghost fluid method is adopted for sharp interface treatment and a volume-of-fluid method in orthogonal curvilinear coordinates is coupled with the level set method for enhanced interface tracking properties. A Lagrangian dynamic Smagorinsky subgrid-scale model is used for the spatially filtered turbulence closure. Several small-scale cases, bubbles and droplets, are calculated and compared with reference data to validate the sharp interface method on orthogonal curvilinear grids. Wave breaking over a submerged bump and around a wedge-shaped bow is simulated to demonstrate the capabilities of the solver.

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