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A Three-dimensional SPH Simulation of Iceberg Calving generated Waves

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The calving of large-scale icebergs into the sea can generate a local tsunami that may threaten coastal communities or passing ships. A three-dimensional smoothed particle hydrodynamics model of rigid-body–fluid system is established to simulate the spatial wave generated by calving iceberg. The model is tested with simulated waves induced by a cube iceberg fall into the water body. Good agreement is obtained between simulation results and experimental data. The generation and evolution processes, and the near flow-field characteristics of the waves are analyzed. The simulation results show that waves generated in iceberg calving can generate not only a huge leading wave but also notable tailing waves. The initial propagation direction of the leading wave is determined by iceberg geometry, but as the leading wave propagates away, the water level displacement gradually develops into a semicircle wavefront which is irrelevant to iceberg geometry.