

Abstract

Wave generation, runup and rundown from three-dimensional sliding masses

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Subaerial and submarine landslides may generate sizeable offshore and onshore propagating waves leading to significant danger of coastal inundation with little warning time. To better understand the waves and runup, several small and large-scale experiments have been conducted. On the other hand, due to the limited computational capability and the difficulties of treating complex turbulent surface waves and the moving boundary, not many simulation models based on the 3D Navier-Stokes equations have been reported. In this study, we develop a Large Eddy Simulation (LES) model by adopting the traditional Smagorinsky Sub-Grid Scale (SGS) model. The LES is coupled with a moving boundary algorithm for simulating the slide movement. The Volume of Fluid (VOF) method similar to used to track the surface location. 45 simulations have been conducted with different initial elevations and specific weight of solid slides. The results are compared with the experimental data. Many physical phenomena observed from the numerical solutions will be addressed and discussed. The simulation model can also be used to calculate wave forces on structures.