ABSTRACT

Propagation and runup of tsunami wave have been an interesting and challenging research topics for many researchers in a field of tsunami modelling. Wave model and its numerical implementation that is accurate as well as effisien in computation is needed in designing a software for tsunami early warning system. Tsunami in general, is categorized as a long wave, therefore to study the tsunami wave, the tsunami usually is assumed as a solitary wave. In this paper, we use the nonlinear, non-dispersive Shallow Water Equations (SWE) as the wave model. The model is implemented numerically by using finite volume method in a staggered grid scheme. The model and its numerical implementation is used to study the propagation of tsunami wave on a complex bathymetry, i.e. a composite beach. The accuracy of the numerical implementation is validated by comparing results of simulations with available experimental data from hydrodynamic laboratory. There are test three cases that are investigated, i.e. solitary wave propagation above a flat bottom, and propagation of non-breaking and breaking solitary wave above a composite beach. Results of comparison show a good agreement between numerical simulation with experimental data.

Keywords: Tsunami, solitary wave, finite volume, staggered grid, Shallow Water Equations