

Abstract

In this final task, the numerical simulations of two-layer shallow water equations (SWE) for submarine avalanches are elaborated. The numerical scheme of staggered finite volume scheme is used. The numerical results using two-layer SWE model is compared to the SWE-Exner equation model and the data experiment which is performed by Louvain-la-Neuve Université Catholique de Louvain. The results are shown in a good agreement for both comparisons. Another simulation which is simulation of submarine avalanches near inclined topography is also elaborated. The results shows the first waves generated by avalanches climb the topography in 10 meters forward. Meanwhile, the second waves are shown propagate until 70 meters approximately forward from the initial coastal. Moreover, the parallel performance for numerical simulation is observed. The speedup of parallel is obtained 2.864439 times using $N_x = 3200$ with 4 processors from the serial computing. In addition, the efficiency using $N_x = 3200$ is calculated 71%.

Keywords: Two-layer, shallow water equations, staggered grid, shared parallel programming, OpenMP, simulation, submarine avalanche.