

Abstract—In nature, there are many examples of shallow water flows, such as flooding in coastal cities, river flow, or tsunami propagation and runup. The favorite model that is chosen for simulating such phenomena is the Shallow Water Equations (SWE) or also called the Saint-Venant equation. To simulate various nonlinear phenomena such as wave breaking and wave runup, the model should be implemented numerically by using a numerical scheme that is robust, accurate, and yet efficient in computation. In this paper, we implemented the model by using Finite Volume method in a staggered grid scheme. To broaden the applicability of the model for simulating large domain of computation, the model is implemented in CUDA architecture in Graphical Processing Unit (GPU). The performance of the parallel architecture is tested by comparing the computation time between the CUDA implementation with the traditional CPU implementation. The comparison shows significant speed up in the CUDA implementation.

Index Terms—Shallow Water Equations, Staggered grid, parallel, CUDA