



Validation of Numerical Codes to Compute Tsunami Runup And Inundation

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FLOW 3D and NAMI DANCE are two numerical codes which can be applied to analysis of flow and motion of long waves. Flow 3D simulates linear and nonlinear propagating surface waves as well as irregular waves including long waves. NAMI DANCE uses finite difference computational method to solve nonlinear shallow water equations (NSWE) in long wave problems, specifically tsunamis. Both codes can be applied to tsunami simulations and visualization of long waves. Both codes are capable of solving flooding problems. However, FLOW 3D is designed mainly to solve flooding problem from land and NAMI DANCE is designed to solve flooding problem from the sea.

These numerical codes are applied to some benchmark problems for validation and verification. One useful benchmark problem is the runup of solitary waves which is investigated analytically and experimentally by Synolakis (1987). Since 1970s, solitary waves have commonly been used to model tsunamis especially in experimental and numerical studies. In this respect, a benchmark problem on runup of solitary waves is a relevant choice to assess the capability and validity of the numerical codes on amplification of tsunamis. In this study both codes have been tested, compared and validated by applying to the analytical benchmark problem of solitary wave runup on a sloping beach. Comparison of the results showed that both codes are in good agreement with the analytical and experimental results and thus can be proposed to be used in inundation of long waves and tsunami hazard analysis.