Behaviors of Nearshore Tsunamis Around Islands

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Recently, many impulsive undersea earthquakes have triggered devastating tsunamis around the Pacific and Indian Ocean rims including 2004 West Asia Tsunami event. Among them, 1992 Flores (Indonesia) and 1993 Hokkaido (Japan) Tsunamis have attracted scientific attention because of observation of unusual huge run-up heights in the lees of Babi and Okushiri Islands, respectively. In this study, a numerical model based on the two-dimensional shallow-water equations is employed to investigate the huge run-up heights observed in the lees of Babi and Okushiri Islands. In numerical experiments, the maximum run-up heights of incident solitary waves around circular islands are estimated. It is well known that the solitary waves may have similar physical characteristics of tsunamis and are relatively easy to generate in laboratory and numerical experiments. Obtained run-up heights are firstly verified by comparing with laboratory measurements done by the Coastal Engineering Research Center, US Army Corps of Engineers. The numerical model is then used to examine effects of various parameters on the run-up heights of incoming solitary waves around an island. The parameters may include the crest-length of incident waves, island shape, skewness of incident waves, interactions of adjacent two islands and others. This research is financially supported by the KSGP of the Ministry of Marine Affairs and Fisheries. Keywords: tsunami, shallow-water equations, run-up heights, inundation