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Run-Up Heights of 1983 Central East Sea Tsunami Along the Eastern Coast of Korea

YONG-SIK CHO[1], SUNG-MIN KIM[2], TAE-MIN HA[2]

[1] *Professor and Graduate Students*

[2], *Department of Civil Engineering, Hanyang University,*
17 Haengdang-dong, Seongdong-gu, Seoul 133-791, Korea

Tsunamis are large water waves triggered by landslides, submarine volcanic explosions, or sea-bottom deformations associated with large submarine earthquakes. During last decades several devastating tsunamis have been generated around the Pacific Ocean zone. These tsunamis not only killed many human beings but also caused serious property damages. For example, the West Asia Tsunami occurred on December 26, 2004 killed about 300, 000 people and deprived of property of 10 billion USD. There were two historical tsunami events in 1983 and 1993 in the East Sea. Both tsunami events invaded the East Coast of the Korean Peninsula and left serious damage in coastal communities. Several nuclear power plants (hereafter NPP) are located along the Eastern coastline of the Korean Peninsula to get enough amount of cooling water. Furthermore, several more plants are now under construction. Thus, variation of water level caused by tsunamis should be conservatively and accurately estimated. In this study, a second-order upwind finite difference scheme is employed to discretize the nonlinear terms of the momentum equations. The numerical model is then established to simulate 1983 Central East Sea Tsunami event. The model consists of a propagation and an inundation models and is based on the shallow-water theory. A moving boundary treatment is implemented in the inundation model to track time-dependent motion of a shoreline. The maximum run-up heights along the Eastern coastline of Korea are predicted and compared to available field observed data at several locations. This research is financially supported by the KSGP of the Ministry of Marine Affairs and FisheriesKeywords: tsunami, run-up heights, nonlinear shallow-water equations, nuclear power plant