Geophysical Research Abstracts
Vol. 20, EGU2018-5898-1, 2018
EGU General Assembly 2018
© Author(s) 2018. CC Attribution 4.0 license.

Calculation of wave overtopping with Adaptive Mesh Refinement (AMR) method in the Busan Marine City during typhoon Chaba (1618)

Junghyun Park (1), Jin-Hee Yuk (1), and Han Soo Lee (2)

(1) Korea Institute of Science and Technology Information, Daejeon, Republic Of Korea (pjh@kisti.re.kr), (2) Hiroshima Univ., Civil and Environmental Eng. Unit, Academy of Science and Technology, 1-5-1 Kagamiyama, Higashi-Hiroshima 739-8529 , Hiroshima, JAPAN (lee.hansoo@gmail.com)

Numerical models are important tools to predict wave overtopping due to storm surge and storm waves in coastal zones. Direct calculation of wave overtopping over coastal structure during storm surge induced by typhoons and its impacts on coastal environment requires high computational cost due to complex processes in wave shoaling, breaking, run-up, turbulence and air entrapment because of fine grid interval in the order of 10 meters or even less. In this study, the adaptive mesh refinement (AMR) method for wave overtopping modeling due to storm surge is applied through numerical experiments to illustrate its efficiency in terms of computational time and accuracy.
Gerris is an open source computational fluid dynamic code that solves non-linear shallow water equations with AMR and wet-dry scheme. As a case study, the wave overtopping during Typhoon Chaba (1618) induced storm surge along the Haeundae Beach in Busan, Korea, was simulated in terms of overtopping height and discharge. The wave overtopping caused direct flood damage to adjacent buildings in the Busan Marine City. In this result, wave overtopping modeling with AMR method is proven to be a good alternative choice in compromise of computational cost and accuracy and in operational use.