



Coastal risk assessments due to hybrid disasters in Korea

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Korean coasts are exposed to high risks such as storm surge, storm-induced high waves and wave overtopping. Also, localized heavy rainfall events have occurred frequently due to climate change, too. Especially, since coastal urban areas depend heavily on pump and pipe systems, extreme rainfalls that exceed the design capacity of drainage facility result in increasing inland flood damage. Nevertheless, the population in Korea is concentrated in the coastal areas and the value and density of coastal utilization are increasing. In this study, the risk of hybrid disasters in the coastal areas was assessed for safe utilization and value enhancement of coastal areas. The framework of the coastal risk assessment has been adopted from the concept of climate change vulnerability of the IPCC(2001). Coastal Risk Index(CRI) in this study was defined as a function of Exposure and Sensitivity exclude Adaptive Capacity using GIS-based DBs. Indicators of Exposure consisted of a storm surge, storm-induced high waves, wave overtopping and rainfalls. Indicators of Sensitivity consisted of human(population density), property(buildings and roads), and geography(inundation area). All these indicators were gathered from government agencies, numerical model experiments(ADCIRC, unSWAN, FLOW3D and XP-SWMM model), and field surveys(Drone & Lidar survey). And then spatial analysis was performed by using a GIS program after passing the quality control and analyzed data were standardized and classified 4 grades; Attention(blue color), Caution(yellow color), Warning(orange color) and Danger(red color). This frame of risk assessment was first applied to Marine City, Haeundae in Busan, Korea which was heavily damaged by the typhoon CHABA in 2018. According to the assessment results, it was confirmed that the results were in good agreement with the observation data and damage range. At present, the study area of risk assessment is expanding to other areas. The results of coastal risk assessment are used as reference indicators to identify and prevent the cause of coastal disasters, establish countermeasures, determine the development or management of coastal areas based on GIS, thus will contribute to effective and safe coastal management.