



Development of Inundation Map for Bantayan Island, Cebu Using Delft3D-Flow Storm Surge Simulations of Typhoon Haiyan

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On average, 20 typhoons enter the Philippine area of responsibility annually, making it vulnerable to different storm hazards. Apart from the frequency of tropical cyclones, the archipelagic nature of the country makes it particularly prone to storm surges. On 08 November 2013, Haiyan, a Category 5 Typhoon with maximum one-minute sustained wind speed of 315 kph, hit the central region of the Philippines. In its path, the howler devastated Bantayan Island, a popular tourist destination. The island is located north of Cebu City, the second largest metropolis of the Philippines in terms of populace. Having been directly hit by Typhoon Haiyan, Bantayan Island was severely damaged by strong winds and storm surges, with more than 11,000 houses totally destroyed while 5,000 more suffered minor damage. The adverse impacts of possible future storm surge events in the island can only be mitigated if hazard maps that depict inundation of the coastal areas of Bantayan are generated. To create such maps, Delft3D-Flow, a hydrodynamic model was used to simulate storm surges. These simulations were made over a 10-m per pixel resolution Digital Elevation Model (DEM) and the General Bathymetric Chart of the Oceans (GEBCO) bathymetry. The results of the coastal inundation model for Typhoon Haiyan's storm surges were validated using data collected from field work and local government reports. The hydrodynamic model of Bantayan was then calibrated using the field data and further simulations were made with varying typhoon tracks. This was done to generate scenarios on the farthest possible inland incursion of storm surges. The output of the study is a detailed storm surge inundation map that depicts safe zones for development of infrastructure near coastal areas and for construction of coastal protection structures. The storm surge inundation map can also be used as basis for disaster preparedness plans of coastal communities threatened by approaching typhoons.