MODELING TYPHOON HAIYAN AND ITS IMPACTS ON THE SEDIMENTS OF SAN PEDRO BAY

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ABSTRACT

In the Philippines, intensity of typhoons is measured by maximum wind speed attained, with damage resulting mostly from the ferocious winds and sometimes torrential rains. However, typhoons also inflict damage by changing the onshore and offshore landscape at a faster rate than normal through morphological processes such as erosion and sedimentation. Typhoon Haiyan (Yolanda) is an intense typhoon that devastated the Visayas region in the Philippines on November 8, 2013. The coastal towns along San Pedro Bay were among the most affected when Haiyan made landfall. WRF and Delft3D-Flow/Wave models was used to simulate the conditions that led to the coastal erosion and sedimentation during and after the event. WRF typhoon model parameterization focused on varying microphysics schemes. The wind and pressure produced from WRF and the wind from JTWC were used as inputs for the Delft3D hydrodynamic model. Implementation of waves and sediments as processes were also included in the model. In Tacloban City, a surge of ~5.90 m was produced using JTWC winds and only ~2.08 m surge using WRF winds a difference due to the significantly weaker wind produced from WRF simulation. There are erosion and sedimentation hotspots in the coasts of San Pedro Bay, with Tacloban and Tanauan as areas with significant erosion and Basey with significant sedimentation. To some extent, hydrodynamic process, coastal erosion and sedimentation that led to the morphological changes in the study area were reproduced and is consistent with previous studies. This study, however, is the first of its kind that tried to couple atmospheric, oceanographic, and sedimentological process in simulating the damage by Haiyan.