**ABSTRACT**

**SEMI-AUTOMATED TIDE CORRECTION TECHNIQUE FOR IN-SITU AND SATELLITE-DERIVED SHORELINES: A CASE STUDY OF SUPER TYPHOON HAIYAN-INDUCED COASTAL EROSION IN SMALL ISLANDS SYSTEMS OF BORACAY AND BANTAYAN**

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Shoreline mapping and change detection is commonly used to assess coastal erosion. In the Philippines, datasets are often restricted to inconsistent shorelines derived from topographic maps, Landsat images and field survey. Inconsistencies arise from subjective manual tracing and tidal fluctuations during ground survey and satellite overpass. To enable appropriate comparison, all shorelines must be referenced to a common datum (e.g. MSL). Hence, a semi-automated extraction and correction methods were developed to (1) extract shorelines from Landsat enhanced thematic mapper plus (ETM+) images using combined slicing of bands 5, 4, 2 and modified normalized difference water index (MNDWI) and (2) adjust both in-situ and Landsat-derived shorelines to MSL using beach profiles and waterline approach (digital elevation model (DEM) creation), respectively. The methods were applied to siliciclastic beaches of Masinloc- Candelaria, Zambales and to carbonate beaches of Boracay, Aklan and Bantayan, Cebu. Comparing with reference field shorelines, extracted shorelines in carbonate environment resulted in lower root mean square error (RMSE) of 5.7 m than the shorelines in siliciclastic beaches (RMSE of 9.6 m). Adjusting the shorelines to MSL resulted to an RMSE of 3.7m. Shoreline extraction accuracy is dependent on the complexity of the intertidal environment with presence of adjacent mangroves and seagrasses increasing the difficulty of extraction. Adjustment of in-situ and Landsat-shorelines depends on the number and accuracy of beach profiles and the number of Landsat images used to create a DEM, respectively. The proposed method was applied to shoreline datasets in Boracay and Bantayan from 1953 to May 2014 to assess their beach response and recovery to super typhoon Haiyan (Yolanda). Shoreline change analysis and beach profiles reveal that both islands eroded after Haiyan. Beaches were lower and narrower with more landward shorelines. Within six months after the storm, only Bantayan initially recovered with higher and wider beaches. Boracay beaches further lowered and narrowed. Considering the high intensity of Haiyan, the impact on both islands was less intense than anticipated. This was attributed to the storm transpiring at low tide causing the wave runup to reach just the normal high tide. The fairly straight to convex shape, beach topography and wide reef flat, nearshore bathymetry, parallel orientation of Boracay to storm path and wave exposure to monsoon winds of both islands also limited the damages. During recovery period, the exposure to winds, longshore transport and inherent nearshore slope and topography subjected Boracay to further erosion. Knowledge of contributing factors to storm-induced beach erosion and its recovery rate is crucial in estimating and mitigating future storm impact to coastal areas.