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Climate Change-adjusted Storm Surge Hazard Assessment for the University of the Philippines Campuses in the Cities of Manila and Cebu, Philippines

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Recent climate change studies show that the subsequent increase in global temperature would result to rise in sea level and a likely increase in tropical cyclone mean intensity. In 2016, observed sea surface temperature of at least 1°C above average was observed in the north western pacific basin, where the Philippines is located. According to the World Meteorological Organization, the highest rising sea-level rates were also observed during the recent years (1993-2015). Projected stronger typhoons, combined with sea level rise, pose an even greater risk of coastal flooding due to storm surge.

In this study, the two city coastlines (Manila and Cebu) hosting the University of the Philippines (UP) campuses are adjusted according to the corresponding sea level rise data gathered from the RCP 4.5 climate change projections of the Intergovernmental Panel on Climate Change (IPCC) for 2050 and 2100. The typhoon track of the hypothetical tropical cyclones with climate projected increase in intensity are obtained from the Joint Typhoon Warning Center (JTWC); this are used as an input for the Delft3D model, hydro-dynamic that simulates non-steady flow and transport phenomena, resulting from tidal and meteorological forcing on a rectilinear or a curvilinear, boundary fitted grid. The climate scenario storm surge time series results are used as input files in the using FLO-2D model to produce storm surge inundation and hazard maps. FLO-2D is a physical process model that routes runoff and flood hydrographs over unconfined flow surfaces using the dynamic wave approximation to the momentum equation. The hazard maps generated are 5-year, 25-year, and 100-year return periods using RCP 4.5 for climate projections of 2050 and 2100. These high-resolution climate-projected maps can be used to aid the coastal communities in identifying and managing risks to adapt to climate-induced natural hazards.