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Development of Storm Surge Hazard Maps and Advisory System for the Philippines

Joy Santiago (1,2), Alfredo Mahar Francisco Lagymay (1,2), Carl Vincent Caro (1,2), John Kenneth Suarez (1), Judd Tablazon (1), Lea Dasallas (1), and Prince Garnet Goting (1)

(1) Nationwide Operational Assessment of Hazards, Quezon City, Philippines, (2) University of the Philippines - Diliman, Quezon City, Philippines

The Philippines, located in the most active region of cyclogenesis in the world, experiences an average of 20 tropical cyclones annually. Strong winds brought by tropical cyclones, among other factors, cause storm surges that inundate the coastal areas of the country. As an archipelago with the fourth longest coastline in the world, the country is expose to the threats of storm surges. This was manifested by Typhoon Haiyan on 8 November 2013, which devastated the country and left 6,293 deaths and approximately USD 2 billion worth of damages. To prevent such disaster from happening again, the Nationwide Operational Assessment of Hazards (Project NOAH) developed a Storm Surge Advisory (SSA) that aims to warn communities in coastal areas against impending floods due to storm surges. The Japan Meteorological Agency storm surge model was used to simulate 721 tropical cyclones that entered the Philippine Area of Responsibility from 1951-2013. The resulting storm surge time series from the simulations were added to the maximum tide levels from the WXTide software for the 4,996 observation points placed nearshore in the entire country. The storm tide levels were categorized into four groups based on their peak height to create the SSA – SSA 1 (0.01m to 2m), SSA 2 (2.01m to 3m), SSA 3 (3.01m to 4m), and SSA 4 (4m and above). The time series for each advisory level was used in inundation modelling using FLO-2D, a two-dimensional flood modeling software that uses continuity and dynamic wave momentum equation. The model produced probable extent, depth of inundation, and hazard level for each advisory level. The SSA hazard maps are used as reference to warn communities that are likely to be affected by storm surges. Advisory is released 24 hours in advance and is updated every six hours in the Project NOAH website. It is also being utilized in the pre-disaster risk assessment of the national government agencies and local government units in designing appropriate response to impending threats and risk brought by natural hazards.