Shallow Landslide Susceptibility Mapping for Selected Areas in the Philippines Severely affected by Super Typhoon Haiyan

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Super Typhoon Haiyan, considered as one of the most powerful storms recorded in 2013, devastated the central Philippines region on 8 November 2013. In its wake, Haiyan left 6,190 fatalities, 28,626 injured and 1,785 missing, as well as damage amounting to more than USD 823 million. To mitigate damage from similar events in the future, it is imperative to characterize hazards associated with tropical cyclones such as those brought by Haiyan, with detailed studies of storm surges, landslides and floods. Although strong winds and powerful storm surges up 15-17 feet were the primary causes of damage, landslides studies are also vital in the rehabilitation of typhoon damaged areas. Cities and municipalities of Leyte (7,246.7 sq. km) and Samar (13,121 sq. km) provinces, the heaviest cities area during the onslaught of Haiyan, require detailed and up-to-date hazard maps for their rebuilding and disaster mitigation programs. In order to delineate areas susceptible to rainfall induced shallow landslides, Stability INdex MAPping (SINMAP) software was used over a 6-meter Synthetic Aperture Radar (SAR)-derived DEM grid. Soil calibration parameters from previous studies were used as parameter input to generate a worst-case scenario hazard map of the two provinces. Topographic, hydrologic and soil parameters (cohesion, angle of friction, bulk density and hydraulic conductivity) were used for each pixel of a given digital elevation model (DEM) grid to compute for the corresponding factor of safety. The landslide maps generated using SINMAP are found to be consistent with the landslide inventory derived from high-resolution satellite imagery 2003-2013. The landslide susceptibility classification found in the landslide hazard maps are useful to identify no-build zones, areas that can be built upon but with slope intervention and monitoring as well as places that are safe from shallow landslides. These maps complement the debris flow and structurally-controlled landslide hazard maps that are also being prepared for rebuilding Haiyan's devastated areas.