



Comparison of High Resolution Topographic Data Sources (SAR, IfSAR, and LiDAR) for Storm Surge Hazard Maps

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As an archipelagic country, the Philippines has experienced multiple storm surge threats. Moreover, the country's location, adjacent to the Pacific Ocean, results in an average of eight to nine typhoons that make landfall in a year. Storm surge hazard maps require high resolution topographic data to illustrate water inflow in the event of storm surges in vulnerable coastal areas and for accurate boundaries and coastline. Furthermore, potential hazard areas tend to be generalized in lower resolution data. The objective of this research is to compare three sources where accurate and quality storm surge hazard maps will draw bases from. For this purpose, the researcher used and compared SAR, IfSAR and LiDAR. The study involved comparing maps from different topographic data sources in Tacloban, in the province of Leyte. This area was one of the most heavily stricken areas during typhoon Haiyan where more than 6,000 people died and US\$ 763 million worth of property was destroyed. In the comparison of the three sources, the following had be taken into consideration: cost of acquiring data, processing time, purpose, and the results. The research learned the following: Synthetic Aperture Radar or SAR produces data with a 30 meter resolution, while Interferometric Synthetic Aperture Radar (IfSAR) offers a resolution of 5 meters. Light Detection and Ranging (LiDAR) has the highest resolution of the three with 1 meter. In addition, higher costs are paid for more detailed topographic data. Also, processing time takes longer for finer details due to the memory of the computer units used for modelling. The sources were also evaluated on the necessity of the scale at which the maps are needed for specific purposes such as practicality and direct disaster response. Results from the maps have been validated through interviews with the locals on the experience of actual storm surges. Through this study, the researcher concluded that although LiDAR can offer a more detailed and accurate topographic data, IfSAR is more strategic to use for immediate operational mapping. Because data from LiDAR takes a longer time to model due to the amount of detail, it is better used for long-term planning efforts, while IfSAR can substitute for immediate disaster response especially in local government units during typhoons.