Improvement of Rating Curve Through Manning's Equation and LiDAR

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SUMMARY

In-situ river discharge measurement during event flows are dangerous and expensive to capture. In addition, the opportunities to gather field measurement are far in-between. Often only base flow discharge is available especially for newly installed stream gauges. Nonetheless, the need to gather this is needed for developing the elevation-discharge relationship. The resulting equation or rating curve is essential for disaster mitigation efforts such as flood modelling and scenario building. Yet, given the limited data, the results of these new rating curves overestimate magnitude. This study aims to improve the rating curve in a river cross-section using the Manning's equation and high-resolution digital elevation models (DEM).

The area of interest is the Agusan River Basin, the third largest river system in the Philippines. Discharge measurements were taken during Typhoon Yolanda (international name: Haiyan). Using cross-section taken from LiDAR data, the HQ curve is "filled" given different elevations in the cross section. The resulting discharges from different equations are compared to the actual event discharge measurements taken from the river. The guidelines established may be used to estimate possible discharges in water level sensors with limited event discharges.