Enhancing flood models by incorporating the effect of suspended sediment load

Ma. Rebecca S. Soriano

Dr. CHERRY L. RINGOR
Thesis Adviser

Dr. CHELO S. PASCUA
Thesis Co-Adviser

Dr. TOLENTINO B. MOYA
Thesis Reader

Abstract

Rivers create, destroy and re-create distinct landforms through erosion and deposition. It evolves as a result of flow variation and sediment load (i.e. bed load and suspended load). The suspended sediment load comprises fine-grained materials (i.e. <2mm) which have been tied to erosion in the watershed and its river channels. It controls not only the material flux in rivers but play an important role in nutrient transport, turbidity and food-web dynamics. Excess suspended sediment load can degrade any aquatic ecosystem.

During flood events, suspended sediments can dominate the erosional and depositional character of a river. It is necessary to be measured and monitored as it defines how the river accommodates runoff and floods. Results in this study show that depositional and erosional areas, and its impact on river channel morphology in each flood event can be modelled and forecasted. Coupled with other sources of information (i.e. bedload), predicting the path of a succeeding flood event can be predicted with greater accuracy.

In this regard, the continuous seasonal changes in river morphology has been used as an additional input in predicting flood depth and extents for the lower Bauang River. It is then compared with the results from the PhilLiDAR 1 Project (UP-BAGUIO / DOST) which assumes a static river morphology (i.e. no seasonal changes). In the simulated 50year flood event, a larger area of the river floodplain is shown to be inundated with the incorporation of the measured seasonal changes in river morphology done in this study.

The changes in river morphology brought by changes in suspended sediment load can thus greatly alter the forecasted flood inundation maps for the lower Bauang River.