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12th International Conference on Hydroscience & Engineering
Hydro-Science & Engineering for Environmental Resilience
November 6-10, 2016, Tainan, Taiwan.

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ABSTRACT

A river watershed typically covers the hill areas in the upstream, as well as alluvial pains, estuarine delta, and nearby coastal low-plain areas in the middlestream and downstream. During storm periods, a large quantity of earth and sand in the watershed enters river channel, which becomes a threat to natural environment and human livings so that we need to have the response strategy.

The river upstream of watersheds in Taiwan is very steep, where soil and rock are often unstable so that the river watershed typically has the attribute of high sand yield and turbid runoff due to the excessive erosion in the heavy rainfall seasons. The flood water within in the river may erode its main channel. When flood water that overflows the river floodplain retards or recesses, fine sediments that contain fine sand and clay would deposit. Although flood and sediment may cause disasters, they also bring some natural resources. Therefore, in order to develop management strategy, it is necessary to treat river basin as the objective and then to analyze the phenomenon of movement of flood, earth, and sand during the period of storm surge flood, by which the potential zone of sediment deposition in the watershed can be identified. From the prospective of homeland environmental conservation, we shall investigate the quantity of watershed sediments necessary to be dredged and can be exploited and then to develop the technology of resource utilization of watershed sediments.

The purpose of this project is to develop the flood erosion-deposition model that can be accurately applied to river channel and flood plain, which will be established based on both the physiographic soil erosion-deposition model and the two-dimensional mobile-bed model. As an illustrative example, we shall apply the flood erosion-deposition model for river channel and flood plain to model the short-, medium- and long-term phenomenon of erosion and deposition in the Tsenwen creek watershed. The potential zone of sediment deposition will be identified and then more sustainable and more multi-functional approaches will be proposed for the clearance and transport of a large quantity of earth and sand.