

## Simulation of Sediment Suspended Hysteretic Loops of Soofichai River in times of Flood

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(Received: May. 12-2013 ; Accepted : Nov. 08-2014)

### Abstract

Information on suspended sediment variation in times of flood is important in management of water resources, particularly management of basins, and in investigation of the causes of erosion. The relationship between discharge and suspended sediment concentration during floods is not similar and homogeneous for different reasons such as precipitation variety, discharge rate and sources of sediment and production of hysteretic loops. In this study, the instantaneous values of suspended load were simulated using genetic programming and regression methods. By comparing the two models, Genetic programming model was selected as the better one with the mean square error and determination coefficient of 0.8 and 0.5, respectively. Then based on this model, loops of suspended hysteretic load were drawn for the six events recorded in the period of 1387-1383. This resulted in 4 linear and 2 clockwise hysteretic loops for the river suspended sediment. Identifying various hysteretic loops is effective in determination of relative contributions of processes to production and transfer of sediment including amount and intensity of precipitation, flow rate and previous moisture conditions of watershed. The results showed that the clockwise hysteretic loops occurred usually in high precipitation and discharge, and linear hysteretic loops in spring because of low intensity precipitation.

**Keywords:** Hysteretic loop, Suspended sediment, Soofichai, Flood.

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