Model Linking Landslides and River Evolution of Incisional Channel Created by River Erosion

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Landslides produce enormous volumes of sediment in mountainous watersheds. However, quantifying landslide-derived sediment transported downstream remains a challenge. This study makes effort in determine the amount of landslide-derived sediment that eroded by the water and the ratio of sediment yield of this problem. We try to use a coupled two-dimensional model to investigate the evolution of landslide aggregation influenced by the channel flow.In this study, the shallow water equations consider the two-dimensional distribution flow velocity to estimate the shear stress. In addition, the Exner equation is applied to calculate the sediment transport the landslide aggregation evolution. By assuming constant inflow, the Exner equation can be derived as a diffusion equation. Besides, both of the two equations under a horizontal 2D straight, non-erodible banks, and no secondary flow channel can be derived as our governing equation which has the nonlinear terms, and the analytical method may not work to solve the two equations under the 2D condition. As a result, this study adopts the finite volume method to proceed this work. This proposed model will be able to have a better presentation in estimating the landslide-derived sediment in channel, and these sequences are expected to be useful indicators in the watershed management according to the predicted the upstream of watershed sediment yield .

Keywords: Landslide aggregation, River erosion, Finite volume method, Exner equation, Shallow water equations, Numerical modeling

