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Sediment yield model for a watershed: a case study of Choushui River, Taiwan.

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A numerical sediment yielding model that takes account of the sediment sources not only from surface erosion but also from rainfall-induced landslide is established. In the model, the drainage basin is divided into several sub-basins according to the similarity of physiographic and hydrologic characteristics. A sub-basin is the basic computation element in the model, which consists of three computational modules, the hydrologic routing, the sediment yield routing and the sediment transport routing modules. In the hydrologic routing module, the SCS rainfall loss computation is used with kinematics wave model to transform the rainfall hyetograph into runoff hydrograph. The channel flows that connect sub-basins were also computed by using the kinematics wave model. In sediment yield routing module, it consists of two components, the surface erosion and the rainfall-induced landslide. Surface erosion is computed with the MUSLE equation (Williams and Berndts, 1977), and the rainfall-induced landslide is computed by using the Utsuogi empirical relation (1971). In the sediment transport routing module, conventional total-load equations, such as Yang's formula, Einstein plus MPM formula and Hsieh's regression relation for debris flow concentration, could be selected. The Wu-She Reservoir that located at the upstream of Choushui River basin in central Taiwan is selected as the test site for model verification. According to sedimentation data from the reservoir during 1991$\sim$1998 and the corresponding rainfall records, the established model and simulation results are satisfactory. The results also show the great contributions of rainfall-induced landslide to the sediment yield that have been confirmed by field observations in mountainous area of Taiwan.