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The landslide and sediment delivery change in the Da-Jia River after earthquake (Taiwan)

S.C. Chen and W.H. Liao

National Chung-Hsing University, Taiwan (scchen@dragon.nchu.edu.tw / Fax: +886 04 22853967)

The Chi-Chi Earthquake (ML = 7.3; at 23.85jN, 120.81jE) brought the tremendous landscape shift and collapse in 1999. Following with the Typhoon Toraji(2001) and Typhoon Mindulli(2004) with high precipitation aggravated the occurrence of landslide and debris flow. This purpose of this paper is to realize the landslide features and sediment delivery history of Da-Jia River in central Taiwan. The history disaster records of landslides and debris flow, as will as the channel cross-section in several periods were collected for this research.

The results showed that most landslides were located on slope around 20-50 degrees before the Chi-Chi Earthquake, but new landslides after earthquake concentrate on the slope around 40-50 degrees. The riverbed of the Da-Jia River was elevated about 0.81m after the earthquake. The sediment delivery is remarkable from the upstream to the valley affected by debris flows because of subsequent typhoons. In this paper, four segments were defined from river mouth to upstream (divided by Sih-Gang Dame, Ma-An Dame, and Tian-Lun Dame). The 354 landslides and $9.3 \times 10^6 \mathrm{m}^3$ in volumes were observed and calculated during subsequent typhoons and rainstorms. The sediment deposit depths were observed about 3.58m from Ma-An Dame to Tian-Lun Dame and about 3.77m from Shi-Gang Dame to Ma-An Dame. However, the scour depth was evaluated about 1.10m and the sediment volume presented $0.12 \times 10^6 \mathrm{m}^3$from the river mouth to Shi-Gang Dame. The results showed that the considerable quantities of sediments were still unstable on the channel.