Slope stability in a dynamic environment: A Case Study of the Tachia River, Central Taiwan

J. C. Lin (1) and D. Petley(2)
(1) Department of Geography, National Taiwan University, Taipei, Taiwan,
(2) Department of Geography, University of Durham(jclin@ntu.edu.tw/Tel & Fax:+886 2 223687056)

Abstract

It is well-established that landslides are extensively triggered as a result of large seismic events in upland areas. This paper examines the Tachia River basin in western Taiwan, which was extensively affected by landslides during the 1999 Chi-Chi earthquake. Using series of aerial photographs and satellite images, this study seeks to examine the area affected by landslides in a time series. It is shown that although there was extensive co-seismic landsliding, the greatest intensity of landslides occurred substantially after the main earthquake as a result of high intensity rainfall events. However the slopes in many slide area are still active eight years after the Chi-Chi earthquake.

The results show that (1) the slope stability can be divided into two parts: triggering mechanism and subsequently erosion by fluvial processes. Each factor contributes to different types of slope failure; (2) In many cases, rivers in Taiwan belong to transport-limited type, however, landslides become an important factor to supply sediments. Slope stability highly depends on the bank erosion of Tachia river; (3) The delivery of sediment could be enhanced and enlarged dramatically after heavy rainfall because of slope failure.