Hydrological response of hillslope to rainfall at Jiangjia Ravine in Yunnan Province, China

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Understanding of the mechanisms leading to slope failures is the key issue for developing a successful hydrological model of rainfall-triggered shallow landslide. Many previous studies proposed that the shallow landslides could result from the increase of positive pore water pressure in saturated soil due to groundwater table rise. In order to discovery the role of pore water pressure during the shallow landslides, two sets of monitoring system including pore pressure sensor, extensometer and rainfall gauges were installed at upstream of Jiangjia ravine, Yunnan province of China. The variations of displacement and pore pressure were measured along with the rainfall from June to September, 2013. Three shallow landslide events were monitored in this period. It was found the pore pressure increased suddenly at the timing of the shallow landslides. The soil displacement strongly depends on the accumulative rainfall. An empirical relationship between the soil displacement and the rainfall amount is obtained by a regression analysis of the monitoring data. The data are also helpful for testing different physically-based shallow landslide models.