

Effect of the definition of a single rainfall event on the rainfall threshold of mass movements

CHEN, Chiwen^{1*} ; OGUCHI, Takashi¹

¹Department of Natural Environment Studies, The University of Tokyo

This study analyzes mass movements caused by rainstorm and typhoon events in Taiwan during 2006 to 2012. Data for 263 mass movement events were collected from the reports of the Soil and Water Conservation Bureau of Taiwan, including 172 landslides and 107 debris flows caused by nine frontal rainstorm events and 15 typhoon events. After checking the location of each event, we compiled relevant rainfall data by interpolating data from the surrounding rain gauges. This approach is useful to analyze rainfall conditions for the events and discuss the mechanism of the rainfall-induced mass movements. This study uses two different definitions of a single rainfall event in relation to the triggering of mass movements. One is defined as a period from the time when hourly rainfall becomes greater than 4 mm to the time when the hourly rainfall becomes less than 4 mm for the next six consecutive hours. The other is defined as a period delimited by a non-rainfall period of more than 24 h. These two definitions gave significantly different results concerning the rainfall condition of mass movements. The first definition represents higher rainfall intensity, shorter duration and less cumulative rainfall. The second definition represents lower intensity, longer duration and more cumulative rainfall. We also used the rainfall intensity-duration (*I-D*) relationship from these two definitions to establish two *I-D* thresholds of mass movements in Taiwan. Comparing the thresholds from this study to those for Taiwan and Japan from previous studies, we found that the definition of a single rainfall event and the number of data are two important factors affecting the rainfall threshold of mass movements.

Keywords: mass movements, rainfall event, landslides, debris flows, I-D threshold