A landslide-quake detection algorithm with STA/LTA and diagnostic functions of moving average and scintillation index: A preliminary case study of the 2009 Typhoon Morakot in Taiwan

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Since 1999, Taiwan has experienced a rapid rise in the number of landslides, and the number even reached a peak after the 2009 Typhoon Morakot. Although it is proved that the ground-motion signals induced by slope processes could be recorded by seismograph, it is difficult to be distinguished from continuous seismic records due to the lack of distinct P and S waves. In this study, we combine three common seismic detectors including the short-term average/long-term average (STA/LTA) approach, and two diagnostic functions of moving average and scintillation index. Based on these detectors, we have established an auto-detection algorithm of landslide-quakes and the detection thresholds are defined to distinguish landslide-quake from earthquakes and background noises. To further improve the proposed detection algorithm, we apply it to seismic archives recorded by Broadband Array in Taiwan for Seismology (BATS) during the 2009 Typhoon Morakots and consequently the discrete landslide-quakes detected by the automatic algorithm are located. The detection algorithm show that the landslide-detection results are consistent with that of visual inspection and hence can be used to automatically monitor landslide-quakes.