Seismic network detects landslides on broad area scale

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From 1999 to 2006, Taiwan's Chenyoulan watershed experienced 48,000 landslides, rock avalanches, and other geomorphic events, the bulk of which are thought to be triggered by the powerful tropical cyclones that batter the island each summer. Rock slides and other geomorphic events are a natural hazard, but they're also the source for some of the raw sediment that ends up winding its way downstream, affecting watershed erosion and sedimentation dynamics. From both of these perspectives, having a handle on when and where these geomorphic events occur is important. However, the main method used to track landslides—optical satellite observations—has a low temporal resolution, has trouble discerning new activity at previously affected sites, and struggles to see through clouds or dense canopy cover. Using 14 seismic sensors installed from July to September 2010, Burtin et al. studied the skill of their network in detecting geomorphic activity in the Chenyoulan watershed.

The authors detected 314 separate geomorphic events during their study period. Using their moderately dense network of seismic sensors, the authors located the geographic source of each event, and a manual analysis let them categorize the cause of the signal. Different types of geomorphic events produce seismic signals with different shapes. Comparing their observations with rainfall records, they find that 69 percent of the events coincided with storms, with the timing of the landslide or other event often occurring during the period of peak precipitation. Tracking the source of the seismic signals, they find that 61 percent of the events occurred at sites of previous geomorphic events.

The authors note that their seismic network approach still needs work, but that when fully developed, it could provide a means to automatically assess the occurrence, cause, and type of geomorphic events.

More information: Burtin, A. et al. Continuous catchment-scale monitoring of geomorphic processes with a 2-D seismological array, J*ournal of Geophysical Research-Earth Surface*. DOI: 10.1002/jgrf.20137, 2013 onlinelibrary.wiley.com/doi/10 … /jgrf.20137/abstract

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