

High-speed landslide mechanism extracted from long-period surface waves

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Long-period seismic signals gathered at stations far from landslide area can be used to recover the landslide source force applied on ground during the rapid sliding process. This force history is helpful to improve our ability to deduce the characteristics of the event as well as the dynamic properties of bulk motion. We use source mechanism inversion to analyse two different large landslides. Seismic waves generated by these two events have been recorded respectively by more than 5 stations, with the distance range from 69km to 1325km.

The first event is the sudden failure happened at Qianjiangping village (30.97°N , 110.61°E) on 13 July 2003, on the bank of the Qinggan river. The landslide flow brought about 20 million cubic meters rock and soil masses right into the river in a short time. It moved about 250 meters in the main sliding direction of $\text{S}45^{\circ}\text{E}$ before stopped by the opposite bank. It is a typical reservoir landslide, which has been compared to the 1963 Vaiont landslide in Italy. The other event is the Xiaolin (120.64°E ; 23.16°N) deep-seated landslide, located in southwestern Taiwan and had volume of about 27 million cubic meters. The landslide moved in the westward direction, divided into two streams at about the middle of the run-out, because there had been a small ridge and two valleys extended from the west side of the ridge. The deposit spreading length of this landslide is about 2300 meters.

We discuss the different characteristics of the two events in both geological structure and movement mode based on the field survey. Then we show that those differences are also revealed by the source force-time functions from inversion.