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Dynamic processes and basal friction of large-scale landslides derived from broadband seismic inversion

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The ground motions generated by large-scale landslides can be recorded by adjacent seismic stations, and they can be extracted form continuous records. By long-period waveform inversion, the force-time functions of landslides can be recovered. As the weights of sliding mass are estimated, the resultant force-time functions for landslides can be applied to calculate the velocity and displacement of sliding mass. Consequently, based on conservation of energy, the steady state deformations and basal friction coefficients of sliding mass can be derived from force-time functions with the given angles of slopes. In the study, we performed a general source inversion to reconstruct the dynamic force history for several large-scale landslides triggered by the extremely heavy rain in the period of 8th to 10th August 2009 in Taiwan. The time history of basal friction coefficients along slopes are obtained and shows the trace which rapidly reduced from a maximum value and then remained at a steady value. The resultant steady friction coefficients can be used to characterize the geomaterial properties on failure slopes, which provides an alternative approach to replace traditional direct shear test for rocks.