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Travel Distance Prediction of Landslides Triggered by the M8.0 Wenchuan Earthquake	
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Travel distance prediction of landslides triggered by the M8.0 Wenchuan earthquake

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Key words: Wenchuan earthquake; Landslides; Runout distance; Volume; Slope; Empirical-statistic model

Abstract. Volume and slope are two important factors affecting the runout distance of landslides. Field investigation on 46 landslides triggered by the Wenchuan earthquake show that there are positive linear correlations between the logarithmic values of landslide volume and travel distance. And there is also a positive linear relationship between the equivalent friction coefficient and tangent value of initial slope angle for the landslides. On the basis, we obtained an empirical-statistic equation between the horizontal and vertical travel distance, the volume and initial slope angle. This can provide a basis for prediction of earthquake-induced landslides.

Introduction

Runout distance estimation is a main topic of landslide prediction. So far, many methods have been proposed, roughly in two categories: empirical-statistic and dynamic methods. Empirical-statistic models analyze the relationships between travel distance, geometric characteristics and inducing factors, which are often easy to use [1-4]. But they can only be applied to the conditions similar to those on which their development is based. Dynamic models are physically based, and can consider the mechanism, movement pattern and the momentum or energy conservation of the landslide mass [1, 5-8]. A major difficulty in developing deterministic models for landslide runout prediction is the choice of appropriate friction parameters or material rheologies [6].

The M8.0 Wenchuan earthquake occurred on May 12, 2008 in Sichuan Province, China. The earthquake induced about more than 10000 geological disasters, 41% of which are landslides. For these landslides with same trigger factor and similar geological background, it is feasible to establish empirical-statistic prediction models of runout distance related to their characteristic parameters.

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