

Method of estimating damage caused by large-scale landslides originating in deep-seated landslides

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1. Introduction

Deep-seated landslides occur less frequently than regular landslides. Yet, they are extremely large landslides and sometimes cause massive damage, such as the major water hazard that occurred on the Kii Peninsula in 2011. Meanwhile, conventional measures to prevent landslides are probably not sufficient to reduce the damage caused by deep-seated landslides, which means that the appropriateness of mitigation measures needs to be examined.

2. Past measures implemented to control deep-seated landslides

The key to any examination of deep-seated landslide mitigation measures is to expect the phenomena and damage that occur in a deep-seated landslide in areas with a high risk of deep-seated landslides. The Ministry of Land, Infrastructure, and Transport released the Deep-seated Landslide Frequency Estimation Map in 2010 and the Stream (small basin) Level Evaluation concerning the risks of deep-seated landslides in 2012 to identify areas where the risk of deep-seated landslide is considered high.

Meanwhile, the estimation of phenomena and damage that occur in a deep-seated landslide has not been sufficiently done, and its method has not been organized. Thus, the Sabo Department of the National Institute for Land and Infrastructure Management established a method of estimating large-scale landslide damage originating in deep-seated landslides based on the outcomes of recent research and examinations conducted by regional development bureaus.

3. Outline of this method

Based on examinations concerning methods, it is probably often difficult to conclusively set phenomena originating in a deep-seated landslide that will occur in the future with current research and technology levels. Thus, this method estimates deep-seated landslide phenomena with high probabilities based on past records in individual areas with similar conditions for triggering deep-seated landslides as shown in the figure. The

expected categories here include the characteristics of the site of onset (terrain, geological structure), scale of landslide, style of flow, and frequency.

On the other hand, recent studies have revealed that numerical simulations were effective in estimating the range of damage caused by deep-seated landslides. Therefore, this method also uses a method based on numerical simulations to estimate the range of damage caused by a highly likely deep-seated landslide. This method also presents a method to narrow down computation cases to implement efficient simulations.

4. Summary

Regional development bureaus are starting examinations using this method. The method is going to be refined by finding problems in the execution.

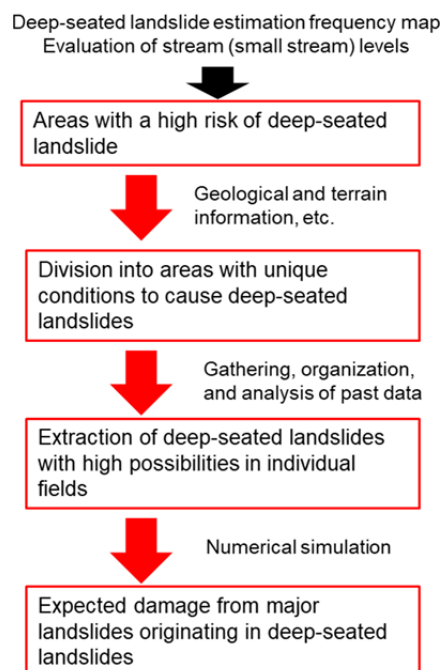


Figure 1. Examination flow for this method

☞ For more detail

1) National Institute for Land and Infrastructure Management
Reference No. 983

<http://www.nilim.go.jp/lab/bcg/siryou/tnn/tnn0983.htm>