

Relationship between earthquake induced-landslide and marginal topography of landslide

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A large number of landslides caused severe damages by the recent earthquakes in eastern Japan. It demonstrated the importance to develop risk evaluation technique for earthquake induced-landslide. Consequently, it is essential to clarify the topographic characteristics of landslide area. Suzuki (2009) studied marginal condition on clear landslide topographies prior to the Mid-Niigata Prefecture earthquake, and showed that landslide occurrence has relationship with marginal erosion condition of the landslide site. We investigated the all landslide sites, including unclear landslide topographies prior to the Mid-Niigata Prefecture earthquake. We also analyzed the relationship between the landslides occurrence and the marginal erosion.

Suzuki (2009) defined the marginal erosion ratio of landslide site as the ratio of erosion valley length to total length on landslide margin of concave landslide topography. Generally, there are also convex topographies that interpreted as the topographies formed by landslide. Although such convex landslide topographies do not show clear erosion valley around them, but it can be distinguished from surrounding area according to topographic and aerial photographic interpretation. In the case of the Mid-Niigata Prefecture earthquake, it was reported the landslide in convex topography such as Iketani area (Oyagi, 2007). In this study, we regarded the margin of landslides sites on convex slope as erosion valley, so as to evaluate landslides on convex landslide topography.

As a result, 80% of earthquake induced-landslides on the landslide topographies showed the marginal erosion ratio higher than 30%. However, the landslide occurring ratio was only 10% of the whole landslide topographies that have marginal erosion ratio larger than 30%. We also analyzed landslide area, landslide length and width with the marginal erosion ratio. The results showed that, the landslides with large area, or with small ratio of length to width are not likely to occur without larger marginal erosion ratio.

The above results showed that, the marginal condition, the area, length and width of landslides are important factors for evaluating earthquake induced-landslide.

References

Suzuki (2009):Relationship between earthquake induced landslide and marginal topography of landslide, Abstract of The 48th Japan Landslide Society Meeting, p.200

Oyagi(2007):Reading method of the landslide topography, Kinmiraisya press, p.247~260

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