

Temporal Changes in Landslide Frequency After Forest Harvesting in Ikawa, Central Japan

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Landslides are considered as one of the worst impacts of forest harvesting because landslides that occur rapidly in mountainous areas can supply a large amount of sediment to the downstream. Therefore, it is important to evaluate the effect of forest harvesting, including clearcutting and forest regeneration, on the landslide occurrences. This study aims to clarify the effect of forest harvesting on the landslide frequency in the artificial forest area in Ikawa. The rainfall threshold was also investigated for the occurrence of landslides in each forest age class. Aerial photograph in 10 periods (1970, 1975, 1980, 1984, 1986, 1991, 1996, 1998, 2003, 2008) was used to examine the landslide occurrences in Ikawa area, including location and area of the new landslide in each period. New landslide occurrences in each period (1970, 1975-1980, 1980-1984, 1984-1986, 1986-1991, 1991-1996, 1996-1998, 1998-2003, 2003-2008) were assessed by comparing the earlier and the later aerial photographs. Analysis results revealed that the number of new landslides in the period from 1980 to 1984, which includes the largest rainfall event (total rainfall of 747.5 mm) in the entire study period, was the highest in the 10 photograph periods. Area frequency of landslides in 0 to 5 years-old forests was the highest amongst all the forest age classes. These results indicate that the occurrence of landslides is affected by rainfall and young forest age. Landslides still occurred in the 15-years-old forests when rainfall events are more than 300 mm, while landslides did not occur in the forests older than 25 years even the rainfall event is 747.5 mm.

Keywords: Landslide, Forest harvesting, Heavy rainfall