

Landslides and driftwoods in headwater catchments: Supply, transport, and storage

*Takashi Gomi¹

1. Tokyo University of Agriculture and Technology

Recent landslides and debris flows produce numerous amounts of drifting woods together with sediment. Drifting woods produced in headwater areas cause serious damages for infrastructures and residential area in downstream. For instance, record amount of driftwood with 210,000 m³ was produced by 586 mm during storm events in northern Kyushu, July 2017. Volume of drifting wood in headwaters possibly associated not only areas of landslides, but also for volumes of timber in mountainous landscapes. Therefore, supply, storage and runoff of drifting woods need to examine for developing countermeasure of driftwood and watershed-scale forest resources management. We examined supply, transport, and storage of driftwood produced by landslides in the upstream of Akaya River (6.2km²) in Haki district, Asakura city, Fukuoka prefecture. The area covered by granite, pelitic schist, sedimentary rocks, and igneous rocks. Dominant forested vegetation is 5 to 95 years of cedar and cypress as well as broadleaf forest and bamboo. We conducted both field measurement and GIS analysis for landslides and forest conditions. Landslides occurred 67% in cedar forest, 24% in cypress forest, 4% in broad-leaved forest, 5% of bamboo forest and others. Greater percentages of collapse area occurred up to 20 years old plantation forest, while 40 to 50 years old plantation forest also had high percentages. The mean depth of landslide scarred was 1.3 m ($\pm$ 0.6) from 0 to 21 years, and 2.0 m ($\pm$ 0.9) from 26 to 68 years, which may associate with growth of tree root. Relationship between the amount of sediment produced and volume of generated driftwood in this study was tended to be greater than that was proposed by Ishikawa et al. (1989). Because relationships between landslide sediment and driftwood was developed by Ishikawa et al. (1989) was conducted more than 30 years ago, increases in the volume of plantation timber for the last three decades possibly provide higher volume of timber by landslides. The finding of this study suggested that forest management for controlling the volume of timber in headwater areas is necessary for reducing the availability of drifting wood for landslides and debris flows.

Keywords: Landslide, Driftwood, headwater, Forest condition