

## Distribution of infilling rates in hollows estimated from radiocarbon dates and high-resolution DEMs -A case study of granitic mountain slopes in Hiroshima City, Hiroshima Prefecture-

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Hollows are generally infilled by soil creep or rockfall from upper slopes after shallow landslide occurs. Although many studies have focused on the temporal variation of landforms around valley heads and hollows under various regional settings, few studies have focused on the relationship between topographic parameter and infilling rates in each valley. Radiocarbon dates of charcoal in valley-head sediment were analyzed for granitic mountains of Hiroshima City where many shallow landslides occurred due to the heavy rainfall on August 20, 2014. Total 22 samples of charcoal were collected from 5 valley heads. In addition, the topographic parameters such as slope gradient and size of source area were measured using a 1 m-DEM before and after the shallow landslides. Furthermore, infilling rates at the valley heads were estimated from the calibrated radiocarbon ages and the pre-landslide depth of the samples. The calibrated radiocarbon ages ranged from about 350 to 1600 cal BP. This result suggests that the timing of the previous landslide event varied by valley. The estimated infilling rates of the valley heads ranged from about 0 to 3.5 mm/yr. When focusing on the middle to downstream parts of the valley heads, the infilling rates tend to increase with increasing source-area size. The infilling rates also tend to increase with increasing surface roughness of the source area, which is an index of rock exposure on ground surface. There was also a positive correlation between the infilling rates and the grain size of ground surface. Furthermore, the maximum grain size of mobile debris by overland flow was 10 cm or less at the middle to downstream parts of the valley heads under the assumption of heavy rainfall of 75 - 100 mm/h. These results suggest that the pre-landslide infilling rates were not spatially uniform and that the infilling proceeds faster at the downstream section of valley heads because large cobbles and boulders can accumulate downstream, except for some sites with intense human impacts.

Keywords: valley head, shallow landslide, radiocarbon dating, 1-m DEM, granite