

Impact of continuous sediment supply from large landslide scars in the southern Japanese Alps

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The Japanese Alps located in humid and tectonically active regions has high denudation rates, which were estimated from sedimentation rates in dam reservoirs and concentration of terrestrial cosmogenic nuclides. One of direct causes of high denudation rates is probably the occurrence of new large landslides. However, few studies have paid attention to impact of continuous sediment supply from bare grounds after the landslide events. To clarify sediment supply from landslide scars after the original events, we examined spatial distribution and volume lost of large landslides ($\geq 10^4 \text{ m}^2$) in Hayakawa River basin (ca. 500 km^2), southern Japanese Alps using LiDAR data in 2009 and 2015. In addition, focusing on continuities of landslide, landslides were classified into two types: new type (NT) formed between 2009 and 2015 and persistent type (PT) formed before 2009. Total 57 landslides were found for analysis, eight of which were NT and the other 49 were PT. Total volume lost from 2009 to 2015 reached about $4.4 \times 10^6 \text{ m}^3$. NT produced only 20% of the volume. In contrast, three largest PT landslides, which have already existed in early 1900s, produced about 70% of the total volume lost. The high distribution density of sackung scarps around the three PT suggests that decrease in rock mass strength with deep-seated gravitational slope deformation facilitates active sediment supply. Therefore, PT landslides seem to have more impact on sediment supply into Hayakawa River basin.

Keywords: large landslide, sediment supply, LiDAR data, gravitational deformation