



Applicability of the multi-temporal airborne LiDAR survey to measure sediment dynamics in mountainous region

T Yamakoshi , A Matsuoka , and K Tamura

Public Works Research Institute, Erosion and Sediment Control Research Group, Tsukuba, Japan

The airborne LiDAR (Light Detection And Ranging) survey becomes more and more popular in Japan. It is utilized for various purposes not only by scientists but also by engineers. Here, the authors show the applicability of the multi-temporal airborne LiDAR survey to know sediment dynamics in mountainous region, in which sediment moves so dynamic that it has been very difficult to figure out. Especially, repeated LiDAR surveys can take a snap shot of sediment movement and provide spatially distributed quantitative data very easily. The authors show several examples where the multi-temporal airborne LiDAR surveys were applied in erupted volcanoes or seismically-disturbed mountainous watersheds. There, it can provide thickness of volcanic tephra, depth of rapid gully erosion, volume of landslides and up-and-down of riverbed of the volcanically or seismically devastated river basins, quantitatively. On the other hand, the application of LiDAR also has limitations. In many cases, almost perfect matching is necessary to evaluate small topographic changes. Even in the very devastated river basin, such as the river basin where a large number of landslides occurred because of a large earthquake, simple subtraction of the two LiDAR DEMs before and after the landslides could not provide landslide volume precisely. Clouds of errors in the estimation of topographic change because of vegetation growth or etc. were too prominent to mask the topographic changes induced by the landslides. The matching of the two DEMs and the removal of vegetation-originating errors are critical to know sediment dynamics in mountainous regions.