



Sediment dynamics in the seismically disturbed mountainous watersheds based on multi-temporal LiDAR surveys

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The strong earthquake occurred in October 2004 and caused a large number of landslides and landslide dams in small mountainous river basin, the Imo river basin ($A=38 \text{ km}^2$) in Niigata Prefecture, Japan, altering sediment yield and runoff processes. Especially, one of the largest landslides that occurred formed a large natural dam with height of around 30m. Snowmelt and strong rainfall events produced more landslides in the river basin in the following years. The authors conducted multi-temporal aerial LiDAR surveys to clarify the post-seismic sediment dynamics in this seismically disturbed mountainous watershed. The surveys provided a fairly good estimation of the total amount of post-seismic sediment runoff from the watersheds which is differently measured by multitemporal bathymetric surveys of the natural dam. Furthermore, they also revealed the following. 1) The total amount of the sediment yielded by seismic origin landslides was 4.8 Mm^3 . 2) 1.4 Mm^3 of the sediment followed to be yielded by the succeeding snowmelt events and heavy rainfall events within 19 months, which is much larger than the normal sediment yield rate in this region. 3) 70% of the sediment yielded by landslides was not delivered away to the downstream, but remained under the scarps or beside the streams as of May 2006.

The authors also conducted a simple 1-D sediment transport simulation along the river with utilizing the topographic change data obtained by aerial LiDAR surveys for its validation. The result shows the sediment dynamics were, roughly speaking, able to be mimicked by the simulation.