



GIS-based numerical simulations of the July 2014 Nagiso debris flow in Nagano Prefecture, Japan

Chunxiang Wang and Hiroshi Fukuoka

Niigata University, Research Institute for Natural Hazards and Disaster Recovery, Niigata, Japan
(chunxiangwang@hotmail.com)

A debris flow disaster took place in Nagiso, Nagano Prefecture of Japan in the later afternoon of 9 July 2014 triggered by 76 mm torrential rain associated with the typhoon Neoguri. This debris flow killed one resident and completely destroyed several houses. Although the source of the debris flows, especially the origin of their large boulders exceeding 5 m, are not clear, it seems that those debris flows initiated in the two upstream torrents and they joined Nashisawa torrent. Finally the debris flow ran and deposited in the Kiso River. The downstream residents are much aware of the many historical cases on similar debris flow disasters in the torrents in Nagiso and surrounding communities. Most of the residents could evacuate immediately after they felt the ground tremors induced by the running debris flow.

Authors used LAHARZ (Schilling 1998) to simulate the Nagiso debris flow using 5-meter resolution Digital Elevation Model and several debris-flow volumes for the calibration. We also performed a numerical simulation to predicting the runout distance and to get insight into the behavior of the debris flow movement. A GIS-based depth-averaged 2D numerical model using a coupled viscous and Coulomb type law is used to simulate a debris flow from initiation to deposition. We compared the two simulation results and suggested the more appropriate coefficients of equations in LAHARZ for calculating the cross sectional area and planimetric area for application to the July 2014 Nagiso debris flows.