

Prediction of Lahar Inundation Area for Volcanic Eruption of Baegdusan using LAHARZ

Sanghyun Kim¹, Taebok Song², Hyunjun Kim³, Kwangjun Jung⁴, Sungwook Kim⁵, Khilha Lee⁶,
Sung-Hyo Yun⁷

¹Dept. of Environmental Engineering, Pusan National University, South Korea, ²Dept. of Environmental Engineering, Pusan National University, South Korea, ³Dept. of Environmental Engineering, Pusan National University, South Korea, ⁴Dept. of Environmental Engineering, Pusan National University, South Korea, ⁵Geo Information Research Group, South Korea, ⁶Dept. of Civil Engineering Daegu University, South Korea, ⁷Dept. of Earth Science Education, Pusan National University, South Korea

E-mail: kimsangh@pusan.ac.kr

Recent monitoring reports pointed out various unrest activities in Baegdusan (Chanbaishan in Chinese) volcano located in the border region of China and North Korea. The eruption of Baegdusan volcano introduces substantial damages to adjacent countries. The generation of lahar in the study area is strongly associated with the mixing process of magma within Cheonji (Tianchi in Chinese) caldera and results into the overflow of density current due to the rising of mixed fluid level. Both gravity and density difference are controls for fluid behavior and the topography primary determines the spatial distribution of lahar inundation. Digital terrain analysis had been performed using the digital elevation model with spatial resolution in 50 m obtained from United State Geological Survey (USGS). LAHARZ (USGS) was used for a tool for flow path delineation based on D8 algorithm. Assuming the flow direction toward Erdaobaihe in Jilin, China, the overflows over Cheonji caldera were assumed to be varied between 1 and 10 m for modeling conditions. Based on delineated proximal hazardous zone, the conventional relationships between lahar volume and cross sectional or planimetric areas were used to predict the lahar inundation area. Depending on various overflow scenarios, different lahar inundation hazard zones were obtained. However, spatial distributions of flow pattern also indicated the implementation of D8 algorithm may require further improvement for the simulation of flow divergence in conjunction with allowance of flow direction in multiple without restriction of 8 angles.

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