Geophysical Research Abstracts
Vol. 21, EGU2019-3829-1, 2019
EGU General Assembly 2019

Identification of Hazard Zone using Numerical Modeling for Debris Flow

Sungsu Lee, Seul Gi Lee, Joo Yong Lee, and Sung Bo Kim
Chungbuk National University, Cheongju, Korea, Republic Of (sungsulee@chungbuk.ac.kr)

Debris flow as a mixture of solid particles of various sizes and water is one of the life threatening natural hazards frequently occurring during heavy rain or typhoon. This often causes extensive damage in the form of socio-economic losses and casualties as witnessed during the incident around Mt. Umyeon, Seoul, Korea in 2011. There have been numerous investigation to mitigate the impacts from debris flow; however, the estimation as preparedness measure has not been successful due to nonlinear and multiphase characteristics of phenomena both in material and process inherent in the debris flow. This paper presents a numerical study of computational fluid dynamics application to simulate the debris flow using the open-source code with consideration of multiphase flow of non-linear viscosity. In order to validate the proposed numerical method, the quantitative evaluations were made by comparisons with experimental results and qualitative analysis for the dispersion characteristics was carried for the case of debris flow in the actual incident from Mt. Umyeon. This study in addition models several study regions where frequent debris flow damages have occurred or are anticipated. Since the volume of the debris flow nor moisture contents in the soil are known, the parametric investigations are performed for various volume and moisture contents. In addition, different initial locations of the debris flow are tried to identify the most dangerous zone where a computational model for barrier is implemented. As the results, the proposed approach can be utilized to identify the hazardous region in advance and assess the effect of the structural countermeasures. This work was supported by 'Disaster Management Human Resource Development Project' funded by Korean Ministry of Interior and Safety (MOIS) of Republic of Korea.