Geophysical Research Abstracts
Vol. 21, EGU2019-6357, 2019
EGU General Assembly 2019
© Author(s) 2019. CC Attribution 4.0 license.

Grain size dependent on geotechnical and rheological characteristics of debris flow materials in undrained ring shear and rheometric tests

Sueng-Won Jeong (1) and Young-Suk Song (2)

(1) Korea Institute of Geoscience and Mineral Resources, Daejeon, Korea, Republic Of (swjeong@kigam.re.kr), (2) Korea Institute of Geoscience and Mineral Resources, Daejeon, Korea, Republic Of (yssong@kigam.re.kr)

There is a little-known mechanism about the landslide transition from landslide occurrence to debris flow propagation. In the landslide mobilization and fluidized processes, the geotechcial and rheological characteristics are crucial in mitigating the georisks in the mountainous areas. In general, these characteristics cand be obtained from empirical methods, field investigation and laboratory testing. However, many cases are still used them based on a trial and error method. Empirical relationsiphis, which is an outcome from engineering behavair and grouping, may be useful to predict the future debris flow event; however, a more robust approach is still necessary to reduce the uncertainty of landslide risks in selecting an input parameter in the back-analyis of landslide mobilization. At the onset of landslide occurrence, we have performed a series of undrained ring-shear tests, which may produce the residual shear strength of soils. The soil resistance is belong to the minimum value along the slip surface in landslides. It is very sensitive to the variation in drainage, grain size and shear velocity. For the debris flow mobility, the frictional values are obtained from the rheometric tests. Rheological properties are determined by commerical rheometers: ball-measuring BMS model and stirrer-rotating MCR52 model (Anton-Paar, Austria). Both have stress and rate-control mode. Assuming that the debris flow materials behaved as the Bingham fluid, the Bingham yield stress and viscosity are determined as a function of volumetric concentration of solid. Regardless of grain size effect, there is a positive relationships between Bingham yield stress and Bingham viscosity. As a result, the ratio of Bingham yield stress to Bingham viscosity is ranged from 1 to 1000 for highly fluidized flow conditions. We would highlight the transition mechanism based on ring shear tests and rheometric tests with different types of grain sizes.