Geophysical Research Abstracts
Vol. 19, EGU2017-5516, 2017
EGU General Assembly 2017

Landslide field-scale spatial variability and deformation analysis based on surface nuclear magnetic resonance investigation

Shu Zhang and Huiming Tang

Three Gorges Research Center for geo-hazards, China University of Geosciences (Wuhan), Wuhan, China (suzy923@foxmail.com)

Debris landslides distribute widely in Three Gorges Reservoir area (TGRA), and the deformation have significant connection with seepage properties. However, the seepage properties obtained from conventional laboratory and field experiments have great variation range, which suggests that the geo-material of landslide mass is heterogeneous. For the purpose of better understanding the spatial variability of seepage properties of landslide mass, surface nuclear magnetic resonance (SNMR) technology has been introduced in a representative reservoir debris landslide field in TGRA, Baishuihe landslide. In this study, 4 survey lines were arranged at the landslide field, which provided a series of relative reliable and sufficient spatial measured data (i.e. hydraulic conductivity and water content) for the study. On the one hand, these obtained spatial data have been used to analyze the spatial variability according to the basic theory of geostatistics. The results indicates that the field-scale anisotropy of the properties have close relation with the experienced engineering geological action and deformation behavior of the landslide. On the other hand, the deformation behavior analysis of Baishuihe landslide in terms of Seepage-stress filed coupling simulation has been performed on the basis of SNMR measured data. By contrasting simulated deformation behavior and actual monitoring results, Baishuihe landslide can be regarded as a retrogressive landslide, and the main controlling factor is rainfall.
Key words: Surface nuclear magnetic resonance, spatial variability, debris landslide, deformation behavior