Geophysical Research Abstracts
Vol. 21, EGU2019-17656, 2019
EGU General Assembly 2019


# Topographic effects on the frequency-size distribution of landslides triggered by the 2018 Hokkaido Eastern Iburi earthquake, Japan

Mio Kasai and Takashi Yamada

Hokkaido University, Research Faculty of Agriculture, Sapporo, Japan (kasaim@for.agr.hokudai.ac.jp)

On 6th September 2018, Hokkaido Eastern Iburi earthquake (Mw 6.6) induced more than 6,000 landslides over 440 km2 in Iburi subprefecture of Hokkaido, Japan (Kita, 2018). This study examined the frequency-size distribution of landslides and the effects of slope angle and curvature on the distribution pattern, with the assumption that these features represent the depth of saturated soil. The study area is characterized with gently undulating terrain with low divides between catchments, predominantly covered with the layers of volcanic ash and pumices with high water content. Most of landslides were shallow landslides, and their slip surfaces were very often formed in the layer of volcanic soil. Average slope angle of the landslides was 27 degrees. Their sizes tended to increase as slope angle became steeper up to 20 - 25 degrees, and then decrease with the angle. Each landslide was classified into four types based on average profile and planform curvature; Cc type (concave for both the curvature), Cv type (convex for both the curvature), Ccpl type (concave only for planform curvature), and Ccpr type (concave only for profile curvature). As a result, about a half of landslides belonged to Cc type, and their average size (8,720 m2) was larger than other slope types. In contrast, Cv type occupied 17 % of total landslides, and their average size (5,190 m2) was the smallest. There were 9 landslides larger than 105 m2, and their slope angle was between 20 and 30 degrees. 8 of them were coalesced landslides over low divides between catchments, and 7 were Cc type. The frequency-size distribution of landslides presented high rollover (5.0•10-3 km2), while the exponent of power law decay for medium to large sized landslides was -2.46, similarly to the study cases in the past. Comparing with other seismically caused landslide cases, landslides triggered by Hokkaido Eastern Iburi earthquake could be characterized with ‘more clustered, larger number, and larger size’, for the moment magnitude of the earthquake. This study demonstrated that gently undulating regions can cause unexpectedly large number and size of landslides once the area is hit by an intense earthquake, in case that soil layers vulnerable to ground shaking cover the ground.