

The geomorphic characteristics of landslides induced by The 2018 Eastern Iburi earthquake, Hokkaido

*Rasis Putra Ritonga¹, Takashi Gomi^{2,4}, Hefryan Sukma Kharismalatri², Rozaqqa Noviandi³, Yoshiharu Ishikawa⁴

1. United Graduate School of Agricultural Science, Tokyo University of Agriculture and Technology, 2. Institute of Global Innovation Research, Tokyo University of Agriculture and Technology, 3. International Environmental and Agricultural Science, Tokyo University of Agriculture and Technology, 4. Graduate School of Agriculture, Tokyo University of Agriculture and Technology

Up to 6000 landslides over 400 km² in Iburi Sub-prefecture, Hokkaido were induced by the Eastern Iburi Earthquake (EIE) on 6th September 2018. These landslides are unique because of their unusual topography, shape, and location where landslides occurred on hillslope. First, the landslides occurred on rather gentle and hilly topography (<500 m) with several landslides collapsed on entire hillslope and reaching valley while the others stopped on the middle part of hillslope. Moreover, those landslides formed into various shapes. Such unusual characteristics may affect sediment movement and production. We identified 1440 landslide scars in 18.87 km². Among them, 84% of landslides has area <3×10³ m² while the greatest landslides area was 18×10³ m². Landslide topography characteristic was examined based on frequency distribution of elevation, slope gradient, etc. Eastern Iburi area has elevation of 20-300 m with 75% of landslides were occurred on elevation of 100-200 m. Regarding slope gradient, landslides occurred over the whole range of gradients with 60% of them was occurred on the slope ranging from 25-35°. Landslides tend to occur gradually until topography slope of 25°, and increase rapidly as the topography slope increase until 35°, then decrease after. However, Eastern Iburi topography range of >35° tends to collapse. Based on landslide shape characteristics of the ratio of length and width (L/W ratio), 92% of landslides had 1 to 3 of L/W ratio with 2 of mean value. Relationship between normalized distance to stream and ridge line indicates the locations of landslide occurrence on the hillslope. We found 56.4% of the landslide clustered near the stream and ridge, followed by near the ridge of upper quart of the slopes (11.5%), and near the stream lower quart of the slopes (3.8%). Meanwhile, the largest landslide area was found in those occurred near ridge and stream, followed by near the ridge, and near the stream for 2459 m², 797 m², and 236 m² respectively. Our study showed that those unique landslide characteristics may very advantageous for understanding the possible subsequent sediment transferred to channel in sediment management practice after earthquake.

Keywords: Earthquake-induced landslide, topography characteristics, landslide shape characteristics, landslide position