Assessment of earthquake-induced landslides potential on artificial landform transformation areas in the Tama Hills covered with thick tephric loess, west Tokyo

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Eolian sediments alternating primary fall-out tephras and tephric loess (tephric soil deposits), so-called “loam” in Japan, is one of factors cause earthquake-induced landslides on slope of hill landforms where thick loam is preserved. To evaluate potential of slope failure by this condition in the Japanese Islands, distribution map of this eolian sediments has been reported. In east areas along the volcanic front in NE and SW Japan, thick loam distributes by the affection of westerlies which transport tephras (ash, pumice and scoria) eastward. Recent landslide disasters such as 2018 Hokkaido Eastern Iburi Earthquake and 2016 Kumamoto Earthquake are characterized by slope failures on natural slopes covered with loam.
On the other hand, to assess possibilities of earthquake-induced landslides in hilly areas heavily modified by human activities, man-made landforms should be modelled at the micro-landform scale considering original loam thickness. We estimated elevation changes by cutting and fill operation in the Gotentoge and Karakida areas in the Tama Hills where the Tama New Town was built in 1970s to 1990s, west part of Tokyo. We used 1:3,000 topographical maps published in 1950s and present digital elevation model (DEM) with 5 to 2 m mesh. Also, 1:10,000 geological map of loam was used for estimation of thickness distribution of preserved loam. By this method, we tentatively mapped earthquake-induced landslides potential for these areas, artificial landform transformation hills in the depositional area of thick tephric loess.

Keywords: earthquake-induced landslide, artificial landform transformation, tephric loess

