

Distribution of earthquake-susceptible tephra in Kanto and Tohoku areas: For the earthquake hazard mapping

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Many debris avalanches have been induced by earthquakes in areas of pyroclastic fall deposits. They occur on rather gentle slopes and had high mobility; because pyroclastic fall deposits form similar geological conditions in wide areas so their landslides commonly occur spontaneously in many numbers; even one landslide could have hundreds of fatalities when it occurs in a populated area. We have been examining such landslides induced by 7 earthquakes in Japan and one in Indonesia with field surveys. Examined landslides were those induced by the 1923 Kanto earthquake, 1949 Imaichi earthquake, 1968 Tokachi-Oki earthquake, 1978 Izu-Oshima-Kinkai earthquake, 1984 Naganoken-Seibu earthquake, 2011 Tohoku earthquake, 2016 Kumamoto earthquake and 2009 Padang earthquake, Indonesia. Sliding surface of the landslides induced by these earthquakes was mostly made within a pumice layer, volcanic soil just beneath a pumice layer, a lapilli layer with greasy halloysite in its interstices, and andosol. All these materials were rich in halloysite, which is inferred to have been made by resilication in the depths. The pumice, scoria, and lapilli have been identified in terms of tephrostratigraphy: They were Tokyo Pumice, Kanuma Pumice, Ogawa Lapilli, Hachinohe Pumice, Hachino-yama Tephra, Senbonmatsu Scoria, Sr-9, Kpfa. These pyroclastics are of from 330 to 15 ka and importantly they had all slope-parallel mantle bedding. Only 2016 Kumamoto earthquake induced landslides with the sliding surface in andosol. We will examine pyroclastic fall deposits in Kanto and Tohoku area and make a tentative hazard map of earthquake-induced landslides of pyroclastic fall deposits.

Keywords: earthquake, landslide, debris avalanche, tephra, pumice