

Disastrous shallow landslide of granite and ignimbrite in Japan

MASAHIRO CHIGIRA

Laporan (Report)

Prof. Masahiro Chigira of the Disaster Prevention Research Institute, Kyoto University, Japan, gave the above talk on Wednesday 17 October 2001 at 10.00 am at Bilik Cempaka, Bangunan Pusat Komputer, Universiti Kebangsaan Malaysia.

Abstrak (Abstract)

Landslide disasters in Japan have been caused by gigantic, deeply extending landslides and by small but enormous number of shallow landslides. My talk will focus on the shallow landslides. Shallow landslides, which caused many of the most severe disasters in Japan, have been occurring in granite and ignimbrite areas, because they move very rapidly for a long distance and occur densely. Most of the shallow landslides of granite have two different types of geological causes. One is the reweathering of paleoweathering material, and the other is the loosening of micro-sheeted granite. Reworking, of weathered granite occurs on the order of years when it is exposed to ground surface by artificial cutting or natural erosion. Micro-sheeting, microscopic to mesoscopic sheeting made by unloading, occurs in special type of granite. Micro-sheeted granite, even if it is scarcely weathered chemically, is disintegrated near the ground surface with a distinct front on the order of years. These loosened materials slide by the infiltration of water from intense rainfall. Ignimbrite has several types of weathering profiles according to the, intensity of welding, and these types determine the mechanisms of landslide. Non-welded ignimbrite is weathered to form a hydrated and clayey zone, which keeps suspended water above the unsaturated fresh zone. The suspended water increases the weight of the weathering zone by long rainfall rather than short intense rainfall, and leads to their landslide. Moderately welded ignimbrite by vapour-phase crystallization forms a weathering profile with a clearly defined front, which is made mainly by chemical weathering. Permeable, heavily weathered zone above this front finally slides by intense rainfall.

GSM