

Jointed slope structures of the Pleistocene Andesite lava and formation of steep slopes of the Mt. Kirikabu, Oita, Japan

Shuichiro Yokota[1]; Akiyoshi Tanaka[2]

[1] Geoscience, Shimane Univ.; [2] Geoscience, Shimane Univ

Occurrences of rock fall on steep slopes depend on generally steepness, materials, and structures of slopes. In the case of rock slopes, combination of joint planes of which direction and spacing are changeable may be major parameters controlling the stability of steep slopes and types of movements when it becomes unstable. The stability and type of movements along slopes may influence on regression rate and configuration of steep slopes during long-term period, respectively. Then, jointed slope structures and their changes may be fundamental information with slope configuration to make slope hazard map expressing the frequency of the occurrence of rock fall.

As an attempt to obtain such relation, joint structures of the Pleistocene andesite lava composing Mt. Kirikabu, Oita, Japan, which is well known as mesa topography elongating in N-S trend with an ellipsoidal shape in plan, have been analyzed.

Slopes of the mountain are steep with angle of 60 to 75 degrees. They are steepest in northern edges, whereas relative gentle in another portions. Two joint systems of gentle (5 - 30) and nearly vertical (70-90) are recognized in whole slopes. Although strike of the former is almost concordant with outer rim of the mountain, it is divided into inner dip joints and outer dip ones. Inner dip is genetic one of the lava flow, while outer dip may be sheeting joints relating to unloading. Strikes of vertical joints are N-S and E-W, and are independent of gentle ones. Spacing of joint planes is wide ranging 0.5 to 2.0m in gentle ones, whereas narrow in vertical ones.

Combination of these joint planes makes some type of slope structures. Out of them, stability is high in the zone where inner dip joints are dominant, whereas low in outer dip dominant zone. Slope angle may reduce in the latter zone, where translational slides frequently occur. This consequently brings about large regression of the slopes. On the other hand, although it is low frequent with small regression rate, toppling will be expected in the zone where inner dip gentle plane is dominant.

Roughly correspondence among jointed slope structure, types of movements, and configuration of steep slopes were recognized in the study area, and this means that these may become fundamental information for construction of slope hazard map including rock fall.