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Landslide characteristics on a differentially weathered rock mass, Korea

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Landslide characteristics in terms of their failure type, magnitude and frequency have been determined on a natural terrain, Korea where a rock mass has been affected severe differential weathering. The rock mass is dominantly consisting of gabbro and partly of diorite. Core stones are well developed in this rock mass as a result of differential weathering.

In general, landslides on natural terrains of Korea are initiated as translational slide which then become liquefied and accelerate down slope as debris flows along valleys. According to the previous studies, most of the translational slides are characterized by their small size. Among 283 slides investigated previously, more than 80% of them are smaller than 40 m in length and are narrower than 10 m in width, with 6 m to 10 m widths being most dominant. The depth of the slide surface is also very shallow, being less than 1m, with less than 0.5m depth occupying 80% of the total. Volumes of the failured material range from 200 m^3 to 600 m^3, with about 250 m^3 in volumes being most dominant.

In the study area, however, landslides are relatively large in magnitude compared to those previously investigated, and showing circular or semi circular in type. The volumes of 15 landslides investigated in this study range from about 500 m^3 to 5800 m^3, with between 800 m^3 and 2000 m^3 being most dominant. Most of the landslides of the study area are also larger than 100 m in length and are wider than 20 m in width. The weathering profiles are also relatively deep, ranging 3 m to 10 m in depth which is probably more than 10 times deeper than elsewhere in Korea we have investigated previously.

Any significant geological structure promoting weathering process has not been ob-

served in the area, but core stones produced by differential weathering have been observed in many places. The maximum weathering thickness of core stone area reaches to about 15 m. This may indicate that the places more core stones developed are more likely susceptible to weathering process. Such deep weathering process also easily develops thick colluviums on the slopes by continuous failure of weathered zones on upper parts. Consequently differential weathering process to the depth brings about core stone to the extended area and causes lot of thick colluviums resulting in big circular landslides.