

The erosion processes of mudstone surface effected by drying and rain infiltrating cycle in southern Taiwan

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Mudstone which is low utilization and difficult to make constructions is distributed in the south part of Taiwan. Understanding erosion processes, we investigate the influence of porewater chemistry and drying effect of this mudstone under the high erosion rate site. Rapidly slaked zone by drying and heavy precipitation reaches 10-20 cm from the crust surface.

Pliocene-Pleistocene thick mudstone layer is distributed over 250 km², forming badlands (locally called moon-world) which forms 20 m high slope. Usually, fresh mudstone exposes on surface of the slope by wash out.

The unsaturated crust covers the mudstone slope surfaces about 2 cm. The crust consists of Na⁺, Ca²⁺, Cl⁻, and SO₄²⁻ rich porewater. Ion contents of porewater decrease to 10-20 cm deeper area, increase to more deep area, again.

The bonding force for each particles increases with increasing ion contents, inversely the repulsive force increase with decreasing ion contents as percolation of rain. Drying mudstone quickly slakes by a lot of precipitation and infiltration.

To measure the evaporation rate on site, the drying area will reach 10 cm under the surface in a few days. Especially, mudstone will rapidly shrink and occur the slaking between the drying and low ion concentrated area (10-20 cm) to infiltrate fresh water.

We consider that this slaking process which has annual cycle of drying and wetting near surface of this area progresses 20 cm erosion (regression) per year.

Keywords: rapid slaking, Taiwan, mudstone, drying