Mineralogical, geochemical and microtextural variations in soils affected by rainfall with respect to landslide, Korea

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Background of Research

It has been well known that fatal landslides are triggered by debris composed of regolith developed on steep slopes due to heavy rainfall in Korea [1], especially concentrated in summer season [2, 3]. After rainfall during summer and time elapsed, soils were collected from 9 points where subsurface depths for sampling at each point were chosen at 5 cm and 30 cm, respectively. Analyses using SEM with EDS, XRD, and XRF on soils were applied to better understand mineralogical, geochemical and microtextural variations in soils affected by rainfall with respect to landslide.

Results and Discussion

Most particles are less than 200 μm with subangular minerals or plate clay minerals. Surfaces of particles are rough due to weathering and formation of secondary minerals newly formed. Their chemical components in soils are O, Si, Fe, Mg, Al, Ca, K, and Na, indicating the presence of illite and mafic secondary minerals such as vermiculite, chlorite and iron hydroxides. Clay minerals contained in soils are comparatively enriched in deeper layers in the upward soils, indicating fine particles were mostly removed to the downward soils. Based on bulk chemical data analyzed by XRF, SiO_2 decreased with increasing Al_2O_3 and Fe_2O_3, which is consistent with the clay contents in soil.

[1] Jeong *et al* (2011) *Nat.Hazards* **59**, 347-365 [2] Kim *et al* (2006) *J.EngGeolKor* **16**, 201-204 [3] Nam *et al* (2013) *Proc. KSEG. Conf*. 115-118