

Study on the relationship between chemical weathering indices and clay-silt rates of the slope soil layers in granitic bedrock areas

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The phenomena of rock weathering usually combine chemical and mechanical (physical) weathering. This study examines which type of weathering is dominant and appears the characteristics of slope soils in several granitic base-rock areas. Rock samples are pre-collected in the granite areas of Nagiso, Iwakuni, Hiroshima, and Ishigaki, Japan. The relationships between the several chemical weathering indices such as CIA (Chemical Index of Alteration), Si/Al ratio, MWPI (Modified Weathering Potential Index), and PI (Product Index), and the particle size distribution were investigated. The results show that the CIA values and the Si/Al ratios are proportional to the clay-silt contents in those rocks and soils. In addition, those values have correlated with the climatic conditions of sampling sites. The CIA values indicate the dissolution degree of alkali/alkali earth elements from rocks and soils, whereas the Si/Al ratios indicate mineral alteration to clays. Therefore, it is considered that the larger the decomposition of rocks and chemical index changes, the chemical weathering are dominant.

Keywords: granite, chemical weathering, physical weathering (mechanical weathering), weathering index, clay, silt