



Determination of Soil Water Content by Hyperspectral Camera and Regression Analysis in Weathered Granite Soils

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Soil water content is one of the most common physical parameters that can trigger landslides or debris flows. The conventional volumetric water content test is time consuming and it is difficult to measure accurately because it is disturbed in sampling from the site. Therefore, it is of very importance to determine or predict the water content quickly and non-destructively. In this study, relationships between soil water content and reflectance spectra in weathered granite soils, sands and silts were investigated. It is discovered that the Near Infrared Region (NIR) absorbance band (1450 nm) of OH in water varies with the volumetric water contents of weathered granite soils, sands and silts and it could be detected by a hyperspectral camera. A Least Squares Regression (LSR) analysis can be applied to develop a calibration-model. The LSR model resulted in a good correlation between water content and NIR absorbance band variation. The results demonstrate that the hyperspectral camera combined with the LSR model can be a useful and non-destructive tool for the determination of soil water contents in the weathered granite soils which can be encountered in the landslide susceptible areas.