

Assessment of Field and Airborne Hyperspectral to Detect Peat Forest Degradation in Central Kalimantan, Indonesia

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Microsatellite is a new paradigm in Remote Sensing technology. Toward a new paradigm to attach the hyperspectral sensor on board microsatellite in the very new future, it need some more efforts to assess the sensors performance for operational use. Integration field, airborne or current space-based hyperspectral sensors is still important to reveal the physical and biophysical correlation with spectral reflectance for environmental issue such as peat forest degradation.

Colored Dissolved Organic Matter (CDOM) of peatland water in canal and forest canopy were measured by using ground-based spectroradiometer and HyMap sensor onboard an airplane, which ranged from 350 nm up to 2500 nm, respectively. Coinciding with the duration of airborne hyperspectral measurement, the physical and biophysical parameters such as soil moisture, underground water level, tree species, tree height, trees diameter of breast height (DBH), and crown cover were measured on the ground.

In finding the best correlation among physical and biophysical parameters with hyperspectral reflectance, waveband ranged from 350 to 2500 nm explored to find the optimal wavebands against physical, biophysical parameters and water index. Meanwhile, several indices such as Water Band Index (WBI) and Normalized Difference Water Index (NDWI) were applied from spectral transformations (obtained from selected optimal waveband) to improve sensitivity of ground water analysis. The present study is directed (1) to analyze the empirical correlation between spectral characteristic and forest degradation condition, (2) to find the appropriate indices (vegetation or water), (3) to find the correlation between forest degradation and underground water level. The initial results of study will contribute to develop a monitoring system for forest degradation, and to build a new approach to assess the carbon emission from peatland soil to the river as an optional tool of MRV to reach REDD+ monitoring target.

Keywords: remote-sensing, satellite, hyperspectral, airborne, peat forest