Analysis of crown spectral characteristic and tree species mapping of tropical forest using hyperspectral imaging.

ABSTRACT

Airborne hyperspectral remote sensing in Malaysia is relatively new. The advantage of hyperspectral remote sensing over satellite remote sensing is its ability to take high spatial resolution images. In this study, hyperspectral data were used for classification of individual tree crowns in a tropical rainforest. Field spectroradiometer and airborne hyperspectral reflectance spectra (288 bands, 500-850 nm) were acquired from eight species of emergent tree crown in Gunung Stong Forest Reserve, Kelantan, Peninsular Malaysia. Analyses focused on tree crown spectra in a 5 ha plot. Firstly, the spectral characteristic of the tree crown was developed. Next, spectral-based species classifications were performed using spectral angle mapper (SAM) classifiers. Optimal regions of the spectrum for species discrimination varied with scale. Near-infrared (700-850 nm) bands were consistently important regions across all scales. However, the band in the visible region (537-700 nm) was also important at crown scales. This study concluded that high spectral and spatial resolution imagery acquired over tree crown canopy of tropical forest has substantial potential for individual tree species mapping.