VARIATION AND ANISOTROPY OF REFLECTANCE OF FORREST TREES IN RADIOMETRICALLY CALIBRATED IMAGES OF AN AIRBORNE LINE SENSOR IMAGES – IMPLICATIONS TO SPECIES CLASSIFICATION

I. Korpela[*a] **F. Rohrbach**[a]

[a] University of Helsinki, Department of Forest Sciences, POB 27, 00014, University of Helsinki, Finland

Technical Commission VII Symposium 2010

KEY WORDS: Radiometry, Forestry, Modelling, Calibration, Pushbroom, Multispectral, LIDAR

ABSTRACT:

The performance of radiometrically calibrated images of the ADS40-SH52 airborne pushbroom sensor in tree species classification was tested in Finland. Sensor was flown at four altitudes over a test scene with over 15 000 trees. Study objectives were 1) implementation of a sensor model, 2) crown modeling in LiDAR for the determination of sun-lit and shaded parts of the crowns using ray-tracing in LiDAR, 3) study of the effects of the view-illumination geometry, adjacency effects, and other tree and stand factors, radiometric calibrations on the observed reflectance, and 4) tree species classification trials for pine, spruce, and birch. Results showed that the line-sensor geometry reduces the variability due to the view-illumination geometry making the image material more homogenous spectrally. Strong 20-30% adjacency effects were observed for conifers enclosed by birches having a high NIR reflectance. The reflectance values were strongly dependant on the illumination geometry in the oblique views of ADS40. Radiometric corrections reduced the variation due to the view-illumination geometry, which explained the improved classification accuracy using these data.

TOPIC: Multi-spectral and hyperspectral remote sensing
ALTERNATIVE TOPIC: Remote sensing applications