Estimation of leaf area index in a varying age Eucalyptus Globulus plantation from Landsat ETM+ imagery

Pranab Baruah
Insititute of Industrial Science, The University of Tokyo
Yasuoka Lab., Ce509, 4-6-1 Komaba, Meguro-ku,Tokyo, Japan
E-mail: **pjbaruah@iis.u-tokyo.ac.jp**

Abstracts

Estimation of leaf area index is important as it is related to processes of photosynthesis, transpiration, evaporation and found to be the most influencing biophysical parameter to primary productivity, and hence above-ground carbon stock, needed for carbon trading under 'Clean development Mechanism' of Kyotoh protocol. Spatial estimation of leaf area index can be used to predict future growth and can be indicative of canopy structure responses to competition, disease and climate change in spatial terms, making it useful for efficient forest management.

We measured plant area index (PAI) in a varying age Eucalyptus Globulus plantation (3 - 10 years) in Chile using hemispherical photography. Leaf area indices were then calculated by applying known factors to plant area indexes. A Landsat ETM+ imagery for the study area with the date of overpassing within a week of hemi-photo data collection date was used. Necessary corrections were applied to both the hemi-photos and the satellite imagery prior to any analysis. Relationships between corrected ETM+ signatures as well as concerned vegetation indices and LAI derived from hemi-photo were investigated. It was found that, Green Corrected Normalized Difference Vegetation Index (NDVIc), was best for estimating LAI from ETM+ imagery in our varying age E. Globulus plantation. The best relationship was applied to generate a LAI map for the study area