



Estimation of surface parameters from MISR data

J. Hu (1), Y. Su (1), K. A. Crean (2), J. V. Martonchik (2), D. J. Diner (2), **Y. Knyazikhin** (1) and R. B. Myneni (1)

(1) Boston University, Boston, USA, (2) Jet Propulsion Laboratory, California Institute of Technology, Pasadena, USA (jknjazi@crsa.bu.edu)

The Multi-angle Imaging SpectroRadiometer (MISR) instrument is designed to provide global imagery at nine discrete viewing angles and four visible/near-infrared spectral bands. The MISR standard products include green Leaf Area Index (LAI) of vegetation and Fraction of Photosynthetically Active Radiation absorbed by vegetation (FPAR). These parameters are being routinely processed from MISR data at the Langley Atmospheric Sciences Data Center since October 2002. A principal objective of the MISR approach is to retrieve LAI and FPAR without requiring a static, pre-specified global biome map. Single angle retrievals require this information to constrain the results. Performance of the MISR LAI/FPAR algorithm for a limited set of data from Africa suggests that the joint use of angular and spectral information without a prescribed biome map or training data results in comparable accuracy to LAI values obtained from single-angle retrievals that require a pre-defined biome map. The multiangle algorithm can therefore adapt to changing or unknown land cover.

The MISR surface product includes PAR-integrated bihemispherical reflectance (BHRPAR), a broadband visible albedo. The fraction of PAR absorbed by the ground beneath the canopy can be obtained as $FGROUND = 1 - BHRPAR - FPAR$. This variable together with independent estimates of LAI can be used to derive at least three measures of canopy structure – (1) extinction coefficient for use in ecological models, which typically use the Beer's law or two stream approximation to model radiation, (2) mean leaf angle inclination and (3) gap fraction. Another discipline where FGROUND can be useful is the general theme of freeze-thaw studies in cold climate.