

Observing bidirectional reflectances from space with the Multi-angle Imaging SpectroRadiometer

David J. Diner, Jet Propulsion Laboratory/California Institute of Technology

The Multi-angle Imaging SpectroRadiometer (MISR) is one of five instruments in polar sun-synchronous orbit aboard the Terra satellite. MISR contains nine cameras that acquire moderate resolution global imagery at nine discrete along-track view angles ranging from nadir to 70.5 degrees, in four spectral bands. Automated methods of processing the multi-angle data have been developed in order to provide bidirectional reflectances that are co-registered to the surface terrain or to the tops of cloud fields. The observed angular signatures are governed, at least in part, by macroscopic texture at the subpixel scale. Example applications of this type of information include detecting surface water, distinguishing different types of vegetation or ice, and discriminating clouds from snow and ice. Bidirectional reflectances additionally enable more accurate estimates of surface and cloud albedo than can be obtained from measurements at a single angle of view. MISR imagery and bidirectional reflectances from a number of different geographic locations will be presented to illustrate the capabilities of this novel observational technique.