Aerosol Properties Over Dark Water from MISR Multi-angle Imaging

R Kahn, D McDonald, J Jackson (Jet Propulsion Laboratory, Pasadena,CA 91109; 818-354-9024; e-mail: ralph.kahn@jpl.nasa.gov)

The Multi-Angle Imaging SpectroRadiometer (MISR) has been orbiting Earth for just under two years. It provides 36 simultaneous views of the planet, in an unprecedented combination of nine angles and four wavelengths, with spatial resolution as high as 275 m.

Pre-launch theoretical studies indicated that MISR's well-calibrated spectral radiances, measured at precisely known air-mass factors ranging from one to three, could provide tight constraints on aerosol optical depth. And along with the wide range of scattering angles sampled (about 50° to 160° at mid-latitudes), MISR would offer constraints on particle shape, size distribution, and composition, particularly over a dark, uniform ocean surface.

We have participated in four major field campaigns during the past year, giving us opportunities to measure the actual performance of MISR standard and research aerosol retrieval approaches against near-simultaneous in situ atmospheric and surface observations. The analysis of these data is underway.

MISR overflew the Puerto RIco Dust Experiment (PRIDE; July 2000) site when coordinated measurements were made of dusty as well as clean maritime air. At SAFARI 2000, MISR and AirMISR imaged air containing biomass burning and dust particles off the west coast of Namibia. ACE-Asia (April 2001) produced MISR aerosol validation data in air containing Gobi desert dust, biomass burning particles, marine aerosols, and pollution. And during the CLAMS campaign (July 2001), MISR and AirMISR viewed clean maritime and polluted air while detailed characterization of the atmosphere and ocean surface below was taking place. In addition to testing MISR aerosol retrieval approaches with these data and refining the component particle properties we assume in the climatological retrievals, ACE and CLAMS included volume closure experiments, allowing us to assess the contribution of scene variability to measurement uncertainty.

Early results indicate that under many circumstances, MISR algorithms retrieve aerosol optical depth to an accuracy greater than 0.05, and that in addition to separating spherical from randomly oriented non-spherical particles, they may distinguish thin cirrus from dust.