

Pollution and mineral dust aerosol retrievals over dark water from MISR multi-angle satellite imaging

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The MISR multi-angle imaging instrument, flying aboard the NASA Earth Observing System's Terra satellite, makes measurements at nine view angles, in each of four wavelengths, near-simultaneously. MISR systematically covers a range of air mass factors from one to three, and in mid-latitudes, samples scattering angles extending from about 60° to 160°. We are quantifying the information these data provide about particle size distribution, shape, composition, and amount, with the help of field data acquired during the ACE-Asia and CLAMS campaigns. In both campaigns, we obtained high-resolution data over a 400-km-wide swath, coincident with observations by multiple instruments on two or more surface and airborne aerosol-measuring platforms. The cases obtained capture a range of clean, dusty, and polluted aerosol conditions. Initial characterization of the detailed environmental conditions for five of these cases, based on the field observations, has been completed.

This presentation uses the field results as ground truth, to critically test the sensitivity of MISR aerosol retrievals to assumed particle micro-physical properties, a key step in refining the satellite multi-angle retrieval algorithms. We concentrate here on our ability to distinguish pollution aerosols from naturally occurring, non-spherical Asian dust, to measure the total aerosol column optical depth, and to determine the size distribution and single scattering albedo of the pollution component.