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Mapping Dusty-region Aerosol Air Mass Types from Space

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Coincident surface, aircraft, and MISR space-based multi-angle imaging observations during the SAMUM and UAE-2 field campaigns have made it possible both to validate the satellite aerosol amount and particle type retrievals, and to demonstrate how such data can place sub-orbital aerosol measurements into a regional context. The former has allowed us to quantify the strengths and limitations of MISR aerosol retrievals in desert and mixed desert dust + pollution environments, whereas the latter points toward applications of the MISR data to regional aerosol air mass characterization. The MISR data contain enough information to retrieve aerosol optical depth (AOD) over bright desert surfaces, and to separate spherical from non-spherical particles when total-column mid-visible AOD exceeds about 0.15 or 0.2. In addition, near aerosol sources, where distinct features are visible in multi-angle views, the heights of aerosol plumes can be derived by stereo-matching.

This presentation will elaborate on the strengths and limitations of MISR aerosol products for dusty region aerosol air mass type mapping, with illustrations from the field campaigns, as well as the most recent results from ongoing aerosol transport and source characterization studies.