Multiangle remote sensing, in particular from Multi-angle Imaging SpectroRadiometer (MISR), provides a unique, independent source of data for study dust emission and transport. MISR is an imaging instrument that uses the combination of multi-spectral and multi-angle data to retrieve aerosol properties and stereo heights.

We examine the 10-year MISR data record of aerosol optical thickness (AOT), optical properties, and dust heights in largest dust source regions and along dust transport routes. Within each selected region, we analyze the multi-annual mean and variability of AOT and particle properties, taking into account the effects of MISR sampling and cloud coverage. We use AERONET ground-based sun-photometry, available meteorological, and other satellite data to supplement and constrain the MISR products. Comparisons between MISR and the validation data sets demonstrate similarities in AOT multi-year spatial and temporal patterns in the dust regions, although some discrepancies, especially under heavy dust loading, are observed and will be discussed.

In addition to AOT/optical property analysis, we will present a climatology of MISR stereo plume heights and winds over the Bodélé Basin and the Taklimakan. We demonstrate that, although large-scale dynamics has some effect on dust properties, month-to-month differences in the anomaly time series are dominated by meso-scale systems specific to the each source region. These source-specific differences provide valuable information for testing/validating regional dust transport models. The results will be presented and interpreted in the context of atmospheric dynamics variability, including variability of meteorological regimes in dust sources and the large-scale atmospheric circulation features controlling the dust transport.