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Current and future MISR datasets from the NASA Terra satellite for model evaluation

Michael Garay[†];
[†] Raytheon, USA
Leading author: Michael.J.Garay@jpl.nasa.gov

The Multi-angle Imaging SpectroRadiometer (MISR) instrument has been operational on the NASA Terra satellite since early 2000. In spite of providing over 11 years of quantitative observations of clouds, aerosols, and land surfaces, MISR data is relatively underutilized within the wider climate community. Part of the reason for this is that, although most MISR products are available within 24 hours, this is outside the near real time window for assimilation of data within operational numerical weather prediction (NWP) models. On the other hand, because these products are not assimilated, MISR provides unique datasets for model assessment and validation. The MISR instrument team is also working on a number of advanced products that take advantage of our increased understanding of multi-spectral, multi-angle data to yield new types of information previously unavailable from satellites. We will describe a number of these products, and discuss how they can be used for data evaluation and assimilation, particularly for reanalysis. The MISR cloud fraction by altitude and cloud motion vector products provide global summaries of some of the fundamental MISR cloud geophysical parameters, including geometrically-retrieval cloud-top heights, which are independent of knowledge of the atmospheric temperature structure, and height-resolved cloud motion vector winds. Future refinements to the MISR wind products include higher resolution vector wind and wind component retrievals. The operational MISR aerosol product provides aerosol optical depth (AOD) information at 17.6 km spatial resolution over both land and water. Particle type, including identification of absorbing and non-spherical (dust) aerosols is also provided. We will discuss the performance of this product relative to validation data and on-going work aimed at improving the performance of the MISR AOD retrievals, especially in situations of large aerosol loading, and refinements to the MISR particle type retrieval.