

Recent Advances In Passive Remote Sensing of Aerosol Vertical Distribution

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The vertical distribution of aerosols regulates the aerosol impacts on the climate, cloud formation, and surface air quality. While the remote sensing of the aerosol vertical profile from active satellite sensors suffers from the narrow swath, the passive remote sensing provides much wider spatial coverage with lower information content. This presentation will briefly overview the recent advances in passive remote sensing of aerosol distribution, including retrieval of aerosol optical centroid height (AOCH) and aerosol vertical profile. The physics and theoretical basis for the retrieval algorithm will be provided, so is the recent new development of Unified Linearized Vector Radiative Transfer Model (UNL-VRTM) that describe the aerosol vertical profiles from the principal component analysis of 15 years of aerosol profile measurements from the spaceborne lidar Cloud-Aerosol Lidar with Orthogonal Polarization, serving as the prior information for the retrieval. Case studies of using TEMPO data and TROPOMI data for aerosol vertical profiles are then validated with the lidar data from space (such as from EarthCare).