

Following the Dust: Satellite Perspectives of Dust Sources, Transport, Deposition, and Impacts

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Mineral dust is an integral component in the Earth system that interacts with the system's many other components involving the energy, water, and carbon cycles. Dust also degrades air quality and adversely affects human health. These interactions and impacts are not contained in regions nearby dust sources, but can reach very far because of the long-range transport on intercontinental and global scales. Satellite's routine sampling and extensive coverage in time and space makes it an ideal platform to follow the dust from sources to sinks and assess its impacts along the long journey. Dust particles are unique in their coarse size and irregular shape, which makes it feasible to distinguish them from other aerosol particles using remote sensing techniques. This talk will provide an overview of what we have learned from analyzing advanced satellite remote sensing measurements during the EOS-era supplemented by in situ observations and model simulations, including dust source characterization, seasonal and interannual variability, trans-Pacific and trans-Atlantic transport and deposition, and dust influences on the radiation budget, air quality, and ecosystems. The talk will also discuss challenges and opportunities to further improve the dust characterization and assessment of the impacts via remote sensing techniques.