ABSTRACT
Atmospheric aerosols have major roles in global public health and radiative forcing of climate. Fine particulate matter (PM$_{2.5}$) is the leading environmental risk factor for global burden of disease. However, ground-level monitoring remains sparse in many regions of the world. Satellite remote sensing offers a global data source to address this issue. Global modeling plays a critical role in relating these observations to ground-level concentrations. The resultant satellite-based estimates of PM$_{2.5}$ indicate dramatic variation around the world, with implications for global public health. A new ground-based aerosol network offers valuable measurements to evaluate and improve satellite-based PM$_{2.5}$ estimates. Satellite remote sensing at ultraviolet wavelengths provides new insight into atmospheric brown carbon and radiative effects. Interpretation of Arctic aerosol observations with a chemical transport model identifies processes controlling aerosol number and climate forcing. This talk will highlight recent advances in combining satellite remote sensing, global modeling, and ground-based measurements of atmospheric aerosols to improve understanding of global population exposure and of climate processes.

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