Satellite Remote Sensing of Air Pollution and Aerosol Climate Forcing

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Abstract

Particular matter (PM), or aerosol, is the general term used for a mixture of solid particles and liquid droplets found in the atmosphere. Monitoring natural (e.g. dust) and anthropogenic aerosols (biomass burning smoke, industrial pollution) has gained renewed attention because they influence cloud properties, alter the radiation budget of the earth-atmosphere system, and cause changes in surface temperature and precipitation. Aerosols also reduce visibility and induce respiratory diseases when sub-micron sized aerosols penetrate the lungs, thereby affecting air quality and health. Although several ground-based networks are currently in operation to monitor aerosols for different purposes they are essentially point measurements and are inadequate to provide health alerts on large spatial scales. On the other hand, satellite imagery due to their large spatial coverage and reliable repeated measurements, provide another important tool to monitor aerosols and their influence of climate. New satellite sensors from NASA’s Terra and Aqua satellites have tremendous potential for examining the role of aerosols on climate and air pollution. Using a combination of satellite and ground-based data sets, this paper will review some recent results and progress in using remote sensing data sets for air quality and aerosol climate forcing studies.

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