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AEROSOLS AND CLIMATE CHANGE: A TUTORIAL

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Abstract

Atmospheric aerosol particles scatter and absorb shortwave (solar) radiation and, by serving as nuclei for cloud droplet formation, affect the number concentration of cloud droplets, in turn influencing cloud reflectance and precipitation formation. The influences of anthropogenic aerosols on Earth's radiation budget are substantial locally and globally. At present radiative forcing of climate change by anthropogenic aerosols is considered the most uncertain component of forcing of climate change over the industrial period, largely on account of uncertainties in the amount and properties of these aerosols. This tutorial presents an overview of these phenomena and identifies the aerosol properties that must be known to quantify their radiative influences, permitting calculations of the aerosol perturbations to shortwave irradiance and of their sensitivity to controlling variables.

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