

Special Program in Applied Mathematics and Applied Mechanics

Uncertainties in estimates of aerosol direct radiative forcing

2013 - 12 - 18 (Wed.)

15:00 - 18:00

308, Mathematics Research Center Building (ori. New Math. Bldg.)

Aerosols affect Earth's energy budget by scattering and absorbing radiation (the "direct effect") and by modifying microphysical and radiative properties of clouds (the "indirect effect"). Current assessment of aerosol radiative effect is hindered by our incomplete knowledge of aerosol optical properties, especially absorption. In addition, the complex spatial, temporal, chemical composition, physical size and shape, and optical characteristics of atmospheric aerosols cause large uncertainties in the estimation of aerosol effects on climate [IPCC, 2013]. In this presentation, I want to explain the different approaches (i.e., observational and theoretical approaches) we have used for estimating aerosol radiative forcing, as well as their corresponding uncertainties. To lessen the uncertainties, remote sensing and in-situ measurements as observational approach providing essential information; however, comprehensive modeling is required to bridge these temporal and spatial observations, and to serve as the integrator of our understanding of many physical processes in the Earth-atmosphere system.



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