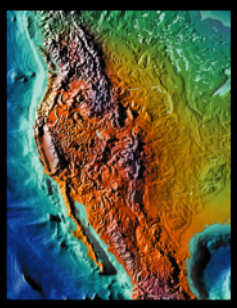

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Frontiers in Geoscience Colloquium

Tuesday, September 20, 2016
3:00pm – 4:00pm
Physics Auditorium (TA-3, Bldg 215)

A multi-scale modeling framework for simulating climate impacts of carbonaceous aerosol

Professor Nicole Riemer

University of Illinois at Urbana-Champaign

Quantifying the effects of carbonaceous aerosol on climate requires a faithful representation of this aerosol type in global climate models. This is a challenging task since the quantities that determine macro-scale climate impacts—such as aerosol absorption and scattering, and cloud condensation nuclei activity—depend on micro-scale aerosol processes.

In this seminar I will present a multi-scale modeling framework to investigate and improve the representation of carbonaceous aerosol in global models such as CAM5. The framework is based on detailed particle-scale simulations with the stochastic particle-resolved aerosol model PartMC-MOSAIC. Using this type of detailed modeling approach enables us to quantify the individual processes that contribute to the aging of carbonaceous aerosol and to quantify the effect of aerosol mixing state on optical properties and CCN activation properties. I will discuss coarse-graining methods for scaling PartMC-MOSAIC model results for use in large-scale climate models, and compare and contrast the results to those obtained with the traditional CAM5 aerosol microphysics.

Host: Manvendra Dubey, EES-14, 5-3128

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