EE 500 GRADUATE COLLOQUIUM

Spring 2014

You are cordially invited to

"Coherent Scattering from Cloud Drops and Ice Crystals: One Perspective on Its Ramifications for Climate, Cloud Property Remote Sensing, and Evaluation of Microphysical Models"

By

Dr. Eugene Clothiaux

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Date: April 3, 2014

Time: 4:00 pm

Location: 160 Willard Bldg.

Abstract

Quantifying the feedbacks of clouds on a warming climate has been particularly challenging. For example, the IPCC 5th Assessment Report from Working Group 1 contains the following statements in Section TFE.6 -Climate Sensitivity and Feedbacks (Page 82): "Cloud feedbacks continue to be the largest uncertainty" and "Clouds respond to climate forcing mechanisms in multiple ways and individual cloud feedbacks can be positive or negative. Key issues include the representation of both deep and shallow cumulus convection, microphysical processes in ice clouds and partial cloudiness that results from small-scale variations of cloud-producing and cloud-dissipating processes." The focus of this talk will be on the radiative implications of "partial cloudiness that results from small-scale variations of cloud-producing and cloud-dissipating processes" and "microphysical processes in ice clouds." Coherence will be introduced in a consideration of the radiative impacts of partial cloudiness and extended to the remote sensing of ice-particle properties at cloud-radar wavelengths. Results from the ice-particle studies will subsequently be used to provide one perspective on ways to move forward in the evaluation of cloud microphysical models using cloud-radar observations.

Biography

Eugene E. Clothiaux was born in Las Cruces, New Mexico on (Friday) October 13, 1961. He spent most of his early years in Auburn, Alabama, and later attended Auburn University, where he received the B.Sc. degree in physics in 1983. He attended Brown University for graduate research, obtaining the M.S. degree in physics in 1986 and the Ph.D. degree in physics in 1990. The primary focus of his Ph.D. work was comparisons of the predictions of a neural network model for synaptic plasticity in kitten visual cortex with experimental data. In 1991 he was awarded a Department of Energy Global Change Distinguished Post-Doctoral Fellowship to study radar returns from clear-air turbulence and clouds using a number of different radars developed at the Pennsylvania State University. He is currently a professor in the Department of Meteorology at the Pennsylvania State University, where his interests are ground- and satellite-based remote sensing of clouds with an emphasis on trying to understand the impact of clouds on the radiation budget of the Earth. During the course of his work, he has participated in a number of

observational programs, including the First International Satellite Cloud Climatology Project Regional Experiments in Coffeyville, Kansas, the Atlantic Stratocumulus Transition Experiment in Santa Maria, The Azores, the Maritime Continent Thunderstorm Experiment in Darwin, Australia, and the Department of Energy Atmospheric Radiation Measurement Program experiments now underway in the Southern Great Plains of the United States, the North Slope of Alaska, and the tropical western Pacific. He has also participated in the development of cloud detection algorithms applied to data from the Multi-Angle Imaging Spectrometer Radiometer developed by the Jet Propulsion Laboratory and flown on the NASA EOS TERRA platform. He is currently a member of the American Geophysical Union and the American Meteorological Society.

His research involves scientific disciplines of ground- and satellite-based remote sensing of clouds with an emphasis on trying to understand the impact of clouds on the radiation budget of the Earth. He has worked with wind-profiler radars, high-frequency short-wavelength cloud radars, micro-pulse lidar, and microwave radiometers. Collectively, these instruments are at the core of ground-based retrievals of cloud properties. Understanding the impact of cloud properties on the radiation budget of the Earth is an important topic in current numerical weather prediction and climate change research. He has translated results from ground-based retrieval research into many collaborative ventures related to the energy budget of the Earth, including studies on clear-sky radiative transfer, cirrus properties, and photon path length within the oxygen A-band.