

PURDUE FLUIDS SEMINAR SERIES

Particle and Cloud Measurements from High Altitude Research Aircraft: From Engineering to Deployment

FRIDAY NOVEMBER 15TH, 2024
SEMINAR 2:15PM-3:00PM ARMS 1010
DISCUSSION 3:30PM-4:00PM ARMS 1109



DANIEL CZICZO

Professor, Department of Earth, Atmospheric, and Planetary Sciences
Purdue University

Abstract

Among the greatest contemporary challenges faced by our society is climate change. One reason climate change has presented a challenge is because of the complex, and often interwoven, factors causing the observed changes. While greenhouse gases are accurately measured and their impact well known, the emission of particles and the clouds they spawn are far less understood and form a large fraction of the uncertainty in projecting future change. This seminar will address one important aspect of understanding atmospheric particles and clouds: how to design and deploy inlets on high-altitude and high-speed aircraft. These inlets need to be able to sample particulate matter without introducing biases due to particle properties, such as volatility or size. Likewise, biases due to aircraft motion, such as variable speed and angle of attack, also need to be considered. Relevant data from recent flights aboard platforms such as NASA's DC-8 and ER-2 will be presented as well as concepts for future flights and aircraft.

Biography

Dan Cziczo is an atmospheric scientist interested in the interrelationship of particulate matter and cloud formation. His research utilizes laboratory and field studies to elucidate how small particles interact with water vapor to form droplets and ice crystals which are important players in the Earth's climate system. Experiments include using small cloud chambers in the laboratory to mimic atmospheric conditions that lead to cloud formation and observing clouds in situ from remote mountaintop sites or through the use of research aircraft. Dan's current research interests include: Chemical composition of atmospheric aerosols with an emphasis on their effect on cloud formation mechanisms, Earth's radiative budget, and meteoritic debris and launch vehicle emissions in the atmosphere.



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