UTSA The University of Texas at San Antonio™

DATE:
Thursday, November 4, 2021

TIME:
11:00am-12:00pm CDT

LOCATION:
BSE 2.102

CAMEE

NASA MIRO CAMEE

CENTER FOR ADVANCED MEASUREMENTS IN EXTREME ENVIRONMENTS

PRESENTS:

Dr. Ralph Kahn, Senior Research Scientist at NASA Goddard Space Flight Center.

Title: *Desert Dust, Wildfire Smoke, Volcanic Ash, Urban Pollution—Satellite Contributions Toward Grasping the Role Particles Play in Global Climate and Regional Air Quality*

Abstract:

Airborne particles are ubiquitous components of our atmosphere, originating from a variety of natural and anthropogenic sources, exhibiting a wide range of physical and chemical properties, and contributing in multiple ways to regional air quality as well as regional-to-global-scale climate. Most remain in the atmosphere for a week or less, but can traverse oceans or continents in that time, carrying nutrients or disease vectors in some cases. Bright aerosols reflect sunlight, and can cool the surface; light-absorbing particles can heat the atmosphere, suppressing cloud formation and mediating larger-scale circulations. In most cases, particles are required to collect water vapor as the initial step in cloud formation, so their presence (or absence) and their hygroscopic properties can affect cloud occurrence, structure, and ability to precipitate.

Grasping the scope and nature of aerosol environmental impacts requires understanding microphysical-to-global-scale processes, operating on timescales from minutes to days and longer. Satellites are the primary source of observations on kilometer-to-global scales. Spacecraft observations are complemented by suborbital platforms: aircraft *in situ* and remote sensing measurements as well as surface-based instrument networks that operate on smaller spatial scales, some on shorter timescales. Numerical models play a third key role in this work — providing a synthesis of current physical understanding with the aggregate of measurements, filling observational gaps, and allowing for some predictive capability.

This presentation will focus primarily on what we can say about aerosol amount and type ***from space***. Satellites have done a reasonable job of mapping monthly, global aerosol amoint (aerosol optical depth) over the past two decades. Constraining particle "type" is at present the leading challenge for satellite aerosol remote sensing. We will review recent advances, including the strengths and limitations of available approaches, and will cover a little about the need to better integrate satellite and suborbital measurements with models to create a clearer picture of aerosol environmental impacts, globally.

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