UTSA The University of Texas at San Antonio™

DATE:
Thursday, June 18, 2020

TIME:
2:00-3:00pm CST

LOCATION:
via Zoom (link provided in email)

CAMEE

NASA MIRO CAMEE

CENTER FOR ADVANCED MEASUREMENTS IN EXTREME ENVIRONMENTS

PRESENTS:

Dr. John Cassano, Fellow of the Cooperative Institute for Research in Environmental Sciences and Associate Professor in the Department of Atmospheric and Oceanic Sciences, University of Colorado, Boulder. Dr. Cassano is also a collaborating CAMEE PI.

Title: *Autonomous Observations of the Polar Atmospheric Boundary Layer*

Abstract:
The atmospheric boundary layer modulates the exchange of heat, moisture, momentum and other properties between the atmosphere and the underlying surface. As such, understanding the boundary layer is critical for understanding the climate system. The polar atmospheric boundary layer exhibits several unique features relative to lower latitude boundary layers and weather and climate models struggle to represent some of the less common boundary layer features found in the polar regions.

Our research group has used unmanned aerial systems (UAS) and automatic weather stations (AWS) to study the atmospheric boundary layer in the polar regions. AWS observations from a 30 m tower on the Ross Ice Shelf, Antarctica have been made since 2011. Eight field campaigns, using UAS, have been conducted throughout the annual cycle over ice sheet, sea ice and bare ground locations in the Antarctic from 2009 to 2017. In 2020 we took part in the MOSAiC (Multidisciplinary drifting Observations for the Study of Arctic Climate) expedition and made UAS observations of the boundary layer over second year sea ice in the central Arctic from the end of the Arctic winter into early spring. The AWS and UAS data we have collected capture a wide range of boundary layer conditions including very shallow and strongly stable boundary layers, shallow wind-mixed boundary layers and deep convective boundary layers. Analysis of this data offers insights into the processes that control the thermodynamic state of the lower atmosphere and how the atmosphere interacts with the underlying ice surface. This data also allows us to evaluate the ability of weather and climate models to reproduce observed boundary layer features and processes. Examples illustrating the range of boundary layer states observed in the Antarctic and Arctic will be presented. This presentation will conclude with a discussion of a new 30 m AWS that will be installed in West Antarctica in the near future.

More details about Dr. Cassano's research: https://cires.colorado.edu/council-fellows/john-j-cassano

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