Welcome!

Please join us for the final ATOC Colloquium of the academic year on **Friday, April 22** from **11:00 AM–12:00 PM,** which will be held in **SEEC S228 and simulcast over Zoom.**. This week's colloquium features graduate students, **Mckenzie Dice, Sam Mogen, and Andrew Buggee**. Please join us for coffee beginning at 10:45 AM and stay for lunch from Illegal Pete's afterwards.

Mckenzie Dice ▸ Assessing Physical Relationships Between Atmospheric State, Fluxes, and Boundary Layer Stability at McMurdo Station, Antarctica

Observations at McMurdo Station, Antarctica from 24 November 2015 through 3 January 2017 were used to characterize the physical relationships between boundary layer stability and atmospheric state and fluxes. The basis of this analysis was self-organizing maps (SOMs), a neural network algorithm used to identify the range of potential temperature profiles present in the twice-daily radiosonde data during the ARM (Atmospheric Radiation Measurement) West Antarctic Radiation Experiment (AWARE) campaign. The SOM identified profiles ranging from strongly stable to weakly stable regimes over the lowest 500 m of the atmosphere. The mechanisms responsible for the dominance of different stability regimes in each season were analyzed to determine why these regimes occur with varying frequency throughout the year. This analysis found that wind speed variations and radiative cooling are responsible for the stability observed in the winter, radiative warming, as well as weaker wind speeds, are responsible for summer weak stability, and stability variations in the transition seasons (FMA, SON) are characterized by a change in sign of net radiation with increasing stability, as wind speed changes little across stability regimes. The occurrence of low-level jets and the depth of the boundary layer, as estimated by the bulk Richardson number, were also analyzed. The future of this research will also be presented.

Sam Mogen ▸ Ocean biogeochemical signatures of the North Pacific Blob

The North Pacific Marine Heatwave (2013-2016) was an extreme and persistent event that had impacts on regional ecosystems. While the temperature anomalies of the early heatwave (The Blob) are well understood, the biogeochemical impacts are understudied. Here we use an Earth System Model reconstruction to better quantify the impacts of the heatwave on biogeochemistry. We find that the heatwave was associated with a temporary mitigation of ocean acidification and worsening of ocean deoxygenation.

Andrew Buggee ▸ Estimating Vertical Profiles of Cloud Microphysical Properties from Space

Clouds play an essential role in Earth's climate by modulating the flow of energy through the Earth system. However, clouds remain difficult to study both in-situ and remotely, leading the latest Earth Science decadal survey to list clouds as the most important observable over the next decade. Current cloud retrieval methods use a few spectral bands to estimate column averaged properties. Several upcoming NASA missions will carry hyperspectral imagers that measure scattered radiation over most of the solar spectrum. These instruments will measure hundreds of spectral bands contiguously, enabling the estimation of vertical profiles of cloud microphysical properties. This talk will introduce the classic optical cloud retrieval technique, and lay the groundwork for next-generation retrievals of vertical profiles using space-borne hyperspectral instruments.

Zoom: https://cuboulder.zoom.us/j/92145912241 **Passcode:** ATOC

About the ATOC Colloquium

The Department of Atmospheric and Oceanic Sciences (ATOC) Colloquium is typically held **every other Friday** from **11:00 AM–12:00 PM**. Colloquia alternate between the following formats: (A) Full-length talk by a faculty member or invited speaker, (B) Three conference-length talks by graduate students or postdocs. If you would like to nominate a speaker (including self), please email the ATOC Colloquium Committee Chair, Prof. Jan Lenaerts (jan.lenaerts@colorado.edu). Please visit www.colorado.edu/atoc/colloquium for further details.