Welcome!

Please join us for the next ATOC Colloquium on **Friday, Apr. 10** from **11:00 AM–12:00 PM**, which will be held in **SEEC S228** and simulcast over Zoom. This week's colloquium features three ATOC graduate students/postdocs, **Shawn Wang, Quinn Adams, and Yu-Wen Chen**. Please join us for conversation beginning at 10:45 AM.

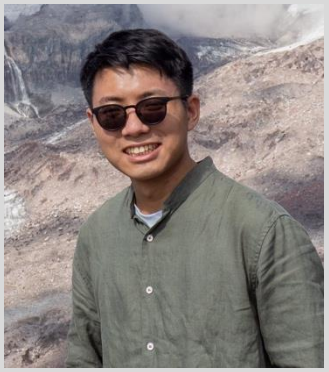
Shawn Wang ▸ Coupling of Pacific and Indian Ocean Variability disrupted by 19th century volcanism

On inter-annual to decadal timescales, the Indian Ocean displays a basin-wide warming pattern known as the Indian Ocean basin-mode (IOBM). The IOBM covaries with the Pacific Walker Circulation (PWC) through inter-basin teleconnections but this coupling has degraded considerably in recent decades. While studies link this anomalous behavior to greenhouse gas forcing, the instrumental record is too short to unequivocally determine whether such a decoupling could have also arisen naturally. Here we contextualize recent trends by reconstructing the IOBM and PWC over the past four centuries by utilizing a compilation of tropical paleoclimate records. We demonstrate that the IOBM was largely coupled to the Pacific throughout the preindustrial era, but this coupling was disrupted by a series of strong volcanic eruptions during the early 19th century. Nonetheless, the PWC-IOBM relationship since the mid-20th century appears exceptional relative to equivalent intervals of the past 1,000 years, including periods of strong volcanism. Given that interactions between ocean basins have been recognized as important sources of near-term predictability, our results have implications for climate risk management efforts.

Quinn Adams ▸ From Regional Signal to Local Decisions: Advancing Climate-Informed West Nile Virus Forecasting

Climate is a key driver of West Nile virus (WNV) transmission. However, translating this signal into actionable forecasts remains a challenge, particularly at the local scales relevant for intervention. In this talk, I present our team's county-level extension of recent regional advances in climate-informed disease forecasting using hierarchical statistical modeling and machine learning approaches to explicitly separate two objectives: inference of climate–disease relationships and optimization of predictive skill. We built a rolling retrospective forecasting system across U.S. counties and show that incorporating distributed lag climate features, spatial structure, and non-linear interactions improves short-term (1–3 month) forecasts relative to persistence and climatological baselines, even at fine spatial scales. We further show that reframing the prediction target from continuous disease incidence to decision-relevant classification outcomes (e.g., exceeding intervention thresholds) can enhance both operational utility and predictive performance. Together, these results highlight the opportunities and trade-offs of moving from regional to local climate–health forecasting and outline a path toward actionable early warning systems for vector-borne disease.

Yu-Wen Chen ▸ Spring- and Summertime Airborne Observations in the Arctic Suggest Prolonged Cloud-Induced Surface Melt



While satellite observations provide extensive spatial and temporal coverage of the Arctic, their coarse spatial resolution and the persistent presence of low-level clouds make it difficult to accurately measure sea ice properties over highly inhomogeneous surfaces. To bridge the gap between localized ground measurements and large-scale satellite observations, this study utilizes airborne measurements from the 2024 Arctic Radiation Cloud Sea Ice eXperiment (ARCSIX). We quantify the spatiotemporal evolution of sea ice albedo north of Greenland during the late spring and early summer season. To derive surface properties from flight-level observations, we apply a rigorous atmospheric correction using composite thermodynamic profiles initialized with satellite background data and constrained by high-resolution dropsonde and in situ trace gas measurements. Our observations reveal that springtime sea ice maintains a significantly higher albedo than estimated by current reanalysis products such as ERA5. When we evaluate the liquid cloud radiative effect using this brighter observed surface alongside in situ cloud properties, results show that a greater range of clouds contribute to net surface warming well into late spring than previously assumed.

Zoom: https://cuboulder.zoom.us/j/4713174822 **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–Noon**. 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. If you would like to nominate a speaker (including self), please email the ATOC Colloquium Committee Chair, Prof. Jianghanyang (Ben) Li (Jianghanyang.li@colorado.edu). Please visit www.colorado.edu/atoc/colloquium for further details.