



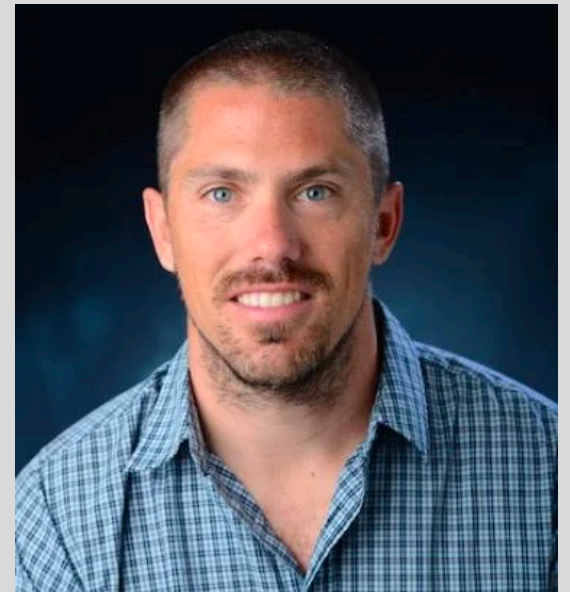
# ATOC COLLOQUIUM

## Welcome!

Please join us for first ATOC Colloquium of the fall semester on **Friday, September 2** from **11:00 AM–12:00 PM**, which will be held in **SEEC S228 and simulcast over Zoom**. This week's colloquium features **ATOC Professor Kris Karnauskas**. Please join us for coffee beginning at 10:45 AM and stay for lunch catered by Illegal Pete's afterwards. **Please be aware that masks are optional on the CU Boulder campus.**

## Upwelling and Equatorial Islands: Old Theories and the Ocean Data Revolution

Wind-driven upwelling is the stuff of 20th century legends from Ekman to Wyrtki. Along the equator in the open ocean, easterly trade winds peel the surface away and cold, nutrient-rich water rises from depth. Islands, on the other hand, are flies in the ointment. Hotspots of marine productivity and biodiversity near equatorial island chains, fueled by upwelling velocities an order of magnitude greater than in the open ocean, challenge the textbook theories. Our nascent understanding of equatorial islands and their relationship with the ocean circulation delays our ability to predict (and protect) crucial tropical marine ecosystems. First, we will use the global Argo array of profiling floats to reveal the spatial scales and provenance of upwelling at two distinct equatorial island chains (Galápagos and Gilberts). Argo measurements resolve a clear subsurface thermal fingerprint of vertical divergence at the depth of the Equatorial Undercurrent (EUC), confined to within 100 km of both island chains. This signal at the Galápagos is well reproduced by a high-resolution ocean reanalysis, enabling estimation of vertical velocities balancing the convergence of the EUC upon the islands. Next, we will investigate the curious observation that the waters off the Galápagos have been cooling over the satellite era. Using the aforementioned reanalysis, we will see that an acceleration and shift of the EUC, attributable to the interhemispheric gradient in surface warming, leads to faster upwelling and more vigorous mixing. Analogous to other so-called cold blobs, this is an early and important sentinel of broader changes in the global ocean circulation. Thus far, and for perhaps the very near future, the western shores of the Galápagos appear to offer refuge from some of the harmful impacts of climate change.



**Location:** SEEC S228 & Zoom

**Zoom:**

<https://cuboulder.zoom.us/j/97845417945>

**Password:** 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. Andrew Winters ([andrew.c.winters@colorado.edu](mailto:andrew.c.winters@colorado.edu)). Please visit [www.colorado.edu/atoc/colloquium](http://www.colorado.edu/atoc/colloquium) for further details.