

CGD SEMINAR



DATE: Tuesday, 13 March 2018

TIME: 11 a.m.

LOCATION: NCAR, 1850 Table Mesa Drive
Mesa Lab, Main Seminar Room

TITLE: Are the Tropics Expanding? Comparing
Our Expectations from Climate Models
with Observations

SPEAKER: Kevin Grise, University of Virginia

ABSTRACT:

In recent decades, the poleward edges of Earth's Hadley circulation have shifted poleward in both the Northern and Southern Hemispheres, acting to push subtropical dry zones further poleward. In this talk, I will review theoretical and modeling evidence supporting a widening of the tropics, and compare and contrast those expectations with trends from nine observation-based data sets. In particular, I will focus on the seasonal and regional characteristics of the recent poleward expansion of the Hadley circulation, which have not been extensively examined in previous studies. The Hadley circulation has expanded the most poleward during summer and fall in both hemispheres, with more zonally asymmetric circulation trends occurring in the Northern Hemisphere (NH). The seasonal and regional characteristics of the observed trends generally fall within the range of trends predicted by climate models for the late 20th and early 21st centuries, and in most cases, the magnitude of the observed trends does not exceed the range of trends from the models' control runs, which are driven exclusively by natural variability. One key exception occurs during NH fall, when large poleward shifts in the atmospheric circulation over the North Atlantic sector exceed nearly all trends projected by models. While most recent NH circulation trends are consistent with driving by a change in phase of the Pacific Decadal Oscillation (PDO), the circulation trends over the North Atlantic are only weakly affected by the PDO and instead reflect 1) unusually large natural variability and/or 2) a circulation response to anthropogenic forcing that is not properly captured by models.

Live webcast: <http://ucarconnect.ucar.edu/live>

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