

CGD SEMINAR



DATE: Tuesday, 19 February 2019

TIME: 11 am – 12 pm

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

TITLE: Quantifying contributions of cloud radiative feedbacks and ocean heat transport to sea surface temperature variability

SPEAKER: Eleanor Middlemas,
University of Colorado Boulder

ABSTRACT:

Literature states that dynamical ocean heat transport drives interannual to decadal sea surface temperature (SST) variations both in the deep tropics and in the global-mean. At the same time, cloud radiative feedbacks enhance subtropical SST variations. Here, we quantify the contributions of heat transport and cloud feedbacks on SST variability using CESM simulations and CMIP5 multimodel analysis. The experimental modeling configurations include those with ocean heat transport and/or cloud radiative feedbacks disabled, which result in different, freely-evolving climates. The influence from either ocean dynamics or cloud feedbacks depends on the region and timescale. Global-scale decadal changes in temperature do not require dynamical ocean heat transport; instead, decadal variations in global mean temperature can arise from atmospheric noise interacting with the mixed layer of the ocean. Meanwhile, decadal variability in the deep tropics related to El Nino Southern Oscillation is damped by cloud radiative feedbacks. In the subtropics, cloud radiative feedbacks enhance SST variability in the northeastern subtropical ocean basins by up to 40%, but the degree of this enhancement depends on the location of ocean heat convergence. Given the large intermodel spread in cloud radiative feedbacks across CMIP5 models, this study motivates future experiments with cloud radiative feedbacks disabled to better constrain the role of cloud radiative feedbacks on the climate system.

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

For more information, contact Tracy Baker, tbaker@ucar.edu 303.497.1366