

MMM SEMINAR SERIES



Convectively Coupled Kelvin Waves and Their Interactions with African Easterly Waves: From Reanalysis Data to Numerical Simulations

Quinton Lawton
NSF NCAR/MMM

The interactions between convectively coupled Kelvin waves (CCKWs) and African easterly waves (AEWs) are poorly understood. In this talk, I discuss ongoing research into CCKW-AEW interactions and their impacts on tropical cyclone (TC) formation. First, I present a 39-year climatology of CCKW-AEW interactions using reanalysis and satellite data. These interactions are common, with over 70% of AEWs encountering at least one CCKW in their lifetime. CCKWs also temporarily modify the characteristics and behavior of AEWs, including their dynamic *and* thermodynamic structure. Through an evaluation of these interactions in the context of TC formation (“genesis”) processes, I argue that CCKWs may encourage genesis through the enhancement of column moisture and cloud-radiative feedbacks. I then shift to how these features are represented in numerical models. To do so, I present results from a set of global MPAS-A experiments run for a time period in which several CCKWs coexisted around the globe. In these experiments, the amplitudes of CCKWs are modified at model initialization. This modification method is effective at robustly changing the strength and structure of simulated CCKWs and can make their convective coupling easier to identify. However, these experiments fail to simulate convective coupling in a strong Atlantic CCKW. The cause of this failure is unclear and motivates additional work into the predictability of CCKW events. I close this talk by discussing my current plans at NCAR to explore equatorial wave predictability and forecast busts.

Thursday, 17 October 2024, 2:00PM

Refreshments 1:45PM

Please also join colleagues for refreshments and informal discussion after the seminar until 3:30pm

NSF NCAR-Foothills Laboratory, 3450 Mitchell Lane
FL2-1022, Large Seminar

Seminar will also be live webcast

<https://operations.ucar.edu/live-mmm>

Participants may ask questions during the seminar via Slido.