

CGD/MMM Seminar Series

Tropical Weather Systems in a Hierarchy of MPAS-A Aquaplanet and Real-Data Simulations

Rosimar Rios-Berrios

NCAR

Date: Tuesday 26 April 2022

Time: 11am – 12pm

For Zoom information, please contact

Tracy Baker tbaker@ucar.edu

*For live stream information, visit the
CGD Seminar Webpage*

ABSTRACT

Tropical weather systems are important components of Earth's climate system—from being key players in redistributing heat and moisture from the tropics to the high latitudes to manifesting into powerful high-impact phenomena (e.g., hurricanes). Despite being so important, the representation of tropical weather systems and their variability is deficient in most climate and weather prediction models. This study tackles this issue by examining the multi-scale variability of tropical weather systems in a hierarchy of model experiments with varying horizontal cell spacing—from 120 km to 3 km—and for both idealized and realistic scenarios. All experiments were produced with the Model for Prediction Across Scales-Atmosphere (MPAS-A). In the first part of this talk, I will introduce a set of MPAS-A aquaplanet experiments and will demonstrate that all experiments capture tropical rainfall variability driven by equatorial waves. In the second part, I will present a novel analysis of the structure of convectively coupled equatorial waves as represented in both aquaplanet and real-data experiments. This analysis shows that convection-permitting resolution captures a more accurate vertical structure due to a better representation of diabatic heating within the equatorial waves. This, in turn, affects the rainfall intensity and evolution of the simulated waves. I will conclude with a discussion of the implications of these results, along with examples of other issues I plan to explore with the MPAS-A aquaplanet experiments.

For more information, contact Tracy Baker | tbaker@ucar.edu | x1366