MMM SEMINAR SERIES

"If It happened In..." A Pseudo-Global Warming Assessment of Tropical Cyclone Tornadoes: Hurricane Ivan (2004).

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The purpose of this study is to investigate the impacts of anthropogenic climate change on the frequency of tornadoes spawned by tropical cyclones making landfall in the U.S. Atlantic Basin. Hurricane Ivan (2004), a prolific tropical cyclone tornado (TCT)-producing storm, is the particular case under consideration. Using the Weather Research and Forecasting model, Hurricane Ivan is simulated under its current-climate forcings. Such a control simulation is compared to simulations conducted using a "pseudo-global" warming (PGW) approach, which allows for an assessment of long-term impacts of changes in greenhouse gas concentrations and associated radiative forcing. The PGW simulations involve future climate conditions over the late (2080-2090) century period under RCP 8.5, using the Community Climate System Model version 4 (CCSM4), Model for Interdisciplinary Research on Climate version 5(MIROC5), and Geophysical Fluid Dynamics Laboratory Climate Model version 3(CM3) climate models. Changes in tropical cyclone intensity and TCT production, identified for the PGW-perturbed Ivan are documented and analyzed.

In lieu of explicitly resolving tornadoes, TCT surrogates (TCTS) are identified using an algorithm based on a resolution dependent threshold of maximum updraft helicity (UHmax) and simulated radar reflectivity (SRF) greater than 30 DBZ. Compared to the control simulation, all three PGW simulations show an increase in intensity, as well as westward shifting tracks. The most significant changes were found in the accumulated rainfall over the course of Ivan's progression overland. Regarding TCT production, MIROC produced more TCTSs than the control, while the CM3 and CCSM4 models produced fewer TCTSs. These simulations are being paired with demographic and socioeconomic data to assess the resultant disaster risk under future climates.

Thursday, 18 October 2018, 3:30 PM

Refreshments 3:15 PM!

NCAR-Foothills Laboratory
3450 Mitchell Lane
Bldg. 2, Main Auditorium, Room 1022

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