Department of Atmospheric Sciences & IPRC
Joint Seminar Announcement

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SEMINAR TITLE:

Cause of Tropical Cyclone Size Difference between Western North Pacific and North Atlantic: Mean State Effect

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Date:	**Wednesday, November 20, 2019**
Refreshments:	**3:00pm at MSB courtyard**
	Cookies, Coffee & Tea Provided
Seminar Time:	**3:30pm**
Location:	**Marine Sciences Building, MSB 100**

Abstract:

Observational studies have shown that tropical cyclone (TC) size in the western North Pacific (WNP) is statistically larger than its counterpart in the North Atlantic (NA). In this study we conduct idealized simulations for TC developments using high-resolution WRF model to understand the reason behind the size difference and relative contributions from among temperature, moisture and wind fields to modulate the TC size. Climatological mean states of the WNP and NA were computed using long-term analysis fields and used as background fields for the simulations.

With identical initial vortices, TCs in the WNP environment evolve to larger sizes than those in the NA environment, consistent with previous observational studies and our own analysis using Joint Typhoon Warning Center (JTWC) and National Hurricane Center (NHC) best track data. Experiments were designed to separate impacts of the specific humidity, wind fields, and the temperature profiles. Our simulations indicate that the temperature profile is the dominant factor in controlling the TC size with its influence about twice as larger than from the specific humidity or the wind fields. The background climatological state in the WNP has a higher SST and a lower tropopause temperature than in the NA, thus is more favorable for more intense TCs. Meanwhile, the size is linearly proportional to the intensity of the storm, explaining the reason behind the larger size observed in the WNP.