

**ATS/CIRA Colloquium**

**Weixin Xu**

**from Sun Yat-sen University**

**Hosted by Kristen Rasmussen**

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**ATS 101 and Zoom**

## **Diurnal Variations of Convection in Tropical Cyclones**

Forecasting tropical cyclone (TC) intensity change, especially rapid intensification, still faces great challenges, as intensity change is impacted by complex processes across multiple scales involving both environmental forcing and internal structures. The diurnal cycle of TCs is likely one such process. TCs show significant diurnal variations in many aspects, and one of the most spectacular diurnal cycle features is the radially outward propagation of a cooling signal in the upper-level clouds, the so-called diurnal pulse (DP). This study addresses (but not limited to) the following outstanding scientific questions regarding the DPs: 1) Do DPs occur in the deep convective layer or just at the upper-level cold clouds? 2) How do TC's internal structures change in association with DP occurrence? 3) What are the relationships between DPs and TC intensity change, especially rapid intensification? 4) Does the intensification (rate) of TCs show significant diurnal variation? This talk will present and discuss some interesting findings raised from the investigation of thousands of DP events and intensifying TC periods using 18 years of multi-source satellite data. Overall, DP implies a coherent pattern of the convective structure in the TC's evolution and provides important implications for TC intensity change.

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