



# *Tropical Cyclone Response to Vertical Wind Shear in High-Resolution Climate Model Ensembles*

*Jacob Carstens*  
*University of North Dakota*

Mean tropical cyclone (TC) intensity is generally projected to increase as oceans warm, along with the proportion of TCs that become particularly intense. However, most TCs fail to reach their maximum potential intensity due to various environmental factors. In particular, vertical wind shear (VWS) has long been considered an important negative influence on TC development via vortex tilt, asymmetries in kinematic and thermodynamic structure, and ventilation of cooler, drier environmental air into the circulation. Recent work has shown that uncertain projections of future VWS are a leading-order cause of spread in projected TC activity among climate models. Process-level understanding of this relationship is limited, however. For example, parameters derived from the large-scale state (e.g., genesis potential indices) may not accurately project TC behavior in the future climate. Additionally, TC-environment interactions are typically estimated using monthly mean quantities (e.g., VWS, large-scale absolute vorticity) that may not represent the synoptic- and mesoscale environments that TCs and their precursor seeds encounter in reality...[Link to Full Abstract](#)

**Thursday, 11 September 2025, 2:00PM**

**Refreshments 1:45PM**

**Please also join colleagues for refreshments and informal discussion after the seminar until 4:30PM**

NCAR-Foothills Laboratory, 3450 Mitchell Lane

**FL2-1001, SMALL Seminar**

Seminar will also be live webcast

<https://sundog.ucar.edu/public/page/MMM>

Participants may ask questions during the seminar via Slido.