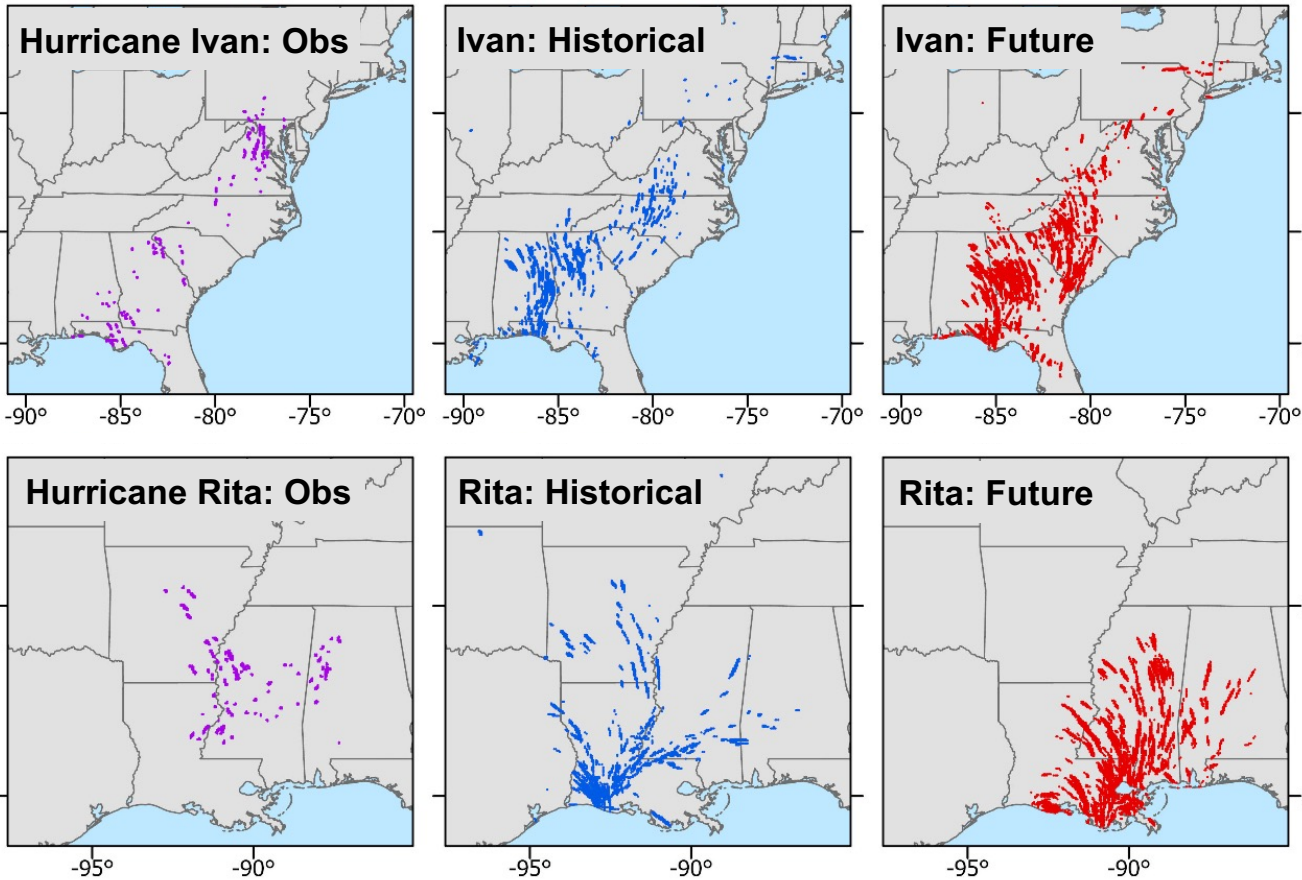


Future Changes in Tropical Cyclone Tornadoes



(left) Observed TC-tornadoes. TC-tornado surrogates from (middle) historical and (right) future simulations for Hurricanes (top) Ivan and (bottom) Rita. The simulations consist of 4-member ensembles, which explains the appearance of greater TC-tornado activity in the model than observations.

Objective

We investigated future changes in tropical cyclone (TC) tornadoes using four-member ensembles of convection-permitting simulations. We simulated four TCs that produced the greatest TC-tornado outbreaks on recent record in the U.S. using the pseudo-global warming or “storyline” approach.

Results

We found robust increases in future TC-tornado activity for all four events (~1.5-4 times the historical) and an increase in nocturnal TC-tornado activity for three of the four events. Future increases in TC-tornado activity were supported by enhanced thermodynamic and dynamic environmental favorability.

Impact

Future increases in total and nocturnal TC-tornado activity, together with an increasing coastal population, can lead to greater TC hazards in the future.