Examination of Land-falling Tropical Cyclones in an IPCC Future Climate Scenario

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In this work, we examine land-falling TCs in a possible future climate scenario for the years of 2098, 2099, and 2100. The Representative Concentration Pathway 8.5 scenario of the Intergovernmental Panel on Climate Change (IPCC) Fifth Climate Model Intercomparison Project (CMIP5) has +8.5 W/m^2 of radiative forcing relative to the present day due to increased concentrations of carbon dioxide. The NCAR Community Climate Model System 4 (CCSM4) output is used to generate pseudo-observations under this scenario, which are then assimilated by the Navy 4DVAR Data Assimilation System (NAVDAS-AR) to create consistent global future climate analyses from the Navy Global Earth Model (NAVGEM). These future global analyses are then used to drive a multiply-nested regional TC prediction model (the Coupled Ocean-Atmosphere Mesoscale Prediction System – Tropical Cyclones (COAMPS-TC)) at a cloud resolving horizontal resolution (5-km).

The tropical cyclogenesis index is used to seed tropical cyclones in this future climate, and the characteristics of the simulations are examined, with particular focus on the impact of land-falling TCs. Overall, the simulations exhibit an intensity distribution similar to other future climate predictions, with a tail of higher intensity TCs than observed in the present climate. Close examination of the tracks, structure, intensity, and precipitation of the land-falling TCs will be shown. These results can be used as a guide to understand how land-falling TCs in a future climate may differ from that in the present climate.

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