



Tropical Cyclone rainfall changes in a warmer climate

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Possible changes in the intensity of rainfall events associated with tropical cyclones (TCs) are investigated under idealized forcing scenarios, with a special focus on landfalling storms. A new set of experiments designed within the U.S. CLIVAR Hurricane Working Group allows disentangling the relative role of changes in atmospheric carbon dioxide from that played by sea surface temperature (SST) in changing the amount of rainfall associated with TCs in a warmer world. Compared to the present day simulation, we found an increase in TC rainfall under the scenarios involving SST increases. On the other hand, in a CO₂ doubling-only scenario, the changes in TC rainfall are small and we found that, on average, TC rainfall tends to decrease compared to the present day climate. The results of this study highlight the contribution of landfalling TCs to the projected increase in the rainfall changes affecting the tropical coastal regions. Scenarios involving SST increases, project a TC rainfall strengthening more evident over land than over ocean. This is linked to the increased lifting effect on the landfalling TCs, induced by an increased instability of the atmospheric column along the coastal regions in a warmer climate.