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Reconciling Seasonal Droughts and Landfalling Tropical Cyclones in the Southeastern US

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ABSTRACT

A popular perception is that landfalling tropical cyclones help to mitigate droughts in the Southeastern United States (SeUS). However intriguing paradigms on the role of large scale SST variations on continental US including SeUS droughts and seasonal Atlantic tropical cyclone activity confronts us. These paradigms suggest that in the presence of warm (cold) eastern tropical Pacific and cold (warm) Atlantic Ocean Sea Surface Temperature Anomaly (SSTA) lead to the increased likelihood of wetter (drier) conditions over the continental US including the SeUS. Juxtaposing this understanding with the fact that landfalling tropical cyclones contribute significantly to the annual mean total rainfall in the SeUS and in El Niño (La Niña) years with cold (warm) tropical Atlantic SSTA lead to reduced (increased) Atlantic tropical cyclone activity raises a conflict on the role of the large-scale SST variations in SeUS hydroclimate.

This study attempts to investigate the apparent dichotomous role of the large scale SST variations on the SeUS hydrology by examining the role of rainfall from landfalling tropical cyclones in the SeUS to local seasonal droughts (Figure 1).

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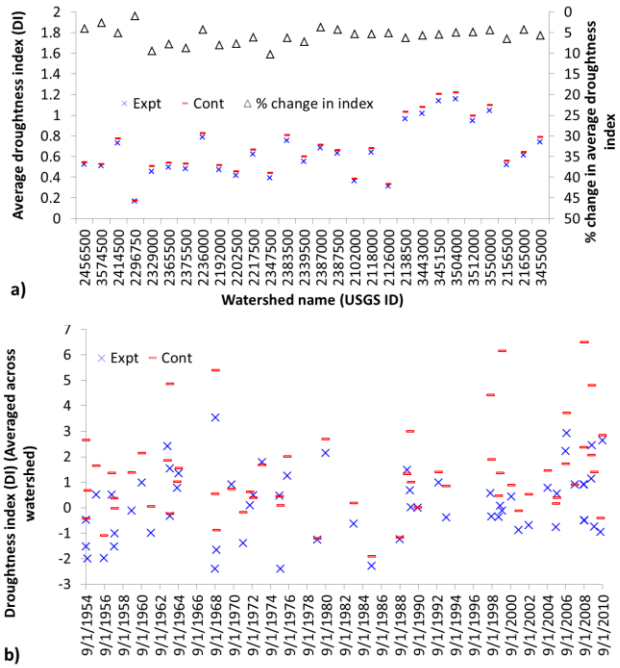

Fig. 1 a) The average drought index over the 28 watersheds spread across the southeastern United States from the control model and experimental model (where the rainfall for 5 days subsequent to landfall is removed) and the difference in the drought index between control and experiment, showing that the mitigating impact of the landfalling TCs is rather minimal, b) The drought index averaged across all 28 watersheds for each year from 1954 to 2010 from control and experiment, revealing apparent difference in months when there are multiple landing TCs. (From Misra and Bastola 2015).

Reference

Misra, V. and S. Bastola, 2015: Reconciling droughts and landfalling tropical cyclones in the Southeastern United States. *Clim. Dyn.*, in press, doi:10.1007/s00382-015-2645-7.

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