



Changes in extreme precipitation patterns over the Greater Antilles and teleconnection with large-scale sea surface temperature

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This study investigates the evolution of extreme precipitation over the Greater Antilles and its relationship with large-scale sea surface temperature (SST) during the period 1985-2015. The data used are derived from two satellite datasets, CHIRPS (Climate Hazards Group InfraRed Precipitation, Funk et al. (2015)) and NOAA (OI V2 Sea Surface Temperature, Huang et al. (2021)), at resolution of 5km and 25km respectively. Changes in the characteristics of six indices of precipitation extremes (Precipitation total; number of rainy days; contribution of heavy rainfall, R95p, maximum duration of consecutive rainy and dry days) defined by the WMO ETCCDI (World Meteorological Organization Expert Team on Climate Change Detection and Indices, Peterson et al. (2001)) are described and the influence of four large-scale SST indices (Northern Oscillation Index, NAO; Southern Oscillation Index, SOI; Tropical South Atlantic, TSA; Caribbean Sea Surface Temperature, SST-CAR) is investigated using Spearman's correlation coefficient. The results show that at regional scale, a positive phase of the TSA index contributes to an increase of the rainfall intensity while a positive phase of NAO is significantly associated with a decrease of total precipitation, of daily rainfall intensity, and of heavy rainfall. At country level, in southeastern Cuba and Puerto Rico, the increase in heavy precipitation and rainfall intensity is linked to a positive phase of the SOI, TSA and SST-CAR, while in Jamaica and northern Haiti, they are associated with positive phase of TSA and SST-CAR. Increases in the number of rainy days and the maximum duration of consecutive rainy days over the southern Haiti and the Dominican Republic are significantly associated with positive phase of the Southern Oscillation (SOI) and warming of SST over the east of the Caribbean Sea. The results of this study show that, in the Caribbean, particularly in the Greater Antilles, large-scale SST have had a strong influence on extreme precipitation over the past 30 years.

Keywords: Caribbean region; Greater Antilles; Extreme precipitation; Climate variability; Sea surface temperature