

ABSTRACT

INVESTIGATION OF THE CLIMATIC EFFECTS OF THE ATLANTIC AND
PACIFIC OCEANS ON TRINIDAD AND TOBAGO'S RAINFALL

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Factors affecting the Caribbean climate such as sea surface temperatures (SSTs), sea level pressure (SLP), specific humidity (Q), air temperature, the El Niño/La Niña events, zonal (U) and meridional (V) winds have been continuously investigated since the 1900s. However, there is a paucity of research into how these climate parameters affect individual small island states in the Caribbean Sea. This investigation therefore will (1) determine the relation between the ENSO region and Trinidad and Tobago's rainfall by firstly describing and defining its SST climatology, (2) deduce the SST areas in the Atlantic and Pacific Oceans which influence its total and seasonal rainfall and (3) determine whether and/or how the Atlantic and Pacific atmospheric and oceanic factors impact on its early rainy season (JJA).

Gridded 4km SST data were analyzed and the cooler SST (26°C to 30.5°C) months coincided with the dry season and the warmer SST (31.5°C to 34°C) months corresponded to the rainy season for Trinidad and Tobago. February (28.5-31.5°C) was found to be the lowest average SSTs with September (30.5-34.5°C) being the highest average SST month. Using the HadISST (1870-2008) data set correlation analysis exhibited negative relationships with the ENSO regions and the Caribbean Sea while the Tropical Atlantic Ocean showed a dipolar correlation. Seasonally, the ENSO region, the Caribbean and TNA had positive correlations for the winter correlation whilst the spring correlation showed a domineering dipolar influence of the TNA.

The SSTA composites confirmed the influence and transitions of the phases of the El Niño when Trinidad and Tobago experiences a below than average rainfall and La Niña when it has an above than average precipitation. Walker and Hadley cells circulation patterns were also observed as aiding in the rainfall. Specific humidity and moisture transport for Trinidad and Tobago's precipitation shows a teleconnection to systems concentrated over Central Africa.

Key words: SST, SSTA, El Niño, La Niña, U and V winds, Q, SIDS, Pacific Ocean, Atlantic Ocean, Caribbean Sea.