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ABSTRACT

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Analyses of Rainfall, Temperature and Related Extreme Events for Trinidad and Tobago

Firstly, I express my gratitude and thanks to God. For without him this would not have been possible.

Sharlene Lata Beharry

This work focuses on historical in-situ data sets of rainfall and temperature for the period 1862 to 2010, with several data sets with different periods. Due to poor data quality, 14 precipitation and 2 temperature monthly data sets over the northern and central region of Trinidad, together with 4 rainfall data sets for Tobago were selected from 230 station data. These were examined for abrupt changes in the mean and median and monotonic trends. Further investigation into the extreme events: the number of “dry and wet days”, “warm and hot days”, and “cool and cold nights”, was done using daily data. The study utilized a robust statistical non-parametric approach. The Pettit and the Mann Whitney tests were used to examine the abrupt changes. The Mann Kendall test in addition to the Sen’s estimator and a bootstrap method were employed to investigate and justify the results of the monotonic changes, respectively.

Interpretation of the results showed statistically significant at the 95 % level of rainfall stations with and without gradual changes. In Trinidad, the rainfall mainly decreased in the wet season months with the rates of decrease varying between 0.5 mm to 4.0 mm per year during the period 1961-2010. For Tobago, Mount Irvine was the sole station tending towards an increase rainfall in November by 3.2 mm per year. The results of the rainfall analyses suggested that Trinidad may have micro-climates within the hydrometric areas. No changes were detected in the number of dry and wet days. For the period 1963 to 2010, there were abrupt and gradual increases in the average, maximum and minimum temperatures at the Piarco and The University of the West Indies Field Station (UFS) stations. The temperatures in some wet season months have increased at a rate of 0.1°C per decade which align with global findings. The number of hot days and cool nights has increased while the number of warm days and cold nights has decreased.

Keywords: climate; rainfall; temperature; dry days; wet days; hot days; warm days; cool days; cold days; climate variability