

STATE OF THE CLIMATE IN 2011

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As of the date of this publication, the impacts of the drought on agriculture, livestock, and human populations have not been completely calculated. Most of the dams located in the northern region had their lowest levels following a poor recharge in the summer 2011. The bean crop dropped by almost half due to the late onset of the rainy season, delaying the sowing. Only 53.4% of croplands were planted in the main bean-producing states of Chihuahua, Durango, Zacatecas, and San Luis Potosí; in Sinaloa, less than 50% of agricultural lands were cultivated during the fall–winter 2011/12 season and pastures were not sufficient to feed the livestock. The federal government implemented national and local programs to support the population in order to mitigate the drought impacts, including water delivery for domestic use and temporary employment programs to reinvigorate local economies.

c. Central America and the Caribbean

1) CENTRAL AMERICA—J. A. Amador, H. G. Hidalgo, E. J. Alfaro, B. Calderón, N. P. Mora, and I. L. Rivera

For this region, 11 stations were analyzed from 6 countries. The stations located on the Caribbean side are: Phillip Goldson International Airport (MZBZ), Belize; Puerto Barrios, Guatemala; Puerto Lempira, Honduras; Puerto Cabezas, Bluefields, Nicaragua; and Puerto Limón, Costa Rica. The following stations are located on the Pacific side: Tocumen International Airport (MPTO) and David, Panamá; Liberia, Costa Rica; Choluteca, Honduras; and San José, Guatemala.

(i) Temperatures

On the Caribbean side, the mean temperature for the 2001–10 decade was warmer than the 1971–2000 average, with 0.5°C above average at MZBZ, Puerto Lempira, and Puerto Cabezas, and Bluefields. Meanwhile, near-average conditions were present at Puerto Barrios and Puerto Limón. The 2011 mean temperature was near average when compared to the 2001–10 decade, with the exception of Puerto Barrios and Puerto Lempira. During the last decade, the Pacific southernmost stations at MPTO and David, experienced above-average temperatures. In contrast, Liberia had cooler-than-average temperatures, while the northernmost stations of Choluteca and San José had near-average temperatures. A striking feature of 2011 was the higher frequency of near mean temperature conditions and smaller frequency of high mean temperature values in all the Pacific side stations (shown as green line distributions in Fig. 7.10). Since many stations have a large amount of missing data in

their daily minimum and maximum temperatures, these two variables were analyzed regionally by taking an average of the five stations on the Pacific slope and the six stations on the Caribbean side. Both minimum and maximum temperatures for the last decade and 2011 were warmer than the 1971–2000 average in the Caribbean and Pacific basins.

(ii) Precipitation

Across Central America's Pacific side, the stations experienced a near-average rainy season (May–November), with the exception of Choluteca and David, which had a significant early start when compared to the 1971–2000 average. However, when compared to the 2001–10 decade, most stations had a normal start to the rainy season, with the exception of David, which had a late start. Consistent with the La Niña influence and the impact of warmer-than-normal Caribbean sea surface temperatures, the end of the rainy season was later than normal across all stations. With respect to the previous decade, 2011 had a late ending in all stations (but significant in only two stations) with the exception of Choluteca, which showed normal conditions.

(iii) Notable events

The year 2011 was slightly below average in terms of tropical storm activity in the Caribbean basin (6°N–24°N, 92°W–68°W), which is unusual considering the development of La Niña and much weaker-than-average 900 hPa winds (inserted arrows in Fig. 7.10) during the period of the prevalence of the Caribbean low-level jet (a characteristic of La Niña events in the region and a condition favorable for tropical cyclone formation; Amador et al. 2006). In the Caribbean basin, Tropical Storm Harvey (19–22 August) and Hurricane Irene (21–28 August), and in the Pacific, Tropical Storm Dora (18–24 July), impacted Central America in different ways, but no human casualties were reported from any of those systems.

The significant 2011 storms that wreaked havoc across Central America were Tropical Depression 12-E (12–13 October) and Hurricane Rina (23–28 October). Rina triggered landslides and floods due to heavy rains in Belize, Guatemala, Honduras, and Nicaragua. A total of 46 fatalities, mostly from Honduras and Nicaragua, were attributed to Rina. Despite the relatively high storm activity in the eastern Pacific, the major regional impact to economic and social welfare was not caused by a hurricane, but by Tropical Depression 12-E (approximate trajectory in red dots in Fig. 7.10). This storm caused significant

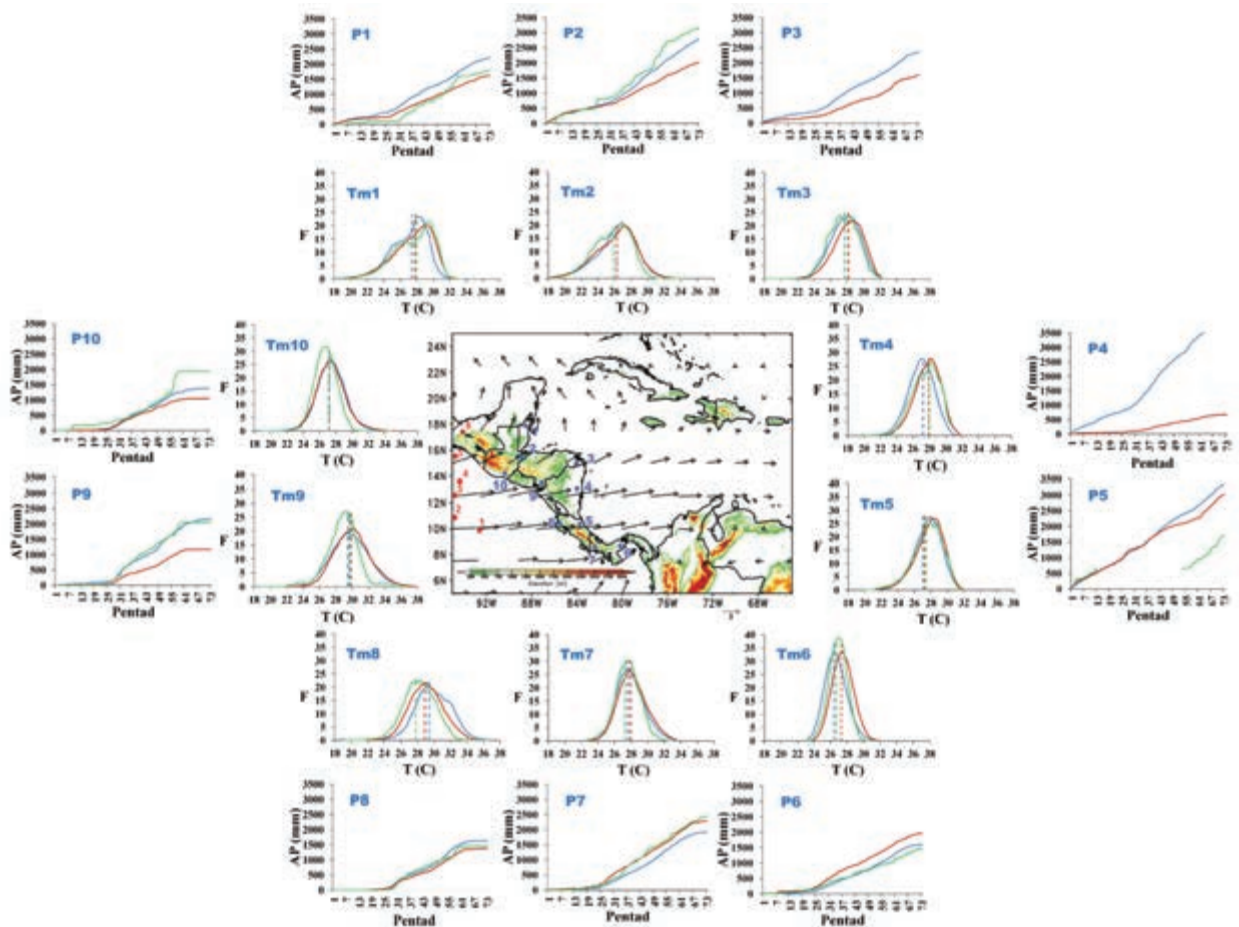


FIG. 7.10. Mean surface temperature frequency (T_m) and accumulated pentad precipitation (P) time series shown for the 10 stations (blue dots depict station location) in Central America: (1) Phillip Goldson International Airport, Belize; (2) Puerto Barrios, Guatemala; (3) Puerto Lempira, Honduras; (4) Puerto Cabezas and Bluefields (showed at their mean geographical position; see text for explanation), Nicaragua; (5) Puerto Limon, Costa Rica; (6) Tocumen International Airport, Panama; (7) David, Panama; (8) Liberia, Costa Rica; (9) Choluteca, Honduras; and (10) San Jose, Guatemala. Blue line represents the 1971–2000 average (base period), red the 2001–10 decade, and green 2011. Note that stations (3) and (4) do not show 2011 precipitation due to a large number of missing data, and station (5) only shows available data for the beginning and ending of the rainy season. The start and end of the rainy season is calculated as follows: the precipitation pentad data were analyzed starting from the beginning of the year. If in any particular pentad at time “ t ” the precipitation was greater or equal to 25 mm, and the precipitation of day $t+1$ was also greater or equal to 25 mm, and the precipitation of $t+2$ was greater than zero, it was considered that the rainy season started at time t . A similar procedure was used for computing the end of the rainy season, with the exception that the procedure was applied from the end of the year backwards. Wind anomalies at 925 hPa, based on 1958–99 for July. The approximate track for Tropical Depression 12-E is shown for locations 1 to 6 (red dots) at 7 October 00Z, 7 October 12Z, 11 October 12Z, 12 October 00Z, 12 October 12Z, and 13 October 00Z, respectively. (Source: NOAA/NCDC)

economic losses in Guatemala, El Salvador, Honduras, Nicaragua, and Costa Rica (\$397, \$902, \$204, \$445, and \$0.1 in US million dollars, respectively) with a total of 117 human casualties. A lesson learned from Tropical Depression 12-E is that the relative position and low system motion of a tropical depression with respect to highly vulnerable areas, such as those in Central America, are as important as tropical storm intensity.

2) THE CARIBBEAN—M. A. Taylor, T. Stephenson, A. Trotman, J. Spence, O. Martínez-Sánchez, G. Votaw, I. González-García, R. Pérez-Suárez, B. Lapinel-Pedroso, A. León-Lee, D. Boudet-Rouco, and N. González-Rodríguez

The climate conditions across the Caribbean during 2011 were largely impacted by the end of the La Niña event in May, the onset of another La Niña in October, and very warm Caribbean sea surface temperatures (SSTs) in the Main Development Region

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