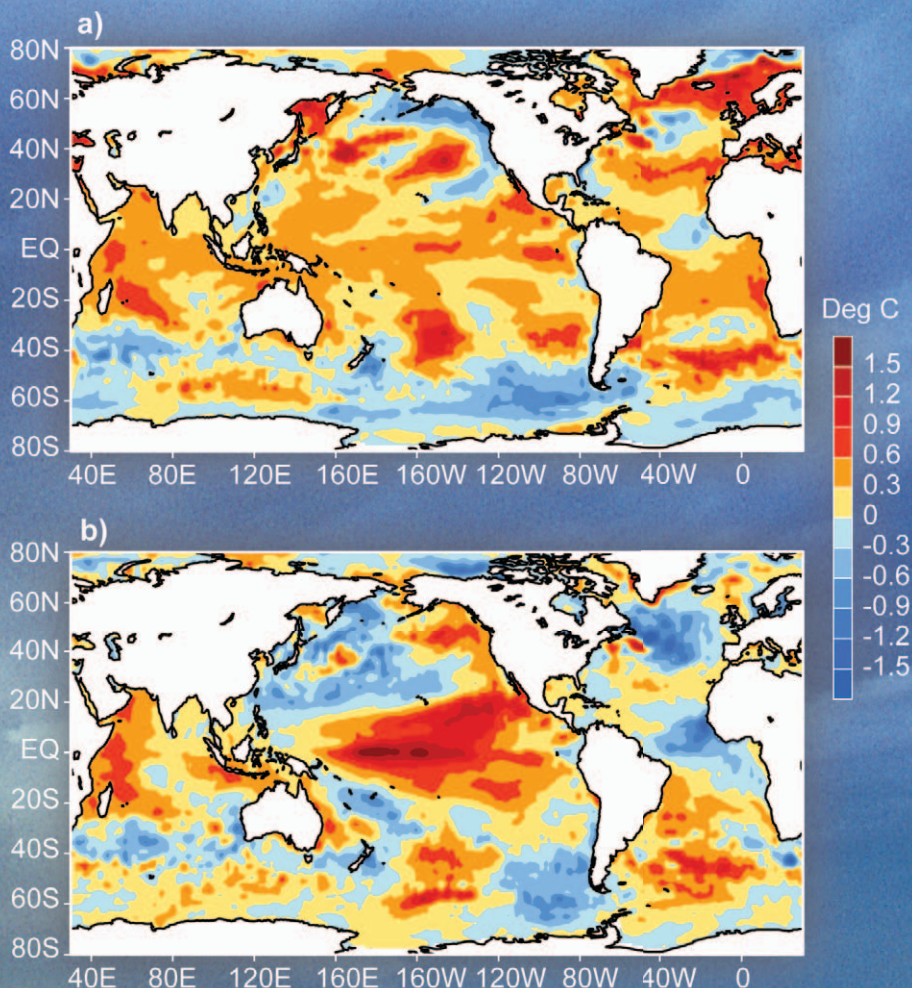


STATE OF THE CLIMATE IN 2009

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(a) Yearly mean sea surface temperature anomalies (SSTA) in 2009 and (b) SSTA differences between 2009 and 2008. Anomalies are defined as departures from the 1971-2000 climatology. Refer to Chapter 3, Figure 3.1 for a more detailed description.

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The first drought occurred in March and April and produced some impacts in the southern and south-eastern states of the country. Thousands of livestock and hundreds of thousands of dollars U.S. were lost by the end of April, seriously impacting the economy of Tabasco. The development of the rainy season during May and June allowed the scheduled farming activities in most of the country; however, a new drought developed as a consequence of the fast appearance of El Niño. This drought episode hit agricultural, cattle, and water sectors in most of México.

Precipitation statistics ranked July 2009 as the driest since 1941 at a national level. Due to the devastating impacts, some farmer organizations in the central region of the country declared the event as the worst drought in 70 years.

Precipitation recovered in the western, central, and southern areas of México in the beginning of September, with an exceptionally wet autumn. However, the total annual precipitation reported by the National Meteorological Service was below normal (Fig. 7.6b). The largest negative annual anomalies were registered in Distrito Federal (-47.7%), Nayarit (-24.7%), Tabasco (-23.6%), Yucatan (-22.7%), Quintana Roo (-22.4%), Aguascalientes (-22.2%), Sinaloa (-20.0%), Estado de México (-19.8%), Jalisco (-18.4%), Michoacán (-18.3%), Veracruz (-16.8%), Morelos (-14.9%), Chiapas (-14.5%), Queretaro (-12.4%), and Chihuahua (-11.8%). Only

five of the 32 states of Mexico reported rainfall above normal: Baja California Sur (+69.6%), Baja California (+26.6%), Hidalgo (+11.3%), Zacatecas (+6.7%), and Sonora (+4.5%).

(iii) Wildfires

According to the National Forest Commission (CONAFOR) reports less than 10 000 wildfires were observed during 2009 in the country. Most were registered during the period from February through July. The states with the highest occurrence of fires were México, Distrito Federal, Michoacán, Chihuahua, Puebla, Jalisco, Chiapas, Tlaxcala, Hidalgo, and Baja California. Those with the highest affected areas were Baja California, Quintana Roo, Coahuila, Yucatán, Oaxaca, Zacatecas, Chiapas, Michoacán, Guerrero, and Chihuahua.

c. Central America and the Caribbean

I) CENTRAL AMERICA—J. A. Amador, E. J. Alfaro, H. G. Hidalgo, E. R. Rivera, and B. Calderon

For this region, seven stations from the following five countries were analyzed: Belize, Honduras, Costa Rica, Panama, and Guatemala.

(i) Temperature

Most stations located on the Pacific coast show, for 2009, very little surface temperature departures from

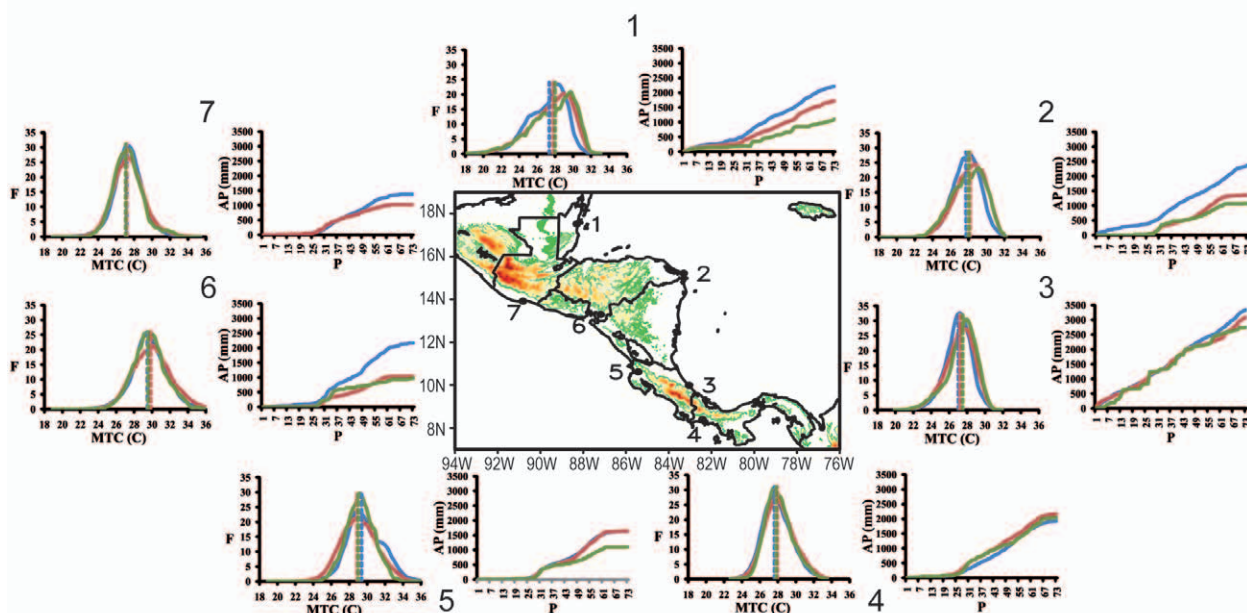


FIG. 7.7. Central America showing the location of selected stations: 1. Phillip Goldson Int. Airport, Belize; 2. Puerto Lempira, Honduras; 3. Puerto Limon, Costa Rica; 4. David, Panama; 5. Liberia, Costa Rica; 6. Choluteca, Honduras; and 7. San Jose, Guatemala. For each station, surface temperature frequency is shown on the left and accumulated pentad precipitation on the right. Blue represents climatology for the base period 1971–2000, red the 2000–09 decade and green 2009. Note that San Jose does not show 2009 precipitation data due to large amount of missing data. (Source: NOAA/NCDC.)

their climatology or from their 2000–09 averages (Fig. 7.7). Stations located on the Caribbean side present a shift toward the right in their frequency distribution, implying a warmer year than normal. Distribution for the 2000–2009 decade confirms, in general, a warmer decade than normal.

(ii) *Precipitation*

The year was generally drier-than-normal for three of the seven stations analyzed: Phillip Goldson A. (Belize), Puerto Lempira (Honduras), and Liberia (Costa Rica). None of these sites show dry conditions exceeding the 95% confidence level with respect to the mean. In terms of the starting and ending dates (SD and ED) of the rainy season, there is a general tendency for 2009 being a year with late SDs when compared to both the baseline period and 2000–09 average. Also, the 2009 rainy season had an early ED for Liberia, compared to the averages for 1971–2000 and 2000–09, while Choluteca shows an early ED compared to 1971–2000 but a late ED compared to 2000–09. David behaves in an opposite way to Choluteca. These variabilities suggest more local than regional physical mechanisms controlling precipitation.

The number of five-day rainy events (pentads) during 2009 was lower than average in six of the seven stations analyzed. The exception was Puerto Limon (Costa Rica). Conversely, the 2009 number of dry pentads was higher than normal for four of the seven stations analyzed (Phillip Goldson, Puerto Lempira, Liberia, and San Jose), while Choluteca and David were lower than normal and Puerto Limon was about average. The interquartile range (IQR, a measure of variability for the pentad data) was about average in all stations, except for San Jose. Finally, the number of wet outliers was lower than normal for San Jose, Lempira, Choluteca, David, and Liberia; slightly less than average for Belize; and above average in Limon. Most below-normal precipitation in the Pacific slope of Central America can be associated with a warm ENSO condition for the second half of the year and stronger-than-normal winds associated with the Intra-Americas Seas (IAS) low-level jet. A cold or near-neutral ENSO condition during northern winter 2009 did not reflect in relevant departures from normal conditions in the region.

(iii) *Tropical cyclone activity*

Tropical cyclone activity in the Caribbean was below normal during 2009. There were two named storms in this region (nine in the Atlantic) and one hurricane (three in the Atlantic). No strong hurri-

canes (category > 2) were observed in this region (two in the Atlantic). Typical values (given by the median) in the Caribbean during the last four decades are four named storms, two hurricanes and one strong hurricane. As a consequence of this decrease in tropical cyclone formation, Central America experienced reduced societal impacts caused by hurricanes. Of special interest for the region was Hurricane Ida. This storm originated over the Caribbean Sea on 4 November, and moved ashore over Nicaragua the following day. After reemerging over the Caribbean, the storm gradually grew stronger as it moved northward.

(iv) *Notable events*

According to the Costa Rican National Meteorological Institute, 16 easterly cold waves were observed between June and October. There were 12 cold outbreaks in the Caribbean Sea during 2009, in contrast to the observed typical value of 16 events per year (relative to 1975–2001). In El Salvador, deadly floods and landslides, associated in part with Hurricane Ida, claimed 192 lives. The National Electricity Board of Costa Rica (ICE in Spanish) reported an additional investment of more than \$5 million U.S. to produce thermal electricity. This additional production of thermal energy was necessary due to the drier-than-normal year.

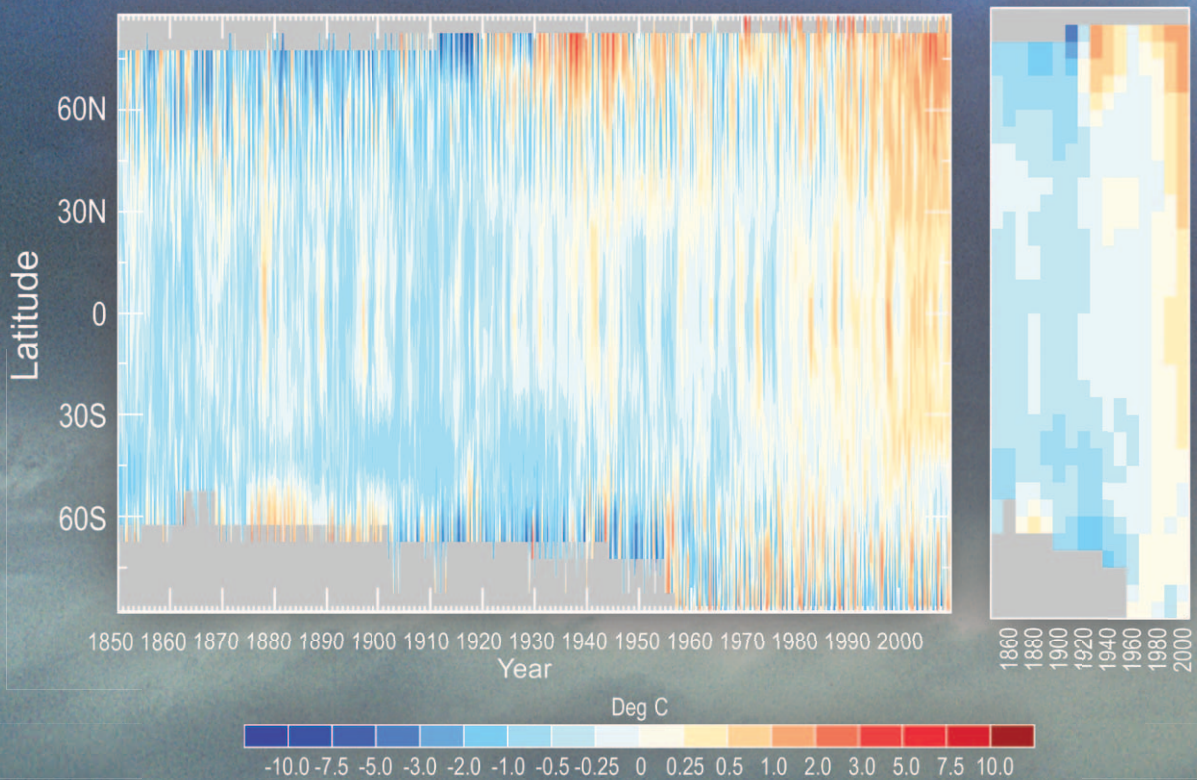
2) THE CARIBBEAN—C. Fonseca Rivera, B. Lapinel Pedroso, R. Pérez Suárez, A. Carrión Romero, A. León Lee, V. Cutié Cancino, I. González García, T. S. Stephenson, M. A. Taylor, J. M. Spence, and S. Rossi

Countries considered in this region include: Cuba, Jamaica, Puerto Rico, and the U.S. Virgin Islands.

(i) *Temperature*

For Cuba, 2009 was characterized by mean temperatures above the long-term average (1971–2000), resulting once again in a warm year. The annual mean of 25.9°C ranks 2009 as the 10th warmest year since 1951 (Fig. 7.8a). This behavior was strongly influenced by an increase in extreme temperatures and high values reported in the summer. It highlights July, August, and September as the warmest since 1970. Also October 2009, where the values were 1°C above normal, was the warmest October since 1970.

For Jamaica, slightly-above-normal temperatures were recorded for some coastal stations. This was observed against negative sea surface temperature anomalies around Jamaica for the first half of the year with a shift to positive anomalies for the latter half of the year.



Monthly average temperature anomalies by latitude for the period 1850 to 2009. Decadally-averaged anomalies are shown on the right-hand side where 66% of months are present. Refer to Chapter 2, Figure 2.1 for a more detailed description.

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