Seasonal Diagnostics of Climate Events for the RCC-Washington Region

October - December

(i) Temperature

During the October - December (OND) season, mean maximum temperatures were near normal across most of the Caribbean, with some small positive anomalies in eastern Cuba and parts of Hispaniola (Fig. 1). Minimum temperatures through most of the Caribbean were close to normal. Cuba registered slightly below-average temperatures and eastern Puerto Rico registered slightly above-average temperatures (Fig. 2).

In Mexico, maximum temperatures were above average by 2-4°C throughout the northeastern part of the nation. Smaller positive anomalies of 1-2°C were observed in many central and southern parts of the country (Fig. 1). Maximum temperatures in Central America were also near to or warmer than average. Anomalies of 2-4°C were observed in eastern Guatemala, western Honduras, and western El Salvador. Smaller positive anomalies of 1-2°C were observed in other parts of Honduras, northern and southern Nicaragua, as well as Costa Rica.

Minimum temperatures were warmer than average in northwestern Mexico with anomalies of 1-4°C, while patches of 1-2°C positive anomalies were scattered about other parts of Mexico, including the Baja California Peninsula (Fig. 2). In Central America, the most anomalously warm mean minimum temperatures were observed in southern Guatemala and El Salvador, where anomalies were 2-6°C. Cooler minimum temperatures were present in southern Nicaragua and western Costa Rica, as well as eastern Panama, where negative anomalies of 1-4°C were observed.

(ii) Precipitation

For the OND season, rainfall was suppressed over the Lesser Antilles, Hispaniola, Central America and parts of southern Mexico. In the Caribbean, most islands received at least 100mm of rainfall (Fig. 3). The areas that received the greatest rainfall, greater than 300mm, include parts of the Bahamas and localized portions of Cuba. The remainder of the Bahamas received 200-300mm. South-central portions of Hispaniola received less than 100mm. While the rainfall resulted in positive anomalies along much of Cuba and the Bahamas, many of the remaining islands registered negative anomalies. Much of Hispaniola and Puerto Rico showed negative anomalies of 50-100mm (Fig. 4). Negative anomalies exceeded 100mm for many of the Lesser Antilles.

Seasonal rainfall was greatest along the southwestern seaboard of mainland Mexico along with the Gulf of Mexico and Caribbean Coasts. Totals were greater than 300mm in Guerrero State in the Southwest and Veracruz, Tabasco, Chiapas, and Campeche states (Fig. 3). The interior corridor of Mexico observed lesser rains of 10-50mm, as did the Baja California Peninsula. The far-northwestern portion of the peninsula registered 50-100mm of rainfall. Negative rainfall anomalies were observed across southern Mexico and the Yucatan Peninsula. However, rains in Guerrero state, Veracruz, Tabasco, Chiapas, and Campeche States resulted in
positive anomalies of 100mm or more (Fig. 4). Positive anomalies of 50-100mm or more were also observed in west-central parts of Mexico and the northeastern corner of Mexico. Central and northern portions of the Baja California peninsula registered 25-100mm positive anomalies. In Central America, seasonal totals were broadly suppressed below normal. The largest seasonal totals were observed along the Caribbean coastline where 300-750mm were observed. The southern tip of Nicaragua and small portions of Costa Rica and Panama tallied over 750mm. Areas of central and Southern Guatemala and the Gulf of Fonseca region observed 300-500mm. Interior portions of Central America received the least rainfall during the season totaling less than 100mm. These totals were suppressed below averages through much of Guatemala, Belize, El Salvador, Honduras, Nicaragua, and Costa Rica –especially in interior regions. Negative anomalies generally ranged from 50-200mm with some larger ones in Nicaragua. The Caribbean coastlines of Belize, Honduras, and northeast Nicaragua were the wetter regions that registered positive anomalies of up to 100-300mm.

(iii) Notable Events

A highly anomalously dry pattern led to a failed Postrera rainfall season across Central America. Large rainfall deficits amounting to less than 50% of normal for the season negatively impacted ground conditions in a large portion of Central America. Conditions were found to be consistent with abnormal dryness and drought across Belize, Guatemala, Honduras and northern Nicaragua. These observations are substantiated by CMORPH 3 Month SPI analysis covering the season. Values less than -0.8 are prevalent and SPI as low as -2.0 are observed in Honduras and Nicaragua (Fig. 5). These values are consistent with drought. Another outcome is the fast start of the fire season to date. The dry season’s onset after the failed Postrera has created conditions that are highly favorable for fires. Many fires have been reported throughout Guatemala in 10 departments. 39.55 hectares have been consumed thus far according to the country’s government. Fire activity is also observed across other Central America Countries with abnormally dry ground conditions. Satellite observed fire activity is especially prevalent in El Salvador, Honduras, northern Belize, northern Nicaragua, as well as southern Mexico.

Heavy rainfall disrupted parts of the region on several occasions. In Mexico, heavy rains on 01 October led to flooding in Querétaro State. According to authorities, the San Juan and Querétero rivers broke their banks. 3,500 homes and other buildings were damaged in several municipalities according to reports by local media. At least 4 fatalities were also reported. Heavy rain in Panama on 21 November triggered flash floods in an area called Las Cuevas de Bayano located 50km east of Panama City. According to Panama’s Sistema Nacional de Protección, there were at least 2 fatalities and 13 injured persons. During December, localized heavy rain caused flash floods in some parts of Guatemala. These included the Izabal department during the week of 16-22 December and floods were reported in Petén department over the municipalities of Dolores and Sayaxché during the final week of the month.

In October, Mexico was impacted by 2 hurricanes. Hurricane Pamela made landfall in Sinaloa state in western Mexico as a Category 1 storm. The storm knocked out power and

For more information, visit:
http://www.cpc.ncep.noaa.gov/products/international/usrcc/carib_cm.shtml
caused minor street flooding and damage to homes. Hurricane Rick made landfall in Guerrero State 15 miles east of the port of Lazaro Cardenas as a category 2 storm. The storm had winds of 193 kph and brought heavy rains to the coastal mountains.

(iv) Sea Surface Temperature and Circulation

During the OND season, negative SST anomalies expanded and strengthened in the equatorial East Pacific as La Niña formed. At the start of the season the core of the strongest SST anomalies was located in the equatorial Central Pacific. The pool of cooler waters expanded into the equatorial East Pacific. By December, 1.0-2.0°C negative anomalies prevailed over the region from 170E to 80W. The Niño3.4 index began October near -0.5. It quickly dropped below -1.1 by the end of the month. The index fluctuated up and down during November before stabilizing at around -1.1 in December. After a La Niña watch was already in place to start the season, NOAA’s Climate Prediction Center (CPC), officially declared a La Niña in October. The La Niña remains in place through end of the season, with tropical atmospheric conditions responding consistently to SST. La Niña is favored to continue through Northern Hemisphere winter 2021-22 and into spring with a 67% chance during March-May according to CPC. Then a transition to ENSO neutral is favored with a 51% chance during April-June.

Narrowing the focus to the local region, waters in the Gulf of Mexico were above average by 0.5-1.5°C (Fig. 6). Similar SST anomaly were found in the Atlantic north of the Caribbean island chain. SST in the Caribbean were close to average. Slightly above-normal SST (0.5-1.0°C anomaly) were found in the Gulf of California as well as other waters of the Pacific South and west of Mexico.

The circulation pattern at 850mb during OND featured southwesterly anomalies over southern Mexico and into the Gulf of Mexico. A corridor of easterly anomalies over the Caribbean and Central America were the strongest in the region (Fig. 7). These likely helped contribute to enhancing rainfall along Central America’s Caribbean coast. Some slight westerly anomalies were present over Cuba and the Bahamas.

At 200mb, a robust easterly wind anomaly was observed over the equatorial eastern Pacific, associated with the ongoing La Niña (Fig. 8). This merged into a southerly anomaly that crossed over Central America, the Caribbean and the Greater Antilles before gaining more of a westerly component. Strongly anomalous northeasterly and easterly flow was present over northern Mexico.

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http://www.cpc.ncep.noaa.gov/products/international/usrcc/carib_cm.shtml
Figure 1. Gridded mean maximum temperature anomaly (°C) during the 2021 OND season. Anomalies are computed with respect to the 1991-2020 base period.

Figure 2. Gridded mean minimum temperature anomaly (°C) during the 2021 OND season. Anomalies are computed with respect to the 1991-2020 base period.
Figure 3. Satellite-estimated rainfall total (mm) during the 2021 OND season.

Figure 4. Satellite-estimated rainfall anomaly (mm) during the 2021 OND season. Anomalies are computed with respect to the 1998-2012 base period.
Figure 5. Standardized precipitation index (SPI) utilizing CMORPH data for the 3-month period from 2 October to 30 December indicating the number of standard deviations by which the observed anomaly deviates from the long-term mean.

Figure 6. Average sea surface temperature (SST) anomalies (°C) for the 2021 OND season. Anomalies are computed with respect to the 1991-2020.
Figure 7. 850mb mean vector wind anomalies for the 2021 OND season. Anomalies are computed with respect to the 1991-2020.

Figure 8. 200mb wind vector anomaly for the 2021 OND season. Anomalies are computed with respect to the 1991-2020.