Seasonal Diagnostics of Climate Events for the RCC-Washington Region
October - December

(i) Temperature

During the October - December (OND) season, mean maximum temperatures were warmer than normal across Jamaica, southern Hispaniola, and the Lesser Antilles. 1-2°C positive anomalies were recorded (**Fig. 1**). Mean minimum temperatures were warmer than average for Jamaica, southern Haiti, and the Lesser Antilles (**Fig. 2**).

In Mexico, maximum temperatures were above average by 1-4°C in northwestern Mexico, the Baja California and eastern Yucatán Peninsulas, while they were closer to average across the remainder of the country (**Fig. 1**). Maximum temperatures in Central America were 1-2°C above average through eastern Honduras, eastern Nicaragua, Costa Rica, and Panama. The remainder of the region was near average.

Minimum temperatures were warmer than average by 1-2°C across western and southern portions of Mexico. A small area was 2-4°C above average in eastern Sonora State. Northeastern Mexico and parts of the Yucatan Peninsula observed near-average minimum temperatures (**Fig. 2**). In Central America, 3-month mean minimum temperatures were warmer than average by 1-2°C across the entire region.

(ii) Precipitation

For the OND season, rainfall was mostly near to above average over the Caribbean islands. The largest 3-month rainfall totals of 300-500 mm were observed in parts of The Bahamas, eastern Jamaica, and many of the Lesser Antilles (**Fig. 3**). Seasonal rainfall totals across the rest of the islands ranged between 100 and 300 mm. The greatest departures from average were registered in northern portions of The Bahamas, and the Lesser Antilles where negative anomalies were 100 to 200 mm or more (**Fig. 4**). Rainfall across parts of central and western Cuba was below average by 10 mm to 100 mm and in central Haiti and northwestern Dominican Republic but 50-200mm.

Seasonal rainfall performance was variable across Central America and Mexico. In Mexico, rainfall was greatest in the Pacific coast and South regions where rainfall totals of up to 300 mm to 500 mm were registered (**Fig. 3**). Rainfall across central and northeastern regions of Mexico was generally 100 to 300 mm. Lesser rainfall amounts (<100 mm) were observed in parts of northwestern Mexico, the Baja California Peninsula, and Oaxaca state. In general, seasonal rainfall amounts were above average across Pacific coastal, Central, Bajio, and northeastern regions, as well as Baja California and Sonora states (**Fig. 4**). Surpluses reached higher than 200mm in some localized pockets. Significant negative anomalies were present in southern Mexico and the Yucatan Peninsula. Negative anomalies of 50 – 200 mm were common.

In Central America, seasonal rainfall totals ranged from 75 mm to 100 mm in pockets of northern and southern Guatemala, to as much as 500 -750 mm in many coastal regions. Much of the interior of Guatemala, Honduras, El Salvador, and Nicaragua observed 150 – 300 mm.

Large negative anomalies (100 – 300 mm) resulted from this pattern in northern/southern Guatemala, eastern El Salvador, southern/eastern Honduras, northwestern/northeastern/southern Nicaragua, eastern Costa Rica, and much of Panama. Conversely, positive anomalies of 100 mm to 300 mm were observed in eastern Belize, far-eastern Guatemala, northern Honduras, parts of southwestern Nicaragua, and western Costa Rica, and Panama.

(iii) Notable Events

The tropical Pacific basin remained active during October with 5 named storms and 3 reaching major hurricane strength (**Fig. 5**). The major hurricanes included, in order: Lidia (Cat 4), Norma (cat 5), and Otis (Cat 5). Every storm made landfall in Mexico – 2 as major hurricanes. Lidia made landfall on 10 Oct in Jalisco state with 220 km/h winds. Next, Otis made landfall on 26 Oct near Acapulco with winds of 270 km/h. This was an extremely destructive storm for the large city causing widespread structural damage and at least 48 fatalities. There were 2 named storms in the Atlantic. Sean was a tropical storm, while Tammy reached category 2 strength and made landfall in Barbuda causing minimal damage there. A period of very heavy rains from a passing tropical disturbance affected Jamaica, Haiti, and the Dominican Republic on 17-18 November. In Dominican Republic, 431 mm were recorded on 17 November near Santo Domingo, which is a 24 hour record for the country. Dominican Republic reported 21 fatalities, several bridges and roads were washed out and thousands of families were displaced. A broad region of disturbed weather that included tropical storm Pilar affected Central America – mainly El Salvador, Honduras, and Costa Rica at the beginning of November. At least 3 fatalities were reported by El Salvador Authorities.

Long-term drought continues to impact Mexico as the dry season begins. Much of the country (about 70%) is classified under moderate to extreme drought at the end of December according to the North American Drought Monitor. Notably, abnormally low rain resulted in historic seasonal lows (44% below December average) of the Cutzamala system — a network of 3 reservoirs serving more than 20 million residents of the Mexico City metro area. According to news reports, recent cuts that are the most drastic drought-related cuts to the city's water that have ever been announced, decreased the systems total flow by 25%.

Rains were insufficient through the 'postrera' season across most of Central America. Over the past 3 months, standardized precipitation index values are -0.4 to -2.0 in many parts of Costa Rica and Panama indicting that abnormally dry conditions continued. This led to failed growing seasons in many cases. These deficits are affecting the shipping industry in the Panama Canal where water levels are sitting at 6 ft. (1.8 m) below normal. The canal authority capped the number of vessels that can cross through currently at 24 ships per day, well below the normal of 38.

(iv) Sea Surface Temperature and Circulation

During the OND season, sea surface temperature (SST) remained relatively steady across the East pacific and warmed in the Central Pacific. The largest anomalies (2.0 - 2.5°C) started

the season in the East Pacific and then shifted slightly westward through the season. A pool of similar positive anomalies formed in the Central Pacific during November and remained through the end of the season. The Niño3.4 index increased steadily from start of October through late November when it peaked at about 2.2°C. The index dropped slightly before holding relatively steady around 2.0°C through the end of December. The Niño 1+2 index continued to cool through the season, dropping from 2.6°C to about 1.0°C at the end of January. Based upon these observed SST patterns and a coupled atmospheric response, NOAA's Climate Prediction Center has issued an El Niño advisory (meaning that an El Niño is ongoing). These current El Niño conditions are expected to last through the northern hemisphere winter (Jan-Mar). The El Niño is expected to gradually weaken and ESO Neutral conditions are favored by the end of spring (April - June) 2024 with a 73% chance.

Within the USRCC region, SST was above average throughout the much of the Gulf of Mexico and the Caribbean with anomalies of 0.5-1.5°C (**Fig. 6**). Positive anomalies were most uniformly 1.0 – 1.0°C in central and western portions of the Caribbean. The tropical and subtropical Atlantic also exhibited warmer than average SST (0.5-1.5°C anomalies). SST was warmer than average (by 0.5-3.0°C) across the tropical East Pacific basin. SST to the west of Costa Rica was 1.5-2.0°C above average. The waters around the Baja California Peninsula were also well-above average and registered 1.0-2.5°C positive anomalies.

The circulation pattern at 850mb during OND featured anomalous westerly winds across the tropical East Pacific, Costa Rica, Panama, northern South America and the Lesser Antilles (**Fig. 7**). There is a broad weak low-level cyclonic circulation centered over the Gulf of Mexico and influencing portions of Mexico and the Greater Antilles.

At 200mb, an enhanced sub-tropical Jet was observed across northern portions of the region. The westerly wind anomalies were observed over northern and central Mexico as well as the Gulf of Mexico, Florida, and the northern Bahamas (**Fig. 8**). Northerly wind anomalies were present over Central America and substantial northeasterly wind anomalies were present over the Lesser Antilles. Associated upper-level divergence may have helped to enhance rainfall over the Lesser Antilles.

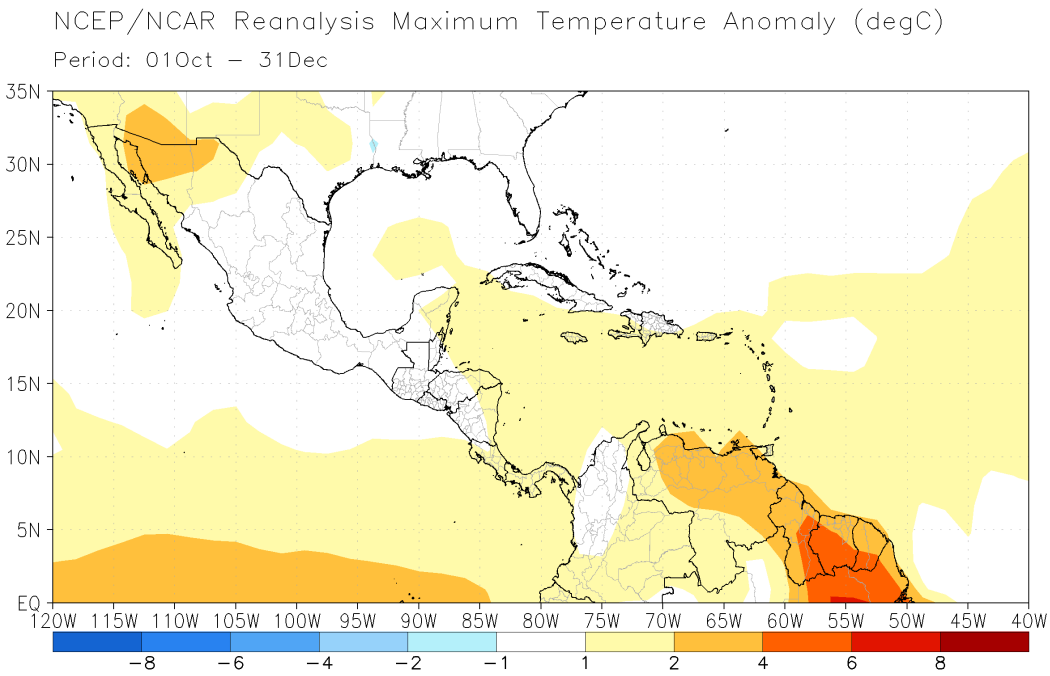

Figure 1. NCEP/NCAR Reanalysis mean maximum temperature anomaly (°C) during the 2023 OND season. Anomalies are computed with respect to the 1991-2020 base period.

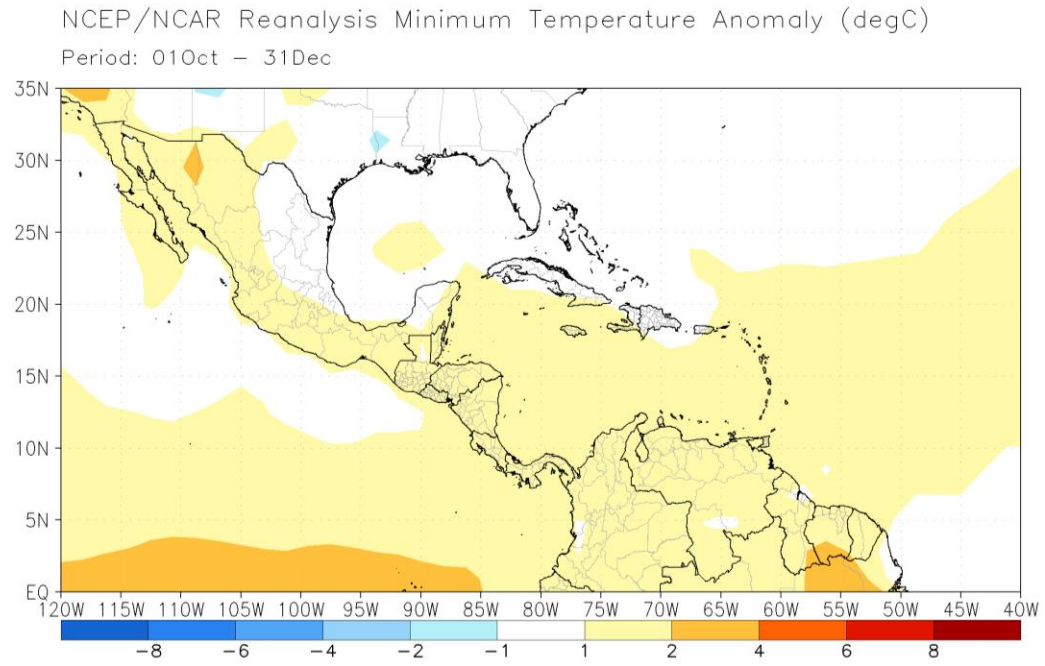

Figure 2. NCEP/NCAR Reanalysis mean maximum temperature anomaly (°C) during the 2023 OND season. Anomalies are computed with respect to the 1991-2020 base period.

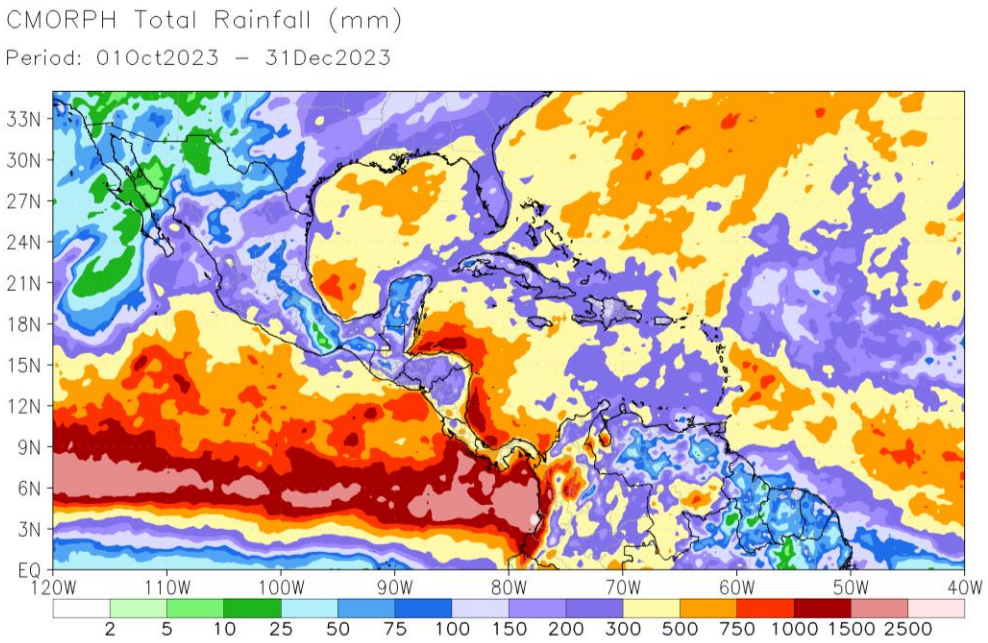

Figure 3. Satellite-estimated rainfall total (mm) during the 2023 OND season.

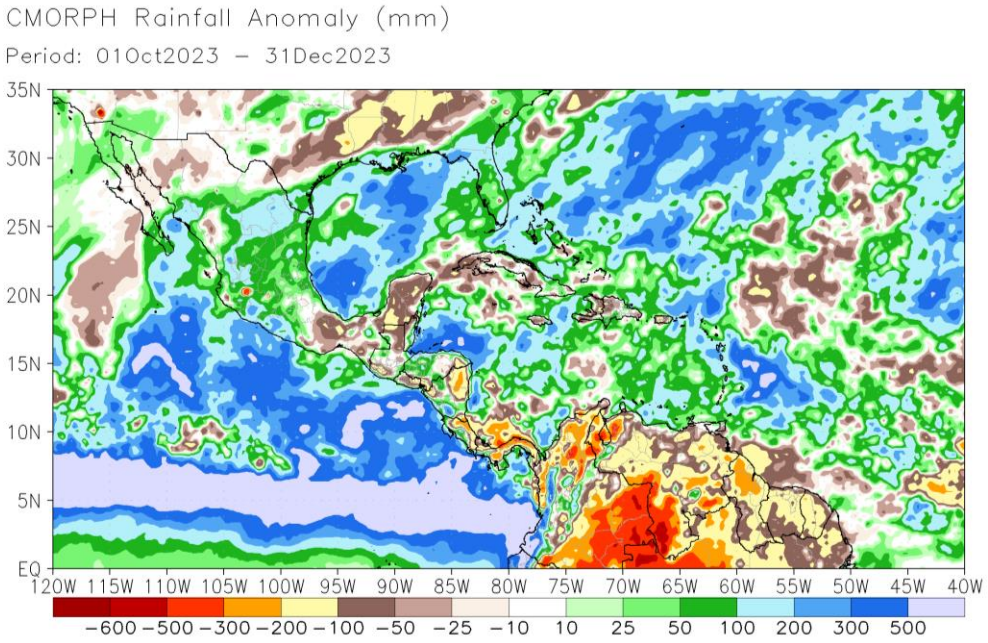

Figure 4. Satellite-estimated rainfall anomaly (mm) during the 2023 OND season. Anomalies are computed with respect to the 1998-2012 base period.

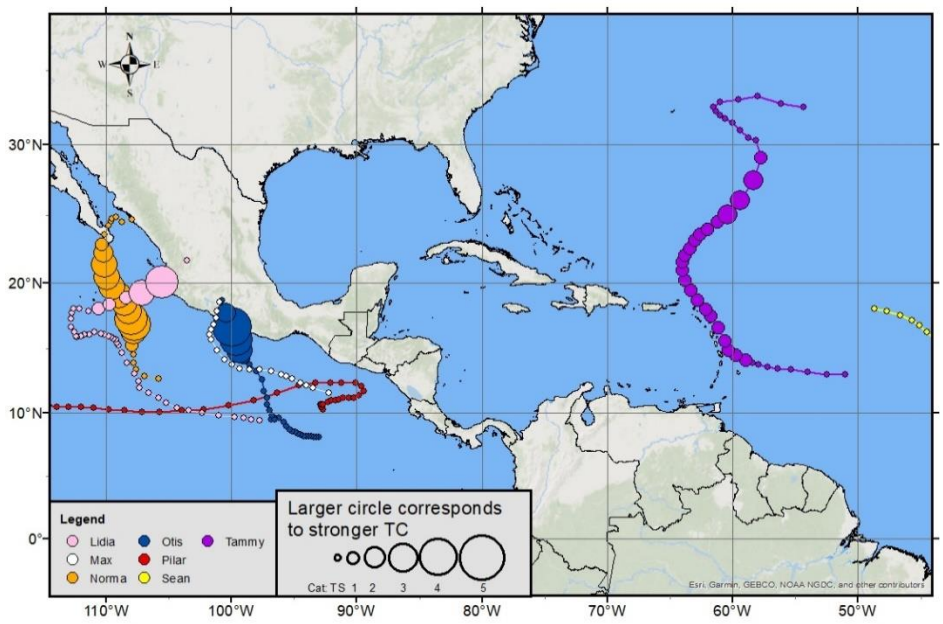

Figure 5. Plot of the tracks of 7 named tropical cyclones that traversed the RCC region during October. Size of the circle indicates relative strength of the storm. Data form the National Hurricane Center best track archive.

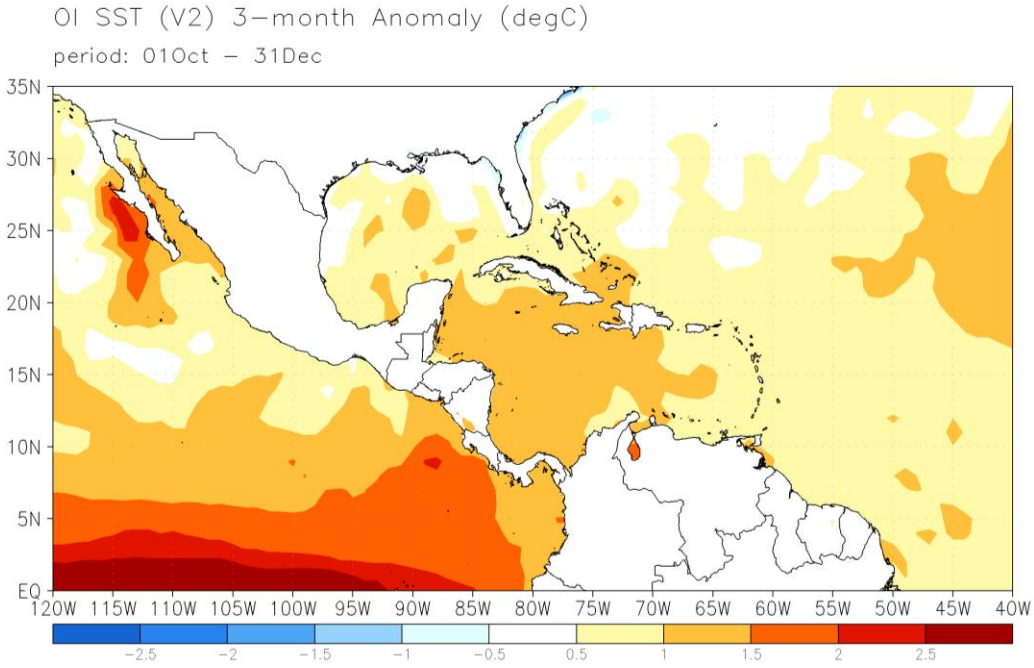

Figure 6. Average sea surface temperature (SST) anomalies (°C) for the 2023 OND season. Anomalies are computed with respect to the 1991-2020.

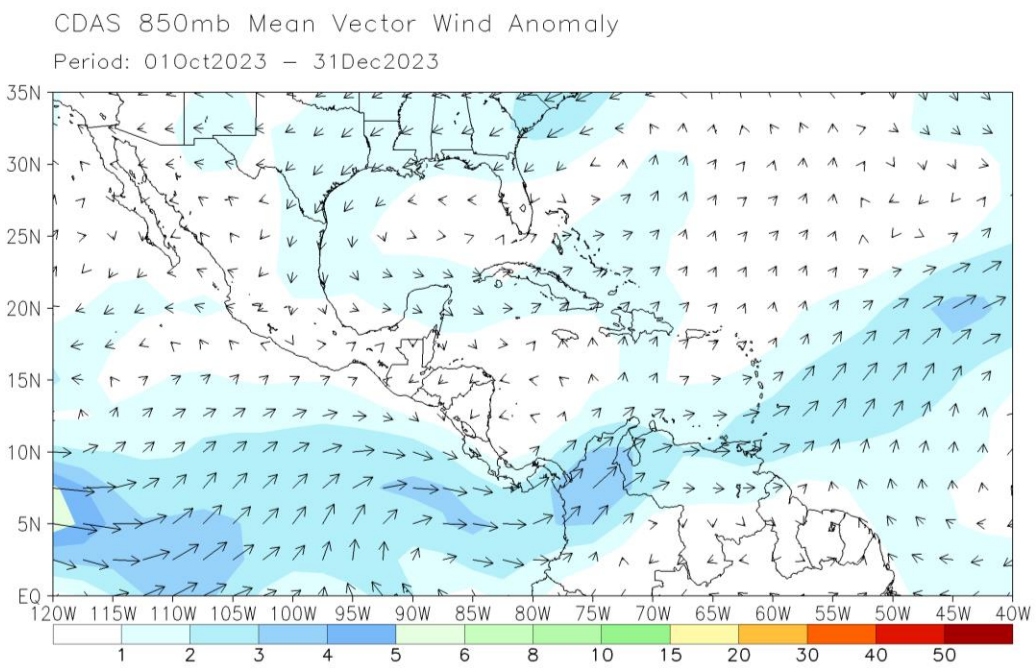

Figure 7. 850mb mean vector wind anomalies for the 2023 OND season. Anomalies are computed with respect to the 1991-2020.

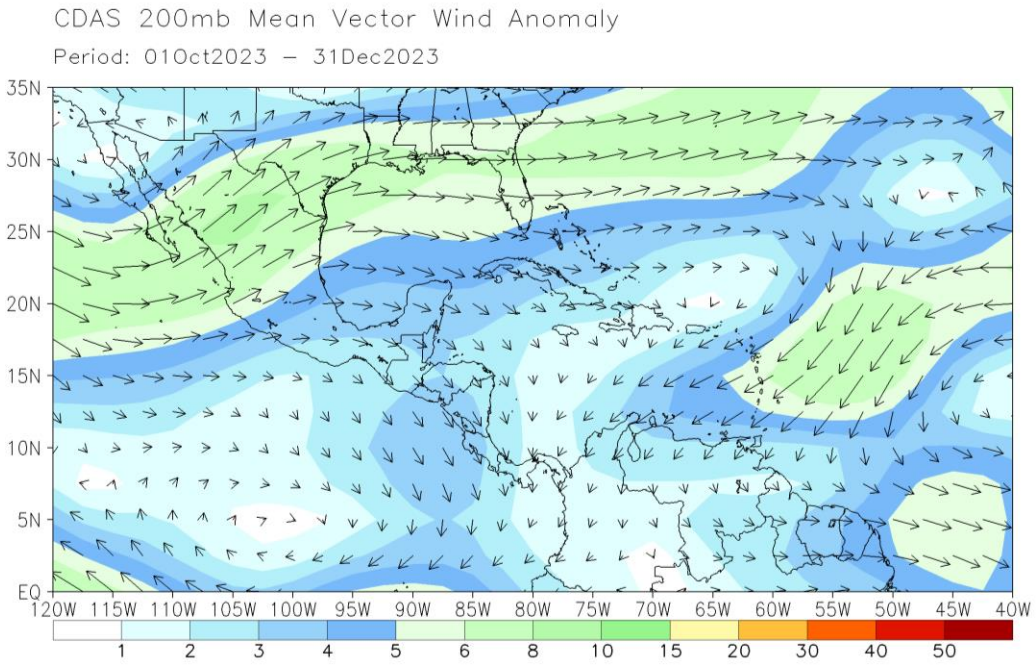

Figure 8. 200mb wind vector anomaly for the 2023 OND season. Anomalies are computed with respect to the 1991-2020.

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Update prepared by Climate Prediction Center / NCEP