July 2016 Climate Review for Puerto Rico and the U.S. Virgin Islands.

Synopsis: ***Above normal rainfall was observed across most of the area with warm to hot temperatures. There is a slight shift in probabilities to near to above normal rainfall during the upcoming months.***

Summary

An active and wetter weather pattern was observed throughout most of the month throughout the local islands mainly due to the passage of several tropical waves. Even though the majority of the tropical waves were modest, there were two potent tropical wave events that left behind significant impacts across the local islands. The first tropical wave affected the region on July 1st-2nd and it combined with an upper-level low that positioned itself to the west of the region to produce periods of heavy showers and strong thunderstorms across the local islands. The other tropical wave affected the region on July 31st and it also produced heavy showers and strong thunderstorms with more significant rains also observed, especially across the Eastern Half of PR and the USVI. In addition to the passage of these tropical waves, an excessive rain event, as a result of a surface induced trough, was observed across the San Juan Metropolitan Area on July 13th as up to 5-6 inches of rain was observed creating flash flooding.

Based on the Cooperative Observer Network Data (COOP), 103 % of the normal rainfall was observed across Puerto Rico. Preliminarily, an average rainfall total of 5.15 inches was measured, which is 0.12 inches above normal (Table 1). Across St. Croix, an average rainfall total of 3.78 was observed, which is slightly above the normal rainfall (Table 1). At the primary climatological data sites, a rainfall surplus of 0.50 and 0.13 inches was observed at Henry E. Rohlsen Airport in Saint Croix (TISX) and Cyril E King Airport in St Thomas (TIST) respectively. The mean temperature at TISX and TIST was 84.3 and 86.0ºF, which is 0.7 and 2.0ºF above normal respectively. In fact, July 2016 ended as the 4th warmest July on record at TIST.

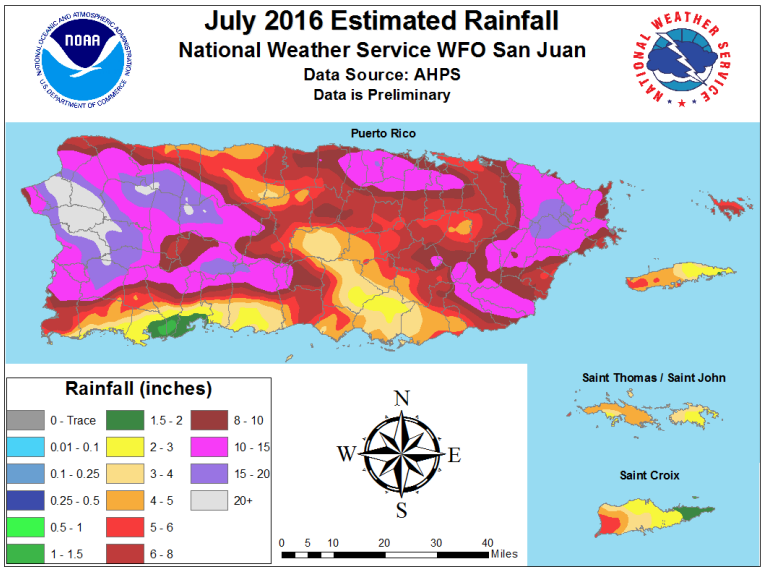
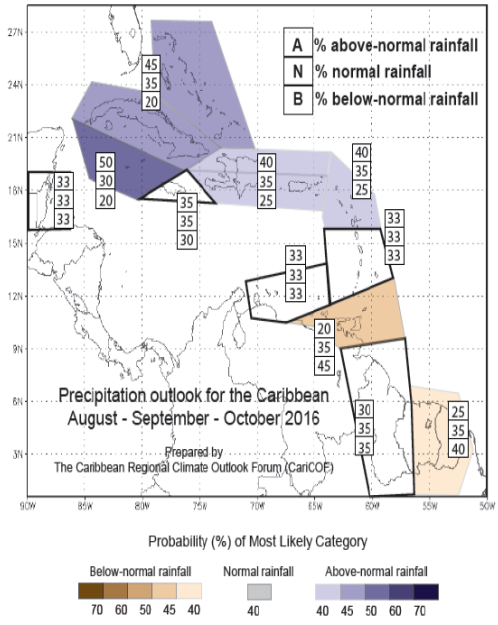
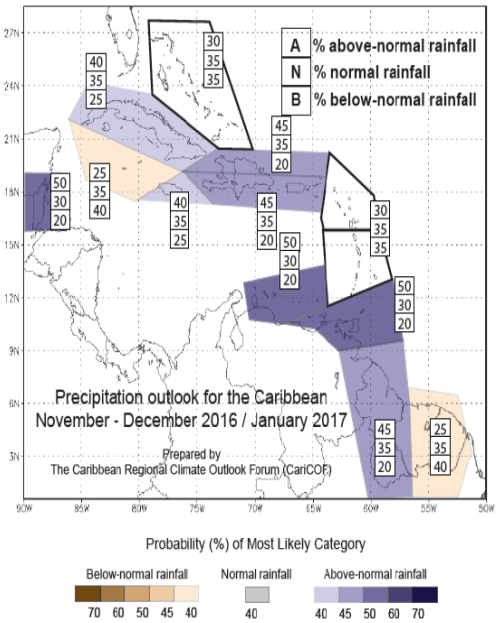


Figure 1. Rainfall Totals based on AHPS (click on the image to enlarge)

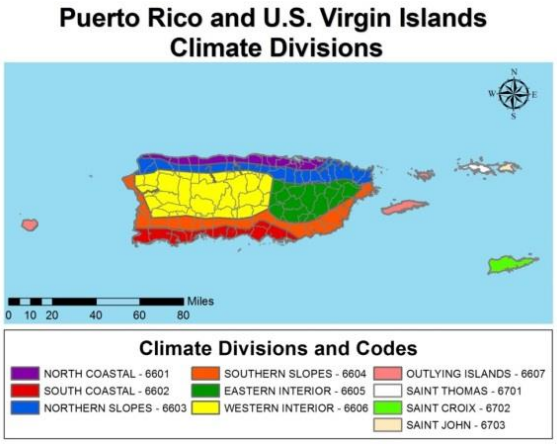
Looking Ahead





Sea Surface Temperature (SST) anomalies in El Niño region are currently near average and most of the models are suggesting a developing La Niña likely to peak by November-December-January (NDJ). Tropical North Atlantic SSTs tend to be warmer than average during a La Niña, and are currently above average throughout the Caribbean Islands. Warm Atlantic temperatures increase evaporation and local deep atmospheric convection, potentially increasing precipitation. Average circulation patterns during La Niña periods may also contribute to increased frequency of developing tropical storms. Therefore, August-September-October (ASO) rainfall is likely to be near to above normal across the local area. More Info: http://rcc.cimh.edu.bb/long-range-forecasts/caricof-climate-outlooks/

Average Rainfall Accumulation per climate zones based on COOP



	North Coastal	South Coastal	Northern Slopes	Southern Slopes	Eastern Interior	Western Interior	All PR	St Croix	St Thomas
Observed (Jul)	7.21	1.25	4.01	4.14	7.65	6.55	5.15	3.78	1.64
Normal (Jul)	5.67	2.97	5.49	3.83	7.13	4.98	5.01	3.24	3.33
% PON (Jul)	**127**	**42**	**73**	**108**	**107**	**132**	**103**	**117**	**49**
Accumulated YTD	34.08	16.92	30.50	27.52	43.36	39.64	33.01	22.80	11.79
Normal accumulation YTD	32.67	17.63	33.64	23.32	39.44	33.23	29.99	17.33	18.59
% PON accumulated YTD	**104**	**96**	**91**	**118**	**110**	**119**	**110**	**132**	**63**

Table 1. July 2016 and Year to date (YTD) Rainfall (inches). Percent of Normal (PON).

Historical Rainfall and Temperature

	Puerto Rico		San Juan Area		IST		ISX	
1	**2015**	**1.85**	**1929**	**1.10**	**2007**	**0.03**	**1976**	**0.49**
2	**1970**	**2.14**	**1974**	**1.12**	**2015**	**0.22**	**2015**	**0.77**
3	**1947**	**2.20**	**1947**	**1.41**	**1956**	**0.24**	**2014**	**0.90**

Table 2. Driest July on record.

	Puerto Rico		San Juan Area		IST		ISX	
1	**2003**	**12.38**	**2013**	**14.17**	**1958**	**7.41**	**1958**	**7.62**
2	**1960**	**10.82**	**1950**	**11.23**	**2010**	**7.40**	**1964**	**6.91**
3	**2002**	**10.62**	**2011**	**11.08**	**2005**	**5.74**	**2011**	**6.57**

Table 3. Wettest July on record.

	Puerto Rico**		San Juan Area		IST		ISX	
1	**1948**	**81.1**	**1980**	**85.1**	**1979**	**86.6**	**1989**	**86.5**
2	**1947**	**80.6**	**2014**	**85.0**	**1994**	**86.5**	**1985**	**85.3**
3	**2007**	**80.6**	**1981**	**84.9**	**1993**	**86.2**	**2014**	**85.0**

Table 4. Warmest July on record.

	Puerto Rico**		San Juan Area		IST		ISX	
1	1943	71.6	1921	78.7	1956	81.8	1956	81.2
2	1940	72.7	1913	78.8	1955	82.1	1952	81.2
3	1941	73.2	1919	78.9	1954	82.3	1955	81.4

Table 5. Coolest July on record.

**** Following years are not included: 1955, 1956, 1957, 1959, 1962, 1967, 1971, 1973, 1978, 1979, 1980, and 1981 ****

	Puerto Rico	San Juan Area	IST	ISX
Temperature	79.3	83.4	84.0	83.6
Rainfall	5.13	5.07	2.85	3.04

Table 6. Normal Values for July

Monthly and Seasonal Highlights for Primary Climatological Data Sites.

	June	July	August	Season JJA (data till 07/31)	Year to Date
San Juan Area	9th warmest (83.8F)	---	---	---	8th warmest 80.9F
IST	5th warmest (85.2)	4th warmest 86.0F	---	3rd warmest 85.7F	4th warmest 82.5F
ISX	10th warmest (83.9)	10th warmest 84.3F	---	4th warmest 84.5F	5th warmest 81.4 F

Table 7. Summer 2016

Data is preliminary and has not undergone final quality control by the National Centers for Environmental Information / NCEI/. Therefore, this data is subject to revision. Report based on data received until August 10th 2016.

Puerto Rico Climate Record Period: 1940 to 2016
San Juan Metro Area Climate Record Period: 1898 to 2016 (Primary climatological site)
Cyril E. King Airport/St Thomas Climate Record Period: 1953 to 2016 (Primary climatological site)
Henry E. Rohlsen Airport/St Croix Climate Record Period: 1951 to 2016 (Primary climatological site)