



2011: A Year of Extremes

*Annual State of the Climate Report for
the Southeast United States*

*Preliminary Report Produced by the
Southeast Regional Climate Center*

January 31, 2011

An aerial view of tornado damage in Tuscaloosa, Alabama, which was hit with an EF-5 tornado on April 27. Hundreds of people were killed across the South when a swarm of tornadoes hit the region between April 25 and 28. (AP Photo/Dave Martin)

Overview

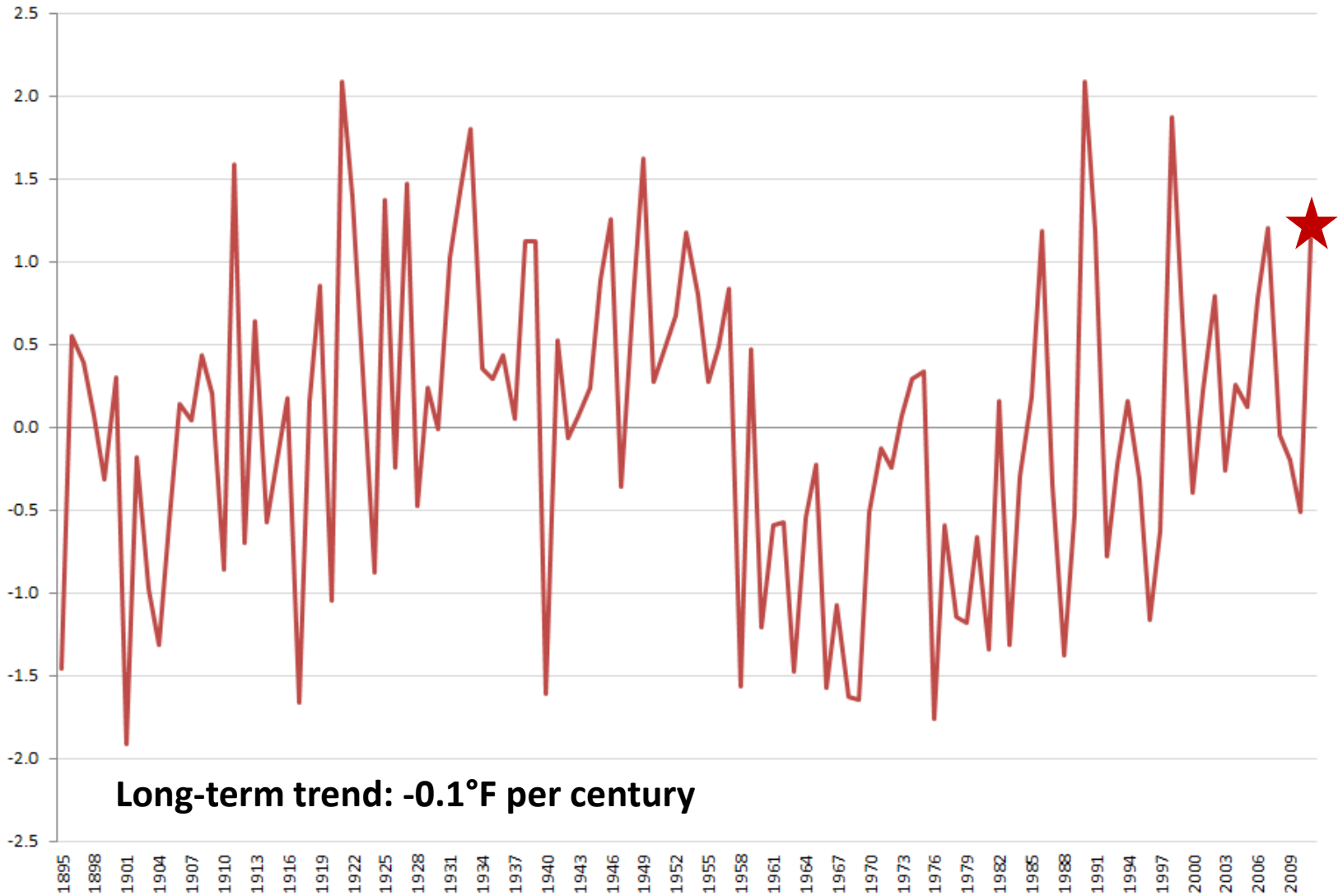
This preliminary report provides a regional perspective of the climate in the Southeast U.S. in 2011. Several variables and events are placed in historical context so that the climatological significance of 2011 can be assessed.

Overall, the Southeast region experienced a number of notable weather and climate events in 2011. These included winter storms and cold temperatures in January; extreme and exceptional drought conditions, particularly across Georgia; wildfires, particularly across Georgia, the Florida Panhandle, and the Carolinas; urban flooding; severe thunderstorms, including a record large hailstone in Georgia; historic tornado outbreaks in Alabama and North Carolina; extreme summer heat; and tropical cyclones, highlighted by Hurricane Irene and Tropical Storm Lee. More detailed information on these events can be found in our monthly climate reports, which are part of NCDC's monthly State of the Climate summary for the U.S. <http://www.ncdc.noaa.gov/sotc/national/2011/>

Based on preliminary data, **2011 was the 16th warmest year in the Southeast since 1895**. The regional average annual temperature was 64.0°F, which is 1.2°F above the long-term average (1895-2011) (see Slides 3 and 5). While much attention is paid to the upward trend in mean annual temperatures since about the 1960s, it is worth noting that 8 of the 10 warmest years in the Southeast region since the end of the 19th century occurred prior to 1950. Just one year after experiencing its warmest summer (June-August) on record, **the Southeast experienced its second warmest summer in 2011**. The regional average summer temperature was 80.3°F, which is 2.4°F above the long-term average (see Slide 4). Prior to this, the Southeast had not experienced back-to-back years with extreme summer heat since the 1950s. **The winter of 2010-2011 (December-February) ranked as the 14th coldest on record across the Southeast**. It marked the second consecutive year of well below-average winter temperatures across the region. In fact, the average temperature of the past two winters ranks as the 4th coldest of all consecutive winter seasons in the Southeast since 1895.

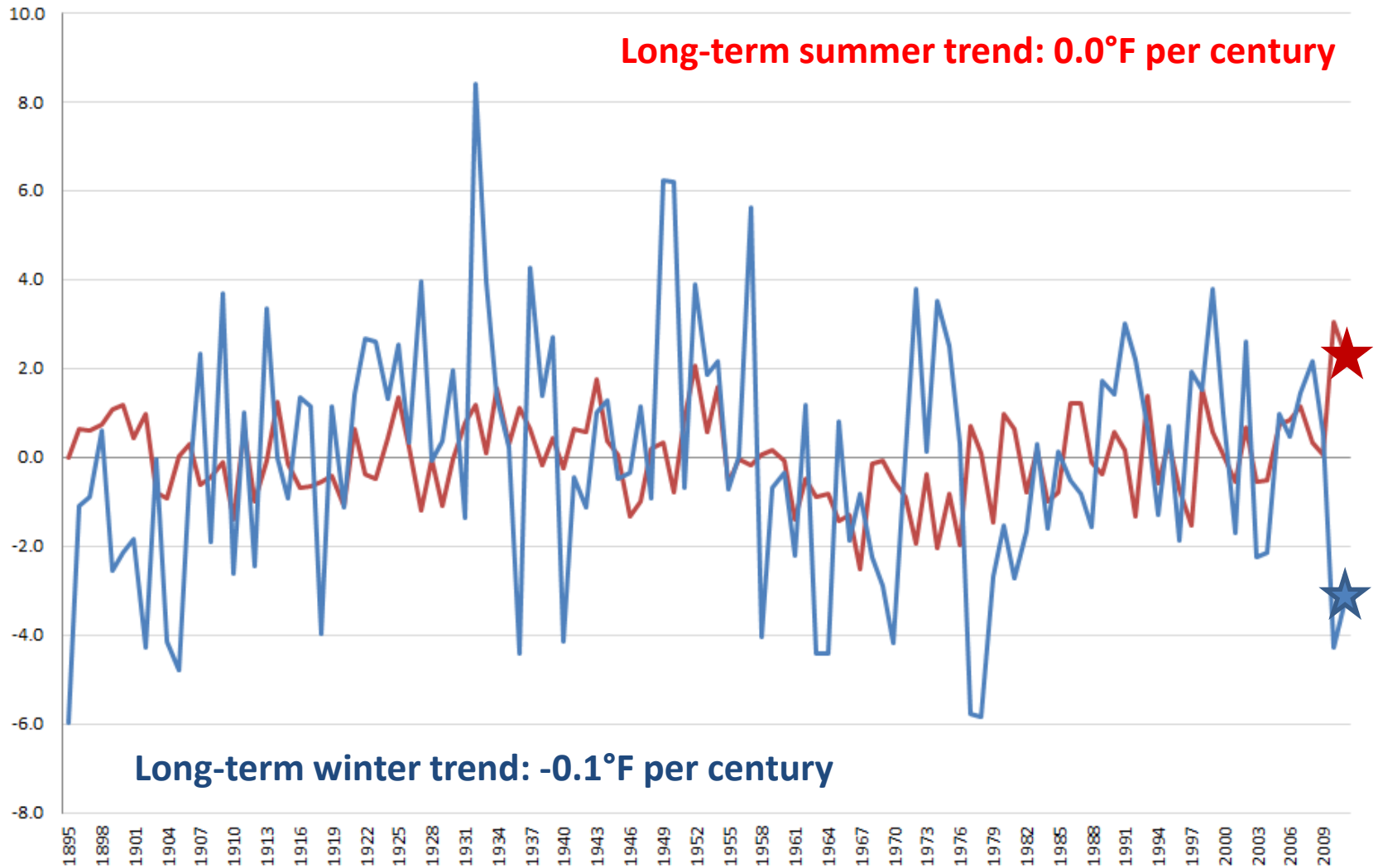
The Southeast region experienced its 27th driest year on record in 2011 with an average regional deficit of 4.57 inches of precipitation (see Slides 6 and 8). However, there was much intra-regional variability: annual precipitation across Virginia was nearly 5 inches above the long-term average, while **the state of Georgia recorded its 5th driest year on record** with a deficit of over 10 inches (see Slide 8). Summer season precipitation across the Southeast in 2011 was approximately 2 inches below the long-term average and ranked as the **16th driest summer on record** (see Slide 7). The hot and dry summer weather led to several weeks of exceptional drought conditions across nearly 15% of the region, as defined by the U.S. Drought Monitor (see Slide 9). A comparison of extreme and exceptional drought conditions from 2000 to the end of 2011 is provided in Slide 10. Using the Palmer Drought Severity Index (PDSI) and Palmer Hydrological Drought Index (PHDI), the drought conditions of 2011 can be placed in a more objective and long-term context (see Slide 11). Both the PDSI and PHDI values indicate that **the dryness experienced across the Southeast throughout much of 2011 has not been experienced since the early 1980s and is comparable to the dryness experienced during the drought years of the 1920s, 1930s, and 1950s**.

Annual Temperature Anomaly for the Southeast Region (1895-2011)



Temperatures in degrees F

Summer and Winter Season Temperature Anomalies for the Southeast Region (1895-2011)



Temperatures in degrees F

Statewide Temperature Anomalies by Month

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual
Virginia	-3.0	3.9	0.7	4.0	1.3	2.3	2.8	1.2	1.0	-0.8	3.4	5.4	1.9
North Carolina	-4.4	3.0	0.6	3.3	0.8	3.0	2.6	1.5	0.4	-2.0	2.2	4.9	1.4
South Carolina	-4.9	3.0	1.1	2.7	0.6	3.5	2.8	2.4	0.0	-2.7	1.4	3.8	1.1
Georgia	-4.9	2.0	1.7	2.4	-0.1	3.2	1.9	2.8	-1.0	-3.1	1.4	3.7	0.9
Alabama	-4.4	1.2	2.2	2.5	-0.9	3.6	1.7	2.2	-2.6	-3.6	1.7	2.7	0.5
Florida	-3.5	1.8	1.7	3.3	0.4	1.9	1.1	2.2	0.4	-2.3	1.6	4.2	1.1
Region	-4.2	2.5	1.3	3.0	0.4	2.9	2.2	2.1	-0.3	-2.4	2.0	4.1	1.2

Temperatures in degrees F

Annual Temperature Anomalies at Selected Locations in Puerto Rico and the U.S. Virgin Islands

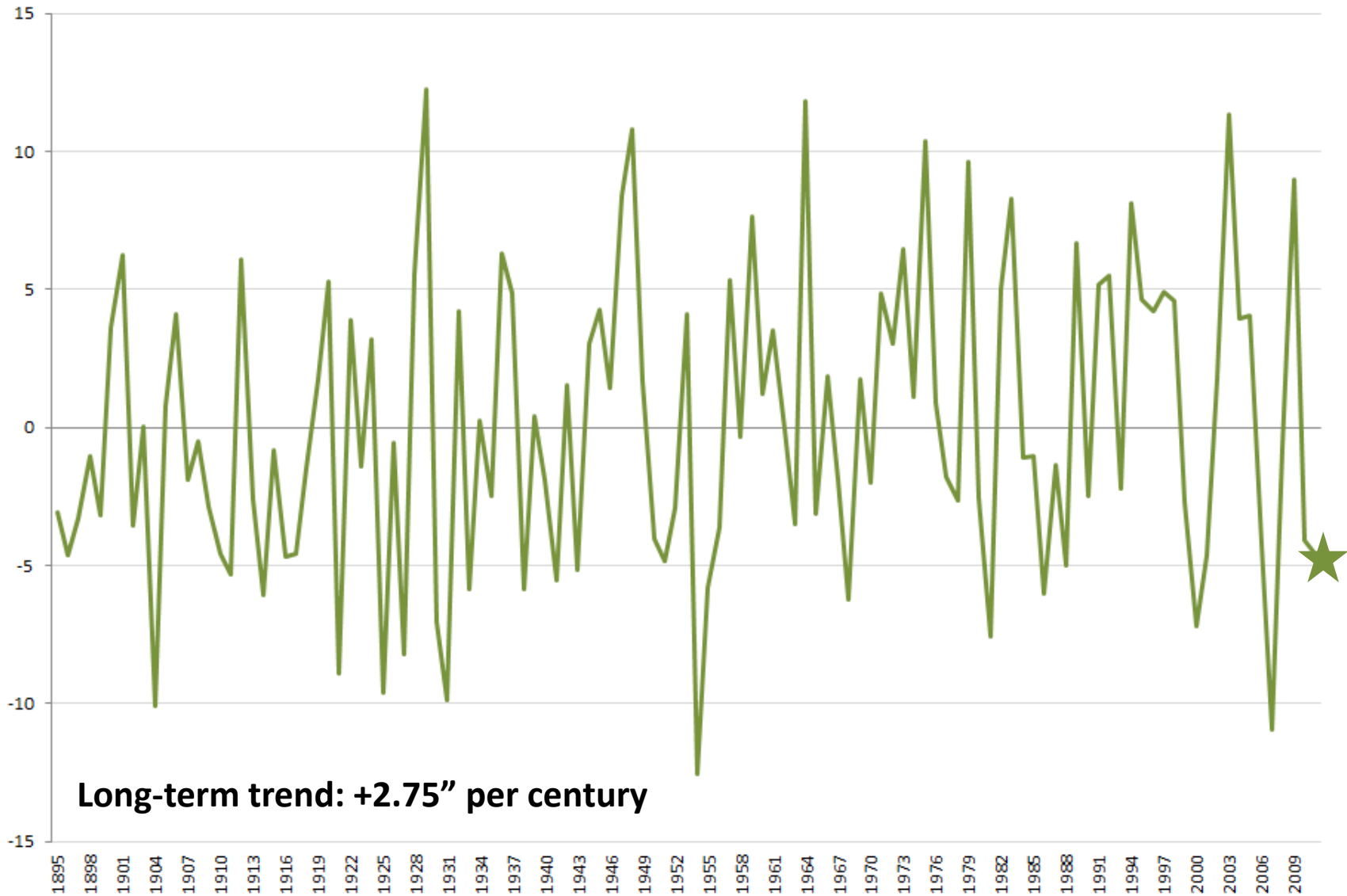
San Juan Ap, PR	0.3	(1898-2011)
Guayama, PR	0.4	(1914-2011)
Aibonito, PR	-1.9	(1906-2011)
Coloso, PR	1.0	(1899-2011)
Charlotte Amalie Ap, St. Thomas	-1.1	(1953-2011)
Christiansted Ap, St. Croix	-1.3	(1951-2011)

August 2011 ranked as the warmest on record in the state of Florida (since 1895)

Top 5 Warmest Year on Record in 2011

Miami, FL	1 st Warmest	(1895-2011)
Cape Hatteras, NC	1 st Warmest	(1893-2011)
Tampa, FL	2 nd Warmest	(1890-2011)
Richmond, VA	2 nd Warmest	(1887-2011)
Columbia, SC	T-2 nd Warmest	(1887-2011)
Norfolk, VA	T-2 nd Warmest	(1874-2011)
Washington, D.C.	4 th Warmest	(1871-2011)
Fort Myers, FL	4 th Warmest	(1892-2011)
Columbus, GA	4 th Warmest	(1948-2011)
Raleigh, NC	4 th Warmest	(1887-2011)
Greensboro, NC	T-4 th Warmest	(1892-2011)
Charleston, SC	5 th Warmest	(1938-2011)
Roanoke, VA	5 th Warmest	(1912-2011)

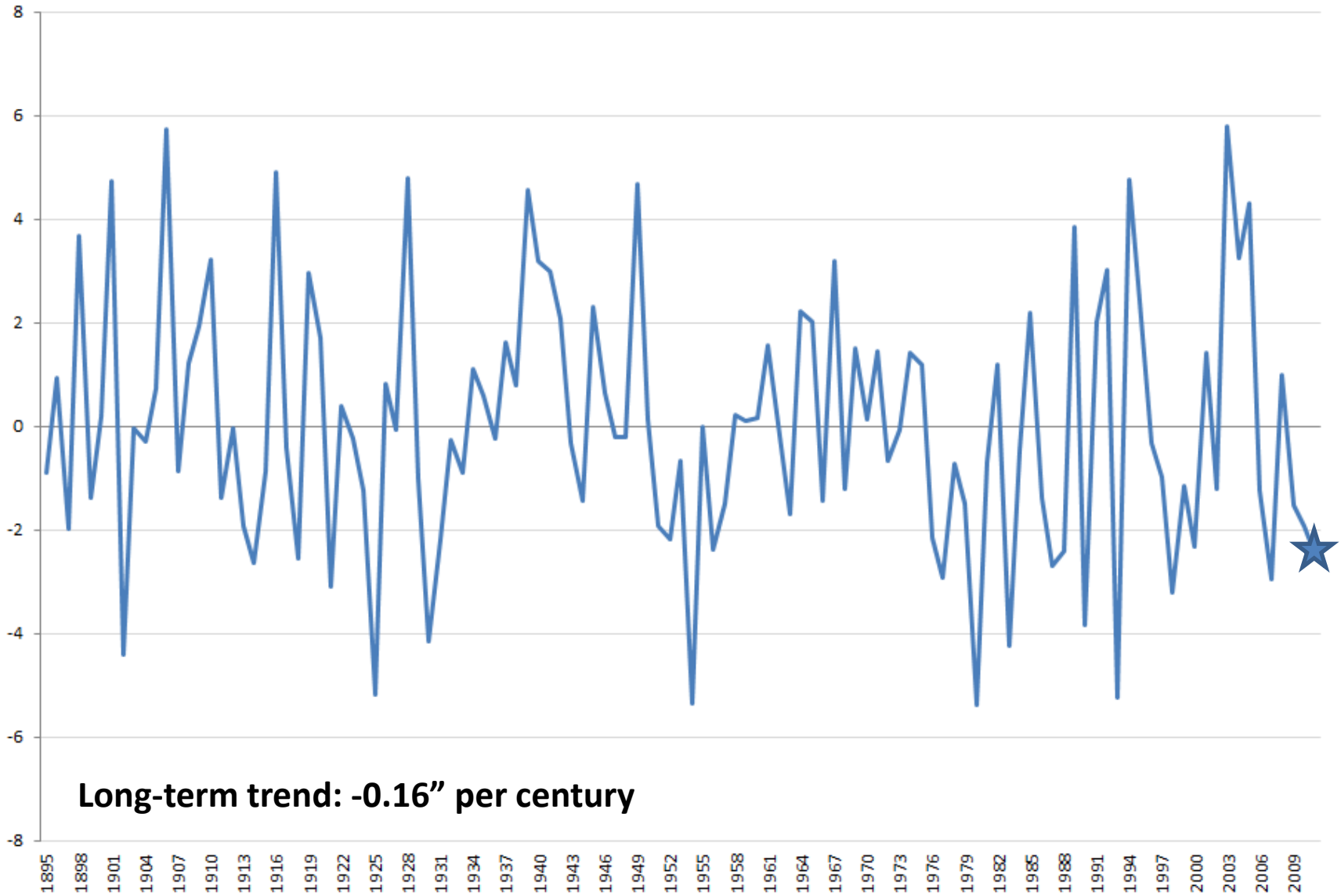
Annual Precipitation Anomalies for the Southeast Region (1895-2011)



Long-term trend: +2.75" per century

Precipitation in inches

Summer Precipitation Anomalies for the Southeast Region (1895-2011)



Precipitation in inches

Statewide Precipitation Anomalies by Month

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual
Virginia	-1.78	-1.46	1.41	1.32	0.50	-0.68	-0.23	0.95	2.91	0.52	0.79	0.54	4.77
North Carolina	-1.78	-1.23	0.90	0.04	-1.00	-1.37	-1.25	2.29	1.19	-0.49	1.42	-1.01	-2.28
South Carolina	-1.87	-0.57	0.55	-0.56	-0.80	-1.78	-1.41	-1.07	0.54	-0.76	-0.05	-1.47	-9.25
Georgia	-0.99	-0.72	0.73	-1.11	-2.48	-1.05	-1.19	-2.59	-0.19	0.01	-0.01	-1.09	-10.68
Alabama	-0.79	-1.52	2.20	0.27	-2.41	-0.56	0.25	-2.06	3.31	-2.23	0.25	-0.25	-3.53
Florida	1.38	-1.23	0.40	-0.86	-2.17	-2.08	-0.24	-0.47	-1.00	2.11	-0.80	-0.48	-5.43
Region	-5.83	-6.73	6.19	-0.90	-8.36	-7.52	-4.07	-2.95	6.76	-0.84	1.60	-3.76	-4.57

Precipitation in inches

Annual Precipitation Anomalies (and totals) in Puerto Rico and the U.S. Virgin Islands

San Juan Ap, PR	37.39 (88.15)
Guayama, PR	35.31 (87.32)
Aibonito, PR	57.91 (107.66)
Coloso, PR	27.80 (102.07)
Charlotte Amalie Ap, St. Thomas	8.27 (46.14)
Christiansted Ap, St. Croix	7.88 (47.72)

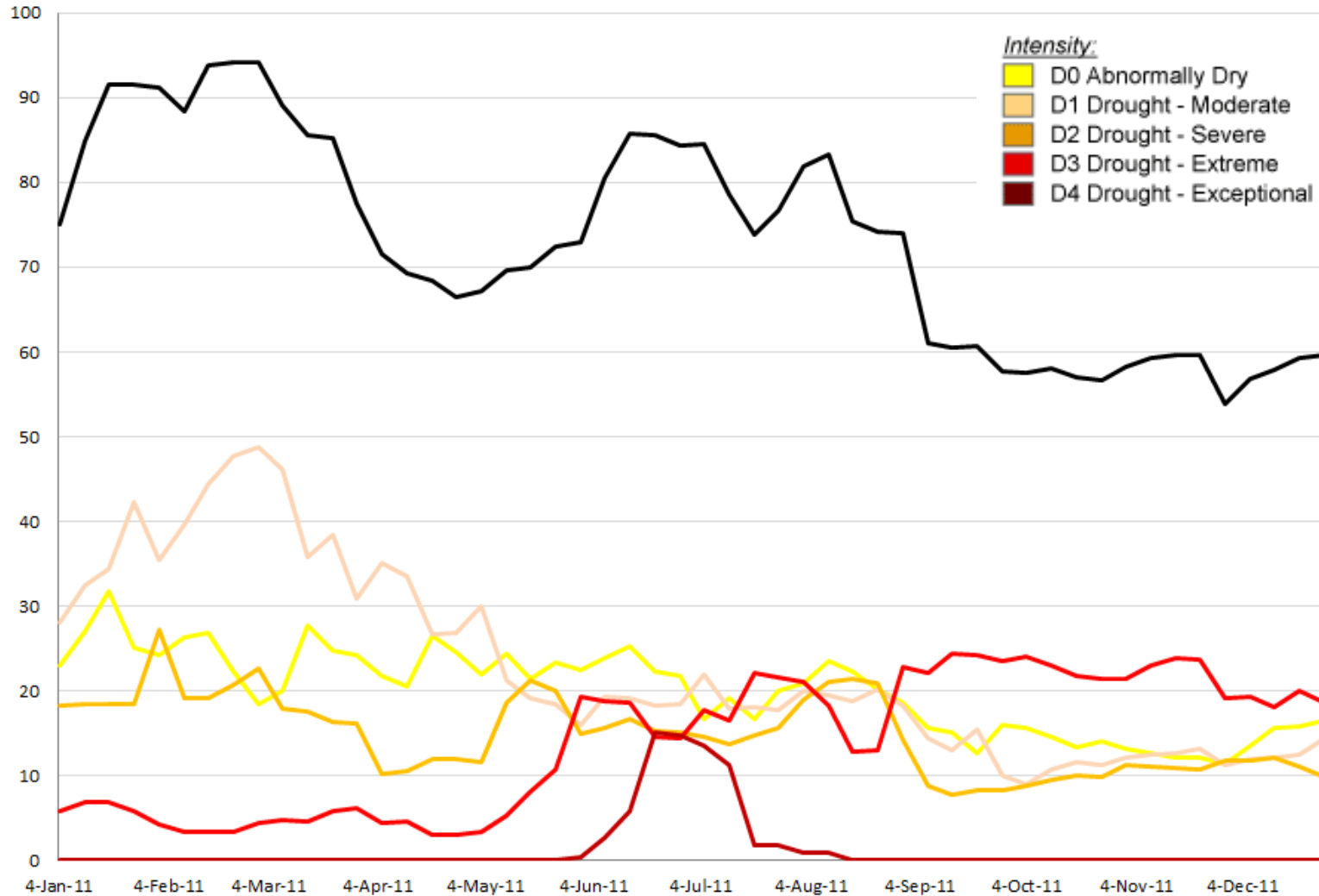
Top 5 Wettest/Driest Year on Record in 2011

San Juan, PR	2 nd Wettest	(1898-2011)
Gainesville, FL	2 nd Driest	(1890-2011)
Tallahassee, FL	2 nd Driest	(1892-2011)
Augusta, GA	4 th Driest	(1871-2011)
Macon, GA	4 th Driest	(1892-2011)
Charleston, SC	5 th Driest	(1938-2011)

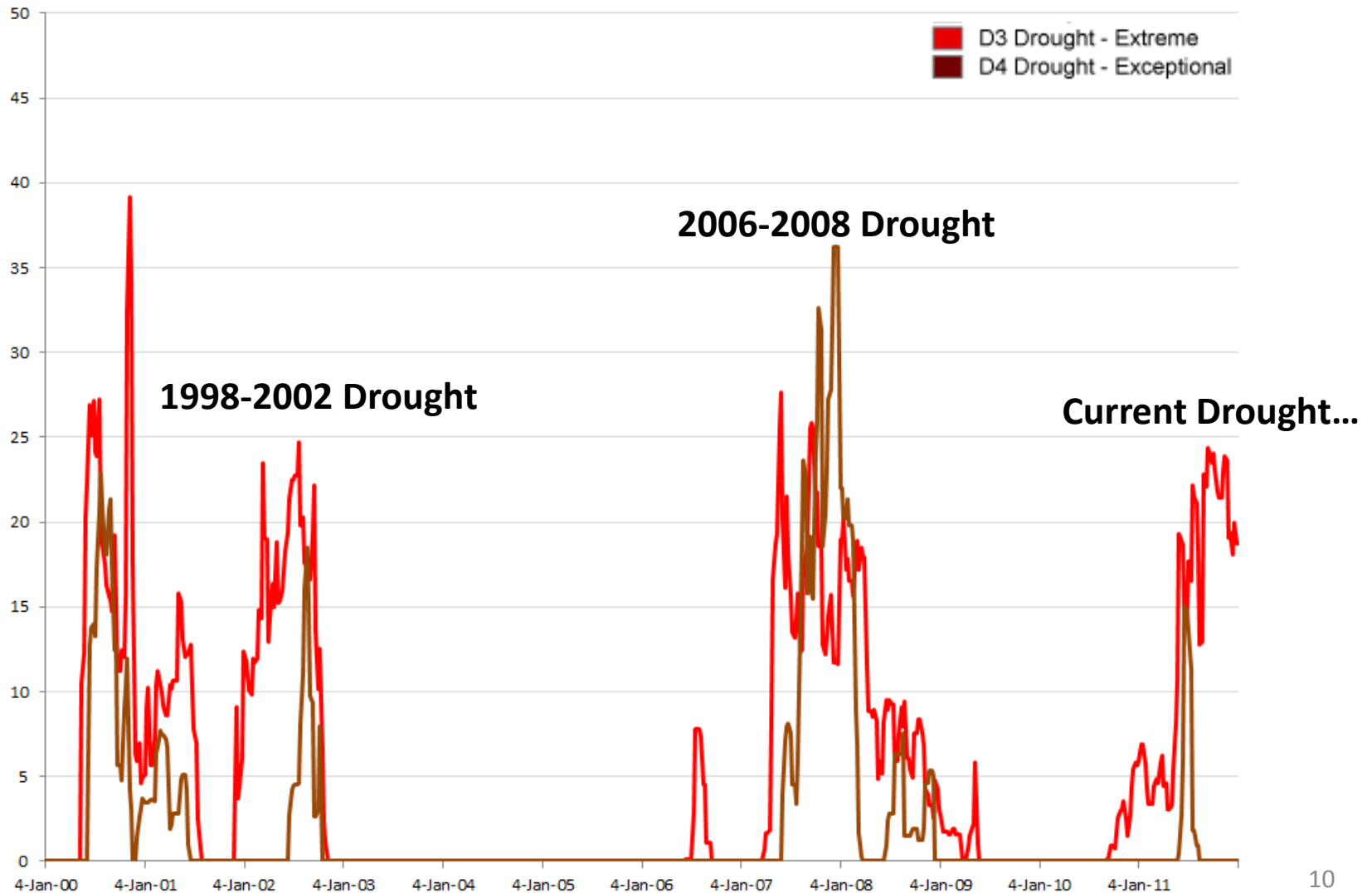
2011 ranked as the 5th driest year on record in the state of Georgia (since 1895)

Weekly Drought Conditions

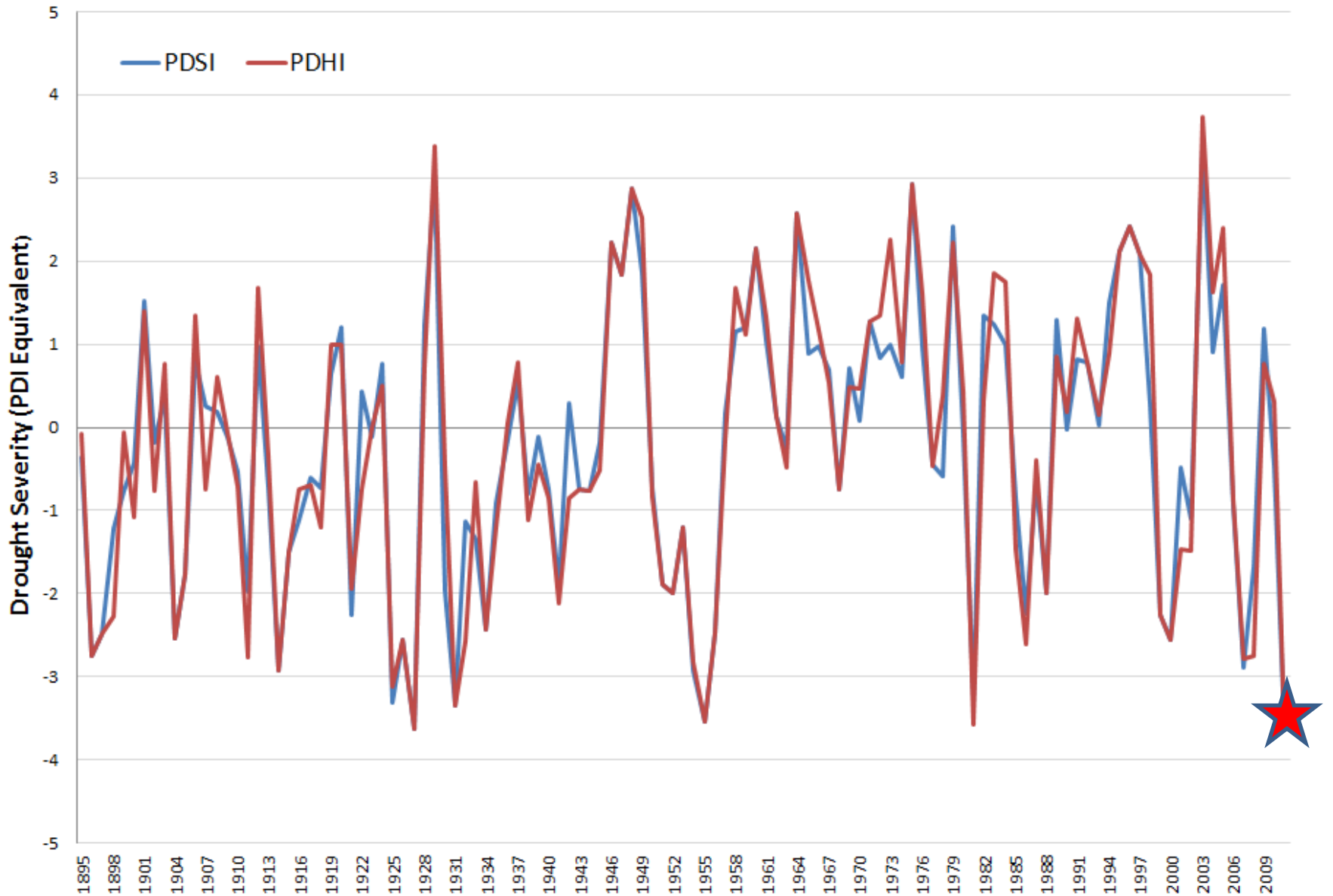
Percent of Southeast Region in Drought by Week, 2011



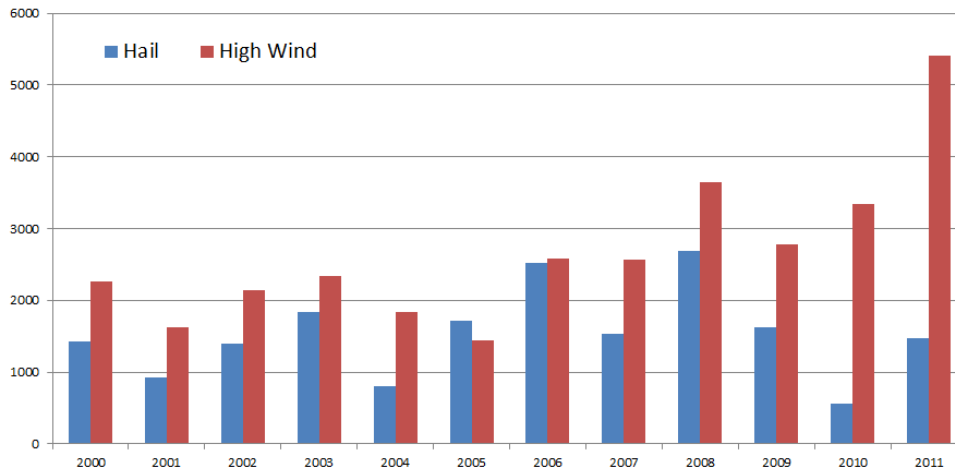
Percent of Southeast Region in Extreme and Exceptional Drought by Week, 2000-2011



Regionwide Annual Drought Indices (1895-2011)

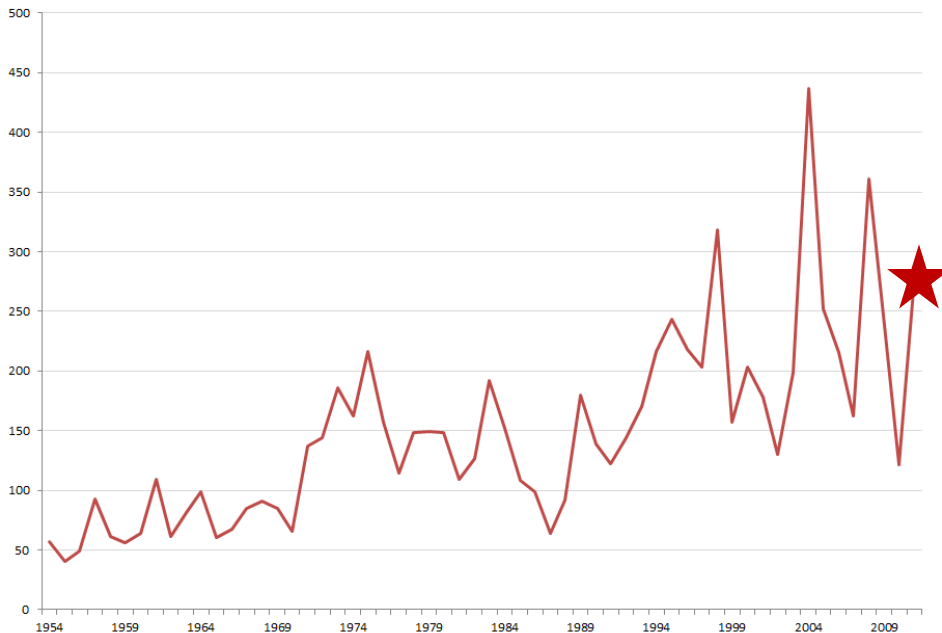


Severe Weather and Tornadoes



The Southeast U.S. recorded over 5,000 high wind reports in 2011, the most in a single year since 2000. June alone saw over 1,500 high wind reports, while April saw nearly 1,200 reports. The number of hail reports was near the 10-year annual average of 1,400.

Annual Frequency of Tornadoes (F0-F5) in the Southeast Region, 1954-2011*



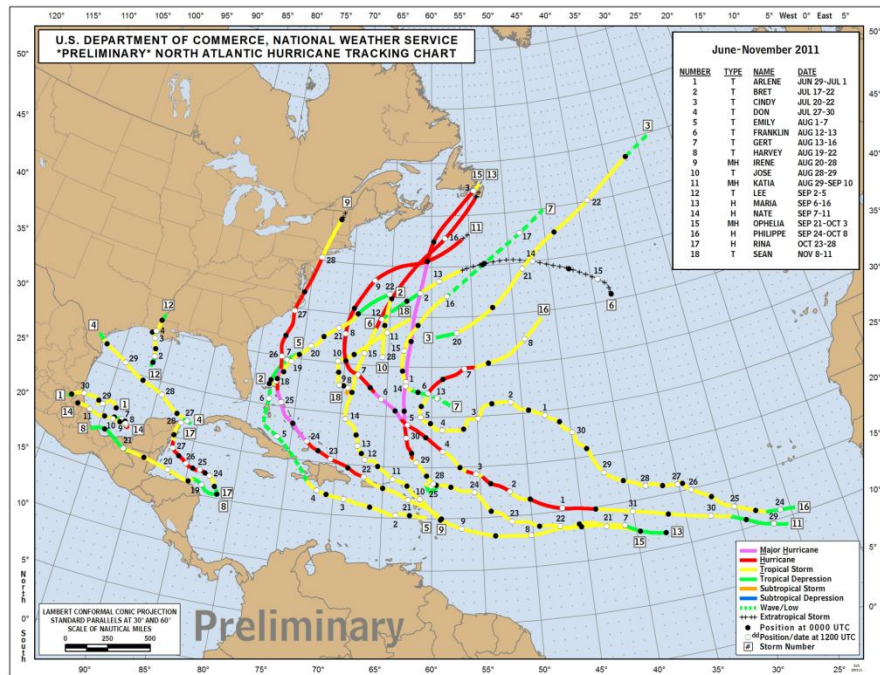
Based on preliminary data, the Southeast U.S. recorded over 250 tornadoes in 2011. Since 1954, there have been three years with more tornadoes: 1998 (318), 2008 (361), and 2004 (437). The unusually high number of tornadoes in 2004 may be tied to a large number of weak tornadoes that were spawned from landfalling tropical storms along the Gulf Coast.

****We are currently working to update this climatology with official tornado counts by F/EF scale. It is believed that 2011 will stand out as an extraordinary year with regards to fatalities and strong tornadoes (F/EF-2 and greater). More details will be released by Spring 2012.***

Tropical Cyclones

According to data compiled by NOAA's National Hurricane Center, the 2011 Atlantic hurricane season was an active one with 19 named storms. This marks the 3rd highest total since 1851. Six of the 19 storms reached hurricane strength, with two becoming major hurricanes (Category 3 and greater).

Despite above average activity, Hurricane Irene was the lone hurricane to strike the U.S. She made landfall near Cape Lookout, NC on the morning of August 27 as a Category 1. Nearly a week earlier, Irene pounded Puerto Rico with heavy rain and high wind. Irene was the first hurricane to strike the mainland U.S. since Ike in 2008 and the last to strike the Southeast U.S. since Wilma in 2005.



In all, four tropical cyclones affected the Southeast U.S. in 2011 (see Slide 14). Two of these storms, Tropical Storms Emily and Maria, only affected Puerto Rico, while Tropical Storm Lee only affected the Southeast mainland.

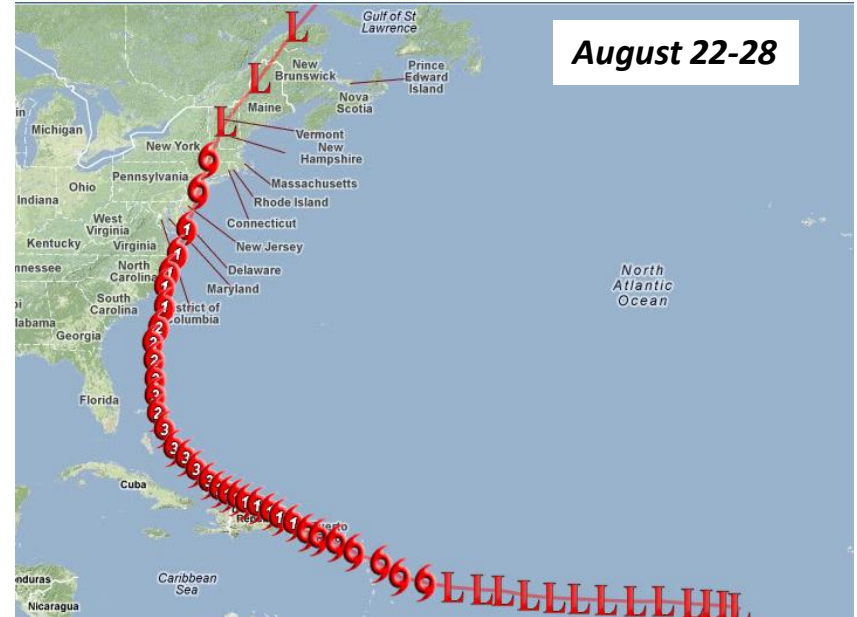
More information on the impacts of these storms across the Southeast can be found in our monthly state of the climate reports:

<http://www.ncdc.noaa.gov/sotc/national/2011/>

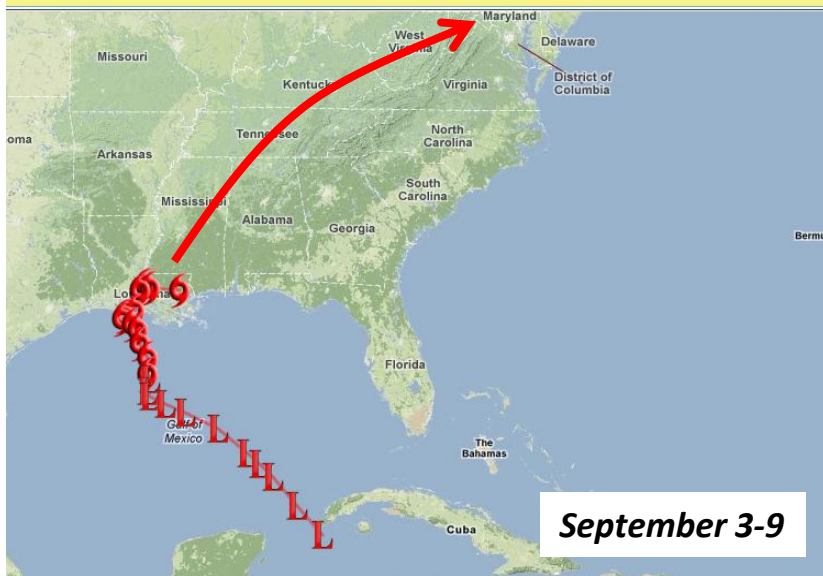
Tropical Storm Emily (2011)



Hurricane Irene (2011)



Tropical Storm Lee (2011)



Hurricane Maria (2011)



For more information, please contact the Southeast Regional Climate Center

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