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# Does a Super El Niño Mean a Super Cold Winter?

John Nielsen-Gammon, Texas State Climatologist, Department of Atmospheric Sciences, Texas A&M University

The Earth is in the midst of one of the strongest El Niño events on record. By one comprehensive measure, the Multivariate ENSO Index, this El Niño is the third strongest El Niño since at least 1870. Stories abound about the potential for disastrous weather, including California flooding.

Those of us in the South-Central United States, like those in California, have been dealing with droughts for the past several years and don't mind a little rain. El Niño, which typically enhances rainfall during the wintertime across the southern United States from southern California to the Carolinas, is

therefore welcome, as long as it doesn't create too much rain. Oklahoma has already broken its annual rainfall record, and each succeeding raindrop from now to the end of 2015 will only add to the record.

The seasonal Climate Prediction Center forecasts for December through February, provided in last month's newsletter, featured the classic El Niño footprint of enhanced precipitation chances across the southern United States. It also featured the classic El Niño footprint of enhanced chances of below-normal temperatures across most of the south-central United States.

Given that forecast, you might

think that not only is the South unusually vulnerable to wintertime flooding this year, it is also unusually vulnerable to extreme cold waves. But that's not so! It turns out that the super-cold events usually happen during ENSO-neutral years, when neither an El Niño nor a La Niña is present. Though an El Niño year usually means cooler-than-normal weather for the South-Central United States, the South usually manages to dodge the extremely cold weather that occasionally comes its way.

Here's a plot of average wintertime temperatures for various cities in the south-central United States according to El Niño or La Niña status. Any index values greater than 0.5 constitute an El Niño, while any index values less than -0.5 constitute a La Niña. For the most part, the lines slope downward toward the right, indicating that El Niño winters tend to be cooler than La Niña winters in the south-central United States.

Compare that to a plot of the coldest temperature observed at any time during the winter

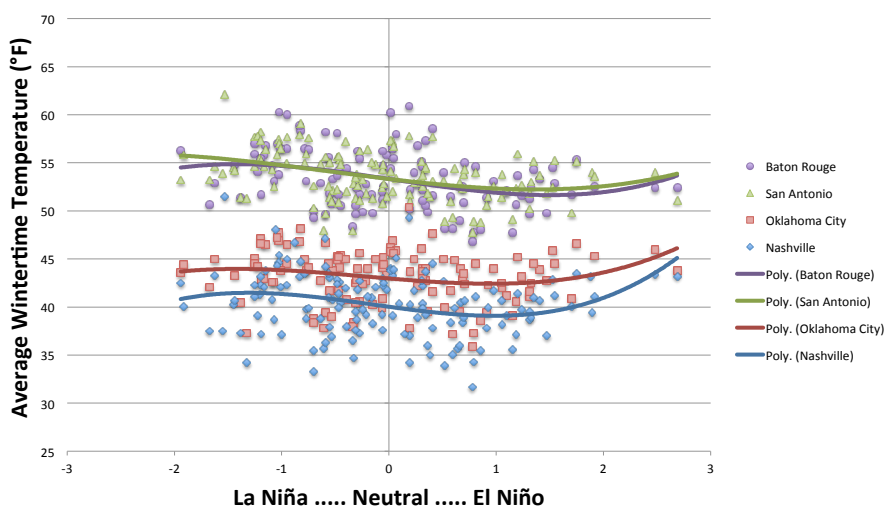


Figure 1. Average wintertime temperatures for various cities in the south-central United States.

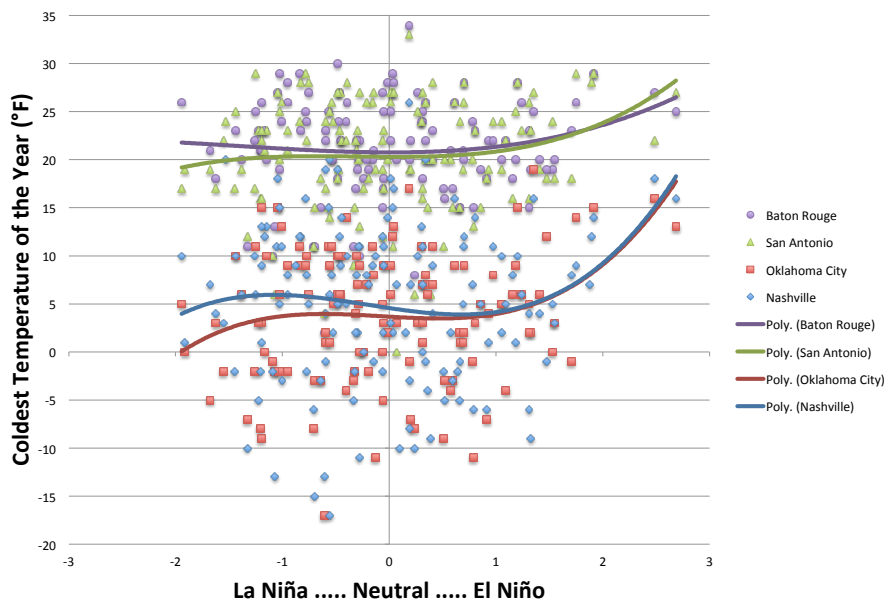


Figure 2. Coldest wintertime temperatures for various cities in the south-central United States.

season. First off, notice that the coldest temperature plot has a lot more scatter than the wintertime average plot. That's because the coldest temperature is the product of an individual semi-random weather event, whereas the average temperature is the product of a whole bunch of weather events averaged together.

Notice also that the upward-trending curve for stronger El Niños is much more prominent for extreme cold temperatures than for average temperatures. Indeed, for an El Niño around 2.3 such as is going on right now, the expected value for coldest winter temperature is 4-5 °F warmer than average in Baton Rouge and San Antonio and 8-9 °F warmer than average in Oklahoma City and Nashville.

Similar patterns hold

elsewhere across the south-central United States. In Houston, the temperature has dropped below 19 °F fifty times in the past 122 years, but none of them were during any of the 20 strongest El Niño events.

What is it about strong El Niños that seems to confer immunity to extreme cold temperatures? Part of the answer lies in the rest of the United States temperature pattern. The southern United States is the only part of the country that is typically cooler than normal. The rest of the United States is typically warmer than normal, and the northern Plains in particular are typically much warmer than normal.

Any extremely cold air that reaches the South has to go through the northern Plains first. If the northern Plains are much warmer than normal, they cannot be receiving their

normal quota of cold air blasts from Canada and the Arctic. If the cold air is not reaching the High Plains, it's not going to reach the South.

These temperature patterns are related to the jet stream pattern. In a strong El Niño, the jet stream tends to be farther south than normal. Often the jet stream will split, with a southern branch bringing wet weather to the South while the northern branch remains in Canada. For the south-central United States to experience super-cold weather, there needs to be a single jet stream that forays far north over western North America and then dips far south in the central and eastern United States. That sort of thing happens during neutral and La Niña winters, but not so much during El Niño winters.

Still, despite this, El Niño winters do tend to be cooler than normal. This coolness is related to the enhanced rainfall and the enhanced cloud cover that goes along with it. The weather tends to be gloomy, with less sunlight than normal and fewer warm days. Without as much energy from the Sun, the ground can't heat up as much.

Damp and gloomy. It's a forecast that only someone who knows drought can love. And judging from the warm weather during the first half of December, that gloom has a lot of catching up to do.



# Drought Update

**Luigi Romolo,**  
Southern Regional Climate Center

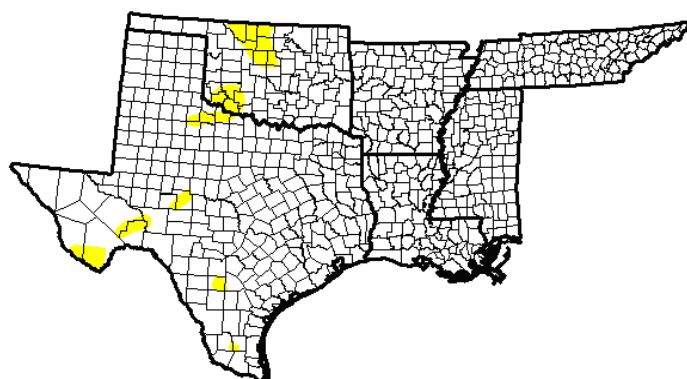
Heavy precipitation throughout the Southern Region has led to the complete removal of drought conditions such that all 6 states are now drought-free. Only small pockets of abnormally dry conditions remain in parts of Texas and Oklahoma.

On November 16, the passage of a cold front resulted in over a dozen tornadoes in eastern Oklahoma and northern Texas. There were no reports of fatalities or injuries. Damage was mainly limited to trees and power lines.

On November 17, the cold front which unleashed havoc in Texas and Oklahoma a day earlier, spawned thunderstorms with numerous

tornadoes in central Mississippi. Most of the reported damage was limited to trees and power lines and there were no reports of injuries or fatalities.

The States at Risk Project included Texas in the top five states that are at the most risk of changing weather due to climate change. Texas also received poor grades for preparedness of climate change, which is not good news due to the fact Texas will most likely see the most extreme changes in weather because of a shift in the climate. For the fourth year in a row, Texas has seen a rise in vehicle injuries and fatalities. While the most likely cause is an increase in speed limits on highways, weather related accidents have also increased (Information provided by the Texas Office of State Climatology).



Released Thursday, December 3, 2015

David Simeral, Western Regional Climate Center



Above: Drought conditions in the Southern Region. Map is valid for December 1, 2015. Image is courtesy of National Drought Mitigation Center.

*Drought Conditions (Percent Area)*

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
<b>Current</b>	96.28	3.72	0.00	0.00	0.00	0.00
<b>Last Week</b> 11/24/2015	91.00	9.00	2.10	0.00	0.00	0.00
<b>3 Months Ago</b> 9/1/2015	56.77	43.23	24.61	7.93	0.67	0.00
<b>Start of Calendar Year</b> 12/30/2014	41.57	58.43	33.88	18.43	8.80	2.36
<b>Start of Water Year</b> 9/29/2015	36.88	63.12	37.43	18.31	5.72	0.00
<b>One Year Ago</b> 12/2/2014	46.47	53.53	32.26	16.58	7.24	1.97

## Intensity:

	D0 Abnormally Dry		D3 Extreme Drought
	D1 Moderate Drought		D4 Exceptional Drought
	D2 Severe Drought		

*The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.*

## Southern Climate Monitor

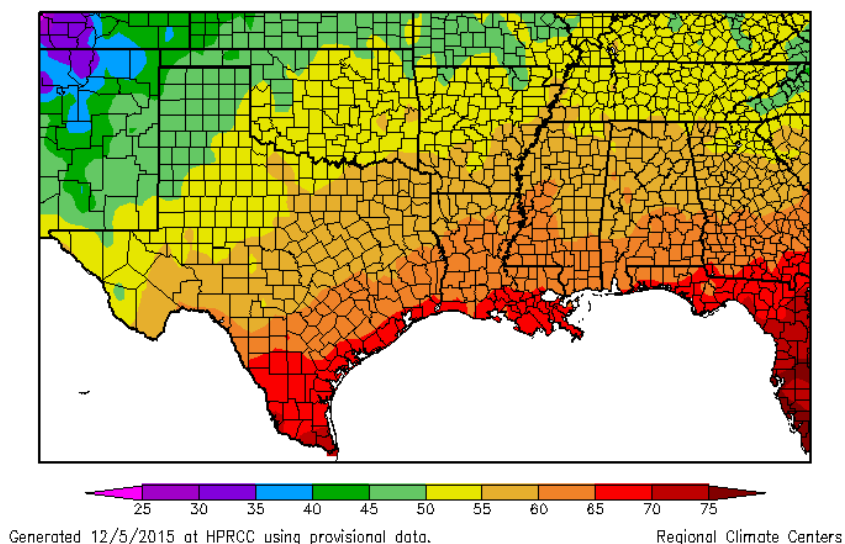
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# Temperature Summary

Luigi Romolo,  
Southern Regional Climate Center

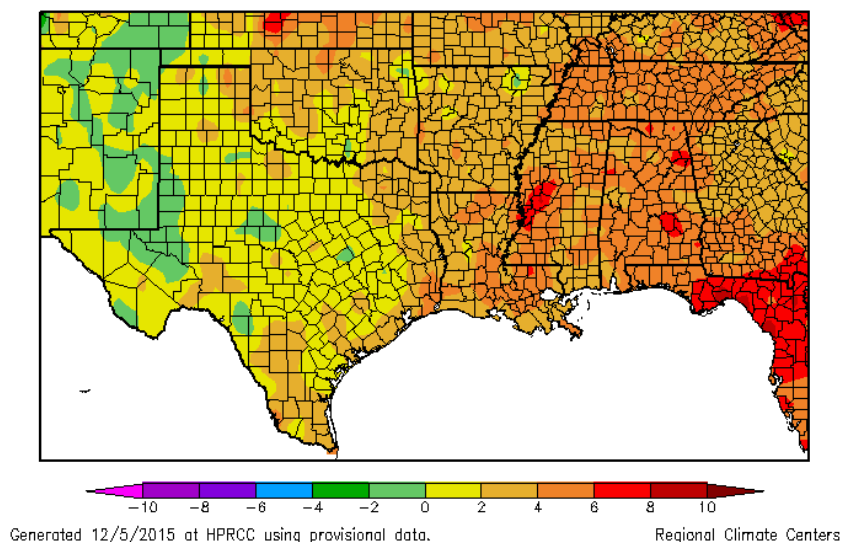
November was a warm month across the board for the Southern Region, with all six states averaging above normal state-wide average temperatures. In Texas, temperatures averaged approximately 0-2 degrees F (0-0.57 degrees C) above normal. Temperature anomalies were slightly higher in Oklahoma, Arkansas and Louisiana where most stations averaged between 2-4 degrees F (1.11-2.22 degrees C) above normal. Mississippi and Tennessee experienced the highest temperature anomalies with the majority of stations averaging between 4-6 degrees F (2.22-3.33 degrees C) above normal. The state-wide average temperatures for the month are as follows: Arkansas averaged 54.20 degrees F (12.33 degrees C), Louisiana averaged 63.00 degrees F (17.22 degrees C), Mississippi averaged 59.30 degrees F (15.17 degrees C), Oklahoma averaged 51.40 degrees F (10.78 degrees C), Tennessee averaged 53.50 degrees F (11.94 degrees C), and Texas averaged 57.40 degrees F (14.11 degrees C). It was the fourth warmest November on record for Tennessee, and the fifth warmest November for Mississippi. Louisiana experienced their seventh warmest November while for Arkansas it was their twelfth warmest. It was also the twenty-fourth warmest and twenty-eighth warmest November for Oklahoma and Texas, respectively. All ranking records are based on the period spanning 1895-2015.

Temperature (F)  
11/1/2015 – 11/30/2015



Average November 2015 Temperature across the South

Departure from Normal Temperature (F)  
11/1/2015 – 11/30/2015



Average Temperature Departures from 1971-2000 for November 2015 across the South

## Southern Climate Monitor

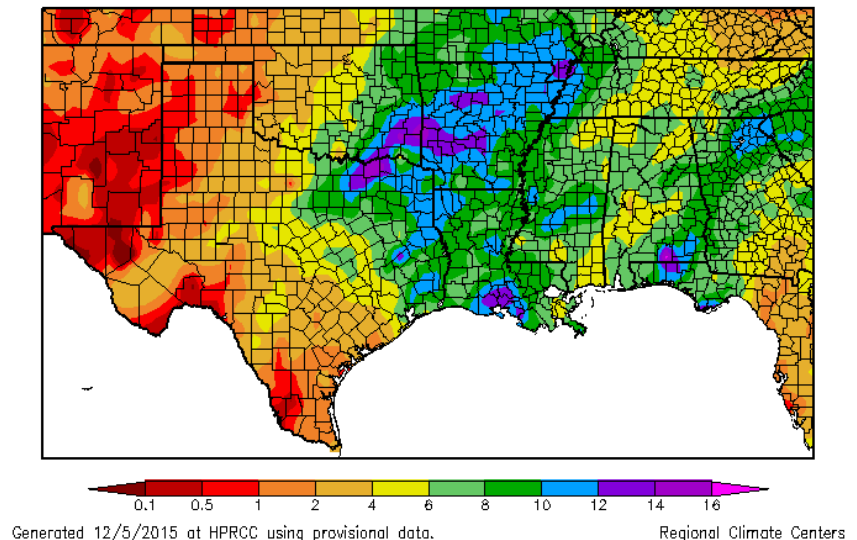
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# Precipitation Summary

Luigi Romolo,  
Southern Regional Climate Center

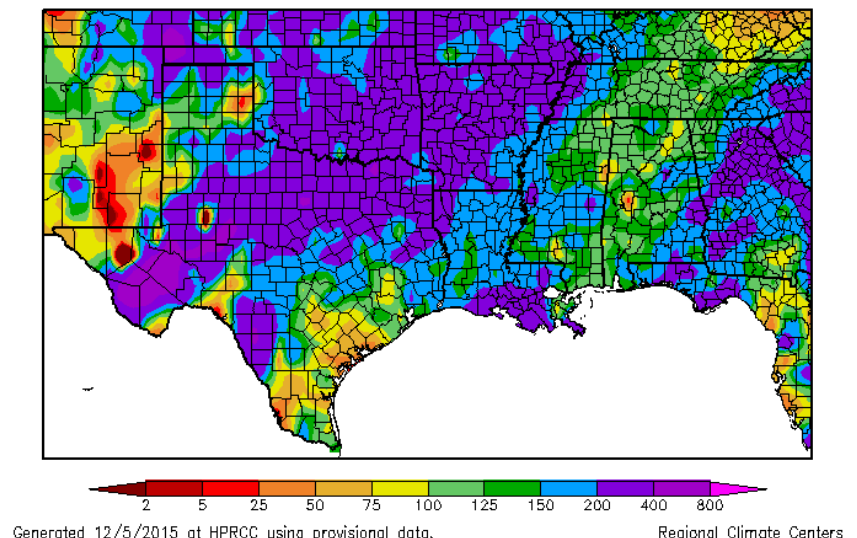
November was an extremely wet month for the Southern Region, with the majority of stations averaging 150 to 200 percent of normal precipitation. For the entire Southern Region, it was the fourth wettest November on record (1895-2015). Only a small portion of the region experienced a drier than normal month. This included a small handful of counties in southern Texas and in the western Texas panhandle. A large area of the region averaged over 200 percent of normal precipitation. This included most of Arkansas, eastern Oklahoma and central Texas. The state-wide precipitation totals for the month are as follows: Arkansas reporting 10.65 inches (270.51 mm), Louisiana reporting 8.82 inches (224.03 mm), Mississippi reporting 7.18 inches (182.37 mm), Oklahoma reporting 5.91 inches (150.11 mm), Tennessee reporting 6.34 inches (161.04 mm), and Texas reporting 3.85 inches (97.79 mm). It was the wettest November on record for Arkansas, and the second wettest November on record for Oklahoma. Texas experienced their sixth wettest November, while for Louisiana, it was their ninth wettest. Mississippi recorded their sixteenth wettest November while Tennessee reported their eighteenth wettest November. All state ranking records are based on the period spanning 1895-2015.

Precipitation (in)  
11/1/2015 – 11/30/2015



## November 2015 Total Precipitation across the South

Percent of Normal Precipitation (%)  
11/1/2015 – 11/30/2015



## Percent of 1971-2000 normal precipitation totals for November 2015 across the South

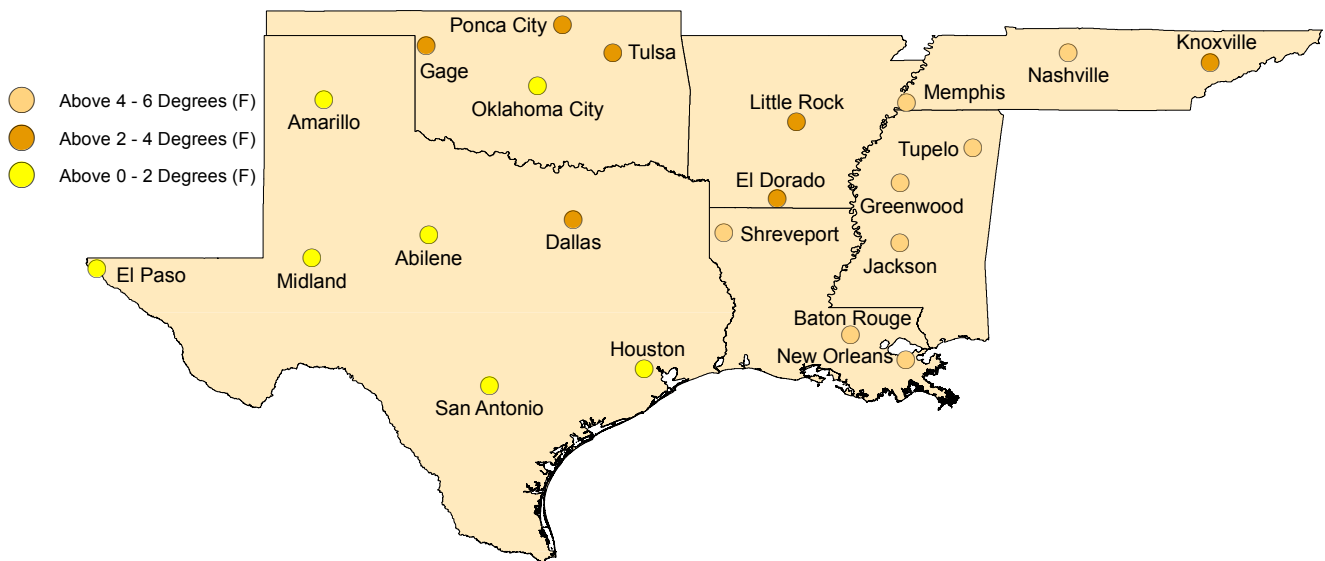
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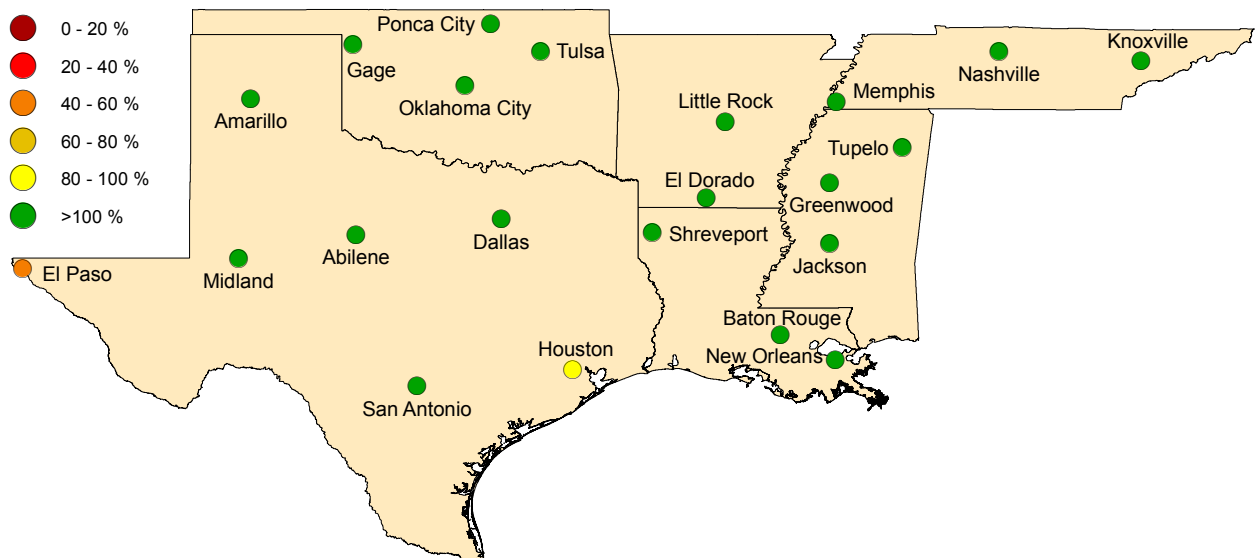
# Regional Climate Perspective in Pictures

## November Temperature Departure from Normal



November 2015 Temperature Departure from Normal from 1971-2000 for SCIPP Regional Cities

## November Percent of Normal Precipitation



November 2015 Percent of 1971-2000 Normal Precipitation Totals for SCIPP Regional Cities

# Climate Perspective

State	Temperature	Rank (1895-2011)	Precipitation	Rank (1895-2011)
Arkansas	54.20	12 <sup>th</sup> Warmest	10.65	1 <sup>st</sup> Wettest
Louisiana	63.00	7 <sup>th</sup> Warmest	8.82	9 <sup>th</sup> Wettest
Mississippi	59.30	5 <sup>th</sup> Warmest	7.18	16 <sup>th</sup> Wettest
Oklahoma	51.40	24 <sup>th</sup> Warmest	5.91	2 <sup>nd</sup> Wettest
Tennessee	53.50	4 <sup>th</sup> Warmest	6.34	18 <sup>th</sup> Wettest
Texas	57.40	28 <sup>th</sup> Warmest	3.85	6 <sup>th</sup> Wettest

State temperature and precipitation values and rankings for November 2015. Ranks are based on the National Climatic Data Center's Statewide, Regional, and National Dataset over the period 1895-2011.

## Station Summaries Across the South

Station Summaries Across the South											
Station Name	Temperatures								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	%Norm
El Dorado, AR	66.9	47.6	57.3	3.4	81	11/05	27	11/23	9.56	4.67	196
Little Rock, AR	65.1	46.7	55.9	3.3	78	11/05	30	11/22	11.06	5.78	209
Baton Rouge, LA	74.2	54.9	64.5	4.2	87	11/05	32	11/23	6.53	2.43	159
New Orleans, LA	74.0	60.0	67.0	4.3	86	11/06	42	11/24+	6.25	1.76	139
Shreveport, LA	69.5	51.6	60.6	4.2	84	11/05	31	11/23	10.34	5.81	228
Greenwood, MS	70.8	49.6	60.2	5.9	84	11/05	26	11/23	5.50	0.98	122
Jackson, MS	71.4	50.7	61.0	5.3	84	11/06	27	11/23	8.99	4.23	189
Tupelo, MS	67.6	47.6	57.6	4.7	80	11/05	24	11/23	6.33	1.63	135
Gage, OK	61.9	35.1	48.5	2.8	79	11/10+	21	11/22	2.00	0.88	179
Oklahoma City, OK	62.7	40.5	51.6	0.9	78	11/05	22	11/22	4.57	2.59	231
Ponca City, OK	63.0	38.9	51.0	3.2	79	11/05	24	11/22+	3.27	1.46	181
Tulsa, OK	63.5	41.7	52.6	2.3	78	11/11	27	11/22	7.21	4.40	257
Knoxville, TN	63.3	44.2	53.7	4.0	78	11/04	24	11/23	6.21	2.20	155
Memphis, TN	66.7	48.9	57.8	4.6	81	11/05	28	11/23	10.16	4.67	185
Nashville, TN	65.4	46.0	55.7	5.9	80	11/05	22	11/23	4.84	0.53	112
Abilene, TX	65.9	44.2	55.0	0.4	86	11/05	24	11/22	3.77	2.36	267
Amarillo, TX	61.8	33.5	47.6	1.4	80	11/02	22	11/28+	1.50	0.70	188
El Paso, TX	66.9	42.7	54.8	1.7	78	11/03	31	11/22	0.28	-0.21	57
Dallas, TX	67.8	49.6	58.7	2.1	83	11/11	30	11/22	9.86	7.15	364
Houston, TX	72.5	53.8	63.1	0.8	84	11/11	35	11/23	3.80	-0.54	88
Midland, TX	66.9	42.8	54.8	1.9	81	11/03+	25	11/22	1.61	0.92	233
San Antonio, TX	72.2	53.9	63.1	2.0	86	11/11+	33	11/23	2.58	0.30	113

Summary of temperature and precipitation information from around the region for November 2015. Data provided by the Applied Climate Information System. On this chart, "depart" is the average's departure from the normal average, and "% norm" is the percentage of rainfall received compared with normal amounts of rainfall. Plus signs in the dates column denote that the extremes were reached on multiple wdays. Blueshaded boxes represent cooler than normal temperatures; redshaded boxes denote warmer than normal temperatures; tan shades represent drier than normal conditions; and green shades denote wetter than normal conditions.



# 2015 Hurricane Season Quiet at the Big Easy

Barry Keim, Louisiana State Climatologist, Louisiana State University

The 2015 hurricane season came to a close at the end of November, and it was a very favorable one for Louisiana and for the entire U.S. Coast (Figure 1). Going in to this season, NOAA predicted we'd have between 6-11 named storms and we ended up with 11. Of those 11, 4 became hurricanes, and of those, 2 became major hurricanes. As shown in Figure 1, there were only 2 landfalls in the U.S. this

season – the first was Tropical Storm Anna which made landfall in South Carolina in early May, and the second was Tropical Storm Bill which made landfall along the mid-Texas coast in late June. There were impacts from these two storms, but nothing compared to a severe hurricane like Katrina or Rita. The big storm of this season was Hurricane Joaquin, which never made landfall in

the U.S., but it created high winds along the U.S. coast from the Carolinas to New England, leading to coastal flooding and severe erosion. Figure 1 also shows where several storms formed this past season in the eastern Atlantic Ocean, but as they traveled westward, they were torn apart by a region of upper air wind shear over the central and western Atlantic. This served to protect the U.S. from several of these storms, and for that, we can thank El Nino. I also note that this is the 10th straight season where we have not had a major hurricane landfall in the U.S. The last Category 3-5 hurricane to make a U.S. landfall was Hurricane Wilma in October of 2005. Our hurricane records go back to 1851, and this is longest time span we've ever gone without a major hurricane landfall. The previous record was 8 straight seasons from 1861-1868. Let's try to make it 11 straight years next season! If you have any questions, feel free to contact me at [keim@lsu.edu](mailto:keim@lsu.edu).

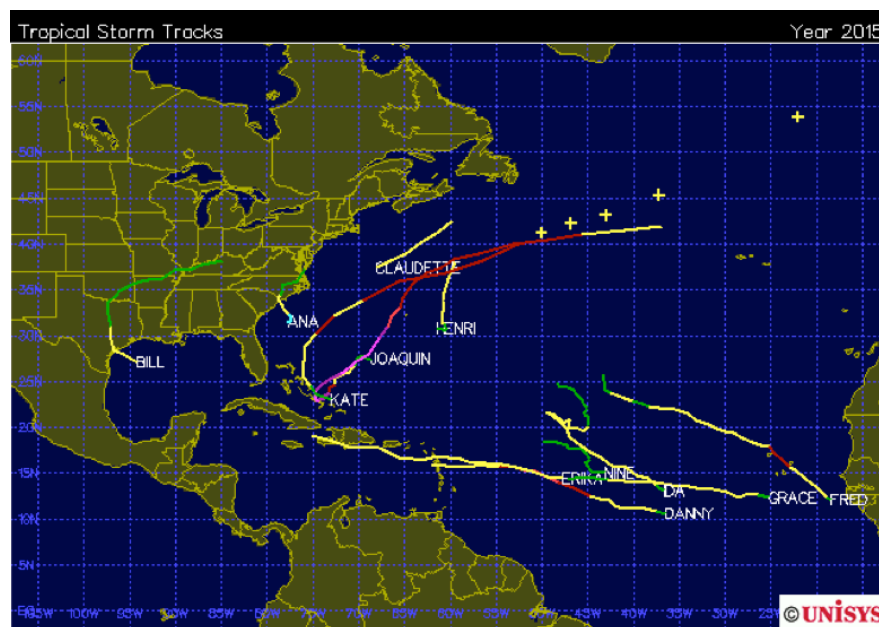


Figure 1. Tracks of the 11 named storms of the 2015 Atlantic Hurricane season. Image is from <http://weather.unisys.com/hurricane/atlantic/2015/track.gif>.

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## Contact Us

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For questions or inquiries regarding research, experimental tool development, and engagement activities at the Southern Climate Impacts Planning Program, please contact us at [405-325-7809](tel:405-325-7809) or [225-578-8374](tel:225-578-8374).

## Monthly Comic Relief



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