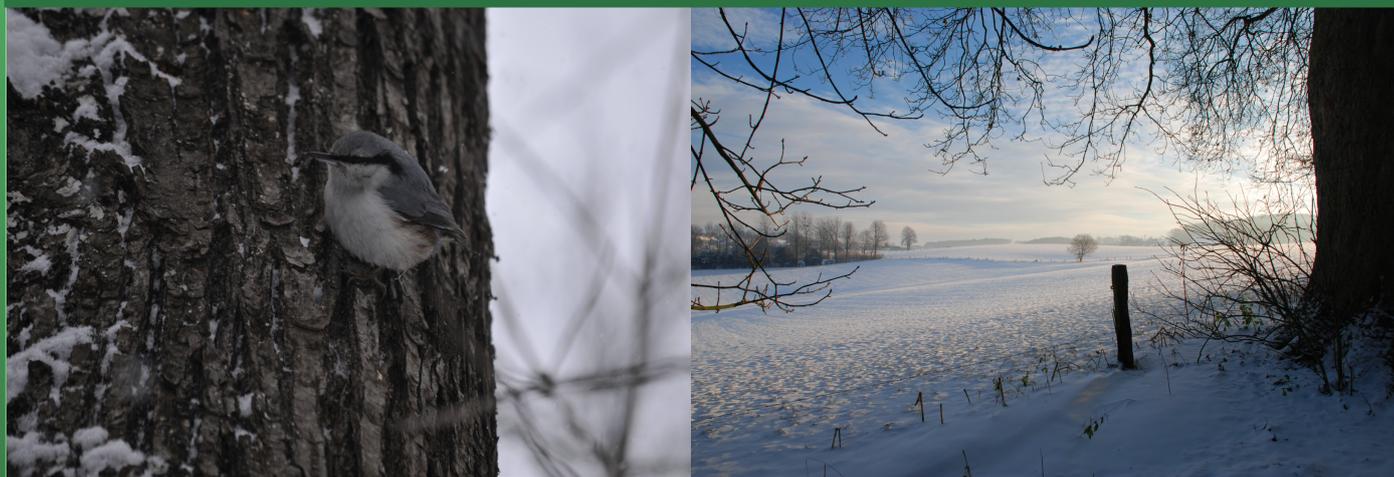


Southern Climate Monitor

February 2014 | Volume 4, Issue 2



SCIPP

Southern Climate Impacts Planning Program
A NOAA RISA Team

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The Southern Climate Monitor is available at www.srcc.lsu.edu & www.southernclimate.org

Understanding One's Severe Weather Risk

Dr. Patrick Marsh, NOAA/NWS Storm Prediction Center

Despite the recent snow and ice across many areas of the SCIPP region, the calendar does indeed read "March"; a quick search of Google yields an increasing number of articles discussing the approach of "tornado season"; and the National Oceanic and Atmospheric Administration's (NOAA) National Weather Service (NWS) recently declared the week of 2-8 March 2014 to be "National Severe Weather Preparedness Week". All of this would seem to indicate that severe weather is just around the corner. Or is it?

Generally speaking, when asked, "When is 'severe weather season'?" or "When is 'tornado season'?", most people I speak with respond with some variant of either "I don't know" or "Late Spring into Summer". In a nationalistic sense, the latter answer appears to be somewhat reasonable. If one were to take a look at the probability of at least one tornado occurring *anywhere* in the United States, as shown in Figure 1, he or she would quickly notice that the maximum probability occurs during the first two weeks of June, and peaks at around 90 percent! Unfortunately, when trying to understand one's risk posed by tornadoes, the United States is a fairly large country; there is a lot of land over which a single tornado might occur. As such, the national probability of at least one tornado occurring might look very different than one's

local probability of at least one tornado. If this turns out to be the case (spoiler alert: it is!) then the nationalistic definition of "tornado season" might not be appropriate to use at every location of the United States.

In Figures 2 and 3, the local probability of at least one tornado occurring is shown for a few locations throughout the SCIPP region. In particular, Figure 2 shows the yearly probability distribution for Oklahoma City, OK (OKC); Dallas-Fort Worth, TX (DFW); Lubbock, TX (LUB); and Amarillo, TX (AMA). Figure 3 shows the yearly probability distribution for Little Rock, AR (LZK); Jackson, MS (JAN); Nashville, TN (BNA); and New Orleans, LA (MSY). One thing that should be readily apparent is that the probabilities are much lower in Figures 2 and 3 than those shown in Figure 1. This should make sense, seeing as Figures 2 and 3 are only depicting single cities instead of the entire United States.

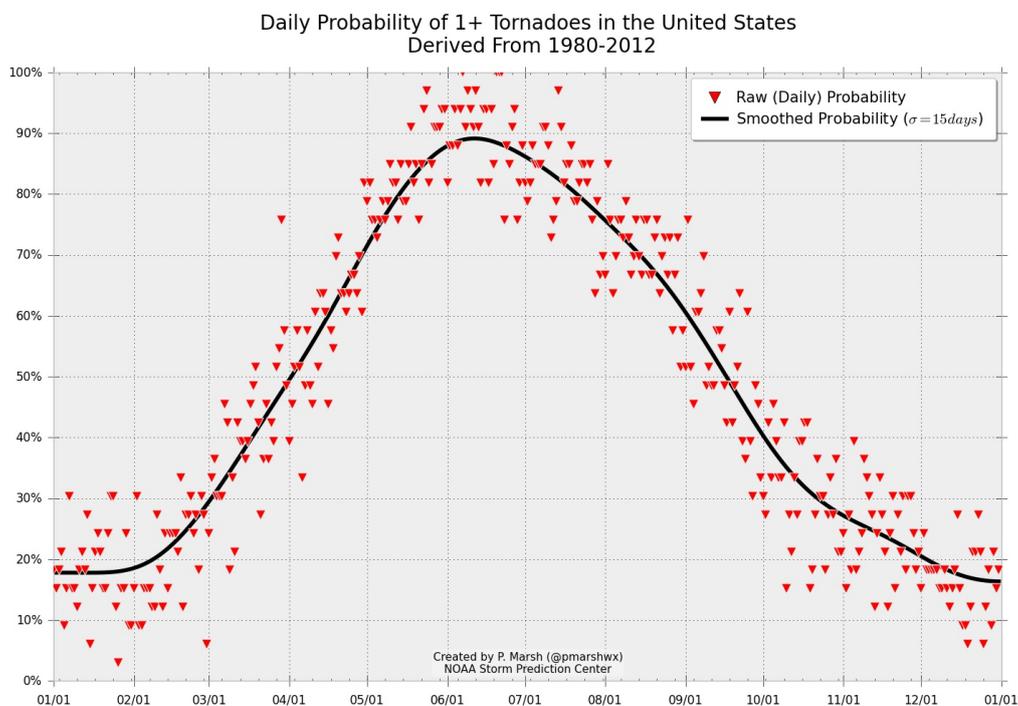


Figure 1: Daily Probability of 1+ Tornadoes in the United States Derived From 1980-2012.

Continuing to examine the figures, it should quickly become apparent that the shapes of the tornado probability distributions are somewhat similar when only examining the distributions within each specific figure, but are very different when comparing across Figures 2 and 3. This is not a coincidence! The locations chosen for Figure 2 can be considered part of the Southern Plains of the United States, whereas those chosen for Figure 3 can be loosely considered to be part of the southeastern United States. Within the Southern Plains, the daily probability of a tornado is shaped somewhat similarly to that of the national distribution, except at lower probabilities, and peaked slightly earlier in the year. Therefore, in the Southern Plains (and it turns out to hold true for most locations in the central United States) defining a "tornado season" to be the time period of late Spring into early Summer would seem to work fairly well.

This is because although there are some slight differences between all four locations, the general shape is consistent with the notion of a single time period of enhanced tornado potential during the late Spring into early Summer.

However, the same does not hold true across the southeastern States. In all four locations chosen to be representative of the southeast (limited to the SCIPP region), the shape of the tornado probability distribution looks considerably different than that of the Southern Plains,

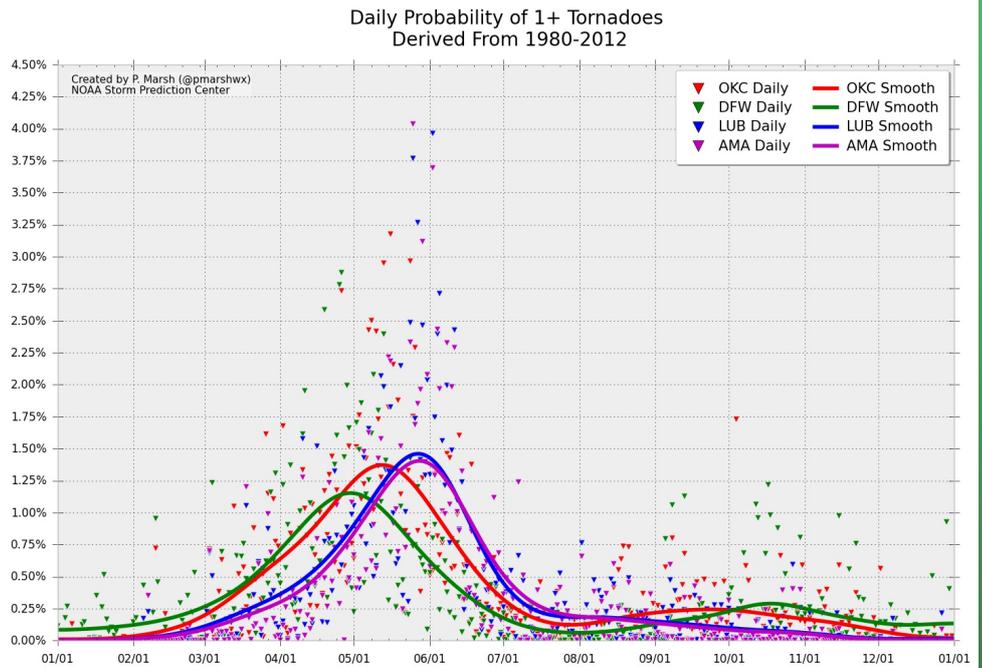


Figure 2: Daily Probability of 1+ Tornadoes Derived From 1980-2012.

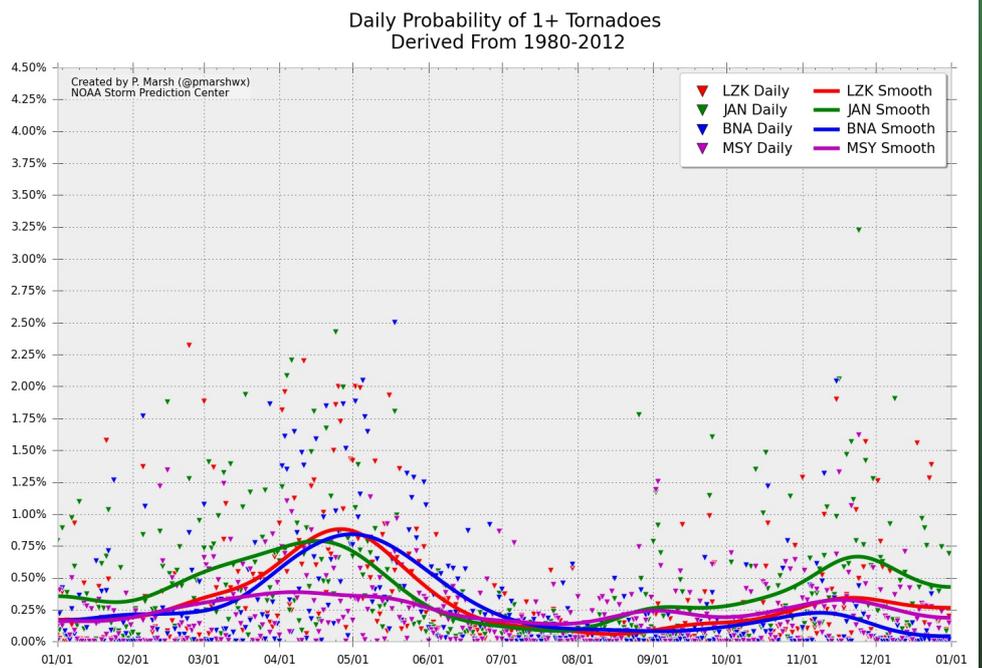


Figure 3: Daily Probability of 1+ Tornadoes Derived From 1980-2012

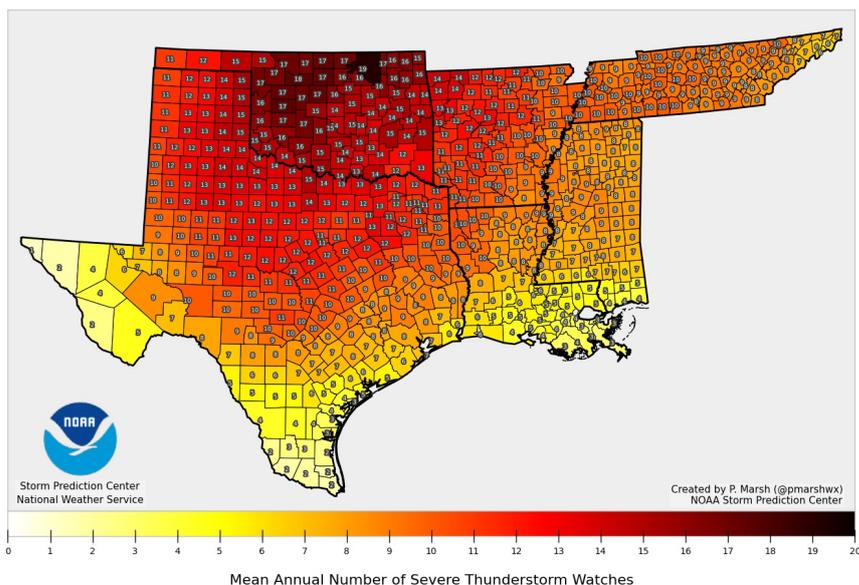
as well as that of the entire United States. Instead of having a single peak in the late Spring into early Summer, there are multiple peaks; one occurring in the late Winter and another occurring in the Fall. Although neither of these peaks result in a maximum daily probability similar in magnitude to those locations shown in the Southern Plains, the fact that there are two comparable peaks results in a overall (yearly) tornado threat that is on par with the overall (yearly) tornado threat experienced in the Southern Plains. This is actually a very important point. **Even though both the Southern Plains and southeastern United States have generally the same yearly risk of experiencing a tornado, how that probability is distributed throughout the year is considerably different!** Putting this another way: One's climatological exposure to tornadoes is geographically-dependent. Yet another way to say this: **"Tornado season" in the southeast United States is fundamentally different than "tornado season" in the Southern Plains.**

So, is severe weather season "right around the corner"? Maybe. Especially for the Southern Plains. However, for the southeast, it's been ongoing since last fall. In fact, in some years, large outbreaks of severe thunderstorms and tornadoes would have already happened across portions of the southeastern United States by

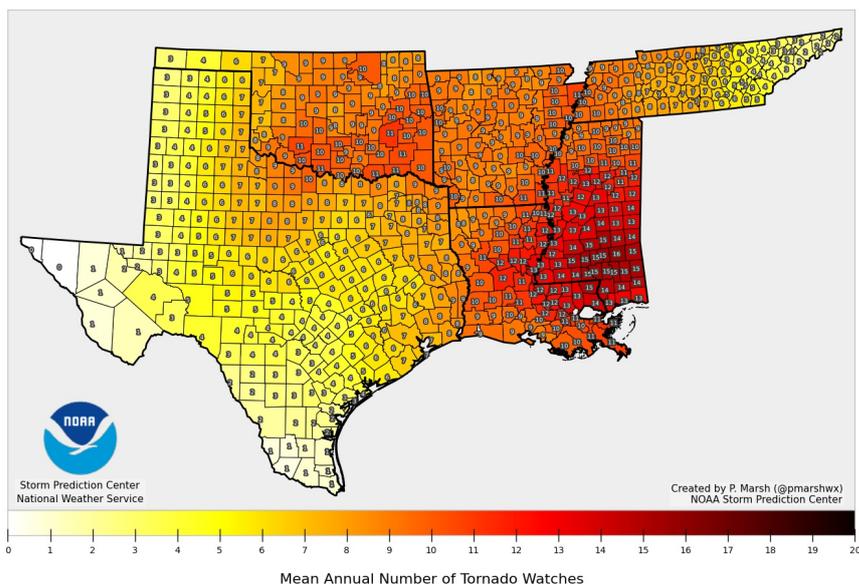
this time of the year. 01 March 1997, 21 January 1999, and 05 February 2008 are all examples of significant tornado outbreaks across the southeastern part of the SCIPP region (Arkansas, Louisiana, Mississippi, and Tennessee) that occurred before mid March!

Additional Figures

Mean Annual Number of Severe Thunderstorm Watches
2000-2013



Mean Annual Number of Tornado Watches
2000-2013



Drought Update

*Luigi Romolo
Southern Regional Climate Center*

Drought conditions over the month of February remained relatively unchanged in most states of the Southern Region, although some abnormally dry areas (D0) were added (e.g., northwestern Arkansas, northern Louisiana, eastern Oklahoma), while others areas saw a reduction in abnormally dry conditions (e.g., northern Mississippi and southern Louisiana, east of the Mississippi River). In Texas, the relatively dry conditions that persisted throughout the month led to the introduction of moderate drought in the central counties.

In Texas, the lack of rainfall helped drought conditions spread rapidly after the last 2 months' dry conditions, causing a slew of new fire risks across central Texas. Water, as usual, remains a problem, holding at

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	32.43	67.57	42.36	19.69	6.04	0.86
Last Week <i>2/25/2014</i>	30.23	69.77	43.10	20.79	6.51	0.79
3 Months Ago <i>12/3/2013</i>	52.53	47.47	28.25	12.88	3.60	0.80
Start of Calendar Year <i>12/31/2013</i>	55.85	44.15	27.23	13.21	3.58	0.72
Start of Water Year <i>10/1/2013</i>	26.20	73.80	50.11	17.90	3.16	0.25
One Year Ago <i>3/5/2013</i>	36.58	63.42	55.03	43.05	20.26	5.01

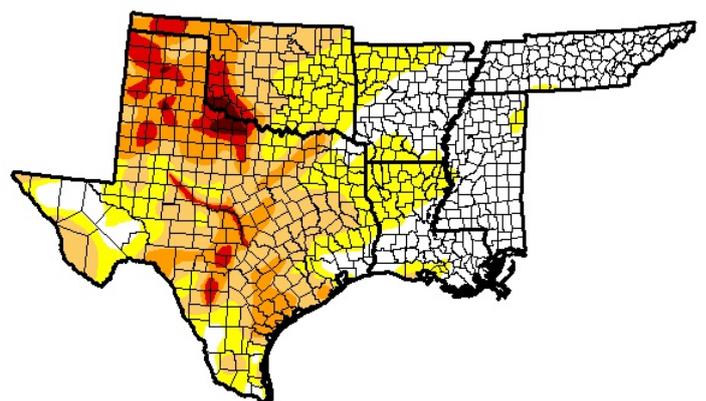
Intensity:

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

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompany text summary for forecast statements. <http://droughtmonitor.unl.edu>

64%, a record low for this time of year. The city of Wichita Falls is nearing the 25% water supply levels that will require the initiation of stage 5 water restrictions preventing any nonessential water usage. A cloud seeding proposal set out last month was approved, allotting \$300,000 of the city's budget to the project. Several other cities, including San Antonio, El Paso, and Leander are looking at possible upgrades to their water restrictions as well. A total of 163 counties across the state now qualify for up to \$2 million in federal disaster loans due to continuing short and long term drought conditions (Information provided by the Texas Office of State Climatology).

There was one day of severe weather in the Southern Region, which occurred on February 20, 2014. In Tennessee and Mississippi, dozens of wind reports were documented by NOAA's Storm Prediction Center. There were also some reports of tornadoes in southern Mississippi and south central Tennessee.



Released Thursday, Mar. 6, 2014

Brad Rippey U.S. Department of Agriculture



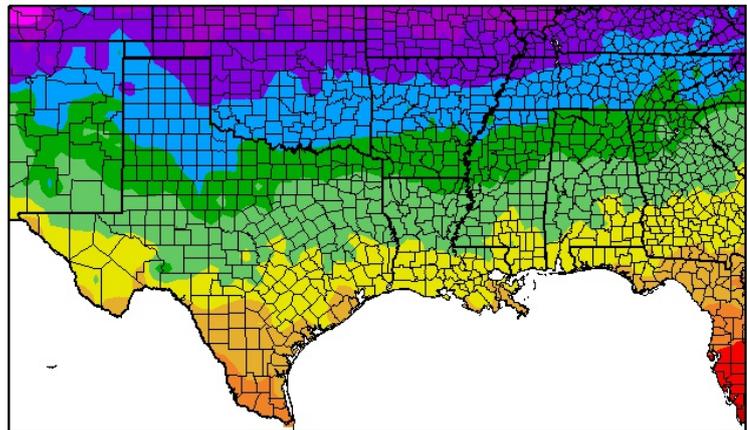
Above: Drought Conditions in the Southern Region. Map is valid for March 4, 2014. Image is courtesy of National Drought Mitigation Center.

Temperature Summary

Luigi Romolo
Southern Regional Climate Center

February was generally a colder than normal month for the Southern Region. The highest departures from normal occurred in the northern parts of Oklahoma and Arkansas, where temperature anomalies ranged from 4 to 8 degrees F (2.22 to 4.44 degrees C) below normal. Similar anomalies were also observed in the north central counties of Texas, and in western Tennessee. Elsewhere, temperature anomalies ranged from near normal to 4 degrees F (2.22 degrees C) below normal. The only parts of the Southern Region that experienced warmer than normal temperatures was the western panhandle of Texas, and a few counties in central Mississippi, where temperatures varied from normal to 6 degrees F (3.33 degrees C) above normal. The statewide average temperatures for the month are as follows: Arkansas averaged 38.80 degrees F (3.78 degrees C), Louisiana averaged 50.40 degrees F (10.22 degrees C), Mississippi averaged 46.30 degrees F (7.94 degrees C), Oklahoma averaged 36.10 degrees F (2.28 degrees C), Tennessee averaged 38.80 degrees F (3.50 degrees C), and Texas averaged 48.50 degrees F (9.17 degrees C). For Arkansas, it was the nineteenth coldest February on record (1895-2014), while Oklahoma recorded its fourteenth coldest February on record (1895-2014). All other state rankings fell within the two middle quartiles.

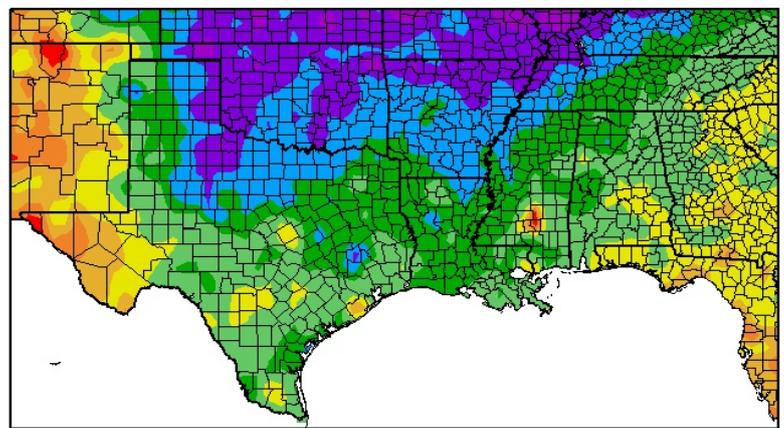
Temperature (F)
 2/1/2014 – 2/28/2014



Generated 3/2/2014 at HPRCC using provisional data. Regional Climate Centers

Average February 2014 Temperature across the South.

Departure from Normal Temperature (F)
 2/1/2014 – 2/28/2014



Generated 3/2/2014 at HPRCC using provisional data. Regional Climate Centers

Average Temperature Departures from 1971-2000 for February 2014 across the South.

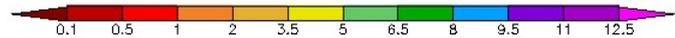
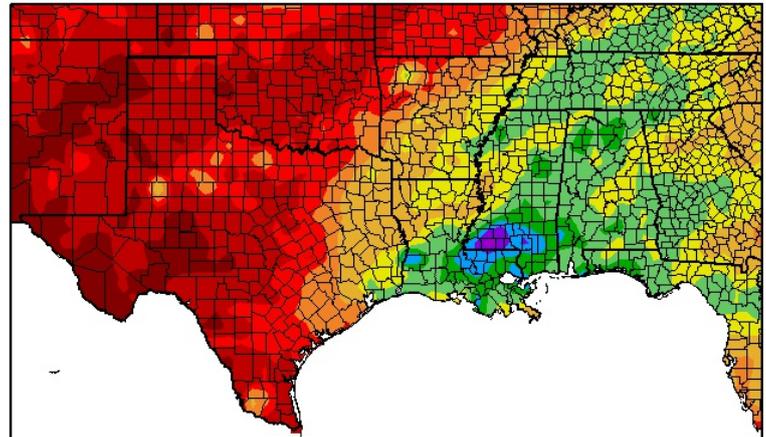
Precipitation Summary

Luigi Romolo
 Southern Regional Climate
 Center

February precipitation in the Southern Region varied spatially with extreme dryness in the western half and wetter than normal conditions along the south central Gulf coast. In the western half of the region, precipitation totals varied from under 5 percent of normal to 70 percent of normal, with most of Texas and Oklahoma receiving less than half the expected precipitation. This was also the case in northern and northwestern Arkansas. Most stations in the central portion of the region (including southeastern Texas, northern Louisiana and southern Arkansas) reported precipitation totals that varied from 50 to 70 percent of normal. In Tennessee and northern Mississippi, precipitation totals were generally near normal to slightly below normal. Conversely, conditions were quite wet in southern Louisiana and southern Mississippi. Precipitation totals there varied from near normal to 200 percent of normal, however, most stations reported between 130 to 150 percent of normal. The statewide average precipitation totals for the month are as follows: Arkansas recorded 2.59 inches (65.79 mm), Louisiana recorded 5.48 inches (139.19 mm), Mississippi recorded 5.94 inches

(150.88 mm), Oklahoma recorded 0.42 inches (10.67 mm), Tennessee recorded 4.65 inches (118.11 mm), and Texas recorded 0.70 inches (17.78 mm). For Oklahoma, it was their ninth driest February on record (1895-2014), while for Texas, it was their twentieth driest February on record (1895-2014). All other state rankings fell within the two middle quartiles.

Precipitation (in)
 2/1/2014 - 2/28/2014

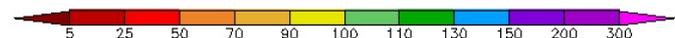
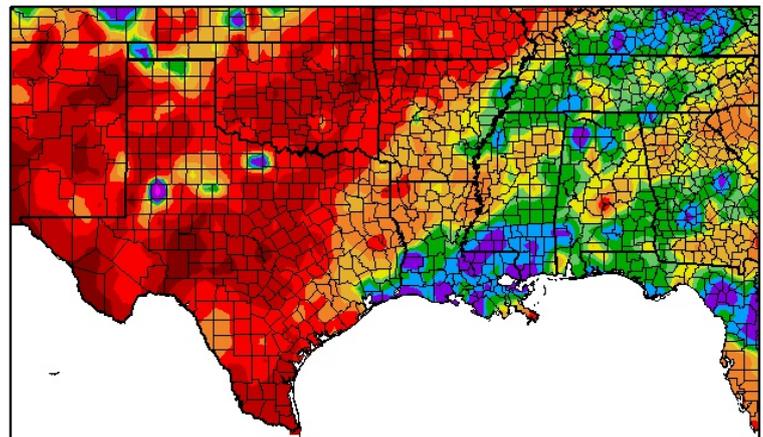


Generated 3/2/2014 at HPRCC using provisional data.

Regional Climate Centers

February 2014 Total Precipitation across the South.

Percent of Normal Precipitation (%)
 2/1/2014 - 2/28/2014



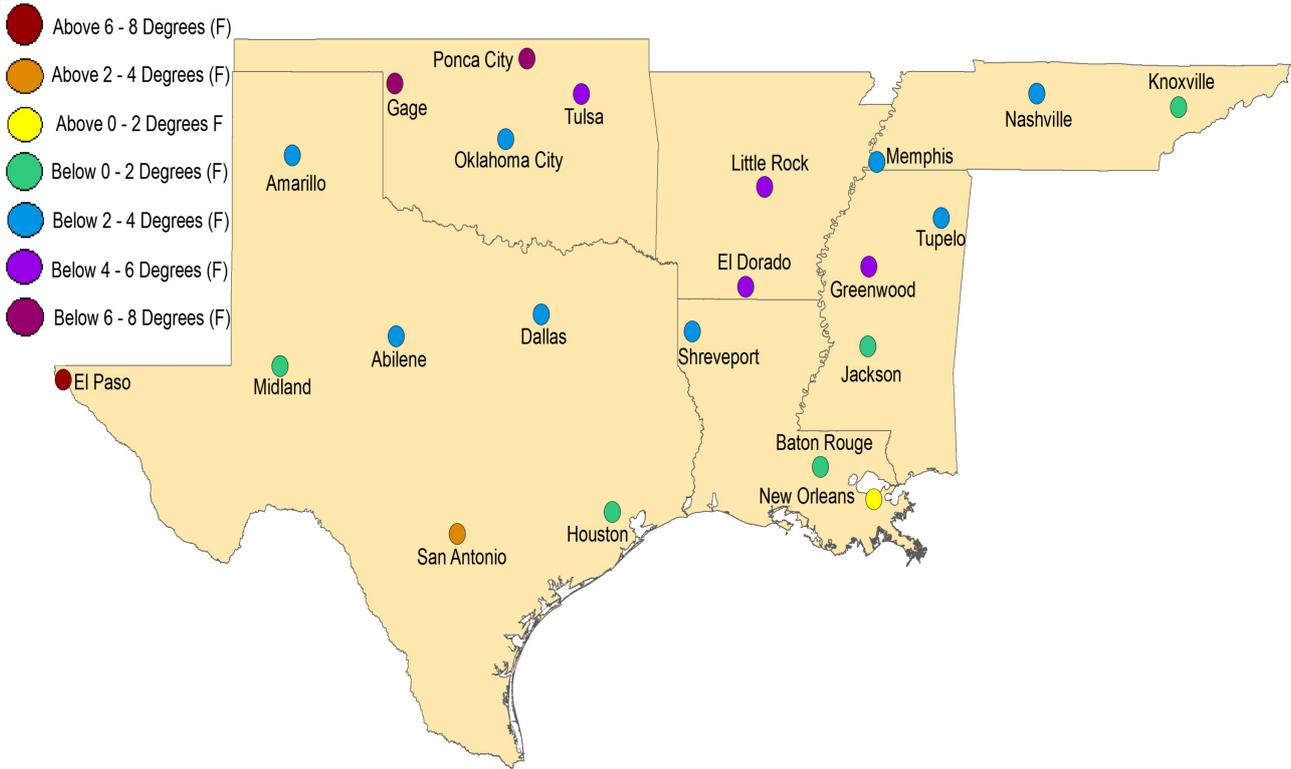
Generated 3/2/2014 at HPRCC using provisional data.

Regional Climate Centers

Percent of 1971-2000 normal precipitation totals for February 2014 across the South.

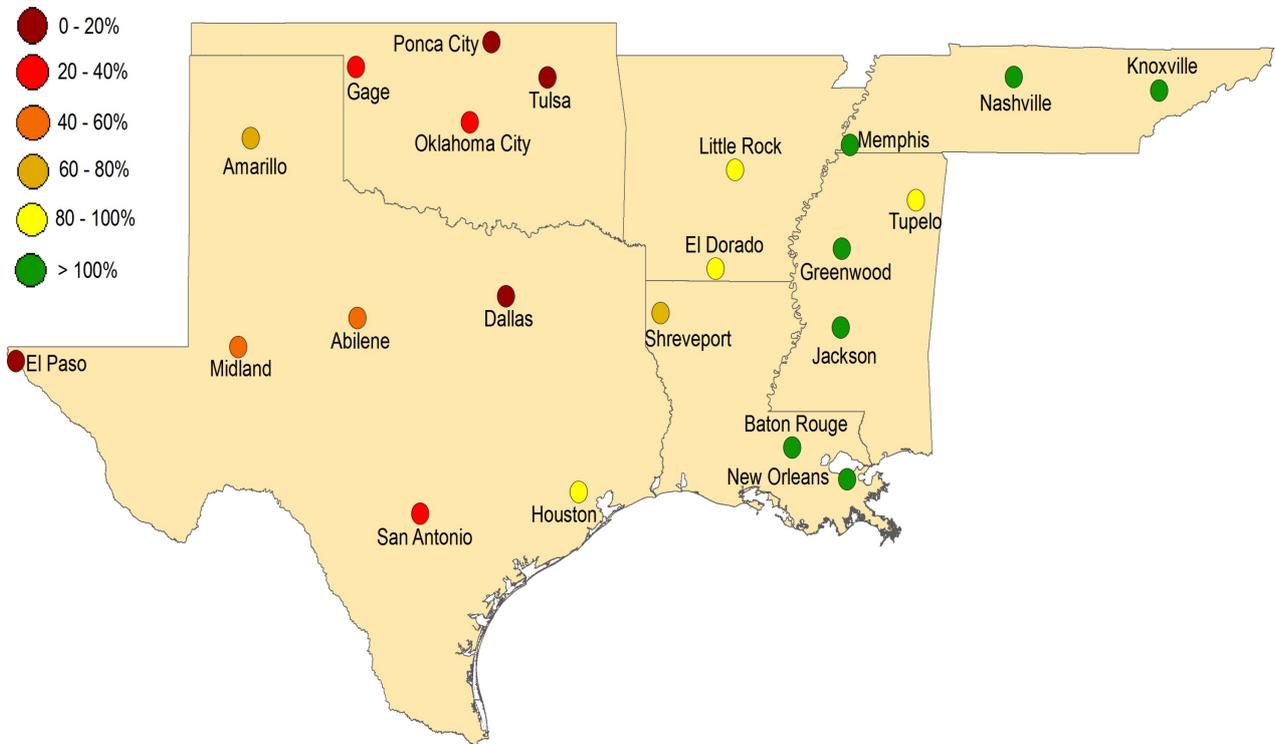
Regional Climate Perspective in Pictures

February Temperature Departure from Normal



February 2014 Temperature Departure from Normal from 1971-2000 for SCIPP Regional Cities

February Percent of Normal Precipitation



February 2014 Percent of 1971-2000 Normal Precipitation Totals for SCIPP Regional Cities

Climate Perspective

State	Temperature	Rank (1895-2011)	Precipitation	Rank (1895-2011)
Arkansas	38.80	19th Coldest	2.59	33rd Driest
Louisiana	50.40	36th Coldest	5.48	41st Wettest
Mississippi	46.30	39th coldest	5.94	40th Wettest
Oklahoma	36.10	14th Coldest	0.42	9th Driest
Tennessee	38.30	39th Coldest	4.65	43rd Wettest
Texas	48.50	48th Coldest	0.70	20th Driest

State temperature and precipitation values and rankings for February 2014. 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 (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	%Norm
El Dorado, AR	53.9	33.5	43.7	-4.6	78	2/20	20	2/27	3.42	-0.82	81
Little Rock, AR	51.1	30.5	40.8	-4.4	79	2/20	19	2/6	3.23	-0.10	97
Baton Rouge, LA	63.4	42.2	52.8	-0.7	82	2/20	28	2/7	7.19	2.09	141
New Orleans, LA	65.4	47.0	56.2	0.4	80	2/20	34	2/7	6.30	0.83	115
Shreveport, LA	58.0	37.5	47.8	-3.4	80	2/23+	24	2/13	2.62	-1.59	62
Greenwood, MS	53.9	34.0	43.9	-4.4	78	2/20	18	2/27	4.71	0.51	112
Jackson, MS	58.8	36.5	47.6	-1.6	82	2/20	21	2/27	5.44	0.94	121
Tupelo, MS	52.8	32.2	42.5	-2.2	77	2/20	19	2/27	4.33	-0.35	93
Gage, OK	45.9	19.0	32.4	-6.1	80	2/18	1	2/5	0.20	-0.53	28
Oklahoma City, OK	49.3	27.4	38.3	-3.9	75	2/18	9	2/6	0.36	-1.20	23
Ponca City, OK	46.2	21.1	33.1	-6.6	75	2/18	6	2/6+	0.23	-1.18	16
Tulsa, OK	47.8	25.3	36.5	-5.5	74	2/18	8	2/6+	0.32	-1.63	16
Knoxville, TN	51.2	31.3	41.3	-0.5	74	2/20	16	2/27	4.94	0.93	123
Memphis, TN	50.2	31.9	41.1	-3.8	74	2/20	19	2/11+	4.96	0.65	115
Nashville, TN	49.6	28.8	39.2	-2.1	78	2/20	16	2/27+	5.09	1.40	138
Abilene, TX	57.5	31.9	44.7	-3.9	86	2/19	11	2/6	0.49	-0.64	44
Amarillo, TX	52.2	23.2	37.7	-2.9	77	2/18+	1	2/6	0.36	-0.19	66
El Paso, TX	69.3	44.1	56.7	6.2	83	2/15	20	2/6	0.00	-0.39	0
Dallas, TX	57.5	36.4	46.9	-2.4	84	2/28	17	2/6	0.41	-1.96	17
Houston, TX	64.0	45.4	54.7	-0.7	80	2/18	29	2/13	2.39	-0.59	80
Midland, TX	62.9	33.6	48.3	-0.3	85	2/19+	13	2/6	0.26	-0.32	45
San Antonio, TX	69.2	46.0	57.6	2.9	92	2/14	29	2/6	0.42	-1.33	24

Summary of temperature and precipitation information from around the region for February 2014. 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 days. 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.

Climate Prediction Center Issues El Nino Watch

Barry Keim, Louisiana State Climatologist, Louisiana State University

Recently, the NOAA's Climate Prediction Center issued an El Nino watch. What this means is that we have about a 50 percent chance of experiencing an El Nino later this year. The El Nino is not likely to get established until later this upcoming summer, or in the fall. Right now, we're in ENSO-Neutral conditions, which means that we are having neither an El Nino, nor a La Nina. We've been neutral since spring of 2012. However, sea surface temperatures are on the upswing in the Tropical Pacific Ocean, and if this trend continues, we should experience the El Nino.

So, what does this mean for Louisiana? It could loom large for this upcoming hurricane season, as tropical storms and hurricanes are less frequent during El Nino events in the North Atlantic Basin, including the Caribbean, and the Gulf of Mexico. After the quiet year we had last hurricane season, another would be just nice. Note,

however, that in the year 1992, we also had an El Nino, and we only had 7 named storms that year which is well below normal, but one of them was Hurricane Andrew! As for the fall, winter, and spring, we can expect cooler and wetter than normal conditions, especially across South Louisiana. During El Nino winters, we tend to get enhanced storm formation in the Gulf of Mexico - with these extratropical storms tracking across Louisiana bringing us the rain, and the set up for cooler air. This is also the type of meteorological set-up required to produce snow, sleet, and freezing rain across South Louisiana, so we could see more of that this upcoming winter, if the El Nino actually happens. In addition, El Nino winters tend to bring enhanced storminess to California, which is now experiencing a record-breaking drought. Also, the Great Lakes, and northern Great Plains tend to be warmer than normal, which will be very welcome after this past winter across this region. Please contact me with any questions or complaints at keim@lsu.edu.

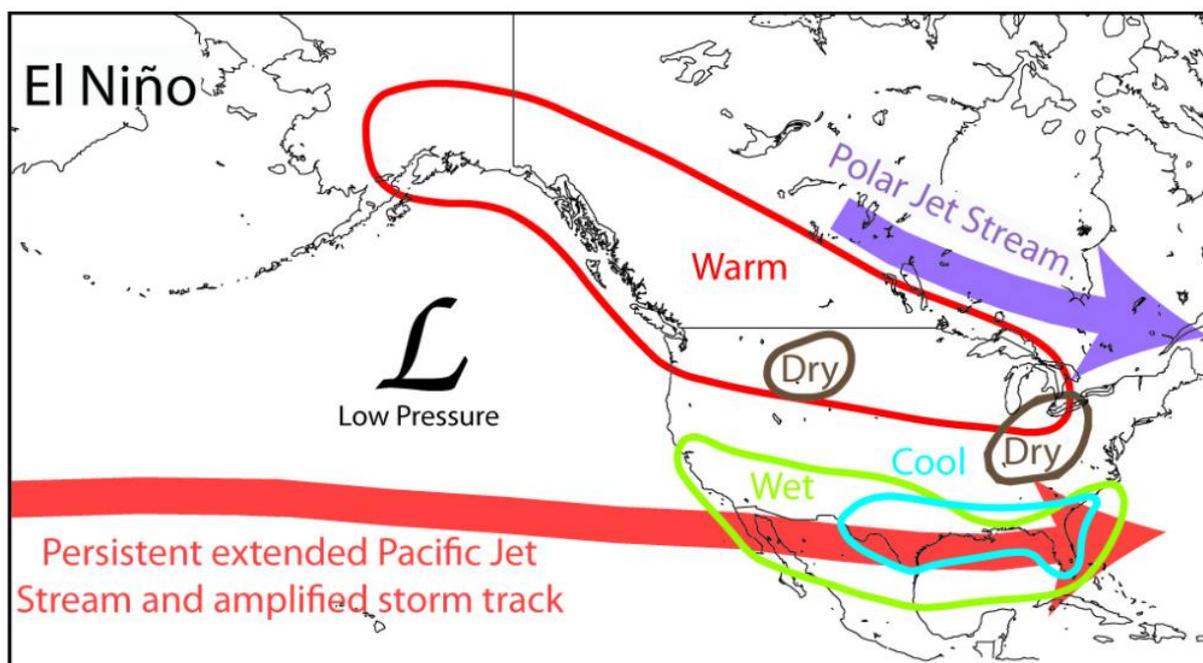
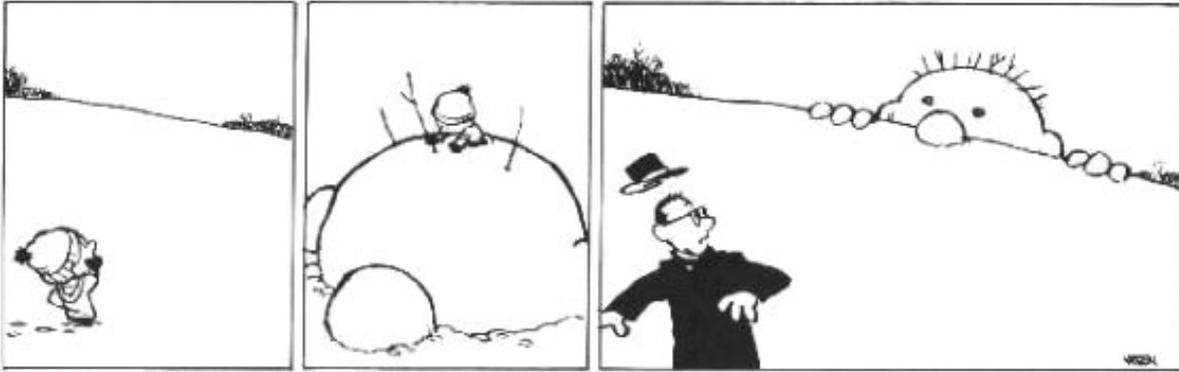


Figure 1. Preferred weather anomalies during an El Niño. Graphic is from NOAA's CLIMAS Program at the University at Arizona and can be found at <http://www.climas.arizona.edu/sw-climate/enso>.

Monthly Comic Relief



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For any questions pertaining to historical climate data across the states of Oklahoma, Texas, Arkansas, Louisiana, Mississippi, or Tennessee, please contact the Southern Regional Climate Center at 225-578-502. 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 or 225-578-8374.

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