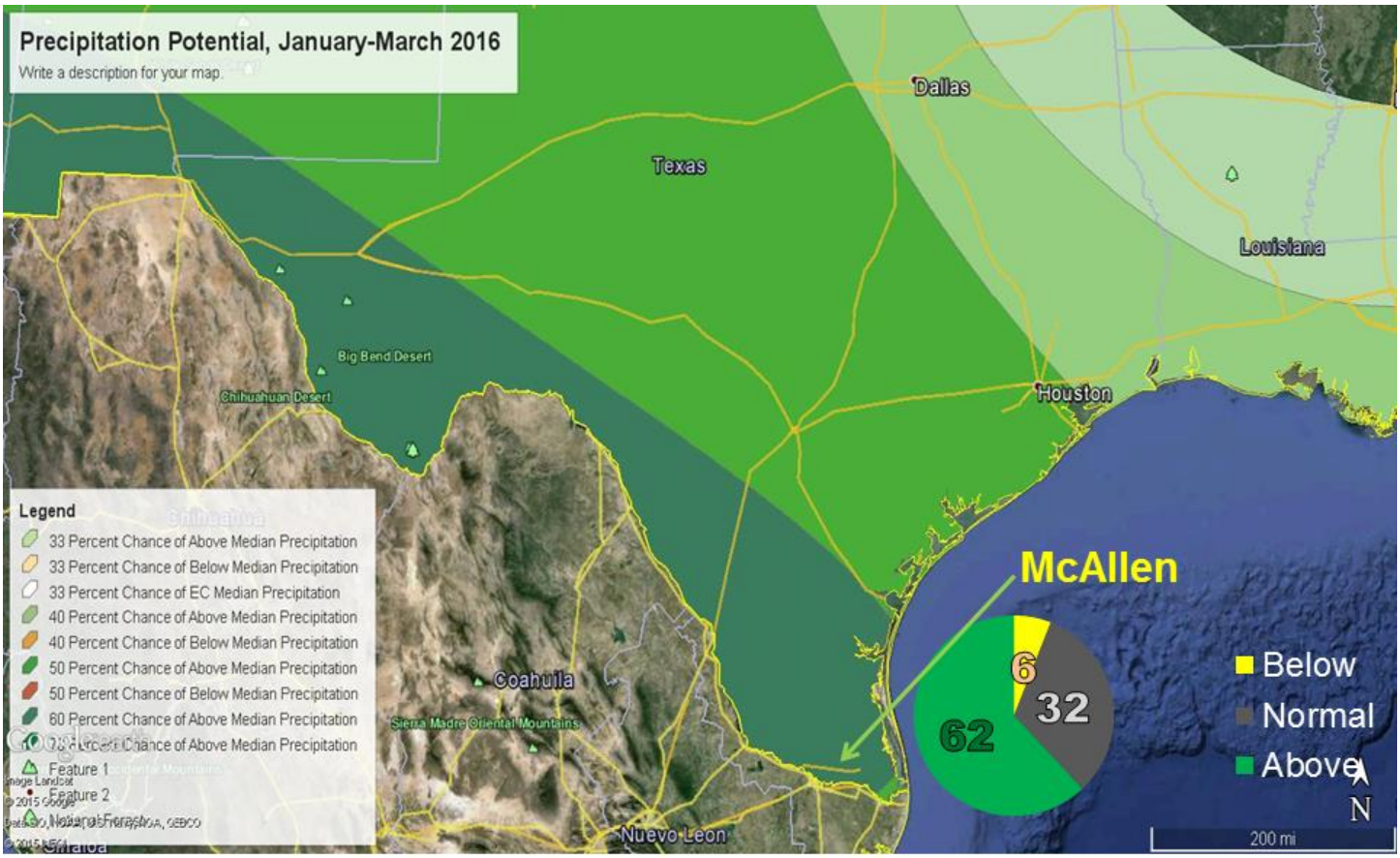
January-March 2016 Outlook

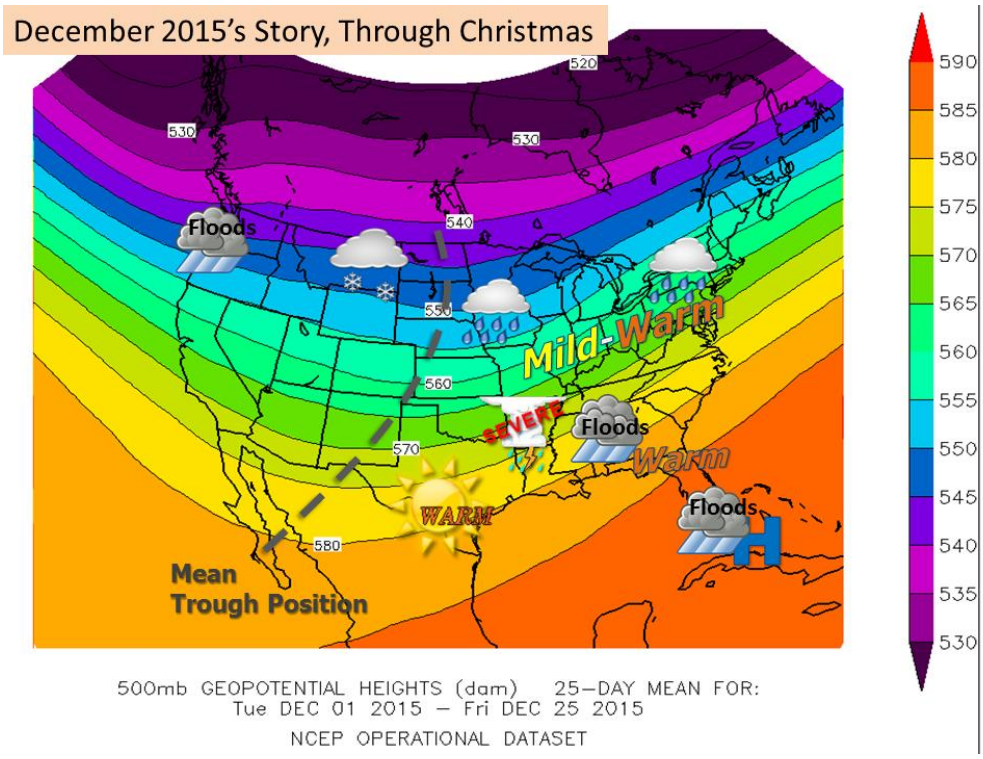


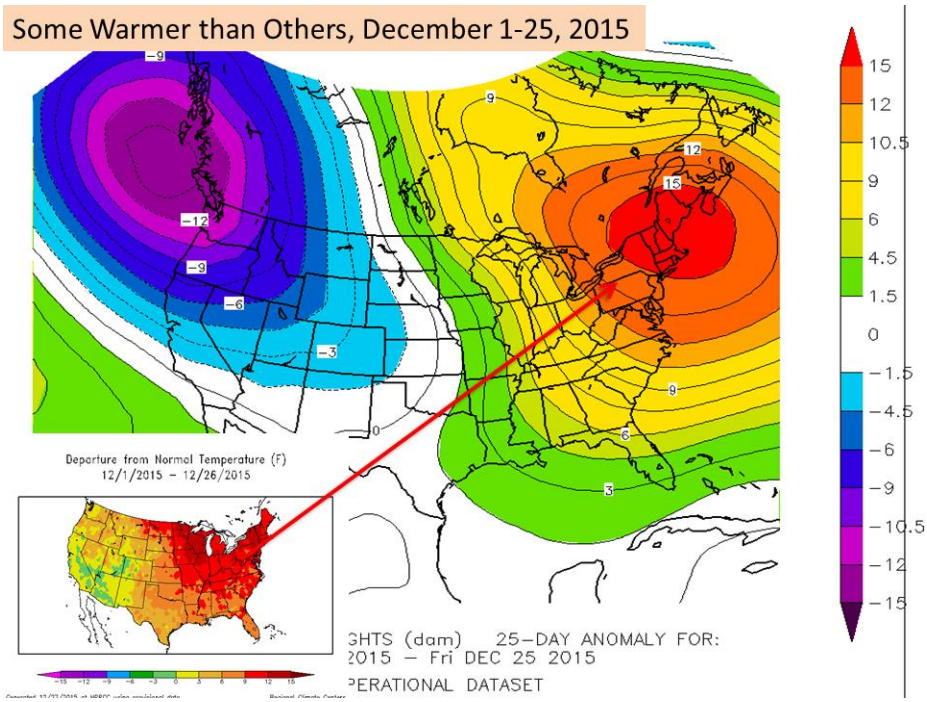
Rio Grande Valley Average for January-March (based on 1981-2010)
Precipitation: Ranges from 2 ½ inches Starr/Zapata to 4 ½ inches Along Coast

Does the Rain Return in January/February?

Rainfall Looks More Likely as Pattern Evolves; How Much Still in Question

El Niño maintained its expected peak through most of December 2015, and while some impacts (warm across the eastern U.S.; wet in Florida) occurred as expected, other factors turned December's Rio Grande Valley forecast around. In reality, an end of month cooldown was no match for several days of record warmth during Christmas week, and the precise position of the subtropical jet stream north of South Texas kept notable rain far to the north. As of December 26th, Brownsville had a paltry 0.11" of rainfall, a fraction of the 1.15" average, and temperatures were nearly 7°F above average; McAllen had only registered 0.01", through the same date. By month's end, it was likely that the trifecta of primary stations in the Rio Grande Valley (McAllen, Brownsville, and Harlingen) would finish among the top ten warmest and top fifteen driest on record. So, what went wrong? For rainfall, the issue may well be serendipity. Similar to the strong El Niño of 1997, once the Eastern Pacific tropical season wound down, the region had to rely on the exact location and phasing of the subtropical jet and mid latitude jet to increase rain chances. With the mid-latitude jet remaining far enough north - and a big reason for the much above average temperatures – the ability of the few fronts that approached the region to lift moisture into showers and thunderstorms was negated, and the deeper tropical moisture fed into such fronts farther east, across the Alabama/Georgia region in particular. The images below show just how close – and how far – the Rio Grande Valley and much of south Texas was to the rain.





Above (top): Mean December steering pattern and general weather conditions for December, 2015. Bottom: Departure from average of the steering pattern (500 mb, or ~18,000 feet above ground). Note how nearly all of the U.S. was above average for surface temperatures, and how Texas - on back edge of the positive pattern anomaly - was, too.

What's Next – Late Winter into Early Spring 2016?

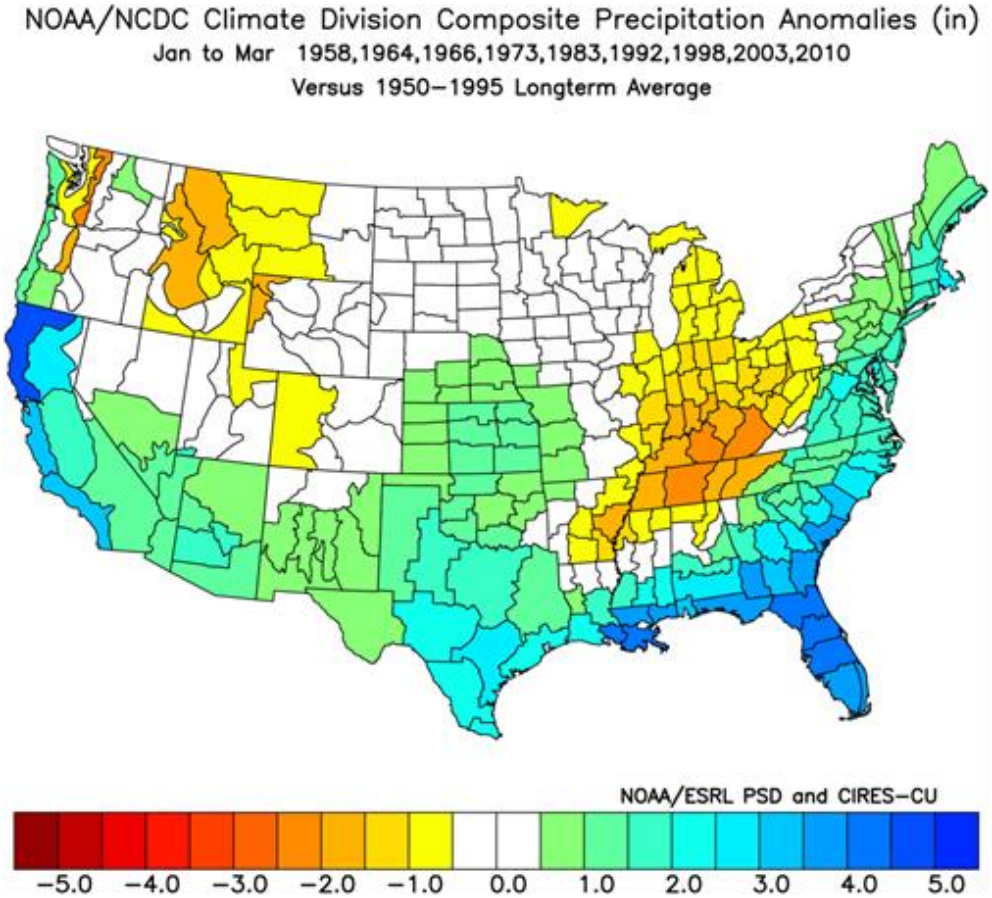
A temperature and precipitation forecast for the first month of winter that goes in the wrong direction can be humbling, indeed – and shows the limitations of relying heavily on El Niño and analogues in the past to predict the typical "cooler and wetter than average" forecast. Other teleconnections, including the Pacific Decadal Oscillation – which had been strongly positive leading into fall and early winter – may have played a role as water temperatures along the entire U.S. west coast were much higher than those in 1997 (which was a cool, though relatively dry, November-December period) and may have influenced the ability for warm, tropical air to

beat back the slowly approaching mid latitude jet. The positive phase of the Arctic Oscillation may also have played a role in the warmer temperatures, though more data needs to be studied to find answers. December 1997 was similarly dry like 2015, but that may not be saying much as December is one of the driest months, on average, in the Valley – so, a single event can make all the difference in any year.

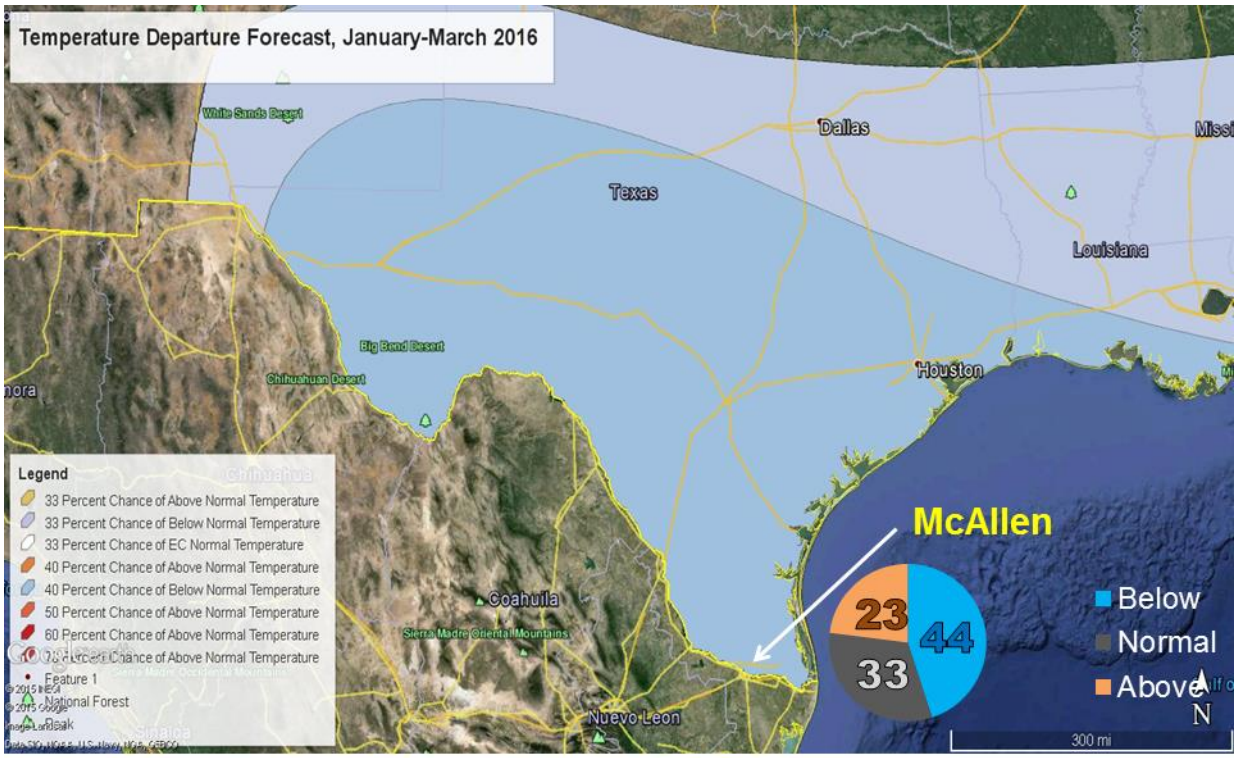
All this said, there were indications as of this writing that both the rain and cooler temperatures would arrive, at least for the first half of January 2016. Initially, a plunge of cool to cold air from the North Pole would reach the southern U.S. Plains and eventually the east coast, putting an end to the spring in winter conditions that had many folks in shorts in shirtsleeves on Christmas Eve and Day, 2015. The present subtropical jet would likely feed warmer, humid air over the shallow cool air to help bring some raw rainy conditions around the New Year. As January gets underway, a "split flow", very common to strong El Niños in mid-winter, had a better than average chance of setting up which would help keep overall temperatures down due to cloud cover, rainfall, and more days with north or northeast wind vs. south or southeast wind, which dominated parts of December 2015.

What might March bring? As the atmosphere inevitably warms, whenever more rain than average is forecast, the concern turns to flooding and an increased chance at hail and wind producing thunderstorms. The jury is still out on the severe (hail/wind) threat during an El Niño spring, and much may depend on the timing of teleconnection puzzle pieces, including the Madden Julian Oscillation and Arctic Oscillation. The Madden-Julian Oscillation can inject sufficient moisture for heavy rain events, while the phase of the Arctic Oscillation may determine if cooler or warmer air masses dominate. See the Preparedness, Awareness section for the details.

For more on the El Niño and Winter relationship for the Rio Grande Valley, check out the Winter 2016 Outlook.



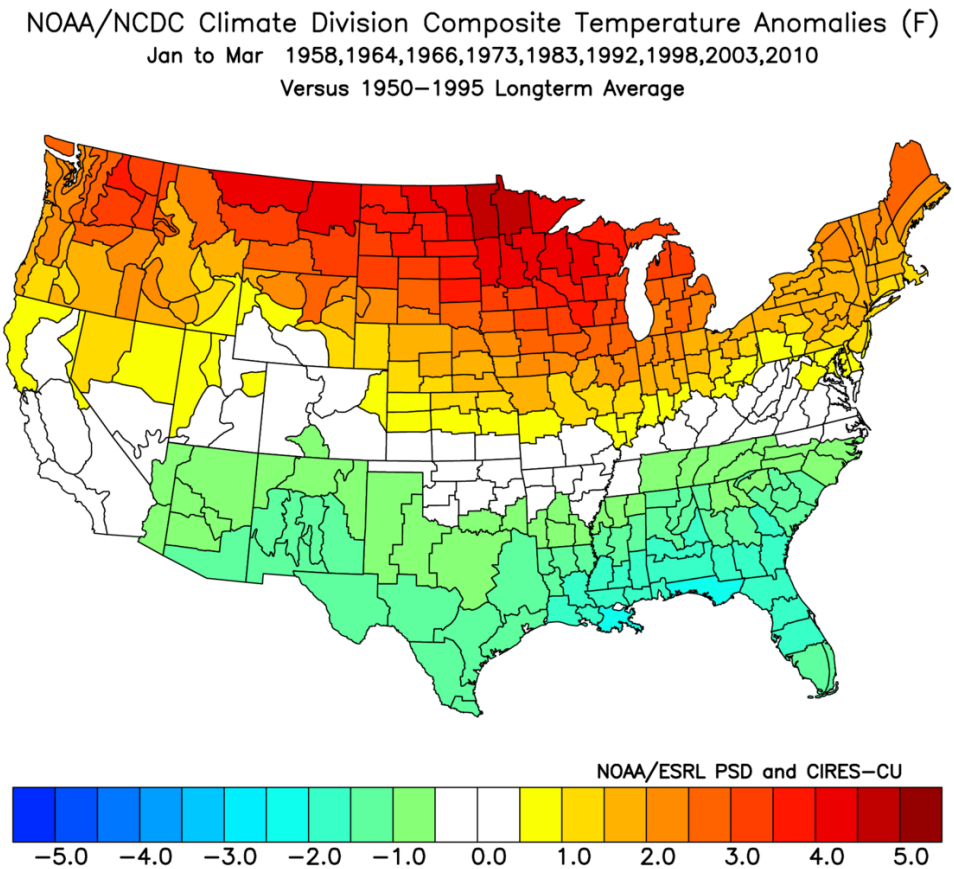
Above: Precipitation departures for analogous El Niño (moderate to strong) development years when compared with 2016. For the Rio Grande Valley, one would expect 2 to 3 inches above average for December-February; average is 2.5 to 4.5 inches, which means another 33 to 50% of rain than what would be expected without El Niño.



Rio Grande Valley Average for January-March (based on 1981-2010)

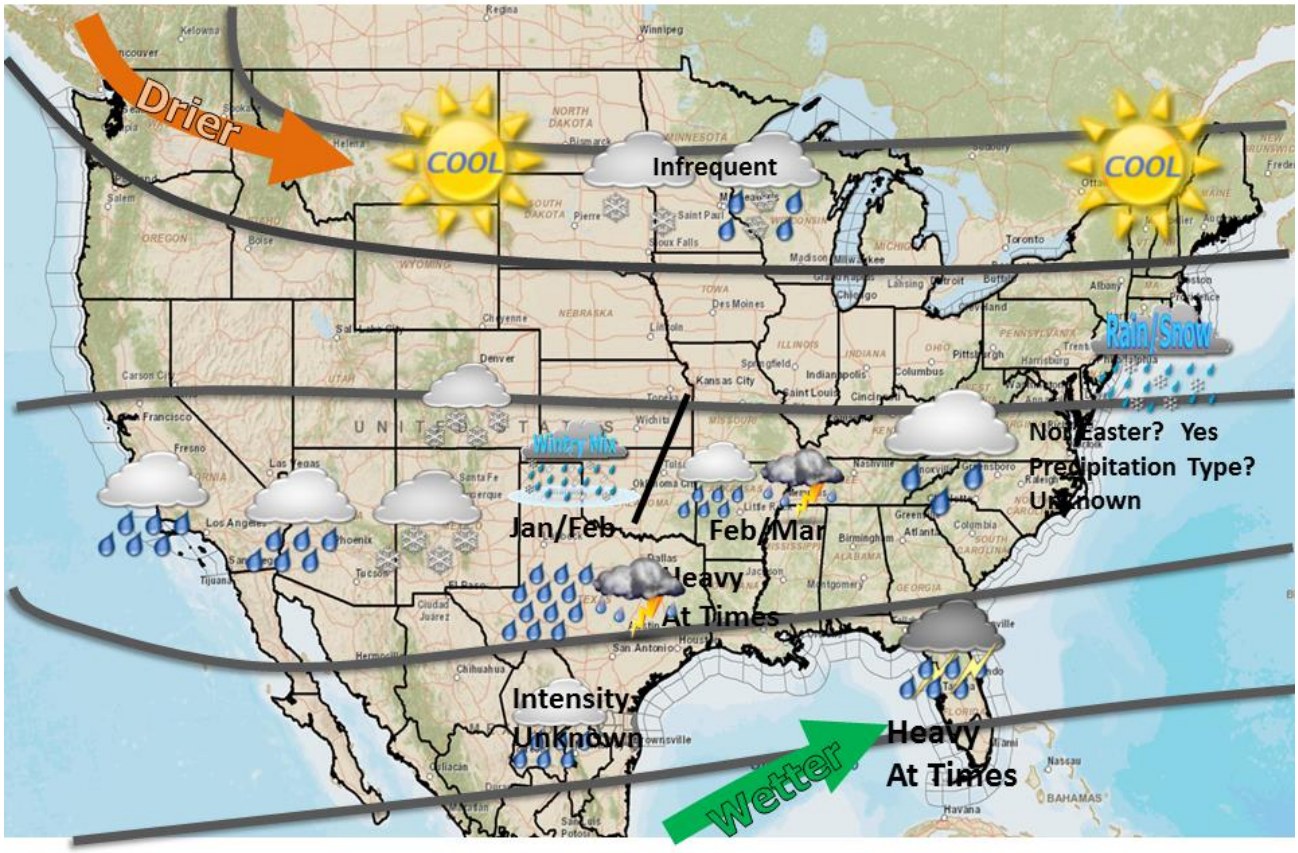
Wake-Up Temperature: Lower to Mid 50s

Afternoon Temperature: Mid 70s



Above (bottom): January through March temperature departures from average for similarly developing El Niños to what was occurring in late 2015.

January-March 2016 Pattern Possibilities



Pattern Matters

If you recall the Winter Outlook, the steering pattern map is almost identical. A few small changes included bringing wintry mix into play to north Texas through February; adding an "intensity unknown" for the rain potential across the Rio Grande Valley, and add uncertainty to the type of precipitation that any "Nor'easters" produce from the Mid-Atlantic region through New England. If 2016 follows 1998's lead – and that assumes the teleconnections set up appropriately – windy, *rainy* events could dominate the coast, with snow most likely in the Appalachians. Southern California may yet find modest drought relief but confidence remains sketchy due to the persistent warm waters which could pump up the upper level ridge, which tends to lead to drier rather than wetter conditions. This uncertainty shows up in prior strong El Niños for the late winter/early spring.

Finally - the cooler than average forecast does not necessarily translate into a better chance for a freeze or any freezing/frozen precipitation. In fact, the chance for a hard freeze is slim to none based on prior El Niño episodes, largely due to the dominance of the injection of eastern Pacific tropical moisture into the systems that dive south and tap it.

One cannot rule out a January or early February freeze. The key puzzle piece would be the development of a persistent negative phase North Atlantic or Arctic Oscillation (NAO/AO). Such was the case in January 2010, when a hard freeze struck much of the Valley on the 9th and 10th. As of late December, the NAO/AO continued to trend neutral to positive; such a trend into February would guarantee no hard freezes for the Valley and nothing more than "glancing" freezes in preferred colder areas. The NAO, however, only has predictability out about two weeks. A pronounced and prolonged shift during the heart of winter would increase the threat for a freeze/hard freeze. Stay tuned!

Preparedness, Awareness

October 2015 reminded us of the flood producing power of tropical moisture during an El Niño. While the short term intensity of rains will dip through February, it wouldn't take much to regenerate floods in areas like Willacy County and Weslaco who still remain near saturation.

- ***Flooding Rain.*** January and February could still see one or more widespread moderate to heavy rainfall events, which combined with additional cloud cover and limited evaporation rates, could pile up water across the Rio Grande Valley, more likely toward the coast – but in a gradual fashion rather than rapid runoff which was a big reason for the late October floods in Weslaco and Willacy County. March is a more difficult proposition, as the warming low levels of the atmosphere might hook up with deep tropical moisture to increase the threat for more rapid flood development.

  It's always a good time to check roofs and walls for leaky areas and repair, and December gave the Valley a pass. But anytime is a good time to remove any debris from gutters and downspouts. Speaking of debris - after trimming brush and cutting grass, be sure to remove it and never clog drainage ditches or canals!! More here:
  - Flood Safety Awareness

- ***Chill.*** December failed to bring anything more than minor winter chill on a few occasions, but colder temperatures and gusty north winds can't be ruled out for January and February. Whether they come barreling through after very warm weather, as they did on December 27th, or come as reinforcing cooling after a generally below average period remains to be seen. The best chance for a rapid change would favor the last half of February into early to mid-March. Be ready to change from spring/summer clothes into winter jackets, sweaters, and the like in a matter of hours when the season of "gray 'northers" begins. If you have a space heater and plan to use it this winter, the time to service it to ensure sparks don't ignite into a house fire is now.

- ***Freezes and Winter Weather (ice/snow)?*** We can't discuss winter without the outside chance. That said, past moderate to strong El Niños have tended to keep the coldest of air locked up well north of the Rio Grande Valley, and the influence of tropical moisture on the atmosphere favors chilly, but not frigid, weather during December. There are no certainties, however; atmospheric "teleconnections" such as the North Atlantic/Arctic Oscillation could become a player in cold air intrusion for January and February.

- ***Hail and Thunderstorm Winds?*** The expected pattern (above) would keep the threat slim to none through mid- February, but the opportunity for each could gradually increase later in February and especially in March. March 26th, 2015 reminded the region of the onset of our true severe weather season and brought memories for some of March 29th, 2012, so one can always be ready. Preparedness Tips can be found on a variety of guides from this page; click on the links under "severe weather".