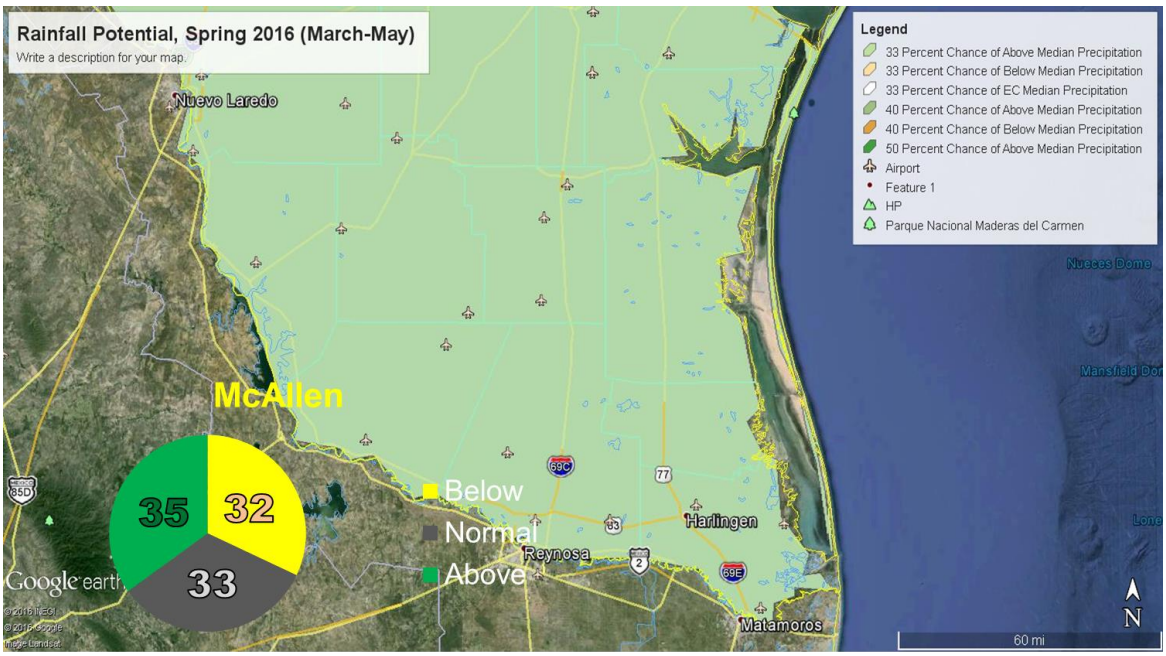
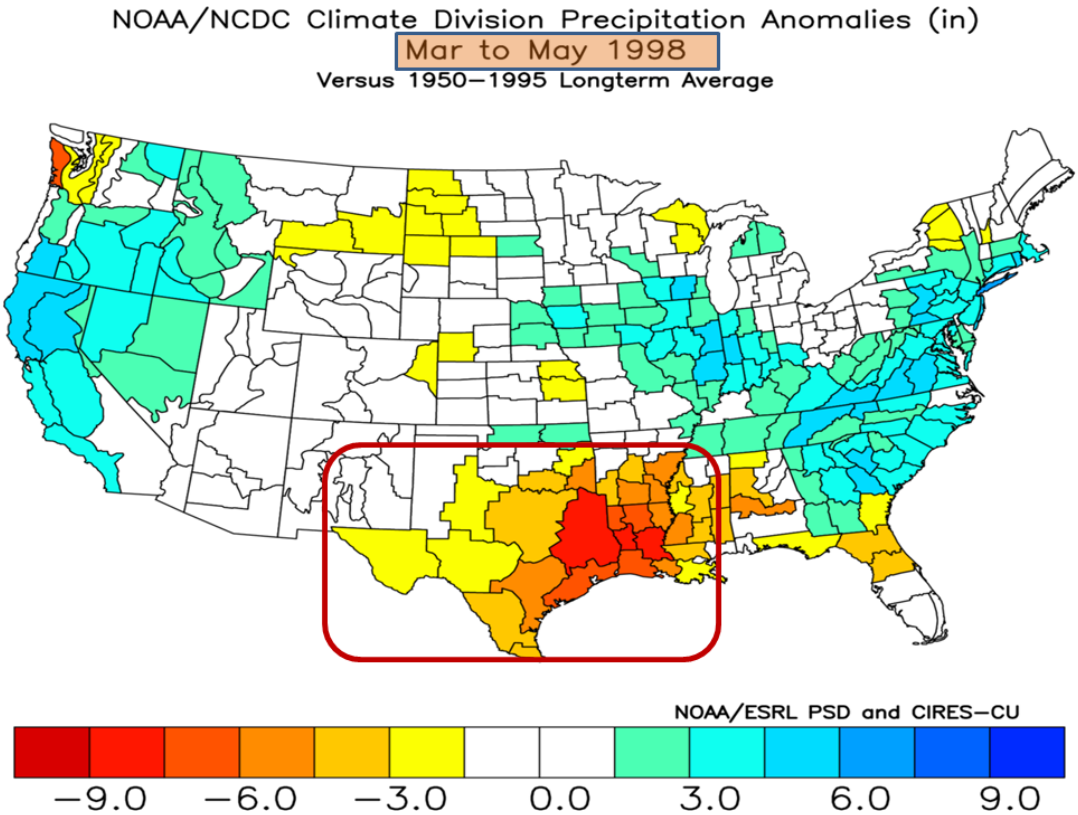
This?…



Rio Grande Valley Average for March-May (based on 1981-2010)
Precipitation: Ranges 4 ½ inches Mid/Upper Valley to 5-6 inches Ranchlands and Lower Valley

…or *This*?



Spring 2016's Rainfall (and Temperature) Forecast Highly Uncertain

Does the Dry, Warm Trend Continue or Do Rains Return?

El Niño remained among the strongest on record through the end of winter 2015/2016 (December-February), but the expected impacts of above average rainfall, predicted with a 65% likelihood just prior to December 1, and below average temperatures, predicted with a 44% likelihood, were cemented as a failed forecast at the end of February 2016. The destroyed forecast included rainfall that ended up generally 25 to 75 percent of average, which was only given a 4% probability of occurrence by most experts in late November, 2015, and temperatures that ranged from 1 to 3°F above normal – given only a 23% probability of occurring back in November. As mentioned in the prelude to the February to April 2016 outlook, the pattern that developed in early January continued in earnest during February, to the point that there was *no measurable rainfall* across the Rio Grande Valley, one of very few times that has happened (Just four times since 1878 for Brownsville alone). For the bulk of February, Texas mainly "waved" to the systems which cruised across the southern plains; "dry" fronts, continued to produce gusty north to northwest winds in their wake and "flash" drought conditions which rapidly dried up fine fuels such as grasses and light brush, leading to wildfire danger (rapid growth and spread) conditions. At one point, between January 28th and February 12th, some locations had 75% of afternoons with humidity that fell below 20 percent for at least one hour. Will this threat continue through spring?

Outlook: Spring 2016

The current trends into early to mid-March suggest a few things:

- The storm track that kept California and much of the southwest U.S. dry in February will shift, bringing some periodic and welcome rainfall, including parched southern California…
- …but the systems, borne in the east central Pacific, will tend to "lift" well north of the Rio Grande Valley and reduce the opportunity for rain
- The slightly shifted pattern will pick up where February left off, and virtually guarantee an above to much above normal March 2016.
- "Cold" fronts are likely finished for the season. There will be wind shifts and slight cooling and drying, particularly at night, but most days should be at or above average, which means afternoon temperatures at or above 80 on nearly every day, away from the coast.

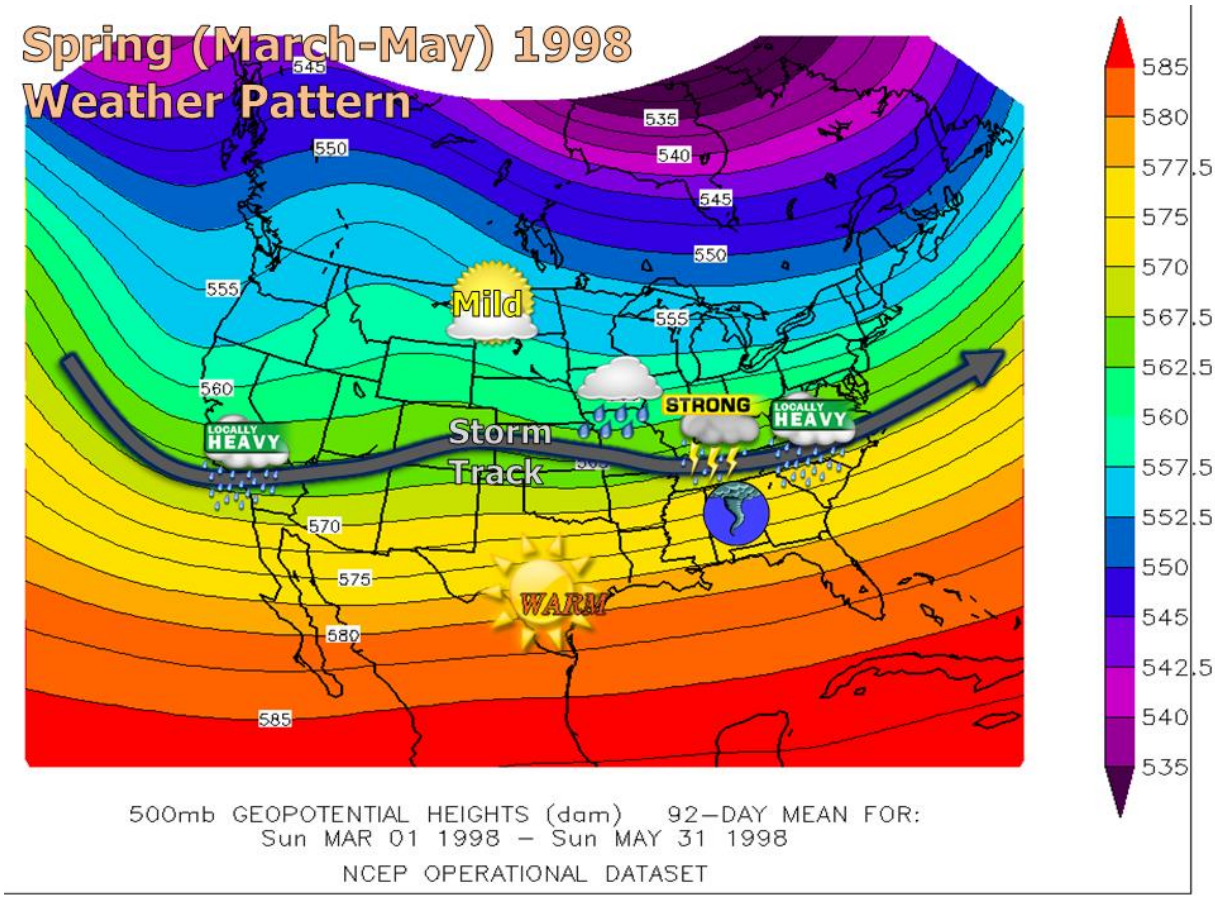
What about April and May? The prognosis gets even more difficult. Here's why.

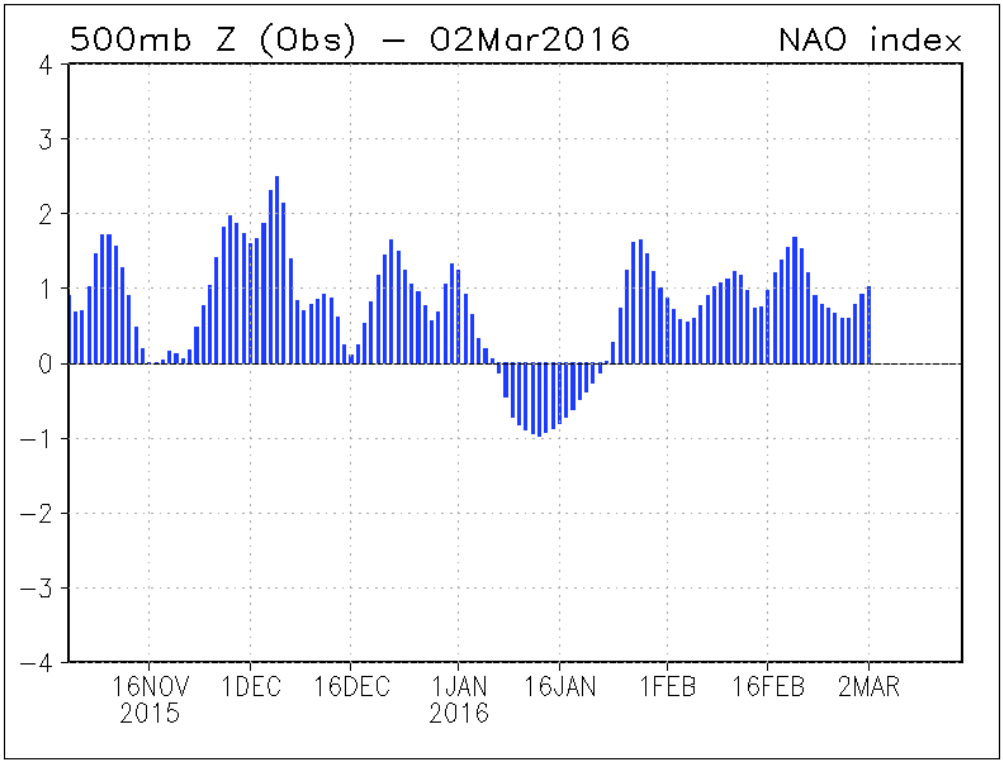
First, the mid latitude jet stream, which dictates the overall storm track, will inevitably shift farther north into the mid latitudes, from northern California through the central Great Plains and into the Mississippi and Ohio Valley in April. Such a pattern would tend to favor even *more warming* with periodic gusty southerly winds doing the work; nights and early mornings would tend to become increasingly muggy. With deep tropical moisture only available through a rogue system that somehow would dive into northern Mexico, an already dry month on average (1 to 1.5 inches area wide) would fall short, and temperatures, which push toward 90°F in the mid Valley during the mid-afternoon by late month, would run a few degrees higher still.

As for May, all bets are off. An active storm track, even across the Central Plains and Midwest U.S., could keep brief wind shifts from the northwest going amidst a predominant southerly flow; each would tend to suppress the deeper tropical moisture necessary to produce a couple of thunderstorm cluster events which can easily surge totals well above the monthly average, which ranges from 2 to 2.5 inches area wide, in general. A weaker mid-latitude storm track, however, would reduce the strength of the southerly flow and could allow pulses of deep tropical moisture to push north from the still-warmed eastern tropical Pacific Ocean, as well as the southwest Gulf and western Caribbean Sea.

In 1998, the last time El Niño was similarly strong and had a similar trend, combined with the prolonged positive phase of the Pacific-Decadal Oscillation that existed then, rainfall was limited to about one-half the average in March (0.5 to 0.75 inches vs. 1 to 1.5 inches), and nearly nil for April and May. That ominous trend *may* be checked by what has been a persistent *positive* North Atlantic Oscillation (+NAO) for most of 2015 (continuing almost unbroken in early 2016), the opposite of the trend in 1998 (negative, or -NAO) which may have induced a "tightening" of the jet stream gradient across the mid latitudes (below) and never allowed any deep tropical moisture to get into the mix. Should the +NAO dominate late spring, the rains *may come again* –

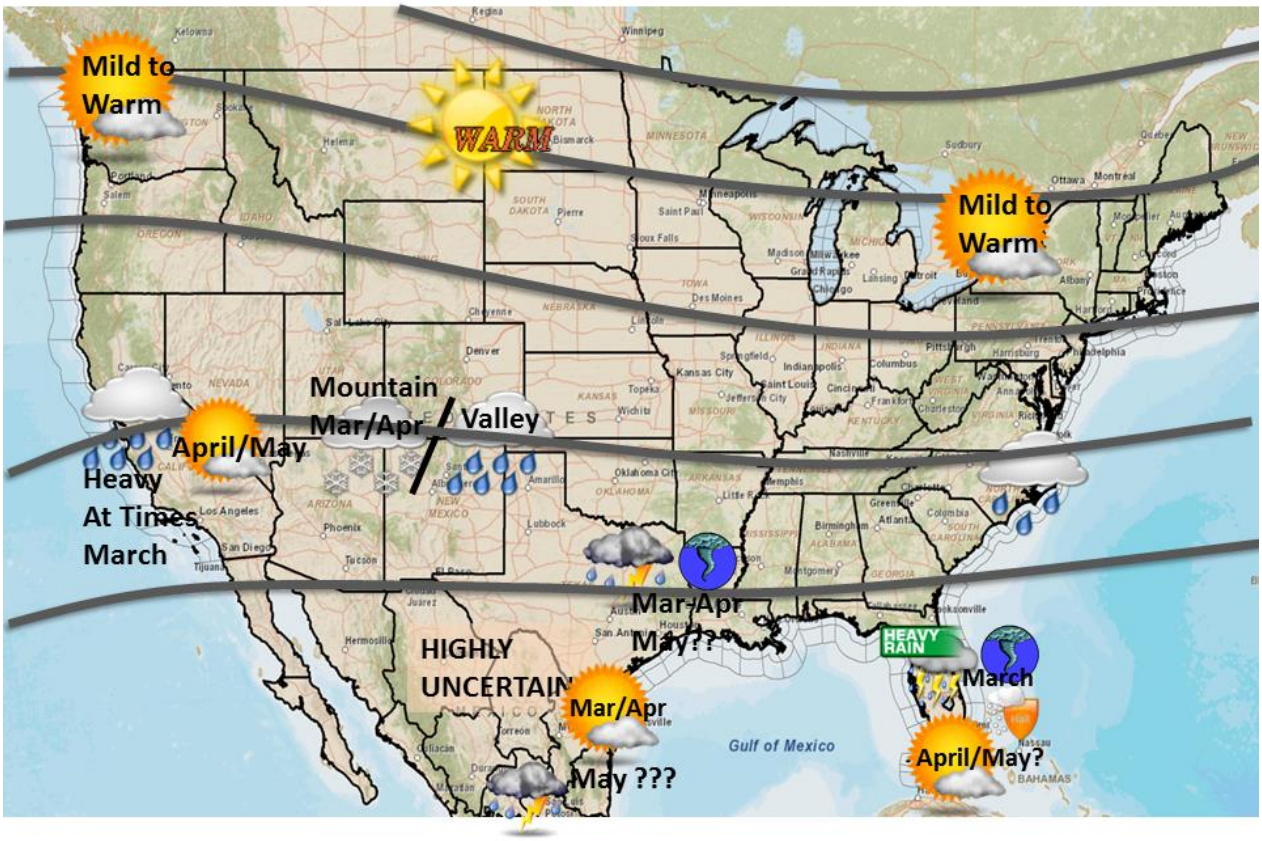
though probably not to the level of May, and spring 2015. Should the oscillation turn to a multi-month -NAO by April or early May, the dry and warm/hot trend is likely to continue.





Above: Phase of the North Atlantic Oscillation (NAO) from mid-November 2015 through early March 2016. A small window of –NAO in mid-January notwithstanding, the entire period has been in positive (+NAO) phase.

March-May 2016 Pattern Possibilities



Pattern Matters

Based on the winter reality, which showed a northward shift in the jet stream pattern across the southwest U.S. along with a general northwest to southeast flow from the Pacific coast through the southern Plains (before lifting a bit toward the east coast – click here and scroll to page 2 for an article on the topic), the spring pattern is expected to follow suit – at least for the first half of the period. One difference is a decided change for the Pacific coast, where signs of more storminess (upper level disturbances) will come ashore before tending to lift into the central Rockies.

This is a slightly modified version of what was observed in 1998 (page 3, above) and *leans* toward the outcomes experienced then, which included a drier than average spring with near normal temperatures overall. This year, we suspect that March will end up several degrees above average based on the prevailing storm track bringing southerly, then southwesterly, winds near the surface across the Valley on most days. Should this pattern continue into April, it would become very difficult for the entire season to be anything but above average for temperature, as stormy May days tend to be followed by warm to hot days. Continued southerly flow would ensure mild to warm nights, which was the case in 2015 and allowed May to end up above average despite the wetness.

Preparedness, Awareness

Even if spring 2015 ends up being on the dry (and hot) side of the pillow, the season is also the peak of severe weather, on average, in the form of hail storms, wind storms, and even small tornadoes. Any influx of deep tropical moisture can produce thunderstorm clusters, some which may be slow-moving and create rapid onset of flooding with the general poor drainage of the region. Still, given the leans this time around, we'll be focusing more on drought, wildfire spread, heat, and even air quality issues.

- **Wildfire Spread.** The number of "flash drought" events in January and February sounded the alarm to be wary of rapid spread of any wildfires that begin on "crispy" fuels such as grasses and brush. Continued dry weather will inevitably increase the area under moderate drought, and could bring

severe drought to the ranchlands and mid/upper Valley at some point in April or May. A prolonged period of rain between March and May would help greatly, but any breezy, dry fronts with rapid drops in humidity, combined with the usual (and perhaps unusual) warming as the sun gains elevation and days lengthen, are points of increasing concern. Farmers and ranchers should continue to follow safety precautions, including parking vehicles on dirt or pavement, not driving them in high grasses on dry, windy/breezy days, and refraining from using welding/grinding equipment in or near high grass/brush. Be Firewise! Remember, only you can prevent wildfires.

- ***Hail, Thunderstorm Winds, Lightning, and Tornadoes?*** With uncertainty reigning in the ultimate outcome of the spring pattern – particularly by May and possibly depending on the phase of the NAO – we urge all residents to be prepared for the hazards that thunderstorms can bring. 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. Spring 2015 was laden with a combination of brazen lightning storms, damaging wind storms, and periodic – though minor – hail events. Preparedness Tips can be found on a variety of guides from this page; click on the links under "severe weather". Or just check out the 2016 (Spring) Hazardous Weather Guide for all the details!

- ***Flooding Rain.*** Even if spring ends up drier than average, the possibility of one or more slow-moving torrential rain events, more than likely involving thunder and lightning, remains a concern. This could be most important during the second half of spring, all depending on the eventual atmospheric pattern. We only need to look back to April 2015 and Spring 2015 overall to remember the several cases of flooding.

  It's always a good time to check roofs and walls for leaky areas and repair; dry periods in March and probably April will provide the opportunity. 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

- ***Air Quality Concerns.*** The start of the Mexican, particularly over and toward the Yucatan Peninsula, combined with a dominant south to southeast wind flow pattern, will likely bring the return of an annoying haze and worse, somewhat polluted air from dust and smoke that causes persons with respiratory ailments, from asthma to allergies, breathing difficulties. This period typically covers late March through mid-May. Be prepared with particulate-blocking masks and other equipment, and be ready to spend time indoors in worse case situations. Clear/change air conditioning filters and service systems to ensure particulates are removed from the air before reaching the inside of the home. Keep tabs of the air quality conditions across Texas and U.S. at http://airnow.gov .