



# Texas Weather Wire



## Hurricane Hunter Aircraft Visit San Antonio!

By Jason Runyen

On May 16th, for the first time ever, the 2016 National Oceanic and Atmospheric Administration (NOAA) Hurricane Awareness Tour visited an inland Texas city. The tour came to the San Antonio International Airport in San Antonio. The annual event traditionally rotates through coastal cities on the Gulf and Atlantic coasts, but this year an inland stop was added.

The event brought hurricane experts flying aboard the USAF Reserve WC-130J and NOAA G-IV hurricane hunter aircraft to San Antonio to raise awareness on both coastal and inland threats from tropical cyclones. The mission of the hurricane hunter aircraft is to conduct tropical cyclone reconnaissance to determine the intensity of the storm. The Hurricane Awareness Tour educates the public on the dangers of being caught without a personal hurricane plan and suggests tools to create one and actions to take before, during and after the storm.

Five hundred 4th and 5th grade students from seven different schools in the San Antonio area attended the event and were able to go onboard the aircraft, meet the crews, and visit other static displays related to hurricanes, safety, and preparedness. In addition, hundreds of public citizens were able to tour the aircraft. Several congressional staff representatives, emergency management officials, and corporate partners also toured the aircraft and were able to meet with the National Hurricane Center Director, Dr. Rick Knabb. Members of the media were also on hand for interviews.



NOAA G-IV hurricane hunter aircraft and USAF Reserve WC-130J

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**Hurricane Hunter continues...**

## Hurricane Hunter...



The event showcased our nation's WC-130J and NOAA G-IV hurricane hunter aircraft. The WC-130J is one of ten such aircraft used by the U.S. Air Force Reservists from the 53rd Weather Reconnaissance Squadron, 403rd Wing, located at Keesler AFB in Biloxi, Mississippi. Air crews fly directly into the core of tropical cyclones to gather data critical for forecasting tropical cyclone intensity and landfall.

The G-IV is part of NOAA's fleet of highly specialized research and operational aircraft operated, managed, and maintained by the NOAA Office of Marine and Aviation Operations and based at MacDill AFB in Tampa, Florida. It flies at high altitudes around and ahead of the tropical cyclone, gathering critical data to go into the hurricane forecast models.



The event also promoted awareness to inland hazards from tropical cyclones, such as flooding from heavy rainfall, damaging winds, and tornadoes, all of which South-Central Texas has experienced from past systems. Other stops on the tour this year included Galveston, Texas, New Orleans, Louisiana, Mobile, Alabama and Naples, Florida.

Hearing Loss is next...

### NWS Austin/San Antonio Begins Campaign to Engage the Hearing Loss Communities Across South Central Texas

By Trevor Boucher

NOAA Weather Radios, tornado sirens, cell phone alerts (WEA), apps for mobile devices, indoor sirens, intercoms, car radio, the Emergency Broadcast System alert tones, what do all of these things have in common?

Well for one, they are the most well-known avenues for receiving notifications of either a weather or civil emergency alert. Just about everybody has at least one of these things that they utilize to get life-saving weather warning information. But, what else do all of the above notification methods have in common? They all make noise.

Whether it's the shrieking noise of the NOAA Weather Radio alert or the ominous howl of the tornado siren, we all have a sound that we associate with bad weather. Once we hear that familiar sound, we know it's time to pay attention to what's going on with the weather and pay close attention. We also can rest at night knowing that our trusty weather radio will wake us up if the weather gets real bad.

But what if you couldn't hear? How scared would you feel if you awoke in the middle of the night by a quick flash of lightning and your house shaking from the thunder? You turn on the television to see what's going on, and the weather broadcaster looks very concerned, pointing to your neighborhood multiple times and saying something into the camera, but you can't hear what it is they are trying to say! What is it? Flooding? If so, you better get upstairs! But wait, is it a tornado? Then you need to get to the lowest, center part of your home, and immediately! The captioning for the live broadcast is slow and it's jumbled. The words are misspelled and they don't make any sense. Where do you turn to get the information you need to be safe?

This is the reality for many Deaf and hard of hearing people across the country. While the rest of us benefit from the ability to hear the notifications that save our lives, those with hearing loss are left without a place to turn, needing the same information that we are getting, but it's not anywhere to be found for them.

This is why the National Weather Service wants to build relationships with the hearing loss community of South Central Texas and begin to address these issues that so many have. The hearing loss community in Austin is one of the largest not only in the state, but in the country. In addition to being the state capitol and a major city, Austin is also home to the Texas School for the Deaf, a residential school for Deaf children.

Over the next year, the National Weather Service office in New Braunfels is planning to partner directly with the Texas School for the Deaf to begin learning how we can help those with hearing loss overcome some of these weather obstacles. Not only are we hoping to mitigate some of the issues with weather notifications, but also weather safety messaging, weather education, and disaster preparedness actions for the hearing loss community.

Hearing Loss continues...

## Hearing Loss...

Over the course of the last few years, a small grassroots team of NWS meteorologists from across the country called the Deaf and Hard of Hearing Outreach Team (DaHHOT) have been brainstorming how to provide a more inclusive slogan for the hearing loss community. This effort, led by meteorologists Jen Saari (NWS Huntsville, AL), Trevor Boucher (NWS Austin/San Antonio, TX) and Steve Pfaff (NWS Wilmington, NC) has resulted in a brand new, visually based slogan and symbol that was unveiled on June 22nd, 2016.



“See a Flash, Dash Inside!”

In addition, through collaboration between the NWS and Gallaudet University, the national university for the Deaf, a brand-new lightning safety public service announcement video was produced in American Sign Language, but also narrated and captioned in English. Now, at least for lightning safety, the hearing loss community has some resources officially provided to them by the National Weather Service, which is a step in the right direction. To check out the PSA: <https://www.youtube.com/watch?v=uU1IO1S15e4>

The NWS office in New Braunfels wants to continue to take more steps in the right direction and that is why we are beginning the campaign to better serve our Deaf and hard of hearing partners across South Central Texas. Over the next few years, we plan on holding SKYWARN Trainings, hold workshops, provide warning information, and build partnerships with communication access groups and hearing loss communities across the area. No longer will the issues of the hearing loss community fall on the “deaf” ears of the hearing. NWS Austin/San Antonio is listening, and we want to help. To contact us regarding this campaign, email [trevor.boucher@noaa.gov](mailto:trevor.boucher@noaa.gov).

Coop Observer Awards is next...

## Coop Observer Awards

By Steve Smart



Fred Kaufman (center) of Andice, Texas receives a 20 year length of service award presented by Steve Smart, Observing Program Leader from the Austin/San Antonio National Weather Service (NWS) office. Fred Kaufman has been measuring, recording and reporting the official Andice, Texas rainfall data for the National Weather Service since March 19th, 1996. Also picture is Fred's wife Alice Kaufman, who also helps maintain the rainfall records. Camera timer photo by Steve Smart, OPL.



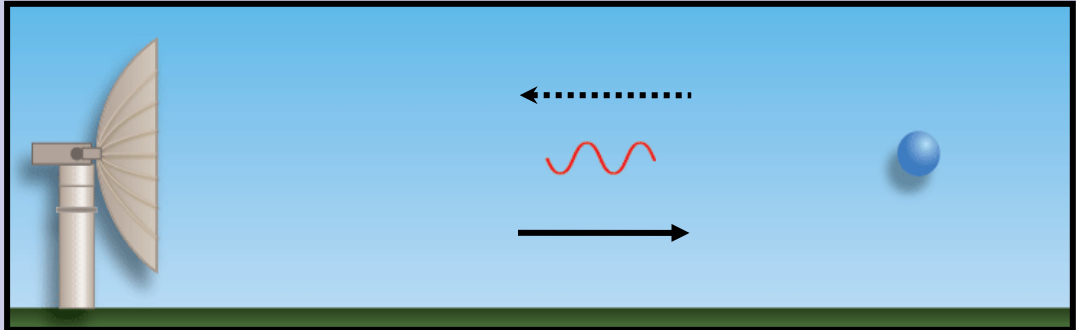
Calvin Hutzler (right) of Rio Medina, Texas receives a 20 year length of service award presented by Steve Smart, Observing Program Leader from the Austin/San Antonio National Weather Service (NWS) office. Calvin has been measuring, recording and reporting the official Rio Medina, Texas rainfall data for the National Weather Service since April 1st, 1996. Camera timer photo by Steve Smart, OPL.

Radar and Bats is next...

## The Bat Signal on Radar

By Aaron Treadway

Did you know that weather radar picks up more than just rain, hail, and thunderstorms? Because of how sensitive the weather radar is, it can see birds, insects, dust, smoke, and bats!



Doppler radar sends radio wave pulses then listens for returns. (NWS Jetstream)

### How the Radar Works

Let's have a quick review of how the radar works. The radar will send out short bursts of radio waves, then the radar begins to "listen" for returned energy. When the pulse of radio waves hits something, like the raindrop above, the radio wave changes and gets bounced back to the radar. By measuring the change in the radio waves, the weather radar can determine the movement and shape of the target. This change in the radio waves is similar to the "Doppler effect" where sound pitch changes with objects moving toward or away from you due to the compression of the sound waves. For this reason our weather radars are called Doppler Weather Radars or WSR-88Ds.

### Bats on Radar

The bats show up best on the Central Texas radars during the summer months. Millions of Mexican free-tailed bats take up residence in the limestone caves across the area from late spring through early autumn. They like the warm climate and enjoy dining on the various bugs and mosquitoes that call Central Texas home. Each night around sunset the bats begin to emerge from their caves. As they exit the caves, they begin to circle. The circle gradually expands as the bats increase in altitude before they fly away to find their insect dinner.

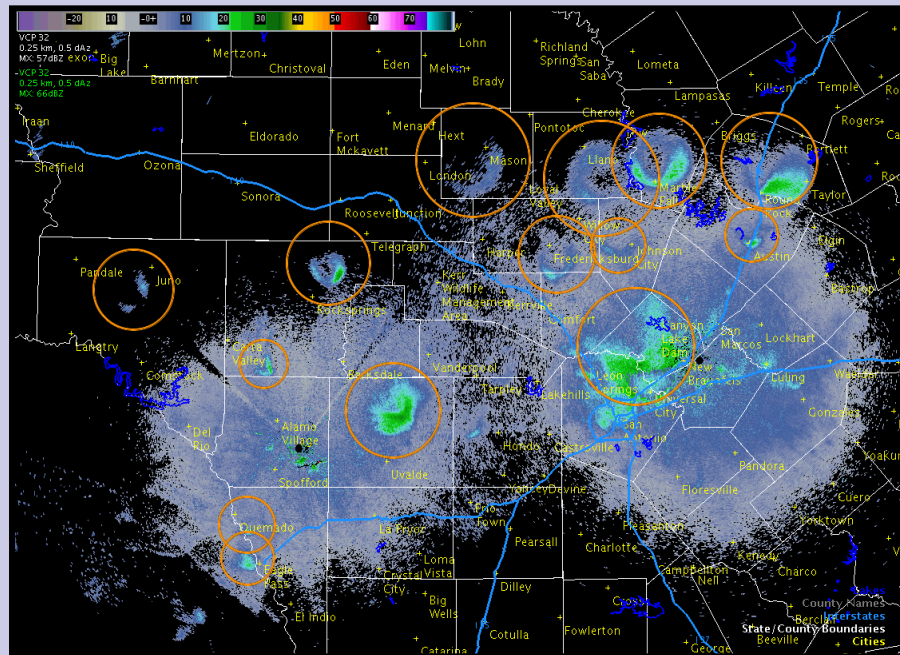


Bats Exiting Bracken Cave (Photo by Jason Runyen)

Radar and Bats continues...

## The Bat Signal on Radar

The circle of bats initially appears up on radar with high radar reflectivity (yellows and sometimes red) due to the large number of bats. While the radars can usually identify the shape of an object that the beam bounces back from, the shape of the bats look like large raindrops to the radar. As the bats gain altitude and the circle grows, a donut pattern forms on radar with the size gradually growing with each radar scan. In the image below you can see over a dozen different bat colonies emerging from caves across the area (orange circle). You can see colonies that have just started coming out, like those over the Edwards Plateau and Austin area, while others like the large Bracken Cave bat colony have already dispersed and no longer look like a donut.



After a night of feasting, you can also see what looks like a shower form and then shrink over some of the caves as the bats return and then enter the cave to sleep through the day. Another interesting fact we have observed is that the bat colonies wait until storms have passed to exit the caves. This prevents them from having to fight the winds in the storms and there is plenty to eat as insects emerge behind the storms.

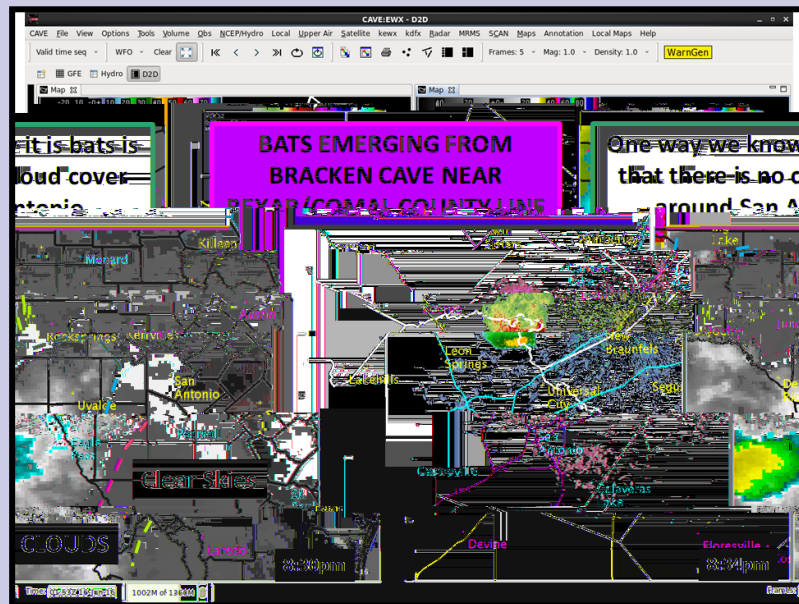
More on radar and bats next...

## The Bat Signal on Radar

### Bracken Cave

The cave is home to more than 15 million Mexican free-tailed bats, making it the world's largest bat colony, according to Bat Conservation International (<http://www.batcon.org/>). The colony also grows during the summer as new baby bats, called pups, are born, learn to fly, and then join their mothers to hunt insects. Because of the sheer number of bats coming out nightly from the Bracken Cave on the border of Bexar and Comal counties the reflectivity on the Doppler radar often looks like a small storm developing. Meteorologists at the office are aware of the cave and the pattern it and the other colonies make on radar, so we can tell the difference between the bats and storms. There are also other ways we can tell the difference. A few of these are listed below:

1. The bats are usually only seen on the lowest scan of our radar, while storms grow tall enough to be seen on multiple vertical scans of the radar.
2. We can compare the radar signatures to the satellite. If there are clear skies on satellite and yet returns on radar, then the radar returns have to be caused by something non-weather related like the bats, birds, dust, etc. Check out the image below.



Weather radar is a valuable tool, that not only helps meteorologists issue life-saving watches and warnings, but can pick up different biological returns like the bats. Check out the radar online at <http://radar.weather.gov/radar.php?rid=ewx> during the evenings in the summer time and watch the bat emergence! Follow us on social media for more information on the bats and to watch animations of the bats leaving their caves!

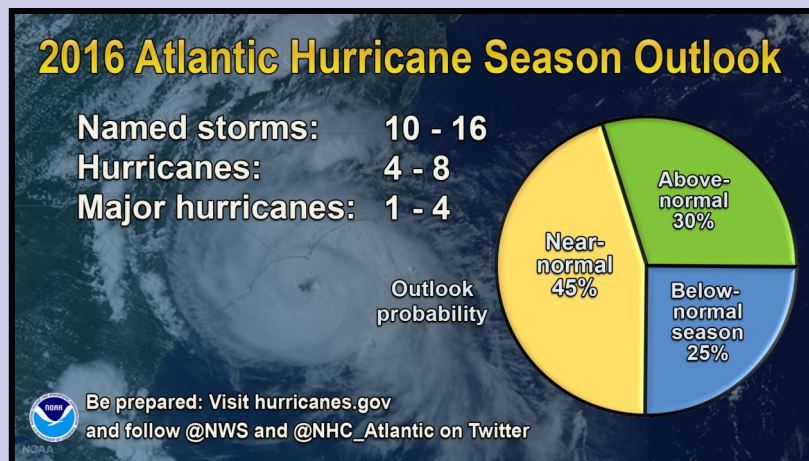
Hurricane Outlook is next...



## A Look at the 2016 Hurricane Season Forecast

By Jason Runyen

The National Oceanic and Atmospheric Administration (NOAA) predicts a 70 percent likelihood of 10 to 16 named storms (winds of 39 mph or higher), of which 4 to 8 could become hurricanes (winds of 74 mph or higher), including 1 to 4 major hurricanes (Category 3, 4 or 5; winds of 111 mph or higher). While a near-normal season is most likely with a 45 percent chance, there is also a 30 percent chance of an above-normal season and a 25 percent chance of a below-normal season. On average, we see 11-12 named storms, 6-7 hurricanes, and 2-3 major hurricanes during an Atlantic Basin hurricane season.

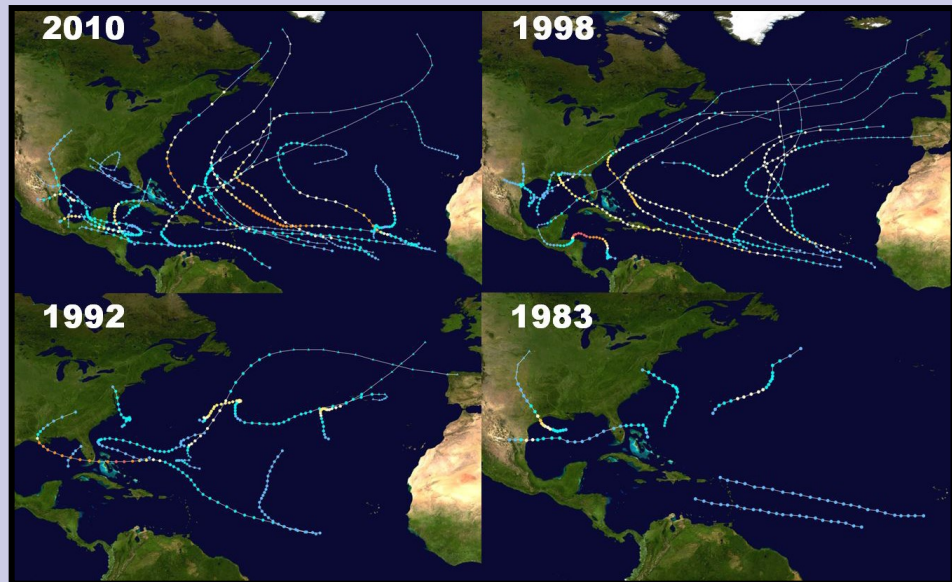


In addition, El Niño has dissipated and NOAA’s Climate Prediction Center is forecasting a 70 percent chance that La Niña — which favors more hurricane activity in the Atlantic Basin — will be present during the peak months of hurricane season: August through October. However, current model predictions show uncertainty as to how strong La Niña and its impacts will be.

What has happened during past hurricane seasons when we have trended out of moderate to strong El Niño events and into neutral or weak La Niña conditions? It has varied considerably the past four instances this has happened. The last time this happened in 2010 there were 19 named storms in the Atlantic basin, a very active season, including Tropical Storm Hermine that brought flooding and strong winds to South-Central Texas. 1998 was another similar transition, and there were 14 named storms that season, including Tropical Storm Charlie that brought 19 inches of rain in just 4 hours to Del Rio. On the flip side, 1992 and 1983 saw similar transitions from El Niño to La Niña and resulted in a low number of named storms (7 and 4 respectively). But those seasons saw big impact storms with Hurricane Andrew hitting South Florida and Louisiana and Hurricane Alicia striking the upper Texas Coast.

Hurricane Outlook continues...

## Hurricane Outlook...



(Comparison of last four tropical seasons in which a trend out of a moderate-strong El Niño into neutral or weak La Niña conditions occurred)

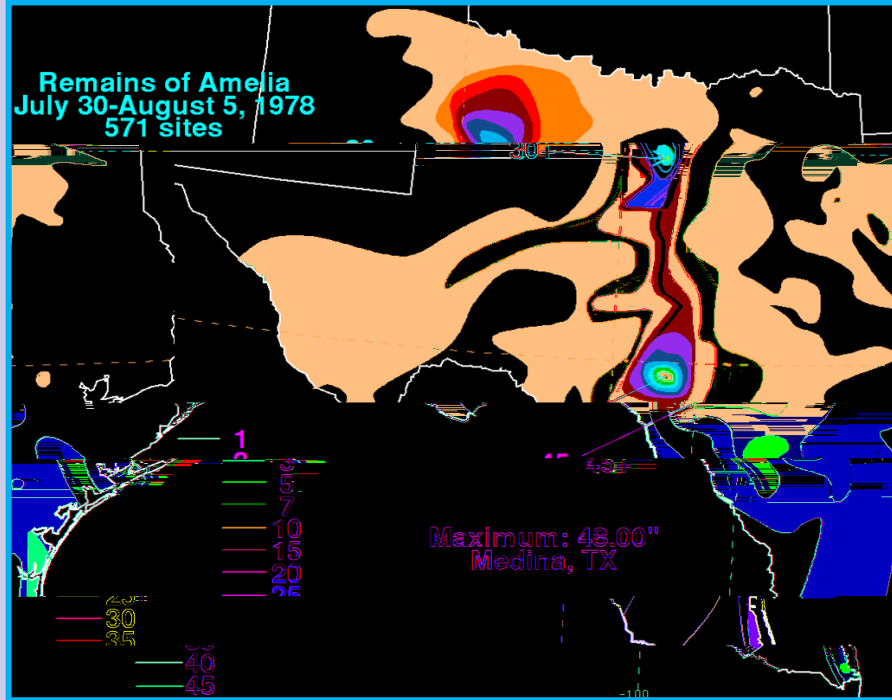
It is very important to note that besides El Niño and La Niña there are many other competing factors that can affect a given tropical season. “This is a more challenging hurricane season outlook than most because it’s difficult to determine whether there will be reinforcing or competing climate influences on tropical storm development,” said Gerry Bell, Ph.D., lead seasonal hurricane forecaster with NOAA’s Climate Prediction Center. “However, a near-normal prediction for this season suggests we could see more hurricane activity than we’ve seen in the last three years, which were below normal.”

Some interesting statistics:

- The longest period on record Texas has ever gone without a direct Hurricane strike was 10 years (1989-1999). Currently it has been nearly 8 years since a hurricane struck Texas (Hurricane Ike in 2008 being the last).
- As of the end of June we have already had 4 named tropical cyclones in the Atlantic Basin for the 2016 Season (Hurricane Alex, Tropical Storm Bonne, Tropical Storm Collin, and Tropical Storm Danielle). This was the fastest start on record in the Atlantic basin.
- On average 2/3rds of all hurricanes in the Atlantic Basin form after August 28th, and ½ for after September 9th.
- Tropical cyclones are NOT just coastal events. Historically South-Central Texas has experienced some of its biggest floods from “weaker” category storms. Some examples: 48 inches of rain occurred over 3 days in Bandera County in 1978 from the remnants of Tropical Storm Amelia. 43 inches of rain occurred in just 24 hours in Alvin, TX in 1979 from Tropical Storm Claudette. In 2001 Tropical Storm Allison dumped over 30 inches of rain in parts of the Houston area.

More on Hurricane...

## Hurricane Outlook...



(Rainfall from Remains of Tropical Storm Amelia in 1978)

It's important not to focus too much on seasonal outlooks as it only takes one bad storm to impact a community forever. Hurricanes Andrew and Alicia, referenced above, are perfect examples of this. Therefore we must prepare the same in any given year...as if this could be the year we are impacted from a tropical cyclone.

### 2016 Atlantic Tropical Cyclone Names

Alex	Hermine	Otto
Bonnie	Ian	Paula
Colin	Julia	Richard
Danielle	Karl	Shary
Earl	Lisa	Tobias
Fiona	Matthew	Virginie
Gaston	Nicole	Walter



Be prepared: Visit [hurricanes.gov](http://hurricanes.gov)  
and follow @NWS and @NHC\_Atlantic on Twitter

NWS Connects is next...

## Austin/San Antonio National Weather Service Connects...

By Orlando Bermúdez

The National Weather Service does more than just weather; it provides weather, water, and climate data information. We do forecasting, warnings, and training of our partners and community for the protection of life and property. In addition to weather related topics, we have been involved in activities serving the community in a spectrum of ways. Our efforts will continue to evolve and expand to better serve the public in the future.



The Univision Television Network weather anchors and producers attended a full day of training conducted by the National Weather Service staff. With the “One Voice” concept in mind, we discussed terminology and translation of weather products into Spanish. Ensuring clarity in the information being transmitted so that the best actions are taken when faced with bad weather.



Meteorologist Orlando Bermudez conducted a “Hurricane Weather” talk in Spanish to a Community Emergency Response Teams (CERT) group in Houston. The focus of the training was the “2016 Hurricane Outlook” and discussed emergency weather plans and actions.



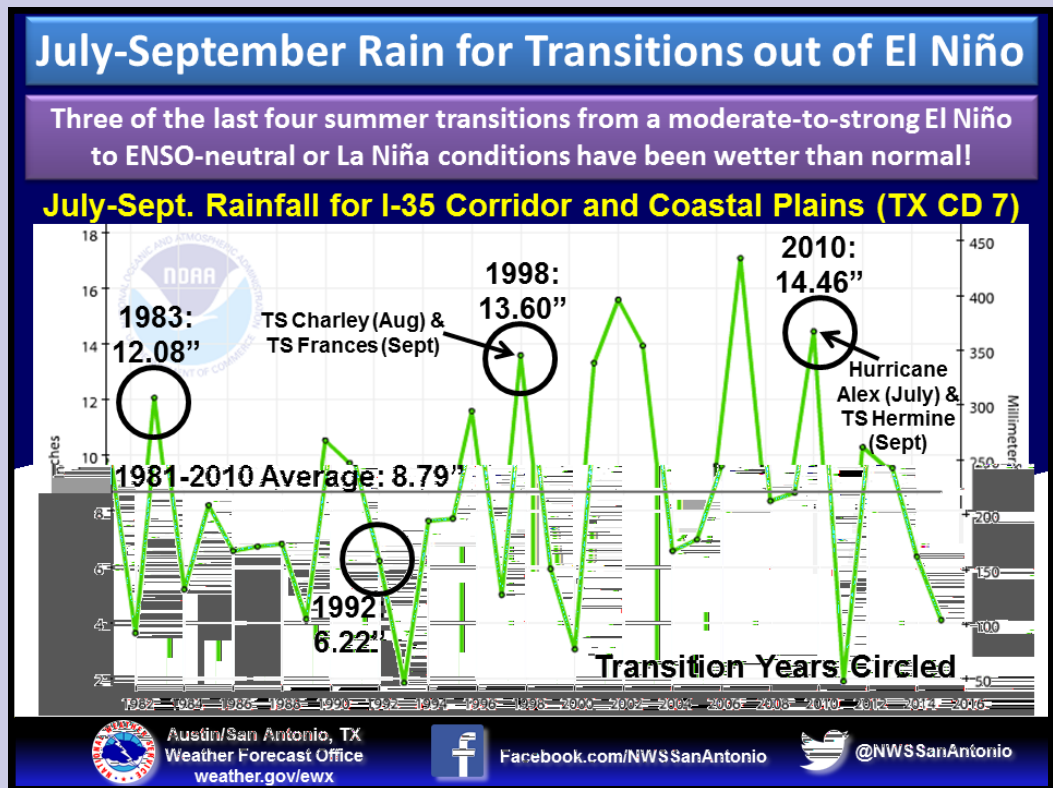
The Austin/San Antonio National Weather Service office donated the extra t-shirts from the Hurricane Hunter Tour on May 16th, 2016 to the Children’s Hospital of San Antonio. The t-shirts were distributed to modern day heroes who battle a monster with their strength and unrelenting hope of a better tomorrow.

NWS information is next...

## South Central Texas Climate Outlook

By Larry Hopper

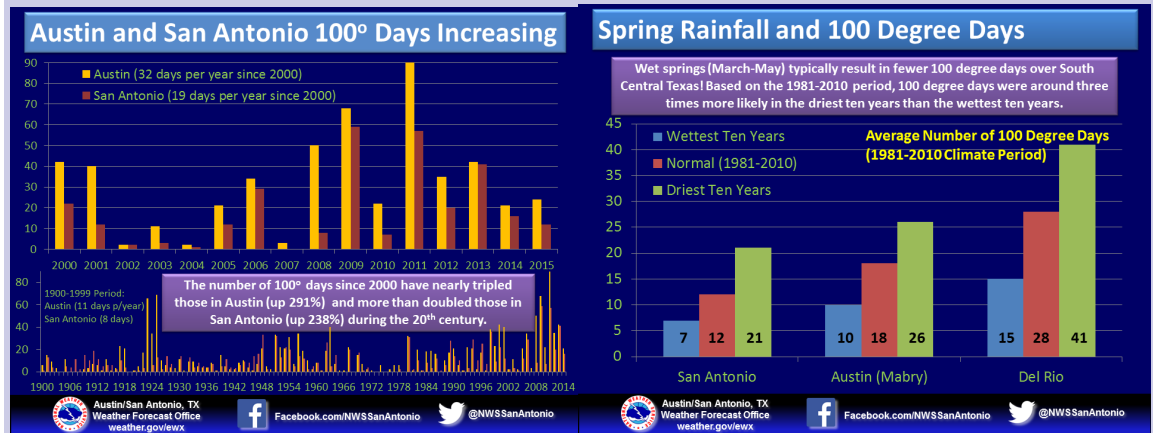
A much wetter than normal spring helped cap a wet first half of 2016 with South Central Texas once again experiencing flash flood events during mid-April and a prolonged rainy period from the second half of May to first few days of June. Rainfall on average was six inches above normal during the first six months of the year across the South Central Texas climate division, with Austin-Bergstrom receiving 30.92 inches to rank second since 1942. This rainfall was partially due to our strong 2015-16 El Niño that since been replaced by ENSO-neutral conditions as East Pacific sea surface temperatures (SSTs) decrease. The majority of models predict that these SSTs may fall enough to allow weak La Niña conditions to develop by August, with the Climate Prediction Center (CPC) predicting a 75% chance of La Niña for this fall and winter.



NWS information is next...

## South Central Texas Climate Outlook

CPC continues to predict odds tilted towards a near to slightly wetter and warmer than normal summer, but July will be warmer and drier than normal. The number of 100 degree days this summer will most likely be near normal due to above normal soil moisture from our wet spring offsetting our long-term trend of increasing summer temperatures unless summer rainfall is much above or below normal. South Central Texas has been 3-6 inches wetter than normal in three of the last four summer transitions from moderate-to-strong El Niño events into ENSO-neutral or La Niña conditions, so optimistically our recent dry period early this summer may be temporary. However, if the region rapidly transitions to La Niña without receiving at least one tropical cyclone, then hot temperatures and the ongoing dry period may continue and cause drought conditions to reappear across the Rio Grande Plains and expand east through the end of summer.



Finally, NOAA is predicting near normal Atlantic and East Pacific hurricane seasons, the latter of which should be much less active than last year's record breaking season. However, hurricanes along the Texas Gulf Coast are more common during La Niña episodes, especially when the North Atlantic Oscillation (NAO) and the subtropical Bermuda high is shifted to the southeast. La Niña will most likely be in place by August or September, so any shift in the NAO and associated high pressure systems could increase (or decrease) these enhanced odds during late summer. Considering that the Texas Gulf coast has been hurricane free since Ike in 2008 and the longest such stretch is only ten years, it is just a matter of time before coastal counties that typically receive hurricane-force winds every 6-8 years have their next storm. Even if a hurricane does not occur, the region has seen significant flooding from tropical storms like Hermine in 2010 as well which occurred during our last transition from El Niño to La Niña.

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### National Weather Service Mission Statement

“The National Weather Service (NWS) provides weather, hydrologic, and climate forecasts and warnings for the United States, its territories, adjacent waters and ocean areas, for the protection of life and property and the enhancement of the national economy. NWS data and products form a national information database and infrastructure which can be used by other governmental agencies, the private sector, the public, and the global community.”



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**<http://www.weather.gov/austin>**

*Thank you for reading our newsletter!*

***Have a happy summer and enjoy  
South-Central Texas weather!***