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Texas Weather Wire

Forecasters Development Training

By Jason Runyen

(Above, members of NWS Austin-San Antonio, NWS Corpus Christi, NWS Brownsville, San Antonio Office of Emergency Management and City of Austin Office of Homeland Security and Emergency Management)

The National Weather Service (NWS) in Austin-San Antonio hosted an important learning workshop for forecasters on the topics of Marine Forecasting and Impact Based Decision Support Services on March 11th and 12th. Guests from NWS Corpus Christi and NWS Brownsville were also in attendance, to both learn and share important best practices on these topics.

The first day focused on marine forecasting. Topics included routine and non-routine NWS Marine Products and Decisions Support Services, Unique Marine and Coastal Hazards Meteorology along the Mid and Lower Texas coasts, and Marine Modeling.

"Practice is the best of all instructors"

Sections on this issue:

Story Continues...

Forecaster On Training Continues...

While NWS Austin-San Antonio does not provide routine, daily forecasts for marine areas, we are the primary backup office for NWS Corpus Christi and secondary backup office for NWS Brownsville. We are also the only inland office in the NWS that has backup responsibilities for a Gulf of Mexico coastal office. On rare occasions when either NWS Corpus Christi or Brownsville cannot perform normal operations and services, NWS Austin-San Antonio must seamlessly step in to perform their services, which includes marine forecasting. Workshops like these, in combination with routine back-up exercises, help NWS Austin-San Antonio forecasters remain proficient in being able to serve and protect marine customers and interests along the Mid and Lower Texas coasts.

"Confidence comes from discipline and training"

The second day focused on best methods to provide effective impact based support to partners so that they can make better informed decisions. Officials from the San Antonio Office of Emergency Management and City of Austin Office of Homeland Security and Emergency Management were present for an open discussion on how the NWS can provide the most effective weather support to their respective offices. Lessons learned from recent winter and heavy rain events served as discussion points. Other topics the second day focused were on social media best practices and improving graphical and video services.

(Above, members of NWS Austin-San Antonio, NWS Corpus Christi, NWS Brownsville, San Antonio Office of Emergency Management and City of Austin Office of Homeland Security and Emergency Management on second day of training during a round table conversation)

Next AWIPS2...

AWIPS2 (Advanced Weather Interactive Processing System)

By Nick Hampshire

"AWIPS 2 allows us to view, overlay, and manipulate all types of weather data, including radars, satellites, computer forecast models, etc…"

On March 3rd, the Austin/San Antonio National Weather Service office installed a major upgrade to our Advanced Weather Interactive Processing System (AWIPS), now called AWIPS 2. AWIPS 2 allows us to view, overlay, and manipulate all types of weather data, including radars, satellites, computer forecast models, aircraft, ground sensors, weather balloons, airport weather observations, and river/ocean gauges, all essential to our work as forecasters. The recent upgrade has been under development since 2005 with an initial test roll out to some offices in late 2011. After several years of testing and additional updates, the software is being rolled out to the rest of the 122 NWS Weather Forecast Offices. The overall look and feel of the upgrade is very close to AWIPS 1. However, the background operating system is different and a much needed upgrade for current and future needs. One example is the emergence of Geographic Information Systems (GIS) -- for which AWIPS 2 more readily provides the creation and display of high-resolution maps. Some other examples are the capability to ingest newer and a greater number of datasets into our system to use in forecast and severe weather operations and the streamlining of our data and processing structures. This now allows us to receive future updates to the system in a much more timely fashion, which means that when we provide (or receive) backup from our sister offices in Corpus Christi and Brownsville, this task will be completed in shorter amounts of time than our previous system. Bottom line, these upgrades will translate to better forecasts, warnings, and additional real-time information for you when hazardous weather occurs.

AWIPS2 Workstation at EWX office

Radar is Next...

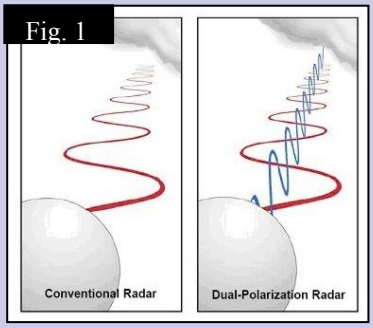
Radar Section

Using Dual-Polarization Radar for Severe Strom Detection

By Jared Allen

In the last edition we talked about how recent upgrades in the dual-pol radar technology helped meteorologists better detect winter weather. As we head into the spring storm season, we will continue with dual-pol technology and how it helps detect extremely heavy rain and hail cores as well as confirm a circulation is producing a tornado and doing damage. Knowing this information can refine the types of National Weather Service warnings issued to get the right message across at the right time.
Dual-pol radar is when electromagnetic radio wave pulses are sent in both the horizontal and the vertical axes (Figure 1).

Fig. 1



The information that comes back to the radar based on both pulses is processed by computers and is displayed in several different formats. The formats to investigate heavy rain, hail cores, and potential tornado-lofted debris are the following:

Specific Differential Phase (KDP)
Differential Reflectivity (ZDR)
Correlation Coefficient (CC)

Detecting Heavy Rainfall

One of the best radar uses is to detect where the heaviest rain is falling and to alert the weather forecaster of where flash and river flooding could occur. In addition to normal reflectivity, Specific Differential Phase (KDP) is one of the best dual-pol products to highlight where the largest rain drops and rain-coated hail is likely to reside. KDP focuses only on the amount of liquid water present.

Radar Continues...

The more blue to green and especially yellow to orange colors, the bigger the rain drops and higher the concentration. Using a toggle or multi-panel view, a warning operator can look at multiple radar formats to determine the hazards in a storm. For example, figure 2 shows normal reflectivity and figure 3 shows the corresponding KDP.

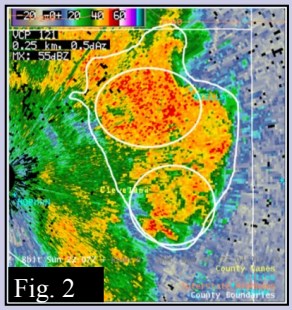


Fig. 2

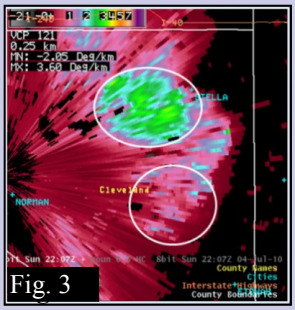


Fig. 3

In figure 2, both ovals have about the same radar reflectivity (yellows & reds) that could indicate heavy rain. However, analysis of the KDP shows that the top oval has much heavier rainfall (green/yellow area) than the southern storm (purple area). If this storm stays stagnant, then localized flashing and river flooding could become an issue.

Detecting Large Hail

In addition to determining where heavy rainfall is occurring, KDP, in combination with Differential Reflectivity (ZDR), can be used to find where the hail core is located. ZDR is the difference between the horizontal and the vertical radar beams returned power back to the radar. If the radar sweeps across a hail core, the ZDR values will be lower as hail will have a more spherical shape vs. a flatter large rain drop. If these lower ZDR values are co-located with low- to mid-range KDP values, then a solid hail core or melting hail inside a heavy rain shaft is likely.

For example, figures 4 and 5 below show a severe storm when looking at the ZDR and KDP simultaneously. In the far right circle, ZDR values are high and are co-located with lower KDP values, indicating moderate uniform rainfall.

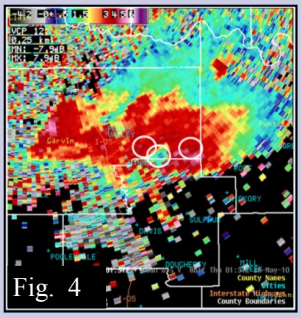


Fig. 4

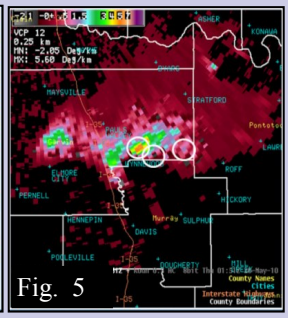


Fig. 5

"Knowing this information can refine the types of National Weather Service warnings issues to get the right message across at the right time"

Radar Continues...

However, the middle circle shows a lowering of ZDR while co-located with lower KDP, indicating a large hail core outside of any rain shaft. This area would be highlighted in a severe thunderstorm warning and mentioned specifically in communications with emergency managers. The left circle shows a slight lowering in ZDR but has a high KDP value. This signal may be some small or rain-coated hail within the larger heavy rain shaft posing more of a flash flooding hazard. Another radar feature seen in figures 4 & 5 is the presence of a Three-Body Scatter Spike (TBSS) which is also a radar signal for hail being present. Analyzing multiple radar products within minutes is crucial to understanding the storm morphology and the hazards within it.

3) Detecting Tornado Debris Signatures

One of the most significant upgrades in the dual-pol technology allows a radar warning operator to determine if a tornado is causing damage and lofting debris into the air. This information can be crucial in situations including a storm during the night or in a rural area, or if a storm spotter has not yet confirmed the ground truth of a tornado. The main radar format used to identify a Tornado Debris Signature (TDS) is the Correlation Coefficient (CC) product. The CC helps distinguish between precipitation and non-precipitation and how different the types and shapes of the objects are relative to each other. When CC values are low, that means there are numerous types of objects being detected. Research around the country has led to some radar signal thresholds used to identify if a TDS is present. These thresholds must be co-located with each other across different radar formats. These thresholds are:

- Correlation coefficient < 0.90
- Strong meso-cyclone or circulation present
- Reflectivity > 35 dBZ
- Supportive tornadic environment

When thresholds are met and the atmosphere is supportive of rotating storms, then the radar warning operator can further enhance the warning wording so local media and emergency mangers know the seriousness of the situation. Confirming that a tornado is causing damage will likely drive more people to take protective and proactive measures. In figure 6, a four-panel radar image depicts the different radar formats that confirm a TDS. Starting with the top-left going clockwise, the images are: Reflectivity, Storm Relative Velocity (SRV), CC, and ZDR. First, notice the extremely strong and tight velocity couplet in the top-right. This is indicative of a potentially strong tornado and if the lower CC data is co-located with this signal (which it is) and the dBZ of the reflectivity aligns, a TDS is confirmed.

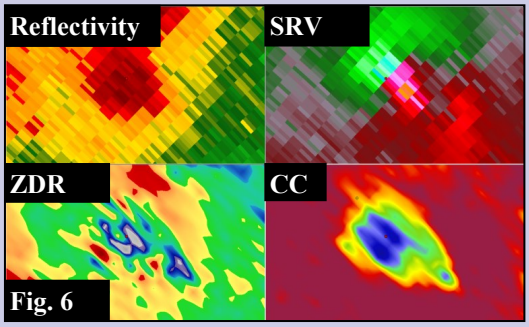


Fig. 6

Another radar product to further confirm the TDS is ZDR. The lower values seen in the bottom-left image shows values near zero, also indicating that numerous multi-sized and types of objects are being detected by radar. The radar is observing shingles, wood, roofs, trees, leaves, and other non-precipitation objects in the air.

If a TDS is present, the next question is how high in altitude does the TDS reach? Recent research by Entremont et al. (2014) looked at 181 TDS cases across the country and measured how high the debris was lofted based on set criteria. Their findings indicated when TDS heights reach above 10,000 feet, a strong tornado (EF2+) is likely occurring (Figure 7). If the height is greater than 20,000 feet then a very strong to violent tornado is possible to likely.

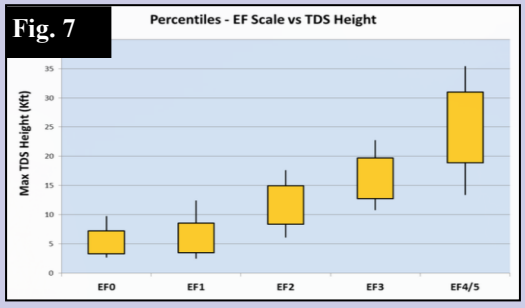


Fig. 7

Understanding and processing dual-pol radar data quickly and efficiently is critical to diagnosing hazards threatening life and property. By knowing this new in-depth information about the storm, enhanced warnings known as Impact Based Warnings (IBW) are used to convey the storm's hazards. More on IBW warnings can be found in the following section. So, as we head into spring convective season, please stay situationally aware of thunderstorms and check the wording of the warnings and listen to what the media is saying. How big is the hail? Is there a radar confirmed tornado? Thanks to dual-pol technology, these answers will be with the NWS warning itself. This way, not only do you know the storm is severe, but you know the magnitude of the severity as well.

"One of the most significant upgrades in the dual-pol technology allows a radar warning operator to determine if a tornado is causing damage and lofting debris into the air"

IBW is Next...

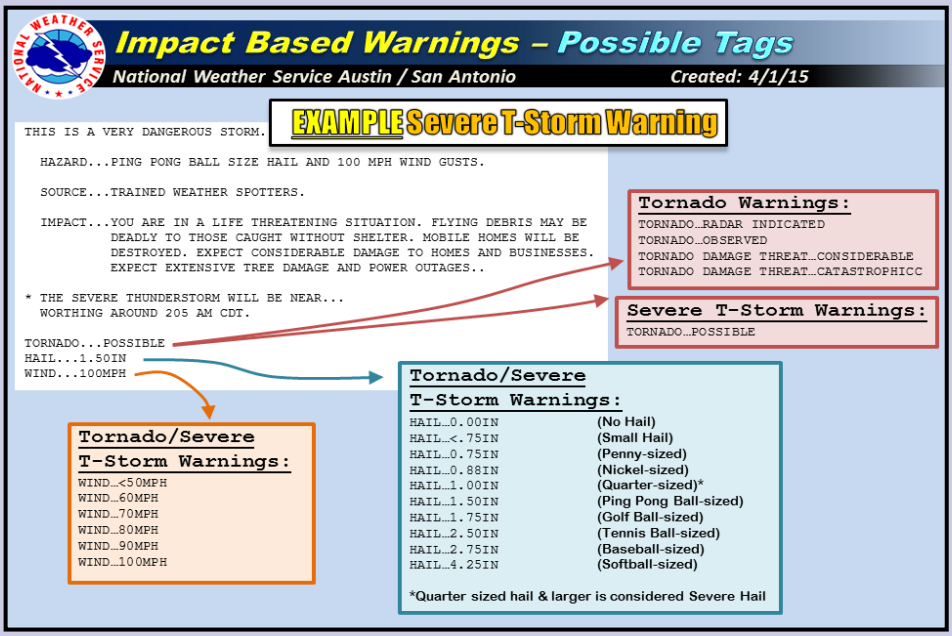
Impact Based Warnings–Same Trusted Warnings, Better Communicated Threats

By Aaron Treadway

As of April 1st, a total of 67 National Weather Service forecast offices are participating in the Impact Based Warning program. This includes our office and eight other offices in Texas (the coastal offices are not participating at this time). Impact based warnings are meant to provide additional information to the media, emergency managers, and the public about the impacts associated with the thunderstorm or tornado that the warning covers. The hope is that this added information will help you, the public, be more apt to respond to warnings and help you make better decisions.

Impact based warnings build upon the trusted severe thunderstorm and tornado warnings that the National Weather Service has already been issuing by changing the text in the warning. The new text will bring it more in line with societal impacts of the weather and communicate recommended actions and precautions more precisely. The new text will also help distinguish between low impact and high impact events.

The warnings will be enhanced by improving communication of critical information. Being able to quickly identify the information will allow the user (media, emergency manager, or you!) to prioritize the most important warnings in your area. They allow us, as forecasters, to provide different levels of risk within the standard warning template and allow us to express a confidence level of the potential impacts. The last improvement is that the tags included in the warning highlight storms that are particularly dangerous.



"The hope is that this added information will help you, the public, be more apt to respond to warnings and help you make better decisions"

IBW Continues...

IBW Continues…

This project was developed after the devastating Joplin tornado of 2011. It was discovered that many people sought confirmation from additional sources before taking shelter and that credible, extraordinary risk signals prompted people to take protective actions. For more information on impact based warnings you can visit: http://www.weather.gov/impacts/. On the website you can find a link to the customer survey, where you can provide the National Weather Service feedback on impact based warnings. Other offices, including the Gulf Coast offices, will be brought on board in the coming months.

he below graphic gives an example of an impact based severe thunderstorm warning. The key feature is that the hazards, source of report, and impacts are now broken down into three bullets. This allows the reader of the warning to quickly determine how the thunderstorm being warned on will impact them. The warning makes use of different tags for tornadoes, hail, and wind, as illustrated in the graphic above. The wind and hail tags indicate the magnitude of wind or size of hail that we expect with the thunderstorm. We use Dual-Polarization Radar to determine these wind speeds and hail sizes. You can read about this in the preceding article.

Tornado warnings have seen a significant change in vocabulary. In addition to the traditional tornado warning the forecaster can now differentiate between a radar indicated or an observed tornado. A radar indicated tornado is one where there is evidence on radar of a tornado and the environment is supportive of tornadoes, but there is no confirmation. The tag would change to observed once the tornado was confirmed by a spotter, law enforcement, the public, etc. In addition to being able to differentiate between radar indicated and observed, the new tags also let the forecaster indicate the potential strength of a tornado. It is important to note that we are not trying to determine the final rating (EF0 to EF5) of a tornado before the damage survey, but rather communicate the seriousness of the situation. Using Dual-Polarization we can see the debris that a tornado is lofting into the atmosphere. Once this happens, confidence grows that not only is a tornado on the ground, but it is producing damage.

At this point we can add either a considerable or catastrophic tag to the tornado warning. A considerable tag is added when there is credible evidence of a tornado capable of producing considerable damage and is imminent or ongoing. The catastrophic tag will be reserved to be used only when there is a severe threat to human life and catastrophic damage from the tornado is occurring. The catastrophic tag will also only be used when a violent tornado is confirmed by reliable sources and the storm is moving into a populated area.

Tornado Tag	
TORNADO...RADAR INDICATED	Evidence on radar and near storm environment is supportive, but no confirmation.
TORNADO...OBSERVED	Tornado is confirmed by spotters, law enforcement, etc.
Tornado Damage Threat Tag	
No Tag	Use most of the time, when tornado damage possible within the warning polygon. Tornado duration generally expected to be short-lived
TORNADO DAMAGE THREAT...CONSIDERABLE	Use rarely, when there is credible evidence that a tornado, capable of producing considerable damage, is imminent or ongoing. Tornado duration generally expected to be long lived
TORNADO DAMAGE THREAT...CATASTROPHIC	Use exceedingly rarely, when a severe threat to human life and catastrophic damage from a tornado is occurring, and will only be used when reliable sources confirm a violent tornado.. Tornado duration generally expected to be long lived
Tornado Tag In Severe Thunderstorm Warnings	
TORNADO...POSSIBLE	A severe thunderstorm has some potential for producing a tornado although forecaster confidence is not high enough to issue a Tornado Warning.

It is important to note that we are not trying to determine the final rating (EF0 to EF5) of a tornado before the damage survey, but rather communicate the seriousness of the situation.

COOP is Next...

COOP Observers Program

By Steve Smart

For the United States and its territories, there are nearly 9,000 official National Weather Service (NWS) Cooperative Observers. These individuals volunteer to measure, record and report daily climate and weather information directly to the NWS. Predominately, temperature and precipitation data is transmitted to the NWS each morning via the internet, but other information such as snow measurements, evaporation and soil temperatures may be provided as well. The data provided is used in near real-time to help support a wide range of operations from the timely issuance of flash flood warnings to the compilation of daily climate reports. Ultimately, Cooperative Observer information is processed, archived and made available as a matter of public record by the National Centers for Environmental Information (NCEI) in Asheville, NC. It cannot be overstated how critically important this information is when you consider the fact it is used to define the climate of the United States. On a larger scale, it is also used by the scientific community to help understand global climate change. For more information about the Cooperative Observer Program, please visit: www.nws.noaa.gov/om/coop/

Above, Steve Smart for the National Weather Service Austin/San Antonio helping out a COOP observer to calibrate equipment.

Please visit: www.nws.noaa.gov/om/coop/ for more information on this excellent program.

Spanish Section Next...

La Resaca (Spanish Section)

Por Orlando Bermúdez

Una vez comienza la primavera, esta nos da una señal que las temperaturas estarán en ascenso. De igual manera, es el comienzo de la apertura de los parques acuáticos y las visitas a las playas o áreas costeras. Visitantes de todo el mundo viajan a nuestras áreas costeras para disfrutar con sus familiares o amistades durante la época de "spring break" o vacaciones de primavera. Ahora, existe la peligrosidad escondida en las áreas costeras llamada "La Resaca". La resaca es una corriente de agua canalizada que se mueve desde la orilla de la playa hacia mar adentro. Por lo general, "Resacas" pueden ser observadas donde se interrumpen los bancos de arena y también cerca de las escolleras y de los malecones. La resaca es muy común ya que puede ocurrir todos los días en todas las playas de oleaje ¿Por qué es peligrosa?

"La resaca es una corriente de agua canalizada que se mueve desde la orilla de la playa hacia mar adentro"

A continuación, les muestro el por que "Las Recacas" son tan peligrosas,

- La resaca arrastra a la gente hacia mar adentro.
- La velocidad de la resaca varía de un momento a otro y puede acelerar repentinamente, lo cual crea un peligro para todos los que entren a la zona de oleaje.
- La resaca puede arrastrar hacia mar adentro hasta al más experto nadador.

Aunque es difícil pensar o concentrarse cuando uno está atrapado en "La Resaca", aquí unas recomendaciones a seguir:

- Mantenga la calma.
- No luche contra la corriente.
- Escápese de la corriente nadando en dirección paralela a la orilla.
- Cuando este fuera de la corriente, nade diagonalmente lejos de ella y hacia la orilla.
- Si no logra escaparse nadando, manténgase a flote pedaleando.
- Cuando la corriente se haya disipado, nade diagonalmente lejos de ella y hacia la orilla.

Pero para evitar un mal momento durante sus vacaciones de primavera o cualquier época del año, es mejor asesorarse con las oficinas de meteorología nacional más cercana. Si vas a la costa sur del Golfo de Mexico, las oficinas de Corpus Christi y Brownsville serian su mejor recurso para saber sobre las condiones del tiempo y los riegos de "Reseca". Corpus Christi (http://www.srh.noaa.gov/crp/?n=marine), Brownsville (http://www.srh.noaa.gov/bro/?n=marine).

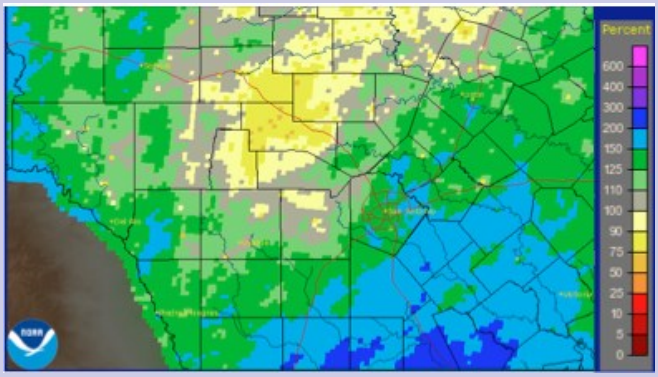
Climo is Next...

South Central Texas Rainfall Outlook (Climo)

By Larry Hopper

Wetter than normal conditions are expected through March 2016 for all of South Central Texas. Although there currently is no clear signal for most of summer and early fall, the Climate Prediction Center is predicting a 65-75% chance of greater than normal rainfall through the end of June and from October through next March. This additional rainfall will help put a dent in drought conditions that are ongoing in much of the Hill Country, particularly in Kerr, Real, and western Gillespie Counties that have had below normal rainfall over the past 180 days. Outside of the Hill Country, most of South Central Texas has experienced greater than normal rainfall over the last 180 days, so additional rainfall should continue to keep these areas out of drought while also increasing the potential for river and flash flooding.

High confidence exists in these forecasts due to the return and likely persistence of El Niño conditions for the first time since the 2009-2010 fall and winter seasons. Although a weak El Niño technically began last fall, the Climate Prediction Center is predicting a 60-70% chance that these conditions will continue through the end of the year, with many forecast models predicting a much stronger El Niño for next fall and winter. Rainfall during El Niño episodes (using data from 1981-2010) typically increases substantially at Austin (Mabry), Del Rio, and San Antonio during the winter, with more modest increases during spring and fall and mixed results during summer. Climate signals like El Niño are typically weaker and have less forecast skill during summer than other seasons, but it is worth noting that hurricane activity usually increases in the East Pacific Basin during summer and fall despite decreasing in the Atlantic Basin. These East Pacific hurricanes often combine with Gulf moisture and slow-moving fronts in during fall to produce heavy rain events over South Central Texas, including some of our most prolific flash flood events over the past few decades.



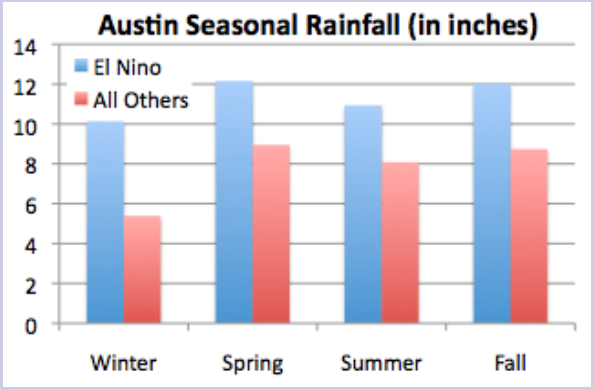
180-Day Percent of Normal Precipitation for South Central Texas as of April 20, 2015.

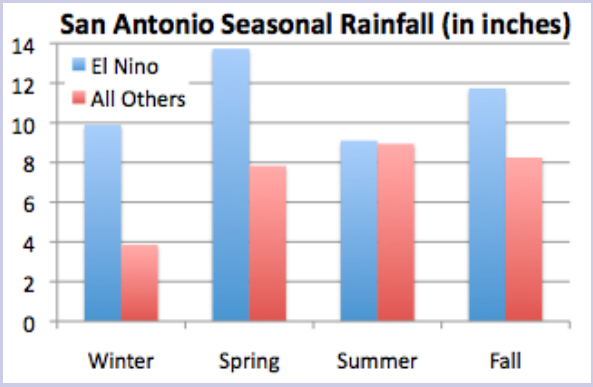
"High confidence exists in these forecasts due to the return and likely persistence of El Niño conditions for the first time since the 2009-2010 fall and winter seasons"

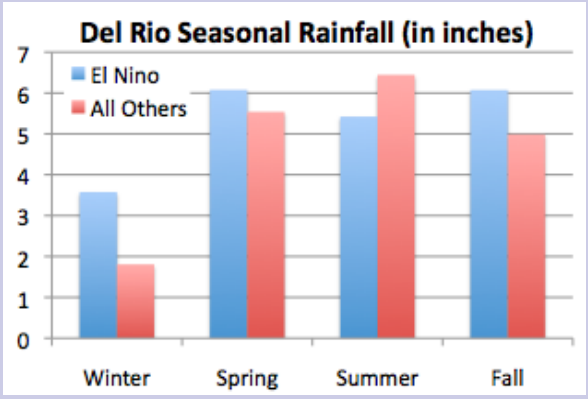
Climo Continues...

Climo Continues...

"If you don't dedicate yourself to becoming better every single day, you will never be able to communicate with people the way that you want"







Seasonal Rainfall Totals at Austin-Mabry, San Antonio, and Del Rio from 1981-2010 (Note: Winter includes data from December 1979, but not December 2010). El Niño seasons were determined from the Oceanic Nino Index threshold used by the Climate Prediction Center, which resulted in 8 events during winter, 3 in spring, 5 in summer, and 10 in fall. Non-El Niño seasons are included in the "All Others" group.

Local Activities Next...

Office Activities...

On April 8, 2015, some members from the EWX staff, spouses and significant others went to see the NBA basketball champs, the San Antonio Spurs. We had a lot of fun during the game as the Spurs defected the Houston Rockets 110-98.

"The quality of your life is the quality of your relationships"

Here is a photo from the group that attended the game on April 8, 2015.

Last Page is Next..

Texas Weather Wire

National Weather Service
Austin/San Antonio
Weather Forecast Office (WFO)
2090 Airport Road
New Braunfels, Texas
Phone: 830-606-3617

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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Austin/San Antonio National Weather Service Home Page

http://www.srh.noaa.gov/ewx/

Thank you for reading our newsletter!

- ***Are we expecting a normal summer this year?***
- ***Is it time for a tropical cyclone to hit the Texas coast?***

Answers to these questions and more will be included in the summer edition of the Texas Weather Wire