



# Coyote Crier



Spring/Summer 2017

Volume 23, Issue 1

## GOES-16 Ushers in a New Era of Satellite

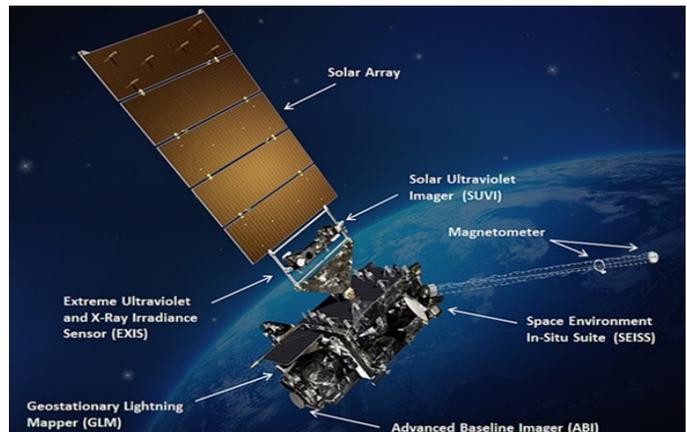
### Remote Sensing Dan Leins, Science and Operations Officer

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On Saturday November 19 at approximately 4:45pm MST, a new era of satellite remote sensing capabilities began as our newest weather satellite, GOES-R, was launched into orbit. Several days later it reached its designated resting place over 22,000 miles above the equator and took on its permanent name: GOES-16. GOES-16 is the first of four new satellites that will be launched into orbit over the next few years and will significantly improve meteorologists' ability to accurately predict severe weather, detect dust storms, monitor fires, and issue more accurate forecasts on a day to day basis.

GOES-16 marks a revolutionary shift in the way meteorologists will view data from space. For starters, GOES-16 has the ability to view three times as many "channels" of data as compared to the previous generation of satellites. Instead of simply looking at a single "water vapor" image to determine how much moisture is in mid levels of the atmosphere, meteorologists can now view three different water vapor images to determine if that moisture is in the upper level, mid levels, or lower levels. Similarly, forecasters no longer limited to looking at one "visible" channel during the daytime hours. They now have the option to look at a channel that highlights smoke plumes, a high resolu-



Schematic of GOES-16

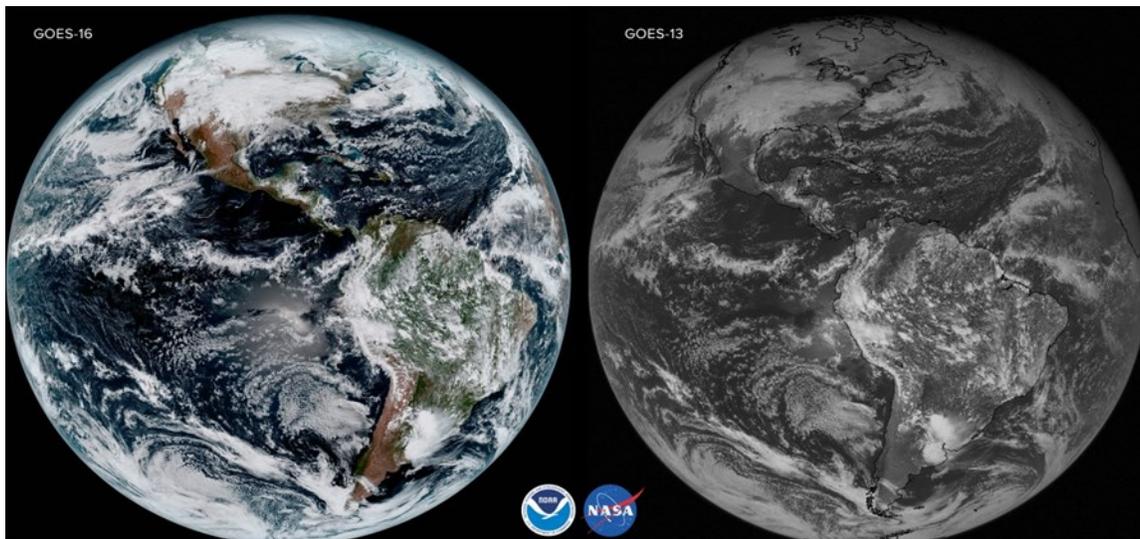
tion channel, a channel to highlight areas of vegetation, and two channels to highlight clouds that contain ice. Meteorologists will now have the capability to combine different channels of data together and view "true color" images of the Earth for the first time. Another significant change with GOES-16 is the increased spatial resolution of the data, which is now 4 times greater than the previous generation of satellites. This is particularly noteworthy as this increased resolution will allow forecasters to see clouds, storms, areas of dust, and smoke plumes with much greater detail. This is truly like going from standard definition television to high definition. GOES-16 will also provide updates to forecasters 5 times as quickly as the previous generation of satellites. During periods of active weather, GOES-16 can be configured to send updates

every minute, and in some cases it can be asked to send updates every 30 seconds. The previous generation of satellites would only send updates every 5 minutes during active weather.

Finally, GOES-16 was outfitted with a Global Lightning Mapper which will allow forecasters to view lightning from space. This is the first satellite based lightning detection instrument and is truly revolutionary in the sense that it will allow meteorologists to get a more complete picture of the total amount of lightning in a storm. Current lightning detection systems are ground based and are mostly limited to sensing cloud to ground lightning strikes, but research has shown that looking at the total amount of lightning in a

**"GOES-16 marks a revolutionary shift in the way meteorologists will view data from space."**

Photo showing GOES-16 True Color imagery vs. GOES-13 Visible imagery for the same date/time. Note the increased clarity from GOES-16 in addition to the color. GOES-13 is one of the previous generation of satellites that were launched 10-15 years ago.



storm (vs. only cloud to ground) should help forecasters make better warning decisions during severe weather. Overall, meteorologists nationwide, including everyone here at NWS Tucson, are eager to start looking at all of these new datasets and using them on a day to day basis. For more information on GOES-16, as well as the other three satellites scheduled for launch in the coming years, check out [www.goes-r.gov](http://www.goes-r.gov).

## Winter 2016-2017 Summary

**John Glueck—Senior Forecaster & Climate Focal Point**

El Niño conditions in the tropical Pacific normally bring wetter than normal winters to southeast Arizona while on the opposite side, La Niña conditions normally brings drier than normal winters. During the El Niño event during winter 2015-16, most of southeast Arizona recorded below normal precipitation. The prospects for another below normal winter were possible during the winter 2016-17 due to weak La Niña conditions in the tropical Pacific. However, winter 2016-17 was un-La Niña-like as an active storm track brought near normal to above normal precipitation to parts of southeast Arizona.

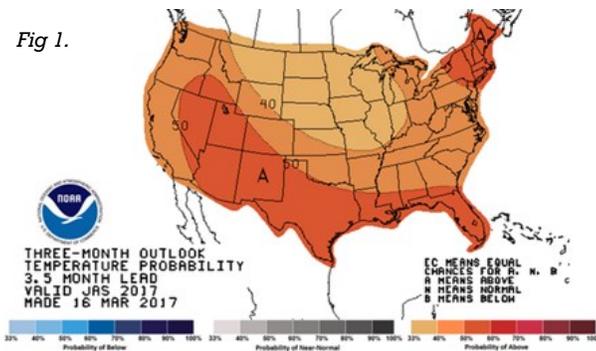
Location	Dec-Mar Precip	Normal Precip	Departure
Organ Pipe Cactus National Monument	6.10"	3.90"	+2.20"
Willcox	4.57"	3.95"	+0.62"
Duncan	4.10"	3.57"	+0.53"
Sierra Vista	3.68"	3.23"	+0.45"
San Simon	3.79"	3.38"	+0.41"
Kitt Peak	8.09"	7.72"	+0.37"
Coronado National Memorial	6.79"	6.58"	+0.21"
Douglas airport	3.05"	2.86"	+0.19"
Ajo	3.17"	3.05"	+0.12"
Chiricahua National Monument	6.28"	6.17"	+0.11"
Bisbee	5.16"	5.13"	-0.03"
Safford	2.96"	3.00"	-0.04"
San Manuel	4.46"	4.55"	-0.09"
Benson	2.84"	3.08"	-0.24"
Tucson International airport	3.17"	3.46"	-0.29"
Picacho	3.58"	4.38"	-0.80"
Oracle	8.37"	9.27"	-0.90"
Sasabe	6.43"	5.53"	-0.90"
Fort Thomas	3.00"	3.92"	-0.92"
Tombstone	2.46"	3.56"	-1.10"
Nogales	3.11"	4.52"	-1.41"

# Monsoon Outlook for Southeast Arizona

Ken Drozd, Warning Coordination Meteorologist

As we approach summer, inquiring minds begin to ask what the monsoon will be like this year. The official outlook from the Climate Prediction Center for the 3 month period of July, August and September indicates a warmer than normal monsoon (Fig. 1) but is less clear about precipitation. The precipitation outlook shows equal chances of being wetter, drier or near normal for that three month period. (Fig. 2) These maps can be found at [http://www.cpc.noaa.gov/products/predictions/long\\_range/](http://www.cpc.noaa.gov/products/predictions/long_range/).

Fig 1.



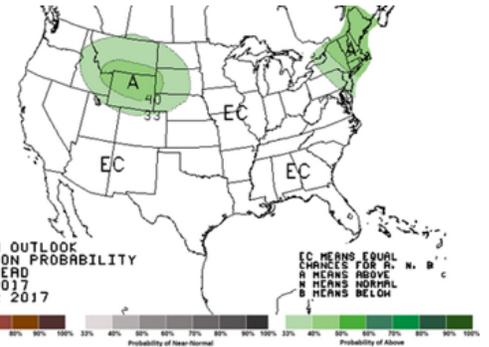
So how much rain is normal? Well, that depends a LOT on where you are! Southern and eastern areas of southeast Arizona tend to get more rainfall than northern and western areas and mountains tend to receive more rain than valleys. From this series of maps (Fig.3), heavier average rain amounts are indicated in orange and red, with those areas normally receiving 3 to 6 inches of rain during the month indicated. So, doing some quick math, you can see that the Tucson Metro roughly averages between 5 and 7 inches of rain during the monsoon, again depending where you are, exactly. Meanwhile, locations to the south and east receive 7 to 11 inches of rain with even higher amounts in mountain locations.

A few factors that go into determining the monsoon outlook include: 1.) Rocky

Mountain snowpack, 2.) Pacific Ocean temperatures, and 3.) climate models.

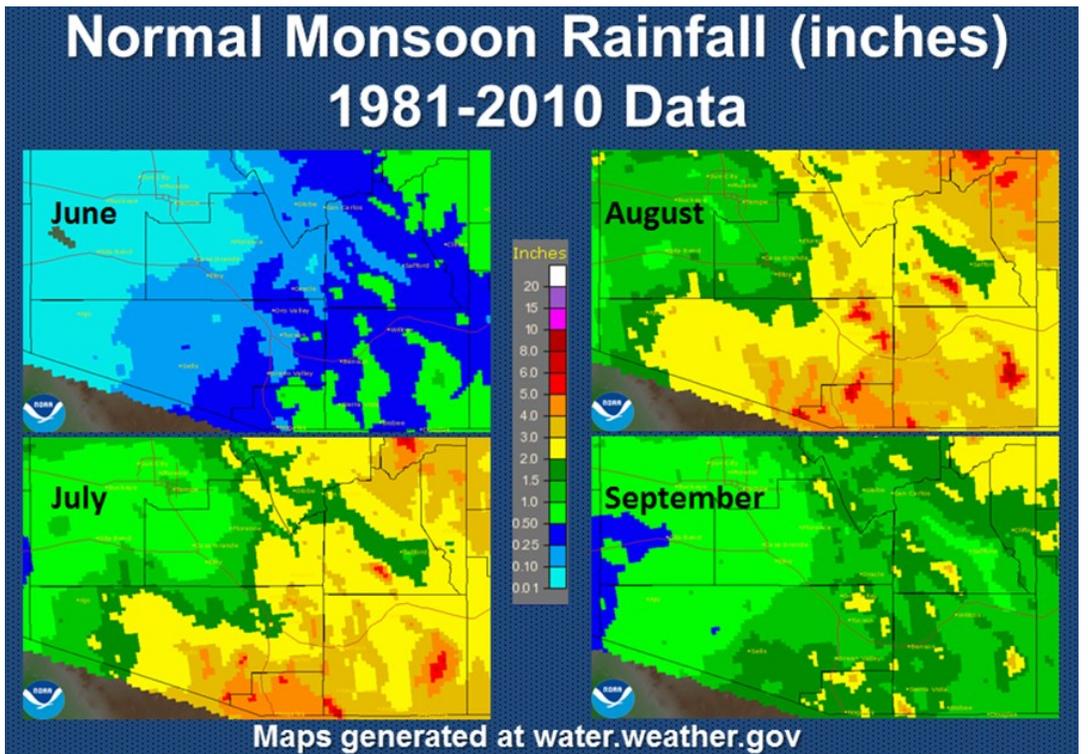
A substantial snowpack in the Rocky Mountains can inhibit the northward migration of subtropical high pressure commonly referred to as the "monsoon high." It is when this high moves northward that upper level winds in southeast Arizona shift from the west to the moist east or southeast flow that leads to frequent rounds of thunderstorms during the monsoon. Snowpack is currently high in the Rockies, which could point to a delayed onset of the monsoon. However, a very warm May and June to our north could still quickly deplete that snowpack and remove any influence on the monsoon high.

Equatorial Pacific Ocean temperatures commonly referred to as El Niño when warmer than normal, or La Niña when



cooler than normal, can influence ocean circulations and ultimately atmospheric circulations. While the influence of these ocean temperatures during our monsoon is not as great as is the case during winter, some effects on our monsoon can occur. Presently, ocean temperatures in the equatorial Pacific Ocean are near normal and are forecast to remain near normal through much of the summer, so this factor does not really help with our monsoon prediction this year. There is some hint at warming toward the end of the monsoon. This could allow tropical systems to advance a bit farther north and enhance our September

Fig 3.



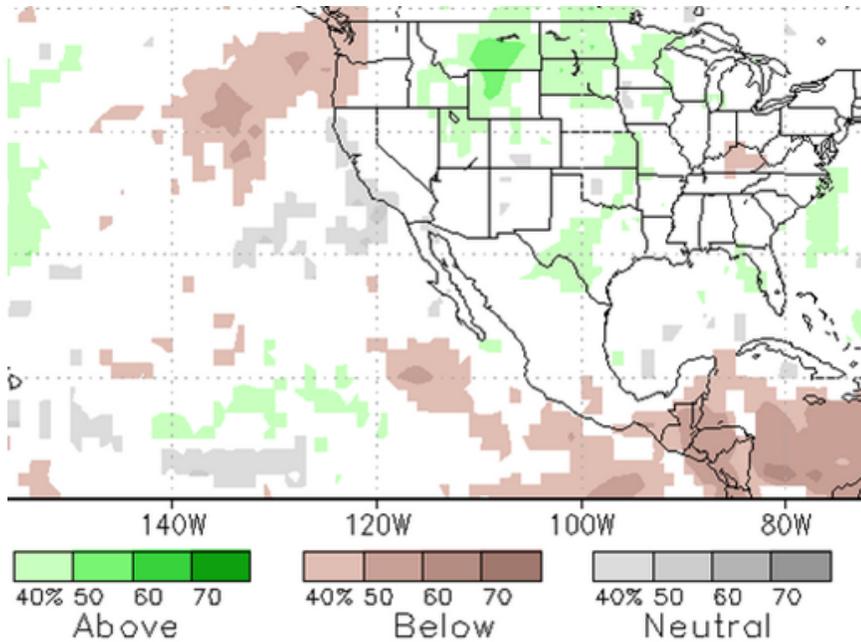


Fig 4. ber rainfall, but that may be a long-shot.

Lastly, climate models are not showing a clear cut signal toward a wet or dry monsoon either. (Fig. 4) <http://www.cpc.ncep.noaa.gov/products/NMME/prob/usPROBprate.S.html>

So you can see why the Climate Prediction Center’s precipitation outlook for the monsoon is somewhat inconclusive. We could be looking at a dry or delayed start to the monsoon in late June/early July and possibly a wetter September, but it is still a little early to have much confidence in that scenario at this point.

## Fire Season 2017 – What are we looking at?

**Carl Cerniglia—Forecaster and Incident Meteorologist**

The weather the last couple of years has been interesting with a very strong El Nino last year that should have resulted in a wet winter and didn’t, then this past winter that should have been a bit drier but turned out to be pretty close to normal most areas and wetter in a few. The last couple of summer and fall seasons have been reasonably wet as well. This has led to an interesting setup for this year’s fire season which peaks from April through June.

There are several factors that affect a fire season and when they all come into alignment it can be very active. This year there are factors working against and for an active fire season and most of those are due to longer term trends.

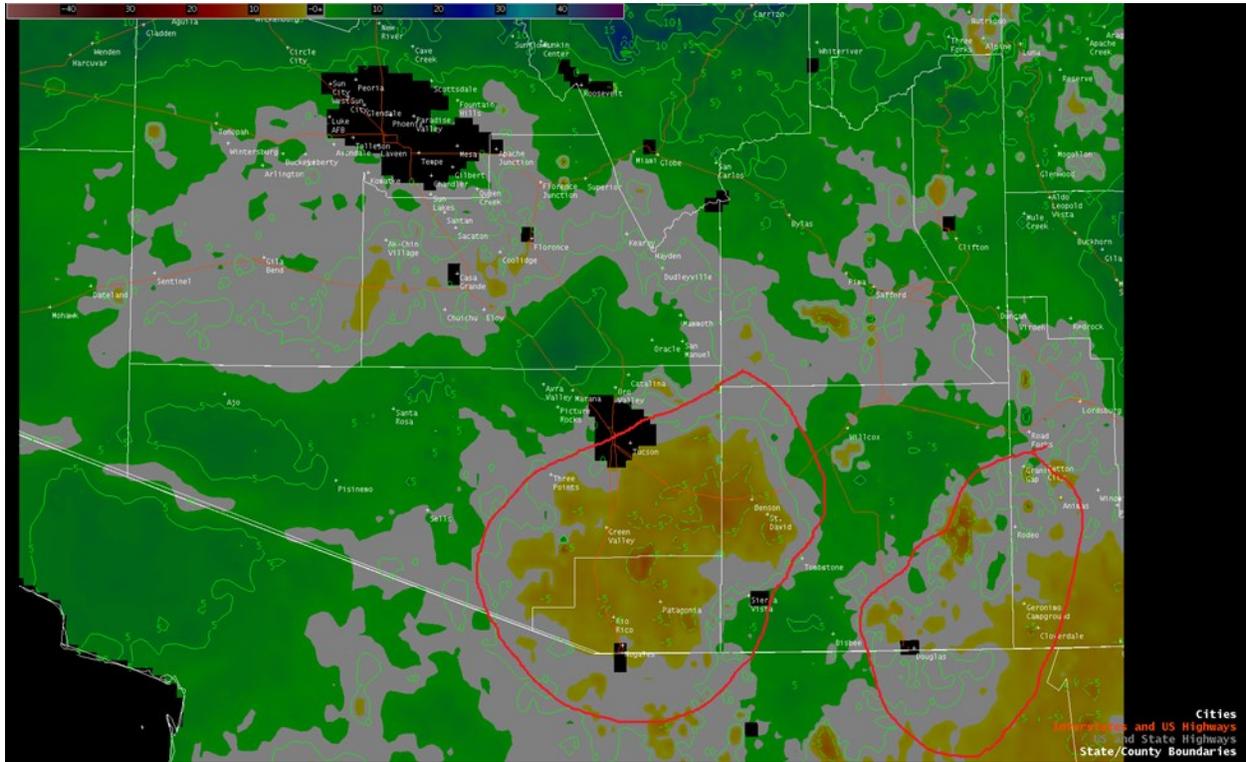
On the “for” side the main one is dead grass. Many areas, primarily south and east of Tucson have an overabundance of standing dead grass from our previous couple of good growing seasons. In some locations it is at least waist high and thick enough to be challenging to walk through. This makes an excellent fire carrier and can be very difficult to fight on dry, windy days when it spreads rapidly. Another factor for this year is the long range forecast of continued hotter than normal temperatures overall

which dries out the vegetation and dead material making it more susceptible to burning.

On the “against” side of the ledger is the decent amount of precipitation we have had over the last year plus, including some of the best mountain snows we have seen in quite some time. That snow just recently melted off across elevations above 7500 feet which helps slow fire season as we move into spring. The precipitation the last year and a half has nearly wiped out the long-term drought conditions that plagued the region and as a result, the live trees and brush are in much better shape this year then they have been in quite some time, especially across higher elevations.

Other factors that affect fire season relate to what may happen such as, the amount of rain we receive between now and monsoon season, how many wind events occur and how many fire starts we have, either natural or human caused. This season there is no strong trend that can be discerned for how much precipitation is expected before monsoon season or when the monsoon season will start. Before then we will likely see several strong wind events through early May which is typical and we always seem to have fire starts as the majority are human caused.

**“This year there are factors working against and for an active fire season and most of those are due to longer term trends.”**



So putting this all together assuming warmer than normal temperatures, normal rainfall (which isn't much) and an average number of wind events and fire starts, the primary concern will be across the grass and shrub areas below roughly 6,000 feet where there is an abundance of dead grass. Areas east and south of Tucson fall into this area and the region around Sonoita/Elgin/Nogales and the far southeast corner of Cochise County have not gotten as much rain as other areas. This can be seen in the graphic (above) which shows the change in soil moisture (the top 6 feet) from one year ago. The yellow/orange areas are drier and the green areas wetter. These drier areas are where more active fires are more likely. The areas in green will be in better shape at least for the early part of the fire season. The latter part of the season will be strongly determined by the weather conditions between now and then. The forests across the higher mountains should be spared a bad season this year thanks to the good rains last year and the decent snow we had this winter.

With that in mind, it is always wise to be careful with fire, sparks and hot equipment (like your car's exhaust system), especially when stronger than normal winds are in the forecast. It is also prudent to be sure your home is fire-wise, which you can learn about here: <http://www.firewise.org/wildfire-preparedness/be-firewise/home-and-landscape.aspx>.



## A Friendly Reminder



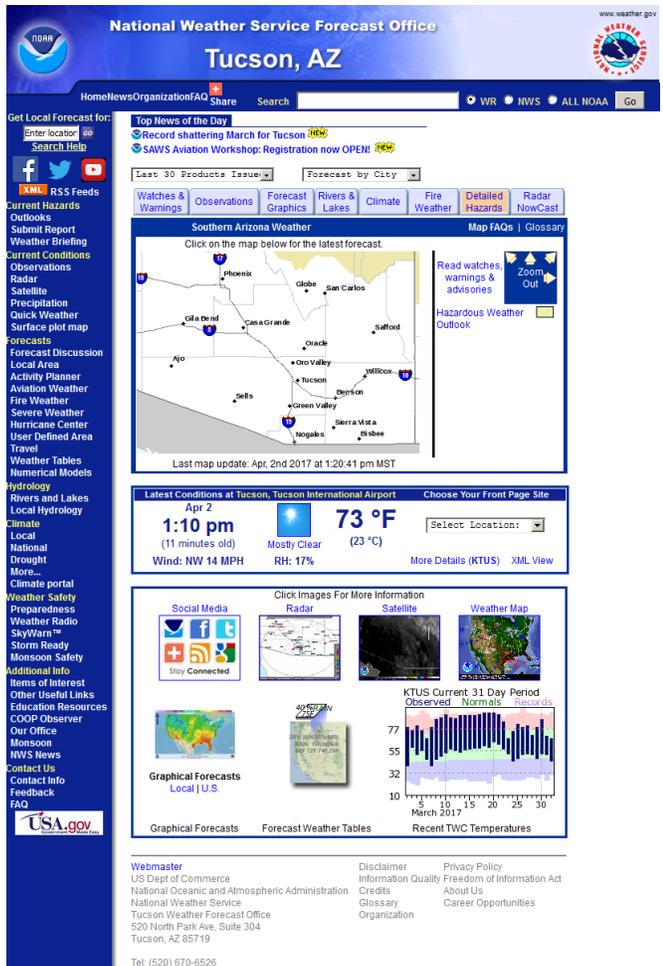
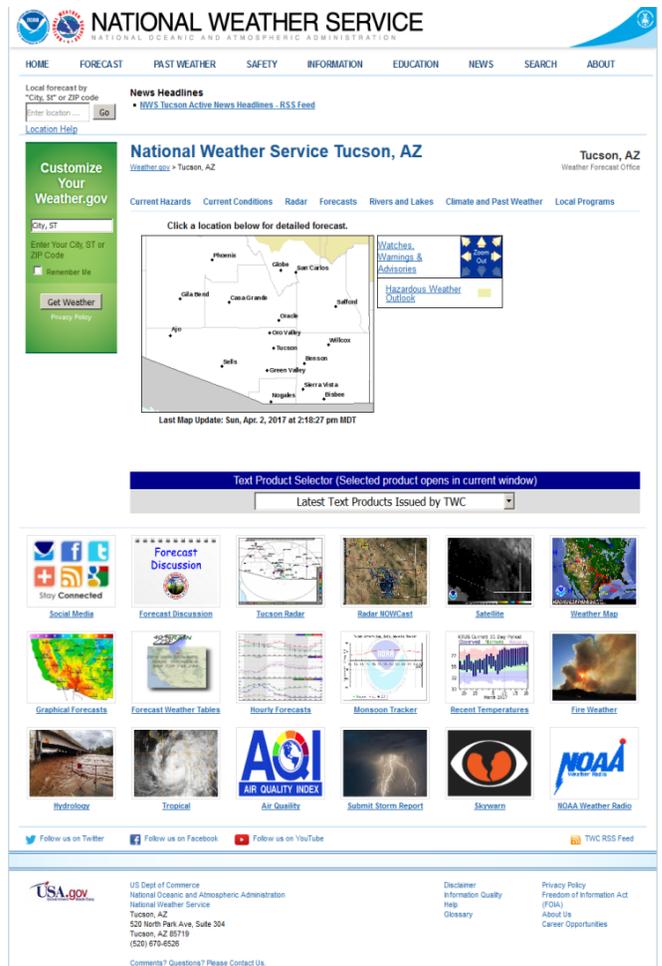
Please help us keep in contact with you! If you think we may not have your current phone number, address, and/or e-mail address, the easiest way to update your information is to send an e-mail to: **[emily.french@noaa.gov](mailto:emily.french@noaa.gov)**.

# Changes to our Website look and feel Coming this year!

**John Glueck—Senior Forecaster & Webmaster**

Around April 18<sup>th</sup>, our website will migrate to a new layout starting with our home front page. This change is in response to a required web infrastructure consolidation and it will provide office to office consistency across the National Weather Service. The URL address will also change, and will only provide service through a secure connection (https).

Some of the notable changes are the elimination of the left hand menu with most of these items being found in drop down menus or from icons located below the map. Through the remainder of this year the rest of the website will migrate over to the newer layout. If you have bookmarked any of our pages, a link will be provided to the newer URL. Please be patient with us in this transition time.

Current front page & URL address	Upcoming front page & new URL address
<p><a href="http://www.wrh.noaa.gov/twc">http://www.wrh.noaa.gov/twc</a></p>	<p><a href="https://www.weather.gov/twc">https://www.weather.gov/twc</a></p>
	

# NWS Tucson Welcomes Three New Meteorologists!

## Jordan Pegram

I was born and raised in a very small town in southern Virginia. I attended Virginia Tech in beautiful Blacksburg, VA and received my Bachelor's Degree in Meteorology in May 2016. During my undergrad, I was selected to serve as both a student volunteer and Capstone course participant at the National Weather Service office in Blacksburg. I quickly fell in love with the NWS through performing the daily duties, launching weather balloons, and attending outreach events. Also while at Virginia Tech, I was a member of the 2015 Hokie Storm Chase where I travelled across the country forecasting and studying severe weather with a crew of fellow students and professors. I am currently pursuing my Master's Degree in Applied Meteorology through Mississippi State University's Distance Education program.



I am an avid football, baseball, and NASCAR fan, and I enjoy being outside whenever possible. I have also been playing the piano for over ten years. Having grown up in a very rural area surrounded by trees, I'm already enjoying living amongst the open skies of southeast Arizona and I look forward to experiencing the upcoming monsoon season.

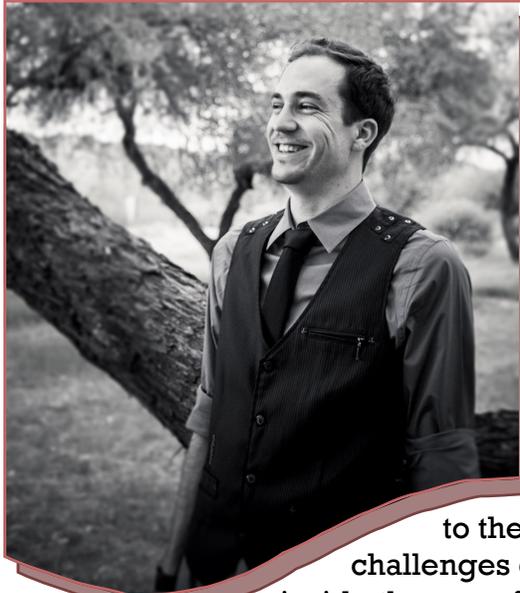
## Aaron Hardin

I grew up in Fredericksburg, TX which is located in the Texas hill country about an hour west of Austin, TX. I spent a lot of time outside hunting and camping with my dad, uncles, and grandpa and still enjoy doing those things. I went to high school in Fredericksburg which is when I developed my love for the weather. My parents bought me a weather station that we set up in our backyard that still partially runs to this day. From there I attended the University of Oklahoma from 2009-2013 and graduated with a Bachelors in Meteorology. I am a huge college football fan and the Sooners are by far my favorite team. After OU I attended graduate school at Texas Tech University and received a master's degree in atmospheric science. My thesis research focused on urban heat island intensities under different weather types and how different urban surfaces affect temperature and human comfort. After finishing school I entered the private sector where I worked for a flight planning company based in Houston forecasting for private/corporate jets all over the world. I am now eager and happy to start the next chapter in my life here in Tucson working for the National Weather Service.



## Rob Howlett

A long time ago in a land not so far away, I came into this world delighted by two seemingly unrelated avocations--University of Arizona basketball and thunderstorms. I always craved the excitement that each season brought to the city of Tucson, but I never imagined that many years later I would join the NWS team located at the very campus I revered. The only way to improve this narrative would be to add a Nerf basketball hoop to the office, which I am making my top priority (pending acting MIC approval of course!).



Due to an irresolute path through young adulthood, my arrival at the Tucson WFO was anything but direct. I came close to a career as a high school history teacher. I pursued a passion for creating, performing and recording music. When rock superstardom failed to fill my pockets with more than guitar picks, I returned to an old love and earned my B.S. in Meteorology/Climatology. My first job in the field sent me thousands of miles away to the small island of Bermuda, where I learned to navigate the challenges of forecasting. I even held an anemometer while standing inside the eye of Hurricane Gonzalo.

I am beyond thrilled to be back home providing a valuable resource to the community I care so deeply about. Nothing is more beautiful than rain in the desert and I look forward to watching our skies for many years to come.

## 60-second Spotter Review

### What you should report:

<b>Tornado:</b>	Either on the ground or a funnel cloud aloft
<b>Heavy Rain:</b>	<b>1/2" or more</b> , if it fell in less than an hour
<b>Hail:</b>	Generally <b>dime size or larger</b>
<b>High Wind:</b>	Estimated or measured <b>50 mph or greater</b>
<b>Flooding:</b>	<b>"Water where it shouldn't be"</b> , closed roads due to flooding
<b>Snow:</b>	<b>1" or more</b> (2" or more if above 5000 ft.)
<b>Visibility:</b>	<b>Less than 1 mile</b> for any reason (fog, dust, snow)
<b>Death/Injury:</b>	<b>Any</b> weather-related reason
<b>Damage:</b>	<b>Any</b> weather-related reason (most often from wind)

## The Staff at NWS Tucson

<b>Meteorologist in Charge</b>	Vacant
<b>Administrative Support Assistant</b>	Leslie Cole
<b>Warning Coordination Meteorologist</b>	Ken Drozd
<b>Science and Operations Officer</b>	Dan Leins
<b>Electronic System Analyst</b>	Chris Carney
<b>IT Specialist</b>	Evelyn Bersack
<b>Electronic Technicians</b>	Rick Leupold, Keith Sapp
<b>Service Hydrologist</b>	Erin Boyle
<b>Observations Program Leader</b>	Vacant
<b>Senior Forecasters</b>	Jeff Davis   Brian Francis   John Glueck   Jim Meyer   Vacant
<b>Forecasters</b>	Carl Cerniglia   Emily French   Glenn Lader   Chris Rasmussen   Gary Zell
<b>Meteorologist Interns</b>	Aaron Hardin   Rob Howlett   Jordan Pegram



## Don't Forget to Find us on Social Media!



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U.S. National Weather Service Tucson Arizona

### National Weather Service - Tucson, AZ

520 N. Park Avenue, Suite #304  
Tucson, Arizona 85719  
Phone: (520)670-6526  
Fax: (520) 670-5167

We're on the web!

[www.weather.gov/tucson](http://www.weather.gov/tucson)

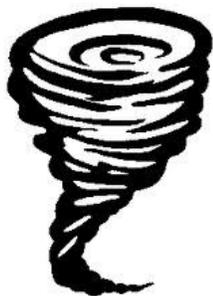
## Rainfall Reports

When reporting your rainfall amounts to the NWS, remember we only need reports that are considered significant. This generally means rainfall greater than or equal to a half inch (0.50") in less than an hour. Be sure that if your rainfall amount does exceed this threshold, to promptly report it so that it can be used in our decision making process for warnings and advisories. We no longer collect rainfall amounts on a monthly basis. Due to the advent of CoCoRaHS (Community Collaborative Rain, Hail and Snow) and RainLog, we no longer need you to send us your rainfall data. If you would like to report your rainfall amounts on a daily or monthly basis, we invite you to learn more about CoCoRaHS or RainLog by visiting their webpages.

**CoCoRaHS**—<https://cocorahs.org/>   or   **RainLog**—<https://rainlog.org/>

# 2017 Spotter Training Schedule

Date	Time	Location
Monday April 24 <sup>th</sup>	6:00 P.M.	Sierra Vista Police Dept. Auditorium 911 North Coronado Drive, Sierra Vista
Monday May 1 <sup>st</sup>	6:00 P.M.	Santa Cruz County Court Administration Building 2150 North Congress Drive, Nogales
Monday May 8 <sup>th</sup>	6:30 P.M.	Marana Municipal Complex 11555 West Civic Center Drive, Marana
Thursday May 11 <sup>th</sup>	6:00 P.M.	County Board of Supervisors Mtg Room 1415 Melody Lane, Bldg. G Bisbee
Saturday May 13 <sup>th</sup>	2:00 P.M.	U of A Campus, ENRB 235 520 N. Park Avenue, Tucson
Wednesday May 17 <sup>th</sup>	6:00 P.M.	Sif Oidak District Office BIA Route 15 North, Mile Marker 25 North Komelik
Saturday May 20 <sup>th</sup>	2:00 P.M.	Oro Valley Public Library Lower Level Meeting Room 1305 W. Naranja Drive, Oro Valley
Monday June 5 <sup>th</sup>	6:00 P.M.	Graham County General Services Building 921 Thatcher Boulevard, Safford
Thursday June 8 <sup>th</sup>	6:00 P.M.	San Xavier Recreation Center 8549 Virginia Drive, Tucson



For this spring/summer season, 9 training sessions are being offered to the public. Anyone is welcome to attend and there is no need to pre-register. We recommend attending a class at least once every 5 years.

On **Saturday June 3**, we will offer an **Advanced Skywarn** class at the same time and location as the “basic” Tucson class on May 13th. This class will cover additional meteorology topics like supercells, tornadoes, and radar in more depth. Class size will be limited to the first 50 people. **Pre-registration is required to attend this class**, and you must have attended a basic class in the last 3 years. Please contact Emily French or Ken Drozd for more information and to register for this class.