The Four Peaks Post

Spring 2012

National Weather Service — Phoenix, AZ

Inside this issue:

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Spring Edition of The Four Peaks Post Newsletter!

By Charlotte Dewey, Meteorologist Intern

It is Spring time here in the desert Southwest. Weather patterns are transitioning and attention begins to focus on the upcoming convective summer season everyone anticipates: the Monsoon.

We look forward to many more newsletters coming out with great information that will hopefully be helpful and informative.

Image credit Arizona Highways Magazine 2001

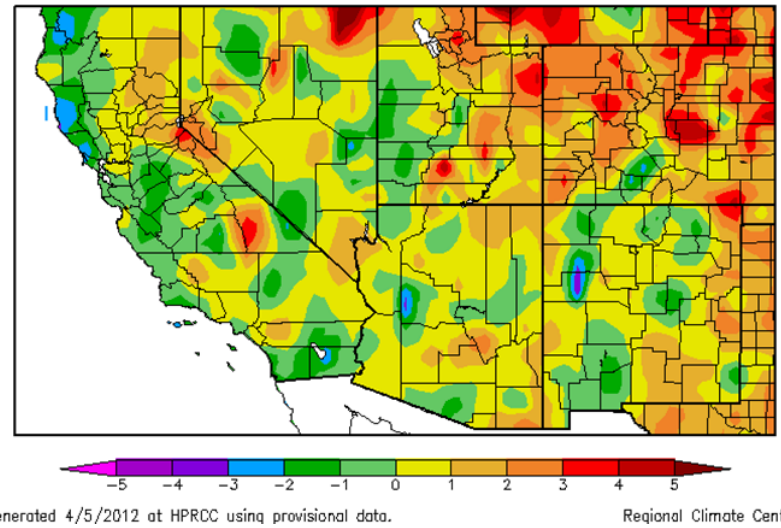
Southwest Climate Corner

By Mark O'Malley, Forecaster/Climate Science Program Manager

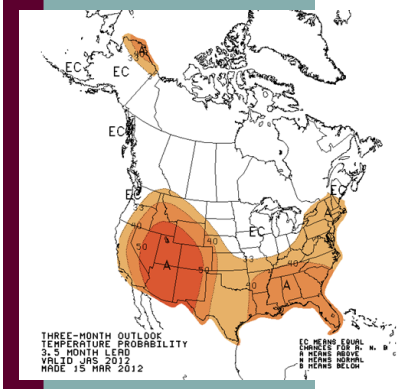
A second consecutive winter characterized by La Nina conditions (seasonally cooler than average sea surface temperatures across the central and eastern equatorial Pacific Ocean) has passed. The overall winter 2011-12 temperatures were not far from normal, but precipitation once again this year was mostly below normal.

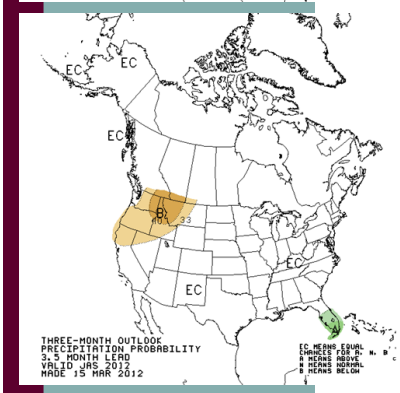
City	Nov 2011 Avg Temp	Dec 2011 Avg Temp	Jan 2012 Avg Temp	Feb 2012 Avg Temp	Mar 2012 Avg Temp	Nov-Mar Avg Temp
Phoenix	65.3 (-0.6)	53.2 (-2.2)	58.7 (+2.3)	60.3 (+0.6)	65.9 (+0.7)	60.7 (+0.5)
Yuma	63.8 (-1.9)	54.6 (-2.8)	60.5 (+1.9)	60.7 (-1.2)	65.7 (-1.5)	61.1 (-1.1)
Tucson	59.2 (-0.6)	48.9 (-3.0)	55.6 (+3.0)	55.6 (+0.3)	60.6 (+0.5)	56.0 (+0.1)
Flagstaff	36.2 (-0.5)	26.3 (-3.3)	34.3 (+4.4)	31.9 (-0.2)	37.4 (+0.4)	33.2 (+0.1)

Departure from Normal Temperature (F)
10/1/2011 – 4/4/2012



City	Nov 2011 Precip	Dec 2011 Precip	Jan 2012 Precip	Feb 2012 Precip	Mar 2012 Precip	Nov-Mar Precip
Phoenix	0.81 (+0.16)	1.10 (+0.22)	T (-0.91)	T (-0.92)	0.25 (-0.74)	2.16 (-2.19)
Yuma	0.42 (+0.20)	1.15 (+0.64)	T (-0.37)	0.03 (-0.36)	0.01 (-0.32)	1.61 (+0.09)
Tucson	0.97 (+0.40)	2.03 (+1.10)	0.14 (-0.80)	0.08 (-0.78)	0.34 (-0.39)	3.56 (-0.47)
Flagstaff	1.76 (0.00)	2.16 (+0.29)	0.42 (-1.63)	0.99 (-1.17)	1.81 (-0.31)	7.14 (-2.82)



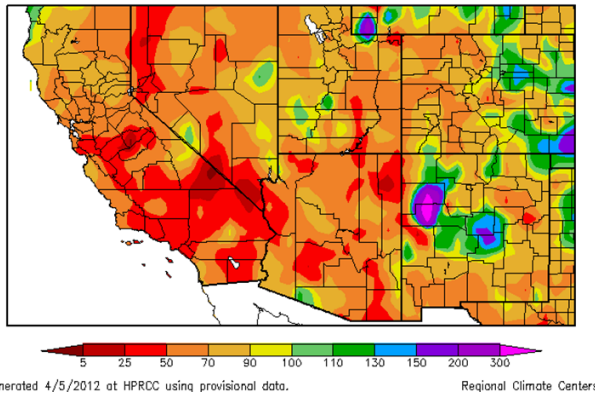


Climate Corner (Continued)

The La Nina conditions have already been waning across the Pacific basin early this spring, with the expectation that more neutral conditions (average sea surface temperatures) will persist into the summer months. Thereafter, considerable uncertainty exists, with equal chances that La Nina, El Nino, or neutral conditions will emerge in the fall and winter of 2012-13. Please note that historically, multi-year La Nina events have always been followed by another La Nina event (3rd winter season), or transition into El Nino by the autumn season.

What about the Arizona Summer Monsoon? The Climate Prediction Center outlook for the summer thunderstorm season calls for an enhanced probability of warmer than average conditions; and equal chances for above, below, or near average rainfall (images to the left). Because La Nina/El Nino conditions typically deteriorate during the summer months, there is little predictable influence on monsoon moisture from these measures alone.

Percent of Normal Precipitation (%)
10/1/2011 – 4/4/2012



Here's a look at the average and recent past monsoon rainfall totals:

6/15-9/30 City	Average Monsoon Rainfall	2011	2010	2009	2008	2007
Phoenix	2.71	1.60	2.48	0.87	5.70	0.74
Yuma	1.30	0.76	0.61	1.76	1.49	1.98
Tucson	6.08	8.62	5.45	2.86	5.52	6.57
Flagstaff	8.31	8.43	10.38	2.87	5.44	8.32

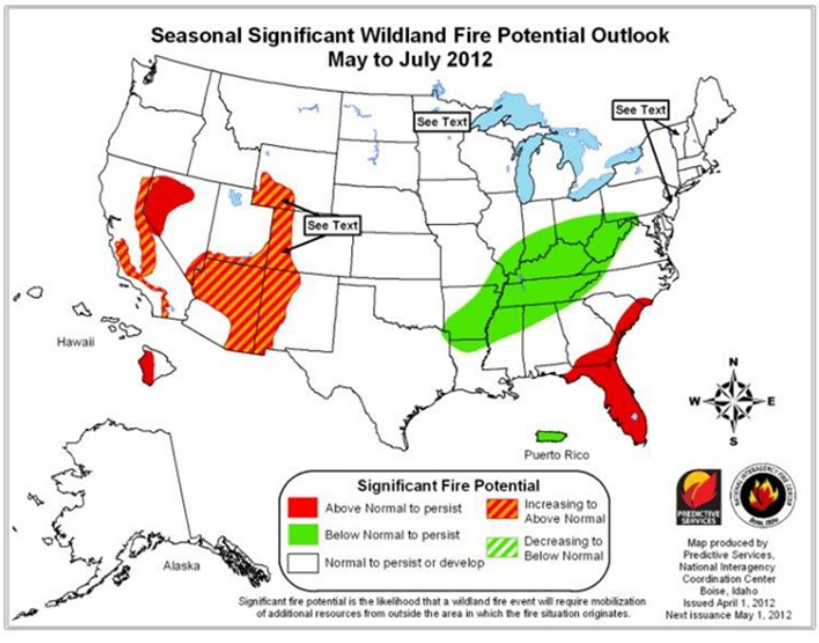
Fire Season Outlook

By Valerie Meyers, Forecaster/Fire Weather Program Manager

This year has the potential to be another above average fire season across most of Arizona, especially for Southeast Arizona. There are several key elements that are now aligned and support a critical 2012 fire season. These factors include a lack of precipitation, the overabundance of cured (dead) grasses and small shrubs from previous years, the heavy loading of dead and downed vegetation resulting from a decade of persistent drought, and finally the rapid onset of warmer temperatures across the region that will continue to stress many forest areas in the state before the onset of the summer monsoon.

The past two winter seasons have fallen under the influence of a strong La Nina, contributing to below normal precipitation totals and exacerbating the drought across the desert Southwest. Even though the longer term climate signal is beginning to shift toward an El Nino influence, the atmospheric circulation patterns that impact the West Coast are still driven by the weakening La Nina. So what can we expect weather-wise during May and June? Another windy spring and early summer?

Right now all the trends point to continued warm and dry conditions with high pressure establishing itself over the southwest United States. Under this pattern, the jet stream and entrained low pressure systems would generally remain well north of our area, thus leading to fewer windy episodes, and much warmer temperatures. With less wind, the potential for any fire to rapidly spread and grow is also less. But that doesn't mitigate the fire danger or change the fire season outlook. The season is still critical. The graphic below issued by the National Interagency Coordination Center still displays a significant fire potential for most of Arizona into July before the monsoon starts.



Demystifying Precipitation Probabilities

By Matthew Hirsch, Lead Forecaster

Throughout my career, I have been interested in how to better incorporate mathematics and statistics into the weather forecast. This has led me into researching the meaning and utility of probabilities, and in particular, the Probability of Precipitation (PoP).

One thing is certain with precipitation probabilities, PoP is one of the most valuable components of a weather forecast, but is often misunderstood. Although ideally we strive to forecast precipitation as one of either two events: rain (PoP=100%) or no rain (PoP=0%), the reality is that this is just not possible due to the inherent uncertainty of observing and modeling the atmosphere.

Common Misconceptions

- PoP is not the probability that rain accumulates somewhere (at least one spot) within a particular forecast zone/county or geographic area, like the "Valley". If that were true, then the bigger the area, the better chance it would rain somewhere within that area. With a large enough area, the PoP would approach 100%.
- PoP is not the percentage of time over a forecast period that will be raining. For example, if the PoP is 100%, it doesn't mean that it will rain non-stop during the forecast period.

The actual definition of PoP is short and simple:

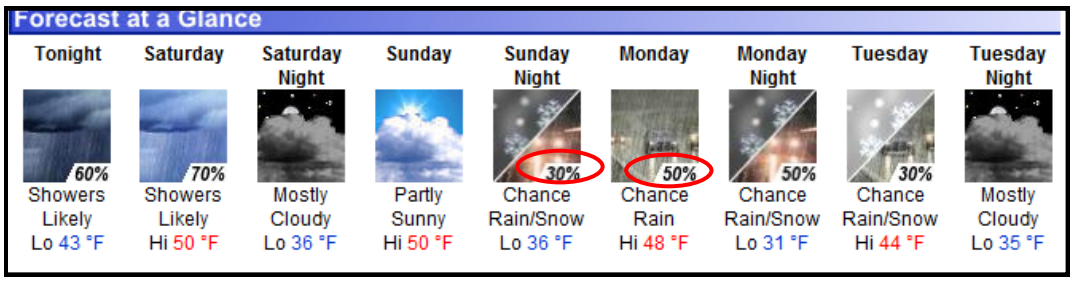
- PoP is the likelihood of measurable rainfall (at least .01") at a particular location ("point") over a specified time-period (usually 12-hr periods such as Today, Tonight, Tomorrow, Tomorrow Night, etc.).

The important thing to keep in mind is that PoP is a point probability, not an areal probability. This point could be the rain gauge in your backyard or an official observation site, like Sky Harbor Airport in Phoenix, AZ. Let's take the definition one step further. PoPs that appear in a Zone Forecast or a Point-n-Click Forecast (for a 1.6 mile X 1.6 mile grid box), represent the average (or other measure of representativeness) of the point probabilities over that area, not the areal coverage of rainfall. For example, if the PoP of the Phoenix zone in the Zone Forecast is 40%, it means that 40% is the average point probability over that area. Similarly, if the Point-n-Click forecast has a 40% PoP, the 40% is the most representative point probability over that small (1.6 mi. X 1.6 mi.) area.

(continued)

Precipitation Probabilities (Continued)

But now, what does "likelihood" mean? Let's take the familiar example of flipping a coin. We know that the probability, or likelihood, of getting heads is ½ or 50%. If we flipped a coin once and got tails, would the forecast of 50% probability of heads be a bad forecast? No, it wouldn't. If we could repeat this experiment 1000 times, the relative frequency of heads would be very close to 50%. Precipitation forecasting works the same way. If a 30% PoP forecast is used 10 times for a given point over the course of a month during the monsoon season and the forecasts are "reliable", we would expect rain at a relative frequency of 30%, or 3 of the 10 times. However, if it rained in none of those 10 periods, the forecaster would have what is known as a "bias". In this case, the forecasts had a wet bias. The only time you can truly say one forecast is a bust or not is when PoPs of 0% and 100% are used. Otherwise, the accuracy of the forecast needs to be evaluated over longer time periods (like a season) and include many events.



Here in a point-and-click forecast, the PoPs are displayed, circled in red.

Spotter Training in Full Swing!

By Austin Jamison, Forecaster/Spotter Program

Training classes for Skywarn Storm Spotters are well underway with the majority of sessions taking place in April and May. Once again this year, we will have offerings in each county of our forecast area totaling at least 25 classes. Spotters are volunteers that provide highly valuable information that is not available from any other source. Though we have sophisticated technologies such as Doppler radar, satellites, and computer models, they have limitations. Using those tools we can infer that hazardous weather is occurring but we don't know for sure what is happening on the ground. For instance, we can infer that a thunderstorm is producing wind damage but without a Spotter report we don't know what the extent of the damage is or even if the winds were strong enough to cause damage at all. Thus, the Spotters provide us with ground truth information. We use this information as part of the warning decision process. By issuing warnings, we alert the public to dangerous situations so they can take measures to protect life and property.

Prior meteorological training is not necessary in order to become a Spotter. The free two hour class will teach attendees everything they need to know in order to be successful. Spotters are typically adults but can be as young as high school age. People who enjoy paying attention to the weather or who are outdoors a lot are encouraged to become volunteer Skywarn Storm Spotters. Our website, weather.gov/phoenix, has a schedule of classes that list dates, times, locations, and pre-registration (if necessary). You can find it by accessing the "Skywarn" link on the left hand side toward the bottom or by going directly to the URL below. The majority of classes are Standard classes and are suitable both for new Spotters and as refresher training for current Spotters. Those who are already Spotters need to attend a class once every two years to stay current. If so, they are eligible to attend one of the Advanced classes which explores the underlying meteorological science of severe storms.

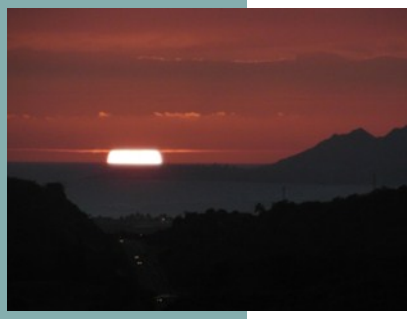
http://www.wrh.noaa.gov/psr/general/skywarn/index.php

For any questions about the program, send an email to austin.jamison@noaa.gov or ken.waters@noaa.gov or call 602-274-0073 (option 5).

Creating Time Lapse Movies (Part 1)

By Ken Waters, Warning Coordination Meteorologist

CAVEAT: The choices for camera, websites, and software are not an endorsement for any particular product or service but simply serve as an example of one method that has proven successful. Comments are welcome at: ken.waters@noaa.gov



Have you ever watched time lapse movies and wondered how they are done? As it turns out this can be a complicated process, often requiring expensive equipment. However, there are fairly inexpensive methods that will enable you to product good-quality time lapses.

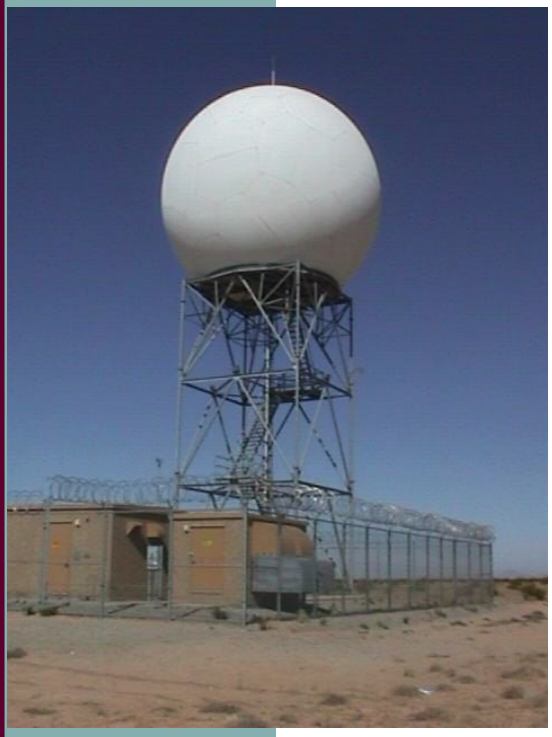
There are two very different mechanisms for creating time lapse movies. The first of these is to simply shoot a video and use some mechanism to either speed it up or sample the frames to simulate speeding it up. The second method is to take many single shots from a camera at a fixed location and then composite those images into a movie. Starting from a video has problems due to shooting time limitations (time lapse often takes place over two or more hours) as well as quality issues with speeding up a video. The second method is often the method of choice for most quality time lapse imagery.

First choice is the camera to use. While there are many options on the market, a little time researching will be worth it. Many photography and time lapse experts recommended using digital single lens reflex (DSLR) cameras. These range from $500 up to several thousand dollars in cost and often require more than the basic starter models due to lens and feature requirements. In addition, there are concerns about wearing out the mechanical mechanism of the mirror in DSLRs. Lastly, using a DSLR normally requires purchase of an add-on device known as an intervalometer. This device has to be connected to the camera and provides the shutter control, snapping an image at regular intervals. This adds from $50 to $200 to the equipment cost. A number of the experts also suggest purchasing movie editing software that could add several more hundreds of dollars to the bill. More discussion on this later in the article.

***This will be a two part article with the second half in our next issue. Stay tuned for the rest of the story!*

Dual Pol Radar comes to Yuma

By Charlotte Dewey, Meteorologist Intern



Yuma WSR-88D radar, KYUX, in Yuma, AZ

In May of 2011, the WSR-88D radar in Phoenix received Dual-Polarization upgrade. This has been a very valuable upgrade allowing better data interrogation during severe storms across the Greater Phoenix Metro and surrounding areas this past summer and winter. The KIWA radar was one of the first in the country to receive this upgrade. During the 2011 Monsoon, there were lower than normal levels of thunderstorm activity but one storm of note was the July 5th Dust Storm.

The National Weather Service in Phoenix is pleased to announce that the Yuma WSR-88D Dual-Polarization upgrade will begin on April 30, 2012. The upgrade will take place between **April 30th and approximately May 11th**, during which time the radar data will be unavailable. Neighboring sites, including radars from San Diego, Las Vegas, Tucson and Phoenix will provide continued coverage during the time of the upgrade. This important technology will greatly expand the amount of data types and radar products available to users.

Dual-Polarization radar transmits radio waves in both horizontal and vertical directions, being able to analyze targets more thoroughly. This will help improve estimation of precipitation amounts, types and rates, as well as differentiating between non-meteorological targets such as birds.

The basic radar products that have been historically available to users are reflectivity (Z), mean radial velocity (V), and spectrum width (SW). While these products will continue to be available after the upgrade, three new products will be added to the inventory: differential reflectivity (ZDR), correlation coefficient (CC), and specific differential phase (KDP).

Here is a link to the Warning and Decision Training Branch (WDTB) hosting training for Dual-Pol radar on how to interpret the data http://www.wdtb.noaa.gov/courses/dualpol/ .

Staff Corner

New faces at the Phoenix WFO

By Charlotte Dewey, Meteorologist Intern

This Spring we've added two new forecasters to the office here in Phoenix, as we have had to say farewell to two forecasters; one retiring and one moving on to another office. Please join me in welcoming our two new forecasters: Mark O'Malley and Marvin Percha.

Mark is our new Lead forecaster coming from Pleasant Hill (Kansas City), Missouri where he was a Journey/General forecaster. He has also worked in the Portland, Oregon office as well as a few years in the private sector prior to joining the National Weather Service. Mark attended Michigan State where he received his Bachelors degree and Oklahoma for his Masters degree. Some of Mark's interests and background include convective weather, drought, climate and DSS (Decision Support Services) which include preparing web images and multimedia briefings.

Marvin is our new Journey forecaster coming from the Center Weather Service Unit (CWSU) in Fremont, California. Prior to his work there he had worked in the Fairbanks, Alaska Weather Forecast Office. Along with Fairbanks, Marvin also has some experience working at the Monterey, CA WFO (Weather Forecast Office). He attended Penn State University where he received his Bachelors degree and aviation meteorology is one of his interests.

A CWSU, Center Weather Service Unit, is responsible for providing meteorological support for FAA (Federal Aviation Administration) air traffic management for airports in the designated area. Across the country there are 21 Air Route Traffic Control Centers (ARTCC).