

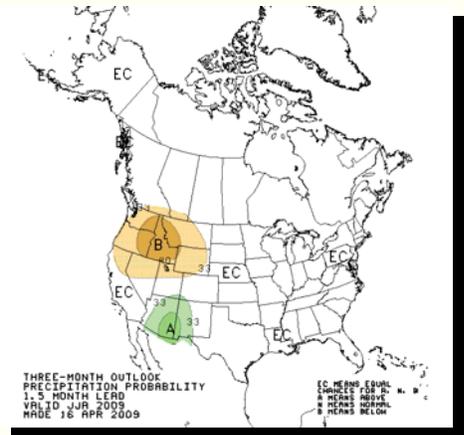
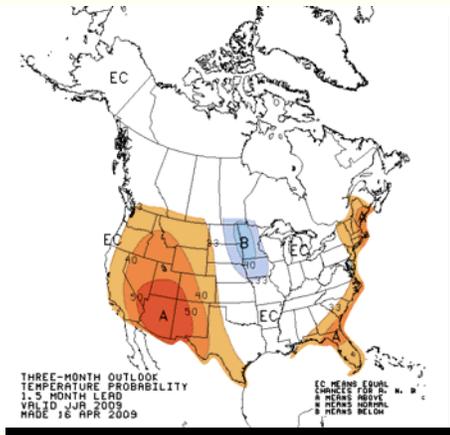


Coyote Crier

NATIONAL WEATHER SERVICE, TUCSON

2009 Monsoon Outlook June July August

Erik Pytlak - Science and Operations Officer, John Glueck and Greg Mollere - Senior Forecasters



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The Climate Prediction Center has issued its outlook for the upcoming monsoon. Research within the past decade or so has investigated the possible causes behind the variability of the North American Monsoon. Specific factors that were examined include: Sea surface temperature anomalies, large-scale circulation patterns, land surface conditions, tropical convergence zones and moisture transport mechanisms.

CPC's precipitation outlook for June, July and August 2009 calls for enhanced probabilities of above normal precipitation for portions of Arizona and New Mexico. There are several reasons for this. An intensifying drought over the central and southern Plains, below normal mountain snowpack in the central Rockies this past winter, a developing dipole of below normal sea surface temperatures (SST's) in the Caribbean and above normal SST's off the southern coast of Mexico and two separate ensemble climate/long range model suites forecasting a rapid development of the monsoon high this May, followed by a rapid northward advance. If this northward advance of the high occurs as expected, it would result in a shift in our winds from predominately westerly to easterly or southeasterly. This shift in the winds transports moisture from the Gulf of Mexico, Mexico and the Gulf of California or even from the Plains.

CPC's temperature forecast for the 2009 monsoon also calls for enhanced probabilities of above normal temperatures.

Many factors influence the variability from one monsoon to the next. All of these factors are inter-related to each other, and likewise none of them totally account for monsoon variability. The scientific understanding of this variability has increased substantially over the past 15 years and remains an active research area.

The Climate Prediction Center will revise its June, July and August forecast again on the third Thursday in May (May 21st). You can see the updated forecast by going to:

Fire Season Looms Once More

Steven M. Reedy

Fire Weather Focal Point and Incident Meteorologist

...with assistance from Smokey T. Bear

Wildfire Prevention Spokesbear



IMET Steve Reedy dispatched to a fire

*There are ways
that you too
can provide
support to fire
fighters and
incident
command teams
as we enter into
this fire season*

As we enter into spring in Southeastern Arizona, while much of the country is singing "April showers bring May flowers", we in drier climates are singing a different tune. At this point of the year, we're in between our usual wet seasons, winter and the monsoon, and when we live up to our reputation of being a desert. Tucson only averages 1.33" of rainfall during this period while winter brings nearly 3 inches and the monsoon averages a little over 6 inches. With less rainfall, vegetation that has grown will dry out and thus, the threat of wildfires materializes. And while there are fire fighters and incident command teams ready to go this time of year to provide defense from these destructive fires, the forecasters of the National Weather Service and you as spotters can also provide support to make

sure that everyone in Southeast Arizona can remain safe this spring.

The National Weather Service Forecast Office in Tucson provides many services to aid in supporting firefighting efforts, from routine to highly specialized, depending on the scenario. First is the Presuppression Forecast, or the Fire Weather Forecast (FWF). This product is issued twice daily consisting of a short discussion about the weather over Southeast Arizona and how it may impact fire development and a detailed forecast highlighting temperatures, relative humidity, winds and ventilation data. This forecast is divided into three zones, as dictated by how Southeast Arizona is divided by the US Forest Service. Think of this as the Forest Service's version of counties. Should more detail be needed, fire crews in the field can request a Spot Forecast. These are usually requested for Prescribed Burns or Wildfires and thus cover a much more limited area when compared to the regular FWF. These forecasts allow for much greater detail by narrowing the ranges in the forecast. For example, in the usual FWF, forecasted temperature

ranges are usually spread out over 20 degrees, a 10 degree spread for elevations above 5000 feet and a 10 degree spread for elevations below 5000 feet. The spot forecast is for a specific location, so with the elevation fixed, a single temperature spread of 5 degrees can provide much better support. But sometimes, even this spot forecast is not enough. Sometimes incident command teams feel that containment efforts would best be served if a meteorologist were on site providing weather support in real time. It is then that an Incident Meteorologist (IMET) is dispatched to the scene. Through specialized equipment, called an All-hazards Mobile Response System (AMRS), the IMET has access to much of, though not all, the weather data he or she would use in the forecast office to provide all the weather support the incident could need including, but not limited to, briefings, forecasts and decision support (which can be anything from answering all sorts of weather questions to giving the final 'yes' or 'no' as to whether or not a helicopter takes flight!).

(continued on next page)

Fire Season Looms Once More

There are ways that you too can provide support to fire fighters and incident command teams as we enter into this fire season, by taking to heart the words of Smokey the Bear; "Only you can prevent wildfires." Keep these tips in mind when out and about:

- If smoking outdoors, safe practice requires a 3-foot clearing around the smoker.
- Don't park your vehicle on dry grass.
- If using an off-road vehicle, your internal combustion equipment requires a spark arrester.
- Know your county's outdoor burning regulations. Unlawful trash burning is a punishable offense.
- At the first sign of a wildfire, leave the area immediately by established trails or roads. Contact a Ranger (if at a park) or the Sheriff's Department as soon as possible. If escape route is blocked, go to the nearest lake or stream.
- If camping, leave your campsite as natural as possible, traveling on trails and other durable surfaces.
- Never take burning sticks out of a fire.
- Never take any type of fireworks on public lands.
- Keep stoves, lanterns and heaters away from combustibles.
- Store flammable liquid containers in a safe place.
- Never use stoves, lanterns and heaters inside a tent.
- You should always use existing campsites and established fire rings when camping or building a fire.
- But there are also things you can do around your home to minimize the impact a potential wildfire might have. This will help to keep you, your family and your property safe should fire be close by.
- Clear away any tree branches that might be hanging over your house.
- Clear away any leaves and ground clutter.
- Mow down any tall grass and prune any overgrown shrubbery.
- Remove any low hanging branches (any branches within 6 feet of the ground).
-

It's important to follow the above for a radius of 30 to 100 feet around your home. This distance will vary depending on your location and how prone the area is to wildfire. An important fact to remember is that radiant heat energy from fire can travel as far as 100 feet from the flame producing it! By keeping the above tips in mind, you too can play a vital role in fire prevention this season.

There are many factors that we can't control when it comes to wildfires, like those started by lightning, but many of them we can prevent. Those that we can't prevent, we can certainly prepare for. Through all our efforts, fire fighters, incident command teams, meteorologists and you, we can help to minimize the impacts wildfires can have on all our lives!

National Weather Service Tucson Office Staff

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Hydrometeorological Technician.....Hans Hanson

Rainfall Reporting Refresher

Greg Mollere

Senior Forecaster and Spotter Program Focal Point

If you have attended a weather spotter training session in the past year or so you should know that there are certain criteria for reporting rainfall, as well as certain types of rainfall spotters.

There are two types of rainfall spotters that serve as volunteers for the National Weather Service. One type of rainfall spotter is a person that wants to report only significant rainfall amounts. This type of spotter is one that we usually only hear from during the monsoon. This is because the National Weather Service in Tucson only wants to know about what we consider significant rainfall events from these type of spotters. By local definition a significant rainfall event is one in which a half inch of rain or greater (> 0.50 inches) has fallen in an hour or less.

The other type of rainfall spotter is one that belongs to what we refer to as the "RainNet". This type of spotter calls in significant rainfall amounts as described above, but also records

rainfall totals on a monthly basis, no matter how great or small. Sometimes these spotters may only receive a few hundredths of an inch of rain on any given day. These spotters make a record of the amount, and at the end of the month they either email or phone in their monthly total.

Some confusion seems to linger regarding what to report and when. So...just as a refresher, if you *do not* log rainfall at your location on a *monthly* basis, then we only want to know about significant events. On the other hand if you *do* report rainfall to us on a *monthly* basis we want to know about both the significant events and the monthly totals. However, we do not need to know about the tenth of an inch that fell 4 days ago when a storm came through. By the same token if you do get a significant amount of rainfall we would like to know about that as quickly as possible.



By local definition a significant rainfall event is one in which a half inch of rain or greater (> 0.50 inches) has fallen in an hour or less.

Please keep your personal information up-to-date. Do we have your correct mailing address, location, phone number and e-mail address? If not, please update us so that our database is as current as possible. The best way to update your information is by e-mail, or to call and speak with Greg Mollere. Thanks!

Greg.Mollere@noaa.gov



New Hail Reporting Criteria

Greg Mollere, Senior Forecaster and Spotter Program Focal Point



The National Weather Service Central Region has conducted a demonstration in the state of Kansas and adjoining County Warning Areas over the past four years, utilizing a hail size criterion for issuance of Severe Thunderstorm Warnings of 1" in diameter, rather than the historical ¾" threshold. This experiment was based on feedback from local partners, as well as scientific research conducted by Texas Tech University which demonstrated that significant property damage does not occur until hailstone sizes reach 1" in diameter. Central and Western Regions, in conjunction with NWS Office of Climate, Weather and Water Services (OCWWS), are now taking steps to expand the demonstration area to encompass all Central and Western Region weather offices.

Central Region has conducted the 1-

inch hail criteria demonstration in all Kansas offices since 2005. The experiment was based on feedback from local emergency managers, media, the public and other partners, as well as scientific research conducted by Texas Tech University. The basis of the request was two-fold:

Hailstones of at least 1 inch diameter are required to cause significant property damage; Core partners shared concerns about the public becoming desensitized by numerous warnings being issued for marginal hail sizes.

Customer responses have indicated high satisfaction with adoption of the 1 inch hail criterion.

Media partners said warnings are more meaningful because the public knows there is a genuine risk of damage when a Severe Thunderstorm Warning is issued.

Emergency managers agree warnings carry more weight and credibility.

Research supports the 1-inch criterion.

A Texas Tech research study, "Hail

damage threshold sizes for common roofing materials" (Marshall, T.P., Richard F. Herzog, and Steven K. Smith, 2002.; 21st Conference on Severe Local Storms, San Antonio, TX) cited laboratory tests of numerous types of shingles. These tests showed hail damage to shingles and other roofing materials begins at 1inch hail diameter.

Central Region has completed the required steps to implement the change to one inch hail criterion regionwide, and began the change April 1, 2009. Western Region will implement a similar demo for all 8 WR states, on June 1 to catch the main severe weather season for both the northern tier of WR and the southwest monsoon season. This implementation will also eliminate potential county warning area/state border issues between CR and WR offices.

If feedback in this large area over the next year remains positive, it is expected that the change to one inch hail criterion for severe thunderstorm warnings will be expanded nationwide.

So...what does this mean to you as a spotter??

It means for the upcoming monsoon, severe criteria for hail will be 1 inch in diameter, or about the size of a **quarter**. It also means that we **NO LONGER** need you to report hail that is **less than the size of a dime**, or less than a half inch in diameter.



New Wind Reporting Criteria

Greg Mollere, Senior Forecaster and Spotter Program Focal Point

Although the wind criteria for a severe thunderstorm warning has NOT changed (50 knots/58 mph), the minimum wind speed to report has changed. During the upcoming monsoon, the National Weather Service in Tucson would prefer if you report wind gusts of 45 mph or greater. In the past we requested a minimum gust speed of 40 mph. However...this results in too many phone calls to the office

at a time when the forecasters are extremely busy. In addition...40 mph wind gusts rarely result in any significant structural damage.

We would also prefer that if you do not have a wind sensor (anemometer), that you use the Beaufort scale to estimate wind speed. The Beaufort scale uses the motion of physical objects in the real world to estimate wind speeds. Trying to "guess"

how fast the winds are blowing with just a cursory look often yields estimates that can be 10 to 20 mph faster than what is actually occurring.

During the upcoming monsoon, the National Weather Service in Tucson would prefer if you report wind gusts of 45 mph or greater.



MPH	KNOTS		
45-57	39-49	Near Severe	Small limbs break, and a few larger dead or weak branches may break. Old/weak structures (e.g., sheds, barns) may sustain minor damage (roofs, doors). Building partially under construction may be damaged. A few loose shingles removed from houses. Carports may be uplifted; minor cosmetic damage to mobile homes.

Cold Air Funnels Visit the Tucson Area

Greg Mollere, Senior Forecaster and Spotter Program Focal Point



A picture that Kandie Vactor took of a cold air funnel near the Sabino Canyon area on Saturday April 11, 2009. The cold air funnel can be seen in the lower center of the photograph.

On Saturday April 11, 2009 a cold upper low moved through the state. During the early afternoon hours and continuing into the evening, scattered to numerous showers and isolated thunderstorms developed over the Tucson forecast area...mainly from Pinal county and south across the Tucson area towards Green Valley and Nogales. Nearly every shower that developed that day produced pea size hail. Numerous reports of small hail were received from our weather spotters that day. Around 1 pm a call came in from one of our trained weather spotters, Joel Ewing, indicating that he was witnessing a funnel cloud to the northeast of the intersection of Oracle Rd. and River Rd. The picture to the left was taken by another Tucsonan, Kandie Vactor, near the Sabino Canyon area.

A cold-air funnel is a funnel cloud or (rarely) a small, relatively weak tornado that can develop from a small shower or thunderstorm when the air aloft is unusually cold (hence the name). If a cold air funnel were to touch the ground, which is rare, they are much less violent than tornadoes that form in the Plains, since the process in which they form is much different.

Monsoon Safety

Although the monsoon brings welcome rains and relief from the summer heat, the thunderstorms that come with the monsoon bring their own hazards. This is the most dangerous time of year weather-wise in Arizona, so before and during the season, it is a very good idea to review these safety tips:

Lightning:

- If you hear thunder, you are close enough to a storm to be struck by lightning. Go to a safe place immediately! The safest locations are sturdy buildings and hard-topped vehicles.
- Get away from open areas, including armadas, porches, trees, convertible cars, swimming pools, and open areas.
- Plan outdoor activities to avoid being outside between mid afternoon and mid evening, especially in higher elevations where lightning is more common.
- Do not touch any wires or plumbing inside a building
- Remember that it does not have to be raining for you to be struck by lightning. Lightning can strike up to 60 miles away from the nearest rainfall!
- Bring pets indoors. Lightning and thunder are very scary for pets, and they are likely to panic or even run away to try and escape the storm.
- If someone is struck by lightning, call 911 immediately!

Flash Floods:

- Flash floods are common in Arizona. There are thousands of low water crossing and dips which flood every summer. Know where they are, and avoid them during heavy rains.
- Never ever drive into a flooded roadway. The water depth is very easy to misjudge, and the road itself may be damaged or destroyed underneath. It only takes about 1 to 2 feet of water to float most vehicles, including SUVs.
- Never drive around barricades. They are there for a reason – usually because flash flooding is about to

take place, is already happening or the road is damaged by flooding and is unsafe.

- Never allow children to play near washes or storm drains after any rainfall, no matter how light. These flood easily and rapidly, and storm drains are usually so large that children can be swept away.
- Beware of distant thunderstorms, especially if they're over mountains. Flash flooding can occur many miles away from the thunderstorm as the runoff flows into the valleys and deserts.
- Do not camp overnight near streams during the monsoon. Although many of our thunderstorms occur during the afternoon and evening, some of our worst flash floods have occurred in the middle of the night.
- Hikers and mountain bikers should try to get out early in the day to avoid the dangers of not only flash flooding, but also lightning. Wherever you are hiking during the monsoon, be aware of your escape routes, follow ranger instructions, and be prepared to move to higher ground quickly.

Dust storms:

- These are an underrated killer in Arizona! Straight line winds in any thunderstorm can lift huge clouds of dust and reduce visibilities to near zero in seconds, which can quickly result in deadly, multi-vehicle accidents on roadways.
- Dust storms are more common in the early part of the monsoon, near agricultural areas, and near the Willcox Playa in Cochise County. Use caution in these areas any time thunderstorms are nearby.
- If you encounter a dust storm, pull off the road immediately. Turn off your headlights and put your vehicle in "PARK," and take your foot off the brake. Other motorists may tend to follow taillights in an attempt to get through the dust storm, and may strike your vehicle from behind.
- Dust storms usually last a few minutes, and up to an hour at most. Stay where you are until the dust storm passes.

Straight-line winds:

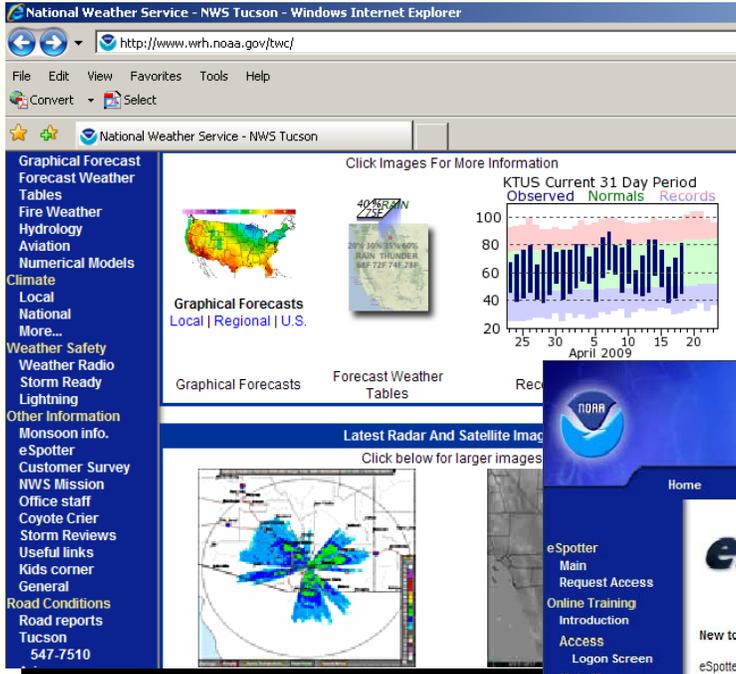
- Thunderstorm wind gusts in Arizona almost always exceed 40 mph. The strongest straight line wind gusts can exceed 100 mph, and can produce damage similar to a tornado! Anytime a thunderstorm approaches, no matter how weak it seems, move indoors to avoid flying debris. Winds rushing down from a thunderstorm can develop very quickly.
- When a Severe Thunderstorm Warning is in effect, it means damaging wind gusts of 60 mph or higher are likely. Move into a central interior room. Stay away from windows.
- Unanchored mobile homes are NOT safe in any severe thunderstorm, and even anchored mobile homes can be heavily damaged in winds over 80 mph. Move to a more sturdy structure.
- Stay away from trees. The vast majority of people are killed or injured in severe thunderstorms by falling trees, from flying debris, or from downed power lines.
- Never touch a downed power line, even if it appears dead. Assume that it is live. Call for help instead.
- Straight line winds can travel dozens of miles away from the thunderstorm that produced them. If the wind suddenly shifts and blows toward you from an approaching storm, while the temperature either becomes much colder or much hotter, the winds are likely to become even stronger. Move indoors!
- Before the monsoon, it is a good idea to either secure loose outdoor furniture and garbage cans, or move them indoors. These are frequently blown around in our summer thunderstorms – even the weakest ones.

Become an eSpotter

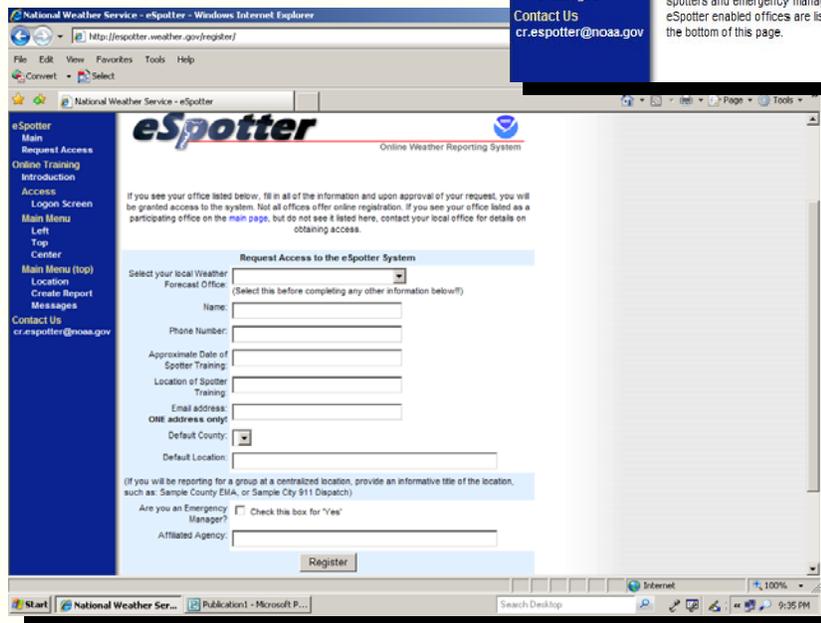
Greg Mollere, Senior Forecaster and Spotter Program Focal Point

One of the challenges for the forecaster at the National Weather Service during severe weather is time management. During severe weather events spotter reports are critical to the success of our mission. However, when the weather becomes severe the phone calls increase considerably. This can sometimes take the focus off of the radar and storm interrogation. A new method of getting your severe weather reports to the National Weather Service in Tucson is on its way. It is called "eSpotter".

You have to register via our web page to become an eSpotter. Once you register and you are "approved", anytime you submit a severe weather report to us through eSpotter the report comes to us directly. The report is received through AWIPS (Advanced Weather Interactive Processing System). We will be able to see in an instant who the report came from, where the severe weather occurred, what type of severe weather occurred, or is occurring, and when it happened. The main benefit is that it will reduce the number of phone calls during severe weather.



Our web page is:
www.weather.gov/tucson



If you have a computer at home and you are interested in becoming an eSpotter give Ken Drozd our Warning and Coordination Meteorologist a call, or send an email. He will be glad to let you know what steps you need to take to utilize this new service.

Ken Drozd (WCM)
(520) 670-6526, ext. 223
kenneth.drozd@noaa.gov

March 2009 Climate Report for Tucson

John Glueck, Senior Forecaster and Climate Focal Point

March 2009 headlines

7th warmest on record
 24th driest on record
 2nd warmest January-March period on record

Decade of 2000s headlines

Warmest March decade on record
 2nd driest March decade on record

The very warm temperatures that occurred during the last week of February continued through the first week of March. In fact, the first six days of the month goes into the record books as the warmest on record with an average temperature of 70.1 degrees. The combined last eight days of February and the first six days of March goes into the record books at the warmest on record for this period with an average temperature of 67.7 degrees.

Average temperatures March 1-6

Warmest during this period

	1st-6th	Normal	Dep
High	83.3°	70.8°	+12.5°
Low	56.8°	43.3°	+13.5°
Avg	70.1°	57.1°	+13.0°

Average temperatures 2/21 - 3/6

Warmest during this period

	2/21-3/6	Normal	Dep
High	83.3°	70.2°	+13.1°
Low	52.1°	42.9°	+9.2°
Avg	67.7°	56.6°	+11.1°

Near normal temperatures returned to the area during the second week of March. The upper air flow pattern was out of the south southwest from the 7th to the 9th. This brought a significant amount of mid to high level clouds across the area but the low levels of the atmosphere were fairly dry. On the evening of the 8th, a weather disturbance moved over the area and developed showers across the area. These showers continued overnight into the morning of the 9th with rainfall amounts ranging from 0.10" to 0.33". This system also brought 1-3" of snow above 7500 feet.

Temperatures warmed up to above normal values on the 11th and 12th before another weak weather system moved through the area on the 14th with very light precipitation. A significant warmup occurred by the 16th with daily highs being in the 80s from the 16th through the 22nd.

The last week and a half of March was active with several dry cold fronts moving through the area producing gusty winds and below normal temperatures.

March 2009 goes into the record books as the **7th warmest** on record with an average monthly temperature of 63.2 degrees, which is four degrees above normal. Temperature extremes for the month ranged from a record high of 91 degrees on the 2nd to a low of 38 degrees on the 28th.

Area rainfall totals for the month ranged from a tenth of an inch to a third of an inch. Officially, the International airport recorded just under two-tenths of an inch /0.18", which is almost two thirds of an inch below normal and ranks as the **24th driest** March on record.

March 2009 stats	Month	Normal	Departure	2009 stats thru March	Year	Normal	Departure
Average high temperature	77.9°	73.3°	+ 4.6°	Average high temperature	73.2°	68.7°	+ 4.5°
Average low temperature	48.5°	45.1°	+ 3.4°	Average low temperature	44.3°	41.8°	+ 2.5°
Average temperature	63.2°	59.2°	+ 4.0°	Average temperature	58.7°	55.2°	+ 3.5°
Rainfall	0.18"	0.81"	- 0.63"	Rainfall	1.37"	2.68"	- 1.31"
				2008-09 Water Year rainfall (Oct-Mar)	2.69"	5.59"	- 2.90"

The first three months of 2009 goes into the records books as the **2nd warmest** on record with an average temperature of 58.7 degrees. The warmest January to March period occurred in 1986 when the average temperature was 59.9 degrees. The 2008-2009 water year is at the halfway mark and is currently 2.90 inches below normal. This ranks as the **22nd driest** water year to date.

Weather Spotter Training Schedule 2009

Date	Time	Location
May 11th (Mon)	6:30 pm	U of A Campus ENRB Room 253 Tucson
May 19th (Tue)	6:30 pm	Santa Cruz County Building 2150 N. Congress Drive Nogales
May 30 (Sat)	1:00 pm	U of A Campus ENRB Room 253 Tucson
June 3 (Wed)	6:30 pm	Oro Valley Town Hall 11000 N. La Canada Dr. Oro Valley
June 6 (Sat)	1:00 pm	Oro Valley Town Hall 11000 N. La Canada Dr. Oro Valley
June 11 (Thu)	6:30 pm	Oscar Yrun Community Cntr 3020 E. Tacoma St. Sierra Vista

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Check us out on the web at:
www.weather.gov/tucson

What you should report?

Tornado:	A tornado or a funnel cloud aloft
Heavy Rain:	A half an inch or more in less than an hour
Hail:	Dime size hail (1/2 inch) or larger
High Wind:	Estimated or measured 45 mph or greater
Flooding:	Any kind of flooding
Snow:	One inch or more (2 inches if above 5000 ft.)
Visibility:	Less than one mile
Death/Injury:	Any weather-related reason
Damage:	Any weather-related reason

(520) 670-5162 or 1-800-238-3747