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Employee Spotlight ~ Evelyn Bersack, ITO

Evelyn Bersack is the Information Technology Officer (ITO) here at the National Weather Service Office in Tucson. As an Arizona native, she attended the University of Arizona where she received a Bachelors Degree in Mathematics. Once in the working world, she worked as a Mathematician for the Department of Defense at the Yuma Proving Grounds. To further her career she left Yuma Proving Grounds and went to Monterey, California to attend the Naval Post Graduate School. There she earned a Masters Degree in Computer Sciences. With this degree she went back to Yuma Proving Grounds but this time as a Computer Scientist. Evelyn continued to work at the Yuma Proving Grounds until 2002 when she joined the National Weather Service as an ITO. Evelyn is responsible for several different computer programs/systems that the forecasters use on a daily basis. She does programming and scripting to help make programs work faster and more efficiently. Her work is always greatly appreciated by the staff.

Look for another Employee Spotlight in the next edition of the Coyote Crier!

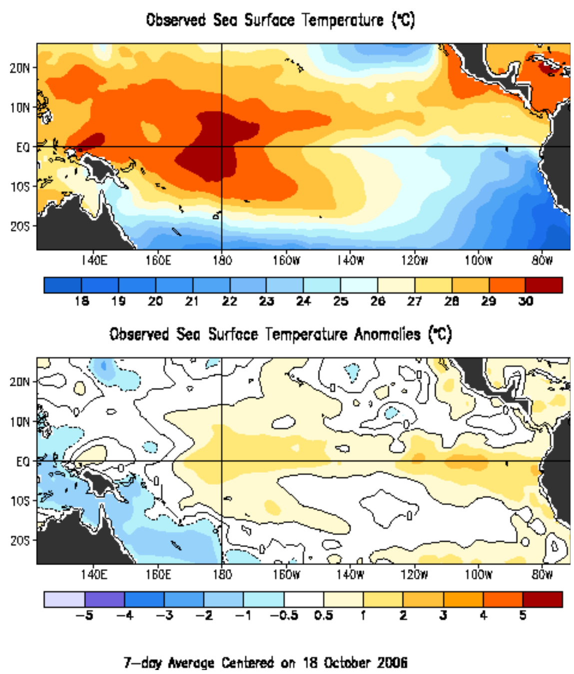
Check Our Local Web Page for More Great Information!
www.weather.gov/Tucson

National Weather Service Mission: "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."

El Niño Is Here! But What Does That Mean For Us

Erik Pytlak, Science and Operations Officer, NWS Tucson AZ

Our old friend, El Niño, is back. And he may already be affecting the weather across the globe. In short, El Niño is a periodic warming of Pacific Ocean water temperatures along the equator between the International Date Line and the South American Coast. It is named after the Christ Child since Peruvian fisherman noticed many decades ago that this warming tended to peak around the Christmas season.

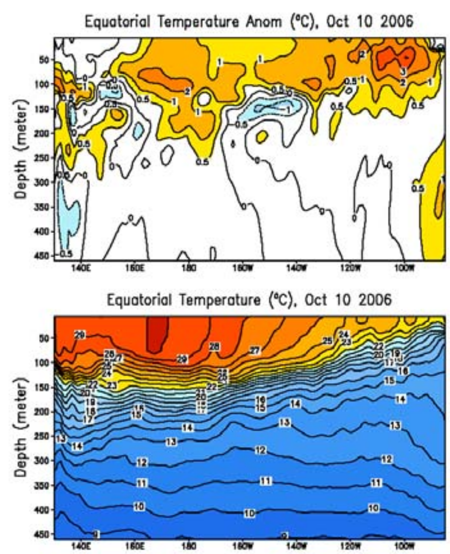


Top figure: **Sea Surface Temperatures, showing the warming of the ocean near the equator.**
Bottom Figure: **Sea Surface Temperature (SST) Anomalies, showing the departure of the current SSTs from the normal SSTs.**

Although this latest El Niño developed a little later than usual, it is definitely there and is still strengthening. Water temperatures in mid October averaged up to 2.5°C above normal in the eastern tropical Pacific. When an El Niño develops rapidly like this one has, we look for signs that it may also weaken rapidly. However, based on NOAA buoy data along the equator, the warmer-than-normal water extends downward as much as 150 meters from the surface.

This means the ocean has considerable "heat content" that has to work to the surface between now and spring. The data also suggests that this El Niño, while not nearly as strong as the one in 1997-98 which caused devastating floods in California and a wild winter in southern Arizona, will be stronger than the last one in 2003.

The atmosphere may already be responding to this El Niño episode. Because the area of warm water is fairly large already, more thunderstorms than usual have been observed in the tropical Pacific since mid August. This in turn has started to energize the subtropical jet stream aiming at the southern U.S., including Arizona. As a typical El Niño matures and begins to fade in December through February, systems moving along this subtropical jet tend to be stronger, more frequent, wetter, but fairly mild. The warm waters and increased energy in the subtropical and polar jet streams also favor a persistent upper level ridge north of Hawaii, which in turn leads to a persistent upper level trough over the southwest U.S.



Top Figure: **Water temperature anomalies, the departure from normal, at different depths of the ocean.**
Bottom Figure: **Water temperature at different depths of the ocean.**

All of these trends add up to a potentially wet 2006-07 winter season. The NWS forecast now calls for at least a 40% chance of above normal precipitation in southeast Arizona this winter, with only a 20-25% chance of below normal precipitation. There is also a slight chance of above normal temperatures this winter. If you want to track the latest El Niño, there is a wealth of information on the Climate Prediction Center website.

http://www.cpc.ncep.noaa.gov

Additional El Niño figures on page 3

El Niño article continued from page 2

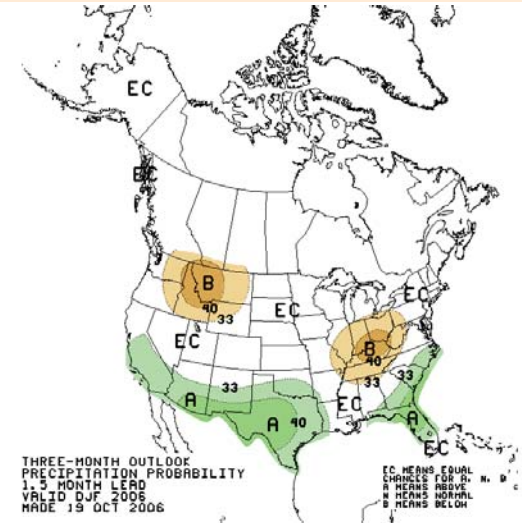


Figure to the Left: **Three month outlook of precipitation probability for the months of December, January, and February. Green shading represents areas with a probability of getting above normal precipitation amounts, and brown shading represents areas with a probability of getting below normal precipitation amounts during the three month period. EC means an equal chance of above or below normal precipitation amounts. The contours represent the chance of above or below normal precipitation.**

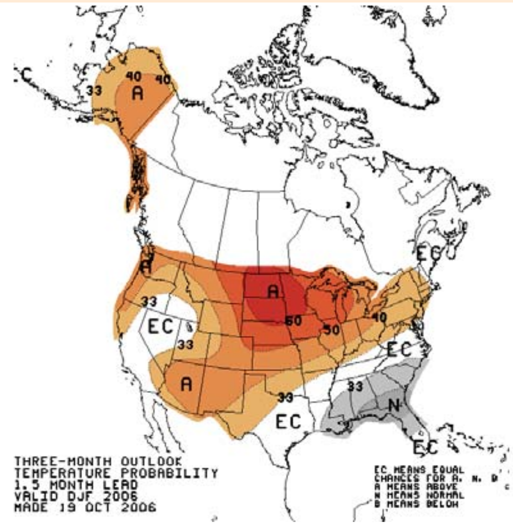


Figure Above: **Three month outlook for temperature probability for the months of December, January, and February. Red/orange shading represents areas with a probability of above normal temperatures for the three month period. The contours represent the chance of above or below normal temperatures.**

Incident Meteorologists
(Or "Why is the weather guy carrying hot dogs and marshmallows?")

Steven M. Reedy
General Forecaster & Incident Meteorologist, NWS Tucson AZ

Generally, forecasting services provided by the National Weather Service are thought to be confined to the Forecast Offices (FO) scattered across the country. However, there are instances when local factors and small scale changes in the weather can make the difference between life and death. In these instances, a small corps of forecasters can be called upon to go out into the field, bringing all the skill and technology usually associated with forecasts coming out of the FO and fine tune it for these events. These are the Incident Meteorologists, or IMETs.

While mostly associated with wildfires in the West, IMETs can be dispatched for any number of reasons. IMETs were dispatched to help in relief efforts associated with Hurricane Katrina as well as recovery efforts from the loss of the Space Shuttle Columbia. Believe it or not, IMETs are also dispatched for events that would seemingly rely little on weather, such as the Republican and Democratic National Conventions!

The first phase of an IMET deployment usually proves to be the most cumbersome: dispatch. When an Incident Command Team determines that an IMET is needed, they place an order for one, just as they would any other resource, personnel or equipment. This is where the IMET comes into contact, and sometimes conflict, with bureaucracy at its finest. This arises due to the fact that, depending on the nature of the incident, many government agencies that normally don't work together are forced to do so and sometimes there are no set precedents for these agencies to interact. Some of this is mitigated by the National Interagency Fire Center in Boise and in particular their liaison with the National Weather Service who is in charge of determining which IMETs are sent on which incidents. Many factors go into this selection, such as which IMET is closest to the incident in question, that IMET's level of experience, if that IMET is available to go to the incident and so on.

Once all those hurdles have been cleared and the IMET is selected and notified, the focus shifts to preparing for and getting to the incident. More than 90% of the time, the IMET is on site within 24 hours of being ordered. Within that 24 hours, there's a lot to do. Given that an "incident" can happen anywhere, more often than not, much of what an IMET has to pack is camping gear. In addition to that, though, is what is probably the most important to the IMET, the All Hazards Mobile Response System or AMRS. AMRS consists of a laptop computer, modems and satellite dish. This allows an IMET access to most, if not all, of the information he would use at the Forecast Office while at remote and isolated locations.

After packing up, the next step for the IMET is to get a better feeling for the situation they're being placed into. More often than not, an IMET will be dispatched close to, if not within, their own office's County Warning Area (CWA). Thus, it's an area they're already familiar with. If dispatched outside of their own CWA, then it's up to the IMET to check in with the local office to get briefed on the current weather and what's expected as well as any special concerns and effects that might arise due to the location and surrounding terrain.

On site, the IMET will check in with the Incident Commander (IC) and/or the Fire Behavior Analyst (FBAN) and exchange information. They'll brief the IMET on the fire's status, growth and history as well as any localized weather patterns that fire crews have observed. In turn, the IMET will give them a general idea of what to expect weather-wise for the next couple of days. With this information about the fire, the IMET will then reassess what tools he has on hand and if he needs any additional support. For example, the fire perimeter may be close enough to a Remote Automated Weather Sensor (RAWS) station where he can get hourly updates on temperature, dewpoint, winds and etc. If one isn't nearby, then an order can be placed for a portable Fire RAWS so that the IMET can get those observations. Another item an IMET may feel they need out on a fire is an Atmospheric Theodolite Meteorological Unit (ATMU). This allows the IMET to launch and track a balloon to get a better understanding of how the winds are behaving through various layers of the atmosphere, much like the weather balloons sent up at Forecast Offices.

With all these tools in place, it is now the IMET's job to support fire operations as best they can. A typical day for an IMET out on an incident starts bright and early, usually between 4:30 and 5:00 AM. This is usually to check and make sure that the forecast for that day, which was generated the previous night, is still accurate. The morning briefing for the fire crews follows at 6:00 AM and fire weather is usually, if not always, first up. Once the briefing is done, there's usually a little bit of time to grab breakfast before another meeting with the command and general staff sometime during the mid-morning, often around 9:00 AM. If the command team has night shifts fighting the fire as well, the late morning and early afternoon are spent preparing an overnight forecast and briefing for the night crews. Also, if there are numerous fires in the area, there may be a conference call set up between the IMETs in the area and the local Forecast Office to exchange ideas and information as well as coordinate forecasts. In addition to all this, the IMET must monitor the weather and should anything significant occur, from a change in the forecast to approaching weather phenomena, then they must get the word out to the crews, usually over the radio or through the communications unit. Usually just after dinner, right around sunset, there's a planning and strategy meeting where details about the fire's activity through the day are discussed as well as a plan for operations the next day. It's here where the IMET gives the IC his initial thoughts with regards to the next day's forecast. After this meeting, the IMET usually has an hour or two before having to turn in a forecast for the next day to be distributed to the fire crews the next morning. Once all of that is done, the IMET has just enough time to take one more look over things before calling it a night! This daily schedule continues until the incident is concluded and the IMET is demobilized back home.

Hopefully this provides a look into a service that generally isn't thought of in association with your local Weather Service office. However, through the efforts of these dedicated forecasters, countless lives and structures have been saved.

IMET Steven M. Reedy with a portable Fire RAWS station on the Florida Fire.

Debris Flow Hazards in Southern Arizona

Michael Schaffner
Service Hydrologist, NWS Tucson AZ

Debris flows are mixtures of sediment (70 to 90%) and water (10 to 30% by weight). They are often initiated by the collapse of sediment on a steep slope during periods of prolonged rainfall. Sediment can range in size from clay to large boulders. Debris flows tend to originate in mountainous regions. While many only impact the local vicinity below the area of sediment collapse, a few continue to travel downstream. Particularly concerning are debris flows that impact life and property. Hazard areas may include roadways and recreational areas in mountainous terrain and developments on alluvial fans at the mouth of mountain fronts.

Debris flows have been documented in most mountain ranges in southern Arizona including the Santa Catalina, Huachuca, and Pinaleno Mountains. The occurrence of debris flows is however low in historic times. A half dozen historic debris flows have been documented in the Santa Catalina Mountains before 2006. Older debris flow levees are present, but these were thought to be upwards to thousands of years old.

The end of July 2006 was marked by widespread flash flooding and several areas of river flooding. It soon became apparent that debris flows had also occurred. The initial count of debris flows was about three dozen for the Santa Catalina Mountains. After several helicopter flights and detailed field mapping, the U.S. Geological Survey (USGS) has identified about 240 individual slope failures. In addition to the Santa Catalina debris flows, debris flows took place on the south end of the Huachuca Mountains above Montezuma Canyon Road.

Particularly hard hit was the greater Sabino Canyon area. Lower Sabino Canyon was impacted by 18 debris flows. Debris flows removed structures, destroyed the roadway in multiple locations (figure 1), and closed public access. To the west in Rattlesnake Canyon, debris flows in the upper watershed coalesced to travel 1.75 miles downstream washing out Sabino Canyon Road and depositing upwards of 20 feet of sediment in Sabino Creek. To the east in Soldier Canyon, a debris flow just barely was able to pass under the Catalina Highway. After passing the highway, the debris flow plugged the culverts and channel along the Mount Lemmon Short Road. The subsequent flood followed alternative channel pathways and flooded homes built on alluvial sediments originating from Soldier Canyon.

No single day of rainfall was responsible for the debris flow outbreak of July 31, 2006. This was a multiple day event (figure 2). July 31st simply marked the rainfall triggering event for the debris flow outbreak and was proceeded by 4 consecutive days of significant rainfall centered over the lower Santa Catalina Mountains near Sabino Canyon. The National Weather Service is partnering with the USGS,

Figure 1: Debris flow covering roadway in Sabino Canyon.

Arizona Geological Survey, and the University of Arizona to study the debris flow hazard in the Santa Catalina Mountains. Our work is expected to identify debris flow prone areas, determine the recurrence interval of debris flow events, and set rainfall thresholds that might trigger future debris flow activity. The later would be used as a guideline for when to place debris flow information and call to action statements in our flash flood products.

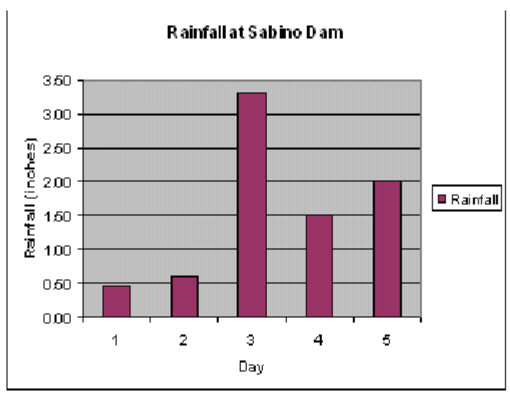


Figure 2: Bar graph showing distribution of rainfall over 5-day event with day 5 representing July 31st. Data from Pima County Flood Control rain gage at Sabino Dam.

As a SKYWARN spotter, you play an important role. The National Weather Service will issue a flash flood warning specifying the debris flow hazard if a debris flow is reported. Rainfall reports are also essential. If you live near the mountain front and observe an active debris flow, you are encouraged to take photographs, video, and note the start and end time of the debris flow at your location. This information is invaluable in understanding the timing of a debris flow with respect to their causative rainfall.

2006 Monsoon

John Glueck, Senior Forecaster, NWS Tucson AZ

On average, an early and active summer thunderstorm season occurs after a dry winter season. The early forecasts were for an early and active season. Additionally, an oddity in the monsoon start dates was evident when looking at years that ended in **"6"**. Going back to 1956, the years that ended in "6" had start dates around June 28th (June 28th in 1956/1966/1976…June 29th in 1986 and June 30th 1996). So the big question was, "Could the past foretell the 2006 start date occurring on June 28th"? Sure did, since the 2006 monsoon started on **June 28th**. The season was very active with many locations across the area recording well above normal rainfall. In fact, the 2006 total in several places was more than the combined total from the 2004 & 2005 seasons.

Monsoon rainfall since 2004				
Location	**2006**	**2005**	**2004**	**Normal**
Pima County				
Tucson International Airport	10.20"	5.31"	2.43"	6.06"
University of Arizona campus	10.05"	6.40"	3.25"	5.68"
Green Valley	9.52"	7.32"	6.34"	8.68"
Vail	12.35"	5.37"	4.92"	9.18"
Redington	6.76"	6.21"	3.99"	7.03"
Kitt Peak	18.02"	12.30"	9.35"	12.00"
Sells	6.67"	7.03"	7.84"	7.71"
Ajo	3.37"	2.57"	0.79"	3.25"
Organ Pipe Cactus Nat'l Monument	5.50"	2.38"	3.54"	4.42"
Southeast Pinal County				
Oracle	14.32"	7.32"	7.24"	9.71"
Picacho Peak	6.89"	4.87"	2.27"	3.65"
San Manuel	12.18"	5.35"	4.28"	6.88"
Kearny	8.13"	1.27"	3.60"	4.57"
Santa Cruz County				
Nogales	10.55"	9.67"	5.16"	10.73"
Patagonia	15.75"	8.52"	12.50"	10.11"
Graham County				
Fort Thomas	6.22"	2.51"	3.85"	3.94"
Safford Agricultural Center	6.62"	2.16"	5.25"	4.60"
Greenlee County				
Duncan	6.43"	3.91"	4.47"	5.88"
Hannagan Meadow	21.52"	10.53"	10.55"	9.94"
Cochise County				
Benson	10.84"	5.38"	4.05"	8.89"
Cascabel	8.32"	8.23"	7.24"	6.98"
Pearce-Sunsites	9.82"	6.14"	6.20"	8.06"
Bisbee	17.37"	9.45"	6.70"	11.44"
Coronado National Memorial HQ	24.64"	9.41"	10.09"	10.66"
Sierra Vista	12.90"	9.99"	4.33"	8.53"
Tombstone	7.27"	6.88"	4.55"	8.05"
Hereford (Y Lightning Ranch)	12.92"	12.10"	4.40"	8.85"
Bowie	4.52"	4.51"	7.20"	5.77"
San Simon	6.74"	3.22"	5.38"	5.37"
Douglas	8.74"	7.40"	5.39"	8.28"

Early monsoon start date prediction for 2016: **June 28th**.

The History of Weather

Angel Corona, Observation Program Leader, NWS Tucson AZ

In the ancient world, weather was seen as seasonal in character. Since the seasons could be related to the positions of the stars and solar elevations, they thought the weather was governed by their stellar and planetary gods. Therefore, weather predictions were based mainly on astronomical occurrences.

The Chinese were the first to make a serious attempt at studying the weather. By 1300 BC, the Chinese were able to produce weather summaries for a ten year period. By 1000 BC they had a systematic weather observing network . This lead to the earliest known weather "forecast" from around 1000 BC in China… *"If the wind is in the north and the skies clear, there will be a frost."*

By around 700 BC, the Greeks had a number of rules for weather prediction based on previous occurrences (what we call weather lore.)

Aristotle

Around 350 BC Aristotle wrote Meteorologica, becoming the first person to use the word in writing. Meteorologica contains his theories of the earth sciences. It includes accounts of water evaporation and weather phenomena.

Although the term meteorology is used today to describe a sub discipline of the atmospheric sciences, Aristotle's work is more general.

One of Aristotle's most impressive achievements in Meteorology is his description of what is now known as the hydrologic cycle:
"Now the sun, moving as it does, sets up processes of change and becoming and decay, and by its agency the finest and sweetest water is every day carried up and is dissolved into vapour and rises to the upper region, where it is condensed again by the cold and so returns to the earth."

Aristotle on Water Vapour:
"Some of the vapour that is formed by day does not rise high because the ratio of the fire that is raising it to the water that is being raised is small."
"...hoar-frost is not found on mountains contributes to prove that these phenomena occur because the vapour does not rise high. One reason for this is that it rises from hollow and watery places, so that the heat that is raising it, bearing as it were too heavy a burden cannot lift it to a great height but soon lets it fall again."

Aristotle on Tornadoes:
"So the whirlwind originates in the failure of an incipient hurricane to escape from its cloud: it is due to the resistance which generates the eddy, and it consists in the spiral which descends to the earth and drags with it the cloud which it cannot shake off. It moves things by its wind in the direction in which it is blowing in a straight line, and whirls round by its circular motion and forcibly snatches up whatever it meets."

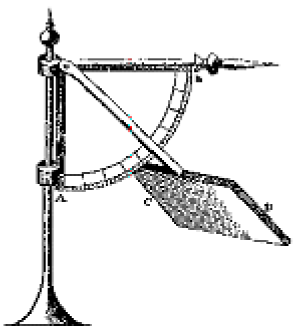
Several years later, Theophrastus, a pupil of Aristotle, compiled a book on weather forecasting, called the Book of Signs. His work consisted of ways to forecast the weather by observing various weather-related indicators, such as a ring around the moon, which is often followed by rain. The work of Aristotle and Theophrastus remained a dominant influence in the study of weather and in weather forecasting for nearly 2000 years.

In 1592 Galileo Galilei invented a crude thermometer (called a thermoscope) that used the expansion and contraction of air in a bulb to move water in an attached tube. Others then invented other temperature measuring devices. Unfortunately, these instruments were of little use as there was no standard measurement.

Weather forecasting took a giant leap in 1643 when Italian physicist Evangelista Torricelli invented the barometer. He was actually trying to create a vacuum. Torricelli filled a four-foot long glass tube with mercury and inverted the tube into a dish. Some of the mercury did not escape from the tube and Torricelli observed the vacuum that was created. A side effect was that his simple device was able to measure the pressure of the air. Torricelli noticed that air pressure changes in accordance with changes in the weather. In fact, a drop in pressure would often signal that a storm was coming.

Torricelli

In 1667 Robert Hooke, an English scientist, invented an aneend. When the wind blew it would push the disk from the vertical position about the angle corresponding to the speed of air.



Hooke's anemometer

In 1714 German physicist Daniel Fahrenheit developed the mercury thermometer. The Fahrenheit temperature scale became popular through its use on the first reliable, commercially-available, mercury-in-glass thermometers. Fahrenheit manufactured such thermometers in Amsterdam from about 1717 until his death in 1736. As the zero point on his scale Fahrenheit chose the temperature of a bath of ice melting in a solution of common salt, a standard 18th century way of getting a low temperature in the laboratory. For a consistent, reproducible high point he chose the temperature of a healthy person, which he measured in the armpit and called 12 degrees. He later divided each of these into 8 equal subdivisions producing a scale of 96 degrees. Fahrenheit noted that his scale placed the freezing point of water at 32 °F and the boiling point at 212 °F, a neat 180 degrees apart.

In 1742 Swedish astronomer Anders Celsius devised the Celcius scale for reading temperature. In the original scale, the boiling point of water at 1,000 millibars was defined as 0 degrees and the freezing point of water was defined as 100 degrees, exactly the reverse of the modern Celsius scale. It was then reversed to its modern order some time shortly after his death.

It was in 1765 that daily measurements of air pressure, moisture content, wind speed and direction began to be made. This was first done by French scientist Laurent Lavoisier who stated, "*With all of this information it is almost always possible to predict the weather one or two days ahead with reasonable accuracy.*" However things were not as simple as Lavoisier had thought.

Between 1814 and 1825, the Army Medical Department, the General Land Office, the Academies in the State of New York, and a group of college professors in New England established limited, predominantly climatological observing programs.

In 1837 Samuel F. B. Morse invented the electric telegraph. Meteorology got a giant boost with the invention of the telegraph. Weather observations and information could now be rapidly disseminated and in 1849 the Smithsonian Institution supplied weather instruments to telegraph companies and established an extensive observation network. Observations were submitted by telegraph to the Smithsonian, where weather maps were created. The ability to observe and display simultaneously observed weather data, through the use of the telegraph, quickly led to initial efforts toward the next logical advancement, the forecasting of weather.

In 1854 a French warship and 38 merchant vessels sank in a fierce storm off the Crimean port of Balaklava. The director of the Paris Observatory was asked to investigate the disaster. On checking meteorological records it was seen that the storm had actually formed two days previous to the sinkings and had swept across Europe from the southeast. If a tracking system had been in place the ships could have been warned of the pending danger. As a result of these findings a national storm warning service was set up in France. This is recognized as the start of modern meteorology.

In 1870, a Joint Congressional Resolution requiring the Secretary of War *"to provide for taking meteorological observations at the military stations in the interior of the continent and at other points in the States and Territories...and for giving notice on the northern (Great) Lakes and on the seacoast by magnetic telegraph and marine signals, of the approach and force of storms"* was introduced. The Resolution was passed by Congress and signed into law on February 9, 1870, by President Ulysses S. Grant. An agency had been born which would affect the daily lives of most of the citizens of the United States through its forecasts and warnings.

On October 1, 1890 the Weather Service is first identified as a civilian enterprise when Congress, at the request of President Benjamin Harrison, passes an act creating a Weather Bureau in the Department of Agriculture.

Material referenced from:
wikipedia.org and history.noaa.gov

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:	**Small hail** (1/4 inch) or larger
High Wind:	Estimated or measured **40 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
Earthquake:	**Any** tremor

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

Storm Spotters: *Recording History*

Jeff Davis, Senior Forecaster, NWS Tucson AZ

As a SKYWARN spotter, you are an integral part of the warning process. Your real-time observations of hazardous weather assist forecasters in their warning decisions that enable the National Weather Service (NWS) to fulfill its mission of protecting life and property. In addition to being a key player in the warning process, did you know that your timely and accurate reports also represent historical accounts of hazardous weather? Not only do you help warn your community and other people of dangerous weather, you help document historical weather events.

Each month NWS offices across the country compile a list of hazardous weather events for their area of responsibility. SKYWARN spotter reports along with reports from newspaper clippings, local law enforcement officials, emergency management officials, and NWS storm damage surveys are used to document the events. These compiled events are published in STORM DATA which is an official publication of the National Oceanic and Atmospheric Administration (NOAA). The STORM DATA publication provides a historical record of hazardous weather events used for research, risk management, litigation, insurance rates and claims, and climatology. A subscription to STORM DATA and archived publications can be obtained from the National Climate Data Center (NCDC). NCDC also provides free online access to a limited dataset from STORM DATA called U.S. Storm Events Database which can be found at:

http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storms

The University of Arizona's Institute of Atmospheric Physics also maintains an online database derived from STORM DATA. This database can be found at:

http://ag2.calsnet.arizona.edu/cgi-bin/storms.cgi

Now that you're equipped with a few sources for storm data, try answering some trivia questions on Arizona's hazardous weather climatology from 1950 to 2005. Answers to these questions can be found on page **10** of this newsletter.

1. **How many tornadoes does Arizona average each year?**
    a. **1**
    b. **9**
    c. **6**
    d. **4**
2. **What weather related hazard is ranked #1 for fatalities in Arizona?**
    a. **Dust storms**
    b. **Flash floods/Floods**
    c. **Exposure to extreme temperatures (Heat/Cold)**
    d. **Tornadoes**
3. **How many tornado fatalities have there been in Arizona?**
    a. **none**
    b. **1**
    c. **20**
    d. **3**
4. **What county in Arizona has the most tornado reports?**
    a. **Pima**
    b. **Pinal**
    c. **Cochise**
    d. **Maricopa**

Great lightning picture provided by a local spotter on July 25, 2006.

Have a great storm picture that you would like to share with the National Weather Service? E-mail your pictures to: Pamela.Elslager@noaa.gov

National Weather Service

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Suite #304
Tucson, Arizona 85719

Phone: (520)670-5156
Fax: (520)670-5167
pamela.elslager@noaa.gov

Please keep your personal information up to date. The best way to update your information is to send an e-mail to:

Pamela.Elslager@noaa.gov

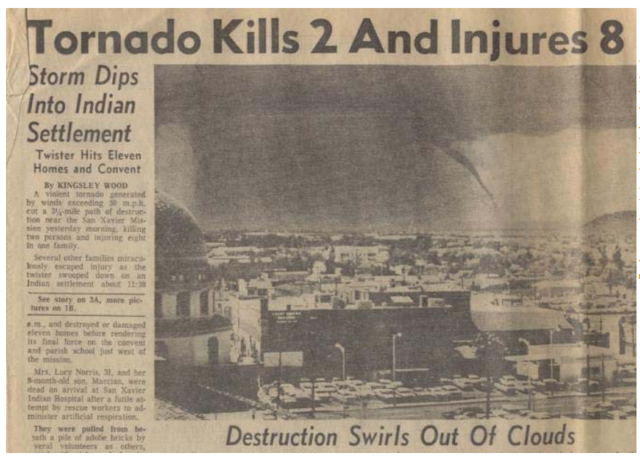
If you are unable to e-mail please call the number listed above and ask to speak with either Pamela or Tom to update your information.

No spotter training dates have been set at this time. Please continue to monitor our website or contact the office to find out when spotter training is available.

www.weather.gov/Tucson
pamela.elslager@noaa.gov
(520)670-5156

Answers to questions on Arizona's hazardous weather climatology from page 9:

1. The answer is d. Arizona averages about 4 tornadoes per year based on calculations from 1950 to 2005.
2. The answer is c. This is somewhat of a trick question because STORM DATA does not document fatalities related to extreme temperature exposure very well. In this case, other sources must be used to supplement STORM DATA. A study by the Arizona Department of Health on injuries and mortality among Arizona residents from 1990 to 2000 indicates that deaths associated with extreme temperatures (heat/cold) exceed fatality figures associated with other weather hazards.
3. The answer is d. Two different tornado events account for the 3 fatalities reported in Arizona from 1950 to 2005. The first 2 deaths occurred on August 27th, 1964 when an F2 tornado touched down near the San Xavier Mission southwest of Tucson killing 2 and injuring 9. The second event also occurred southwest of Tucson when an F2 tornado hit a trail park on June 23rd, 1974 leaving 1 dead and 40 injured.
4. The answer is d. Maricopa County has the most tornado reports followed by Pinal. This is mainly an artifact of the population density rather than a meteorological factor.



Tornado Kills 2 And Injures 8

Storm Dips Into Indian Settlement

Twister Hits Eleven Homes and Convent

By KINGSLEY WOOD

A violent tornado generated by winds exceeding 50 m.p.h. cut a 3¼-mile path of destruction near the San Xavier Mission yesterday morning, killing two persons and injuring eight in one family.

Several other families miraculously escaped injury as the twister swooped down on an Indian settlement about 11:30

See story on 3A, more pictures on 1B.

a.m., and destroyed or damaged eleven homes before rendering its final force on the convent and parish school just west of the mission.

Mrs. Lucy Norris, 31, and her 9-month-old son, Marcian, were dead on arrival at San Xavier Indian Hospital after a futile attempt by rescue workers to administer artificial respiration.

They were pulled from beneath a pile of adobe bricks by several volunteers as others,

Destruction Swirls Out Of Clouds

Image to the left: Newspaper article from the Arizona Daily Star referring to the tornado event on August 27,1964 in Tucson.

Amateur Radio

Greg Peters, Spotter and Sector 1 Operator

It's been a long time coming, back with a lot of renewed interested both from Amateur Radio Operators and the National Weather Service (NWS) is Skywarn for Southern Arizona Sector 1 (to include Cochise, Graham, Greenlee, Pima and Santa Cruz, Southern Pinal Counties). I would like to thank Pamela Elslager, Tom Evans (NWS) and Chuck Michaels, (Chief Radio Operator, Pima County R.A.C.E.S.) bringing new life to the Skywarn Sector 1 program.

Would like to thank all the amateur (ham) radio operators that participated in the Sector 1 Skywarn general information and activation nets over the course of the Monsoon Season (May-September). During the season we had weekly Tuesday evening nets and actually activated ten times throughout the season in support of severe weather in Sector 1. During net activations, Skywarn Spotters reported through net control what NWS outlined in the training they provide the spotters during annual training. Areas that were reported included high winds in access of 45 mph, rain greater than 1" an hour and other time critical information to NWS.

The net meets every third Tuesday at 1930 MST during non-monsoon weather months on 146.880 + (PL 110.9). The net is opened to all ham radio operators throughout Sector 1.
If you require more information, please contact Greg Peters (520) 514-2419 or via e-mail kc5zgg@arrl.net.