National Weather Service

Coyote Crier

Volume 7, Issue 2
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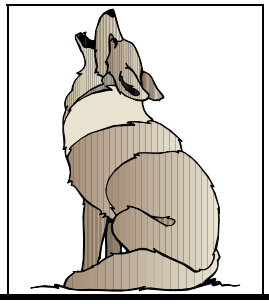


Meet Our New Staff!

By: Pamela Wollack and Lisa Reed

Since the last issue of the Coyote Crier there have been many notable events with the weather and also within our office. Within the past several months the National Weather Service in Tucson has undergone numerous changes in its personnel. We have gained a number of highly talented and much needed personnel as well as seeing two of our long standing staff members move on to new jobs. We have also had the joy of seeing one of own promoted within our office. We would like to introduce you to our new staff members.

This past October we found out that two of our long time managers, Paul Flatt (Warning Coordination Meteorologists, WCM) and David Bright (Science and Operations Officer, SOO) had both accepted new jobs. Paul Flatt moved on to become the WCM for the Boise, Idaho office and David Bright moved on the Severe Storms Laboratory in Norman, Oklahoma. To fill the position of WCM, Tom Evans, a lead forecaster from the Monterey, California Office, was added to our team. To fill the position of SOO, one of our own lead forecasters, Erik Pytlak, was promoted to the management team.

Also joining our team is a new hydrologist, Mike Schaffner, who relocated to Tucson from the east coast. We are excited to have him fill the hydrologist position that was vacant for about two years. To fill Erik's vacant lead forecaster spot, Greg Mollere, a general forecaster from the Tallahassee, Florida office was added to our team in February of this year. To complement our staff Evelyn Bersack, a computer scientist from the Yuma Proving Grounds, joined our office late last year. Her computer expertise is a very valuable asset with the new technology used by the Weather Service and she will serve us well as the Information Technology Specialist.

With our team complete, we look forward to another year of providing efficient meteorological and hydrological service to Southeastern Arizona.

Inside this issue:

Editors:
Pamela Wollack
Lisa Reed

What to report:

- Your spotter number (found on the address label of your Coyote Crier)
- What you have seen
- Where you saw it (to your southeast, near the wash, etc.)
- When you saw it (if it's not occurring right now)
- What it is doing (movement, getting stronger/weaker, damaging buildings, etc.)

** Below is a list of weather criteria that spotters should use to call in and report. Spotter Training dates and times will be sent out soon. To report call:

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

What you should report:

Tornado:	Either on the ground or aloft (a funnel cloud)
Heavy Rain:	A **half an inch or more**, especially if it fell in less than an hour
Hail:	**Pea size** (1/4 inch) or larger
High Wind:	Estimated or measured **50 mph or greater**
Flooding:	**Any** kind of flooding
Snow:	**One inch** or more (2 inches or more if above 5000 ft.)
Visibility:	**Less than one mile** for any reason (fog, dust, snow)
Death/Injury:	**Any** weather-related reason
Damage:	**Any** weather-related reason (most often from wind)
Earthquake:	**Any** tremor

National Digital Forecast Database

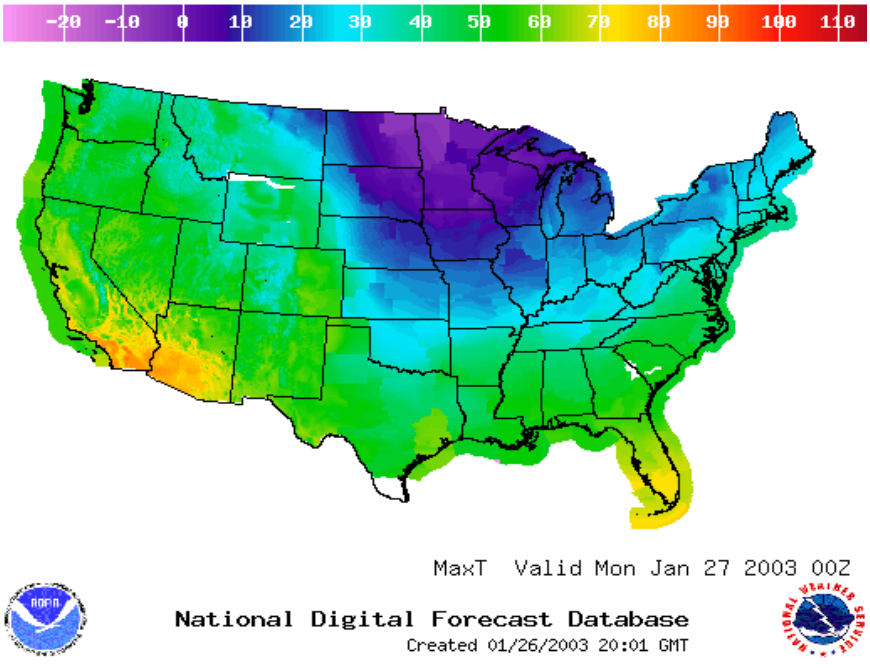
By Glen Sampson, Meteorologist in Charge

Beginning in late 2003, the National Weather Service will begin making available digital forecasts through a National Digital Forecast Database (NDFD). These forecasts are similar to what the Tucson office made available a couple of years ago on its web page http://www.wrh.noaa.gov/Tucson under the Digital Forecasts link. However, the forecasts will now be available from all NWS offices, not just Tucson.

The NDFD development within the NWS is a major change in how daily forecasts are created. In the past, forecasts were created manually with a keyboard and computer screen. The meteorologist, after looking at data for several hours, would spend 1-2 hours typing out the forecast. Everything was disseminated in a text format. Unfortunately, text products can only contain the general forecast for an area. They will not contain the details nor smaller scale atmospheric features known by the forecaster. The NDFD is helping to change this situation.

Rather than typing out forecasts, the meteorologist now edits a digital database which contains all critical forecast elements. These elements include temperature, dew point, wind, sky cover, weather, probability of precipitation and other seasonal type of fields such as snow level. Thus this digital database is a collection of grids (one for each forecast element) covering the forecast area. These grids are at a resolution of 5 km x 5 km, with lower resolutions expected in the future.

The power of the NDFD is not in viewing the individual forecast grids, but in the applications which can be driven from this data set. For example, a person driving across country will be able to obtain a detailed forecast specific for their time of travel and route. Currently this type of forecast product is only available by looking at many text products. As you can see, the NDFD provides a revolutionary new level of forecast services for the Nation. If you are interested in more information on the NDFD, check out the web site: http://www.nws.noaa.gov/ndfd



Experimental Image of NDFD Data, Maximum Temperature Map.

Images can be shown at a state, regional, and national level.

What Held Back the Winter Rains?

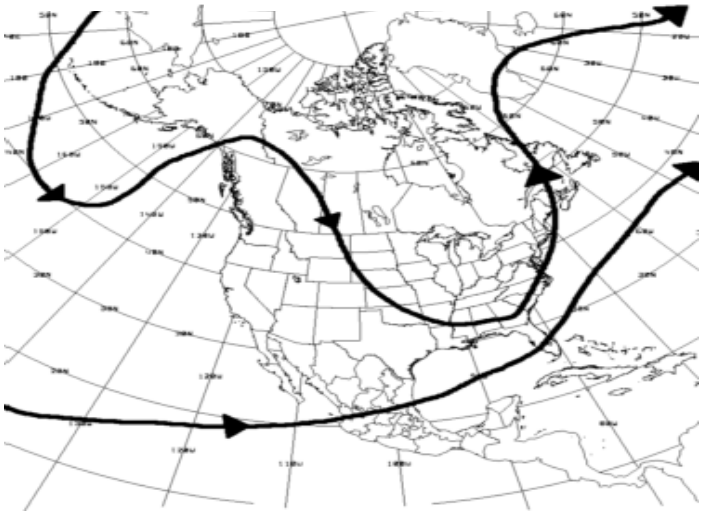
By Erik Pytlak, Science and Operations Officer

The winter of 2002-03 held so much promise. During the summer and fall of 2002, water temperatures along the equator over the central Pacific Ocean warmed as much as 4 degrees above normal. An El Niño was getting underway. In virtually all El Niño events during the 20th century, above normal winter precipitation was observed over most of the southwest United States. With drought conditions gripping the state since the last El Niño in 1997-98, there was hope that this El Niño, although weaker than its >97->98 cousin, would still bring badly-needed precipitation to the region.

However, not all El Niño events result in above normal precipitation, especially weaker ones like this year. If an El Niño (or a La Niña, for that matter) is weak, other larger-scale patterns tend to overwhelm the effects that Pacific water temperatures have on the jet stream. This was the case through mid February this year. Since late October, the Pacific-North American (PNA) pattern has dominated instead. The PNA pattern is basically a two to three month oscillation in the jet stream, characterized by a strong upper level ridge over the western United States and a strong upper level trough over the eastern United States. Normally, the winter jet stream comes into North America over the Pacific Northwest. In a PNA situation, though, the jet comes in over Alaska and then dives southeast into the eastern United States. This not only keeps storms far away from Arizona, but it sends bitterly cold air from northern Canada into country east of the Rockies. If a weak El Niño and a persistent PNA pattern combines as they have for most of this year, disturbances along the subtropical jet stream passing across northern Mexico amplify as they hit the East Coast. Moisture, plus cold, plus intensifying storm systems equals lots of snow. That has certainly been the case on the Eastern Seaboard this year.

Strong PNA patterns typically last for only a couple of months. While the PNA episode earlier in the winter was a particularly strong and persistent one, it began to weaken in early February and completely disappeared for a couple of weeks at the end of the month. This collapse allowed both the polar jet stream to come much farther south, and the subtropical jet stream, which is still stronger than usual due to the lingering El Niño, to come farther north. The result was a significant upswing in precipitation over Arizona with warm, almost subtropical-like storms followed by colder and snowier ones (at least snowier for our mountains). As March got underway, it looked like the PNA pattern would reassert itself for a couple of weeks, but there are signs that it will weaken once again before our winter rainy season ends in early April. The March outlook from the Climate Prediction Center still calls for a decent chance of above normal rainfall with temperatures most likely to remain near normal.

More typical El Niño jet stream pattern. The subtropical (more southern) jet stream is able to bring moisture-laden storms into Arizona.



In A PNA-dominated pattern, the northern branch of the jet stream brings Arctic air from northern Canada into the eastern U.S., while also helping to keep the subtropical jet stream south of Arizona. The result is warm and dry conditions over our region.

Forest Fire and Its Impact on Flash Flooding

By Mike Schaffner, Hydrologist Intern

Forest fires are no stranger to Arizona. Last year, both the Bullock Fire in the Santa Catalina Mountains and the Rodeo-Chediski Fire in the White Mountains dramatically reshaped our landscape. The Bullock Fire burned over 30,000 acres. This amounts to 40 percent of the Santa Catalina mixed conifer forest.

Soil naturally absorbs a given amount of water through a process called infiltration. Forest fire releases tree resins which mix with ash under high temperatures. The result is that the soil becomes hydrophobic (i.e. water hating). How hydrophobic a soil is can be determined by simply placing a drop of water on soil and recording how long it takes to be absorbed. Some samples from the Ahigh intensity@ burn area on Coronado National Forest took over 18 minutes before the water no longer beaded!

Reduced infiltration due to hydrophobic soils increases both the amount and speed of runoff. When comparing pre and post fire runoff, the amount of runoff is predicted by computer models to have roughly doubled. Those watersheds most affected by the fire were Alder, Edgar, and Buehman Canyons. Luckily all of these are on the backside of the Santa Catalina=s where development is at a minimum. Bear Canyon is the only watershed with a noticeable burned area (12 percent) on the Tucson side. This burn area is located upstream of the Catalina Highway. Concern here is two fold. First, increased runoff could wash out a portion of the highway thus isolating the community of Sumerhaven. Secondly, the flash flood threat will tend to be higher than it was in lower Bear Canyon. This is of particular concern for those hikers traveling up towards Seven Falls or beyond in Sabino Canyon Recreation Area.

In response to the Bullock Fire, Pima County installed a new rain gage in the burn area and hired out an engineering company to conduct the hydrologic computer modeling mentioned above. The National Weather Service (NWS), in Tucson, is receiving data from this rain gage and has received the hydrologic modeling results. The NWS has also conducted a presentation regarding the Bullock Fire to the local chapter of the American Meteorological Society. Finally, we continue to watch the situation closely since the impact of such a forest fire tends to last on the order of three to five years.

Bullock Watershed and Burn Area (Acres)

	Buehman Canyon	Alder Canyon	Edgar Canyon	Bear Canyon
Watershed Area	19460.0	18227.2	19052.8	10013.4
Burn Area in Watershed	9251.3	9802.2	7612.5	1223.6
Burn Percentage	47.5	53.8	40.0	12.2

Pacific Decadal Oscillation

By Pat Holbrook, Forecaster

In the last edition of the Coyote Crier we discussed the El Niño that began last summer and is just about to end. We pointed out that precipitation in an El Niño winter is generally above normal with the caution that the Pacific Decadal Oscillation (PDO) was in a cold phase and working against El Niño. Precipitation in Arizona for our water year, which began back in October of 2002, has been below normal, except for the area from Ajo to Phoenix and in far northwest Arizona. The PDO tended to be more dominant this winter than El Niño.

What is the PDO? Scientists, puzzled by decadal shifts in the salmon catches in the Pacific Northwest and Alaska, determined that sea surface temperature anomalies in the Pacific Ocean shifted every 20 to 30 years. Therefore, fish being fish, the water with the highest nutrient value produced more fish and thus the fish puzzle was solved. Given below is a chart showing the monthly PDO index since 1900. If you want to know more about how the PDO index is calculated and general information on the PDO go to the following link:

http://www.atmos.washington.edu/~mantua/REPORTS/PDO/pdo_paper.html

We shifted from a warm to cold phase PDO in the late 1990s. For our part of Arizona, cold phase PDO means about 17% less than normal precipitation during the winter. The warm phase of the PDO is just the opposite with above normal precipitation. How about the monsoon? Sorry, apparently the PDO has little impact on monsoon precipitation.

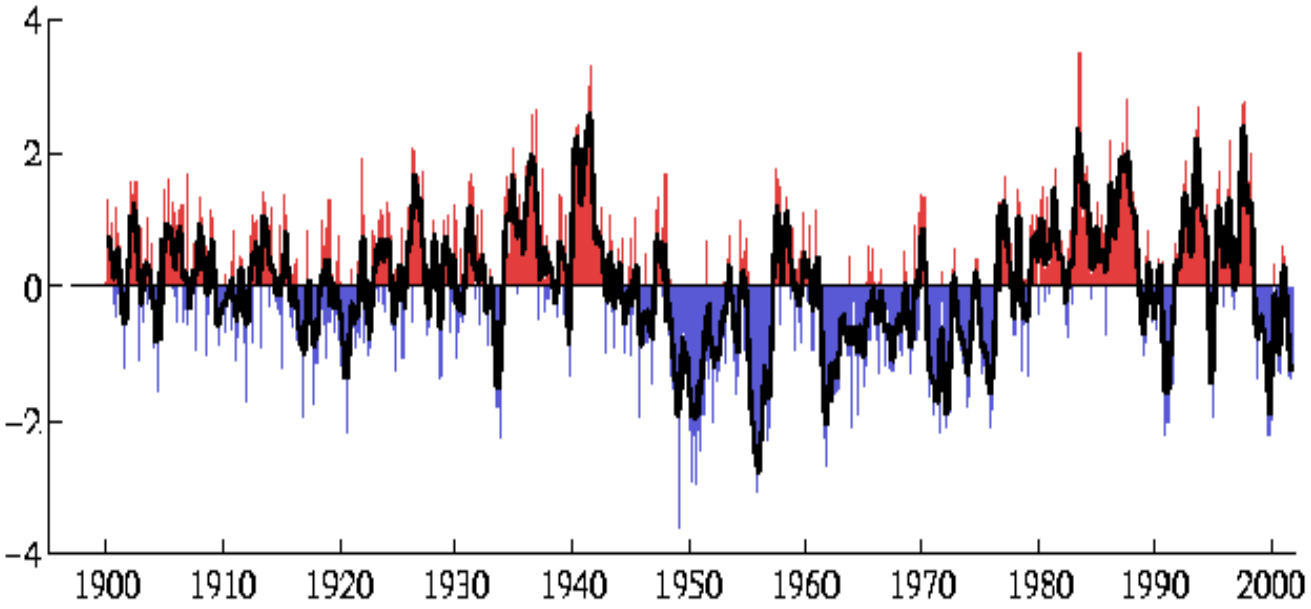


Figure 1: Monthly values of PDO index 1900-2001. The PDO index is defined as the leading principal component of North Pacific monthly sea surface temperature variability.

The Coyote Crier

Spotter News for Southeast Arizona

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