

El Niño News

Wet But Wary, Arizona Awaits Next El Niño Move

Because of El Niño's seemingly late start and uncertain progress, a pattern that did not conform to some early predictions, some people in the western United States question what effect El Niño finally will have on the area; some even believe the event might be diminishing. El Niño, however, should not be lightly dismissed, as recent rains demonstrate. A January report from the U.S. Weather Service's Tucson office confirms El Niño's continued presence: "We are currently in a strong El Niño episode, which is forecast to continue through April 1998. This episode is similar in magnitude and aerial extent to that of 1982-83, which is considered the strongest of the century."

Westerners' efforts to anticipate El Niño have not been helped by the mixed signals conveyed by various El Niño reports, including early and recent accounts. For example, some early reports indicated the West would get a

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RANDOM SHOTS



Like hurricanes, the atmospheric condition now generically known as El Niño may some day be assigned personal names; e.g. Alphonso, Benjamin, etc. Meanwhile, the present, nameless El Niño is developing a distinct personality of its own, its potential for fun and profit noted and often exploited.

(Comic courtesy of Rand Carlson and the "Tucson Weekly.")

BY RAND CARLSON

El Niño Gains Clout as Media Celebrity *Blame it on El Niño*

Although El Niño's climatic legacy has not yet been determined, it nonetheless has achieved the dubious distinction of becoming this season's major media event. From mere atmospheric phenomenon to media celebrity, El Niño now is cast as a cultural spectacle, available to serve many causes, from the comic to the commercial.

Even during its early days, when El Niño was seen as threatening, if not actually causing calamitous weather in various parts of the world, including the U.S. Southwest, not everyone was stockpiling sand bags and updating flood insurance. An "El Niño Hype Watch" website was established for collecting what it referred to as "El Niño media doom predictions." The site recorded that the Weather Channel predicted on September 25 that, "Yuma, Arizona may get ten times its normal rain,

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and have a flood." A *U.S. & World News Report* headline hyperventilated on October 6: "Southwest and California: Storms, Flooding, Mudslides." UPI was shown to be in the spirit of the season when it headlined a story on December 22, "El Niño could cause a white Christmas as far south as Mexico."

What made this El Niño special to scientists — the early prediction and the long-term tracking made possible by advanced technology — also ensured that the event would get prolonged public exposure. This, in turn, meant that some sort of narrative would likely be created, with a building sense of expectation, spiced with drama; thus, the above headlines.

While the headlines may inject an element of drama, the website devoted to them is to prick pretensions and to present the funny side of the situation. And the funny side of El Niño keeps turning up, with one theme occurring sufficiently often to qualify as an ongoing gag. Finding things to blame on El Niño has become the equivalent of asking why the chicken crossed the road.

In the comic strip "Non Sequitur" two mice overlook a jumble of dead dinosaurs. The caption announces, "The latest dinosaur extinction theory" and one of the mice says, "El Niño." Another comic from *Parade Magazine* shows a small boy standing beside a smashed vase as he says to his mother, "It wasn't me... It was El Niño." It goes on and on, with different situations, but the same conclusion: Blame it on El Niño. One final situation will serve to make — and summarize — the point. In *High Country News*, Mike Thompson of the Montana Fish, Wildlife and Parks Department was quoted as saying that hunters who were unsuccessful at bagging game should blame El Niño, since that

excuse "works for most everything."

What these jokes play on is a valid scientific phenomenon that El Niño is demonstrating and, because El Niño is attracting extensive coverage, widely publicizing. El Niño is showing that the workings of the world are incredibly complex, with many events and occurrences often interrelated, a cause on one side of the earth setting off an effect on the other side. Sufficient evidence exists to blame El Niño for drought in Australia, forest fires in Indonesia, and the failure of the fish harvest in South America. Closer to home, El Niño is blamed for encephalitis outbreaks along the U.S. east coast, increased rattlesnake bites in Montana and shark attacks along the Oregon coast, not to mention a greater incidence of spine injuries among California surfers fooled by altered ocean floors.

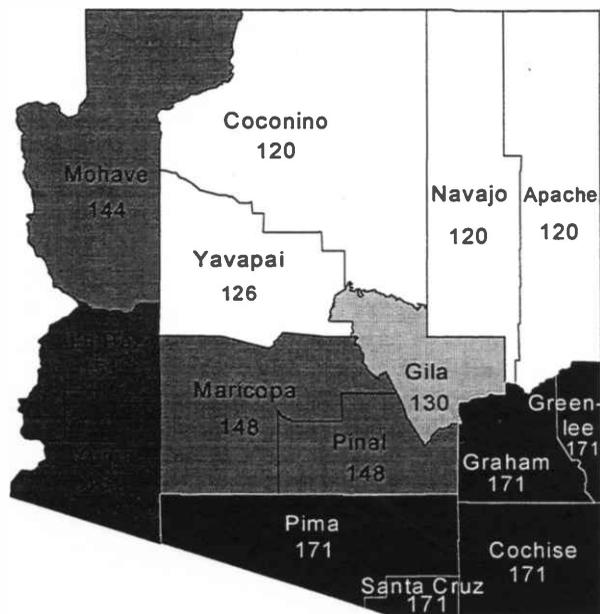
In a sense, the El Niño jokes then are a takeoff on reality. If El Niño could in fact cause an increase in rattlesnake bites, it might also be held responsible if a hunter failed to shoot an elk. But perhaps El Niño jokes are expressing a suspicious, even critical attitude about the phenomenon. By interpreting El Niño as some sort of meteorological communist conspiracy theory, its sinister influence and effects at work all over globe, the jokes may be expressing skepticism of what science claims are El Niño's true effects. Considering that 11 percent of the U.S. population claims to have seen UFOs and 17 percent believe that the July Mars landing was a fake, the ranks of those who are distrustful of science may be surprisingly large.

Finally, El Niño serves a cultural purpose in its marketing potential. A garage on Santa Monica Boulevard in Los Angeles sports a billboard offering a seasonal special: a "Ready for El Niño" oil change, wiper blades and brake-job package, all for \$115. An ad in the *Tucson Monthly* is headlined with snow-covered letters stating, "El Niño is Coming," The

text warns, "They say it's not a threat, but a promise! El Niño, that wrecker of weather havoc, has already been blamed for floods, cold and all around miserable weather across the country." Relief, however, is at hand with the purchase of a new gas heater. El Niño, the trickster, is thwarted.

Mark Twain is oft quoted as saying, "Everybody talks about the weather, but no one does anything about it." With people doing more things with the weather, Twain might now long for the old days when people just talked about it.

Average El Niño Precipitation January-March
As A Percentage of 102-Year Normal



The graph shows average El Niño year precipitation for January through March as a percentage of average precipitation over the last 102 years. El Niño years used to obtain the El Niño year average include 1915, 1919, 1941, 1958, 1966, 1969, 1973, 1983, 1987, and 1992. As is shown, southern Arizona generally receives more precipitation compared to normal during El Niño years than does northern Arizona, with the storm track pushed further south as a result of El Niño conditions.

El Niño and Global Interaction

This season's El Niño demonstrates the subtle interconnection of earthly phenomena. The following stories interpret El Niño beyond strictly atmospheric and meteorological boundaries.

Volcanoes Once Said to Cause El Niños

Although scientists have yet to discover what causes El Niños, they know enough about the phenomenon to disprove some El Niño origin theories. One such theory attributed El Niños to the eruption of volcanoes on the earth's surface. A related theory considered eruptions on the ocean floor — known as deep-ocean vents — as modifying ocean temperatures, thus causing El Niños.

The volcano origin theory arose because recent El Niño events closely followed the eruptions of volcanoes. Mount Chichon in Mexico erupted in February, 1982, preceding the 1982-83 El Niño. Also, Mount Pinatubo erupted in the Philippines in June, 1991, and was followed by El Niño of 1991-92. Scientists determined, however, that no cause and effect linked volcanoes with El Niños.

They noted that volcanoes often erupted in different areas of the world, with one very likely to be occurring whenever an El Niño is building up. The simultaneous occurrence between the two events thus is coincidental. Also, increasingly sophisticated computer modeling has demonstrated that El Niños are a natural mode of variability of the ocean-atmosphere system. An external process such as a volcano is not needed to explain El Niños. Some scientists believe, however, that volcanoes, by erupting large quantities of dust into the stratosphere, likely modify El Niños, possibly in important ways.

With regard to deep-ocean venting, researchers now believe that their heat contributes to the long-term evolution of ocean conditions. The effects of this source of heat, however, are felt

over decades, even centuries, and not on the relatively short timescale of El Niño formation.

El Niño Linked to Disease Outbreaks

Increased information on El Niño has enabled scientists to better understand the profound effect climate variability has on the occurrence of diseases affecting humans, animals, and plants. For example, some scientists believe that the occurrence of Hantavirus, a disease that emerged in the Four Corners area in NE Arizona has an El Niño link. Hantavirus has a 60 percent mortality rate.

Hantavirus appeared following the heavy El Niño-related rains of 1993. The heavy rains by themselves would not have caused a problem except they occurred following six years of drought. Drought conditions had devastated populations of owls, snakes and other rodent predators in the Southwest. With an increased food supply following the rains and the absence of predators, the deer mouse population, which carried Hantavirus, exploded.

This situation is similar to what occurred in southern Africa, where heavy rodent infestations closely followed El Niño years of 1976, 1983 and 1993, with severe effects on the human population of the area.

India's population suffered devastating effects from recent El Niño conditions. Summer temperatures hovered around 124 degrees Fahrenheit, well above the normal 80-90 degrees. The three-month monsoons then created conditions favorable to breeding malaria, dengue fever and pneumonic plague. More than 4,000 people died from these three diseases.

The good news is that, with greatly improved methods of forecasting El Niños, public health personnel will be better prepared for the possible outbreak of diseases. By integrating health surveillance with environmental and climatological monitoring, early action can be taken to reduce the morbidity and mortality of infectious diseases.

SW Wildfires Relate to El Niño Cycles

Researchers have found a correlation between the El Niño/Southern Oscillation (ENSO) patterns and the occurrence of wildfires in the U.S. Southwest. Thomas Swetnam of the Laboratory of Tree-Ring Research, University of Arizona, and Julio Betancourt of the Desert Laboratory, U.S. Geological Survey, examined tree ring records extending back to 1700. Tree rings indicate El Niño years by enhanced tree-ring growth, and local surface burns are recorded in tree rings as fire scars.

A fire scar index for the Southwest from 1700 to 1905 showed widespread occurrence of fire across scattered fire-scar sites during specific periods. This suggested climate as an influencing factor. The researchers then found a good correlation between area burned and the Southern Oscillation Index (SOI).

Fire and climatic records between 1905, the last year to be included in the above fire scar index, and about 1960 also show a high correlation between the SOI and annual area burned. After the 1960s the record is less clear because total area burned increased and became less variable, possibly because of the occur-

rence of more human-caused fires or the added accumulation of fuels resulting from fire suppression policies.

Swetnam and Betancourt examined both the high tree growth and low fire occurrence years often associated with El Niño as well as the low tree growth and high fire occurrence years often associated with La Niña, the cool phase of the ENSO cycle associated with dry conditions in the Southwest. This broader view allowed them to identify a pattern linking El Niño precipitation and the occurrence of forest fires. They found that years of increased fires were often fueled by prior years of wet conditions, when tree-ring growth and production of grass fuels were high. The reverse pattern was evident during reduced fire years, and may be explained by less fuels being produced in dry years, and subsequent reduced fire activity in wet years.

The delay between ENSO events and occurrence of burning in certain areas enables forest managers to take action to reduce the threat of wildfire. They can schedule control fires or improve fire readiness in response to El Niño or La Niña conditions. For example, based on La Niña conditions of fall 1995 and forecasts for a dry southwestern winter and spring, emergency funds were obtained to combat a heavy 1996 fire season.

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strong taste of El Niño in the fall. Some recent reports are conveying another story. A January 16 Associated Press story headlined "El Niño Not Dead Yet" reports that recent data and images from the Topex-Poseidon satellite indicate that as of January 8 the warm water mass in the Pacific Ocean has shrunk considerably from its November peak. Topex-Poseidon interprets sea surface height as a measure of water temperature. The story suggests that this El Niño may be waning.

Also the Multivariate ENSO Index (MEI) has dipped from its highpoint in July/August and now is below the 1982-83 event for intensity. Ongoing comparisons have been made between the MEI index for the current El Niño and the event of 1982-83, with the two events engaged in a "horse race" to determine which would be the strongest in this century. It now appears that El Niño 1982-83 is the winner.

The above MEI data, however, aside from its sporting application to a "horse race," may predict El Niño's likely effect in the West. It has been suggested that when the MEI responds in this fashion, with an early and steep rise that reaches a peak early in the two-year cycle, heavy precipitation tends to occur in December, with more precipitating occurring later in the spring.

Whether the MEI does in fact anticipate this precipitation pattern — some critics believe MEI has not yet been thoroughly tested — some weather officials have noted that a December with heavy precipitation is sometimes followed by a period of normal, possibly even below normal precipitation, before increasing again in March and early spring.

Meanwhile precipitation did increase in Arizona during December. For example, six significant storms affected the Tucson metropolitan area, making this December the eighth wettest on record, with 2.88 inches of precipitation recorded, or 269 percent of the normal 1.07 inches for December.

U.S. Weather Service forecast calls for precipitation amounts for southeast Arizona during December through March to be about 180 percent of average. The average precipitation during



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this time period is 3.95 inches; El Niño events in the past average seven inches. Associated with this increase in precipitation, temperatures are expected to be a couple of degrees below average.

The wet December, however, does not necessarily portend increased El Niño activity in Arizona. Weather officials warn that a longer perspective is needed to determine likely El Niño developments. For example, January was well below average precipitation. Officials believe that observations at least through February are needed to attempt an accurate forecast of the conclusion of this El Niño. February began with ample rain.

El Niño predictions also must contend with the question of flooding. Many areas of the state are prone to damage caused by floods, which have occurred during both El Niño and non-El Niño years. In response to this concern, the U.S. Weather Service recently conducted a study that examined the occurrence of flooding in the Tucson area during El Niño years. Reviewing the 12 El Niño years from 1914 to 1997, the report found that flooding occurred during only three of those years or 25 percent of the time. The occurrence of El Niño-related precipitation this spring therefore will not necessarily be accompanied by flooding.



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