Bay Breezes

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Summer/Fall 2010 October 2010

Inside this issue:

Newly Developed La Niña Continue through the Winter

by Warren Blier *Science and Operations Officer*

The terms El Niño and La Niña refer to the large-scale ocean-atmosphere climate phenomenon linked to periodic warming and cooling of sea-surface temperatures across the central and eastern equatorial Pacific. El Niño represents the warm phase of the El Niño/Southern Oscillation (ENSO) cycle, and is sometimes referred to as a Pacific warm episode. The cool phase of this cycle, corresponding to a Pacific cold episode, is called a La Niña.

The term "El Niño" (Spanish for "the Christ Child") was originally used by fishermen along the coasts of Ecuador and Peru to refer to a warm ocean current that usually developed each year around Christmastime and then lasted for several months. Fish are less abundant during these warm intervals, and thus fish catches diminished. In some years, however, the water would be especially warm and result in much poorer than normal fish harvests persisting into May or even June. Over

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Local forecaster dispatched to Gulf Oil Spill

by Matt Mehle *Incident Meteorologist*

As an incident meteorologist, summer months are typically spent monitoring fire weather conditions and being dispatched to wildfires around much of the Western United States. However, this past summer was different given the relatively cool conditions, above normal fuel moistures and lack of large wildfires. On April 20th the oil rig, Deepwater Horizon, experienced an explosion and catastrophic fire. By April 22nd the oil rig capsized and sank with crude oil spilling into the Gulf of Mexico. The NOAA Deepwater Horizon Reponse began in earnest right after the incident occurred. As one could imagine, weather would play a crucial role in clean up and containment efforts. NOAA's response included weather and oceanic support from, but not limited to, local forecast offices along the Gulf Coast,

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Current La Niña

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time, the term "El Niño" has come to be reserved for just these exceptionally strong warm intervals that occur irregularly and only once every 2 to 7 years. With further analysis, it became evident that a mirror-image sort of event also sometimes occurs – with significantly cooler than normal sea surface temperatures across the central and eastern Pacific. In recent years the term "La Niña" has become commonly used for these cold episodes. Literally this means "the Little Girl," but the underlying motivation was simply to have a term that sounded like the opposite of "El Niño."

NOAA's Climate Prediction Center (CPC), which is part of the National Weather Service, considers El Niño/La Niña conditions to occur when the monthly average sea-surface temperature departure exceed +/-0.5°C (0.9°F) in the east-central equatorial Pacific [the region between 5°N - 5°S and 170°W – 120°W, the so-called Nino 3.4 region] along with consistent atmospheric features. These anomalies must also be forecasted to persist for 3 consecutive months. (By historical standards, to be classified as a full-fledged El Niño or La Niña episode, these thresholds must be exceeded for a period of at least 5 consecutive overlapping 3-month seasons.)

El Niño and La Niña are naturally occurring phenomena that result from interactions between the ocean surface and the atmosphere over the tropical Pacific. Changes in the ocean surface temperatures affect tropical rainfall patterns and atmospheric winds over the Pacific Ocean, which in turn impacts the ocean temperatures and currents. The El Nino and La Niña related patterns of tropical rainfall cause changes in the weather patterns around the globe.

During a strong El Niño, ocean temperatures can average 2°C – 3.5°C (4°F – 6° F) above normal over the tropical Pacific between the date line and the west coast of South America (bottom left map). These areas of exceptionally warm waters coincide with the regions of above-average tropical rainfall. In contrast, during a La Niña temperatures average 1°C – 3°C (2°F – 5°F) below normal over the eastern equatorial Pacific. In turn, this large region of below-average temperatures coincides with the area of well below-average tropical rainfall.

For both El Niño and La Niña, the tropical rainfall, wind, and air pressure patterns over the equatorial Pacific Ocean are most strongly linked to the underlying sea-surface temperatures, during December-April. During this period the El Niño and La Niña conditions are typically strongest, and have the largest impacts on U.S. weather patterns.

El Nino and La Niña episodes typically last approximately 9-12 months. They often begin to form during June-August, reach peak strength during December-April, and then decay during May-July of the next year. However, some prolonged episodes have lasted 2 years and even as long as 3-4 years. While their periodicity can be quite irregular, El Niño and La Niña events occur every 3-5 years on average.

Current La Niña

Over the past several months, a La Niña event has been developing across the equatorial Pacific Ocean. For the 4-week period ending 2 October 2010, the most recent available at the time of this writing, SSTs were at least 1.0°C below average between 165°E and the South American coast, with some

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Current La Niña

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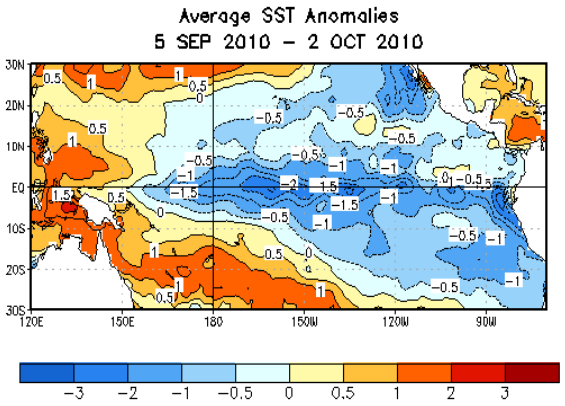

Figure 1. Average SST anomalies (°C) for the period 5 September – 2 October 2010 across the equatorial Pacific Ocean.

areas recording departures more than 2.0°C below average east of the International Date Line. At present, the developing La Niña event would be categorized as weak-to-moderate. However, latest computer model projections indicate it will continue to intensify over the next few months, and be moderate-to-strong during the coming winter season.

Moderate-to-strong La Niña winters tend to be associated with four significant impacts on the atmospheric flow across the eastern North Pacific and North America. The first is amplification of the climatological mean wave pattern of large-scale upper level ridges and troughs -- and thus increased meridional (poleward or equatorward) orientation of the upper-level flow. The second is enhanced likelihood of "blocking activity" over the higher latitudes of the eastern North Pacific – occurrence of persistent large-scale upper-level ridges of high pressure. There also tends to be greater-than-usual variability of the strength of the jet stream over the eastern North Pacific. And finally, the mean jet position entering North America tends to be displaced northward to the Pacific Northwest.

The typical La Niña-associated winter season weather conditions across North America are shown in Figure 2. For California in particular, the odds of it being a drier than normal winter increase, especially for the southern 2/3 of the state. The chances of episodes of significantly colder than normal weather also increase – as a result of occasional westward shifts of the more frequent high-amplitude "blocking

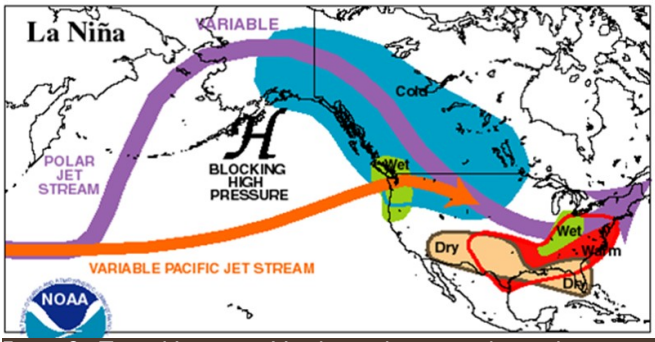

Figure 2. Typical January – March weather anomalies and atmospheric circulation during moderate-to-strong La Niña.

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Current La Niña

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highs" over the eastern North Pacific.

It is interesting to note, however, that a number of the biggest floods of record in the central Sierra Nevada Mountains have occurred in La Niña winters. This is not necessarily inconsistent with the winter as a whole being drier than normal, as large floods can be generated in just a few days, and the weather pattern during that time may poorly represent the overall character of that winter season.

A key question then for our presently developing La Niña event is how strong it will become over the coming months. Latest observations and dynamical computer-model forecasts indicate it will likely increase in magnitude over the next few months, and then continue through the Northern Hemisphere winter of 2010-11 as a "strong" event (Figure 3). At least for all but the northern-most portions of our state then, chances of this being a drier-than-normal winter season are increasing.

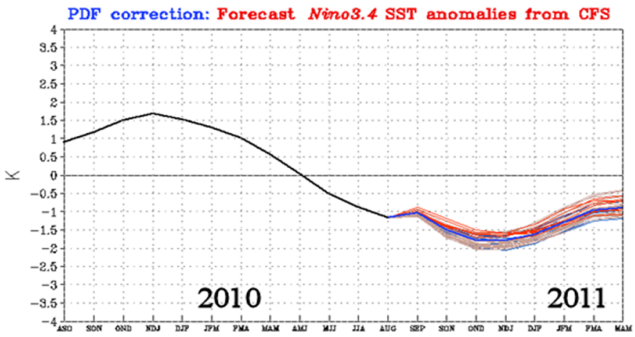

Figure 3. NOAA/NWS National Center for Environmental Prediction (NCEP) Climate Forecast System ensemble forecast SST anomalies for the Nino 3.4 region (the east-central equatorial Pacific between 5°N - 5°S and 170°W – 120°W).

Monterey Forecast Office hosts 'Building Relationships Workshop'

From August 31st to September 1st,, the Monterey Forecast Office hosted a workshop in San Francisco that was designed to foster better working relationships with west coast National Weather Service Offices, Coast Guard and general mariners. During the two day workshop, open discussions helped to highlight how mariners use marine forecasts to make decisions. Through this dialogue ideas were discussed on how to create a centralized location or 'one-stop shop' to better utilize marine information and forecasts. Once the workshop had ended participants hope to keep the open dialogue even after returning to their home offices.

Participants of the workshop gathering in front of the Oakland Bay Bridge

Local forecaster dispatched to Gulf Oil Spill

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NOAA's Scientific Support Team, NOAA's Office of Response and Restoration, National Data Buoy Center and on-site incident meteorologists(IMETs). During the month of July I had the privilege of being dispatched to the Deepwater Horizon MC 252 oil spill in the Gulf of Mexico as an incident meteorologist. The general mission of this dispatch was very similar to wildfire dispatches; protect personnel working in the field from weather hazards like lightning and deteriorating weather conditions. Give that most incident meteorologist forecasts are for wildfires they tend to focus on relative humidities, temperatures, wind speed and wind direction. However, at the oil spill the current and forecasted sea state was one of the more important parameters given the proximity to the Gulf of Mexico. While working on wildfires IMETS work closely with fire agencies, but given the magnitude and impact of this incident along a major coastline I worked closely with the United States Coast Guard and Wildlife and Fisheries personnel. The experience I had while working at the oil spill response was extremely rewarding as I felt like 'I was doing my part'. For most of the year I work behind a desk so it's always nice to get out in the field and directly help people. It was also rather impressive to see thousands of people from all over the United States work together to help clean up the Gulf and Gulf Coast.

About to take a recon trip around the Mississippi Delta

Workers cleaning up oil on a beach

More info on the Web:
deepwaterhorizon.noaa.gov

How cold has it been?

by Matt Mehle

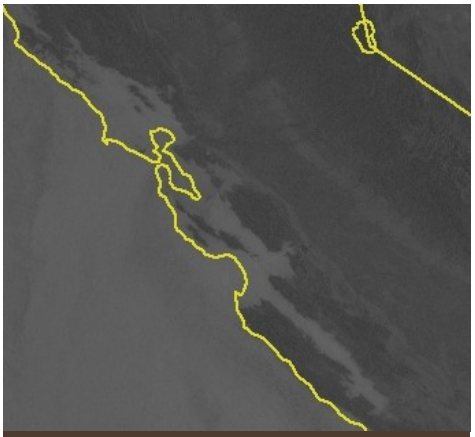
A famous quote simply stated, "The coldest winter I ever saw was the summer I spent in San Francisco." Everyone in the Bay Area can probably agree with that statement since this past summer (June-August) has been one of the coolest on record. Like a log jam in a river, the flow across the United States remained stagnant resulting in the persistent cool temperatures. A large area of high pressure remained over much of the East Coast producing record heat while low pressure and an upper level trough remained over the West Coast with below normal temperatures. However, there was a brief taste of summer in late August when the trough weakened a few record high temperatures were set. The cool and moist conditions also led to a somewhat in active fire weather season. Despite continuing drought conditions across the Bay Area, the below normal temperatures and persistent coastal fog and drizzle kept wild fire activity to a minimum. This is the first summer out of the past few summers that has not had a large wild fire in the Monterey Forecast Area. However, there were a few grass/brush fires but they were successfully contained with initial attack activities by fire fighting agencies.

In addition to below normal temperatures, a few days of light precipitation occurred along the coast. Granted, only a few hundredths of an inch were recorded, but these values were close to setting a few records for daily rainfall.

Summer 2010 Rankings

	Average High	Average High Ranking	Years of Record
Monterey	63.8	1	60
San Rafael	75.8	1	60
Mount Diablo	78	1	57
Oakland Museum	69.6	4	38
Santa Rosa	77.7	4	108
San Jose	78.7	10	86
San Francisco	64.7	32	136

Above is a table that compares the 2010 summer average to other notable years.*



Typical visible satellite image from this past summer

*data compiled by D. Dykema and D. Henderson

Camp Parks Wildland Fire Training School 2010

by Matt Mehle

To get ready for the wildfire season firefighters go through rigorous training and early June was no exception. For over 15 years, firefighters from all over the Bay Area have attended a 'live' fire training exercise at Camp Parks near Dublin, CA. This year over 300 firefighters and emergency personnel participated in the event. Throughout the two day training exercise rookie firefighters and veterans alike are able to practice wildland firefighting tactics and techniques.

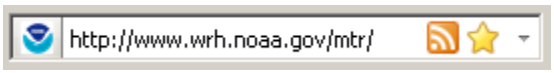
In recent years, the National Weather Service in Monterey has given support to the wildland fire exercise by providing weather forecasts. On wildfires, weather is one of the most variable components and hardest to predict. A well composed and accurate weather forecast is essential for firefighter safety. Weather conditions can also determine how a wildfire will likely behave and what strategies firefighters use to attack it. This year the National Weather Service in Monterey was able to send one of their two in-house Incident Meteorologists (IMET) to Camp Parks. An IMET is a meteorologist who can be rapidly deployed for disaster response or wildfire support to provide on-site weather forecasts. In addition to an IMET, local researchers took advantage of the 'live' fire training to conduct field experiments. Assistant Professor, Craig Clements, and two graduate students from San Jose State used a variety of weather instruments to measure atmospheric conditions in and around a passing fire front. Through their research they hope to better understand atmospheric conditions near wildfires and how wildfires behave.

40 foot Weather Tower with several instruments on it

Checking the instruments to see what data was collected

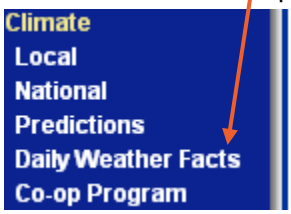
For more photos: http://www.wrh.noaa.gov/mtr/camp_parks

New on the web!



Weather Fact of the Day

Where to find it: On the WFO Monterey Homepage under climate

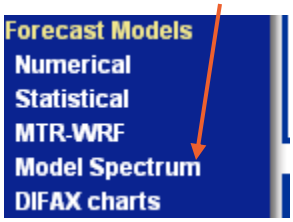


What is it: A webpage to highlight notable or extreme weather across The Bay Area for each calendar day

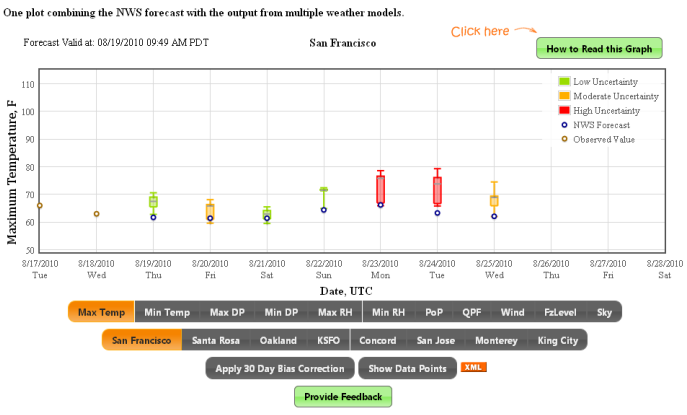
EXAMPLE

Model Spectrum

Where to find it: On the WFO Monterey Homepage under forecast models



What is it: A webpage that shows a graphical depiction for various outputs for multiple computer forecast models



Coming Soon: Spotter Training

10/28—Half Moon Bay	7:30 PM	11/13—Hollister	1:30 PM
11/10—Morgan Hill	7:00 PM	11/20—Dublin	1:30 PM

For Specific Details and Directions please visit
http://www.wrh.noaa.gov/mtr/skywarn/skywarn.php

NOAA Cycling Wins!

Congratulations to Steve Anderson, founder of NOAA Cycling, on his win at the Central Coast Mountainbike race in Monterey on Sunday May 16th.

Steve is using these spring and summer races to get ready for the 2010 cyclocross season that starts in September and continues through January. His main goal will be to race in the Cyclocross National Championships in Bend Oregon at the end of the year.

Steve crosses the finish line.

For the Glory! Atop the winners podium.

NOAA CYCLING TEAM
catch the momentum

On the Web: noaacycling.org

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Editor:
Matt Mehle

Mailing Address

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San Francisco/ Monterey Bay Storm Spotters:

Anytime you observe any of the adjacent weather conditions, please call us with your report.

Please include your name and spotter number when calling.

Check us out online at: http://www.weather.gov/sanfrancisco

New mailing address? New e-mail address? New Phone number?

Dear Spotters,

If you have recently moved, changed e-mail addresses or received a new phone number please inform Matthew Mehle, Spotter Program Manager. Updating your information will ensure that the Monterey National Weather Service will be able to keep you up to date on the latest spotter training sessions, newest edition of Bay Breezes and much more.

Corrections can be sent to Matthew Mehle at matthew.mehle@noaa.gov