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# California Cumulonimbus

Spring 2015

## Welcome Message

by Jimmy Taeger



**Map of California divided up into different CoCoRaHS regions. Each region has one or more coordinators. (Source: CoCoRaHS)**

Flowers are in bloom and the days are getting longer which means...it's time for another edition of the *California Cumulonimbus*! The *California Cumulonimbus* is a biannual newsletter for California CoCoRaHS observers that is issued twice a year; once in the spring and once in the fall.

This edition contains articles on the summer climate outlook, an observer spotlight, a low elevation snow weather event in SoCal, the El Niño advisory, the continuing California drought and spring in the North Bay area.

If you're not a CoCoRaHS volunteer yet, it's not too late to join!

CoCoRaHS, which stands for Community Collaborative Rain Hail and Snow network, is a group of volunteer observers who report precipitation daily. Not only is it fun, but your report gives vital information to organizations and individuals such as the National Weather Service, River Forecast Centers, farmers, and others.

Visit [cocoahs.org](http://cocoahs.org) to sign up, or e-mail [Jimmy.Taeger@noaa.gov](mailto:Jimmy.Taeger@noaa.gov) for additional information.

Enjoy the newsletter!



## Observer Spotlight: Bob King

by Jimmy Taeger

Since 2009, Bob King has been an active and loyal observer to CoCoRaHS family. Bob was born just after WWII in Oakland, CA, and taught high school math for 37 years at a small school outside of Sacramento. In 2007, Bob moved to Humboldt County where his daughter Sherry, son-in-law Manny, and grandsons Caleb and Colton live.

Sherry was involved in water resources, the weather, and tsunami education, and was the one who originally signed them up to be a part of CoCoRaHS in 2009. Bob quickly took up the responsibility

of the daily observations, especially since the gauge was just 20 feet from his bedroom door. At first, Bob was mainly interested in reporting precipitation when it fell, but then quickly realized the importance of reporting zeros each day. He said, "...if we don't record the zeros, no one will know if rain fell those days or if unrecorded rainfall numbers were just ignored."

Thank you, Bob, for sticking with CoCoRaHS all of these years, and for reporting precipitation when it falls and also when it doesn't.



Rain gauge required for the CoCoRaHS network.



## Low Elevation Snow in SoCal

by Stefanie Sullivan

On December 30<sup>th</sup> and 31<sup>st</sup>, 2014, a rare and exceptional snow event occurred in Southern California. This wasn't your typical winter storm with 1-2 feet of snow blanketing ski resorts with fresh powder. This was nearly a foot of snow in the south-west portion of the Inland Empire - the large valley comprised of portions of Riverside and San Bernardino counties, situated just east of Los Angeles and Orange Counties. Snow accumulations as high as 10 inches were observed around 1400 ft elevation, with light snow reported down to 1000 ft in portions of the southern Inland Empire and the northern San Diego County valleys.

A particular set of circumstances led to the pile up of snow in Wildomar and Temecula. On the night of the 30<sup>th</sup>, the cold low



Low elevation snow on the eastern slopes of the Santa Ana mountains viewed from Lake Elsinore. (Source: Colin Feeney)

pressure system was located just off the Southern California coast. Ample moisture from the Pacific Ocean wrapped around the east and north sides of the low, bringing widespread moderate to heavy rain to San Diego and southern Riverside Counties, where rainfall accumulations locally exceeded one inch. Snow levels were already expected to be fairly low with this system due to its Canadian origins and inland track to southern California, but something else happened that night to drive snow levels even lower. Because of the position of the low pressure system, north-east winds developed over the Inland Empire, ushering in drier air from the deserts at low levels. As precipitation fell through this drier layer, it evaporated and cooled the air, allowing the snow level to drop. The last factor in the heavy snow development in



Snow on palm trees and pool deck in Escondido at 1700 ft elevation. (Source: Lindy Klengler)

Wildomar and Temecula was orographic lift. These cities are located near the eastern foothills of the Santa Ana Mountains, which divide the Inland Empire and Orange County coastal plain. Winds over these areas moved from east to west. As the air flow encountered the mountains from the east, it was forced up the mountains, providing additional lift – and therefore heavier precipitation. It may be a while before these meteorological “ingredients” come together again. This event was certainly one for the record books.



Snow accumulating on I-15 near Wildomar. (Source: Will Wilkins)



## California Cumulonimbus

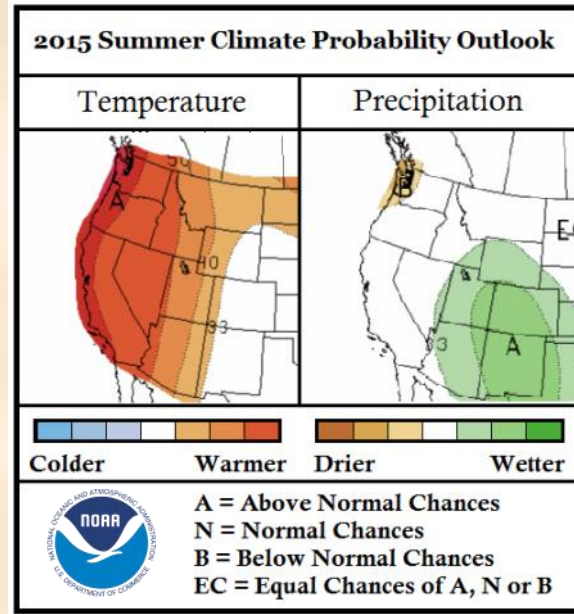
## California's Summer Climate Outlook

by Jimmy Taeger

Another warm summer may be churning for California this year. The summer (June, July and August) climate outlook issued by the Climate Prediction Center (CPC) on March 19th, 2015 is calling for a greater probability of above normal temperatures for the state of California, especially along the coast. A warmer than normal summer may not be very exciting for some Californians considering Old Man Winter didn't show his face much this year. Above normal sea surface temperatures may make for nicer beach days, but will also equate to warmer nights for coastal locations.

The forecast for precipitation is similar to last summer, with equal chances of above normal, normal or below normal precipitation forecast across the state. Given the current state of the drought, one can only hope for an active monsoon season with beneficial rains, but at the same time less flash flooding.

This summer, remember to stay cool and avoid working outside during the warmest time of day. Stay hydrated, wear loose-fitting clothing, and remember to never ever leave children or pets unattended in a vehicle. If you must use water for landscaping, water in the early morning before sunrise.



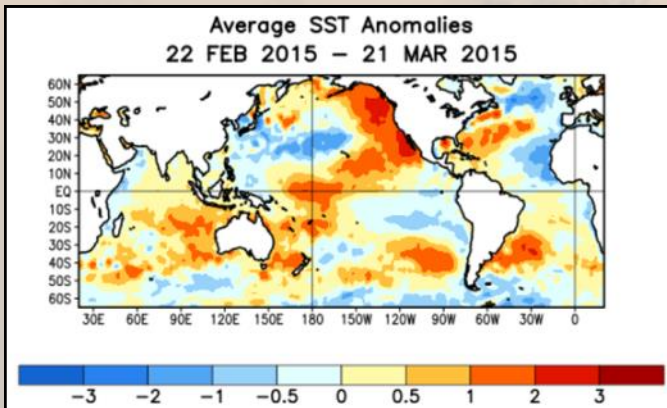
June, July and August temperature and precipitation probability outlooks from the CPC generated on March 19th, 2015. (Source: CPC)

## El Niño Advisory In Effect

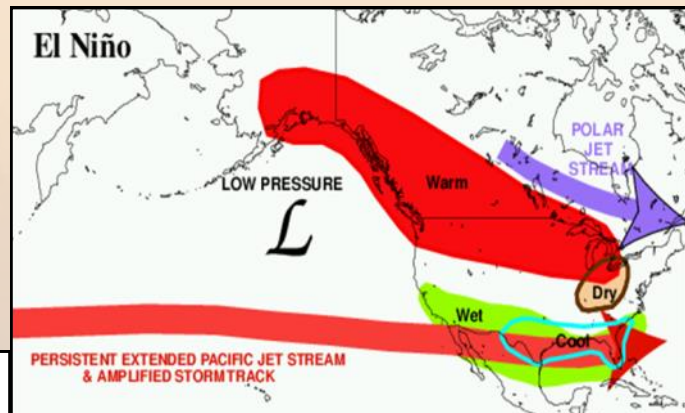
by James Thomas

It is official! The Climate Prediction Center (CPC) has upgraded their El Niño Watch to an El Niño Advisory. Sea surface temperatures (SSTs) in the eastern equatorial Pacific (referenced as Niño 3.4), have risen above their average value by more than 0.5 degrees C (image below). At 0.6 degrees C above normal, this is to be considered a weak El Niño.

In the past, weak El Niño events have lead to a mixed bag of results for California, with little influence on large scale weather



From February 22, 2015 to March 21, 2015, equatorial SSTs were above average in portions of the Niño regions. (Source: CPC)



Typical January through March weather pattern during an El Niño. (Source: NOAA)

patterns. California has seen both years of flooding and years of drought during weak El Niño years. Typically, it takes a moderate to strong El Niño before California experiences a stronger subtropical jet and an abundance of precipitation (image above). SSTs 1.0 degree C above normal equates to a moderate El Niño, and 1.5 degrees C a strong El Niño.

According to the CPC, there is an approximately 50-60% chance that El Niño conditions will continue through Northern Hemisphere summer 2015.



## California Cumulonimbus

**Dodging the Drops: The Continuing California Drought**

by Chris Stachelski

**I**t started off promising and in some cases, generous, however the precipitation that marked the early part of the 2014-2015 winter storm season in California was largely gone with the flip of the calendar to 2015. Following a record dry January in 2014, many locations beat these incredibly low totals this January! For example, downtown San Francisco, which has the longest set of continuous precipitation records in all of California dating back to 1849, only saw 0.06 inch of rain in January 2014. This past January this location saw no precipitation at all. The normal January precipitation for San Francisco is 4.50 inches.

Inland areas have also seen a lack of precipitation so far this year, resulting in historically low snowpack levels by March standards in the Sierra Nevada. With the primary storm season just about over, there is very little chance of a marked turn around in the state's primary water source to bolster the snowpack before the traditional summer dry season sets in.

Why has the drought continued? As was the case in recent winter seasons, it all comes down to the pattern in the atmosphere. For much of last winter and this winter, an area of high pressure aloft has been sitting off the coast of California blocking storms

from moving in directly from the Pacific. When storms have come close enough to the state, many have tracked along or just offshore of California and lacked a significant moisture tap. As a result, many areas have been spared precipitation or seen only light amounts.

The ongoing drought continues to challenge water supplies across the state with many lakes and streams seeing very low levels and flows. Some small communities have run out of water. The drought has also impacted agriculture production, recreational abilities in areas that depend on snowpack or high enough lake levels, as well as the movement of key fish species. Additionally, the warm weather that has dominated much of the winter has pushed many areas of the state into an increased risk for wildfire development, especially in central and southern sections of the state.

Occasionally, the monsoon season will bring a significant enough push of moisture to trigger thunderstorms in inland parts of the state. However, this may only bring short-term, highly localized relief in instances of very heavy rainfall. Unfortunately for most of the Golden State, it will likely be a long, dry summer where all eyes remain focused on water.

***“Inland areas have also seen a lack of precipitation so far this year, resulting in historically low snowpack levels by March standards in the Sierra Nevada.”***



**A California Department of Water Resources staff member conducts a snow survey of Sierra snowpack. (Source: California Department of Water Resources)**





## California Cumulonimbus

## An Early Arrival of Spring in the North Bay Area

by Debbie K. Clarkson

Here in the San Francisco North Bay except for a few days, spring definitely arrived early. The calendar recently changed to spring, however here in Marin,

Napa and Sonoma Counties all of the plants are acting as if spring arrived some time ago. We have had a few days with promising clouds, but very little measurable rain-fall and a splash of hail since December. I

want to thank all of you who continue to send in daily CoCoRaHS observations. The best way to show the early signs of spring are with pictures. Enjoy some scenes around the North Bay!



Many signs of spring around the North Bay area. (Source: Debbie K. Clarkson)





Marina Chetper



California Travel Guide



Walerian Walawski



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## California Cumulonimbus

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General Forecaster - NWS San Diego
- **James Thomas:** Author  
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### What is CoCoRaHS?

CoCoRaHS, which stands for Community Collaborative Rain Hail and Snow Network, is a non-profit group of volunteer precipitation observers. Anyone can join, and it's easy to report the information. All you need is a 4 inch rain gauge, the internet, and a few minutes each day. The website is easy to navigate and has different instructional materials for anyone to learn how to record an observation.

The site also has daily maps of observer's reports showing where precipitation fell the day before. It's fun to compare the different amounts of precipitation that can fall in an area from just one storm. Not only is the information interesting to look at, it is very valuable for organizations such as the National Weather Service, hydrologists, farmers and many others.

Visit [cocoahs.org](http://cocoahs.org) to sign up, or e-mail [Jimmy.Taeger@noaa.gov](mailto:Jimmy.Taeger@noaa.gov) for questions. Join CoCoRaHS, today!



Rain gauge required for the program.



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