

California Cumulonimbus

Fall 2013

Articles in this Edition:

Welcome Message 1

Observer Spotlight: Jim Baack 1

Flash Flooding in Riverside, CA 2

The North American Monsoon and California Summer Rainfall 3

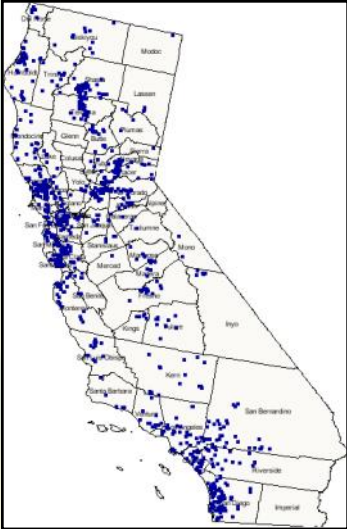
San Diego County Makes CoCoRaHS Map of the Day 3

What Does Winter have in Store for California 4

Early Season Southern California Fires 5

Welcome Message

by Jimmy Taeger



Map of current California CoCoRaHS observers as of Nov. 22nd, 2013. (Source: CoCoRaHS)

It's Fall and you know what that 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 winter climate outlook, the North American Monsoon, a rainfall event from this past summer, active fires this past Spring in southern CA, CoCoRaHS map of the day and an observer spotlight.

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 cocoRaHS.org to sign up, or e-mail Jimmy.Taeger@noaa.gov for additional information.

Enjoy the newsletter!



Observer Spotlight: Jim Baack

by Jimmy Taeger

Observing precipitation for CoCoRaHS is part of their daily routine, in the Baack household. Jim Baack and his two children, Kieran and Shannon, have been active in the network since 2008.

Jim works in Information Technology. He lives near Oakland in Piedmont, CA, with his wife, Michelle, and two children. He read about CoCoRaHS expanding into CA in the newspaper in 2008, and thought observing precipitation would be a fun activity to do with his family. Jim enjoys hiking, sailing in the Bay area, and cross-country skiing in the Sierras. He's always had an interest in weather, and was interested in joining CoCoRaHS after reading about it.

Now that Jim's kids are getting older, he plans on

having his younger niece and nephew help him with observations in the future since they live close by, and have an interest in the gauge.

Thanks, Jim, for being such an active observer!!!



Jim Baack and his two children, Kieran and Shannon next to their rain gauge. (Source: Jim Baack)



Flash Flooding in Riverside, CA

by Cindy Palmer

A very active thunderstorm season erupted across Southern California in the latter part of August and first part of September. Several of these thunderstorm events stand out as significant, but August 29th is one clear day where CoCoRaHS reports were extremely useful in verifying the radar estimates of the storm, even though they were not under the thunderstorm's core.

An abundant amount of tropical moisture filtered across Southern California during the day, with light flow at the surface. This allowed a sea breeze convergence zone to set up in the Inland Empire by midafternoon. Around 2:30 pm, a massive thunderstorm developed along the sea breeze convergence, over the City of Riverside, and a flash flood warning was issued just before 3 pm. One hour radar rainfall estimates showed between 2 and 2.5 inches fell in Riverside between 3 and 4 pm, bringing the storm total estimates to between 3 and 4 inches for this thunderstorm alone. This extremely heavy rainfall in a short amount of time caused serious flooding at the Riverside Community College, as well as in the surrounding area and across several major freeways during rush hour, damaging buildings and floating cars.

Unfortunately, the majority of this rainfall was not captured by the official gauges in and around Riverside. For example, the Riverside Airport did not measure any precipitation, and the March Air Force Base only measured 0.02 inches. Our CoCoRaHS

observers did a little better, with CA-RI-19 or 3.8 NW of Riverside reporting 0.06 inches and CA-RI-21 or 2.6 E of Riverside reporting 0.26 inches. The University of California Riverside gauge recorded the most, with 1.2 inches of rainfall. This one case is a great



A bicyclist in Riverside, CA riding through an area receiving flash flooding. (Source: Press Enterprise)

example of how variable rainfall totals can be within the vicinity of a thunderstorm. Forecasters use all the rainfall data, including the CoCoRaHS observations to verify events like this and double check radar estimates. Therefore, the National Weather Service (NWS) encourages CoCoRaHS observers to not only report daily rainfall totals, but also Significant Weather Reports during heavy rainfall events like this. These reports can give NWS forecasters real time observations, and useful information towards their warnings and verification.

“One hour rainfall estimates showed between 2 and 2.5 inches fell in Riverside between 3 and 4 pm...”



A flooded parking lot in Riverside, CA, which had a water depth of over 18 inches. (Source: Press Enterprise)



(Source: NOAA)

California Cumulonimbus

The North American Monsoon and California Summer Rainfall

by Stefanie Sullivan



Surface high pressure transporting moisture into California from the Southeast. (Source: ouramazingplanet.com)

The North American Monsoon, also referred to as the Southwest Monsoon, Arizona Monsoon, or Mexican Monsoon, is marked by an increase in precipitation over the Southwest US and Northwest Mexico, usually during the months of July through September. Surface heating in the Desert Southwest under the intense summer sun causes a thermal trough to develop

over the deserts, drawing up low-level moisture from the Gulf of California and the Eastern Pacific. When an upper level high pressure center sets up over the Four Corners region, East or Southeast flow on the south and west flanks of the high brings in mid-level moisture, usually originating in the Gulf of Mexico, into California.

Monsoon convection can account for a significant portion of annual rainfall in the deserts. For example, in Imperial, CA, the rainfall total for Oct 2012-Mar 2013 was 1.04 inches. In July-September 2013, they received 1.15 inches of rain! Monsoon storms are also fairly common in the mountains of California, resulting in a second weaker annual peak in rainfall – with the primary peak being during the cool season. Because the warm summer air is capable of holding much more water vapor than a cold winter storm, summer thunderstorms can produce very heavy rain – resulting in flash flooding.

These storms are not limited to the mountains and deserts. Under certain conditions, storms may develop over the valley and coastal portions of California, as well. This can occur when surface convergence boundaries and sufficient low level moisture exist, or when a mid-level trough with moisture and instability moves over the area. Summer precipitation from the monsoon can occur anywhere in CA, so don't forget to keep an eye on your rain gauge!



Thunderstorms over the San Diego County mountains. (Source: Stefanie Sullivan)

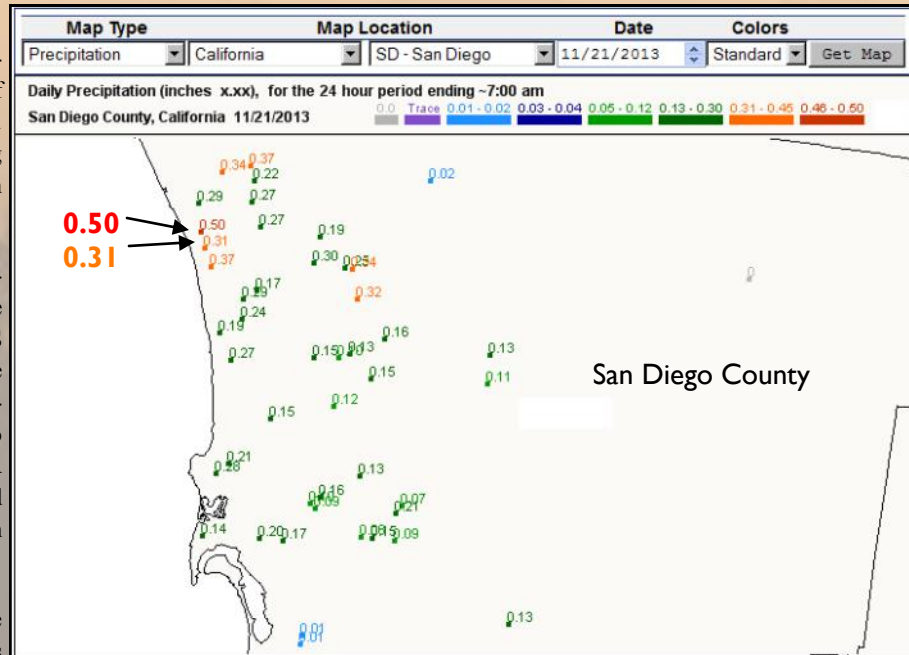
San Diego County Makes CoCoRaHS Map of the Day

by Jimmy Taeger

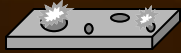
One of the main reasons why CoCoRaHS was founded was because of a lack of precipitation observations over many areas. This can pose a problem when analyzing where precipitation fell when amounts can vary dramatically from place to place.

On November 21, 2013, CoCoRaHS observers in San Diego County helped earn the honor of "Map of the Day" from CoCoRaHS headquarters. The map of observations to the right clearly shows how precipitation observations can vary in such a close proximity to each other. Two observers in Carlsbad, CA are less than two miles from each other, and yet one received 0.19" more precipitation than the other.

Great job and a big thank you to all of those who take the time to send their observations each and every day!



24 hour rainfall (in) in San Diego county, ending at 7:00 am on 11/21/13. (Source: CoCoRaHS.org)



What Does Winter have in Store for California?

by Chris Stachelski

Winter precipitation plays a dominant role in California's water supply. So, the outlook for winter is often highly anticipated with managing this precious commodity in the Golden State. Unlike many recent winters when an El Niño or La Niña was present, for this winter, the weather is forecast to be neutral with respect to conditions in the equatorial Pacific. Therefore while other oscillations may play a role in driving the large scale weather patterns that impact California during the winter at some point, such as the Madden-Julian oscillation, the major oscillations to watch for clues for winter precipitation this year yields no overwhelming signal as to what may occur in California.

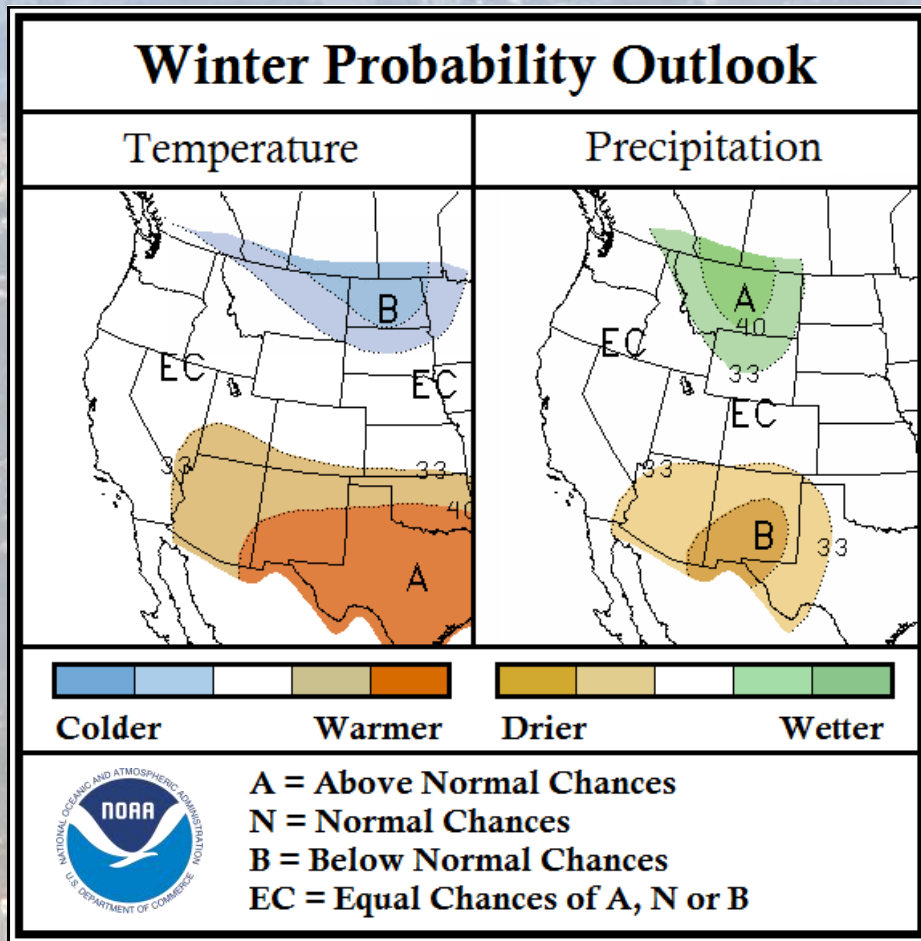
The official forecast from the Climate Prediction Center (CPC) calls for an equal chance of above normal, normal or below normal precipitation from December through February in California (with the exception of the CA/AZ border). As is typical in

many winters in California, there will be wet and dry periods, some of which may last for longer periods of time depending on what part of the state you live in. A closer look at neutral winter precipitation using a location near the geographic center of California, Fresno, shows that most neutral winters have had normal to above normal precipitation.

As for temperatures, most of the state has an equal chance to see above normal, normal or below normal temperatures for the December through February period based on the forecast from the CPC (with the exception of the CA/AZ border). A closer look at average temperatures for neutral winters in the past using Fresno as an example show that normal to above normal temperatures have prevailed in most neutral winters.



“The official forecast from the Climate Prediction Center calls for an equal chance of above normal, normal, or below normal precipitation ...”



Three-month temperature and precipitation climate probability outlook for December, January and February. Image created on November 21, 2013. (Source: CPC)



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Early Season Southern California Fires

by Jimmy Taeger



Picture of the Mountain Fire. (Source: Rob Balfour)



Picture of the Mountain Fire near Keenwild, CA. (Source: Ed Sherman)

Although Southern California's fire season can be year-round, the greatest number of wildfires typically occurs between September and November. The fall months are usually the driest across Southern California, and when very dry and warm Santa Ana winds develop, the fire danger can quickly rise from elevated to critical.

California's rainy season in the winter months and a deep marine layer in spring and summer help keep plants and trees

green. However, the 2012-2013 water year (July 1st-June 30th) was very dry, with many areas receiving well below average

“...the 2012-2013 water year was very dry, with many areas receiving well below average precipitation. This left a higher wildfire potential for the spring and summer.”

precipitation. This left a higher wildfire potential for the spring and summer.

Southern California was one of many places around the Golden State that had large wildfires in May, June, July and August.

The Mountain Fire near Mountain Center burned over 27,000 acres in July. Unless California receives closer to normal precipitation this winter, elevated fire danger will continue.



Source: smokeyzone.com

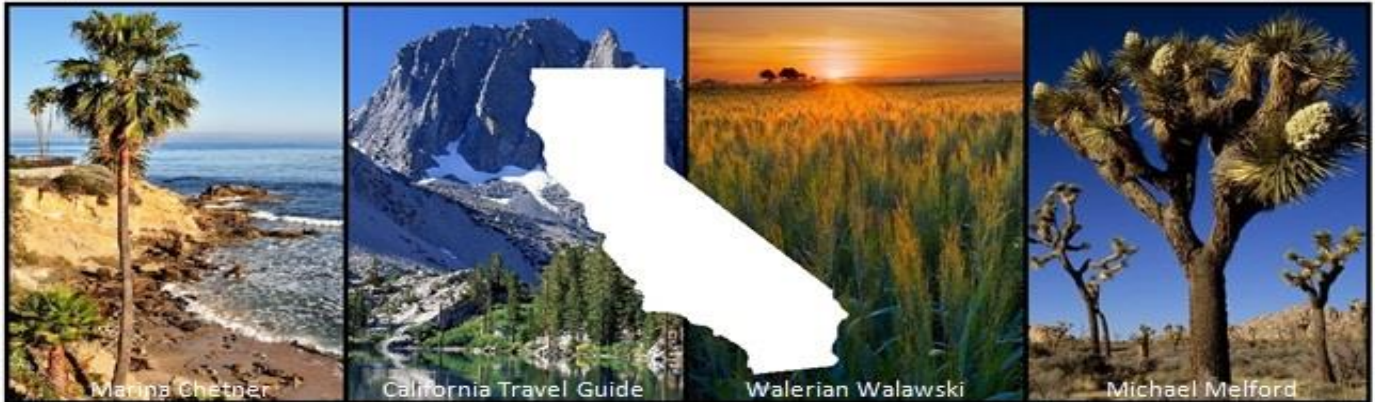
Large Spring and Summer Fires in Southern California: 2013

Name of Fire	Month of Occurrence	Acres Burned
General	May	1,271
San Felipe	May	2,781
Hathaway	June	3,825
Chariot	July	7,055
Mountain	July	27,531
Silver	August	20,292

Table of southern California wildfires from spring and summer of 2013. (Source: CalFire)



California CoCoRaHS



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California Cumulonimbus

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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 cocorahs.org to sign up, or e-mail Jimmy.Taeger@noaa.gov for questions. Join CoCoRaHS, today!



Rain gauge required for the program.



Find us on Facebook at

facebook.com/California.CoCoRaHS



cocorahs.org



weather.gov