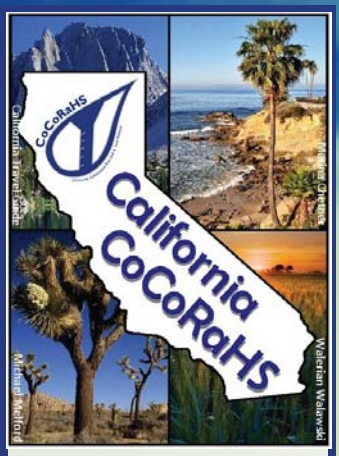


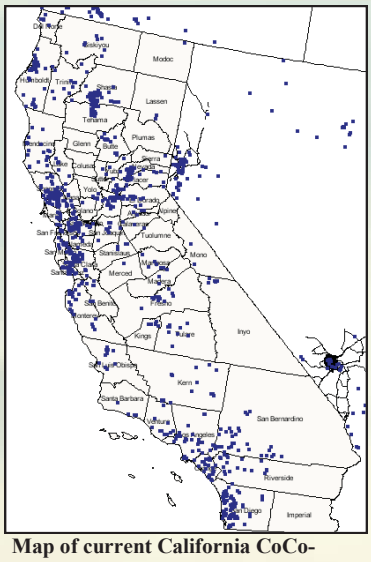
California Cumulonimbus

Fall 2012

Articles in this Edition:

Welcome Message

by Jimmy Taeger



Map of current California CoCoRaHS observers as of Dec. 5th, 2012. ***(Source: CoCoRaHS)***

It is with great pleasure to announce the first ever *California Cumulonimbus* newsletter for California CoCoRaHS observers! The newsletter will be issued twice a year; once in the spring and once in the fall.

Each newsletter will contain various articles ranging from past weather events to seasonal climate outlooks and more.

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.

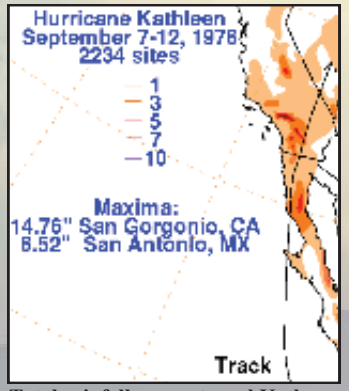
Visit cocorahs.org to sign up, or e-mail me at Jimmy.Taeger@noaa.gov for additional information.

Enjoy the newsletter!

Observer Spotlight: Laura Quarantiello

by Jimmy Taeger

As one of San Diego county's first CoCoRaHS observers, Laura Quarantiello has been regularly reporting precipitation since 2008. Laura was born near Los Angeles, but moved with her family in 1976 to San Marcos, where she currently resides today. She will never forget the day her family made the move to San Marcos. There were torrential downpours and gusty winds from the remnants of Hurricane Kathleen moving over as they made the drive.



Total rainfall amounts and Kathleen's track in 1976. ***(Source: HPC)***

Laura works as a Medical Transcriptionist, and also volunteers as a Park Ranger and SKYWARN Spotter. She loves watching the weather, and is intrigued by how quickly it can change. Laura is able to monitor the weather in her own backyard with her Davis weather station.

When not engaged with the weather, Laura enjoys photography, her amateur radio, and hiking with her dog.

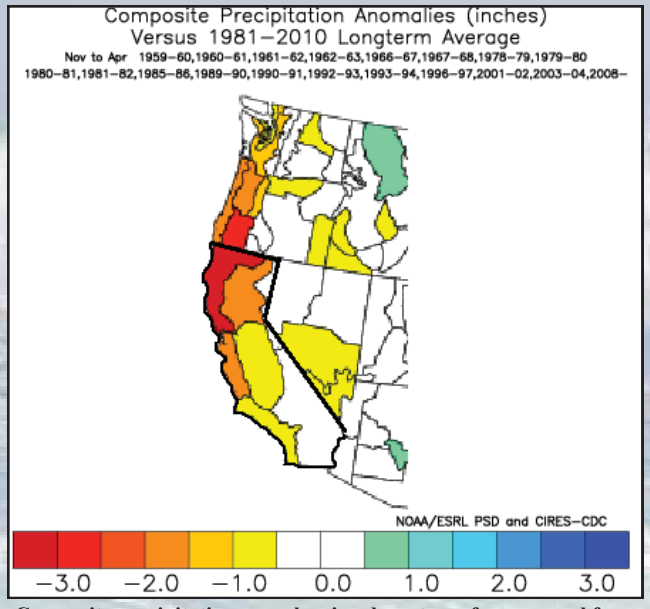
Thank you, Laura, for your hard work and dedication to being a great CoCoRaHS observer!!

Above are a few outdoor components of a Davis Weather Station. Some of which record wind speed and direction, precipitation, temperature and pressure. ***(Source: davis.com)***

ENSO-Neutral and California Winter Precipitation

by Chris Stachelski

The El Niño-Southern Oscillation, or ENSO, is a large scale ocean-atmospheric phenomenon linked to a pattern of temperature variations in the central and eastern Pacific Ocean near the equator. During the El Niño phase these waters are warmer than normal, while during the La Niña phase these waters run cooler than normal. Once the water temperatures in the equatorial central and eastern Pacific Ocean fall within a half degree Celsius on either side of what is defined as normal, the ENSO stage is considered neutral (where neither El Niño nor La Niña is occurring).



Composite precipitation map showing departures from normal for the western U.S. from November-April for ENSO-Neutral periods. (*Source: NOAA/ESRL-Physical Sciences Division*)

Looking back at past El Niños and La Niñas, some correlations of what is a more likely outcome in winter time precipitation have been noted. However, many of these have become stereotyped. For example, an El Niño winter in California is often viewed as a wet winter where flooding and mudslides are prevalent, but also some of the biggest flooding events have occurred outside of an El Niño winter. Although, there have been El Niños where well below normal precipitation was observed in California. For example, the 1976-1977 winter season ranks as one of the driest on record in California, and featured near record low snowpack in the Sierra Nevada. By contrast, one of the worst flooding events ever took place in the San Joaquin Valley just after Christmas in 1955 during a La Niña (which is typically correlated to be a drier than normal period). Therefore, caution must be given to conclusions drawn from the consensus of any phase of ENSO.

Using composite maps of precipitation departures, one can see that the overall November through April time period (which makes up the cold season in which the majority of California's precipitation falls) since 1950 where ENSO was in a neutral stage, precipitation in southern California was near normal, while precipitation averaged below normal in central and especially northern California.

Other various atmospheric phenomena can come into play during any winter season that can easily sway precipitation totals. One classic example of these is a conveyor belt of tropical or subtropical moisture from the Pacific. Known as an atmospheric rivers, they have been shown to produce extremely heavy precipitation in California, even in winter seasons where global signals favored a drier than normal winter. One such recent example occurred just before Christmas in 2010 over central and southern California when heavy snows blanketed the mountains and heavy rains fell in the lower elevations triggering widespread flooding.

In conclusion, although the general consensus points ENSO-neutral winter precipitation in California to be near normal to below normal, periods of wetter weather do occur.

The Mojave River washed out a bridge at Lenwood in December 2012 due to flooding from heavy rain, and snow in the mountains. (*Photo: John Fertsch*)

"Known as atmospheric rivers, they have been shown to produce extremely heavy precipitation in California, even in winter seasons where global signals favored a drier than normal winter."

The Importance of Reporting Daily

by Rand Allan

We all became CoCoRaHS observers because of our interest in the weather. However, when you keep weather records with CoCoRaHS, many others are depending on you to maintain accurate and timely reports. Engineers use your information to help design channels, retention basins, and bridges over rivers. Climatologists use your records to document the ever-changing climate. Hydrologists use your records in river flow models. Data analysts use it as a check on the accuracy of nearby observers' measurements. Finally, the new PRISM portal (recently introduced to CoCoRaHS) utilizes your data to continuously update a national climate model. This model uses the last 100 years of rain data as input to produce annual climate data (you can use this portal to compare your observations against the climate for your site).

Since many others depend on the data, it is important to enter observations not only when it rains but also when there is no rain. Excluding data during clear weather is treated the same as missing data, and prevents the data from being effectively used by others.

Clicking the 0.0 Precip box is an easy way to complete your records where no precipitation was observed for certain days. (*Source: CoCoRaHS*)

Consistent observations are important, too. Setting up a daily routine of a certain time to read and submit an observation can make reporting easier to remember, especially when rain does not occur for weeks at a time. Remember, zero rain is data, too. At the very least on regular intervals, click the monthly zeros tab, and click the check box on each day you know there was no rain to complete the records.

If you forget to take a reading during a storm, take it the next day at your regular time and record the amount as a multi-day reading. If something happens to the rain gage and you lose the rain total that fell during a storm, record it as missing data.

Remembering to enter an observation every day of the year helps to maintain complete records that can then be used by others. If all else fails, make a commitment to treat your observations like a diary of the weather for the day, like farmers used to do, and enter it every day. Note the sky conditions, observations on the changing of the seasons, or temperature changes. Even this information can be used by the researchers to tell a little bit about the climate in your area.

Happy observing! Let's all strive for 100% complete records.

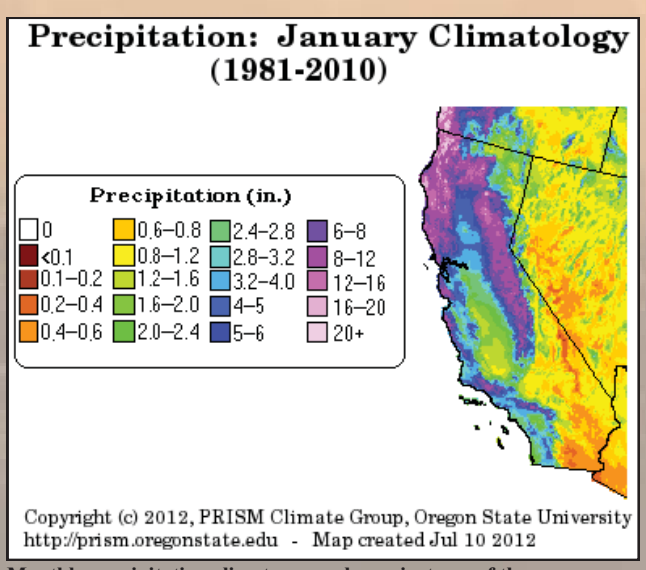
PRISM-CoCoRaHS Climate Portal

by Jimmy Taeger

CoCoRaHS volunteers can now view modeled precipitation climate normals (30-year averages) which uses their daily observations, and observations of others. PRISM, which stands for Parameter-elevation Regressions on Independent Slopes Model, is a computer model that was written by Chris Daly at Oregon State University in the early 1990s. The model generates maps of "normal" precipitation estimates, in addition to estimates of monthly precipitation totals, on a contiguous U.S. scale.

Data and maps are available to CoCoRaHS volunteers, and the link to PRISM can be accessed from the CoCoRaHS website. First, log into your account, and click "My Account". Next, under "My Stations" click PRISM Data. Then, you will be redirected to the PRISM Portal page where you can choose and pick the type of map you would like to view. Additional PRISM maps are available to the public at http://prism.nacse.org/.

If you get the chance, go check it out! The PRISM-CoCoRaHS Climate Portal is yet another way that your observations are used to benefit others. For additional information, visit http://cocorahs.org/PRISMportalFinal.v1.0..pdf.



Monthly precipitation climate normals are just one of the many maps available from PRISM. (*Source: http://prism.nacse.org/*)

Significant Flooding in Mecca, CA

by Tina Stall

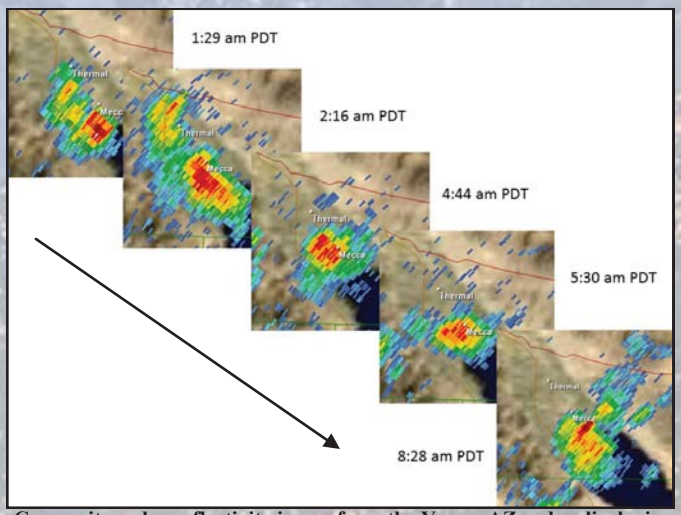
"...from approximately 1:00 AM through 9:00 AM...the storm produced 3.0 to 5.5 inches of rainfall near Mecca."

An upper-level low pressure area moving slowly northeast over the lower deserts, and an associated weak disturbance high above the surface triggered a slow moving thunderstorm in the lower Coachella Valley near the community of Mecca, CA (approximately 30 miles southeast of Palm Springs, CA) just after midnight PDT on September 11, 2012.

The storm remained nearly stationary from approximately 1:00 AM through 9:00 AM, and with abundant moisture present extending from the surface to about 25,000 feet the storm produced 3.0 to 5.5 inches of rainfall near Mecca. However, radar estimated rainfall was more in the range of 5 to 8 inches. Observed rainfall amounts included 5.51 inches at an Automated Local Evaluation in Real Time (ALERT) gauge 3 miles south of Mecca and 3.23 inches at another ALERT gauge about half way between Mecca and Thermal. Most of the rain fell between 1:00 AM and 5:00 AM, which resulted in rare and damaging flash flooding in the area. Approximately 15-20 mobile homes in the Duroville Mobile Home Park were damaged, as well as 15 classrooms and a few offices at the Saul Martinez Elementary School. An evacuation center was set up for the approximately 1500 people affected. A boil water message for the mobile home park was also issued. Several instances of roadway flooding were also reported, including 3 feet of water over Highway 111 south of Mecca, causing multiple road closures.

It is possible that the actual rainfall in areas from the storm over Mecca was over 6 inches. However, due to the lack of actual observations in the area, the higher radar estimates were not verified.

(*Source: NOAA*)



Composite radar reflectivity image from the Yuma, AZ radar displaying heavy precipitation (red and yellow pixels) falling near Mecca, CA on the morning of September 11, 2012.

(*Source: NOAA*)

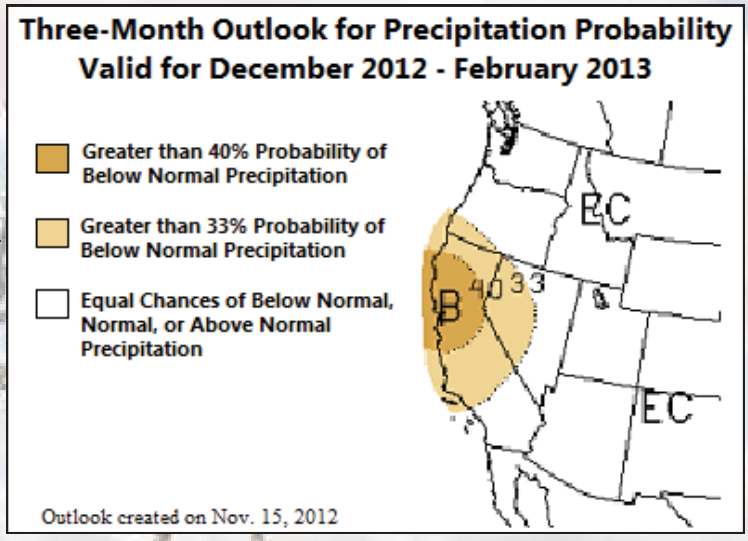
Flooded classroom at Saul Martinez Elementary due to a nearly stationary storm on September 11, 2012. (*Source: KESQ TV*)

Flooded mobile home park in Duroville, CA from a nearly stationary storm on September 11, 2012. (*Source: Desert Sun Newspaper*)

California's Winter Climate Outlook

by Stefanie Sullivan

It's hard to imagine that after of days of consecutive torrential precipitation in Central and Northern California in late November and early December of this year (with a few locations totaling over 20 inches of rain) the Climate Prediction Center (CPC) is calling for below normal precipitation in parts of California for December through February. So what gives? Don't look for any help from the El Nino Southern Oscillation (ENSO). What was once forecast to be a moderate El Niño has turned to neutral conditions that are expected to persist through the winter.



California is expected to receive near normal to below normal precipitation this winter. (*Source: CPC*)

However, there is still hope. While the dynamic climate models (think long term weather models) show a pattern that would result in greater chances of below normal precipitation for parts of California, a fair amount of variability between the different climate models remains. This means there is still some uncertainty in the precipitation outlook for "the golden state." Our winter precipitation will also depend on the phase of the Arctic Oscillation (AO), which is a measure of the difference in pressure between the northern polar region and the mid-latitudes. According to the CPC, the AO is unpredictable beyond one to two weeks, which also contributes to the uncertainty for California's upcoming winter precipitation.

Even if the CPC's winter precipitation outlook is correct, the areas that are highlighted for below normal precipitation for December, January and February are already over 3 inches above normal for the water year -to-date (since July 1) – including Eureka, Redding, Sacramento, and San Francisco. Some San Joaquin Valley and Southern California locations haven't been as fortunate to receive as much precipitation, with places like Fresno, Bakersfield, Los Angeles, San Diego, and Palm Springs currently heading towards an inch below normal.

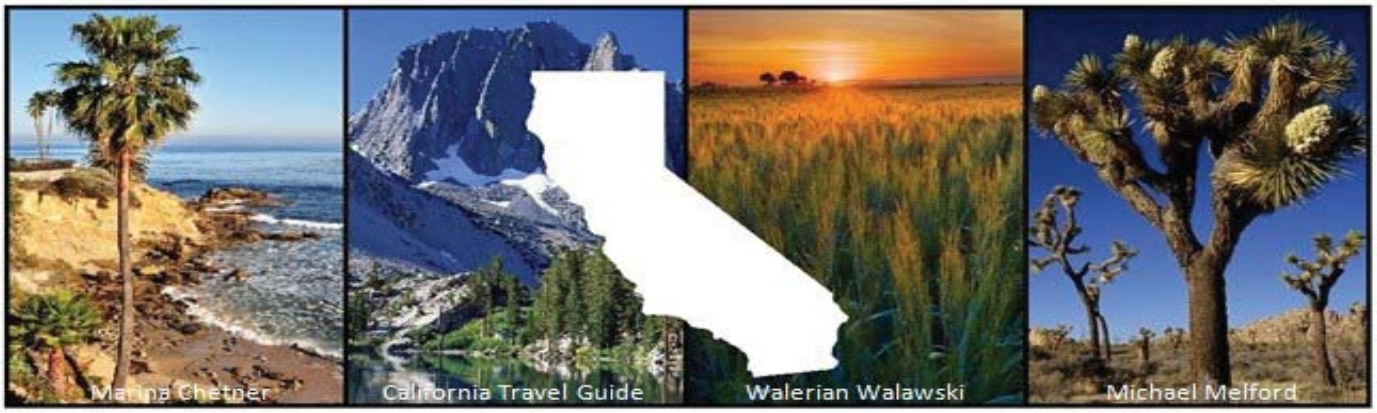
For short and long term temperature and precipitation outlooks, visit http://www.cpc.ncep.noaa.gov/.

Normal Winter Precipitation (in.) From 1981-2010

California Cities	December	January	February	Winter Season
Alturas	1.71	1.65	1.45	4.81
Bakersfield	1.02	1.16	1.24	3.42
Bishop	0.80	1.05	0.85	2.70
Crescent City	11.27	10.39	8.88	30.54
Eureka	8.12	6.50	5.63	20.25
Fresno	1.77	2.19	2.03	5.99
Los Angeles	2.05	2.71	3.25	8.01
Palm Springs	0.88	1.00	1.03	2.91
Sacramento Exec. Airport	3.25	3.64	3.47	10.36
San Diego	1.53	1.98	2.27	5.78
San Francisco Airport	4.03	4.19	4.06	12.28
Santa Barbara	2.94	3.50	3.96	10.40
Santa Maria	2.12	2.75	2.99	7.86
South Lake Tahoe	2.93	2.67	2.62	8.22

Table of monthly and seasonal precipitation normals (30 year averages) for various cities around California. The Climate Prediction Center is forecasting precipitation values near or less than the values above for this winter.

California CoCoRaHS



California Cumulonimbus

California Cumulonimbus Contributors: Fall 2012

- **Jimmy Taeger, California South Coast Coordinator - San Diego Region:** Editor, Template Designer and Author
  General Forecaster - NWS San Diego
- **Chris Stachelski, California Southeast Deserts Coordinator - Vegas Region:** Author
  General Forecaster - NWS Las Vegas
- **Rand Allan, California South Coast Coordinator - San Diego Region:** Author
  County of San Diego Flood Control
- **Stefanie Sullivan, CoCoRaHS Observer:** Author, Photographer of Background Pictures and Creator of Cumulonimbus Image
  General Forecaster - NWS San Diego
- **Tina Stall:** Author
  Meteorologist - NWS San Diego

What is CoCoRaHS?

Rain gauge required for the program.

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 record an observation.

The site also has daily maps 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!

Find us on Facebook at
facebook.com/California.CoCoRaHS

cocorahs.org

weather.gov