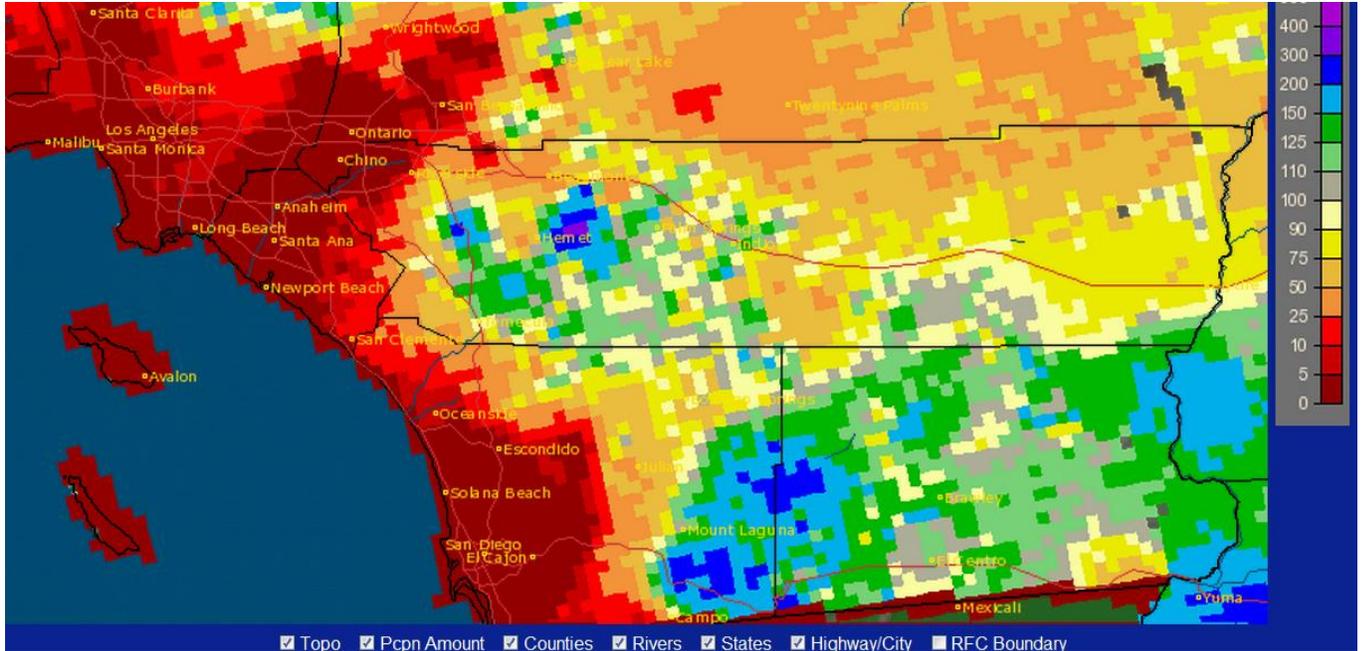
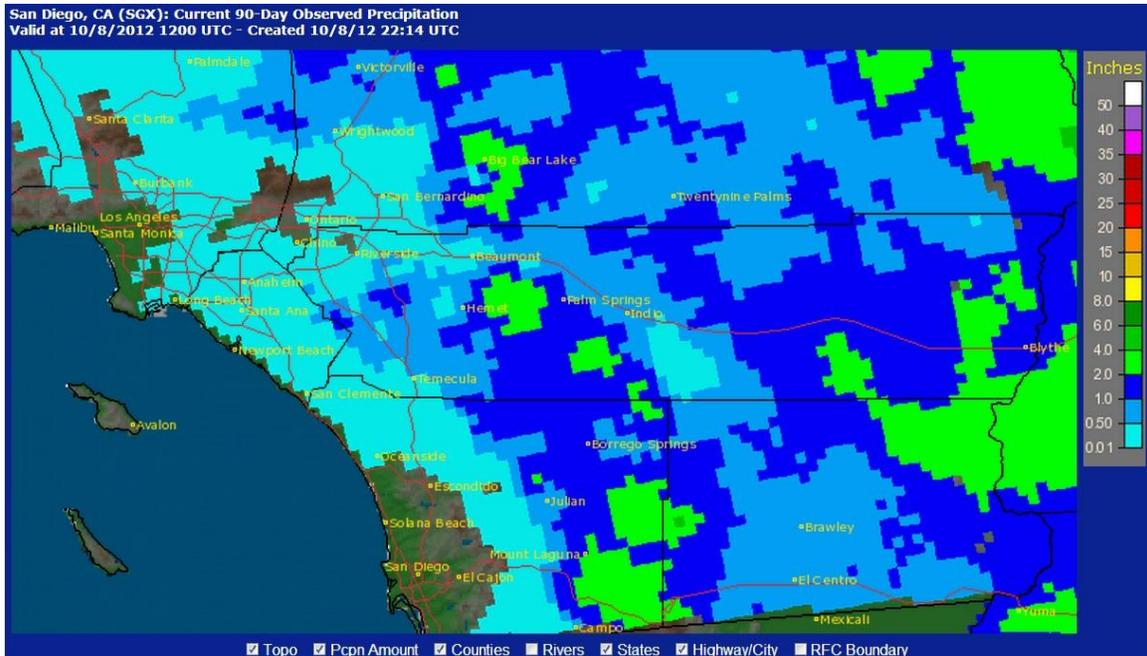


# Summary 2012 monsoon

Alex Tardy NWS San Diego



Past 60 days precipitation percent of normal as of September 21, 2012.



Precipitation total from July 8 to October 8, 2012.

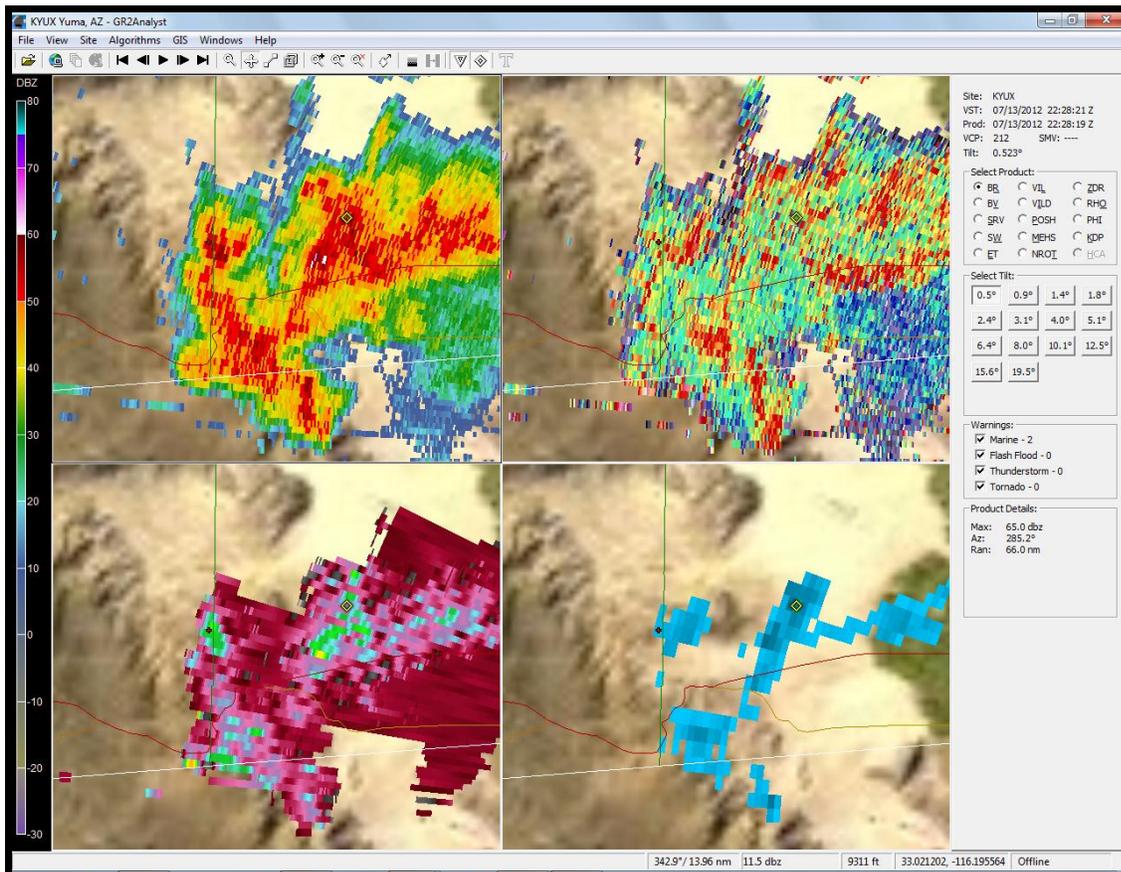
# July 2012

## Flash Flood Events and Urban and Small Stream Flooding

July 13: Big Bear City flooding around 5 am

Flash Flood (nocturnal)

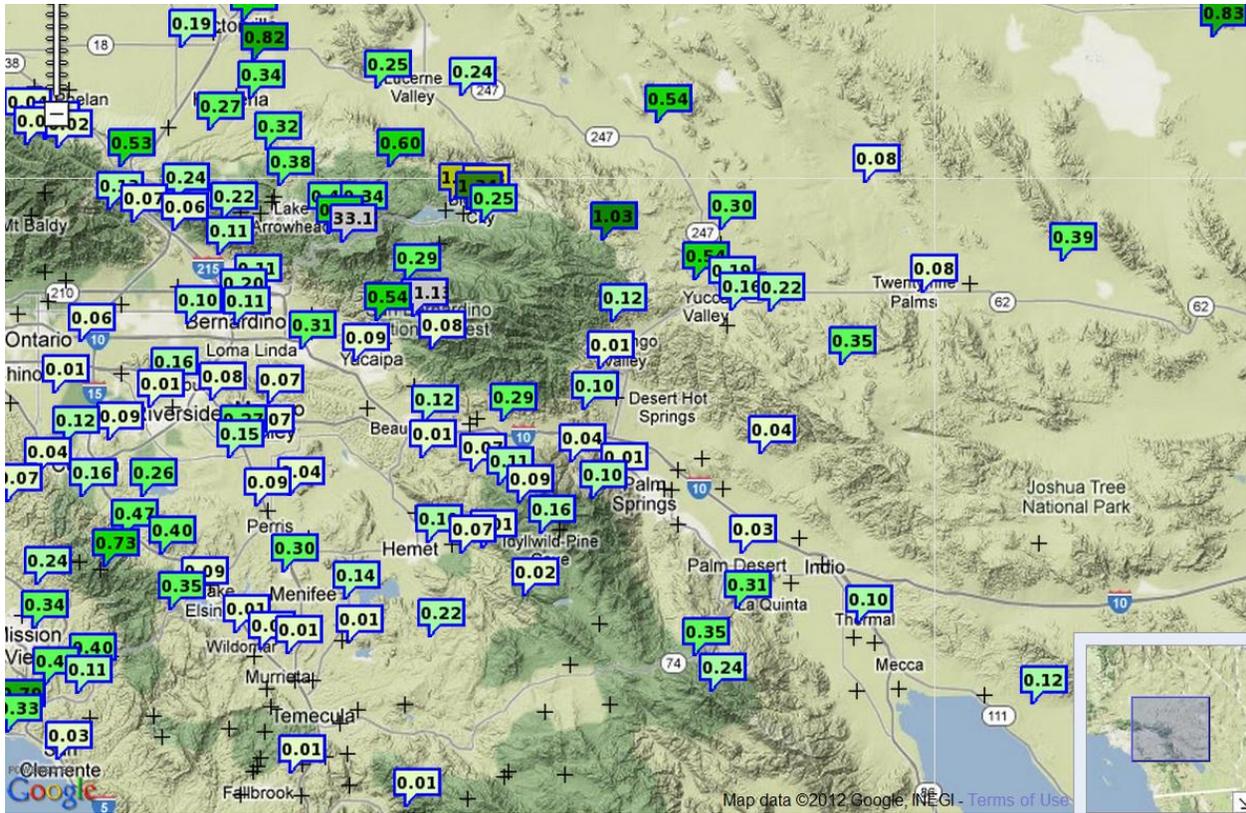
July 13: Imperial County border Flash Flood



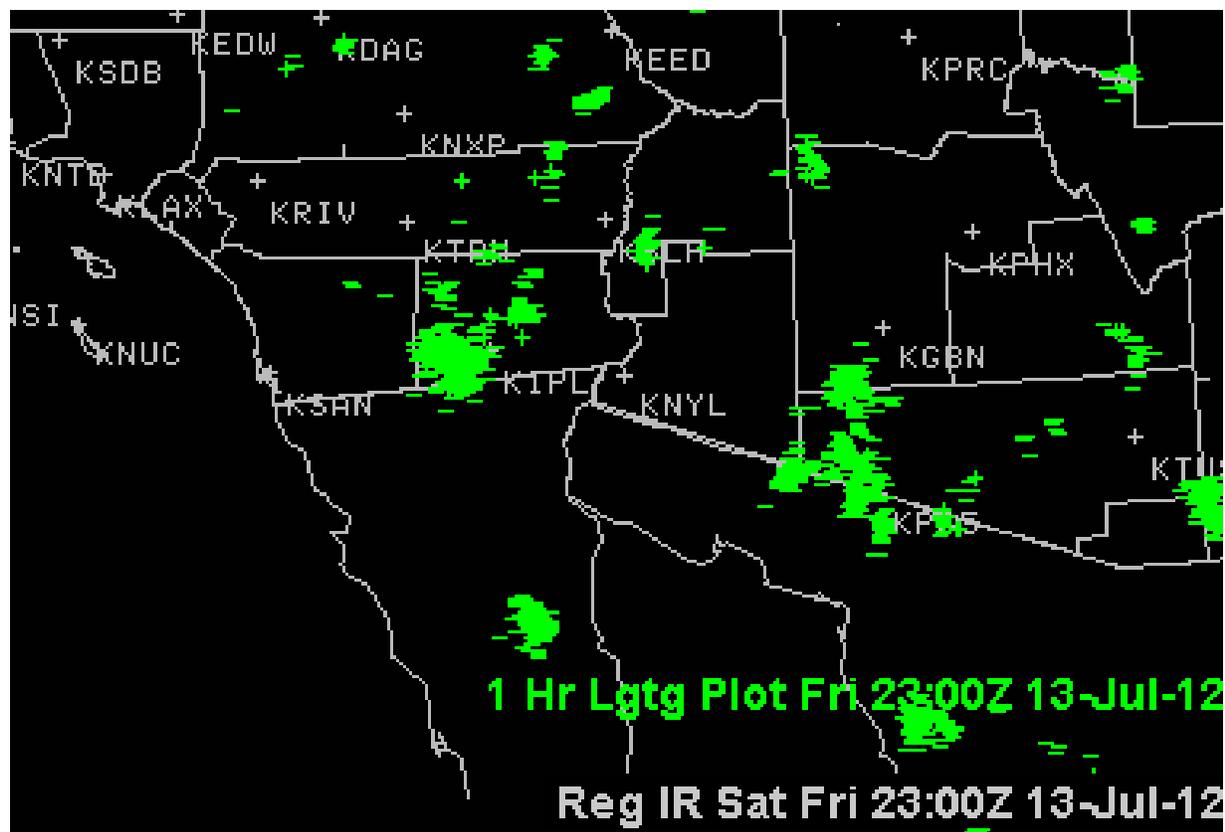
Radar image depicting the heavy rain that occurred along the count line.



**Near the Imperial and San Diego Counties line. Note the significant dirt along the edge of the road.  
Photos by Stefanie Sullivan. Flooding occurred on July 13.**



Rainfall totals for the nocturnal and daytime shower and thunderstorms on July 13. Note the rainfall across the Santa Ana mountains and adjacent valleys.



One hour lightning from 2 to 3 pm July 13. A few thousands cloud to ground strikes occurred along the western portion of Imperial County and along San Diego County.

# July 30-31 heavy rain event

July 30: near Julian mud and debris on S2 in Shelter Valley

July 31: water flowing over streets in Thousand Palms and Indio

July 31: Ocotillo Wells Anza Borrego State Park

**Major Flash Flood in caves (slots) and Fish Creek ranger district**

1.66 inches in 1 hour 10 miles north of Campo

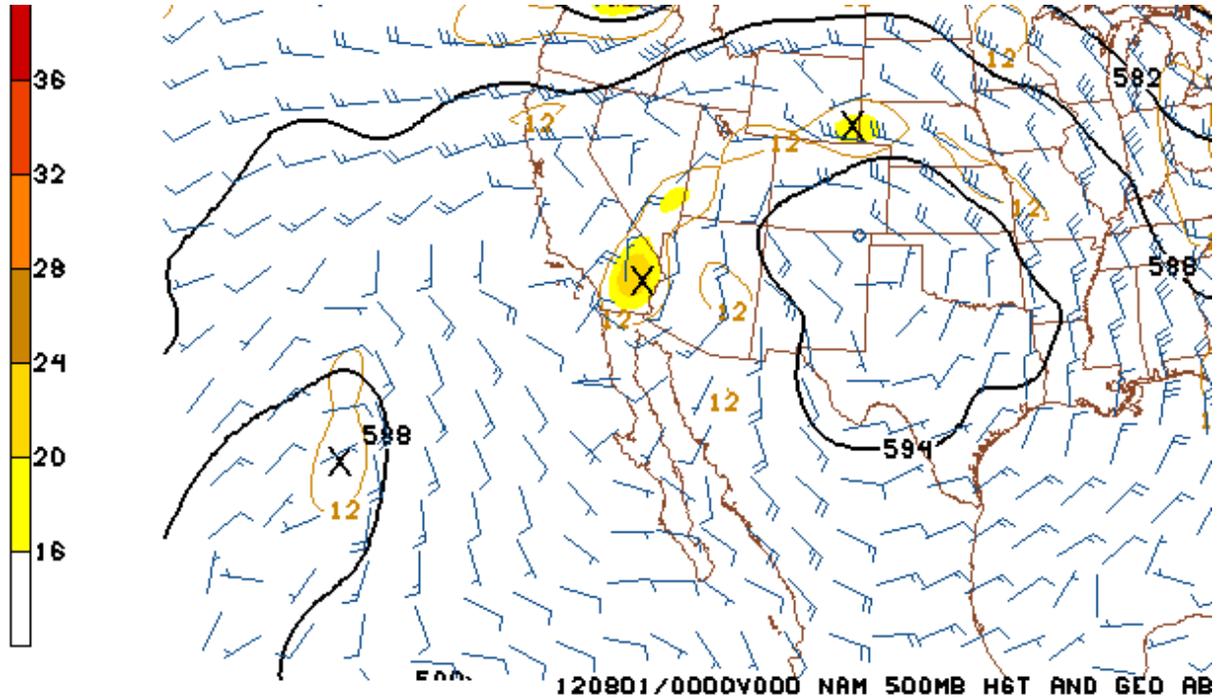
2 men in Silent Caves. 15 feet of water washed truck 1.5 miles.



This truck was swept down the Silent Caves and carried 1.5 miles in flash flood waters reported to be several feet deep.

July 31 – Heavy rain Coachella Valley in north flow (upper low)

Significant urban and small stream (possible flash flood)



Small upper low “caught” in the west side of the mean upper ridge (seasonal high pressure aloft), produced north to south moving thunderstorms in the Coachella Valley on July 31.

## August 2012

August 9: Wrightwood (Big Pines, Mt High in LA)

Urban and Small stream flooding (debris blocked culvert)

LADPW Rain Gauge	1.54 inches
Big Pines RAWS	0.91 inches
Weather spotter	0.68 inches

## Wrightwood



Photos by spotter Ron Heinig. Flooded roadways from flood waters in the creek and led to culverts blocked by debris.

**August 11 – Victorville and Big Bear**

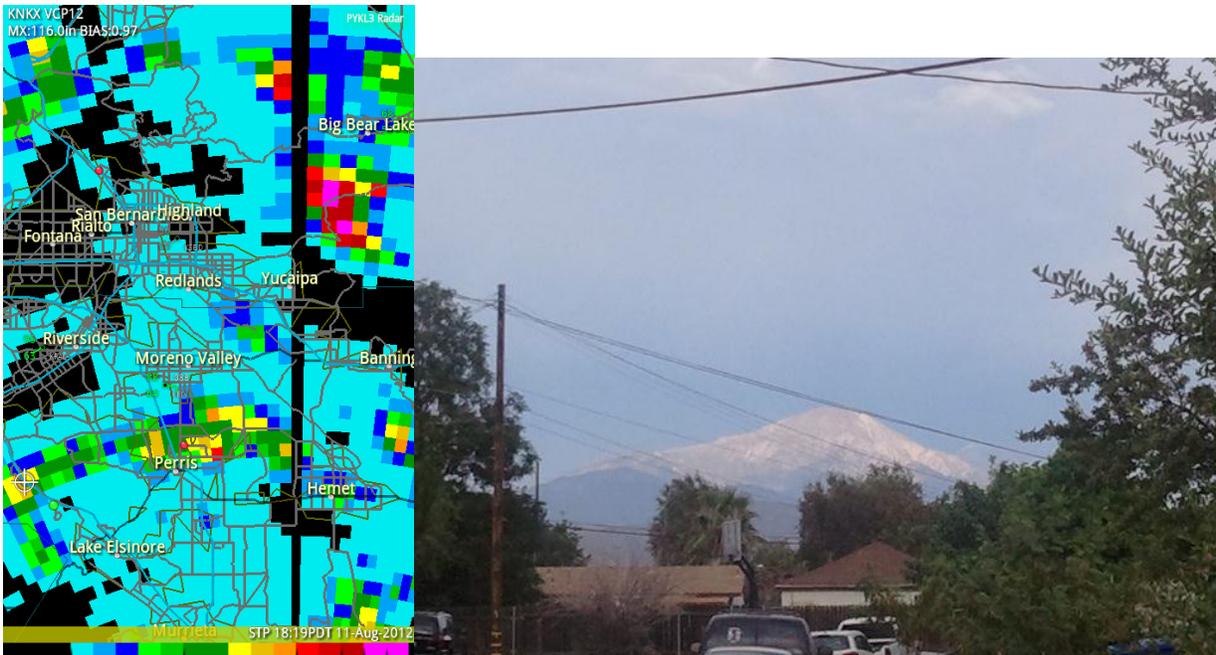
**Flash Flooding** in city (spotter reported)

**Significant Urban and Small stream flooding in Victorville**

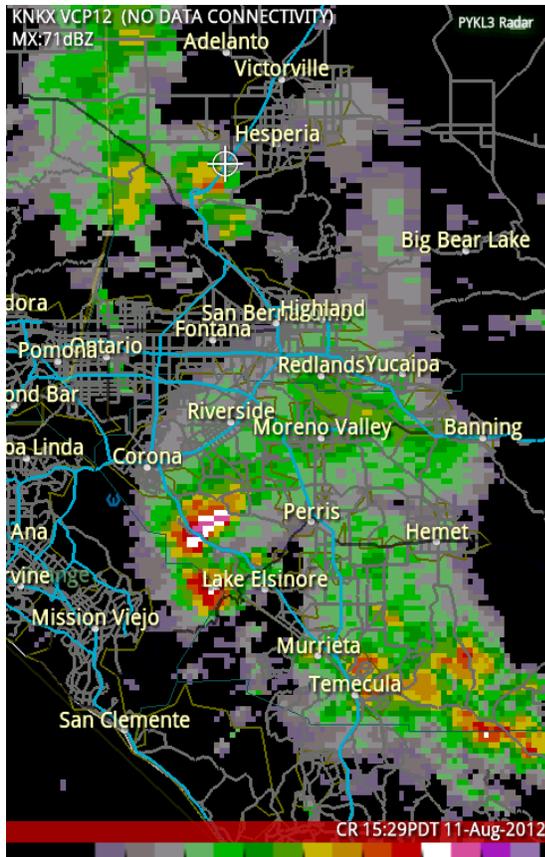


**WCM survey of thunderstorm impact and photos of significant street flooding**

**August 11 – Big Bear and Temescal**



**Hail over the San Geronio Wilderness and legacy storm total precipitation (KNKX). Photo from Weather Currents. New dual-pol radar estimates can eliminate the excessive precipitation estimated caused by hail in thunderstorms.**



Radar image (left) and MODIS satellite on right on August 11, 2012. The large storm over the eastern San Bernardino mountains (Big Bear) was stationary for 2 hours.

### Flash Flood

August 11, 2012 in Big Bear City with closure to Highway 38.





**This storm was anchored over the high terrain of Big Bear on August 11, 2012. Significant hail over San Geronio and flash flooding in Big Bear City. Photo view from Apple Valley by Alex Tardy.**



**This storm was moving slowing across Victorville (west side) and produced significant street flooding. Photo by Alex Tardy.**

Reported 88 mph gust Temescal RAWs (**investigated by Alex Tardy and large tree limbs down and a couple small trees down were found**). Photos taken by Alex Tardy.



Small tree down in neighborhood in Temescal. Minor flooding. Photos by Alex Tardy.

August 12

Minor Urban and Small stream flooding along Highway 74

Microburst (wet) damage (severe) and tornado landspout observed.

2 reported tornadoes (Perris and Lake Elsinore)

**WCM, Alex Tardy survey and photos of Glen Ivy Resort and Spa on August 11 (branches down and local flooding).**



**Along highway 74 between Lake Elsinore and Perris. Photos by Alex Tardy. Most widespread damage were downed powerlines in Nuevo near I-215, east of Perris.**

**Tornado video on YouTube:**

<http://www.youtube.com/watch?v=ZeZMdysRfjc>



**Upper right photo by Alex Tardy. Others posted by Press Enterprise.**

**Photos of funnel clouds (Lake Elsinore) not shown.**

**Video of tornado (landspout) in Nuevo (Menifee) on YouTube.**

**Video of downburst (lower right) east of Perris on YouTube.**

**Photos in upper left of damage (poles down) by Press Enterprise.**

**Photo in upper right and survey by Alex Tardy from Lake Elsinore to Perris**

**August 12**

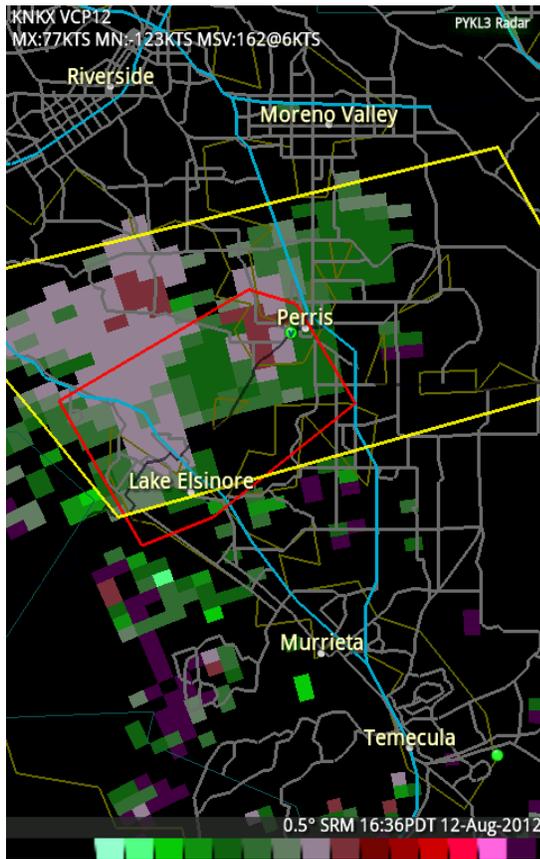
**Urban and Small Stream flooding in Apple Valley on Central and Tussing Roads**

**Severe thunderstorm**

Wind gust of 58 mph (SDGE site) and up to penny size hail reported.



August 12, afternoon thunderstorms near Warner Springs @ 2 pm (photos by spotter John Pedersen).



Radar storm relative velocity(wind speeds on Doppler radar) image at 1636 PDT on August 12.



**August 12 evening (photo by spotter Gabban). Thunderstorms continued in the deserts well into the evening hours on this date.**

**August 12 – Warner Springs**

**Flash Flooding**

**2 to 3 feet of water on S2 San Filipe road off (road closed at Highway 79)**

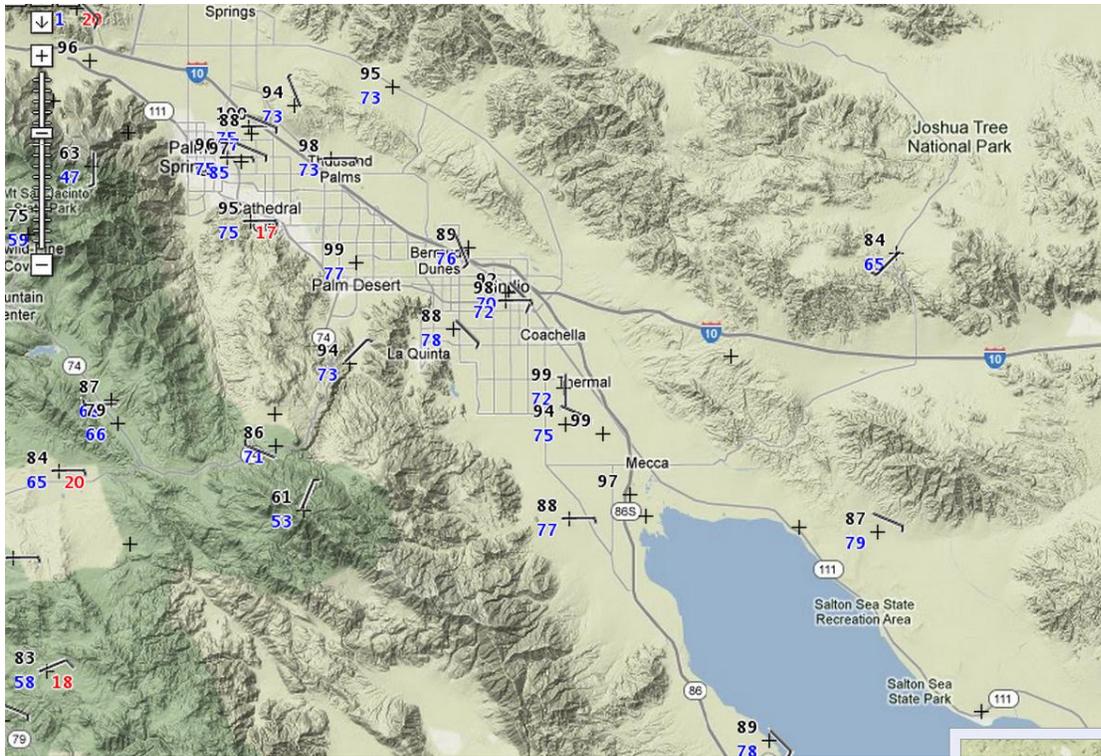
**August 13 –**

A police scanner reported that a 3 foot wall of water came down near Forest Falls and Angelus oaks. Police evacuated people that were down at the bottom of the Santa Ana river. Estimated to have occurred between 230 pm and 300 pm.

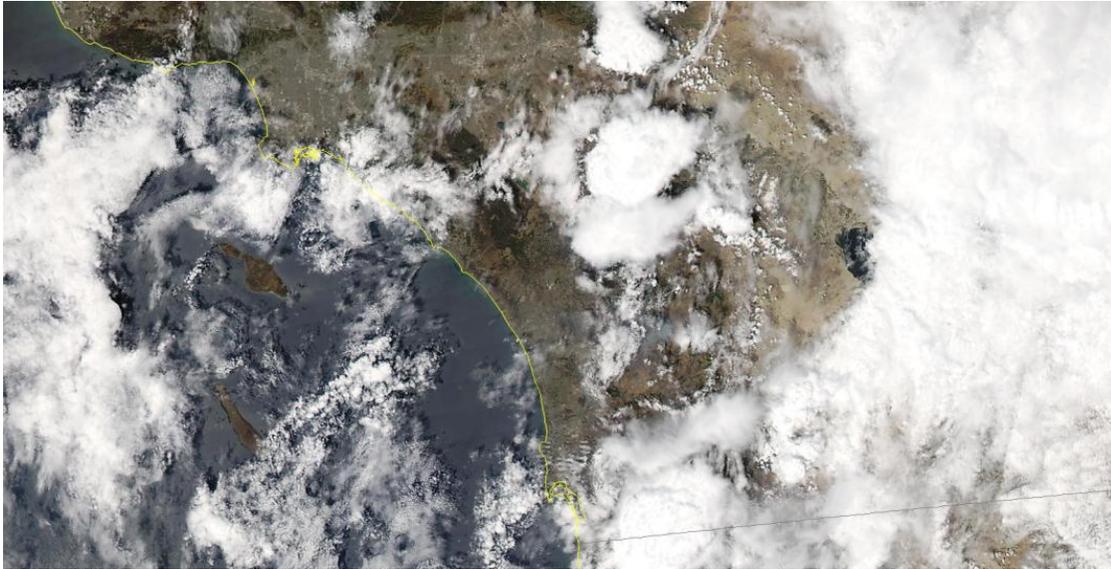
**August 16 – Dulzura**

**Flash Flood**

California Highway Patrol reported heavy rain causing flash flooding in northwest Dulzura near Highway 94. The bridge near the fire station has water going over it.



**Dewpoints in the upper 70s in the Coachella Valley on August 16. This is a measure of moisture in the lower atmosphere and upper 70s is high for anywhere in the United States!**



**MODIS satellite image on August 16. Large thunderstorms over the Mexico Border and the Riverside and San Diego County line.**

**August 16 – flooding reported Highway 79 east of Scissors Crossing**

**Flooding on Buck Fire and severe wind knocked down 2 large tents.**

**August 17 – Major flooding**

### **Flash Flood**

**Flash Flooding in Apple Valley and Victorville (one high water rescue and damage to property and school)**





Photos posted by San Bernardino Skywarn weather group.

**August 17-**

**Caltrans removed debris on Japatul Valley and Lyons road intersections.**

**Mobile home park in Apple Valley with 2 inches standing water (0.62 rainfall).**

**Forest Falls Mill Creek flash flood event**

**Flash Flood**

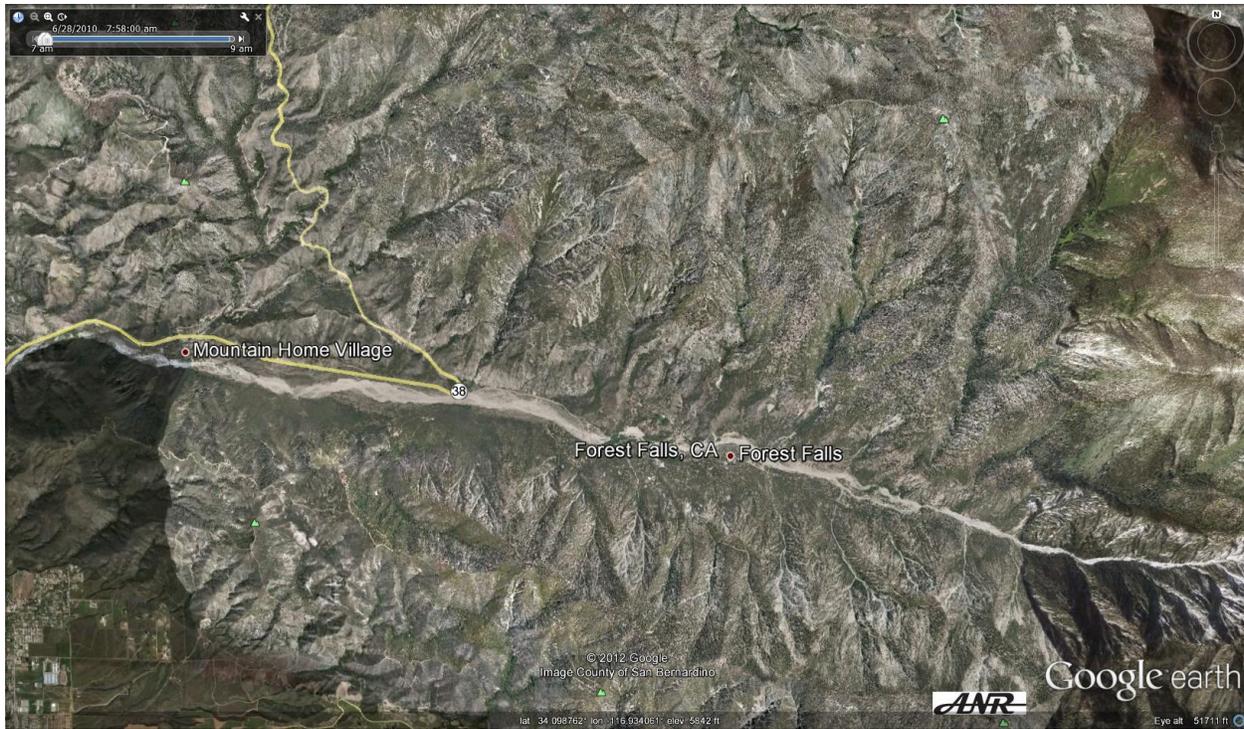
**Video <http://www.youtube.com/watch?v=0Kabn3ET1QE> (click to watch)**

**Flash Flood Forest Falls 8/17/2012**



**Get Out of the Creek during Flash Floods**





Google Earth depiction of the flash flood zone of Forest Falls.

**August 18-20**

**Big Bear City**

**Urban and Small Stream flooding**

**2.39 inches at gauge near Big Bear. Flooding observed around 430 pm by law enforcement.**

**August 21**

**Urban and small stream flooding**

**2 to 3 inches of water observed flowing over parts of Highway 78 and S3, near Ranchita.**



**Highway 79 near S3 runoff. Photo by Anza Borrego State Park, Kent Miller. Some debris reported on San Filipe Road.**

## **August 22**



**900 am thunderstorms over Lake Henshaw (photos by John Pedersen). Isolated nighttime thunderstorms occurred in eastern San Diego County and part of central Riverside County, and continued through the morning hours.**

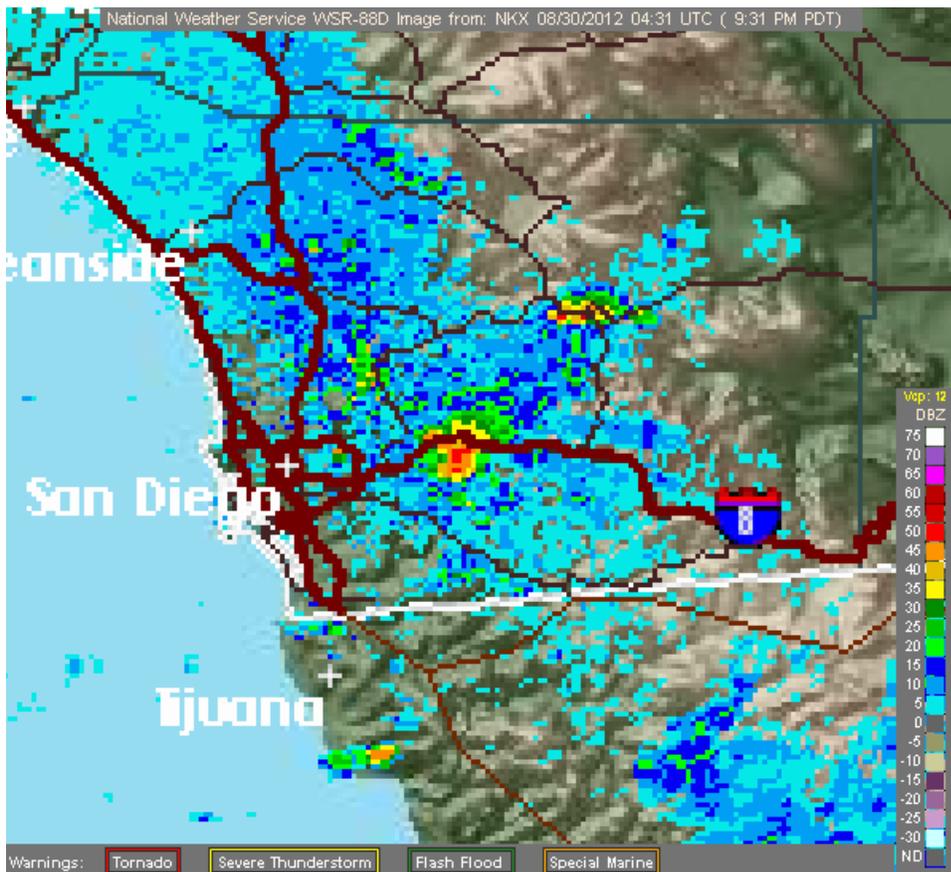
### **Urban and Small stream flooding**

**At 300 pm, California Highway Patrol reported roadway flooding on Highway 22 or Borrego Salton Sea Way. Flash Flooding was also reported 10 miles northwest of Ocotillo Wells.**

August 29



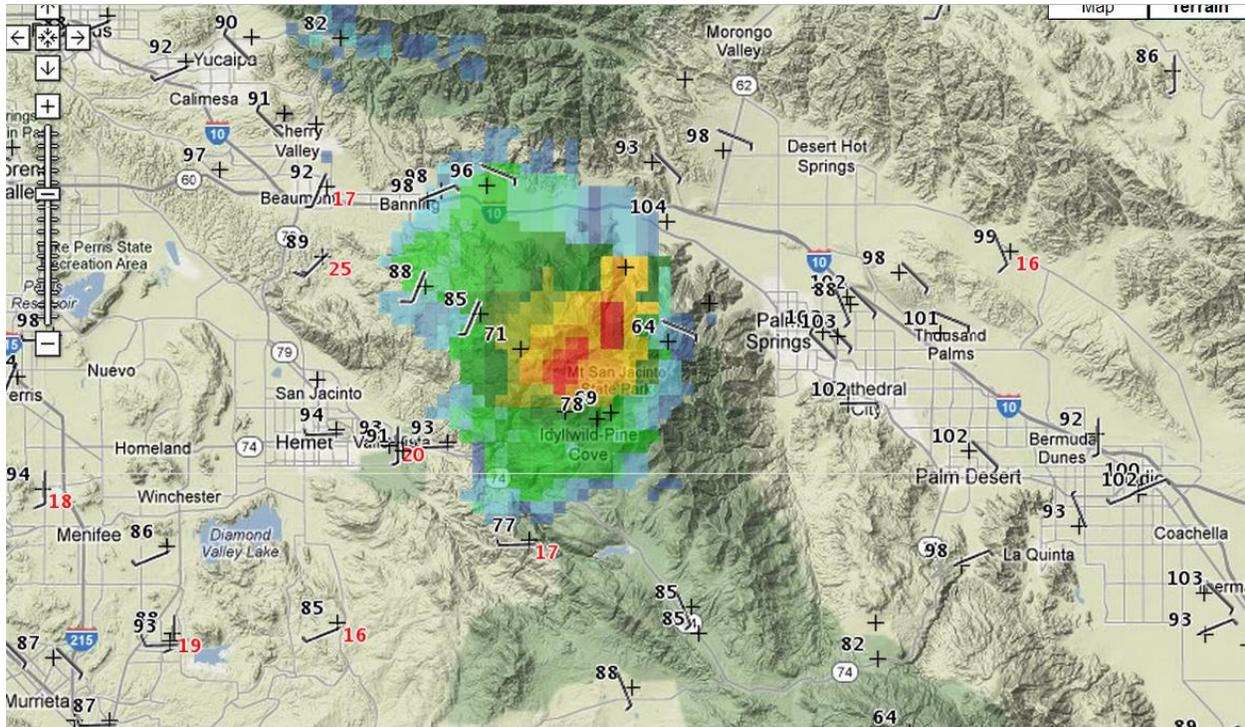
Early morning thunderstorm east of NWS office. Photo by Stefanie Sullivan.



**An evening thunderstorm along Interstate 8 made for a nice moon rise.**



**Moonrise and thunderstorm over I-8 on August 29, 2012. Photo by Alex Tardy.**



**An isolated thunderstorm formed right over San Jacinto peak on August 29. The air is rising on all sides of the mountain peak and converging near the top in order to form this storm late in the day.**

**August 30 - Major flash flood events**

- \*Redlands and Moreno Valley including Highway 60 (mud debris inundated neighborhood)
- \*Victorville (12 inch water at underpass and successful high water rescue)
- \*Chihuahua Valley on Highway 79 (2 to 3 feet of running water over road and debris)
- \*Cathedral City (Eagle Canyon Wash, flash flooding streets 12 to 18 inches deep, business floors damaged)
- \* Borrego Spring highway 78 (large rocks on roadways)

**August 30, 2012 major flash flood event**



View from NWS office on August 30 during peak of thunderstorm outbreak.

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## Impact Photos Cathedral City



Photos by KESQ news in Palm Springs.

# Image Photos Moreno Valley and Redlands



Photos by Press Enterprise.

# Impact Photos high Deserts (Victorville)



Photos by San Bernardino Skywarn Nikki Metzger.

## Impact Photos eastern Deserts (Borrego)



Photos taken by John Pedersen on S2 just off of Highway 79.

# Chihuahua Valley Highway 79



Photo of flash flooding taken by weather spotter.



Views from the Inland Empire on August 30. Photos from Alex Maldonado and Danny Villanueva.

## September 2012

**September 4, 2012**

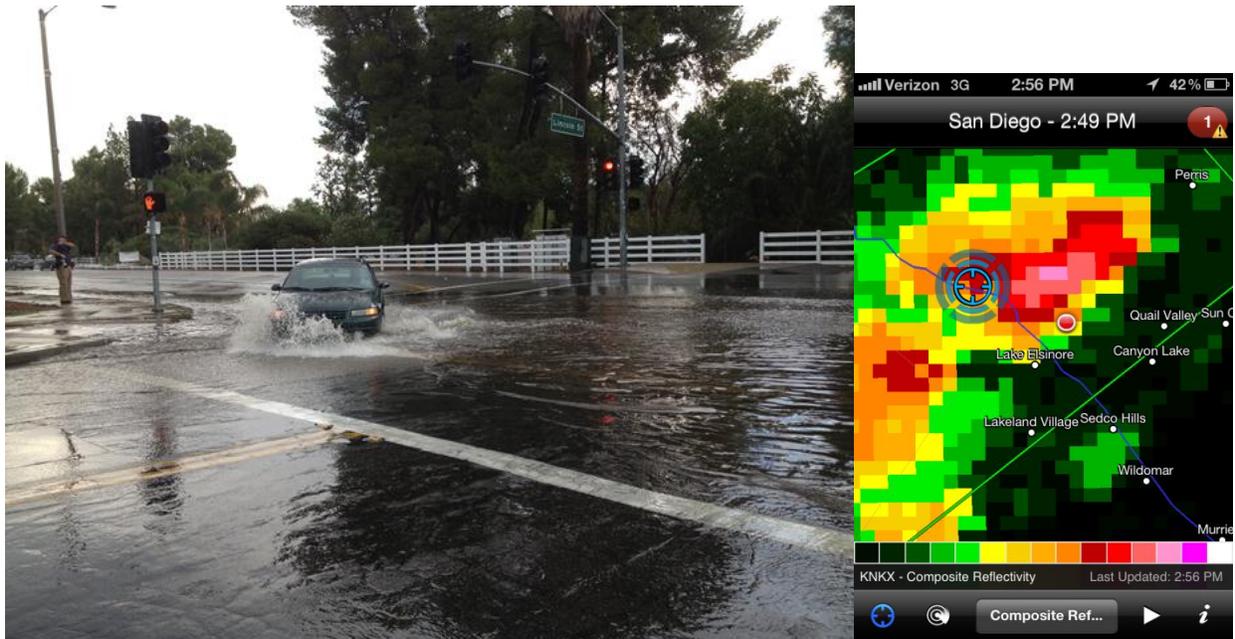
2 isolated strong storms, one over Shelter Valley and another Agua Caliente Springs.





Flooding just east of Scissors Crossing. Caltrans responded to the incident and San Filipe received 1.22 inches. Photos by weather spotter John Pedersen.

## September 9-11 major event



Significant urban flooding on Highway 74 in Lake Elsinore on September 9. Composite reflectivity radar image just prior to the flooding. Photo by Alex Tardy.



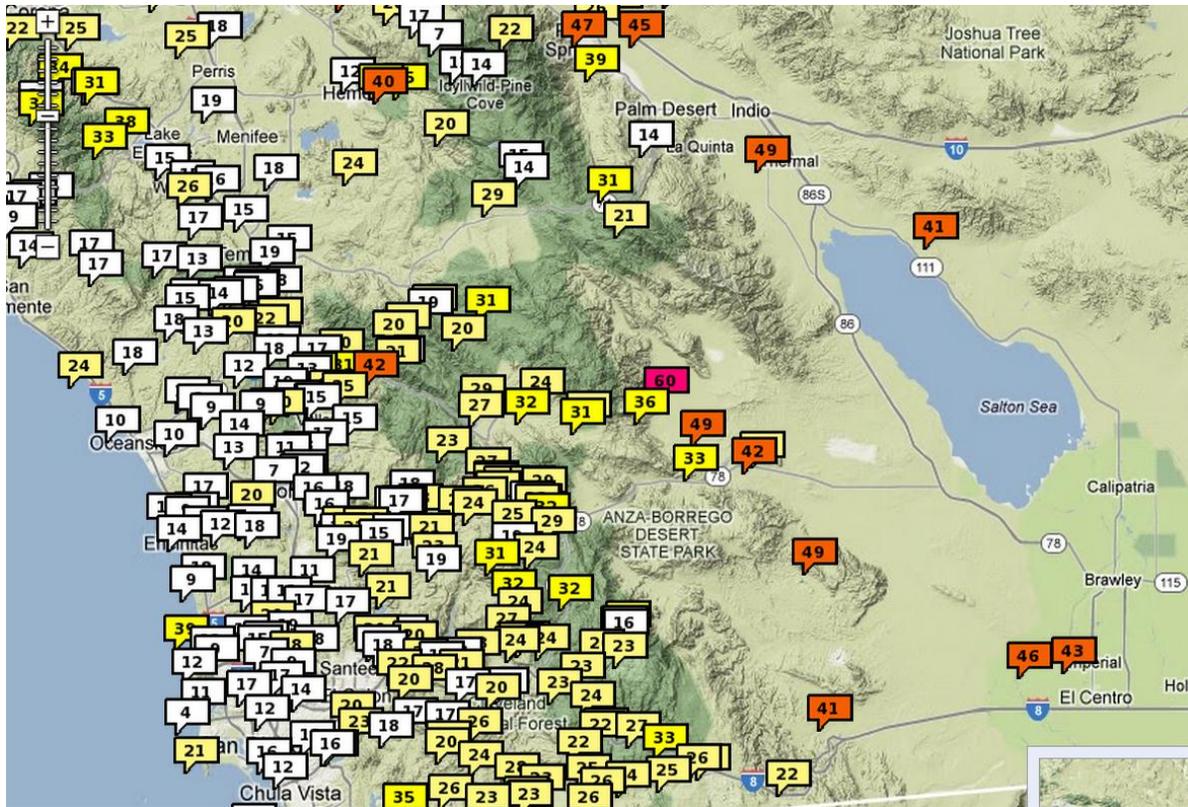
Large tree downed by severe thunderstorm in Cuca Ranch on Highway 76. Photo by Roger Pierce.



Strong storms near Highway 76 as photographed by John Pedersen.



Landspout near Perris around 230 pm September 9<sup>th</sup>. Photo by Will Wilkins.



Mesoscale convective system (MCS) brought strong winds to the deserts and scattered thunderstorms during the late evening hours on September 9<sup>th</sup>. Dust was observed to significantly reduce visibilities in the deserts.



View of thunderstorm approaching KSOX radar on September 9 (Santa Ana Mountains). Photo by Scott O'Donnell.

## Gust Front and Thunderstorms Headed West Toward San Diego Deserts And The Coachella Valley



NWS San Diego weather story Nowcast by James Thomas. This is the MCS that brought up to 60 mph wind gusts.



News10 did a story on NWS storm surveys. Background is a strong storm over Palomar that was producing very heavy rain. Photo by Alex Tardy on September 10<sup>th</sup>.



Water flooding streets on Highway 76 in Pauma Valley on September 10<sup>th</sup>. Photo by Alex Tardy.



Highway 76 heading west bound, traffic is slowed by heavy rain and street flooding. Photo by Alex Tardy.



Flash flooding in Victorville from intense storms on September 10<sup>th</sup>. Photo from Daily Press.



Mud slide clean up by Caltrans on Highway 76 near 5 pm on September 10<sup>th</sup>. The highway closed for 1 hour. Photo by Alex Tardy.



Thunderstorms crossing I-15, near Lake Elsinore, on September 10 around 200 p m.  
Photo by Alex Tardy.



Heavy rain near Lake Elsinore on September 9, 2012. Photo by Alex Tardy.





School damage by flooding in Mecca. Photo from KESQ.



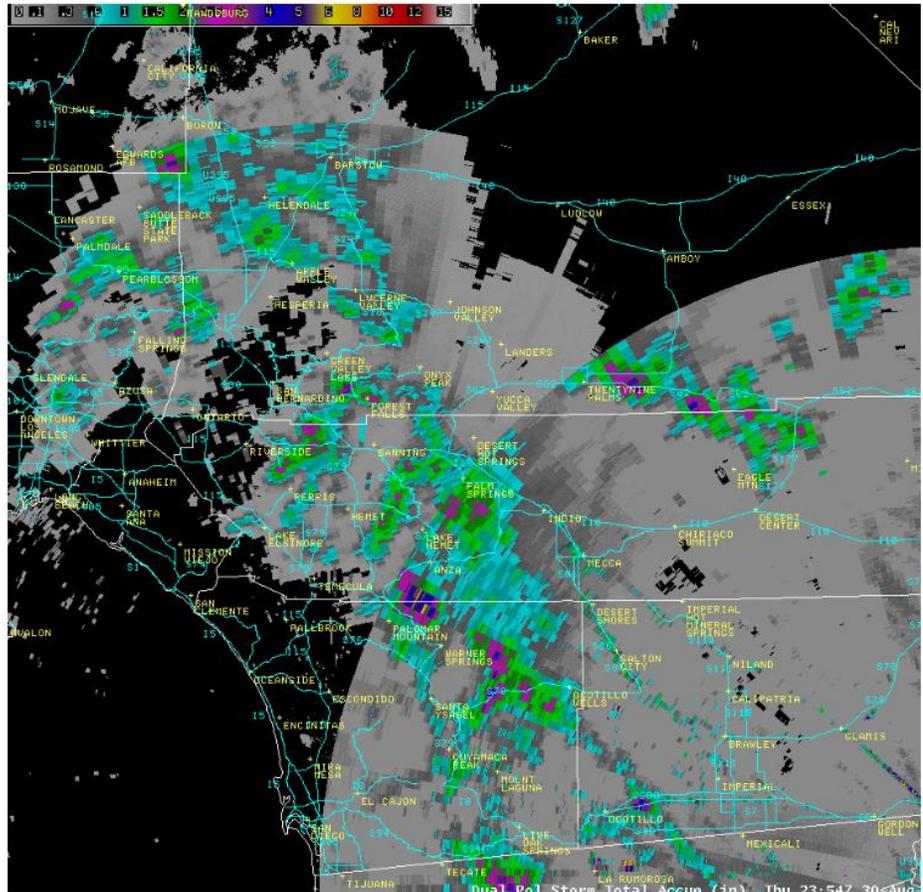
Highway 111 road damage from flooding in Mecca. Photo by Roger Pierce.



Fields flooded into shallow lakes and damaged irrigation and soil in Mecca. Photo by Roger Pierce.

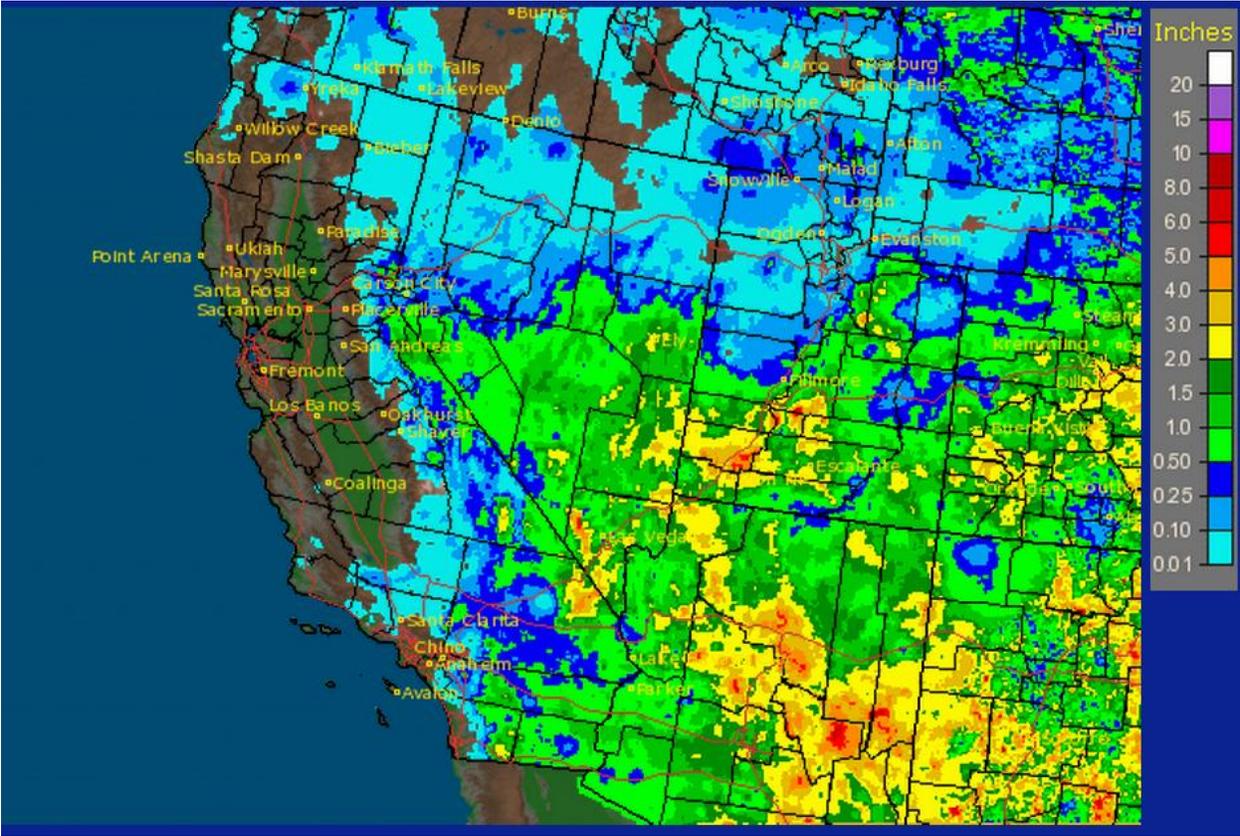


# Storm Total Dual Pol Mosaic STA



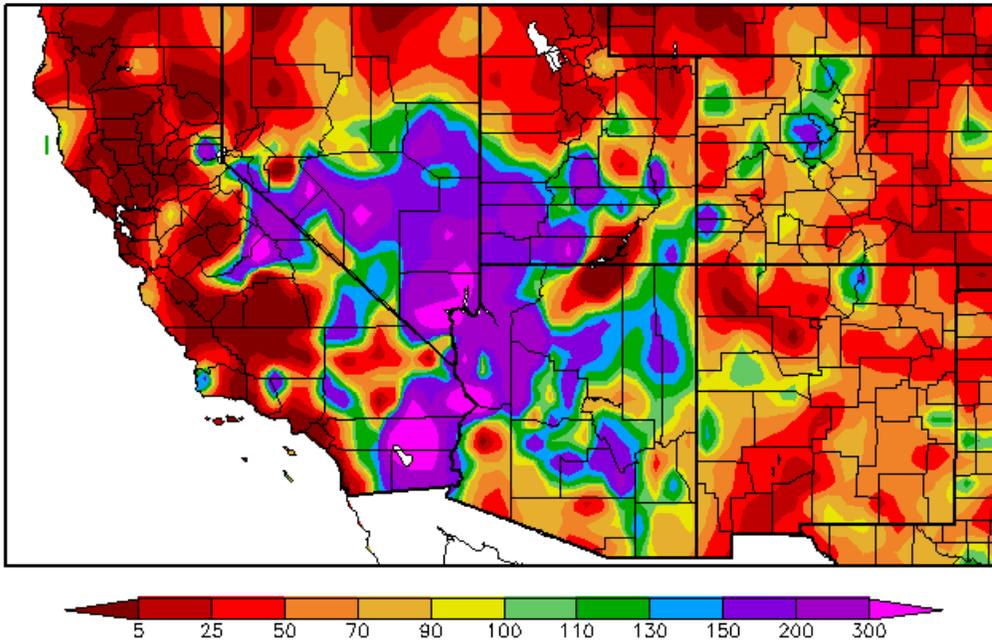
Example of new Dual-Pol radar storm total precipitation estimates from the August 30<sup>th</sup> event.

# August 2012 highlights



Total precipitation for August 2012.

Percent of Normal Precipitation (%)  
7/25/2012 – 8/23/2012



Generated 8/24/2012 at HPRCC using provisional data.

Regional Climate Centers

**Percent of normal precipitation from July 25 to August 23, 2012 which captured several of the significant heavy rain events.**