

## Storm Data and Unusual Weather Phenomena - December 2013

Location	Date/Time	Deaths & Injuries	Property & Crop Dmg	Event Type and Details
<b>CALIFORNIA, South Central</b>				
<b>(CA-Z089) W CENTRAL S.J. VALLEY, (CA-Z090) E CENTRAL S.J. VALLEY, (CA-Z091) SW S.J. VALLEY, (CA-Z092) SE S.J. VALLEY</b>				
	12/05/13 00:00 PST		0	Frost/Freeze
	12/10/13 00:00 PST		0.44B	
<b>(CA-Z095) KERN CTY MTNS, (CA-Z098) INDIAN WELLS VLY, (CA-Z099) SE KERN CTY DESERT</b>				
	12/07/13 11:00 PST		0	High Wind (MAX 86 kt)
	12/07/13 22:00 PST		0	

December began with an upper-level ridge of high pressure over the central California interior. This ridge brought clear skies and above-normal temperatures to the region for the first two days of the month. . On December 2nd, some dense fog was also observed in the San Joaquin Valley, especially from Selma to Hanford. By the afternoon of the 2nd, the ridge of high pressure began to break down, and winds began to increase over the crest of the southern Sierra Nevada. This was a signal of an approaching storm system.

A cold front brought colder weather to the region on December 3rd, followed by a stronger system on December 6th and 7th. The first storm brought gusty winds to the mountains and desert, as well as light rain and drizzle over the San Joaquin Valley. Some light snow fell in Yosemite and other parts of the Sierra Nevada. Daytime high temperatures cooled to below normal in quite a few locations, especially north of Kern County, due to increased cloud cover and light precipitation.

Behind the cold front, an arctic airmass brought freezing temperatures to the central and southern San Joaquin Valley. Well below normal minimum temperatures commenced on December 4th and continued until the 6th as a modified Arctic airmass was entrenched in the region. Low temperatures dropped below 20 degrees in some San Joaquin Valley locations during the mornings of the 5th and 6th, such as Madera, where the low reached 19 degrees. Daytime high temperatures were generally a few degrees below average until the 6th.

The long duration hard freeze across the San Joaquin Valley during the period December 4-9 resulted in extensive crop damage, especially to the citrus crop. Local estimates were eventually reported as being \$441 Million as reported by California Citrus Mutual.

By the evening of the 6th, a low pressure system approached the northern part of the central California interior, and its associated cold front brought rain to the San Joaquin Valley and snow as low as the lower Sierra Nevada foothills during the overnight hours. Snow levels reached around 1,500 feet by the morning of the 7th, except some light snow flurries were reported in Three Rivers, at an elevation just below 900 feet. Several inches of snow fell as low as 2000 feet in the Sierra Nevada foothills, including near Coarsegold (4.5 inches at 2296 feet) and Oakhurst.

The higher elevations of the Southern Sierra Nevada received up to a foot of new snow, and snow even fell on the east slopes of the Sierra west of Inyokern. Enough snow fell on Interstate 5 over the Grapevine during the morning hours on the 7th to shut it down.

Although some of the computer models had indicated the potential for flurries mixing with the rain on the San Joaquin Valley floor, an influx of sufficient warm air ahead of the front allowed temperatures to warm to the mid 40s shortly before the rain arrived

During the afternoon of the 7th, or shortly after the cold front passed over Kern County, strong winds blew over the Kern County deserts, especially in Inyokern, where the wind gusted to 76 mph. An even stronger wind gust was recorded at the remote weather station in Indian Wells Canyon, where a gust of 99 mph was recorded. These strong winds definitely impacted traffic on the nearby stretch of U.S. Highway 395 as two big rig trucks were reported blown over by the California Highway Patrol. Temperatures dropped to much colder to normal once again overnight and continued for the next several days.

By the 10th, a ridge of high pressure began to strengthen over the region and allowed daytime high temperatures to warm a little each day. Low temperatures, however, had been slow to warm and remained below normal in the lower elevations during the next several days, especially the San Joaquin Valley, as cold dry air had lingered over the area. Nighttime fog development over the San Joaquin Valley also remained suppressed during this time; however, hazy conditions and poor air quality remained as the airmass was quite stagnant due to the prevailing high pressure.

These two storms brought the only precipitation of December to much of the central California interior. The exception was the southern end of the region, where an upper-level trough dropped through California on December 19th. A closed low developed in the base of the trough and was located offshore near the Channel Islands. This positioned to low to spin subtropical moisture into Kern County from the south. Showers developed over the Tehachapi Mountains, and a few drifted northward over the south end of the San Joaquin Valley.

Behind this trough, high pressure strengthened back over California. Daytime high temperatures warmed to well above normal for the remainder of the month, and a strong inversion trapped particulates to produce haze on a daily basis through December 27th. A weak upper-level trough brought enough mixing to clear out the central San Joaquin Valley on the 28th, although the south Valley remained enshrouded by the haze. Some dense fog with visibilities around 500-1000 feet was even observed in parts of the San Joaquin Valley

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during the early morning hours, including near Selma, Hanford, and Merced.

The upper-level ridge of high pressure remained along the California coast through the end of the month, spreading over the central California interior. Daytime highs in the central and southern San Joaquin Valley continued well above normal, but overnight lows were near, or even a few degrees below, normal due to long nighttime and the clear skies, which allowed for radiational cooling. The dry airmass had low dewpoints, which allowed San Joaquin Valley lows to fall into the upper 20s to mid 30s.

For the month of December, Fresno only had 0.15 inch of rain, 8.5 percent of its monthly normal of 1.77 inch. Bakersfield had even less rain, 0.10 inch, but as its normal rainfall for December is less (1.02 inch), the percent of normal was slightly higher at 9.8 percent.

For the year, Fresno had below normal rainfall every month for its driest calendar year on record. Bakersfield had below normal rainfall for every month except July, when the normal is 0 inch. Most of the central and southern San Joaquin Valley saw record or near-record dryness in 2013, as seen in the table below. (Rainfall amounts are in inches).

2013 was the warmest year on record for Fresno, with an average temperature of 66.9 degrees. This broke the old record (set the previous year) by 0.1 degree. Fresno also recorded its warmest average high temperature for the year, with 2013 having 80.2 degrees. The previous record was 79.4 degrees, set in 2012. The average low temperature for 2013 of 53.6 degrees tied with 2005 for the second warmest average low on record. The record average low temperature for the year is 54.1 degrees, set in 2012.

Bakersfield tied for its 14th warmest year on record. The average high temperature for the year of 79.4 degrees was the 22nd warmest annual average high temperature. The average low for the year, 53.6 degrees, matched the 30-year average for the annual average low.