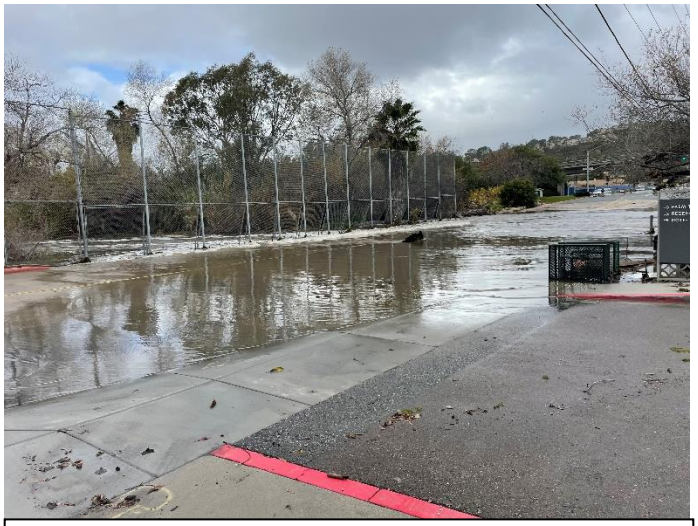
2023

January

A potent storm moved in late on the 31st, and continued into New Year's Day. The heaviest band of rain straddled the region just as the clock struck midnight to ring in the new year on a decidedly wet note. Many mountain locations recorded over 4 inches of precipitation, mostly rain. Lytle Creek took top honors with 5.85 inches storm total. Lower elevations generally got 1 to 2 inches, but Coto de Caza overachieved with 3.62 inches. Street and stream flooding was observed in many areas, and was particularly serious next to the Fairview burn scar south of Hemet. The San Diego River reached 10.3 feet, just shy of flood level, although enough to flood several streets and parking lots in Mission Valley. Snowfall up to 8 inches fell at Snow Valley, with 3 to 7 inches common around Big Bear Lake. The snow fell only during the later colder stages of the storm on New Year's Day. Strong winds accompanied this band with some gusts over 60 mph on ridgetops and adjacent desert slopes. The highest measured gust was 79 mph at Toro Peak. Gusts near the coast reached 35 to 40 mph and toppled several trees.

The next storm system passed through the region on January 4-6 with significant orographic rainfall and strong winds to the coast. Precipitation of 2 to 4 inches were common in the mountains. Running Springs ran away with the lead of 5.55 inches. Snowfall reached up to 8 inches at Snow Valley, but most places reported less than 5 above 5,500 feet. Runoff flowing through usually dry channels took a life in San Bernardino. Gusty winds were strongest over mountain ridges into deserts, with top gusts achieving 50 to 72 mph. A very large swell combined with a very high king tide to produce coastal flooding and beach erosion. Many beach homes and property were damaged by sea water. Surf was observed up to 12 feet at Mission Beach. Surf and tides produced flooding at Seal Beach.



The San Diego River rose to 10.3 feet on New Year's Day at Fashion Valley, below flood level, but still inundating low water crossings on several streets and parking areas (Alex Tardy).

Nice weather over the weekend January 7 and 8 allowed for some recovery.

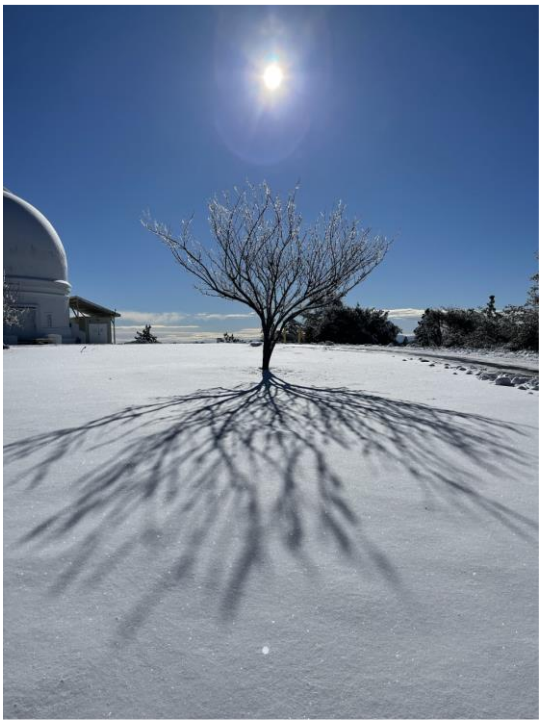
Another atmospheric river hit January 9-10. Parts of the mountains above Santa Barbara received a ridiculous 10-15 inches of rainfall in 24 hours. 3 to 6 inches were common in the mountains and foothills of Orange and San Bernardino Counties. The Lytle Creek area had 6 to 9 inches, while the lowlands received 0.50 to 2 inches. Except in San Diego County, less than 0.50 inch fell. Higher snow levels meant rain fell on snow in parts of the mountains. Several mudslides blocked Highway 243 and Highway 74 in Riverside County. The Whitewater

River flowed through the Coachella Valley, and one swift-water rescue was needed there. Strong winds lashed the mountains and deserts, with recorded gusts 60 to 77 mph, strongest around Cajon Summit.

Another atmospheric river stayed well toward our north, allowing for dry weather in far Southern California on January 11-13.

A pair of atmospheric rivers made a direct hit on the 14th through the 16th, resulting in widespread heavy rain and flooding. Rainfall from the 14th through the 17th exceeded 11 inches at Palomar Observatory. Many other mountain locations in San Diego County exceeded 5 inches of precipitation. The San Diego River hit 12.8 feet on January 16 with a dozen swift-water rescues. Flooding also occurred on Tijuana and Santa Margarita rivers. Heavy wet snow fell on the 14th, followed by drier, deeper snow on the 15th. That amounted to 1 to 2 feet of snow at Big Bear area ski resorts. Top wind gusts reached 60 to 74 mph once again in the mountains and deserts.

From January 20 to 27, the region endured several offshore Santa Ana wind events. On the 23rd, strongest gusts exceeded 60 mph in many foothills, and 35 to 50 mph in adjacent inland areas. Even stronger gusts and greater damage occurred on the 26th. Top gusts exceeded 80 mph at many foothill locations, with the top spot Sill Hill clocking 93 mph. 20 large trees and several other trees were knocked down by 45 mph gusts in Balboa Park. One of them injured a woman.



This giant Eucalyptus (above) was one of 20 large trees that fell in Balboa Park during the Santa Ana winds on 26 January (Alex Tardy). Snowfall (right) at the Palomar Observatory was captured with an artistic flair on 31 January (Kajsa Peffer).

Big rig trucks were toppled on freeways. Dry air and clear nights allowed temperatures to drop close to record lows during this week, including areas of frost in the valleys.

A second round of king tides this month pushed water into coastal homes and businesses from the 20th to 23rd.

A closed low brought a stormy end to the month from the 29th through the 31st. This storm brought a greater share of precipitation to San Diego County where over 1 inch of precipitation fell in the mountains. 1 to 6 inches of snow fell in the mountains, with Crestline reporting the greatest amount of 6 inches. Thunderstorms added lightning, thunder, brief heavy rain and some excitement to the storm on the 30th. This burst of heavier rain produced a rapid rise in the San Diego River.

February

The region was due for a week or two of relief from the very active winter so far, and that is what we got. The overall jet stream pattern continued active, but troughs came and went with lacking moisture or only glancing blows to Southern California.

Offshore flow produced winds on the 6th and 7th that exceeded 60 mph at top gusty spots like Pleasants Peak at 67 mph. A second offshore wind event produced similar gusts (68 mph at Highland Springs) on the 10th.

A low pressure system dove down the coast on the 12th and produced greatest rainfall in San Diego County where up to 1 inch fell. A few thunderstorms were also seen and heard around the Coachella Valley and La Jolla. Several cold, frosty nights followed.

The next storm brought strong onshore winds to the mountains and deserts on the 14th, where Whitewater recorded a 77-mph gust. Precipitation favored San Diego County again where up to 0.75 inch fell in the mountains. Low snow levels made travel hazardous through most mountain highways.

The high desert received heavy snow on 25 February. Snowfall of 6 inches was measured at Pinyon Pines (left, Sarah Berryman). Several inches coated everything in Phelan (above, John McDonald).

A crazy low pressure trough cut off west of California on the 17th and dove south and east through Baja California on the 21st. This system brought little wind or precipitation. A powerful wave followed, with very strong winds on the 21st and 22nd. Burns Canyon topped the list with an astounding 101 mph gust on the evening of the 21st. 60 to 90-mph gusts were common in the mountains and deserts.

Right on its heels came a series of very cold troughs from Canada from the 22nd through the 26th. Wave after cold and windy wave of precipitation pummeled the region these days. Precipitation amounted to nearly 9 inches at Lytle Creek over the five-day period. Amounts of 4 to 6 inches were common in the mountains and 1 to 4 inches in the lowlands, except as low as 0.10 inch in the Thermal area. These storms brought several feet of snow, including 93 inches to Mountain High Ski Resort. Up to 6 inches was measured in parts of the high desert. Snow was observed as low as 1,000 feet elevation, with sticking, measurable snow as low as 1,100 feet in the Inland Empire. Brief but heavy convective showers commonly dropped hail or ice pellets across the lower elevations. The epic snowfall, something of a once in a 20- to 30-year occurrence, crippled mountain communities for at least a week. Power outages, food supplies, caved-in roofs and other tree and structure damage, gas leaks and resulting house fires were truly disastrous for much of the community. Thousands were trapped, literally snowed-in, and had to shelter in place for days.

Standing lenticular clouds caused by strong winds blowing over mountain ridges was captured on camera beautifully by Florian Boyd over Palm Springs on 12 Feb.

The February onslaught wasn't done yet. A final storm ripped through the region on the 28th to 1 March with another round of strong winds, rain and snow. Winds in mountains and deserts measured 50-70 mph, with Volcan Mountain achieving 77 mph. Gusts at the coast and in the valleys were commonly 35 to 50 mph. This brought down more trees and knocked out more power. This two-day storm brought 2 to nearly 4 inches to foothill areas, including Henshaw Dam with 3.85 inches and Cal State San Bernardino with 3.35. Most lower elevations ranged from about 0.25 inch to 2 inches (San Diego only got 0.22 inch). Snowfall accumulated to 59 inches at Snow Summit, 42 inches at Big Bear Lake and Lake Arrowhead, and measurable amounts to 1 inch as low as Devore at 2,500 feet. This was the icing on the already frosty-snowy cake for the San Bernardino Mountains, which compounded the threats to life and property already experienced in previous storms.

March

Strong winds felled trees in La Mesa (above, youtube CBS8 San Diego), while a burst of heavy snow struck Brea (below, Brea Fire Dept.) on 1 March, a crazy weather day.

March decidedly came in roaring like a lion with one of the windiest days in recent years and disastrous snowfall finally coming to an end. Snowfall over the previous 10 days reached an unbelievable 150 inches at Snow Summit Ski Area and 100 inches at Crestline. Wind gusts of 35-50 mph were common in the populated lowlands, while mountains and deserts reported gusts 60-77 mph (the top gust recorded at Volcan Mountain). In the San Bernardino Mountains, residents were still in an emergency situation, many without power or sufficient food and supplies. Over the ensuing days, the digging out and emergency trucking in of supplies eventually reached most people.

Numerous thunderstorms and convective showers dropped snowflakes as low as 1,000 feet in elevation from inland Orange County through the Inland Empire.

Mercifully, Mother Nature gave the region a break from storms to allow for better traction on recovery in the mountains. However, conditions remained cool under a weak trough aloft.

A weak trough enhanced a makeshift marine layer to produce light showers on the night of the 5th and the morning of the 6th. Up to 0.25 inch was measured in the foothills of the mountains, but lowlands got zero to 0.10 inch.

After a few more cool days and nights, the pattern shifted as an atmospheric river took aim at northern and central California. Temperatures and snow levels rose as the storm arrived on the 10th. Rain on snow added snowmelt to rainfall runoff, to produce areas of flooding. Heavy rain in northern San Diego County produced a flooded onramp on Highway 78 in Oceanside. Storm totals through the 11th were as high as 2.34 inches at Pine Cove, but around 0.25 to 2 inches across the region, except in deserts where 0.25 inch or less fell.

This hillside in San Clemente gave way on 15 March. There were no injuries, but it prompted evacuations (OCFA).

The next storm arrived on the 14th and 15th and came in strong with additional heavy rains. In typical fashion, mountains received the most, with Palomar Mountain topping the list with 5.78 inches. Some higher valley and foothill locations received 3 to 5 inches, 1.50 to 3 inches fell in the lowlands, but only one third inch or less was recorded in the deserts. Flooding and mudslides resulted in the San Bernardino Mountains and foothills, Hwy. 78 in Oceanside, near Julian, north Palm Springs, Chino, Murrieta, Santa Ana and west Riverside, where a swiftwater rescue was needed.

A landslide (debris flow) occurred in San Clemente, prompting evacuations, and a boulder blocked the highway near Anza. A large tree fell on Hwy. 163 in San Diego, closing it for a time.

Several impulses brought light rain day after day from the 19th to the 21st, before the stronger, heavier storm continued on the 21st into the 23rd. This storm was colder with greater snowfall in the mountains. Five-day storm total precipitation amounted to 6 to 8.23 inches at the Lytle Creek area, 4 to 6 inches at other mountain locations, 1 to 3 inches across the populated lowlands, and less than 0.40 inch in the deserts. Snowfall piled as high as 3.5 feet in the mountains, with Snow Valley Ski Area reporting over

Significant flooding closed this road in Temecula (above) on 21 March (photo from spotter Jeff Marold).
These spectacular undulatus asperitas clouds (right) were captured on camera over Ranchita on 19 March by Elizabeth Conroy.

40 inches. Several inches were reported as low as 4,000 feet elevation. A funnel cloud was reported in Nuevo (near Perris). Mud closed highways in Waterman Canyon, the Banner Grade east of Julian, and near Dulzura. Numerous roads and low-water crossings were flooded in Murrieta, Barona, La Jolla, Mission Valley, and several spots in far northern San Diego County. A swiftwater rescue was needed in Devore. A large tree was downed in Encinitas.

The storms still were not done. A cold upper trough combined with a weak atmospheric river to bring a final storm of our wild and wooly March on the 29th and 30th. Thunderstorms were an added feature to this storm, particularly in the San Diego metro area and north inland region, and in the area around San Bernardino. Hail was reported in La Mesa. Severe thunderstorm winds damaged three homes and downed power lines in Spring Valley. Storm total rainfall amounted to 2.78 inch at Lytle Creek, with other mountainous areas receiving 1.5 to 2.5 inches. Lower elevations reported 0.20 to 1 inch, and less than 0.10 inch in the deserts. Green Valley Lake topped the snowfall list with 12 inches, followed by Mt. Baldy at 10 inches, Running Springs with 8 and Palomar Mountain at 7. Other mountain locations received lesser amounts down to the 4,000 foot level. Localized flooding was observed in Lemon Grove.

April

The heavy precipitation of March tapered off significantly in April.

A couple of weak upper lows passed through Southern California during the first few days of the month. It was energetic enough to bring areas of light rain to the coastal basin and the mountains. Most places received less than one tenth inch. Foothills and the San Bernardino Mountains received about one quarter to as high as one half inch at Panorama Point. The snow level was around 6,000 feet elevation, and 1-2 inches of snow was observed at Running Springs. Strong winds accompanied the second wave on the 3rd, when widespread gusts across the region were 30 to 50 mph and top gusts hit 73 mph at Whitewater.

April snowfall accumulated in Mt. Baldy Village on 4 April (Graham Hendrickson).

High pressure gradually built over the region to bring higher temperatures and spring-like weather through the 6th. Cold ocean waters helped to develop a stable yet stubborn marine layer that muted any warming trend near the coast. Inland areas climbed into the 80s and lower deserts into the 90s from the 9th through the 11th.

A trough of low pressure swung through the area on the 12th and 13th, bringing brisk onshore winds to the mountains. A deepened marine layer responded to the lower pressure and produced light showers from the coast to the mountains. Amounts were generally less than one quarter inch in the lowlands,

but foothills received one third to nearly 1 inch (0.98 inch at Panorama Point).

Another few days of higher pressure and dry, warmer weather followed through the 16th. A deep marine layer produced scattered drizzle and light showers on the 17th.

The next trough arrived on the 18th and 19th bringing strong winds again. Gusts in the mountains and deserts reached 40 to 60 mph with top gusts of 65 mph at Whitewater.

Benign weather with a shallow to moderate marine layer followed for several days through the 25th.

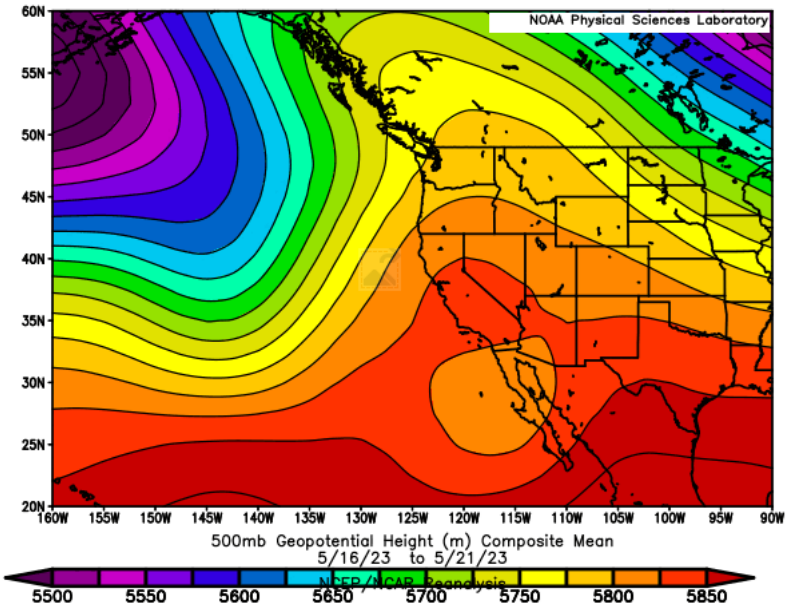
Stronger high pressure built over the West Coast from the 26th to the end of the month. Temperatures in the lower desert soared well past 100 degrees for the first time this season, while some inland spots exceeded 90.

May

An active pattern continued to bring trough after trough to the region during May. This enhanced a well-established marine layer already in place from cooler than average coastal waters. The first few days of the month featured drizzle and light showers that made streets wet for some of the morning commutes.

On the 4th and 5th, a more organized band of precipitation moved through the area, especially Orange and San Bernardino Counties. Amounts totaled over one inch in many foothill areas and in Orange County. The top amount was 1.47 inches at Santa Rosa Plateau. Snowfall in the front range of the San Bernardinos and San Gabriels reached 5 to 8 inches above 6,000 feet.

A general trough pattern continued to bring cooler than average weather with a healthy marine layer to Southern California through the 17th.



The upper air pattern (above) featured a strong ridge over western North America and a weak trough over Baja California, constituting a Rex Block pattern. The Baja low drew in moisture from Mexico, triggering showers and thunderstorms across the mountains and high desert of Southern California from May 17-22 (image NOAA PSL).

A Rex Block pattern set up over western North America through the middle of the month. This is an upper ridge amplifying north in western Canada with a weak trough directly south over Southern California or northern Baja (see image above).

The weak upper low over Baja California, worked in concert with the upper high

over the Pacific Northwest to draw in monsoon moisture from the east, a "pseudo" monsoon flow pattern. This brought showers and thunderstorms mainly to the mountains and high desert, from the 17th to the 21st. On May 20, thunderstorms quickly drenched the El Mirage area. On May 21, another thunderstorm complex formed in the exact same place, dumping 1.23 inches of rain in just one hour (and 1.45 inch total), leading to localized flash flooding and road damage. Many other storms across all the mountains brought quick heavy rainfall of 0.25 to 0.71 inch on the 21st, the heaviest day.

The damaging results of a flash flood near El Mirage after thunderstorms on 20 and 21 May (above, Alex Tardy).

A low pressure trough sagged south along the West Coast over the next few days, pushing aside that anomalous monsoon moisture.

On the 23rd and 24th to bring a fairly impressive rain event out of a deep marine layer. Widespread totals in coastal areas were generally less than one tenth inch, but southern Orange County squeezed out more than that, up to 0.23 inch in Bee Canyon.

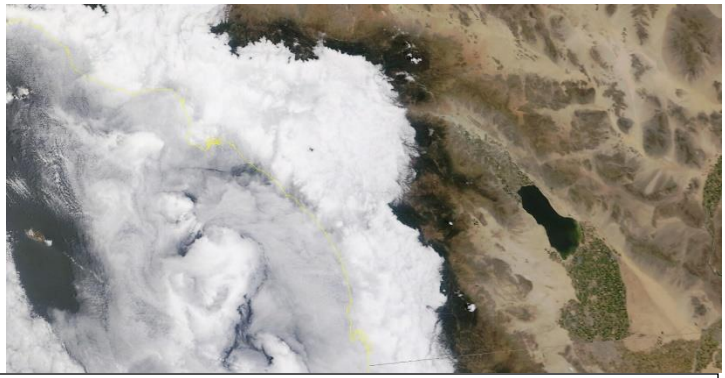
A low pressure trough moved through the region on the 25th and 26th, enhancing the marine layer but also boosting onshore winds. Many spots in the mountains and deserts registered gusts ranging from 40 to 65 mph, but Whitewater touched 75 mph.

The marine layer continued to dominate through the Memorial Day weekend. May Gray was in full swing and that included light rainfall for two days after the holiday to finish the month. This time, precipitation favored inland San Diego County, where amounts of 0.10 to 0.27 inch were common in the foothills.

In San Diego, May finished cooler than average again, now the seventh consecutive month that average temperature fell below climatological normals (since November 2022).

June

The relentless May Gray transitioned seamlessly to June Gloom as weak low pressure continued to hover over Southern California. However, a little more sunshine broke



This NOAA satellite image from 1 June was a common sight during May and June this season, including low clouds shrouding the entire coastal basin into the mountains.

through for the first weekend on the 3rd and 4th.

Light rain developed late on the 4th into the 5th, producing a few hundredths of an inch across many coastal areas. Coto de Caza managed to wring out 0.12 inch.

From the 9th through the 11th, a deeper trough built a deep marine layer that produced drizzle and light showers mainly during nights and mornings. Less than one quarter inch of rain fell across the lowlands, but many foothill and mountain locations received one half up to 0.89 inch.

The coastal slopes of the San Bernardino Mountains (left) had to contend with persistent fog many nights and mornings (Alex Tardy).

The region received a taste of the monsoon on the 16th. Many thunderstorms erupted in the mountains and desert of San Bernardino County. Some heavy rains missed rain gauges, but the gauge at Fawnskin received 0.55 inch, mostly in one hour. Lucerne Valley managed 0.13 inch while surrounding areas got less than 0.10 inch.

The persistent trough pattern continued essentially through the rest of the month. Below normal temperatures and deep marine layer cloudiness followed suit.

The pattern began to shift to more high pressure and warmer weather on the 30th.

July

July started out with the first heat wave of the calendar year under seasonably strong high pressure. Temperatures exceeded 100 degrees in most of the Inland Empire.

That pressure weakened for a few days of lower than average temperatures through the 9th.

Stronger high pressure aloft built and was relentless, persisting pretty much through the rest of the month. Nearly every day's high temperatures were above average while daily records were set at several locations on several days in the inland valleys, mountains and deserts. The hottest days were the 15-16th, and the 20th-21st. The hottest readings were 121 at Ocotillo Wells on the 20th and

The Rabbit Fire burned hot in the Gilman Springs area on 14 July (Desert Sun).

120 at Palm Springs on the 21st. The Rabbit Fire east of Moreno Valley started on the 14th and rapidly spread to over 8,000 acres before containment a week later.

On the last day of the month, the monsoon pushed into the region, bringing clouds, humidity and thunderstorms, but cooler weather. This was a widespread "elevated convection" event, with showers and thunderstorms not tied to the mountains and deserts, and also not just during the afternoon. Heavy thunderstorms were noted in the Anza Borrego Desert and over the San Gorgonio Wilderness. An early morning haboob produced tree and property damage across the Coachella Valley, while lightning strikes started several small fires. Several wind gusts over 50 mph were observed, along with visibility near zero in blowing dust. Rainfall was light near the coast.

Not your typical sky over Carlsbad in July. Elevated convective showers and thunderstorms gave the sky an unstable appearance on 31 July (Tardy).

July in Palm Springs was the hottest month on record, period. An average high temperature of 113.6 degrees and an average temperature of 98.5 degrees were recorded.

The coast was protected from extreme heat by the persistent marine layer. San Diego ended the month with an average temperature slightly below normal.

August

August started out hot with many thunderstorms in the mountains and deserts on the 1st.

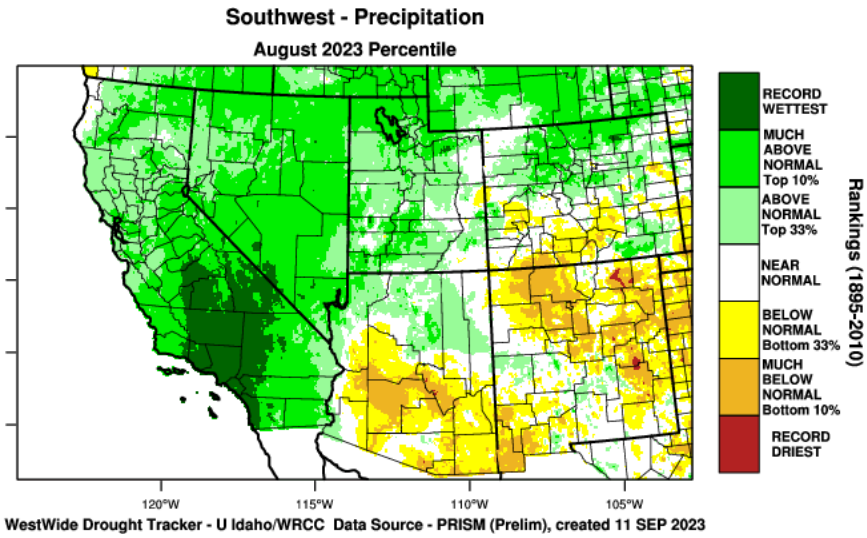
The heat relented a bit as drier westerly flow brought single-digit humidity to inland areas from the 4th through the 7th.

On the 6th and 7th, temperatures went above 100 again in the Inland Empire, but it was a dry heat.

Weak low pressure aloft brought cooler than normal weather from the 9th through the 14th. It also drew in monsoon moisture which brought light showers all the way to the coast.

Building high pressure brought back the triple-digit inland heat from the 15th through the 17th.

August 1st brought numerous showers and thunderstorms to the mountains and deserts, like this one shot near Warner Springs (above, right —Jon Pederson).



August precipitation was the greatest on record across a wide swath of Southern and central California (right), while the usual monsoon-favored states of Arizona and New Mexico were drier (Westwide Drought Tracker).

A low pressure trough off the coast combined with a giant high pressure ridge over the Midwest to set up southerly flow over Southern California on the 18th and 19th. This helped draw former category-4 hurricane Hilary up the Baja California coast and through Southern California as a tropical storm. Heavy rain and strong winds struck the region on the 20th.

Strongest winds were observed in the mountains and western foothills, with Big Black Mountain in the

Top Rainfall—Hilary	
Mission Creek	13.11 in
Mount San Jacinto	11.74
Raywood Flats	11.73
Heart Bar	9.67
Lytle Creek	9.44
Middle Fork Lytle Ck	8.84
Heaps Peak	8.46
Bernina Drive	8.11
Snow Creek	7.83
Ranchita	7.38
Mount Laguna	7.11

Peak Wind Gusts—Hilary	
Big Black Mountain	84 mph
Silverwood West	80
Palomar Mtn Lookout	79
Pisgah Peak	79
Hauser Mountain	78
Silverwood Lake	75
Burns Canyon	71
West Santa Ysabel	71
Hellhole Canyon	70
Sill Hill	70
Whitewater	70

mountains of San Diego County achieving the highest gust of 84 mph. Wind gusts in the deserts, valleys and the coast ranged from 30 to 60 mph.

Rainfall was heavy and widespread, but thankfully rain rates in the coast and valleys were generally below flash flood or debris flow thresholds. Roughly 1.5 to 3 inches fell in the coastal and valley areas, around 1.5 to 6.5 inches fell in the deserts, and 1.5 to 13 inches fell in the mountains. Mission Creek, on the east slopes of the San Bernardino Mountains, harvested 13.11 inches. While deserts commonly receive a secondary maximum precipitation during monsoon season each year, Hilary's rainfall still proved quite remarkable. Many desert locations logged over half of their average annual rainfall on this one day, some in just six hours. The one-day total of 2.35 inches at Thermal on Aug. 20 represented 79% of its annual average rainfall. The 3.18 inches that fell in Palm Springs amounted to 69% of its annual average. In Victorville, rainfall of 2.63 inches made up 47% of the annual average, but also shattered the rainfall record for August—in just one day. The old record was a mere 1.43 inches in 1977, not surprisingly when the remnants of post-hurricane Doreen doused the region (records date back to 1939).

High pressure tepidly rebuilt over the next few days bringing dry and warmer conditions after the wet and windy weather. This allowed temperatures to normalize.

August had one more heat wave to give. High temperatures soared well above normal from the 26th through the end of the month, which included 106 in Riverside and 118 in Palm Springs.

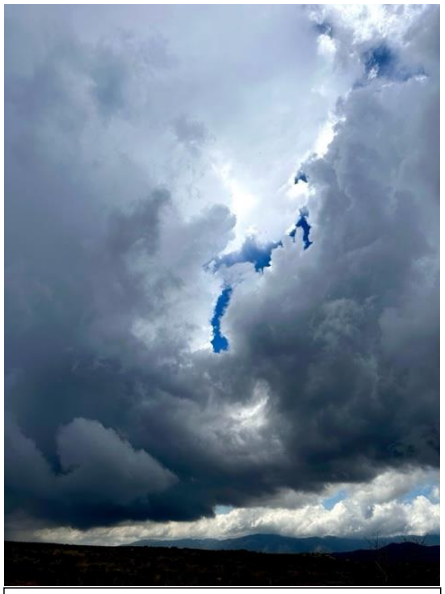
Photos of only a couple of the many impacts of Hilary. A high-clearance 4-wheeler was no match for the deep mud and water in this Palm Desert neighborhood (above left, Robert Hyatt). Seven Oaks Road was completely washed out in the Santa Ana Canyon (above right, Alex Tardy).

Impacts of Tropical Storm Hilary in Southern California — Aug. 20, 2023
Interstate 10 was flooded with water, mud and debris in the Coachella Valley. The interstate was closed to allow crews to clear. Flooding was also reported along I-10 in Cabazon.
Two rail lines were damaged and undercut in the Coachella Valley, which caused a train derailment north of Palm Springs.
Widespread street and golf course flooding all over the Coachella Valley.
Multiple road washouts occurred on Route 38 near Barton Flats.
Two bridges washed out near Seven Oaks Dam.
A bridge washed out in Mias Canyon.
A major debris flow in Wrightwood closed State Route 2 at Sheep Creek.
A major debris flow in Forest Falls closed Valley of the Falls Drive.
A major debris flow poured through Oak Glen at Potato Canyon.
A bridge was damaged at Windy Point northwest of Palm Springs.
A major debris-filled flood 250 yards wide flowed down the Whitewater drainage from Indian Canyon to Date Palm, causing serious road damage.
State Route 247 in Helendale was flooded with mud from the Mojave River.
Water and mud surrounded an assisted care center in Cathedral City, where 14 residents were rescued by a front end loader.
13 people were rescued from the swelling San Diego River.
Large boulders on Highway 79 just south of Julian.
In the Anza Borrego Desert, giant boulders blocked a stretch of Interstate 8 in In-Ko-Pah and flooding closed Highway 78 at Yaqui Pass and San Felipe Wash.
Mud and flooding of road in Nuevo, street flooding in Riverside, Murrieta, San Jacinto, Winchester.
Rock and debris blocked roads in Lake Gregory, Crestline, Angelus Oaks, Banner Grade.
Downed trees blocked roads near Warner Springs and southeast of Big Bear City. Tree damage occurred in Orange, La Habra, La Jolla and 4S Ranch San Diego.

September

September started off unusually wet. A surge of monsoon air brought widespread showers and some heavy thunderstorms to the mountains and deserts on the 1st and 2nd. Some even reached west of the mountains. A thunderstorm complex over Mecca dropped 2.83 inches (nearly the annual average) in just a few hours on the 1st. Flash flooding resulted in the eastern Coachella Valley, which caused property damage and required the rescue of a few motorists. Flash flooding was also observed in Phelan on the 2nd. Two-day rainfall was locally 2 to 2.83 inches in the eastern Coachella Valley, 1 to 2.5 inches in the San Gabriel Mountains, 0.25 to 0.50 inch in the northern Inland Empire, and generally less than one tenth inch elsewhere west of the mountains.

Thunderstorms produced a dust storm in the lower deserts on the 1st. Another dust storm on the 3rd near Palm Springs contributed to a three-car collision that killed three. (It appears that the floods from Hilary in August put down an extensive ground cover of fine silt, more sensitive to winds to produce blowing dust.)



Thunderstorms erupted in the mountains and deserts on 2 September, this one in east Ranchita (Jon Pederson).

Labor Day and a few days thereafter were refreshingly cool and dry as a trough of low pressure moved through the West.

High pressure over the Southwest rebuilt in the wake of the trough, allowing temperatures to climb above normal from the 7th through the 11th. That included a 115-degree reading in Palm Springs and a few spots exceeding 100 degrees in the Inland Empire on the 9th. Lots of moisture and clouds from tropical cyclone Jova moved across the region on the 11th, dropping sprinkles and a few light showers of less than 0.04 inch.

A weak trough hung over the West Coast through the middle of the month, which allowed the marine layer to build and strengthen. On the 16th and 17th, there was very little clearing west of the mountains and even some drizzle and light showers both days.

The weak trough pattern persisted for several days with a deep marine layer producing coastal clouds filling the valleys each morning, reminiscent of spring weather.

A weak ridge followed from the 23rd through the 27th to bring seasonably hot inland weather for several days, and coastal clouds remaining more coastal.

An unseasonably deep trough amplified over the West for the last day of the month and the 1st of October. This trough brought brisk onshore winds on the 30th and very cool weather. So cool, in fact, that several low maximum temperature records were set on both days. Mostly light showers occurred on both days, but there were some heavy thunderstorms in the northern Inland Empire during the afternoon of the 30th. From Alta Loma came an impressive report of 0.70 inch in 30 minutes.

October

A bird's eye view looking south over the San Gorgonio Pass on 11 October. Note the deep marine layer cloudiness in the coastal basin at right, and the blowing dust in the Coachella Valley at left (Bill Callahan).

The month started off cool and breezy as an anomalous low pressure trough traversed the region.

The trough moved east, putting Southern California u nder a building ridge and northerly flow. This combined with an offshore pressure gradient at the surface to produce the season's first Santa Ana episode from the 3rd through the 8th. The heat peaked of the 5th through the 7th, when mid 90s to lower 100s were common in the lower elevations. Dense fog appeared along the San Diego coast on the 7th.

A trough of low pressure rebuilt the marine layer to such a degree on the 10th and 11th that some drizzle and light rain (less than 0.15 inch) was measured in coastal inland areas. This system also brought strong winds to the desert that stirred up dust.

The script flipped on the 12th, when offshore flow quickly developed, generating northeast winds below passes and canyons into some of the Inland Empire.

Halloween brought a scare to residents of Aguanga. The Highland Fire started, crossed Highway 371 and threatened homes. It eventually burned 2,500 acres (Alex Tardy).

Seasonal weather followed through the 17th as a ridge of high pressure gradually amplified. That ridge produced hot weather inland, with 90s and even a few 100+ - degree readings. 90s even approached the coast on the 20th.

The high pressure ridge broke down over ensuing days, with a trough of low pressure that moved through Southern California. This brought some showers and wind on the 22nd and 23rd. About 0.25 to 0.33 inch fell in foothills, and less than 0.10 inch for many coastal areas and valleys. Top wind gusts were 40-50 mph on the mountain ridges.

A series of low pressure troughs rotated through the West to finish out the month. On the 27th, offshore winds blew, reaching 50-80 mph in the foothills and below Cajon Pass. Several big rigs overturned in Fontana and Rialto.

On Halloween, the Highland Fire roared to life, threatening homes in the Aguanga area.

November

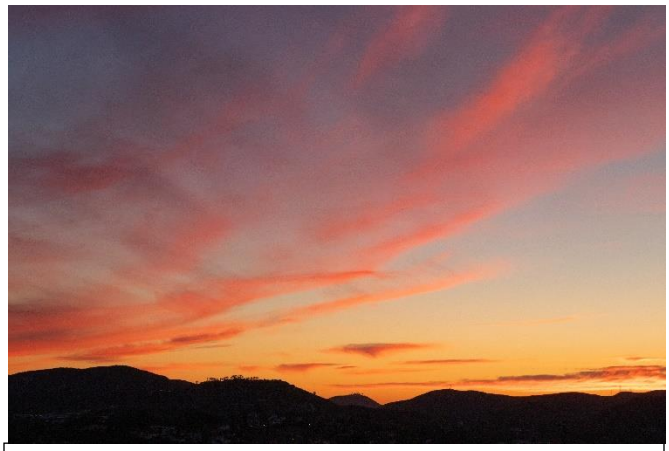
Thunderstorms brought bursts of heavy rain across much of the region and quite a light show for these surfers in Coronado on 15 November (Kyle Goff).

The first several days of the month began warm under Santa Ana conditions and a high pressure ridge; temperatures near the coast were in the 80s.

The ridge broke down as a weakening trough of low pressure moved into California on the 6th and 7th, followed by offshore flow on the 8th and 9th. Top gusts in the San Bernardino Mountain foothills reached 55-70 mph.

Over the next few days, a deep and large trough of low pressure developed over the northeast Pacific. It drew copious moisture and unstable air from the tropics as it moved through Southern California to produce the first widespread rai n event of the season on the 15th and 16th. Lytle Creek got the most rain with 2.24 inches, and amounts of 1 to 2 inches were common in foothills and mountains. Other areas got from 0.25 to 1.25 inch, but the southern San Diego area got less than one quarter inch. Thunderstorms erupted across much of the region, producing some intense bursts of rain and strong, gusty winds. Gusts over 40 mph produced localized property damage. Lingering showers continued into the 18th.

Strong offshore winds developed on the 20th and continued through the 21st. Wind gusts in the foothills were impressive, reaching as high as 89 mph at Santiago Peak. Many valley areas recorded gusts of 40-70 mph, with Grand Terrace clocking 74 mph. The winds overturned big rigs in the northern Inland Empire. A high pressure ridge combined with these offshore winds to boost temperatures near the coast into the 80s on the 21st and 22nd.



The sunrise in Escondido on 10 November was especially colorful (Kim DeCew).

Much cooler weather arrived on the 23rd and 24th as a deep trough dug southward into the region. Light showers brought less than 0.10 inch to many low elevations on the 24th and 25th, and 0.20 to 0.41 inch in the mountains.

Offshore flow brought areas of northeast winds to foothills again on the 26th.

A final, quick storm brought rain that favored San Diego County on the 29th and 30th. Mountains received over 1 inch, with Julian measuring the greatest amount of 1.45 inch. Elsewhere, amounts were less than one half inch, and less than one quarter inch in Orange County and the Inland Empire.

December

December started cool and brisk the first three days, but high pressure brought dry and warmer weather from the 4th through the 6th.

Onshore flow through the 8th turned offshore to produce northeast winds. These winds were strongest in the foothills where gusts of 60-70 mph were measured.

Several offshore wind events followed through the 15th. High pressure and offshore breezes boosted temperatures west of the mountains on the 9th and 10th. A cold but dry trough moved through the region on the 11th and 12th setting up another offshore wind event on the 13th through the 15th. Wind gusts reached 45-55 mph at the top foothill areas.

Fair and warm weather prevailed through the 20th as a high pressure ridge moved through the West Coast.

After a dry three weeks, a legitimate storm finally arrived on the 21st and 22nd, bringing rain and high mountain snow. It also brought some thunderstorms and hundreds of lightning strikes to much of the region. Rain and gusty winds were intense with these storms, particularly in an organized squall that moved ashore in San Diego County. Carlsbad reported a gust of 55 mph, which knocked down several trees. Moonlight Beach hit 61 mph. The strongest winds with this system were associated with this thunderstorm squall, and not in the mountains and deserts as usual. Rainfall exceeded 2 inches in the San Bernardino Mountains, with Lytle Creek topping the list at 2.58 inches. Other storm totals were variable, depending on whether thunderstorms hit rain gauges. Lower elevation totals ranged from one-third to about 1.50 inch. Localized flooding was reported in urban areas when the most intense rains pushed through. A creek crossing in Canebrake was washed out.

Intense rain ripped through Canebrake, washing out this creek crossing on 22 December (Natalie Spandau).

The storm wrapped up in time for Christmas Eve and Christmas Day, which were fair and seasonal. High pressure aloft maintained the dry and seasonal weather until the final weekend of the year.

Extremely large surf of 10-18 feet struck the beaches on the 28th through 30th, generating coastal flooding of parking lots and beach erosion.

On the 30th and 31st, two shortwave troughs from the west moved through the region, each bringing rain. A few mountain locations accumulated over 1 inch, with Wrightwood

taking top honors with 1.31. Snow levels remained high during this warmer maritime storm. Less than 0.40 inch fell on most of the lowlands. Northern Orange County, the Inland Empire, the eastern San Bernardino Mountains and the high desert got less than 0.10 inch.

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Summaries were written by Miguel Miller, editor of the NWS San Diego's quarterly newsletter *Coast to Cactus Weather Examiner*.