

CW3E Event Summary: 22–27 Dec 2019



Center for Western Weather
and Water Extremes

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AT UC SAN DIEGO

Multiple storms bring heavy rainfall and mountain snowfall to Southern California

- Two separate systems affected Southern California on 22–23 Dec and 25–27 Dec
- Some parts of Southern California received more than 3 inches of total rainfall
- The second storm produced 1–3 feet of snow over the higher elevations of the Transverse Ranges

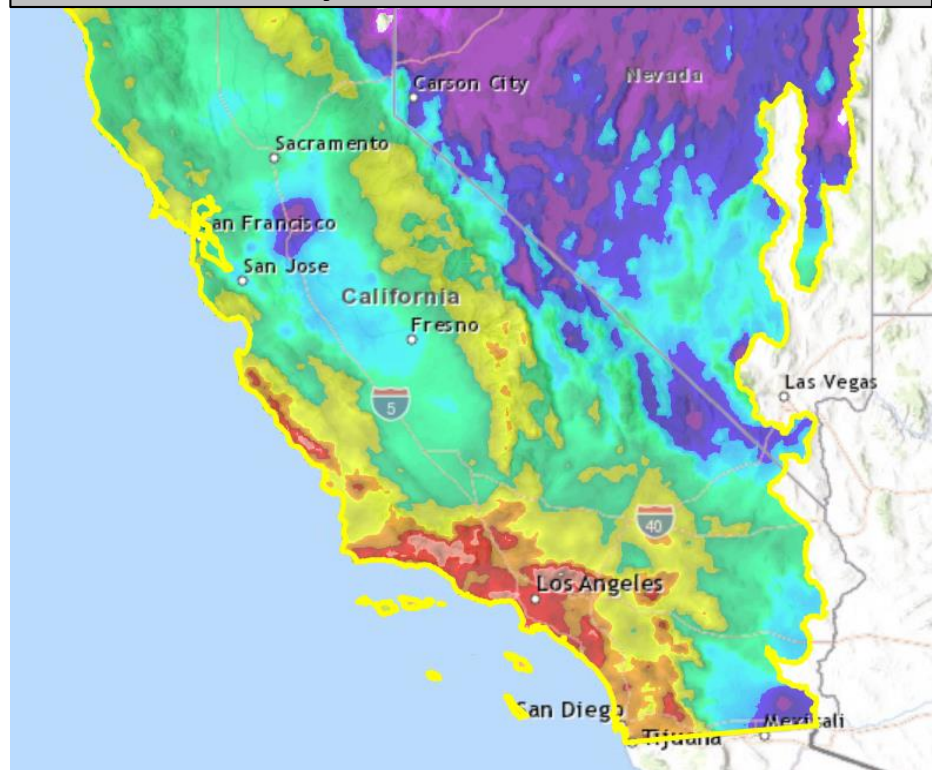
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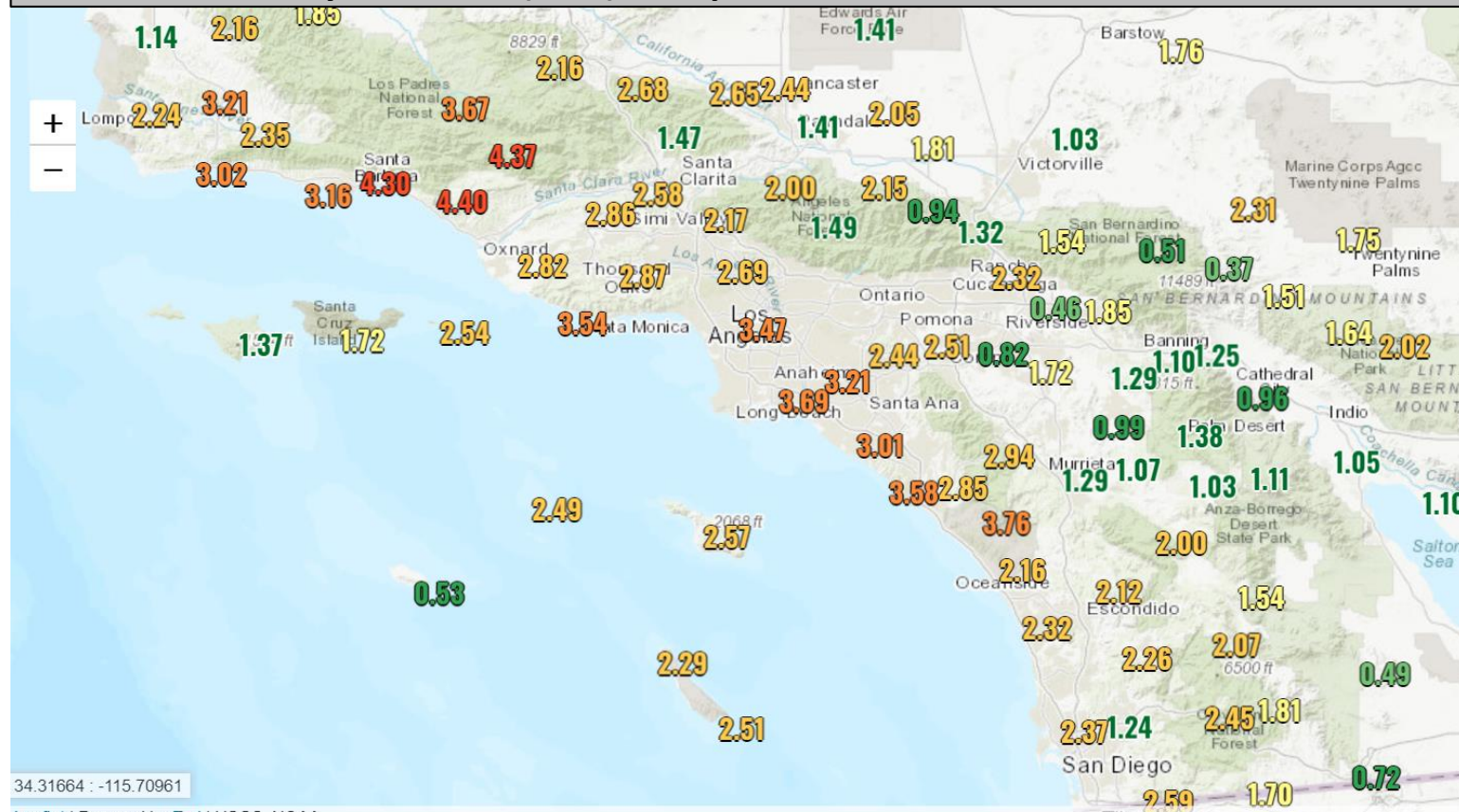
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CNRFC 7-day QPE: Valid 1200 UTC 28 Dec



Source: NOAA/NWS CNRFC, <https://cnrfc.noaa.gov/>

7-day Observed (Raw) Precipitation: Valid 1200 UTC 28 Dec



34.31664 : -115.70961

Leaflet | Powered by Esri | USGS, NOAA

Source: NOAA/NWS Western Region Headquarters, <https://www.weather.gov/wrh/>

- The two storms produced 2–5 inches of total precipitation over coastal Southern California, the Transverse Ranges, and the Peninsular Ranges, and 1–2.5 inches of precipitation in the High Desert and interior valleys
- Many locations received 15–30% of the normal total annual precipitation from these two storms
- Barstow-Daggett Airport recorded 43% of its normal total annual precipitation in a 24-hour period

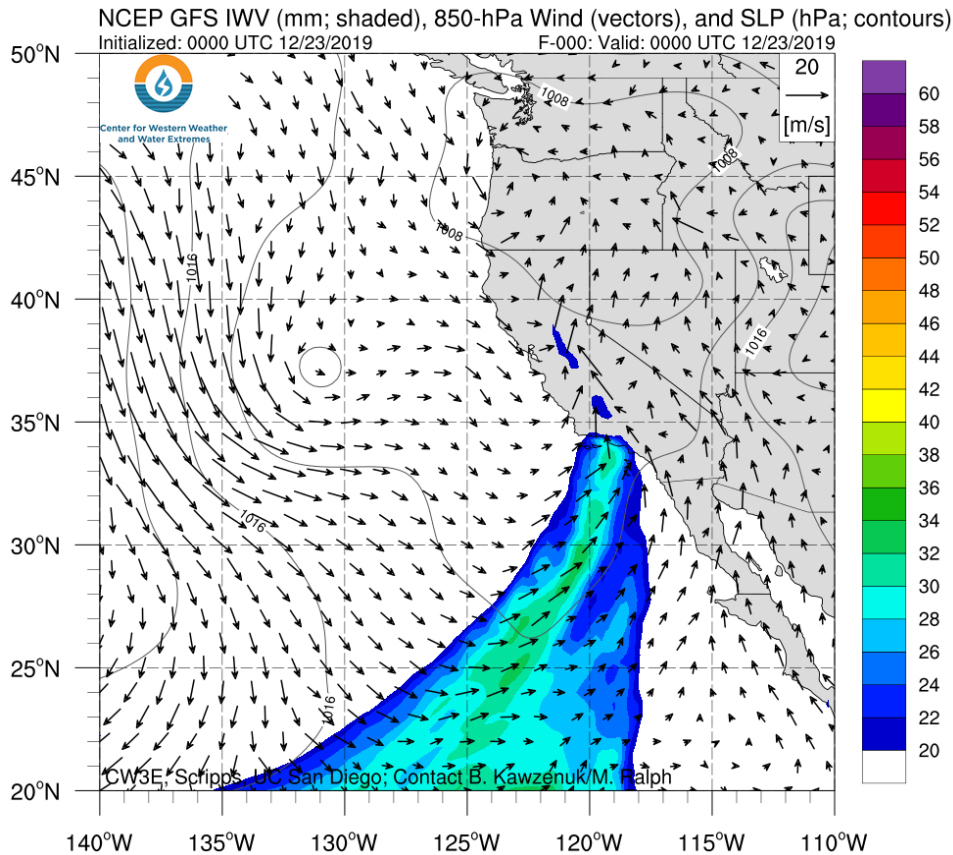
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GFS IWV Analysis: Valid 0000 UTC 23 Dec



NKX Radar: Valid 1540 UTC 23 Dec



Source: NWS San Diego, <https://www.weather.gov/sgx/>

- Heavy rainfall on 22–23 Dec was associated with the remnants of a landfalling AR downstream of an amplifying upper-level trough
- 0000 UTC 23 Dec GFS analysis revealed a narrow plume of moist air extending poleward into Santa Barbara and Ventura Counties
- NWS San Diego radar indicated bands of intense rainfall (> 40 dBZ) moving onshore into Orange and San Diego Counties during the morning of 23 Dec

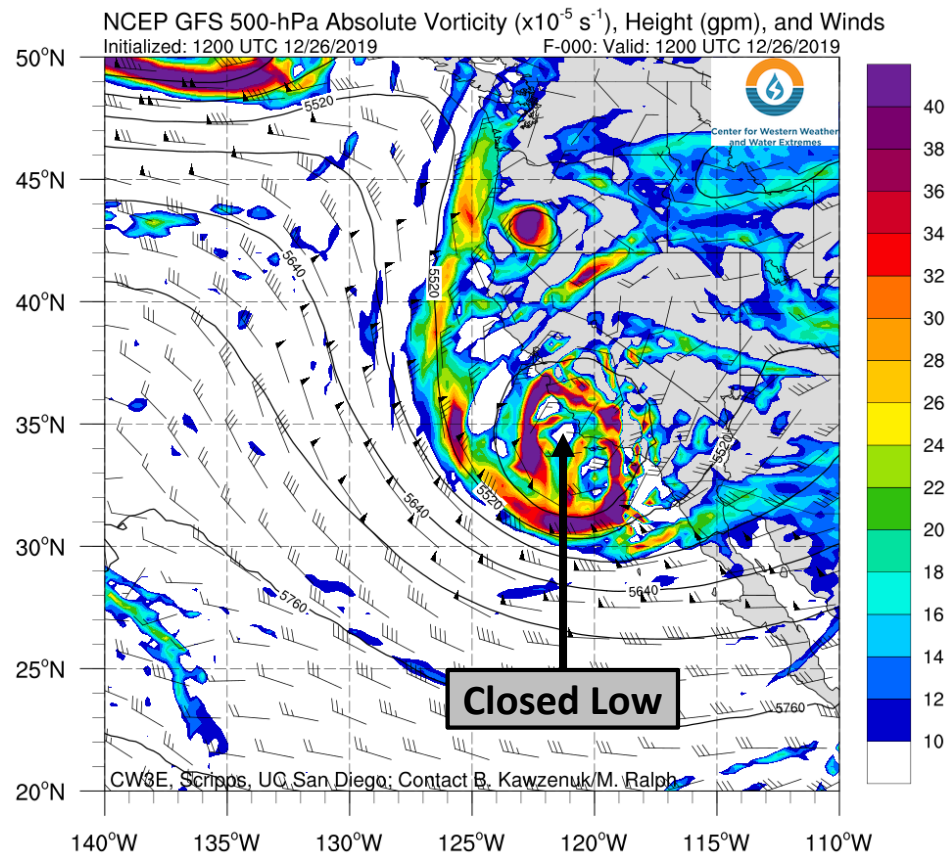
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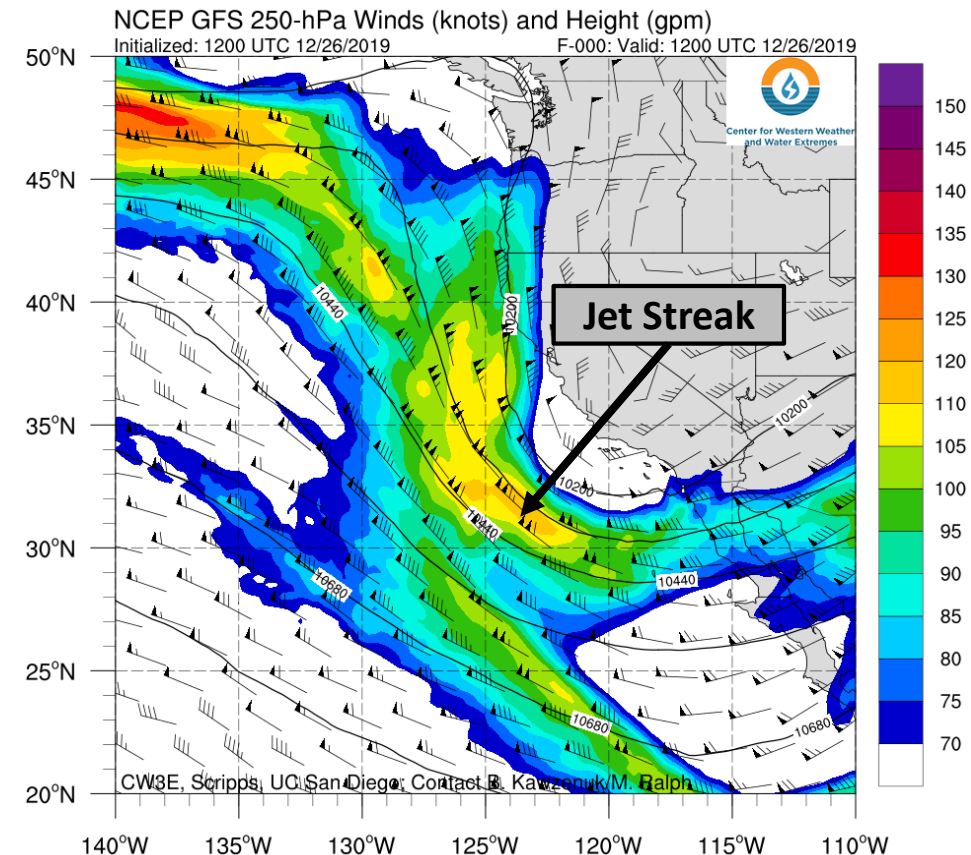
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GFS 500-hPa Analysis: Valid 1200 UTC 26 Dec



GFS 250-hPa Analysis: Valid 1200 UTC 26 Dec



- Heavy precipitation on 25–27 Dec was associated with a closed low off the California coast that moved onshore near San Diego, CA
- Although moisture was lacking with this storm, there was strong dynamical forcing for precipitation
- 1200 UTC 26 Dec GFS analysis shows a closed 500-hPa low and 250-hPa jet streak upstream of Southern California
- These features imply forcing for ascent via differential cyclonic vorticity advection and upper-level divergence

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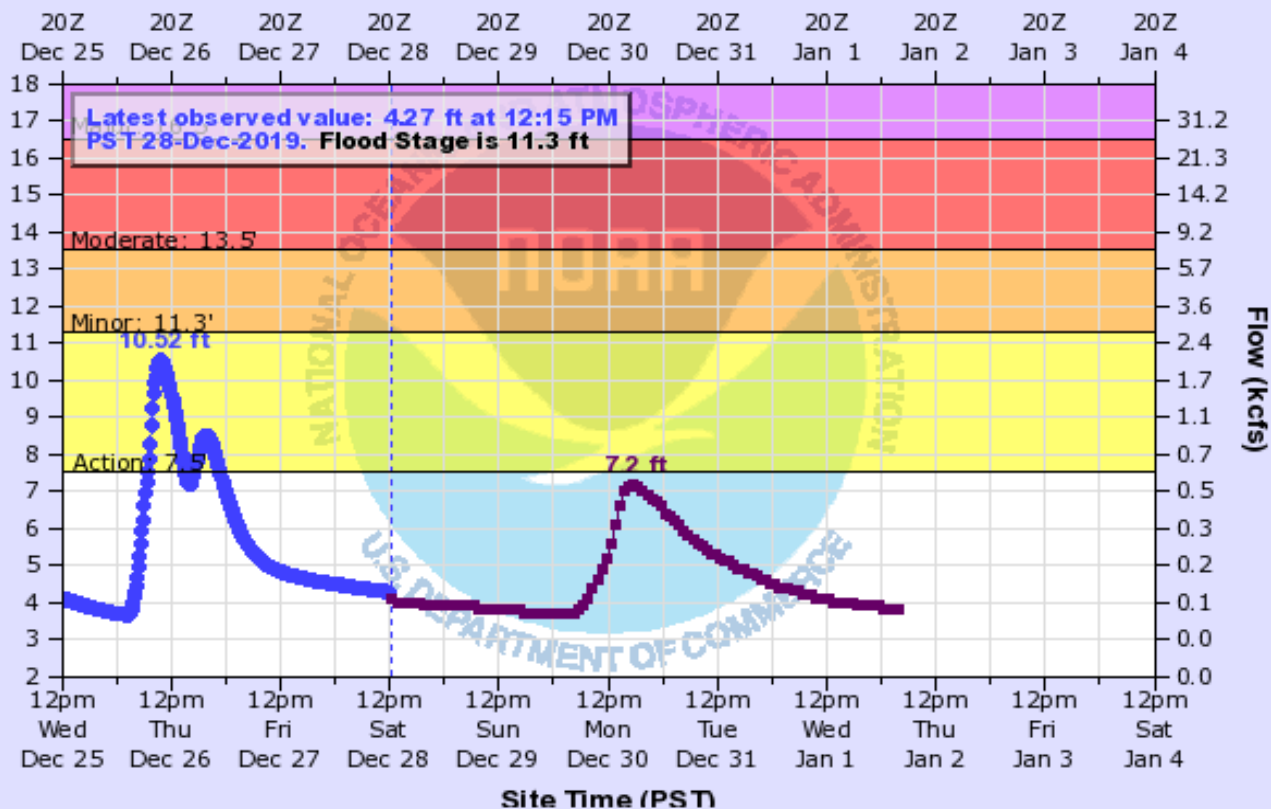


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SAN DIEGO RIVER AT FASHION VALLEY

Universal Time (UTC)



Source: NOAA/NWS Advanced Hydrologic Prediction Service, <https://water.weather.gov/ahps/>

Street Flooding in San Diego, CA



Source: Chris Castellano, CW3E

- Heavy rainfall during the morning of 26 Dec triggered a rapid rise in stage height (> 6 feet in a 6-hour period) along the San Diego River at Fashion Valley
- Fashion Valley Road was closed for several hours due to street flooding

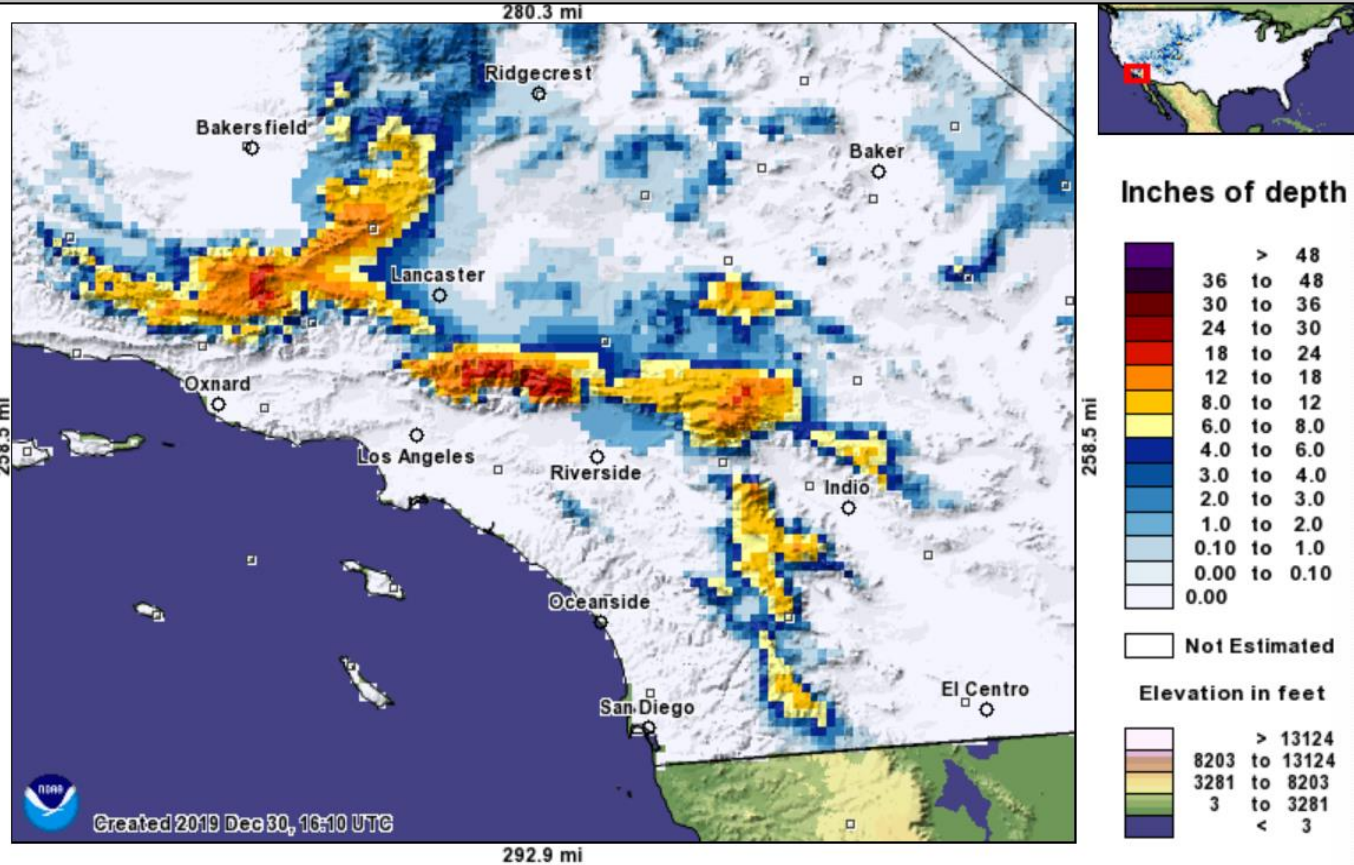
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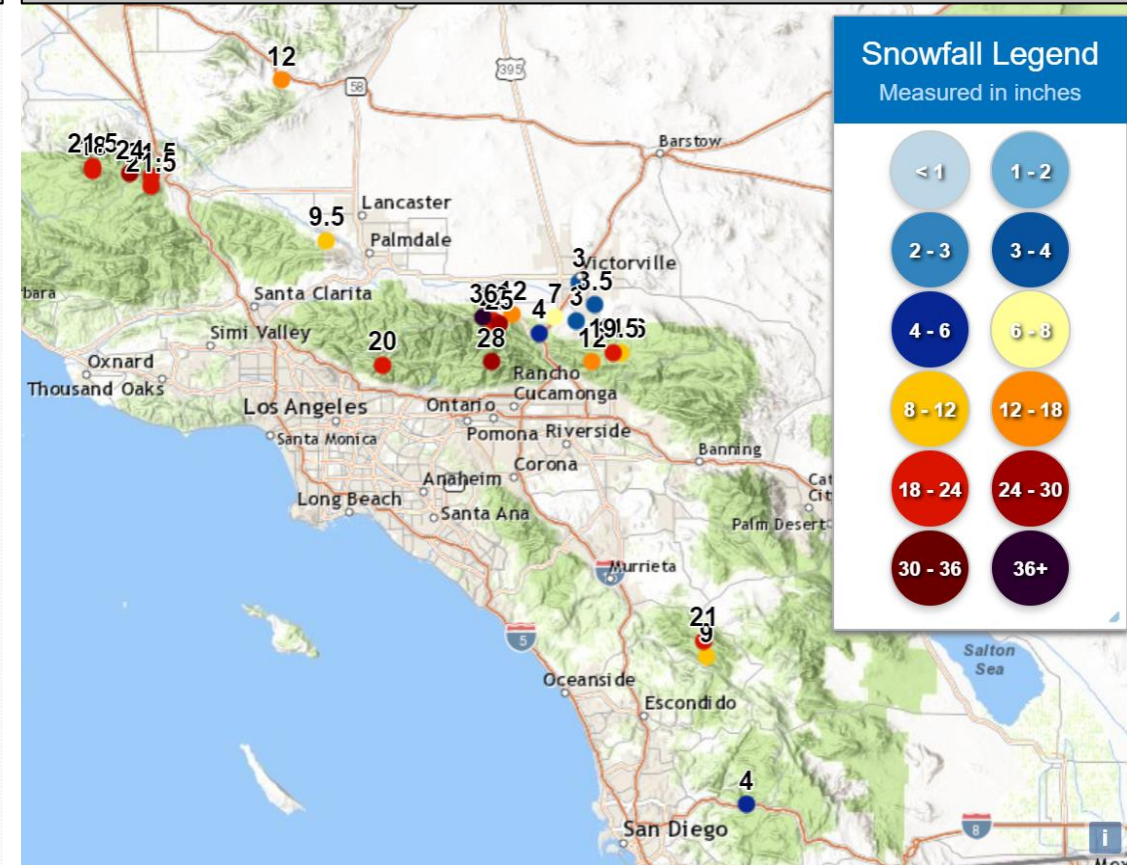
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48-hour Interpolated Snowfall: Valid 1200 UTC 27 Dec



Source: NOAA/NWS NOHRSC, <https://www.nohrsc.noaa.gov/>

72-hour Observed Snowfall: Valid 1200 UTC 28 Dec



Source: NOAA/NWS Central Region Headquarters, <https://www.weather.gov/crh/>

- The second storm produced more than 6 inches of snow over the Peninsular and Transverse Ranges, with the highest amounts (1–3 feet) in northern Ventura County, the Tehachapi Mountains, the San Gabriel Mountains, and the San Bernardino Mountains
- Notable Snowfall Reports: Mountain High Resort - 36 inches; Wrightwood - 25 inches; Palomar Observatory - 21 inches

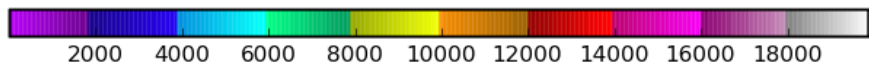
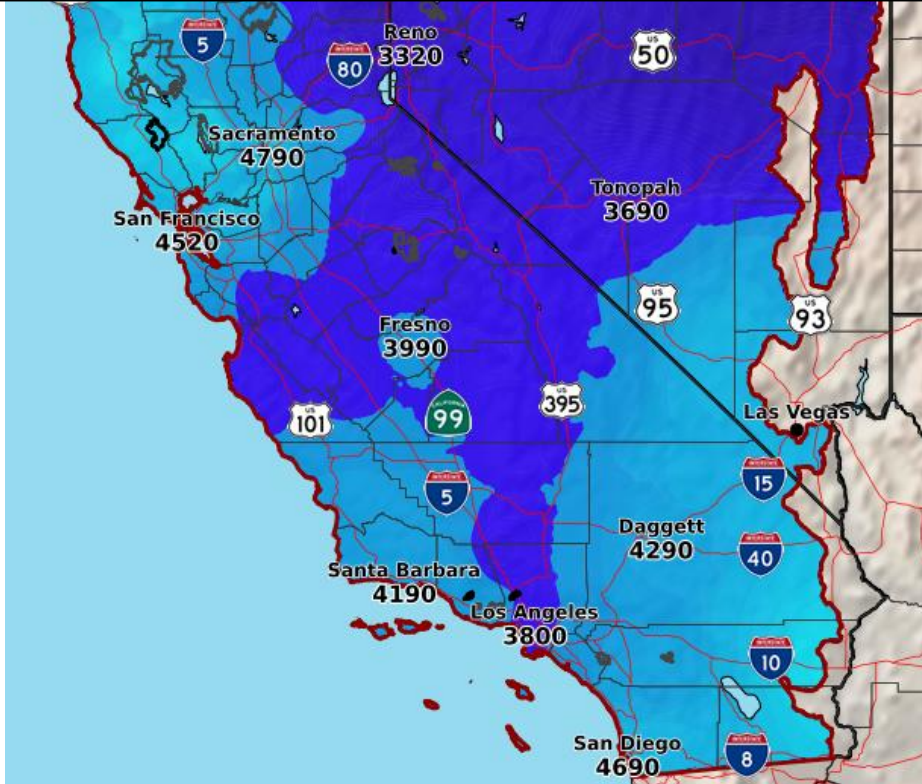
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Observed Freezing Level (ft): Valid 1200 UTC 26 Dec



Source: NOAA/NWS CNRFC, <https://cnrfc.noaa.gov/>

Interstate 15 at Cajon Pass



Source: Johnny Lim via AP

- Low freezing levels lead to accumulating snowfall below 4,000 feet
- Interstate 15 was closed at Cajon Pass and near the California–Nevada state line for several hours
- Interstate 5 was closed at the Grapevine for nearly 36 hours

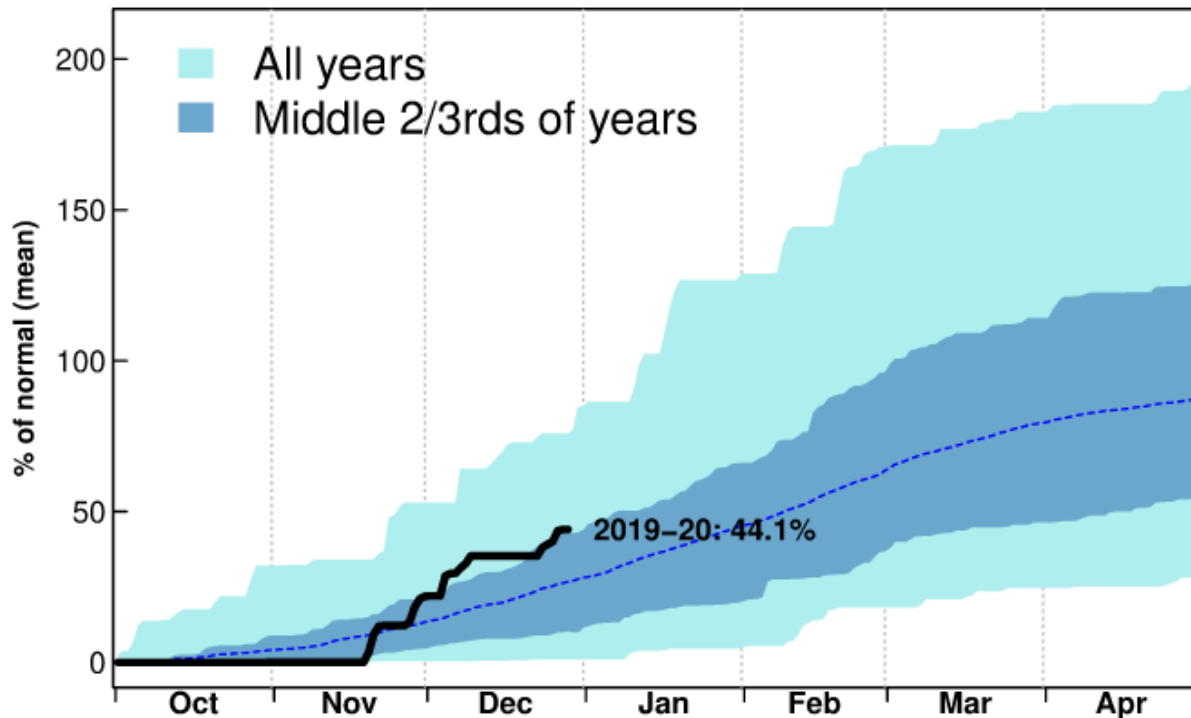
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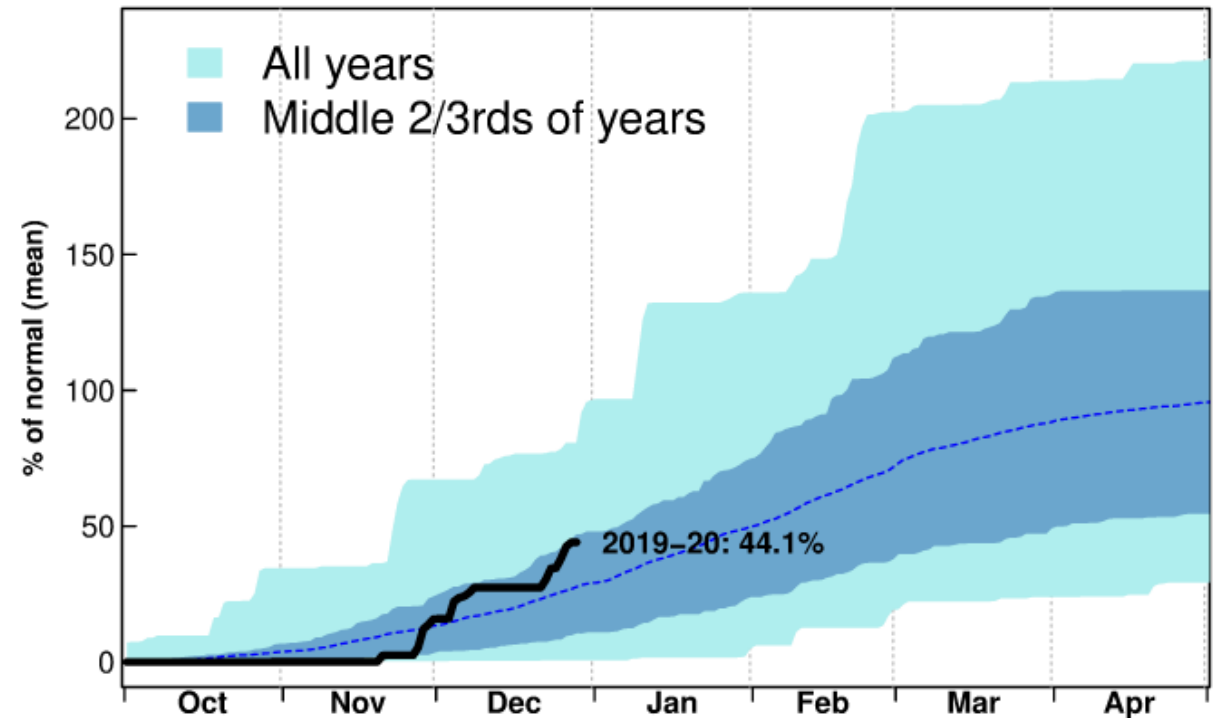
San Diego County Precipitation Tracking

SD_county precip for all years, data through 2019/12/28



Greater Los Angeles Precipitation Tracking

LA_basin precip for all years, data through 2019/12/28



Source: California–Nevada Applications Program , <https://scripps.ucsd.edu/programs/cnap/>

- As of 28 Dec, San Diego County and the Greater Los Angeles area have received about 44% of the normal total water year (Oct–Sep) precipitation
- On average, each region receives less than 30% of the normal total water year precipitation by the end of December