

Southern California Tropical Storms

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Introduction

Tropical cyclones are rare events in Southern California, but they can cause significant impacts. Heavy rain can cause floods. Wind damage is usually minor, but strong winds can cause electricity outages. This poster reviews three tropical storms that affected Southern California. Nora brought wind and rain in 1997. Hilary dropped heavy rain that caused floods in 2023. A tropical storm sometimes called El Cordonazo made landfall in Long Beach in 1939, and it caused multiple fatalities.

Tropical Storm Nora (1997)

- Moved near California/Nevada border on September 25-26
- Intensified to a major hurricane west of Mexico
- Was a tropical storm over southeastern California
- Street flooding reported in San Diego, El Centro, Palm Springs and Indio
- 125,000 customers lost electricity in Los Angeles

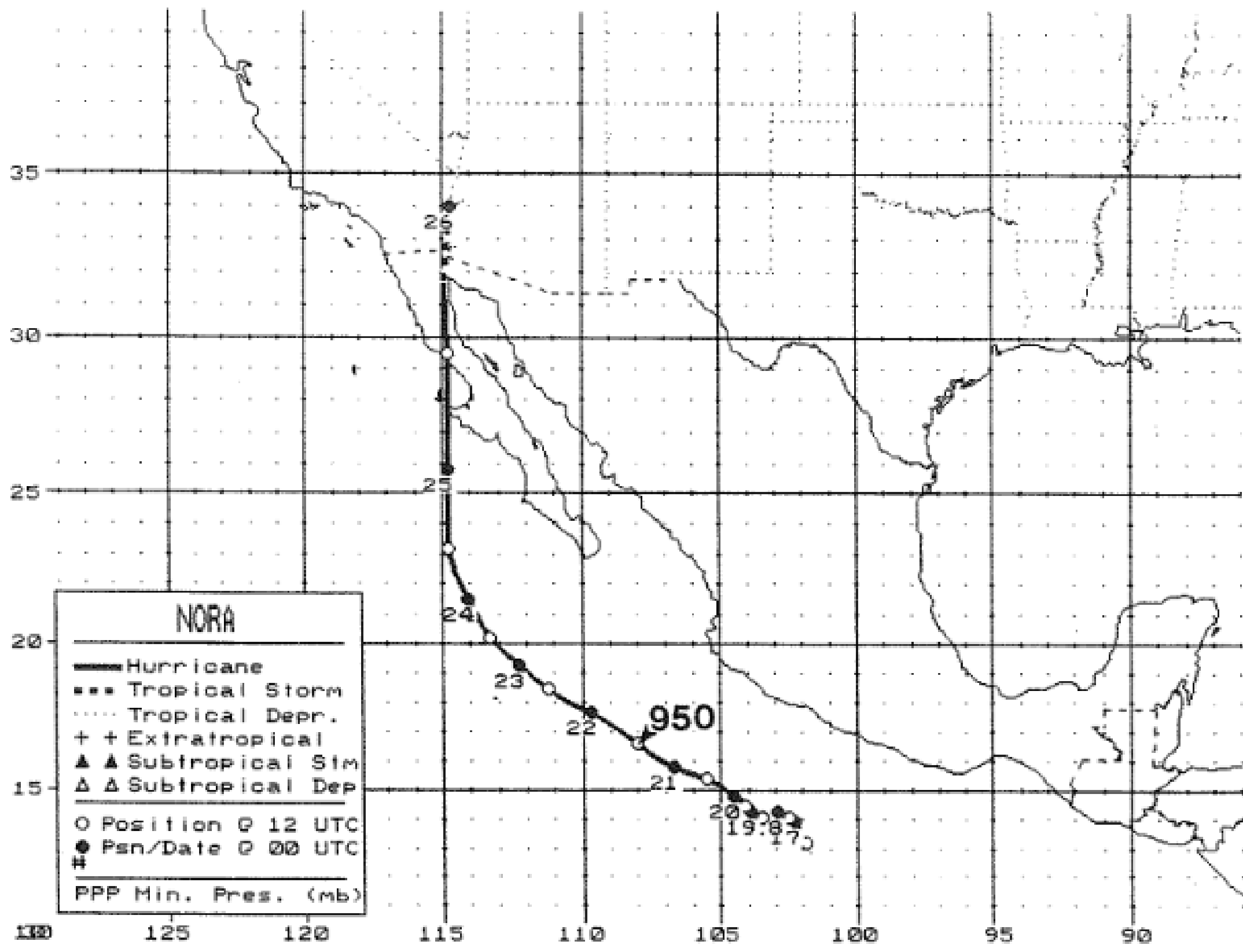
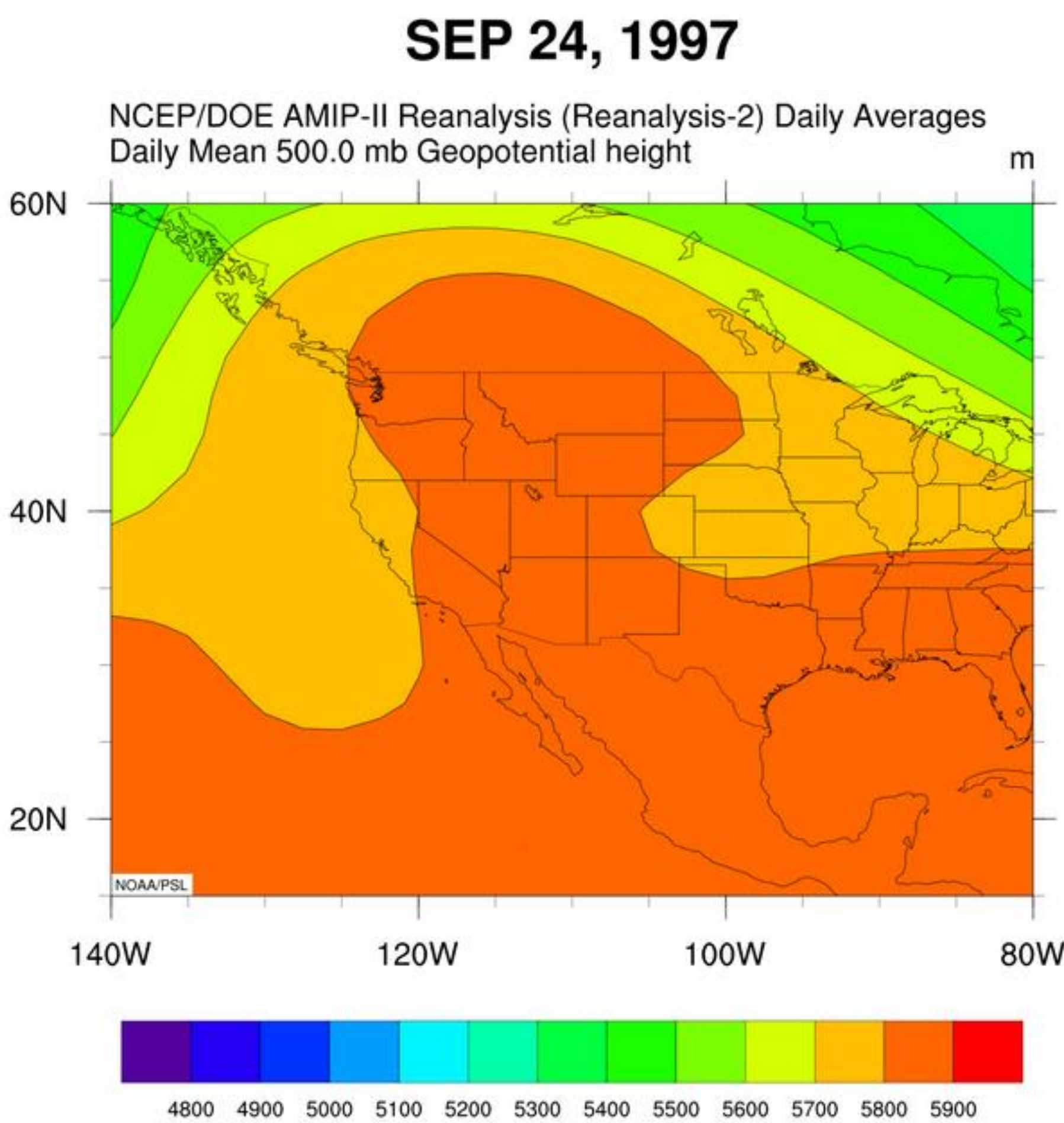


Figure 1a. Best track of Hurricane Nora, September 1997.

- Passed over cool wake caused by Hurricane Linda
- Then passed over water with warm anomaly of more than 2 K
- Moved between upper low west of California and ridge over Rocky Mountains



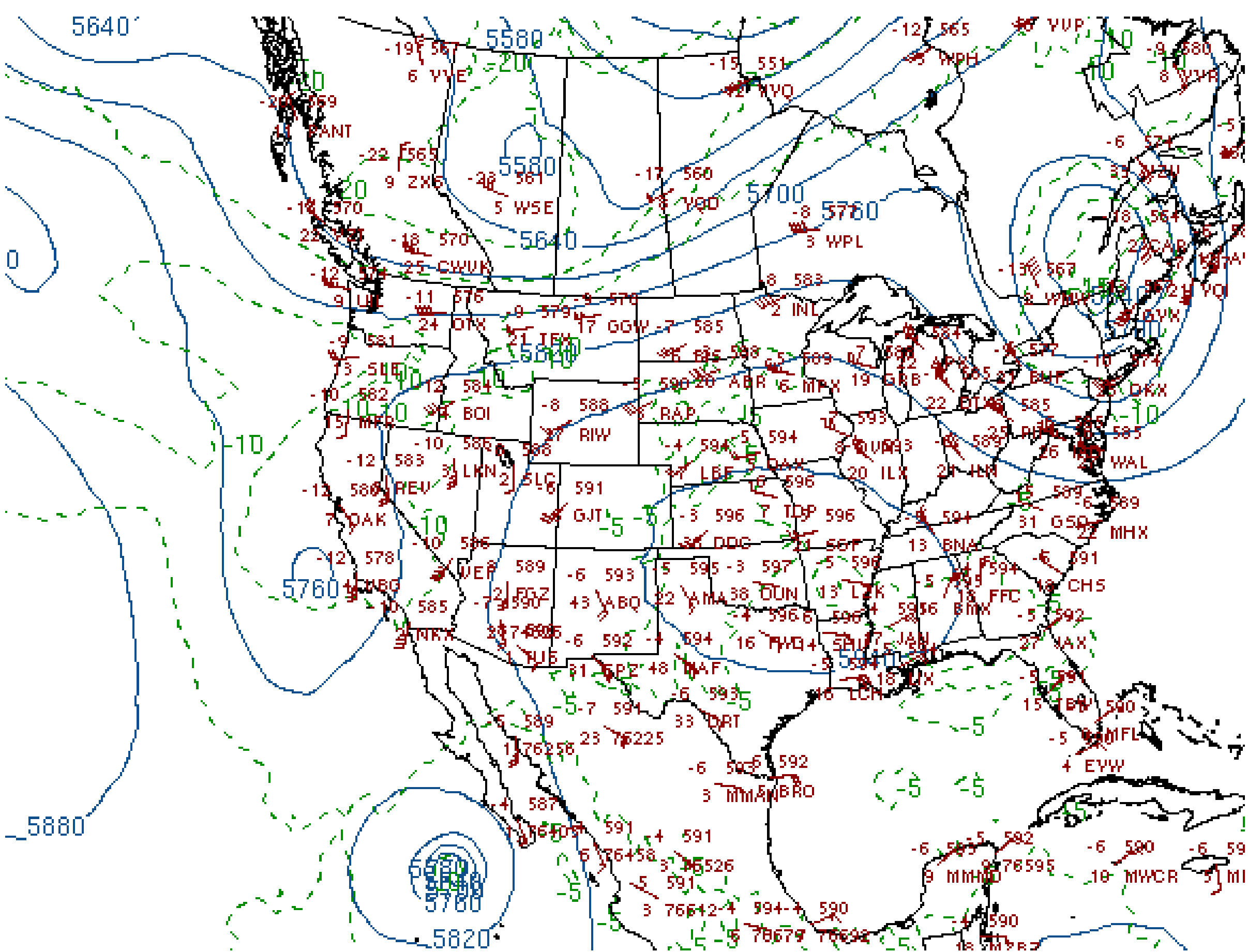
Tropical Storm Hilary (2023)

- Tropical Storm Warning from U.S./Mexico border to Point Mugu and Catalina Islands
- Operationally thought to move over Southern California as a tropical storm
- Later analysis by NHC determined low level center dissipated near Baja California
- New, non-tropical low formed near San Diego
- Affected Southern California during August 20-21
- 2 fatalities in Mexico, 1 fatality in U.S.
- 900 million dollars in damage in U.S.
- Automated station at Mount San Jacinto (elev. of 8616 ft) had 11.75 inches of rain
- Downtown Los Angeles had 2.48 inches, San Diego had 1.82 inches
- Parts of Interstate 10 closed due to floods
- Flooding also in Palm Springs, Seven Oaks, Death Valley and along San Diego River



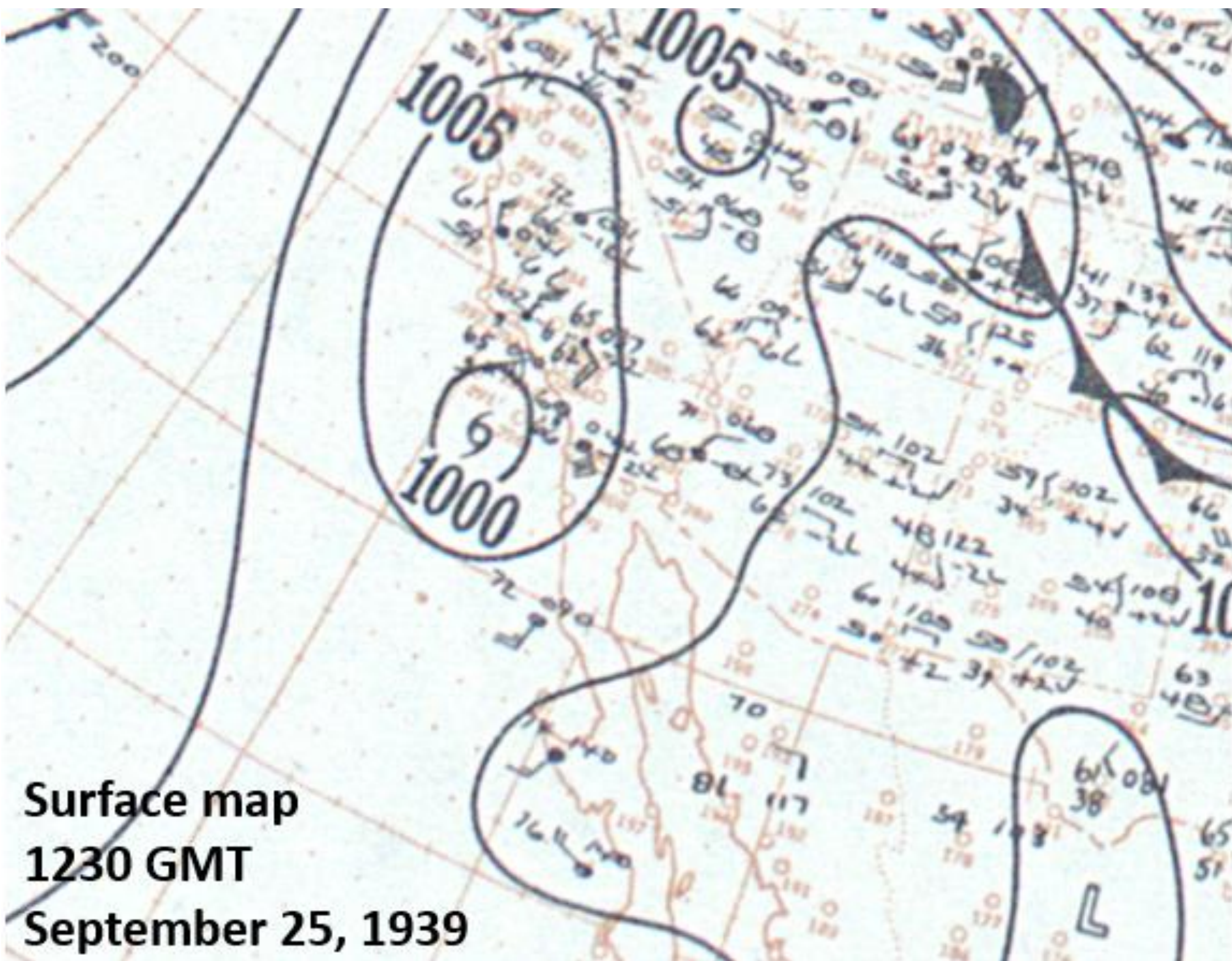
Figure 1. Best track positions for Hurricane Hilary, 16-20 August 2023.

- Major hurricane (Cat. 4) south of Baja California
- Moved between upper level trough west of California and ridge over Southwest U.S.
- Initial low level center dissipated because of mountains in Baja and strong wind shear
- Occurred during onset of strong El Niño



Long Beach Tropical Storm (1939) – El Cordonazo

- Affected Southern California during September 24-26
- Made landfall near Long Beach
- May have been hurricane just prior to landfall
- Sustained wind speed of 50 m.p.h. (80 km/h)
- Torrential rain with 11.60 inches at Mt. Wilson, 5.42 inches at Los Angeles
- 48 fatalities from sinking boats, 45 fatalities from floods



- Track uncertain but appears to have approached coast from south
- May have been onset of strong El Niño
- People unprepared
- Weather Bureau established Southern California Forecast Office in 1940

Summary

- Southern California tropical storms are rare but they do happen
- Primary risks are heavy rain and floods
- Wind damage is typically minor
- El Niño or onset of El Niño contributes to more favorable Sea Surface Temperatures
- Upper level trough or cutoff low west of California and ridge over Rocky Mountains or southwest U.S. steer storms toward Southern California
- Usually move northward across Baja California, but not always
- Formerly hurricanes that weaken due to passage over mountains and strong vertical wind shear

References

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