

### Which climate factors (“Climate Controls”) influence California’s weather the most?

**Latitude:** 32°- 42 ° N, so the southern part of CA. is warmer from getting more solar radiation. The northern part of the state is wetter (see Climate types below).

**Coastal / Inland differences:** Because of water’s high heat capacity, the ocean does not heat up or cool off as quickly as land does, which often results in an overcast “marine layer” (stratus clouds or fog). Coastal temperatures are milder with less extremes, and inland temps. have “higher highs and lower lows.” (If you live near the coast, temperature, pressure, and humidity may change daily with wind direction.)

**Mountain influences: Elevation:** temperature, moisture, and air pressure decrease with higher altitude / elevation, and mountains act as ‘**topographic barriers**’ to ocean moisture, forcing moist air upward and orographic precipitation on windward (W) sides of mountains, and dry rain shadows on leeward (E) sides. Precipitation decreases as we move E in CA, except on high western slopes of Sierra Nevada Mountains.

**Mid-latitude westerly winds** are one of Earth’s global wind belts, so W winds are most common.

**Air mass sources:** From the North Pacific Ocean (the Aleutian Low pressure center) come Low-pressure wave cyclones, cold fronts, unstable air. From both the E Pacific High pressure center & the Great Basin High center (Nevada & Utah) come sunny, sinking air (“anticyclones”). From the SE (Gulf of Mexico) or Gulf of CA, summer “monsoon” (sea-to-land) winds bring tropical-like humidity, cumulonimbus clouds and “pop-up” rain.

### Other conditions commonly referred to in weather reports:

**Cold fronts** from the NW bring cumulonimbus clouds, possible rain, wind, and colder temps. The day after a cold front passes is usually cold, windy, sunny, with clean air. (“Bring a jacket”: the air is “visiting” us from Alaska.)

**Warm fronts** from SW bring stratus and nimbostratus clouds, possible light rain ahead of front.

**Fog** forms along the coast or inland valleys when air temperatures are near the dew point. (So. Cal.-Catalina Eddy).

**Temperature inversions** occur if colder ocean air blows in under a warmer “lid” of sinking air.

**(So. Cal.) Santa Ana condition** – High pressure, sunny, very dry, compressional, down-slope heating, “offshore” winds from E/NE. High fire risk. Sinking air can intensify smog.

### Climate Types in California

Most of California has a **Mediterranean** climate similar to the Mediterranean region of Europe, when rains come in winter and summers are dry (Koeppen **Csa** + **Csb** in **Mild Midlatitude C** classification.) (Most of the rest of the world has rain in their high-sun season.) We are located between more dry **B** climates to the S and E of us, and the moist **Marine West Coast** (Koeppen **Cfb**) climates in coastal Oregon & Washington. Think of Earth’s orbit around the sun and the tilt of our axis causing seasons: it is as if the weather systems N and S of us like to travel: sunny, subtropical high pressure “visits” us in summer, and rains from the North “visit” us in winter.

**Dry B** climates include **semi-arid / steppe (Bs)** in inland valleys near deserts, and the southern coastal strip including San Diego. True **deserts (Bw)** get less than 10” of rainfall a year, and are in SE California and the southern San Joaquin (Central) Valley, not in “L.A.” Hottest temperatures are in Death Valley at lowest elevations. Central Valley is productive agriculturally because of irrigation from the Sierras, not rainfall.

**Mountain climates** include sections of “Severe Midlatitude **D**” (subarctic, similar to Canada).

**Highland EH – tundra** is at the highest altitudes. (Globally, a progression upward in altitude is similar to an increase in northward latitude with climate and vegetation; i.e., driving uphill to Sequoia National Park is a bit like “driving to Canada.”)