WATER YEAR 2017

Western Regional Climate Center

Will La Niña Make a Difference?

October 2016

- Making seasonal forecasts of precipitation – the ability to predict now if 2017 will be wet or dry (and how wet or dry) – is scientifically difficult, and the accuracy of such predictions is very low, much less than that of a seven-day weather forecast.

- Scientists consider teleconnections (recurring and persistent, large-scale patterns of pressure and circulation anomalies over important regions of the globe that correlate with climate at a site of interest) when attempting to make seasonal climate forecasts.

- The El Niño-Southern Oscillation (ENSO) is one of the most studied climate phenomena and one that can provide some predictive guidance in parts of the United States under certain conditions. ENSO is characterized by year-to-year fluctuations in sea surface temperatures along the equator in the Pacific Ocean between Peru and the International Date Line and simultaneous fluctuations in sea level air pressures between Tahiti and Darwin, Australia. The ENSO cycle is expressed as three states: neutral conditions, El Niño (warm ocean phase), and La Niña (cold ocean phase).

- The National Oceanic and Atmospheric Administration's Climate Prediction Center classifies current ENSO conditions as neutral, with a 70 percent chance of transitioning to La Niña conditions this fall and a 55 percent chance that La Niña will persist during the winter.

Seasonal forecasts of precipitation are difficult and much less accurate than a seven-day weather forecast.

- The graphics on the reverse show the relationship over a more than 80-year period between measured precipitation in each of California's climate divisions (see indicator map) and ENSO conditions, expressed as the Southern Oscillation Index, a measure of air pressure fluctuations between Tahiti and Darwin, Australia. The strongest El Niño and La Niña events plot on the far left and far right sides of the graphics, respectively.

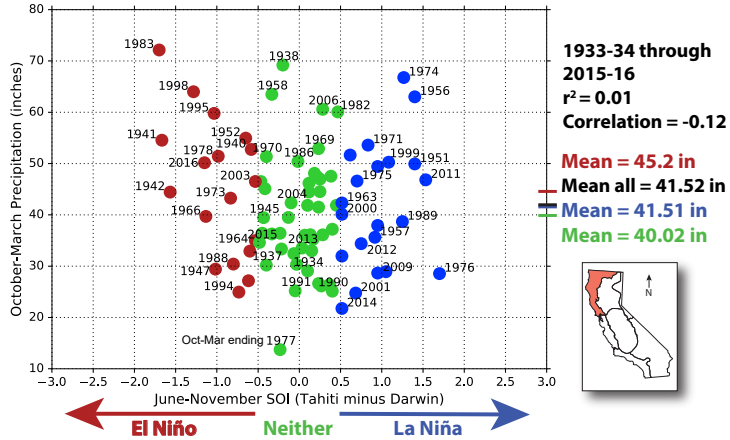
- ENSO's strongest signal in California is for Southern California to be drier than average in La Niña years. California's large year-to-year variability and the importance of a few individual large storms prevent using ENSO alone to predict seasonal precipitation outcomes for California.

- Floods can happen in any given winter. Some major floods (December 1955, December 1964, February 1986, and New Year 1997) have occurred in La Niña and neutral years.

- Of the 18 La Niña winters since 1950-51, 16 have provided below-average precipitation for Southern California's coastal region, and 15 winters have resulted in below-average precipitation for Southern California's interior region. Water year 2011 contained the only significantly wet La Niña event in this time period.

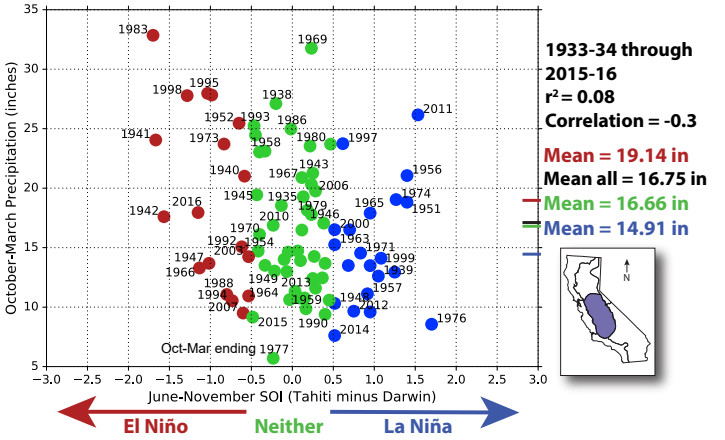
- Conversely, when La Niña conditions were in place during winter from 1950-51, above-average precipitation was recorded in 11 years for the Northern Sierra and in 8 years for the Central and Southern Sierra.

October-March (winter) precipitation for 1933-34 through 2015-16 by Climate Division versus Southern Oscillation Index for immediately preceeding June-November



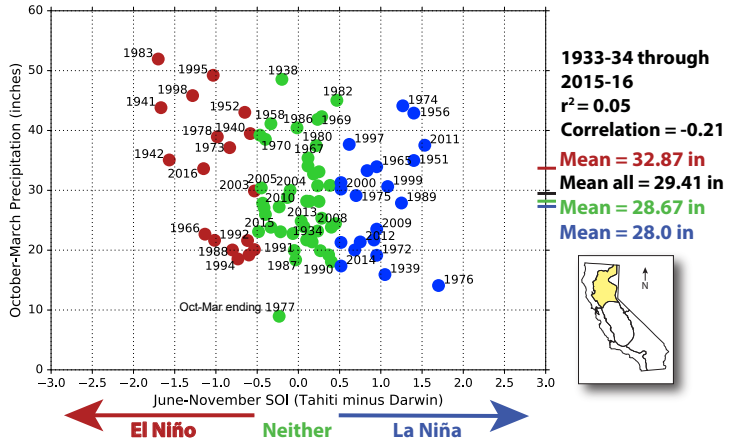
1933-34 through 2015-16
r^2 = 0.01
Correlation = -0.12

Mean = 45.2 in
Mean all = 41.52 in
Mean = 41.51 in
Mean = 40.02 in



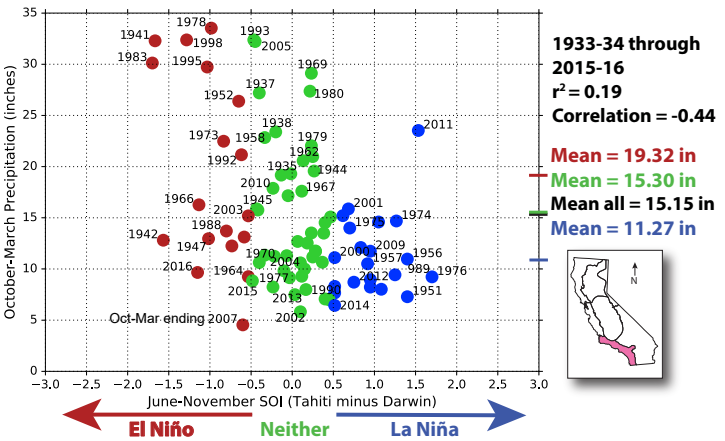
1933-34 through 2015-16
r^2 = 0.08
Correlation = -0.3

Mean = 19.14 in
Mean all = 16.75 in
Mean = 16.66 in
Mean = 14.91 in



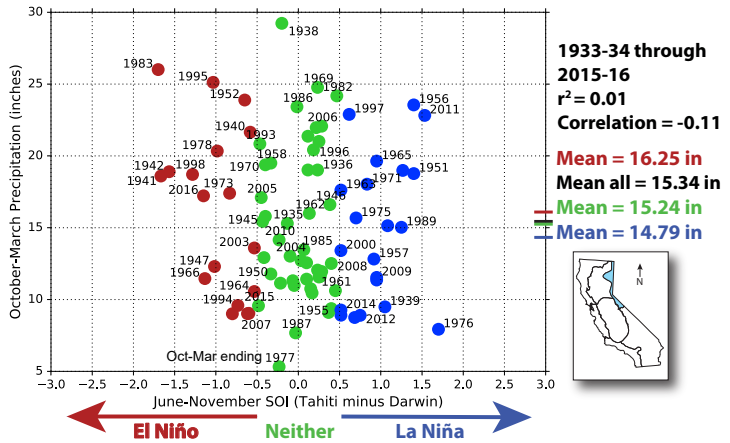
1933-34 through 2015-16
r^2 = 0.05
Correlation = -0.21

Mean = 32.87 in
Mean all = 29.41 in
Mean = 28.67 in
Mean = 28.0 in



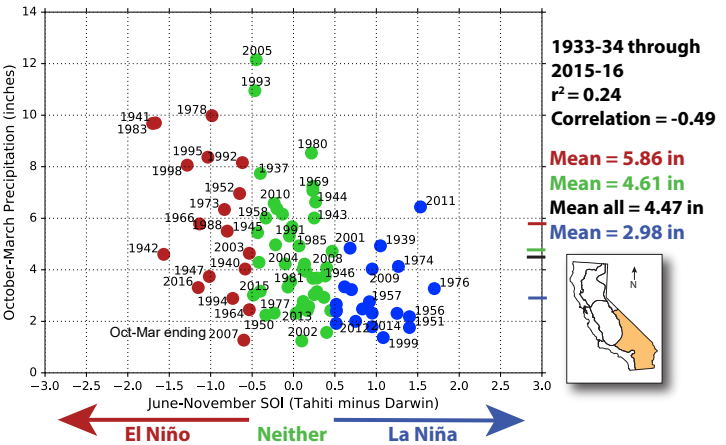
1933-34 through 2015-16
r^2 = 0.19
Correlation = -0.44

Mean = 19.32 in
Mean = 15.30 in
Mean all = 15.15 in
Mean = 11.27 in



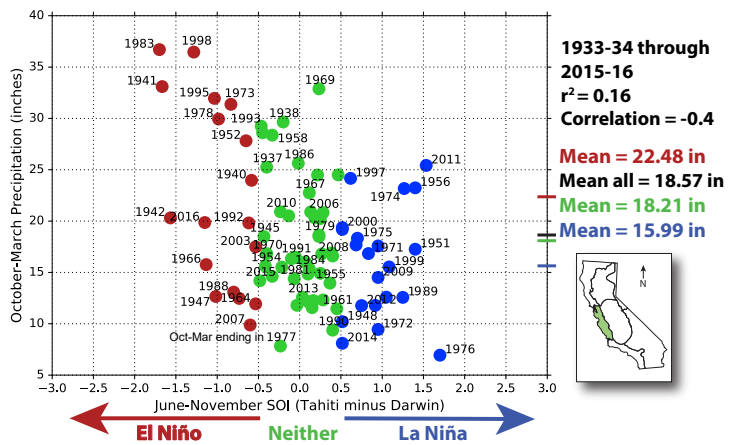
1933-34 through 2015-16
r^2 = 0.01
Correlation = -0.11

Mean = 16.25 in
Mean all = 15.34 in
Mean = 15.24 in
Mean = 14.79 in



1933-34 through 2015-16
r^2 = 0.24
Correlation = -0.49

Mean = 5.86 in
Mean = 4.61 in
Mean all = 4.47 in
Mean = 2.98 in



1933-34 through 2015-16
r^2 = 0.16
Correlation = -0.4

Mean = 22.48 in
Mean all = 18.57 in
Mean = 18.21 in
Mean = 15.99 in

Western Regional Climate Center Regions