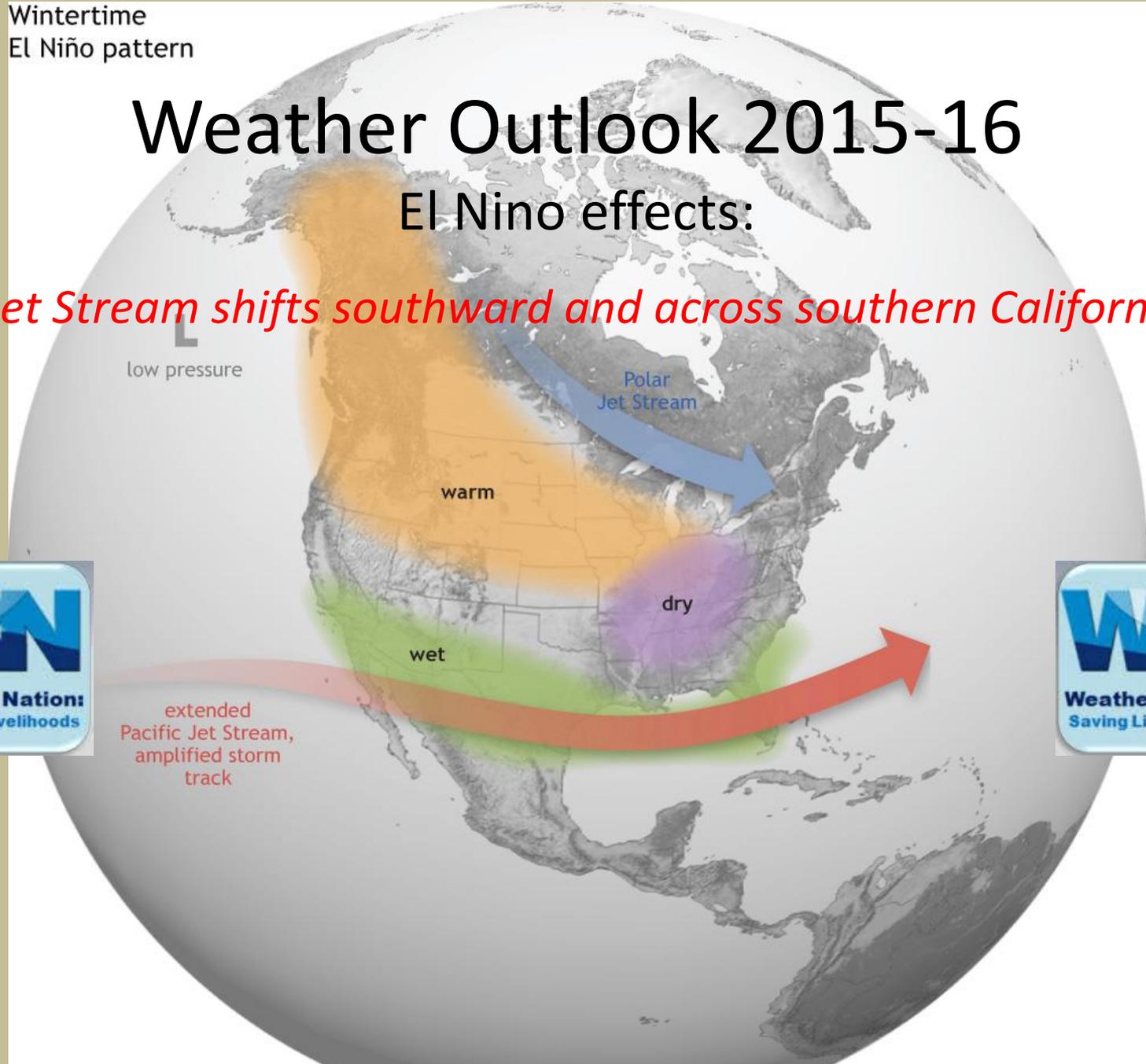


Wintertime
El Niño pattern

Weather Outlook 2015-16

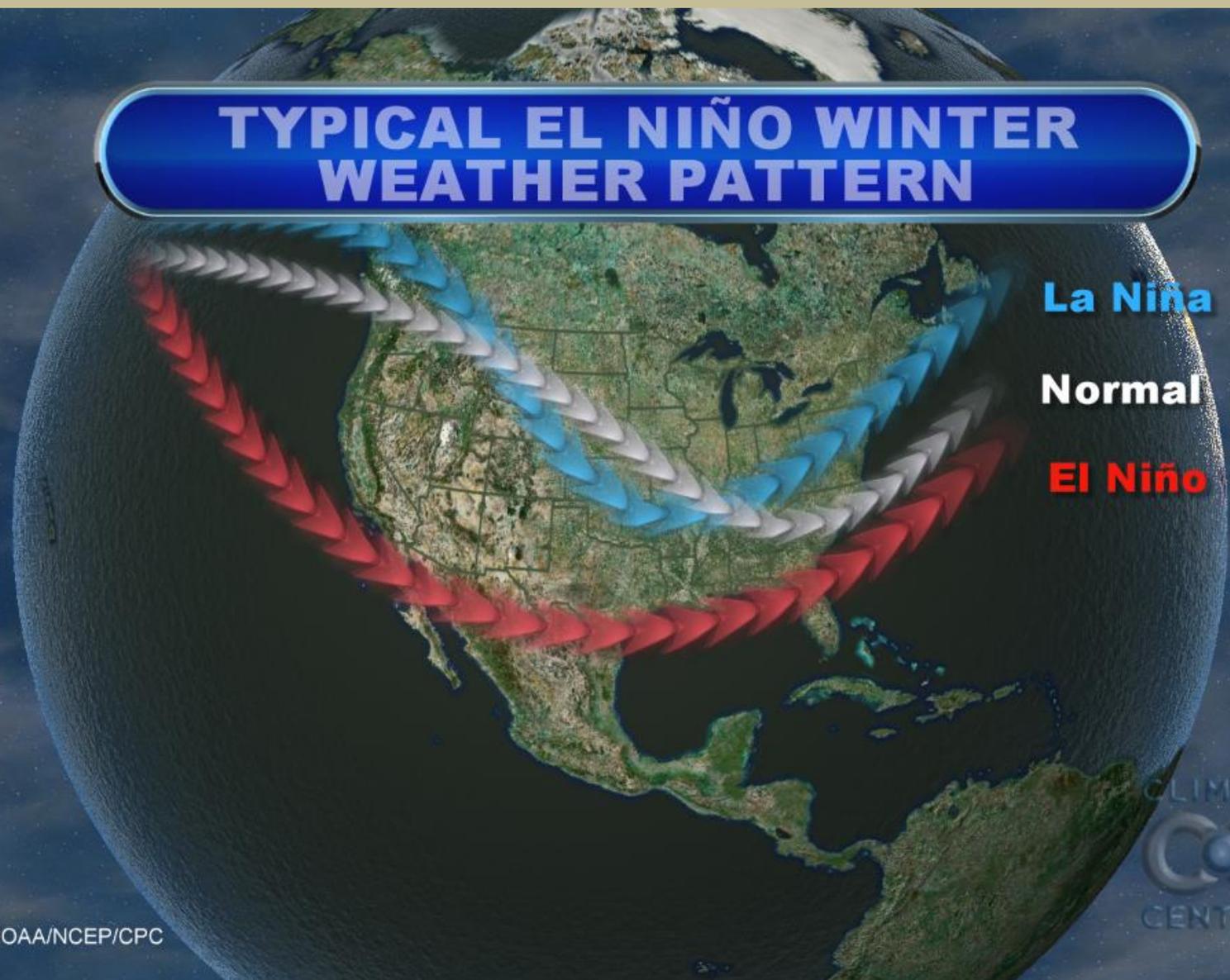
El Niño effects:

Jet Stream shifts southward and across southern California



How the jet stream changes

TYPICAL EL NIÑO WINTER WEATHER PATTERN



Source: NOAA/NCEP/CPC

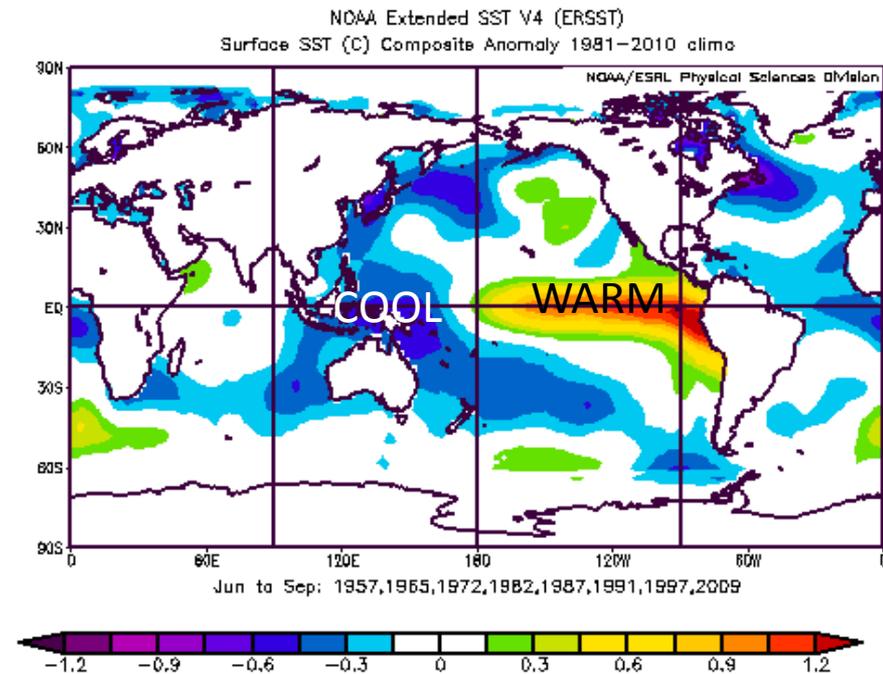
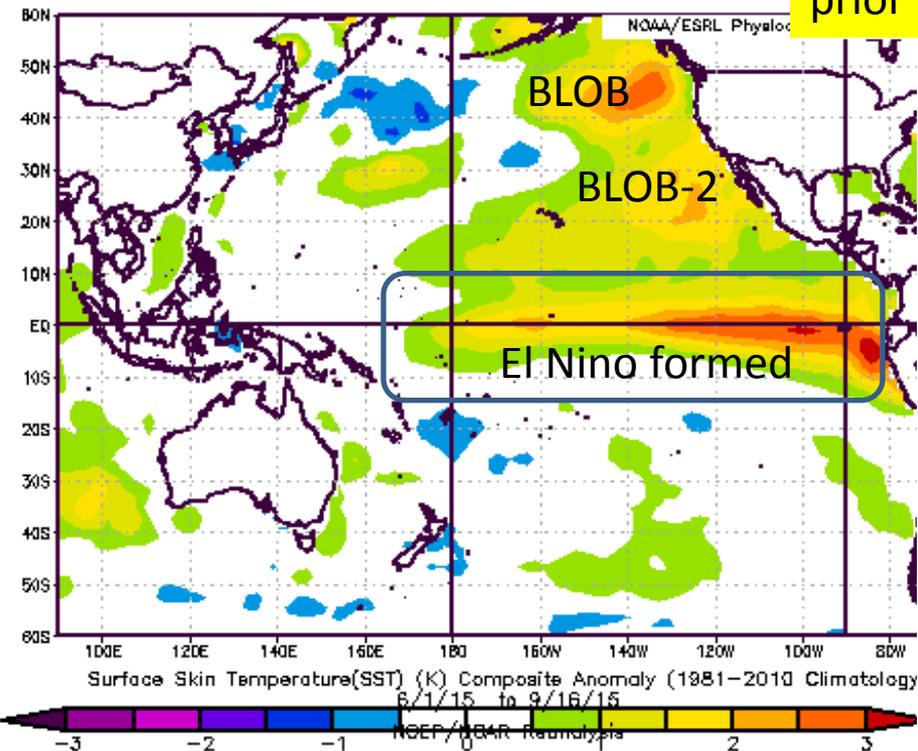


Sea Surface Temperature Departure from Normal June 1 to September 16, 2015

2015 summer

Warmth in the east
Pacific not seen with
prior El Nino years

Past El Nino years



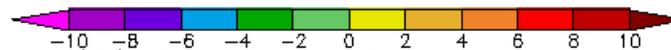
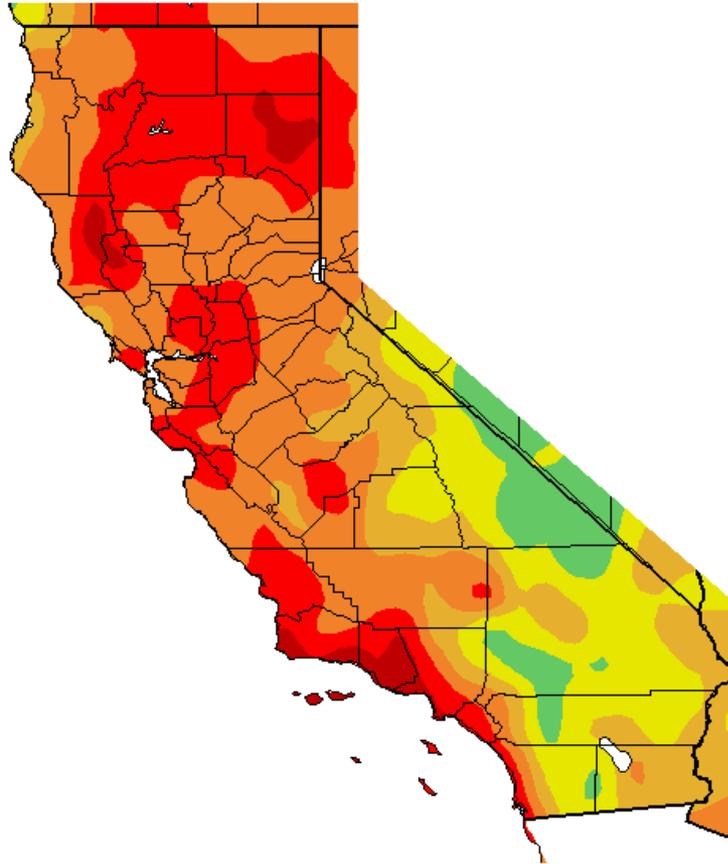
October record warmth!

FACTS at San Diego

- October 2015 was 7.7 F degrees above normal
- Average in October was 74.4 F degrees
- 2.2 F above the previous record in 1983 (2014 was 3rd)
- October 10 and 13 had low temperatures of 76
- 4 days above 90 (99 F highest) from 9th- 12th
- Highest monthly departure is September 1984 at 8.3 F above normal
- March 2015 was 7.2 F degrees above normal

2015 warmest since 1984
(shy by 0.1 degrees)

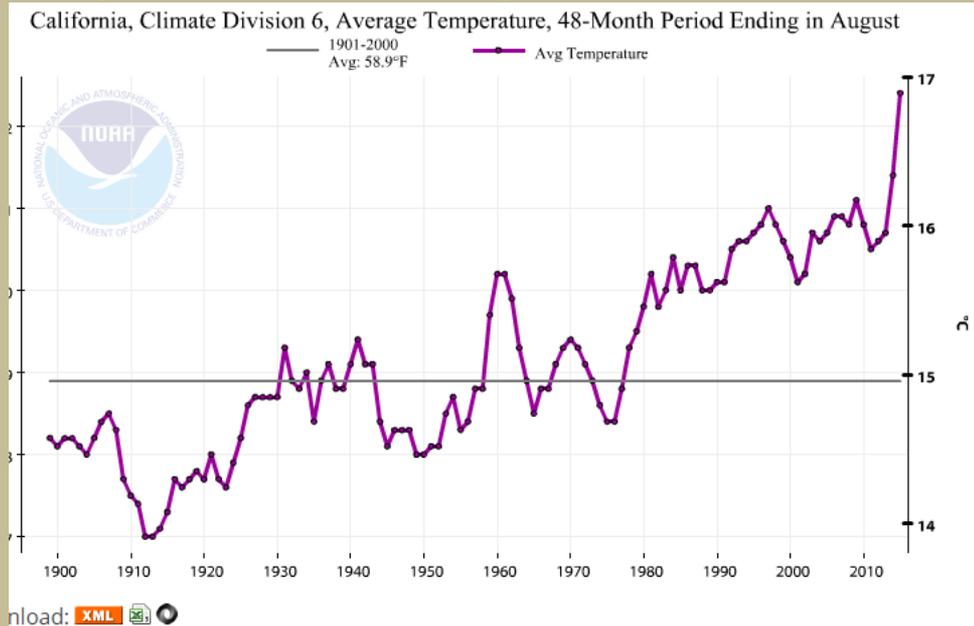
Avg. Max. Temperature dep from Ave (deg F)
10/3/2015 - 11/1/2015



Generated 11/02/2015 at WRCC using provisional data.
NOAA Regional Climate Centers

South Coast Division

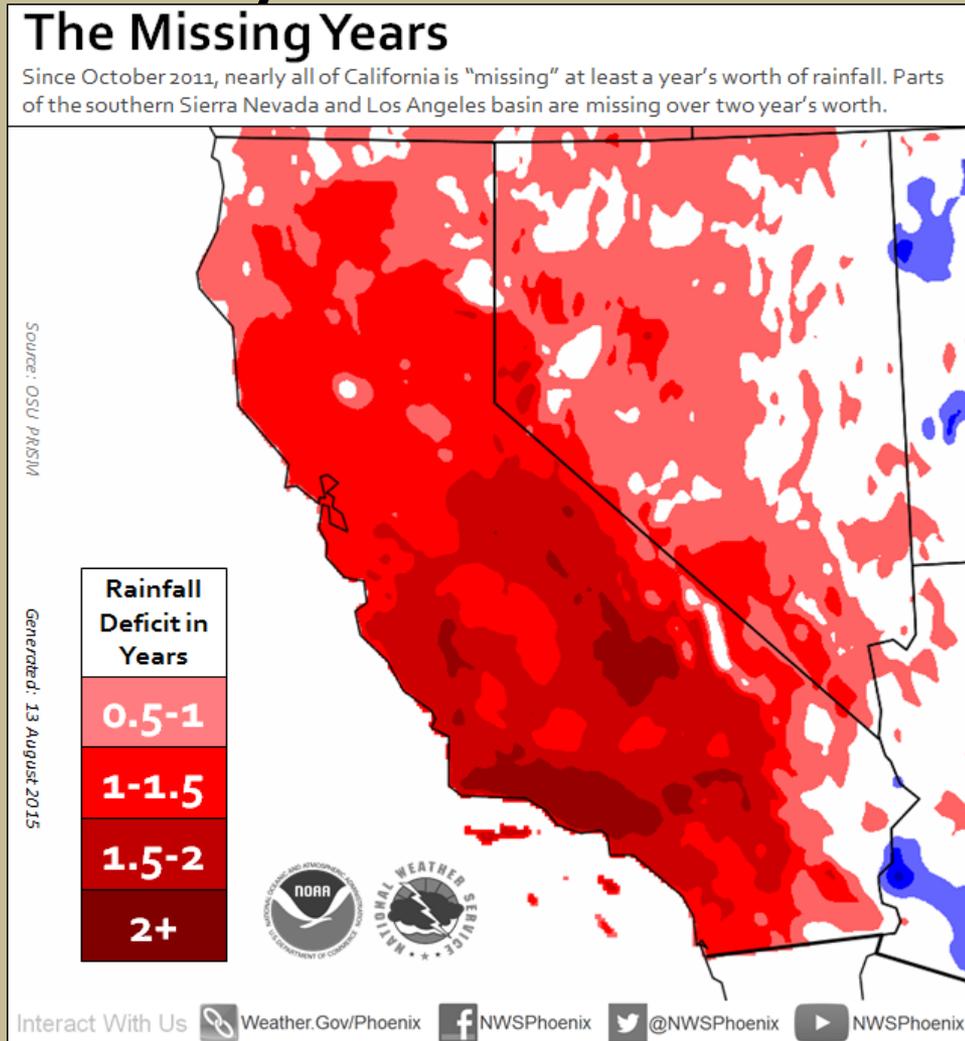
temperature past 48 months



2011-15

DATES	VALUE	RANK	ANOMALY (58.9°F) 1901-2000 BASE PERIOD
201109 - 201508	62.4°F	117	3.5°F
201009 - 201408	61.4°F	116	2.5°F
200509 - 200908	61.1°F	115	2.2°F
199309 - 199708	61.0°F	114	2.1°F
200209 - 200608	60.9°F	113	2.0°F
200309 - 200708	60.9°F	113	2.0°F
199209 - 199608	60.8°F	111	1.9°F

Missing Years of Precipitation 1 to 2 years worth needed

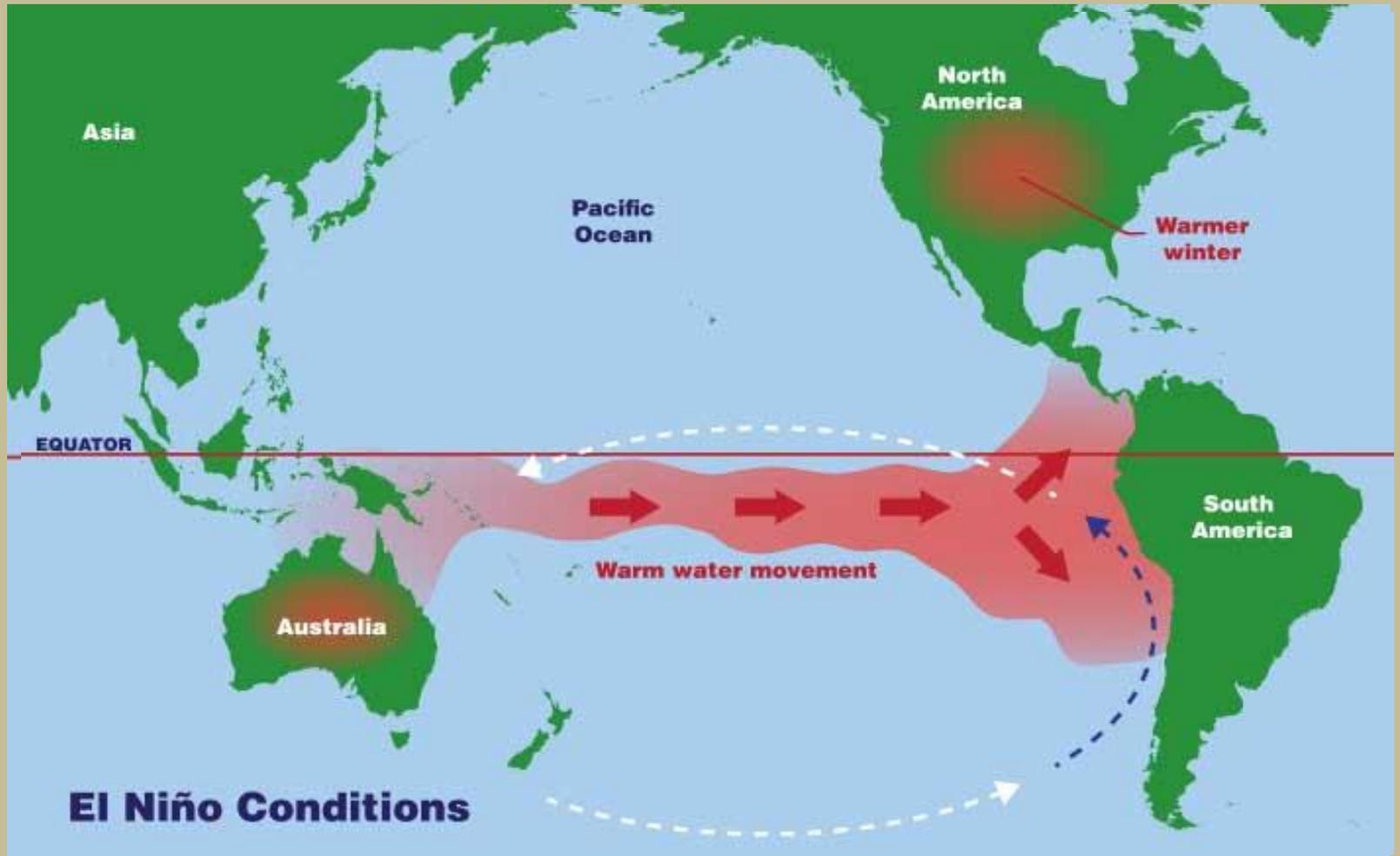


Credit Paul Iniguez

Heavy Rain and Flooding Turn Around Don't Drown

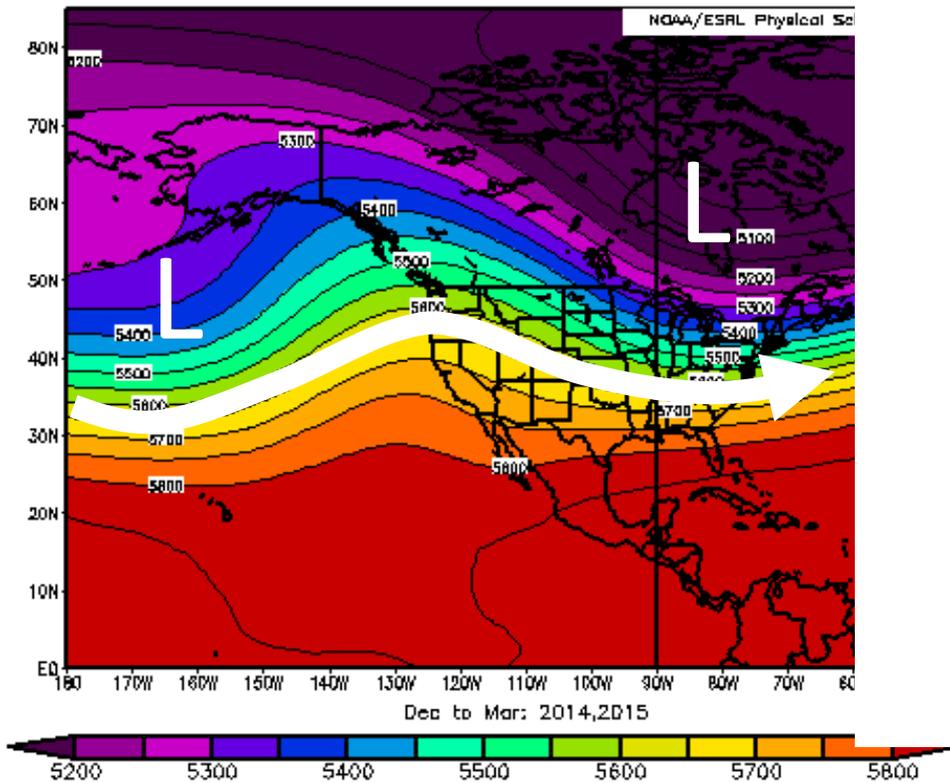


Photo by Alex Tardy



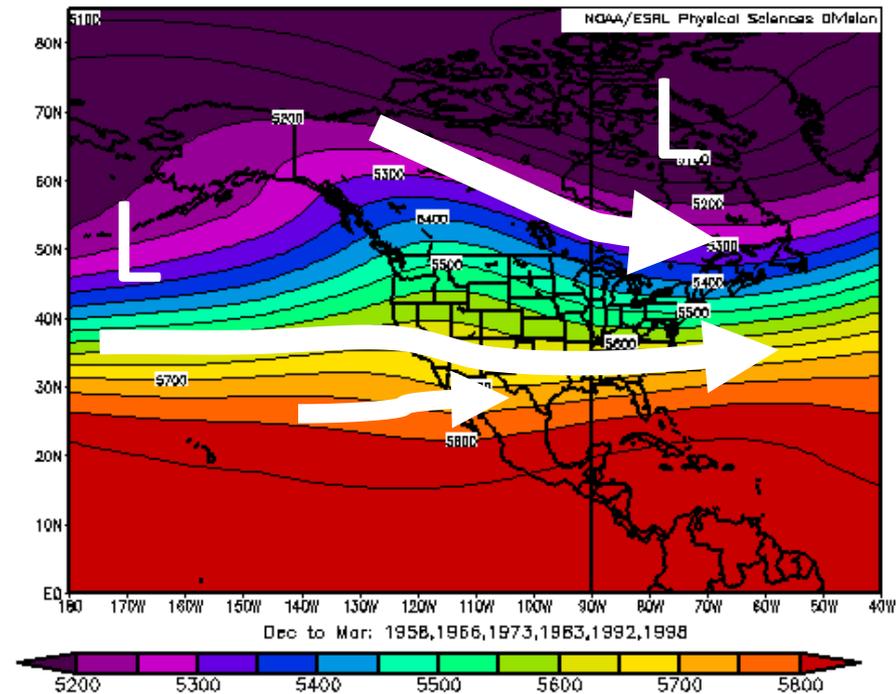
Comparing Jet Stream

NCEP/NCAR Reanalysis
500mb Geopotential Height (m) Composite Mean



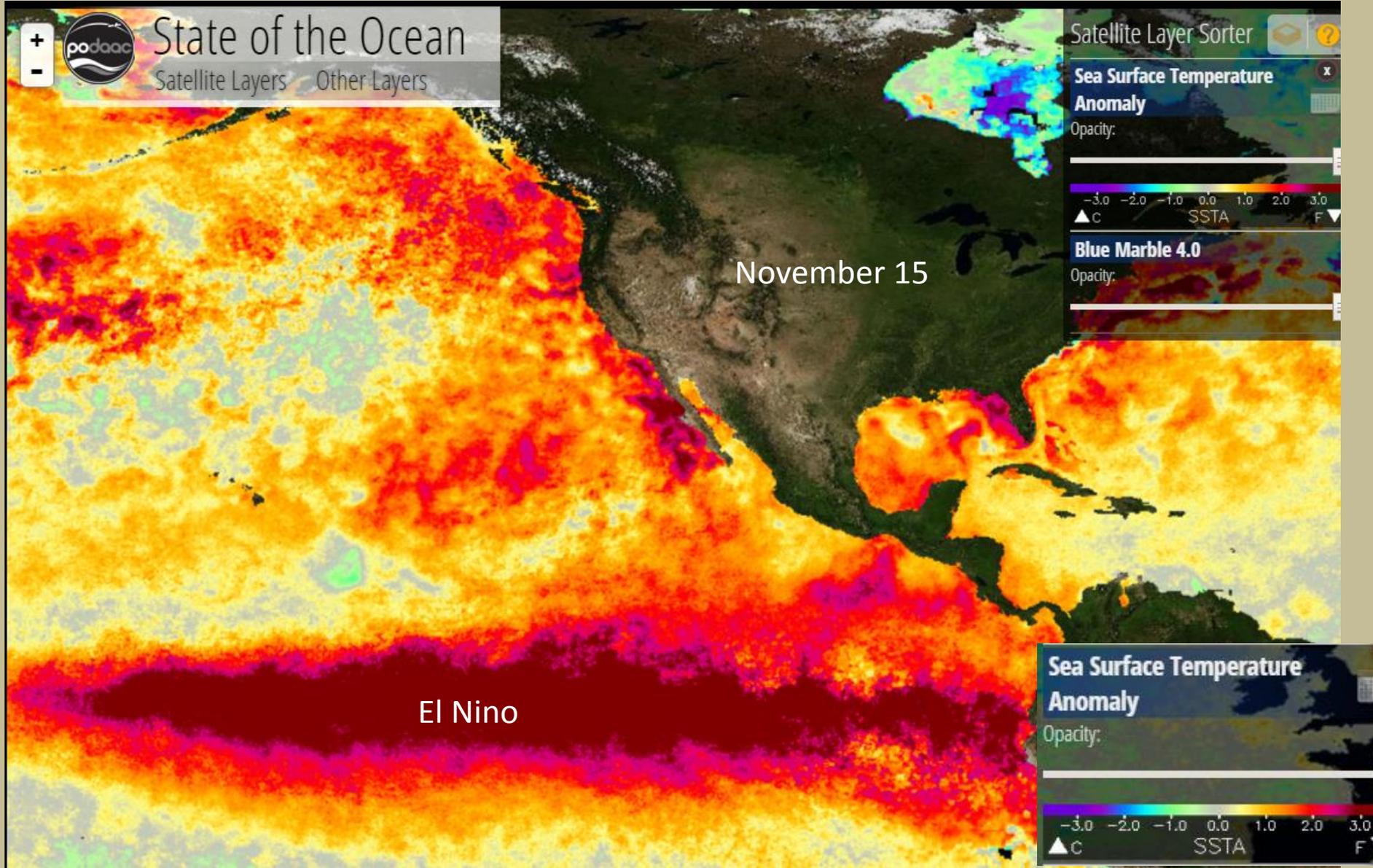
2013-2015

NCEP/NCAR Reanalysis
500mb Geopotential Height (m) Composite Mean



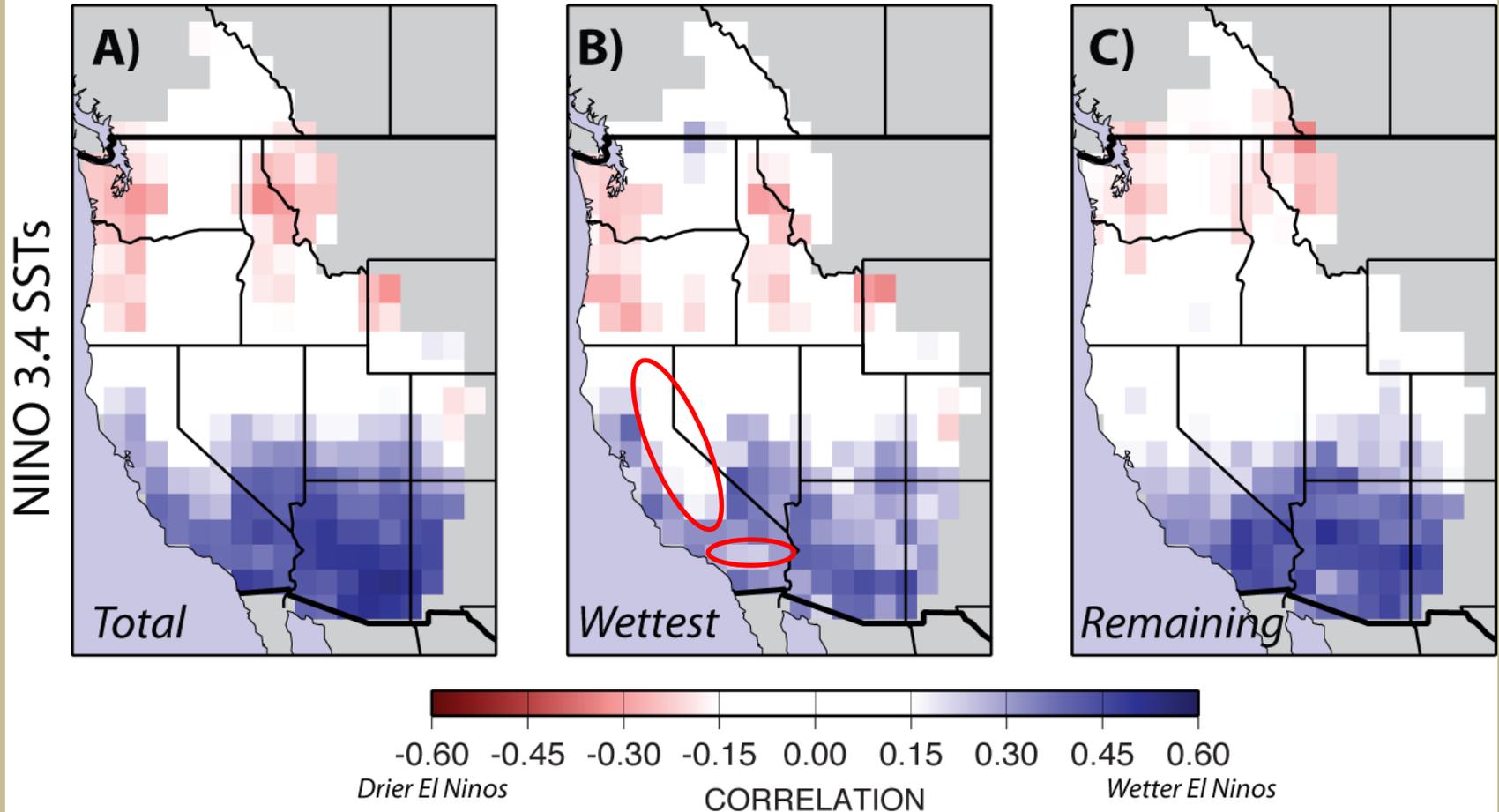
Strong El Nino

State of Pacific Ocean



Atmospheric River major events can be any year

RELATIONS BETWEEN NINO3.4 SSTs & TOTAL PRECIP, CONTRIBUTIONS FROM WETTEST 5% OF WET DAYS, AND REMAINING DAYS, 1916-2011

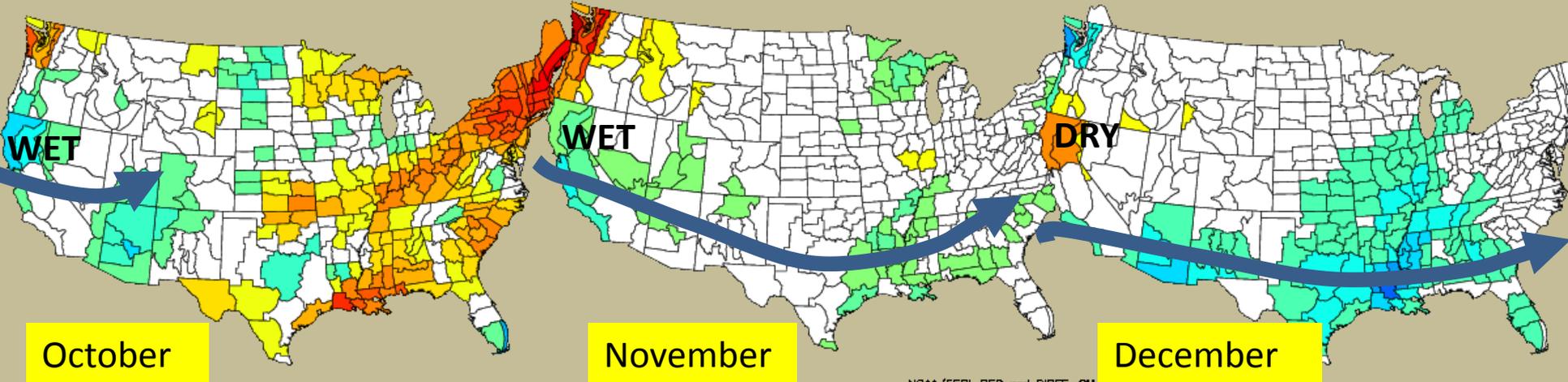


Credit: Scripps Institute of Oceanography

NOAA/NCDC Climate Division Composite Precipitation Anomalies (in) Oct 1957,1965,1972,1982,1991,1997 Versus 1981-2010 Longterm Average

NOAA/NCDC Climate Division Composite Precipitation Anomalies (in) Nov 1957,1965,1972,1982,1991,1997 Versus 1981-2010 Longterm Average

NOAA/NCDC Climate Division Composite Precipitation Anomalies (in) Dec 1957,1965,1972,1982,1991,1997 Versus 1981-2010 Longterm Average

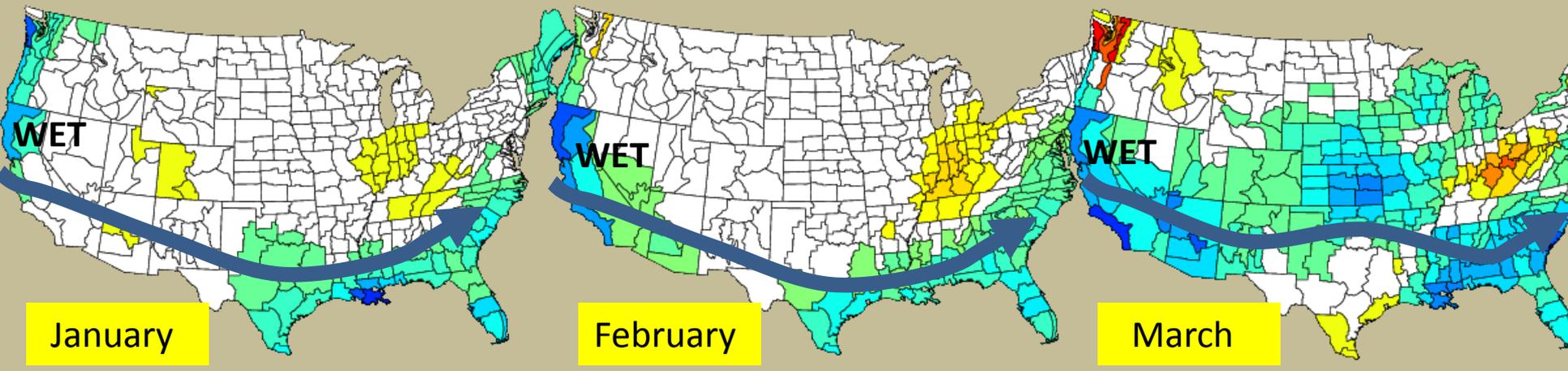


Precipitation All Strong El Nino Month by Month

NOAA/NCDC Climate Division Composite Precipitation Anomalies (in) Jan 1958,1966,1973,1983,1992,1998 Versus 1981-2010 Longterm Average

NOAA/NCDC Climate Division Composite Precipitation Anomalies (in) Feb 1958,1966,1973,1983,1992,1998 Versus 1981-2010 Longterm Average

NOAA/NCDC Climate Division Composite Precipitation Anomalies (in) Mar 1958,1966,1973,1983,1992,1998 Versus 1981-2010 Longterm Average



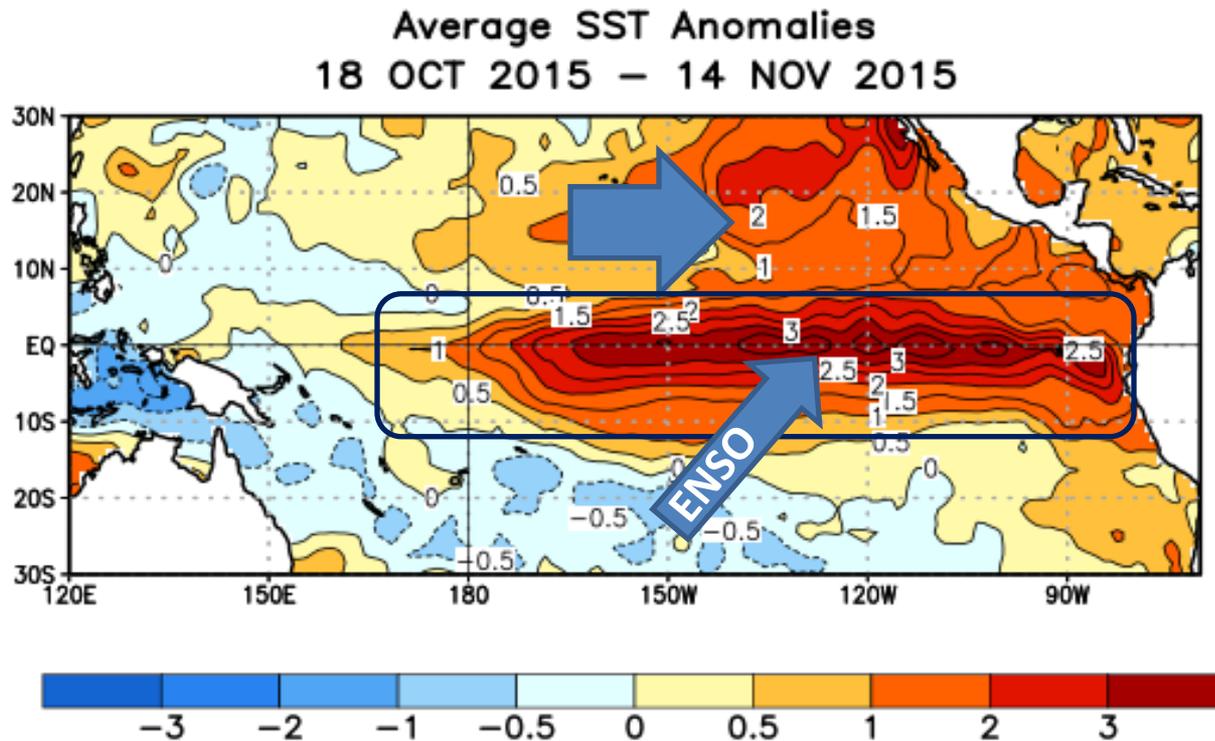
-4.0 -3.0 -2.0 -1.0 0.0 1.0 2.0 3.0 4.0

-5.0 -4.0 -3.0 -2.0 -1.0 0.0 1.0 2.0 3.0 4.0

-2.00 -1.50 -1.00 -0.50 0.00 0.50 1.00 1.50

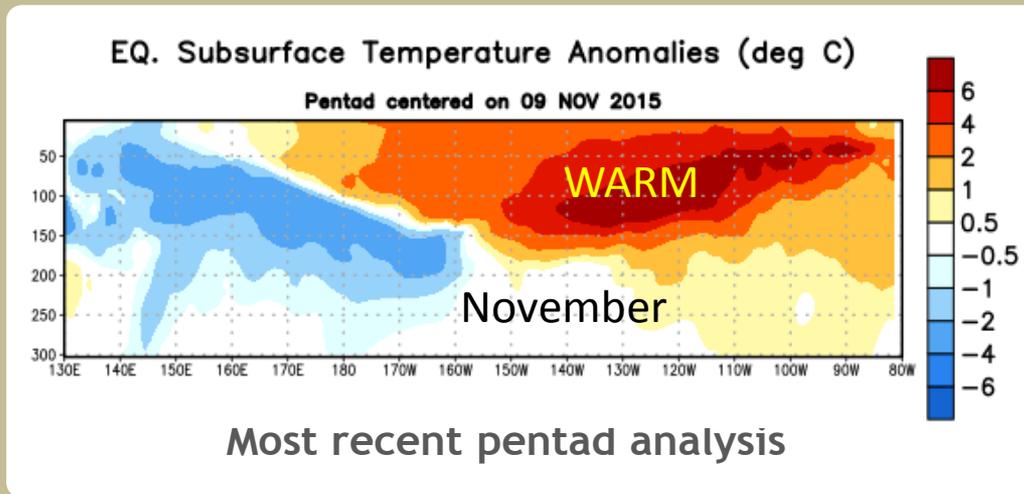
SST Departures (°C) in the Tropical Pacific During the Last Four Weeks

During the last four weeks, equatorial SSTs were above average across the central and eastern Pacific, with the largest anomalies off the coast of S. America.

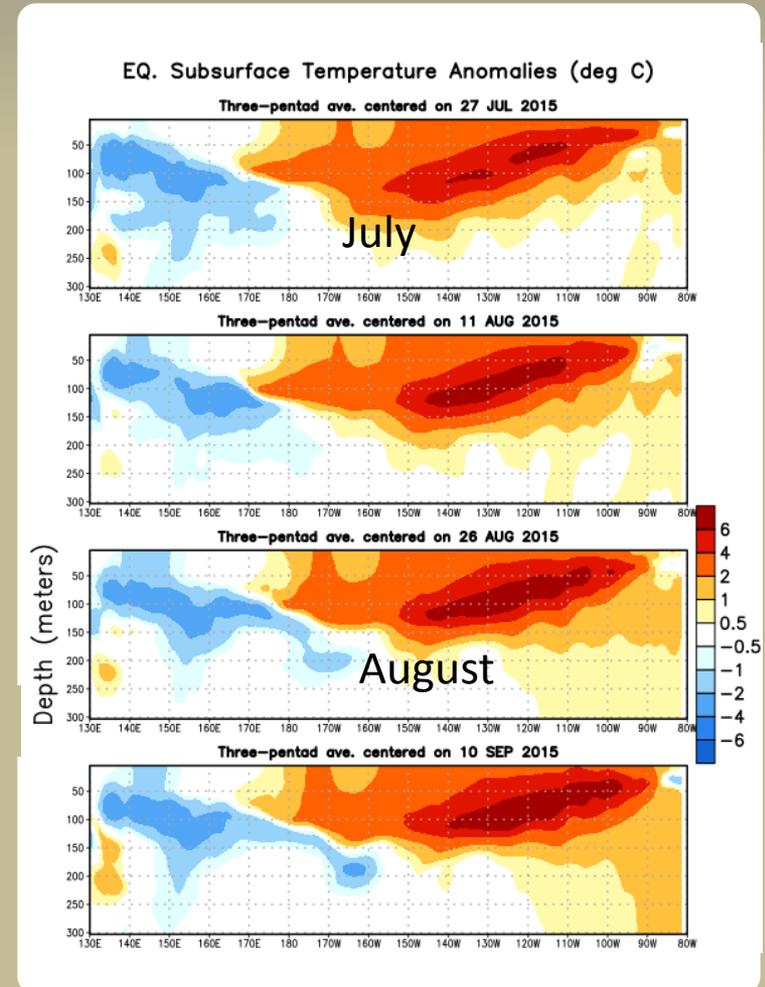


Sub-Surface Temperature Departures in the Equatorial Pacific

During the last two months, positive subsurface temperature anomalies were observed across most of the equatorial Pacific



Deep Warm Waters



Niño Region SST Departures (°C) Recent Evolution

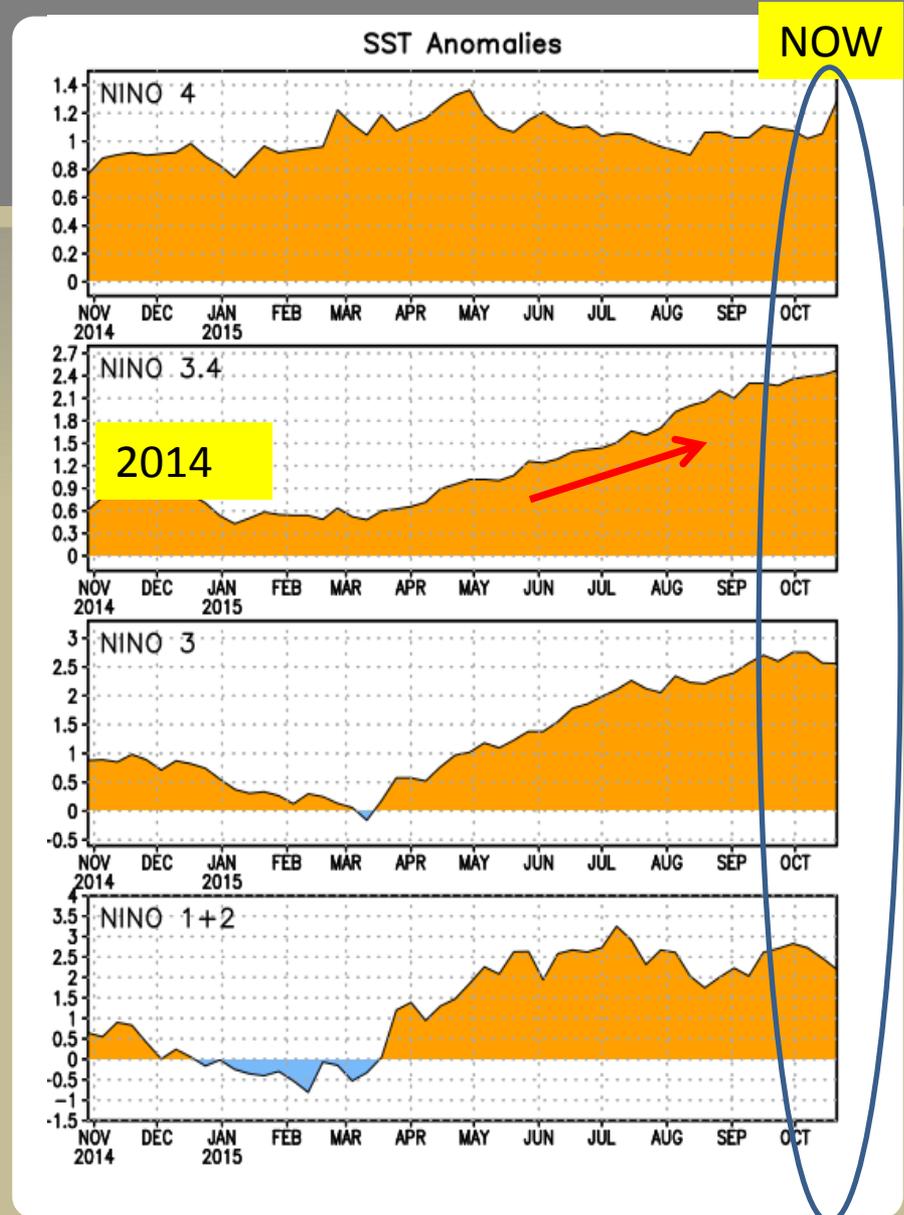
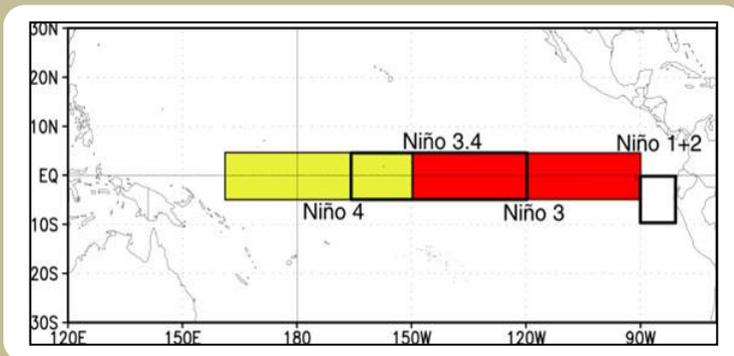
The latest weekly SST departures are:

Niño 4 **1.7°C**

Niño 3.4 **3.0°C ***

Niño 3 **3.0°C**

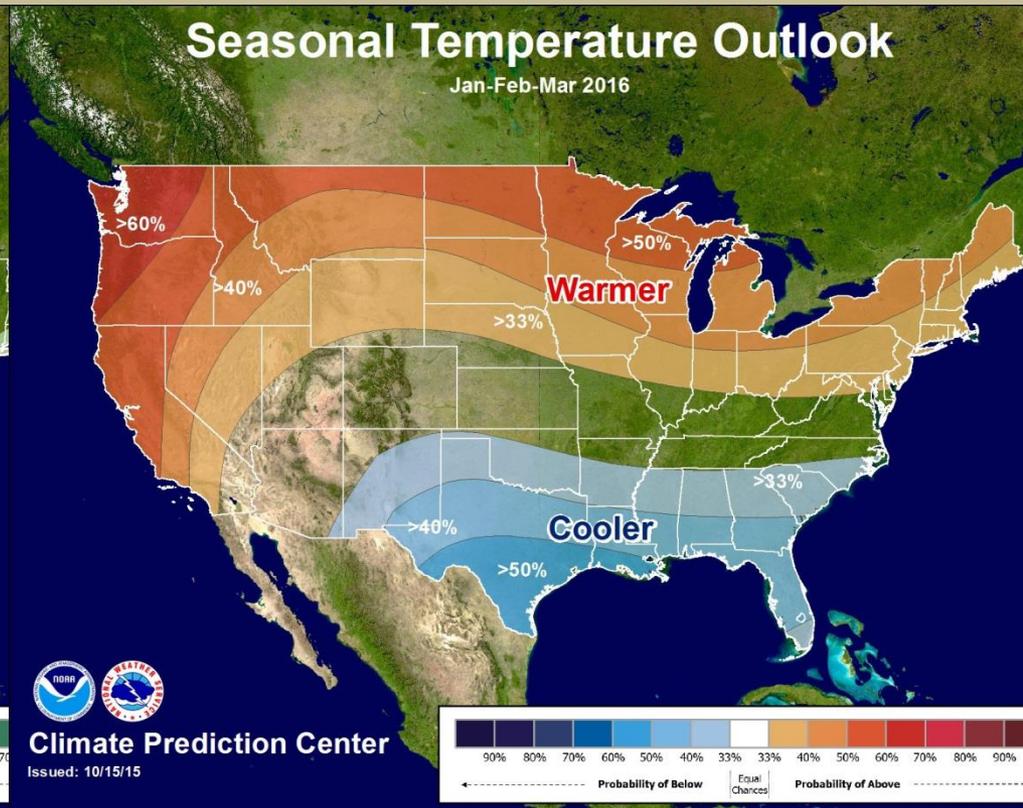
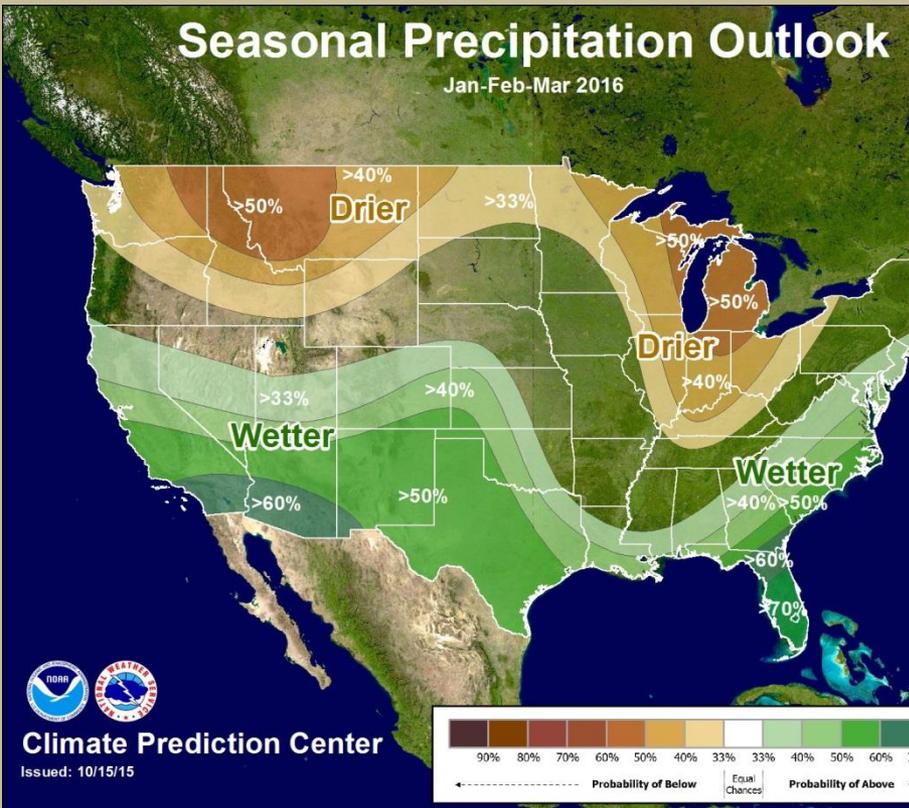
Niño 1+2 **2.0°C**



* Record High Weekly Average Value

Winter Outlook 2015-16

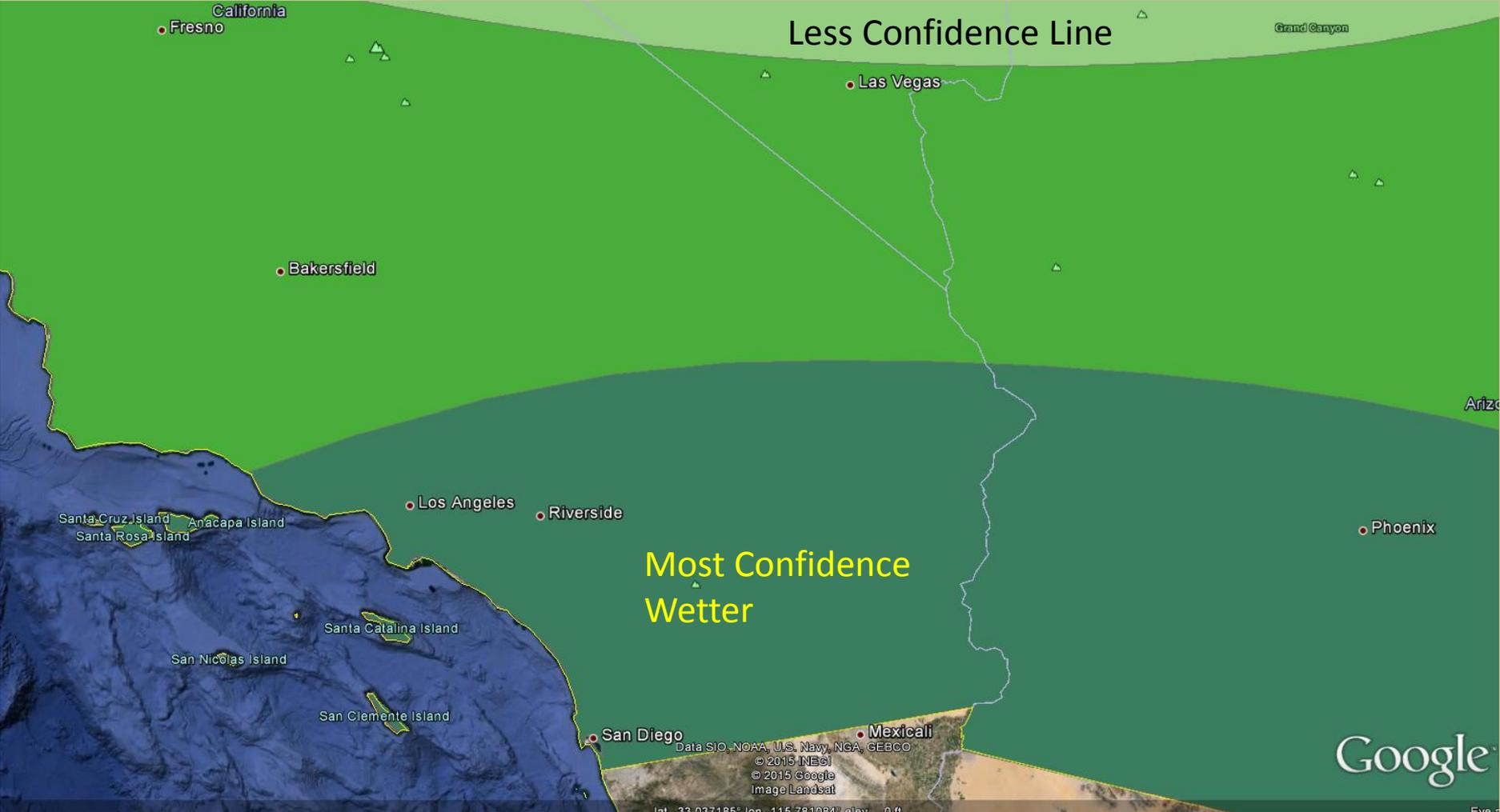
issued October 15



Southern California

January to March

Precipitation Outlook



Summary of El Nino

- El Nino conditions are the unusual warming of the Sea Surface Temperatures in the Pacific Ocean along the equator (occurs every 3 to 7 years) after trade winds are weakened
- An El Nino can take the normal Jet Stream from Oregon and bring it south across Southern California for much of the winter and spring months
- El Nino can result in a pattern that brings a series of stormy periods in the winter and spring months, but not a particular storm
- Strong (1.7 °C running mean) El Nino is present and strengthening slowly through Fall
- El Nino at the strong phase correlates to above normal precipitation in southern California but not necessarily the whole state
- Currently it is the strongest El Nino on record (3.0 °C in the center)
- Above normal precipitation and frequent storms are expected for southern California with the best chance from December through March
- Santa Ana winds still occur in El Nino years (Santa Ana's peak in December)
- Moderate snow levels (not the tropical high snow events and not the arctic air mass)
- The "blob" warm waters can enhance rainfall rates (more unstable)
- El Nino can impact the jet stream to bring more frequent storms during the wet season but not necessarily stronger storms (not just the Pineapple Express or Atmospheric River)
- Some of the wettest months have been El Nino years but individual large precipitation events have occurred in non- El Nino and La Nina years (such as January 1993 and December 2010)
- El Nino does not guarantee above normal precipitation and there have been several dry or average years in California during El Nino
- Drought will continue since 4-year deficits are 1 to 2 seasons missed and the entire state will need much above normal precipitation and above normal snowpack

Impacts and Actions

- Flooding (river, urban, small stream) from repeated storms and saturated soils (not necessarily major storms) – locations may not have flooded for 5 to 25 years
- Beach and coastal erosion from repeated elevated surf and wind
- Clean storm drains, remove debris that can cause back-ups, contact city public works for road and drainage changes, or areas with historical flood impacts
- Check fire station locations for sand bags and they may not be provided with sand
- If you live near a slope, downstream of known debris flows or a fire burn scar (excessive rain will saturate soil and could cause steeper slopes move earth)
- Check your home owners insurance to see if it covers FLOODS
- Are you in a Flood Plain? <http://gis.bam.water.ca.gov/bam/>
- Download the [FEMA flood plain](#) app by Atkins



Resources

Alex Tardy

alexander.tardy@noaa.gov

Warning Coordination Meteorologist

<http://weather.gov/sandiego>



Monitor Hazards

<http://www.wrh.noaa.gov/wrh/whv/?wfo=SGX> (all graphical hazards)

<http://www.nws.noaa.gov/wtf/udaf/area/?site=sgx> (area forecast)

<http://www.weather.gov/forecasts/wfo/sectors/sgx.php> (digital graphics)

Monitor weather

<http://www.wrh.noaa.gov/mesowest/gmap.php?map=sgx>

visit <http://weather.gov/sandiego>

for WATCHES, ADVISORIES and WARNINGS

Report and Follow on



El Nino updates

<http://cpc.ncep.noaa.gov>

