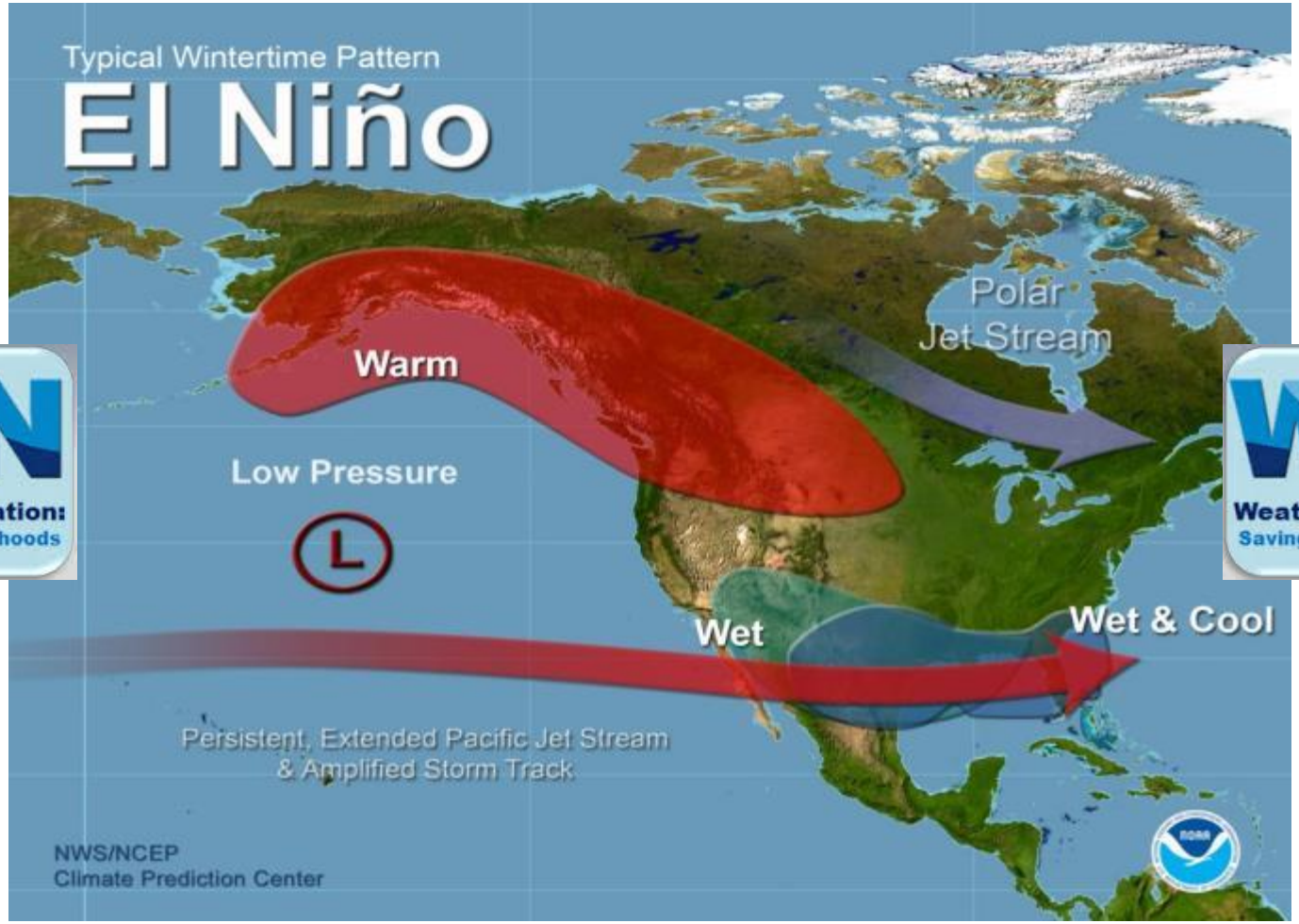
Weather Outlook 2015-16

El Nino can bring:

more of a consolidated elongated Pacific Jet



Summer 2015
What is up with the weather?

More Heavy Rain

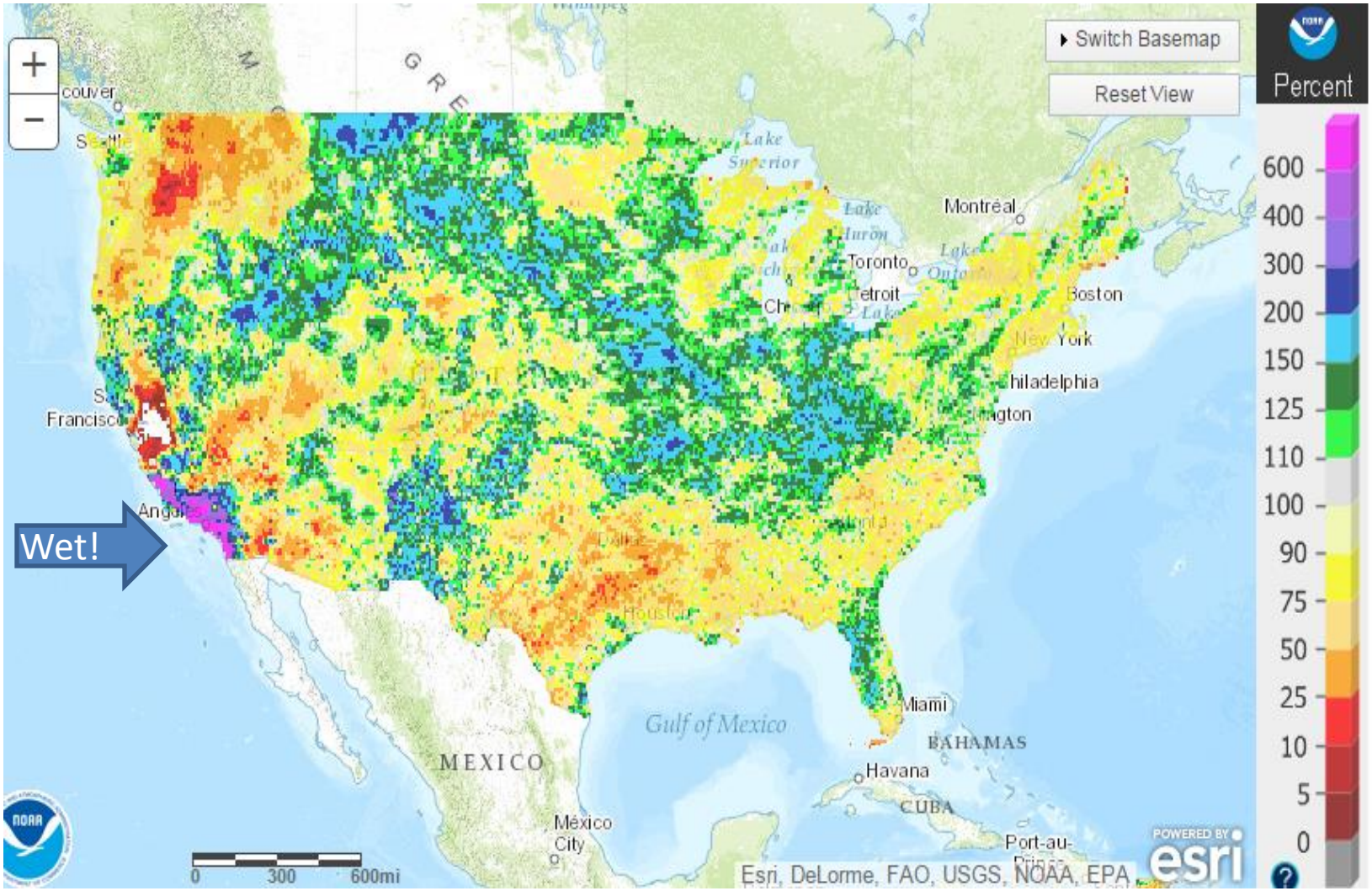
Modjeska
Canyon

NWS San Diego, CA

Briefing issued September 18, 2015

Alex Tardy, Meteorologists

Precipitation across the US
June 20 to September 17, 2015



Sea Surface Temperature

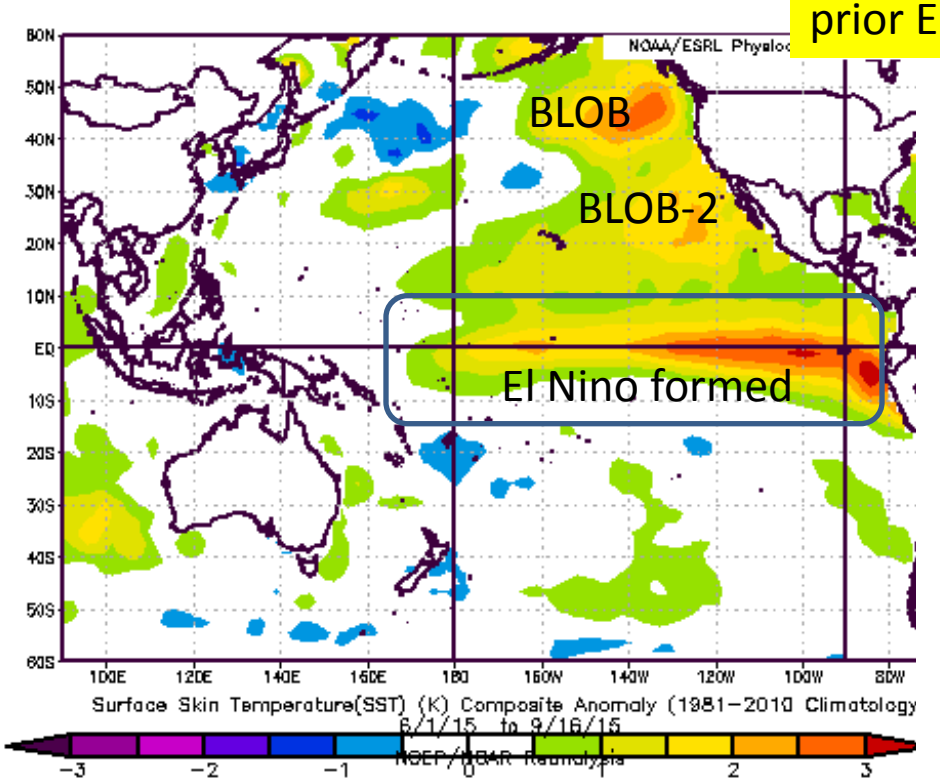
Departure from Normal

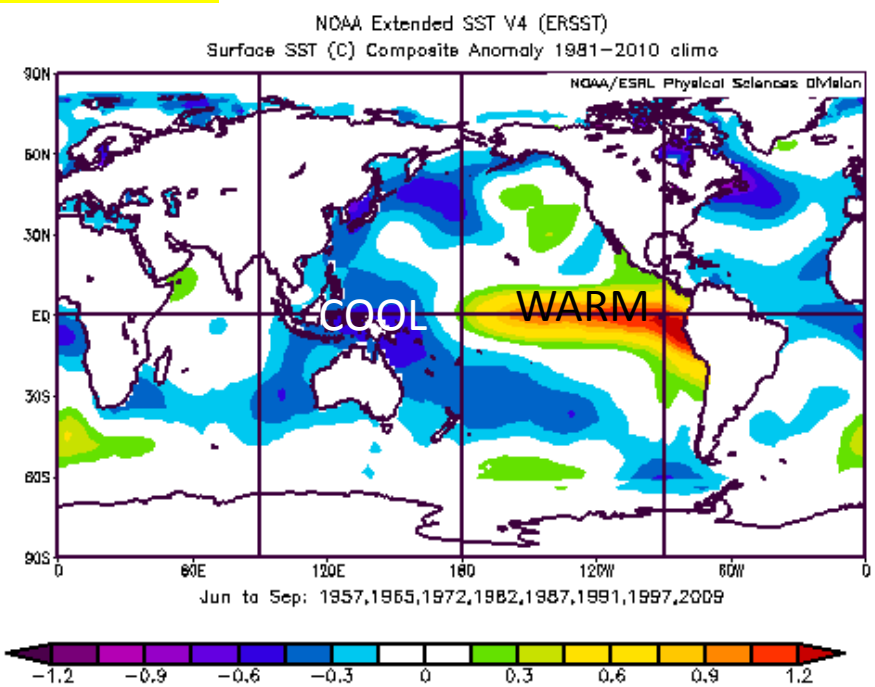
June 1 to September 16, 2015

2015 summer

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

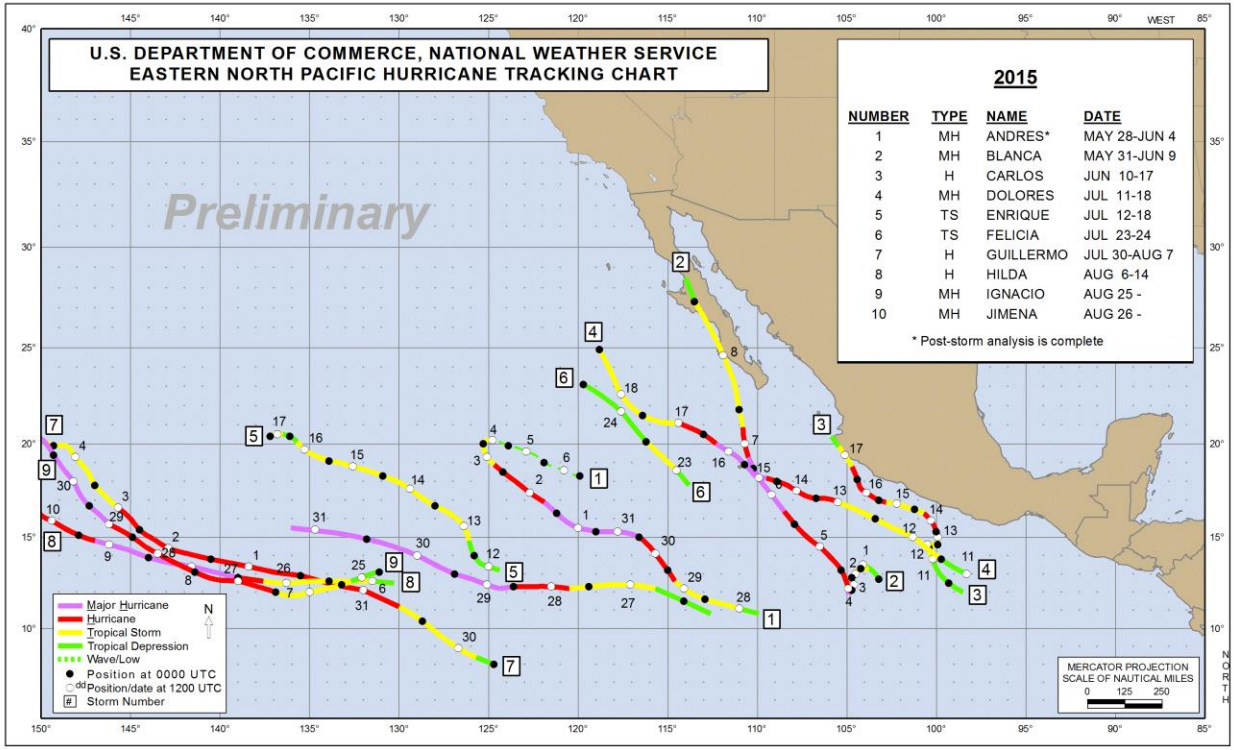
Past El Nino years





2015 tropical track East Pacific

#	Name	Date	Wind	Pres	Cat
1	Hurricane-4 ANDRES	28 MAY-04 JUN	120		4
2	Hurricane-4 BLANCA	31 MAY-09 JUN	125		4
3	Hurricane-1 CARLOS	10-17 JUN	80		1
4	Tropical Storm ELA	08-10 JUL	35		-
5	Tropical Storm HALOLA	09-13 JUL	50		-
6	Tropical Storm IUNE	09-13 JUL	35		-
7	Hurricane-4 DOLORES	11-19 JUL	115		4
8	Tropical Storm ENRIQUE	12-18 JUL	45		-
9	Tropical Storm FELICIA	23-25 JUL	35		-
10	Tropical Depression EIGHT_	27-30 JUL	30		-
11	Hurricane-2 GUILLERMO	30 JUL-07 AUG	90		2
12	Hurricane-4 HILDA	06-14 AUG	120		4
13	Tropical Depression ELEVEN	16-18 AUG	30		-
14	Hurricane-4 KILO	20 AUG-01 SEP	120		4
15	Hurricane-1 LOKE	21-26 AUG	65		1
16	Hurricane-4 IGNACIO	25 AUG-05 SEP	125		4
17	Hurricane-4 JIMENA	26 AUG-10 SEP	130		4
18	Tropical Storm KEVIN	31 AUG-05 SEP	55		-
19	Hurricane-3 LINDA	06-10 SEP	110		3

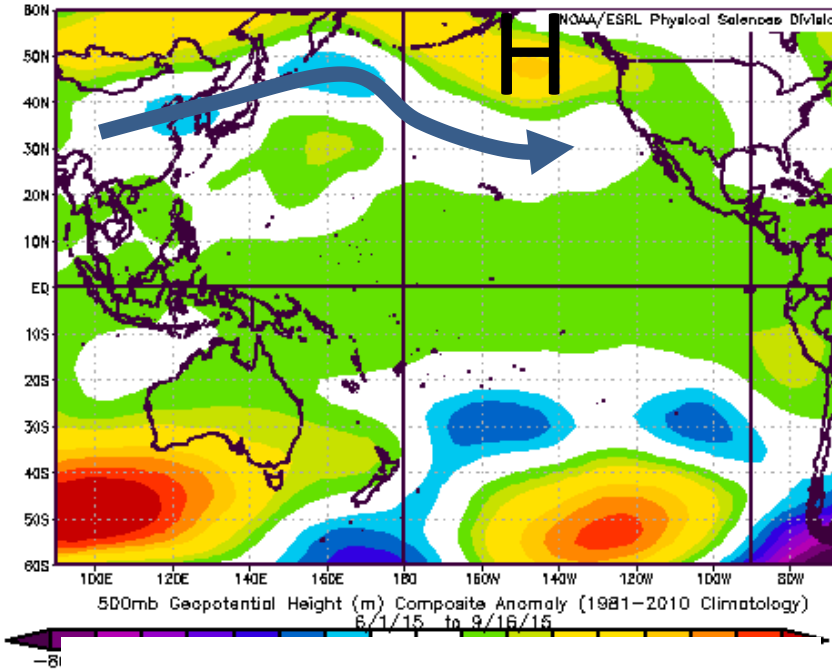


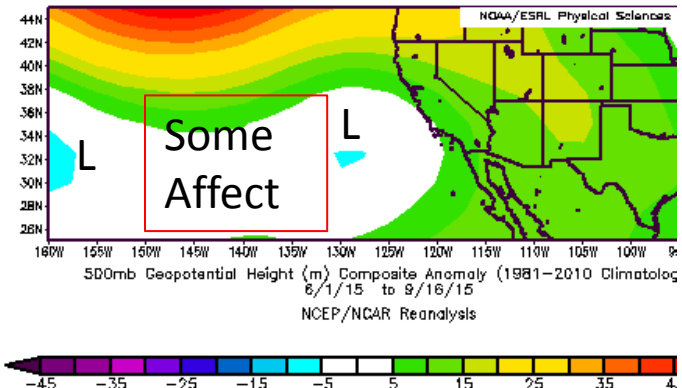
17 named tropical cyclones

Kevin and Linda in September 2015

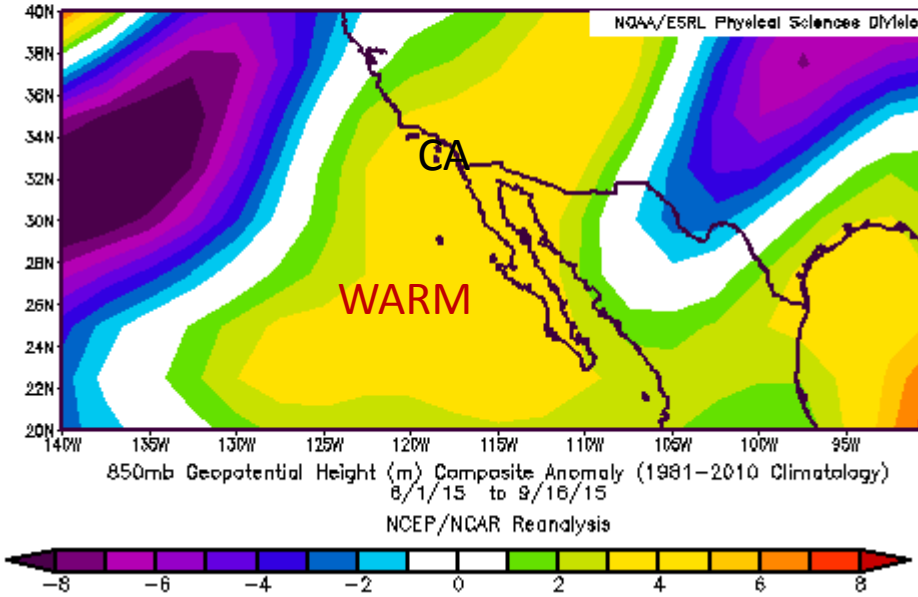
2015 summer weather pattern

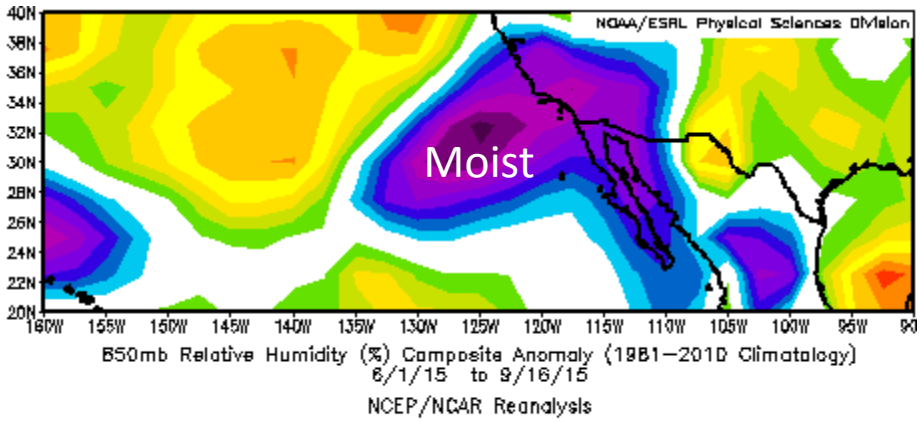
Weather Pattern
Some affect to Jet Stream





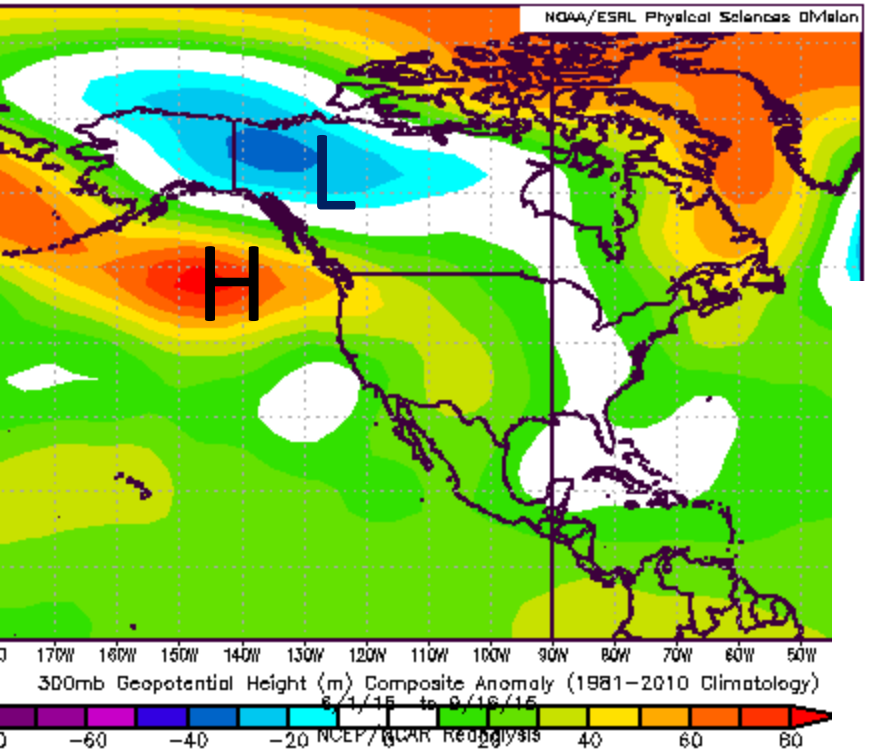
Warmth of Air mass



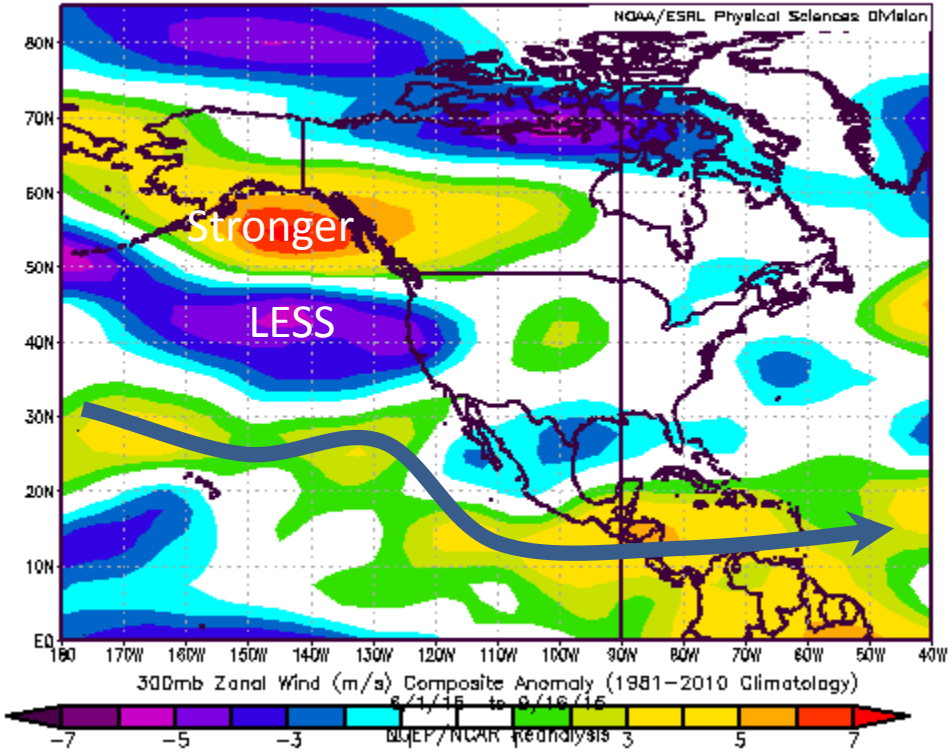


Jet Stream Level

Departure from normal



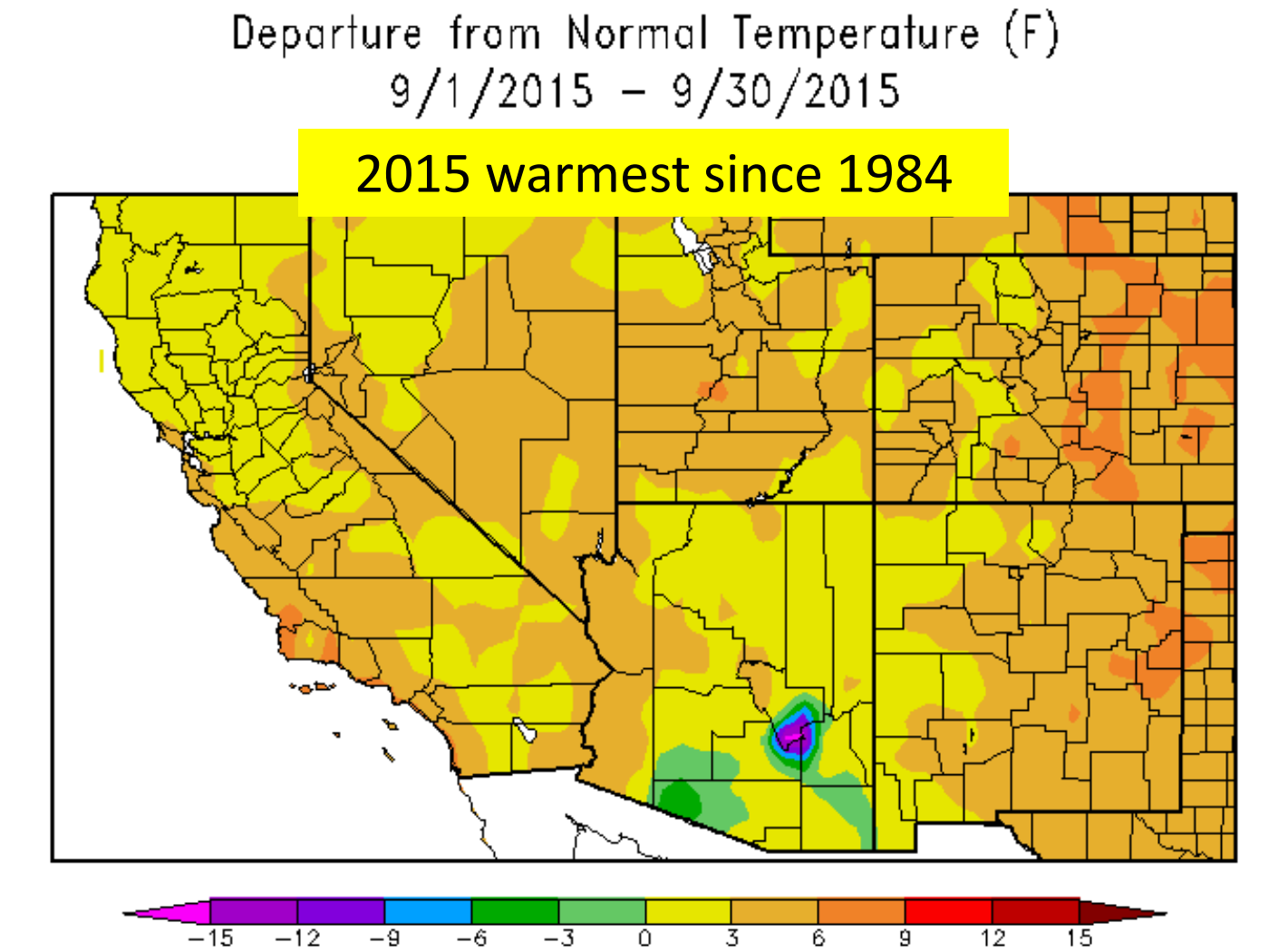
Wind Speed



Starting to see signs of El Nino signal

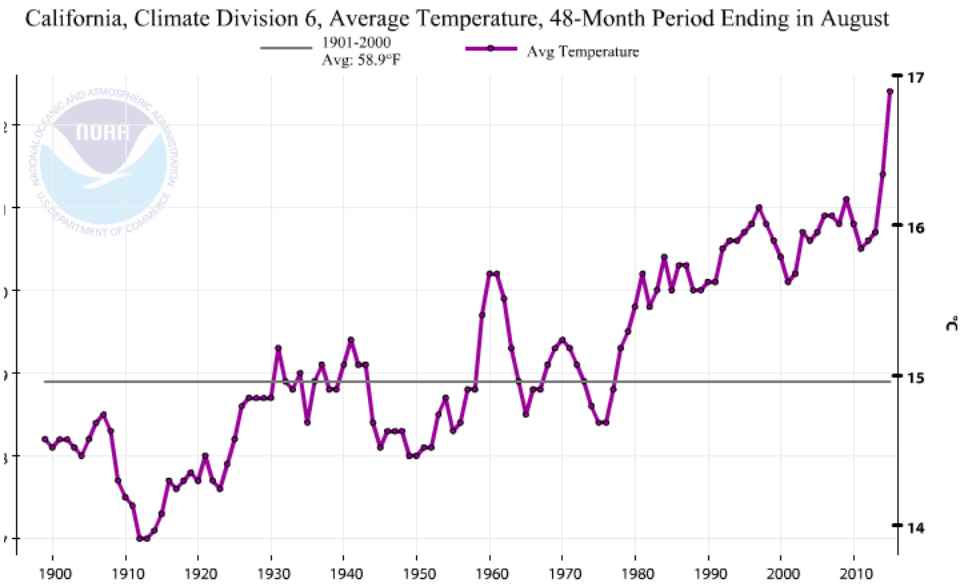
Record warmth continues into fall

77.2 deg at SAN for September
(6.6 above normal)



South Coast Division

temperature past 48 months

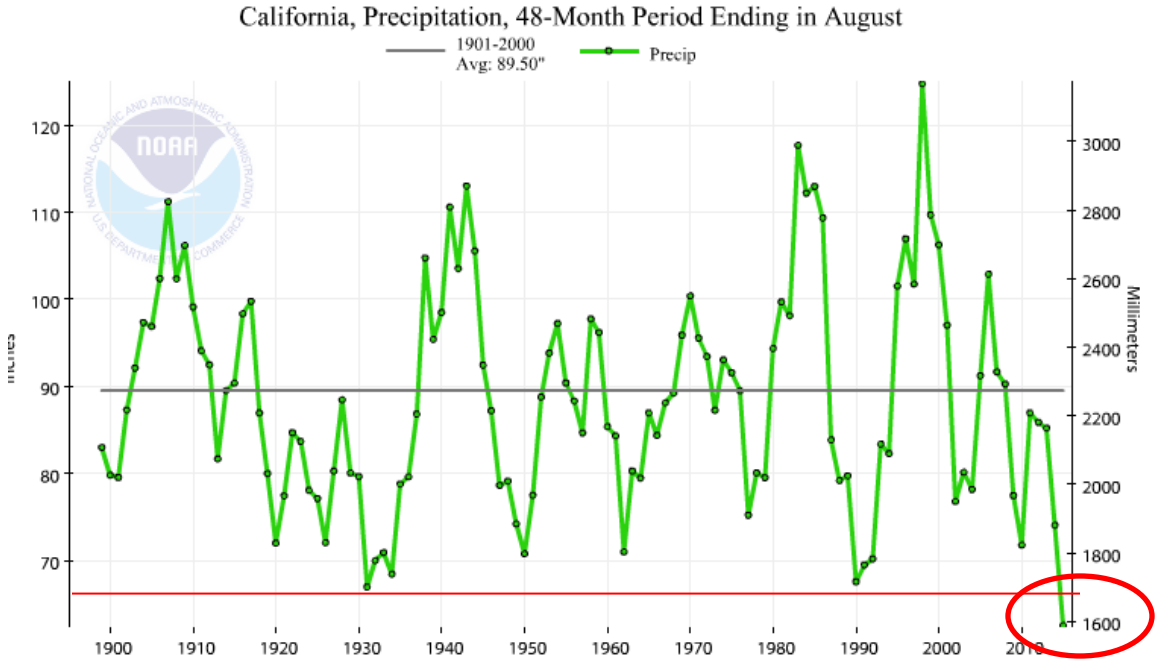


nload: XML

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

Precipitation past 48 months California



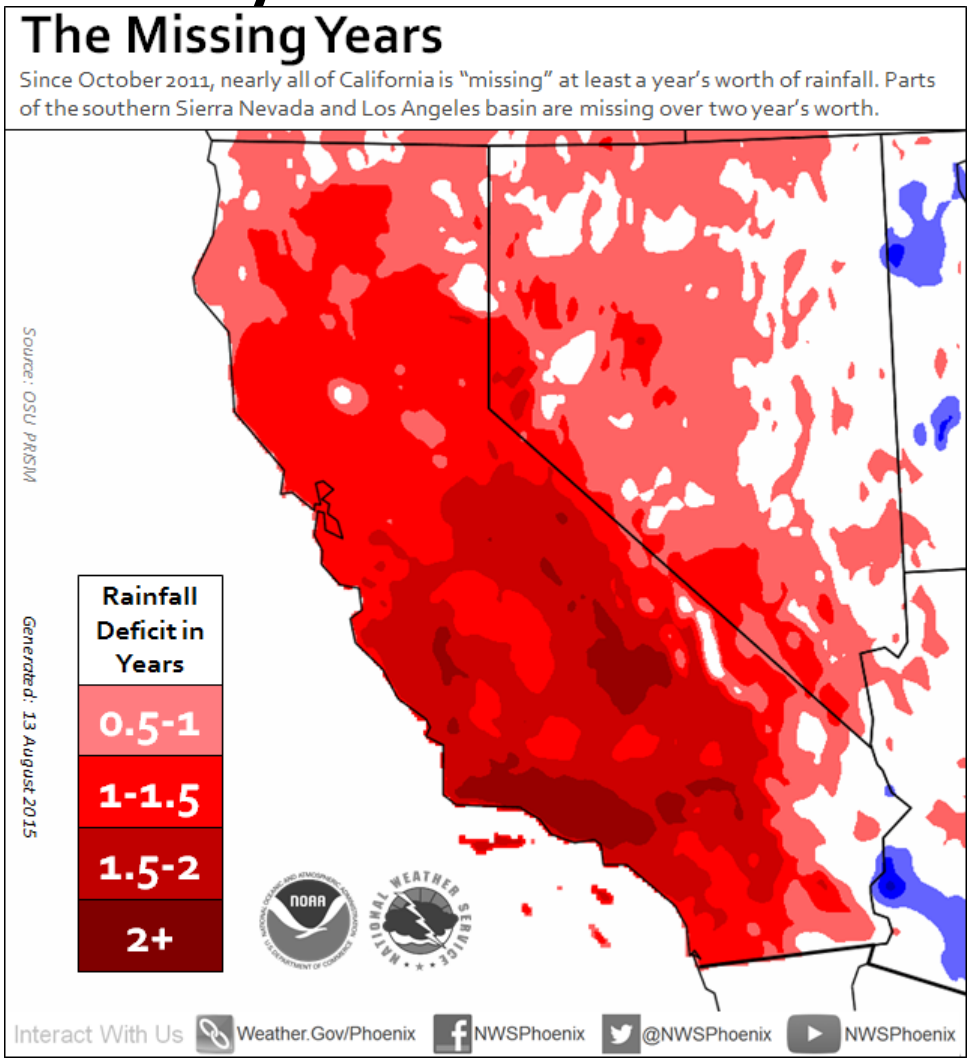
Download: XML

2011-15

DATES	VALUE	RANK	ANOMALY (89.50") 1901-2000 BASE PERIOD
201109 - 201508	62.52"	1	-26.98"
192709 - 193108	66.94"	2	-22.56"
198609 - 199008	67.55"	3	-21.95"
193009 - 193408	68.42"	4	-21.08"
198709 - 199108	69.48"	5	-20.02"
192809 - 193208	69.98"	6	-19.52"

- 27 inches

Missing Years of Precipitation
1 to 2 years worth needed



Credit Paul Iniguez

4 year precipitation since January 2011

September 23, 2015

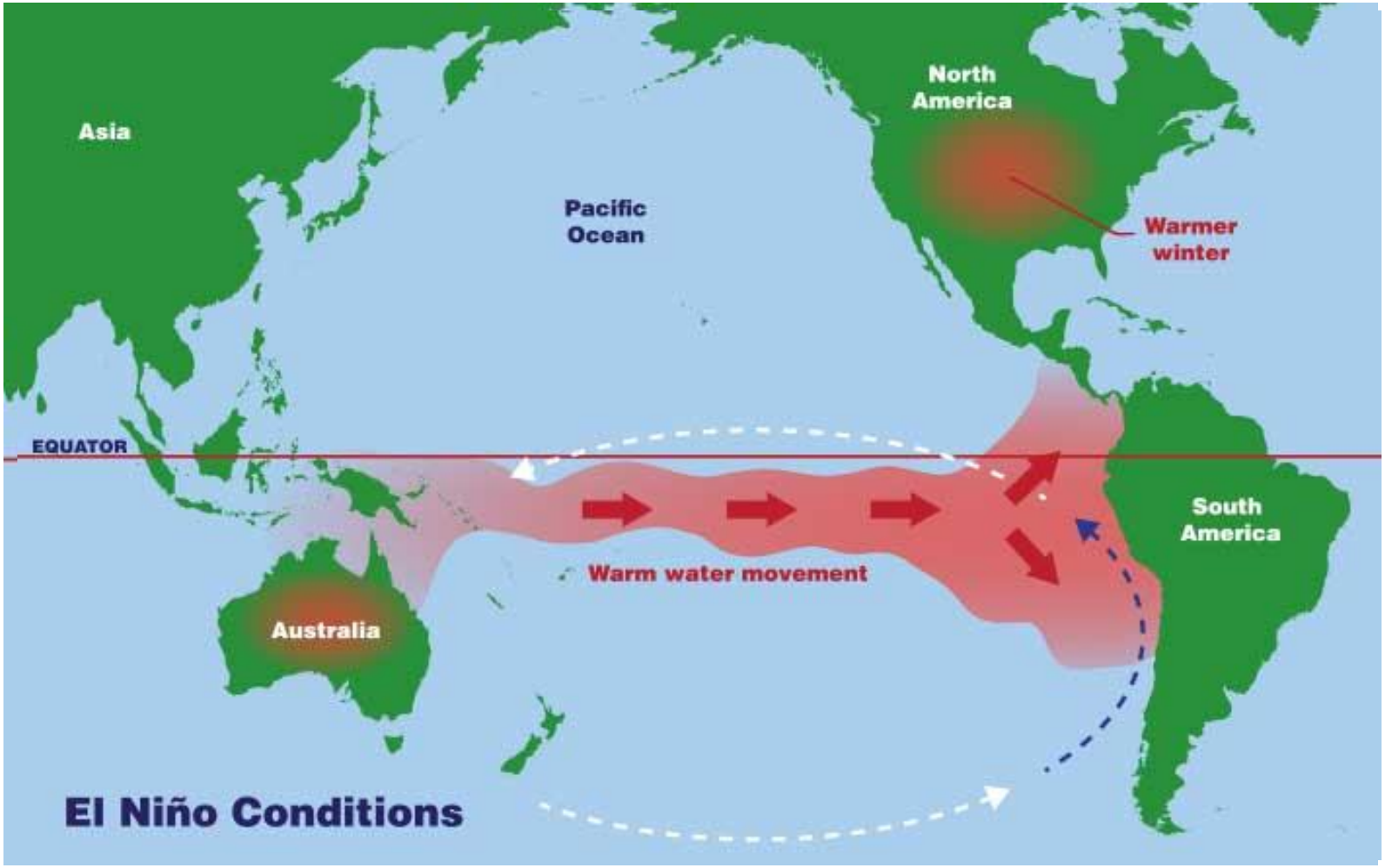
Station 4 year precipitation	Needed by 09/30/2016 Deficit	2014-15 Season %	Annual average	Lost precipitation
San Diego (SAN)	22.83			
36.10	12.42 inches	10.66 or 100%	**10.34**	1 ½ season
Santa Ana (Fire stn)	45.70			
32.25	31.98 inches	7.01 or 51%	**13.63**	2 ½ seasons
Riverside (Fire stn)	28.20			
30.99	17.82 inches	7.96 or 77%	**10.33**	2 seasons
Palomar Mtn*	76.54			
95.98	46.18 inches	16.15 or 53%	**30.20**	1 ½ season
Idyllwild*	67.33			
78.79	41.15 inches	16.86 or 64%	**26.18**	1 ½ season
Palm Springs	15.88			
11.82	11.00 inches	3.10 or 64%	**4.83**	2 ½ seasons

Heavy Rain and Flooding
Turn Around Don't Drown

Photo by Alex Tardy

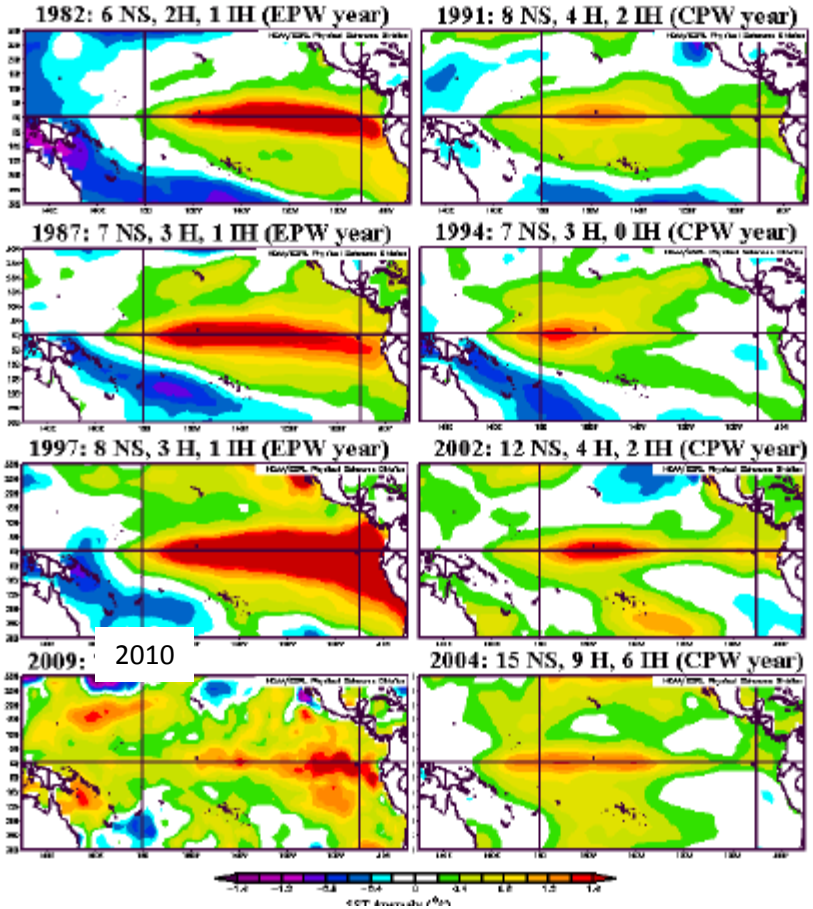
Silverado Canyon – December 2010

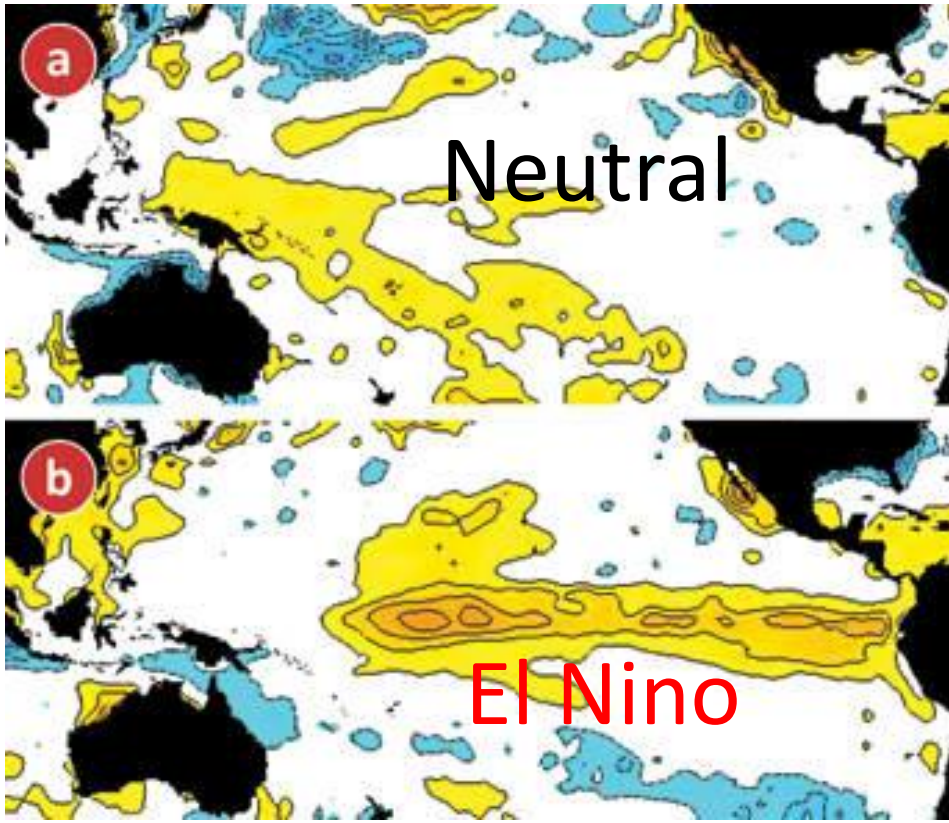
March 2, 2015 debris flows


Asia
North America
Pacific Ocean
Warmer winter
EQUATOR
South America
Warm water movement
Australia
El Niño Conditions

ENSO El Nino correlation with precipitation in California

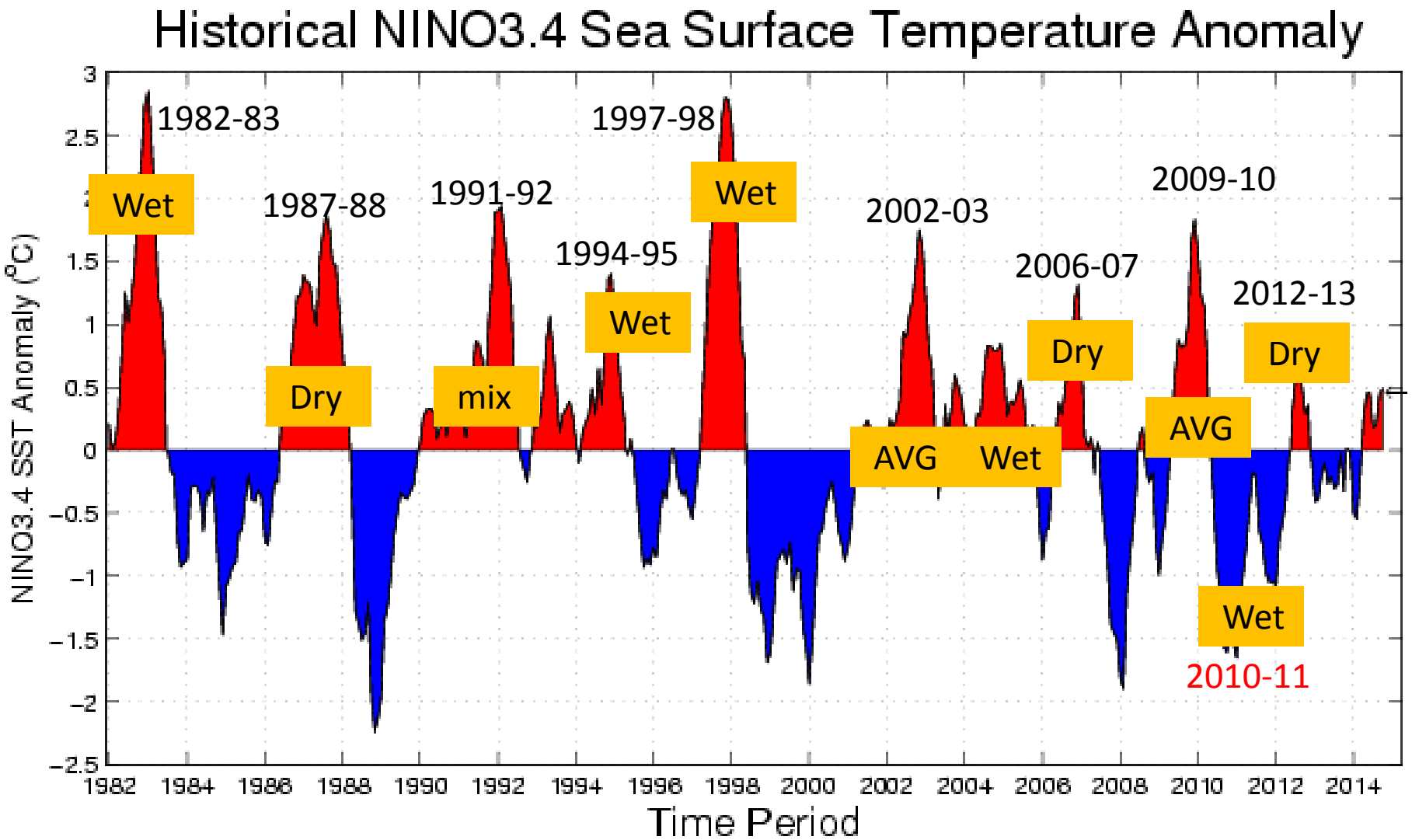
What strength is forecast?





Historical ENSO periods

warm = red blue=cool phase



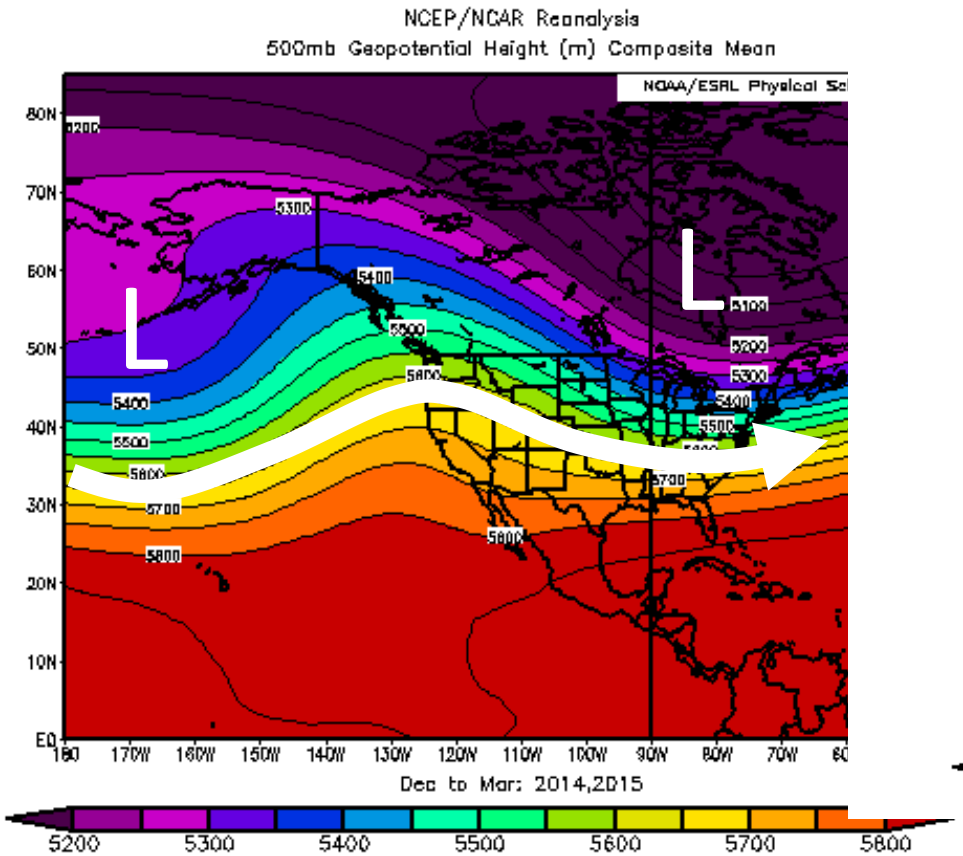
Water Year	ENSO ONI (NDJ)	October-April (inches)
1951-52	0.6	17.13
1957-58	1.6	13.13
1963-64	1.1	4.92
1965-66	1.5	14.74
1968-69	0.8	11.28
1972-73	**1.9**	**10.97**
1982-83	**2.1**	17.83
1986-87	1.1	8.53
1987-88	1.1	12.36
1991-92	1.4	12.29
1994-95	1.0	16.03
1997-98	**2.3**	16.19
2002-03	1.1	**10.01**
2006-07	1.0	3.80
2009-10	1.3	**10.52**
*1976-77 and 1977-78	0.8	
11.98	average	179.73

Normal is 9.95 inches

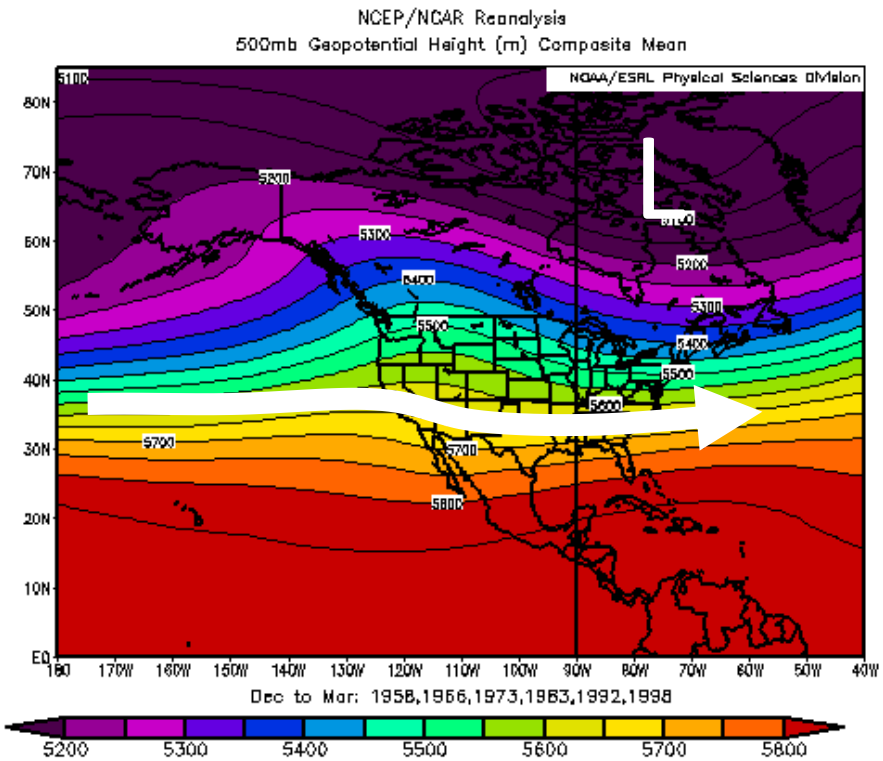
Past Years
Does El Nino mean wet weather and drought relief?

- Would need 150 percent of normal precipitation in the Sierra Nevada and statewide for “drought buster” with a snowpack
- Past El Nino seasons have resulted in variable precipitation
- Moderate to Strong correlate to wet in southern California but only very strong correlates for northern California as wet
- Above normal snowpack is needed!

Comparing Jet Stream

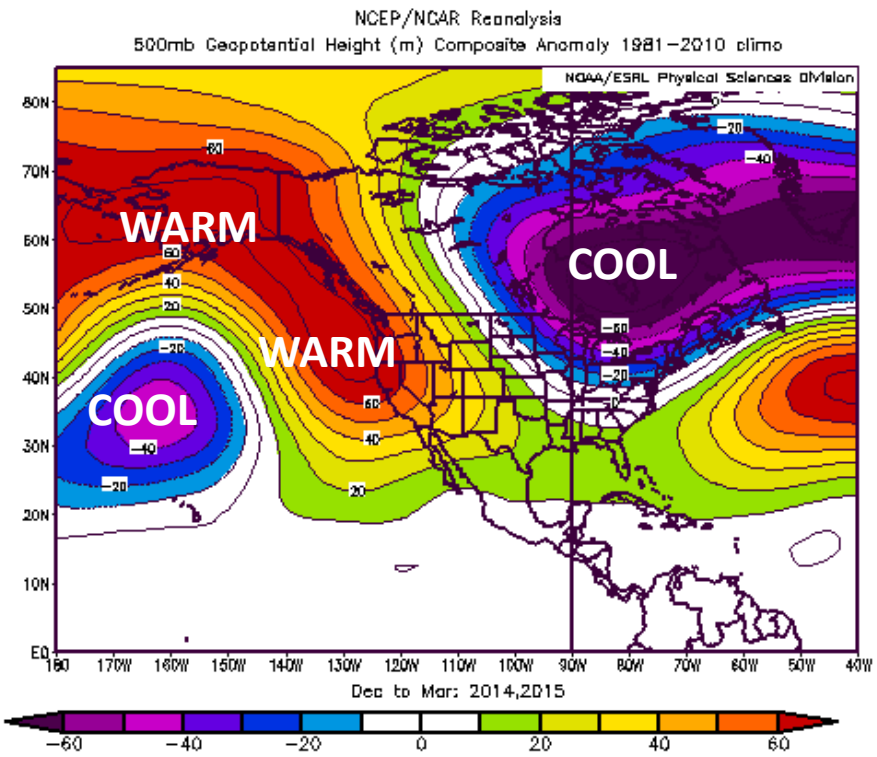


2013-2015

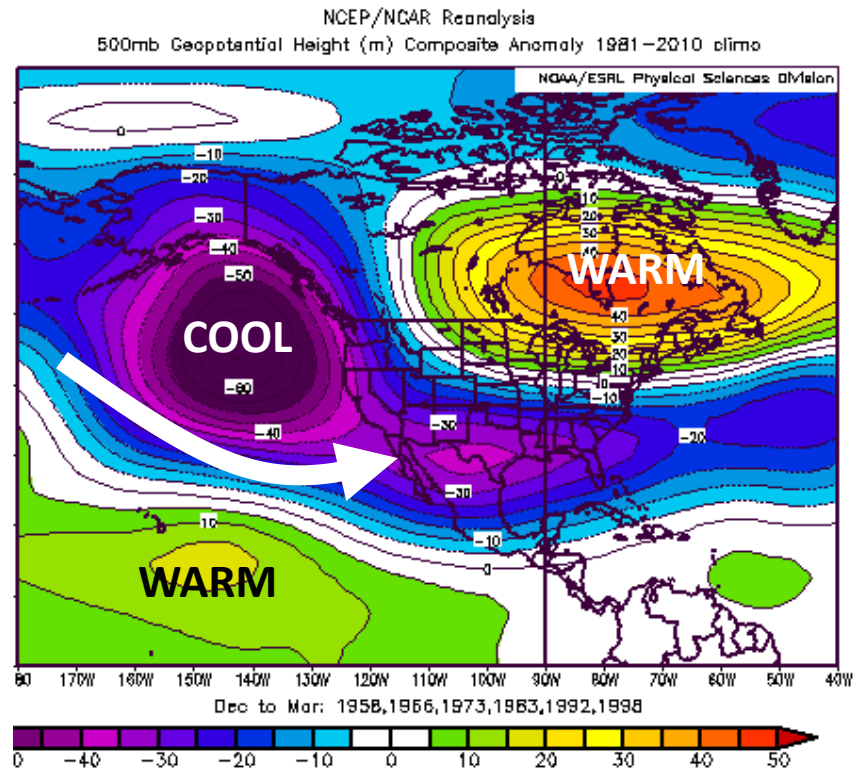


Strong El Nino

Jet Stream Departure from normal

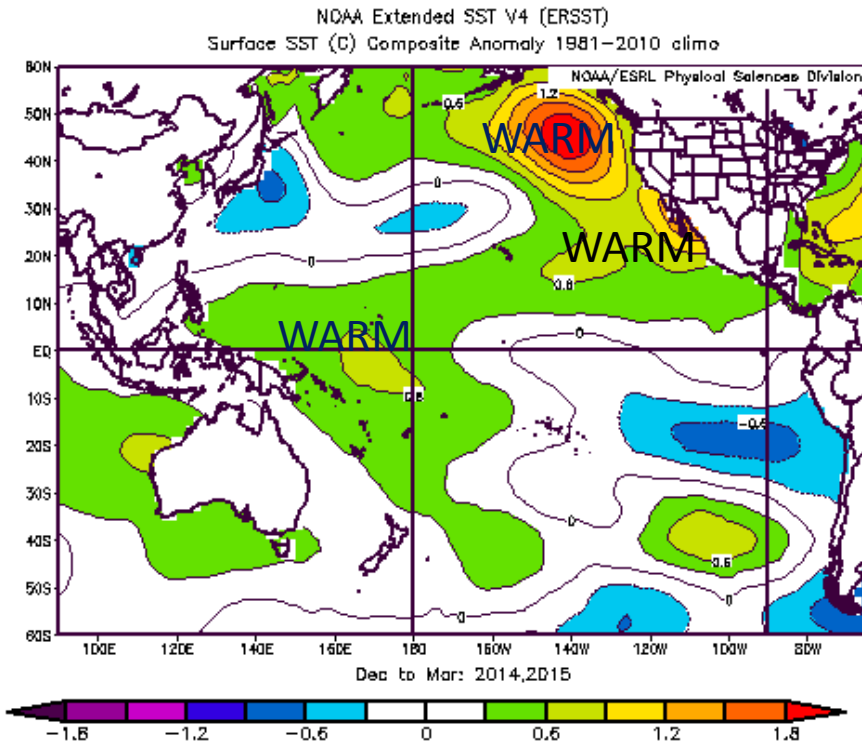


2013-2015

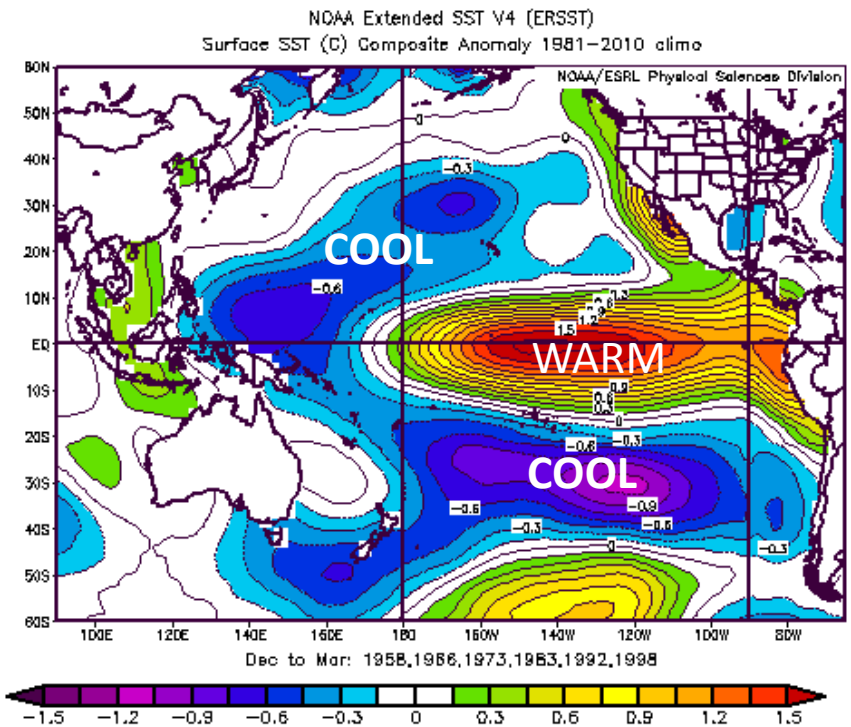


Strong El Nino years

Sea Surface Temperature Anomaly

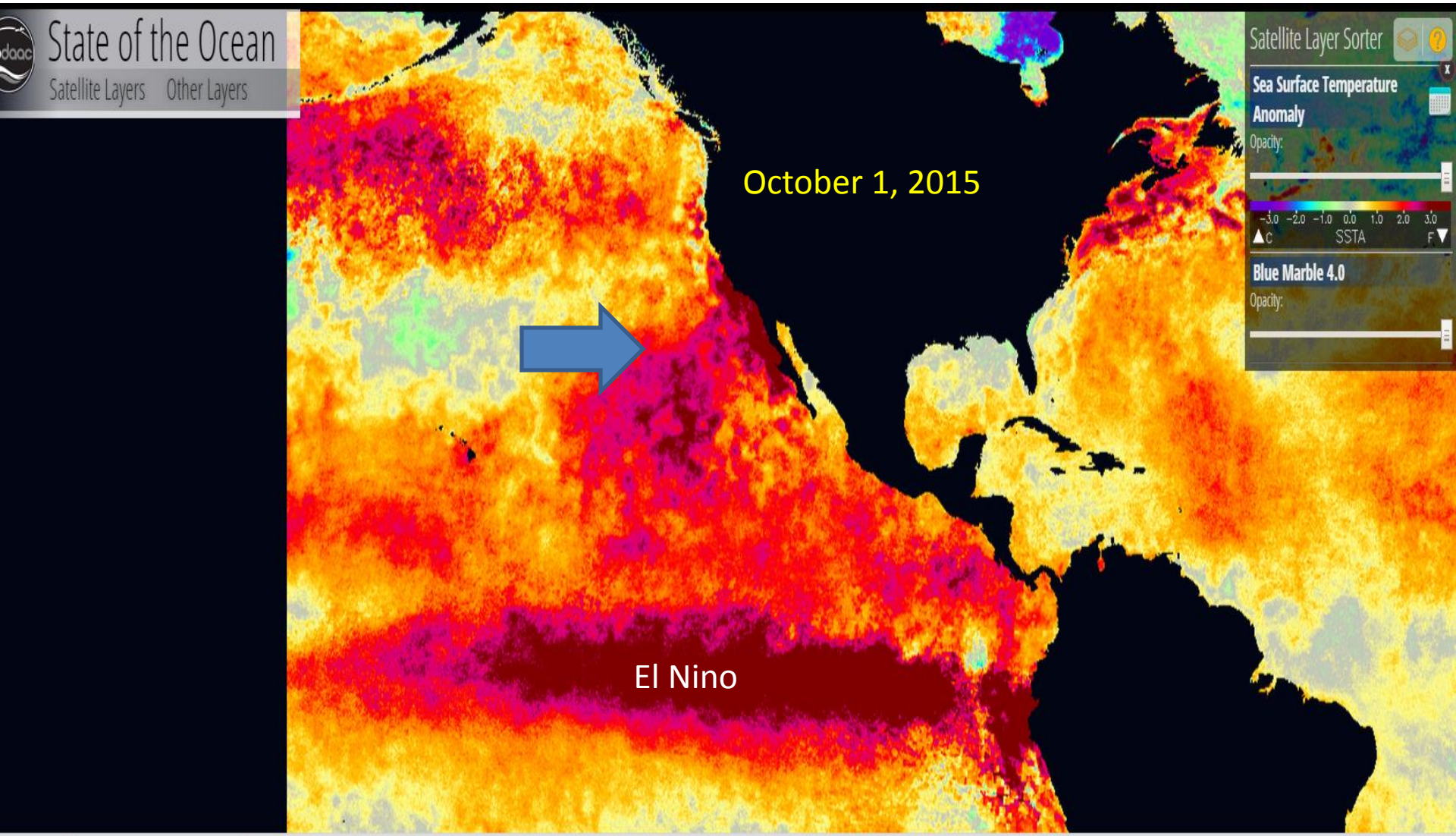


2013-2015

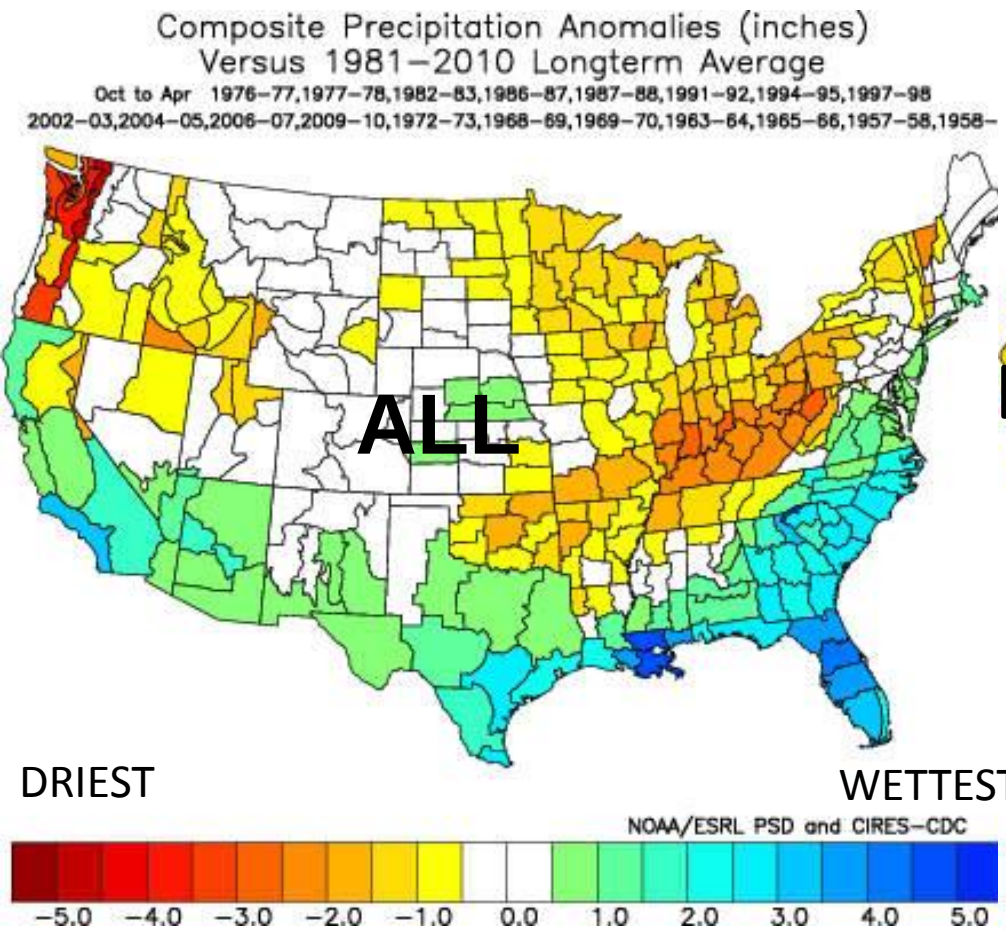


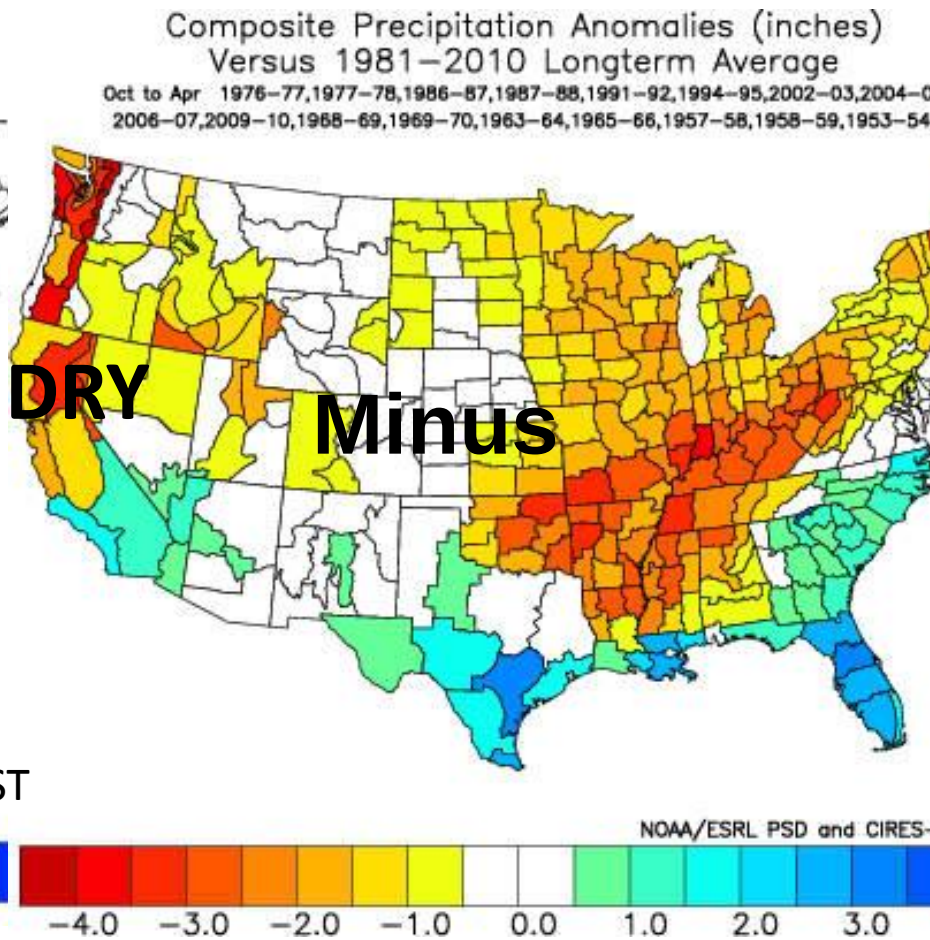
Strong El Nino years

State of the Ocean



All ENSO + and All ENSO
minus 1972, 1982 and 1997



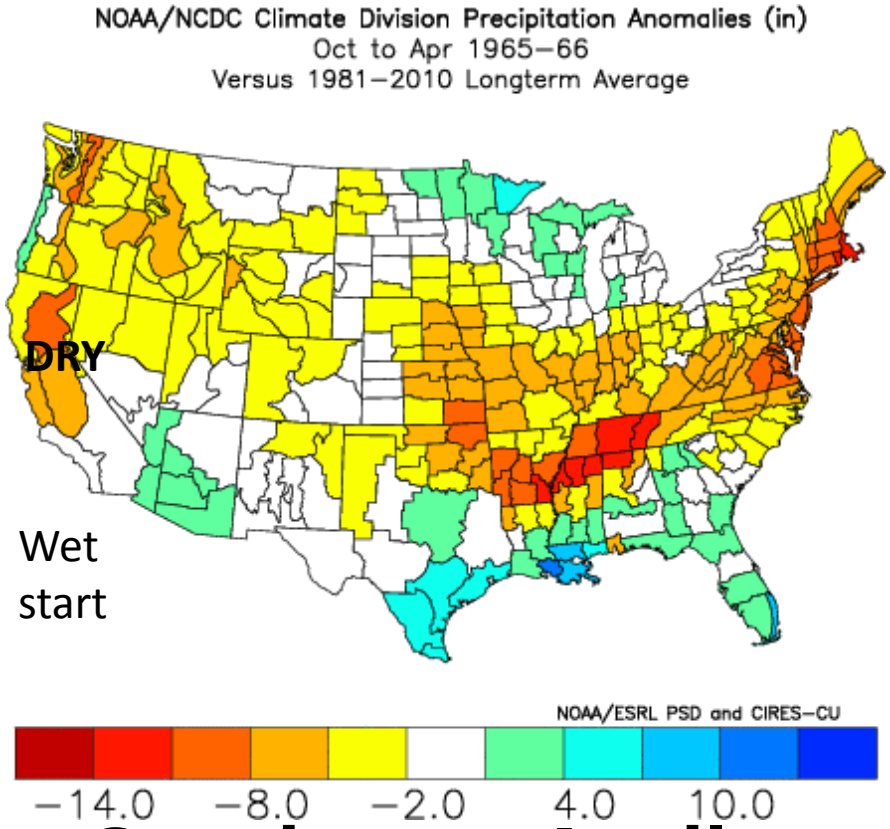


Precipitation October to April

1.5 strong El Nino ONI
but peaked too early at 1.8 in OND

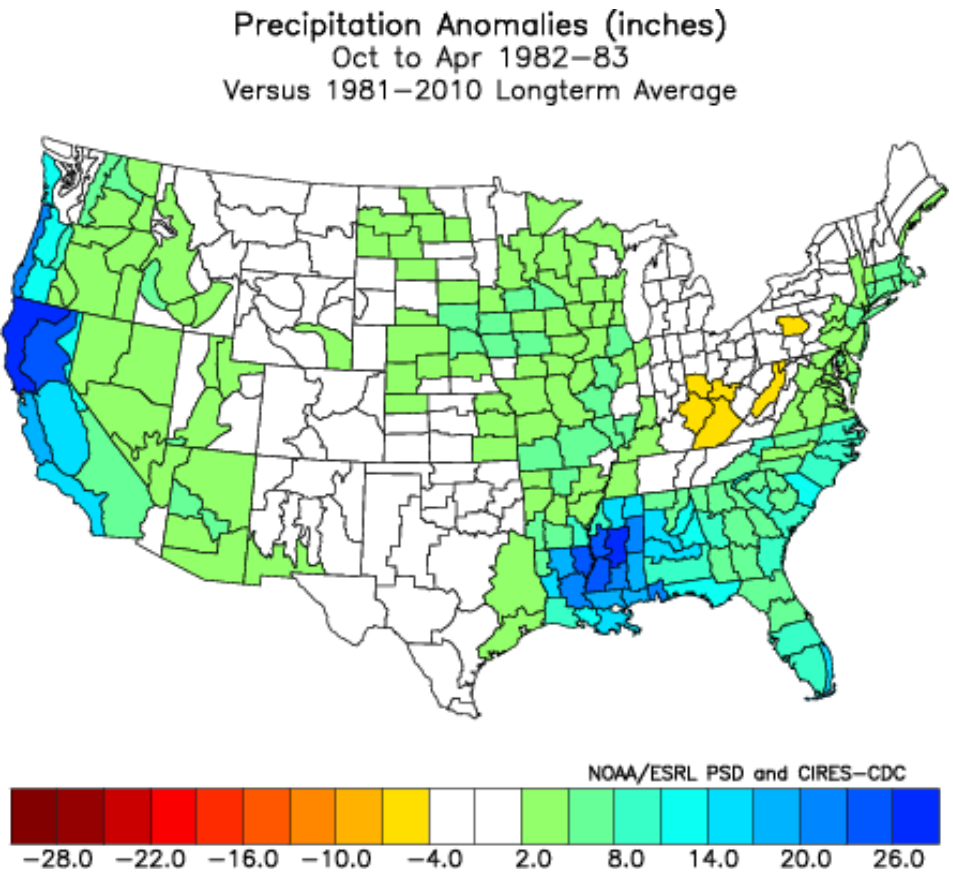
Strong El Nino but dry in Norcal

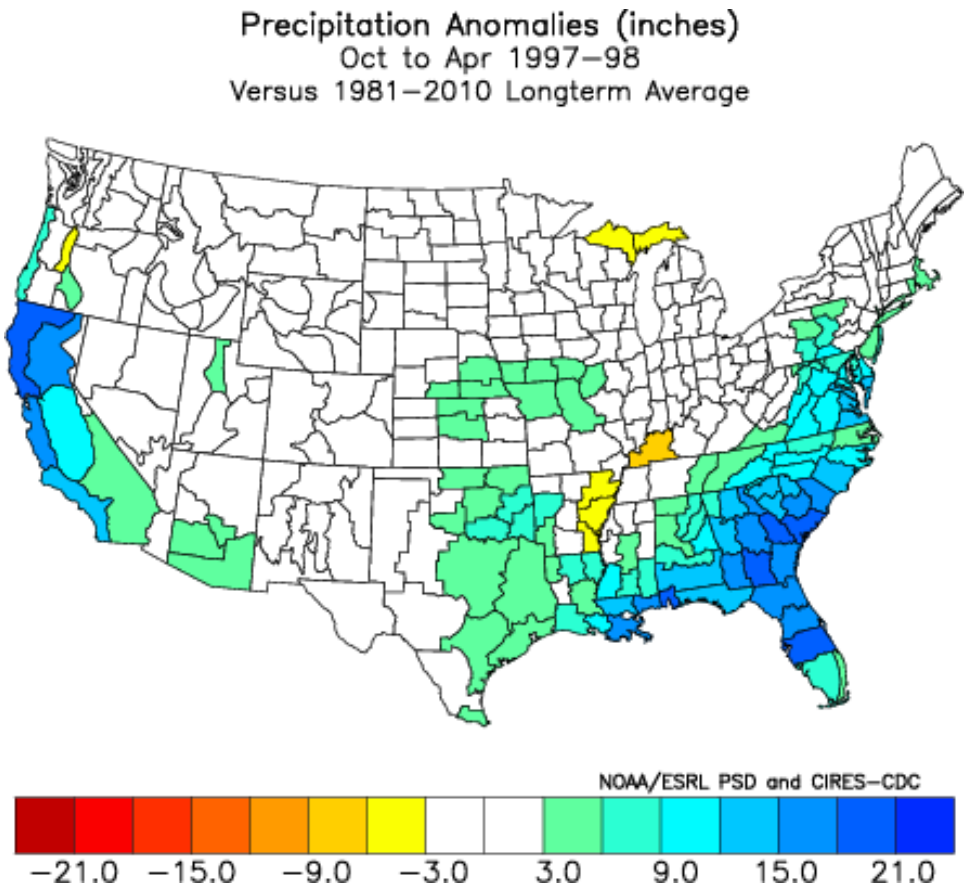
1965-66



October to April

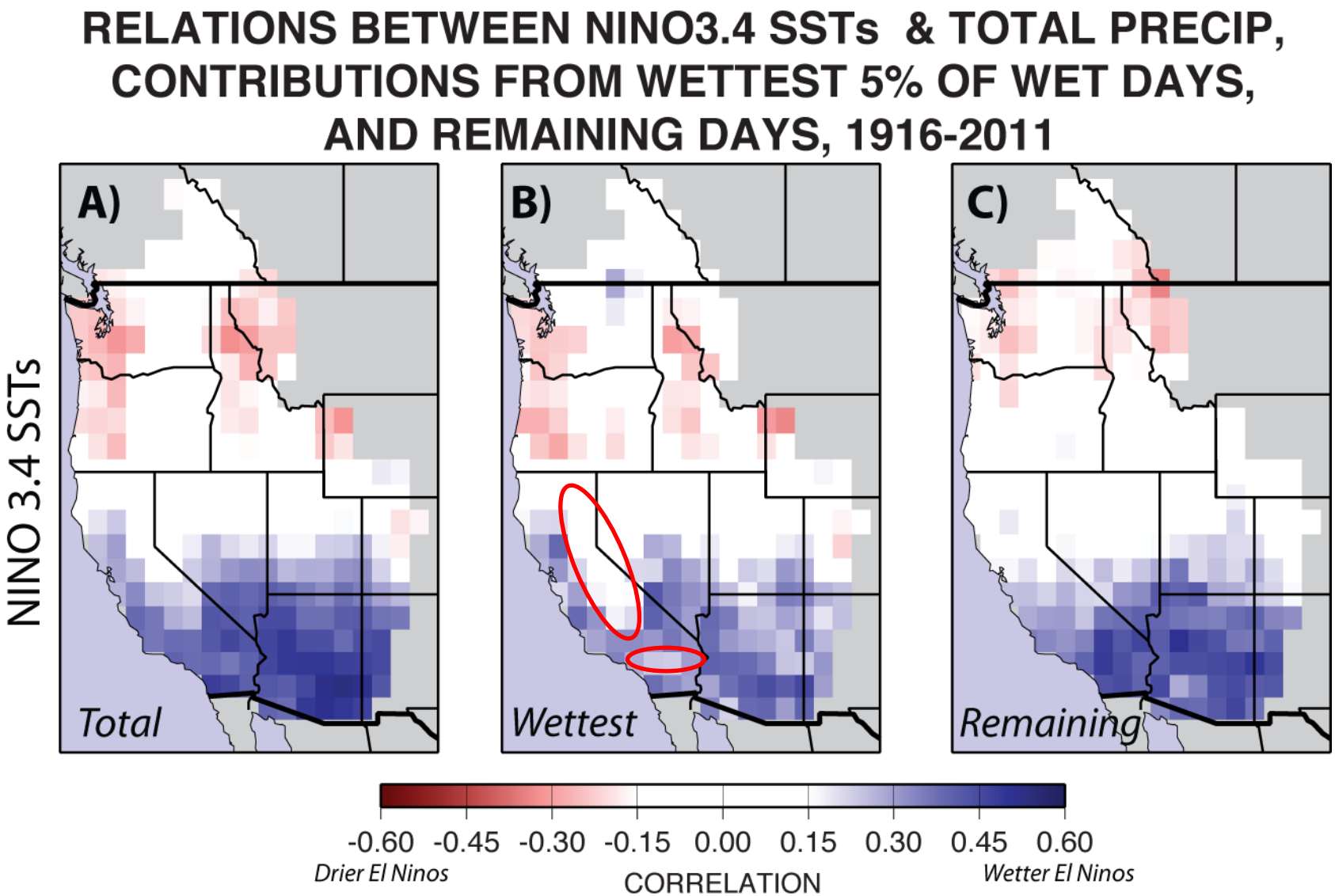
Major El Nino 2.0-2.3 ONI
Classic seasons of ENSO +





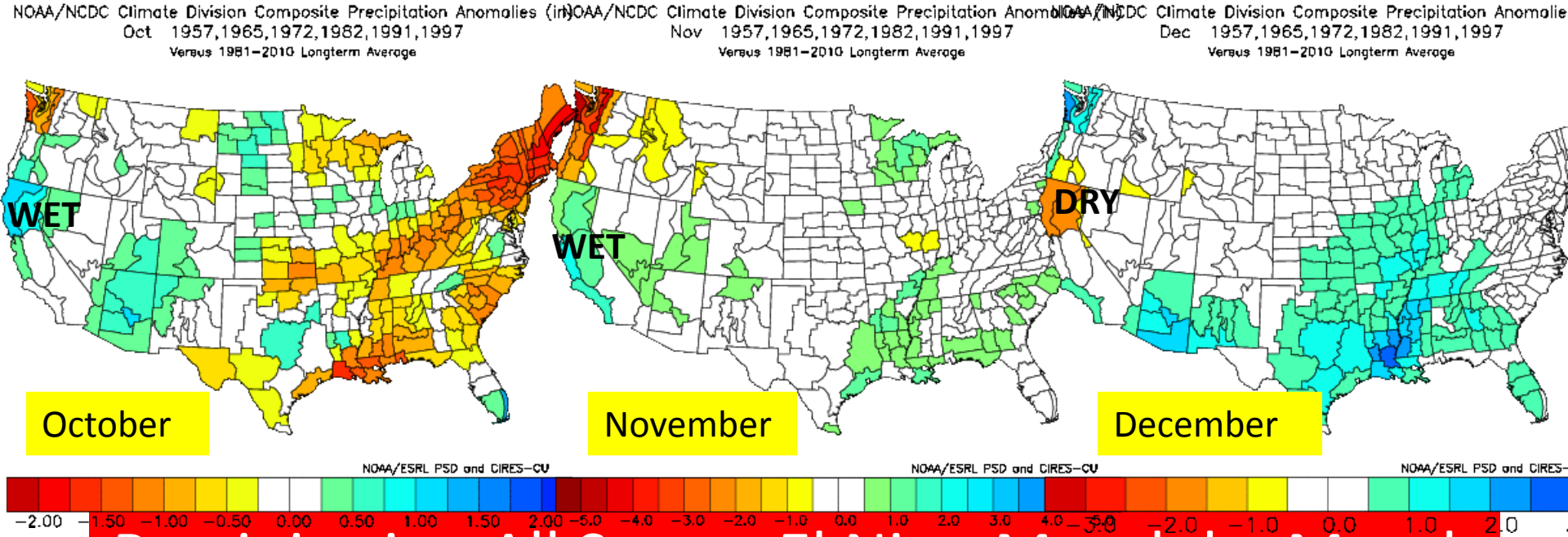
1982-83 **October to April** **1997-98**

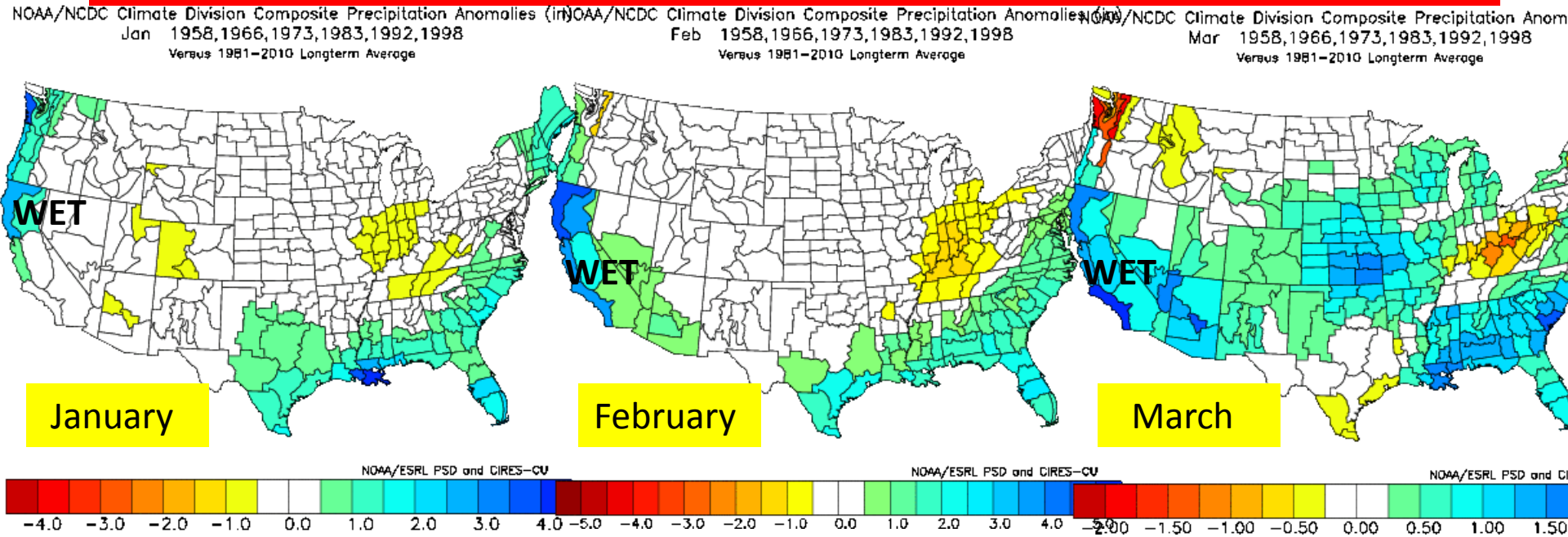
Atmospheric River major events can be any year



Credit: Scripps Institute of Oceanography

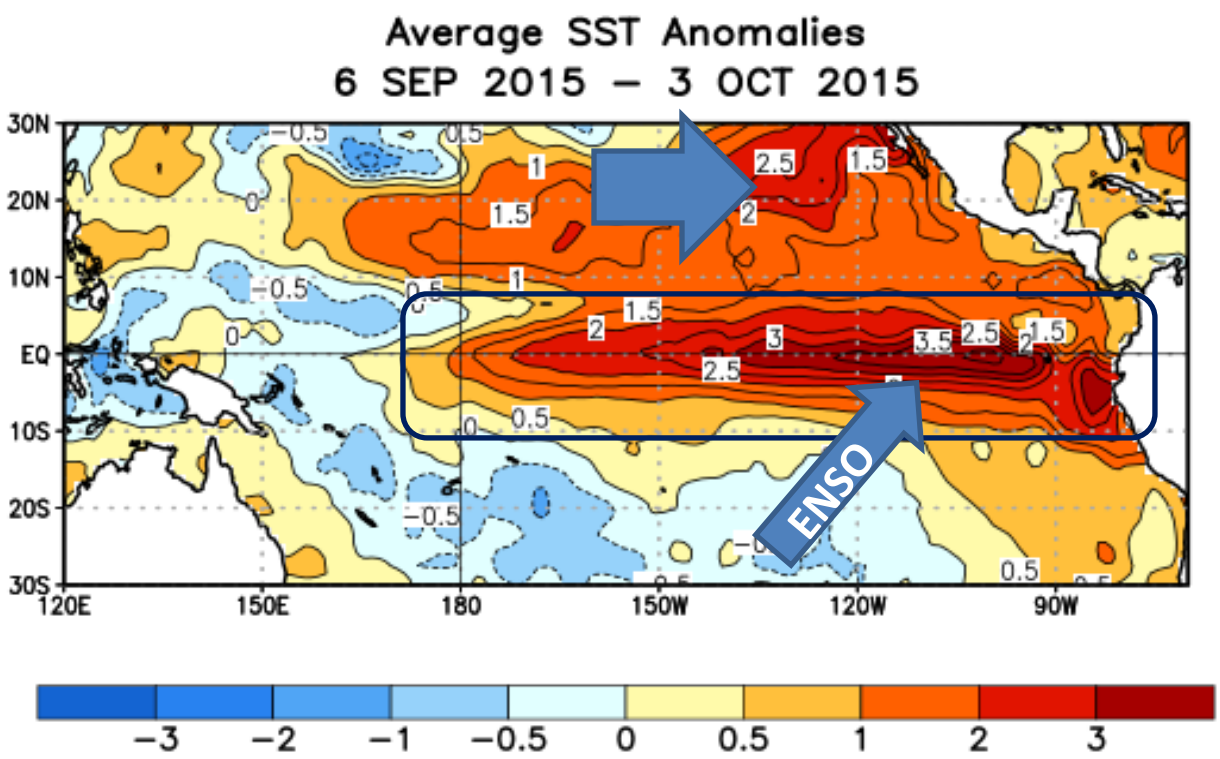
Precipitation All Strong El Nino Month by Month





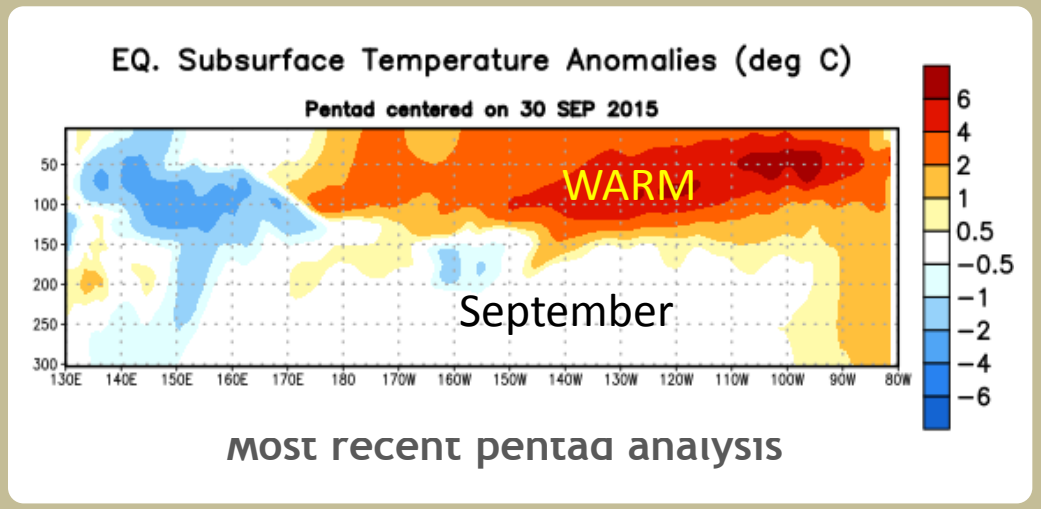
SST Departures (ºC) in the Tropical Pacific During the Last Four Weeks

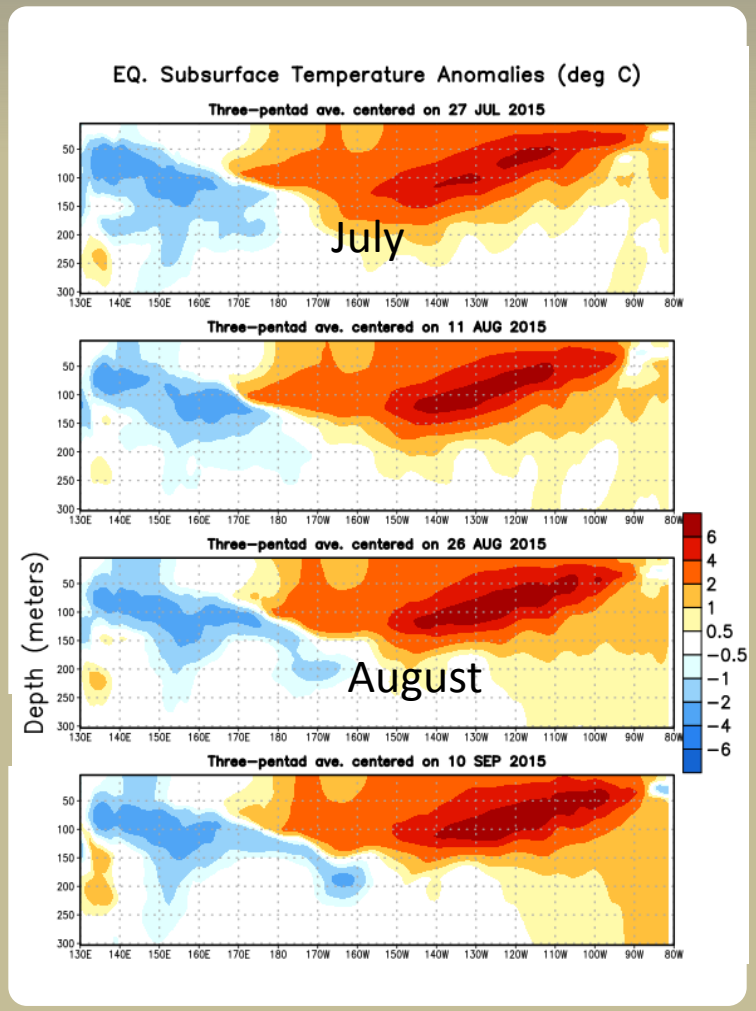
During the last four weeks, equatorial SSTs were above average across the central and eastern Pacific, with the largest anomalies off the coast of S. America.



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



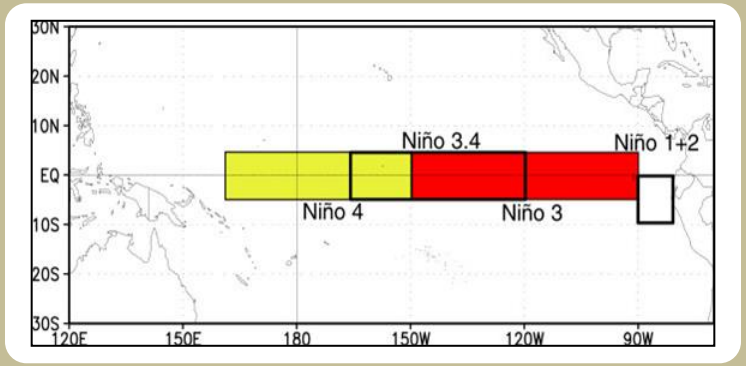


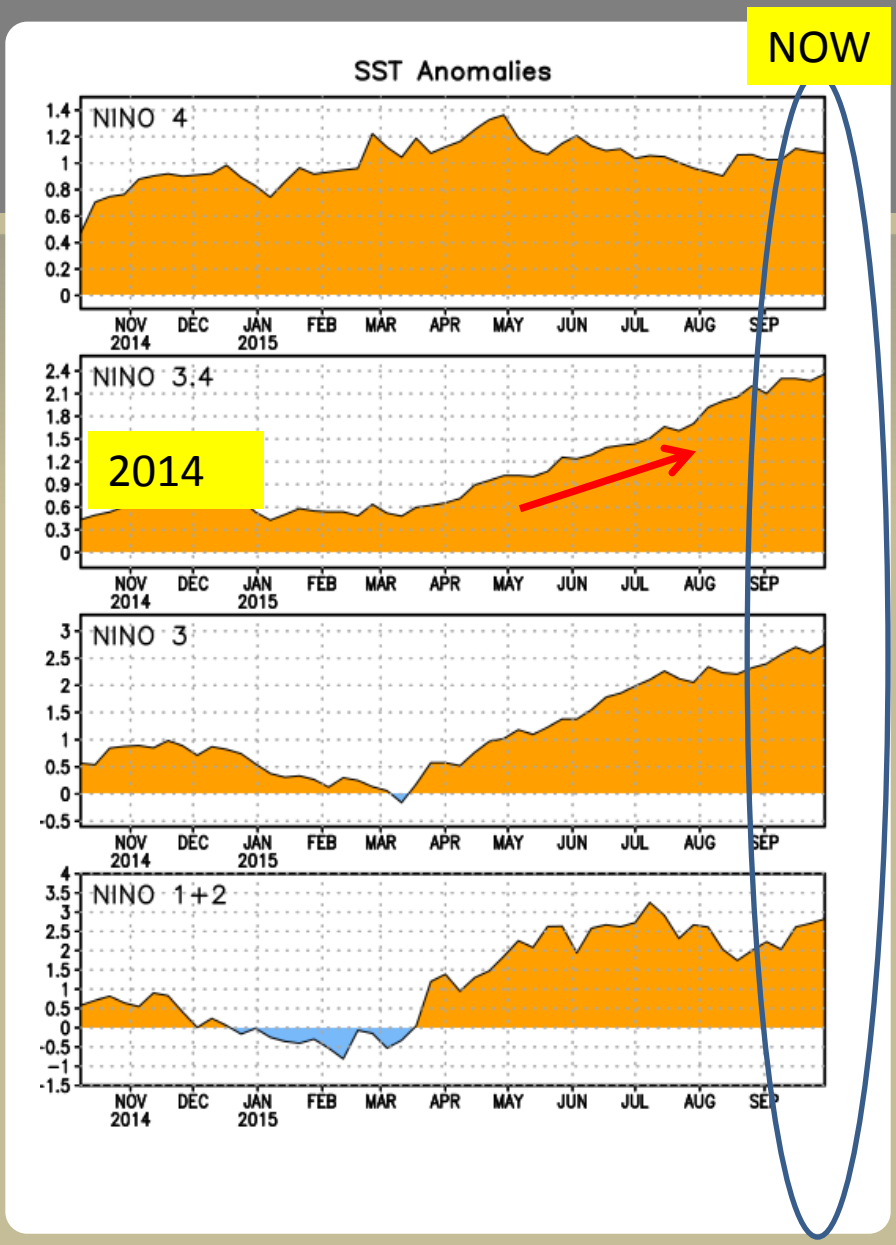
Deep Warm Waters

Niño Region SST Departures (°C) Recent Evolution

The latest weekly SST departures are:

Niño 4	1.1°C
Niño 3.4	2.4°C
Niño 3	2.8°C
Niño 1+2	2.8°C



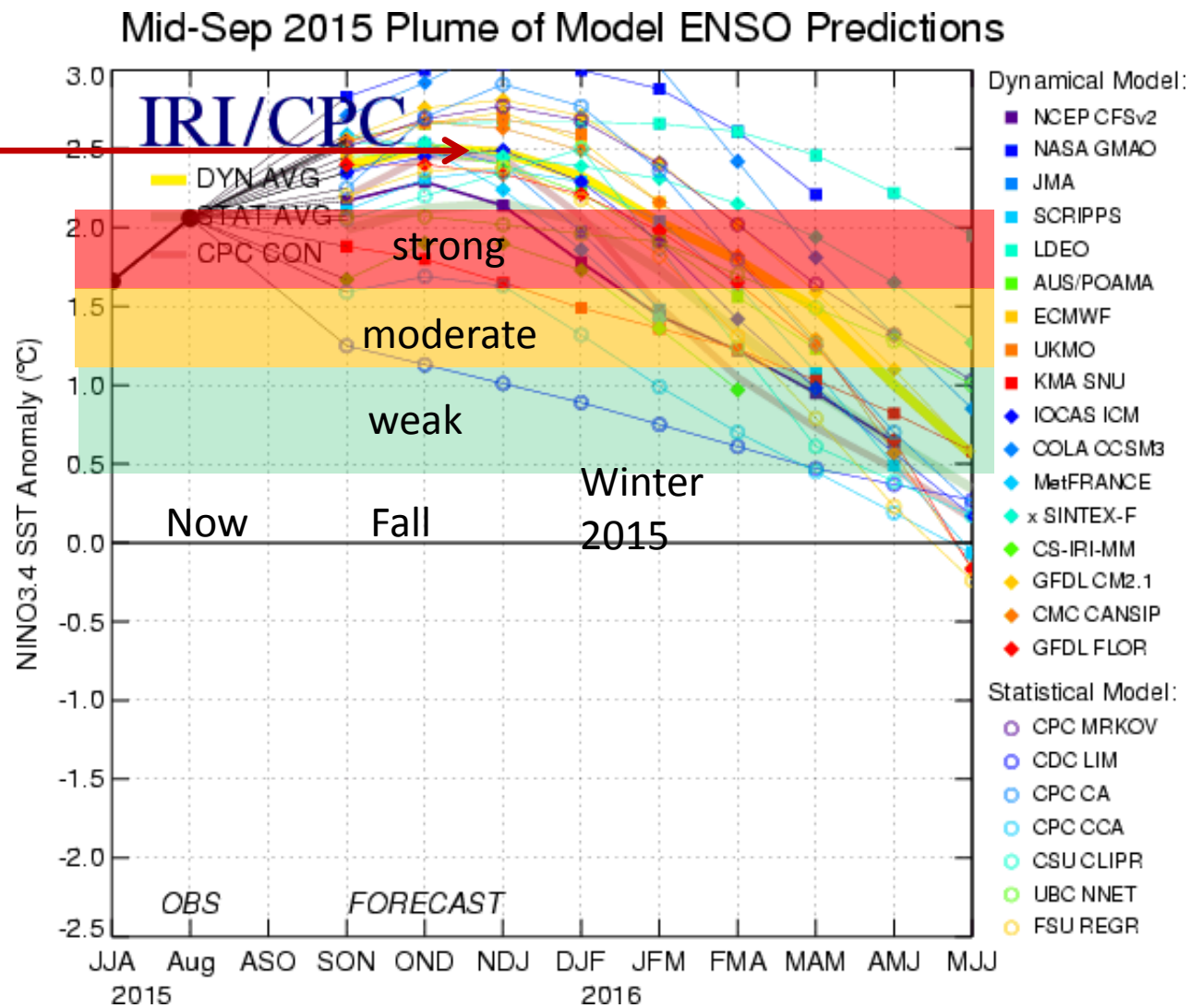


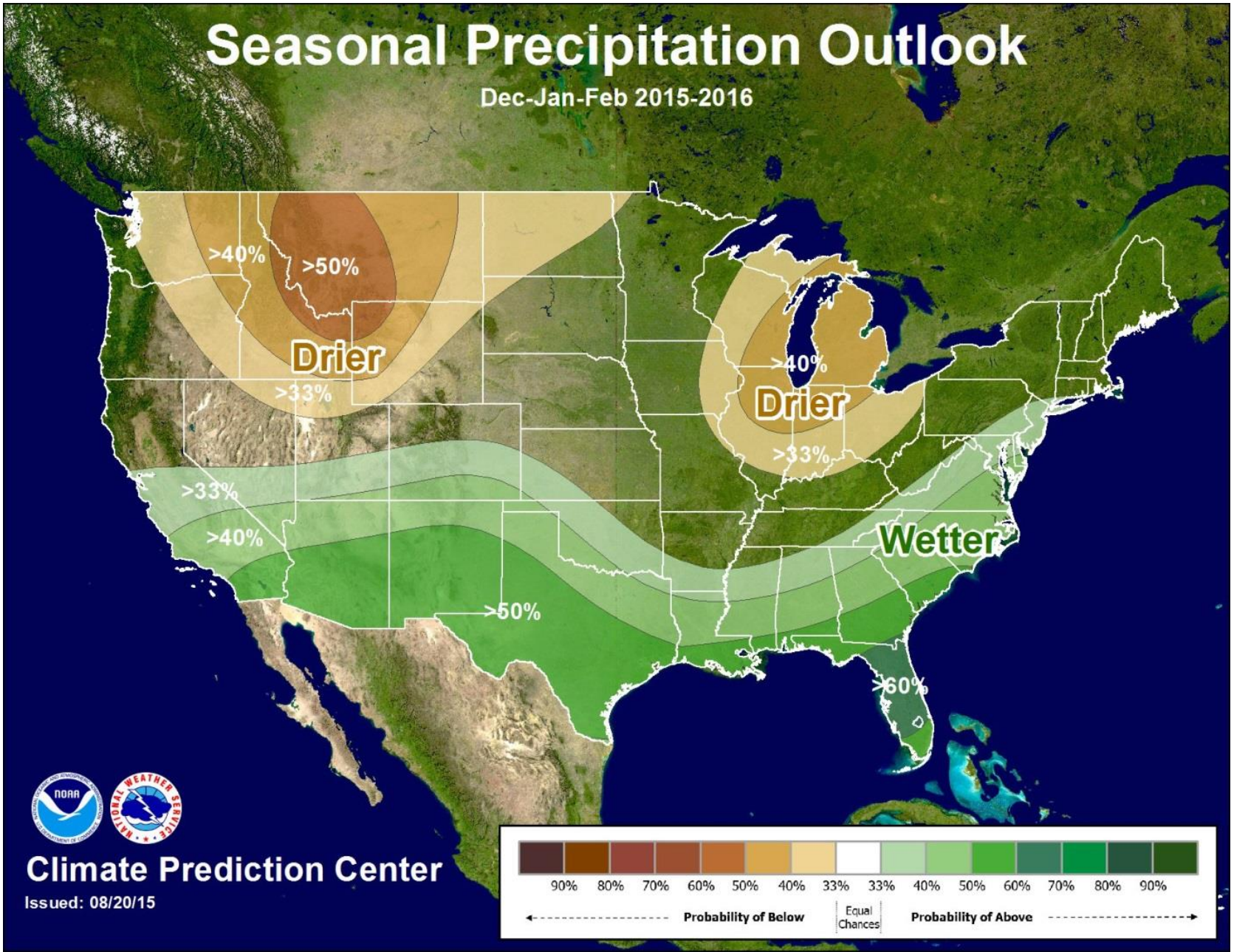
ENSO forecast

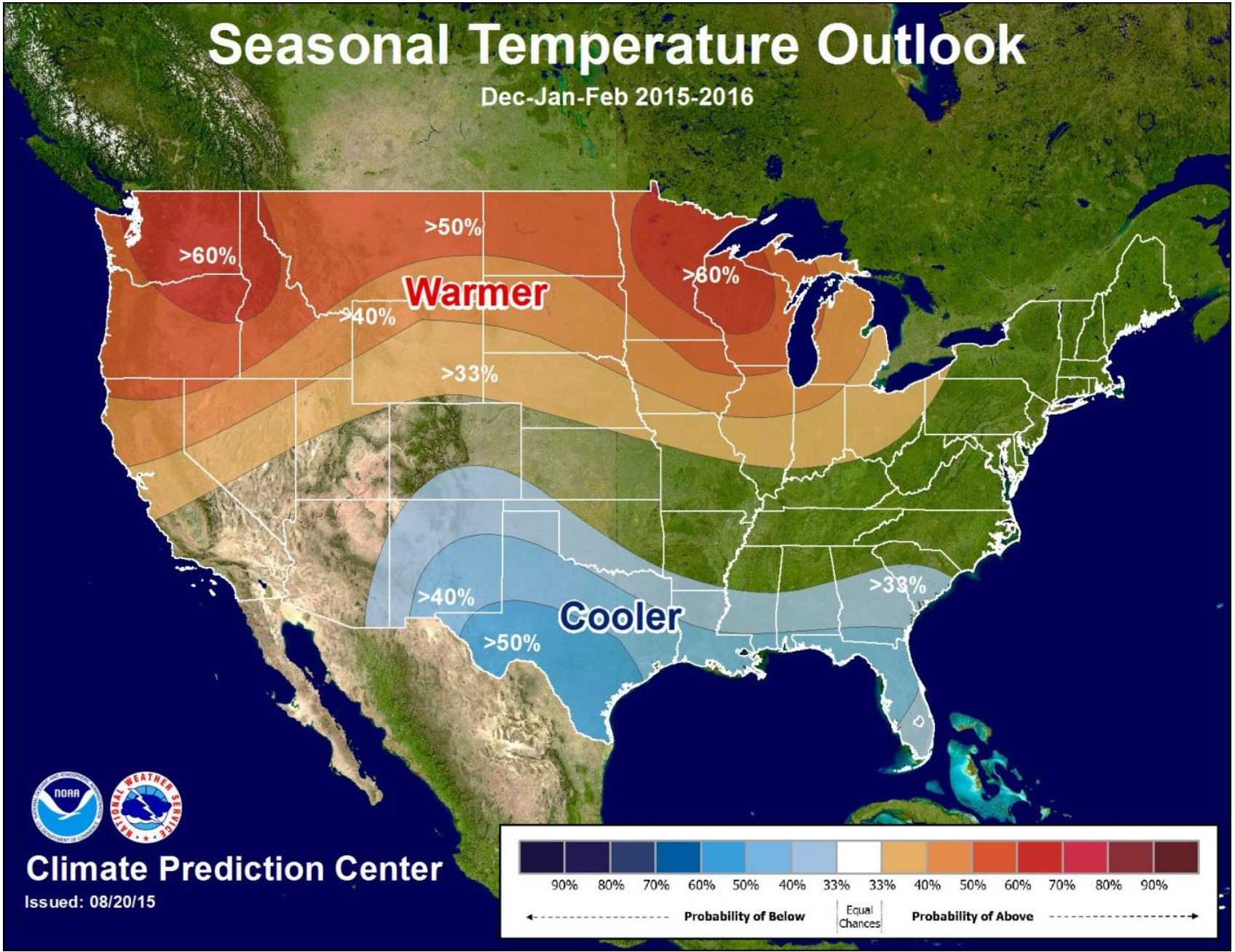
Yellow Line is Average

El Nino/ Warm SST

2.5 C average line



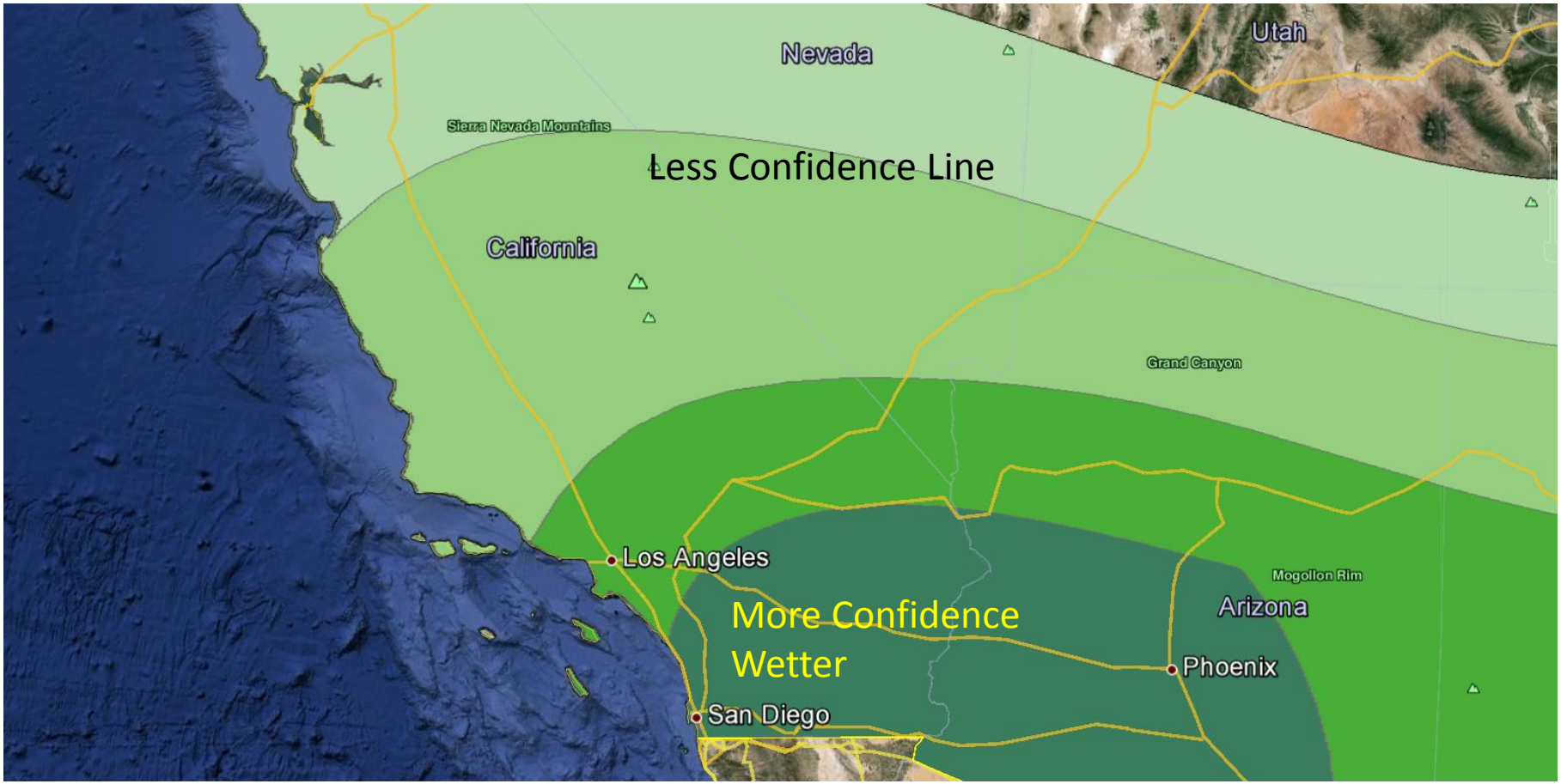

Seasonal Precipitation Outlook
Dec-Jan-Feb 2015-2016
>40%
>50%
Drier
>33%
>40%
Drier
>33%
>33%
>40%
Wetter
>50%
>60%
Climate Prediction Center
Issued: 08/20/15
90% 80% 70% 60% 50% 40% 33% 33% 40% 50% 60% 70% 80% 90%
Probability of Below
Equal Chances
Probability of Above


Seasonal Temperature Outlook
Dec-Jan-Feb 2015-2016
>60%
>50%
>60%
Warmer
>40%
>33%
>40%
Cooler
>50%
>33%
Climate Prediction Center
Issued: 08/20/15
90% 80% 70% 60% 50% 40% 33% 33% 40% 50% 60% 70% 80% 90%
Probability of Below
Equal Chances
Probability of Above

Southern California

January to March

Precipitation



Summary

- Strong (1.5 C) El Nino is present and strengthening
- Good chance to see a Strong El Nino in late fall 2015
- El Nino at the strong phase correlates to above normal precipitation in southern California but not necessarily the whole state

- 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 the Pineapple Express or Atmospheric River)
- 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

- Moderate snow levels (not the tropical high snow events and not the artic air mass)
- Flooding (river, urban, small stream) from repeated storms and saturated soils (not necessarily major storms) – locations may not have flooded for 5 to 25 yearsBeach 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
- 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