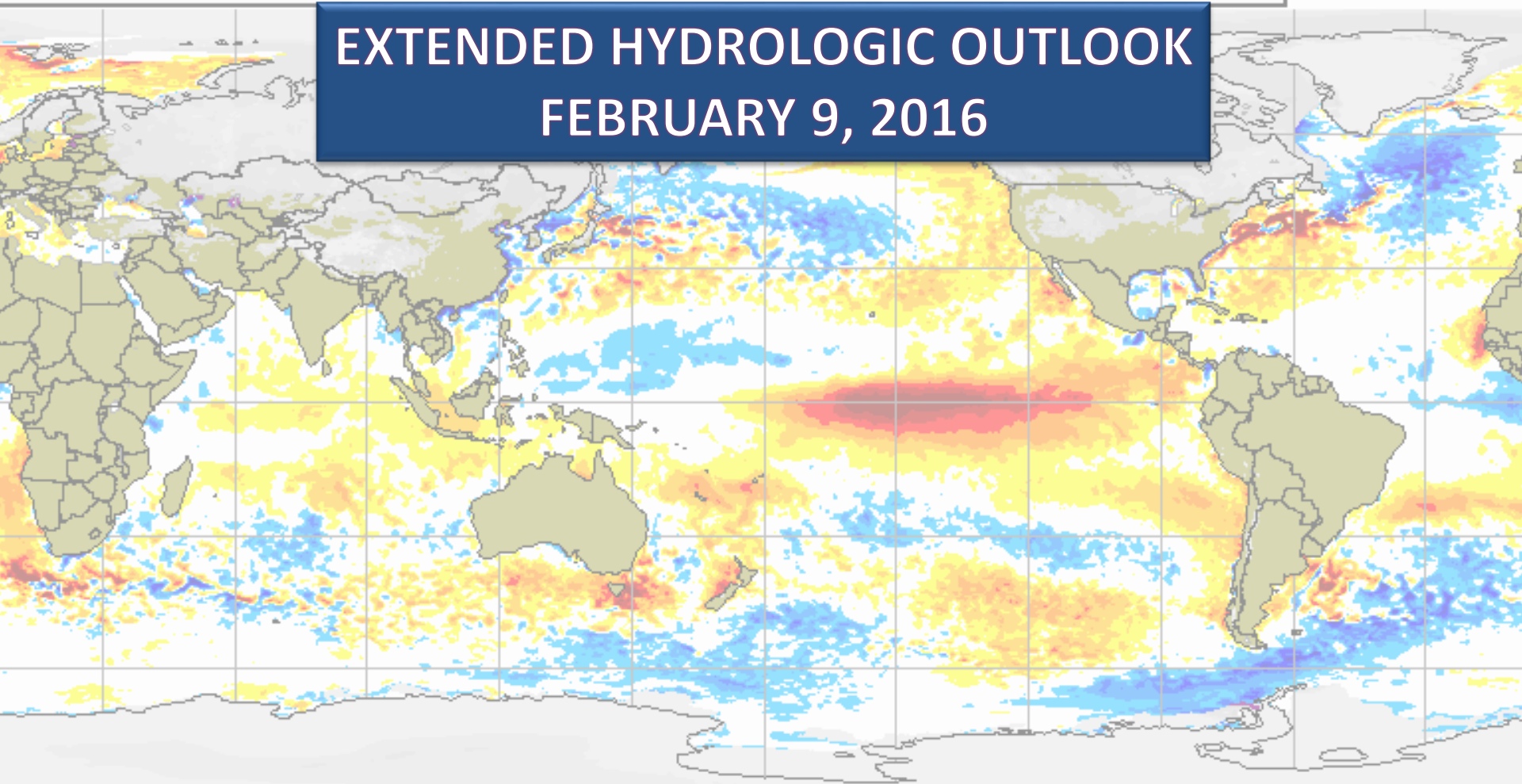
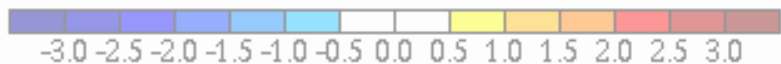


# EXTENDED HYDROLOGIC OUTLOOK FEBRUARY 9, 2016



Sea surface temperature anomaly / Anomalie de la température de la mer (°C)



Snow depth / Épaisseur de la neige (cm)



Uncovered sea ice  
Glace marine à découvrir  
Climatologie 1995-2009 Climatologie



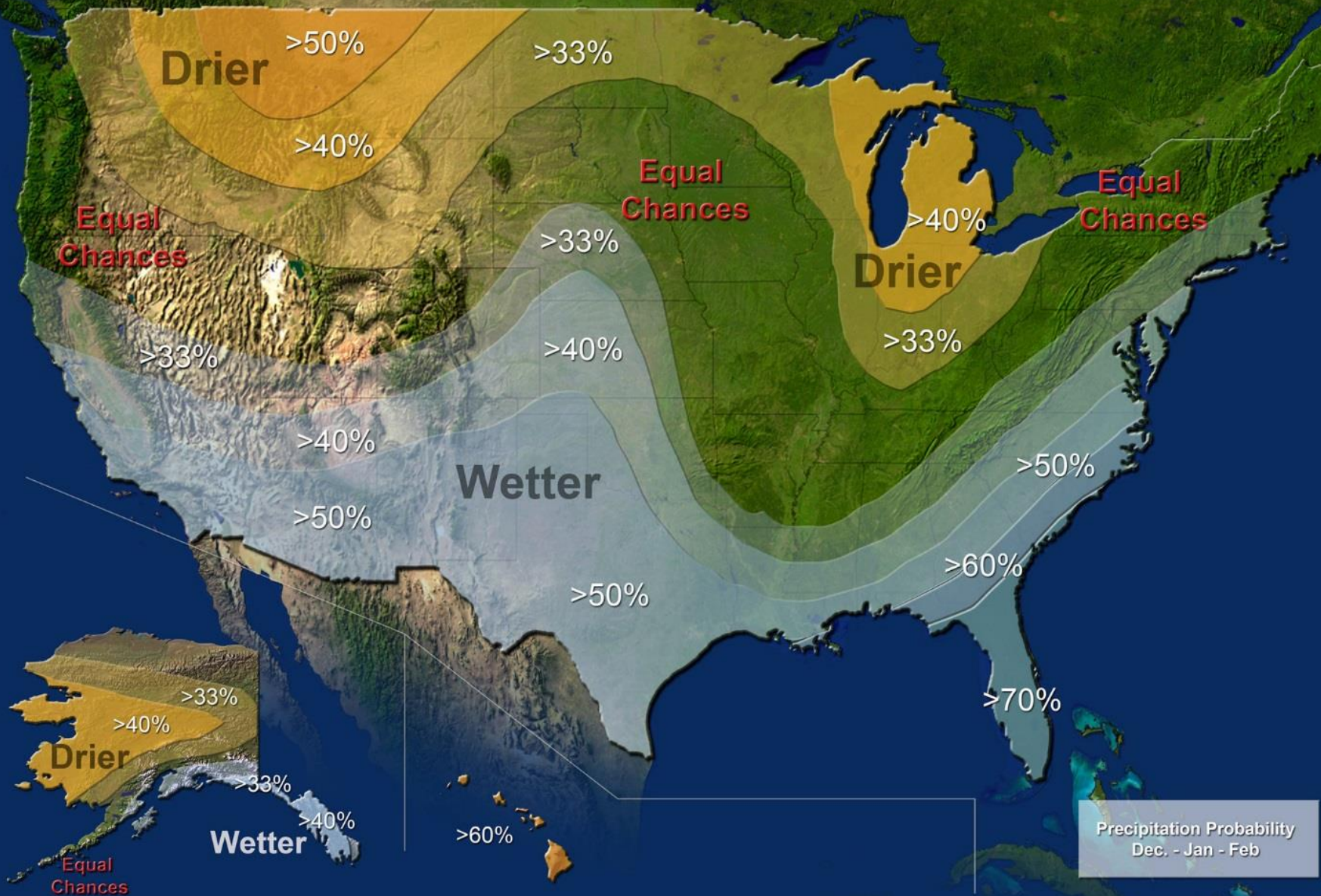
CMC Environnement Canada  
CMC Environment Canada

# Summary

- The Climate Prediction Center (CPC) is forecasting above-normal rainfall for February through April. NOAA is forecasting a 70% likelihood of being in the wettest tercile through winter 2016.
- Strong El Niño conditions are present. A strong El Niño is likely to persist through winter 2016. There are increased chances of above normal rainfall for the 2015-2016 dry season.
- The strong positive phase of the Pacific Decadal Oscillation increases the potential for above normal rainfall in the winter and a greater number of El Niño events for multi-year periods.
- Watching Atlantic Multidecadal Oscillation (AMO) index for potential switch to negative (cold) phase, this has the potential to contribute to a drier-than-normal 2016 wet season.

# U.S. Winter Outlook

## Precipitation



National Weather Service Melbourne

# DRY SEASON FORECAST

Jan  
2016

The Forecast

## November – December - January

### STRONG EL NINO

WEAK EL NINO  
NEUTRAL  
WEAK LA NINA  
STRONG LA NINA

ENSO State

### WELL ABOVE NORMAL

ABOVE NORMAL  
NEAR NORMAL  
BELOW NORMAL  
WELL BELOW NORMAL

Temperature

WELL ABOVE NORMAL

### ABOVE NORMAL

NEAR NORMAL  
BELOW NORMAL  
WELL BELOW NORMAL

Precipitation

WELL ABOVE NORMAL

### ABOVE NORMAL

NEAR NORMAL  
BELOW NORMAL  
WELL BELOW NORMAL

Storminess

## February – March - April

### STRONG EL NINO

WEAK EL NINO  
NEUTRAL  
WEAK LA NINA  
STRONG LA NINA

ENSO State

WELL ABOVE NORMAL  
ABOVE NORMAL  
NEAR NORMAL

### BELOW NORMAL

WELL BELOW NORMAL

Temperature

### WELL ABOVE NORMAL

ABOVE NORMAL  
NEAR NORMAL  
BELOW NORMAL  
WELL BELOW NORMAL

Precipitation

### WELL ABOVE NORMAL

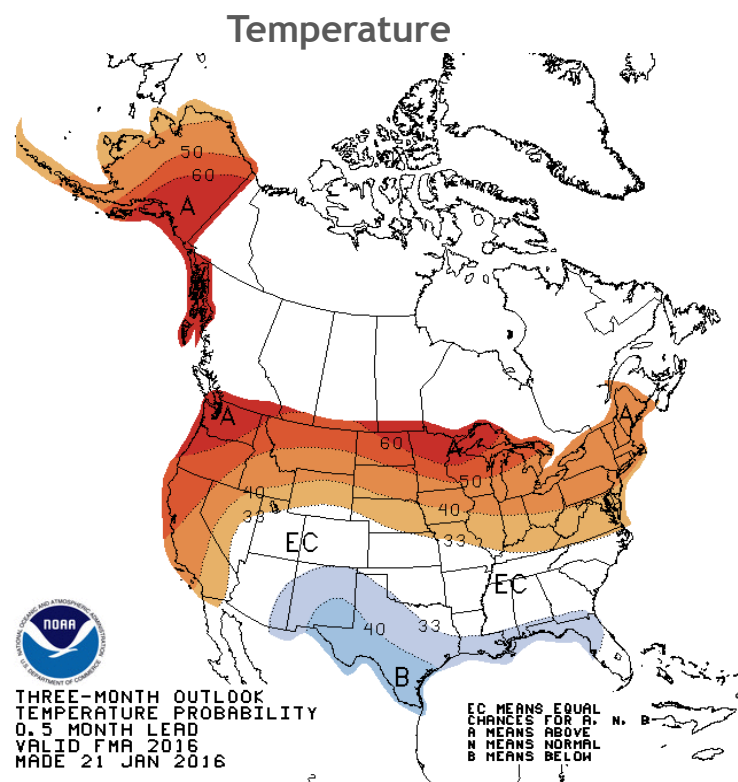
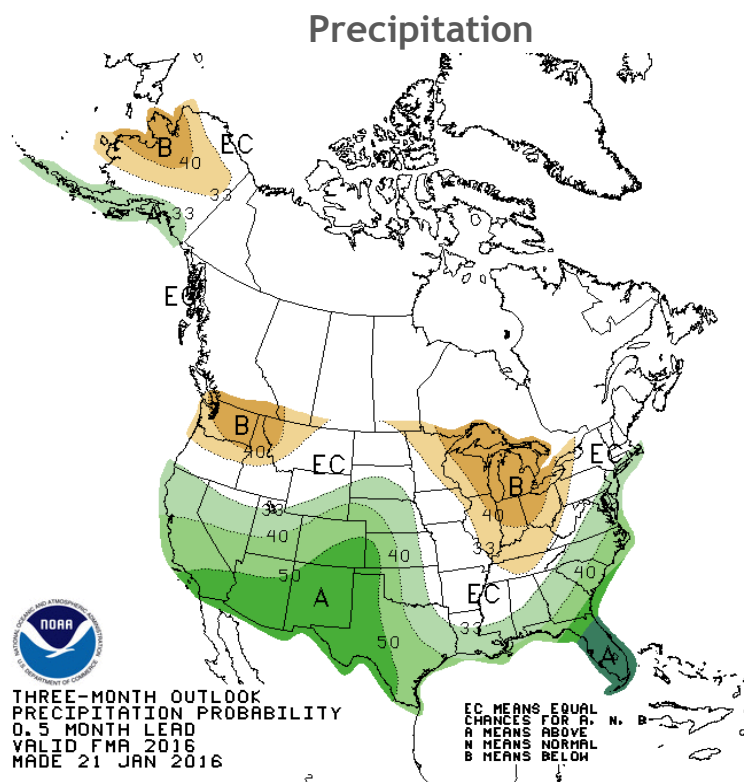
ABOVE NORMAL  
NEAR NORMAL  
BELOW NORMAL  
WELL BELOW NORMAL

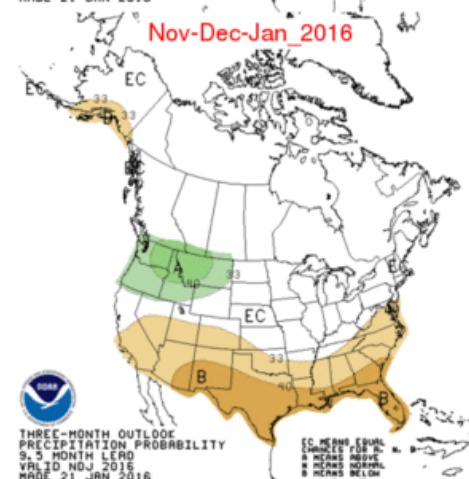
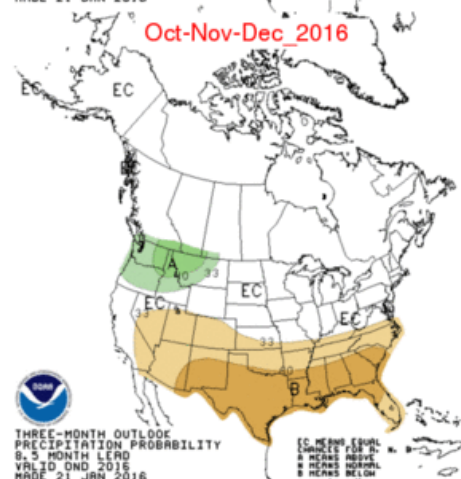
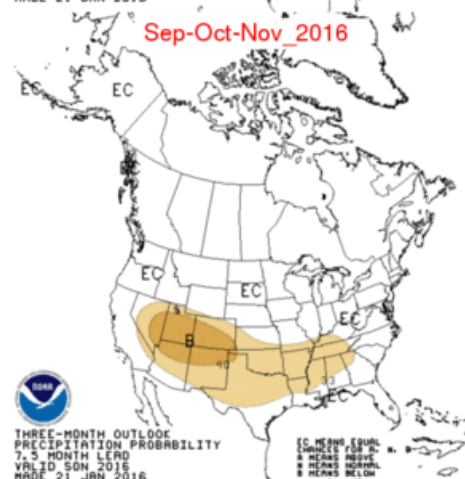
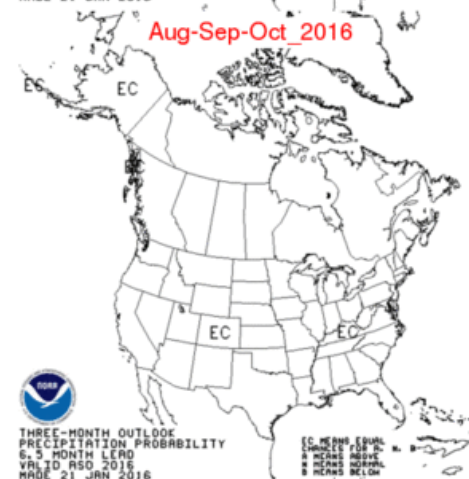
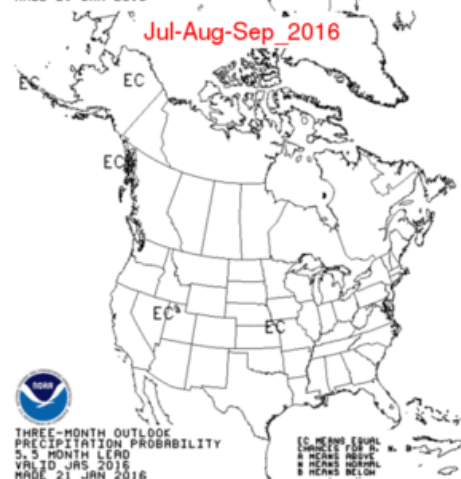
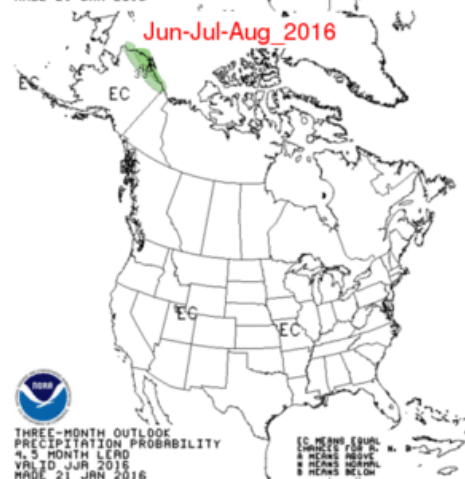
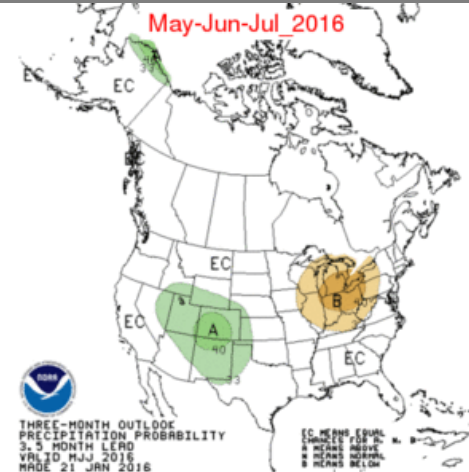
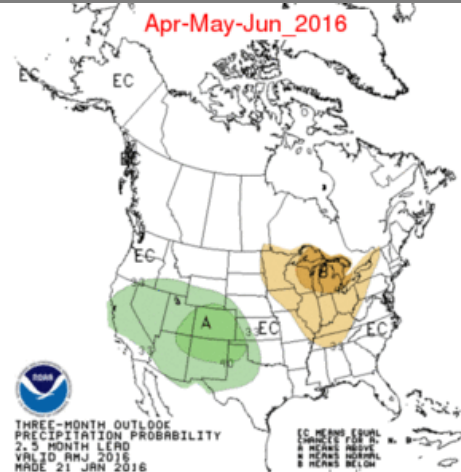
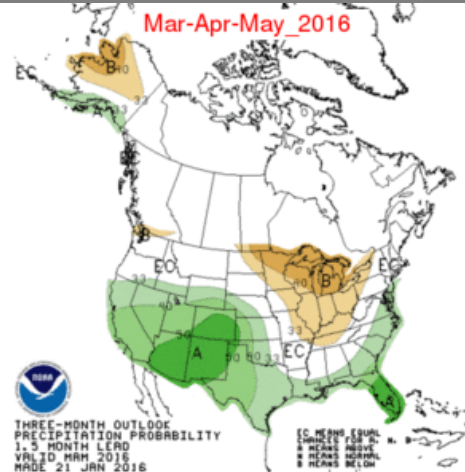
Storminess

# U. S. Seasonal Outlooks

February - April 2016

The seasonal outlooks combine the effects of long-term trends, soil moisture, and, when appropriate, ENSO.

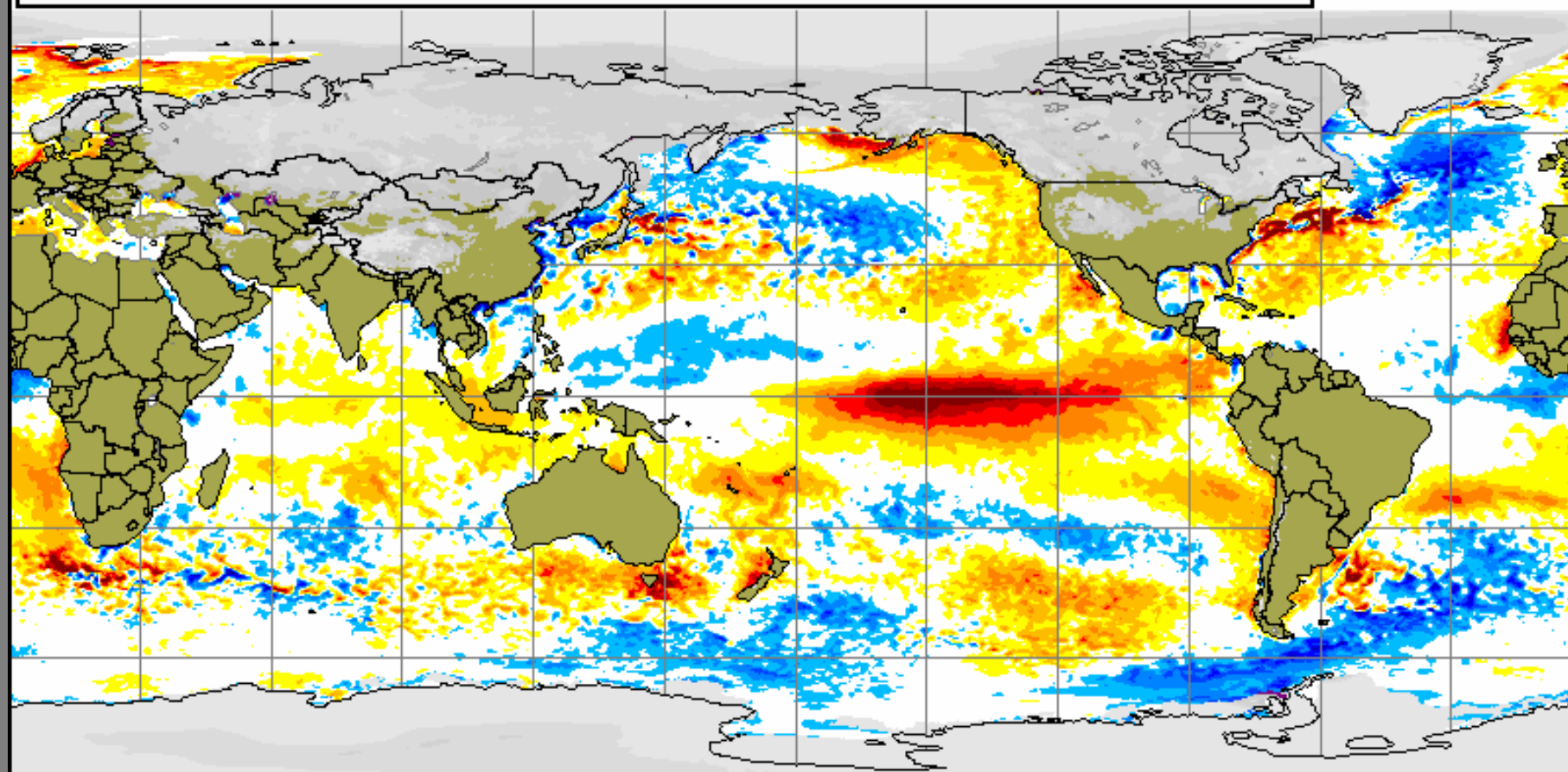




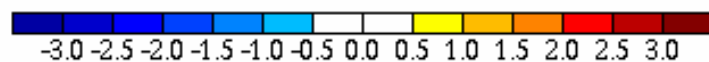
# Current Global Sea Surface Temperature Anomalies

Global sea surface anomaly and snow cover  
09 Feb 2016

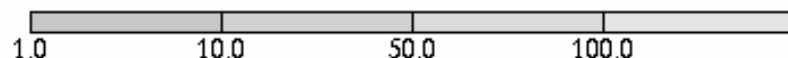
Anomalie de la température de la mer et épaisseur de la neige  
09 Feb 2016



Sea surface temperature anomaly / Anomalie de la température de la mer (°C)



Snow depth / Épaisseur de la neige (cm)

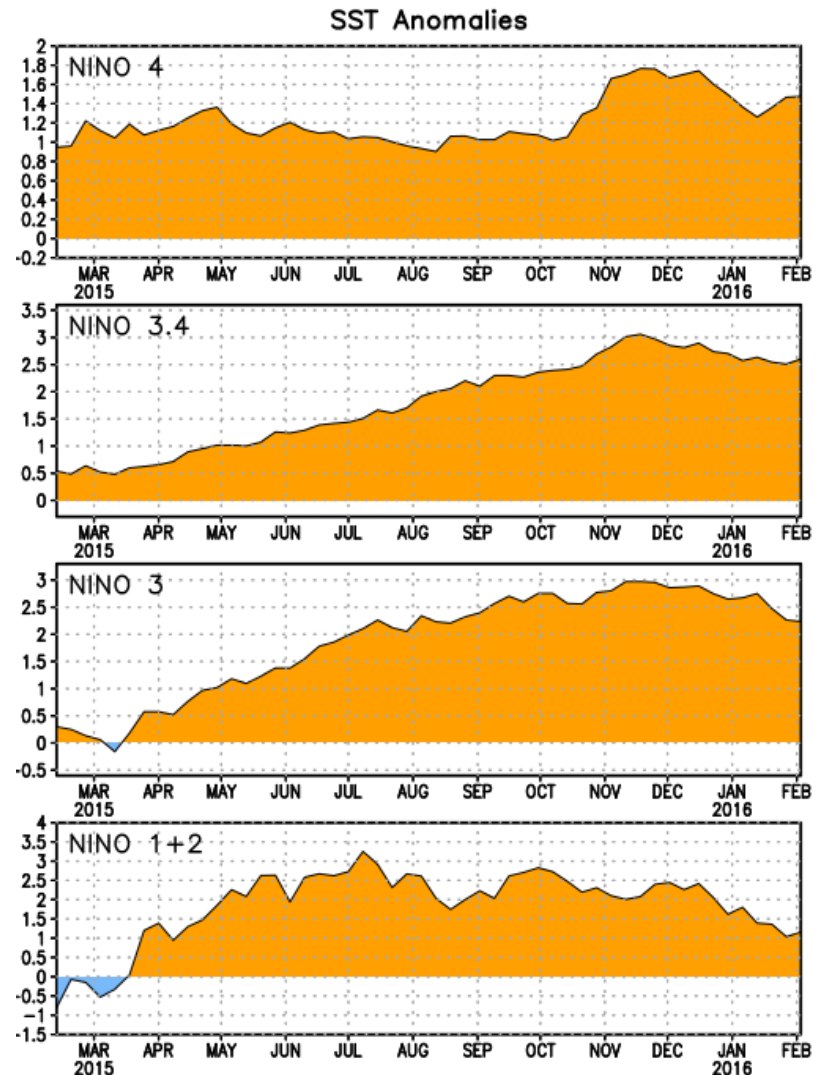
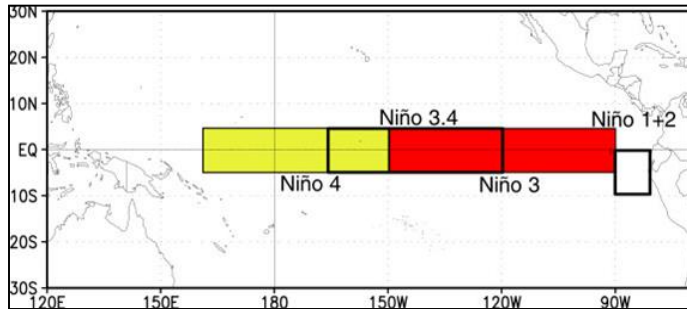


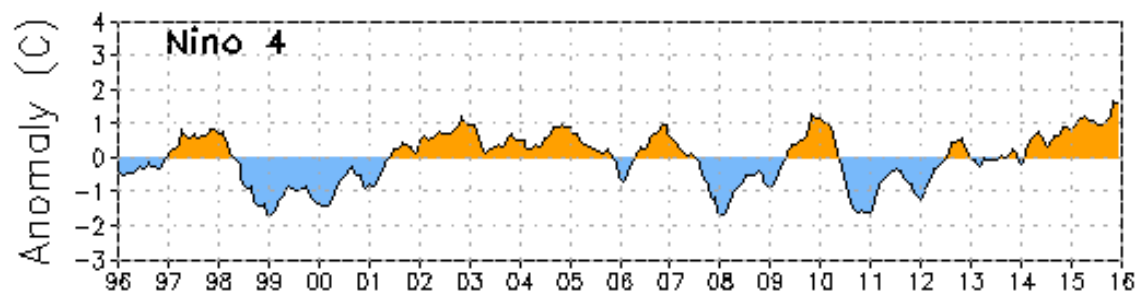
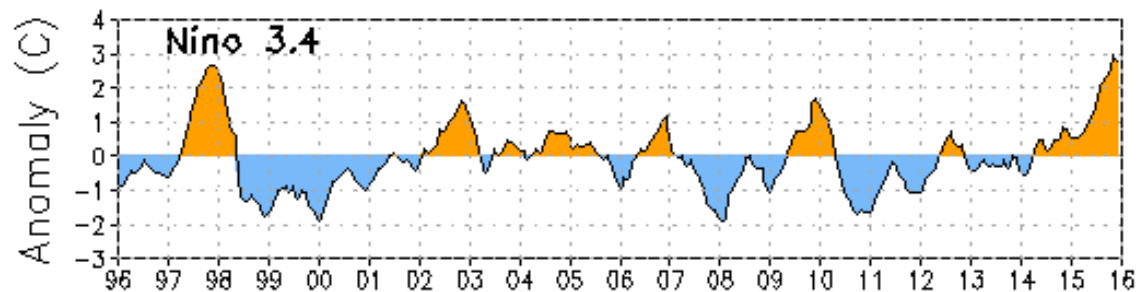
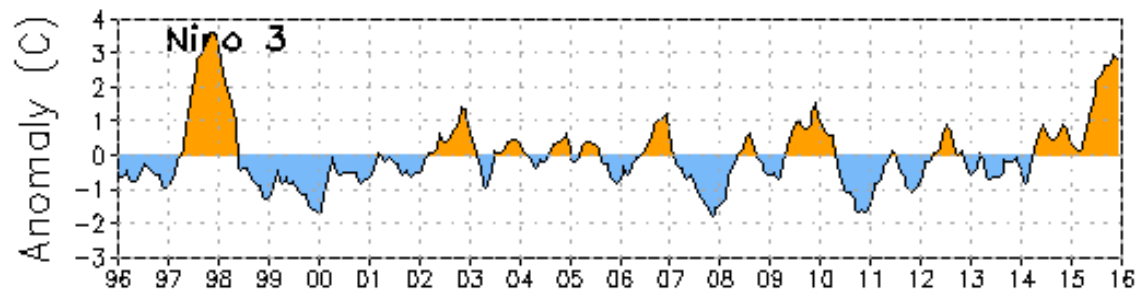
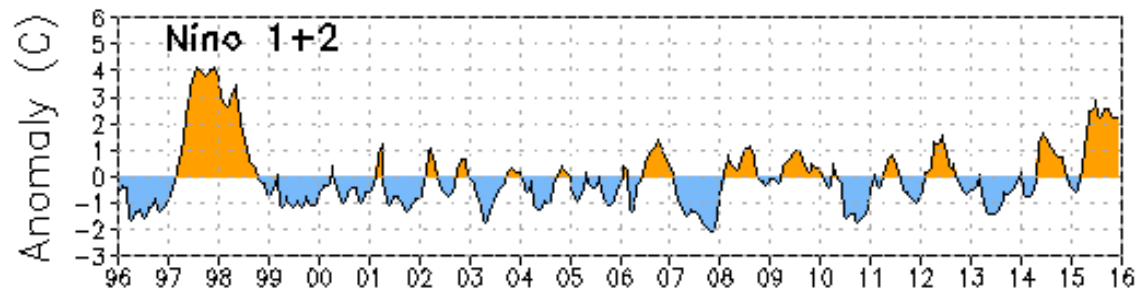
Uncovered sea ice  
Glace marine à découvert  
Climatologie 1995-2009 Climatologie

# Niño Region SST Departures (°C) Recent Evolution

The latest weekly SST departures are:

Niño 4	1.5°C
Niño 3.4	2.6°C
Niño 3	2.2°C
Niño 1+2	1.2°C





Data updated through December 2015

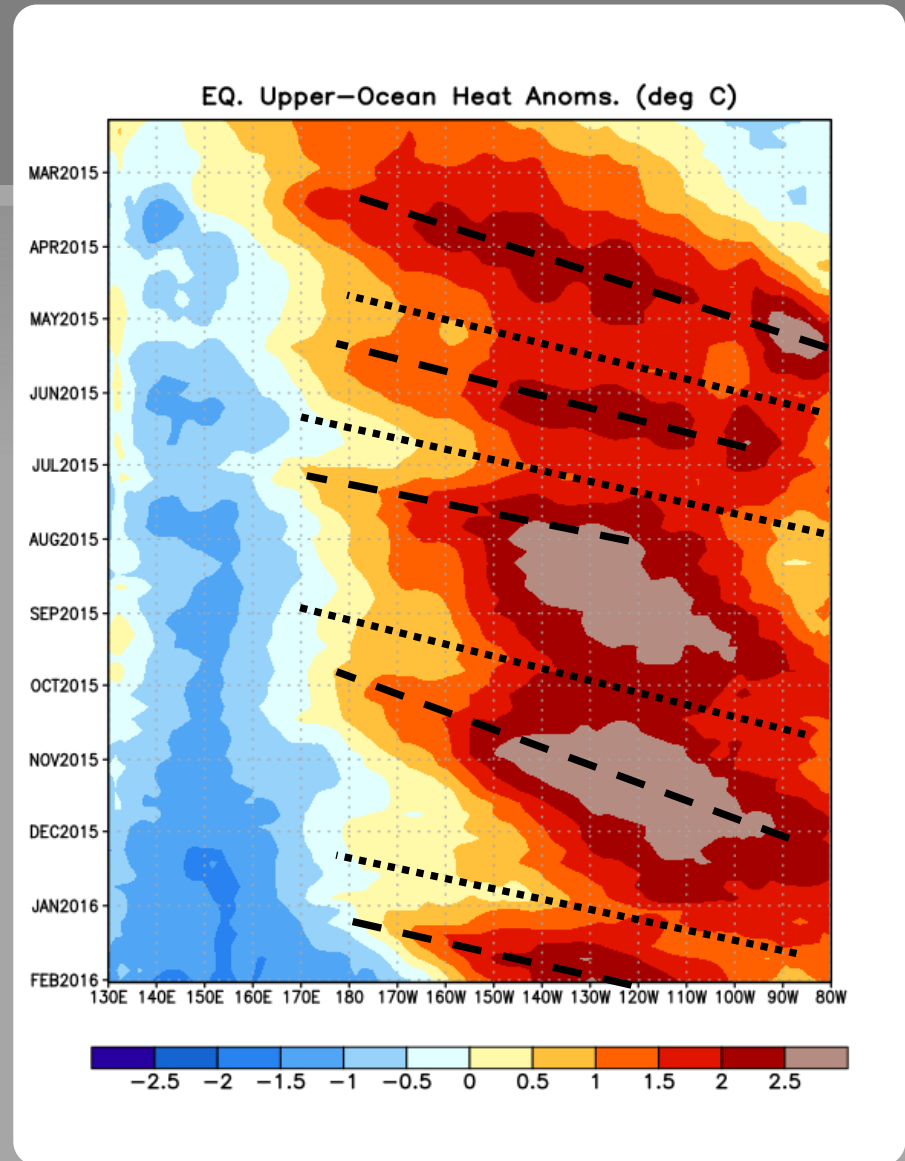
# Weekly Heat Content Evolution in the Equatorial Pacific

Downwelling phases of a Kelvin wave were observed in March-April, mid-May to late June, July-August, and October to November.

During August and September, positive subsurface temperature anomalies slowly shifted eastward.

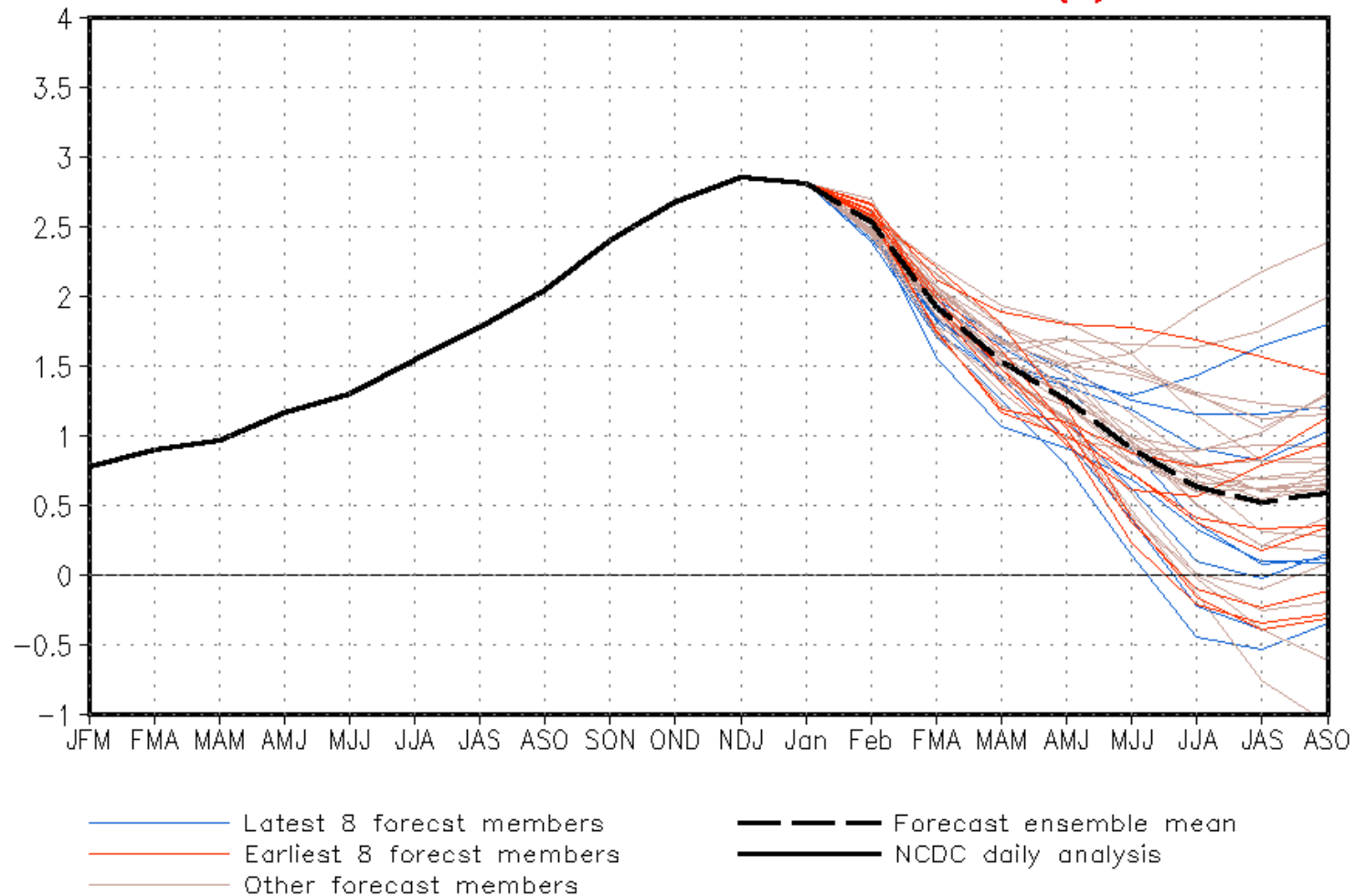
Another downwelling phase of a Kelvin wave is evident more recently.

Oceanic Kelvin waves have alternating warm and cold phases. The warm phase is indicated by dashed lines. Down-welling and warming occur in the leading portion of a Kelvin wave, and up-welling and cooling occur in the trailing portion.





## CFSv2 forecast Nino3.4 SST anomalies (K)



# IRI/CPC Pacific Niño 3.4 SST Model Outlook

Positive Niño 3.4 SST anomalies are predicted to weaken into the Northern Hemisphere Spring 2016.

Most models suggest a transition to ENSO-neutral by May-June-July (MJJ) 2016.

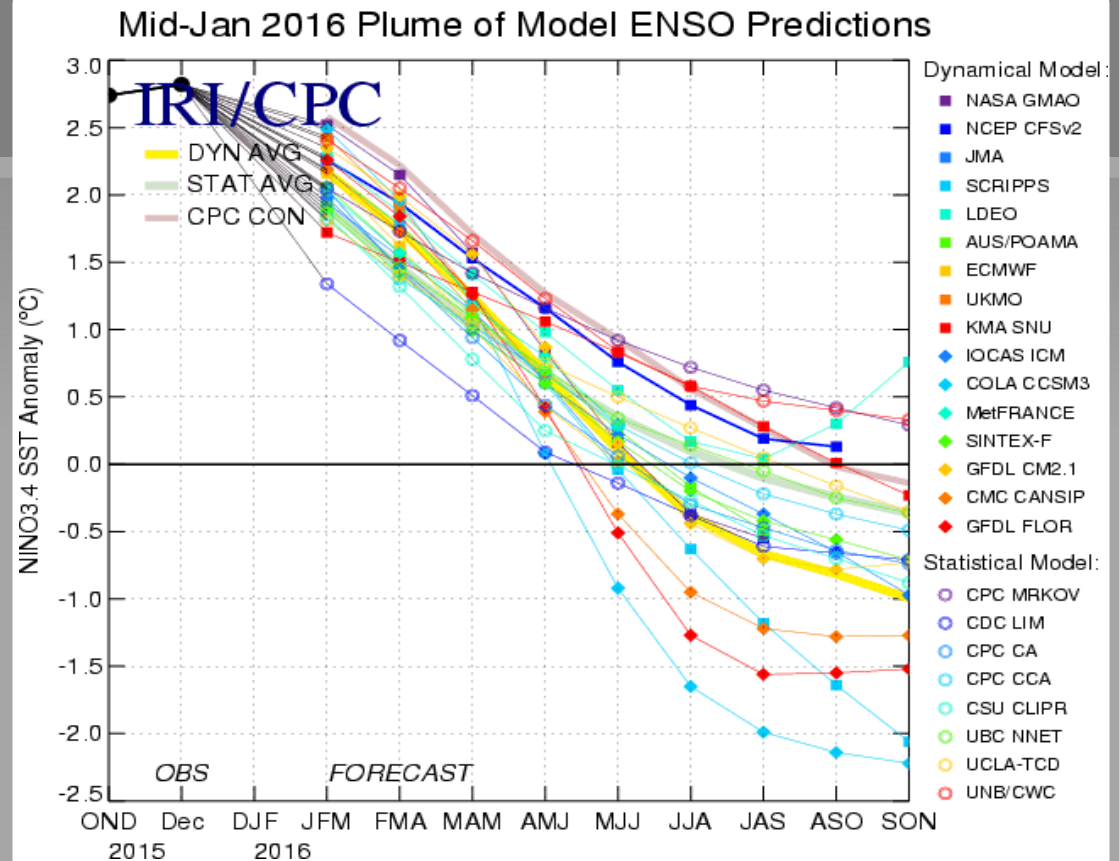


Figure provided by the International Research Institute (IRI) for Climate and Society (updated 12 January 2016).

# Historical El Niño and La Niña Episodes Based on the ONI computed using ERSST.v4

Recent Pacific warm (red) and cold (blue) periods based on a threshold of  $\pm 0.5$  °C for the Oceanic Nino Index (ONI) [3 month running mean of ERSST.v4 SST anomalies in the Nino 3.4 region (5N-5S, 120-170W)]. For historical purposes, periods of below and above normal SSTs are colored in blue and red when the threshold is met for a minimum of 5 consecutive over-lapping seasons.

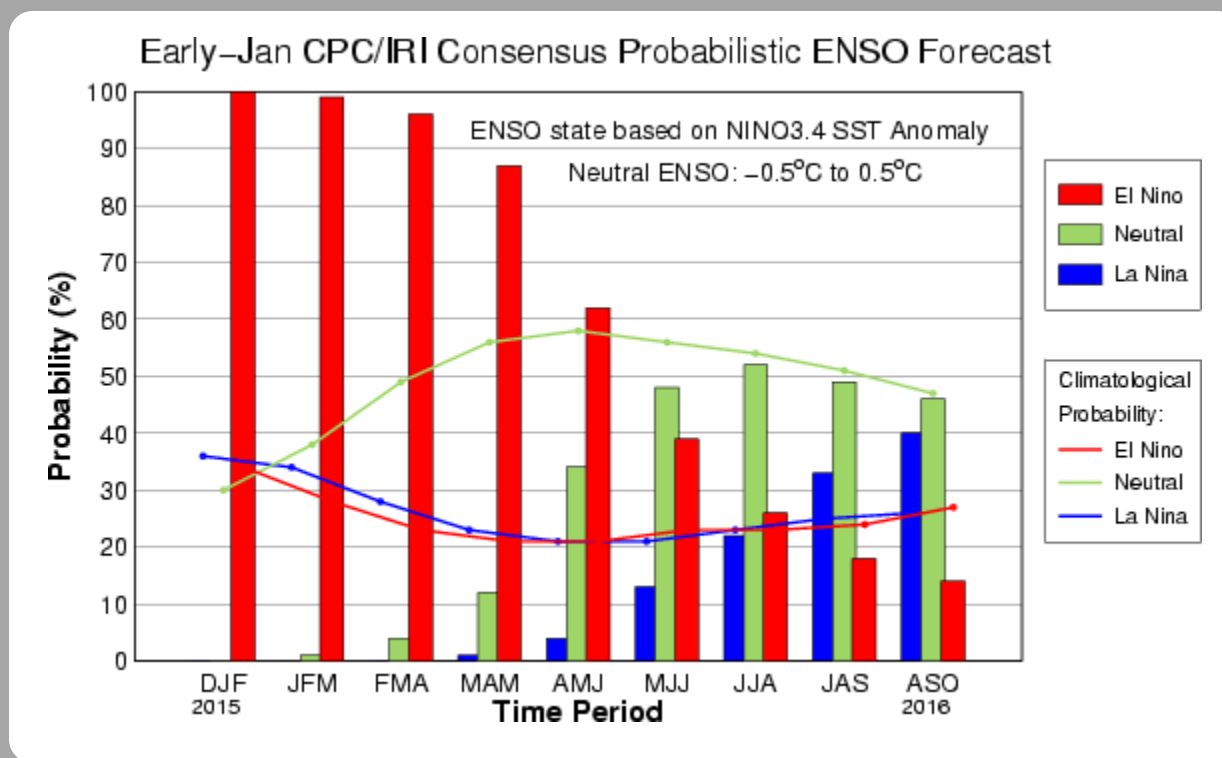
The ONI is one measure of the El Niño-Southern Oscillation, and other indices can confirm whether features consistent with a coupled ocean-atmosphere phenomenon accompanied these periods. The complete table going back to DJF 1950 can be found [here](#).

Year	DJF	JFM	FMA	MAM	AMJ	MJJ	JJA	JAS	ASO	SON	OND	NDJ
2003	0.9	0.6	0.4	0.0	-0.2	-0.1	0.1	0.2	0.3	0.4	0.4	0.4
2004	0.3	0.2	0.1	0.1	0.2	0.3	0.5	0.7	0.7	0.7	0.7	0.7
2005	0.6	0.6	0.5	0.5	0.4	0.2	0.1	0.0	0.0	-0.1	-0.4	-0.7
2006	-0.7	-0.6	-0.4	-0.2	0.0	0.1	0.2	0.3	0.5	0.8	0.9	1.0
2007	0.7	0.3	0.0	-0.1	-0.2	-0.2	-0.3	-0.6	-0.8	-1.1	-1.2	-1.3
2008	-1.4	-1.3	-1.1	-0.9	-0.7	-0.5	-0.3	-0.2	-0.2	-0.3	-0.5	-0.7
2009	-0.8	-0.7	-0.4	-0.1	0.2	0.4	0.5	0.6	0.7	1.0	1.2	1.3
2010	1.3	1.1	0.8	0.5	0.0	-0.4	-0.8	-1.1	-1.3	-1.4	-1.3	-1.4
2011	-1.3	-1.1	-0.8	-0.6	-0.3	-0.2	-0.3	-0.5	-0.7	-0.9	-0.9	-0.8
2012	-0.7	-0.6	-0.5	-0.4	-0.3	-0.1	0.1	0.3	0.4	0.4	0.2	-0.2
2013	-0.4	-0.5	-0.3	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.3
2014	-0.5	-0.6	-0.4	-0.2	0.0	0.0	0.0	0.0	0.2	0.4	0.6	0.6
2015	0.5	0.4	0.5	0.7	0.9	1.0	1.2	1.5	1.8	2.1	2.2	2.3

# CPC/IRI Probabilistic ENSO Outlook

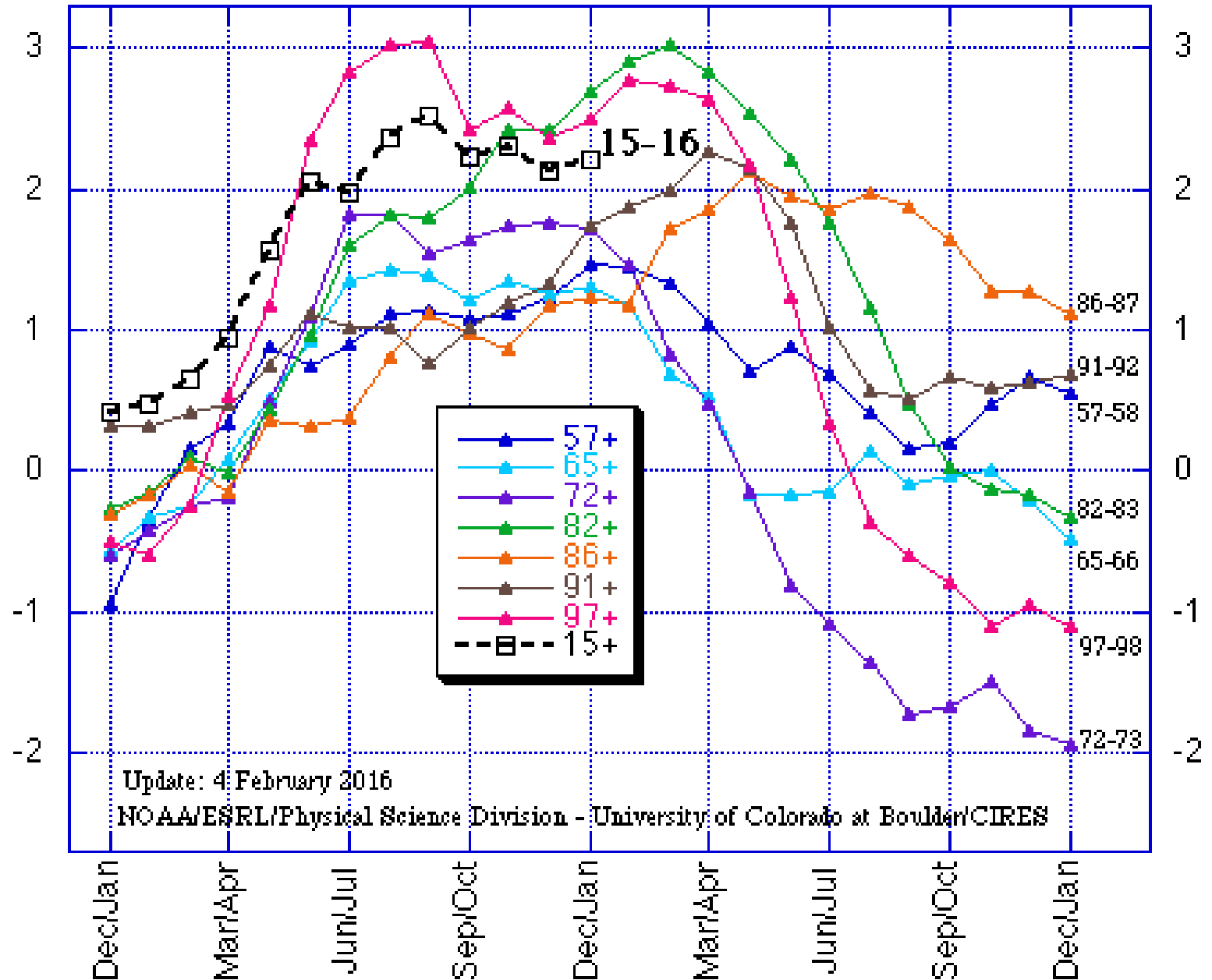
Updated: 14 January 2016

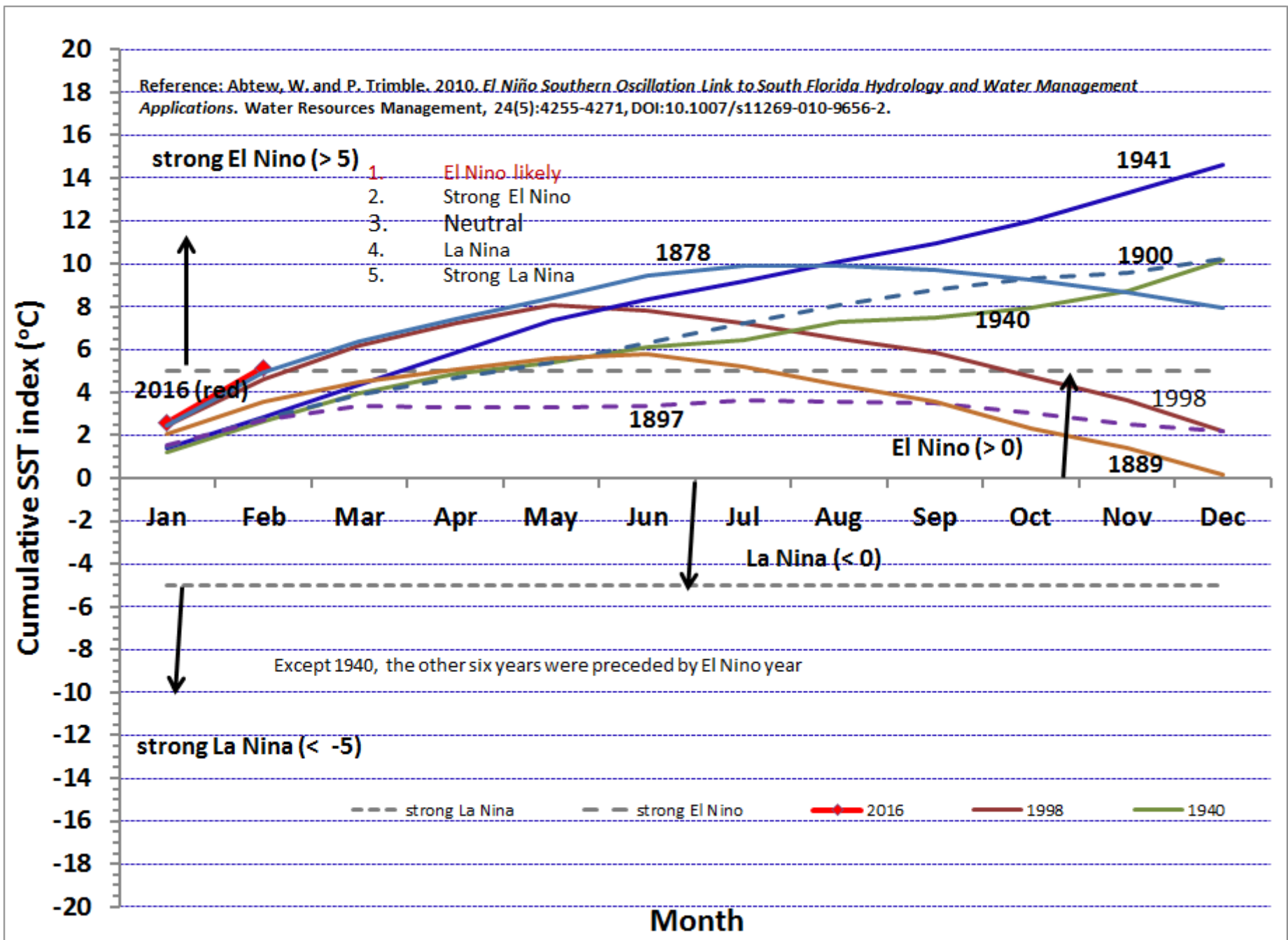
The chance of El Niño gradually decreases into the spring and ENSO-neutral is favored by May-June-July (MJJ) 2016. The chance of La Niña increases to 40% in August-September-October (ASO) 2016.



# Multivariate ENSO Index (MEI) for the seven strongest El Niño events since 1950 vs. 2015-16

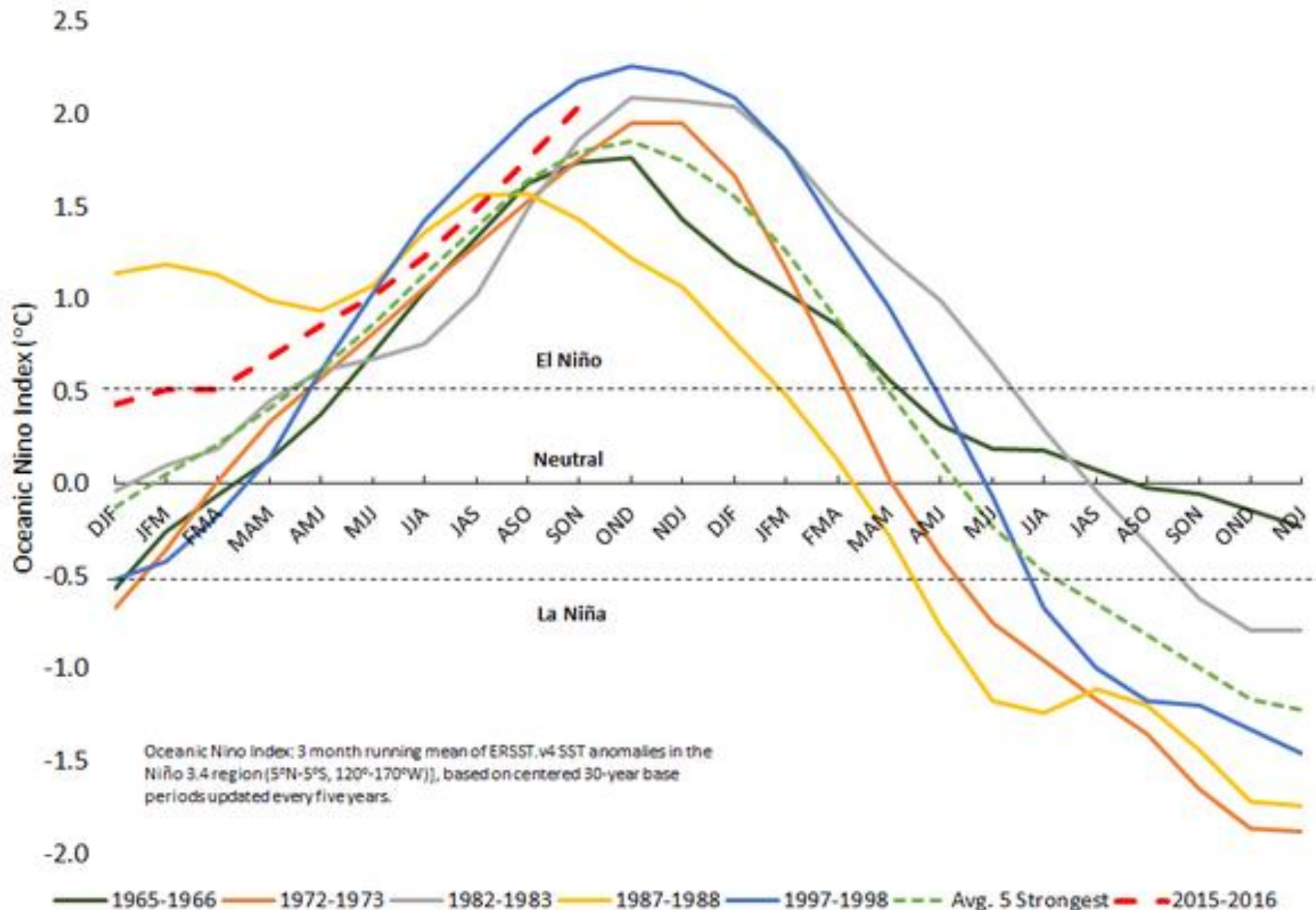
Standardized Departure





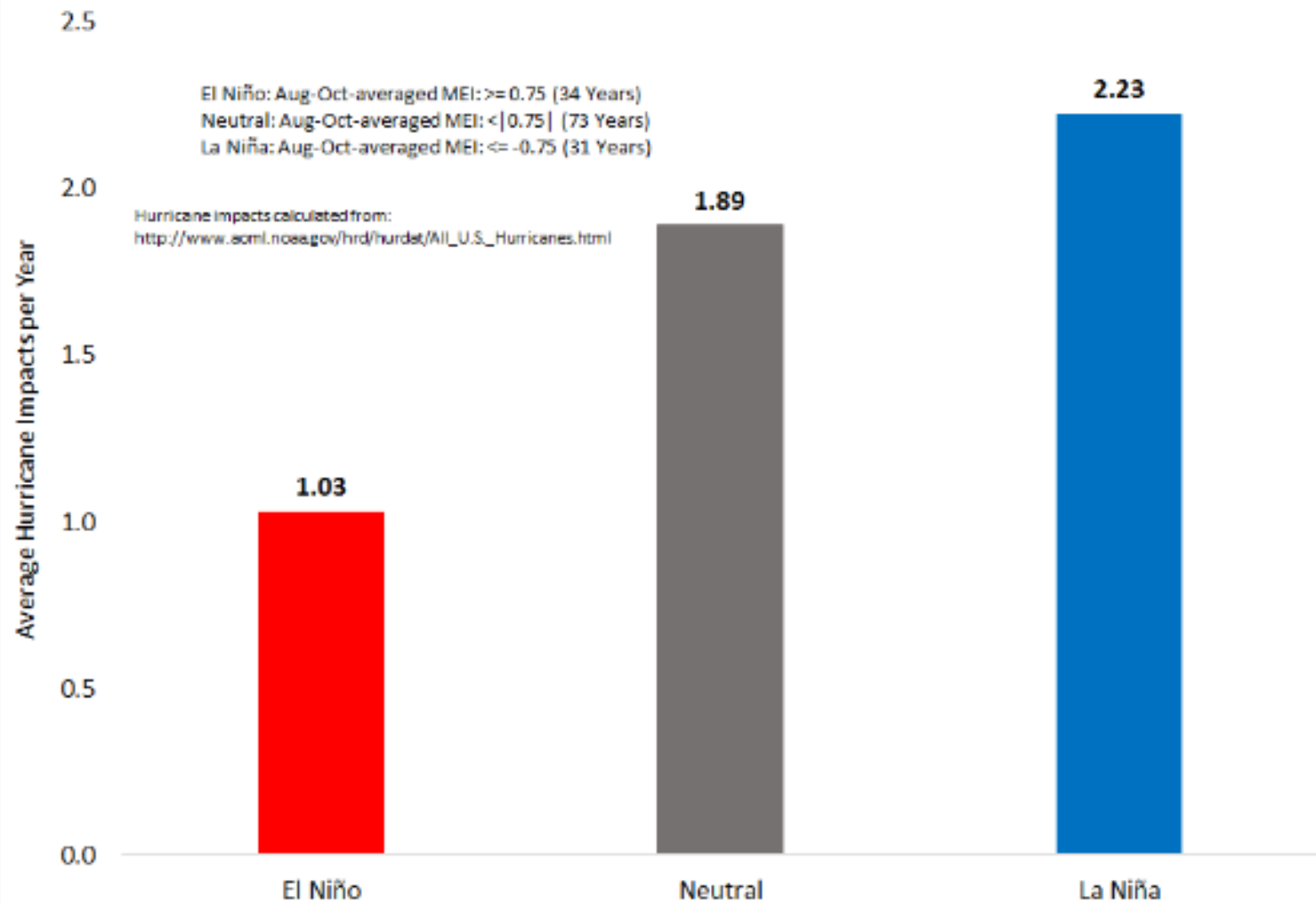
Source: Wossenu Abtew (SFWMD)

Progression of Five Strongest El Niño Events since 1950



Source: Phil Klotzbach (CSU)

### United States Hurricane Impacts by ENSO Phase (1878-2015)



**Philip Klotzbach** @philklotzbach · 18 Dec 2015

Over twice as many hurricanes impact the United States in La Nina years vs. El Nino years. #ElNino



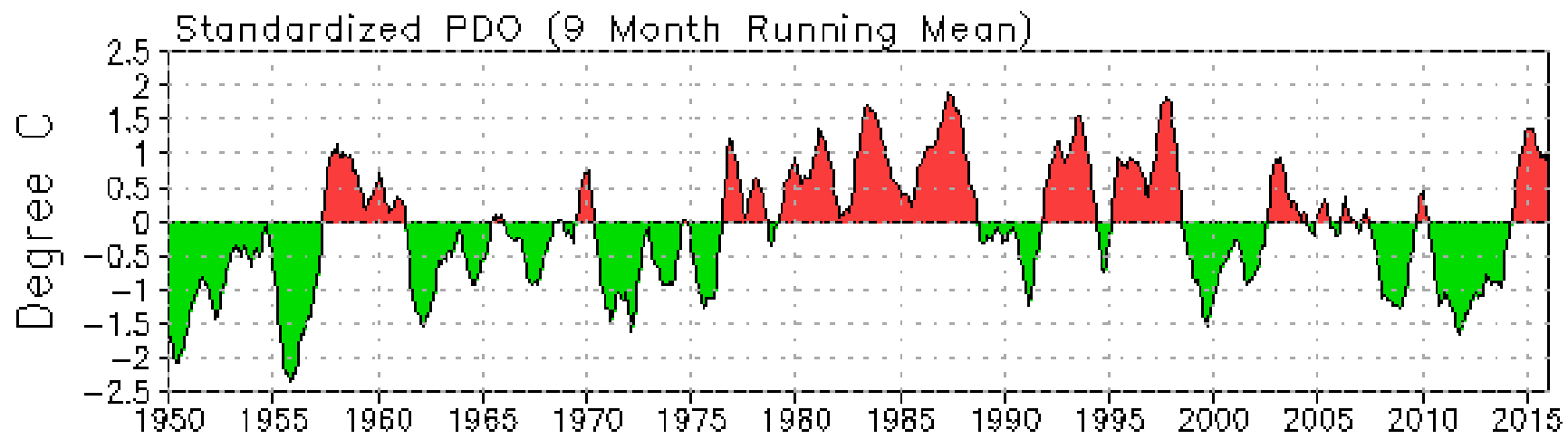
28



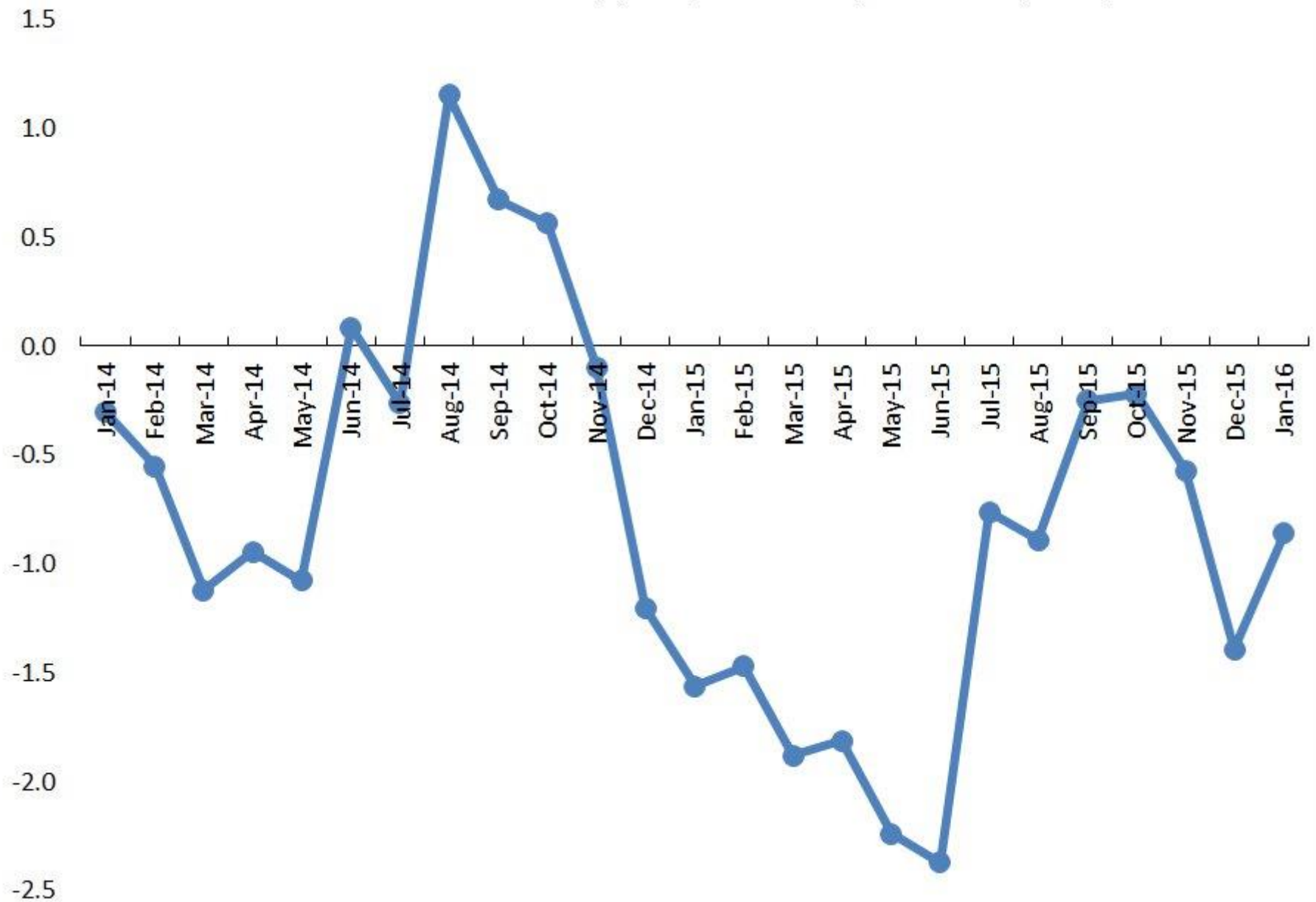
16



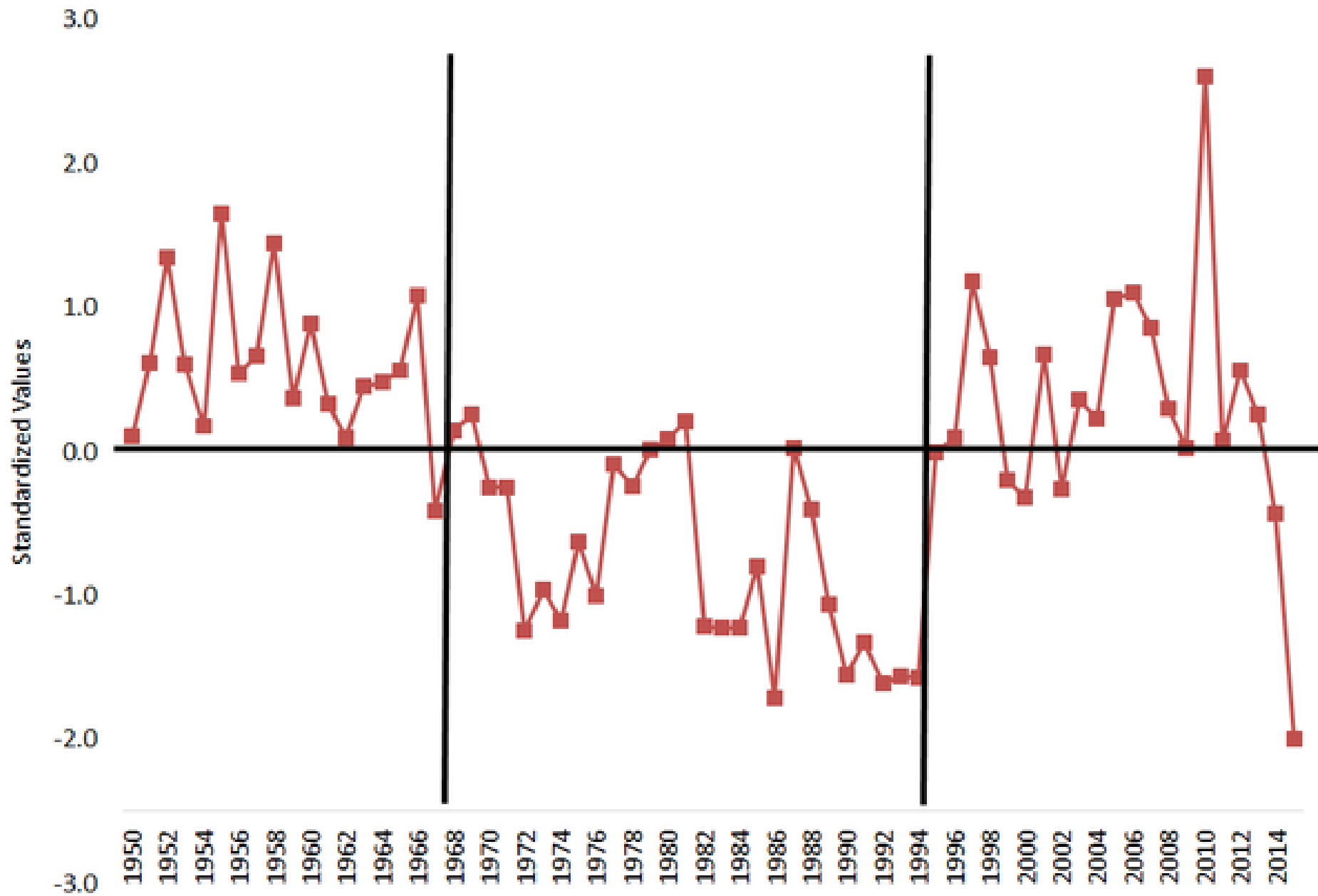
Source: Phil Klotzbach (CSU)



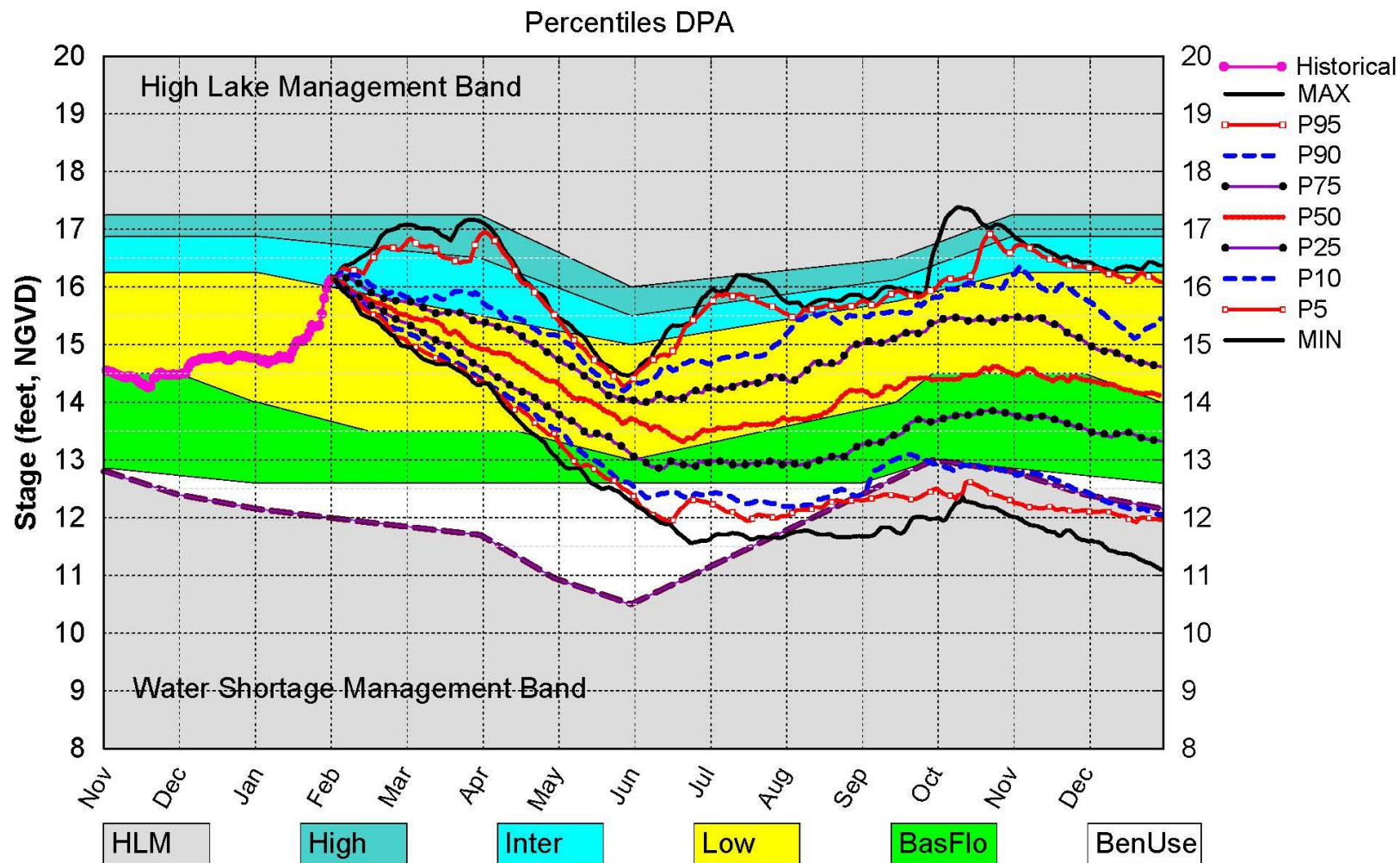
Standardized Klotzbach and Gray (2008) AMO Index (Since January 2014)



Annual AMO Index (1950-2015) - Calculated from Klotzbach and Gray (2008)



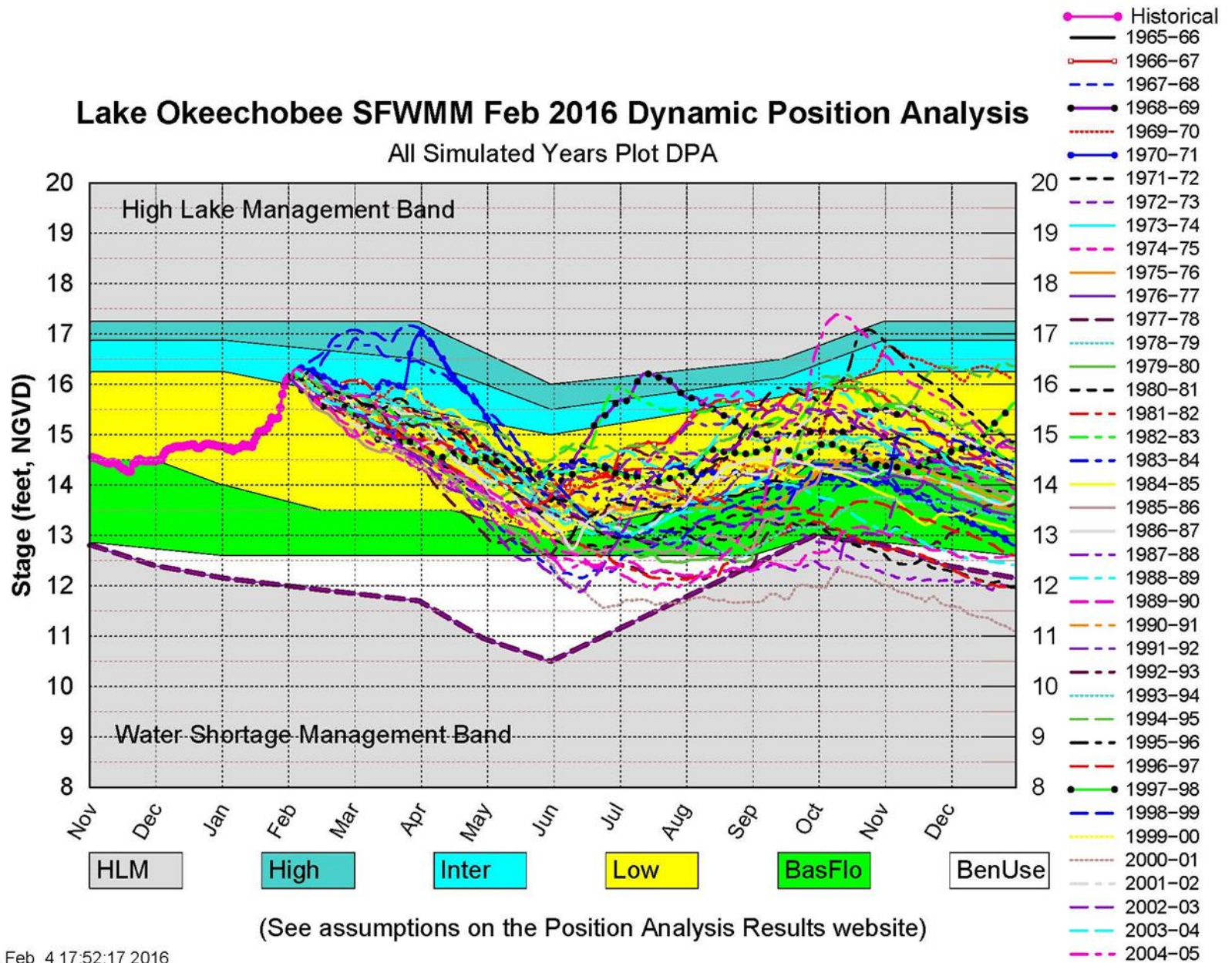
# Lake Okeechobee SFWMM Feb 2016 Dynamic Position Analysis



(See assumptions on the Position Analysis Results website)

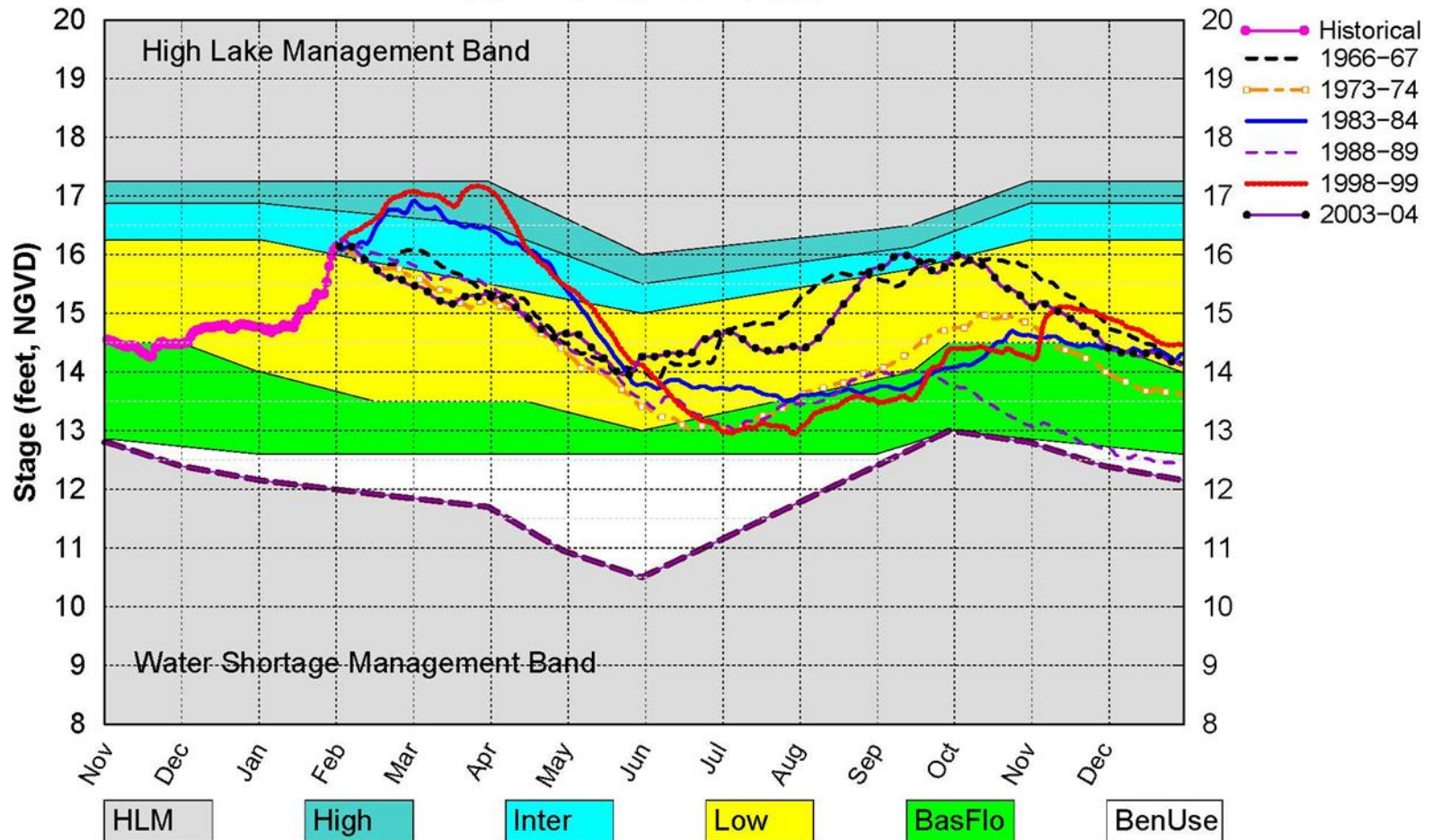
# Lake Okeechobee SFWMM Feb 2016 Dynamic Position Analysis

All Simulated Years Plot DPA



# Lake Okeechobee SFWMM Feb 2016 Dynamic Position Analysis

All El Nino Years Plot DPA



(See assumptions on the Position Analysis Results website)

# Lake Okeechobee SFWMM Feb 2016 Dynamic Position Analysis

AMO Warm / El Nino Analog Years Plot DPA

