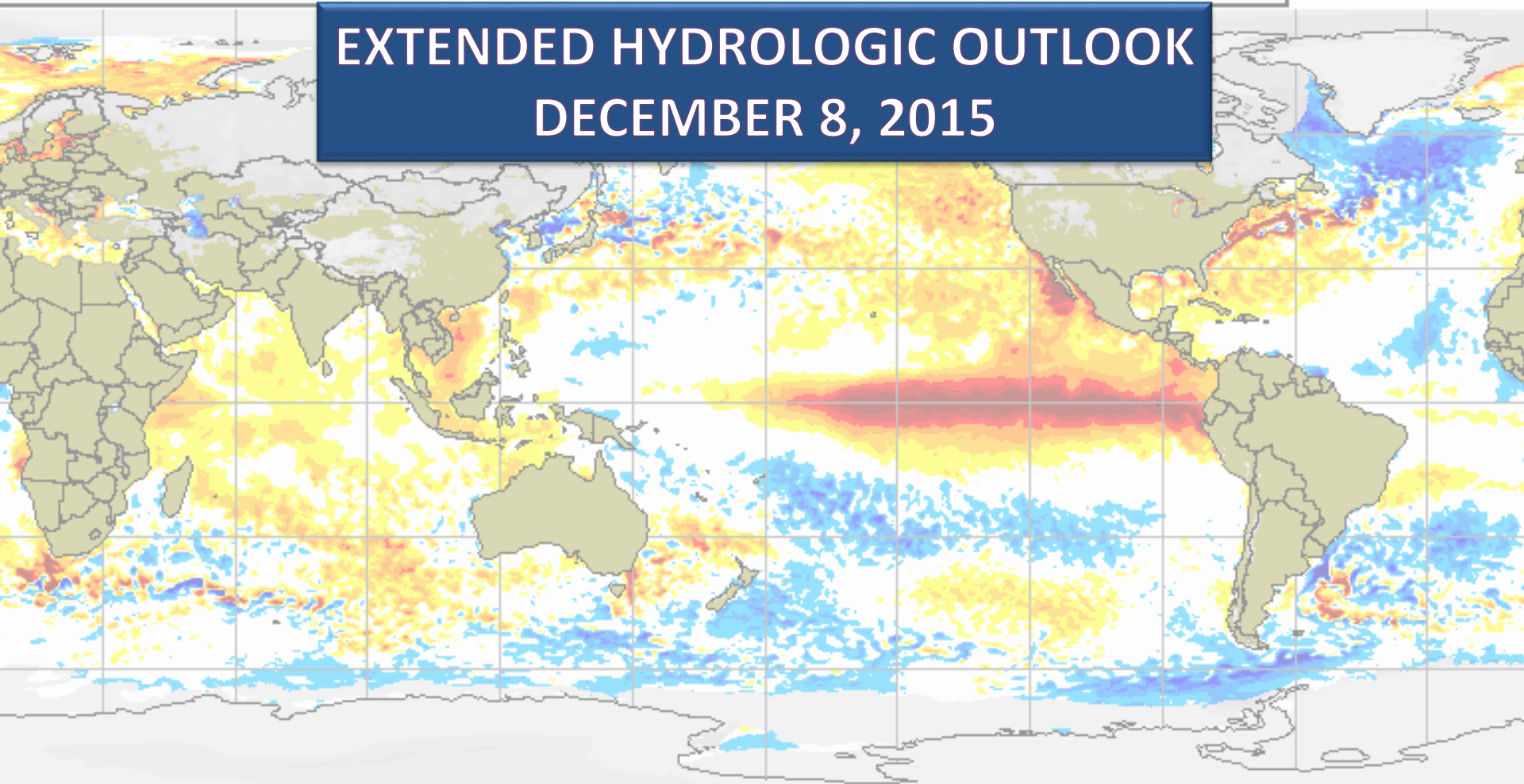


EXTENDED HYDROLOGIC OUTLOOK DECEMBER 8, 2015



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



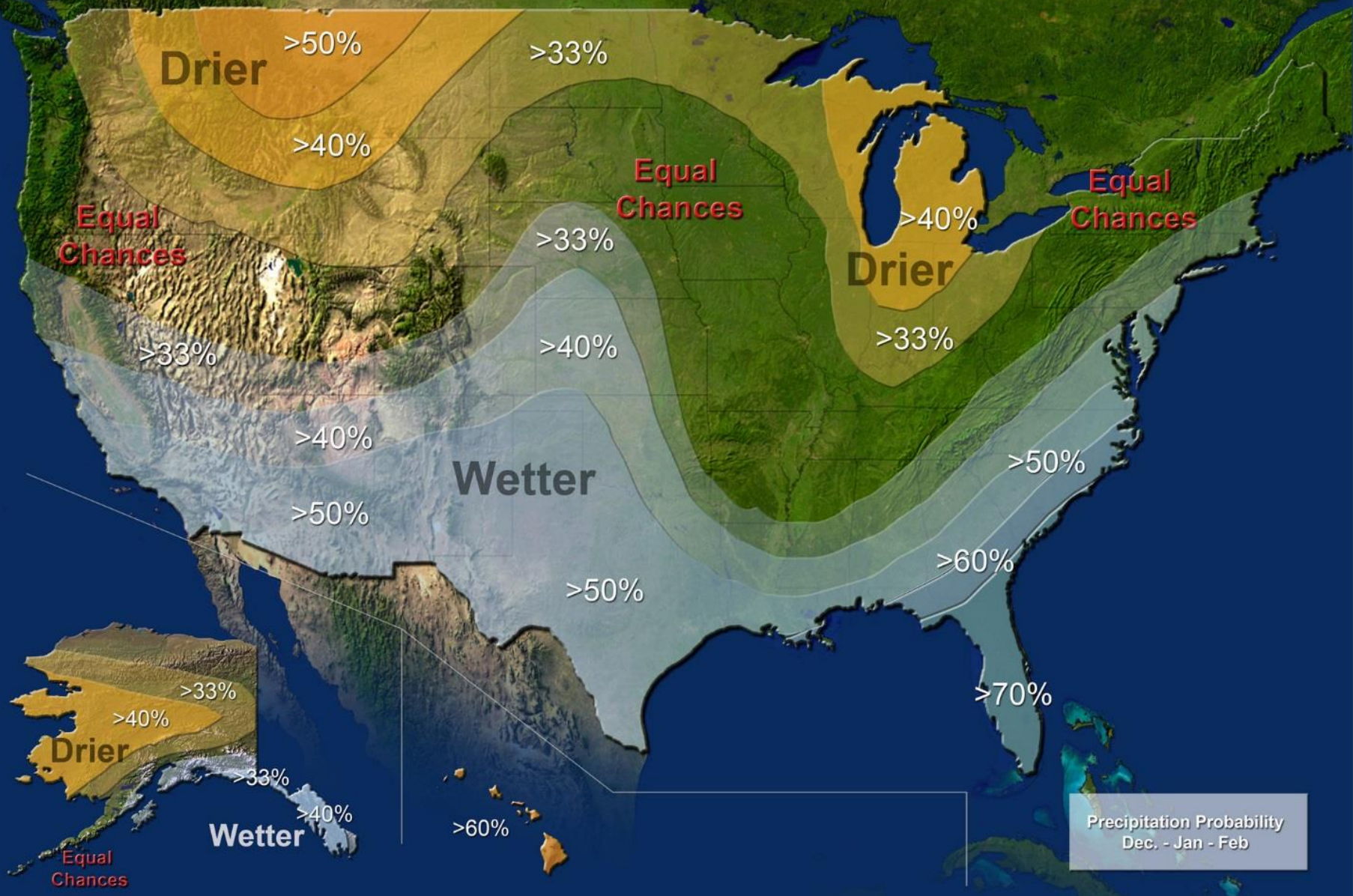
CMC Environnement Canada
CMC Environment Canada

Summary

- The Climate Prediction Center (CPC) is forecasting above-normal rainfall for December through February. 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 and to weaken through spring 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 for a drier than normal 2016 wet season.

U.S. Winter Outlook

Precipitation



Precipitation Probability
Dec. - Jan - Feb

National Weather Service Melbourne

DRY SEASON FORECAST

Nov
2015

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

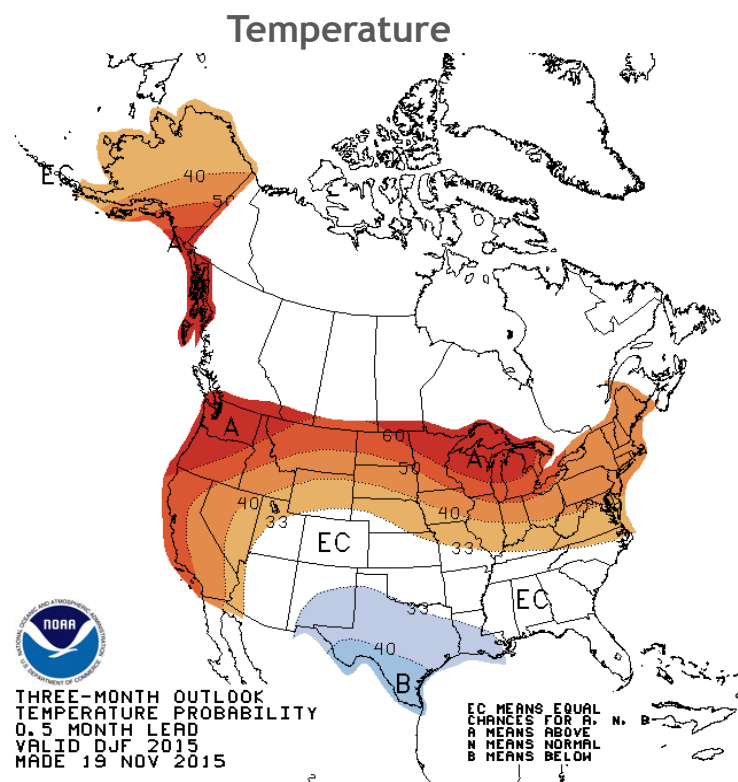
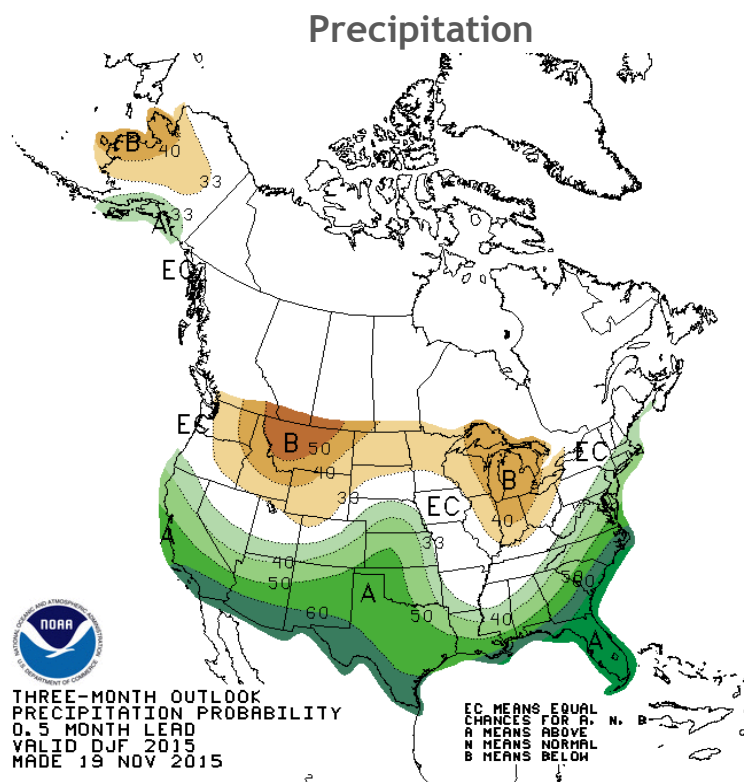
WELL BELOW NORMAL

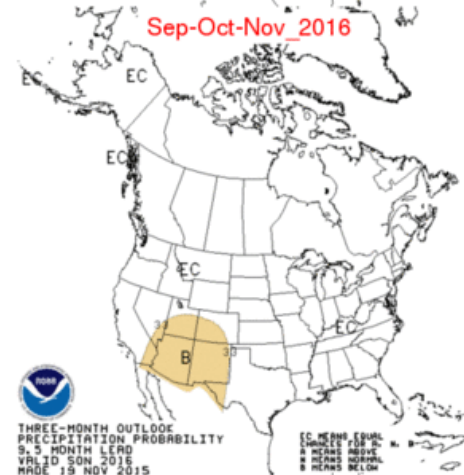
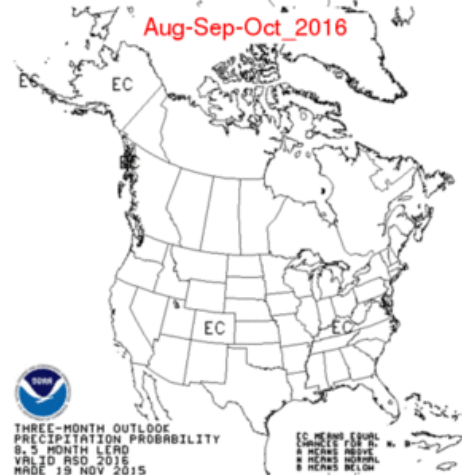
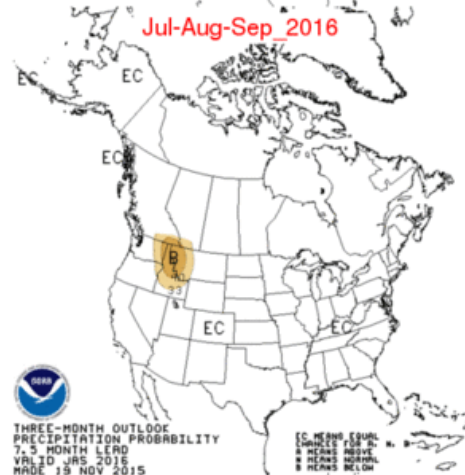
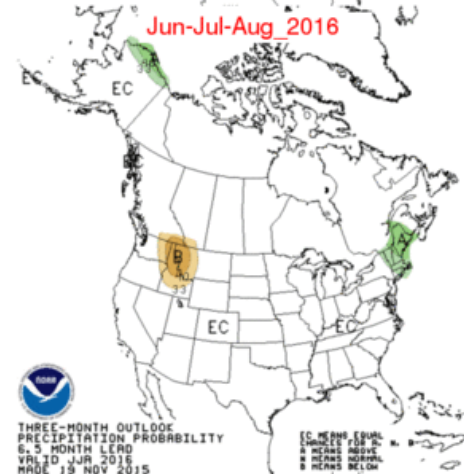
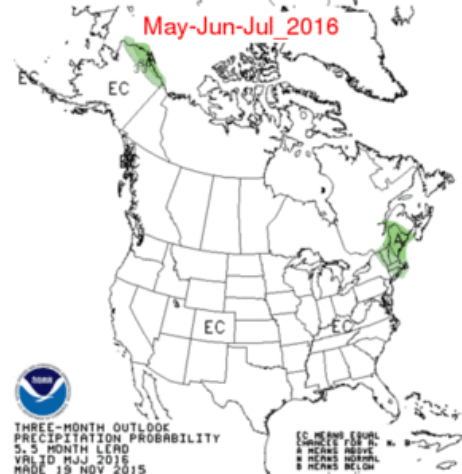
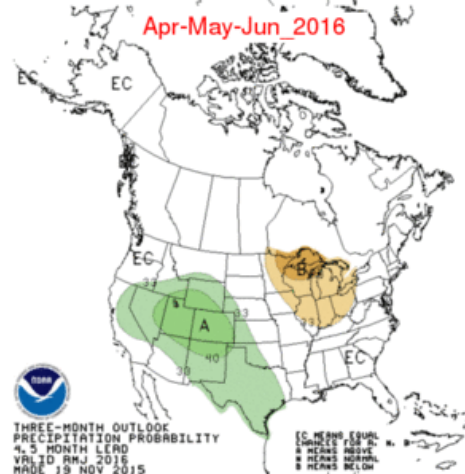
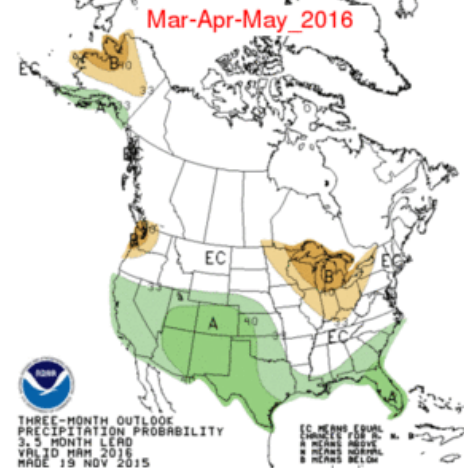
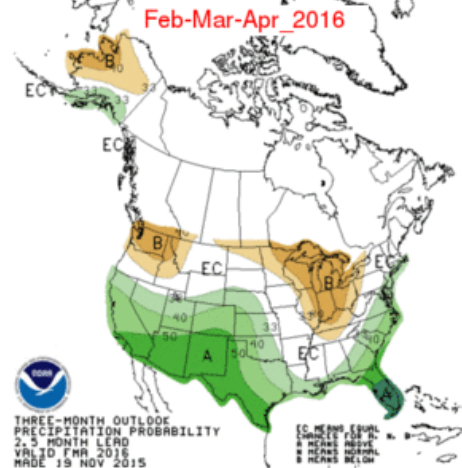
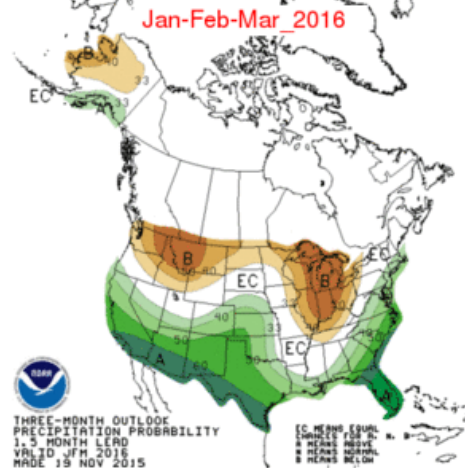
Storminess

U. S. Seasonal Outlooks

December 2015 - February 2016

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

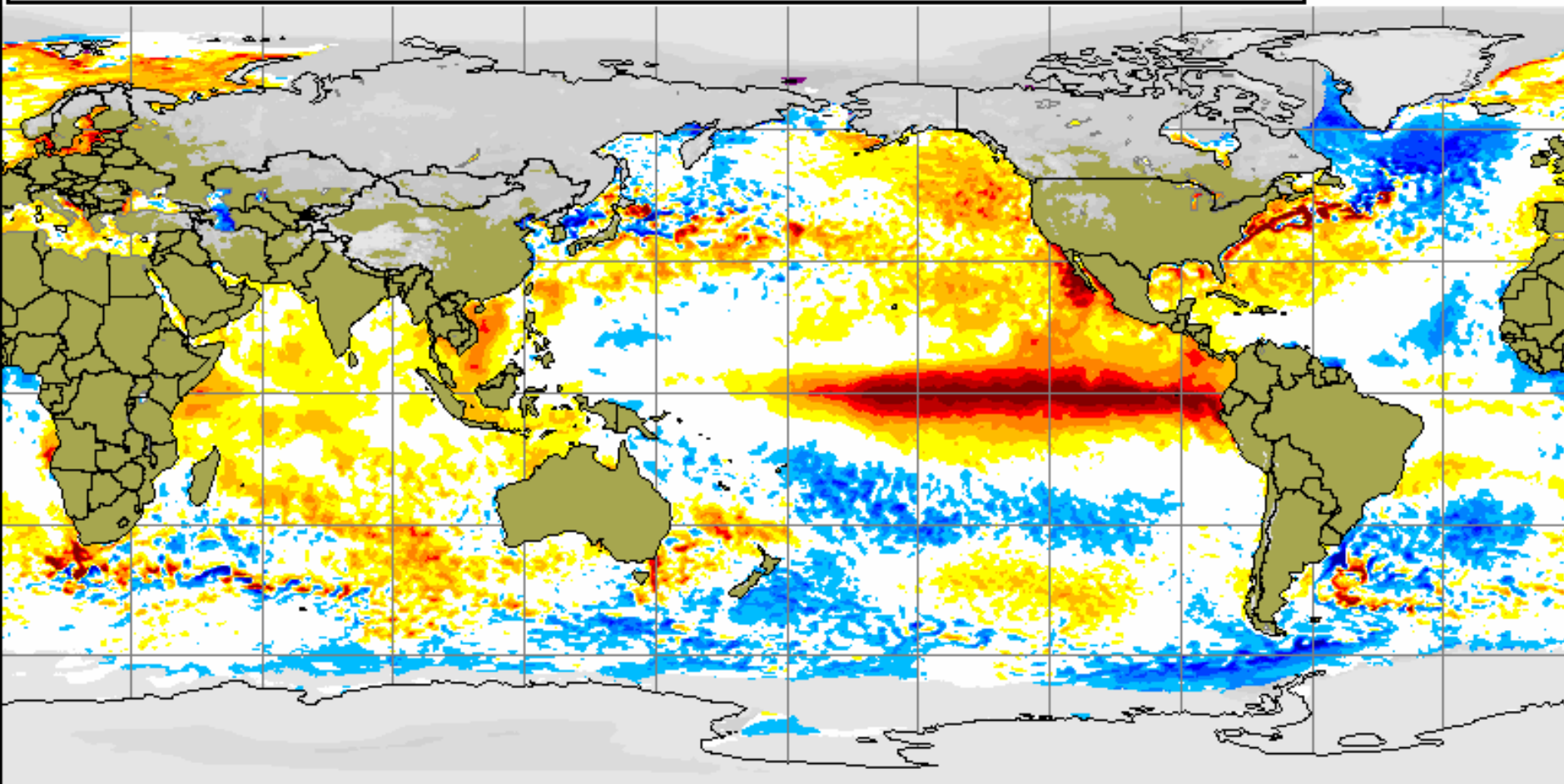




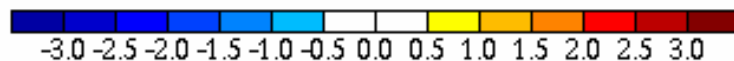
Current Global Sea Surface Temperature Anomalies

Global sea surface anomaly and snow cover
08 Dec 2015

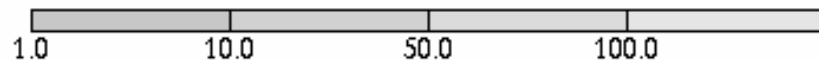
Anomalie de la température de la mer et épaisseur de la neige
08 Dec 2015



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 Climatology

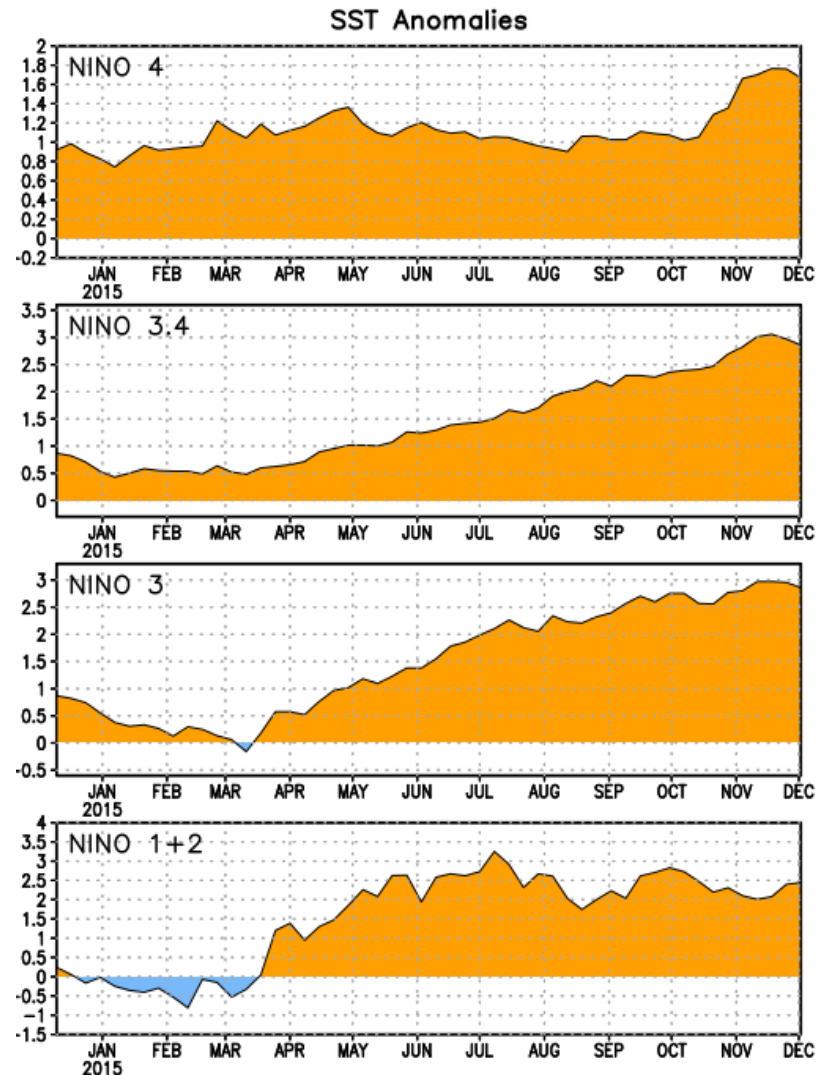
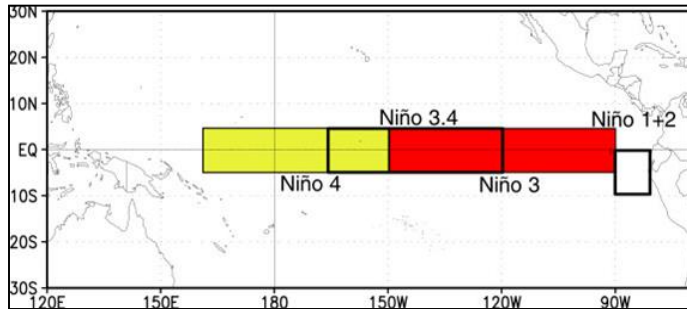


CMC Environnement Canada
CMC Environment Canada

Niño Region SST Departures (°C) Recent Evolution

The latest weekly SST departures are:

Niño 4	1.7°C
Niño 3.4	2.9°C
Niño 3	2.9°C
Niño 1+2	2.4°C



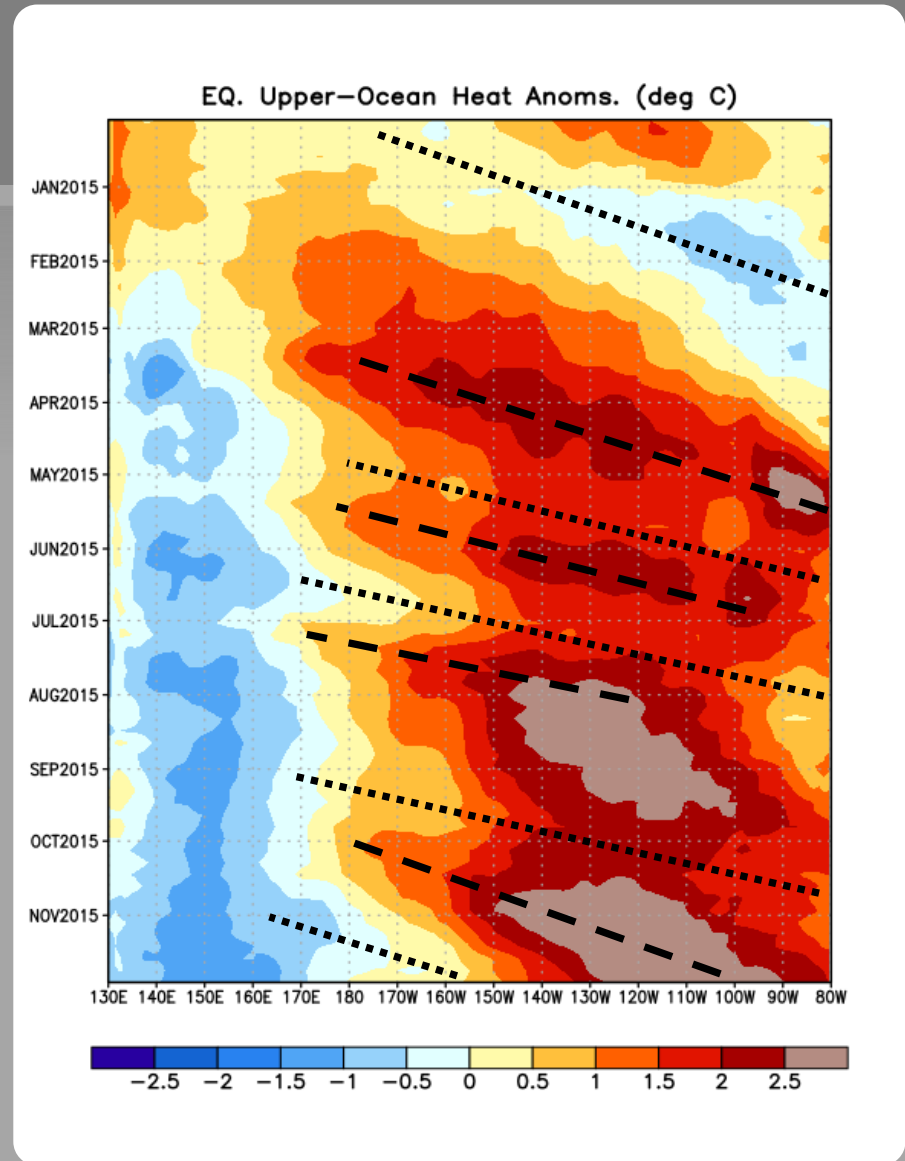
Weekly Heat Content Evolution in the Equatorial Pacific

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

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

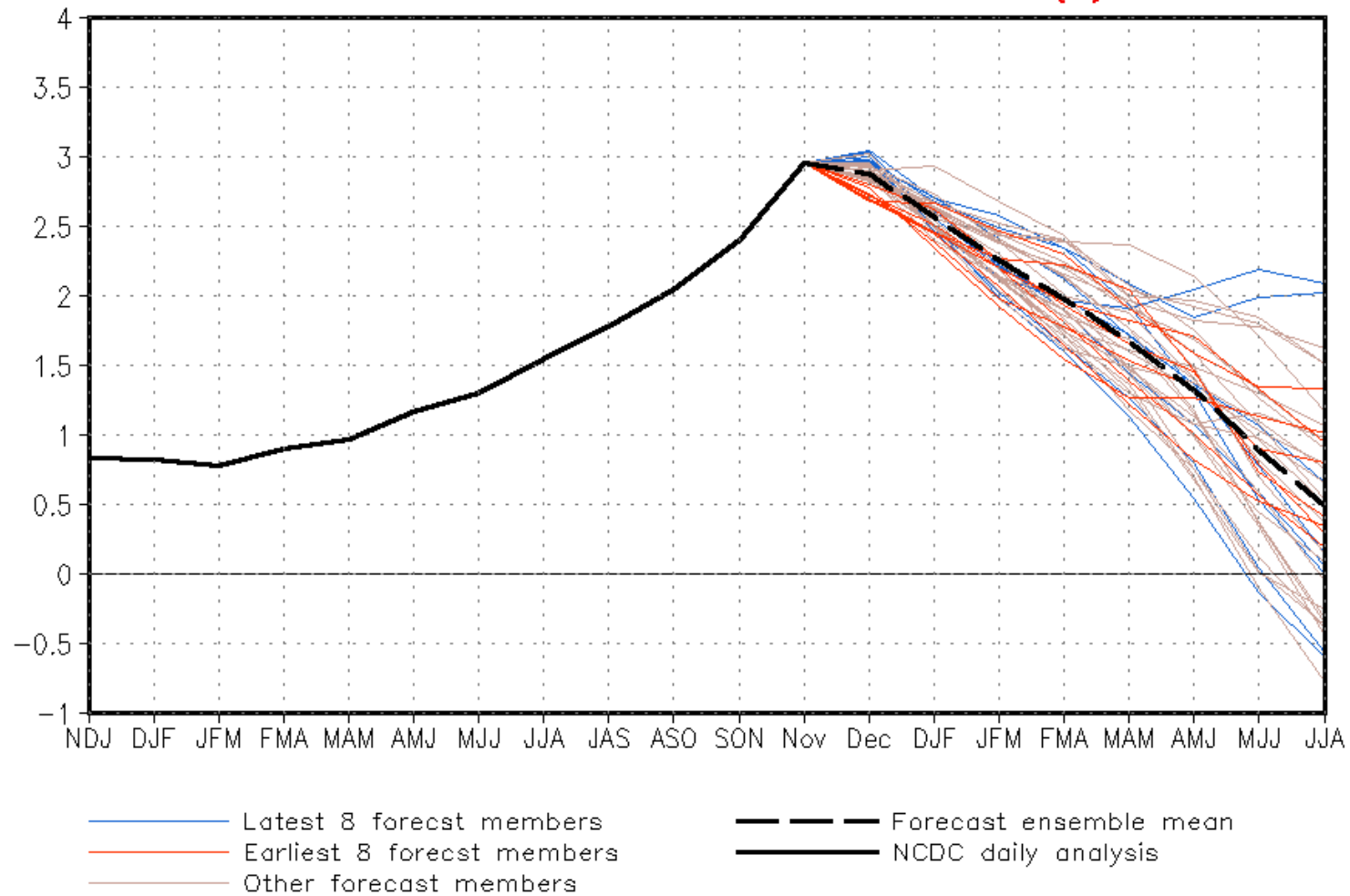
Another Kelvin wave was initiated in early October. The downwelling phase of this wave has shifted eastward into the eastern Pacific and the upwelling phase is evident in the west-central Pacific.

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

Most models indicate that Niño 3.4 will remain strong into early 2016.

Positive anomalies are predicted to weaken through the Northern Hemisphere Spring 2016.

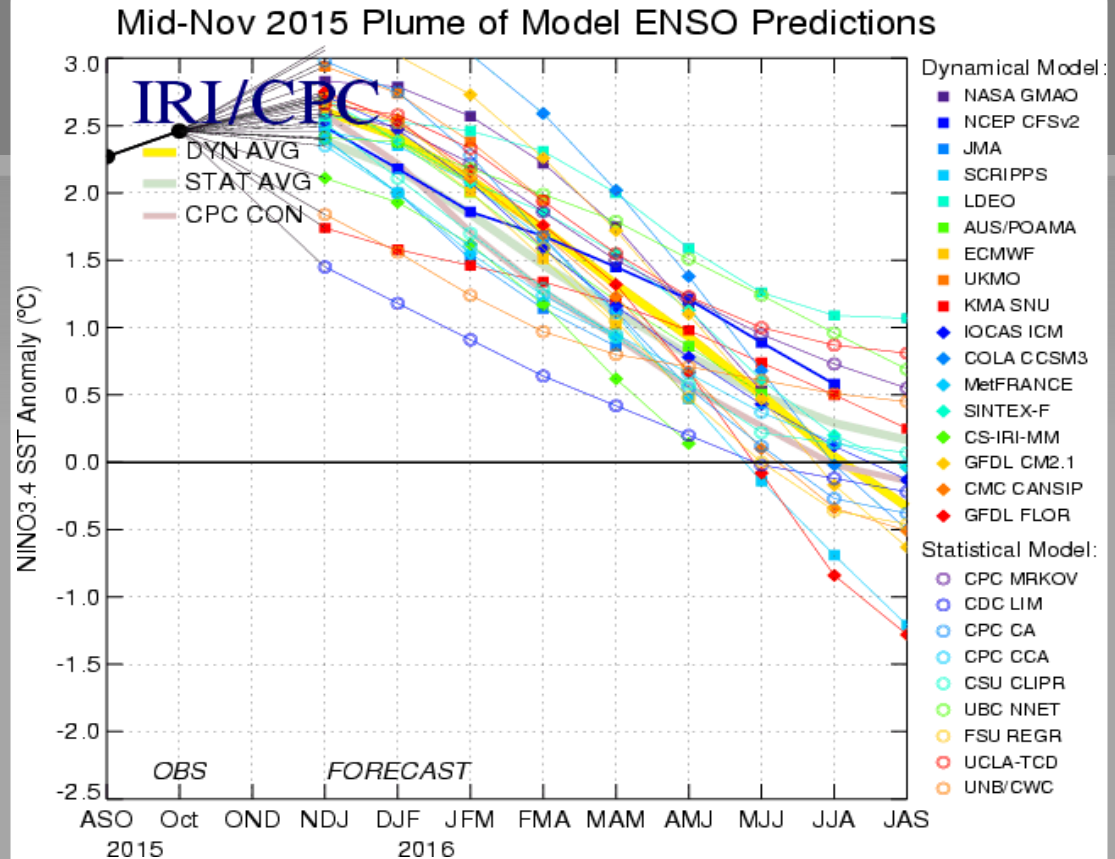


Figure provided by the International Research Institute (IRI) for Climate and Society (updated 17 November 2015).

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 ± 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.

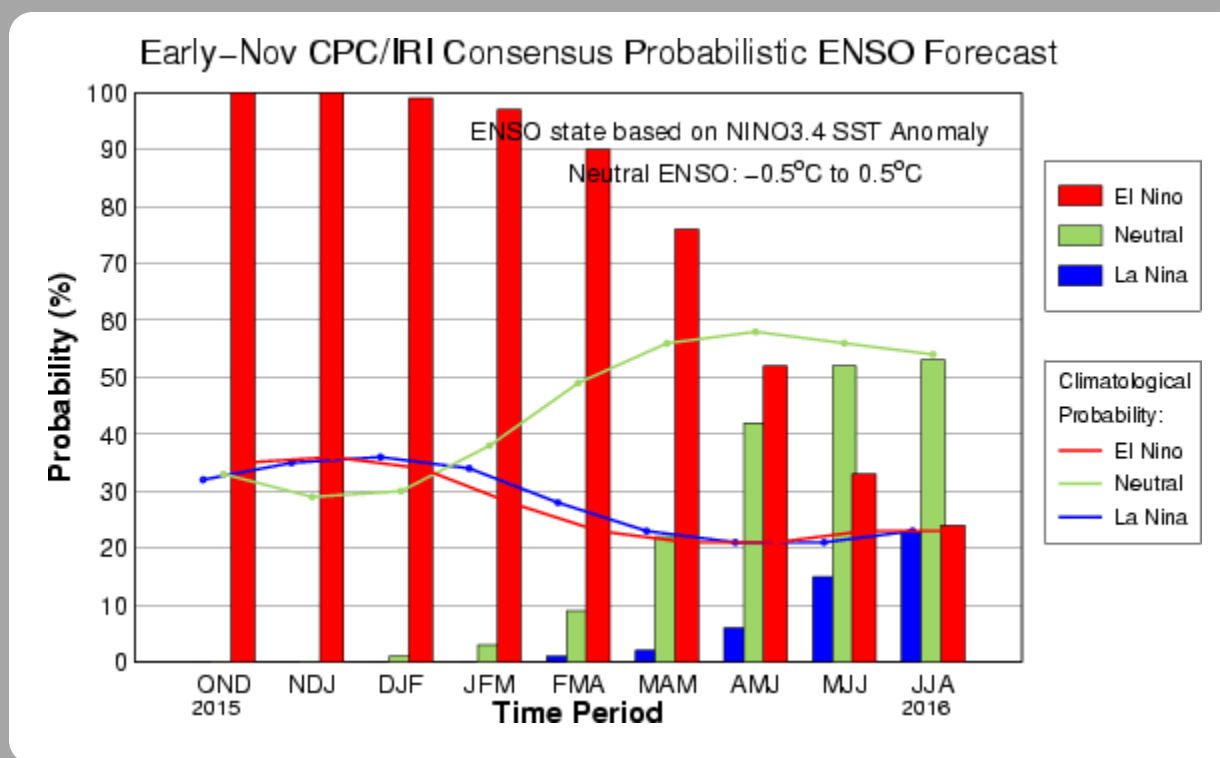
The ONI is one measure of the El Niño-Southern Oscillation, and other indices can confirm whether features consistent with a coupled ocean-atmosphere phenomenon accompanied these periods. The complete table going back to DJF 1950 can be found [here](#).

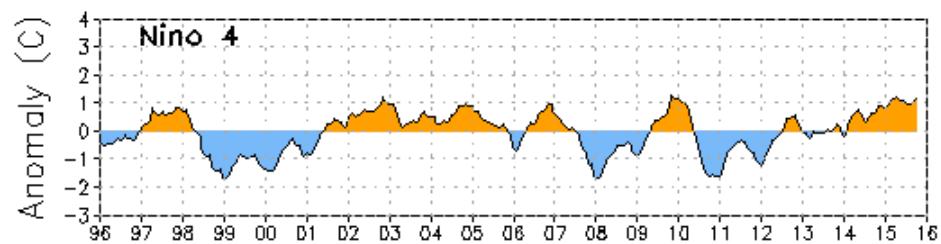
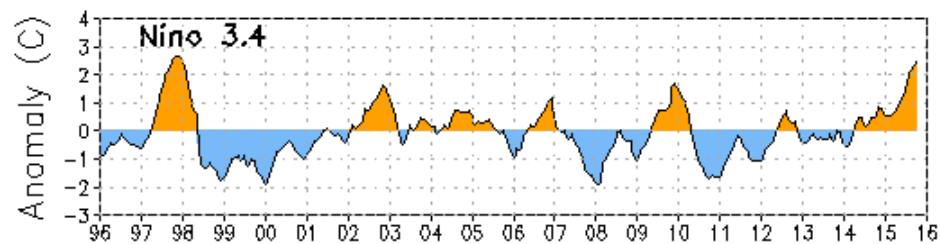
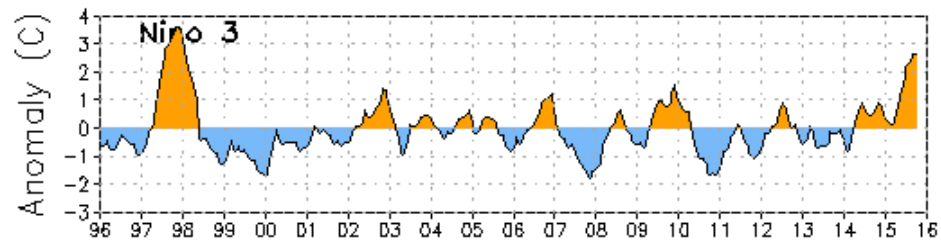
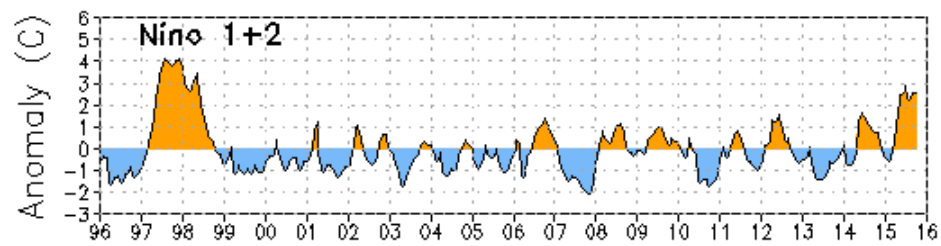
Year	DJF	JFM	FMA	MAM	AMJ	MJJ	JJA	JAS	ASO	SON	OND	NDJ
2003	0.9	0.6	0.4	0.0	-0.2	-0.1	0.1	0.2	0.3	0.4	0.4	0.4
2004	0.3	0.2	0.1	0.1	0.2	0.3	0.5	0.7	0.7	0.7	0.7	0.7
2005	0.6	0.6	0.5	0.5	0.4	0.2	0.1	0.0	0.0	-0.1	-0.4	-0.7
2006	-0.7	-0.6	-0.4	-0.2	0.0	0.1	0.2	0.3	0.5	0.8	0.9	1.0
2007	0.7	0.3	0.0	-0.1	-0.2	-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	0.5	0.5	0.7	0.9	1.0	1.2	1.5	1.8	2.0		

CPC/IRI Probabilistic ENSO Outlook

Updated: 12 November 2015

The chance of El Niño gradually decreases into the spring and ENSO-neutral is favored by May-June-July (MJJ) 2016.

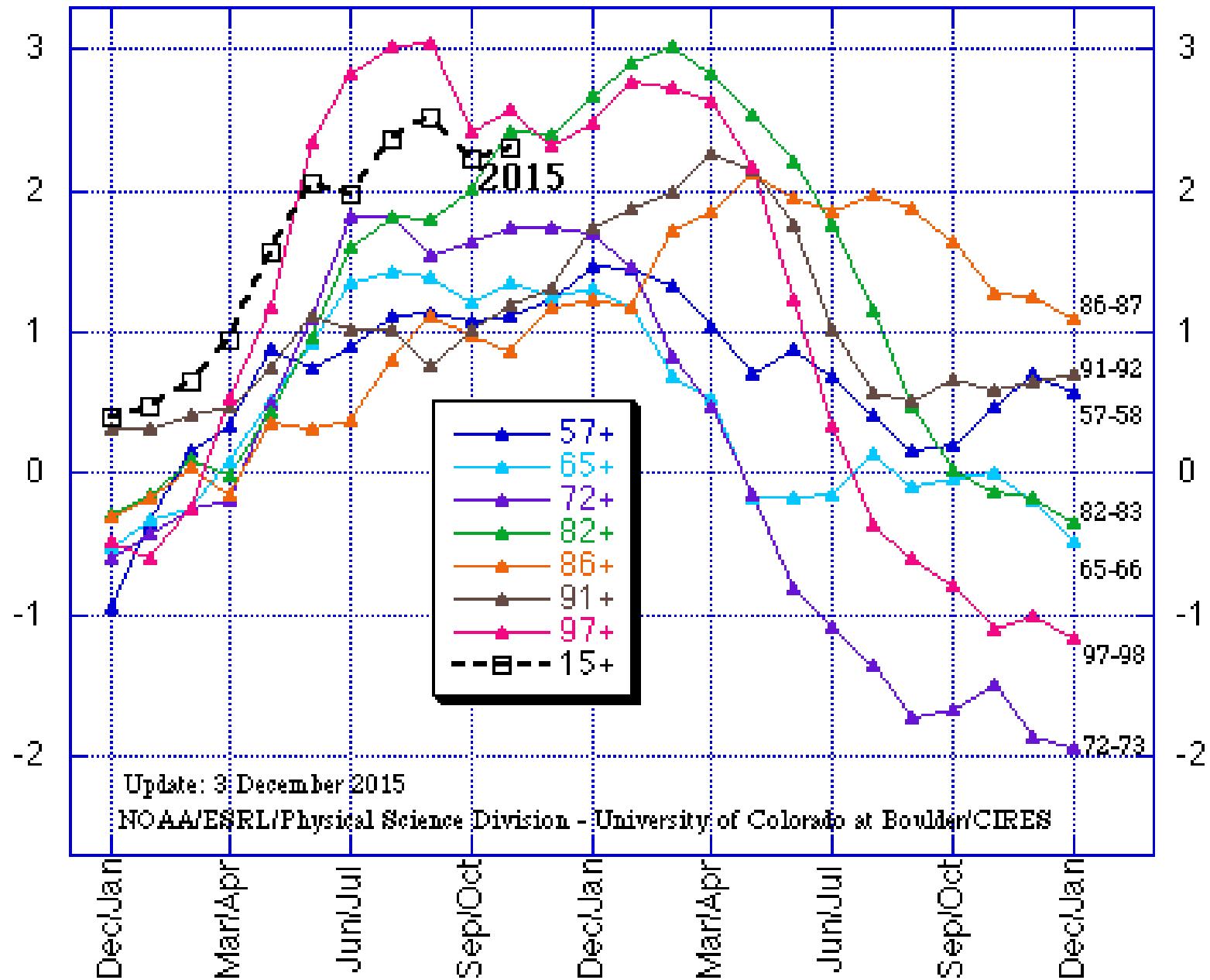


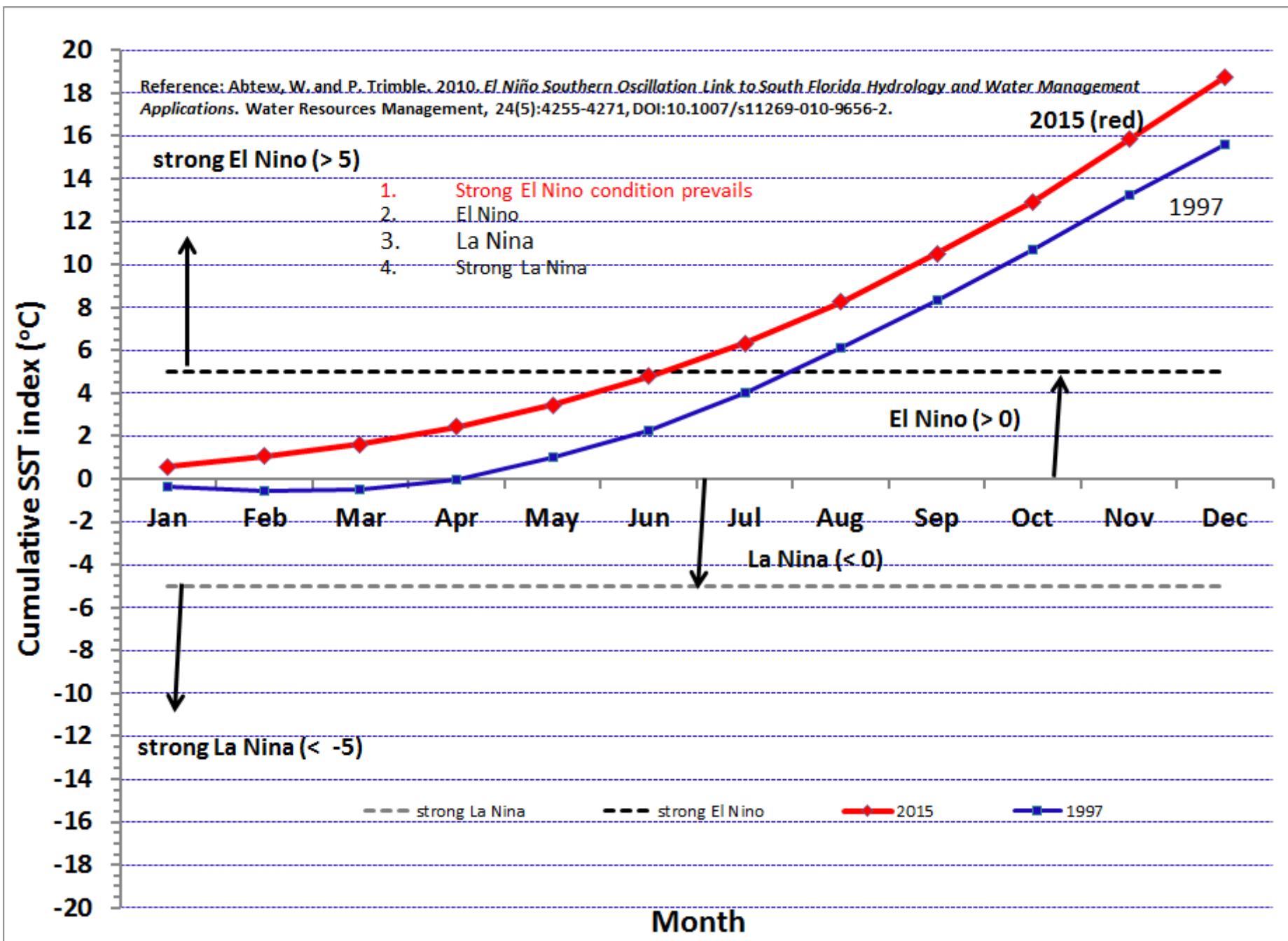


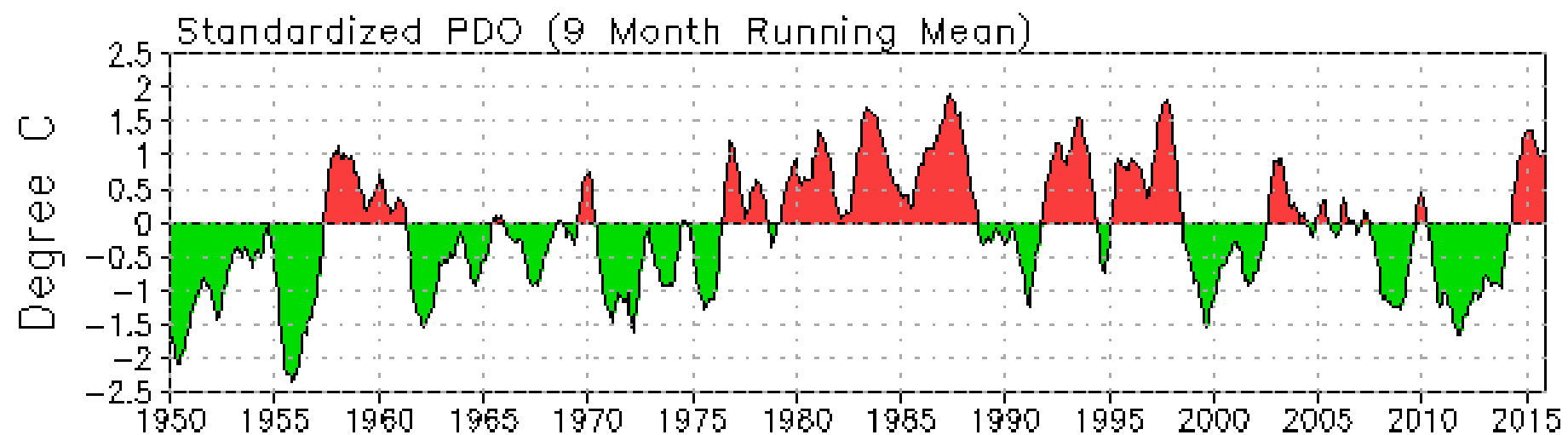
Data updated through October 2015

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

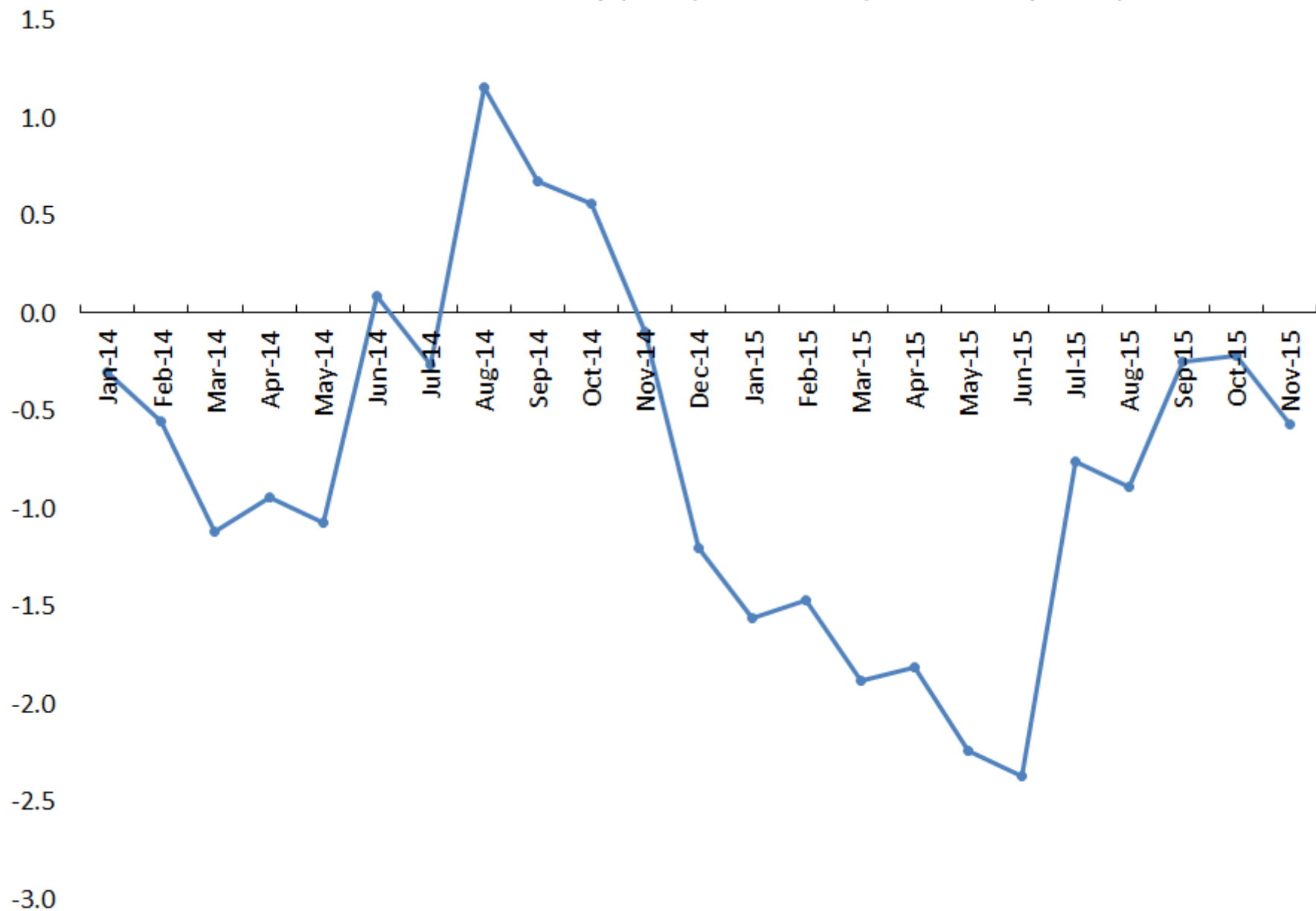
Standardized Departure



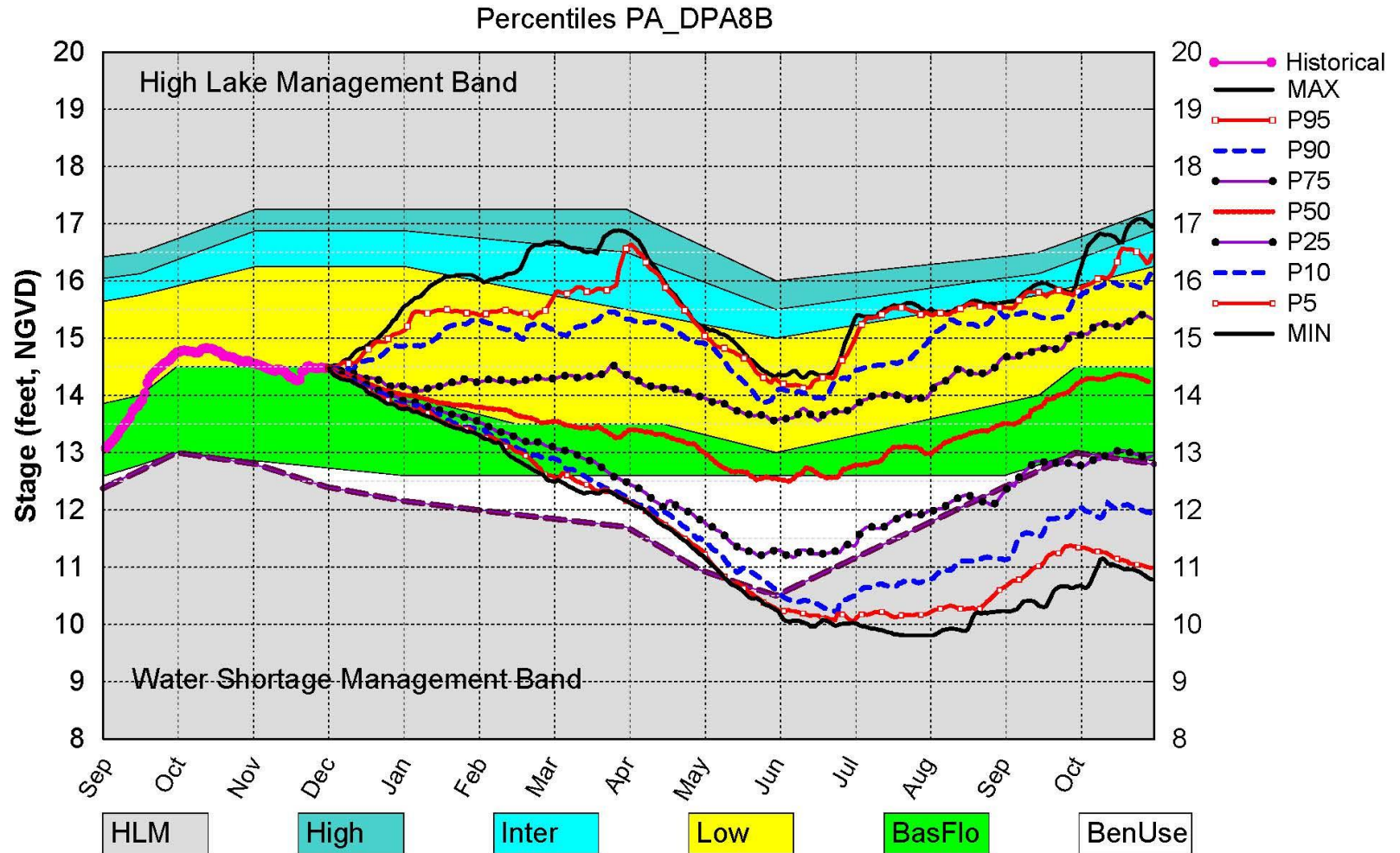




Standardized Klotzbach and Gray (2008) AMO Index (Since January 2014)



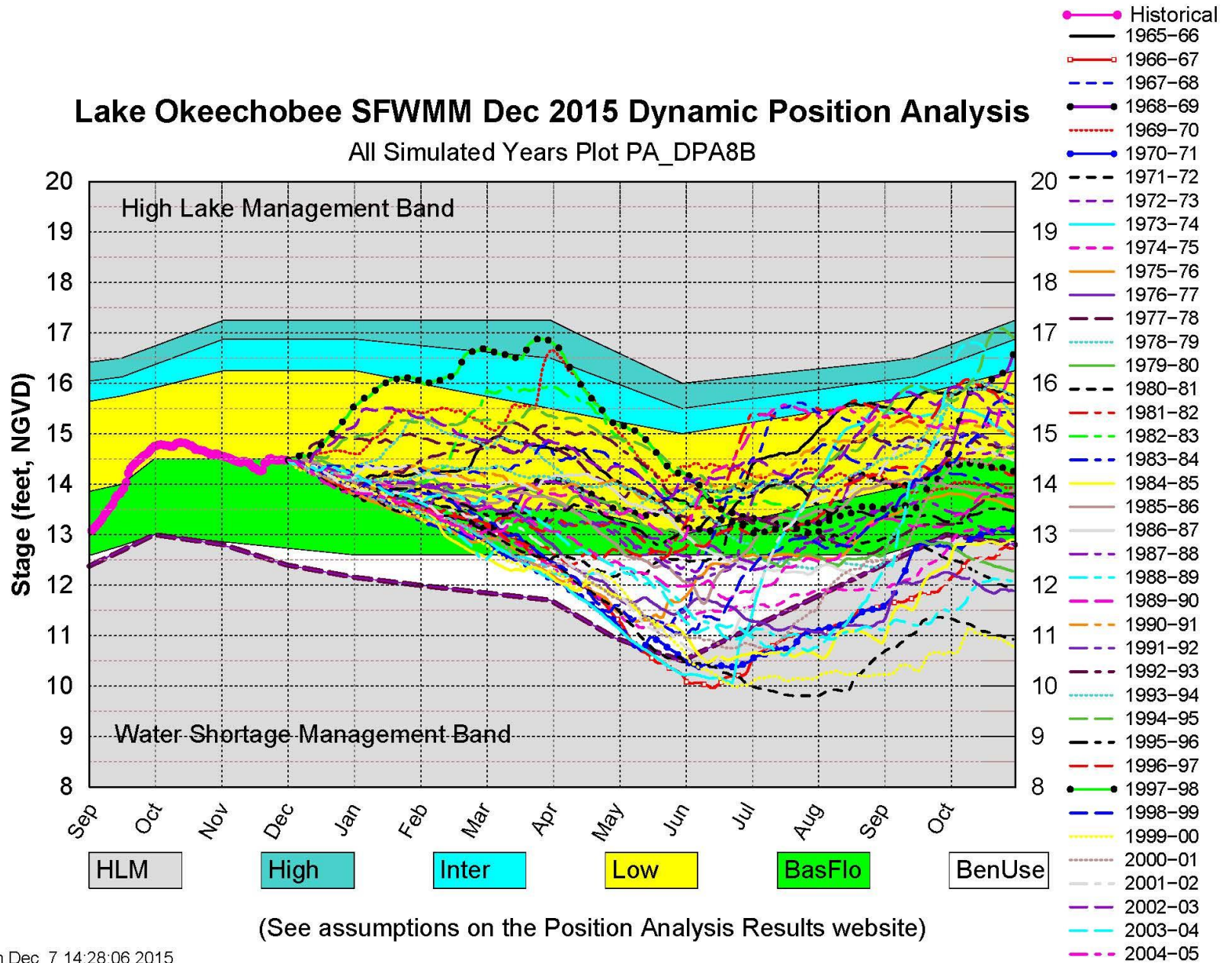
Lake Okeechobee SFWMM Dec 2015 Dynamic Position Analysis



(See assumptions on the Position Analysis Results website)

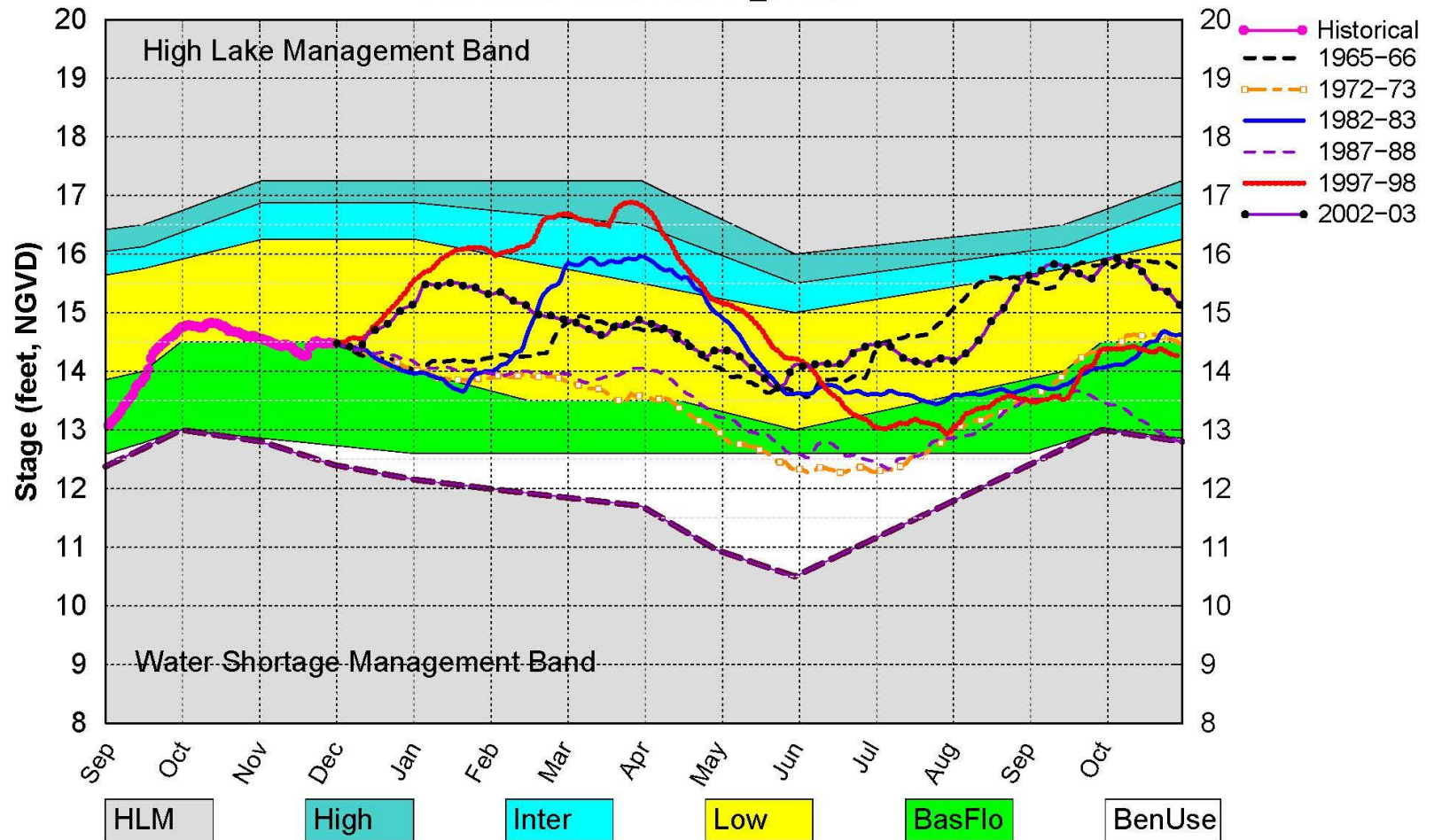
Lake Okeechobee SFWMM Dec 2015 Dynamic Position Analysis

All Simulated Years Plot PA_DPA8B



Lake Okeechobee SFWMM Dec 2015 Dynamic Position Analysis

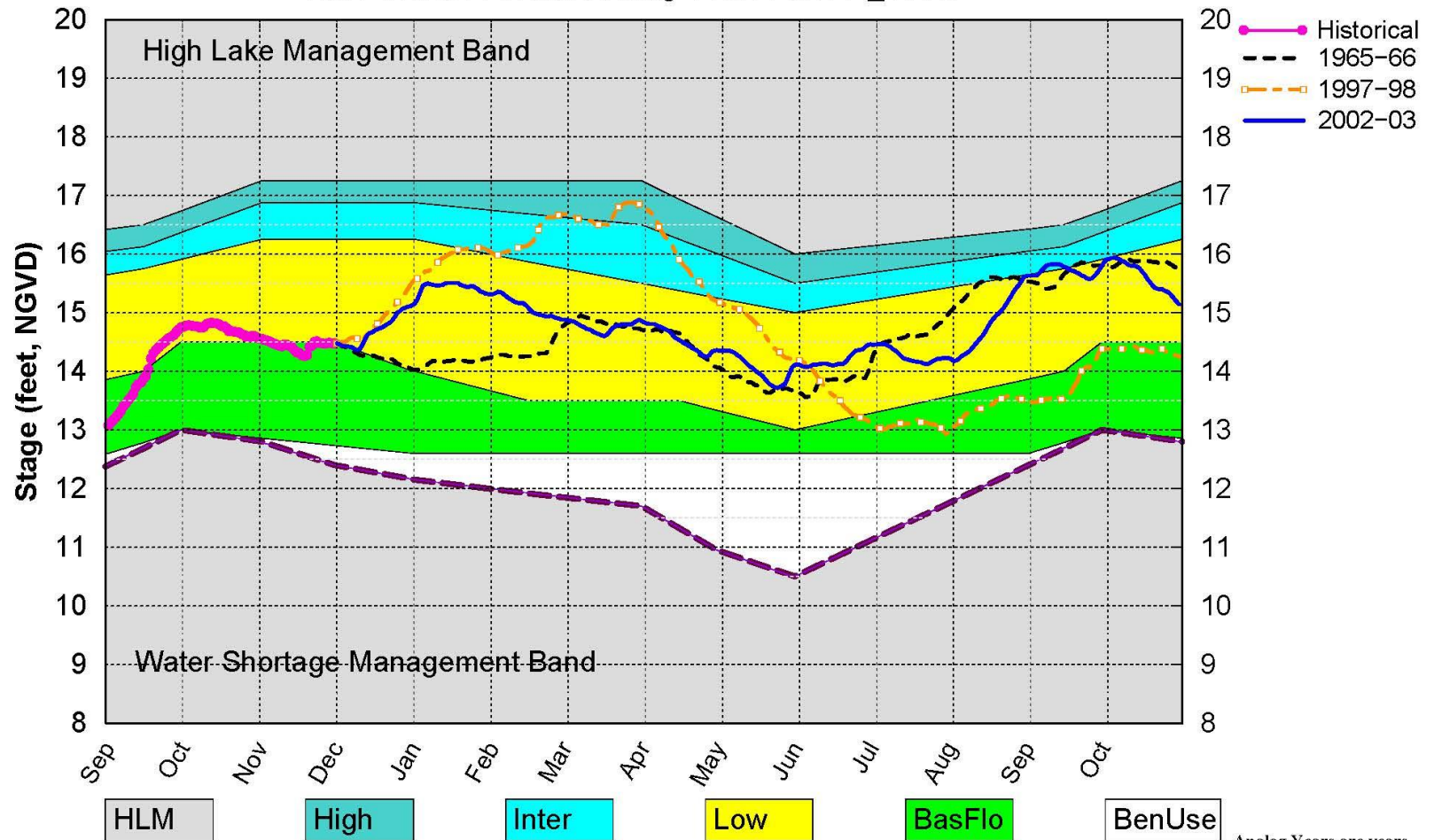
All El Nino Years Plot PA_DPA8B



(See assumptions on the Position Analysis Results website)

Lake Okeechobee SFWMM Dec 2015 Dynamic Position Analysis

AMO Warm / El Nino Analog Years Plot PA_DPA8B



(See assumptions on the Position Analysis Results website)

Analog Years are years
with similar climatological conditions
to the current year.