EXTENDED HYDROLOGIC OUTLOOK
MAY 7, 2019
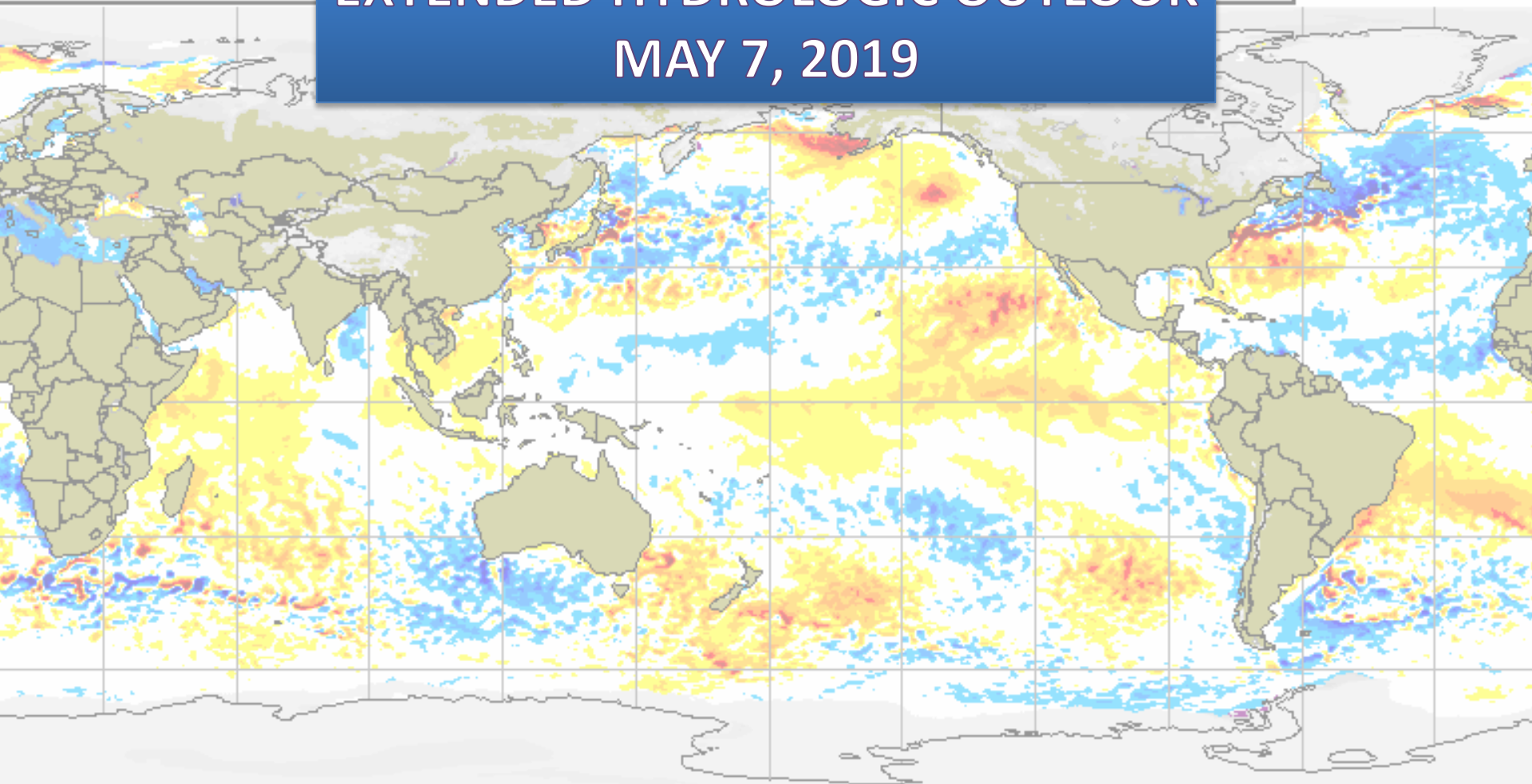
Global sea surface anomaly
06 May 2019

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

-3.0 -2.5 -2.0 -1.5 -1.0 -0.5 0.0 0.5 1.0 1.5 2.0 2.5 3.0

Snow depth / Épaisseur de la neige (cm)

1.0   10.0   50.0   100.0

Uncovered sea ice
Glace marine à découvert

Climatologie 1995-2009 Climatology

CMC Environment Canada
CMC Environnement Canada

Summary

- **The Climate Prediction Center (CPC) is forecasting <u>above normal rainfall for May through July.</u>**

- **A weak El Niño is likely to continue through summer 2019 (65% chance) and possibly fall (50-55% chance). El Niño increases the chances of a <u>wetter-than-normal dry season and decreases the potential for tropical storm activity from the Main Development Region in the Atlantic Ocean.</u>**

- **Monitoring Atlantic Multidecadal Oscillation (AMO) index for switch to negative (cold) phase, this has the potential to contribute to <u>drier-than-normal wet seasons.</u>**

U. S. Seasonal Outlooks

May-July 2019

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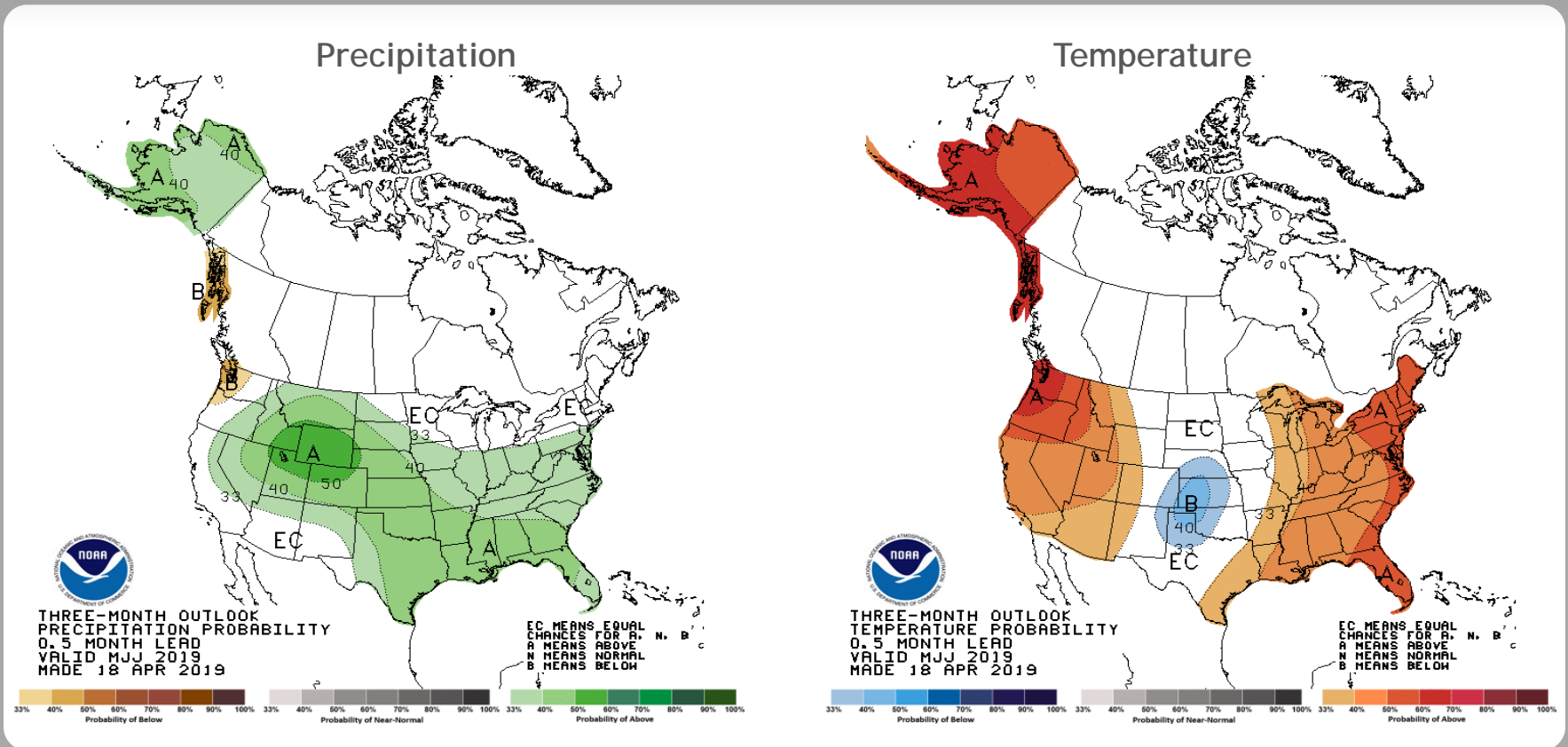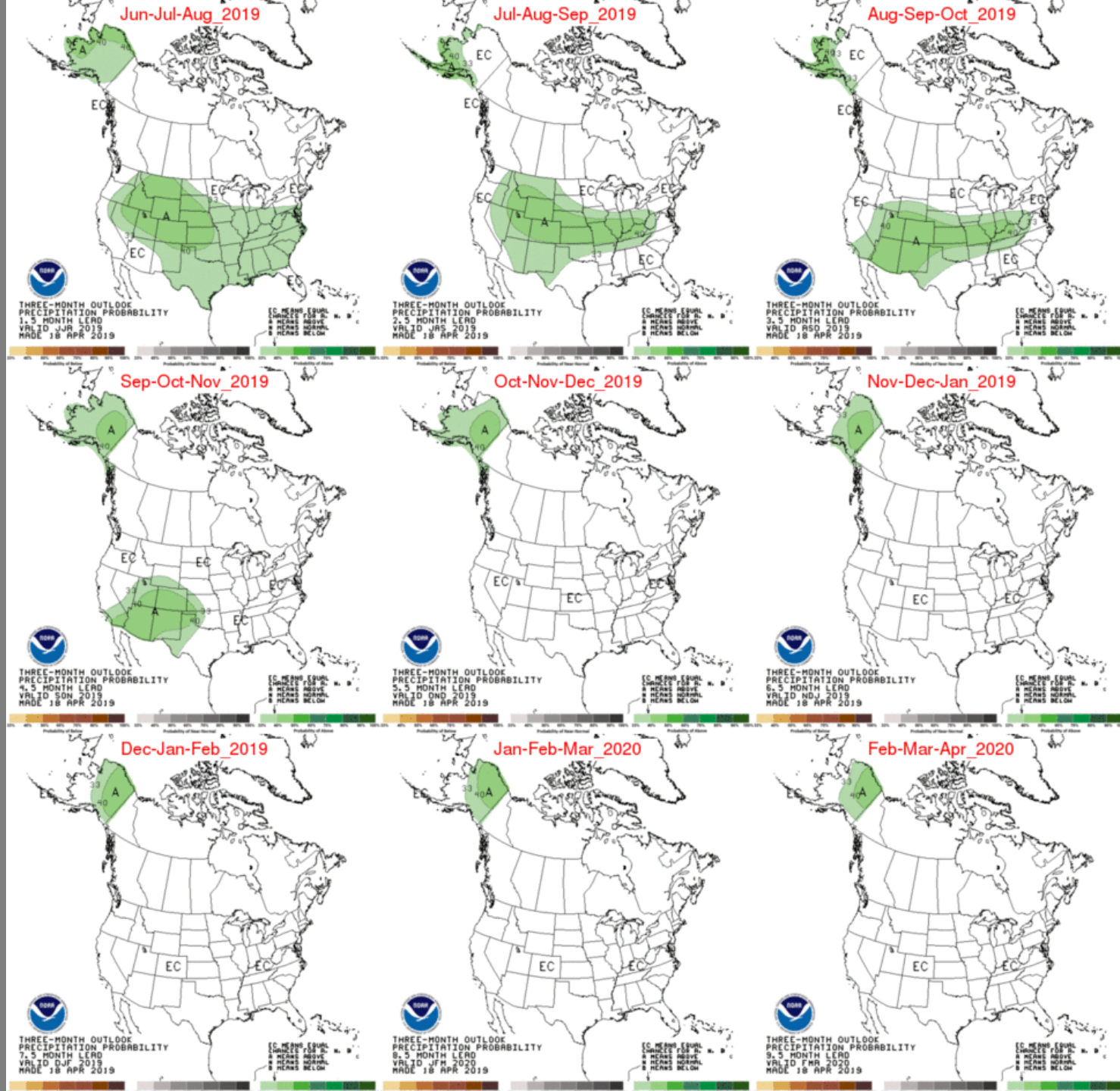
Teleconnections to South Florida

Climate anomalies being related to each other at large distances:

<u>El Niño Southern Oscillation (ENSO)</u>

South Florida dry season (November through May) rainfall is positively correlated with El Niño which has a frequency that ranges between 3 to 7 years while rainfall is negatively correlated with La Niña November through March with a potential increase in tropical rainfall during La Niña

<u>Atlantic Multidecadal Oscillation (AMO)</u>

Average annual inflow to Lake Okeechobee is nearly 50% greater during the warm phase compared to the cold phase of the AMO, easterly flow toward south Florida affected by phase
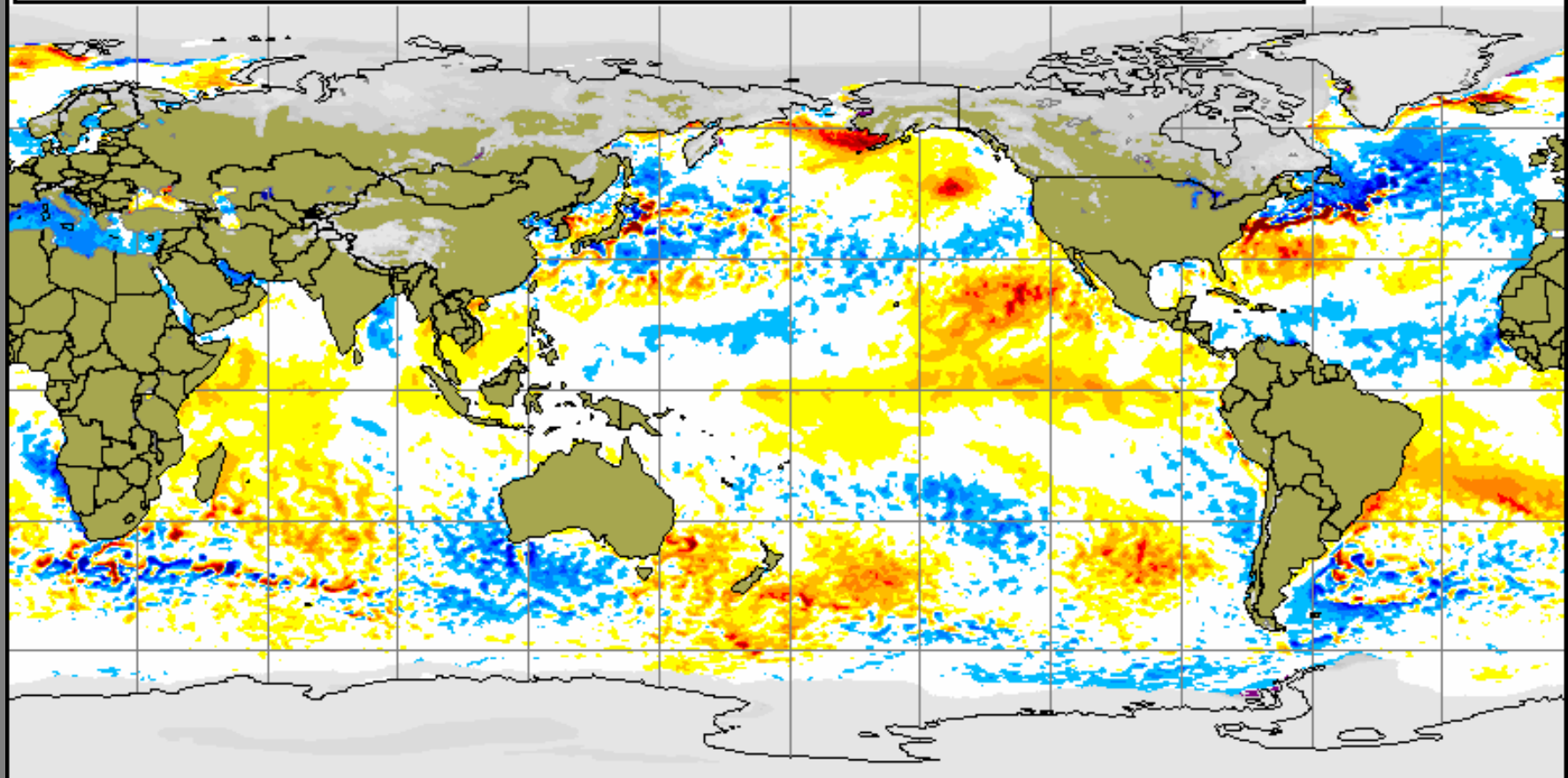
<u>Pacific Decadal Oscillation (PDO)</u>

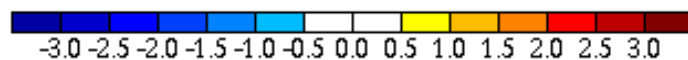Increases variations of south Florida dry season rainfall

Current Global Sea Surface Temperature Anomalies

Global sea surface anomaly and snow cover
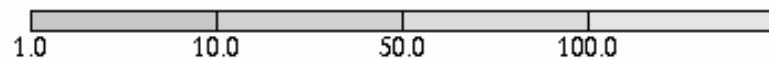06 May 2019

Anomalie de la température de la mer et épaisseur de la neige
06 Mai 2019

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

-3.0 -2.5 -2.0 -1.5 -1.0 -0.5 0.0 0.5 1.0 1.5 2.0 2.5 3.0

Snow depth / Épaisseur de la neige (cm)

1.0   10.0   50.0   100.0

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

CMC Environnement Canada
CMC Environment Canada

Niño Region SST Departures (ºC) Recent Evolution

The latest weekly SST departures are:

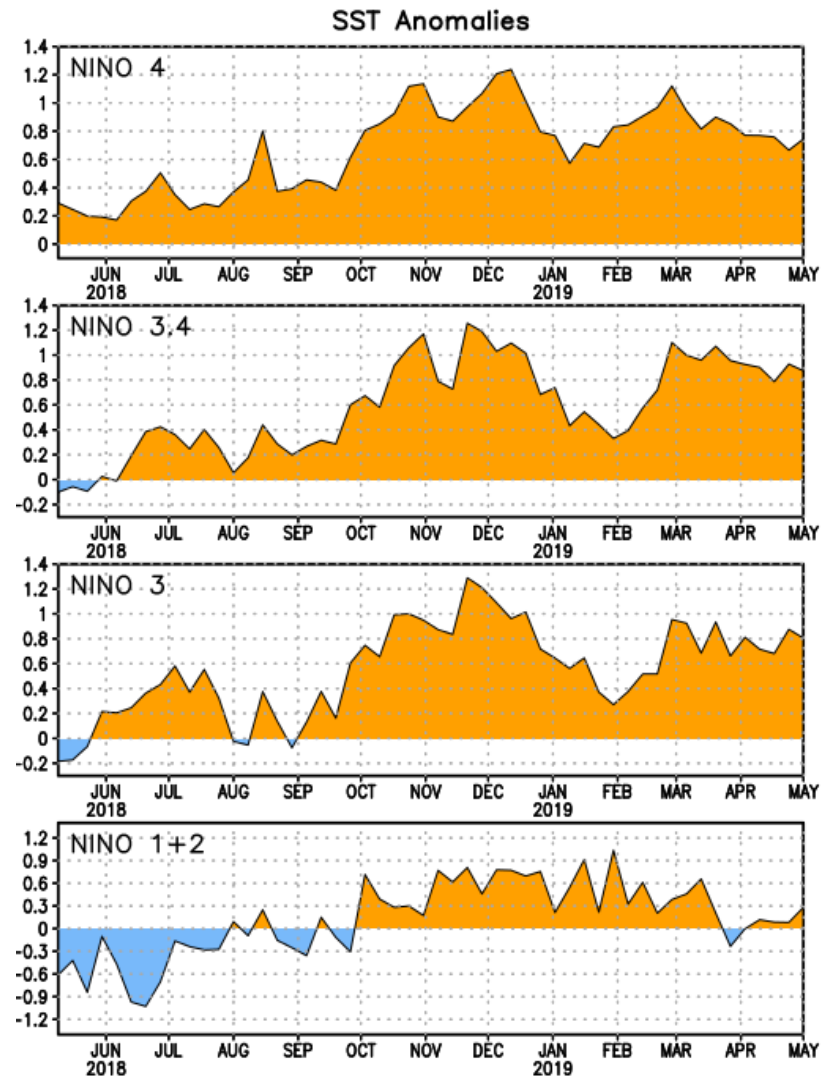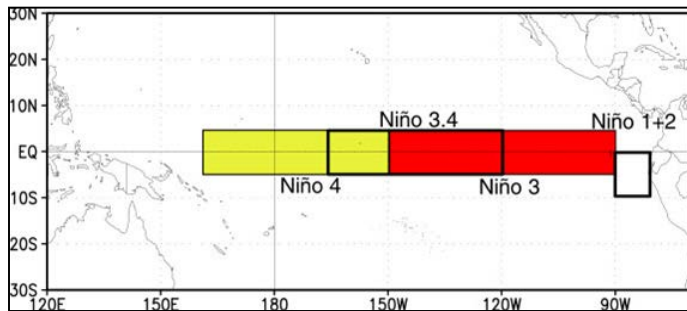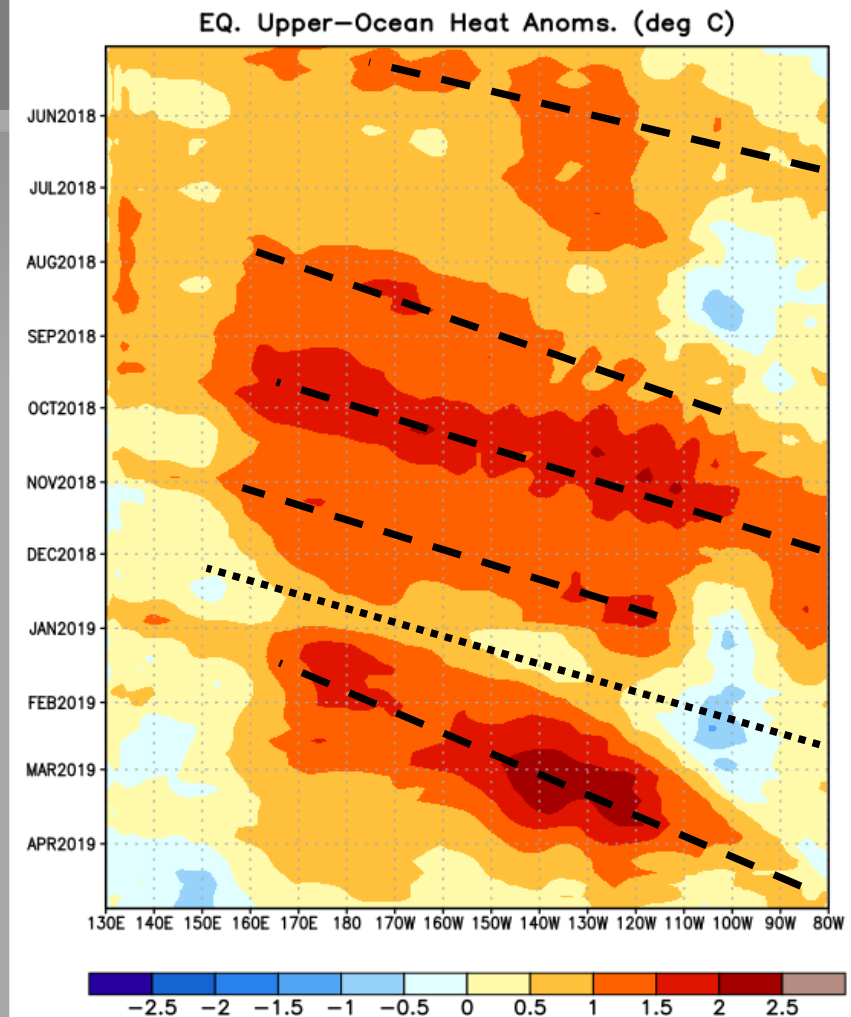|	
Niño 4	0.7ºC
Niño 3.4	0.9ºC
Niño 3	0.8ºC
Niño 1+2	0.3ºC

Weekly Heat Content Evolution in the Equatorial Pacific

Equatorial oceanic Kelvin wave activity has been especially prominent since August 2018.

In early August, October, and November 2018, positive subsurface temperature anomalies increased, partly due to downwelling Kelvin waves.

During January-March 2019, another downwelling Kelvin wave led to an eastward progression of large positive subsurface temperature anomalies.

Equatorial 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.

EQ. Upper−Ocean Heat Anoms. (deg C)

CFSv2 forecast Nino3.4 SST anomalies (K)

NWS/NCEP/CPC

Last update: Tue May 7 2019
Initial conditions: 26Apr2019–5May2019

Latest 8 forecst members
Earliest 8 forecst members
Other forecast members

Forecast ensemble mean
NCDC daily analysis
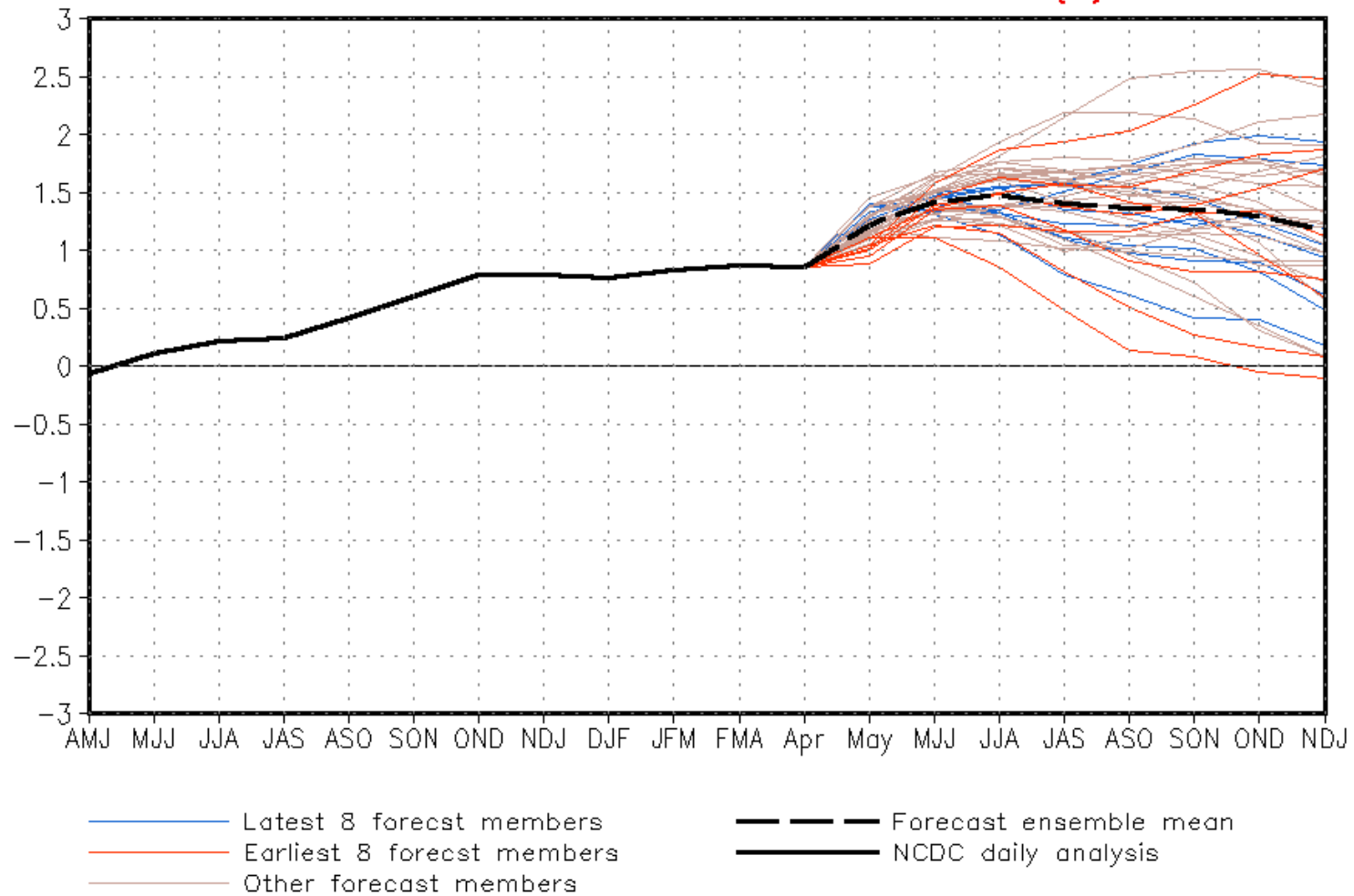
IRI/CPC Pacific Niño 3.4 SST Model Outlook

The majority of models predict a weak El Niño to continue into the Northern Hemisphere fall 2019.
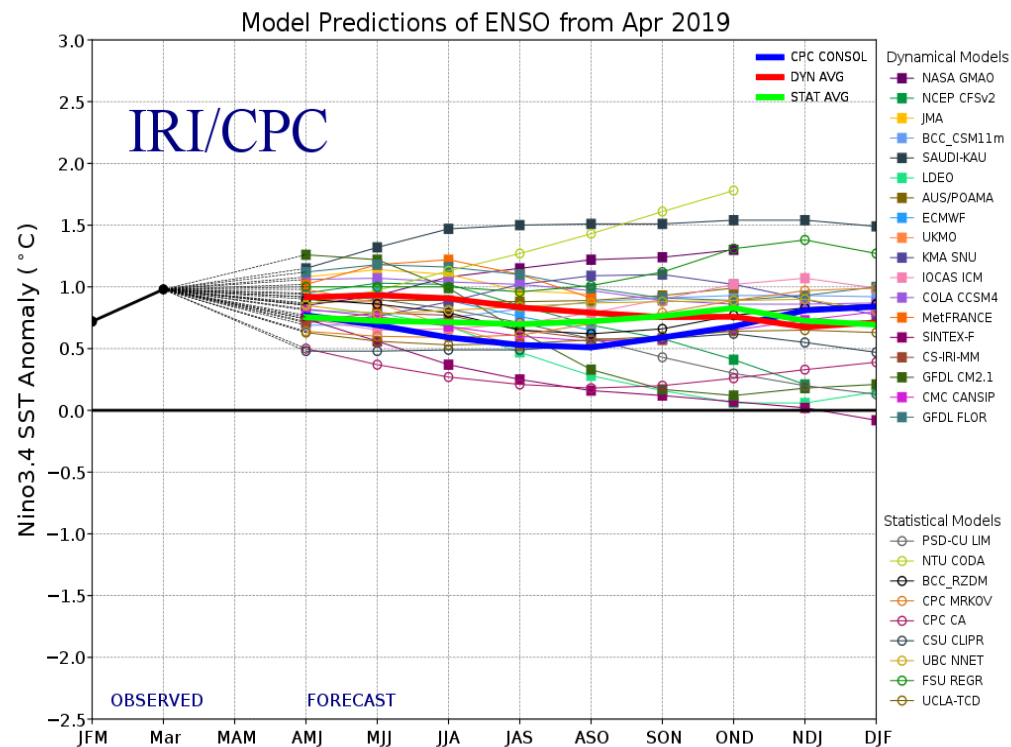

Figure provided by the International Research Institute (IRI) for Climate and Society (updated 19 April 2019).
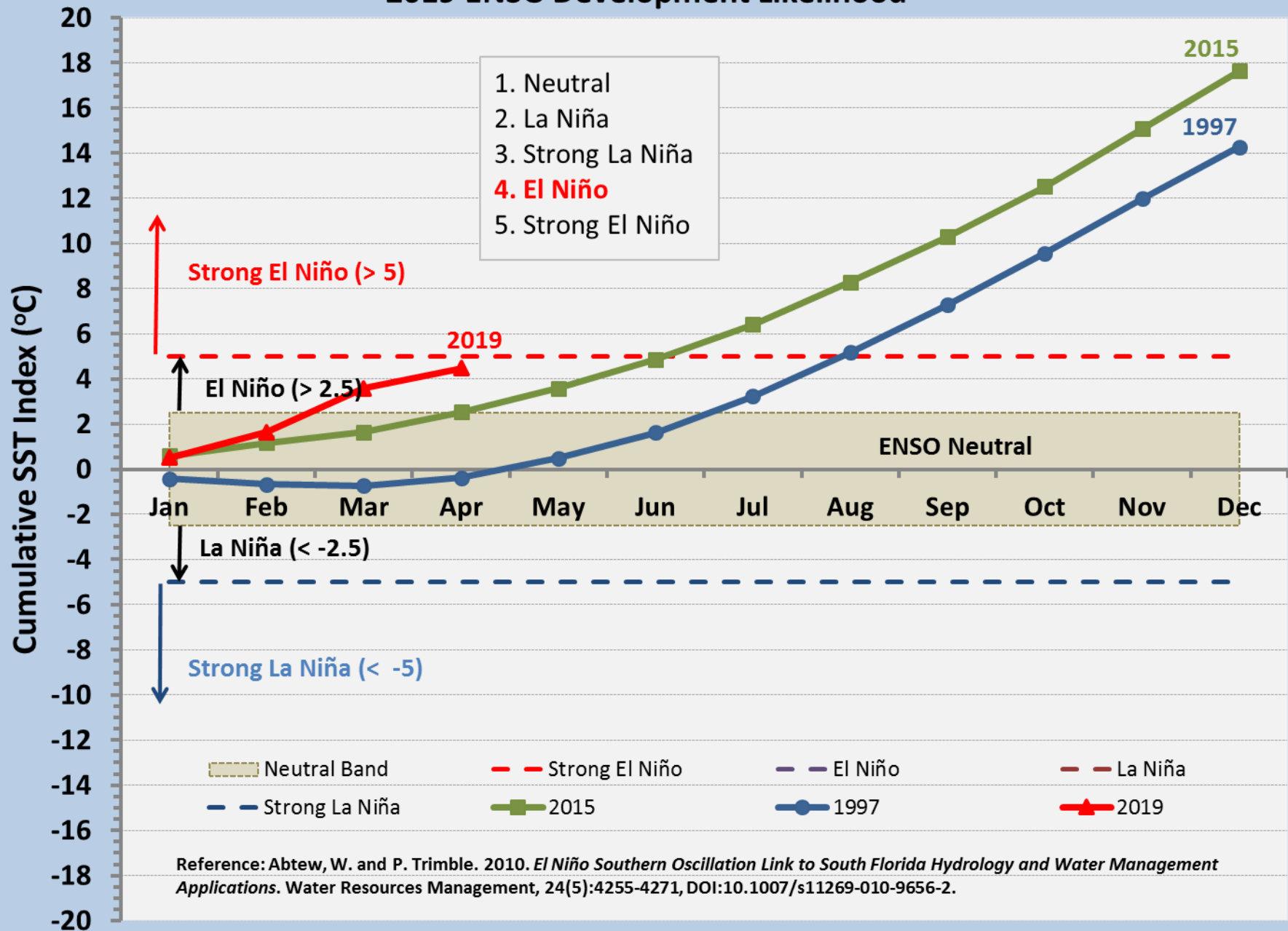
Historical El Niño and La Niña Episodes Based on the ONI computed using ERSST.v5

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.v5 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
2007	0.7	0.3	0.0	-0.2	-0.3	-0.4	-0.5	-0.8	-1.1	-1.4	-1.5	-1.6
2008	-1.6	-1.4	-1.2	-0.9	-0.8	-0.5	-0.4	-0.3	-0.3	-0.4	-0.6	-0.7
2009	-0.8	-0.7	-0.5	-0.2	0.1	0.4	0.5	0.5	0.7	1.0	1.3	1.6
2010	1.5	1.3	0.9	0.4	-0.1	-0.6	-1.0	-1.4	-1.6	-1.7	-1.7	-1.6
2011	-1.4	-1.1	-0.8	-0.6	-0.5	-0.4	-0.5	-0.7	-0.9	-1.1	-1.1	-1.0
2012	-0.8	-0.6	-0.5	-0.4	-0.2	0.1	0.3	0.3	0.3	0.2	0.0	-0.2
2013	-0.4	-0.3	-0.2	-0.2	-0.3	-0.3	-0.4	-0.4	-0.3	-0.2	-0.2	-0.3
2014	-0.4	-0.4	-0.2	0.1	0.3	0.2	0.1	0.0	0.2	0.4	0.6	0.7
2015	0.6	0.6	0.6	0.8	1.0	1.2	1.5	1.8	2.1	2.4	2.5	2.6
2016	2.5	2.2	1.7	1.0	0.5	0.0	-0.3	-0.6	-0.7	-0.7	-0.7	-0.6
2017	-0.3	-0.1	0.1	0.3	0.4	0.4	0.2	-0.1	-0.4	-0.7	-0.9	-1.0
2018	-0.9	-0.8	-0.6	-0.4	-0.1	0.1	0.1	0.2	0.4	0.7	0.9	0.8
2019	0.8	0.8	0.8									

Prepared by: Climate Prediction Center/IRI

2019 ENSO Development Likelihood

Reference: Abtew, W. and P. Trimble. 2010. *El Niño Southern Oscillation Link to South Florida Hydrology and Water Management Applications*. Water Resources Management, 24(5):4255-4271, DOI:10.1007/s11269-010-9656-2.
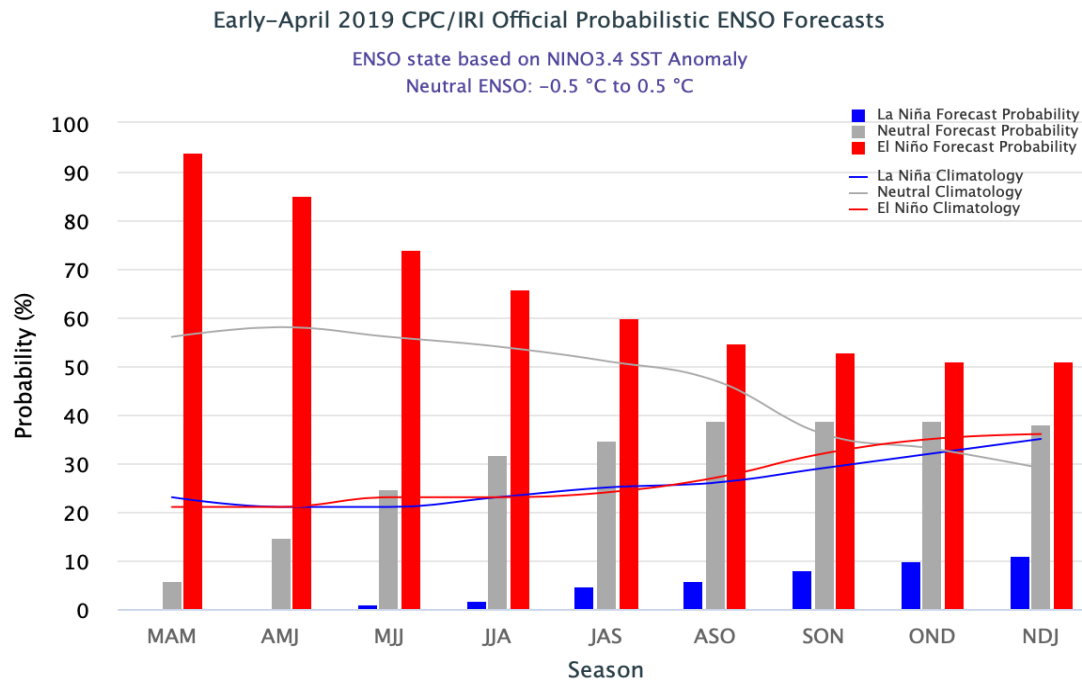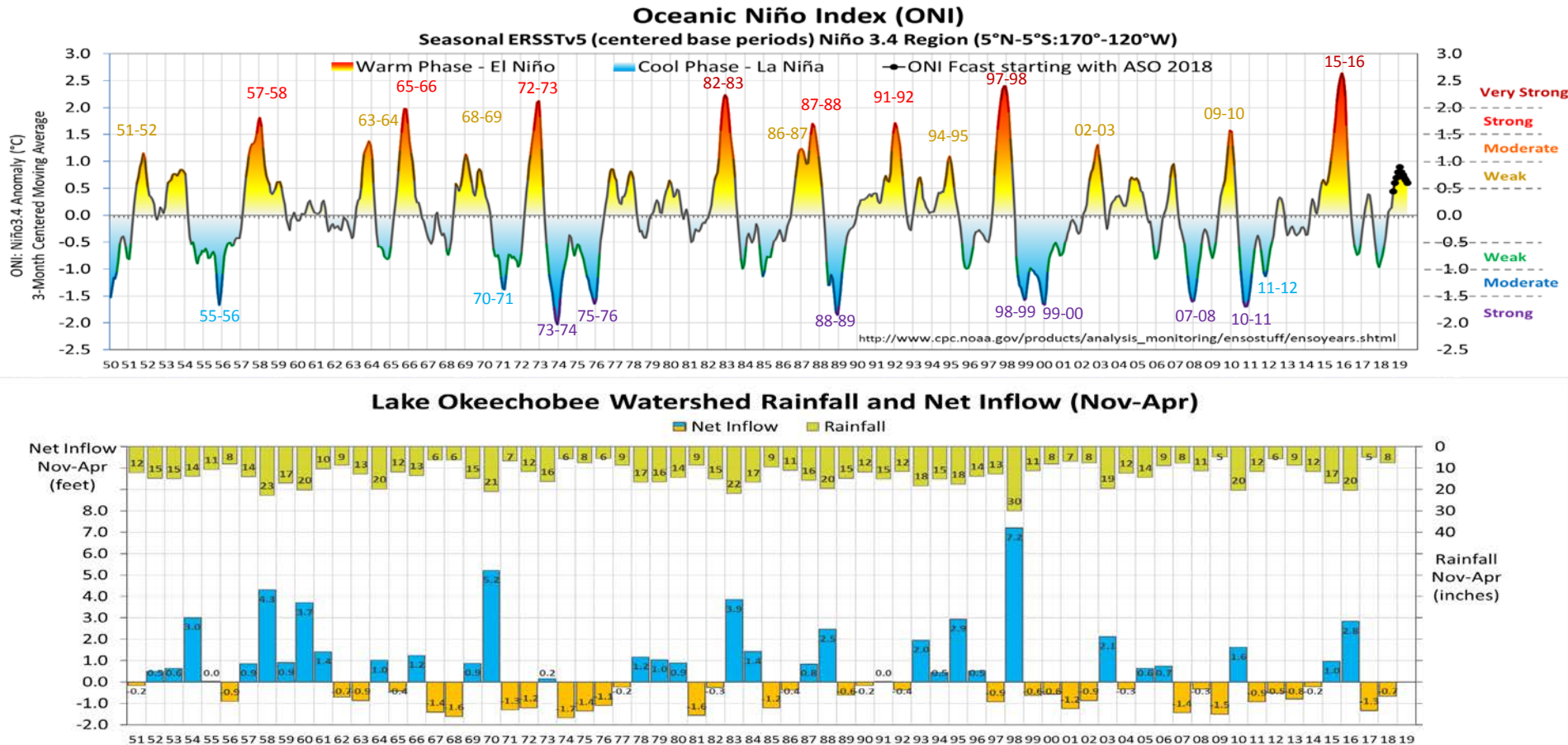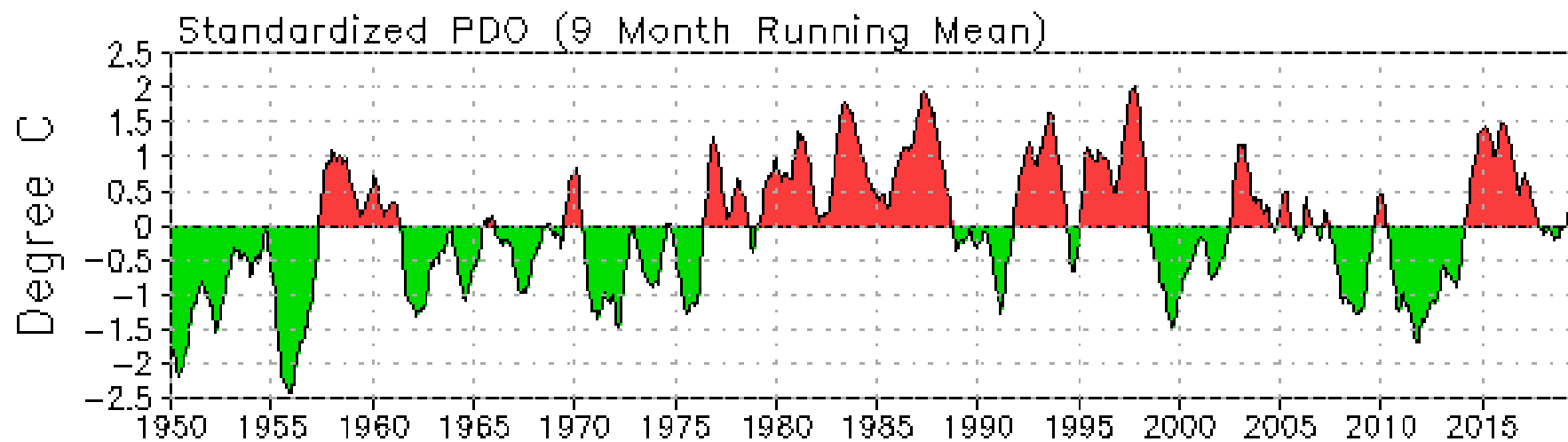
CPC/IRI Probabilistic ENSO Outlook

Updated: 11 April 2019

El Niño conditions are favored to continue through fall 2019 with diminishing chances (~50% in October-November-December).

Early–April 2019 CPC/IRI Official Probabilistic ENSO Forecasts

El Niño & La Niña Events (1950-2018), and
Lake Okeechobee Watershed Rainfall & Net Inflow

Source: Cal Neidrauer (SFWMD)

Standardized PDO (9 Month Running Mean)

Standardized Klotzbach/Gray Atlantic Multidecadal Oscillation Index (CSU)
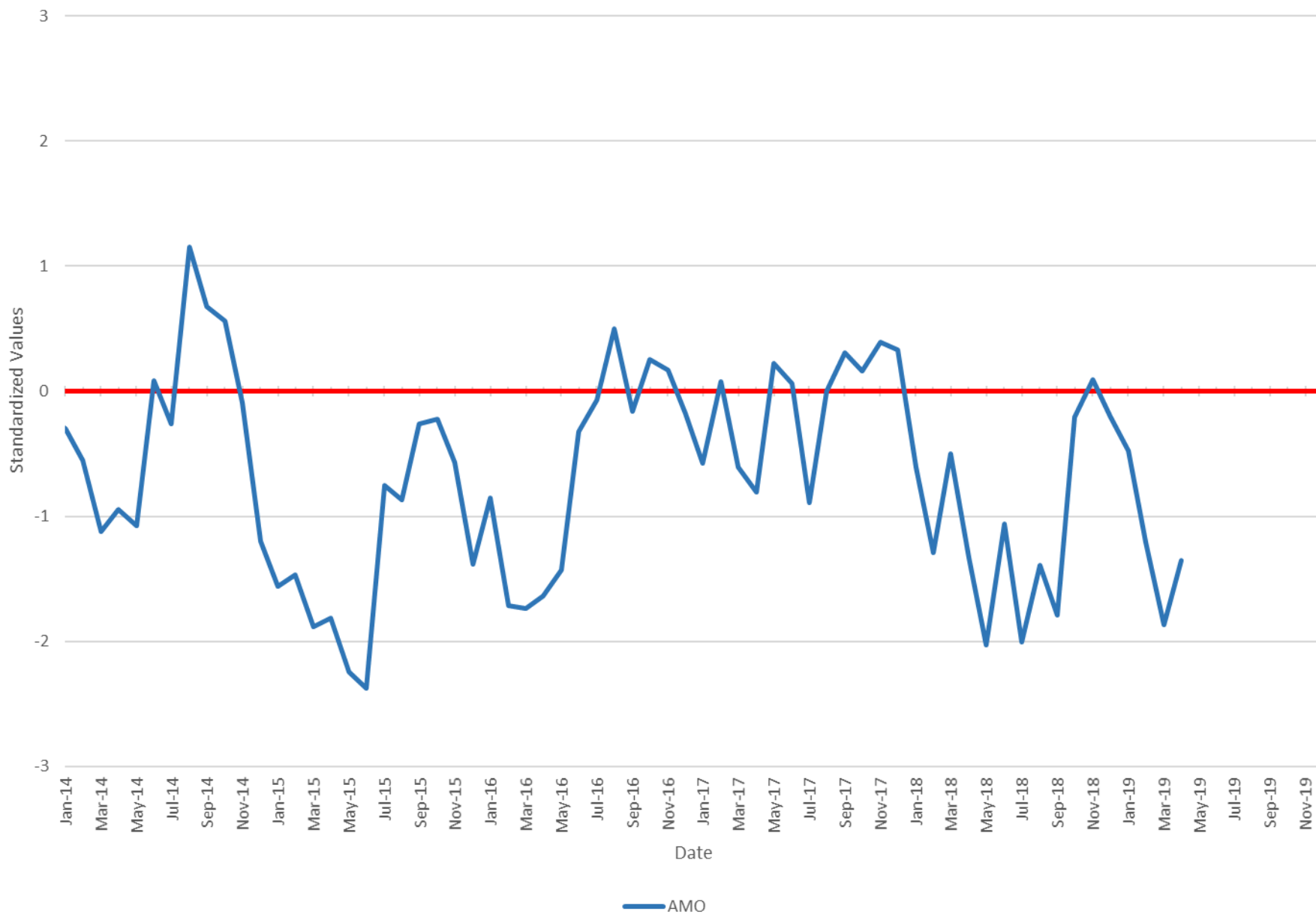
2019 Tropical Outlook

NHC forecast anticipated to be available mid to late May

ATLANTIC BASIN SEASONAL HURRICANE FORECAST FOR 2019

Forecast Parameter and 1981-2010 Average (in parentheses)	Issue Date 4 April 2019
Named Storms (NS) (12.1)	13
Named Storm Days (NSD) (59.4)	50
Hurricanes (H) (6.4)	5
Hurricane Days (HD) (24.2)	16
Major Hurricanes (MH) (2.7)	2
Major Hurricane Days (MHD) (6.2)	4
Accumulated Cyclone Energy (ACE) (106)	80
Net Tropical Cyclone Activity (NTC) (116%)	90

We anticipate that the 2019 Atlantic basin hurricane season will have slightly below-normal activity. The current weak El Niño event appears likely to persist and perhaps even strengthen this summer/fall. Sea surface temperatures averaged across the tropical Atlantic are slightly below normal, and the far North Atlantic is anomalously cool. Our Atlantic Multi-decadal Oscillation index is below its long-term average. We anticipate a slightly below-average probability for major hurricanes making landfall along the continental United States coastline and in the Caribbean. As is the case with all hurricane seasons, coastal residents are reminded that it only takes one hurricane making landfall to make it an active season for them. They should prepare the same for every season, regardless of how much activity is predicted.
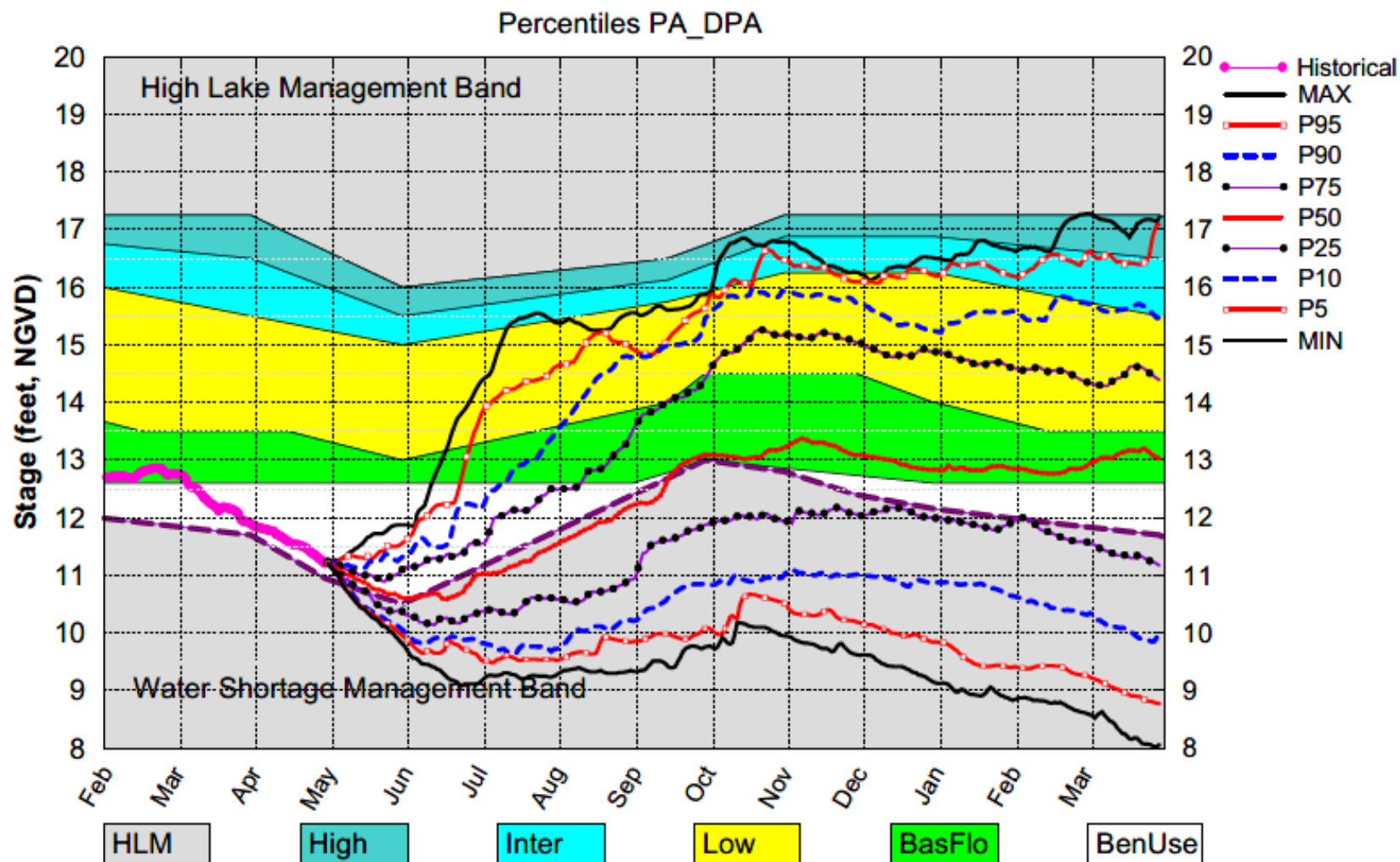
Next Update: June 4, 2019
https://tropical.colostate.edu/

Source: Colorado State University/Tropical Meteorology Project

Dynamic Position Analysis

- Based on historical climatic conditions spanning the period 1965-2005

- Each year the model resets the initial stages for Lake Okeechobee (LOK) and the Water Conservation Areas (WCAs) to value on the 1st of the previous month and conditions the simulation using real time data during the previous month to achieve real time stage on the 1st of the current month for both Lake Okeechobee and the Water Conservation Areas

- Dynamic Position Analysis
    - Each 1-year simulation starts with current hydrologic conditions (e.g., 1-May-2019)
    - 41 1-year simulations of system response to historical rainfall conditions
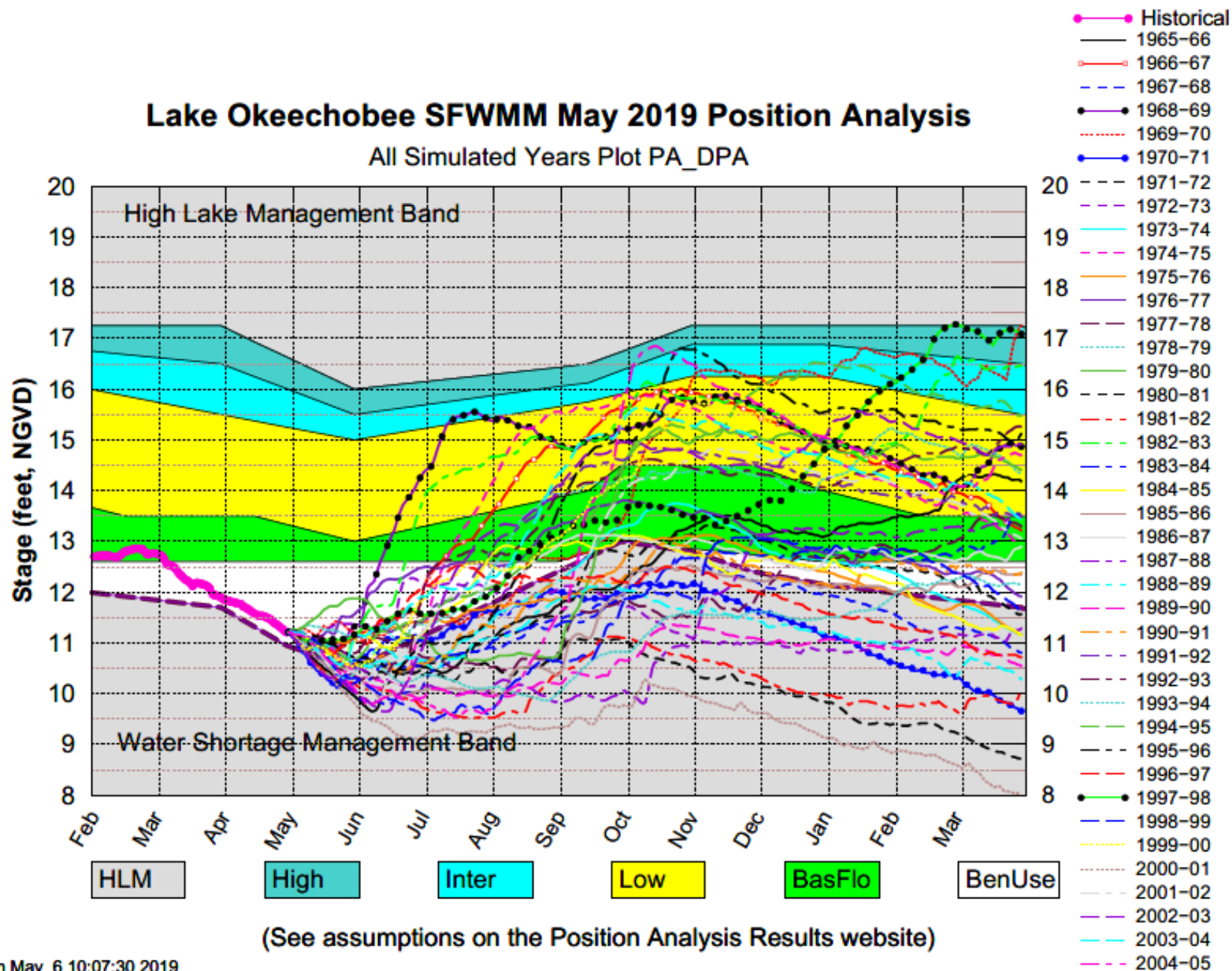   - Statistical summaries used to display projections

Lake Okeechobee SFWMM May 2019 Position Analysis

Lake Okeechobee SFWMM May 2019 Position Analysis

All Simulated Years Plot PA_DPA

High Lake Management Band

Water Shortage Management Band

Stage (feet, NGVD)

HLM   High   Inter   Low   BasFlo   BenUse

(See assumptions on the Position Analysis Results website)

Mon May 6 10:07:30 2019

Legend:
- Historical
- 1965–66
- 1966–67
- 1967–68
- 1968–69
- 1969–70
- 1970–71
- 1971–72
- 1972–73
- 1973–74
- 1974–75
- 1975–76
- 1976–77
- 1977–78
- 1978–79
- 1979–80
- 1980–81
- 1981–82
- 1982–83
- 1983–84
- 1984–85
- 1985–86
- 1986–87
- 1987–88
- 1988–89
- 1989–90
- 1990–91
- 1991–92
- 1992–93
- 1993–94
- 1994–95
- 1995–96
- 1996–97
- 1997–98
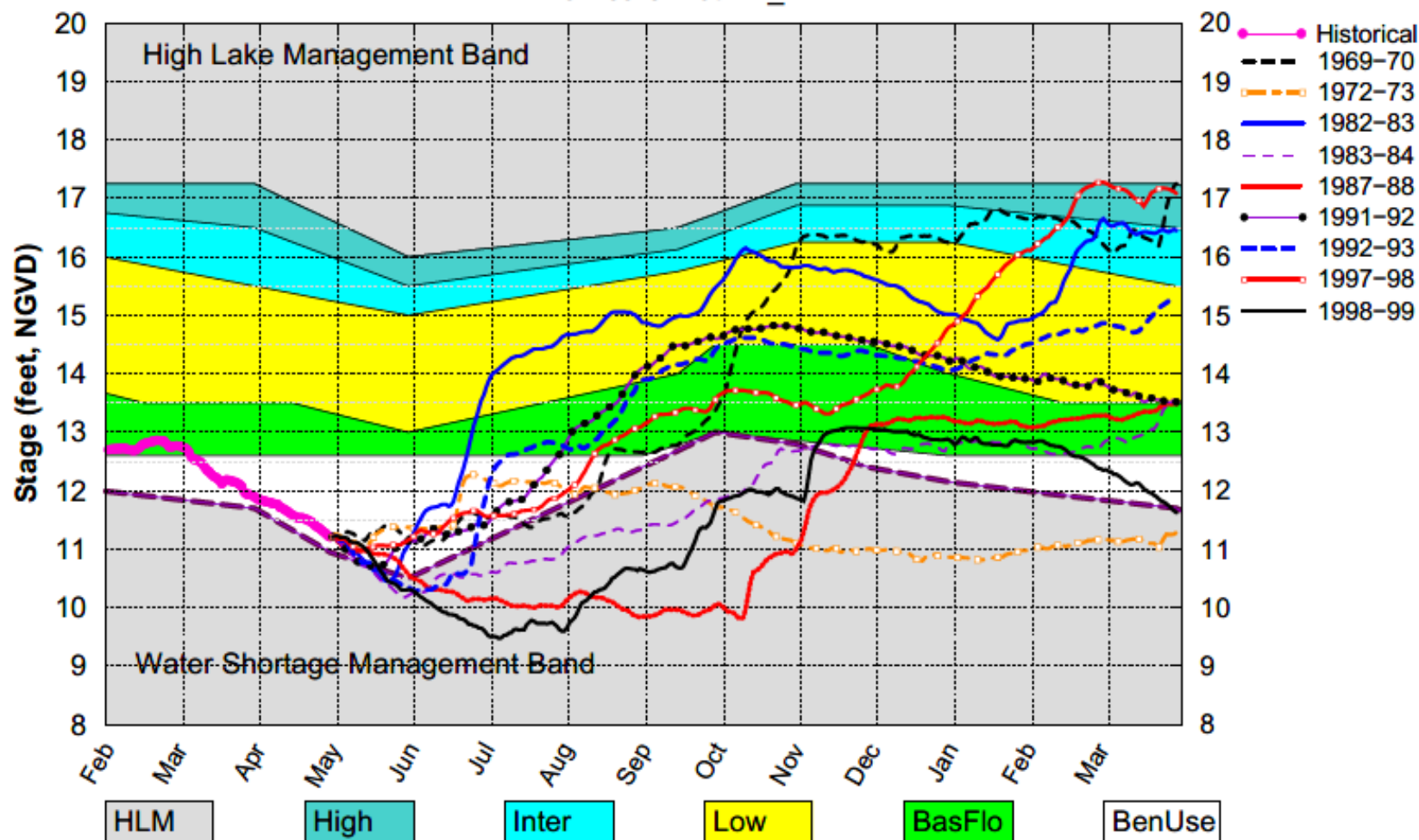- 1998–99
- 1999–00
- 2000–01
- 2001–02
- 2002–03
- 2003–04
- 2004–05

Lake Okeechobee SFWMM May 2019 Position Analysis

All El Nino Years Plot PA_DPA

Lake Okeechobee SFWMM May 2019 Position Analysis