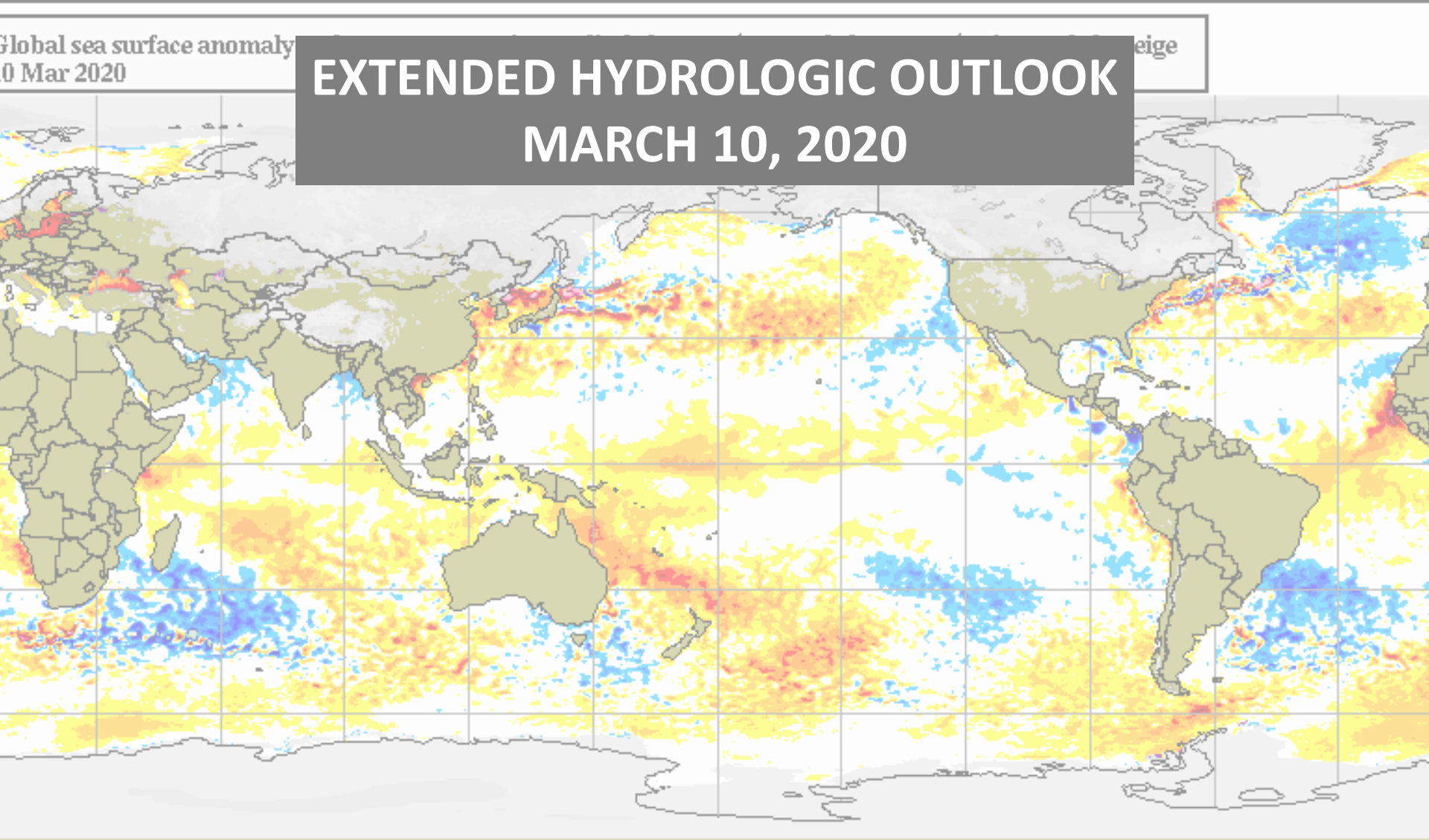
EXTENDED HYDROLOGIC OUTLOOK
MARCH 10, 2020



Summary

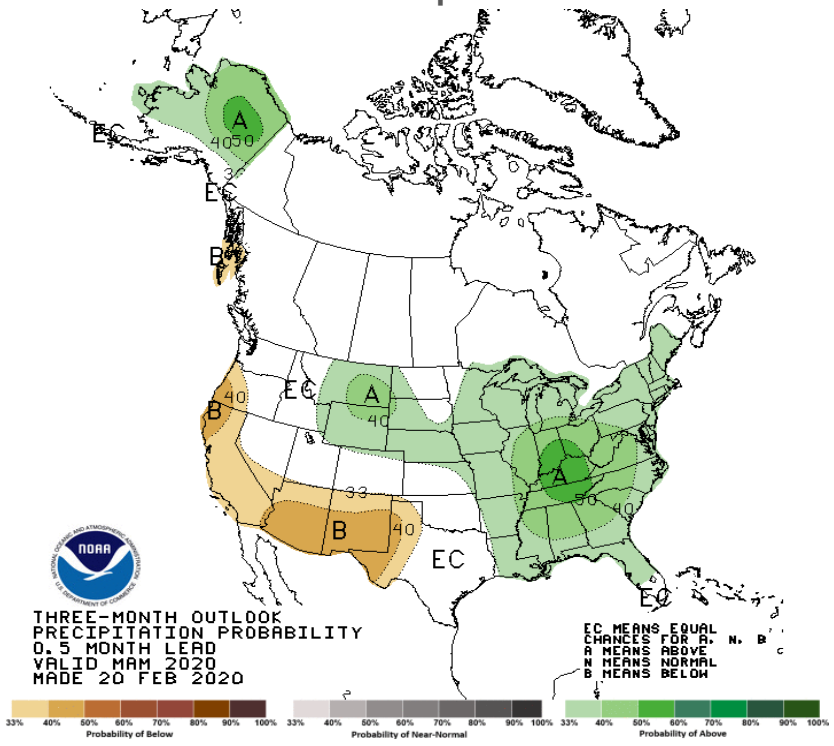
- The Climate Prediction Center (CPC) is forecasting above normal rainfall for areas north of Lake Okeechobee and equal chances of below normal, normal and above normal rainfall for Lake Okeechobee and areas south of Lake Okeechobee from March through May.
- ENSO-neutral conditions are present and favored through spring 2020 (~60% chance), continuing through summer 2020 (~50% chance). El Niño increases the chances of a wetter-than-normal dry season, La Niña increases the chances of a drier-than-normal dry season (both have most influence November through March).
- Monitoring Atlantic Multidecadal Oscillation (AMO) which is currently in the warm phase
  - Average annual inflow to Lake Okeechobee is nearly 50% greater during the warm phase compared to the cold phase

U. S. Seasonal Outlooks

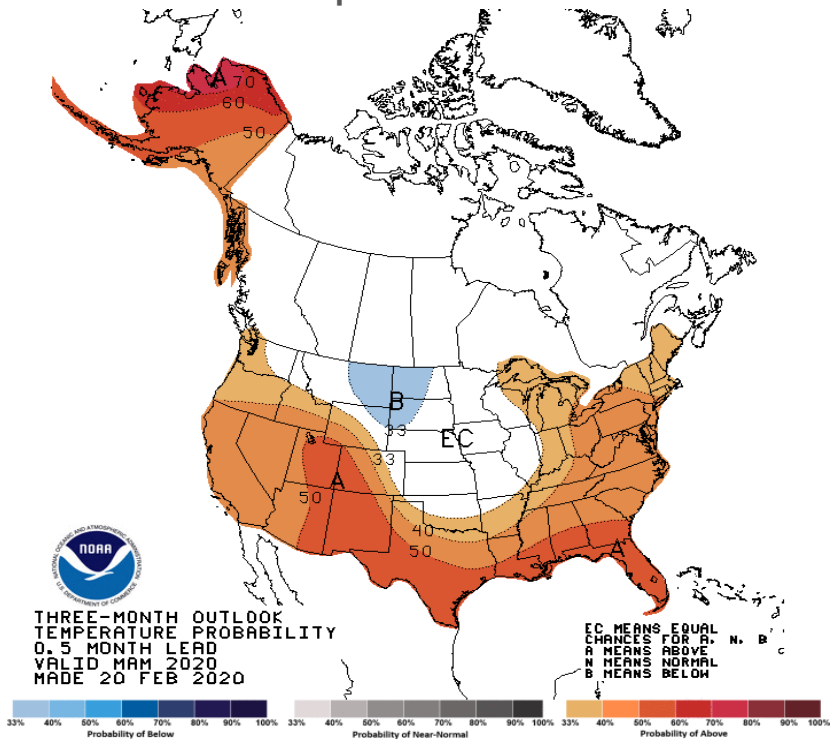
March-May 2020

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

Precipitation



Temperature



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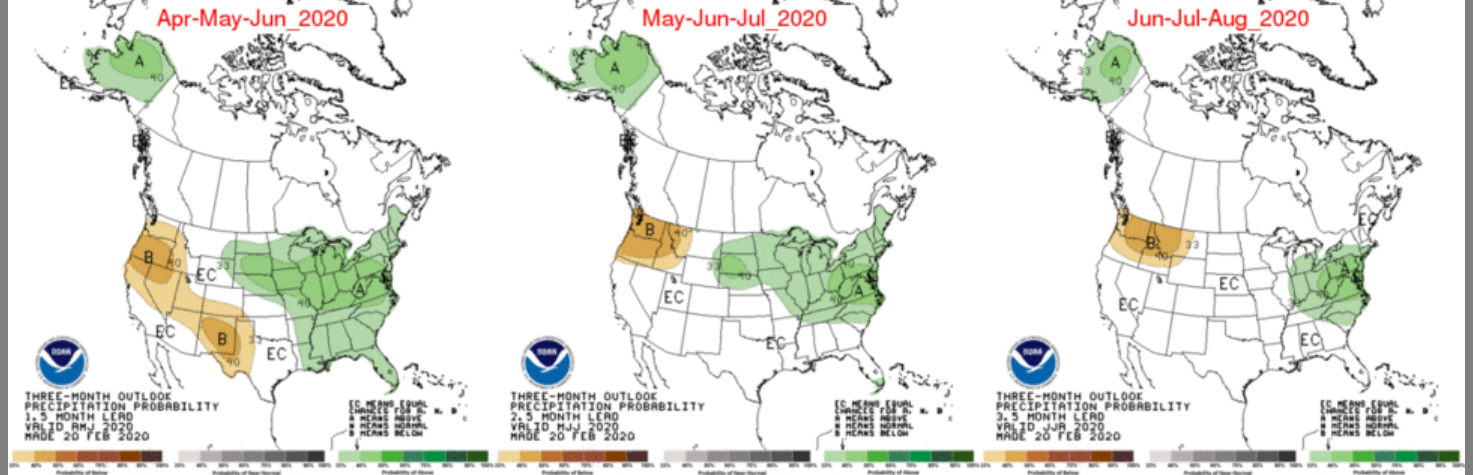

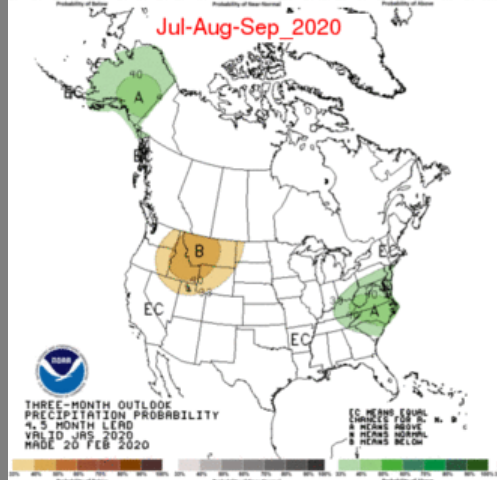

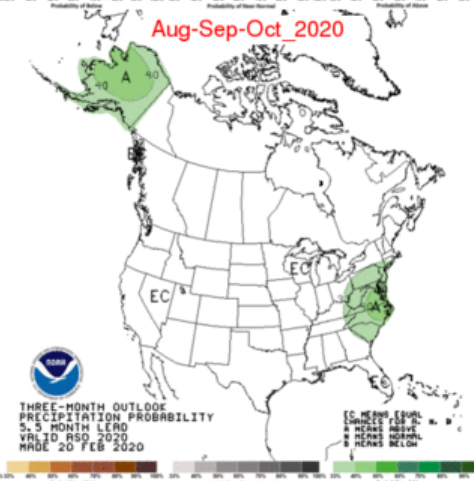

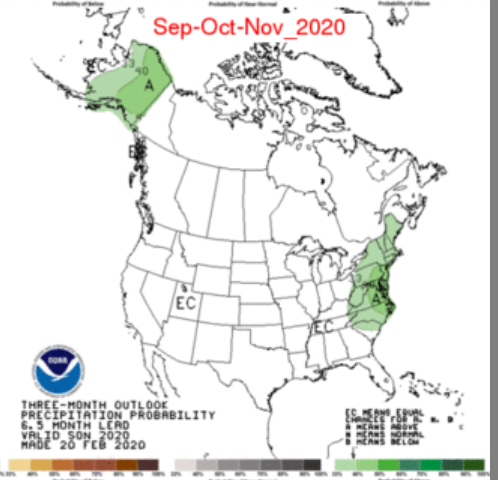

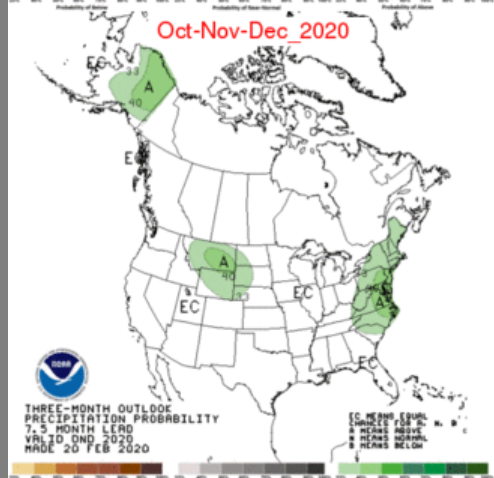

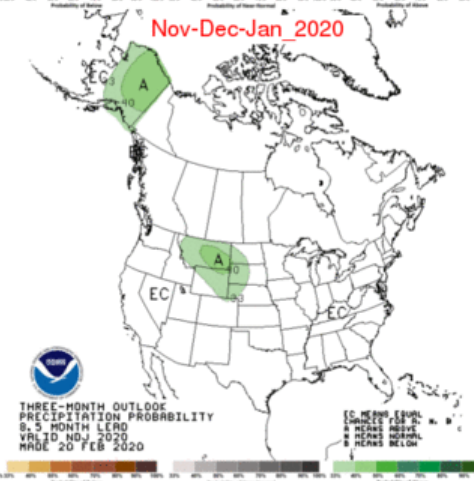

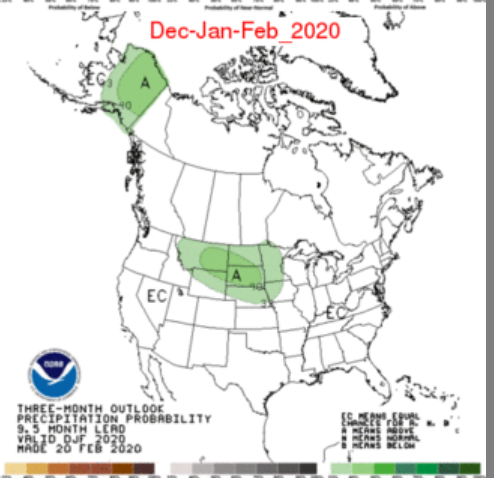

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Teleconnections to South Florida

Climate anomalies being related to each other at large distances:

El Niño Southern Oscillation (ENSO)

- **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**

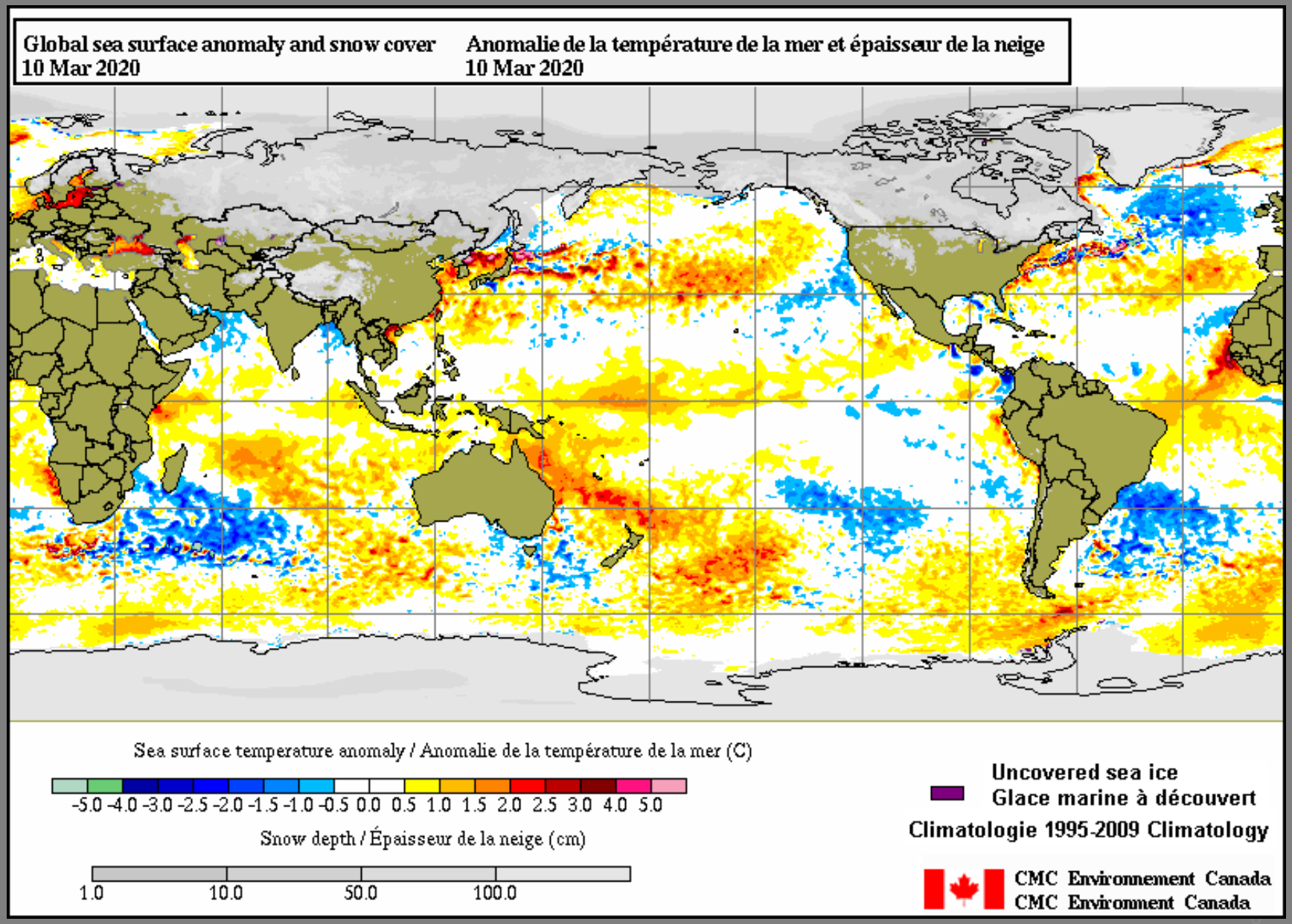
Atlantic Multidecadal Oscillation (AMO)

- **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**

Pacific Decadal Oscillation (PDO)

- **Increases variations of south Florida dry season rainfall**

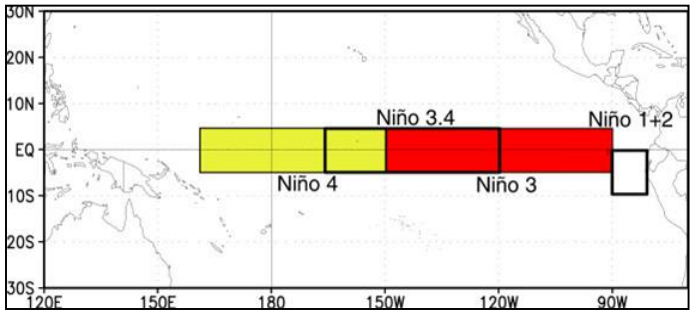
Current Global Sea Surface Temperature Anomalies

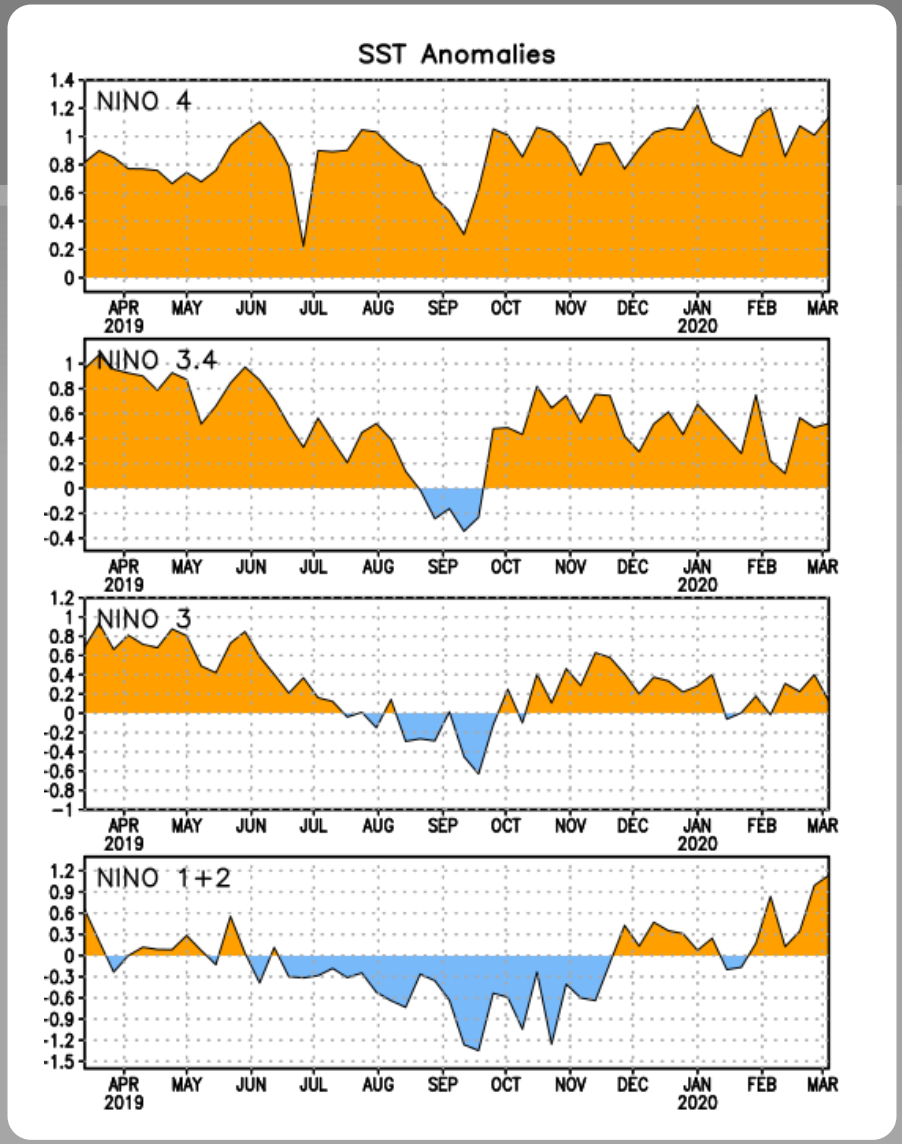


Niño Region SST Departures (ºC) Recent Evolution

The latest weekly SST departures are:

Niño 4	1.1ºC
Niño 3.4	0.5ºC
Niño 3	0.1ºC
Niño 1+2	1.1ºC





Prepared by: Climate Prediction Center/NCEP

Weekly Heat Content Evolution in the Equatorial Pacific

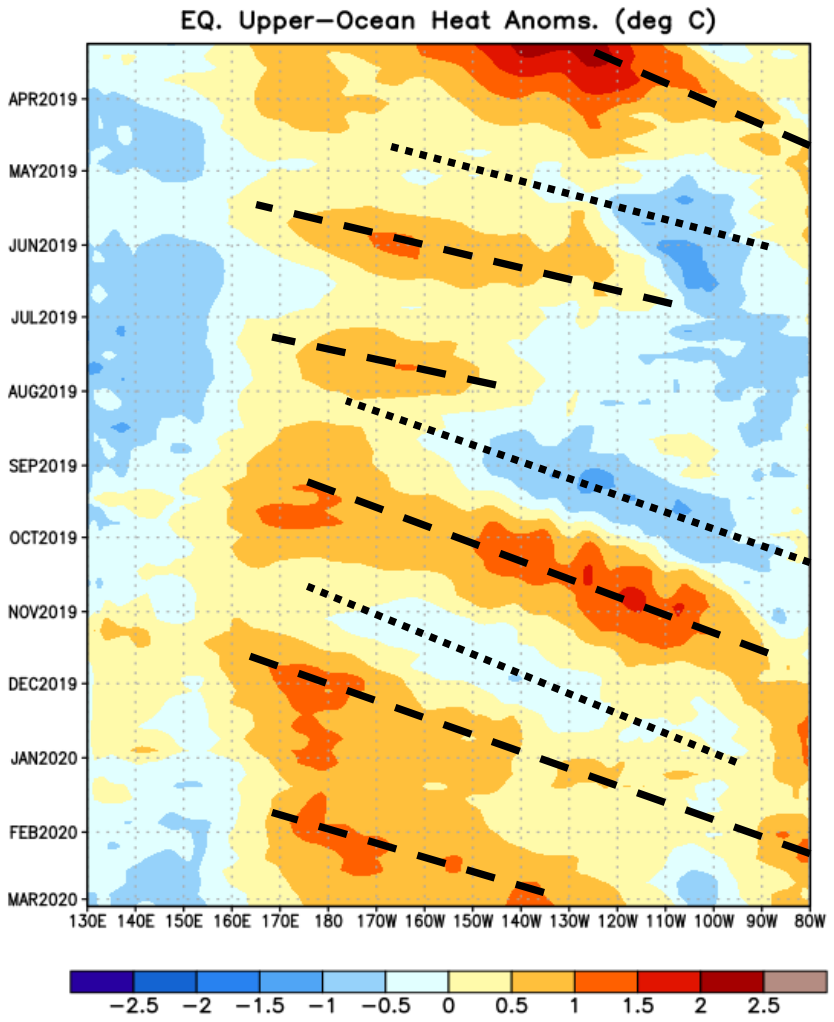
Significant equatorial oceanic Kelvin wave activity (dashed and dotted lines) has been present throughout the period shown.

During December 2019 and January 2020, a downwelling Kelvin wave (dashed line) resulted in above-average subsurface temperatures across the central and east-central equatorial Pacific.

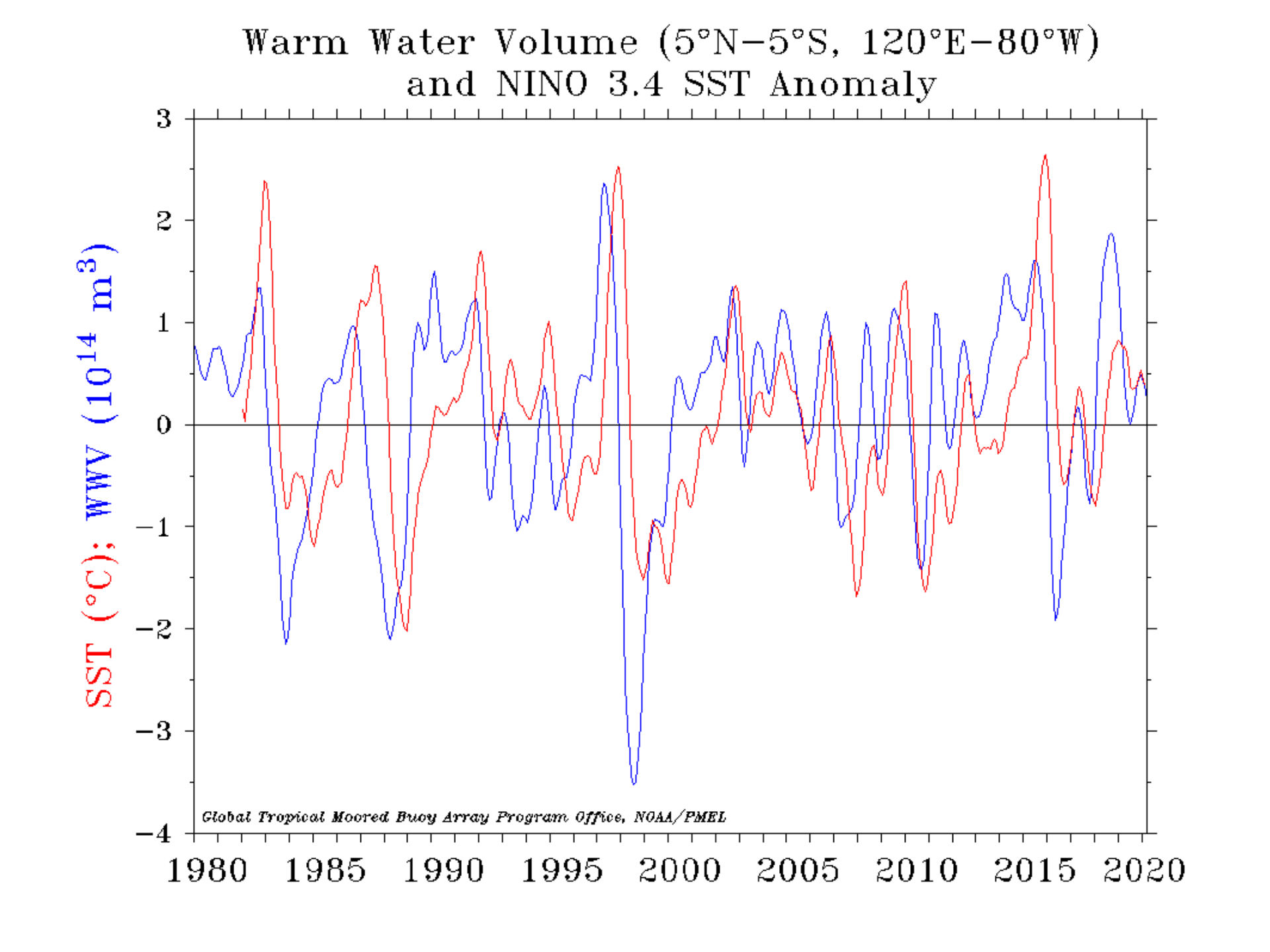
Since mid-December 2019, above-average temperatures have persisted between ~170°E and ~140°W.

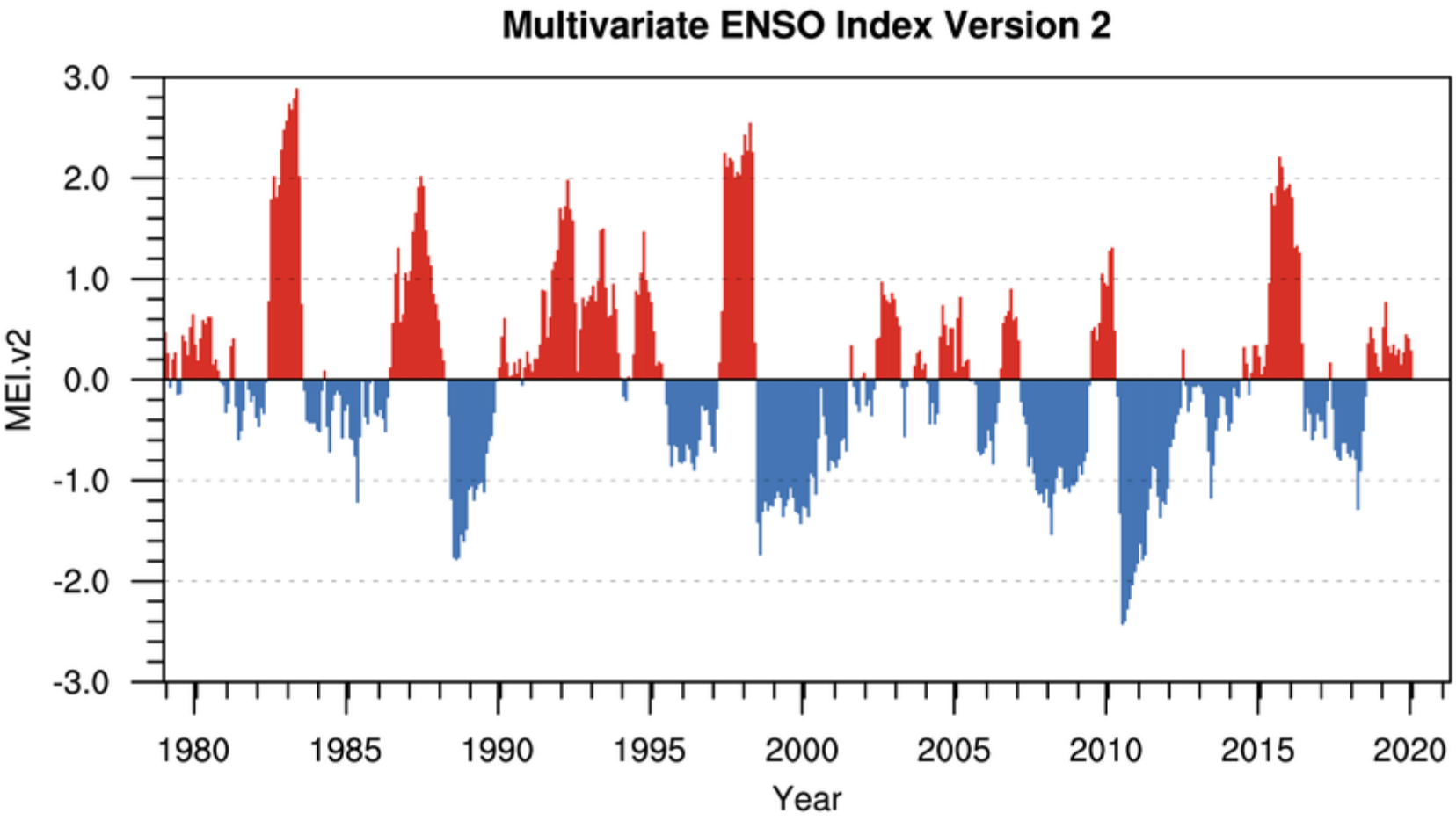
Recently, a downwelling Kelvin wave increased temperature anomalies in the east-central Pacific.

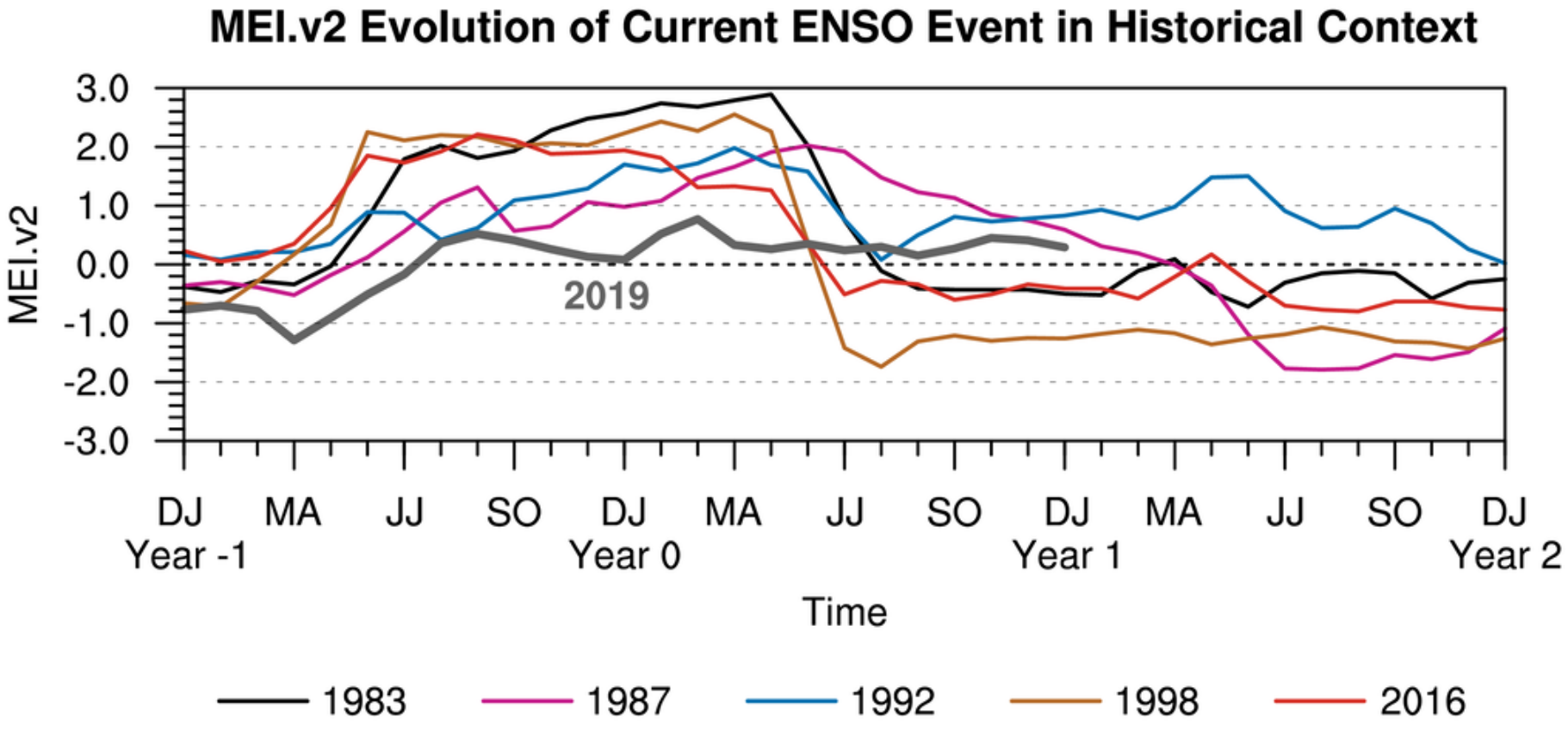
Equatorial oceanic Kelvin waves have alternating warm and cold phases. The warm phase is indicated by dashed lines. Down-welling and warming occur in the leading portion of a Kelvin wave, and up-welling and cooling occur in the trailing portion.



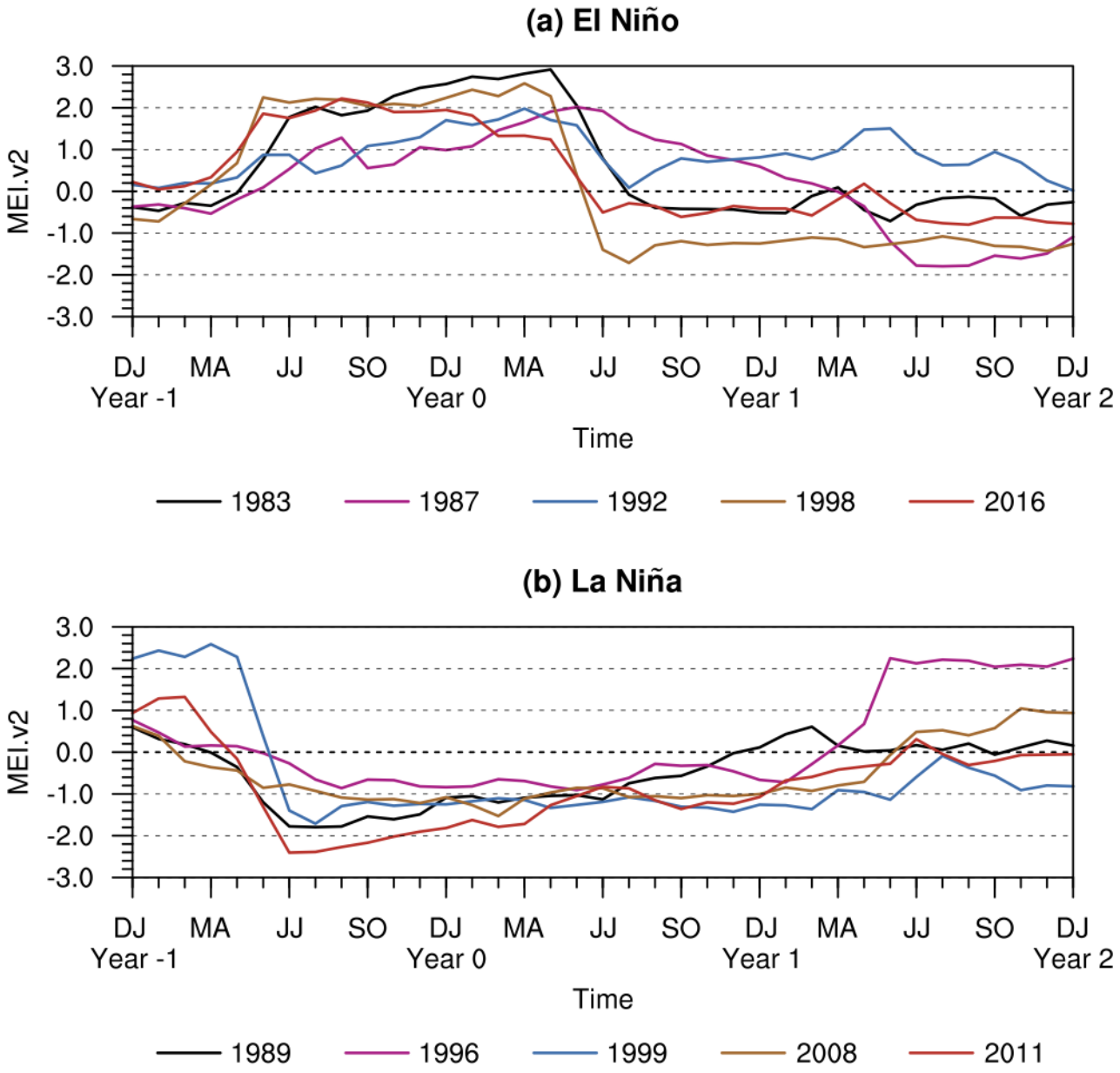
Prepared by: Climate Prediction Center/NCEP


Warm Water Volume (5°N–5°S, 120°E–80°W)
and NINO 3.4 SST Anomaly
SST (°C); WWV (10^{14} m^3)
3
2
1
0
−1
−2
−3
−4
1980
1985
1990
1995
2000
2005
2010
2015
2020
Global Tropical Moored Buoy Array Program Office, NOAA/PMEL


Multivariate ENSO Index Version 2
MEI.v2
3.0
2.0
1.0
0.0
-1.0
-2.0
-3.0
1980
1985
1990
1995
2000
2005
2010
2015
2020
Year

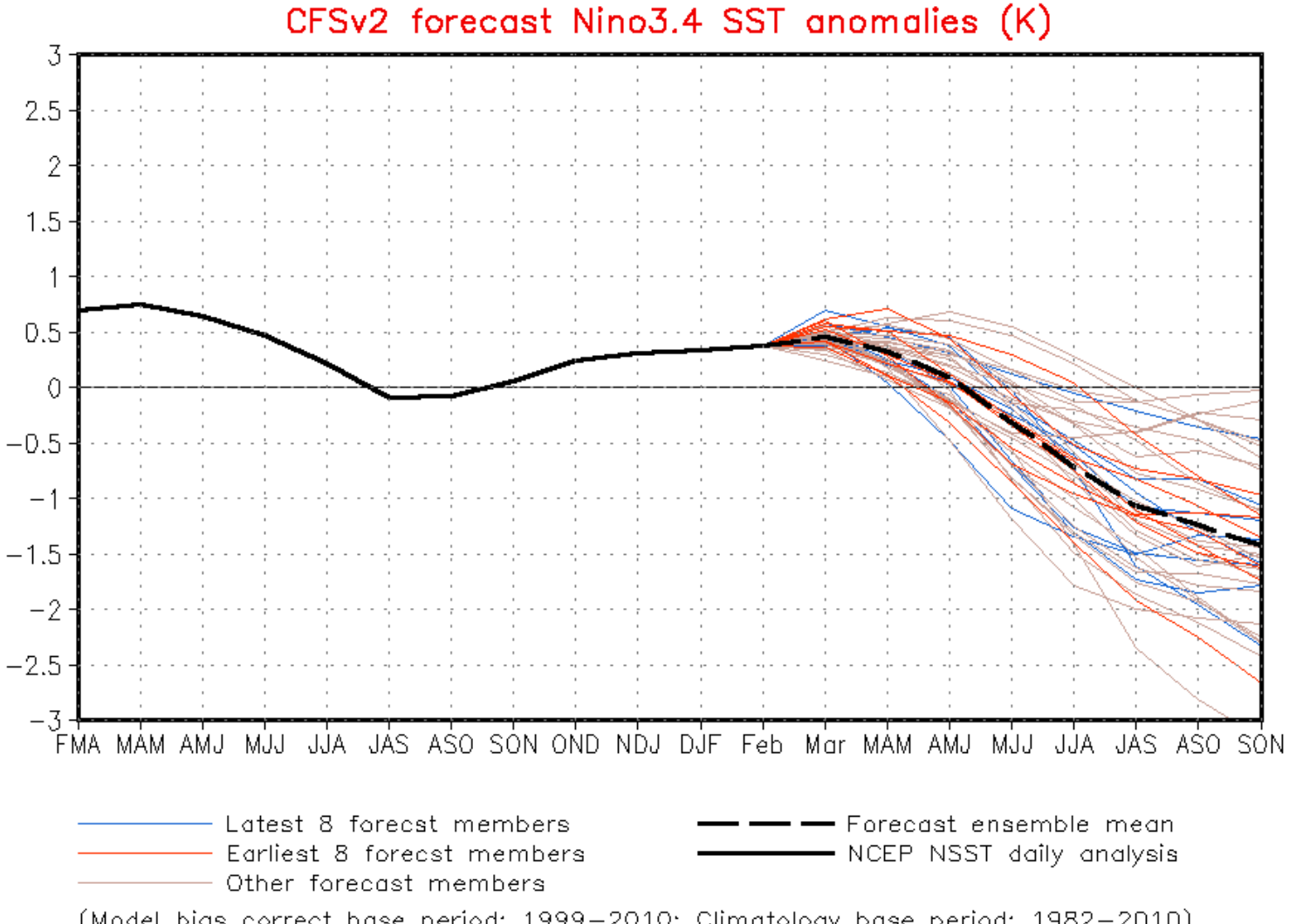

MEI.v2 Evolution of Current ENSO Event in Historical Context
MEI.v2
3.0
2.0
1.0
0.0
-1.0
-2.0
-3.0
2019
DJ
MA
JJ
SO
DJ
MA
JJ
SO
DJ
MA
JJ
SO
DJ
Year -1
Year 0
Year 1
Year 2
Time
1983
1987
1992
1998
2016

MEI.v2 Evolution of Historical ENSO Events



NWS/NCEP/CPC

Last update: Sun Mar 8 2020
Initial conditions: 7Feb2020–16Feb2020



IRI/CPC Pacific Niño 3.4 SST Model Outlook

A majority of models favor ENSO-neutral through the Northern Hemisphere summer 2020.

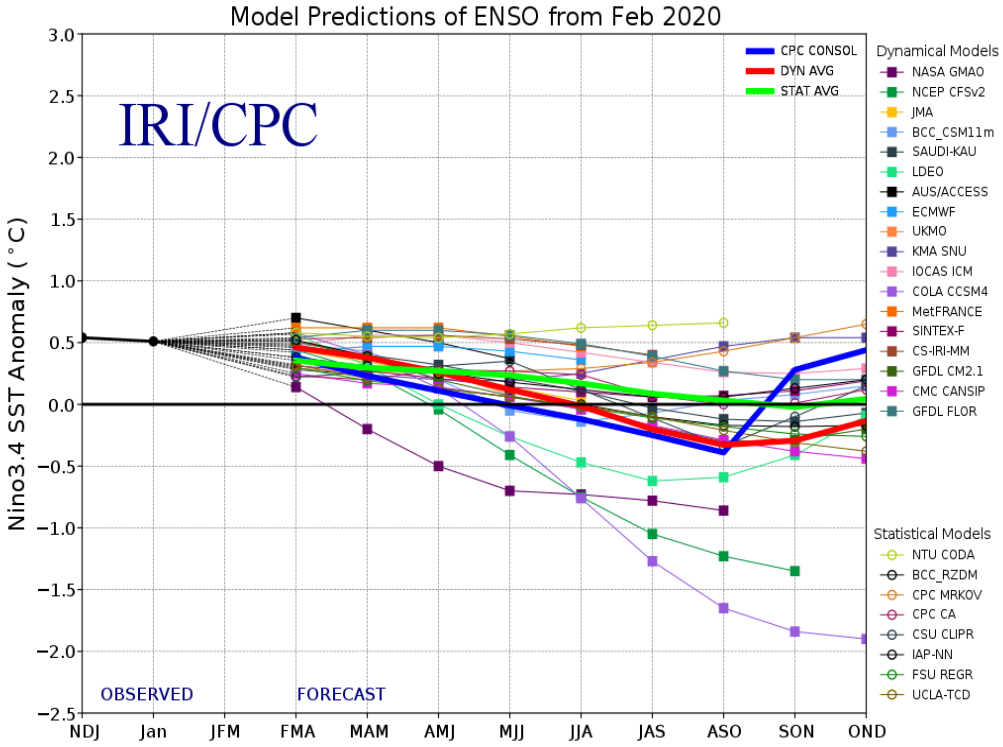


Figure provided by the International Research Institute (IRI) for Climate and Society (updated 19 February 2020).

Prepared by: Climate Prediction Center/NCEP

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.

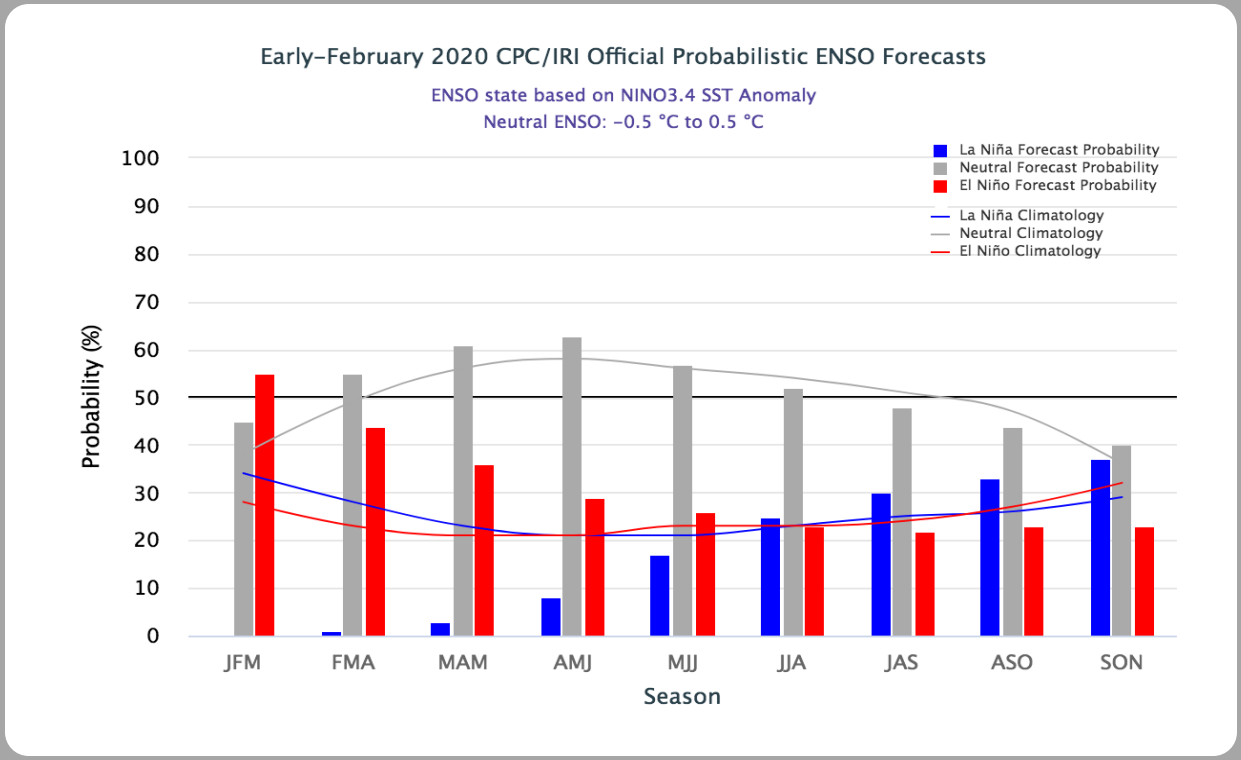
Year	DJF	JFM	FMA	MAM	AMJ	MJJ	JJA	JAS	ASO	SON	OND	NDJ
2008	-1.6	-1.4	-1.2	-0.9	-0.8	-0.5	-0.4	-0.3	-0.3	-0.4	-0.6	-0.7
2009	-0.8	-0.7	-0.5	-0.2	0.1	0.4	0.5	0.5	0.7	1.0	1.3	1.6
2010	1.5	1.3	0.9	0.4	-0.1	-0.6	-1.0	-1.4	-1.6	-1.7	-1.7	-1.6
2011	-1.4	-1.1	-0.8	-0.6	-0.5	-0.4	-0.5	-0.7	-0.9	-1.1	-1.1	-1.0
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	0.8	0.6	0.5	0.3	0.1	0.1	0.3	0.5	0.5
2020	0.5											

Prepared by: Climate Prediction Center/IRI

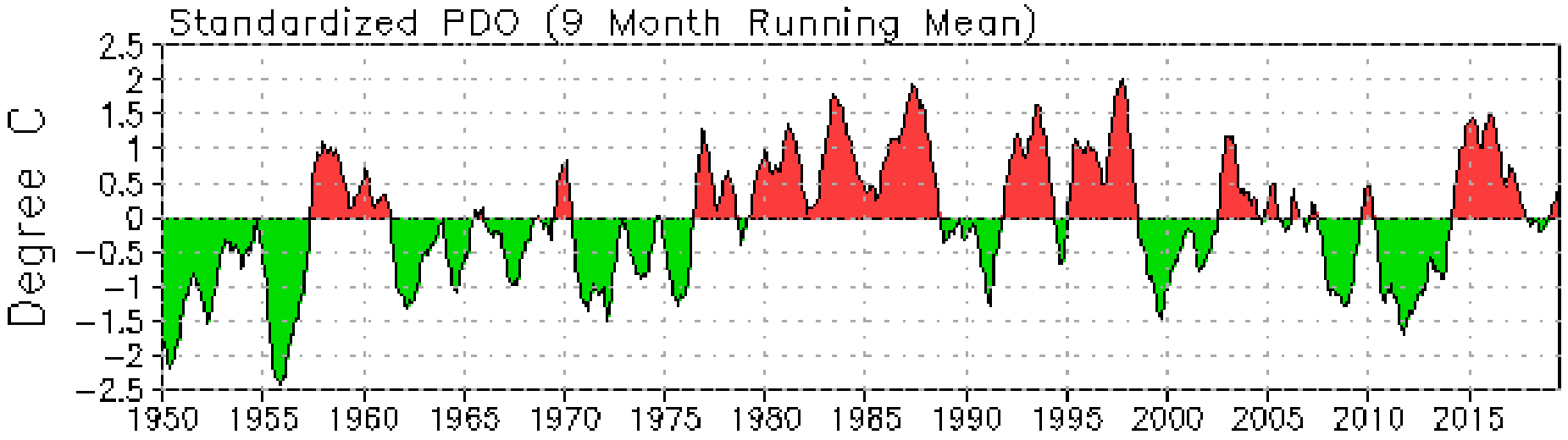
CPC/IRI Probabilistic ENSO Outlook

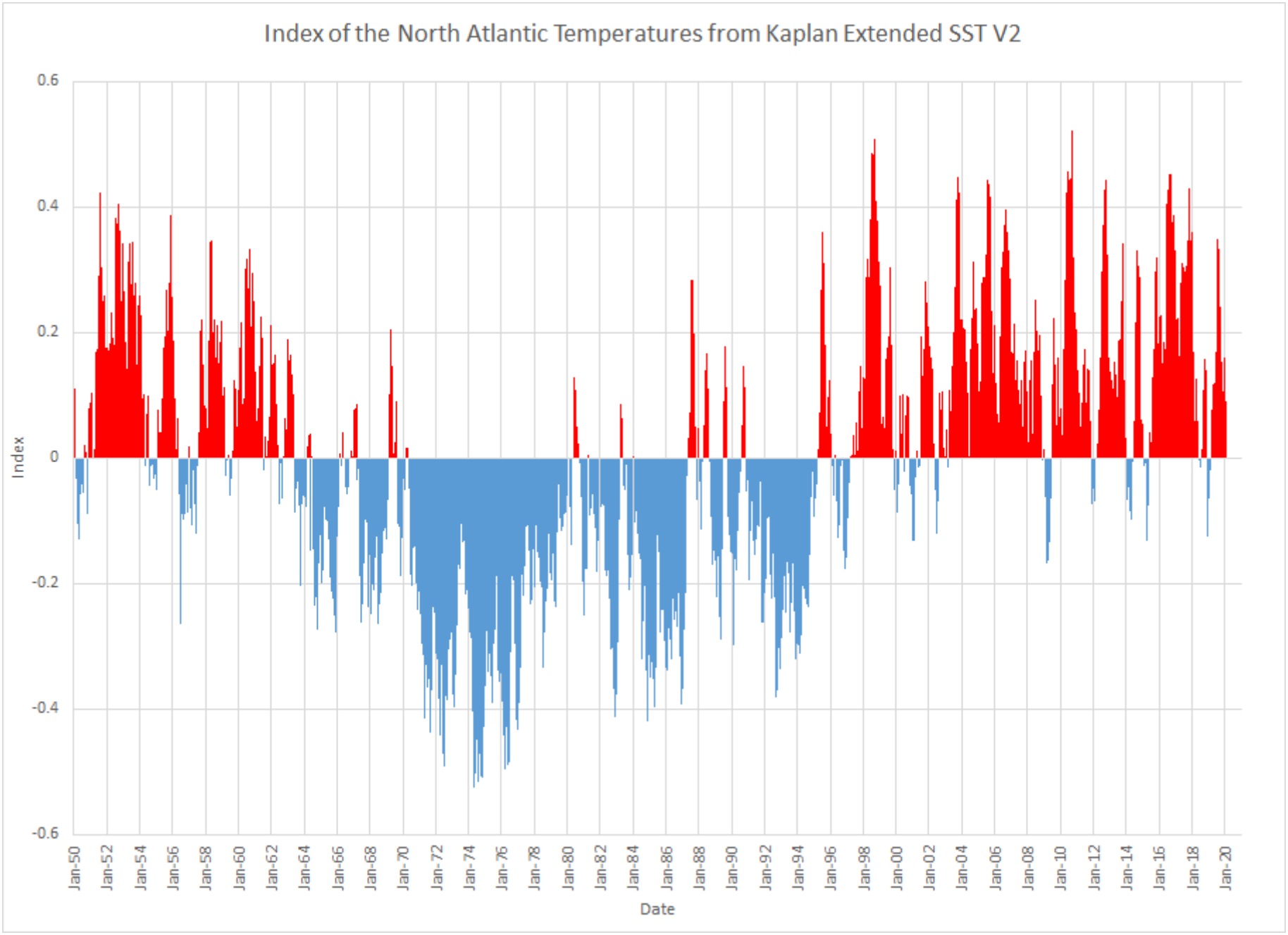
Updated: 13 February 2020

ENSO-neutral is most likely to continue through the Northern Hemisphere summer 2020.



Prepared by: Climate Prediction Center/IRI

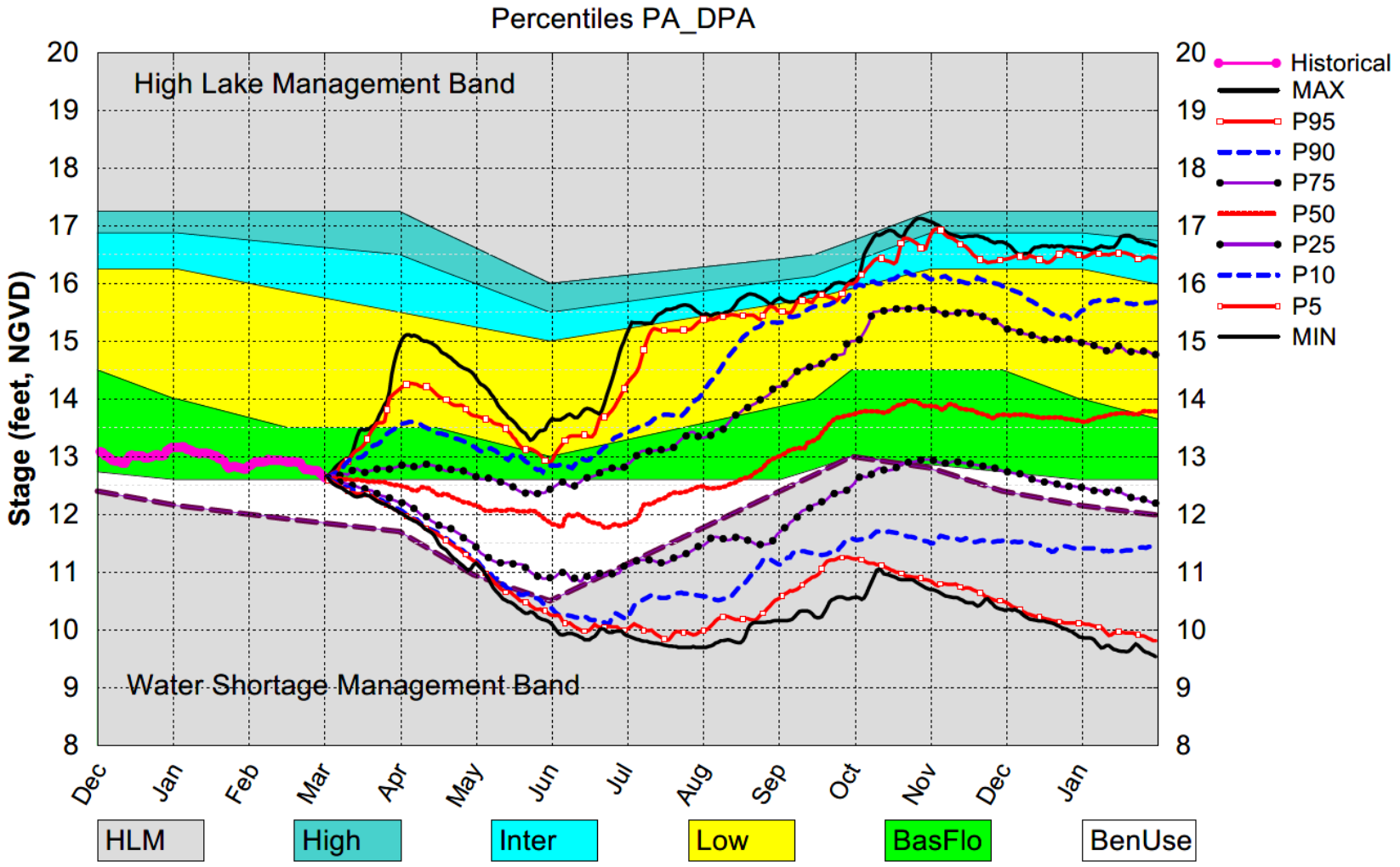

Standardized PDO (9 Month Running Mean)
Degree C
2.5
2
1.5
1
0.5
0
−0.5
−1
−1.5
−2
−2.5
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015


Index of the North Atlantic Temperatures from Kaplan Extended SST V2
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
Index
Jan-50
Jan-52
Jan-54
Jan-56
Jan-58
Jan-60
Jan-62
Jan-64
Jan-66
Jan-68
Jan-70
Jan-72
Jan-74
Jan-76
Jan-78
Jan-80
Jan-82
Jan-84
Jan-86
Jan-88
Jan-90
Jan-92
Jan-94
Jan-96
Jan-98
Jan-00
Jan-02
Jan-04
Jan-06
Jan-08
Jan-10
Jan-12
Jan-14
Jan-16
Jan-18
Jan-20
Date

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 or 15th 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-March-2020)
  - 41 1-year simulations of system response to historical rainfall conditions
  - Statistical summaries used to display projections

Lake Okeechobee SFWMM Mar 2020 Position Analysis

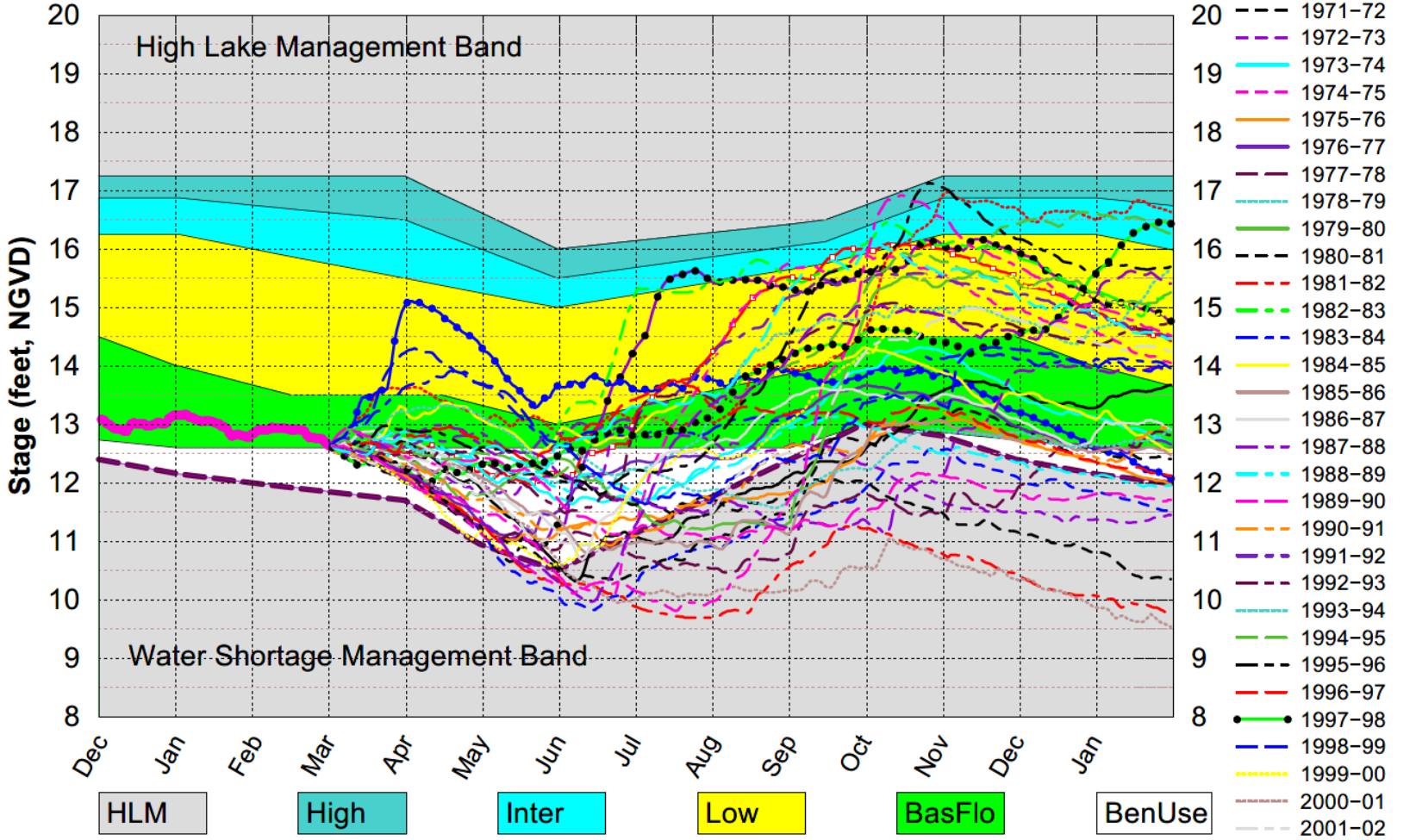


(See assumptions on the Position Analysis Results website)

Fri Mar 6 13:22:26 2020

Lake Okeechobee SFWMM Mar 2020 Position Analysis

All Simulated Years Plot PA_DPA

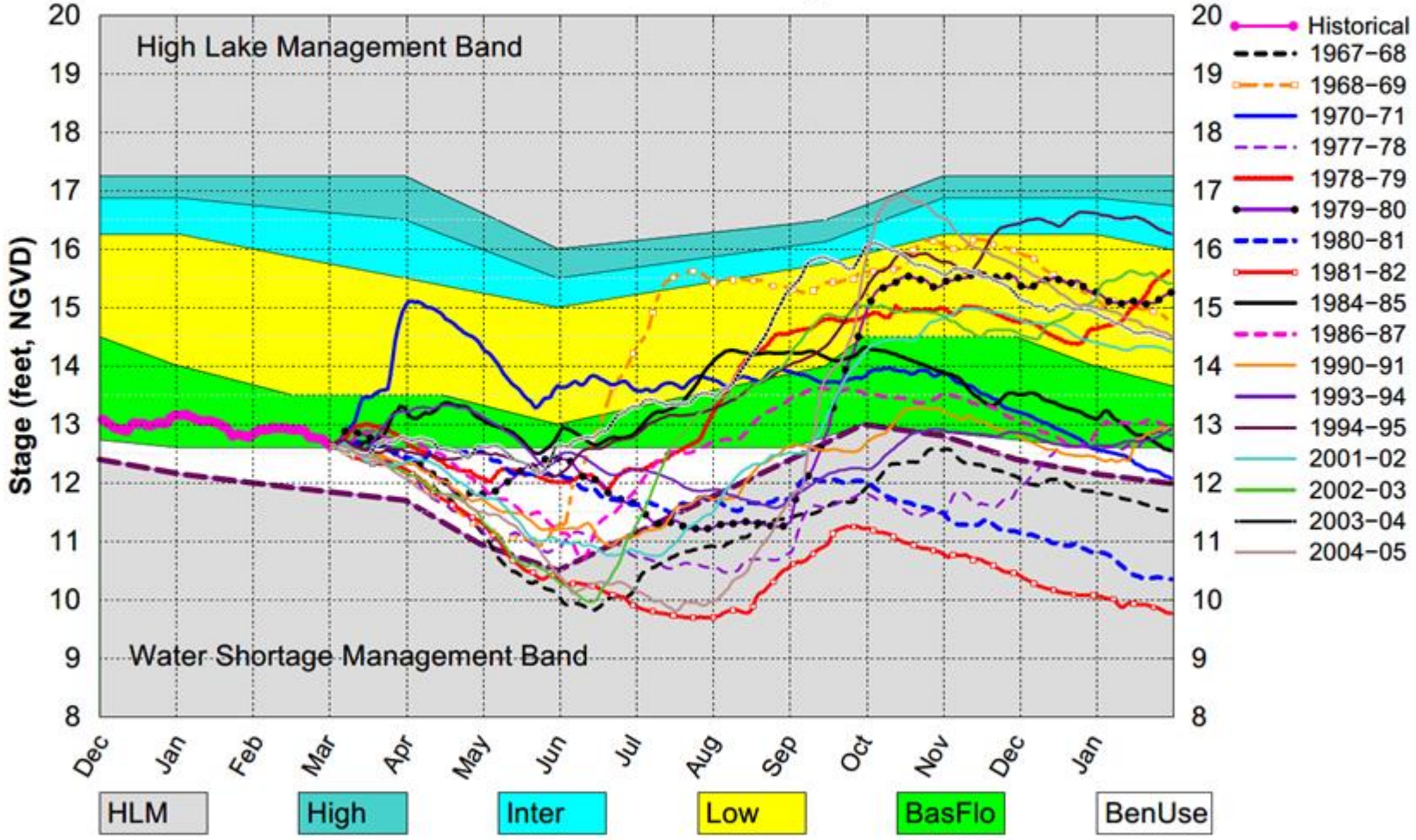


(See assumptions on the Position Analysis Results website)

Fri Mar 6 13:25:28 2020

Lake Okeechobee SFWMM Mar 2020 Position Analysis

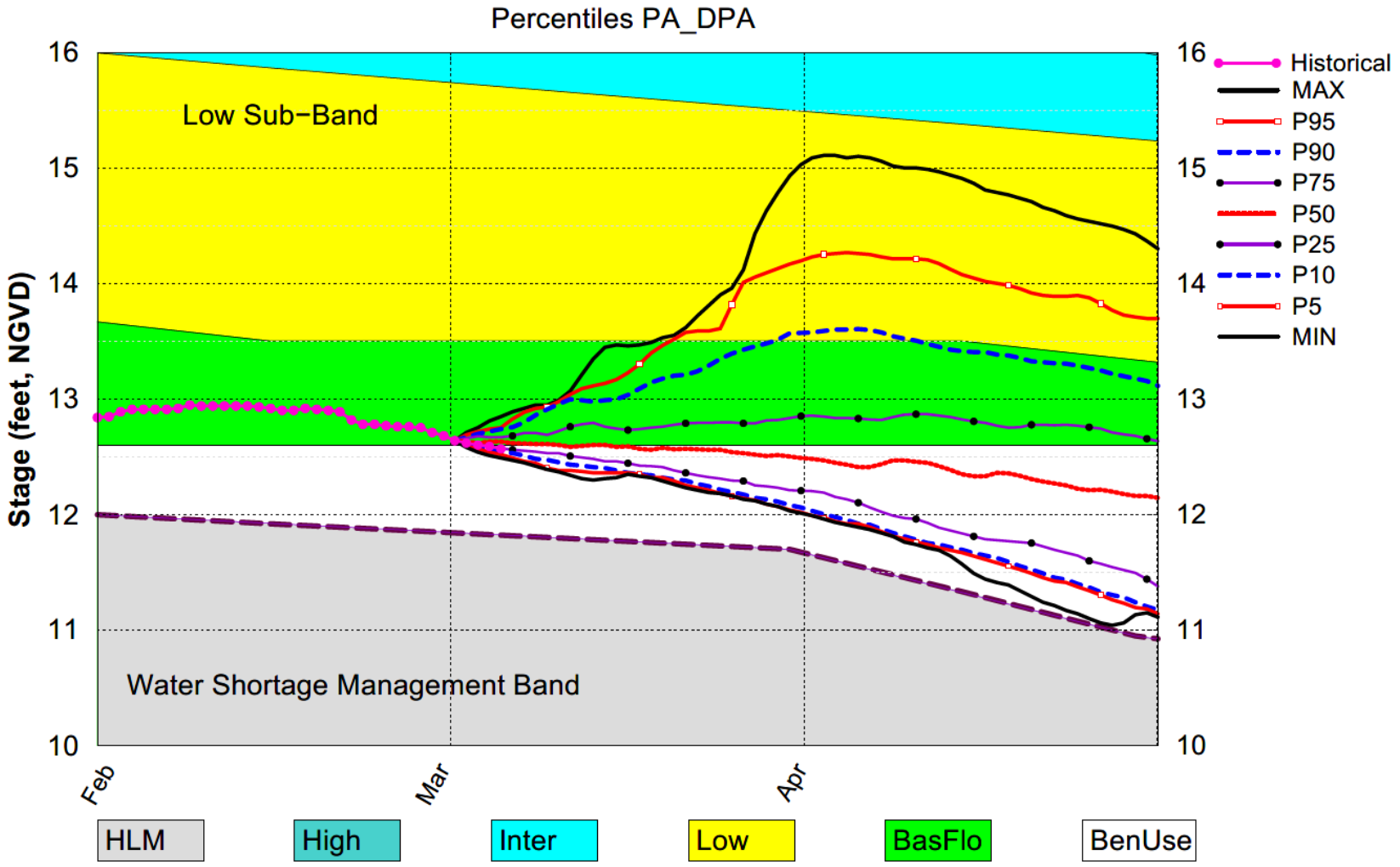
All ENSO Neutral Years Plot PA_DPA



(See assumptions on the Position Analysis Results website)

Fri Mar 6 13:23:02 2020

Lake Okeechobee SFWMM Mar 2020 Position Analysis



(See assumptions on the Position Analysis Results website)

Fri Mar 6 15:05:49 2020