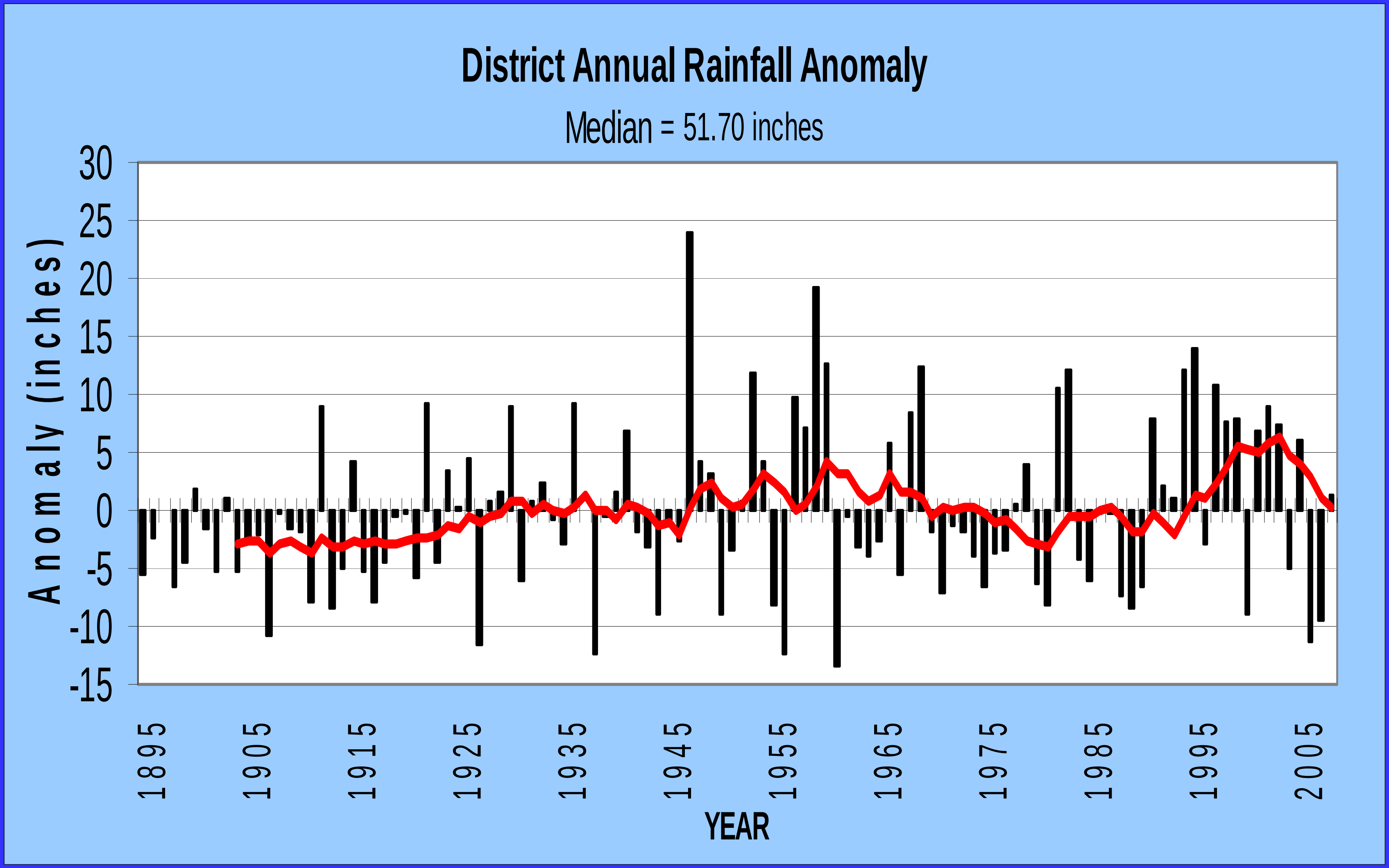
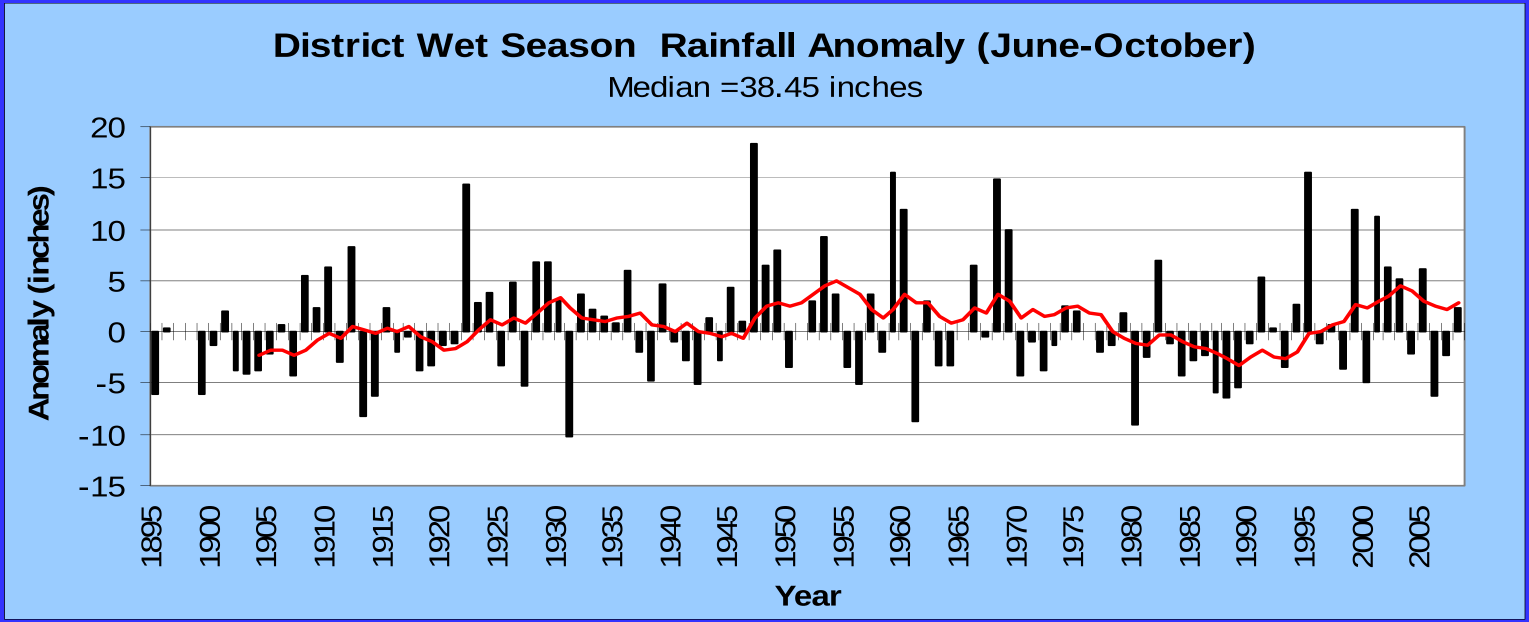
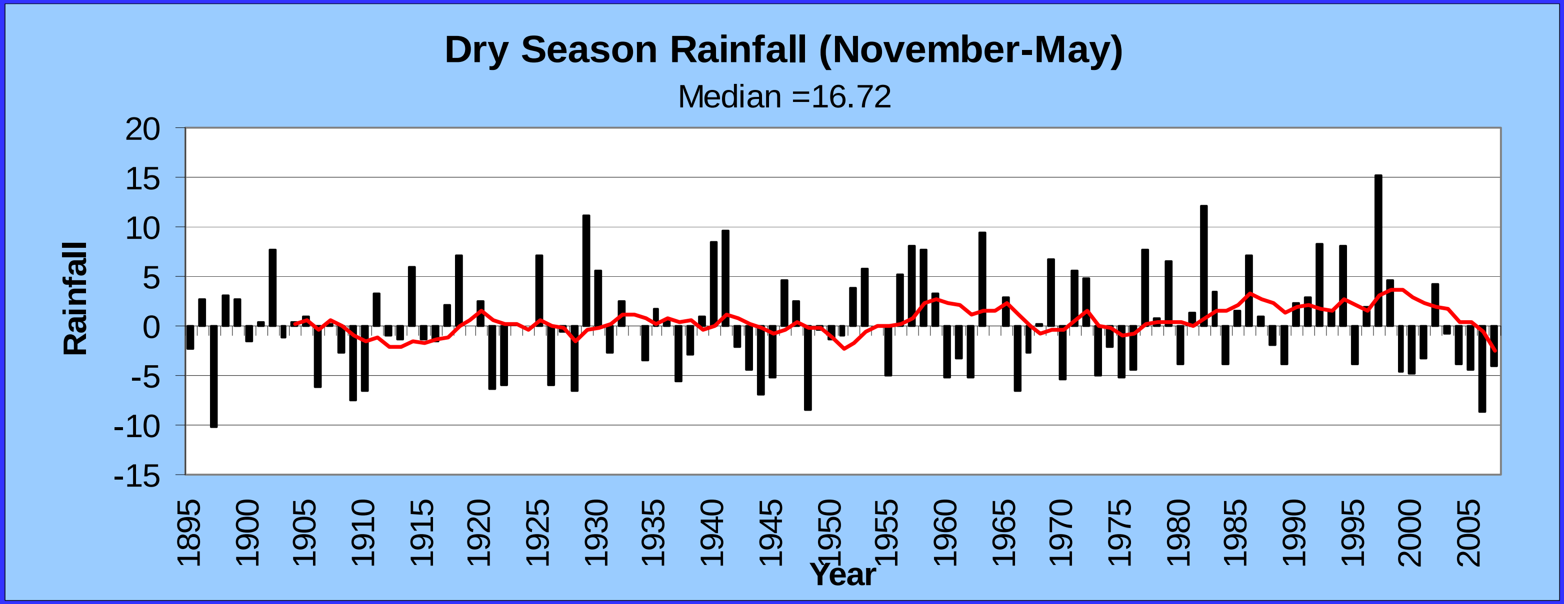
Weekly Climate Update April 14th 2009

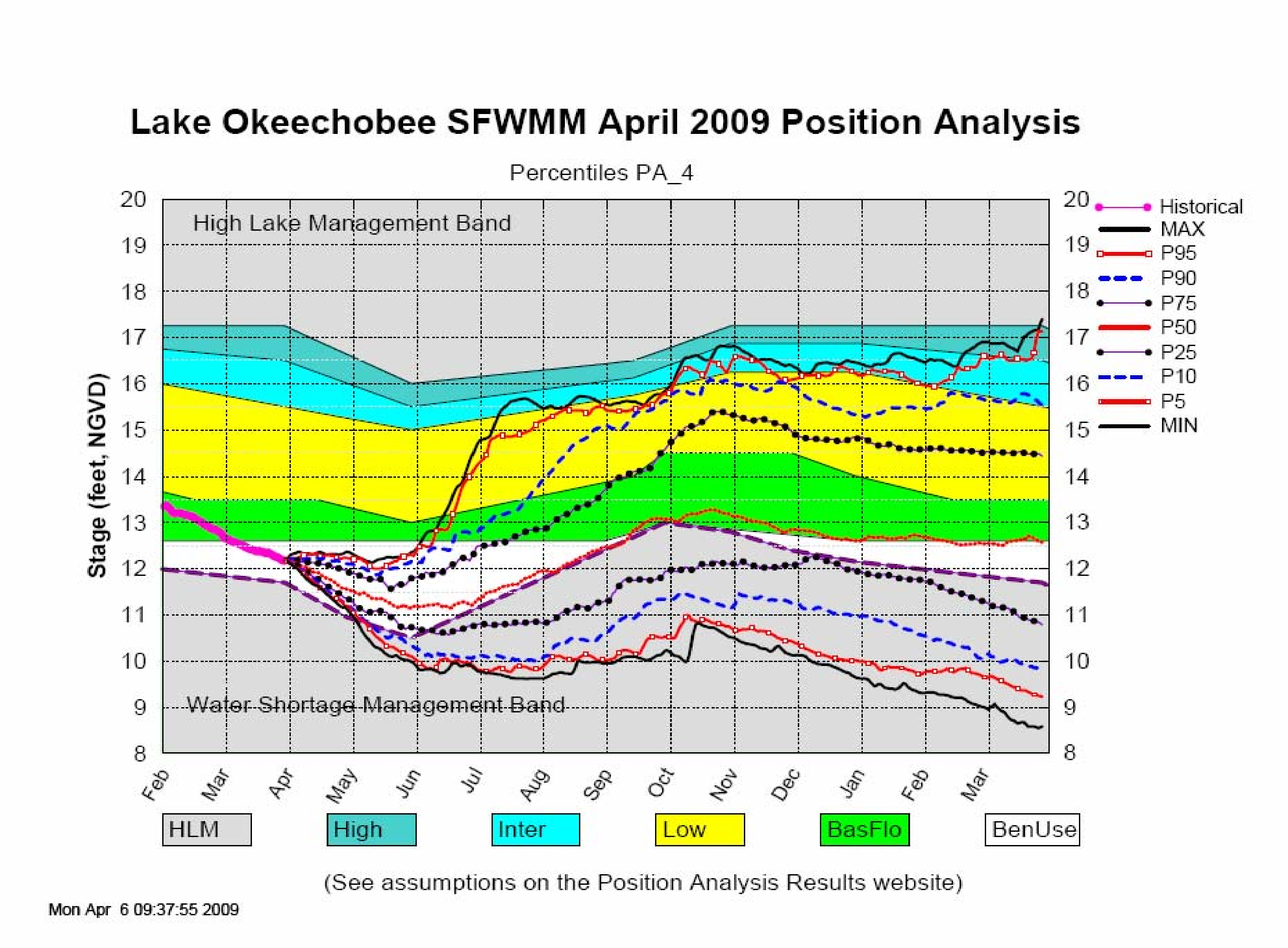
- La Nina conditions have been slowly weakening and currently are transitioning to neutral conditions. The month of May rainfall has been below normal during for the past several years [slide 31].
- The negative subsurface temperature anomalies along the central and eastern equatorial Pacific Ocean are a sign that La Nina conditions have potential to redevelop later this year. However, the majority of models predict neutral or warm phase ENSO conditions to develop this upcoming wet season period.
- The official climate outlook calls for an increased probability of below normal rainfall for the remainder of the dry season (April through June).
- The April Position Analysis in slide 13 - 17 illustrate projected water levels for Lake Okeechobee and the Water Conservation Areas.


District Annual Rainfall Anomaly
Median = 51.70 inches
Anomaly (inches)
30
25
20
15
10
5
0
-5
-10
-15
1895
1905
1915
1925
1935
1945
1955
1965
1975
1985
1995
2005
YEAR

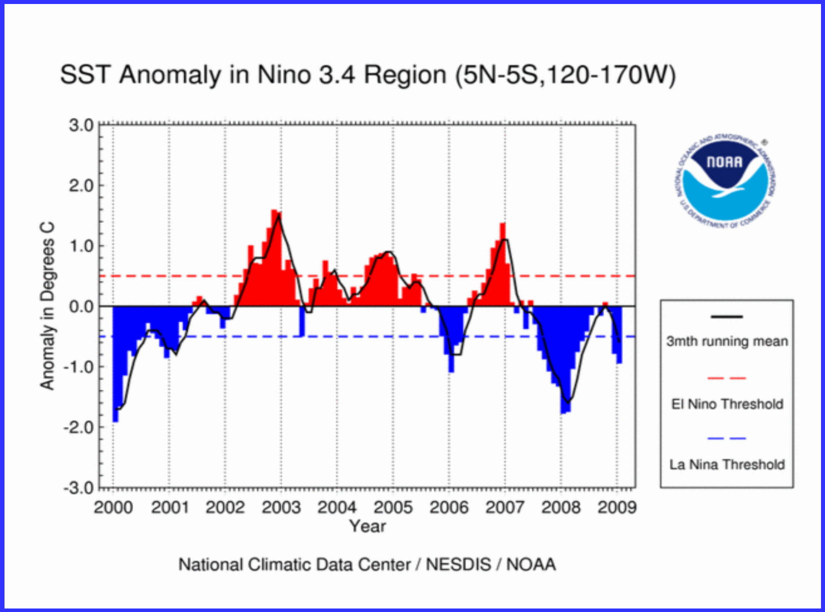

District Wet Season Rainfall Anomaly (June-October)
Median =38.45 inches
Anomaly (inches)
20
15
10
5
0
-5
-10
-15
1895
1900
1905
1910
1915
1920
1925
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
Year


Dry Season Rainfall (November-May)
Median =16.72
Rainfall
20
15
10
5
0
-5
-10
-15
1895
1900
1905
1910
1915
1920
1925
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
Year

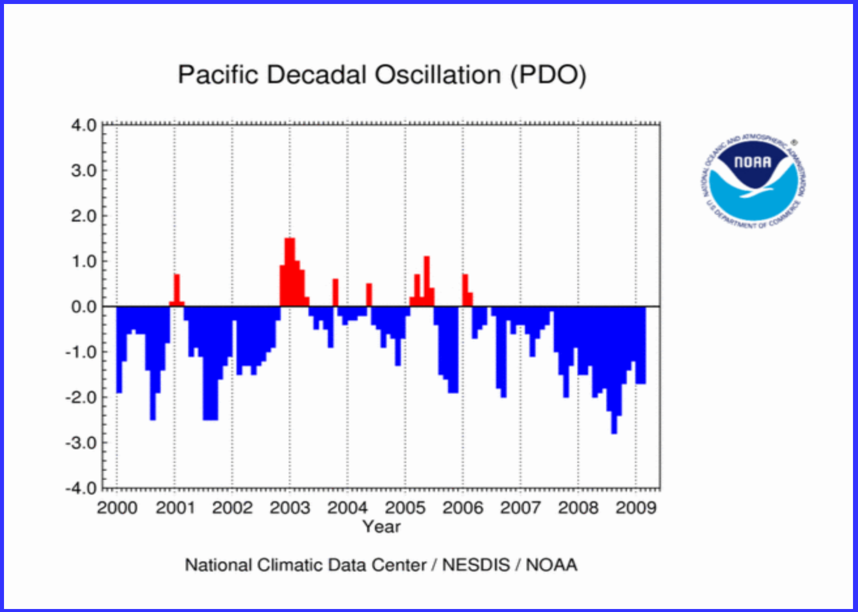
April 1st Lake Okeechobee Position Analysis

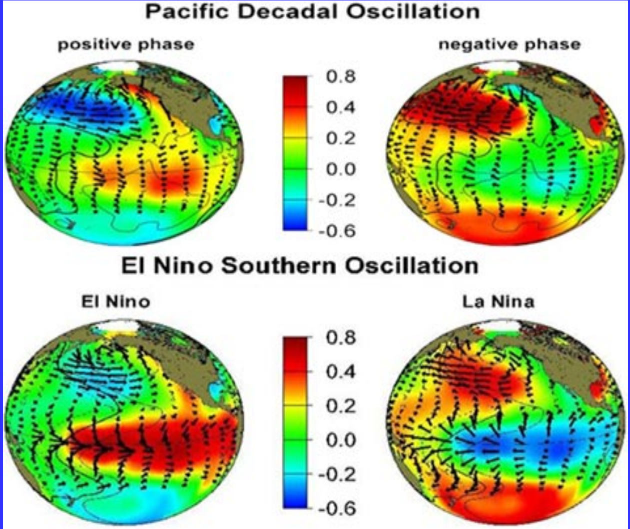


El Nino-Southern Oscillation



Pacific Decadal Oscillation





While the PDO and ENSO influence the same oceanic regions. The periods of oscillations are in different ranges. The ENSO period of oscillation ranges between 3 and 7 years while the PDO period of oscillation is closer to 10 years.

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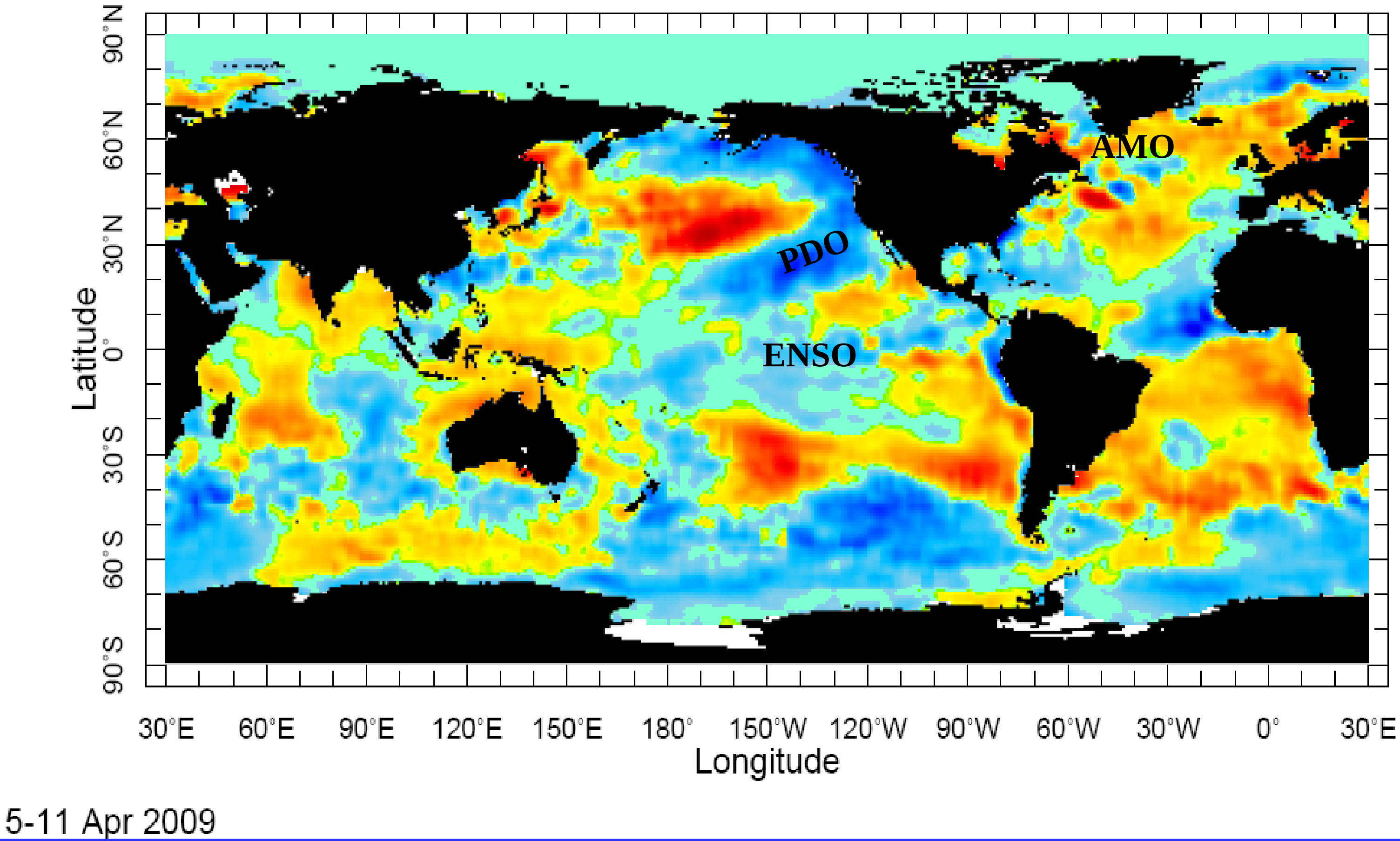
Latest Weekly Sea Surface Temperature Anomaly

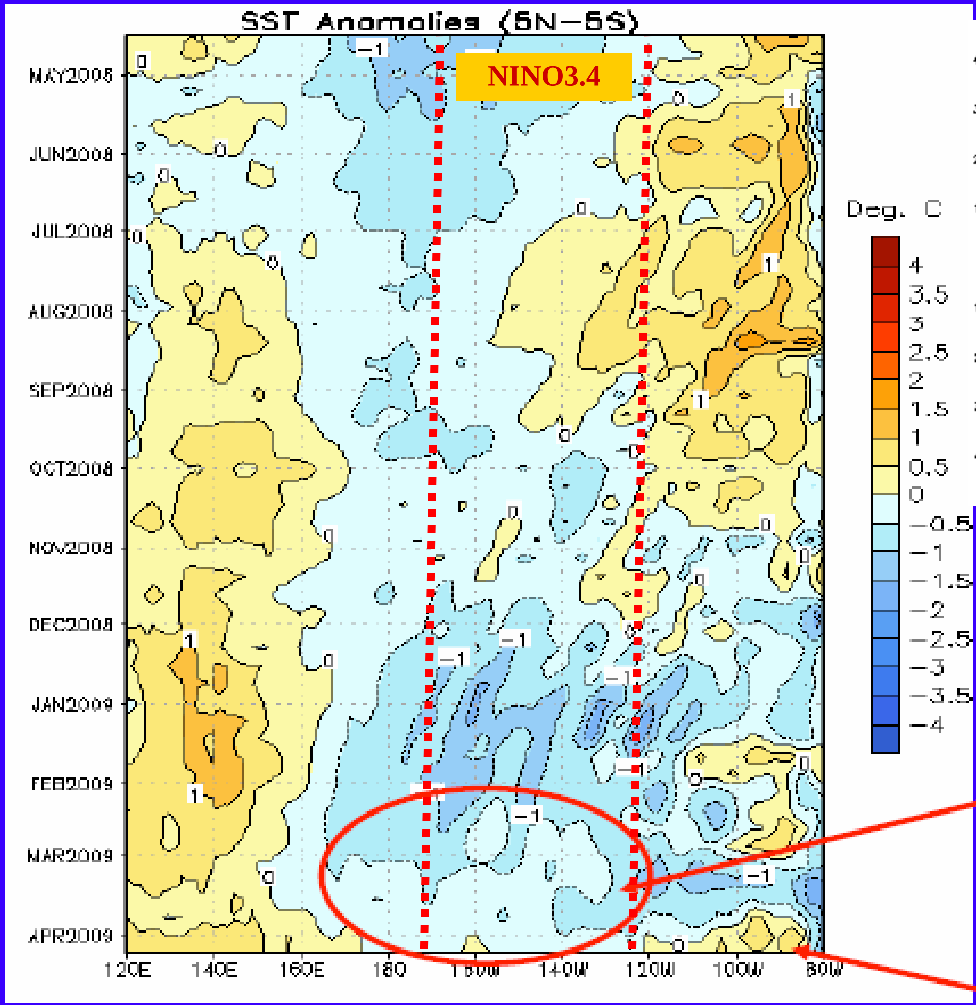
International Research Institute



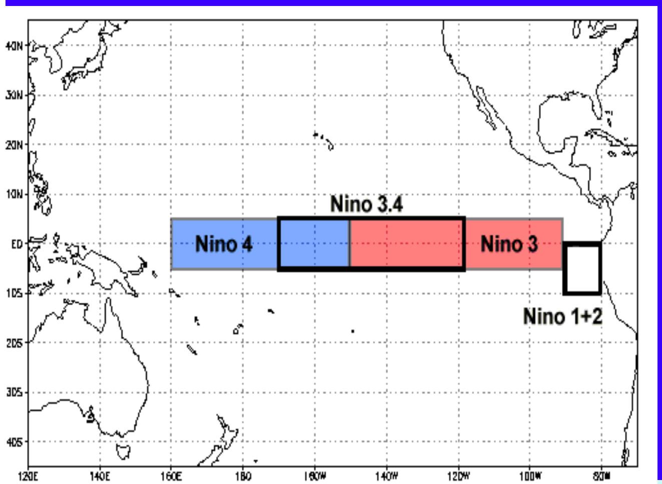
Cooler than normal sea surface temperatures along the west coast of North America are a result of the cold phase of the Pacific Decadal Oscillation.

Recent Evolution of Equatorial Pacific SST Departures (ºC)

Time



Longitude



Since October 2008, negative sea surface temperature (SST) anomalies in the central and east-central equatorial Pacific Ocean have been in place.

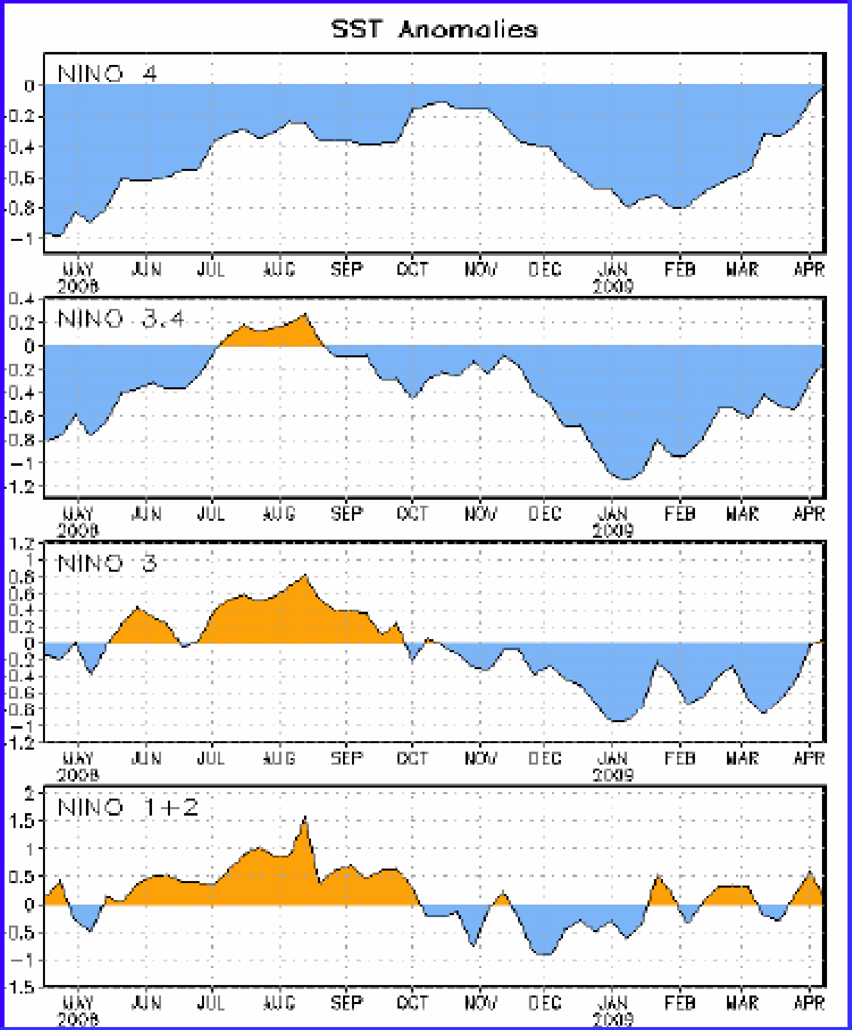
Since February 2009, negative SST anomalies have weakened in the central and east-central Pacific.

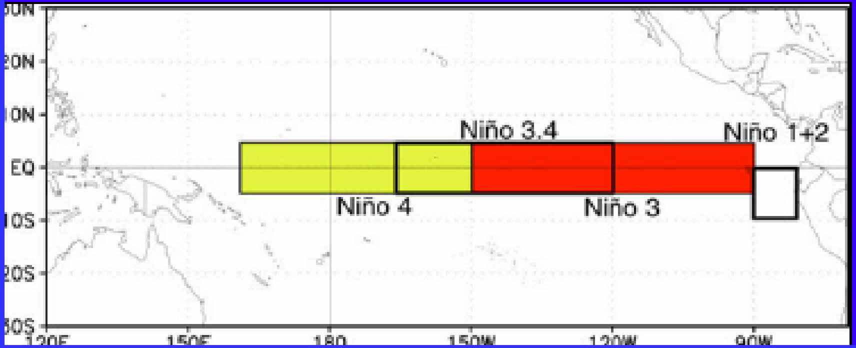
Recently, SST anomalies in the eastern Pacific have also increased.

Niño Region SST Departures (ºC) Recent Evolution

The latest weekly SST departures are:

Niño 4	0.0ºC
Niño 3.4	-0.1ºC
Niño 3	0.1ºC
Niño 1+2	0.1ºC





Equatorial Pacific Subsurface Temperature Anomalies

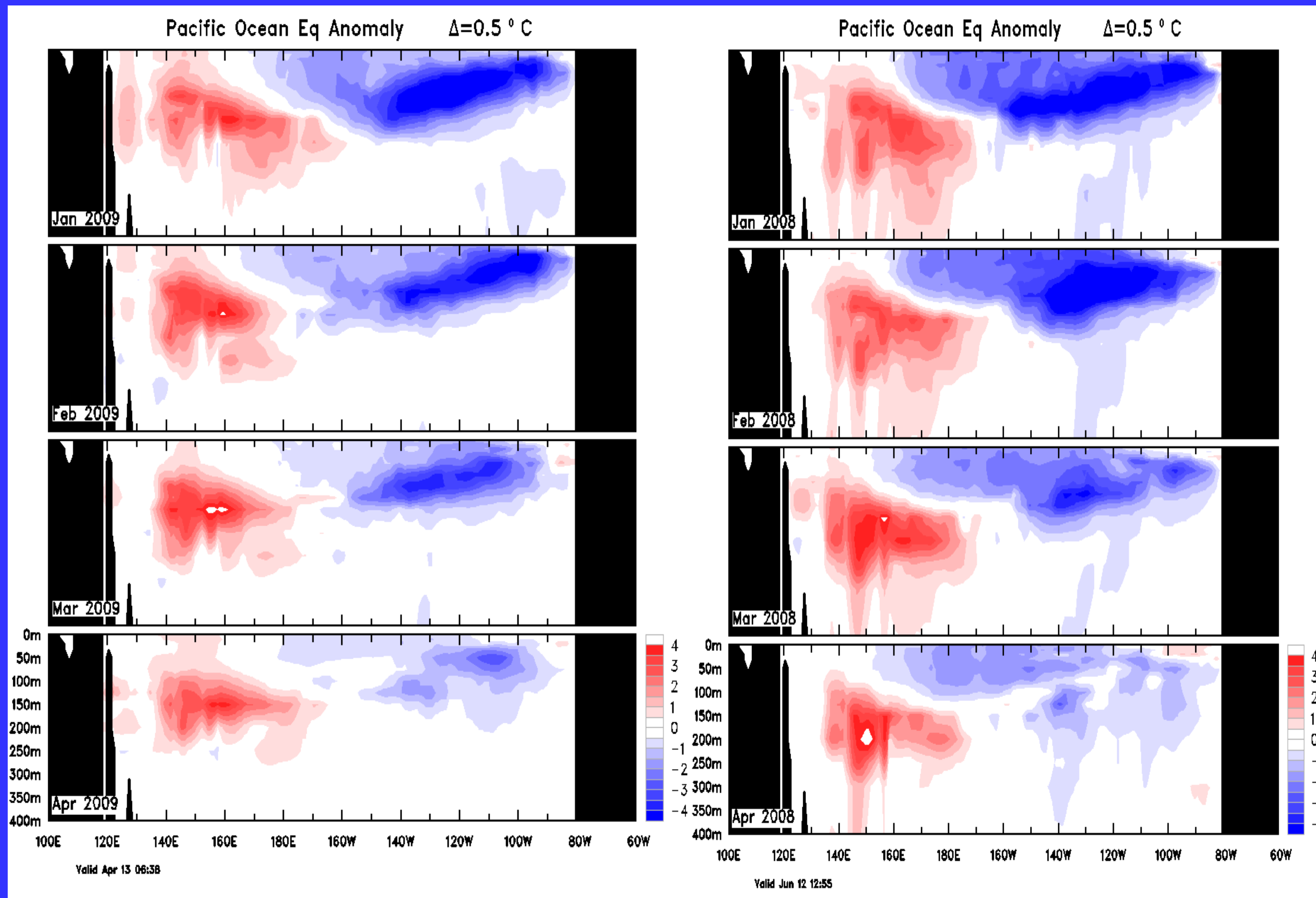
Current | 2008

December

January

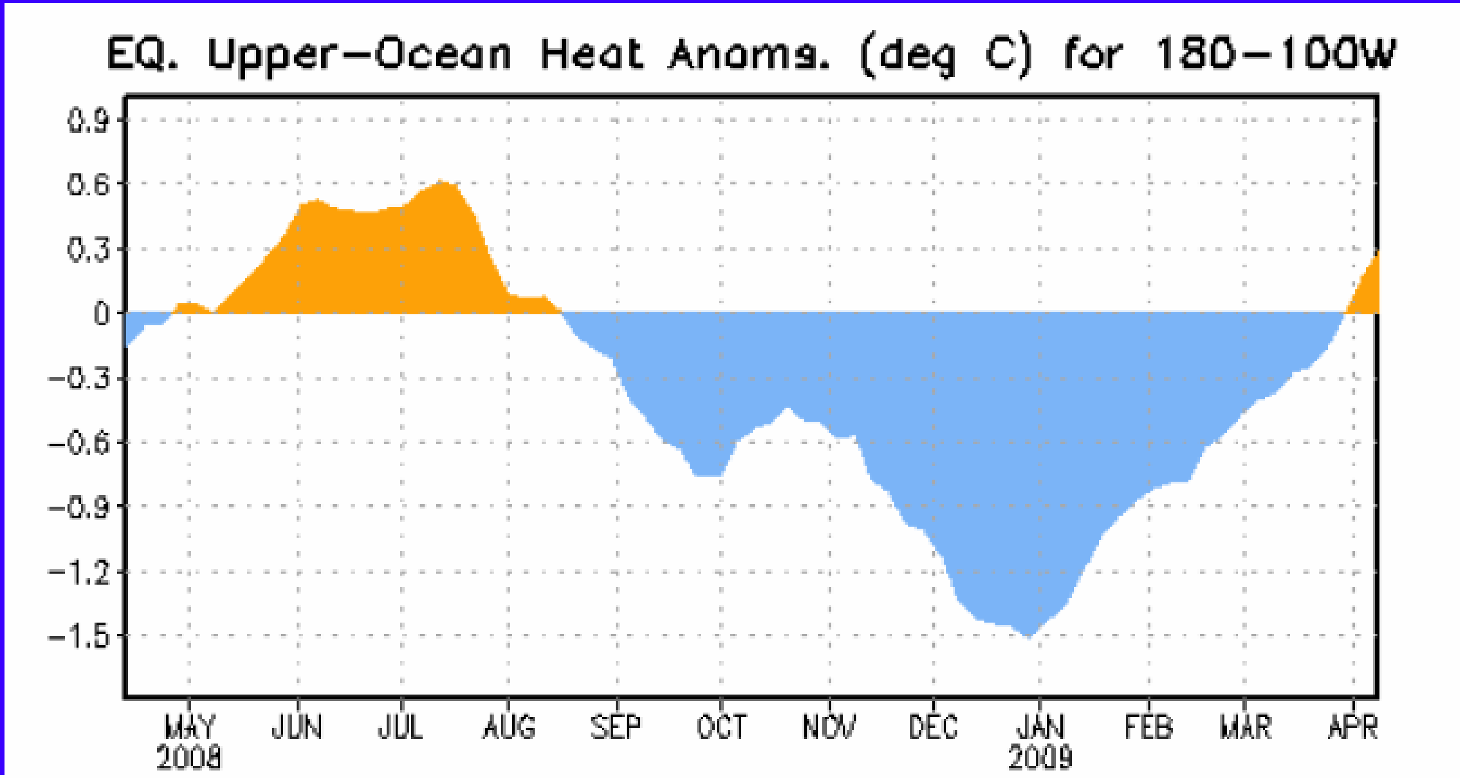
February

March



Subsurface temperatures are similar with slightly smaller anomalies than last year

Central & Eastern Pacific Upper-Ocean (0-300 m) Weekly Heat Content Anomalies

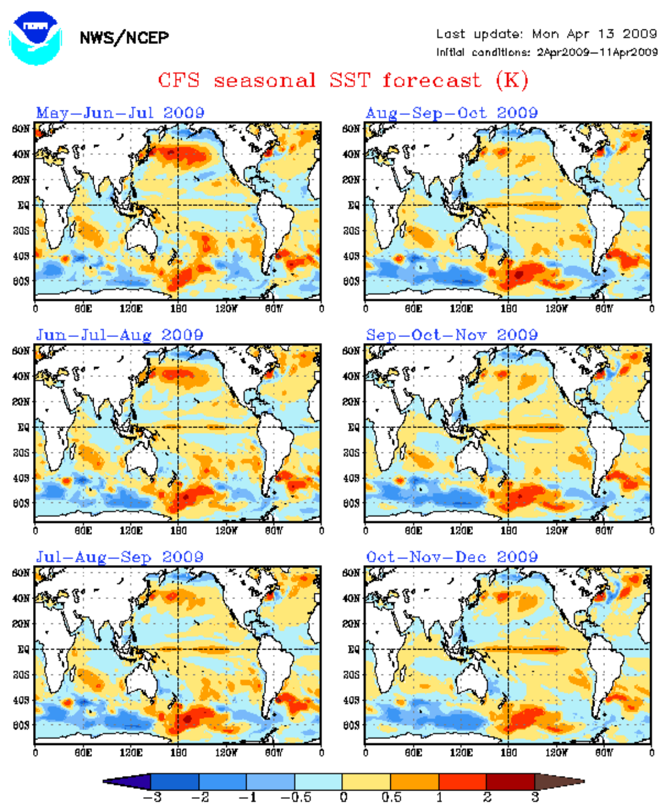


The upper ocean heat content was below-average across the eastern half of the equatorial Pacific Ocean between mid-August and March 2009. Heat content anomalies have weakened since late December 2008 and have recently become positive.

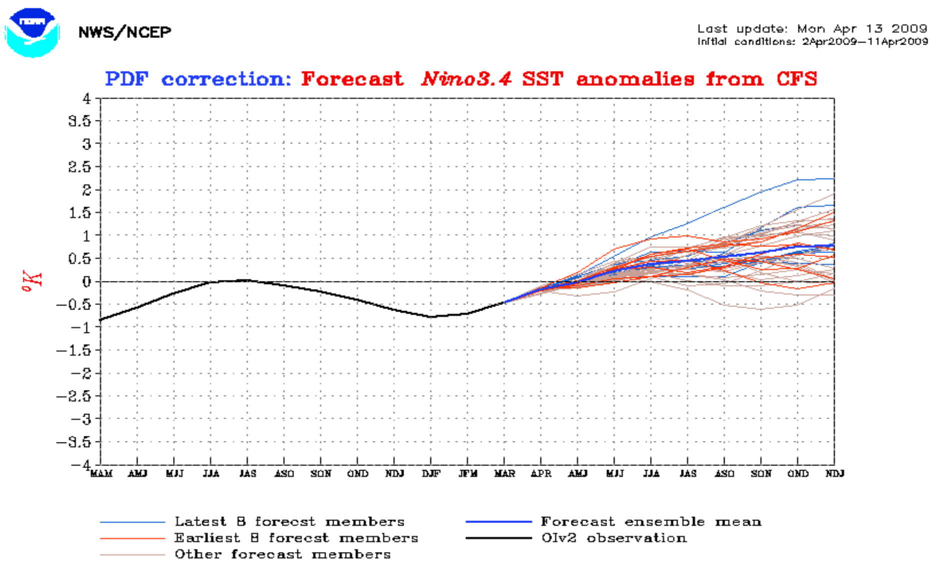
Predicted Sea Surface Temperature Anomalies

Issued April 14th

Global

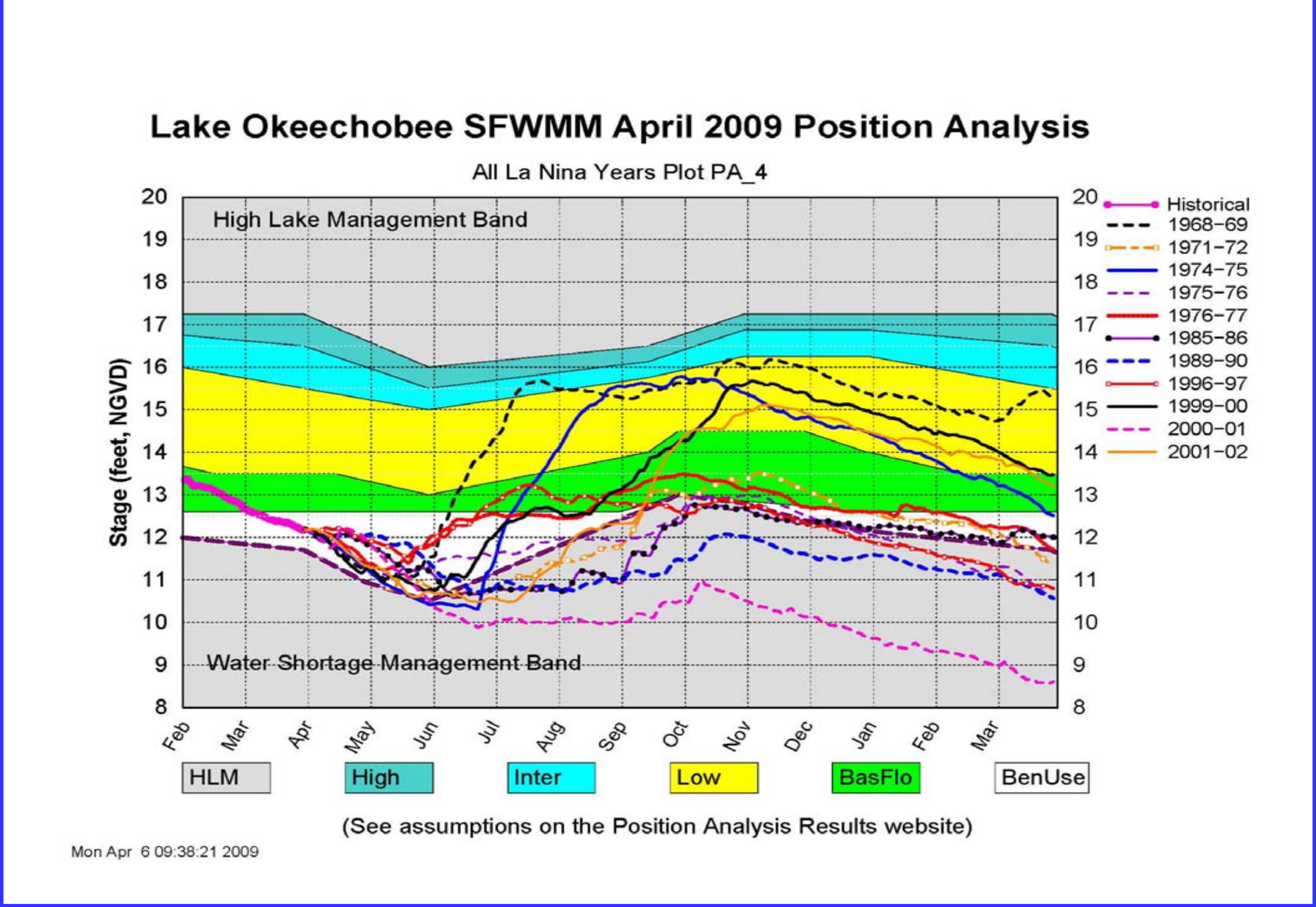


NINO 3.4 Ensemble

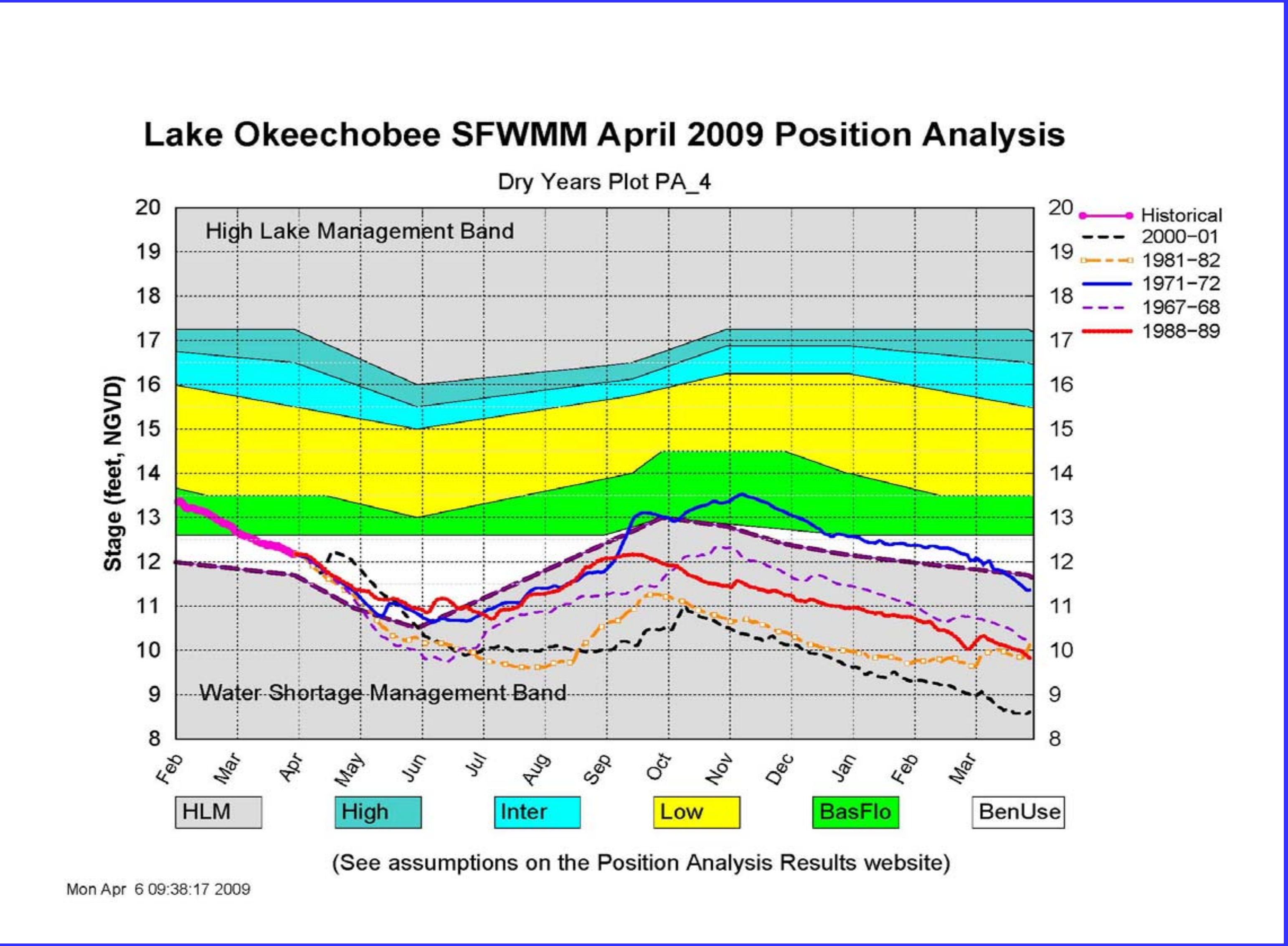


The CFS ensemble mean (heavy blue line) predicts La Niña will end during April 2009, followed by positive SST anomalies in the Niño 3.4 region during the last half of 2009.

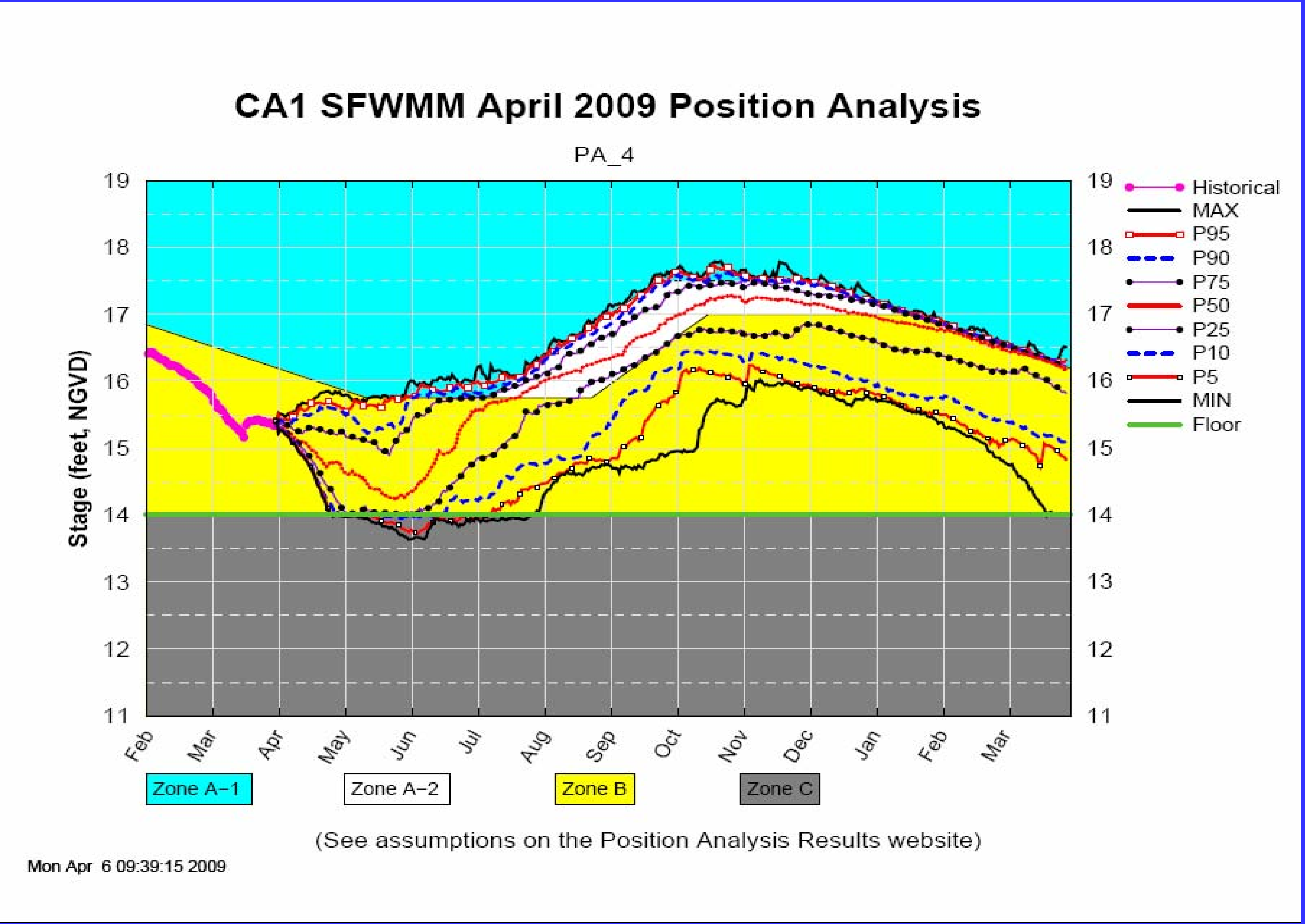
April Position Analysis for La Nina Years



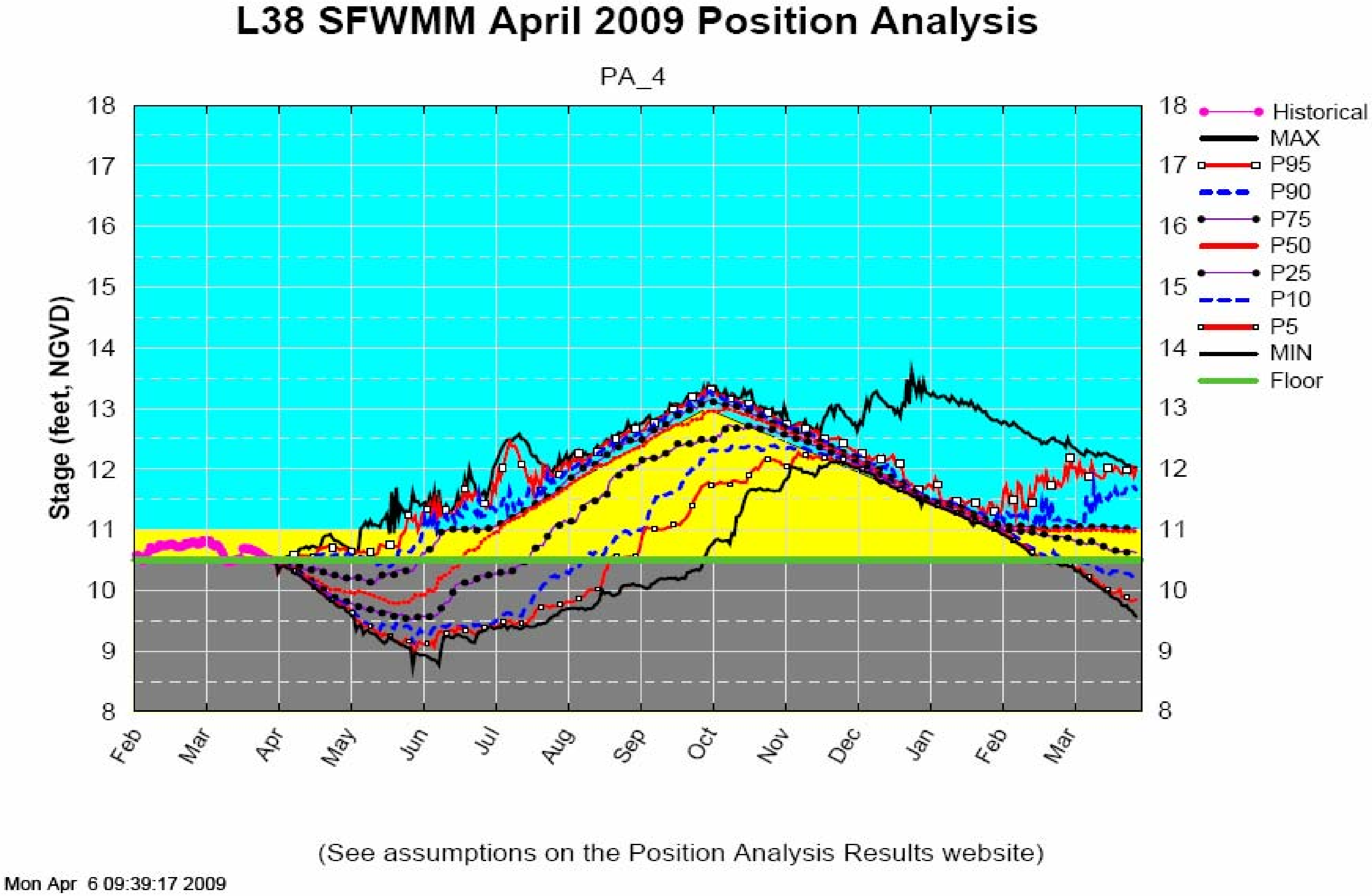
April Position Analysis Dry Years



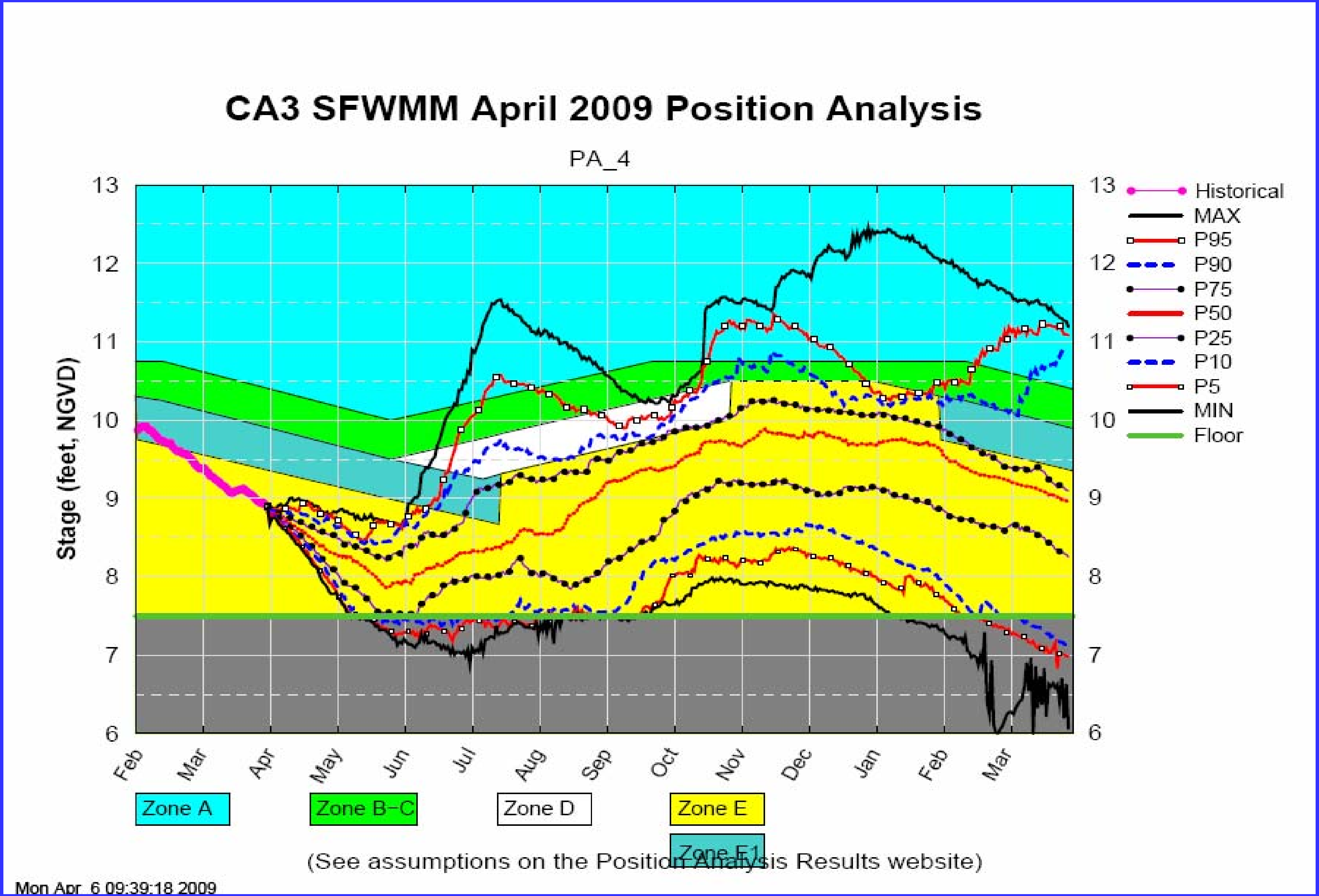
April Position Analysis



April Position Analysis

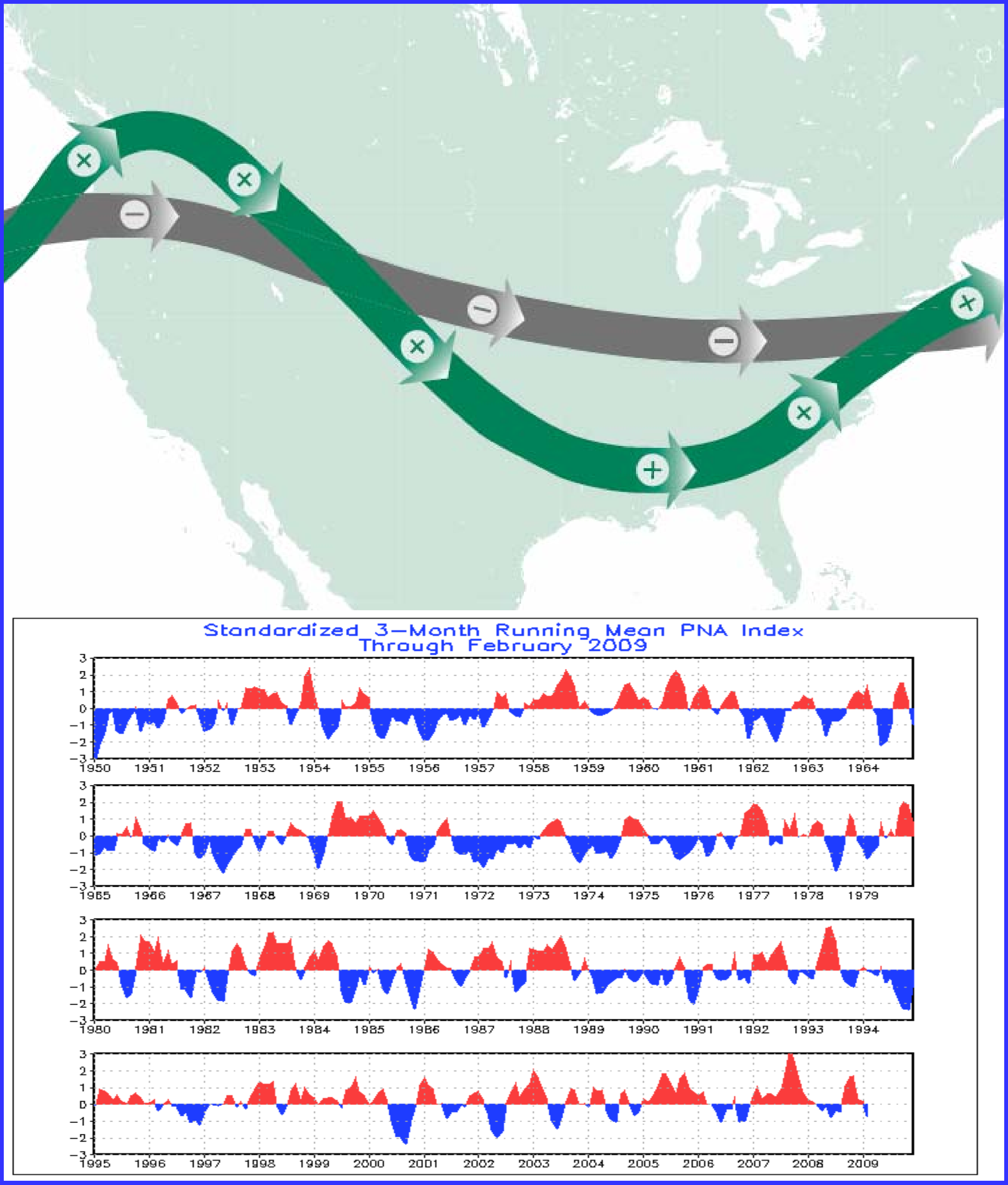


April Position for Water Conservation Area 3



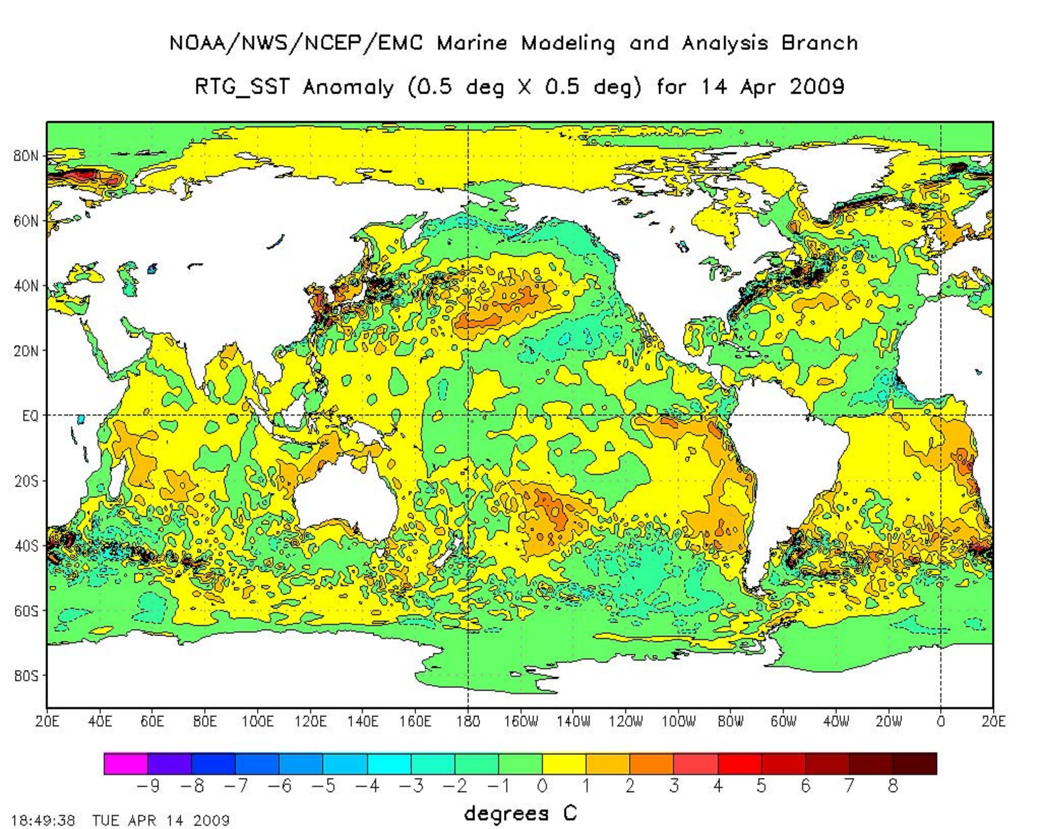
Backup Slides
with additional support material

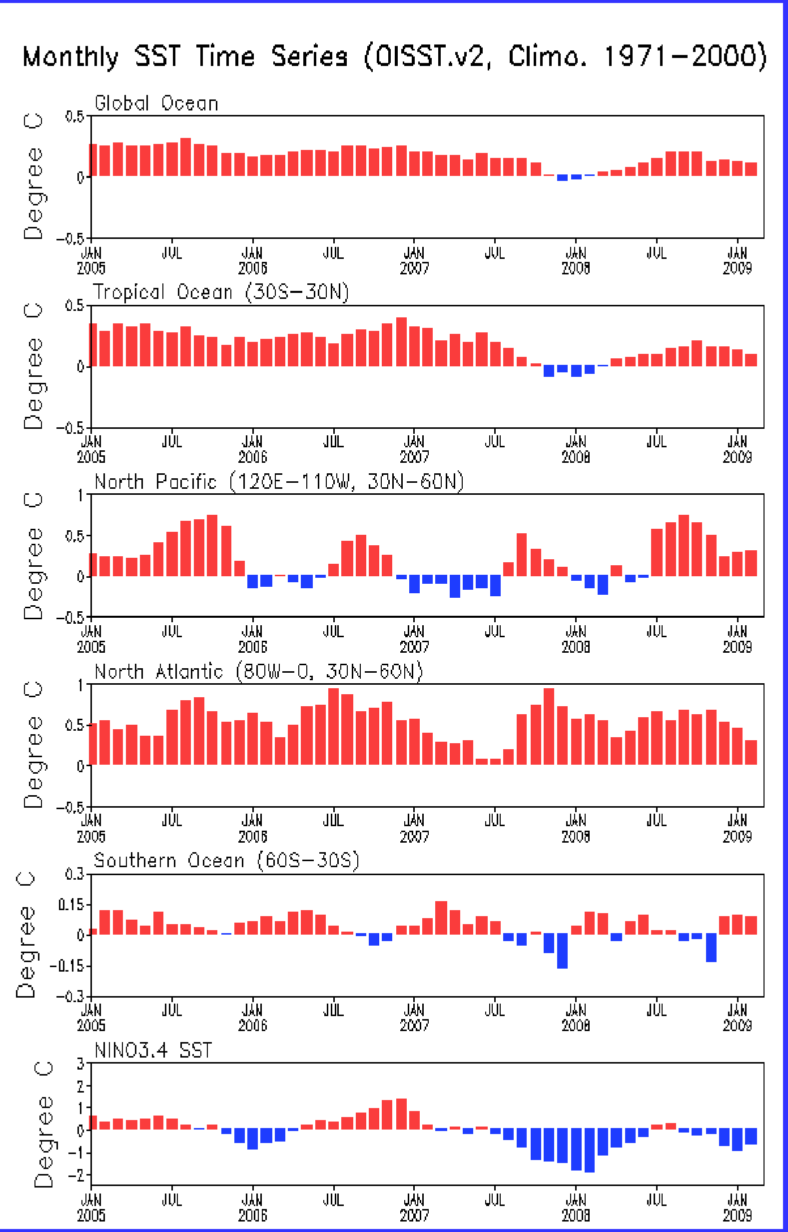
Pacific – North American Index



Summary of Global Sea Surface Temperature Anomalies by Regions

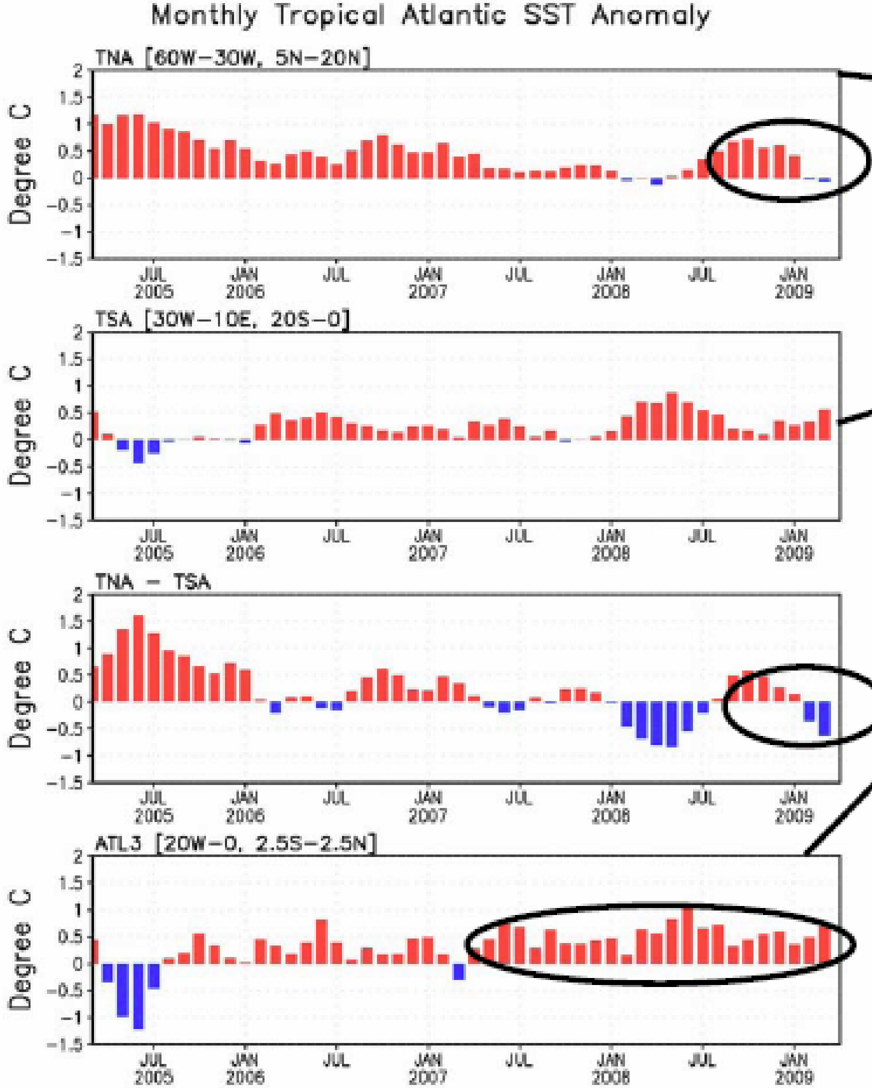
- La Nina conditions
- Tropical North Atlantic cooler than normal

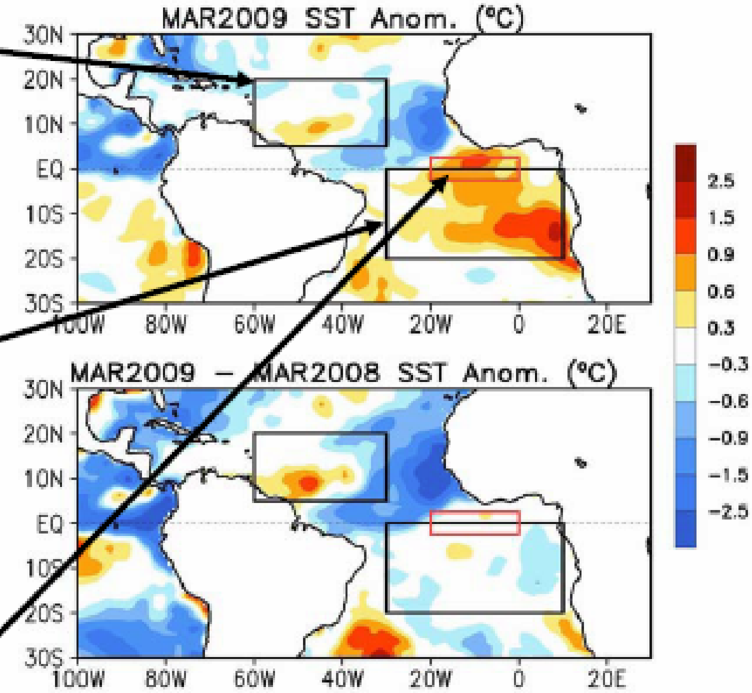




Weekly update: http://ioc3.unesco.org/oopc/state_of_the_ocean/all/

Evolution of Tropical Atlantic SST Indices

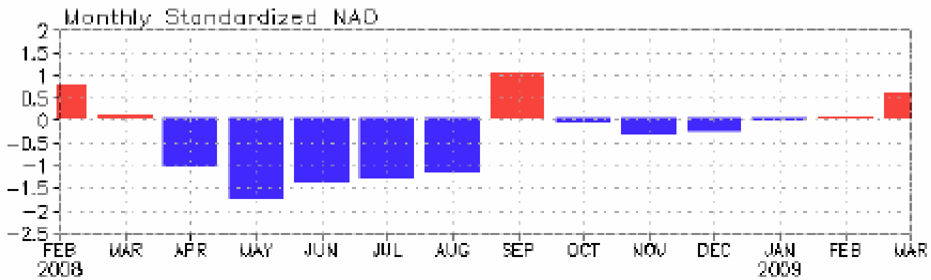


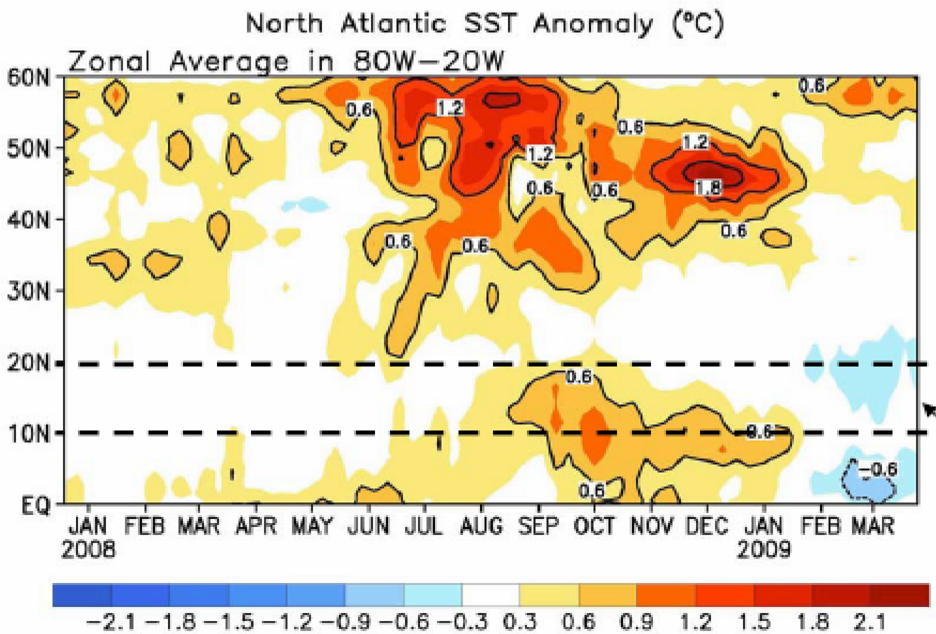


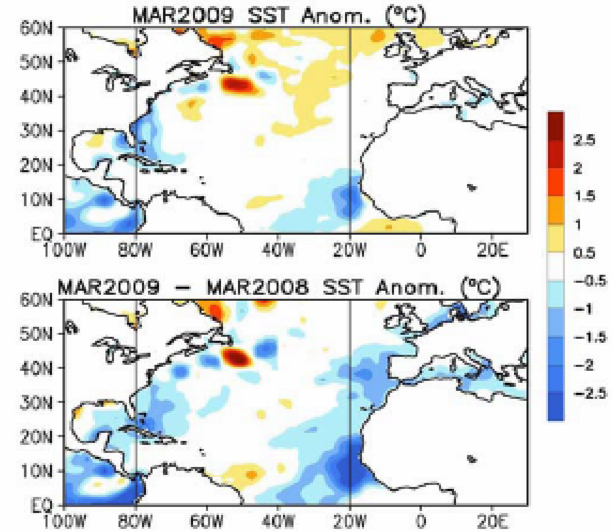
- **Tropical North Atlantic SST was near-normal in Feb-Mar 09.**
- **Tropical South Atlantic SST remained above-normal and warmed up slightly in March.**
- **Meridional Gradient Mode (TNA-TSA) switched to negative in Feb 09, and deepened further in Mar 09.**

Fig. A1a. Tropical Atlantic Variability region indices, calculated as the area-averaged monthly mean sea surface temperature anomalies (°C) for the TNA [60°W-30°W, 5°N-20°N], TSA [30°W-10°E, 20°S-0] and ATL3 [20°W-0, 2.5°S-2.5°N] regions, and Meridional Gradient Index, defined as differences between TNA and TSA. Data are derived from the NCEP OI SST analysis, and anomalies are departures from the 1971-2000 base period means.

NAO and SST Anomaly in North Atlantic





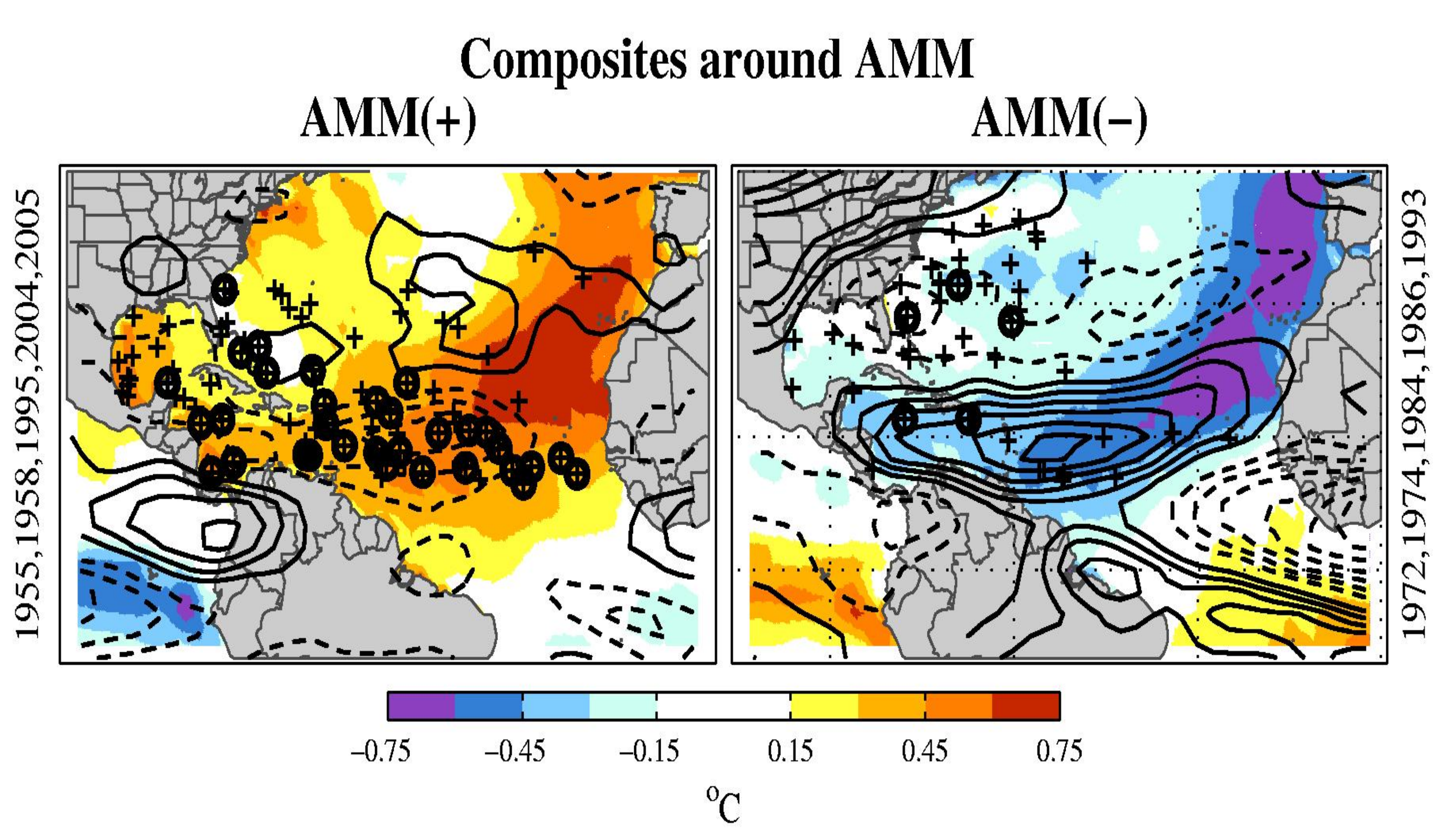


- High-latitude North Atlantic SSTA are closely related to NAO index – negative (positive) NAO leads to SST warming (cooling).

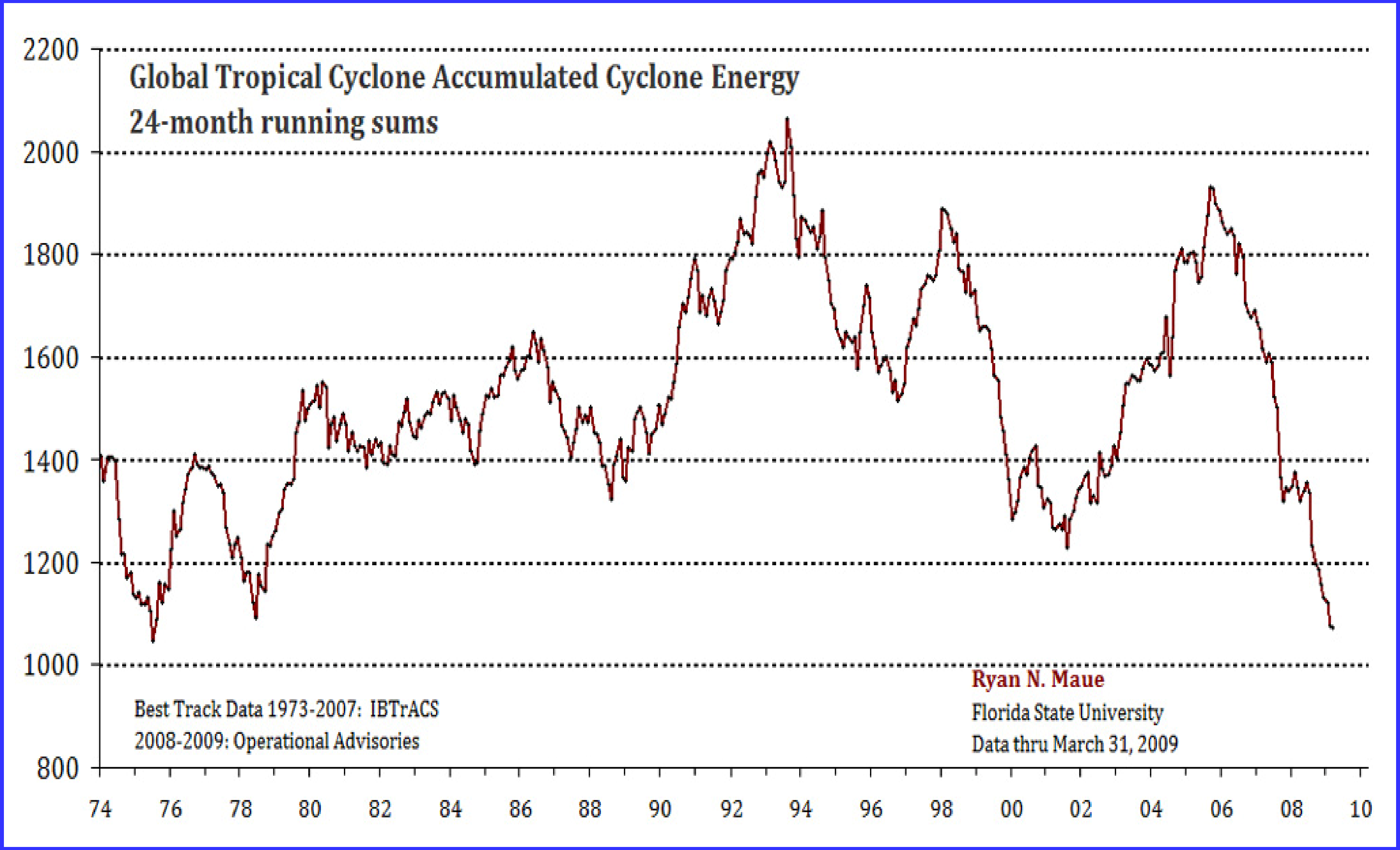
- NAO became above-normal in March 09.

- SSTA in the Hurricane Main Development Region were weakly below-normal in Feb-Mar 09.

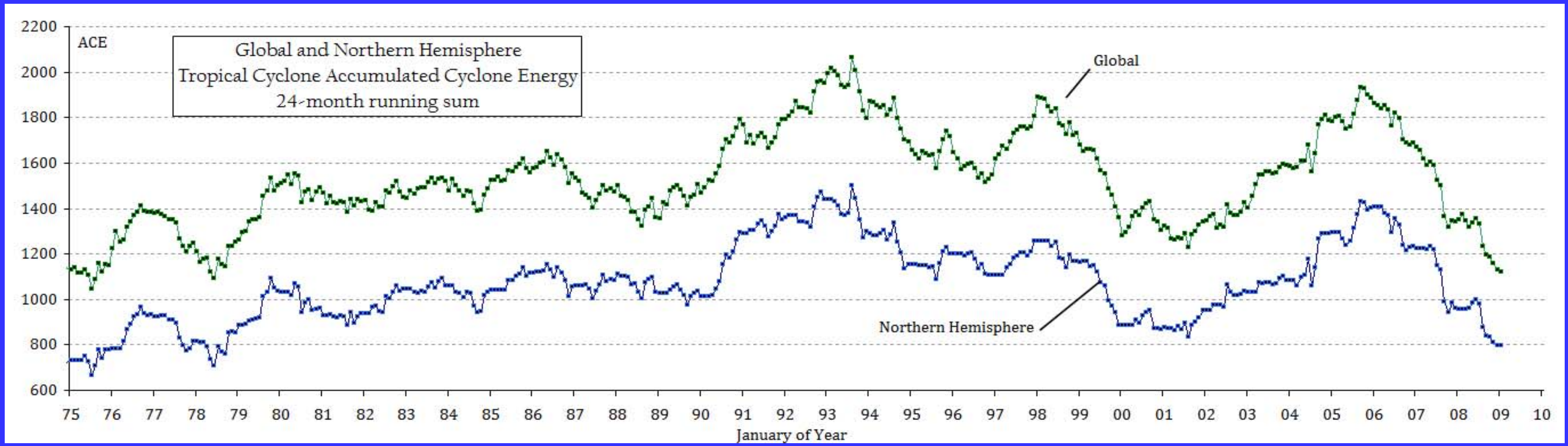
Fig. NA2. Monthly standardized NAO index (top) derived from monthly standardized 500-mb height anomalies obtained from the NCEP CDAS in 20°N-90°N (http://www.cpc.ncep.noaa.gov). Time-Latitude section of SST anomalies averaged between 80°W and 20°W (bottom). SST are derived from the NCEP OI SST analysis, and anomalies are departures from the 1971-2000 base period means.


Composites around AMM
AMM(+)
AMM(–)
1955,1958,1995,2004,2005
1972,1974,1984,1986,1993
–0.75
–0.45
–0.15
0.15
0.45
0.75
°C

Global Tropical Cyclone Accumulated Cyclone Energy



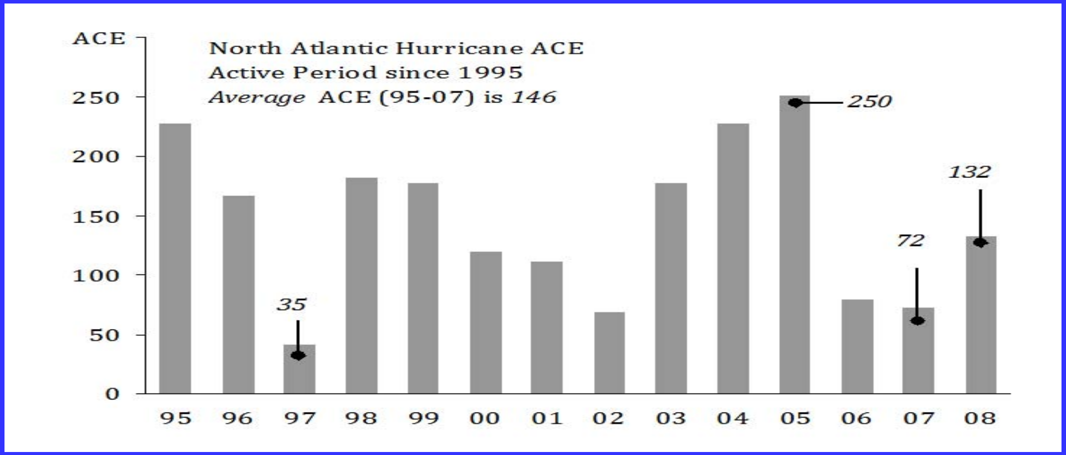
Global and Northern Hemisphere Accumulated Cyclone Energy (ACE) -- 24 month running sum

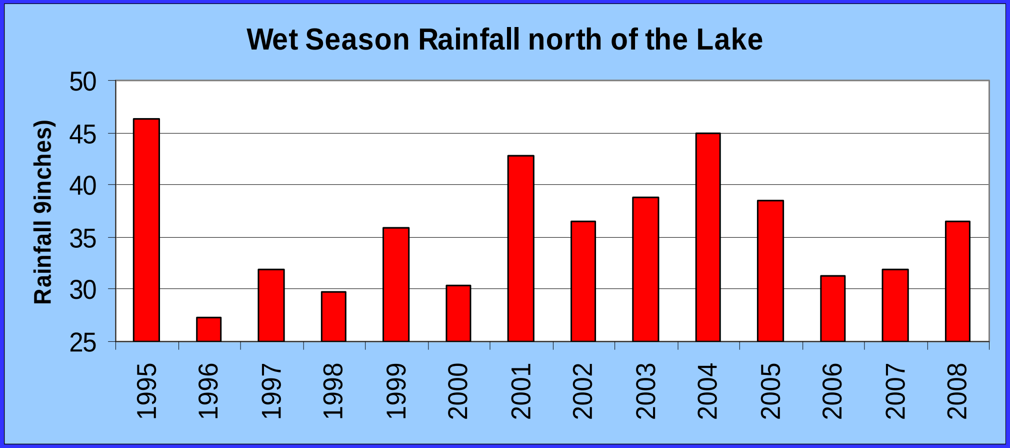


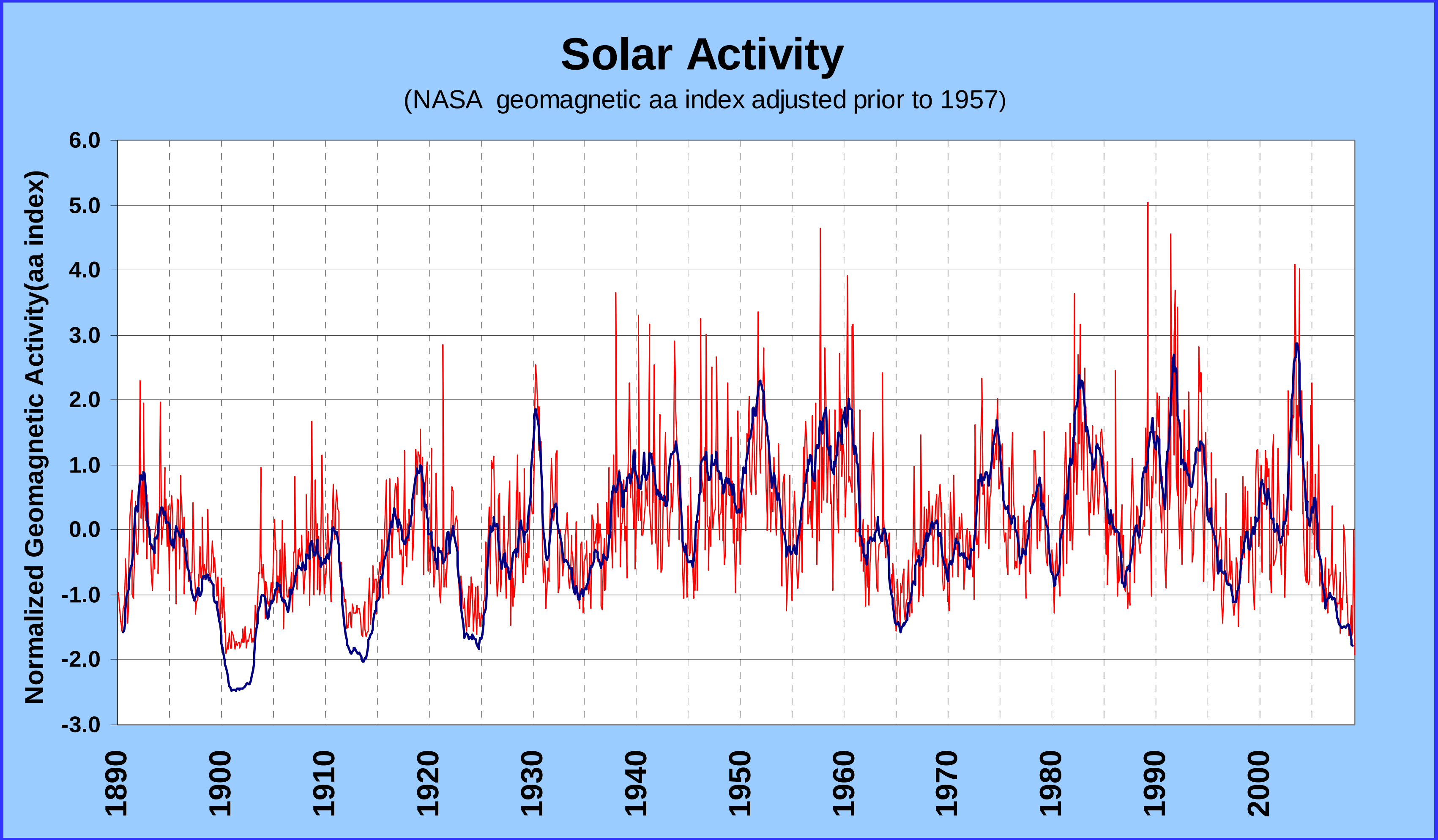
Analysis shown in the figure depicts tropical cyclone energy continuously summed over 24-month periods from 1975 through 31, January 2009. The top green time series shows the evolution of global Accumulated Cyclone Energy or ACE. Global ACE is at historical lows, and the lowest in 30-years. The Earth is experiencing a prolonged period of severely depressed cyclone activity. The Northern Hemisphere is responsible for 70% of global tropical cyclone ACE *on average* since 1975. Thus, it is no surprise that Northern Hemisphere Tropical Cyclone activity is also at 30-year lows.

Source: FSU

North Atlantic Accumulated Cyclone Energy



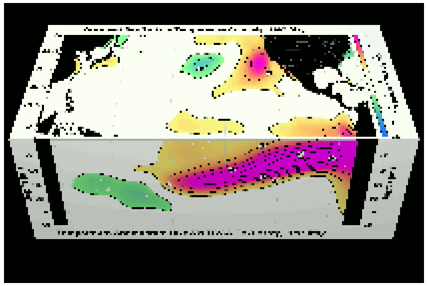




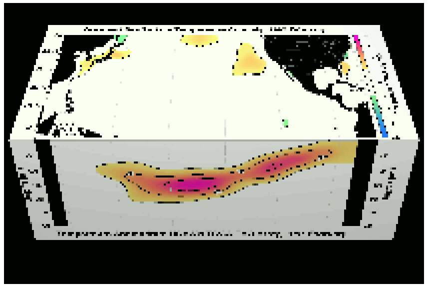
From historical record it can be seen that many of the SFWMD drier periods tend to occur more often during periods of lower solar activity. Examples of such periods are the mid- 1940s, mid-1950s , early to mid- 1960s and early 1980s. Solar activity since the end of 2005 has been very low.

Scripps Institution of Oceanography Climate Prediction Center

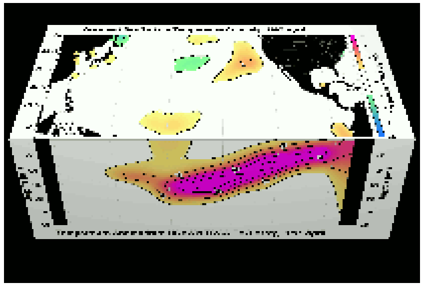
January 1997



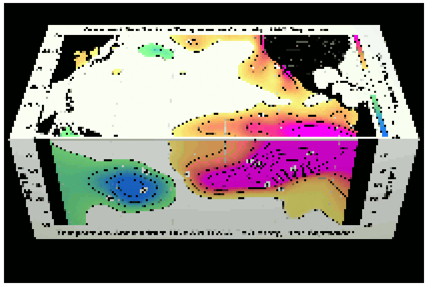
February 1997



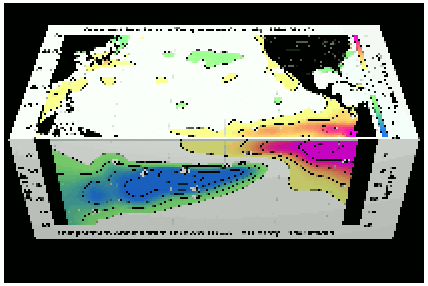
April 1997



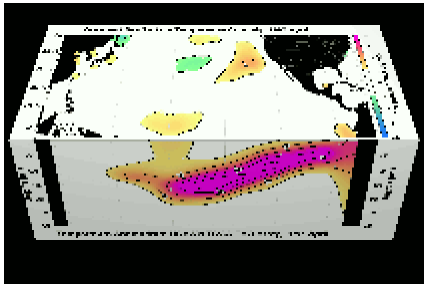
May 1997



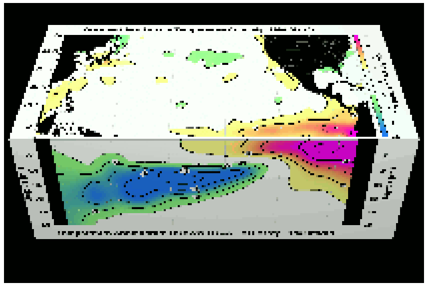
September 1997



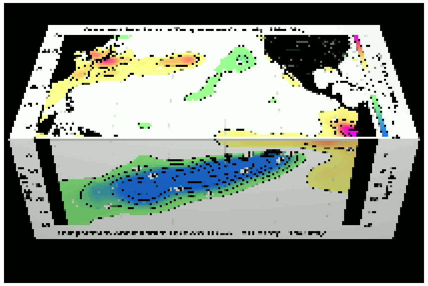
January 1998



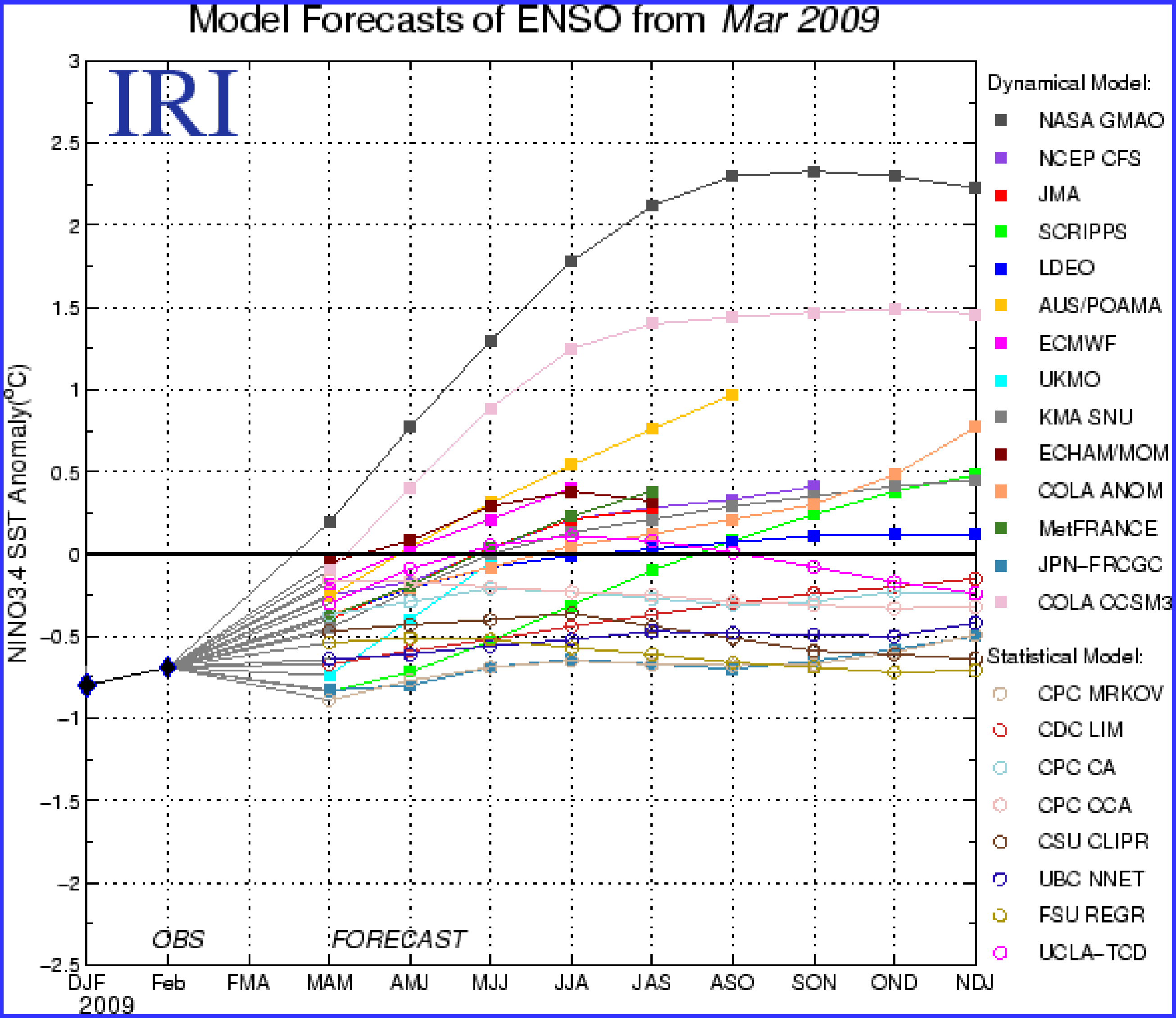
March 1998



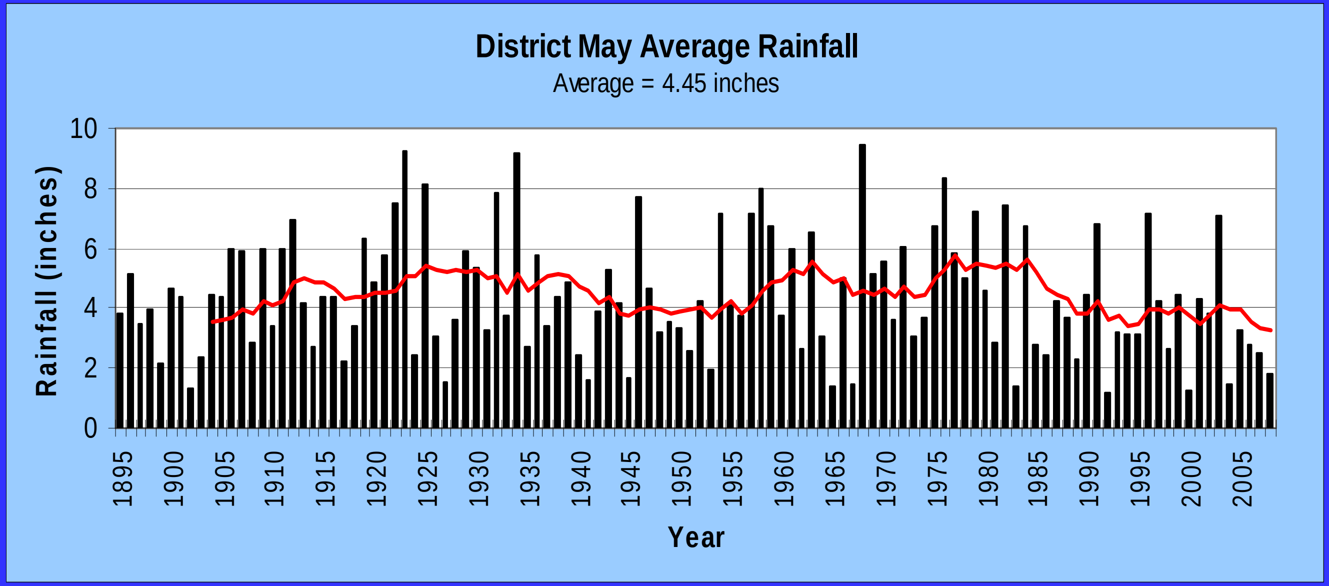
May 1998

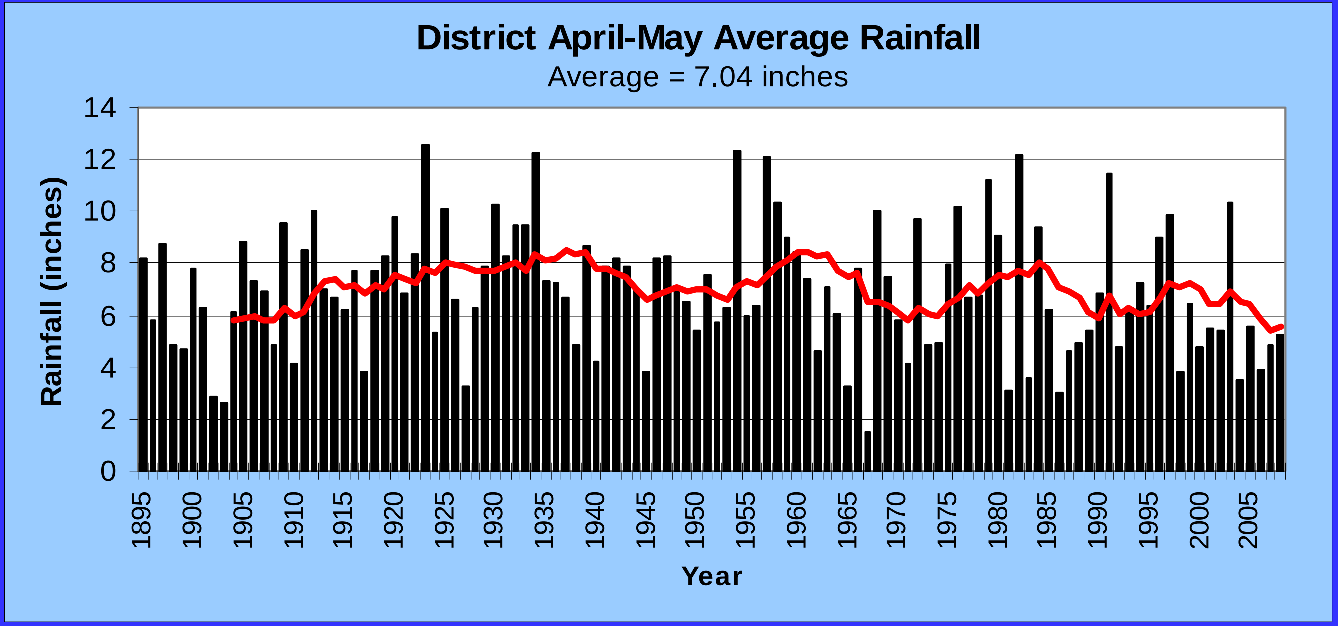


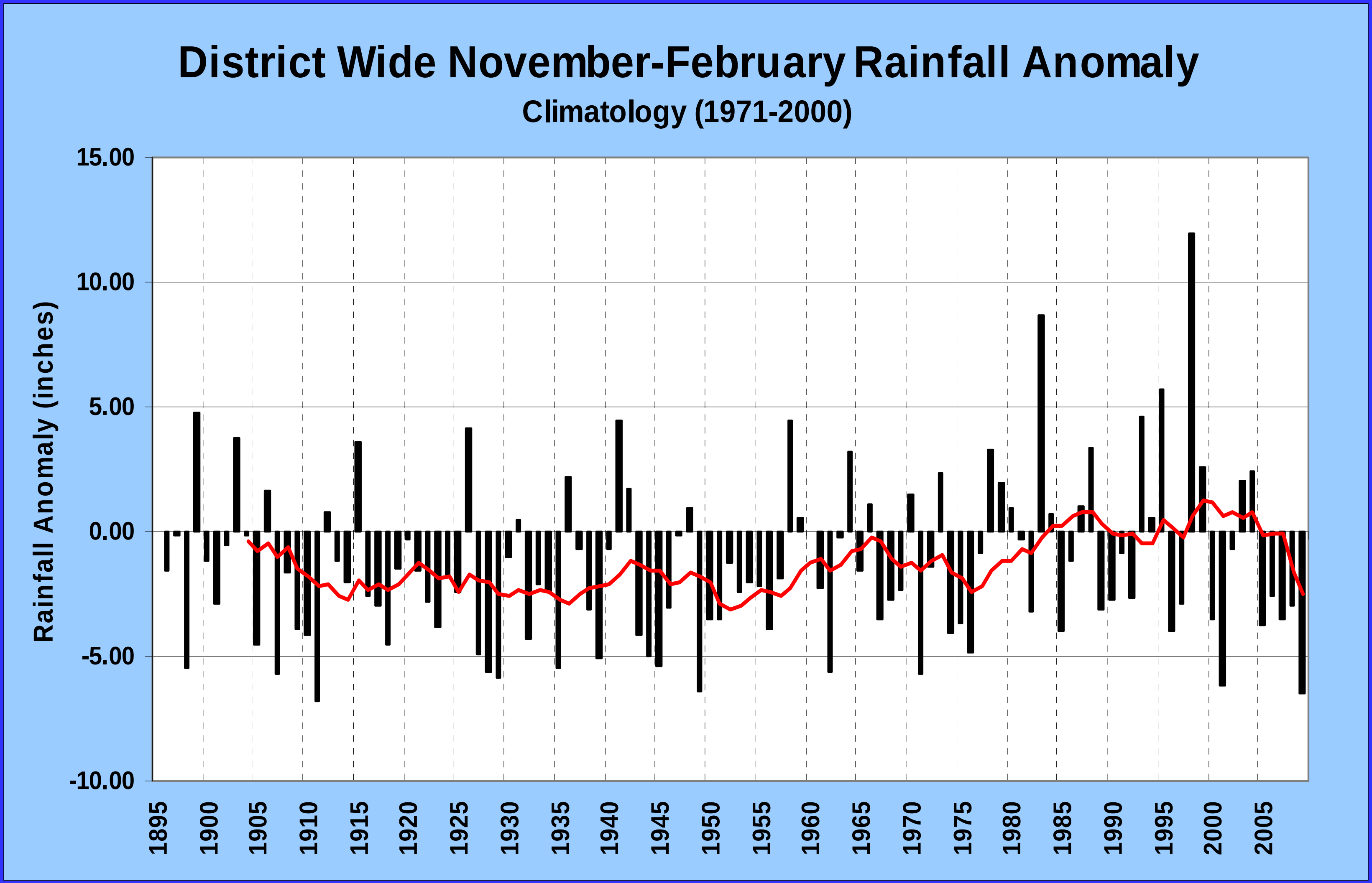
➢http://meteora.ucsd.edu/~pierce/elnino/en97/en97.html

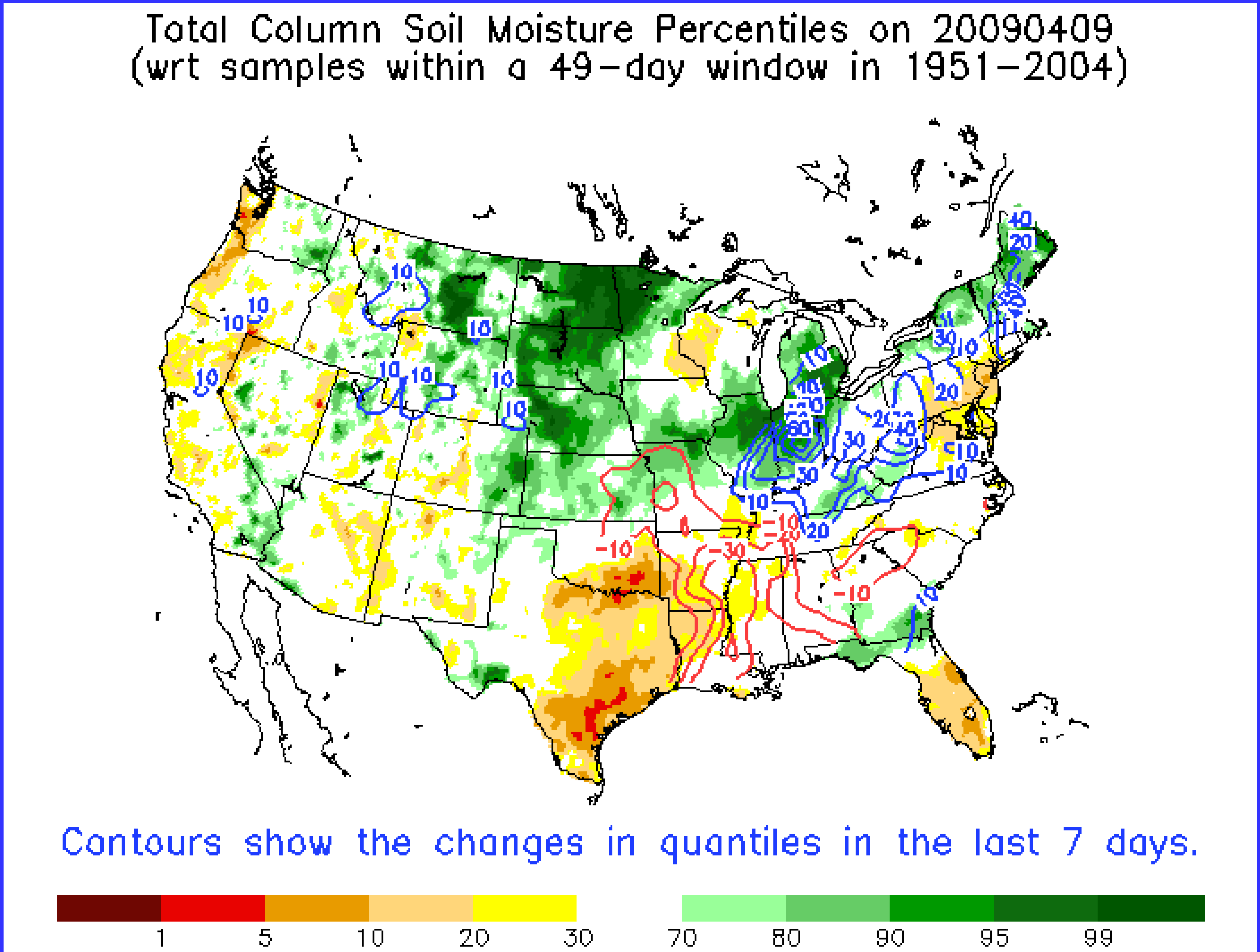


Model Forecasts of ENSO from Mar 2009
IRI
NINO3.4 SST Anomaly(°C)
3
2.5
2
1.5
1
0.5
0
−0.5
−1
−1.5
−2
−2.5
OBS
FORECAST
DJF
2009
Feb
FMA
MAM
AMJ
MJJ
JJA
JAS
ASO
SON
OND
NDJ
Dynamical Model:
NASA GMAO
NCEP CFS
JMA
SCRIPPS
LDEO
AUS/POAMA
ECMWF
UKMO
KMA SNU
ECHAM/MOM
COLA ANOM
MetFRANCE
JPN–FRCGC
COLA CCSM3
Statistical Model:
CPC MRKOV
CDC LIM
CPC CA
CPC CCA
CSU CLIPR
UBC NNET
FSU REGR
UCLA–TCD


District May Average Rainfall
Average = 4.45 inches
Rainfall (inches)
0
2
4
6
8
10
1895
1900
1905
1910
1915
1920
1925
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
Year


District April-May Average Rainfall
Average = 7.04 inches
Rainfall (inches)
0
2
4
6
8
10
12
14
1895
1900
1905
1910
1915
1920
1925
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
Year


District Wide November-February Rainfall Anomaly
Climatology (1971-2000)
Rainfall Anomaly (inches)
15.00
10.00
5.00
0.00
-5.00
-10.00
1895
1900
1905
1910
1915
1920
1925
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005

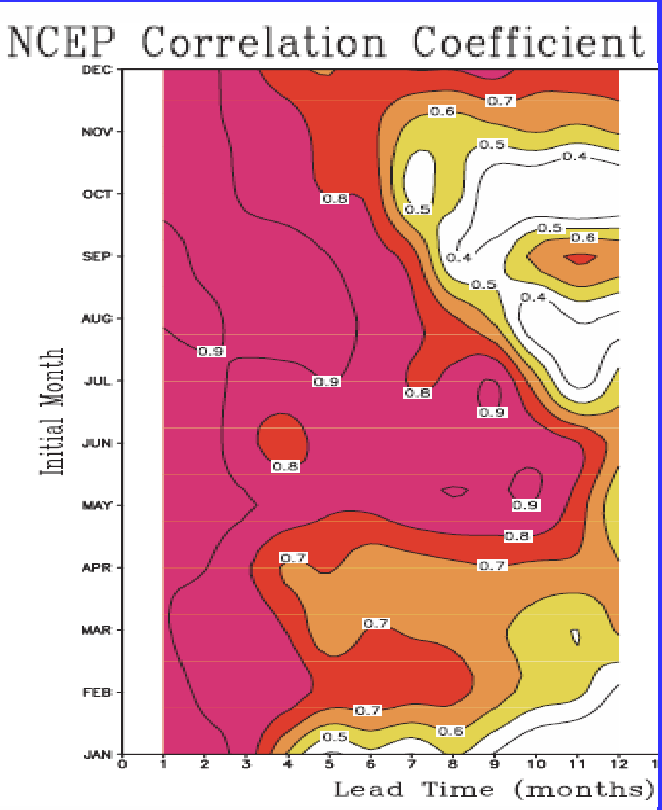

Total Column Soil Moisture Percentiles on 20090409
(wrt samples within a 49-day window in 1951-2004)
Contours show the changes in quantiles in the last 7 days.
1
5
10
20
30
70
80
90
95
99

Year	DJF	JFM	FMA	MAM	AMJ	MJJ	JJA	JAS	ASO	SON	OND	NDJ
2002	-0.1	0.1	0.2	0.4	**0.7**	**0.8**	**0.9**	**1.0**	**1.1**	**1.3**	**1.5**	**1.4**
2003	**1.2**	**0.9**	**0.5**	0.1	-0.1	0.1	0.4	0.5	0.6	0.5	0.6	0.4
2004	0.4	0.3	0.2	0.2	0.3	**0.5**	**0.7**	**0.8**	**0.9**	**0.8**	**0.8**	**0.8**
2005	**0.7**	**0.5**	0.4	0.4	0.4	0.4	0.4	0.3	0.2	-0.1	-0.4	-0.7
2006	-0.7	-0.6	-0.4	-0.1	0.1	0.2	0.3	**0.5**	**0.6**	**0.9**	**1.1**	**1.1**
2007	**0.8**	0.4	0.1	-0.1	-0.1	-0.1	-0.1	-0.4	**-0.7**	**-1.0**	**-1.1**	**-1.3**
2008	**-1.4**	**-1.4**	**-1.1**	**-0.8**	**-0.6**	-0.4	-0.1	0.0	0.0	0.0	-0.3	-0.6
2009	-0.8	-0.7										

Spring Barrier with ENSO Forecasts

Forecasts skill as a function (month, lead time)

When predicting ENSO the challenge of the spring barrier has been well established over the years. Looking at the graphic, the y- axis indicates the month that the ENSO forecast is made and the x- axis is the lead time. It can be seen that skillful forecast with longer lead times occur starting in the month of May. In most cases when climate outlooks are made they are based on ENSO prediction initiated the previous month. So in the current case during the March Climate Outlook are based on ENSO predictions initiated on February 1st, while the latest April 1st are using March 1st Predictions. It can be seen in the graphic that skilled ENSO prediction skill for longer lead times doesn't increase until May. So expect that the ENSO predictions to improve as we approach summer with Climate outlook skills lagging one month. This is the advantage of the CFS Model as its forecasts are continually updated each day with the most data.



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