

Weekly Climate Update November 3rd 2009

➤ “Westerly wind bursts” along the equatorial Pacific Ocean during certain times of the year are an early sign of the formation or regeneration of an El Niño sea surface temperature pattern. These westerly wind bursts are most important in autumn and early winter when the sea surface temperatures are "locking" into a pattern for the following 12- months. Equatorial Pacific westerly wind bursts are normally 1- to 3- weeks in duration. Such a westerly wind burst has been in progress the past several weeks and has in deed helped intensify the current El Nino event. The official forecasts calls for the potential for additional strengthening in the upcoming weeks with the El Nino conditions to persist at least into early 2010.

➤The CPC and the IRI outlooks are calling for an increased chance of above normal rainfall for the upcoming dry season (especially during the months of December through March). The IRI had estimated a ten percent chance the El Nino could fade out before the end of winter. This value is likely to decrease with the ongoing westerly wind burst and strengthening El Niño.

➤The Atlantic Basin Accumulated Cyclone Energy (ACE¹) continues to be less than 50% normal. The ACE index is commonly used as a measure of tropical activity that combines the number, duration and intensity of tropical storm activity during a particular region and period. The largest portion of the ACE this year was generated by the two major hurricanes Bill (63%) and Fred (24%). [http://coaps.fsu.edu/~maue/tropical/] > By the same measure the northern hemisphere global accumulated tropical cyclonic activity has decreased in recent years.

➤A complete summary of Climate indices (including AMO) can be found at the following link:

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

¹ACE computations throughout this PowerPoint are part of ongoing research associated with **Ryan Maue's** PhD dissertation and a publications resulting from it. **Maue, R. N., 2009:** Northern Hemisphere Tropical Cyclone Activity. *Geophys. Res. Lett.*, 36, L05805, doi:10.1029/2008GL035946.

Special Discussion regarding 2009 El Nino

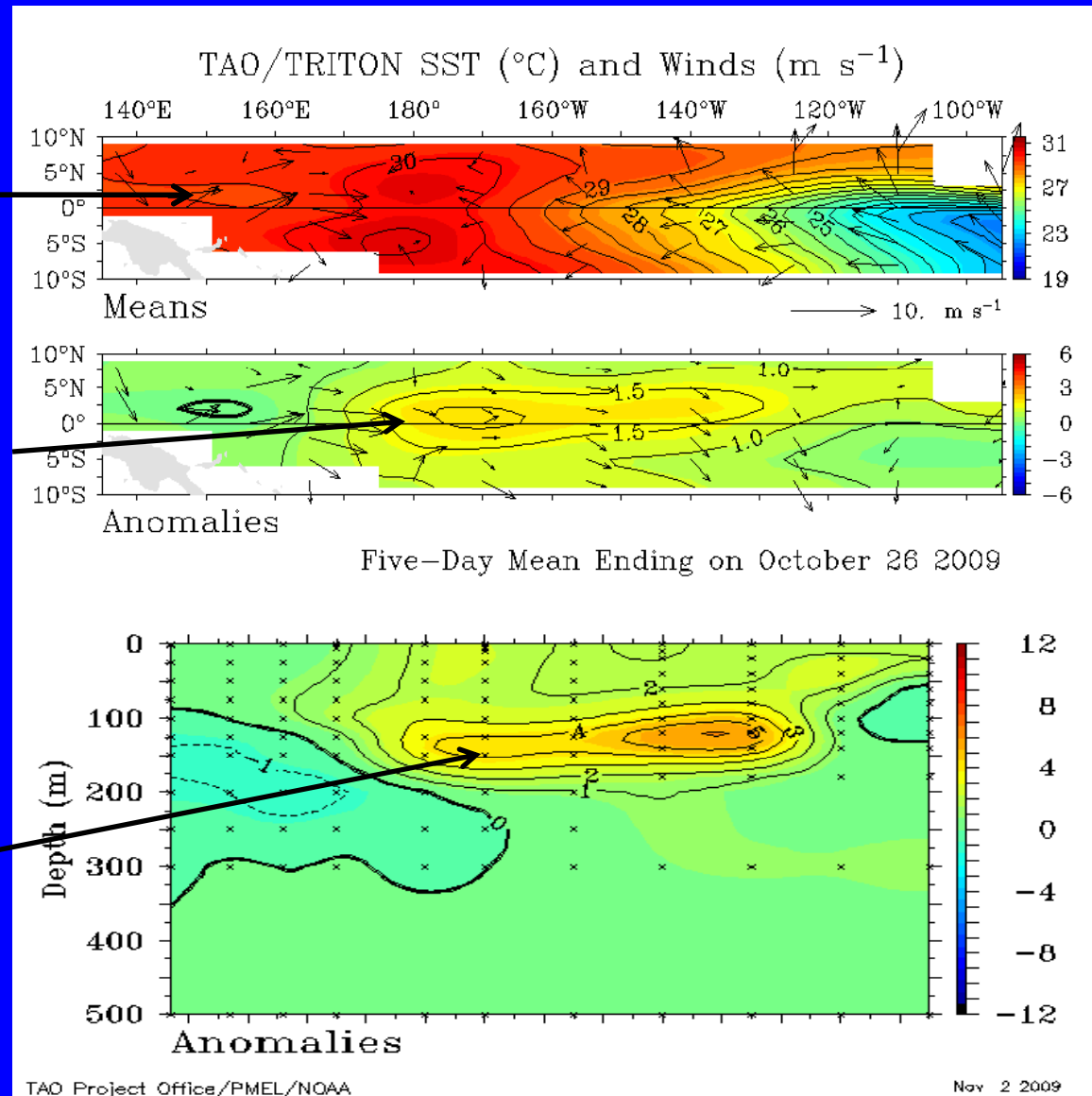
- In a decade characterized by unusual El Nino events, the ongoing El Niño of 2009-2010 is another strange one. El Niño signals continue mixed. The Aug-Sep Multivariate ENSO Index (MEI), decreased from 0.978 to 0.754, however other El Niño signals appear to be rebounding. In the last two weeks low level equatorial westerly anomalies have increased significantly. The reduction in the strength of the trade winds, and a down welling Kelvin wave resulting from a very strong westerly wind burst already appear to be increasing upper ocean heat content in the central equatorial Pacific. The 30- day moving Southern Oscillation Index (SOI) has been dropping, and should return to negative territory in a day or so. 'Negative (positive) SOI corresponds to El Nino (La Nina) conditions.
- Recurring equatorial westerly wind bursts and enhanced west-central Pacific convection has been slowly migrating eastward. The most recent round of enhanced convection was centered at about 160E. This is consistent with a developing El Niño.
- However, total and relative Atmospheric Angular Momentum (AMM) remain negative, and are lower than is generally the case during a developing El Niño. Of the weak to moderate El Niño's that have occurred since 1950, only the 1994-95 El Niño has had negative average July-September relative AAM values comparable to the current El Niño.

An Ongoing “Westerly Wind Burst” in the Tropical Pacific is a mechanism that contributes to the Strengthening of El Nino events

Equatorial
Pacific
Wind and
Temperature

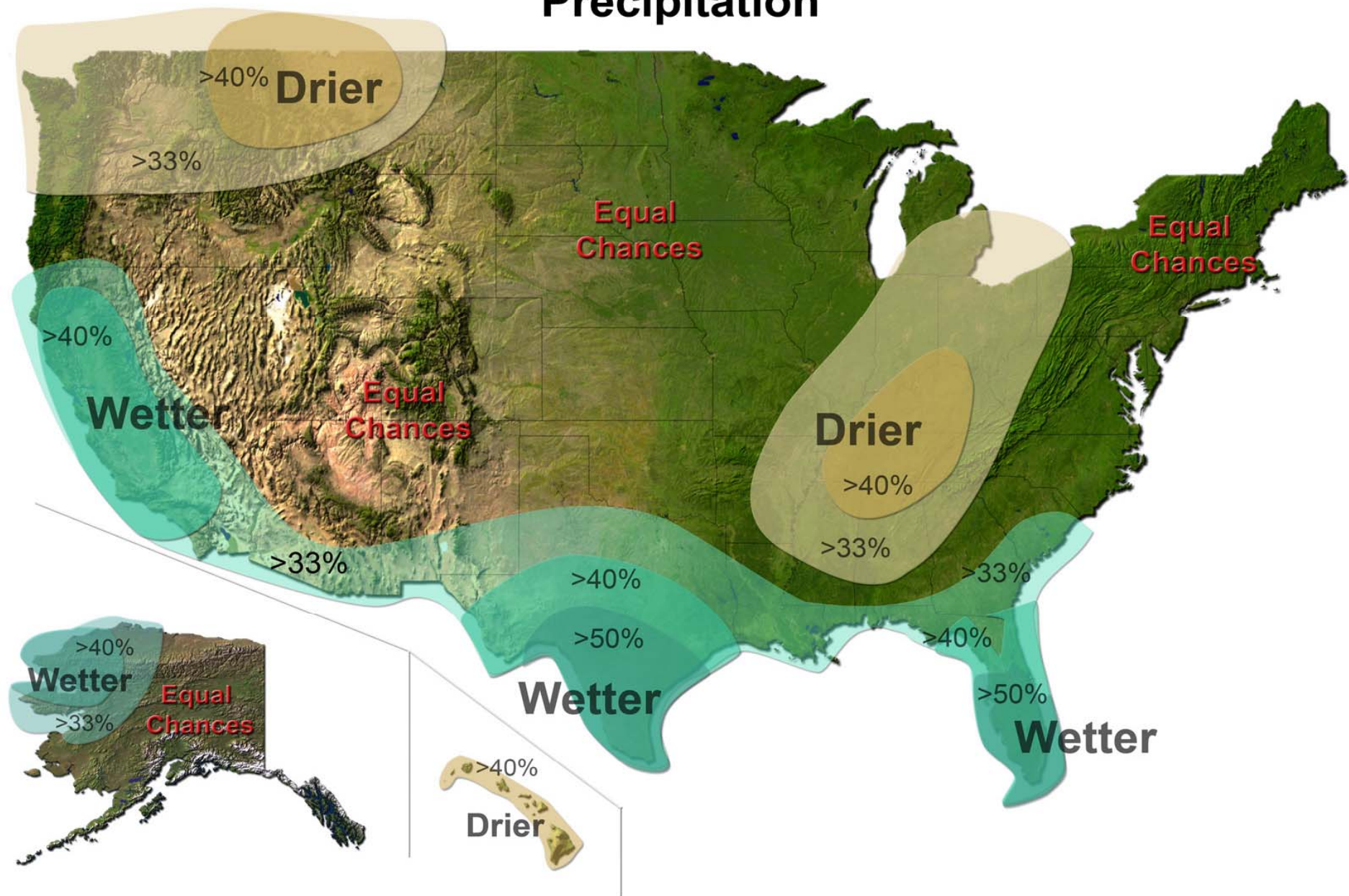
Westerly Wind
and Sea Surface
Anomalies

Sub Surface
Kelvin Wave
Generates
Increasing
Temperature
Anomalies



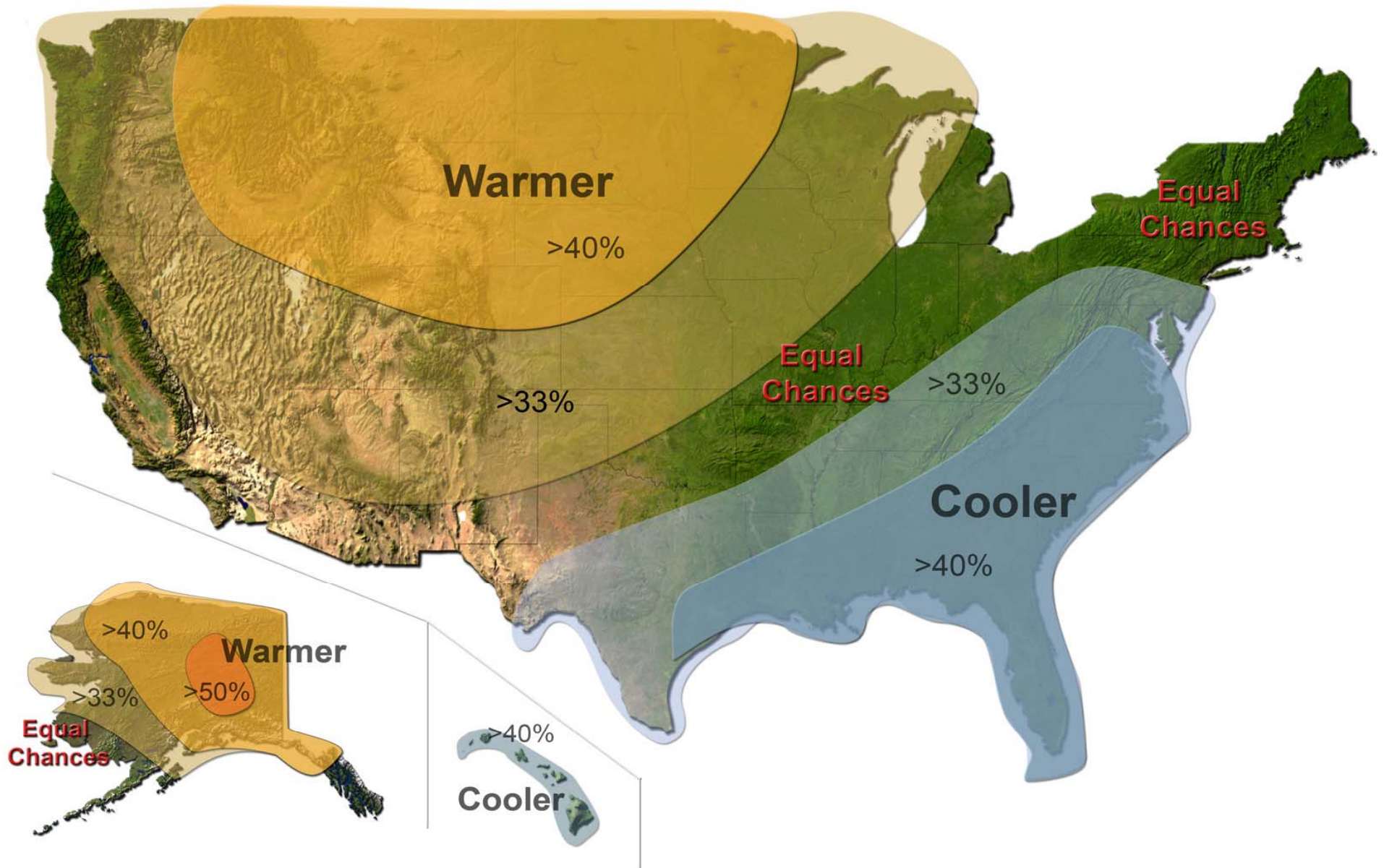
U.S. Winter Outlook

Precipitation

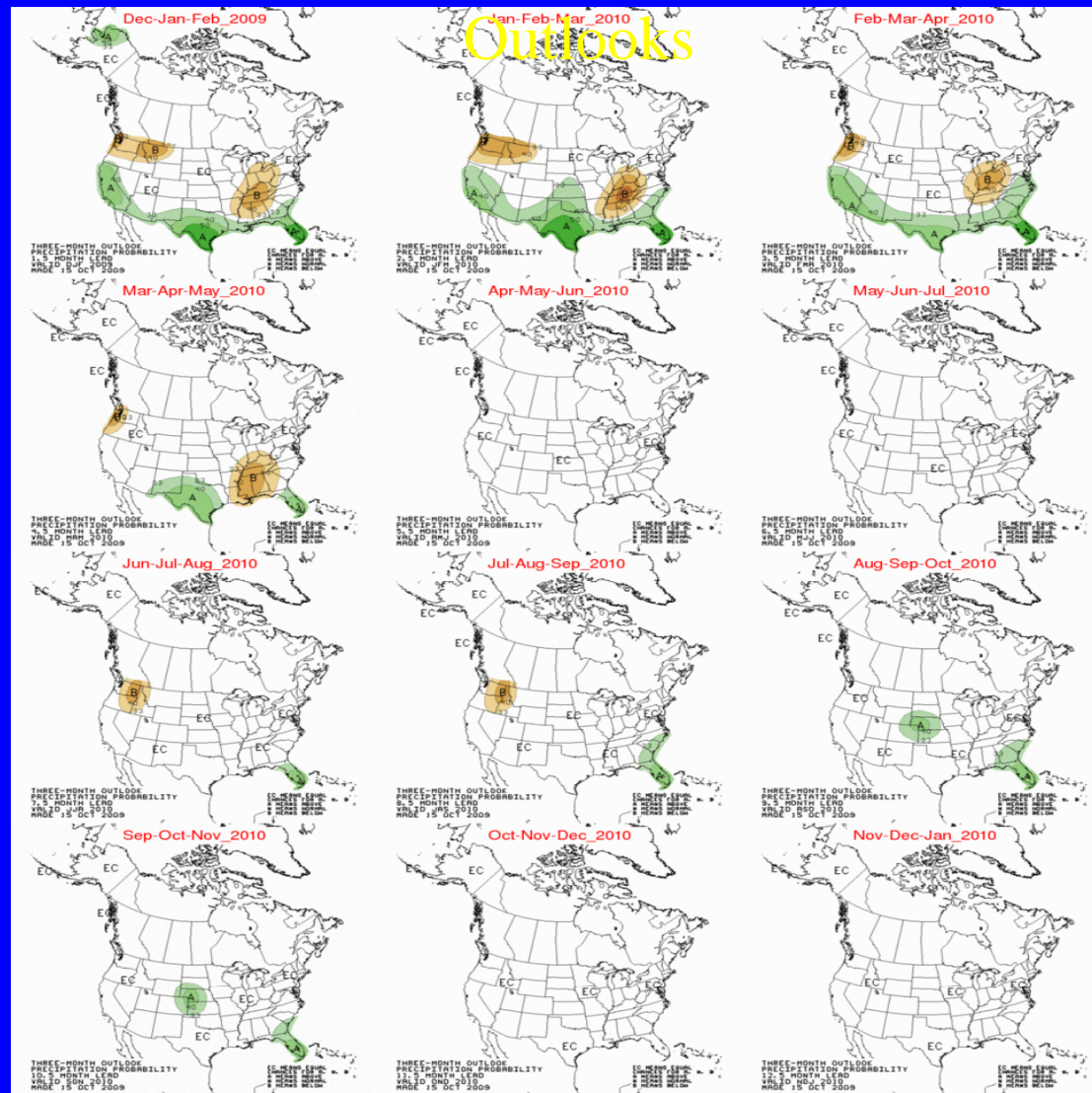


U.S. Winter Outlook

Temperature

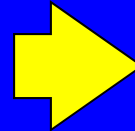


Extended Seasonal Rainfall Outlooks



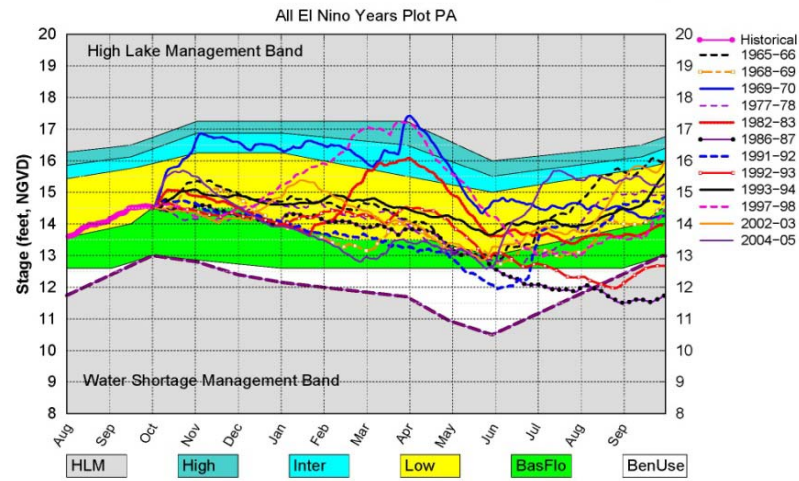
Position Analysis (PA) for El Nino Years

October 1st



November 1st

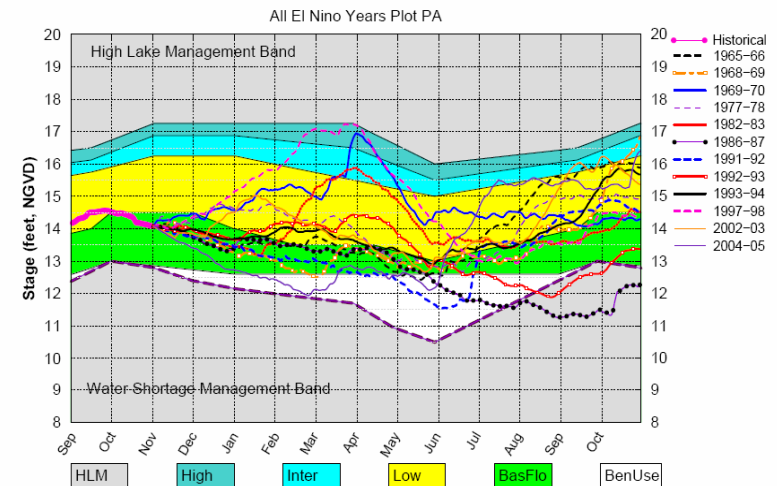
Lake Okeechobee SFWMM October 2009 Position Analysis



Mon Oct 5 15:16:33 2009

(See assumptions on the Position Analysis Results website)

Lake Okeechobee SFWMM November 2009 Position Analysis



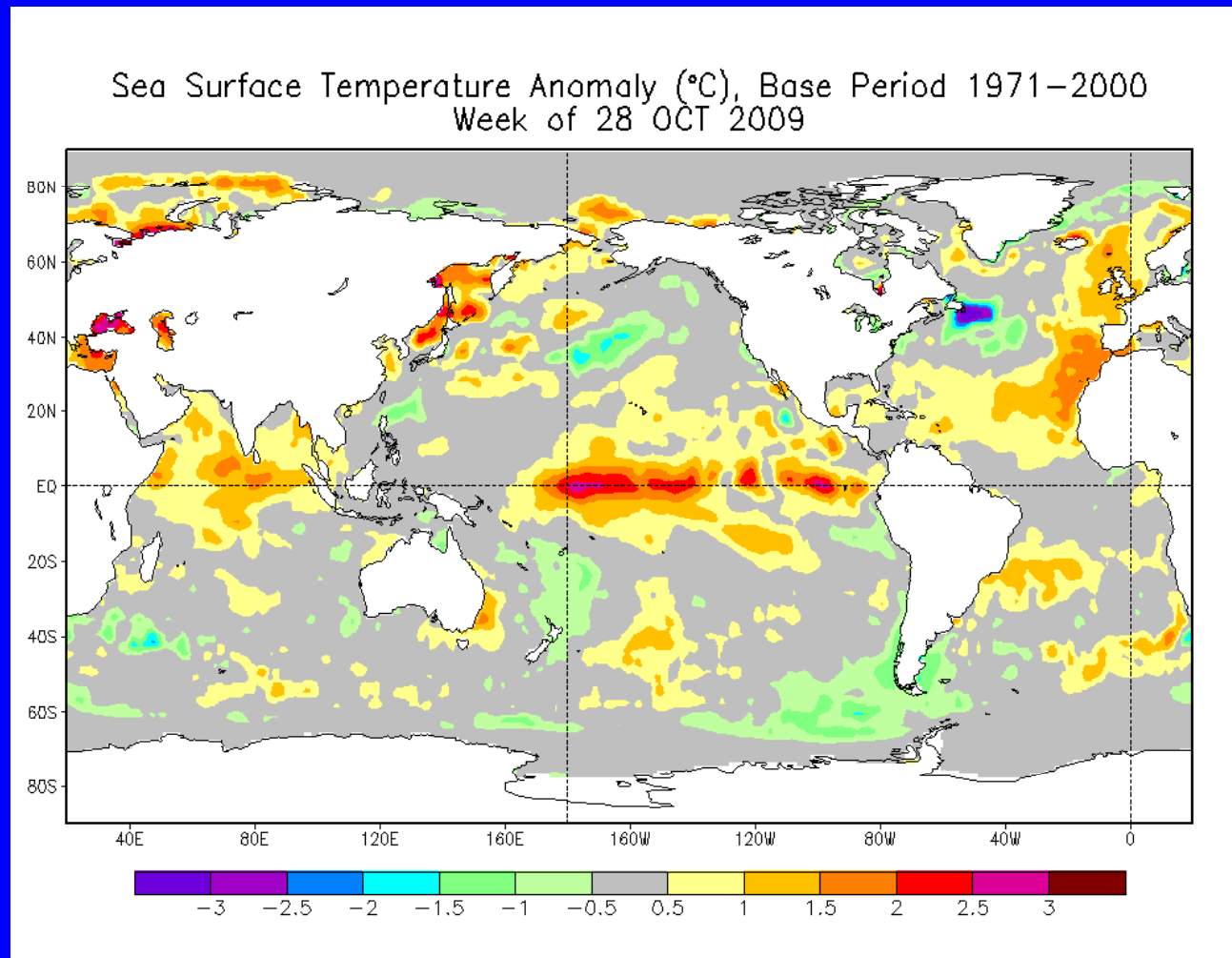
Tue Nov 3 08:53:10 2009

(See assumptions on the Position Analysis Results website)

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Latest Weekly Global Sea Surface Temperature Anomaly

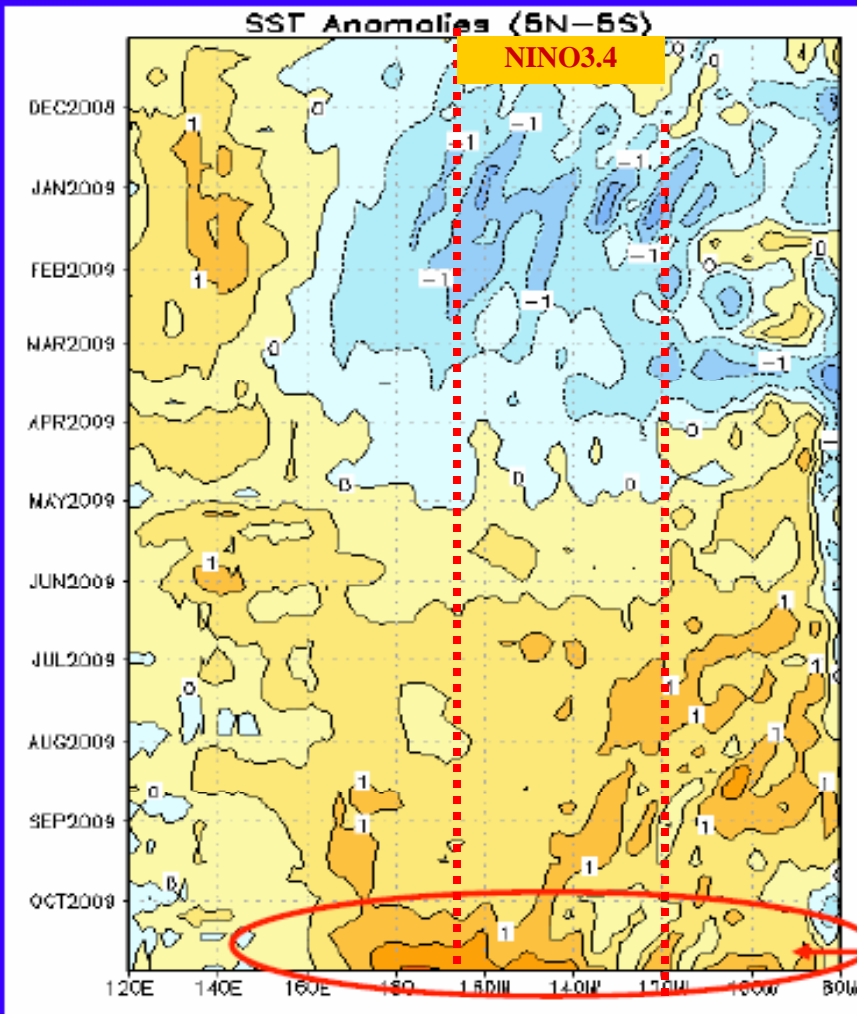


Most of the north tropical Atlantic ocean anomalies have increased and became positive during the summer. El Nino has intensified during the most recent week.

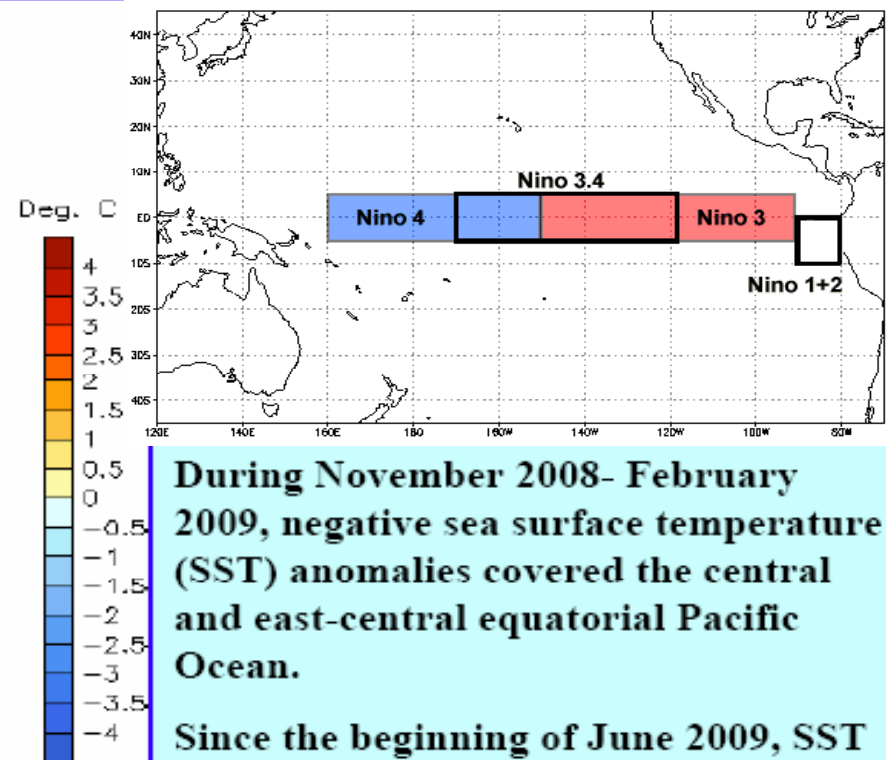


Recent Evolution of Equatorial Pacific SST Departures (°C)

Time



Longitude



During November 2008- February 2009, negative sea surface temperature (SST) anomalies covered the central and east-central equatorial Pacific Ocean.

Since the beginning of June 2009, SST anomalies have been at least $+0.5^{\circ}\text{C}$ across most of the equatorial Pacific.

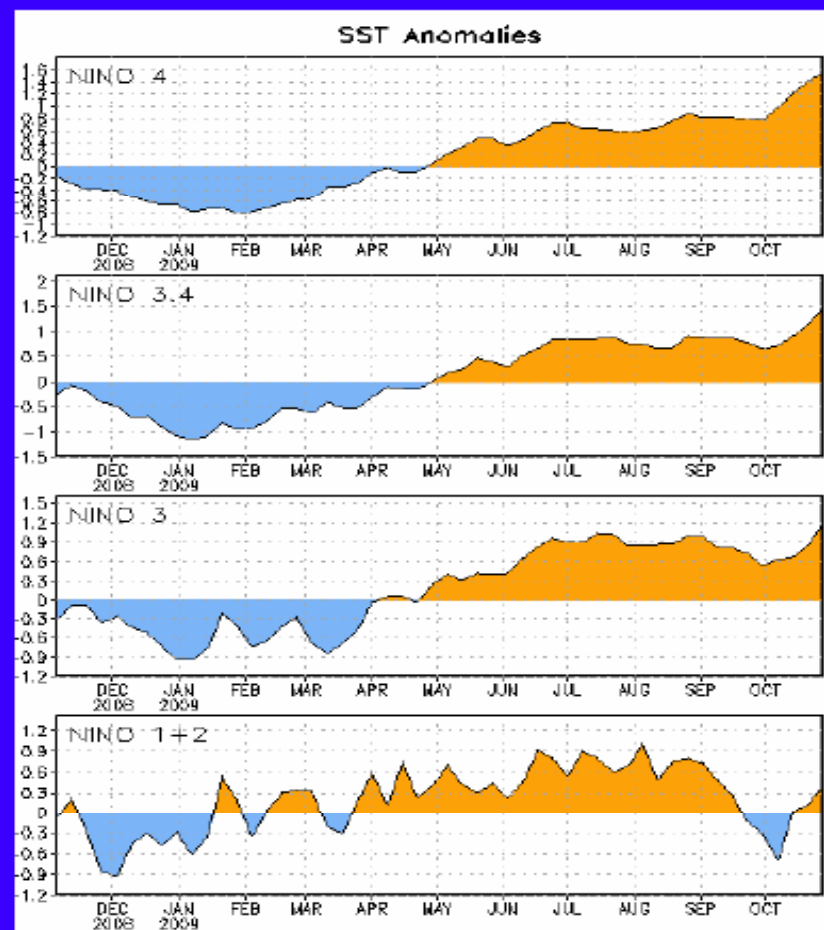
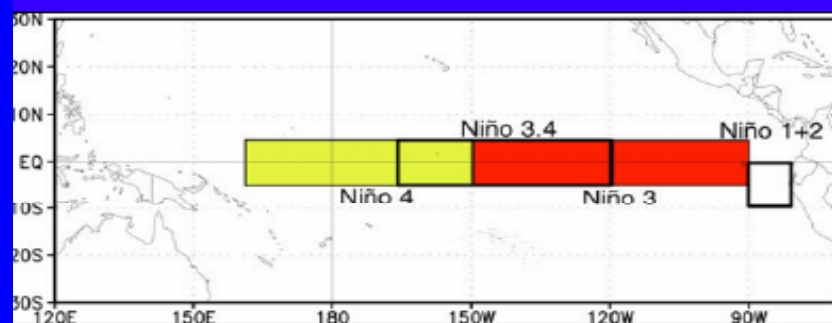
Recently, SST anomalies have increased across much of the equatorial Pacific.



Niño Region SST Departures (°C) Recent Evolution

The latest weekly SST departures are:

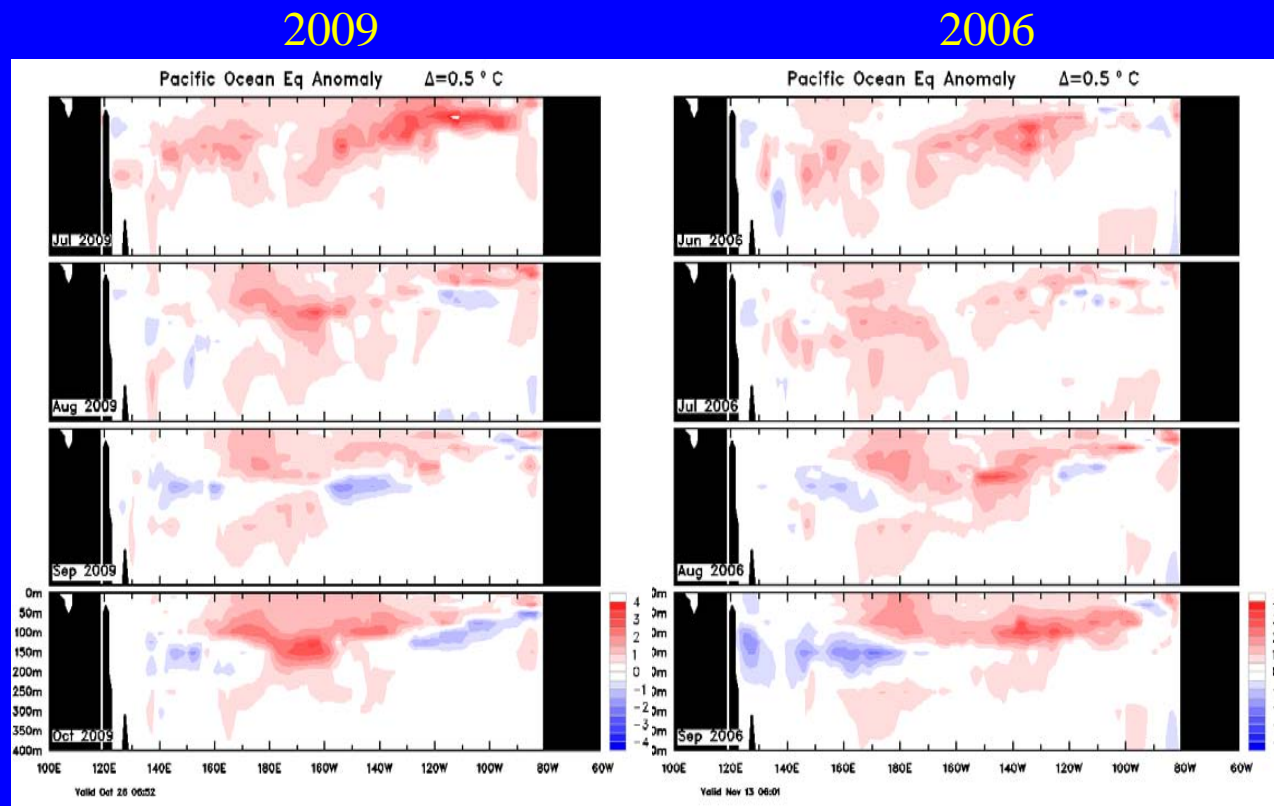
Niño 4	1.6°C
Niño 3.4	1.5°C
Niño 3	1.2°C
Niño 1+2	0.4°C



Sea Surface temperatures in the tropical Pacific have warmed from La Nina conditions in January to El Nino Conditions in June. The warming had stalled in late June until very recently. A 'Westerly Wind Burst' has caused a reaccelerated of the warming in the equatorial central Pacific. This warming is expected to spread to the west coast of South America

Subsurface Equatorial Pacific Ocean Temperature Anomaly

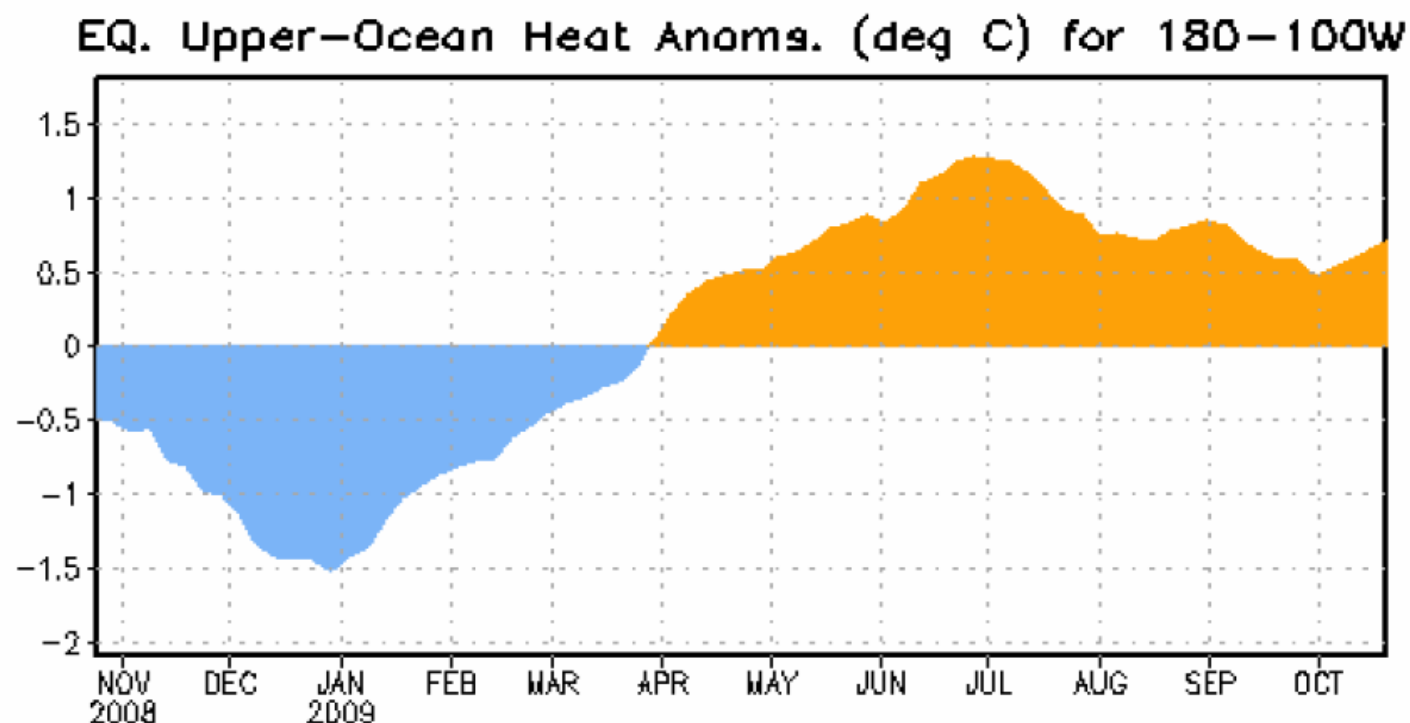
Comparison of Equatorial Pacific Sub Surface Temperatures Anomalies for 2009 and 2006



August and September 2009 Subsurface temperature anomalies are similar to those in 2006.



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

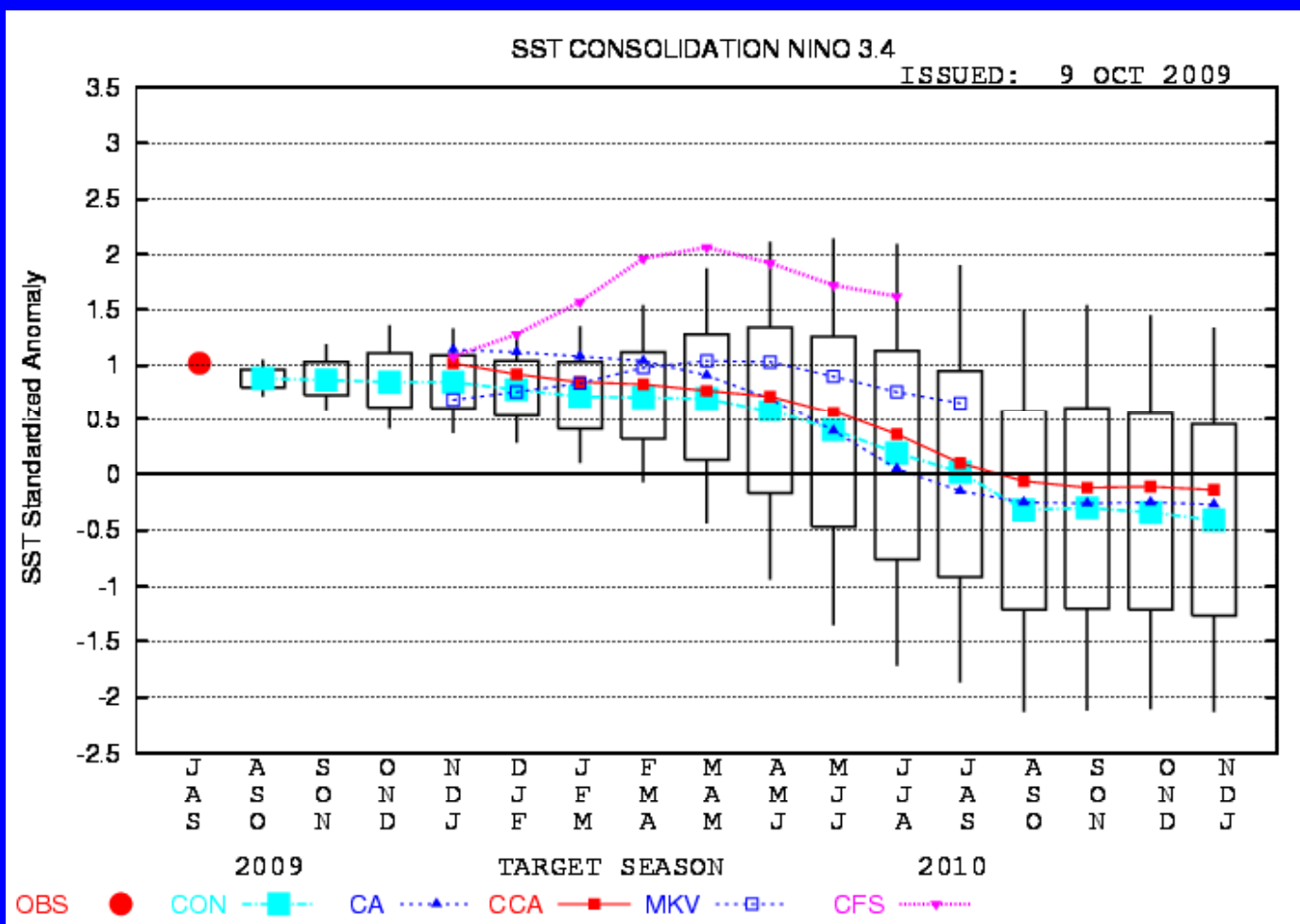


Since April 2009, the upper-ocean heat content has been above average across the eastern half of the equatorial Pacific Ocean. The heat content was previously below-average from mid-August 2008 through March 2009, with a minimum reached in late December 2008.



Predicted Sea Surface Temperature Anomalies

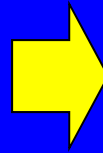
Issued October 9th 2009



The latest official ENSO forecasts (CONsensus) indicates a weak El Nino to be in place through the upcoming winter

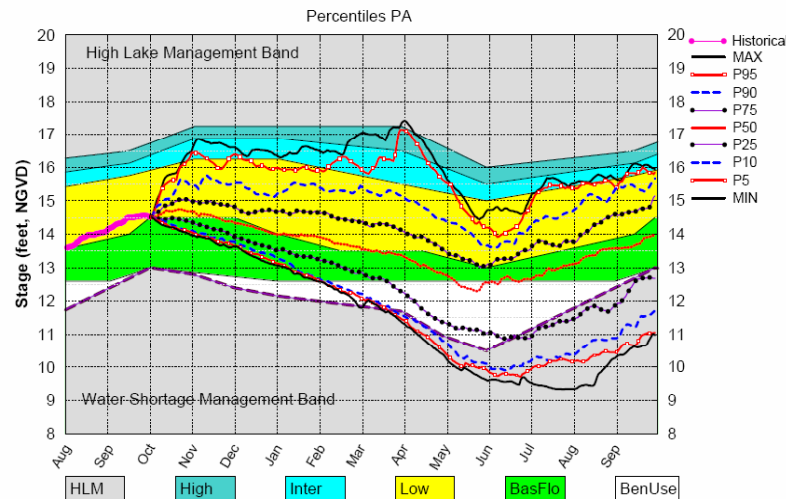
Update Position Analysis (PA) Percentiles

October 1st PA



November 1st PA

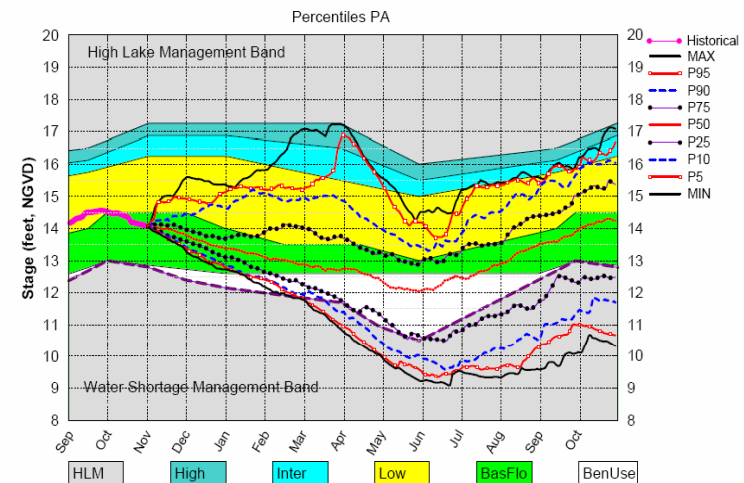
Lake Okeechobee SFWMM October 2009 Position Analysis



Mon Oct 5 15:16:07 2009

(See assumptions on the Position Analysis Results website)

Lake Okeechobee SFWMM November 2009 Position Analysis



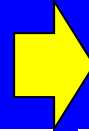
Tue Nov 3 08:52:21 2009

(See assumptions on the Position Analysis Results website)

Less Chance of reaching the high management operational zone during the remainder of the wet season with new PA

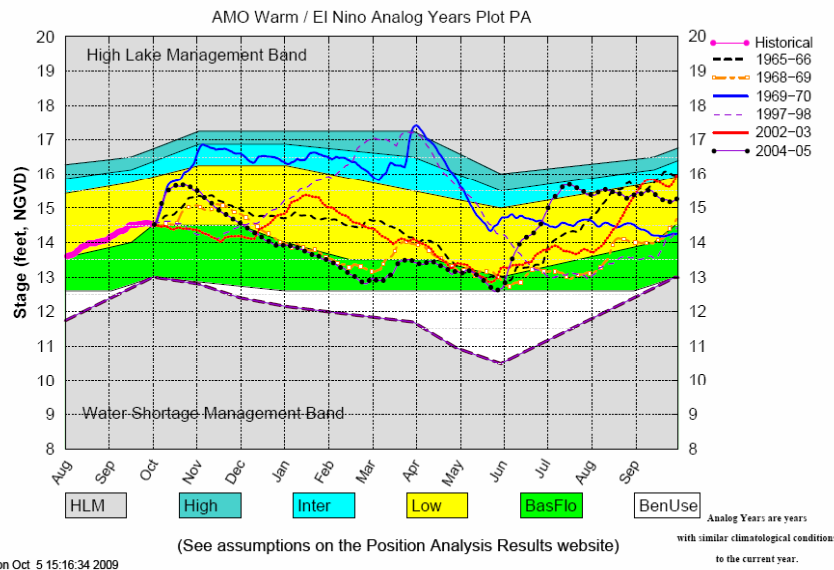
Update Position Analysis (PA) for AMO Warm/El Nino Years

October 1st PA

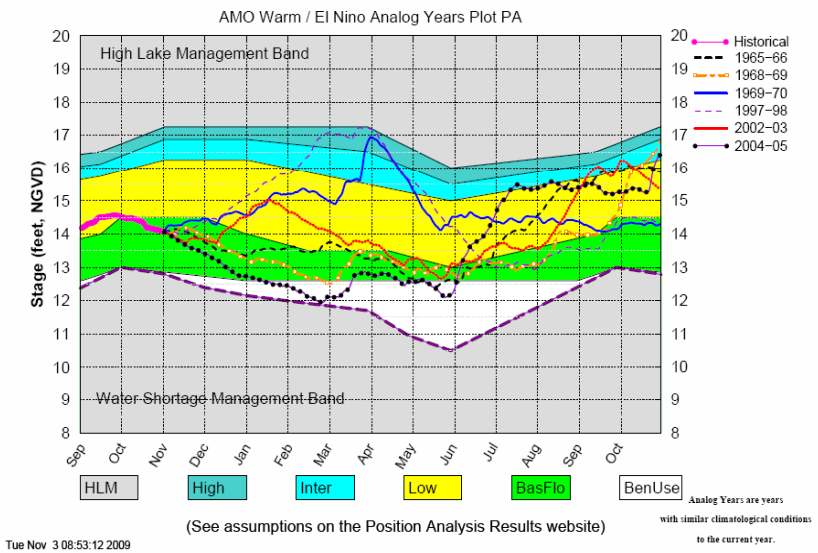


November 1st PA

Lake Okeechobee SFWMM October 2009 Position Analysis

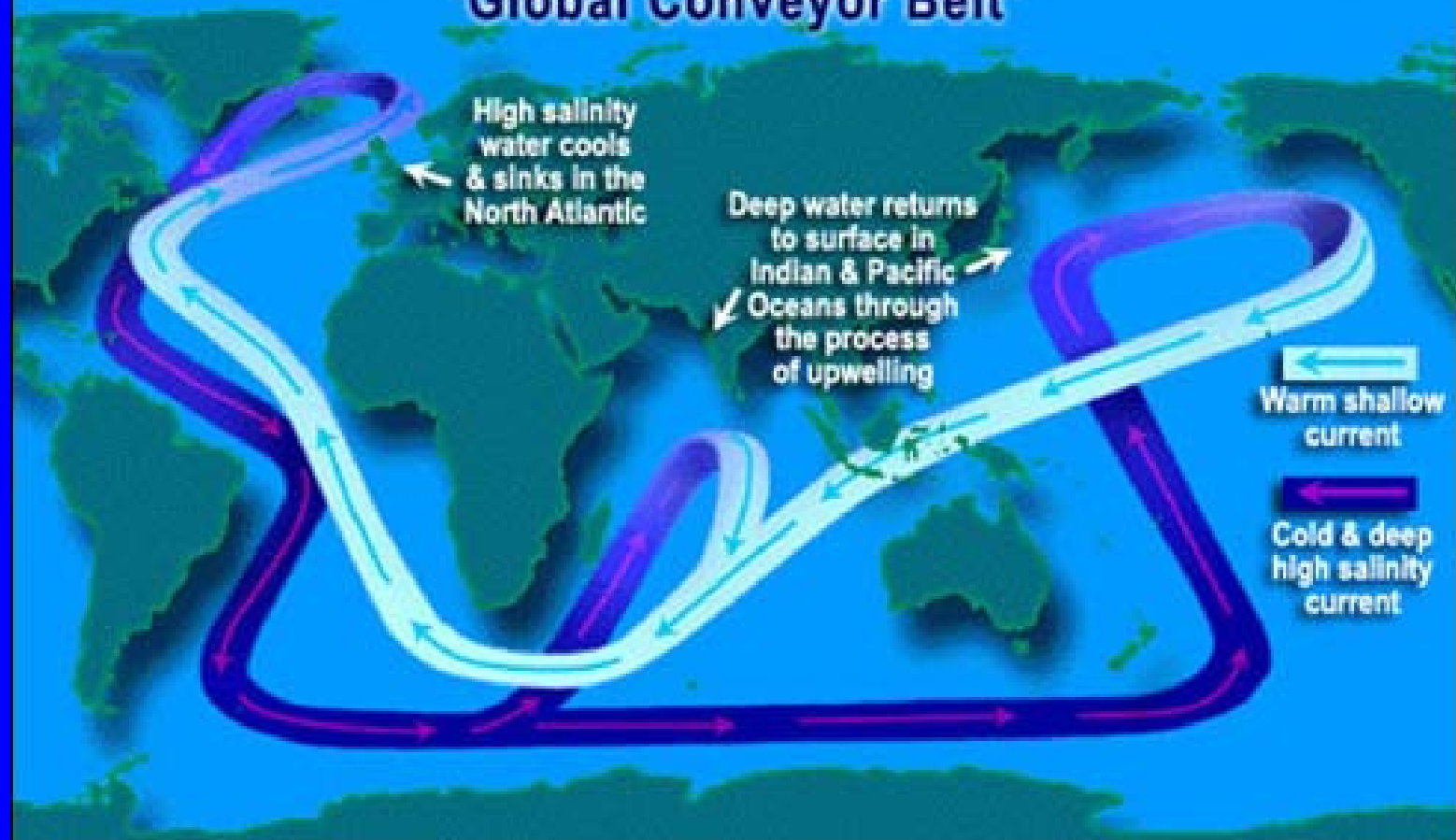


Lake Okeechobee SFWMM November 2009 Position Analysis



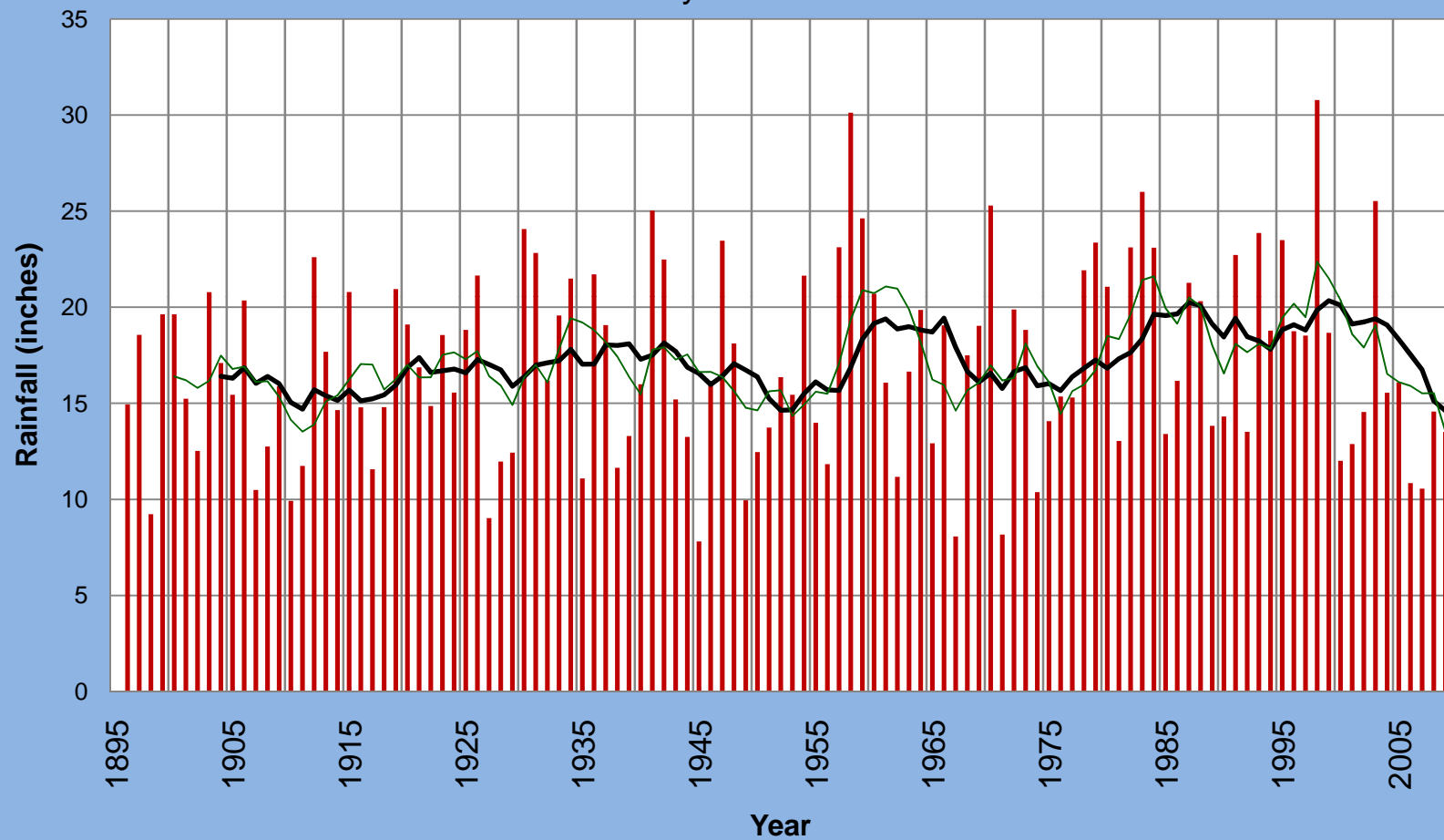
Backup Slides with additional support material

Generalized model of thermohaline circulation: "Global Conveyor Belt"



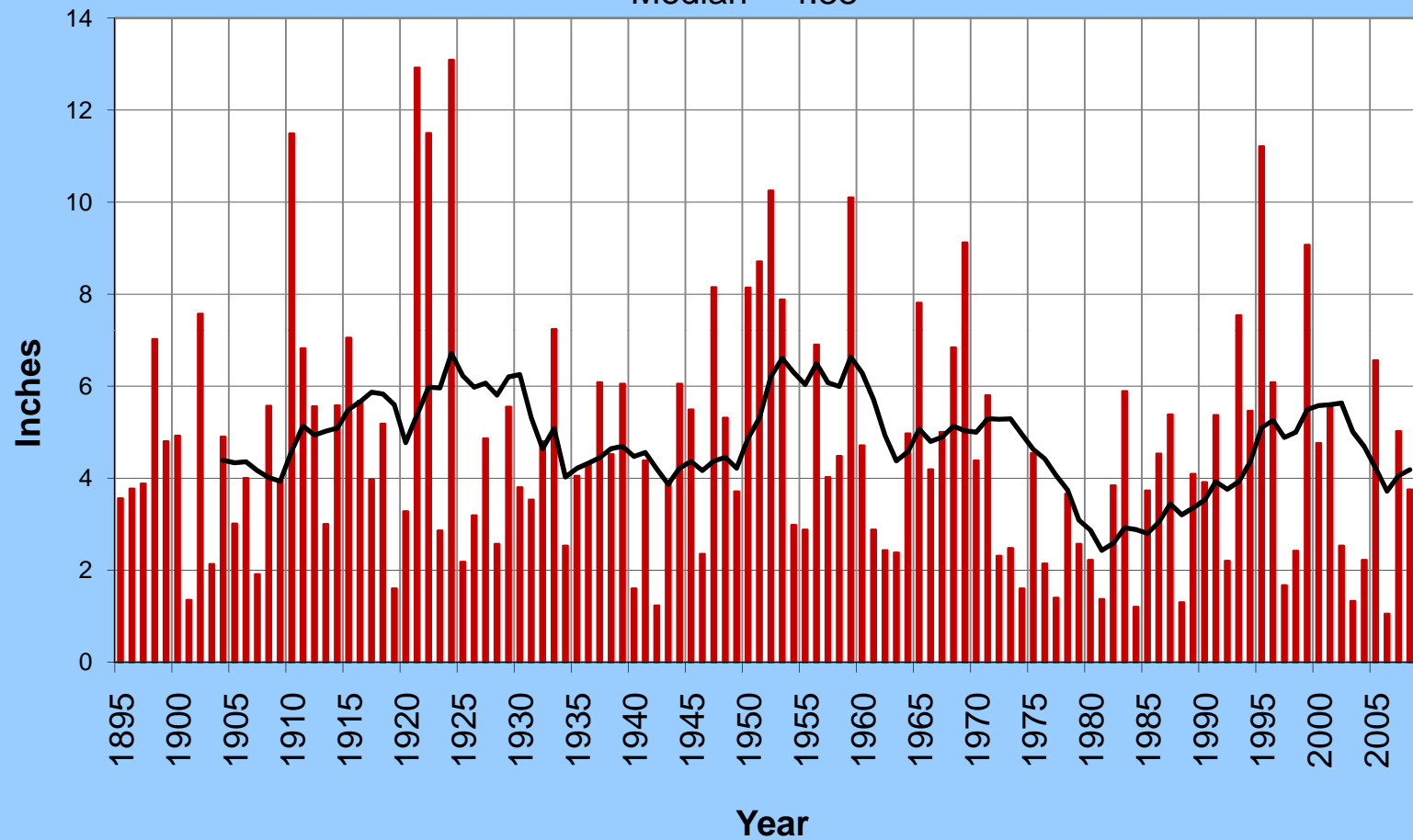
Dry Season District Rainfall

November-May Median RF = 16.18 inches

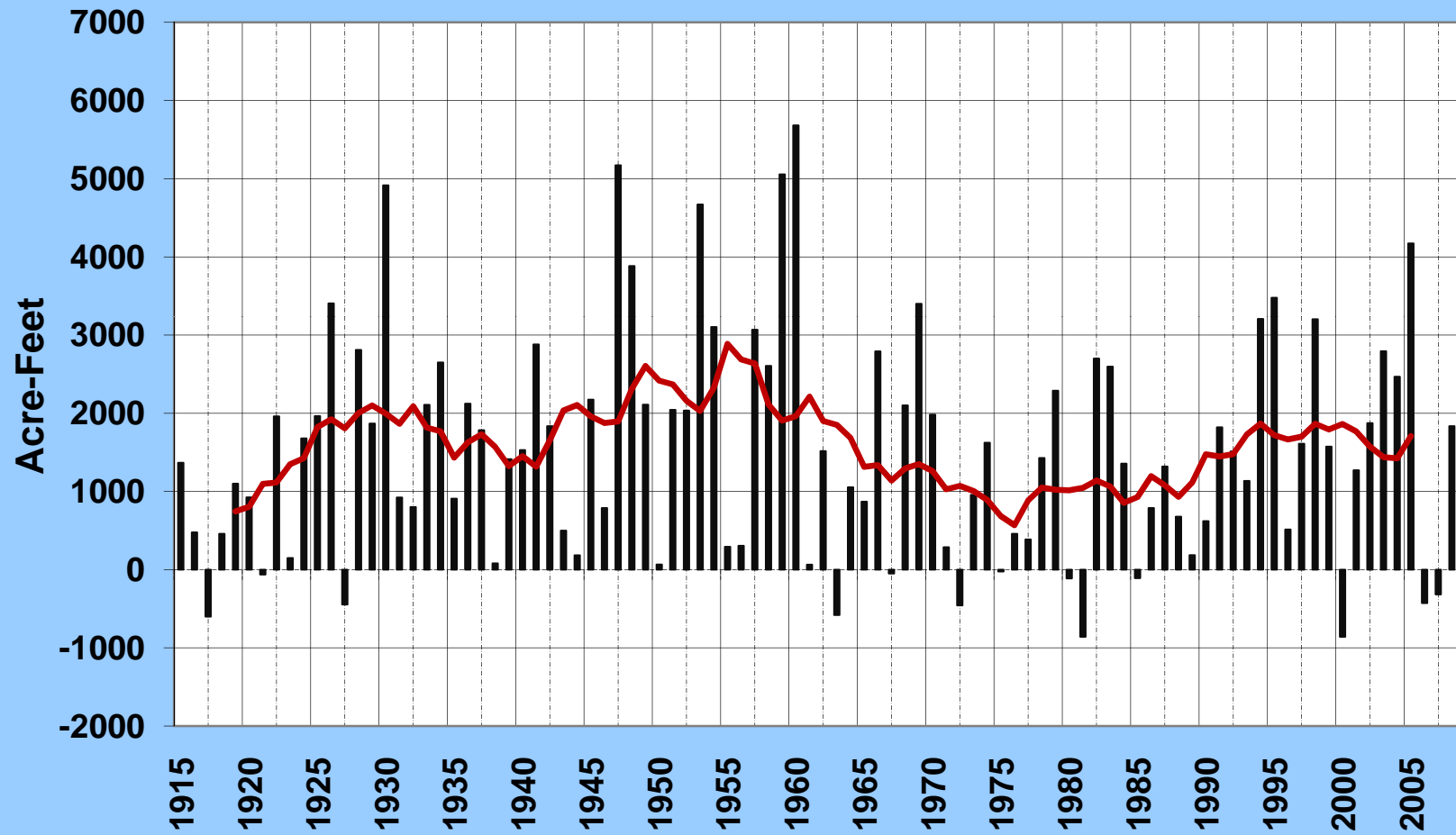


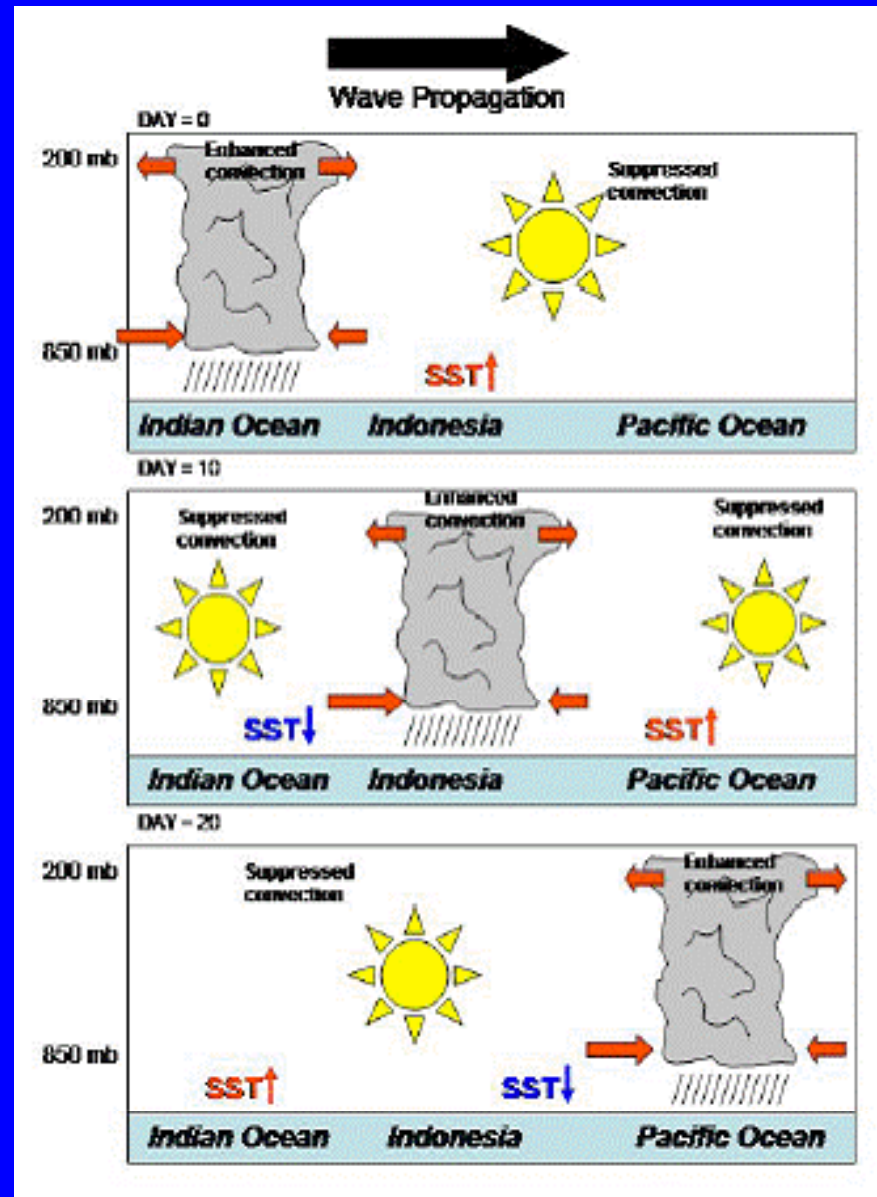
October District Wide Rainfall

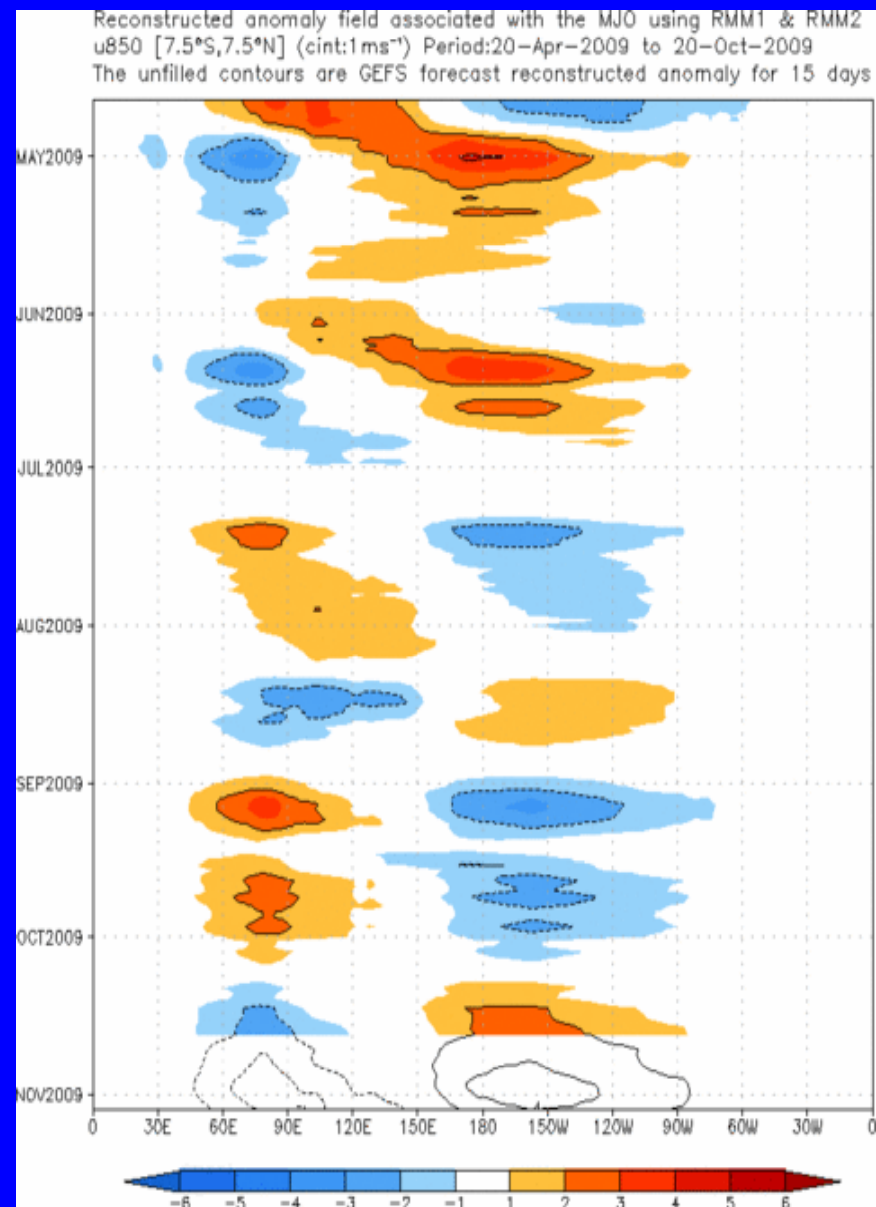
Median = 4.38



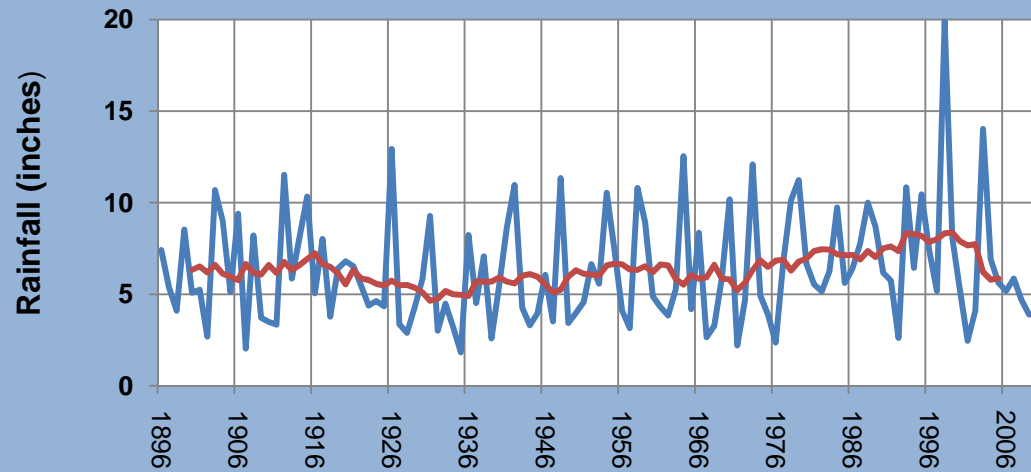
Lake Okeechobee Annual Net Inflow



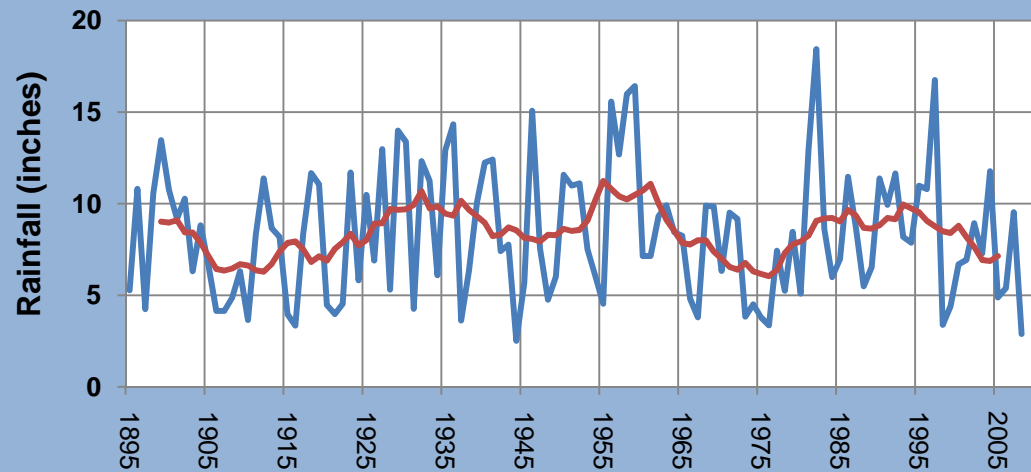




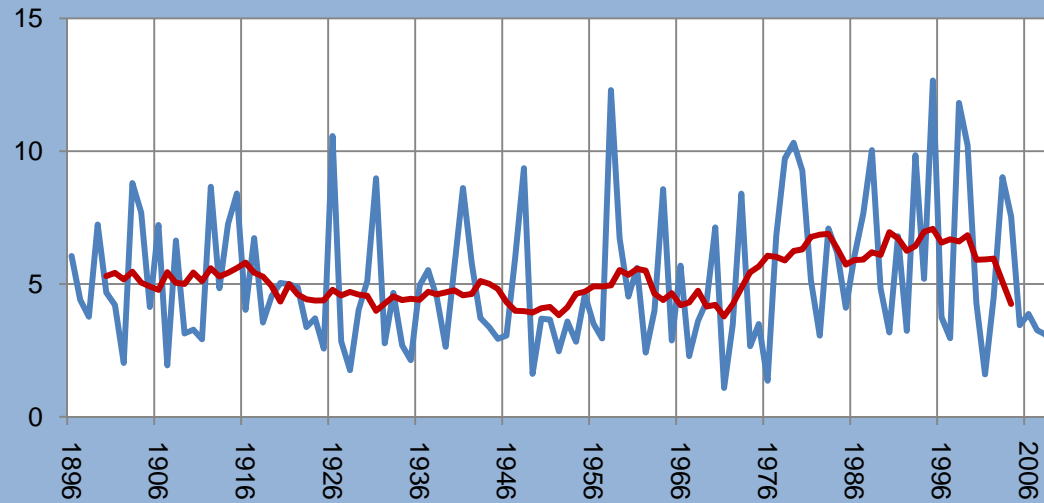
November-January Climate Division 4 Rainfall



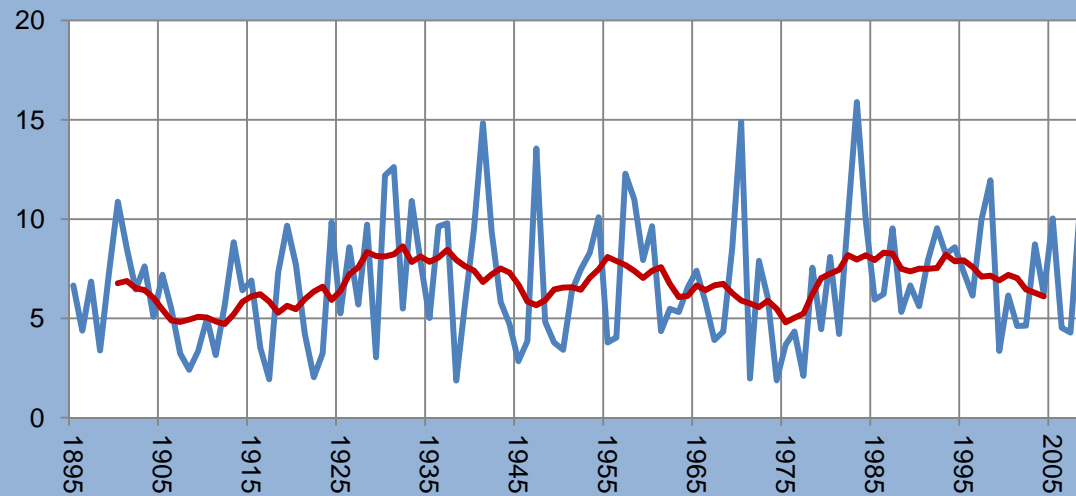
February-April Climate Division 4 Rainfall



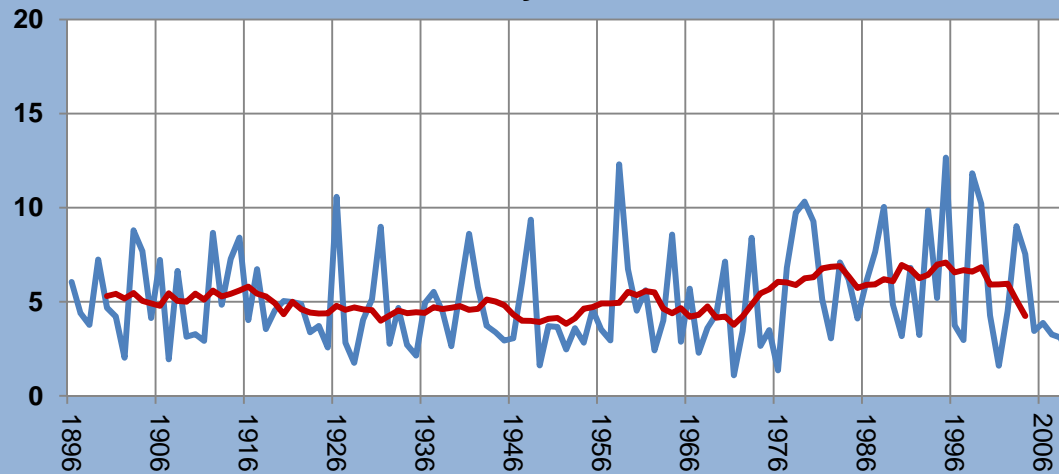
November - January Climate Division 5 Rainfall



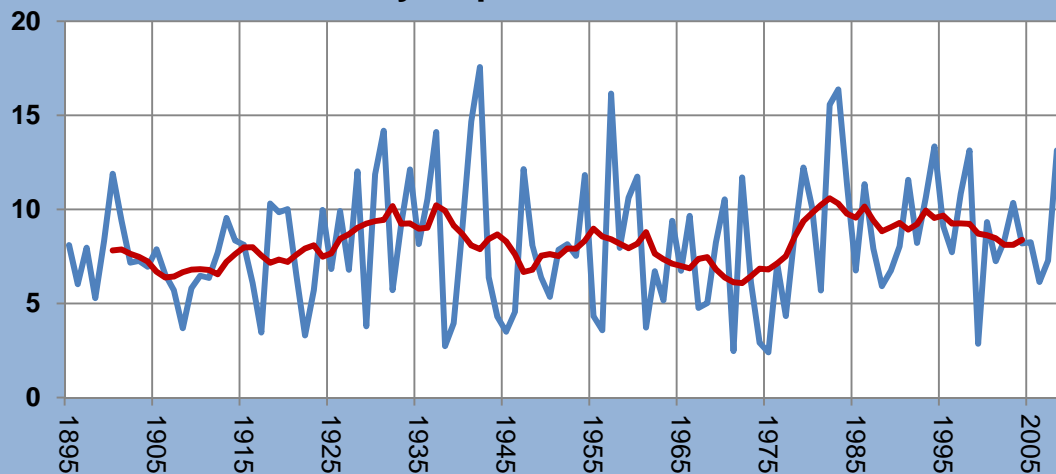
February - April Climate Division 5 Rainfall



November - January Climate Division 5 Rainfall



February - April Climate Division 6 Rainfall



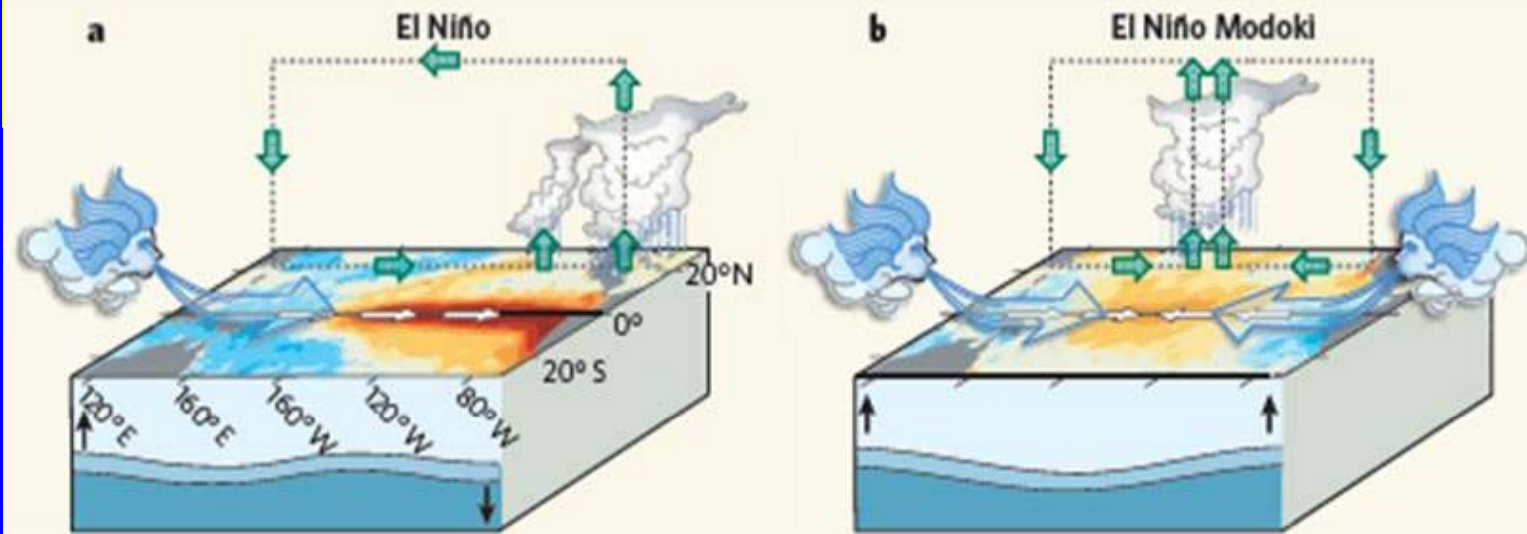
El Niño Modoki

Hye-Mi Kim, Peter J. Webster,* Judith A. Curry, July 2009 Science

<http://www.sciencemag.org/cgi/content/abstract/325/5936/77>

Modoki is a Japanese word Meaning “similar but different”

<http://www.pmel.noaa.gov/tao/jsdisplay/>

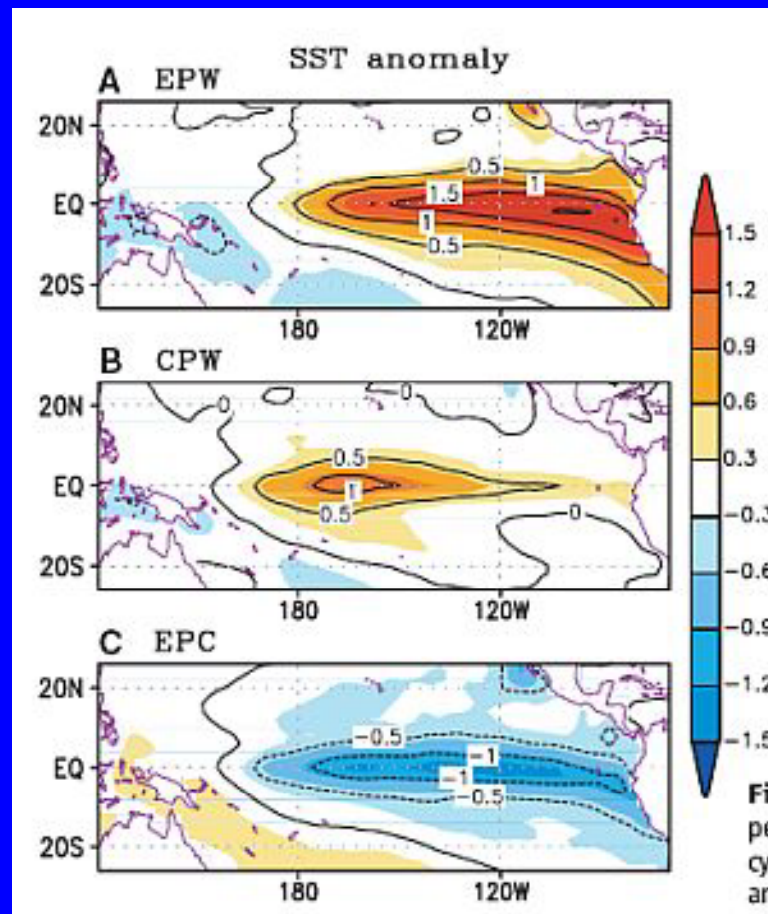


El Nino Modoki is a newly identified Pacific Ocean pattern that has significant effect on The Atlantic basin climate. During the tropical season it often acts more similar to a La Nina condition with a greater number of Atlantic tropical activity and often wetter conditions in Florida during the wet season. However during the dry season Florida still receives its expected above average rainfall as with traditional El Nino events. The El Nino Modoki increases the chances of above normal rainfall in consecutive wet and dry seasons. Examples of such events include 1969-1970, 1994-1995 and 2004-2005.

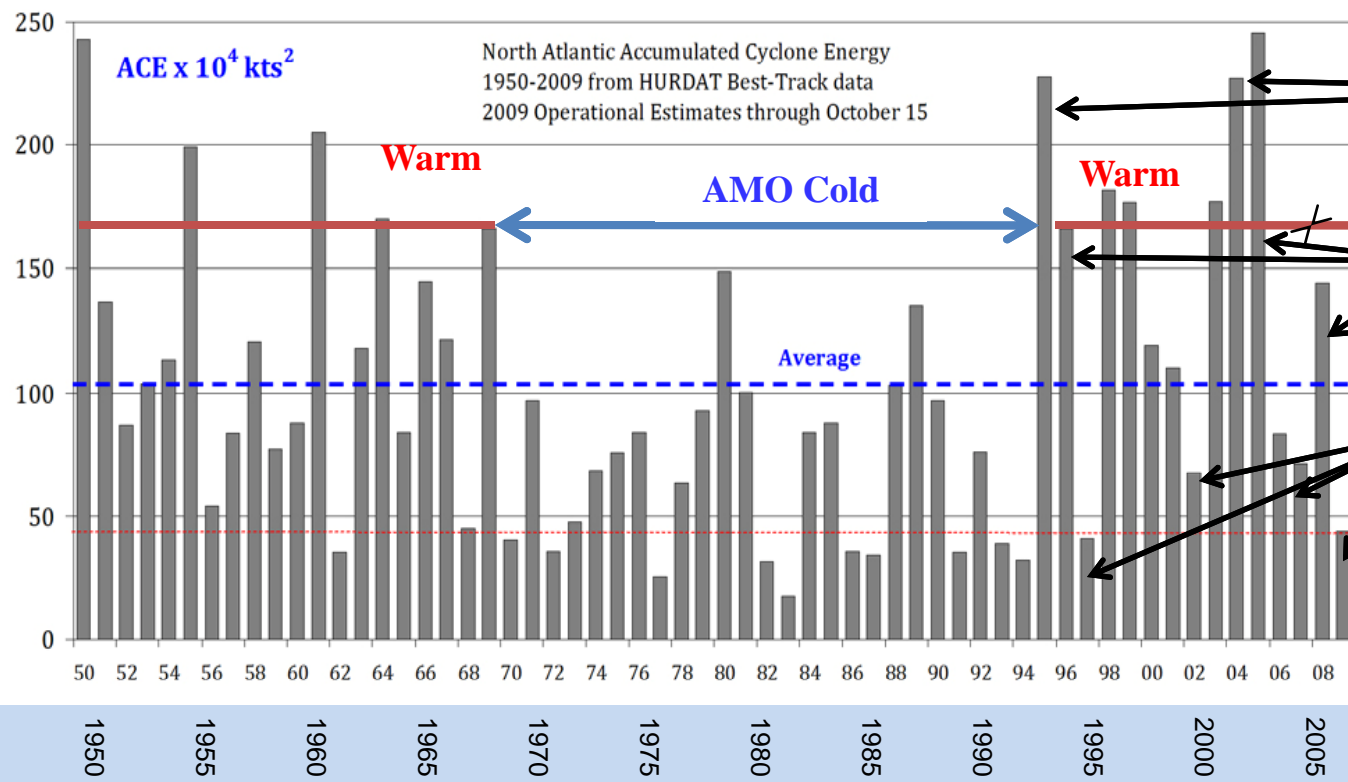
Traditional El Nino

El Nino Modoki

La Nina



North Atlantic Accumulated Cyclonic Energy



	Through September	Through October	Tropical Season Climatology
ACE Climatology	85	99	106
2009	43	44	