

**APPENDIX B**

**NOAA DROUGHT ANALYSIS**

**29 OCTOBER 2007**



# **ENSO Cycle: Recent Evolution, Current Status and Predictions**

**Update prepared by  
Climate Prediction Center / NCEP  
October 29, 2007**



# Outline

- **Overview**
- **Recent Evolution and Current Conditions**
- **Oceanic Niño Index (ONI) – “Revised 1 March 2004”**
- **Pacific SST Outlook**
- **U.S. Seasonal Precipitation and Temperature Outlooks**
- **Summary**
- **Temperature and precipitation La Niña composites**

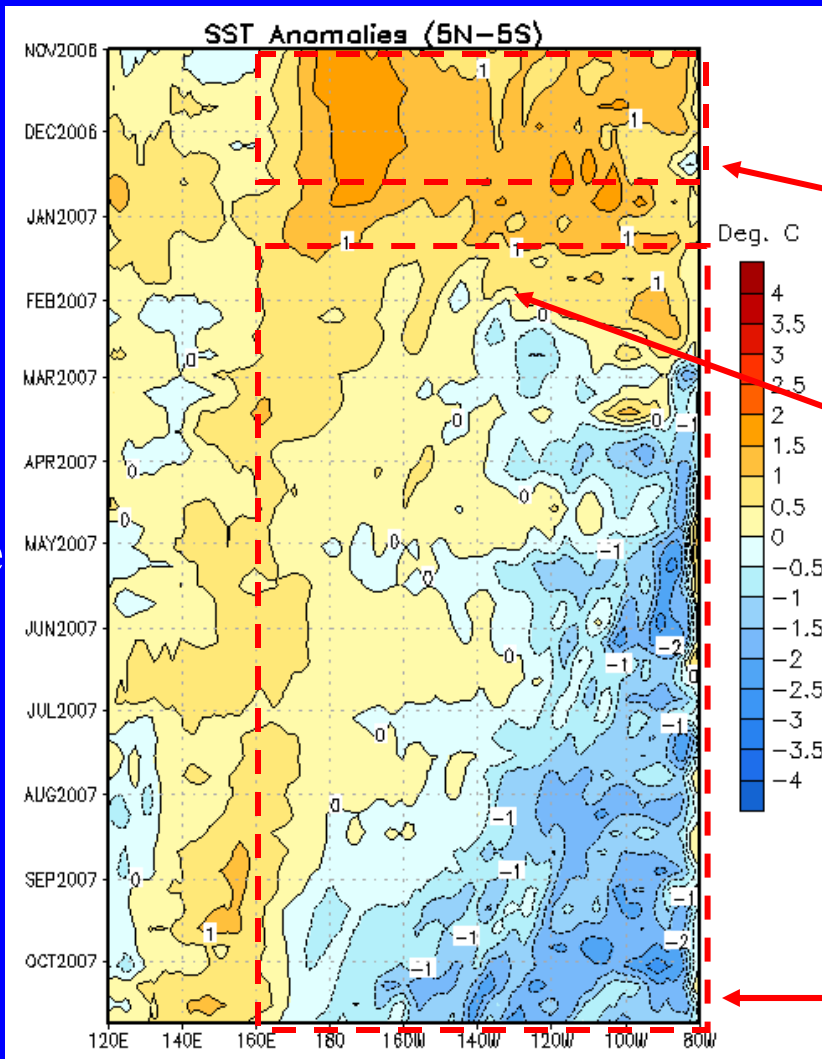


# Overview

- **La Niña is present across the tropical Pacific.**
- **Negative SST anomalies extend along the equator from the Date Line eastward to the South American coast.**
- **Recent equatorial Pacific SST trends and model forecasts indicate La Niña will continue through early 2008.**



# Recent Evolution of Equatorial Pacific SST Departures (°C)



Time  
↓

Longitude

Between May 2006 and December 2006, positive SST anomalies increased across the equatorial Pacific between 160°E and the South American coast.

The SST anomalies decreased rapidly in January 2007 everywhere east of the Date Line.

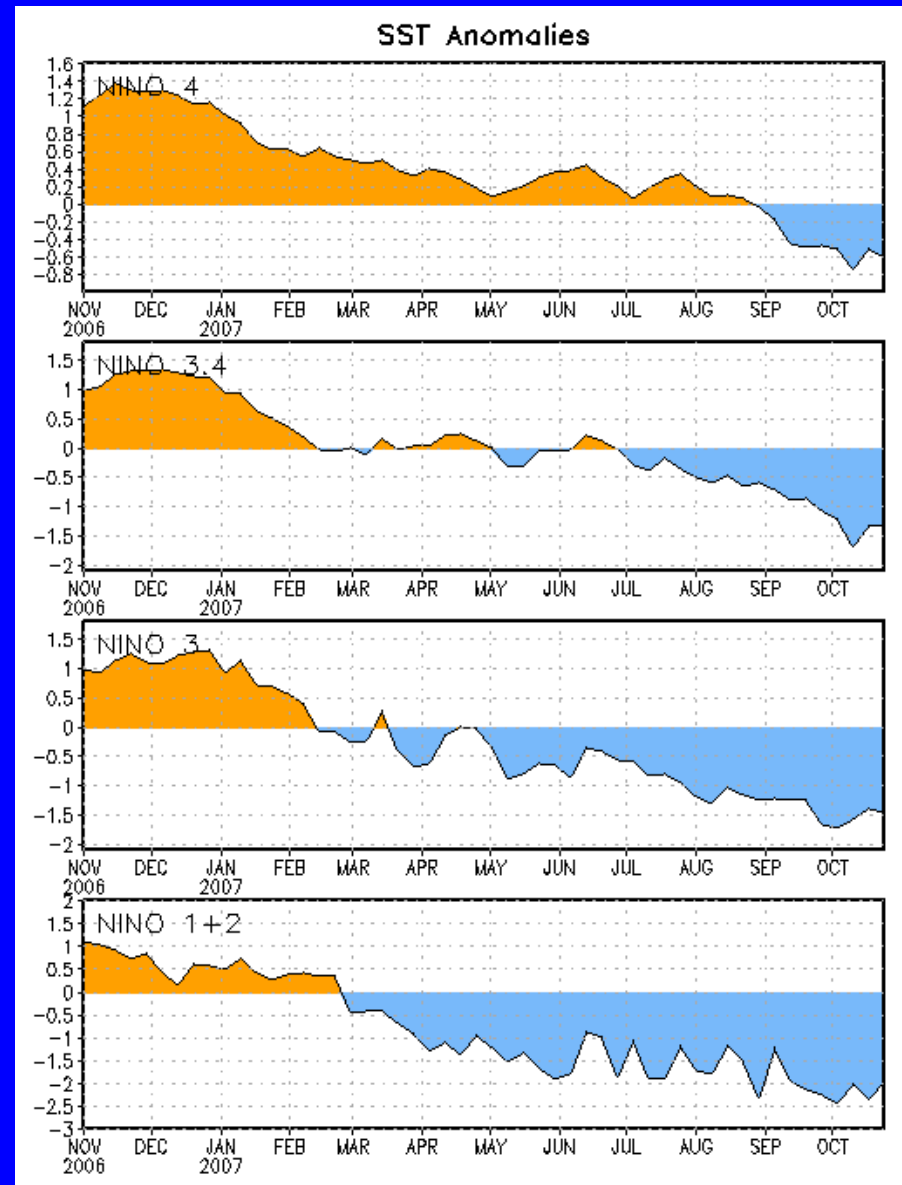
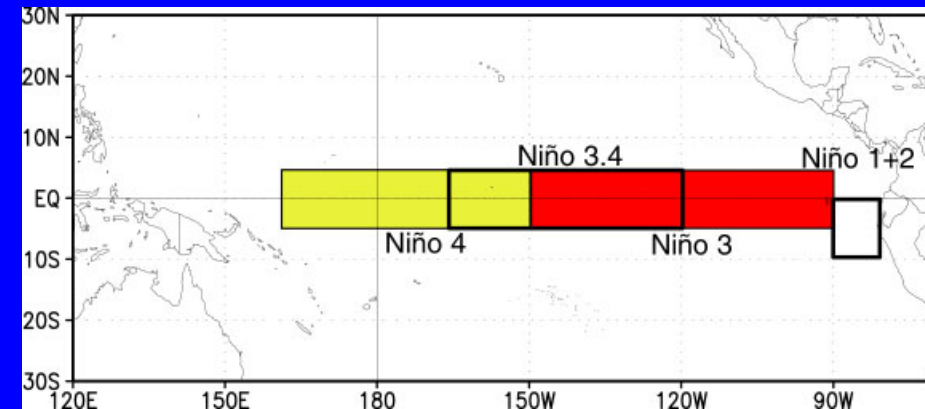
Over the past several months, below average SSTs have expanded westward, and negative anomalies now extend from west of the Date Line to the west coast of South America.



# Niño Region SST Departures (°C) Recent Evolution

The latest weekly SST departures are:

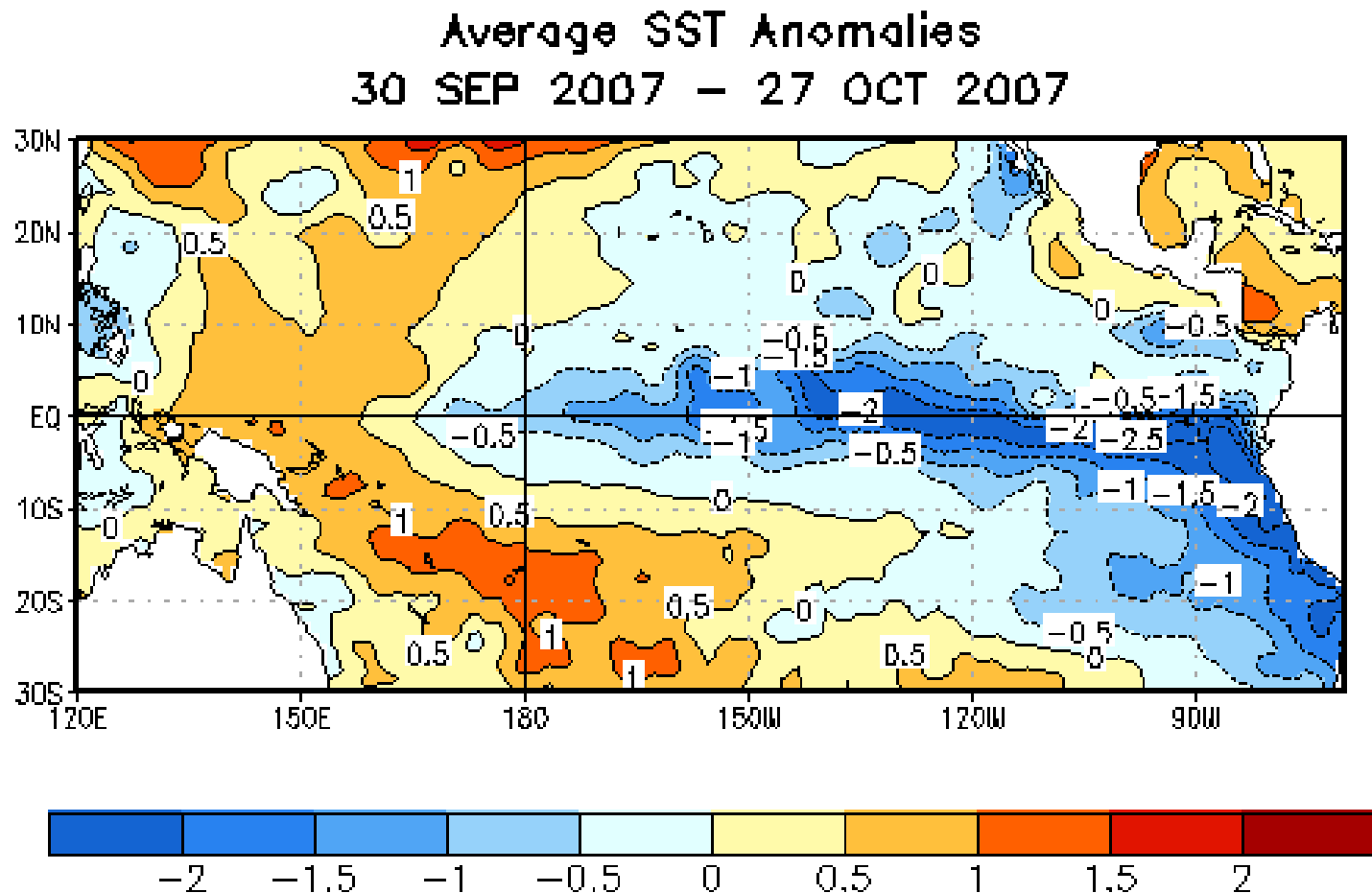
<b>Niño 4</b>	<b>-0.6°C</b>
<b>Niño 3.4</b>	<b>-1.3°C</b>
<b>Niño 3</b>	<b>-1.4°C</b>
<b>Niño 1+2</b>	<b>-1.9°C</b>





# SST Departures ( $^{\circ}\text{C}$ ) in the Tropical Pacific During the Last 4 Weeks

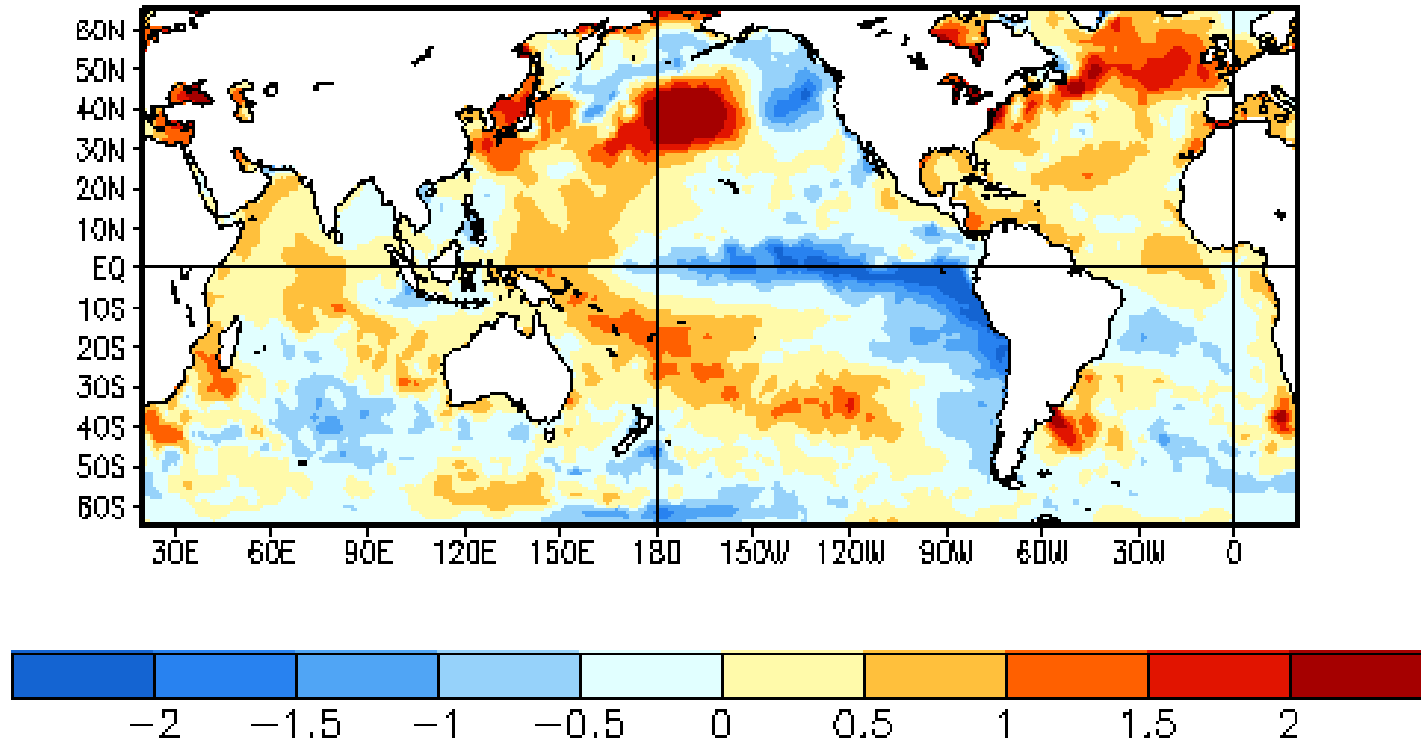
During the last four weeks, equatorial Pacific SSTs were generally more than  $-2^{\circ}\text{C}$  below average east of  $140^{\circ}\text{W}$ , and more than  $-1^{\circ}\text{C}$  below average east of  $175^{\circ}\text{W}$ . SSTs remained more than  $+0.5^{\circ}\text{C}$  above average between  $130^{\circ}\text{E}$  and  $160^{\circ}\text{E}$ .





# Global SST Departures (°C)

Average SST Anomalies  
30 SEP 2007 – 27 OCT 2007



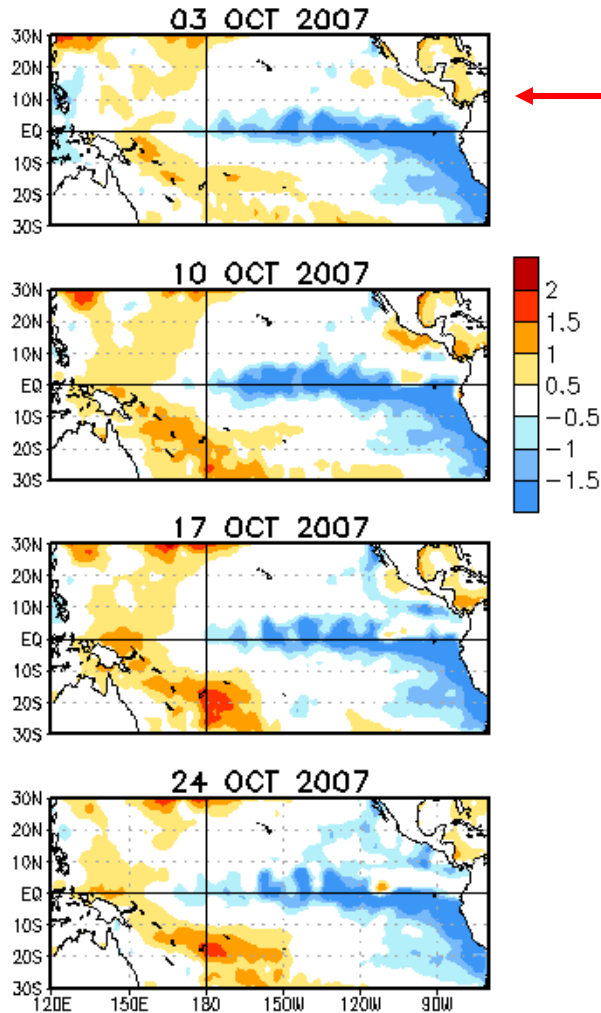
**Equatorial SSTs remained below average across the central and eastern equatorial Pacific Ocean, and above average in the western Pacific Ocean, the Indian Ocean, and the Atlantic Ocean. A horseshoe-shaped pattern of positive anomalies spanned the Pacific Ocean of both hemispheres. Positive anomalies also covered the northernmost latitudes of the Atlantic Ocean.**



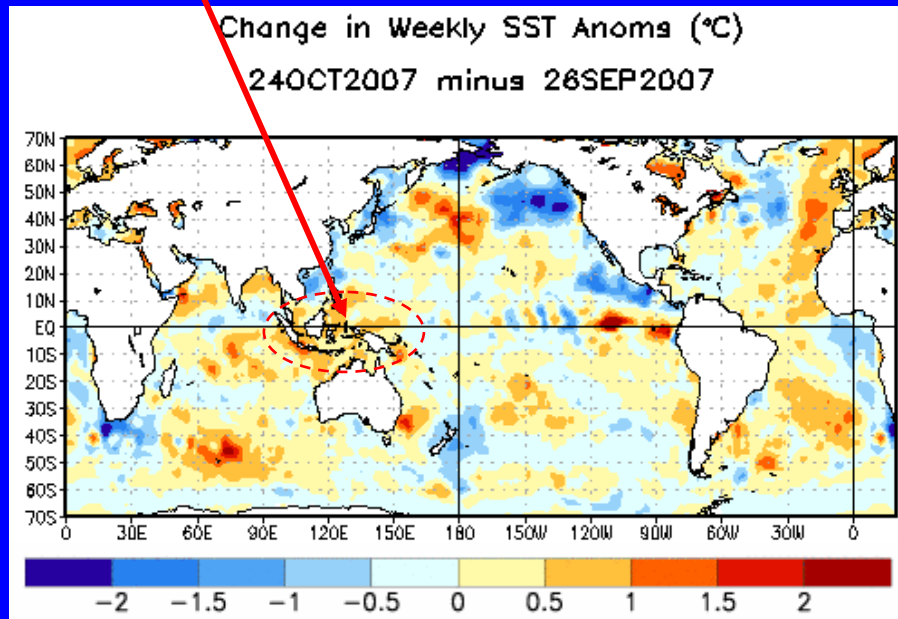


# Weekly SST Departures (°C) for the Last Four Weeks

Weekly SST Anomalies (DEG C)



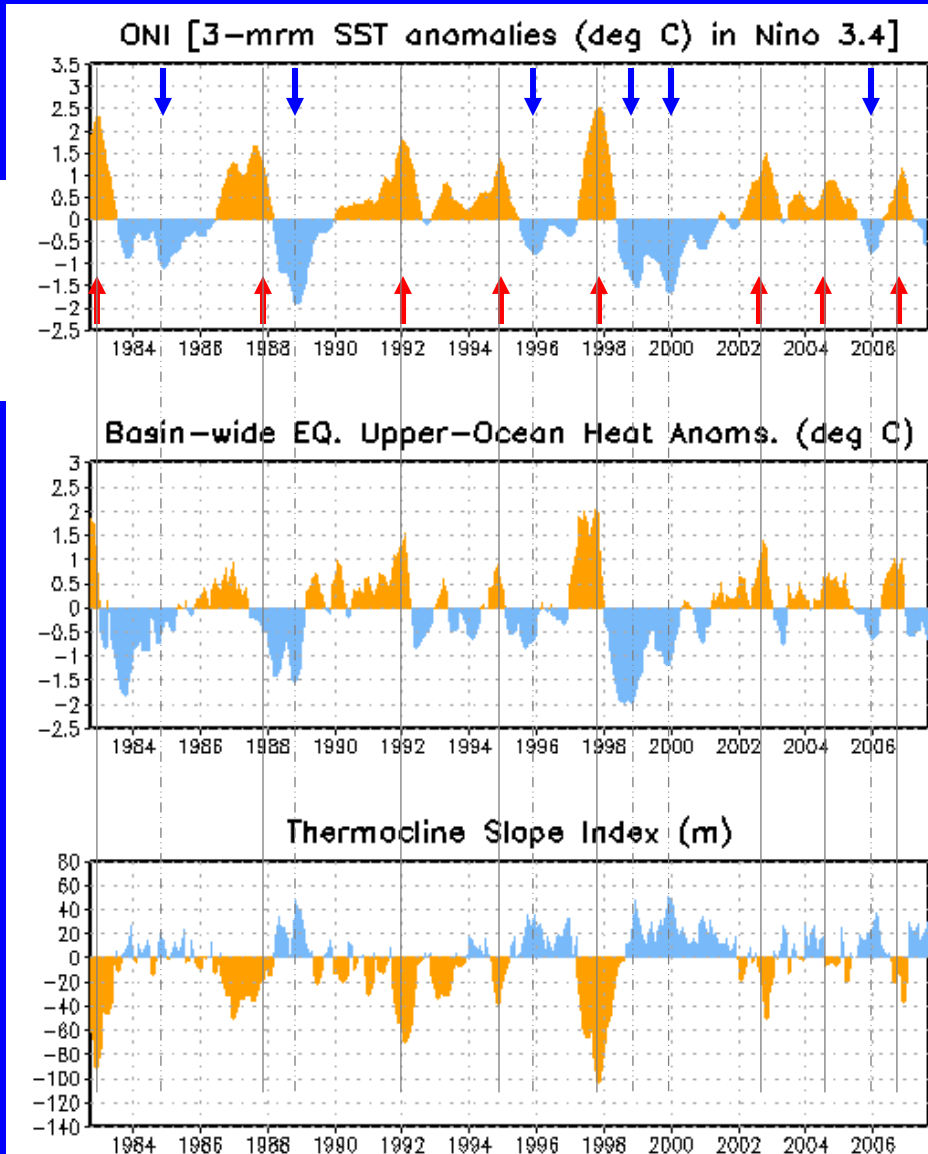
- During October 2007 negative SST departures spanned the central and eastern equatorial Pacific.
- Over this 4-week period equatorial SST anomalies changed little in the area east of the Date Line, and increased near the Maritime Continent.





# Upper-Ocean Conditions in the Eq. Pacific

Cold Episodes ↓  
Warm Episodes ↑



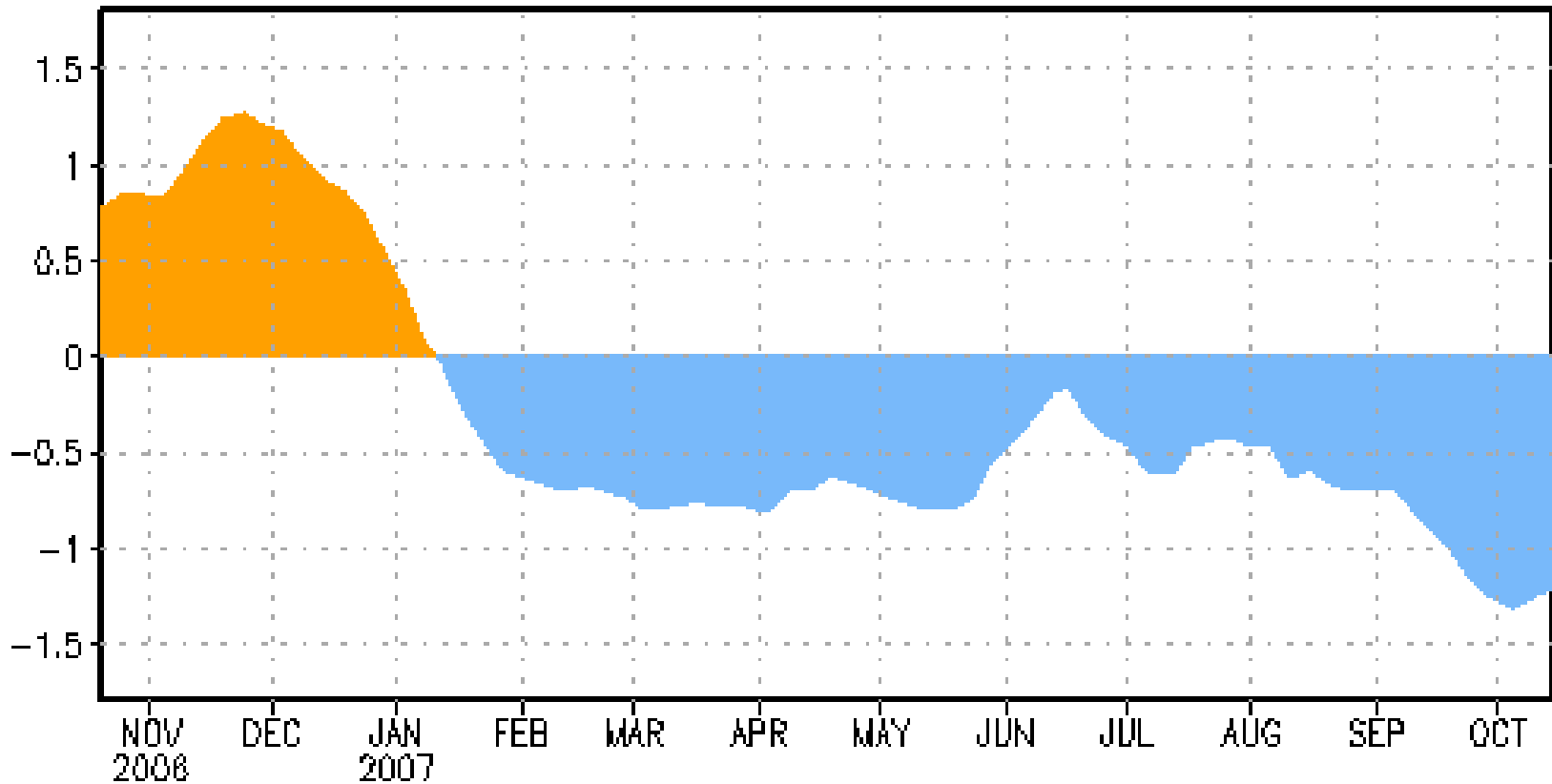
- The basin-wide equatorial upper ocean (0-300 m) heat content is **greatest** prior to and during the early stages of a Pacific **warm** (El Niño) episode (compare top 2 panels) and **least** prior to and during the early stages of a **cold** (La Niña) episode.
- The slope of the oceanic thermocline is least (greatest) during warm (cold) episodes.
- Current values of the upper-ocean heat anomalies (negative) and the thermocline slope index (positive) indicate La Niña.

The monthly thermocline slope index represents the difference in anomalous depth of the 20°C isotherm between the western Pacific (160°E-150°W) and the eastern Pacific (90°-140°W).



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

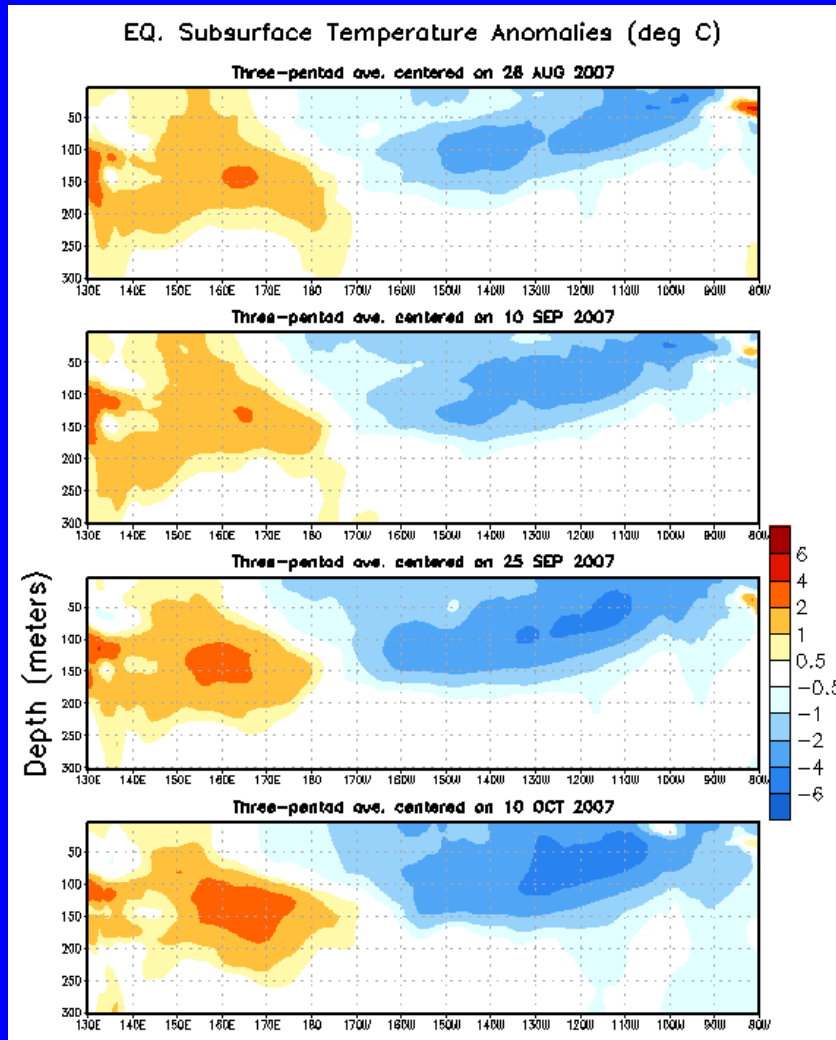
EQ. Upper-Ocean Heat Anoms. (deg C) for 180-100W



Since January 2007, the upper ocean heat content has been below average across the eastern half of the equatorial Pacific Ocean. Intraseasonal fluctuations in heat content during May- August 2007 are related to the MJO. Below average heat content is favorable for the continued development of La Niña.



# Sub-Surface Temperature Departures (°C) in the Equatorial Pacific



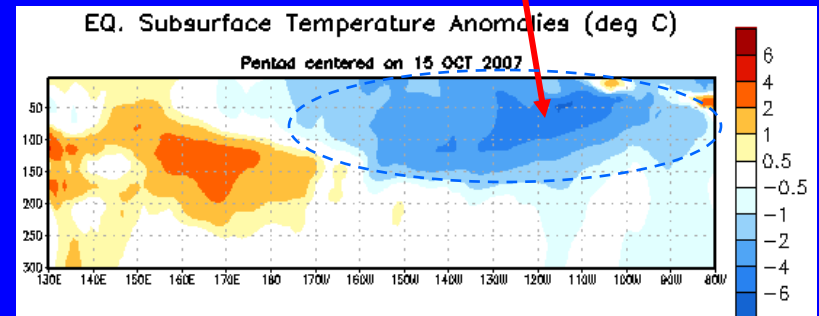
Time



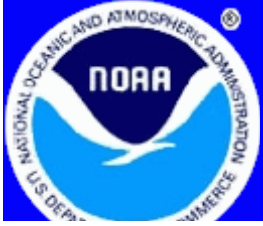
Longitude

- During late August – mid October 2007 sub-surface temperature anomalies became increasingly negative across the eastern half of the equatorial Pacific Ocean, while positive anomalies remained confined to the western Pacific.

- The most recent period (below) shows negative temperature anomalies between the surface and 150 m depth across the central and eastern equatorial Pacific Ocean, with the largest departures (-4°C to -6°C) between 135° and 100°W.

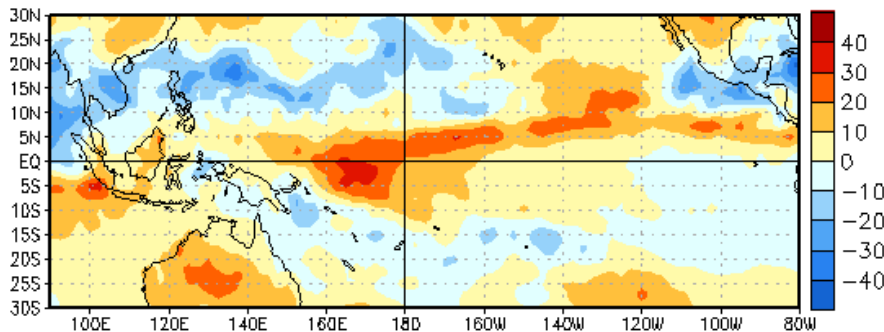


Most recent pentad analysis



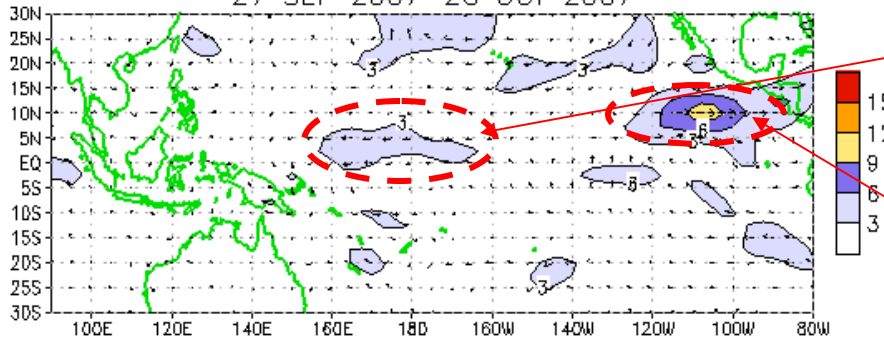
# Tropical OLR and Wind Anomalies During the Last 30 Days

OLR Anomalies  
30 SEP 2007 to 25 OCT 2007



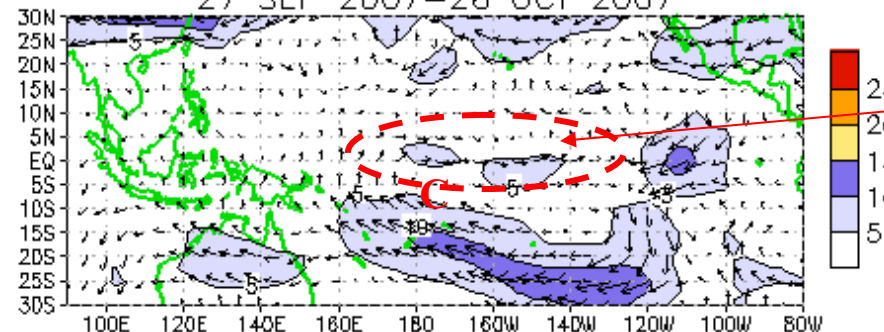
Positive OLR anomalies (suppressed convection and precipitation, red shading) were observed across the tropical Pacific, west of the Date Line and also between the equator and 10°N east of the Date Line. Negative OLR anomalies were present over the Philippines, Southeast Asia, and to the southeast of Papua New Guinea.

CDAS 850-hPa Wind Anoms  
27 SEP 2007-26 OCT 2007

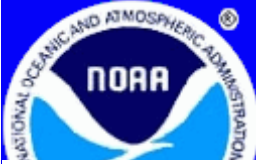


Weak low-level (850-hPa) easterly wind anomalies were evident in the central equatorial Pacific. Anomalous low-level westerlies were present in the eastern Pacific just north of the equator.

CDAS 200-hPa Wind Anoms  
27 SEP 2007-26 OCT 2007



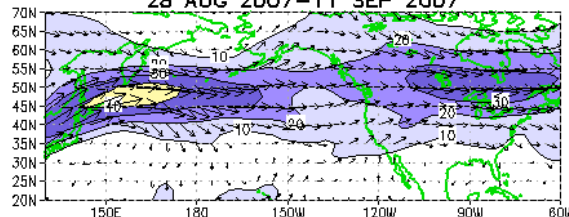
Over the central Pacific, the combination of upper-level (200-hPa) westerly wind anomalies at the equator and cyclonic anomalies in the Southern Hemisphere subtropics, reflect La Niña.



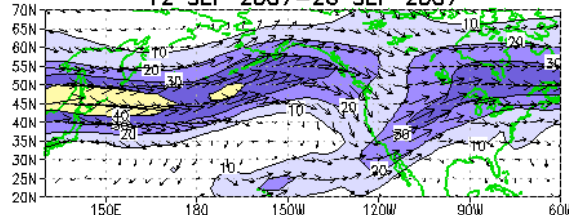
# Atmospheric Circulation over the North Pacific & North America During the Last 60 Days

## 200-hPa Wind

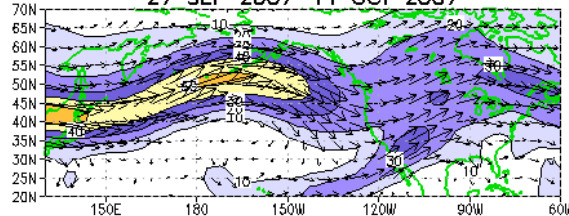
28 AUG 2007-11 SEP 2007



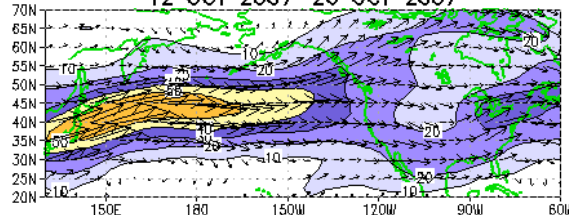
12 SEP 2007-26 SEP 2007



27 SEP 2007-11 OCT 2007

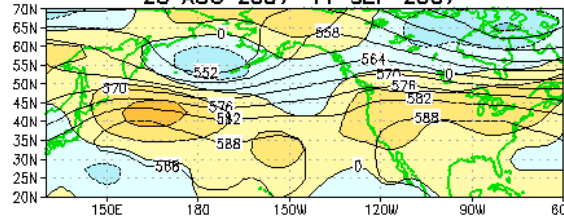


12 OCT 2007-26 OCT 2007

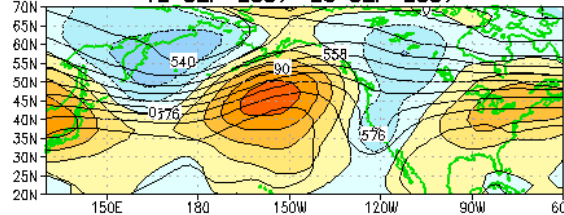


## 500-hPa Height & Anoms.

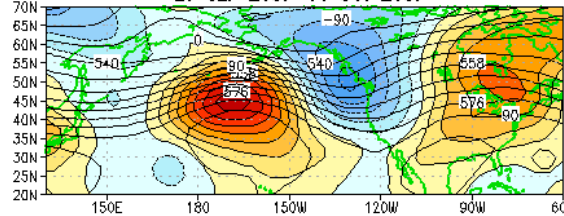
28 AUG 2007-11 SEP 2007



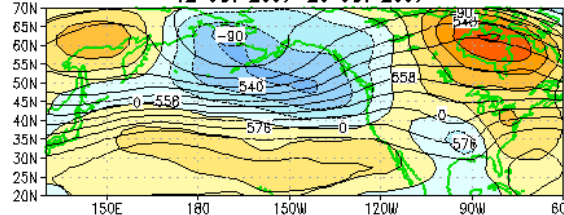
12 SEP 2007-26 SEP 2007



27 SEP 2007-11 OCT 2007

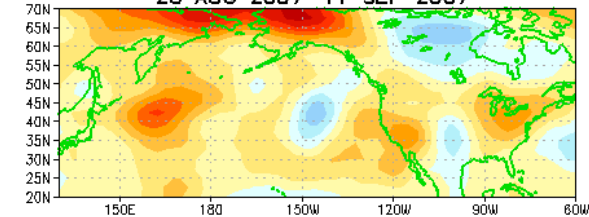


12 OCT 2007-26 OCT 2007

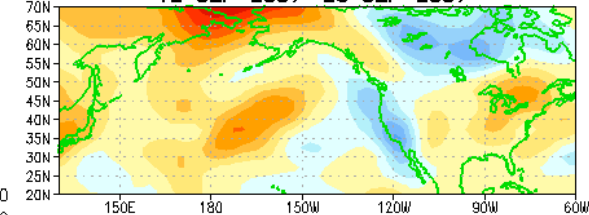


## 925-hPa Temp. Anoms. (°C)

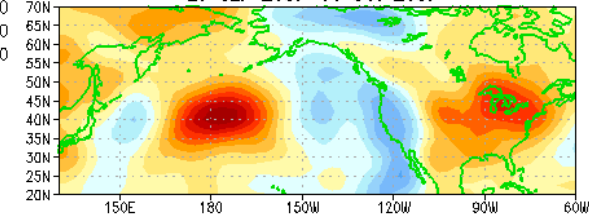
28 AUG 2007-11 SEP 2007



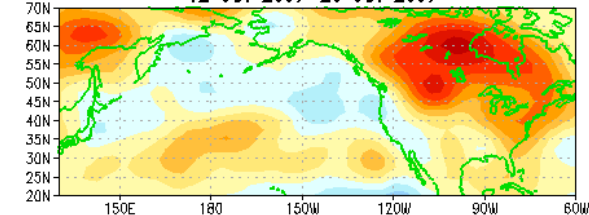
12 SEP 2007-26 SEP 2007



27 SEP 2007-11 OCT 2007



12 OCT 2007-26 OCT 2007



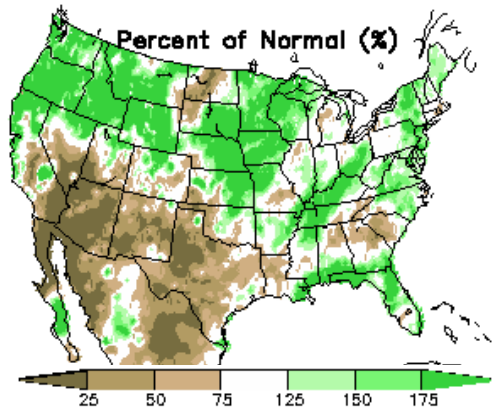
In late August and early September, above-average heights and temperatures dominated much of the contiguous United States. During late September a strong ridge developed over the Gulf of Alaska, followed by a trough over the western North America and a ridge in the East. This wave pattern amplified and slightly retrograded in early October, bringing below-average temperatures to Alaska and the U.S. west coast and above-average temperatures to central and eastern North America. During late October a more zonal flow over the eastern Pacific Ocean and continued above-average heights across eastern Canada brought a return of above average temperatures to much of North America.



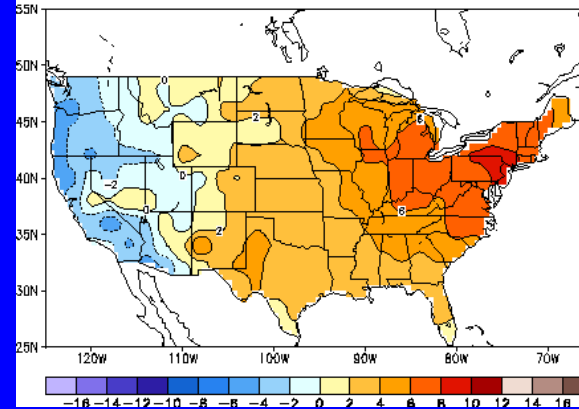
# U.S. Temperature and Precipitation Departures During the Last 30 and 90 Days

## Last 30 Days

30-day (ending 28 Oct 2007) % of average precipitation

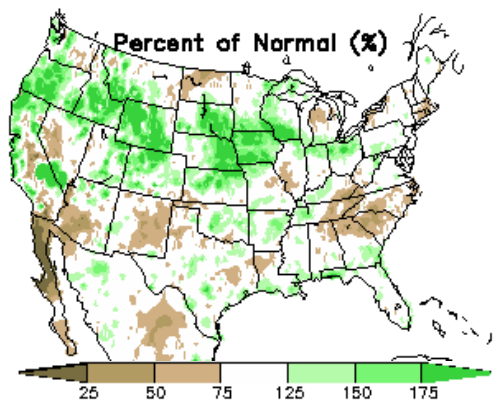


30-day (ending 26 Oct 2007) temperature departures (degree C)

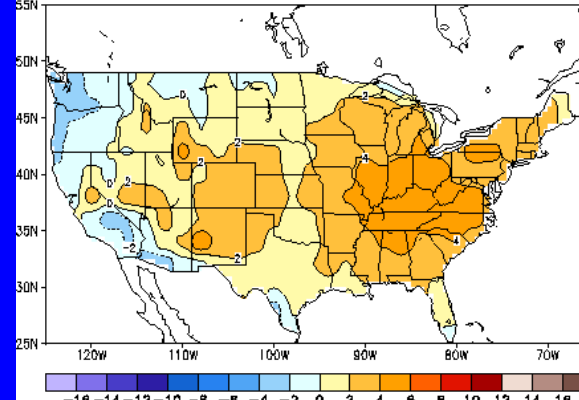


## Last 90 Days

90-day (ending 28 Oct 2007) % of average precipitation



90-day (ending 26 Oct 2007) temperature departures (degree C)





# Intraseasonal Variability

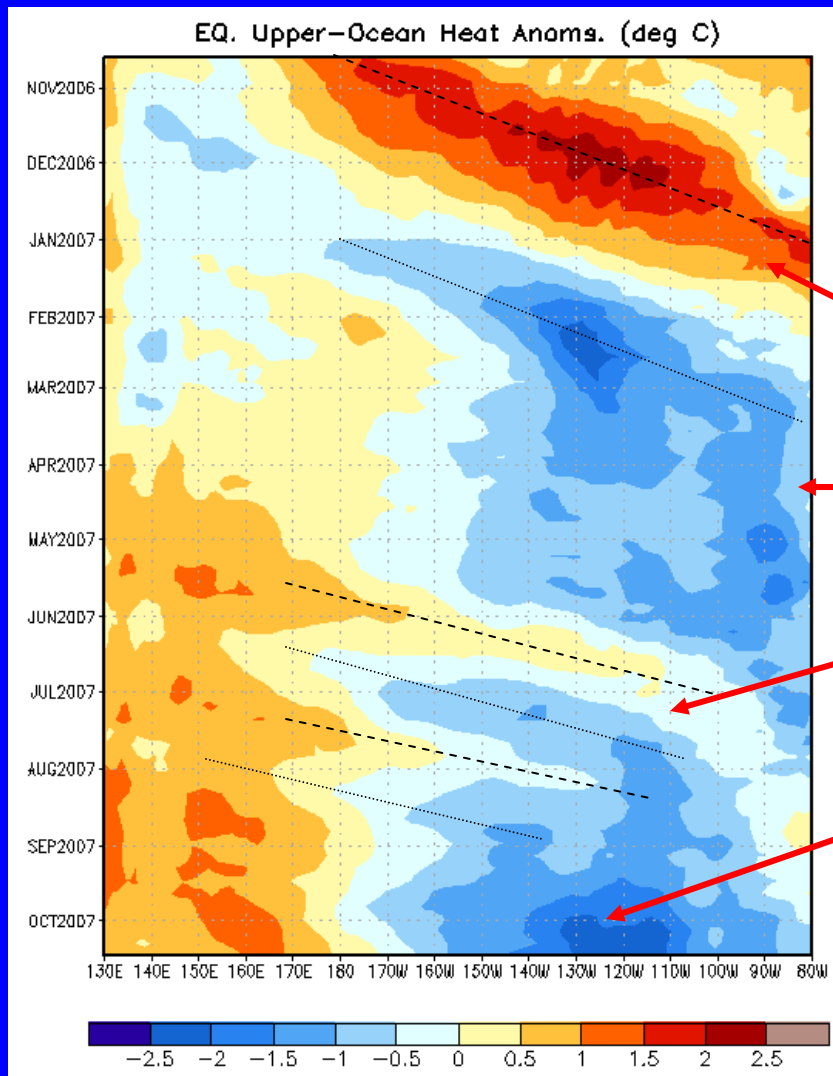
- **Intraseasonal variability in the atmosphere (wind and pressure), which is often related to the Madden-Julian Oscillation (MJO), can significantly impact surface and subsurface conditions across the Pacific Ocean.**
- **Related to this activity**
  - **significant weakening of the low-level easterly winds usually initiates an eastward-propagating oceanic Kelvin wave.**
  - **Several Kelvin waves have occurred during the last year (see next slide).**





# Weekly Heat Content Evolution in the Equatorial Pacific

Time



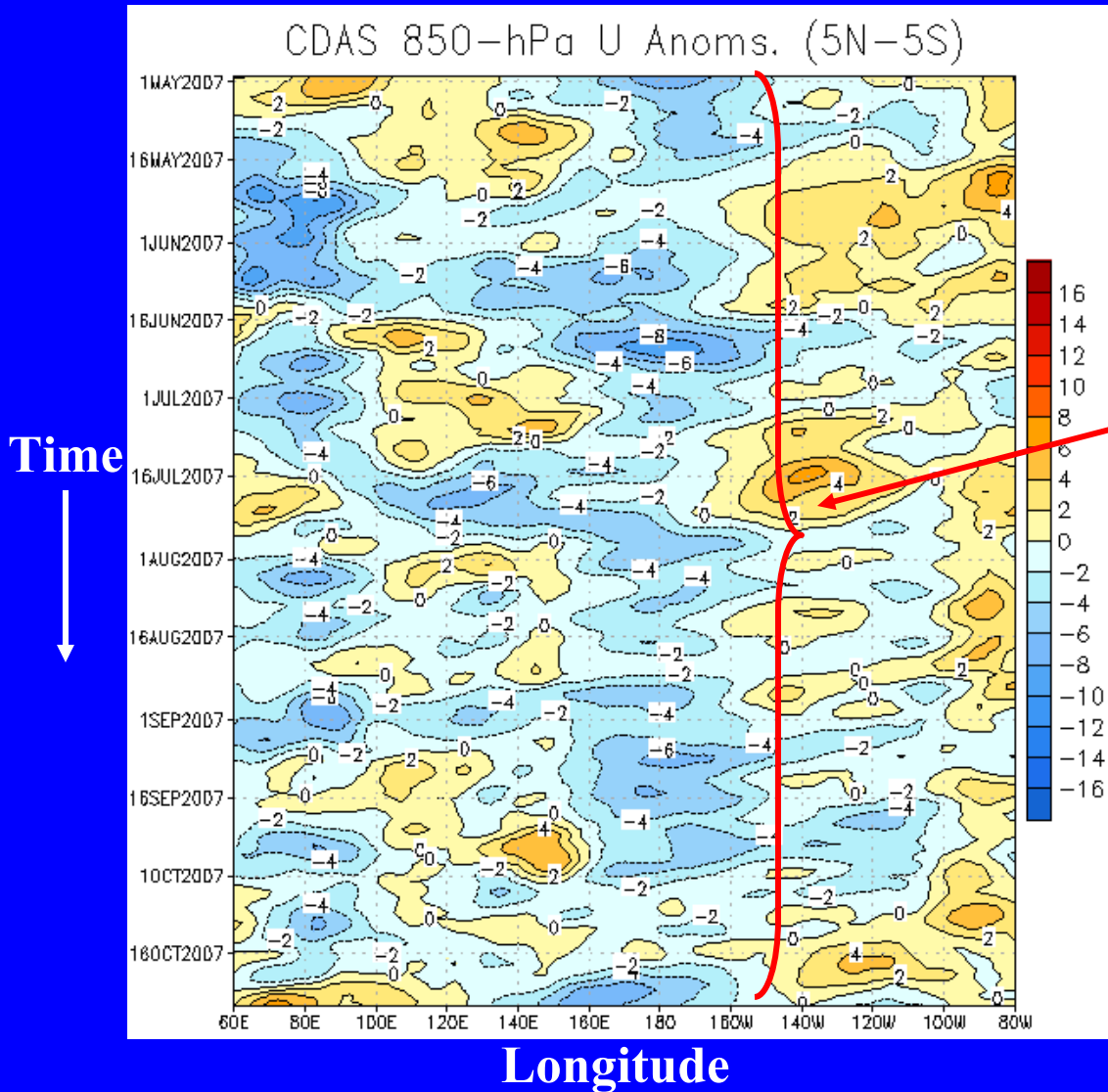
Longitude

- El Niño conditions and anomalously high heat content (red) were present during the latter part of 2006.
- Month-to-month variability in heat content during September 2006 – January 2007 is due to Kelvin wave activity.
- During February-May 2007, the heat content was anomalously low (blue) in the eastern equatorial Pacific.
- During May-August 2007, the subsurface temperature anomalies were affected by weak Kelvin wave activity.
- In recent weeks the increasing strength of the negative heat content anomalies reflects La Niña.

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



# Low-level (850-hPa) Zonal (east-west) Wind Anomalies ( $\text{m s}^{-1}$ )



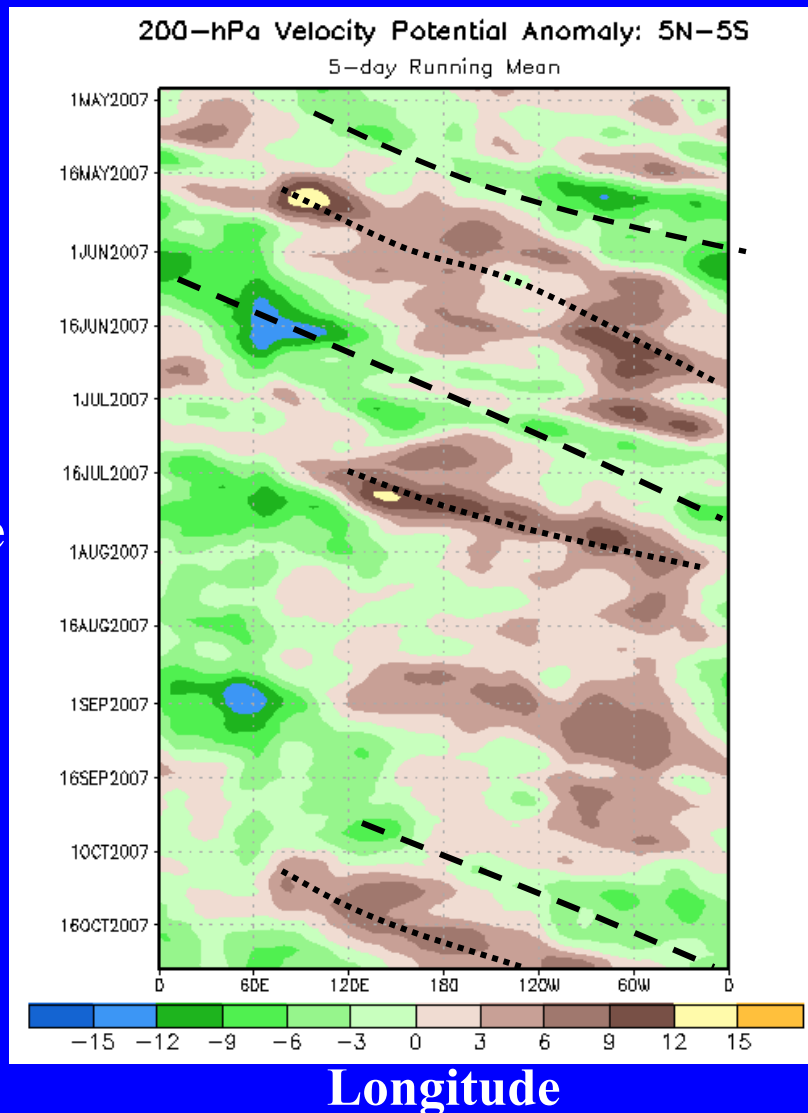
Westerly wind anomalies (orange/red shading).

Easterly wind anomalies (blue shading).

Low-level (850-hPa) easterly wind anomalies have persisted since January 2007 over the equatorial Pacific in areas between 160°E and 150°W.



# 200-hPa Velocity Potential Anomalies (5°N-5°S)



**Positive anomalies (brown shading) indicate unfavorable conditions for precipitation.**

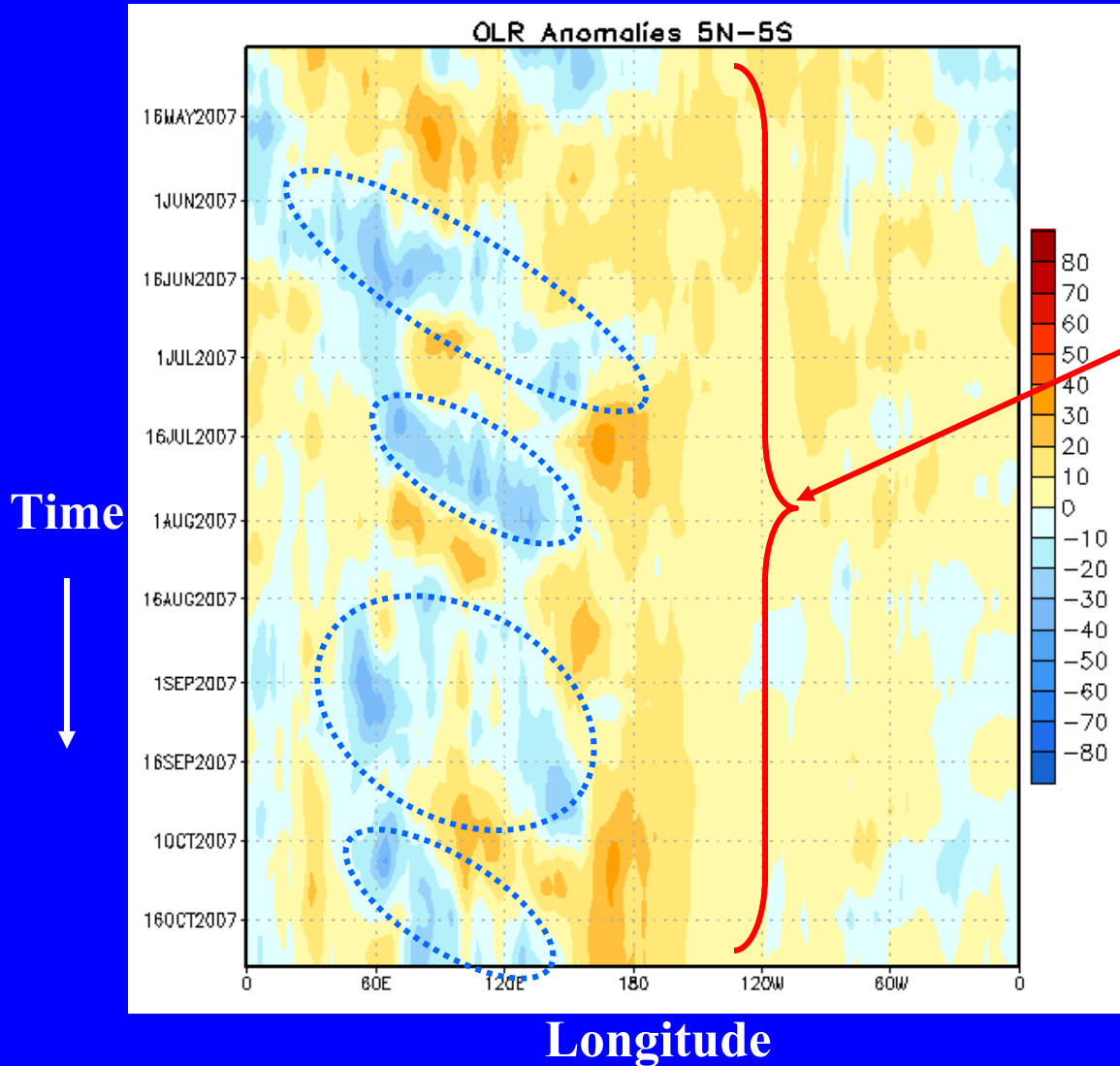
**Negative anomalies (green shading) indicate favorable conditions for precipitation.**

**Weak-to-moderate MJO activity was observed during May - July, followed by no MJO activity during August and September.**

**Recently, MJO activity has increased.**



# Outgoing Longwave Radiation (OLR) Anomalies



**Drier-than-average conditions (orange/red shading)**

**Wetter-than-average conditions (blue shading)**

Since February 2007, convection has been suppressed across the eastern half of the equatorial Pacific Ocean.

Convection has occasionally been enhanced over the western equatorial Pacific and central Indian Ocean.



## Oceanic Niño Index (ONI)

- The ONI is based on SST departures from average in the Niño 3.4 region, and is a principal measure for monitoring, assessing, and predicting ENSO.
- Defined as the three-month running-mean SST departures in the Niño 3.4 region. Departures are based on a set of improved homogeneous historical SST analyses (Extended Reconstructed SST – ERSST.v2). The SST reconstruction methodology is described in Smith and Reynolds, 2003, *J. Climate*, 16, 1495-1510.
- Used to place current events into a historical perspective
- NOAA's operational definitions of El Niño and La Niña are keyed to the ONI index.



# NOAA Operational Definitions for El Niño and La Niña

El Niño: characterized by a *positive* ONI greater than or equal to  $+0.5^{\circ}\text{C}$ .

La Niña: characterized by a *negative* ONI less than or equal to  $-0.5^{\circ}\text{C}$ .

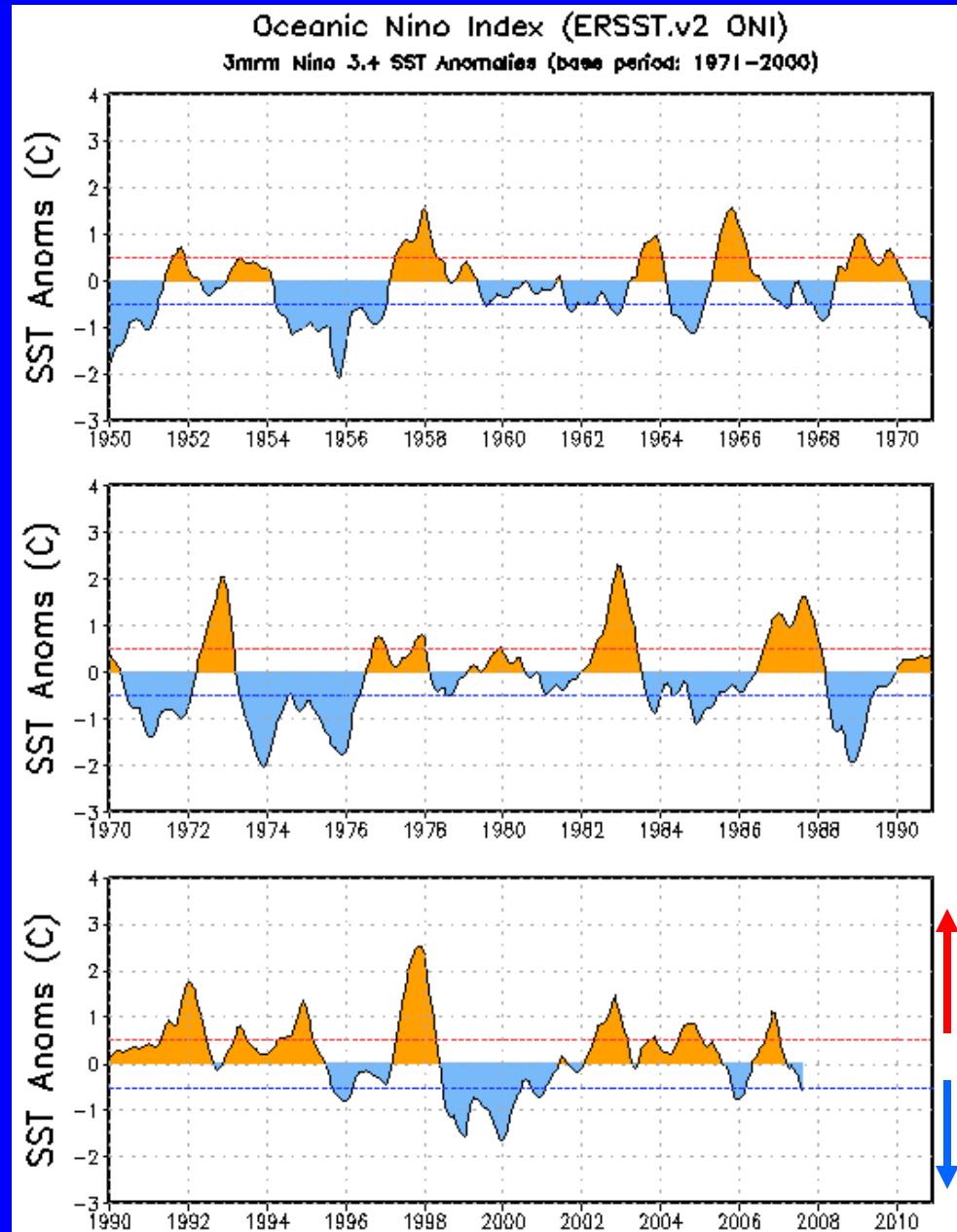
By historical standards, to be classified as a full-fledged El Niño or La Niña episode, these thresholds must be exceeded for a period of at least 5 consecutive overlapping 3-month seasons.

*CPC considers El Niño or La Niña conditions to occur when the monthly Niño3.4 SST departures meet or exceed  $\pm 0.5^{\circ}\text{C}$  along with consistent atmospheric features.*



# ONI (°C): Evolution since 1950

The most recent ONI value (July – September 2007) is **-0.6°C**.



El Niño  
neutral  
La Niña



# Historical El Niño and La Niña Episodes

## Based on the ONI computed using ERSST.v2

Highest		Lowest	
<u>El Niño</u>	<u>ONI Value</u>	<u>La Nina</u>	<u>ONI Value</u>
JAS 1951 - NDJ 1951/52	0.7	ASO 1949 – FMA 1951	-1.8
MAM 1957 – MJJ 1958	1.6	MAM 1954 – DJF 1956/57	-2.1
JJA 1963 – DJF 1963/64	1.0	ASO 1961 – MAM 1962	-0.6
MJJ 1965 – MAM 1966	1.6	MAM 1964 – JFM 1965	-1.1
OND 1968 – AMJ 1969	1.0	SON 1967 – MAM 1968	-0.9
ASO 1969 – DJF 1969/70	0.7	JJA 1970 – DJF 1971/72	-1.4
AMJ 1972 – FMA 1973	2.1	AMJ 1973 – JJA 1974	-2.0
ASO 1976 – JFM 1977	0.8	ASO 1974 – AMJ 1976	-1.8
ASO 1977 - DJF 1977/78	0.8	ASO 1983 – DJF 1983/84	-0.9
AMJ 1982 – MJJ 1983	2.3	SON 1984 – MJJ 1985	-1.1
JAS 1986 – JFM 1988	1.6	AMJ 1988 – AMJ 1989	-1.9
AMJ 1991 – MJJ 1992	1.8	ASO 1995 – FMA 1996	-0.8
FMA 1993 – JJA 1993	0.8	JJA 1998 – MJJ 2000	-1.6
MAM 1994 – FMA 1995	1.3	SON 2000 – JFM 2001	-0.7
AMJ 1997 – MAM 1998	2.5		
AMJ 2002 – FMA 2003	1.5		
JJA 2004 – JFM 2005	0.9		
ASO 2006 - DJF 2006/07	1.1		





**Historical Pacific warm (red) and cold (blue) episodes based on a threshold of +/- 0.5 °C for the Oceanic Nino Index (ONI) [3 month running mean of ERSST.v2 SST anomalies in the Nino 3.4 region (5N-5S, 120-170W)], calculated with respect to the 1971-2000 base period. For historical purposes El Niño and La Niña episodes are defined when the threshold is met for a minimum of 5 consecutive over-lapping seasons.**

Year	DJF	JFM	FMA	MAM	AMJ	MJJ	JJA	JAS	ASO	SON	OND	NDJ
1950	-1.8	-1.5	-1.4	-1.4	-1.4	-1.2	-0.9	-0.8	-0.8	-0.8	-0.9	-1.0
1951	-1.0	-0.8	-0.6	-0.4	-0.2	0.1	0.4	0.5	0.6	0.7	0.7	0.6
1952	0.3	0.1	0.1	0.1	0.0	-0.2	-0.3	-0.3	-0.1	-0.2	-0.2	-0.1
1953	0.1	0.3	0.4	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.3	0.3
1954	0.3	0.2	-0.1	-0.5	-0.7	-0.7	-0.8	-1.0	-1.1	-1.1	-1.0	-1.0
1955	-1.0	-0.9	-0.9	-1.0	-1.1	-1.0	-1.0	-1.0	-1.5	-1.8	-2.1	-1.7
1956	-1.2	-0.8	-0.7	-0.6	-0.6	-0.6	-0.7	-0.8	-0.9	-0.9	-0.9	-0.8
1957	-0.5	-0.1	0.2	0.6	0.7	0.8	0.9	0.9	0.8	0.9	1.2	1.5
1958	1.6	1.5	1.1	0.7	0.5	0.5	0.4	0.1	0.0	0.0	0.1	0.3
1959	0.4	0.4	0.3	0.2	0.0	-0.3	-0.4	-0.5	-0.4	-0.4	-0.3	-0.3
1960	-0.3	-0.3	-0.3	-0.2	-0.1	-0.1	0.0	0.0	-0.1	-0.2	-0.3	-0.2
1961	-0.2	-0.2	-0.2	-0.1	0.1	0.1	0.0	-0.3	-0.6	-0.6	-0.5	-0.5
1962	-0.5	-0.5	-0.5	-0.5	-0.4	-0.3	-0.2	-0.3	-0.4	-0.6	-0.7	-0.7
1963	-0.6	-0.3	0.0	0.1	0.1	0.3	0.6	0.8	0.8	0.9	1.0	1.0
1964	0.8	0.4	-0.1	-0.5	-0.7	-0.7	-0.8	-0.9	-1.0	-1.1	-1.1	-1.0
1965	-0.8	-0.5	-0.3	0.0	0.2	0.6	1.0	1.2	1.4	1.5	1.6	1.5
1966	1.2	1.1	0.8	0.5	0.2	0.1	0.1	0.0	-0.2	-0.3	-0.3	-0.4
1967	-0.4	-0.5	-0.6	-0.5	-0.3	0.0	0.0	-0.2	-0.4	-0.5	-0.5	-0.6
1968	-0.7	-0.9	-0.8	-0.8	-0.4	0.0	0.3	0.3	0.2	0.4	0.6	0.9
1969	1.0	1.0	0.9	0.7	0.6	0.4	0.4	0.4	0.6	0.7	0.7	0.6
1970	0.5	0.3	0.2	0.1	-0.1	-0.4	-0.6	-0.8	-0.8	-0.8	-0.9	-1.2
1971	-1.4	-1.4	-1.2	-1.0	-0.8	-0.8	-0.8	-0.8	-0.9	-0.9	-1.0	-0.9
1972	-0.7	-0.3	0.0	0.3	0.5	0.8	1.1	1.3	1.5	1.8	2.0	2.1
1973	1.8	1.2	0.5	-0.1	-0.5	-0.8	-1.1	-1.3	-1.4	-1.7	-1.9	-2.0
1974	-1.8	-1.6	-1.2	-1.1	-0.9	-0.7	-0.5	-0.4	-0.5	-0.7	-0.8	-0.7
1975	-0.6	-0.6	-0.7	-0.8	-1.0	-1.1	-1.3	-1.4	-1.6	-1.6	-1.7	-1.8



Historical Pacific warm (red) and cold (blue) episodes based on a threshold of +/- 0.5 °C for the Oceanic Nino Index (ONI) [3 month running mean of ERSST.v2 SST anomalies in the Nino 3.4 region (5N-5S, 120-170W)], calculated with respect to the 1971-2000 base period. For historical purposes El Niño and La Niña episodes are defined when the threshold is met for a minimum of 5 consecutive over-lapping seasons.

Year	DJF	JFM	FMA	MAM	AMJ	MJJ	JJA	JAS	ASO	SON	OND	NDJ
1976	-1.6	-1.2	-0.9	-0.7	-0.5	-0.2	0.1	0.3	0.5	0.7	0.8	0.8
1977	0.6	0.5	0.2	0.1	0.2	0.3	0.3	0.4	0.5	0.7	0.8	0.8
1978	0.7	0.4	0.0	-0.3	-0.4	-0.3	-0.4	-0.5	-0.5	-0.4	-0.2	-0.1
1979	-0.1	0.0	0.1	0.2	0.1	0.0	0.0	0.2	0.3	0.4	0.5	0.5
1980	0.5	0.3	0.2	0.2	0.3	0.3	0.2	0.0	-0.1	0.0	0.0	-0.1
1981	-0.3	-0.4	-0.4	-0.3	-0.3	-0.3	-0.4	-0.3	-0.2	-0.1	-0.1	-0.1
1982	0.0	0.1	0.2	0.4	0.6	0.7	0.8	1.0	1.5	1.9	2.2	2.3
1983	2.3	2.0	1.6	1.2	1.0	0.6	0.2	-0.2	-0.5	-0.8	-0.9	-0.8
1984	-0.5	-0.3	-0.2	-0.4	-0.5	-0.5	-0.3	-0.2	-0.3	-0.6	-1.0	-1.1
1985	-1.0	-0.8	-0.8	-0.8	-0.7	-0.5	-0.4	-0.4	-0.4	-0.3	-0.2	-0.3
1986	-0.4	-0.4	-0.3	-0.2	-0.1	0.0	0.2	0.5	0.7	0.9	1.1	1.2
1987	1.3	1.2	1.1	1.0	1.0	1.2	1.5	1.6	1.6	1.5	1.3	1.1
1988	0.8	0.5	0.1	-0.3	-0.8	-1.2	-1.2	-1.1	-1.3	-1.6	-1.9	-1.9
1989	-1.7	-1.5	-1.1	-0.9	-0.6	-0.4	-0.3	-0.3	-0.3	-0.3	-0.2	-0.1
1990	0.1	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.4
1991	0.5	0.4	0.4	0.4	0.6	0.8	0.9	0.9	0.8	1.0	1.4	1.7
1992	1.8	1.7	1.6	1.4	1.1	0.8	0.4	0.2	-0.1	-0.1	0.0	0.1
1993	0.3	0.4	0.6	0.8	0.8	0.7	0.5	0.4	0.4	0.3	0.2	0.2
1994	0.2	0.3	0.4	0.5	0.6	0.6	0.6	0.6	0.7	0.9	1.2	1.3
1995	1.2	0.9	0.7	0.4	0.2	0.1	0.0	-0.3	-0.5	-0.6	-0.7	-0.8
1996	-0.8	-0.7	-0.5	-0.3	-0.2	-0.2	-0.1	-0.2	-0.2	-0.2	-0.3	-0.4
1997	-0.4	-0.3	0.0	0.4	0.9	1.4	1.7	2.0	2.3	2.4	2.5	2.5
1998	2.4	2.0	1.4	1.1	0.4	-0.1	-0.8	-1.0	-1.1	-1.1	-1.3	-1.5
1999	-1.6	-1.2	-0.9	-0.7	-0.8	-0.8	-0.9	-0.9	-1.0	-1.2	-1.4	-1.6
2000	-1.6	-1.5	-1.1	-0.9	-0.7	-0.6	-0.4	-0.3	-0.4	-0.5	-0.7	-0.7
2001	-0.7	-0.5	-0.4	-0.2	-0.1	0.1	0.2	0.1	0.0	-0.1	-0.2	-0.2





# Pacific Niño 3.4 SST Outlook

Most ENSO models predict that La Niña (cooler than  $-0.5^{\circ}\text{C}$  in the Niño 3.4 region) will persist through early 2008. Nearly all of the dynamical and statistical models predict a weak-to-moderate La Niña during the next several months.

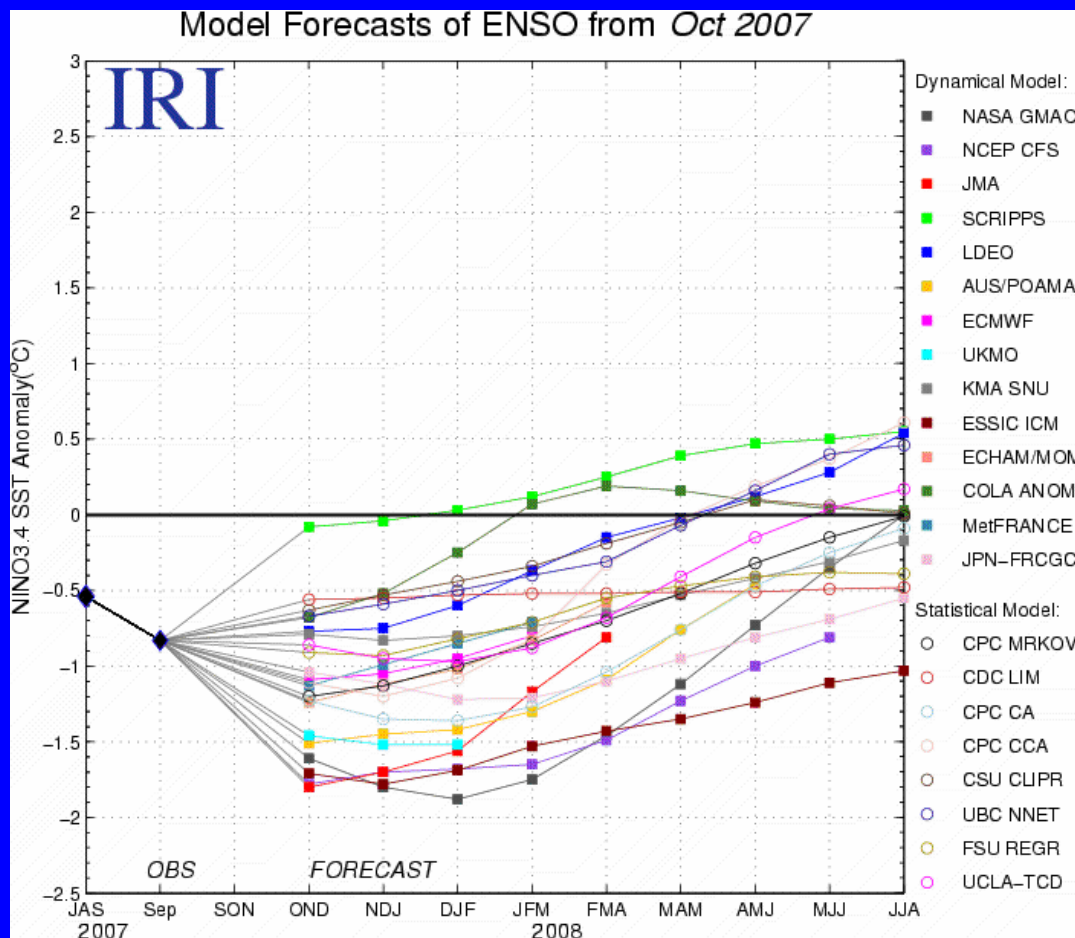
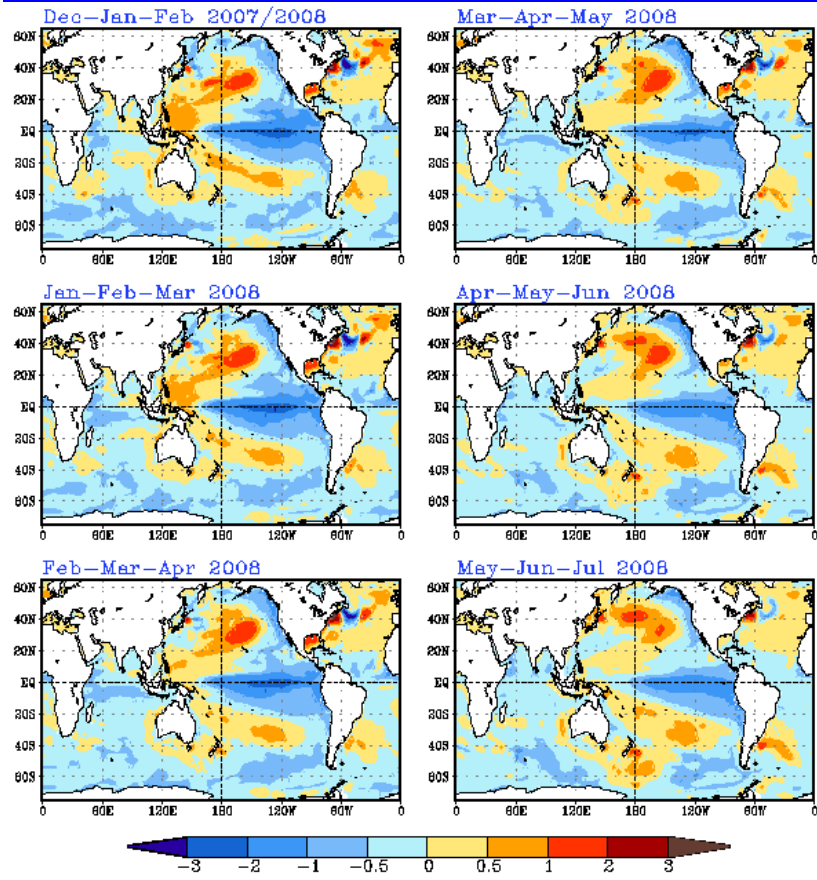


Figure provided by the International Research Institute (IRI) for Climate and Society (updated 16 October 2007).



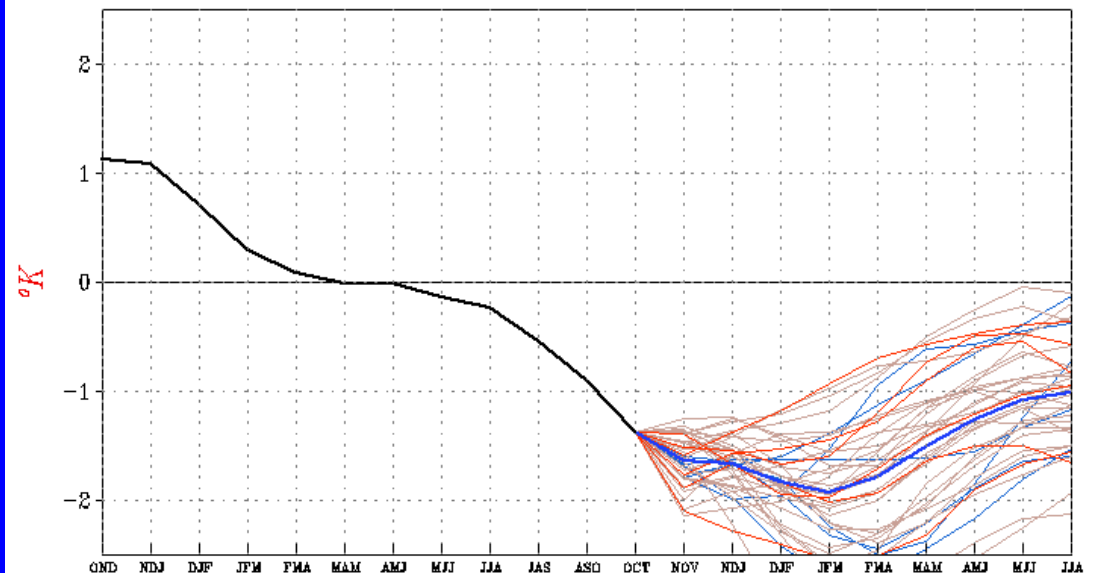
# SST Outlook: NCEP CFS Forecast

## Issued 29 October 2007



The CFS ensemble mean (heavy blue line) predicts La Niña will strengthen during the next few months.

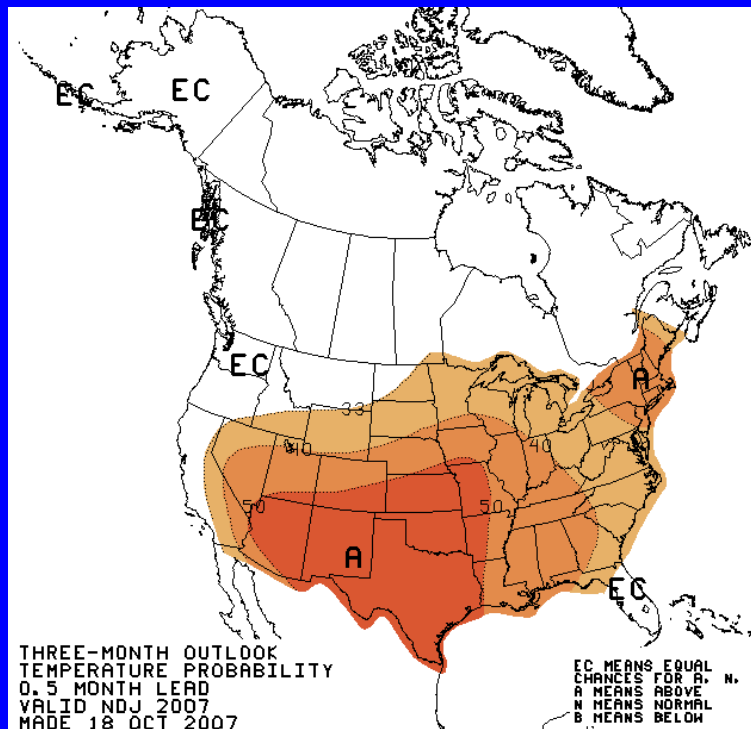
Forecast *Niño3.4* SST anomalies from CFS



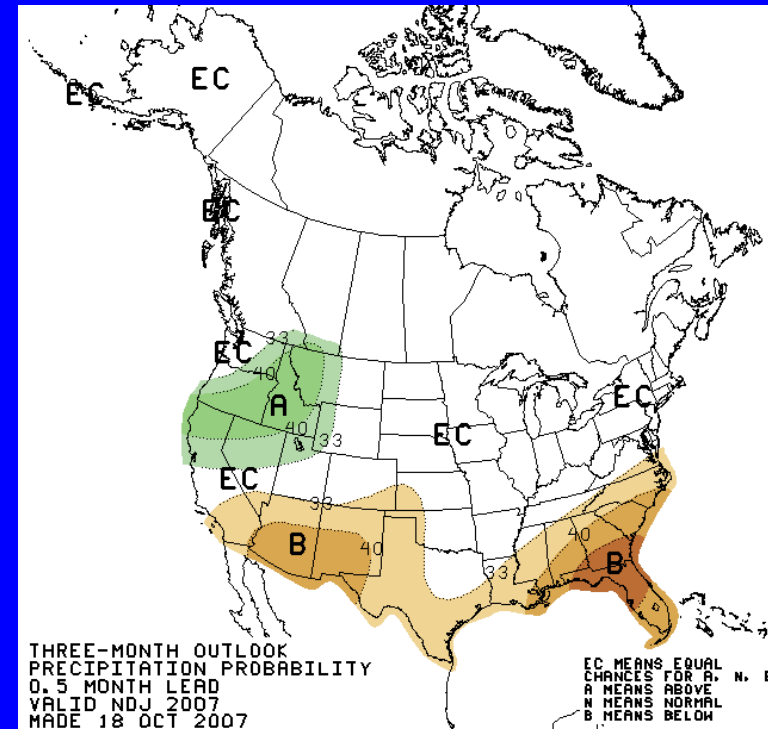


# U. S. Seasonal Outlooks November 2007- January 2008

## Temperature



## Precipitation



**These seasonal outlooks combine typical La Niña impacts, along with long-term trends and soil-moisture effects.**



# Summary

- **La Niña is present across the tropical Pacific.**
- **Negative SST anomalies extend along the equator from the Date Line eastward to the South American coast.**
- **Recent equatorial Pacific SST trends and model forecasts indicate La Niña will continue through early 2008.**



# Temperature Departures (°C) for Ranges of the ONI during October-December

Weak

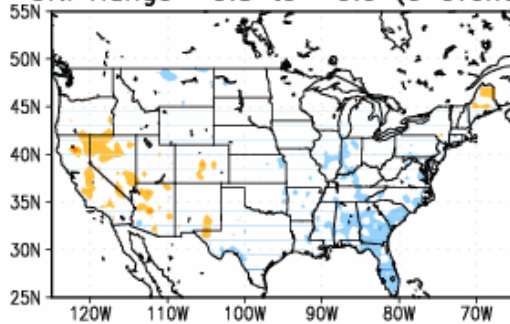
Moderate/  
Strong

All episodes

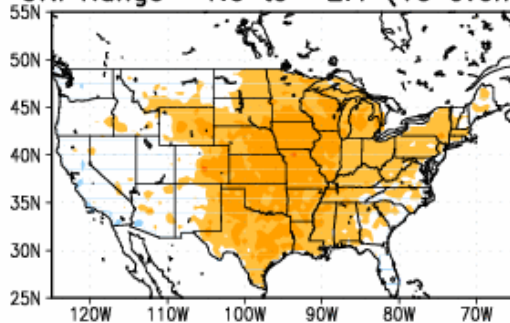
## La Niña

OND Temp.

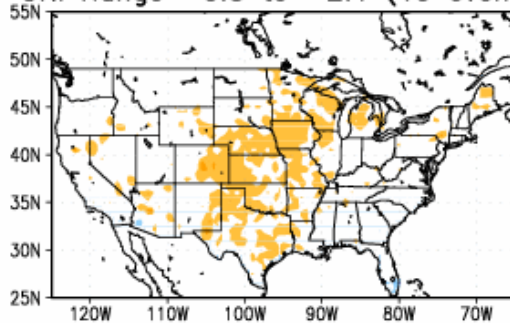
ONI Range -0.5 to -0.9 (9 events)



ONI Range -1.0 to -2.1 (10 events)



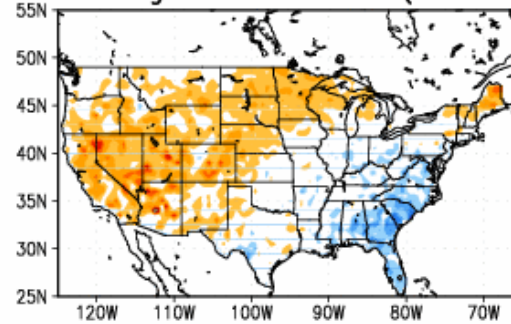
ONI Range -0.5 to -2.1 (19 events)



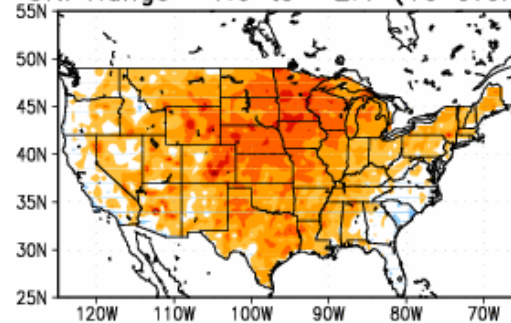
## La Niña + Trend

OND Temp. + Trend

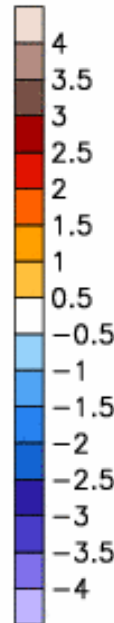
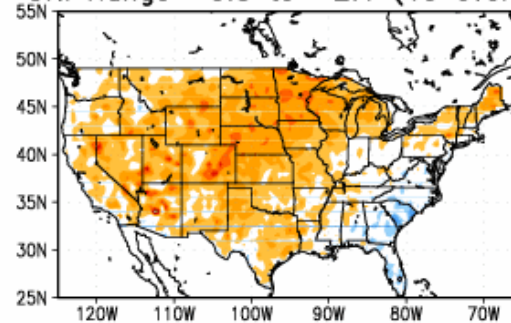
ONI Range -0.5 to -0.9 (9 events)



ONI Range -1.0 to -2.1 (10 events)



ONI Range -0.5 to -2.1 (19 events)







# Precipitation Departures (mm) for Ranges of the ONI during October-December

Weak

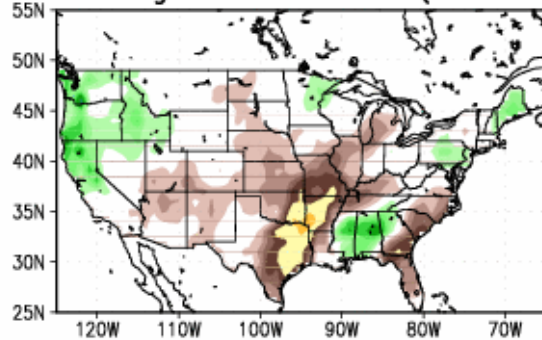
Moderate/  
Strong

All episodes

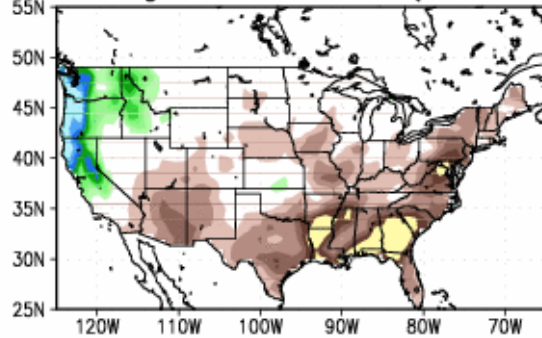
## La Niña

OND Prec.

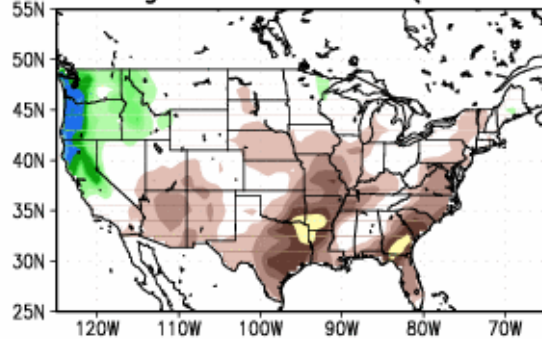
ONI Range -0.5 to -0.9 (9 events)



ONI Range -1.0 to -2.1 (10 events)



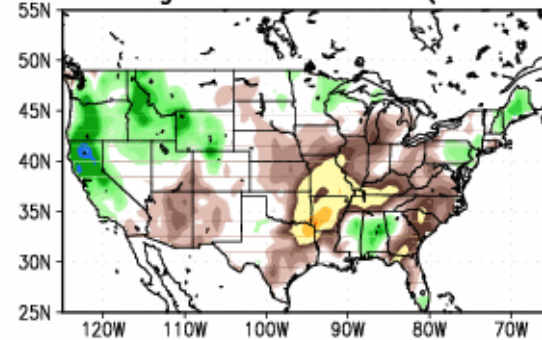
ONI Range -0.5 to -2.1 (19 events)



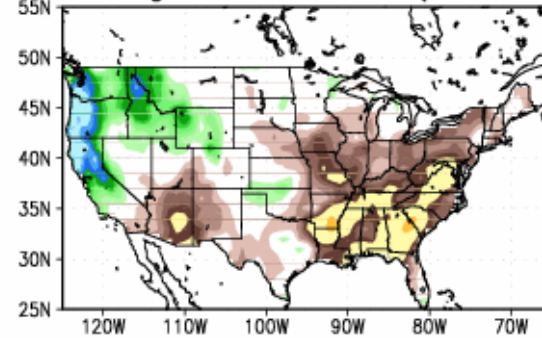
## La Niña + Trend

OND Prec. + Trend

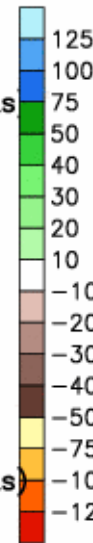
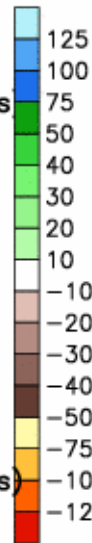
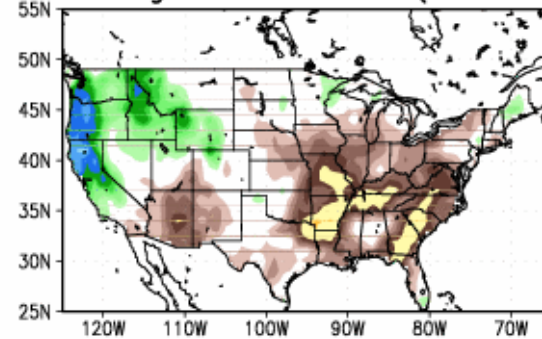
ONI Range -0.5 to -0.9 (9 events)



ONI Range -1.0 to -2.1 (10 events)



ONI Range -0.5 to -2.1 (19 events)





# Temperature Departures (°C) for Ranges of the ONI during November-January

Weak

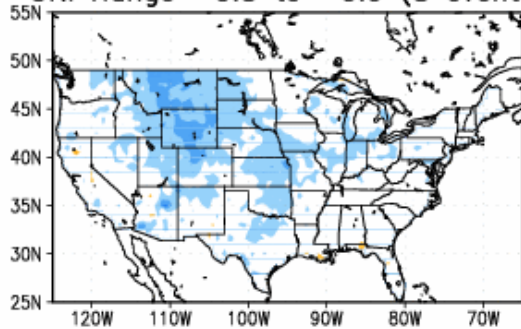
Moderate/  
Strong

All episodes

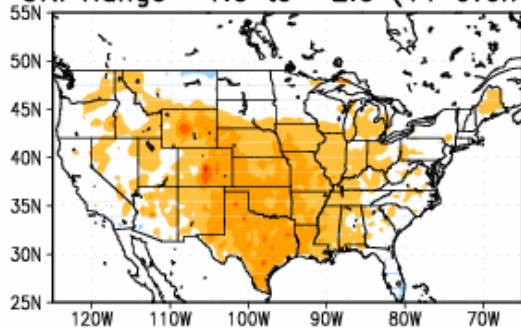
## La Niña

NDJ Temp.

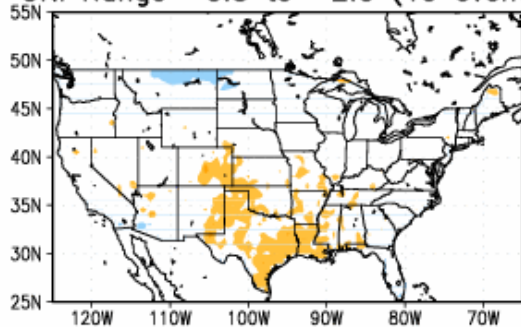
ONI Range -0.5 to -0.9 (8 events)



ONI Range -1.0 to -2.0 (11 events)



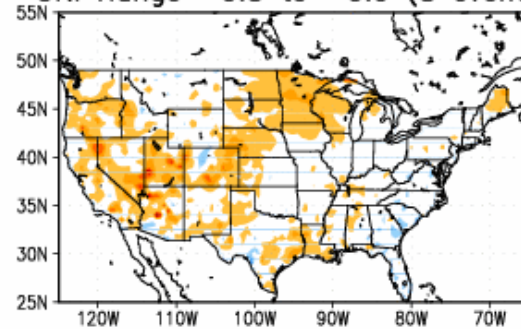
ONI Range -0.5 to -2.0 (19 events)



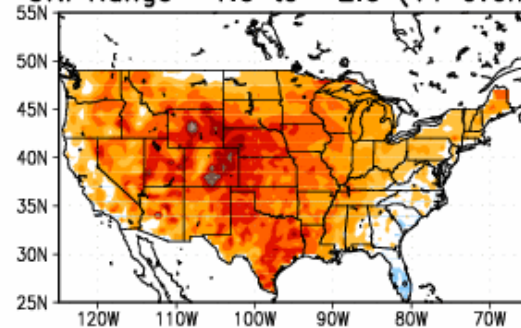
## La Niña + Trend

NDJ Temp. + Trend

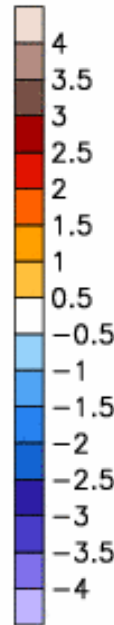
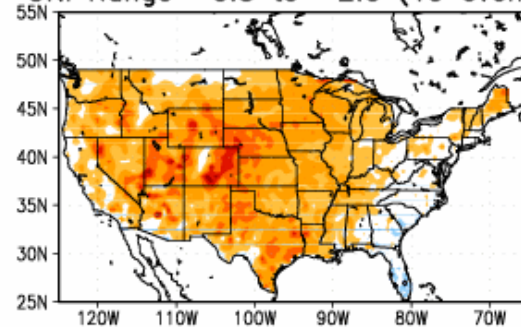
ONI Range -0.5 to -0.9 (8 events)



ONI Range -1.0 to -2.0 (11 events)



ONI Range -0.5 to -2.0 (19 events)





# Precipitation Departures (mm) for Ranges of the ONI during November-January

Weak

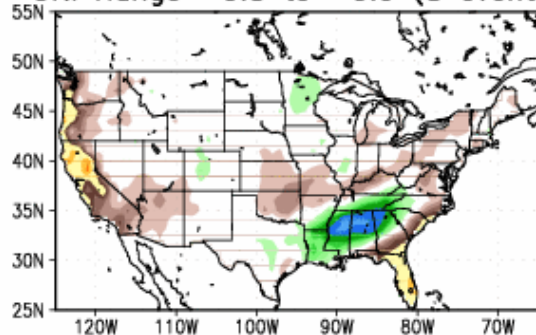
Moderate/  
Strong

All episodes

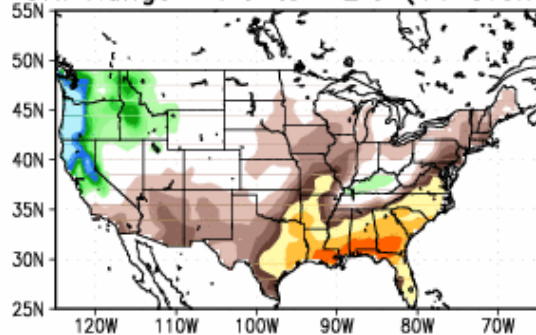
## La Niña

NDJ Prec.

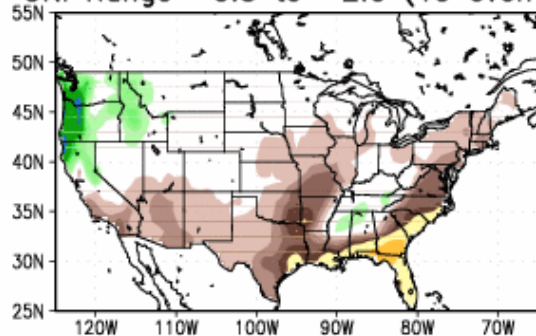
ONI Range -0.5 to -0.9 (8 events)



ONI Range -1.0 to -2.0 (11 events)



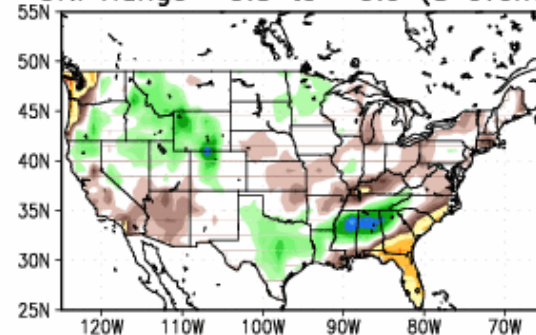
ONI Range -0.5 to -2.0 (19 events)



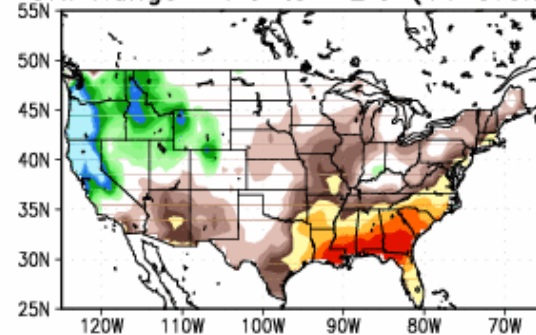
## La Niña + Trend

NDJ Prec. + Trend

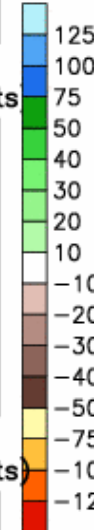
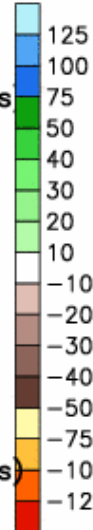
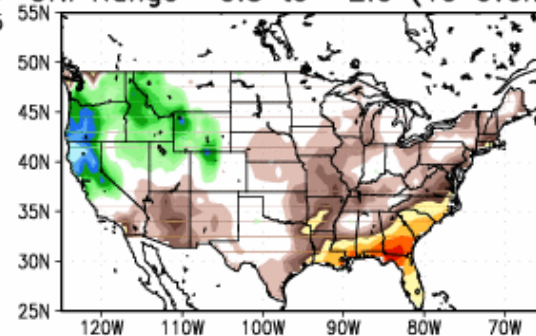
ONI Range -0.5 to -0.9 (8 events)



ONI Range -1.0 to -2.0 (11 events)



ONI Range -0.5 to -2.0 (19 events)



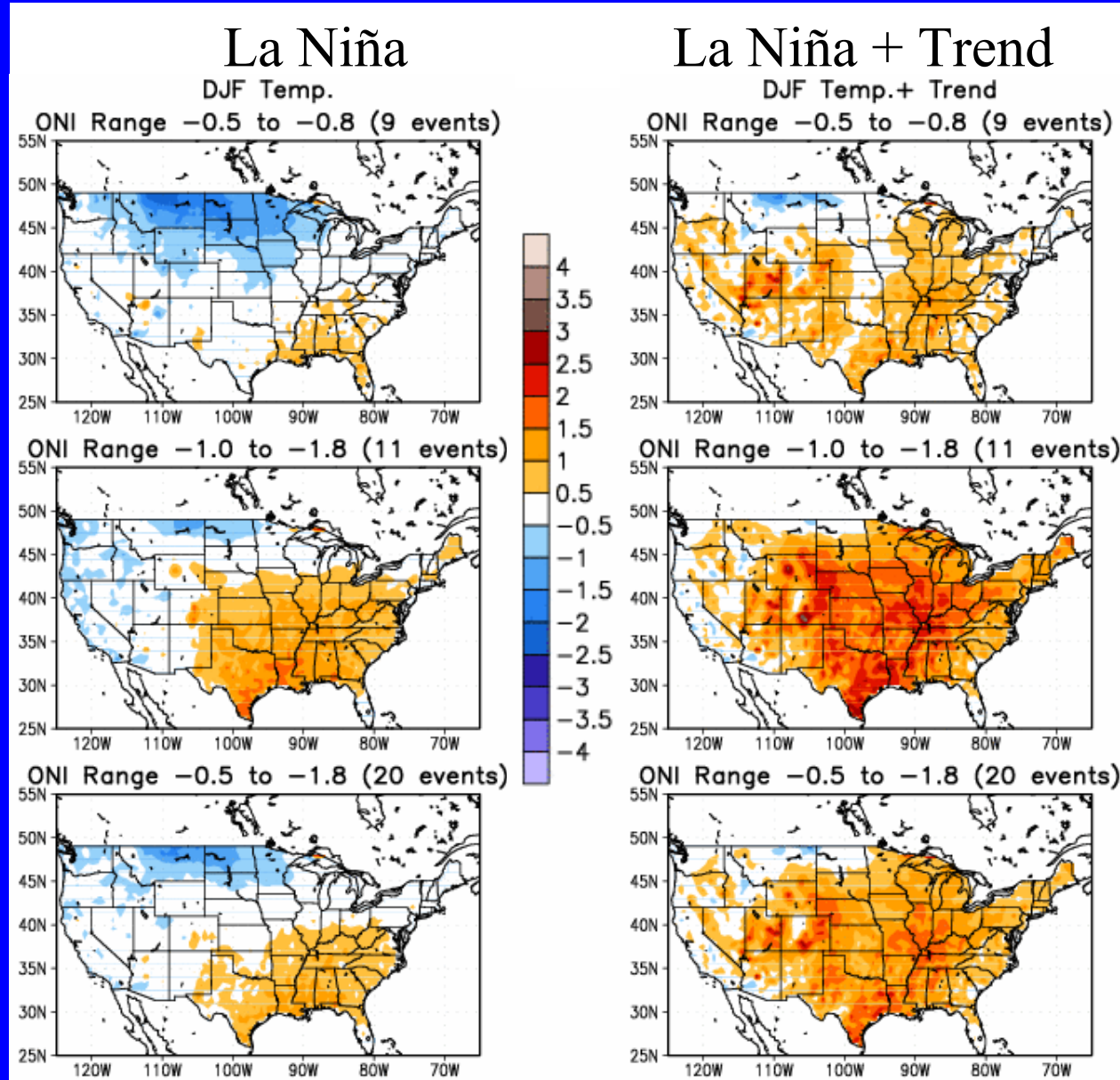


# Temperature Departures (°C) for Ranges of the ONI during December-February

Weak

Moderate/  
Strong

All episodes





# Precipitation Departures (mm) for Ranges of the ONI during December-February

Weak

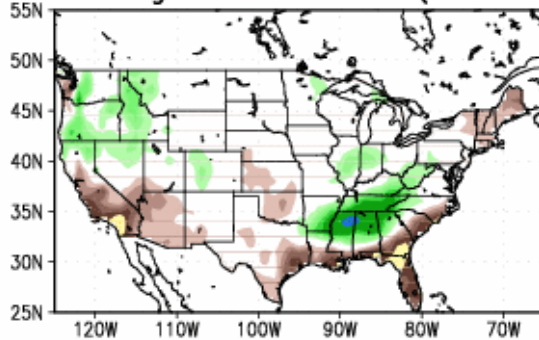
Moderate/  
Strong

All episodes

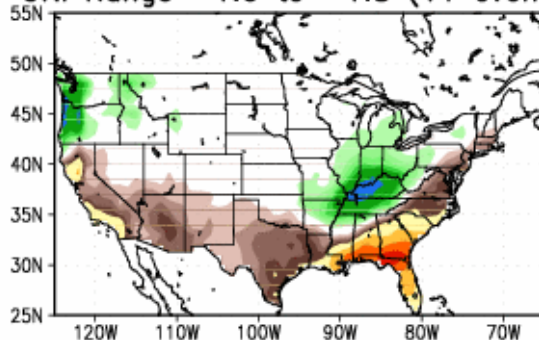
## La Niña

DJF Prec.

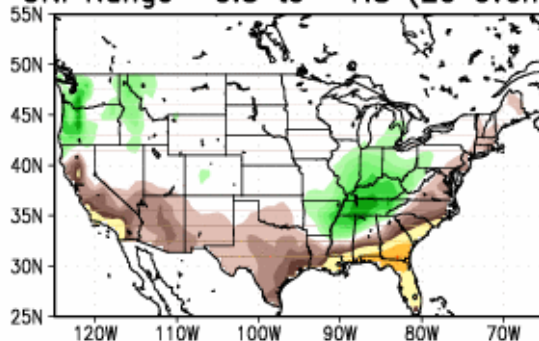
ONI Range -0.5 to -0.9 (9 events)



ONI Range -1.0 to -1.8 (11 events)



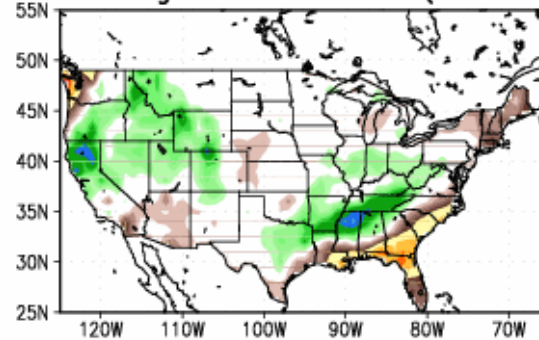
ONI Range -0.5 to -1.8 (20 events)



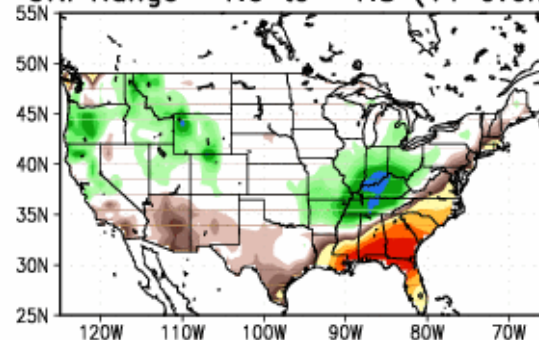
## La Niña + Trend

DJF Prec. + Trend

ONI Range -0.5 to -0.9 (9 events)



ONI Range -1.0 to -1.8 (11 events)



ONI Range -0.5 to -1.8 (20 events)

