

Pacific Region ENSO UPDATE AND SEASONAL OUTLOOK

UPDATED 10 April 2015

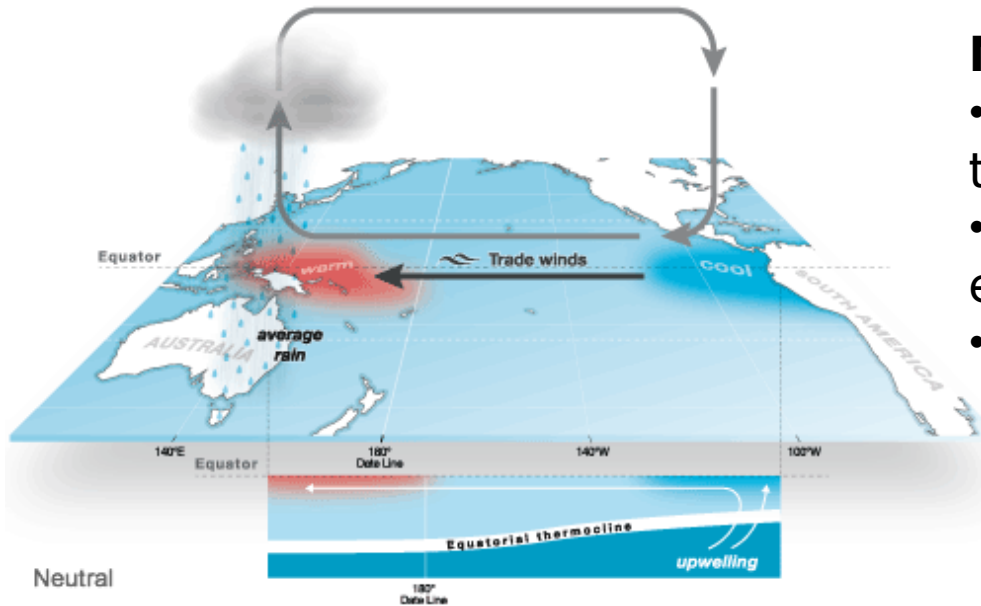
PREPARED BY THE PEAC CENTER



What Is El Niño

A general description of its global impacts

El Niño in a nutshell

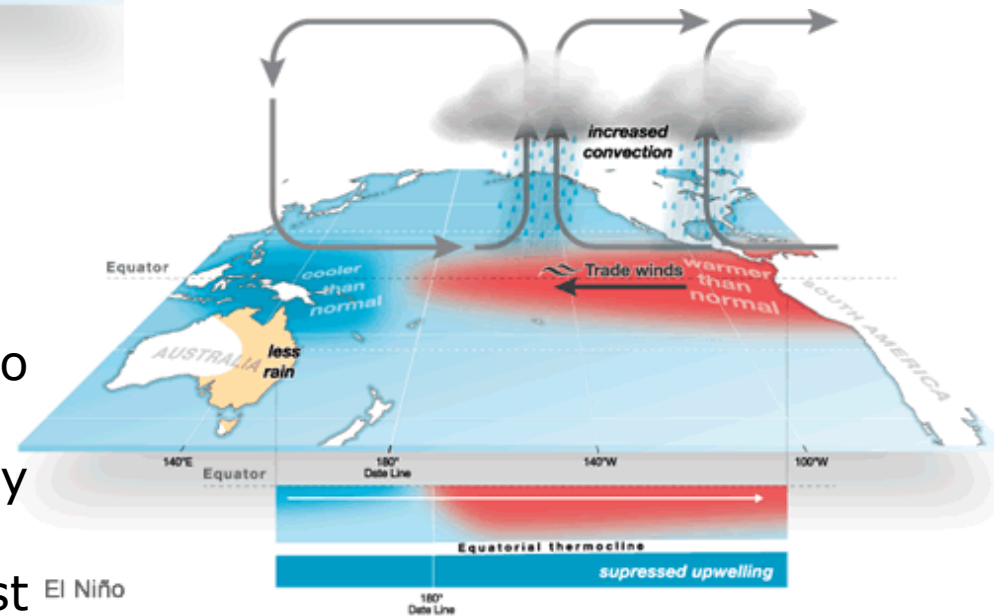


Neutral Conditions:

- Cold sea surface temperatures to the east and warm to the west
- Strong trade winds blowing from east to west
- Rainfall over the Western Pacific

El Niño Conditions:

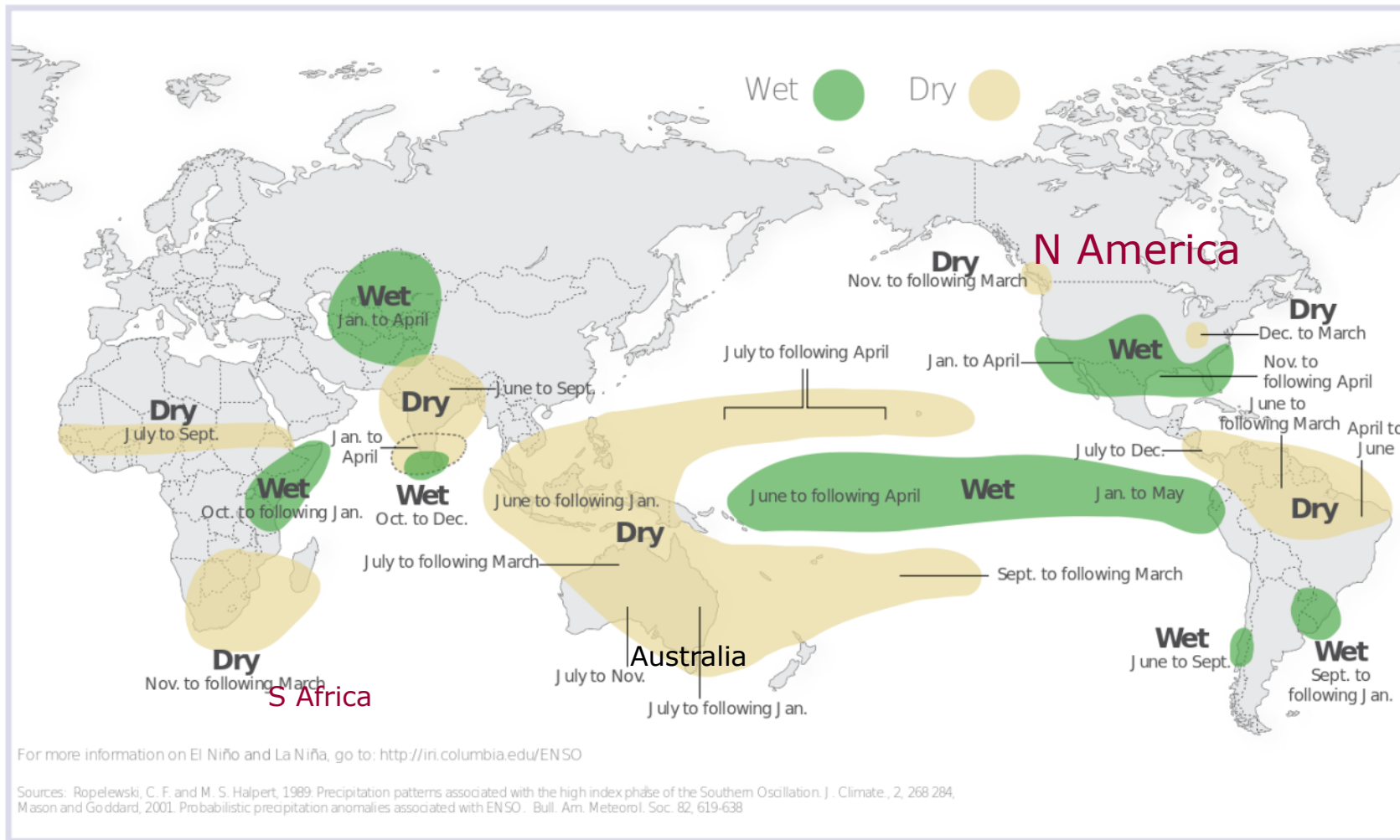
- Warm sea surface temperatures to the east and cold to the west
- Weakened trade winds, westerly winds over east Pacific
- Rainfall over the Central and East Pacific



El Niño

El Niño and Rainfall

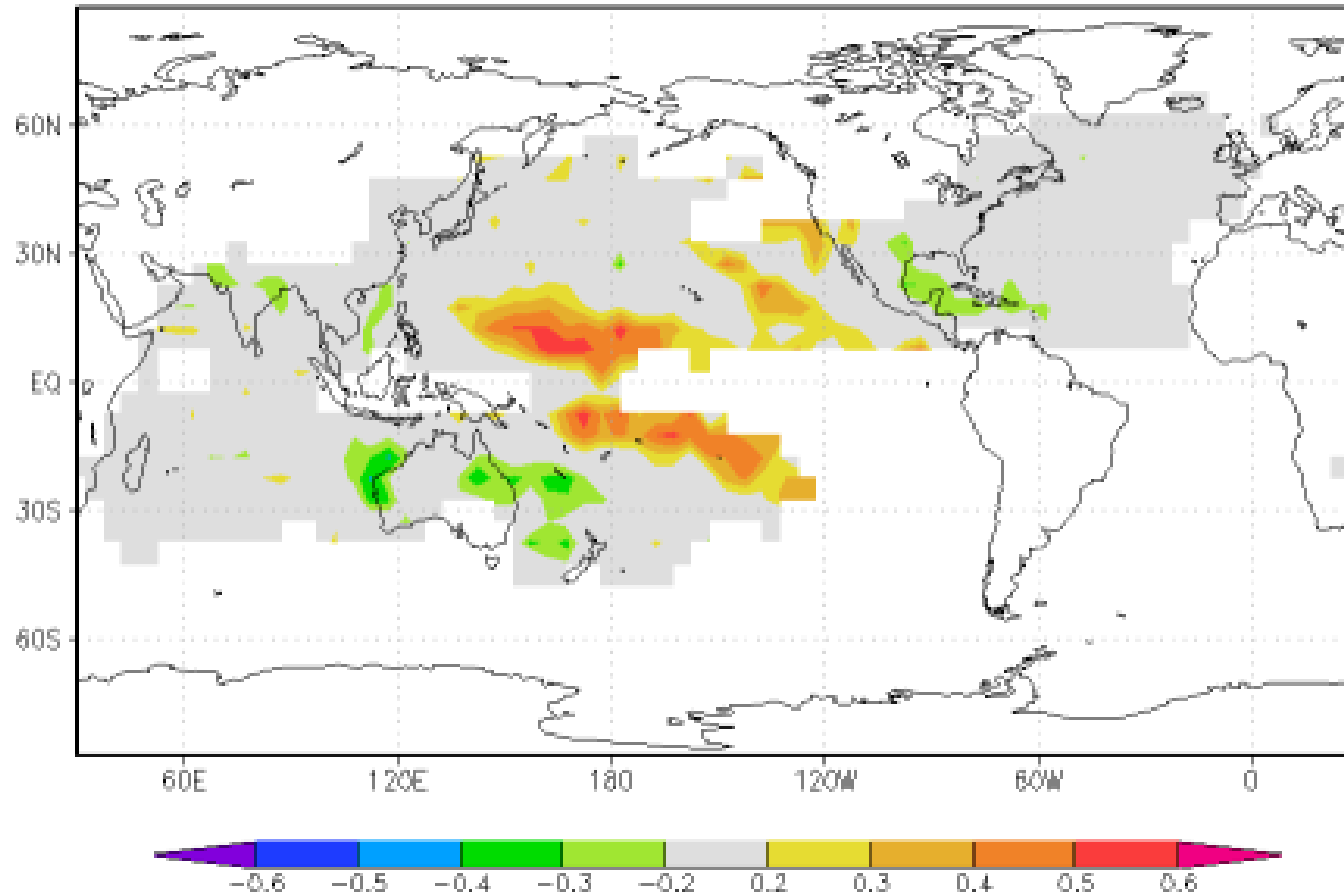
El Niño conditions in the tropical Pacific are known to shift rainfall patterns in many different parts of the world. Although they vary somewhat from one El Niño to the next, the strongest shifts remain fairly consistent in the regions and seasons shown on the map below.



<http://www.climate.gov/news-features/department/8443/all>

El Niño and Tropical Cyclones

corr Jul–Jun averaged NINO3.4 index
with Jul–Jun averaged MIT #TS tracks 1856:2004



El Niño shifts TC genesis Eastward over the North and South Western Pacific

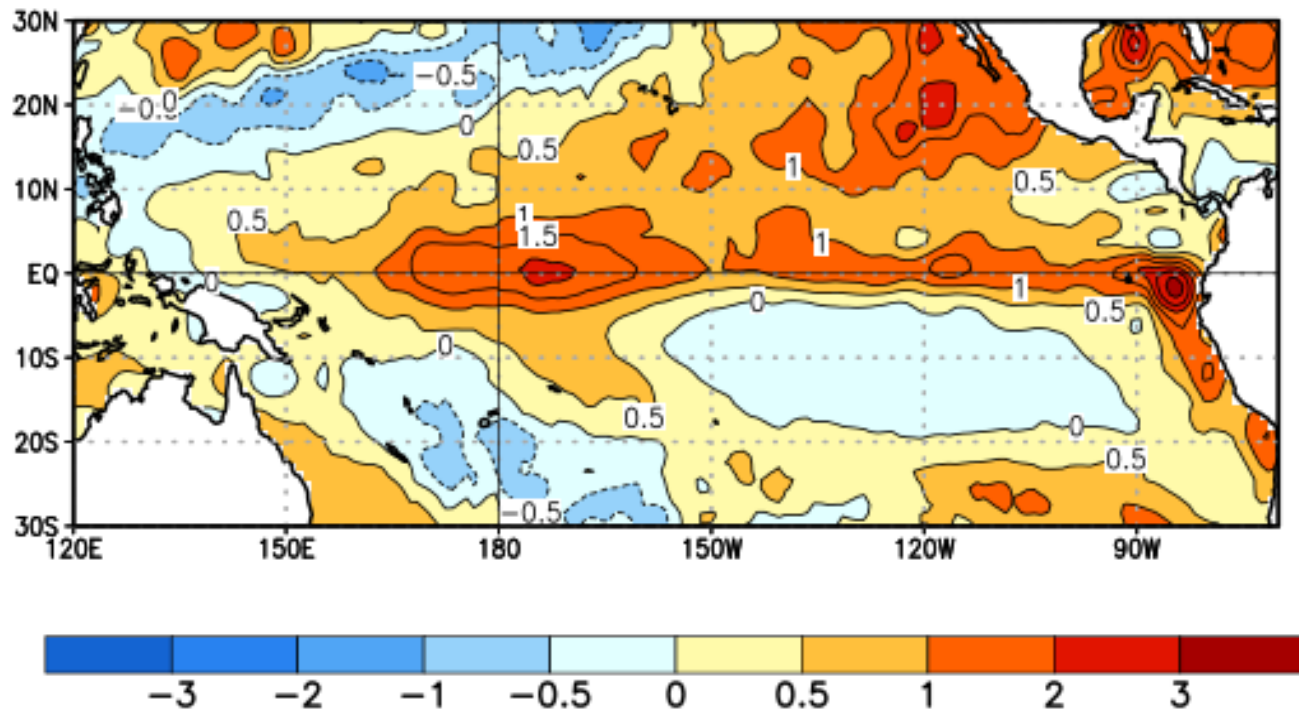
- Less TC activity
 - Australia
 - Philippines
- More TC activity
 - Tropical Pacific
 - Hawaii
 - American Samoa

Current Conditions

General State of the Ocean and Atmosphere

During the last four weeks, equatorial SSTs were above average across the Pacific Ocean

Average SST Anomalies
5 APR 2015 – 2 MAY 2015



Average sea surface temperature (SST) anomalies ($^{\circ}$ C). Over the past month, Warm SST anomalies were prevalent over the western central and eastern Pacific Ocean.

Development of SST anomalies over the past 4 weeks.

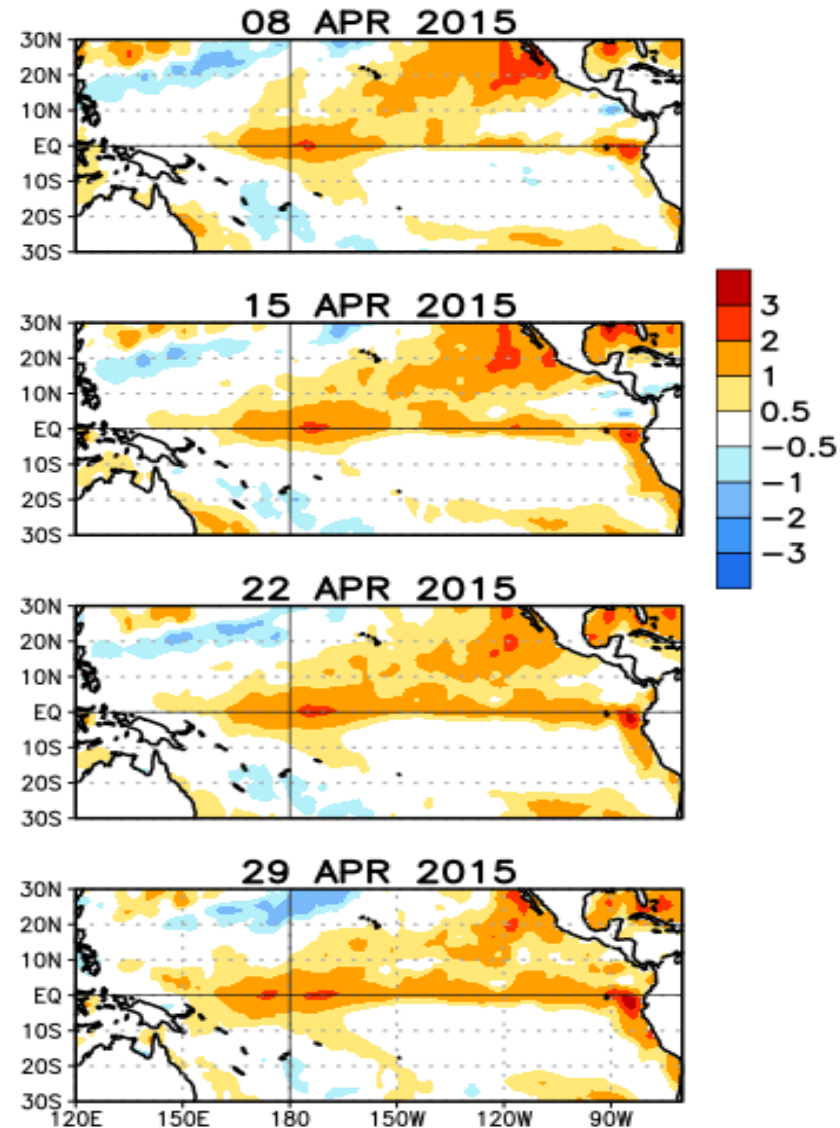
During the last four weeks

- Positive SST anomalies strengthened across the Equatorial Pacific
- Positive SST anomalies off the Peruvian Coast strengthened

Sea Surface Temperature and Subsurface temperatures are all supportive of

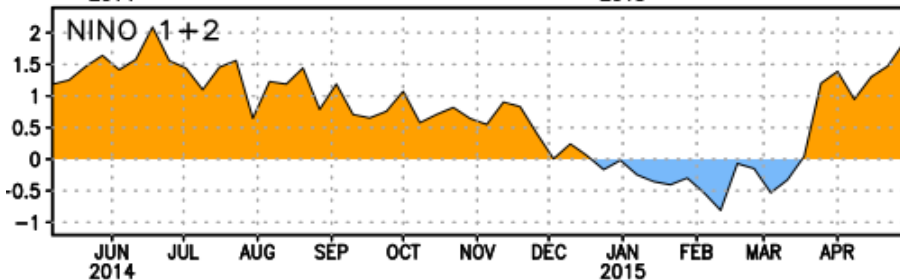
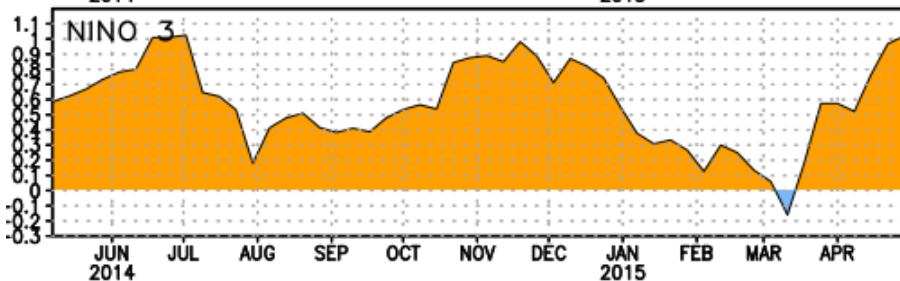
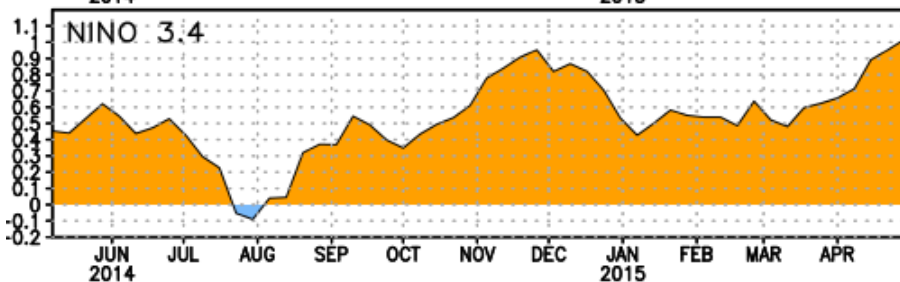
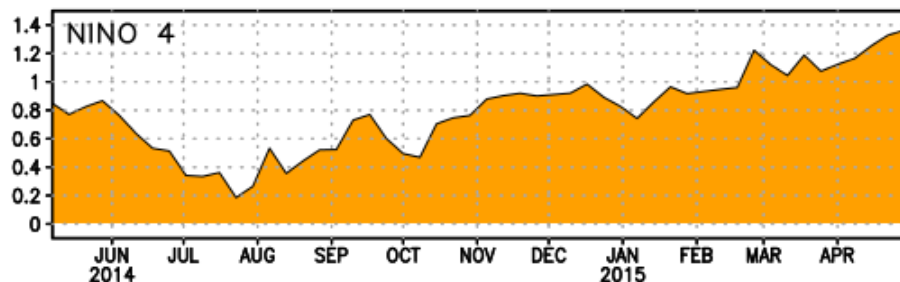
Weak El Niño conditions

Weekly SST Anomalies (DEG C)



SST DEPARTURES AND UPPER OCEAN (0 - 300m) HEAT CONTENT ANOMOLY

SST Anomalies



The latest weekly SST departures are:

Niño 4 1.4°C

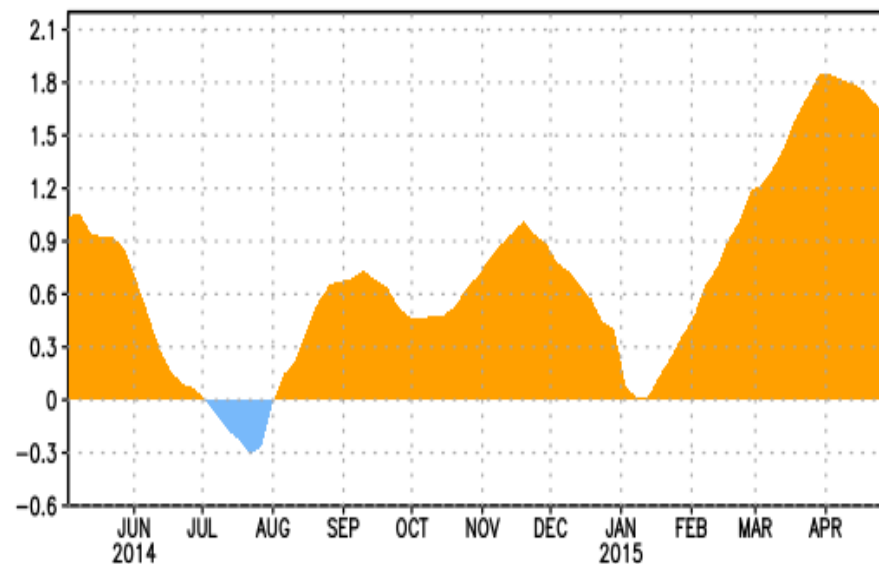
Niño 3.4 1.0°C

Niño 3 1.0°C

Niño 1+2 1.9°C

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

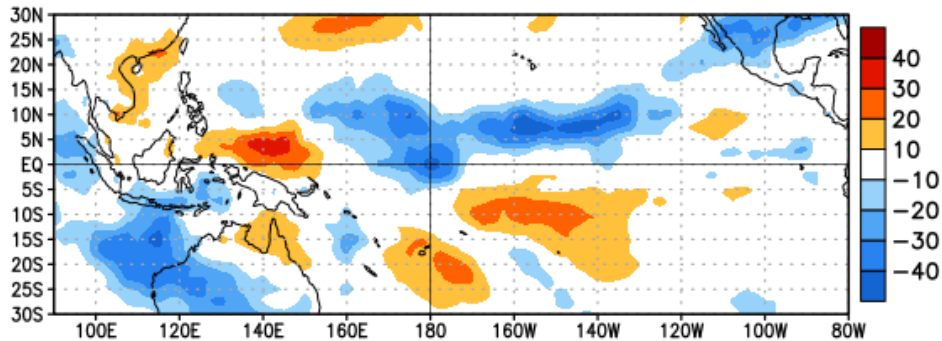
EQ. Upper-Ocean Heat Anoms. (deg C) for 180-100W



OLR and Wind Anomalies for Past 30 Days

OLR Anomalies

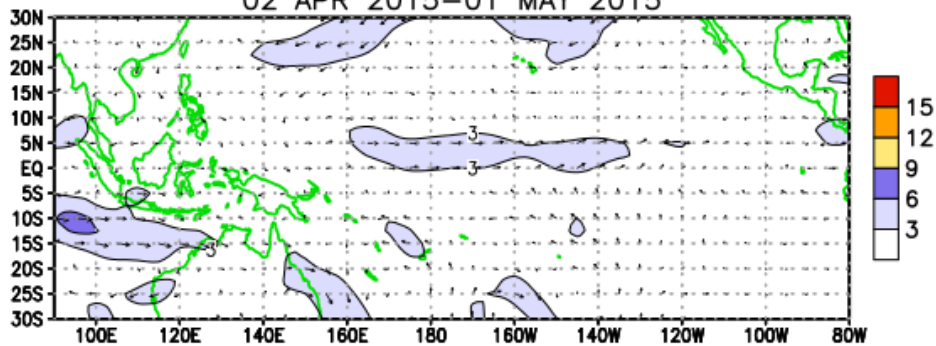
03 APR 2015 to 28 APR 2015



- Above average deep convection (= OLR anomalies)
- Over the dateline
- ITCZ
- Below average precipitation (+ OLR anomalies)
- Western Pacific

CDAS 850-hPa Wind Anoms

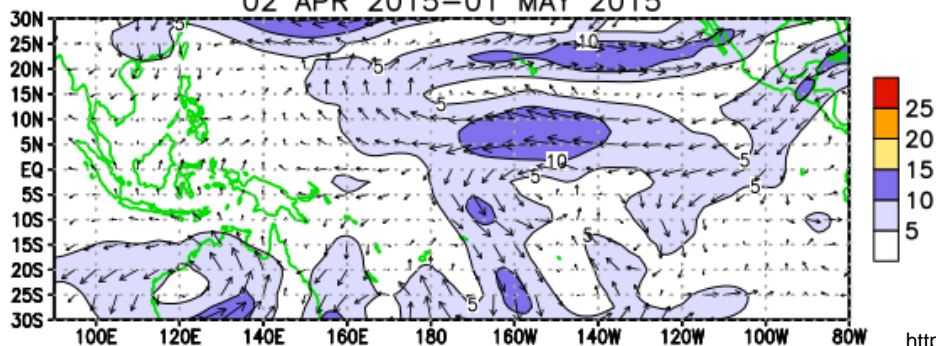
02 APR 2015-01 MAY 2015



Low level westerlies over the Equatorial Central Pacific

CDAS 200-hPa Wind Anoms

02 APR 2015-01 MAY 2015



Upper level winds show predominant easterly winds

EL NIÑO/SOUTHERN OSCILLATION (ENSO) DIAGNOSTIC DISCUSSION

ENSO Alert System Status: **El Niño Advisory**

Synopsis:

- El Niño conditions were reflected by
 - above-average sea surface temperatures (SST) across the equatorial Pacific
 - expected tropical atmospheric response
- Niño indices were all above average
- Subsurface temperature anomalies increased substantially during the month, which resulted in strong positive subsurface anomalies across most of the Pacific
- Consistent with ocean-atmosphere coupling
 - Enhanced convection shifted eastward to the central equatorial Pacific
 - Low-level westerly wind anomalies continued over the western equatorial Pacific
 - Upper-level easterly wind anomalies continued in the central Pacific

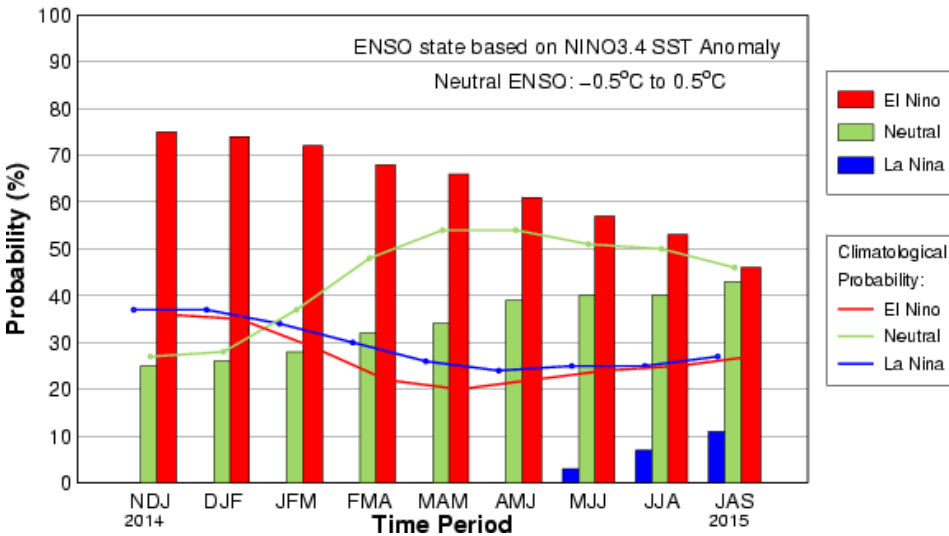
Forecast

ENSO forecasts

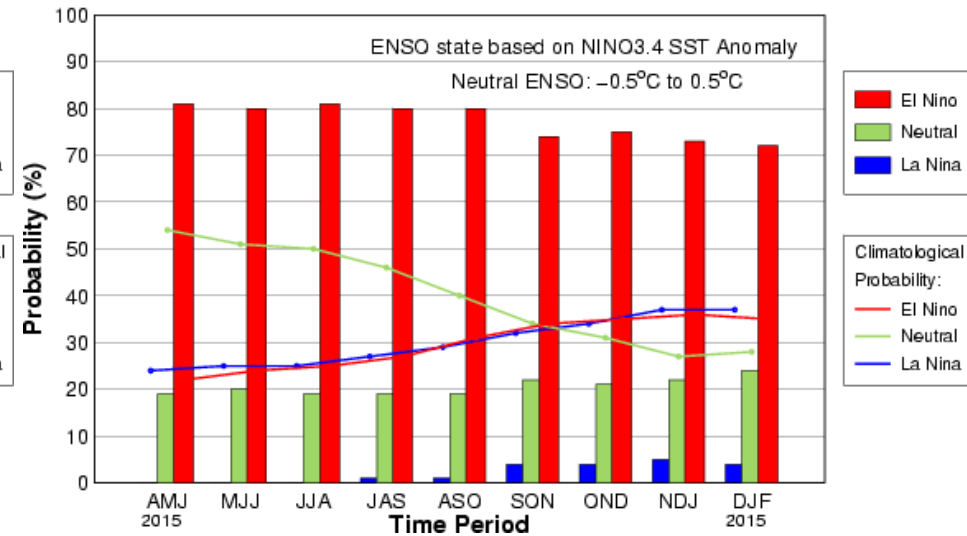
Rainfall, Sea level, Tropical Cyclones and
Coral Bleaching

CPC/IRI ENSO Forecast

Mid-Nov IRI/CPC Plume-Based Probabilistic ENSO Forecast



Mid-Apr IRI/CPC Plume-Based Probabilistic ENSO Forecast



CPC/IRI EL NIÑO/SOUTHERN OSCILLATION (ENSO) DIAGNOSTIC DISCUSSION

Expected Conditions

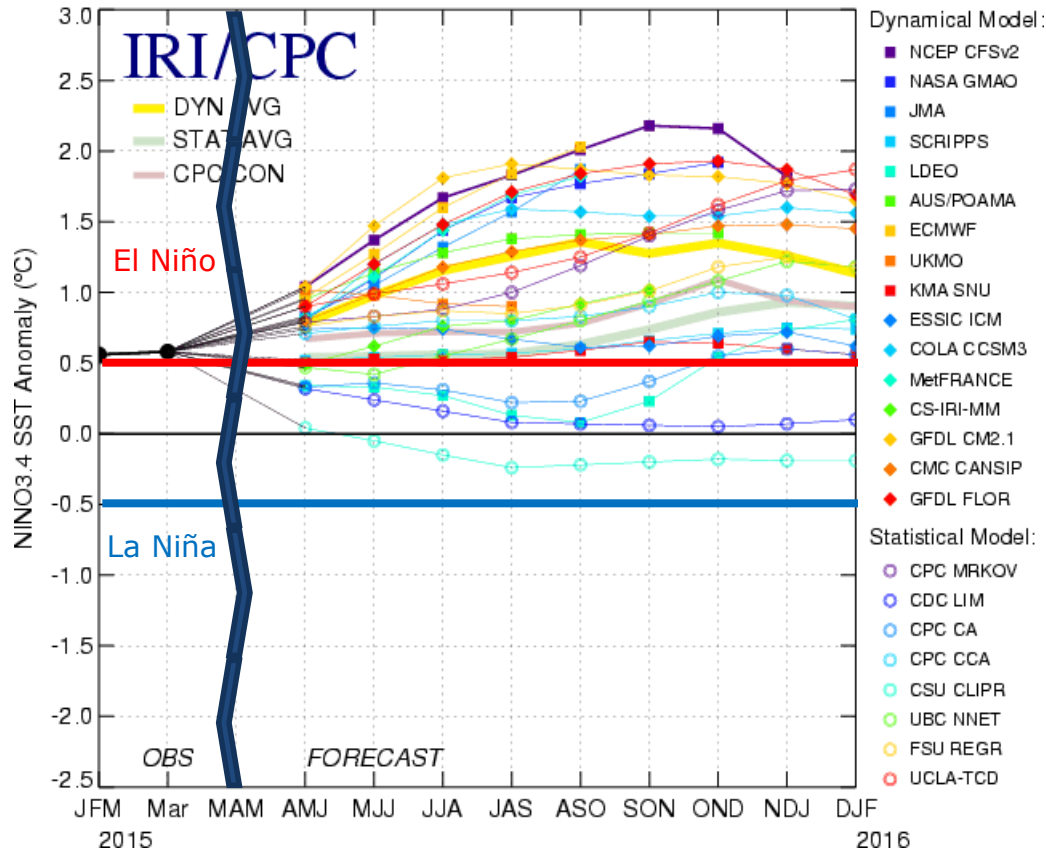
- The consensus of forecasters indicates a ~80% chance of El Niño during the April-June 2015 season
- The probability of drops off slightly but remains above 70% by the end of 2015

Climate Prediction Center
National Centers for Environmental Prediction
NOAA/National Weather Service
College Park, MD 20740

Season	La Niña	Neutral	El Niño
AMJ 2015	~0%	19%	81%
MJJ 2015	~0%	20%	80%
JJA 2015	~0%	19%	81%
JAS 2015	1%	19%	80%
ASO 2015	1%	19%	80%
SON 2015	4%	22%	74%
OND 2015	4%	21%	75%
NDJ 2015	5%	22%	73%
DJF 2015	4%	24%	72%

CPC/IRI ENSO Forecast

Mid-Apr 2015 Plume of Model ENSO Predictions



CPC/IRI EL NIÑO/SOUTHERN OSCILLATION (ENSO) DIAGNOSTIC DISCUSSION

Expected Conditions

- Most models predict the SST anomalies to remain at weak El Niño conditions through spring 2015
- Continuation of El Niño conditions appears likely from the current Apr-Jun 2015 season through to the Jul-Sep seasons
- The average of all models predicts El Niño amplification
- There is still substantial spread among the individual model predictions, and dynamical models are showing stronger El Niño predictions than statistical ones

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Average Niño 3.4 SST Anomaly Forecast

	AMJ	MJJ	JJA
Dynamical	0.8	1	1.2
Statistical	0.5	0.5	0.6
All Models	0.7	0.8	1

http://iri.columbia.edu/our-expertise/climate/forecasts/enso/current/?enso_tab=enso-cpc_update
http://iri.columbia.edu/our-expertise/climate/forecasts/enso/current/?enso_tab=enso-sst_table
http://iri.columbia.edu/our-expertise/climate/forecasts/enso/current/?enso_tab=enso-iri_update
http://iri.columbia.edu/our-expertise/climate/forecasts/enso/current/?enso_tab=enso-sst_table

EL NIÑO/SOUTHERN OSCILLATION (ENSO) DIAGNOSTIC DISCUSSION

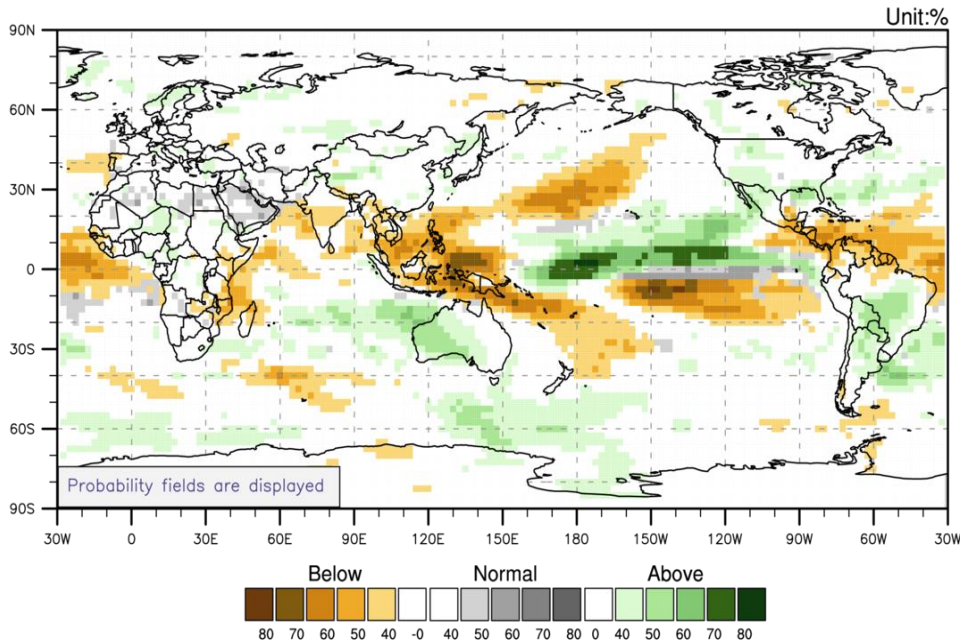
ENSO Alert System Status: **El Niño Watch**

Synopsis:

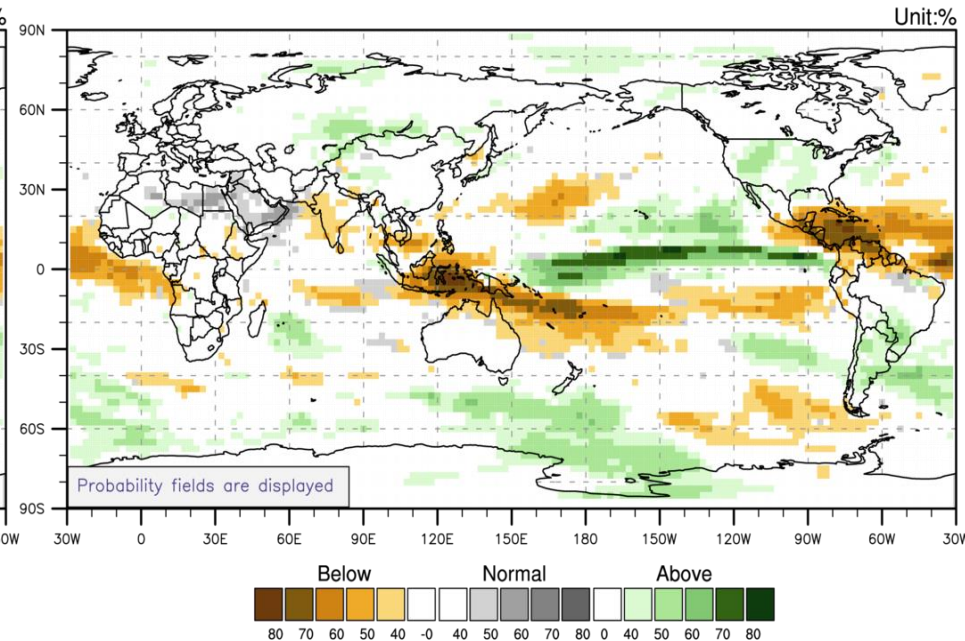
- Models predict El Niño (3-month values of the Niño-3.4 index equal to or greater than 0.5° C) to continue throughout 2015
 - These forecasts are supported by the increase in subsurface temperatures, enhanced convection over the Date Line, and the increased persistence of low-level westerly wind anomalies
- Model forecast skill tends to be lower during the Northern Hemisphere spring, which limits the forecast probabilities of El Niño through the year
- At this time, there is also considerable uncertainty as to how strong this event may become
- There is an approximately 80% chance that El Niño will continue through the Northern Hemisphere summer 2015,
- Greater than 70% chance that it will last through winter

Tropical Rainfall Forecasts (May 2015-Oct 2015)

May-June-July



August-September-October



- Maritime Continent likely to see dry conditions, worsening as the year progresses
- Dry conditions expected for India and South East Asia
- China likely to see near normal conditions
- Hawaii likely to get above normal rainfall
- Central and Northern South American likely to see worsening dry conditions
- Australia, conditions expected to shift from wetter to dryer than normal
- Continental U.S. may experience some drought relief

Synopsis

Current Conditions

- El Niño conditions were reflected by
 - Above-average sea surface temperatures (SST) across the equatorial Pacific
 - Expected tropical atmospheric response

General Forecast

- Models predict El Niño to continue throughout 2015
- Considerable uncertainty as to how strong this event may become
- Approximately 80% chance that El Niño will continue through the Northern Hemisphere summer 2015
- Greater than 70% chance that it will last through winter



The PEAC Center

The Pacific ENSO Applications Climate
Center



Photo courtesy of
Lt. Charlene Felkley