



# The El Niño you don't know and why it matters to you

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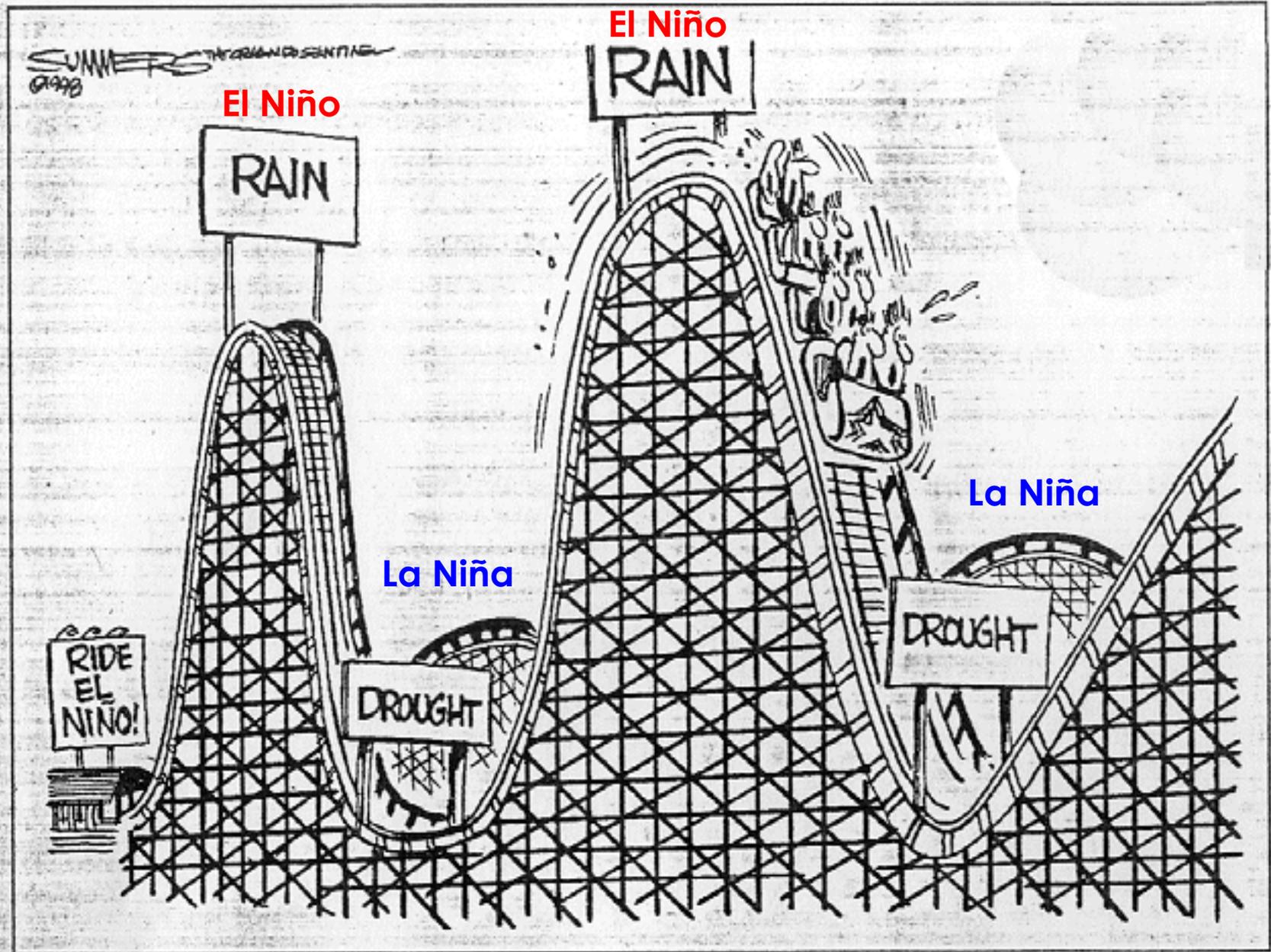
How does La Niña/El Niño impact California?

## La Niña Watch

....



# How does La Niña/El Niño impact California?



# How does La Niña/El Niño impact California?

**La Niña**  
**Clean Beaches**



**El Niño**  
**Polluted Beaches**

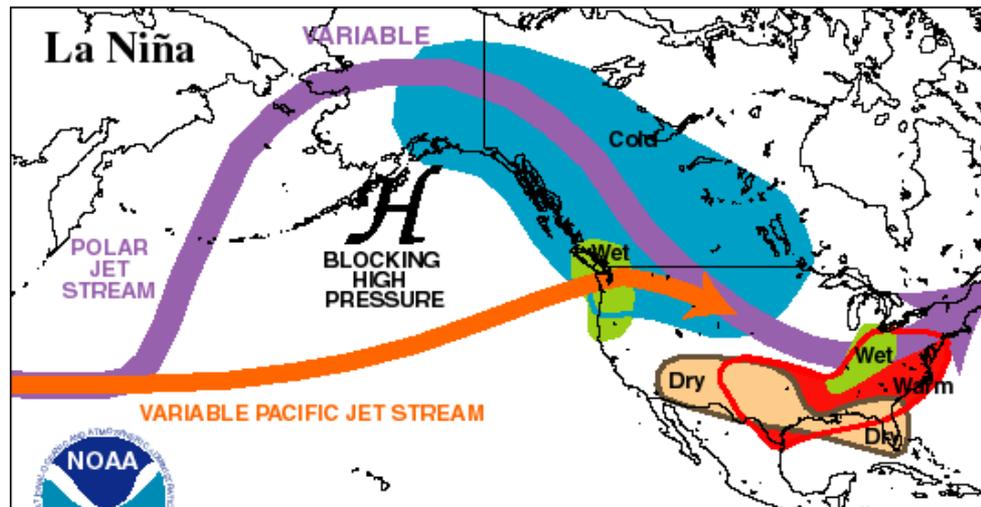
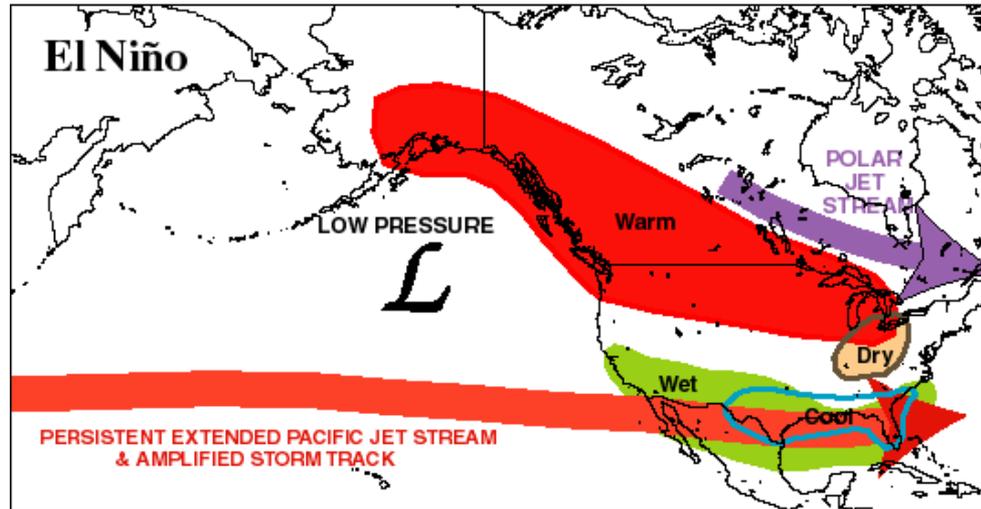


Gracias!  
El Niño

RON BITES THE SUN 2006

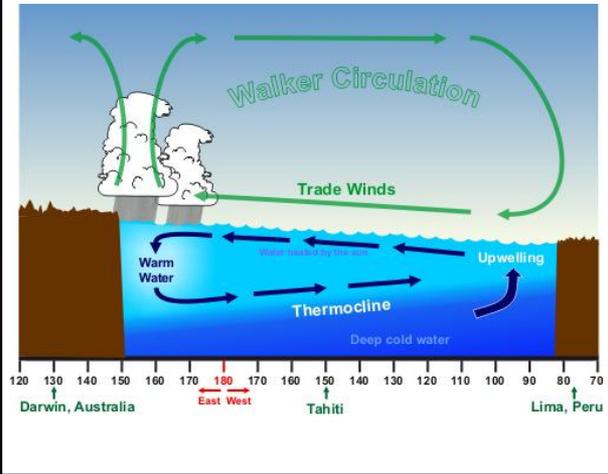
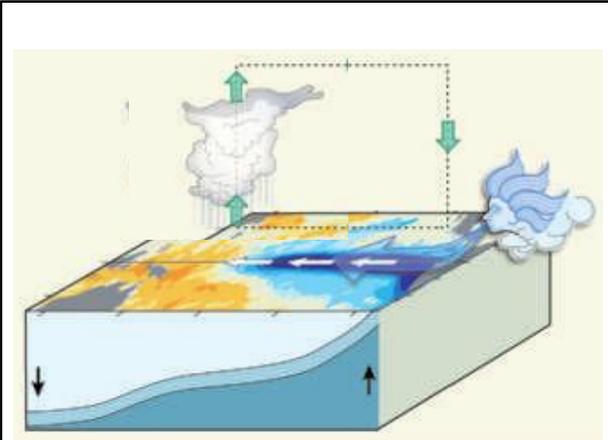
# Why does La Niña/El Niño impact California?

## TYPICAL JANUARY-MARCH WEATHER ANOMALIES AND ATMOSPHERIC CIRCULATION DURING MODERATE TO STRONG EL NIÑO & LA NIÑA

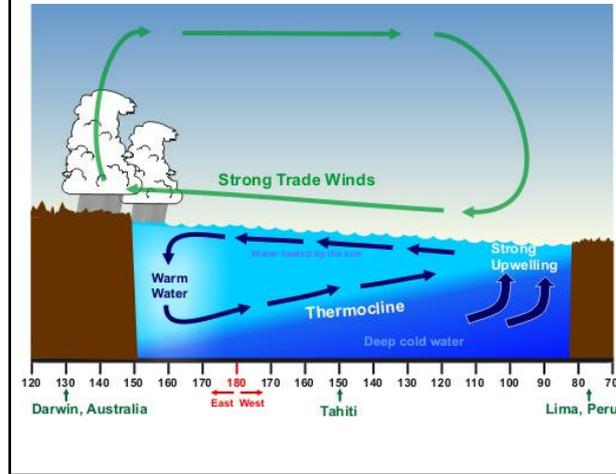
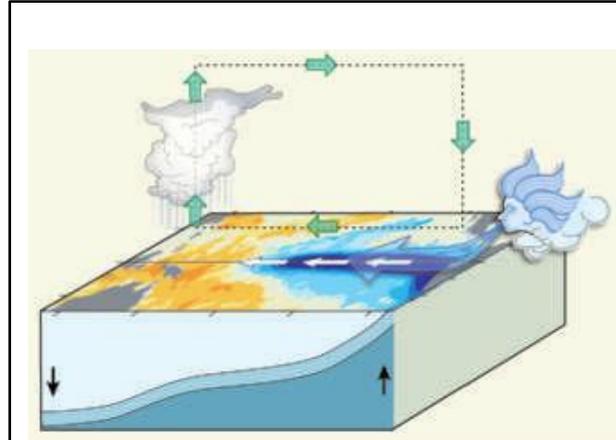


# Coupled Atmosphere-Ocean Phenomena

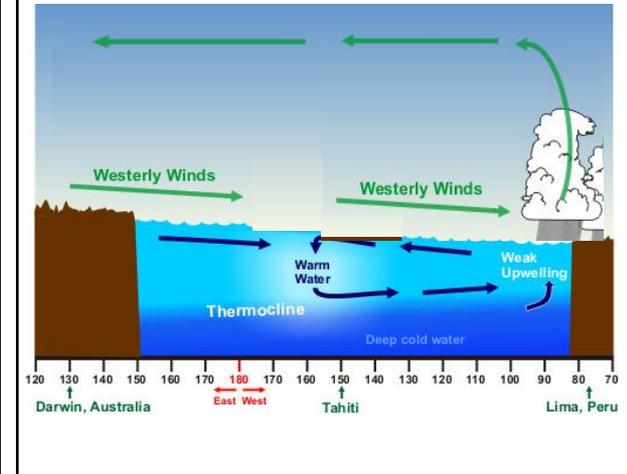
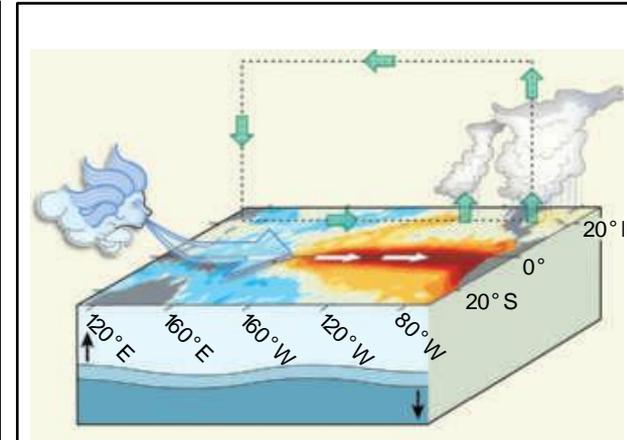
## Neutral



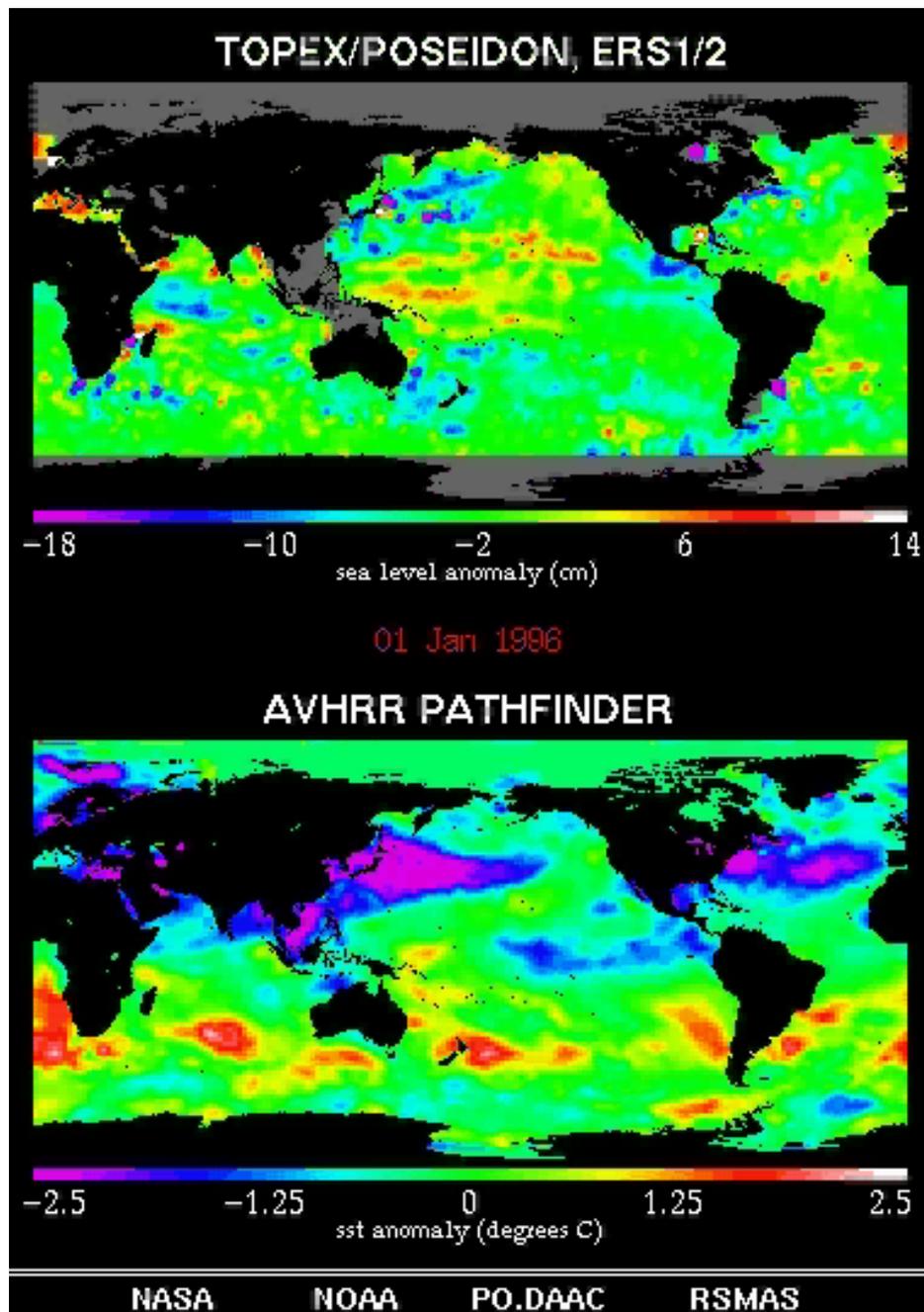
## La Niña



## El Niño

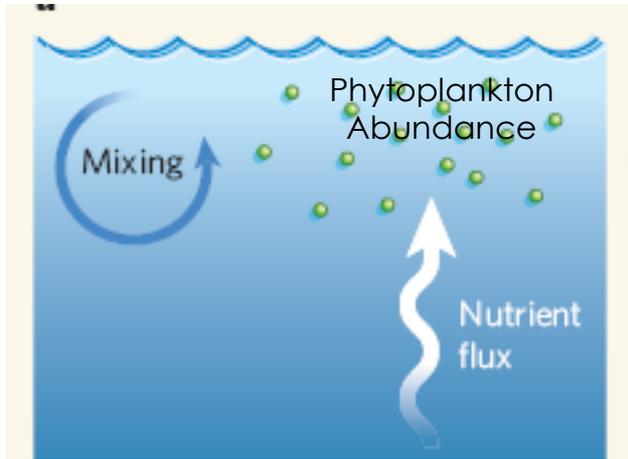


# Ocean response to El Niño/La Niña: Physical

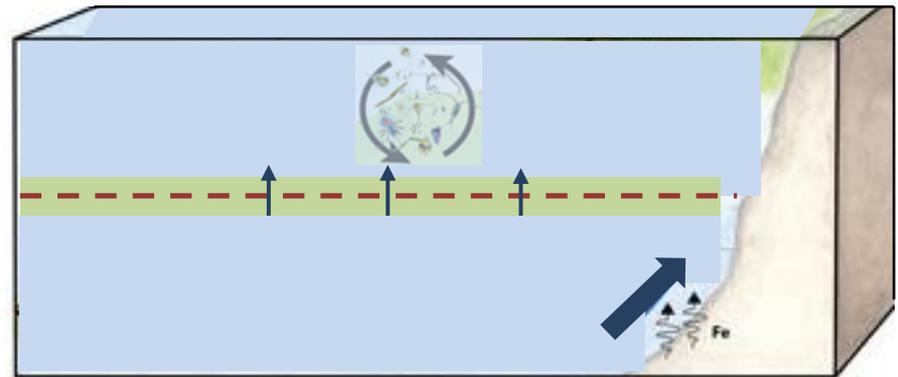
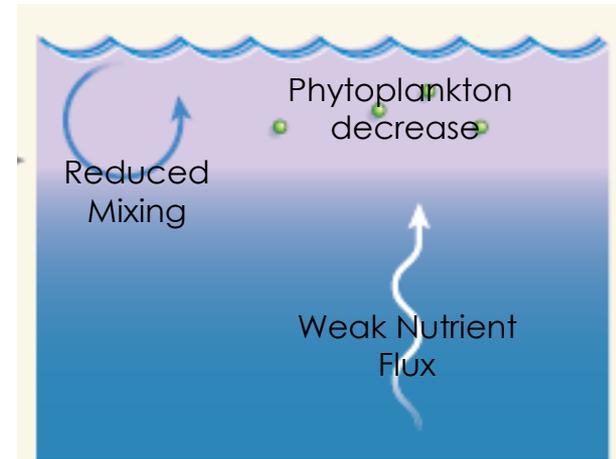


# Ocean response to El Niño/La Niña: Biological

## Neutral and La Niña



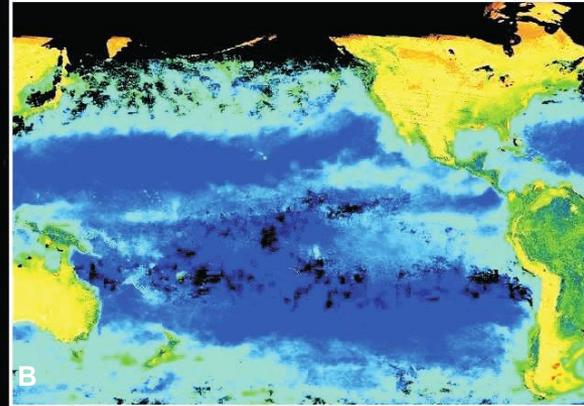
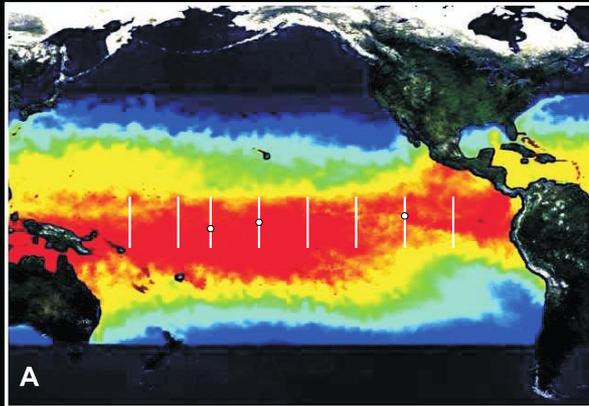
## El Niño



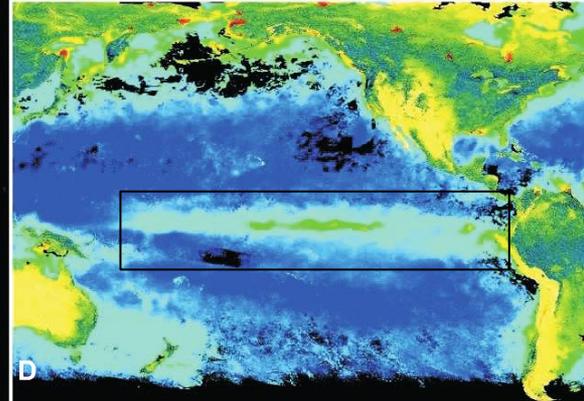
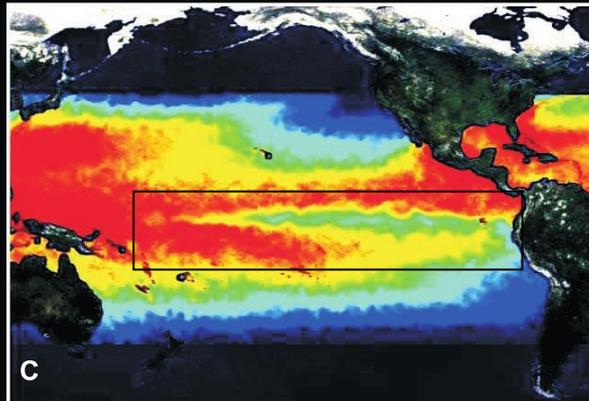
# Ocean response to El Niño/La Niña: Biological

AVHRR Sea Surface Temperature

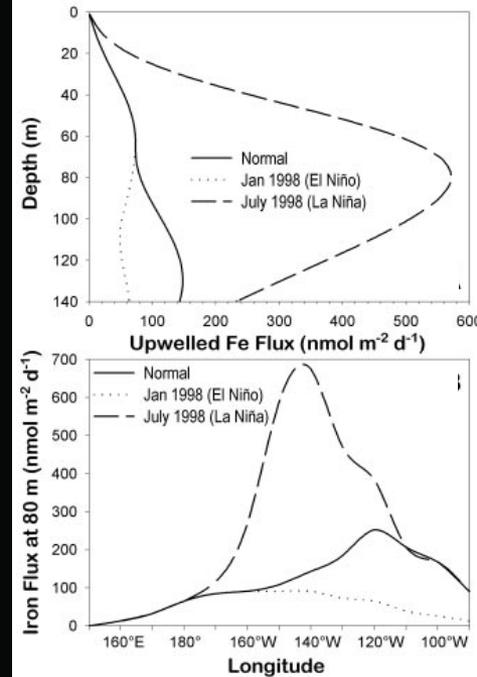
SeaWiFS Ocean Chlorophyll



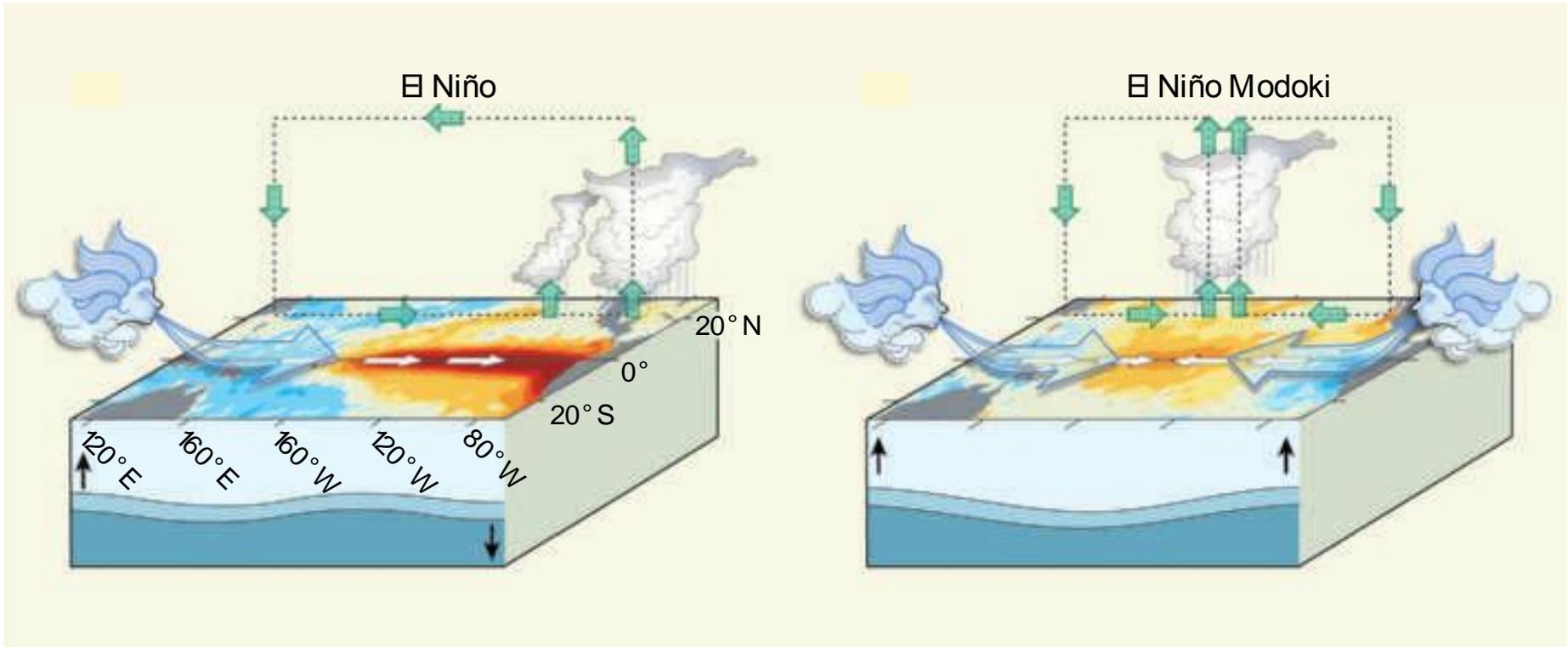
January  
1998



July  
1998



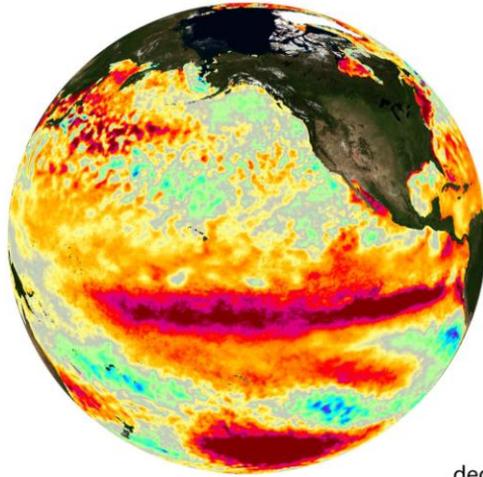
# A New Type of El Niño Emerges...



Central Pacific (CP)-El Niño, warm-pool El Niño, dateline El Niño, or El Niño Modoki

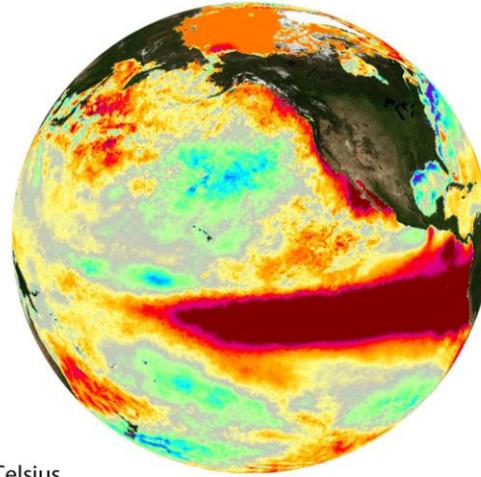
## Central Pacific El Niño

December 2009  
Blended AMSR-E and MODIS SSTA



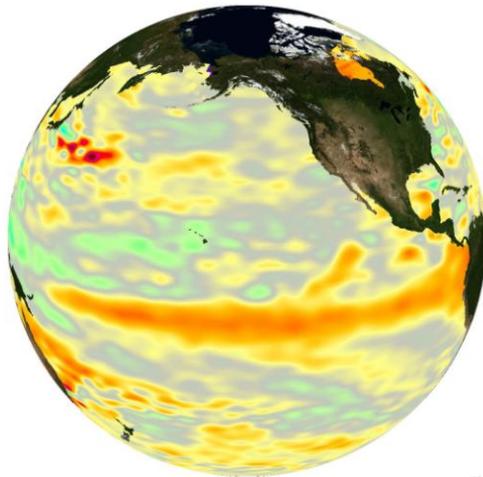
## Eastern Pacific El Niño

December 1997  
Pathfinder AVHRR SSTA

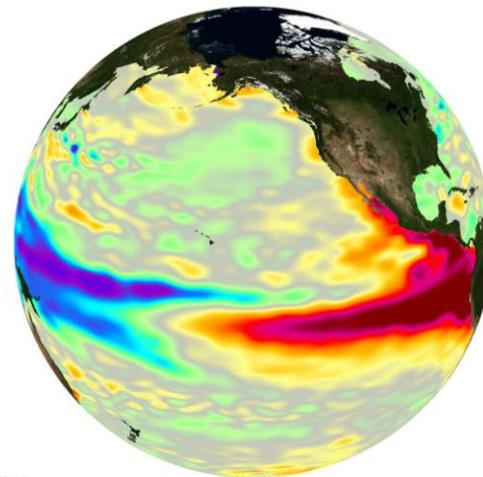


degrees Celsius  
-2.5 0.0 2.5

December 2009  
Jason-1 SSHA



December 1997  
Jason-1 SSHA



millimeters  
-300.0 0.0 300.0

# 2009-10 Central Pacific El Niño

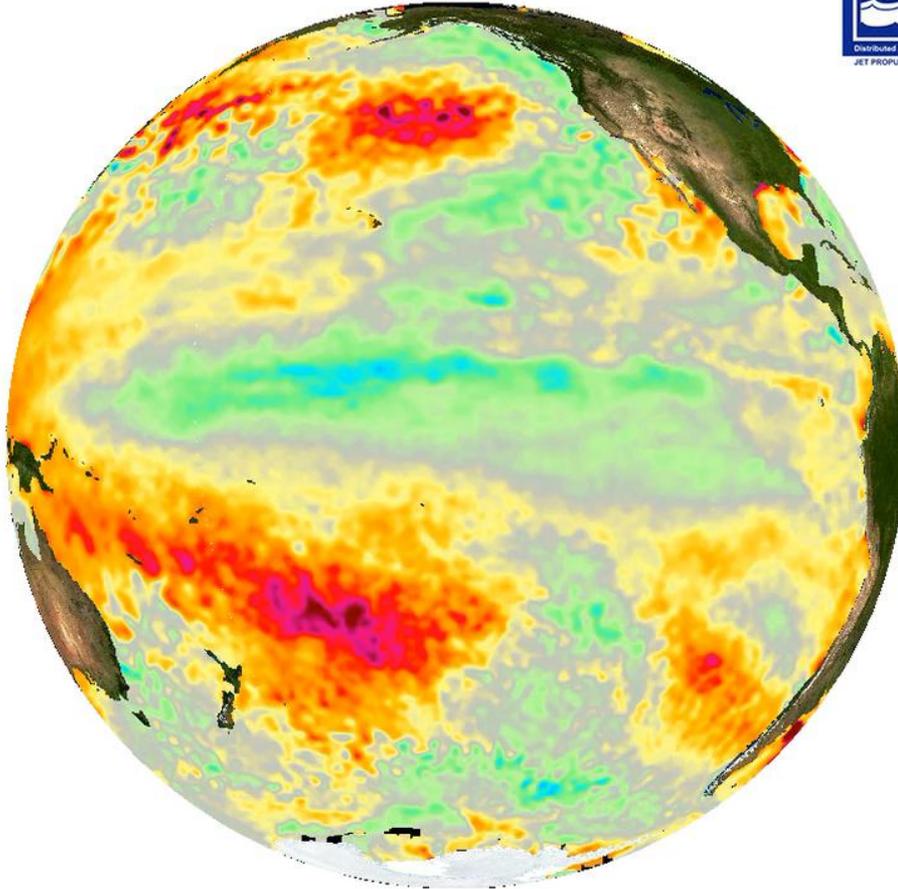
Sea Surface Temperature Anomaly

January 1, 2009

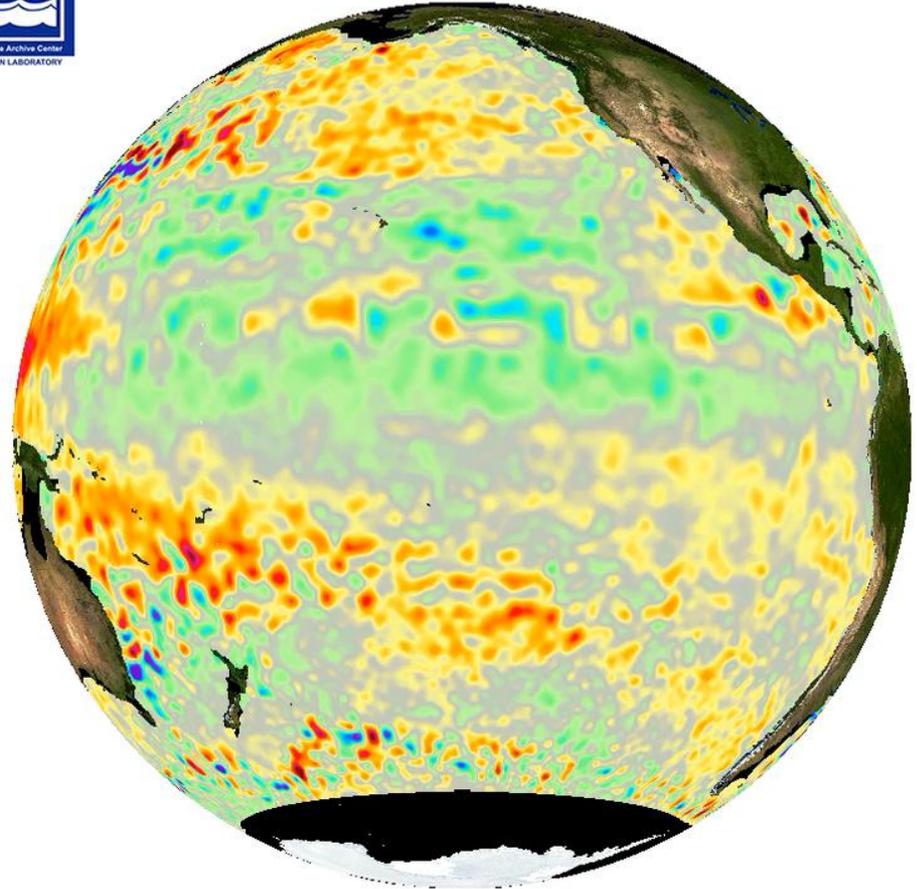
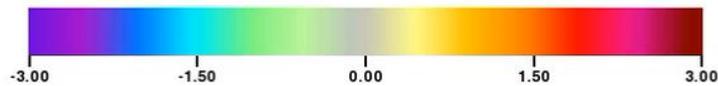


Sea Surface Height Anomaly

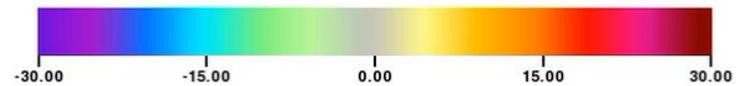
January 1, 2009



degrees C



cm

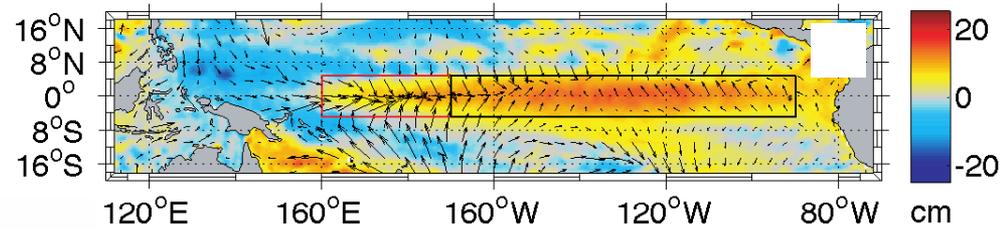
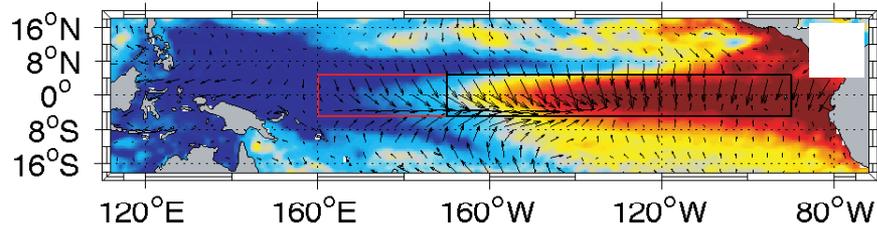


# Oceanic Response to El Niños: Physical

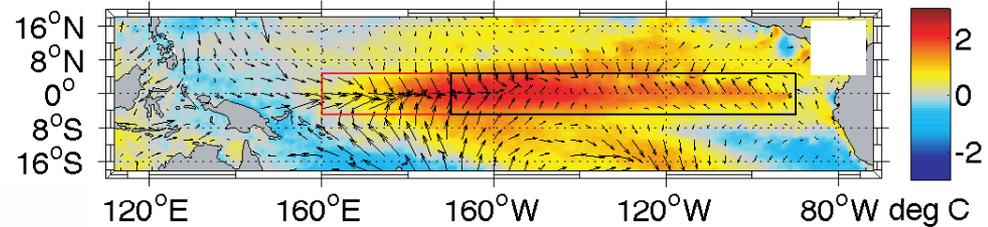
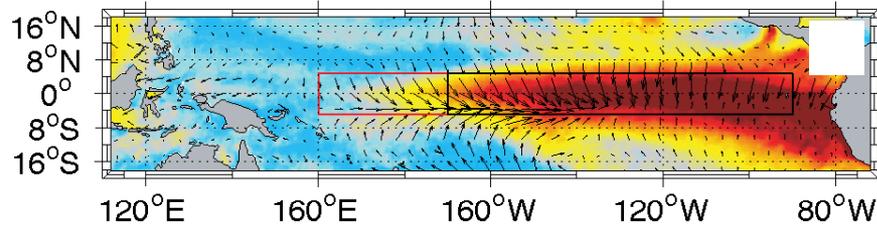
## 1997-98 Eastern Pacific El Niño

## 2009-10 Central Pacific El Niño

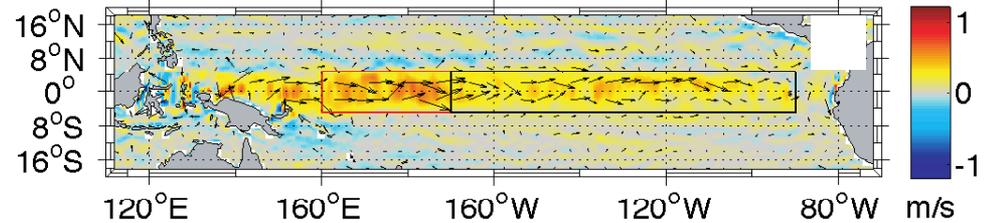
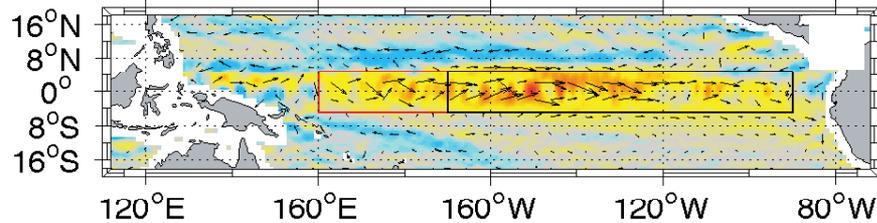
### Sea Surface Height



### Sea Surface Temperature



### Zonal (Eastward) Surface Currents

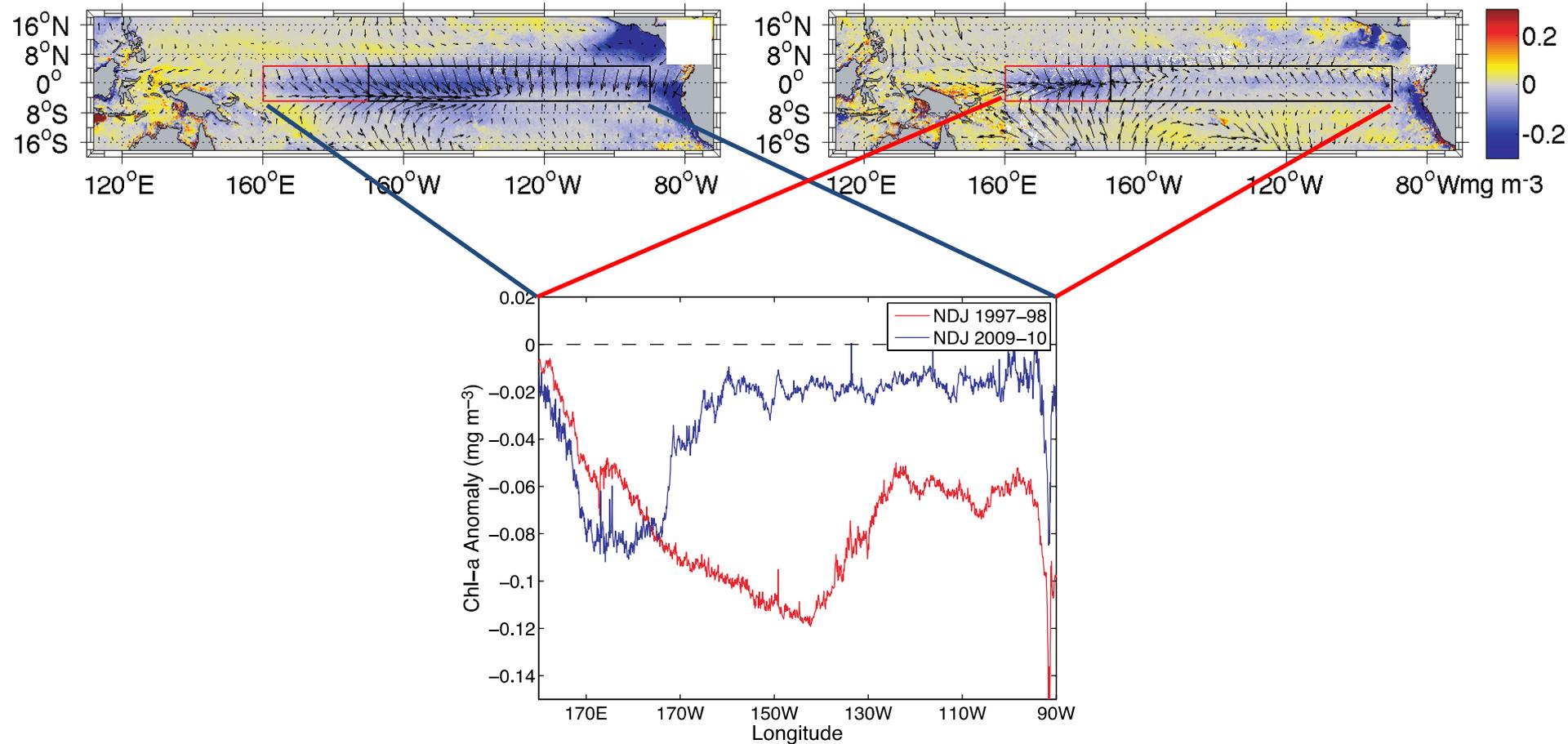


# Oceanic Response to El Niños: Biological

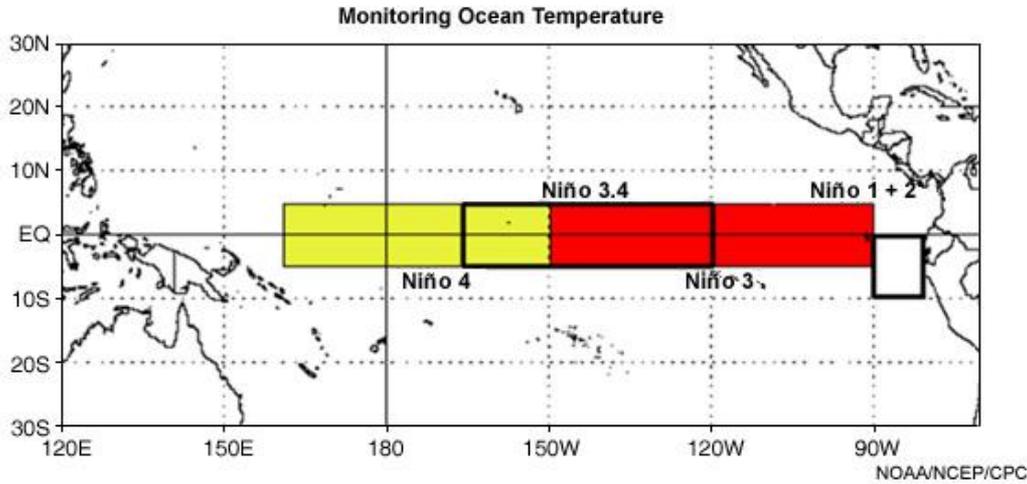
1997-98 Eastern Pacific El Niño

2009-10 Central Pacific El Niño

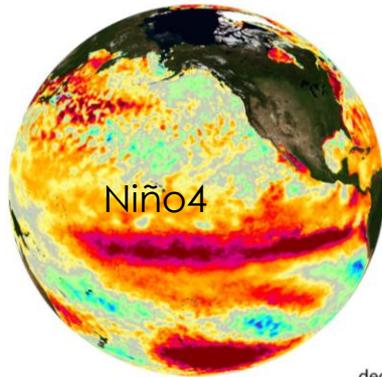
Chlorophyll-a



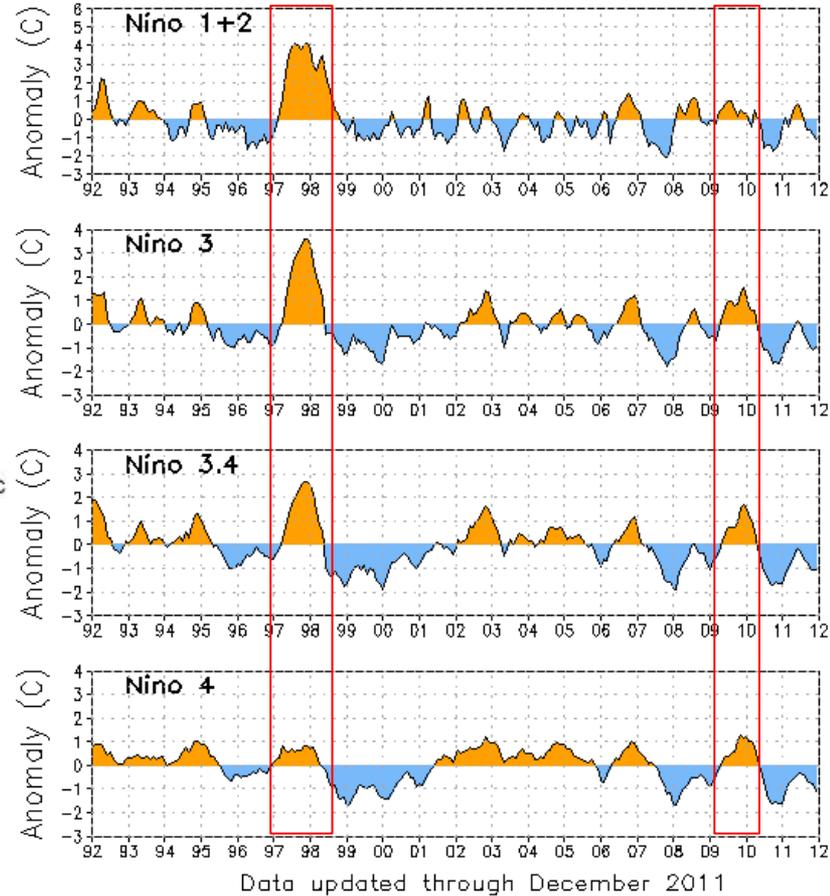
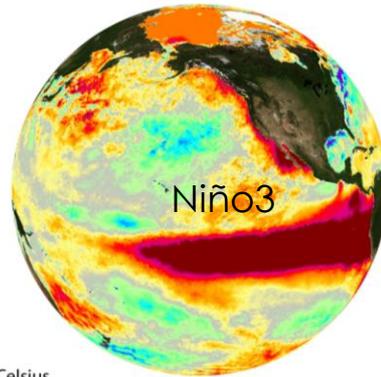
# How are the two types of El Niños defined?



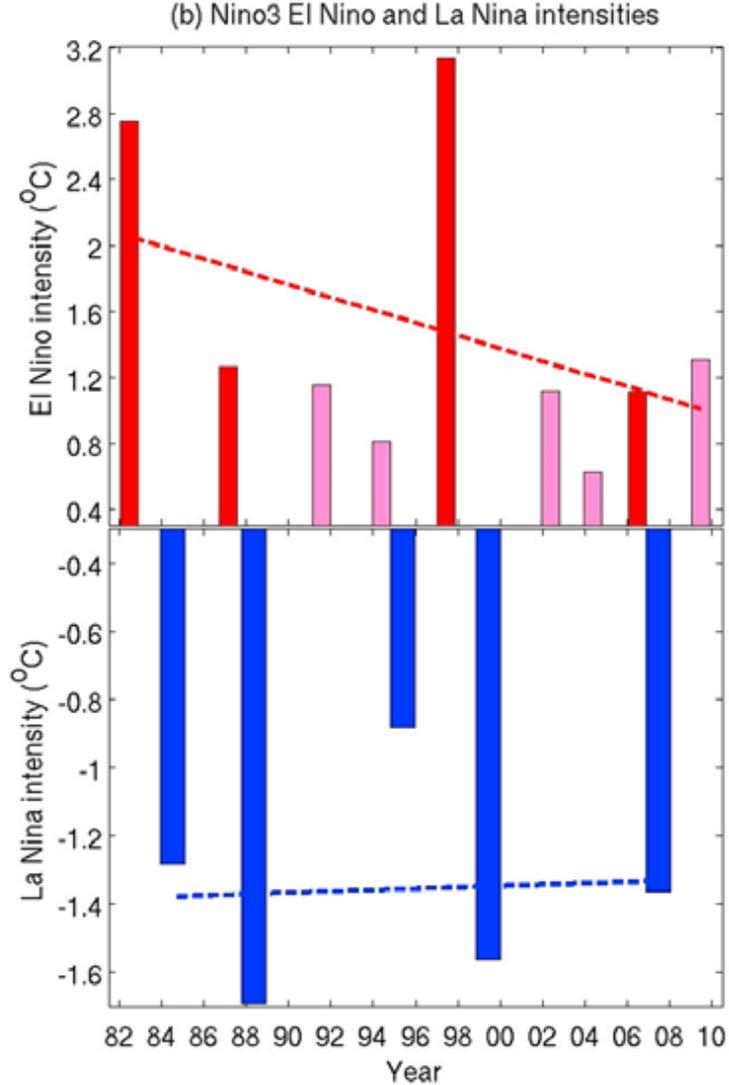
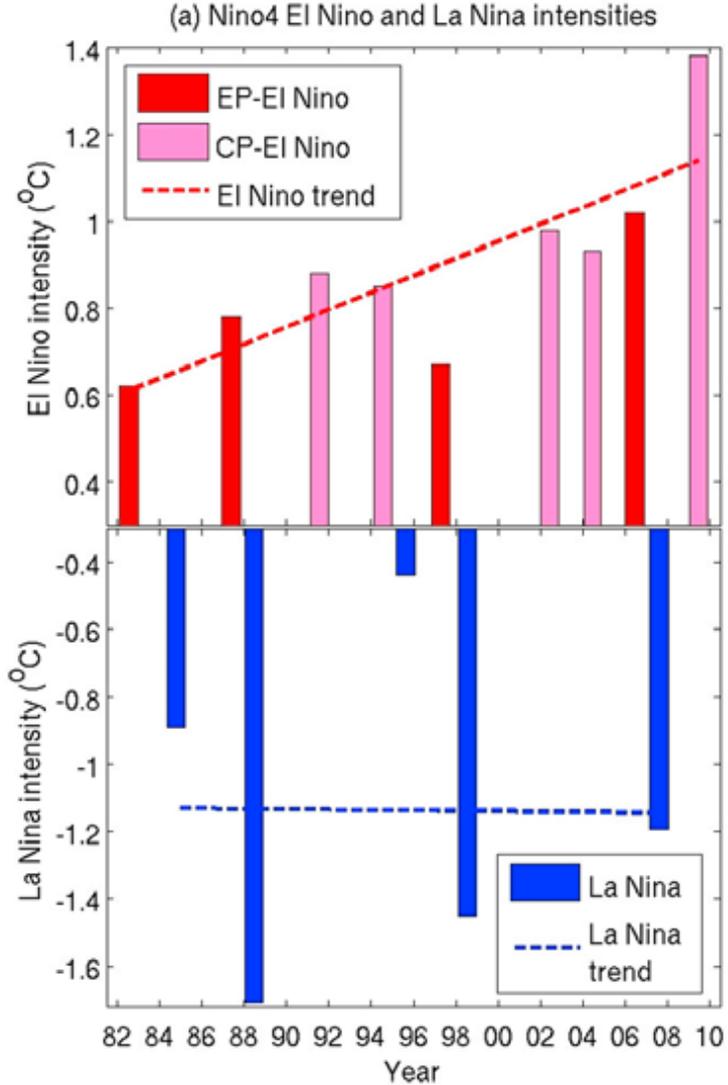
December 2009



December 1997

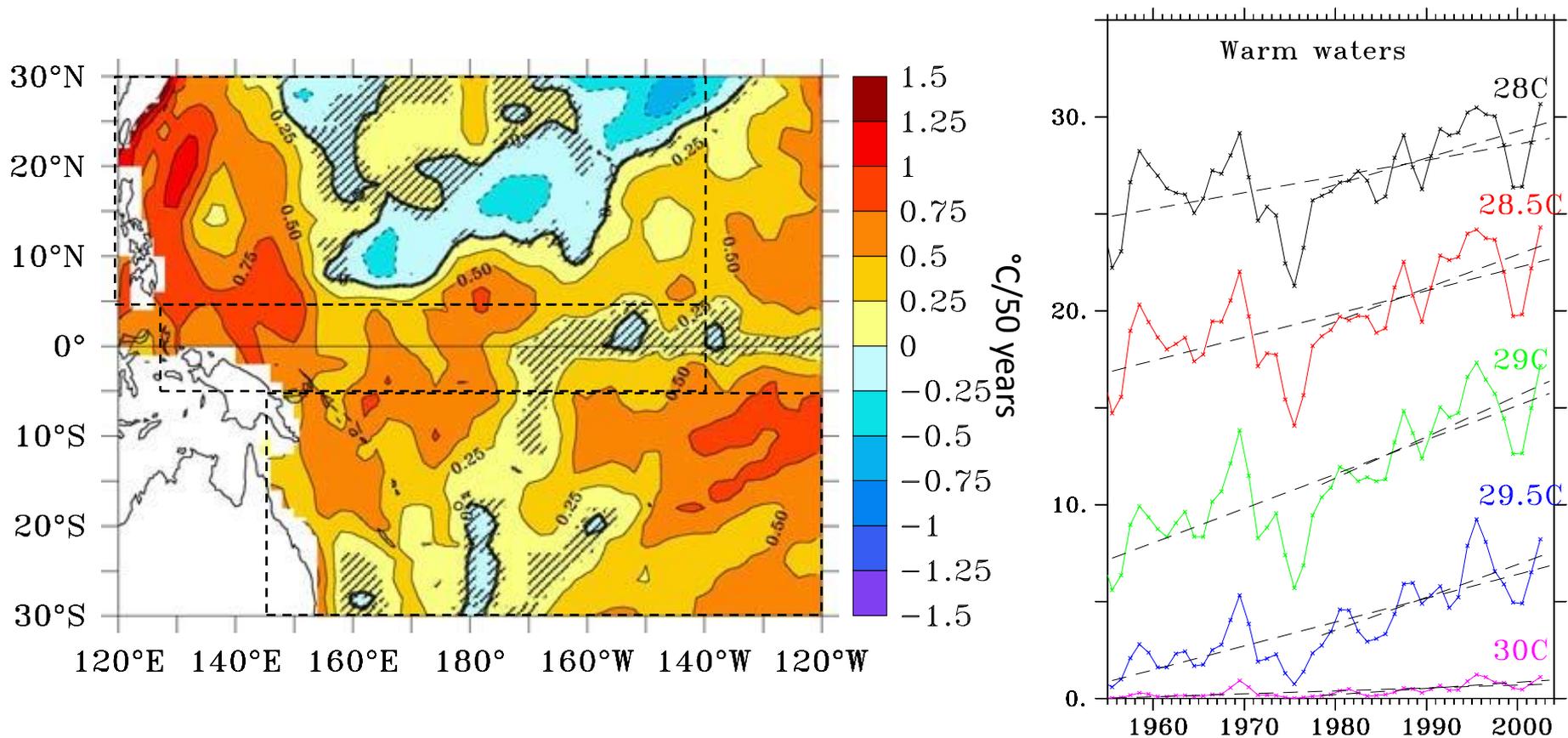


# Decadal Trends in El Niño/La Niña



[Image from Lee and McPhaden, 2010]

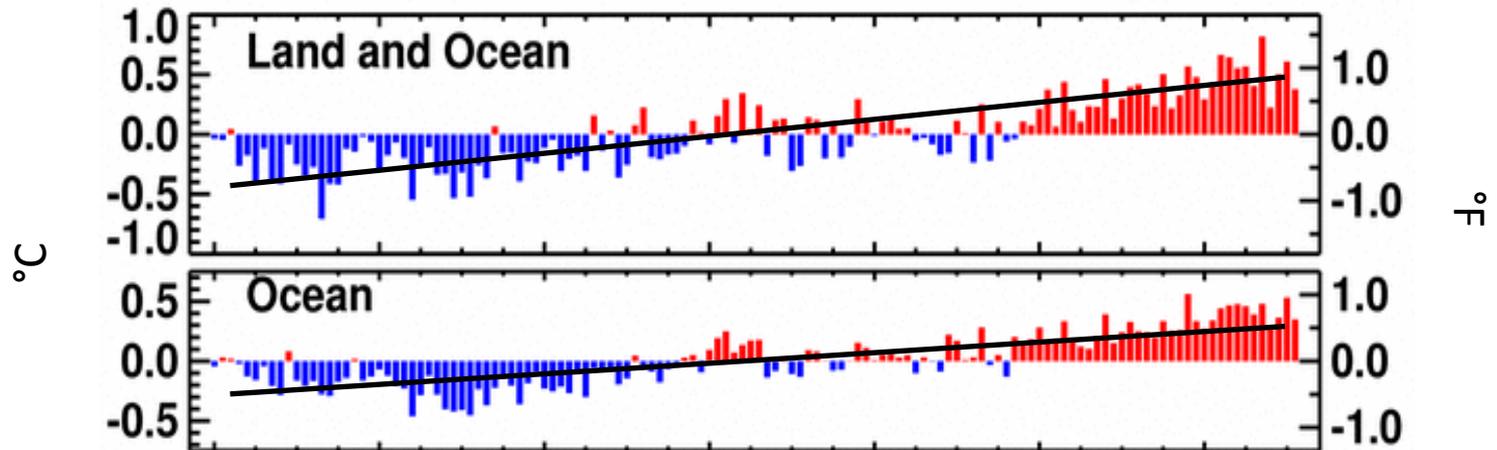
# Regional Decadal Trends in Sea Surface Temperature



# Global Decadal Trends in Sea Surface Temperature

## January Global Surface Mean Temp Anomalies NCDC/NESDIS/NOAA

Analysis is based upon Smith et al. (2008) methodology.



# Future of El Niño/La Niña?

## THE LA NINA AND EL NINO WEATHER PATTERNS...



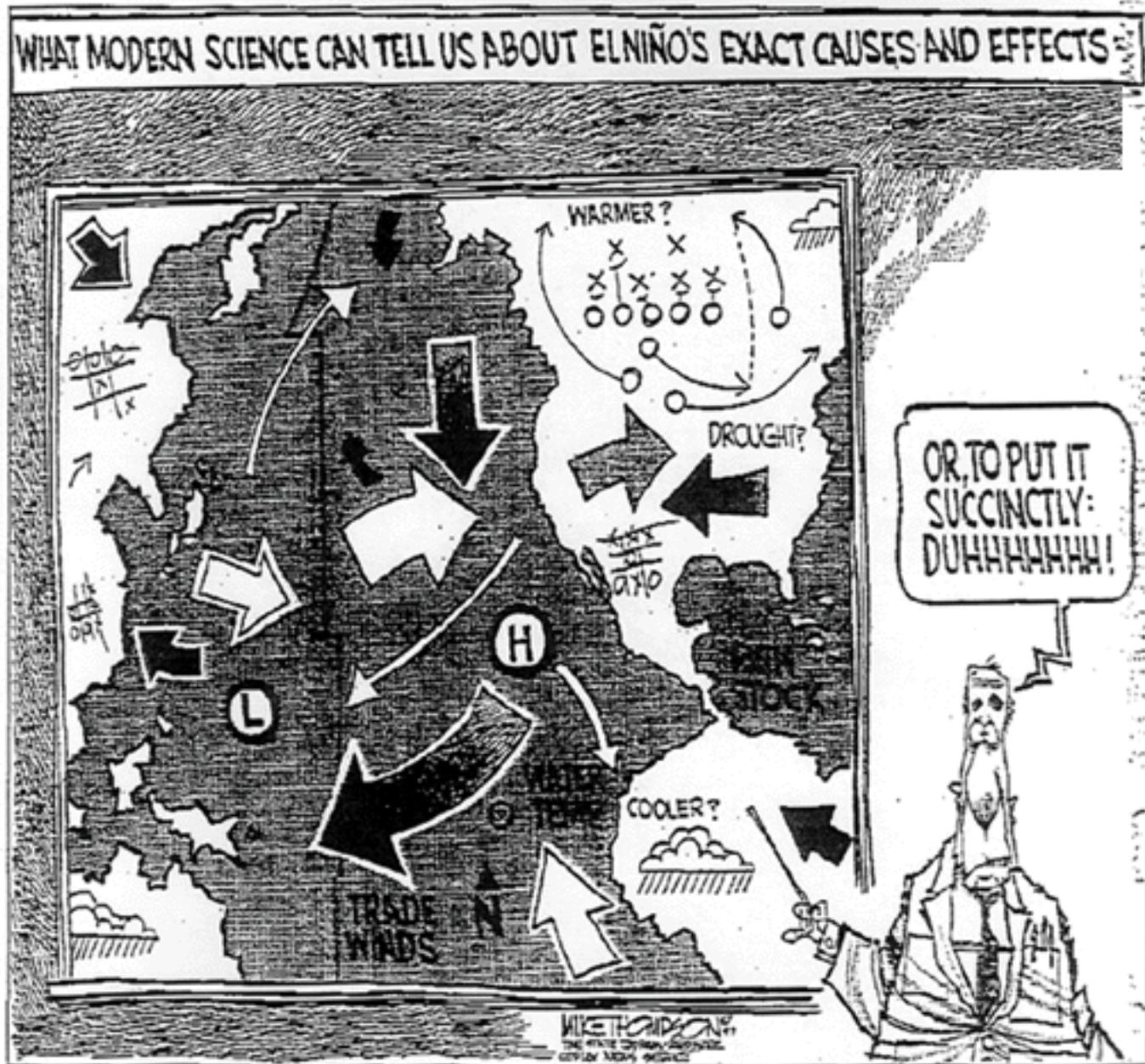
IN THE PAST



TODAY

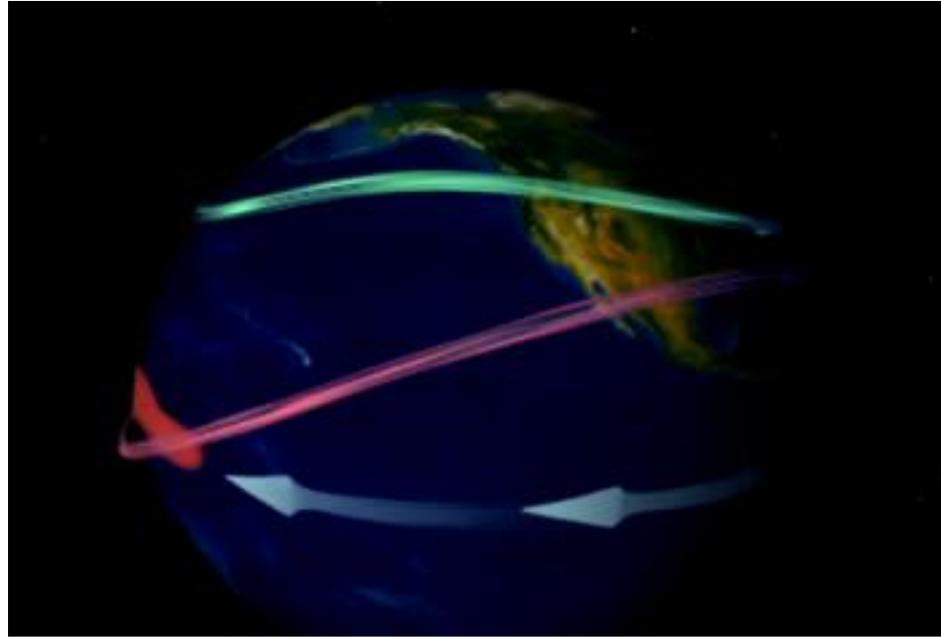
INKINCT

# Questions?

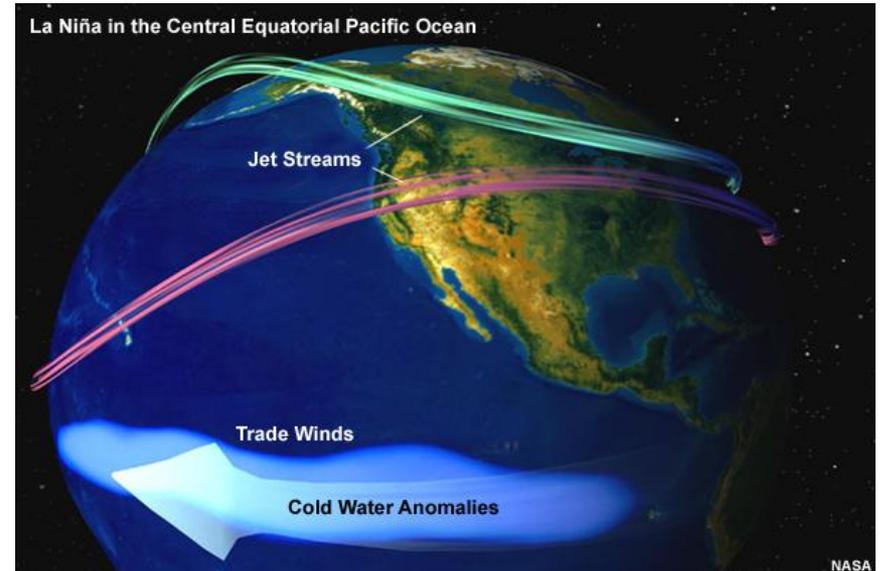
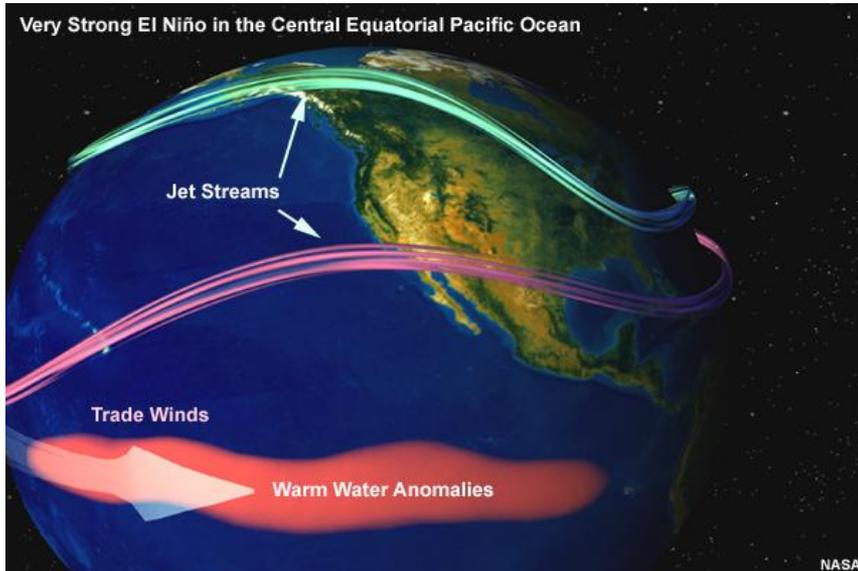


Backup Slides

# Effects of El Niño/La Niña on regional climate patterns



[http://www.nasa.gov/vision/earth/lookingatearth/el\\_nino\\_split.html](http://www.nasa.gov/vision/earth/lookingatearth/el_nino_split.html)



[http://www.nasa.gov/vision/earth/lookingatearth/el\\_nino\\_split.html](http://www.nasa.gov/vision/earth/lookingatearth/el_nino_split.html)