El Niño

- Peruvian Fishermen: around Xmas time
- decrease in fishing in Pacific of South America
- dry season -> crop failure

- elsewhere high precipitation -> mudslides

El Nino and Ancient Peruvian and Bolivian Potato Framers

Pleiades (within Taurus)

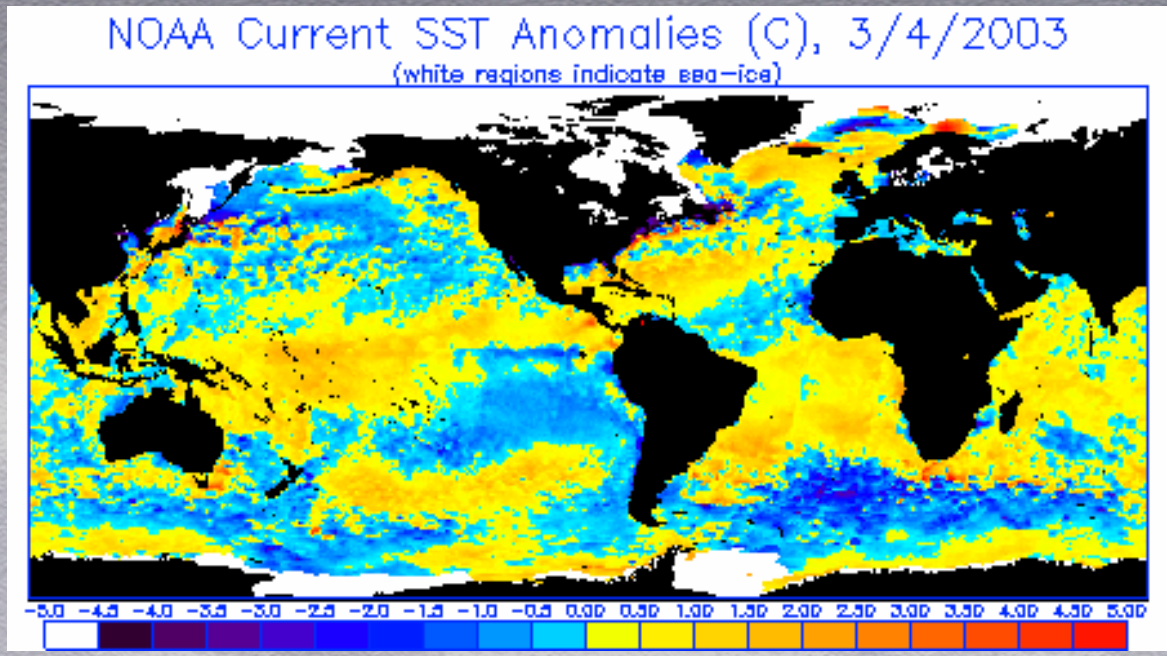
- if bright in June, rain plentiful, sow in October
- if dim, dry spell, sow 6 weeks later

modern science:

- invisible low-density, high-altitude clouds (cirrus) linked to El Nino
- cirrus don't make rain
- 1/3 less rainfall

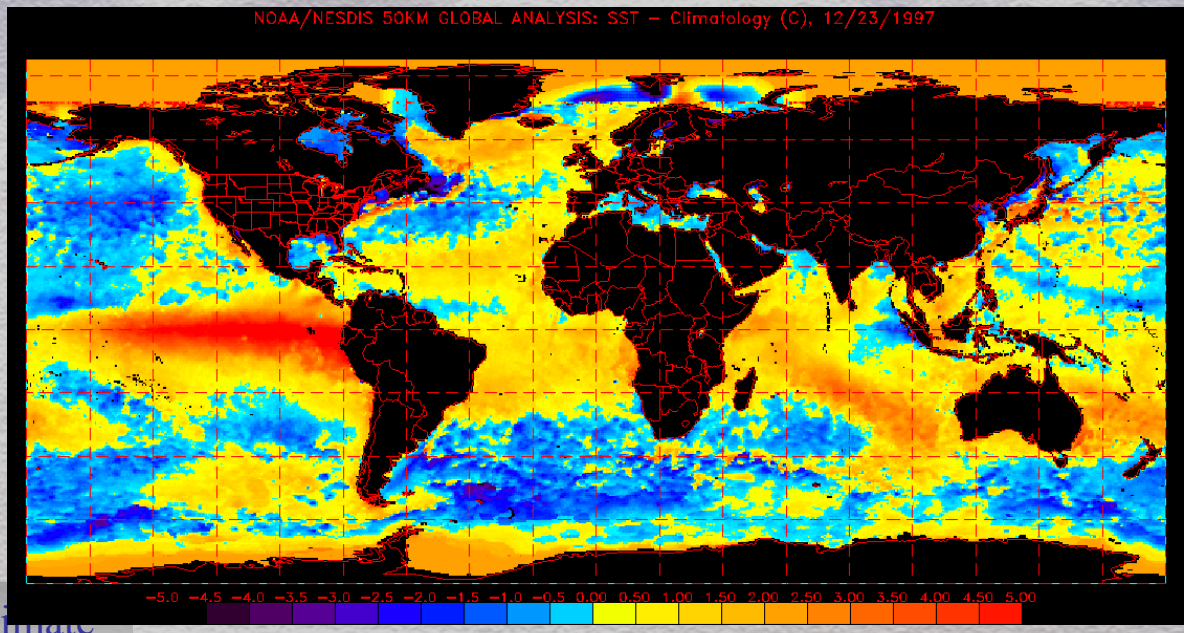
El Nino and Sea Surface Temperature

normal



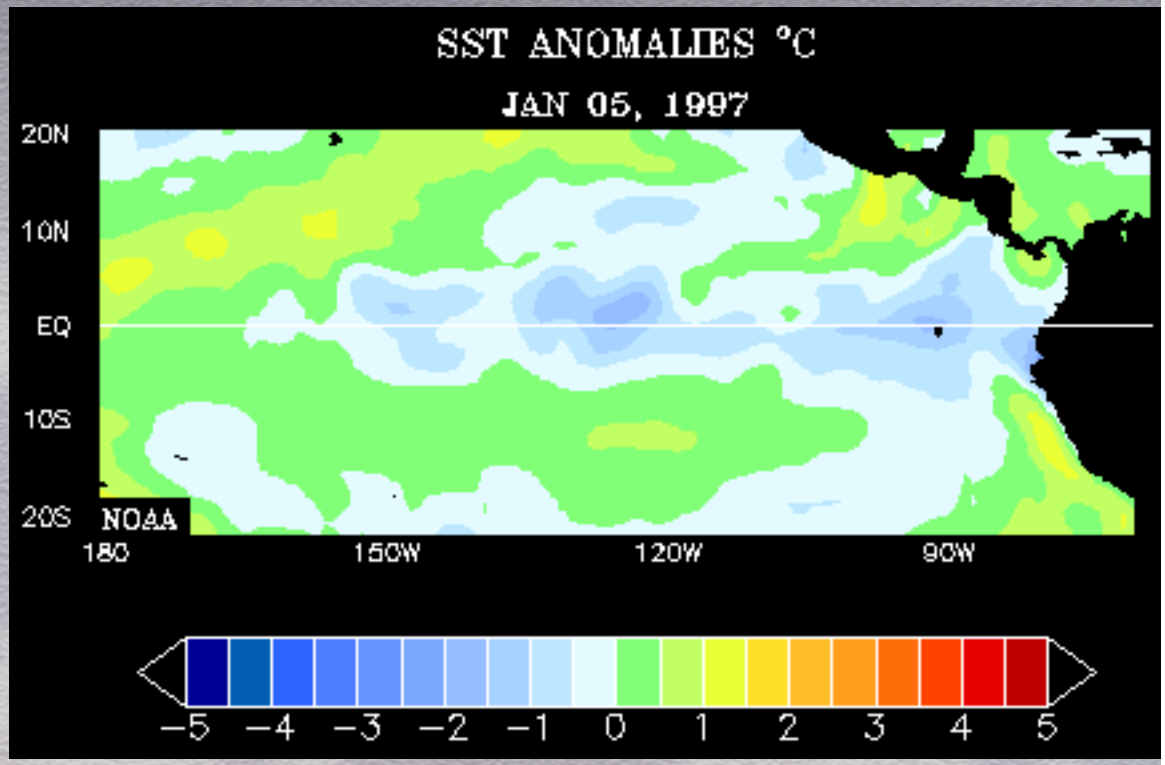
- increased equatorial sea surface T in E. Pacific (5°C)

El Nino



El Nino and Sea Surface Temperature

- increased equatorial sea surface T in E. Pacific (5°C)



El Niño

- about every 5-7 years
- recurrence time complex due to other ocean circulations (e.g. decadal oscillation)

-particularly strong El Ninos:
- 1972/73
- 1982/83
- 1991/92
- 1997/98

- strong El Niños seem to bring wet seasons to California; otherwise 50/50
- may have global effects but affects Pacific Region most strongly

DROUGHT:
- Indonesia
- Australia
- high Andes

WET:
- central America
- California?
(strong El Ninos only)

El Niño Southern Oscillation

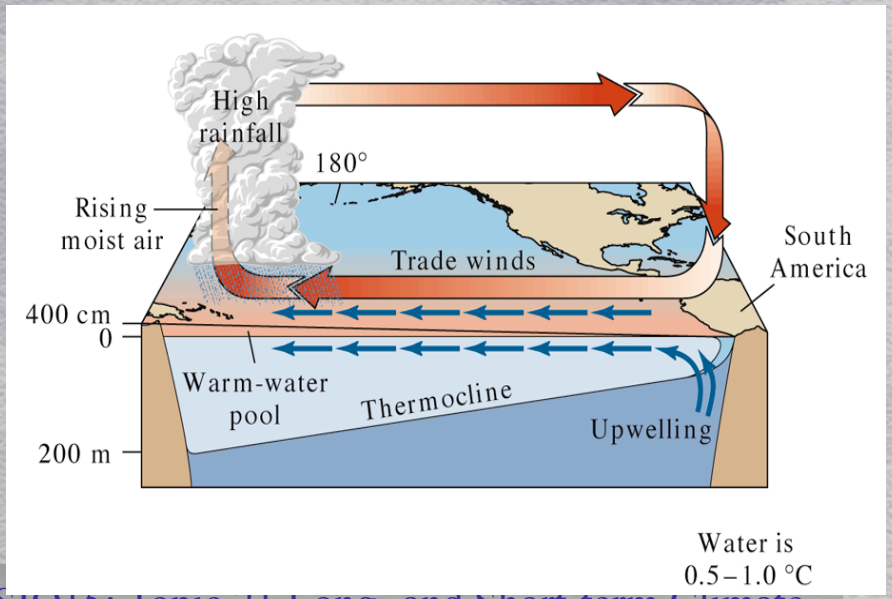
Normal Conditions

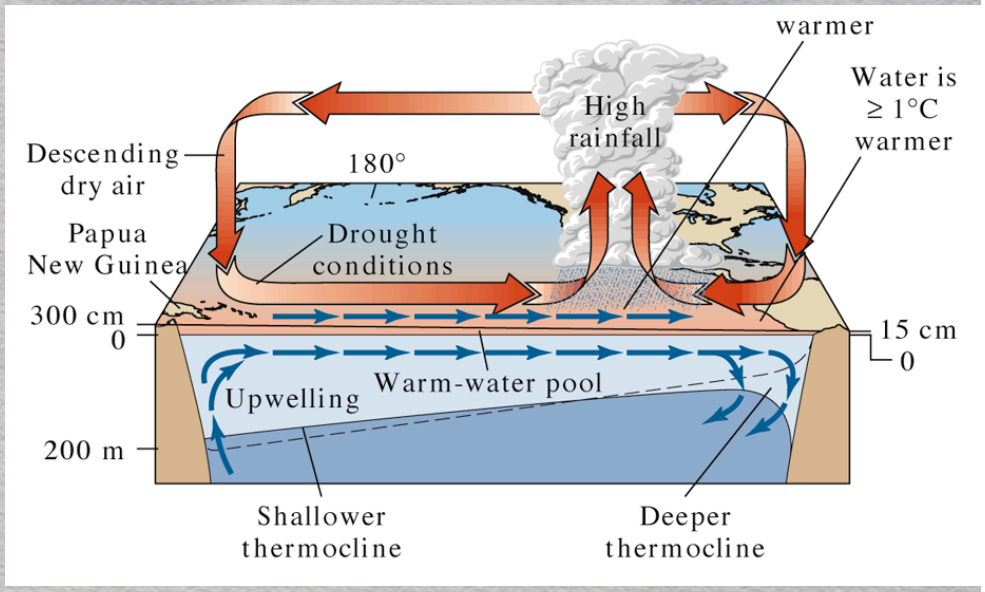
W. Pacific:
trade winds push air to west
- low pressure in Indonesia

-E. Pacific:
- trade winds pull away warm water
- upwelling of cold, deep, nutrient rich water

El Nino

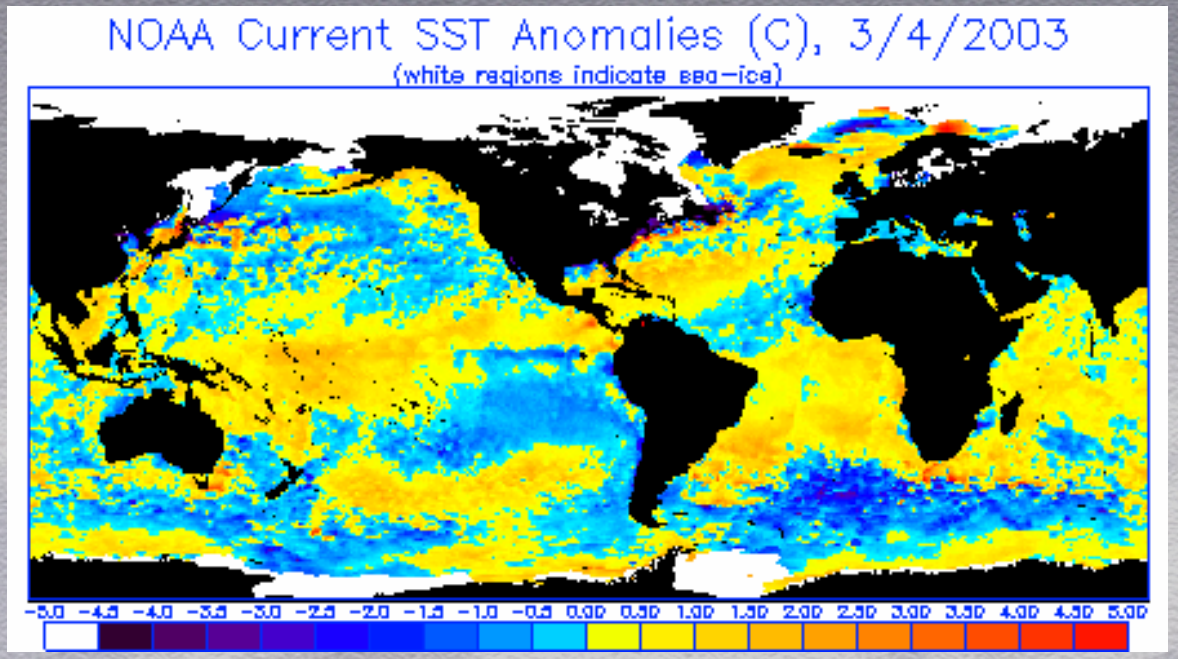
- weakening of trade winds
- shift in low pressure system from Indonesia to Central Pacific
- reversal of equatorial ocean circulation
- drought in Indonesia
- cut-off of deep nutrient-rich water





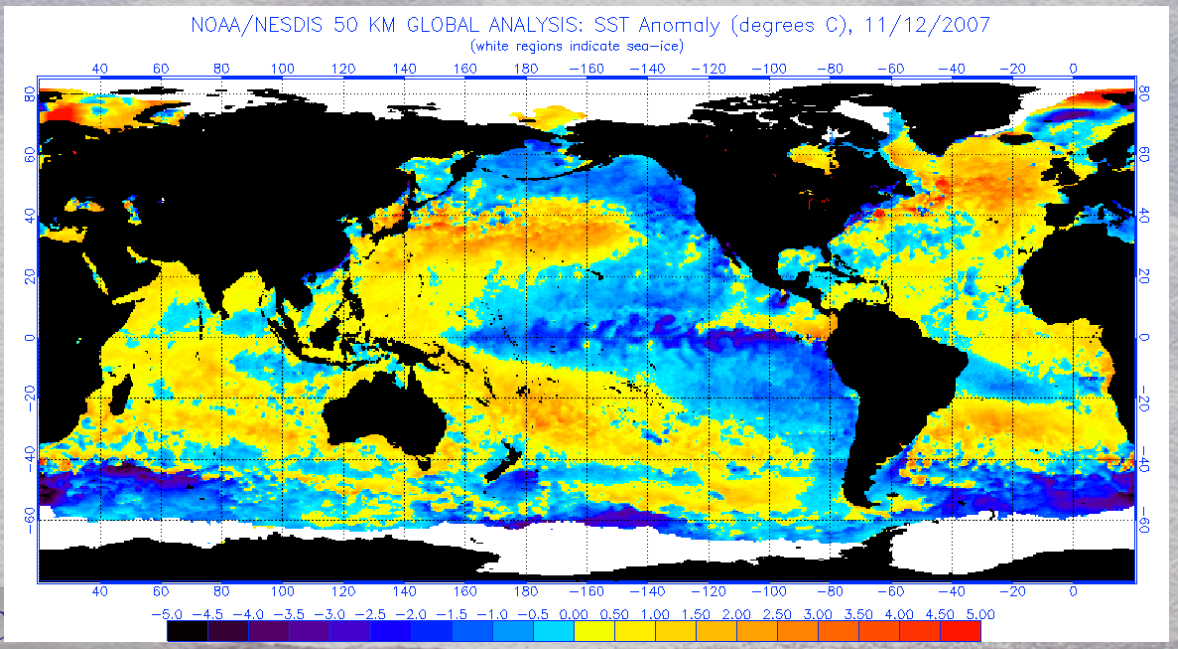
La Nina and Sea Surface Temperature

normal



La Nina has cooler than normal SST

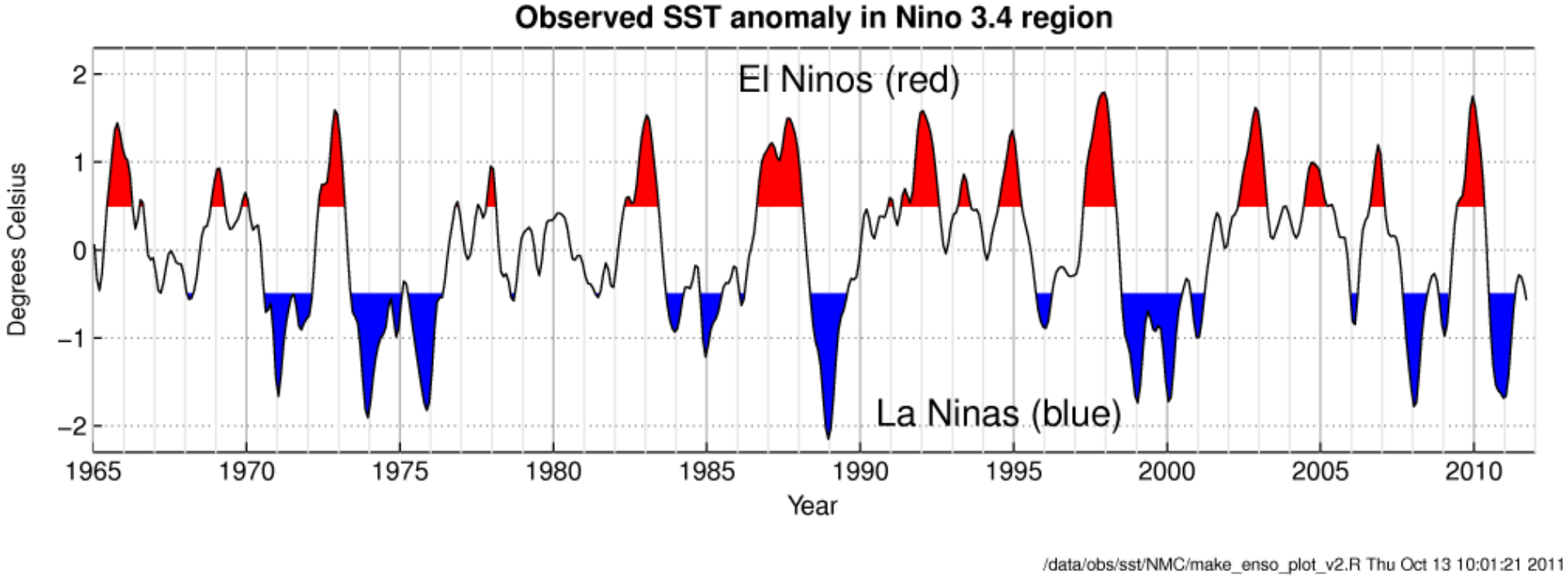
La Nina



2007 La Nina conditions

- drier winters in SoCal

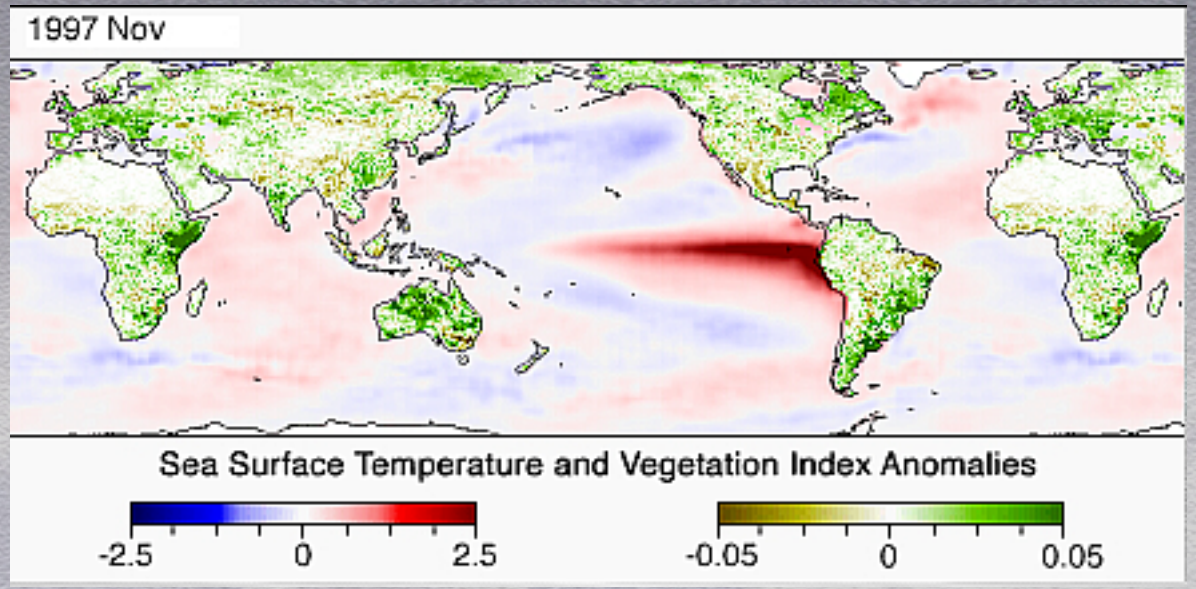
El Niño and La Niña



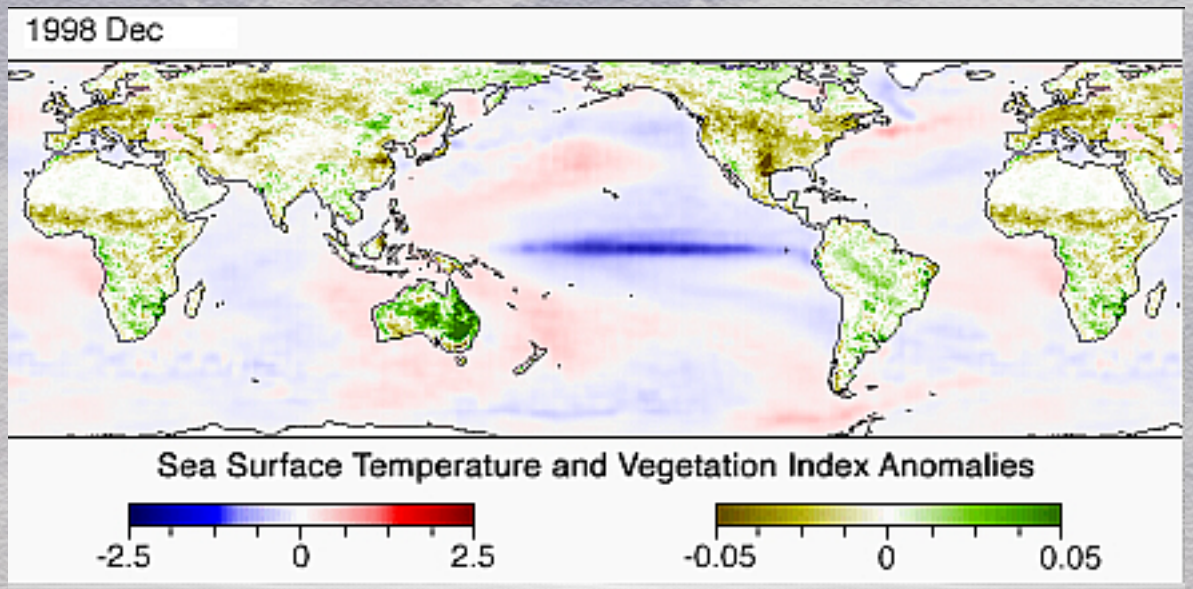
research done at SIO

El Nino and Global Vegetation

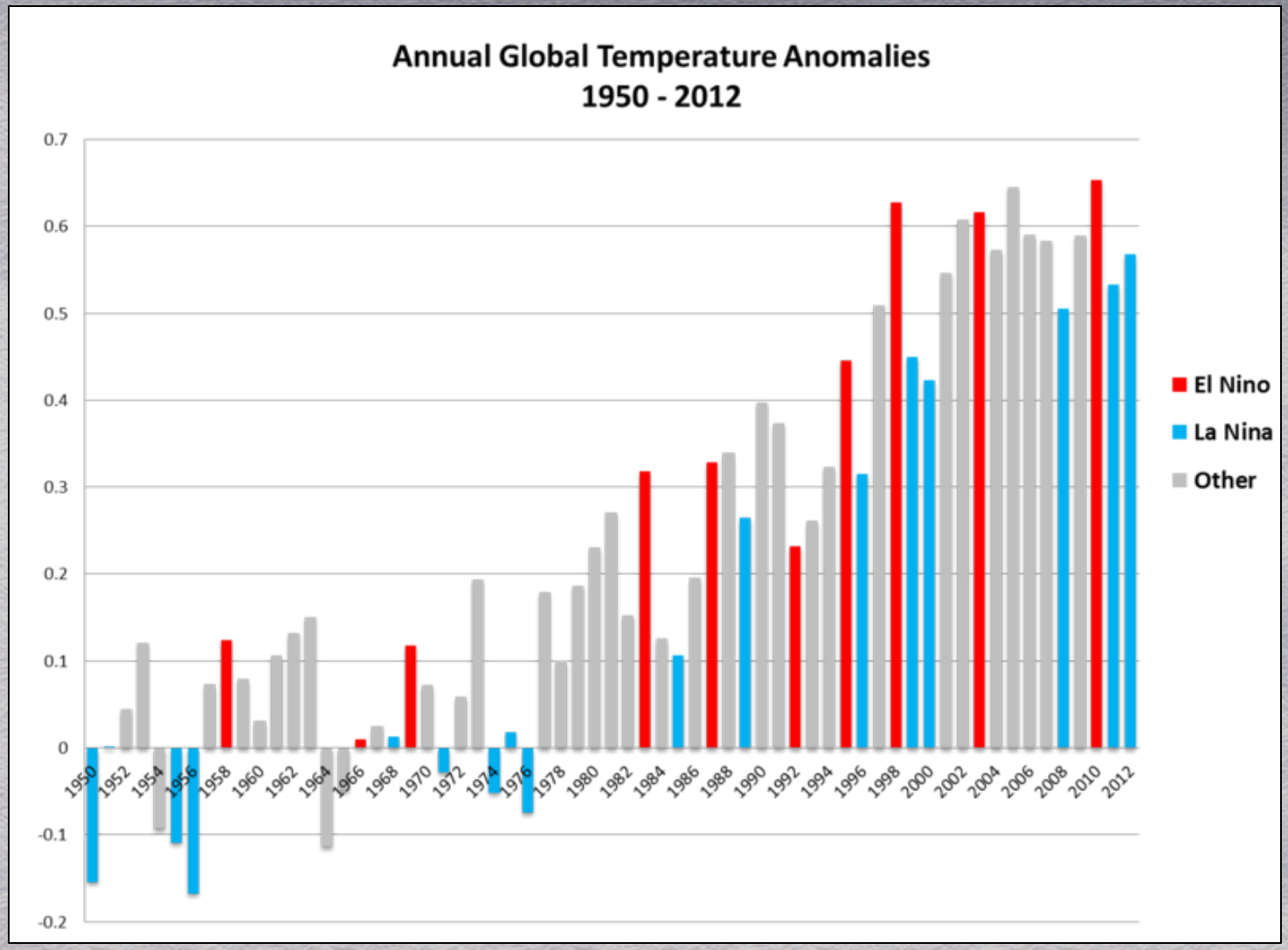
- 1997 El Nino
  wet in East Africa,
  Europe, Americas;
Drought in Amazon Basin



- 1998 La Nina
  dry in Africa, Europe,
  N. America

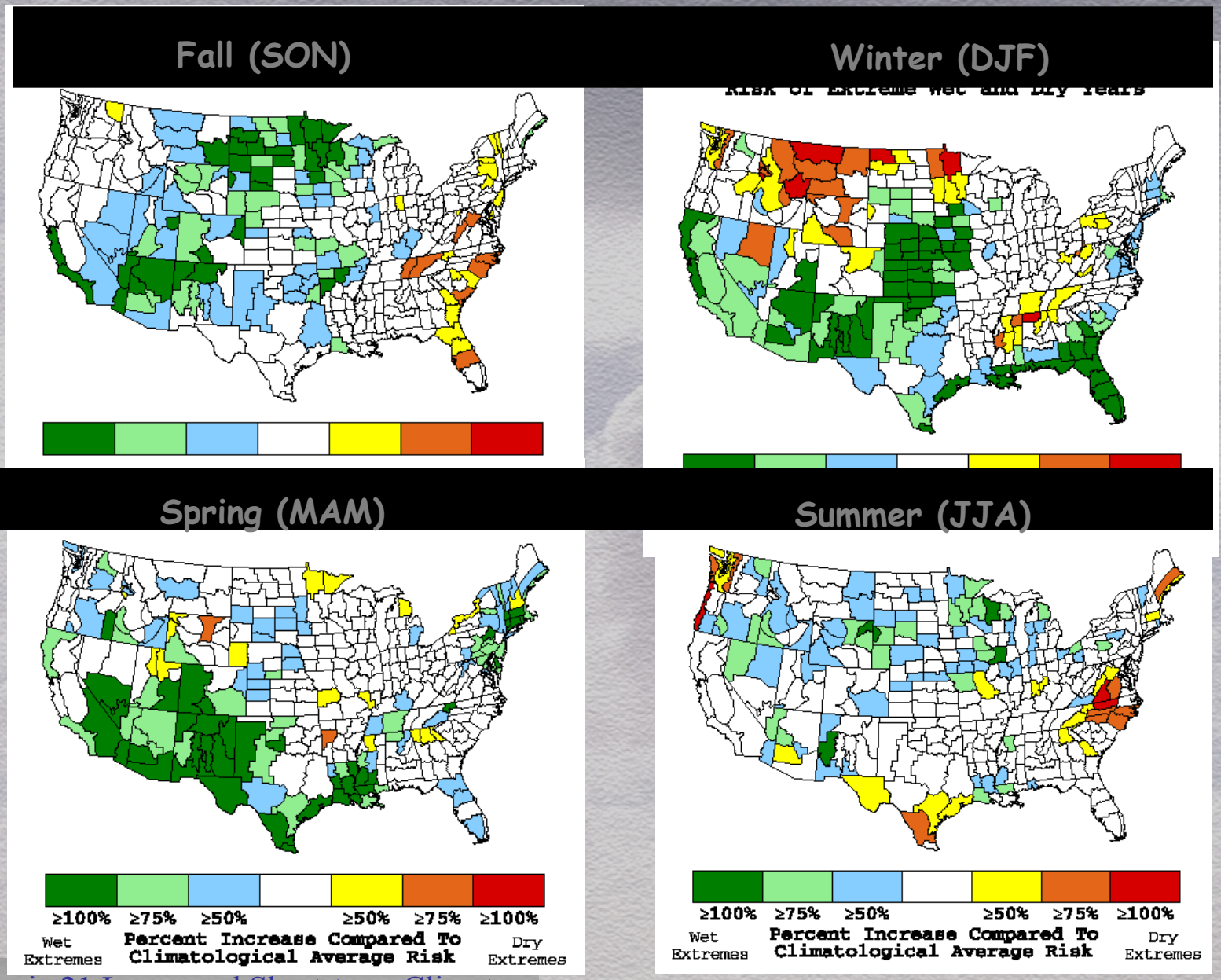


El Niño, La Niña and Global Average T

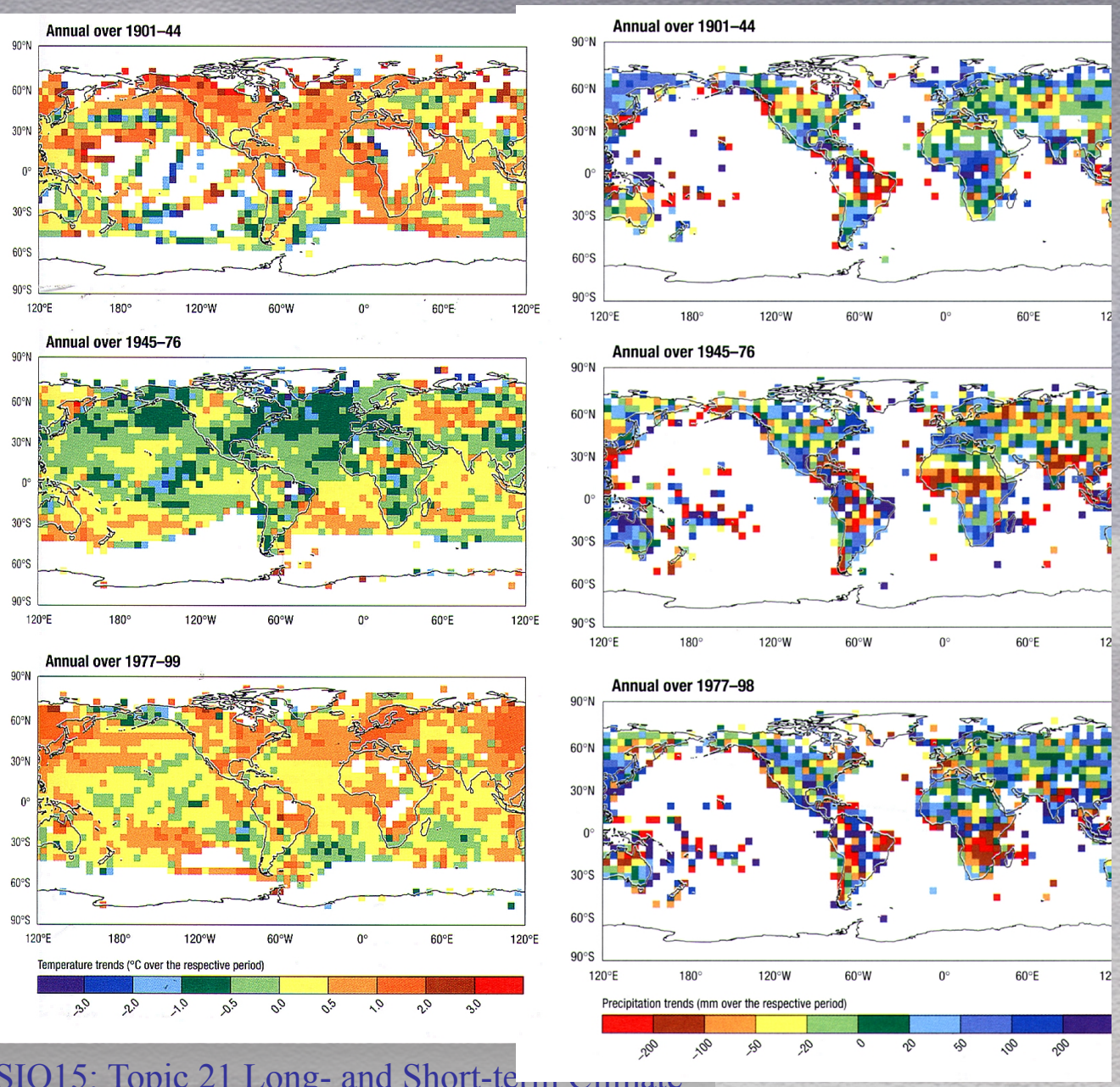


from NOAA

El Nino and Climate in the U.S.



Temperature and Precipitation last 100 years



- T is simple;
- precipitation is not!