El Niño Effects on Major World Crop Growing Areas

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OUTLINE

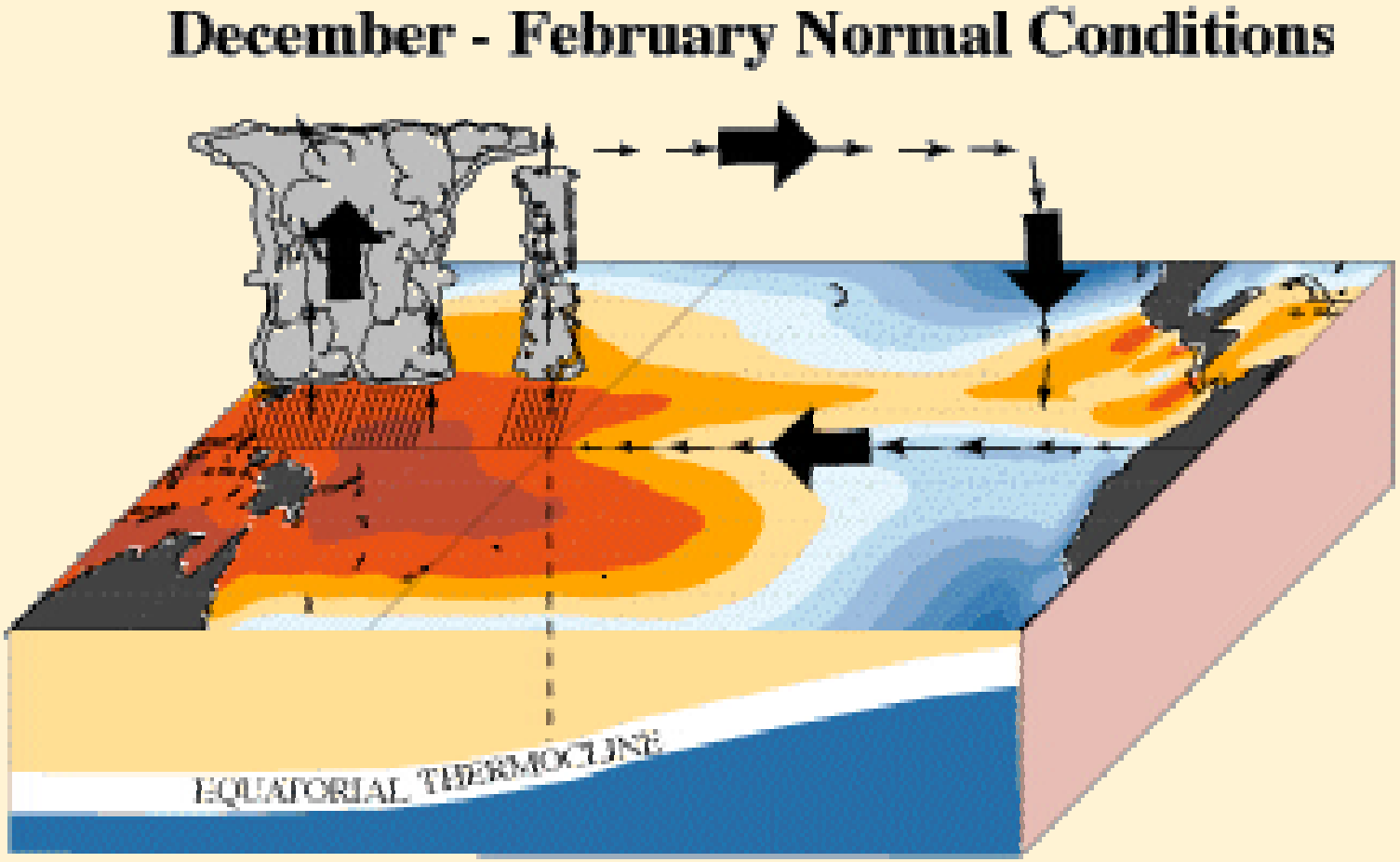
- A brief overview of ENSO
(El Niño /Southern Oscillation)

- Typical ENSO rainfall patterns

- A review of the 2002-03 global rainfall

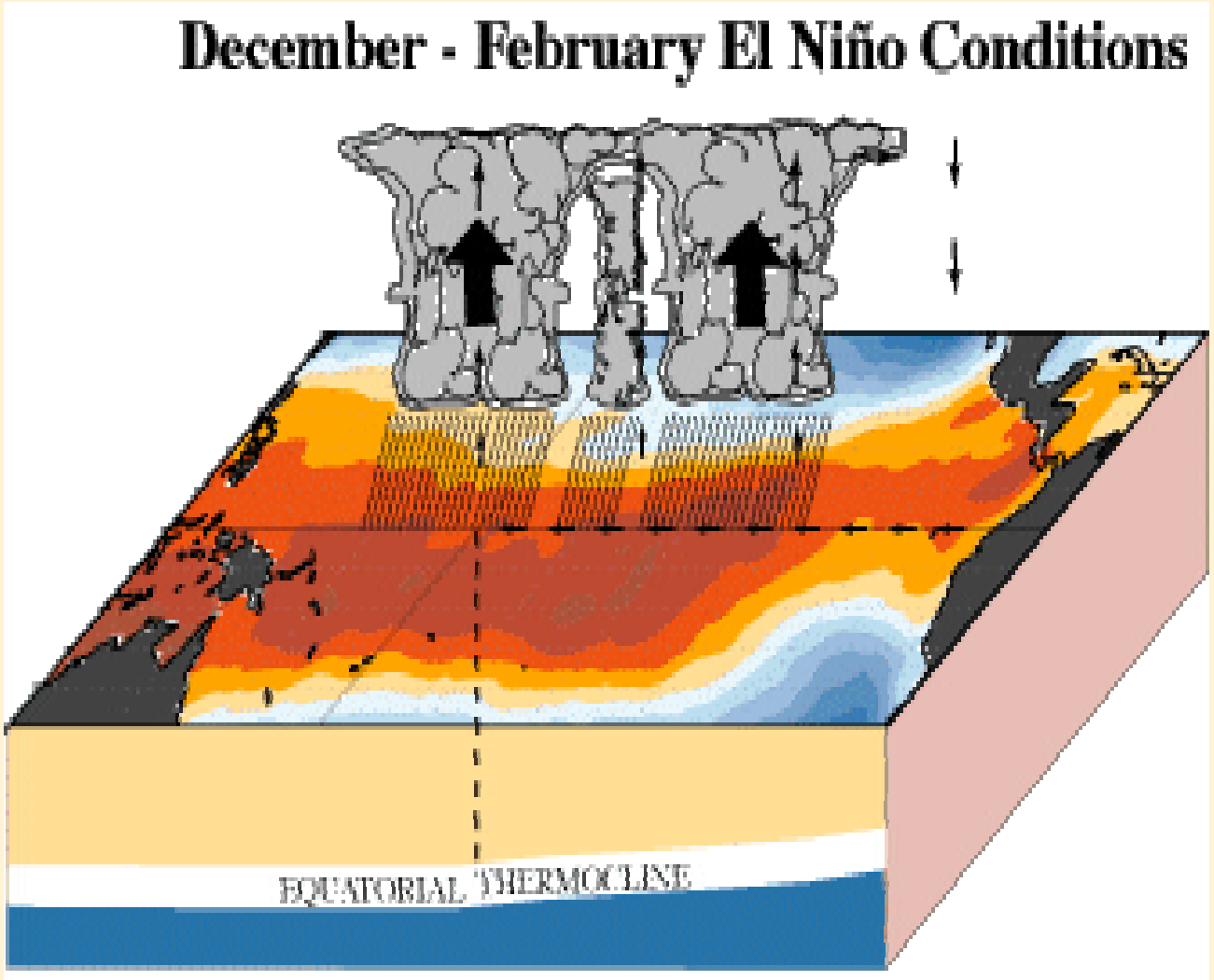
- A look at recent seasonal forecasts

Tropical Pacific – Average State

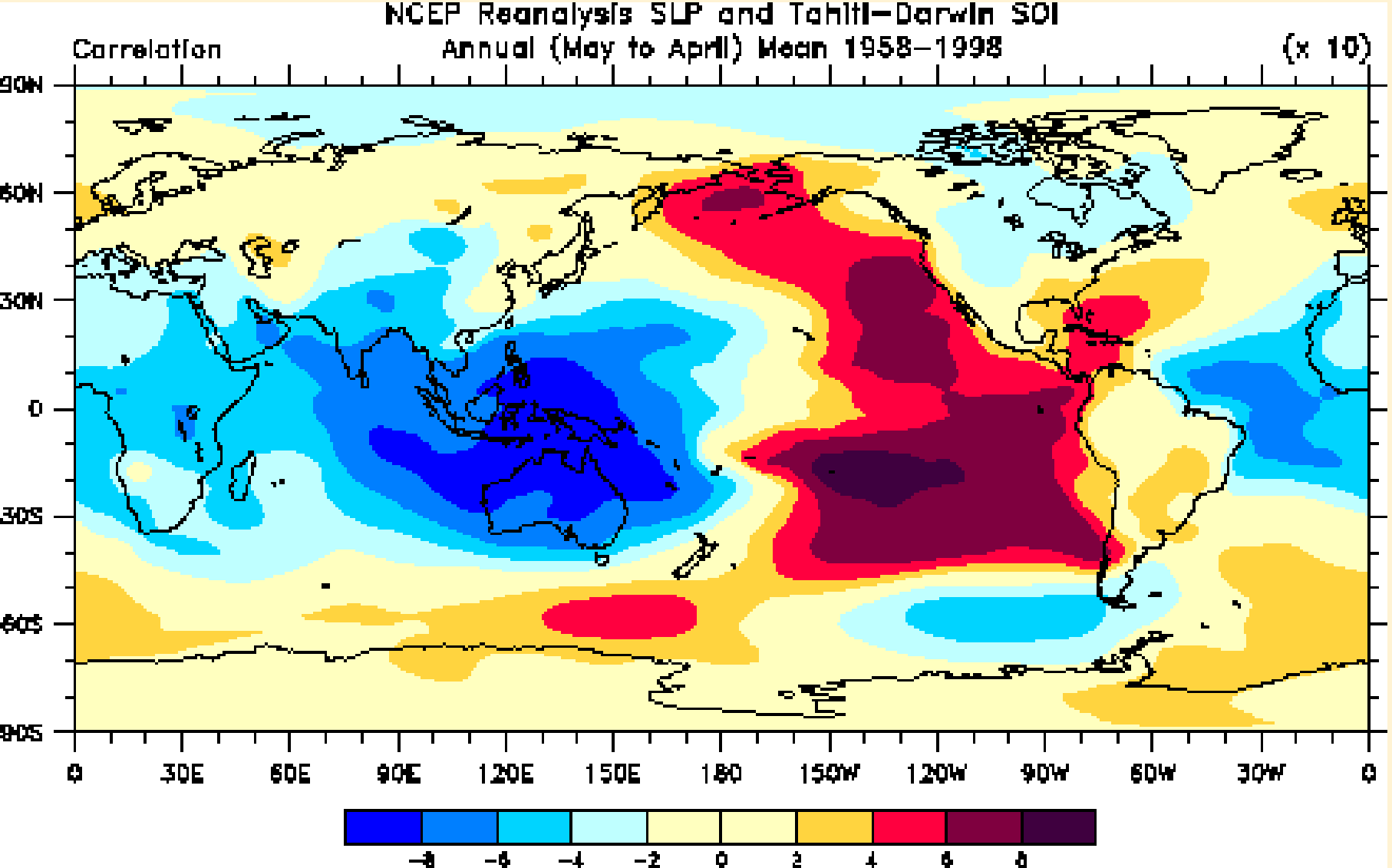


El Niño

Trade winds get weaker
Warm water flows back eastward
Convection moves eastward
Winds weaken further, etc.



The Southern Oscillation



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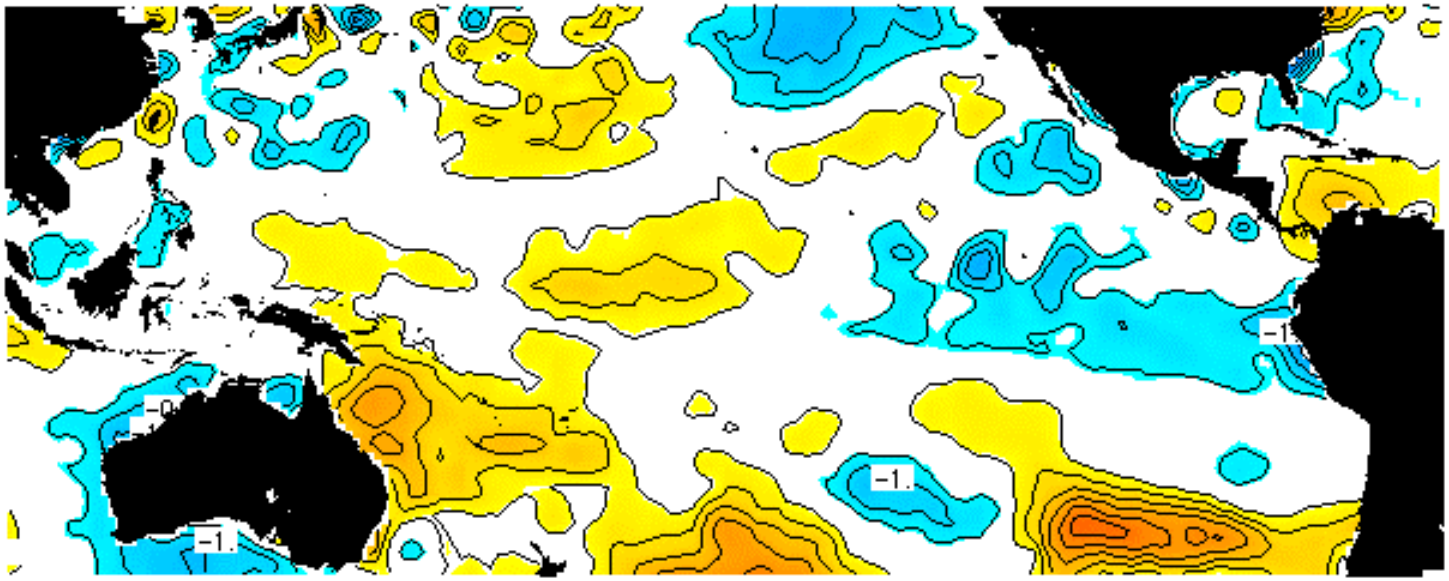
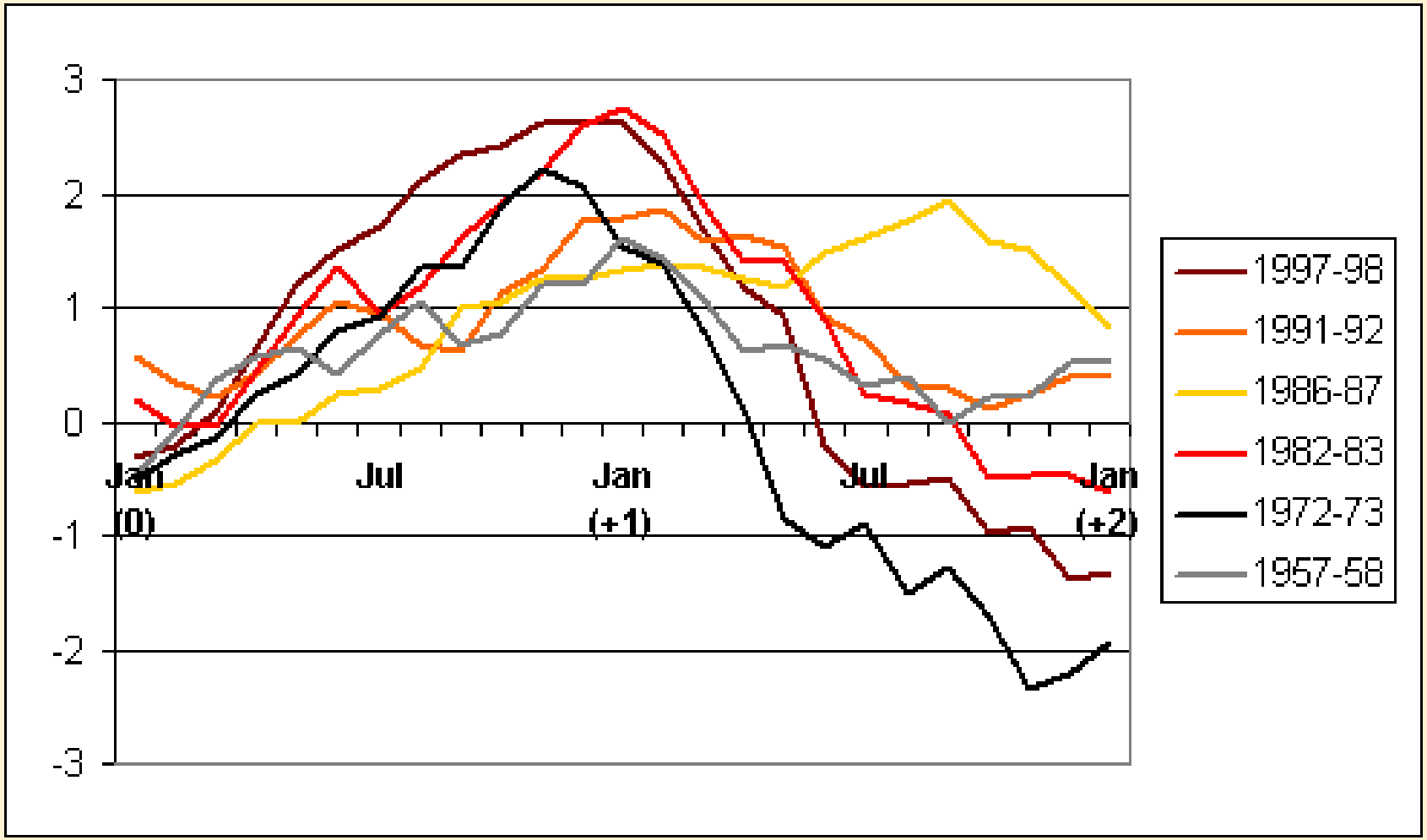
Animation SST

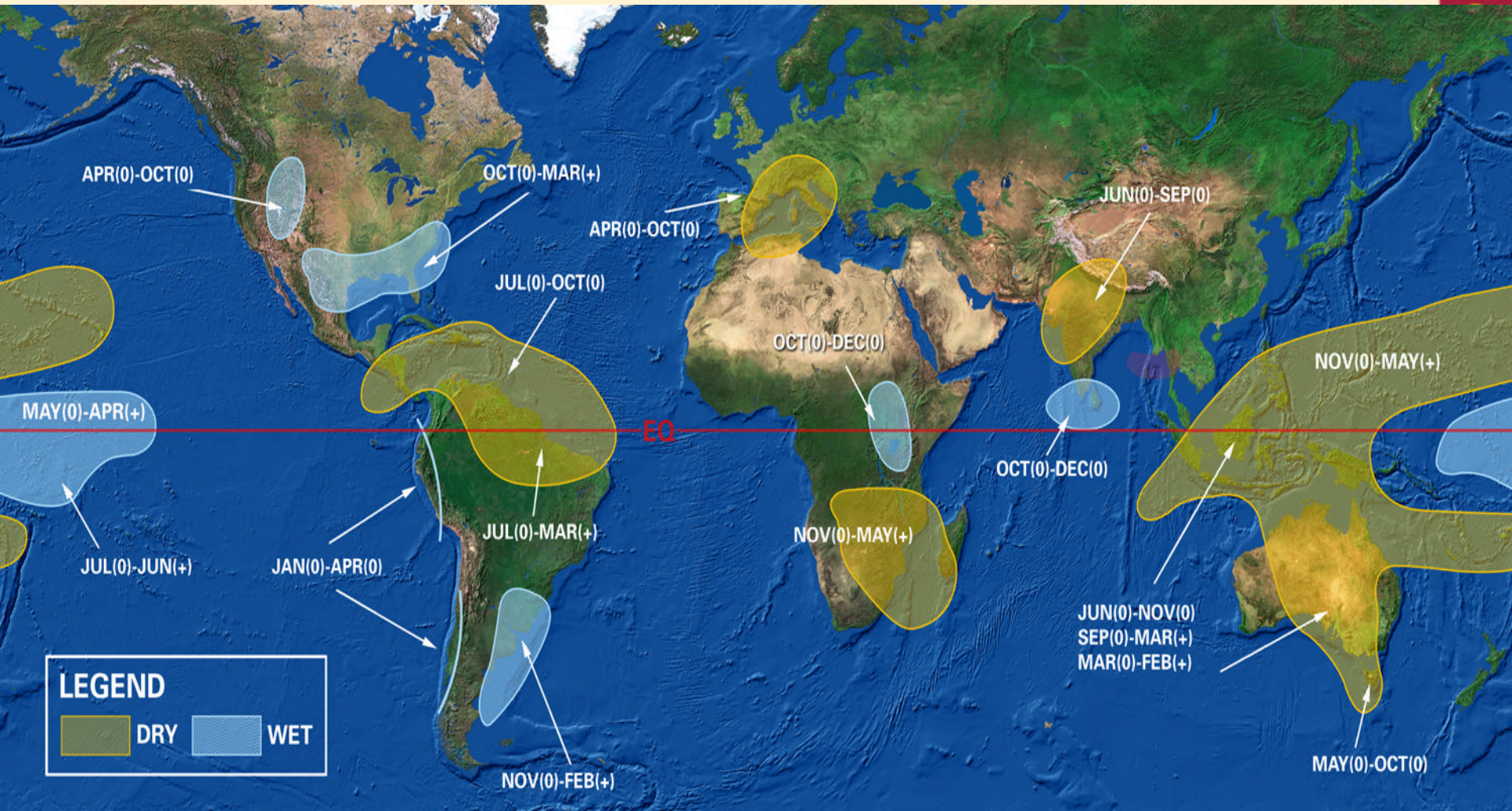


All El Niño
and
La Niña
episodes are unique,
but they share
Common features

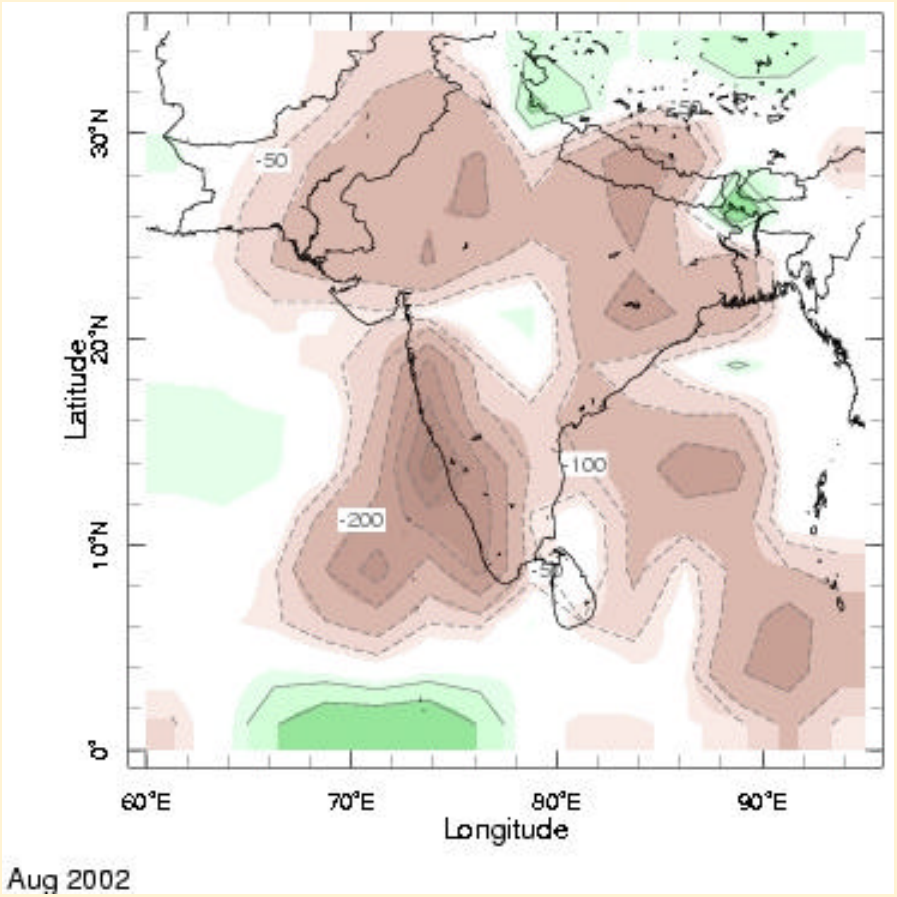
El Niño Events tend to peak near end of the year



Typical Rainfall Patterns associated with El Nino Episodes



2002 Failed Monsoon



- First failed monsoon since 1987
- Driest July on record
- Drought comparable to 1972

Southern Africa Drought

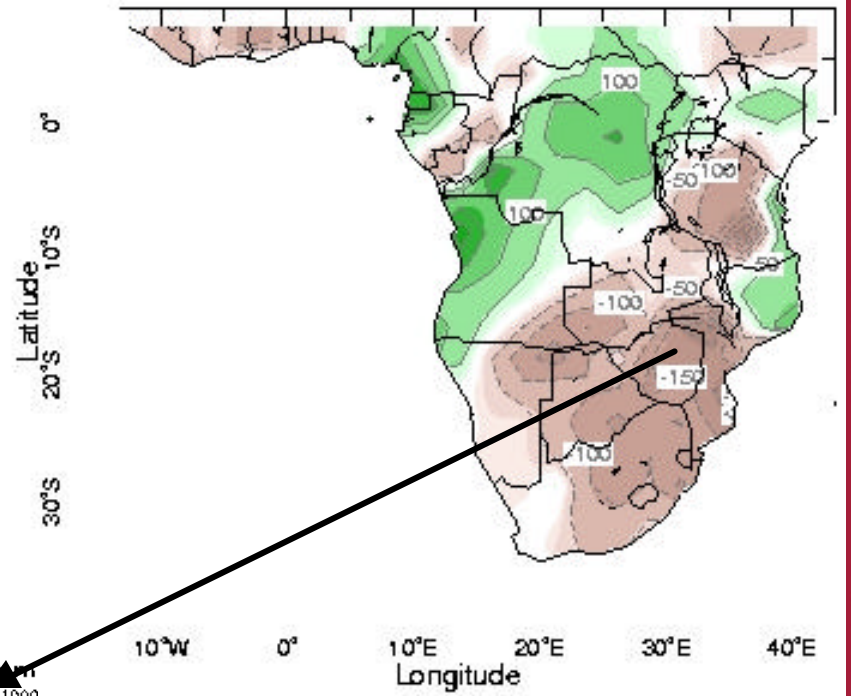
Jan-Apr 2002

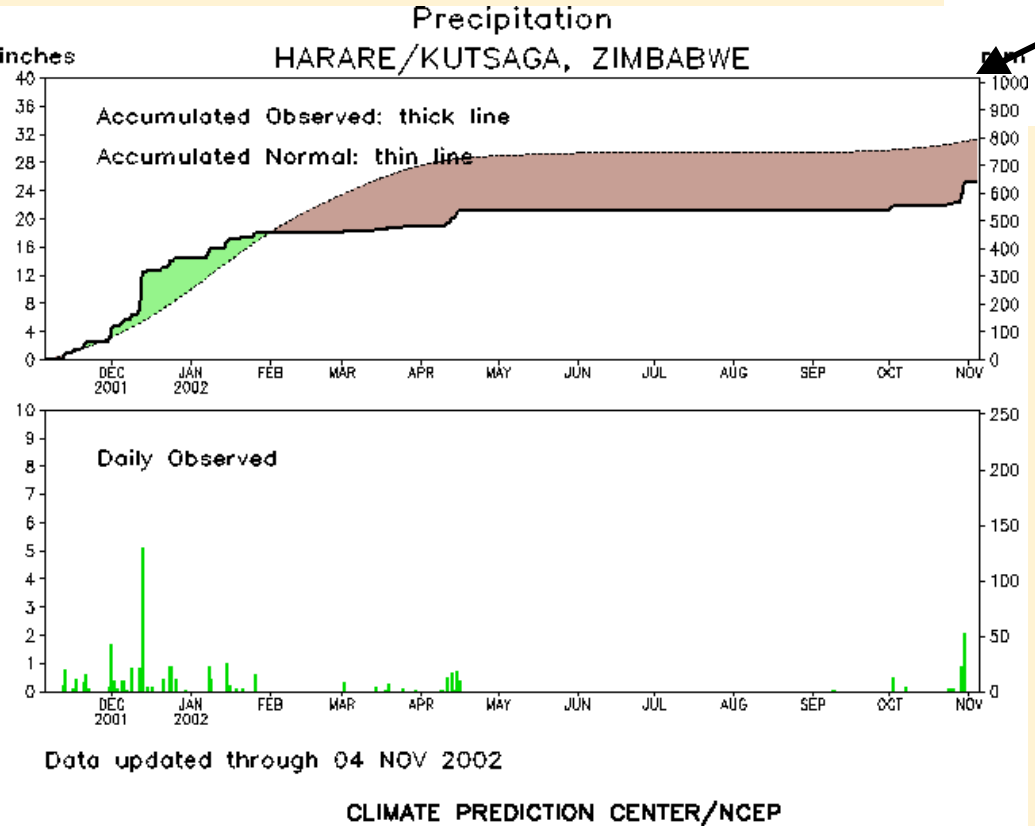
PRCP

Anomaly (mm)

Erratic end of rainy season

The coming El Nino?





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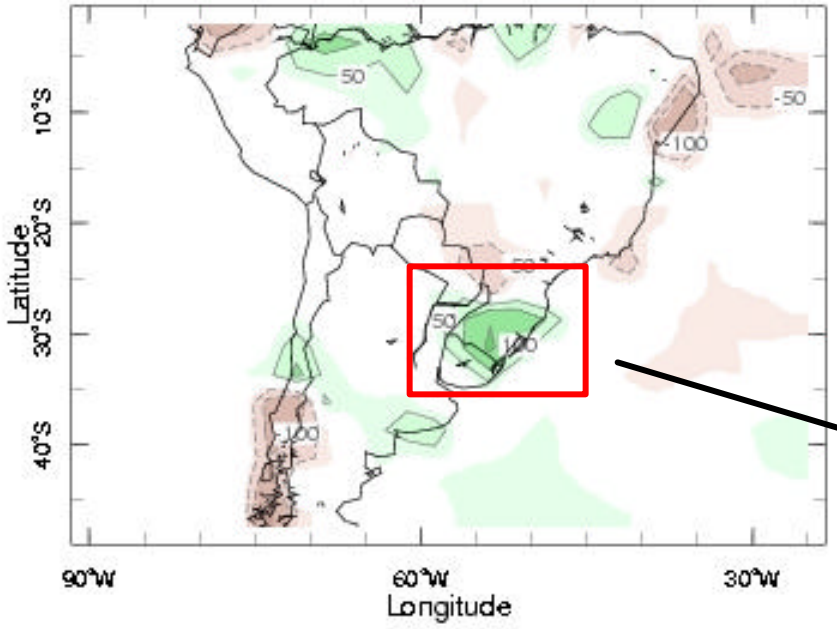
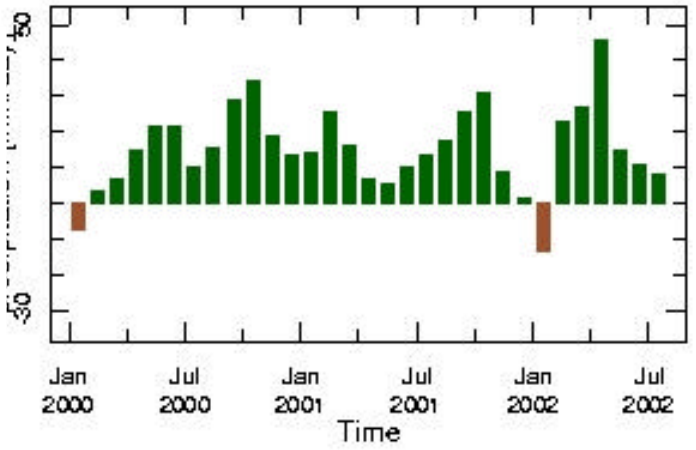
Prolonged Wet Spell SE South America



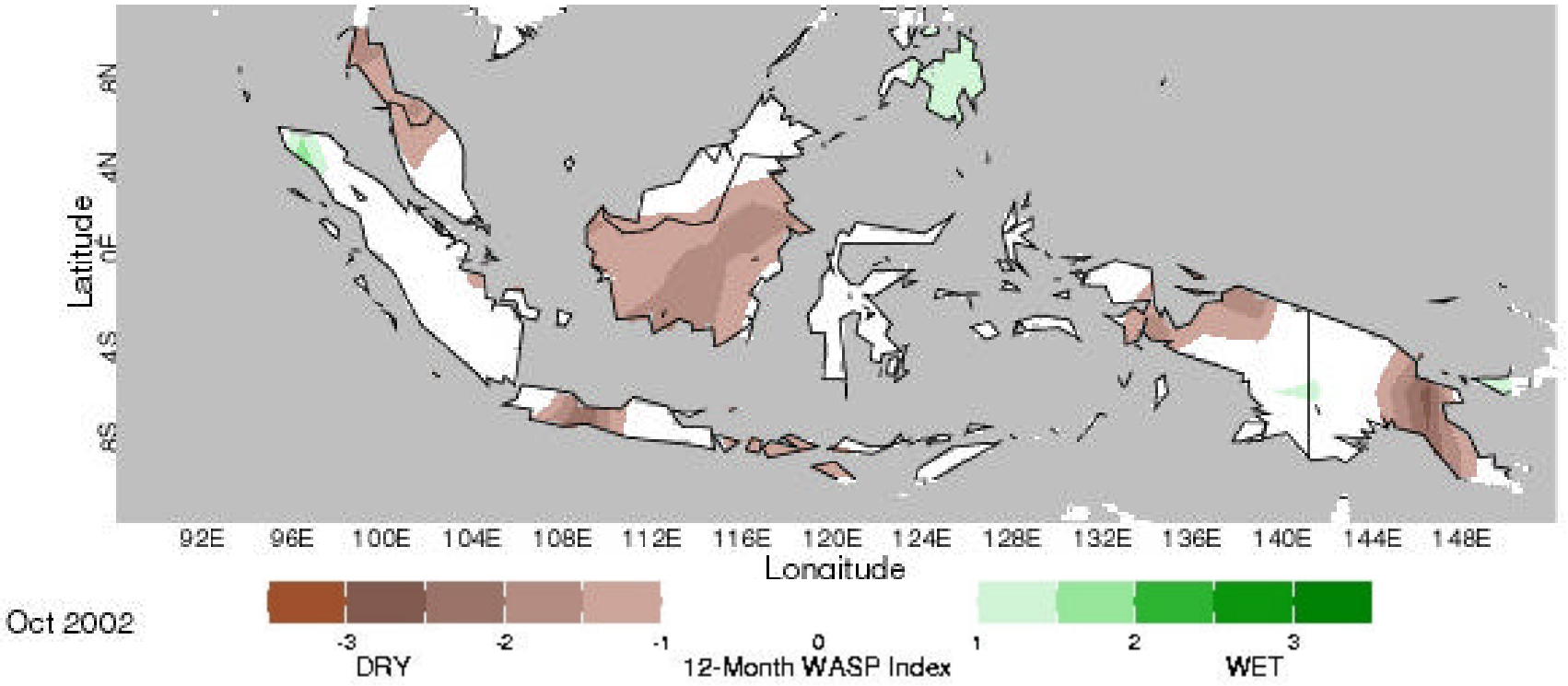
June – Aug PRCP anomaly (mm)

3-mo running average PRCP



Dry Conditions in Indonesia

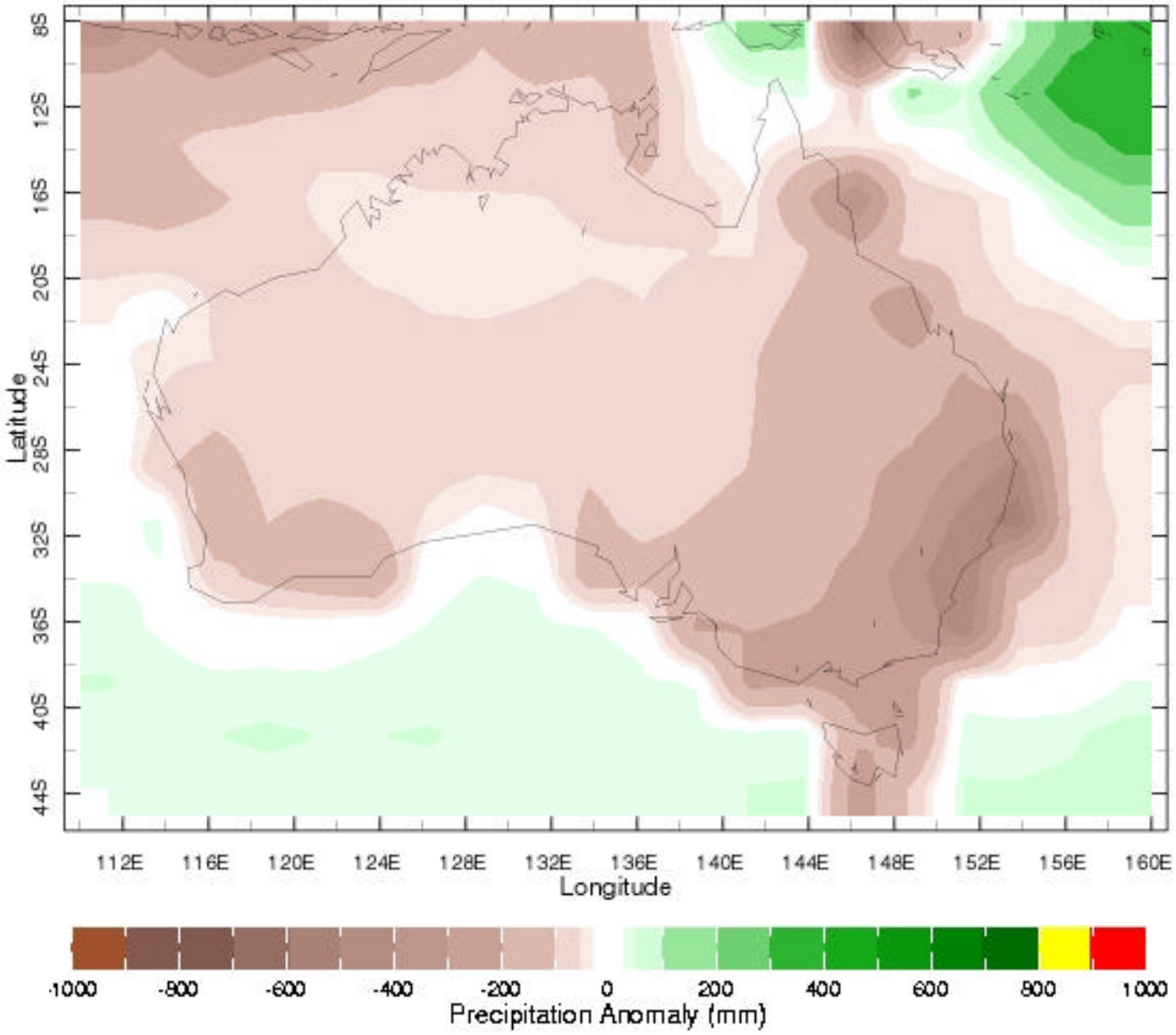
12-Month WASP Index, October 2002



WASP is an acronym for the *Weighted Anomaly Standardized Precipitation* index, which is based on monthly rainfall departures from the long-term (30-year) average.

- Very dry anomalies primarily in parts of Borneo and Java
- Deficits in the past year as large as 1000 mm

April-October 2002 Accumulated Precipitation Anomaly (mm, CAMS-OPI)

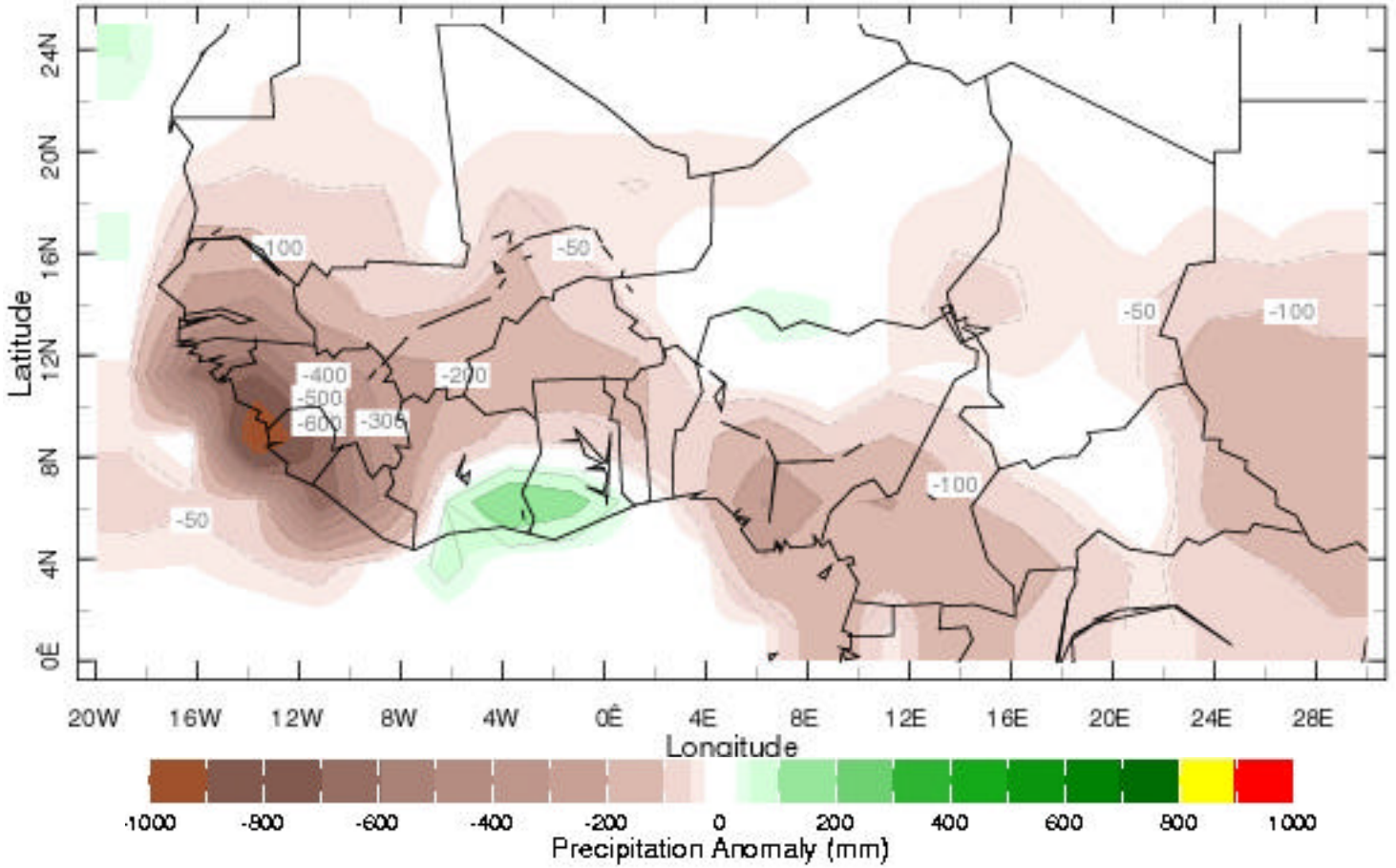


Australian Drought

Nearly 70% of Australia experienced April-October 2002 rainfall in the lowest 5% to 10% of the historical record for the period. In terms of extent and mean percentile, it was the **driest 7-month period** observed for the country as a whole. The areas most seriously affected are in the southern half of the country. (Australian BOM)

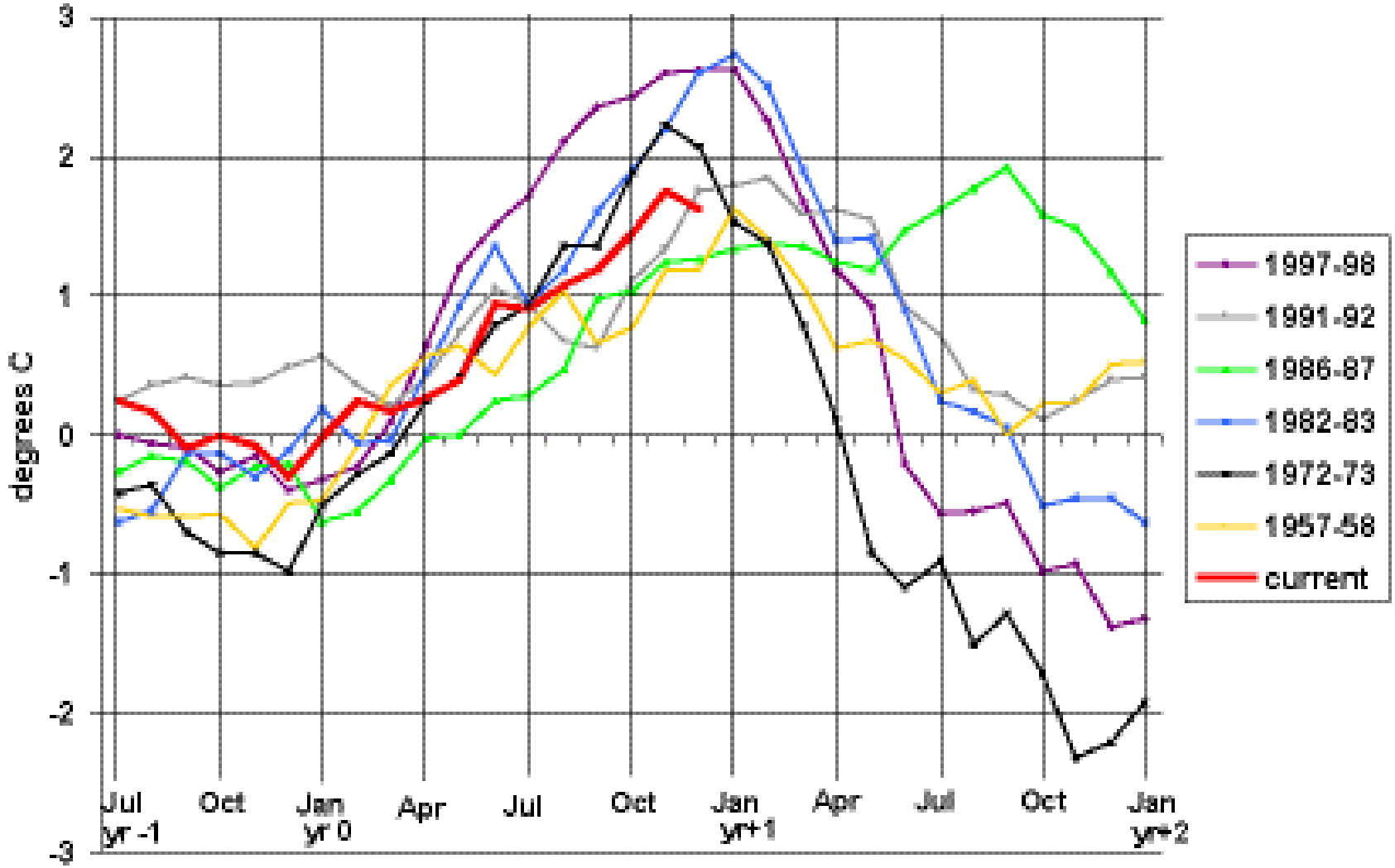
Dry Western Sahel, 2002 Rainy Season

July-September 2002 Accumulated Precipitation Anomaly (mm, CAMS-OPI)

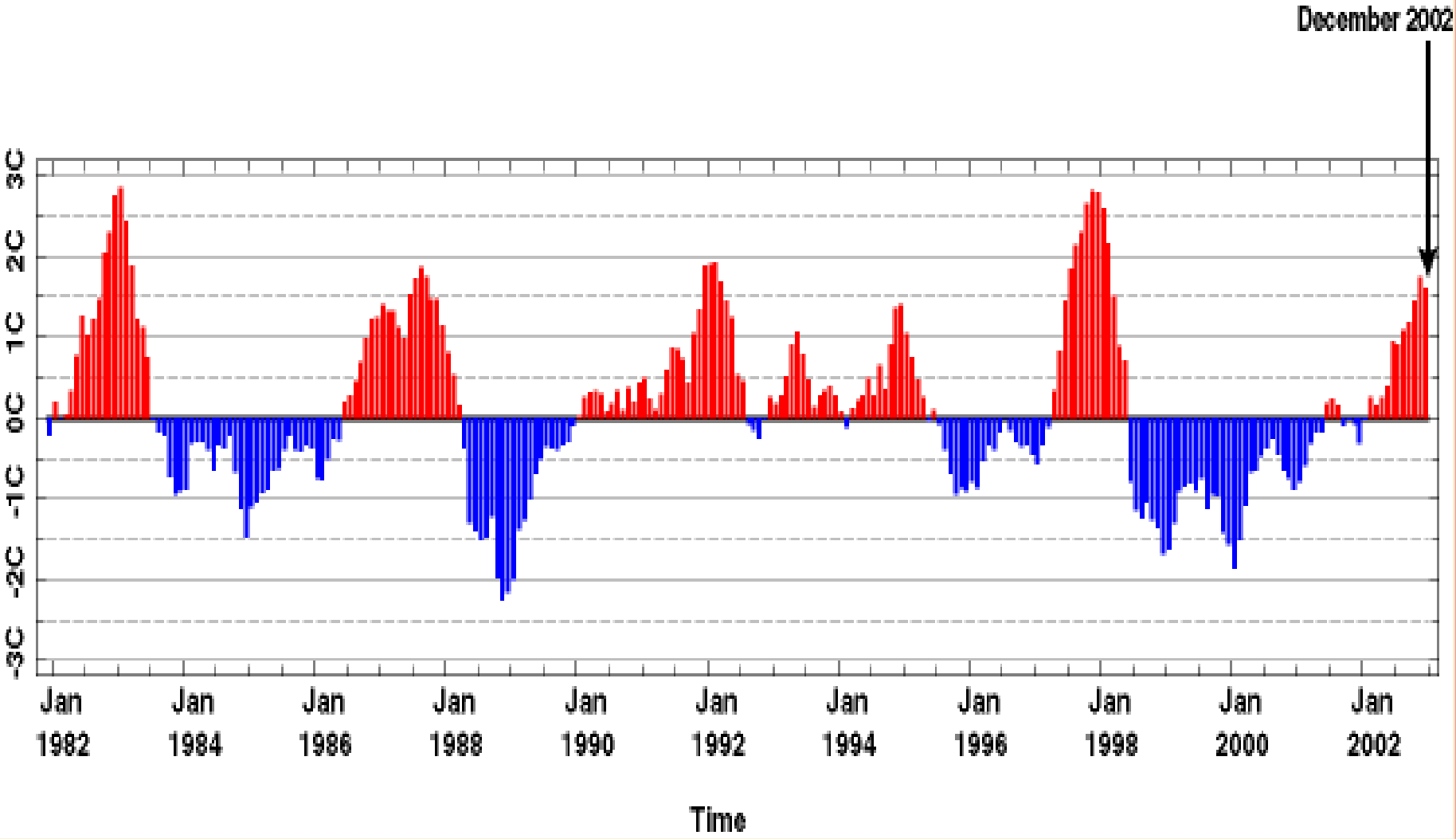


Some stations in Senegal and Mauritania received just 25% to 50% of their normal precipitation

Current Conditions vs. Past El Niño



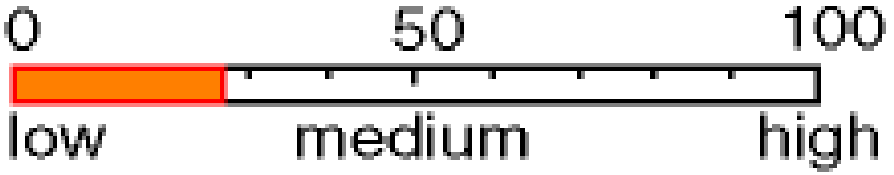
Historical Sea Surface Temperature Index **



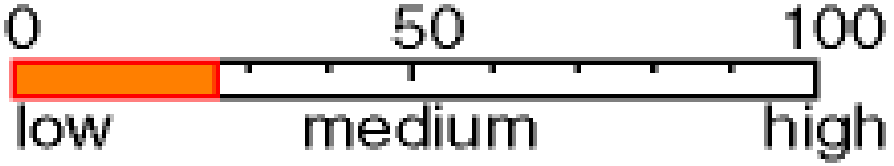
Current ENSO Forecast Summary *

Forecast Period: June 2003 - August 2003

- **Probability of El Niño**



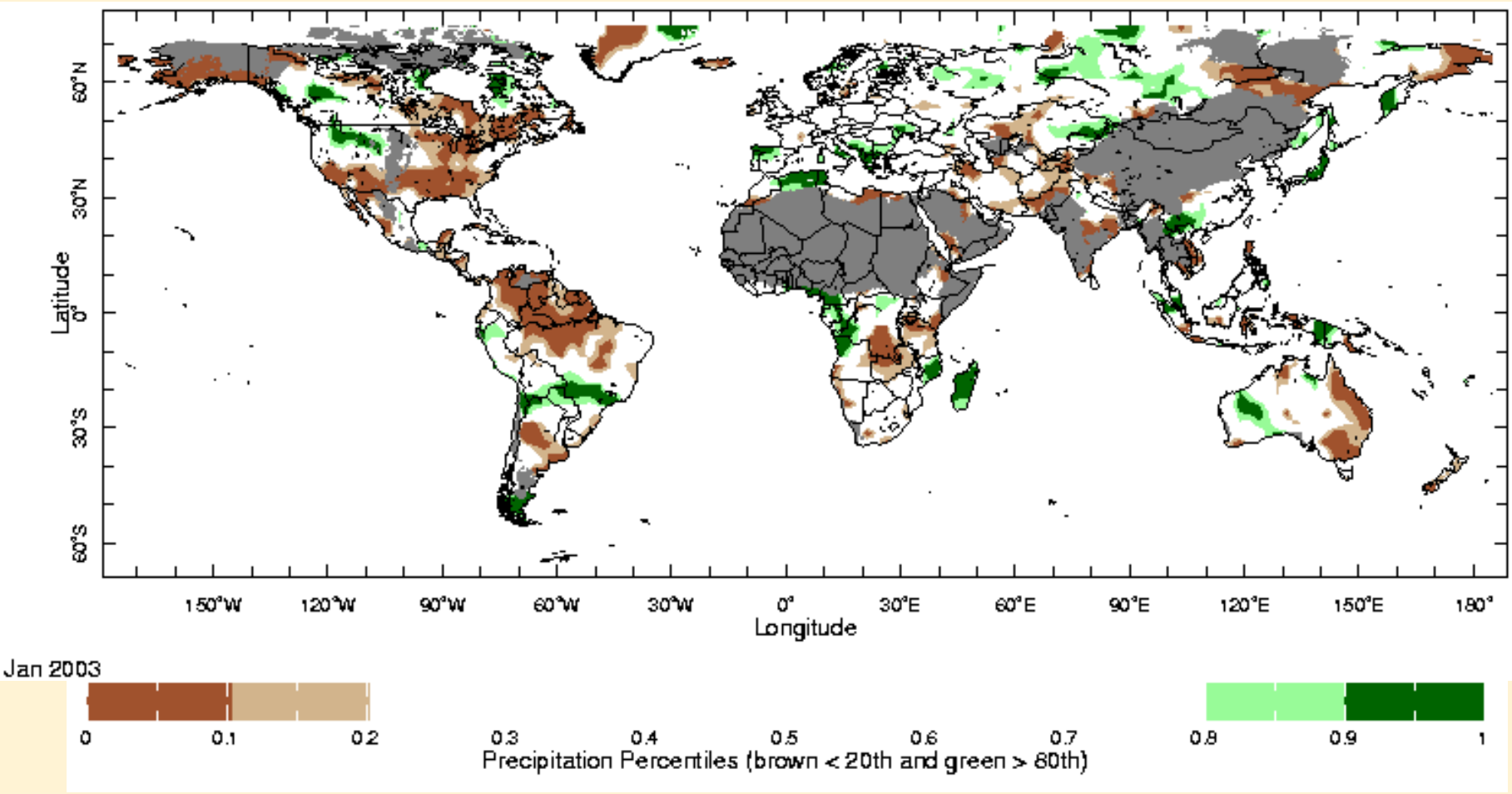
- **Probability of La Niña**



- **Probable Magnitude of Event**

(not applicable)

Precipitation Percentiles
January 2003



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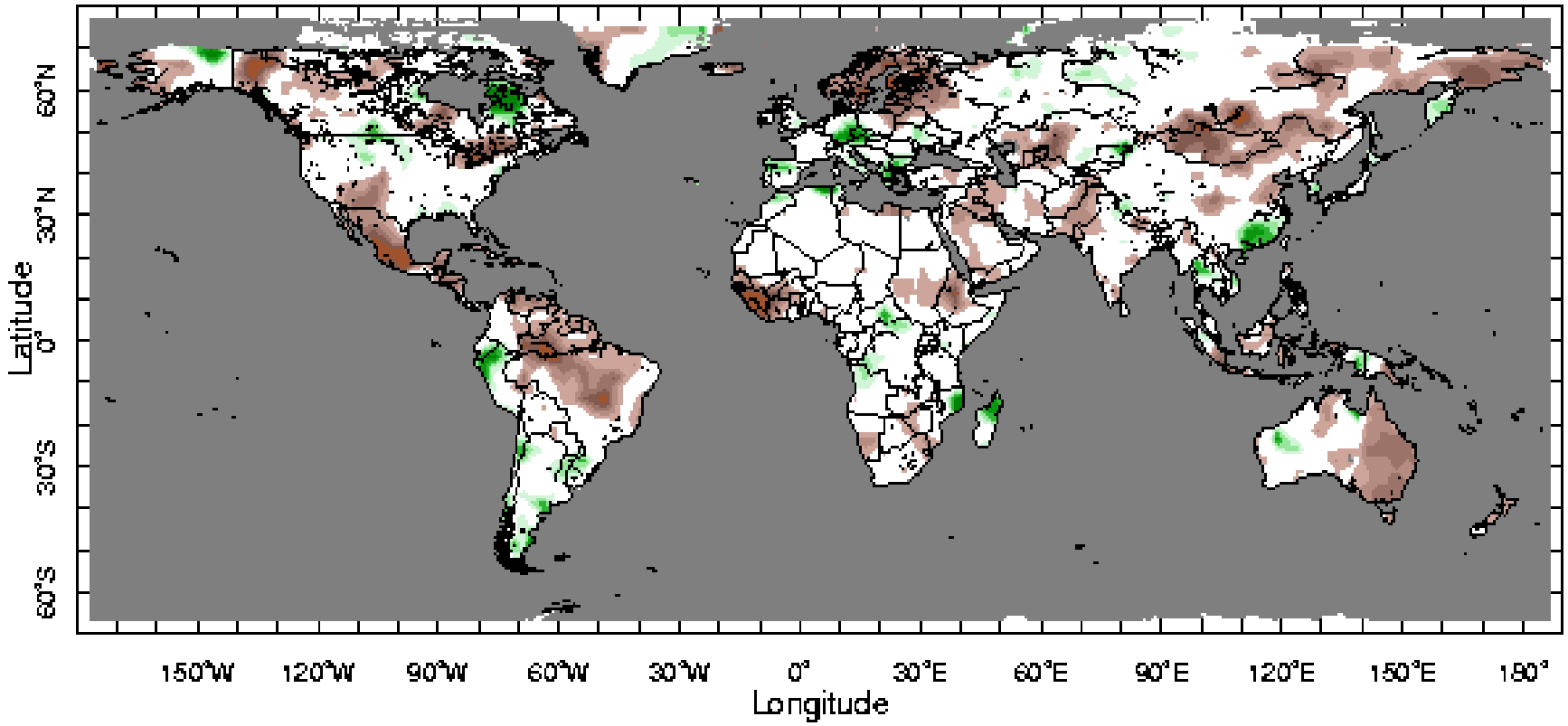
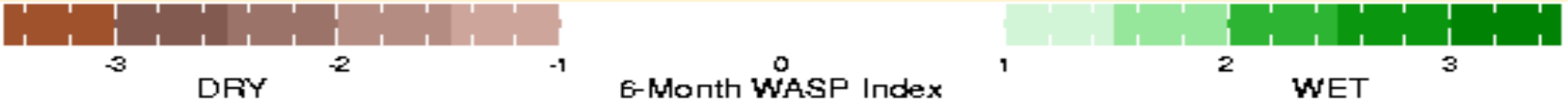
Weighted Anomaly Standardized Precip (WASP)

6 Months (Aug-Jan)



Aug-Jan 2003



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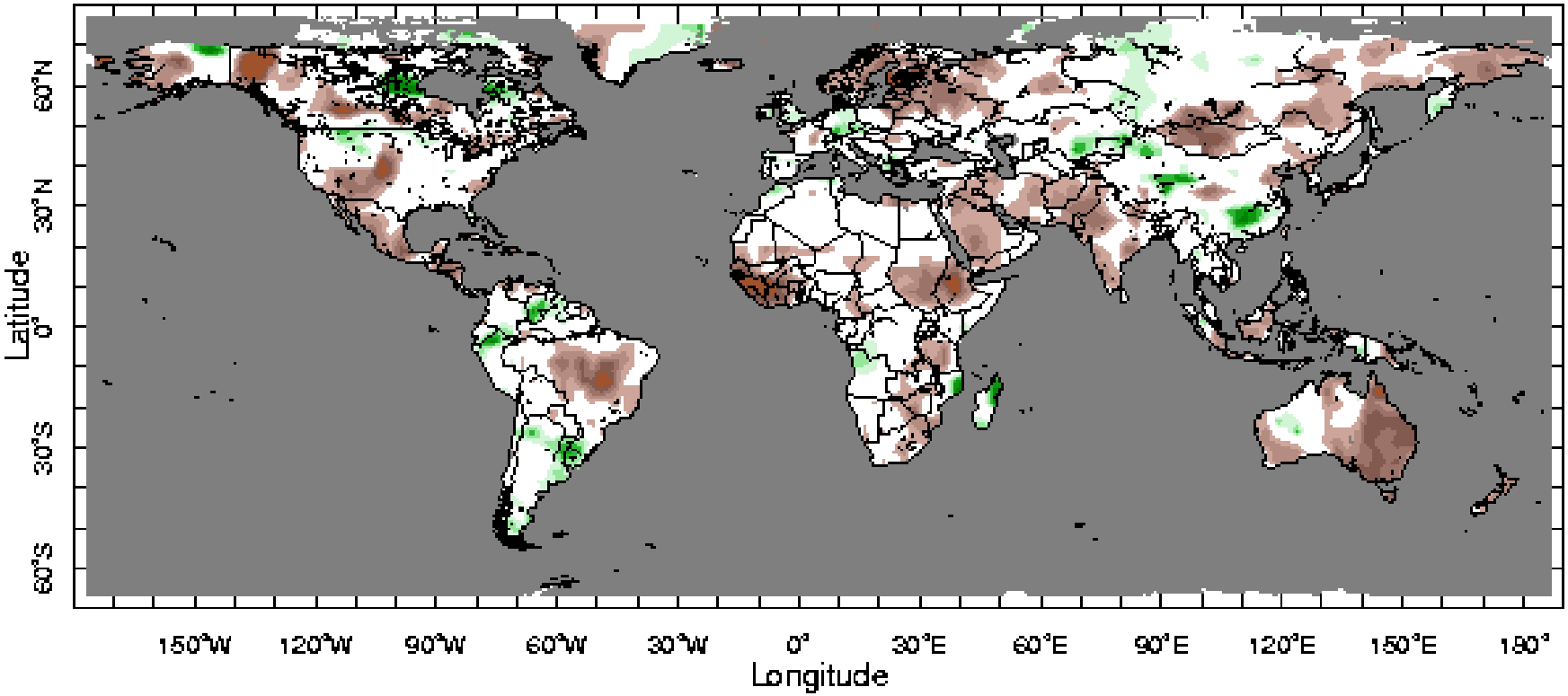
12 Month WASP
Feb 2002 to Jan 2003

WASP INDEX LEGEND

- (> +3) Extremely Wet
- (+2 to +3) Very Wet
- (+1 to +2) Moderately Wet
- (+1 to -1) Near-Normal
- (-1 to -2) Moderately Dry
- (-2 to -3) Very Dry
- (< -3) Extremely Dry



Feb-Jan 2003

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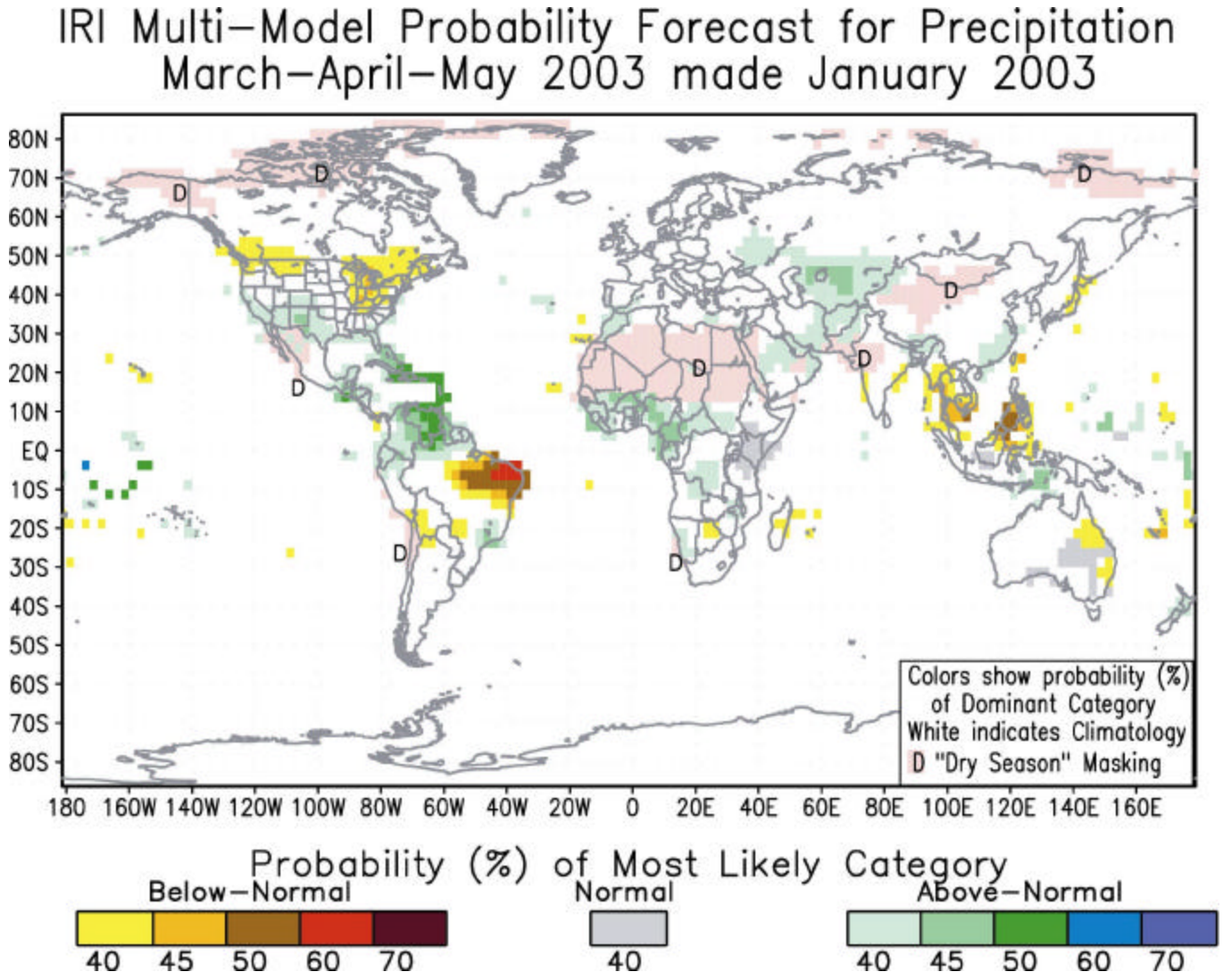
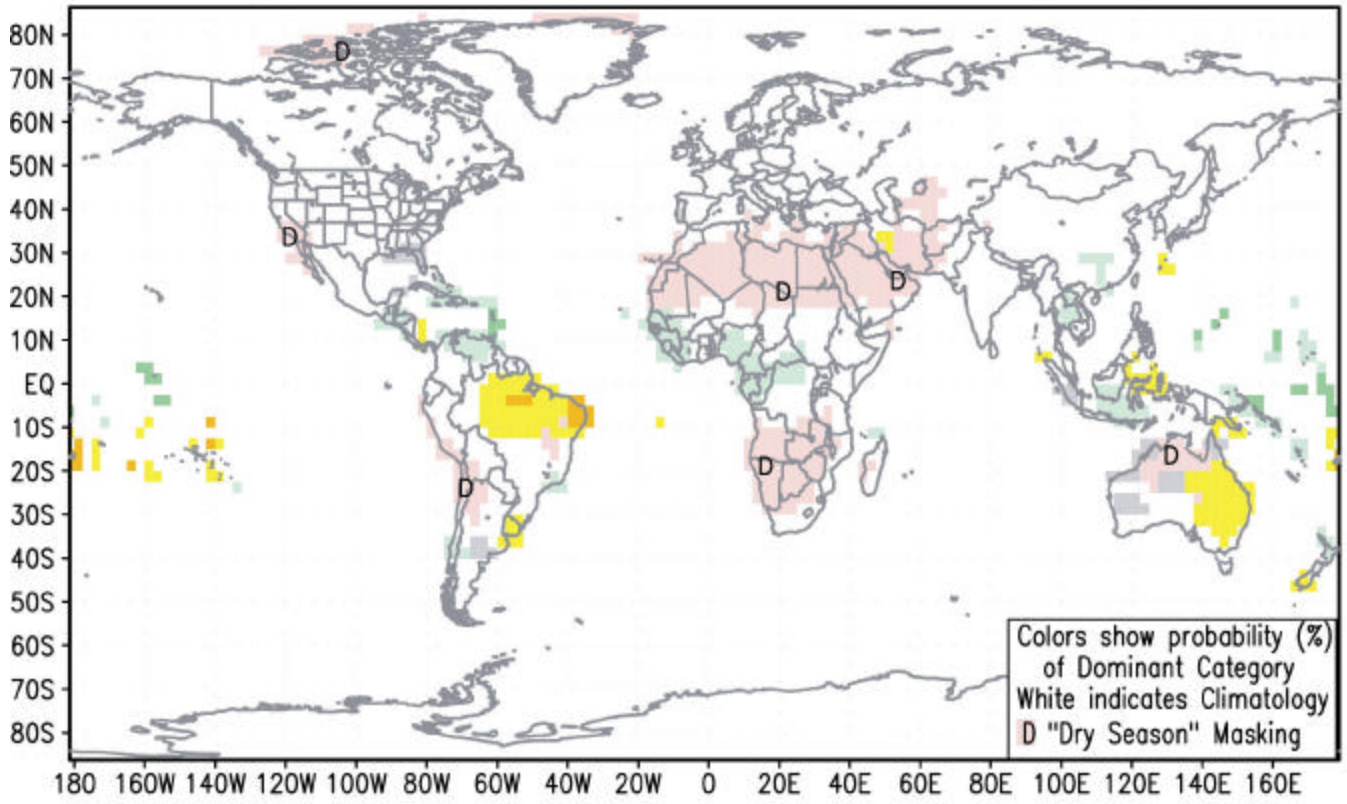

IRI Multi-Model Probability Forecast for Precipitation
March-April-May 2003 made January 2003
80N
70N
60N
50N
40N
30N
20N
10N
EQ
10S
20S
30S
40S
50S
60S
70S
80S
180 160W 140W 120W 100W 80W 60W 40W 20W 0 20E 40E 60E 80E 100E 120E 140E 160E
D
Colors show probability (%)
of Dominant Category
White indicates Climatology
D "Dry Season" Masking
Probability (%) of Most Likely Category
Below-Normal
40 45 50 60 70
Normal
40
Above-Normal
40 45 50 60 70

IRI Multi-Model Probability Forecast for Precipitation
May-June-July 2003 made January 2003



Probability (%) of Most Likely Category

Summary

- No two El Nino Episodes are exactly alike
- Nonetheless, consistent broad patterns of rainfall (and temperature) tend to occur in association with ENSO
- The 2002-2003 El Nino Episode was a moderate event with many of the typical rainfall anomalies
- The 2002-2003 Episode is expected too decrease in strength and be over by late NH spring.