Oceanos Tropicais e Chuva no Nordeste

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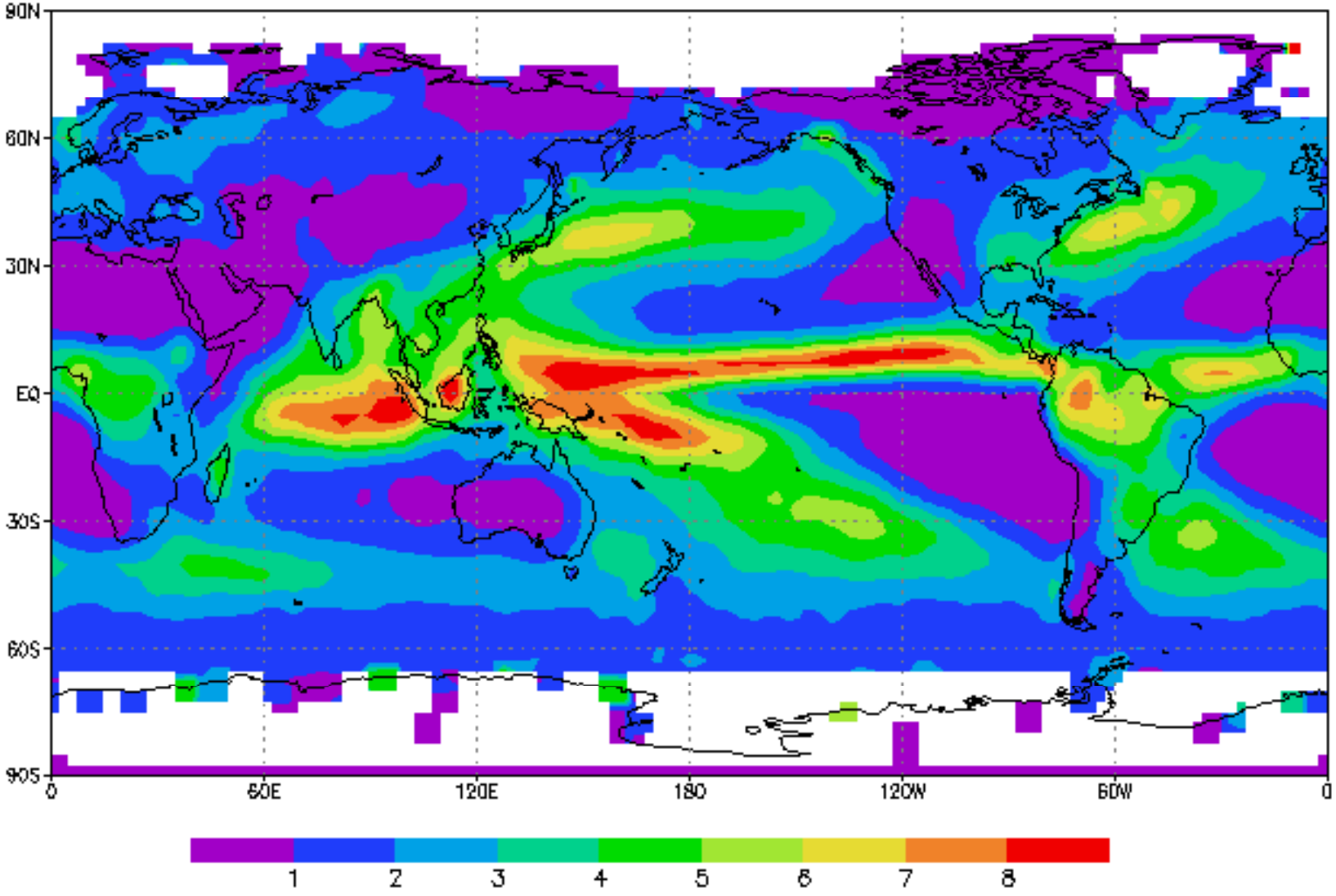
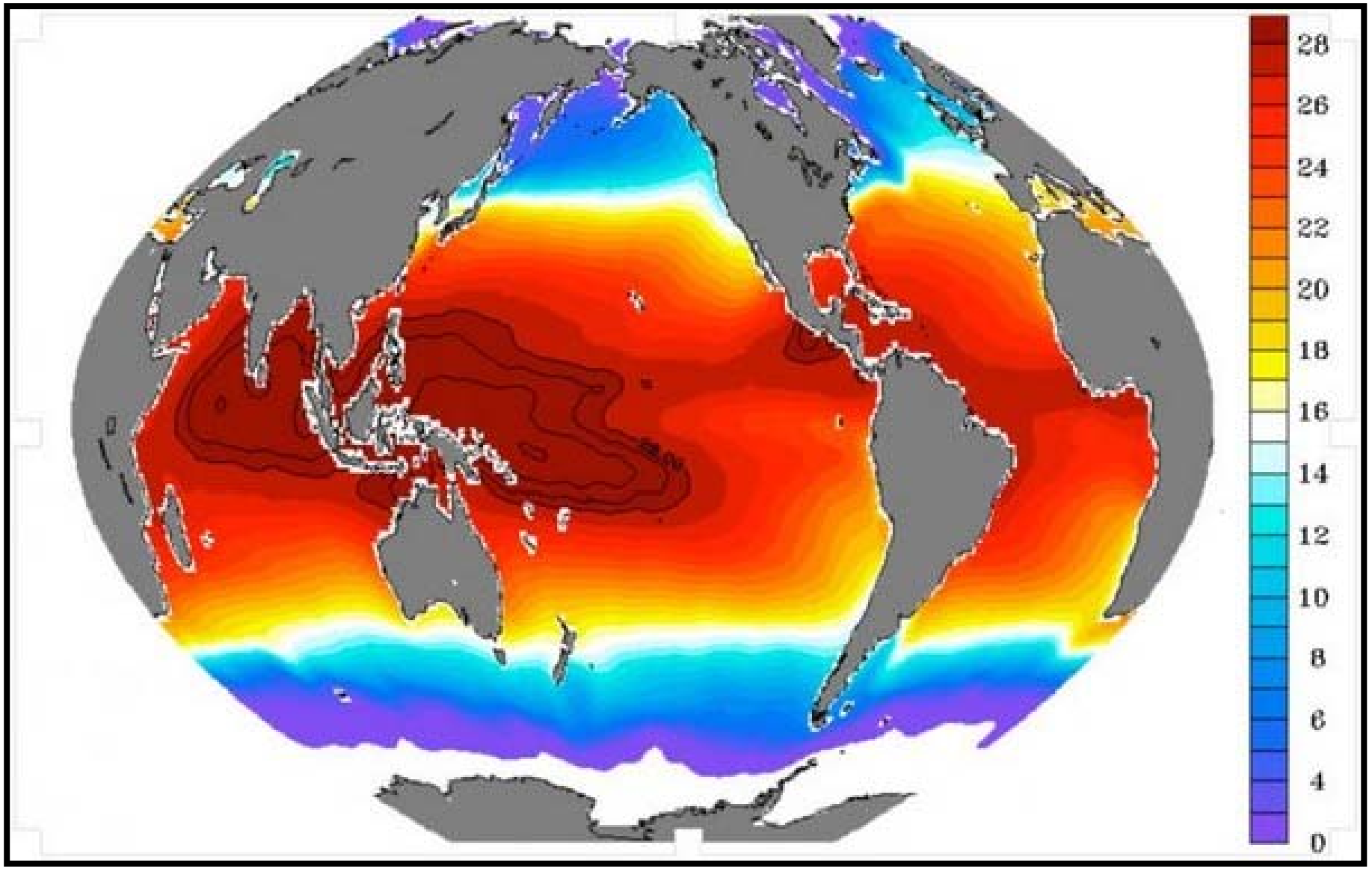
XVIII BRAZILIAN WATER RESOURCES SYMPOSIUM

Campo Grande city - Brazil, November 22 to 26, 2009

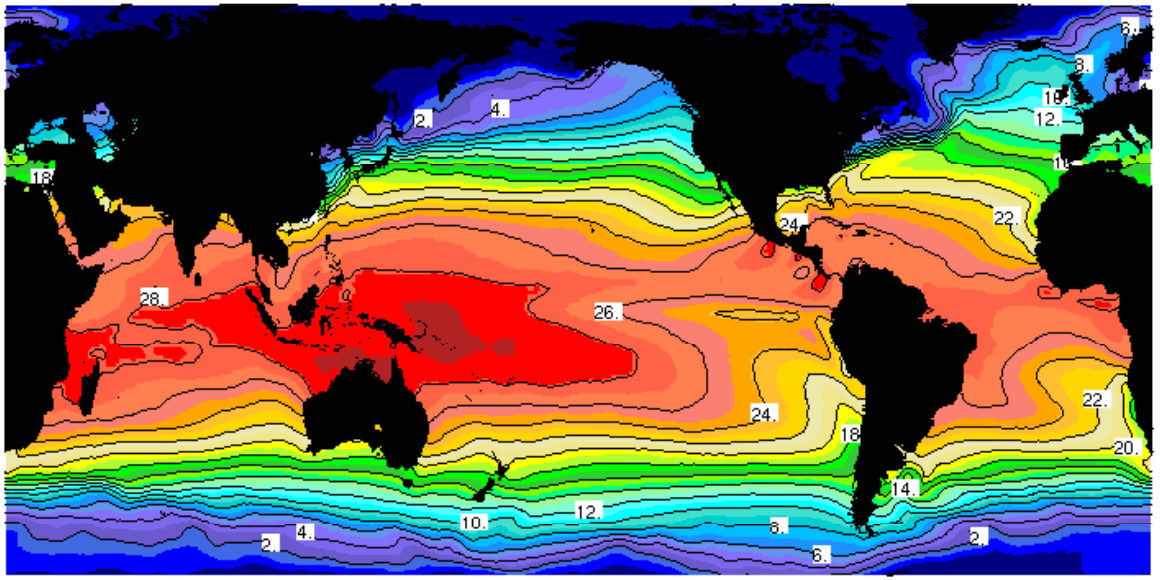
Precipitação Média Anual (mm/dia)



Média Anual daTemperatura de Superficie do Mar (TSM)



Chuva e TSM



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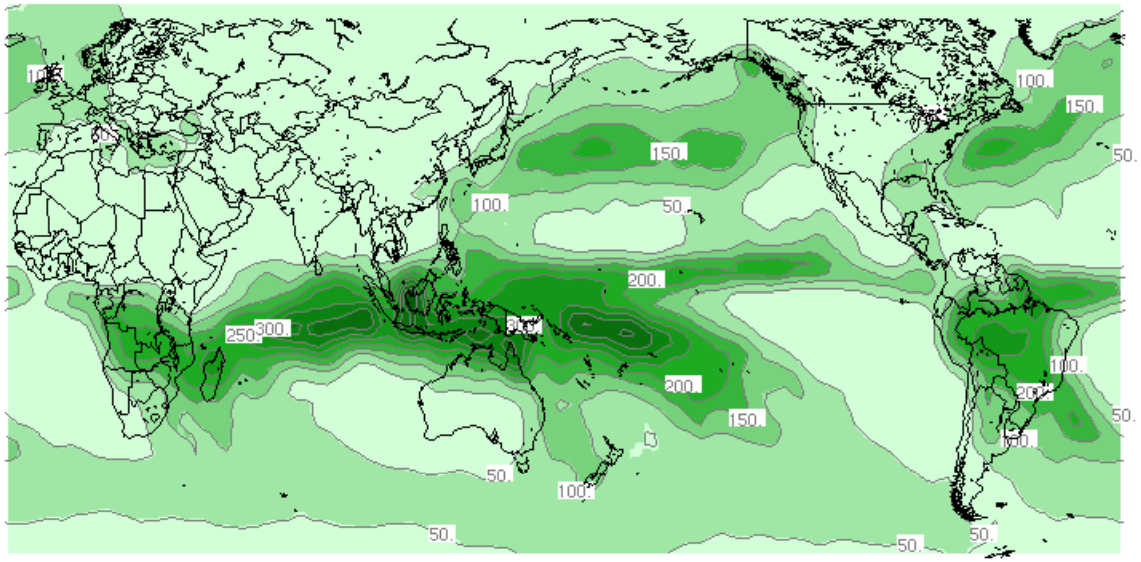
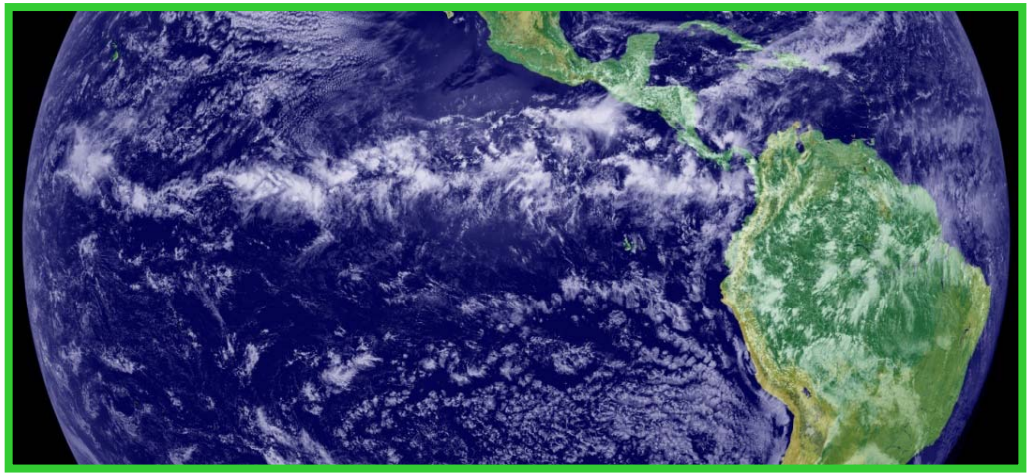
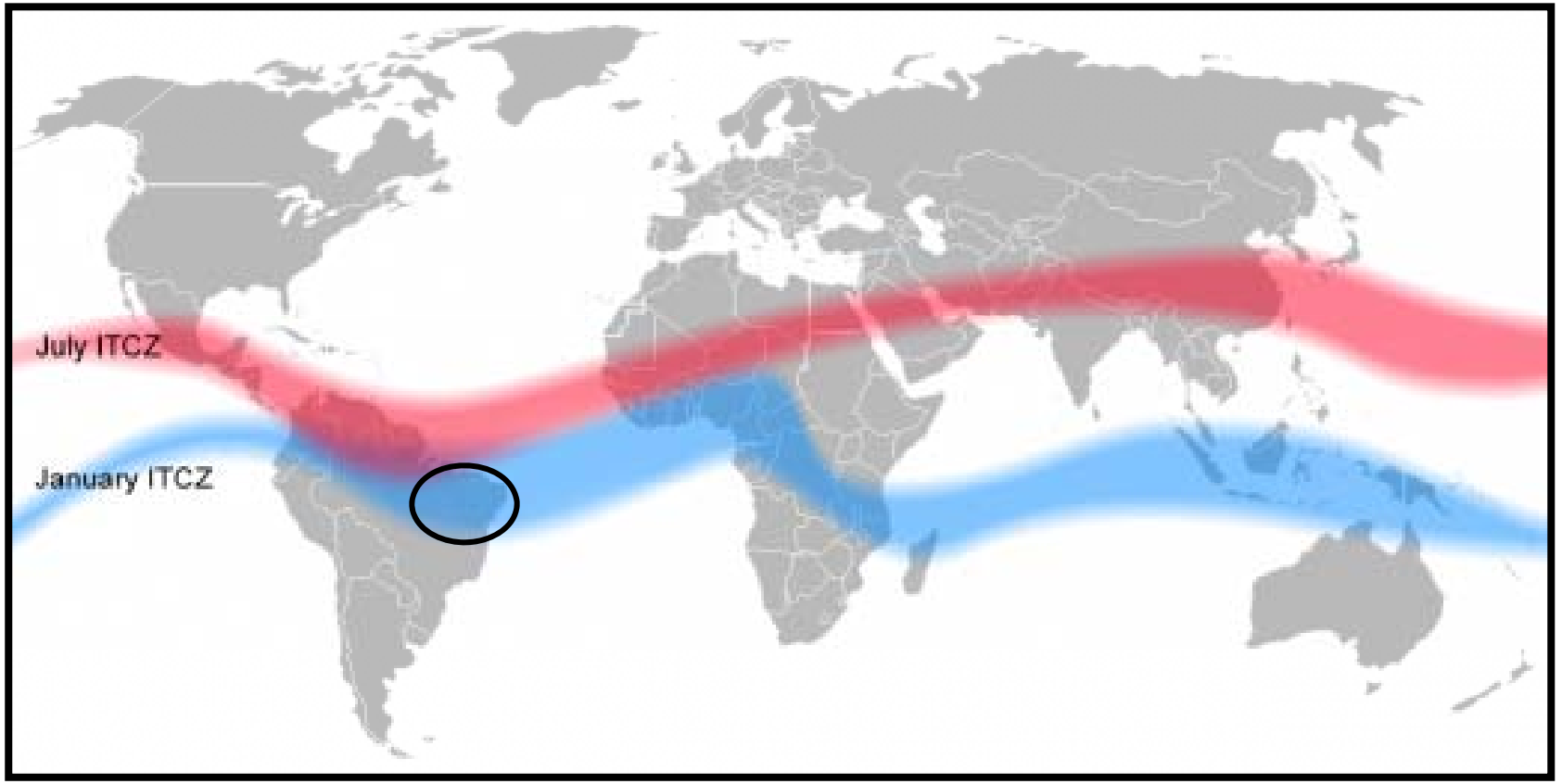


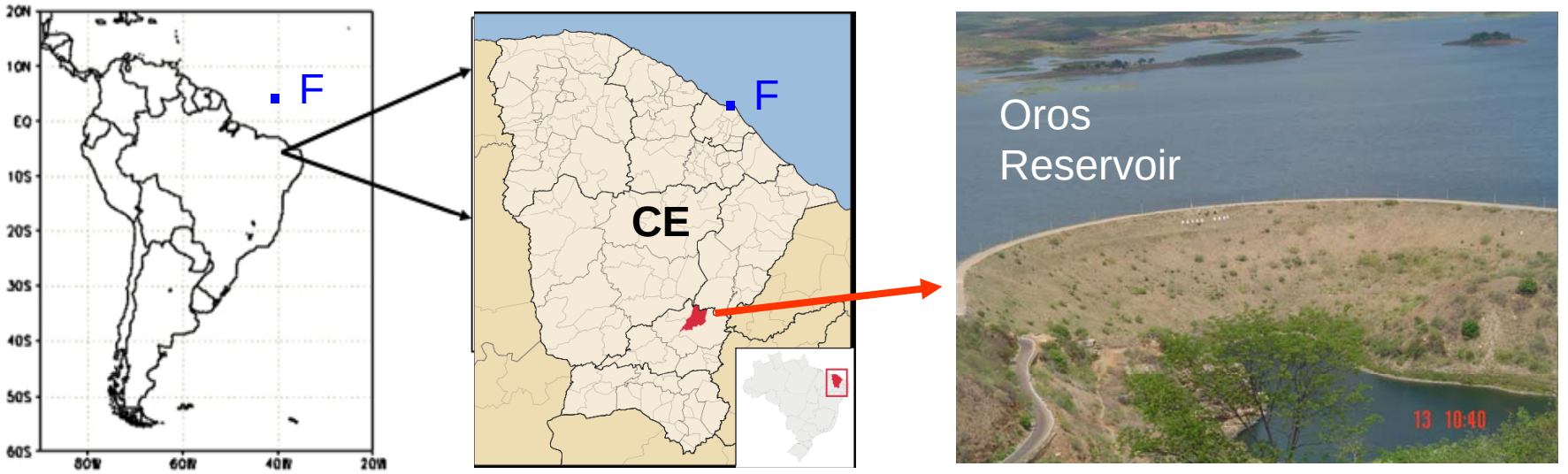
Jan

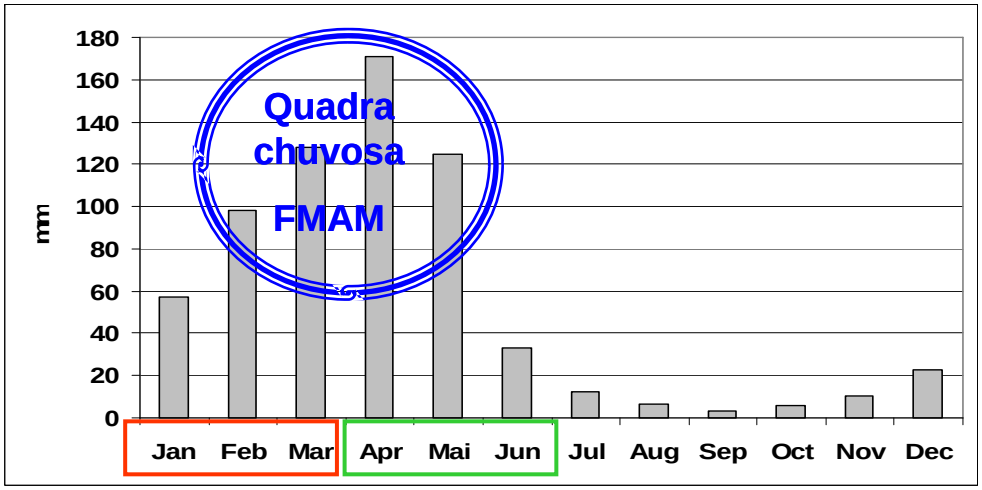
(From Souza Filho, 2009)

Zona de Convergença Inter-Tropical (ZCIT)

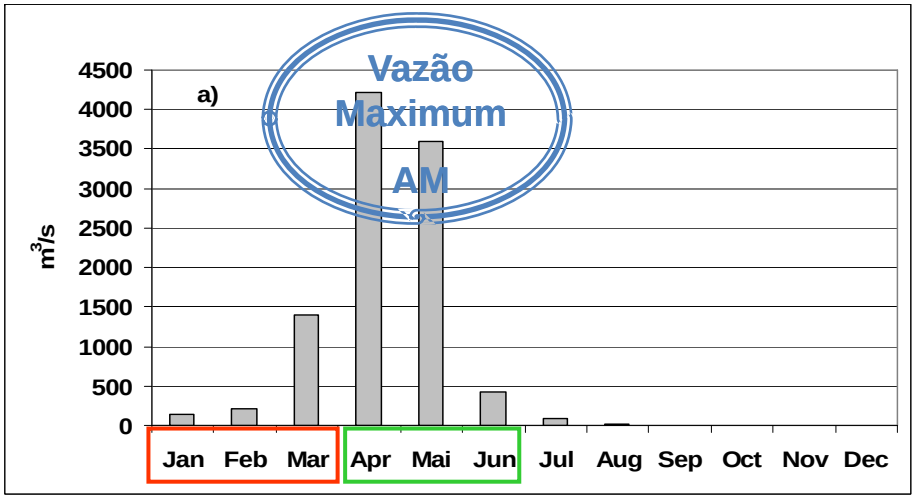




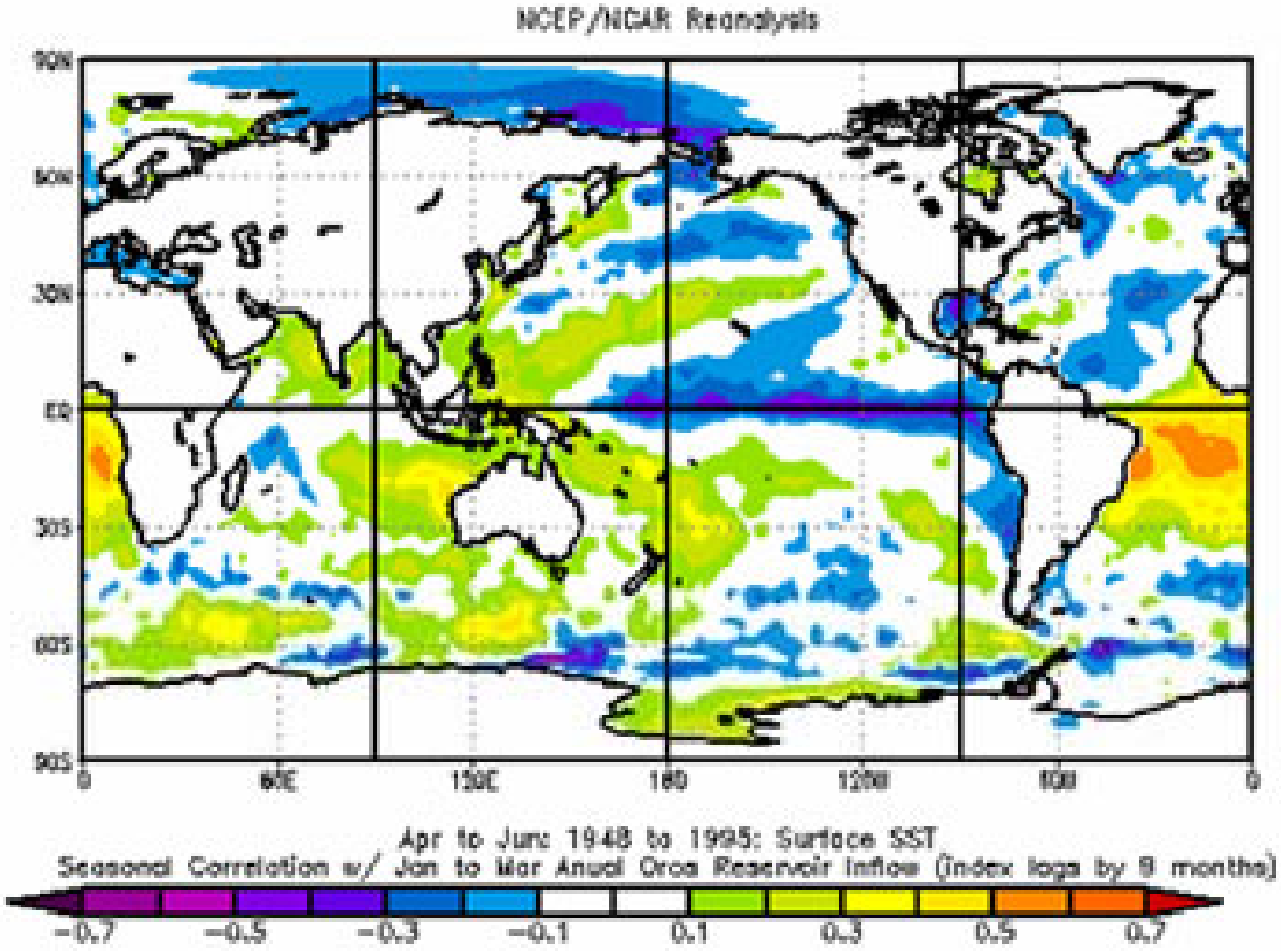




Monthly rainfall (in mm) on Iguatu station (Jaguaribe River basin)



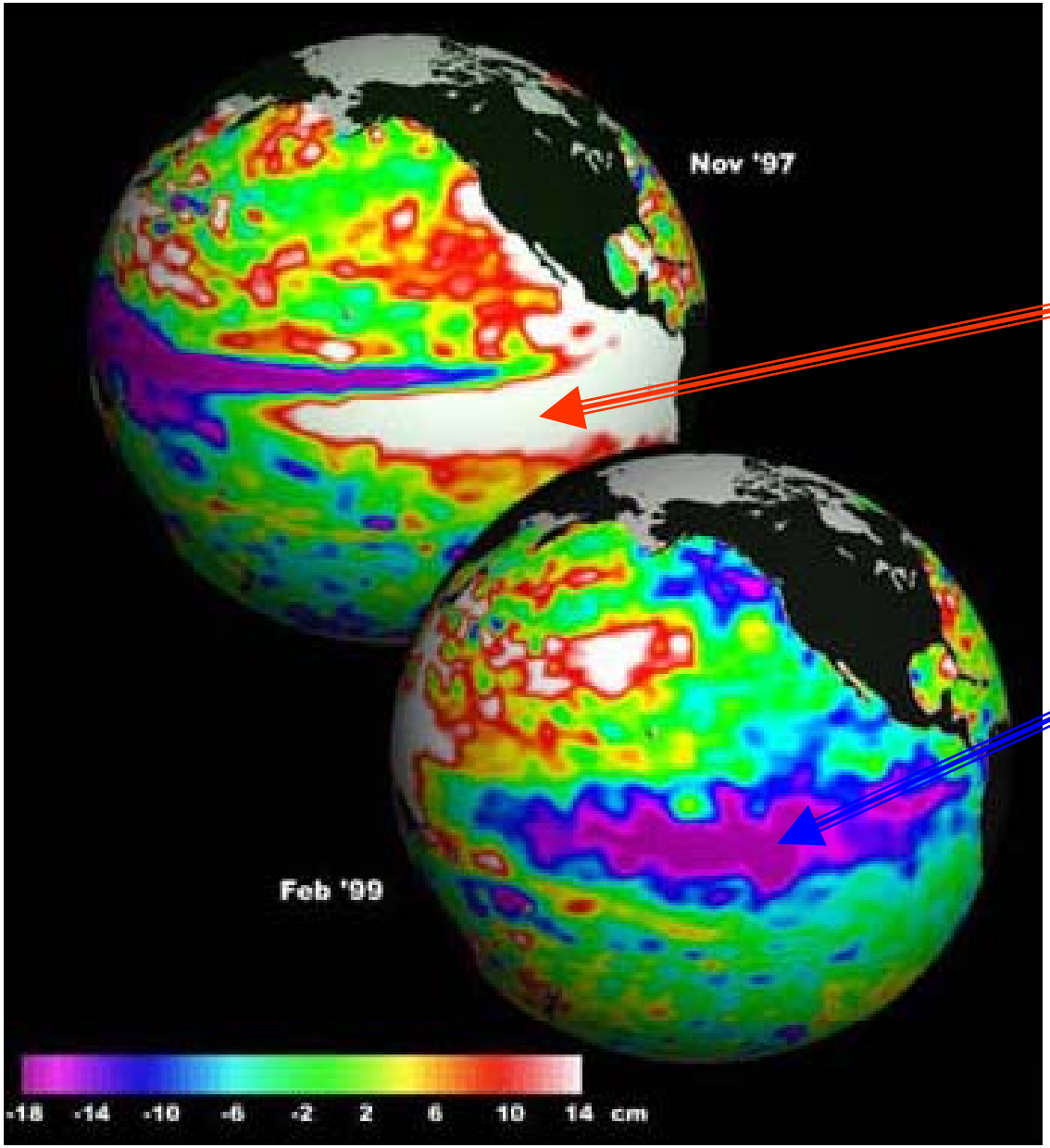
Monthly discharge (in m^3/s) at Iguatu station (Jaguaribe River basin)



1948-1995 correlation between April-June SST and the Oros reservoir (CE) inflows 9 months later (January-March)

(Souza Filho et al., 2003)

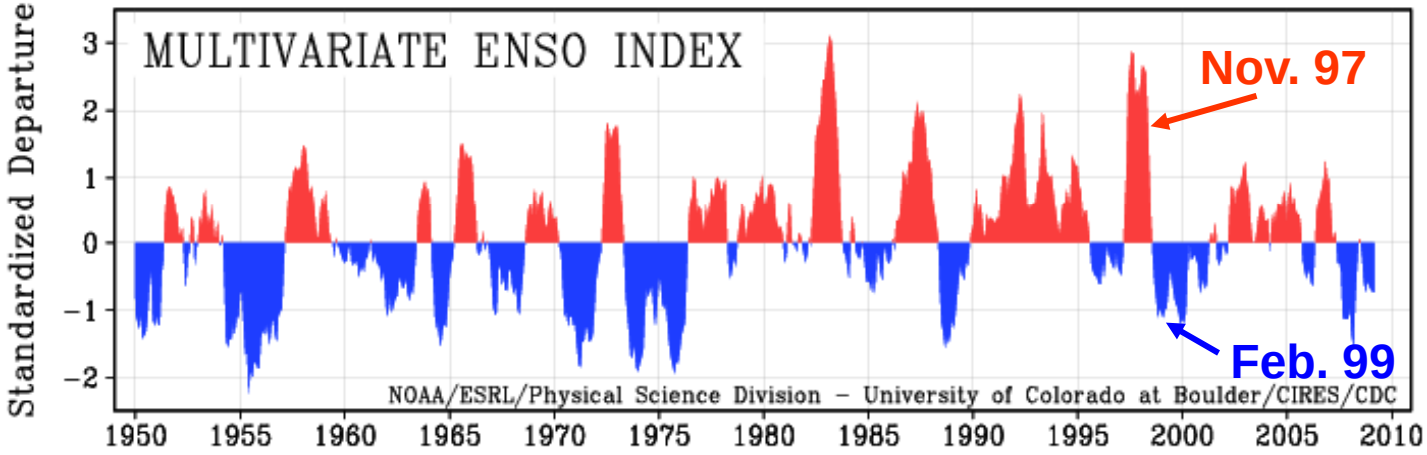
El Niño / La Niña - Southern Oscillation (ENSO)

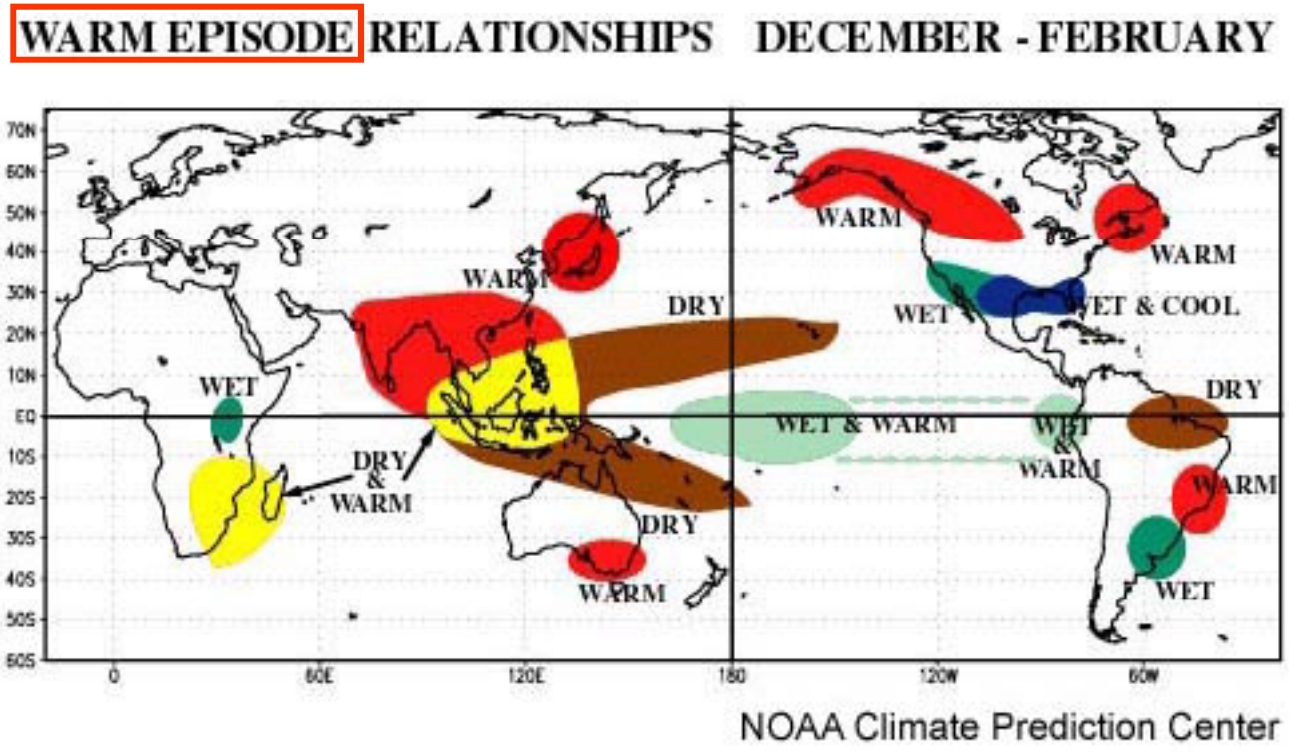


Nov. 1997

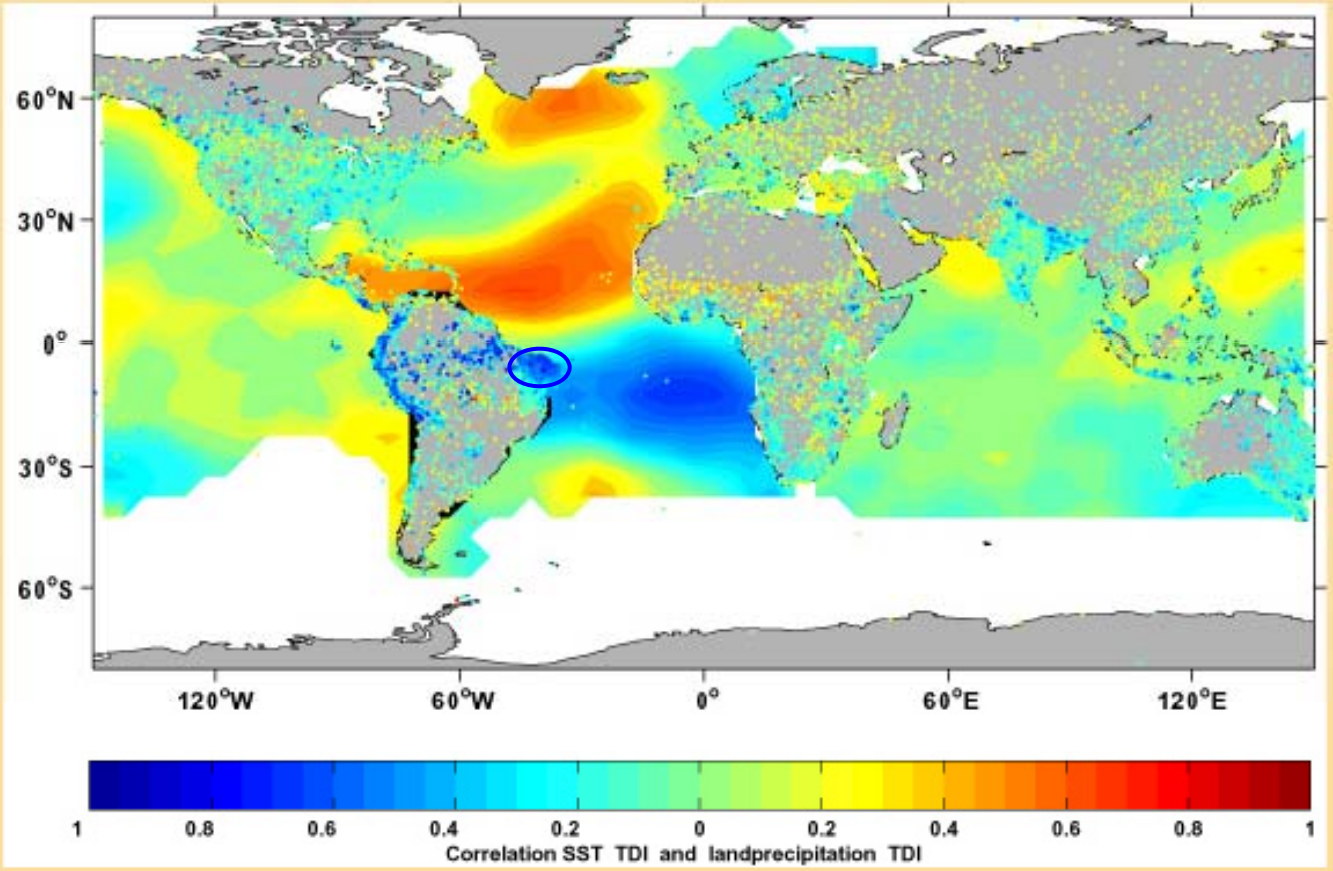
Feb. 1999

El Niño / La Niña - Southern Oscillation (ENSO)



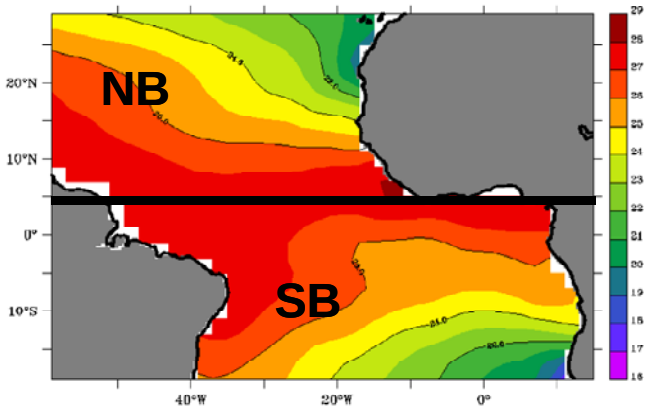


Atlantic SST and Rainfall



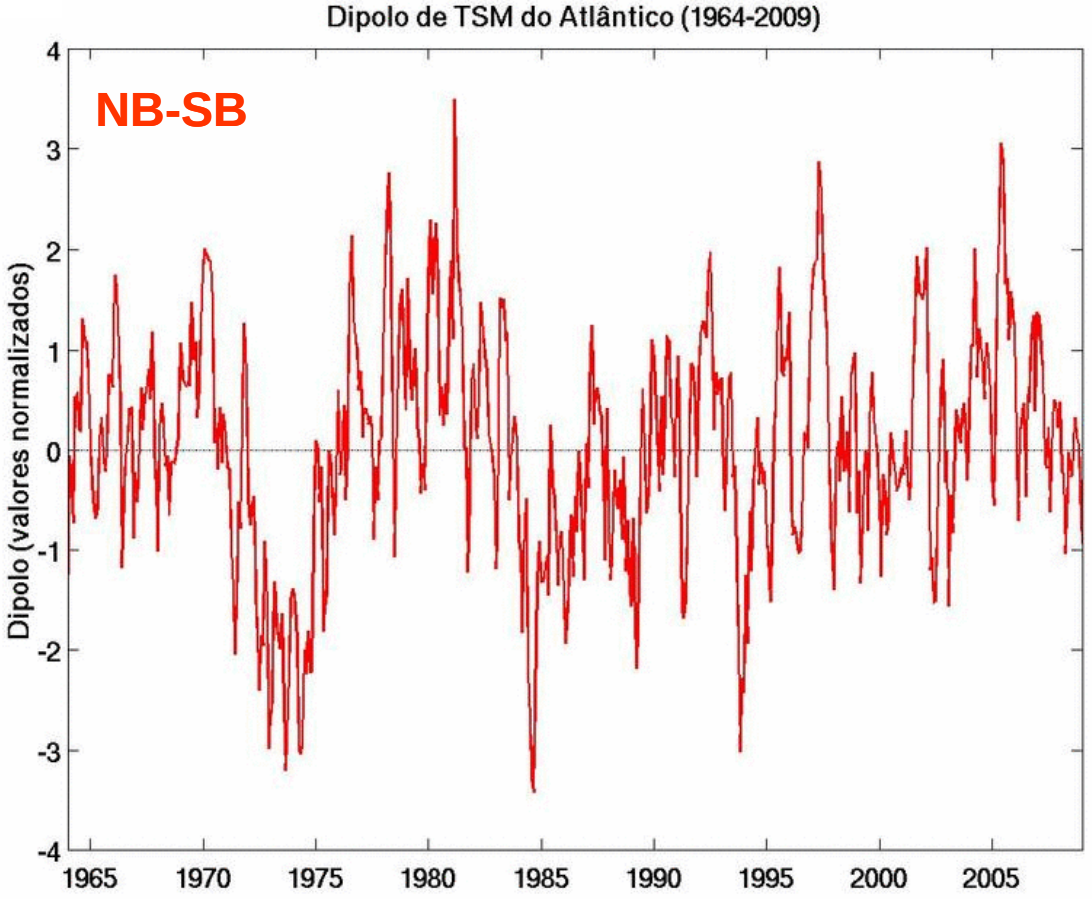
ML/G4/991

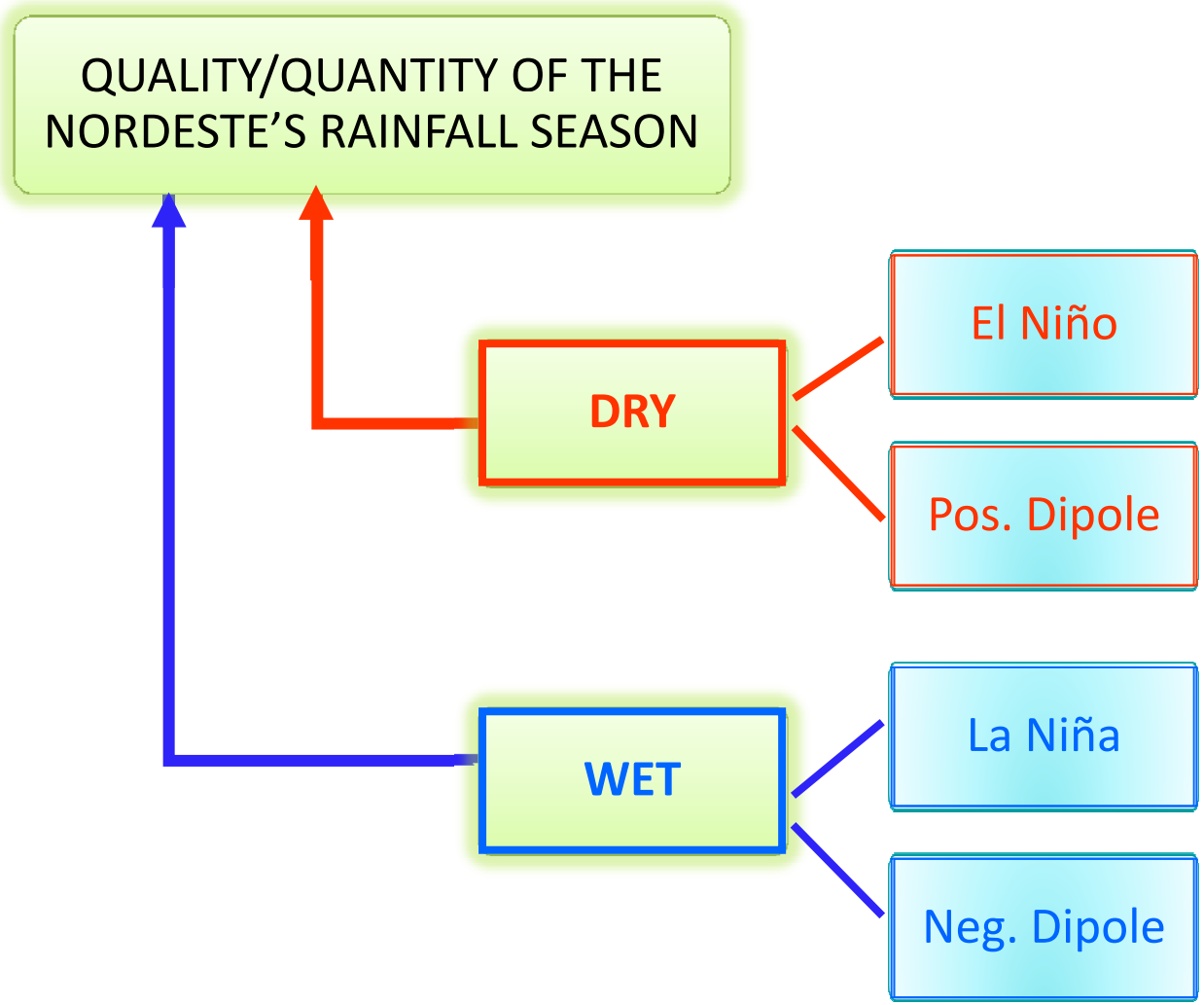
Correlation between the Atlantic cross ITCZ SST difference as defined by Servain (1991, J. Geophys. Res., 15137-15146), and station rainfall. This figure is done for annual averages of both the index and the rainfall data from 47 years. The pattern of the Atlantic SST is very similar to the NAO pattern: i.e. during strong phases of the NAO, there are strong westerlies and north-easterlies, colder SST, and thus the ITCZ is further south. When ITCZ is further south, the correlation with Tropical Dipole Index (TDI) is negative, less precipitation over the Sahel region and more precipitation along the coastline in the Gulf of Guinea, more precipitation in the Nordeste Brazil as well (Y. Kushnir and G. Krahmann, 1998, personal communication).



IRD
Institut de recherche pour le développement

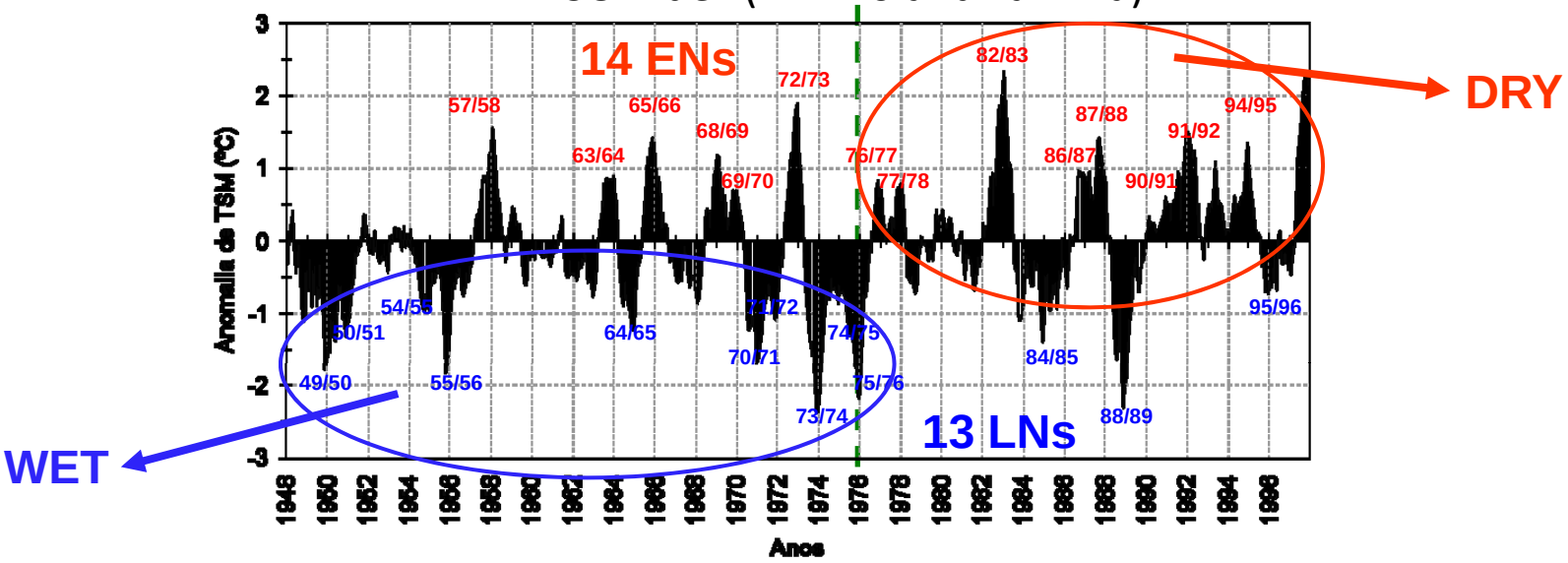
FUNCEME



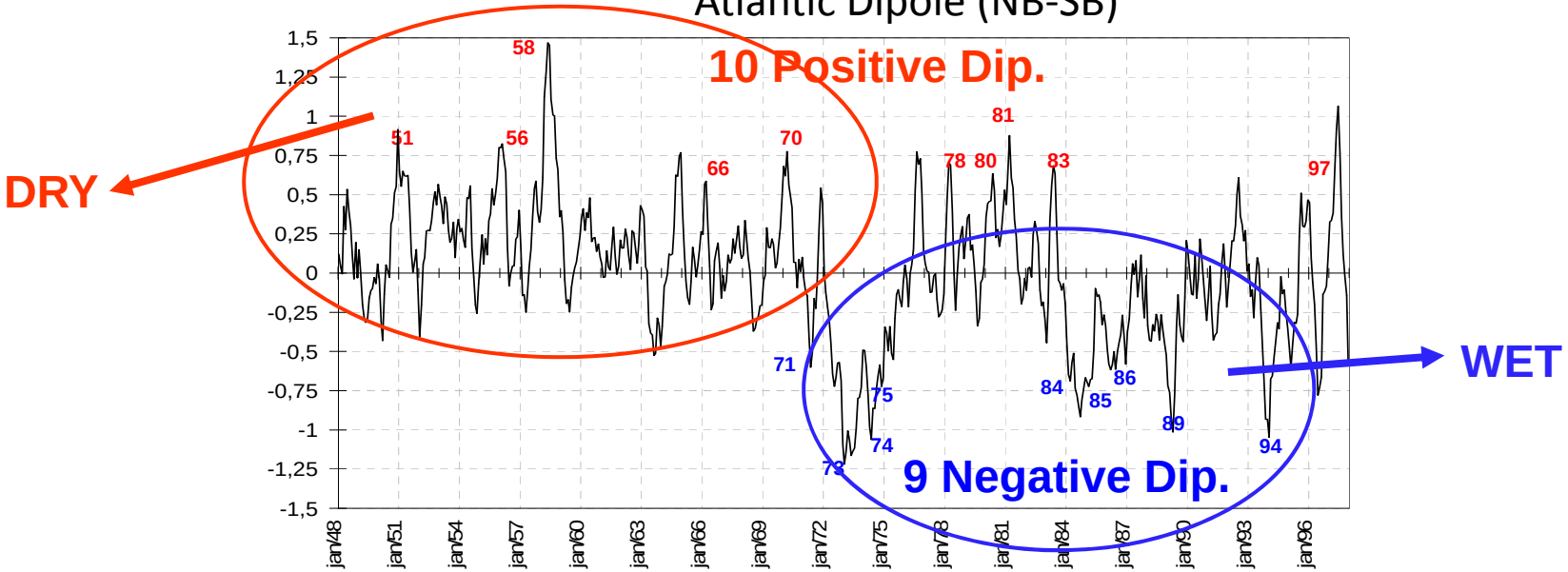

QUALITY/QUANTITY OF THE NORDESTE'S RAINFALL SEASON
DRY
El Niño
Pos. Dipole
WET
La Niña
Neg. Dipole

1948-1997

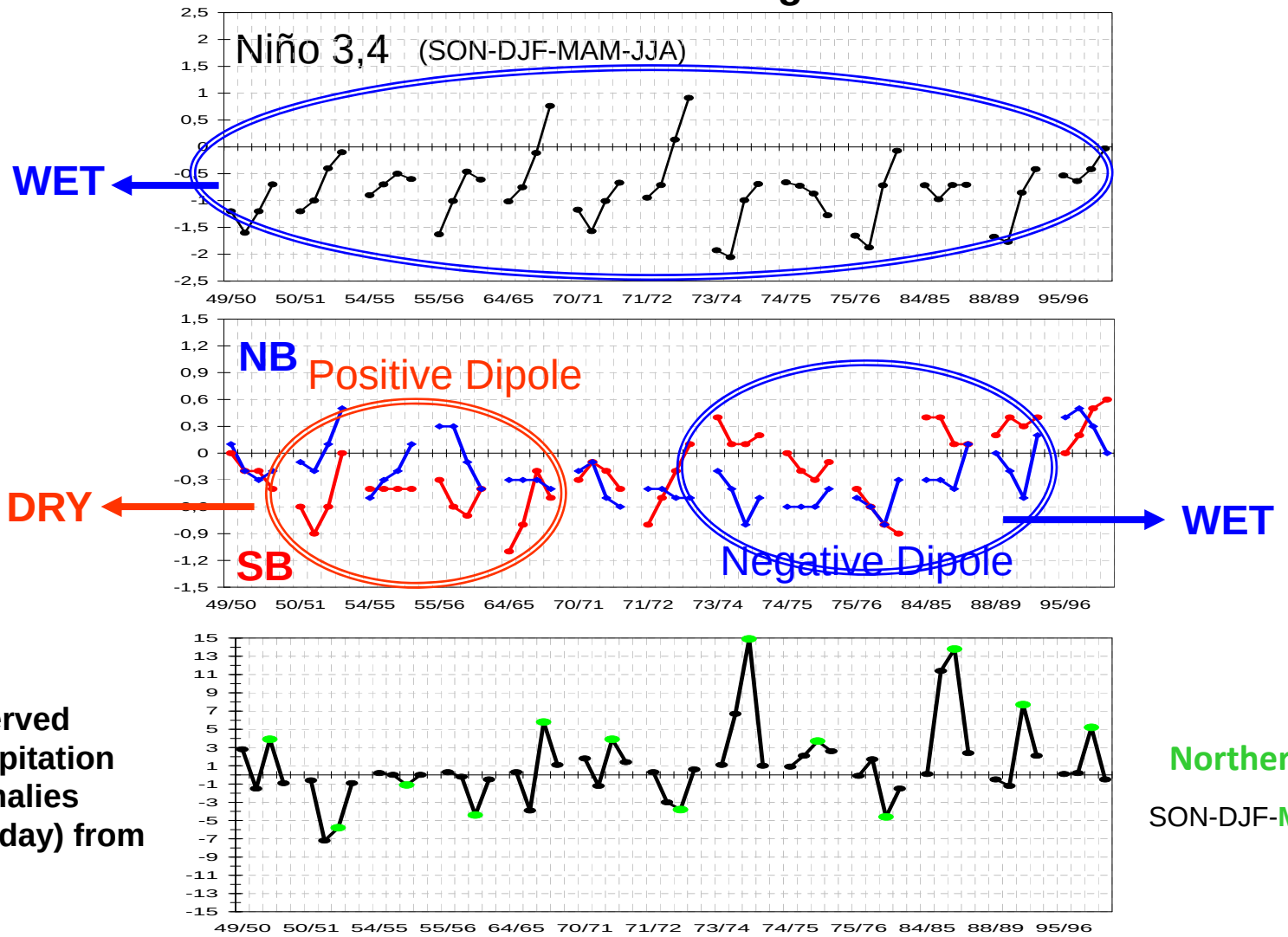
ENSO Index (El Niño and La Niña)



Atlantic Dipole (NB-SB)



The 13 LN events during 1948-1997

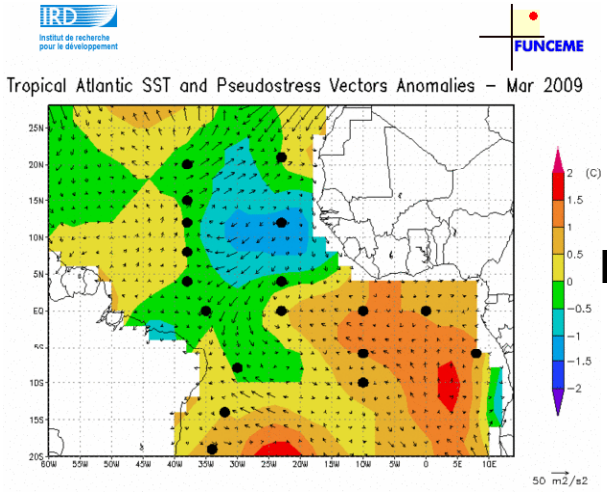


Observed precipitation anomalies (mm/day) from CPC

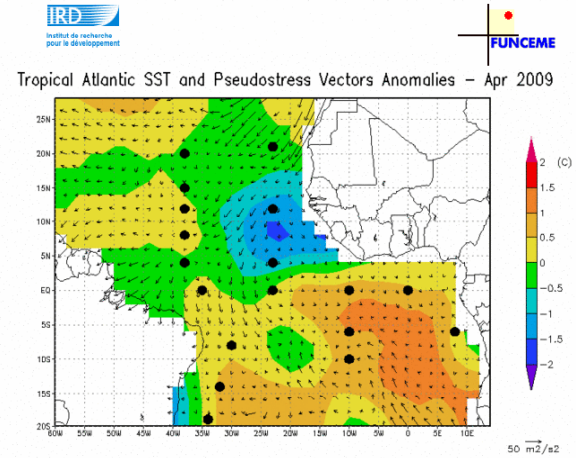
Northern NE

SON-DJF-**MAM**-JJA

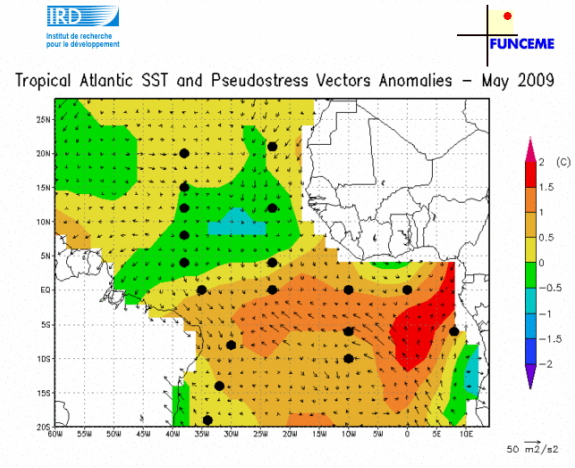
(Lucena, 2008)



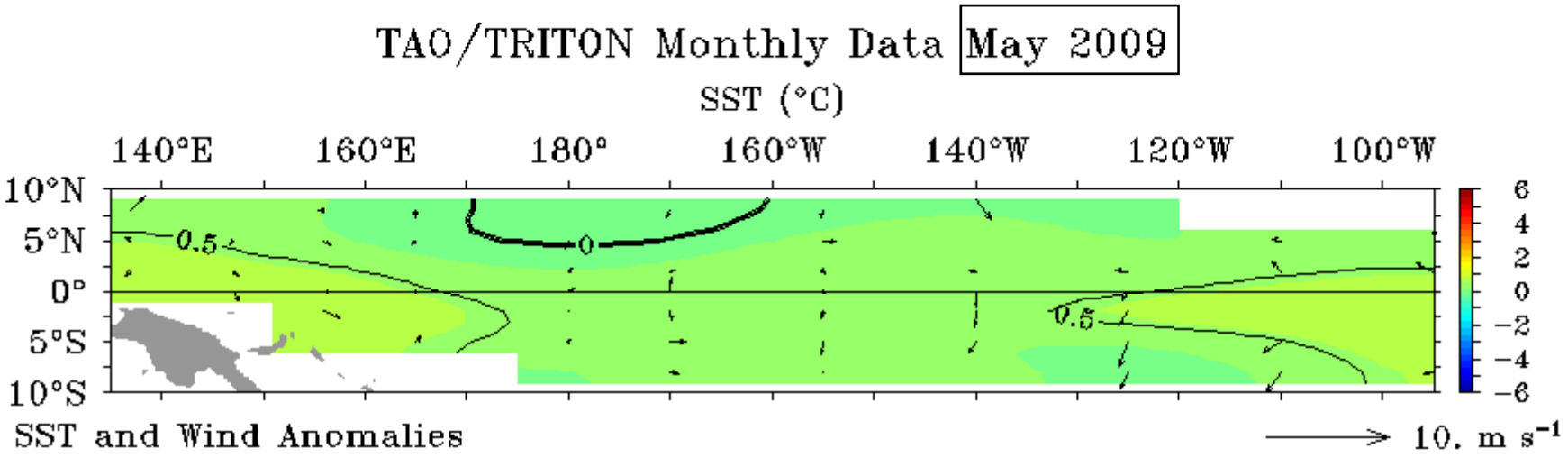
Março 2009

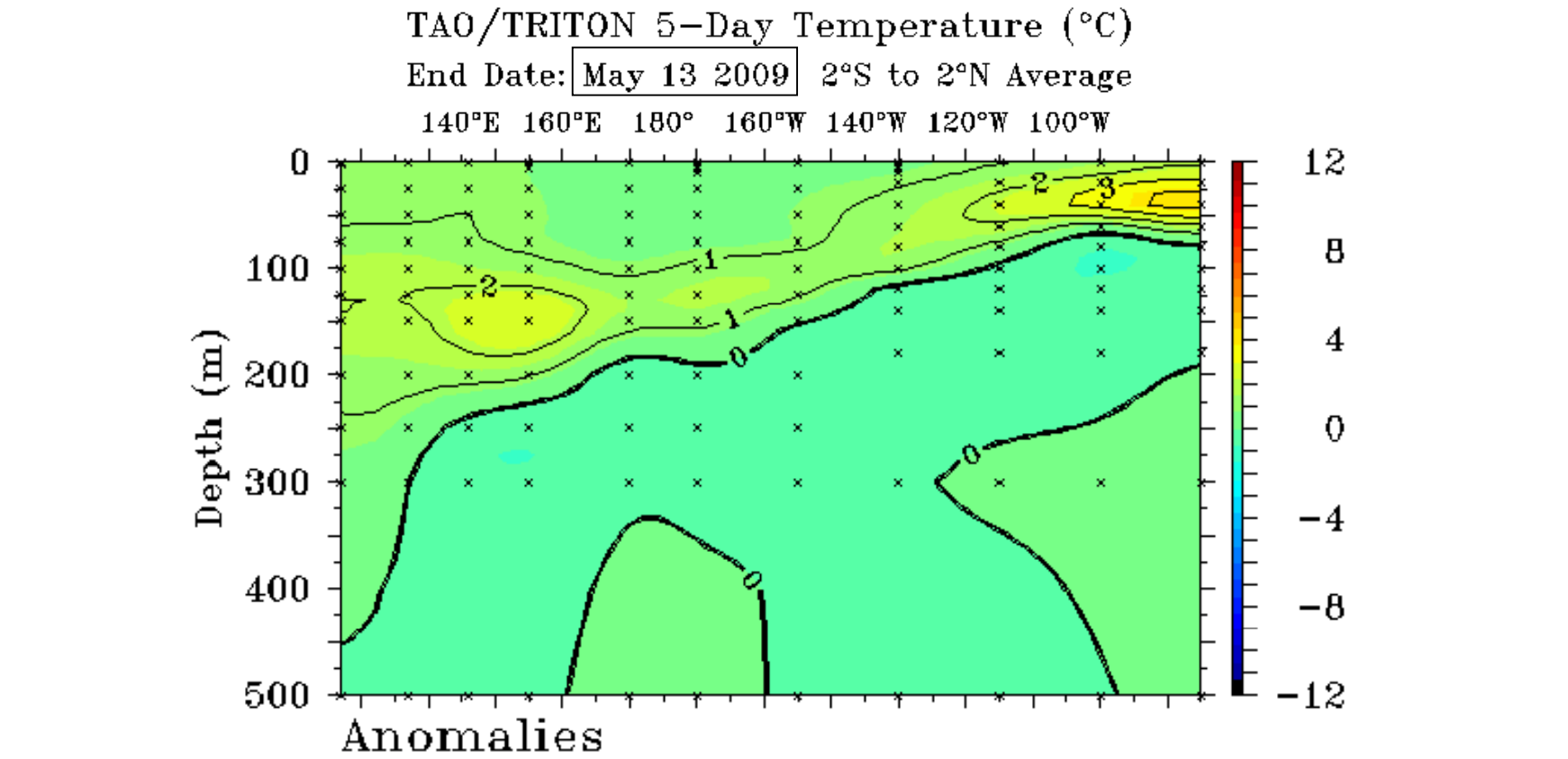


Abril 2009

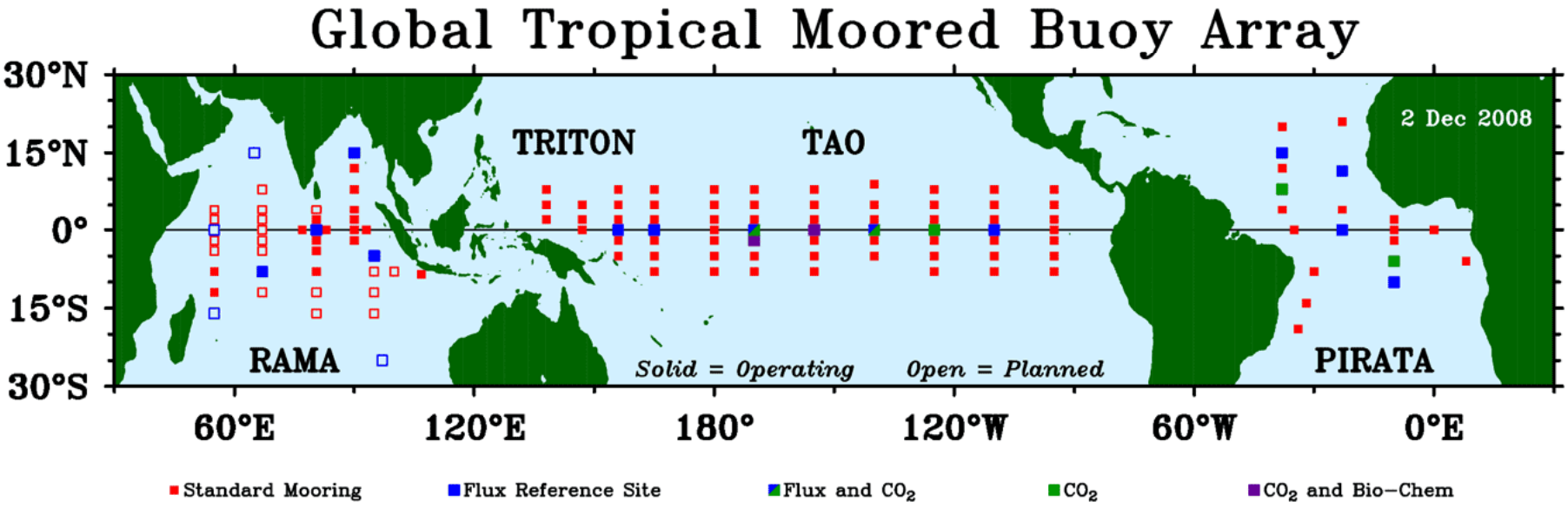


Maio 2009

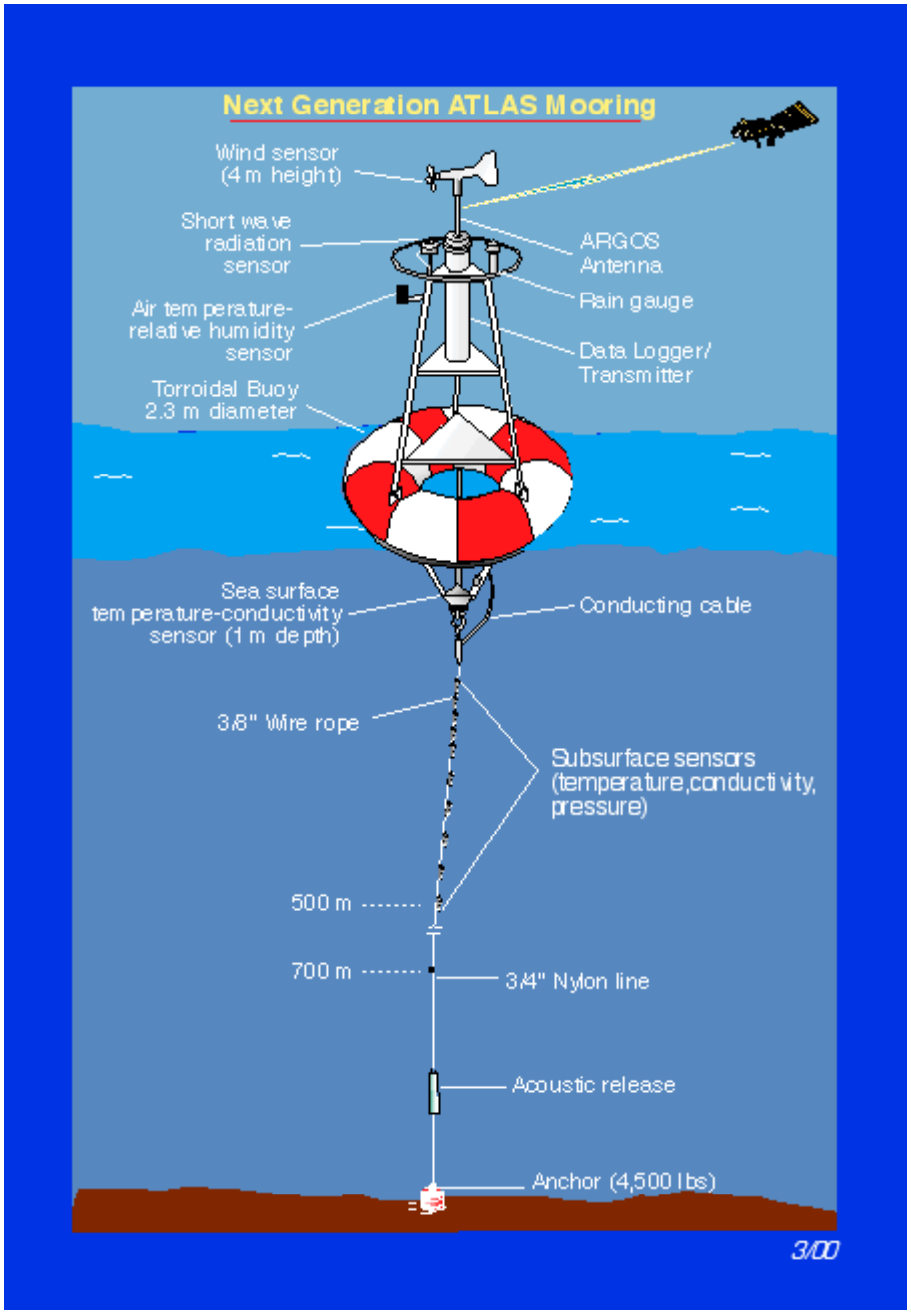

TAO/TRITON Monthly Data May 2009
SST (°C)
140°E
160°E
180°
160°W
140°W
120°W
100°W
10°N
5°N
0°
5°S
10°S
0.5
0
0.5
6
4
2
0
−2
−4
−6
SST and Wind Anomalies
10. m s-1

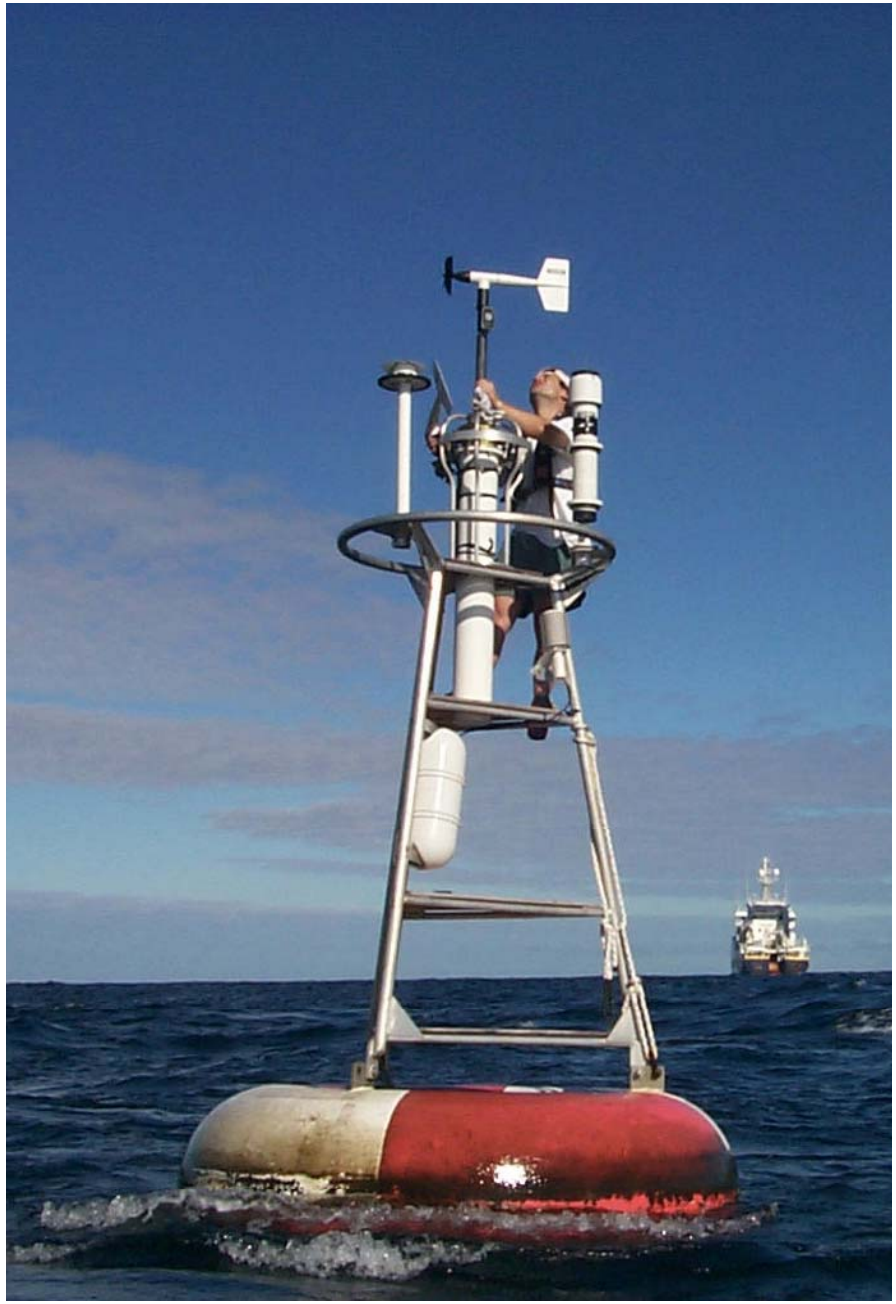

TAO/TRITON 5−Day Temperature (°C)
End Date: May 13 2009 2°S to 2°N Average
140°E
160°E
180°
160°W
140°W
120°W
100°W
Depth (m)
0
100
200
300
400
500
2
3
1
2
1
0
0
0
12
8
4
0
−4
−8
−12
Anomalies

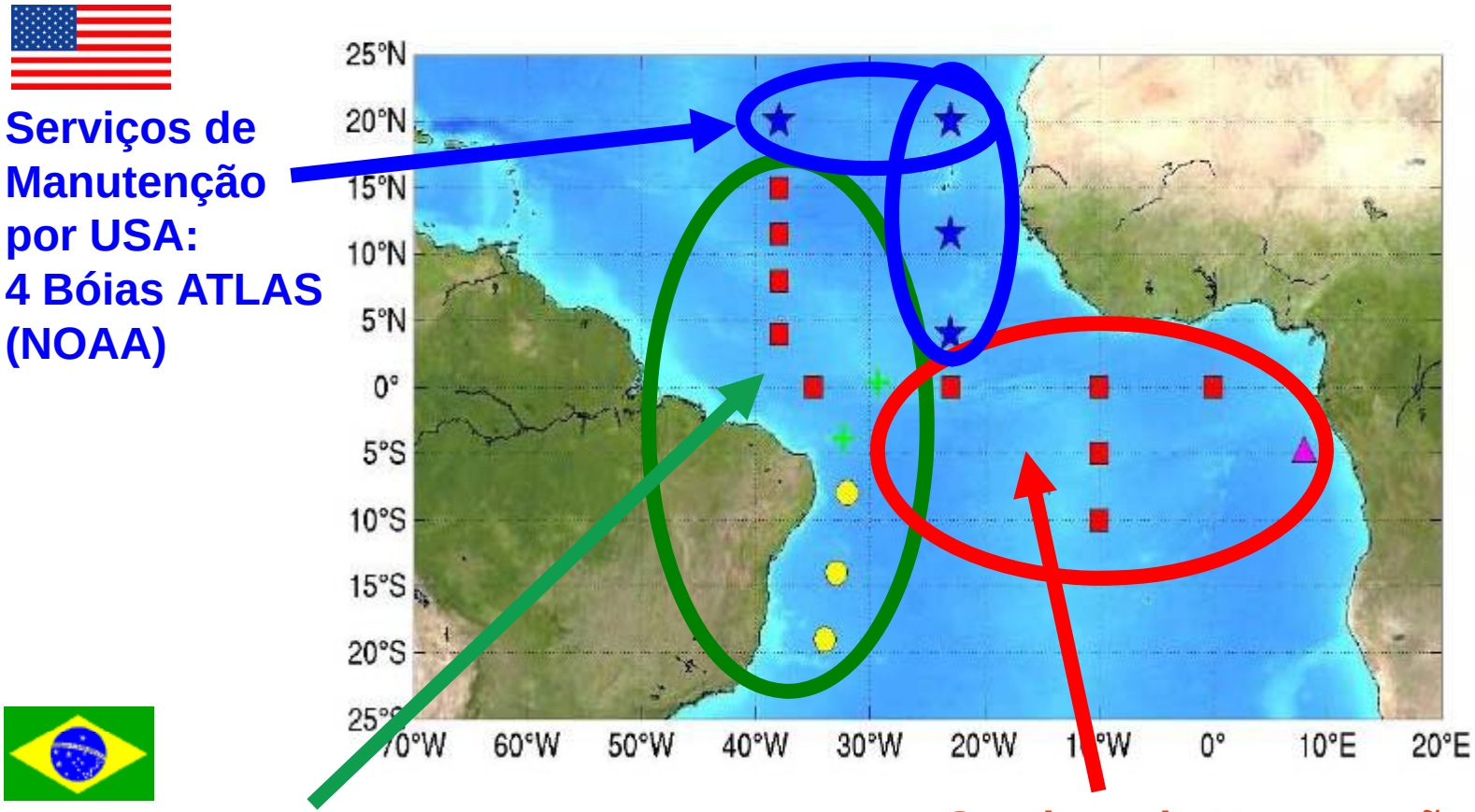
TAO/TRITON
PIRATA
RAMA



2008 →


Next Generation ATLAS Mooring
Wind sensor (4 m height)
Short wave radiation sensor
Air temperature-relative humidity sensor
Torroidal Buoy 2.3 m diameter
ARGOS Antenna
Rain gauge
Data Logger/ Transmitter
Sea surface temperature-conductivity sensor (1 m depth)
Conducting cable
3/8" Wire rope
Subsurface sensors (temperature,conductivity, pressure)
500 m
700 m
3/4" Nylon line
Acoustic release
Anchor (4,500 lbs)
3/00





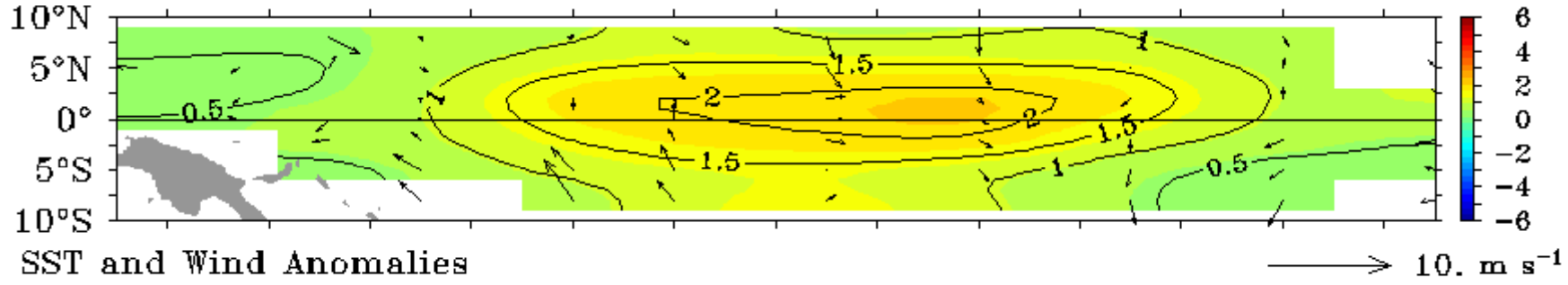
Serviços de Manutenção por USA: 4 Bóias ATLAS (NOAA)

Serviços de Manutenção por Brasil: 8 Bóias ATLAS (INPE+DHN)

Serviços de Manutenção por França: 6 Bóias ATLAS ATLAS (IRD)

⇒18 Bóias ATLAS Prestadas Serviços de Manutenção <u>Anualmente</u> desde 2007 !

TAO/TRITON Monthly Data November 2009

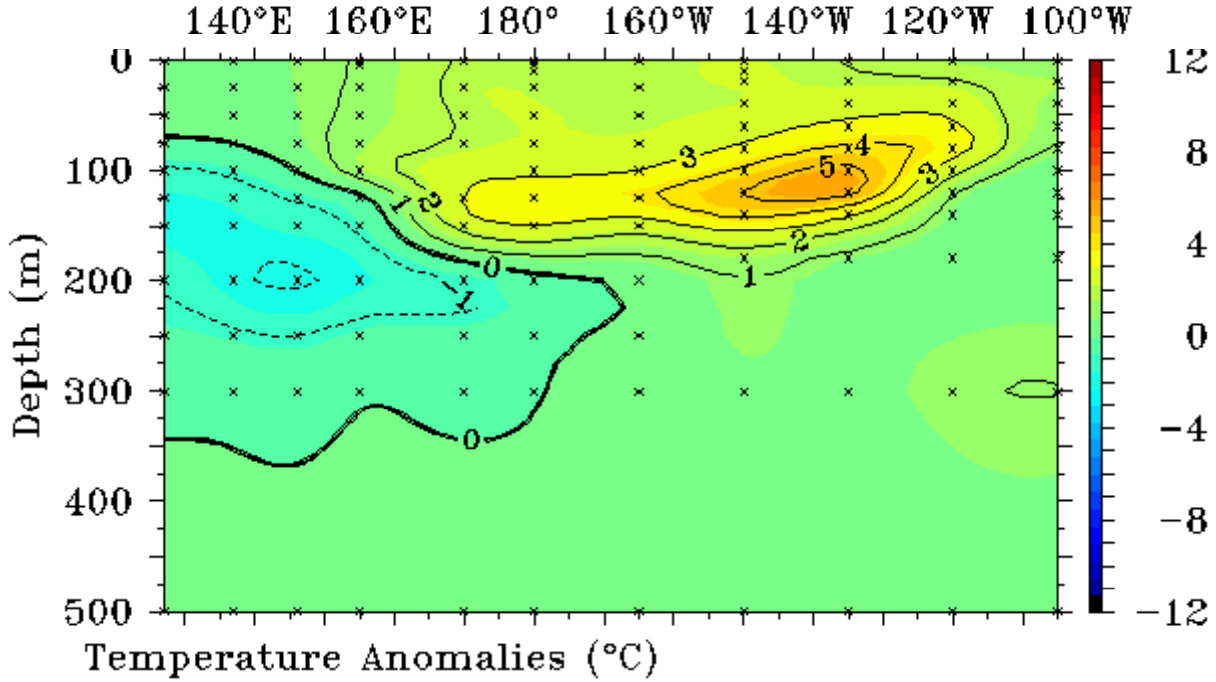


TAO Project Office/I

Nov 22 2009

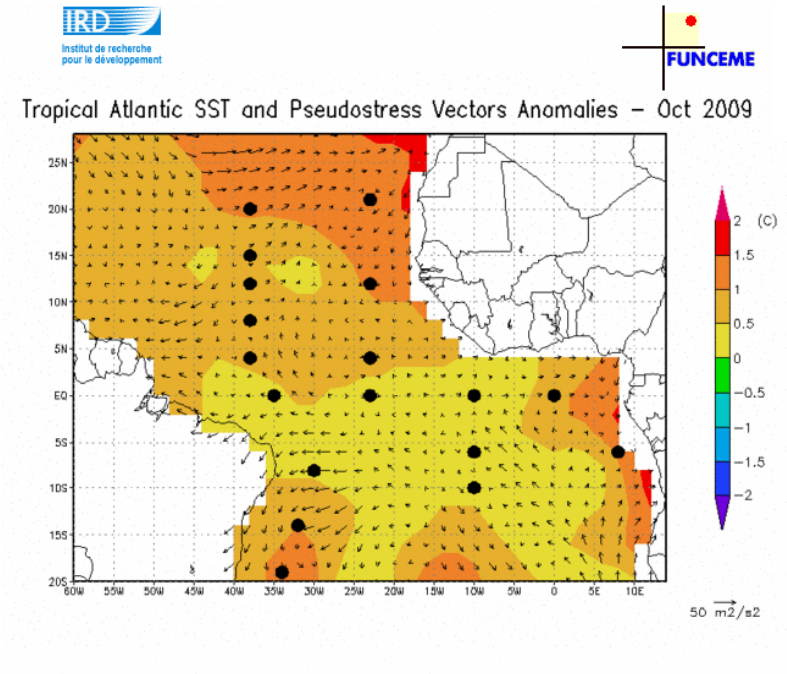
Monthly Data November 2009

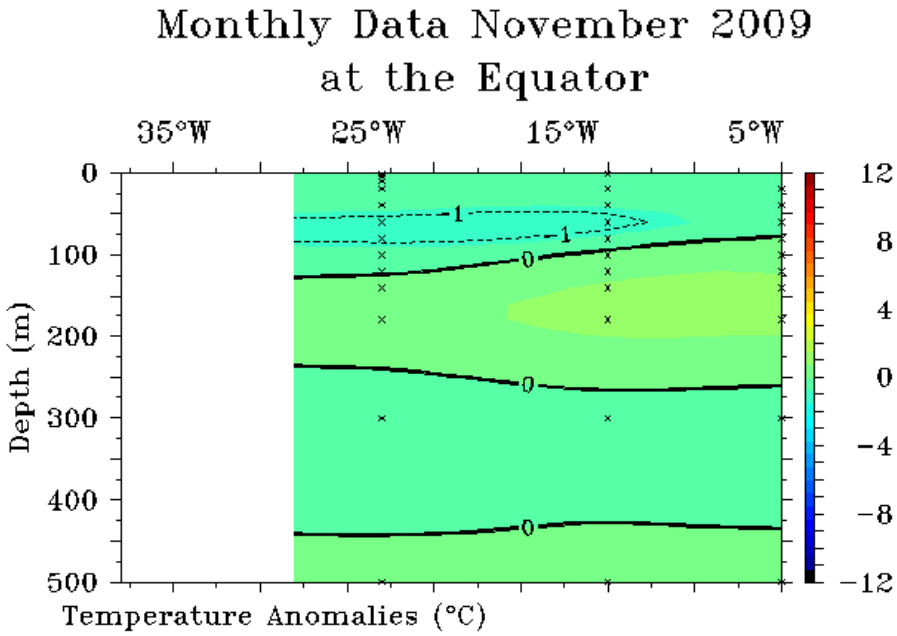
2°S to 2°N Average



TAO Project Office/PMEL/NOAA

Nov 22 2009





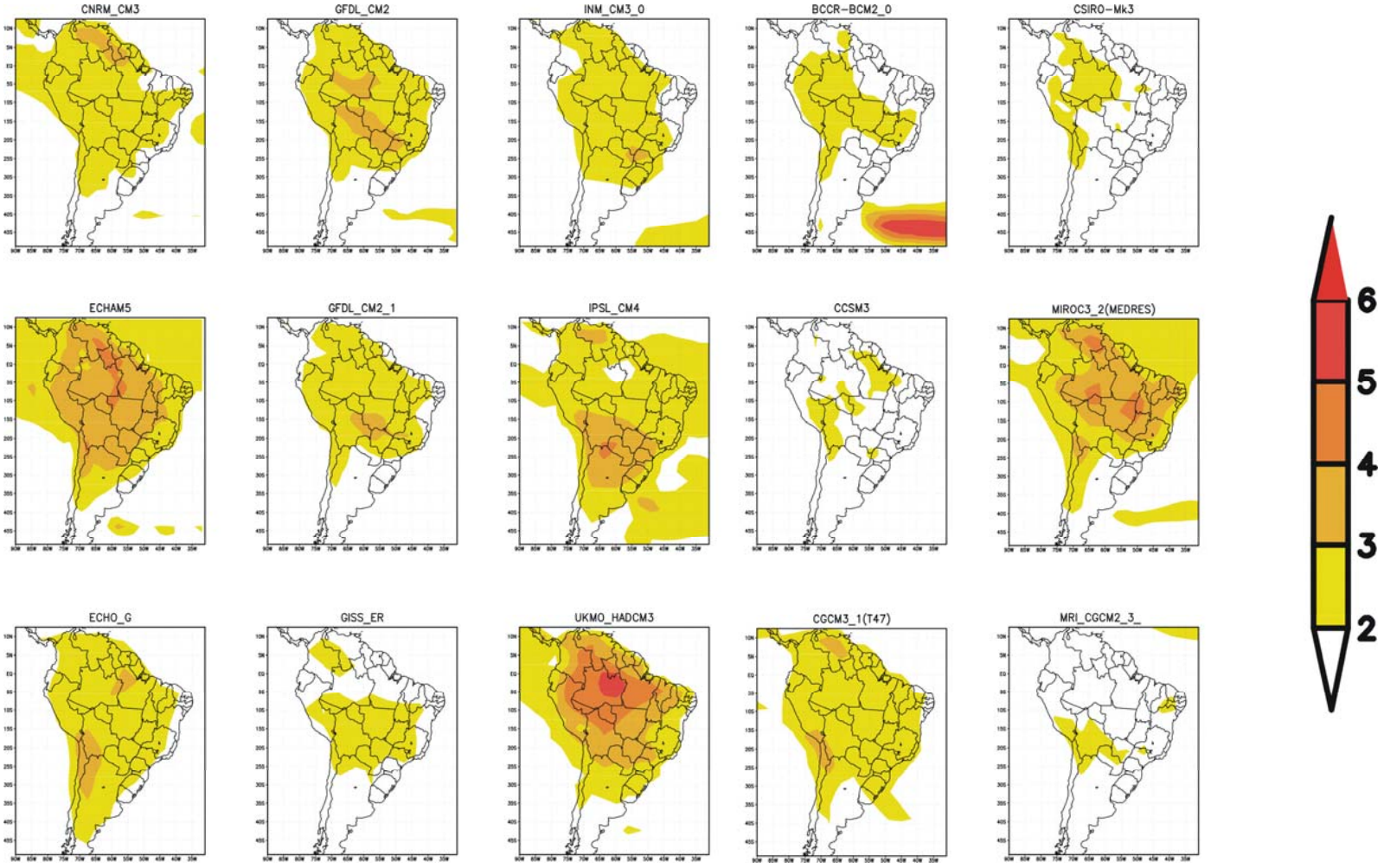
TAO Project Office/PMEL/NOAA

Nov 22 2009

Muito obrigado !!!

Jacques.Servain@gmail.com

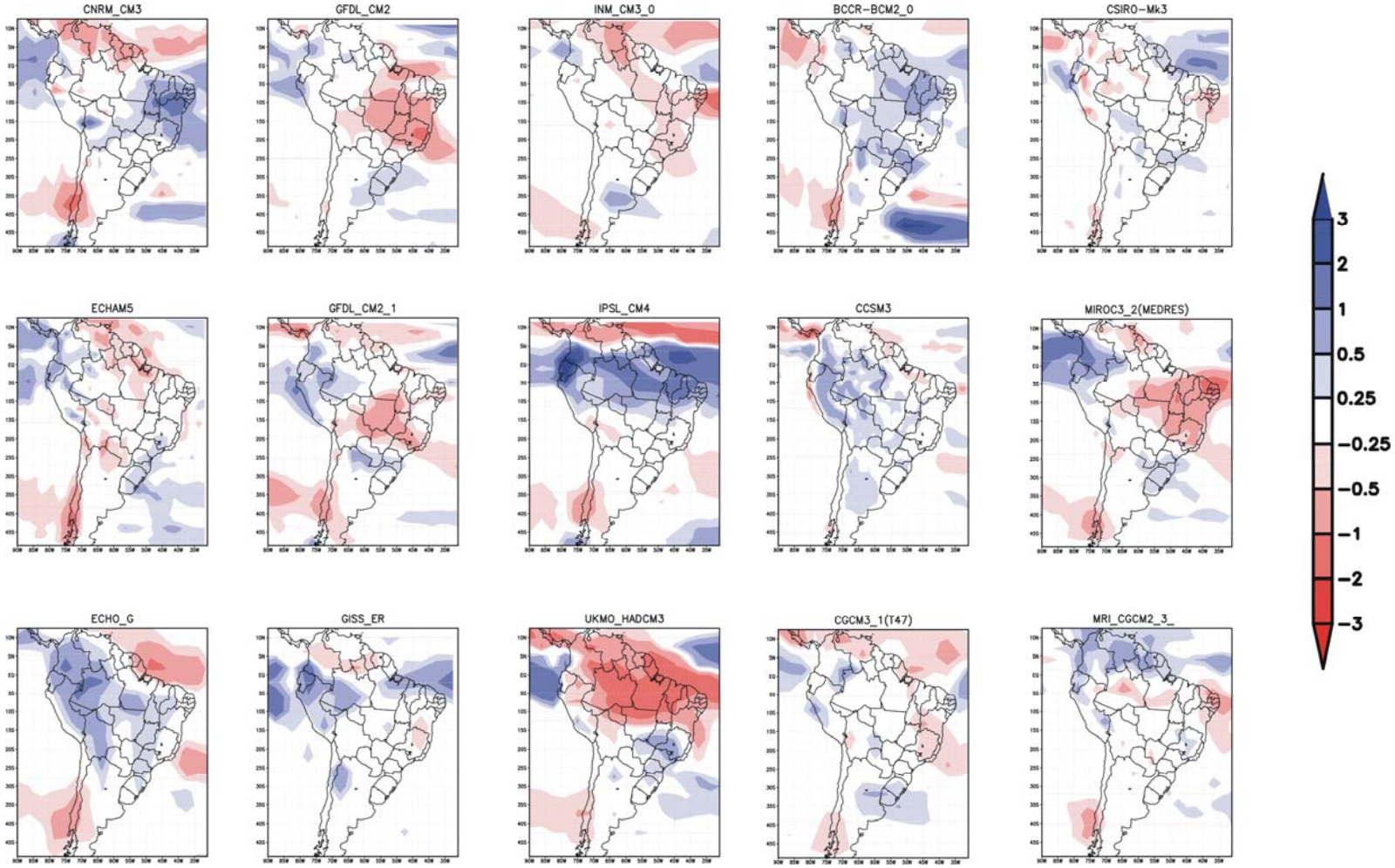
Cenários Climáticos globais para América do Sul



Projeções de anomalias de **temperatura** (mm/dia) para América do Sul para o período de **2090-2099** (**Cenário B1**) em relação ao período base de **1961-1990** para 15 diferentes modelos climáticos globais disponíveis através do IPCC.

(From C. Nobre, 2009)

Cenários Climáticos globais para América do Sul



Projeções de anomalias de **precipitação** (mm/dia) para América do Sul para o período de **2090-2099** (**Cenário B1**) em relação ao período base de **1961-1990** para 15 diferentes modelos climáticos globais disponíveis através do IPCC.

(From C. Nobre, 2009)

Previsões de Mudanças de Vazões Anuais em 2050 para o Cenário A1B

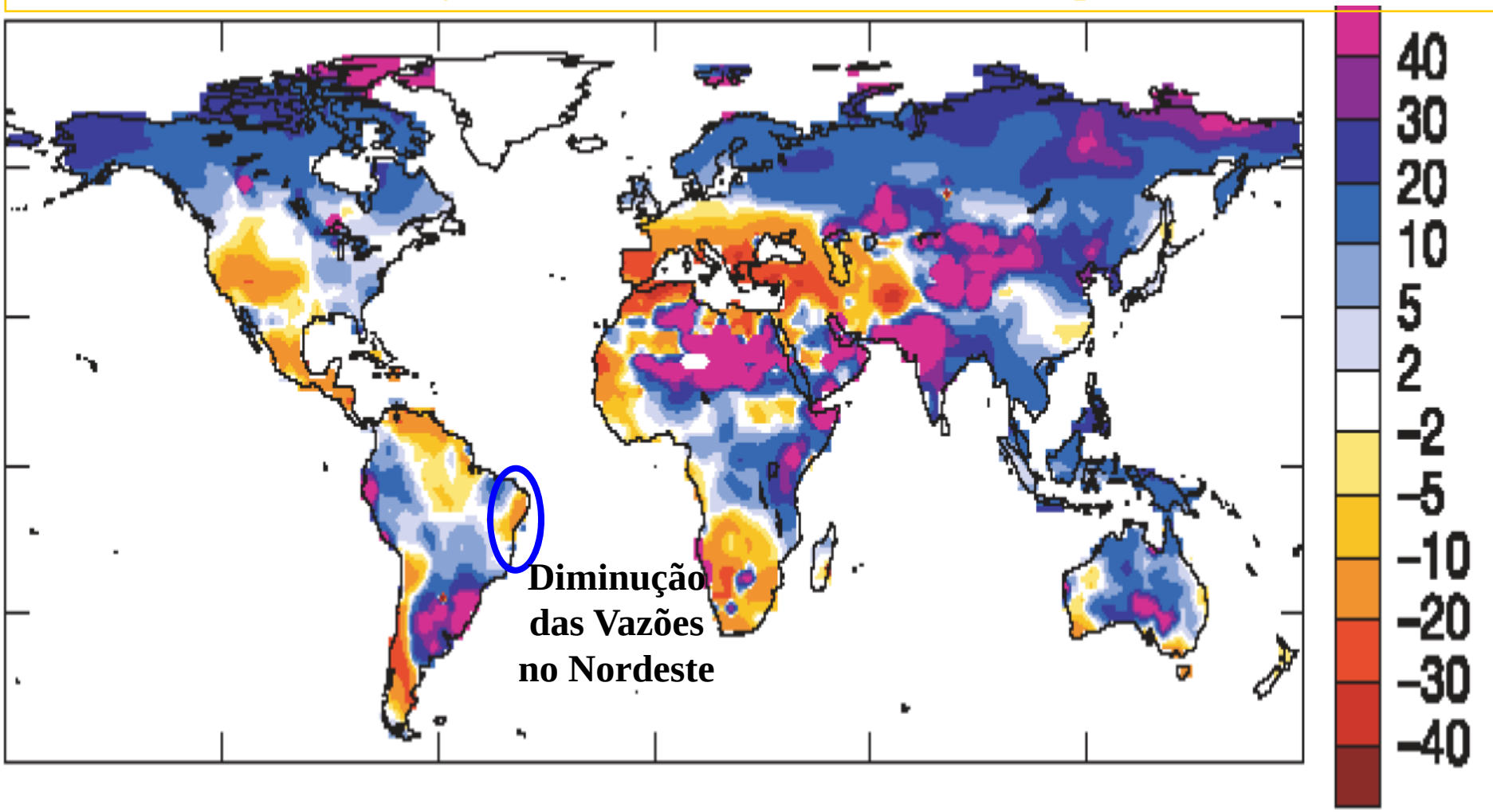
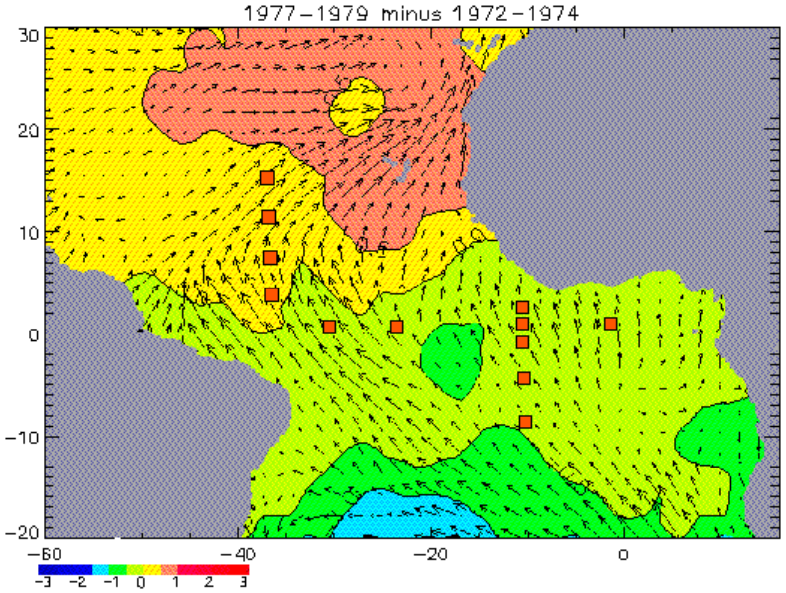
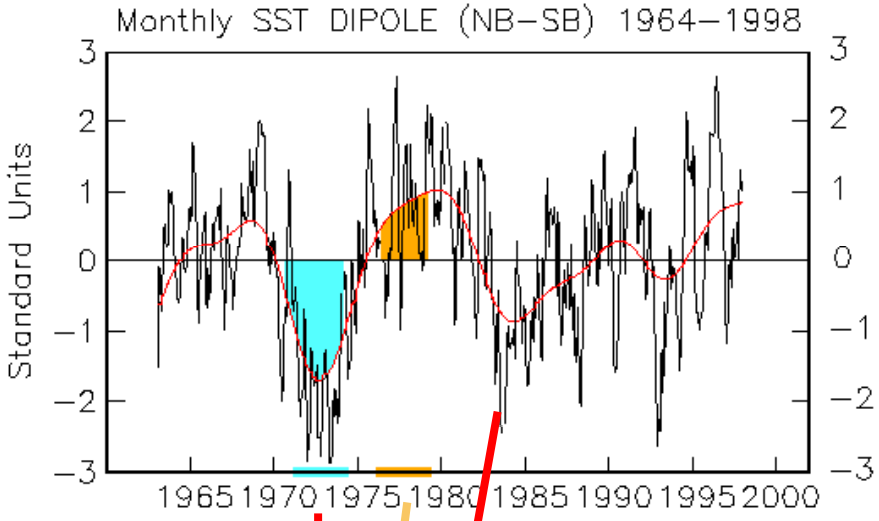


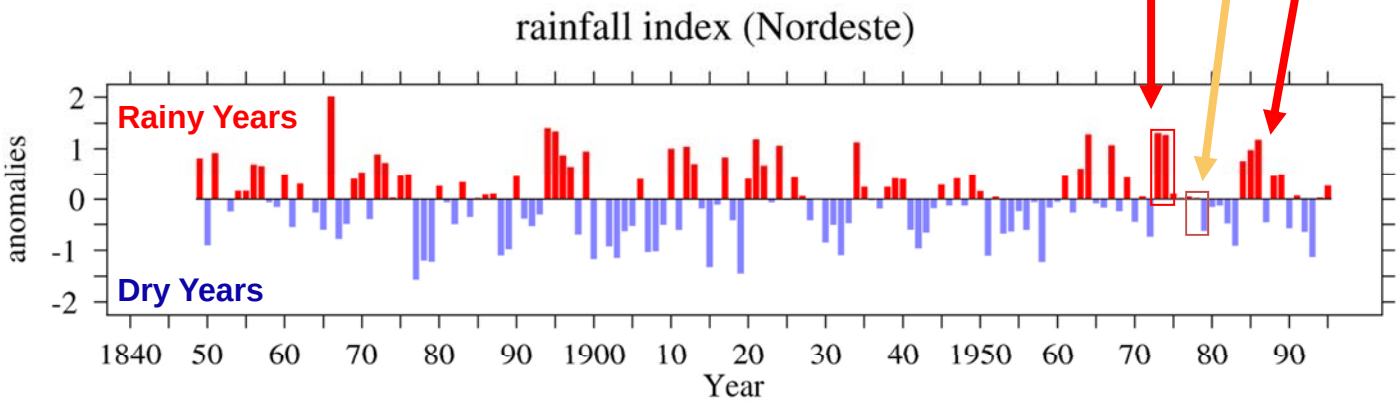
Figura 3.4: Mudança da média do conjunto de 12 modelos climáticos para a vazão média anual (%), em 2050 para o cenário de emissões SERE A1B (Milly et al., 2005).

(From C. Nobre, 2009)

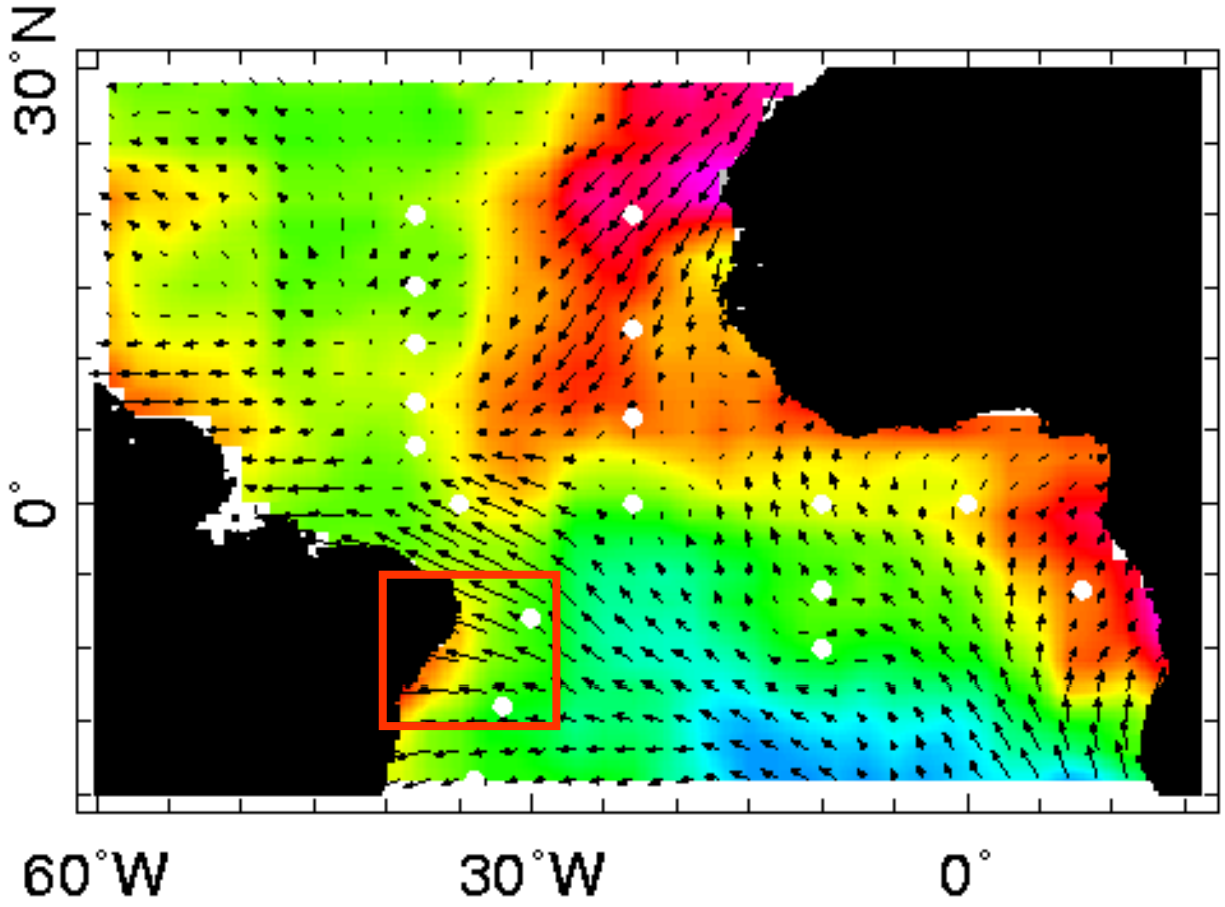
An Illustration of the TA Dipole





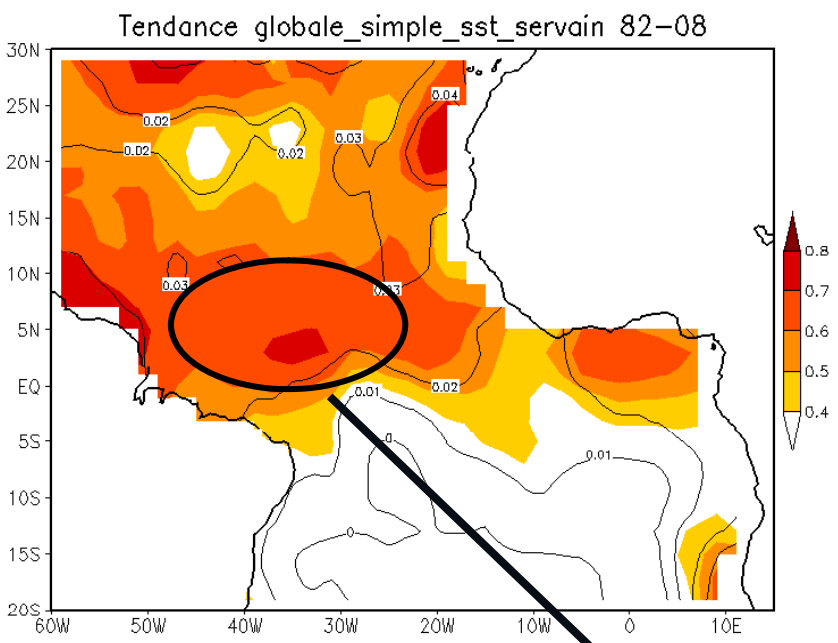


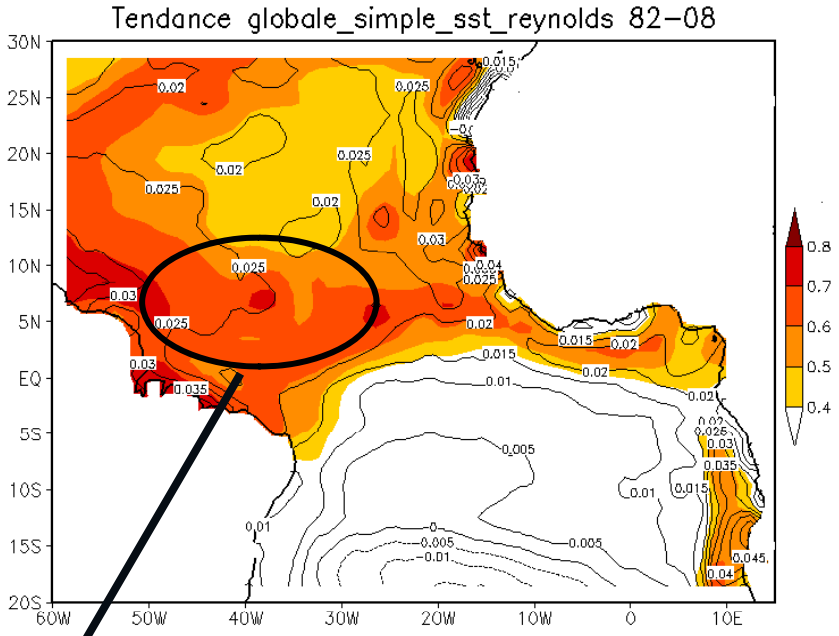
SST and PWS Anomaly 1997-2006 *vs.* 1964-2003



sea surface temperature anomaly

SST Linear Trend 1982-2008





+0.03 °C/Year

~ +0.75 °C/27-Year