



**The Abdus Salam
International Centre for Theoretical Physics**



2148-Presentations

**Fifth ICTP Workshop on the Theory and Use of Regional Climate
Models**

31 May - 11 June, 2010

The 2009 rainy season in Eastern amazon as simulated by REGCM4

DE SOUZA Everaldo, Do Carmo A. and Llopart M.

*Universidade Federal do Pará
Belém-PA
Brasil*



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*5th ICTP Workshop on the
Theory & Use of **REG**ional **C**limate **M**odels*

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THE 2009 RAINY SEASON IN EASTERN AMAZON AS SIMULATED BY REGCM4

Lab. session work by Amazon group # 9

Everaldo DE SOUZA*

Alexandre DO CARMO*

Marta LLOPART**

* **Universidade Federal do Pará, Belém-PA, Brasil**

** **Universidade de São Paulo, São Paulo-SP, Brasil**

SIMULATION SET UP:

60 Km (80 x 120 X L18) NORMER

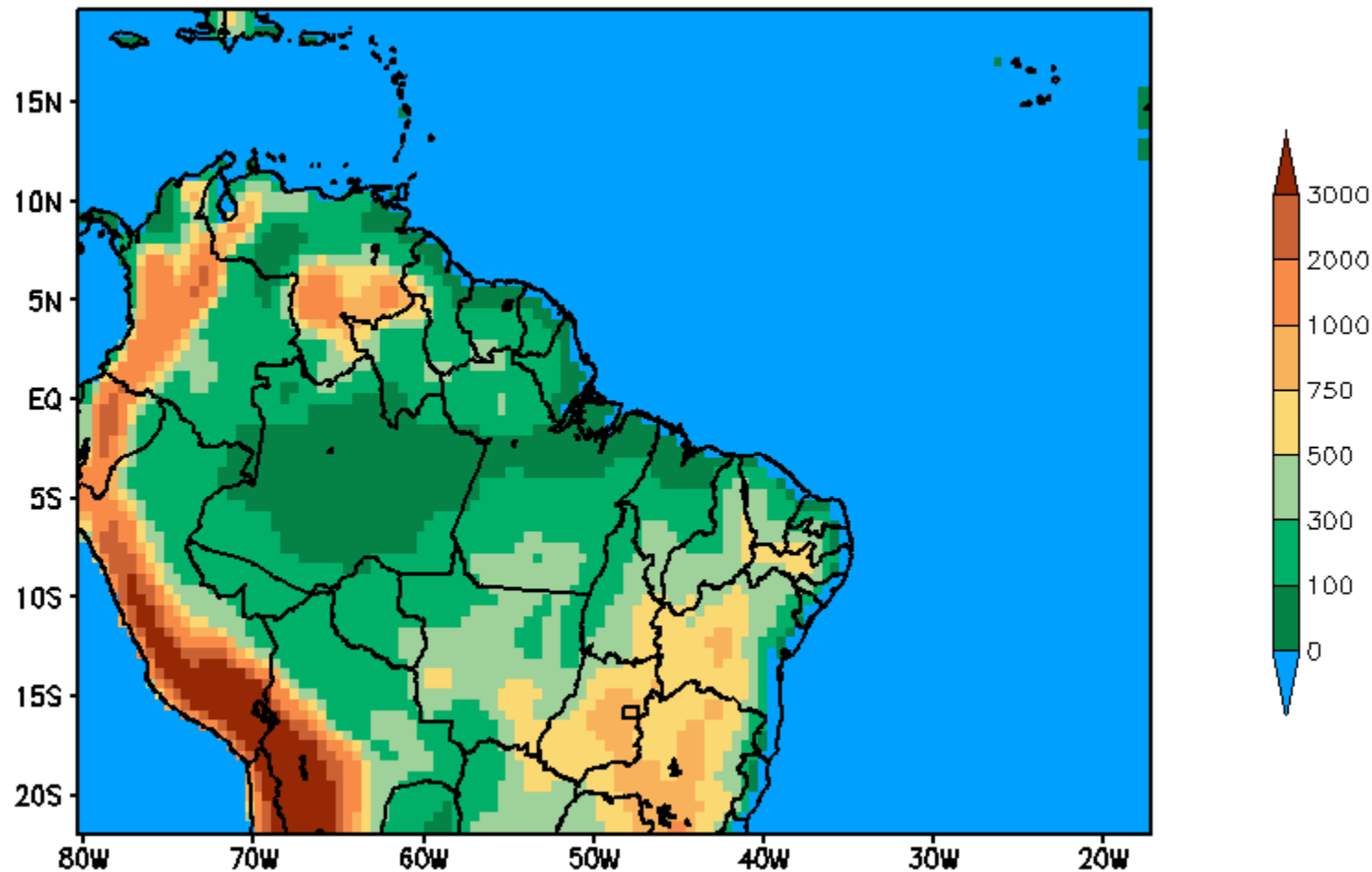
Period: 01Jan to 01May 2009

ICBC: EIN15 / OI_WK

Spin-up: 30 days (Jan 2009)

Convective scheme: GFC and MIT

RegCM4 Domain:



SENSITIVITY TEST → DSST SCHEME

RegCM4 with **CLM** with **DSST**

RegCM4 with **CLM** **without DSST**

AIM:

What is the effect of the SST scheme in reproducing surface atmospheric fields and the regional precipitation?

Model performance analysis:

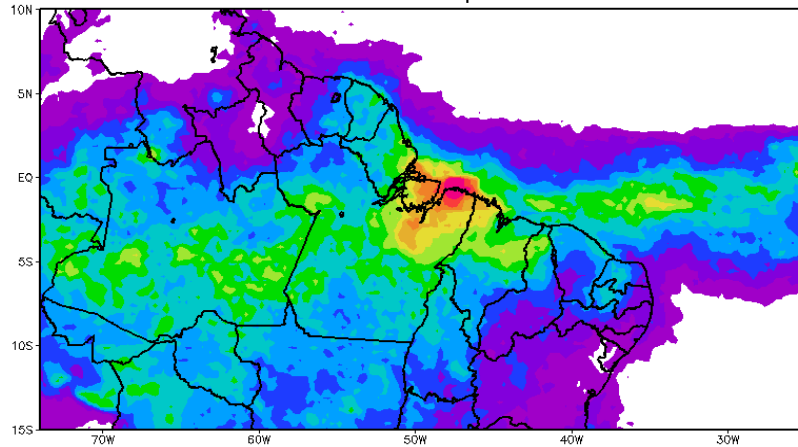
Dynamical fields → regional precipitation 

Observational data: TRMM, GPCP and GAUGE

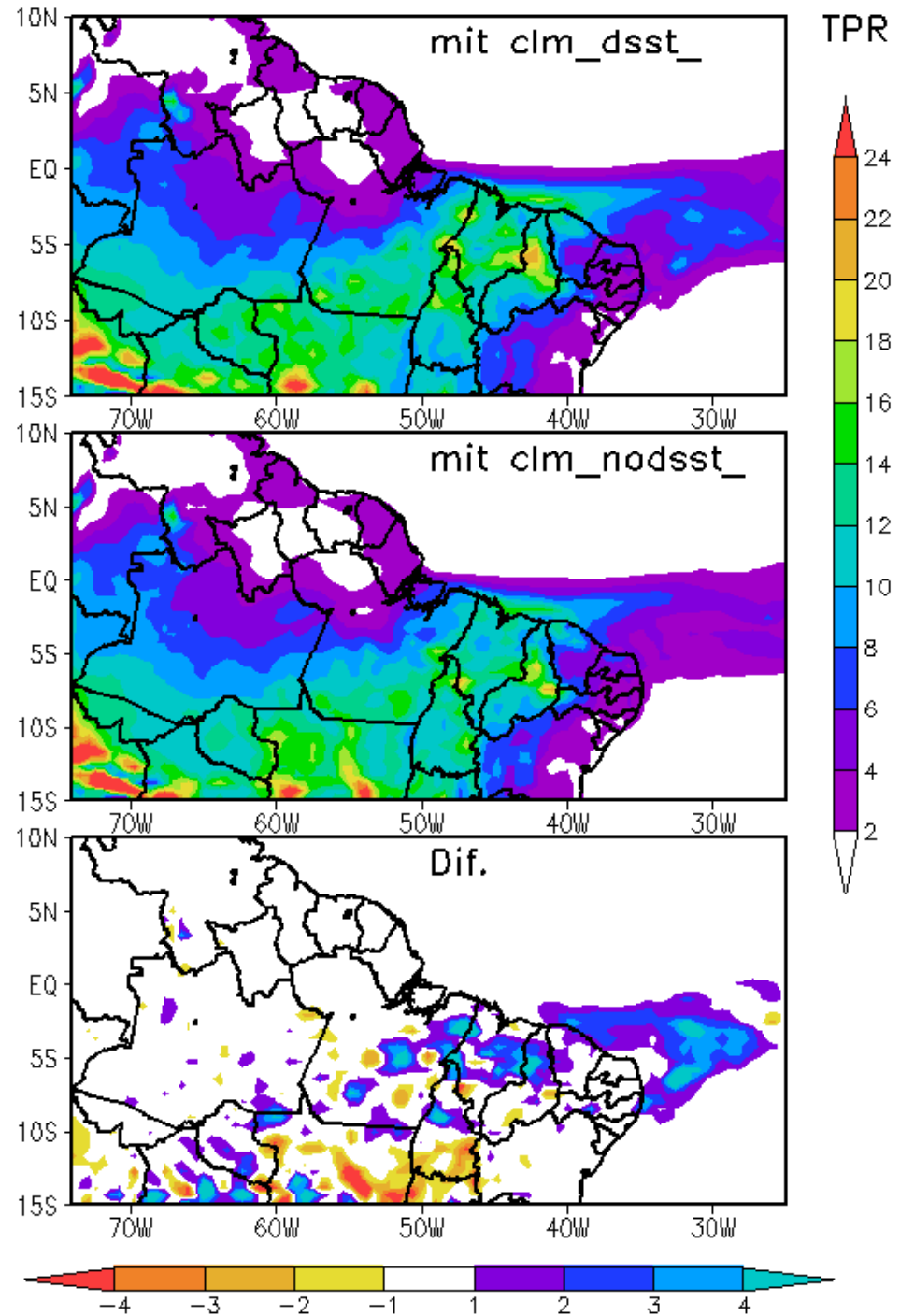
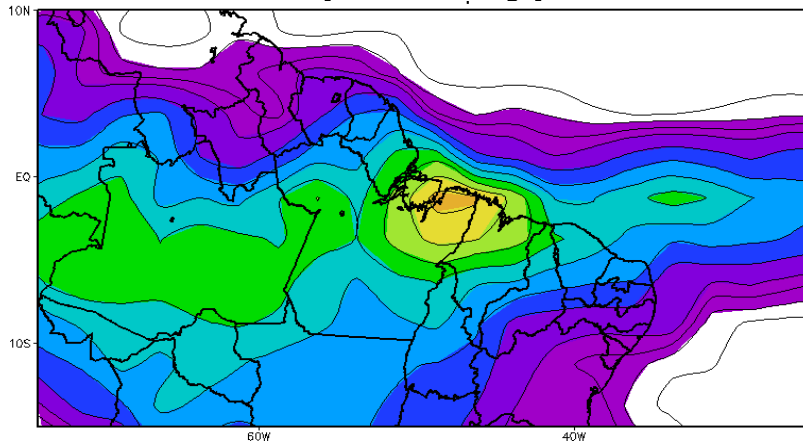
MIT

(tpr = total precipitation)

TRMM (mm/day)

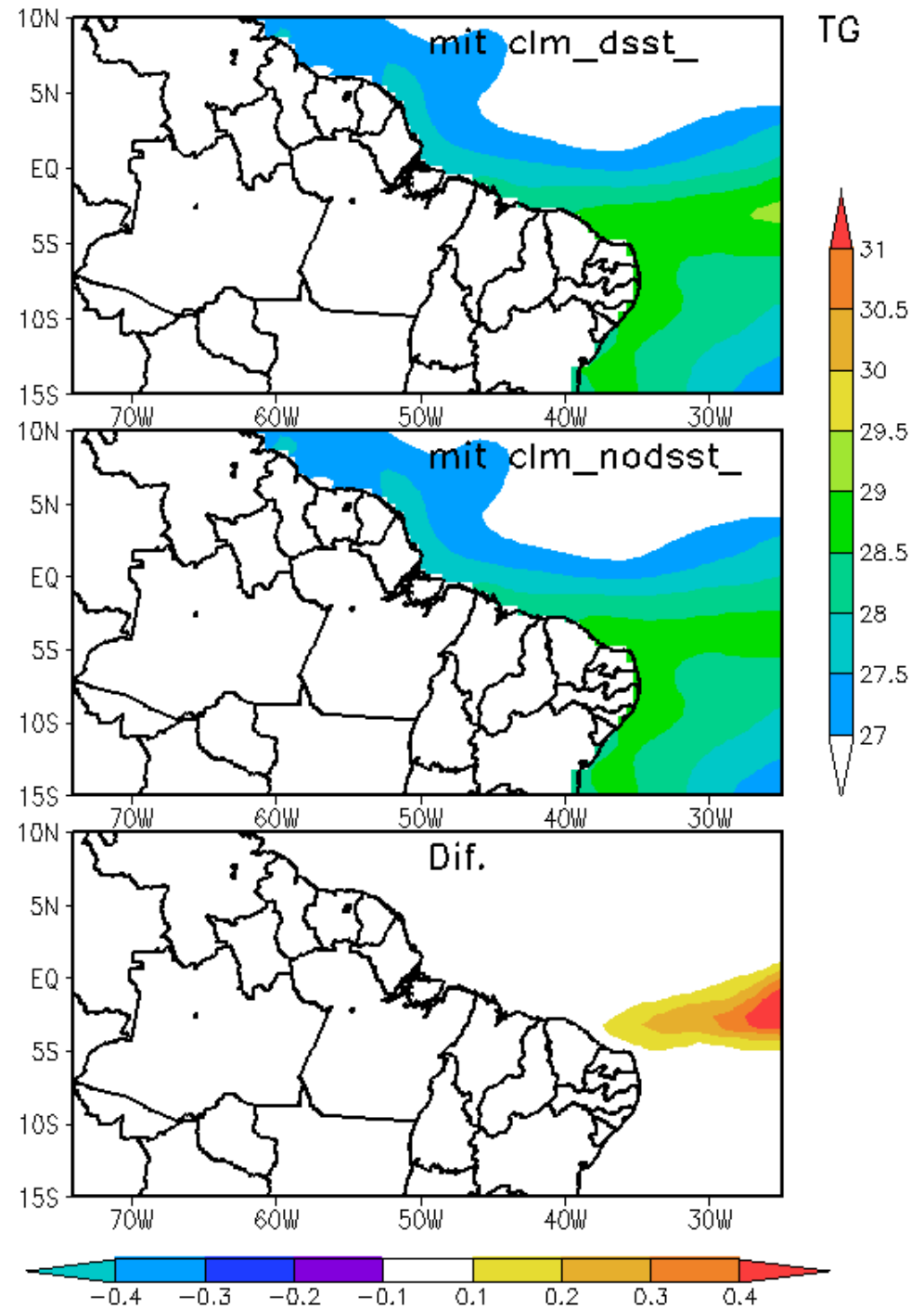


GPCP (mm/day)



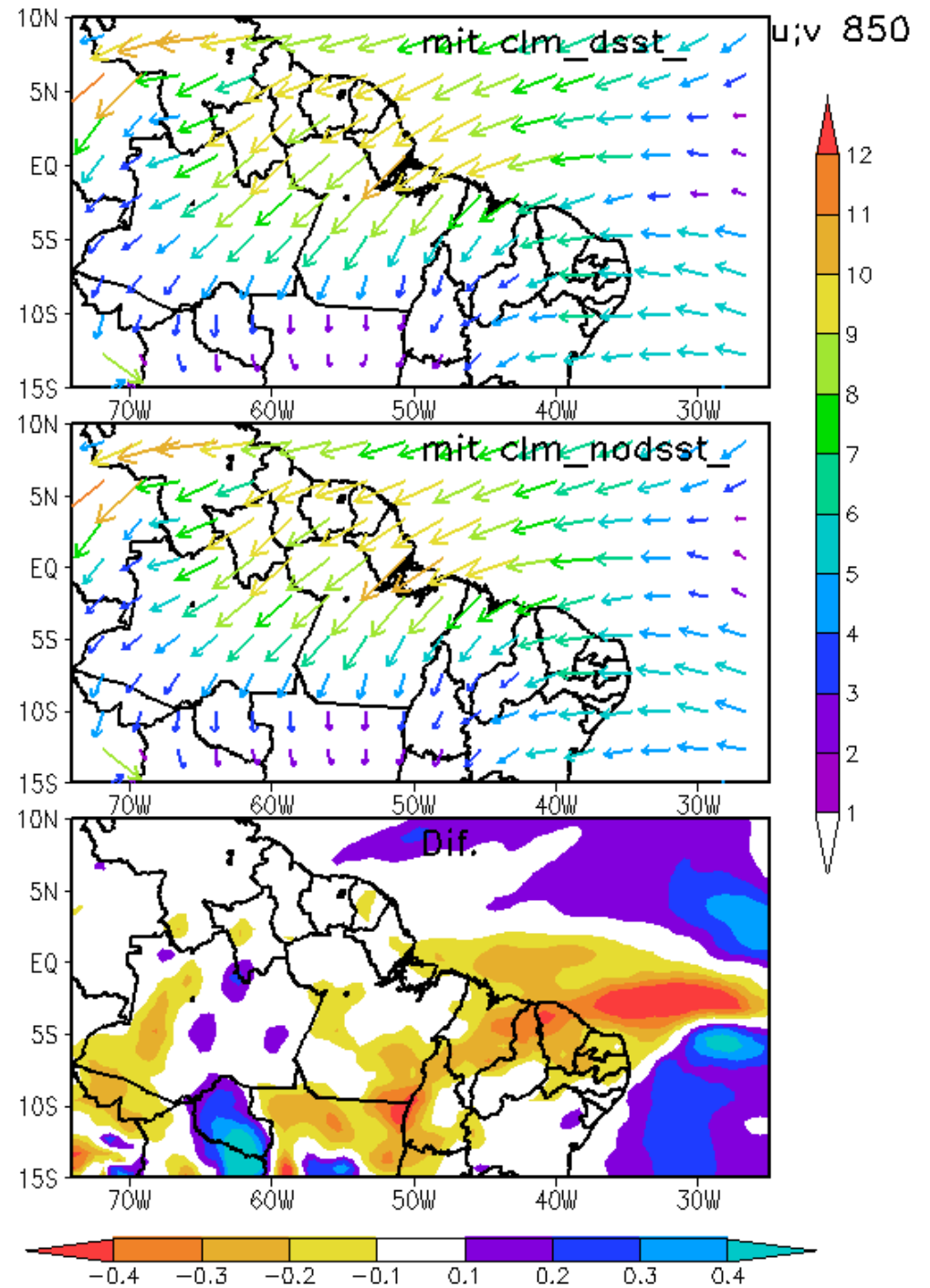
MIT

(tg = ground temperature)



MIT

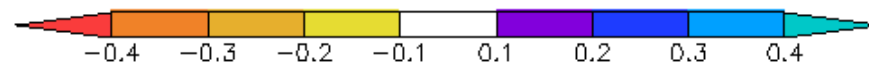
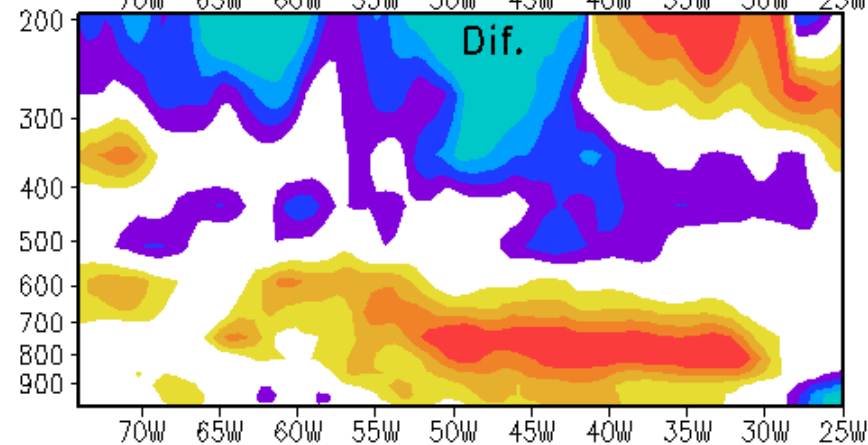
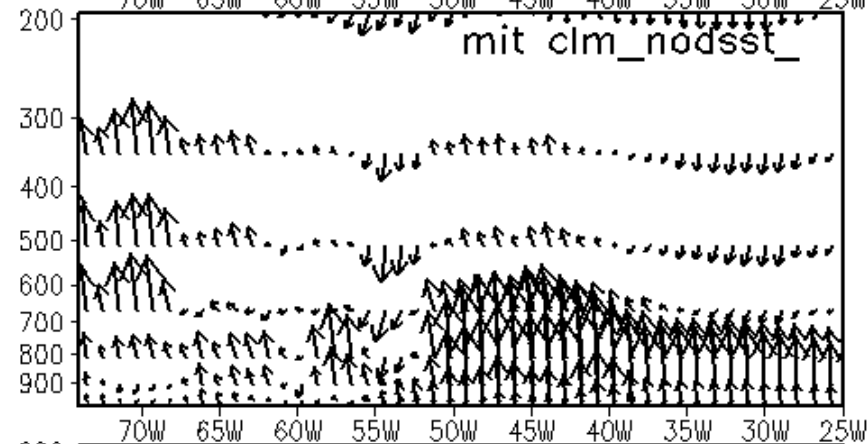
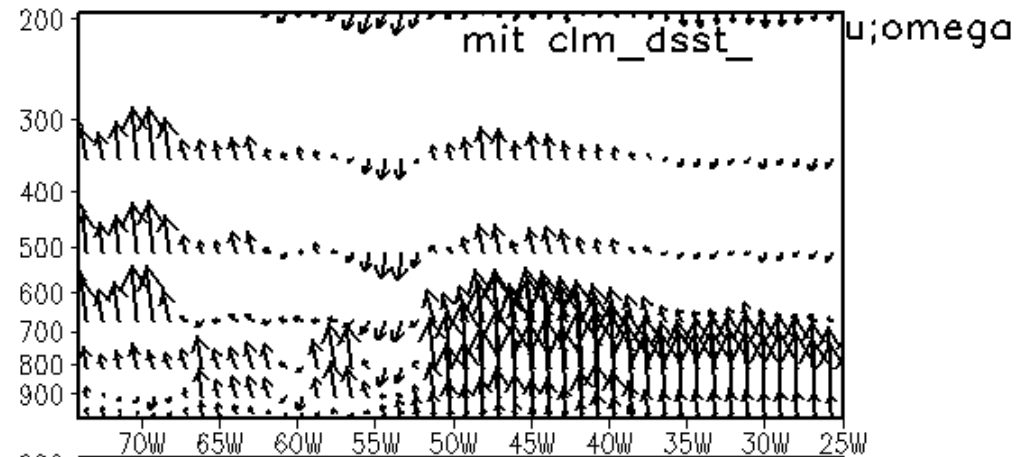
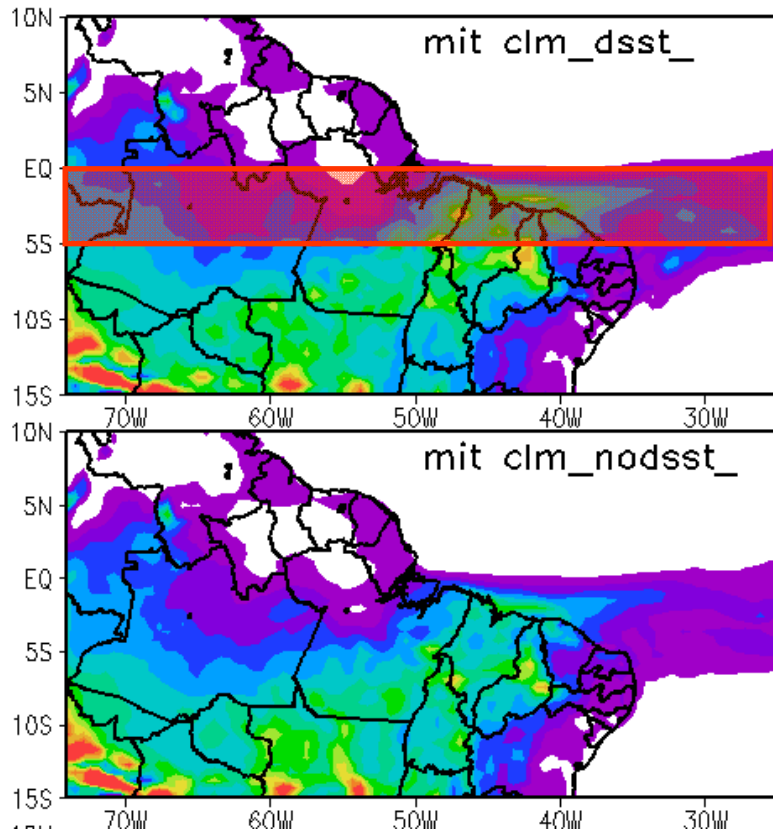
(Wind 850 hPa)



MIT

(Zonal circulation cross-section)

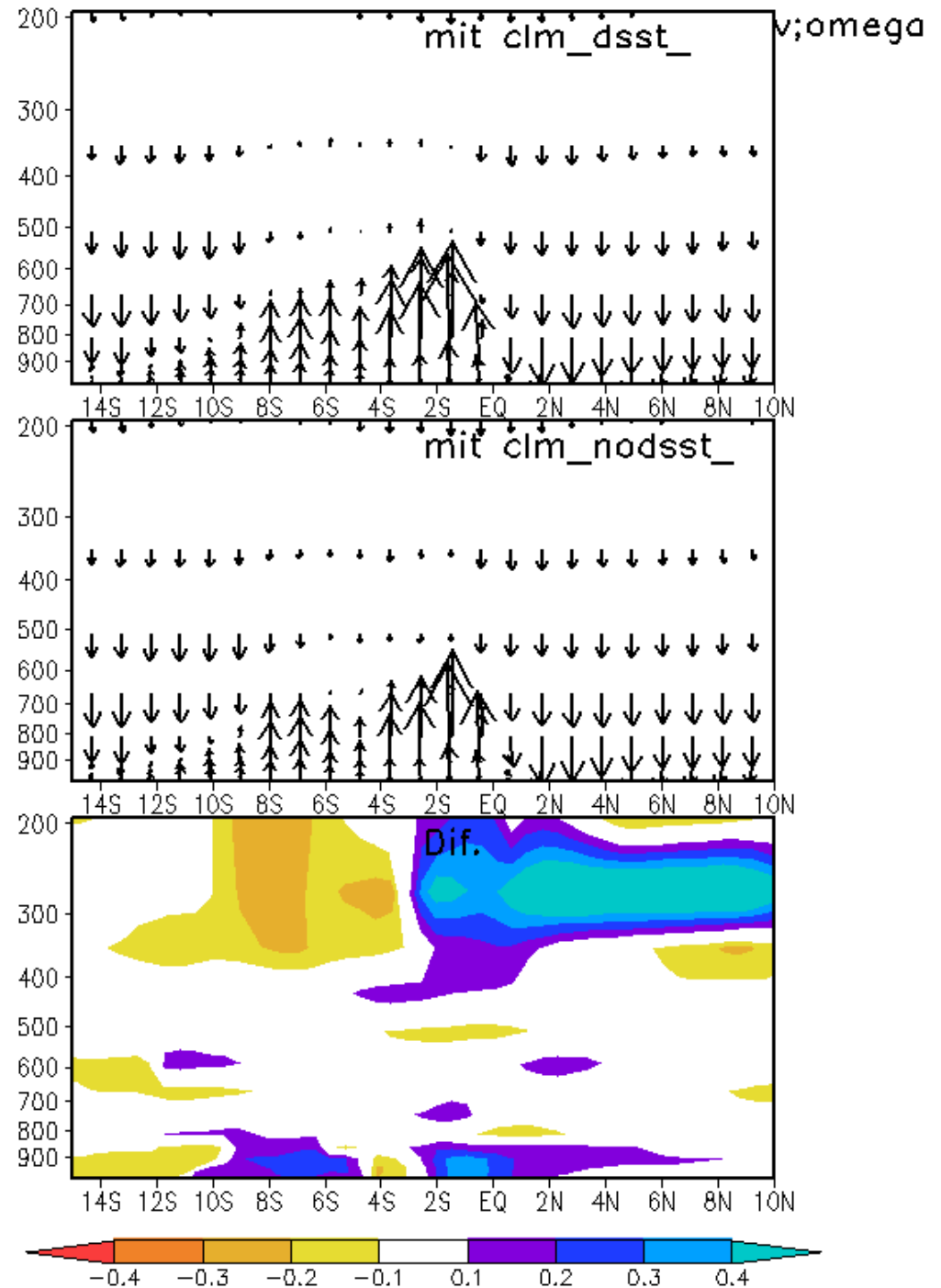
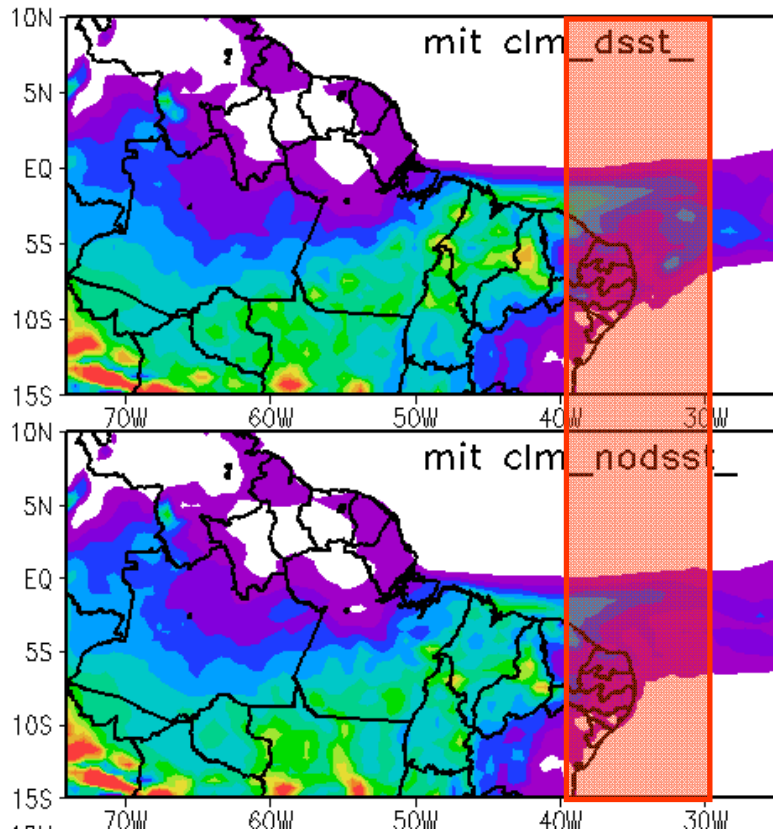
Local Walker cell:
Averaged area 5S-1N



MIT

(Meridional circulation cross-section)

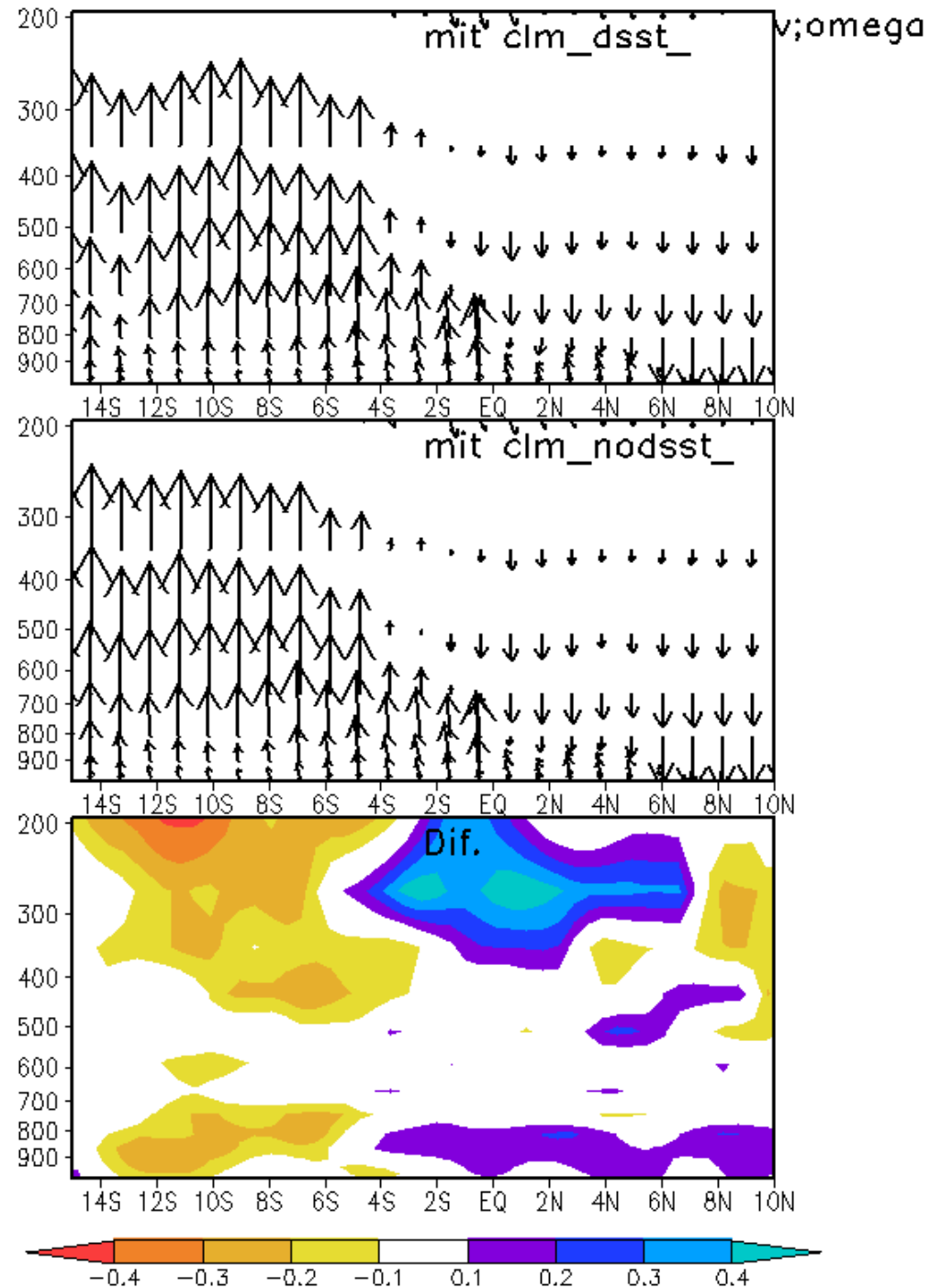
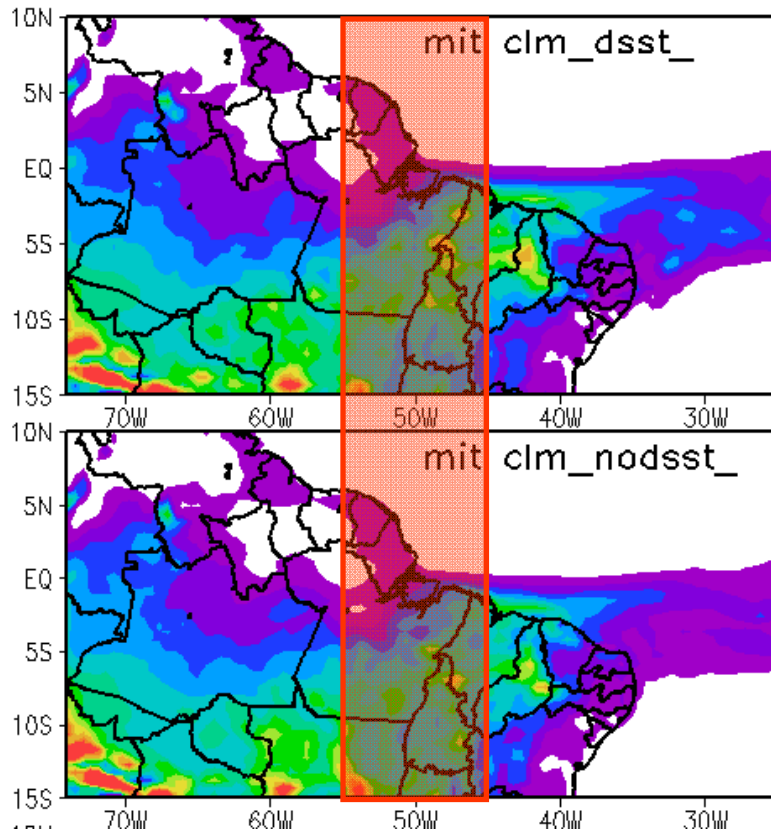
Local Hadley cell:
Averaged area 40W-30W



MIT

(Meridional circulation cross-section)

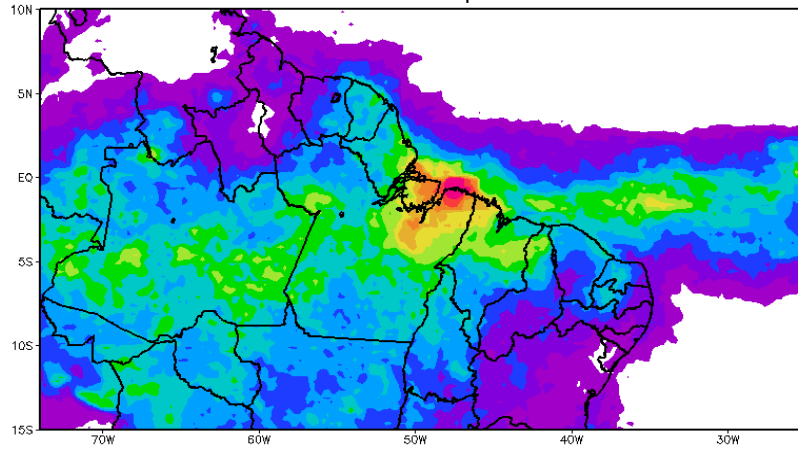
Local Hadley cell:
Averaged area 55W-45W



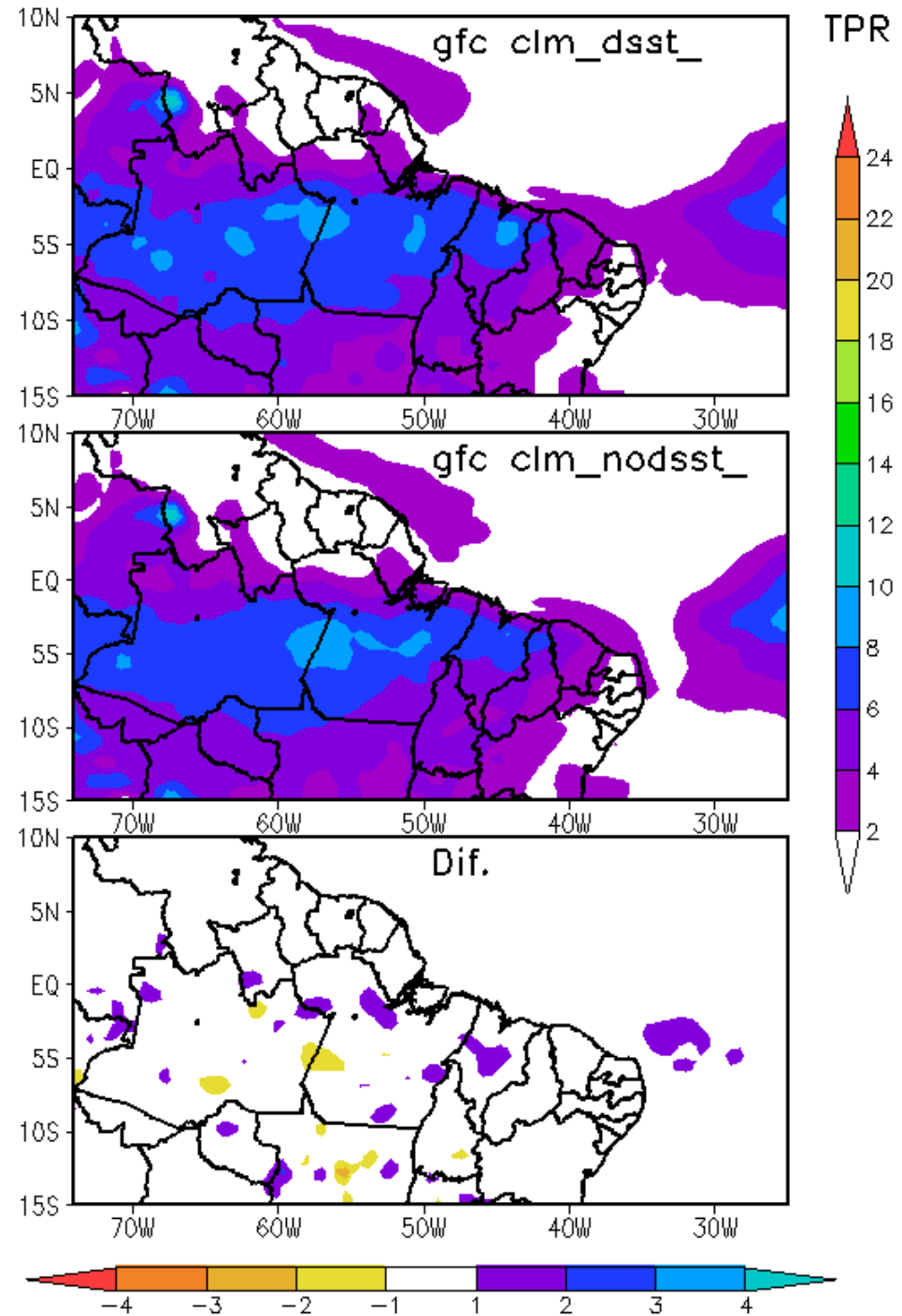
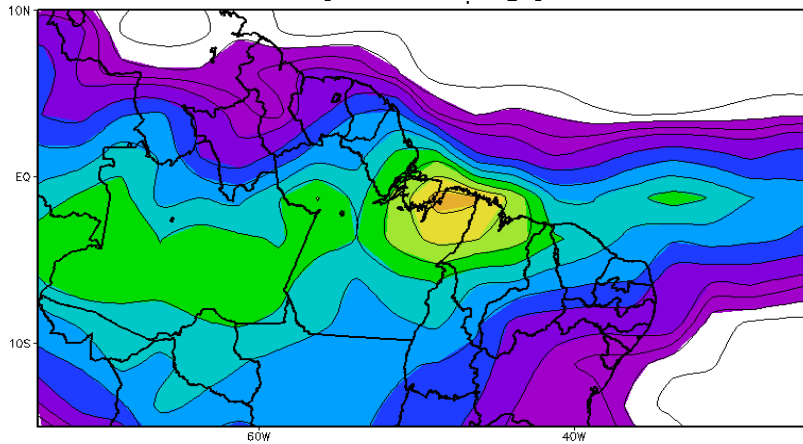
GFC

(tpr = total precipitation)

TRMM (mm/day)

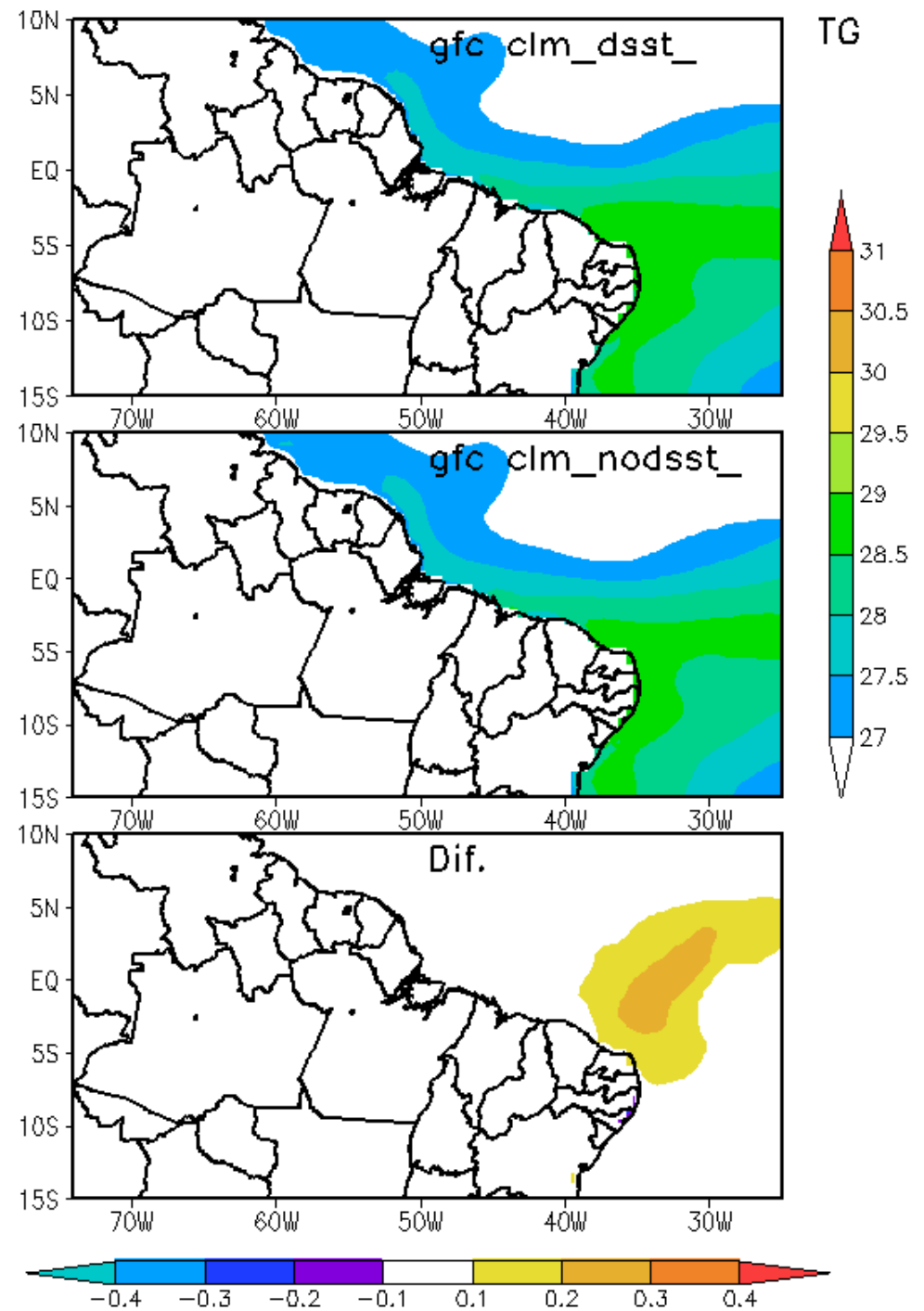


GPCP (mm/day)



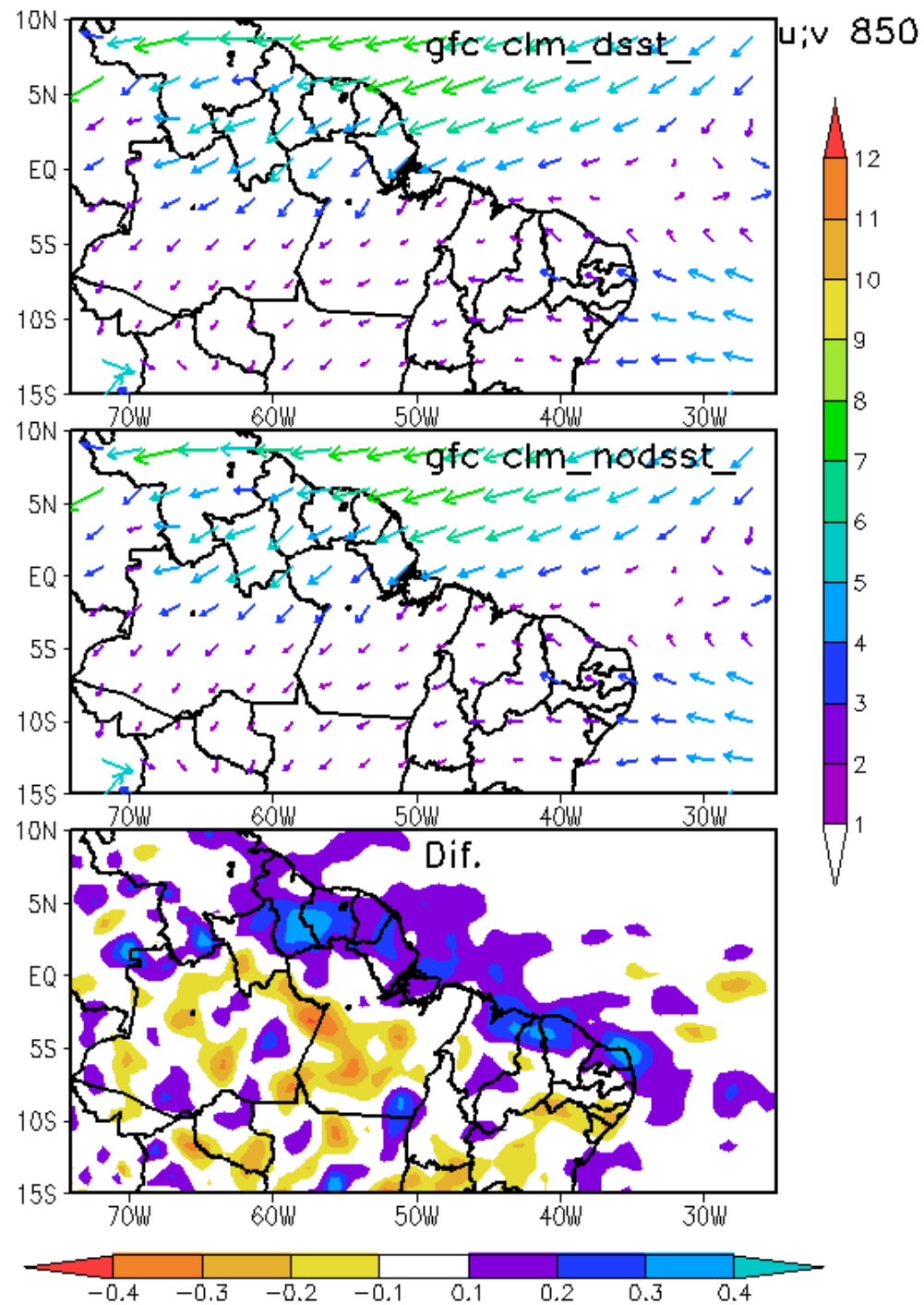
GFC

(tg = ground temperature)



GFC

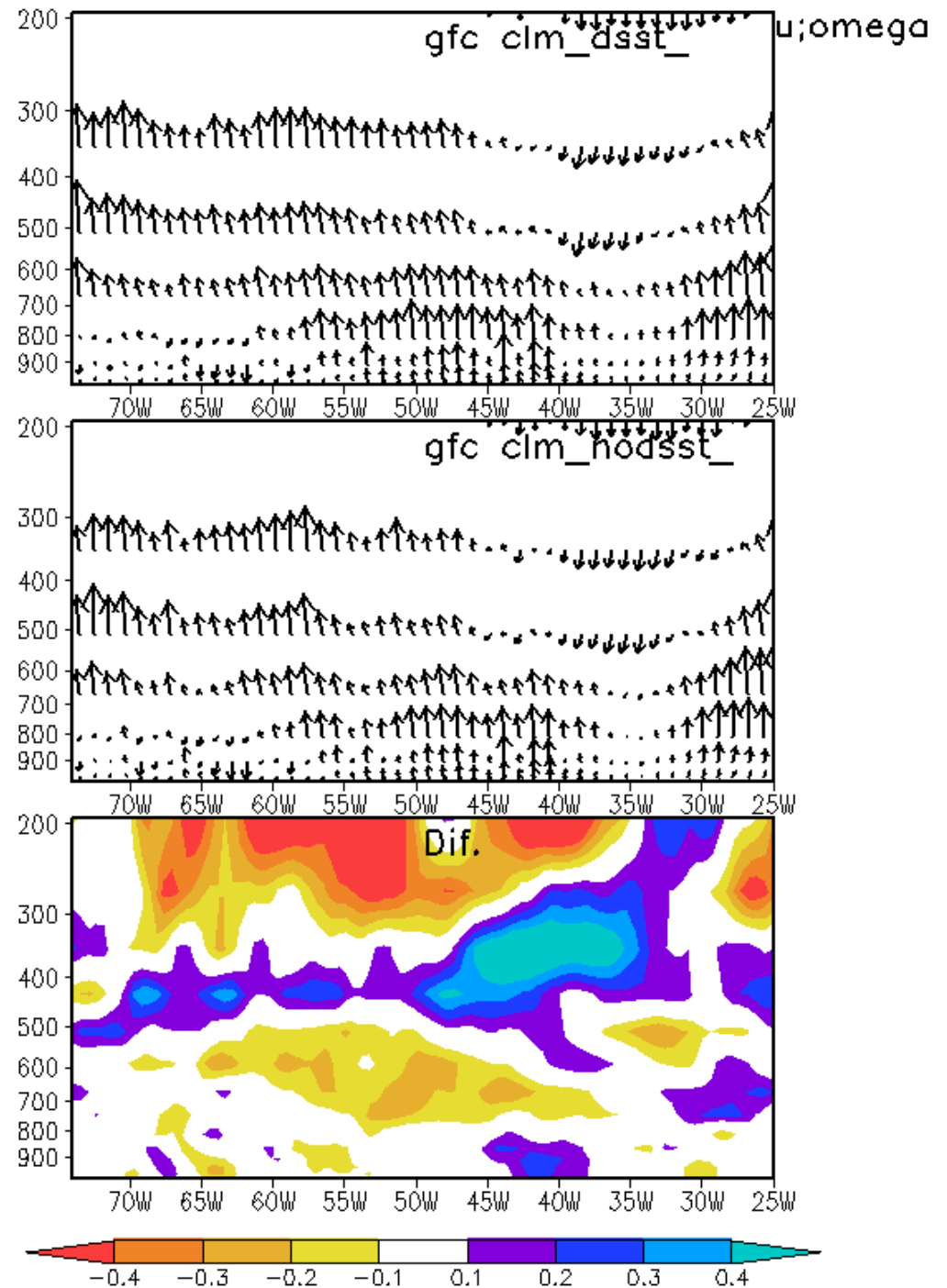
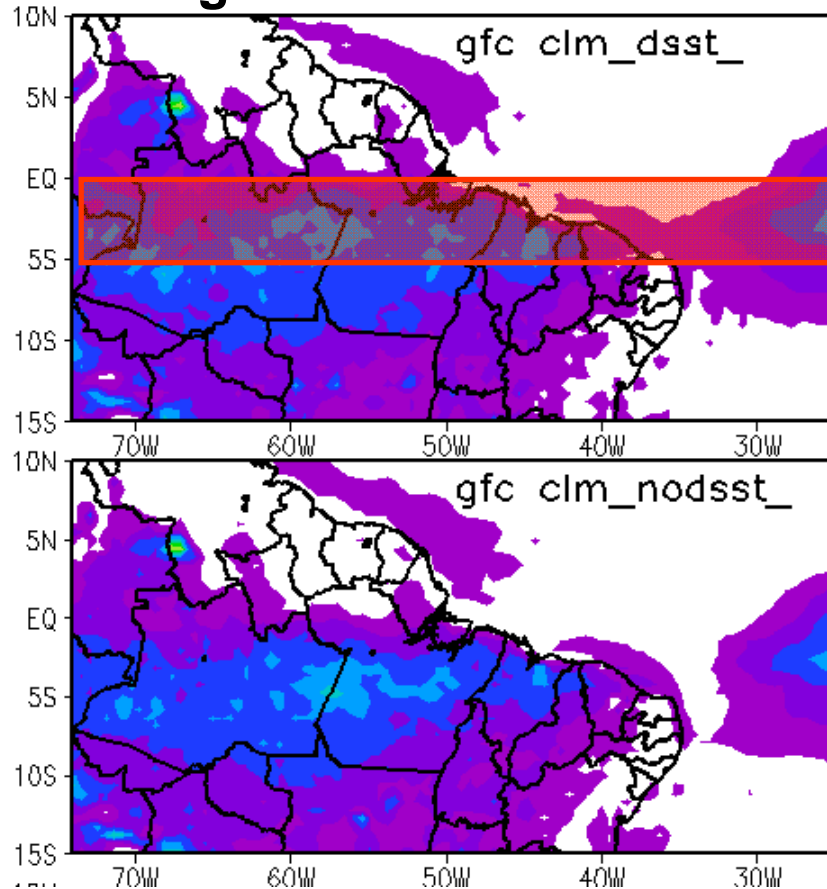
(Wind 850 hPa)



GFC

(Zonal circulation cross-section)

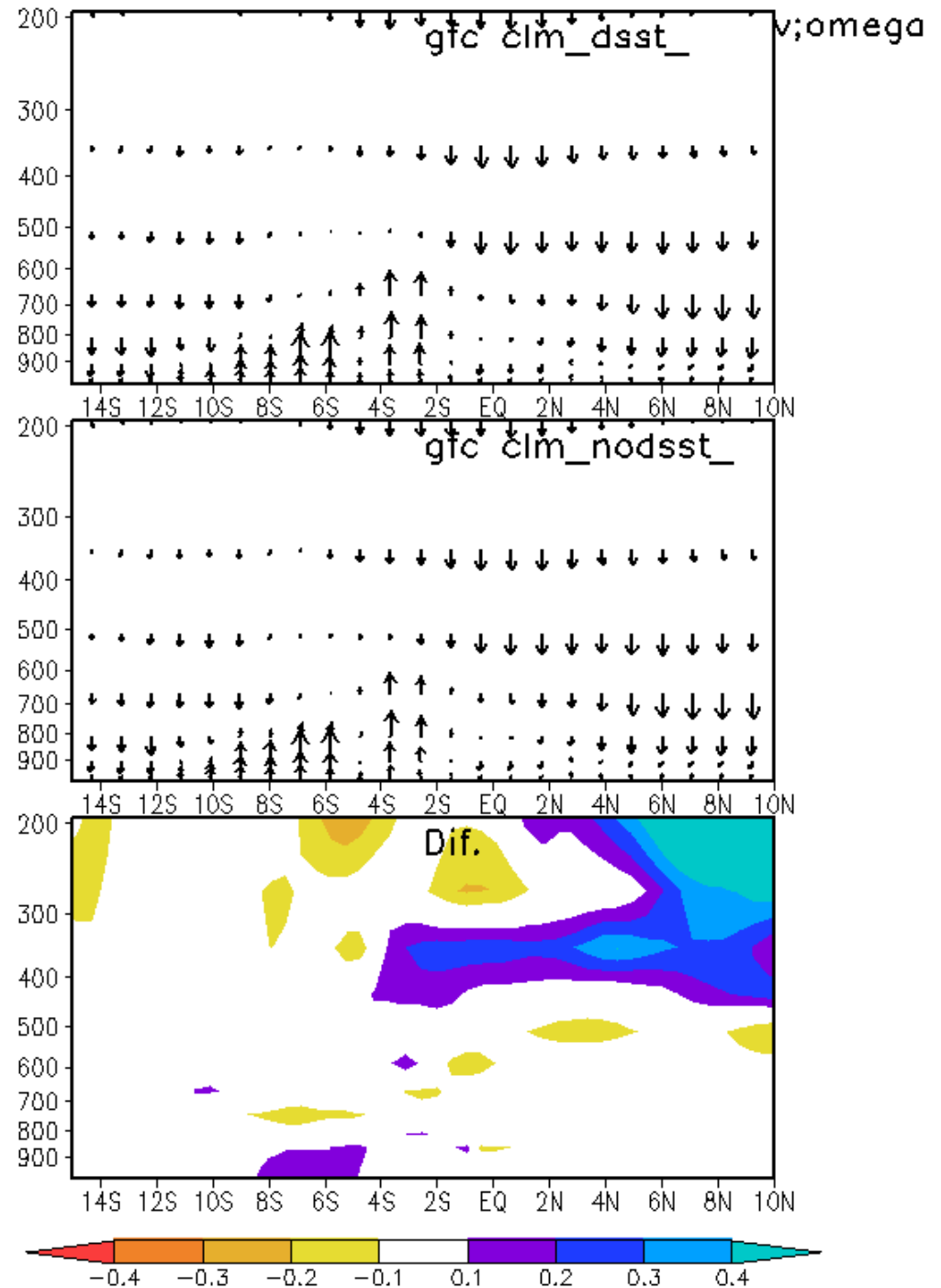
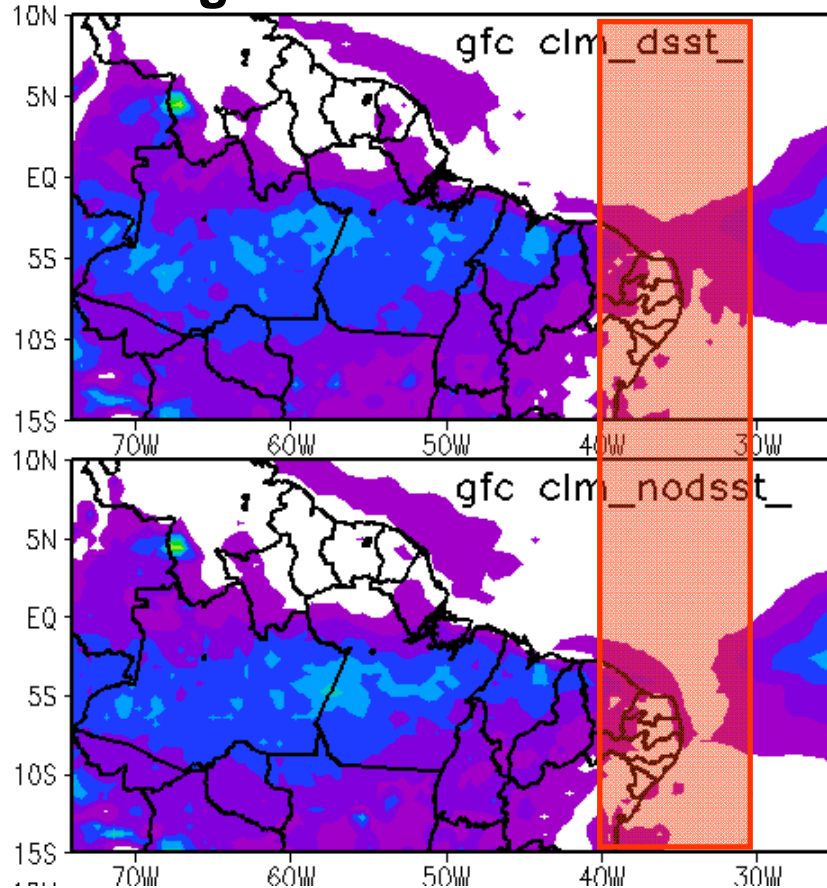
Local Walker cell:
Averaged area 5S-1N



GFC

(Meridional circulation cross-section)

Local Hadley cell:
Averaged area 40W-30W

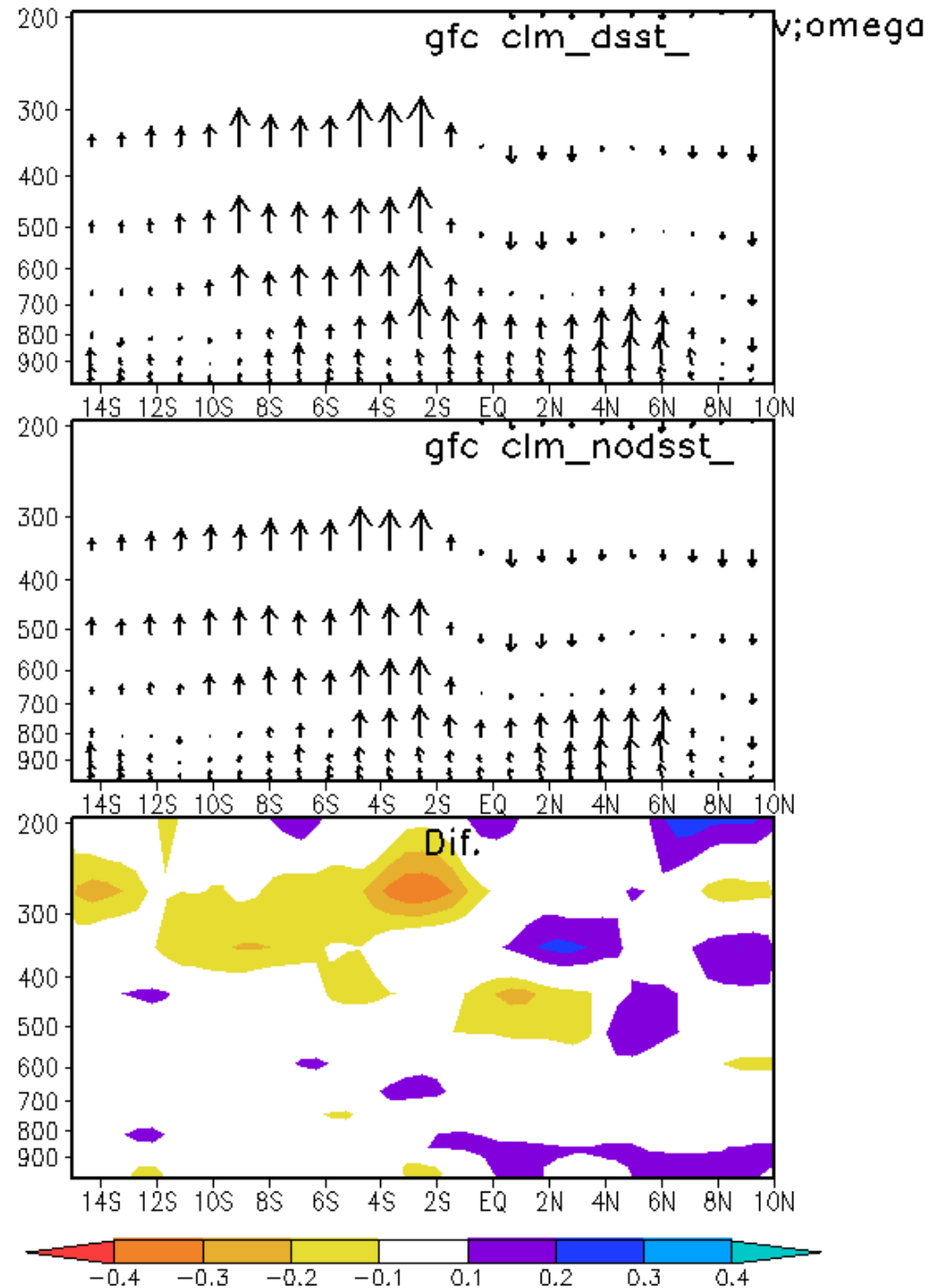
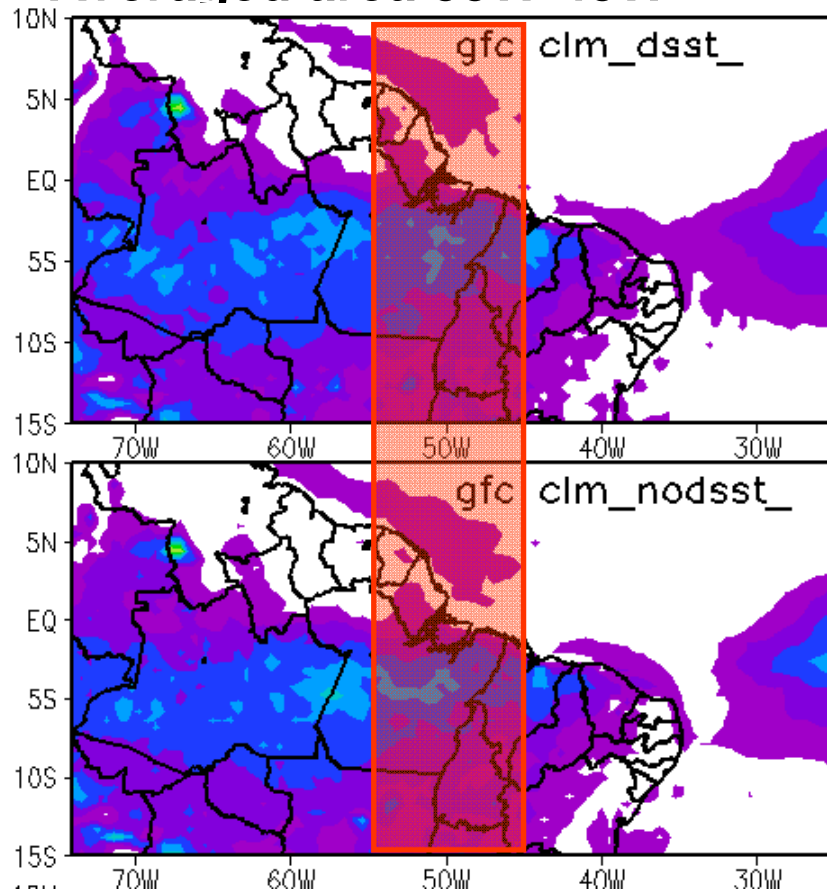


GFC

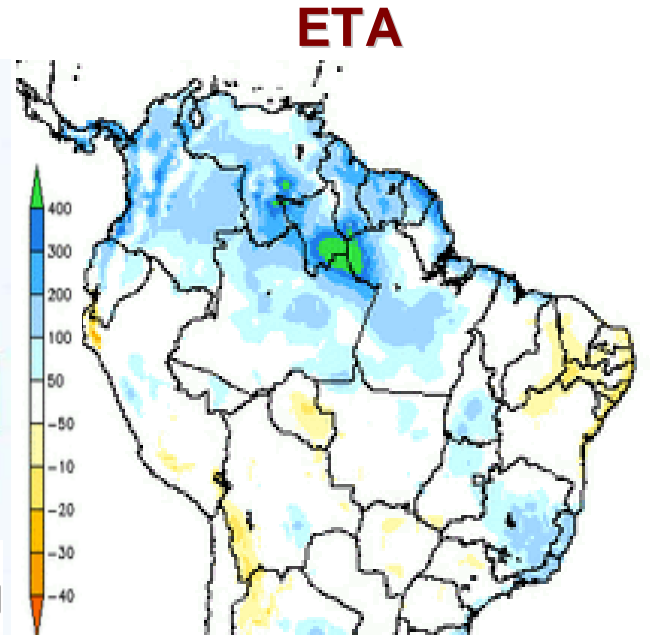
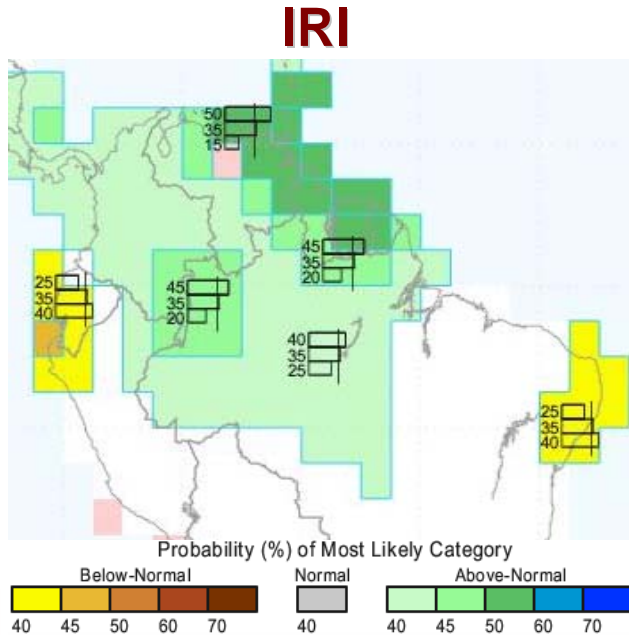
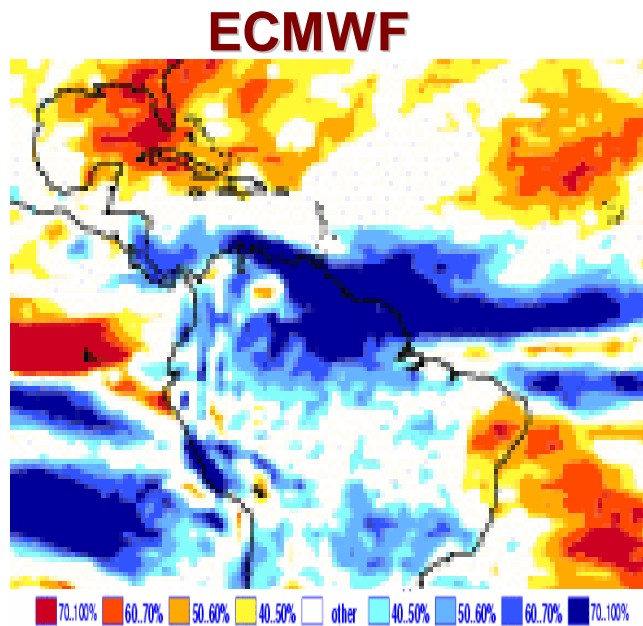
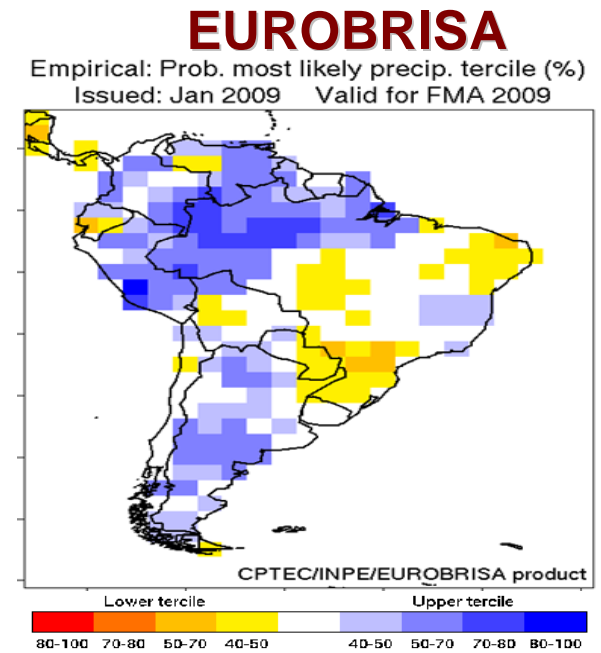
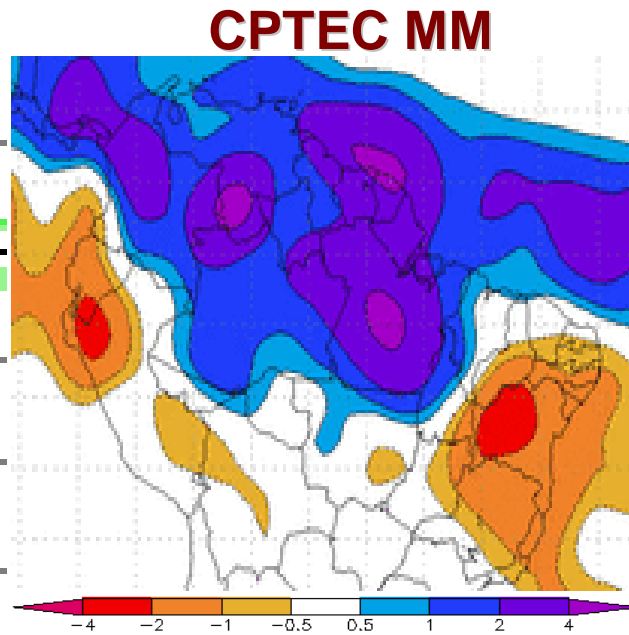
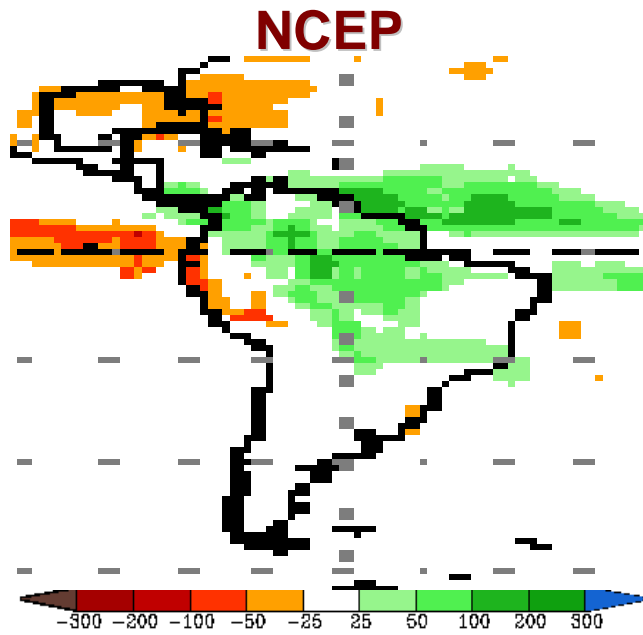
(Meridional circulation cross-section)

Local Hadley cell:

Averaged area 55W-45W



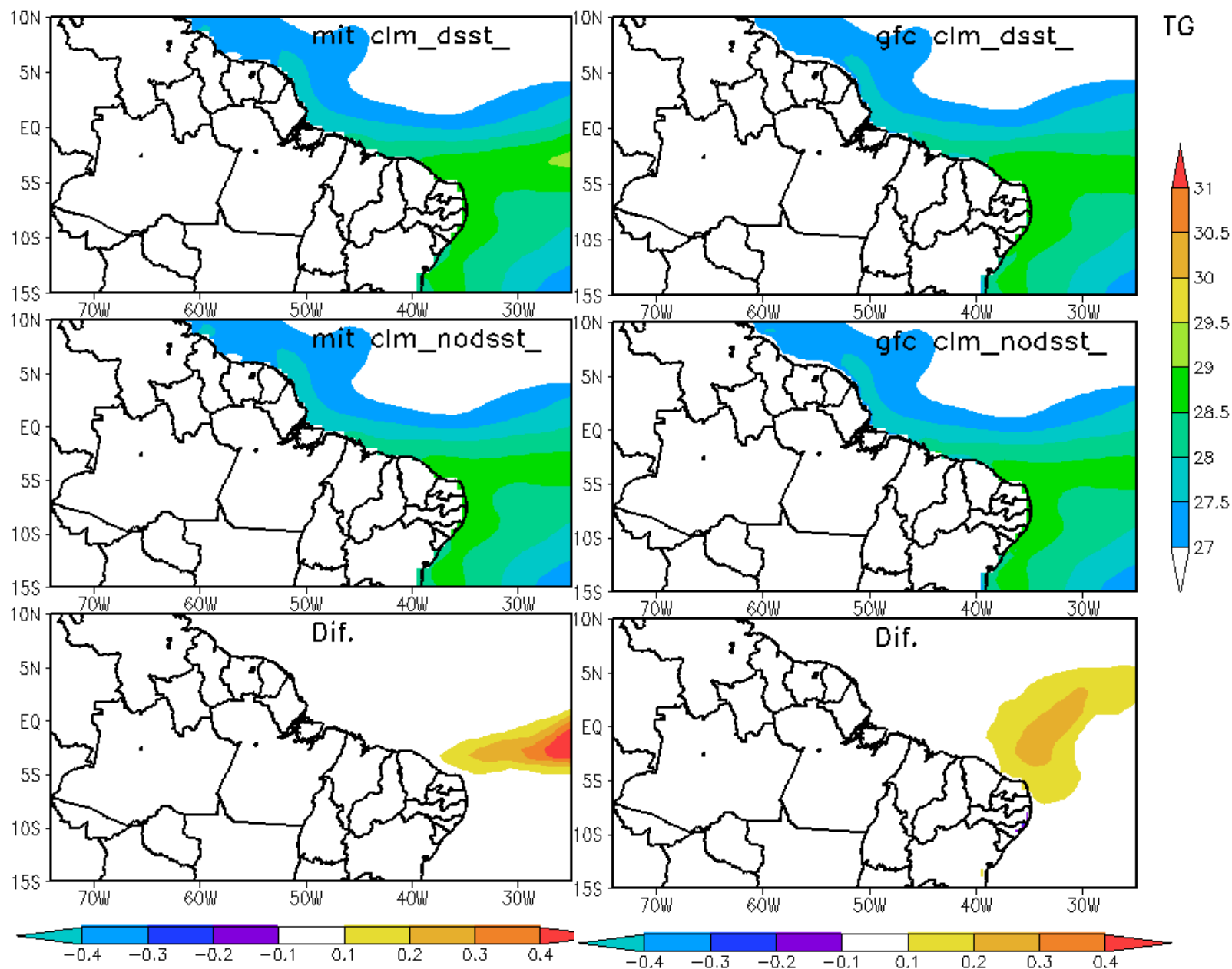
Others Seasonal forecast for FMA 2009 (issued in Jan/09)



RegCM4 CLM

MIT

GFC

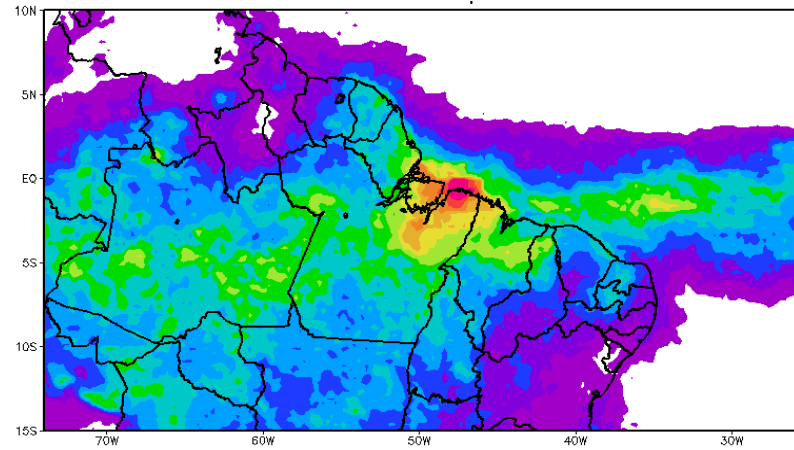


Some conclusions:

- Over the equatorial Atlantic Ocean, DSST scheme produces SST warmer with MIT than GFC, thereby possible influences on surface wind patterns;

These findings are only for 2009 conditions. So, it is necessary more simulations including another years.

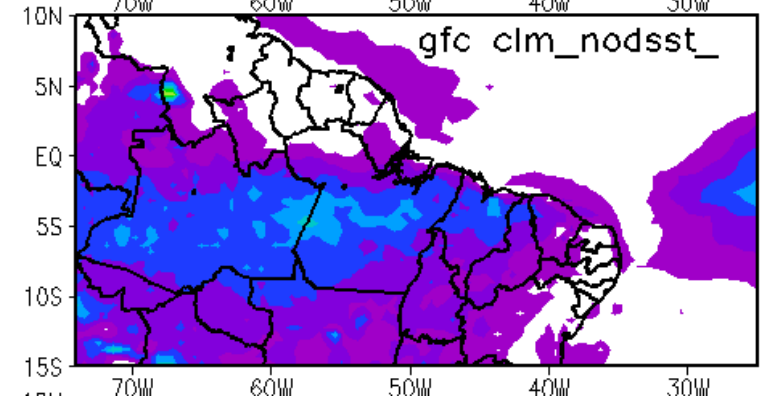
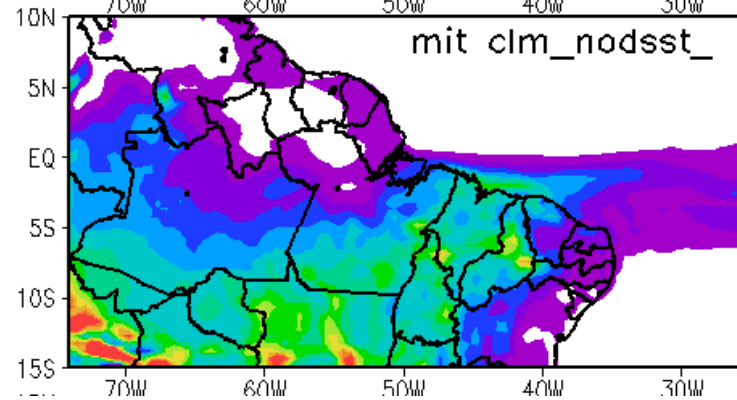
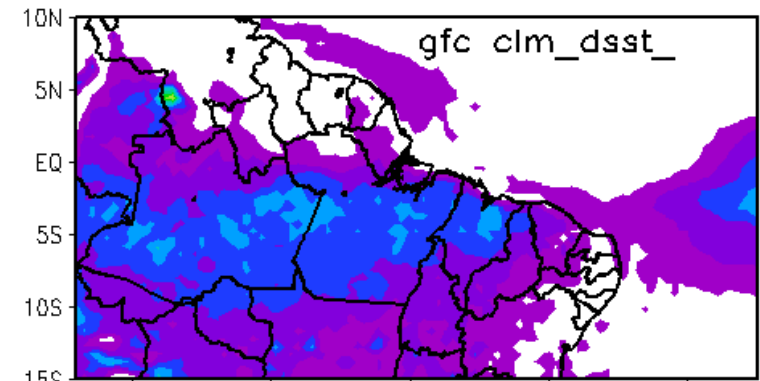
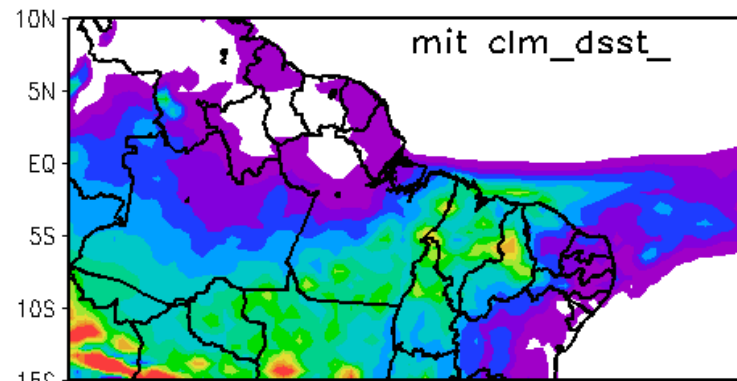
TRMM (mm/day)



RegCM4 CLM

MIT

GFC



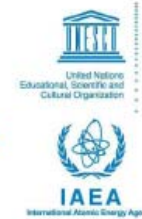
Some conclusions:

- Oceanic rainfall maximum over equatorial Atlantic is slightly well reproduced by MIT and GFC not;
- Over land in Amazon, although GFC has negative bias, it localizes well maximum in central-western and eastern portions; MIT shifts maximum toward south Amazon and Brazil Nordeste;
- The wind patterns predicted by RegCM4 is dynamically consistent with rainfall distribution.

*To be done (E. De Souza, Do Carmo & Rosmeri):
tunning RegCM4 for Amazon basin...*



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Muito obrigado!
Thank you very much!

