



# Influence of the South American Monsoon on the Atlantic

the Atlantic temperature bias

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INPE/CPTEC-CCST

Workshop on Coupled Ocean-Land-Atmosphere  
processes in the Tropical Atlantic

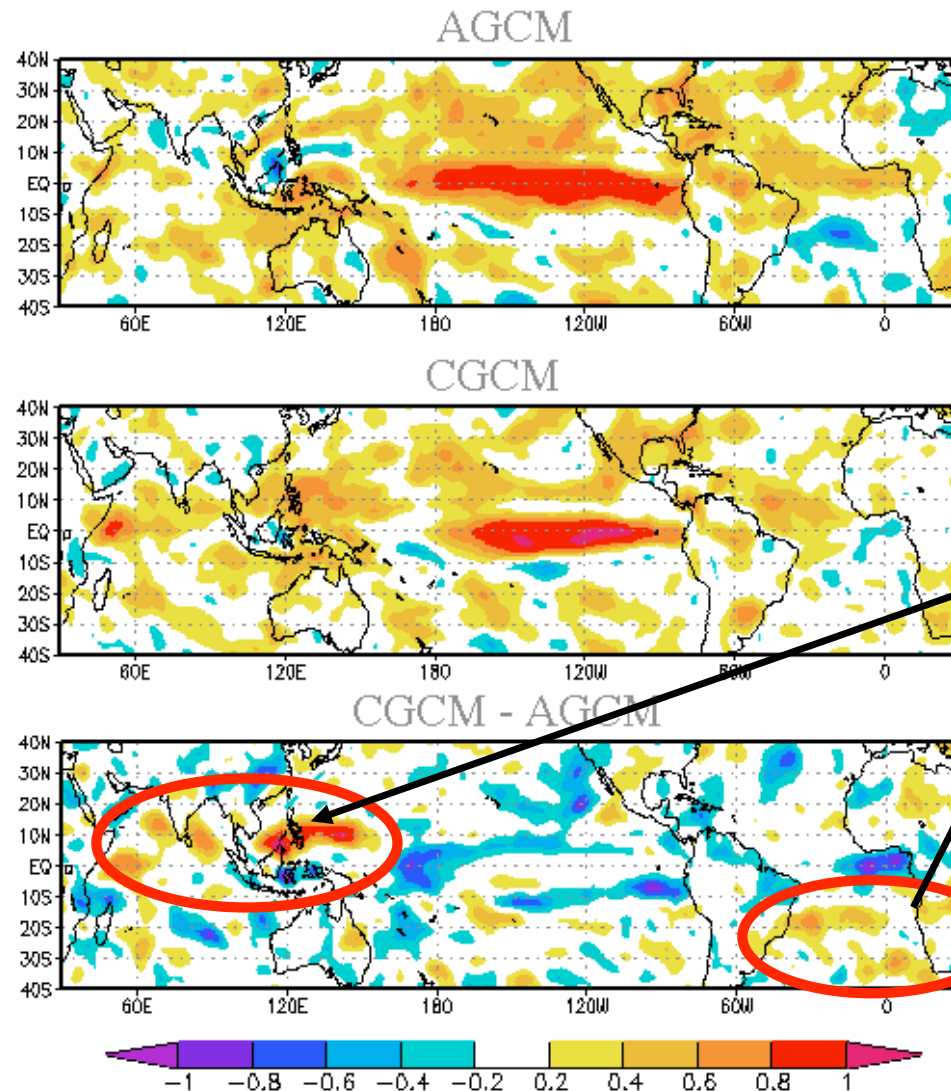
Miami, 24 March 2011





# Coupled Ocean-Atmosphere processes at play

## DJF Precipitation Forecasts anomaly correlations

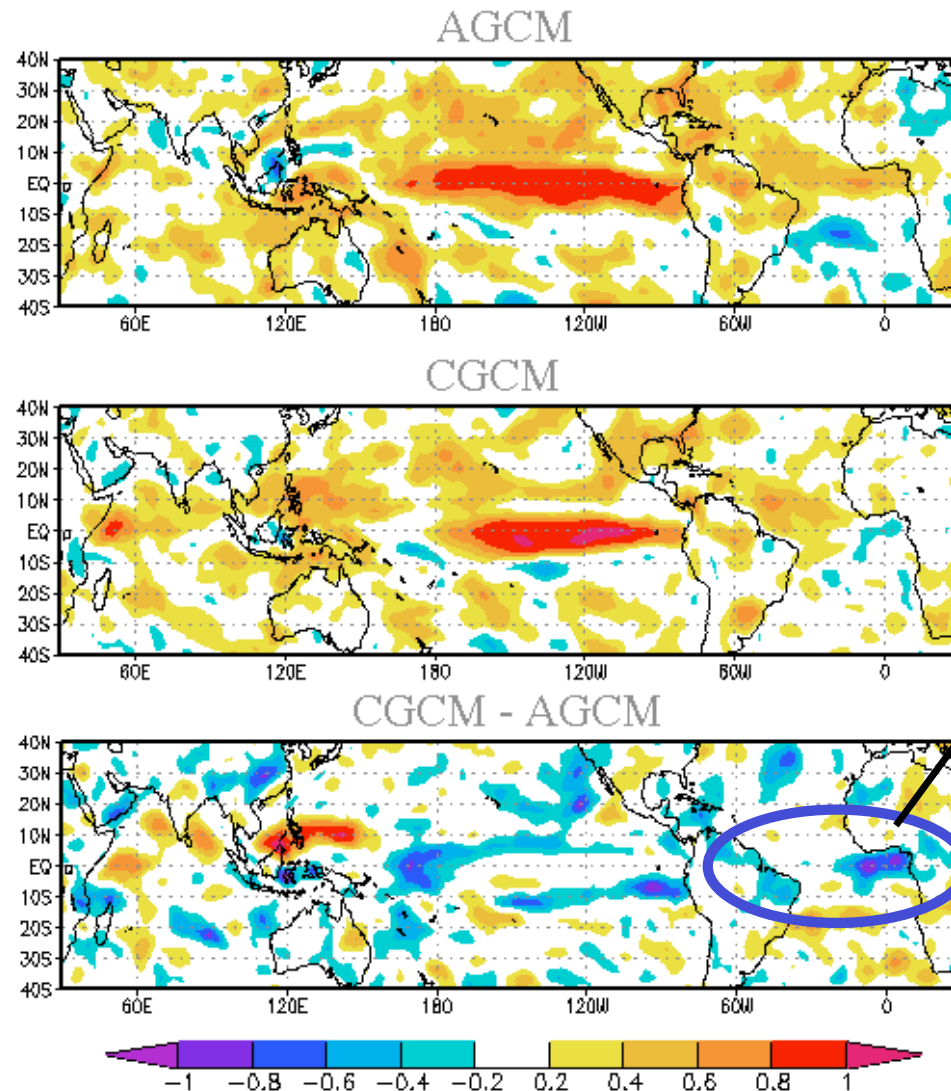


**Increased  
Coupled  
Model  
Forecast  
Skill**



# Coupled Ocean-Atmosphere processes at play

## DJF Precipitation Forecasts anomaly correlations



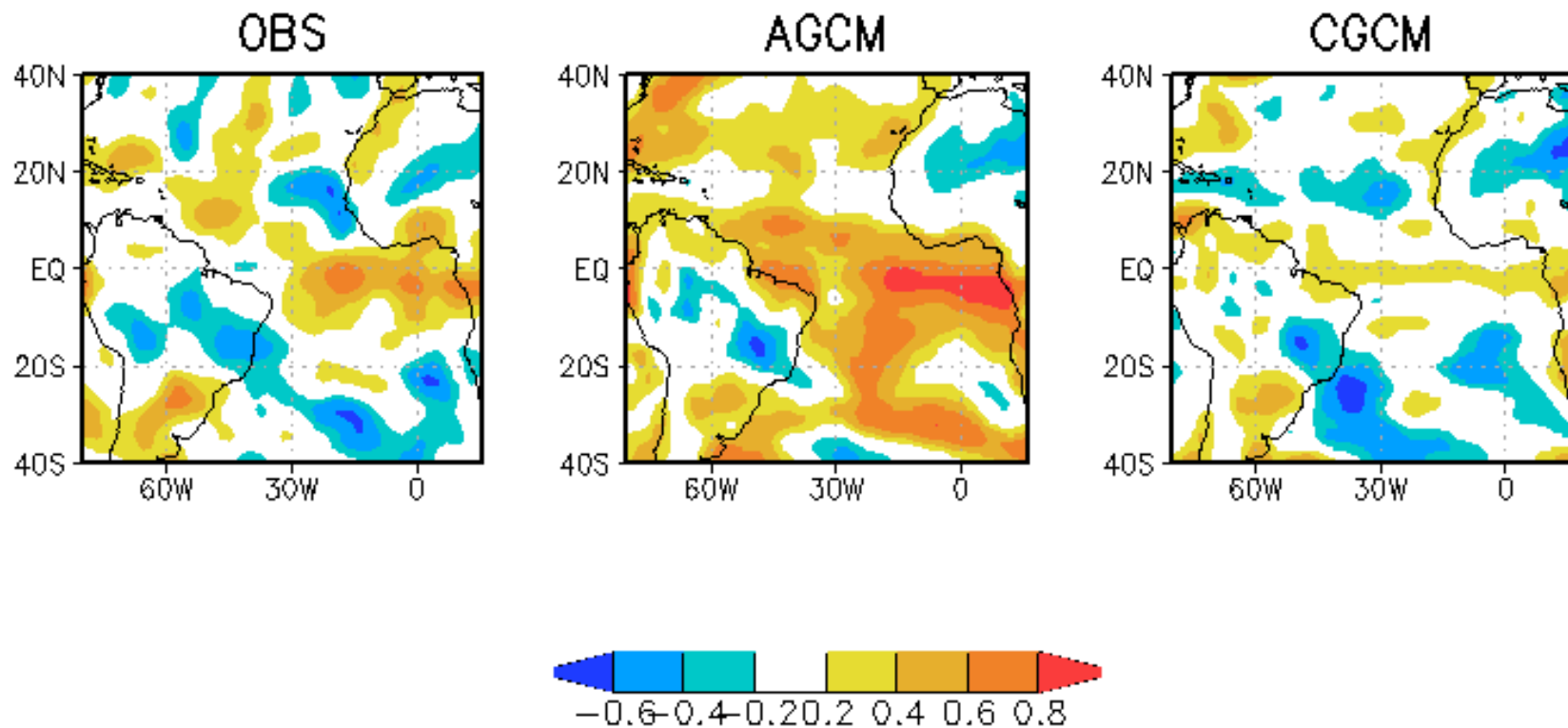
**Decreased  
Coupled  
Model  
Forecast  
Skill**

Nobre et al. (2011, in prep)



# Coupled Model ability to Forecast rainfall over cold waters

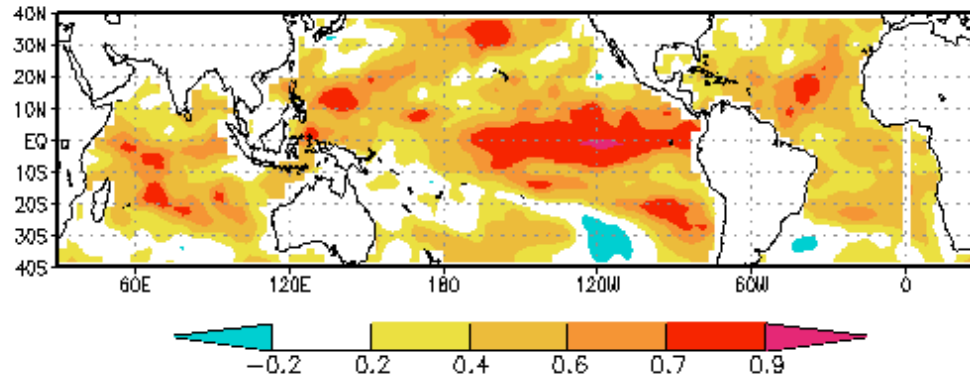
DJF rainfall – Sfc Temperature Anomaly Correlations  
November IC



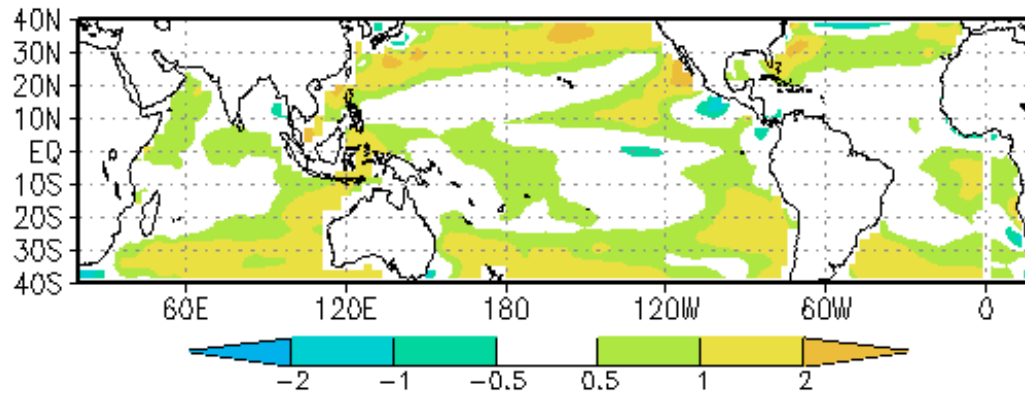


# CPTEC CGCM x OISST DJF TEMP ACOR

## NOV IC



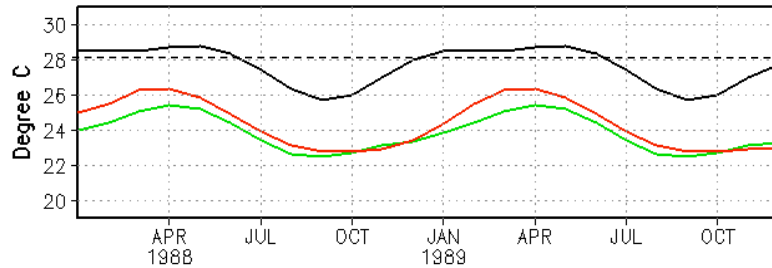
# BIAS DJF TEMP (deg C) IC NOV CPTEC CGCM x OISST



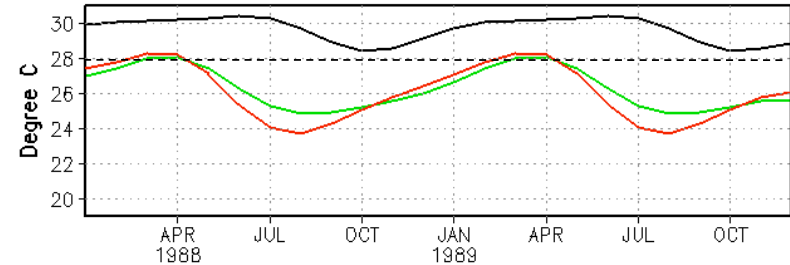


# Eastern Oceans' Coupled O-A Interactions

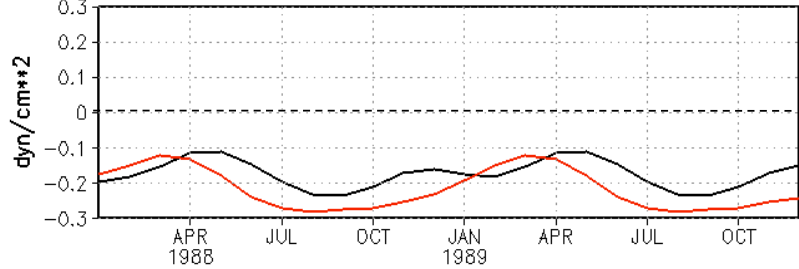
CGCM OGCM OI SST Eastern Eq. Pacific Climo



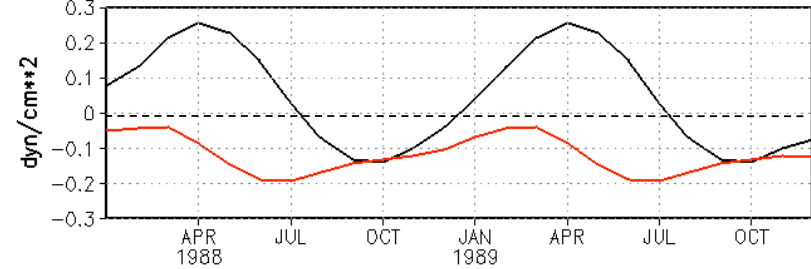
CGCM OGCM OI SST Eastern Eq. Atlantic Climo



CGCM & NCEP Reanalysis TAUX Eastern Eq. Pacific Climo



CGCM & NCEP Reanalysis TAUX Eastern Eq. Atlantic Climo



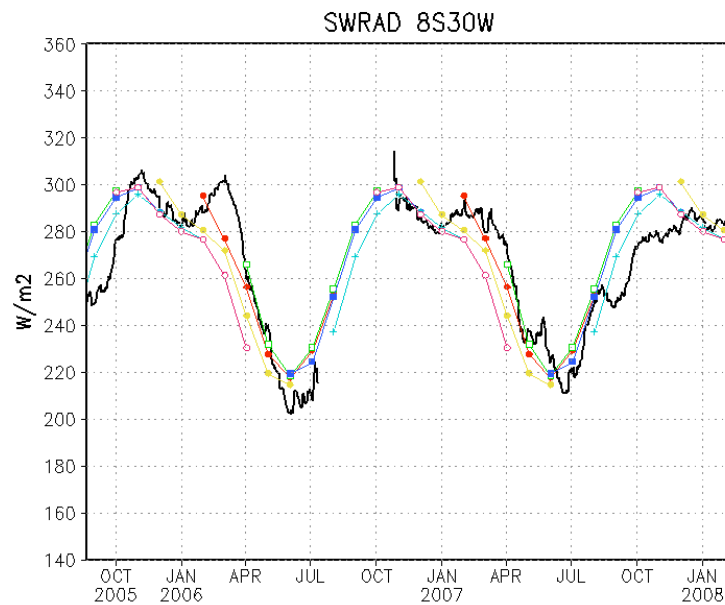
- CGCM Climatology
- OGCM Climatology
- OI-SST / NCEP Reanalysis



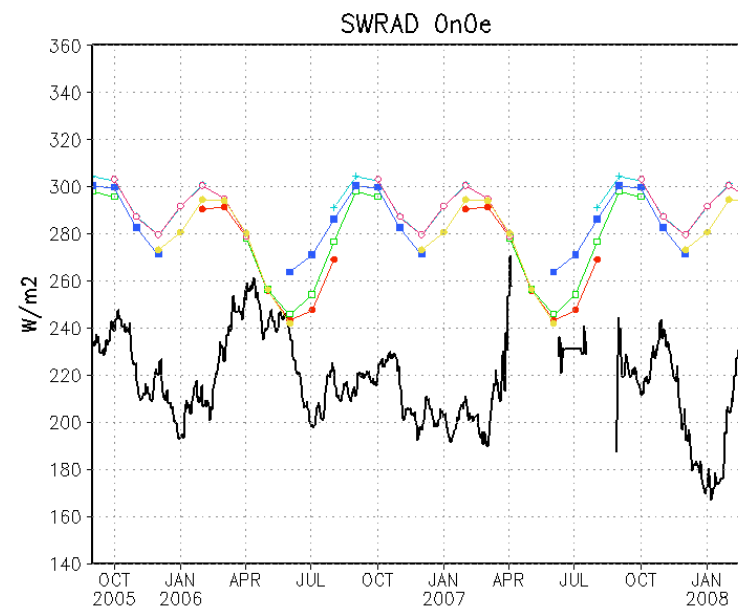


# CGCM SWRad systematic errors

8S 30W

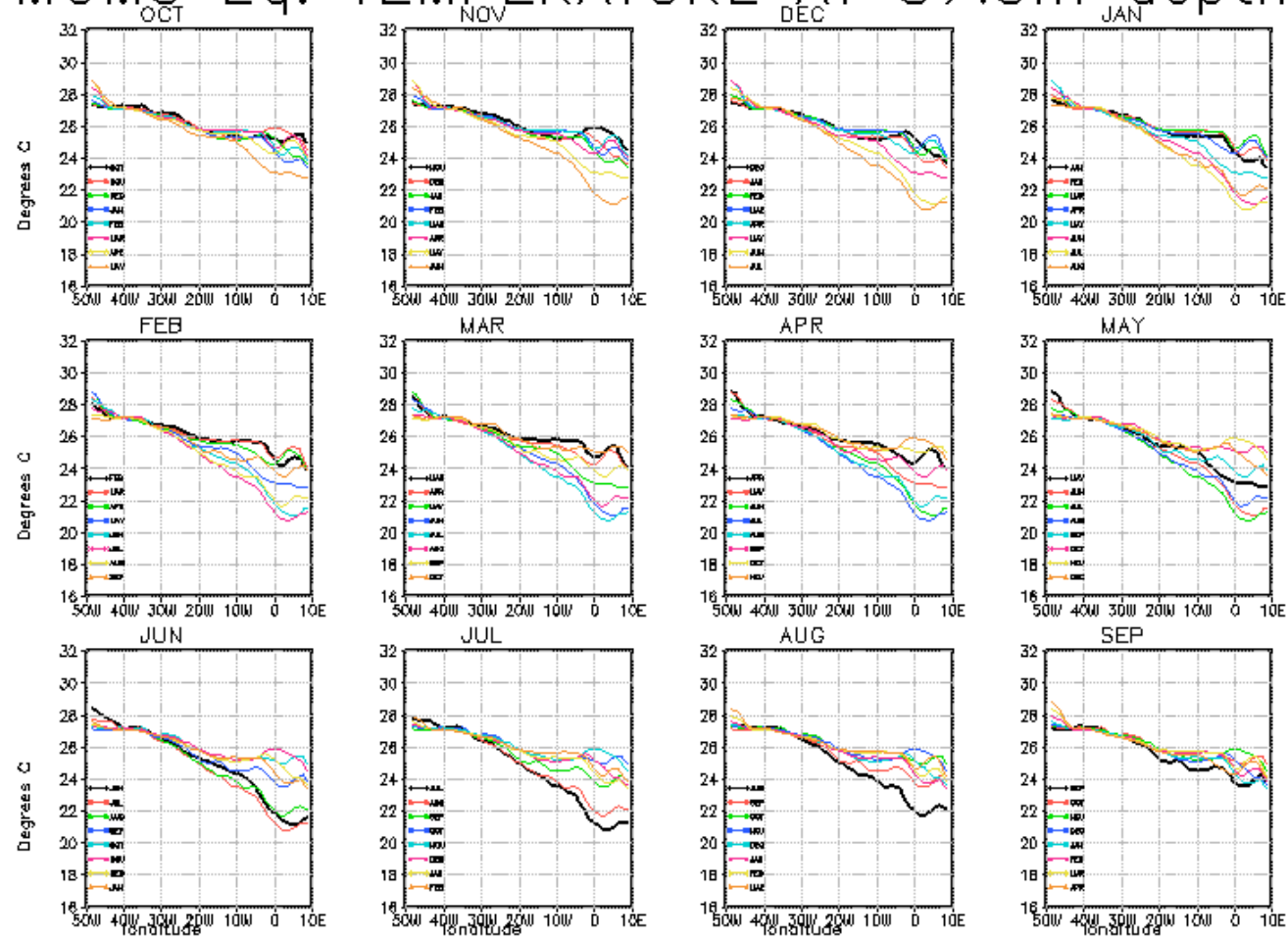


0N 0W





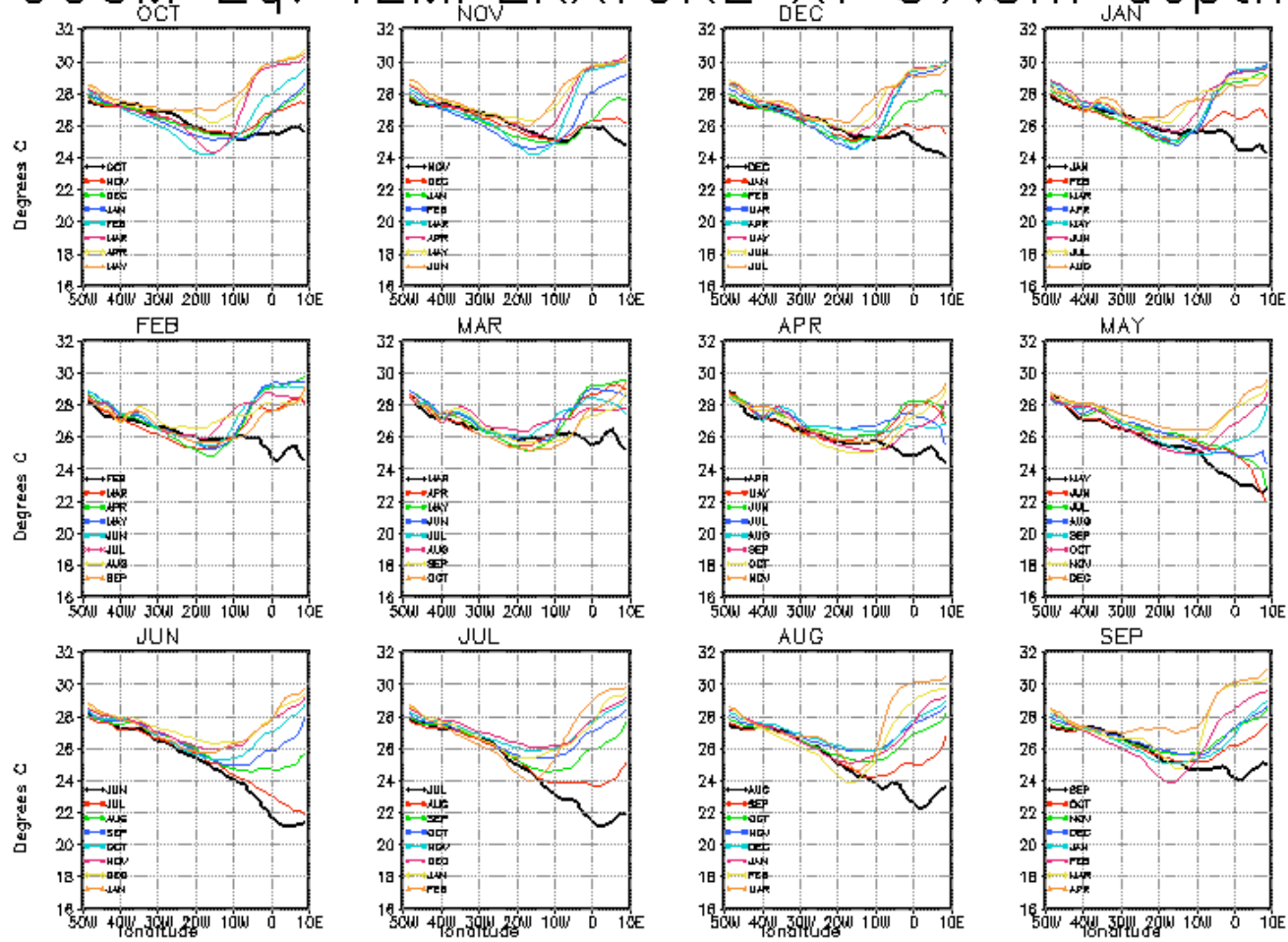
# MOM3 Eq. TEMPERATURE AT 37.5m depth





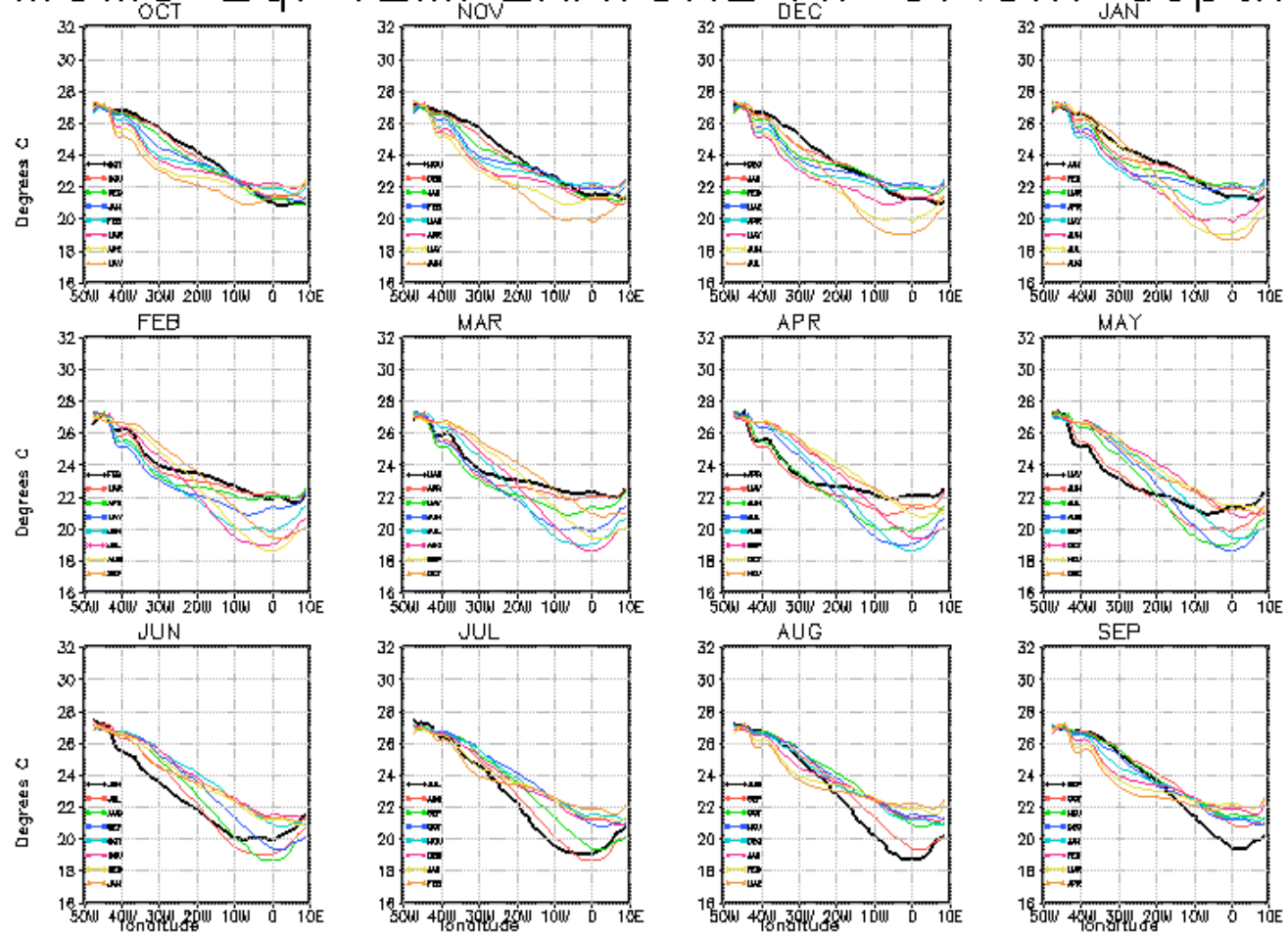


# CGCM Eq. TEMPERATURE AT 37.5m depth



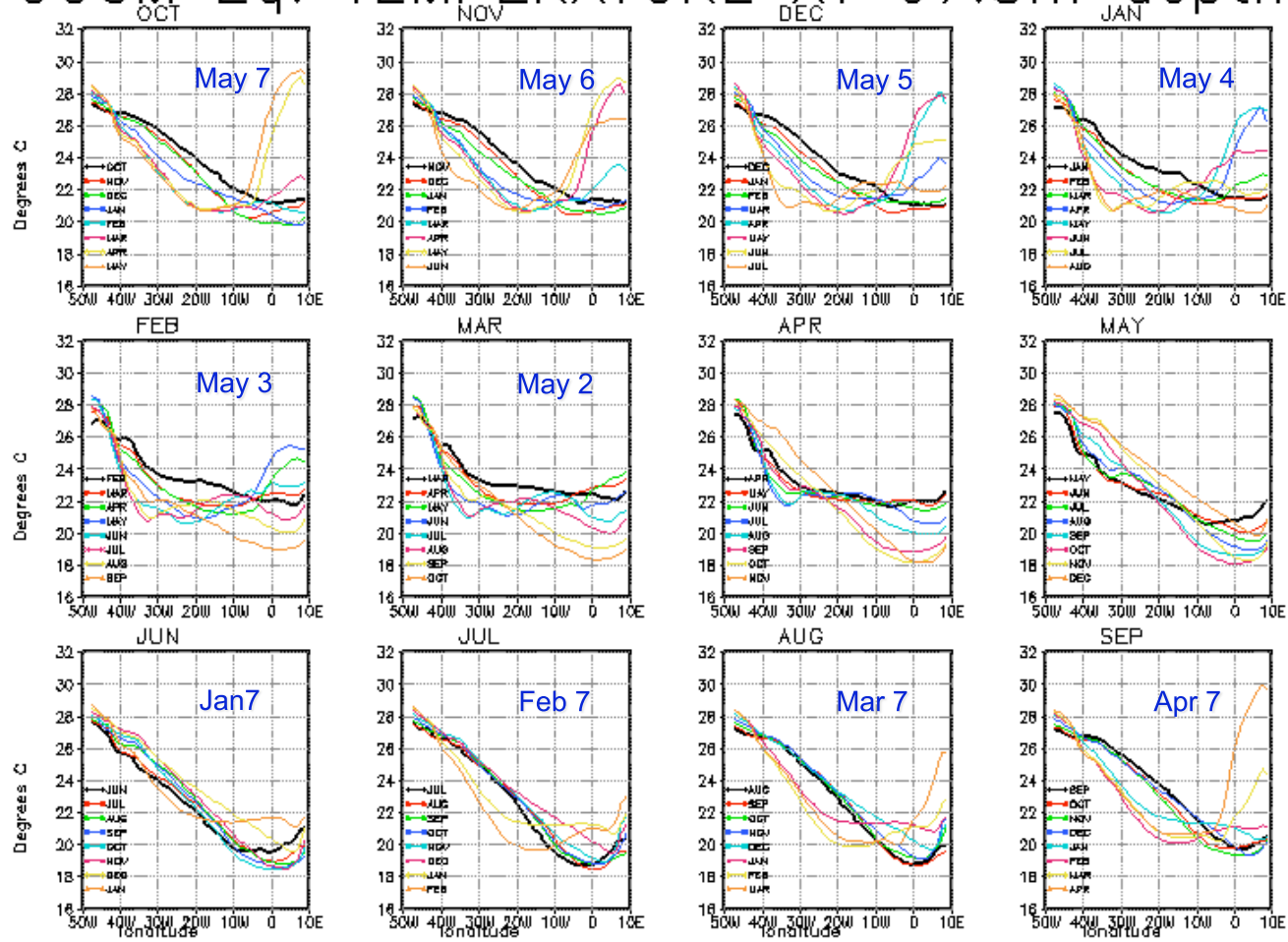


# MOM3 Eq. TEMPERATURE AT 67.5m depth



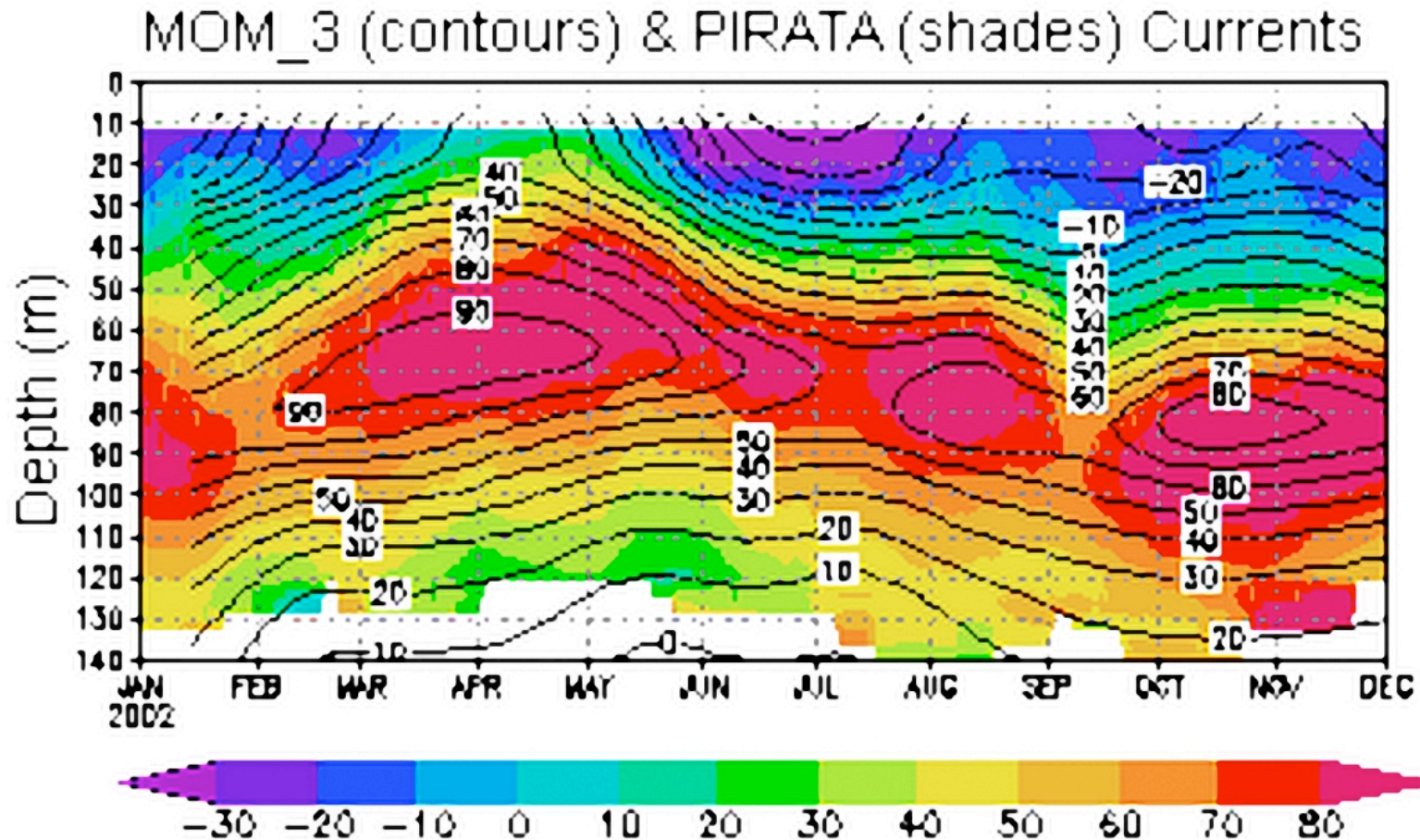


# CGCM Eq. TEMPERATURE AT 67.5m depth





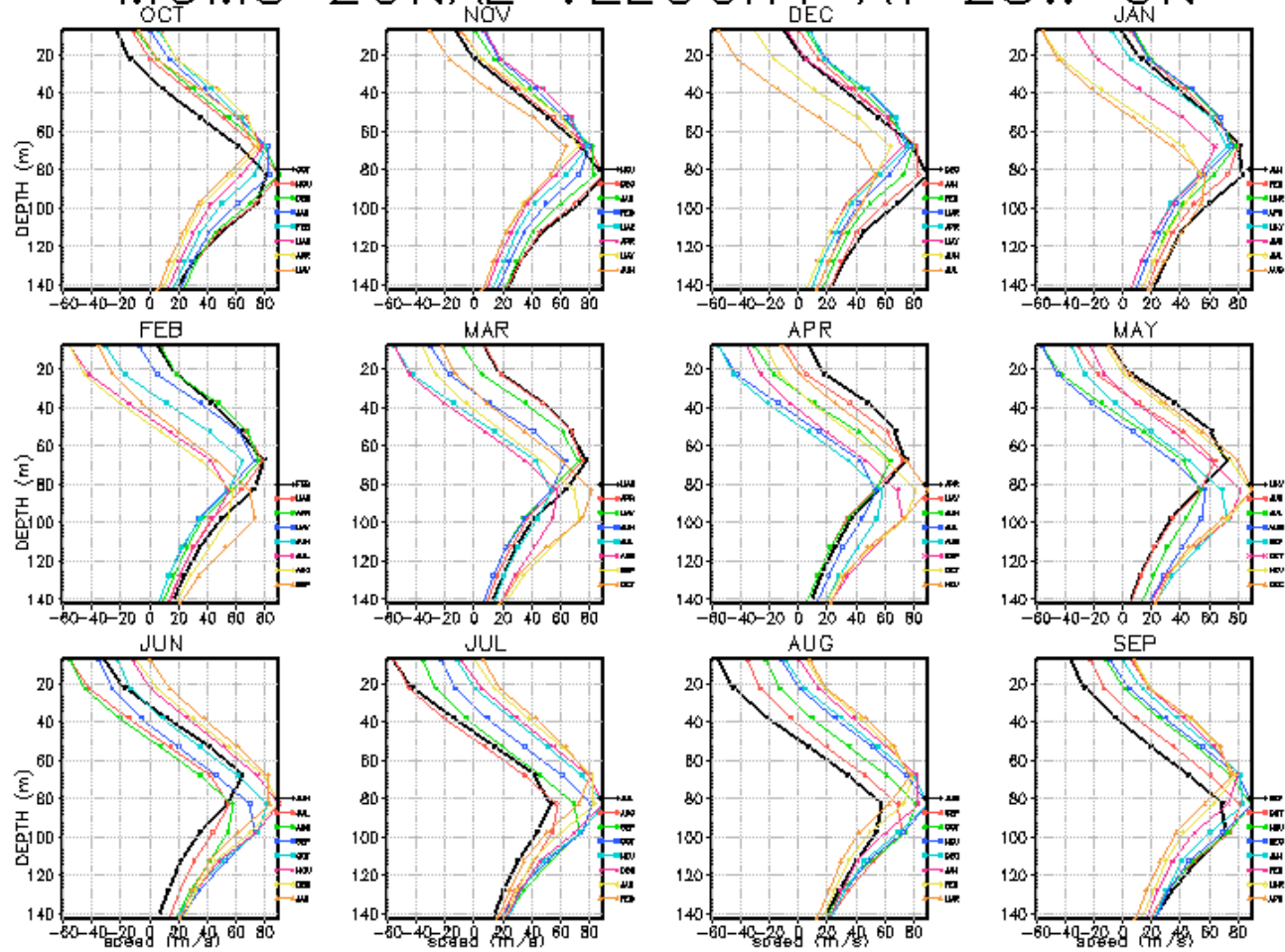
# Atlantic EUC Obs & Simulation at 23W





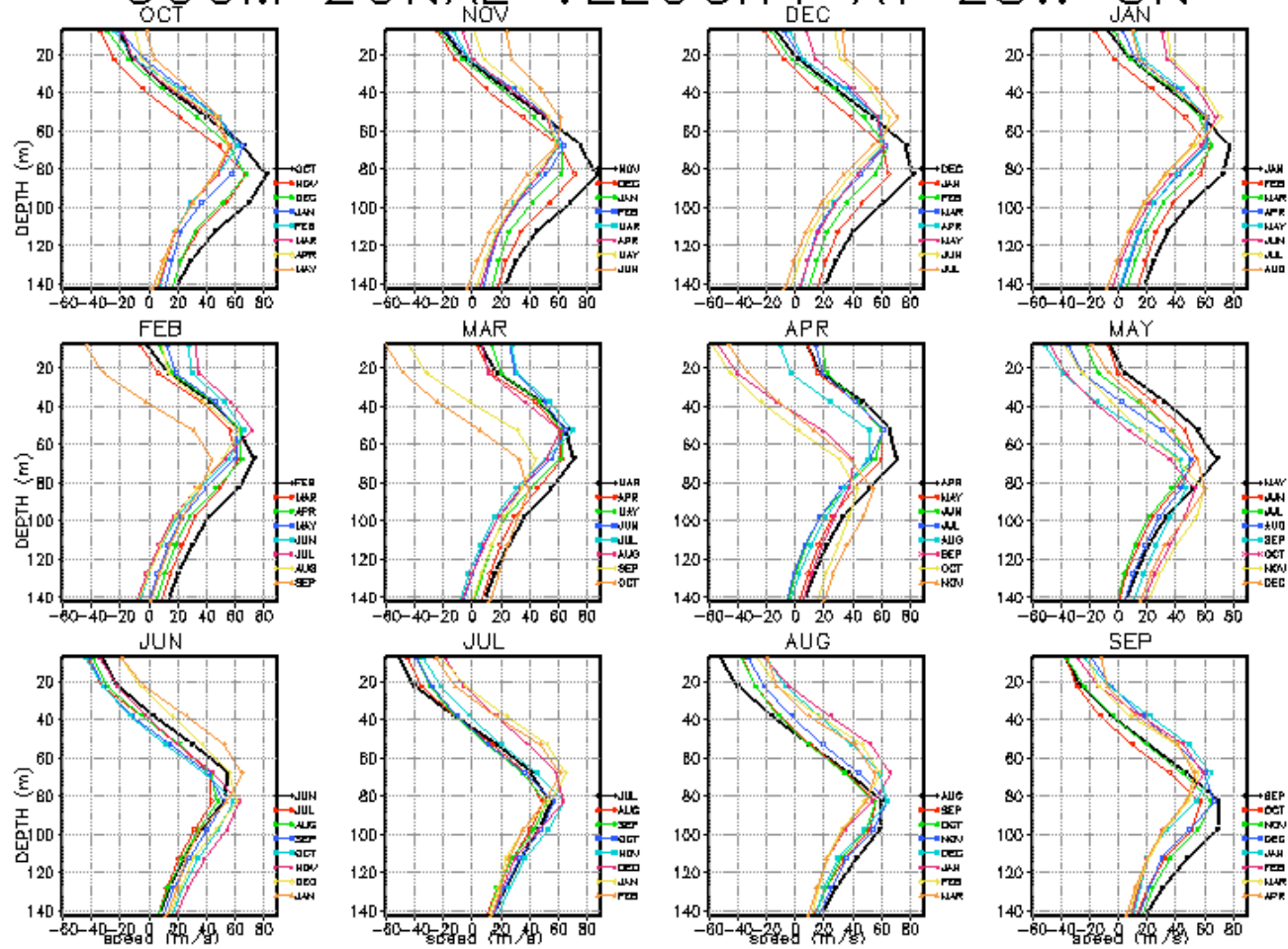


# MOM3 ZONAL VELOCITY AT 28W 0N



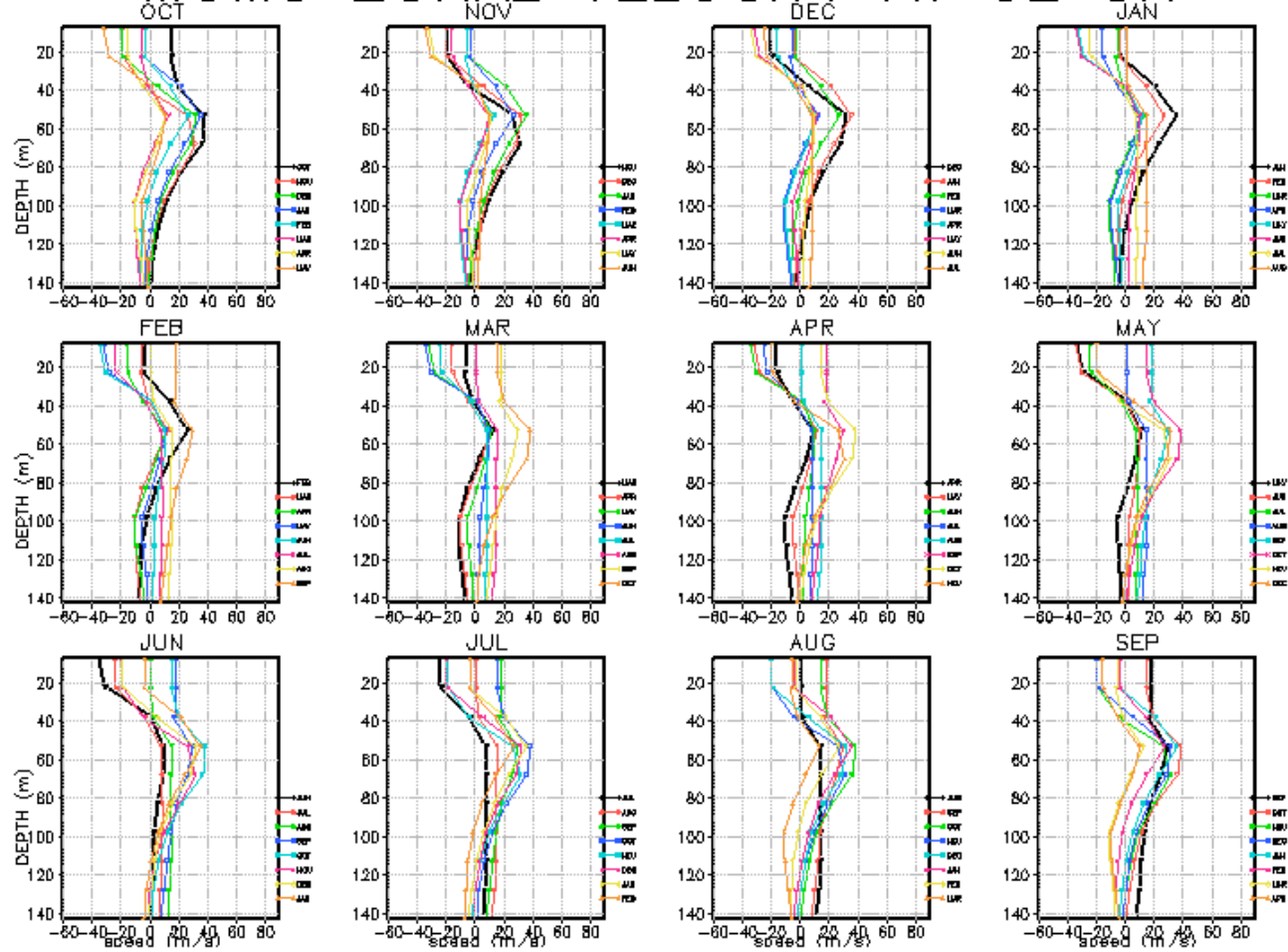


# CGCM ZONAL VELOCITY AT 28W ON



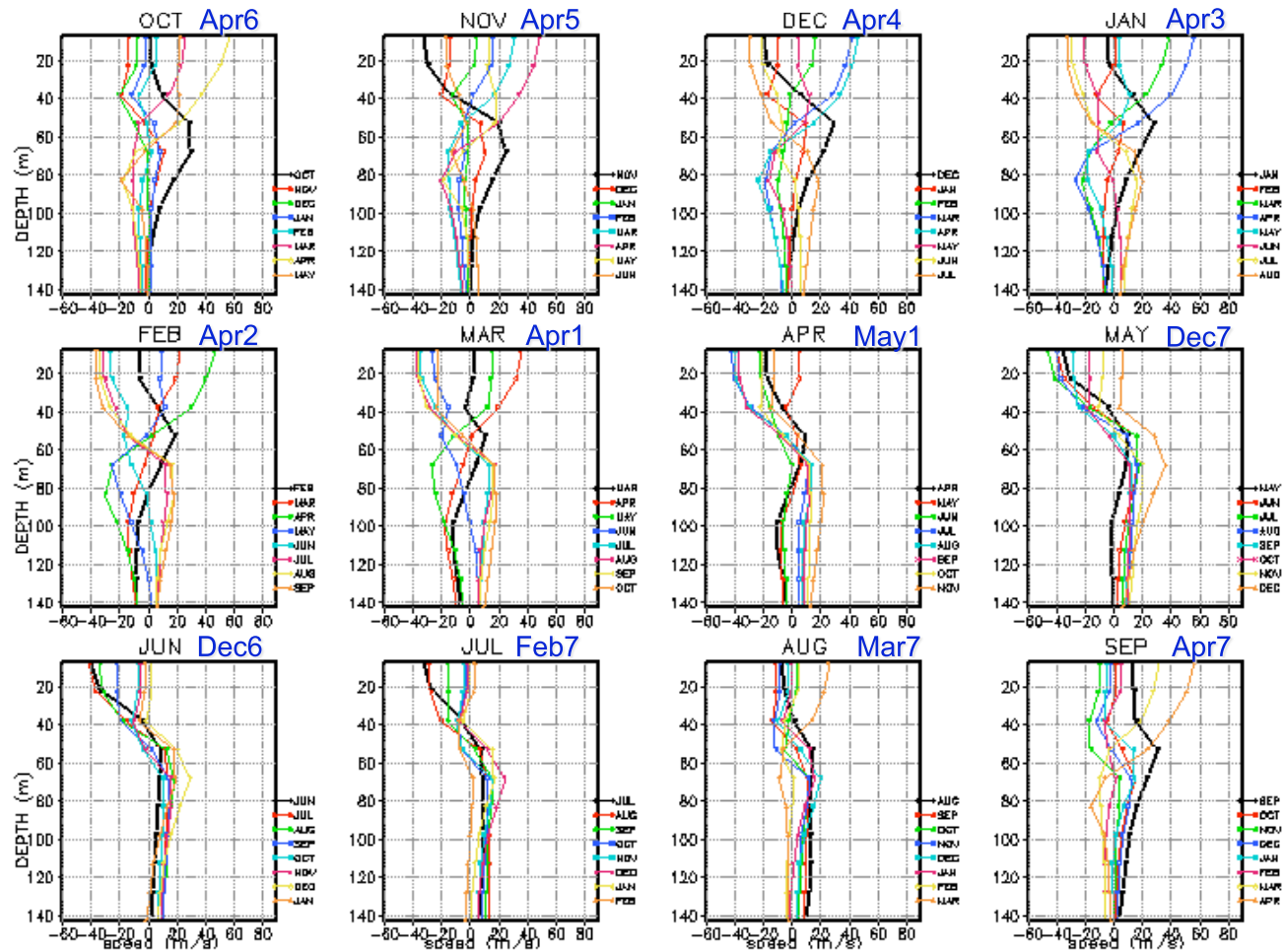


# MOM3 ZONAL VELOCITY AT 0E 0N





# CGCM ZONAL VELOCITY AT 0E 0N

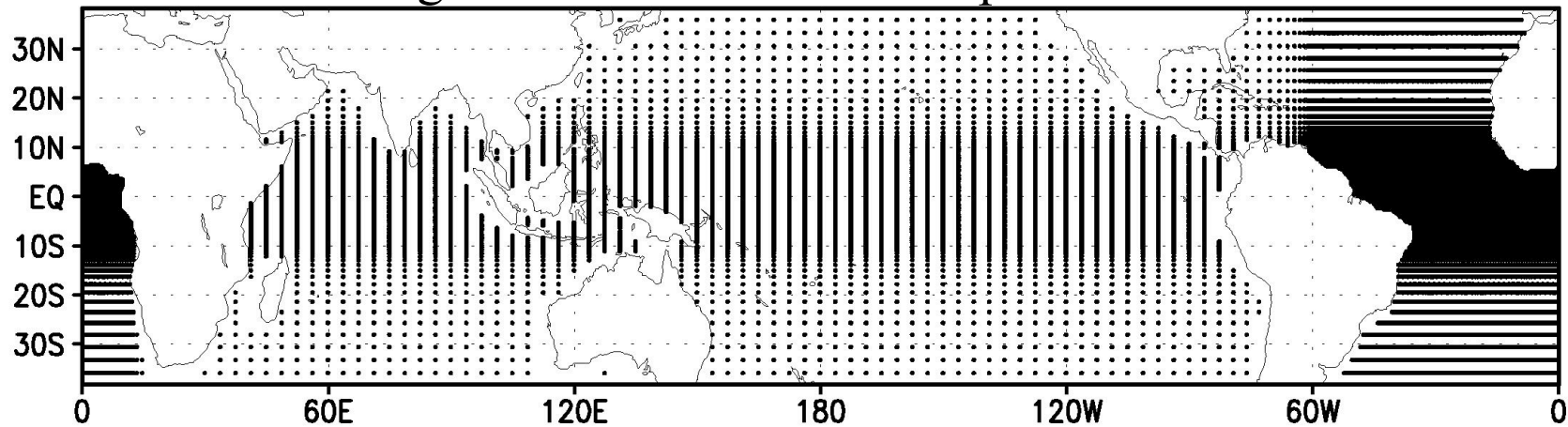






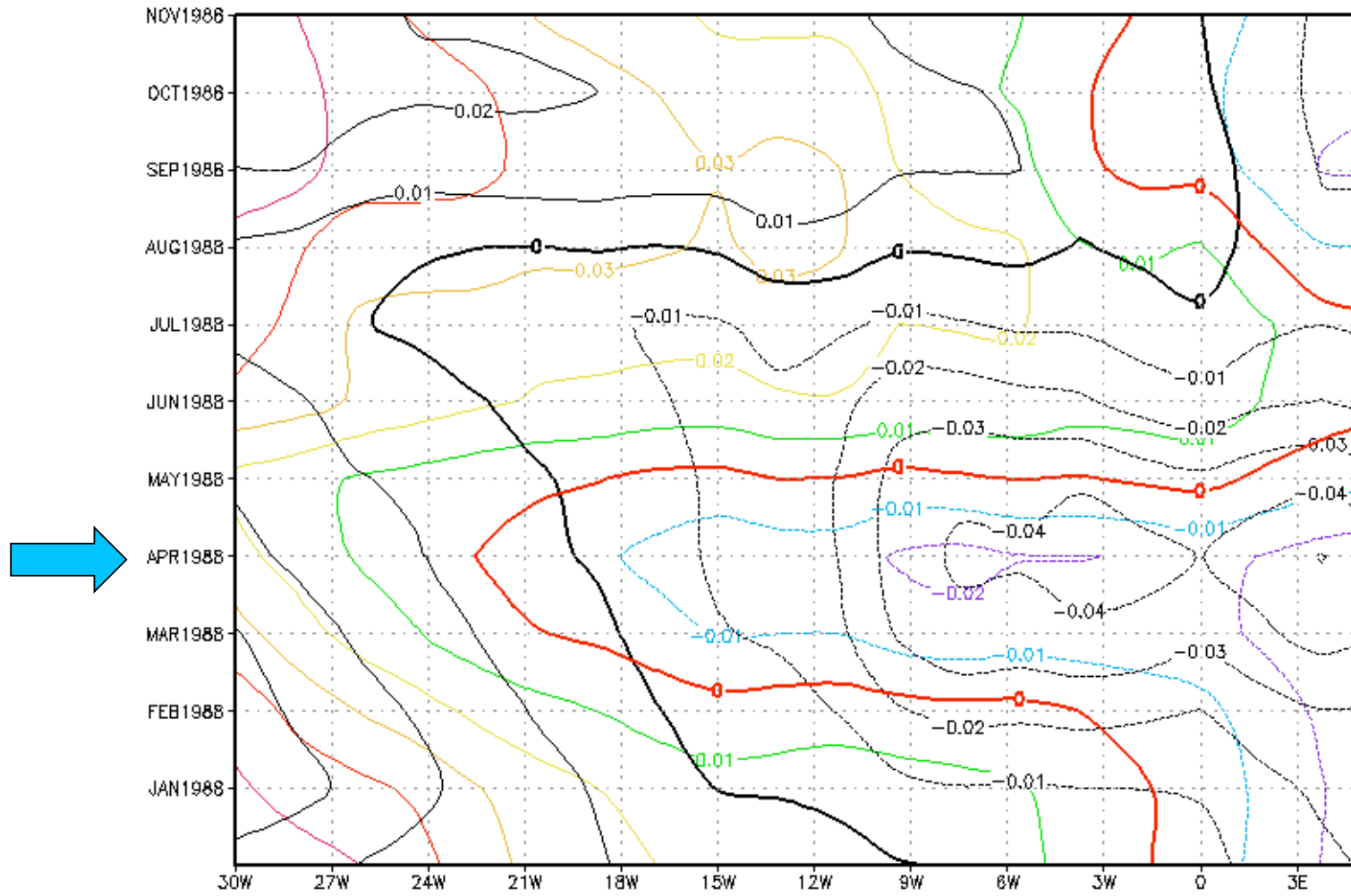
# OGCM Grid

High Res: 0.25° Lon Lat Tropical Atlantic



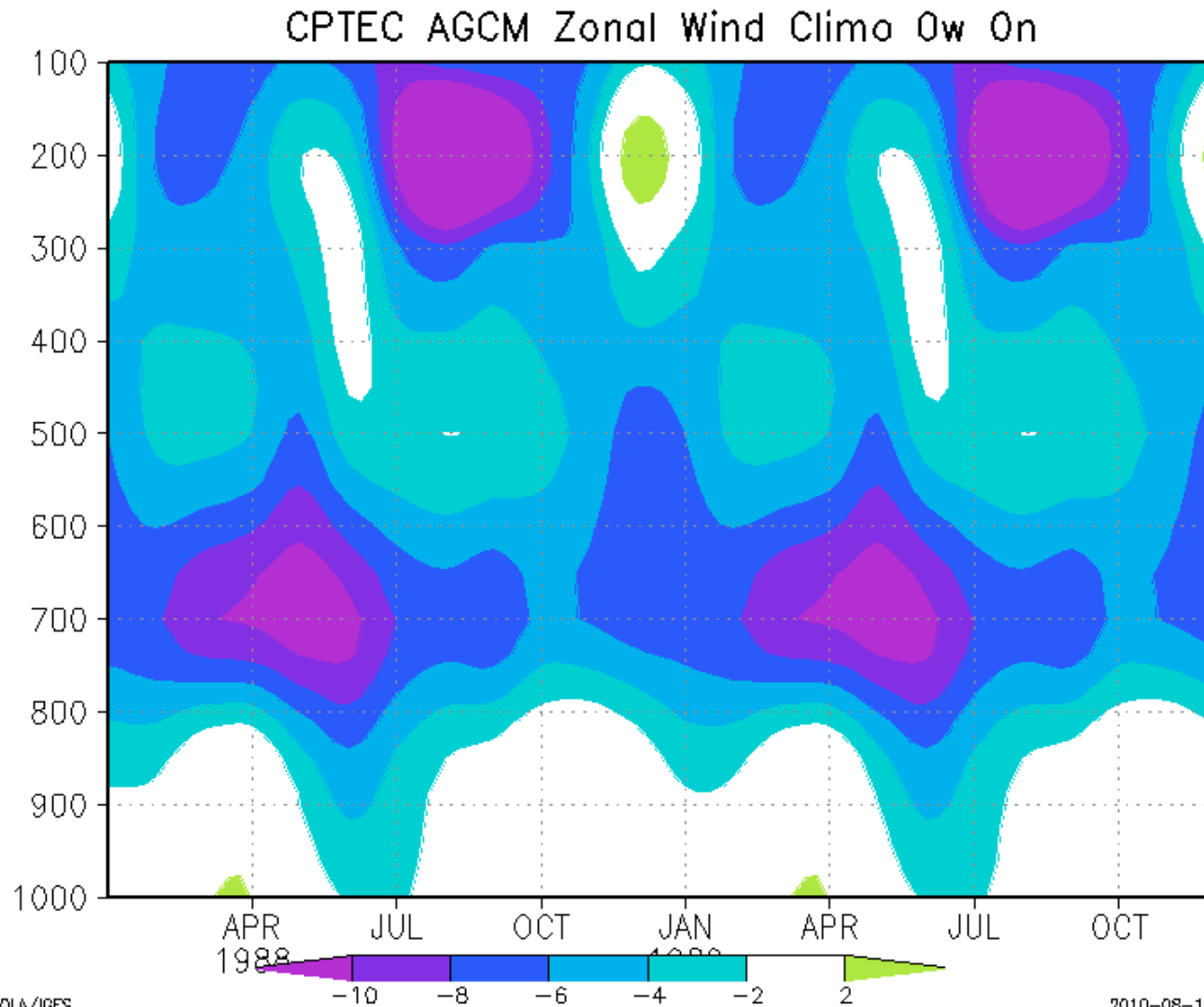


# AGCM & CGCM surface zonal wind



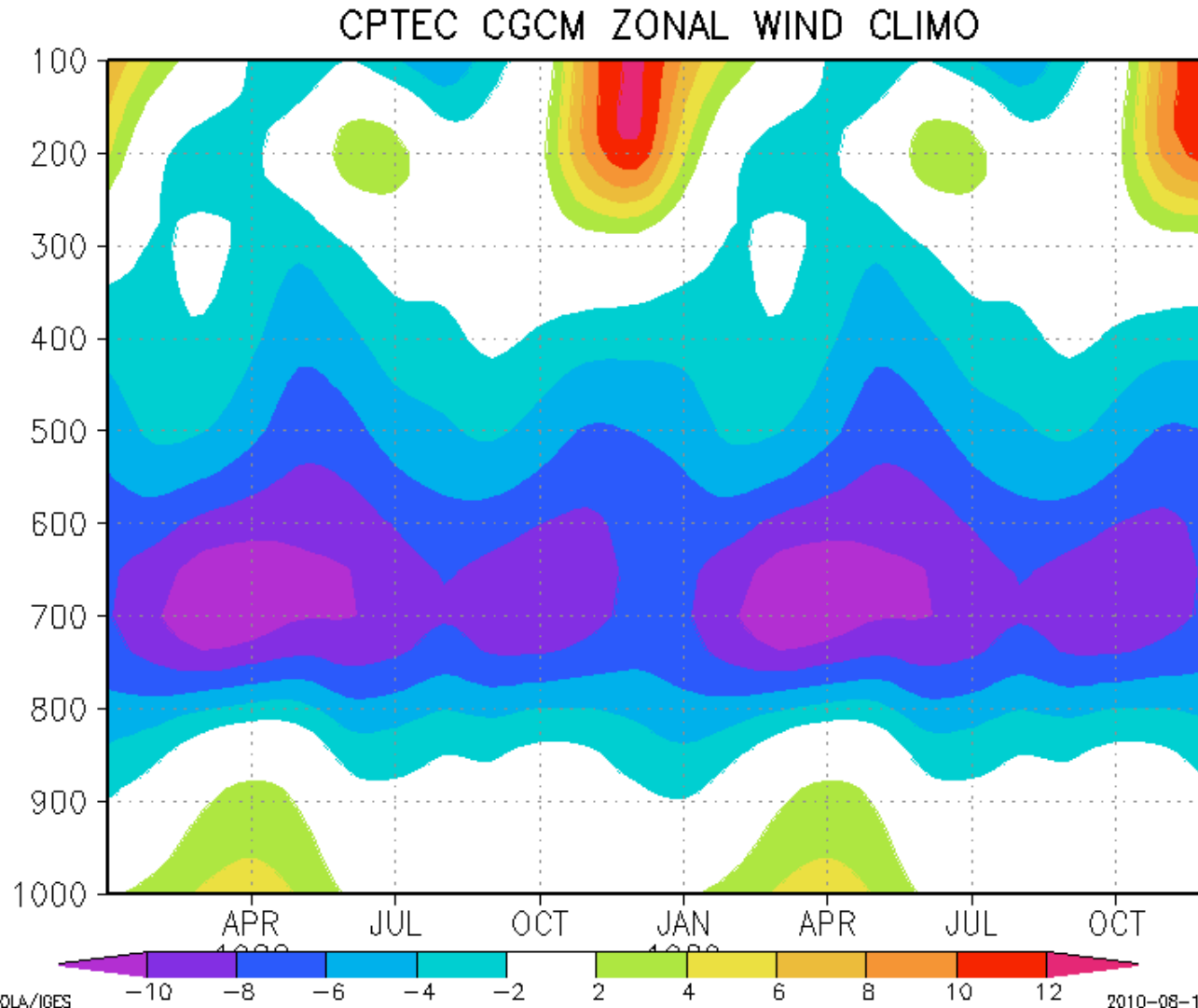


# AGCM Zonal Winds





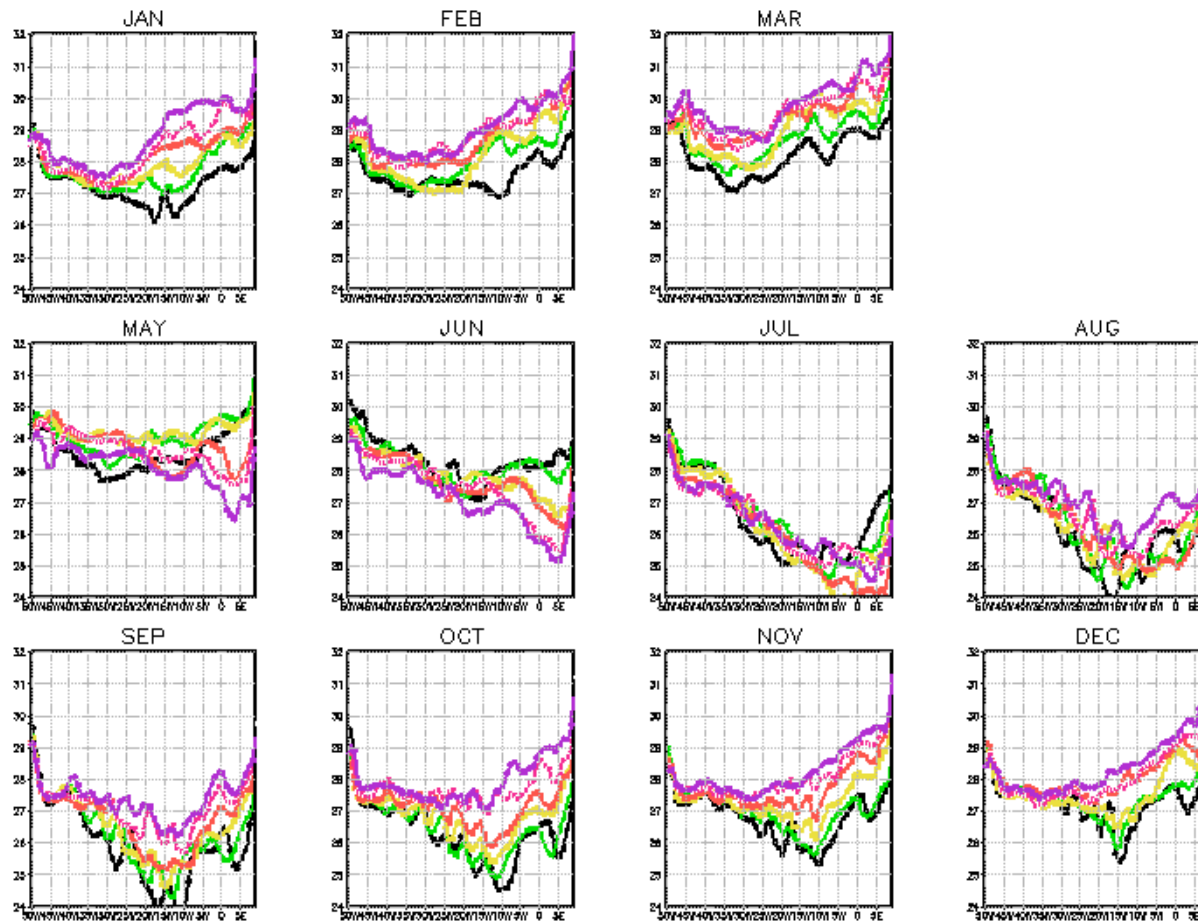
# CGCM Zonal Winds





# INPE CGCM Version 2.1

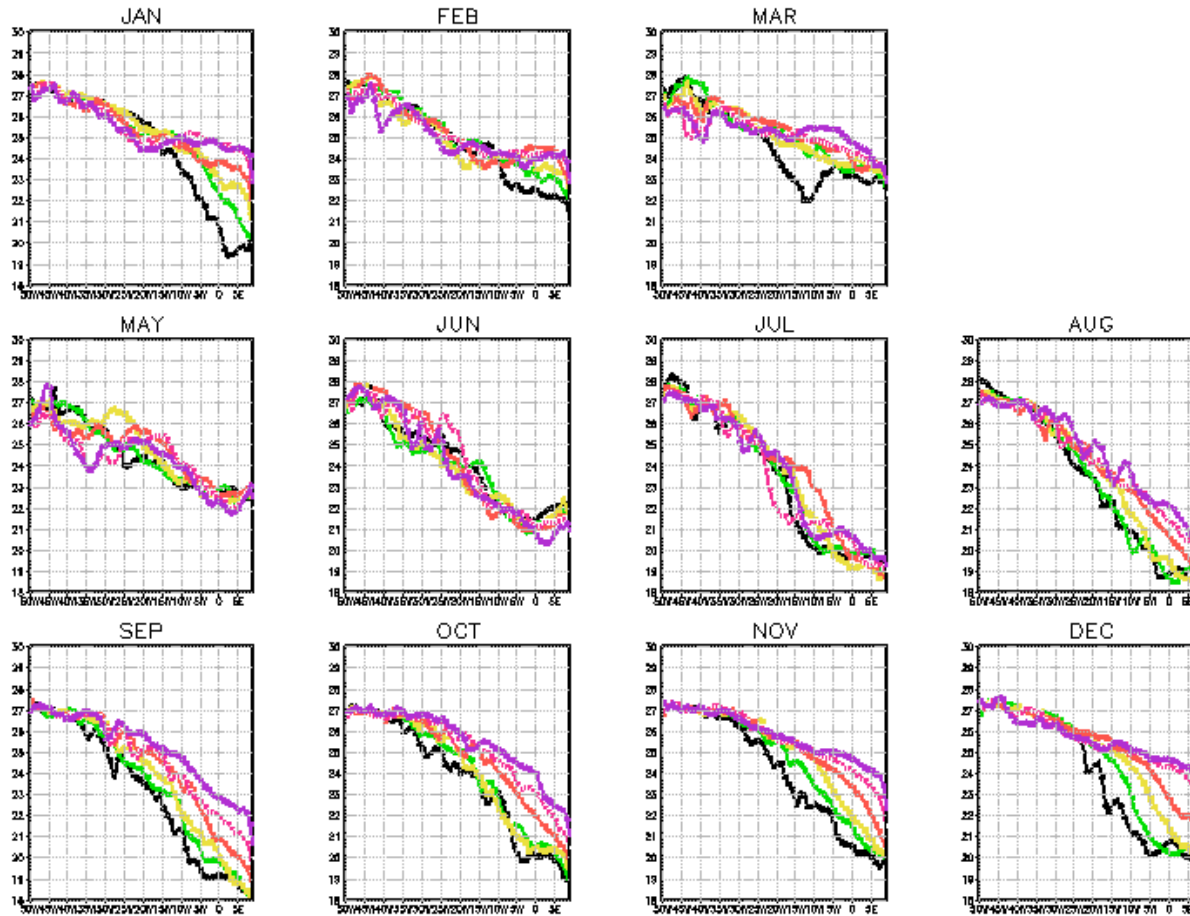
## Eq. Atlantic Temperature at Surface





# INPE CGCM Version 2.1

## Eq. Atlantic Temperature at 67m depth



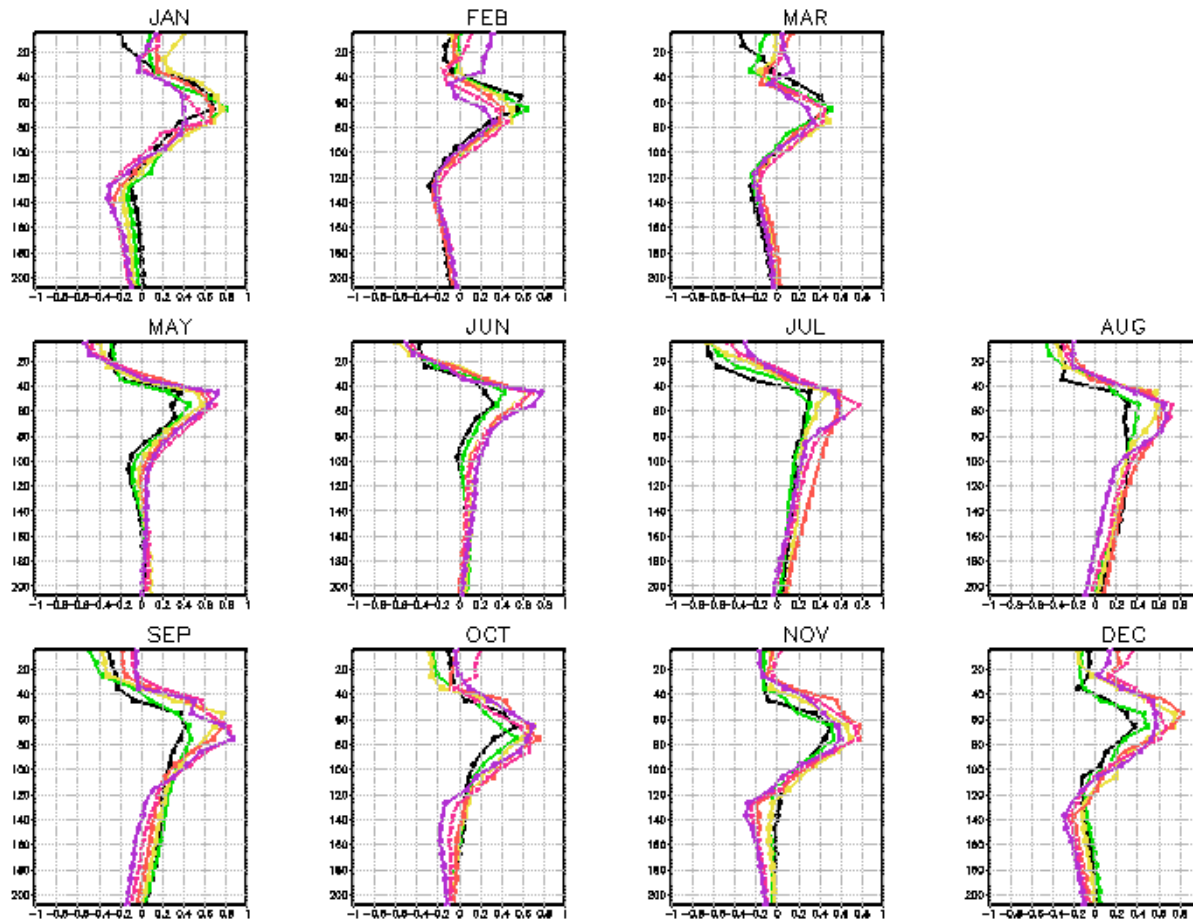
Nobre et al (2011; prelim. res)





# INPE CGCM Version 2.1

## Eq. Atlantic Zonal Currents





# Concluding remarks

- Representation of SACZ rainfall over cooler waters improved with coupled o-a model
- Eastern equatorial Atlantic SST CGCM bias related to strong shortwave radiation bias
- Atmospheric zonal wind stress bias present on AGCM forced run; amplified in the coupled run
- Newest version of INPE's Coupled GCM presents encouraging results regarding EUC representation and temperature bias over equatorial Atlantic.

