



Operational Monsoon Monitoring at NCEP

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National Centers for Environmental Predictions



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Monsoon Team:

African Monsoons, W. Thiaw

American Monsoons: V. Kousky/W. Shi

Asian – Australian Monsoons: S. Yang



Outline



- Objectives
- Global monsoon briefing page features
- Climate risk assessments
- Domestic and International Outreach
- Future Development and challenges



Climate Prediction Center Mission Statement

- *“We deliver climate monitoring, assessment, and prediction products for timescales from weeks to years to the **Nation and the global community** for the protection of life and property and the enhancement of the economy.”*



Objectives

- Better understand the global monsoon systems
- Consolidate climate monitoring efforts at CPC
- Improve forecasts
- Provide advanced notice on potential climate and weather related hazards



Current Data



- CPC unified gauge-based precipitation data
- Other CPC precipitation data sets
- NCEP reanalysis
- NCEP global forecast system and ensembles
- NCEP climate forecast system
- Data from international partners



Global Monsoon Monitoring Website



www.cpc.ncep.noaa.gov/products/Global_Monsoons/Global-Monsoon.shtml

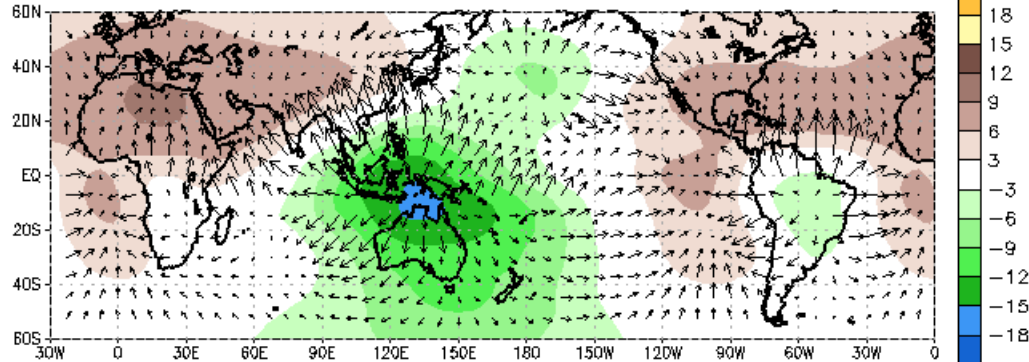
HOME > [Climate](#) - [Weather](#) > [Global Monsoons](#)

Global Monsoons

Move cursor over product parameter name to display the graphic or click on link to access graphic.

Sea Surface Temperature						Soil Moisture					
Total			Anomaly			Total			Anomaly		
1Week	4Weeks	13Weeks	1Week	4Weeks	13Weeks	---	Monthly	Seasonal	---	Monthly	Seasonal
200-hPa Winds						Precipitation					
Total			Anomaly			Total			Anomaly		
7-day	30-day	90-day	7-Day	30-Day	90-Day	5-Day	30-Day	90-Day	5-Day	30-Day	90-Day
850-hPa Winds						OLR					
Total			Anomaly			Total			Anomaly		
7-day	30-day	90-day	7-Day	30-Day	90-Day	5-Day	30-Day	90-Day	5-Day	30-Day	90-Day
200-hPa Velocity Potential						2m Temperature					
Total			Anomaly			Total			Anomaly		
7-day	30-day	90-day	7-Day	30-Day	90-Day	7-Day	Monthly	Seasonal	7-Day	Monthly	Seasonal

200-hPa Ave. Velocity Potential ($10^6 m^2 s^{-1}$) & Div. Wind 22DEC2010-21MAR2011



Data Source: NCEP CDAS

Search the CPC

Go

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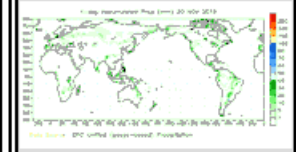
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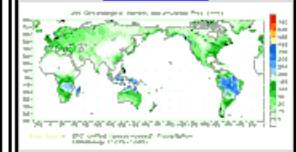
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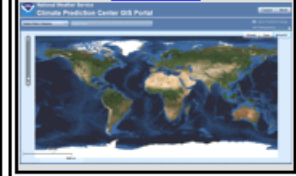
Global Precipitation Analyses



Global Precipitation Analyses Climatology



Climate Prediction Center GIS Portal





Global Monsoon Web-Page Features



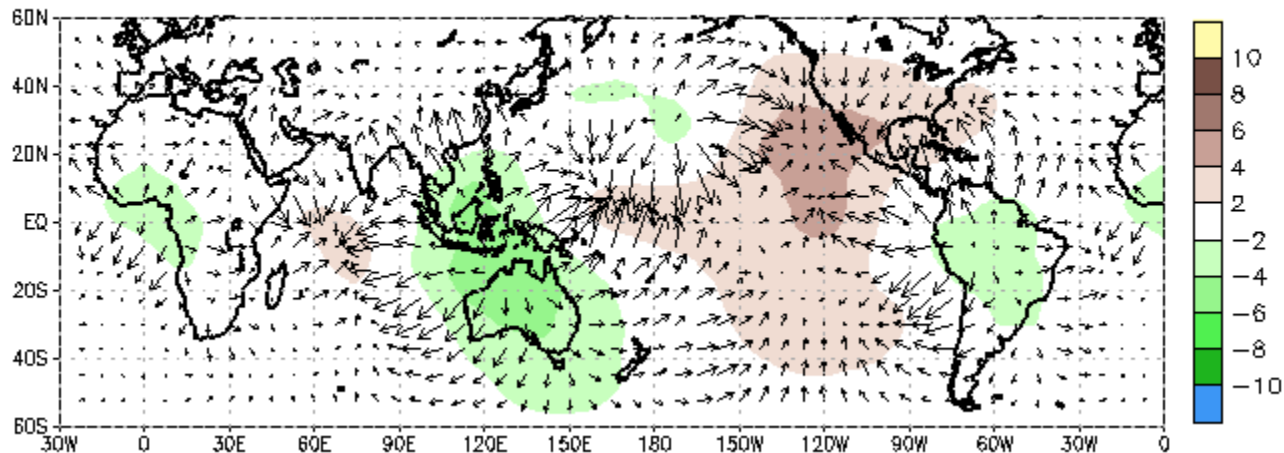
- Recent evolution: total and anomalies (Last 90, 30, and 7 days)
 - Sea surface temperature
 - Winds (200 and 850 hPa)
 - Velocity potential (200 hPa)
 - Soil moisture
 - Precipitation
 - Outgoing longwave radiation
 - Temperature – 2 meter
- Regional monsoons briefing web pages



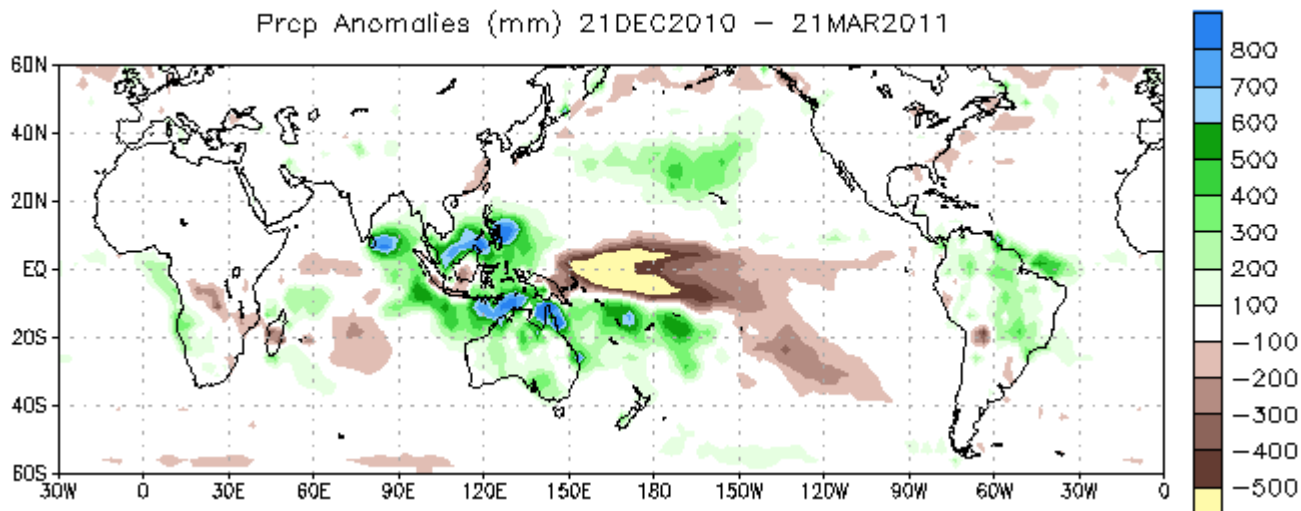
Velocity Potential and Precipitation Anomalies (Last 90 days: 21 Dec 2010 – 21 Mar 2011)



200-hPa Ave. Velocity Potential ($10^6 \text{m}^2 \text{s}^{-1}$) & Div. Wind Anomalies 22DEC2010–21MAR2011



Prpc Anomalies (mm) 21DEC2010 – 21MAR2011





Regional Monsoon Web-Page Features



- Animation of weekly OLR, 200 hPa streamlines, and 850 hPa winds
- Recent evolution (Last 180, 90, 30, and 7 days)
 - Precipitation maps and time series
 - Temperature – 2 meter
 - SST and soil moisture
 - Winds and water vapor flux
- Weekly monsoon updates (PPT)
 - Highlights (last 7 days)
 - Recent evolution (Last 180, 90, 30, and 7 days)
 - Week1 & Week2 outlooks
 - Summaries
- GFS Forecasts

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Monitoring
Precipitation
Precip Time-Series
Winds & WV Flux
SST & S. Moisture

Forecasts
GFS

Weekly Update
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Precipitation

- NAMS
- SAMS

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SST & S. Moisture
2m Temperature

Hydrologic Basins
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Brazil Hydro

Forecasts
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SAMS_Jul09-Jun10
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Global Monsoons

Monitoring
Precipitation

- Land Only
- Land & Ocean

Precip Time-Series
Winds & WV Flux
SST & S. Moisture

Forecasts
GFS
Indices

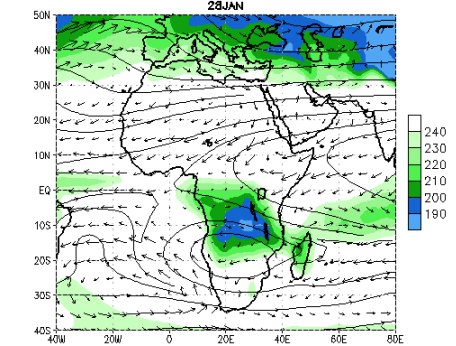
Weekly Update
AAMS.ppt
AAMS Summer2008
Monsoons in 2009
AAMS Archive

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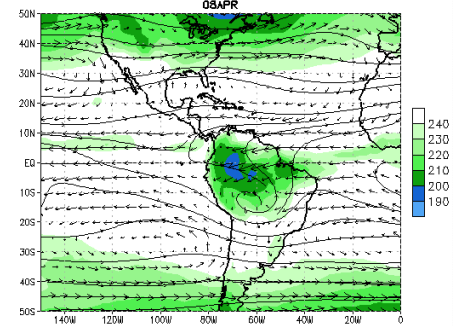
African Monsoons

OLR, 200-hPa Streamlines and 850-hPa Wind Clim (1979-1995)



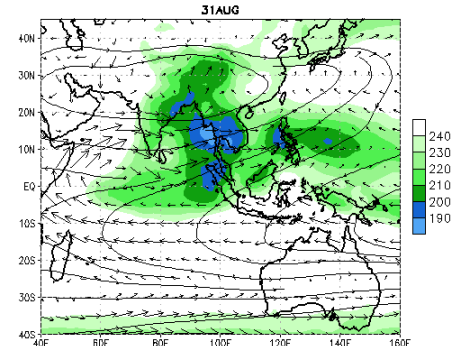
American Monsoons

OLR, 200-hPa Streamlines and 850-hPa Wind Clim (1979-1995)



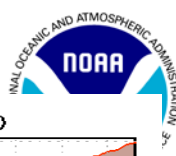
Asian-Australian Monsoons

OLR, 200-hPa Streamlines and 850-hPa Wind Clim (1979-1995)

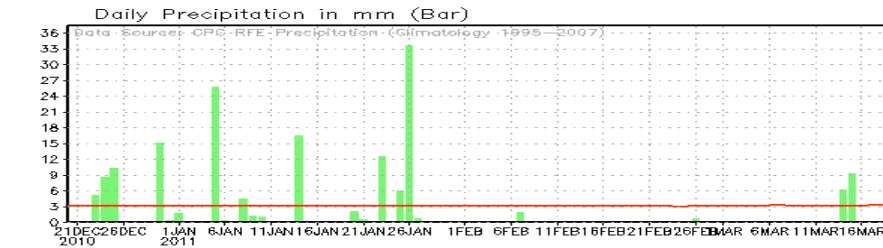
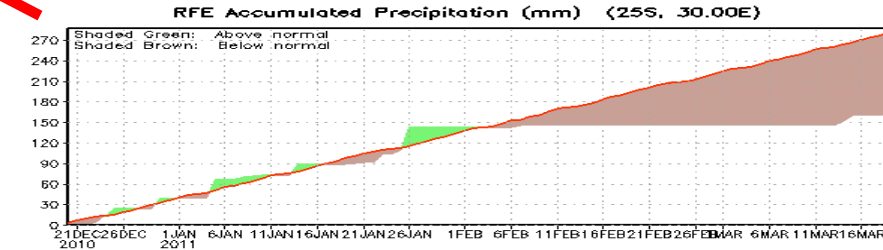
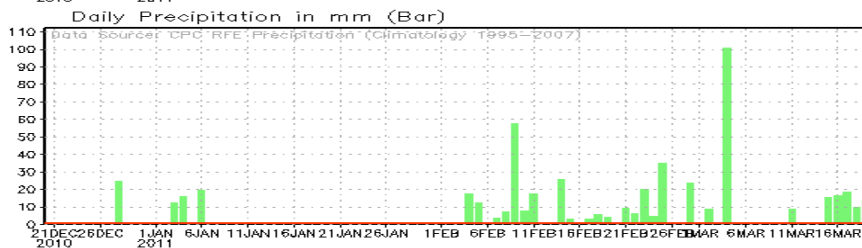
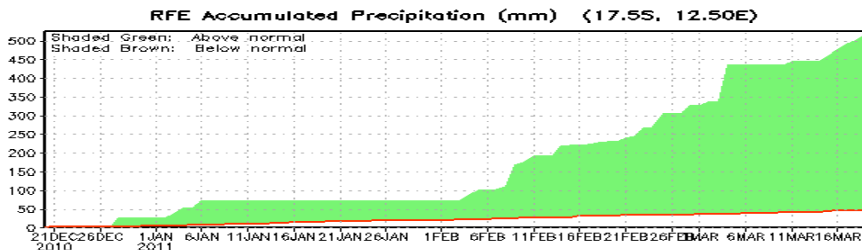
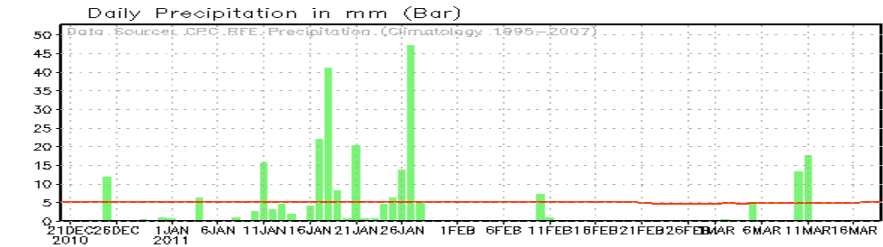
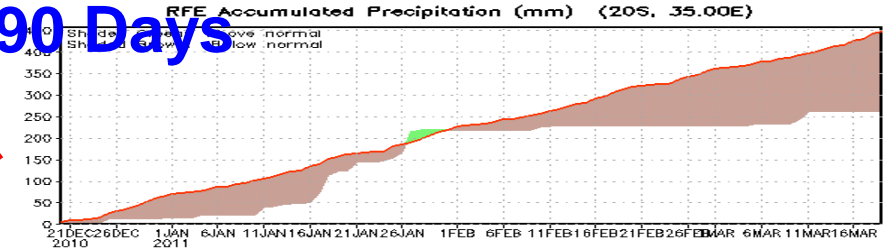
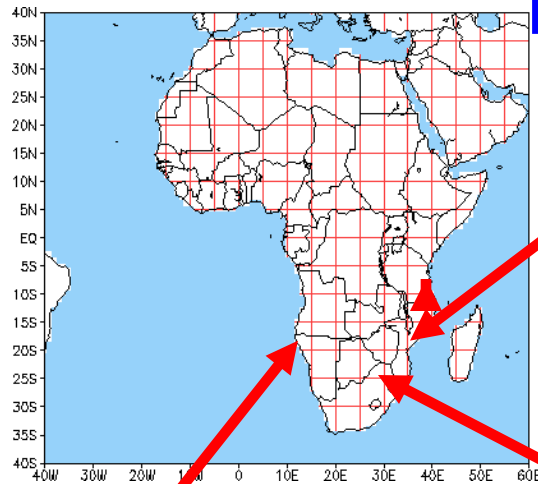




Recent Evolution: Rainfall



Last 90 Days



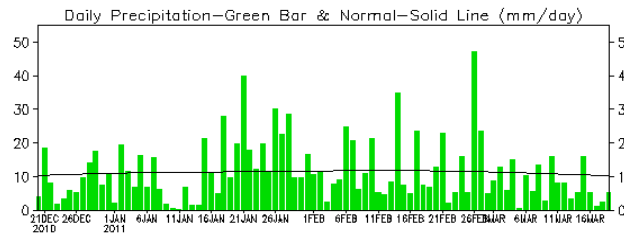
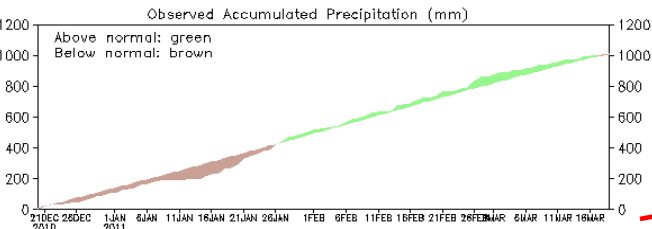
Daily evolution of rainfall over the last 90 days at selected stations indicates that persistent rains sustained moisture surpluses along the western border between Namibia and Angola (lower panel –left). The suppressed rainfall in parts of the Maize Triangle of South Africa (lower panel –right) and Mozambique (upper panel –right) has prolonged and worsened mid-season dryness in local areas.



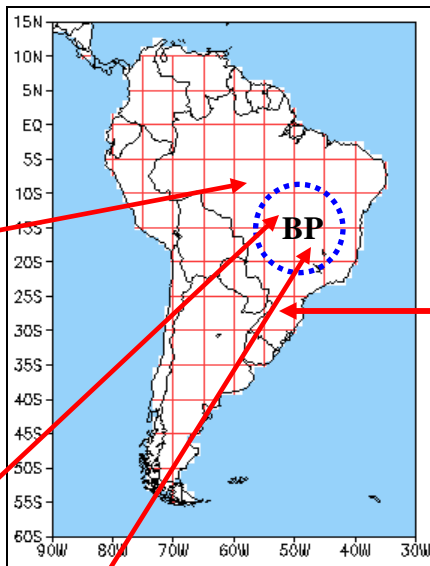
Recent Evolution: Rainfall Last 90 Days



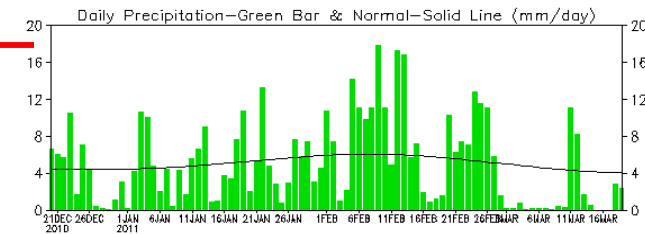
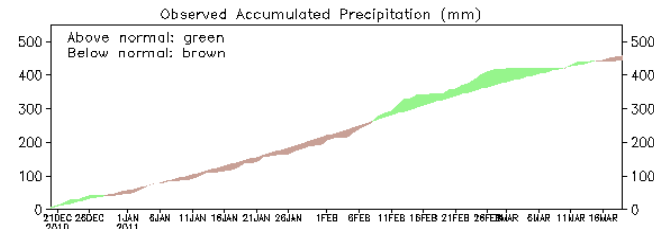
(10S–5S, 60W–55W)



Data Source: CPC (Gauge-Based) Unified Precipitation (Climatology 79–95)
(updated on 00Z19MAR2011)

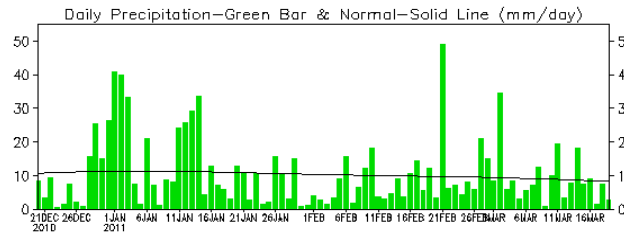
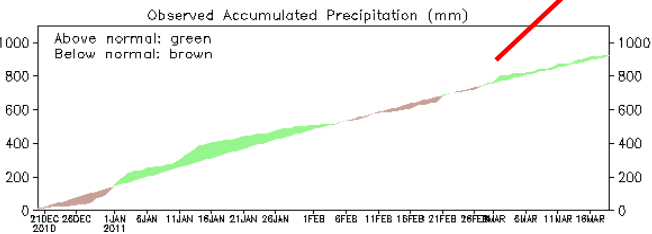


(30S–25S, 55W–50W)



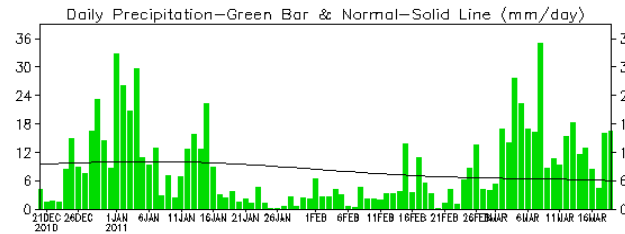
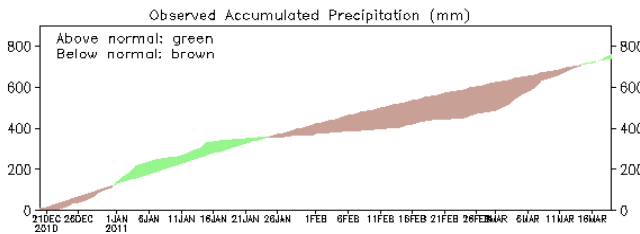
Data Source: CPC (Gauge-Based) Unified Precipitation (Climatology 79–95)
(updated on 00Z19MAR2011)

(15S–10S, 55W–50W)



Data Source: CPC (Gauge-Based) Unified Precipitation (Climatology 79–95)
(updated on 00Z19MAR2011)

(20S–15S, 50W–45W)



Data Source: CPC (Gauge-Based) Unified Precipitation (Climatology 79–95)
(updated on 00Z19MAR2011)

• 90-day rainfalls are near-average over the southern Amazon Basin. Recent heavy rains in this area helped to offset the long-term deficits. Near-average rainfall was also observed over the core monsoon region (BP).

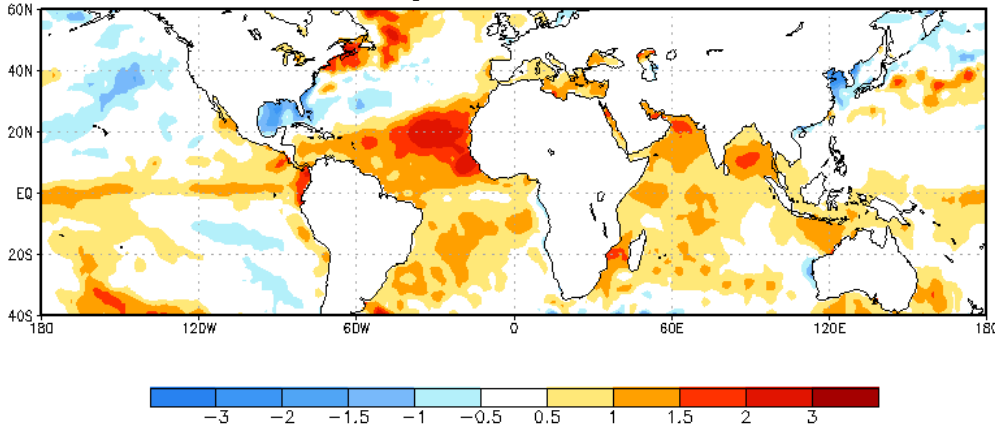
• 90-day totals are slightly below average in southern Brazil.



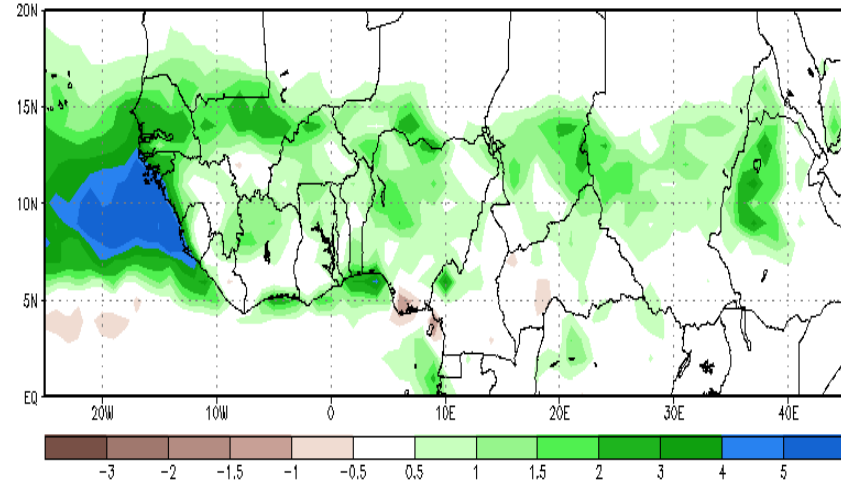
Experimental CFS T382 Seasonal Forecasts: Case of West Africa Summer 2010



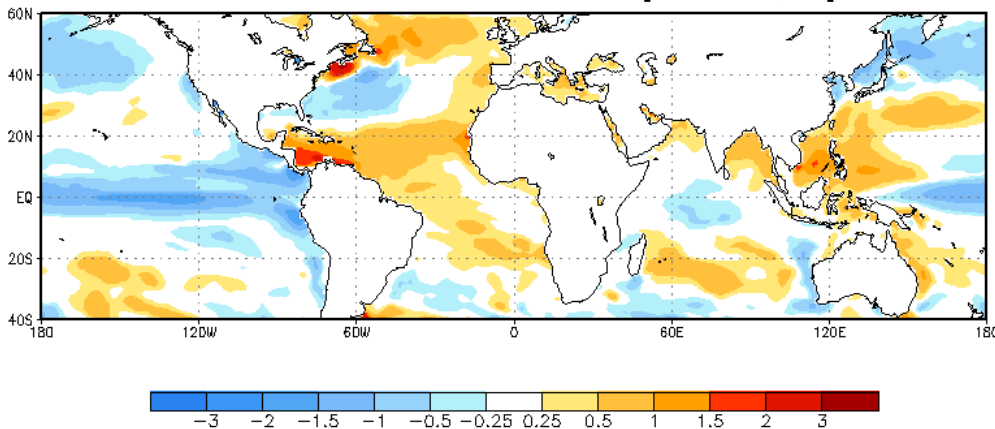
Observed SST – April 2010



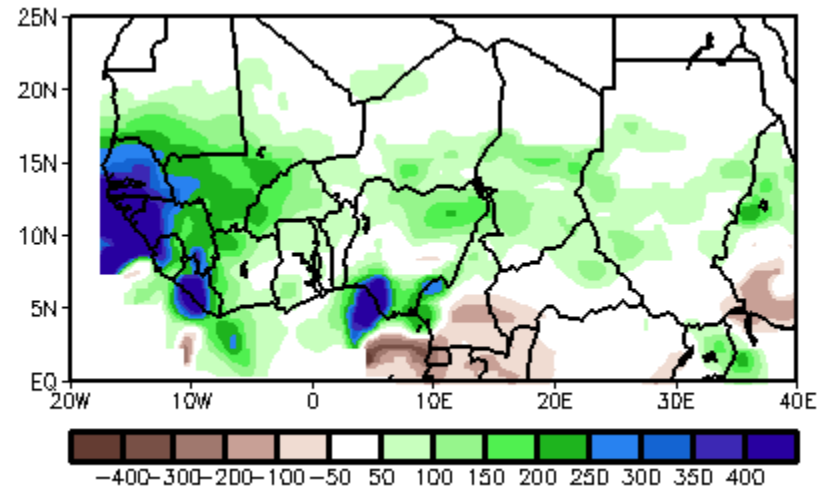
CFS Predicted P for Jul-Sep 2010, April IC



CFS Predicted SST for Jul-Sep 2010, April IC



Observed P for Jul-Sep 2010





Domestic and International Outreach Potentials

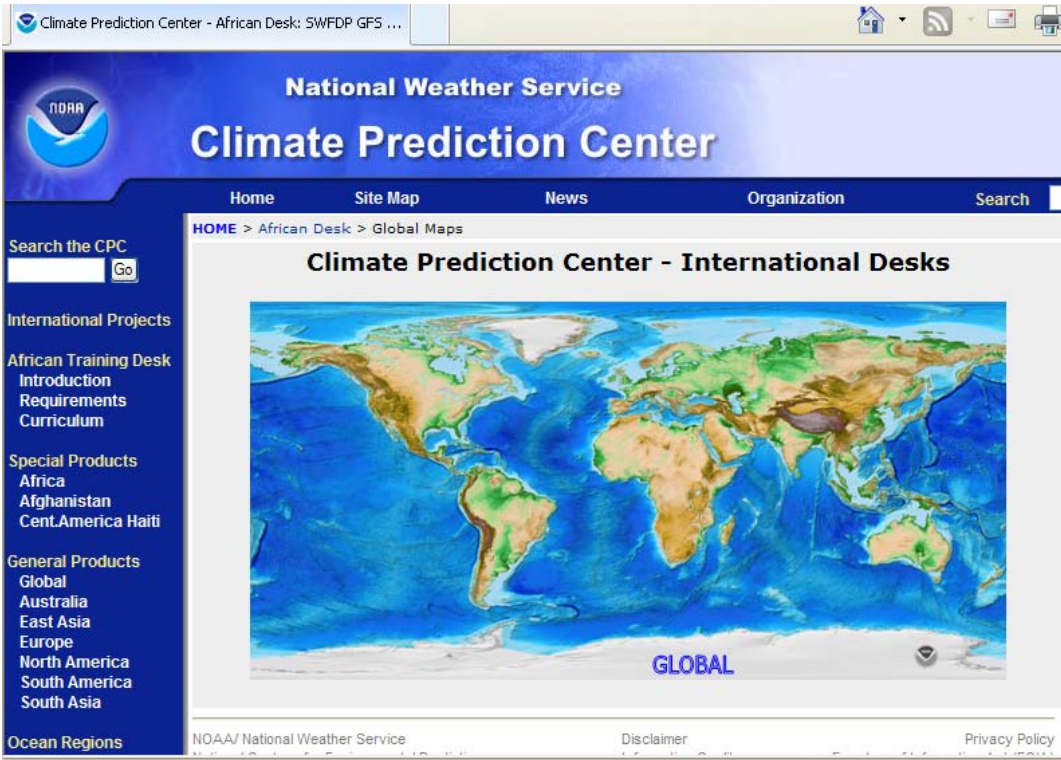
- Weekly ppt updates and Applications
 - Food security planning
 - Advance warning for coastline erosion
 - Fishery protection
 - Advance warning of potential for Atlantic hurricane activity
 - Instruction tools in academia
 - Capacity building for developing countries



CPC International Desks Web Site

Provide access to real time NCEP prediction, assessment, and monitoring products

- Daily QPF forecasts
- Weekly hazard assessments
- Weekly monsoon monitoring
- Seasonal rainfall outlooks
- Global tropical cyclone monitoring





Future Development and Challenges

- Monsoon indices for all regions
- Forecast forums for all monsoon regions
- Challenges
 - Limited predictability on both subseasonal and seasonal time scales
 - Limited resources for Research and Development
 - Inconsistency in current precipitation data



NCEP International Training Desks

- Climate Prediction Center
 - African Desk
 - Monsoon Desk

- Hydrometeorological Prediction Center
 - South American Desk
 - Caribbean Desk



Climate Variability and Prediction Workshops



- Partnership between NOAA, USAID, UCAR
 - Objective: To help build capacity in operational climate predictions, monitoring, and assessments in developing countries
 - Intended for professional meteorologists working on climate predictions and monitoring
 - Lectures on climate base state, variability, and predictions
 - Hands-on training on the use of climate prediction and monitoring tools



Climate Variability and Prediction Workshops



- Focus on Ocean Basins:
 - First Workshop: Indian Ocean Basin: East Africa – Southeast Asia, June 2009
 - Second Workshop: Mediterranean Basin: Northern Africa – Southeastern Europe, July 2010
 - Third Workshop: Atlantic Basin: West Africa, Caribbean, and South America, June 2011



Workshop Expected Outcome

- To present recent advances in climate science to scientists in developing countries and to provide them with access to tools to diagnose, predict, and monitor short term climate variations
- To entice operational meteorological centers to engage with academia and the research community to develop capacity in climate predictions to improve services
- To build a network of climate scientists across the Atlantic for knowledge sharing and to foster collaboration