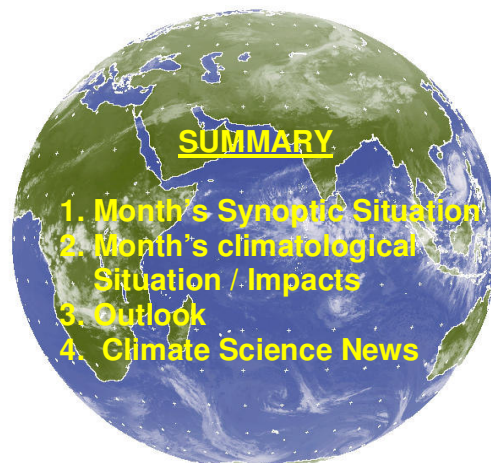


CLIMATE WATCH AFRICA BULLETIN

N° 07
July 2009



MET5 15 NOV 2003 1800 DTOT

HIGHLIGHTS: Eastern part of Gulf of Guinea countries, north-western part of Central Africa countries and northern part of GHA countries experienced heavy rainfall while rainfall over large part of the Sahel remained suppressed.

1. SITUATION DURING THE MONTH OF JULY, 2009

This section provides the strengths of the surface pressure systems; the 850hPa general circulation anomalies; middle and upper troposphere zonal winds; upper troposphere thermal regimes; sea surface temperature (SST) and El Nino/Southern Oscillation (ENSO).

1.1 Centres of Anticyclone

The Figure1 shows surface pressure systems as described below:

The Azores high pressure at 1024hPa strengthened by 2hPa compared to the previous month and shifted northwest at about 32°N/50°W extending a trough over northern Africa.

The St Helena high pressure at 1026hPa strengthened significantly by 4hPa compared to the past month and shifted southeast at 32°S/05°W extending a ridge over western Gulf of Guinea countries.

The Saharan thermal lows of 1008hPa maintained its intensity compared to the past month, but covered limited areas in eastern Niger/western Chad and northern Mali.

The Mascarene high pressure at 1026hPa strengthened significantly by 4hPa and shifted northwest at 30°S/60°E with a ridge over eastern Africa.

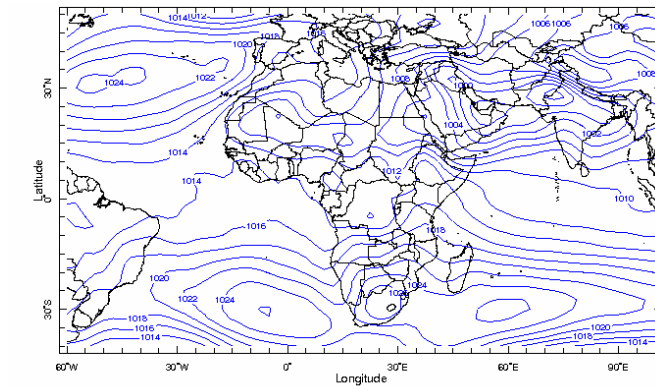


Figure 1 : Mean surface pressure during the Month of July, 2009

(Source : IRI/NOAA/NCEP)

1.2 Low level wind anomaly flow at 850hPa

The Figure 2 shows wind anomalies at 850hPa derived from reference period 1971-2000.

Strong easterly wind anomalies were observed over western Algeria and central Morocco.

Over western Democratic Republic of Congo, Congo and Gabon strong easterlies wind anomalies prevailed turning to northerly anomalies over coastal Angola.

The average wind anomaly speed (shaded) was observed at about 08 m/s and above.

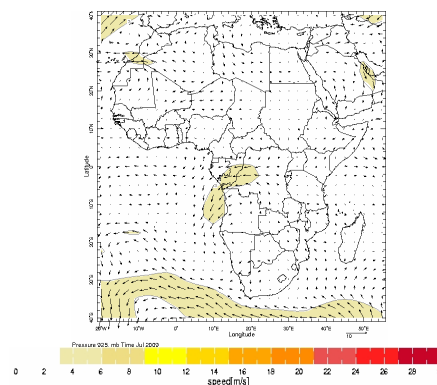


Figure 2 : July 2009, Wind Anomalies at 850hPa

(Source : IRI/NOAA/NCEP)

1.3 Mid and upper troposphere winds

At the 700hPa (Figure 3), a wind core associated with the African Easterly Jet (AEJ) of about 11m/s were observed at about 15°N of latitude over Senegal and Mauritania.

The Figure 4 shows, the tropical Easterly Jet at 150hPa of about 30 m/s were observed over Indian Ocean extending its effect up to the eastern Sahel.

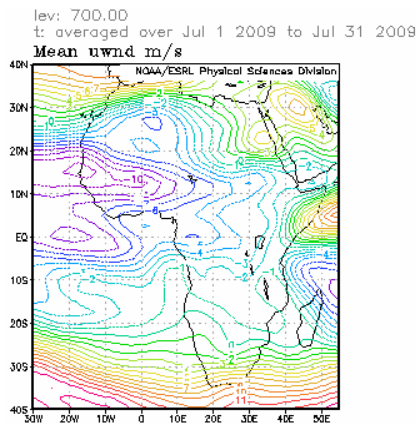


Figure 3 : U - Winds velocity at 700hPa
(Source : NOAA/NCEP)

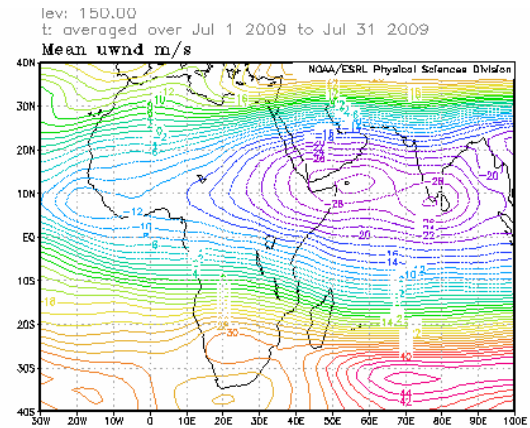


Figure 4 : U - Winds velocity at 150hPa
(Source : NOAA/NCEP)

1.4 Thermal index

In the month of July, 2009, the thermal index (TI) regime at 300hPa, Figure 5, had a near-threshold value of 242°K isotherm over Africa covering the Sahel, northern part of Gulf of Guinea countries, northern parts of central Africa and parts of GHA countries maintaining reasonable conditional instability associated with heavy rainfall. The threshold value of 243°K and above with epicenter of 249°K over northeastern Asia maintained the highest conditional instability associated with heavy convective rainfall with floods. The low TI regime value of 241°K and below was associated with suppressed convection over most the Sahara and part of Southern Africa countries.

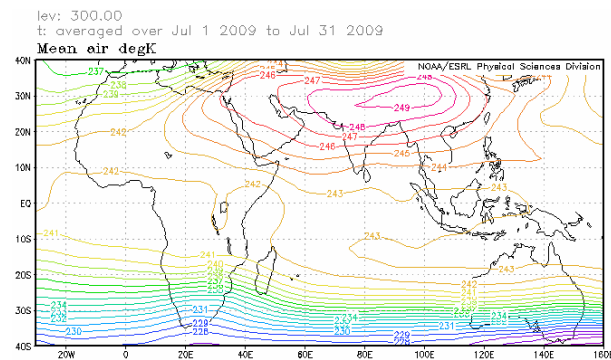


Figure 5 : Thermal regime at 300hPa
(Data Source: NOAA/NCEP)

1.5 Sea Surface Temperature (SST) and El Nino/Southern Oscillation (ENSO)

A neutral to warming conditions prevailed in most of the Pacific Ocean except in the southern and northern parts where some cooling conditions prevailed. Neutral to warming conditions were observed in most of the Atlantic Ocean except in the equatorial east, north-eastern, north-western and south central where some cooling conditions were observed. Neutral to warming condition were observed in most of the Indian Ocean except the cooling conditions observed in the Bay of Bengal and southern Indian Ocean.

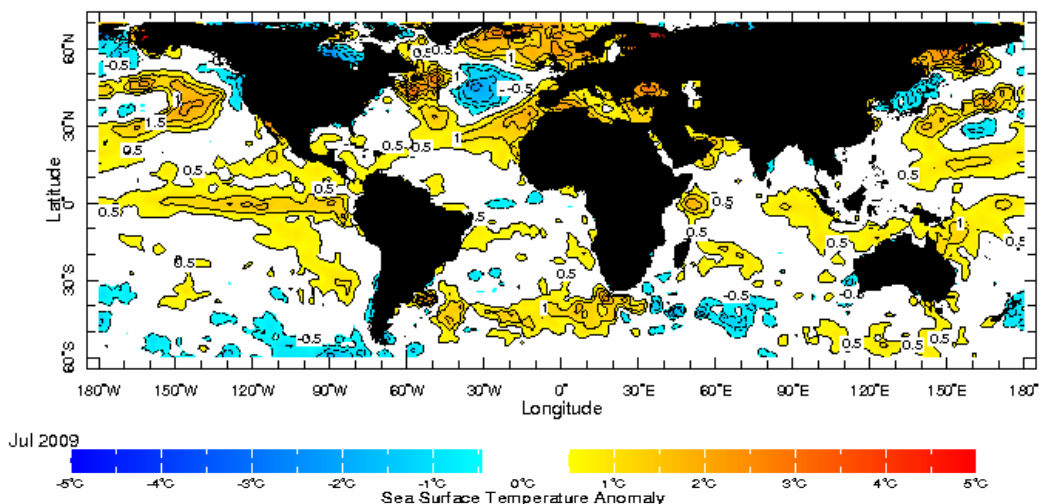


Figure 6: Sea Surface Temperature Anomalies (Source: IRI)

2. CLIMATOLOGICAL SITUATION AND IMPACTS DURING THE MONTH OF JULY, 2009

The section provides the general climatological situation covering two major parameters, the rainfall and temperature.

2.1 Rainfall

Compared to the last month, the estimated rainfall for July 2009 in Figure 7, shows slight spatial increase in rainfall distribution over the Sahel and Greater Horn of Africa (GHA) countries while northern and southern Africa and Gulf of Guinea countries observed decrease in spatial rainfall distribution. In detail:

- **North Africa:** had significant spatial rainfall distribution decrease observing rainfall amounts ranging from 10mm to 50mm over northern Morocco and Algeria.
- **The Sahel :** had spatial rainfall distribution and amounts increase observing amounts ranging from 10mm to 150mm with maximum rainfall amounts ranging between 150mm to 300mm over western Senegal, the Gambia and Guinea Bissau.
- **Gulf of Guinea :** countries observed decrease in rainfall distribution and amounts ranging from 10mm to 150mm with heaviest amounts ranging from about 150mm to 400mm over Nigeria and Cameroon.
- **Central Africa :** countries had decrease in rainfall amounts observing 10mm to 150mm with peaks ranging from about 150mm to 200mm over western Central Africa Republic and northern Democratic Republic of Congo.
- **GHA :** northern countries experienced spatial rainfall distribution increase observing amounts ranging from 10mm to 100mm with peaks of about 100mm to 400mm over southern Sudan and northern Ethiopia/Eritrea.
- **Southern Africa :** countries experienced spatial rainfall distribution decrease observing localized amounts ranging from 10mm to 100mm with localized heaviest amounts ranging from about 100mm to about 400mm observed over Zimbabwe and Mozambique.

Compared to the reference period 1979-2000, the July, 2009, rainfall anomalies, Figure 8 shows significant rainfall deficits over most of Gulf of Guinea countries, GHA countries, northern part of Central Africa Countries, eastern part of Madagascar, Central Mali and southern part of Senegal. However, excessive rainfall was observed over Ghana, Benin, Togo and Mozambique.

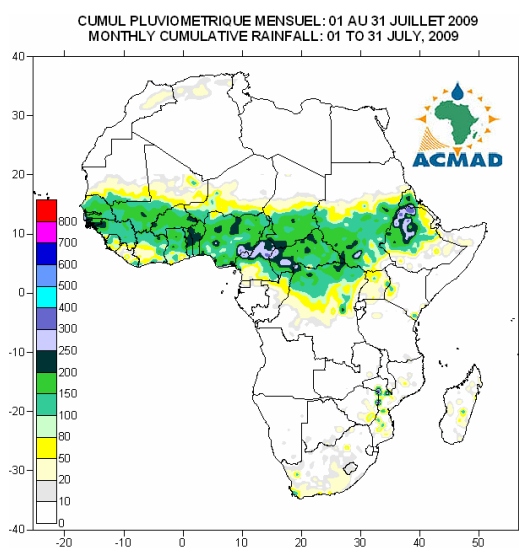


Figure 7: Monthly cumulative rainfall
(Data Source: NOAA/NCEP)

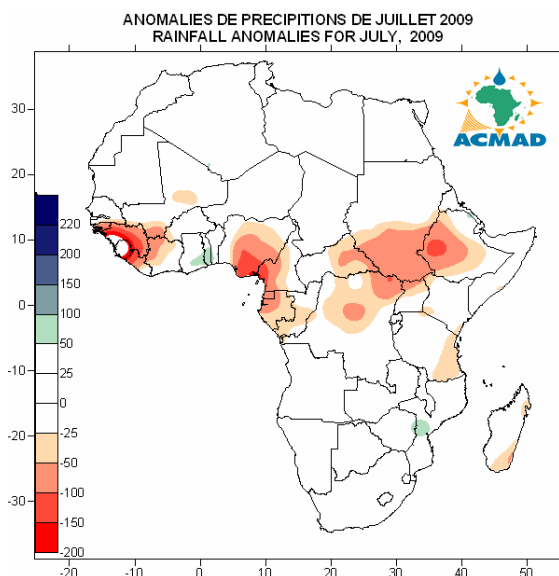


Figure 8: Monthly Precipitations Anomalies
(Data Source: NOAA/NCEP)

2.2 Surface Temperature Anomalies

In July 2009, the temperature anomalies (Figure 9) compared to 1971-2000 base period, in most of African countries were generally normal (1 °C to -1 °C) except over extreme northern Algeria were positive temperature anomalies (>1.5°C) were observed.

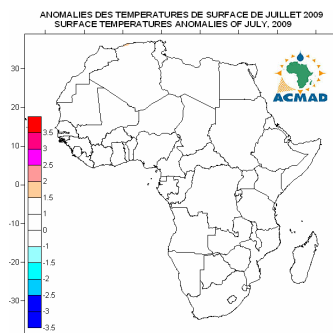


Figure 9 : Monthly Temperatures Anomalies
(Data Source: NOAA/NCEP)

3. OUTLOOK

The subsections provide the expected SSTs and ENSO characteristics and evolution of events based on Figures 10 and 11 respectively with rainfall outlook in August.

3.1 Forecast Sea Surface Temperature (SST)

The figure 10 shows the forecast Sea Surface Temperature Anomalies from July 2009 for the period July-August-September.

Pacific Ocean: Neutral to warming conditions will continue over most of Pacific ocean except in the southern and equatorial north-western parts where cooling will prevail.

Atlantic Ocean: A neutral to warming condition is expected over most of Atlantic Ocean except the south-western part of the ocean.

Indian Ocean: Neutral to warming condition are expected over most of the Indian Ocean while over the south-western part the cooling conditions will persist. Over Mozambique Channel, neutral condition will prevail.

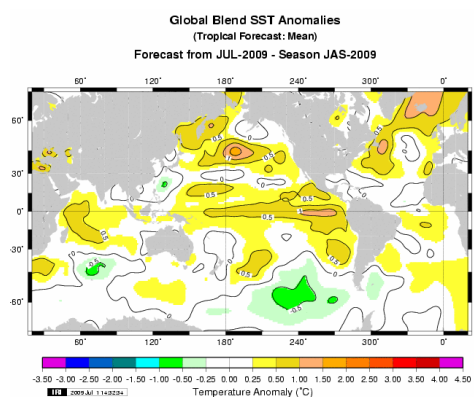


Figure 10 : Forecast Sea Surface Temperatures Anomalies
(source IRI)

3.2 El Ni Niño/La Niña

The set of dynamical and statistical model forecasts of ENSO over Niño 3.4 domain (5°N – 5°S, 120°W – 170°W) shown on Figure 11 that, current forecasts and observations indicate that maintenance of weak to moderate El Niño conditions is the most likely scenario through 2009 (with probability near 80% from JAS to NDJ seasons), with a return to neutral conditions only about 20% likely during the coming several months.

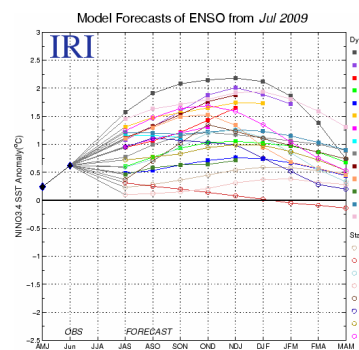


Figure 11 : Multi-model ENSO Forecast
(source IRI)

3.3 Rainfall

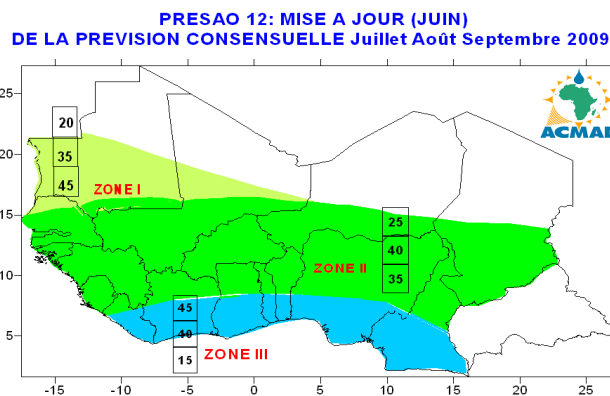
There will be no significant moisture influx reduction over the Sahel due to the weakening of southwest monsoon compounded by the continental winds over the central Africa countries. In detail

- **North Africa countries:** will experience rainfall increase, amounts ranging from 10mm to 75mm.

- **The Sahel:** will continue to experience increasing temperatures with slight rainfall decrease recording amounts ranging from 10mm to 100mm with highest amounts about 200mm over southern parts of the Sahel countries. However, the rainfall will remain depressed due to evolving El Nino.
- **Gulf of Guinea countries:** will experience no significant rainfall increase recording amounts ranging from 10mm to 150mm with peaks ranging from about 200mm to 300mm.
- **Central Africa countries:** will have no significant rainfall increase over northern parts recording amounts ranging from 10mm to 150mm with peaks ranging from about 200mm to 250mm.
- **GHA countries:** will record slight rainfall increase over northern parts with amounts ranging from 10mm to 150mm with peaks of about 200mm to about 300mm.
- **Southern Africa countries:** expected to have slight rainfall increase with amounts ranging from 10mm to 100mm.

3.4 Result of PRESAO12:seasonal rainfall forecast for July-August-September 2009

- Over zone III which covers the southern part of Gulf of Guinea countries (from Cote d'Ivoire to Cameroon), a high probability of rainfall higher than normal (Probability of 0,45)
- Over the zone II, which corresponds to the Central Sahel and including Sierra Leone, Guinea Conakry, Guinea Bissau, southern Senegal, the Gambia, southern Mali, Burkina Faso, Niger, Chad, North Gulf of Guinea, the probability of rain near normal ($p = 0.40$) with a tendency to below normal ($p = 0.35$) is forecast.
- Finally over zone I, which includes the south-west of Mauritania, northern Senegal, probability of rainfall below normal ($p = 0.45$) is forecast.



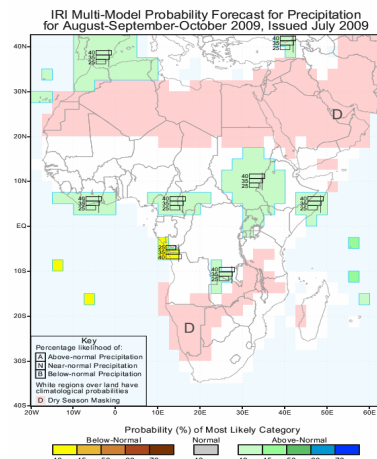
ADVICE:

THE POTENTIAL OF ADVERSE IMPACTS IN THE REGIONS ARE CLEAR FROM THE FORECAST PROBABILITIES. ORGANISATIONS PROVIDING EARLY WARNING AND INTERVENTION SERVICES NEED, MORE THAN EVER, TO MAINTAIN CLOSE AND PERMANENT COORDINATION.

3.5 Seasonal Rainfall forecast for August-September-November 2009

The IRI seasonal rainfall forecast issued on July for the period of August-September-October 2009 show:

- excessive rainfall over western and eastern Gulf of Guinea and most of GHA countries, northern part of Morocco, Algeria and Tunisia, Southern Democratic Republic of Congo/ western Zambia/eastern Angola.
- Below normal rainfall is expected over southern Gabon, southern Congo and extreme western Democratic Republic of Congo





El Nino/Southern Oscillation

1. Introduction

The studies have established that the Southern Oscillation Index (SOI) is connected to El Niño. The Peruvian anchovy fisherman ruefully christened the phenomenon “El Niño” in English “The Christ Child” because it occurred in late December around Christmas. The El Niño phenomenon occurs off the coast of Peru and Ecuador (South America coast between the equator and 12°S) when the cool and nutrient rich water which normally upwells from several hundred meters below sea level is suppressed by the sudden appearance of abnormally warm and less nutrient rich surface waters. The phenomenon has also been explained as an oceanic response to the relaxation of wind stress over equatorial Pacific, which in turn is related to the weakening of the eastern south Pacific high. Every 2 to 7 years this warming starts around March/April and spreads to the central and eastern Pacific attaining its peak late in December. In some years this warming is much more extreme than normal. The El Niño events were recorded in 1877, 1918, 1925, 1940, 1941, 1957-58, 1965, 1969, 1972-73, 1976, 1982-83, 1987, 1991, 1994, 1997-98, 2002, 2004 and 2006. The El Niño events have teleconnections with a series of simultaneous rainfall anomalies in far distant areas. The evolution of El Niño in 2009 has been confirmed and model have a strong consensus with a probability 80%.

2. Impacts

The evolution of El Niño in the Pacific Ocean is presently linked to the prevailing global rainfall anomalies over several parts of the globe with expectation of the anomalies magnification as we attain the mature phase of El Niño by November-December, 2009. As observed during other major El Niño years, the following rainfall anomaly patterns are expected in 2009.

- a) Heavy rainfall characterized by floods in October-November-December (OND) season over GHA countries.
- b) Severe rainfall deficits and drought over southern Africa countries during the peak and post El Niño.
- c) The Sahel countries will experience suppressed July-August-September (JAS) rainfall recording below average with post El Niño drought.
- d) The Gulf of Guinea countries will experience heavy rainfall with floods over several parts with serious threat to the coastal settlements.

The National Meteorological and Hydrological Services (NMHSs), have documented information on how El Niño impacts on the countries' climate. The NMHSs in Africa have to advise users of climate information and prediction products to guard against risks of climate extremes during the coming months as the phenomenon moves to its maturity.

The users are advised to consult local and sub-regional climate outlooks for information during the coming months which will be characterized by extreme rainfall events such as floods and droughts. ACMAD will maintain Climate Watch and provide regular updates on El Niño evolution and expected intensity (weak, moderate or strong) including impacts as we progresses towards its mature phase by end of December, 2009.