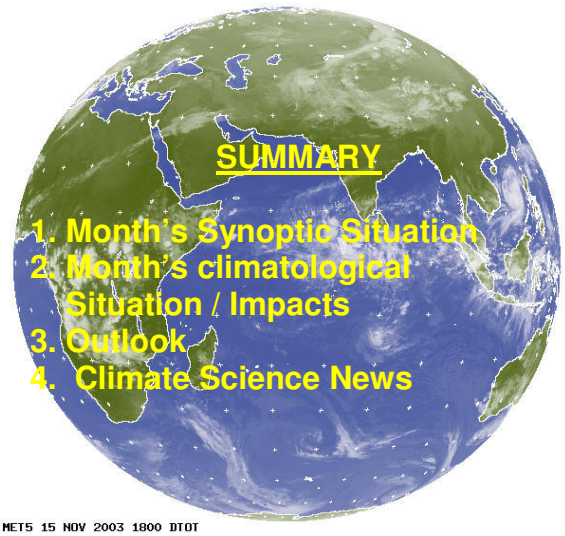
AFRICAN CENTRE OF METEOROLOGICAL APPLICATIONS FOR DEVELOPMENT
CENTRE AFRICAIN POUR LES APPLICATIONS DE LA METEOROLOGIE AU DEVELOPPEMENT

CLIMATE WATCH AFRICA BULLETIN

N° 07
July 2008



SUMMARY

HIGHLIGHTS: Observed spatial and intensity rainfall increase over Gulf of Guinea countries, the Sahel, the northern and western parts of Greater Horn of Africa (GHA) countries where the spatial and intensity of rainfall is expected to increase with outbreak of flash floods over few parts in August.

1. SITUATION DURING THE MONTH OF JULY, 2008

1.1 Centres of Anticyclone

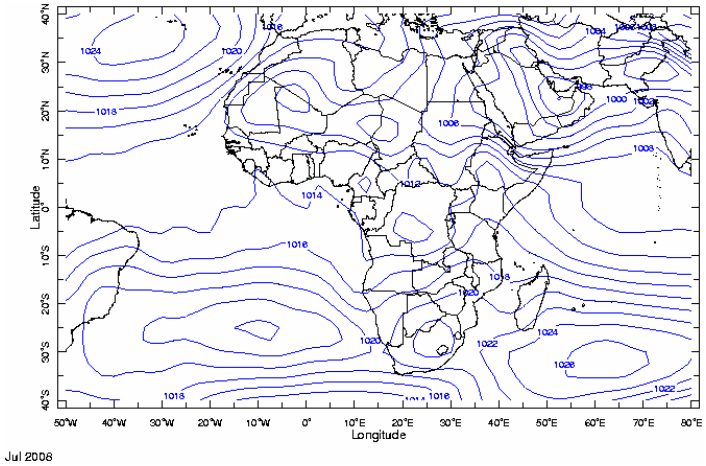
The Azores high pressure at 1024hPa strengthened by 2hPa compared to the past month and displaced slightly to the west at 35°N/35°W.

The St Helena high pressure centre at 1024hPa strengthened by 2hPa compared to the previous month and shifted towards the northwest at 25°S/10°W.

The Saharan thermal low of 1008hPa maintained its intensity compared to the past month with limited area coverage over western Chad/eastern Niger and north Mali/south Algeria.

The Mascarene high pressure at 1026hPa strengthened by 2hPa and its position at 33°S/65°E with a strong ridge over eastern Africa and southern Africa.

The Indian monsoon thermal low fill up slightly with a trough extending over northern part of Great Horn of Africa countries.



Mean surface pressure during the Month of July, 2008 (Source : IRI)

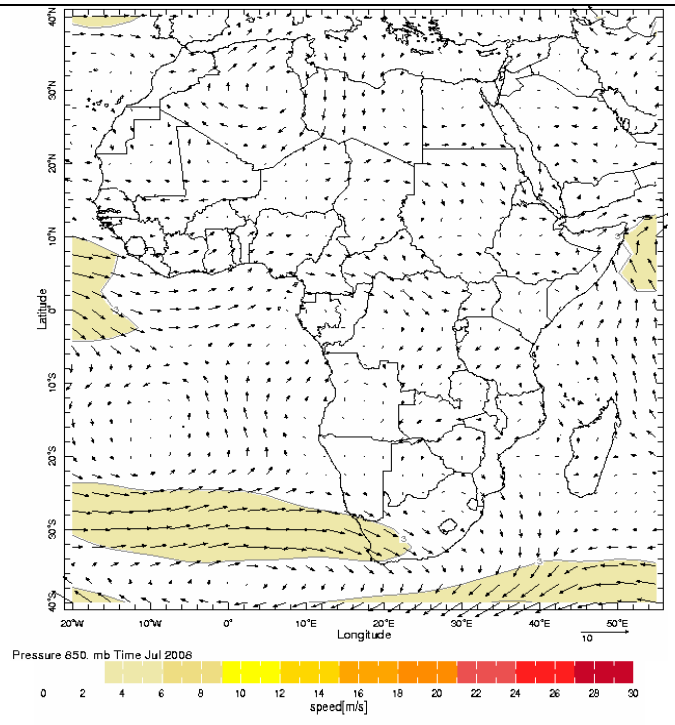
1.2 Low level wind anomaly flow at 850hPa

At 850hPa level, the strong westerly wind anomalies were observed over eastern part of the Gulf of Guinea.

In Indian Ocean strong winds anomalies from the south were observed over northeastern coast of Somalia.

In the southern hemisphere strong easterly winds anomalies were observed in southern Indian Ocean wile westerly wind anomalies were observed from south Atlantic Ocean to east of South Africa.

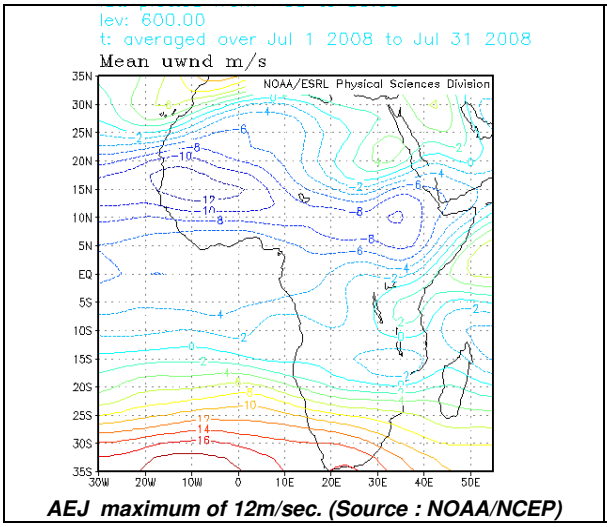
The average wind anomaly speed (shaded) was observed at 08 m/s and above.



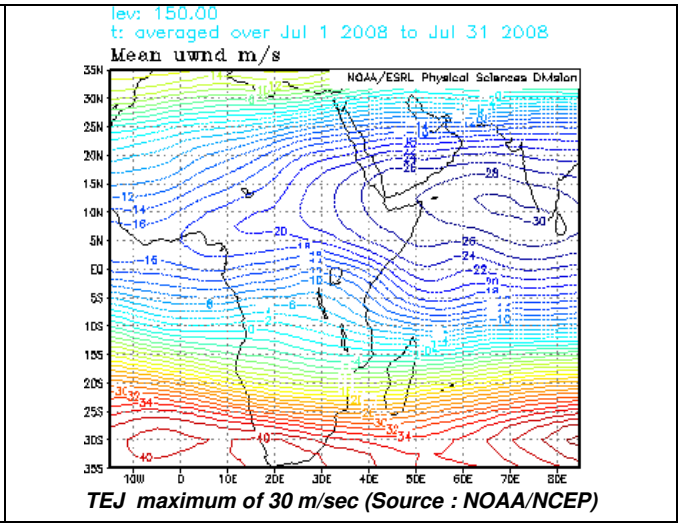
(Source : NOAA/NCEP)

1.3 African Easterly Jet (600hPa) and Tropical Easterly Jet (150hPa)

The mean maximum speed of African Easterly Jet at 600Hpa was 12 m/s. It's axis was located at about 15°N stretching from north Senegal, south Mauritania and south Mali. The mean maximum speed of tropical Easterly Jet at 150Hpa was 30 m/s over the Indian Ocean with an extension up to West Africa.



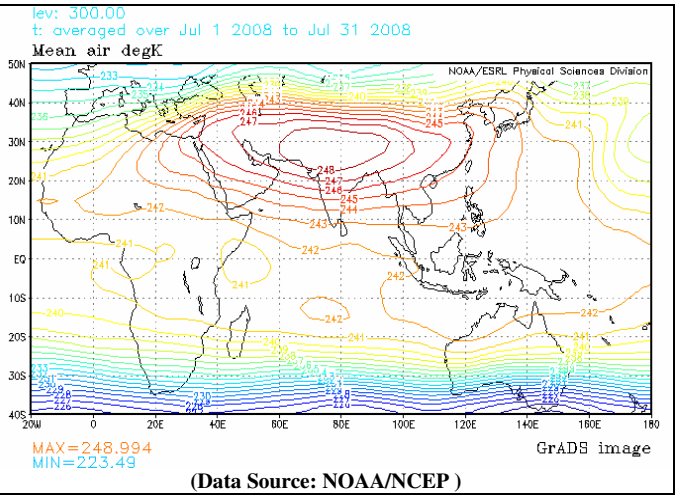
AEJ maximum of 12m/sec. (Source : NOAA/NCEP)



TEJ maximum of 30 m/sec (Source : NOAA/NCEP)

1.4 Thermal index

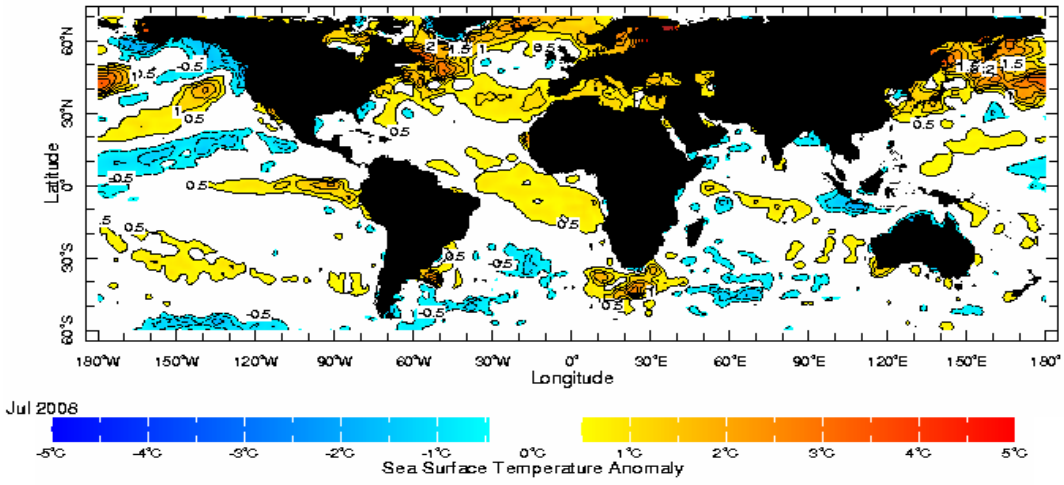
In the month of July, 2008, the thermal index (TI) regime at 300hPa, map show, had a near-threshold value of 242°K isotherm over the northeastern parts of Gulf of Guinea countries and eastern and extreme western part of the Sahel countries that maintained reasonable conditional instability triggering heavy convective rainfall. The threshold value of 243°K over northeast Africa and north GHA extending from the maximum TI value of 248°K maintained the highest conditional instability associated with heavy convective rainfall with severe floods over Asia.



(Data Source: NOAA/NCEP)

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

The cooling extended into the north-eastern from the central equatorial Pacific Ocean, while neutral to warming conditions prevailed in the south, central north, and north-western Pacific Ocean. A neutral to warming condition was observed over most of the Atlantic Ocean. A neutral to warming condition were observed from central Indian Ocean up to western coast of Australia. The neutral to warming conditions was observed south of Mozambique Channel while neutral to cooling conditions was observed its northern part.



Source: IRI

2. CLIMATOLOGICAL SITUATION AND IMPACTS DURING THE MONTH OF JULY, 2008

2.1 Rainfall

The estimated rainfall map below shows spatial and rainfall intensity increase over the Sahel countries and GHA countries; rainfall intensity increase over Gulf of Guinea countries. Central Africa countries had slight spatial increase while northern and southern Africa countries had no significant change. In summary.

- **North Africa** had no significant change compared to the past month, recording rainfall amounts ranging from 10 to 50 mm over north Algeria.

- **The Sahel** countries had spatial and intensity of rainfall increase recording rainfall amounts ranging from 10 to 250 mm with a maximum of above 300mm over southern Chad, southern Mali and southwest Senegal.

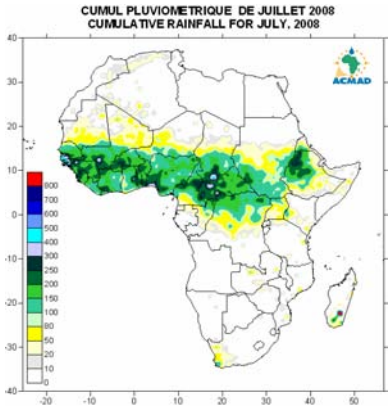
- **Gulf of Guinea** countries experienced rainfall intensity increase recording heavy amounts ranging from 50mm to 300mm with peaks of about 400mm over southwest Nigeria and east Ghana.

- **Central Africa** countries experienced slight spatial rainfall intensity increase recording amounts ranging from 10 to 250 mm with peaks of about 300 mm over west Central Africa Republic.

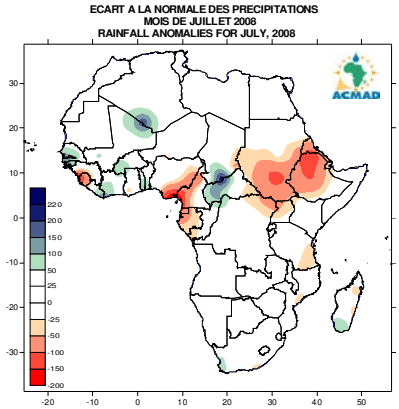
- **GHA** countries experienced increase in rainfall activities recording intensity amounts ranging from 10 to 250 mm, intensifying over western Ethiopia and southwestern Sudan with peaks of about 300mm.

- **Southern Africa** countries experienced some localized rainfall amounts ranging from 10mm to 100 mm over south Africa, Zambia and Mozambique with excessive rainfall of above 800 mm over southern Madagascar.

The July rainfall anomaly map show severe rainfall deficits over Djibouti, Ethiopia, Sudan, east Nigeria, west Cameroon, Sierra Leone and southwest Guinea, while excessive rainfall were recorded over south Chad, west Central African Republic, South Algeria, north Mali, west Burkina Faso, south Benin, south Togo, south west Côte d'Ivoire, west Senegal, Gambia and south Madagascar.



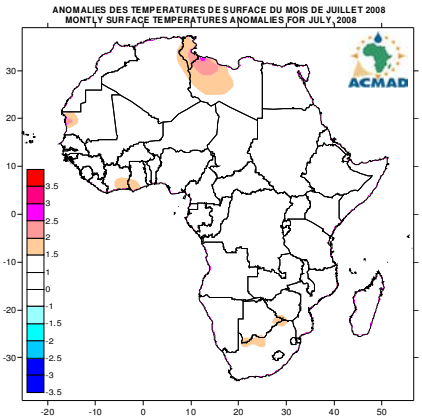
(Data Source: NOAA/NCEP)



(Data Source: NOAA/NCEP)

2.2 Surface Temperature Anomalies

In July, 2008, the temperature anomalies over most of African countries were generally normal (1℃ to –1℃). However, high temperature anomalies above 1.5℃ were observed in Tunisia, western Libya, northeast Algeria, northwest Mauritania, south Côte d'Ivoire, south Ghana, south Zimbabwe, and north South Africa.



(Data Source: NOAA/NCEP)

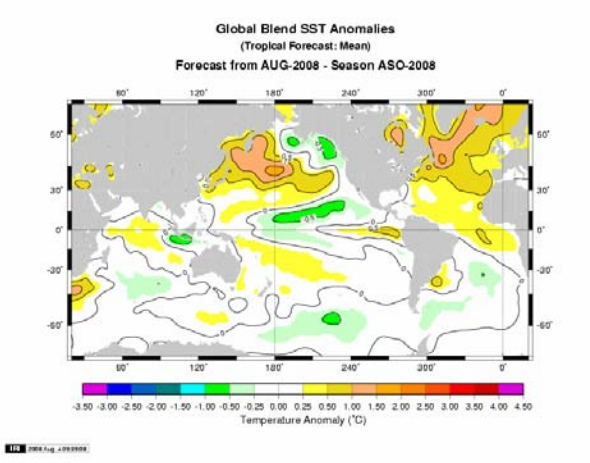
3. OUTLOOK

3.1 Forecast Sea Surface Temperature (SST)

Pacific Ocean: Neutral to cooling conditions will continue in the central, northeastern and south Pacific Ocean but warming is expected over its northwestern and south central part. However, the set of dynamical and statistical model forecasts of ENSO over Nino 3.4 domain (5°N – 5°S, 120°W – 170°W) indicated a spread of possible SST anomalies maintain neutral conditions throughout the forecast period.

Atlantic Ocean: A neutral to cooling condition is expected over south-western Atlantic Ocean, while warming trend is expected to continue over the rest of Atlantic.

Indian Ocean: Neutral to cooling condition is expected over south and northeastern Indian Ocean, but neutral to warming condition will extend from northwestern up to southeastern part.

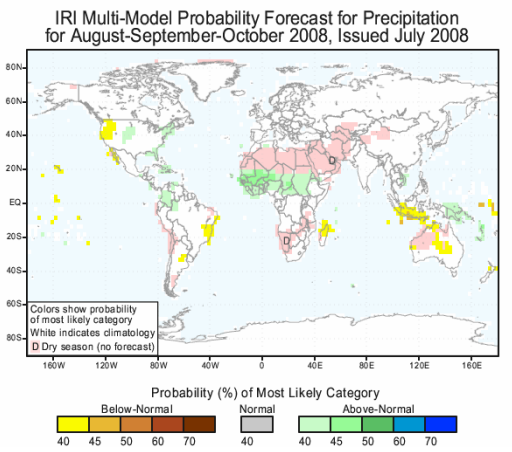


(source IRI)

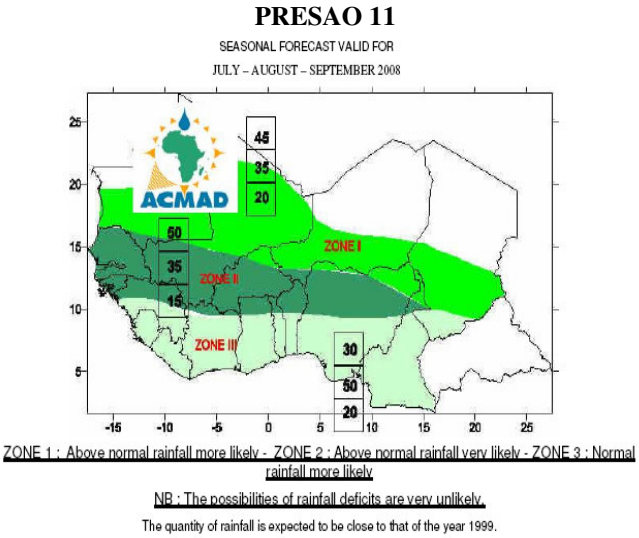
3.3 Rainfall

The northward movement of the ITD will lead to high moisture influx and heavy rainfall with isolated outbreaks of flash floods over northern parts of the Gulf of Guinea countries, the Sahel countries, northern parts of central Africa countries, northern and western GHA countries.

The IRI forecast shown below indicates above normal rainfall over most of West Africa countries, Chad and Cameroon consistent with seasonal rainfall consensus forecast of PRESAO-11 presented below. However, there is increased probability and confidence for above normal rainfall as predicted by ACMAD and updated on 27th June, 2008 based on global Centres climate forecasts updates.



(source IRI)



ZONE 1 : Above normal rainfall more likely - ZONE 2 : Above normal rainfall very likely - ZONE 3 : Normal rainfall more likely

NB : The possibilities of rainfall deficits are very unlikely.

The quantity of rainfall is expected to be close to that of the year 1999.

Climate Science News

AFRICAN JET STREAMS
by
Dr. Leonard Njau and Tinni H. Seydou

The characteristics of various African jet streams have been extensively studied and documented. The middle and upper tropospheric wind maxima are associated with the African Easterly Jet (AEJ) and the Tropical Easterly Jet (TEJ).

The mid-tropospheric AEJ occurs at 650 – 600hPa in June through September, but descends sharply to about 700hPa in October. Though a very prominent feature of the West African summer hemisphere, there is a tendency for maximum winds of up to 12 m/sec to occur more persistently west of longitude 5ºE. It may however be noted that word "Jet" is not used according to the acknowledged definition and it has been loosely used to distinguish the characteristic strong easterlies at mid-tropospheric levels from an otherwise weak easterly current in that layer. The AEJ origin has been attributed to the thermal structure over continental north Africa during summer.

The upper level Tropical Easterly Jet (TEJ) is over Horn of Africa and west Africa. The TEJ is at a height of 200-100hPa, but on the mean centred at 150hPa and running along 15º north. It is observed to be strongest during the peak of the summer monsoon July and August. The TEJ maximum values occur in the eastern parts of West African region. It is most intense in July when highest values of 20-22 m/sec are observed east of the Greenwich Meridian. However, the TEJ maximum in excess of 30m/sec is located over north Indian Ocean, off the south coast of the Indian sub-continent.

The AEJ at 700-600hpa layer and the TEJ at 200-100hPa layer, together with West African wave disturbances propagating westward all constitute important northern summer weather features in the West African region. Studies suggest that since the West African easterly wave disturbances have their largest amplitudes near the 700hPa level with a scale of about 2000km and speeds of the order of 6º-10º long/day, the choice of 700hPa level would appear appropriate for making forecasts in West Africa.

Cross equatorial flow from southern to northern hemisphere is a significant component of monsoon circulation that has been recognized as an important global circulation feature for inter-hemispheric energy exchange. The cross equatorial flow constitutes the East African Low Level Jet (LLJ) which is dominant during the northern hemisphere summer period (June-August). The vertical wind shears of the LLJ below and above axis of the jet undergo diurnal fluctuations being larger in the morning than in the afternoon. Generally the mean vertical wind shears below the LLJ core are of 6 – 9 m/s per km in the morning and 3 – 6 m/s per km in the afternoon. Above the jet core, shears are of the order 3 – 6 m/s per km in the morning and 2 – 6 m/s per km in the afternoon.

The southeast and northeast monsoons over lndian Ocean branch off coast to the Turkana in the northwest Kenya experiencing channelling effects of the Ethiopian and East African highlands to form the Turkana jet which persists throughout the year with primary speed maximum in February-March and a secondary peak in June-July.

The recent advances in technology has resulted in enhanced climate science research on global and regional climate systems contributing significantly to the natural and socio economic systems in the globe. The global climate centres products and services coupled with experience have contributed tremendously in the monitoring and prediction of extreme weather and climate events for the protection human lives and property.