African Centre of Meteorological Application for Development
Centre Africain pour les Applications de la Météorologie au Développement

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Dekad of 11 to 20 August, 2009

HIGHLIGHT: The heaviest rainfall amounts were observed over western parts of north central Africa and western part of Gulf of Guinea with rainfall peaks ranging from 250mm to 300mm and above over Guinea and western Cameroon.

1. GENERAL SITUATION

Subsection 1.1 provides the strengths of the surface pressure systems, the ITD displacement while the subsection 1.2 in the Troposphere gives a brief on monsoon, thermal index regimes and relative humidity.

1.1 SURFACE

- **Azores high:** Pressure of 1026hPa with an SW-NE axis maintained its intensity and shifted southeast compared to the past dekad. Its mean position was located at about 34°N/35°W, extending a ridge over north Morocco and Algeria.

- **St. Helena high:** Pressure of 1029hPa with an W-E axis strengthened slightly by 1hPa and shifted southwest at 25°S/18°W with an extended ridge over south Atlantic Ocean.

- **Mascarene high:** Pressure of 1033hPa with an SW-NE axis weakened by 3hPa compared to the past dekad and shifted east. Its mean position was located at 35°S/59°E with an extended ridge over Indian Ocean.

- **Saharan Thermal Low:** Pressure at 1005hPa deepened slightly by 1hPa and shifted westward compared to the previous dekad. Its mean position was located at 22°N/03°W with an extended trough over east Mauritania, north Mali, southwest Algeria, north Niger and Chad.

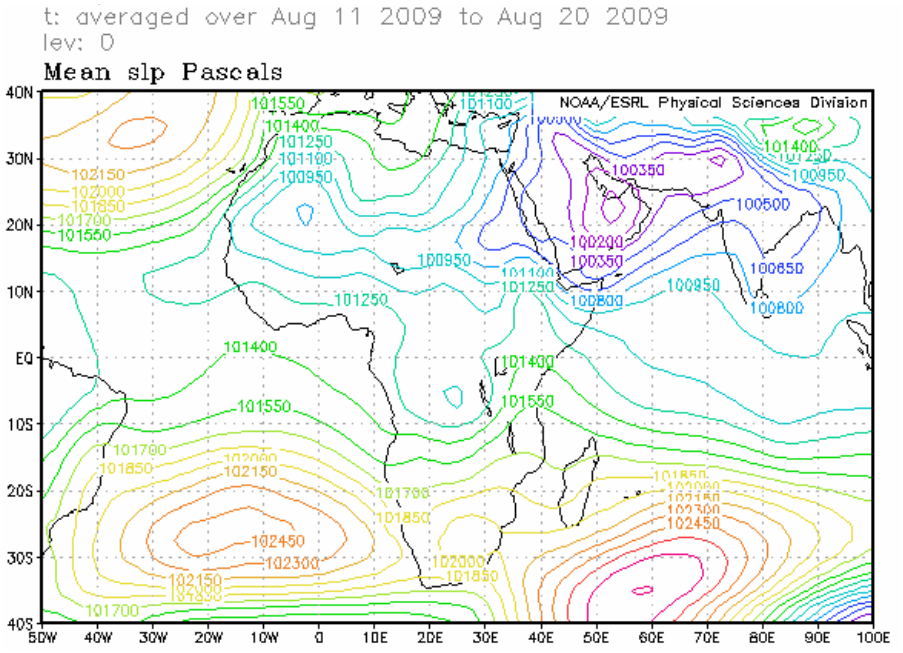

Figure 1: Mean Sea Level Pressure (Source: NOAA/NCEP/ESRL: PSD)

- **Inter -Tropical Discontinuity (ITD):** Between the first dekad (blue line) and the second dekad (black line) of August, 2009, the ITD (Figure 2) shift slightly southwards over northeast Mali and north Sudan; elsewhere over the Sahel its maintained a quasi-stationary position. Comparing the present ITD position to that of the same dekad in 2008 (pink line), the 2009 ITD had slightly northward displacement over western Mauritania but had southward displacement of about 150km to 200km over eastern Sahel.
The mean position of the second dekad of August 2009 ITD was observed at 18.3°N over longitude 20°W; at 20.0°N and 20.8°N over west and central Mauritania respectively; at 20.9°N and 19.8°N over northwest and northeast Mali respectively; at 19.5°N over extreme south Algeria; at 19.4°N and 18.7°N over north and extreme east Niger respectively; at 17.1°N over central north Chad; at 16.6°N and 16.9°N over northwest and north Sudan respectively.

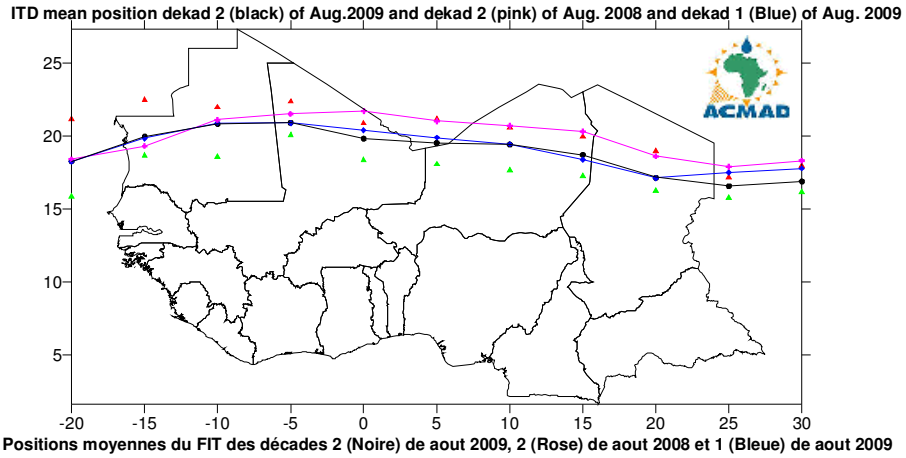

Figure 2 : The red and green triangles represent the max. and min. displacements of the ITD respectively

1.2 TROPOSPHERE

- **Monsoon:** Monsoon influx at 925hPa level was weak (1 to 5m/s) over southwest Cameroon and moderate (5.5 to 11.5m/s) over Liberia, Côte d'Ivoire, Ghana, Togo, Benin and Nigeria..

- **African Easterly Jet (AEJ):** The mean speed of the AEJ (figure 3) at 700hPa level was about 18m/s during the dekad with an axis located at about 16°N, stretching from south Mauritania, north Senegal up to Cape Verde Island in north Atlantic Ocean (Figure 3).

- **Tropical Easterly Jet (TEJ):** The core value of the TEJ at 150hPa level was 30m/s at about 15°N of latitude over south India extending its axis over northern GHA countries and eastern Sahel , with secondary winds core of 20m/s at about 5°N over western part of Gulf of Guinea countries (Figure 4).

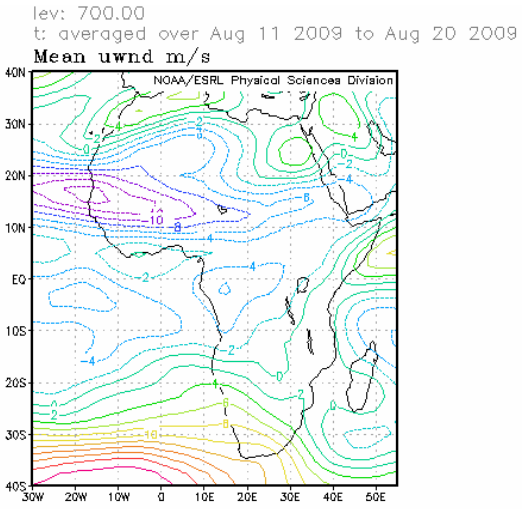

Figure 3: Position of AEJ
(Source: NOAA/NCEP/ESRL: PSD)

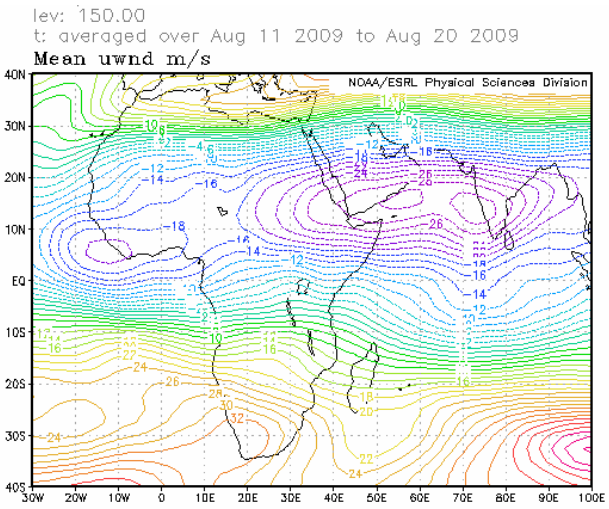

Figure 4: Position of the TEJ
(Source: NOAA/NCEP/ESRL: PSD)

- **Thermal Index (TI):** In the second dekad of August, 2009, the thermal index (TI) regime at 300hPa in (figure 5), had TI regime value of 242°K and above covering extreme northern parts of Central Africa countries, northern part of GHA countries with the threshold value of 243°K and above covering the western Sahel triggered heavy rains over the areas characterized by high relative humidity(>60%) as observed in Figure 6. The highest thermal index regime of 249°K was located over northern India extending into north western Pacific Ocean and northeastern Africa associated with heavy rainfall with floods.

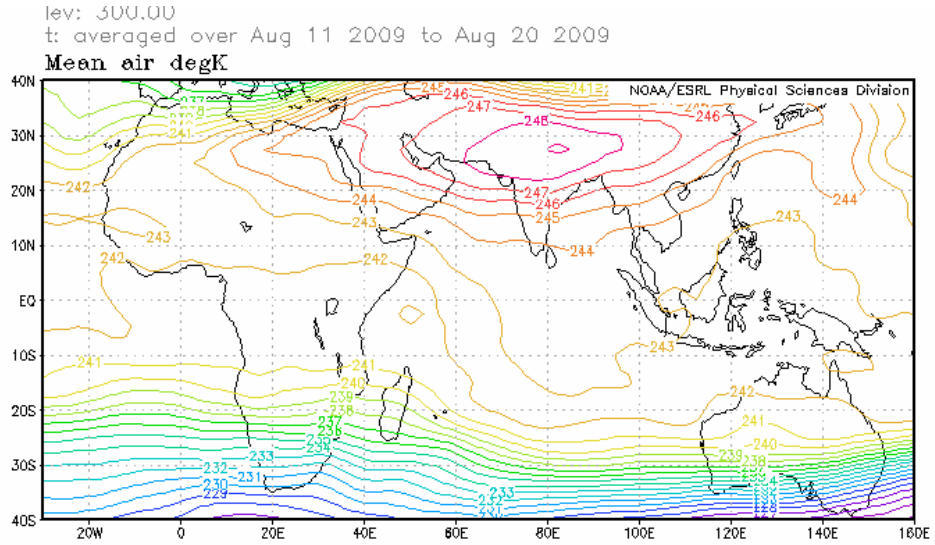

Figure 5: Thermal regimes at 300hPa (Source: NOAA/NCEP/ESRL: PSD)

- **Relative Humidity (RH):** The 850hPa (Figure 6) shows high RH (>70%) in the second dekad of August, 2009 over parts of GHA countries, Gulf of Guinea countries, southern part of the Sahel countries and northwestern part of Central Africa countries. The Sahara, northern parts of the Sahel, Southern Africa and southern part of Central Africa countries experienced dry conditions characterized by the lowest RH (<40%).

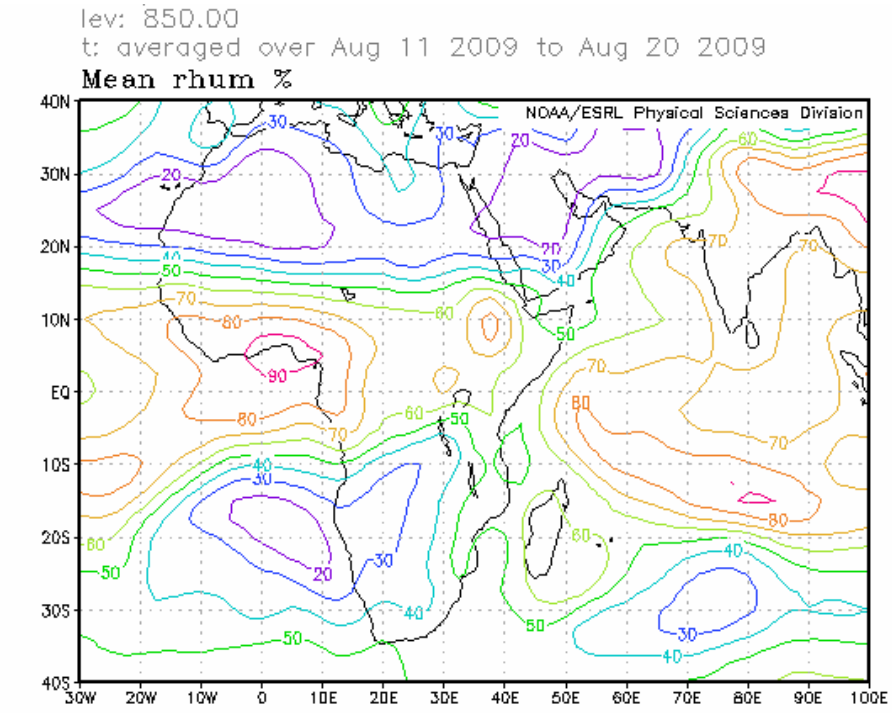

Figure 6: Relative Humidity at 850hPa (Source: NOAA/NCEP/ESRL: PSD)

2. RAINFALL AND TEMPERATURE SITUATION

Subsection 2.1 provides a summary on estimated rainfall amounts and distribution and the subsection 2.2 gives stations observed data on rainfall, mean maximum and mean minimum temperatures including number of rainy days.

2.1 RAINFALL

The rainfall estimate based on Satellite and Rain Gauge in Figure 7 below shows slight rainfall distribution increase over northern Africa and GHA countries, while over the Sahel some slight rainfall distribution decrease were observed. Central Africa countries observed slight increase in rainfall amounts. Southern Africa and Gulf of Guinea countries had non significant change in spatial rainfall distribution and amounts. In detail:

- **North Africa countries:** slight rainfall distribution and amounts increase observing 10 mm to 75mm over north Algeria and Tunisia.

- **The Sahel:** had slight decrease in rainfall distribution observing amounts ranging from 10mm to 150mm with some peaks ranging between 150mm to 200mm over south Mauritania/Mali and western Senegal/ Gambia.

- **Gulf of Guinea countries:** southern part of Gulf of Guinea continued to experience dryness conditions while the northern part had 10mm to 150 mm of estimated rainfall, intensifying the amounts ranging between 150mm to 250mm with heaviest amounts above 300 over western Cameroon

- **Central Africa countries:** observed rainfall amounts ranging from 10mm to 150mm with maximum of about 200mm over Democratic Republic of Congo.

- **GHA countries:** experienced slight increase in rainfall distribution, but observed amounts ranging between 10mm to 100mm with maximum amounts of about 150mm over Sudan, Ethiopia, Uganda and western Kenya.

- **Southern Africa countries:** remained generally dry except over its extreme southwestern part were some rainfall amounts ranging between 10mm to 100mm were observed.

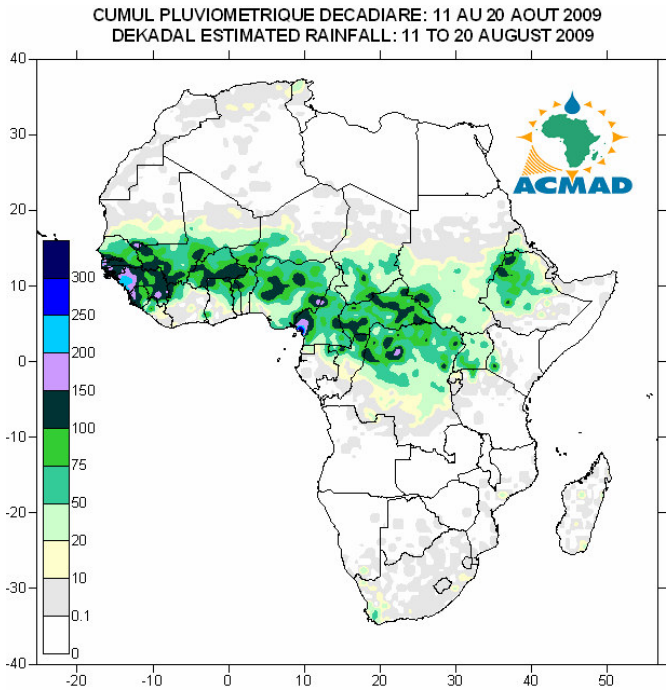

Figure 7: Estimated precipitations, (Data Source: NOAA/NCEP)

2.2 OBSERVED DATA

The Table below shows heaviest cumulative rainfall recorded over Douala in Cameroon, Banjul in Gambia, Conakry in Guinea, and Niamey in Niger. The lowest temperature of 4.5°C was recorded at Johannesburg in South Africa while the highest temperature of 41.0°C was recorded at Bilma in Niger.

N°	STATIONS	Précipitations (mm)	Number of rainy days	Température Max mean(°C)	Température min mean (°C)
1	Abidjan	3	3	28,3	22,9
2	Accra	0	0	28,3	23,5
3	Addis-Abéba	19	2	20,8	11,0
4	Agadez	28	2	39,2	26,3
5	Alger(Dar El Beida)	11	1	32,0	23,0
6	Antananarivo	3	2	22,7	11,2
7	Antsiranana	0	0	29,3	19,1
8	Bamako-Senou	88	4	31,0	22,5
9	Bangui	28	4	32,3	21,7
10	Banjul	265	8	31,4	23,0
11	Beira	10	3	28,5	17,6
12	Bilma	0	0	41,0	25,7
13	Bobo Dioulasso	76	7	29,3	21,7
14	Brazzaville	0	0	28,5	20,3
15	Casablanca	0	0	27,7	22,3
16	Conakry	197	4	27,4	-
17	Cotonou	0	0	27,9	23,8
18	Dakar-Yoff	51	4	31,2	25,5
19	Dar-es-Salaam	0	0	30,0	18,7
20	Douala	318	9	27,1	23,1
21	Durban	2	1	22,8	13,6
22	Entebbe	22	1	26,4	18,1
23	Francistown	0	0	25,5	6,2
24	Johannesbourg	0	0	17,8	4,5
25	Khartoum	0	0	39,7	28,8
26	Kigali	0	0	27,7	16,8
27	Kigoma	0	0	30,1	17,7
28	Le Caire	0	0	33,8	24,2
29	Le Cap	52	6	15,9	10,2
30	Libreville	3	1	28,0	22,7
31	Lomé	1	1	28,2	23,1
32	Lusaka	0	0	26,6	9,8
33	Manzini	1	1	24,8	11,0
34	Maputo	1	1	25,9	14,8
35	Maun	0	0	28,1	10,9
36	Mbeya	0	0	24,2	7,4
37	Nairobi	0	0	24,1	12,1
38	Nampula	0	0	28,9	16,1
39	Ndele (RCA)	66	5	28,7	19,5
40	N'Djamena	55	2	32,7	23,5
41	Niamey-Aéroport	111	5	31,4	23,9
42	Nouakchott	0	0	32,3	26,4
43	Ouagadougou	89	4	31,7	23,7
44	Plaisance	67	6	25,1	18,7
45	Sal	0	0	30,3	25,9
46	Seretse Khama Intl Aéro	0	0	23,1	5,9
47	Seychelles	24	3	29,0	24,6
48	Tamanrasset	1	1	35,7	23,8
49	Toalagnaro	30	3	23,7	17,7
50	Tombouctou	4	1	38,3	26,4
51	Tripoli	0	0	38,9	24,2
52	Tunis	5	3	35,2	24,8
53	Windhoek	0	0	25,2	7,8
54	Zinder	46	6	34,9	23,9

NOTE: **0** means no rain;
- means no temperature data available

Data Source: ACMAD / GTS

3. OUTLOOK FOR DEKAD (01st - 10th SEPTEMBER, 2009)

3.1 RAINFALL

The ITD limited slight southward displacement will lead to less moisture influx over the Sahel reducing rainfall the Sahel confining it over limited parts in the south sector with most rainfall covering northern parts of Gulf of Guinea countries, central Africa and northern sector of GHA countries. Rainfall deficits will continue over southern parts of GHA countries with acute dry conditions prevailing over southern Africa countries (Figure 8). In detail**:**

- **North Africa countries:** will experience slight rainfall increase amounts ranging from 10mm to 50mm.
- **The Sahel:** will continue to experience high temperatures with rainfall decrease over several parts of the Sahel recording amounts ranging from 10mm to 75mm with isolated peaks of about 100mm over southern parts of the Sahel.
- **Gulf of Guinea countries:** will experience rainfall increase recording amounts ranging from 10mm to 150mm with peaks of about 200mm and above.
- **Central Africa countries:** will have rainfall increase over northern parts recording amounts ranging from 10mm to 150mm with peaks ranging of about 200mm and above.
- **GHA countries:** will have rainfall increase over western parts observing amounts ranging from 10mm to 150mm with peaks of about 200mm and above.
- **Southern Africa countries:** dry conditions will be expected to prevail over most of the countries with light rainfall patches ranging from 10mm to 20mm over eastern parts.

3.2 TEMPERATURE

The forecast in Figure 9, shows that the mean surface temperature will continue to increase over Gulf of Guinea countries, the Sahel, northern parts of central Africa and parts of GHA countries. The highest forecast temperatures range from 20°C to 35°C covering more than 70% of the Continent.

3.3 SOIL MOISTURE

The outlook on soil moisture change, maps shown in Figure 10 include the initial soil moisture and the forecast changes over the next 7 days. The soil moisture change and precipitation relationship is discernable on the maps below. The areas forecast to have highest soil moisture change include Gulf of Guinea countries, southern parts of the Sahel, northern central Africa and northern GHA countries.

3.4 IMPACTS

Health: The incidences of malaria and other climate related diseases are higher in areas with high temperatures during rainy period. The temperatures in the range of 18°C to 32°C with high rainfall and relative humidity (>60%) favour the survival of the vector and development of the parasite in the vector resulting in high incidences of malaria even in low prevalence areas. The parts of Gulf of Guinea, the Sahel, northern parts of central Africa and northern GHA countries with high humidity/rainfall coupled with prevailing conducive temperatures will support the survival of parasite resulting in higher incidences of climate related diseases including malaria. The health authorities and Agencies need to continue the healthcare and humanitarian services to protect lives of the vulnerable communities.

Agriculture and food security: The integration of climate information and prediction products in agricultural production is of crucial importance. We often emphasize on the importance of well documented onset dates of seasonal rainfall as well as monitoring of the phenological stages of crops for crop yield assessments in our countries. It is imperative to carry out cost benefit analysis on determination and applications of appropriate planting dates in order to take full advantage of limited soil moisture availability in a shortened crop growing season. The drought-tolerant crops can be grown in zones where the prevailing soil moisture is the major climate constraint on crop yield. The crop varieties that are higher yielding, more drought resistant, earlier maturing, disease and pest tolerant are recommended in these moisture constrained zones for communities' sustained food security and

adaptation. There is also a need to invest in higher yielding crops during a good rainy season by taking advantage of seasonal climate consensus forecast, for example those issued by regional climate outlook fora (RCOF), the GHACOF, PRESAO, PRESAC, and SARCOF for Greater Horn of Africa (GHA), West Africa, central Africa, and southern Africa countries respectively. The prevailing protracted drought over parts of eastern African after the failure of long rains over much of the subregion is mainly due to the evolving El Niño while at the same time the countries in the subregion have to put in place mitigation strategies to cope with heavy rains with floods expected to hit the countries in November/December, 2009 at the peak of the El Niño.

African Ecosystems : While noting that forests serve as water catchments areas, the destruction of forests has been blamed for the declining water levels in the African lakes and rivers. We have to rehabilitate our presently degraded rainfall catchments areas and forests ecosystems through enhanced national policies and environmental reclamation strategies that include national tree planting, afforestation and soil conservation during rainy seasons to minimize soil loss due to heavy runoff. Enhanced national strategies and policies for adaptation to Climate Change are of highest priority for States' enhanced economic recovery and sustainable development. Invest in environmental conservation now for better tomorrow.

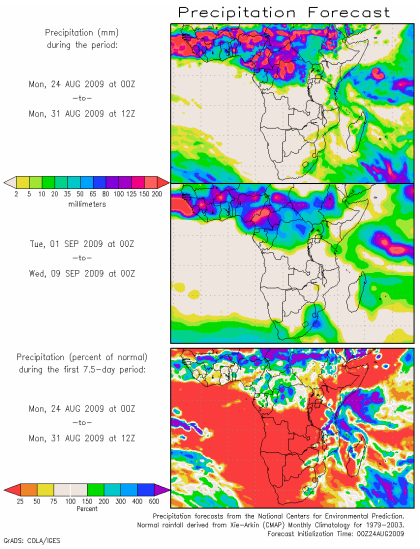

Figure 8: Precipitation forecast, Source : COLA

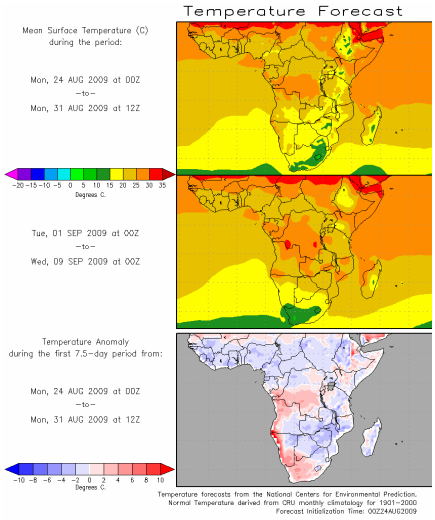

Figure 9 : Temperature forecast Source : COLA

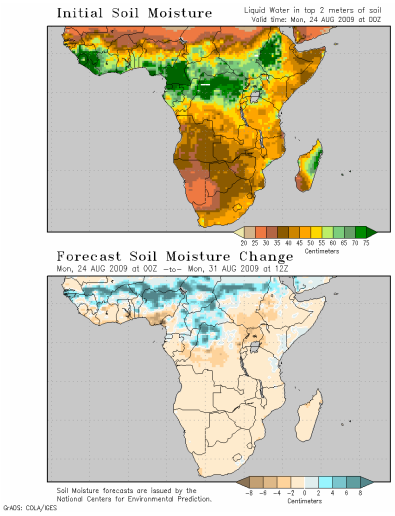

Figure 10 : Soil moisture forecast, Source: COLA

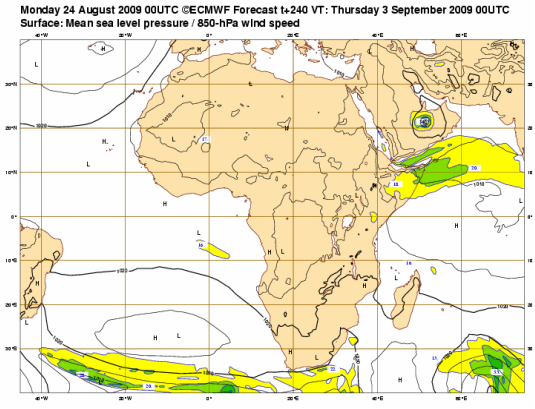

Figure 11 : Mean sea Level pressure forecast

Source : ECMWF