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 July, 2009

HIGHLIGHT: The heaviest rainfall amounts were observed over Guinea Bissau, Guinea and Cameroon while the Sahel experienced slight increase. However, the Sahel and parts of GHA countries will continue to experience depressed rainfall due to evolving El Nino.

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 1027hPa strengthened significantly by 3hPa and shifted southwest compared to the past dekad. Its mean position was located at about 35°N/42°W, extending a ridge over north Morocco.

- **St. Helena high:** Pressure of 1032hPa strengthened significantly by 5hPa and shifted southeast at 33°S/05°W with an extended ridge over Gulf of Guinea.

- **Mascarene high:** Pressure of 1031hPa weakened significantly by 5hPa compared to the past dekad and shifted southeast. Its mean position was located at 28°S/68°E with an extended ridge over Indian Ocean.

- **Saharan Thermal Low:** Pressure at 1006hPa maintained its intensity and shift northwest compared to the previous dekad. Its mean position was located at 22°N/02°W with an extended trough over east Mauritania, north Mali, south Algeria and north Niger.

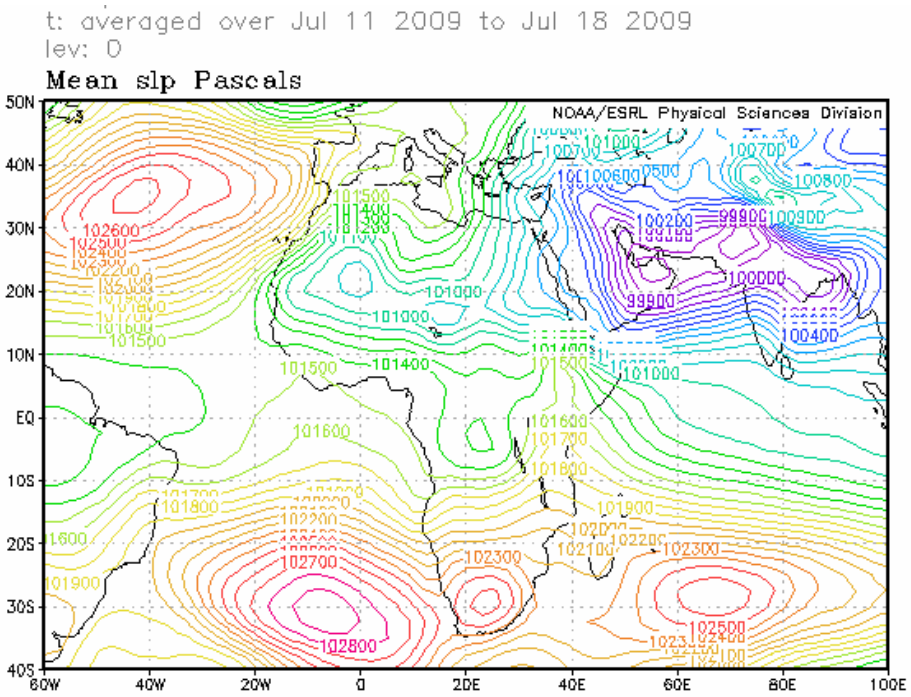

Figure 1: Mean Sea Level Pressure (Source: NOAA/NCEP/ESRL: PSD)

- **Inter -Tropical Discontinuity (ITD):** Between the first dekad (blue line) and the second dekad of July (black line), 2009, the ITD (Figure 2) continued its migration northwards over the Sahel at about 1.5° of latitude. Comparing the present ITD position to the second dekad of July 2008 (pink line), the second dekad of July (black line), 2009 there is slightly northward of 2008 ITD position over western Sahel and south over the eastern part. The mean position of 2009 ITD was observed at 17.1°N over longitude 20°W; at 19.5°N and 20.3°N over west and central Mauritania respectively; at 21.1°N and 21.4°N over northwest and northeast Mali respectively; at 19.9°N over extreme south Algeria; at 19.0°N and 18.0°N over central north and extreme east Niger respectively; at 17.9°N over central north Chad; at 17.7°N and 17.8°N over northwest and north Sudan respectively.

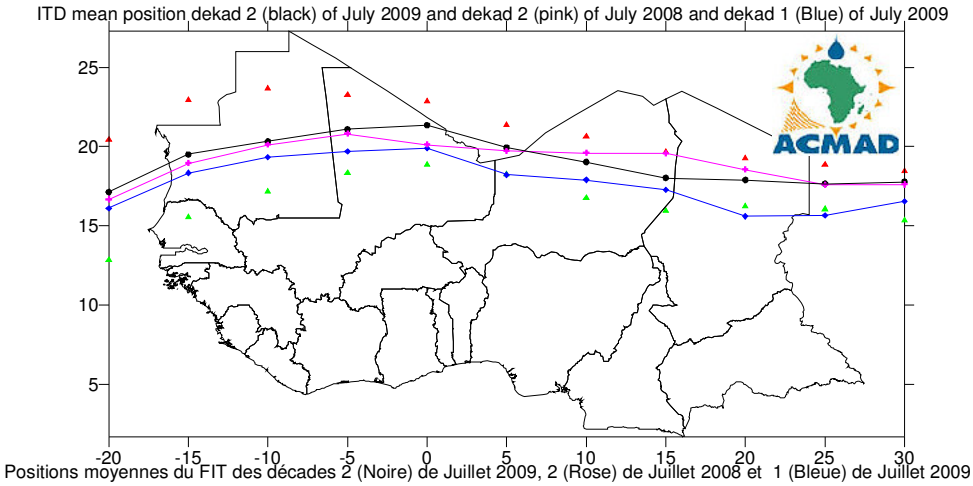

Figure 2 : The red and green triangles represent the max. and min. displacements of the ITD respectively

1.2 TROPOSPHERE

- **Monsoon:** Monsoon influx at 925hPa level was moderate (5.5 to 11.5m/s) over Côte d'Ivoire, Ghana, Burkina Faso, Togo, Benin, Nigeria and central Niger.

- **African Easterly Jet (AEJ) and Tropical Easterly Jet (TEJ):**

The mean speed of the AEJ (figure 3) at 700hPa level was about 17m/s during the dekad with an axis located at about 15°N, stretching from southern Mali, central Senegal up to southwest Cape Verde Island in north Pacific Ocean (Figure 3).

The core value of the TEJ at 150hPa level was 32m/s at about 12°N of latitude over northwest Indian Ocean extending its axis over GHA countries and eastern part of the Sahel countries (Figure 4).

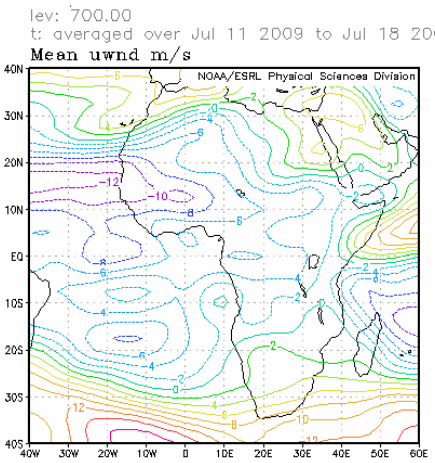

Figure 3: U-wind à 700hpa
(Source: NOAA/NCEP/ESRL: PSD)

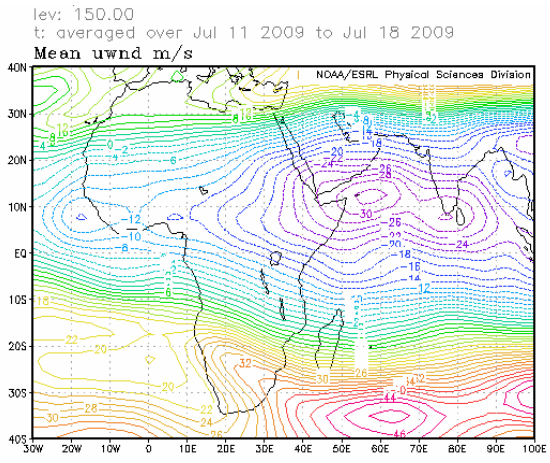

Figure 4: U-wind à 150hpa
(Source: NOAA/NCEP/ESRL: PSD)

- **Thermal Index (TI):** In the second dekad of July, 2009, the thermal index (TI) regime at 300hPa in (figure 5), had TI regime value of 242°K covering eastern part of the Sahel, part of Great Lakes countries and part of GHA countries as well as northern part of Madagascar resulting in heavy rainfall over areas characterized by high relative humidity as observed in Figure 6. The highest thermal index regime of 243°K and above characterized by heavy rainfall with floods was located over Asia extending over northeastern Africa and northern Australia.

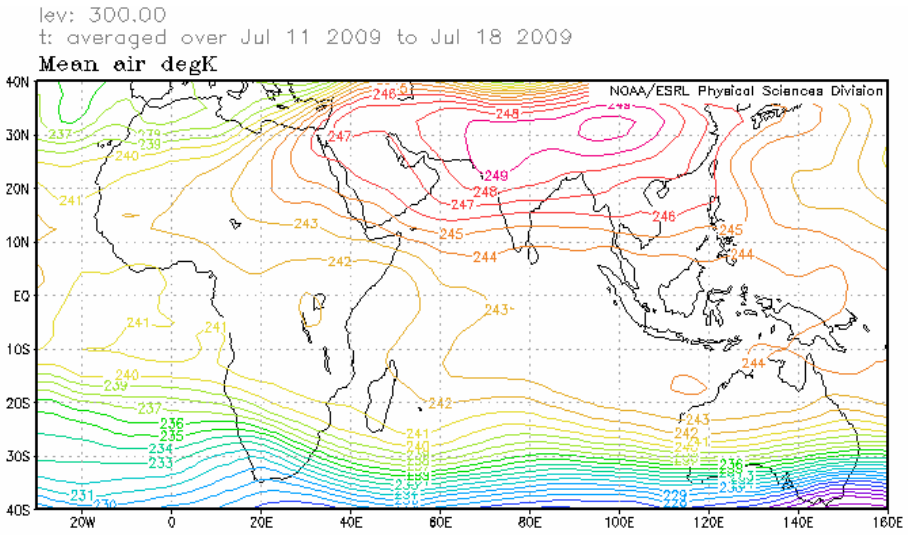

Figure 5: Thermal regimes at 300hPa (Source: NOAA/NCEP/ESRL: PSD)

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

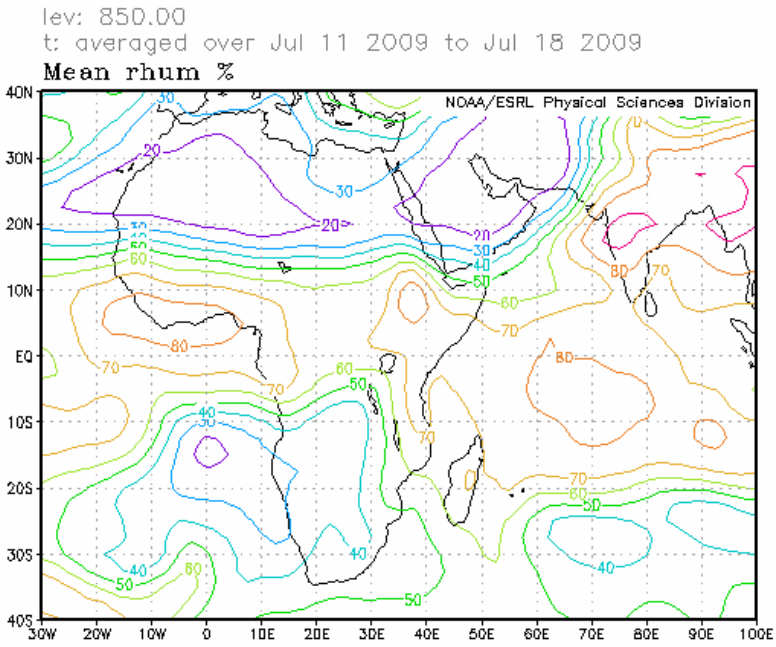

Figure 6: Relative Humidity at 850hPa (Source: NOAA/NCEP/ESRL: PSD)

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 rainfall distribution increase over the Sahel and GHA countries while Central Africa and Gulf of Guinea countries experienced decrease in spatial rainfall distribution. In detail:

- **North Africa countries:** experienced a decrease in rainfall with amounts ranging from 10mm to 20mm over Algeria.

- **The Sahel:** had rainfall distribution increase with amounts ranging from 10mm to 100mm with a peak of about 150mm over northeast Mali.

- **Gulf of Guinea countries:** experienced decrease in rainfall distribution especially over the coastal part but observed 10mm to 100mm with maximum amounts ranging from 100mm to 150 over Guinea Conakry, Guinea Bissau, Nigeria and Cameroon.

- **Central Africa countries:** had spatial rainfall distribution decrease with amounts ranging from 10mm to 100mm intensifying to about 250mm over eastern Democratic Republic of Congo.

- **GHA countries:** experienced slight increase in rainfall distribution with amounts ranging from 10mm to 100mm intensifying to about 150mm to 200mm over northern Ethiopia and southern Sudan.

- **Southern Africa countries:** experienced localized rainfall with amounts ranging from 10mm to 100mm over Malawi, northern Mozambique and western South Africa intensifying over the Cape.

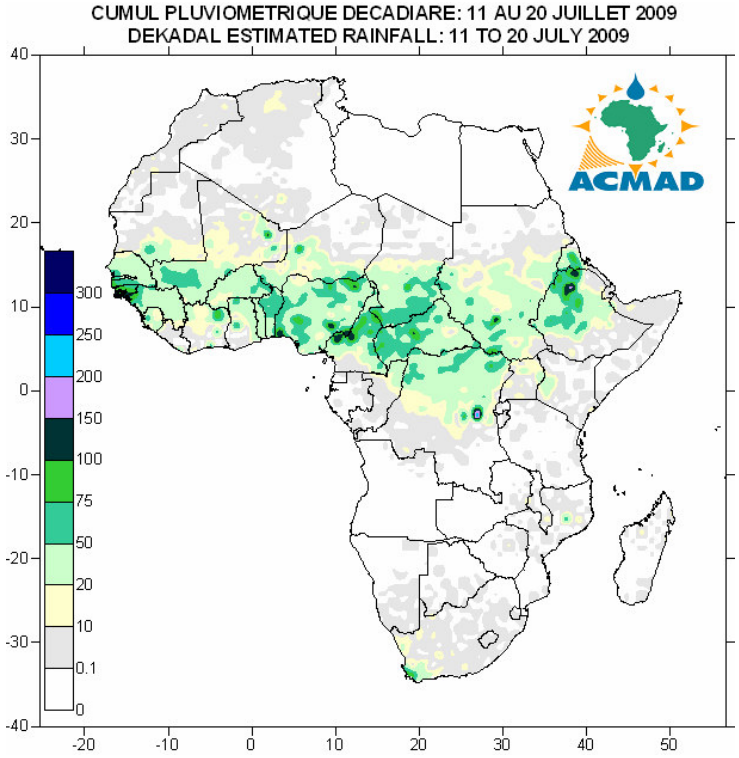

Figure 7: Estimated precipitations, (Data Source: NOAA/NCEP)

2.2 OBSERVED DATA

The Table below shows heaviest cumulative rainfall recorded over Banjul in the Gambia. The lowest temperature of –1.6°C was recorded at Maseru in Lesotho while the highest temperature of 43.9°C was recorded at Bilma in Niger.

N°	STATIONS	Précipitations (mm)	Nombre de jours de pluie	Température maxi moyenne (°C)	Température mini moyenne (°C)
1	Abidjan	22	4	29,8	24,5
2	Abuja	18	2	-	-
3	Accra	0	0	28,3	-
4	Addis-Abéba	41	5	21,6	11,5
5	Agadez	11	1	40,1	27,0
6	Alger(Dar El Beida)	0	0	33,0	20,6
7	Antananarivo	0	0	21,2	9,2
8	Antsiranana	0	0	29,4	20,2
9	Bamako-Senou	72	4	31,8	23,1
10	Bangui	76	4	31,6	21,3
11	Banjul	109	4	31,7	24,2
12	Beira	50	2	26,5	18,0
13	Bilma	0	0	43,9	26,9
14	Bobo Dioulasso	28	3	30,8	22,1
15	Brazzaville	0	0	25,7	19,2
16	Conakry	0	0	28,7	-
17	Cotonou	8	4	28,5	24,6
18	Dakar-Yoff	27	4	31,0	25,9
19	Dar-es-Salaam	1	1	30,5	19,9
20	Douala	33	3	28,8	23,7
21	Durban	1	1	22,1	9,9
22	Entebbe	0	0	26,1	18,0
23	Francistown	0	0	22,8	5,8
24	Harare	0	0	20,5	-
25	Johannesbourg	0	0	15,8	2,2
26	Khartoum	0	0	37,6	24,7
27	Kigali	0	0	27,8	-
28	Kigoma	0	0	30,1	16,5
29	Le Caire	0	0	36,2	25,1
30	Le Cap	39	3	17,4	10,5
31	Libreville	0	0	27,3	21,9
32	Lilongwe	1	1	-	-
33	Lomé	45	3	28,4	23,9
34	Lusaka	0	0	25,0	9,5
35	Manzini	1	1	-	8,8
36	Maputo	0	0	26,3	13,5
37	Maseru	0	0	-	-1,6
38	Maun	0	0	23,7	9,0
39	Mbeya	0	0	22,4	7,6
40	Nairobi	0	0	23,9	10,7
41	Nampula	0	0	28,2	16,7
42	N'Djamena	77	4	35,3	23,8
43	Niamey-Aéroport	56	3	35,6	25,5
44	Nouakchott	0	0	31,6	26,2
45	Ouagadougou	44	6	32,5	23,2
46	Plaisance	33	10	24,6	19,3
47	Seretse Khama Intl Aéro	0	0	20,7	3,3
48	Seychelles	31	8	28,9	24,5
49	Tamanrasset	1	1	36,6	24,0
50	Toalagnaro	10	1	24,9	17,2
51	Tombouctou	0	0	39,5	28,3
52	Tripoli	0	0	35,3	22,0
53	Tunis	0	0	34,4	23,5
54	Windhoek	0	0	19,9	4,5
55	Zinder	31	3	36,7	24,0
56	Ndele (RCA)	0	0	31,7	19,7

NOTE: **0** means no rain;

- means no temperature data available

Data Source: ACMAD / GTS

3. OUTLOOK FOR DEKAD (01st – 10th AUGUST, 2009)

3.1 RAINFALL

The ITD will move northwards maintaining moisture influx and rainfall increase over Gulf of Guinea countries, parts of the Sahel, northern parts of central Africa and northern sector of GHA countries. There will be rainfall decrease over southern parts of GHA countries with significant decrease over southern Africa countries (Figure 8). In detail**:**

- **North Africa countries:** will experience rainfall decrease, amounts ranging from 10mm to 50mm.
- **The Sahel:** will continue to experience increasing temperatures with rainfall increase recording amounts ranging from 10mm to 100mm with highest amounts about 150mm over southern parts of the Sahel countries. However, the rainfall will remain depressed due to evolving El Nino.
- **Gulf of Guinea countries:** will experience rainfall increase recording amounts ranging from 10mm to 150mm with peaks ranging from about 200mm to 250mm.
- **Central Africa countries:** will experience slight rainfall increase over northern parts recording amounts ranging from 10mm to 100mm with peaks ranging from about 150mm to 250mm.
- **GHA countries:** will record rainfall increase over northern parts with amounts ranging from 10mm to 100mm with peaks of about 150mm to about 250mm.
- **Southern Africa countries:** expected rainfall decrease amounts ranging from 10mm to 75mm.

3.2 TEMPERATURE

The forecast in Figure 9, shows that the mean surface temperature will increase over northern part of Gulf of Guinea countries, the Sahel, northern parts of central Africa and northern parts of GHA countries. The highest forecast temperatures range from 25°C to 35°C in orange and red colours respectively with more than 60% of the Continent recording 20°C and above.

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 northern parts of 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 periods. 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.

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

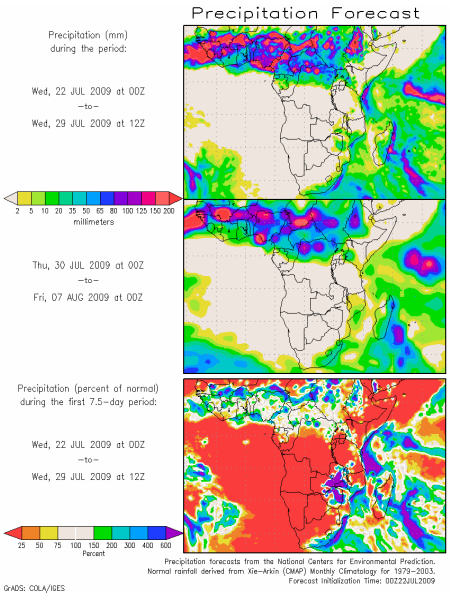

Figure 8: Precipitation forecast, Source : COLA

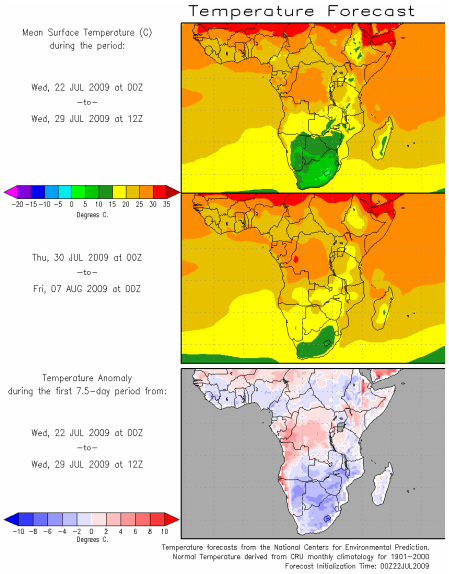

Figure 9 : Temperature forecast Source : COLA

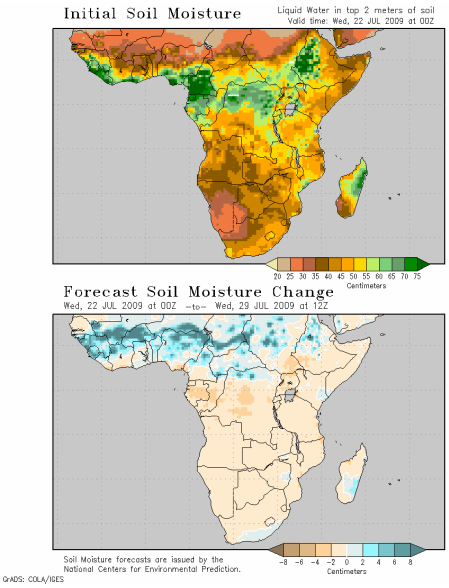

Figure 10 : Soil moisture forecast, Source: COLA

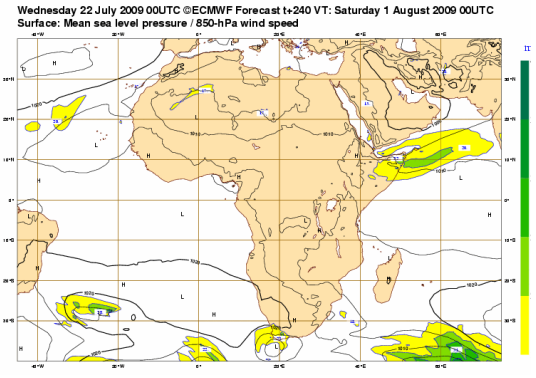

Figure 11 : Mean sea Level pressure forecast

Source : ECMWF