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

Ten Day Climate Bulletin

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Dekad of 21 to 30 June, 2009

HIGHLIGHT: The heaviest rainfall mounts were observed over Cotonou in Benin, Abidjan in Côte d'Ivoire, Lomé in Togo, Douala in Cameroon and Ouagadougou in Burkina Faso.

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 1024hPa weakened significantly by 4hPa and shifted southeast compared to the past dekad. Its mean position was located at about 33°N/25°W, extending a ridge over north Morocco.

- **St. Helena high:** Pressure of 1033hPa strengthened significantly by 7hPa and shifted southeast at 35°S/04°W with an extended ridge over South Atlantic Ocean.

- **Mascarene high:** Pressure of 1030hPa weakened by 2hPa compared to the past dekad and shifted northeast. Its mean position was located at 34°S/68°E with an extended ridge over Indian Ocean.

- **Saharan Thermal Low:** Pressure at 1006hPa maintained its intensity and shift west compared to the previous dekad. Its mean position was located at 16°N/08°E with an extended trough over north Mali, south Algeria, central Niger and Chad.

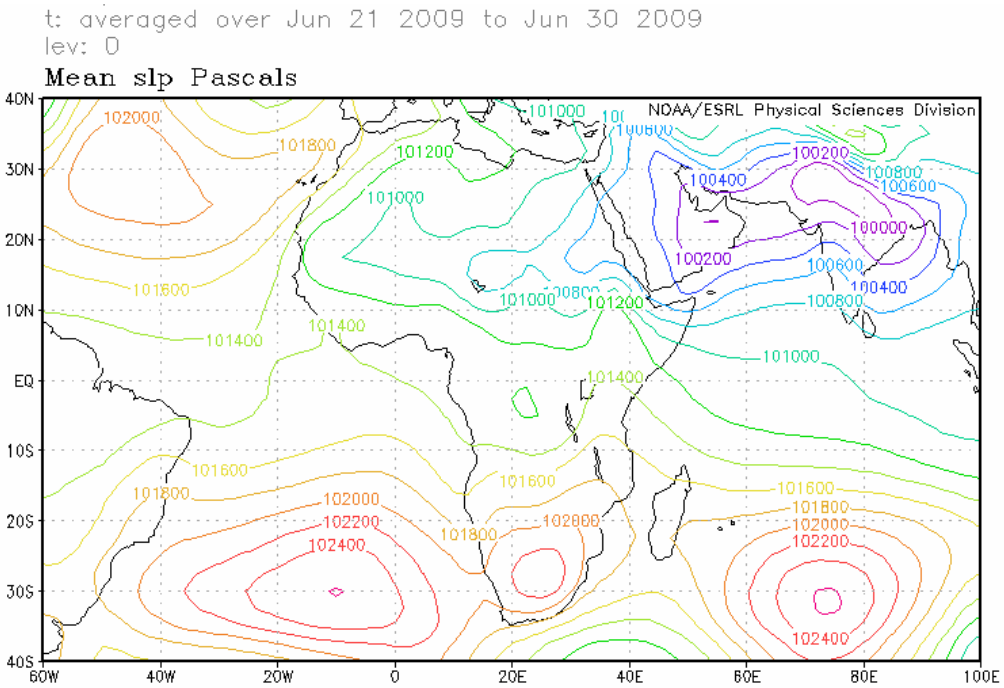

Figure 1: Mean Sea Level Pressure (Source: NOAA/NCEP/ESRL: PSD)

- **Inter -Tropical Discontinuity (ITD):** Between the second dekad (blue line) and the third dekad of June (black line), 2009, the ITD (Figure 2) moved uniformly northwards over the Sahel countries. Compare to the ITD position of the third dekad of June 2008 (pink line), the 2009 ITD was located south of 2008 ITD position. Its mean position of 2009 ITD was observed at 5.4°N over longitude 20°W; at 18.1°N and 18.5°N over southwest and central south Mauritania respectively; at 18.9°N and 18.8°N over west and east Mali respectively; at 17.8°N and 17.6°N over central north and extreme east Niger respectively; at 5.3°N over central east Chad; at 14.1°N and 15.5°N over west and central north Sudan respectively.

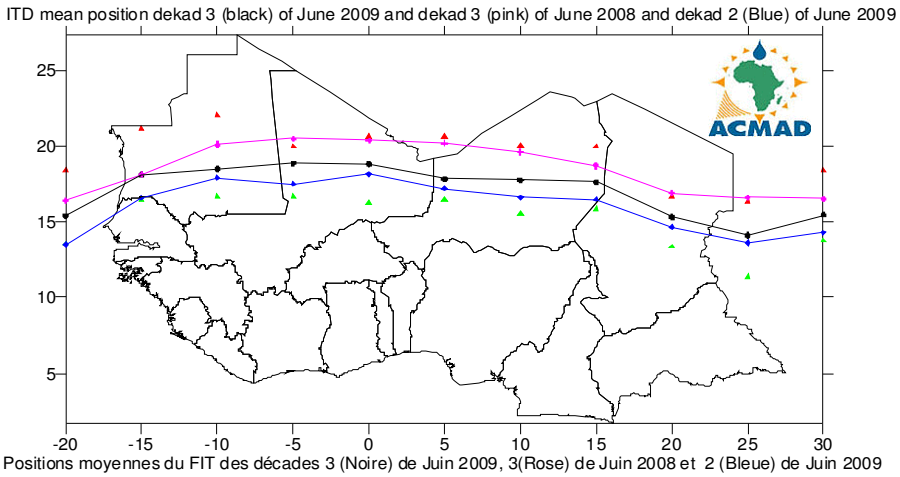

Figure 2 : The red and green triangles represent max. and min. displacements of the ITD respectively.

1.2 TROPOSPHERE

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

- **African Easterly Jet (AEJ):** The mean speed of the AEJ at 700hPa level was 16m/s during the dekad with an axis stretching from northern Nigeria and Benin, south Burkina Faso and Mali, Guinea Bissau up to about 26°W over the north Atlantic ocean.

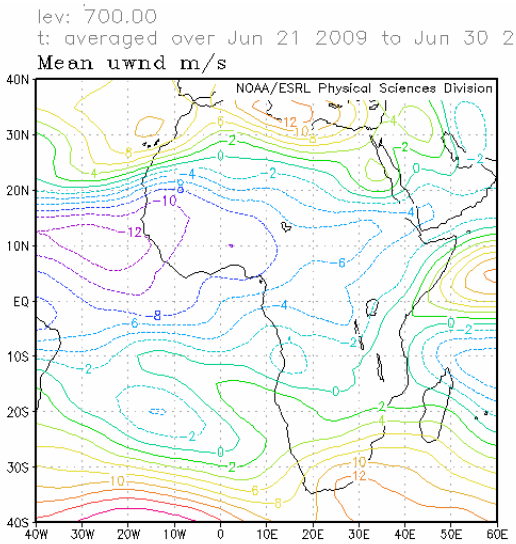

Figure 3: U-wind at 700hpa level (Source: NOAA/NCEP/ESRL: PSD)

- **Thermal Index (TI):** In the third dekad of June, 2009, the thermal index (TI) regime at 300hPa in (figure 4), had TI regime value of 242°K covering part of Gulf of Guinea, minor part of the Sahel, eastern part of central Africa and northern part of GHA countries resulting in heavy rainfall over areas characterized by high relative humidity as observed in Figure 5. The highest thermal index regime of 243°K and above characterized by heavy rainfall with floods was located over Asia extending over extreme northeastern Africa.

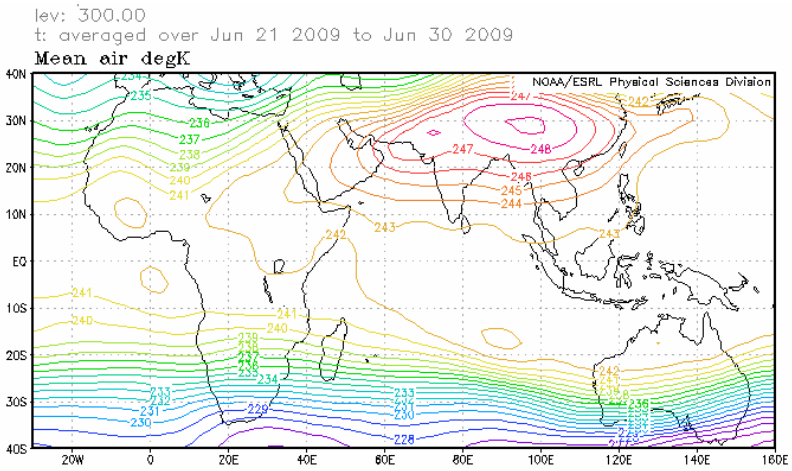

Figure 4: Air temperature at 300hPa (Source: NOAA/NCEP/ESRL: PSD)

- **Relative Humidity (RH):** The 850hPa (Figure 5) shows high RH (>70%) in the third dekad of June, 2009 over GHA, western and eastern parts of Gulf of Guinea countries and part of central Africa countries and Madagascar. The Sahara, parts the Sahel countries, most parts of Southern Africa countries and northern part of central Africa countries experienced dry conditions characterized by the lowest RH (<40%).

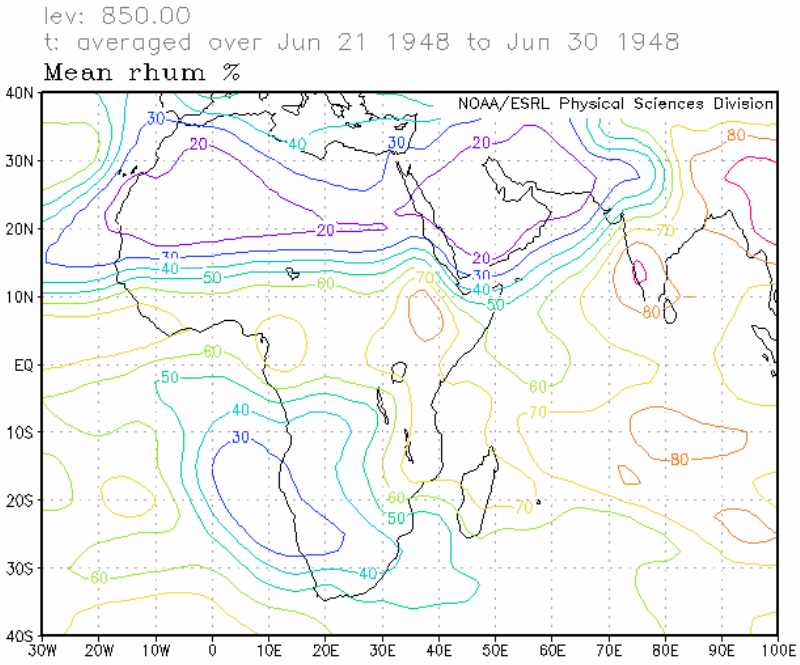

Figure 5: Relative Humidity at 850hPa (Source: NOAA/NCEP/ESRL: PSD)

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 6 below shows rainfall distribution and amounts increase over the Sahel, Central Africa and GHA countries while Northern Africa and Gulf of Guinea countries experienced slight rainfall activities decrease. In detail:

- **North Africa countries:** experienced significant spatial rainfall distribution and amounts decrease ranging from 10mm to 50mm over northern Morocco and Algeria.

- **The Sahel:** had rainfall distribution increase amounts ranging from 10mm to 100mm with maximum of about 150mm over central Burkina Faso and western Guinea Conakry.

- **Gulf of Guinea countries:** experienced slight decrease in rainfall amounts observing 10mm to 100mm intensifying over the coastal zones with amounts ranging above 100mm to 150 with peaks of about 200mm observed over southeast Côte d'Ivoire, southwest Ghana and extreme southwest Nigeria.

- **Central Africa countries:** had slight spatial rainfall distribution increase with amounts ranging from 10mm to 100mm over Central African Republic, Democratic Republic of Congo and north Congo intensifying to about 200mm over southwest and southeast Central African Republic.

- **GHA countries:** experienced increase in rainfall distribution and amounts ranging from 10mm to 100mm intensifying to about 200mm over parts of Ethiopia and Somalia with heaviest amounts ranging from above 200mm to above 300mm over southeast Sudan.

- **Southern Africa countries:** experienced slight increase in rainfall amounts with estimated amounts ranging from 10mm to 75mm. However, some localized heaviest rainfall amount of about 200mm were observed over central South Africa.

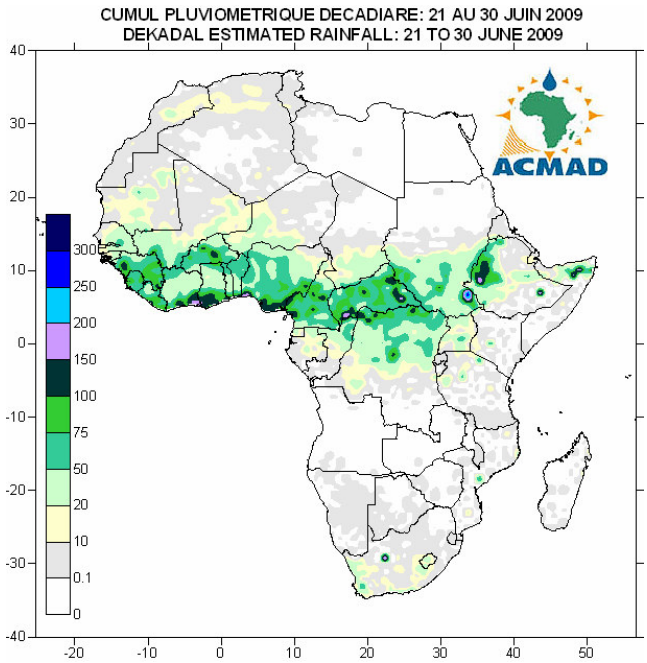

Figure 6: Estimated precipitations, (Data Source: NOAA/NCEP)

2.2 OBSERVED DATA

The Table below shows heaviest cumulative rainfall recorded over Cotonou in Benin, Abidjan in Côte d'Ivoire, Lomé in Togo, Douala in Cameroon and Ouagadougou in Burkina Faso. The lowest temperature of 2.0°C was recorded at Francistown in Botswana while the highest temperature of 44.7°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	149	8	30,1	24,7
2	Abuja	64	3	30,3	22,0
3	Accra	69	7	28,5	23,5
4	Addis-Abéba	9	3	-	11,9
5	Agadez	0	0	42,4	28,8
6	Alger(Dar El Beida)	0	0	30,7	16,2
7	Antananarivo	0	0	22,9	8,4
8	Antsiranana	1	1	30,6	19,6
9	Bamako-Senou	4	3	34,7	23,6
10	Bangui	24	4	30,4	21,8
11	Banjul	5	1	32,1	24,0
12	Beira	29	1	28,2	15,7
13	Bilma	0	0	44,7	25,2
14	Bobo Dioulasso	98	4	31,8	22,2
15	Brazzaville	0	0	27,9	20,2
17	Conakry	21	1	29,9	-
18	Cotonou	171	9	28,7	24,1
19	Dakar-Yoff	1	1	31,0	25,4
20	Dar-es-Salaam	0	0	30,5	20,8
21	Douala	146	5	29,2	23,3
22	Durban	0	0	24,9	10,6
23	Entebbe	5	2	26,5	18,3
24	Francistown	0	0	22,4	2,0
25	Harare	0	0	21,6	8,8
26	Johannesbourg	0	0	14,9	3,8
27	Khartoum	0	0	42,1	30,4
28	Kigali	0	0	27,4	15,8
29	Kigoma	17	1	29,8	17,1
30	Le Caire	0	0	37,2	25,3
31	Le Cap	40	4	17,1	11,4
32	Libreville	6	4	27,9	22,0
33	Lomé	149	10	29,2	23,9
34	Lusaka	0	0	24,8	8,4
36	Maputo	0	0	28,0	12,1
38	Maun	0	0	24,5	7,3
39	Mbeya	0	0	23,4	6,7
40	Nairobi	0	0	25,6	12,3
41	Nampula	4	2	27,1	16,7
42	N'Djamena	0	0	39,9	27,1
43	Niamey-Aéroport	4	1	37,2	26,3
44	Nouakchott	0	0	34,8	24,2
45	Ouagadougou	109	5	33,6	25,4
46	Plaisance	17	4	26,3	20,0
47	Sal	0	0	28,1	22,9
48	Seretse Khama Intl Aéro	0	0	19,4	4,2
49	Seychelles	24	4	30,4	25,0
50	Tamanrasset	0	0	36,8	24,0
51	Toalagnaro	8	2	25,2	17,2
52	Tombouctou	0	0	40,7	27,8
53	Tripoli	0	0	33,5	20,9
54	Tunis	0	0	30,9	20,2
55	Windhoek	0	0	20,5	5,1
56	Zinder	5	1	38,5	25,4
57	Ndele (RCA)	63	5	30,3	19,7

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

Data Source: ACMAD / GTS

3. OUTLOOK FOR DEKAD (11th – 20th JULY, 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 7). In detail**:**

- **North Africa countries:** will experience rainfall increase, amounts ranging from 10mm to 75mm.
- **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.
- **Gulf of Guinea countries:** will experience rainfall increase recording amounts ranging from 10mm to 150mm with peaks ranging from about 200mm to 300mm.
- **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 300mm.
- **Southern Africa countries:** expected rainfall decrease amounts ranging from 10mm to 75mm.

3.2 TEMPERATURE

The forecast in Figure 8, 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 9 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: Call for rehabilitation of our presently degraded rainfall catchments areas and forests ecosystems through enhanced national policies and conservation programmes 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.

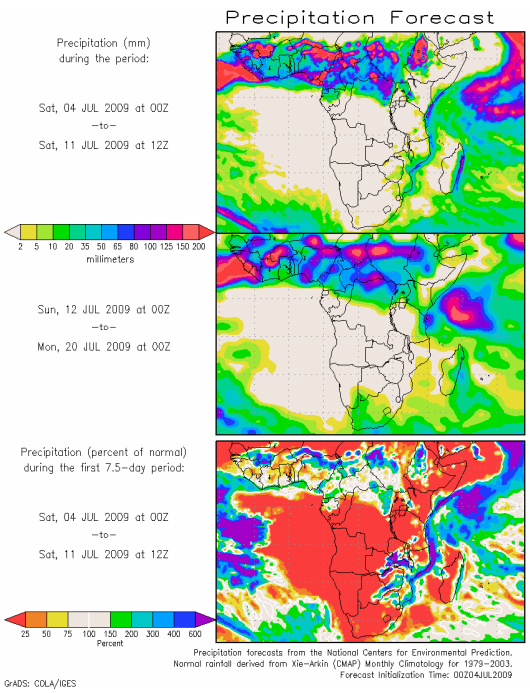

Figure 7: Precipitation forecast, Source : COLA

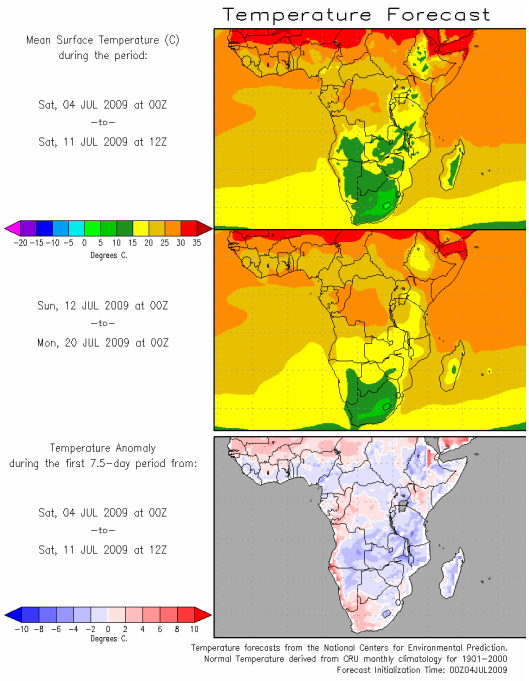

Figure 8 : Temperature forecast Source : COLA

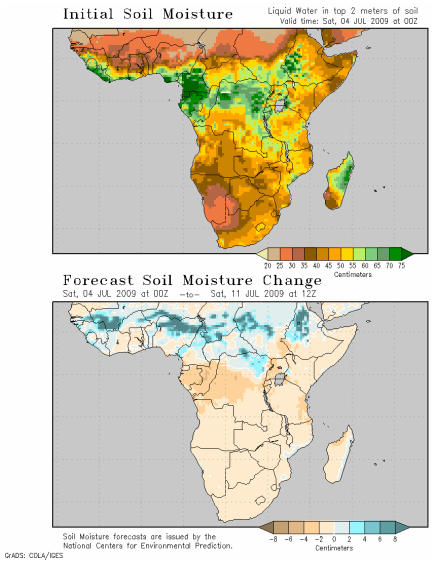

Figure 9 : Soil moisture forecast, Source: COLA

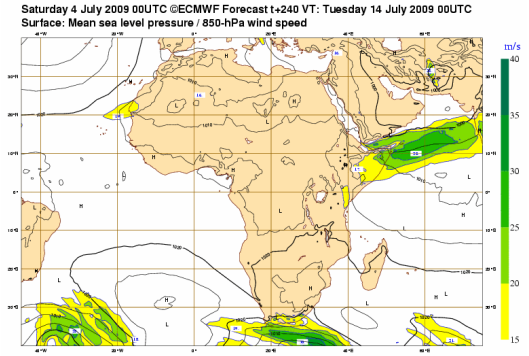

Figure 10 : Mean sea Level pressure forecast

Source : ECMWF