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

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Dekad of 21 to 31 August, 2009

HIGHLIGHT: Heavy rainfall amounts were experienced over parts of the Sahel, northern central Africa and northern sector of the GHA countries with the highest of 300mm and above over southwest Chad and northern Cameroon.

1. GENERAL SITUATION

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

1.1 SURFACE

- **Azores high:** Pressure of 1026hPa with a NE axis maintained its intensity and shifted north compared to the past dekad. Its mean position was located at about 36°N/35°W, extending a ridge over north Morocco and Algeria.

- **St. Helena high:** Pressure of 1026hPa with a NW-SE axis weakened by 3hPa and shifted southeast at 32°S/02°E with an extended ridge over south Atlantic Ocean.

- **Mascarene high:** Pressure of 1034hPa with a W-E axis strengthened slightly by 1hPa compared to the past dekad and shifted southeast. Its mean position was located at 38°S/81°E with an extended ridge over Indian Ocean.

- **Saharan Thermal Low:** Pressure at 1006hPa filled up slightly by 1hPa and shifted south-eastward compared to the previous dekad. Its mean position was located at 16°N/15°W with an extended trough over east Mauritania, north Mali, southwest Algeria, north Niger and Chad.

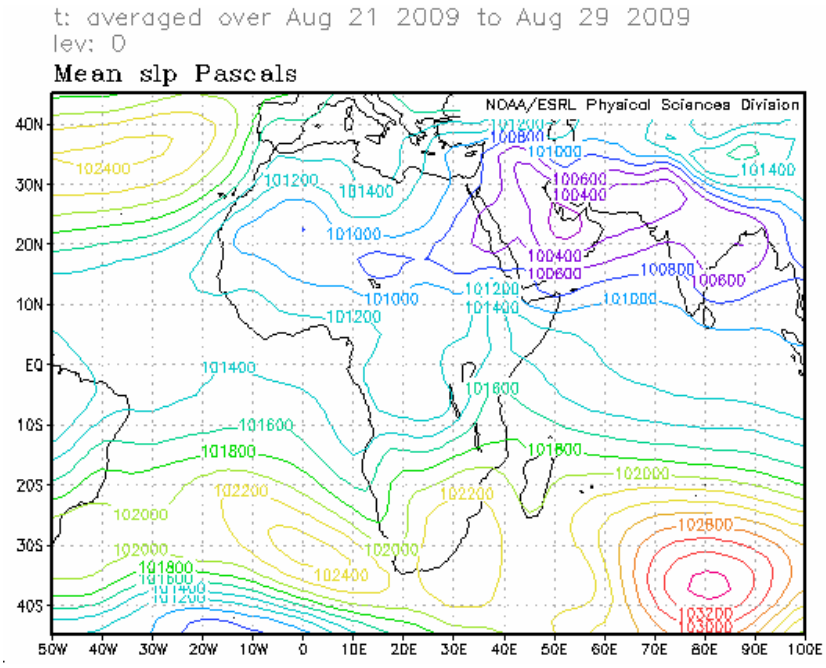

Figure 1: Mean Sea Level Pressure (Source: NOAA/NCEP/ESRL: PSD)

- **Inter -Tropical Discontinuity (ITD):** Between the second dekad (blue line) and the third dekad (black line) of August, 2009, the ITD (Figure 2) shift slightly northwards to about 100Km - 200Km over northeast Mali, east Chad and northwest Sudan; elsewhere its maintained a quasi-stationary position. Comparing the present ITD position to same dekad in 2008 (pink line) its location is south all over the domain. The mean position of the third dekad of August 2009 ITD was observed at 18.5°N over longitude 20°W; at 20.2°N and 21.2°N over west and central Mauritania respectively; at 21.5°N and 21.4°N over northwest and extreme northeast Mali respectively; at 20.4°N over extreme south Algeria; at 19.6°N and 18.5°N over north and extreme east Niger respectively; at 17.7 °N over central north Chad; at 17.6°N and 17.9°N over northwest and north Sudan respectively.

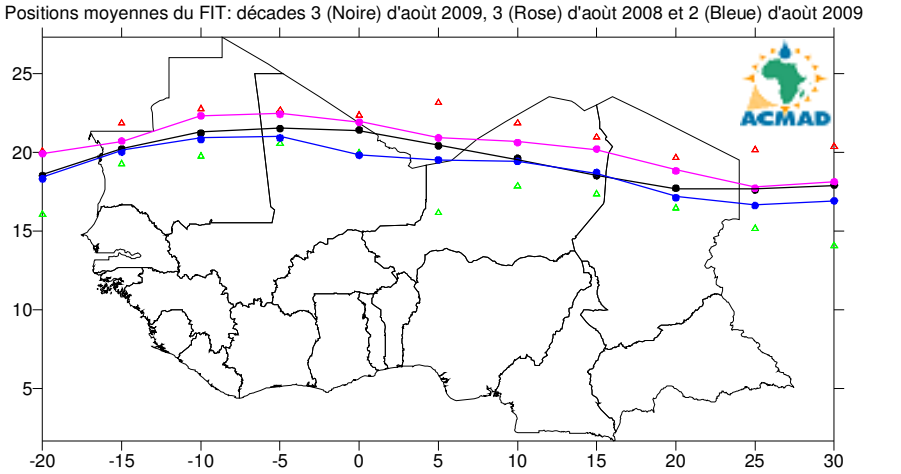

Figure 2 : The red and green triangles represent the max. and min. displacements of the ITD respectively

1.2 TROPOSPHERE

- **Monsoon:** Monsoon influx at 925hPa level was moderate (5.5 to 11.5m/s) over 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 15m/s during the dekad with an axis located at about 15°N, stretching from south Mauritania and north Senegal (Figure 3).

- **Tropical Easterly Jet (TEJ):** The core value of the TEJ at 150hPa level was 24m/s at about 09°N of latitude over extreme south India extending its axis over northern GHA countries, with secondary core of 18m/s at about 5°N over coastal Liberia and Sierra Leone (Figure 4).

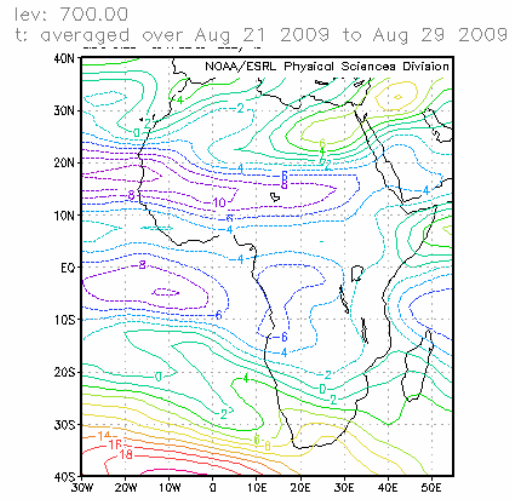

Figure 3: Position of AEJ
(Source: NOAA/NCEP/ESRL: PSD)

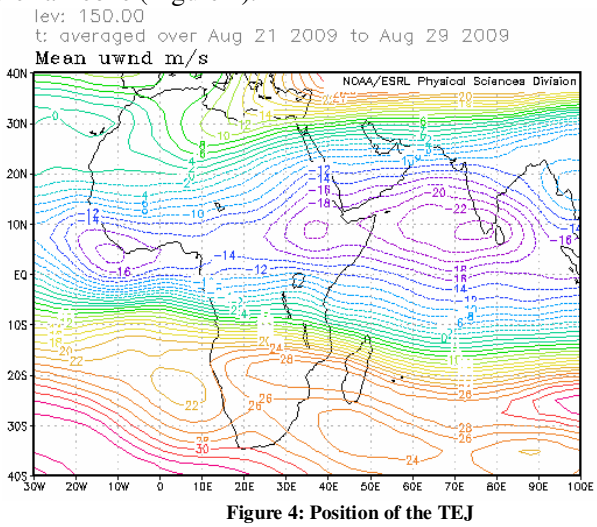

Figure 4: Position of the TEJ
(Source: NOAA/NCEP/ESRL: PSD)

- **Thermal Index (TI):** In the third 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 242.5°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 247°K was located over northern India extending into north western Pacific Ocean and northeastern Africa associated with heavy rainfall with floods.

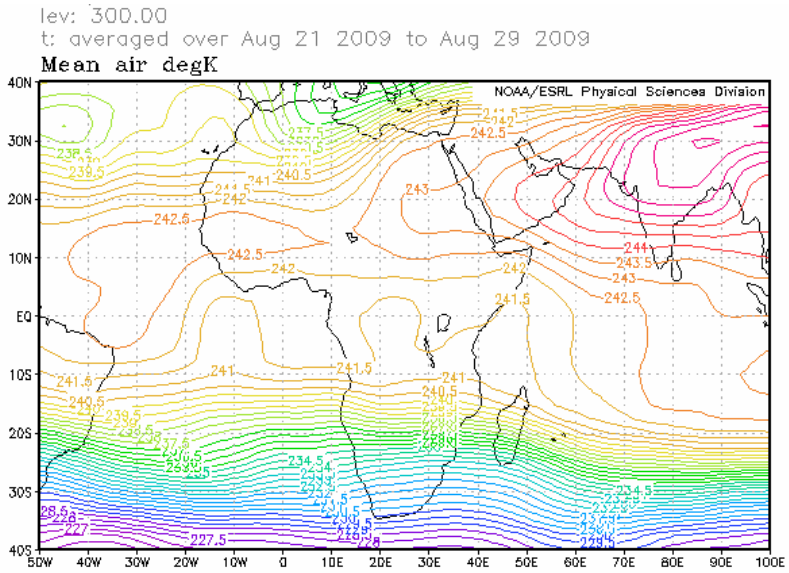

Figure 5: Thermal regimes at 300hPa (Source: NOAA/NCEP/ESRL: PSD)

- **Relative Humidity (RH):** The 850hPa (Figure 6) shows high RH (>70%) in the third 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%).

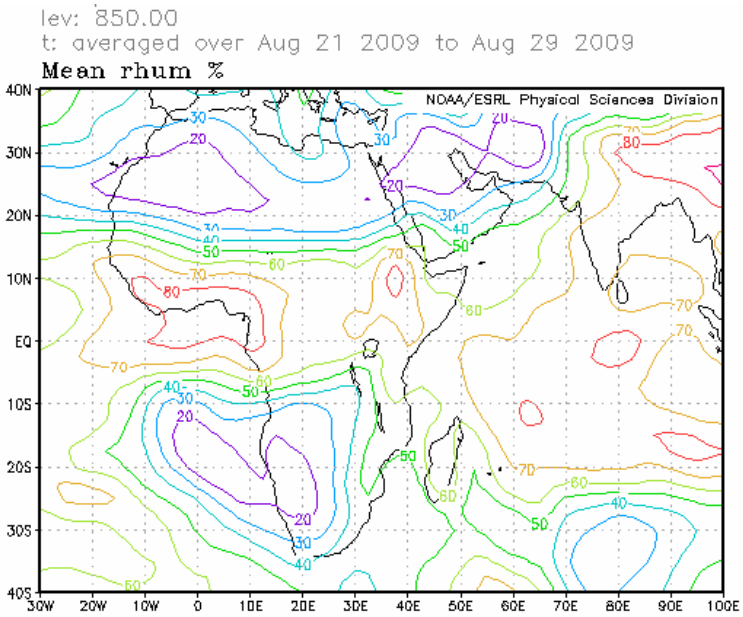

Figure 6: Relative Humidity at 850hPa (Source: NOAA/NCEP/ESRL: PSD)

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 estimated rainfall based on Satellite and Rain Gauge in Figure 7 below shows slight rainfall distribution increase over the Sahel, Gulf of Guinea countries, Central Africa and GHA countries, while Northern and Southern Africa countries had no significant change in spatial rainfall distribution and amounts. In detail:

- **North Africa countries:** no significant change in rainfall pattern with amounts of 10mm to 50mm over southern Algeria and extreme north Algeria and Tunisia.

- **The Sahel:** had increase in rainfall distribution observing amounts ranging from 10mm to 150mm with heaviest amounts between 150mm to 250mm over southern Senegal, the Gambia intensifying to about 300mm over south-western Chad.

- **Gulf of Guinea countries:** experience slight rainfall distribution increase over its Southern part observing 10mm to 150mm, intensifying with amounts ranging between 150mm to 250mm observing the heaviest amounts of above 300 over northern Cameroon

- **Central Africa countries:** observed slight rainfall distribution increase with decreasing amounts ranging from 10mm to 100mm with maximum of about 150mm over northern Democratic Republic of Congo and Central African Republic.

- **GHA countries:** experienced slight increase in rainfall distribution and amounts ranging between 10mm to 100mm with maximum amounts ranging between 100mm to 250mm over Sudan, Ethiopia, and Eritrea.

- **Southern Africa countries:** remained generally dry except over extreme southwestern part of Madagascar where some rainfall amounts ranging between 10mm to 50mm were observed.

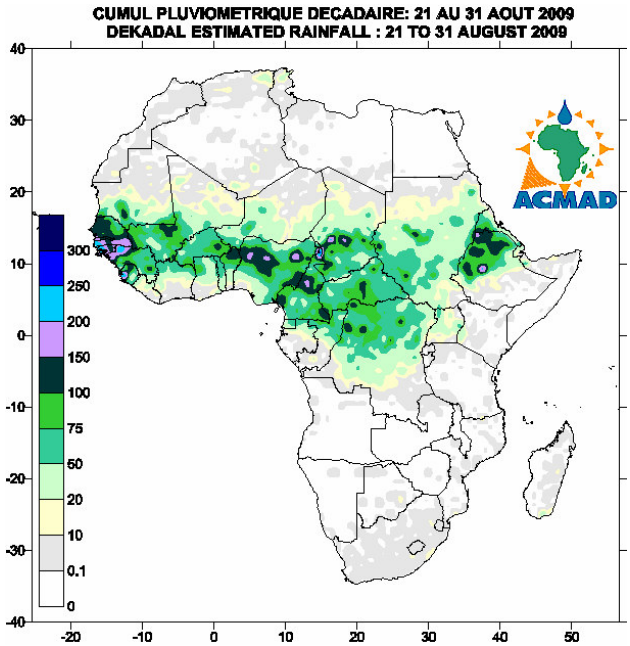

Figure 7: Estimated precipitations, (Data Source: NOAA/NCEP)

2.2 OBSERVED DATA

The Table below shows heaviest cumulative rainfall recorded over Dakar in Senegal, Douala in Cameroon, Banjul in Gambia and N'Djamena in Chad. The lowest temperature of 5.5°C was recorded at Windhoek in Namibia while the highest temperature of 42.1°C was recorded at Bilma in Niger.

N°	STATIONS	Precipitation (mm)	Number of rainy days	Temperature Max mean (°C)	Temperature Min mean (°C)
1	Abidjan	1	1	28,2	22,5
2	Abuja	80	1	-	-
3	Accra	1	1	28,5	23,5
4	Addis-Abéba	42	5	-	12,0
5	Agadez	26	3	38,7	26,2
6	Alger(Dar El Beida)	0	0	32,1	20,2
7	Antananarivo	2	2	23,9	12,2
8	Antsiranana	0	0	30,1	19,3
9	Bamako-Senou	26	4	31,1	22,6
10	Bangui	19	1	30,2	21,7
11	Banjul	111	3	30,9	23,0
12	Beira	28	2	25,8	16,2
13	Bilma	0	0	42,1	25,9
14	Bobo Dioulasso	26	6	30,3	21,9
15	Brazzaville	0	0	28,3	21,1
16	Casablanca	0	0	27,0	22,6
17	Conakry	52	3	28,7	-
18	Cotonou	3	3	28,7	24,2
19	Dakar-Yoff	133	5	31,1	25,1
20	Dar-es-Salaam	0	0	30,9	19,5
21	Douala	119	9	28,5	23,4
22	Durban	5	1	21,7	12,0
23	Entebbe	1	1	25,8	19,4
24	Francistown	0	0	26,5	6,5
25	Harare	0	0	23,4	8,7
26	Johannesbourg	0	0	21,1	6,9
27	Khartoum	7	1	36,9	25,5
28	Kigali	0	0	27,6	16,7
29	Kigoma	0	0	30,8	17,8
30	Le Caire	0	0	34,0	24,2
31	Le Cap	0	0	19,1	10,9
32	Libreville	4	4	28,0	22,7
33	Lomé	29	3	28,9	23,8
34	Lusaka	0	0	26,8	9,8
35	Manzini	4	1	-	10,8
36	Maputo	0	0	25,9	13,4
37	Maun	0	0	30,0	11,2
38	Mbeya	0	0	23,6	9,9
39	Nairobi	0	0	22,8	13,1
40	Nampula	1	1	28,4	15,7
41	Ndele (RCA)	22	3	-	-
42	N'Djamena	103	1	33,3	23,5
43	Niamey-Aéroport	16	3	33,6	24,9
44	Nouakchott	13	1	32,6	27,3
45	Ouagadougou	64	6	31,3	23,8
46	Plaisance	49	8	25,3	18,8
47	Sal	0	0	30,8	25,4
48	Seretse Khama Intl Aéro	0	0	25,3	8,8
49	Seychelles	15	2	29,3	24,8
50	Tamanrasset	2	2	34,4	22,7
51	Toalagnaro	30	3	23,7	17,0
52	Tombouctou	65	3	37,2	26,1
53	Tripoli	0	0	36,6	23,2
54	Tunis	6	2	35,5	23,9
55	Windhoek	0	0	27,8	5,5
56	Zinder	41	4	34,6	24,6

NOTE: **0** means no rain;
- means no temperature data avail able

Data Source: ACMAD / GTS

3. OUTLOOK FOR DEKAD (11th - 20th SEPTEMBER, 2009)

3.1 RAINFALL

The ITD limited southward displacement will lead to less moisture influx reducing rainfall over the Sahel, but confining it over limited parts over southern part of the Sahel with most rainfall covering northern parts of Gulf of Guinea countries, central Africa and northern sector of GHA countries. Severe 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 100mm.

- **The Sahel:** will continue to experience high temperatures with rainfall decrease over several parts of the Sahel recording amounts ranging from 10mm to 100mm with isolated peaks of about 150mm over southern parts of the Sahel.

- **Gulf of Guinea countries:** will experience rainfall decrease recording amounts ranging from 10mm to 100mm with peaks of about 150mm to 200mm and above.

- **Central Africa countries:** will have rainfall increase recording amounts ranging from 10mm to 150mm with peaks ranging from about 200mm and above.

- **GHA countries:** will have rainfall increase over northern and 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 60mm over eastern parts and localized peaks of about 100mm.

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 southern parts of the Sahel, Gulf of Guinea countries, 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 countries, 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 catchment 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 catchment 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 growth and sustainable development. Invest in environmental conservation now for better tomorrow.

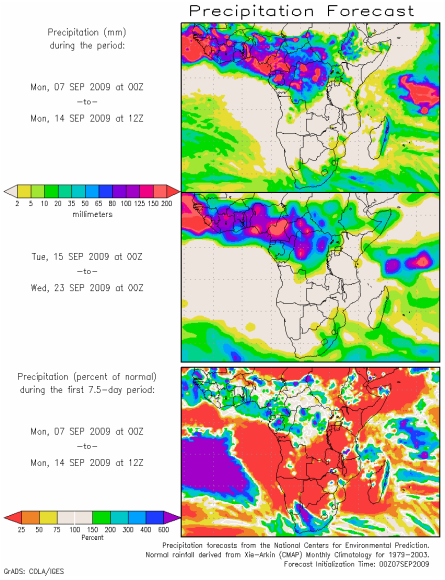

Figure 8: Precipitation forecast, Source : COLA

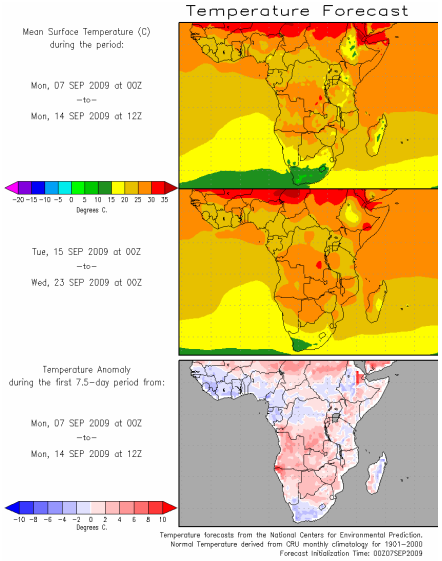

Figure 9 : Temperature forecast Source : COLA

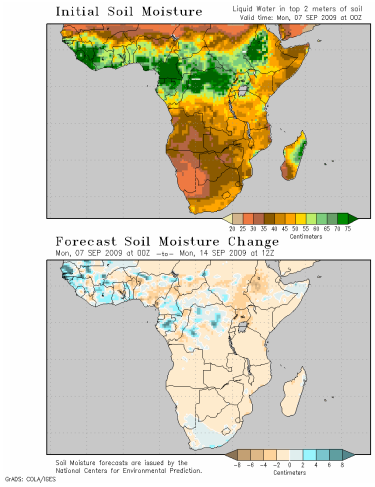

Figure 10 : Soil moisture forecast, Source: COLA

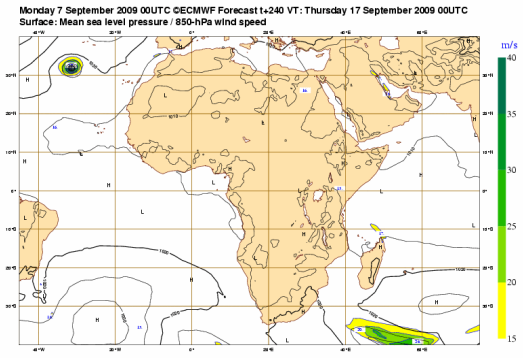

Figure 11 : Mean Sea Level pressure forecast Source : ECMWF