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

Ten Day Climate Bulletin

N° 25 Year 2009

Dekad of 01 to 10 September, 2009

HIGHLIGHT: Heaviest rainfall amounts with floods were recorded over parts of Burkina Faso, Mali and 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 1028hPa with an SW-NE axis strengthened slightly by 2hPa and shifted east compared to the past dekad. Its mean position was located at about 36°N/25°W, extending a ridge over north Atlantic Ocean.

- **St. Helena high:** Pressure of 1035hPa with an WSW-ENE axis strengthened significantly by 9hPa and shifted northwest at 29°S/10°W with an extended ridge over Gulf of Guinea.

- **Mascarene high:** Pressure of 1035hPa with an W-E axis strengthened slightly by 1hPa compared to the past dekad and shifted northwest. Its mean position was located at 32°S/64°E with an extended ridge over Indian Ocean.

- **Saharan Thermal Low:** Pressure at 1008hPa filled up slightly by 2hPa and shifted eastward compared to the previous dekad. Its mean position was located at 16°N/18°E with an extended trough over northeast Mauritania, north Mali, south Algeria, northeast Niger and northwest Chad.

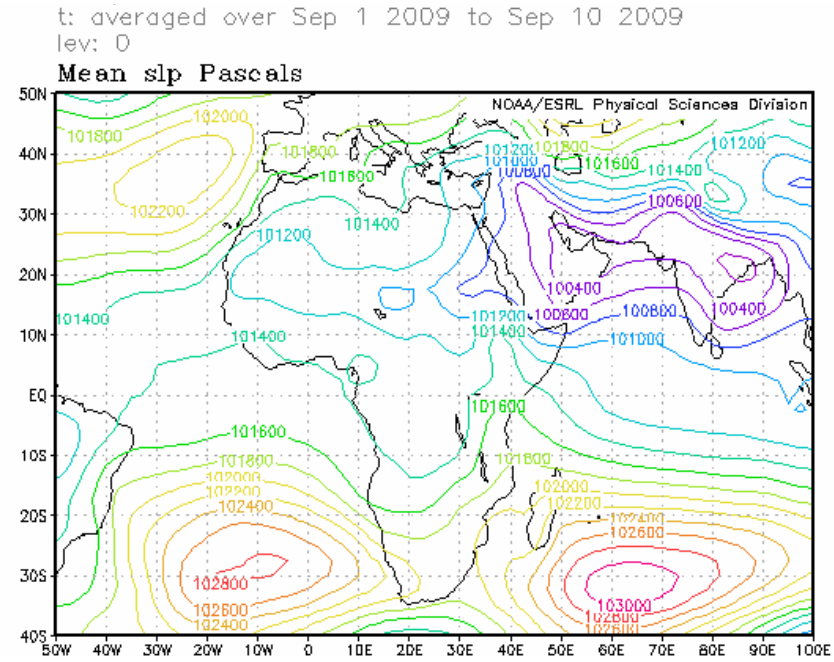
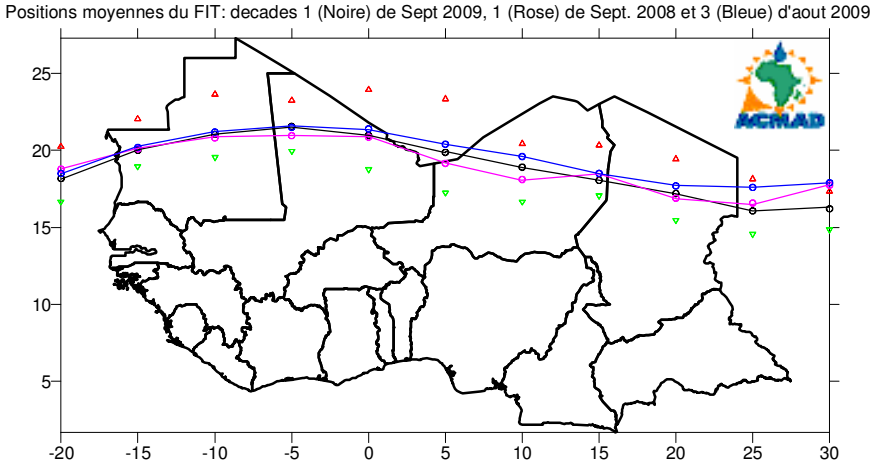


Figure 1: Mean Sea Level Pressure (Source: NOAA/NCEP/ESRL: PSD)

- **Inter -Tropical Discontinuity (ITD) :** Between the third dekad of August (blue) and the first dekad (black) of September, 2009, the ITD (Figure 2) had started its southwards migration over the Sahel, particularly over its eastern part with a mean displacement of about 100km (central Sahel) and 200km (extreme east). The actual ITD position (black line) was located slightly north of that of the same dekad in 2008 (pink line) over Niger and over south Sudan.



ITD mean position dekad 1 (black) of Sept. 2009, dekad 1 (pink) of Sept. 2008 and dekad 3 (blue) of August 2009

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 Sierra Leone, Liberia, Côte d'Ivoire, Ghana, Togo and north Benin.

- **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 15°N, stretching from south Mali, extreme south Mauritania and north Senegal (Figure 3).

- **Tropical Easterly Jet (TEJ):** The core value of the TEJ at 150hPa level was 28m/s at about 05°N of latitude over extreme south India extending its axis over northern GHA countries, with secondary core of 16m/s at about 8°N over eastern equatorial Atlantic (Figure 4).

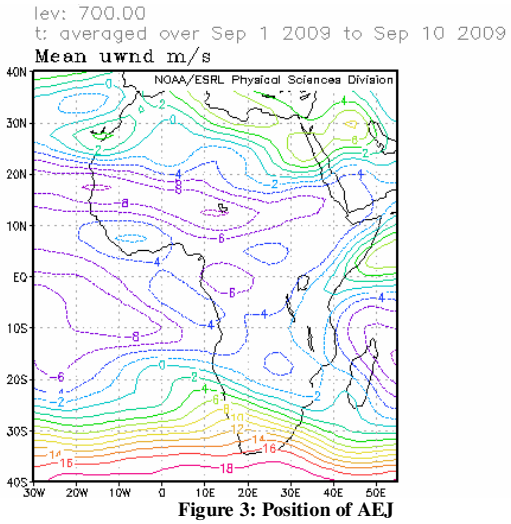


Figure 3: Position of AEJ
(Source: NOAA/NCEP/ESRL: PSD)

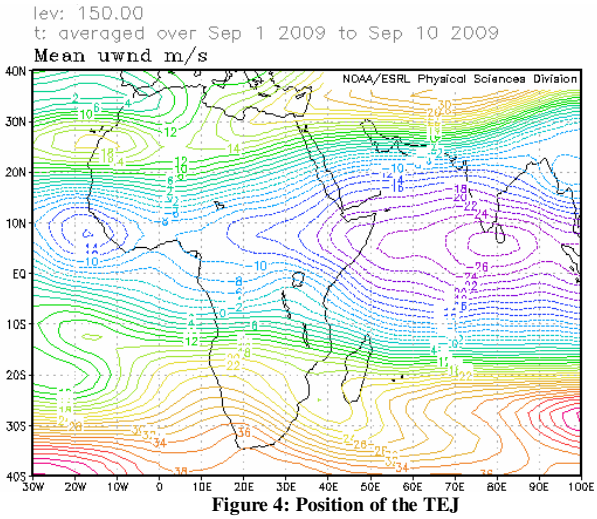


Figure 4: Position of the TEJ
(Source: NOAA/NCEP/ESRL: PSD)

- **Thermal Index (TI):** In the first dekad of September, 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 rainfall with floods 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 northeastern Africa and north western Pacific Ocean associated with heavy rainfall with floods.

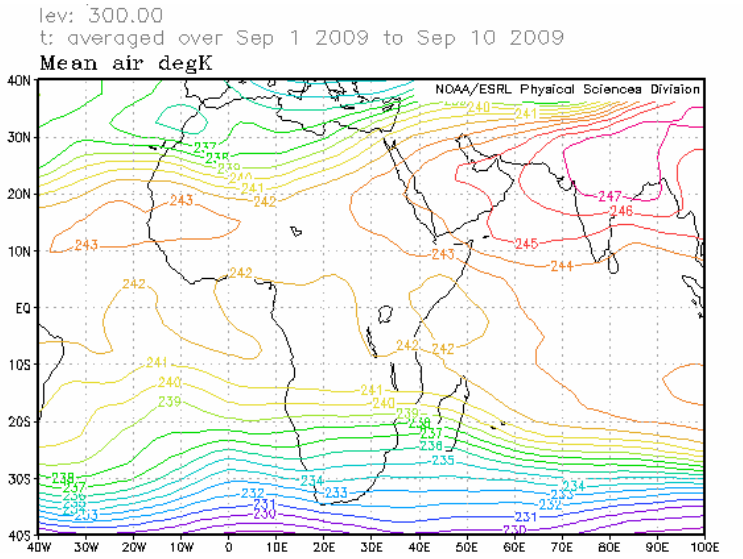


Figure 5: Thermal regimes at 300hPa (Source: NOAA/NCEP/ESRL: PSD)

- **Relative Humidity (RH):** The 850hPa (Figure 6) shows high RH (>70%) in the first dekad of September, 2009 over parts of GHA countries, Gulf of Guinea countries, southern part of the Sahel countries, extreme north western part of Central Africa countries and over Madagascar. 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%).

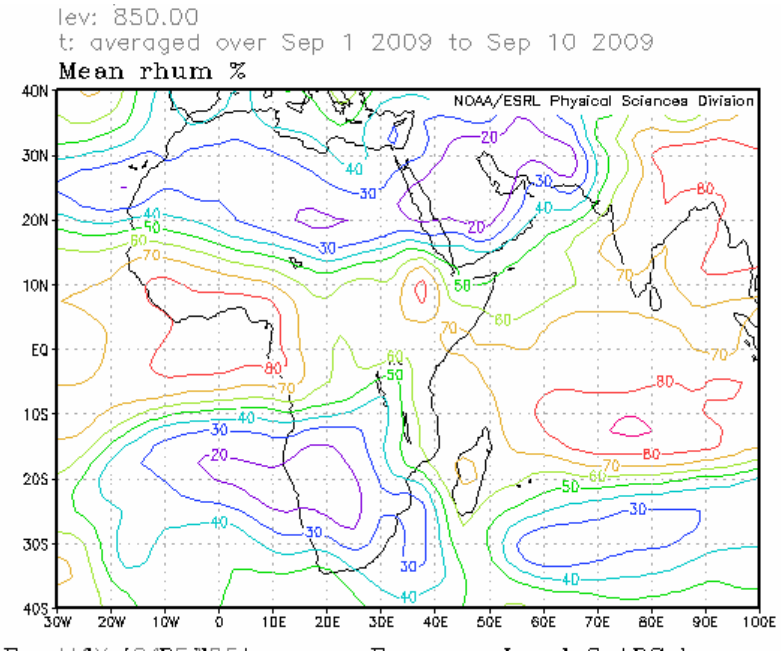


Figure 6: Relative Humidity at 850hPa (Source: NOAA/NCEP/ESRL: PSD)

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 rainfall distribution increase over Northern Africa, the Sahel, Gulf of Guinea countries and Central Africa, while Southern Africa countries had no significant change in spatial rainfall distribution and amounts. In detail:

- **North Africa countries:** significant rainfall distribution and amounts increase observing 10mm to 100mm over Morocco, Algeria, Tunisia and Libya.

- **The Sahel:** had an increase in rainfall distribution and amounts observing amounts ranging from 10mm to 150mm with heaviest amounts ranging between 150mm to 300mm over Burkina Faso, Mali, Guinea Conakry, southwest Senegal and the Gambia.

- **Gulf of Guinea countries:** experienced slight rainfall distribution increase with decreased amounts ranging from 10mm to 100mm of estimated rainfall, intensifying the amounts ranging between 100mm to 150mm over Ghana, Benin, and Nigeria with heaviest amounts of above 200mm over Cameroon and Sierra Leone

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

- **GHA countries:** experienced slight decrease in rainfall amounts, ranging between 10mm to 100mm with maximum amounts ranging between 150mm to 200mm over northwest Ethiopia.

- **Southern Africa countries:** remained generally dry except over the Cape and extreme northeastern part of Madagascar that had some rainfall amounts ranging between 10mm to 75mm.

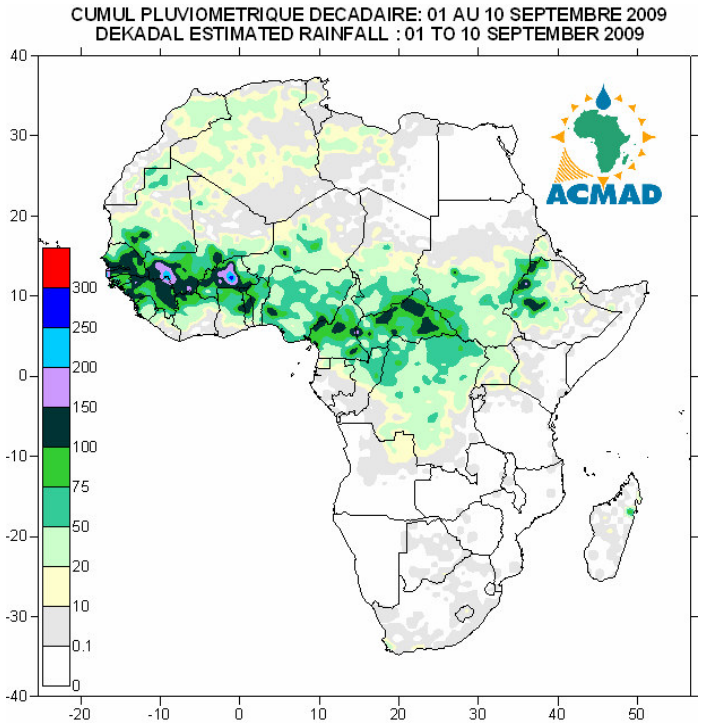


Figure 7: Estimated precipitations, (Data Source: NOAA/NCEP)

2.2 OBSERVED DATA

The Table below shows heaviest cumulative rainfall recorded over Ouagadougou and Bobodioulasso in Burkina Faso, Bamako in Mali, Banjul in the Gambia and Douala in Cameroon. The lowest temperature of 8.0°C was recorded at Mbeya in Tanzania while the highest temperature of 41.8°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	23	2	28,3	22,7
2	Abuja	2	1	29,4	22,2
3	Accra	0	0	29,7	23,9
4	Addis-Abéba	9	1	-	-
5	Agadez	49	1	37,5	26,2
6	Alger(Dar El Beida)	0	0	31,1	19,4
7	Antananarivo	0	0	22,2	11,9
8	Antsiranana	14	5	29,5	19,8
9	Bamako-Senou	231	9	30,5	22,0
10	Bangui	34	5	31,4	21,2
11	Banjul	204	6	30,5	23,4
12	Beira	0	0	28,2	18,2
13	Bilma	0	0	41,8	23,4
14	Bissau	23	1	-	-
15	Bobo Dioulasso	116	8	30,2	21,9
16	Brazzaville	0	0	30,5	21,7
17	Casablanca	27	1	26,9	21,8
18	Conakry	28	1	-	-
19	Cotonou	0	0	29,1	24,8
20	Dakar-Yoff	90	9	30,3	25,3
21	Dar-es-Salaam	0	0	31,7	19,4
22	Douala	184	5	29,4	23,5
23	Durban	0	0	25,1	14,9
24	Entebbe	1	1	25,9	18,1
25	Francistown	0	0	31,7	9,2
26	Harare	0	0	26,7	13,8
27	Johannesbourg	0	0	25,6	13,6
28	Khartoum	15	1	39,1	26,8
29	Kigali	0	0	26,8	16,9
30	Kigoma	0	0	32,3	18,3
31	Le Caire	0	0	33,3	24,0
32	Le Cap	22	5	17,5	11,2
33	Libreville	2	1	28,1	23,3
34	Lomé	1	1	29,1	24,7
35	Lusaka	0	0	29,2	11,8
36	Maputo	0	0	31,1	17,5
37	Maun	0	0	33,5	14,7
38	Mbeya	0	0	25,0	8,0
39	Nairobi	3	2	23,5	12,9
40	Nampula	0	0	31,4	16,3
41	Ndele (RCA)	96	7	28,6	19,2
42	N'Djamena	26	2	33,2	23,9
43	Niamey-Aéroport	75	5	33,0	24,0
44	Nouakchott	39	1	34,0	27,1
45	Ouagadougou	290	7	30,9	23,2
46	Plaisance	17	9	25,2	19,4
47	Sal	0	0	31,2	25,4
48	Seretse Khama Intl Aéro	10	1	29,9	10,0
49	Seychelles	10	5	28,7	24,8
50	Tamanrasset	0	0	32,4	21,0
51	Toalagnaro	0	0	25,9	19,8
52	Tombouctou	0	0	37,1	26,6
53	Tripoli	0	0	36,1	23,5
54	Tunis	7	2	32,3	23,3
55	Windhoek	0	0	29,0	12,9

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

Data Source: ACMAD / GTS

3. OUTLOOK FOR DEKAD (21st - 30th SEPTEMBER, 2009)

3.1 RAINFALL

The ITD southward displacement will lead to significantly reduced moisture influx leading to reduction of rainfall over the Sahel with limited convective rainfall activities over extreme southern part of the Sahel , parts of Gulf of Guinea countries, central Africa, the northern and western parts of GHA countries. Severe rainfall deficits will continue over southern parts of GHA countries with acute dry conditions prevailing over southern Africa countries due to persistent low relative humidity and moisture deficit (Figure 8). In detail**:**

- **North Africa countries:** will experience slight rainfall increase amounts ranging from 10mm to 100mm with peaks of about 150mm.

- **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 increase recording amounts ranging from 10mm to 150mm with peaks of about 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 75mm over with 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 ranging from 20°C to 35°C cover 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, northern part of Gulf of Guinea countries, great part of central Africa and northern part of 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 Gulf of Guinea, the Sahel, 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 malaria including other climate related diseases. 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 skillful prediction of seasonal rainfall onset dates and suitable planting dates 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 rainfall 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. Good practice in ecosystems rehabilitation include national tree planting, afforestation and soil conservation to minimize soil loss during rainy seasons 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.

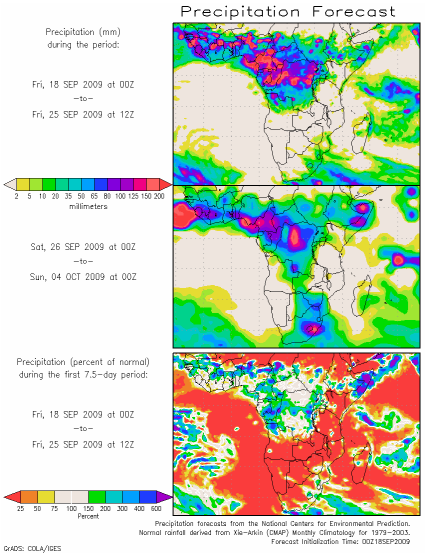


Figure 8: Precipitation forecast, Source : COLA

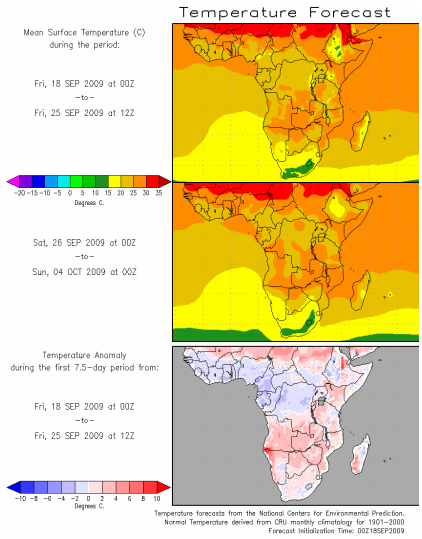


Figure 9 : Temperature forecast Source : COLA

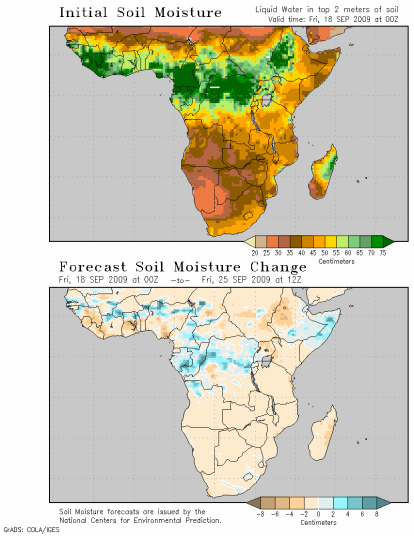


Figure 10 : Soil moisture forecast, Source: COLA

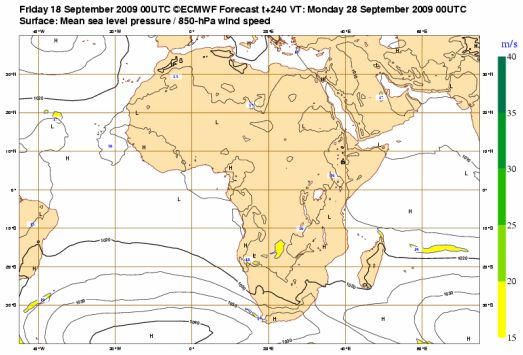


Figure 11 : Mean Sea Level pressure forecast Source : ECMWF