Ten Day Climate Bulletin
N° 23
Dekad 11th to 20th August, 2010

HIGHLIGHT: During the first 10 days of the month there was rainfall increase over the Gulf of Guinea, the Sahel. Northe Africa countries noticed rainfall increase over Algeria and Morocco. GHA region remained dry, except northwest and central Ethiopia. Southern African countries remained mainly dry.

GENERAL SITUATION

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

1.1 SURFACE

- **Azores high:** pressure of 1026 hPa with SW-NE axis, weakened by 2 hPa and shifted southwest compared to the previous dekad. Its mean position was about 38°N/28°W with an extended ridge over North Atlantic Ocean.

- **Saharan low:** pressure of 1006 hPa shifted southwest and filled up by 2 hP compared to the previous dekad. Its mean position was about 22°N/02°W, extending a trough over north Mali, south Algeria, north Niger and north Chad.

- **St. Helena high:** pressure of 1028 hPa weakened by 3 hPa and shifted northwest compared to the past dekad. Its mean position was about 25°S/40°W with an extended ridge over south Atlantic Ocean.

- **Mascarene high:** pressure of 1032 hPa with W-E axis, weakened slightly by 1 hPa and shifted southeast compared to the previous dekad. Its mean position was about 35°S/72°E with an extended ridge over east of Southern Africa and Eastern Africa countries.

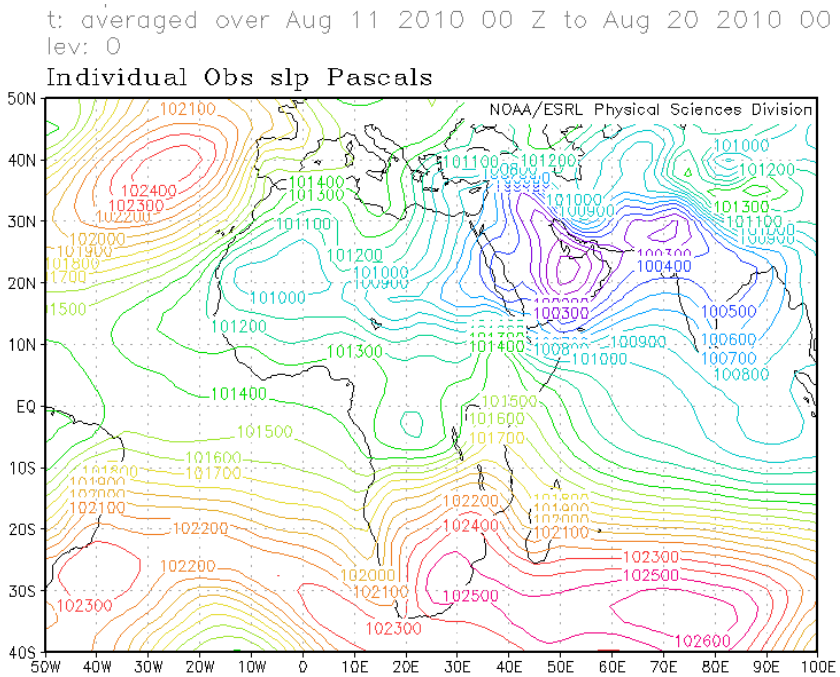

Figure 1: Mean Sea Level Pressure (Source: NOAA/NCEP/ESRL: PSD)

- **Inter-Tropical Discontinuity (ITD)**
  Between the first dekad (blue line) and the second dekad of August (black line), 2010, the ITD continued its northward migration over west part of Sahel and withdrawed southward over east part. (Figure2)

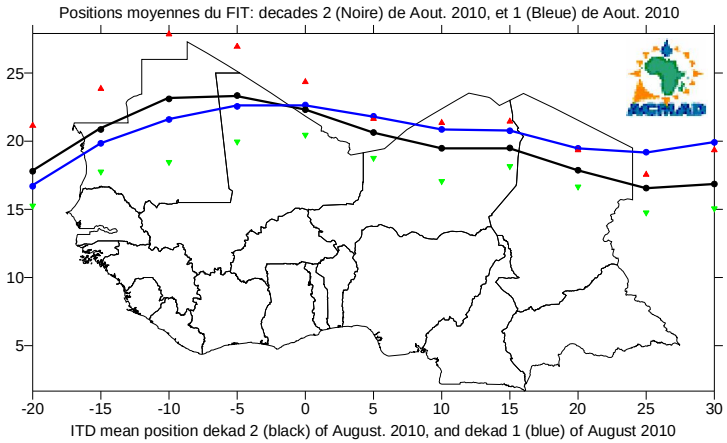

Figure 2: The red and green triangles represent the max. and min. displacements of the ITD respectively

1.2 TROPOSPHERE

1.2.1 Monsoon

Monsoon influx at 925hPa level was generally moderate (5.5 to 12.5 m/s) over Guinea Bissau, Guinea Conakry, Liberia, Côte d'Ivoire and Ghana during the dekad.

1.2.2 Thermal lndex (TI)

In the second dekad of August, 2010, thermal index (TI) regime at 300hPa in (Figure 3) had threshold TI regime value of 243°K enclosing the extreme western part of Sahel countries. A near threshold value of 242°K was observed over most of the Sahel, Gulf of Guinea, and central Africa.. Highest TI values ranging between 243°K to 244°K were observed over extreme eastern part of the Sahel and northeast Africa. The high TI regime with attendant high relative humidity (>60%), will trigger heavy rainfall which may result into flooding.

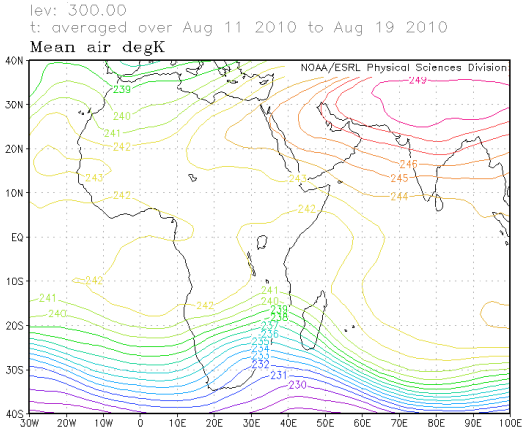

Figure 3: TI at 300hPa (Source: NOAA/NCEP)

1.2.3 Relative Humidity (RH)

The 850hPa (Figure 4) shows high RH (>70%) in the second dekad of August, 2010 over south Sahel, Gulf of Guinea, GHA, extreme northern part of central Africa and eastern part of southern Africa countries. However, extreme northern part of the Sahel, the Sahara as well as western part of Southern Africa countries experienced the lowest RH (< 40%).

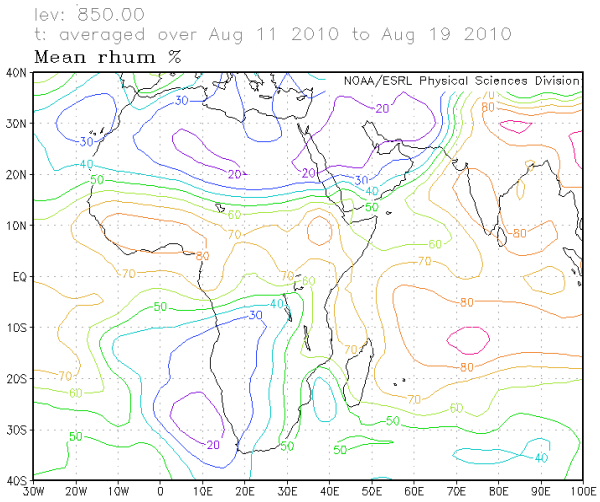

Figure 4 : RH at 850hPa (Source: NOAA/NCEP)

2.RAINFALL AND TEMPERATURE SITUATION

Subsection 2.1 provides a summary on estimated rainfall amounts and distribution while subsection 2.2 provides a table showing stations' observed rainfall, number of rainy days, mean maximum and mean minimum temperatures.

2.1 RAINFALL

The rainfall estimate based on satellite and rain gauge observations in Figure 5, shows decrease in rainfall distribution GHA countries. However, Northern Africa, the Sahel, the Gulf of Guinea countries showed an increase in both rainfall distribution and amounts. Southern Africa remained cold and dry. In detail:

- **North Africa countries:** had spatial rainfall distribution increase, with rainfall amount ranging from 20mm to 50mm over Morocco and Algeria.

- **The Sahel:** had both increase in spatial distribution and amounts in estimated rainfall, observing between 10mm to 150mm with the highest amounts of about 200mm over western Burkina Faso.

- **Gulf of Guinea countries:** continued to experience an increase in rainfall distribution and amounts ranging between 20mm to 150mm with maximum about 200mm over western Côte d'Ivoire and Nigeria.

- **Central Africa countries:** observed rainfall amounts between 10mm to 100mm over northern countries with localized peaks of about 150mm.

- **GHA countries:** experienced slight spatial rainfall distribution decrease; observing amounts of rainfall between 10 to 150mm with highest amounts of 200mm over northern Ethiopia.

- **Southern Africa countries:** continues to experience deficit in rainfall. However, some localized estimated rainfall amounts ranging from 10mm to 150mm were observed over Mozambique and Madagascar.

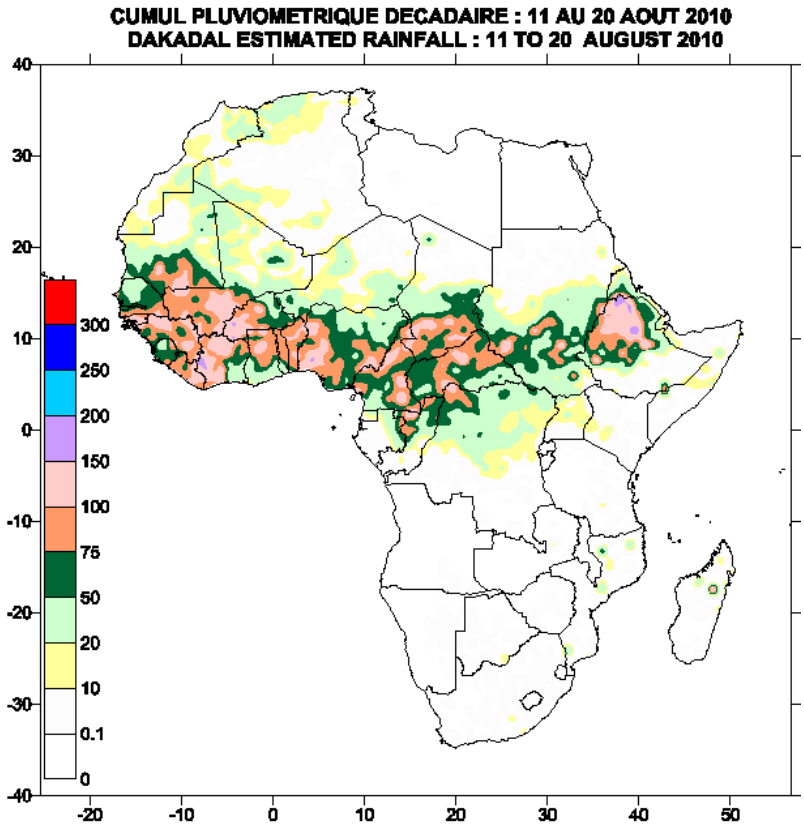

Figure 5 : Estimated precipitations, (Data Source: NOAA/NCEP)

2.2 OBSERVED DATA

The Table below shows that heavy rainfall amounts (>100mm) were observed at Bobo Dioulasso in Burkina Faso over Sahel countries (SC) and at Douala in Cameroon and Lomé in Togo over Gulf of Guinea countries (GGC). The highest mean maximum temperature of 43.1°C was observed at Bilma in Niger while the lowest mean minimum temperature of 1.4°C was observed at Maseru in Lesotho.

	STATIONS	Rainfall (mm)	Number of rainy days	Mean maximum temperature (°C)	Mean minimum temperature (°C)
NAC	Alger (Dar El Beida)	24	5	30,5	21,4
	Tunis	0	0	35,9	23,8
	Tripoli	0	0	38,8	24,6
	Le Caire	0	0	37,1	25,8
	Casablanca	0	0	27,5	22,9
	Tamanrasset	7	4	35,3	22,7
SC	Nouakchott	31	4	32,7	26,6
	Dakar-Yoff	99	4	31,4	26,4
	Tombouctou	13	2	37,0	25,8
	Banjul	67	4	30,7	24,1
	Bamako-Sénou	71	6	30,8	22,9
	Ouagadougou	83	6	31,6	23,5
	Bobo Dioulasso	203	6	29,2	22,0
	Bilma	1	1	43,1	26,4
	Agadez	13	3	38,6	25,9
	Niamey-Aéroport	41	4	32,2	24,2
	Zinder	3	2	33,5	24,3
	N'Djamena	29	5	31,7	23,8
GGC	Conakry	63	4	28,0	-
	Abidjan	39	4	28,2	23,0
	Accra	22	3	28,9	23,6
	Lomé	105	5	28,9	24,2
	Cotonou	41	4	28,4	24,5
	Abuja	0	0	29,3	-
	Douala	140	6	29,6	23,8
CAC	Libreville	4	4	26,7	23,1
	Bangui	53	3	30,9	21,7
	Brazzaville	0	0	30,6	20,3
GHAC	Khartoum	5	1	37,9	26,2
	Nairobi	16	1	-	-
SAC	Nampula	33	3	26,3	15,6
	Lusaka	0	0	25,0	6,8
	Harare	0	0	24,1	8,2
	Bulawayo	0	0	24,8	8,0
	Maputo	0	0	26,4	14,1
	Beira	8	3	-	15,7
	Maun	0	0	27,9	8,8
	Ghanzi	0	0	25,8	3,9
	Francistown	0	0	23,8	5,2
	Seretse Kama Intl Airport	0	0	24,3	-
	Manzini	0	0	-	9,5
	Maseru	0	0	-	1,4
	Windhoek	0	0	25,8	8,5
	Johannesbourg	0	0	19,8	5,3
	Pretoria	0	0	23,3	6,1
	Port Elisabeth	12	1	20,3	9,7
	Durban	0	0	23,2	10,7
	Le Cap	4	2	21,1	6,9
IOC	Seychelles	6	4	28,9	24,5
	Antsiranana	4	1	29,9	19,4
	Antananarivo	0	0	21,9	9,8
	Toalagnaro	1	1	23,4	15,6
	Plaisance	18	7	25,3	19,1

Data Source: ACMAD / GTS

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

NAC= Northern Africa Countries ; **SC**=Sahel Countries; **GGC**=Gulf of Guinea Countries; **CAC**=Central Africa Countries; **GHAC**=Greater Horn of Africa Countries; **SAC**=Southern Africa Countries; **IOC**=Indian Ocean Countries.

3. OUTLOOK FOR DEKAD (1st – 10th SEPTEMBER, 2010)

3.1 RAINFALL

The ITD indicated southward movement over eastern parts of the Sahel during the last ten day period; this will led to reduction in rainfall in the Sahel mainly in the northeastern parts. This situation is expected to continue during the outlook period for the northeastern sector although rainfall will continue being heavy over southern parts of Sahel. GHA will also experience reduced rainfall except over Ethiopia where continued rainfall are expected but at reduced levels compared to the prior wet period.

- **North African countries**: may realise some light rains especially over southwest Algeria and Morocco.

- **The Sahel:** will experience rainfall decrease both in intensity and spread with amounts ranging between 5mm and 50mm being reported in the central areas of the zone. This amount is expected to remain high in some areas with amounts over 125mm over southern areas.

- **Gulf of Guinea countries:** will experience reduction of rainfall amounts over most parts of coastal and central belt of the region reporting 5 mm to 35mm except countries situated in the far west neighbouring Guinea Conakry and Sierra Leonne where high rainfall above 125 mm may be realised.

- **Central Africa countries:** during the period under consideration rainfall will continue being reported over most parts of the region with amounts ranging between 65 to 100mm being reported over eastern sector of Democratic republic of Congo and Central African Republic. This situation will also be realised in most parts of Cameroun but will see an increased trend as we move northward in Cameroun where amounts greater than 125mm will be reported. Unlike in the past when dry conditions were pronounced in southern parts of the region, during the outlook period slight rainfall of about 5mm to10mm will be reported.

- **GHA countries:** will have decreased rainfall of amounts ranging between 10 and 35mm over most parts, however central Ethiopia and southern and central Sudan will have an active situation but at a lower level than realised previously with 65mm to 80mm being reported.

- **Southern Africa countries:** will continue to experience dry conditions over the western sector of the region, however the eastern coastal belt will realise rainfall ranging between 5 to 10 mm but is expected to have some peaks of amounts between 65 to 80 mm to the east of Lesotho.

3.1 TEMPERATURE

The forecast in Figure 7 shows temperature in the Gulf of Guinea will be cool at 20°C – 25°C, except over the coast where 25-30°C will be realised. Over the Sahel 25°C - 30°C be realised in the south while in the north it will be between 30°C and 35°C. Central Africa is expected to record temperatures between 20°C - 25°C in the north while central and southern sectors will have 25°C to 30°. GHA countries will continue warming with central Kenya, Ethiopia and Tanzania recording temperatures of 20°C - 25°C. These temperatures are expected to become cooler over Ethiopian and Kenyan highlands which will be between 10 -15°C. Southern Africa will remain cold with temperatures between 10°C and 15°C at the Cape. These temperatures will show warming as we move northwards to between 25°C to 30°C over Zambia, Malawi and northern Mozambique.

3.2 SOIL MOISTURE

The outlook on soil moisture changes, Fig.8 indicates that there has been ample moisture over the southern Sahel. Gulf of Guinea countries are expected to continue having soil moisture recharge though at a lower degree compared to the last period. Central Africa region is expected to notice reduced soil moisture but some increase will be noted in eastern DRC and northwestern parts of Cameroun, while in the south due to increased temperature depletion is expected to occur. In GHA as a consequence of warming temperatures, soil moisture is expected to remain low over most parts, however most areas of Ethiopian and Kenyan highlands may notice increased moisture due to light rains from low level clouds. Low soil moisture conditions are expected to continue over most of other parts of southern Africa.

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, Sahel and central African countries with high humidity of over 60% , sufficient rainfall and conducive temperatures will support survival of malaria and it is therefore advised that plans be put in place to combat likely outbreaks. Chances of out break of malaria are low in southern areas of South African due to low relative humidity and temperature.Temperatures have relatively increased over GHA countries which may lead to outbreaks hence need for close monitoring of the situation.

Agriculture and food security: The integration of climate prediction products and information into agricultural production and food security is of crucial importance. We emphasize on the importance of suitable planting dates, seasonal rainfall onset, rainfall amounts and length of the season including monitoring of the phenological stages of crops for crop yield assessments in the countries. It is imperative to carry out cost benefit analysis on applications of appropriate planting dates and suitable seed variety 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. In the Sahel with the continued good performance of rainfall so far crops are expected to continue benefiting from the available soil moisture while livestock pasture will be readily available. The rains are expected to continue recharging livestock and wildlife drinking water points both in the south and some parts of northern Sahel.

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, rivers and the drying wetlands. The current rains are expected to provide sufficient moisture for rejuvenation of the earlier dormant shrubs else as vegetation in the riverine areas. We have to rehabilitate our presently degraded rainfall catchment areas and natural ecosystems through enhanced national policies and environmental reclamation strategies. Good practices in ecosystems rehabilitation and management include national tree planting during rainy season and soil conservation to minimize soil loss during rainy seasons due to heavy runoff**.** Farmers in the Sahelian region which now is under rainfall may take this opportunity to plant trees as seedlings survival rate is high due to the prevailing soil moisture conditions. Riverine areas are expected to receive occasional flooding which may lead to destruction of some existing ecosystems.

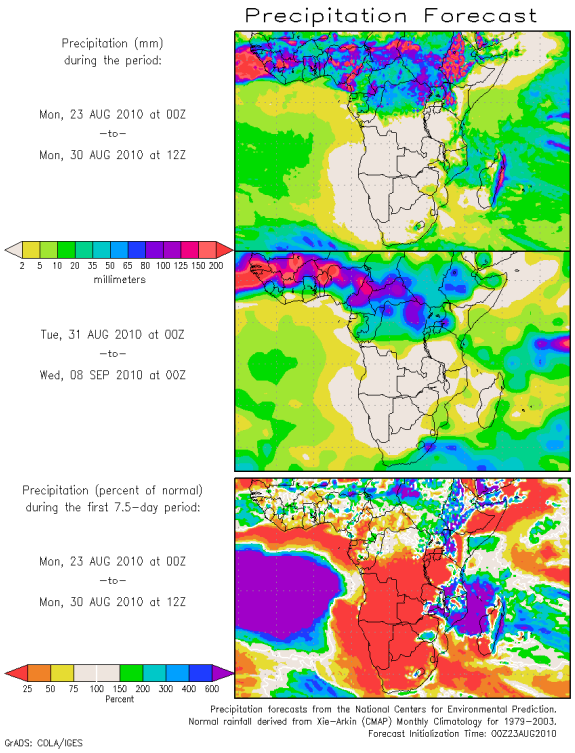

Figure 6 : Precipitation forecast, Source : COLA

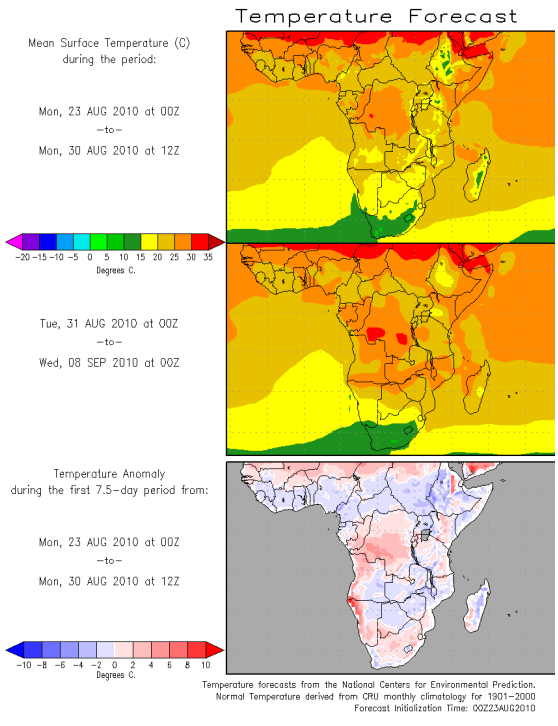

Figure 7 : Temperature forecast Source : COLA

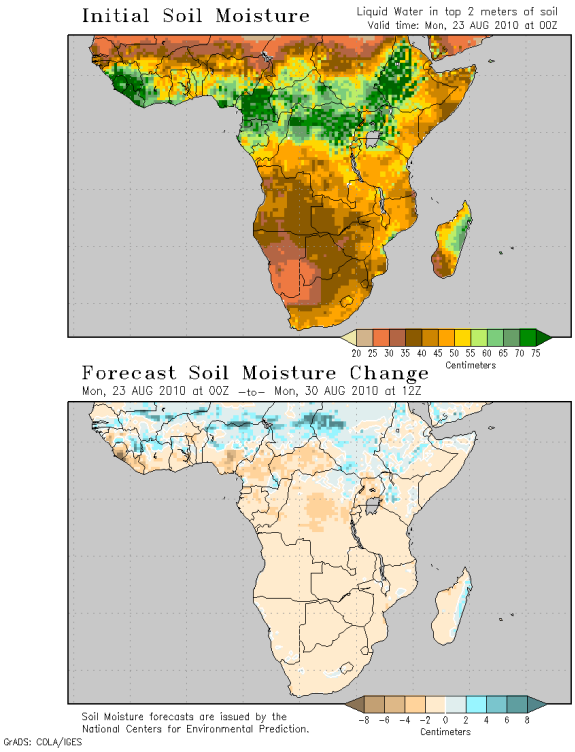

Figure 8 : Soil moisture forecast, Source: COLA

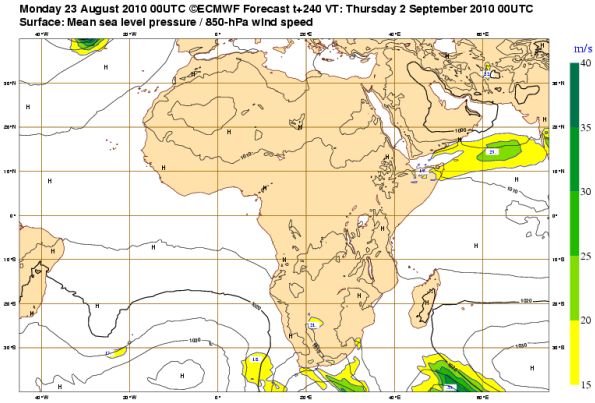

Figure 9: Mean Sea Level pressure forecast
Source: ECMWF