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

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HIGHLIGHT: increase in rainfall activities over Northern Africa and southern Africa countries while the Sahel and GHA countries had a decrease. The highest and lowest temperatures continued to be observed in the GHA counties and Southern Africa respectively.

GENERAL SITUATION

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

1.1 SURFACE

1.1.1. Pressure Systems

- **Azores high** of 1025hPa strengthened significantly by 5hPa and shift northeast compared to the past dekad. The centres of the highs were located at about 45°N/08°W over North Atlantic Ocean extending a ridge over northern Africa countries.

- **Saharan Thermal Low** of 1008hPa maintained its depth and position compared to the previous dekad and was located at about 15°N/17°E over southern Chad.

- **St. Helena high** had a cell of 1023hPa weakened by 2hPa and shift northwest. Its center was located at 30°S/02°W over South Atlantic Ocean.

- **Mascarene high** of 1023hPa weakened slightly by 1hPa and shifted northeast compared to the previous dekad. The mean position was at about 30°S/85°E extending a ridge over south-eastern part of the continent.

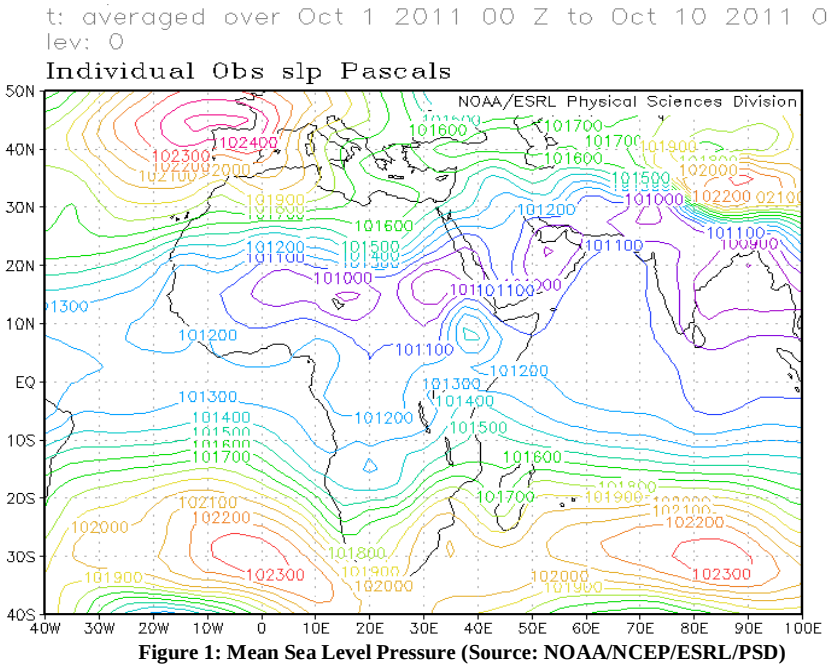

Figure 1: Mean Sea Level Pressure (Source: NOAA/NCEP/ESRL/PSD)

1.1.2 Inter-Tropical Discontinuity (ITD)

Between the first dekad of October (black line) and the third dekad (blue line) of September 2011, the ITD had a general southwards movement of about 1 degree of latitude over south-western Mauritania; 2 to 5 degrees of latitude from south-central Mauritania to eastern Mali; and quasi-stationary from western Niger up to Sudan (Figure2).

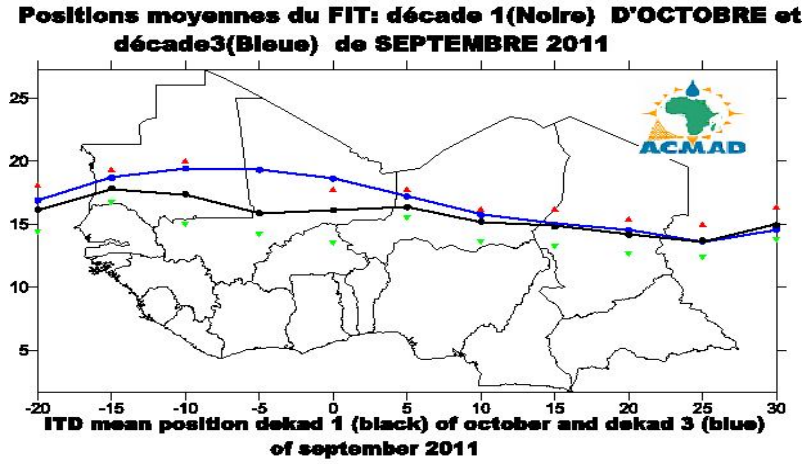

Figure 2: The red and green triangles represent the max. and min. displacements of the ITD respectively

1.2 TROPOSPHERE

1.2.1 African Monsoon

At 925hPa level, the intensity of the monsoon winds was weak (1 to 5 m/s) over the southeastern part of the Sahel, most of the Gulf of Guinea countries and northwestern part of Central Africa countries.

At 850hPa level, the intensity of the monsoon winds continues to be weak (1 to 5m/s) over extreme southern part of the Gulf of Guinea countries and northwestern part of central Africa countries.

1.2.2 Dust loading particles

The map below (Figure 3), shows slight concentration of dust (0.1 to 0.4g/m^2) over most of African countries in the northern hemisphere above 07°N of latitude with moderate concentrations ranging from 0.4 to 0.8g/m^2 over central Chad, eastern Niger, southern Algeria, southern Morocco, Mauritania, north-eastern Sudan, northern Somalia, Eritrea and Djibouti.

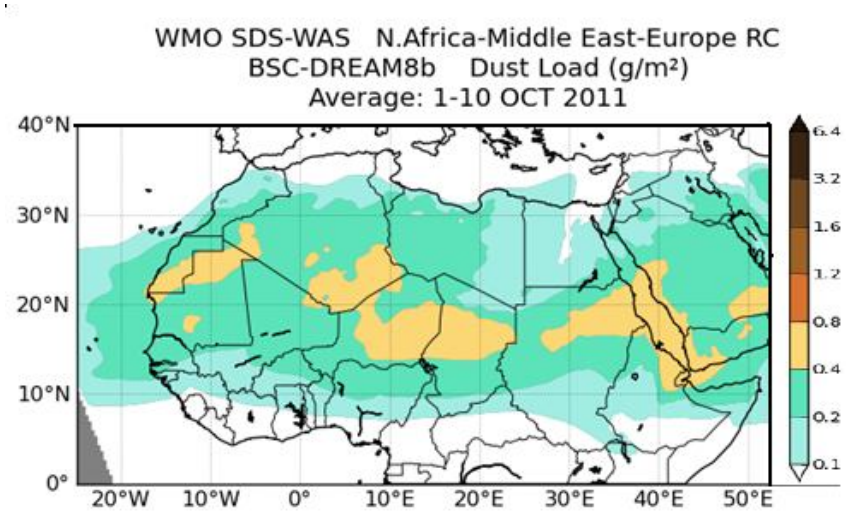

Figure 3: Dekadal Dust loading (g/m2), Source WMO SDS-WAS: BSC-DREAM8b

1.2.3 Thermal lndex (TI)

In the first dekad of October, 2011, thermal index (TI) regime at 300hPa in (Figure 4) had the high value of 242°K covering extreme southeastern part of the Sahel, the Gulf of Guinea countries, most of GHA, most of central African and extreme northern part of southern Africa. The high TI regimes with attendant high relative humidity (≥70%), triggered heavy rainfall which could resulted into flooding over some parts while areas with TI value ≤ 241°K experienced dry conditions.

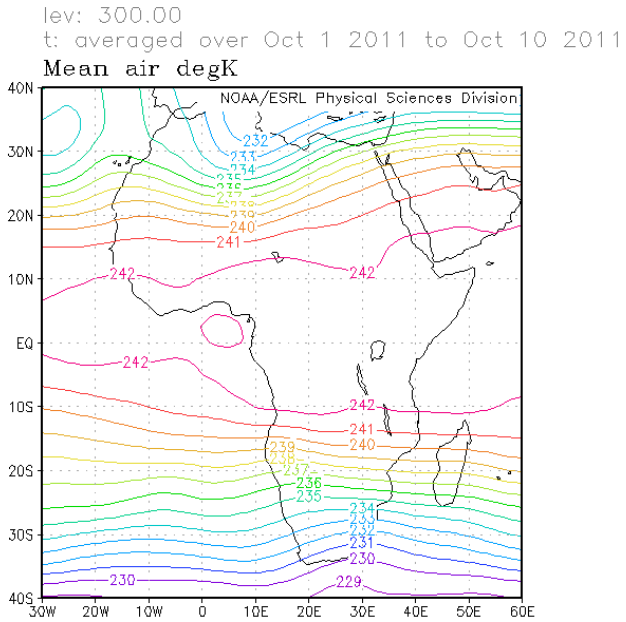

Figure 4: TI at 300hPa (Source: NOAA/NCEP)

1.2.4 Relative Humidity (RH)

The 850hPa (Figure 5) shows high RH (≥70%) in the first dekad of October 2011 over southern part of the Gulf of Guinea Countries, most part of GHA countries, most of central Africa and extreme northern par of Southern Africa. However, most of the Sahel, northern Africa and most of western part of the southern Africa continue to experience the lowest RH (< 40%).

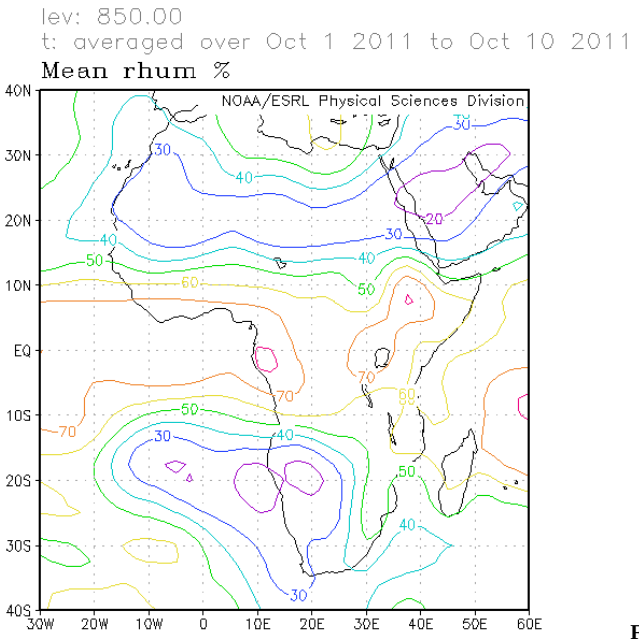

Figure 5 : RH at 850hPa (Source: NOAA/NCEP)

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 6, shows increase in rainfall activities over Northern Africa and southern Africa while its decrease over the Sahel and GHA countries during the dekad.

In detail**:**

- **North Africa countries:** had increase in rainfall distribution with amounts ranging 10mm to 75mm mainly over Algeria, Libya and Tunisia.

- **The Sahel:** had decrease in rainfall distribution and amounts ranging between 10mm to 50mm intensifying to about 75mm over southern Chad.

- **Gulf of Guinea countries:** had rainfall amounts ranging between 10mm to 200mm intensifying to maximum of 200mm over Nigeria.

- **Central Africa countries:** had rainfall amounts ranging from 10mm to 200mm over most part, intensifying to maxima between 200 and 250mm over north-east Democratic Republic of Congo.

- **GHA countries:** had decrease in rainfall distribution and amounts, ranging from 10mm to 75mm with maxima of about 150mm over Sudan, Ethiopia and Tanzania.

- **Southern Africa countries:** experienced increase in rainfall distribution in the northern part with amounts between 10mm to 75mm. However, localised high amount of rainfall about 150mm was observed over Northern Malawi, north-eastern Mozambique and northern Madagascar.

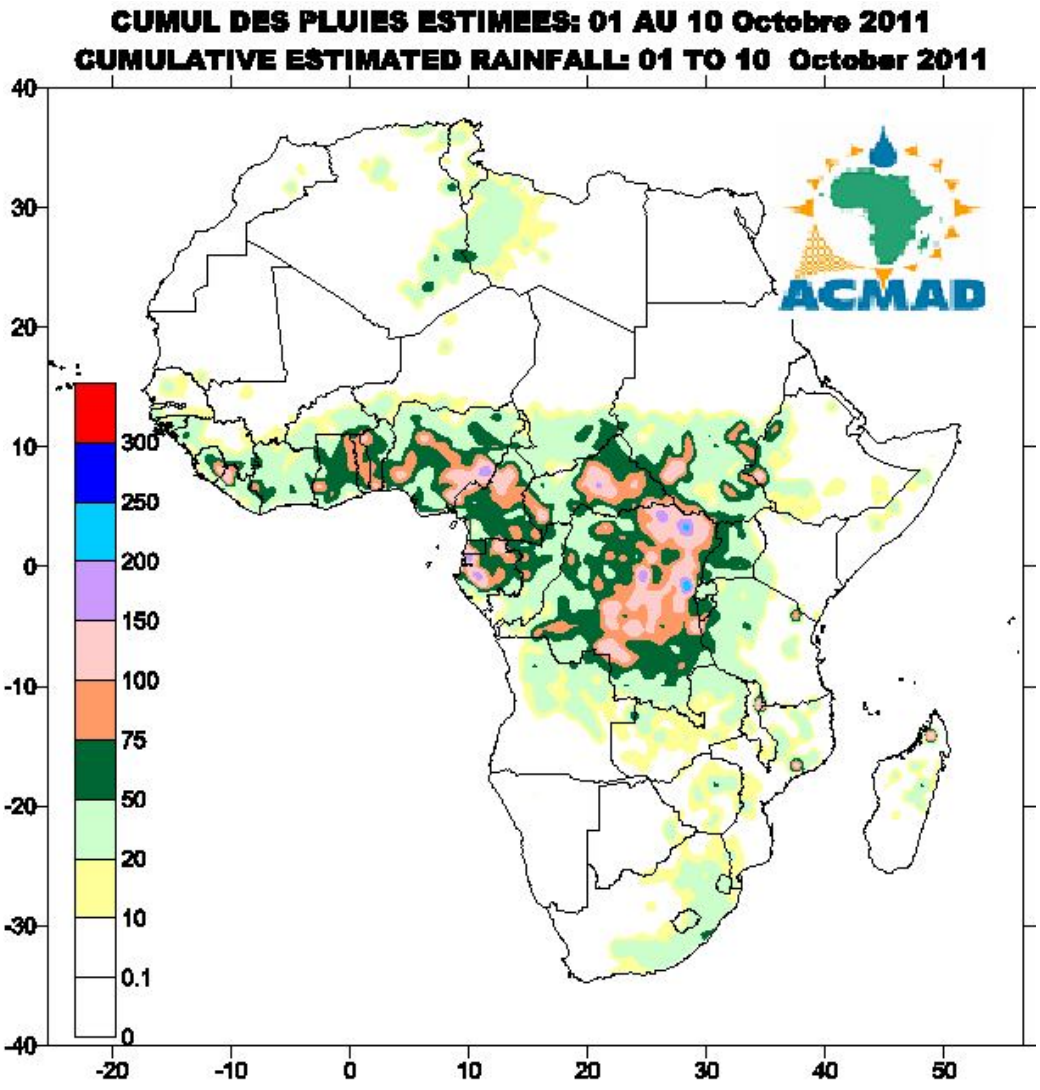

Figure 6 : Estimated precipitations, (Data Source: NOAA/NCEP)

2.2 OBSERVED DATA

The Table below shows moderate rainfall of 334.0 mm at Seychelles in Seychelles and 129.7 mm in Kigoma in Tanzania. The highest mean maximum temperature of 41.9°C was observed at Khartoum in Sudan while the lowest mean minimum temperature of 8.5°C was observed in Johanesburg in South Africa.

	STATIONS	Precipitations (mm)	Number Rain day	MaximumTemp. (°C)	MinimumTemp. (°C)
NAC	Alger (Dar El Beida)	9,0	2,0	27,2	13,7
	Tunis	16,8	3,0	26,0	18,0
	Tripoli	0,0	0,0	29,7	18,4
	Le Caire	0,0	0,0	32,2	21,6
	Casablanca	0,0	0,0	26,2	19,5
	Tamanrasset	44,0	3,0	29,3	17,3
SC	Nouakchott	0,0	0,0	37,0	27,1
	Dakar-Yoff	5,4	3,0	32,2	26,7
	Tombouctou	0,0	0,0	38,6	24,3
	Banjul	48,0	3,0	32,9	24,1
	Bamako-Sénou	0,0	0,0	35,2	20,9
	Ouagadougou	1,3	2,0	36,0	24,8
	Bobo Dioulasso	77,0	4,0	32,5	22,0
	Bilma	0,0	0,0	40,4	25,2
	Agadez	0,0	0,0	40,3	27,3
	Niamey-Aéroport	38,0	2,0	37,3	26,0
	Zinder	32,0	3,0	37,4	24,6
	N'Djamena	0,9	1,0	37,8	24,3
GGC	Abidjan	24,4	4,0	30,7	24,9
	Accra	-	-	-	-
	Lomé	13,3	4,0	32,0	25,0
	Cotonou	58,9	6,0	29,8	25,5
CAC	Douala	50,2	7,0	30,7	24,0
	Bangui	13,7	4,0	31,4	21,3
	Libreville	33,4	6,0	28,5	24,2
	Brazzaville	0,0	0,0	33,2	22,8
GHAC	Khartoum	0,0	0,0	**41,9**	28,8
	Nairobi	0,7	1,0	27,7	14,9
	Dodoma	0,0	0,0	30,5	17,9
	Kigoma	**129,7**	5,0	28,6	20,3
	Dar-es-Salaam	10,0	2,0	31,9	21,6
	Mbeya	42,0	1,0	24,3	13,8
	Mtwara	12,0	2,0	29,9	19,6
SAC	Nampula	-	-	-	19,3
	Lusaka	3,0	1,0	29,2	14,0
	Harare	13,7	2,0	25,7	10,6
	Bulawayo	6,0	3,0	27,1	12,7
	Windhoek	0,0	0,0	29,6	12,4
	Maputo	4,0	1,0	25,9	17,0
	Beira	5,0	2,0	28,1	20,7
	Ghanzi	0,0	0,0	30,6	12,2
	Francistown	1,0	1,0	29,2	13,9
	Seretse Kama	5,0	1,0	27,9	11,1
	Manzini	36,0	3,0	-	13,0
	Johannesbourg	37,0	2,0	21,8	**8,5**
	Pretoria	38,0	2,0	25,4	12,9
	Port Elisabeth	11,0	2,0	21,4	10,4
	Durban	44,0	4,0	24,0	15,2
	Cape Town	0,2	1,0	23,0	10,0
IOC	Seychelles	**334,0**	9,0	28,6	23,9
	Antsiranana	-	-	-	-
	Antananarivo	42,0	1,0	24,4	12,9
	Toalagnaro	-	-	-	-
	Plaisance	14,9	5,0	26,6	20,4

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 (21th –31th October 2011)

3.1 MONSOON

In Figure 7, the forecast reduction of monsoon over the Sahel that will reduce moisture influx over the region with intrusion of Harmattan winds with localise dust episode.

3.2 RAINFALL

The ITD will continue its southward migration that will contribute to the reduction of rainfall and the enhanced northerly/north-easterlies winds (dry ad dusty) over Sahara and most of the Sahel countries. The coastal parts of the Gulf of Guinea countries, northern and western parts of central Africa countries will continue to record significant rainfall amounts. The GHA, northern and eastern parts of southern Africa will recover from the rainfall deficits with some light to moderate amounts (Fig. 8).

North Africa: most of the region will be generally dry. However, some localised rainfall amounts ranging from 10mm to 80mm will be observed over Morocco, Algeria and Tunisia.

The Sahel: the extreme southern part will continue to experience rainfall amounts ranging from 10mm to 50mm.

Gulf of Guinea countries: will continue to observe rainfall amounts ranging from 10mm to 150mm intensifying to above 200mm over the coastal zones.

Central Africa countries: will have amounts ranging between 10mm to 150mm intensifying to above 200mm over Gabon, Equatorial Guinea, Congo, Cameroon and Democratic Republic of Congo.

GHA countries: will have rainfall amounts between 10mm to 80mm over most part with maximum of 100mm over northern Somalia and Great Lakes Countries.

Southern Africa countries: will l have some light rainfall amounts of ranging from 10mm to 80mm with maximum of about 125mm over Botswana.

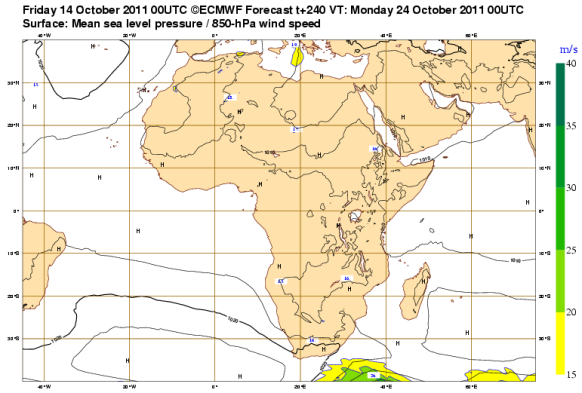

Figure 7: Mean Sea Level pressure/850hPa wind forecast (Source: CMWF)

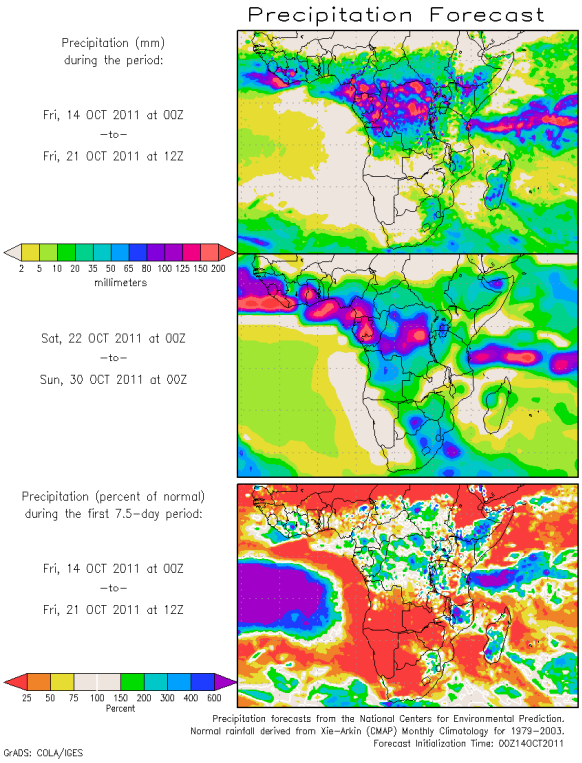

Figure 8: Precipitation forecast. Source: COLA

3.2 TEMPERATURE

The forecast in Figure 9 shows mean surface temperature will continue to be high over the Sahel countries recording 25°C to 30°C with the highest temperatures of 35°C over southern part sector of the Sahel. Most part of the Gulf of Guinea countries will experience temperatures ranging from 25°C to 30°C. In central African countries, the temperature will range between 20°C to 30°C over most parts. The GHA countries will have temperature between 25°C to 30°C decreasing to the lowest temperature ranging from 15°C to 20°C over the Ethiopian highlands and Great lakes countries while the highest temperature of above 35°C will be observed over Sudan. In the southern African countries, the temperatures will range from 30°C decreasing gradually southwards to the lowest of 10°C in the extreme southern parts.

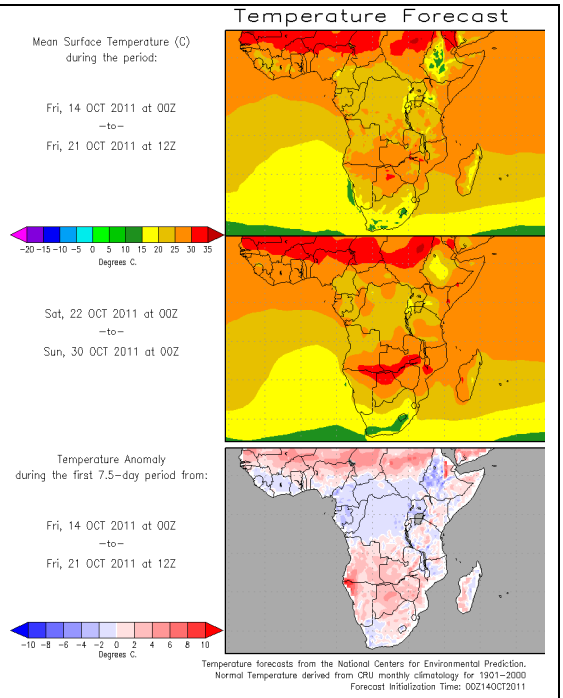

Figure 9 : Temperature forecast Source : COLA

3.3 SOIL MOISTURE

The outlook on soil moisture change, Figure10 indicates that there will be an increase in soil moisture levels in the top 2 metre layer of the soil in central Africa, part of GHA and some southern Africa countries while maximum soil moisture deficits will be observed in the Ethiopia highland, Great Lakes countries and Gulf of Guinea countries.

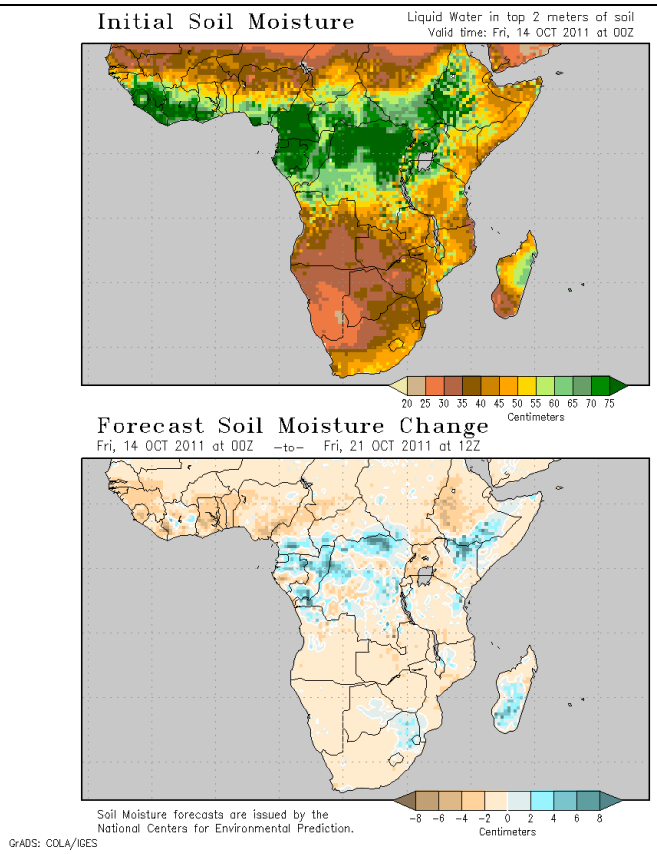

Figure 10: Soil moisture forecast. Source: COLA

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, parts of southern Sahel, parts of central Africa and north eastern parts of GHA countries will have incidences of malaria. It is imperative that necessary measures be taken combat the outbreaks of malaria.

Agriculture and food security: The integration of climate information and forecast products into agricultural production and food security is of crucial importance. We emphasize on the importance of suitable planting dates, seasonal rainfall onset dates, amounts and the length of the rainy season including monitoring of the phenological stages of crops as impotant components in the crop yield assessments. The parts with good seasonal rainfall performance have ample soil moisture in the top rooting zone of annual crops leading to better crop yield. There is a need to maximise agricultural production by selecting the appropriate seed varieties based on expected seasonal rainfall performance.

African Ecosystems: While noting that forests serve as rainfall catchment areas, the destruction of forests in Africa has been blamed for the declining water levels in the lakes, rivers and disappearance of Africa's high mountains glaciers and wetlands as well as the encroachment of desert conditions. The seasonal rains are expected to provide sufficient moisture for rejuvenation of shrubs and increase biomass in the dry lands. 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. Riverine areas are expected to receive flooding which may lead to destruction of some existing ecosystems and human settlements especially in the Gulf of Guinea countries, parts of central Africa countries.