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

# Ten Day Climate Bulletin

## N° 14 Year 2009

## Dekad of 11 to 20 May, 2009

**HIGHLIGHT:** The GHA countries with the highest relative humidity and reasonable thermal index regime (TI) of 242°K experienced heavy rainfall. The areas with high relative humidity (>70%) and TI value of 242°K and above will experience heavy rainfall.

### 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 weakened by 4hPa and shifted southwest compared to the past dekad. Its mean position was located at about 36°N/27°W, extending a ridge over north Morocco.

- **St. Helena high:** Pressure of 1027hPa strengthened by 2hPa and shifted northwest at 36°S/05°E with an extended ridge over South Atlantic ocean.

- **Mascarene high:** Pressure of 1028hPa strengthened by 2hPa compared to the past dekad and shifted northwest. Its mean position was at 37°S/52°E with an extended ridge over Mozambique, east Zimbabwe and South Africa.

- **Saharan Thermal Low:** Pressure at 1006hPa filled up by 2hPa compared to the previous dekad and shifted southwest at 15°N/01°E with an extended trough over east Senegal, south Mauritania, east Mali, north Burkina Faso, south Niger and west Chad.

- **Inter -Tropical Discontinuity (ITD):** Between the first and second dekad of May, 2009, the ITD (Figure 1) moved northwards over western Sahel while it had significant southward movement over the eastern part particularly over central-east Niger and western Chad. Its mean position was observed at 12.4°N over longitude 20°W; at 14.5°N over central Senegal; at 15.8°N over south Mauritania; 15.7°N and 16.8°N over central-west and central-east Mali respectively; at 14.8°N and 13.4°N over central-west and south-east Niger respectively; at 12.3°N north Cameroon; at 11.4°N over south-east Chad; at 10.4°N and 11.4°N over south-west and central-south Sudan respectively.

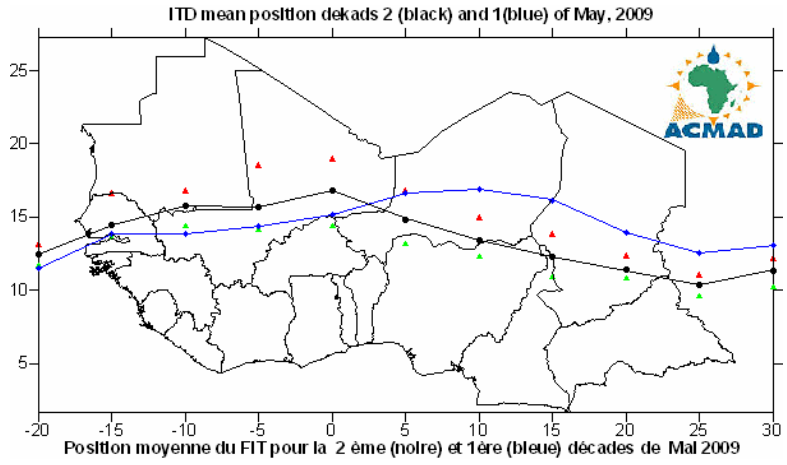


**Figure 1 : The red and green triangles represent the max. and min. displacements of the ITD respectively**

## 1.2 TROPOSPHERE

• **Monsoon:** Monsoon influx at 925hPa level moderate (5.5 to 11.5m/s) over north Ghana, Togo and Benin,.

• **Thermal Index (TI):** In the second dekad of May, 2009, the thermal index (TI) regime at 300hPa in (figure 2), had TI regime value of 242°K extended about 10°N and 10°S covering Gulf of Guinea, central Africa and GHA countries resulting in convective rainfall over some parts characterized by high relative humidity as observed in Figure 3. The highest thermal index regime of 243°K and above characterized by heavy rainfall with floods was located over eastern Indian Ocean and Asia.

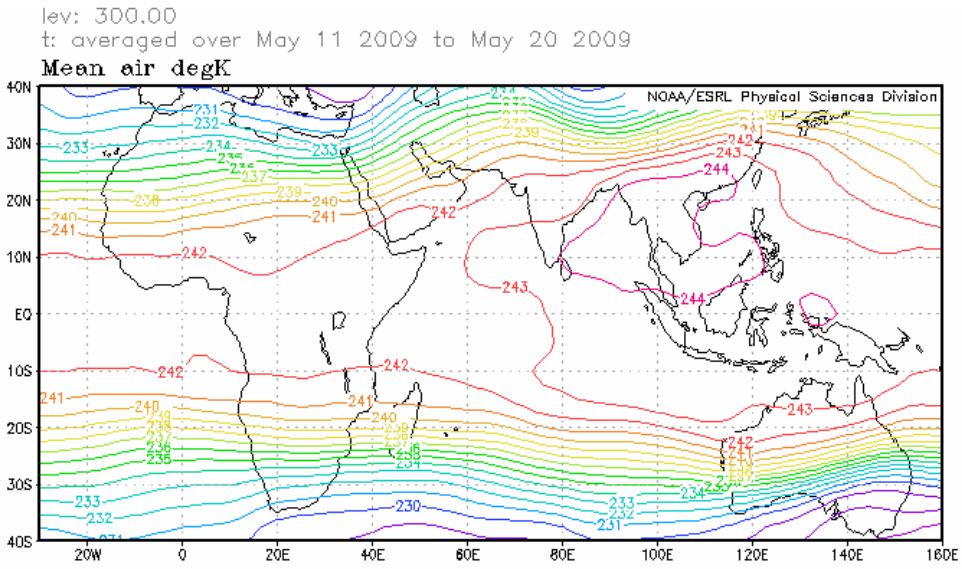


**Figure 2: Air temperature at 300hPa (Source: NOAA/NCEP/ESRL: PSD)**

• **Relative Humidity (RH):** The 850hPa (Figure 3) shows high RH (>70%) in the second dekad of May, 2009 over Great Lakes countries, part of GHA countries, central Madagascar and over the Gulf of Guinea countries. The Sahara, the Sahel countries and western part of Southern Africa countries experienced dry conditions characterized by the lowest RH (<40%).

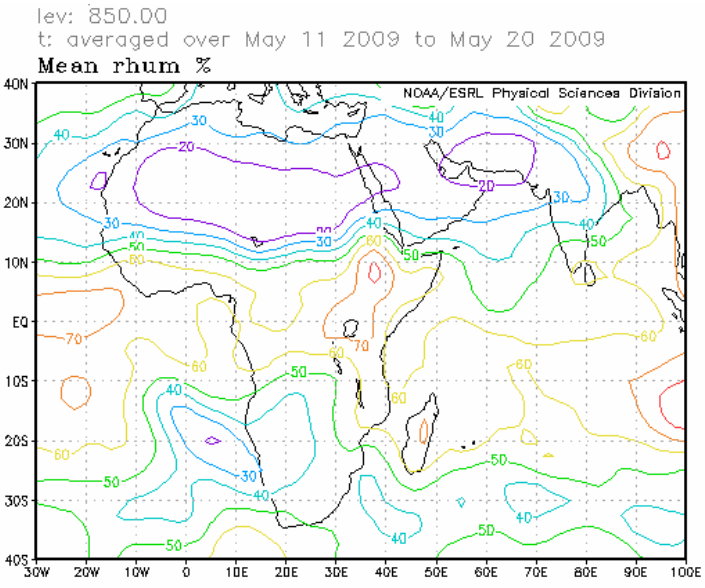


**Figure 3: Relative Humidity at 850hPa (Source: NOAA/NCEP/ESRL: PSD )**

## 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 4 below shows rainfall distribution and amounts increase over North Africa, the Sahel and GHA countries while over Gulf of Guinea, Central Africa and Southern Africa countries experienced rainfall decrease in distribution and amounts. In summary:

- **North Africa countries:** experienced slight rainfall distribution and amounts increase ranging from 10mm to 75mm over extreme northeast Algeria and north Tunisia.

- **The Sahel:** had increase in rainfall distribution and amounts ranging from 10mm to 100mm over the southern part.

- **Gulf of Guinea countries:** experienced rainfall decrease in distribution and amounts ranging from 10mm to 100mm with maximum ranging from 100mm to 200mm over central and eastern Nigeria.

- **Central Africa countries:** had decrease in rainfall distribution and amounts ranging from 10mm to 100mm, intensifying over Democratic Republic of Congo, Gabon and Equatorial Guinea to about 150mm.

- **GHA countries:** experienced rainfall increase in distribution and amounts ranging from 10mm to 100mm with peaks of about 150mm over south Ethiopia, western Kenya, northwest Tanzania with the heaviest amounts ranging about 200mm to 250 mm recorded over western Tanzania.

- **Southern Africa countries:** experienced significant rainfall decrease in distribution and amounts ranging from 10mm to 75mm over South Africa, Namibia and Madagascar where maximum rainfall of about 100mm was observed.

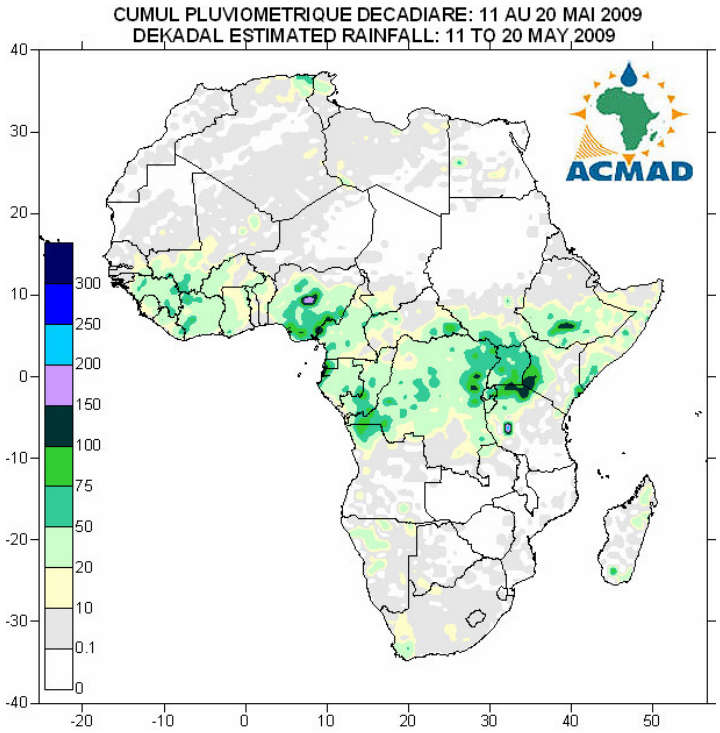


**Figure 4: Estimated precipitations, (Data Source: NOAA/NCEP)**

## 2.2 OBSERVED DATA

The Table below shows heaviest rainfall recorded over Libreville in Gabon. The lowest temperature of 4.6°C was recorded at Maseru in Lesotho while the highest temperature of 42.2°C was recorded at Niamey in Niger.

| N° | STATIONS | Précipitations (mm) | Nombre de jours de pluie | Température maxi moyenne (°C) | Température mini moyenne (°C) |
|---|---|---|---|---|---|
| 1 | Abidjan | 7 | 2 | 32,5 | 25,7 |
| 2 | Accra | 0 | 0 | 32,7 | 25,3 |
| 3 | Agadez | 0 | 0 | 41,5 | 26,7 |
| 4 | Alger(Dar El Beida) | 6 | 1 | 27,7 | 14,2 |
| 5 | Antananarivo | 0 | 0 | 23,6 | 13,4 |
| 6 | Antsiranana | 0 | 0 | 32,2 | 22,1 |
| 7 | Bamako-Senou | 21 | 2 | 37,7 | 25,6 |
| 8 | Bangui | 10 | 4 | 32,3 | 22,9 |
| 9 | Banjul | 0 | 0 | 33,5 | 21,0 |
| 10 | Beira | 26 | 2 | - | 18,7 |
| 11 | Bilma | 0 | 0 | 41,1 | 26,0 |
| 12 | Bissau | 0 | 0 | 33,9 | - |
| 13 | Bobo Dioulasso | 9 | 3 | 35,5 | 23,6 |
| 14 | Brazzaville | 38 | 4 | 33,2 | 23,0 |
| 15 | Casablanca | 0 | 0 | 21,4 | 15,9 |
| 16 | Conakry | 1 | 1 | 31,3 | 25,3 |
| 17 | Cotonou | 2 | 1 | 31,1 | 25,7 |
| 18 | Dakar-Yoff | 0 | 0 | 26,5 | 20,5 |
| 19 | Dar-es-Salaam | 2 | 1 | 30,8 | 22,2 |
| 20 | Douala | 21 | 3 | 32,5 | 24,0 |
| 21 | Durban | 0 | 0 | 24,9 | 14,4 |
| 22 | Entebbe | 35 | 2 | 25,9 | 19,0 |
| 23 | Francistown | 0 | 0 | 26,3 | 6,7 |
| 24 | Harare | 0 | 0 | 24,6 | 8,2 |
| 25 | Johannesbourg | 0 | 0 | 18,4 | 7,5 |
| 26 | Khartoum | 0 | 0 | 40,3 | 26,0 |
| 27 | Kigali | 11 | 3 | 24,6 | 15,8 |
| 28 | Kigoma | 13 | 2 | 28,1 | 18,7 |
| 29 | Kinshasa | 0 | 0 | 33,7 | 23,5 |
| 30 | Le Caire | 0 | 0 | 33,9 | 19,9 |
| 31 | Le Cap | 13 | 2 | 18,7 | 12,3 |
| 32 | Libreville | 138 | 6 | 30,7 | 23,3 |
| 33 | Lilongwe | 0 | 0 | 25,5 | 11,3 |
| 34 | Lomé | 8 | 2 | 33,2 | 25,9 |
| 35 | Lusaka | 0 | 0 | 24,8 | 10,7 |
| 36 | Maputo | 0 | 0 | 29,7 | 15,9 |
| 37 | Maseru | 1 | 1 | - | 4,6 |
| 38 | Maun | 0 | 0 | 28,0 | 11,6 |
| 39 | Mbeya | 0 | 0 | 23,3 | 8,9 |
| 40 | Monrovia | 0 | 0 | 31,0 | - |
| 41 | Nairobi | 0 | 0 | 24,8 | 15,6 |
| 42 | Nampula | 10 | 1 | 28,5 | 17,5 |
| 43 | N'Djamena | 0 | 0 | 41,9 | 25,6 |
| 44 | Niamey-Aéroport | 0 | 0 | 42,2 | 30,0 |
| 45 | Nouakchott | 0 | 0 | 36,6 | 21,2 |
| 46 | Ouagadougou | 10 | 3 | 38,7 | 27,3 |
| 47 | Plaisance | 75 | 7 | 27,0 | 20,8 |
| 48 | Sal | 0 | 0 | 24,7 | 20,0 |
| 49 | Setse Khama Intl Aéro | 0 | 0 | - | 6,8 |
| 50 | Seychelles | 64 | 5 | 31,7 | 26,8 |
| 51 | Tamanrasset | 0 | 0 | 33,4 | 18,5 |
| 52 | Toalagnaro | 30 | 5 | 26,1 | 19,1 |
| 53 | Tombouctou | 0 | 0 | 42,0 | 27,2 |
| 54 | Tripoli | 0 | 0 | 31,2 | 17,6 |
| 55 | Tunis | 2 | 2 | 26,5 | 16,5 |
| 56 | Windhoek | 5 | 1 | 24,3 | 9,6 |
| 57 | Zinder | 0 | 0 | 40,4 | 25,8 |

NOTE: **0** means no rain;

**-** means no temperature data available Data Source: ACMAD / GTS

## 3.OUTLOOK FOR DEKAD (01st – 10th JUNE, 2009)

### 3.1 RAINFALL

The ITD will move northwards maintaining moisture influx and rainfall increase over Gulf of Guinea countries, southern part of the Sahel and northern parts of central Africa countries. There will be rainfall decrease over parts of GHA countries with significant decrease over southern Africa countries (Figure 5). In summary**:**

- **North Africa countries:** will experience rainfall increase amounts ranging from 10mm to 100mm.
- **The Sahel:** will continue to experience increasing temperatures with rainfall increase recording amounts ranging from 10mm to 100mm over parts of the Sahel countries.
- **Gulf of Guinea countries:** will experience rainfall increase recording amounts ranging from 10mm to 150mm with isolated peaks ranging from about 200mm to 300mm.
- **Central Africa countries:** will experience slight rainfall decrease recording amounts ranging from 10mm to 100mm with peaks ranging from about 150mm to 250mm.
- **GHA countries:** will record rainfall decrease with amounts ranging from 10mm to 100mm with peaks ranging from about 150mm to 200mm.
- **Southern Africa countries:** will experience significant rainfall decrease recording amounts ranging from 10mm to 50mm with isolated peaks of about 100mm.

### 3.2 TEMPERATURE

The forecast in Figure 6, 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 7 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 increase include parts of Gulf of Guinea, parts of the Sahel and central Africa 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 (high humidity) 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, parts of the Sahel, central Africa, parts of GHA countries and Madagascar with high humidity/rainfall coupled with the 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 health care 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, West Africa, central Africa, and southern Africa countries respectively.

**African Ecosystems:** Call for rehabilitation of our presently degraded rainfall catchments areas and forests 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 high priority.

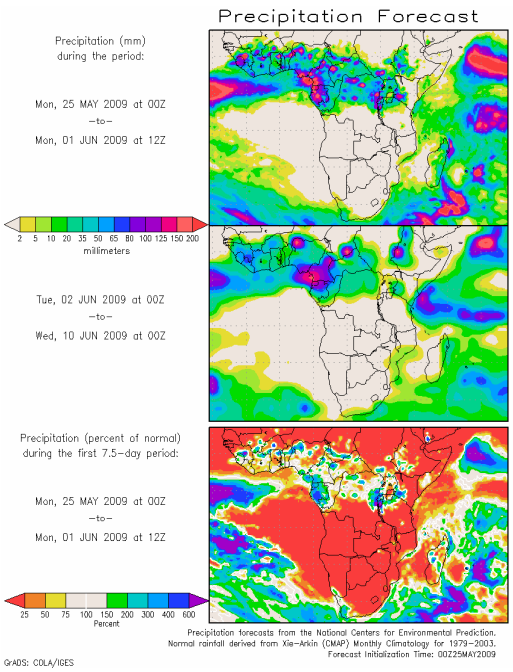


**Figure 5: Precipitation forecast, Source : COLA**

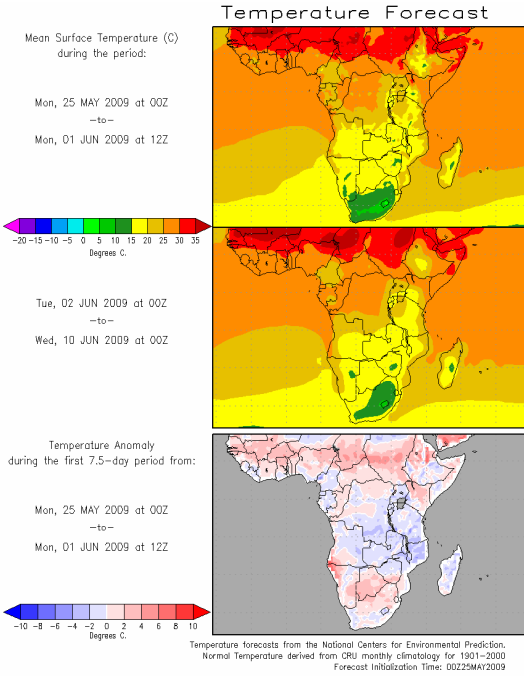


**Figure 6 : Temperature forecast Source : COLA**

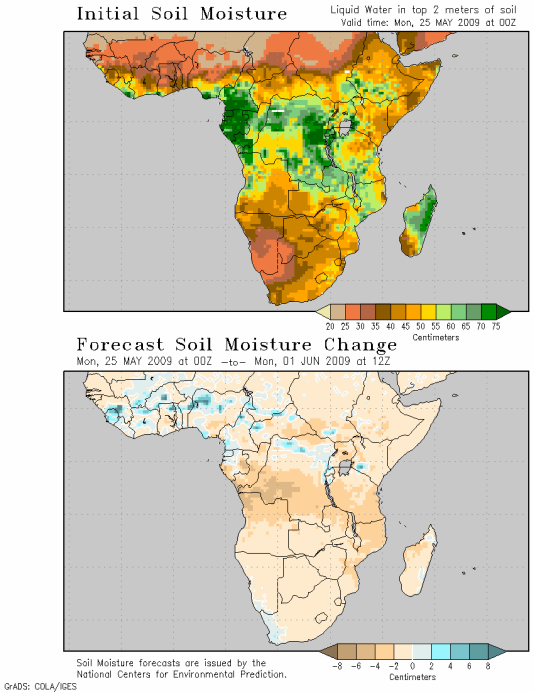


**Figure 7 : Soil moisture forecast, Source: COLA**

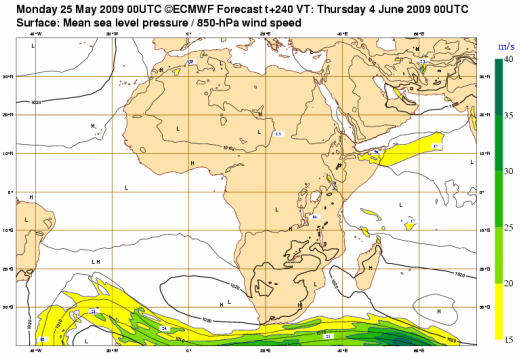


**Figure 8 : Mean sea Level pressure forecast**

**Source : ECMWF**