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

Ten Day Climate Bulletin
N° 32 Year 2009

Dekad of 11 to 20 November, 2009

HIGHLIGHT: Heaviest cumulative rainfall amounts were recorded over Maputo in Mozambique, Manzini in Swaziland, Durban in South Africa, Douala in Cameroon and Libreville in Gabon.

1. GENERAL SITUATION

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

1.1 SURFACE

- **Azores high:** Pressure of 1022hPa with an NW-SE axis weakened significantly by 9hPa and shifted northwest compared to the previous dekad. Its mean position was located at about 35°N and 45°N west of 50°W, extending a ridge over north pacific ocean.

- **Libyan high:** Pressure of 1023hPa was centered at 32°N/11°E with an extended ridge over north-est Niger and north Chad

- **St. Helena high:** Pressure of 1027 hPa with an NW-SE axis strengthened significantly by 6hPa and shift southeast compared to the past dekad . Its mean position was at 32°S/05°E with an extended ridge over South Atlantic Ocean.

- **Mascarene high:** Pressure of 1023 hPa with a W-E axis weakened by 2hPa compared to the previous dekad and shifted northeast. Its mean position was located at 27°S/85°E with an extended ridge over Indian Ocean.

- **Saharan Thermal Low:** Pressure at 1009 hPa filled up by 2hPa and shifted southeast compared to the previous dekad. Its mean position was located at 10°N/18°E with an extended trough over southeast Chad and northeast Sudan.

- **Thermal Low :** Pressure of 1008hPa over Southern Africa had a centre at 20°S/22°E with extended trough over Namibia, Botswana up to South Africa.

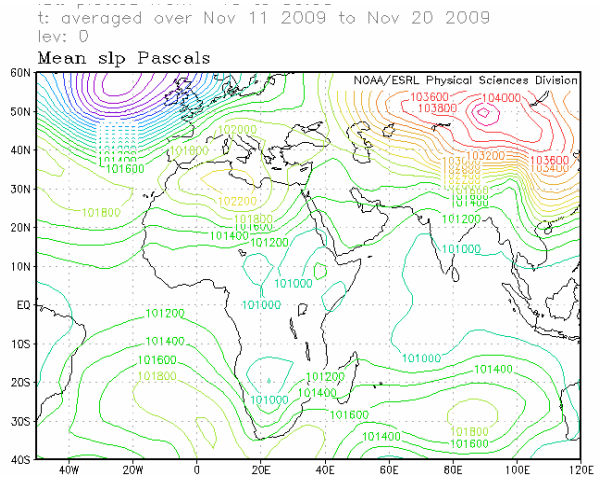

Figure 1: Mean Sea Level Pressure (Source: NOAA/NCEP/ESRL: PSD)

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- **Inter-Tropical Discontinuity (ITD):** Between the first dekad (blue) and second dekad (black) of November, 2009 in (Figure 2), the ITD had a mean southwards displacement over the Sahel with maximum displacement of about 400Km over its central part including Mali and Burkina Faso.

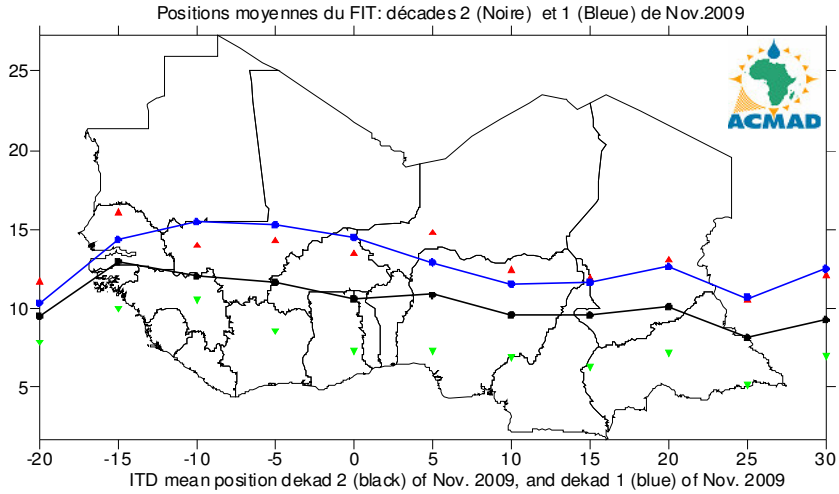

Figure 2: The red and green triangles represent the max. and min. displacements of the ITD respectively

1.2 TROPOSPHERE

1.2.1 Monsoon

Monsoon influx at 925hPa level was not significant over the sub-region.

1.2.2 Thermal Index (TI)

In second dekad of November, 2009, the thermal index (TI) regime at 300hPa in (figure 3), had TI regime value of 242°K covering Gulf of Guinea countries, Central Africa, GHA countries and northern part of southern Africa countries. The highest 242.5°K near threshold value of 243°K for heavy rains associated with floods covered extreme eastern part of Gulf of Guinea countries, southern part of central Africa and most of GHA countries characterized by heavy rains resulting in floods over areas with high relative humidity shown in Figure 4.

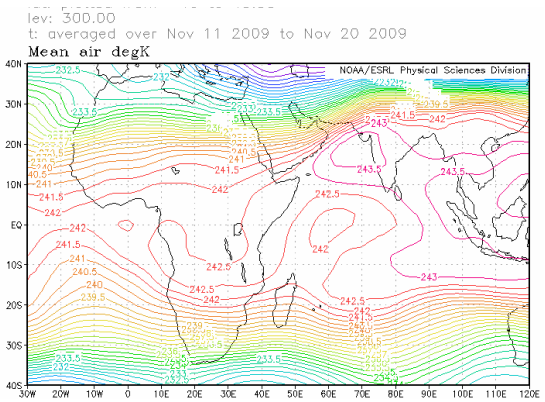

Figure 3: TI at 300hPa
(Source: NOAA/NCEP/ESRL: PSD)

1.2.3 Relative Humidity (RH)

The 850hPa (Figure 4) shows high RH (>70%) in the second dekad of November, 2009 over southern part of Gulf of Guinea countries, eastern central Africa and western part of GHA countries. The Sahara, the Sahel and southern Africa countries experienced dry conditions characterized by the lowest RH (40%).

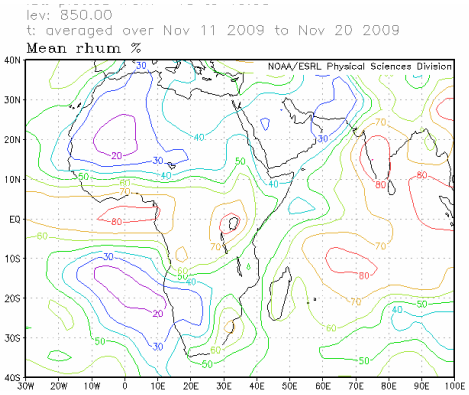

Figure 4 : RH at 850hPa
(Source: NOAA/NCEP/ESRL: PSD)

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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 in Figure 5 below shows rainfall distribution decrease over the north Africa, Gulf of Guinea, the Sahel and GHA countries while rainfall distribution and amount increased over Central Africa and Southern Africa countries. In detail:

- **North Africa countries:** had significant rainfall decrease, with no significant amounts of rainfall.
- **The Sahel:** remained dry and dusty with no significant amounts. However, most of the Sahel is under the Harmattan characterized by dry and dusty conditions.
- **Gulf of Guinea countries:** experienced persistent rainfall distribution decrease with amounts ranging from 10mm to 200mm with maxima ranging between 200mm to 300mm over western Côte d'Ivoire and eastern Nigeria/western Cameroon.
- **Central Africa countries:** observed rainfall distribution increase with amounts ranging from 10mm to 200mm with peaks ranging from 200mm to 400mm over northeast Democratic Republic of Congo, Congo, Gabon and Equatorial Guinea.
- **GHA countries:** experienced significant decrease in rainfall distribution with estimated rainfall amounts ranging from 10mm to 150mm over the western part.
- **Southern Africa countries:** continued to get an increase in rainfall with amounts ranging from 10mm to 100mm with a peak of about 150mm over northeast South Africa, south Mozambique and Zambia.

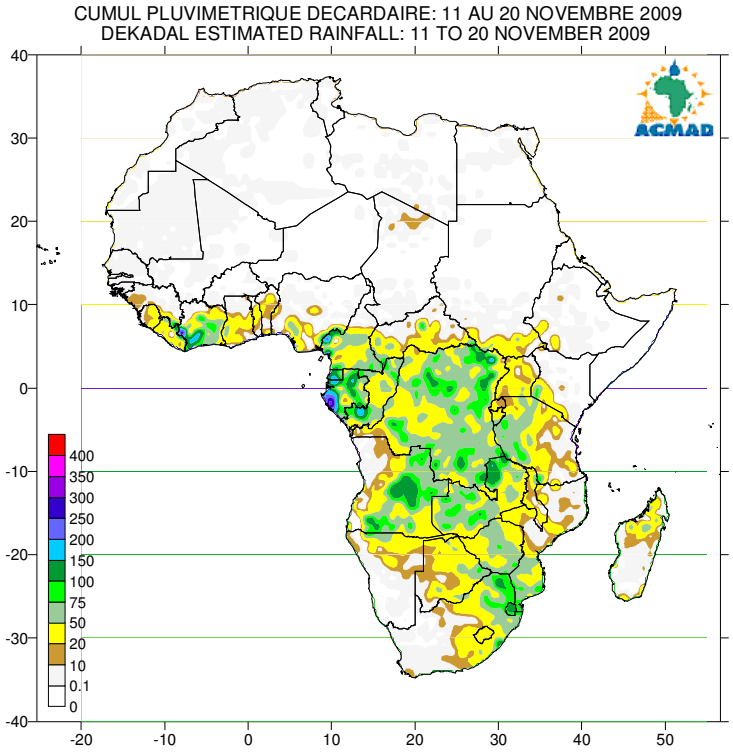

Figure 5 : Estimated precipitations, (Data Source: NOAA/NCEP)

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2.2 OBSERVED DATA

The Table below shows heaviest cumulative rainfall recorded over Maputo in Mozambique, Manzini in Swaziland, Durban in South Africa, Douala in Cameroon and Libreville in Gabon. The highest temperatures of 46.2°C were recorded over N'Djamena in Chad while the lowest temperature of 7.3°C was recorded over Addis Ababa in Ethiopia.

N°	STATIONS	Precipitations (mm)	Number of rainy days	Temperature maxi mean (°C)	Temperature min mean (°C)
1	Abidjan	54	4	33,1	25,0
2	Abuja	0	0	32,4	-
3	Accra	0	0	31,5	24,9
4	Addis Abéba	0	0	23,6	7,3
5	Agadez	0	0	32,7	19,6
6	Alger(Dar El Beida)	0	0	26,9	9,0
7	Antananarivo	8	3	28,3	15,2
8	Antsiranana	0	0	33,2	22,9
9	Bamako-Senou	0	0	34,6	15,6
10	Bangui	0	0	-	19,9
11	Banjul	0	0	32,2	19,6
12	Beira	39	4	30,0	22,6
13	Bilma	0	0	32,1	14,8
14	Bobo Dioulasso	0	0	33,9	19,8
15	Brazzaville	35	6	30,8	22,5
16	Casablanca	0	0	25,5	15,5
17	Cotonou	7	1	31,7	25,3
18	Dakar-Yoff	0	0	30,6	23,3
19	Dar-es-Salaam	1	1	32,7	23,7
20	Douala	106	2	31,3	23,1
21	Durban	110	8	23,0	16,9
22	Francistown	27	4	30,3	18,1
23	Harare	13	3	26,2	15,9
24	Johannesbourg	85	7	22,0	12,3
25	Khartoum	0	0	34,4	21,0
26	Kigali	0	0	26,4	16,6
27	Kigoma	25	3	26,8	20,7
28	Le Caire	0	0	23,7	15,7
29	Le Cap	4	2	20,1	13,0
30	Libreville	105	7	29,0	23,9
31	Lomé	12	1	33,2	24,9
32	Lusaka	52	4	28,8	17,1
33	Manzini	178	8	-	14,9
34	Maputo	147	6	26,3	19,4
35	Maseru	48	2	-	10,6
36	Maun	56	5	34,2	19,9
37	Mbeya	19	1	25,3	-
38	Nairobi	12	1	-	16,3
39	Nampula	2	1	34,1	21,2
40	Ndele (RCA)	4	1	-	-
41	N'Djamena	0	0	36,2	19,4
42	Niamey-Aéroport	0	0	36,1	22,3
43	Nouakchott	0	0	34,2	21,4
44	Ouagadougou	0	0	35,5	21,0
45	Plaisance	99	6	27,8	22,2
46	Sal	0	0	28,5	23,0
47	Seretse Khama- Aéro	7	1	28,1	17,0
48	Seychelles	0	0	30,2	25,9
49	Tamanrasset	0	0	26,1	11,2
50	Toalagnaro	43	5	27,2	19,9
51	Tombouctou	0	0	33,9	18,2
52	Tripoli	0	0	24,3	9,7
53	Tunis	0	0	24,0	10,6
54	Windhoek	0	0	32,1	14,8
55	Zinder	0	0	33,7	19,5

Source of data : ACMAD/GTS

NOTE : 0 signifie : pas de précipitations
- signifie : données manquantes ou incomplètes.

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3. OUTLOOK FOR DEKAD (01st - 10th DECEMBER, 2009)

3.1 RAINFALL

The ITD will be expected to move significantly southward due to the intensification of Azores and Libyan highs resulting in strengthened harmattan associated with dusty and dry conditions with low temperatures over the Sahel countries and northern parts of the Gulf of Guinea countries. The convective rainfall activities will decrease significantly over Gulf of Guinea countries, but intensify over central Africa and western GHA countries. Rainfall deficits will continue over northern Africa , western parts of southern Africa countries with the eastern parts getting light rainfall amounts. In detail**:**

- **North Africa countries:** will experience significant decrease in rainfall amounts ranging from 10mm to 75mm.

- **The Sahel:** will experience dry conditions characterized by low temperatures and dust episodes associated with harmattan.

- **Gulf of Guinea countries:** will experience rainfall decrease recording amounts ranging from 10mm to 75mm with isolated peaks of 100mm and above.

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

- **GHA countries:** will have rainfall increase over western parts observing amounts ranging from 20mm to 200mm with maxima peaks of 250mm to 300mm and above.

- **Southern Africa countries:** will get rainfall amounts ranging from 10mm to 75mm with peaks of about 100mm over limited parts.

3.2 TEMPERATURE

The forecast in Figure 7, shows general decrease in temperature in the Sahel and parts of GHA countries with an increase in the southern Africa countries. The highest forecast temperatures ranging from 20°C to 35°C will cover more than 70% of the Continent.

3.3 SOIL MOISTURE

The outlook on soil moisture change, maps shown in Figure 8 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 high soil moisture change include southern parts of central Africa countries and Madagascar among southern Africa 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, central Africa, parts of GHA including eastern parts of southern Africa 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 Harmattan dust episodes are expected resulting in increased cases of meningitis over the Sahel countries and parts of the Gulf of Guinea countries. 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 prediction products and information into agricultural production and food security is of crucial importance. We have emphasized on the importance of skilful 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 the countries. It is imperative to carry out cost benefit analysis on 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

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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 forecasts, for example those issued by regional climate outlook fora (RCOF), the GHACOF, PRESAO, PRESAC, and SARCOF for Greater Horn of Africa (GHA), West Africa/Chad/Cameroon, central Africa, and southern Africa countries respectively. The parts of GHA countries will continue to experience rainfall anomalies at the peak of El Niño in December, 2009. Rain harvesting is recommended particularly in the Arid and Semi-Arid Lands (ASLS) to alleviate high water demand after cessation of seasonal rainfall.

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 practices in ecosystems rehabilitation include national tree planting during rainy season 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 for sustainable development and the achievement of the United Nations millennium development goals (MDGs). The countries have to invest in environmental conservation now for better tomorrow.

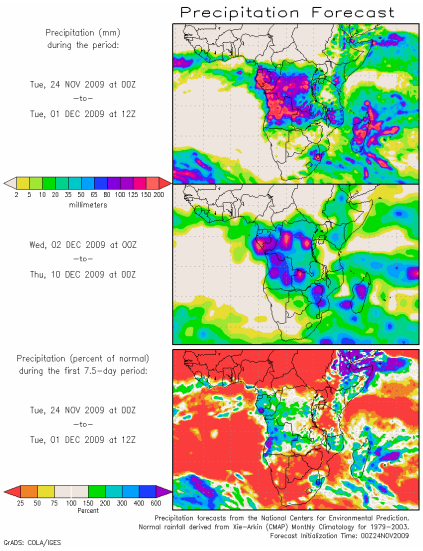

Figure 6 : Precipitation forecast, Source : COLA

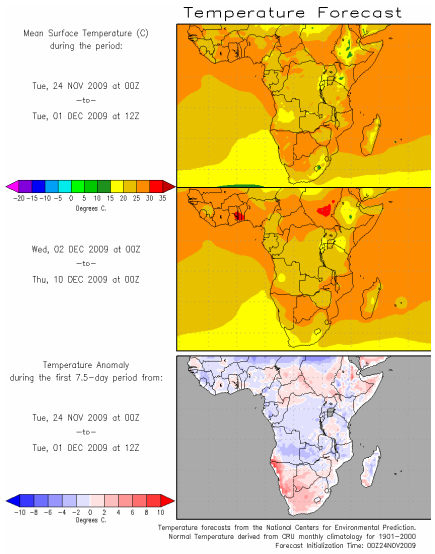

Figure 7 : Temperature forecast Source : COLA

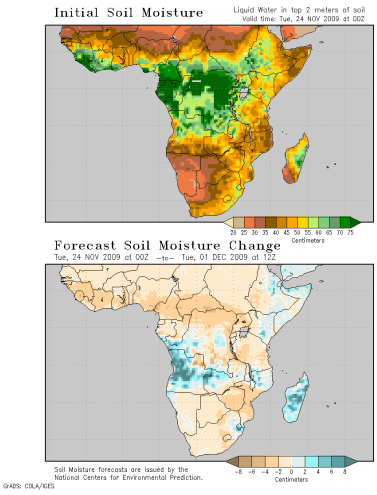

Figure 8 : Soil moisture forecast, Source: COLA

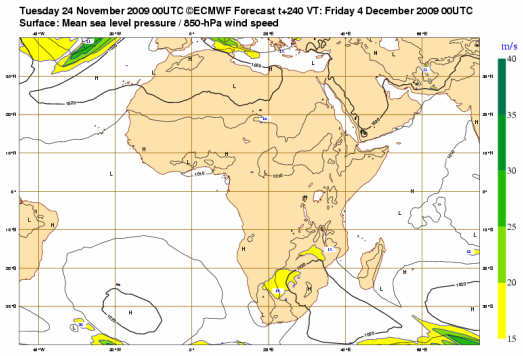

Figure 9 : Mean Sea Level pressure forecast
Source : ECMWF

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