Ten Day Climate Bulletin
N° 35
Dekad 11 to 20 of December, 2009

HIGHLIGHT : The significant weakening of the Azores High by 8 hPa resulted in northward shifting of ITD that brought slight increase in rainfall over southern parts of the Gulf of Guinea countries. The heaviest cumulative rainfall amounts were recorded over Libreville in Gabon and Seychelles.

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 1019hPa weakened significantly by 8 hPa and shifted southwest compared to the previous dekad. Its mean position was observed west of 50°W between 20°N to 30°N extending a ridge over North Atlantic Ocean.

- **Saharan Thermal Low:** Pressure at 1009 hPa maintained its intensity and shifted north compared to the previous dekad. Its mean position was located at 10°N/20°E with an extended trough over south Chad and south Sudan.

- **St. Helena high:** Pressure of 1019 hPa with an SE-NW axis weakened significantly by 7 hPa and shifted northwest compared to the past dekad. Its mean position was at 38°S/05°E with an extended ridge over South Atlantic Ocean.

- **Mascarene high:** Pressure of 1024 hPa with a W-E axis weakened slightly by 1hPa compared to the previous dekad and shifted southwest. Its mean position was located at 36°S/88°E with an extended ridge over Indian Ocean.

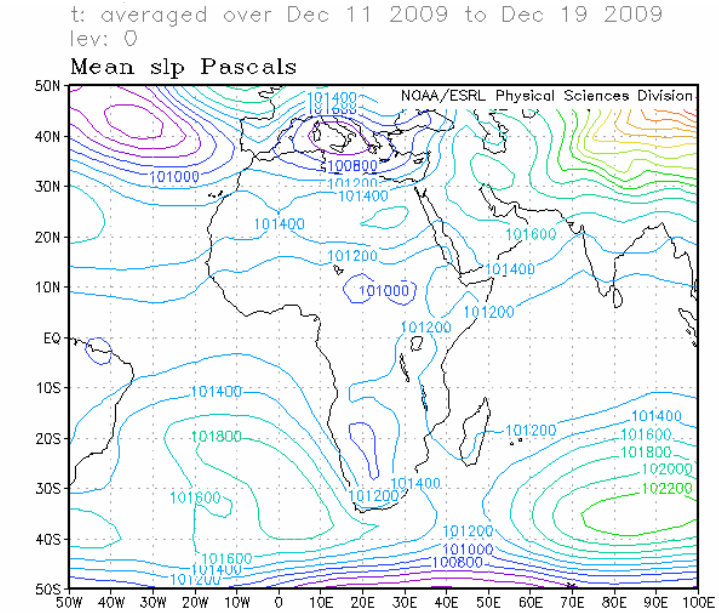

Figure 1: Mean Sea Level Pressure (Source: NOAA/NCEP/ESRL: PSD)

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Inter-Tropical Discontinuity (ITD): Between the first dekad (blue) and second dekad (black) of December, 2009 in (Figure 2), the ITD had a northward mean displacement of 100km over the Gulf of Guinea countries with maximum of 300km over extreme west. However, over the extreme east the ITD had weak fluctuations.

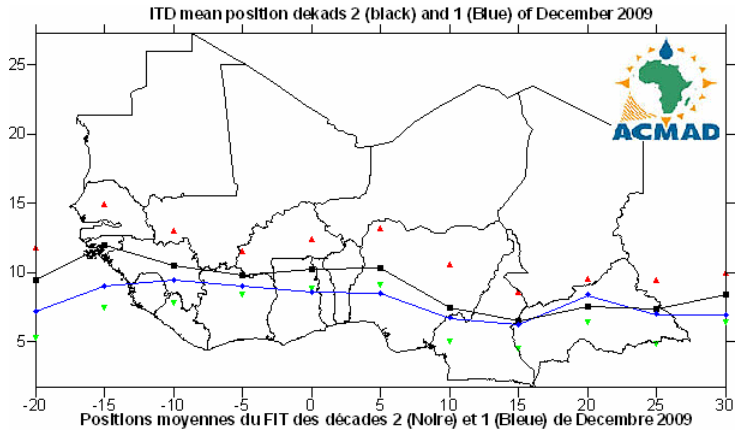

Figure 2: The red and green triangles represent the max. and min. displacements of the ITD respectively

1.2 TROPOSPHERE

1.2.1 Monsoon

Monsoon influx at 925hPa level was weak over southern Cameroon during the dekad.

1.2.2 Thermal Index (TI)

In the second dekad of December, 2009, the thermal index (TI) regime at 300hPa in (figure 3), had isotherm value of 242°K covering extreme south of Gulf of Guinea countries, Central Africa, GHA and northern part of Southern Africa countries. The maximum threshold value of 243°K covered extreme western part of central Africa countries and was associated with heavy rains and floods over the area characterized by high relative humidity in Figure 4.

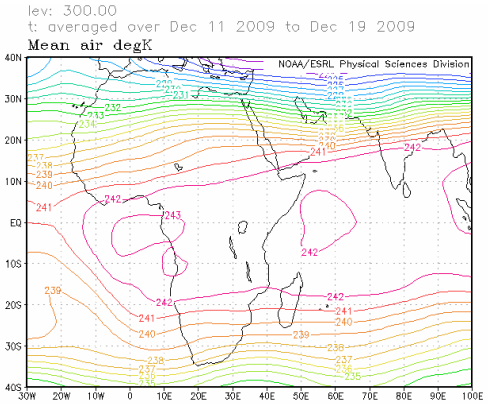

Figure 3: TI at 300hPa
(Source: NOAA/NCEP/ESRL: PSD)

1.2.3 Relative Humidity (RH)

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

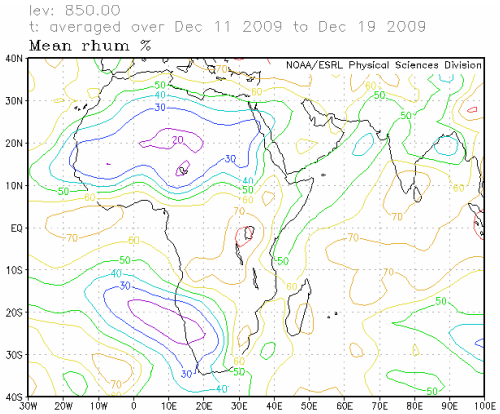

Figure 4 : RH at 850hPa
(Source: NOAA/NCEP/ESRL: PSD)

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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 compared to that of the past dekad shows slight rainfall distribution decrease over Southern Africa, while rainfall distribution increased slightly over GHA and Northern Africa countries. Over the Sahel and Central Africa there is no significant change in rainfall distribution and amount. In detail:

- **North Africa countries:** had slight increase in rainfall distribution and amounts observing amounts ranging between 10mm and 50mm with localized peaks ranging between 50 to 100mm over northern Morocco.
- **The Sahel:** continued to experience dry and dusty conditions under the influence of the Harmattan.
- **Gulf of Guinea countries:** experienced slight increase in rainfall distribution with amounts ranging from 10mm to 50mm with localized peaks of about 75 mm over southern Cote d'Ivoire.
- **Central Africa countries:** observed rainfall amounts ranging between 10mm to 150mm with peaks ranging from 150mm to 200mm over Democratic Republic of Congo, Angola, with intensification of about 300mm over Gabon.
- **GHA countries:** experienced slight increase in rainfall distribution with observed amounts ranging from 10mm to 100mm.
- **Southern Africa countries:** had spatial rainfall distribution decrease with amounts ranging from 10mm to 150mm intensifying over extreme northern Zambia with amounts of about 200mm.

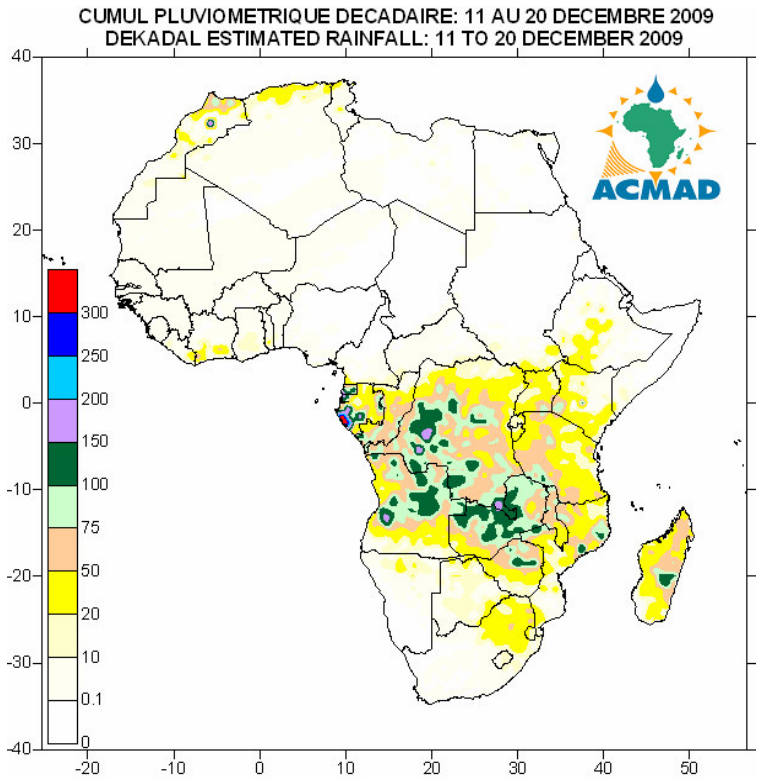

Figure 5 : Estimated precipitations, (Data Source: NOAA/NCEP)

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2.2 OBSERVED DATA

The Table below shows heaviest cumulative rainfall recorded over Seychelles and Libreville in Gabon. The highest temperature of 36.7°C was recorded at Windhoek in Namibia while the lowest temperature of 6.9°C was recorded at Alger (Dar El Beida) in Algeria.

N°	STATIONS	Precipitations (mm)	Number of rainy days	Temperature Max mean (°C)	Temperature Min mean (°C)
1	Abidjan	35	4	32,9	26,2
2	Abuja	0	0	35,6	18,4
3	Accra	0	0	32,1	25,4
4	Addis Abéba	0	0	-	11,0
5	Agadez	0	0	32,3	16,3
6	Alger(Dar El Beida)	68	5	16,7	6,9
7	Antananarivo	61	7	27,4	16,5
8	Antsiranana	11	4	33,1	24,1
9	Bamako-Senou	0	0	33,9	17,7
10	Bangui	0	0	33,9	19,6
11	Banjul	0	0	31,6	17,4
12	Beira	18	3	31,5	23,8
13	Bilma	0	0	30,7	8,8
14	Bobo Dioulasso	0	0	34,6	21,0
15	Brazzaville	37	4	31,1	23,5
16	Casablanca	52	6	20,2	12,8
17	Cotonou	0	0	31,9	26,5
18	Dakar-Yoff	0	0	26,8	20,9
20	Dar-es-Salaam	6	1	32,9	24,9
21	Durban	45	7	25,3	19,2
22	Entebbe	0	0	-	19,0
23	Francistown	1	1	31,9	18,6
24	Harare	2	2	29,2	16,6
25	Johannesbourg	81	6	25,6	15,0
26	Khartoum	0	0	31,7	17,5
27	Kigali	0	0	26,7	16,2
28	Kigoma	31	4	27,1	20,0
29	Kinshasa	0	0	31,3	22,6
30	Le Caire	0	0	21,9	14,4
31	Le Cap	3	1	22,1	14,3
32	Libreville	180	5	29,9	23,8
33	Lilongwe	0	0	-	17,5
34	Lomé	0	0	33,5	25,8
35	Lusaka	69	3	27,9	17,5
36	Manzini	17	4	-	18,5
37	Maputo	15	3	30,4	22,7
38	Maseru	0	0	-	12,6
39	Maun	24	2	34,6	20,5
40	Mbeya	60	5	25,2	14,9
41	Nairobi	4	2	27,9	14,7
42	Nampula	77	4	33,0	22,4
43	Ndele (RCA)	0	0	34,8	13,8
44	N'Djamena	0	0	36,2	16,1
45	Niamey-Aéroport	0	0	36,0	20,1
46	Nouakchott	0	0	30,2	18,1
47	Ouagadougou	0	0	35,2	20,7
48	Plaisance	8	7	30,3	23,7
49	Sal	0	0	27,1	20,5
50	Seretse Khama- Aéro	34	3	31,5	18,6
51	Seychelles	188	7	31,9	25,8
52	Tamanrasset	0	0	22,6	7,4
53	Tamanrasset	0	0	22,4	7,3
54	Toalagnaro	14	5	28,8	22,6
55	Tombouctou	0	0	31,7	15,8
56	Tripoli	2	1	21,6	10,1
57	Tunis	16	5	16,6	10,2
58	Windhoek	1	1	36,7	20,0
59	Zinder	0	0	33,7	17,6

NOTE:

E: **0** means no rain;

- means no temperature data avail able

Data Source: ACMAD / GTS

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

3.1 RAINFALL

The ITD will be expected to be quasi stationary with slight increase in harmattan intensity. Dry and dusty conditions will persist over the Sahel and northern parts of the Gulf of Guinea countries with slight rainfall increase over coastal zone, intensifying over northwest Africa, southern parts of central Africa, southern parts of GHA, northern and eastern parts of southern Africa countries. In detail**:**

- **North Africa countries:** will experience significant increase in rainfall amounts ranging from 10mm to 100mm with maxima peaks of 150mm and above.

- **The Sahel:** will continue to experience dry and dusty conditions under the influence of harmattan.

- **Gulf of Guinea countries:** will have slight increase in rainfall recording amounts ranging from 10mm to 75mm with localized peaks of about 100 mm over southern sector.

- **Central Africa countries:** will observe rainfall amounts ranging between 20mm to 150mm with peaks ranging from about 200mm to 300mm over Gabon, Angola and Democratic Republic of Congo.

- **GHA countries:** will have rainfall decrease over most parts observing amounts ranging from 10mm to 100mm intensifying over southwestern parts with peaks of about 150mm to 200mm.

- **Southern Africa countries:** will get rainfall amounts increase over northern and eastern parts recording amounts ranging from 10mm to 100mm with peaks of about 150mm to 250mm.

3.2 TEMPERATURE

The forecast in Figure 7, shows high temperature in the Gulf of Guinea, central Africa, GHA and parts of southern Africa countries. The high 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, major parts of central and southern GHA and northern parts of 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, GHA and 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 prevailing Harmattan dust will resulting in increased cases of meningitis over the Sahel countries and 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 and cessation dates including 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 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

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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 forums (RCOFs), the GHACOF, PRESAO, PRESAC, and SARCOF for Greater Horn of Africa (GHA), West Africa countries/Chad/Cameroon, central Africa, and southern Africa countries respectively.

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 and management 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 to 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**.**

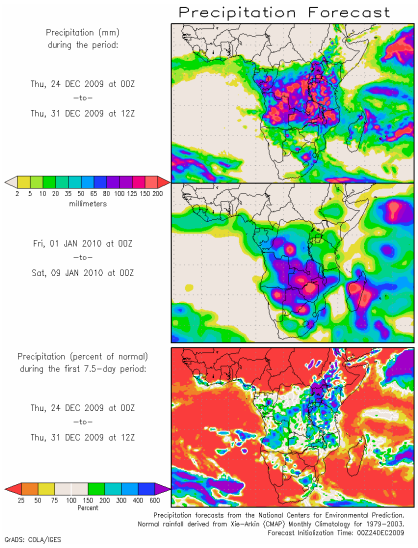

Figure 6 : Precipitation forecast, Source : COLA

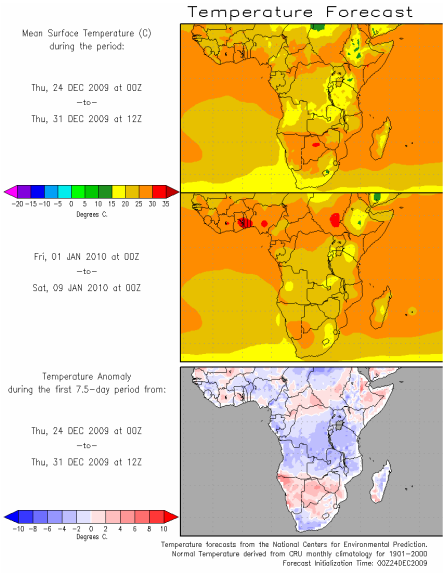

Figure 7 : Temperature forecast Source : COLA

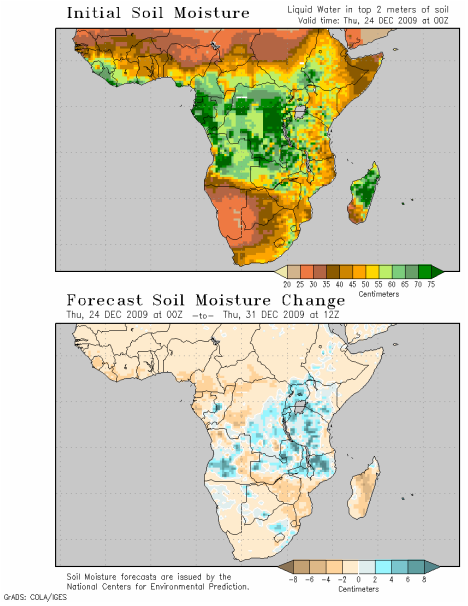

Figure 8 : Soil moisture forecast, Source: COLA

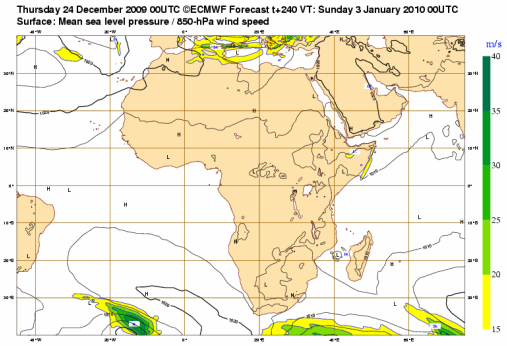

Figure 9 : Mean Sea Level pressure forecast
Source : ECMWF

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