Ten Day Climate Bulletin
N° 36
Dekad 21st to 31st December, 2009

HIGHLIGHT : The heaviest cumulative rainfall was recorded over Seychelles and Brazzaville in Congo while the estimated rainfall maximum of above 250mm was observed over central Tanzania. The highest mean maximum temperature of 36.3°C was recorded at Bamako-Senou in Mali while the lowest mena minimum temperature of 7.6°C was recorded at Bilma in Niger.

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 merged with a high pressure of 1020hPa located over the eastern coast of United State of America at about 35°N/80°W extending a ridge over off coast Morocco in the North Atlantic Ocean.
- **Libyan high:** pressure of 1023hPa centred at about 27N/19E extended a over central Niger, Northern Chad and Northwest Sudan.

- **Saharan Thermal Low:** Pressure at 1010 hPa centred over north Cameroon/south Chad filled slightly by 1hPa compared to the previous dekad. It had an extended trough over north Ghana, Togo, and Benin, south Nigeria, North Cameroon, south Chad and Sudan.

- **St. Helena high:** Pressure of 1023 hPa with an W-E axis strengthened by 4 hPa and shifted northwest compared to the past dekad. Its mean position was at 35°S/13°W with an extended ridge over South Atlantic Ocean.

- **Mascarene high:** Pressure of 1023 hPa with a W-E axis weakened slightly by 1hPa compared to the previous dekad and shifted northwest. Its mean position was located at 32°S/85°E with an extended ridge over Indian Ocean.

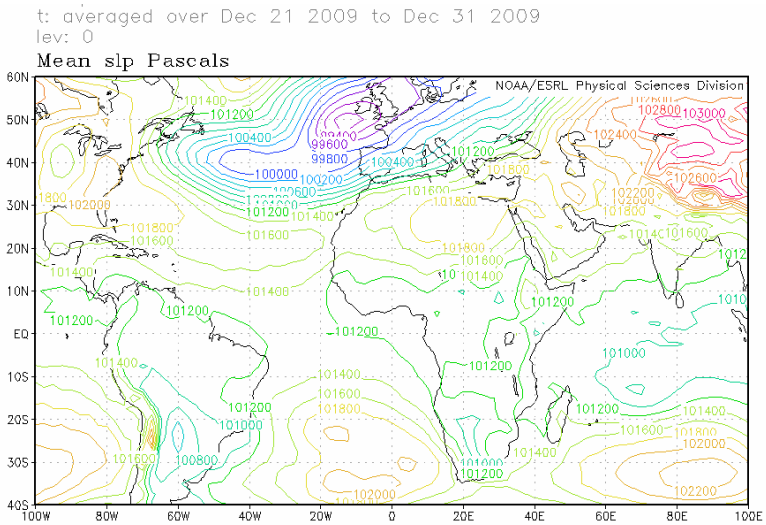

Figure 1: Mean Sea Level Pressure (Source: NOAA/NCEP/ESRL: PSD)

Direction Générale ACMAD, BP 13184, 85 Avenue des Ministères, Niamey - Niger
Tél. (227) 20 73 49 92, Fax : (227) 20 72 36 27, E-mail : dgacmad@acmad.ne, Web : http://www.acmad.org

Inter-Tropical Discontinuity (ITD): Between the second dekad (blue) and third dekad (black) of December, 2009 in (Figure 2), the ITD had a southward mean displacement of 100km over the Gulf of Guinea countries with maximum of 200km over extreme eastern part of Central African Republic (Figure2)..

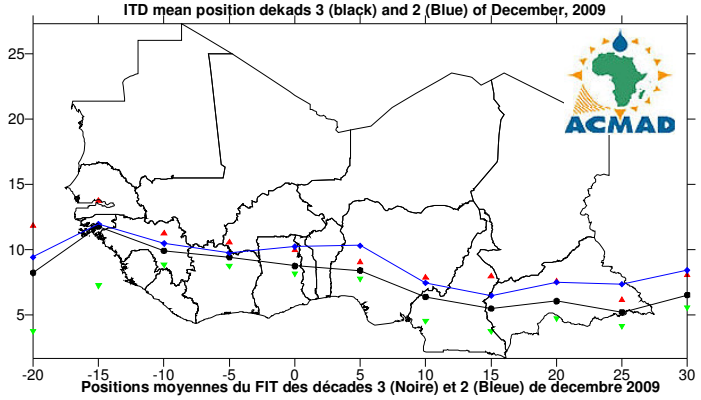

Figure 2: The red and green triangles represent the max. and min. displacements of the ITD respectively

1.2 TROPOSPHERE

1.2.1 Monsoon

Monsoon influx at 925hPa level was weak over Liberia, southeast Côte d'Ivoire and south Cameroon during the dekad.

1.2.2 Thermal Index (TI)

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

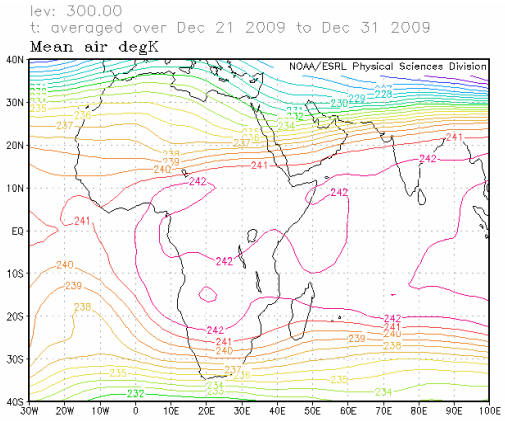

Figure 3: TI at 300hPa
(Source: NOAA/NCEP/ESRL: PSD)

1.2.3 Relative Humidity (RH)

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

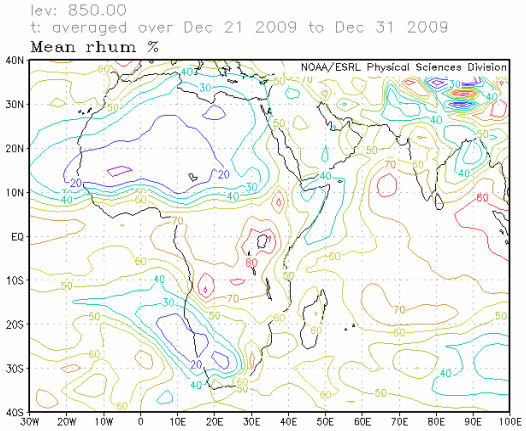

Figure 4 : RH at 850hPa (Source: NOAA/NCEP)

Direction Générale ACMAD, BP 13184, 85 Avenue des Ministères, Niamey - Niger
Tél. (227) 20 73 49 92, Fax : (227) 20 72 36 27, E-mail : dgacmad@acmad.ne, Web : http://www.acmad.org

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 amounts increase over Northern Africa and GHA countries. Over the rest of the continent there is no significant change in rainfall distribution and amount. In detail:

- **North Africa countries:** had increase in rainfall distribution and amounts observing amounts ranging between 10mm and 200mm over Northern Morocco and Algeria with localized peaks ranging from about 250mm to 300mm.

- **The Sahel:** continued to experience dry and dusty conditions under the influence of the Harmattan.

- **Gulf of Guinea countries:** There is no significant change in rainfall distribution and amounts compared to the previous dekad. Estimated rainfall amounts ranging from 10mm to 50mm with localized peaks of about 75 mm over southern Cote d'Ivoire, Ghana and Liberia were observed.

- **Central Africa countries:** observed rainfall amounts ranging between 10mm to 150mm with peaks ranging from 150mm to 250mm over Democratic Republic of Congo, Angola and Gabon.

- **GHA countries:** experienced significant increase in rainfall amounts with observed amounts ranging from 10mm to 150mm intensifying to about 300mm over Tanzania, Kenya and Great Lakes countries.

- **Southern Africa countries:** had rainfall amounts ranging from 10mm to 100mm intensifying over extreme northern Zambia, northern Namibia, northern Mozambique, Malawi and northwestern Madagascar with amounts of about 150mm.

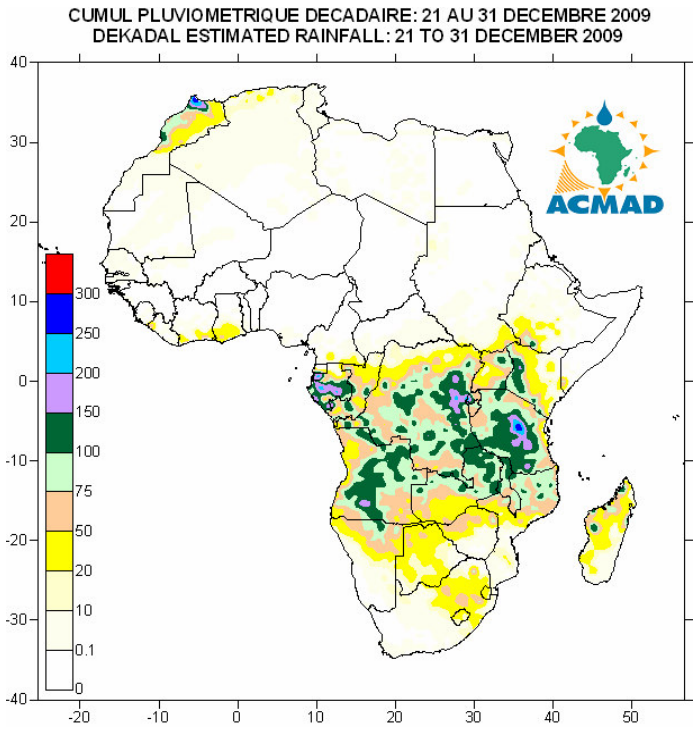

Figure 5 : Estimated precipitations, (Data Source: NOAA/NCEP)

Direction Générale ACMAD, BP 13184, 85 Avenue des Ministères, Niamey - Niger
Tél. (227) 20 73 49 92, Fax : (227) 20 72 36 27, E-mail : dgacmad@acmad.ne, Web : http://www.acmad.org

2.2 OBSERVED DATA

The Table below shows heaviest cumulative rainfall recorded over Seychelles and Brazzaville in Congo. The highest mean maximum temperature of 36.3°C was recorded at Bamako-Senou in Mali while the lowest mean minimum temperature of 7.6°C was recorded at Bilma in Niger.

N°	STATIONS	Précipitations (mm)	Nombre de jours de pluie	Température maxi moyenne (°C)	Température mini moyenne (°C)
1	Abidjan	94	1	32,8	26,7
2	Abuja	0	0	36,0	16,8
3	Accra	44	1	32,8	25,7
4	Addis Abéba	0	0	-	10,8
5	Agadez	0	0	32,4	15,3
6	Alger (Dar El Beida)	26	4	23,2	11,0
7	Antananarivo	0	0	27,3	16,3
8	Antsiranana	8	5	33,3	23,4
9	Bamako-Senou	0	0	36,3	13,8
10	Bangui	0	0	34,0	19,3
11	Banjul	0	0	35,3	16,3
12	Beira	0	0	32,7	25,0
13	Bilma	0	0	31,4	7,6
14	Bobo Dioulasso	0	0	35,3	21,3
15	Brazzaville	101	5	30,7	22,9
16	Casablanca	83	6	21,5	15,9
17	Cotonou	0	0	32,0	26,1
18	Dakar-Yoff	0	0	26,8	20,9
19	Dar-es-Salaam	0	0	33,2	25,0
20	Durban	22	9	26,6	20,4
21	Francistown	0	0	35,1	19,5
22	Harare	47	3	-	17,2
23	Johannesbourg	45	4	27,1	15,8
24	Khartoum	0	0	31,1	17,4
25	Kigali	0	0	25,7	16,8
26	Kigoma	9	2	27,7	20,2
27	Kinshasa	0	0	-	22,0
28	Le Caire	0	0	22,6	14,3
29	Le Cap	0	0	21,9	14,3
30	Libreville	71	5	29,9	24,3
31	Lilongwe	0	0	-	17,5
32	Lomé	0	0	33,9	26,1
33	Lusaka	20	5	28,7	17,9
34	Manzini	19	2	-	18,7
35	Maputo	1	1	35,6	24,0
36	Maseru	99	1	-	13,7
37	Maun	28	5	32,9	21,7
38	Mbeya	47	5	22,2	15,2
39	Nairobi	84	4	26,5	15,0
40	Nampula	65	5	33,5	22,2
41	N'Djamena	0	0	34,7	14,9
42	Niamey-Aéroport	0	0	35,4	17,7
43	Nouakchott	0	0	32,6	18,6
44	Ouagadougou	0	0	36,0	16,5
45	Plaisance	88	10	29,9	24,0
46	Seretse Khama- Aéro	32	1	33,2	19,5
47	Seychelles	119	9	30,9	24,9
48	Tamanrasset	0	0	28,0	10,4
49	Tamanrasset	0	0	22,4	7,3
50	Toalagnaro	0	0	31,9	24,4
51	Tombouctou	0	0	35,7	14,9
52	Tripoli	0	0	26,4	12,1
53	Tunis	2	1	22,8	11,5
54	Windhoek	8	2	34,6	18,9
55	Zinder	0	0	31,9	16,0

NOTE: **0** means no rain;
- means no temperature data avail able

Data Source: ACMAD / GTS

Direction Générale ACMAD, BP 13184, 85 Avenue des Ministères, Niamey - Niger
Tél. (227) 20 73 49 92, Fax : (227) 20 72 36 27, E-mail : dgacmad@acmad.ne, Web : http://www.acmad.org

3. OUTLOOK FOR DEKAD (11st – 20th JANUARY, 2010)

3.1 RAINFALL

The ITD will be expected to have slight southward displacement and intensified harmattan. Dry and dusty conditions will persist over the Sahel and slight rainfall increase over extreme eastern coastal zone of the Gulf of Guinea countries, intensifying over north 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 some 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 rainfall decrease recording amounts ranging from 10mm to 75mm with localized peaks of about 100 mm over eastern coastal zone.

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

- **GHA countries:** will have rainfall decrease over northern sector with increase over parts south of Equator amounts ranging from 10mm to 100mm with peaks of about 150mm to 200mm.

- **Southern Africa countries:** will get rainfall increase over northern and eastern parts recording amounts ranging from 10mm to 150mm with peaks of about 200mm 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, northern and eastern parts of southern Africa countries, southern parts of GHA 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 emphasize on the importance effective applications of prediction products which include seasonal rainfall performance, onset and cessation 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 zones where the prevailing soil moisture is the major climate constraint on crop yield. The crop varieties that are higher yielding,

Direction Générale ACMAD, BP 13184, 85 Avenue des Ministères, Niamey - Niger
Tél. (227) 20 73 49 92, Fax : (227) 20 72 36 27, E-mail : dgacmad@acmad.ne, Web : http://www.acmad.org

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 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**.**

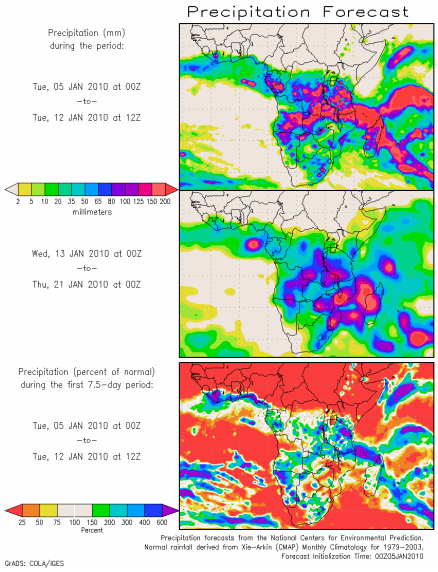

Figure 6 : Precipitation forecast, Source : COLA

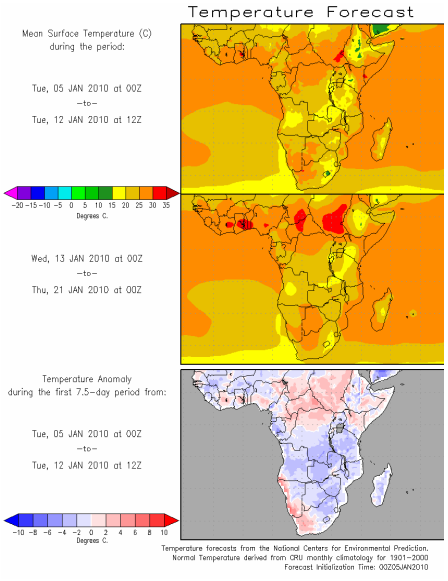

Figure 7 : Temperature forecast Source : COLA

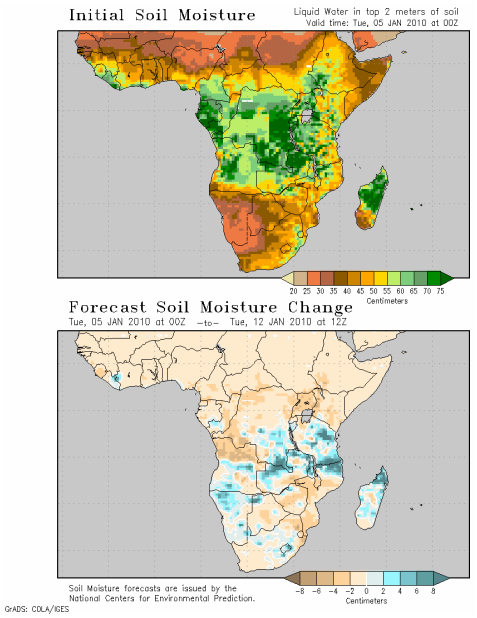

Figure 8 : Soil moisture forecast, Source: COLA

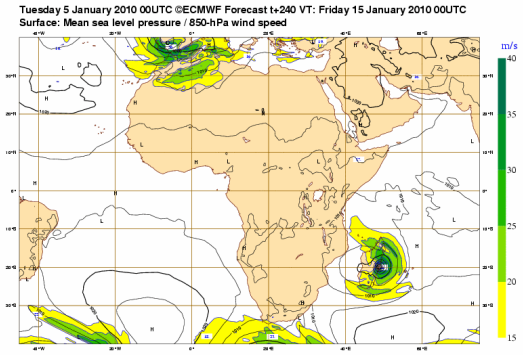

Figure 9 : Mean Sea Level pressure forecast
Source : ECMWF

Direction Générale ACMAD, BP 13184, 85 Avenue des Ministères, Niamey - Niger
Tél. (227) 20 73 49 92, Fax : (227) 20 72 36 27, E-mail : dgacmad@acmad.ne, Web : http://www.acmad.org

Direction Générale ACMAD, BP 13184, 85 Avenue des Ministères, Niamey - Niger
Tél. (227) 20 73 49 92, Fax : (227) 20 72 36 27, E-mail : dgacmad@acmad.ne, Web : http://www.acmad.org