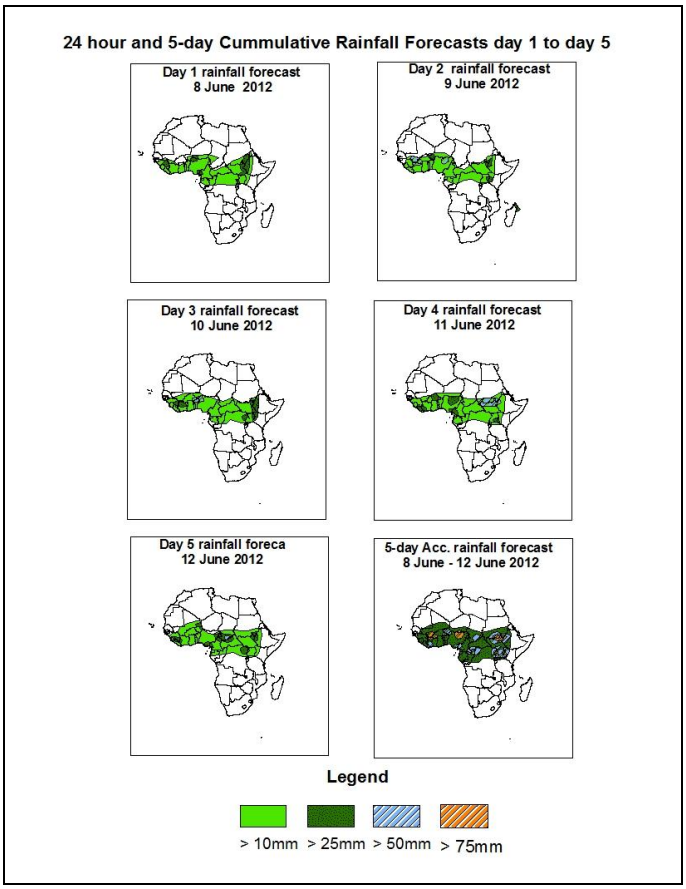
NCEP Contributions to the WMO Severe Weather Forecasting Demonstration Project (SWFDP) and to the African Monsoon Multidisciplinary Analysis (AMMA) Initiative

1.0. Rainfall Forecast: Valid 06Z of 8 June – 06Z of 12 June 2012, (Issued at 13:00Z of 7 June 2012)

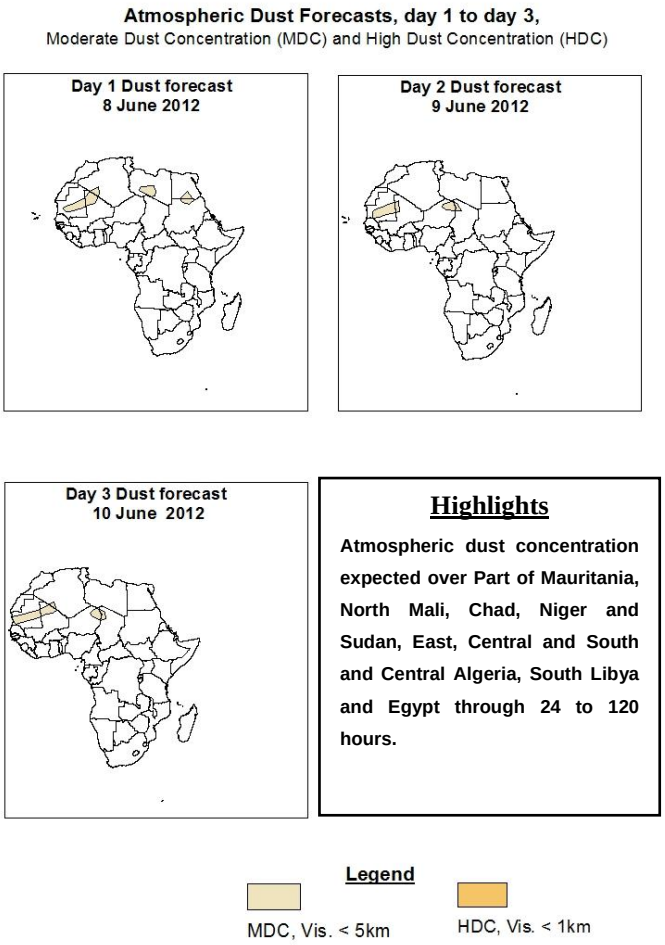
1.1. Twenty Four Hour Cumulative Rainfall Forecasts

The forecasts are expressed in terms of 75% probability of precipitation (POP) exceeded, based on the NCEP, UK Met Office and the ECMWF NWP outputs, the NCEP global ensemble forecasts system (GEFS) and expert assessment.



Summary

In the next five days, ITD is expected to fluctuate between latitude 13^{o}N and 20^{o}N within 24 to 120 hours; with significant monsoon inflow depth trough 72 to 120 hours. Also the TEJ, AEW, AEJ will be more less active with rainfall activities over Guinea Gulf Countries, Part of Sahel region, and horn of Africa, Uganda, Rwanda and Central Africa.



1.3. Model Discussion: Valid from 00Z of 7 June 2012

According to the GFS, ECMWF and UKMET models the heat lows are expected to shift Southward in the region between Southern Mauritania, Northern Mali, Niger, Sudan and Chad through 24 to 72 hours and tends to move Northwards within 96 to 120 hours.

According to GFS model, a thermal low over South Mauritania (1008hpa) through 24 to 48 hours is expected to decrease to 1005hpa in 72hours and (1004hpa) within 96 to 120 hours. The second low over East Mali, North Niger and Chad with a core value of 1007hpa in 24 hours is expected to slightly decrease from 1006hpa to 1005hpa through 48 to 72 hours and 1004hpa within 96 to 120 hours.

The ECMWF model shows a thermal low over South Mauritania (1007hpa) in 96 hours is expected to slightly decrease to 1006 in 120 hours. The second low over North Chad, Mali, Niger and Sudan (1007hpa) in 24 hours is expected to slightly decrease to 1007hpa through 48 to 96hours and 1006hpa within 120 hours.

The UKMET model shows a thermal low over South Mauritania (1008hpa) through 24 to 48 hours. The second low over North Mali, Niger, Chad and Sudan with a core value of 1008hpa in 24 hours is expected to slightly decrease to 1005hpa and 1003hpa through 48 to 72 hours and tends to slightly increase to 1004hpa within 96 to 120 hours.

According to the UKMET model, the St. Helena High pressure system over South Atlantic Ocean with a core value of 1030hpa in 24 hours is expected to fill up and its central pressure value tends to slightly increase to 1031hpa and 1032hpa through 48 to 72 hours and tends to decrease to 1029hpa within 96 to 120 hours. According to the ECMWF model, the central pressure value of 1029hpa in 24 hours tends to slightly increase from 1031hpa to 1032hpa through 48 to 72 hours and decrease to 1030hpa in 96 hours, then tends to increase to 1033hpa in 120 hours. According to the GFS model, the central pressure value of 1030hpa in 24 hours tends to slightly increase from 1031hpa to 1032hpa through 48 to 72 hours and decrease to 1030hpa in 96 hours, tends to increase to 1034hpa in 120 hours.

According to the GFS model, the Mascarene high pressure system over South Indian Ocean with its central pressure value of 1026hpa in 24 hours locate at longitude 70^{o}E and it is expected to increase to 1031hpa and 1034 through 48 to 72 hours by maintaining its position, then tends to decrease to 1031hpa in 96 hours by shifting Eastwards (about 80^{o}E) and finally decrease 1027hpa by maintaining the position around longitude 80^{o}E in 120 hours. According to the ECMWF model, the central pressure value of 1027hpa in 24 hours locate around longitude 70^{o}E is expected to maintain almost the same position by increasing its core value from 1031hpa to 1033hpa through 48 to 72 hours and tends to decrease from 1031hpa to 1029hpa within 96 to 120 hours by shifting Eastwards around longitude 80^{o}E. Lastly, according to the UKMET model of the Mascarene high pressure system over South Indian Ocean with its central pressure value of 1027hpa in 24 hours locate around longitude 70^{o}E is expected to maintain almost the same position by increasing its core value from 1031hpa to 1033hpa through 48 to 72 hours and tends to decrease from 1030hpa to 1028hpa within 96 to 120 hours by shifting Eastwards from longitude 74^{o}E to 80^{o}E.

At 925hpa level, zone of moderate dry Northerly and Northeasterly winds (20 to 50kts) are expected to prevail over Part of Mauritania, North Mali, Chad, Niger and Sudan,

East, Central and South and Central Algeria, South Libya and Egypt through 24 to 120 hours.

At the 850hpa level, a lower tropospheric wind convergence associated with significant West African Monsoon depth is expected to prevail over most parts of Western Africa between latitude 13^{o}N to 20^{o}N through 24 hours to 120 hours. The convergence associated with the meridional arm of the ITCZ is expected remain active across part of Uganda, Southern part of South Sudan Republic, North Tanzania, Western Kenya during 24 hours to 120 hours.

At 700hpa level, the African Easterly Jet (AEJ) with a core of 30 knots through 24 to 48 hours is expected to strengthen to 50knots in 72 hours and thereafter weakens to 30 knots within 96 to 120hours and will be located over South Senegal, Burkina Faso and Guinea Conakry, East, Central and West Nigeria, Togo, Benin, Ghana, Cote d`Ivoire, Part of Guinea Bissau, Liberia, Sierra Leone, Gambia, Southwest Mali. African Easterly Waves appears through 96 to 120 hours over Southwest Mali and Northern Cote d`Ivoire.

At 500hpa level, a wave appears over Central and South Nigeria, Part of Togo, Benin, Cote d`Ivoire, Guinea Conakry and Ghana, Southwest Mali through 24 to 120 hours.

At 150mb, the Sub-Tropical Westerly Jet still is prevailing over North Mali, Niger, Chad, Sudan and most Part of Mauritania, Algeria, Libya and Egypt with a maximum core of 65 Knots. However, the Tropical Easterly Jet with a maximum core of 30 to 40 Knots is extending from South Sudan Republic to South Guinea Gulf Countries through Central African Republic within 24 to 120 hours.

In the next five days, ITD is expected to fluctuate between latitude 13^{o}N and 20^{o}N within 24 to 120 hours; with significant monsoon inflow depth trough 72 to 120 hours. Also the TEJ, AEW, AEJ will be more less active with rainfall activities over Guinea Gulf Countries, Part of Sahel region, and horn of Africa, Uganda, Rwanda and Central Africa.

Atmospheric dust concentration expected over Part of Mauritania, North Mali, Chad, Niger and Sudan; South Algeria, Libya and Egypt through 24 to 120 hours.

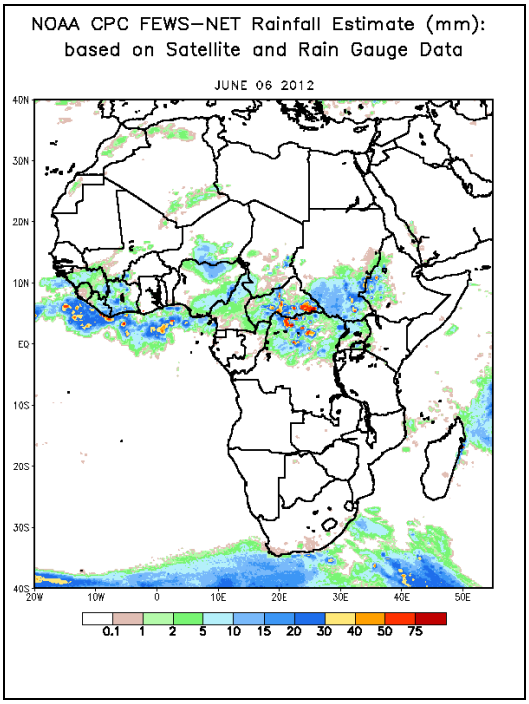
2.0. Previous and Current Day Weather Discussion over Africa (6 June – 7 June 2012)

2.1. Weather assessment for the previous day (6 June 2012)

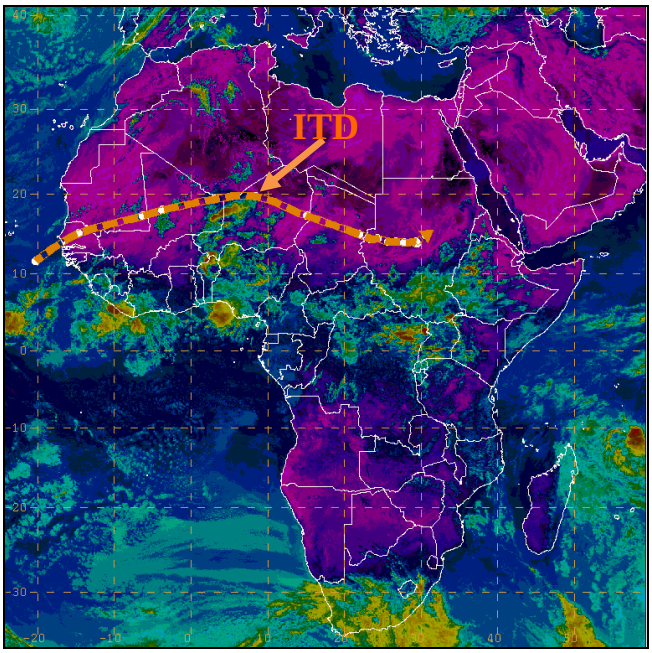
During the previous day, moderate to heavy rainfall was observed across Coastal Sierra Leone, Liberia; South, North and West Cote d`Ivoire; North, Central and South CAR; North, East and South Nigeria; South Niger; North and West Cameroon; North DRC; Part of South Sudan Republic; Western Ethiopia; North Uganda.

2.2. Weather assessment for the current day (7 June 2012)

Convective activities observed across Part of Liberia, Southwest Niger and Nigeria, North Benin, Southeast Burkina Faso, Southeast South Sudan Republic, Northeast DRC, West Uganda, North and West Ethiopia.



ITD Position and IR Satellite Image (valid 1200Z of 7 June 2012)



Previous day rainfall condition over Africa (top Left) based on the NCEP CPCE/RFE and current day ITD Position and cloud cover (top right) based on IR Satellite image and Synoptic Plotting

Authors: **Abdou Adam Abdoul-Aziz Abebe,** (Direction de la Meteorologie Nationale du Niger/ACMAD / CPC-African Desk); abdoul.adam@noaa.gov
Eugene V. S. Gar-Glahn, (Liberia Meteorological Service / CPC-African Desk); eugene.gar-glahn@noaa.gov