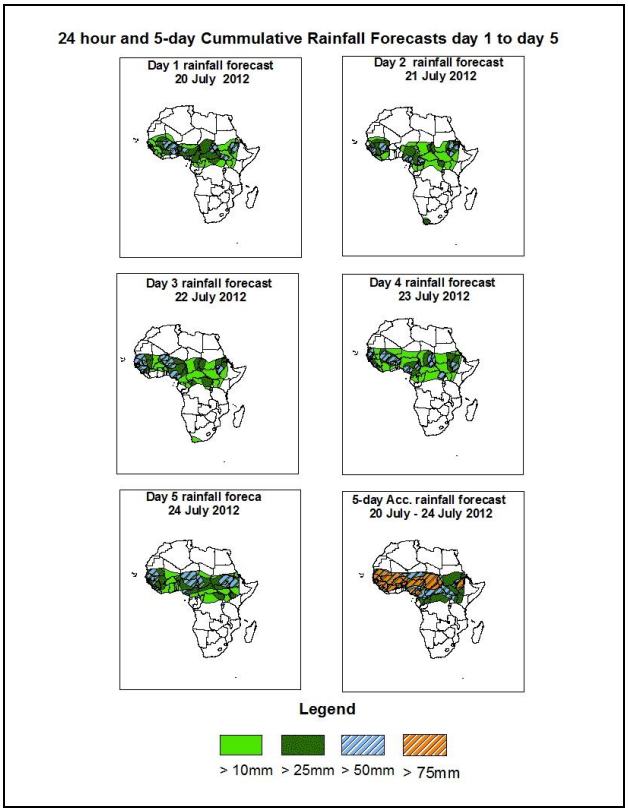
NCEP Contributions to the WMO Severe Weather Forecasting Demonstration Project (SWFDP) and to the African Monsoon Multidisciplinary Analysis (AMMA) Initiative

1.0. Rainfall Forecast: Valid 06Z of July, 20th – 06Z of July, 24th 2012. (Issued at 12:00Z of July, 19th 2012)

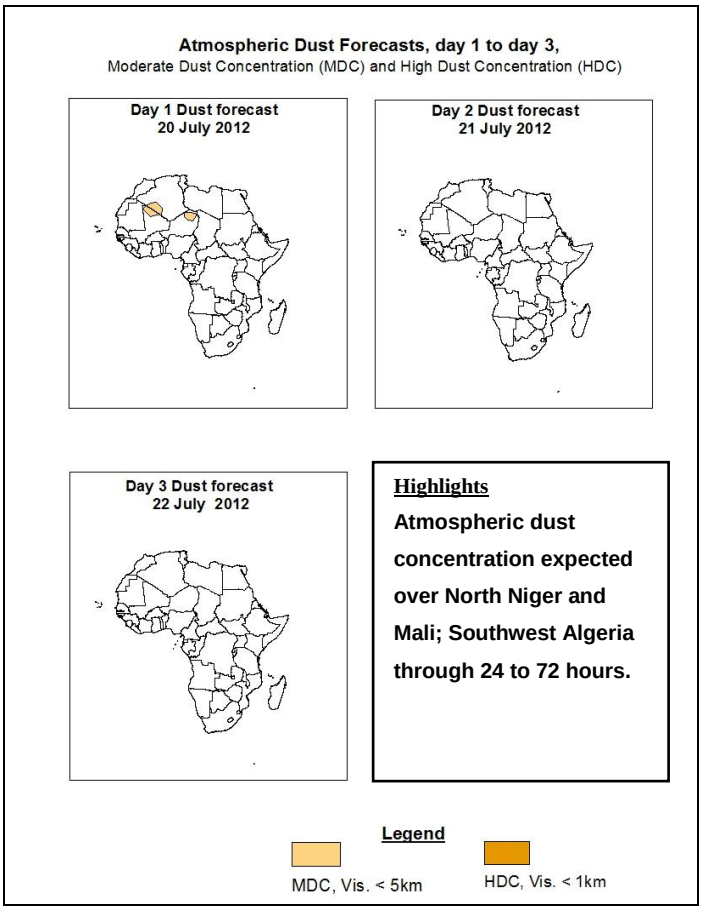
1.1. Twenty Four Hour Cumulative Rainfall Forecasts

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 17°E and 23°N with moderate to strong monsoon depth within 24 to 120 hours; Also the TEJ, AEJ and the AEW propagation with 850 to 700hpa vortices are expected to enhance rainfall activities over South Sudan; East, West and South Chad; North and Southwest Cameroon; North and Southeast Nigeria; Part of Central, West and South Sahel; portion of North Guinea Gulf Countries, Sierra Leone, Central African Republic and Guinea Conakry; West Ethiopia; North South Sudan Republic.



1.3. Model Discussion: Valid from 00Z of July, 19th 2012.

According to the GFS, ECMWF and UKMET models the heat lows are expected to deepen, remain quasi-stationary, and then fill up and vice versa through 24 to 120 hours over Mauritania, Mali, Algeria, Niger, Chad and Sudan.

According to GFS model, a thermal low over North Mauritania (1004hpa) in 24 hours is expected to gradually increase its core value from 1006hpa to 1010hpa within 48 to 96 hours and tends decrease to 1004hpa in 120 hours. The second low over North Mali and South Algeria (1004hpa) in 24 hours is also expected to increase its core value to 1009hpa through 48 to 72 hours, and then decrease from 1006hpa to 1004hpa within 96 to 120 hours. The third low over North Chad and Niger (1006hpa) in 24 hours is expected to slightly increase its core value to 1007hpa through 48 to 72 hours and tends to decrease from 1004hpa to 1002hpa within 96 to120 hours; while the low over North Sudan (1006hpa) through 24 to 72 hours is expected to decrease its core value to 1003hpa in 96 hours and tends to slightly increase to 1004hpa in 120 hours.

The ECMWF model shows a thermal low over North Mauritania (1006hpa) in 24 hours is expected to gradually increase its core value from 1008hpa to 1012hpa through 48 to 72 hours and tends decrease from 1010hpa to 1006hpa within 96 to 120 hours. The second low over North Mali and South Algeria (1006hpa) in 24 hours is expected to increase its core value to 1010hpa through 48 to 72 hours, and then decrease from 1006hpa to 1004hpa within 96 to 120 hours. The third low over North Chad and Niger (1008hpa) in 24 hours is expected increase its core value to 1010hpa in 48 hours and tends to gradually decrease from 1009hpa to 1006hpa through 72 to120 hours; while the low over North Sudan (1006hpa) in 24 hours is expected to maintain almost its core value within 48 to 120 hours.

The UKMET model shows a thermal low over North Mauritania (1003hpa) in 24 hours is expected to gradually increase its core value from 1005hpa to 1008hpa through 48 to 96 hours and tends to decrease to 1004hpa in 120 hours. The second low over North Mali and South Algeria (1006hpa) in 24 hours is expected to slightly increase its core value to 1007hpa in 48 hours and tends to gradually decrease from 1006hpa to 1001hpa within 72 to 120 hours. The third low over North Chad and Niger (1006hpa) in 24 hours is expected to slightly decrease its core value to 1005hpa through 48 to120 hours; while the low over North Sudan (1004hpa) in 24 hours is expected to maintain almost its core value within 48 to 120 hours.

According to the UKMET model, the St. Helena High pressure system over South Atlantic Ocean with a core value of 1028hpa in 24 hours locates at latitude 50^{o}S is expected to decrease to 1024hpa in 48 hours by shifting northwards from latitude 50^{o}S to 30^{o}S and tends to gradually increase from 1026hpa to 1027hpa through 72 to 96 hours by moving to the north from latitude 30^{o}S to 25^{o}S, then decrease to 1025hpa in 120 hours by shifting to the south from latitude 25^{o}S to 35^{o}S.

According to the ECMWF model, the central pressure value of 1028hpa in 24 hours locates at latitude 50^{o}S is expected to decrease to 1023hpa in 48 hours by shifting northwards from latitude 50^{o}S to 45^{o}S and tends to increase to1026hpa by moving to the north from latitude 35^{o}S to 25^{o}S within 72 to 96 hours and southwards from latitude 25^{o}S to 30^{o}S in 120 hours.

Lastly, according to the GFS model, the central pressure value of 1028hpa in 24 hours locates at latitude 50^{o}S is expected to decrease to 1023hpa in 48 hours by shifting northwards from latitude 50^{o}S to 45^{o}S and tends to gradually increase from 1025hpa to 1027hpa through 72 to 96 hours by moving to the north from latitude 45^{o}S to 25^{o}S, then slightly decrease to 1026hpa in 120 hours by shifting to the south from latitude 25^{o}S to 30^{o}S.

According to the GFS model, the Azores high pressure system over North Atlantic Ocean with its central pressure value of 1029hpa in 24 hours and locates at longitude 45^{o}W is expected to decrease its core value to 1026hpa by shifting westwards in 48 hours around longitude 50^{o}W and eastwards near longitude 25^{o}W in 72 hours, then slightly increase to 1027hpa by moving westwards from longitude 25^{o}W to 30^{o}W in 96 hours and tends decrease its core value to 1025hpa by maintaining the same position around longitude 30^{o}W in 120 hours.

According to the ECMWF model, the central pressure value of 1028hpa in 24 hours and locates at longitude 45^{o}W is expected to decrease its core value to 1025hpa by shifting westwards in 48 hours around longitude 50^{o}W and eastwards near longitude 25^{o}W in 72 hours, then slightly increase to 1026hpa by maintaining the same position around longitude 25^{o}W in 96 hours and tends decrease its core value to 1023hpa by maintaining the same position near longitude 25^{o}W in 120 hours.

Lastly, according to the UKMET model, the central pressure value of 1029hpa in 24 hours and locates at longitude 45^{o}W is expected to decrease its core value from 1026hpa to 1025hpa by shifting westwards in 48 hours around longitude 50^{o}W and eastwards near longitude 30^{o}W in 72 hours, then slightly increase to 1026hpa by maintaining the same position around longitude 30^{o}W in 96 hours and tends decrease its core value to 1024hpa by moving westwards from longitude 30^{o}W to 40^{o}W in 120 hours.

At 925hpa level, zone of moderate dry Northerly and Northeasterly winds (20 to 50kts) are expected to prevail over North Niger and Mali; Southwest Algeria through 24 to 72 hours.

At the 850hpa level, a lower tropospheric wind convergence associated with strong and significant West African Monsoon inflow and depth between latitude 15^{o}N 21^{o}N is expected to prevail over parts of Sudan, Cameroon, Chad, Central African Republic and Western Africa within 24 hours to 120 hours. Vortices are expected over East, Central and Coastal Mauritania; South, North and West Mali; East, Central and West Central African Republic; North, West and East Niger; East Senegal; South and West Chad; North Burkina Faso. The convergence associated with the meridional arm of the ITCZ is located over part of South Sudan Republic; North Democratic Republic of Congo; West Uganda; East and South Central African Republic through 24 hours to 120 hours.

At 700hpa level, the African Easterly Jet (AEJ) is expected to affect South and West Mali and Mauritania; West Niger; North Nigeria and Cameroon; The African Easterly Waves (AEW) is also expected to propagate westwards waves to affect part of Guinea Gulf Countries and West Africa; portion of Central Africa within 24 to 120 hours.

At 500hpa level, a wave is expected to affect part of Sahel Region; portion of Guinea Gulf Countries; West Sudan; East, West and South Chad through 24 to 120 hours.

At 150mb, the Tropical Easterly Jet with a maximum core of 35 to 90 Knots will affect Southern Chad and Sudan; Part of Ethiopia, Guinea Gulf Countries and Central African Republic through 24 to 120 Hours. Easterly winds flow will also continue to affect most part of West Africa.

In the next five days, ITD is expected to fluctuate between 17^{o}E and 23^{o}N with moderate to strong monsoon depth within 24 to 120 hours; Also the TEJ, AEJ and the AEW propagation with 850 to 700hpa vortices are expected to enhance rainfall activities over South Sudan; East, West and South Chad; North and Southwest Cameroon; North and Southeast Nigeria; Part of Central, West and South Sahel; portion of North Guinea Gulf Countries, Sierra Leone, Central African Republic and Guinea Conakry; West Ethiopia; North South Sudan Republic.

Atmospheric dust concentration expected over North Niger and Mali; Southwest Algeria through 24 to 72 hours.

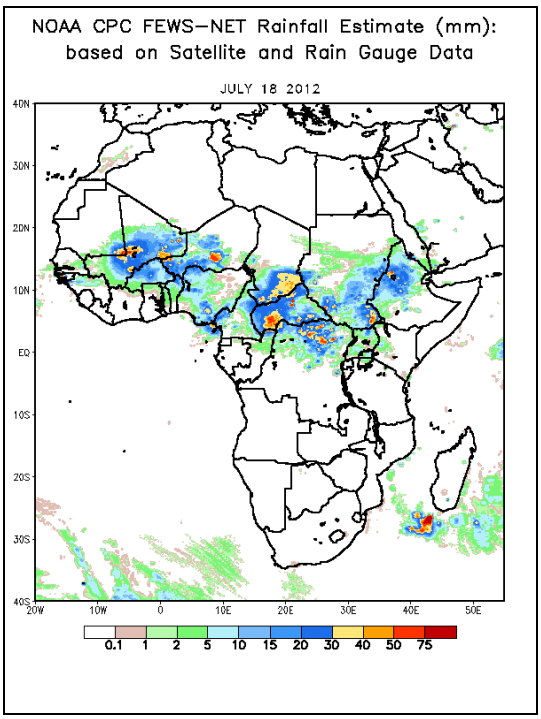
2.0. Previous and Current Day Weather Discussion over Africa (July, 18th 2012– July, 19th 2012)

2.1. Weather assessment for the previous day (July, 18th 2012)

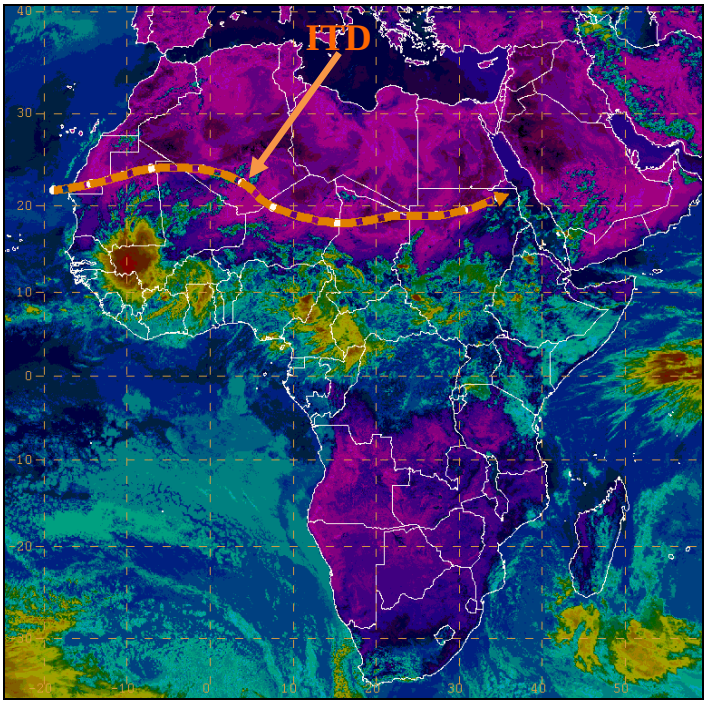
During the previous day, moderate to heavy rainfall was observed over Southeast Mauritania; East, South and West Mali; East, Central and North Burkina Faso; Central, South and West Niger; Northwest and Southeast Nigeria; Southwest Cameroon; South Chad; part of Central African Republic; North Democratic Republic of Congo; East and South Sudan; East, Southeast and North South Sudan Republic; Northwest Ethiopia.

2.2. Weather assessment for the current day (July, 19th 2012)

Convective activities observed across South Mauritania; West Mali; East Senegal; North Guinea Conakry; North Cote d`Ivoire and Ghana; South Burkina Faso; East and Southeast Nigeria; Southwest Sudan; West Central African Republic; South and West Cameroon; North and West Ethiopia; Northwest South Sudan Republic.



ITD Position and IR Satellite Image (valid 1200Z of July, 19th 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