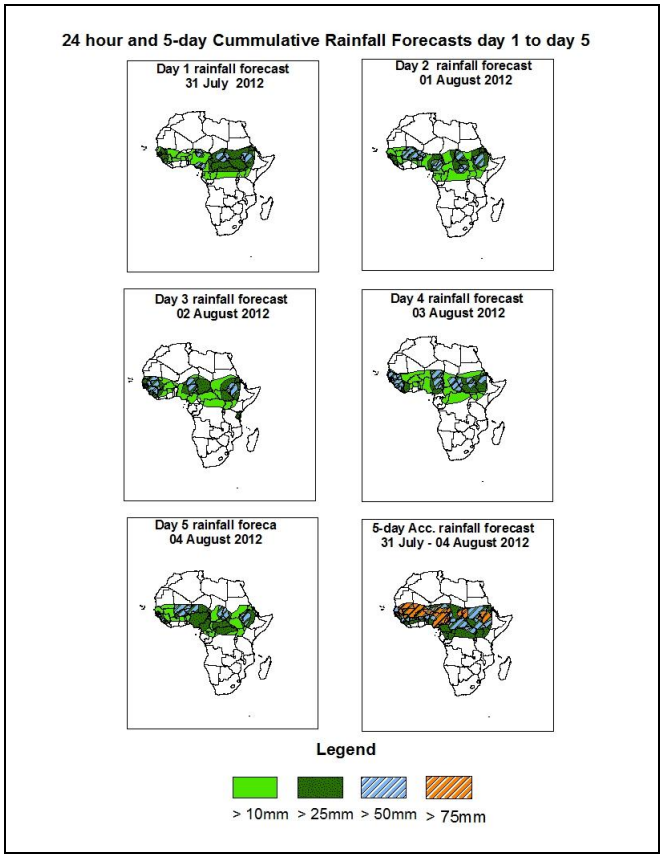
NCEP Contributions to the WMO Severe Weather Forecasting Demonstration Project (SWFDP) and to the African Monsoon Multidisciplinary Analysis (AMMA) Initiative

1.0. Rainfall Forecast: Valid 06Z of July, 31st – 06Z of August, 04th 2012. (Issued at 13:00Z of July, 30th 2012)

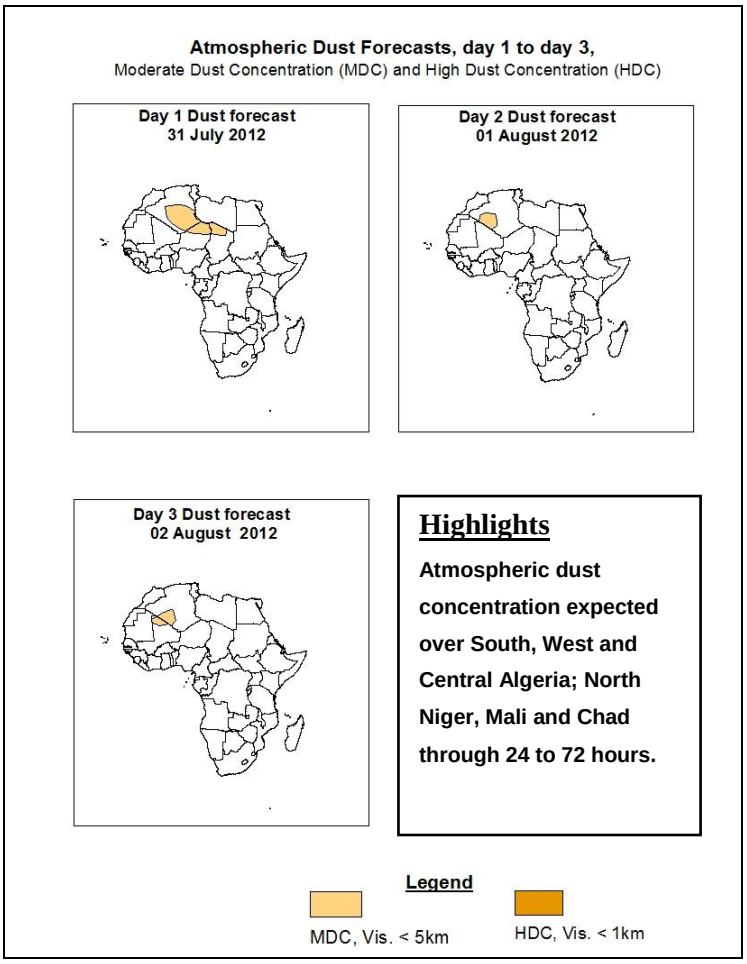
1.1. Twenty Four Hour Cumulative Rainfall Forecasts

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 15°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 East and North South Sudan Republic; South Chad; portion of Nigeria and Cameroon; South Sudan; portion of Sahel Region, Central African Republic and North Guinea Gulf Countries; part of Sierra Leone and Guinea Conakry; West Ethiopia.



1.3. Model Discussion: Valid from 00Z of July, 30th 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, Central and West Mauritania (1008hpa) in 24 hours is expected to increase its core value to 1010hpa in 48 hours, and decrease to 1005hpa within 72 to 96 hours, then tends to increase to 1007hpa in 120 hours. The second low over North Mali and South Algeria (1006hpa) through 24 to 72 hours is expected to slightly increase its core value to 1007hpa in 96 hours, and then decrease to 1006hpa in 120 hours. The third low over North Chad and Niger (1003hpa) in 24 hours is expected to gradually increase its core value from 1004hpa to 1007hpa within 48 to 96 hours, thereafter decrease to 1005hpa in 120 hours; while the low over North Sudan (1004hpa) through 24 to 72 hours is expected to increase its core value to 1006hpa within 96 to 120 hours.

The ECMWF model shows a thermal low over North, Central and West Mauritania (1010hpa) through 24 to 48 hours is expected to decrease its core value from 1008hpa to 1006hpa within 72 to 96 hours, and then slightly increase to 1007hpa in 120 hours. The second low over North Mali and South Algeria (1008hpa) in 24 hours is expected to gradually decrease its core value from 1007hpa to 1005hpa through 48 to 72 hours and tends to increase from 1006hpa to1010hpa within 96 to 120 hours. The third low over North Chad and Niger (1008hpa) in 24 hours is expected to decrease its core value to 1006hpa through 48 to 72 hours, and then increase from 1009hpa to 1010hpa within 96 to 120 hours; while the low over North Sudan (1006hpa) in 24 hours is expected to maintain almost its core value through 48 to 120 hours.

The UKMET model shows a thermal low over North Mauritania (1006hpa) in 24 hours is expected to gradually decrease its core value from 1005hpa to 1003hpa within 48 to 96 hours and tends to slightly increase to 1004hpa in 120 hours. The second low over North Mali and South Algeria (1005hpa) through 24 to 48 hours is expected to slightly decrease its core value to 1004hpa within 72 to 96 hours and tends to increase to 1006hpa in 120 hours. The third low over North Chad and Niger (1003hpa) in 24 hours is expected to gradually increase its core value from 1004hpa to 1006hpa through 48 to 120 hours; while the low over North Sudan (1004hpa) within 24 to 72 hours is expected to increase its core value to 1006hpa 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 1034hpa in 24 hours locates at latitude 40^{o}S is expected to increase to 1041hpa by maintaining almost the same position around latitude 40^{o}S in 48 hours, then gradually decrease from 1039hpa to 1029hpa by shifting northwards from latitude 35^{o}S to 30^{o}S through 72 to 120 hours.

According to the ECMWF model, the central pressure value of 1033hpa in 24 hours locates at latitude 40^{o}S is expected to increase to 1039hpa by maintaining almost the same position around latitude 40^{o}S in 48 hours, and then gradually decrease from 1037hpa to 1029hpa by shifting northwards from latitude 35^{o}S to 30^{o}S through 72 to 120 hours.

Lastly, according to the GFS model, the central pressure value of 1035hpa in 24 hours locates at latitude 40^{o}S is expected to increase to 1041hpa by maintaining almost the same position around latitude 40^{o}S in 48 hours, and then gradually decrease from 1038hpa to 1025hpa by shifting northwards from latitude 35^{o}S to 30^{o}S through 72 to 120 hours.

According to the GFS model, the Azores high pressure system over North Atlantic Ocean with its central pressure value of 1024hpa in 24 hours and locates at longitude 40^{o}W is expected to slightly increase its core value from 1025hpa to 1026hpa by shifting westwards from longitude 40^{o}W to 50^{o}W within 48 to 120 hours.

According to the ECMWF model, the central pressure value of 1024hpa in 24 hours and locates at longitude 30^{o}W is expected to slightly increase its core value to1025hpa by shifting westwards from longitude 40^{o}W to 50^{o}W through 48 to 120 hours.

Lastly, according to the UKMET model, the central pressure value of 1024hpa in 24 hours and locates at longitude 30^{o}W is expected to gradually increase its core value from 1025hpa to 1026hpa by shifting westwards from longitude 35^{o}W to 50^{o}W within 48 to 120 hours.

At 925hpa level, zone of moderate dry northerly and northeasterly winds (20 to 50kts) are expected to prevail over South, West and Central Algeria; North Niger, Mali and Chad 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 13^{o}N 21^{o}N is expected to prevail over parts of Sudan, Cameroon, Chad, Central African Republic and Western Africa through 24 hours to 120 hours. Vortices are expected over portion of Mauritania and Sierra Leone; West and South Burkina Faso; West, South and Central Niger; South Sudan and Chad; North Cote d`Ivoire and Ghana; Northeast Nigeria; East Senegal; South, West and East Guinea Conakry. The convergence associated with the meridional arm of the ITCZ is expected to oscillate between portion of South Sudan Republic; North Democratic Republic of Congo; West and North Uganda; East and South Central African Republic through 24 hours to 120 hours.

At 700hpa level, the AEJ is expected to be weak and the African Easterly Waves (AEW) is also expected to propagate westwards waves to affect part of Guinea Gulf Countries and Sahel Region, portion of Central Africa within 24 to 120 hours.

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

At 150mb, the Tropical Easterly Jet with a maximum core of 35 to 60 Knots will affect portion of South Sudan Republic and Guinea Gulf Countries; Part of Ethiopia and Central African Republic; Easterly winds flow will also continue to affect most part of West Africa, Chad and Sudan through 24 to 120 Hours..

In the next five days, ITD is expected to fluctuate between 15^{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 East and North South Sudan Republic; South Chad; portion of Nigeria and Cameroon; South Sudan; portion of Sahel Region, Central African Republic and North Guinea Gulf Countries; part of Sierra Leone and Guinea Conakry; West Ethiopia.

Atmospheric dust concentration expected over South, West and Central Algeria; North Niger, Mali and Chad through 24 to 72 hours.

2.0. Previous and Current Day Weather Discussion over Africa (July, 29th 2012– July, 30th 2012)

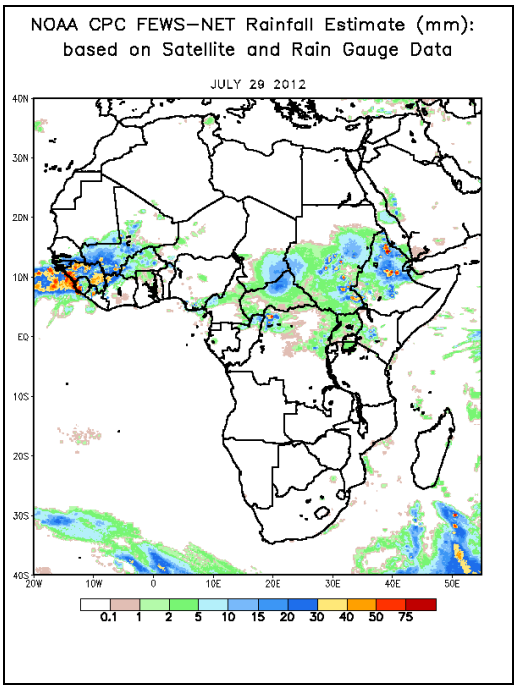
2.1. Weather assessment for the previous day (July, 29th 2012)

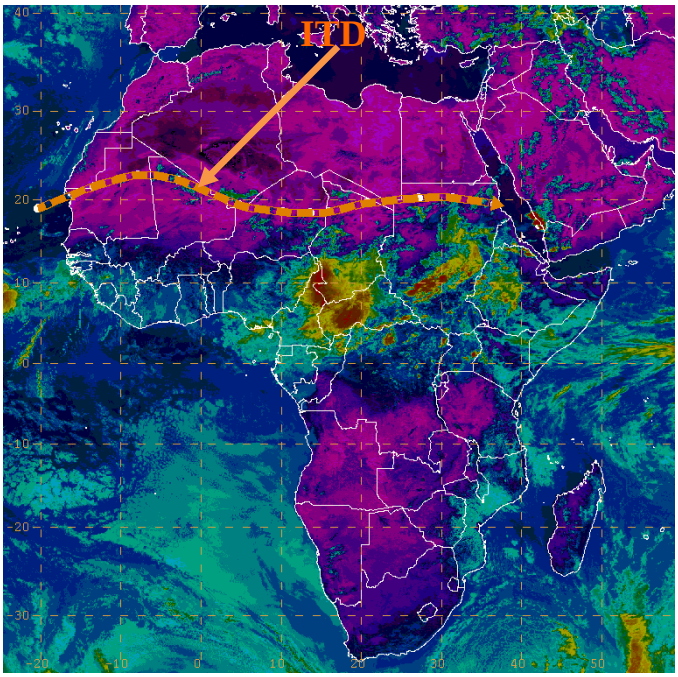
During the previous day, moderate to heavy rainfall was observed over South Senegal; Southeast Mauritania; South and West Mali; Part of Guinea Conakry; portion of Guinea Bissau and Sierra Leone; Northwest Cote d`Ivoire; Southeast and West Burkina Faso; Northwest Democratic Republic of Congo; South Chad; North Central African Republic; East and North South Sudan Republic; Central and North Ethiopia; East and South Sudan.

2.2. Weather assessment for the current day (July, 30th 2012)

Convective activities observed across portion of Cameroon and Central African Republic; South Chad; North Congo and South Sudan Republic; North Democratic Republic of Congo; South Sudan; West Ethiopia; East Uganda.

ITD Position and IR Satellite Image (valid 1200Z of July, 30th 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