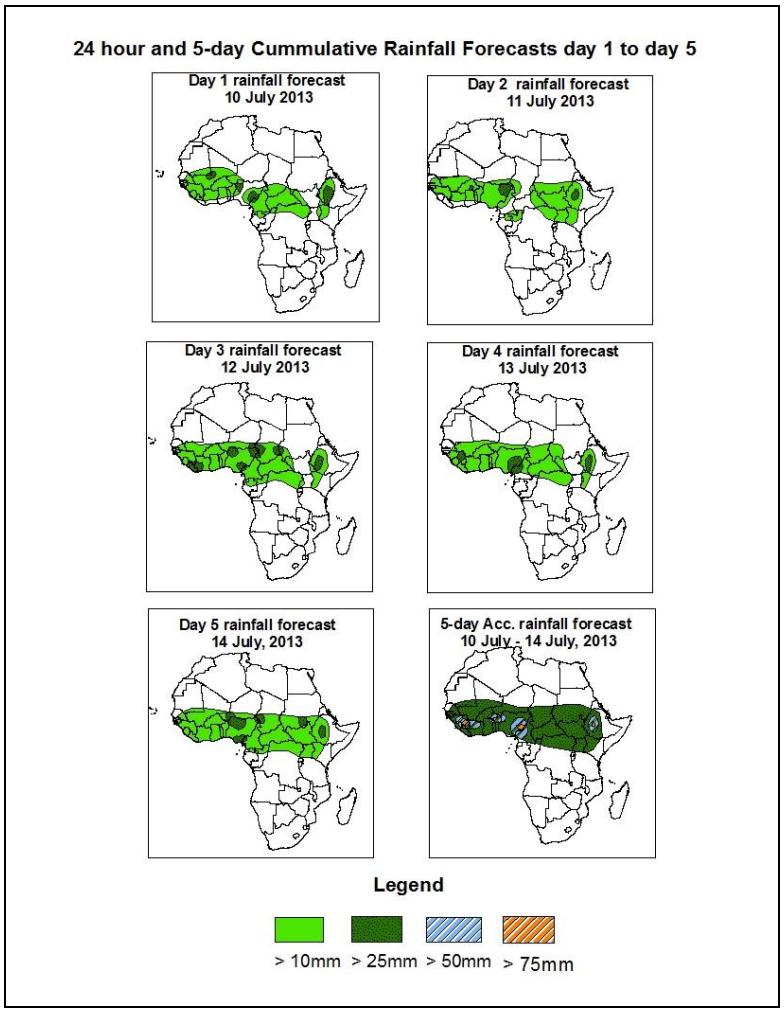
NCEP Contributions to the WMO Severe Weather Forecasting Demonstration Project (SWFDP) and to the African Monsoon Multidisciplinary Analysis (AMMA) Initiative

1.0. Rainfall Forecast: Valid 06Z of 10 July – 06Z of 14 July, 2013. (Issued at 1700Z of 09 July, 2013)

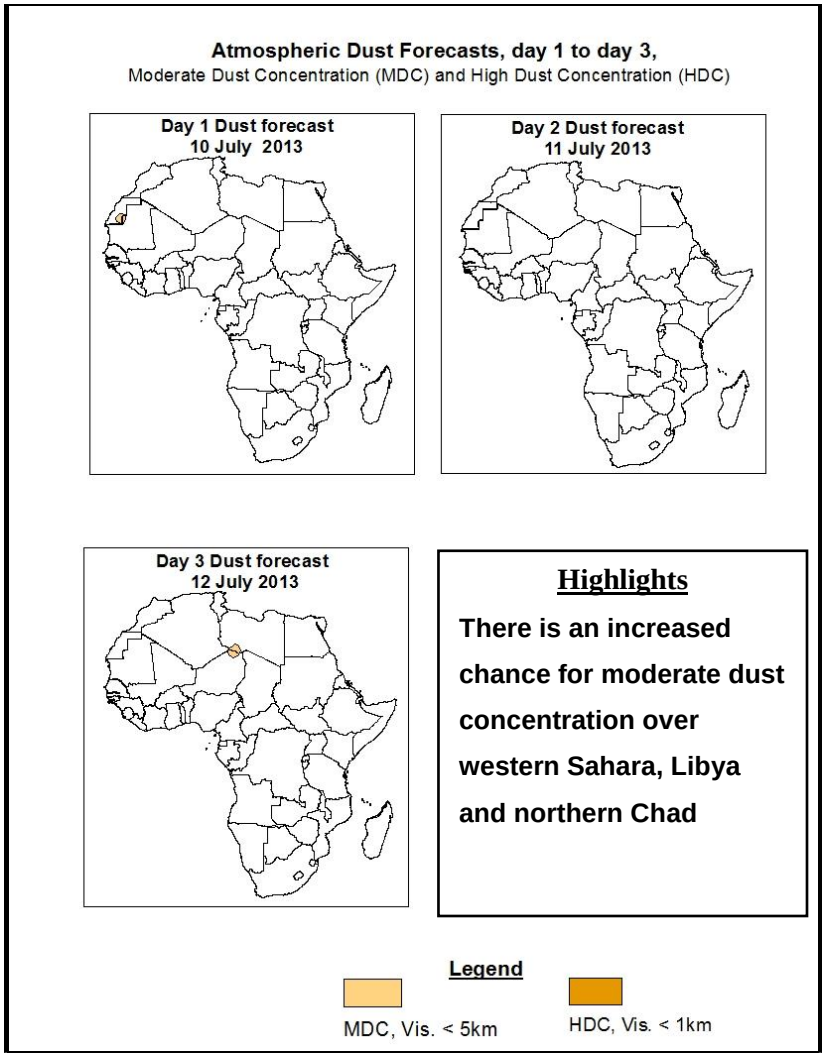
1.1. Twenty Four Hour Cumulative Rainfall Forecasts

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, moisture convergence over West Africa, Central Africa regions and the seasonal wind convergence in Congo Air Boundary (CAB) region is generally expected to increase rainfall in these regions. Strong cross equatorial flow, with its associated convergence over the Horn of Africa is expected to shift rainfall activities further northwards over East and West Africa and enhance precipitation in these regions. There is an increased chance for moderate to heavy rainfall over Senegal, Guinea, Sierra Leone, Mali, Burkina Faso, Cote d'Ivoire, Togo, Nigeria, Cameroun, southern Chad, CAR, southern Sudan, northern DRC, western Ethiopia and Southern Sudan.



1.2. Model Discussion: Valid from 00Z of 09 July 2013

Model comparison (Valid from 00Z;09 July, 2013) shows all the three models are in general agreement in terms of depicting positions of the northern and southern hemisphere sub-tropical highs, while they showed slight differences in depicting their intensity.

The Azores High Pressure System over Northeast Atlantic Ocean is expected to weaken through 24 to 72 hours and increase thereafter. Its central pressure value is expected to decrease from 1031hPa to 1026hPa through 24 to 72 hours according to the GFS and ECMWF models, 1031hpa to 1021hPa according to the UKMET model.

The St. Helena High Pressure System over southeast Atlantic Ocean is expected to remain quasi-stationary and maintain an average central pressure value of 1030hPa according to according to the three models during the forecast period.

The Mascarene high pressure system over southwestern Indian Ocean is also expected to weaken during the forecast period. Its central value is expected to decrease from 1035hPa to 1030hPa according to the GFS model, 1035hPa to 1028hPa according to the ECMWF model, 1035hPa to 1029hPa according to the UKMET model.
The heat lows over the central Sahel and neighboring areas are expected to fill up slightly through 24 to 48 hours and deepen through 72 to 120 hours. The lowest central pressure value is expected to vary between 1004hPa to 1006hPa during the forecast period according to the GFS model, 1005hPa to 1008hPa according to ECMWF model and 1004hPa to 1007hpa according to the UKMET model. The seasonal lows across the Red sea and its neighboring areas are expected to deepen slightly with values varying from 998hPa to 1002hPa according to the GFS and UKMET models.

At the 850hPa level, an anticyclone located close to the coast of the Gulf of Guinea is expected to traverse the Gulf coast from Nigeria to Cote d'Ivoire through 24 to 48 hours. This will reduce chances of heavy rainfall along the areas during the period. However, zonal monsoon wind convergence is expected to dominate the flow across western and central parts of the Sahel South of latitude 18^{o}N, while meridional wind convergence will dominate flow across Sudan, eastern DRC and Ethiopia. Rainfall along the coast of Togo, Ghana, Cote d'Ivoire is expected to be variable as the flow pattern over these areas change occasionally during the forecast period. The increase in number of vortices at this level coupled with the predominant Moist southwesterly to westerly flow over West Africa and its associated convergence over western Ethiopia is expected to maintain moderate to heavy rainfall over most parts of the region.

At 700hPa level, weakening of the broad subtropical anticyclone located at about latitude 30^{o}N is expected to favour northeasterly to easterly flow over West and central Africa during the period.

At 500hpa level, wind speed associated with mid-tropospheric easterly jet are still weak and show common speeds of 30kts only around isolated places in Mali, Ghana, Togo, Chad, Guinea and Senegal during the forecast period.
The zone of maximum wind is expected to gradually shift westwards during the forecast period.

At 150hPa level, tropical easterly jets are gradually becoming stronger and cover wider areas over East Africa. Speeds of 30kts are common over West Africa, Chad and CAR while wind speeds exceeding 70kts are common over Somalia, Ethiopia, Kenya and Sudan during the forecast period.

In the next five days, moisture convergence over West Africa, Central Africa regions and the seasonal wind convergence in Congo Air Boundary (CAB) region is generally expected to increase rainfall in these regions. Strong cross equatorial flow, with its associated convergence over the Horn of Africa is expected to shift rainfall activities further northwards over East and West Africa and enhance precipitation in these regions. There is an increased chance for moderate to heavy rainfall over Senegal, Guinea, Sierra Leone, Mali, Burkina Faso, Cote d'Ivoire, Togo, Nigeria, Cameroun, southern Chad, CAR, southern Sudan, northern DRC, western Ethiopia and Southern Sudan.

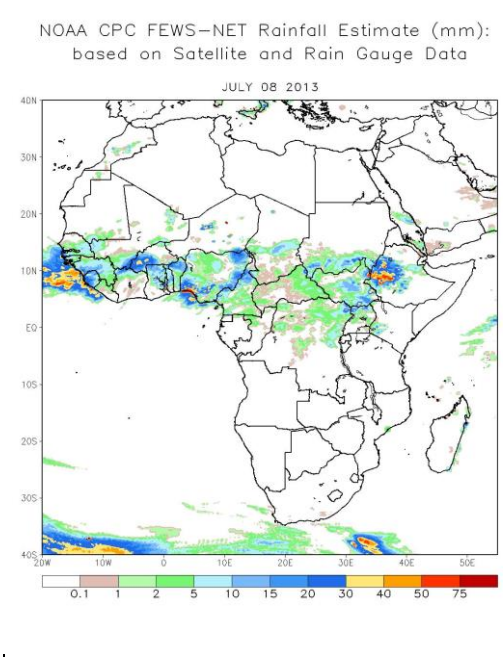
2.0. Previous and Current Day Weather Discussion over Africa
(08 July 2013 – 09 July 2013)

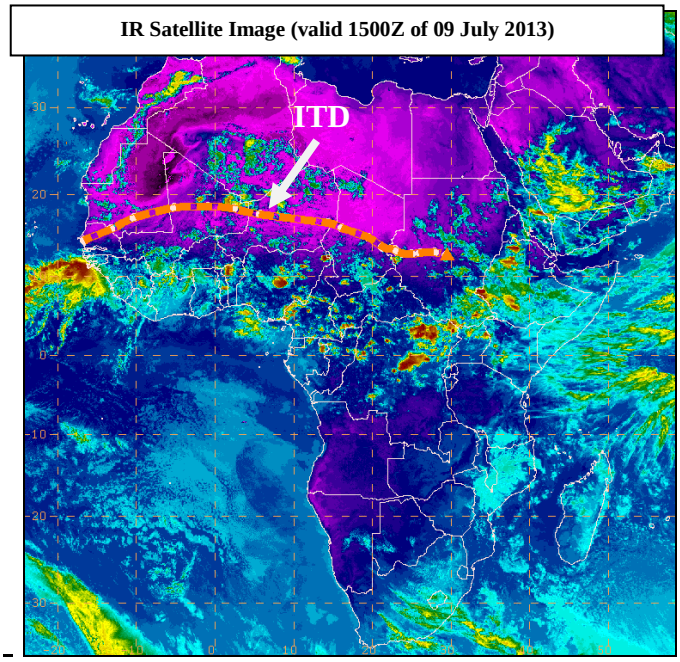
2.1. Weather assessment for the previous day (08 July 2013)

During the previous day, moderate to locally heavy rainfall was observed over western Ethiopia, Southern Sudan, Chad, DRC, Uganda, Nigeria, Cameroun, Niger, Benin republic, Togo, Ghana, Burkina Faso, Mali, Cote d'Ivoire, Guinea, Liberia, Sierra Leone and senegal.

2.2. Weather assessment for the current day (09 July, 2013)

Intense clouds were observed over Ethiopia, Sudan, CAR, northern DRC, Uganda, Cameroun, Nigeria, Congo Brazzaville, Benin Republic, Togo, Ghana, Cote d'Ivoire, Guinea and Mali. The ITD is located at an average position of latitude 18^{o}N over Africa.





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

Author: **Paul Ugbah**, (Nigeria Meteorological Agency / CPC-African Desk); paul.ugbah@noaa.gov