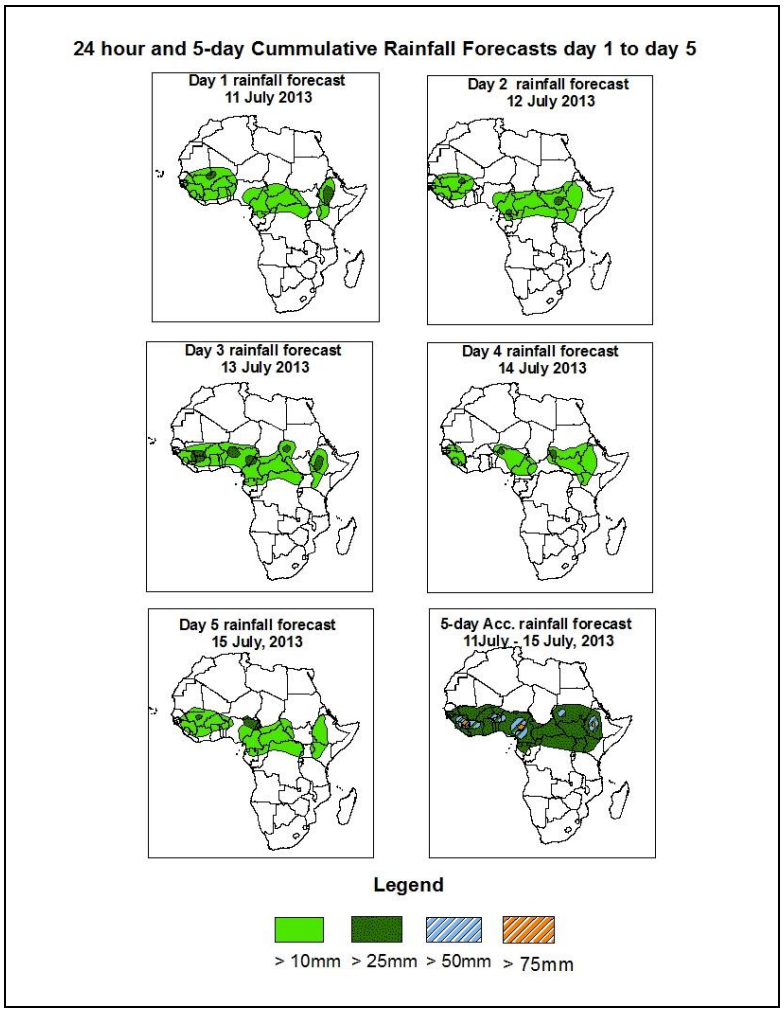
NCEP Contributions to the WMO Severe Weather Forecasting Demonstration Project (SWFDP) and to the African Monsoon Multidisciplinary Analysis (AMMA) Initiative

1.0. Rainfall Forecast: Valid 06Z of 11 July – 06Z of 15 July, 2013. (Issued at 1700Z of 10 July, 2013)

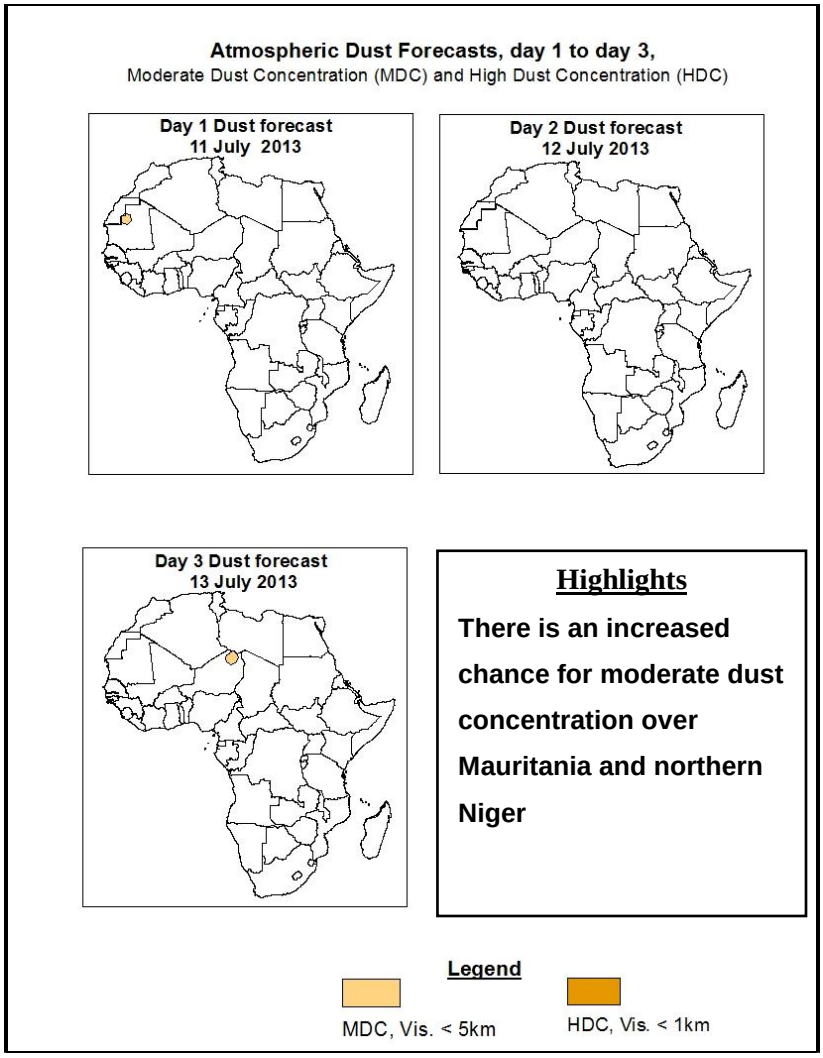
1.1. Twenty Four Hour Cumulative Rainfall Forecasts

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 modulate rainfall in these regions. Strong cross equatorial flow, with its associated convergence over the Horn of Africa is expected to enhance precipitation over East and West Africa. Tropical easterly jets are also becoming stronger over East Africa. Thus, 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 10 July 2013

Model comparison (Valid from 00Z;10 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 slightly weaken through 24 to 48 hours and intensify thereafter. Its central pressure value is expected to decrease from 1029hPa to 1028hPa through 24 to 48 hours according to the GFS model, 1028hPa to 1025hPa according to ECMWF model, 1028hpa to 1026hPa according to the UKMET model and increase thereafter.

The St. Helena High Pressure System over southeast Atlantic Ocean is expected to weaken during the forecast period. Its central pressure value is expected to decrease from 1029hPa to 1025hPa according the GFS model, 1026hPa to 1026hPa according to the ECMWF model, 1030hPa to 1026hPa according to the UKMET model 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 1034hPa to 1028hPa according to the GFS model, 1033hPa to 1026hPa according to the ECMWF model, 1035hPa to 1031hPa according to the UKMET model.

The heat lows over the central Sahel and neighboring areas are expected deepen through 24 to 72 hours and slightly fill up thereafter. The lowest central pressure value is expected to vary between 1004hPa to 1005hPa during the forecast period according to the GFS model, 1006hPa to 1008hPa according to ECMWF model and 1003hPa to 1006hpa 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 997hPa to 1002hPa according to the GFS and UKMET models.

At the 850hPa level, northerly wind flow will occasionally prevail over some countries in West Africa through 24 to 48 hours and this is expected to reduce chances of heavy rainfall over the areas especially the southwest coast of Nigeria to Cote d'Ivoire 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 therefore 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 and wind convergence over Africa is expected to maintain moderate to heavy rainfall over most parts of the region.

At 700hPa level, the progressive intensification of subtropical anticyclone in the northern and southern hemispheres 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 around isolated places in Mali, Mauritania, Burkina Faso, Cote d'Ivoire, Guinea and Senegal during 72 to 96 hours.
The zone of maximum wind is expected to gradually shift westwards during the forecast period.

At 150hPa level, tropical easterly jets are becoming stronger and cover wider areas over East Africa. Speeds of 30kts are common over Chad, Nigeria, Cameroun, Niger and Ghana while wind speeds exceeding 70kts are common over Somalia, Ethiopia, Sudan and Eritrea through 24 to 72 hours and extend to Uganda, Kenya and DRC by 96 hours.

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 modulate rainfall in these regions. Strong cross equatorial flow, with its associated convergence over the Horn of Africa is expected to enhance precipitation over East and West Africa. Tropical easterly jets are also becoming stronger over East Africa. Thus, 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.

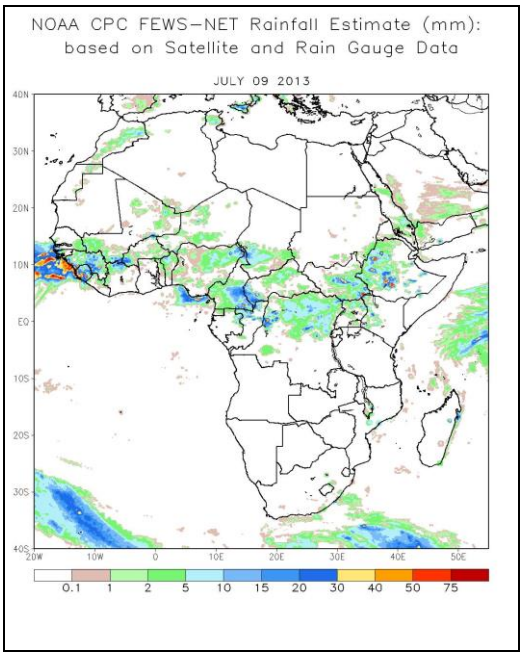
2.0. Previous and Current Day Weather Discussion over Africa
(09 July 2013 – 10 July 2013)

2.1. Weather assessment for the previous day (09 July 2013)

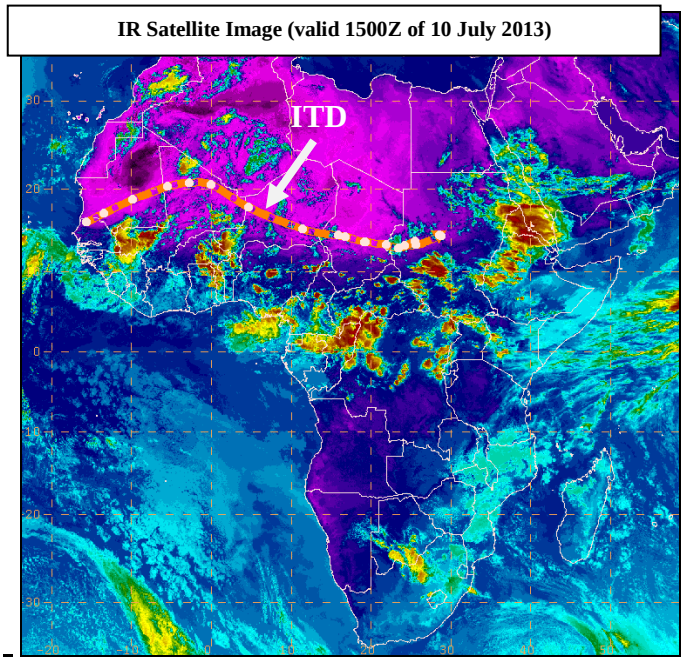
During the previous day, moderate to locally heavy rainfall was observed over western Ethiopia, Southern Sudan, Chad, northern DRC, CAR, Nigeria, Cameroun, Burkina Faso, Mali, Cote d'Ivoire, Guinea and Sierra Leone.

2.2. Weather assessment for the current day (10 July, 2013)

Intense clouds were observed over Ethiopia, Eritrea, Sudan, CAR, northern DRC, Uganda, Kenya, Cameroun, Nigeria, Congo Brazzaville, Benin Republic, Togo, Ghana, Burkina Faso, southwest Niger, Guinea, Mali and southern Mauritania. The ITD is located at an average position of latitude 18^{o}N over Africa.



IR Satellite Image (valid 1500Z of 10 July 2013)



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

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