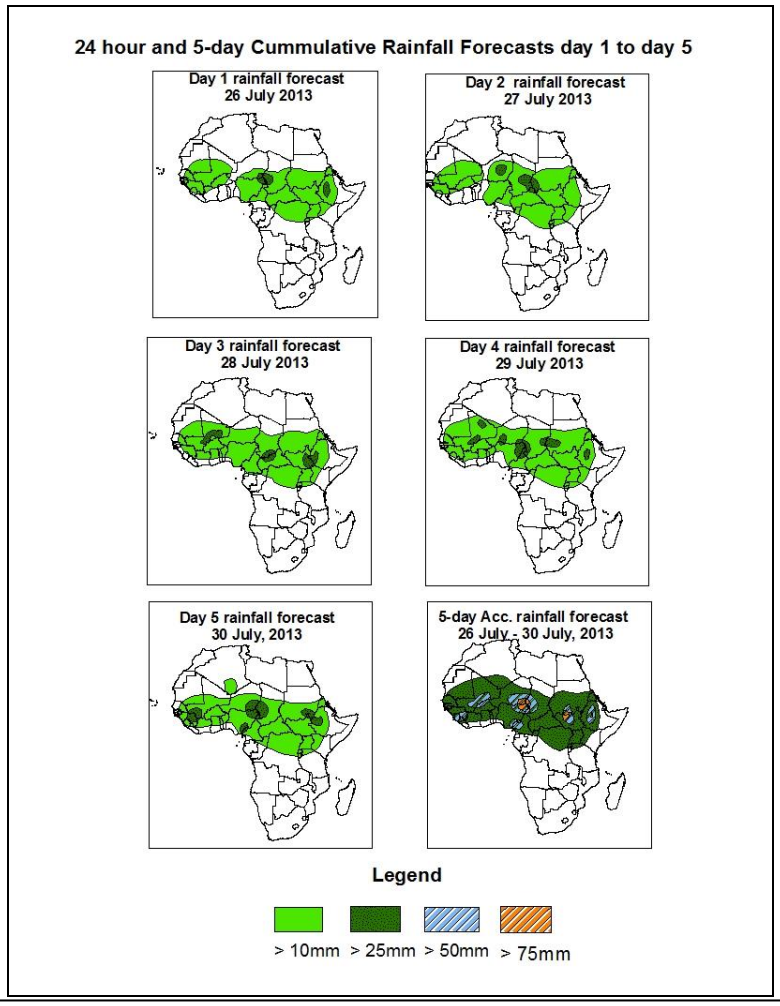
# NCEP Contributions to the WMO Severe Weather Forecasting Demonstration Project (SWFDP) and to the African Monsoon Multidisciplinary Analysis (AMMA) Initiative

## *1.0. Rainfall Forecast: Valid 06Z of 26 July – 06Z of 30 July, 2013. (Issued at 1700Z of 25 July, 2013)*

### 1.1. Twenty Four Hour Cumulative Rainfall Forecasts

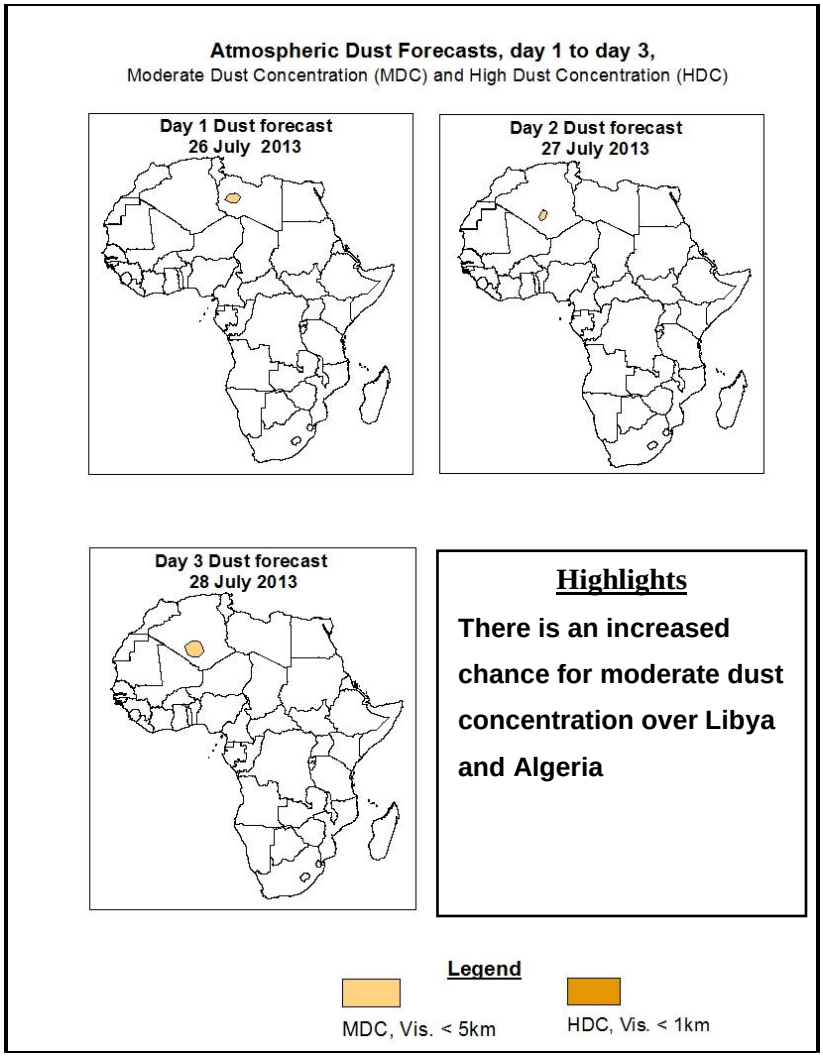
The forecasts are expressed in terms of 75% probability of precipitation (POP) exceeded, based on the NCEP, UK Met Office and the ECMWF NWP outputs, the NCEP global ensemble forecasts system (GEFS) and expert assessment.





## Summary

In the next five days, the zone of seasonal and monsoon wind convergence is expected to push further northwards and shift rainfall activities further to the North over the region. Coastal rainfall along the Gulf of Guinea is also expected to decrease as the 1016hPa isobar of the St. Helena high pressure system reaches a position of Latitude 10$^{o}$N over West Africa during the period. Strong cross equatorial flow, with its associated convergence over the Horn of Africa is expected to enhance precipitation over East Africa. Thus, there is an increased chance for moderate to heavy rainfall over Algeria, Nigeria, Niger, Guinea, Sierra Leone, Liberia, Mali, Burkina Faso, northern Ghana, CIV, Cameroun, southern Chad, CAR, Gabon, Sudan, northern DRC, Uganda, Eritrea and Ethiopia.




## 1.2. Model Discussion: Valid from 00Z of 25 July 2013

*Model comparison (Valid from 00Z;25 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 96 hours and intensify thereafter. Its central pressure value is expected to decrease from 1034hPa to 1023hPa through 24 to 96 hours according to the GFS and ECMWF models, 1034hPa to 1020hPa according to UKMET model.

The St. Helena High Pressure System over southeast Atlantic Ocean is expected to intensify through 24 to 48 hours and weaken thereafter. Its central pressure value is expected to increase from 1034hPa to 1037hPa through 24 to 48 hours according to the GFS model, 1035hPa to 1037hPa according to the ECMWF model, 1035hPa to 1039hPa according to the UKMET model.

The Mascarene high pressure system over southwestern Indian Ocean is expected to weaken through 24 to 72hours and intensify thereafter. Its central value is expected to decrease from 1027hPa to 1022hPa through 24 to 72 hours according to the GFS model, 1026hPa to 1022hPa according to the ECMWF model, 1025hPa to 1020hPa according to UKMET model and an increase thereafter.

The heat lows over the central Sahel and neighboring areas are expected to deepen during the forecast period particularly over Mali and Chad. The lowest central pressure value is expected to vary between 1001hPa to 1007hPa according to the GFS model, 1004hPa to 1007hPa according to ECMWF model and 999hPa to 1006hpa according to the UKMET model. The seasonal lows across the Red sea and its neighboring areas are expected to deepen through 24 to 48 hours and fill up thereafter. values are likely to vary from 1000hPa to 1003hPa according to the GFS model, 1003hPa to 1006hPa according to ECMWF model and 1002hPa to 1004hPa according to UKMET model.

At the 850hPa level, monsoon wind flow is expected to dominate flow across West Africa and penetrate further inland and northwards. Zonal monsoon wind convergence is also expected to dominate the flow across 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 Liberia, Togo, Ghana, Cote d'Ivoire and southwest Nigeria, is therefore expected to decrease as winds diverge from these areas and converge over the inland areas during the forecast period. The slight increase in number of vortices at this level and wind convergence over Africa is expected to maintain moderate to heavy rainfall over the region and the highest rainfall likely over Mali, Nigeria, Sudan and Ethiopia.

At 700hPa level, trough lines are observed during the 24 to 48 hour period while the subtropical anticyclone in the northern and southern hemispheres are expected to maintain northeasterly to easterly flow over West and central Africa during the period.

At 500hpa level, wind speed associated with mid-tropospheric easterly jet show common speeds of 30kts over isolated places in Nigeria, Mali, Senegal, Gambia and Mauritania during the forecast period.

At 150hPa level, tropical easterly jets are now stronger over Nigeria and most places along the Gulf of Guinea coast. Speeds of 50 to 60kts are common over West and East Africa while speeds exceeding 70kts are observed over Ethiopia, Kenya, northwest Nigeria, eastern Sudan and Somalia during the period.

In the next five days, the zone of seasonal and monsoon wind convergence is expected to push further northwards and shift rainfall activities further to the North over the region. Coastal rainfall along the Gulf of Guinea is also expected to decrease as the 1016hPa isobar of the St. Helena high pressure system reaches a position of Latitude 10oN over West Africa during the period. Strong cross equatorial flow, with its associated convergence over the Horn of Africa is expected to enhance precipitation over East Africa. Thus, there is an increased chance for moderate to heavy rainfall over Algeria, Nigeria, Niger, Guinea, Sierra Leone, Liberia, Mali, Burkina Faso, northern Ghana, CIV, Cameroun, southern Chad, CAR, Gabon, Sudan, northern DRC, Uganda, Eritrea and Ethiopia.

## *2.0. Previous and Current Day Weather Discussion over Africa*
## (24 July 2013 – 25 July 2013)

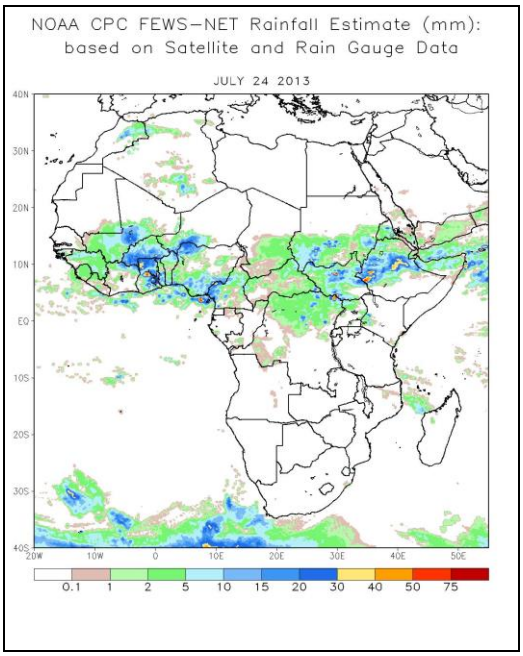
### 2.1. Weather assessment for the previous day (24 July 2013)

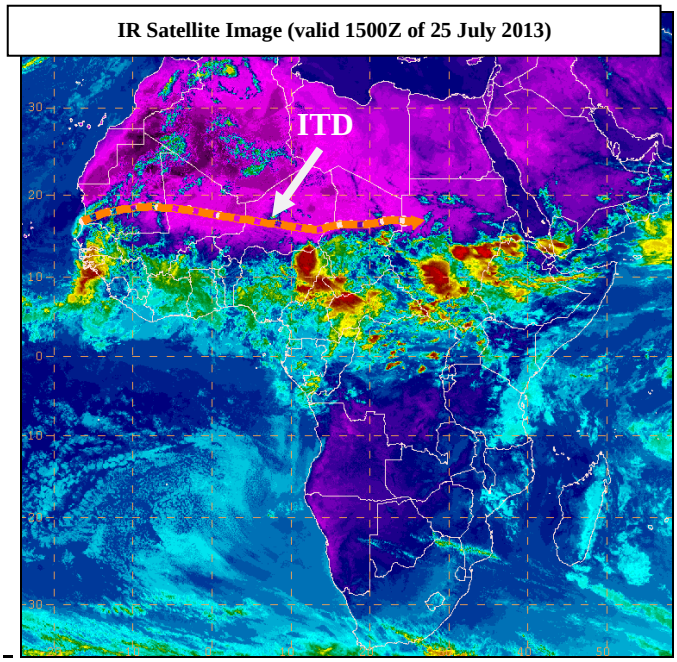
During the previous day, moderate to locally heavy rainfall was observed over Ethiopia, Eritrea, South Sudan, Kenya, northern DRC, Cameroun, Nigeria, Niger, Mali, Burkina Faso, Ghana and Algeria.

### 2.2. Weather assessment for the current day (25 July, 2013)

Intense clouds were observed over Ethiopia, Eritrea, Sudan, CAR, DRC, Uganda, Cameroun, southern Chad, Nigeria, northern Algeria, Senegal, Gambia and Guinea.

The ITD is located at an average position of latitude 17$^{o}$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*

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