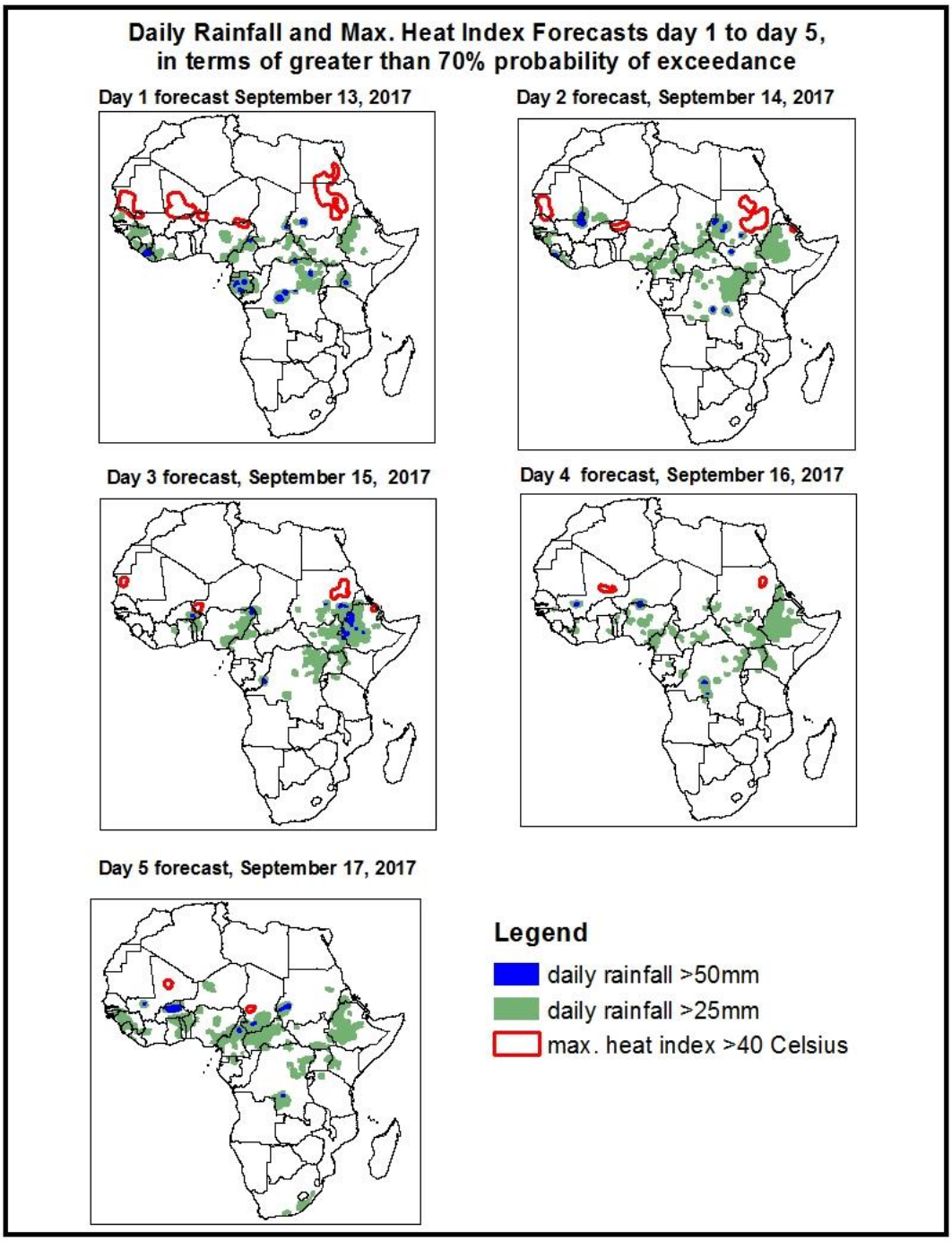
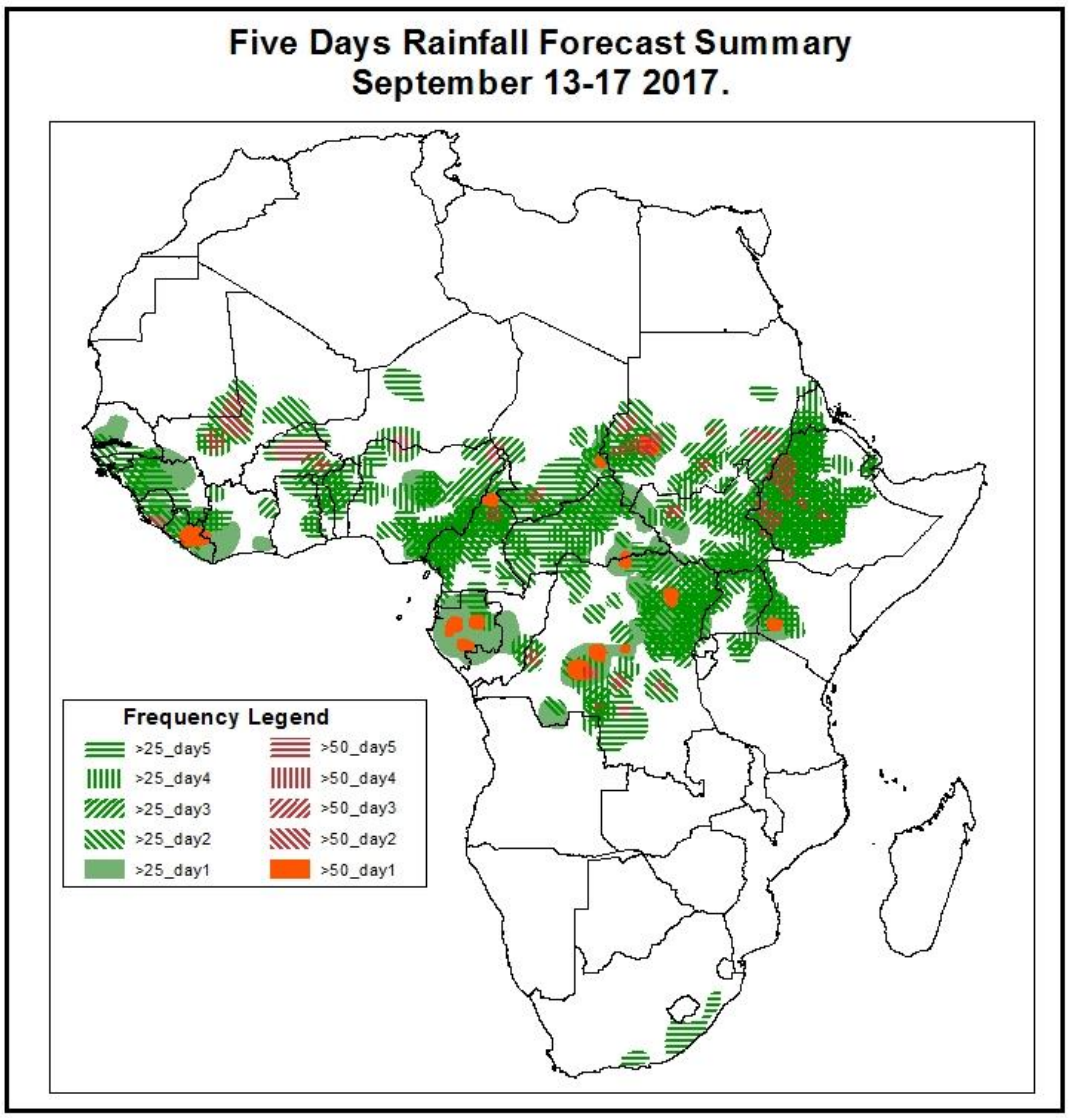
NCEP Contributions to the WMO Severe Weather Forecasting Demonstration Project (SWFDP) and to the African Monsoon Multidisciplinary Analysis (AMMA) Initiative

1. Rainfall, Heat Index and Dust Concentration Forecasts, (Issued on September 12, 2017)

1.1. Daily Rainfall and Maximum Heat Index Forecasts (valid: September, 13-17 2017)

The forecasts are expressed in terms of high probability of precipitation (POP) and high probability of maximum heat index, based on the NCEP/GFS, ECMWF and the NCEP Global Ensemble Forecasts System (GEFS) and expert assessment.



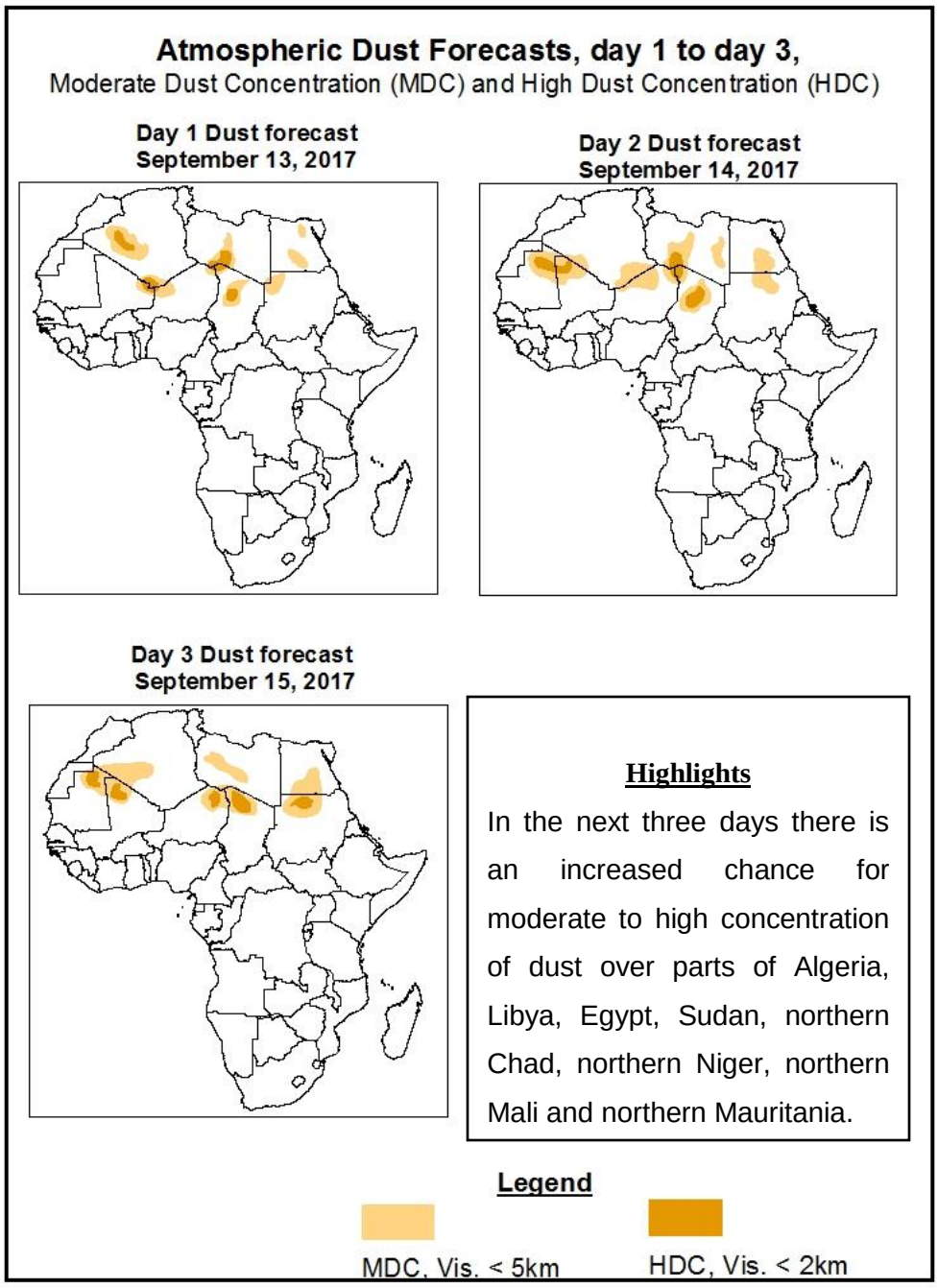


Highlights

In the next five days, a monsoon flow from the Atlantic Ocean across West and Central Africa combined with a lower-level cyclonic circulation propagating across the Sahel countries coupled with upper level divergence is expected to enhance rainfall over many places in West and Central African countries. Active lower-level convergence over northeast Angola to southern DRC which traverse and extends to Uganda and south Sudan is also expected to enhance rainfall in the region. As a result, there is an increased chance for two or more days of moderate to heavy rainfall over many places southern Senegal, Gambia, Guinea Bissau, Guinea, Sierra Leone, Liberia, southern Mali, northern Burkina Faso, northern (Ghana, Togo, Benin), Nigeria, Cameroon, southern Chad, CAR, Gabon, DRC, northern Uganda, western Kenya, southern Sudan, South Sudan and Ethiopia.

1.2. Atmospheric Dust Concentration Forecasts (valid: September 13-15 2017)

The forecasts are expressed in terms of high probability of dust concentration, based on the Navy Aerosol Analysis and Prediction System, NCEP/GFS lower-level wind forecasts and expert assessment.



1.3. Model Discussion, *Valid: September 13-17 2017*

The Azores High Pressure system over the North Atlantic Ocean is expected to gradually intensify from its central pressure value of 1025hpa to 1031hpa in the next 48hours and thereafter weaken to 1027hpa towards the end of the forecast period.

The St. Helena High Pressure system over the Southeast Atlantic Ocean is expected to weaken from its central pressure value of 1035hpa to 1033hpa in the next 24hours and then maintain the value for another 48hours. Thereafter, it will slightly intensify back to its initial value of 1035hpa till the end of the forecast period.

The Mascarene High Pressure system over the Southwest Indian Ocean is expected to gradually weaken from its central pressure value of 1025hpa to 1021hpa towards the end of the forecast period.

The heat low over western Sahel is expected to gradually deepen from its value of 1008hpa in the next 72hours to 1005hpa and then later fill up to 1007hpa towards the end of the forecast period.
Over the central Sahel, the heat low is expected to gradually fill up from its value of 1007hpa to 1009hpa towards the end of the forecast period.
Over the Sudan area, the heat low is expected to deepen from its value of 1007hpa in the next 24hours to 1004hpa and then after another 24hours it fills up to 1006hpa. It continues to fill up to 1009hpa towards the end of the forecast period.

At 925hPa, there is a convergence which is dominated by the continental winds over the Sudan area and a low pressure system develops in the next 48hours moving westwards. Over the central Sahel and the west Sahel regions a series of vortices are developing and sustained with a slight movement westward throughout the forecast period. The maritime winds will dominate the west Sahel region and retard the continental winds towards the end of the forecast period.
Another strong convergence is established over the northeast Angola to southern DRC and traversing through Uganda and then South Sudan with a slight movement eastward towards the end of the forecast period.

The dry north easterlies propagating from the subtropical high pressure over North Africa are intensifying and will result to sustained spreading and transport of the Saharan dust over Algeria, Libya, Egypt, Sudan, northern Chad, northern Niger, northern Mali and northern Mauritania.

At 850hPa, there is a cyclonic circulation over West Africa with pockets of vortices spread over the region and the Sudan area which are predominated by the continental winds with a westward propagation all through the forecast period.
There is a convergence zone over the southern DRC which traverse and extends northeastwards to Uganda with a slight movement in the eastward direction to the end of the forecast period.

At 700hPa, there is the divergence of a northeasterly to easterly flow from the subtropical high pressure system over the north and West Africa to its coasts towards the end of the forecast period.
Divergence over central, eastern and the southern part of Africa predominate and persist over regions towards the end of the forecast period.

In the next five days, a monsoon flow from the Atlantic Ocean across West and Central Africa combined with a lower-level cyclonic circulation propagating across the Sahel countries coupled with upper level divergence is expected to enhance rainfall over many places in West and Central African countries. Active lower-level convergence over northeast Angola to southern DRC which traverse and extends to Uganda and south Sudan is also expected to enhance rainfall in the region. As a result, there is an increased chance for two or more days of moderate to heavy rainfall over many places southern Senegal, Gambia, Guinea Bissau, Guinea, Sierra Leone, Liberia, southern Mali, northern Burkina Faso, northern (Ghana, Togo, Benin), Nigeria, Cameroon, southern Chad, CAR, Gabon, DRC, northern Uganda, western Kenya, southern Sudan, South Sudan and Ethiopia.

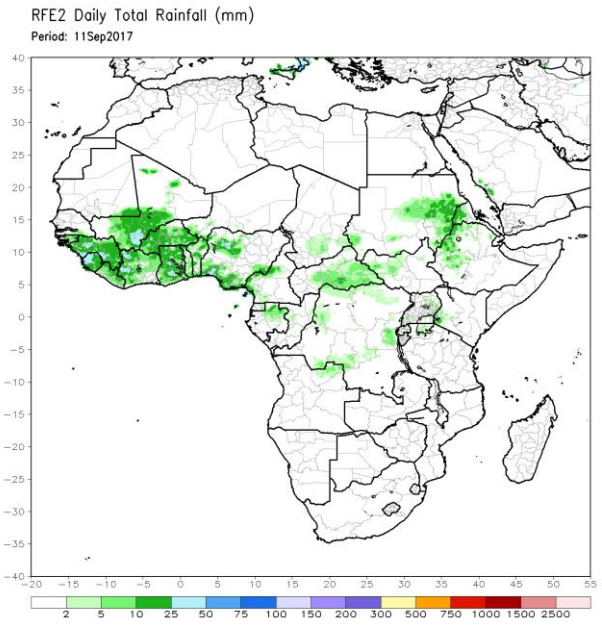
2.0. Previous and Current Day Weather over Africa

2.1. Weather assessment for the previous day (September 11, 2017)

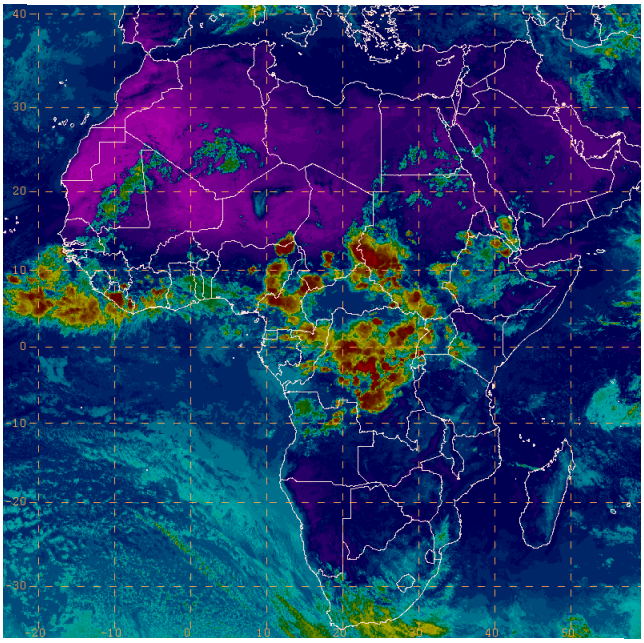
Moderate to locally heavy rainfall was observed over parts of Guinea Bissau, Guinea, Sierra Leone, Liberia, southern Mali, Cote D'Ivoire, Burkina Faso, Ghana, Togo, Benin, some parts of Nigeria, southern CAR, eastern Sudan, western Eritrea and northern Ethiopia.

2.2. Weather assessment for the current day (September 12, 2017)

Intense convective clouds are observed over portions of West, Central and East Africa.



IR Satellite Image (valid 1652 September 12 , 2017)



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

Author: Umar M. Karaye (Nigeria-NIMET)/(CPC-African Desk); umar.karaye@noaa.gov