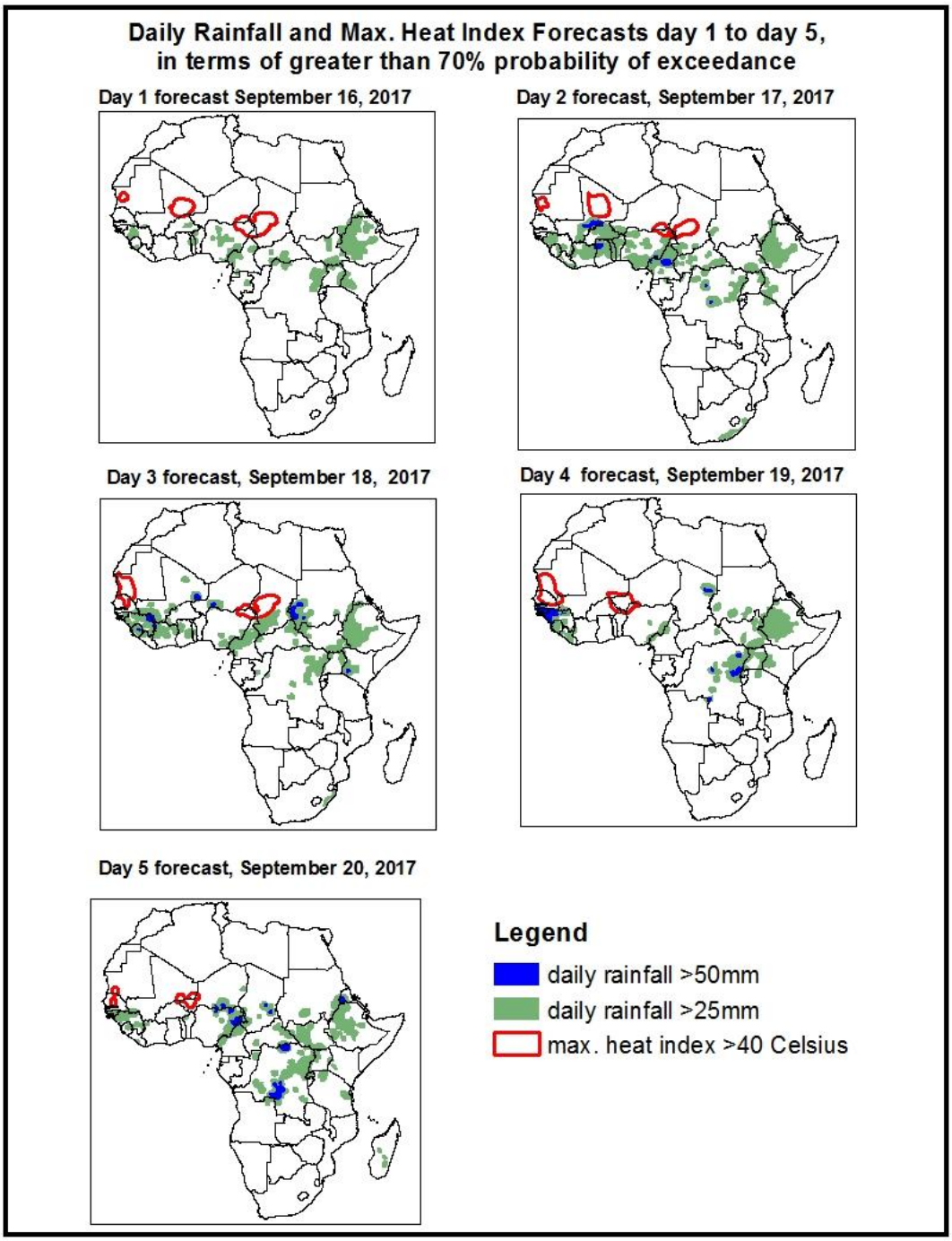
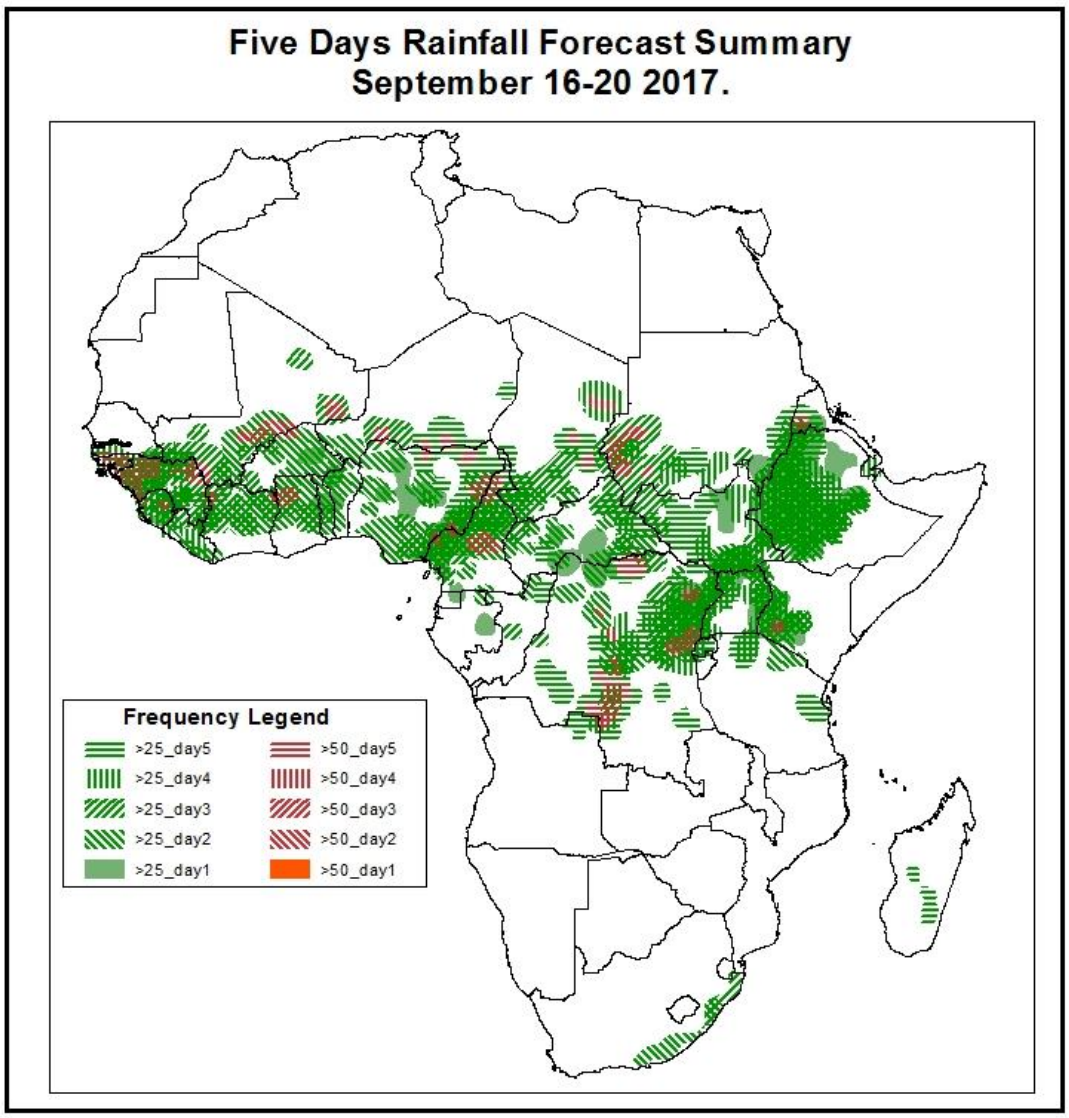
NCEP Contributions to the WMO Severe Weather Forecasting Demonstration Project (SWFDP) and to the African Monsoon Multidisciplinary Analysis (AMMA) Initiative

1. Rainfall, Heat Index and Dust Concentration Forecasts, (Issued on September 15, 2017)

1.1. Daily Rainfall and Maximum Heat Index Forecasts (valid: September, 16-20 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.



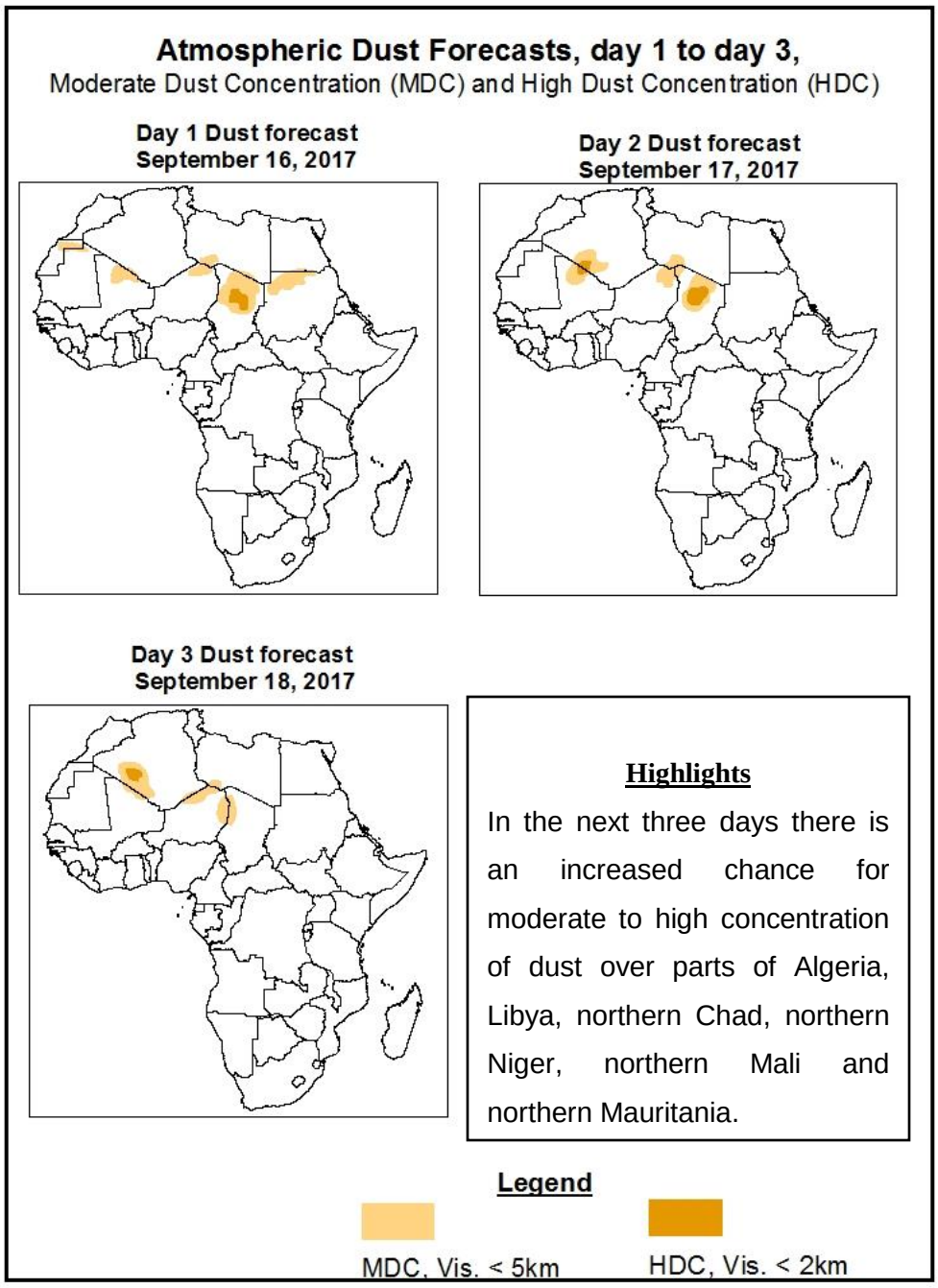


Highlights

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 southern Angola to south eastern DRC and traversing through Burundi, Rwanda, northern Tanzania and then Uganda with a slight movement eastward towards the end of the forecast period 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 Guinea Bissau, Guinea, Sierra Leone, Liberia, southern Mali, northern Cote D`Ivoire, Burkina Faso, northern (Ghana, Togo, Benin), southern Niger, parts of Nigeria, northern Cameroon, southern Chad, CAR, DRC, Uganda, western Kenya, southern Sudan, South Sudan, southern Eritrea and Ethiopia.

1.2. Atmospheric Dust Concentration Forecasts (valid: September 16-18 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 16-20 2017*

The Azores High Pressure system over the North Atlantic Ocean is expected to gradually intensify from its central pressure value of 1025hpa to 1032hpa towards the end of the forecast period.

The St. Helena High Pressure system over the Southeast Atlantic Ocean is expected to gradually intensify from its central pressure value of 1033hpa to 1037hpa in the next 72hours and then thereafter weakens to 1032hpa towards the end of the forecast period.

The Mascarene High Pressure system over the Southwest Indian Ocean is expected to gradually intensify from its central pressure value of 1021hpa to 1031hpa towards the end of the forecast period.

The heat low over western Sahel is expected to fill up from its value of 1006hpa in the next 48hours to 1008hpa and then thereafter deepen back to 1006hpa towards the end of the forecast period.
Over the central Sahel, the heat low is expected to slightly fill up from its value of 1008hpa to 1009hpa in the next 48hours and then maintain this value towards the end of the forecast period.
Over the Sudan area, the heat low is expected to maintain its value of 1008hpa in the next 72hours and then slightly 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 24hours 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 briefly dominate the west Sahel region and retard the continental winds for the next 48hours and thereafter the continental winds dominate towards the end of the forecast period.
Another convergence is established over the southern DRC and traversing through Burundi, Rwanda, northern Tanzania and then Uganda with a slight movement eastward towards the end of the forecast period.

The dry north easterlies to easterly winds propagating from the subtropical high pressure system over North Africa are spreading and transporting the Saharan dust over Algeria, Libya, Sudan, northern Chad, northern Niger, northern Mali, and northern Mauritania.

At 850hPa, there is a cyclonic circulation over West Africa with pockets of vortices spreading over the region and the Sudan area which are dominated by the continental winds with a westward propagation all through the forecast period.
There is a convergence zone over the south eastern DRC which traverse and extends northeastwards to Uganda which is quasi-stationary towards 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 southern Angola to south eastern DRC and traversing through Burundi, Rwanda, northern Tanzania and then Uganda with a slight movement eastward towards the end of the forecast period 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 Guinea Bissau, Guinea, Sierra Leone, Liberia, southern Mali, northern Cote D`Ivoire, Burkina Faso, northern (Ghana, Togo, Benin), southern Niger, parts of Nigeria, northern Cameroon, southern Chad, CAR, DRC, Uganda, western Kenya, southern Sudan, South Sudan, southern Eritrea and Ethiopia.

2.0. Previous and Current Day Weather over Africa

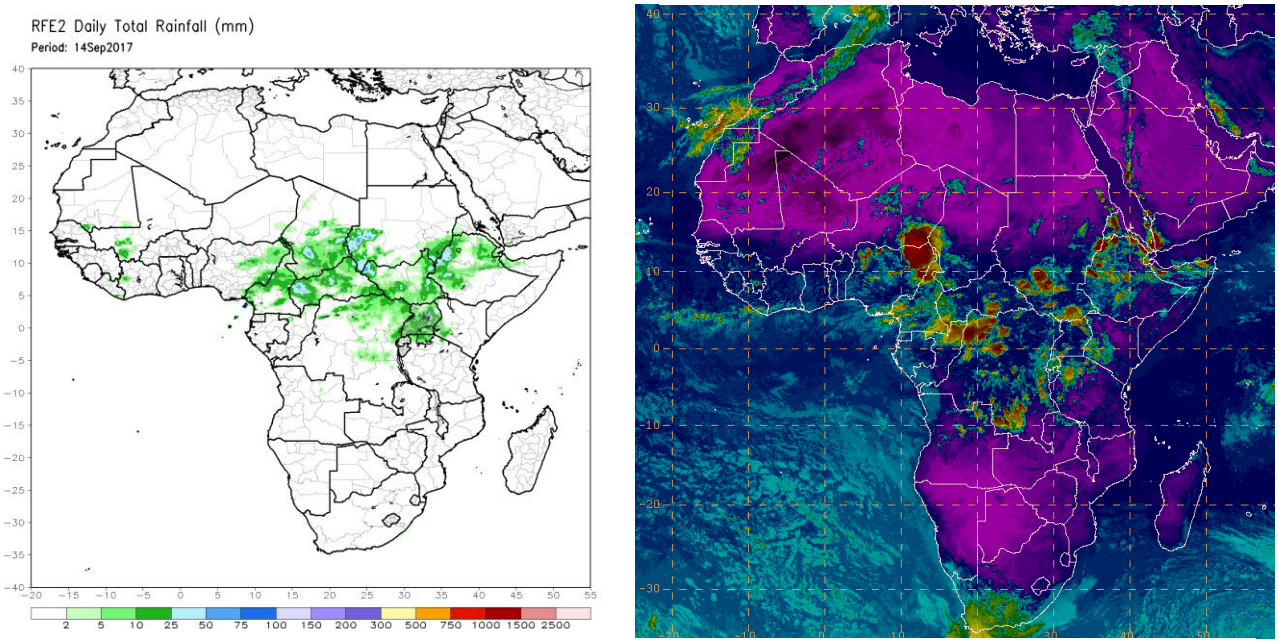
2.1. Weather assessment for the previous day (September 14, 2017)

Moderate to locally heavy rainfall was observed over southern Mali, western Nigeria, northern Cameroun, southern Chad, CAR, northern DRC, southern Sudan, South Sudan, Uganda, western Kenya and some parts of Ethiopia.

2.2. Weather assessment for the current day (September 15, 2017)

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

IR Satellite Image (valid 1422Z September 15 , 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.

Authors: Umar M. Karaye (Nigeria-NIMET)/ (CPC-African Desk);
umar.karaye@noaa.gov
Mahdi F Dobiro (Djibouti-ANM)/ (CPC-African Desk); mahdi.fouad@noaa.gov