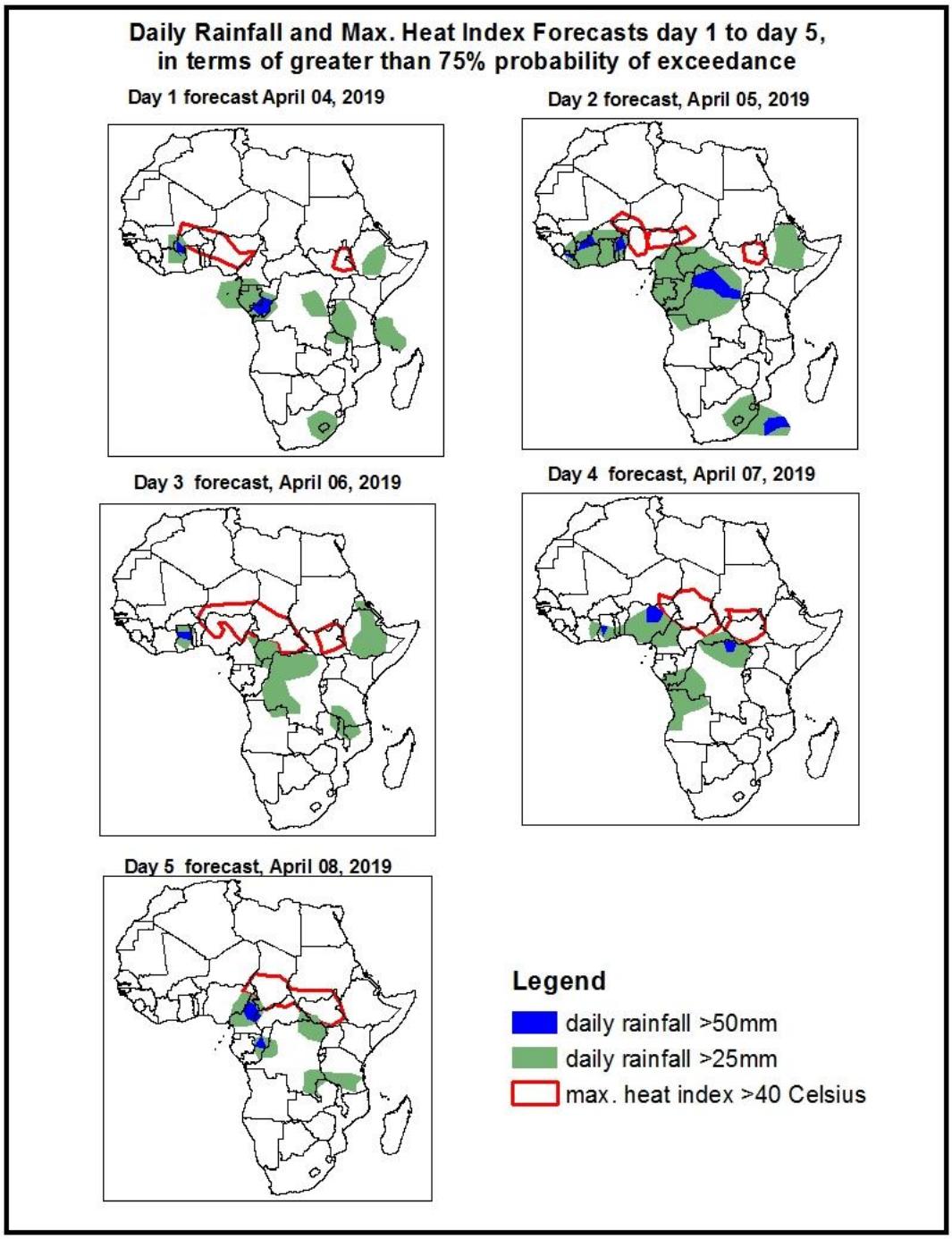
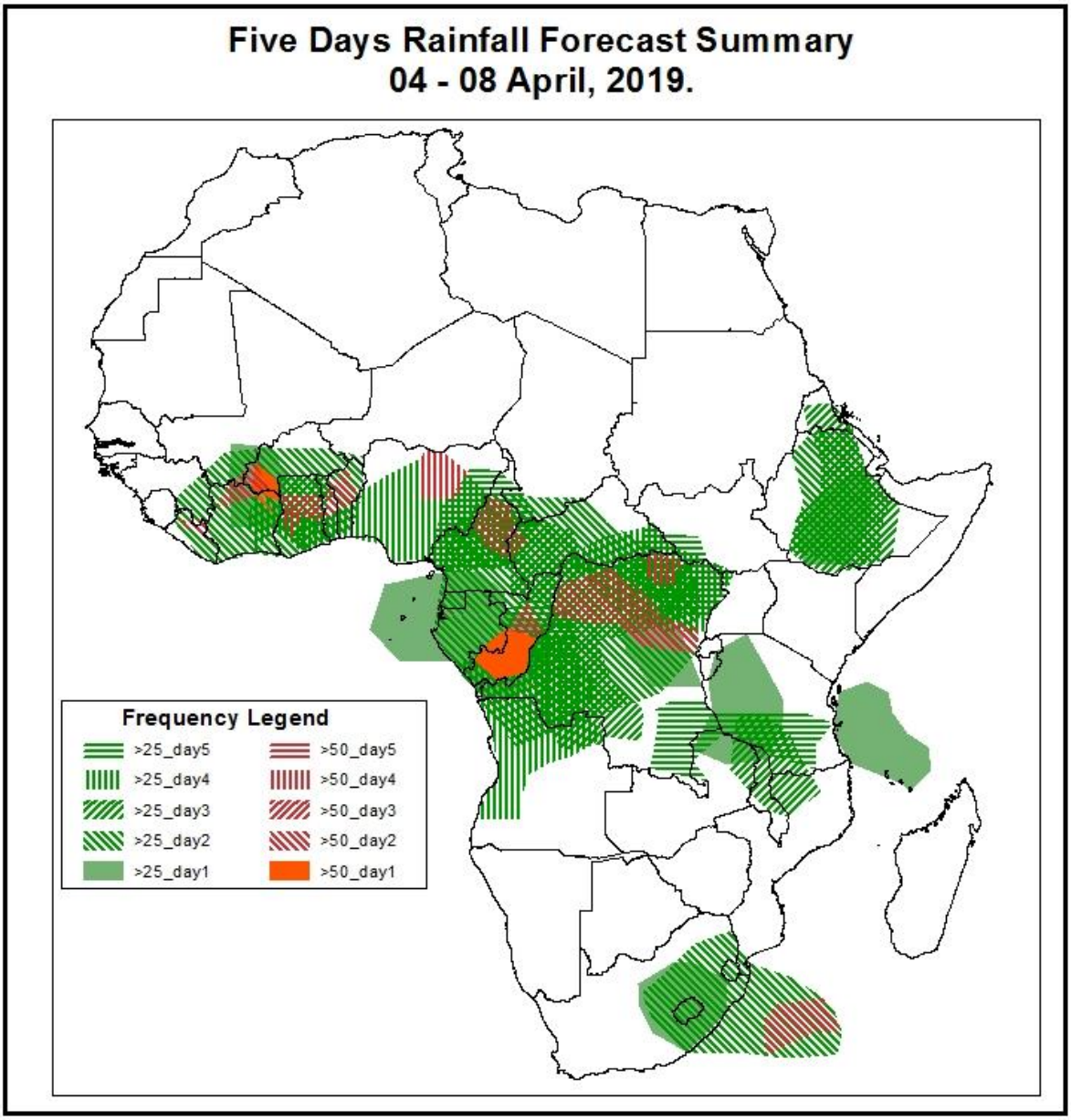
NCEP Contributions to the WMO Severe Weather Forecasting Demonstration Project (SWFDP) and to the African Monsoon Multidisciplinary Analysis (AMMA) Initiative

1. Rainfall, Heat Index and Dust Concentration Forecasts, (Issued on *April 03*, 2019)

1.1. Daily Rainfall and Maximum Heat Index Forecasts (valid: 04 – 08 April, 2019)

The forecasts are expressed in terms of high probability of precipitation (POP), valid 06Z to 06Z, and exceedance probability of maximum heat index (>40°C), based on the NCEP/GFS and the NCEP Global Ensemble Forecasts System (GEFS) and expert assessment.



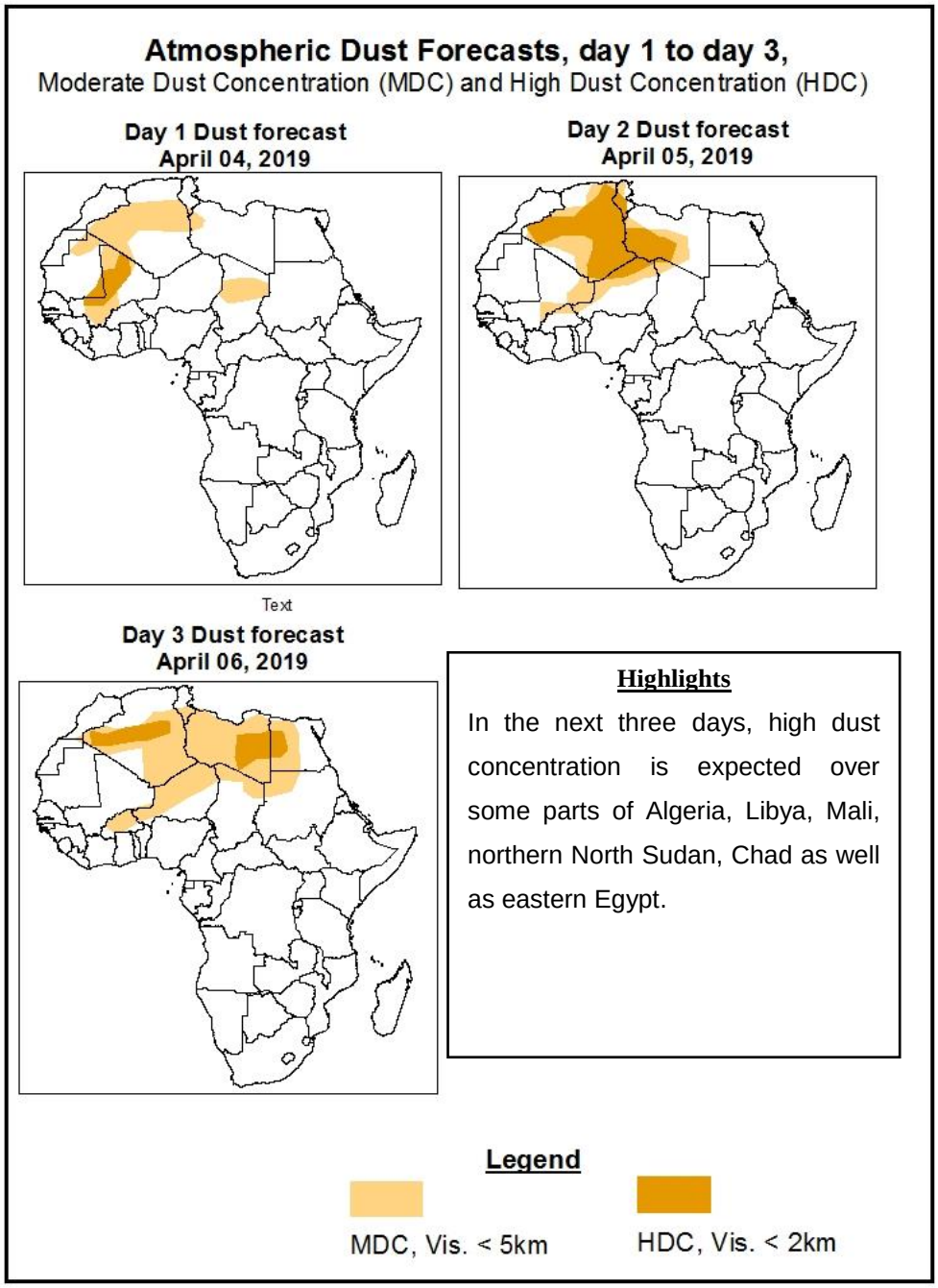


Highlights

- West African Monsoon flow from the Atlantic Ocean with its associated convergence in the Gulf of Guinea region is expected to maintain enhanced rainfall in the region.
- Persistent lower-level wind convergences are likely to maintain significant precipitation over some areas across the Equatorial Africa as well as those in East and few in the Great Horn of Africa.
- The forcing from cold front is likely to cause significant to enhanced precipitation over southern Africa, particularly over South Africa, Lesotho and Swaziland.
- At least 25mm for two or more days is likely in isolated areas over portions of the Gulf of Guinea, central Africa, parts of Ethiopia, southern parts of East Africa and southern Africa.
- There is an increased chance for daily maximum heat index to exceed 40^{o}C across portions of the Sahel region as well as South Sudan.

1.2. Atmospheric Dust Concentration Forecasts *(valid: 04 – 06 April 2019)*

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: 04 – 08 April 2019*

During the forecast period, the Azores High Pressure system over the North of Atlantic Ocean is expected to remain generally weak and confined further West due to the presence of frontal as well as occasional heat lows in Northern Africa. The activities along the Gulf of Guinea are likely to be maintained.

At first, the St. Helena High Pressure system over Southeast Atlantic Ocean is expected to intensify from 1026hPa to 1028hPa, but weakening during the second half of the forecast period to as low as 1021hPa. Despite this, convection along the Gulf of Guinea is only likely to slight weaken and be maintained almost through the forecast period. On the other hand, the Meridional component of the ITCZ is likely to temporarily be pushed further East enhancing precipitation over western areas of East Africa but return to its original position soon after, reducing activities over there.

During the first half of the forecast period, the Mascarene High Pressure system over Southwest Indian Ocean is expected to migrate towards East while intensifying from 1029hPa to around 1032hPa. This is likely to weaken southeasterly winds and slightly reduce precipitation over East Africa. However, during the second half of the period it is expected to return towards West while maintaining its central pressure value and therefore once again increasing precipitation over East Africa. The frontal low over southern Africa is also likely to cause convection over South Africa particularly during the first half of the period.

At 925hPa, Monsoon winds convergence along the Gulf of Guinea and parts of the Sahel are expected to shift further north but maintain precipitation throughout the forecast period especially along coastal areas. Otherwise, low level convergences are expected to influence significant precipitation over some areas in the central, East and Great Horn of Africa.

At 850hPa, mainly westerly convergent wind flow is expected along the Gulf of Guinea coast with the potential of significant precipitation. Separate convergent winds are also likely over parts of central Africa, particularly over the northern DRC and neighboring countries, Great Horn of Africa, especially western Ethiopia towards South Sudan as well as East Africa.

At 700hPa, generally easterly winds are expected over the Gulf of Guinea, central, east as well as Northeast Africa, mainly over Ethiopia.

At 500hPa, a general easterly wind flow is likely over the Gulf of Guinea, central, east as well as Northeast Africa, mainly over Ethiopia.

At 200hPa, strong wind (>130kts), associated with the subtropical westerly jet, is expected to be maintained across northern Africa, with significant bending (trough) over the northeastern parts of Africa, keeping some activities over there.

West African Monsoon flow from the Atlantic Ocean with its associated convergence in the Gulf of Guinea region is expected to maintain enhanced rainfall in the region. Persistent lower-level wind convergences are likely to maintain significant precipitation over some areas across the Equatorial Africa as well as those in East and few in the Great Horn of Africa. The forcing from cold front is likely to cause significant to enhanced precipitation over southern Africa, particularly over South Africa, Lesotho and Swaziland. At least 25mm for two or more days is likely in isolated areas over portions of the Gulf of Guinea, central Africa, parts of Ethiopia, southern parts of East Africa and southern Africa. There is an increased chance for daily maximum heat index to exceed 40oC across portions of the Sahel region as well as South Sudan.

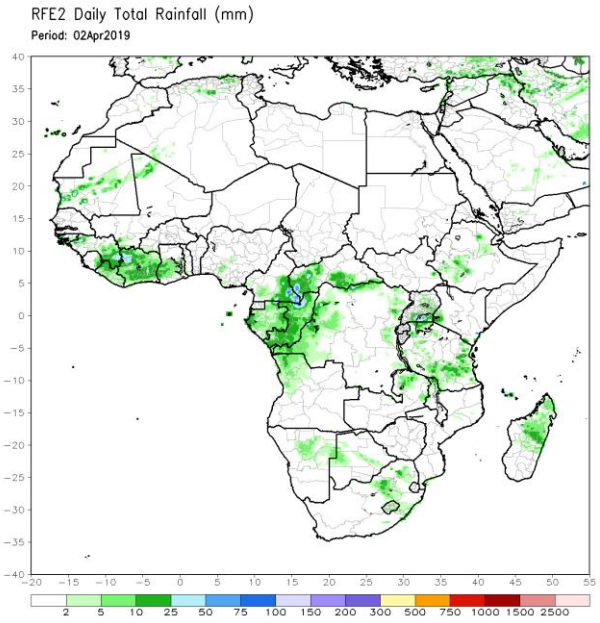
2.0. Previous and Current Day Weather over Africa

2.1. Weather assessment for the previous day (April 2, 2019)

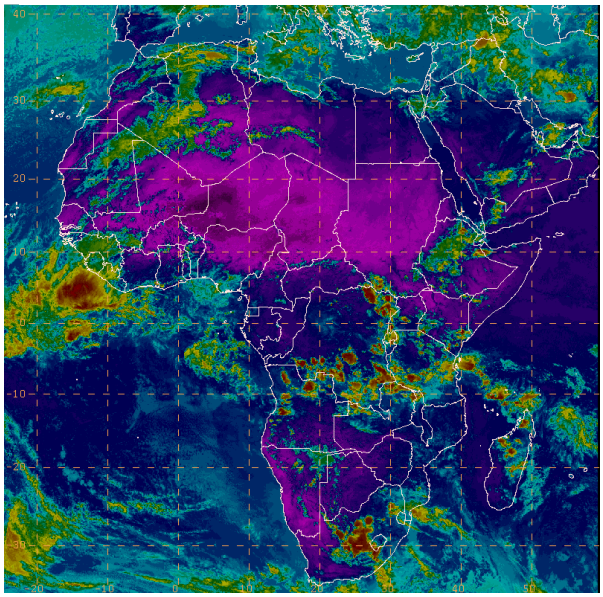
Daily rainfall totals exceeded 25mm over parts of Guinea Conakry, Ivory Coast, Cameroon, Republic of Congo and southern Uganda.

2.2. Weather assessment for the current day (*April 3,* 2019)

Enhanced convective clouds are observed across southern and eastern DRC, parts of Tanzania. Quite enhanced convection is also observed off the coast of Liberia and Sierra Leone.



IR Satellite Image (valid 1452 April 03, 2019)



Authors: Elias Lipiki (Tanzania Meteorological Agency —TMA / CPC-African Desk; elias.lipiki@noaa.gov