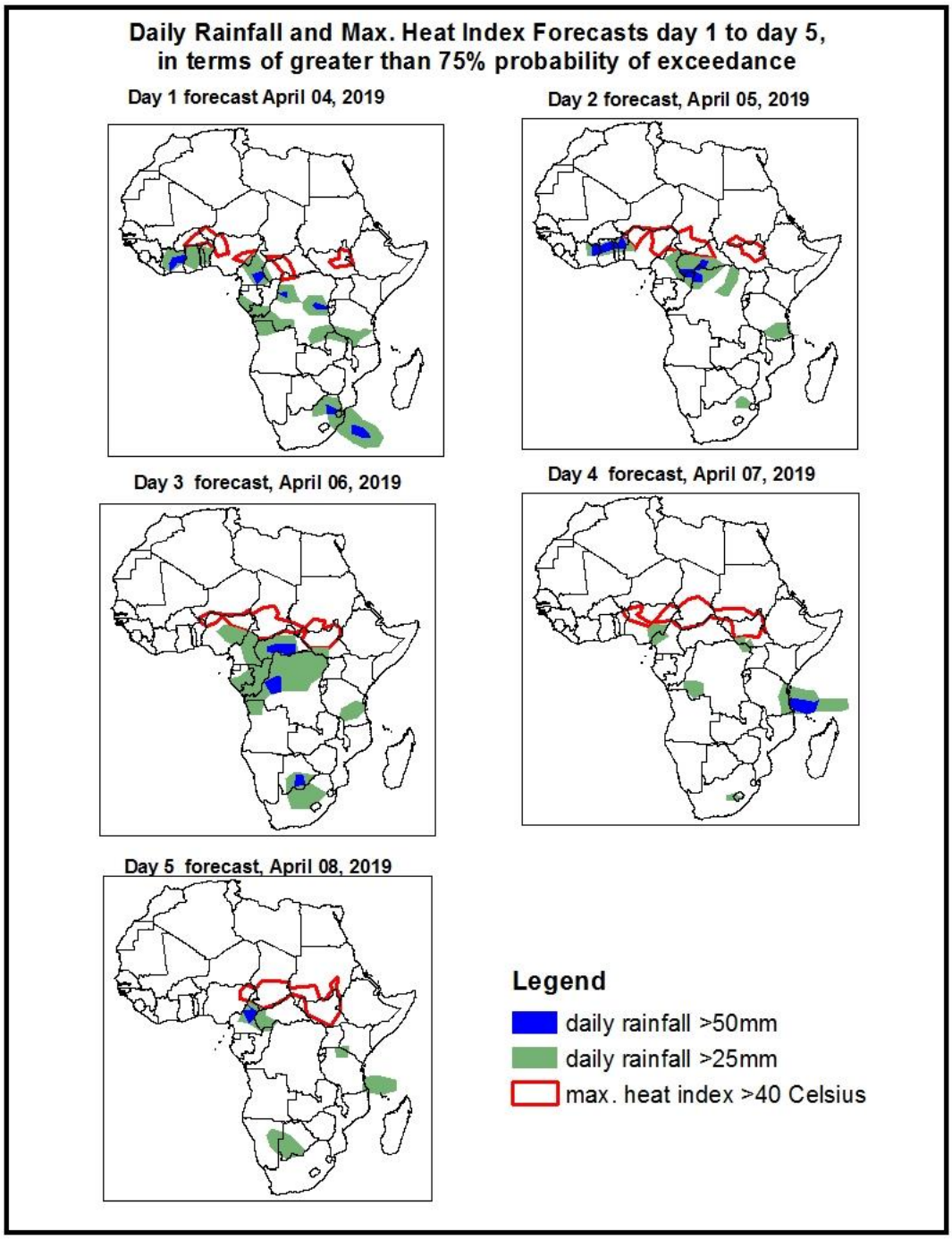
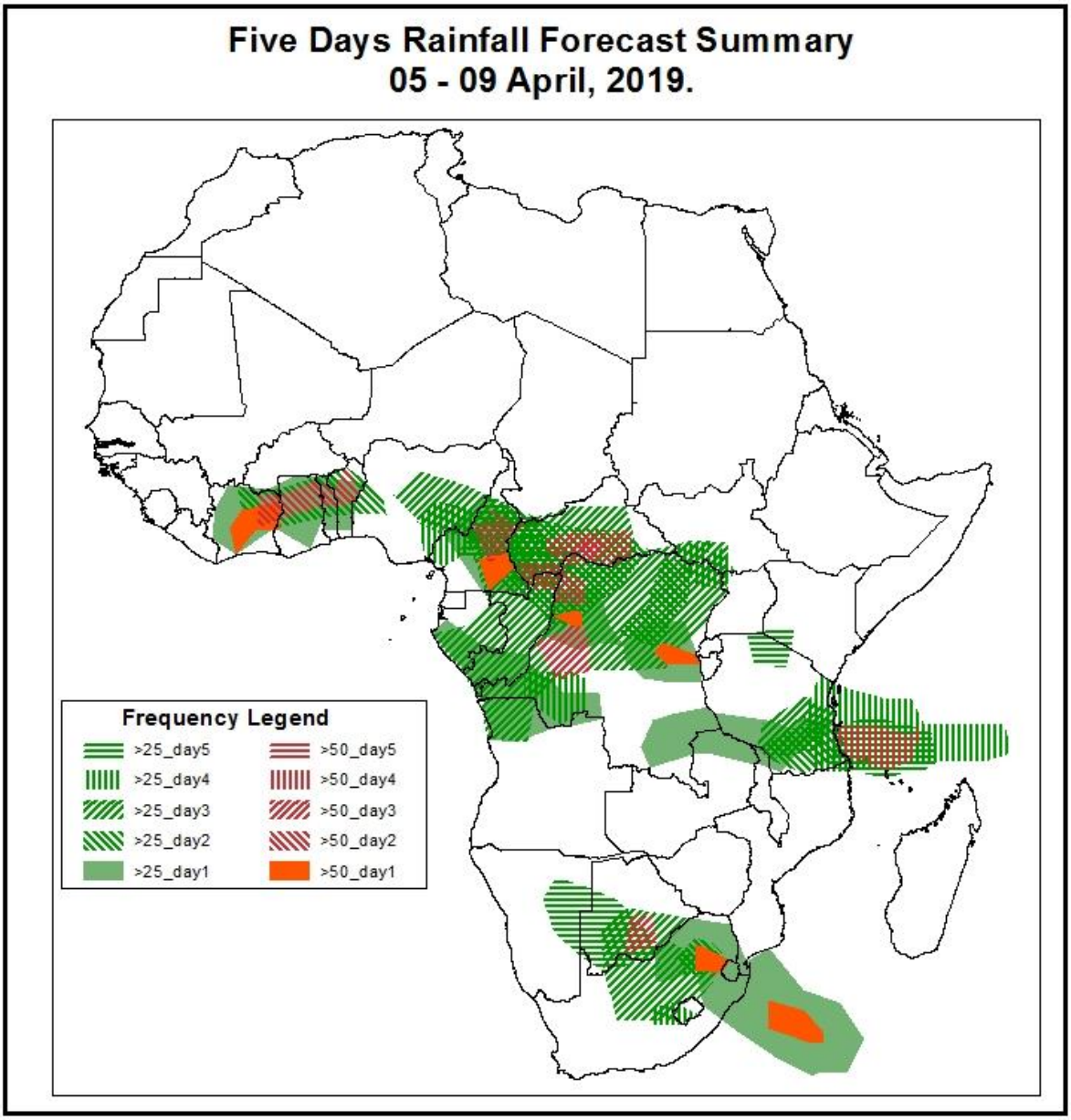
# NCEP Contributions to the WMO Severe Weather Forecasting Demonstration Project (SWFDP) and to the African Monsoon Multidisciplinary Analysis (AMMA) Initiative

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

### *1.1. Daily Rainfall and Maximum Heat Index Forecasts (valid: 05 – 09 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.



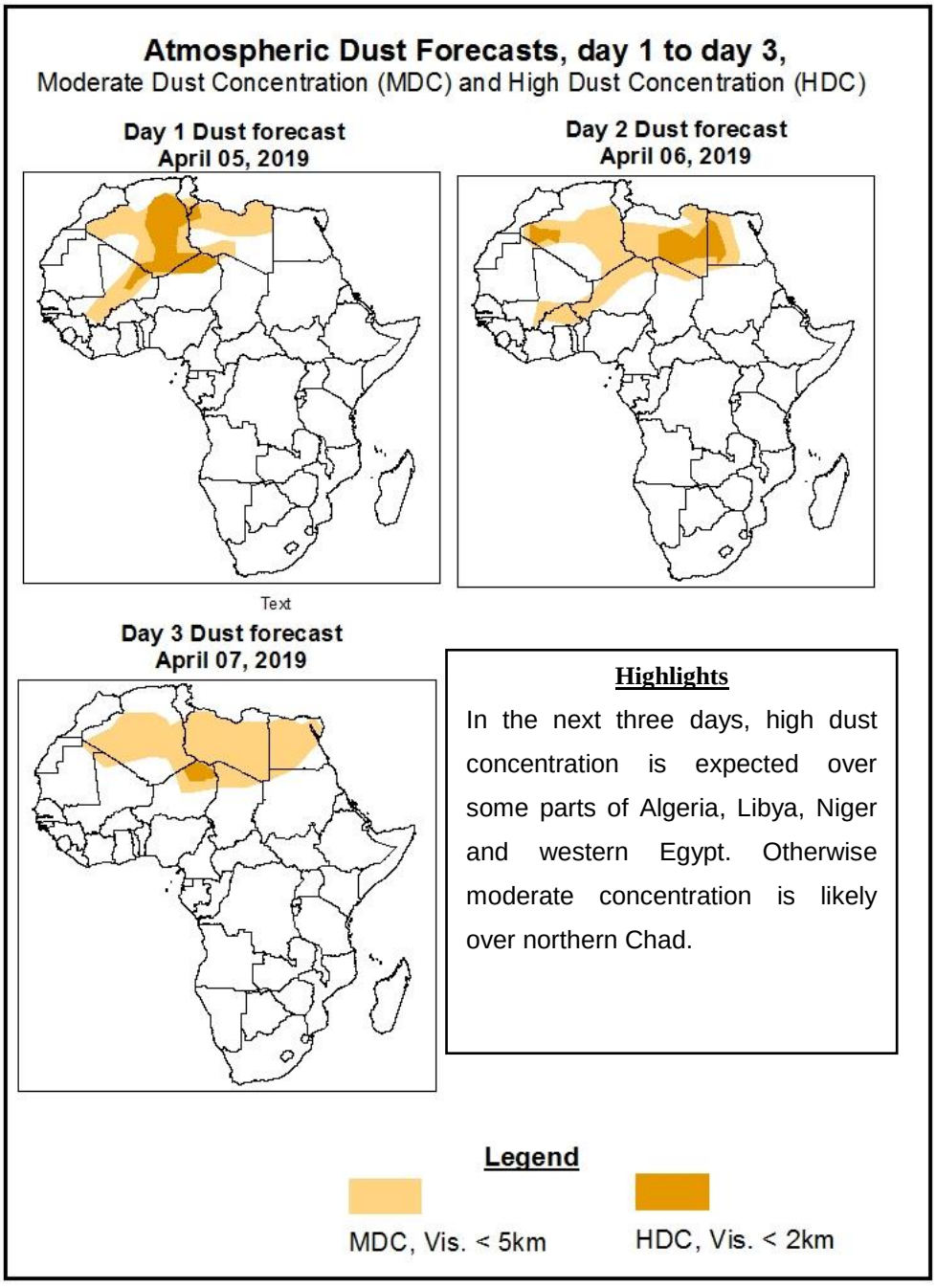



***Highlights***

- 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 Africa.
- The forcing from cold front is likely to cause significant to enhanced precipitation over southern Africa, particularly over South Africa, Lesotho and Swaziland, especially during the first half of the forecast period.
- At least 25mm for two or more days is likely in isolated areas over portions of the Gulf of Guinea, central Africa, 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: 05 – 07 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: 05 – 09 April 2019*

During the forecast period, the Azores High Pressure system over the North of Atlantic Ocean is expected to remain rather weak, even showing signs of weakening at times, and confined further West due to the presence of frontal as well as occasional heat lows in Northern Africa. In light of this, its influence over Gulf of Guinea is minimal.

During the forecast period, the St. Helena High Pressure system over Southeast Atlantic Ocean is expected to relax from 1028hPa to as low as 1018hPa. This is expected to cause the ITCZ to weaken and retard further South keeping moderate precipitation along the coastal areas of Gulf of Guinea. On the other hand, the Meridional component of the ITCZ is likely to retard further West reducing precipitation over western areas of East Africa.

The Mascarene High Pressure system over Southwest Indian Ocean is expected to slightly weaken from 1033hPa to between 1031-1028hPa due to a series of frontal lows South of southern Africa. Thus its influence to southern Africa weather is rather limited. On the other hand, the expected frontal lows are likely to continue influencing moderate to heavy precipitation in southern 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 moderate precipitation over the South throughout the forecast period especially along coastal areas. Otherwise, low level convergences are expected to influence significant precipitation over some areas in the central, south of Eastern Africa as well as parts of the 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. In addition, the precipitation over Southeastern parts of East Africa is likely to be exacerbated by the trough from the Indian Ocean.

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 Africa. The forcing from cold front is likely to cause significant to enhanced precipitation over southern Africa, particularly over South Africa, Lesotho and Swaziland, especially during the first half of the forecast period. At least 25mm for two or more days is likely in isolated areas over portions of the Gulf of Guinea, central Africa, 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.

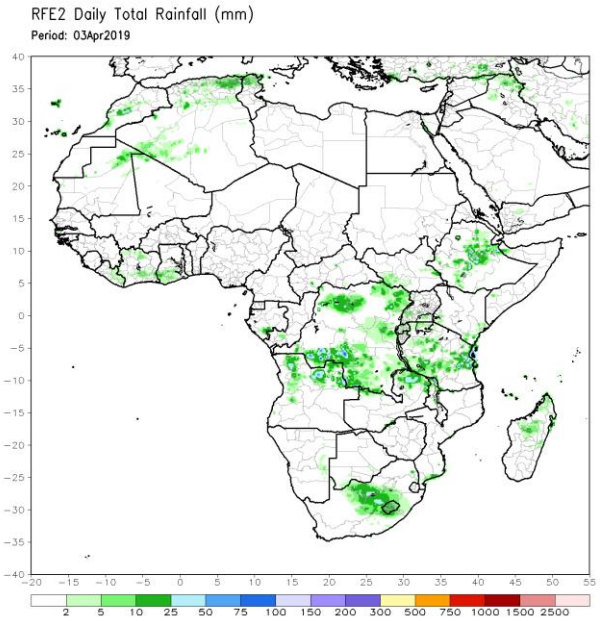
## 2.0. Previous and Current Day Weather over Africa

### *2.1. Weather assessment for the previous day* (April 3, 2019)

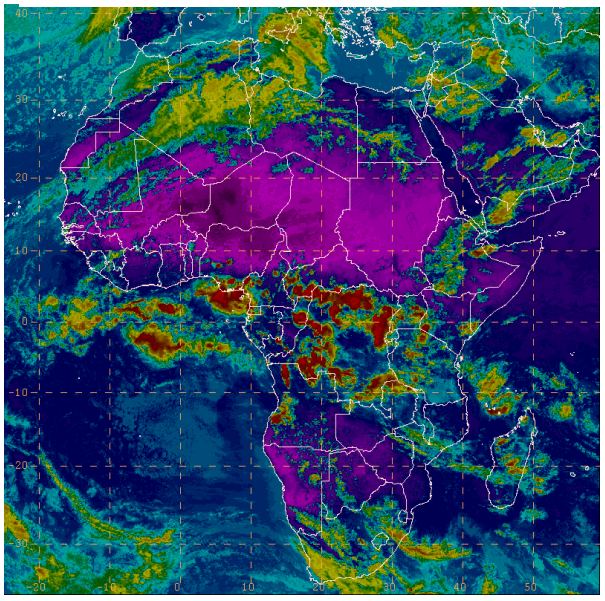
Daily rainfall totals exceeded 25mm over coastal areas of Tanzania, Northern Angola and southern DRC.

### *2.2. Weather assessment for the current day* (*April 4,* 2019)

Severe convection is observed over the central Africa, especially over Cameroon. Over much of DRC, enhanced convective clouds are observed. Otherwise over parts of Tanzania, significant convective clouds are evident.




**IR Satellite Image (valid 1452 April 04, 2019)**



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