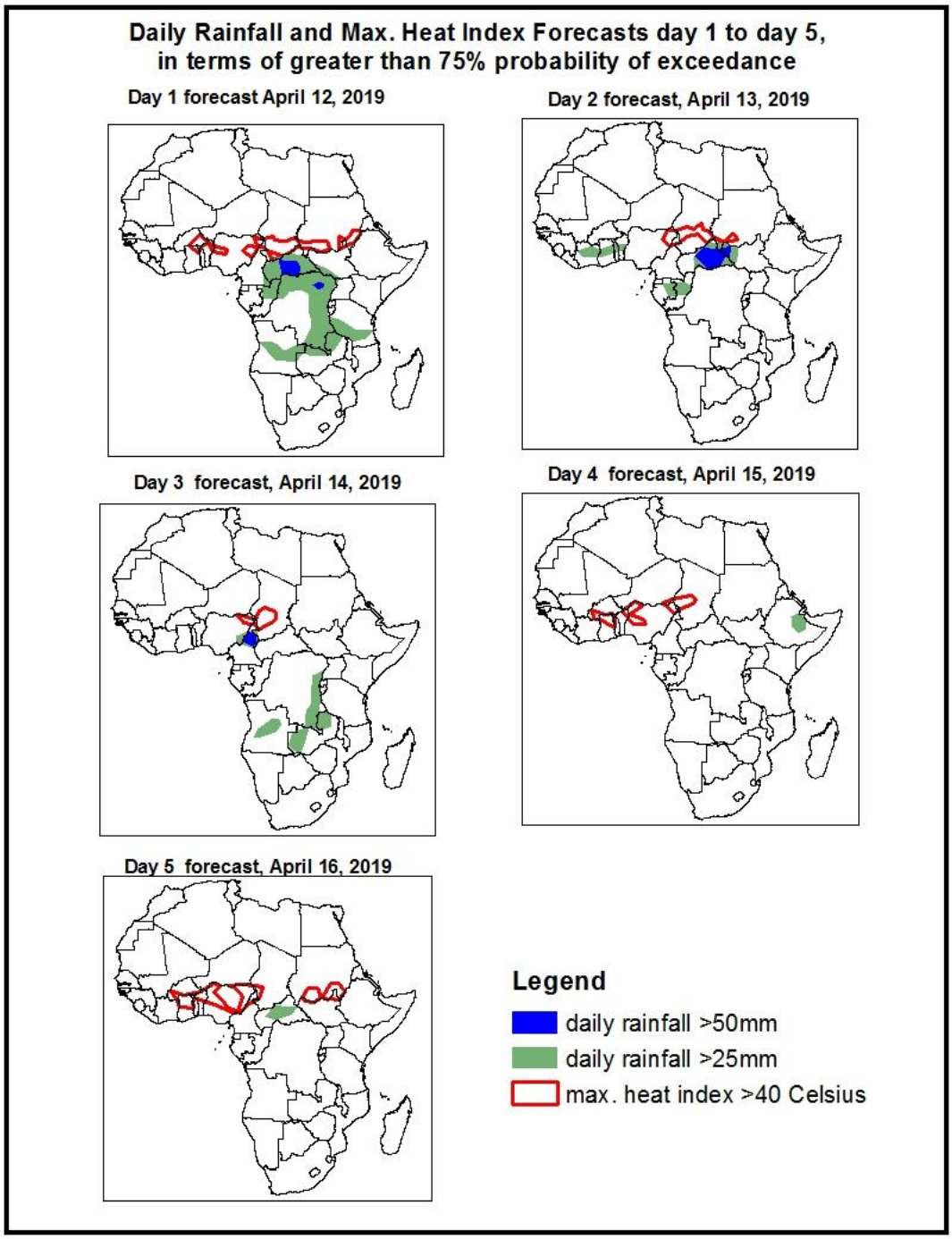
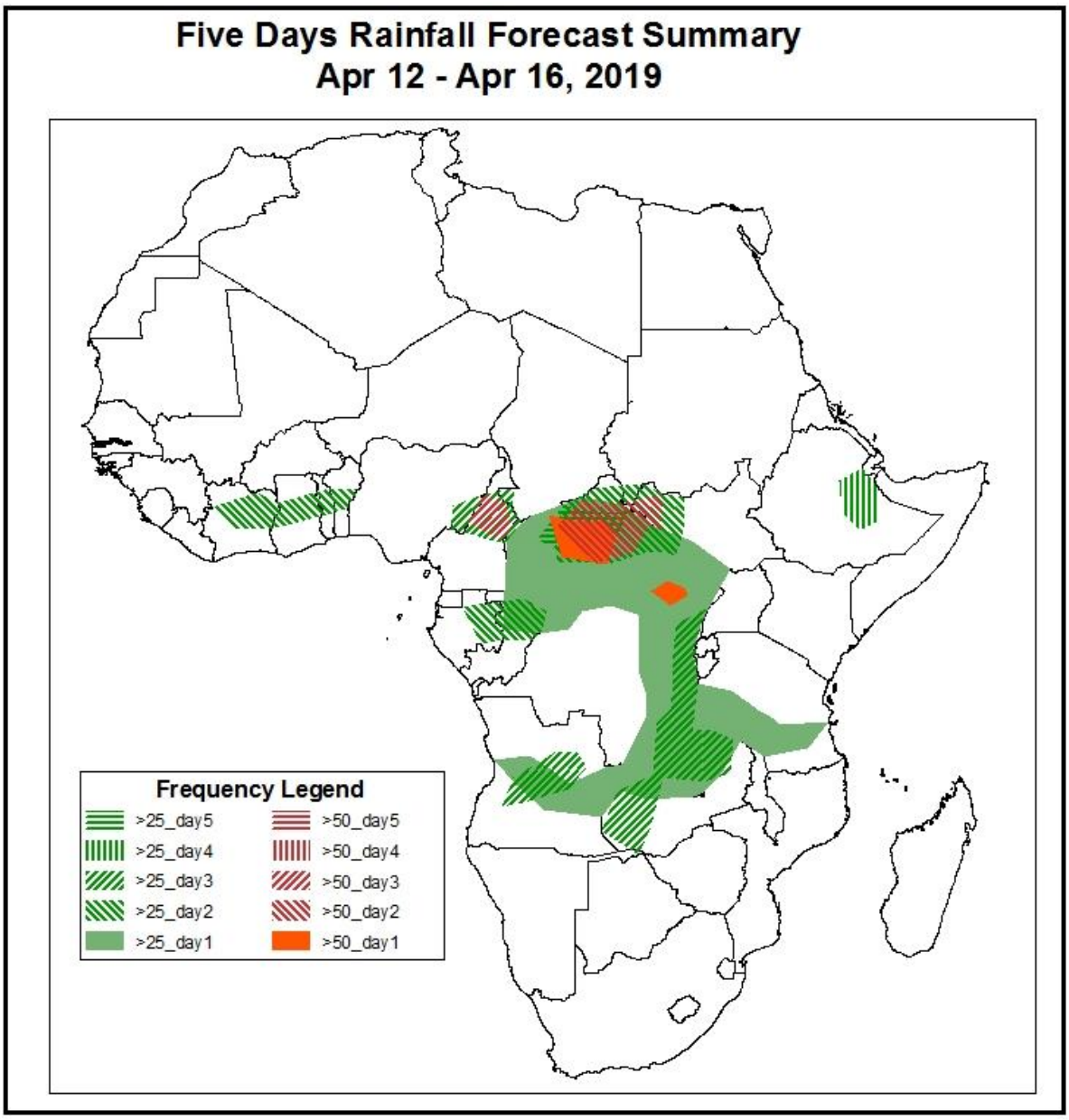
# NCEP Contributions to the WMO Severe Weather Forecasting Demonstration Project (SWFDP) and to the African Monsoon Multidisciplinary Analysis (AMMA) Initiative

## 1. Rainfall, Heat Index and Dust Concentration Forecasts, (Issued on *April 11*, 2019)

### *1.1. Daily Rainfall and Maximum Heat Index Forecasts (valid: 12 – 16 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.



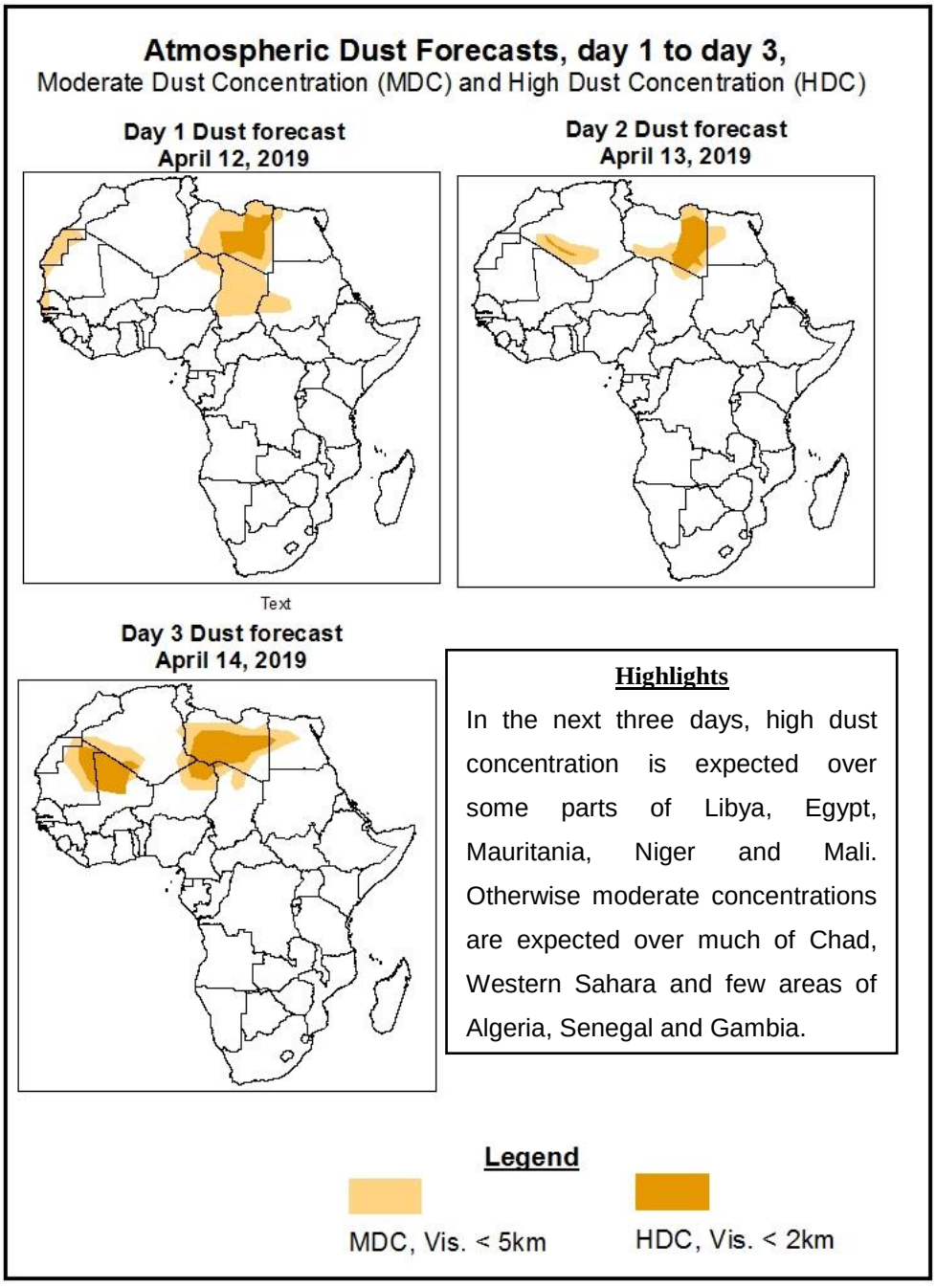



***Highlights***

- Only moderate precipitation over few areas is expected along the Gulf of Guinea.
- Persistent lower-level wind convergences are likely to maintain significant to enhanced precipitation over some areas over central (Cameroon, Republic of Congo, DRC, CAR) and northeast Africa (South Sudan). Meanwhile, the pattern is likely to influence moderate precipitation over southern Africa (Zambia, Angola and Tanzania). Parts of Ethiopia are also expected to receive significant precipitation, especially towards the end of the period.
- At least 25mm for two or more days is likely over the Gulf of Guinea, central Africa, southern parts of East Africa and few areas of southern and northeast Africa. Heavier precipitation is expected over some parts of central 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 and southern Sudan.

## *1.2. Atmospheric Dust Concentration Forecasts* *(valid: 12 – 14 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: 12 – 16 April 2019*

During the forecast period, the Azores High Pressure system over the North of Atlantic is expected to progressively extend towards northern Africa while intensifying from 1018hPa to 1021hPa at the end of the period.

During the first half of the forecast period, the St. Helena High Pressure system over Southeast Atlantic Ocean is expected to continue intensifying to as high as 1032hPa. During the second half of the period, however, it is expected to relax down to 1020hPa due to a frontal system from the West.

During the first half of the forecast period, the Mascarene High Pressure system over Southwest Indian Ocean is expected to continue intensifying to as high as 1033hPa. During the second half of the period, however, it is expected to relax, due to a frontal system from the West, down to 1028hPa.

At 925hPa, an isolated zone with dry northerly to northeasterly winds speeds (>35) is expected over Libya, Mali and Niger. Over these areas, moderate dust concentration is likely. Along the East African coast (Tanzania and Kenya), converging winds, especially during the first half of the period, are likely to cause significant to enhanced precipitation over some parts of these regions.

At 850hPa, convergent wind patterns over the East Africa (Tanzania, Kenya), central Africa (DRC and CAR) as well as over South (Zambia) and southwest Africa (Angola) are likely to keep moderate to isolated cases of enhanced precipitation over there.

At 700hPa, Northerly to Northeasterly wind pattern is expected over the areas expected to receive significant convective activities. In light of this, convective activities are likely to be propagated towards southwest.

Being mainly westerly, 500hPa wind pattern is expected to help propagating activities towards southwest over most of the areas expected to feature significant convection.

At 200hPa, strong wind (>130kts), associated with the Subtropical Westerly Jet, is expected to be maintained across northern Africa throughout the forecast period. The slight bending (trough) expected over northwest Africa towards northeast Africa towards the end of the forecast period is unlikely to influence precipitation over these regions.

Only moderate precipitation over few areas is expected along the Gulf of Guinea. Persistent lower-level wind convergences are likely to maintain significant to enhanced precipitation over some areas over central (Cameroon, Republic of Congo, DRC, CAR) and northeast Africa (South Sudan). Meanwhile, the pattern is likely to influence moderate precipitation over southern Africa (Zambia, Angola and Tanzania). Parts of Ethiopia are also expected to receive significant precipitation, especially towards the end of the period. At least 25mm for two or more days is likely over the Gulf of Guinea, central Africa, southern parts of East Africa and few areas of southern and northeast Africa. Heavier precipitation is expected over some parts of central 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 and southern Sudan.

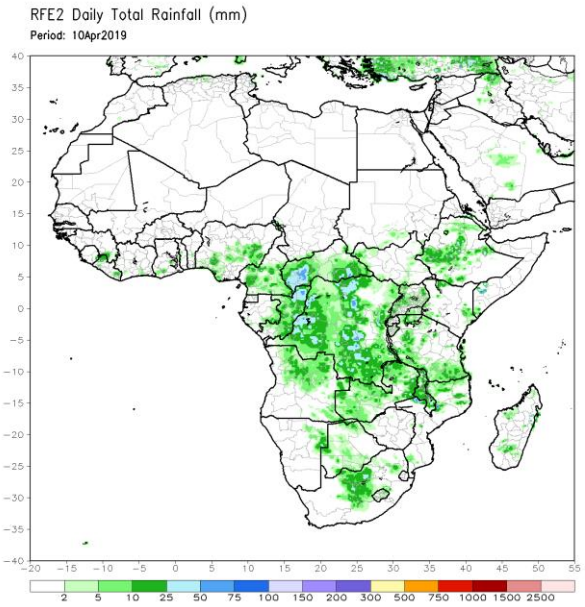
## 2.0. Previous and Current Day Weather over Africa

### *2.1. Weather assessment for the previous day* (April 10, 2019)

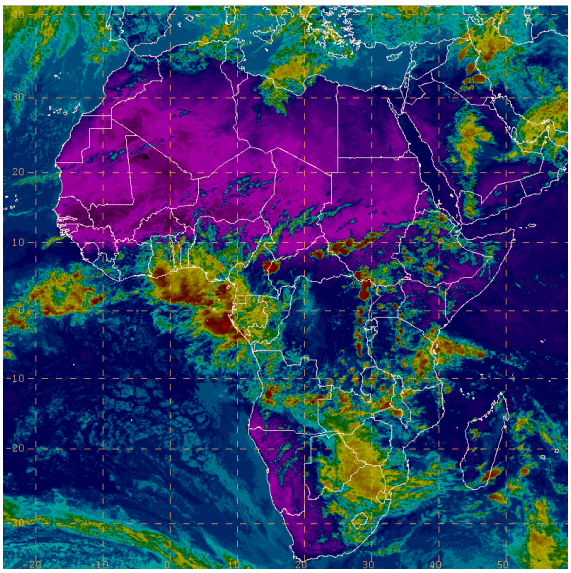
Daily rainfall totals exceeding 25mm is observed over CAR, Republic of Congo and DRC.

### *2.2. Weather assessment for the current day* (*April 11,* 2019)

Deep convective clouds are observed over the Gulf of Guinea while moderate convection is observed CAR, DRC, Angola, Zambia and Tanzania.




**IR Satellite Image (valid 1452 April 11, 2019)**



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