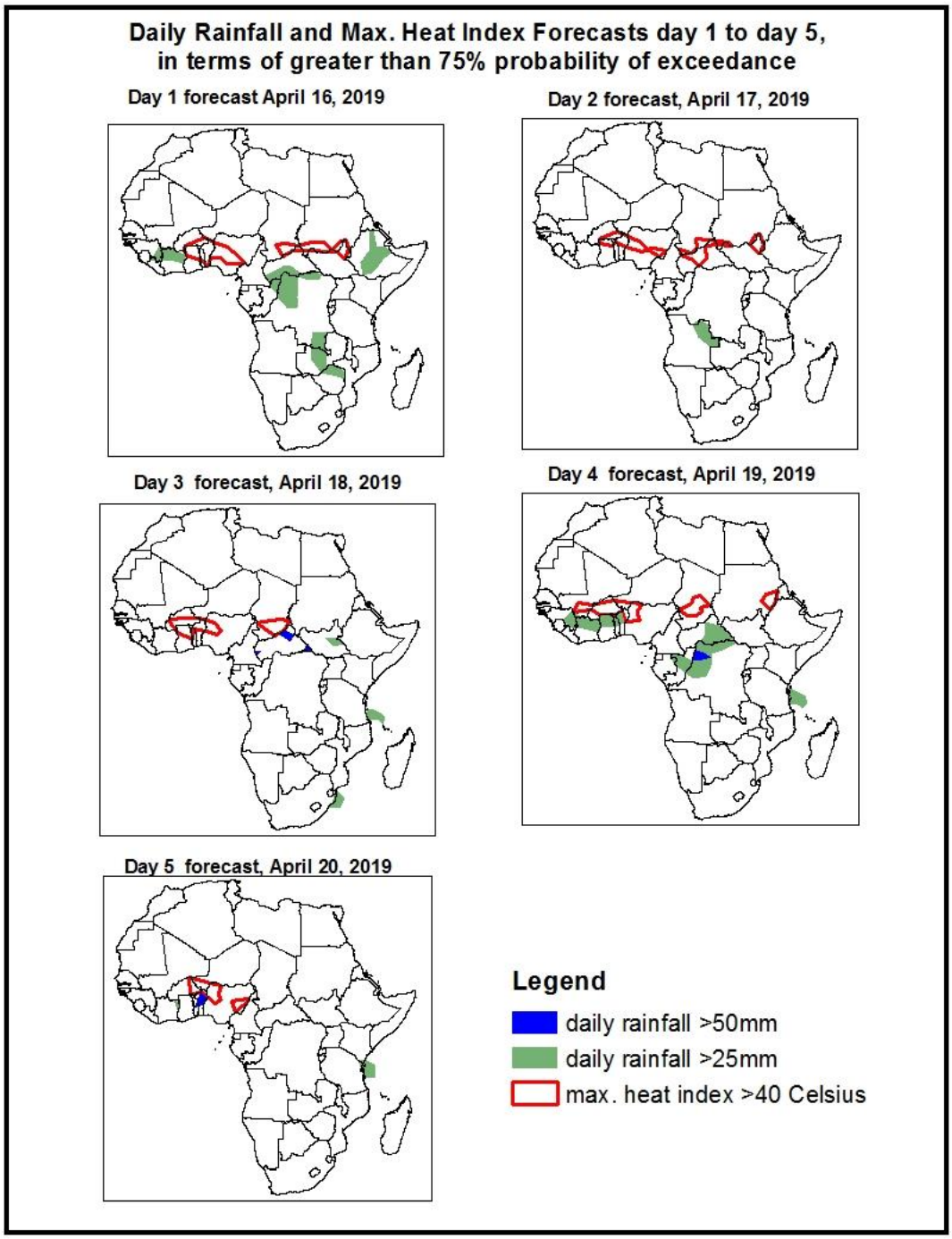
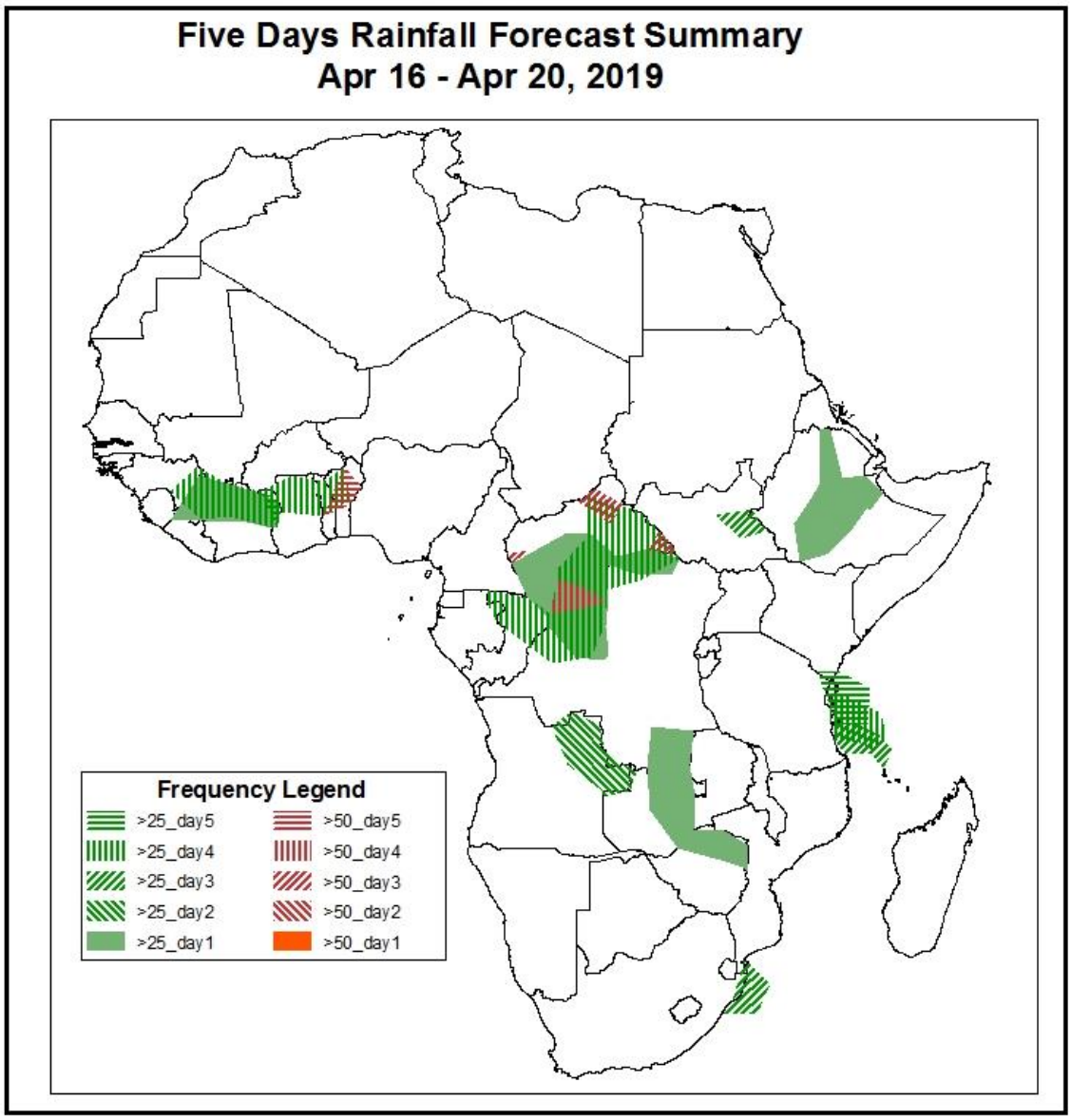
NCEP Contributions to the WMO Severe Weather Forecasting Demonstration Project (SWFDP) and to the African Monsoon Multidisciplinary Analysis (AMMA) Initiative

1. Rainfall, Heat Index and Dust Concentration Forecasts, (Issued on *April 15*, 2019)

1.1. Daily Rainfall and Maximum Heat Index Forecasts (valid: 16 – 20 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.



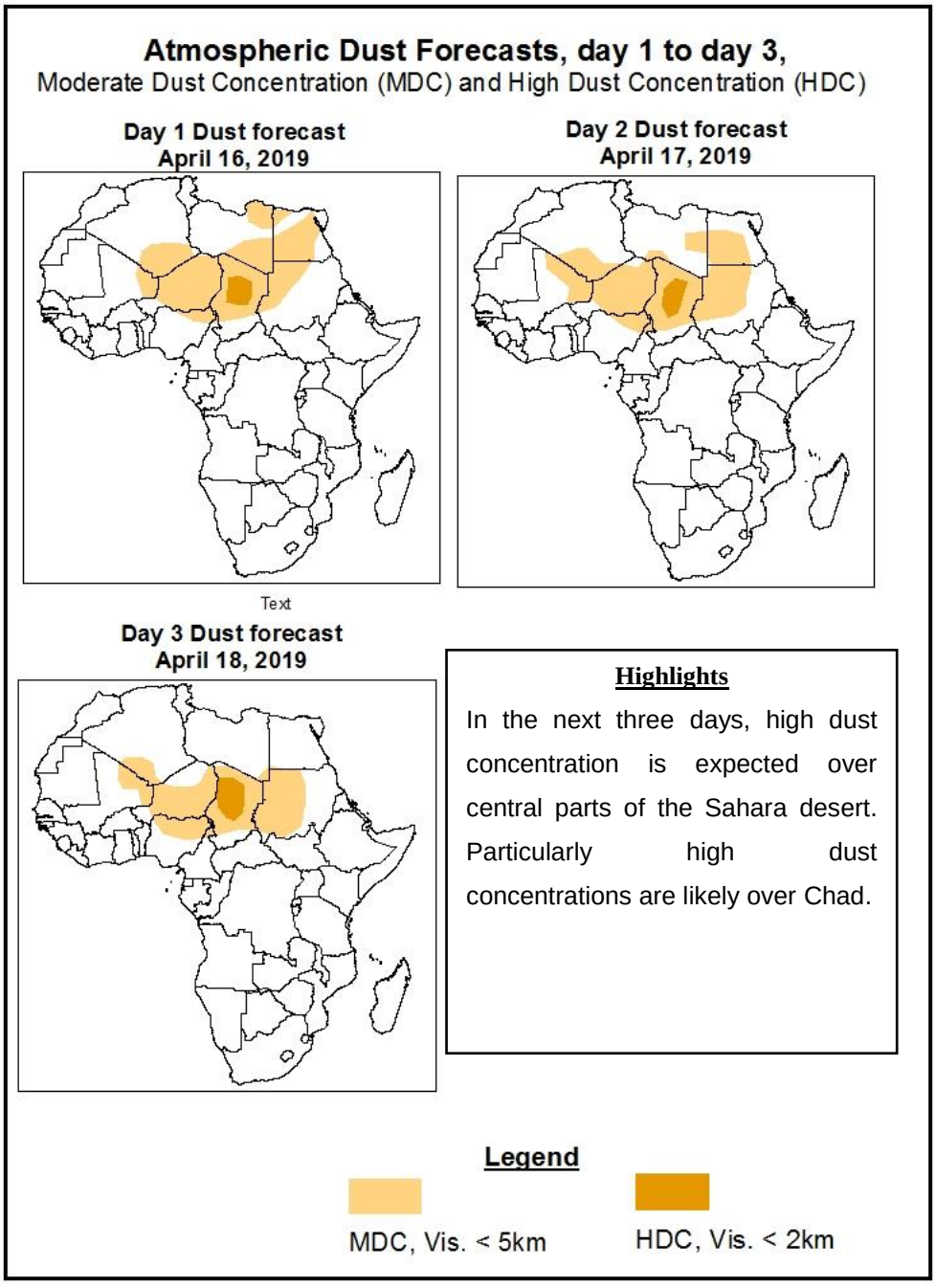


Highlights

- Quite isolated moderate to enhanced precipitation is expected over 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 (Ethiopia and South Sudan). The same is true for few areas along the East African coast.
- At least 25mm for two or more days is likely over few areas of the Gulf of Guinea (Guinea, Ivory Coast, Ghana, Togo and Benin), central Africa (DRC, CAR), South Sudan and few areas in southern Africa (Zambia, Zimbabwe, Angola and South 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: 16 – 18 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: 16 – 20 April 2019*

During the first half of the forecast period, the Azores High Pressure system over the North of Atlantic is expected to lie over northern Africa at around 1020hPa. However, during the second half, it is expected to be eroded by the series of heat lows over there.

During the start of the forecast period, the St. Helena High Pressure system over Southeast Atlantic Ocean is expected rapidly relax due to the incoming frontal system from West. However, soon after, the system is expected to rebuild to as high as 1030hPa, remaining strong during most of the period.

The Mascarene High Pressure system over Southwest Indian Ocean is expected to remain rather weak during the first half of the forecast period due to frontal system from West, only starting intensifying towards the end of the period.

At 925hPa, a zone with dry northerly to northeasterly winds speeds (>35) is expected to hover over Chad triggering quite high atmospheric dust concentration over the area. Further South off the Gulf of Guinea, the trough is limited over the ocean and therefore coastal areas are unlikely to be influenced by the system. Over the central Africa, significant precipitation is likely due to the converging wind patterns over there. Along the East African coast (Tanzania and Kenya), converging winds, especially during the first half of the period, are unlikely to cause significant precipitation over there.

At 850hPa, convergent wind patterns over central Africa (DRC and CAR) are likely to keep moderate precipitation over these areas with good chances of isolated enhanced precipitation. Otherwise, during the first half of the period, wind pattern over East Africa is not favoring enhanced precipitation up until the second half where indication of convergence is expected to cause some activities.

At 700hPa, easterly 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 easterly, 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 the mid of the forecast period is unlikely to influence precipitation over these regions.

Quite isolated moderate to enhanced precipitation is expected over 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 (Ethiopia and South Sudan). The same is true for few areas along the East African coast. At least 25mm for two or more days is likely over few areas of the Gulf of Guinea (Guinea, Ivory Coast, Ghana, Togo and Benin), central Africa (DRC, CAR), South Sudan and few areas in southern Africa (Zambia, Zimbabwe, Angola and South 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 and southern Sudan.

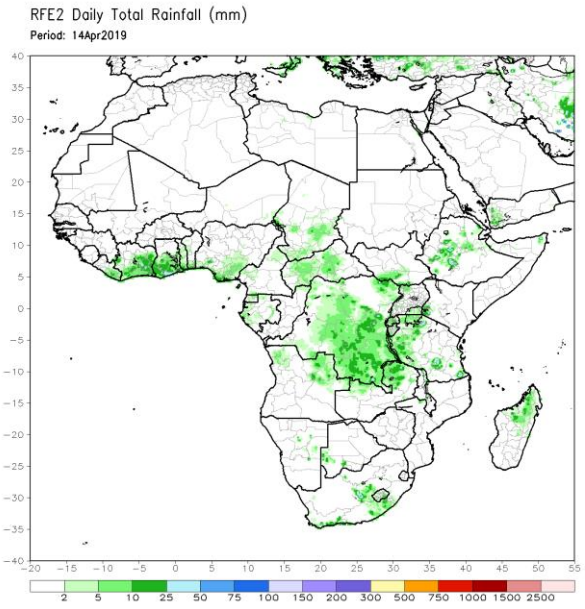
2.0. Previous and Current Day Weather over Africa

2.1. Weather assessment for the previous day (April 14, 2019)

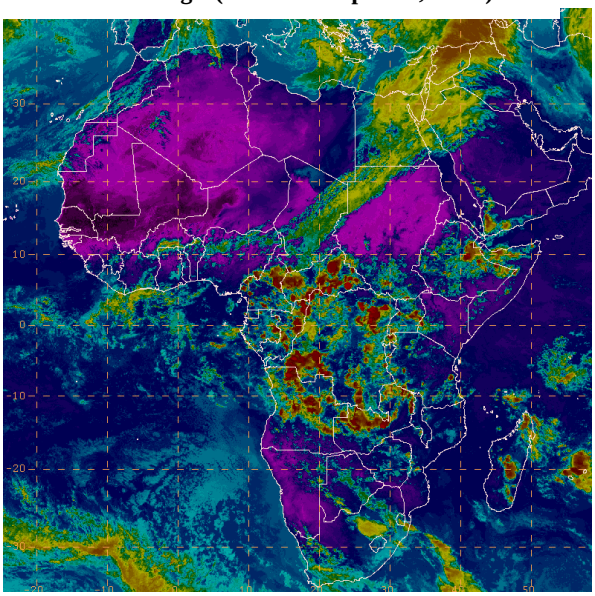
Daily rainfall totals exceeding 25mm is observed over few areas in southern Ghana.

2.2. Weather assessment for the current day (*April 15,* 2019)

Significant convective clouds are observed over the CAR, DRC, Cameroon, Angola and Zambia.



IR Satellite Image (valid 1452 April 15, 2019)



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