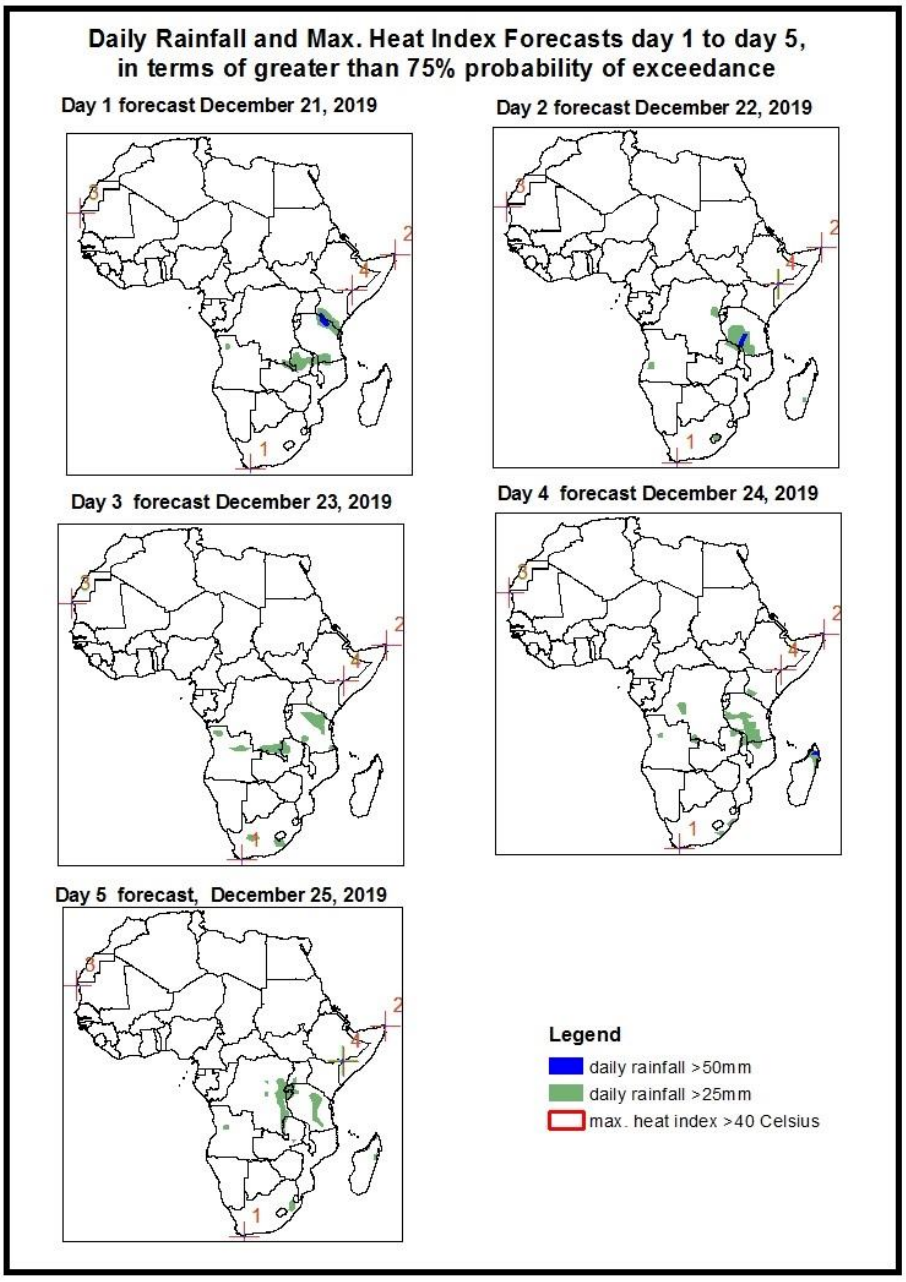
NCEP Contributions to the WMO Severe Weather Forecasting Demonstration Project (SWFDP) and to the African Monsoon Multidisciplinary Analysis (AMMA) Initiative

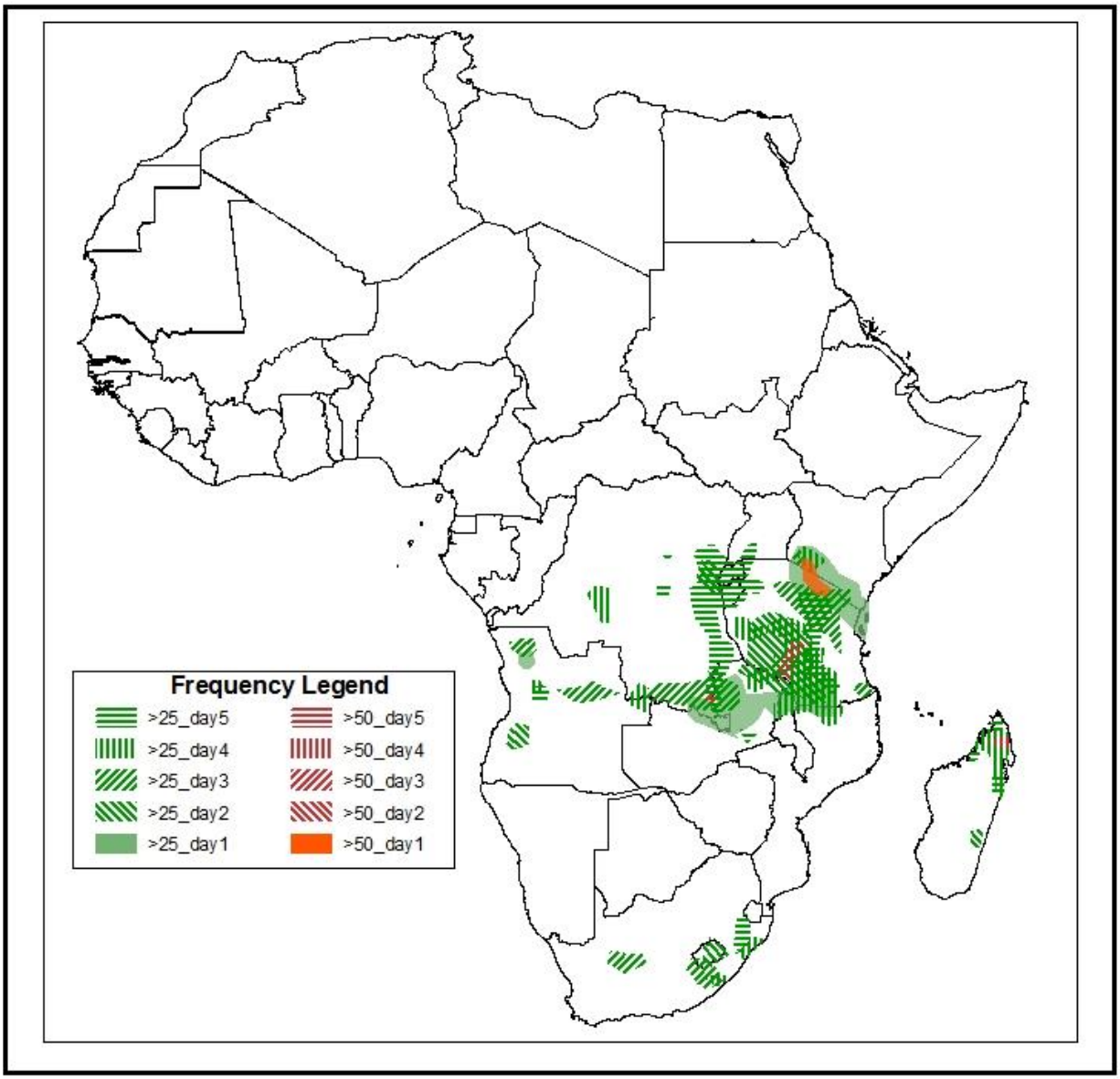
1. Rainfall, Heat Index and Dust Concentration Forecasts, (Issued on December 20, 2019)

1.1. Daily Rainfall and Maximum Heat Index Forecasts (valid: 21 December – 25 December, 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^{o}C), based on the NCEP/GFS and the NCEP Global Ensemble Forecasts System (GEFS) and expert assessment.



Five Days Rainfall Forecast Summary
December 21 - December 25, 2019

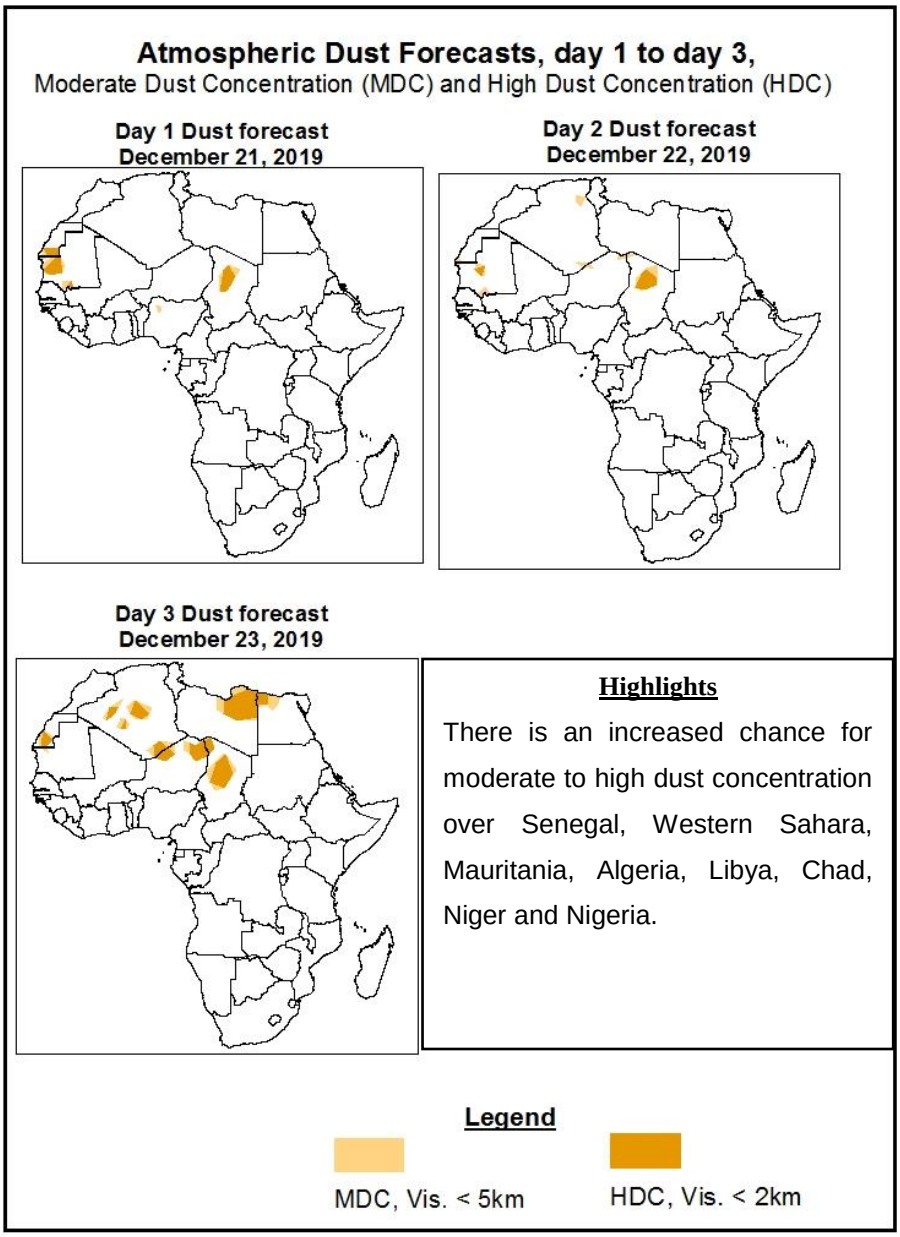


Highlights

- Strong lower-level wind convergences are expected to enhance rainfall over parts of East Africa and Northern Madagascar.
- At least 25mm for two or more days is likely over portions of DRC, Angola, South Africa, Lesotho, Mozambique, Madagascar, Zambia, Malawi, Tanzania, Burundi, Rwanda, Uganda and Kenya.
- There is an increased likelihood for daily rainfall to exceed 50mm over local areas in DRC, Tanzania, Kenya and Madagascar.

1.2. Atmospheric Dust Concentration Forecasts (valid: 21 Dec – 23 Dec 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: 21 December – 25 December 2019*

The Azores High Pressure system over the Northeast Atlantic Ocean has its center purely continental and is generally expected to intensify while shifting eastwards with its central pressure value increasing from 1023hPa to 1028hPa during the first three days of the forecast period. During the last two days of the forecast period, its central pressure value is expected to drop from 1028hPa to 1026hPa.

The St. Helena High Pressure system over the Southeast Atlantic Ocean is generally expected to slightly weaken while shifting eastwards with its central pressure value decreasing from 1026hPa to 1024hPa during the forecast period. Its central pressure value is expected to remain constant at 1026hPa for the first two days of the forecast period and thereafter dropping to 1024hPa on the third day, which is then maintained for the rest of the forecast period.

The Mascarene High Pressure system over Southwest of Indian Ocean is generally expected to intensify while shifting eastwards with its central pressure value increasing from 1025hPa to 1030hPa during the forecast period. However, its central pressure value is expected to remain constant at 1025hPa for the first two days of the forecast period before it steadily increases to 1030hPa for the remainder of the forecast period.

The relatively strong Arabian Ridge is expected to remain active during the forecast period and hence, it will have a significant impact on the weather across most parts of northeastern Africa and portions of the Great Horn of Africa.

At 925-hPa level, strong hot, dry and dusty northerly to northeasterly flow from the Sahara is expected to prevail across northern Sahel region and northwestern parts of Africa, while the cool and moist southwesterly flow from the Atlantic Ocean with its low-level convergence is expected to prevail across the Gulf of Guinea, southern Sahel regions and most neighboring areas of Central, western equatorial and southwestern Africa. The evolution of ITD is clearly visible during the forecast period. On the other hand, the northeasterly flow from the Indian Ocean with its low-level convergence is expected to prevail across most parts of the Greater Horn of Africa and parts of Central Africa whereas the combination of northeasterly and

easterly flows from the Indian Ocean together with their low-level convergences is expected to prevail across most parts of southern Africa.

At 850-hPa level, strong dry northerly flow is expected remain active and prevail across southern Sahel countries while an area of strong anticyclonic circulation is over Northwest Africa. On the other hand, meridional and seasonal wind convergence is expected to remain active across the Lake Victoria region, Congo Basin and the neighboring areas of Central and southern Africa during the forecast period. Converging lower-level winds over Kenya, Tanzania, Uganda, Burundi, Rwanda, Ethiopia, DRC, southern Cameroon, Mozambique, Malawi, Zimbabwe, Zambia, Angola, Namibia, Botswana, South Africa and Madagascar; are likely to maintain the occasional enhanced to moderate precipitation over these areas.

Strong lower-level wind convergences are expected to enhance rainfall over parts of East Africa and Northern Madagascar. At least 25mm for two or more days is likely over portions of DRC, Angola, South Africa, Lesotho, Mozambique, Madagascar, Zambia, Malawi, Tanzania, Burundi, Rwanda, Uganda and Kenya. There is an increased likelihood for daily rainfall to exceed 50mm over local areas in DRC, Tanzania, Kenya and Madagascar.

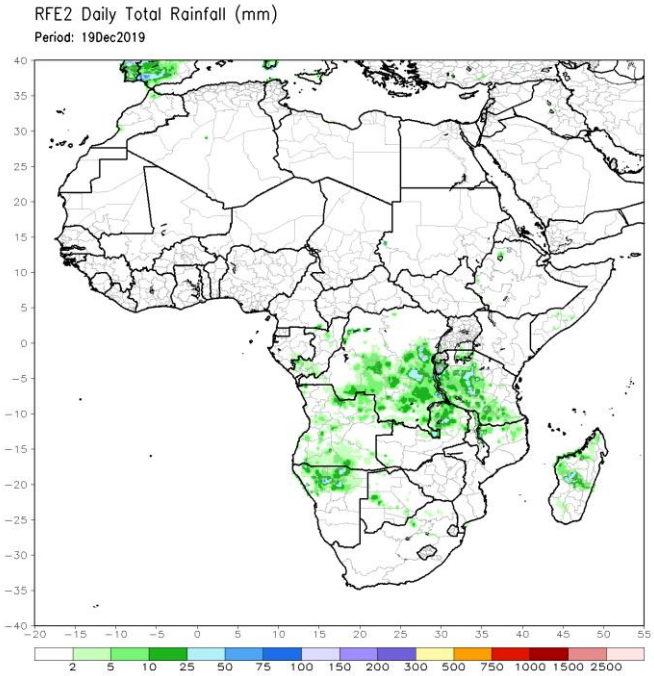
2.0. Previous and Current Day Weather over Africa

2.1. Weather assessment for the previous day (Dec 19, 2019)

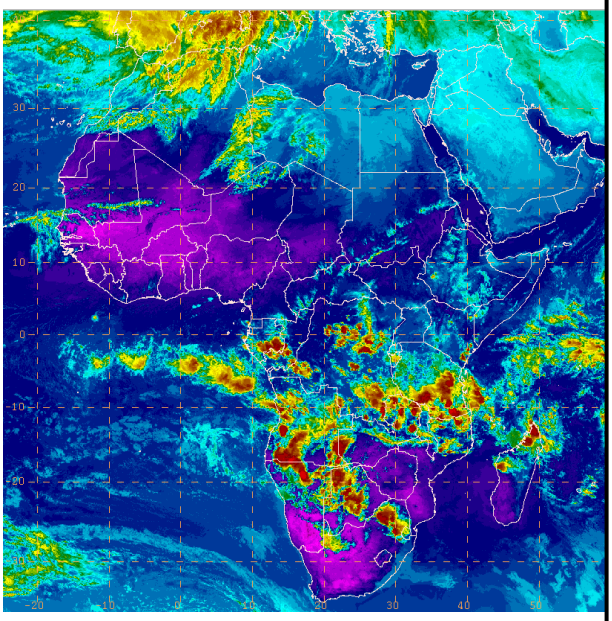
Daily rainfall amount exceeded 25mm over DRC, Angola, Namibia, Zambia, Burundi, Uganda, Sudan, Ethiopia, Tanzania, Mozambique and Madagascar; and exceeded 50mm over DRC, Namibia, Madagascar, Sudan and Ethiopia.

2.2. Weather assessment for the current day (Dec 20, 2019)

Deep convective clouds are observed over many places in the western equatorial and Central Africa, Northern Madagascar, lower half of East Africa and over a small portion of Southern.



IR Satellite Image (valid 1552 December 20, 2019)



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