



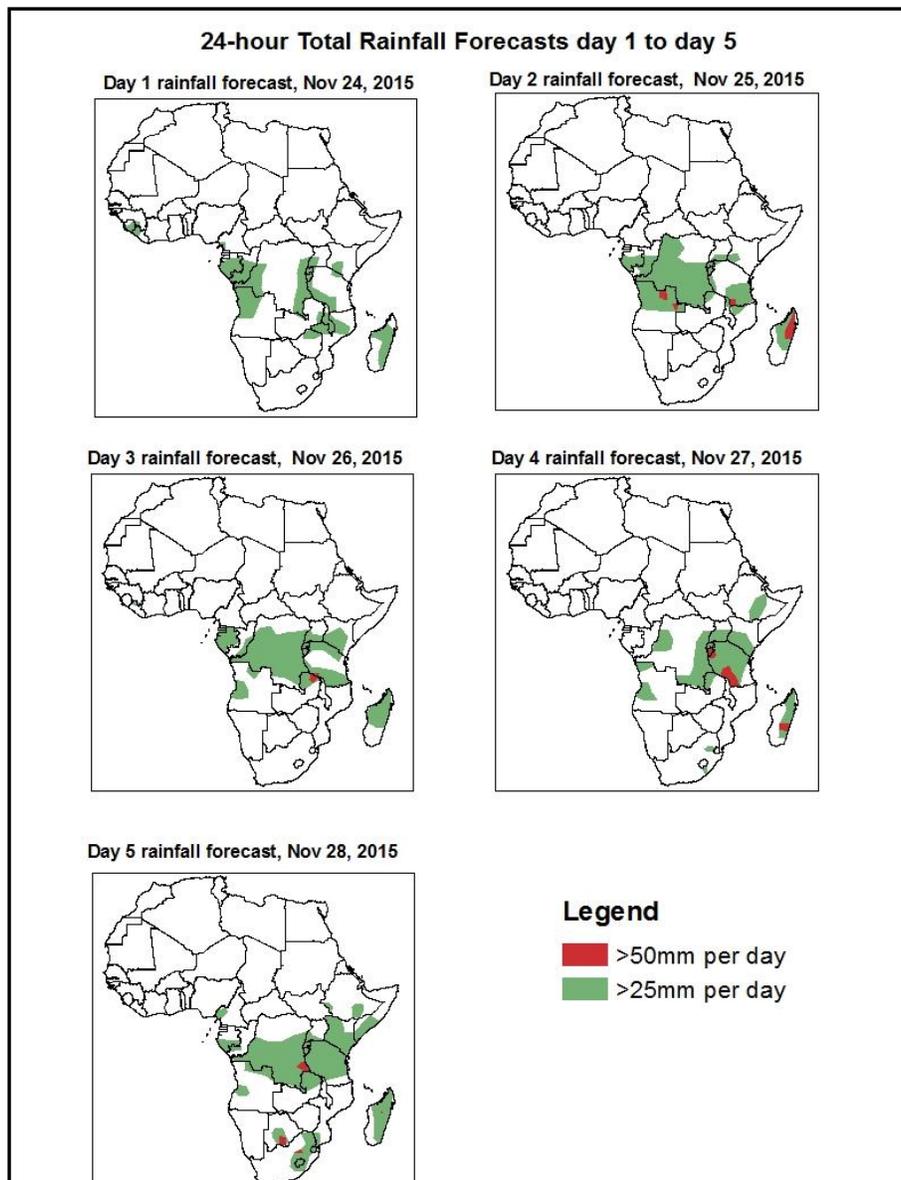
# NCEP Contributions to the WMO Severe Weather Forecasting Demonstration Project (SWFDP) and to the African Monsoon Multidisciplinary Analysis (AMMA) Initiative

## 1. Rainfall and Dust Concentration Forecasts

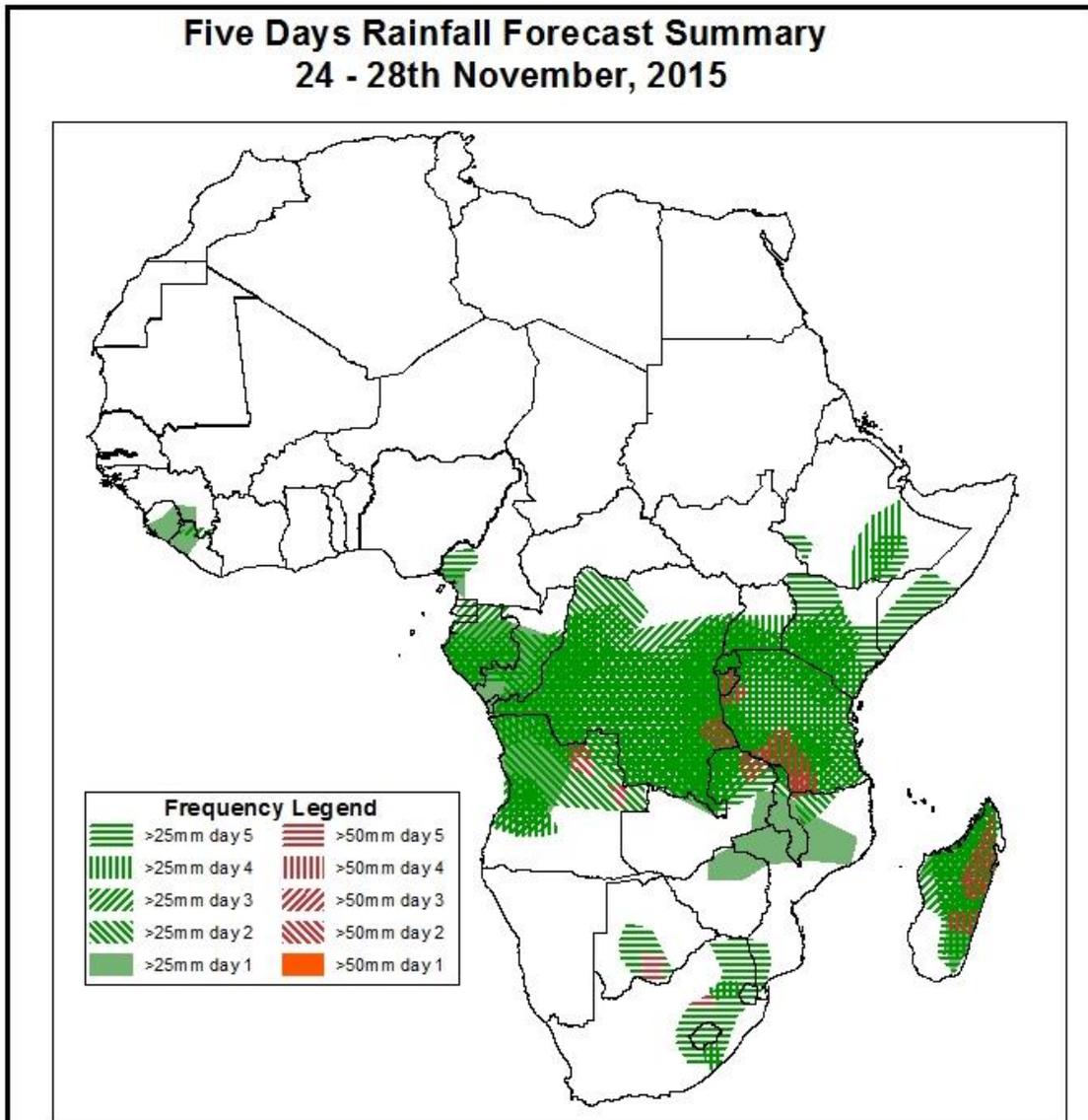
Valid: 06Z of Nov 24 – 06Z of Nov 28, 2015. (Issued on November 23, 2015)

### 1.1. 24-hour Cumulative Rainfall Forecasts

The forecasts are expressed in terms of high probability of precipitation (POP), based on the NCEP/GFS, ECMWF and the NCEP Global Ensemble Forecasts System (GEFS) and expert assessment.



## Five Days Rainfall Forecast Summary 24 - 28th November, 2015

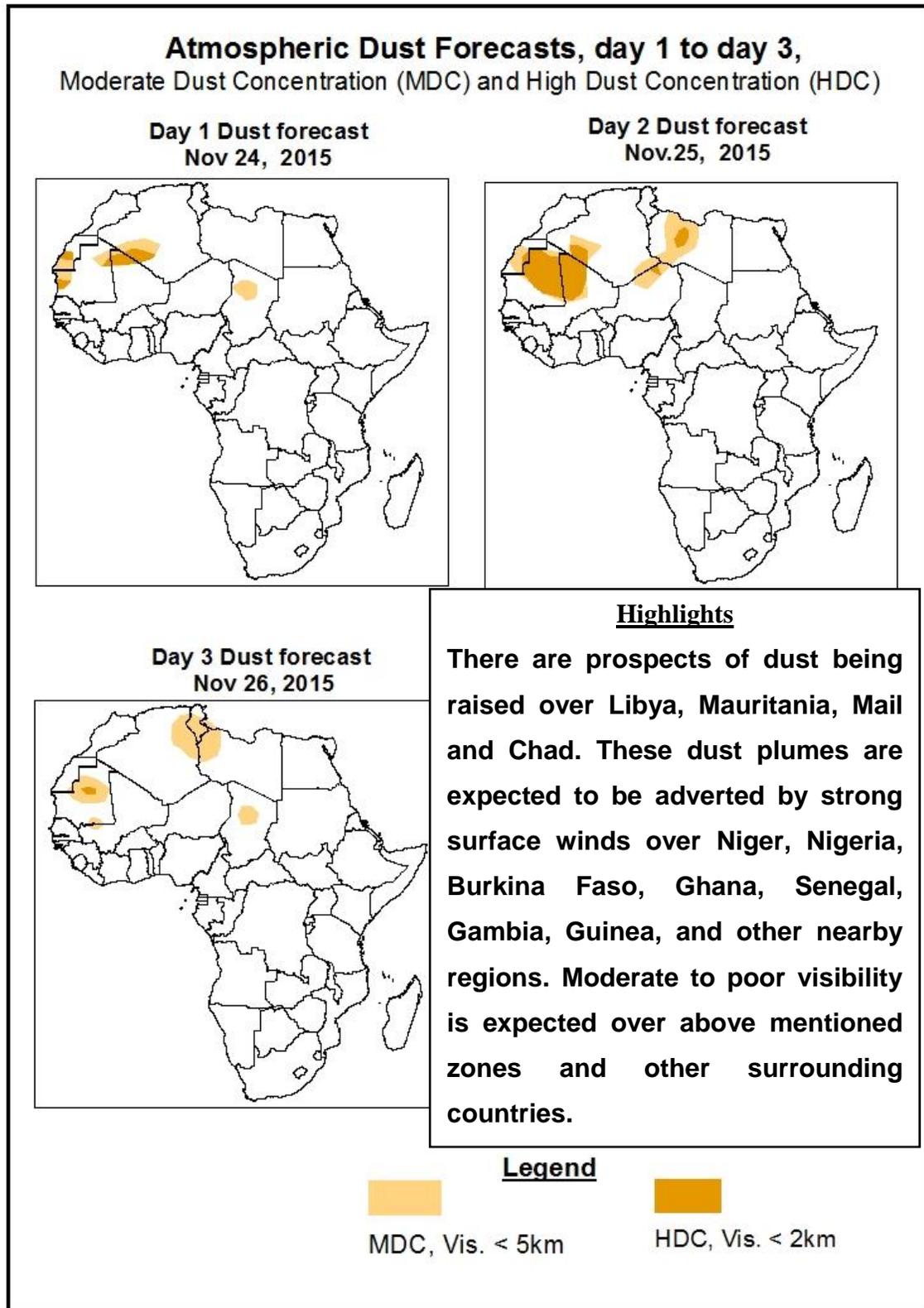


Prognostic analysis of rainfall extent and spread for the subsequent five days over West, central, East and Southern Africa reveals that The Intertropical Discontinuity (ITD) is expected to resume propagating towards its minimum southwards position. The ITD is expected to propagate approximately between 6 and 8 degrees north of the Equator. The North easterly trade wind is will still remain predominant over its counterpart the southwesterly trade wind over most of West Africa, Chad, CAR and Sudan. In view of above, few cases of rainfall are expected over the Coastlines of West Africa. Like the previous days, the meridional convergence over DRC and the East African monsoon are still expected be active; therefore rainfall is expected to continue over most part of Central, Eastern and the Horn of Africa. Convection and low level moisture convergence from the Indian Ocean has prompted rainfall over the East part of Southern Africa. Therefore the following places are expected to have moderate to heavy rainfall; Sierra-Leone, Liberia, Cameroun, Gabon, Congo, DRC, Kenya, Uganda, Rwanda, Burundi, Tanzania, Angola. Ethiopia, East part of South Africa, Mozambique, Zimbabwe, Botswana, Lesotho, and Swaziland. Moderate to heavy amount of rainfall is also expected over the island of Madagascar.

## 1.2. Atmospheric Dust Concentration Forecasts

Valid: 12Z of Nov 24– 12Z of Nov 26, 2015

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: 24 – 28 November, 2015**

The Azores high pressure system is expected to intensify in the next 48 hours, its central value will increase from 1033 mb to 1042 mb. This High pressure system will weaken by 3 mb in the next 72 hours; thereby having a central pressure value of 1039 mb. It will again intensify from 1039 to 1045 mb in the next 96 hours. This pressure system will weaken again by 7 mb, thereby having a central value of 1038 mb by the end of the forecast period according to GFS models.

The Libyan High, relatively known as a cut off High or an extension of the Azores high pressure system, repositioned itself over Libya, with its 1016 isoline below 20 degrees north of the Equator. Unlike the previous days, where the passage of the Mid latitude trough influenced the ITD to temporarily propagate Northwards remarkably. The significant intensification of the Azores high will be greater felt over Mauritania and Western Sahara as Dust is expected to still be raised over those areas. The dust raised will be propagated by relatively moderate to strong Northerly winds towards areas and zones along their trajectory. These developments are strong indication that active rainfall and weather activities have started over the southern hemisphere.

The St Helena high pressure system at the beginning of the forecast period had a central pressure value of 1026 mb. This high pressure system is expected to weaken in the next 48 hours, by 2 mb with its central pressure value decreasing from 1026 to 1024 mb. It will intensify from 1024 to 1029 mb in the next 72 hours. By the end of the forecast period, it is expected that this high pressure system will weaken further to 1028. mb according to GFS Models. This pressure system was observed throughout the forecast period to have moved over Southern Africa and is expected to remain on that position during the next 48 hours. This high pressure system was also observed to move away remarkably from the coast of Western Africa. The St Helena high pressure system being over South Africa within the next 48 hours will most likely cut off convection from the surface and enhance the formation of more stratiform clouds over the South African region, although afterwards convection is expected to resume and enhance rainfall.

The Mascarene high pressure system is expected to intensify from 1018 to 1024 mb in the next 24 hours. It will intensify further in the next 48 hours by 2 mb. Its central pressure values increasing from 1024 mb to 1026 mb. This pressure system will intensify again by 2 mb, having a central pressure of 1028 mb .At the end of the forecast period according to the GFS model, it is expected that the Mascarene high pressure system will intensify by 1 mb, thereby having a central pressure value of 1029 mb. This high pressure system was observed to have moved away remarkably from the coastline of southern African and moved deeper into the Indian Ocean just like the previous days. Its current position has given room for maritime winds and active convection to start taking over that region.

Isolated cut off low pressure systems were observed over West, Central, Eastern and Southern Africa. The central pressure values of these thermal Lows that were observed over West and Eastern Africa responded remarkably to thermal heating, thereby causing their central pressure valves to deepen. Their center values deepen from 1011 mb to 1008 mb over East and Western Africa. At the end of the forecast period, the center pressure values of these isolated thermal low were observed to fill back from 1008 to 1011 mb at the end of the forecast period. Thermal low pressure systems were also observed over Southern Africa and the deepen remarkably within the forecast period.

At 925 mb streamlines; Maritime winds from the Atlantic Ocean were still observed streaming into some countries in West Africa namely Sierra Leone, Liberia, Ivory Coast, Ghana, Togo, Benin Republic, and Southern Nigeria within the forecast period. Maritime winds were also observed streaming into Southern Cameroun, Equatorial Guinea, Gabon and into the inlands of central Africa like, Angola, CAR and DRC. Maritime wind flow patterns from the Indian Ocean were also observed streaming into the inlands of Kenya, Uganda, Tanzania, Malawi, Zambia, thereby instituting the Congo boundary convergence. Indian Ocean monsoon was also observed over Mozambique, Malawi, Botswana, Swaziland and Lesotho in Southern Africa. Whereas The Northeasterly continental wind flow pattern was observed over Senegal, Guinea, Burkina Faso, Mali,

Chad, Niger, Northern and central Nigeria, Northern Cameroun, Central African Republic and Sudan.

At 850 mb streamlines; continental flows, predominant North easterly trade winds were observed over most parts of West Africa namely Senegal, Gambia, Mauritania, Sierra Leone, Liberia, Burkina Faso, Ghana, Togo, Niger, Chad, Nigeria and Cameroun. A high pressure system was also observed over the Indian Ocean, this induced maritime wind flows patterns to stream into Congo, Southern Sudan and DRC in Central Africa and Kenya. Burundi, Rwanda, Uganda, Ethiopia and Somalia in East Africa. The winds at this level were observed to converge over DRC within the forecast period.. Maritime winds from the Indian Ocean were also observed over Mozambique, Zimbabwe, Swaziland and Lesotho in Southern Africa.

At 700 mb streamlines; a wet ridge was observed over east part of South Africa. High pressure systems observed over Mauritania and Northern chad, establishing an anticyclonic flow patterns over Mauritania, Senegal, Guinea, Sierra Leone, Ghana, Benin, Burkina Faso, chad, Niger, Nigeria, Sudan, and Central African Republic. The winds were observed at this level to converge over Tanzania and DRC. Anticyclonic wind flow patterns was observed over Zambia, Namibia, Zimbabwe, Swaziland, Botswana, South Africa and Lesotho. The easterly jets are expected to propagate westwards from Sudan toward the gulf of Guinea during the forecast period. Strong maritime winds flow pattern were also observed streaming into East and central Africa from the Indian Ocean.

At 200 mb streamlines; Anticyclonic flow patterns were observed over West, central and Eastern Africa. Over South Africa Zonal flow patterns was also observed within the next 72 hours. The jets associated with this flow pattern had moderate to strong wind speeds.

Prognostic analysis of rainfall extent and spread for the subsequent five days over West, central, East and Southern Africa reveals that The Intertropical Discontinuity (ITD) is expected resume propagating towards its minimum southwards position. The ITD is expected to propagate approximately between 6 and 8 degrees north of the Equator. The North easterly trade wind is will still remain predominant over its counterpart the southwesterly trade wind over most of West Africa, Chad, CAR and Sudan. In view of above, few cases of rainfall are expected over the Coastlines of West Africa. Like the previous days, the meridional convergence over DRC and the East African monsoon are still expected be active; therefore rainfall is expected to continue over most part of Central, Eastern and the Horn of Africa. Convection and low level moisture convergence from the Indian Ocean has prompted rainfall over the East part of Southern Africa. Therefore the following places are expected to have moderate to heavy rainfall; Sierra-Leone, Liberia, Cameroun, Gabon, Congo, DRC, Kenya, Uganda, Rwanda, Burundi, Tanzania, Angola. Ethiopia, East part of South Africa, Mozambique, Zimbabwe, Botswana, Lesotho, and Swaziland. Moderate to heavy amount of rainfall is also expected over the island of Madagascar.

## 2.0. Previous and Current Day Weather over Africa

### 2.1. Weather assessment for the previous day (November 22, 2015)

Evaluation of rainfall density for the previous day over Africa revealed that only Liberia and Ivory Coast recorded cases of moderate to heavy rainfall over West Africa. This is due to the fact that this is almost the end of rainfall season in that part of the continent. In central Africa, Equatorial Guinea, Gabon, Congo, Angola, and DRC recorded moderate to heavy rainfall. Also Namibia, Rwanda, Tanzania, and Zambia recorded moderate to Heavy rainfall. Over Southern Africa; only Zimbabwe and Madagascar also recorded the same.

### 2.2. Weather assessment for the current day (November 23, 2015)

Convective, dense clouds with small and large ice particles observed over Ivory Coast, Ghana, Togo, Benin, Cameroon, Equatorial Guinea, Gabon, Congo, Angola, DRC, in central Africa. Same convective cloudy were observed over Kenya, Uganda, Rwanda, Tanzania, and Somalia in East Africa. Likewise Zambia, Zimbabwe, Mozambique, South Africa in Southern Africa and Madagascar. Significant presence of Dust particles suspended in the atmosphere were observed over Senegal, Gambia, Western Sahara, Algeria, Southern Mauritania, Guinea, Mali, Burkina Faso, Ghana, Niger, Benin, Togo, Northern, central and Southern Nigeria, Chad and Sudan.

