



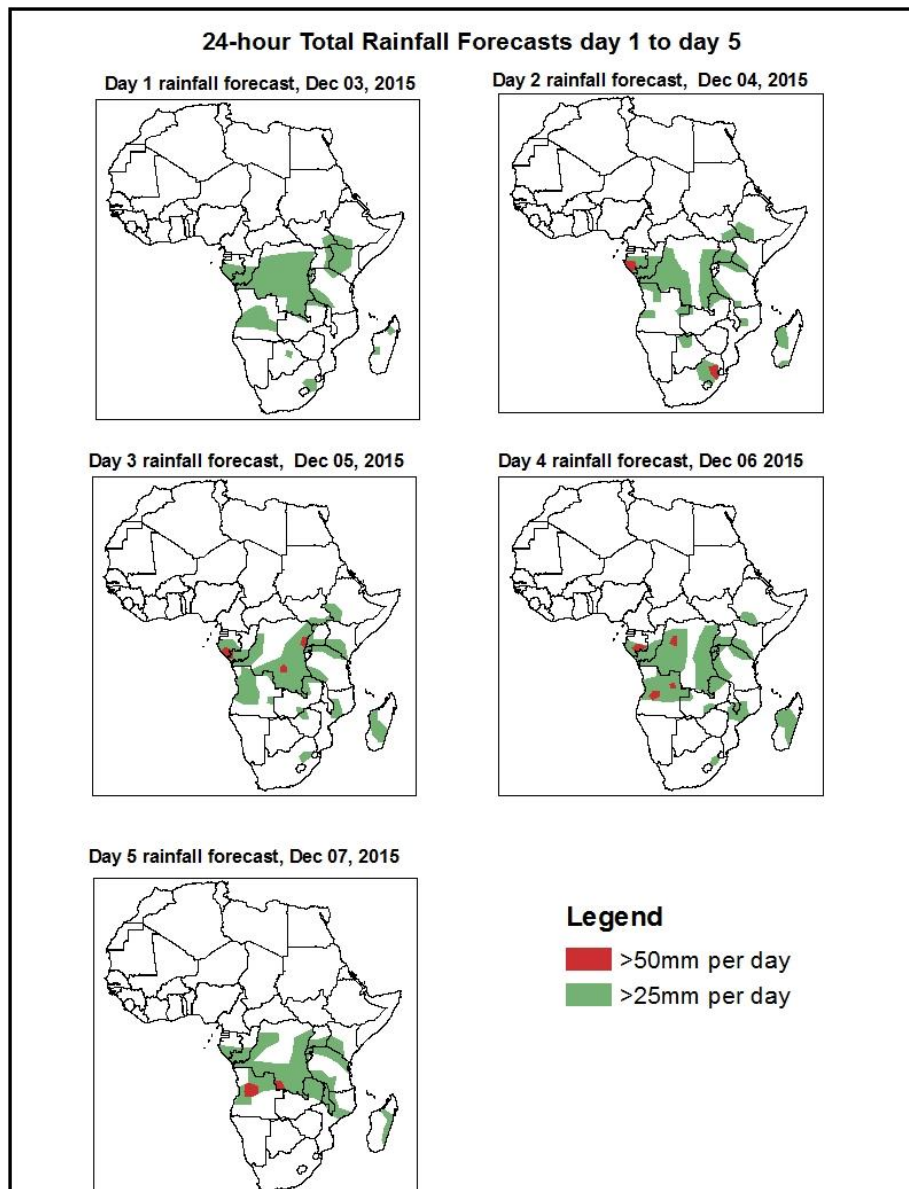
# NCEP Contributions to the WMO Severe Weather Forecasting Demonstration Project (SWFDP) and to the African Monsoon Multidisciplinary Analysis (AMMA) Initiative

## 1. Rainfall and Dust Concentration Forecasts

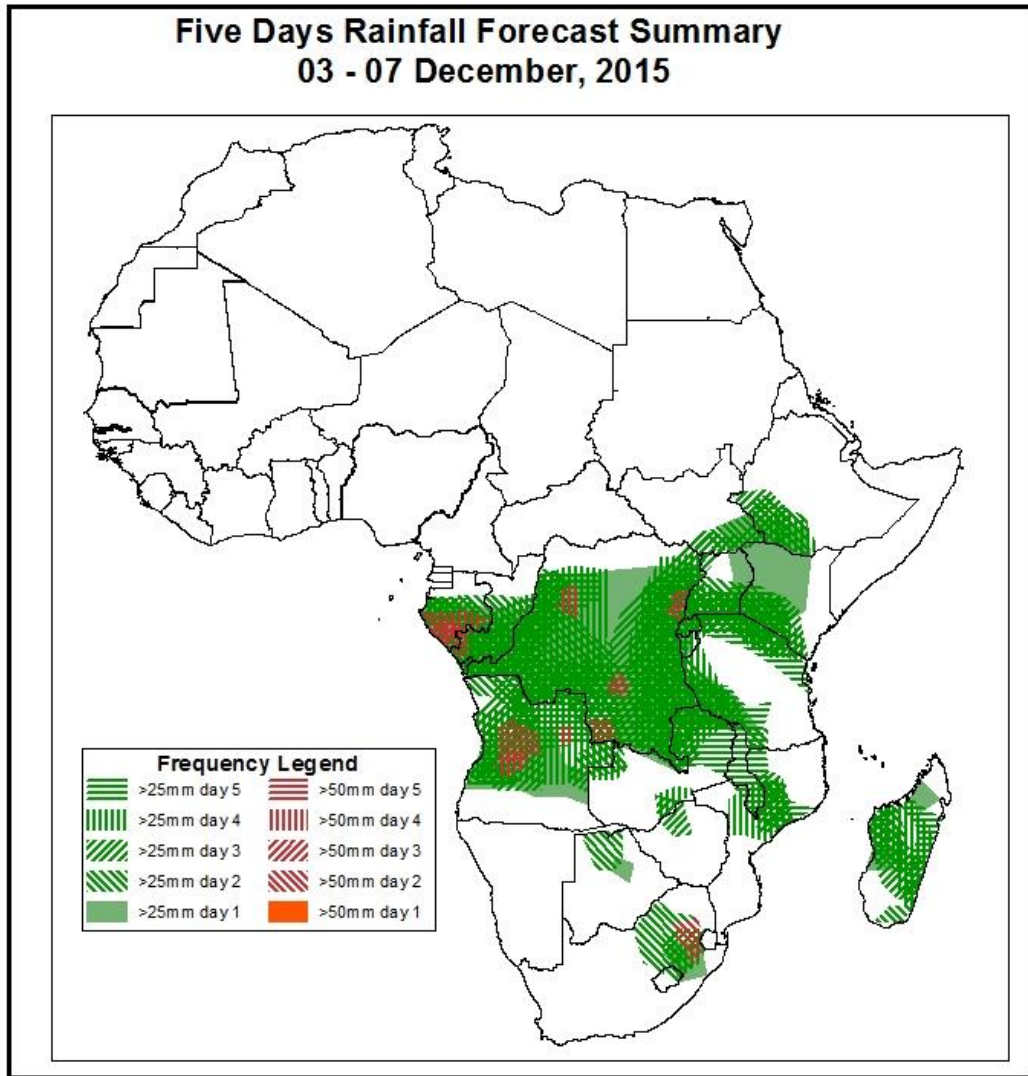
Valid: 06Z of Dec 03 – 06Z of Dec 07, 2015. (Issued on December 02, 2015)

### 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  
03 - 07 December, 2015**

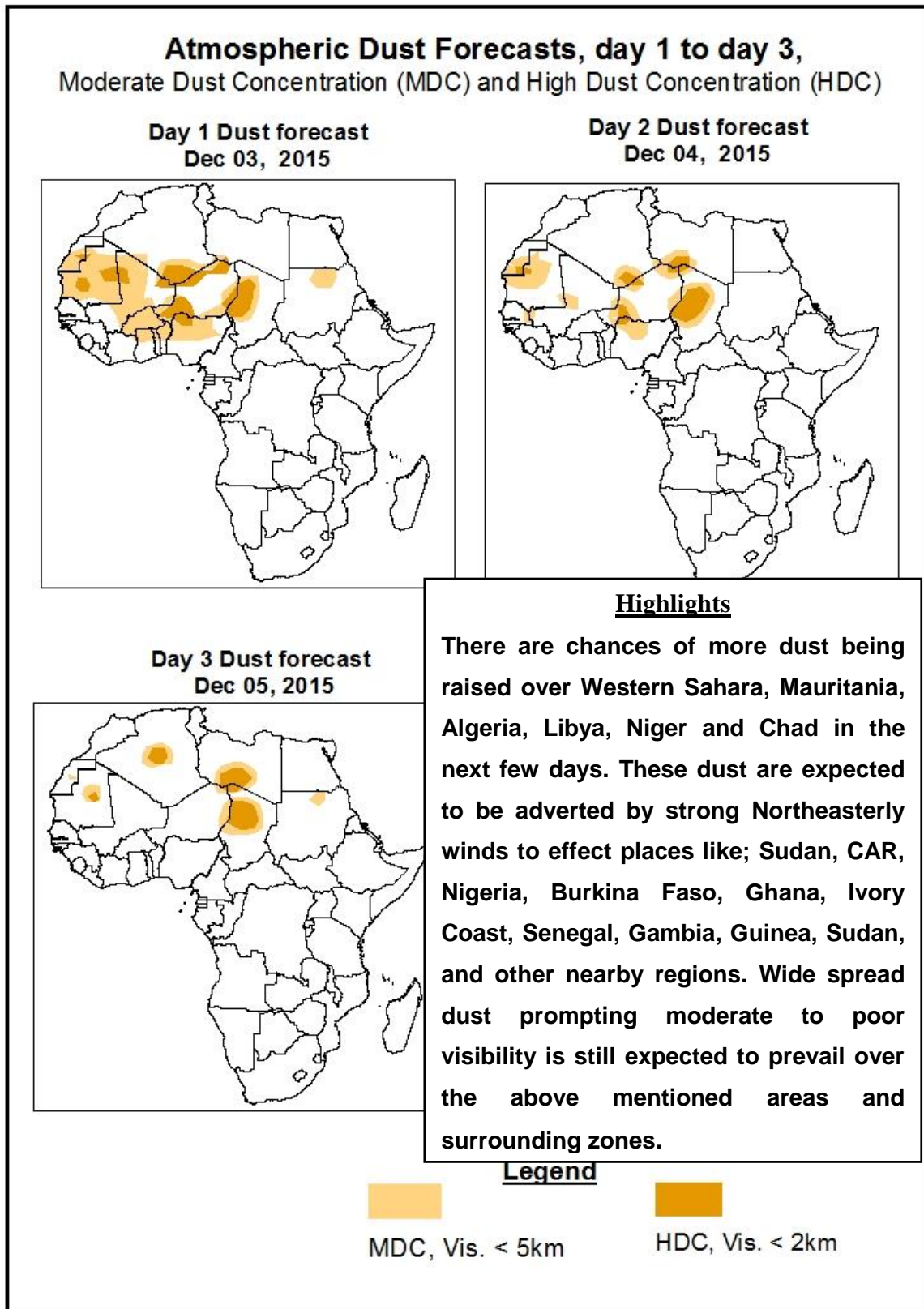


Prognostic review of rainfall estimate and spread for the subsequent five days over West, central, East and Southern Africa reveals that the Intertropical Discontinuity (ITD) is expected to continue propagating southwards towards its minimum position. The ITD is expected to still propagate approximately between 5 and 7 degree north of the Equator. The North east trade wind is expected to still remain dominant over its counterpart the south west trade wind over most countries in West Africa, Cameroun, Niger, CAR and Sudan. In view of above, very little chances of isolated rainfall of below moderate amount are expected over the coastlines of above mentioned Zone. This Indicates that the dry seasons have set in over West Africa. Over East, Central Africa and the Horn of Africa, the meridional convergence over DRC and the East African monsoon are expected to be active; therefore enhanced rainfall is expected to continue over those regions. Convection, influx of Maritime winds and low level moisture convergence from the Indian Ocean is expected to still sustain rainfall over the Eastern part of Southern Africa. Therefore the following places are expected to have moderate to heavy amount of rainfall; Gabon, Congo, DRC, South Sudan, Kenya, Uganda, Rwanda, Burundi, Tanzania, Malawi, Angola. Ethiopia, Angola, Zambia, East part of South Africa, Mozambique, Lesotho, Swaziland and island of Madagascar.

## 1.2. Atmospheric Dust Concentration Forecasts

Valid: 12Z of Dec 03– 12Z of Dec 05, 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: 03 – 07 December, 2015**

The Azores high pressure system is expected to intensify in the next 48 hours, its central value will increase from 1028 mb to 1036 mb. This High pressure system will then weaken by 5 mb in the next 72 hours; thereby having a central pressure value of 1031 mb. It will weaken further from 1031 to 1027 mb in the next 96 hours. This pressure system is expected to intensify by 6 mb, thereby having a central value of 1033 mb by the end of the forecast period according to GFS models.

The Libyan high pressure system which is an extension or a cut off High from Azores high pressure system is expected to maintain its position like the previous days, having its 1016 isobar move as low as 10 degrees north of the Equator approximately. This behavior exhibited by Libyan high pressure Systems is well expected cause of the season we are entering. Therefore, just like the previous days, widespread dust is still expected to still prevail over the dust source regions, affected regions in North Africa and Northern and Central parts of some countries in West Africa like Nigeria, Benin, Ghana, and Burkina Faso. Also Senegal, Guinea, Mauritania, Sudan, Niger, Chad and Northern Cameroun are expected to be effected. The dust raised will be propagated by relatively moderate to strong Northeasterly trade winds towards areas and zones along their trajectory. This development is a strong indication that active rainfall and weather activities are moving towards the southern hemisphere.

The Arabian high pressure system is expected to intensify in the next 48 hours; its central value will increase from 1023 mb to 1032 mb. This High pressure system will later intensify further by 9 mb in the next 72 hours; thereby having a central pressure value of 1041 mb. It will then weaken from 1041 to 1039 mb in the next 96 hours. This pressure system will weaken again by 1 mb, thereby having a central value of 1038 mb by the end of the forecast period according to GFS models. Arabian high pressure system was observed to have moved closer to Africa thereby triggering some cut off high over Egypt and Sudan. AS a result of this, dust is expected to be raised over the dust source regions in Egypt and Sudan.

The St Helena high pressure system at the beginning of the forecast period had a central pressure value of 1025 mb. This high pressure system is expected to intensify in the next 48 hours, by 2 mb with its central pressure value increasing from 1025 to 1027 mb. It will weaken from 1027 to 1019 mb in the next 72 hours. By the end of the forecast period, it is expected that this high pressure system will intensify to 1021. mb according to GFS Models. This pressure system was observed to have move back into the Atlantic Ocean completely and maintained its new position throughout the forecast period.

St Helena high pressure system was also observed to have moved remarkably away from the coast of West Africa and remained on that position throughout the forecast period. This high pressure system current position, with respect to South Africa as earlier described will most likely trigger convection at the surface and enhance weather activities over the South African region.

The Mascarene high pressure system is expected to intensify from 1028 to 1029 mb in the next 24 hours. It will weaken in the next 48 hours by 8 mb. Its central pressure values decreasing from 1028 mb to 1020 mb. This high pressure system will intensify by 6 mb, having a central pressure of 1026 mb .At the end of the forecast period according to the GFS model, it is expected that the Mascarene high pressure system will weaken by 2 mb, thereby having a central pressure value of 1024 mb. This high pressure system was still observed to have moved away remarkably from the coastline of southern African and positioned itself over the Island of Madagascar. Its current position has given room for maritime winds and active convection to start taking over South Africa and 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 still did not responded remarkably to thermal heating, thereby causing their central pressure valves to still fill up. Their center values deepen from 1011 mb to 1008 mb over 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.

At 925 mb streamlines; as expected, maritime winds from the Atlantic Ocean were still observed streaming into southern parts of some countries in West Africa namely Sierra Leone, Liberia, Ivory Coast, Ghana, Togo, Benin Republic, and Southern part of 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, just like the previous days, 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 still observed over most parts of West Africa namely Senegal, Gambia, Mauritania, Sierra Leone, Liberia, Burkina Faso, Ghana, Togo, Niger, Chad, Nigeria, CAR and Cameroun. Maritime winds were also observed to converge over DRC and stream into Congo, Angola, Southern Sudan and DRC in Central Africa and Kenya. Burundi, Rwanda, Uganda, Ethiopia and Somalia in East Africa. Maritime winds from the Indian Ocean were observed streaming into Southern Africa. The high pressure system that was observed previously over that region has completely moved away.

At 700 mb streamlines; a high pressure system was still observed over South Africa throughout the forecast period thereby inducing an anticyclonic flow over Namibia, Botswana, Zimbabwe, Mozambique, Swaziland and South Africa. This feature has persisted for a couple of days. Another high pressure system was still 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, just like the previous days. Maritime winds were observed at this level streaming into East Africa, DRC, Angola and parts of Namibia. The easterly jets are still 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; Meridional flow patterns were observed over most of West Africa namely Ivory Coast, Ghana, Togo, Benin, and Nigeria. Divergent flow patterns were observed over central and Eastern Africa. Over South Africa Divergent flow patterns were current observed but is expected to be replaced by zonal flow patterns within the next 48 hours. The jets associated with this flow pattern had moderate to strong wind speeds.

Prognostic review of rainfall estimate and spread for the subsequent five days over West, central. East and Southern Africa reveals that the Intertropical Discontinuity (ITD) is expected to continue propagating southwards towards its minimum position. The ITD is expected to still propagate approximately between 5 and 7 degree north of the Equator. The North east trade wind is expected to still remain dominant over its counterpart the south west trade wind over most countries in West Africa, Cameroun, Niger, CAR and Sudan. In view of above, very little chances of isolated rainfall of below moderate amount are expected over the coastlines of above mentioned Zone. This Indicates that the dry seasons have set in over West Africa. Over East, Central Africa and the Horn of Africa, the meridional convergence over DRC and the East African monsoon are expected to be active; therefore enhanced rainfall is expected to continue over those regions. Convection, influx of Maritime winds and low level moisture convergence from the Indian Ocean is expected to still sustain rainfall over the Eastern part of Southern Africa. Therefore the following places are expected to have moderate to heavy amount of rainfall; Gabon, Congo, DRC, South Sudan, Kenya, Uganda, Rwanda, Burundi, Tanzania, Malawi, Angola. Ethiopia, Angola, Zambia, East part of South Africa, Mozambique, Lesotho, Swaziland and island of Madagascar.

## 2.0. Previous and Current Day Weather over Africa

### 2.1. Weather assessment for the previous day (December 01, 2015)

Latest assessment of rainfall extent for yesterday over Africa revealed that there wasn't any country in West Africa that recorded cases of moderate to heavy rainfall. Meanwhile few occurrence of rainfall was recorded over the coastline of some countries in West Africa. This is due to the fact that raining season in that part of the continent is about to end. In central Africa, Equatorial Guinea, Gabon, Congo, DRC and Angola, recorded moderate to heavy rainfall. Also Kenya, Tanzania, Zambia, South Sudan, Ethiopia and Somalia recorded cases of moderate to heavy aggregates of rainfall. Over Southern Africa; Zimbabwe, Mozambique and South Africa recorded moderate to heavy amount of rainfall. Madagascar also recorded the same.

### 2.2. Weather assessment for the current day (December 02, 2015)

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

