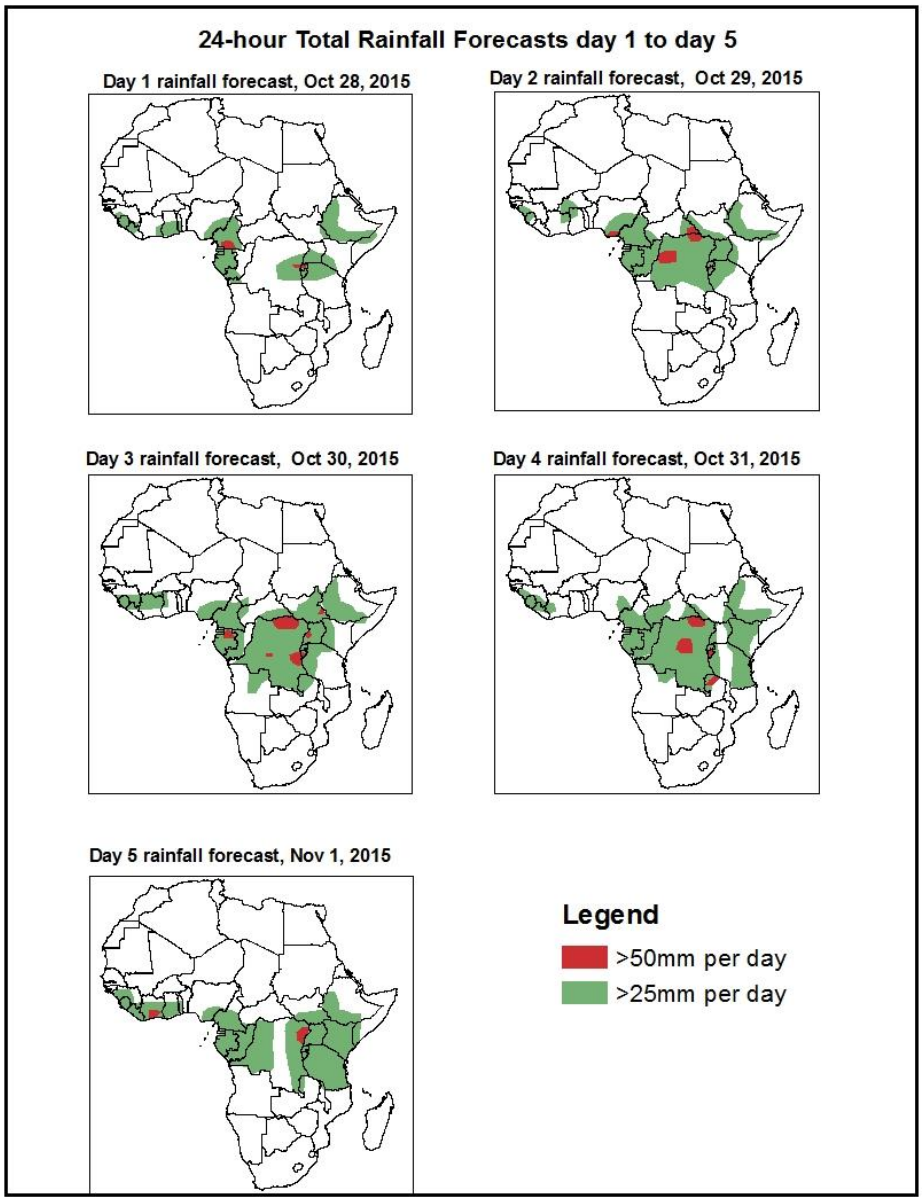
# NCEP Contributions to the WMO Severe Weather Forecasting Demonstration Project (SWFDP) and to the African Monsoon Multidisciplinary Analysis (AMMA) Initiative

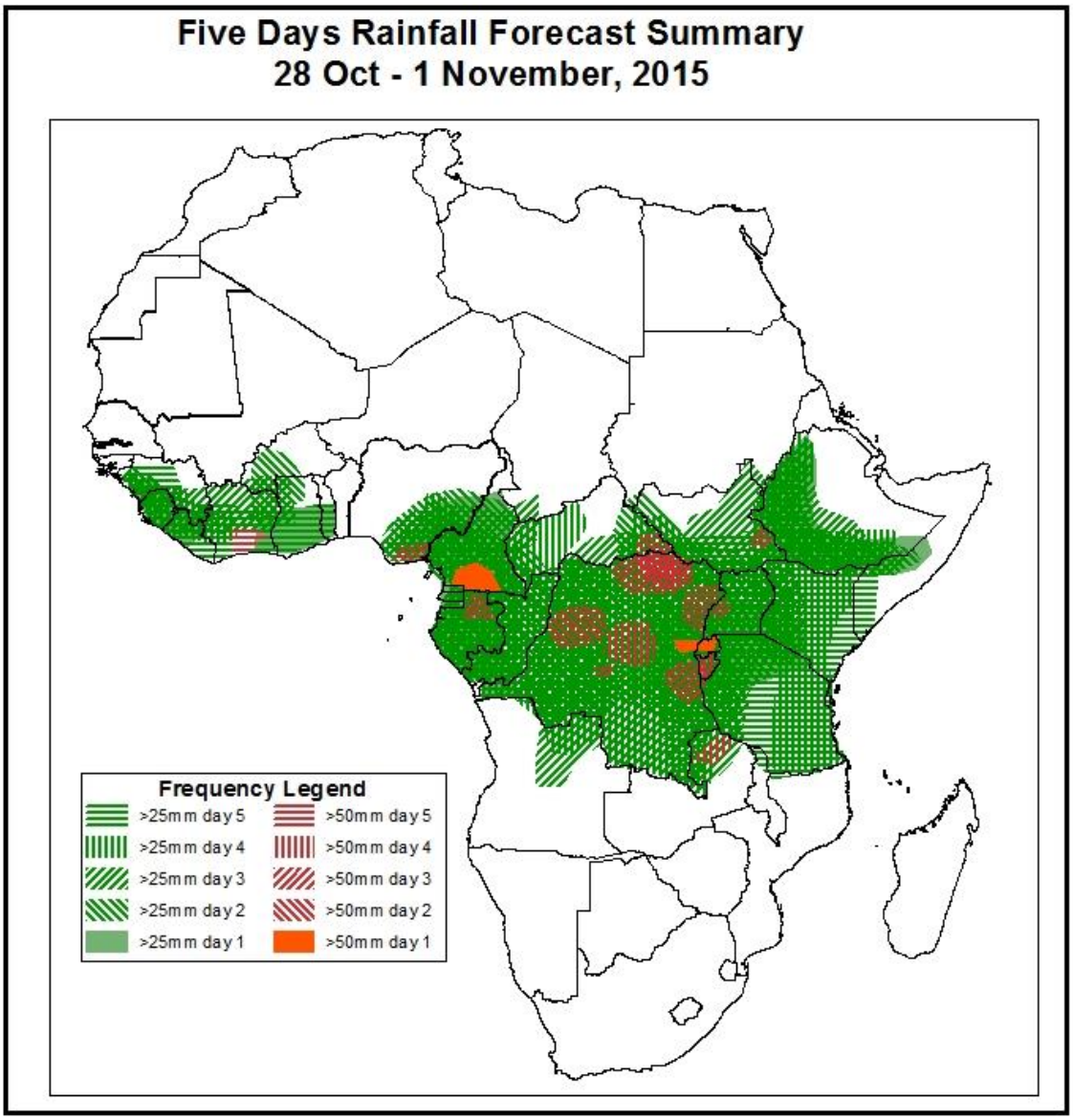
## *1. Rainfall and Dust Concentration Forecasts*

*Valid: 06Z of Oct 29 – 06Z of Nov 2, 2015. (Issued on October 28, 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.



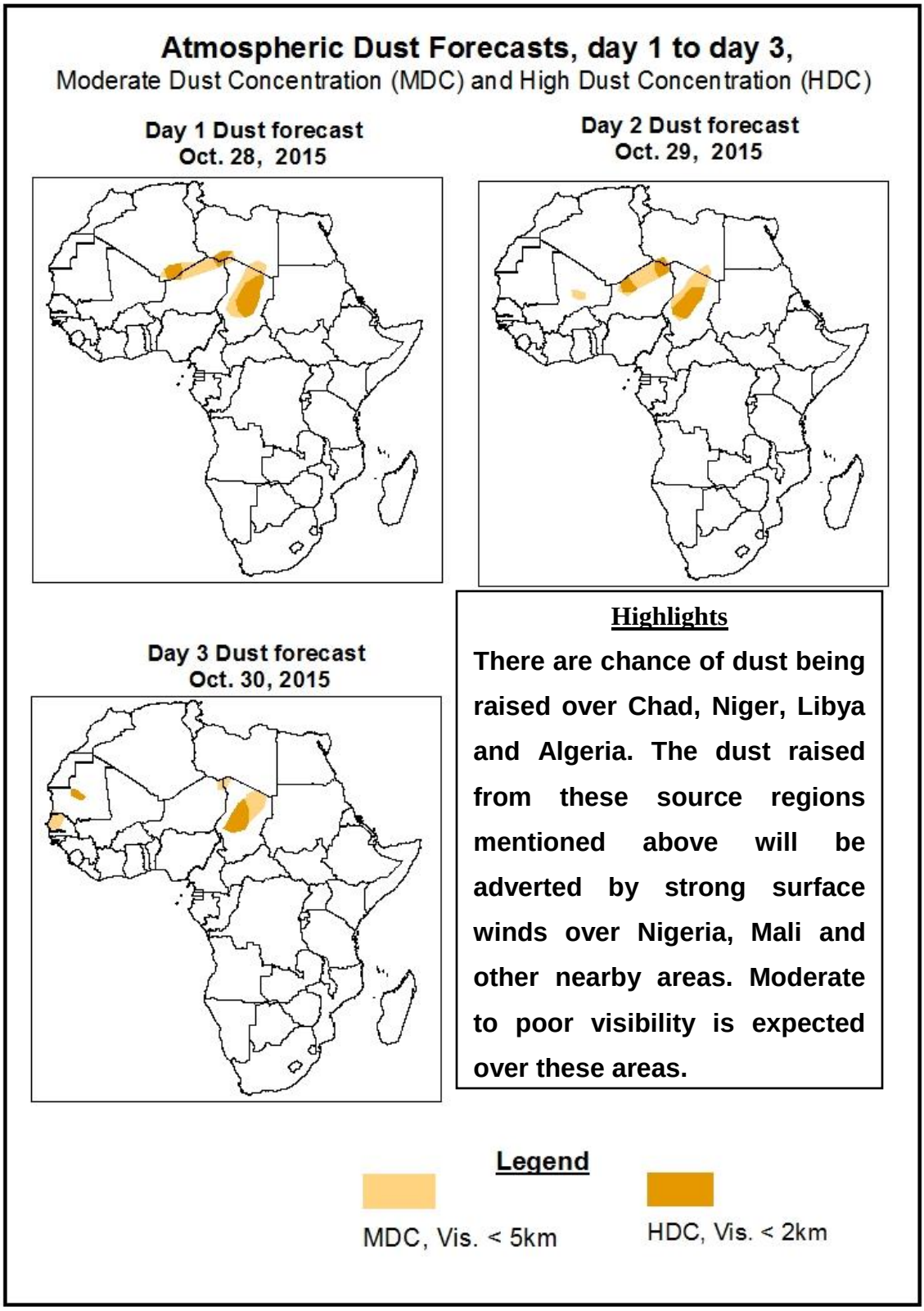



Current assessment for the upcoming five days shows that the Intertropical Discontinuity (ITD), which is the maritime southwesterly wind flow from the Atlantic Ocean with its associated convergence with Northeasterly trade wind across West Africa, is expected to propagate between 10 and 12 degree north of the Equator. Weather activities are expected to occur southwards of the ITD. Thereby limiting weather occurrence mostly to the coastal regions, mountain ranges, elevated highlands and other weather high trigger zones over the West African region. The meridional convergence over DRC and the East African monsoon over the Horn of Africa are still dynamic, so there influence is expected to enhance rainfall in their respective regions. Therefore the following places are expected to have moderate to heavy rainfall. Guinea, Sierra Leone, Liberia, Togo, Ghana and Nigeria. Cameroun and Congo, Equatorial Guinea, CAR, DRC in Central Africa and Sudan ,Kenya, Uganda, Rwanda, Tanzania, in East Africa and Ethiopia and Somalia in the horns of Africa.

## *1.2. Atmospheric Dust Concentration Forecasts*

*Valid: 12Z of Oct 29– 12Z of Oct 31, 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: 29– 2 November, 2015**

The Azores high pressure system is expected to intensify during the next 48 hours, its center value increasing by 6 mb from 1022 to 1028 mb. The High pressure system will continue to intensify in its central pressure value in the next 72 hours by 1 mb, thereby having a central pressure value of 1029 mb and weaken to 1025 mb at the end of the forecast period according to GFS models.

Throughout the forecast period, the extension of the Azores high relatively known as the Libyan high pressure system, still maintained its position over Libya like the previous days. The 1016 isobar associated with this high was still positioned across 20 degree north of the equator. As a result of this, dust have been raised in these past few days over the dust source regions of West and Northern Africa and propagated towards surrounding areas, This is an indication that active weather activities will soon move over to the southern hemisphere.

The St Helena high pressure system over the Atlantic Ocean is expected to intensify in the next 72 hours, by 6 mb with its central pressure value increasing from 1025 to 1031 mb. It will later intensify further from 1031 to 1034 mb in the next 96 hours. This high pressure system intensified remarkably when compared to previous days and moved closer towards the coast of western and southern Africa.

The Mascarene high pressure system is expected to weaken within the next 72 hours with central pressure values varying from 1034 mb to 1029 mb, then weaken further in the next 96 hours by 3 mb, with the pressure value decreasing to 1026 mb. It further weakens to 1023 mb at the end of the forecast period according to the GFS model. This high pressure system is expected to retreat back into the Indian Ocean thereby giving way for a low pressure system to form over southern Africa in the next 48 hours.

**T**he Equatorial low pressure system was observed over West, Central and East Africa. Extending from Eastern Africa through Central Africa up to Liberia in Western Africa. Its central pressure values filled from 1007 mb to 1009 mb over East and Western Africa. At the end of the forecast period the center pressure values this broad thermal low was observed to fill to 1010 mb at the end of the forecast period.

At 925 mb, Maritime winds from the Atlantic Ocean were observed streaming over most countries in West Africa namely Guinea, Sierra Leone, Ghana, Togo, Benin Republic, and Nigeria. Maritime winds were also observed over Cameroun and Gabon and into the inlands of central Africa like Congo, central Africa Republic and DRC. An Anticyclone was observed over the Indian Ocean pushing maritime wind into the inlands

of Kenya, Uganda, Somalia, South Sudan and Ethiopia thereby establishing the Congo boundary convergence. Whereas The Northeasterly continental wind flow pattern was predominantly over Mali, Chad, Niger and Sudan.

At 850 mb level, an anticyclone was observed during the forecast period over Burkina Faso thereby inducing an anticyclonic flow over most of West Africa namely Senegal, Burkina Faso, Guinea and Sierra Lone. Maritime wind flows patterns were observed on this level, streaming into Congo, CAR and DRC in Central Africa and Kenya. Uganda, Ethiopia and Somalia in East Africa. The winds at this level were predominantly easterlies,

At 700 mb level, a high pressure system was observed over Mali, establishing an anticyclonic flow over most places in West Africa like Guinea, Liberia, Burkina Faso and Northern Nigeria. A persistent easterly jets is also expected to propagate westwards from central Sudan toward the gulf of Guinea during the forecast period.

At 250 mb level, Strong Meridional wind flow was observed over West and Eastern Africa. The jets associated with this meridional flow had speeds ranging from 30 to 50 Knots. Divergent Flow patterns were observed over East, Central and most part of West Africa.

Current assessment for the upcoming five days shows that the Intertropical Discontinuity (ITD), which is the maritime southwesterly wind flow from the Atlantic Ocean with its associated convergence with Northeasterly trade wind across West Africa, is expected to propagate between 10 and 12 degree north of the Equator. Weather activities are expected to occur southwards of the ITD. Thereby limiting weather occurrence mostly to the coastal regions, mountain ranges, elevated highlands and other weather high trigger zones over the West African region. The meridional convergence over DRC and the East African monsoon over the Horn of Africa are still dynamic, so there influence is expected to enhance rainfall in their respective regions. Therefore the following places are expected to have moderate to heavy rainfall. Guinea, Sierra Leone, Liberia, Togo, Ghana and Nigeria. Cameroun and Congo, Equatorial Guinea, CAR, DRC in Central Africa and Sudan ,Kenya, Uganda, Rwanda, Tanzania, in East Africa and Ethiopia and Somalia in the horns of Africa.

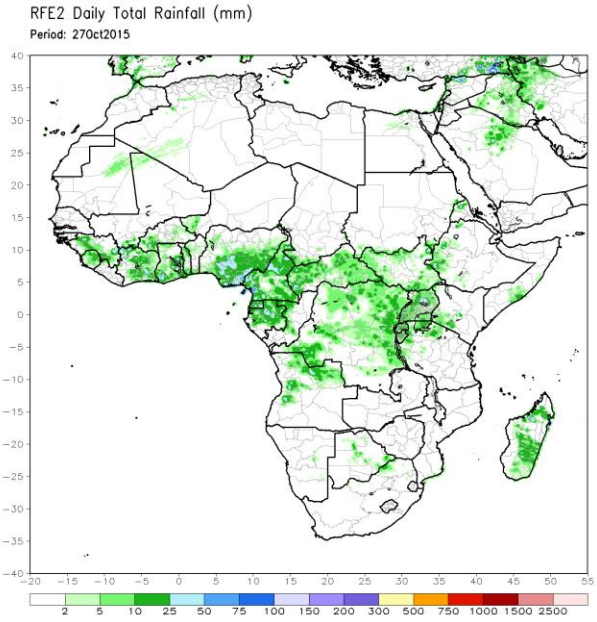
## *2.0. Previous and Current Day Weather over Africa*

### 2.1. Weather assessment for the previous day (October 27, 2015)

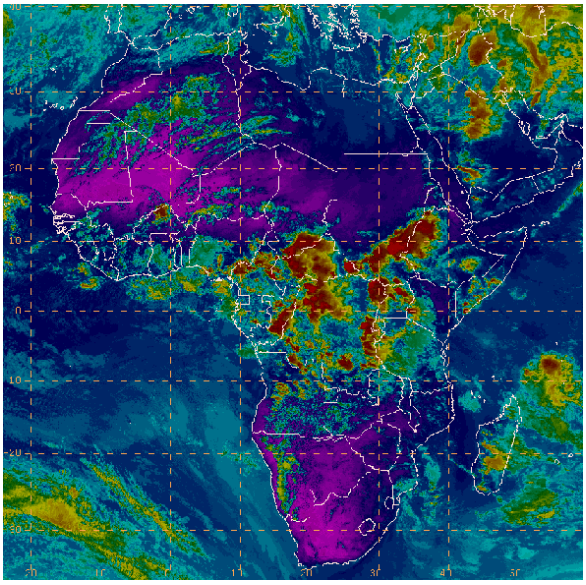
Moderate to locally heavy rainfall was observed over Guinea, Ivory Coast, Southern Mali, Ghana, Nigeria, Cameroun, Gabon, CAR, DRC, Angola, Uganda, Kenya, Tanzania, Rwanda, South Sudan, Ethiopia and Somalia.

### 2.2. Weather assessment for the current day (October 28, 2015)

Convective clouds containing small and large ice particles observed over most parts of West Africa, Central and East Africa, namely Guinea, Ivory Coast, Burkina Faso, Ghana and Nigeria in West Africa and Cameroon, Chad, Gabon, Congo, Angola. CAR, DRC in central Africa and Sudan, South Sudan, Kenya, Uganda, Rwanda, Tanzania, Somalia, Ethiopia in East Africa. Dust plume observed over Algeria, Mali, Northern Burkina Faso, Niger, Northern Nigeria and Chad.




**IR Satellite Image (valid 1500 of October 28, 2015)**



*Previous day rainfall condition over Africa (top Left) based on the NCEP CPCE/RFE and current day cloud cover (top right) based on IR Satellite image*

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