

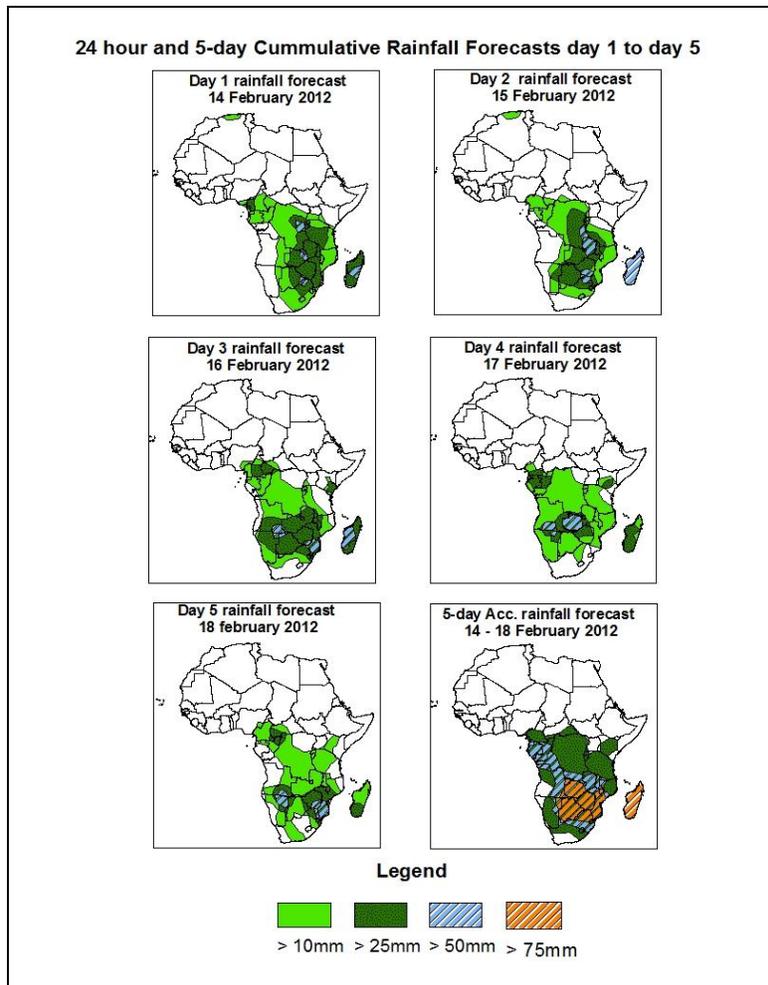


# NCEP Contributions to the WMO Severe Weather Forecasting Demonstration Project (SWFDP) and to the African Monsoon Multidisciplinary Analysis (AMMA) Initiative

## 1.0. Rainfall Forecast: Valid 06Z of 14 February – 06Z of 18 February 2012, (Issued at 18:30Z of 13 February 2012)

### 1.1. Twenty Four Hour Cumulative Rainfall Forecasts

The forecasts are expressed in terms of 75% probability of precipitation (POP) exceeded, based on the NCEP, UK Met Office and the ECMWF NWP outputs, the NCEP global ensemble forecasts system (GEFS) and expert assessment.



### Summary

In the next five days, low level tropospheric wind convergence over the Gulf of Guinea through Central Africa Republic to northwestern and eastern DRC, localized wind convergences and cyclonic circulations in the vicinity of eastern Angola, Namibia, Botswana, Zambia, South Africa, Zimbabwe and southern Mozambique, the tropical cyclone (Giovanna) east of Madagascar and latter over Mozambique Channel are expected to enhance rainfall in their respective regions. Hence, there is an increased chance for heavy rainfall over eastern Angola, eastern Namibia, Zambia, Zimbabwe, eastern South Africa, DRC, Mozambique. Malawi. southern Tanzania and Madagascar.

## **1.2. Models Comparison and Discussion-Valid from 00Z of 13 February 2012**

The GFS, ECMWF and UKMET models indicate series of lows and their associated trough across central and the South African countries. The low sitting over northern DRC and Central Africa Republic is expected to deepen progressively, with its central mean sea level pressure value decreasing from 1005mb to 1002mb towards the end of forecast period, according to the **GFS** model. It is also expected extend westwards to up to central Nigeria through 24 to 48hours and later on, extend southwards up to central and western DRC through 72 to 96 hours. According to **ECMWF** model, this low with MSLP value of 1003mb will be located over northern DRC at the beginning of the forecast period but will extend westwards up to eastern Cameroun and eastwards up to southern Sudan respectively. It tends to fill up with its mean sea level pressure value increasing from 1003mb to 1007mb towards the end of the forecast period. According to the **UKMET** model, this low with mean sea level pressure value of 1004mb will be located over northern DRC and Central Africa Republic at the beginning of the forecast period but will shift southeastwards through 24 to 48 hours to sit over eastern and southern DRC. It however tends to deepen with its central MSLP value decreasing to 1003mb towards the end of the forecast period. Another low is expected to form in the vicinity of Botswana and Zimbabwe with mean sea level pressure value of 1008mb. It tends to progressively deepen with its MSLP central value reducing to 1005mb towards the end of the forecast period. It is however expected to shift westwards and by the end of the forecast period it will be located over northern Namibia and southern Angola, according **GFS** model. According to **ECMWF** model this low will be located at the border of Botswana, Zambia and Zimbabwe with a central MSLP value of 1010mb. It will however fill up through 24 to 48 hours. Another low will then develop in the vicinity of southern Namibia through 48 to 72 hours with a central MSLP value of 1009mb which will increase to 1011mb towards the end of the forecast period. According to the **UKMET** model, the low will be located at the border between Zambia and Zimbabwe with a central MSLP value of 1007mb at the beginning of the forecast period. It will tend to shift westwards and by the end of the forecast period it will be located over northeastern Namibia. Another low over the Republic of South Sudan is expected to remain stationary but tends to deepen with its MSLP value decreasing from 1003mb to 1002mb towards the end of the forecast period according **GFS** model. According to **UKMET** model this low is expected to be stationary but will slightly deepen from MSLP of 1002mb to 1001mb towards the end of the forecast period. According **GFS** model, a

tropical cyclone (Giovanna) with MSLP of 986mb will be located at the eastern Madagascar at the beginning of the forecast period. It will shift westwards to reach west coast and enter Mozambique Channel through 24 to 48 hours. It will then shift southwestwards and by the end of the forecast period it will be located over east coast of southern Mozambique with a MSLP value of 995mb. **ECMWF** model tends to locate the tropical cyclone at the east coast of Madagascar with a central MSLP value of 1003mb at the beginning of the forecast period. It is expected to shift westwards to reach Mozambique Channel through 24 to 48 hours. It will then take a southwestward track to reach the coast of southern Mozambique 48 to 72 hours. Later on it will take a southeastern track and tends to fill with the central MSLP value increasing to 1004mb towards the end of the forecast period. On the other hand **UKMET** model locates the cyclone at the east coast of Madagascar with a MSLP central value of 995mb. The storm is predicted to shift across central Madagascar through 24 to 48 hours where it will then enter Mozambique Channel and take southern track afterwards.

The St. Helena High pressure system over southeast Atlantic Ocean is expected to strengthen, with its MSLP value increasing from 1020mb to 1021mb towards end forecast period. It will however progressively shift southeastwards according to **GFS** model. This high pressure system with a central MSLP value of 1020mb tends to progressively shift southeastwards. Through 48 to 72 hours it will break in to two cells, one with a central MSLP value of 1020mb retracts westwards while the other moves eastwards and joins the Mascarene cell through 72 to 96 hours, according to **ECMWF**. According to **UKMET** model, it is expected to weaken, with its MSLP value decreasing from 1020mb to 1016mb towards the end of the forecast period. The Mascarene high pressure system over southwest Indian Ocean is expected to remain weak, with its central pressure value of 1012mb while shifting southeast throughout the end of the forecast period, according to **GFS** model. According to **ECMWF** model it is expected to weaken, with its central pressure value reducing from 1016mb at the beginning of the forecast to 1012mb towards the end of the forecast period. According to **UKMET** model the Mascarene high pressure system is expected to strengthen through 24 to 48 hours with its central MSLP value increasing from 1012mb to 1016mb but weaken to a central MSLP value of 1012mb through 72 to 96 hours. It will however progressively shift eastward throughout the forecast period.

At the 850hpa level, a lower tropospheric wind convergence is expected to be active over Gulf of Guinea region extending eastwards to Central Africa republic and northern DRC during the forecast period. A low level convergence zone is expected to form over eastern DRC extending through Zambia and Zimbabwe. Through 24 to 48 hours this zone will split to two, one convergence zone will remain sited over eastern DCR and western Tanzania throughout the forecast period. The second convergence zone will be located at the border of Zambia and Zimbabwe with low level cyclonic winds dominating the flow over these areas. Localized winds convergences are also expected to dominate the flow over Namibia/Angola throughout the forecast period. Cyclonic circulations associated with a tropical cyclone (Giovanna) are expected to dominate over eastern Madagascar at the beginning of the forecast period and shift westwards through 24 to 48 hours to reach west coast 48 hours later. The cyclonic convergences will then reach the coast of southern Mozambique through 96 to 120 hours.

At 500hpa, eastward propagating trough is expected to dominate the flow over Mediterranean Sea and northern Africa through 24 to 48 hours with the low geo-potential value of 5400gpm extending to the latitudes of Algeria at the beginning of the forecast period. The northeast-southwest oriented trough, associated with a low is expected to shift northeastwards leading to zonal flow over North Africa.

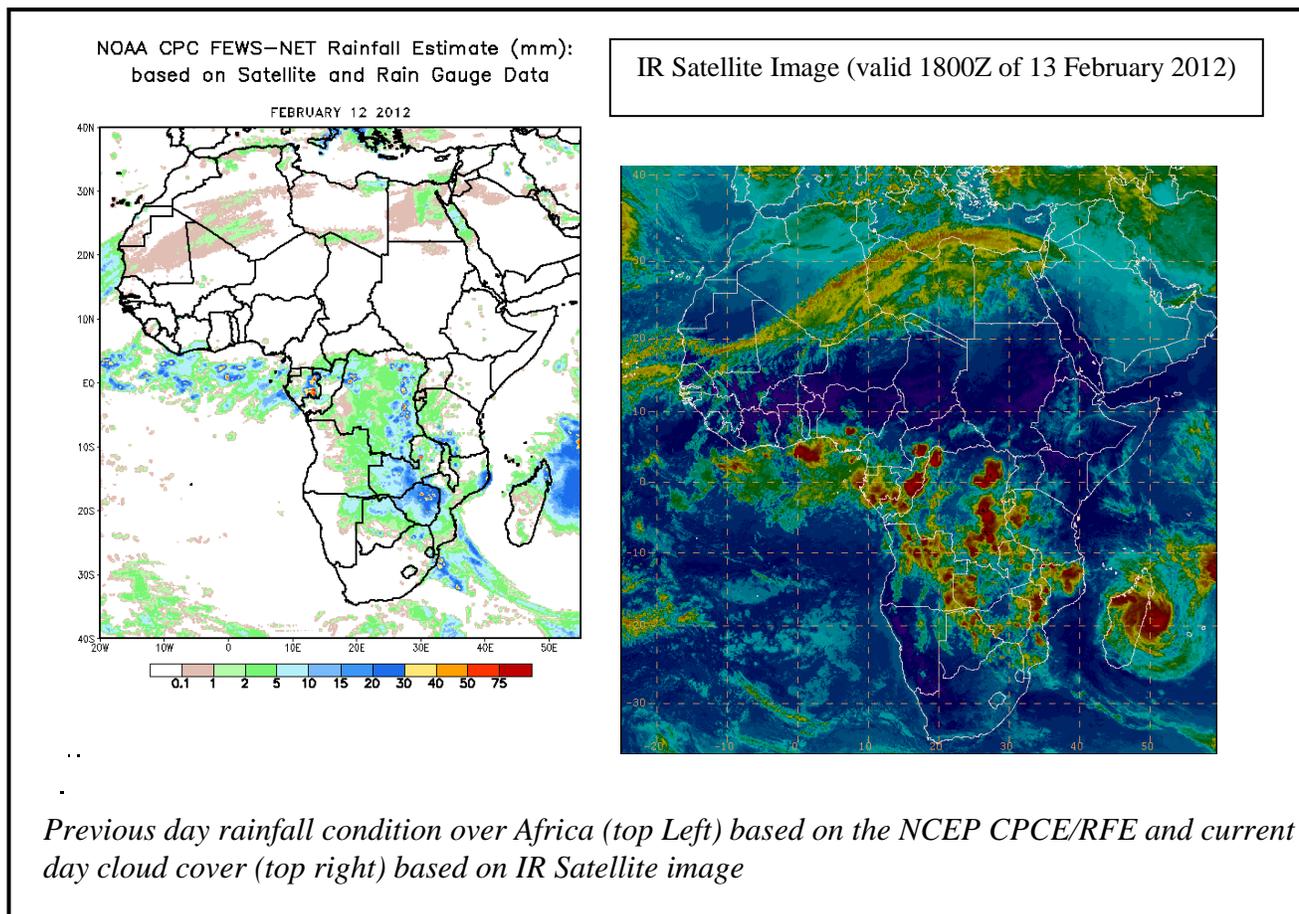
At 200mb, strong winds associated with Sub-Tropical Westerly Jet are expected to dominate the flow across northern Africa, during the forecast period. The intensity of the jet is expected to exceed 130kts in the region between Atlantic Ocean and the Persian Gulf while moving to the east with its core values occasionally increasing to more than 150kts.

In the next five days, low level tropospheric wind convergence over the Gulf of Guinea through Central Africa Republic to northwestern and eastern DRC, localized wind convergences and cyclonic circulations in the vicinity of eastern Angola, Namibia, Botswana, Zambia, South Africa, Zimbabwe and southern Mozambique, the tropical cyclone (Giovanna) east of Madagascar and latter over Mozambique Channel are expected to enhance rainfall in their respective regions. Hence, there is an increased chance for heavy rainfall over eastern Angola, eastern Namibia, Zambia, Zimbabwe, eastern South Africa, DRC, Mozambique, Malawi, southern Tanzania and Madagascar.

## **2.0. Previous and Current Day Weather Discussion over Africa (12 February – 13 February 2011)**

**2.1. Weather assessment for the previous day (12 February 2012):** During the previous day, moderate to locally heavy rainfall was observed over southern and central Zambia, northern and western Zimbabwe, eastern DRC and eastern Gabon.

**2.2. Weather assessment for the current day (10 February 2012):** Intense clouds are observed over eastern Madagascar associated with tropical cyclone (Giovanna), eastern DRC, western Botswana, eastern Angola, Gabon and Congo.



**Author(s): Ezekiel Njoroge (Kenyan Meteorological Department) / CPC-African Desk),  
[ezekiel.njoroge@noaa.gov](mailto:ezekiel.njoroge@noaa.gov) , and**

**Author(s): Lotfi Khammari (Tunisian Meteorological Authority) / CPC-African Desk),  
[lotfi.khammari@noaa.gov](mailto:lotfi.khammari@noaa.gov)**