

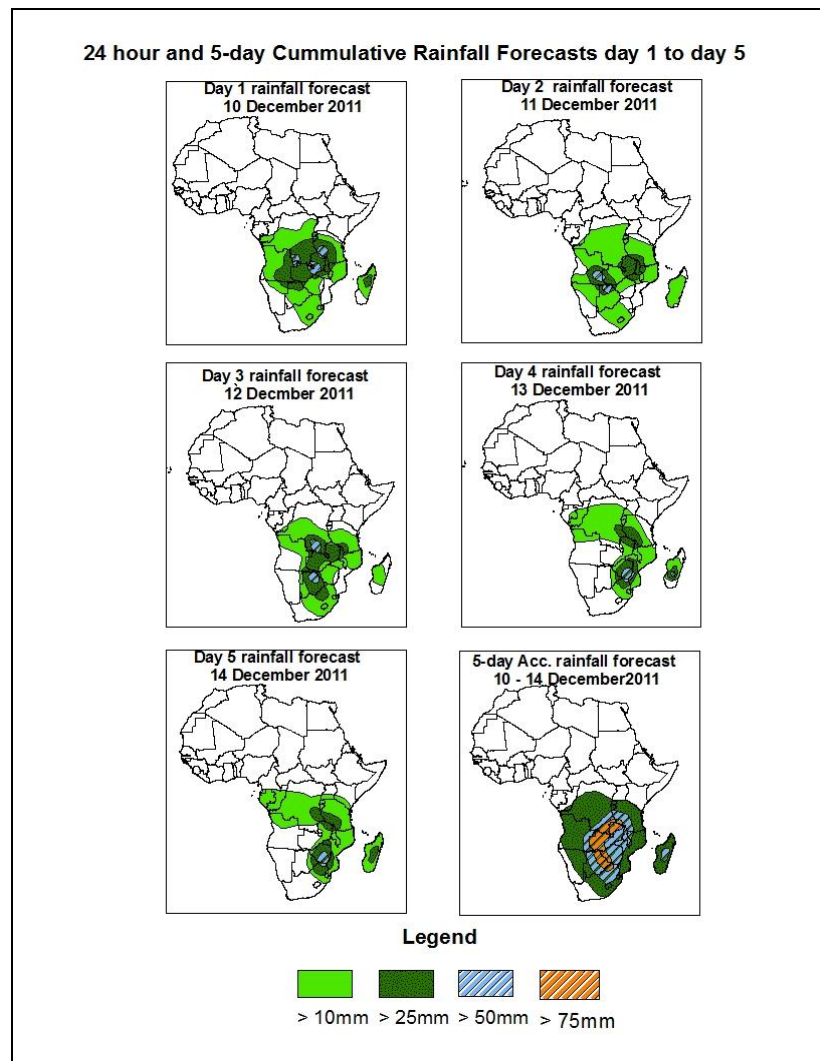


# NCEP Contributions to the WMO Severe Weather Forecasting Demonstration Project (SWFDP) and to the African Monsoon Multidisciplinary Analysis (AMMA) Initiative

## 1.0. Rainfall Forecast: Valid 06Z of 10 December – 06Z of 14 December 2011, (Issued at 16:30Z of 09 December 2011)

### 1.1. Twenty Four Hour Cumulative Rainfall Forecasts

The forecasts are expressed in terms of high 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, seasonal wind convergence in the CAB region, localized wind convergences and cyclonic circulations in the vicinity of Tanzania, Zambia, Zimbabwe and Botswana are expected to enhance rainfall in their respective regions. Hence, there is an increased chance for heavy rainfall over Zambia, Zimbabwe, southern Tanzania and southern DRC.

## **1.2. Models Comparison and Discussion-Valid from 00Z of 09 December 2011**

The GFS, ECMWF and UKMET models indicate series of lows and their associated troughs across central and the South African countries. The low over DRC is expected to fill up, with its mean sea level pressure value increasing from 1007mb to 1008mb through 24 to 72hours and tends to decrease to 1007mb by 96 hours and then tends to increase back to 1008mb towards the end of the forecast period according to the **GFS** model. According to **ECMWF** model it is expected to fill up, with its MSLP value increasing from 1007mb to 1008mb by 96 hours. According to the **UKMET** model, it is expected to fill up from MSLP value of 1007mb to 1008mb towards end of the forecast period. Another low is expected to form in the vicinity of Botswana and tends to deepen, with its MSLP value decreasing from 1005mb to 1002mb and tends to move towards northern Botswana and the adjoining areas of Zimbabwe towards end of the forecast period according **GFS** model. According to **ECMWF** model, the low pressure is expected to fill up, with its mean sea level pressure value increasing from 1008mb to 1009mb through 24 to 48 hours, and then tends to deepen, with its mean sea level pressure value decreasing from 1008mb to 1004mb while covering both Botswana and South Africa areas towards end of the forecast period. According the **UKMET** model, the low pressure is expected to deepen, with its MSPL value decrease from 1006mb to 1004mb and moving towards northern areas until the end of the forecast period. Another low pressure which is expected to form across Mozambique Channel and tends to deepen, with its MSLP value decreasing from 1008mb to 996mb while shifting to the western areas to reach the eastern areas of Zimbabwe towards end of the forecast period according **GFS** model. According to the **ECMWF** this low pressure is expected to maintain its MSPL value of 1008mb towards end of forecast period form. It then tends to fill up, with its MSPL value increasing from 1007mb to 1009 through 24 to 72hours and then tends to deepens back to 1008mb towards the end of the forecast period according **UKMET** model. The fourth low over the southern areas of Sudan tends maintain MSLP value of 1007mb towards end of the forecast period, according **GFS** model. According the **UKMET** model, this low pressure is expected to form by 96hours and tends to maintain its MSLP value of 1009mb until the end of the forecast period.

The St. Helena High pressure system over southeast Atlantic Ocean is expected to weaken, with its MSLP value decreasing from 1028mb to 1024mb through 24 to

72hours according to both **GFS** and **UKMET** models and then it tends to intensify, with its MSLP value increasing from 1024mb to 1028mb towards end of the forecast period. According to **ECMWF** model, it tends to weaken, with its MSLP value decreasing from 1029mb to 1022mb towards end of the forecast period while shifting slightly to west. The Mascarene high pressure system over southwest Indian Ocean is expected to maintain its MSLP value of 1020mb while shifting to east towards the end of the forecast period according to both **GFS** and **ECMWF** models. According to **UKMET** model it is expected to fill up, with its MSLP value increasing from 1020mb to 1024mb through 24 to 96 hours and then it tends to deepen back to 1020mb towards end of the forecast period while shifting slightly to the east until the end of forecast period.

At the 850hpa level, a lower tropospheric seasonal wind convergence is expected to remain active over parts of CAB region then it tends to intensify while extending towards both Zambia and Zimbabwe towards end of the forecast period. Localized wind convergences are also expected to dominate the flow over Angola, Namibia and Botswana while the convergence line is expected to shift to the east through 48 to 96hours. Lower tropospheric anticyclone and its associated ridge are expected over South Africa and the neighboring areas tend to shift slightly to southeast.

At 500hpa, eastward propagating trough in the mid-latitude westerly flow is expected to prevail over Mediterranean Sea and northern Africa during the forecast period; with the low geopotential value of 5820gpm extending to the latitudes of northern Sudan. This northeast-southwest oriented trough is expected to move eastwards until reaching Egypt and the adjoining areas until 72hours. Another mid-latitude frontal system is expected to approach coastal Mauritania through 24hours and it tends to propagate towards western Algeria towards end of the forecast period. A mid latitude frontal system is also expected to propagate eastwards across the Southern African countries with the low geopotential value of 5760gpm during the forecast period.

At 200mb, strong winds associated with Sub-Tropical Westerly Jet are expected to dominate the flow over northern Africa, during the forecast period. The intensity of the jet is expected to exceed 110kts in the region between Niger and the Persian Gulf while moving to the east by 48hours. The jet core tends to propagate towards in the region between Chad and Persian Gulf through 24 and 48 hours then it tends to propagate

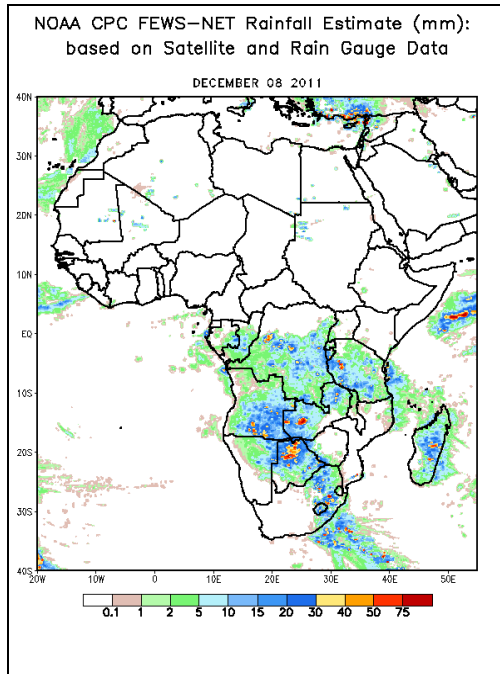
towards in the region between Sudan and Persian Gulf through 48 to 96 hours then it tends to weaken to 90kt towards the end of forecast period. The Sub-tropical Westerly Jet in the Southern Hemisphere is expected to dominate the flow over the South Africa, during the forecast period. The intensity of the jet is expected to exceed 130kts in the region between southeast Atlantic and south Africa, the core of the jet tends to shift further to the east in the region between coastal south Africa and Indian ocean with its maximum wind speed exceeding 110kts by 96hours then it tends to fill up to 130kts towards the end of the forecast period. The third Jet is expected to dominate the flow over the northwest Africa, during the forecast period. The intensity of the Jet is expected to exceed 110kts in the region between Mauritania and Tunisia by 72 hours, the core of jet tends to shift further to the east in the region between North Atlantic Ocean and Persian Gulf towards the end of forecast period.

In the next five days, seasonal wind convergence in the CAB region, localized wind convergences and cyclonic circulations in the vicinity of Tanzania, Zambia, Zimbabwe and Botswana are expected to enhance rainfall in their respective regions. Hence, there is an increased chance for heavy rainfall over Zambia, Zimbabwe, southern Tanzania and southern DRC.

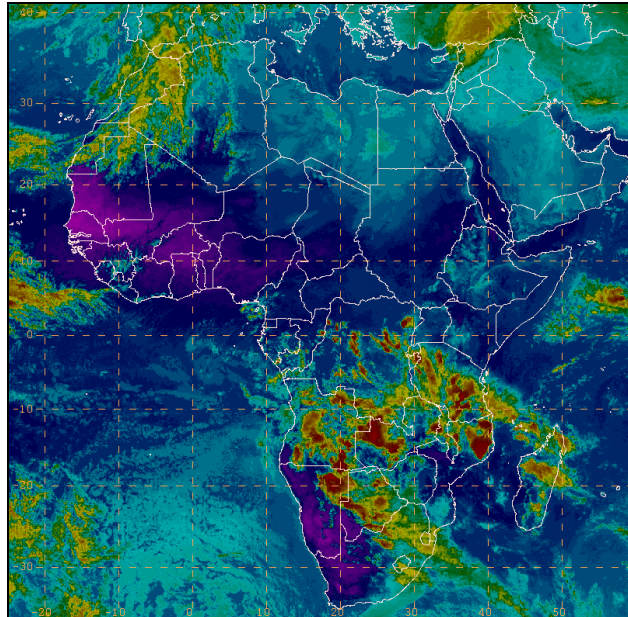
## 2.0. Previous and Current Day Weather Discussion over Africa (08 December – 09 December 2011)

**2.1. Weather assessment for the previous day (08 December 2011):** During the previous day, moderate to locally heavy rainfall was observed over southern DRC, Botswana, Western Zambia, parts of Tanzania and central Madagascar.

**2.2. Weather assessment for the current day (09 December 2011):** Intense clouds are observed over Angola, southern DRC, eastern Namibia, Botswana, Zambia, eastern South Africa, Tanzania, northern Mozambique and Madagascar.



IR Satellite Image (valid 1622Z of 09December 2011)



*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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