

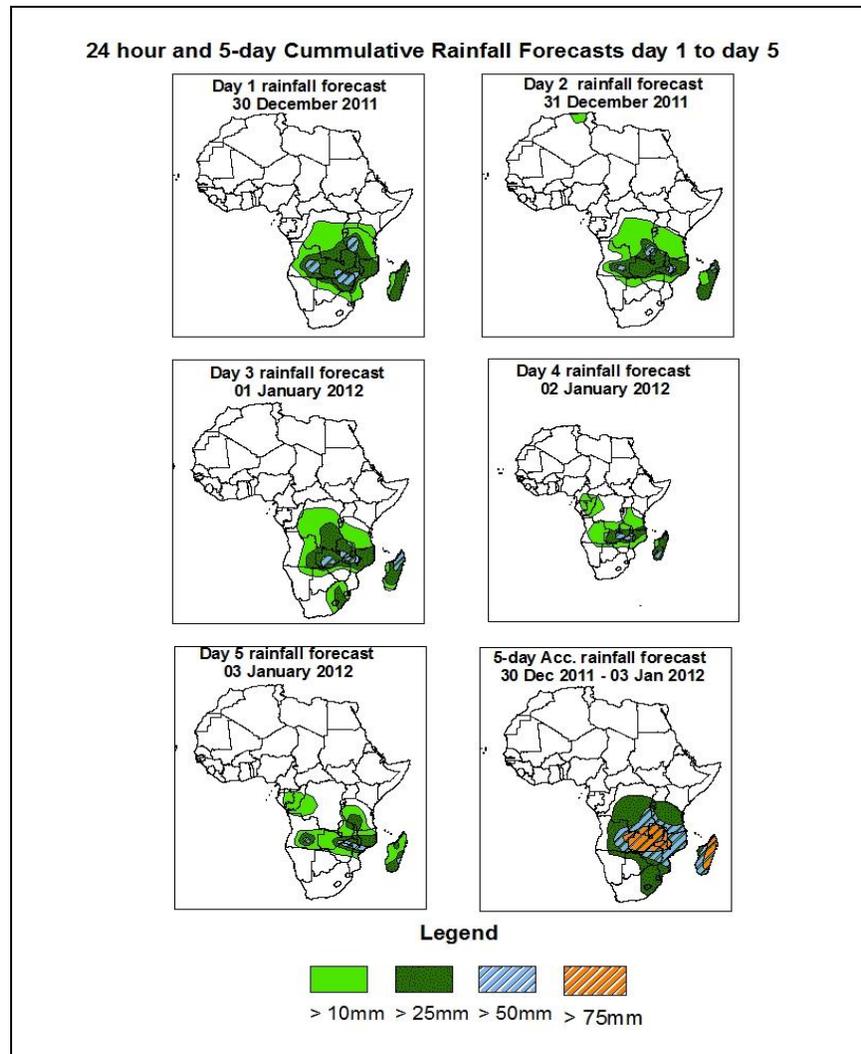


# NCEP Contributions to the WMO Severe Weather Forecasting Demonstration Project (SWFDP) and to the African Monsoon Multidisciplinary Analysis (AMMA) Initiative

## 1.0. Rainfall Forecast: Valid 06Z of 30 December 2011– 06Z of 03 January 2012, (Issued at 16:30Z of 29 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 convergences and the interaction between eastward propagating mid-latitude and tropical systems across southern and southeastern Africa are expected to enhance rainfall in their respective regions. Hence, there is an increased chance for heavy rainfall over southern DRC, eastern Angola, northern Botswana, Zambia, northern Zimbabwe, Malawi, southern Tanzania, parts of Mozambique and Madagascar.

## **1.2. Models Comparison and Discussion-Valid from 00Z of 29 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 deepen, with its mean sea level pressure value decreasing from 1009mb to 1008mb while shifting slightly to the west towards end of the forecast period according to the **GFS** model. According to **ECMWF** model it is expected to appear by 96 hours and it tends to fill up, with its MSLP value increasing from 1008mb to 1009mb towards end of the forecast period. This low is expected to deepen, with its MSLP value decreasing from 1008mb to 1006mb through 24 to 72 hours and then it tends to fill up back to 1007mb towards end of the forecast period according to the **UKMET** model. Another low in the vicinity of southern Botswana is expected to maintain its MSLP value of 1007mb towards end of the forecast period according **GFS** model. According to **ECMWF** model, this low is expected to deepen, with its mean sea level pressure value decreasing from 1010mb to 1008mb while moving to the south towards end of the forecast period. According to the **UKMET** model, this low pressure is expected to deepen, with its MSLP value decreasing from 1009mb to 1007mb while moving slightly towards north and then it tends to fill up back to 1008mb towards end of the forecast period. Another low pressure across Mozambique Channel is expected to fill up, with its MSLP value increasing from 1007mb to 1008mb and then it tends to deepen, with its MSLP value decreasing from 1008mb to 1005mb while shifting slightly to the east towards end of the forecast period according **GFS** model. According to **ECMWF** model this low is expected to deepen, with its MSLP value decreasing from 1010mb to 1007mb while shifting to the east through 48 to 120 hours. According to the **UKMET** this low pressure is expected to fill up, with its MSLP value increasing from 1008mb to 1009 through 24 to 72 hours and then it tends to deepen back to 1007mb towards end of the forecast period. The fourth low over southern Sudan is expected to fill up, with its MSLP value increasing from 1007mb to 1008mb towards end of the forecast period, according both **GFS** model. This low is expected to fill up, with its MSLP value increasing from 1008mb to 1009mb towards end of the forecast period according the **ECMWF** model. According the **UKMET** model this low is expected to fill up, with its MSLP value increasing from 1006mb to 1007mb through 24 to 48 hours and then it tends to deepen back to 1006mb towards end of the forecast period.

The St. Helena High pressure system over southeast Atlantic Ocean is expected to deepen, with its MSLP value decreasing from 1028mb to 1024mb towards end of the forecast period according to **GFS** model. According to **ECMWF** model this high pressure system tends to deepen, with its MSLP value decreasing from 1027 to 1021mb towards end of the forecast period. This high pressure is expected to deepen, with its MSLP value decreasing from 1027mb to 1024mb towards end of the forecast period according to **UKMET** model. The Mascarene high pressure system over southwest Indian Ocean is expected to deepen, with its MSLP value decreasing from 1016mb to 1012mb through 24 to 96 hours and then it tends to fill up back to 1016mb by 120 hours according to **GFS** model, according **ECMWF** this high pressure is expected to fill up, with its MSLP value increasing from 1012mb to 1017mb through 24 to 72 hours and then it tends to deepen back to 1016mb towards end of the forecast period. This high pressure is expected to fill up, with its MSLP value increasing from 1012mb to 1016mb towards end of the forecast period according **UKMET** model.

At the 850hpa level, a lower tropospheric seasonal wind convergence is expected to remain active over the CAB region aligning itself with a convergence across southern Africa. The convergence tends to intensify while shifting slightly to the west and reach Zambia and Zimbabwe towards end of the forecast period. Localized wind convergences are also expected to dominate the flow over Angola and Namibia then it tends to intensify and tends to the east towards end of the forecast period. Lower tropospheric anticyclone and its associated ridge are expected over South Africa and the neighboring areas and tend to intensify and shift slightly to the east towards end of the forecast period. Another lower tropospheric cyclone and its associated trough are expected to dominate the flow over Madagascar through 96 to 120 hours.

At 500hpa, eastward propagating trough in the mid-latitude westerly flow is expected to prevail over North Atlantic Ocean and northeastern Africa during the forecast period; with the low geopotential value of 5760gpm extending to the latitudes of southern Mali. This trough is expected to move westwards to reach northern Niger with the low geopotential value of 5760gpm by 72 hours and then it tends to reach south Algeria with the low geopotential value of 5820gpm through 96 to 120 hours. A mid latitude frontal system is also expected to propagate eastwards across the Southern African countries with the low geopotential value of 5820gpm through 72 to 120 hours.

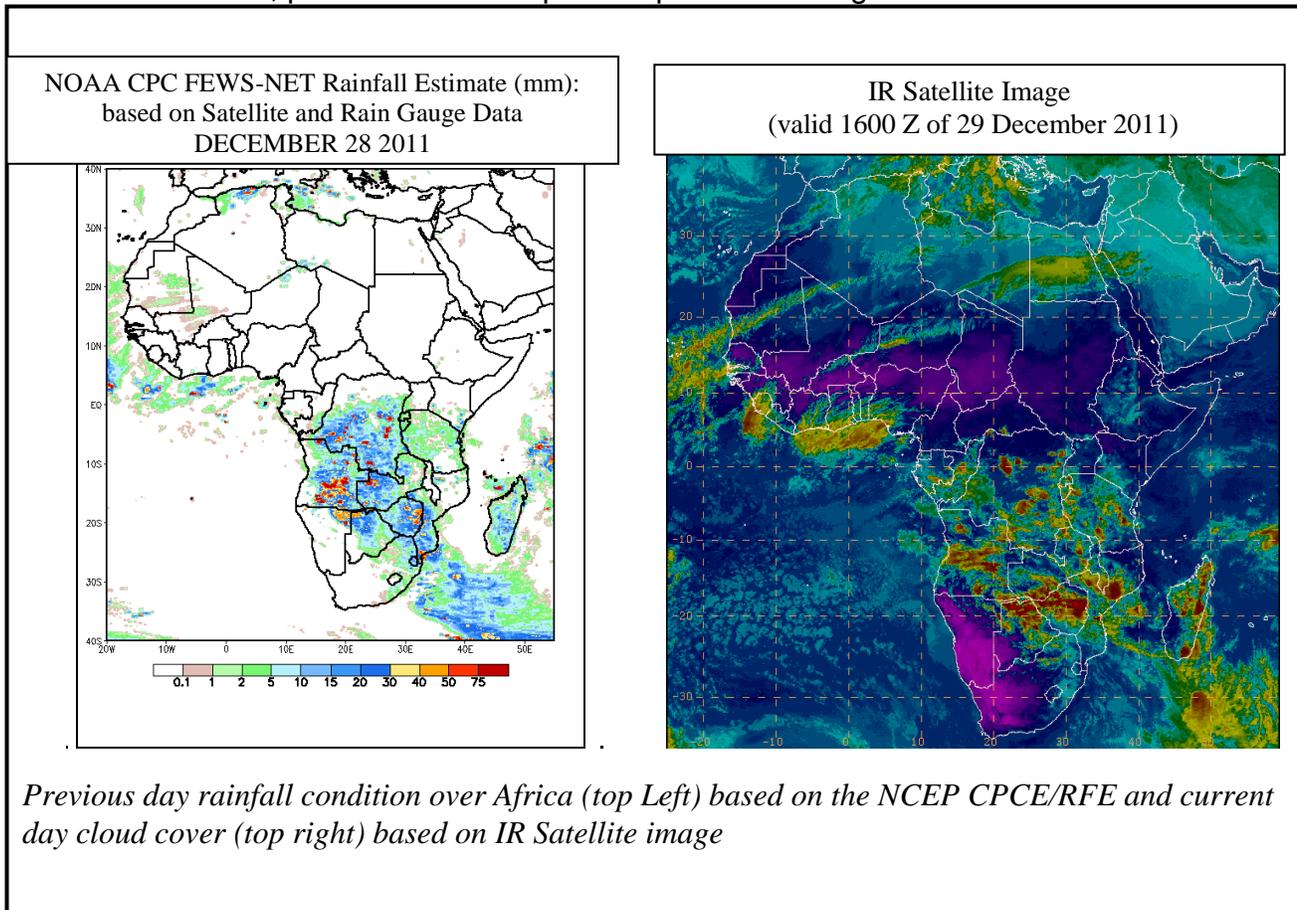
At 200mb, strong winds associated with Sub-Tropical Westerly Jet are expected to dominate the flow over northern Africa, during the forecast period. The intensity of the jet is expected to exceed 150kts in the region between Atlantic Ocean and Persian Gulf across Mauritania, Mali, Niger, and north Chad. The jet core tends to propagate to the east towards end of the forecast period with its maximum wind speed exceeding 130kts. 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 70kts in the region between South Africa and Indian Ocean. The core of the jet tends to shift further to the east with its maximum wind speed exceeding 90kts towards end of the forecast period.

In the next five days, seasonal wind convergence in the CAB region, localized convergences and the interaction between eastward propagating mid-latitude and tropical systems across southern and southeastern Africa are expected to enhance rainfall in their respective regions. Hence, there is an increased chance for heavy rainfall over southern DRC, eastern Angola, northern Botswana, Zambia, northern Zimbabwe, Malawi, southern Tanzania, parts of Mozambique and Madagascar.

## 2.0. Previous and Current Day Weather Discussion over Africa (28 December – 29 December 2011)

**2.1. Weather assessment for the previous day (28 December 2011):** During the previous day, moderate to locally heavy rainfall was observed over northeastern Algeria, parts of DRC, western Zambia, Zimbabwe, northern Botswana, Angola, northeastern Namibia, southern Mozambique and parts of Madagascar.

**2.2. Weather assessment for the current day (29 December 2011):** Intense clouds are observed over parts of DRC, Angola, Tanzania, Zambia, Zimbabwe, Botswana, parts of Mozambique and parts of Madagascar.



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