

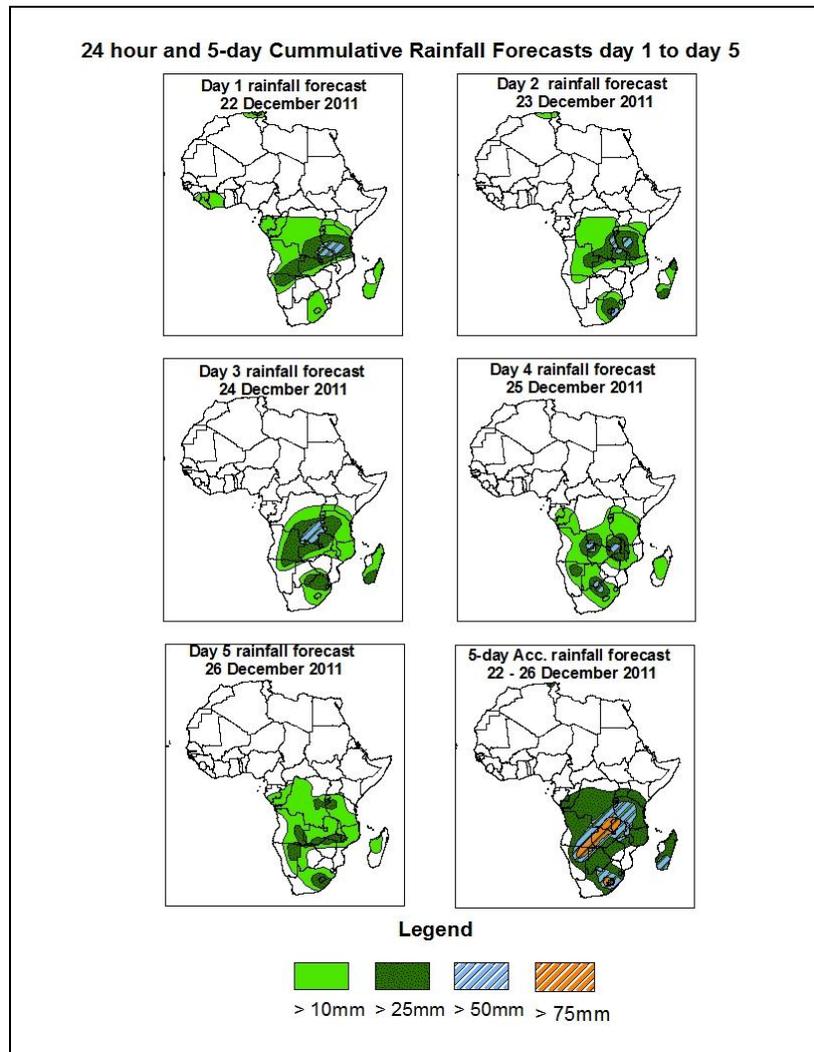


# NCEP Contributions to the WMO Severe Weather Forecasting Demonstration Project (SWFDP) and to the African Monsoon Multidisciplinary Analysis (AMMA) Initiative

## 1.0. Rainfall Forecast: Valid 06Z of 22 December – 06Z of 26 December 2011, (Issued at 17:00Z of 21 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, Burundi, southeastern Angola, northern Namibia, northern Botswana, Zambia, Malawi, parts of Tanzania and eastern South Africa.

## **1.2. Models Comparison and Discussion-Valid from 00Z of 21 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 1009mb to 1010mb through 24 to 48 hours and then it tends to deepen back to 1008mb towards end of the forecast period according to the **GFS** model. According to **ECMWF** model it is expected to deepen, with its MSLP value decreasing from 1009mb to 1008mb through 24 to 96 hours and then it tends to fill up back to 1009mb towards end of the forecast period. This low is expected to deepen, with its MSLP value decreasing from 1009mb to 1008mb towards end of the forecast period while shifting slightly to the northeast according to the **UKMET** model. Another low in the vicinity of southern Botswana is expected to fill up, with its MSLP value increasing from 1006mb to 1009mb while moving towards the northwest to reach Zambia and Namibia towards end of the forecast period according **GFS** model. According to **ECMWF** model, this low is expected to fill up, with its mean sea level pressure value increasing from 1007mb to 1012mb while moving to the southwest towards end of the forecast period. According to the **UKMET** model, this low pressure is expected to deepen, with its MSLP value decreasing from 1008mb to 1006mb while moving slightly towards northeast through 24 to 48 hours and then it tends to fill up, with its MSLP value increasing from 1006mb to 1009 through 48 to 96 hours. This low tends to deepen back to 1007 by 120 hours. Another low pressure across Mozambique Channel is expected to deepen, with its MSLP value decreasing from 1010mb to 1009mb through 24 to 72 hours and then it tends to fill up back to 1010mb by 96 hours. This low tends to deepen, with its MSLP value decreasing from 1010mb to 1009mb towards end of the forecast period according **GFS** model. This low is expected to fill up, with its MSLP value increasing from 1009mb to 1012mb while shifting slightly to the south towards end of the forecast period according **ECMWF** model. According to the **UKMET** this low pressure is expected to maintain its MSLP value of 1010mb through 24 to 72 hours. The fourth low over southern Sudan is expected to deepen, with its MSLP value decreasing from 1009mb to 1007mb through 24 to 72mb and then it tends to fill up back to 1008mb towards end of the forecast period, according **GFS** model. According the **ECMWF** model this low is expected to appear by 48 hours and it tends to deepen, with its MSLP value decreasing from 1009mb to 1008mb through 48 to 96 hours and then it tends to fill up back to

1009mb towards end of the forecast period. This low pressure 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 1009 towards end of the forecast period according the **UKMET** model.

The St. Helena High pressure system over southeast Atlantic Ocean is expected to intensify, with its MSLP value increasing from 1024mb to 1026mb towards end of the forecast period according to both **GFS** and **UKMET** models. According to **ECMWF** model this high pressure system tends to fill up, with its MSLP value increasing from 1024 to 1026mb through 24 to 72 hours and then it tends to weaken, with its MSLP value decreasing from 1026mb to 1025mb towards end of the forecast period. The Mascarene high pressure system over southwest Indian Ocean is expected to maintain its MSLP value of 1020mb towards end of the forecast period according to **GFS**, **ECMWF** and **UKMET** models.

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 Uganda and DRC by 48 hours then Tanzania by 72 hours then Zimbabwe towards end of the forecast period. Localized wind convergences are also expected to dominate the flow over Namibia and eastern South Africa then it tends to intensify and to shift slightly to the northwest to reach Angola towards end of the forecast period. Lower tropospheric anticyclone and its associated ridge are expected over South Africa and the neighboring areas by 72 hours tend to weaken while shifting 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 and then it tends to weaken through 24 to 48 hours while moving to east.

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 Mali. This trough is expected to move eastwards and tends to reach northern Chad with the low geopotential value of 5820gpm 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 5782gpm.

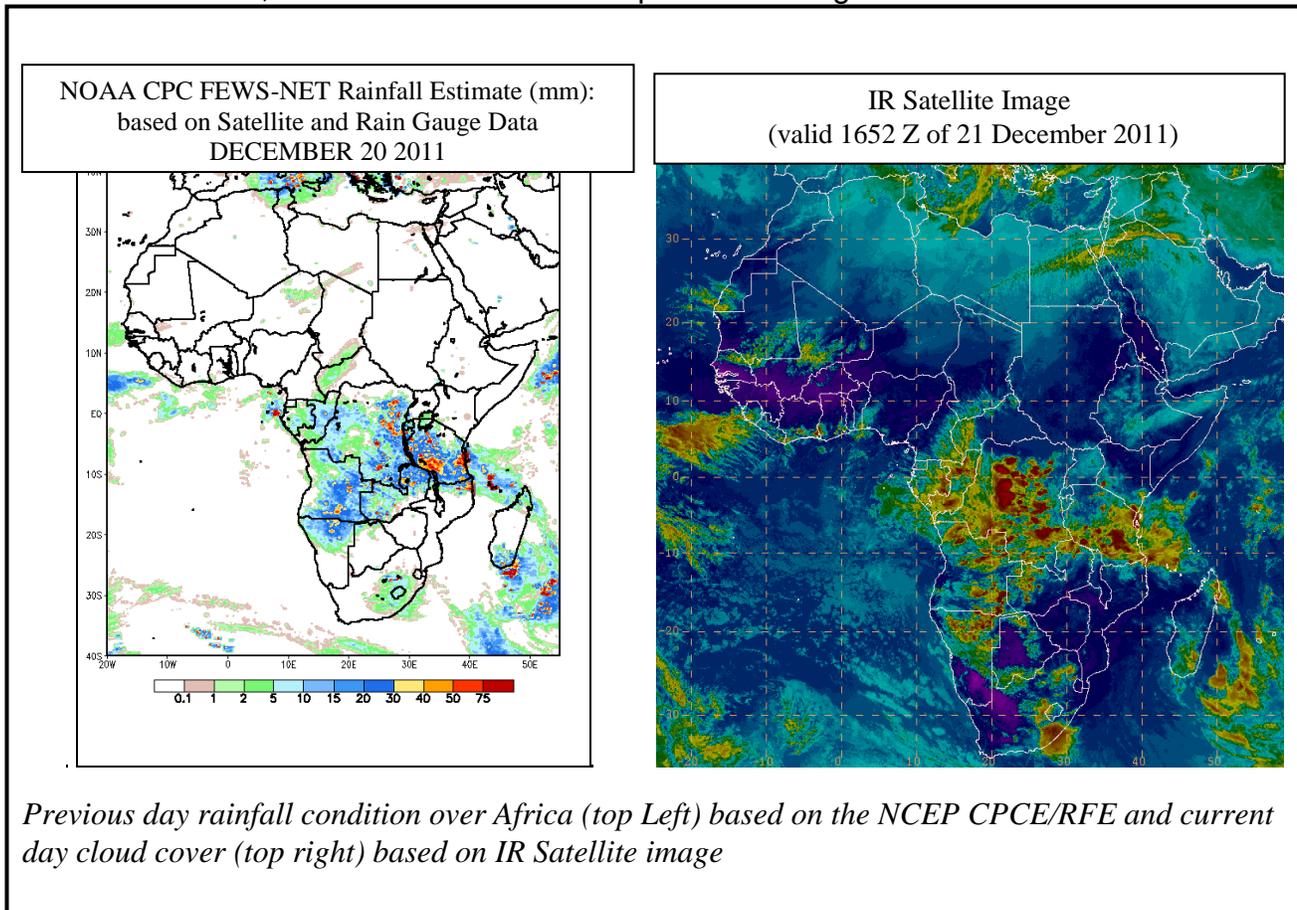
At 200mb, strong winds associated with Sub-Tropical Westerly Jet are expected to dominate the flow over northern Africa, during the forecast period. The intensity of the jet is expected to exceed 130kts in the region between north Mali and Turkey. The jet core tends to propagate towards in the region between Niger and Persian Gulf 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 110kts in the region between southeastern Atlantic Ocean and Indian Ocean across 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 90kts towards end of the forecast period. The third core of the subtropical Westerly Jet is expected to dominate the flow over the northwest Africa, by 48 hours. The intensity of this core is expected to exceed 90kts by 48hours in the region between Atlantic Ocean and Mali across Mauritania. The core of the jet tends to shift further to the east in the region between Atlantic Ocean and Chad with its maximum wind speed exceeding 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, Burundi, southeastern Angola, northern Namibia, northern Botswana, Zambia, Malawi, parts of Tanzania and eastern South Africa.

## 2.0. Previous and Current Day Weather Discussion over Africa (20 December – 21 December 2011)

**2.1. Weather assessment for the previous day (20 December 2011):** During the previous day, moderate to locally heavy rainfall was observed over northwestern Tunisia, Gabon, parts of DRC, Tanzania, Zambia, Burundi, Rwanda, Angola, northern Namibia, northern Malawi, northern Mozambique and southern Madagascar.

**2.2. Weather assessment for the current day (21 December 2011):** Intense clouds are observed over Gabon, Congo, DRC, Angola, northern Namibia, Tanzania, eastern South Africa and parts of Madagascar.



*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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