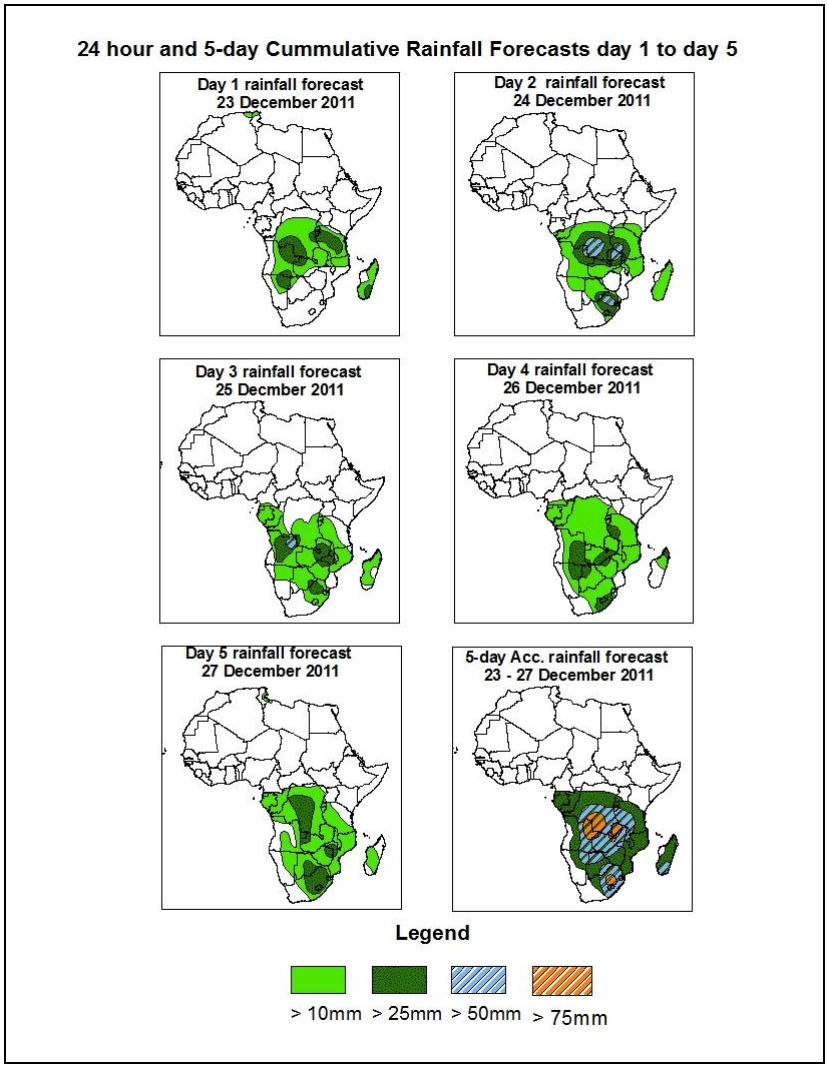
NCEP Contributions to the WMO Severe Weather Forecasting Demonstration Project (SWFDP) and to the African Monsoon Multidisciplinary Analysis (AMMA) Initiative

1.0. Rainfall Forecast: Valid 06Z of 23 December – 06Z of 27 December 2011, (Issued at 16:30Z of 22 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, eastern Angola, northern Namibia, northern Botswana, Zambia, northern Zimbabwe, Malawi, parts of Tanzania and eastern South Africa.

1.2. Models Comparison and Discussion-Valid from 00Z of 22 December 2011

The GFS, ECMWF and UKMET models indicate series of lows and their associated troughs across central and the South African countries. **T**he low over DRC is expected to deepen, with its mean sea level pressure value decreasing from 1010mb to 1008mb through 24 to 72 hours and then it tends to fill up back to 1009mb while shifting slightly to the east towards end of the forecast period according to the **GFS** model. **A**ccording to **ECMWF** model it is expected to appear by 72 hours and it tends to fill up, with its MSLP value increasing from 1009mb to 1010mb towards end of the forecast period. **T**his low is expected to deepen, with its MSLP value decreasing from 1008mb to 1007mb through 24 to 96 hours while shifting slightly to the east and then it tends to fill up, with its MSLP value increasing from 1007mb to 1008mb towards end of the forecast period according to the **UKMET** model. **A**nother 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 southwest to reach towards end of the forecast period according **GFS** model. **A**ccording to **ECMWF** model, this low is expected to fill up, with its mean sea level pressure value increasing from 1009mb to 1010mb while moving to the south through 24 to 72 hours. **A**ccording to the **UKMET** model, this low pressure is expected to fill up, with its MSLP value increasing from 1007mb to 1010mb while moving slightly towards southeast through 24 to 96 hours and then it tends to deepen, with its MSLP value decreasing from 1010mb to 1009 by 120 hours. **A**nother low pressure across Mozambique Channel is expected to fill up, with its MSLP value increasing from 1009mb to 1012mb through 24 to 96 hours and then it tends to deepen back to 1008mb by 120 hours according **GFS** model. **A**ccording to the **UKMET** this low pressure is expected to maintain its MSLP value of 1010mb through 24 to 72 hours. **T**he fourth low over southern Sudan is expected to fill up, with its MSLP value increasing from 1008mb to 1009mb towards end of the forecast period, according **GFS** model. **A**ccording the **ECMWF** model this low is expected to deepen, with its MSLP value decreasing from 1009mb to 1008mb through 24 to 48 hours towards end of the forecast period. **T**his low pressure is expected to deepen, with its MSLP value decreasing from 1007mb to 1006mb through 24 to 72 hours and then it tends to fill up back to 1007 towards end of the forecast period according the **UKMET** model.

The St. Helena High pressure system over southeast Atlantic Ocean is expected to deepen, with its MSLP value decreasing from 1026mb to 1025mb through 24 to 72 hours and then it tends to fill up back to 1026 towards end of the forecast period according to both **GFS** and **ECMWF** models. **A**ccording to **UKMET** model this high pressure system tends to fill up, with its MSLP value increasing from 1026 to 1028mb towards end of the forecast period. **T**he Mascarene high pressure system over southwest Indian Ocean is expected to deepen, with its MSLP value decreasing from 1024mb to 1020mb through 24 to 72 hours and then it tends to fill up back to 1024mb by 96.This high pressure system tends to deepen, with its MSLP value decreasing from 1024mb to 1020mb towards end of the forecast period according to both **GFS** and **ECMWF.** According to **UKMET** model this high pressure system is expected to fill up, with its MSLP value increasing from 1020mb to 1024 through 24 to 96 hours, and then it tends to deepen back to 1020mb by 120 hours.

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 east and reach Tanzania and DRC by 48 hours then Zimbabwe towards end of the forecast period. **L**ocalized wind convergences are also expected to dominate the flow over Angola then it tends to intensify and to shift slightly to the southeast to reach Namibia and Botswana towards end of the forecast period. **L**ower tropospheric anticyclone and its associated ridge are expected over South Africa and the neighboring areas and tend to shift slightly to the east towards end of the forecast period.

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. **T**his trough is expected to move eastwards and tends to reach northern Niger 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 Niger and Persian Gulf. The jet core tends to propagate towards in the region between Chad 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 110kts towards end of the forecast period. The third core of the subtropical Westerly Jet is expected to dominate the flow over the northwest Africa. The intensity of this core is expected to exceed 90kts 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 southern Algeria with its maximum wind speed exceeding 110kts towards end of the forecast period.

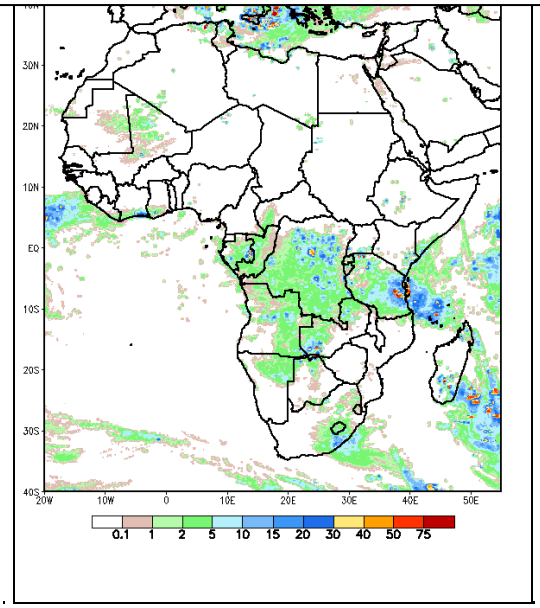
In the next five days, seasonal wind convergence in the CAB region, localized convergences and the interaction between eastward propagating mid-latitude and tropical systems across southern and southeastern Africa are expected to enhance rainfall in their respective regions. Hence, there is an increased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

2.0. Previous and Current Day Weather Discussion over Africa (21 December – 22 December 2011)

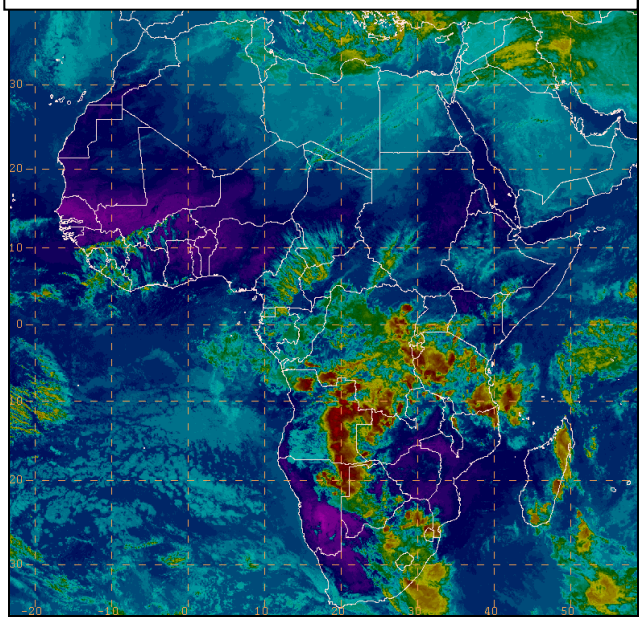
2.1. Weather assessment for the previous day (21 December 2011): During the previous day, moderate to locally heavy rainfall was observed over northeastern Algeria, Gabon, parts of DRC, eastern Tanzania, parts of Zambia, Burundi, Rwanda, Angola and parts of Madagascar.

2.2. Weather assessment for the current day (22 December 2011): Intense clouds are observed over Gabon, Congo, DRC, Angola, northern Namibia, Tanzania, Burundi, Rwanda, eastern South Africa, northern Mozambique and parts of Madagascar.

NOAA CPC FEWS-NET Rainfall Estimate (mm):
based on Satellite and Rain Gauge Data
DECEMBER 21 2011



IR Satellite Image
(valid 1622 Z of 22 December 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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