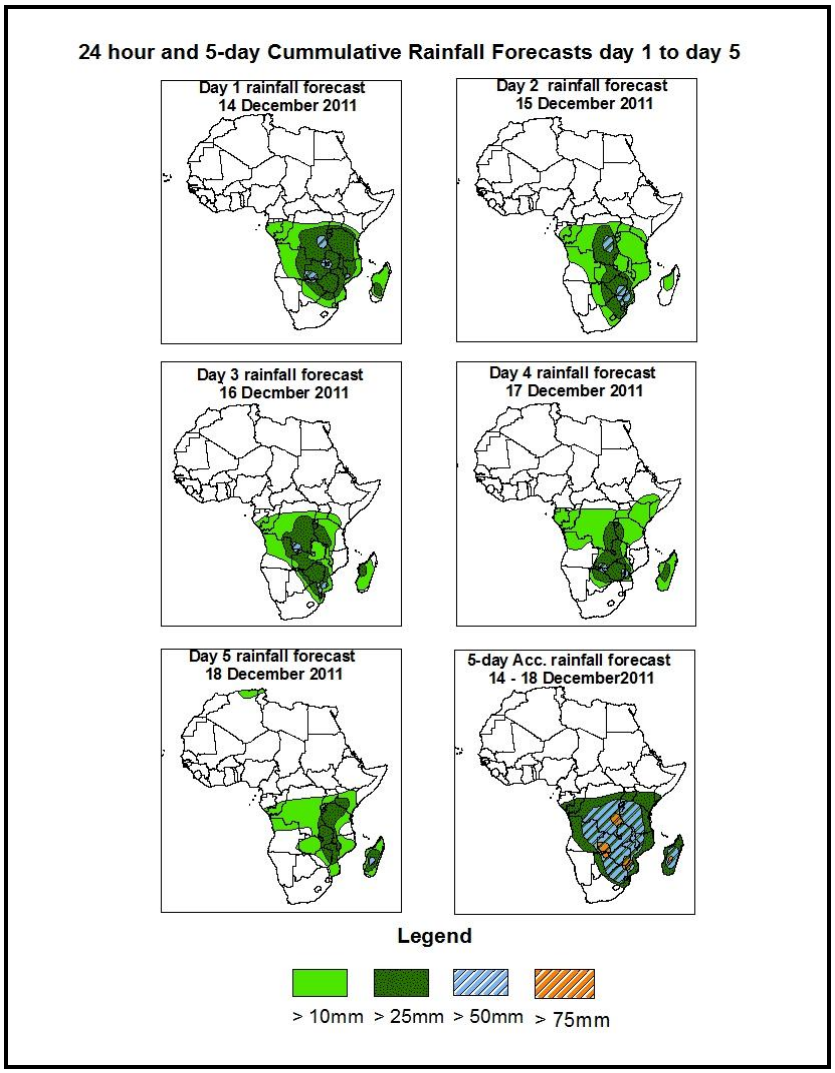
NCEP Contributions to the WMO Severe Weather Forecasting Demonstration Project (SWFDP) and to the African Monsoon Multidisciplinary Analysis (AMMA) Initiative

1.0. Rainfall Forecast: Valid 06Z of 14 December – 06Z of 18 December 2011, (Issued at 16:30Z of 13 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 Zambia, Zimbabwe, parts of Tanzania, southeastern DRC, northern South Africa and Madagascar.

1.2. Models Comparison and Discussion-Valid from 00Z of 13 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 1009mb to 1006mb towards end of the forecast period according to the **GFS** model. **A**ccording to **ECMWF** model it is expected to fill up, with its MSLP value increasing from 1009mb to 1010mb through 24 to 72 hours and then it tends to deepen back, with its MSLP value decreasing from 1010mb to 1008mb towards the of the forecast period. **A**ccording to the **UKMET** model, this low is expected to deepen from MSLP value of 1008mb to 1007mb while shifting to the east towards end of the forecast period. **A**nother low is expected to form in the vicinity of Botswana and tends to fill up, with its MSLP value increasing from 1004mb to 1007mb while moving towards the east to reach western areas of Zimbabwe 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 1008mb to 1012mb towards end of the forecast period. **A**ccording to the **UKMET** model, this low pressure is expected to fill up, with its MSLP value increasing from 1006mb to 1008mb and then it tends to deepen from MSLP value of 1008mb to 1007mb through 48 to 96 hours then it tends to fill up back to 1008mb by 120 hours. **A**nother low pressure which is expected to form across Mozambique Channel and tends to fill up, with its MSLP value increasing from 1007mb to 1008mb through 24 to 48 hours and then it tends to deepen, with its MSLP value decreasing from 1008mb to 1005mb while shifting to coastal Mozambique through 48 to 72 hours. This low is expected to fill up with its mean sea level pressure value increasing from 1005mb to 1007mb towards end of the forecast period according **GFS** model. **A**ccording to the **ECMWF** this low pressure is expected to form by 72 hours and tends to deepen, with its MSLP value decreasing from 1010 to 1008mb while shifting to the eastern areas to reach the coastal areas of Mozambique towards end of forecast period. It then tends to deepen, with its MSLP value decreasing from 1009mb to 1007 through 24 to 72hours and then it tends to fill up, with its MSLP value increasing to 1008mb by 96 hours according **UKMET** model. **T**he fourth low over the southern areas of Sudan is expected to fill up, with its MSLP value increasing from 1007mb to 1008mb through 24 to 72 hours and then it tends to deepen from MSLP value of 1008mb to 1006mb towards end of the forecast period, according **GFS** model. **A**ccording the **ECMWF** model this low is

expected to fill up, with its MSLP value increasing from 1009mb to 1012mb through 24 to 48 hours and then it tends to deepen, with its mean sea level pressure value decreasing from 1012mb to 1008mb towards end of the forecast period. **T**his low pressure is expected to maintain its MSLP value of 1007mb towards end of the forecast period according the **UKMET** model.

The St. Helena High pressure system over southeast Atlantic Ocean is expected to weaken, with its MSLP value decreasing from 1024mb to 1020mb through 24 to 96 hours and then it tends to intensify to 1024mb by 120 hours according to both **GFS** and **UKMET models**. **A**ccording to **ECMWF** model this high pressure system tends to maintain its MSLP value of 1020mb through 24 to 96 hours then it tends to intensify to 1024 towards end of the forecast period. **T**he Mascarene high pressure system over southwest Indian Ocean is expected to intensify, with its MSLP value increasing from 1020mb to 1024mb through 24 to 48 hours and then it tends to weaken back to 1020mb towards end of the forecast period according **GFS, ECMWF** and **UKMET** models.

At the 850hpa level, a lower tropospheric seasonal wind convergence is expected to remain active over parts of CAB region then it tends to align itself with a convergence across Tanzania and Mozambique. The convergence across northern Botswana, Angola and neighboring areas is expected to move towards Zambia while deepening towards end of the forecast period. **L**ocalized wind convergences are also expected to dominate the flow over both southern Congo and Angola, while the convergence line is expected to shift to the east through 48 to 72hours and then it tends to deepen while extending towards Angola and Namibia towards end of the forecast period. **L**ower tropospheric anticyclone and its associated ridge are expected to dominate the flow over South Africa and the neighboring areas.

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 south Libya. This northeast-southwest oriented trough is expected to move eastwards and tends to reach Egypt through 48 to 72 hours. Another mid-latitude frontal system is expected to approach coastal Mauritania with the low geopotential value of 5820gpm through 48hours and it tends to propagate towards southern Algeria then southern Libya with

the low geopotential value of 5760gpm 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 through 24 to 72 hours.

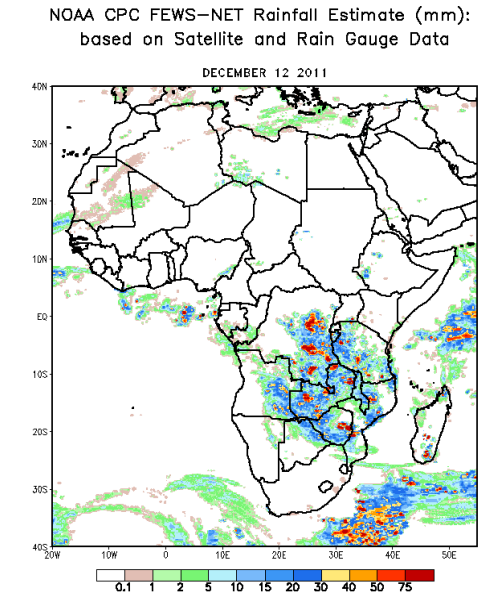
At 200mb, strong winds associated with Sub-Tropical Westerly Jet are expected to dominate the flow over northern Africa, during the forecast period. The intensity of the jet is expected to exceed 110kts in the region between northeastern Atlantic Ocean and Turkey while moving to the east by 48hours and then it tends to weaken to wind speed values exceeding 90kts. The jet core tends to propagate towards in the region between Mauritania and Persian Gulf through 48 and 96 hours while intensifying back to 110kts and then it tends to propagate towards in the region between southern Algeria and Persian Gulf 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 South Africa and western Indian Ocean. 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 48hours then it tends to weaken to 90kts by 72 hours. The third Jet is expected to dominate the flow over the northwest Africa, by 120 hours. The intensity of the Jet is expected to exceed 110kts in the region between Algeria and Greece.

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 Zambia, Zimbabwe, parts of Tanzania, southeastern DRC, northern South Africa and Madagascar.

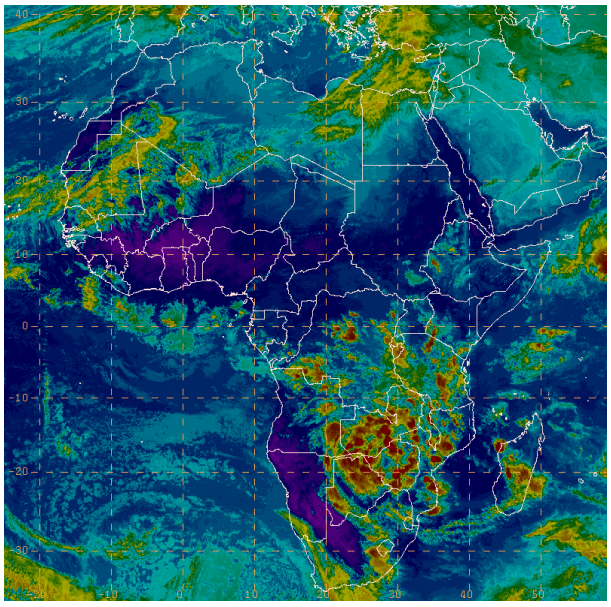
2.0. Previous and Current Day Weather Discussion over Africa (12 December – 13 December 2011)

2.1. Weather assessment for the previous day (12 December 2011): During the previous day, moderate to locally heavy rainfall was observed over southern Congo, eastern DRC, eastern Angola, Zambia, Tanzania, Zimbabwe and southern Madagascar.

2.2. Weather assessment for the current day (13 December 2011): Intense clouds are observed over Angola, parts of DRC, Botswana, Zambia, Zimbabwe, Tanzania, South Africa, 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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