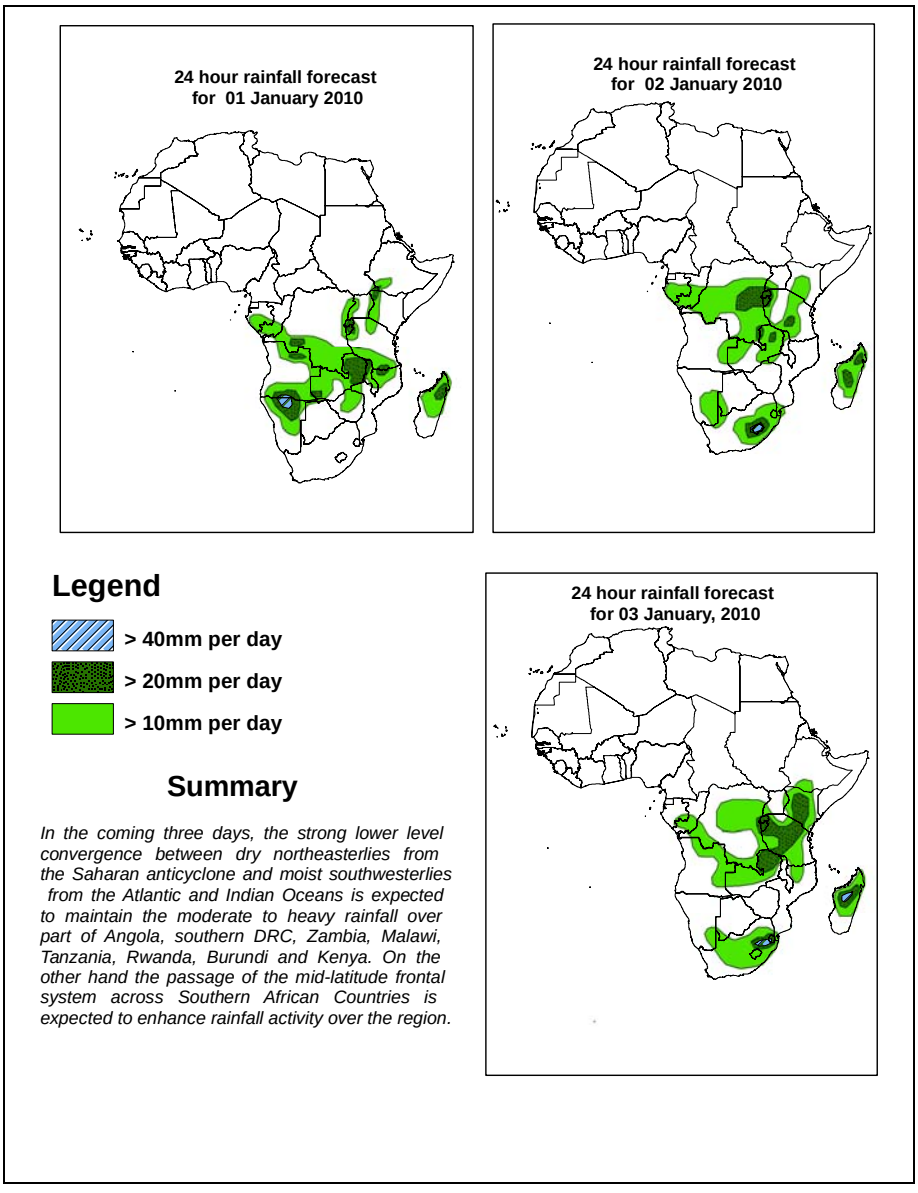
NCEP Contributions to the WMO Severe Weather Forecasting Demonstration Project (SWFDP) and to the African Monsoon Multidisciplinary Analysis (AMMA) Initiative

1.0. Rainfall Forecast: Valid, 06Z of 01 January –06Z of 03 January 2010, (Issued at 14:00EST of 31 December 2009)

1.1. Twenty Four Hour Cumulative Rainfall Forecasts

The forecasts are expressed in terms of probability of precipitation (POP) exceedence based on the NCEP, UK Met Office and the ECMWF NWP outputs, the NCEP global ensemble forecasts system (GEFS) and expert assessment.



1.2. Models Comparison and Discussion - Valid from 00Z of 31 December 2009

The weakening of Saharan high ridge is expected to extend in the region between Algeria and Libya, attaining central pressure value of 1020mb through 24hrs. This system is expected to shift towards the eastwards. The Arabian High is expected to be displaced into the Arabian Sea while strengthening from a pressure value of 1008mb to 1020mb within 24 to 72hrs. On the other hand, the GFS model indicates the passage of a deep mid-latitude low pressure system in the region between northeast Atlantic Ocean and central Mediterranean Sea during 24 to 72 hrs. However, the ECMWF and UK Met Office models tend to slightly underestimate the intensity of this system.

At 850mb level, the center of Saharan Anticyclone is expected to shift from Egypt to northern Saudi Arabia through 24 to 72 hrs. Its peripheral winds are expected to dominate the flow over much of northern, western and central African regions during 24 hrs. With eastward movement of the center of the anticyclone, the influence of the dry northeasterly winds is also expected to expand towards northeast African regions, through 48 to 72 hrs. This dry northeasterly flow, together with moist southwesterly flow from the Atlantic Ocean is expected to maintain the strong lower level convergence over western and central parts of equatorial Africa, resulting in moderate to heavy rainfall in the coming three days in the regions. Moreover, part of this dry northeasterly flow is also expected to converge with a moist flow that comes from the Indian Ocean to maintain the convergence in the CAB region in the coming three days. On the other hand, the mid latitude westerly trough that has been causing increased cloudiness over parts of northeast Africa is expected to move eastward. The axis of this trough is expected to shift towards east of 45^{o}E through 24 to 72 hrs. With eastward shift of the trough axis, an anticyclone system is expected to develop over the Arabian Peninsula through 48 hrs. Hence, the moist easterly flow that has persisted across the Horn of Africa countries is expected to weaken and be replaced by a northeasterly flow through 72 hrs. The weakening of the zonal flow across the Horn of Africa is expected to decrease rainfall activity over Ethiopia and adjacent areas through 24 to 48 hrs. On the other hand, the GFS model indicates westward moving lower level cyclonic circulation over southwestern Indian Ocean. This cyclonic circulation is expected to cross northern Madagascar through 48 to 72 hrs. However, the ECMWF and UK Met Office models tend to underestimate the intensity of this system.

At 500mb level, consistent with lower tropospheric flow, the axis of the mid-latitude trough in the westerlies is expected to shift from about 40^{o}E longitude to about 55^{o}E longitude through 24 to 72 hrs. As a result of this, the interaction between the mid-latitude and tropical air mass and its associated wet weather activity over Ethiopia and its adjacent areas is expected to continue through 24 to 48 hrs. Unlike, the lower tropospheric level, all the three models are in agreement in indicating the time and space evolution of this mid latitude frontal system. On the other hand, a mid latitude frontal system is expected to approach the western coastal areas of South Africa through 72hrs.

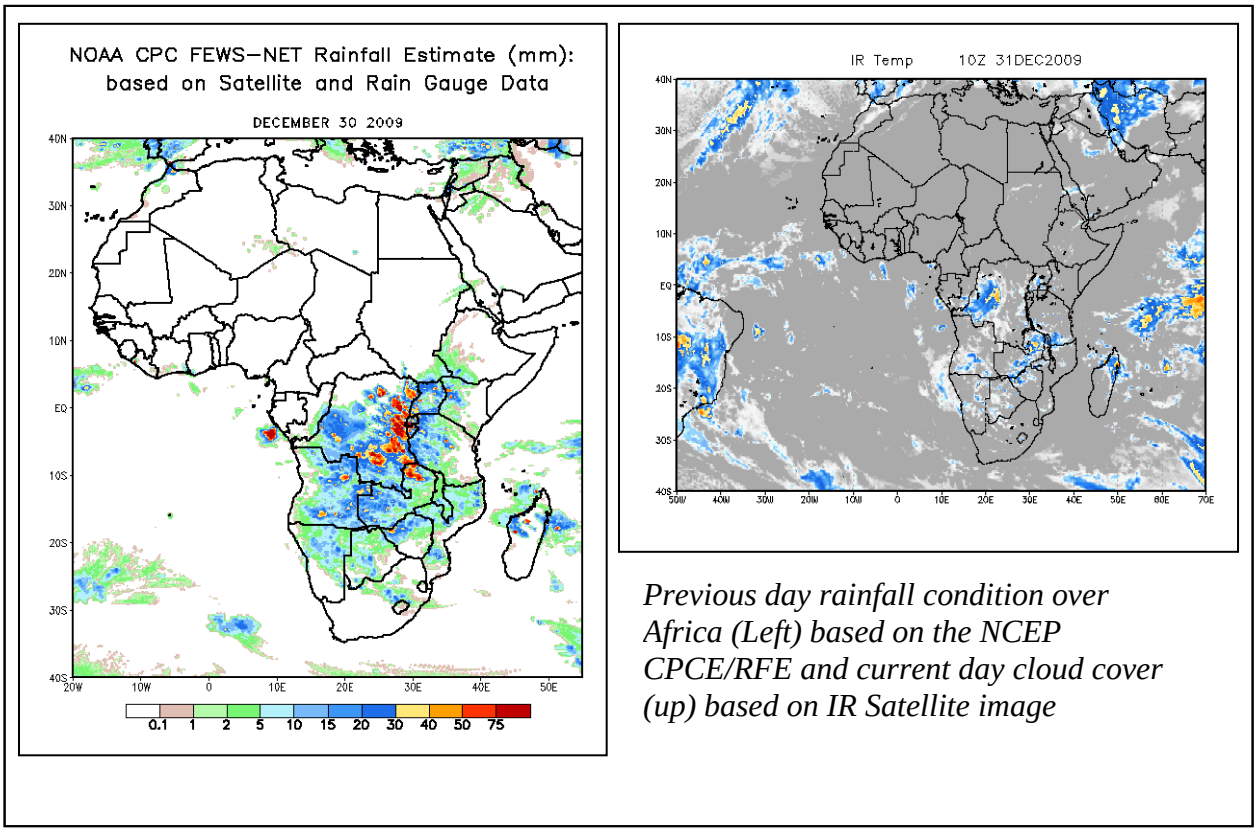
At 200mb, areas ahead of the trough in the westerlies are characterized by strong jet wind. Hence, the jet wind speed is expected to exceed 110kts over northern Africa between Western Sahara and Egypt through 24 to 48hrs, with the zone of the core speed shifting eastward. On the other hand, another zone of maximum wind speed that exceeds 130kts is expected to shift towards southern Saudi Arabia through 24 to 48 hrs. The two zones of maximum wind speed are expected to merge, while slightly weakening through 72 hrs. On the other hand, the flow over subtropical areas of the southern hemisphere is expected to attain a wavy pattern through 48 to 72 hrs with the associated zone of maximum wind speed of 90kts in some places of southwest Indian Ocean, off the coast of South Africa.

In the coming three days, the strong lower level convergence between dry northeasterlies from the Saharan anticyclone and moist southwesterlies from the Atlantic and Indian Oceans is expected to maintain the moderate to heavy rainfall over part of Angola, southern DRC, Zambia, Malawi, Tanzania, Rwanda, Burundi and Kenya. On the other hand the passage of the mid-latitude frontal system across Southern African Countries is expected to enhance rainfall activity over the region.

2. 0. Previous and Current Day Weather Discussion over Africa (30 –31 December 2009)

2.1. Weather assessment for the previous day (30 December 2009): During the previous day, moderate to heavy rainfall events were observed over the DRC, Zambia, eastern Angola, Western Tanzania, Northern Zimbabwe, Uganda the great lake region and western Kenya.

2.2. Weather assessment for the current day (31 December 2009): Heavy clouds are observed in the northwestern DRC, eastern Zambia and extreme northern parts of Malawi and northern Madagascar.



Previous day rainfall condition over Africa (Left) based on the NCEP CPCE/RFE and current day cloud cover (up) based on IR Satellite image

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