

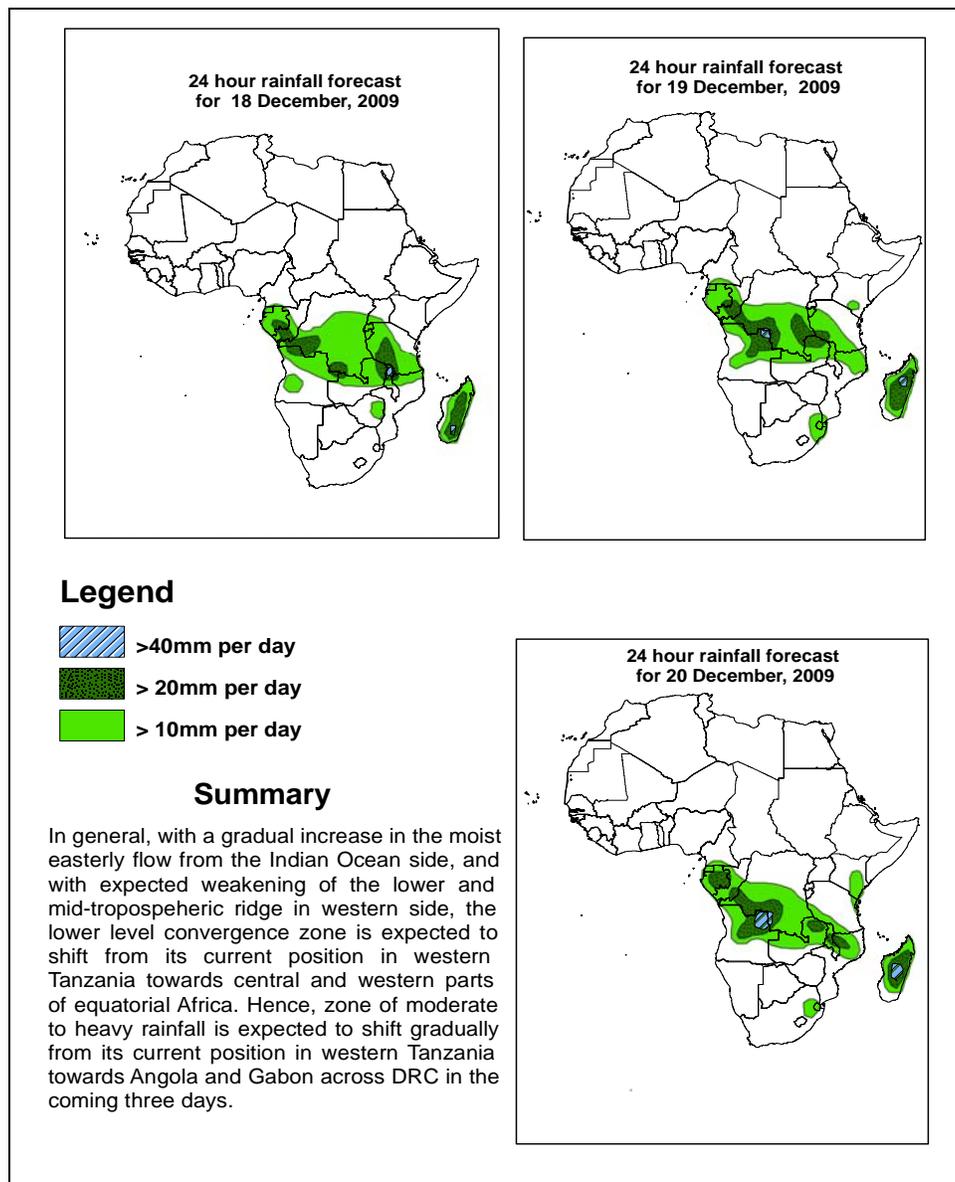


# NCEP Contributions to the WMO Severe Weather Forecasting Demonstration Project (SWFDP) and to the African Monsoon Multidisciplinary Analysis (AMMA) Initiative

## 1.0. Rainfall Forecast: Valid, 06Z of 18 December – 06Z of 20 December 2009, (Issued at 14:00EST of 17 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 17 December 2009**

During 24 hrs, a ridge associated with the Saharan High is expected to extend in the region between Western Sahara and Egypt, with maximum pressure value of about 1020mb within the extent of the ridge. In the succeeding 48 hrs, this ridge is expected to weaken over the western areas, while it is expected to intensify in its eastern extent. After 72 hrs a closed high pressure system, with central pressure value of 1023mb, is expected to develop over the Arabian Peninsula and the adjacent areas of the Persian Gulf, cutting itself from this east-west oriented ridge system. On the other hand, a ridge associated with the St. Helena Anticyclone is expected to have a northwest-southeast orientation in the area extending between 18°W, 23°S and the southern tip of South Africa. The ridge is expected to weaken gradually in its northwestern end while it maintains its central pressure value of 1022mb over the periphery of the southern tip of South Africa during 48 to 72 hrs. Another ridge, extending from eastern Atlantic Ocean to southern Kenya across Angola, Zambia and Tanzania, is expected to weaken in its western extent, while it is expected to remain over southern Kenya and Tanzania as a weak ridge during 48 to 72 hrs. In general, with the expected gradual intensification of a high pressure system over the Arabian Peninsula and adjacent areas, its associated ridge is expected to extend southwestwards influencing the flow over northern Ethiopia and the adjacent areas of Northeast Africa. As a result of this, dry and cool condition is expected to prevail gradually over the highlands of Ethiopia and the adjacent areas. Once again, the ECMWF model tends to deepen the low pressure systems by about 1mb, while it tends to intensify the high pressure systems by about 1mb, when compared with the GFS and UK Met Office Models.

At 850mb level, the persistent low tropospheric circulation off the coast of East Africa is expected to weaken during 48 to 72 hrs. With weakening of this system, the flow over east Africa is expected to be more of easterly, especially, across the southern portions of East African countries. With more easterly flow coming from the Indian Ocean, the lower level convergence is expected to shift from the eastern parts of the Congo Air Boundary (CAB) areas towards central DRC and Angola. This condition is expected to increase rainfall to over 20mm per day, with chances of isolated heavy rainfall over central and southern DRC and Angola through 24 to 72 hrs. On the other hand, with intensification of the Arabian Anticyclone, the Northeast African countries are expected to remain dry during the coming three days.

At 500mb level, the wavy pattern in westerly flow in the southern hemisphere is expected to weaken gradually and be replaced by a more or less zonal flow in the coming three days. Similarly, zonal westerlies will dominate the flow over the subtropical regions of the northern hemisphere. During 24 hrs, an east-west oriented mid-tropospheric ridge is expected across the Sahel, in the region between coastal West Africa and southern Sudan. This ridge is expected to weaken gradually in the

succeeding 48 hrs, consistent with weakening of the ridge associated with Saharan High at the surface level. Similarly, the mid-tropospheric ridge that dominates the flow over western and central parts of the southern African countries is expected to weaken during 48 to 72 hrs, creating conducive condition for increase in wet weather activity over Angola and adjacent areas.

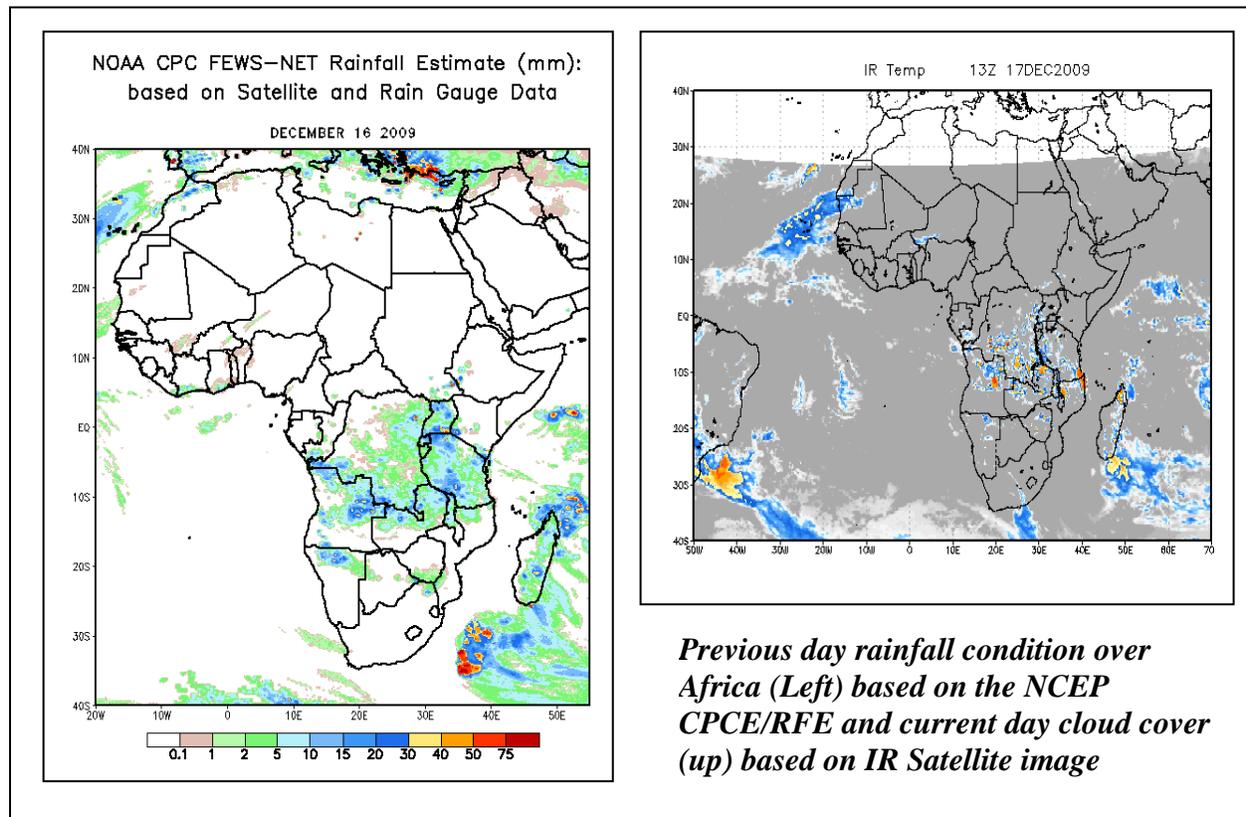
The upper tropospheric flow over the sub-tropical areas of Africa is expected to be more of Zonal during the coming three days. As a result of this the zone of maximum wind speed, associated with the sub-tropical westerly jet is also expected to have a zonal orientation. In general, the persistent zone of maximum wind (>110kts) at 200mb is expected to shift from its current position over eastern Mediterranean region towards the Persian Gulf while weakening. On the other hand, another zone of maximum wind is expected to propagate from around Western Sahara to Libya while intensifying. This eastward propagating zone of maximum wind exceeds 130kts by the time it approaches Libya during 48 hrs and then slightly weakens during 72 hrs. In general, the UK Met Office, model indicates stronger jet wind, covering relatively wider area as compared with the ECMWF and GFS models.

In general, with a gradual increase in the moist easterly flow from the Indian Ocean side, and with expected weakening of the lower and mid-tropospheric ridge in western side, the lower level convergence zone is expected to shift from its current position in western Tanzania towards central and western parts of equatorial Africa. Hence, zone of moderate to heavy rainfall is expected to shift gradually from its current position in western Tanzania towards Angola and Gabon across DRC in the coming three days.

## **2. 0. Previous and Current Day Weather Discussion over Africa (16 –17 December to 2009)**

**2.1. Weather assessment for the previous day (16 December 2009):** During the previous day, moderate to heavy rainfall events were observed over eastern DRC, northeastern Angola, Uganda, southern Zimbabwe, northern Zambia, northern Namibia and Madagascar.

**2.2. Weather assessment for the current day (17 December 2009):** Moderate clouds were observed over parts of southwestern Uganda, southeastern DR Congo, northeastern Angola, southern Tanzania and northern Madagascar.



**Author(s):** Anthony Twahirwa (Rwanda Meteorological Services / CPC-African Desk)

**Disclaimer:** *This bulletin is for training purposes only and should be used as guidance. NOAA does not make forecasts for areas outside of the United State.*