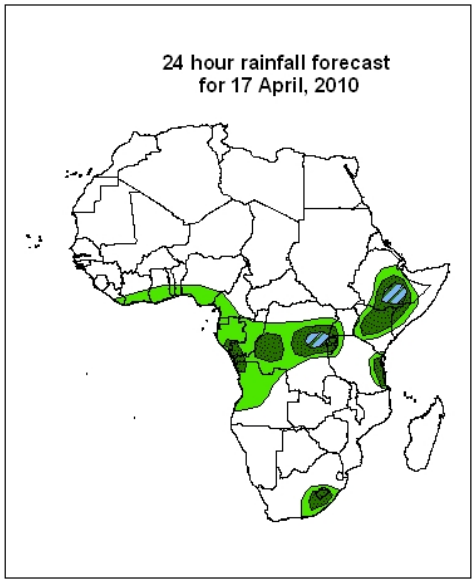
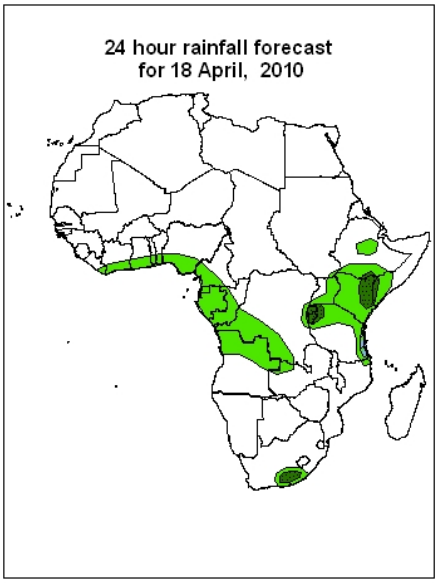
NCEP Contributions to the WMO Severe Weather Forecasting Demonstration Project (SWFDP) and to the African Monsoon Multidisciplinary Analysis (AMMA) Initiative

1.0. Rainfall Forecast: Valid, 06Z of 17 April –06Z of 19 April 2010, (Issued at 14:00EST of 16 April 2010)

1.1. Twenty Four Hour Cumulative Rainfall Forecasts

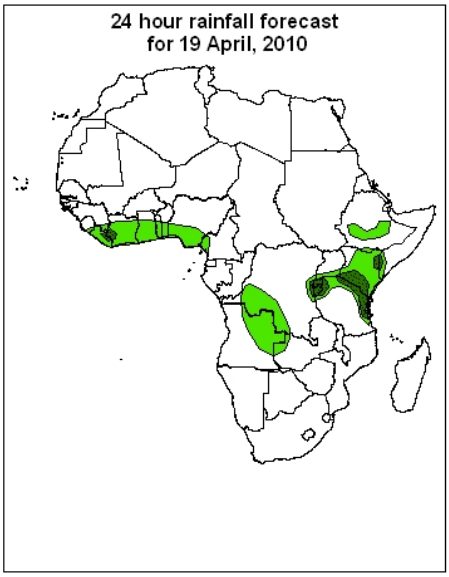
The forecasts are expressed in terms of probability of precipitation (POP) exceedence based on the NCEP, UK Met Office and the ECMWF NWP outputs, the NCEP global ensemble forecasts system (GEFS) and expert assessment.





Legend

- >40mm per day
- > 20mm per day
- > 10mm per day



Summary

The passage of a mid-latitude frontal system across eastern Mediterranean Sea is expected to continue enhancing interaction between the mid-latitude and tropical air masses across northeast Africa through 24 hours. In addition, the abundant moisture from the Arabian Sea and western Indian Ocean towards the Horn Africa and the strong lower level convergence in East Africa are expected to increase rainfall in the region. Hence, many places in Ethiopia and Kenya as well as parts of southern Somalia are expected to have enhanced rainfall through 24 hours. While the rains are expected to weaken in Ethiopia through 48 to 72 hours, the rest of East African regions will continue receiving moderate to heavy rainfall. The active lower level convergence in the Congo Air Boundary (CAB) region is also expected to maintain the moderate to heavy rainfall in the region while a feeble mid-latitude westerly trough that crosses South Africa is expected to increase rainfall in parts of South Africa.

1.2. Models Comparison and Discussion - Valid from 00Z of 16 April 2010

Mid latitude low pressure system that persisted over northeast Atlantic Ocean is expected to fill up, with expansion the Azores Anticyclone in the region. The low is expected shift towards the north, while its central pressure rising above 100mb through 24 to 72 hours. A ridge associated with the Saharan high pressure system is expected to expand and intensify slightly over northern Africa at the expense of the weakening of low pressure zone that stretches between western Algeria and northwest Libya through 24 to 72 hours. Both the GFS and the ECMWF models indicate a gradual filling up of the low the equatorial trough in its eastern end over Sudan and more or less maintaining its intensity in its western end in the Gulf of Guinea regions through 24 to 72 hours. The Mascarene high is expected to shift eastwards across southwest Indian Ocean and its associated East African ridge will weaken through 24 to 72 hours as a mid-latitude frontal system passes across South Africa. At the same time, a ridge associated with the St. Helena high is expected to expand eastwards across South Africa, following the eastward propagation of the frontal system through 24 to 72 hours.

At 850mb level, the easterly to southeasterly winds from the periphery of Arabian Anticyclone is expected to continue carrying moisture towards a strong lower level convergence in East Africa through 24 to 72 hours. In addition, the strong interaction between a mid-latitude frontal and tropical system along the 40^{o}E longitude in the vicinity of Ethiopia is expected to weaken gradually as the mid-latitude frontal system moves towards the Middle East region. The strong peripheral winds from the Mascarene and St. Helena anticyclones are expected to maintain the meridonial wind convergence over southern Africa, while this convergence is expected to shift from the western coastal areas of southern Africa into inland areas through 24 to 72 hours. The peripheral winds from these anticyclones also partly maintain the zonal wind convergence along 12^{o}N latitude in the region between coastal West Africa and western Sudan through 24 to 72 hours. On the other hand, a feeble trough in the mid-latitude westerly flow is expected to cross the southern parts of South Africa through 24 to 48 hours.

At 500mb level, consistent with the lower tropospheric flow, a mid tropospheric westerly trough is expected to move between 45^{0}E and 50^{0}E longitudes, enhancing the lower level convergence in the Horn Africa through 24 to 48 hours. On the other hand, a trough in the westerlies is expected to propagate towards the western coastal areas of southern Africa across southeast Atlantic Ocean 24 to 72 hours.

At 200mb, a mid-latitude westerly trough located near 20^{o} longitude is expected to move eastwards, with its southern extent dominating the flow over much of Sudan and the adjacent areas of Ethiopia and Central African Republic through 24 to 72 hours. In the southern hemisphere the wavy pattern that dominates the flow over the subtropical regions is expected to continue with a deep trough extending towards Tanzania, across Madagascar and the Mozambique Channel through 24 to 72 hours. In the northern hemisphere, the maximum wind speed associated with this flow is expected to exceed

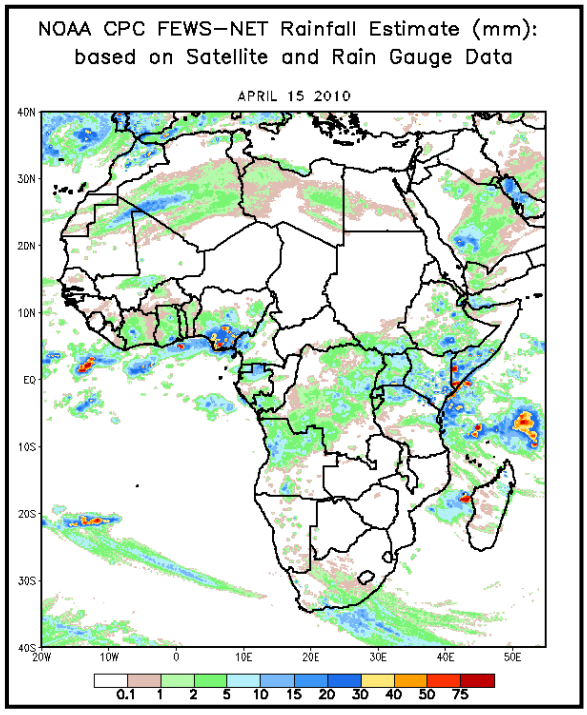
130 knots in the region bordering Algeria and Libya through 24 hours. The speed of the jet wind is expected to weaken through 48 hours and will attain its strength through 48 to 72 hours in association with an east ward propagating the westerly wave.

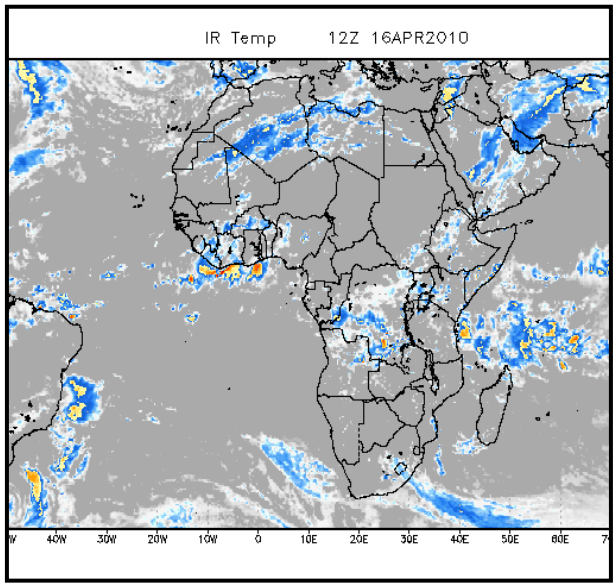
The passage of a mid-latitude frontal system across eastern Mediterranean Sea is expected to continue enhancing interaction between the mid-latitude and tropical air masses across northeast Africa through 24 hours. In addition, the abundant moisture from the Arabian Sea and western Indian Ocean towards the Horn Africa and the strong lower level convergence in East Africa are expected to increase rainfall in the region. Hence, many places in Ethiopia and Kenya as well as parts of southern Somalia are expected to have enhanced rainfall through 24 hours. While the rains are expected to weaken in Ethiopia through 48 to 72 hours, the rest of East African regions will continue receiving moderate to heavy rainfall. The active lower level convergence in the Congo Air Boundary (CAB) region is also expected to maintain the moderate to heavy rainfall in the region while a feeble mid-latitude westerly trough that crosses South Africa is expected to increase rainfall in parts of South Africa.

2.0. Previous and Current Day Weather Discussion over Africa (15 April 2010 – 16 April 2010)

2.1. Weather assessment for the previous day (15 April 2010): During the previous day, heavy rains continued over the Horn of Africa, especially, in parts of southern Somalia and coastal areas of Kenya. Parts of the coastal areas of the Gulf of Guinea also received moderate to heavy rainfall.

2.2. Weather assessment for the current day (16 April 2010): Isolated intense clouds are observed over coastal areas of the Gulf of Guinea and southern DRC. The cloudiness also continues over much of the Horn of Africa countries.





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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