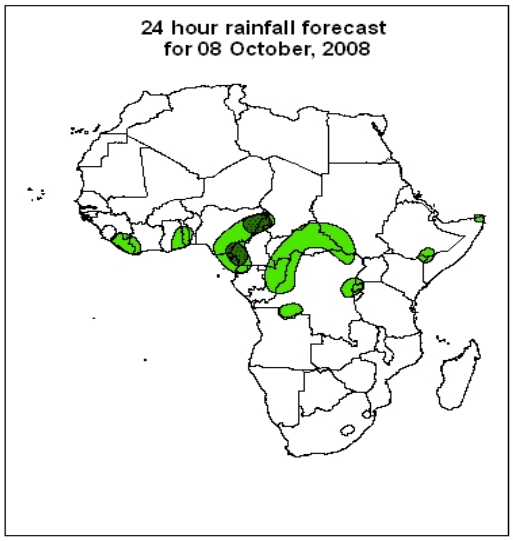
Forecast Guidance for Africa

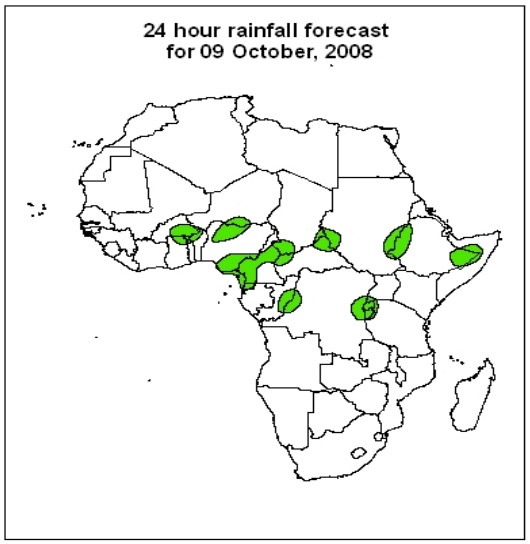
NCEP Contributions to the WMO Severe Weather Forecasting Demonstration Project (SWFDP) and to the African Monsoon Multidisciplinary Analysis (AMMA) Initiative.

FORECAST DISCUSSION 14H00 EST, 07th OCTOBER, 2008
Valid: 00Z 08th OCTOBER – 10th OCTOBER, 2008

1. Twenty Four Hour Cumulative Rainfall Forecasts

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



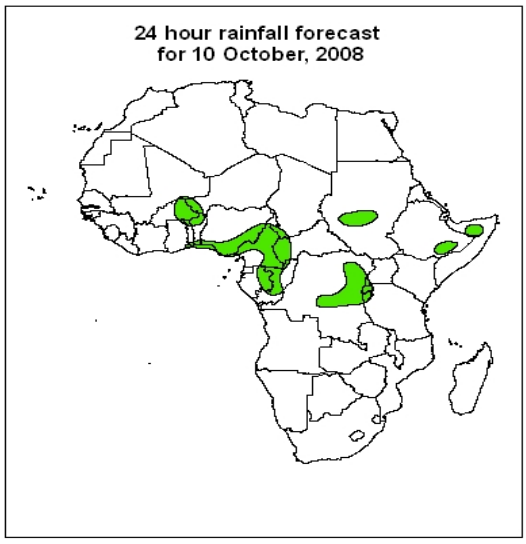


Legend

- africa_countries_new
- > 30mm, with probability 50%
- > 20mm, with probability 40%

Summary

A ridge from the Azores anticyclonic system will suppress rain over much of Western and Central Sahel and Western Gulf of Guinea States. However, cyclonic vortices, mid-level troughs and localized convergence line expected over Eastern Gulf of Guinea States, Central and East Africa; coupled with moisture influx from the Gulf of Guinea and Congo Basin will enchance chance for rain.



2. Model discussion

Model comparison (Valid from 00Z; 08th October, 2008): all the three models are in general agreement especially with respect to the positioning of large scale features, however, the UK model has a tendency to give lower values than the GFS and ECMWF models in the Equatorial (10°S and 10°N) Continental Africa.

2.1. Flow at 850hPa:

T+24h, the Saharan anticyclonic system over Northern Africa is expected to merge with the Azores anticyclonic system centered over Northeastern Atlantic Ocean. There is the likelihood of the development of a series of cyclonic vortices over the border between southern Niger and northern Nigeria, southwestern coast of cote d'Ivorie, northwestern CAR and at the northeastern Tip of Somalia. localized convergence are expected over southern Guinea Conakry, Ghana/Togo, northern/southern Nigeria, southwestern Cameroon, northeastern Chad, eastern Sudan, CAR, Rwanda, eastern DRC and over Angola. Conversely, localized divergence will occur over western and eastern Nigeria, southern Cameroon, eastern Chad, southern Sudan, Ethiopia, northern DRC extending southward to the northern borders of Angola and much of East Africa. The western/southern sectors of Southern Africa will be under the influence of a cut-off cyclonic system centered at the southern coast of South Africa while the rest of the region will be dominated by the Mascarene Ridge.

T+48, the merger between the anticyclonic systems over the Northeast Atlantic and Northern Africa will prevail. However, a mid-latitude trough will likely intrude onto northwestern Maghreb with the development of a cyclonic circulation over southern Algeria; the anticyclonic flow over the area will weaken. The cyclonic vortex featured over Niger/Nigeria will propagate northwestwards onto central Mali, the one over CAR will drift slightly to southern Chad, while those featured over Cote d'Ivorie and Somalia will decay. Other cyclonic vortices are likely to evolve over southern Nigeria and Rwanda. Localized convergence is likely to occur over northern Togo/Benin, southern Niger/northern Nigeria, the entire stretch from western to eastern Sudan, Ethiopia, southeastern DRC and Angola. On the other hand localized divergence will likely occur over the central region of the eastern Gulf of Guinea states, eastern CAR, southern Sudan and most parts of East Africa. Much of Southern Africa will be dominated by the St. Helena's and Mascarene Ridge; except for the southern coastline, which will likely be affected by a cut-off cyclonic system drifting southeastwards off the coast of South Africa.

T+72, the mid-latitude trough featured over the northwestern Maghreb including the cyclonic circulation over southern Algeria and the cyclonic vortex over Mali are like to merge hence forming a massive cyclonic system over Northwestern Africa. The cyclonic vortices featured over southern Nigeria, southern Chad and eastern Sudan will propagate westwards onto the coast of Togo, central Cameroon and towards western Sudan respectively; whereas the one featured over Rwanda will decay. The St. Helena's and Mascarene ridges are expected to dominate the flow over much of Southern Africa.

2.2. Flow at 500hPa:

T+24, a trough is expected to prevail over northern Morocco, most of Algeria and Tunisia while the rest of North Africa will be under the influence of an extensive Sub-Tropical anticyclonic circulation system which extends from Western Sahara to Arabia. Easterlies will prevail equator-wards. A cyclonic circulation will prevail over central DRC with localized confluent flows over southern Cameroon, central CAR, northeastern Angola to southern DRC, eastern Botswana extending to northern South Africa and over central

Madagascar. On the other hand, diffluent flows are expected over southern Cote D'Ivoire, Liberia and central Namibia. Most of Southern Africa will be under the influence of an anticyclonic circulation system except off the southeastern coast of South Africa which is likely to be affected by a trough from a mid-latitude cyclonic circulation.

T+48, the Saharan anticyclonic circulation system is expected to merge with the one over the North Atlantic Ocean while the trough over Algeria will likely remain quasi-stationary. The cyclonic circulation over central DRC will strengthen and extend to north Angola, much of Congo and Gabon; whereas, localized convergence will prevail over central Sudan, western Mali, and northern DRC. Conversely, diffluent flows are likely to be featured over north Benin, northeastern Nigeria, southeastern Sudan and over the tip of Somalia. The flow over Southern Africa will be dominated by the Mascarene anticyclonic circulation and a trough from the mid-latitude westerly wave will affect southern South Africa.

T+72, the trough over Algeria will strengthen and extend to Morocco, Western Sahara, Senegal, The Gambia, Mauritania and western Mali. The rest of North Africa is likely to be under the influence of the Saharan anticyclonic circulation. The cyclonic circulation over DRC will move westwards with its center over the equatorial Atlantic Ocean. The trough over the southern sector of South Africa will propagate eastwards with much of Southern Africa being under the influence of the anticyclonic system.

2.3. Flow at 200hPa:

T+24h, much of northern Africa will be under the influence of a westerly wave with a massive upper-level trough which extends from western Mediterranean Sea onto Mali/Niger. An upper-level anticyclonic system dominates the flow over much of West Africa with diffluent flow patterns over the eastern Gulf of Guinea regions and the Congo Basin; whereas, a cut-off wedge is likely to develop over eastern Sahel. A cross equatorial drift and duct patterns will be featured over the equatorial Eastern Atlantic and Western Indian Ocean respectively. Northwestern Southern Africa will be under the influence of an upper-level anticyclonic system while the rest of the region will be dominated by a westerly wave with a trough likely over southern Namibia/western South Africa and from the Southwest Indian Ocean extending onto Mozambique and eastern Zambia.

T+48h, similar flows to that of the previous day will prevail over much of Africa. However, the upper-level anticyclonic system featured over West Africa will propagate onto the equatorial Atlantic; whereas, the cut-off wedge over eastern Sahel will evolve onto a cut-off cyclonic system with centre over eastern Ethiopia. Much of Southern Africa will be under the influence of a westerly wave with an intense back hanging trough traversing eastwards which extends from the Southeast Atlantic Ocean across South Africa onwards to Botswana and southern Angola.

T+72h, the main difference likely to affect the flow as compared to the previous day will be the evolution of a cyclonic circulation over northern Morocco and is expected to extend a deep trough onto western Gulf of Guinea. The cyclonic system over Ethiopia will likely intensify while the back hanging trough will continue its eastwards propagation onto Zimbabwe, southern Mozambique and the Southwest Indian Ocean.

Authors: George Stafford (Department of Water Resources,The Gambia and African Desk).
Lutumba Tima (Meteorological Institute Angola, and African Desk).