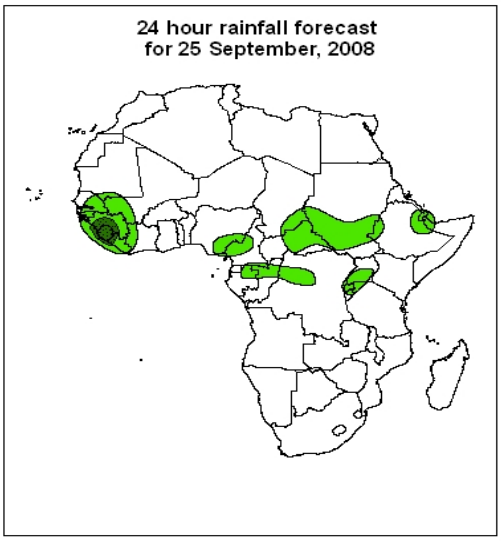
Forecast Guidance for Africa

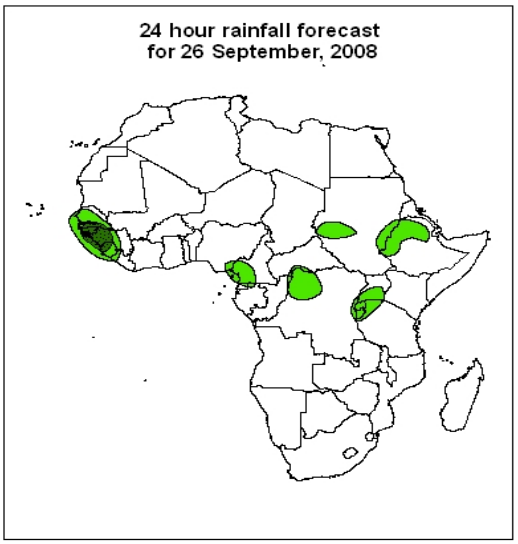
NCEP Contributions to the WMO Severe Weather Forecasting Demonstration Project (SWFDP) and to the African Monsoon Multidisciplinary Analysis (AMMA) Initiative.

FORECAST DISCUSSION 14H00 EST, 24th SEPTEMBER, 2008
Valid: 00Z 25th September – 27th SEPTEMBER, 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.



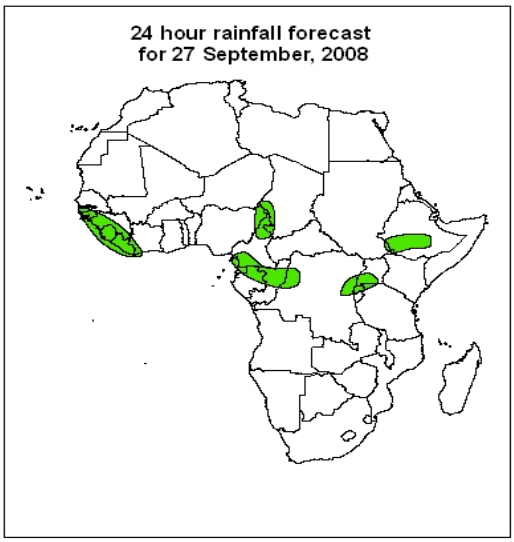


Legend

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

Summary

Cyclonic vortices, mid-level troughs and localized convergence expected over parts of west, 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; 25th September 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^oS and 10^oN) Continental Africa.

2.1. Flow at 850hPa:

T+24h, the Saharan anticyclonic circulation is expected to dominate the flow over North Africa while the Azores ridge will influence the flow over the coastal areas of the western bulge of Sahel/Sahara. A series of cyclonic circulations will be featured over the Northeast Atlantic Ocean; whereas, cyclonic vortices are likely to develop over western and eastern Sudan. A well pronounced trough stretching from Sierra Leone, Senegal and onto Mauritania is likely to be featured. Localized convergence will prevail over western Eritrea, eastern Ethiopia northwestern DRC, Lake Victoria region and Angola. Conversely, localized divergence is likely to occur over much of Central Africa, Southeastern Sahel, over much of East Africa. The Southern African region is expected to be dominated by the merger between the St. Helena's and Mascarene Ridges; with a weak trough likely over the southwestern sectors and westerlies off the southern coast of South Africa.

T+48, a similar flow to that of the previous day is expected to prevail over Northern and Southern Africa. However, a cut-off cyclonic circulation will evolve off The Gambia/Senegal coast and over central Mali. The one featured over western Sudan will remain quasi-stationary while it's counter-part to the northeast will propagate west-southwestwards towards the former. Localized convergence/divergence may likely persist over the same sectors as those mentioned during the previous day. The merger between the St. Helena's and Mascarene Ridges over Southern Africa will prevail; but with the likelihood of the development of a cyclonic vortex over southern Botswana and a weak forward hanging trough over South Africa.

T+72, the Azores ridge is expected to be weakened by the cyclonic system over Northeast Atlantic and the westward propagation of the cyclonic vortex which evolved over The Gambia's coast. The Saharan anticyclonic system is likely to be split by the westward propagating cyclonic vortex which is featured over central Mali and with the evolution of another to the east and over southwestern Algeria. The cyclonic vortices over Sudan are likely to degenerate as they propagate to western/central Chad while another one will likely evolve over the central areas. Cyclonic vortices are also likely to develop over northern Nigeria and at the Liberian coast. Localized convergence will prevail over central Ethiopia, central and southern DRC, western Lake Victoria region and Angola. Much of Southern Africa will be dominated by the merger between the St. Helena's and Mascarene ridges with a weak back-hanging trough over the southeastern coast.

2.2. Flow at 500hPa:

T+24, an extensive Sub-Tropical anticyclonic circulation system is expected to prevail over Northern Africa, stretching from the Tropical Atlantic Ocean onwards to Arabia. A westerly wave will dominate the flow pole-wards featuring a deep cyclonic circulation over the Northeast Atlantic Ocean off the Moroccan coast. Easterlies will prevail equator-wards of these systems and embedded within will be a shortwave trough with its axis centered over eastern Guinea Conakry/ western Mali. Confluent flows are likely to occur over southeastern Nigeria, Congo, southeastern Uganda and over southeastern Ethiopia. The flow over much of the northern sectors of Southern Africa will be dominated by a Sub-

Tropical anticyclonic system; whereas, a westerly wave will prevail over the southern sector with a back-hanging trough to the east of Madagascar.

T+48, a similar flow pattern to that of the previous day is expected over Northern and Southern Africa; only that the shortwave trough featured over Guinea/Mali will likely propagate unto the Tropical Atlantic while other weak ones are likely to be featured over southern Ghana and central Ethiopia. A cyclonic circulation system is expected to evolve over the border between Cameroon and Gabon with a confluent flow over the southern sectors of CAR and Burundi.

T+72, the main difference expected on the general flow patterns over Northern and Southern Africa will be the northwards retreat of the mid-level trough over the Northeast Atlantic due to the weakening of the cyclonic circulation over the area. The shortwave troughs featured over Ghana and Ethiopia will fill-up while another will likely occur over northern Cameroon. Confluent flows are expected over southern Ethiopia and Lake Victoria region.

2.3. Flow at 200hPa:

T+24h, an extensive upper-level anticyclonic flow pattern will prevail over much of Northern Africa extending from the equatorial Atlantic spreading right across to Arabia. Westerlies will dominate the flow pole-ward of the anticyclonic flow and over much of Northwestern Maghreb, while easterlies will prevail equator-ward. A deep upper-level trough will be featured over the Northeast Atlantic; whereas, a shortwave trough will be embedded within the easterlies over western Nigeria stretching onto central Niger. A cut-off cyclonic outdraft is likely to develop over Southeastern Sahel and off the East African coast; whereas, the entire Congo Basin will be udder the influence of diffluence flow patterns. The northern sectors of Southern Africa will be dominated by an anticyclonic flow while, the southern sectors will be under the influence of a well pronounced westerly wave.

T+48h, the flow over Northern Africa is expected to be similar to that of the previous day. However, the shortwave trough featured over Nigeria/Niger will deepen while another one will be featured over Ethiopia. The cut-off cyclonic outdraft featured over Southeastern Sahel is expected to remain quasi-stationary while the one off-shore the East African coast will propagate westwards onto the Kenyan coast. The entire Southern African region will be dominated by a westerly wave with an upper-level trough likely over Angola stretching onto the Namibia/Botswana border and the one over southern Tanzania will stretch onto western Madagascar; whereas a ridge is likely over eastern DRC extending onwards to Malawi/Mozambique. A well defined cross-equatorial flow and equatorial duct pattern is expected over the western and eastern sectors of the continent.

T+72h, the entire Northern and Southern Africa will be under the influence of a westerly wave. The upper-level cross-equatorial and duct patterns are expected to prevail. The shortwave trough featured over Nigeria will evolve onto a cyclonic circulation while the one over southeastern Sahel will propagate to western Sudan and the other one over the coast of Kenya will likely join the trough to the south over northern Mozambique and Tanzania.

Author: George Stafford (Department of Water Resources, The Gambia and African Desk).