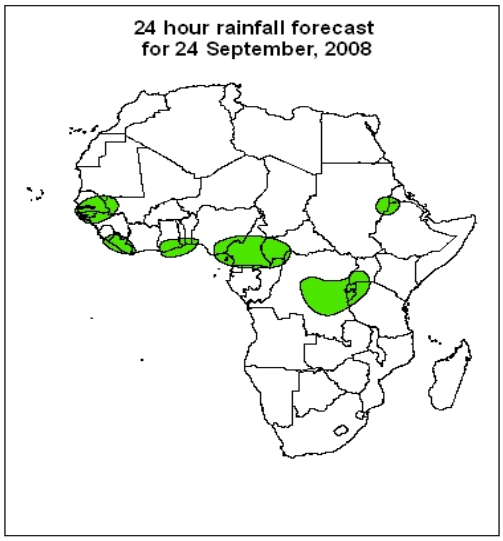
Forecast Guidance for Africa

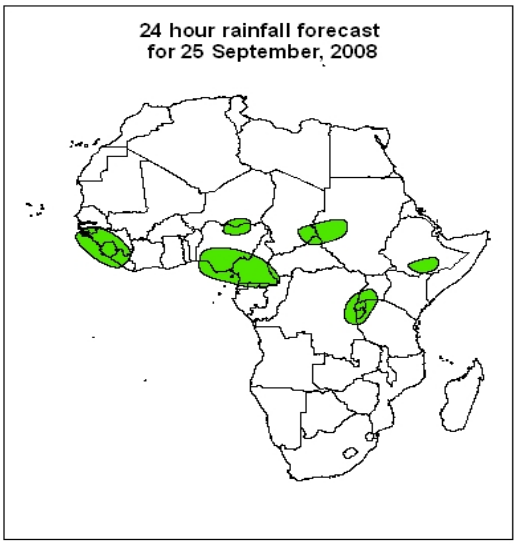
NCEP Contributions to the WMO Severe Weather Forecasting Demonstration Project (SWFDP) and to the African Monsoon Multidisciplinary Analysis (AMMA) Initiative.

FORECAST DISCUSSION 14H00 EST, 23rd SEPTEMBER, 2008
Valid: 00Z 24th September – 26th 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.



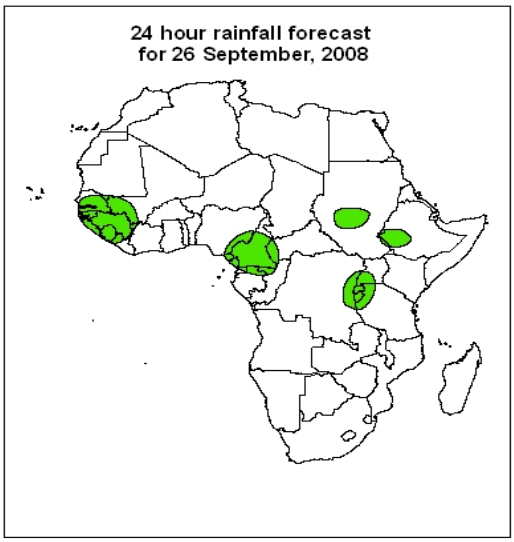


Legend

- 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; 24th 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°S and 10°N) Continental Africa.

2.1. Flow at 850hPa:

T+24h, the Saharan anticyclonic circulation is expected to influence the flow over eastern sectors of North Africa while the Azores ridge will dominate over the western bulge of Sahel/Sahara with a series of cyclonic circulations pole-ward of these systems. A cyclonic vortex is likely to develop over the border between Sudan, Eritrea and Ethiopia with localized convergence expected over southern Algeria, Senegal, eastern Mauritania, western and northern Mali, southern Niger, central Sudan, northern Ghana, western Cameroon, southwestern CAR, central DRC, Lake Victoria region and Angola. Conversely, localized divergence is likely to occur over southeastern Sahel, western Congo Basin and 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 cut-off mid-latitude cyclonic circulation likely to be featured off the southern coast of South Africa.

T+48, a similar flow to that of the previous day is expected to prevail over Northern Africa. However, a cut-off cyclonic circulation over the North Atlantic west of the Azores Islands will intensify and extend its trough southeastwards onto the coast of Western Sahara. The cyclonic circulation featured over northeastern Sahel, will degenerate. Localized convergence is likely to occur over Sierra Leone, eastern Guinea Conakry, the border between eastern Mali/western Niger, between the borders of Chad, Sudan and CAR, borders of Sudan, Eritrea and Ethiopia, and over Lake Victoria region stretching from southeastern Uganda, southern DRC onto Angola. Localized divergence will prevail over southeastern Sahel, western Congo Basin and over much of East Africa. The merger between the St. Helena's and Mascarene Ridges over Southern Africa is likely to be split by a series of cyclonic vortices with centers over eastern Namibia, western Botswana and south of South Africa.

T+72, the Azores ridge is expected to be weakened by the cyclonic system over Northeast Atlantic and as a result will retreat from much of the western bulge while its counterpart the Saharan anticyclone will intensify. Localized convergence will likely occur over southwestern Senegal, western and central Mali, and expected to persist over Sudan, Eritrea/Ethiopia and Lake Victoria region onwards to Angola. Much of Southern Africa will be dominated by the merger between the St. Helena's and Mascarene ridges with a weak trough over the southern coast of South Africa.

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 and a weak trough over Egypt. Easterlies will prevail equator-wards of these systems and embedded within are shortwave troughs with their axis centered off the coastline stretching from Senegal onto Guinea Bissau and over southern Ethiopia stretching onto the Gulf of Aden. Confluent flows are likely to occur over the Ghanaian and Nigerian

Coasts, northern Congo and southern Uganda. The flow over much of the northern sectors of Southern Africa will be dominated by a Sub-Tropical anticyclonic system; whereas, westerly wave will prevail over the southern sectors with a deep trough likely to affect Madagascar.

T+48, a similar flow pattern to that of the previous day is expected over Northern Africa only that the shortwave trough featured over the West African coast will propagate further unto the Tropical Atlantic while the other over Ethiopia and environs will be replace by convergence. The confluent flows over the southern Gulf of Guinea Countries will intensify. The trough over Madagascar will propagate eastwards giving way to the extension of the Southern African Sub-Tropical anticyclonic ridge over the area.

T+72, the flow patterns over Northern and Southern Africa are expected to be similar to that of the previous day only that there is the likelihood of shortwave troughs developing over Liberia stretching onto western Mali, over western Cameroon, and over central Ethiopia; whereas confluent flow will be likely over the border between Cameroon and Chad, and over northwest Tanzania.

2.3. Flow at 200hPa:

T+24h, an extensive upper-level anticyclonic flow pattern will prevail over much of Northern Africa extending from the tropical Atlantic and 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 cyclonic circulation is expected to be featured over the Northeast Atlantic; whereas, weak shortwave troughs will be embedded within the easterlies over western Mali, western Nigeria and central Sudan. A cyclonic circulation is likely to occur over northern DRC. The northern sectors of Southern Africa will be dominated by an anticyclonic flow while, the southern sectors will be under the influence of a westerly wave with a deep upper-level trough featured off the eastern coast of Madagascar.

T+48h, the flow over Northern and Southern Africa is expected to be similar to that of the previous day. However, the shortwave troughs featured over western Mali will move southwestwards to the Tropical Atlantic, the one over Nigeria will move slightly to the northwest and the other over Sudan will propagate westwards to central Chad while another will propagate westwards from the northwestern Indian Ocean onto Ethiopia/ northern Somalia. A cut-off cyclonic outdraft is likely to develop off the Kenyan/Tanzanian coast.

T+72h, the main changes expected to affect the flow pattern will be the development of an upper-level convergence area over Senegal and environs. The shortwave trough featured over Nigeria will move to Ghana stretching northeastwards onto western Niger with another likely to evolve over central Nigeria leaning northeastwards. A cyclonic circulation will evolve over Ethiopia with an associated trough centered over Eritrea. The entire Southern African region will be under the influence of a westerly wave with an upper-level trough likely to affect Angola and much of East Africa.

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