

# Sudan Seasonal Monitor



Sudan Meteorological Authority  
Federal Ministry of Agriculture and Forestry



Issue 6

August 2010

## Summary

- **Advanced position of ITCZ during August to most north of Sudan emerged wide spread and significant amounts of rainfall over the country .see page 1, Fig (1.1)**
- **Above average rainfall amounts covered large parts of central and southern Sudan during mid and late August. See Page2, Fig (2.1, 2.2, 2.3 and 2.4).**
- **In terms of total rainfall amount, August associated with above average rainfall in most central and southern parts of Sudan. In contrast, areas of Northern Gedarif, Blue Nile, Upper Nile, Northern part of White Nile, North Kordufan, North Darfur, northern parts of South Darfur, eastern parts of Jonglei and East Equatoria experienced below average rainfall amount in August, which may affect the crop development and pastoral conditions in this areas. See Page 2, Fig (2.4).**
- **Vegetation levels are enhanced in the most central Sudan to normal and near normal levels as a result of above average rainfall in July and early August. See page 4, Fig (3.1, 3.2).**
- **The development of vegetation level during August and the favourable conditions of crop development may help in narrowing the food gap by the end of the season. See page 4, Fig (3.1, 3.2).**
- **Vegetation situation during August is improving compared to July situation in the regions of Upper Nile, Jonglei and East Equatoria, this affect the pastoral activities in this areas. See page 4, Fig (3.1, 3.2).**
- **SMA updated its seasonal rainfall forecast published earlier in June-July to cover the period from September to December 2010. In this period the rainfall is expected to be on average to above average in the central and Southern Sudan with probability of 40%-35%, this will provide good information for agricultural practices on field management. See page7, Fig (7).**

## Seasonal Progress

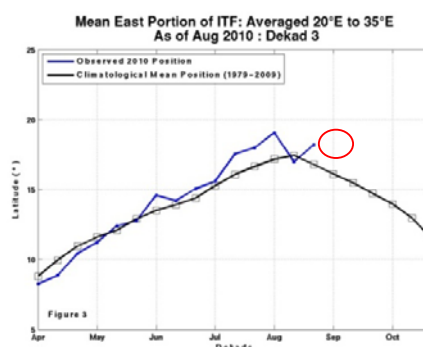
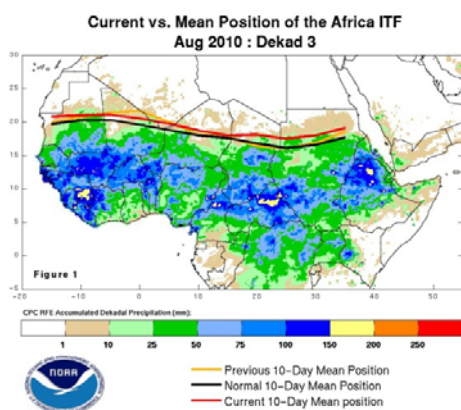


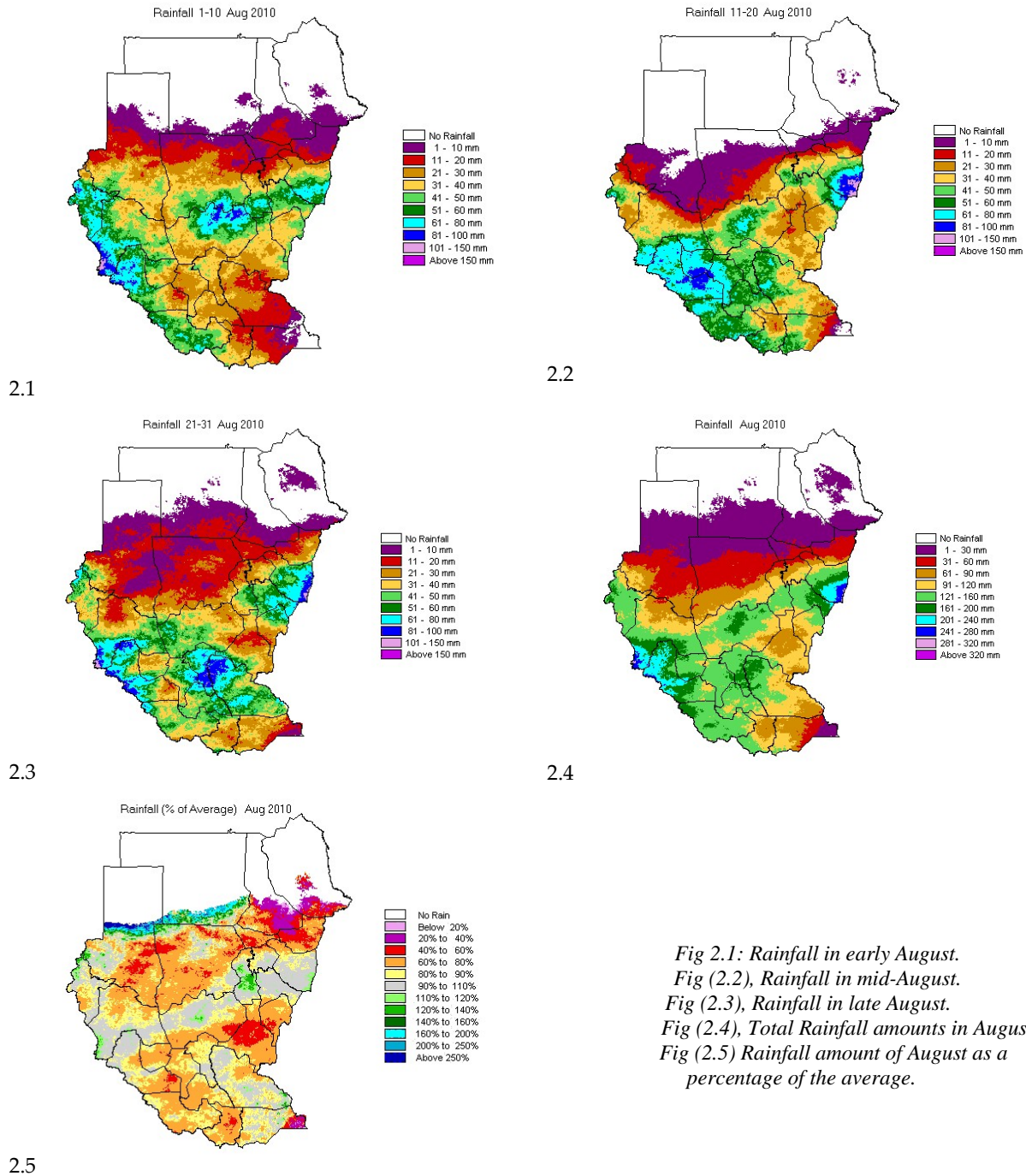
Fig (1.1) – Position of the ITCZ over Africa in Dekad3 August-2010(red) compared to its average position (black) and to its position during previous 10 day mean position. (Source: Climate Prediction Centre (CPC)).

Fig (1.2) – Average position of the ITCZ over Sudan along the current season compared to a 20-years average (1988-2010). (Source: CPC),Note: the position in end August (circled)

Rainfall in Sudan mostly results from a northwards movement of humid air masses from March to August and their southwards retreat from September to November. At their northernmost reach, these humid air masses meet with drier and warmer air to form the Inter tropical Converging Zone (ITCZ). Since the rains follow south of the ITCZ, tracking the ITCZ through the season provides a quick evaluation of the seasonal progress of the rainy season and of its quality.

Fig 1.2 shows a map with the latest ITCZ position. From end August, the ITCZ exceeds its above normal position and remained above of its Climatological average position throughout the month.

## August Rainfall in Sudan



*Fig 2.1: Rainfall in early August.  
 Fig (2.2), Rainfall in mid-August.  
 Fig (2.3), Rainfall in late August.  
 Fig (2.4), Total Rainfall amounts in August.  
 Fig (2.5) Rainfall amount of August as a percentage of the average.*

Early August associated with good amounts of rainfall in the regions of South Kordufan ,lower White Nile state, Sennar ,lower of El Gedarif , West and South Darfur and west Bahr Elghazal .The higher amounts in El Gedarif and Rashad, elsewhere the rainfall amounts were below average especially in Kassala and Jonglei region of the country. See Page 2, Fig (2.1).

In Mid- August good rainfall was well distributed over the central and southern of country, this enhanced the planting condition and the early stages of crop development. In contrast, Kassala, Blue Nile, Upper Nile, East Equatoria showed deficit in rainfall amount during this period, which may cause some difficulties in maintaining the agricultural and pastoral situation for crop developing and grazing. See Page 2, Fig (2.2).

Late -August showed the rainfall belt moved to northwards and a good rainfall amounts in West Bahr Elghazal, Unity, Jonglei, Gedarif and Sennar .On Contrary, Blue Nile and Upper Nile state shows below average rainfall amount, and this may worsen the situation of the crop growth. Gedarif state enjoyed valuable amounts of rainfall, especially in the eastern and south-western parts of the state, which enhanced the agricultural situations. See Page 2, Fig (2.3).

In terms of total rainfall amount, August associated with above average rainfall in most central and southern parts of Sudan. In contrast, areas of Northern Gedarif, Blue Nile, Upper Nile, Northern part of White Nile, North Kordufan, North Darfur, northern parts of South Darfur, eastern parts of Jonglei and East Equatoria experienced below average rainfall amount in August, which may affect the crop development and pastoral conditions in this areas. See Page 2, Fig (2.4).

## Vegetation Status

Vegetation condition and its development are assessed by means of the NDVI (Normalized Difference Vegetation Index) – this is a satellite derived parameter which responds (almost) uniquely to vegetation and is available on a global scale every ten days.

As usual West Equatoria, along the border with Uganda, highlands of East Equatoria and southeastern Jonglei show higher greenness, as a consequence of the good early rainfall during July and early August.

Above average vegetation is noticeable in West Equatoria, along the borders with Uganda, southwest of central Equatoria, Juba region and East Jonglei. Reason was above average, early and significant rainfall in these regions in January and February (not shown in this Bulletin), building on good vegetation development through last stages of 2010. Drier conditions in June decreased vegetation condition but early July rainfall led to renew the growth. See Page 4, Fig (3.1, 3.2).

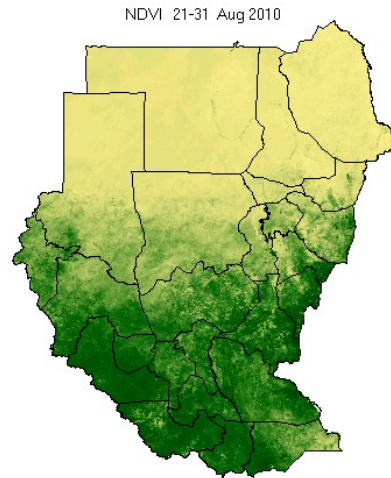
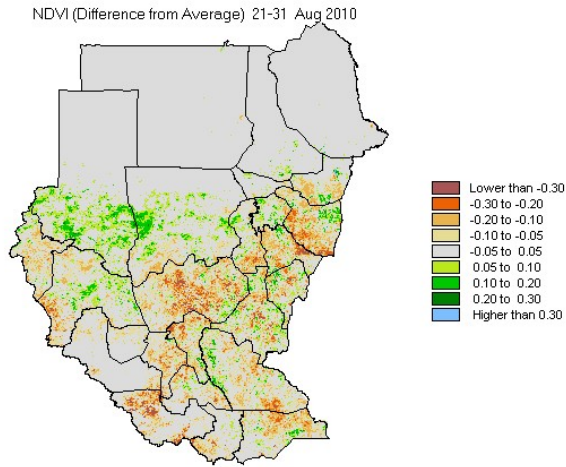
First dekad of July showed below average vegetation development in areas of Gedarif, Blue Nile, Upper Nile, North Parts of South Kordufan, South Darfur and Jonglei, as consequences of the moderate rainfall in late June. See Page 4, Fig (3.1).

Significant development in vegetation level was obvious in mid July as consequences of early July good rainfall, the crop and pastoral situation was maintained and the adequate situation are clear all over central and southern Sudan. See Page 4, Fig (3.2).

Vegetation situation showed a good development in late July as an impact of very good early and mid-July rainfall in most parts of the country. Significant development is a reality across central Sudan. Please note that areas with below average vegetation development in South Sudan shown in Fig 3.1 were due to cloud cover which leads to satellite images contamination. Agriculture situation is developing as results of the good July rainfall in Sudan.

Vegetation situation was well developed across the country during mid and late July; this may help in narrowing the food gap by the end of the season.

Vegetation situation is worsening in the region of Upper Nile, Jonglei and East Equatoria, this may affect the pastoralist's activities in this areas. South Darfur, South Kordufan and Gedarif states showed significant improvement in the vegetation levels as a result of late July good rainfall. Although the rainfall amount varies within this region but it is clear that the situation was highly improved.



3.1

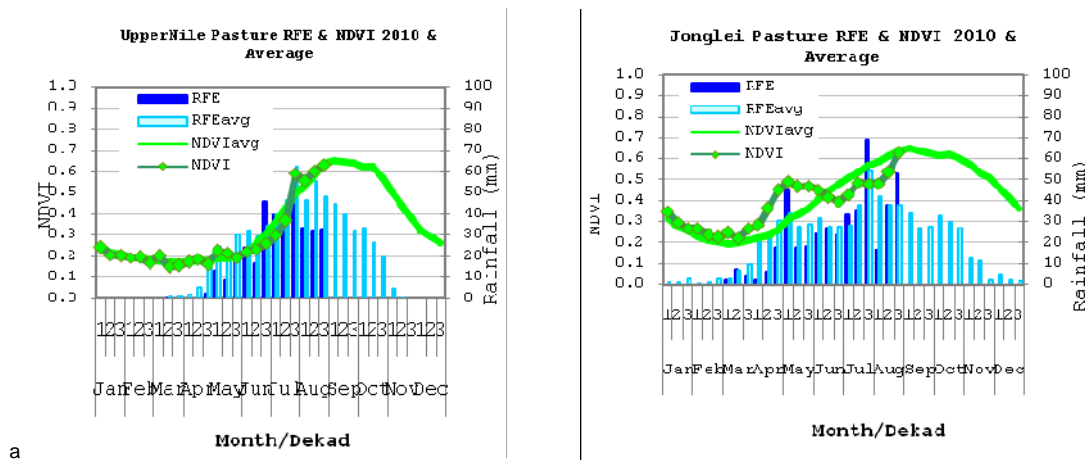
3.2

Fig (3.1, 3.2): NDVI difference from average in late July 2010. Yellows and reds represent below average vegetation development, greens and blues represent above average vegetation development. Note above average development in West Equatoria, Central Equatoria and eastern Jonglei. See text for further details.

### Southern Sudan - Upper Nile, Jonglei, East Equatoria & Warab (Pasture) :

These locations show broad features of rainfall and vegetation development for pasture areas in the states of Upper Nile, Jonglei, East Equatoria and Warab.

The feature has been the good rainfall in May-August. This is reflected in the vegetation development in East Equatoria areas enjoyed good growth, (Upper Nile& Warab) on average values.



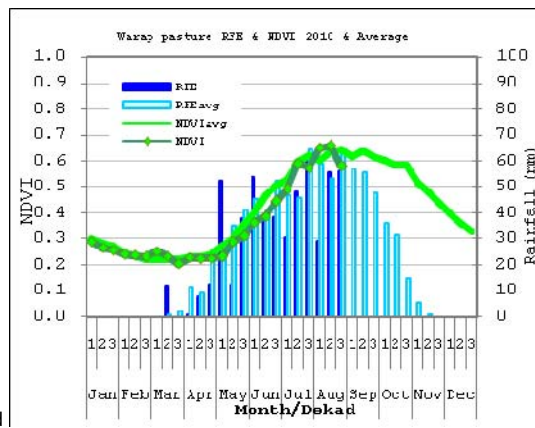
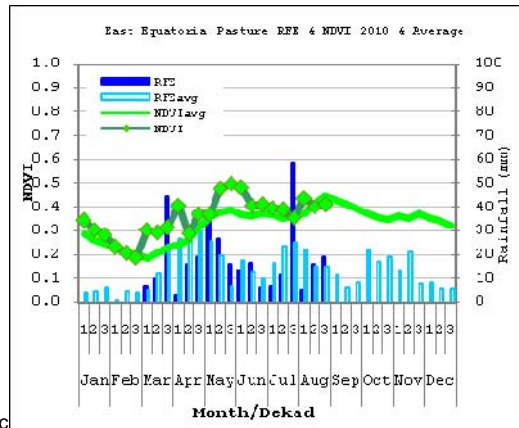


Fig 4a, b, c, d – Rainfall (RFE) and NDVI for 2010 and Average for pasture areas in (a) Upper Nile, (b) Jonglei, (c) East Equatoria and (d) Warab.

In Jonglei, east Equatoria are increase in vegetation levels on late March to May ,Vegetation in Upper Nile (Fig 4 a) pasture areas is on average.

In East Equatoria (Fig 4c), the above normal rainfall in late March and May led to above average vegetation through April to early August.

Warab pasture status is also on average levels, caused above average rainfall from early May Fig (4 d).

### Agricultural areas: Blue Nile, Central Equatoria and Warab

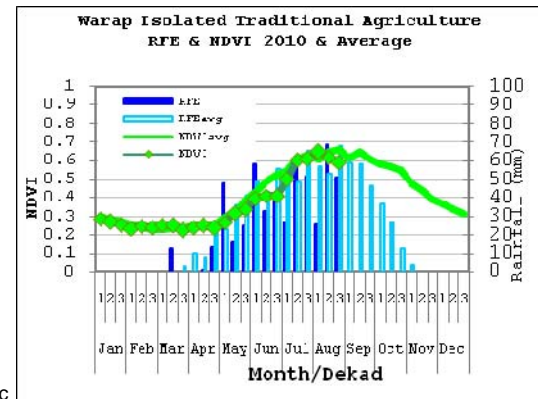
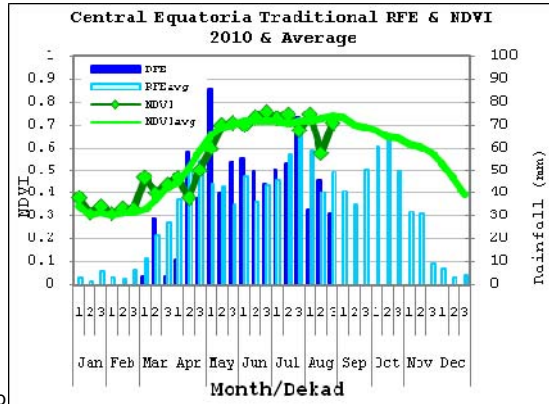
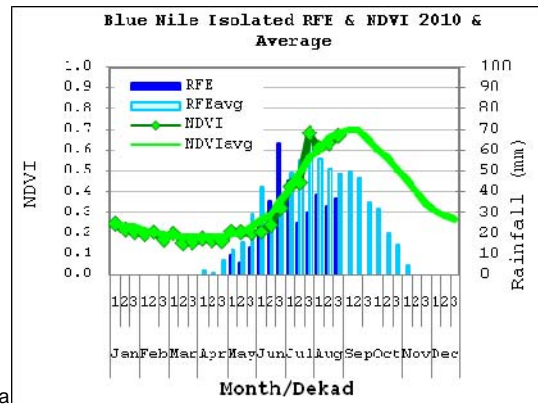


Fig 5 a, b, c, – Rainfall (RFE) and NDVI for 2010 and Average for Isolated Agriculture areas in (a) Blue Nile (b) .Central Equatoria and (c) Warab.

Traditional agriculture areas across Southern Sudan good start of the season with significant amounts of rainfall, which improve the vegetation situation in Central Equatoria Fig (5b) and Warab areas Fig (5c) .In Blue Nile Fig (5a) we also see the vegetation conditions on average values.

**South Kordofan and Blue Nile (Pasture Areas):**

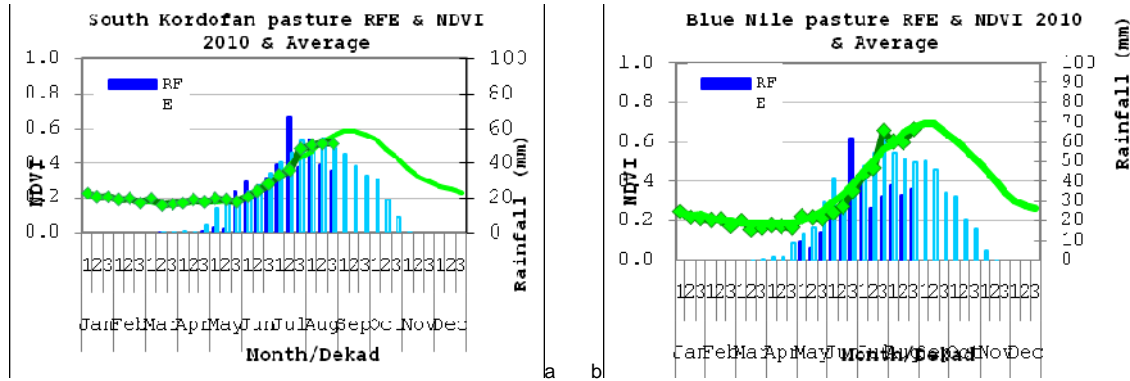


Fig 6 a, b – Rainfall (RFE) and NDVI for 2010 and Average for pasture areas in (a) South Kordofan (b) Blue Nile.

Regions of South Kordofan show a good rainfall in late May leading to average vegetation. Agricultural areas in South Kordofan are also similarly affected. Blue Nile experienced good rainfall in June with the vegetation developing at close to average levels though with some drop in early July.

**Seasonal Perspectives**

El Niño (and La Niña) events are disruptions of the ocean-atmosphere system in the Intertropical Pacific which can cause large scale changes in wind circulation and sea surface temperature, and lead to a variety of impacts on rainfall and temperature distribution across the globe.

During the March- July season there is an approximately 40% probability of maintaining neutral conditions, and that is predicted to be the most likely situation through the end of 2010 and into early 2011. The likelihood of returning to La Niña conditions is now very low while the chances of El Niño conditions are about normal.

Note that El Niño – La Niña effects on the climate of Sudan are not known in detail but are judged to be weaker than in other areas such as Southern Africa and Kenya-Tanzania.

**Rainfall Outlook**

There are a variety of methodologies and models that use tropical east Pacific sea surface temperature (SST) patterns as input to predict/forecast long term (1 to 6 month) changes to rainfall and temperature regimes over wide areas of the globe.

SMA uses seasonal forecast information produced by itself (based on IGAD Climate prediction and Application Centre) and information publicly available on the Web from three main sources: IRI, International Research Institute (USA), CPC, Climate Prediction Centre (NASA, USA), ECMWF, European Centre for Weather Forecasts (Europe).

**September - December –2010 Rainfall Forecasts**

SMA updated its seasonal rainfall forecast published earlier in June-July to cover the period from September to December 2010, (Fig 7). In this period the rainfall is expected to be on average to above average in the central and Southern Sudan with probability of 40%-35%, this will provide good information for agricultural practices on field management.

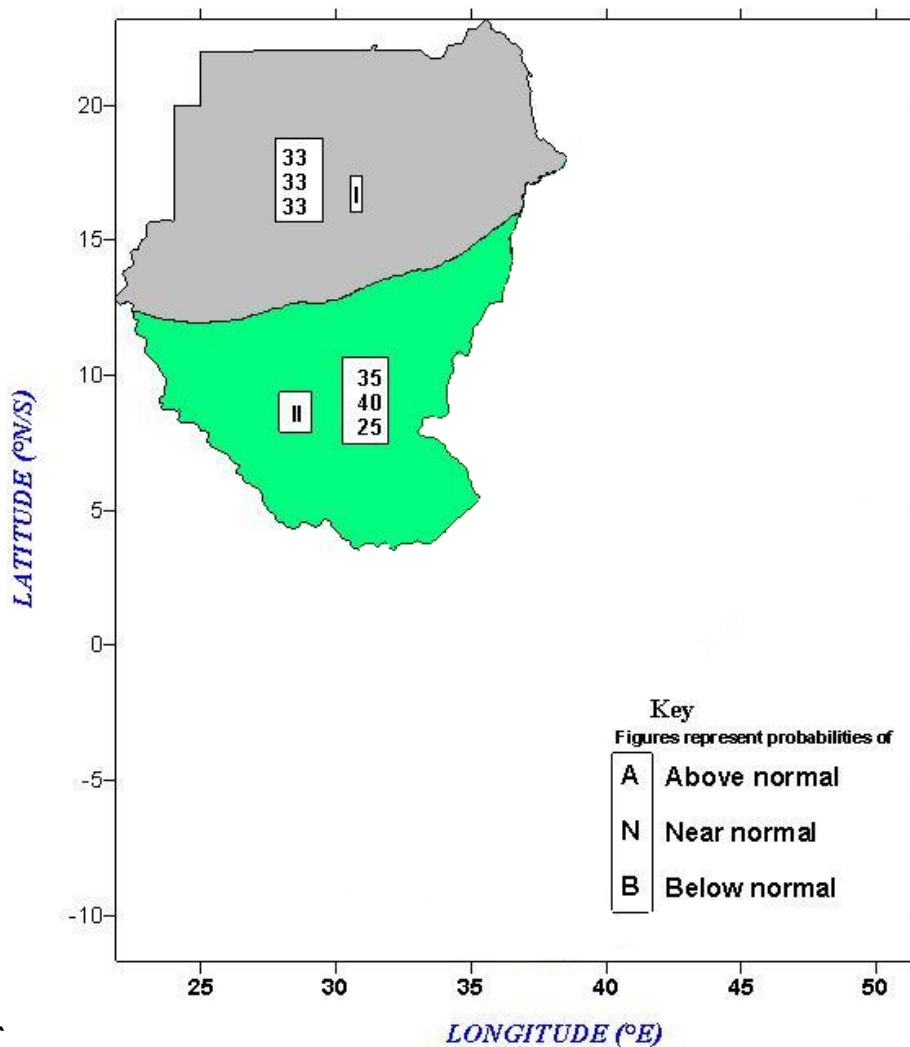


Fig 7– SMA forecasts of September-December rainfall. 2010). Boxes indicate likelihood of above (top), on (middle) and below (bottom) average Conditions. Zones represent homogeneous climatic rainfall

Seasonal forecast done by the other sources (IRI, CPC, and ECMWF) for the 3 month period of July - September are inconsistent.

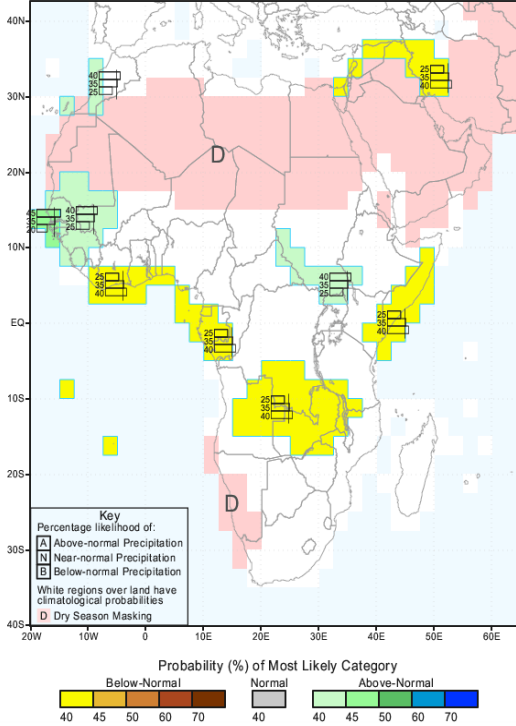
RI predicted Climatological conditions that expected to prevail in the northern part of the country and northern Darfur, elsewhere, above average to on near average rainfall are expected with the chance of 45%-30%.

CPC predicted a Climatological condition across the most north part of the country, below average rainfall is expected in Darfur and Kordufan regions and in the south-western parts of Sudan. Above average rainfall is expected in the south-eastern parts of Sudan.

ECMWF predicted Climatological conditions in the north region, elsewhere above average rainfall is expected with probability of 70-80%, with probability of 80%-90% in the most southern part.

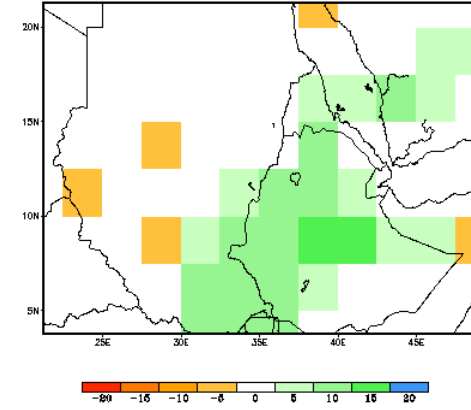
ECMWF and IRI are in consistence with prediction of above average rainfall in the most part of central and southern Sudan, in contrary CPC forecasted above average rainfall in the south-eastern part of the country.

IRI Multi-Model Probability Forecast for Precipitation for September-October-November 2010, Issued August 2010



8.1

CCA Depart. Clim. Prob. Forecast X 100 Jul-Sep 2010 N. Horn of Africa Rainfall, One Month Lead

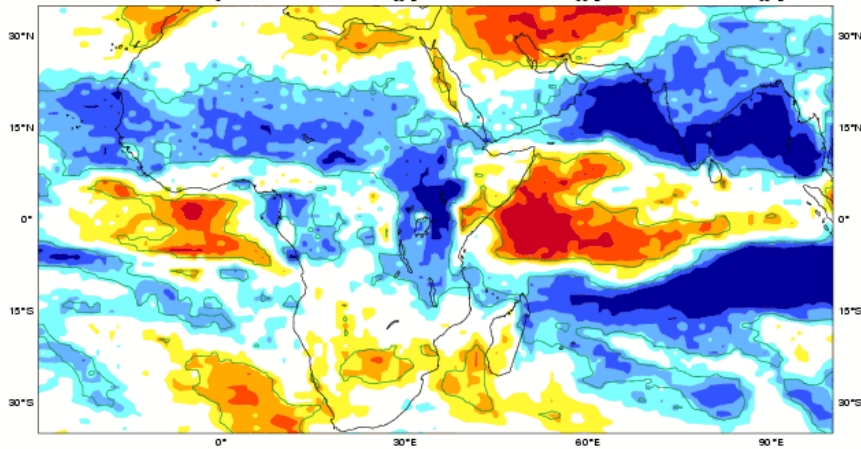


8.2

ECMWF Seasonal Forecast Prob (precipitation > median)

Forecast start reference is 01/08/10  
 Ensemble size = 41, climate size = 275

0..10% 10..20% 20..30% 30..40% 40..80% 80..70% 70..80% 80..90% 90..100%



Forecast issue date: 15/08/2010

ECMWF

8.3

Fig 8.1 – Probabilistic forecast for August-October (Aso) 2010 rainfall for Africa. Boxes indicate likelihood of above (top), on (middle) and below (bottom) average conditions. Green to blue indicate areas of increasingly more likely above average conditions (source: IRI).

Fig 8.2 – Forecast for July-August--September2010 rainfall for Africa. Colours indicate departure from climatology (usual scenario), oranges and yellows for below average conditions, blues and green for above average (source CPC).

Fig 8.3 – Forecast for August-September-October (ASO) 2010 rainfall for Africa. Probability of exceeding median rainfall (usual scenario). Yellow to red for less rainfall than usual, greens and blues for more rainfall than usual. (source : ECMWF)





Map for Sudan states.