



Agrometeorology Division

Sudan Seasonal Monitor *Issue (3) August 2011*

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Sudan Seasonal Monitor



Sudan Meteorological Authority
Federal Ministry of Agriculture and Forestry



Issue 3

August 2011

Summary

- Persistence of dryness conditions during June, early and mid July implies on significant delays on early and replanting process in the most parts of the country (Sorghum belt).
- Good rainfall amounts during late July across the country because of ITF northward movement provided suitable conditions for starting of growing season. *See pages 1 & 5.*
- On average Rainfall amounts in late July extended to the most parts of east central and west Sudan. Which recovered the dryness in June and early and mid July.
- Above average rainfall amounts registered in many part during late July (Gedaref (66.7mm), Um Benain (78.4mm), Abu Naama (69.0 mm), Kadogli (50.8mm), Nyala (70.3mm), Rashad (96.9mm), Geniena (74.0mm), except some areas in the southern Darfur have above average rainfall *See pages 3- 4*
- Noticeable delay in growing condition in most parts of Sudan. *See pages 4-5*
- Vegetation has significantly developed to below average levels in the areas Gedaref, Gezera, Sennar, and Blue Nile after the June dryness. *See pages 6.*
- Forecasts for August-October rainfall from different sources have become more pessimistic (IRI and ECMWF) consistent. On balance, considering forecasts from SMA and from other institutions, expectations for this key period of the rainy season are of on average to below average rainfall. *See pages 11-13.*

IFT movement

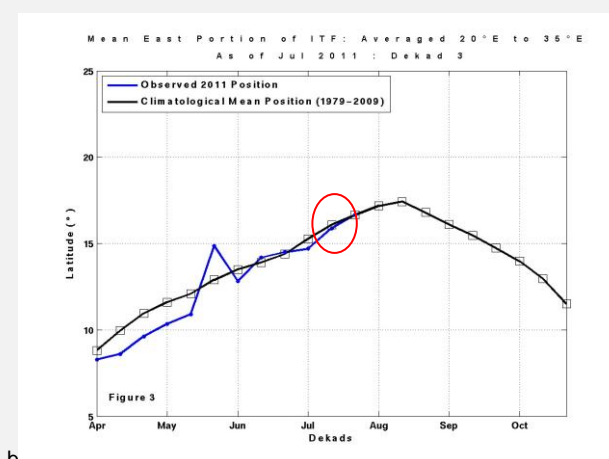
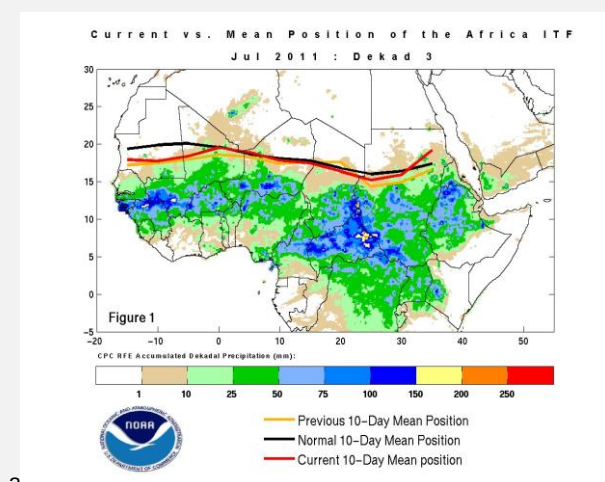


Fig 1a – Position of the ITF over Africa in July21-31-2011(red) compared to average position (black). (Source : CPC)

Fig 1b – Average position of the ITF over Sudan along the current season compared to a 20-year average. (Source: CPC).Note the retreat in the position in early July (circled)

Seasonal Progress

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 convergence zone (ITCZ). Since the rain 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 shows a map with the latest ITCZ position. Current position of the ITCZ is north of the previous dekad and below to its average position in the western parts of the country, while exceeding its previous and normal position in the central and eastern parts. Fig 1b, showing the latitudinal means of the eastern portions of the ITF, and the evolutions since the start of April. The Dekadal progress of ITCZ, shows on average position in late July.

July Rainfall in Sudan

Blow average rainfall during June, early and mid July was followed by moderate wet conditions in late July. Mid July characterized by below average rainfall amounts that prevailing throughout the country as a consequence of ITCZ positioning below its normal position. In contrast; late July characterized by wet conditions with the reasonable distribution all over the country, see Fig(2a,b).

Cumulative rainfall is still below average, this is reflecting that the situation is worsening. Except, Northern state and Nile states experienced above average rainfall during late July. In particularly, areas of Atbara showed above average rainfall. Fig 2c.

In terms of total rainfall amounts during mid July; dryness conditions were prevailing across most parts of the country. Below average rainfall amounts were registered in areas of; Gedaref, Sennar, White Nile, North Kordofan, west Darfur and North Darfur. In contrast; Blue Nile registered above average rainfall amounts See Fig (2a).

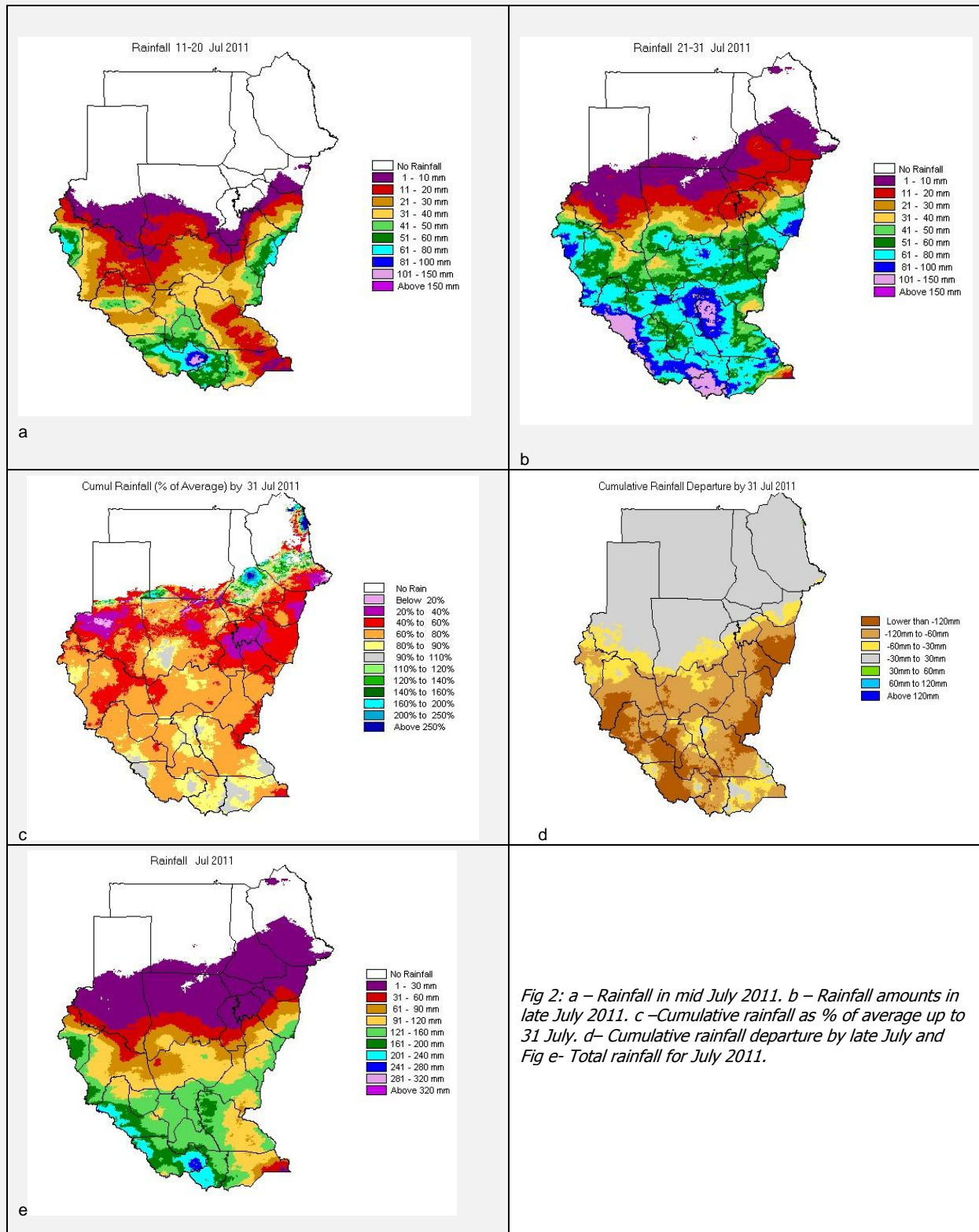
Late July, characterized by good and reasonably distributed rainfall throughout the country. Above average rainfall amounts registered in; Gedaref (66.7mm),Um Benien (78.4mm), Abu Naama (69.0 mm), Kadouglei (50.8mm), Nyala (70.3mm), Rashad (96.9mm), Geniena (74.0mm). see Fig(2c)

Total rainfall amounts during July were below average in Sudan except areas of; eastern, southern and western parts of Blue Nile state, eastern parts of Sennar state with e borders with Ethiopia, southeastern parts of Gedaref state and southwestern parts of southern and western Darfur states where above average rainfall registered. See Fig 2e

The deficit in rainfall by late July shown by cumulative rainfall departure from average in Fig 2d, which indicate high departure in central and southern areas of the country.

Generally; as a consequences of late July good rainfall amounts and their reasonably distributions; sowing conditions are suitable for the crops (Sorghum and Sesame) in areas of Blue Nile, Gedaref, North and South Kordofan, western and southern Darfur.

Also early august brought good rainfall over vast areas of the country, which may enhanced the early growing and late planting. Especially in the eastern and western regions.



Start of Growing Season

A better evaluation of the effect of rainfall on crops can be made by comparing rainfall to a measure of the water demand imposed on crops by the environmental conditions (i.e. temperature, humidity, solar insolation and wind levels).

We can detect when rainfall is enough to meet the estimated water demands of planting and early crop

development – the start of the growing season is taken as the date when these demands are met for at least two 10 day periods. Fig 3 displays the dates on which the growing season started across Sudan.

The map (Fig3) of start of season dates shows that across most of northern Sudan, suitable conditions for planting and early crop development took place in late July, reflecting the good rainfall in this period. There is no start of season detected in mid May in accordance with the very dry situation during this month; this means that areas where the season has started may have faced poor early moisture conditions.

In early June, there was northwards progress of the rainfall and this is reflected in the occurrence of planting conditions across remaining areas of Southern Darfur, south of the eastern Darfur, and in parts of South Kordufan, Small areas in the west of (Sennar, Gedaref, Blue Nile) have not yet registered a growing season indicating very poor conditions for agriculture in this area.

Growing conditions during early July were confined in western Darfur and small parts in southern Darfur and absence elsewhere. Mid July associated with growing conditions in areas of south parts of Sennar and Gedaref and narrow areas in southern and western Darfur. The growing conditions expanded northwards as a results of late July good rainfall and shown in North parts of Gedaref, north parts of Sennar, White Nile , southern parts of North Kordofan and northern parts of southern Darfur and western Darfur.

Noticeable delay of suitable conditions of crop growth shown in the most parts of Sudan due to the dryness that associated by June, early and mid July.

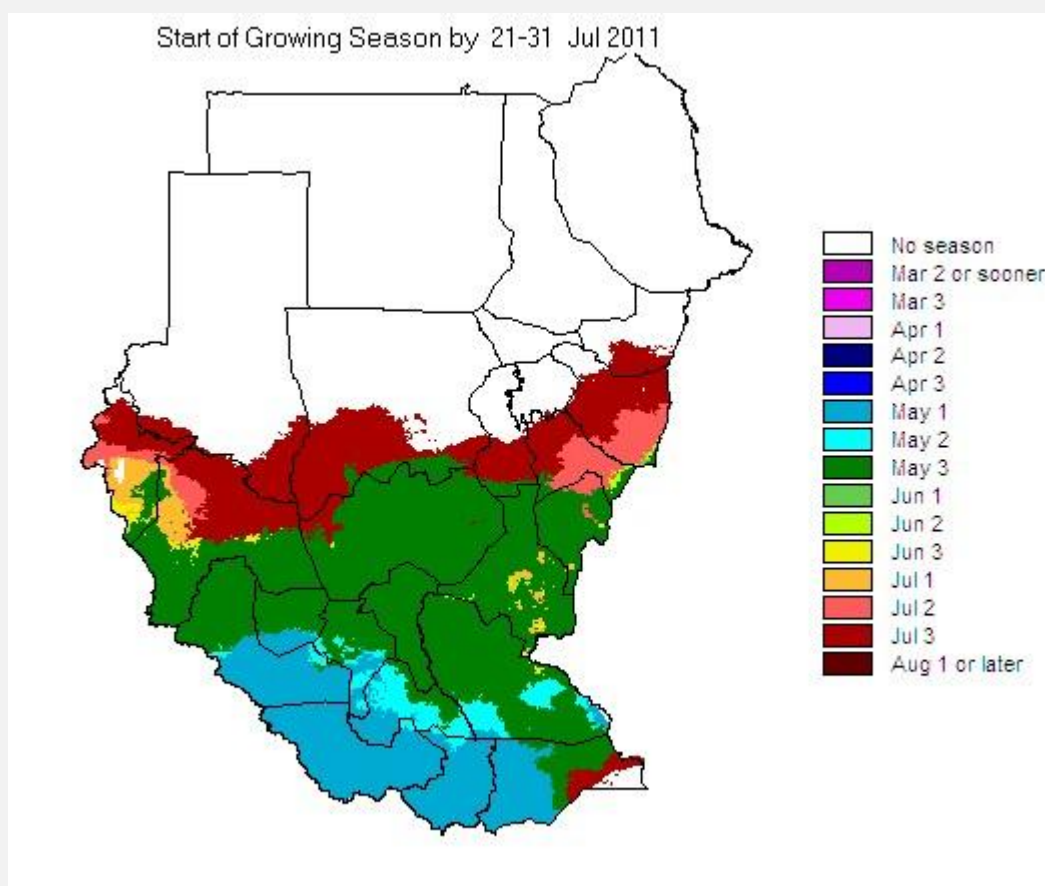


Fig 3 – Dates of Start of Growing Season till early June 2011. Each colour represents a different 10 day period of a given month (1 = 1 to 10, 2 = 11 to 20, 3 = 21 to 30 or 31).

Vegetation Status

Vegetation condition and 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.

The dryness and lack of rainfall during March and April led to below average vegetation development. As a consequence, this led to significant change in vegetation conditions, when compared with average situation (Fig 4b). These worst situations are maintained by May good rainfall, which results in on average vegetation development in June, the most noticeable below average vegetation development regions are Gedaref, El Gezera, Sennar, and Blue Nile. The below average rainfall in the beginning of the season led to the slow development of vegetation in this region. See Fig (4b).

This is likely to widening the hunger gap, especially in the borders states (Kassala, Darfur and Southern Kordofan). Food security situation is also likely to be in stress as there is no crop production during this period.

Pastoral situation is deteriorated as the prevailing of dryness during June, early and mid July. Late July good rainfalls are likely to replenish the pasture situations and provide adequate water resources for animals and pastoral activities.

Below average vegetation development are shown in the north part of Damazine, Sennar Gedaref, north part of Southern Kordofan and north-eastern parts of Southern Darfur.

Southern parts of Blue Nile, Southern Kordofan and Western Darfur showed on average vegetation and crop development levels during late June. See Fig (4b).

The vegetation development situation is likely to improve as the good rainfall in late July. The early growing situations of the crop will improve gradually as the good rainfall amounts continue northward.

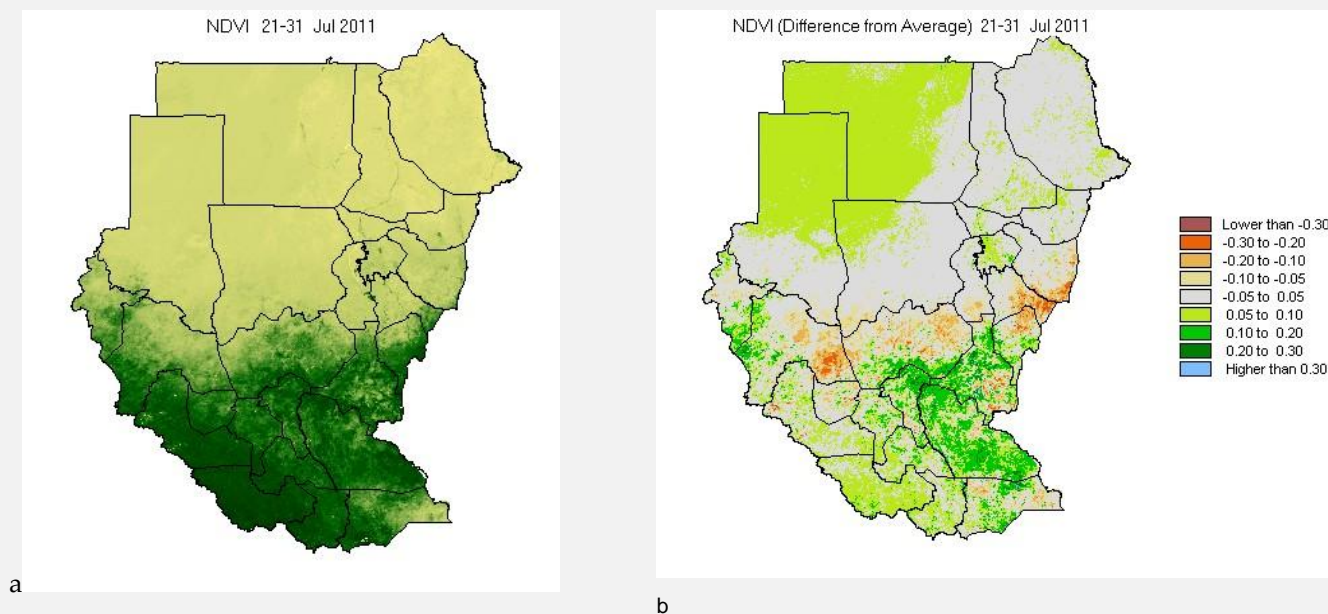
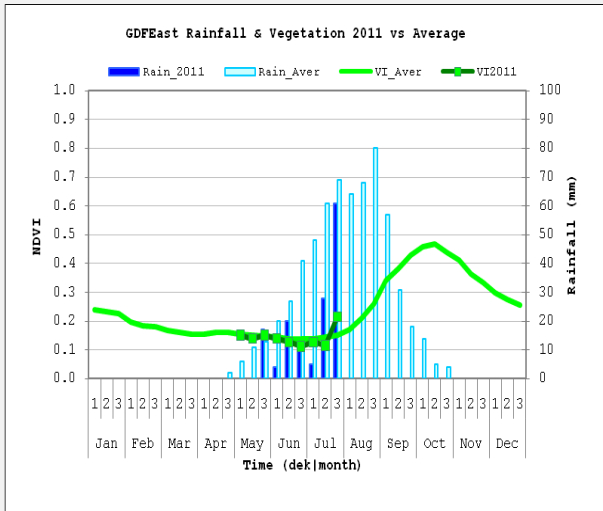


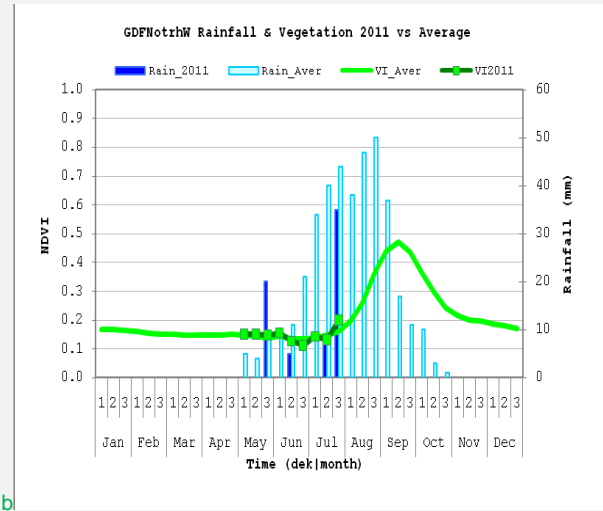
Fig 4a – NDVI progress for early July 2011, Fig 4b – NDVI difference from average in late June 2011. Yellows and reds represent below average vegetation development, greens and blues represent above average vegetation development.

Vegetation & Rainfall Perspectives

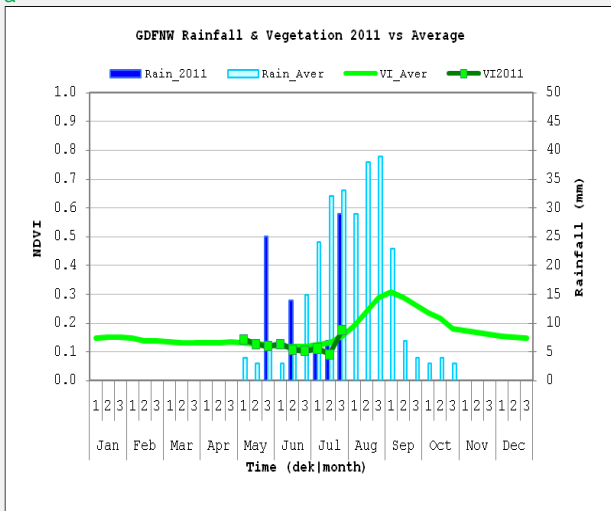
Gedaref State



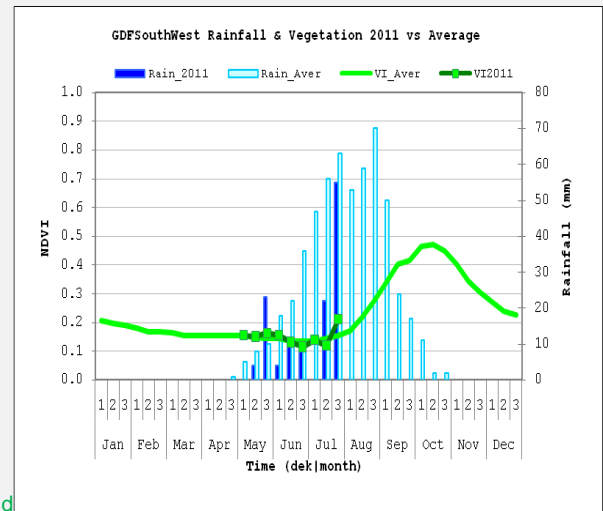
a



b



c

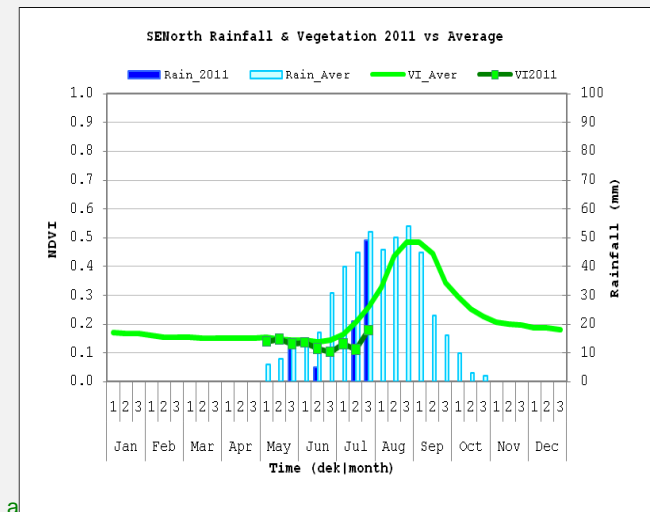


d

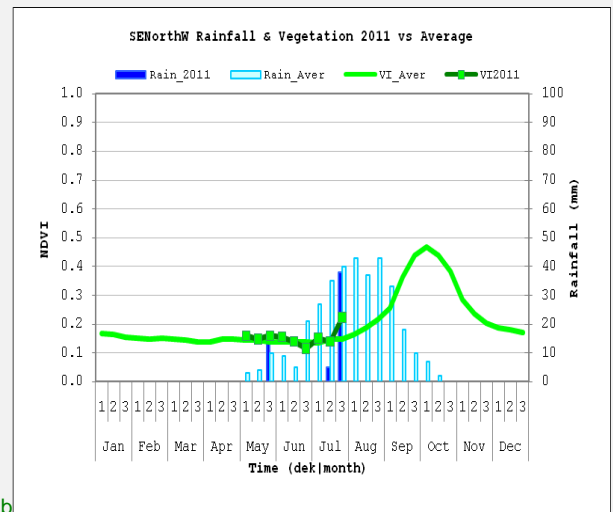
Timely start of rainfall on early May in the most parts of the state with above average rainfall amounts during late May. Timely start of vegetation development in mid July and on to above average developing levels as a results of on average rainfall in the eastern and north western areas.

Although; Below average vegetation developments levels during June, early and mid July in most parts of the state, but late July good rainfall enhanced the situation in most parts of the state.

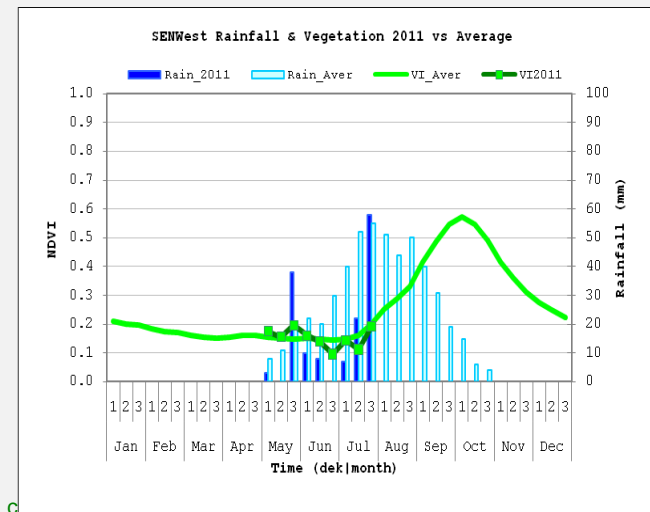
Sennar State: Traditional and semi-mechanize Agriculture



a



b



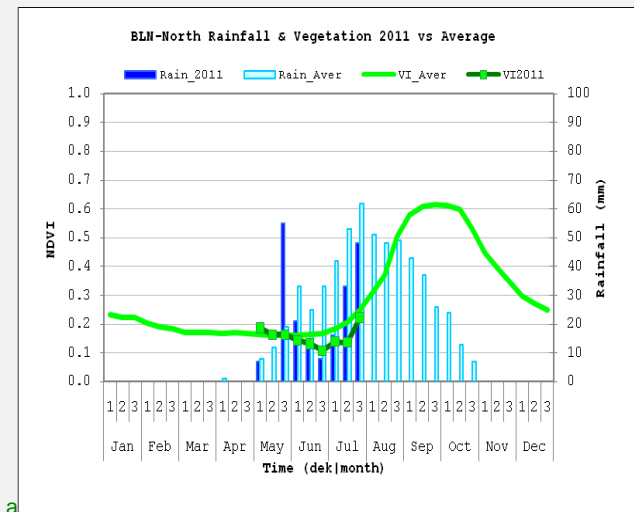
c

Timely start of rainfall on late May in the most parts of the state with above average rainfall amounts during. Vegetation development situation is below average levels as the dryness of June and early July.

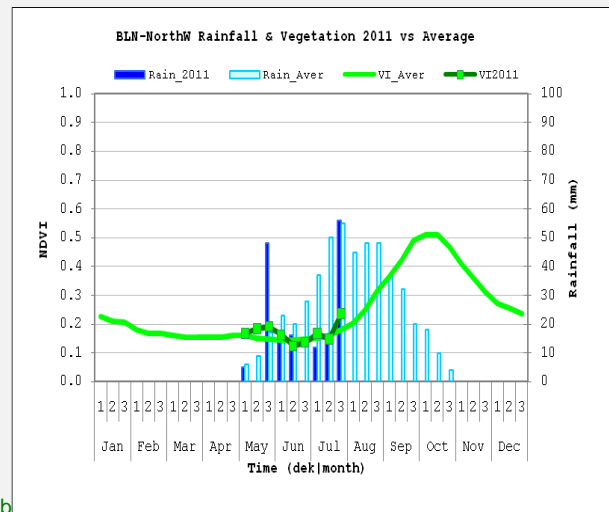
On average and above average vegetation development levels shown in the west and northwest of the state. Elsewhrer; the vegetation development is below average levels.

The situation is likely to enhance as the late July good rainfall and Also the registered good amounts of rainfall during early August in the state.

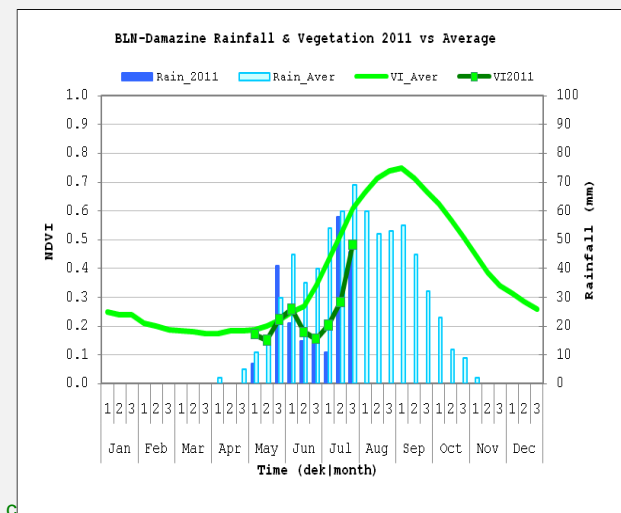
Blue Nile State: Traditional and semi-mechanized Agriculture



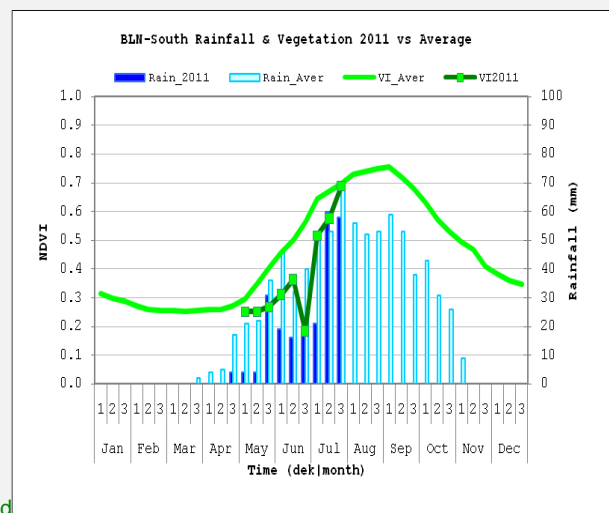
a



b



c

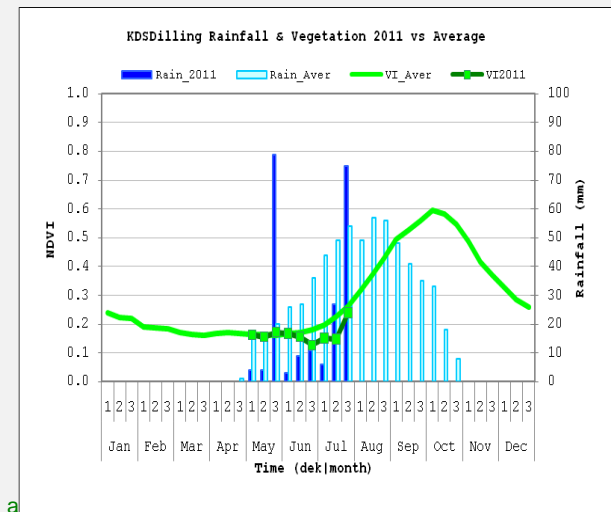


d

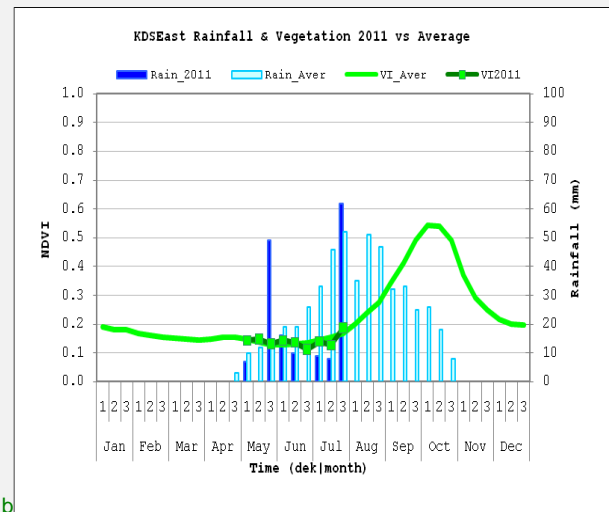
Timely start of rainfall on early May in the most parts of the state with above average rainfall amounts during late May. Significant delay of vegetation development level over all parts of the state with noticeable stress (below average development levels) during late June, early and mid July.

Generally, vegetation development tends to reach the average level during late July as a consequence of its wetness conditions.

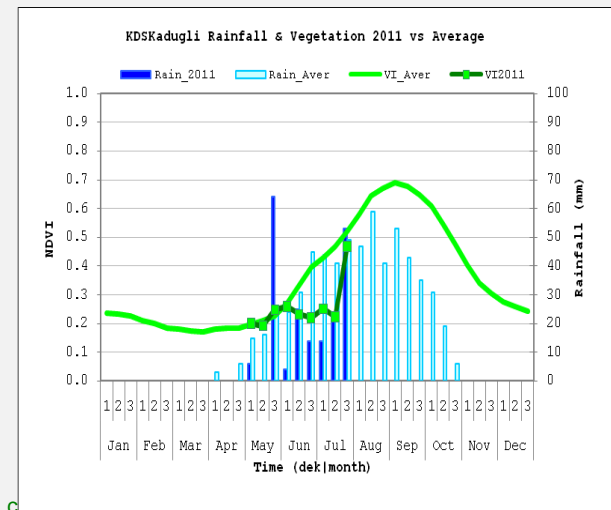
South Kordofan State: Traditional Agriculture



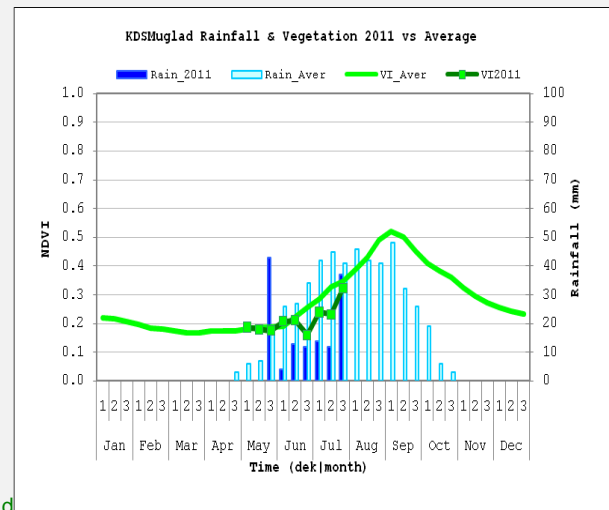
a



b



c



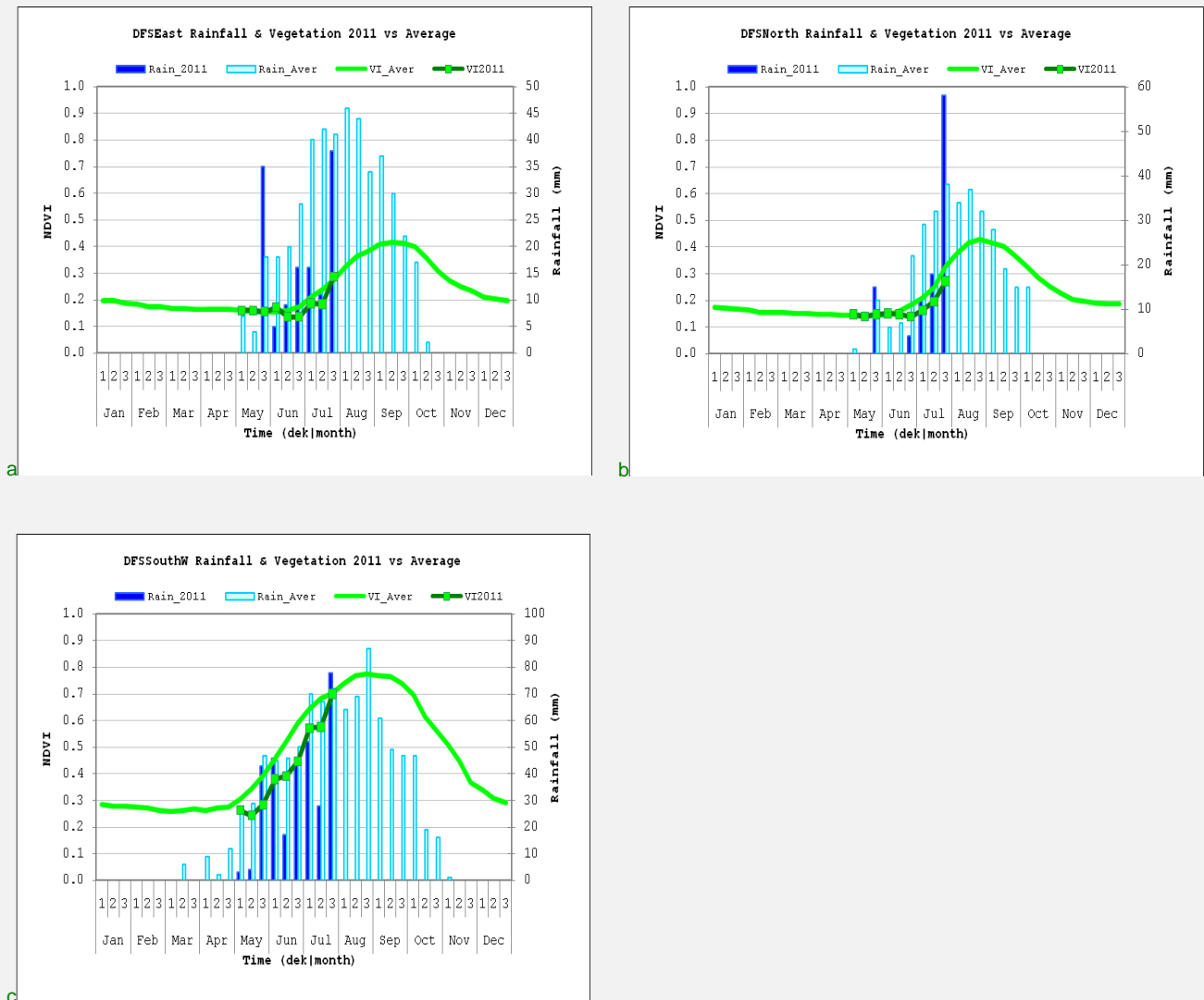
d

Rainfall starts on early May in the most parts of the state with above average rainfall amounts during late May. Significant delay on vegetation development all over the state.

Below average vegetation developments levels during June, early and mid July. On average development level maintained by late July in the most parts of the state.

Vegetation situation is likely to develop as the latest good rainfall received in most parts of the state.

South Darfur State:



Noticeable delay on the start of rainfall on late May in the most parts of the state with on average amounts. Vegetation development was delayed with below average development levels in most parts of the state. In general, the vegetation is likely to develop to above average level during early and mid August as a consequence of on/ above average rainfall in 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 June - August season there is an approximately 71% probability of prevailing neutral conditions, and that is predicted to be the most likely situation through the second half of 2011 and into early 2012. The likelihood of returning to El Niño conditions is now very low (9%), while the chances of La Niña conditions are also low (15%).

Rainfall Outlook

There are a variety of methodologies and models that use tropical east Pacific sea surface temperatures (SSTs) 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).

June - September 2011 Rainfall Forecasts

July-August-September (JJAS) is the crucial period for most crops in Sudan, in particular for the northern regions. Forecasts for JAS rainfall have been prepared in May and June by a variety of sources. Forecasts made at such long time ranges can provide only general guidance and it is possible to find conflicting information.

SMA updated its seasonal forecast for the rainfall for June-July-August-September (JJAS) 2011 (Fig 5) for the coming three months, July, August and September. According to this forecast, JJAS rainfall is expected to be on average to above average in eastern region, with probabilities of 50-35%, the western region is expected to be above average to average with probabilities of 40-35%. In contrast, in Southern Sudan rainfall expected to be on average to below average with probabilities of (45%-30%) with a somewhat higher chance of above average rainfall in the southwest regions.

July -August-September 2011 Rainfall Forecasts

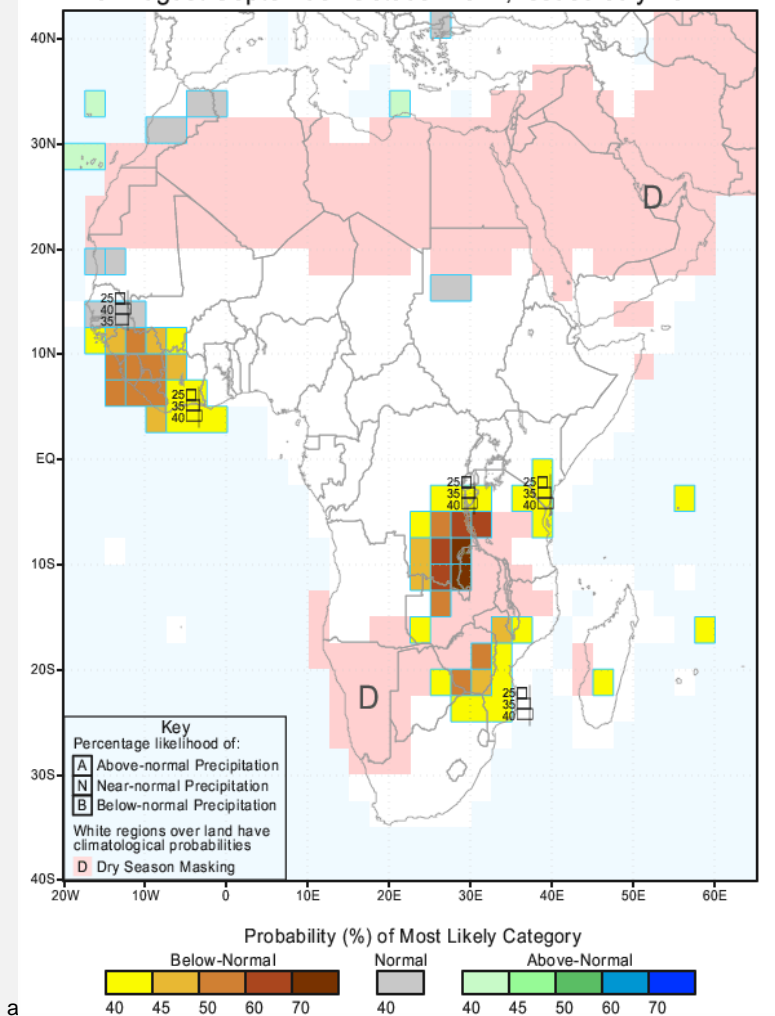
This period is crucial one of most crops in the northern regions of Sudan. International centres produces seasonal forecast for July/August for this period from the sources above. However, forecasts made at such long ranges have low skill and provide only general guidance. As a result, it is frequent to find conflicting information and this is case this season.

IRI and ECMWF forecast (Fig6a, c) outlook – normal rainfall, mainly in north part of Sudan and climatology elsewhere. CCA outlook and forecast below normal rainfall over central Sudan. On average rainfall over the western sectors of Sudan. See (Fig6b).

IRI and ECMWF are in consensus of forecasting normal condition a cross Sudan, CCA forecast of below normal rainfall across Sudan.

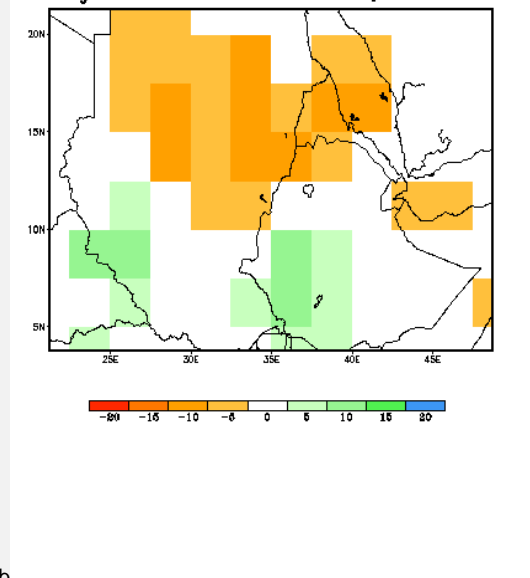
In any case, actual crop-related quality of the rainfall season is influenced by a range of other factors such as the timing and distribution of rainfall amounts through the season, on which these forecasts do not provide information.

IRI Multi-Model Probability Forecast for Precipitation for August-September-October 2011, Issued July 2011



a

CCA Depart. Clim. Prob. Forecast X 100
 Jun-Aug 2011 N. Horn of Africa Rainfall, One Month Lead



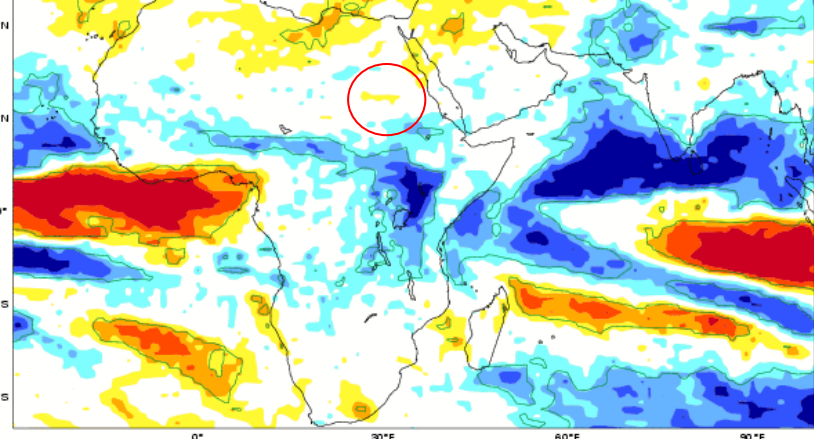
b

ECMWF Seasonal Forecast
 Prob (precipitation > median)

Forecast start reference is 01/07/11
 Ensemble size = 41, climate size = 275

System 3 ASO 2011
 Solid contour at 1% significance level

0..10% 10..20% 20..30% 30..40% 40..60% 60..70% 70..80% 80..90% 90..100%



Forecast issue date: 15/07/2011

ECMWF

c

Fig 6a – Probabilistic forecast for July-August –September (JAS) 2011rainfall 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 6b – Forecast for July-August –September (JAS) 2011 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 6c – Forecast for July-August –September (JAs) 2011 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)

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