

# Seasonal weather outlook

(Aug-Sept-Oct, 2013)

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### **1. Introduction**

*A variety of methods including dynamical models, statistical methods, regional expert judgments and combination of them have been used to generate long-range weather forecast by the different climate prediction centers around the world. National Agromet Center (NAMC), Pakistan Meteorological Department adopts an ensemble approach to formulate its seasonal weather outlook for Pakistan (on experimental basis), taking into consideration available products from major climate prediction centres and different Global Climate Models (GCMs).*

*Regional weather (precipitation and temperature) outlook is predicted from different global climate models by using persisted sea surface temperature on 0000 Aug 01, 2013. Model's output then tuned by applying Regional Correction Factor (RCF). RCF has computed by comparison of Long Range Averages (LRA) with model's simulation for the period (2004-2012) on monthly basis. That might be somewhat different from actual weather because of time to time variation in Sea Surface Temperature (SST) during the season. Accuracy of Outlook seasonal weather mainly depend upon SST used in global climate models. Even with use of accurate SST, still is uncertainty in the climate forecast due to chaotic internal variability of the atmosphere.*

**Acknowledgement:** *NAMC is gratefully acknowledges the International Research Institute (IRI) for climate and Society for providing access of dynamical prediction of Global Climate Model ECHAM4P5, developed and operated by European Center for Medium-Range Weather Forecasts model's simulations and hindcast data to support the formulation of seasonal weather outlook of Pakistan. Output maps have been prepared by using IRI climate software.*

## **2. Synoptic situation**

- Jet stream (U wind at 200 hPa) is shifted slightly towards north with above normal strength. Increasing trend in intensity over the region is expected during August and remaining predicted season. The movement is slightly towards north from the normal movement during August, 2013.

*Probability outlook: Track of the expected monsoonal current likely towards central/upper Punjab and Kashmir with normal intensity. The weather system from west probably will be more active during predicted period*

- Geo-potential height at 500 hPa over the region follows normal patterns with some pockets of low pressure areas in central eastern parts of the country during start of the season and gradually weakens with time.

*Probability outlook: Most likely the monsoonal weather system will give rain over central and northern parts of the country. A normal rain is expected.*

- No significantly change is expected in Surface temperature pattern from normal (1982-2010) during Aug, 2013 over the country. However, east west expansion of small area focused on lower Punjab and Upper Sind will be under influence of slightly higher surface temperature.
- North Atlantic Oscillation (NAO) is in slightly positive phase (0.67) and may cause to shift western disturbances towards north during coming months..  
(Data source: CPU, monthly mean index)

*Probability outlook: Normal rainfall over the country. The focus of weather tracks may be towards northern side.*

## Seasonal weather outlook (Aug-Oct, 2013)

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- Most of the set of dynamical and statistical model predictions neutral conditions for the Aug-Sep-Oct (ASO). During late June and early July, 2013 predicted neutral ENSO conditions, although a few (mainly statistical) models indicate borderline or weak La Nina conditions for northern summer and later, and a few dynamical models call for borderline El Nino conditions developing during the second half of 2013. In the most recent week, the SST anomaly in the Nino3.4 region was -0.4C. Data source: [http://iri.columbia.edu/climate/ENSO/currentinfo/SST\\_table.html](http://iri.columbia.edu/climate/ENSO/currentinfo/SST_table.html)

*Probability outlook: La Nina (29%), Neutral (67%) and El Nino (04 %) during Aug-Sep-Oct season*

- Arabian Sea Surface Temperatures are normal.
- Caspian Sea surface temperatures are above normal.
- Mediterranean Sea surface temperatures are normal to slightly above normal.
- Bay of Bengal Sea Surface Temperatures are normal.

*Probability outlook: Sea Surface Temperature trend is going towards normal leads to normal rainfall over the region and below than normal over Bangladesh and eastern coast of India*

### **3. Seasonal Weather Outlook Summary (Aug- Oct-2013)**

Synthesis of the latest model forecasts for Aug-Oct, 2013 (ASO), current synoptic situation and regional weather expert's judgment indicates that normal rainfall is expected all over the country with normal during August. However, slightly normal rainfall is expected during September and normal during October. The

slightly above normal temperature is likely to occur in the all over the country during predicted period. Temperature will be higher over central parts of the country including south Punjab, North Eastern Baluchistan, upper Sindh and southern KP from surroundings. Neutral-ENSO condition is expected to persist throughout the predicted period.

### **3.1. Weather outlook**

***“Normal during August, above Normal during September and Slightly below normal during October”***

- I. Average ( $\pm 10\%$ ) rainfall is expected during predicted season 2013.
- II. Intensity and frequency of monsoon will be normal during August. It will increase gradually during September over central parts of the country. However, during last phase (October) slightly below normal rainfall will be occurred over plan areas of Punjab and Sind.
- III. The focus of monsoonal weather systems during August will be towards central and Upper Punjab, KP and Kashmir. However, more monsoonal rains are expected over Sind and lower Punjab during September.
- V. Influence of western disturbances over Baluchistan will dominate during whole predicted season.
- VI. Expected Maximum day temperature will be slightly above normal all over the country during the season. In August, above normal temperature is likely to prevail all over the country with highest over central parts of the country including North east Baluchistan, south Punjab and upper Sind. Day temperature will drop below than normal over extreme northern parts of the country during September, while still become above normal over southern parts of the country.

## Seasonal weather outlook (Aug-Oct, 2013)

- VII. Flash flooding over foot hills of the Sulaiman ranges can not be ignored during last phase (September) of monsoon
- VIII. No thread of meteorological drought over Baluchistan during current season
- IX. Maximum day temperature will be on higher side during last phase of summer season (Aug-Sep) from the normal throughout the country.

### 3.2. Monthly Quantitative Weather Forecast

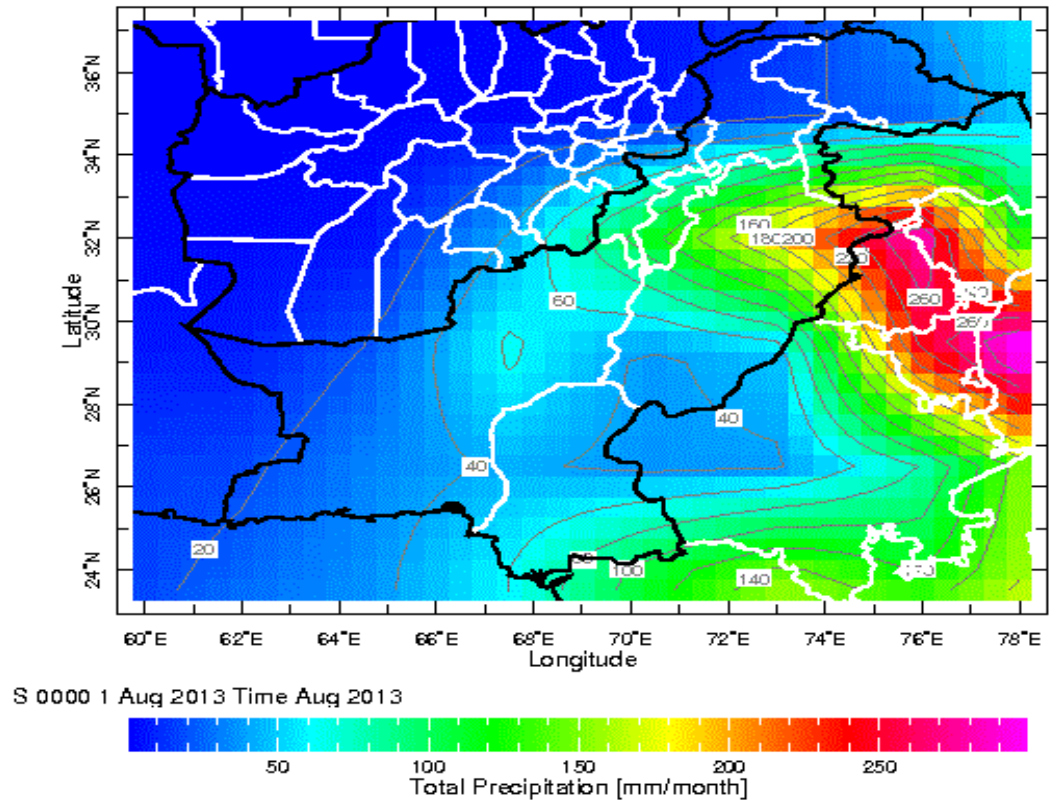
	Aug, 2013		Sep, 2013		Oct, 2013		Aug-Oct, 2013	
	ave	exp	ave	exp	ave	exp	ave	exp
<b>GB</b>	16.8	Abv. Ave	12.4	Abv. Ave	9.6	Abv. Ave	38.8	Abv. Ave
<b>KP</b>	92.5	Blw. Ave	42.7	Blw. Ave	23.9	Blw. Ave	159.1	Blw. Ave
<b>AJK</b>	160.7	Blw. Ave	70.9	Blw. Ave	31.7	Blw. Ave	263.3	Blw. Ave
<b>FATA</b>	67.0	Ave	29.7	Abv. Ave	13.2	Blw. Ave	109.9	Ave
<b>PUNJAB</b>	96.1	Ave	36.8	Abv. Ave	8.4	Blw. Ave	141.3	Ave
<b>BALUCHISTAN</b>	22.2	Abv. Ave	4.8	Abv. Ave	3.7	Blw. Ave	30.7	Abv. Ave
<b>SIND</b>	60.2	Ave	20.2	Abv. Ave	4.5	Ave	84.9	Ave
Precipitation is in mm/month								
<b>Pakistan</b>	<b>54.47</b>	Ave	<b>20.28</b>	Abv. Ave	<b>7.8</b>	Blw. Ave	<b>82.55</b>	Ave

- *Below Average (Blw. Ave) < -10 %*,
- *Average precipitation range (Ave) = -10 to +10 %*,
- *Above Average (Abv.Ave) > +10 %*

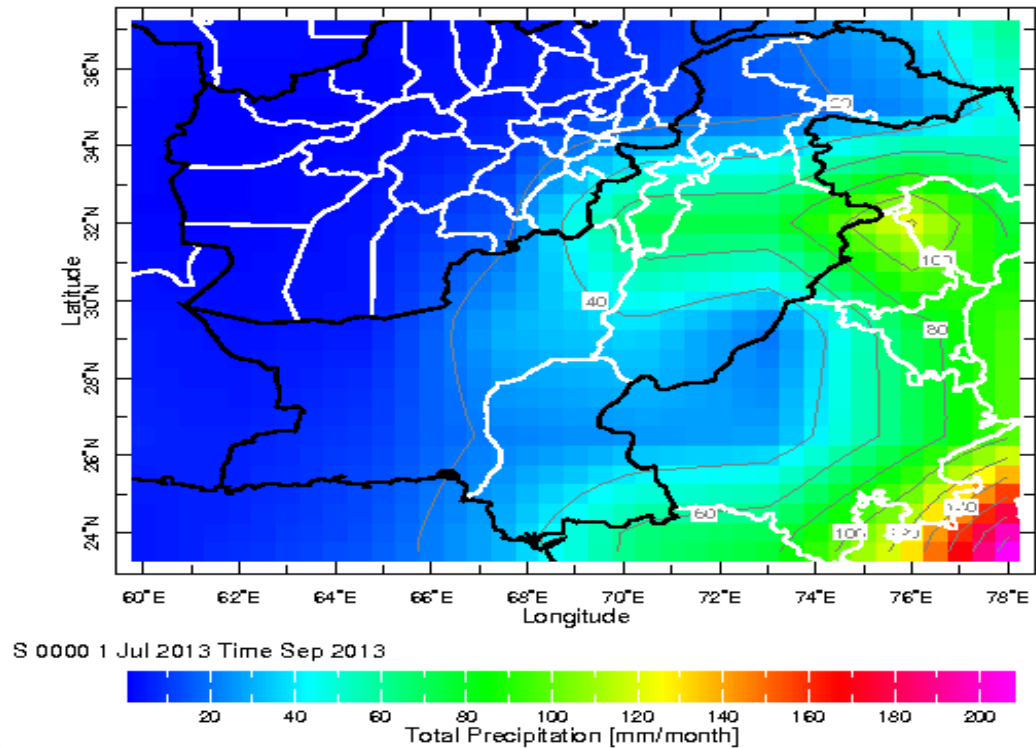
*Note: Average precipitation is computed by using Global Precipitation Climatology Centre (GPCC) gridded data by resolution (0.5x0.5°) latitude by longitude. Ensembles of different climate models are used for computation of expected precipitation over the region.*

## Seasonal weather outlook (Aug-Oct, 2013)

### 4. Spatial distribution of expected rainfall during coming season (GCM-ECHAM)



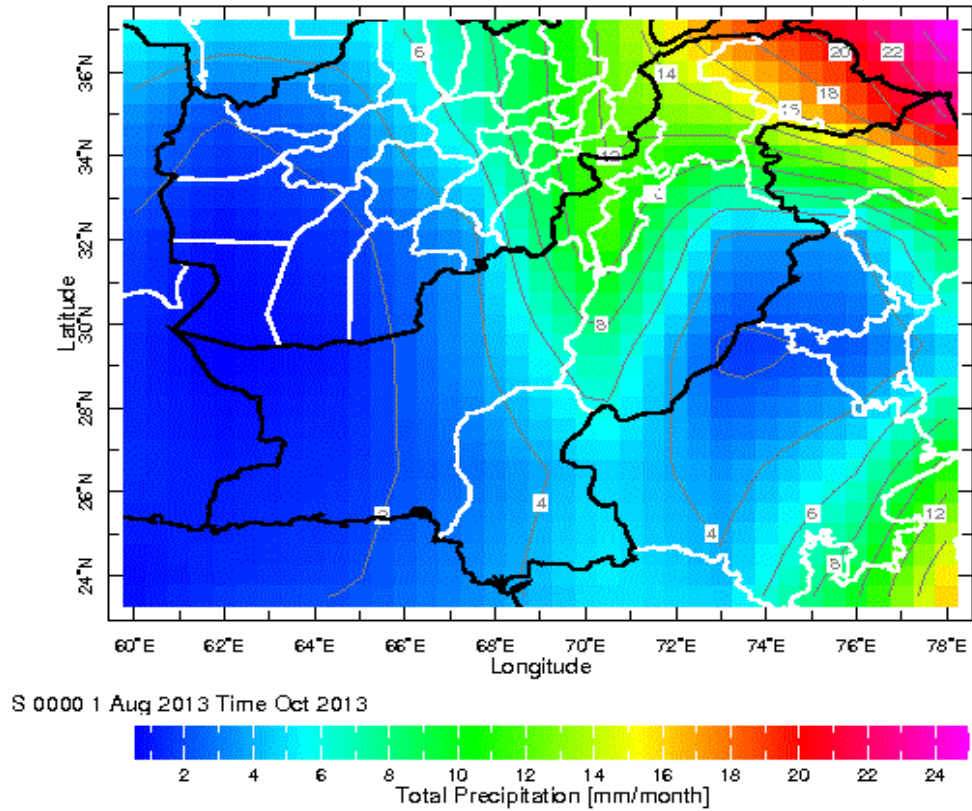
**AUG, 2013**



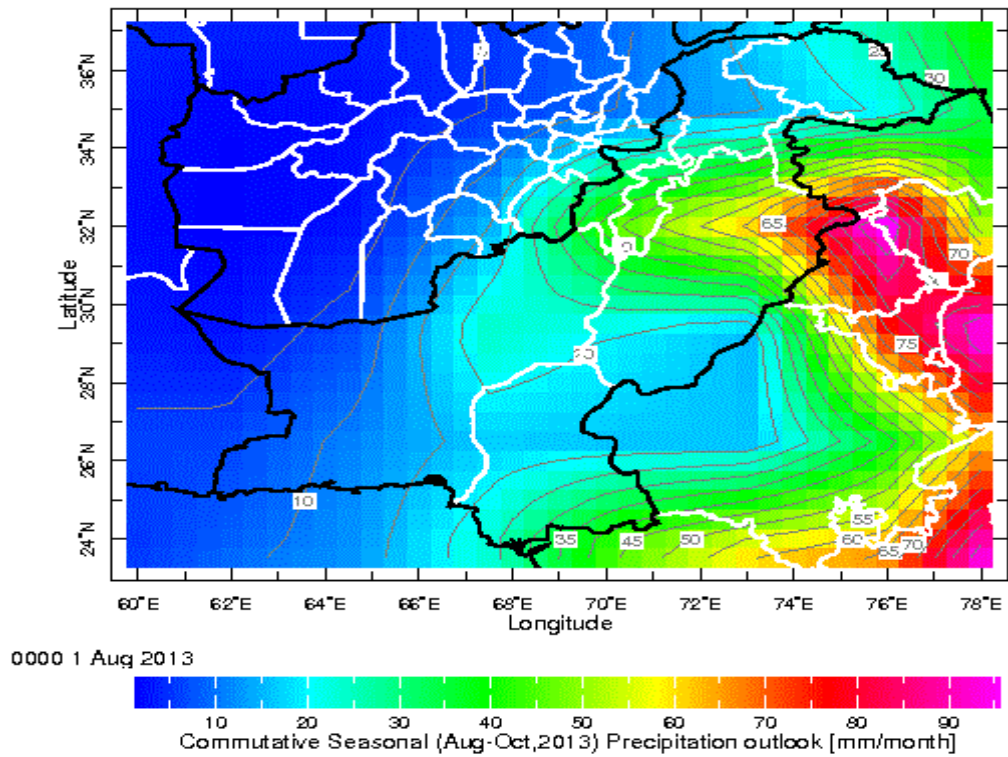
**SEP, 2013**



## Seasonal weather outlook (Aug-Oct, 2013)



**OCT, 2013**

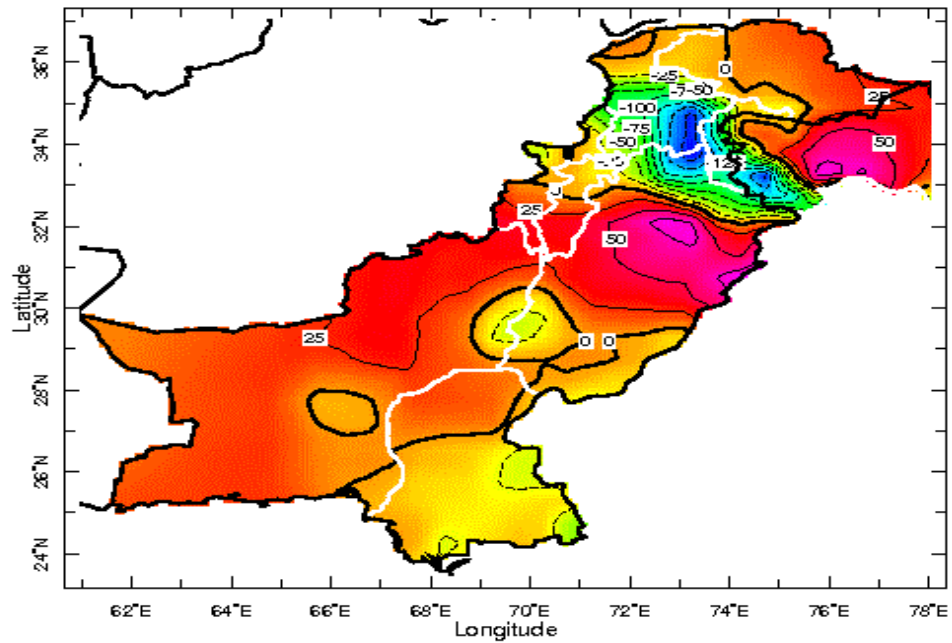


**Jul-Sep, 2013**

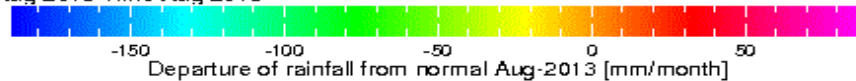


## Seasonal weather outlook (Aug-Oct, 2013)

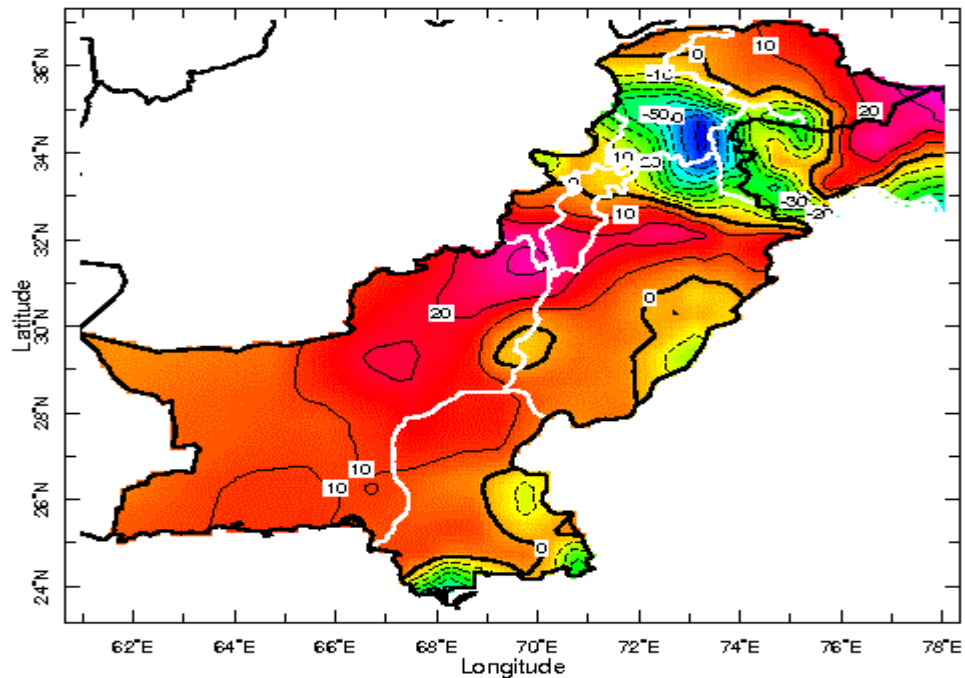
### *Monthly departure from normal (rainfall) during coming season*



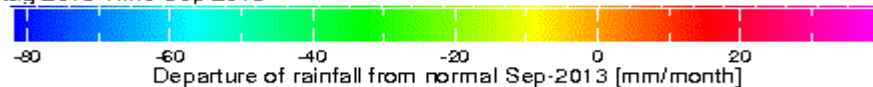
S 0000 1 Aug 2013 Time Aug 2013



**AUG,2013**

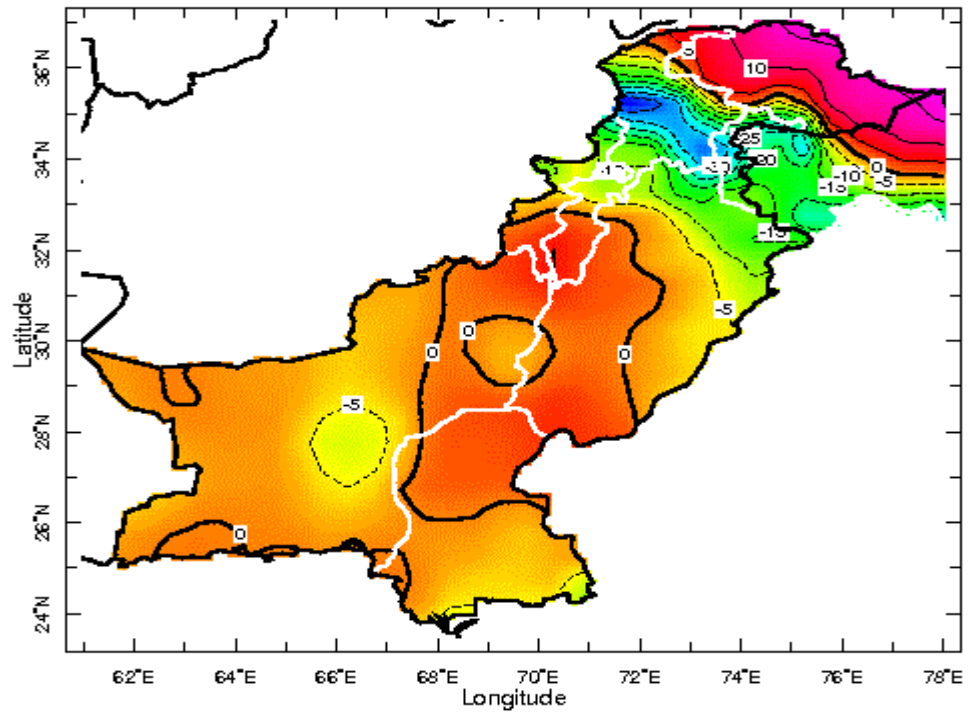


S 0000 1 Aug 2013 Time Sep 2013



**SEP, 2013**

## Seasonal weather outlook (Aug-Oct, 2013)

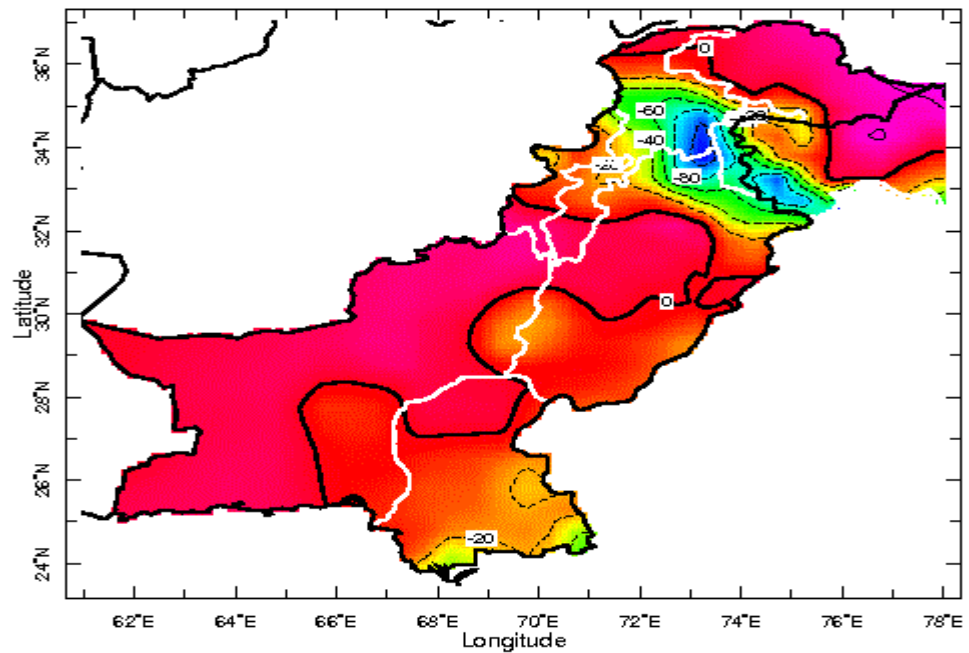


S 0000 1 Aug 2013 Time Oct 2013



Departure of rainfall from normal Oct-2013 [mm/month]

**OCT, 2013**



0000 1 Aug 2013

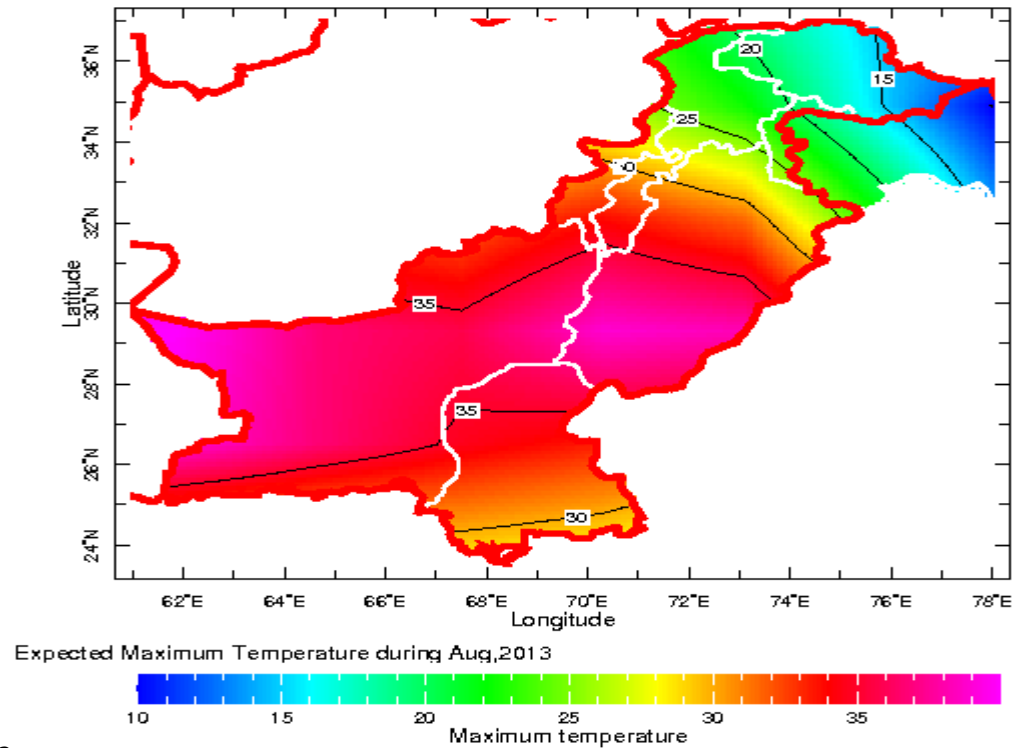


Departure of rainfall from normal Aug-Oct, 2013 [mm/month]

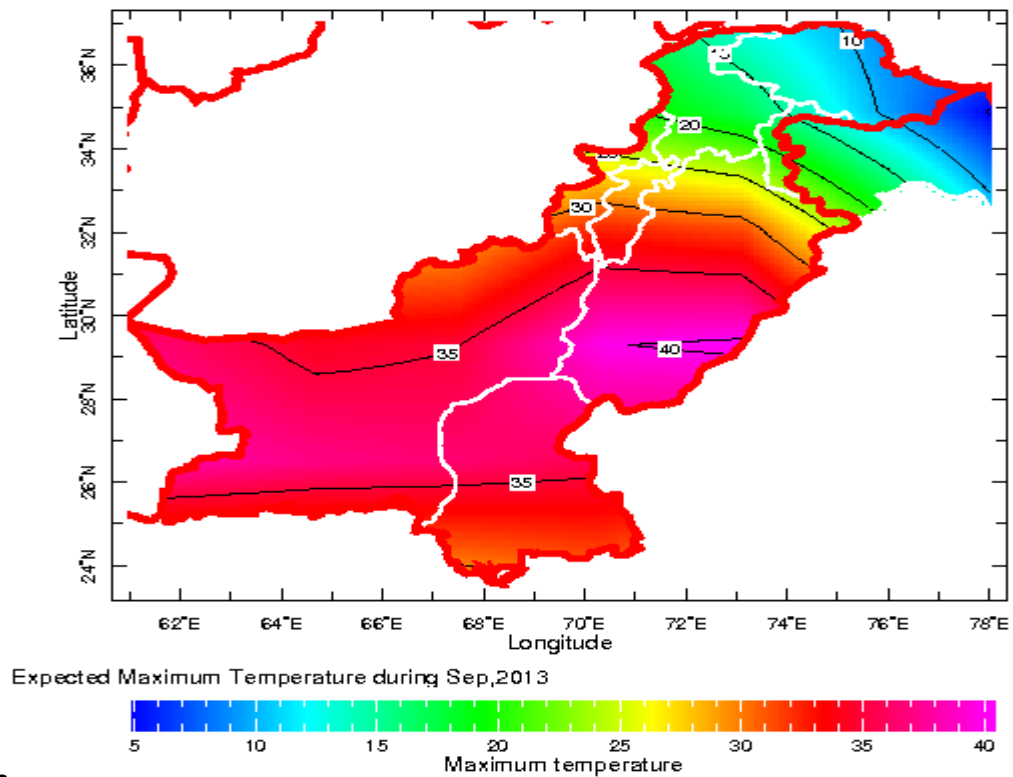
**Jul-Sep, 2013**

## Seasonal weather outlook (Aug-Oct, 2013)

### *Spatial distribution of expected max. temperature during Aug and Sep, 2013*



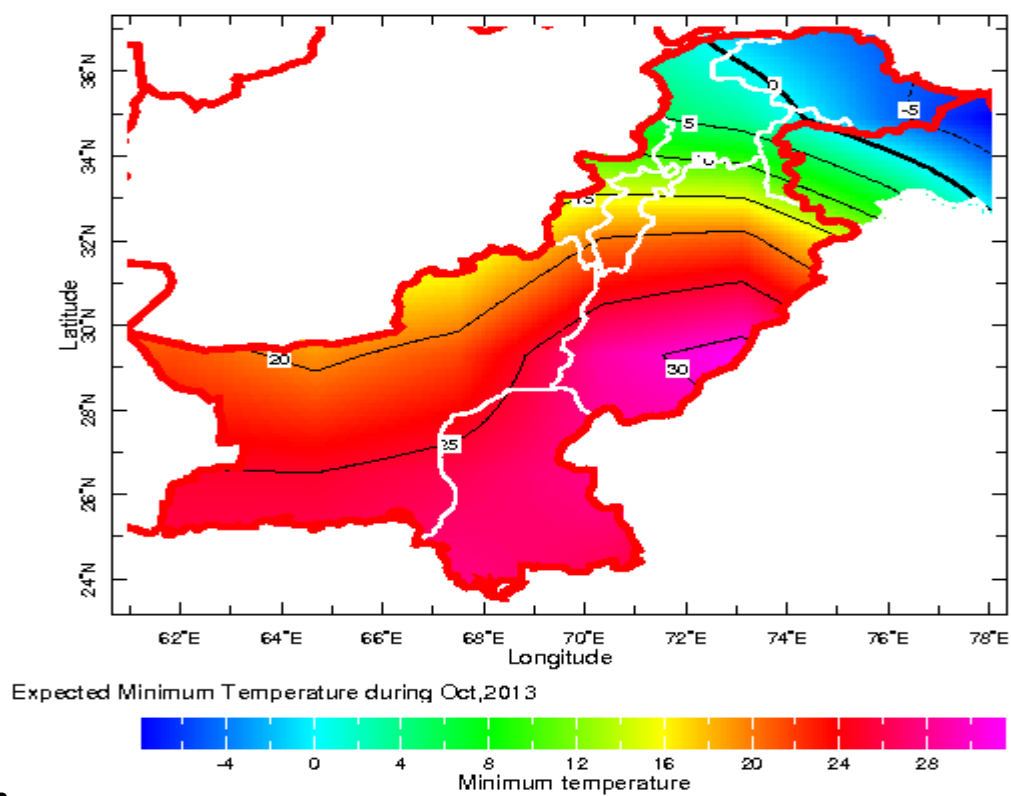
**AUG, 2013**



**SEP, 2013**

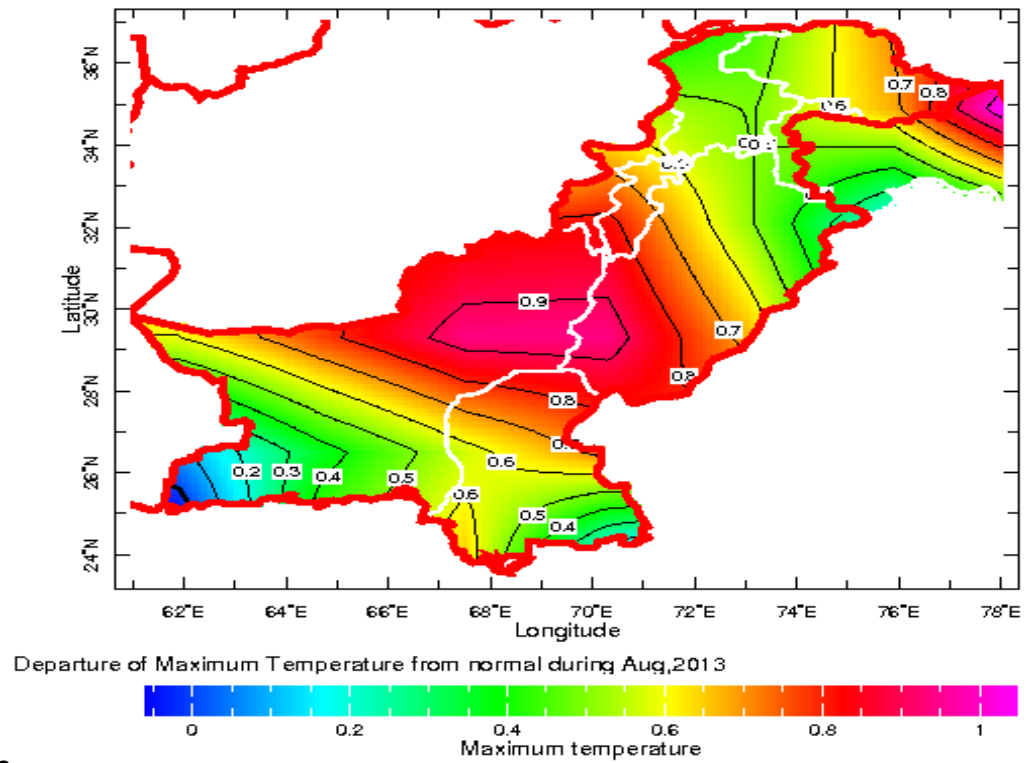
## Seasonal weather outlook (Aug-Oct, 2013)

### *Spatial distribution of expected minimum temperature during October*



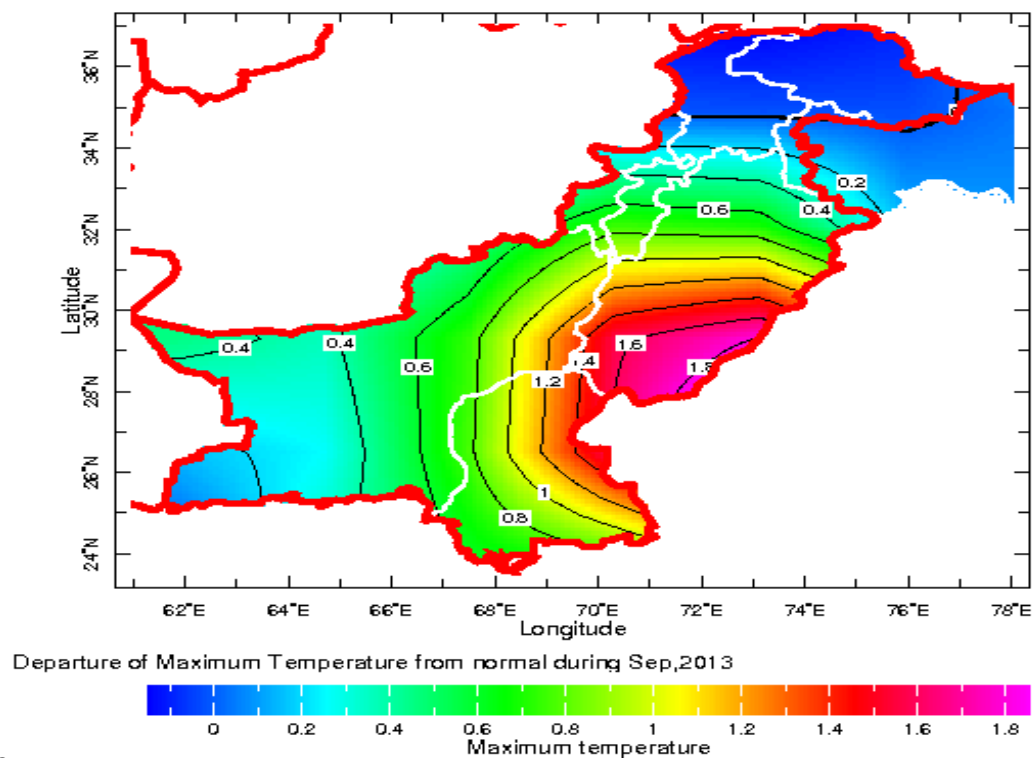
**OCT, 2013**

### *Departure of expected maximum temperature from normal*



**AUG, 2013**

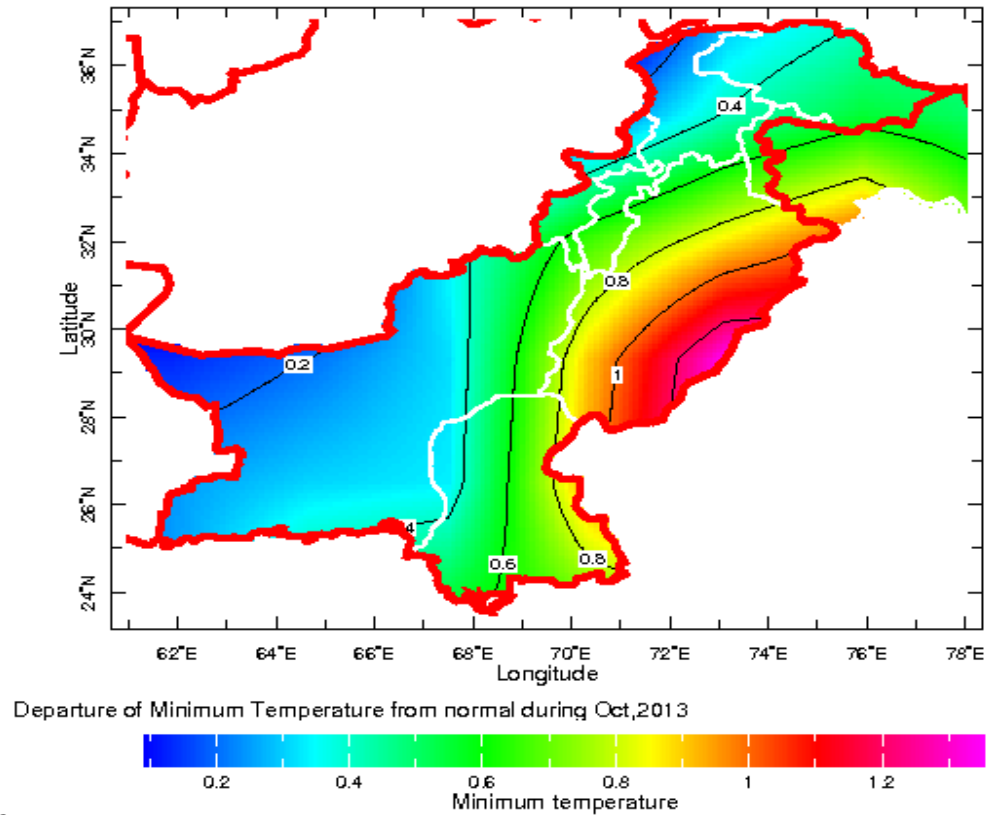
## Seasonal weather outlook (Aug-Oct, 2013)



**SEP, 2013**

***Departure of expected minimum temperature from normal***

## Seasonal weather outlook (Aug-Oct, 2013)



**OCT, 2013**

*Note: Research wing of NAMC is regularly monitoring variation in synoptic situation of the globe and using different global climate models regional weather prediction data for preparation of this weather outlook. Seasonal weather outlook issues 10<sup>th</sup> of every month with three months in advance weather outlook. Lastest seasonal weather summay can be download from NAMC web site mentioned below: <http://namc.pmd.gov.pk/>*