

# Seasonal weather outlook for SAARC region

(Mar-May, 2014)

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**Issued by:**

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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 seasonal weather outlook for south Asian countries included in South Asian Association for Regional Cooperation (SAARC) (on experimental basis), taking into consideration available products from major climate prediction centres by using Global Climate Models (GCMs).*

*This Climate Outlook may be somewhat different from those used by the national meteorological services in the region. Thus, this product may differ from the official forecasts issued in those countries. Regional weather (precipitation) outlook is predicted from ECHAM4 global climate models by using persisted sea surface temperature on 0000 Mar 01, 2014. 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. For further information concerning this and other guidance products, users are strongly advised to contact their National Meteorological Services.*

**Acknowledgement:** *NAMC 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. Special acknowledge to Dr. M. Benno Blumenthal by providing guidance and assistance for using IRI climate software. All the output graphics have been prepared by using IRI climate software.*

### **Classification of average, below average and above average**

- *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*

### **2. Synoptic situation**

- Location of jet stream (U wind at 200 hPa) is at normal position with normal intensity and same areas of high winds towards the west. Intensity of jet stream will be normal during predicted period
- A trough at 500 hPa is expected to be over central parts of the country. As a result, track of the western disturbances may be changed and tilted towards central and southward.
- North Atlantic Oscillation (NAO) is in positive phase (1.34) approaching towards positive phase. As a result normal track of western disturbances will persist. <http://www.cpc.ncep.noaa.gov/products/precip/CWlink/pna/norm.nao.monthly.b5001.current.ascii.table>
- While remaining ENSO-neutral, January was characterized by the periodic emergence of below-average sea surface temperatures (SSTs) across the tropical Pacific Ocean. Weekly Niño index values in Niño-3 and Niño-3.4 bounced around  $-0.5^{\circ}\text{C}$ , while Niño-4 and Niño-1+2 stayed within  $\pm 0.5^{\circ}\text{C}$ . This recent cooling was associated with the upwelling phase of an oceanic Kelvin wave, which was reflected in a dip in the oceanic heat content. and below-average subsurface temperatures at depth across the eastern Pacific. Upper and lower-level winds were near average across most of the Pacific, except for the emergence of strong westerly winds in the western part of the basin toward the end of the month. Convection became more enhanced over eastern Indonesia and the western Pacific and remained suppressed over the central equatorial Pacific. Collectively, these atmospheric and oceanic conditions reflect ENSO-neutral.
- Nearly all model forecasts indicate the persistence of ENSO-neutral (Niño-3.4 index between  $-0.5^{\circ}\text{C}$  and  $0.5^{\circ}\text{C}$ ) through the Northern Hemisphere spring 2014, but afterwards, an increasing number of models suggest the possible onset of El Niño. Strong surface westerly winds in the western Pacific and the slight eastward shift of above-average temperatures in the subsurface western Pacific potentially portend warming in the coming months. However, the spring is also historically associated with lower forecast skill, so the chance of El Niño developing after the spring is not much different from ENSO-neutral. The consensus forecast is for ENSO-neutral to continue through the Northern Hemisphere spring 2014 ([http://iri.columbia.edu/our-expertise/climate/forecasts/enso/2014-february-quick-look/?enso\\_tab=enso-cpc\\_update](http://iri.columbia.edu/our-expertise/climate/forecasts/enso/2014-february-quick-look/?enso_tab=enso-cpc_update))

*Probability outlook: La Nina (3%), Neutral (79%) and El Nino (18 %) during Mar-Apr-May, 2014 season*

- Arabian Sea Surface Temperatures are expected to be slightly below normal near western coastal belt of Pakistan.
- Caspian Sea surface temperatures expected to be slightly above normal over southern half and below normal over upper half.
- Mediterranean Sea surface temperatures are normal to slightly above normal.

## Seasonal weather outlook (Mar-May, 2014)

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- Bay of Bengal Sea Surface Temperatures are slightly below normal.

### 1. **Summary (Mar-May, 2014)**

***“Slightly above average precipitation is expected during the season (MAM)”***

Synthesis of the latest model forecasts for Mar-May 2014 (MAM), current synoptic situation and regional weather expert’s judgment indicates that slightly above average precipitation is expected during the predicted season. Below normal minimum temperature will persist almost all over the SAARC member countries except south western parts of India and Sri Lanka during March. Above normal day temperature are expected over southwestern parts of India and southern parts of Pakistan during March. Rest of the region will be expected below normal to normal day temperature during rest of predicted months. Neutral-ENSO conditions are expected to persist throughout the season.

### ***Seasonal weather outlook:***

As a whole, slightly above average precipitation is likely to all over the region during the season with average during March and April and above average during May. Extremely below average precipitation is expected over Sri Lanka and Bangladesh while remaining countries will receive average precipitation during all the predicted months.

However, Chances of extreme weather during predicted months are very limited.

Chances of drought in western Pakistan can not be ruled out during winter season.

***March, 2014:*** As a whole average precipitation is expected all over the region with above normal over Bhutan and Afghanistan, average over Pakistan, Bangladesh, Nepal and India and extremely below over Sri Lanka. However, intensity of precipitation will be higher over Afghanistan, northern parts of Pakistan and northeastern India. Normal precipitation will be expected all over SAARC member countries except Nepal, extreme northern parts of Pakistan and Kashmir.

Below normal night temperature will be expected all over SAARC region with above average over southwestern India.

***April, 2014:*** Average precipitation is expected all over the region as a whole with significantly below average over Sri Lanka and below average over Bangladesh. Intensity of precipitation will be higher over Bhutan, Afghanistan, northern Pakistan and eastern parts of India. However, below average precipitation over northeast India and Sri Lanka.

Day temperature during April over all the SAARC member countries will be normal.

## Seasonal weather outlook (Mar-May, 2014)

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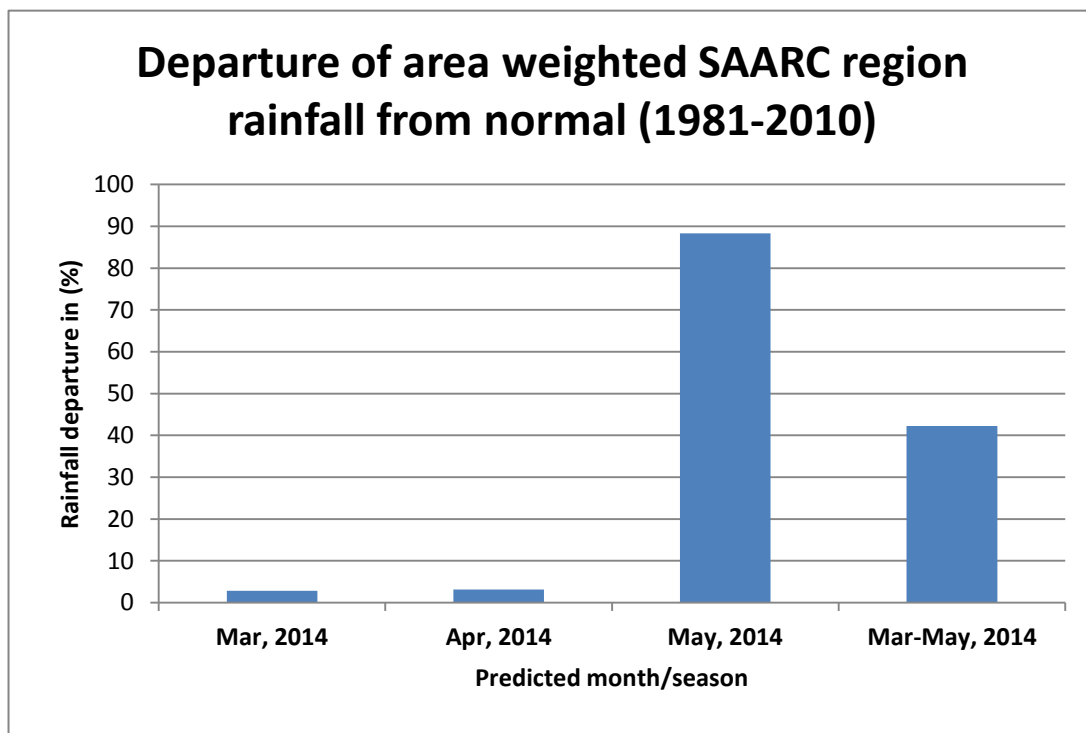
**May, 2014:** Above Average precipitation is expected during May all over SAARC region with below average over Sri Lanka. High intensity precipitation is expected over Bhutan and north eastern parts of India.

Normal to slightly below normal night temperature will be expected all over the region with higher over southeastern and eastern parts of India.

**February-April:** Above normal precipitation is expected all over SAARC member countries except Bangladesh. Above average rainfall during May are may be associated with early setup of monsoon currents.

### **Monsoon 2014 Prediction:**

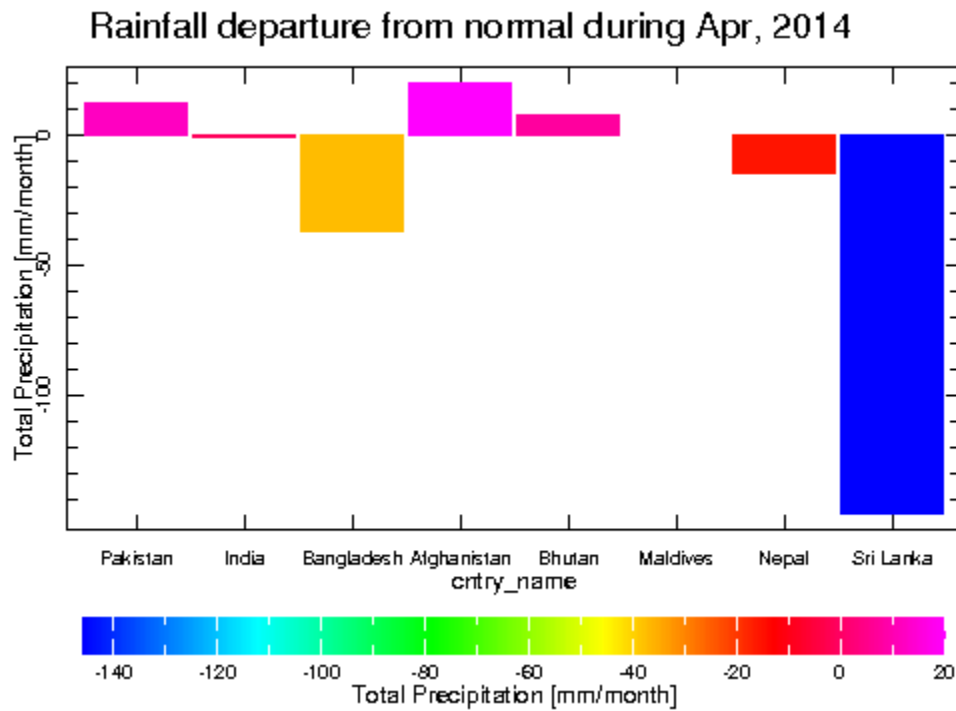
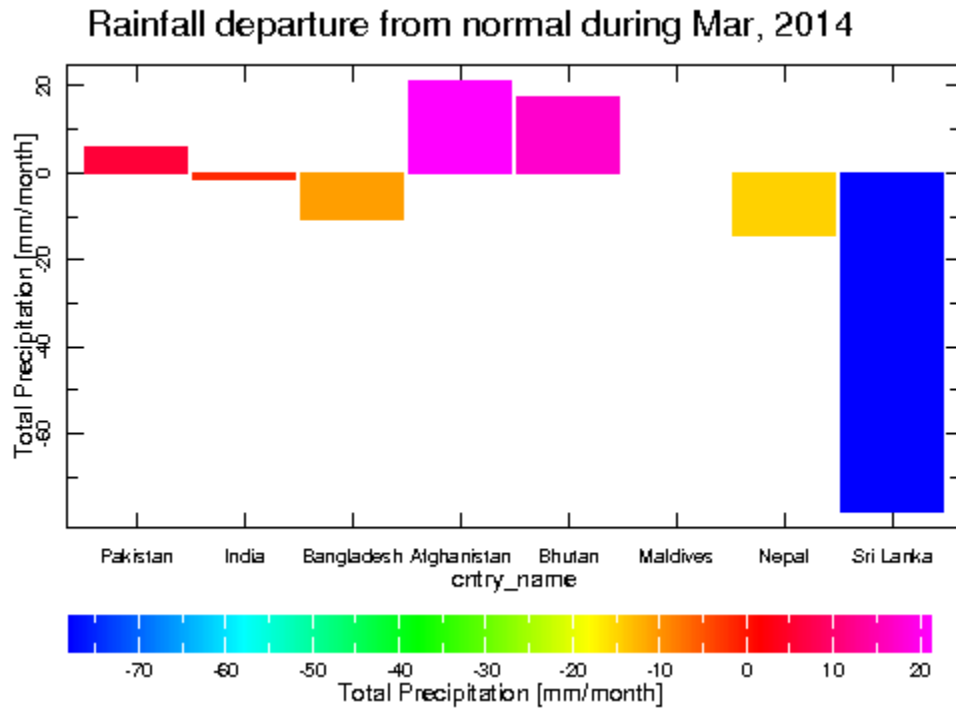
Current synoptic situation and its variation indicates that Below normal rainfall is expected during upcoming monsoon season. Monsoon starts slightly early and then its break in monsoon will be occur.



Note: Departure of Area-weighted rainfall of SAARC region has been computed by subtracting ECHAM predicted monthly/seasonally rainfall from GPCC of corresponding month/season.

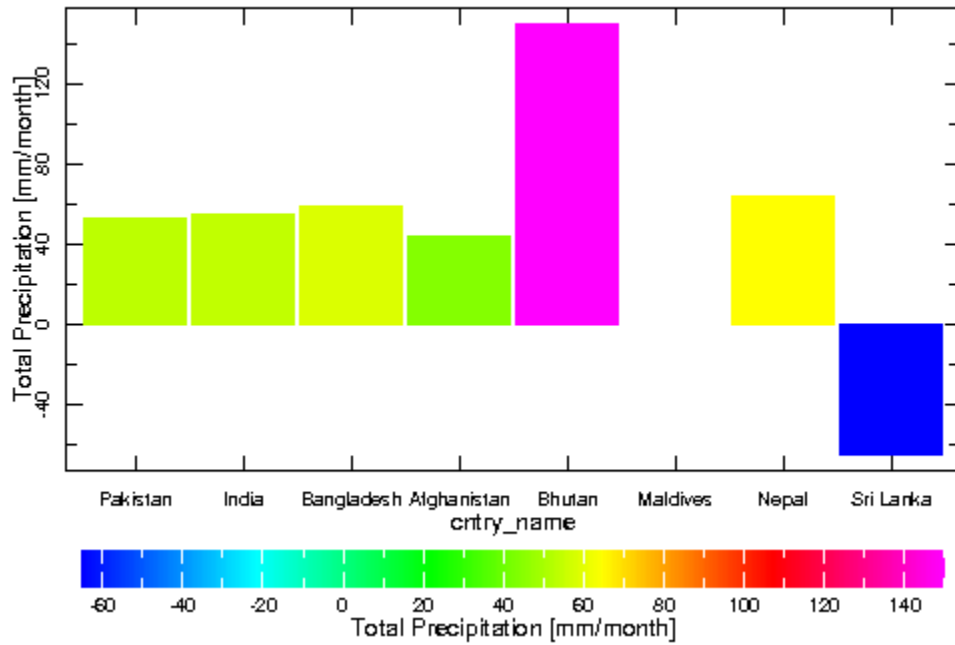
## Seasonal weather outlook (Mar-May, 2014)

### 3. Country wise monthly and seasonal departure of precipitation from normal

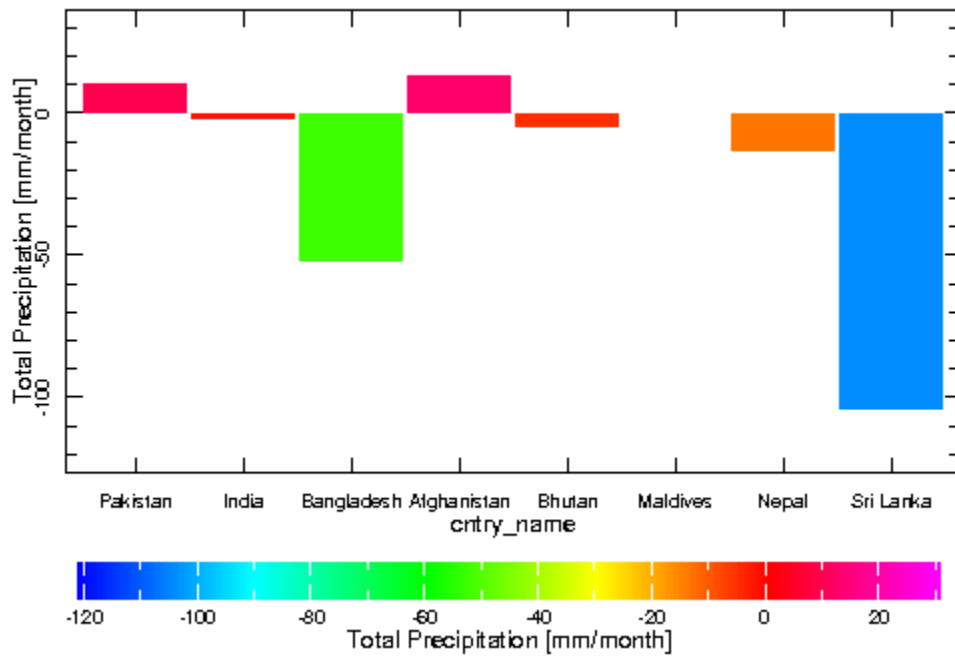


## Seasonal weather outlook (Mar-May, 2014)

### Rainfall departure from normal during May, 2014



### Departure of rainfall from normal for Mar-May, 2014

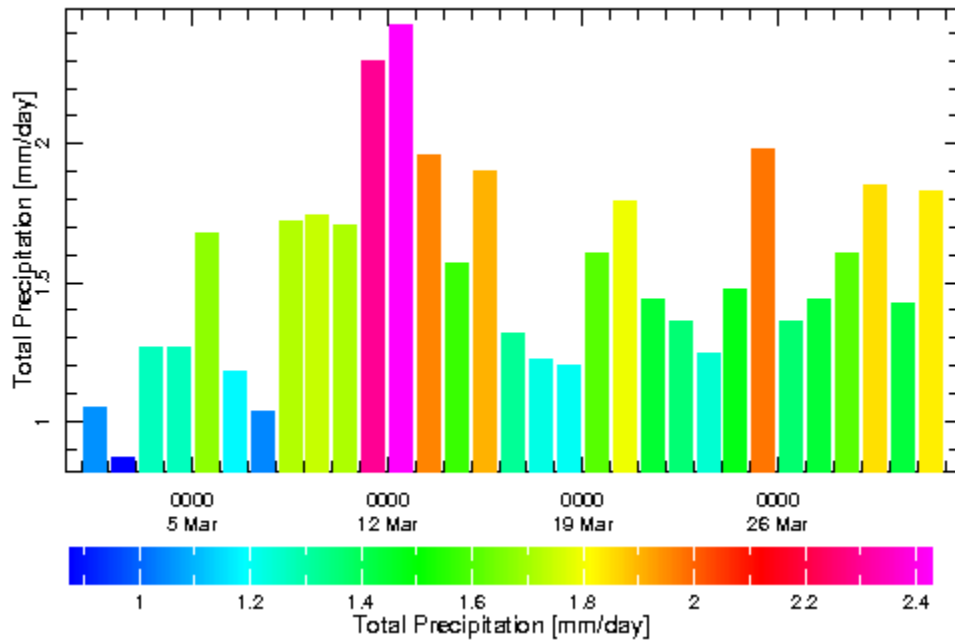


## Seasonal weather outlook (Mar-May, 2014)

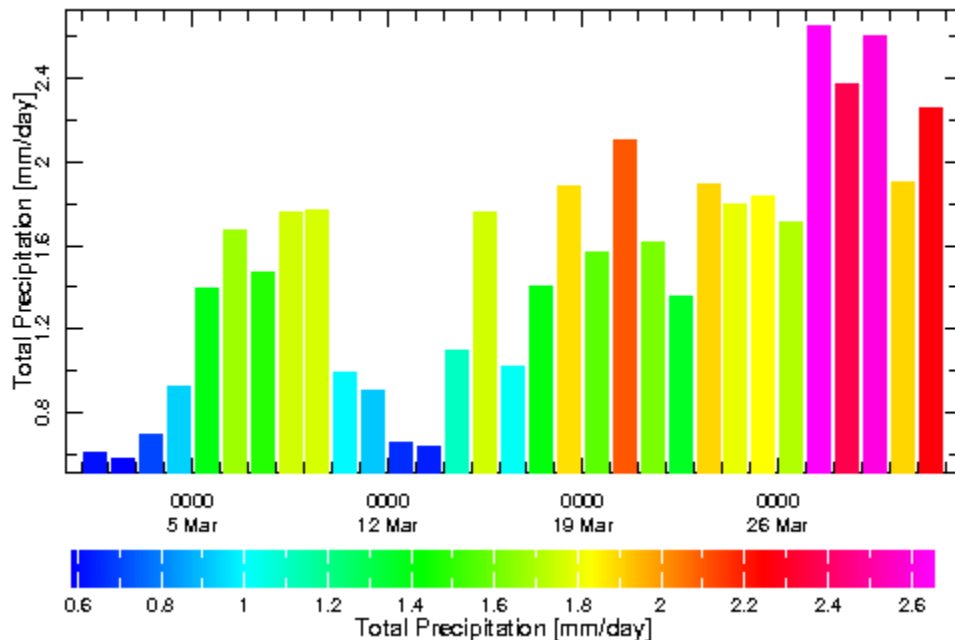
### 4. Daily country wise precipitation prediction for current month (January, 2014)

**Note for daily weather prediction:** It is ECHAM climate model prediction. The numbers of spell can be predicted from above graph. However, the exact data of start or end of spell can be varied and this can be in advance or delayed from the actual observation over the region.

Daily Precipitation of Afghanistan during Mar-2014



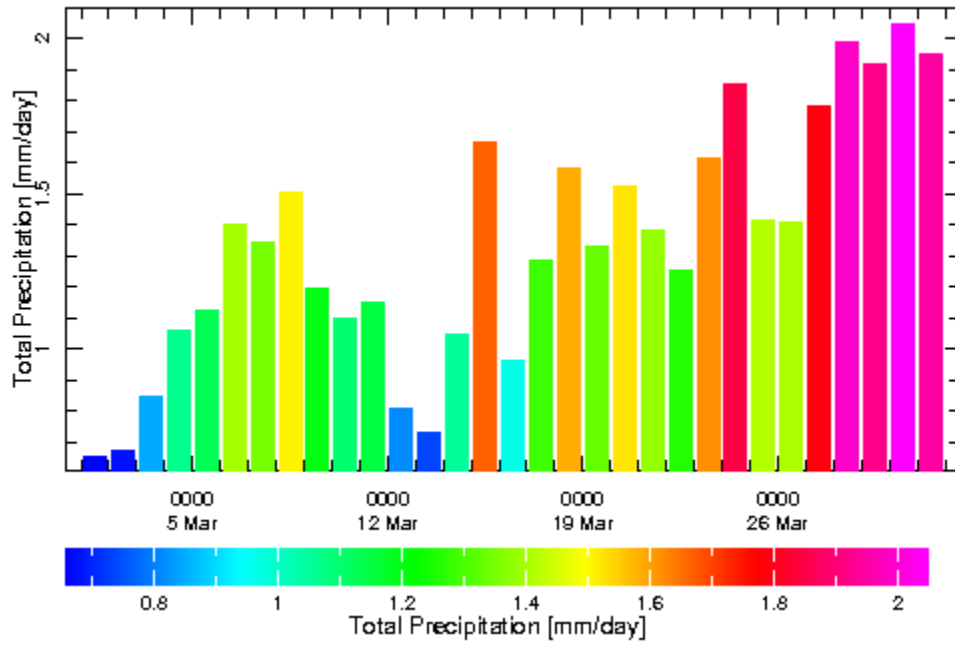
Daily Precipitation of Bangladesh during Mar-2014



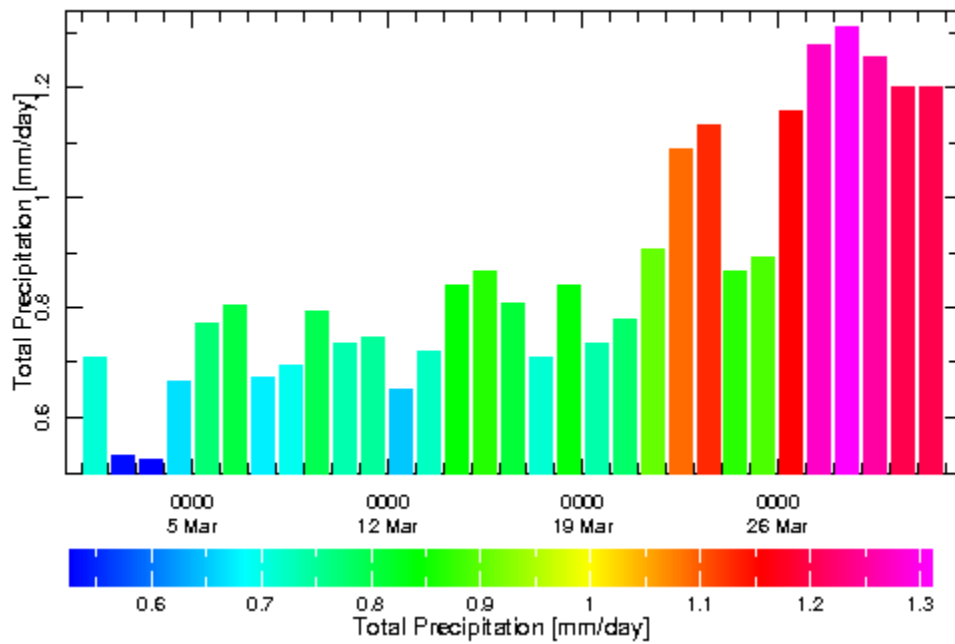


# Seasonal weather outlook (Mar-May, 2014)

## Daily Precipitation of Bhutan during Mar-2014

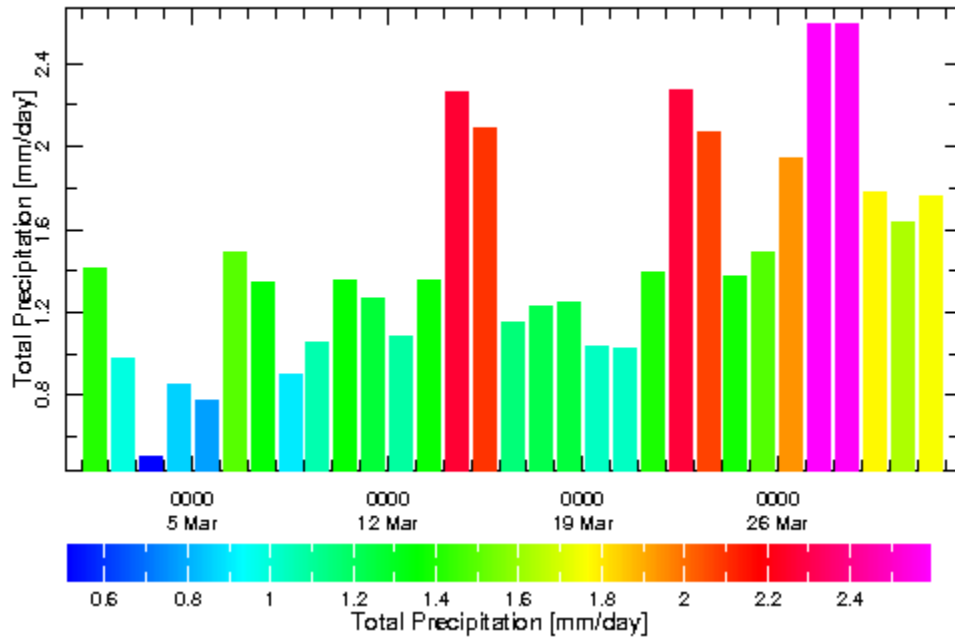


## Daily Precipitation of India during Mar-2014

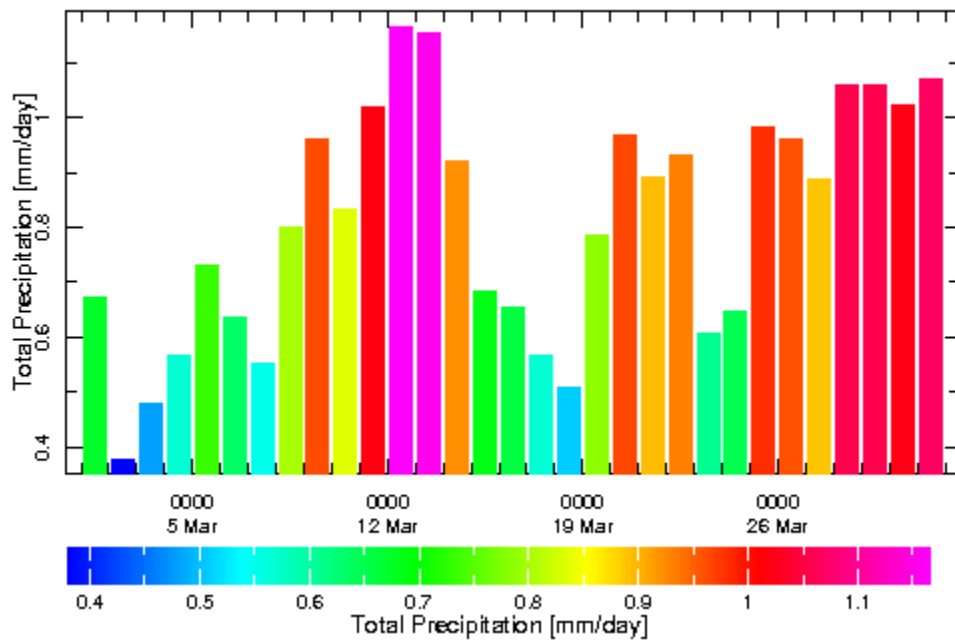


# Seasonal weather outlook (Mar-May, 2014)

## Daily Precipitation of Nepal during Mar-2014

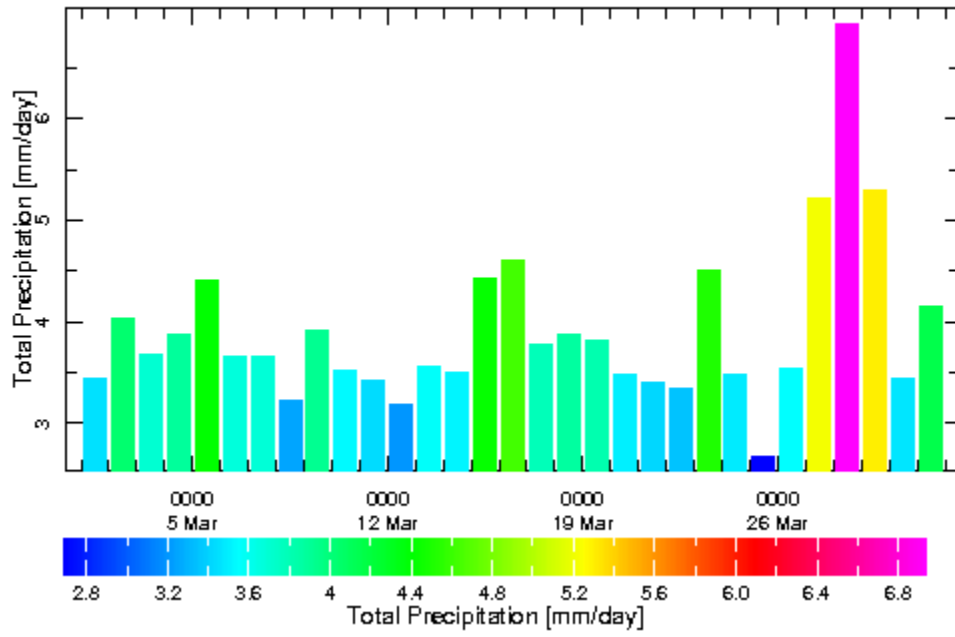


## Daily Precipitation of Pakistan during Mar-2014

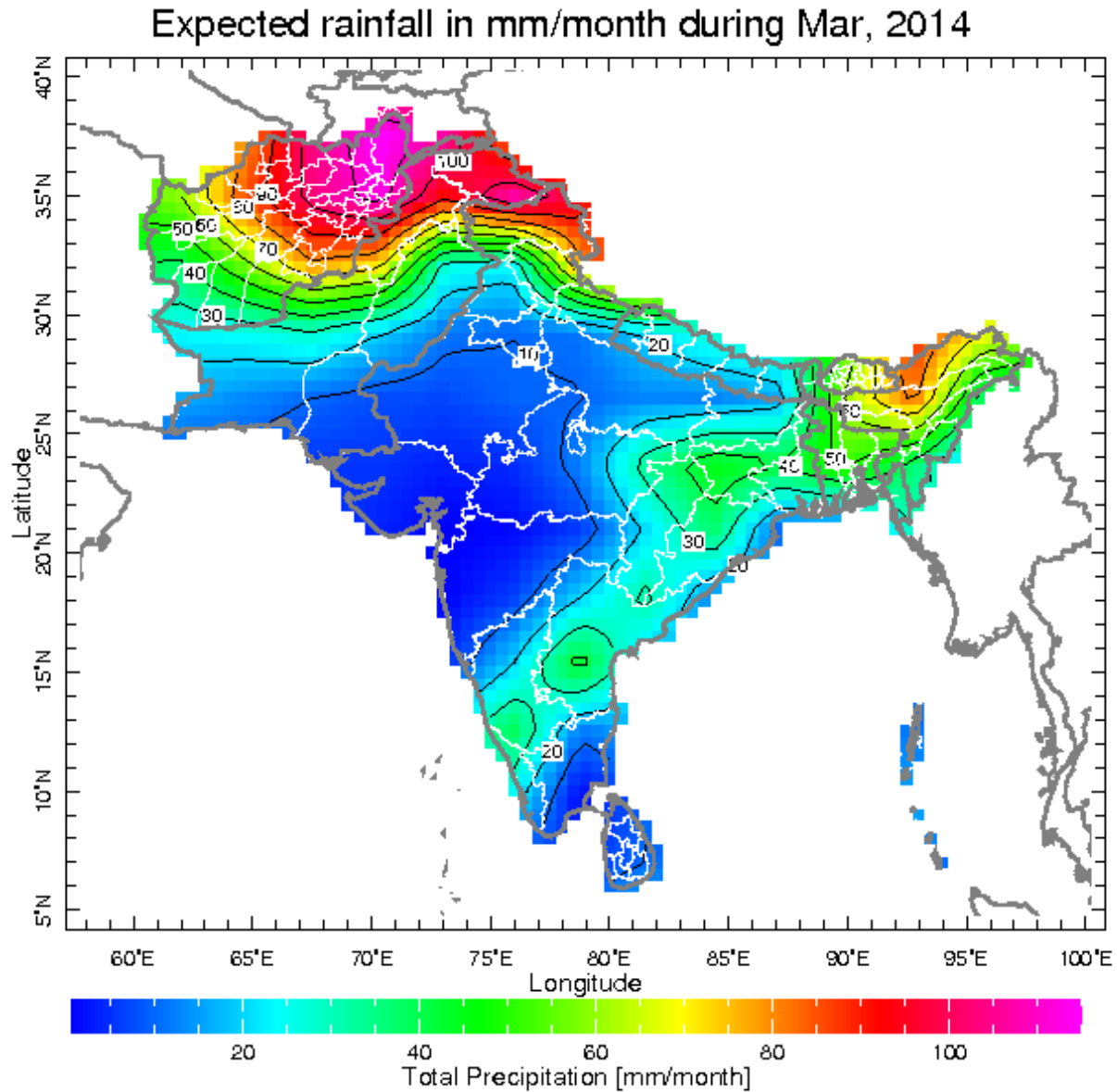


# Seasonal weather outlook (Mar-May, 2014)

## Daily Precipitation of Sri Lanka during Mar-2014

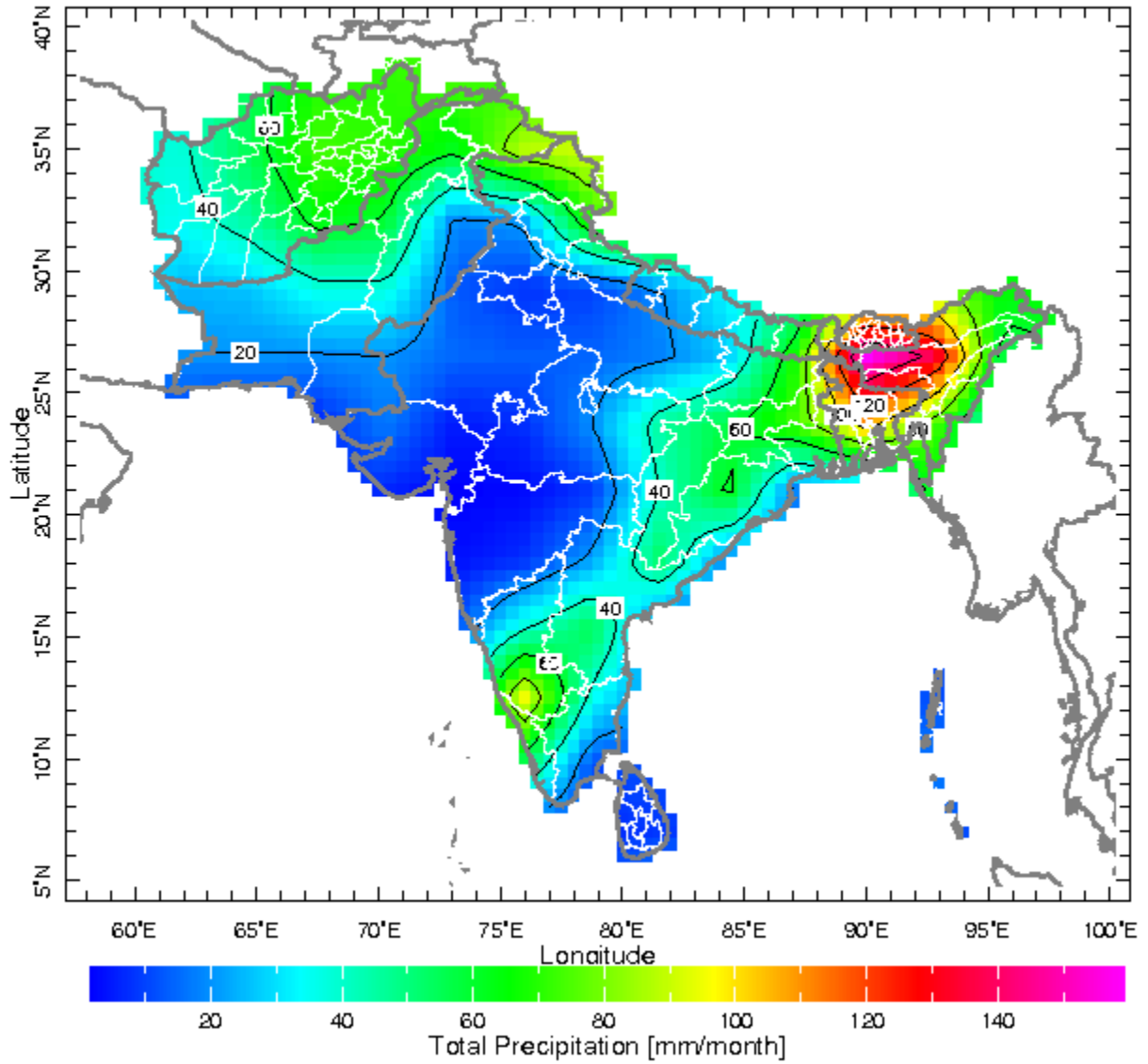


5. Spatial distribution of expected precipitation during coming season (GCM-ECHAM)



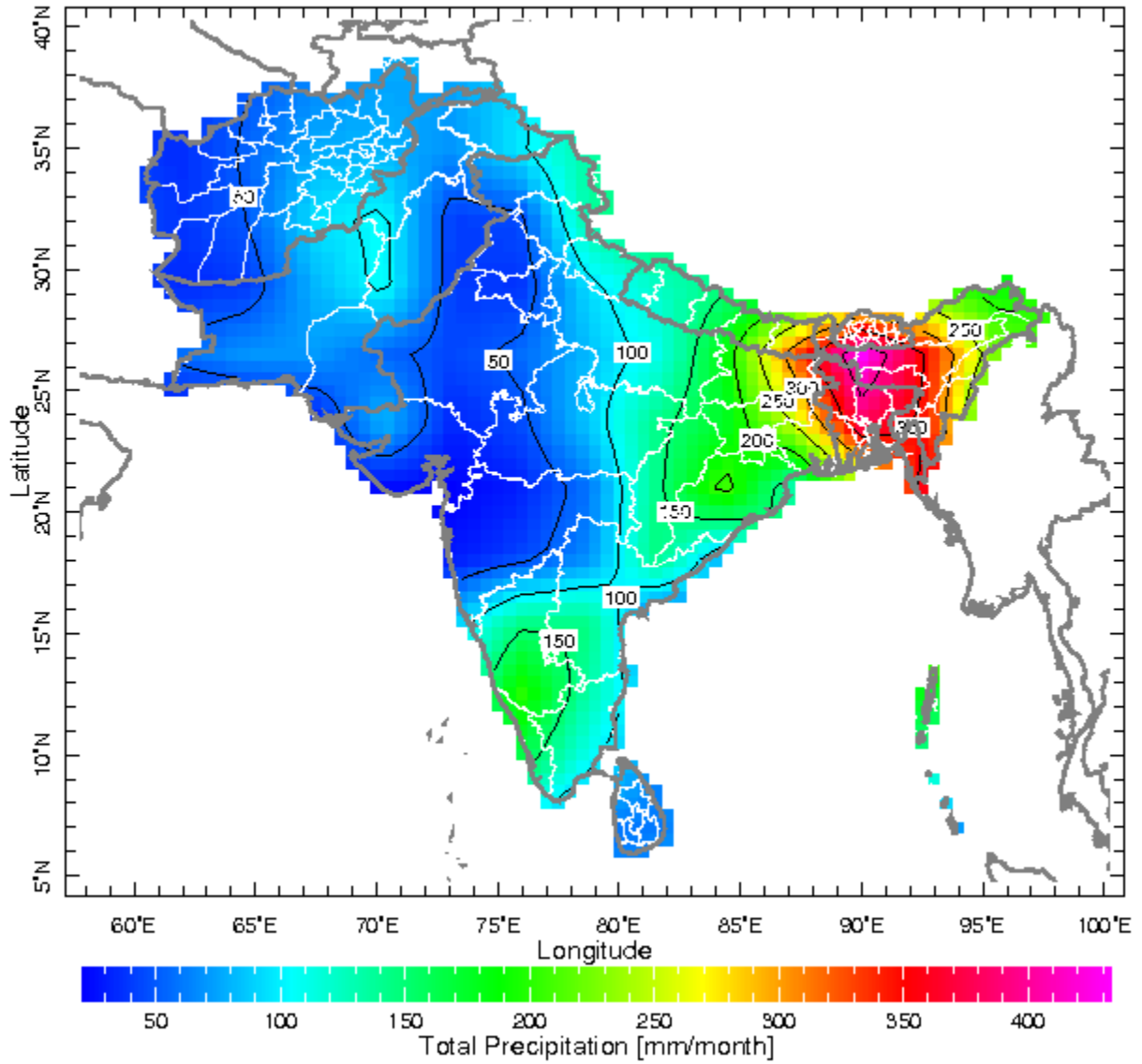
# Seasonal weather outlook (Mar-May, 2014)

## Expected rainfall in mm/month during Apr, 2014



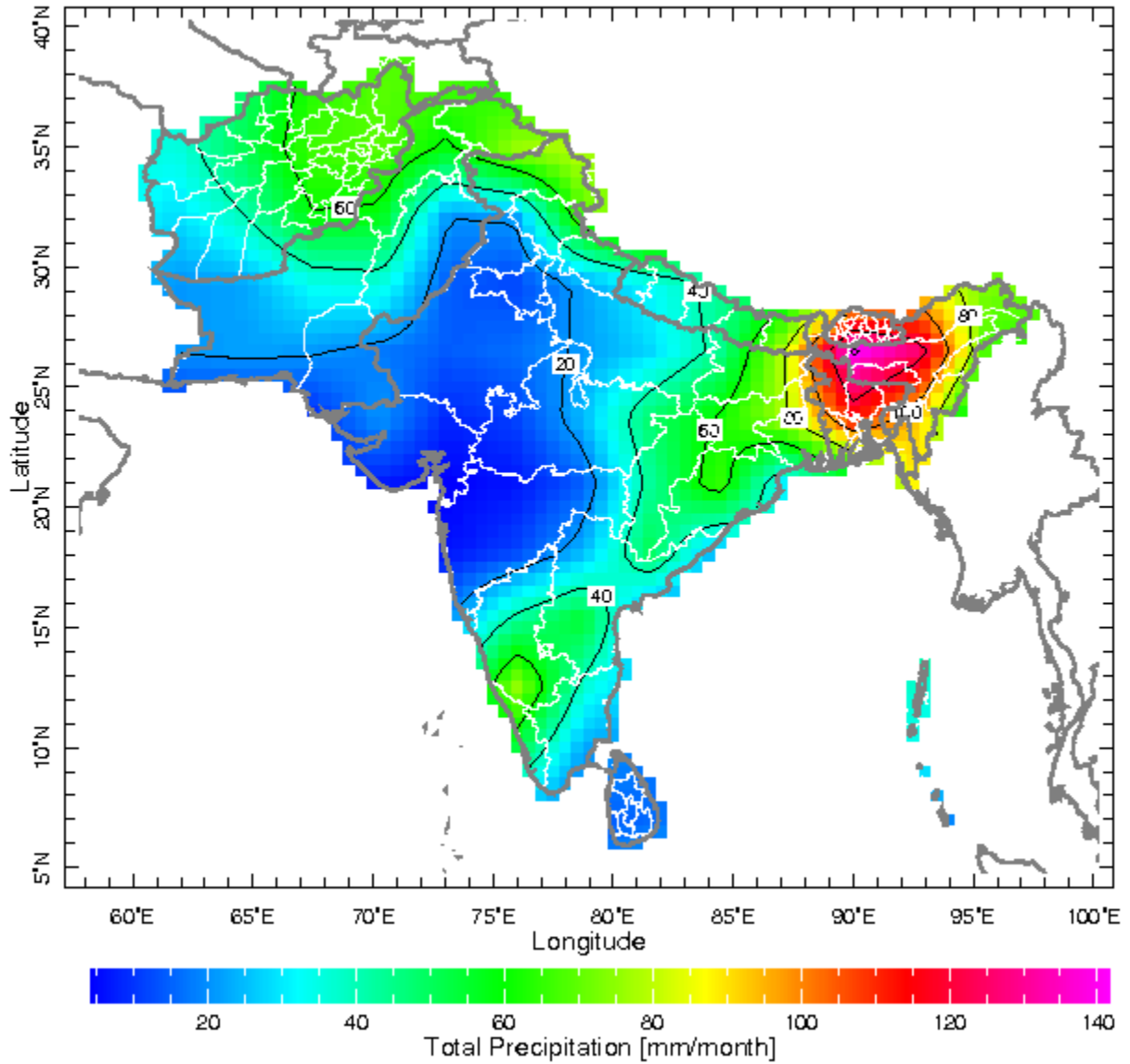
# Seasonal weather outlook (Mar-May, 2014)

## Expected rainfall in mm/month during May, 2014



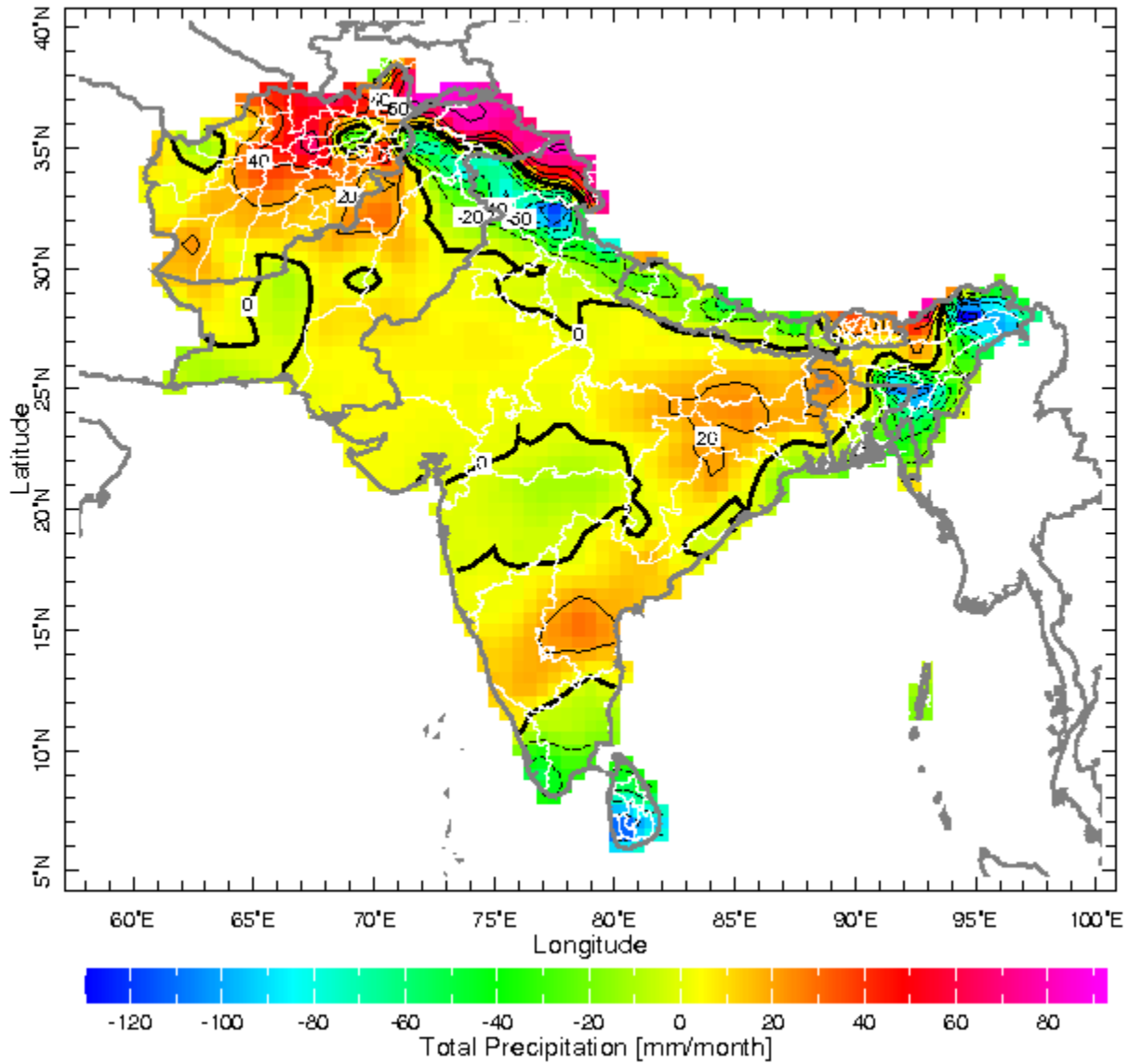
# Seasonal weather outlook (Mar-May, 2014)

## Expected rainfall in mm/month during Mar-May, 2014



6. Monthly departure from normal (precipitation) during coming season

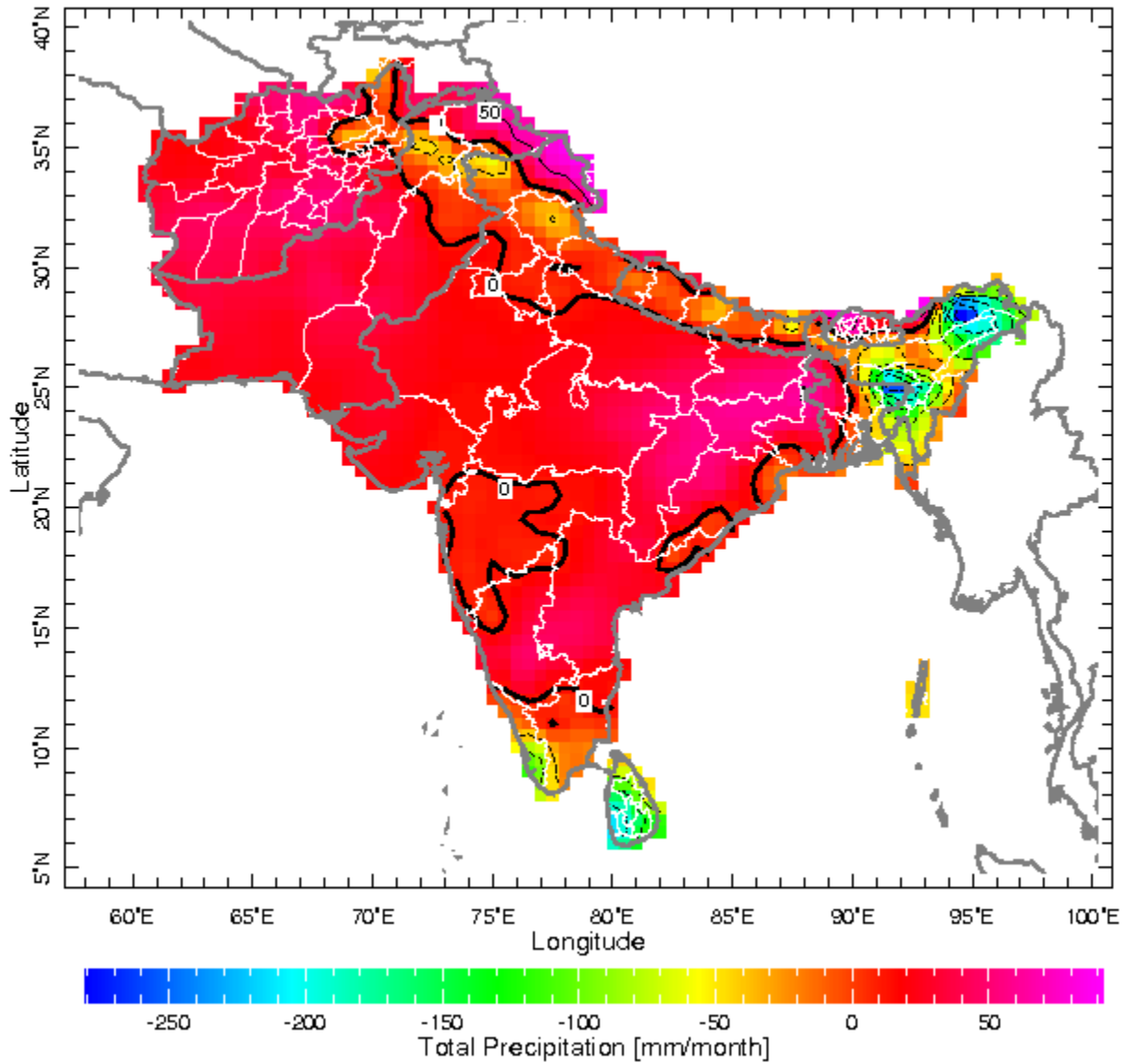
Departure of rainfall from normal during Mar, 2014



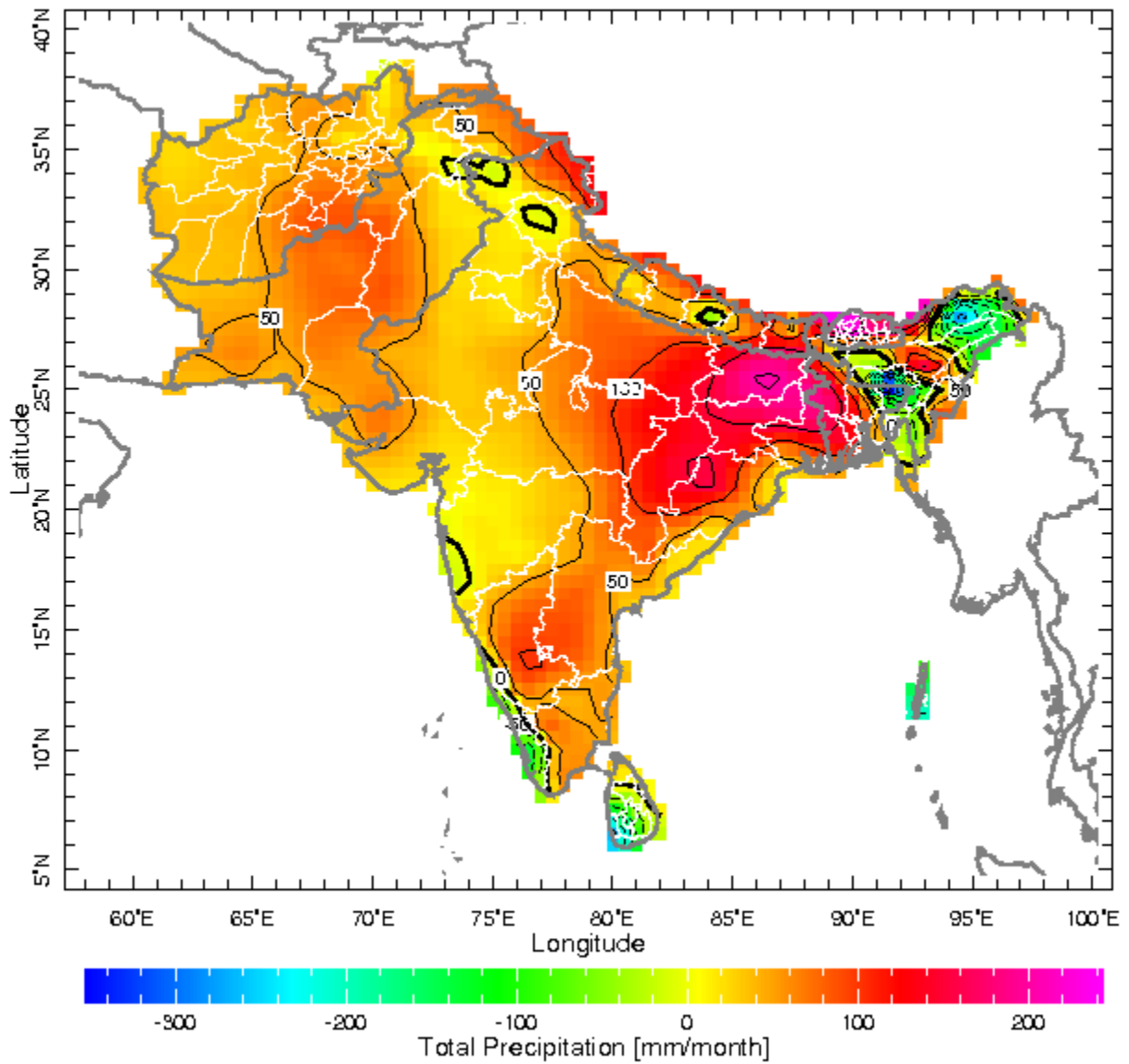


# Seasonal weather outlook (Mar-May, 2014)

## Departure of rainfall from normal during Apr, 2014

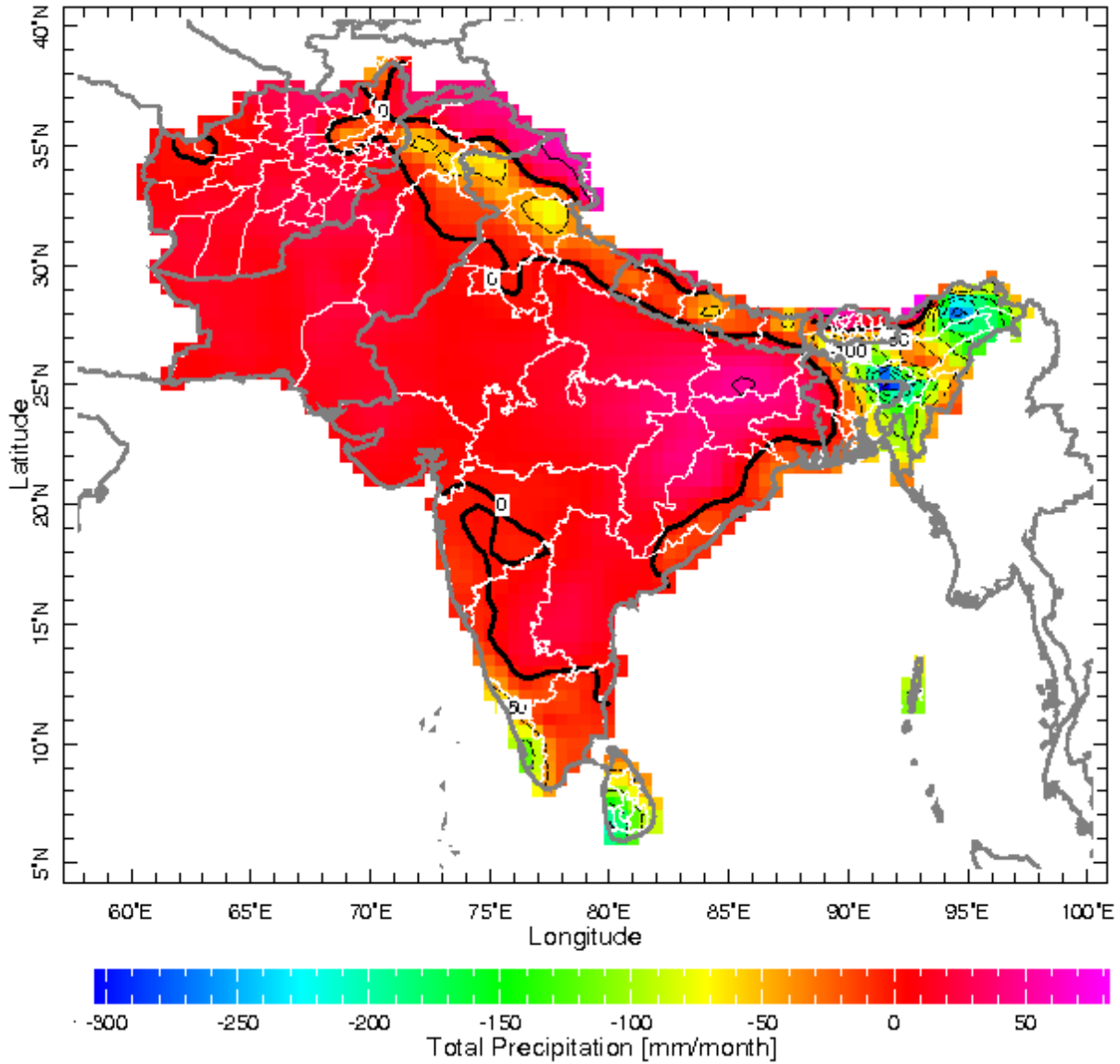


Departure of rainfall from normal during May, 2014



# Seasonal weather outlook (Mar-May, 2014)

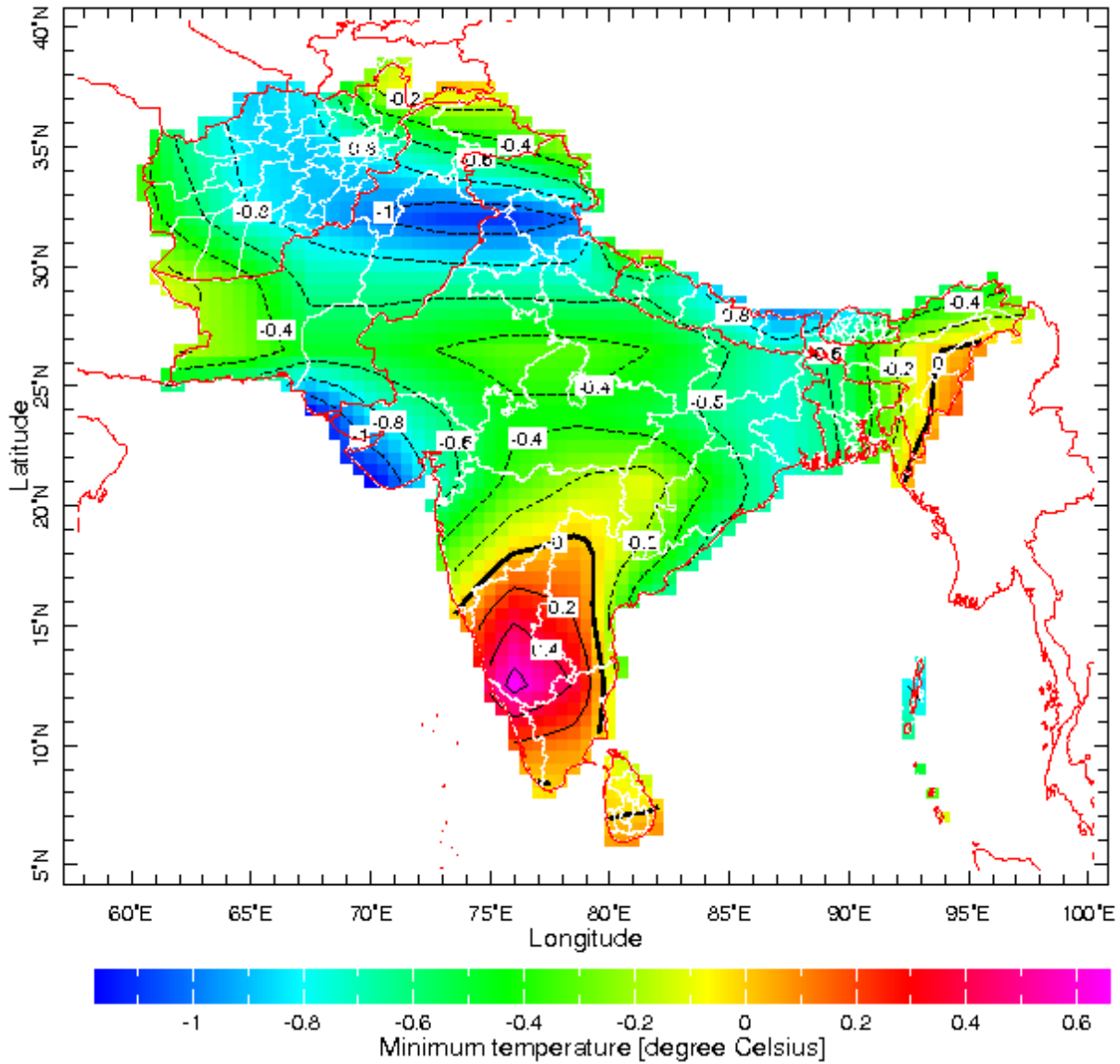
## Departure of rainfall from normal for Mar-May, 2014



# Seasonal weather outlook (Mar-May, 2014)

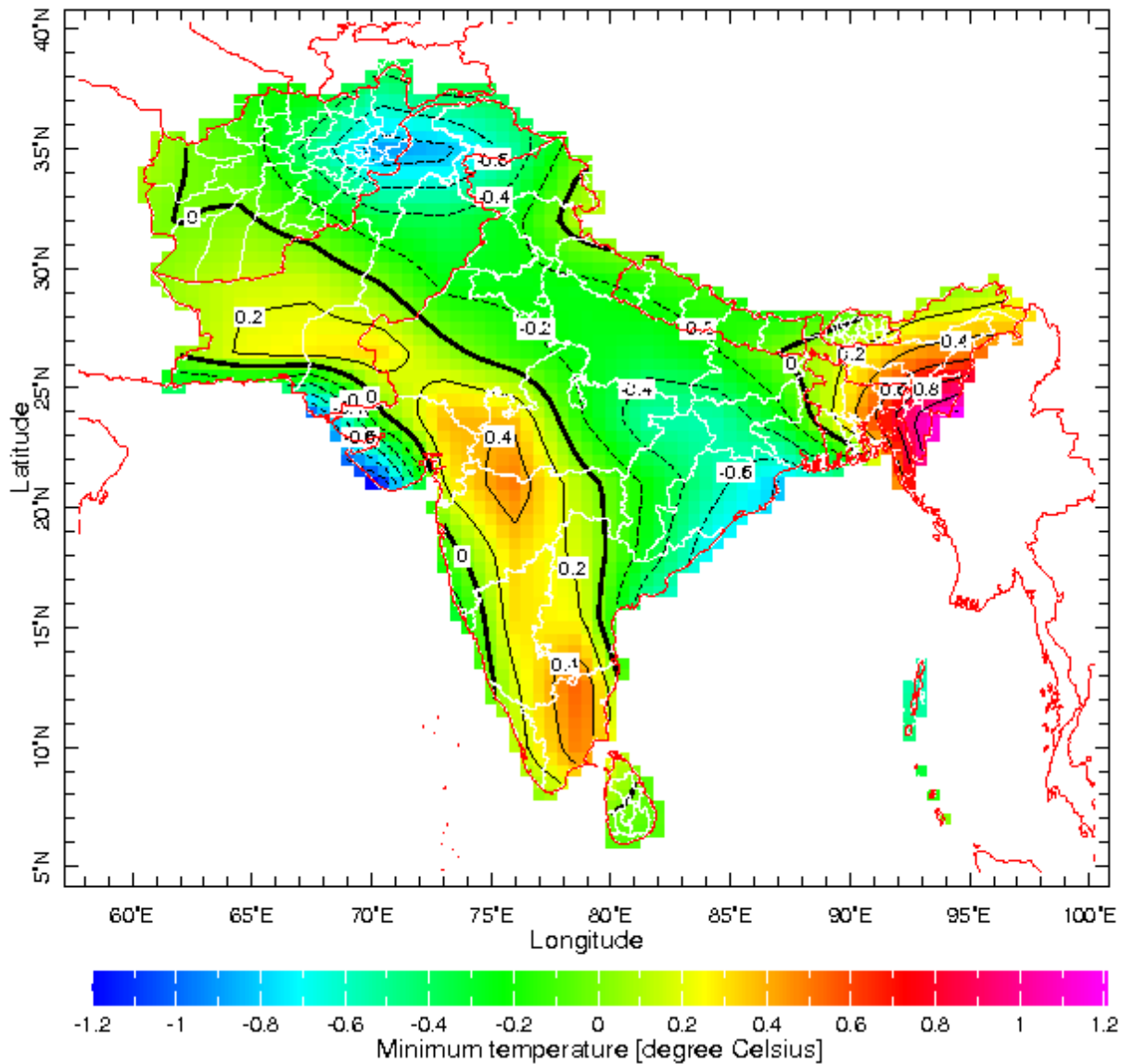
*Departure of Minimum temperature from Normal during*

Departure of Min. Temperature from normal during Mar, 2014



## Seasonal weather outlook (Mar-May, 2014)

### Departure of Min. Temperature from normal during Apr, 2014



*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 for SAARC region will be issued 10<sup>th</sup> of every month with three months in advance weather outlook. Lastest seasonal weather summary can be download from NAMC web site mentioned below: <http://namc.pmd.gov.pk/>*