

Seasonal weather outlook for SAARC region

(Feb-Apr, 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 Feb 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 lower intensity with bigger convergence areas of high winds towards the west. Intensity of jet stream will be slightly below normal during predicted period
- A ridge at 500 hPa is expected to be at same position with higher intensity. As a result, track of the western disturbances may be changed and tilted towards northward.
- Surface temperatures are expected to be on lower side than normal over central parts of the country as compared with normal (1981-2010). However, southern and northern parts with higher than normal temperature will be expected during January.
- North Atlantic Oscillation (NAO) is in positive phase (0.29) approaching towards neutral 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°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. 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°C and 0.5°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)

Probability outlook: La Nina (3%), Neutral (91%) and El Nino (6 %) during Feb-Mar-Apr, 2014 season

- Arabian Sea Surface Temperatures are expected to be slightly above normal near western coastal belt of Pakistan.
- Caspian Sea surface temperatures expected to be slightly above normal.
- Mediterranean Sea surface temperatures are normal to slightly above normal.
- Bay of Bengal Sea Surface Temperatures are slightly below normal.

Seasonal weather outlook (Feb-Apr, 2014)

1. *Summary (Feb-Apr, 2014)*

“Average precipitation is expected during the season (FMA)”

Synthesis of the latest model forecasts for Feb-Apr 2014 (FMA), current synoptic situation and regional weather expert’s judgment indicates that average precipitation is expected during the predicted season. Below normal minimum temperature will persist almost all over the SAARC member countries except south eastern parts of India during February. Below normal night temperature are expected over southeastern parts of India and western parts of Pakistan extended up to eastern parts of Indian Punjab during March. Rest of the region will be expected below normal to normal night temperature during rest of predicted months. Neutral-ENSO conditions are expected to persist throughout the season.

Seasonal weather outlook:

As a whole, average precipitation is likely to all over the region during the season with below during March and slightly above average during April. Extremely below average precipitation is expected over Sri Lanka and above average over Bhutan during all the predicted months however, above average precipitation is likely to occur over Bangladesh during April.

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.

February, 2014: Average precipitation is expected during February all over whole SAARC region with significantly below average over Sri Lanka and above average over Afghanistan and Bhutan. High intensity precipitation is expected over northern and eastern parts of Afghanistan, upper parts of Pakistan. However, below normal precipitation is expected over Nepal, Kashmir and, Sri Lanka and most of the Indian region.

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

March, 2014: As a whole below normal precipitation is expected all over the region with above normal over Bhutan, average over Pakistan, Bangladesh, Afghanistan, 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. Below normal precipitation will be expected all over SAARC member countries except Bhutan, extreme northern parts of Pakistan and northeastern parts of Afghanistan.

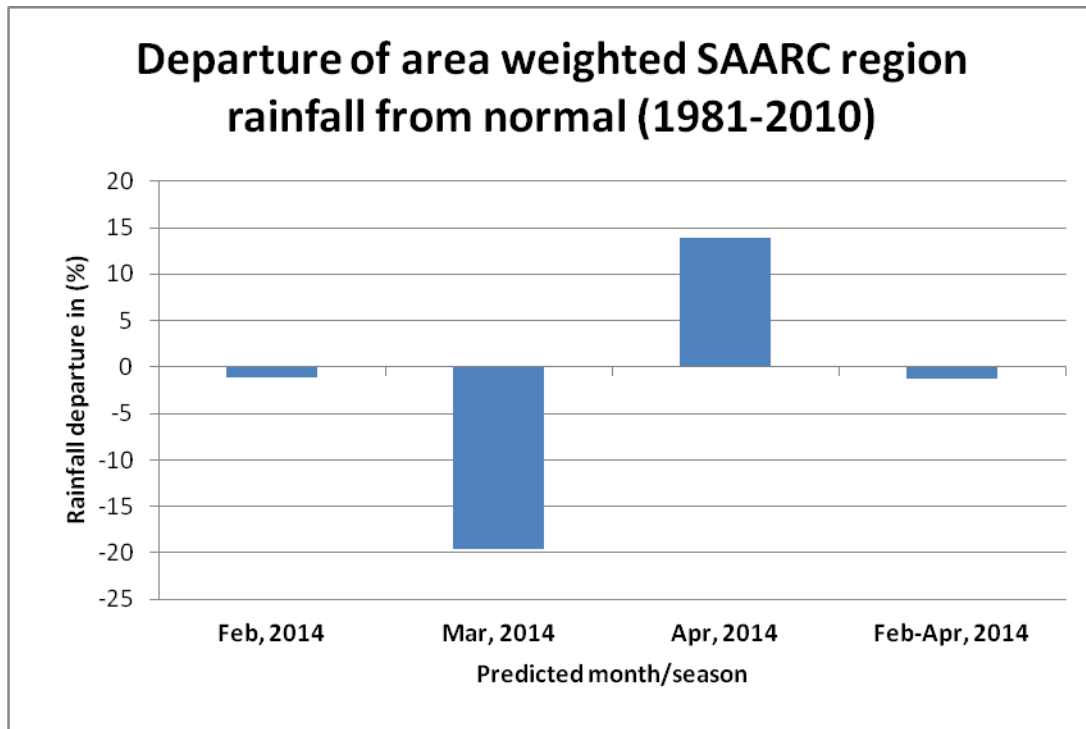
Below normal night temperature will be expected over central SAARC region with above average over southeast India and southwestern parts of Pakistan.

Seasonal weather outlook (Feb-Apr, 2014)

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

Night temperature during March over all the SAARC member countries will be normal.

February-April: Normal precipitation is expected over SAARC member countries. Bangladesh will receive less than normal while other SAARC member countries will receive normal precipitating during the predicted period. Normal weather phenomenon will be expected.

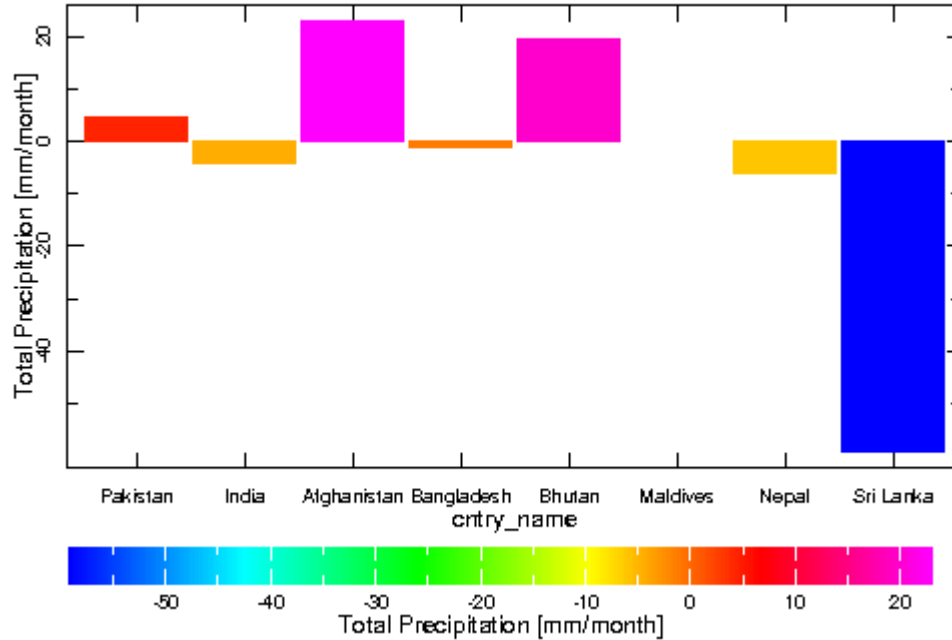


Note: Departure of Area-weighted rainfall of SAARC region has been computed by subtracting ECHAM predicted monthly/seasonally rainfall from GPCP of corresponding month/season.

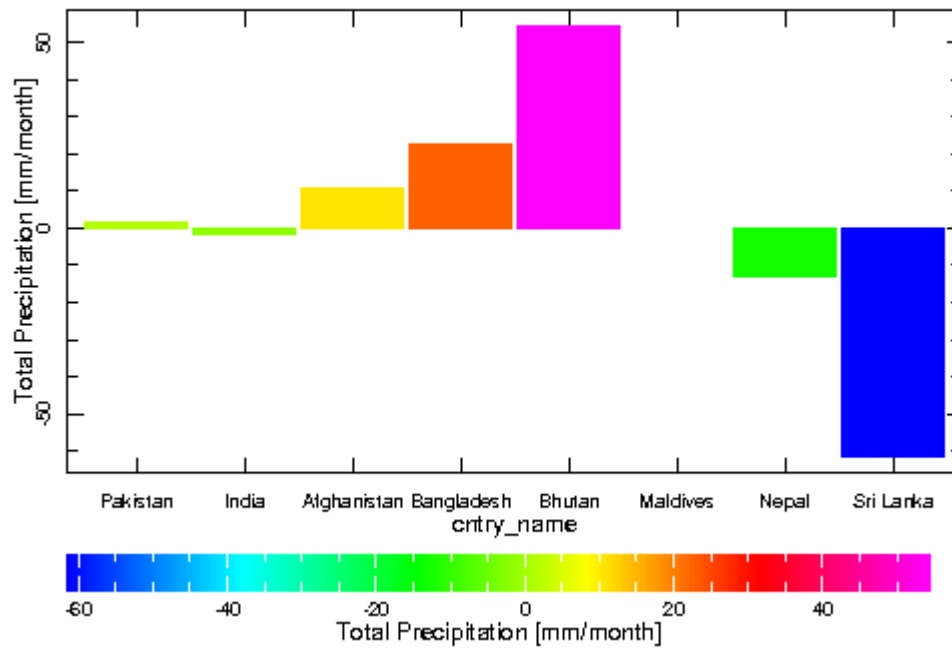
Seasonal weather outlook (Feb-Apr, 2014)

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

Expected Precipitation departure from normal during Feb-2014

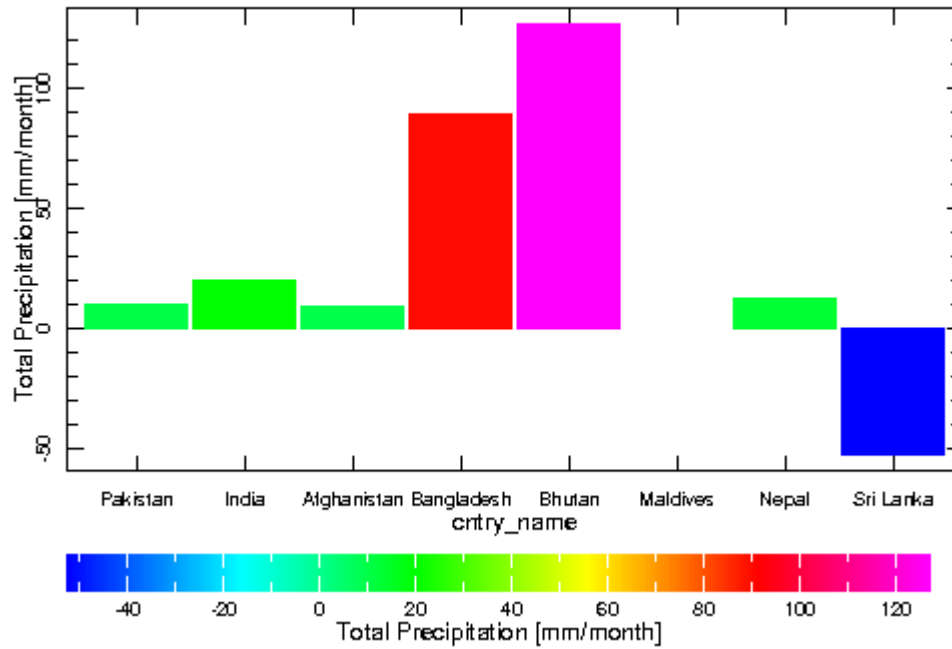


Expected Precipitation departure from normal during Mar-2014

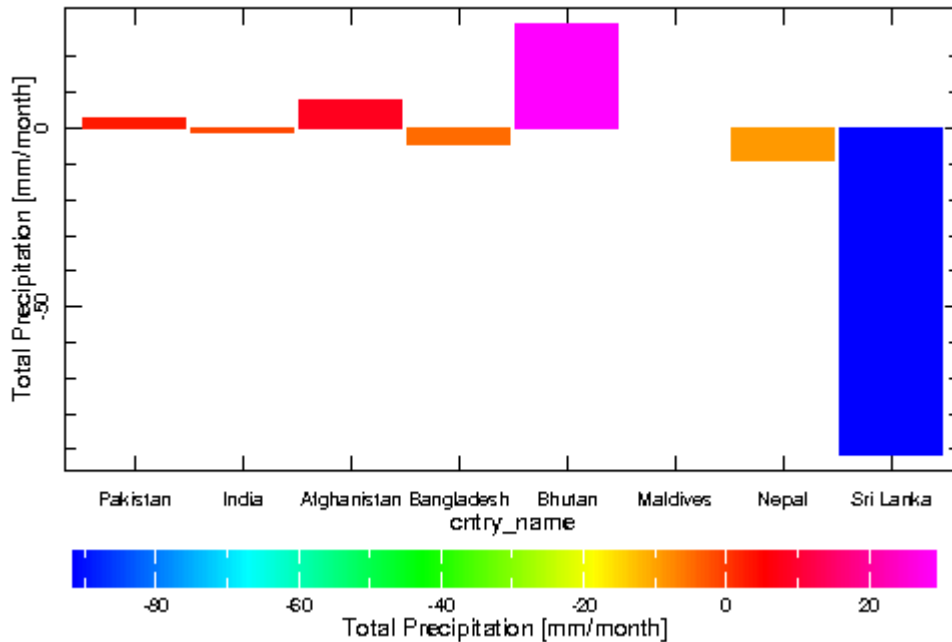


Seasonal weather outlook (Feb-Apr, 2014)

Expected Precipitation departure from normal during Apr-2014



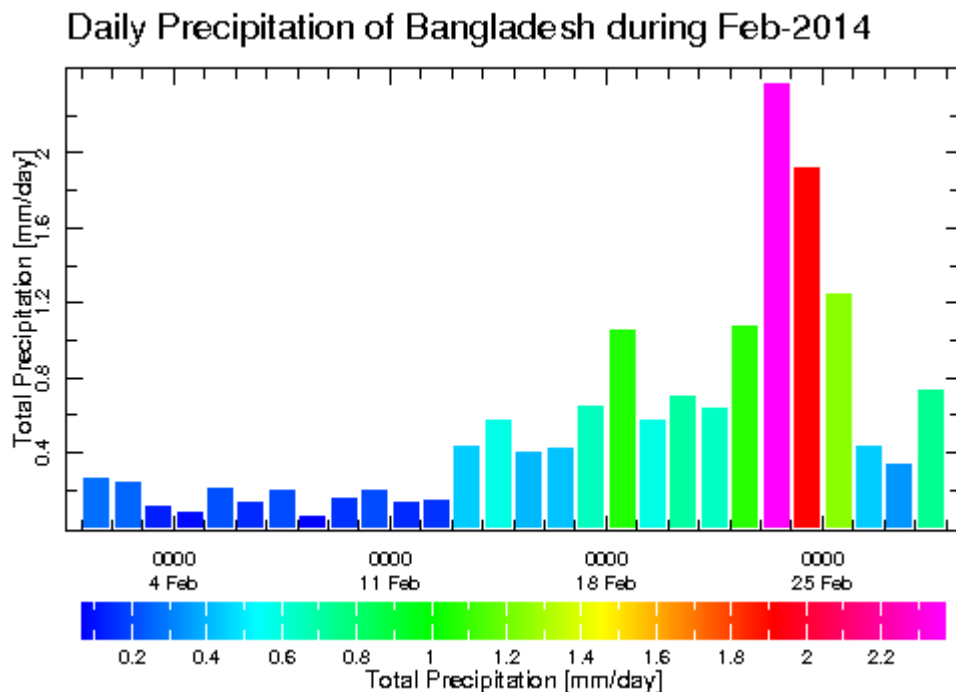
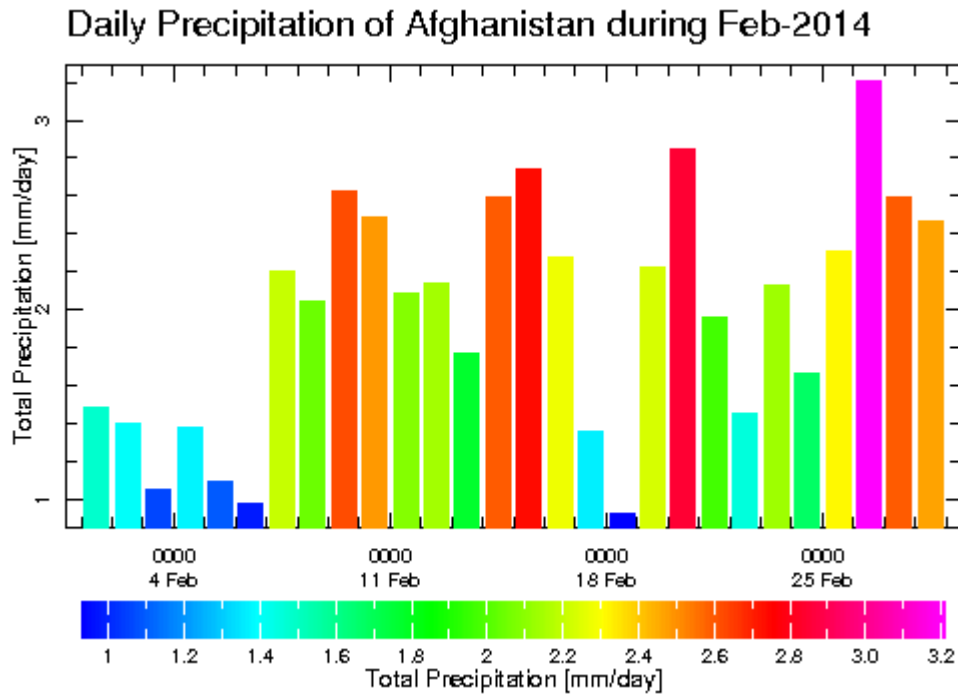
Expected dep. of Precip. from normal for Feb-Apr, 2014



Seasonal weather outlook (Feb-Apr, 2014)

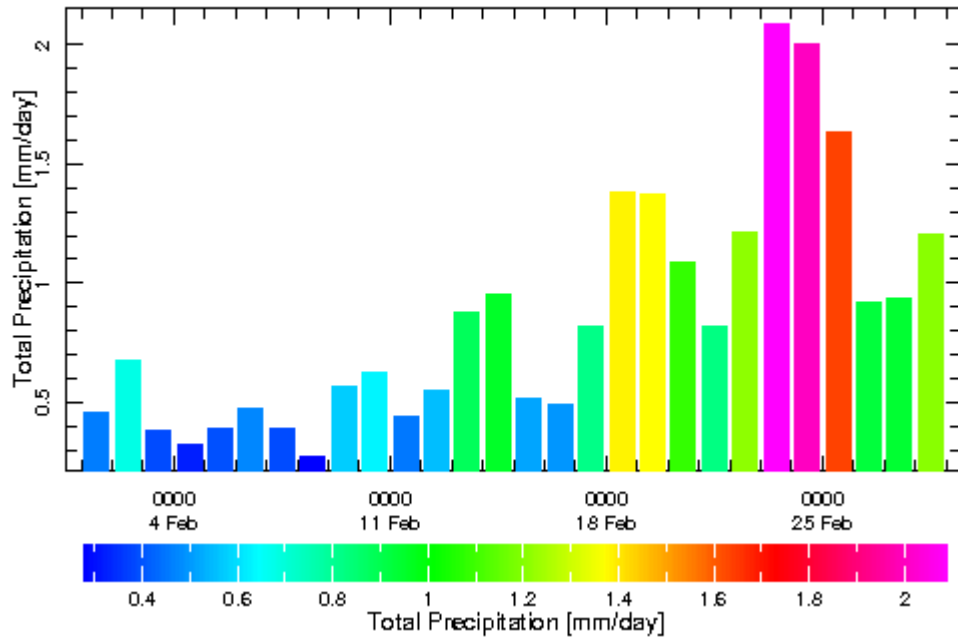
4. Daily country wise precipitation prediction for current month (January, 2014)

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.

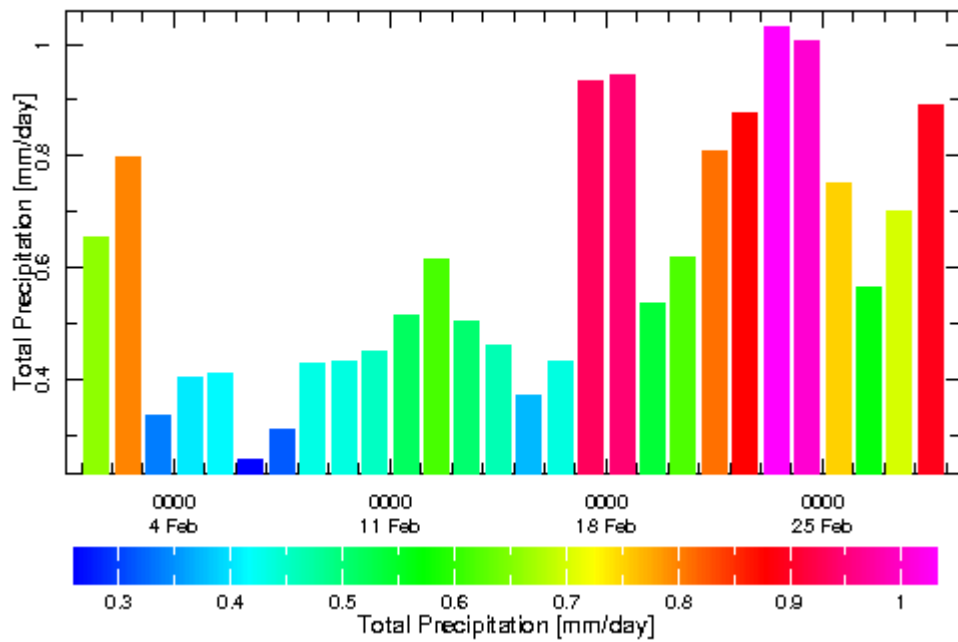


Seasonal weather outlook (Feb-Apr, 2014)

Daily Precipitation of Bhutan during Feb-2014

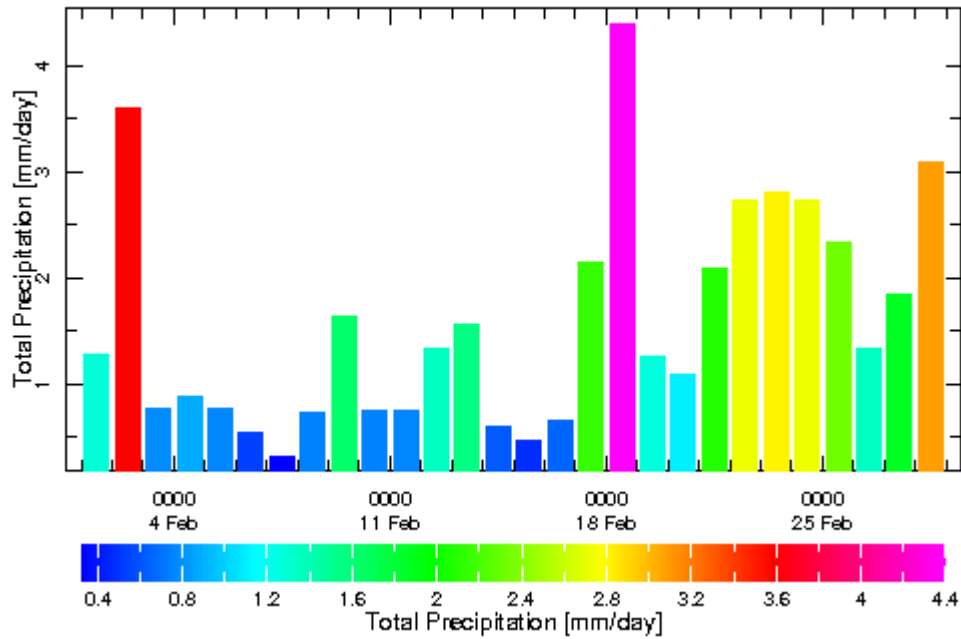


Daily Precipitation of India during Feb-2014

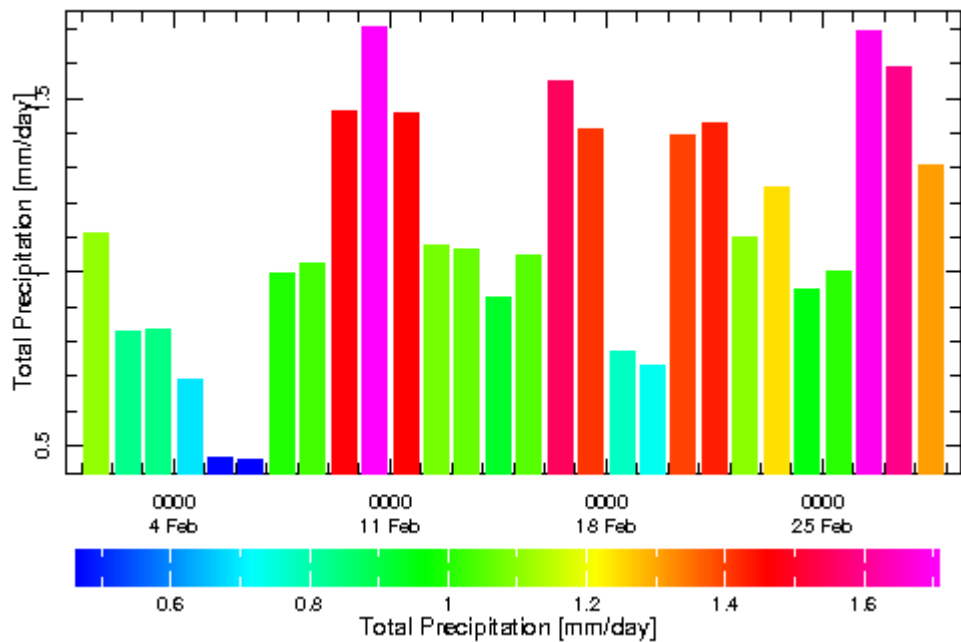


Seasonal weather outlook (Feb-Apr, 2014)

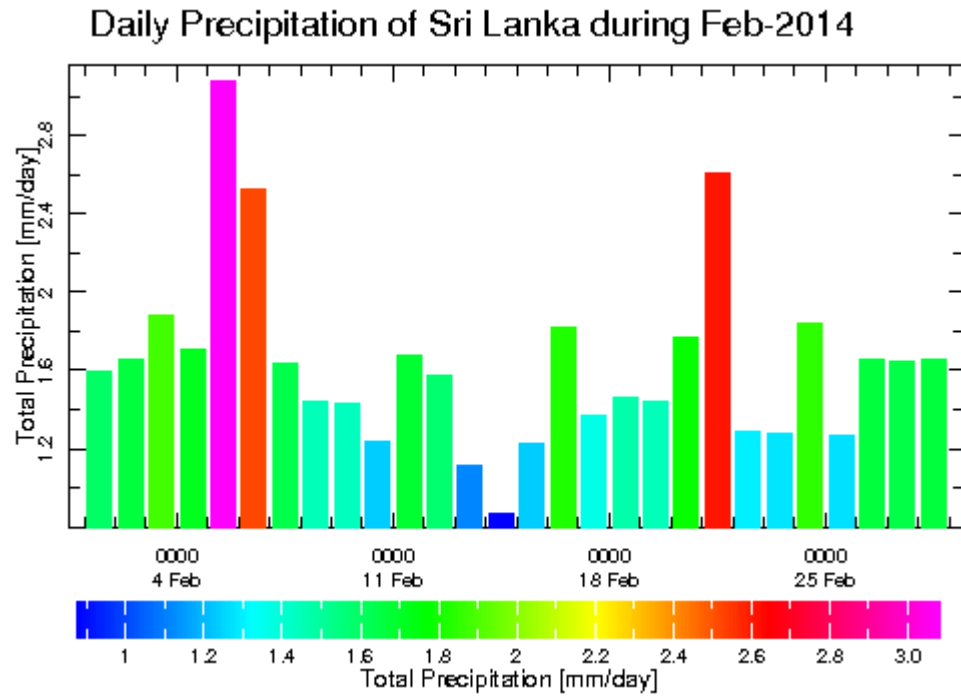
Daily Precipitation of Nepal during Feb-2014



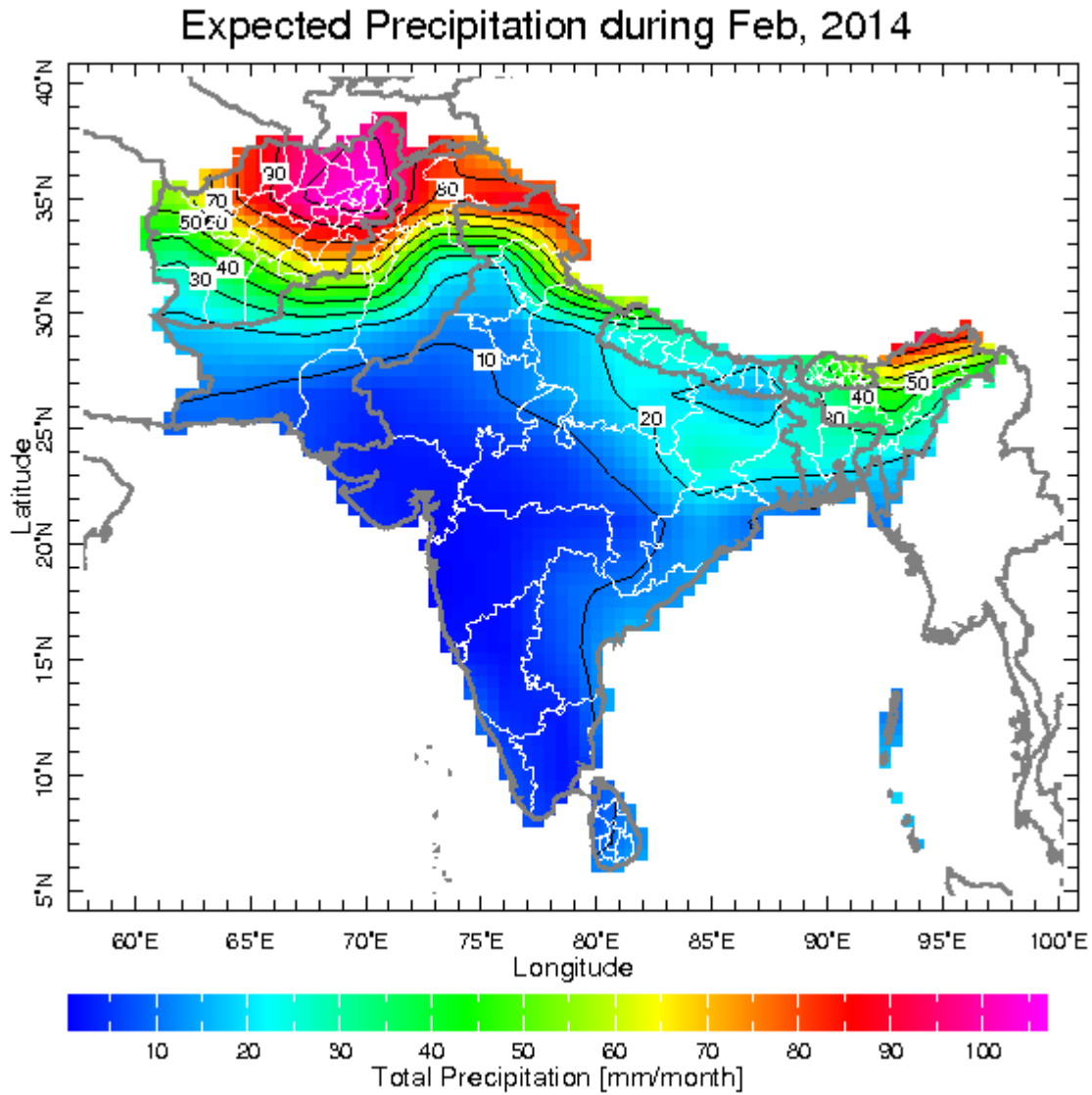
Daily Precipitation of Pakistan during Feb-2014



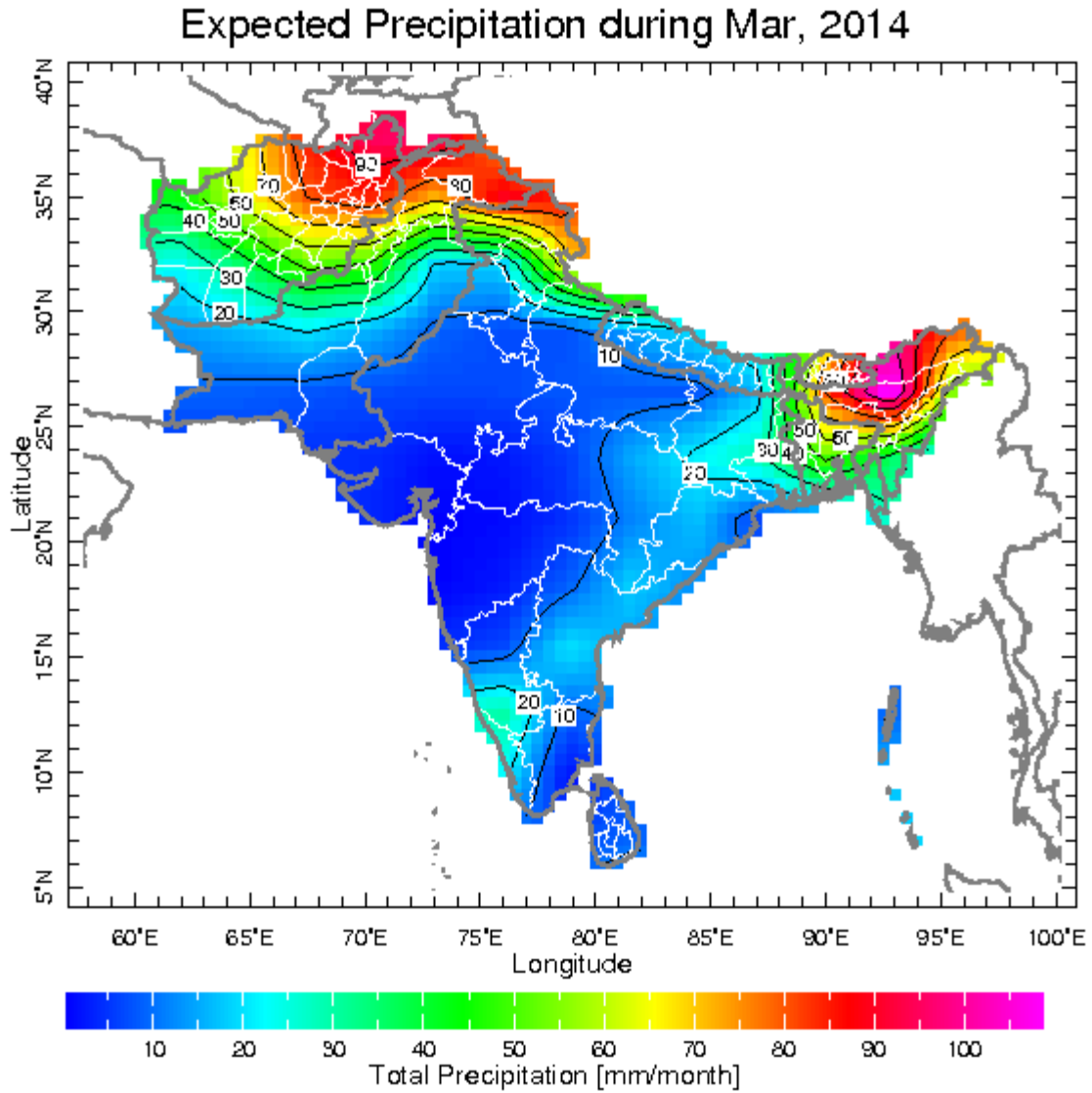
Seasonal weather outlook (Feb-Apr, 2014)



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

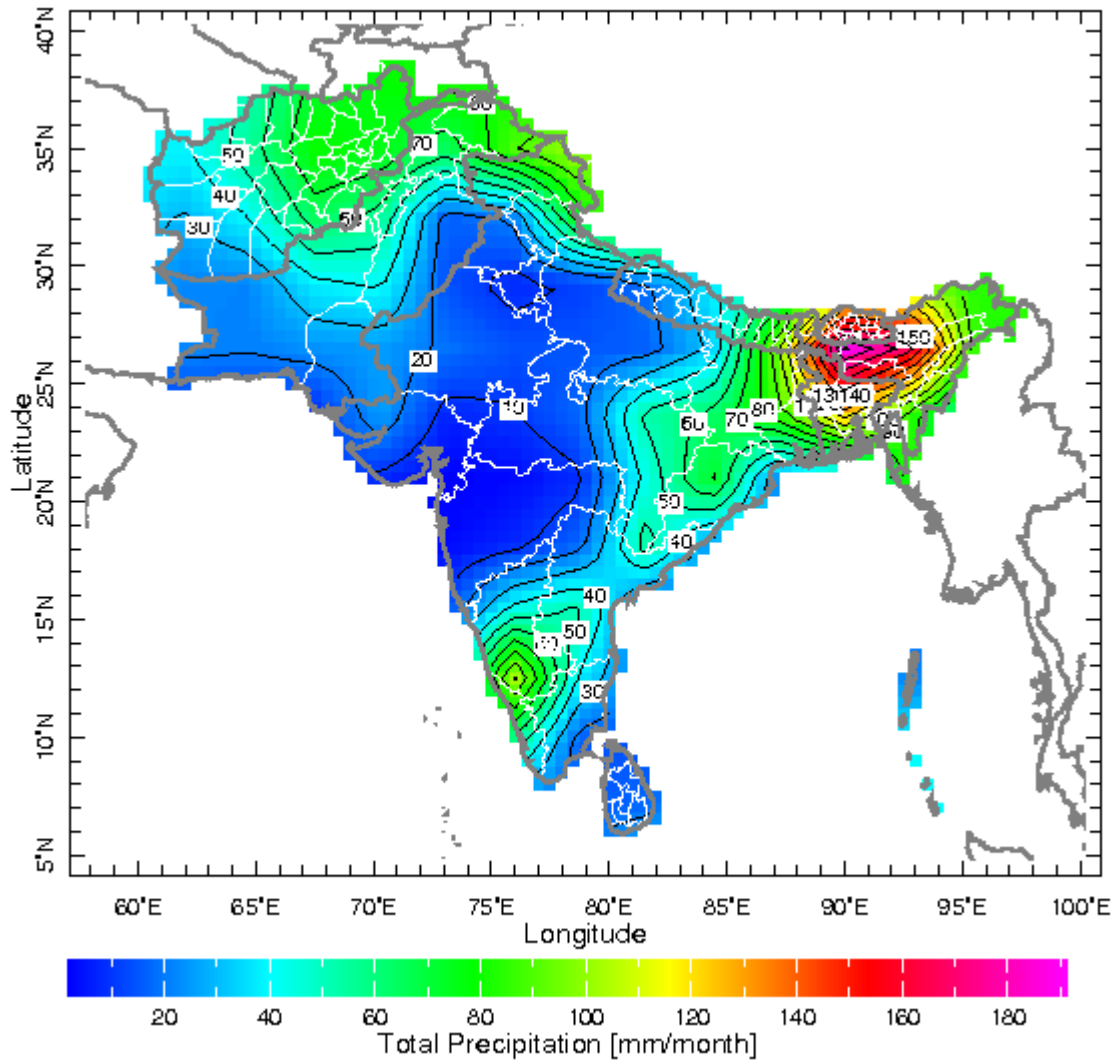


Seasonal weather outlook (Feb-Apr, 2014)



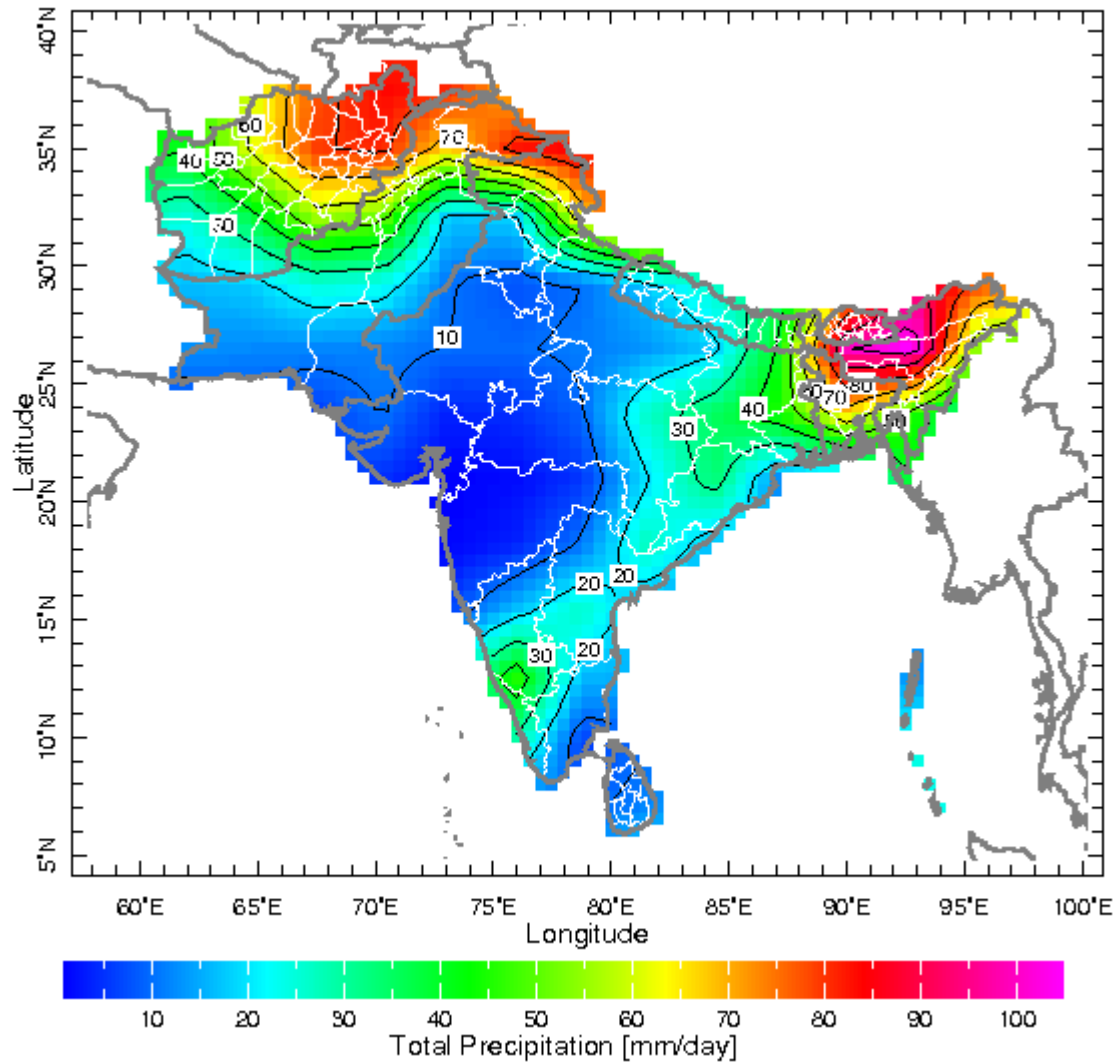
Seasonal weather outlook (Feb-Apr, 2014)

Expected Precipitation during Apr, 2014



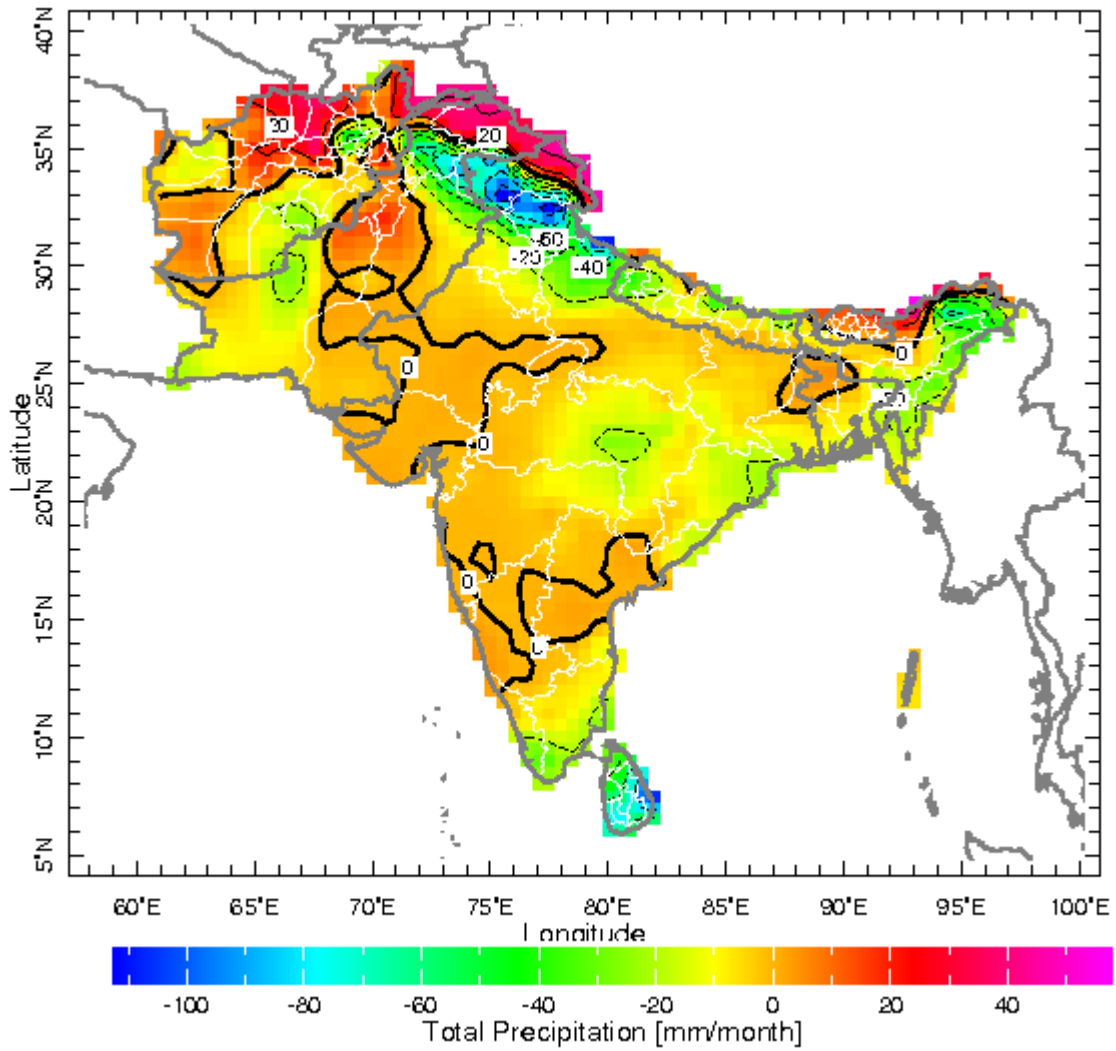
Seasonal weather outlook (Feb-Apr, 2014)

Expected Precipitation during Feb-Apr, 2014

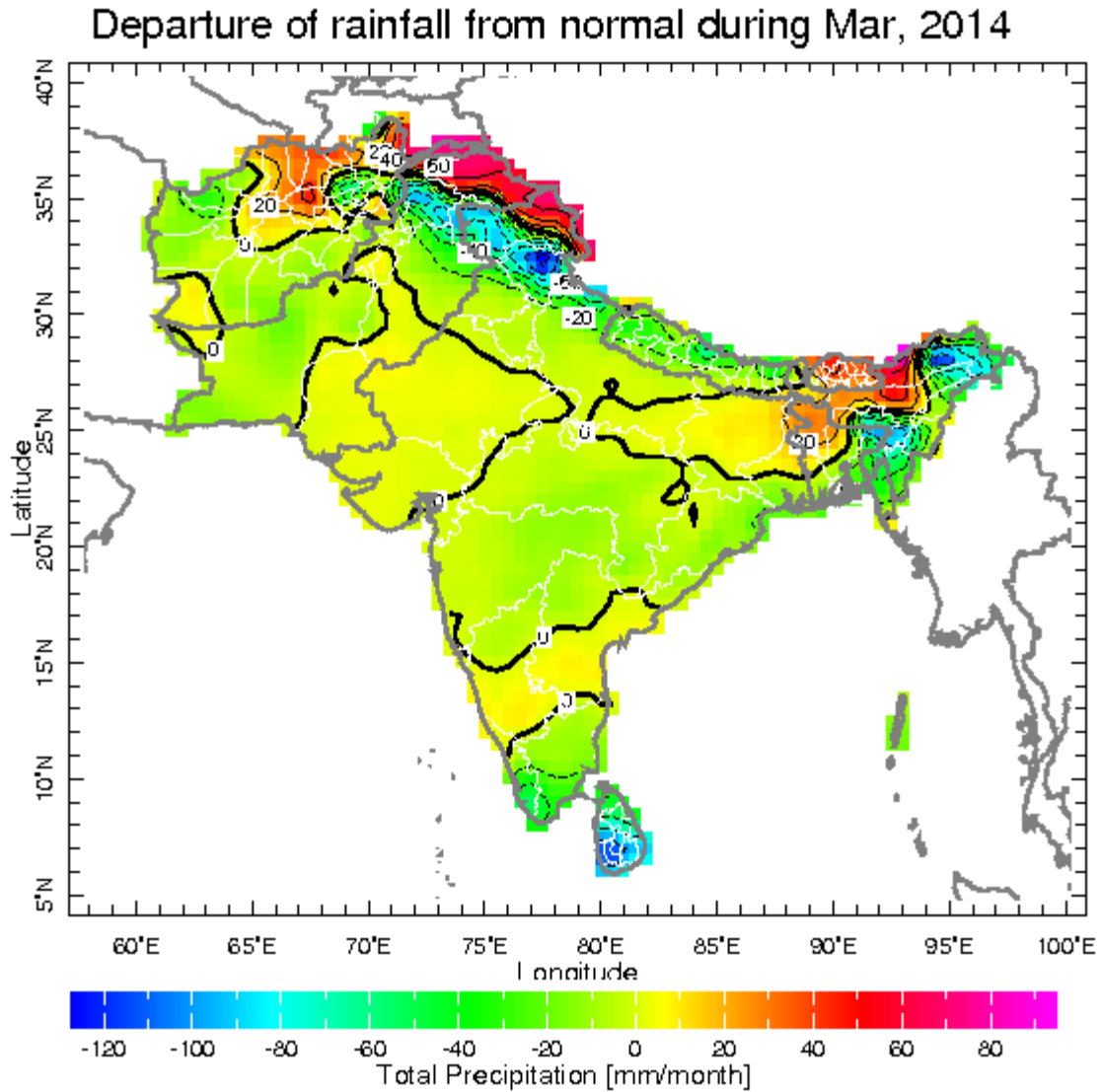


6. Monthly departure from normal (precipitation) during coming season

Departure of rainfall from normal during Feb, 2014

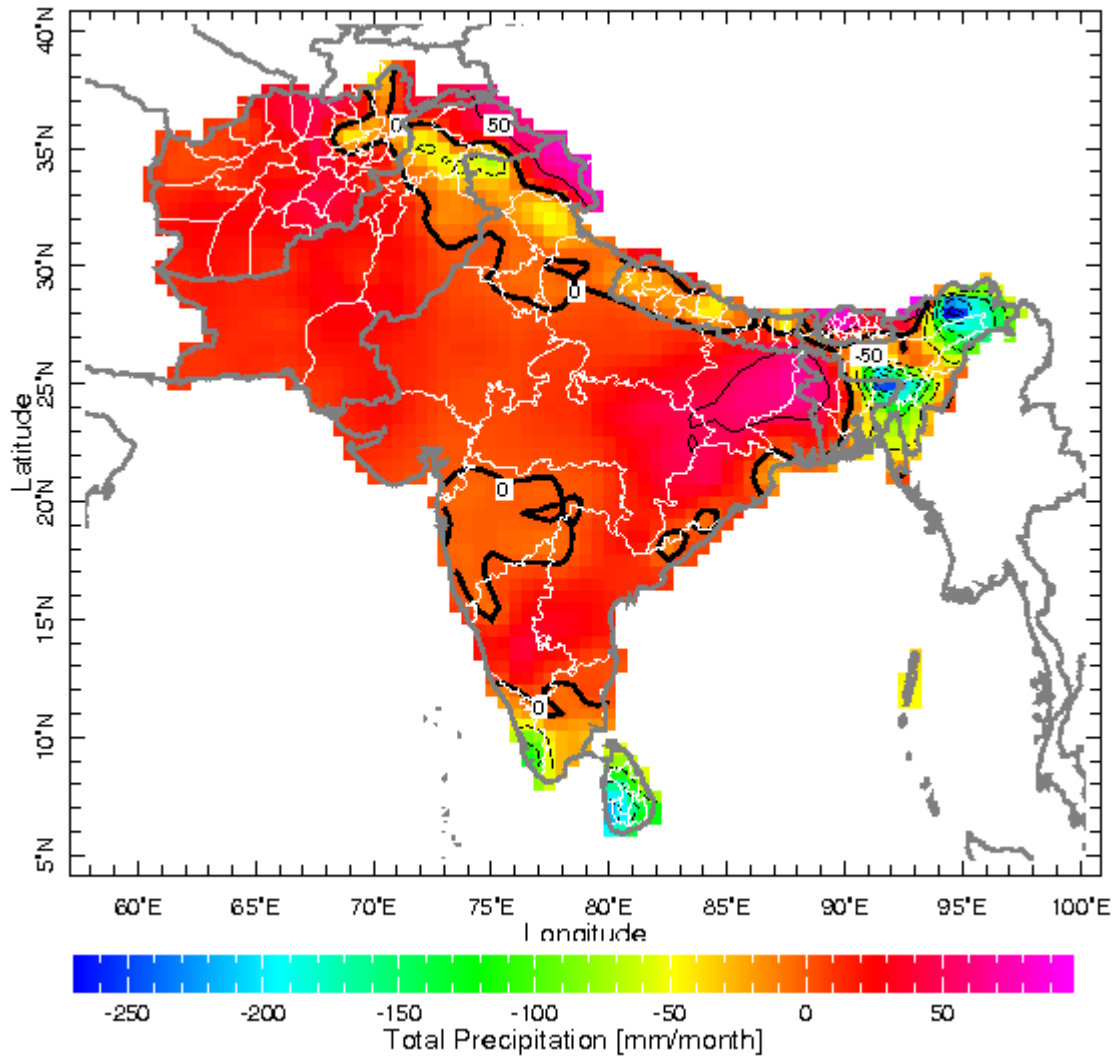


Seasonal weather outlook (Feb-Apr, 2014)



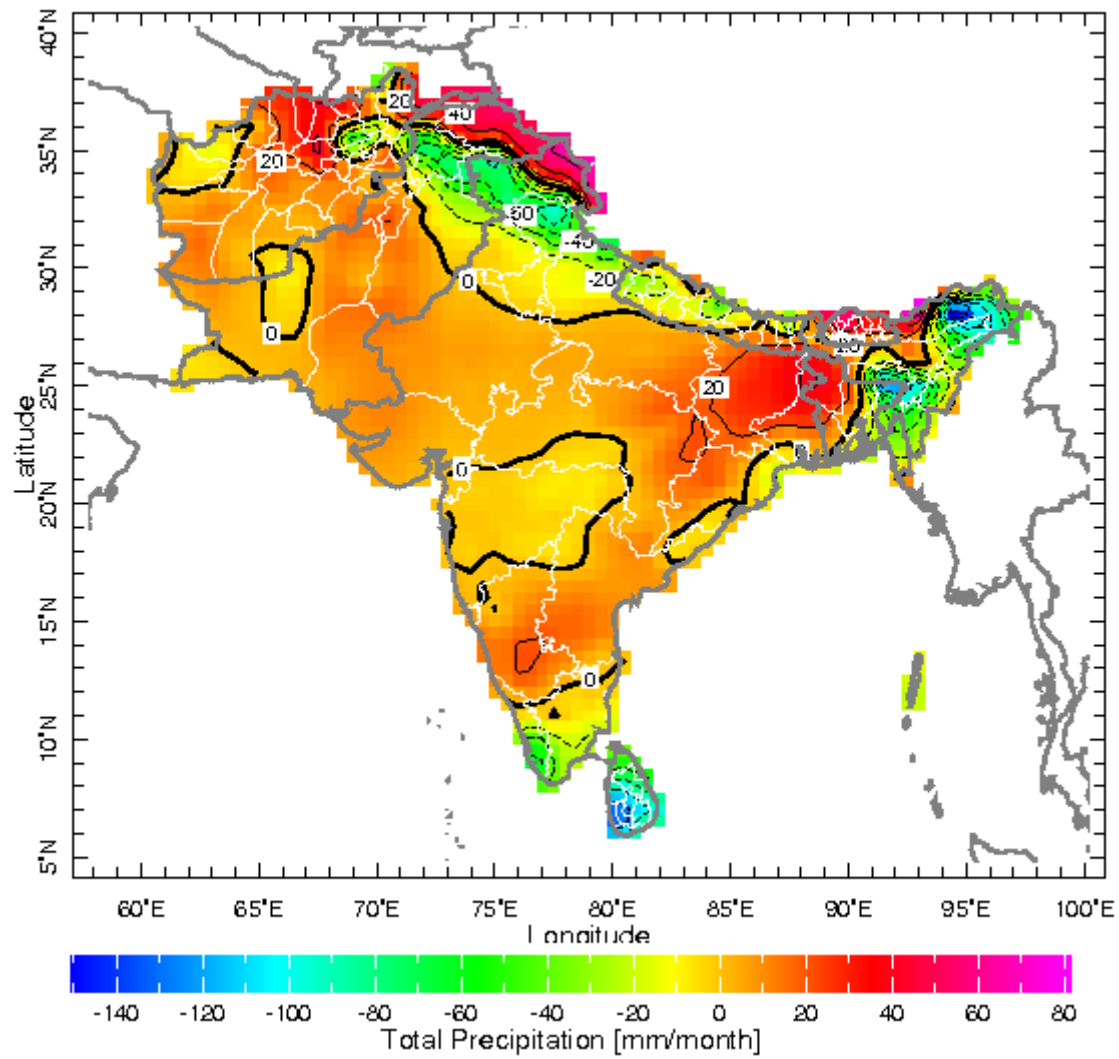
Seasonal weather outlook (Feb-Apr, 2014)

Departure of rainfall from normal during Apr, 2014



Seasonal weather outlook (Feb-Apr, 2014)

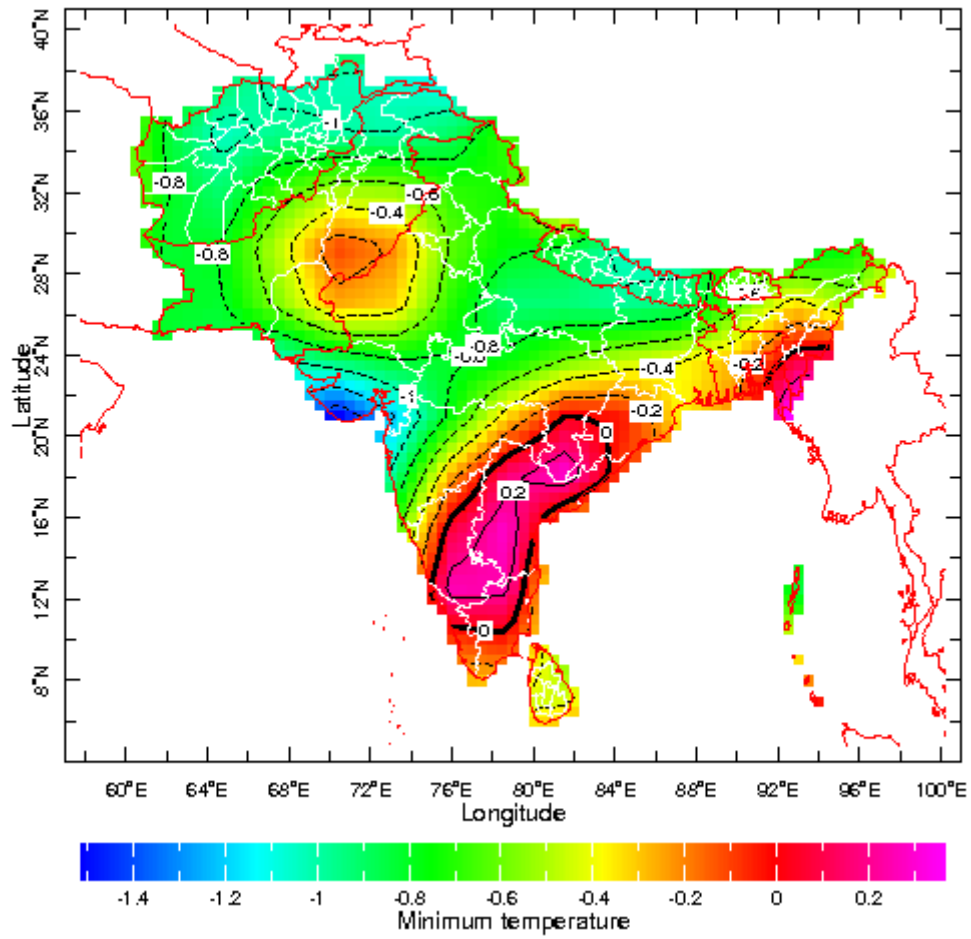
Departure of rainfall from normal for Feb-Apr, 2014



Seasonal weather outlook (Feb-Apr, 2014)

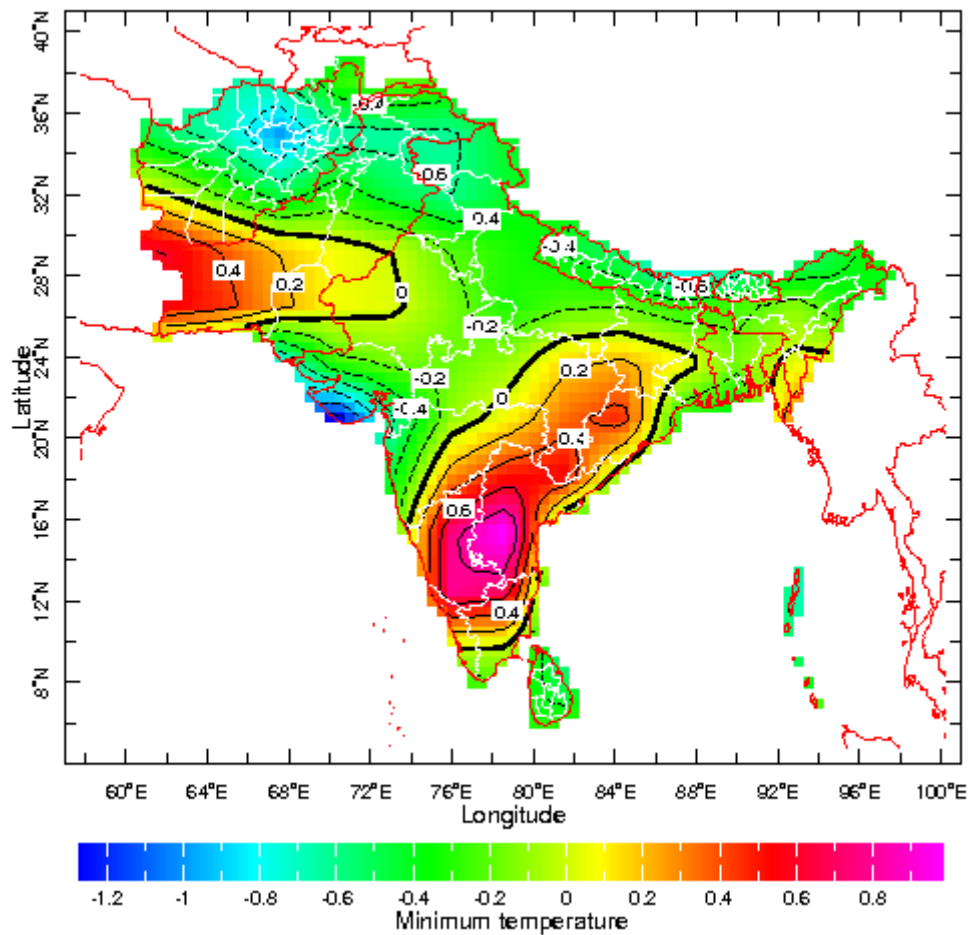
Departure of Minimum temperature from Normal during

Departure of Minimum Temp. from normal during Feb,2014



Seasonal weather outlook (Feb-Apr, 2014)

Departure of Minimum Temp. from normal during Mar, 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 10th 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/>