

Seasonal weather outlook for SAARC region

(Apr-Jun, 2014)

Issued on Mar 05, 2014



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 Apr 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 less than normal intensity. The region may prevail less than normal winds strength. The movement of higher strength winds may cover wider area than normal over the region.
- A ridge at 500 hPa is expected to be over central parts of the country. As a result, western disturbances may be de tracked from normal path.
- Surface temperatures are expected to be on higher side than normal over central parts of the country as compared with normal (1981-2010). However, northern and southern parts may prevail normal surface temperature.
- North Atlantic Oscillation (NAO) is in positive phase (0.8) 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>
- The model predictions of ENSO for this summer and beyond are relatively unchanged from last month. Almost all the models indicate that ENSO-neutral (Niño-3.4 index between -0.5°C and 0.5°C) will persist through the rest of the Northern Hemisphere spring 2014. While all models predict warming in the tropical Pacific, there is considerable uncertainty as to whether El Niño will develop during the summer or fall. If westerly winds continue to emerge in the western equatorial Pacific, the development of El Niño would become more likely. However, the lower forecast skill during the spring and overall propensity for cooler conditions over the last decade still justify significant probabilities for ENSO-neutral. The consensus forecast is for ENSO-neutral to continue through the Northern Hemisphere spring 2014, with about a 50% chance of El Niño developing during the summer or fall (http://iri.columbia.edu/our-expertise/climate/forecasts/enso/current/?enso_tab=enso-cpc_update)

Probability outlook: La Nina (4%), Neutral (68%) and El Nino (28 %) during Apr-May-Jun, 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 over southern half and below normal over upper half.
- Mediterranean Sea surface temperatures are normal to slightly above normal.
- Bay of Bengal Sea Surface Temperatures are close to normal.

3. Weather outlook Summary

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

Synthesis of the latest model forecasts for Apr-Jun 2014 (AMJ), 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 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.

Seasonal weather outlook (Apr-Jun, 2014):

As a whole, slightly above average precipitation is likely to all over the region during the season with below average during first two months (April & May) and above average during June. Extremely below average precipitation is expected over Sri Lanka and extremely above average over India. However rest of the region will receive average rainfall.

Northeast Indian states including western coastal belt of India including western Belt of Sri Lanka and Bangladesh will receive significantly below average rainfall.

Chances of cat and dogs rainy spell are expected during these transition months in the region.

Chances of drought in western Pakistan are not prominent during predicted months.

April, 2014: Average precipitation is expected in SAARC member countries as a whole with below average over Pakistan and extremely below over Afghanistan and India. Rest of the region may receive average precipitation during the month. Rainy spells will be focused over Orissa, Assam and Karnataka states of India, Bangladesh, southern Bhutan, Northern Afghanistan and Kashmir. Arunachal Pradesh and Kerala of India, central parts of Nepal, northern parts of Pakistan and northeastern parts of Afghanistan will receive below normal rainfall during April. Rest of the region will receive average rainfall.

Above normal day temperature will be expected all over SAARC region with higher over Punjab (India and Pakistan) Rajasthan, Manipur and Mizoram of India.

May, 2014: Average precipitation is expected all over the region as a whole with significantly below average over Sri Lanka (-62%) and above average over India (+112%). Intensity of precipitation will be higher over Bhutan, eastern parts of Bangladesh, Karnataka, Orissa, Assam, Mizoram and Manipur of India. Above normal rainfall is expected over Jharkhand and Bihar of India while below normal over northeastern parts of India. Rest of the region will receive normal rainfall during the month.

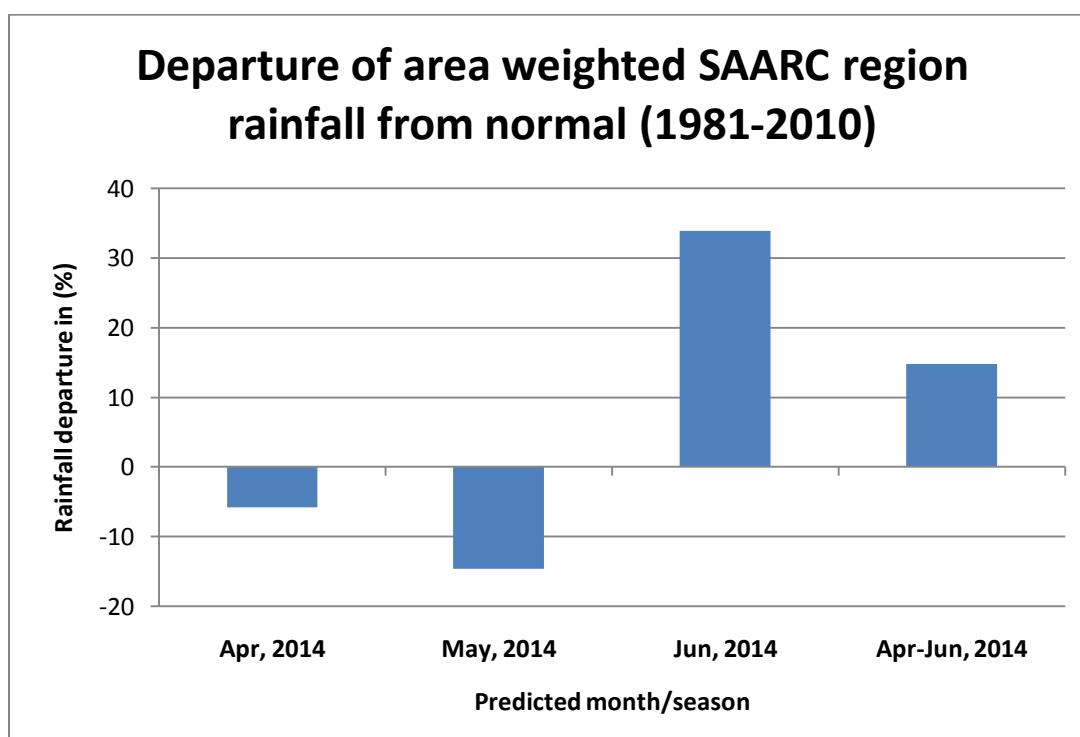
Seasonal weather outlook (Apr-Jun, 2014)

Day temperature will be below normal over central and southern Pakistan, and eastern states of India. However, it will be above normal over eastern parts of India extending from north to south. No exceptional variation in day temperature will be expected over rest of the region.

June, 2014: Above Average precipitation is expected during June all over SAARC region with below average over Sri Lanka (– 58%), and above average over India (+47%) and Afghanistan (+59%). High intensity precipitation is expected over Bangladesh, eastern India extended upto central parts of India and Nepal. Uttar Pradesh and Orissa will receive above normal rainfall during the month while western coastal belt of India, eastern Bangladesh, Bhutan and northeastern India will receive below normal rainfall.

Monsoon 2014 Prediction:

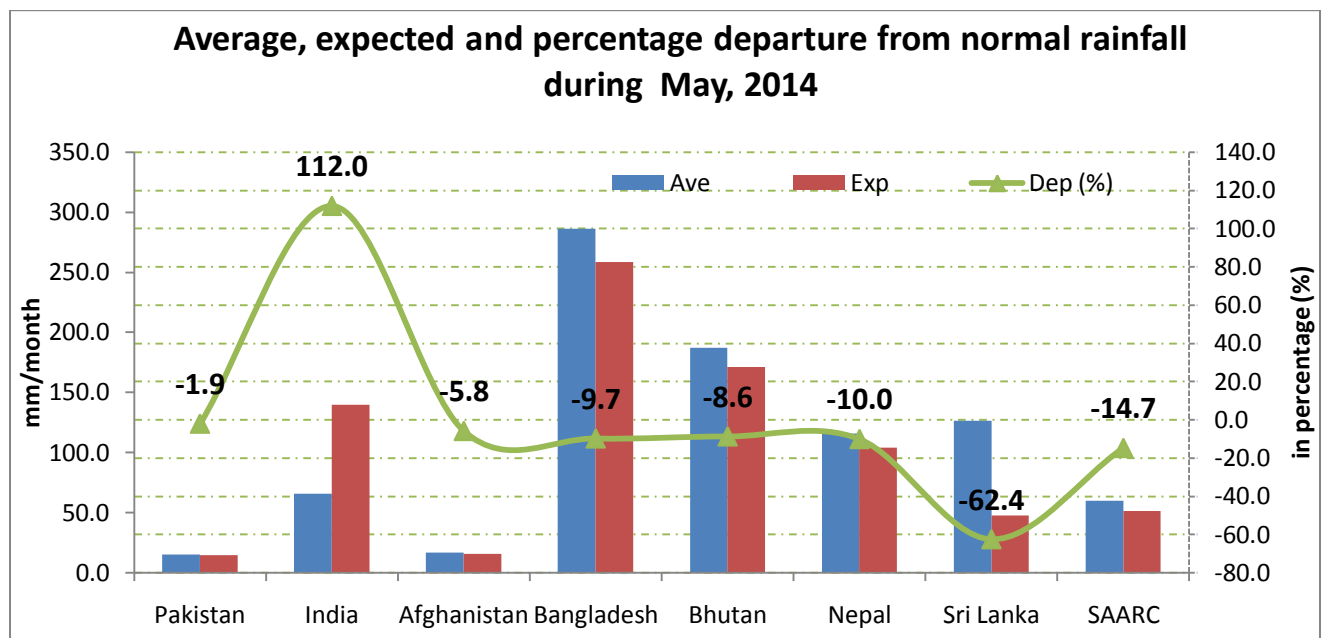
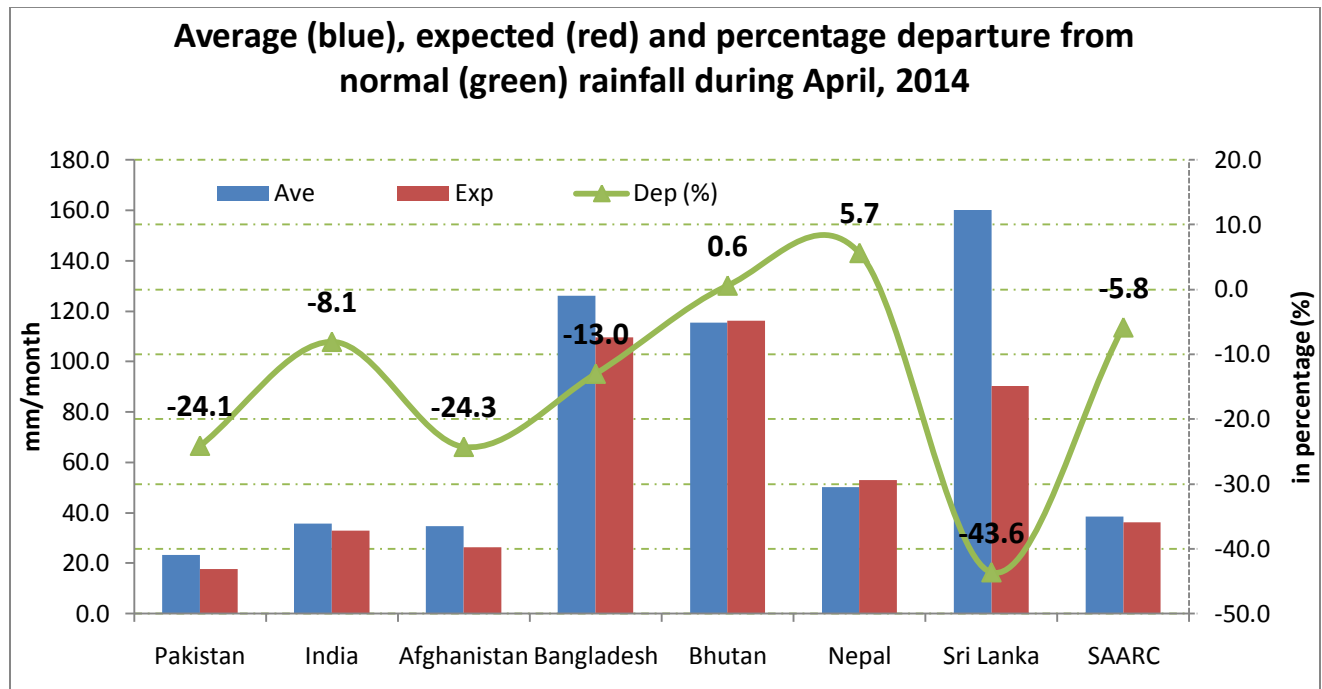
Current synoptic situation and its variation indicate that below normal rainfall is expected during upcoming monsoon season. Monsoon starts in June with full swing and then probably it becomes weak by the time as by prevailing El Nino matureness.



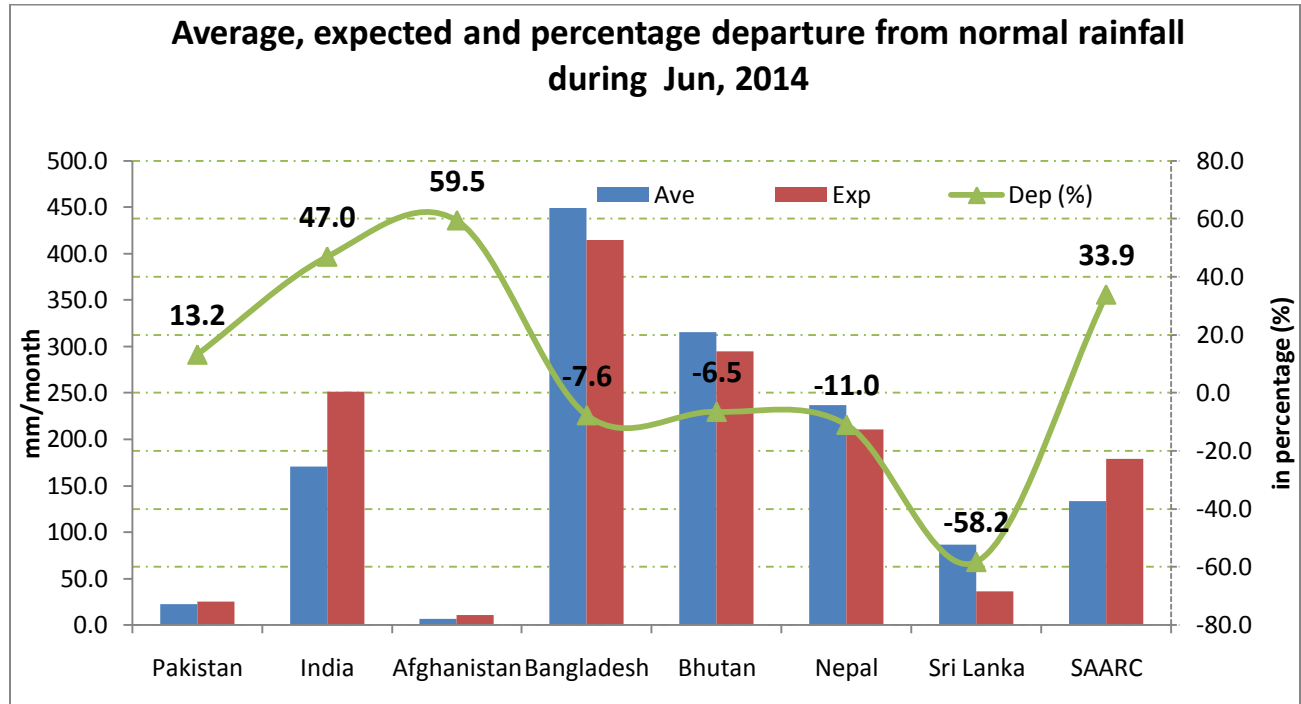
Note: Departure of Area-weighted rainfall of SAARC region has been computed by subtracting ECHAM predicted monthly/seasonally rainfall from GPCC of corresponding month/season.

Seasonal weather outlook (Apr-Jun, 2014)

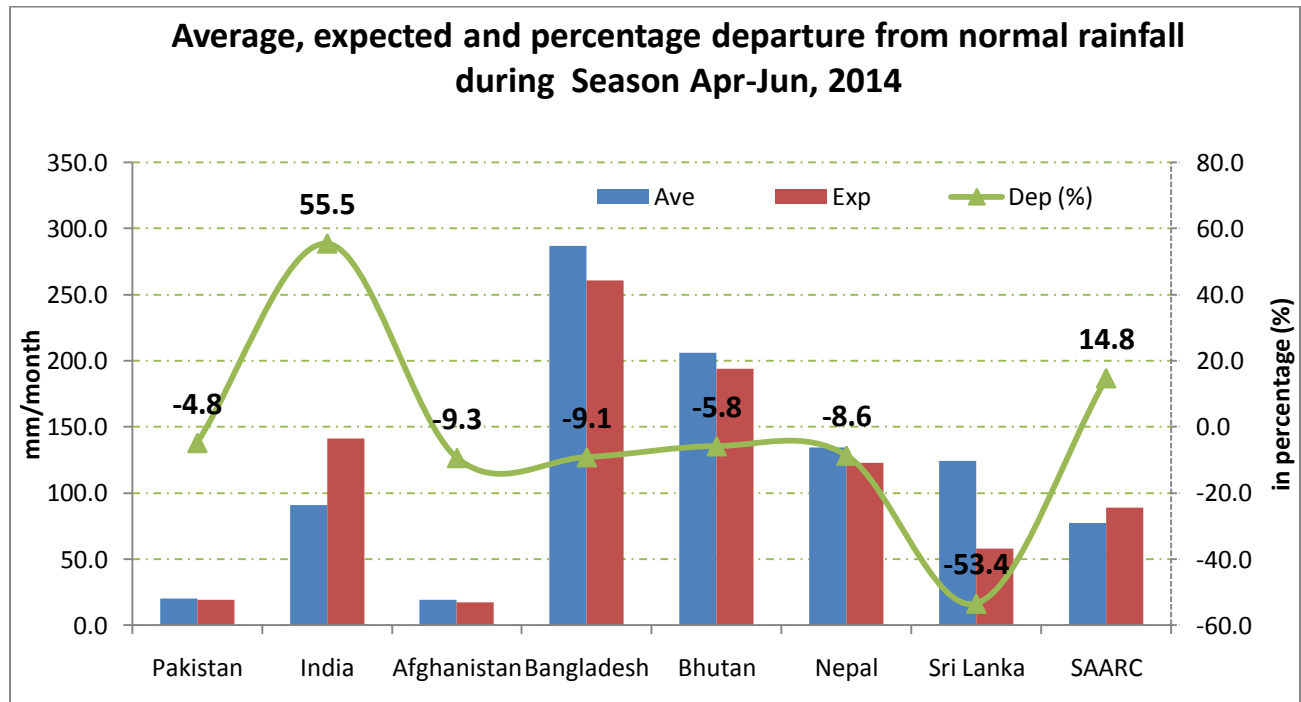
4. Country wise monthly and seasonal quantitative outlook along with departure of precipitation from normal



Seasonal weather outlook (Apr-Jun, 2014)

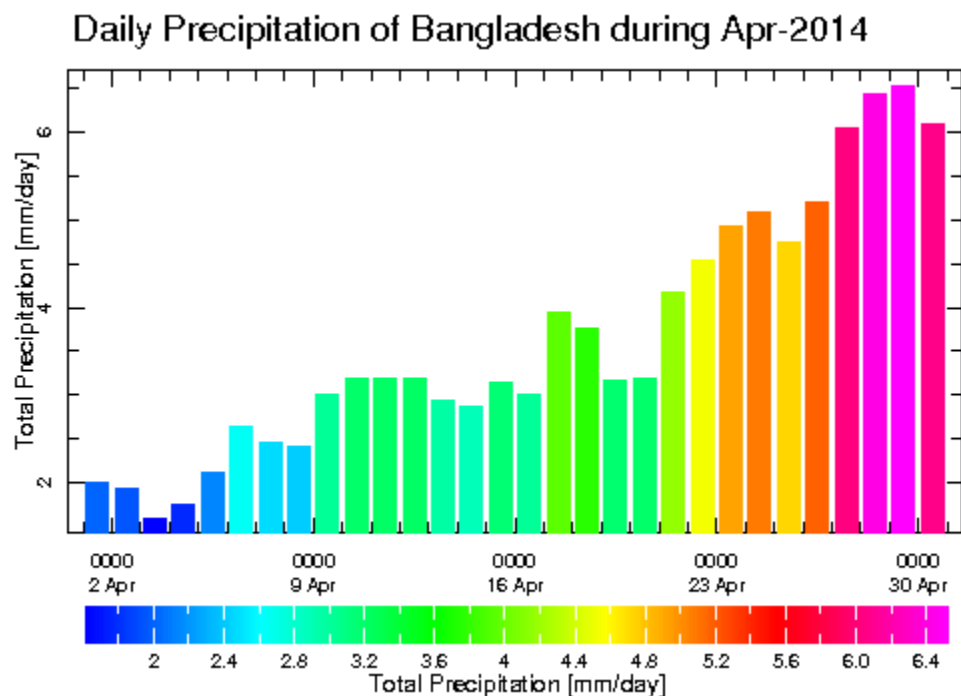
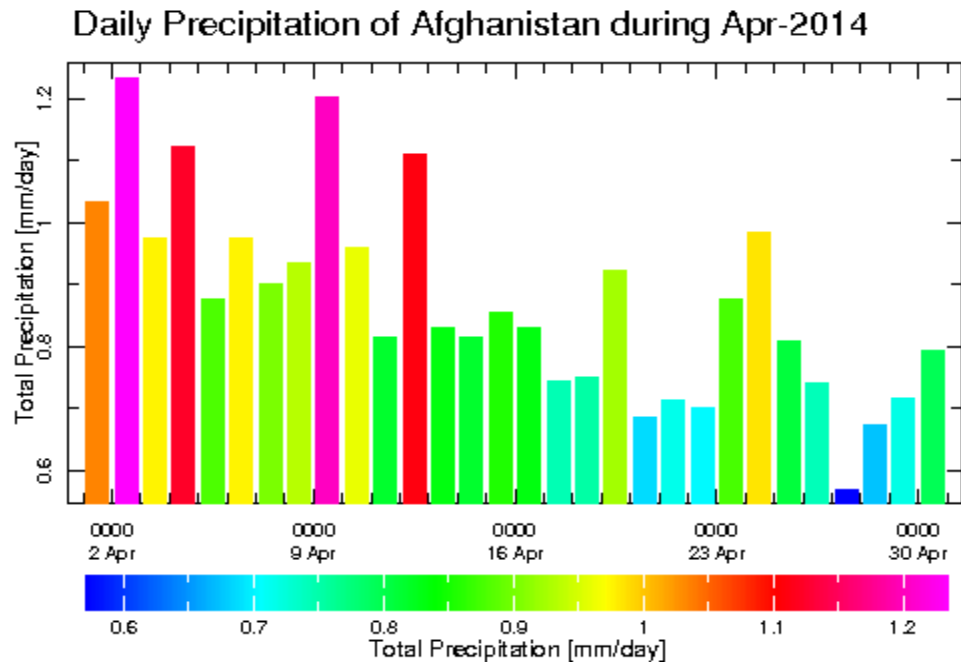


Note for quantitative graph: X axis indicates countries, left y axis stands for bar chart (blue for average and red for expected rainfall in mm/month) and right y axis stands for line chart (green) indicates departure of rainfall from normal in percentage. Average rainfall period is 1981-2010.



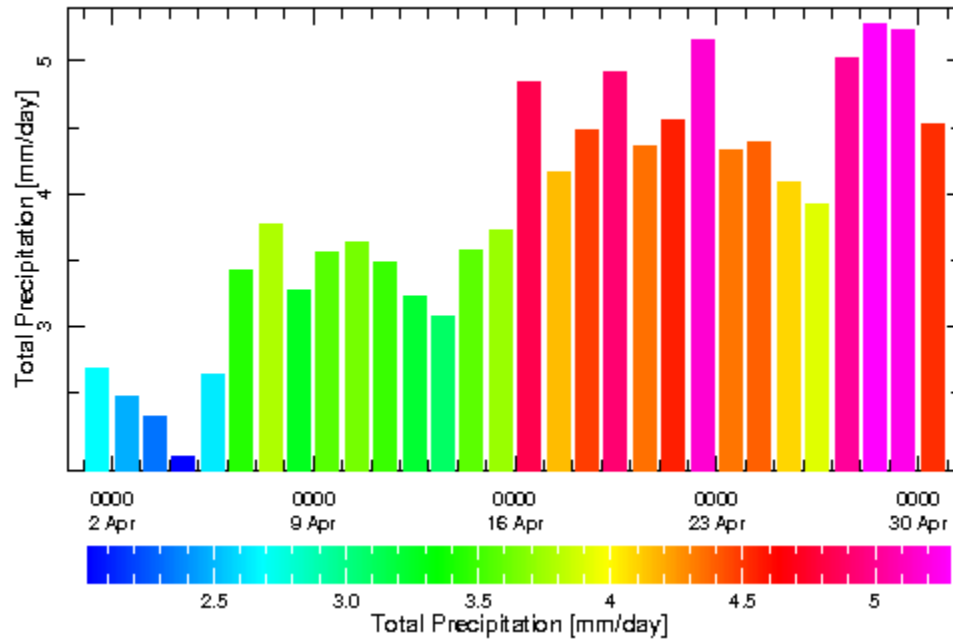
5. Daily country wise precipitation prediction for current month (April, 2014)

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.

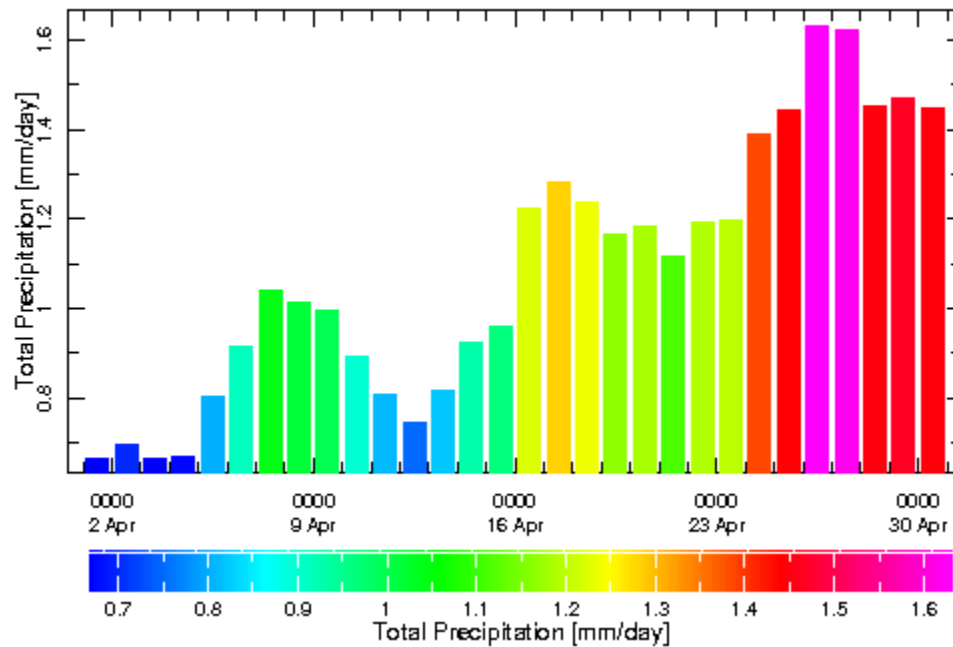


Seasonal weather outlook (Apr-Jun, 2014)

Daily Precipitation of Bhutan during Apr-2014

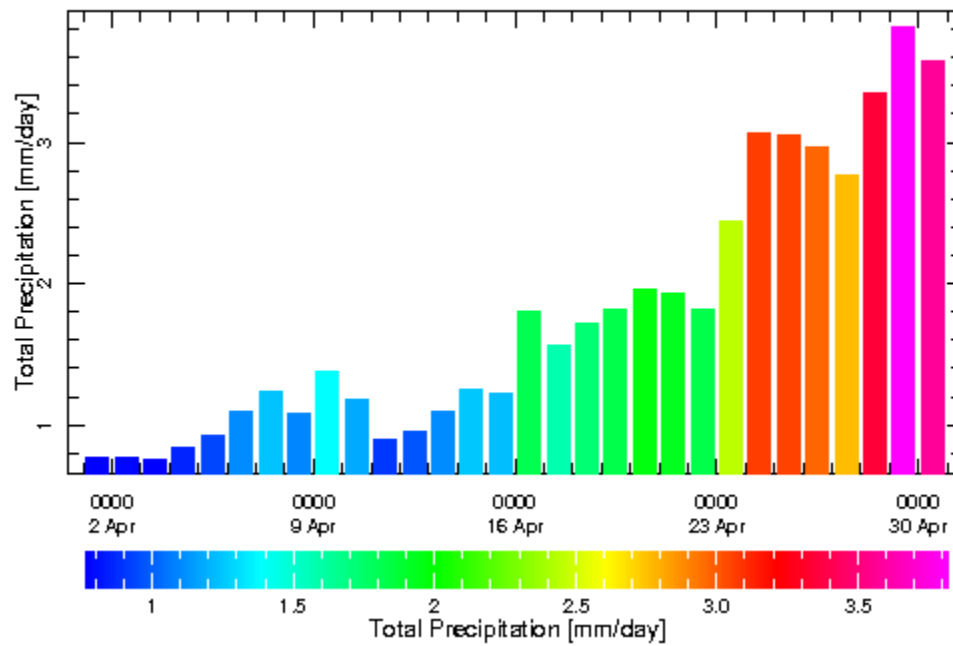


Daily Precipitation of India during Apr-2014

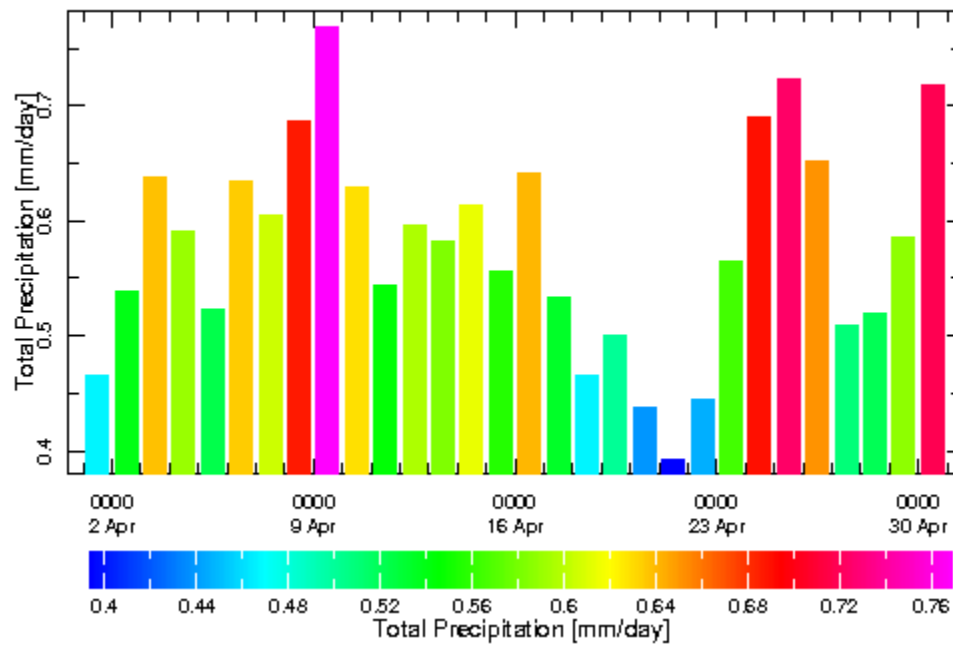


Seasonal weather outlook (Apr-Jun, 2014)

Daily Precipitation of Nepal during Apr-2014

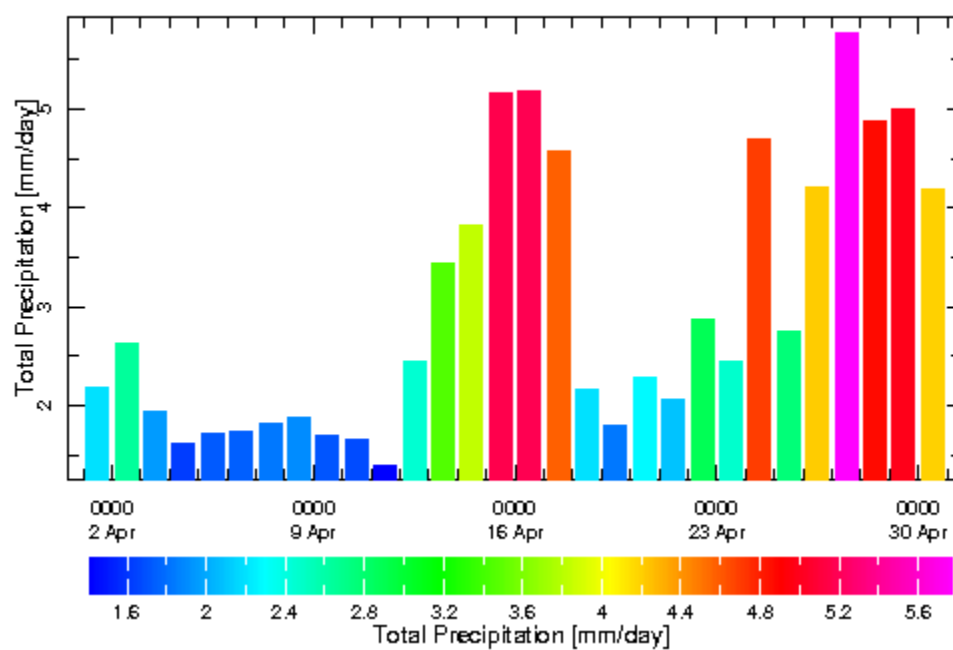


Daily Precipitation of Pakistan during Apr-2014

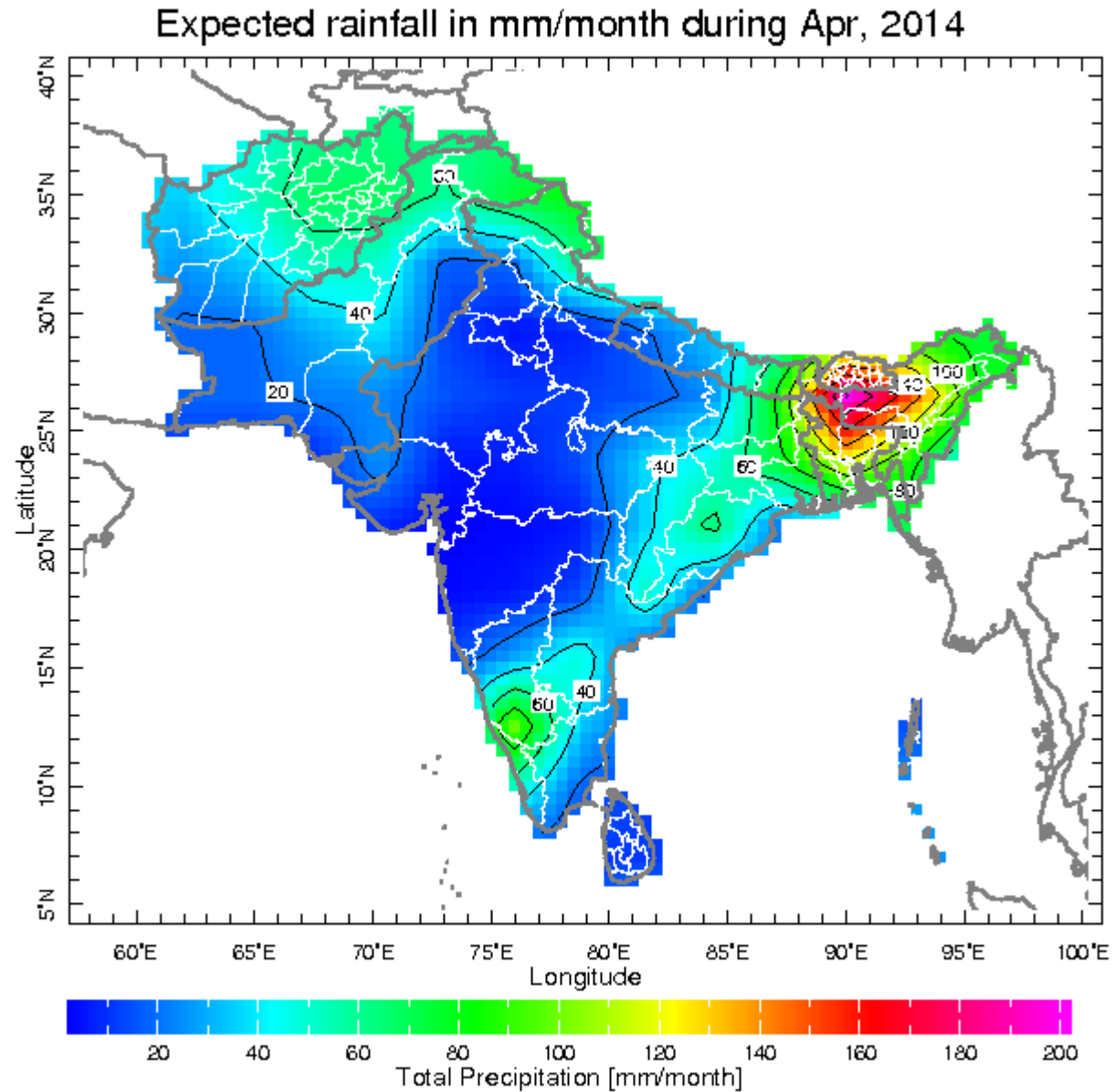


Seasonal weather outlook (Apr-Jun, 2014)

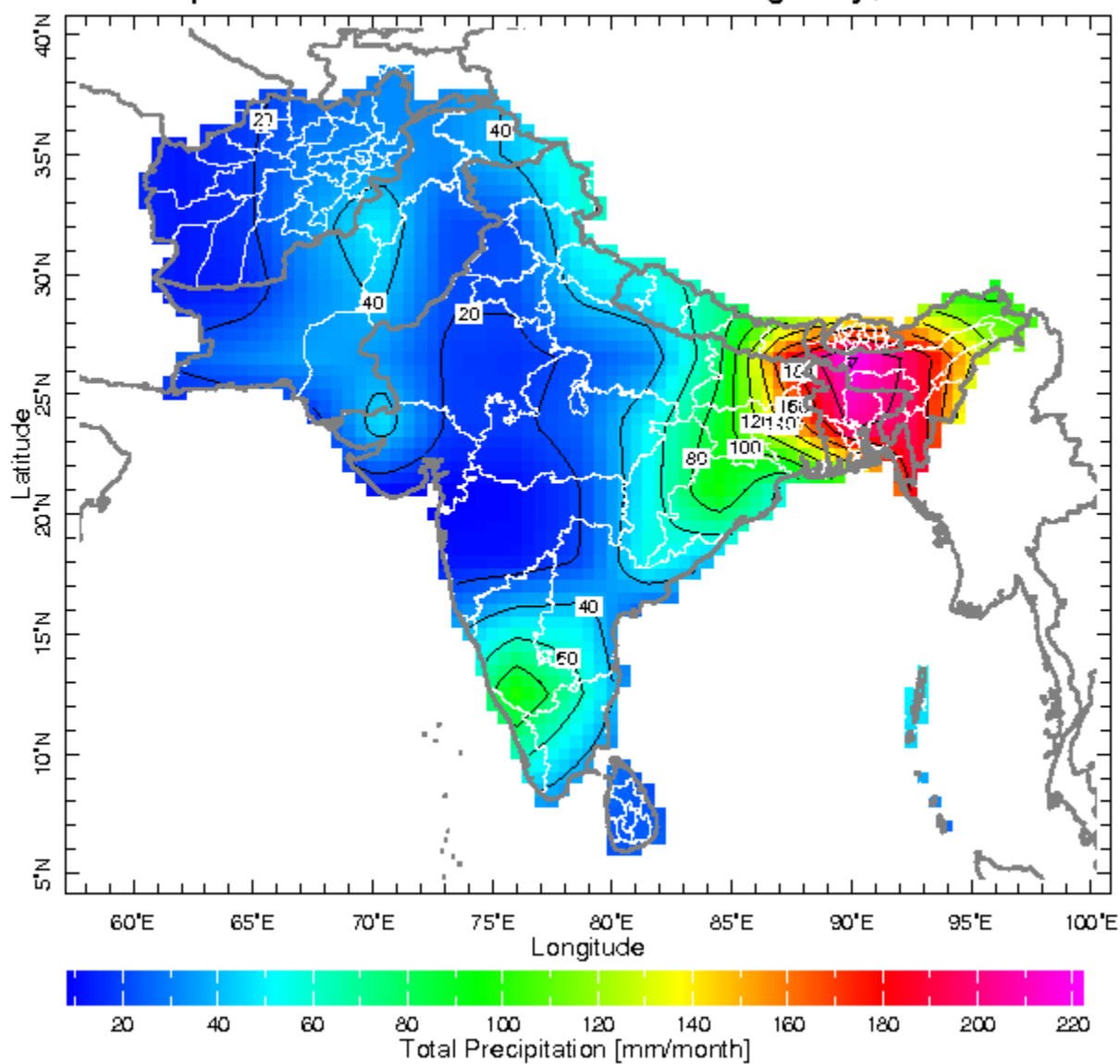
Daily Precipitation of Sri Lanka during Apr-2014



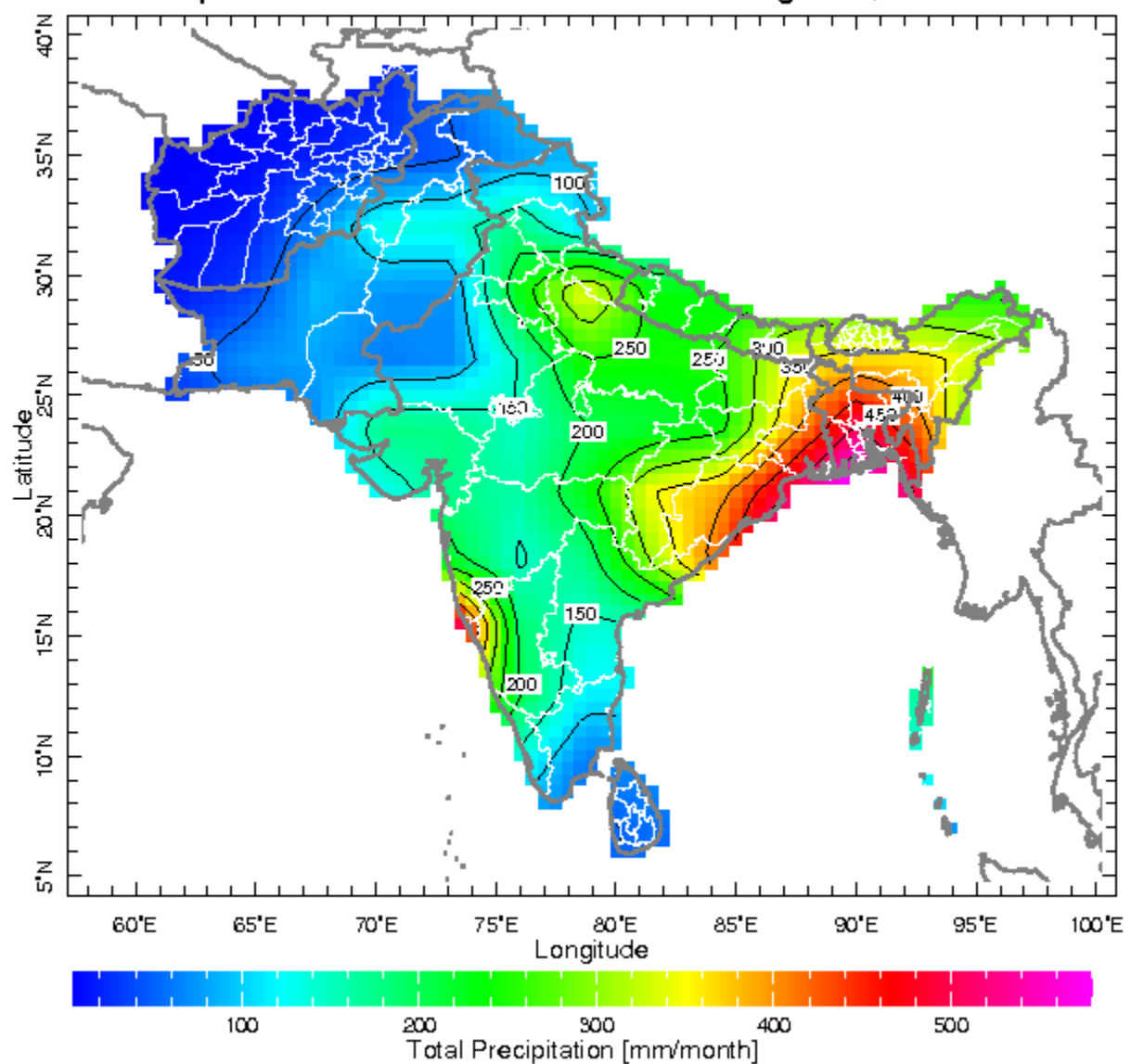
5. Spatial distribution of expected precipitation during coming season (GCM-ECHAM)

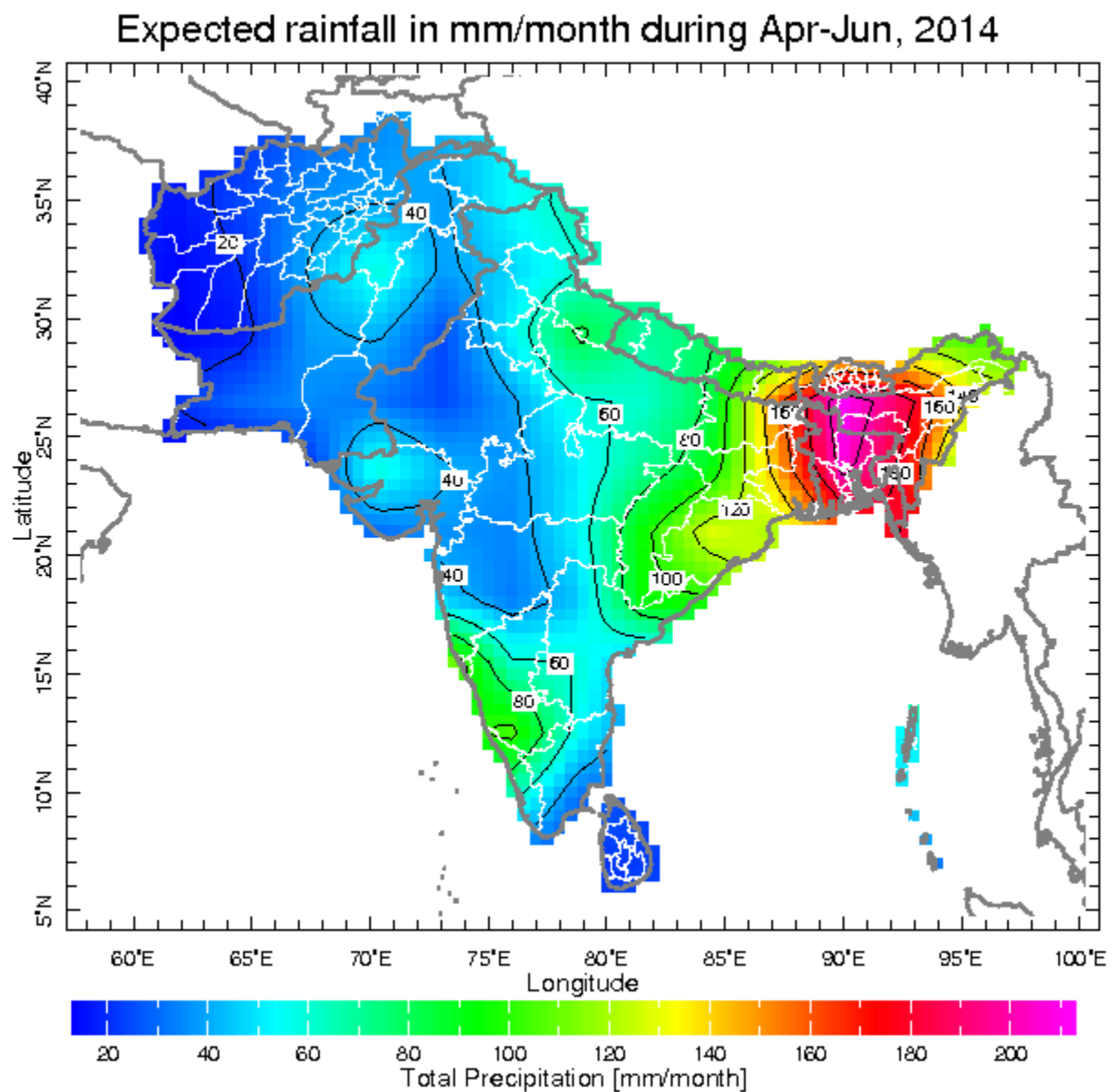


Expected rainfall in mm/month during May, 2014



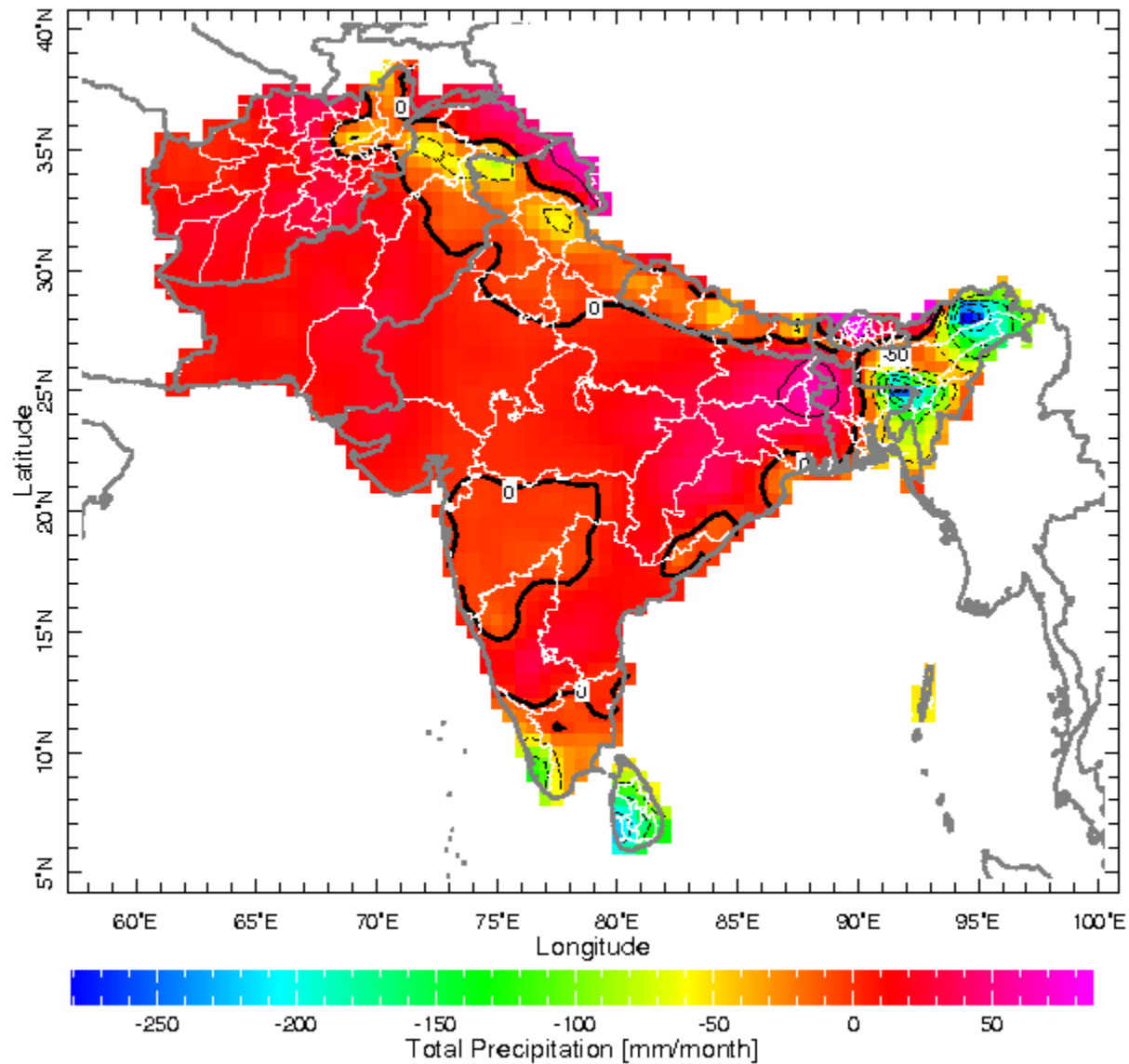
Expected rainfall in mm/month during Jun, 2014

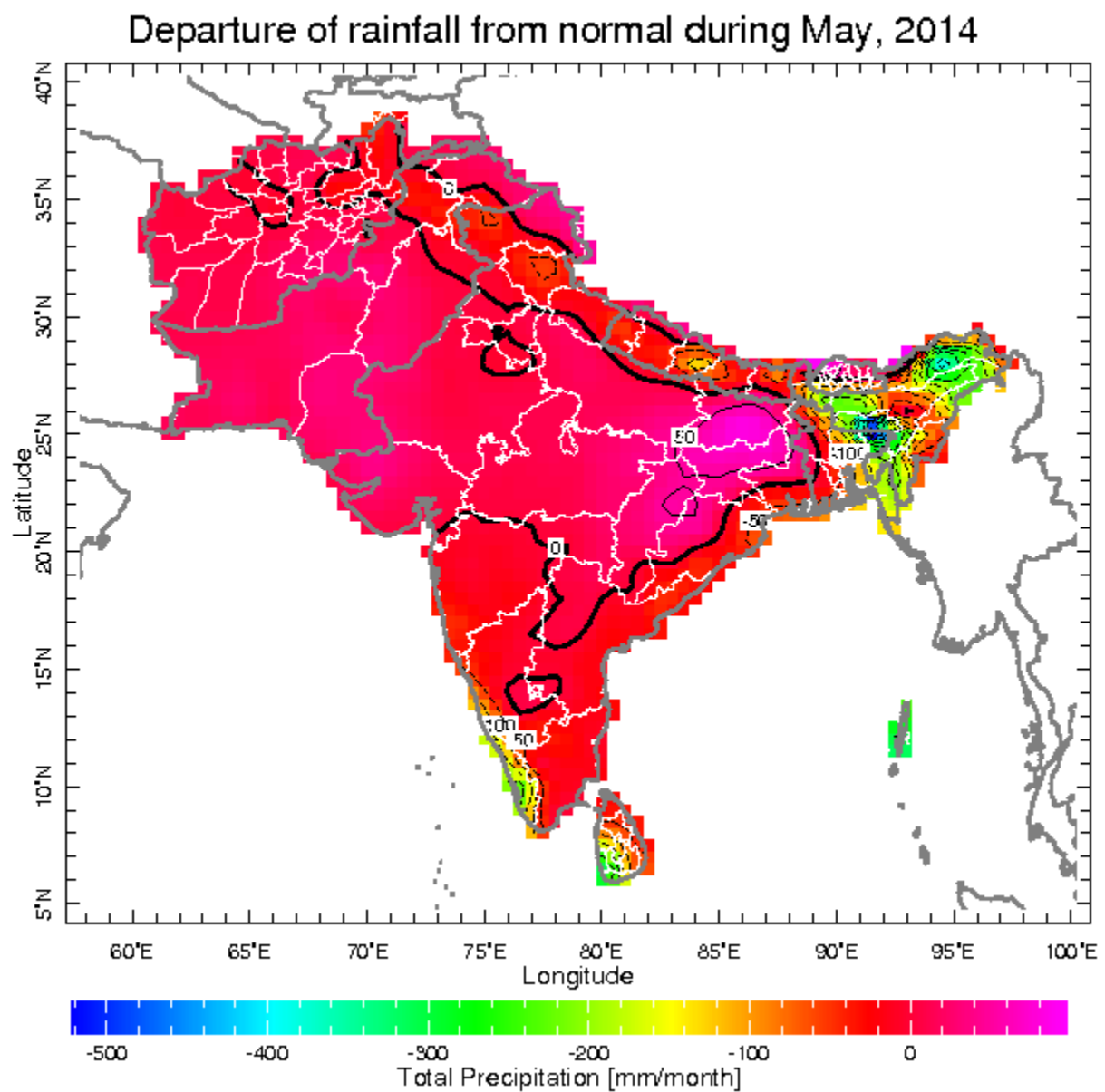




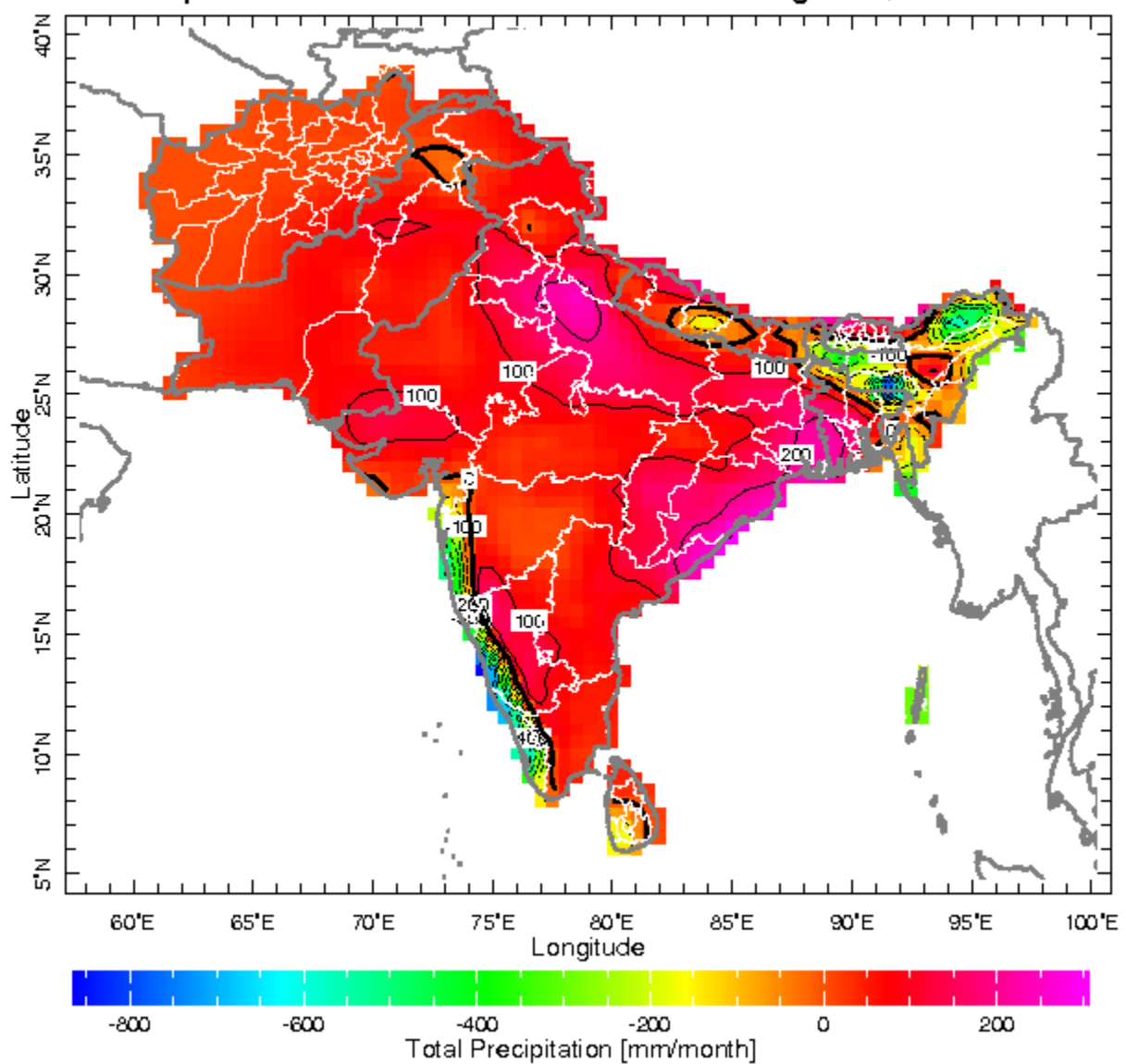
6. Monthly departure from normal (precipitation) during coming season

Departure of rainfall from normal during Apr, 2014

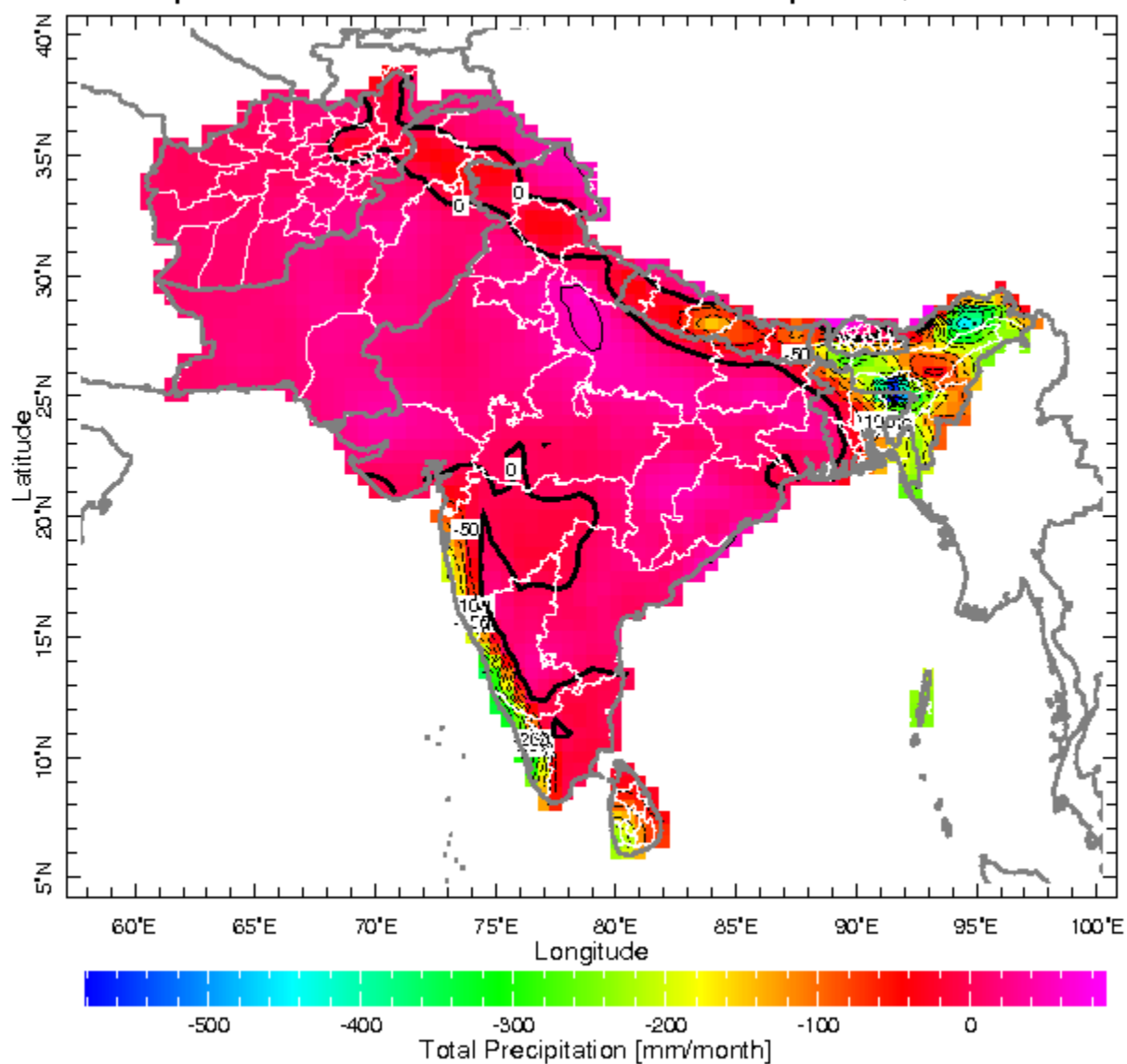




Departure of rainfall from normal during Jun, 2014



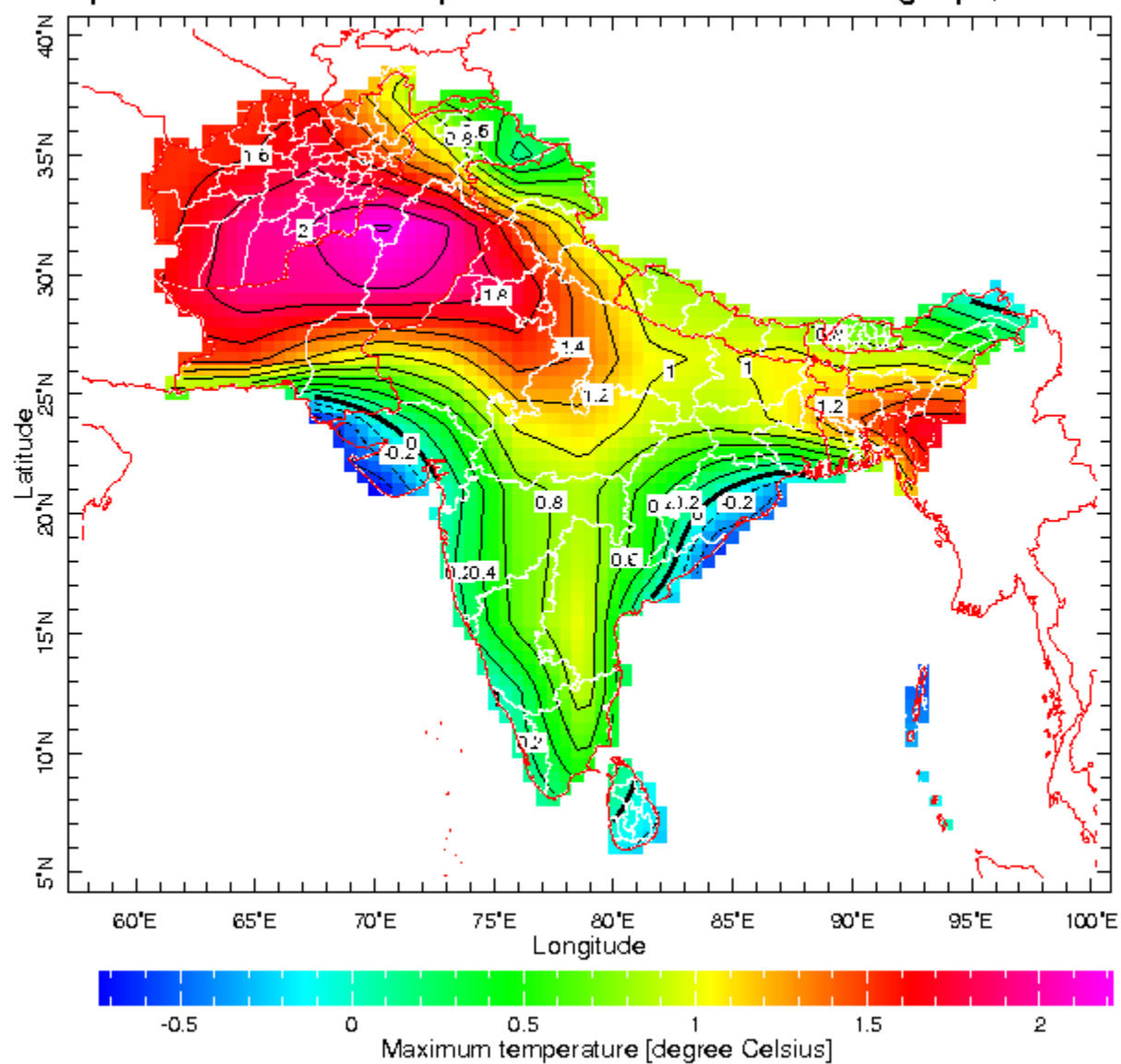
Departure of rainfall from normal for Apr-Jun, 2014



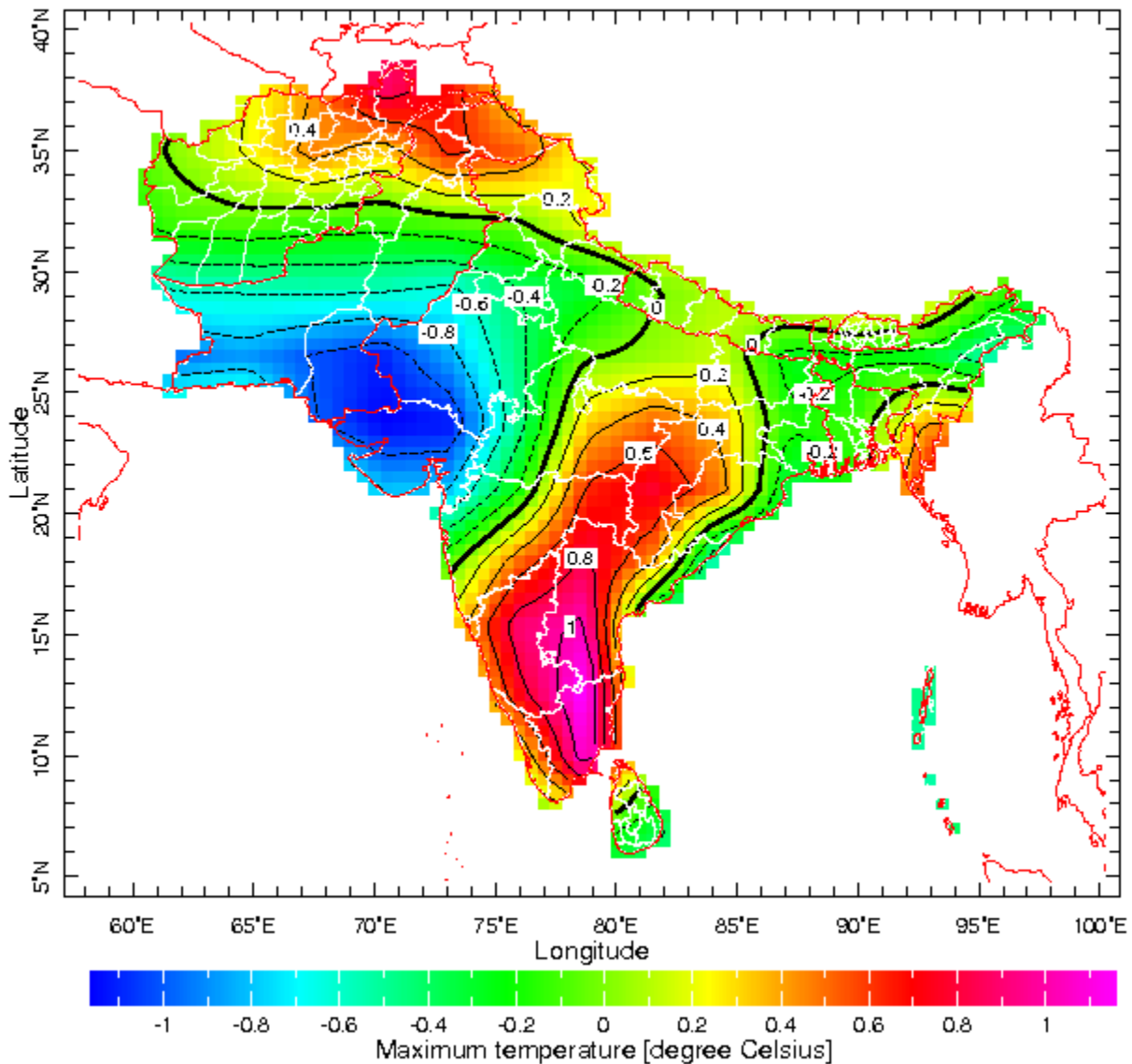
Seasonal weather outlook (Apr-Jun, 2014)

Departure of Minimum temperature from Normal during

Departure of Max. Temperature from normal during Apr, 2014



Departure of Max. Temperature from normal during May, 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. Latest seasonal weather summary can be downloaded from NAMC web site mentioned below: <http://namc.pmd.gov.pk/>