Seasonal weather outlook for SAARC region

(Sep-Oct-Nov, 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 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 Sep 01, 2013. 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 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. 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^{o}) latitude by longitude

2. Synoptic situation

- Location of jet stream (U wind at 200 hPa) is approximately same as normal but with slightly above normal strength. Increasing (decreasing) trend over northern (southern) parts of the country in intensity is expected during September and coming months.
- A trough at 500 hPa is prominent over the region. A ridge over Afghanistan can also be deepening towards the central parts of Pakistan. Mostly normal pattern is followed during September.
- The trend of shifting of trough at 500 hPa towards north over Tibet region is in advance caused advance cut off of Southwest monsoon.
- Area of high surface temperature expands during September from normal (1981-2010) over central parts of Pakistan. Day temperature will be on higher side during September over central Pakistan and eastern India.
- North Atlantic Oscillation (NAO) is in slightly positive phase (0.97) and may cause to shift western disturbances towards north during coming months.. (Data source: CPU, monthly mean index)
- Most of the set of dynamical and statistical model predictions neutral conditions for the Sep-0ct-Nov (SON). ENSO-neutral conditions persisted during July 2013, as reflected by near-average sea surface temperatures (SSTs) across the central and east-central equatorial Pacific and below-average SSTs in the eastern Pacific. Most model forecasts continue to predict ENSO-neutral (Niño-3.4 index between -0.5°C and 0.5°C) into the Northern Hemisphere till spring 2014. The statistical model forecasts remain cooler in the Niño-3.4 region relative to the dynamical model forecasts. Similar to last month, the forecast consensus favors ENSO-neutral (60% chance or greater) through October – December 2013. Data source: http://iri.columbia.edu/climate/ENSO/currentinfo/SST_table.html

- Probability outlook: La Nina (21%), Neutral (66%) and El Nino (13 %) during Sep-Oct-Nov season

- Arabian Sea Surface Temperatures are above normal near the coast of Pakistan.
- 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.

1. Summary (Sep-Nov, 2013)

"Below normal precipitation is expected during the season (SON)"

Synthesis of the latest model forecasts for Sep to Nov 2013 (SON), current synoptic situation and regional weather expert's judgment indicates that below average rainfall is expected during the predicted season. Surface temperature may rise during start of predicted month and then gradually fall till end of Nov. Neutral-ENSO conditions are expected to persist throughout the season.

Seasonal weather outlook:

As a whole, below average rainfall is likely all over the region during the season, with average over Pakistan, India and Afghanistan, below average over Bangladesh and Nepal, and extremely below average Bhutan and Sri Lanka.

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

Meteorological drought condition will prevail over Bhutan and Sri Lanka which cause shortage of water level in the region.

September: Below average rainfall (-16%) is expected during September over whole SAARC region with average over Pakistan, Afghanistan and India, below average over Bangladesh, Nepal and Sri Lanka and significantly below average over Bhutan. Rainfall over Central and eastern coastal belt of India will likely above average. The month of September is likely to be wet for Andhra Pradesh, Karnataka of India and Chittagong, Dhaka of Bangladesh.

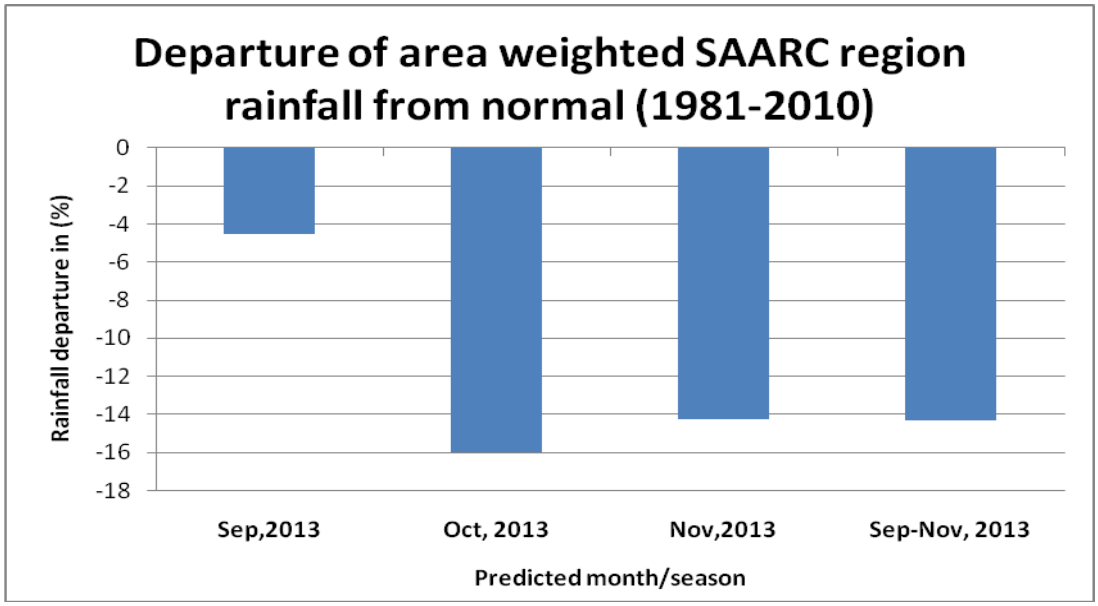
Despite heavy downpour in Central Peninsola & southeastern India, a large part of India may receive well below normal rainfall during the month.

However, well below average rainfall is likely over northern Bangladesh, most of Nepal, Bhutan and Assam that may call for drought management in these regions.

October: As a whole below average rainfall is expected all over the region with average over Pakistan, Afghanistan, Bangladesh, Bhutan and Nepal, below average over India and extremely below over Sri Lanka. Intensity of rainfall will be higher over southern Bangladesh, west Bengal, Orissa, Jharkhand and Karnataka. However, above normal rainfall is likely to occur over boundaries of Chhattisgarh, Jharkhand and Orissa.

Below normal rainfall is likely to occur over southwestern parts of Sri Lanka, eastern and southern coastal belt, Chittagong, Assam and Arunachal Pradesh, Meghalaya and extreme northeastern states of India

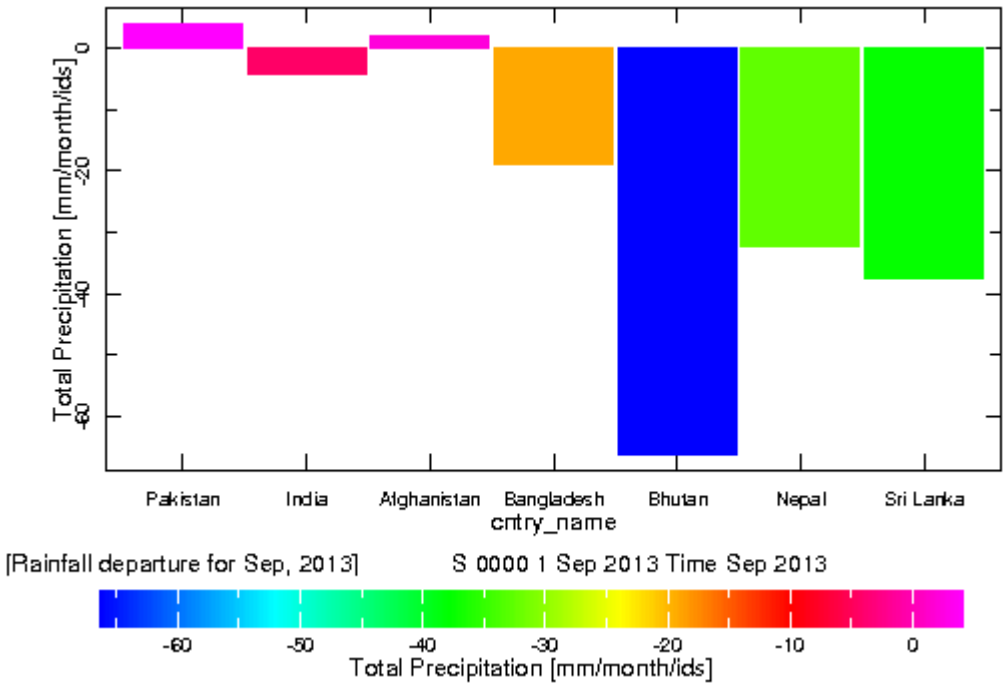
November: Clearly indicates cut off of monsoonal currents and induction of western weather system in the region. Average rainfall is expected all over the region as a whole with significantly below average Sri Lanka. Intensity of rainfall will be higher over Sri Lanka, northern Afghanistan and northern parts of Pakistan. Month is considered to be dry month in the region. However, below normal rainfall is expected over Sri Lanka, extreme southern coastal belt of India with slightly above normal rainfall over northern parts of Pakistan.



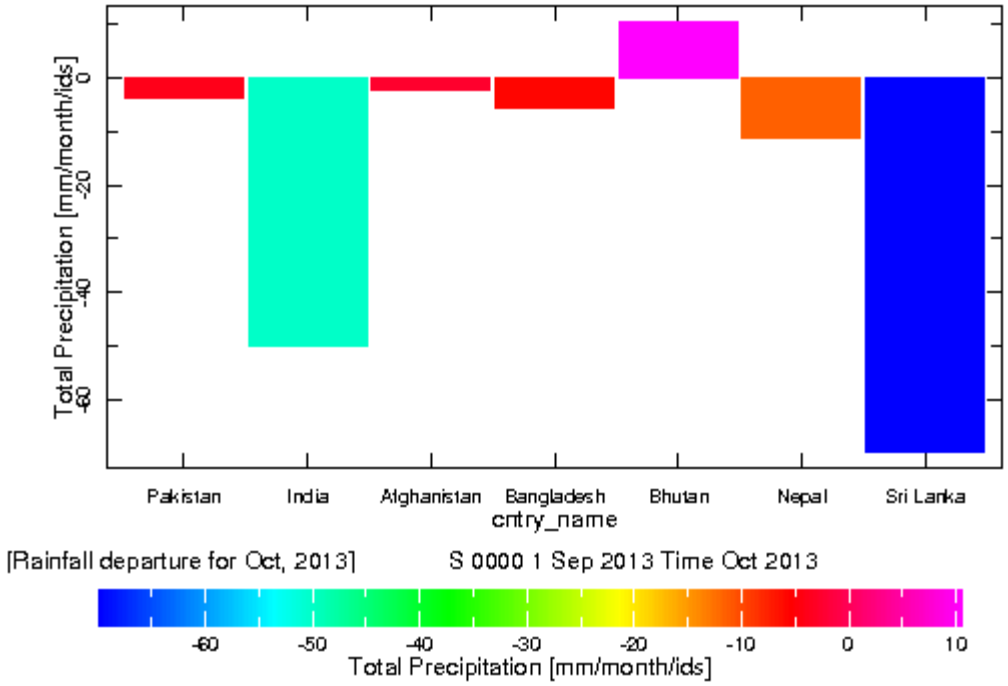
Note: Departure of Area-weighted rainfall of SAARC region has been computed by subtracting ECHAM predicted monthly/seasonally rainfall from GPCC of corresponding month/season.

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

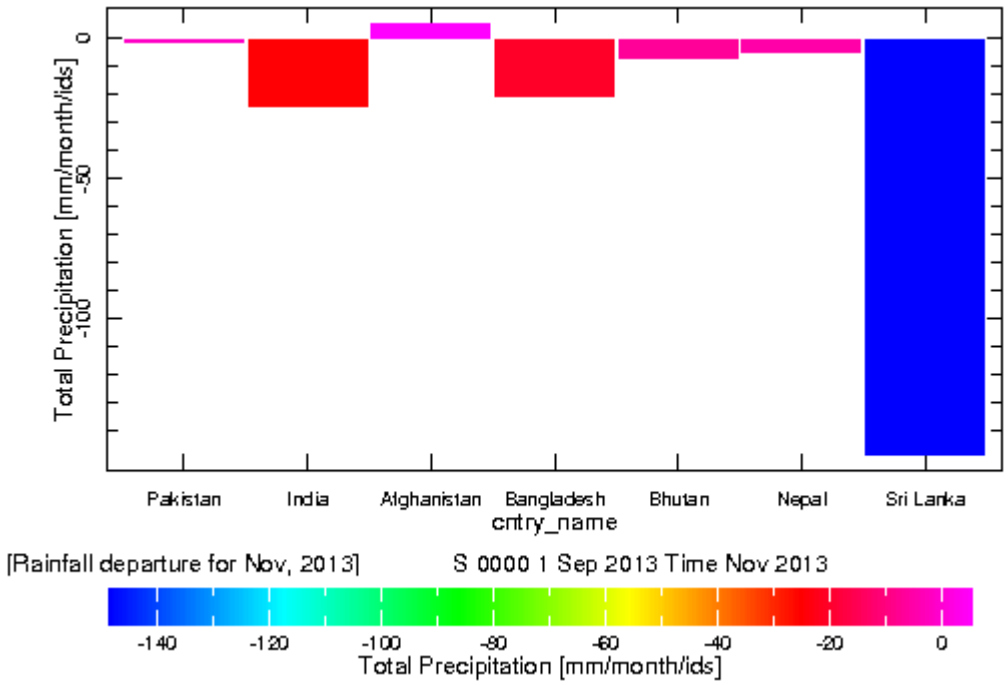
a. Monthly (Sep, 2013)



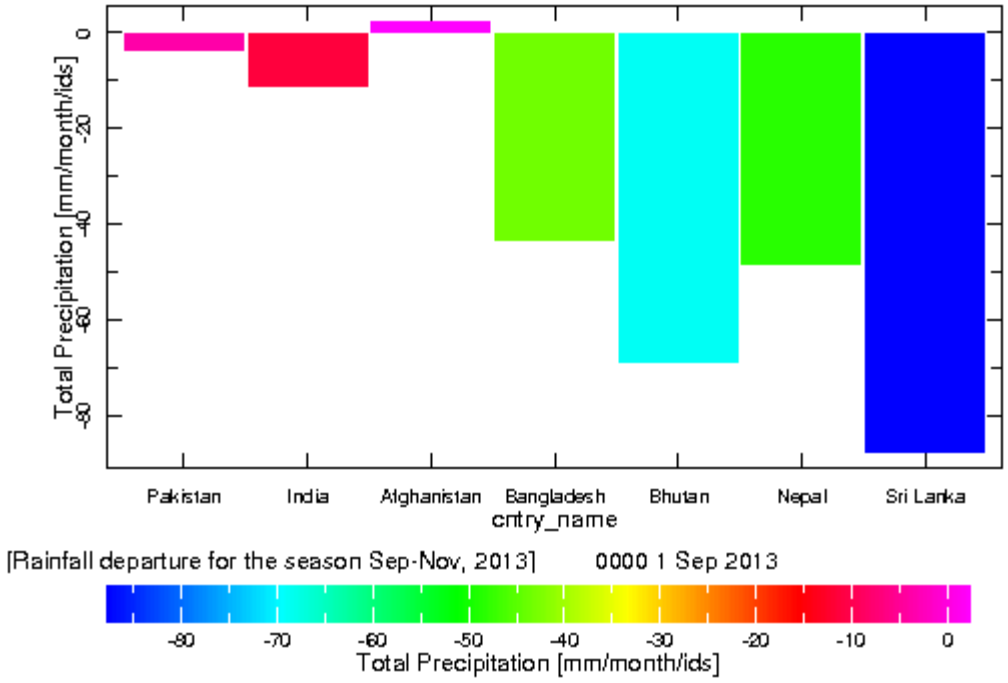
Monthly (Oct, 2013)



b. Monthly (Nov, 2013)

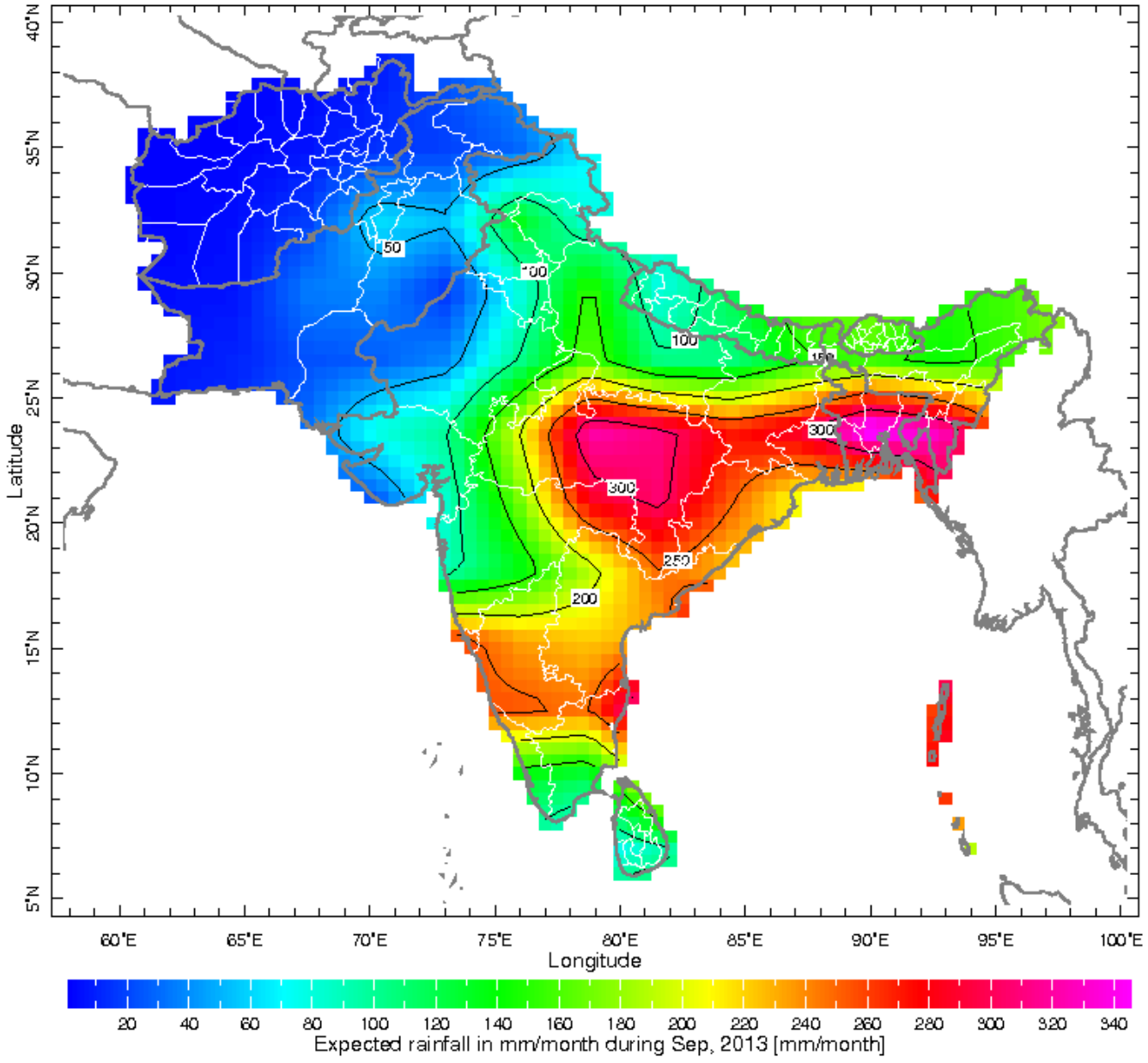


c. Seasonally (Sep-Nov, 2013)

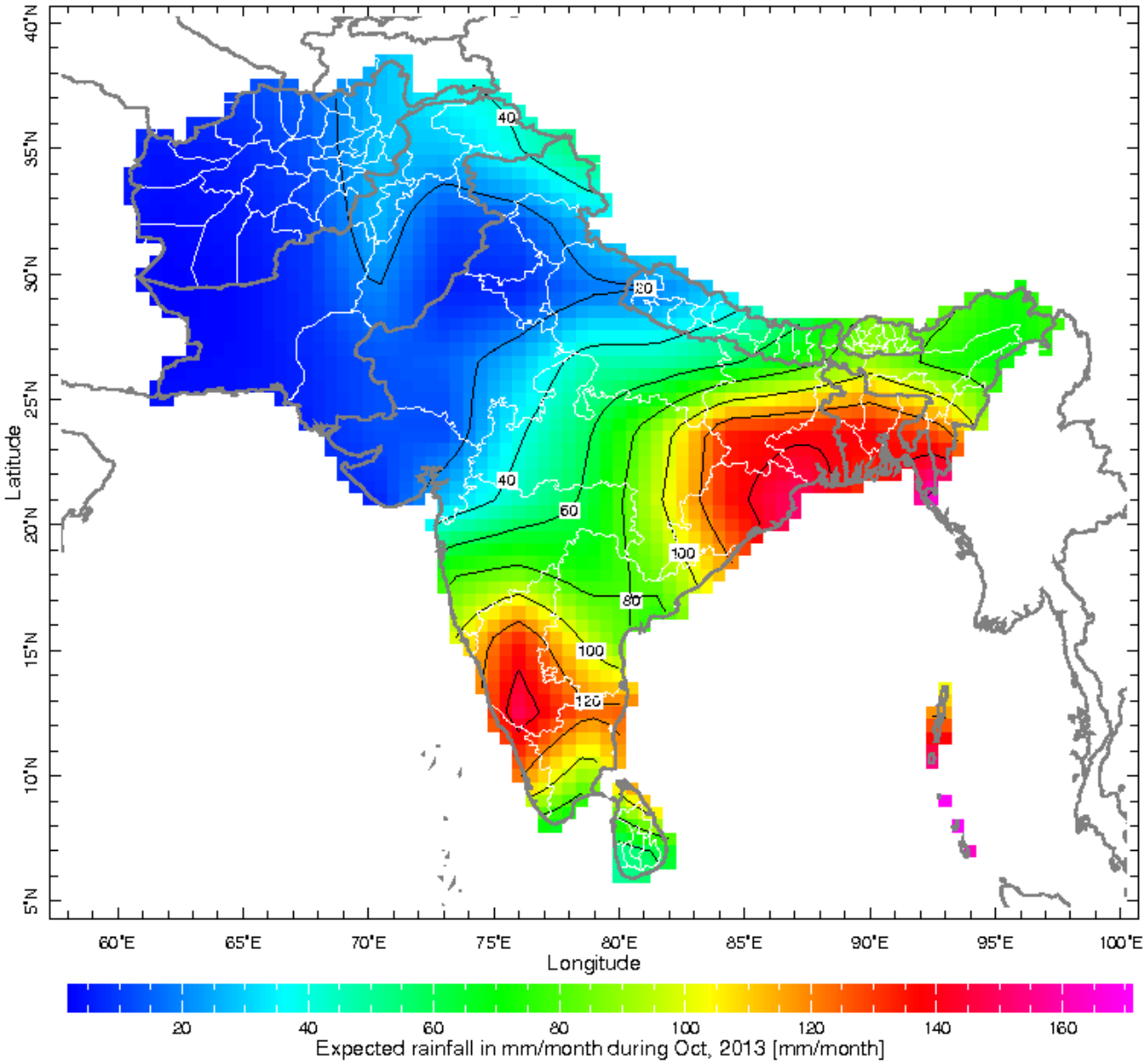


4. Spatial distribution of expected rainfall during coming season (GCM-ECHAM)

Sep, 2013



Oct, 2013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70'E
75'E
80'E
85'E
90'E
95'E
100'E
Longitude
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60
80
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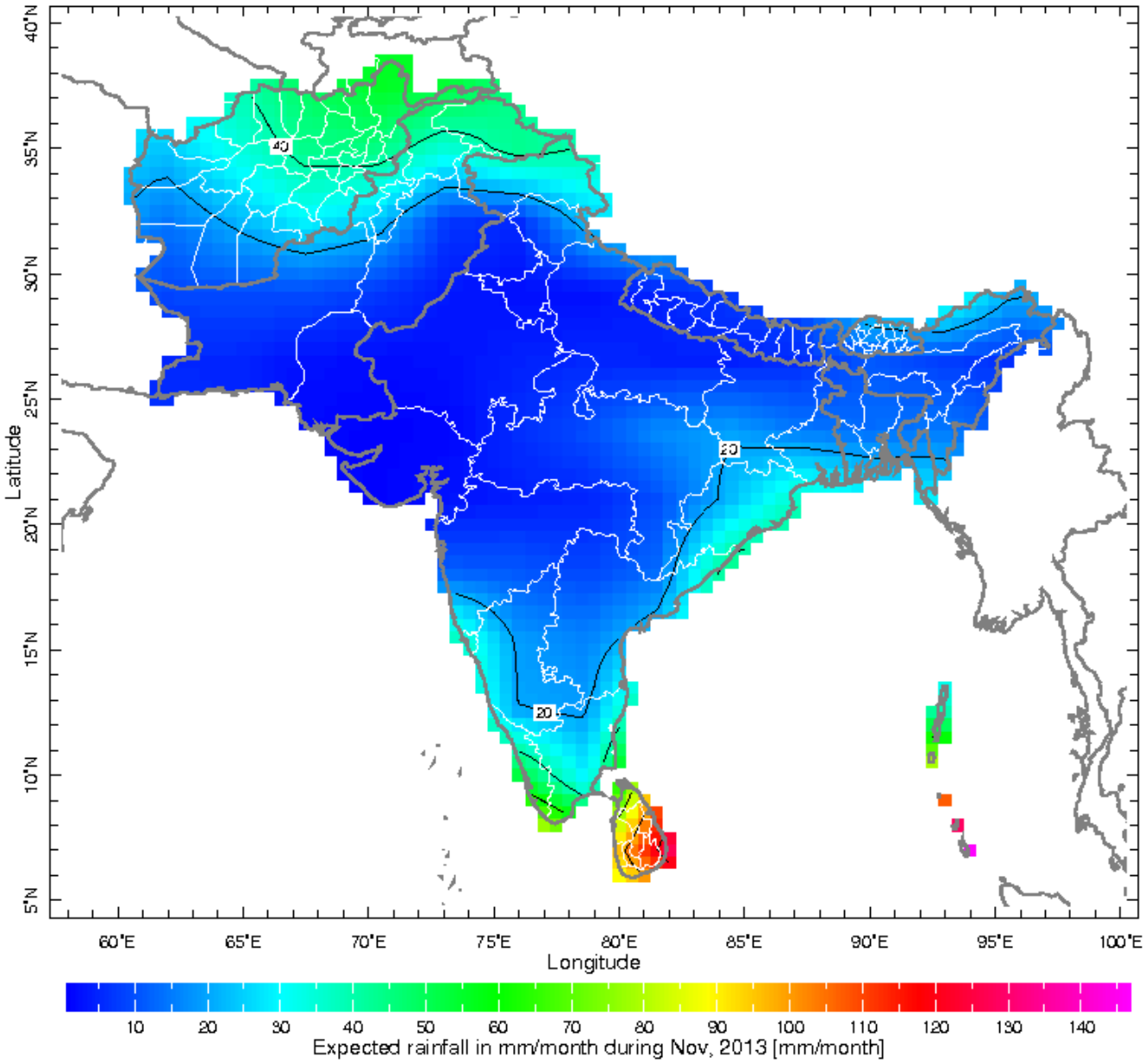
140
160
Expected rainfall in mm/month during Oct, 2013 [mm/month]

Nov, 2013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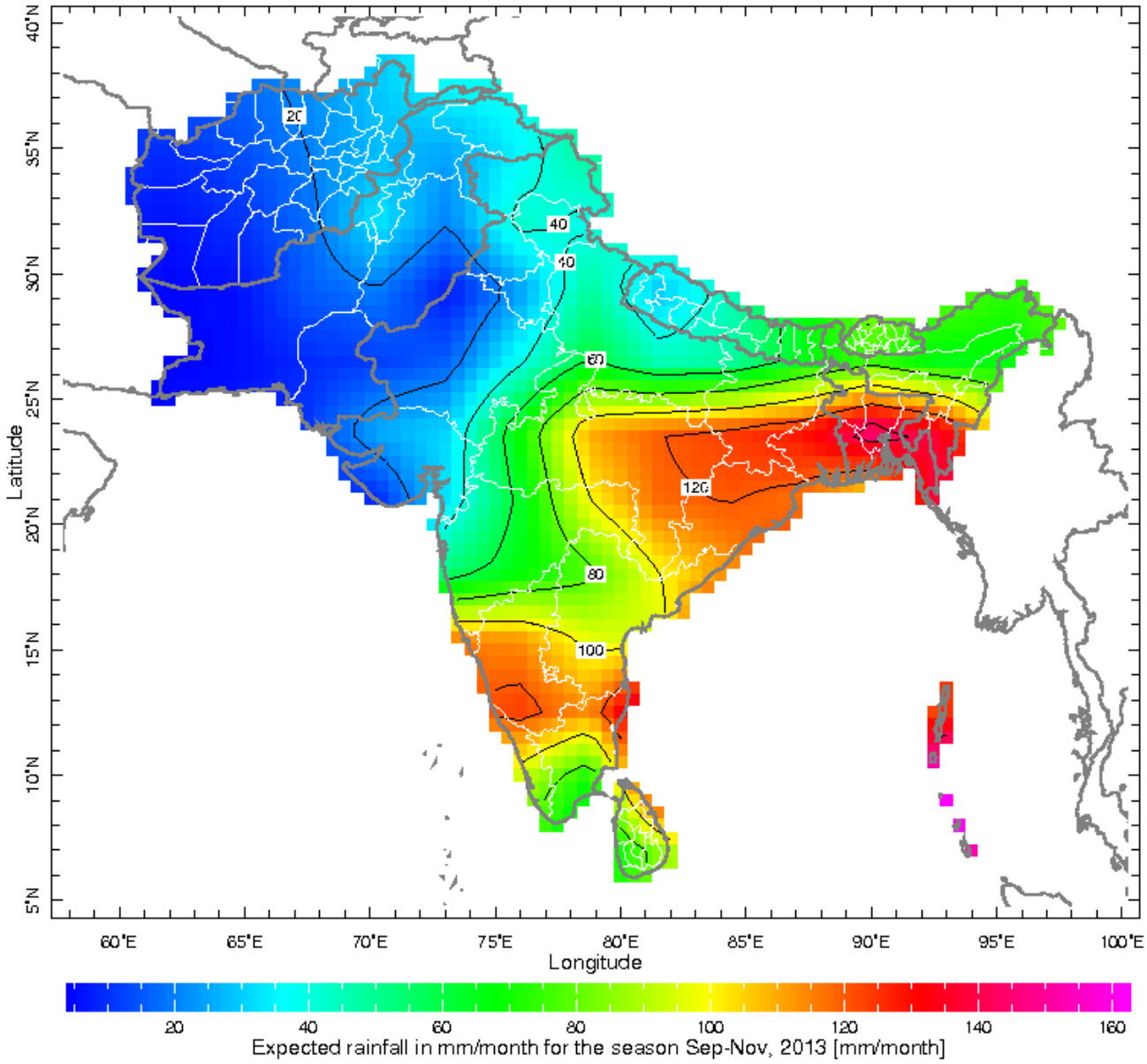
Expected rainfall in mm/month during Nov, 2013 [mm/month]

Sep-Nov, 2013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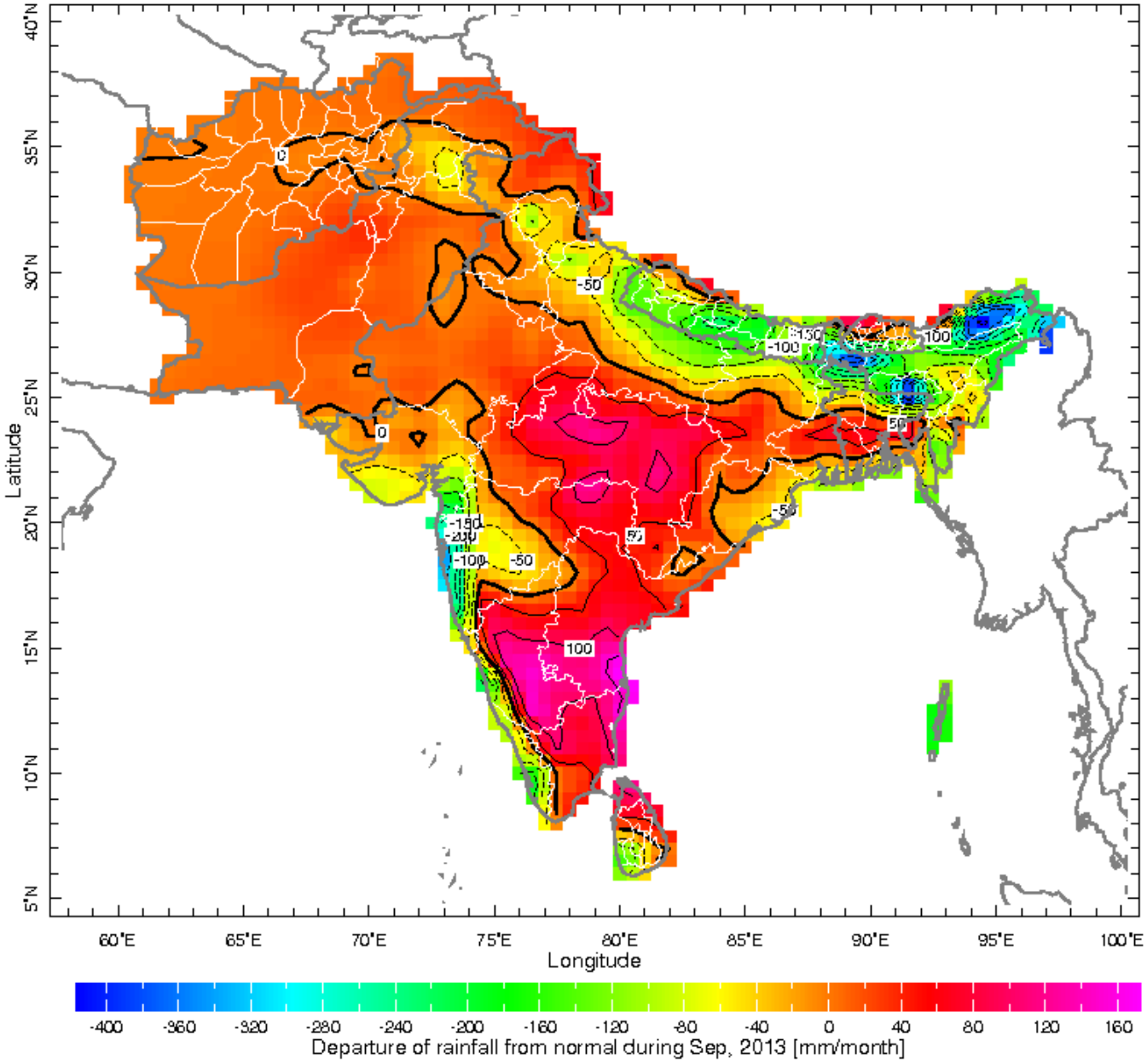
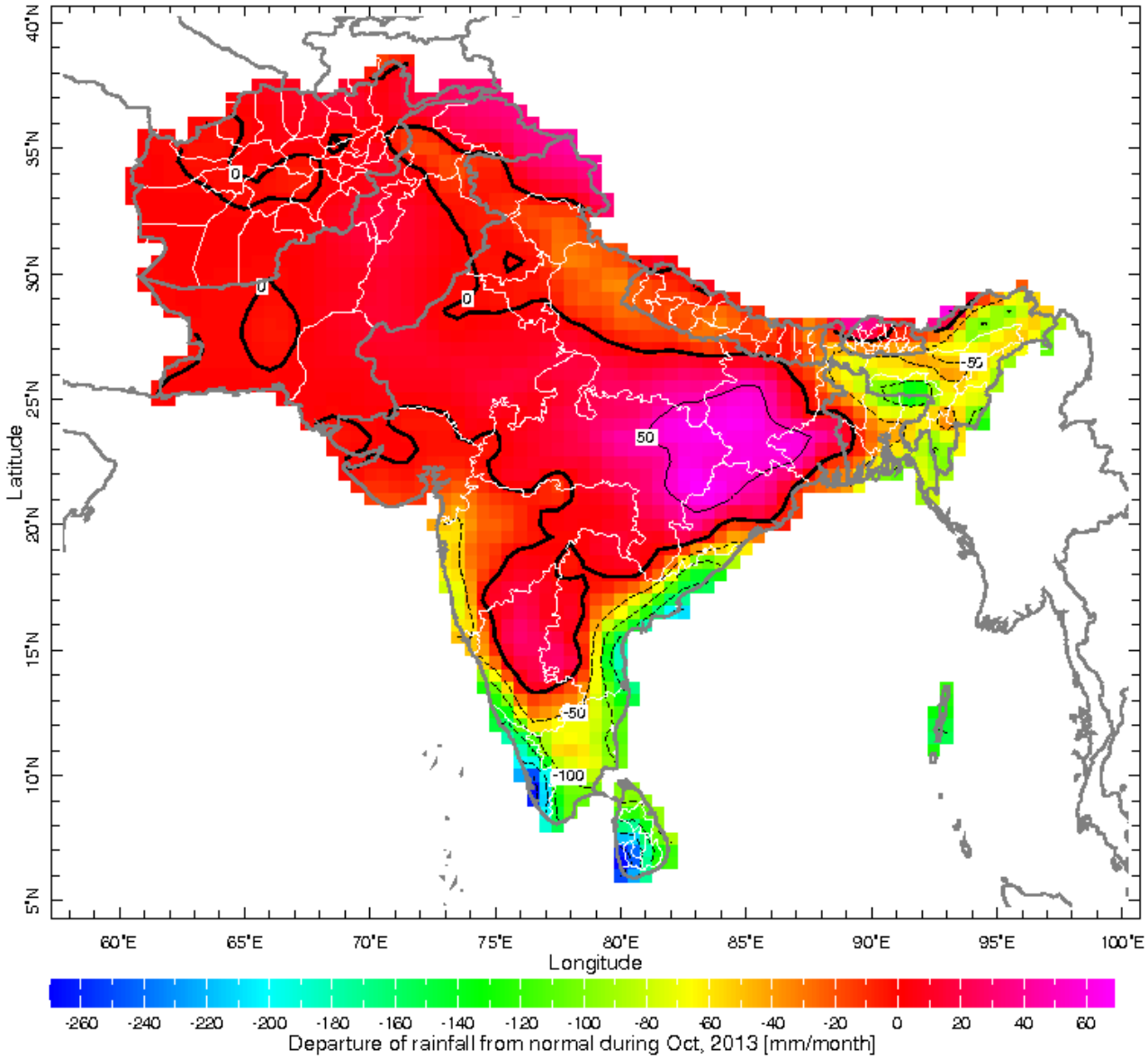
Expected rainfall in mm/month for the season Sep-Nov, 2013 [mm/month]

5. *Monthly departure from normal (rainfall) during coming season*

Sep, 2013



Oct, 2013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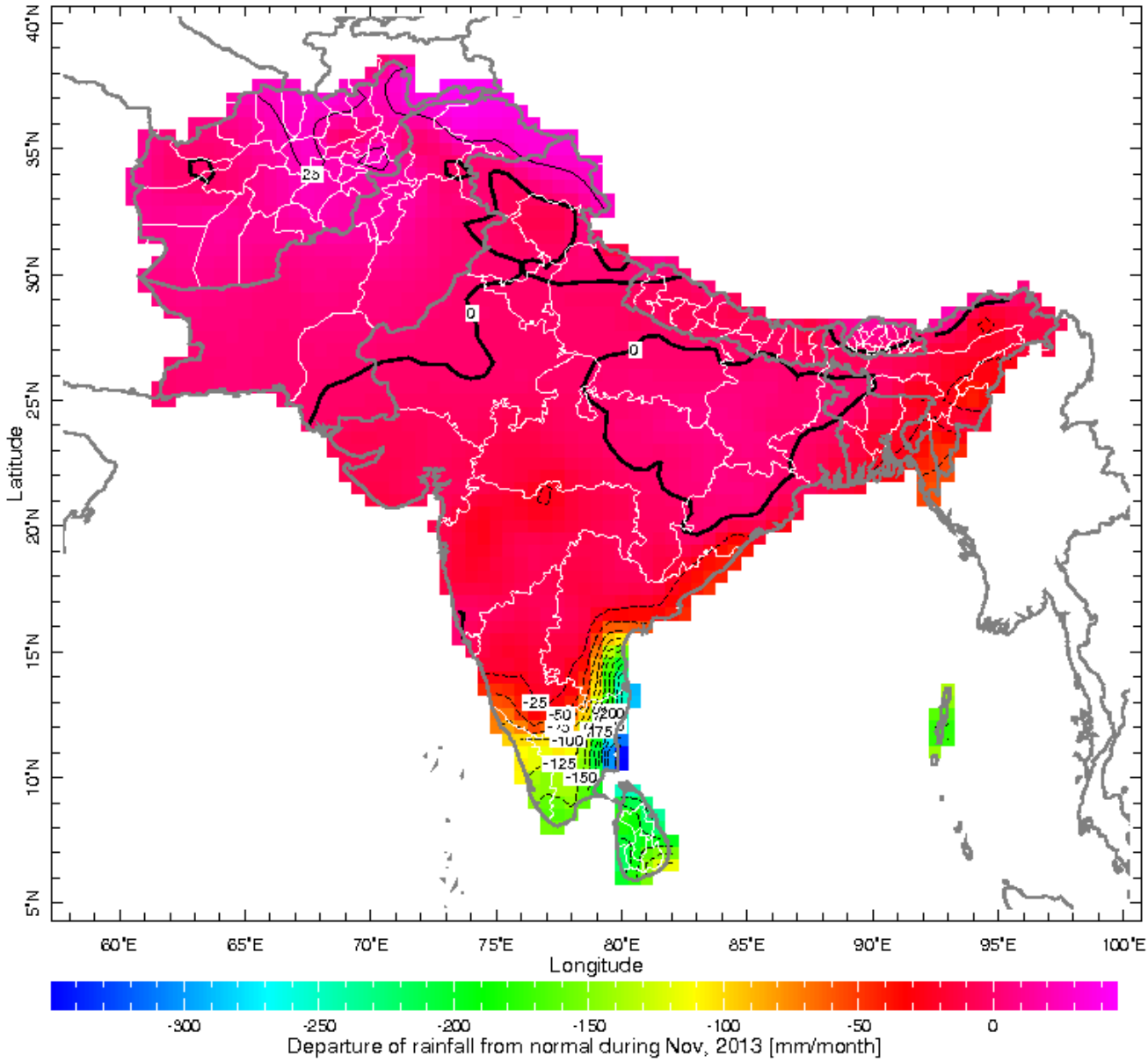
-260 -240 -220 -200 -180 -160 -140 -120 -100 -80 -60 -40 -20 0 20 40 60
Departure of rainfall from normal during Oct, 2013 [mm/month]

Nov, 2013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95°E
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Longitude
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-250
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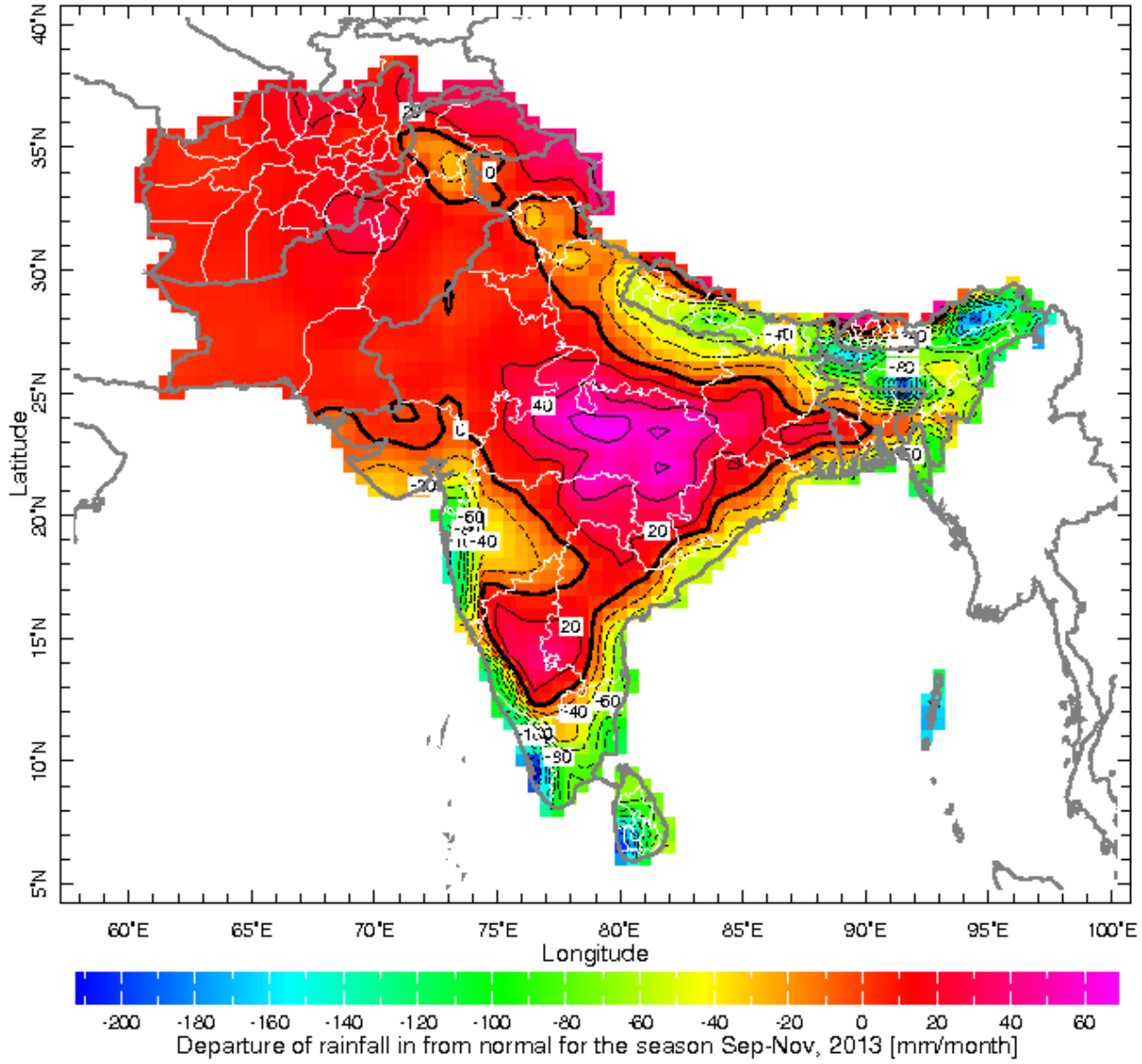
-150
-100
-50
0
Departure of rainfall from normal during Nov, 2013 [mm/month]

Sep-Nov, 2013



Note: Research wing of NAMC is regularly monitoring variation in synopitc situation of the globe and using different global climate models regional weather prediction data for prepration of this weather outlook. Seasonal weather outlook for SAARC region will be issues 10th 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/