Seasonal weather outlook for SAARC region (Jun-Aug, 2014)

Issued on Jun 11, 2014



Issued by:

Dr. Khalid M Malik (Director)

NATIONAL AGROMET CENTRE (NAMC) PAKISTAN METEOROLOGICAL DEPARTMENT SECTOR H-8/2, ISLAMABAD

Phone: <u>+92-51-9250592</u> Email: <u>dirnamc@yahoo.com</u> http://namc.pmd.gov.pk/

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 Jun 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) < -15 %,
- Average precipitation range (Ave) = -15 to +15 %,
- Above Average (Abv.Ave) > +15 %

Note: Average precipitation is computed by using Global Precipitation Climatology Centre (GPCC) gridded data by resolution $(0.5 \times 0.5^{\circ})$ latitude by longitude

2. Synoptic situation

- Location of jet stream (U wind at 200 hPa) is at normal position with slightly higher than normal intensity over west. Most of the region including Pakistan, western Nepal and Sri Lanka may prevail below normal zonal winds at 200 hPa.
- A trough at 500 hPa is expected to be over west of the country. However a strong ridge may prevail over the country during the season which causes to reduce influence of monsoon over the country.
- Surface temperatures are expected to be on higher side than normal all over the country with higher values over central parts.. However, northern and southern parts may prevail normal surface temperature.

• North Atlantic Oscillation (NAO) is in negative phase (-0.92) during May. As a result normal track of western disturbances will persist. http://www.cpc.ncep.noaa.gov/products/precip/CWlink/pna/norm.nao.monthly.b5001.cur rent.ascii.table

ENSO-neutral continued during April 2014, but with above-average sea surface temperatures (SST) developing over much of the eastern tropical Pacific. The monthly SST indices were warmer than average in all regions, except for Niño-1+2. The model predictions of ENSO for this summer and beyond are indicating an increased likelihood of El Niño compared with those from last month. Most of the models indicate that ENSO-neutral (Niño-3.4 index between -0.5°C and 0.5°C) will persist through part of the remainder of the Northern Hemisphere spring 2014, most likely transitioning to El Niño during the summer. There remains uncertainty as to exactly when El Niño will develop and an even greater uncertainty as to how strong it may become. This uncertainty is related to the inherently lower forecast skill of the models for forecasts made in the spring. While ENSO-neutral is favored for Northern Hemisphere spring, the chance of El Niño increases during the remainder of the year, exceeding 65% during the summer. .(http://iri.columbia.edu/our-

expertise/climate/forecasts/enso/current/?enso tab=enso-cpc update)

Probability outlook: La Nina (1%), Neutral (30%) and El Nino (69%) during May-Jun-Jul, 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

"Below average precipitation is expected during the season (JJA)"

Synthesis of the latest model forecasts for Jun-Aug 2014 (JJA), current synoptic situation and regional weather expert's judgment indicates that below average (about 30%) precipitation is expected during the predicted season. Above normal maximum temperature will persist over central and western states of India, Pakistan and Nepal during June. The day temperature will be on higher than normal over central and southern parts of Pakistan (Sindh and southern Punjab), western and eastern estates of India (Rajasthan, Asam). However, day temperature will be below normal over southern states of India (Karnataka, Andhra Pradesh)

Seasonal weather outlook (Jun-Aug, 2014):

As a whole, below average precipitation is likely to all over the region during the predicted season with extremely below average during June. Below average precipitation is expected over Pakistan, India, Nepal, Bhutan and Bangladesh. However, average rainfall is expected over Sri Lanka and Afghanistan.

Nepal, Bhutan, Bangladesh, northeastern parts of Pakistan and southern belt, northern western parts of India will receive good rain during the season. Eastern Indian states including western coastal belt of India including western Belt of Sri Lanka, Nepal and Bhutan will receive significantly below average rainfall. Below normal rainfall is likely to occur over Madhya Pradesh and Behar of India.

Chances of drought in western Pakistan are likely to dominate during predicted months.

June, 2014: Extremely below average precipitation is expected in SAARC member countries as a whole with below average over Sri Lanka, Nepal, Bhutan, India and Pakistan and average Afghanistan. Rainy spells will be focused over Orissa, Jharkhand, Kerala and Karnataka states of India, Bangladesh and Bhutan. Bhutan, eastern parts of Nepal, Manipur, Nagaland and Mizoram of India state will receive below normal rainfall, whereas, Orissa state will receive above normal rainfall during predicted month of June. Rest of the region will receive average rainfall.

Above normal day temperature will be expected over central parts of Pakistan, central and northeastern states of India. Highest above normal day temperature will be expected over Uttar Pradesh (> 2° C). However below normal day temperature will be expected over Karnataka and Tamil Nadu of Indian states.

July, 2014: Below average precipitation is expected during July all over SAARC region. All the SAARC member countries will receive below average rainfall except Sri Lanka. Pakistan will receive (-56%), Afghanistan (-23%), India (-24%), Bangladesh (-39%), Bhutan (-50%), Nepal (-40%) and Sri Lanka (– 13%) rainfall departure from normal. Intensity of precipitation will be

higher over Indian states of Maharashtra, Karnataka, Orissa, west Bengal and southern parts of Bangladesh and Northeastern parts of Pakistan. Above normal rainfall is expected over Uttar Pradesh, Karnataka, Andhra Pradesh and Orissa of India while below normal over northeastern parts of India Nepal and Bhutan. Rest of the region will receive normal rainfall during the month.

Day temperature will be above normal over upper region of domain with maximum (> 4°C) over central Pakistan including Rajasthan of India. However, lower region of the domain will be on below normal day temperature.

August, 2014: Slightly below average precipitation is expected during August all over SAARC region with moderate below average over Pakistan (-31%) and Nepal (-32%), below average over Bhutan (-29%), Bangladesh (-29%) and India (-25%), and average Afghanistan (+15%) and above average over Sri Lanka (– 26%). High intensity precipitation is expected over monsoon pron areas of all the countries. The northeastern parts of Pakistan, southern states of India and Bangladesh may likely to occur above normal rainfall during August.

Monsoon 2014 Prediction (Jun-August, 2014):

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

Afghanistan: July is likely to be less rain and 2-3 good rainy spell are expected during August in the coutnry.

Bangladesh: Good rainy spells are expected in June and will continue till Ist decade of July. Two to three rainy spells are expected in July.

Bhutan: Good rainy spells are expected in last decade of June. Three to four rainy spells with higher intensity rainfall are expected during July. Moderate rainy spell is also expected during last decade of August.

India: Maximum rainy spells are expected during July with moderate intensity. Intensity of rainy spells will gradually decrease during August. Monsoon starts on 1st week of June will slow pace and gradually increase intensity of rainfall. Good rainy spells are expected during June. Rainfall intensity will be less from June during month of July. Chances of flood in the country will be on higher side.

Nepal: Monsoon rain starts in mid of June and increase rainfall intensity gradually. Good rainy spells are expected from second week of July to second week of August.

Pakistan: Monsoon starts from 27-28 June, which will few days in advance as per official date of arrival of monsoon in the country. Good rainy spells are expected during first few days of July

and then it became weak. Good rainy spells are expected in 1st week of August with moderate intensity. Chances of flood can't be ruled out in August.

Sri Lanka: First two weeks of July will be dry but after that rainy spell gradually increases in the region. Good rainy spells are expected during second decade of August (11-20).



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.

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





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.

Bhutan

Nepal

Afghanistan Bangladesh

-40.0

SAARC

Sri Lanka

0.0

Pakistan

India



5. Daily country wise precipitation predictrion for coming months (Jun-Aug, 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 expected Rainfall of Afghanistan for Jun-Aug, 2014



Seasonal weather outlook (Jun-Aug, 2014)







Daily expected Rainfall of Sri Lanka for Jun-Aug, 2014



Daily expected Rainfall of Pakistan for Jun-Aug, 2014

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



Expected rainfall in mm/month during Jun, 2014







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



Departure of rainfall from normal during Jun, 2014











Departure of Max. Temperature from normal during Jun,2014





Departure of Max. Temperature from normal during Jul,2014

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/