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SEASONAL CLIMATE OUTLOOK FOR SOUTH ASIA

(July to October 2025)

Highlights

- Currently, neutral El Nino-Southern Oscillation (ENSO) conditions are prevailing over the equatorial Pacific region. The latest Monsoon Mission Climate Forecast System (MMCFS) as well as other climate model forecasts indicate that the neutral ENSO conditions are likely to continue during the monsoon season.

- At present, neutral Indian Ocean Dipole (IOD) conditions are observed over the Indian Ocean. The latest MMCFS forecast as well as other climate model forecasts indicates that the neutral IOD conditions are likely to turn into weak negative IOD conditions during later part of the monsoon season

- The probability forecast for precipitation for JAS and ASO seasons indicate that enhanced probability of above normal precipitation is likely over most parts of South Asia except over extreme north, some parts of north west and north east South Asia where below normal precipitation is likely.

- In July, the country averaged monthly precipitation is likely to be normal to above normal for all South Asia countries. In August, September and October, the country averaged monthly precipitation is likely to be normal to above normal for all countries except Afghanistan where it is likely to be below normal.

- Temperature probability forecast for JAS and ASO seasons indicate that enhanced probability of above normal temperatures is likely over northwest, north along the plains of Himalayas, east, northeast and south east parts of South Asia and enhanced probability of below normal temperatures is likely over north, central and Peninsular India.

- The country averaged monthly temperatures during July is likely to be above normal for all the south Asian countries except India where it is likely to be below normal. In August, September and October, it is likely to be normal to above normal for all the south Asian countries.

1. Important Global Climate Factors

1.1 Sea Surface Temperatures over the Pacific Ocean

In June 2025, equatorial sea surface temperatures (SSTs) were near average across most of the equatorial Pacific Ocean (Fig. 1a). Warmer-than-average SSTs were observed in the northern and southern extra-tropical regions of the Pacific. Cooler than average SSTs were seen over the north-eastern extra tropical Pacific Ocean. Compared to May 2025, positive SST anomalies developed over the eastern and central Pacific Ocean while negative SST anomalies are seen across the western Pacific Ocean. Additionally, cool SST anomalies were present in some parts of both the South and North Pacific Ocean (Fig. 1a). Currently, neutral El Nino-Southern Oscillation (ENSO) conditions are prevailing over the equatorial Pacific region. The latest Monsoon Mission Climate Forecast System (MMCFS) as well as other climate model forecasts indicate that the neutral ENSO conditions are likely to continue during the monsoon season (Fig.2).

1.2 Sea Surface Temperatures over Indian Ocean

In June 2025, equatorial SSTs were above average across the western Indian Ocean (Fig. 1a). Negative SSTs were observed in the middle of the Arabian Sea. Compared to May 2025, cool SSTs were observed across the Arabian Sea, Bay of Bengal and Western Indian Ocean (Fig. 1b) while warm SSTs were observed over some parts of the Eastern Indian Ocean. (Fig. 1b). At present, neutral Indian Ocean Dipole (IOD) conditions are observed over the Indian Ocean. The latest MMCFS forecast as well as other climate model forecasts indicates that the neutral IOD conditions are likely to turn into weak negative IOD conditions during later part of the monsoon season (Fig.3).

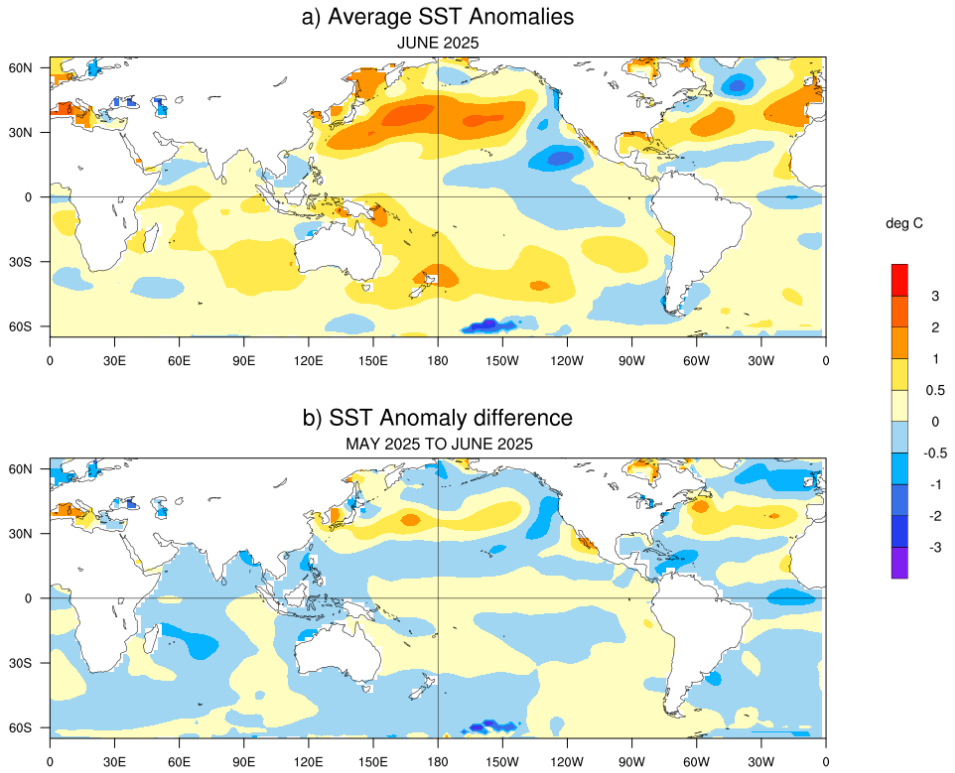

Fig.1: (a) Sea surface temperature (SST) anomalies (^{0}C) during June 2025 and (b) changes in the SST anomalies (^{0}C) from May to June 2025. SSTs are based on the ERSSTv5, from NOAA, and anomalies are computed with respect to 30-year (1991-2020) long term mean.

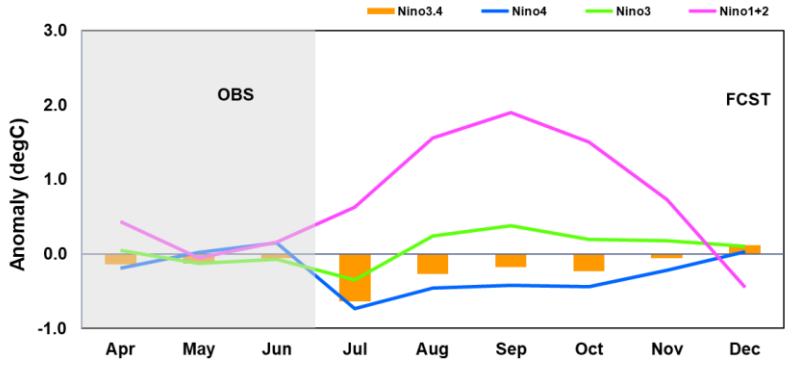

Fig.2: Time series of monthly area-averaged SST anomalies (°C) in the 4 Niño regions. ERSSTv5 observed anomaly for the last 3 months and MMCFS model PDF corrected anomaly forecast for the next 6 months.

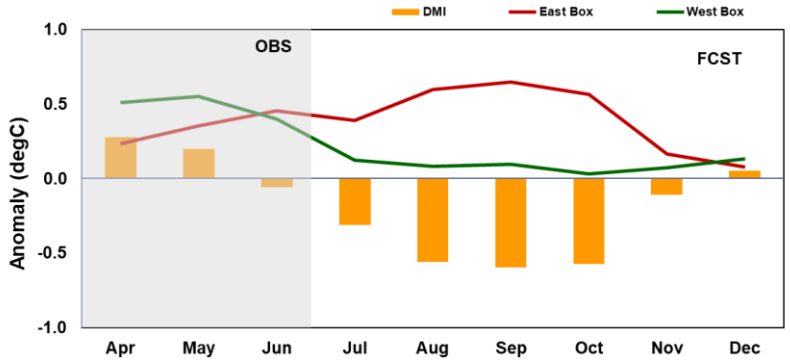

Fig.3: The time series of the monthly area-averaged SST anomaly Indices (°C) over west equatorial Indian Ocean (WEI) & east equatorial Indian Ocean (EEI) along with Dipole Mode Index (DMI=WEI-EEI) representing Indian Ocean Dipole (IOD). ERSSTv5 observed anomaly for the last 3 months and MMCFS model PDF corrected anomaly forecast for the next 6 months.

1.3 Convection (OLR Anomaly) Pattern over the Asia Pacific Region

The Outgoing Longwave Radiation (OLR) anomaly during Jun 2025 is shown in (Fig.4). Negative OLR anomalies (enhanced convection, blue shading) were observed over Bay of Bengal, most parts of western tropical Pacific Ocean and east tropical Pacific Ocean near central America. Negative OLR anomalies were also observed over northwest parts of South Asia, Maritime Continent and Central America. Positive OLR anomalies (suppressed convection, orange/red shading) were observed over southern India, Arabian Sea and tropical Pacific Ocean. Positive OLR anomalies were also observed over some parts of Africa and north America.

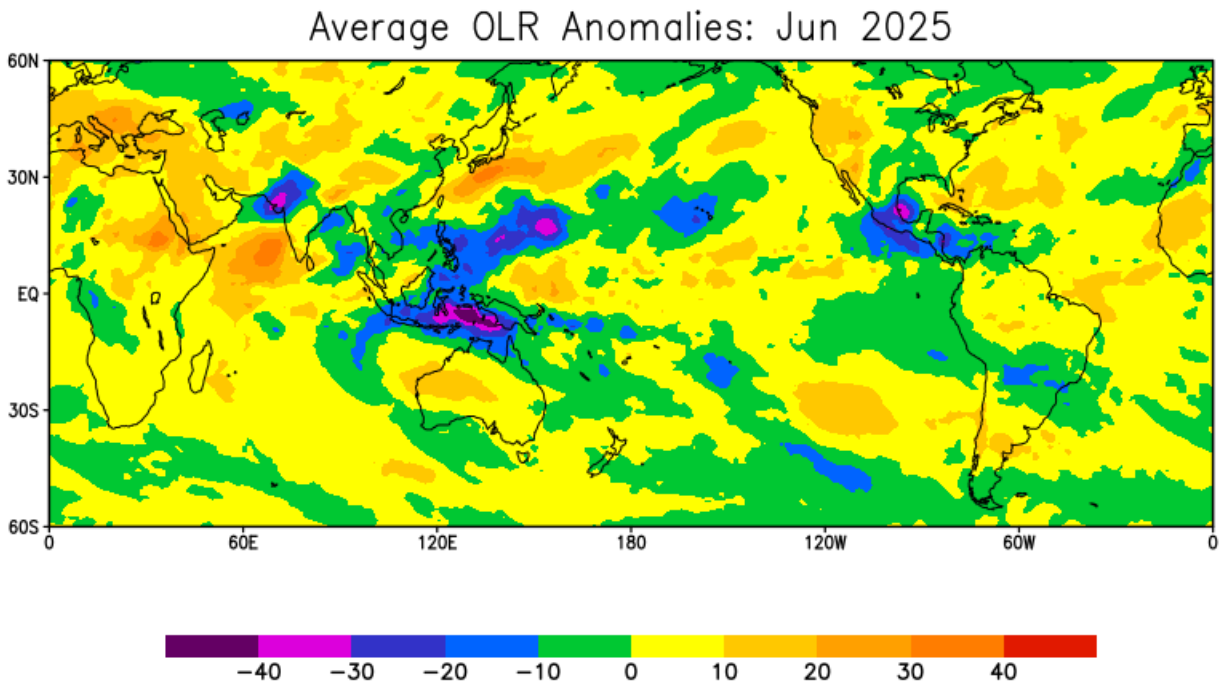

Fig.4: Outgoing Long Wave Radiation (OLR) Anomaly (W/m^2) for Jun 2025 (Data source: NCEP-NOAA)

1.4 Snow Cover Area over the Northern Hemisphere (NH)

During June 2025, the NH snow cover area (6.564 million Sq. km) was less than the 1991-2020 normal by 1.57 million Sq. km (Fig. 5). Eurasian Snow cover area (2.004 million Sq. km) was 0.85 million Sq. km less than the 1991-2020 normal. North America snow cover area of 4.56 million sq. km was less by 0.72 million Sq. Km with respect to 1991-2020 normal.

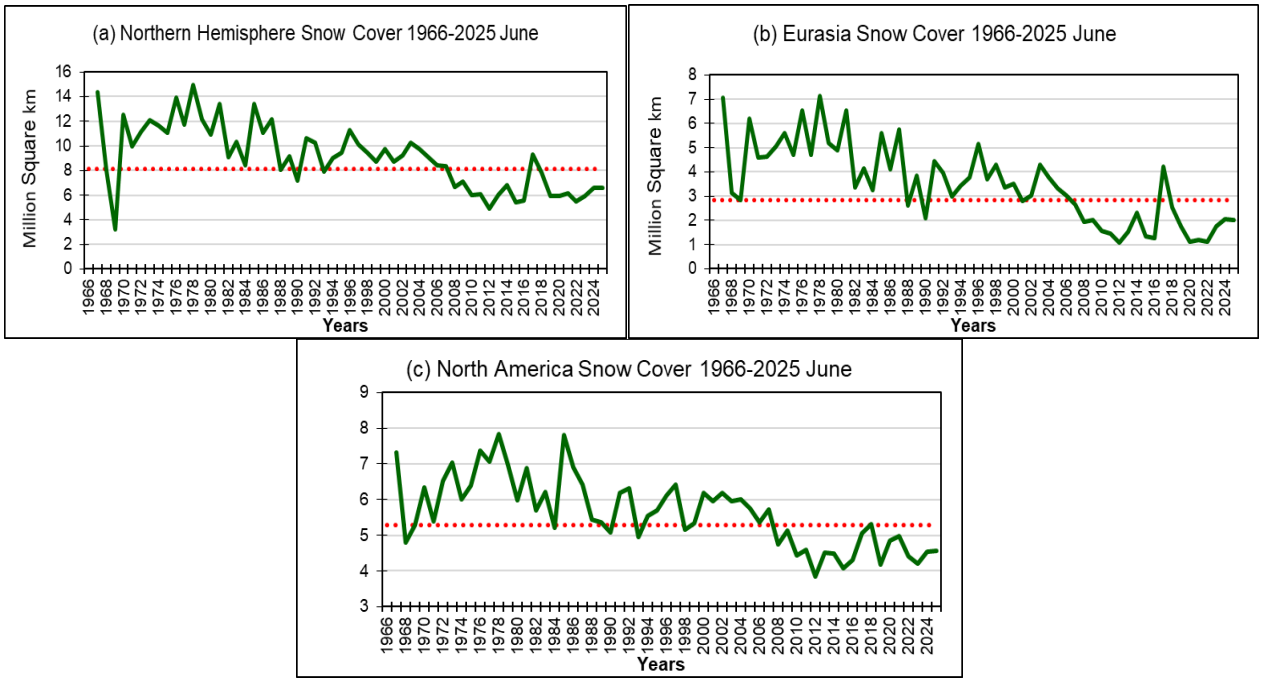

Fig.5. Snow cover area (million Sq. km) for the month of June during the period 1966-2025 (green solid lines) and normal value (1991-2020) (red dotted line) for (a) Northern Hemisphere (b) Eurasia and (c) North America. (Data Source: Rutgers University Snow Lab).

1.5. Madden Julian Oscillation (MJO)

During the first week of June 2025, MJO moved from Phase 4 (Maritime Continent) to phase 6 (Western Pacific) with an amplitude < 1. During the second week it further moved eastwards to Phase 1 (Western Hemisphere and Africa) with amplitude > 1. In the second fortnight it moved eastwards to Phase 5 (Maritime Continent) with an amplitude < 1. The MJO phase diagram illustrates the progression of the MJO through different phases, which generally coincide with locations along the equator around the globe.

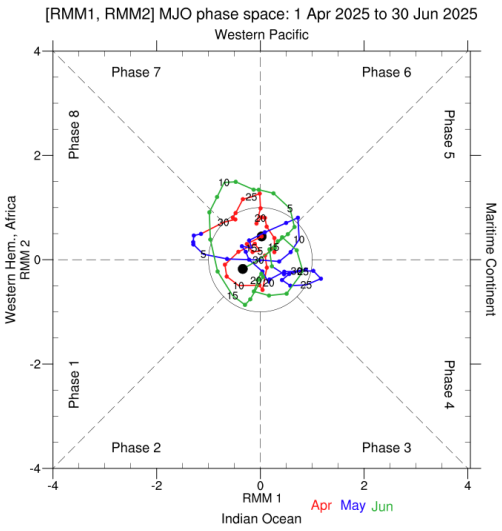

Fig.6. RMM phase diagram for Madden Julian Oscillation (MJO) for the period April to June 2025. (Data Source: http://www.bom.gov.au/climate/mjo/).

2. Seasonal Outlook for South Asia

The seasonal outlook was prepared based on the forecast from Monsoon Mission Coupled Forecasting System (MMCFS). The model is a fully coupled ocean-atmosphere-land model. The atmospheric component of CFSv2 is Global Forecast System (GFS) with spectral resolution of T382 (approximately 38 km) and 64 hybrid vertical levels and the ocean component is Geophysical Fluid Dynamics Laboratory (GFDL) Flexible Modelling System (FMS) Modular Ocean Model version.

2.1. Precipitation Probability Forecast:

The probability forecasts for precipitation for the seasons July to September 2025 (JAS) and August to October 2025 (ASO) are given in the Figures 7a and 7b respectively. The forecast is prepared based on the June initial conditions. The probability forecast for precipitation for JAS and ASO seasons indicate that enhanced probability of above normal precipitation is likely over most parts of South Asia except over extreme north, some parts of north west and north east South Asia where below normal precipitation is likely.

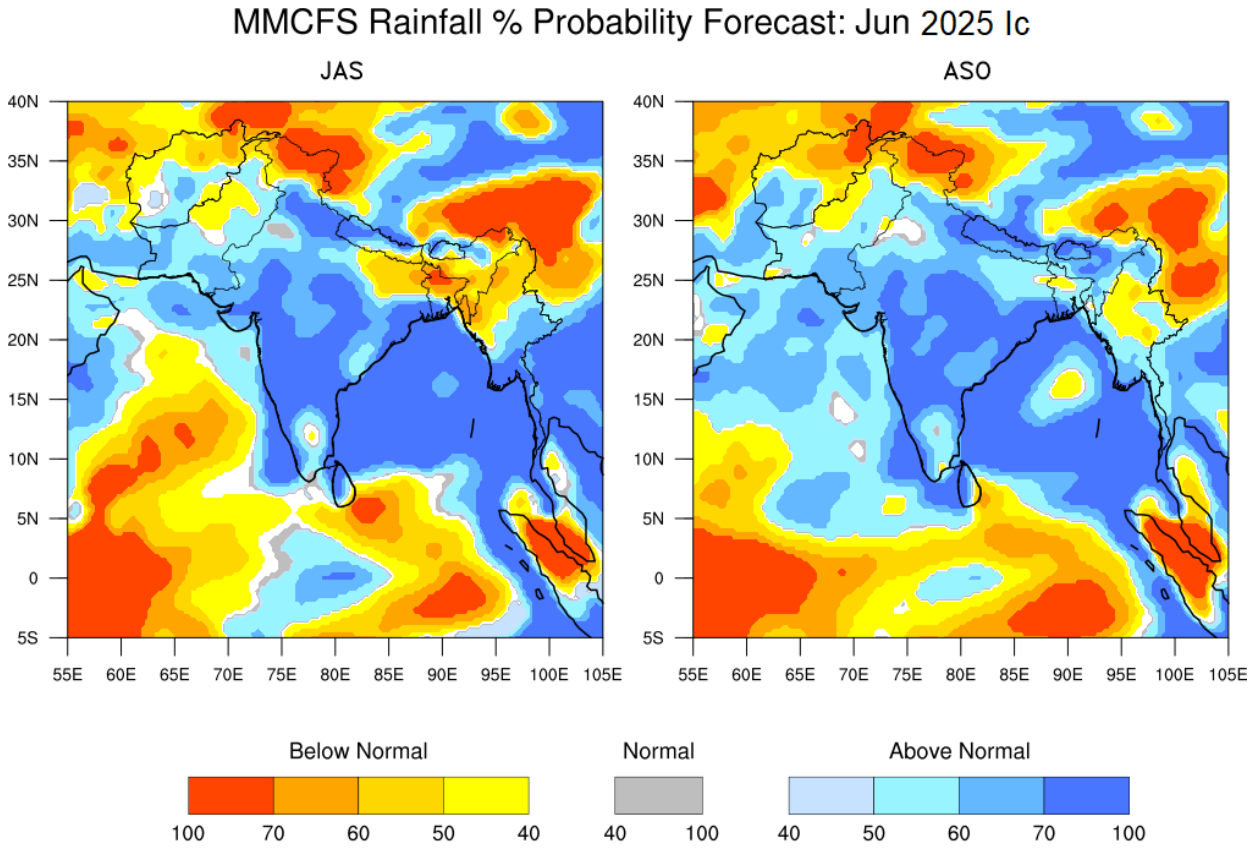

Fig.7: Seasonal probability (%) forecasts of precipitation for (a) JAS 2025 (left) and (b) ASO 2025 (right) based on initial conditions of June 2025.The white colour indicates climatological probability.

2.2. Temperature Probability Forecast*:*

The probability forecasts for temperature for the season July to September 2025 (JAS) and August to October 2025 (ASO) are given in the Figures 8a and 8b respectively. The forecast is prepared based on the June initial conditions. Temperature probability forecast for JAS and ASO seasons indicate that enhanced probability of above normal temperatures is likely over northwest, north along the plains of Himalayas, east, northeast and south east parts of South Asia and enhanced probability of below normal temperatures is likely over north, central and Peninsular India.

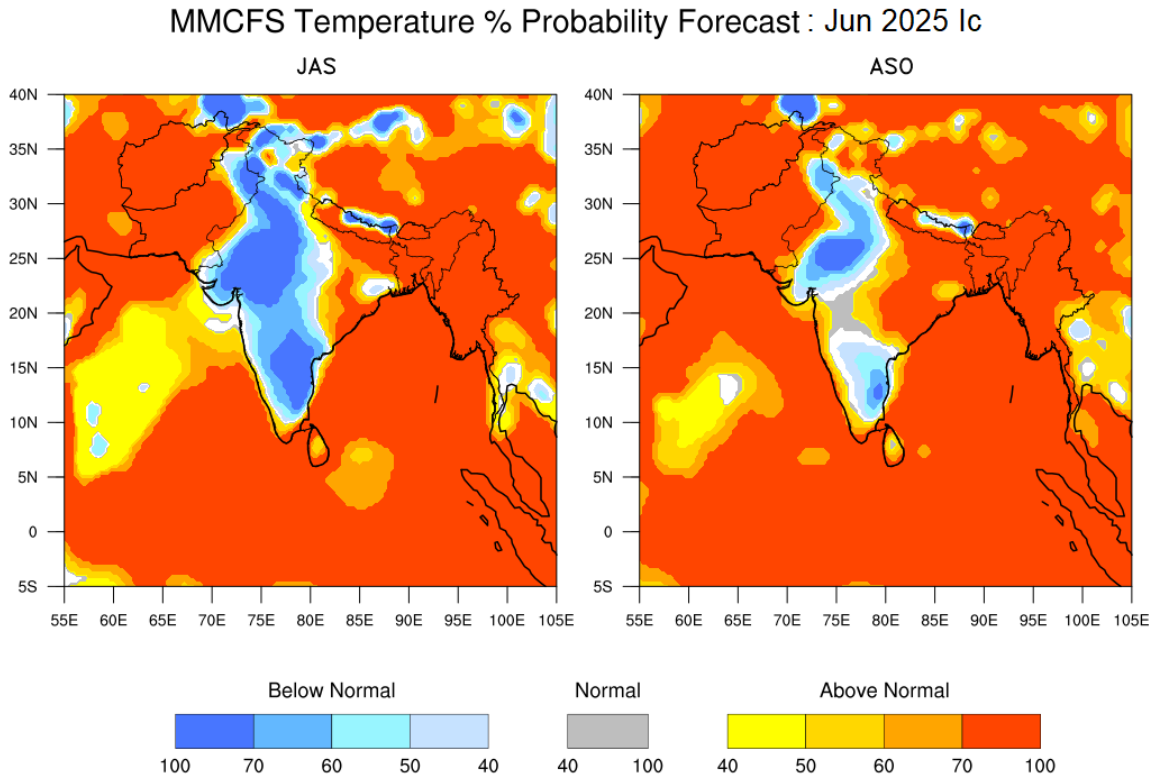

Fig. 8: Probability (%) forecast for the seasonal mean temperature for (a) JAS 2025 (left) and (b) ASO 2025 (right) based on initial conditions of June 2025. The white colour indicates climatological probability.

3. Forecast Outlook for the Country Averaged Monthly Precipitation and Temperature

The MMCFS model forecast for monthly precipitation and temperature for the next four months (from July to October 2025) averaged over the 9 south Asian countries viz., Afghanistan, Bangladesh, Bhutan, India, Maldives, Myanmar, Nepal, Pakistan and Sri Lanka were shown in the Figures 9. The monthly rainfall anomaly is expressed as percentage departure from Long Period Model Average (LPMA) and monthly temperature anomaly is expressed in degree Celsius.

In July, the country averaged monthly precipitation is likely to be normal to above normal for all South Asia countries. In August, September and October, the country averaged monthly precipitation is likely to be normal to above normal for all countries except Afghanistan where it is likely to be below normal.

The country averaged monthly temperatures during July is likely to be above normal for all the south Asian countries except India where it is likely to be below normal. In August, September and October, it is likely to be normal to above normal for all the south Asian countries.

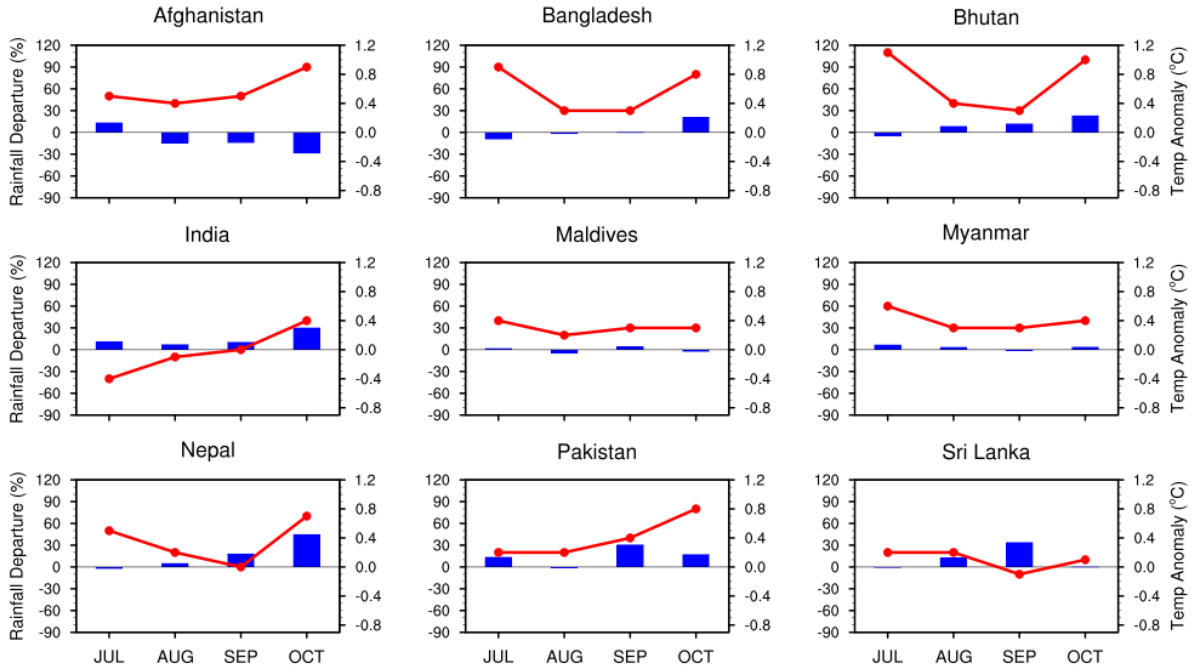

Fig. 9: Monthly country averaged rainfall forecast expressed as percentage departures (%) and Monthly country averaged temperature anomaly (°C) forecast during July to October 2025. Here, the normal range for country averaged monthly precipitation is taken as -10% to +10% (Left Vertical Axis Scale for Precipitation indicated in blue shaded bars) and the normal range for country averaged monthly temperature is taken -0.25°C to +0.25°C (Right Vertical Axis Scale for Temperature indicated in red coloured lines).