



**31st Session of South Asian Climate Outlook Forum (SASCOF-31) and
Climate Services User Forum (CSUF)
Pune, India
28-30 April 2025**

**Statement on the Seasonal Climate Outlook over South Asia for the
2025 Southwest Monsoon Season (June – September)**

Summary

Above normal rainfall is most likely during the 2025 southwest monsoon season (June – September) over most parts of the South Asia except some areas over northern, southern, eastern and north-eastern parts of the region, where normal to below normal seasonal rainfall is most likely. The seasonal rainfall is most likely to be of climatological probabilities over the remaining areas of the region.

During the season, above normal minimum temperatures are most likely over most parts of South Asia except some isolated areas of south-eastern part of the region where normal minimum temperatures are most likely. The seasonal maximum temperatures are most likely to be above normal over most areas of the northern, eastern, and northeastern parts of the region, as well as some areas in the southern parts. However, maximum temperatures over the central parts of the region and most areas in the southern parts are likely to be normal to below normal.

This regional climate outlook for the 2025 southwest monsoon season over South Asia has been collaboratively developed by all nine National Meteorological and Hydrological Services (NMHSs) of South Asia with the support from international experts at the 31st session of the South Asian Climate Outlook Forum (SASCOF-31) conducted at Pune, India. The process involved an expert assessment of the prevailing global climate conditions, national level forecasts and forecasts from different climate forecasting agencies around the world.

Currently neutral El Niño Southern Oscillation (ENSO) conditions are prevailing over the tropical Pacific Ocean. Based on the global climate model forecasts, there is strong consensus among experts that the prevailing ENSO neutral conditions are likely to continue over the equatorial Pacific during the southwest monsoon season. It is recognized that the global climate model predictions prior to and during the spring season generally have noticeable uncertainty due to spring barrier in the seasonal predictability. It is also recognized that other regional and global factors as well as the intra-seasonal features of the region can also affect the seasonal climate patterns over the region.

For more information and further updates on the southwest monsoon outlook on national scale, the respective National Meteorological and Hydrological Services (NMHSs) may be consulted.

Introduction

The climate outlook for the 2025 southwest monsoon season (June to September) was finalized during the 31st session of the South Asian Climate Outlook Forum (SASCOF-31) held in the hybrid mode and was released on 29 April 2025 at Pune, India. The session was attended by the experts representing the National Meteorological and Hydrological Services (NMHSs) of nine South Asian countries as well as those representing several global and regional climate agencies including World Meteorological Organization (WMO), WMO Regional Climate Centre(RCC) Pune, Indian Institute of Tropical Meteorology (IITM), Met Office, UK (UKMO), National Center for Environmental Prediction (NCEP), International Research Institute for Climate and Society (IRI), Regional Integrated Multi-hazard Early-warning System (RIMES), Japan Meteorological Agency (JMA), WMO Lead Centre of Seasonal Prediction, Korean Meteorological Agency etc. The forum deliberated on various observed and emerging climatic features that influence the performance of the southwest monsoon such as the El Niño-Southern Oscillation (ENSO), Indian Ocean Dipole (IOD), winter and spring Northern Hemisphere (NH) snow cover, land surface temperature anomalies etc. The key features of these climate drivers are as follows:

ENSO Conditions over the Pacific Ocean

The ENSO is one of the global-scale climate phenomena that has a robust inverse association with the year-to-year variability of the monsoon over South Asia. Currently, neutral ENSO conditions are prevailing over the equatorial Pacific region. The latest forecasts from various coupled global models indicate that the neutral ENSO conditions are likely to continue during the upcoming monsoon season.

IOD Conditions over the Indian Ocean

In addition to ENSO, other factors such as the Indian Ocean Dipole (IOD) also influence the South Asian southwest monsoon. A positive (negative) IOD is in general associated with a stronger (weaker) than normal southwest monsoon over the region. At present, neutral IOD conditions are prevailing over the Indian Ocean. The recent forecasts from coupled global models suggest that the neutral IOD conditions are likely to continue during the southwest monsoon season.

Snow Cover over the Northern Hemisphere (NH)

The NH winter and spring snow cover extent has a general inverse relationship with the subsequent summer monsoon rainfall over South Asia. The NH winter and spring snow cover areas during January to March 2025 were below normal. The snow cover area during January and March respectively, was 4th and 6th lowest ever recorded during the past 59 years.

Regional Outlook for the 2025 Southwest Monsoon Rainfall over South Asia

A regional climate outlook for the 2025 Southwest monsoon season rainfall over South Asia was prepared based on the expert assessment of prevailing large-scale global climate indicators mentioned above, experimental models developed during capacity-building workshops conducted for the South Asian countries in association with the previous SASCOF sessions, and experimental as well as operational long-range forecasts based on statistical and dynamical models generated by the NMHSs in the region and various other operational and research climate centres of the world.

There is a strong consensus among the experts that the prevailing ENSO neutral conditions are likely to continue over the equatorial Pacific during the southwest monsoon season. Further, it is well-known that ENSO predictions at this time of the year generally have substantial uncertainty due to the so-called spring barrier in seasonal predictability. However, it is important to note that ENSO conditions are not the only factor that determines the performance of Southwest monsoon over the region. Other relevant climate drivers such as the state of the IOD, tropical Atlantic Sea surface temperatures, Eurasian land heating etc. are also important. The relative impact of all these parameters needs to be considered to determine the expected state of the monsoon over the region, which is implicitly considered by the dynamical climate models that underpin the present outlook.

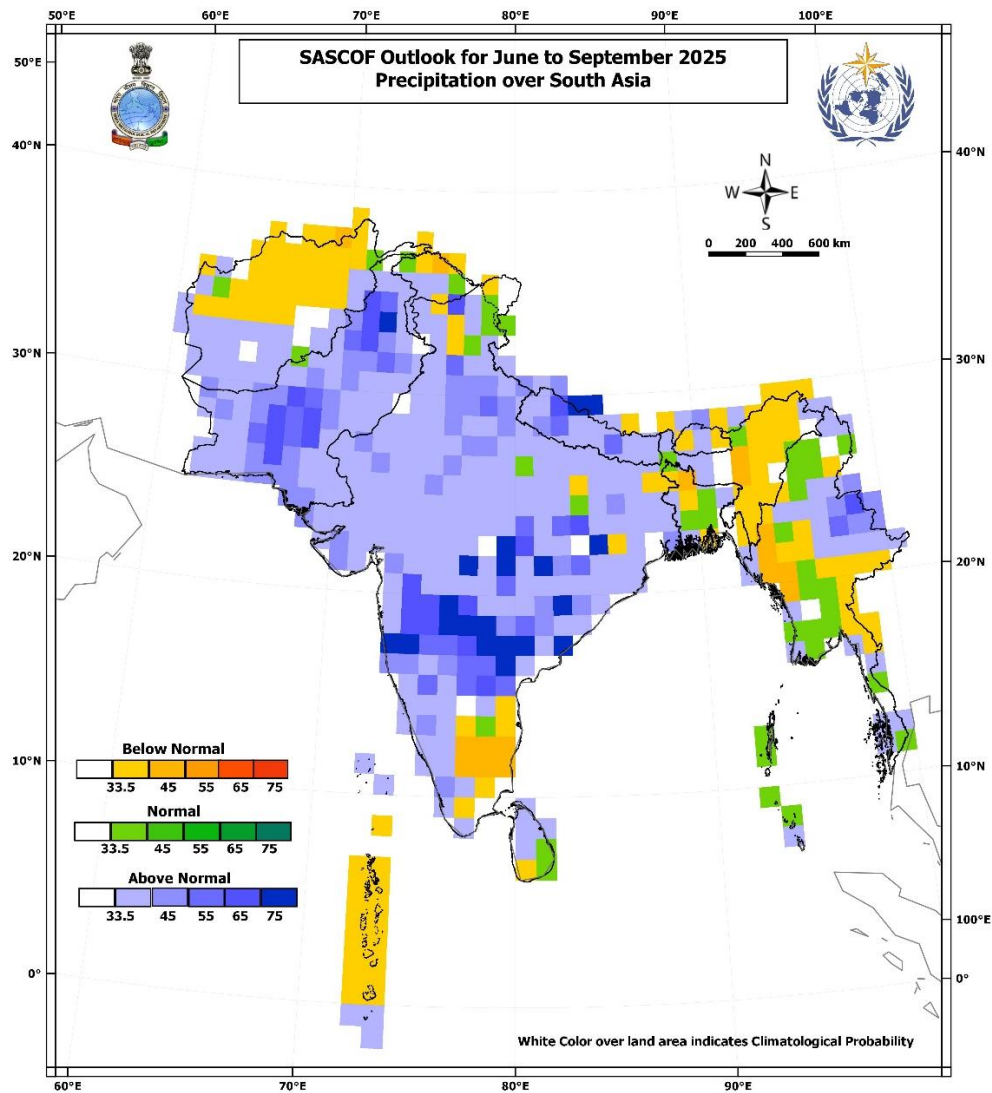


Fig.1a. Probability of the most likely category for the 2025 southwest monsoon rainfall over South Asia.

Tercile categories have equal climatological probabilities, of 33.33% each.

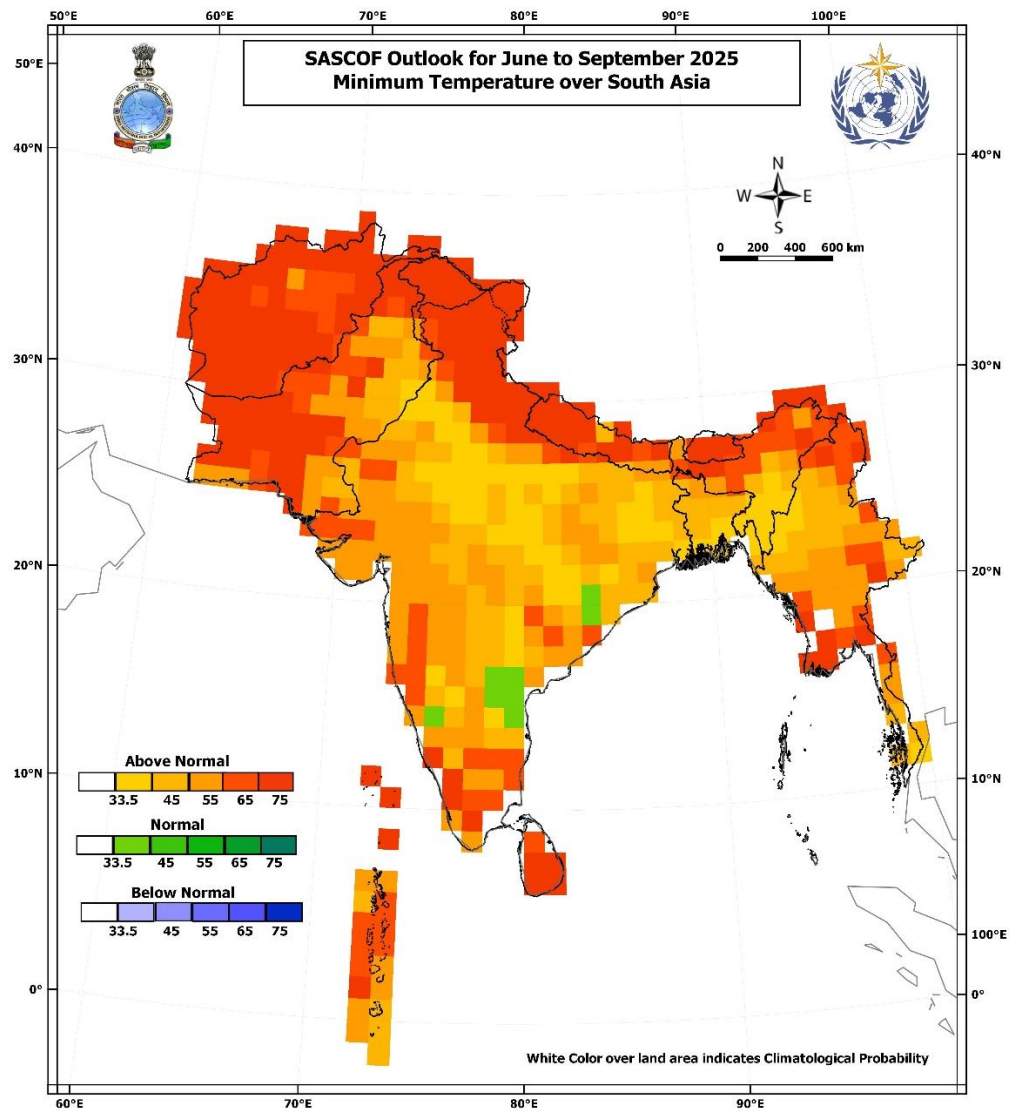


Fig.1b. Consensus outlook for the Minimum Temperature over South Asia during the southwest monsoon season (June to September 2025).

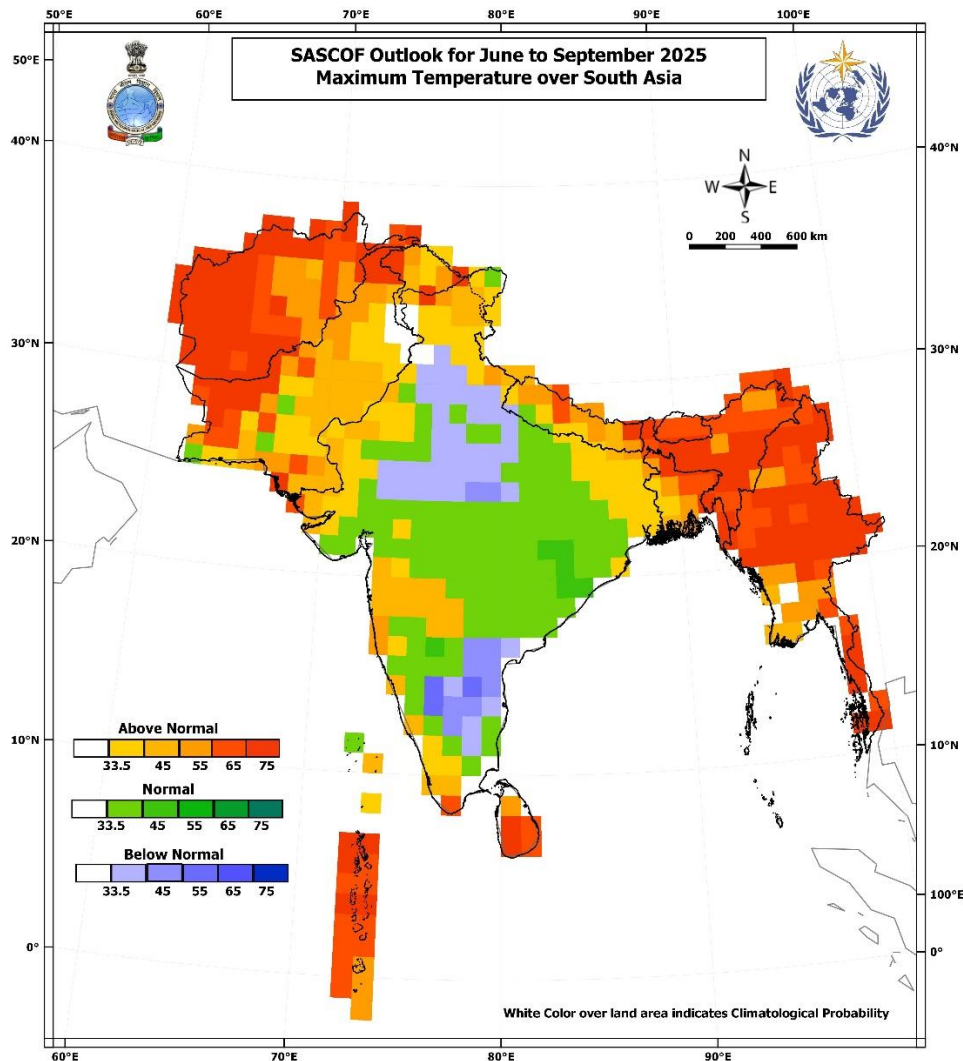


Fig.1c. Consensus outlook for the Maximum Temperature over South Asia during the southwest monsoon season (June to September 2025).

The outlook for the southwest monsoon rainfall and Temperatures (Minimum and Maximum) over the south Asia during the southwest monsoon season (June to September) is shown in Fig. 1a-c. The Figure illustrates grid wise most likely tercile category¹ as well as its probability for each of the 1° latitude x 1° longitude spatial grid boxes over the region. The box-wise tercile probabilities were derived by a synthesis of the available information and expert assessment. It was derived from an initial set of gridded objective forecasts and was iterated through collaborative assessment to synthesize predictive signals coming from reliable multiple sources.

The outlook suggests that above normal rainfall is most likely during the 2025 southwest monsoon season (June – September) over most parts of the South Asia except some areas over northern, southern, eastern and north-eastern parts of the

region, where normal to below normal seasonal rainfall is most likely. The seasonal rainfall is most likely to be of climatological probabilities over the remaining areas of the region.

Consensus outlook on minimum temperatures for June to September 2025 season suggests during the season, normal to above normal minimum temperatures are most likely over most parts of South Asia except some isolated pockets over the south-eastern part of the region where normal minimum temperatures are most likely. The consensus outlook for maximum temperatures during the June to September 2025 season suggests that seasonal maximum temperatures are most likely to be above normal over most areas of the northern, eastern, and northeastern parts of the region, as well as some areas in the southern parts. However, maximum temperatures over the central parts of the region and most areas in the southern parts are likely to be normal to below normal.

As the rainfall and Temperatures during the southwest monsoon season depicts strong intra-seasonal variability, it is advised to watch the extended range forecasts along with updated seasonal forecasts for better decision making. The extended range forecasts for rainfall, temperature, cyclone genesis, MJO etc. over the region can be obtained from RCC, Pune website (<http://rcc.imdpune.gov.in/exrange.html>). These forecasts are updated every week.

Verification of rainfall outlook for JJAS 2024 issued by SASCOF-28

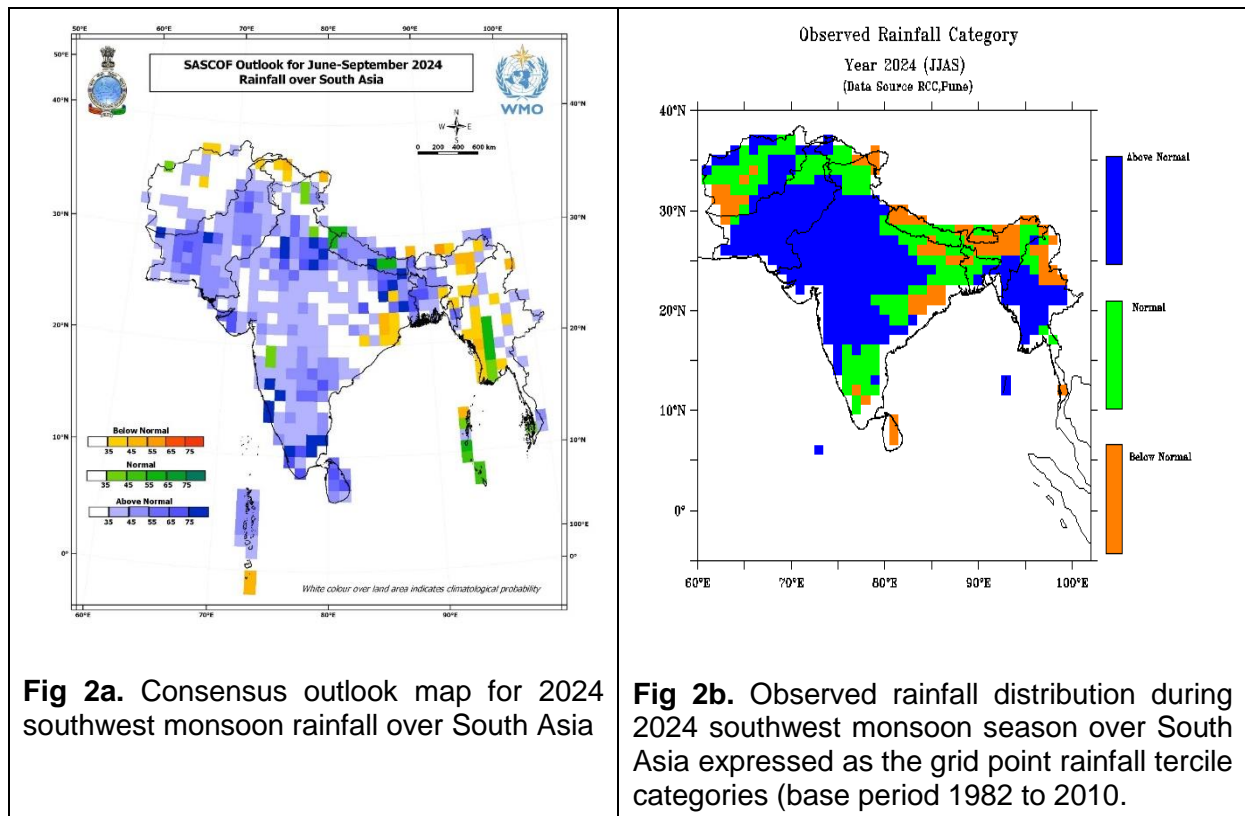


Fig 2a. Consensus outlook map for 2024 southwest monsoon rainfall over South Asia

Fig 2b. Observed rainfall distribution during 2024 southwest monsoon season over South Asia expressed as the grid point rainfall tercile categories (base period 1982 to 2010).

The outlook for the 2024 southwest monsoon season (June to September) showed in the Fig.2a suggested above-normal rainfall over most parts of the South Asia. However, below normal was forecasted over some areas over northern, eastern and north-eastern parts of the region. Normal or climatological probabilities were predicted over the remaining areas of the region

Fig.2b shows the observed rainfall distribution during the 2024 southwest monsoon season expressed in terms of tercile categories. It was seen that above normal rainfall was observed over most parts of the South Asia region. Below normal rainfall was observed along the foothills of the Himalaya and the region's north-eastern parts. The outlook was able to predict the above-normal and below-normal rainfall reasonably well. However, the outlook could not correctly indicate the below-normal rainfall observed in some areas of southern South Asia and along the foothills of the Himalayas.

Background of SASCOF

Climate predictions are of substantial benefit to many parts of the world in risk management and adaptation to the impacts of climate variability and change, and it is considered useful for countries having common climatological characteristics to come together and collaboratively assess the available prediction information to develop consensus outlooks. Recognizing this, regional climate outlook forums (RCOFs) were conceived with an overarching responsibility to produce and disseminate a joint assessment of the state of the regional climate for the upcoming season. Built into the RCOF process is a regional networking of the climate service providers and user sector representatives. In Asia, China has been coordinating the 'Forum on Regional Climate Monitoring, Assessment and Prediction for Regional Association II' (FOCRA II) since 2005, covering the entire Asian continent.

Asia is a large continent with large differences in the climatological settings on sub-regional scales. Therefore, WMO's Regional Association II (Asia) recommended sub-regional RCOFs devoted to specific needs of groups of countries having similar climatic characteristics. Implementation of the South Asian Climate Outlook Forum (SASCOF) in 2010 is a step in that direction with specific focus on the climate information needs of nations affected by the Asian southwest monsoon climate. The first three sessions of the SASCOF were held at Pune, India (during April) and its 4th session was held in April, 2013 at Kathmandu, Nepal. SASCOF-5 (April 2014) was again held in Pune, India.

SASCOF-6 (April 2015) was held in Dhaka, Bangladesh along with Climate Service User Forum (CSUF) for water sector. SASCOF-7 (October 2015), which was the first forum that focused on the winter season, was held in Chennai, India in conjunction with the first CSUF-Agriculture. From SASCOF-7 onwards RIMES joined IMD and WMO in co-sponsoring and co-ordinating the SASCOF events and associated user forum. SASCOF-8 (April 2016) was held in Colombo, Sri Lanka along with CSUF Water and CSUF-Health in parallel sessions. SASCOF-8 was also preceded by a capacity building training workshop on seasonal prediction for the operational climate experts of the South Asian countries. SASCOF-9 (September 2016) was held in Nay Pyi Taw, Myanmar in September 2016, in conjunction with the second CSUF-Agriculture. SASCOF-10 was held in Thimphu, Bhutan (April 2017) and SASCOF-11 was held in Male, Maldives (September 2017). The SASCOF-12 (April 2018) and associated training workshop on Climate Data Base Management and seasonal prediction were held in Pune, 2018. SASCOF-13 (September 2018) was held in Colombo, Sri Lanka. The SASCOF-14 and associated Pre-COF training workshop on seasonal prediction and CSUF was held in Katmandu, Nepal and hosted by Department of Hydrology and Meteorology (DHM). Met Office, UK joined other existing agencies (IMD, WMO and RIMES) in co-sponsoring the SASCOF events since SASCOF-14 event held during 18-23 April, 2019. The SASCOF-15 and associated Pre-COF training workshop on seasonal prediction and CSUF was held during 23-25 September 2019 in Thiruvananthapuram, India was hosted by India Meteorological Department (IMD).

The 16th to 24th Sessions of the SASCOF and associated Climate Service User Forum (CSUF) were held online in the backdrop of the extraordinary circumstances of

Covid-19 pandemic prevailing in the world. The table below shows the brief details of these SASCOF sessions held online during 2020-2023

SASCOF session	Year/Season	Sectors invited for User Forums	Coordinating Agencies
SASCOF-16	2020 (20-22 April)	All the Sectoral Users	IMD, WMO, RIMES, BMD, UKMO
SASCOF-17 & CSUF	2020 (23-24 & 28 September)	All the Sectoral Users	IMD, WMO, RIMES, UKMO , ARRRRC, UKaid
SASCOF-18	2020 November	All the Sectoral Users	IMD, WMO, RIMES, UKMO , ARRRRC, UKaid
SASCOF-19 & CSUF	2021 (26-28 April)	All the Sectoral Users	IMD, WMO, RIMES, UKMO , ARRRRC,
SASCOF-20 & CSUF	2021 (27-30 September)	All the Sectoral Users	IMD, WMO, RIMES, UKMO , ARRRRC, UKaid
SASCOF-21	2021 (25 November)	All the Sectoral Users	IMD, WMO, RIMES, UKMO , ARRRRC, UKaid
SASCOF-22 & CSUF	2022 (26-28 April)	All the Sectoral Users	IMD, WMO, RIMES, UKMO , ARRRRC, UKaid
SASCOF-23 & CSUF	2022 (26-29 September)	All the Sectoral Users	IMD, WMO, RIMES
SASCOF-24	2022 (24 November)	All the Sectoral Users	IMD, WMO, RIMES
SASCOF-25 & CSUF	2023 (27-29 April)	All the Sectoral Users	IMD, WMO, RIMES
SASCOF-26 & CSUF	2023 (27-30 September & 3 October)	All the Sectoral Users	IMD, WMO, RIMES
SASCOF-27	2023 (29 November)	All the Sectoral Users	IMD, WMO, RIMES
SASCOF-28	2024 (29 April to 1 st May 2024)	All the Sectoral Users	IMD, WMO, RIMES
SASCOF-29	2024 (25 September to 3 rd October)	All the Sectoral Users	IMD, WMO, RIMES
SASCOF-30	2024 (5 th December 2024)		IMD, WMO, RIMES

After four years of online sessions of SASCOF, the SASCOF session for the 2024 southwest monsoon season was held in the physical mode during the 28th Session of SASCOF (SASCOF-28) in Pune, India coinciding with the celebration of 150th year of establishment of India Meteorological Department (IMD). The 29th and 30th sessions were again conducted online. The present and the 31st session of the SASCOF (SASCOF-31) was again held in the physical mode during 28-30th April, 2025 in Pune and was jointly coordinated and co-sponsored by IMD, WMO, RIMES and UKMO. Associated with the SASCOF-31, CSUF for various climate sensitive sectors also were held;

For preparing the consensus forecasts, the forecast products from various centres such as RCC Pune, JMA, CMA, WMO's Lead Centre for Long Range Forecasting –Multi-Model Ensemble (WMO LC-LRFMME), National Centre for Environmental Prediction (NCEP), USA, Météo France, Met Office UK, European Centre for Medium Weather Forecasting (ECMWF), Canadian Meteorological Centre (CMC), Bureau of Meteorology (BoM), Australia, International Research Institute for Climate and Society (IRI), USA, Japan Agency for Marine-Earth Science and Technology (JAMSTEC), APCC, and CPTEC, Brazil etc. were also considered.

The long-term historical patterns of the southwest monsoon rainfall over South Asia (Fig.3), characterized by remarkable spatial variability, provide the general reference points at the respective locations for the rainfall anomalies indicated in the outlook.

The long-term historical patterns of the Temperature (Minimum and Maximum) over South Asia during June to September (Fig.4 a & b), characterized by large spatial variability, provide the general reference points at the respective locations for the temperature anomalies indicated in the outlook.

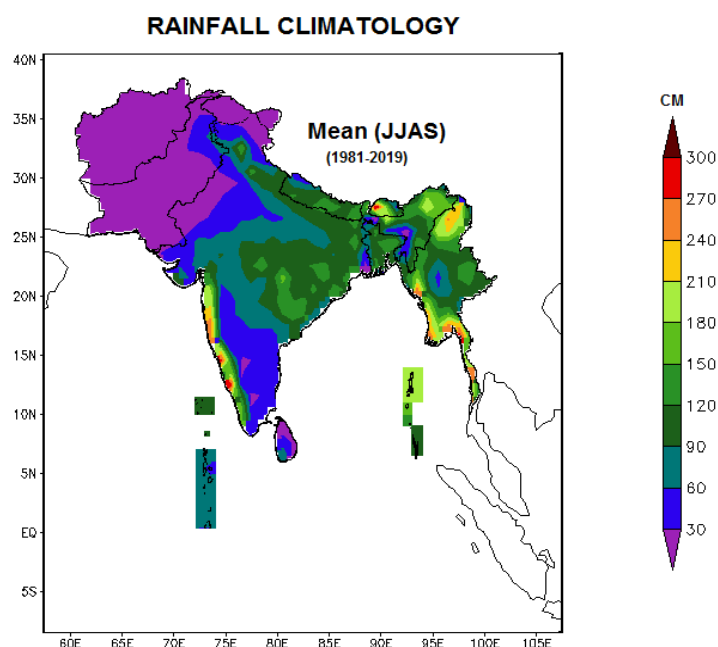


Fig.3. Rainfall climatology for the period 1981-2019 over South Asia
Source: Merged rainfall data over south Asia of RCC, Pune)

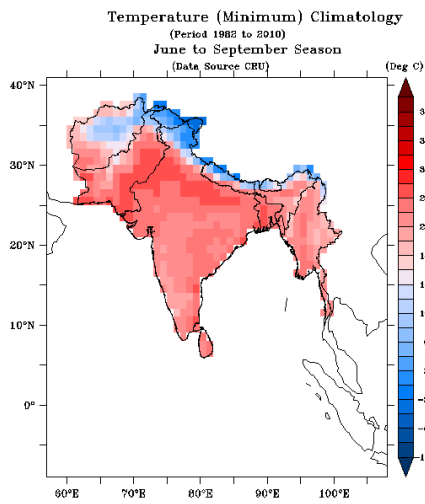


Fig.4 (a) Minimum Temperature climatology for the period 1982-2010 for June to September Season over South Asia

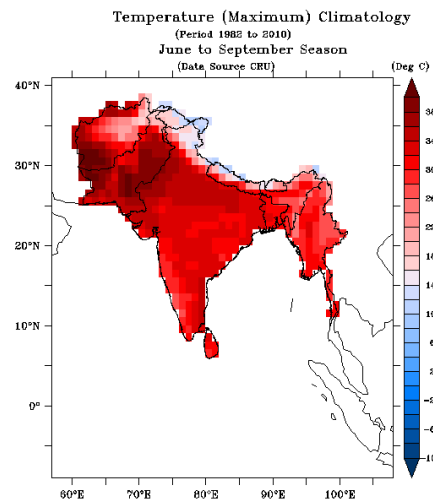


Fig.4 (b) Maximum Temperature climatology for the period 1982-2010 for June to September Season over South Asia