Session to update SASCOF-22 outlook for South Asia
14 June 2022 (Online Session)
Updated Consensus Statement on the Seasonal Forecast over South Asia for the 2022 Southwest Monsoon Season (June – September)

Summary

Normal to above normal rainfall is most likely during the 2022 southwest monsoon season (June – September) over most parts of the South Asia. Geographically, above normal rainfall is most likely along the foot hills of Himalayas, many areas of northwestern and central parts of the region. However, below normal rainfall is most likely over some areas of south, and southeastern parts of the region. The seasonal rainfall is most likely to be normal or of climatological probabilities over the remaining areas of the region.

During the season, above normal minimum temperatures are likely over many areas along foothills of Himalayas, northern, northwestern and northeastern parts of the South Asia. Below normal to normal minimum temperatures are most likely over most areas of central, southern and northeastern part of South Asia. The seasonal minimum temperatures most likely to have climatological probabilities over remaining parts of the region. The seasonal maximum temperatures are most likely to be normal to below normal over most parts of the region except over extreme northwest and some areas of northern and northeastern parts of the region where above normal maximum temperature are likely. The seasonal maximum temperatures are likely to have climatological probabilities over remaining parts of the region.

This updated regional climate outlook for the 2022 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 22nd (update) session of the South Asian Climate Outlook Forum (SASCOF-22) conducted online. The process involved an expert assessment of the prevailing global climate conditions and forecasts from different climate models from around the world. There is strong consensus among experts that the ENSO neutral conditions are likely to prevail 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 update climate outlook for the 2022 southwest monsoon season (June to September) was finalized during the online session for updating the April session of SASCOF-22 outlook held on 14 June 2022. The session was attended by 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 (UKMO), Regional Integrated Multi-hazard Early-warning System (RIMES), Japan Meteorological Agency (JMA) etc. The online 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) conditions over the equatorial Pacific, Indian Ocean Dipole (IOD), winter and spring Northern Hemisphere (NH) snow cover and land surface temperature anomalies. The key features of these conditions are as follows:

ENSO Conditions over the Pacific Ocean

The ENSO is one of the global scale climate phenomena that have significant influence on the year-to-year variability of the monsoon over South Asia. A neutral (cool) ENSO conditions were observed during May-July 2021. The (cool) ENSO conditions started strengthening during August and weak La Niña conditions were established by September 2021. Thereafter, the La Niña conditions kept strengthening to reach its maximum strength in December 2021. The La Niña conditions were slightly weakened in January and subsequently in February 2022, but slightly strengthened again in March-April 2022. Currently, moderate La Niña conditions are prevailing over the Pacific. The latest global models forecast indicate that the La Niña conditions are likely to continue during the upcoming monsoon season.

IOD Conditions over the Indian Ocean

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

Snow Cover over the Northern Hemisphere

The snow-covered area over Northern Hemisphere as well as Eurasia was near normal (slightly towards positive side of the normal based on 1991-2020) during last few months (December 2021, January to March 2022). The northern hemisphere snow cover areas during February and March 2022 were 29th and 25th lowest ever during the respective months in the last 56 years. On the other hand, the Eurasian snow cover area 32th and 24th lowest ever during the respective months in the last 56 years. Winter and spring snow cover extent has a general inverse relationship with the subsequent Asian summer monsoon rainfall.

Updated Regional Outlook for the 2022 Southwest Monsoon Rainfall over South Asia

A updated regional climate outlook for the 2022 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 La Nina conditions are likely to prevail 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. It is also recognized that in La Nina conditions are favourable for the normal to above normal southwest monsoon rainfall over most part of South Asia. 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 Indian Ocean Dipole, 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 are implicitly considered by the dynamical climate models that underpin the present outlook.

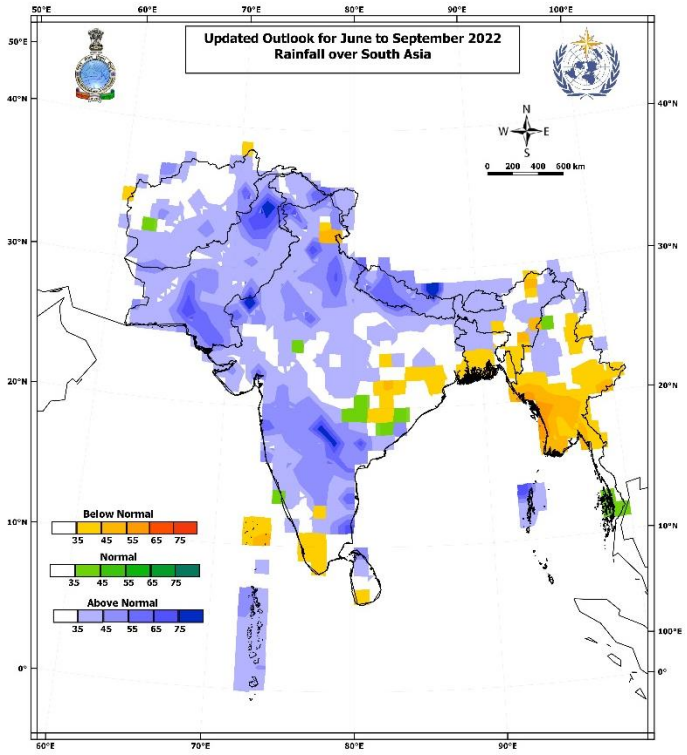

Fig.1a. Updated outlook of probability of the most likely category for the 2022 southwest monsoon (June to September 2022) rainfall over South Asia.

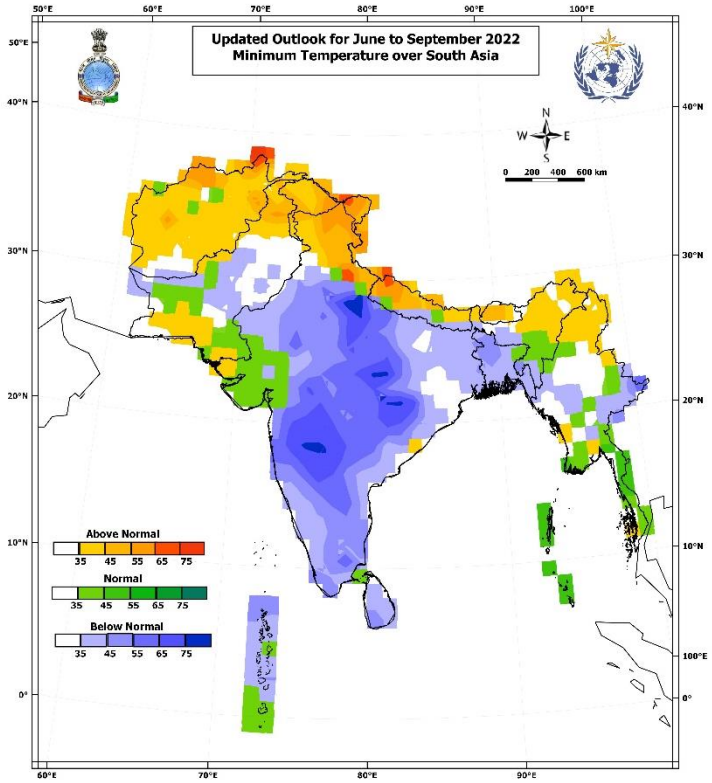

Fig.1b. Updated outlook of probability of the most likely category for the 2022 southwest monsoon (June to September 2022) season Minimum Temperature over South Asia.

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

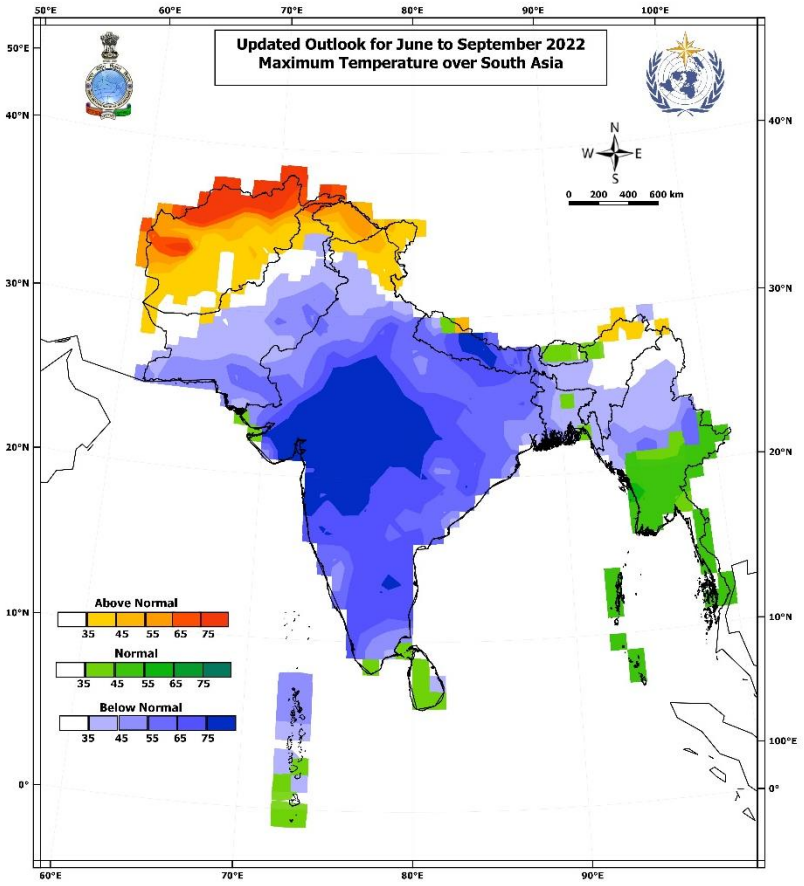

Fig.1c. Updated outlook of probability of the most likely category for the 2022 southwest monsoon (June to September 2022) season Maximum Temperature over South Asia.

The outlook for the southwest monsoon rainfall and Temperature (Minimum & Maximum) for the season (June to September) as a whole over South Asia is shown in Fig. 1**a-c.** The Figure illustrates grid wise most likely tercile category[1] as well as its probability for each of the 1^{o} latitude x 1^{o} 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 (Fig.1a) suggests that Normal to above normal rainfall is most likely during the 2022 southwest monsoon season (June – September) over most parts of the South Asia. Geographically, above normal rainfall is most likely along the foot hills of Himalayas, many areas of northwestern and central parts of the region. However, below normal rainfall is most likely over some areas of south, and southeastern parts of the region. The seasonal rainfall is most likely to be normal or of climatological probabilities over the remaining areas of the region.

Updated outlook on minimum temperatures (fig.1b) for June to September 2022 season suggests that above normal minimum temperatures are likely over many areas along foothills of Himalayas, northern, northwestern and northeastern parts of the South Asia. Below normal to normal minimum temperatures are most likely over most areas of central, southern and southeastern part of South Asia. The seasonal minimum temperatures most likely to have climatological probabilities over remaining parts of the region.

Updated outlook on maximum temperatures (fig.1c) for June to September 2022 season suggests that the seasonal maximum temperatures are most likely to be normal to below normal over most parts of the region except over extreme northwest and some areas of northern and northeastern parts of the region where above normal maximum temperature are likely. The seasonal maximum temperatures are likely to have climatological probabilities over remaining parts of the region.

As the rainfall and Temperature 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.