

**Fifteenth Session of
South Asian Climate Outlook Forum (SASCOF-15)
Thiruvananthapuram, India, 23-25 September 2019**

**Consensus Statement on the Forecast for the 2019 October to
December Season Rainfall and Temperature over South Asia**

Summary

Above normal rainfall is likely during the 2019 October – December season over most parts of Sri Lanka, Maldives and eastern parts of Myanmar. It may be mentioned that these areas of the region climatologically receive good amount of rainfall during the season. Above normal rainfall is also likely over some northern parts of South Asia. However, below normal rainfall is likely over southern parts of Myanmar and some areas of foot hills of Himalayas. Normal rainfall is likely over remaining areas of the region.

During the season, normal to slightly above normal temperatures are likely, over most parts of the region.

This consensus climate outlook for the 2019 October to December season over South Asia has been developed through an expert assessment of the prevailing global climate conditions influencing the South Asian climate and seasonal forecasts from different climate models around the world. Currently neutral El Niño/Southern Oscillation (ENSO) conditions are prevailing in the Pacific Ocean and Indian Ocean Dipole is in the positive mode over the Indian Ocean. These parameters, which are known to influence the climate over South Asia are likely to continue at their current level during the October to December season. Careful consideration is also given to other regional and global factors as well as the intra seasonal variability of the region that can affect the rainfall and temperature patterns over the region.

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

Climate outlook for winter season (December 2019 to February 2020) will be issued through another consensus statement in the second half of November 2019.

Introduction:

During the October to December season, many parts of South Asia receive significant amounts of rainfall which is also one of the major agricultural seasons of the region. The re-establishment of prevailing north easterly trade-wind regime over South Asia associated with the southward movement of the Inter-Tropical Convergence Zone (ITCZ) ushers-in the Northeast monsoon, bringing much needed rainfall to the southern parts of India, Sri Lanka and Maldives. In Sri Lanka, the October to November period is known as second Inter monsoon (SIM) season. It has been recognized that there is moderate seasonal predictability for the Northeast monsoon circulation over the region as the seasonal variability is strongly influenced by the slowly varying boundary forcings like sea surface temperatures. However, the predictability is limited to some extent due to the strong day to day atmospheric variability caused by the passage of the synoptic scale weather systems such as easterly waves, lows, depressions, cyclones etc. The seasonal predictability of the northeast monsoon over the region is also influenced by the Madden Julian Oscillation (MJO), which represent the major global scale intra-seasonal variability pattern.

The climate outlook for the 2019 October to December season was prepared during the fifteenth session of the South Asian Climate Outlook Forum (SASCOF-15), which was held at Thiruvananthapuram, India, 23-25th September 2019. The forum meeting was attended by several experts from eight South Asian countries including Afghanistan, Bangladesh, Bhutan, India, Maldives, Myanmar, Nepal and Sri Lanka., along with number of international experts. The Forum deliberated on various observed and emerging climatic features that are known to influence the climate of the region such as the El Niño/Southern Oscillation (ENSO) conditions over the equatorial Pacific, Indian Ocean Dipole (IOD) conditions over the Indian Ocean etc. 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 northeast monsoon rainfall as well as the surface temperatures over South Asia. The weak El Niño event of 2018-2019 started during the last quarter 2018 continued till late July 2019 and turned in to ENSO neutral conditions and these conditions continued through September. Latest forecasts indicate that neutral ENSO conditions are likely to continue during the October to December season.

Conditions over the Indian Ocean

In addition to ENSO conditions over the Pacific, other factors such as Indian Ocean sea surface temperatures have some influence on the climate of the region. IOD has been in the positive mode over equatorial Indian Ocean since July 2019. Recent forecasts from coupled models suggest positive IOD conditions are likely to continue during the October to December season.

Consensus Outlook for the 2019 October to December Season Rainfall over South Asia:

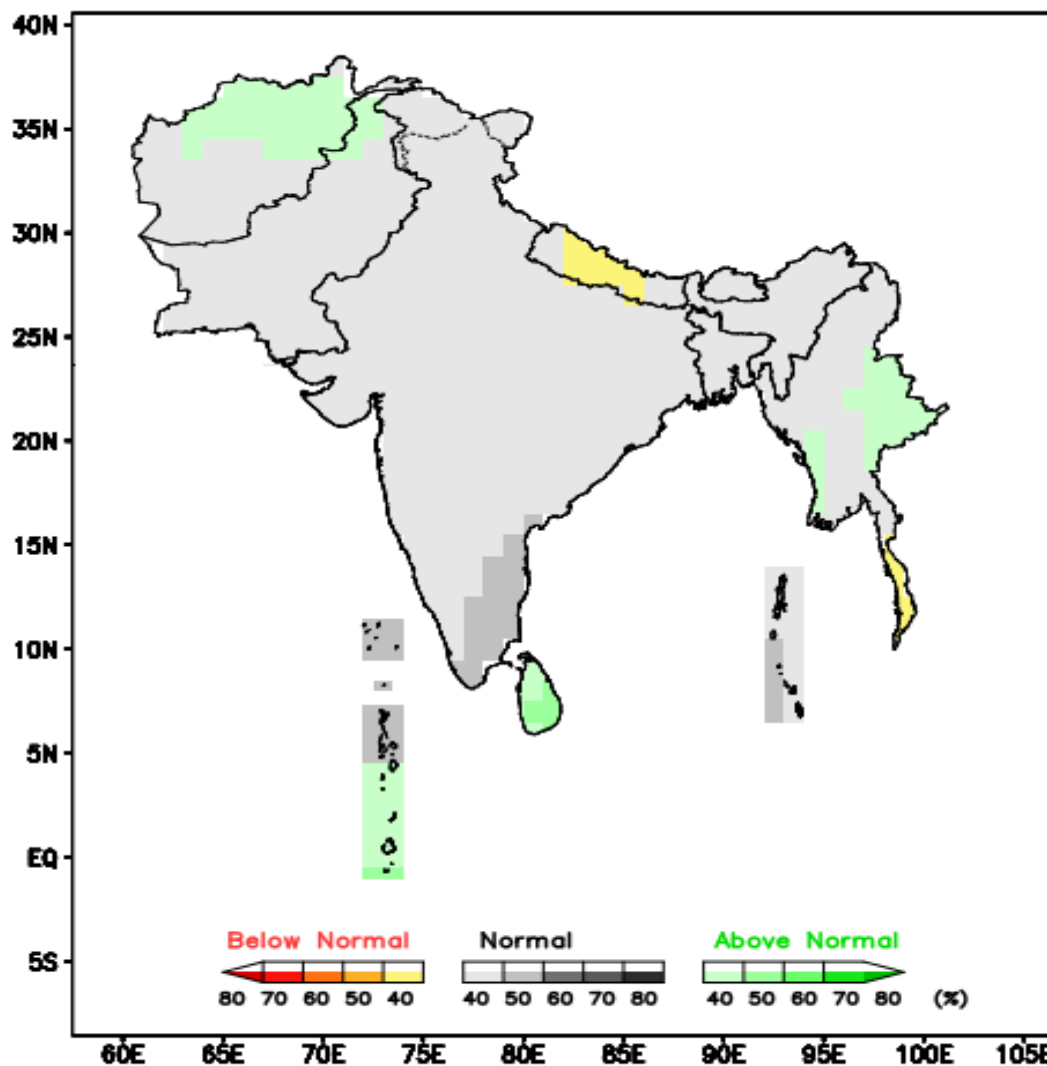
A consensus outlook for October to December season rainfall over South Asia has been prepared based on the expert assessment of prevailing large-scale global climate indicators mentioned above and experimental as well as operational long-range forecasts based on statistical and dynamical models generated by various operational and research centres of the world.

There is unanimity among the experts that the prevailing ENSO neutral conditions in the equatorial Pacific Ocean and positive Indian Ocean Dipole conditions over Indian Ocean are likely to continue during the October to December season. The relative impact of all these parameters needs to be considered to determine the expected state of the climate over the region.

The outlook for the 2019 October to December season rainfall over South Asia is shown in **Fig.1**. The figure illustrates the 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 synthesis of the available information and expert assessment. It was derived from an initial set of gridded objective forecasts and modified through a consensus building discussion of climate experts.

The outlook suggests that during the 2019 October to December season, the rainfall over most parts of Sri Lanka, Maldives, eastern parts of Myanmar and some northern parts of South Asia is likely to be above normal. On the other hand, below normal rainfall is likely over southern parts of Myanmar and some areas of foot hills of Himalayas. The seasonal rainfall over remaining areas of the region is likely to be normal.

During the season, normal to slightly above normal temperatures are likely, over most parts of the region.



Consensus outlook for Rainfall (October to December 2019) over South Asia

Fig.1. Consensus outlook for 2019 October to December season Rainfall over South Asia.

As the rainfall during the October to December 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.

¹Tercile categories have equal climatological probabilities, of 33.33% each.

Verification of consensus outlook for 2018 October to December season

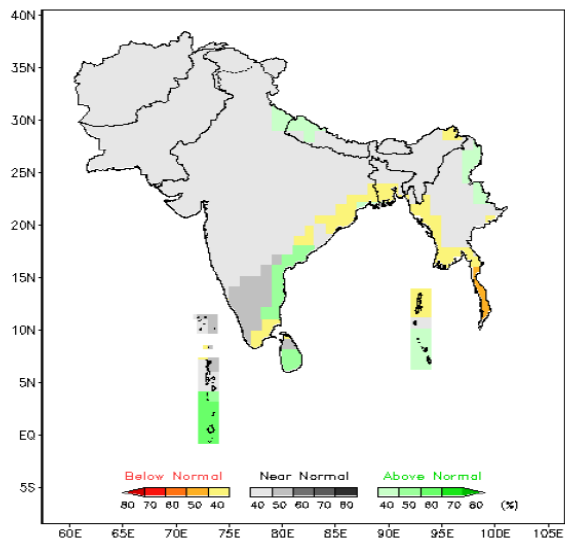


Fig 2. Consensus outlook map of SASCOP- 13 for 2018 October to December Rainfall over South Asia

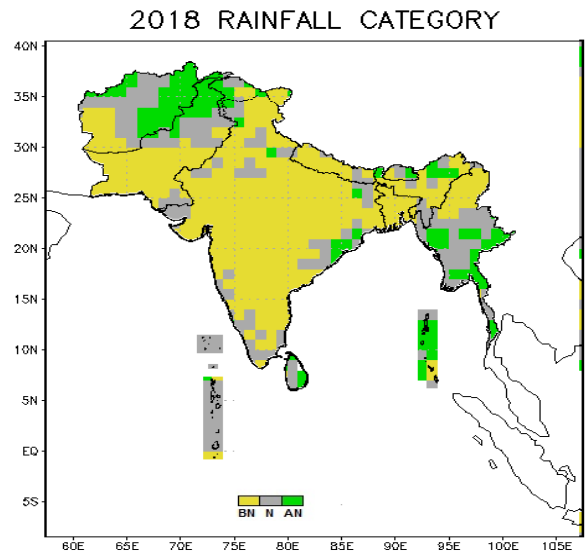


Fig 3. Observed rainfall distribution during 2018 October to December season over South Asia expressed as the grid point rainfall tercile categories. (*Data source: IMD 1x1 variable network and CHIRPS data (iridl.ldeo.columbia.edu/SOURCES/UCSB/CHIRPS/v2p0/monthly/global/deg1p0/precipitation). In addition to that GPCP data used for Island region.

The consensus outlook map (**Fig.2**) for the 2018 October to December season suggested above normal rainfall over some parts of South-eastern Peninsular India, most parts of Sri Lanka, southern parts of Maldives and some areas of North-eastern part of the South Asia region and below-normal rainfall was forecasted over South-eastern part of the region, along the coastal areas adjacent to the north Bay of Bengal and South-eastern most areas of Peninsular India. Normal rainfall was forecasted in remaining areas of the region including northwest and central areas.

Fig. 3 shows the observed rainfall distribution during the 2018 October to December Season expressed in terms of tercile categories. It is seen that some areas of above normal category forecasted over Sri Lanka and Bay of Bengal islands matched with that in the observed map. However, the areas for which normal rainfall was forecast over most parts of Indian region, Pakistan and some North Eastern parts of the region actually received below normal rainfall. Similarly, over north Myanmar, southern parts of Maldives, some parts of eastern coastal India and southern Pakistan, while the rainfall was forecasted to be normal to above normal, the rainfall actually received turned out to be below normal.

On the whole, it can be concluded that the consensus outlook for the 2018 October to December season rainfall could not accurately foresee the observed rainfall distribution over a major part of the region.