



India Meteorological Department WMO Regional Climate Center

Consensus Statement on the Forecast Outlook for the winter season (December 2019 to February 2020) Precipitation and Temperature over South Asia

Summary

Above normal rainfall is likely during the Winter Season (December 2019 to February 2020) over northern most parts of the region, some areas of foot hills of Himalayas including Bhutan and eastern side of Nepal, southern part of the region including Maldives, most part of Sri Lanka, and eastern parts of Myanmar. Normal precipitation is likely over remaining part of the region. During the season, normal to above normal temperatures are likely over most part of the region.

This consensus climate outlook for the 2019/2020 winter season precipitation and temperature 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 warm El Niño/Southern Oscillation (ENSO) neutral conditions are prevailing in the Pacific Ocean and Indian Ocean Dipole is in the positive mode over the Indian Ocean. There is strong consensus among the expert that the ENSO neutral conditions will prevail during the winter 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.

Introduction:

During the winter season (December to January), Northern parts of South Asia receive good amount of precipitation in the form of both snow and rain fall. Southern part of the region consisting of southeastern part of India, Sri Lanka and Maldives also receive good amount of precipitation during the season. Most of the remaining areas of the region are generally receive very little precipitation during the season. It is recognized that the seasonal predictability of the region during the season is limited to some extent by the strong day to day atmospheric variability. The day to day atmospheric variability over the northern (southern) part the region is caused by the passage of disturbances in the mid latitude westerlies (tropical easterlies). The seasonal predictability over southern part of the region is also limited by the eastward moving Madden Julian Oscillation (MJO), which represents the major global scale intra-seasonal variability pattern.

The consensus climate outlook for the 2019/2020 winter season was prepared through exchange of expert assessment among a team of experts from all the countries of South Asia. Experimental as well as operational long-range forecasts based on the statistical and dynamical models generated by various operational and research centres of the world as Met Office, UK, JMA, NCEP, WMO GPCs of LRF, WMO lead center for LRF MME, Seoul, Korea etc. were also considered. The recalibrated forecast using various global climate model were also used for preparation of consensus outlook. The expert team discussed 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 El Niño/Southern Oscillation (ENSO) is one of the global scale climate phenomena having significant influence on the year-to-year variability of the winter precipitation 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. Currently warm ENSO neutral conditions are prevailing and latest forecasts indicate that neutral ENSO conditions are likely to continue during the forthcoming winter 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 June 2019. IOD values remain strongly positive over the Indian Ocean and recent forecasts from coupled models suggest positive IOD conditions are likely to weaken during the winter season.

Consensus Outlook for the 2019 December to February 2020 Season Rainfall over South Asia:

A consensus outlook for December 2019 to February 2020 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 forthcoming winter 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 December to February 2020 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 forthcoming winter season (December 2019 to February 2020), Above normal rainfall is likely over northern most parts of the region, some areas of foot hills of Himalayas including Bhutan and eastern side of Nepal, southern part of

the region including Maldives, most part of Sri Lanka, and eastern parts of Myanmar. The seasonal precipitation over remaining areas of the region is likely to be normal.

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

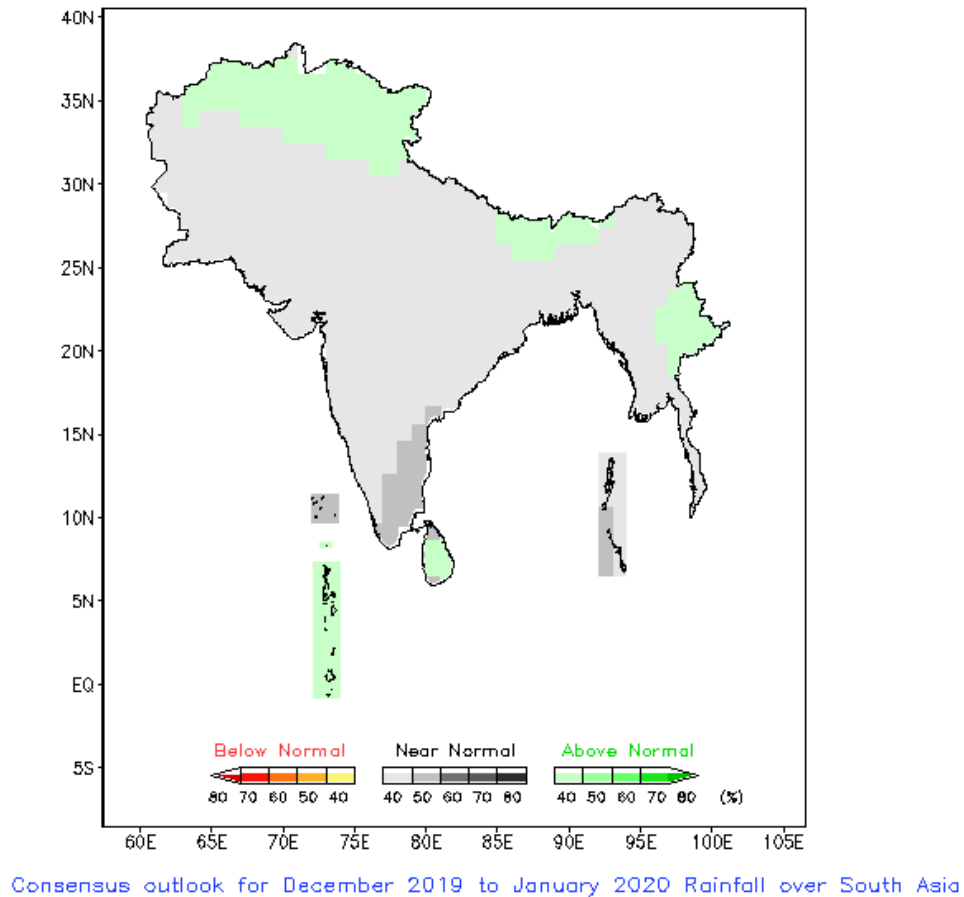


Fig.1. Consensus outlook for 2019 December to February 2020 season Precipitation over South Asia.

As the rainfall during the December to February 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 2018/19 Winter season

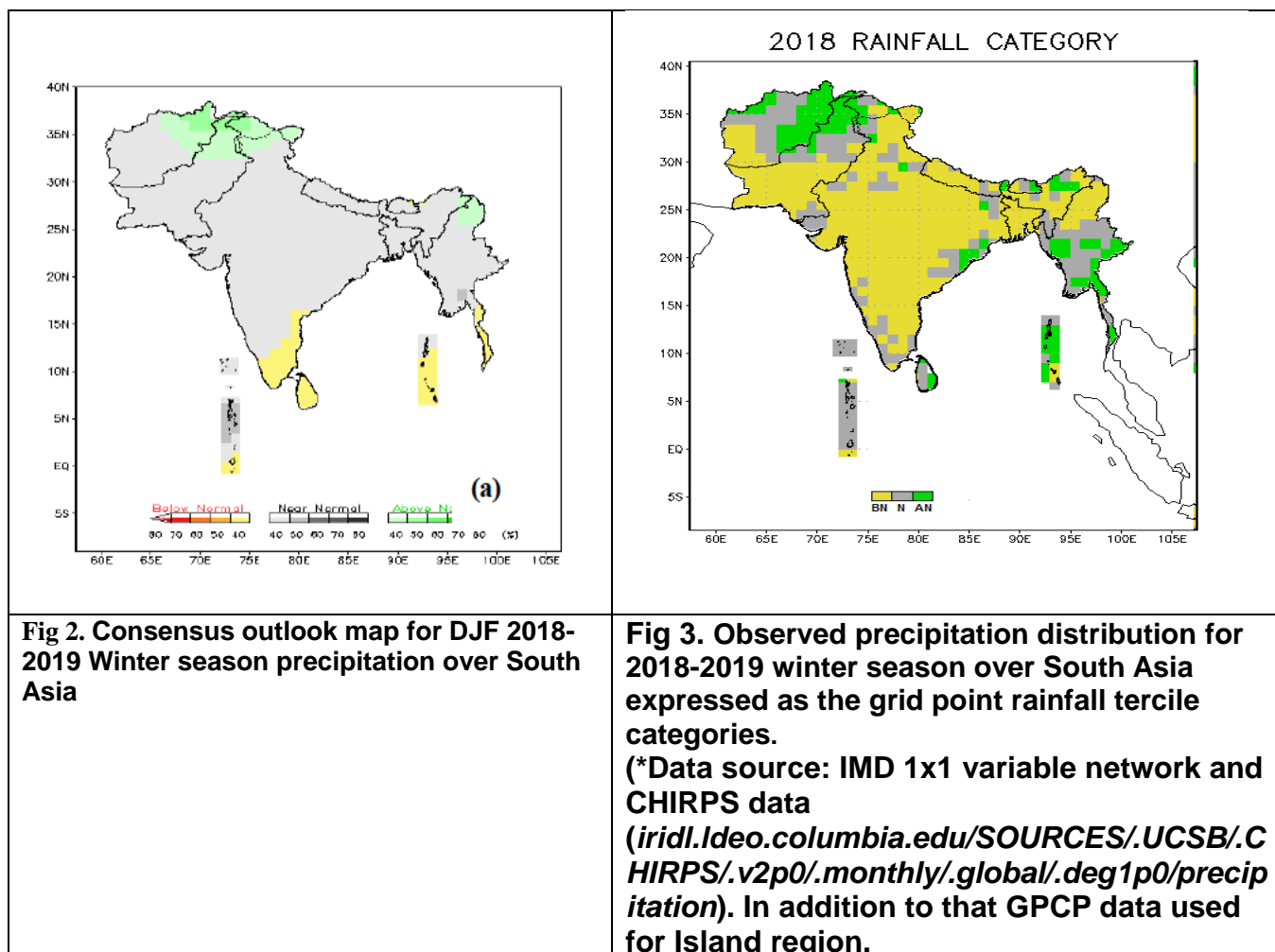


Fig.2 shows the outlook for the 2018-2019 winter season (December to February) which indicated above normal rainfall over some parts of northern India, northern Pakistan, northern Afghanistan and some parts of North Myanmar and below-normal rainfall was forecasted over some parts of SE Peninsular India, most parts of Sri Lanka, some parts of south Myanmar and southern parts of Maldives. Normal rainfall was forecasted in remaining areas of the region including northwest and central areas. Fig.3 shows the observed precipitation distribution during the 2018-2019 winter season expressed in terms of tercile categories. It is seen that most areas of normal, above normal and below normal categories in the forecast map matched with that in the observed map. However, the observed above normal precipitation areas along the Northern parts of East coast of India and over southern Myanmar were forecasted as normal. Similarly observed areas of below normal over west Myanmar, northern parts of Maldives, some parts of North West and central India and some parts of Afghanistan and Pakistan was also forecasted as normal. On the whole, it can be concluded that the consensus outlook for the 2018/19 Winter season rainfall could accurately foresee the observed rainfall distribution over a major part of the region especially the northern part of the S. Asia region.