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Consensus Statement on the Forecast Outlook for the Winter Season (December 2017 – February 2018) Precipitation and Temperatures over South Asia

Summary

Below normal precipitation is likely during the Winter Season (December 2017 to February 2018) over some areas of northeastern part of south Asia including northeast India, Nepal, Bhutan and north Myanmar. Above normal precipitation is likely over some southeastern parts of the region. Normal precipitation is likely over remaining parts of the region. During the season, normal to slightly above normal temperatures are likely over most parts of the region.

This consensus forecast outlook for the 2017/2018 winter season precipitation and temperature over South Asia have been developed through an expert assessment of the prevailing global climate conditions and forecasts from different climate models from around the world. Currently weak La Niña conditions prevail in the Pacific Ocean. There is strong consensus among experts that the La Niña conditions are likely to continue through the winter season. It is recognized that in addition to sea surface temperature (SST) conditions over equatorial Pacific, other regional and global factors can also affect the precipitation and temperature patterns over the region.

For more information and further updates on the northeast monsoon 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 intraseasonal variability pattern.

The consensus climate outlook for the 2017/2018 winter season was prepared through exchange of expert assessment among a team of experts from all the countries of South Asia. 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. 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 were also considered.

ENSO and IOD Conditions

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 warm ENSO neutral conditions that prevailed during April to July, 2017 turned to ENSO neutral conditions by end of July. The sea surface temperatures (SSTs) over equatorial Pacific started cooling thereafter reaching to weak La Niña conditions in early November. Currently, the SST conditions over equatorial Pacific suggest weak La Niña conditions. Atmospheric conditions are also indicating La Niña conditions. The latest forecasts from global climate models indicate strong probability for La Niña conditions to persist during the winter season (DJF).

Currently the SST conditions over equatorial Indian Ocean suggest neutral Indian Ocean Dipole (IOD) conditions. Forecast from global climate models indicate strong probability of neutral IOD conditions to persist during the winter season (DJF).

Consensus Outlook for the Winter Season (December 2017 to February 2018) Precipitation and Temperature over South Asia:

There is unanimity among the experts that the prevailing La Niña conditions are likely to continue through the winter season. The La Niña conditions are likely to start weakening thereafter and reach to normal level by end of spring season of next year. During the season, the climate of the region is also generally get influenced by the strong day to day

atmospheric variability. Therefore, it is recognized that there is large uncertainty in the prediction of winter precipitation over the region. It was also recognised that SSTs over Pacific is not the only factor that decides the performance of winter monsoon over the region. Other relevant climate drivers such as the state of the Indian Ocean Dipole (IOD), the Tropical Atlantic SST etc. are also important. The relative impact of all these parameters needs to be considered to determine the rainfall over the region. However, the impact of La Niña on the winter season precipitation over northern Part of the South Asia is not very clear particularly due to strong day to day atmospheric variability over the region.

The outlook for the 2017/2018 winter season precipitation over South Asia is shown in Fig.1. The figure illustrates the most likely tercile category[1] 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 2017/2018 Winter Season, some areas of northeastern part of south Asia including northeast India, Nepal, Bhutan and north Myanmar are likely to experience below normal precipitation during the Winter Season (December 2017 to February 2018) over. Some southeastern parts of the region are likely to experience above normal precipitation. Remaining parts of the region is likely to experience normal precipitation. During the season, normal to slightly above normal temperatures are likely over most parts of the region.

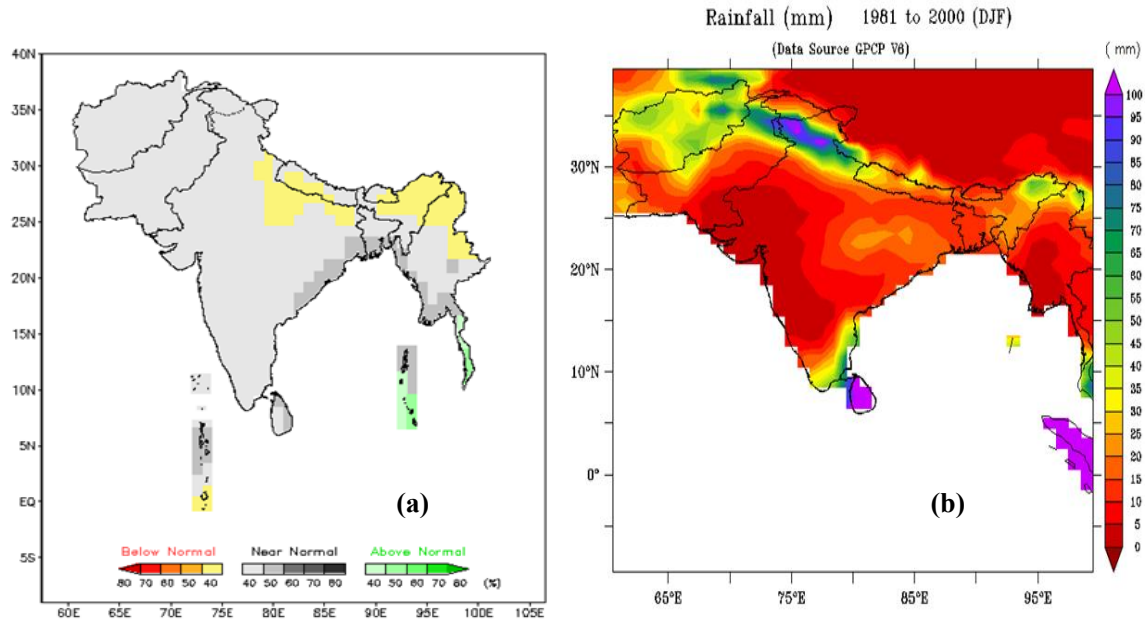

Fig.1. (a) Consensus outlook for the winter season (December 2017 to February 2018) precipitation over South Asia. **(b)** The mean GPCP precipitation (in mm) for the winter season during the period 1981-2000 (source: NOAA ESRL Physical Science Division).

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

Verification of the Consensus Forecast for the 2016/17 Winter Season Precipitation

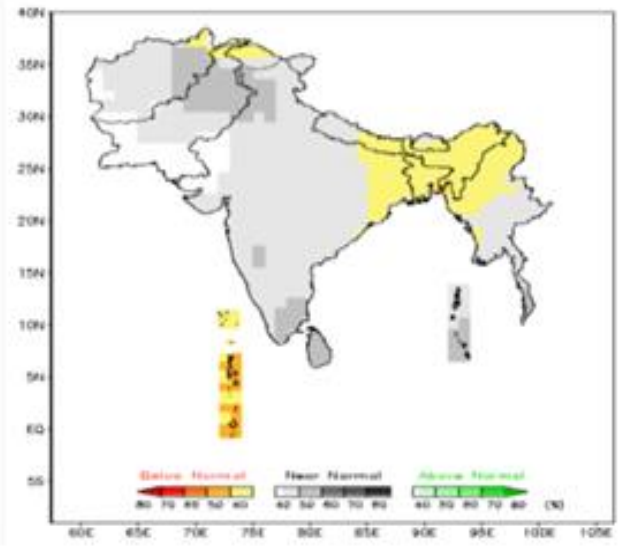

Fig.2. Consensus forecast map of the 2016/17 winter precipitation over South Asia.

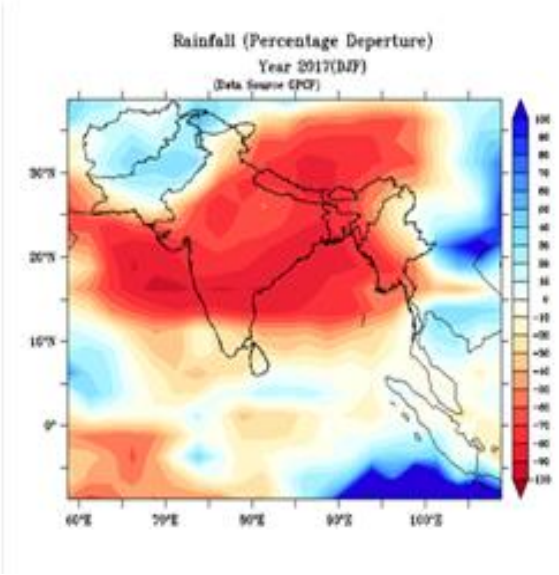

Fig.3. The observed GPCP precipitation anomaly during the 2016/17 Winter Season over South Asia.

The consensus outlook map (Fig.2) for the winter season (December 2016 to February 2017), had forecasted below normal precipitation over northern most parts, Maldives and neighboring Lakshadweep, and north-eastern part of South Asia including northeast India, east Nepal, Bhutan and Northern part of Myanmar. Normal Precipitation was forecasted over the remaining parts of the region. As seen, the observed precipitation anomaly map (Fig.3) suggests normal to above normal rainfall over northwestern parts of the region, near normal precipitation over some areas of southern parts of India and Sri Lanka. Over most of the remaining areas, below normal rainfall was observed. Though at first sight, the large scale features of precipitation during 2016/17 winter season could not be forecasted correctly, it can be seen that the forecast outlook was successful inn correctly indicating normal rainfall over northwestern parts of the region and below normal rainfall over northeastern parts of the region.