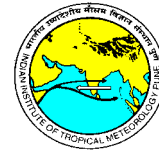




Canada



Fifth Session of

South Asian Climate Outlook Forum (SASCOF-5)

Pune, India, 14-23 April 2014

Consensus Statement

Summary

Below-normal to normal rainfall is most likely during the 2014 summer monsoon season (June – September) over south Asia as a whole. Below-normal rainfall is likely over broad areas of western, central and southwestern parts of South Asia and some areas in the northeastern-most parts of the region. Normal rainfall is likely over broad areas of northwestern and eastern parts and some island areas in the southernmost parts of the region.

This consensus outlook for the 2014 southwest monsoon rainfall over South Asia has been developed through an expert assessment of the prevailing global climate conditions and forecasts from different climate models from around the world. There is strong consensus among the experts about the possibility of evolution of an El Niño event during the summer monsoon season. However, it is recognized that there is uncertainty in the intensity of the El Niño event. There is also consensus about the potential for adverse impacts of El Niño on the monsoon rainfall over the region. However, other regional and global factors also can affect the monsoon rainfall patterns over the region.

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

Introduction:

The fifth session of the SASCOF (SASCOF-5), convened to generate the climate outlook for the summer monsoon season of 2014, was held at Pune, India, from 22-23 April 2014 with the participation of eight South Asian countries. It was preceded by a capacity building training workshop on seasonal prediction for the participants from 14-21 April 2014. These events were hosted by the India Meteorological Department (IMD) in collaboration with the Indian Institute of Tropical Meteorology (IITM), Pune and supported by Ministry of Earth Sciences (MoES), Government of India. World Meteorological Organization (WMO) co-sponsored the events under a project funded by the Department of the Environment, Government of Canada, for the implementation of the Global Framework for Climate Services (GFCS). These events also form part of the demonstration phase for a WMO Regional Climate Centre (RCC) for South Asia, currently under implementation by IMD.

The training workshop was attended by participants from 8 South Asian countries, namely, Afghanistan, Bangladesh, Bhutan, Maldives, Myanmar, Nepal, India and Sri Lanka. In addition to experts from IMD, IITM and MoES, international experts from the International Research Institute for Climate and Society (IRI), USA, National Centers for Environmental Prediction (NCEP), USA, Met Office UK, Japan Meteorological Agency (JMA), and APEC Climate Center (APCC), Korea contributed to the training workshop as resource persons.

The SASCOF-5 (22-23 April 2014) session was attended by the above experts as well as additional experts from WMO, SAARC Meteorological Research Centre (SMRC), International Commission on Irrigation and Drainage (ICID), Global Water Partnership, Bureau of Meteorology, Australia, and water resource sector of various South Asian countries. Scientists from different research institutes within India including NCMRWF, Noida, CSIR-4PI, Bangalore, IIT, Bhubaneswar and experts from various user sectors such as government, health, media, agriculture, water resources etc. took active part in the deliberations for assessing the available forecast information and for finalizing the consensus outlook for the summer monsoon rainfall over South Asia. The user sectors were represented by institutions like National Institute of Virology (NIV), Pune, CWC, New Delhi, Ministry of Agriculture etc. For preparing the consensus forecasts, the forecast products from various centers such as NCEP, USA, Météo France, Met Office UK, European Centre for Medium Weather Forecasting (ECMWF), Canadian Meteorological Centre (CMC), Bureau of Meteorology, Australia, International Research Institute for Climate and Society (IRI), USA, WMO's Lead Centre for Long Range Forecasting - Multi-Model Ensemble (WMO LC-LRFMME), Japan Agency for Marine-Earth Science and Technology (JAMSTEC), APCC, JMA and CPTEC, Brazil etc. were also considered..

The Forum deliberated on various observed and emerging climatic features that are known to influence the performance of the monsoon, such as the El Niño-Southern Oscillation (ENSO) conditions over the equatorial Pacific, Indian Ocean Dipole (IOD) conditions over the Indian Ocean, 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

During February through early part of March the ENSO conditions in the equatorial Pacific were on the border line of weak La Niña and cool neutral. But a subsequent warming trend in the sea surface temperatures (SSTs) over the region through mid-April have caused ENSO conditions now to become warm neutral. At the same time, the sub-surface temperatures in the tropical Pacific have also warmed to levels generally observed prior to an El Niño event. Latest forecasts from almost all ENSO prediction models indicate continuation of the warming trend with the sea surface temperatures over the equatorial Pacific remaining neutral during the Northern Hemisphere spring season and then to develop into El Niño conditions during the southwest monsoon season with a probability of around 60%. The WMO El Niño/La Niña Update issued in mid-April (https://www.wmo.int/pages/prog/wcp/wcasp/enso_update_latest.html), also indicates a fairly large potential for an El Niño, most likely by the end of the second quarter of 2014. El Niño conditions during the monsoon season are known typically to weaken the South Asian summer monsoon circulation and adversely impact rainfall over the region. However, their impact on the regional rainfall distribution varies from year to year.

Conditions over the Indian Ocean

In addition to ENSO conditions over the Pacific, other factors such as Indian Ocean SSTs have some influence on the South Asian summer monsoon. At present, the SST anomalies over most of the areas of the Indian Ocean south of about 10°S are within the normal limits with mostly warmer anomalies over the south Indian Ocean and cooler anomalies over the north Indian Ocean. This distribution indicates neutral Indian Ocean Dipole (IOD) conditions over the equatorial Indian Ocean. The recent forecasts from coupled models suggest the neutral IOD conditions are likely to continue till the end of the southwest monsoon season.

Snow Cover over the Northern Hemisphere

During all months from September 2013 to March 2014 except January and March 2014, the snow-covered area averaged over the NH was normal to slightly above normal with highest anomalies observed during October 2013. The snow-covered area averaged over the NH during January and March 2014 was less than normal with the March NH snow-covered area was the 6th lowest among the March months of the last 48 years. The NH snow cover during winter and spring has a negative relationship in general with the subsequent Asian summer monsoon.

Consensus Outlook for the 2014 Summer Monsoon Rainfall over South Asia:

A consensus outlook for summer monsoon 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 and the current SASCOF sessions, 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.

Due to the prevailing SST and sub-surface warming conditions in the equatorial Pacific, and associated atmospheric conditions, there is strong consensus among the experts about the possibility of evolution of an El Niño event during the summer monsoon season. However, it is recognized that there is uncertainty in the intensity of the El Niño event. There is also consensus about the potential for adverse impact of El Niño on the monsoon rainfall over the region. However, other regional and global factors also can affect the monsoon rainfall patterns over the region.

The outlook for summer monsoon rainfall over South Asia is shown in Fig. 1. The figure illustrates the most likely categories over the region, as well as the probabilities for each tercile category¹. The tercile probabilities were derived by synthesis of the available information and expert assessment.

The outlook suggests that below-normal to normal rainfall is most likely during the 2014 summer monsoon season (June – September) over South Asia as a whole. Below-normal rainfall is likely over broad areas of western, central and southwestern parts of South Asia and some areas in the northeastern-most parts of the region. Normal rainfall is likely over broad areas of northwestern and eastern parts and some island areas in the southernmost parts of the region. It is noteworthy that no part of South Asia has above-normal rainfall as the most likely category.

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

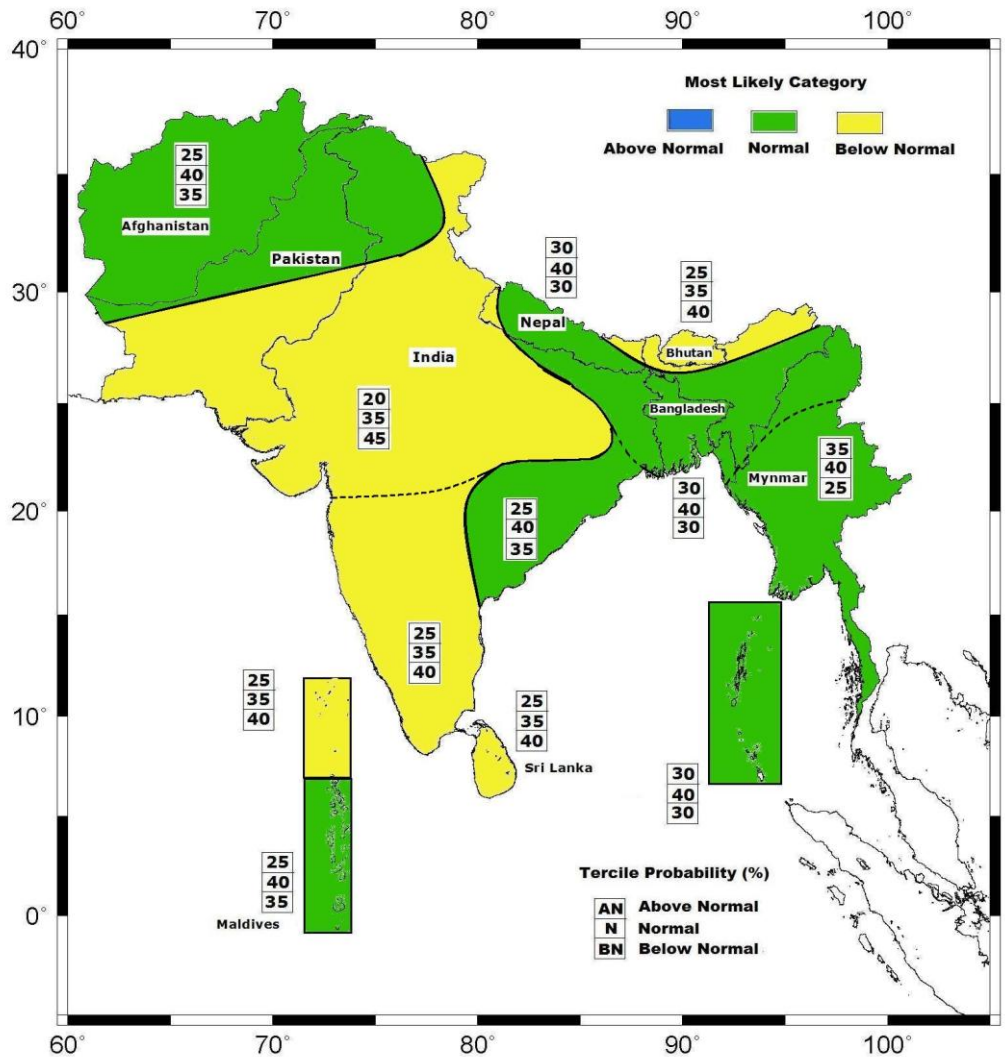


Fig.1. Consensus outlook for 2014 Southwest Monsoon Rainfall over South Asia.

Verification of consensus outlook statement of 2013:

The consensus outlook for the summer monsoon season (June to September) of 2013, developed in the fourth session of the South Asian Climate Outlook Forum (SASCOF-4) had indicated that summer monsoon rainfall over South Asia as a whole during 2013 was most likely to be within the normal range with a slight tendency towards higher side of the normal. The observed rainfall over the region as a whole during the 2013 summer monsoon was in the higher side of the normal limits, in general agreement with the forecast. However, there were some differences between the spatial distributions of the observed and forecasted 2013 summer monsoon rainfall over the region. The forecast had indicated below-normal rainfall over some areas of northwestern and southern parts of South Asia, but rainfall over these regions was normal or slightly above-normal. Similarly, the observed rainfall over northeast India and neighboring regions received below-normal rainfall against a forecast of normal rainfall. On the other hand, the forecast of above-normal rainfall along the Himalayan region matched the observations.

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. Recognizing this, regional climate outlook forums (RCOFs) were conceived with an overarching responsibility to produce and disseminate a regional 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 usersector 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 and its 4th session was held last year at Kathmandu, Nepal. The long-term historical patterns of the summer monsoon rainfall over South Asia (Fig.2), characterized by remarkable spatial variability, provide the general reference points at the respective locations for the rainfall anomalies indicated in the outlook.

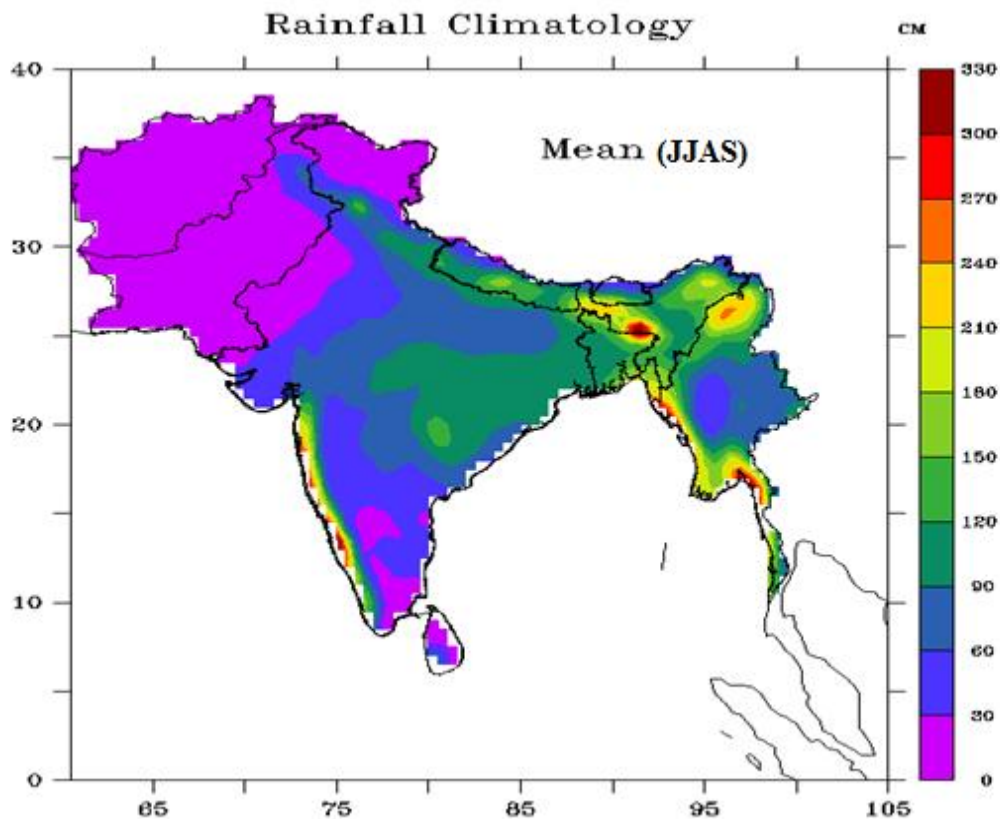


Fig.2 Rainfall Climatology over South Asia (Source: APHRODITE's Water Resources home page, <http://www.chikyu.ac.jp/precip/>]