

Report on Severe Weather Events for the Period July-September 2017

(Reported by Dr. K. Sathi Devi and Smt. Sunitha Devi, NWFC, IMD, New Delhi)

1. Introduction

As per the classification of the year into different seasons, the period from July to September comes under southwest monsoon season. Hence the severe weather phenomena occurring during the earlier period of the monsoon season are associated with the advance of southwest

2. Advance of Southwest Monsoon

Southwest monsoon reached parts of South East Bay of Bengal, South Andaman Sea and Nicobar Islands on 14th May 2017, six days ahead of its normal date. Its onset over Kerala was on 30th May, two days ahead of the normal schedule and

Month	Long Period Average (LPA in mm)	Actual Rainfall for 2017	
		Rainfall (mm)	Rainfall (% of LPA)
July	289.2	294.0	102
August	261.3	228.1	87
September	173.4	152.1	88
August + September	434.7	380.2	87

monsoon. Formation of low pressure systems and their movement across the continent, position of monsoon trough and its intensity, interaction of monsoon current with the westerly trough, formation of synoptic systems within the

it covered the entire country by 19th July, four days later than the normal date.

Figure 1 shows the isochrones of advance of southwest monsoon 2017.

Systems / Month	Deep Depression	Depression	Well marked low pressure area	Low pressure area	Total
July	0	2	1	3	6
August	0	0	2	0	2
Sept.	0	0	1	0	1
Total	0	2	4	3	9

monsoon current and their intensity etc. give rise to very heavy to extremely heavy rainfall events during the season which in turn gave rise to flood, landslides etc which severely affect the public life.

A brief summary of the rainfall recorded in the country during July to September 2017 is given in the first table above.

3. Formation of Low Pressure Systems during July to September 2017

During the period from July to September, 9 low pressure systems formed over the Indian subcontinent. Their month-wise frequency and intensity are given in the second table above.

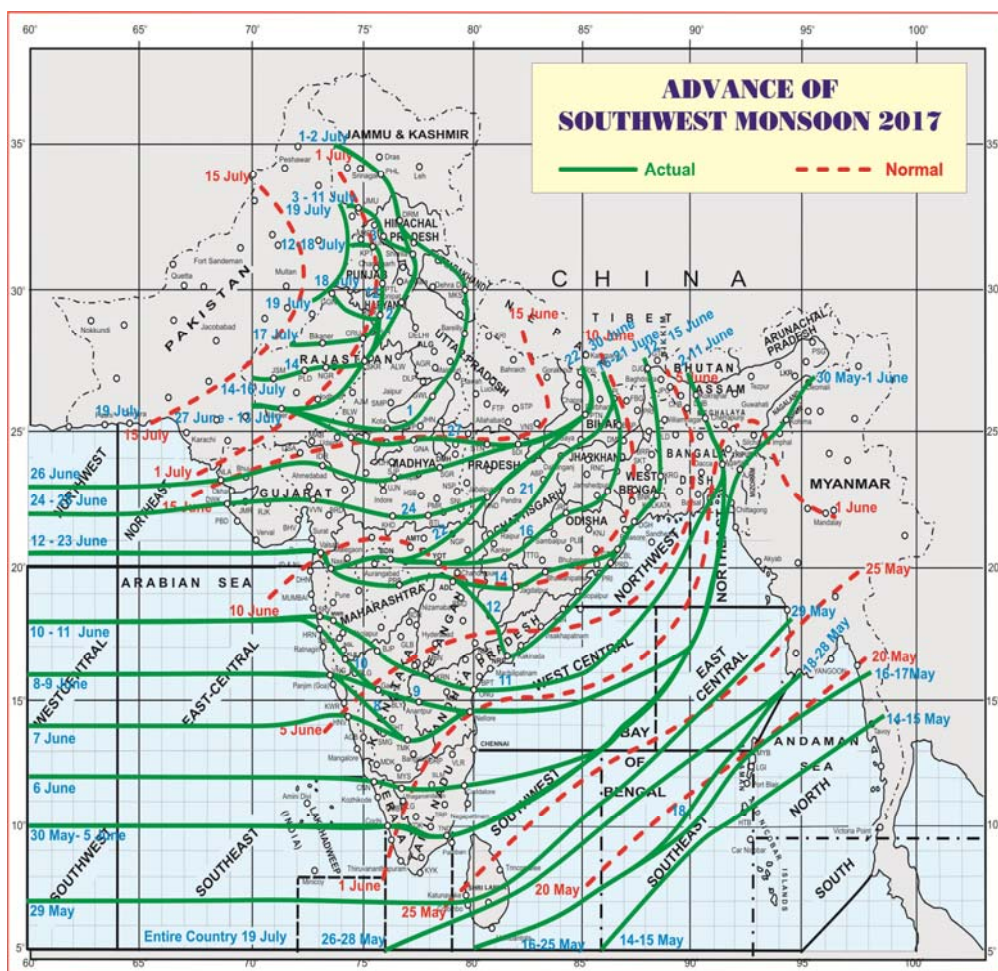


Figure 1: Progress of Southwest Monsoon – 2017

The first low pressure area of July formed during 7–8 July over the northern parts of Uttar Pradesh and neighborhoods and it dissipated over northeastern parts of Uttar Pradesh and adjoining Bihar. The second system, a Well Marked Low Pressure Area formed during 11–16 July over East Uttar Pradesh and neighborhoods which moved westwards and became less marked over south Pakistan and neighborhoods. The third system during the period 18–19 July concentrated into a Depression over North West and adjoining West Central Bay of Bengal and coastal areas of Odisha and dissipated over coastal Odisha and neighborhoods. This was followed by two very short lived low pressure areas on 20th & 21st July respectively over Kutch and neighborhoods and south Gujarat region and neighborhoods. The last system of July formed as a Land Depression over

northwest Jharkhand and neighborhoods during 26 – 27 July and dissipated over southeast Uttar Pradesh and neighborhoods.

Cyclogenesis during August and September remained very much subdued as a result of the overall weakening of the monsoon flow pattern over the Indian region. This is also reflected in the number of Low Pressure System (LPS) [low pressure areas and depressions combined] days, which shows 12 in July, 10 in August and 6 in September against a normal of 14, 17 & 16 during the respective months. The two Well Marked Low Pressure Areas in August formed during 18 – 21 August & 27 August – 1 September. However, both of them traversed across central India. The first one formed over North West Bay of Bengal and neighbourhoods and dissipated over Kutch & neighbourhoods and

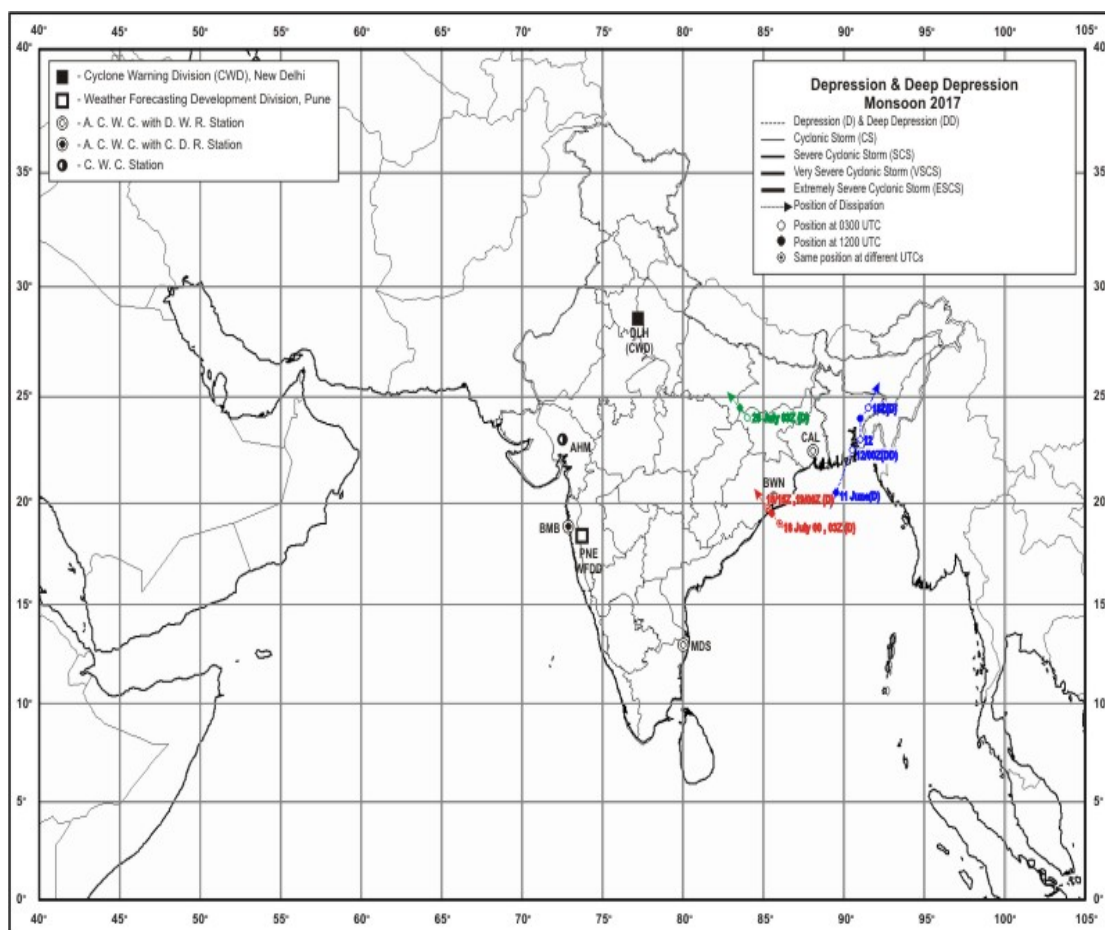


Figure 2: Tracks of the monsoon Depressions

the second one formed over south east Odisha and neighborhoods and became less marked over south Pakistan. Only one system formed in September; a Well Marked Low Pressure Area during 19–24 September over North West Bay of Bengal and neighborhoods which dissipated over west Uttar Pradesh and adjoining Uttarakhand.

Remnants of only two typhoons viz., Typhoons ‘Hato’ and ‘Doksuri’ propagated westwards and induced genesis of monsoon lows over the Indian region during August & September.

Tracks of Depressions & Deep Depressions are given in Figure 2.

The seasonal heat trough which made its appearance along the Indo-Gangetic plains from last week of May got established as the monsoon trough from 19th July. Though it remained

shallow and oscillated north-south quite often, it was active on more number of days in July in association with the formation and movement of low pressure systems. However the trough remained to the north of its normal position and often close to the foothills of the Himalayas during August and September.

The typhoon activity over west Pacific Ocean had a slow start initially up to mid-July and increased drastically thereafter. This had a direct linkage with the pressure field over the Indian region which reflected in terms of the suppressed genesis of monsoon lows over the Bay of Bengal as the Bay branch of southwest monsoon got deflected towards Southeast Asia owing to the strengthening of west Pacific systems.

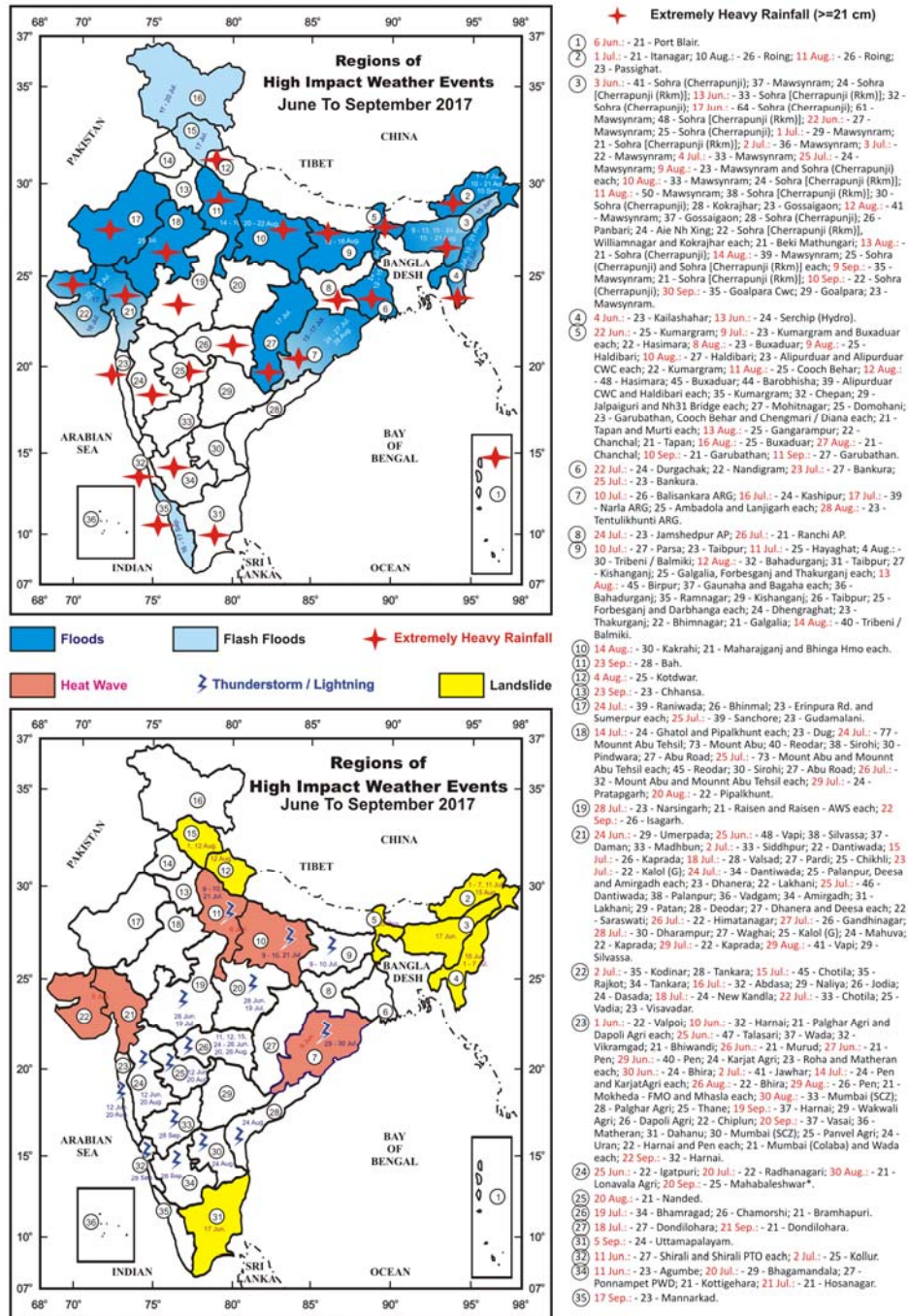


Figure 3: Areas and dates of high impact weather events during the 2017 southwest Monsoon

3. Rainfall Distribution

The rainfall during July to September monsoon months and during the second half of the monsoon season (August + September) over the country as whole are given in the table below.

As seen in the table above, the monthly rainfall over the country as a whole were more than LPA during July (102 % of LPA) and were less than LPA during the last two months of the season (87% of LPA in

Coastal Andhra Pradesh, Madhya Pradesh and Telangana also during the second half of July.

During the month of August, extremely heavy rainfall at isolated places occurred over Bihar, Assam & Meghalaya and Sub Himalayan West Bengal & Sikkim on two to three days and over Arunachal Pradesh, Bihar and East Uttar Pradesh on one or two days during the first half of the month. Extremely heavy rainfall activity

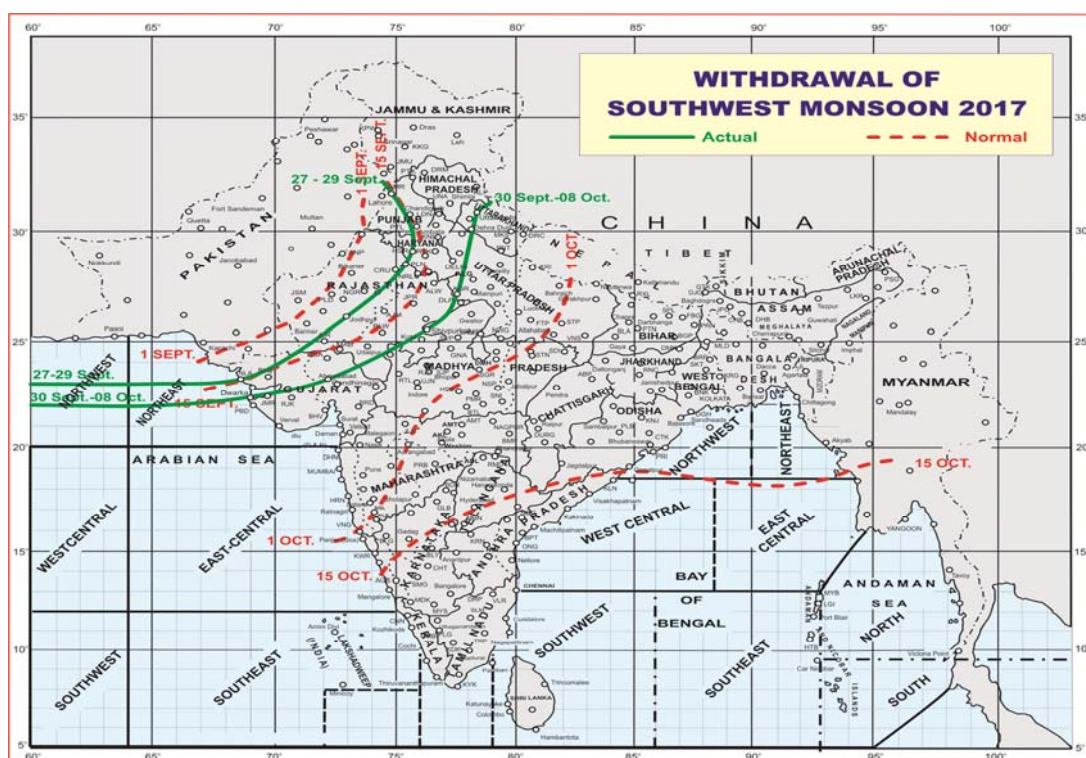


Figure 4: Withdrawal of Southwest Monsoon

August and 88% of LPA in September). The rainfall during the second half of the monsoon season as a whole was also less than the LPA (87% of LPA).

If the heavy rainfall activity is considered, heavy to very heavy rainfall at a few places with extremely heavy rainfall at isolated places occurred over Chhattisgarh and Vidarbha during 17-18 July respectively. Gujarat experienced heavy to very heavy and extremely heavy rainfalls during the period 21-25 July and Rajasthan experienced similar type of intense activity during 23- 26 July. Isolated intense rainfall activity had been observed over Odisha,

occurred also in the second half of the month; over Konkan including Mumbai, Madhya Maharashtra and Gujarat region leading to flood situation during 29th-30th August 2017.

During the month of September, rainfall activity was vigorous during the second half of the month. Extremely heavy rainfall occurred at isolated places over Kerala on 17th September. Similar intense activity has occurred over Konkan & Goa (including Mumbai) during 19-20. Konkan & Goa experienced extremely heavy rainfall activity on 22nd also. Extremely heavy rainfall at isolated places occurred over

Vayu Mandal 43(2), 2017

Chhattisgarh on 21st, over West Madhya Pradesh on 22nd and over Haryana and West Uttar Pradesh on 23rd September 2017.

4. High Impact Weather Events

Figure 3 depicts the met. Sub-divisions or parts thereof, which experienced high impact weather events like, floods, landslides, lightning associated with thunderstorms and heat waves during the southwest monsoon season (June- September) along with the dates.

Figure 3 also indicates areas that experienced isolated extremely heavy rainfall (Rainfall amount \geq 21 cm reported during the 24 hours ending at 0830 hrs IST) events during the season without any reference to the dates of these occurrences.

Apart from the flood situations experienced in association with the advance phase of SWM over northeast India and southern most peninsular India, there had been flood situations over various other parts including Odisha, Bihar, Gujarat, Konkan .As already mentioned before, Mumbai city experienced extremely heavy rainfall leading to flood situation twice during the season viz., 29th August & 19th September. Karnataka, Madhya Pradesh, East Rajasthan , parts of Haryana also had intense rainfall activity leading to flood situation. High temporal and spatial variability of rainfall caused such flood situations with flash floods. Intense convection during the weak phases of monsoon led to events of severe thunderstorms and lightning also over major parts of the country.

5. Withdrawal of Southwest Monsoon

Southwest monsoon withdrawal was delayed in 2017 and it commenced from parts of northwest India on 27th September against the normal date of 1st September, thus with a delay of about three to four weeks. It has withdrawn from most parts of central India by 15th October and from the entire country on 25th October with a delay of about ten days.

Isochrones with respect to the withdrawal of monsoon 2017 till 8th October 2018 is given in Figure 4.