

Report on Severe Weather Events for the Period October to December 2017

1. Introduction

As per the classification of the year into different seasons, the period from October to December is the post monsoon season. This season is characterized with different type of weather phenomena over the different parts of the country.

The month of October is characterized with the withdrawal phase of southwest Monsoon

observed whereas over the northern parts, weather activity related with the passage of western disturbances is dominant. The northern parts of the country starts experiencing dip in the temperature and foggy days also during this season.

The salient features of post monsoon season 2017 and the severe weather experienced during the season are brought forward in this report.

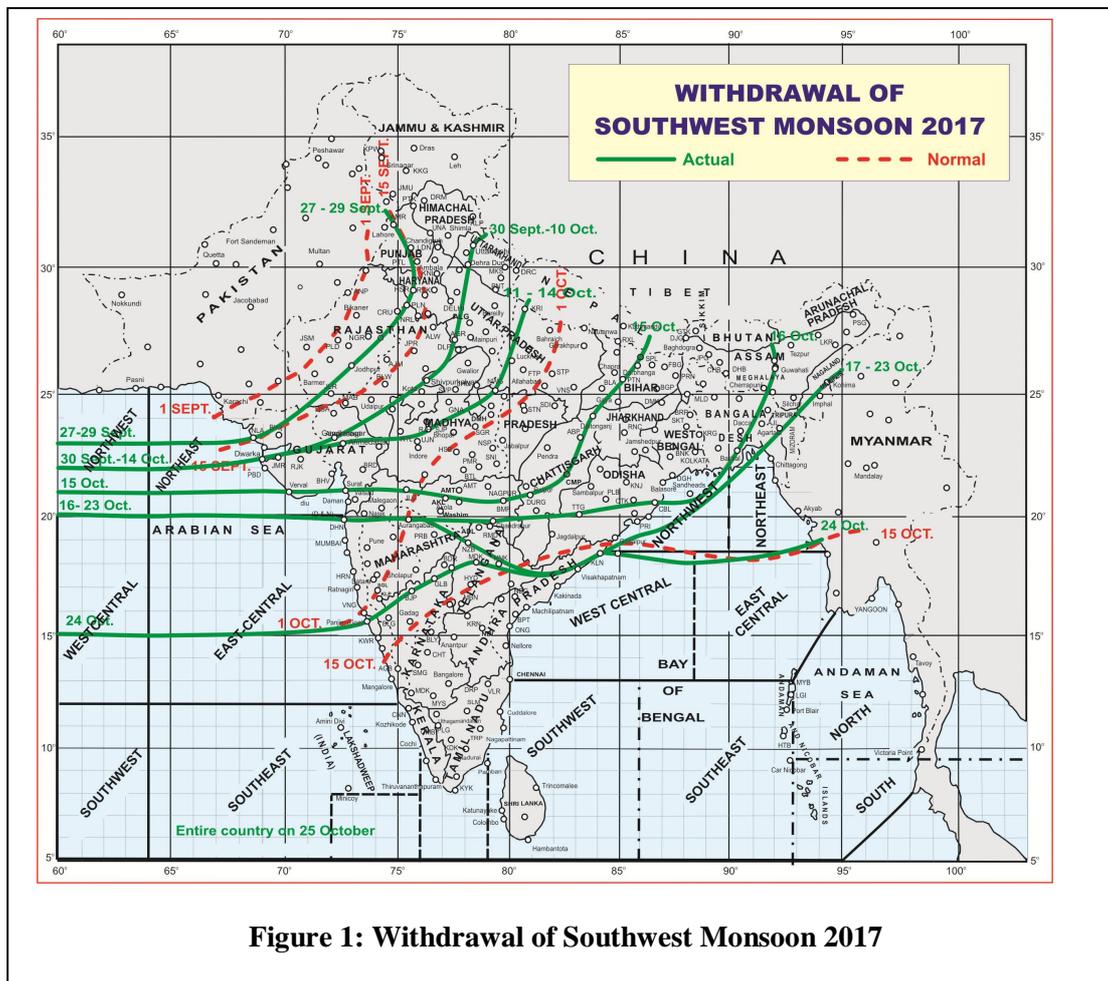


Figure 1: Withdrawal of Southwest Monsoon 2017

as well as the commencement of Northeast monsoon over the extreme southern peninsular India. Also this season is the major cyclone season for the North Indian Ocean; hence formation of low pressure systems and their movement towards the Indian coast is also common. In the southern parts of the country, weather activity related with the movement of easterly waves are

1. Withdrawal of Southwest Monsoon

The withdrawal of southwest monsoon commenced from parts of northwest India on 27th September 2017 against the normal date of 1st September, with a delay of about three to four weeks. It withdrew from most parts of central India by 15th October and from the

Table 1. Heavy rainfall activity during Northeast Monsoon 2017

Subdivision	No of days with		
	Extremely heavy rain	Very heavy rain	Heavy rain
Tamil Nadu	4	14	46
Kerala	1	9	22
Coastal Andhra Pradesh	0	5	19
Rayalaseema	0	6	16
South Interior Karnataka	0	4	12

entire country on 25th October 2017, against the normal date of 15th October. Thus the southwest monsoon withdrawal from the entire country was delayed by about ten days. Isochrones with respect to the withdrawal of southwest monsoon 2017 is given in Figure 1.

The salient features of monsoon 2017 were:

- The rainfall over the country as a whole during the monsoon season (June-September) 2017 was 95% of its long period average (LPA).
- Seasonal rainfall over the four homogeneous regions viz. Northwest India, Central India, South Peninsula and Northeast (NE) India had been 90%, 94%, 100% and 96% of the respective LPAs.
- Monthly rainfall realized over the country as a whole had been 104% of LPA in June, 102% of LPA in July, 87% of LPA in August, and 88% of LPA in September.
- Out of the total 36 meteorological subdivisions, 25 subdivisions constituting 65% of the total area of the country received normal seasonal rainfall, 5 subdivisions constituting 18% of the total area received excess seasonal rainfall whereas 6 subdivisions constituting 17% of the total area received deficient seasonal rainfall.

2. Northeast Monsoon

Northeast monsoon rains commenced over Tamilnadu & Pudducherry, Kerala and adjoining areas of Andhra Pradesh and Karnataka from 27th October 2017. Northeast

Monsoon covers only five subdivisions viz. Tamil Nadu, Coastal Andhra Pradesh, Rayalaseema, Kerala and South Interior Karnataka of south peninsula. The long period average (LPA) of the North-East monsoon seasonal rainfall over the south peninsula for the base period, 1951- 2000 is 332.1mm. Forecast Outlook for North-East Monsoon Rainfall over South Peninsula for the year suggested that the rainfall activity would be normal during the season for the year 2017.

The northeast monsoon rainfall was normal over Tamil Nadu (-9%), Kerala (-8%), South Interior Karnataka (-5%) and Rayalaseema (+19%). However the subdivision Coastal Andhra Pradesh received deficient rainfall (-48%) during the season. It is to be noted that only Rayalaseema showed positive rainfall departure among the subdivisions during the year 2017.

Heavy to very heavy rain was realised over all the subdivisions whereas extremely heavy rainfall was also reported over Tamil Nadu (four days) and Kerala (one day) during the season. The number of days with heavy rainfall or above for the five subdivisions is given in Table 1.

3. Low Pressure systems

3.1. Deep Depression over Gangetic West Bengal (9-10 October, 2017)

A low pressure area formed over North Bay of Bengal and adjoining south Bangladesh on 8th

October 2017 morning. It became Well Marked Low pressure area (WML) over North Bay of Bengal and adjoining coastal areas of Bangladesh and West Bengal in the evening of the same day. It concentrated into a depression in the early morning hours of 9th October over Gangetic West Bengal and adjoining North

3.2. Depression over Bay of Bengal (19-22 October, 2017)

A low pressure area (LPA) formed over Central Bay of Bengal in the morning of 15th October 2017. It became a Well Marked Low pressure area (WML) over Central and adjoining South Bay of Bengal in the morning

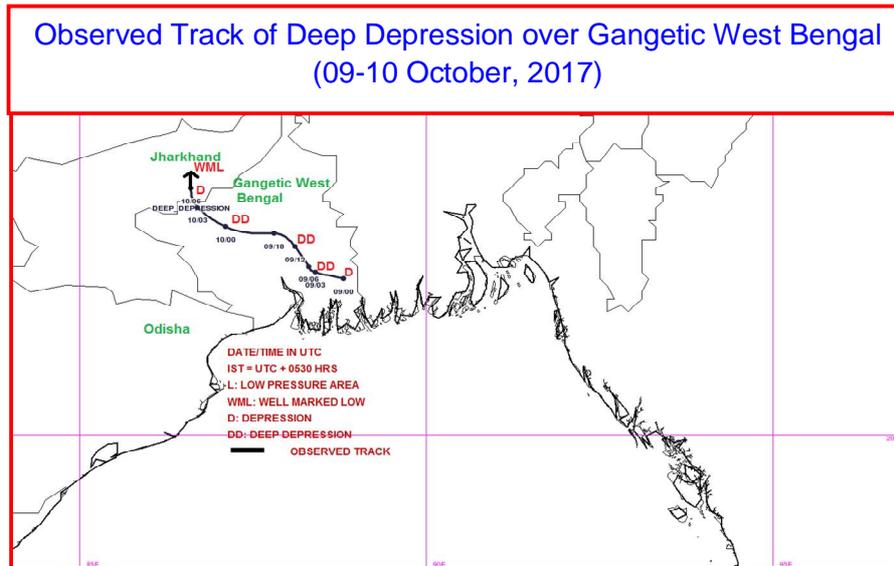


Figure 2: Observed track of deep depression over Gangetic West Bengal (09-10 October, 2017)

Bay of Bengal. Moving northwestwards, it intensified into a deep depression (DD) in the morning of 9th. It moved nearly north-northwestwards and weakened into a depression around noon of 10th and into a Well Marked Low pressure area over northeast Jharkhand and adjoining West Bengal in the evening of the same day and became less marked on 11th October 2017.

The system caused heavy to very heavy rainfall at isolated places over Gangetic West Bengal and Bihar on 10th October and over Gangetic West Bengal, Jharkhand and Bihar on 11th October 2017.

The observed track of the system is given in Figure 2.

of 17th. It concentrated into a depression in the early hours of 19th over West Central Bay of Bengal. Moving nearly northwards, it crossed Odisha coast close to Paradeep in the late evening of 19th. The system recurved and moved nearly eastwards for sometime from the night of 20th. It then moved northeastwards across Gangetic West Bengal and Bangladesh. It weakened into a Well Marked Low pressure area over northeast Bangladesh and adjoining Meghalaya and south Assam in the early morning hours of 22nd October.

Under its influence, isolated heavy rainfall occurred on 18th and scattered heavy with isolated very heavy rainfall occurred on 19th over Odisha. Gangetic West Bengal experienced isolated heavy rainfall on 20th and scattered heavy with isolated very heavy to extremely heavy rainfall on 21st. Assam & Meghalaya experienced isolated heavy to very heavy rainfall on 20th and isolated heavy to very heavy rainfall with extremely heavy falls

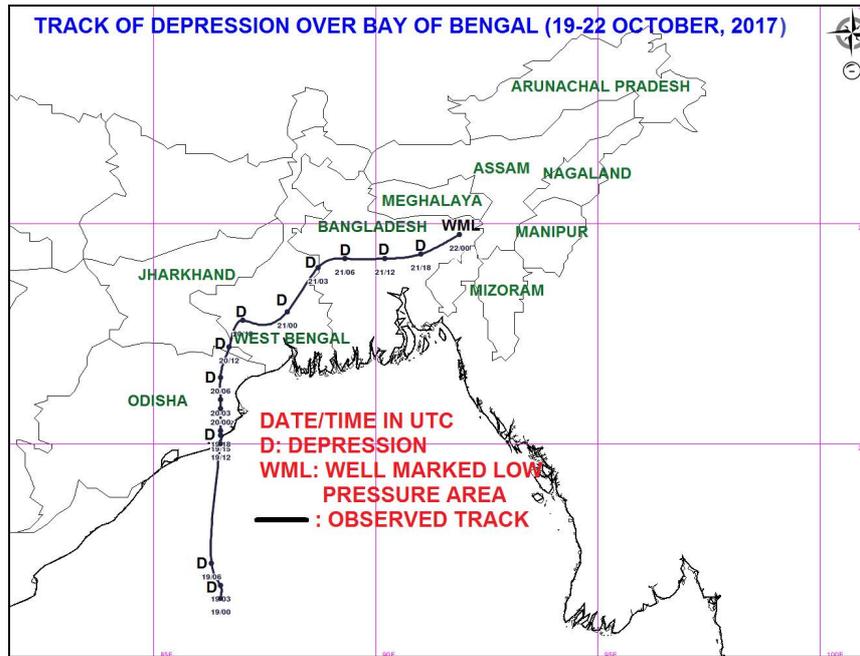


Figure 3: Observed track of Depression over Bay of Bengal during 19-22 October, 2017

at one or two places on 21st. Widespread heavy to very heavy rainfall activity was observed over Nagaland, Manipur, Mizoram & Tripura on 21st October 2017 under the influence of

the system. The observed track of the system is given in Figure 3.

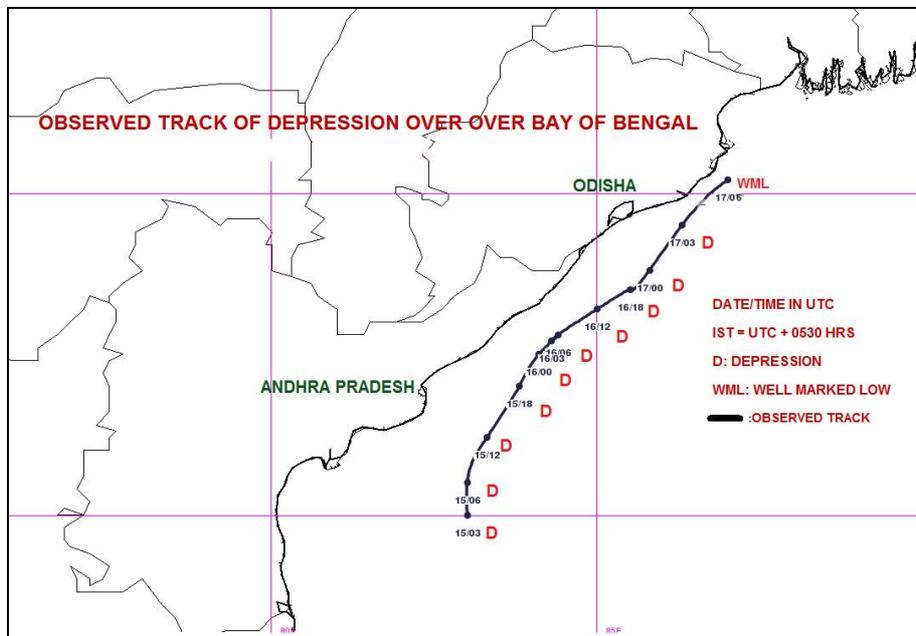


Figure 4: Observed track of Depression over West Central Bay of Bengal (15-17 November, 2017)

3.3. Depression over West Central Bay of Bengal (15-17 November 2017)

A low pressure area formed over South West Bay of Bengal and neighbourhood in the morning of 10th November, 2017. It became a Well Marked Low pressure area (WML) over the same region in the morning of 13th. It concentrated into a depression over West Central Bay of Bengal off Andhra Pradesh coast on 15th. Moving nearly north-northeastwards, it weakened into a WML over North West Bay of Bengal off Odisha Coast on 17th November 2017.

The system caused heavy to very heavy rainfall at isolated places over Odisha and Coastal Andhra Pradesh on 15th and heavy rainfall at isolated places over Odisha on 17th. The observed track of the system is given in Figure 4.

3.4. Very Severe Cyclonic Storm ‘Ockhi’ over the Arabian Sea

A Low Pressure Area formed over southwest Bay of Bengal and adjoining areas of south Sri Lanka & equatorial Indian Ocean in the forenoon of 28th November. It became a Well Marked Low pressure area in the early morning of 29th November over the same region. It concentrated into a Depression over

SouthWest Bay of Bengal off southeast Sri Lanka coast in the forenoon of 29th Nov. Moving westwards, it crossed Sri Lanka coast after some time. Continuing its westward movement, it emerged into Comorin area in the evening of 29th and intensified into a Deep Depression (DD) in the early hours of 30th. It further moved northwestwards and intensified into a Cyclonic Storm (CS) ‘Ockhi’ in the forenoon of 30th November over the Comorin area. Moving west-northwestwards, Ockhi further intensified into a Severe Cyclonic Storm (SCS) over Lakshadweep area in the early morning of 1st Dec. and into a Very Severe Cyclonic Storm (VSCS) over South East Arabian Sea to the west of Lakshadweep in the afternoon of 1st Dec. It then moved northwestwards and reached its peak intensity of 150-160 kmph gusting to 180 kmph in the afternoon of 2nd Dec with lowest central pressure of 976 hPa. It moved north-northwestwards for some time and then changed its course of movement and moved north-northeastwards maintaining its intensity till the early morning of 3rd Dec. It then continued to move north-northeastwards and weakened gradually and crossed South coast of Gujarat between Surat and Dahanu as a Well Marked Low pressure area around early morning of 6th December 2017. Observed track of the system is given in Figure 5.

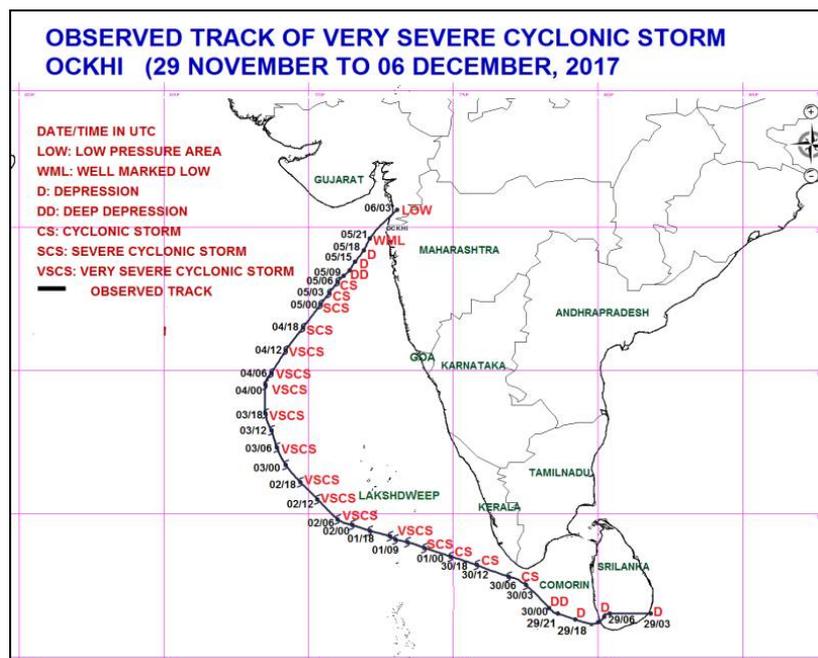


Figure 5: Observed track of VSCS Ockhi (29 Nov.–06 Dec, 2017)

The system led to isolated heavy rainfall on 28th and 29th November and scattered heavy to very heavy rainfall with isolated extremely heavy rainfall on 30th Nov., 1st and 2nd December, 2017 over south Tamil Nadu. Over south Kerala, it caused isolated heavy rainfall on 29th Nov, heavy to very heavy rainfall over south Kerala on 30th Nov and 1st December. Lakshadweep received heavy rains on 1st and 2nd Dec 2017. Heavy rainfall was reported over north coastal Maharashtra and adjoining south coastal Gujarat on 5th December, under the influence of the system.

The unique features of the systems were:

- This was the fourth cyclonic storm developing over Comorin Sea. Previously two cyclones in 1912 and another one in 1925 developed over Comorin Area.
- The system has shown rapid intensification in its genesis stage and has intensified from deep depression into a cyclonic storm over Comorin area within six hours.
- Ockhi had a clockwise recurving track. The track length of the cyclone was 2538 km.
- The 12 hour average translational speed of the cyclone was 15.0 kmph.

•The life period of cyclone was 162 hours (6 days & 18 hours) against long period average of 4.7 days for Very Severe Cyclonic Storm over North Indian Ocean.

3.5. Deep Depression over South East Bay of Bengal (06-10 December, 2017)

A low pressure area formed over Malay Peninsula and adjoining Andaman Sea in the morning of 30th November, 2017. It lay as a Well Marked Low pressure area (WML) over south Andaman Sea & adjoining Strait of Malacca on 1st December, over Sumatra coast and adjoining south Andaman Sea on 2nd, over South East Bay of Bengal & adjoining south Andaman Sea and Equatorial Indian Ocean on 3rd and 4th and over South East Bay of Bengal and neighbourhood on 5th. It concentrated into a Depression (D) over South East Bay of Bengal and neighbourhood in the morning of 6th December. It moved northwards till early hours of 8th. Thereafter, it moved north-northwestwards and intensified into a deep depression (DD) in the early morning of 8th over Central Bay of Bengal. Moving nearly northwards, it weakened into depression (D) during the night of same day over West Central Bay of Bengal. It moved north-northeastwards from morning of 9th and weakened into a WML over North West Bay

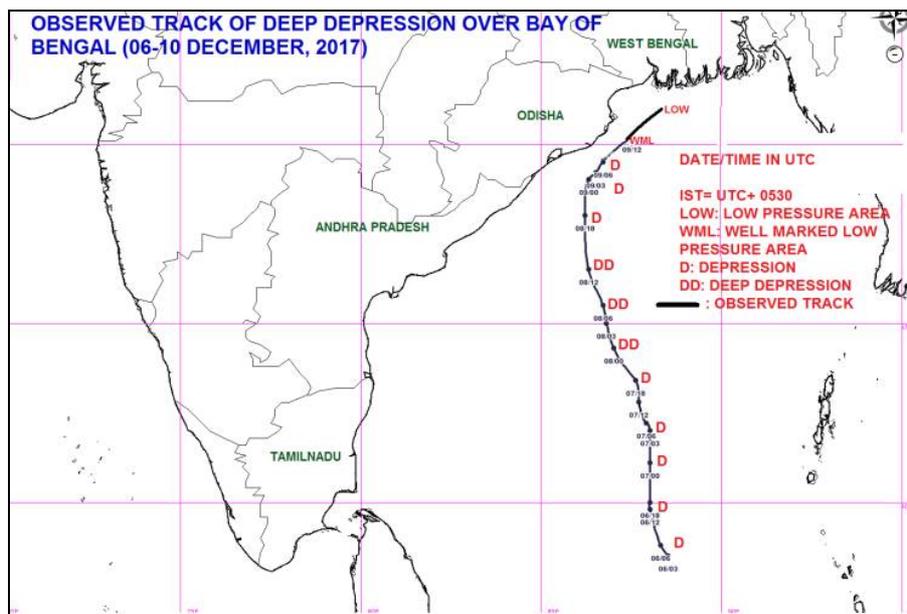


Figure 6: Observed Track of Deep Depression over Bay of Bengal (06-10 December, 2017)

of Bengal in the evening of 9th December and into a Low pressure area over North Bay of Bengal and neighbourhood in the evening of 10th December 2017.

The system gave light to moderate rainfall at many places with isolated heavy falls over Coastal Odisha and adjoining districts of interior Odisha on 8th December. Light to moderate rainfall also occurred at many places over coastal districts of West Bengal, south Assam, Meghalaya, Mizoram and Tripura, with isolated heavy falls over Tripura on 9th.

The observed track of the system is given in Figure 6.

precipitation and remaining caused isolated rainfall activity over Western Himalayan Region and adjoining plains of northwest India.

During the month of November, nine active western disturbances affected western Himalayan region and adjoining plains of northwest India. Out of these, one western disturbance caused isolated to scattered rainfall activity over Punjab, Haryana and north Rajasthan and scattered to fairly wide spread precipitation over Jammu & Kashmir and Himachal Pradesh and isolated precipitation over Uttarakhand. Remaining

Table 2. Frequency of Thunderstorm Days during Post Monsoon 2017

S. No.	Region	Thunder Storm Days during Post Monsoon Season 2017		
		October	November	December
1.	South Peninsular India	29	18	-
2.	Northwest India	05	05	-
3.	Northeast India	22	2	-
4.	East India	19	4	1
5.	Central India	17	-	-
6.	West India (Goa only)	9	-	-

4. Western Disturbances

With the withdrawal of southwest monsoon, passage of western disturbances across the northern parts of the country becomes more frequent by which parts of northwest India especially the western Himalayan region get weather activity.

During the month of October, seven active western disturbances passed across Western Himalayan region and adjoining plains of northwest India. Out of these seven western disturbances one or two western disturbances caused scattered to fairly widespread

western disturbance caused isolated precipitation mainly over Jammu & Kashmir during November 2017.

During the month of December, ten active western disturbances passed across the Indian region. Out of 10 western disturbances, two has caused significant precipitation activity over northwest India. Scattered to fairly widespread rain/snowfall with isolated heavy falls observed over Jammu & Kashmir and Himachal Pradesh on one to two days whereas scattered rainfall activity occurred over plains of northwest India during the passage of these systems.

5. Thunderstorm Activity

Thunderstorm activity observed over the country during the season is expressed in terms of thunderstorm days and given in Table 2. From the table, it is observed that the maximum number of thunderstorm days occurred over south peninsula, in the month of October followed by November. This might have been due to the thunderstorm activity observed in this area during withdrawal of southwest monsoon as well as in the active phase of northeast monsoon.

In case of northwest India, these activities are mainly associated with the passage of western disturbances. In other regions, more activity is found to be concentrated in the month of October, which is mainly associated with the withdrawal phase of south west monsoon. In the month of December, there was only one thunderstorm day and this was reported from Port Blair.

Acknowledgement: This article is compiled with reference to the reports of RSMC, IMD, New Delhi and Press reports of India Meteorological Department.

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