

# Weather

## POST MONSOON SEASON (OCTOBER-DECEMBER 1986)\*

### 1. Chief features

- (i) Southwest monsoon withdrew from the country on 21 October.
- (ii) Northeast monsoon rain commenced over Tamil Nadu on 27 October.
- (iii) During November a cyclonic storm developed in the bay of Bengal and a deep depression in the Arabian Sea. Tracks are shown in Fig. 1.
- (iv) First spell of snowfall occurred over Jammu & Kashmir in October.
- (v) Moderate to severe cold wave in Himachal Pradesh, Rajasthan and Gujarat in December.
- (vi) Rainfall during the season was in large excess in Assam & Meghalaya, Nagaland, Manipur, Mizoram & Tripura, Gangetic West Bengal, Orissa, Bihar, Himachal Pradesh and Jammu & Kashmir and in lights excess in Sub-Himalayan West Bengal & Sikkim, hills of west Uttar Pradesh, Haryana and west Madhya Pradesh. It was normal in Arunachal Pradesh, plains of Uttar Pradesh, east Madhya Pradesh, Vidarbha and coastal Andhra Pradesh. It was in slight deficient in Telangana, Tamil Nadu, coastal and south interior Karnataka & Lakshadweep; Moderately in Andaman and Nicobar Islands, Punjab, Madhya Pradesh, Maharashtra, Marathwada, Rayalaseema, north interior Karnataka & Kerala and in large deficient in Rajasthan, Gujarat and Konkan & Goa (Fig. 2).

### 2. October

#### 2.1. Withdrawal of southwest monsoon and commencement of northeast monsoon rainfall

Southwest monsoon withdrew from east Uttar Pradesh, west Madhya Pradesh, Konkan & Goa and Madhya Maharashtra on 8th and from extreme western parts of Bihar, east Madhya Pradesh, Marathwada, Vidarbha, Telangana and north interior Karnataka on 9th. Thereafter it further withdrew from the rest of Bihar State and Sub-Himalayan West Bengal & Sikkim on 16th and from Gangetic West Bengal and Orissa on 20th and by next day the withdrawal was

complete from the country outside Tamil Nadu and Kerala.

Northeast monsoon rain commenced Tamil Nadu on 27th.

#### 2.2. Weather and associated synoptic features

Extreme north India was affected by four western disturbances during the month. Uttar Pradesh and Madhya Pradesh were affected by a trough in mid and upper tropospheric westerlies between 7th and 10th of this month. Besides these systems, plains of north India between east Rajasthan and Assam & Meghalaya was also affected by an east-west trough in lower levels during the period from 13th to 19th.

The other synoptic features of the month are given in Table 1.

Southwest monsoon was active to vigorous on 1 to 3 days in Andhra Pradesh, coastal and south interior Karnataka up to 10 October. Rain or thundershowers were generally widespread on 5 to 9 days over Andaman and Nicobar Islands, northeast India, Tamil Nadu and Kerala and on 1 to 4 days over hills of west Uttar Pradesh, Punjab, Himachal Pradesh, Jammu & Kashmir, east Madhya Pradesh, coastal Andhra Pradesh, Rayalaseema, Karnataka and Lakshadweep. Heavy to very heavy rainfall occurred on 3 to 5 days in Assam & Meghalaya, Nagaland, Manipur, Mizoram & Tripura, Gangetic West Bengal, Orissa and Tamil Nadu and on 1 to 2 days in Arunachal Pradesh, Bihar plains, coastal Andhra Pradesh, Rayalaseema, south interior Karnataka and Kerala. There was widespread rain or snow over Jammu & Kashmir on 18th. Scattered or isolated rainfall occurred on 17 to 24 days over coastal Andhra Pradesh, Tamil Nadu, south interior Karnataka and Kerala, on 7 to 14 days over Andaman & Nicobar Islands, Assam & Meghalaya, West Bengal & Sikkim, Orissa, Bihar, east Uttar Pradesh, hills of west Uttar Pradesh, Haryana, Punjab, Himachal Pradesh, east Madhya Pradesh, Telangana, Rayalaseema, coastal and north interior Karnataka. Mainly dry weather prevailed over west Rajasthan & Saurashtra and Kutch.

#### 2.3. Rainfall during the month

It was excess in Nagaland, Manipur, Mizoram & Tripura, Gangetic West Bengal, Bihar, hills of west

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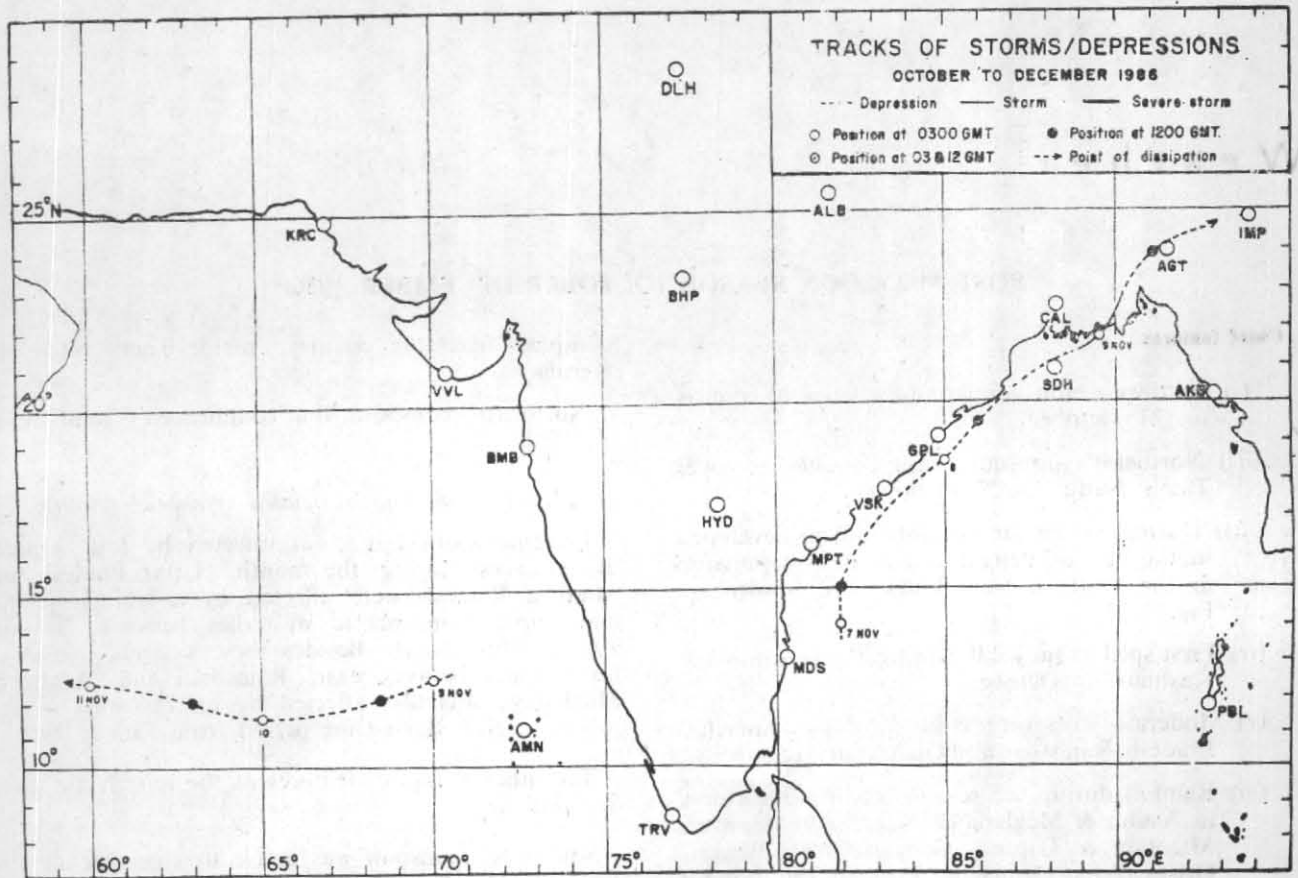


Fig. 1. Tracks of storms/depressions, 1 October to 31 December 1986

Uttar Pradesh, Himachal Pradesh and Jammu & Kashmir; normal in Assam & Meghalaya, Sub-Himalayan West Bengal & Sikkim, Orissa, plains of west Uttar Pradesh, west Rajasthan and Tamil Nadu; deficient in Andaman & Nicobar Islands, Arunachal Pradesh, east Uttar Pradesh, Haryana, Punjab east Madhya Pradesh, Andhra Pradesh, south interior Karnataka, Kerala & Lakshadweep and scanty in east Rajasthan, west Madhya Pradesh, Gujarat, Maharashtra coastal and north interior Karnataka.

The significant amounts (cm). of rainfall were :

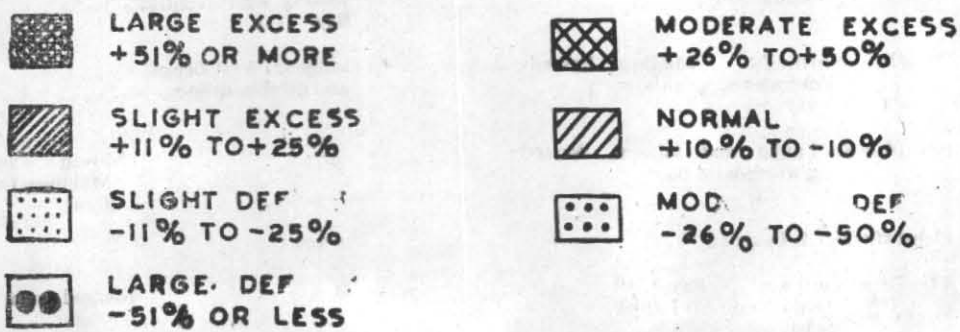
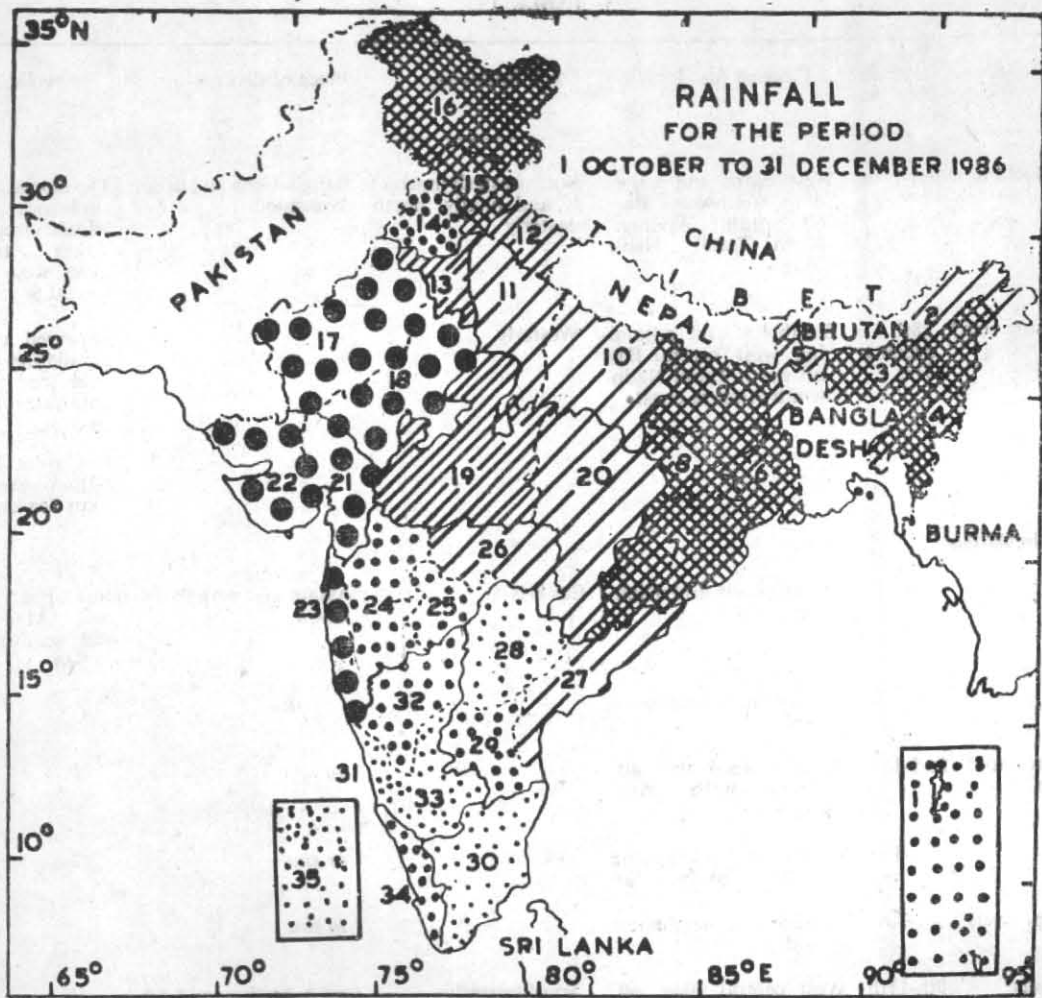
Date Station/Rainfall (cm)

- 1 Triveni 19, Chalakudi 11, Gorakhpur, Maddur & Pennagaram 8 each, Malavalli 7.
- 2 Agartala AP 10, Pasighat 9, Midnapore & Shertbala 7 each.
- 3 Narasapur 11, Rajghat 10, Belgaum AP & Yellamanchili 8 each, Keonjhar & Visakhapatnam 7 each.
- 4 Visakhapatnam & Tekkali 11 each, Purushottampur, & Vridhachalam 10 each, Gopalpur & Mavelikara 9 each, Chadbali & Malavalli 7 each.
- 5 Berhampore 11, Gopalpur & Visakhapatnam AP 10 each, Balasore 9, Contai 8, Sukma 7.

- 6 Gopalpur 11, Sompeta 10, Aijal, Berhampore & Naraj 8 each, Nalgonda & Sagar Island 7 each.
- 7 Cherrapunji 13, Shivaganga 12, Gopalpur 11, Gauhati AP 9, Tumkur 8, Bangalore & Kalingapatnam 7 each.
- 8 Cherrapunji 20, Kailashahar 13, Ariyalur 10, Chamarajnagar & Malavalli 9 each, Dharmasala & Gauhati AP 8 each, Adirampattinam 7.
- 9 Agartala AP 13, Silchar 8.
- 10 Imphal AP 8, Kailashahar & Madras AP 5 each.
- 11 Birpur & Punalur 7 each, Katra 6.
- 12 Car Nicobar 7, Chhibamau, Dehra Dun, Katra, Punalur & Sivaganga 5 each.
- 13 Kondungallur 7, Mannarghat & Paramathy 5 each.
- 14 Tiruchirapalli 8, Tonki 6, Cooch Behar 5.
- 15 Sikar 7, Tangla 5.
- 16 Mavelikara, Mussoorie & Zira 5 each, Ambasundaram & Nahan 4 each.
- 17 Uttar Kashi 5.
- 18 Punalur & Srivillipattur 6 each, Nedumangal 4.

TABLE 1

S. No.	Weather systems	Period (Oct '86)	Place of first location	Track followed	Place of dissipation	Special remarks
1	Well marked low pressure area	2nd-11th	West central and adjoining southwest Bay off south Andhra-north Tamil Nadu coast	Northwesterly/northerly and finally north-easterly	Bangla Desh and neighbourhood	Developed under the influence of the cyclonic circulation in the lower trop. levels over west central Bay on 30 Sep.
2	Low pressure area*	28th evening-31st	Southwest and adjoining west central Bay off north Tamil Nadu-south Andhra coast	Westerly	—	Appeared as a cyclonic circulation in lower and mid trop. levels over southwest Bay on 28th morning *Lay over Kerala and adjoining southeast Arabian Sea on 31st
<b>Cyclonic circulations</b>						
1	Lower trop. levels	1st-3rd	Bihar plains and neighbourhood	Easterly	Assam and neighbourhood	Developed over north-east Madhya Pradesh and neighbourhood on 30 Sep
2	Do.	1st-2nd	Punjab and neighbourhood	—	<i>in situ</i>	
3	Lower and mid trop. levels	2nd-4th	Lakshadweep and adjoining southeast Arabian Sea	—	<i>in situ</i>	
4	Do.	7th-8th	Kerala and adjoining southeast Arabian Sea	—	<i>in situ</i>	
5	Lower trop. levels	5th-7th	Punjab and neighbourhood	—	<i>in situ</i>	
6	Lower levels	9th-11th	West central Bay off Andhra coast	Southwesterly	South Andhra and adjoining west central Bay	
7	Lower trop. levels	9th-13th	Northwest Madhya Pradesh and neighbourhood	Easterly	Gangetic West Bengal and neighbourhood	
8	Do.	10th-14th	Sri Lanka and adjoining south-west Bay	Westerly	—	Moved away across Maldives-Lakshadweep area
9	Lower levels	12th-14th	North Pakistan	—	<i>in situ</i>	
10	Lower trop. levels	14th-23rd	Southwest Bay off Tamil Nadu-Sri Lanka coast	—	<i>in situ</i>	Merged with the seasonal trough
11	Do.	19th-20th	Maldives-Lakshadweep area	—	<i>in situ</i>	
12	Do.	21st evening-30th	Andaman Sea	Westerly	Lakshadweep	
13	Do.	23rd-24th	North Konkan and adjoining Madhya Maharashtra	—	<i>in situ</i>	
14	Lower trop. levels	25th-27th	Northeast Madhya Pradesh and neighbourhood	Eastnortheasterly	Bihar plans	
15	Lower and mid trop. levels	25th-28th	Maldives and Lakshadweep.	Northerly	Lakshadweep	



<i>Sub-divisions</i>	<i>Deapar. from normal</i>	<i>Sub-divisions</i>	<i>Deapar. from normal</i>	<i>Sub-divisions</i>	<i>Deapar. from normal</i>
1. A & N Islands	-37	13. Haryana	19	25. Marathwada	-44
2. Arunachal Pradesh	3	14. Punjab	-27	26. Vidarbha	7
3. Assam & Meghalaya	61	15. Himachal Pradesh	90	27. Coastal A.P.	2
4. N.M.M. & T.	99	16. Jammu & Kashmir	154	28. Telangana	-21
5. S.H.W.B. & Sikkim	11	17. West Rajasthan	-83	29. Rayalaseema	-33
6. G. West Bengal	107	18. East Rajasthan	-82	30. Tamil Nadu	-24
7. Orissa	77	19. West M.P.	23	31. Cot. Karnataka	-15
8. Bihar Plateau	192	20. East M.P.	-7	32. N.I. Karnataka	-48
9. Bihar Plains	58	21. Gujarat Region	-90	33. S.I. Karnataka	-11
10. East U.P.	1	22. Saurashtra & Kutch	-95	34. Kerala	-32
11. Plains W.U.P.	-1	23. Konkan & Goa	-72	35. Lakshadweep	-18
12. Hills of W. U.P.	12	24. Madhya Maharashtra	-48		

Fig. 2. Rainfall for the period, 1 October to 31 December 1986

TABLE 2

Weather systems	Period	Place of first location	Track followed	Place of dissipation	Special remarks
Cyclonic storm	7th-10th	West central and adjoining southwest Bay off south Andhra-north-Tamil Nadu coast	North-northeast/north-easterly	Moved away eastwards across Nagaland, Manipur, Mizoram & Tripura and Meghalaya	Appeared as a low pressure area over southeast Bay on 31 Oct and moved over west central and adjoining southwest Bay on 2 November
Deep depression	9th-11th	East central and adjoining southeast Arabian Sea, centre near 13°N/70°E	Westerly	Southwest and adjoining west central Arabian Sea	Last month's low pressure area which developed over south west and adjoining west central Bay on 28 Oct moved over southeast and adjoining east central Arabian Sea off south Maharashtra-Karnataka coast on 1 Nov and persisted there till 8th
<b>Cyclonic circulations</b>					
Lower trop. levels	11th-14th	Southwest and adjoining west central Bay off north Tamil Nadu-south Andhra coast	South-southwesterly	Sri Lanka and adjoining southwest Bay	
Lower levels	14th-15th evening	Northwest Rajasthan and neighbourhood	—	<i>in situ</i>	
Do.	16th-17th	Punjab, Haryana and neighbourhood	Easterly	West Uttar Pradesh	
Lower trop. levels	16th-17th evening	Comorin and neighbourhood	Westerly	Maldives and neighbourhood	
Lower levels	17th-19th	Southwest Bay and adjoining Sri Lanka	—	<i>in situ</i>	
Lower and mid trop. levels	23rd-25th	South Kerala and neighbourhood	Quasi-stationary	Kerala and neighbourhood	
Lower levels	26th-1st Dec	Northwest Rajasthan and neighbourhood	Easterly	West Uttar Pradesh and neighbourhood	Lay on 30th over Haryana and neighbourhood in lower trop. levels
<b>Trough in easterlies</b>					
Lower levels	28th-30th	Southwest Bay off Tamil Nadu coast	—	—	Persisted on the last day of the month

- 19 Panagarh AP 5, Alathur 4.  
 20 Pamban & Vederanyam 4 each.  
 21 Chidambaram 5.  
 24 Chittur 13, Parli 7, Agumbe & Tuticorin 4 each.  
 25 Majeri 6.  
 26 Madras & Ponneri 5 each, Narasapur 4.  
 27 Parangipettai & Srivilliputtur 9 each, Karaikal 8, Chalakudi 7, Hansur & Puttur 6 each, Trichur 5.  
 28 Minicoy 16, Vridhunagar 8, Palayamkottai & Srinivasapur 6 each, Trichur & Tuticorin 5 each.

29 Parli 11, Nellore 10, Hosanagara & Pudukottai 8 each, Kavali & Madras 7 each, Belthangadi & Tirupati AP 5 each.

30 Nellore 24, Kavali 22, Pooneri 13, Badvel & Ongole 11 each, Cuddapah 8, Madras AP 6, Tirupati 4.

31 Rapur 18, Kavali 17, Kondukur 16, Agumbe 10, Tirupati AP 9, Kundapur 7, Nalgonda & Tondi 6 each.

#### 4. Floods/landslides and damages

As per reports of Central Water Commission and of the Press, rivers *Dhansiri* and *Kopili* in Brahmaputra basin and rivers *Barak* and its tributaries in Barak basin

were in floods in the second week of October. Rivers *Dhansiri* and *Kopili* continued to be in floods up to 18th and 21st respectively. Flood waters of river *Barak* affected about 3 lakhs people and standing paddy crops in 30,000 hectares of land in 300 villages. Flood waters also submerged National Highway 37 and 39 at several places disrupting the road communications. Rivers *Imphal*, *Iril*, *Nambul* and *Thoubal* in Manipur were in floods on 8th and 9th. Incessant and heavy rains in Nagaland during the first fortnight of October caused heavy damages and landslides on several roads which disrupted communications.

### 2.5. Temperature

Day temperatures during October were generally above normal in Rajasthan, Madhya Pradesh, Gujarat, Maharashtra, Andhra Pradesh, Tamil Nadu, Karnataka and Kerala, being appreciably so on 10 to 15 days in east Rajasthan, west Madhya Pradesh, Maharashtra outside Konkan & Goa and Telangana and on 4 to 8 days in west Rajasthan, Gujarat, Konkan & Goa, Rayalaseema and north interior Karnataka. They were appreciably to markedly below normal in Assam & adjacent States, West Bengal & Sikkim and Bihar between 6th and 10th. They were also appreciably to markedly below normal in hills of west Uttar Pradesh, Haryana, Punjab, Himachal Pradesh and Jammu & Kashmir on 17th and 18th.

Night temperatures were generally below normal throughout the month in Assam & adjacent States and Bihar Plateau, being appreciably so on most of the days in Nagaland, Manipur, Mizoram & Tripura during the second fortnight. They were also below normal in Punjab, Himachal Pradesh and Jammu & Kashmir during the second fortnight and in Rajasthan, Madhya Pradesh and Gujarat during 21st to 30th of the month, being appreciably below normal on most days in Jammu. Night temperatures in Marathwada were appreciably below normal from 24th to 29th.

### 3. November

#### 3.1. Storm and depression

During this month a cyclonic storm developed in the Bay of Bengal and a deep depression in the Arabian Sea. The cyclonic storm crossed Bangla Desh coast while the deep depression moved westwards and dissipated over the sea.

#### 3.2. Weather and associated synoptic features

During the month five western disturbances moved away eastwards across Western Himalayas and neighbourhood. The sixth western disturbance of the month lay over Jammu & Kashmir and neighbourhood on the last day of the month. West Bengal & Sikkim and Assam & adjacent States were affected by a trough in mid and upper tropospheric westerlies between 7th and 14th.

Other synoptic features are given in Table 2.

The western disturbances caused two spells of rain or snow over Himachal Pradesh and Jammu & Kashmir. It was widespread over Jammu & Kashmir on 5th and from 26th to 28th and over Himachal Pradesh on 27th and 28th. It was scattered or isolated over Himachal Pradesh on 17th and 29th and over Jammu & Kashmir on 30th.

Rain or thundershowers were generally widespread on 5 to 9 days in coastal Andhra Pradesh, Rayalaseema, Tamil Nadu, Karnataka, Kerala & Lakshadweep and on 1 to 4 days in northeast India outside Bihar plains, Punjab, Himachal Pradesh, Jammu & Kashmir, east Madhya Pradesh and Maharashtra during the period from 1 to 13 November. They were also generally widespread in Andaman & Nicobar Islands on 3 days during the first week and 2 days in the last week of the month. Isolated heavy to very heavy falls occurred on 3 to 5 days in Orissa, coastal Andhra Pradesh and Kerala and on 1 to 2 days Assam & Meghalaya, Nagaland, Manipur, Mizoram & Tripura, Gangetic West Bengal, Himachal Pradesh, Jammu & Kashmir, Rayalaseema, Tamil Nadu and coastal & south interior Karnataka. Rain or thundershowers were scattered or isolated on 20 days in Andaman & Nicobar Islands and 16 days in Tamil Nadu and on 5 to 10 days in Gangetic West Bengal, Orissa, Jammu & Kashmir, Konkan & Goa, Madhya Maharashtra, Andhra Pradesh, coastal & south interior Karnataka and in Kerala and on 1 to 4 days over the rest of the country outside Rajasthan and Gujarat where mainly dry weather prevailed during the month.

#### 3.3. Rainfall during the month

It was excess in Assam & Meghalaya, Nagaland, Manipur, Mizoram & Tripura, West Bengal & Sikkim, Orissa, Bihar Plateau, Himachal Pradesh, Jammu & Kashmir, east Madhya Pradesh, Konkan & Goa, coastal Andhra Pradesh, Telangana, Karnataka, Kerala and Lakshadweep; normal in Arunachal Pradesh and Uttar Pradesh; deficient in Andaman & Nicobar Islands, Haryana, Punjab, Gujarat region, Madhya Maharashtra, Vidarbha, Rayalaseema and Tamil Nadu. It was scanty over the rest of the country outside Rajasthan and Saurashtra & Kutch where there was no rain.

The significant amounts (cm) of rainfall were :

Date	Station/Rainfall (cm)
1	Denkanikottai 13, Madurai 10, Kavali 9, Malavalli & Perinthalmanna 7 each, Munnar 6, Yelchankota AP 5.
2	Kanakpura 18, Perinthalmanna 17, Visakhapatnam 14, Sompeta & Paradip 13 each, Karwar, Panambur & Kalingapatnam 12 each, Trivandrum 9.
3	Berhampore 27, Gopalpur 26, Tekkali 21, Sompeta 19, Kalingapatnam 12, Tirupati AP 9, Pava-gada 7.
4	Kalingapatnam & Sathanur Dam 8 each, Salem & Shapur 5 each, Jagdalpur 4.
5	Adirampattinam 11, Channagiri 8, Vridhuna-gar 7, Chaibasa & Karaikudi 6 each, Alleppey, Dumka, Ongole, Mahabubabad & Pendra 5 each.
6	Perangipettai 19, Sullurpeta 11, Karaikal & Madras AP 10 each, Alleppey, Chamrajanagar, Mandya & Quilon 9 each, Tirupati AP 8, Amini Divi & Phulbani 7 each.
7	Nellore 15, Kozhikode 11, Narsapur 9, Ponneri & Punalur 6 each, Gopalpur 5, Thuckalay, Lingadahatti & Zintoor 4 each.

- 8 Gopalpur 18, Panambur 13, Gudivada 11, Puri & Sagar Island 10 each, Bhubanewar AP 7, Digha, Krishnanagar & Peermade 6 each.
- 9 Balasore 25, Sagar Island 21, Calcutta AP & Uluberia 18 each, Diamond Harbour & Paradip 16 each, Puri & Sandheads 9 each, Peermade 8.
- 10 Kailashahar 10, Peermade & Silchar 8 each, Aijal & Hosangara 7 each, Shillong 6.
- 11 Calcutta AP & Peermade 7 each, Palacode & Quilon 6 each, Karkala & Usilampatti 5 each.
- 12 Mannarghat 9, Kozhikode 7, Vridhunagar 5, Dindigul 4.
- 13 Shirali 10, Belthangadi & Mancompu 4 each.
- 14 Hosdurg 4.
- 15 Batote 5, Kondul, Mavelikara & Nancowry 4 each.
- 16 Banihal 9, Batote, Gulmarg & Kataula 7 each, Chamba & Dalhousie 6 each, Jammu AP & Kulkernag 5 each.
- 21 Car Nicobar 6.
- 25 Parangipettai 5.
- 27 Jogindernagar 8, Banihal & Gulmarg 7 each, Quazigund 6, Manali & Srinagar 4 each.
- 28 Kalpa 9, Nancowry & Quazigund 6 each, Badarwah & Bhuntar AP 4 each.
- 29 Mannargudi 15, Parangipattai 7, Nagapattinam 6, Adirampattinam 5.
- 30 Karaikal 16, Mayiladuthurai 9, Mannargudi 7, Kumbakonam 6, Jogindernagar 5.

### 3.4. Damages due to disastrous weather events

As per press reports heavy rain in Nellore district in the first week of the month claimed 2 human lives heavy snowfall on 15th and 16th and avalanches took a toll of 70 human lives in Kashmir.

### 3.5. Temperature

Night temperatures were appreciably below normal on several days during the period from 16th to 20th in Jammu, Tamil Nadu and south interior Karnataka. They were below normal on several days in Arunachal Pradesh between 7th and 21st. Night temperatures were generally above normal, being appreciably so on a number of days, in Gangetic West Bengal, Bihar, plains of Uttar Pradesh, east Rajasthan, Madhya Pradesh and Saurashtra & Kutch during the month. They were above or appreciably above normal on most days in Gujarat region, Maharashtra and Andhra Pradesh during the first fortnight of the month.

## 4. December

### 4.1. Weather and associated synoptic features

During the month, the systems in westerlies affecting northwest India were rather active.

Previous month's western disturbance over Jammu & Kashmir moved away eastwards across Western Hima-

layas on 1st of this month. Ten more western disturbances moved away eastwards across Western Himalayas and neighbourhood during the month. The eleventh western disturbance of the month was moving away eastwards across Western Himalayas on the last day of the month.

Besides those western disturbances, northwest India was affected by trough in mid and upper tropospheric westerlies between 8th & 10th and between 17th and 18th evening.

The other synoptic features of the month are given in Table 3.

The western disturbances caused generally widespread rain or snowfall over Jammu & Kashmir from 12th to 15th and over Himachal Pradesh on 13th and 14th. Scattered or isolated snowfall continued over Jammu & Kashmir upto 18th and over Himachal Pradesh upto 19th. Isolated heavy falls occurred over Himachal Pradesh and Jammu & Kashmir on the first two days.

Rain or thundershowers were generally widespread on 1 to 3 days in Bihar, Uttar Pradesh, Haryana and Punjab between 13th and 20th and on 2nd, 3rd and 28th in Tamil Nadu and on 27th and 28th in Lakshadweep. They were scattered or isolated on 22 days in Tamil Nadu, 6 to 13 days in Andaman & Nicobar Islands, Orissa, Bihar Plateau, Madhya Pradesh, Vidarbha, coastal Andhra Pradesh, interior Karnataka and Kerala and on 1 to 3 days over the rest of the country outside Gujarat region where the weather was dry.

### 4.2. Rainfall during the month

It was excess in Arunachal Pradesh, West Bengal & Sikkim, Orissa, Bihar, Uttar Pradesh, Haryana, Himachal Pradesh, Jammu & Kashmir, Madhya Pradesh, interior Maharashtra, Telangana and south interior Karnataka; normal in Punjab; deficient in Saurashtra & Kutch, Konkan & Goa, Rayalaseema, Tamil Nadu, north interior Karnataka and Lakshadweep. It was scanty over the rest of the country outside Gujarat region, where there was no rain.

The significant amounts (cm) of rainfall were :

Date	Station/Rainfall (cm)
1	Mayiladuthurai 9, Nagapattinam 7, Kondul & Parangipettai 4 each.
2	Madras 9, Pondicherry 8, Karaikal 7, Cuddalore 6, Tambaram 5.
3	Ramanathapuram 5, Coonoor & Vridhachalam 4 each.
6	Pamban 7.
8	Vedaranyam 9.
11	Neyyattinkara 7, Coonoor 6.
12	Srinagar AP 9, Kayamkulam, Quazigund & Tiruvalla 5 each, Bramhapuri, Kupwara, Madikeri, Mercara, Nagpur AP & Pahalgam 4 each.
13	Manali & Srinagar 9 each, Katra 8, Ambala, Chamba & Nurpur 5 each.

TABLE 3

Weather systems	Period	Place of first location	Track followed	Place of dissipation	Special remarks	
<b>Cyclonic circulations</b>						
1. Lower trop. levels	9th-11th	Northwest Pradesh and neighbourhood	Madhya	Northerly	Plains of west Uttar Pradesh	
2. Do.	13th-14th	Haryana and neighbourhood		Do.	—	Merged with the western disturbance over Jammu & Kashmir and Himachal Pradesh on 14th
3. Lower trop. levels	16th-18th	Gujarat and neighbourhood		—	<i>in situ</i>	
4. Do.	23rd-27th	Haryana and neighbourhood		Eastsoutheasterly	Bihar and neighbourhood	
5. Do.	23rd-25th	Gujarat		Eastnortheasterly	Merged with the system under SN. 4 over northeast Uttar Pradesh and adjoining Bihar plains	
6. Do.	25th-28th evening	East central and adjoining Arabian Sea off Maharashtra-Gujarat coast		Easterly	North Konkan, north Madhya Maharashtra and adjoining south Gujarat	
7. Trough in low level easterlies	1st-10th	Southwest Bay off Tamil Nadu coast		—	<i>in situ</i>	
8. Wind discontinuity at 09 km a.s.l.	12th-13th	From central India to Peninsula		—	<i>in situ</i>	

- 14 Bankura 9, Pahalgam 7, Panagarh AP, Quazigund & Srinagar AP 6 each, Dalhousie, Joshimath, Purulia & Ranchi AP 4 each.
- 15 Gopalpur 4.
- 18 Banda, Bhadarwah & Fatehpur 5 each, Nowgong 4.
- 19 Allahabad AP & Kondul 4 each.
- 21 Parangipettai 7, Mayiladuthurai 5.
- 22 Parangipettai 7, Tiruthuraiipoondi 5, Mayiladuthurai 4.
- 25 Buldhana 9, Mandla 5, Wardha 4.
- 26 Nagapattinam 6, Indi, Karaikal, Mavelikara, Mayiladuthurai & Pamban 4 each.
- 27 Jeer 6, Osmanabad, Pamban & Vikarabad 5 each, Gangapur, Nagamangala & Neyyattinkara 4 each.
- 28 Amini Divi 9, Karaikal 8, Nilambur 7, Pamban 6, Gudibanda & Ramanathapuram 5 each, Solapur 4.

#### 4.3. Damages due to disastrous weather events

According to press reports hailstorms on 26 and 27 December took a toll of 7 human lives and 75

cattle heads in Marathwada region and 4 human lives and 1425 cattle heads in Madhya Maharashtra. It damaged standing crops worth about Rs. 5.50 crores in 80 villages of Pune district, about Rs. 3.5 crores in Nasik district and about Rs. 80 lakhs in Ahmednagar district. Hailstorms were also reported on 25 December from Nagpur district of Vidarbha, which caused considerable damage to rabi crops.

#### 4.4. Temperature

Moderate to severe cold wave conditions prevailed at several places in Himachal Pradesh on 14th, in west Rajasthan from 14th to 20th, in east Rajasthan on 19th and 20th, in Gujarat region on 15th and 16th and in Saurashtra & Kutch from 15th to 18th.

Night temperatures were generally below to appreciably below normal over west Uttar Pradesh and northwest India during the second fortnight and over Assam & Meghalaya and Nagaland, Manipur, Mizoram & Tripura during the first ten days of the month. They were generally above or appreciably above normal in Gangetic West Bengal, Orissa, Bihar plains, Vidarbha and Andhra Pradesh from 9th onwards upto the last day of the month.