Mausam, (1996), 47, 4, 437-450

Weather in India

POST MONSOON SEASON (OCTOBER-DECEMBER 1995)*

1. Introduction

During the post monsoon season all the three cyclonic storms of the year 1995 formed. The first cyclonic storm formed over the Arabian Sea in October and two more storms formed over the Bay of Bengal in November. One of the cyclonic storms which formed in the Bay of Bengal (7-10 November) crossed north Andhra-Orissa coast south of Ichchapuram in Andhra Pradesh. Tracks of these systems are given in Fig. 1.

The southwest monsoon withdrew from Rajasthan, most parts of Gujarat, Punjab, Haryana and Himachal Pradesh by 21 September. It further withdrew from Maharashtra and the regions north of 20°N, by 12 October and from the Peninsula and rest of the country by 23 October. Simultaneously, the northeast monsoon rains commenced over Tamil Nadu and adjoining parts of Andhra Pradesh, Karnataka and Kerala on 23 October.

Monthly and seasonal rainfall amounts and their departures are given in Table 1.

2. Chief features

(*i*) Only two out of three systems, attained the intensity of a hurricane.

(*ii*) There was good rainfall activity in October with more than twice the normal rainfall in west Rajasthan, Madhya Maharashtra, Marathwada, Vidarbha and Telangana.

(*iii*) Four sub-divisions in Peninsular India received excess or normal rainfall, while remaining 4 sub-divisions were deficient.

(*iv*) In December cold wave conditions prevailed for 1 to 5 days in parts of northwest India.

(*v*) The severe cyclonic storm (7-10 November) with a core of hurricane winds, which crossed Andhra-Orissa coast, caused torrential rains and strong winds over coastal Andhra Pradesh, Orissa and West Bengal and caused severe damage to property crops and fisheries.

3. Seasonal rainfall

Seasonal rainfall was excess in 12, normal in 4, deficient in 14 and scanty in 5 met. sub-divisions of the country.

Rainfall was excess in Gangetic West Bengal, Orissa, Bihar plateau, west Rajasthan, Gujarat region, Maharashtra and Goa states, coastal Andhra pradesh, Telangana and north interior Karnataka and was normal in Andaman & Nicobar Islands, Nagaland, Manipur, Mizoram & Tripura, Sub-Himalayan West Bengal & Sikkim and coastal Karnataka. Rainfall was deficient in Arunachal Pradesh, Assam and Meghalaya, Bihar plains, east Uttar Pradesh, Jammu and Kashmir, east Rajasthan, Madhya Pradesh, Saurashtra & Kutch, Rayalaseema, Tamil Nadu, south interior Karnataka, Kerala and Lakshadweep and was scanty in west Uttar Pradesh, Haryana, Punjab and Himachal Pradesh. Seasonal rainfall departures, met sub-divisionwise are given in Fig. 2.

4. Monthly features

4.1. *October*

4.1.1. *Withdrawal of southwest monsoon*

Southwest monsoon withdrew from west Rajasthan on 11 September as against the normal date of 15 September. Monsoon further withdrew from Saurashtra & Kutch, northern parts of Gujarat region, east Rajasthan, Punjab, Haryana and Himachal Pradesh by 21 September. Further

* Compiled by: U. S. De. D. S. Desai and S. G. Bhandari, Meteorological Office, Pune.

TABLE 1

Rainfall figures (mm) for each month and season as a whole (October-December 1995)

S. No.	Sub-division	October			November			December			Season		
		Actual (mm)	Normal (mm)	Dep. (%)	Actual (mm)	Normal (mm)	Dep. (%)	Actual (mm)	Normal (mm)	Dep. (%)	Actual (mm)	Normal (mm)	Dep. (%)
1.	Andaman & Nicobar Islands	279	320	−13	469	253	−85	35	171	−80	784	744	5
2.	Arunachal Pradesh	78	122	−36	7	24	−69	8	11	−28	93	157	−41
3.	Assam & Meghalaya	49	160	−69	59	27	117	3	9	−64	112	196	−43
4.	Nag., Mani., Miz. & Tripura	120	157	−23	105	33	213	0	9	−100	225	200	13
5.	SHWB & Sikkim	65	147	−56	98	16	508	11	5	132	174	168	4
6.	Gangetic West Bengal	91	120	−24	138	19	621	6	3	108	235	142	65
7.	Orissa	178	119	50	129	29	350	0	6	−98	307	153	100
8.	Bihar Plateau	30	84	−64	88	12	623	18	4	311	136	101	35
9.	Bihar Plains	9	63	−86	36	9	317	13	3	371	58	74	−22
10.	East Uttar Pradesh	2	48	−97	18	5	273	10	6	69	30	59	−50
11.	Plains of west U.P.	0	34	−99	1	4	−82	3	9	−63	4	47	−92
12.	Hills of west U.P.	9	58	−84	1	7	−84	4	25	−83	15	91	−84
13.	Haryana, Chandigarh & Delhi	1	19	−97	1	4	−59	1	8	−88	3	31	−90
14.	Punjab	1	21	−97	2	4	−50	1	15	−96	3	40	−92
15.	Himachal Pradesh	7	43	−84	11	13	−20	15	39	−61	33	95	−65
16.	Jammu & Kashmir	7	29	−75	23	17	40	21	48	−56	51	94	−46
17.	West Rajasthan	20	5	291	0	2	−95	0	3	−97	21	10	105
18.	East Rajasthan	7	13	−52	0	4	−98	5	4	23	12	21	−45
19.	West Madhya Pradesh	23	31	−28	0	14	−99	10	7	41	32	53	−39
20.	East Madhya Pradesh	36	52	−31	8	12	−32	6	9	−25	50	72	−30
21.	Gujarat Region	42	27	54	1	8	−90	3	2	65	46	37	25
22.	Saurashtra & Kutch	19	16	19	0	7	−100	1	2	−56	20	25	−21
23.	Konkan & Goa	179	113	59	2	25	−91	0	9	−100	182	147	23
24.	Madhya Maharashtra	149	71	109	9	29	−69	0	7	−99	158	108	47
25.	Marathwada	151	57	164	1	19	−93	0	9	−100	152	85	79
26.	Vidarbha	88	43	107	0	15	−99	0	15	−97	89	72	23
27.	Coastal Andhra Pradesh	319	191	67	60	98	−39	2	23	−92	380	312	22
28.	Telangana	340	76	350	9	19	−53	0	6	−100	349	101	246
29.	Rayalaseema	123	115	8	31	71	−56	1	25	−97	155	210	−26
30.	Tamil Nadu	140	195	−28	115	194	−41	4	88	−96	259	478	−46
31.	Coastal Karnataka	200	184	9	56	66	−15	0	15	−100	255	265	−4
32.	N.I. Karnataka	167	93	79	25	27	−8	0	7	−100	192	127	50
33.	S.I. Karnataka	115	149	−23	37	53	−30	0	12	−100	152	215	−29
34.	Kerala	208	293	−29	181	164	10	0	42	−100	389	499	−22
35.	Lakshadweep	81	163	−50	72	102	−29	3	69	−95	156	334	−53

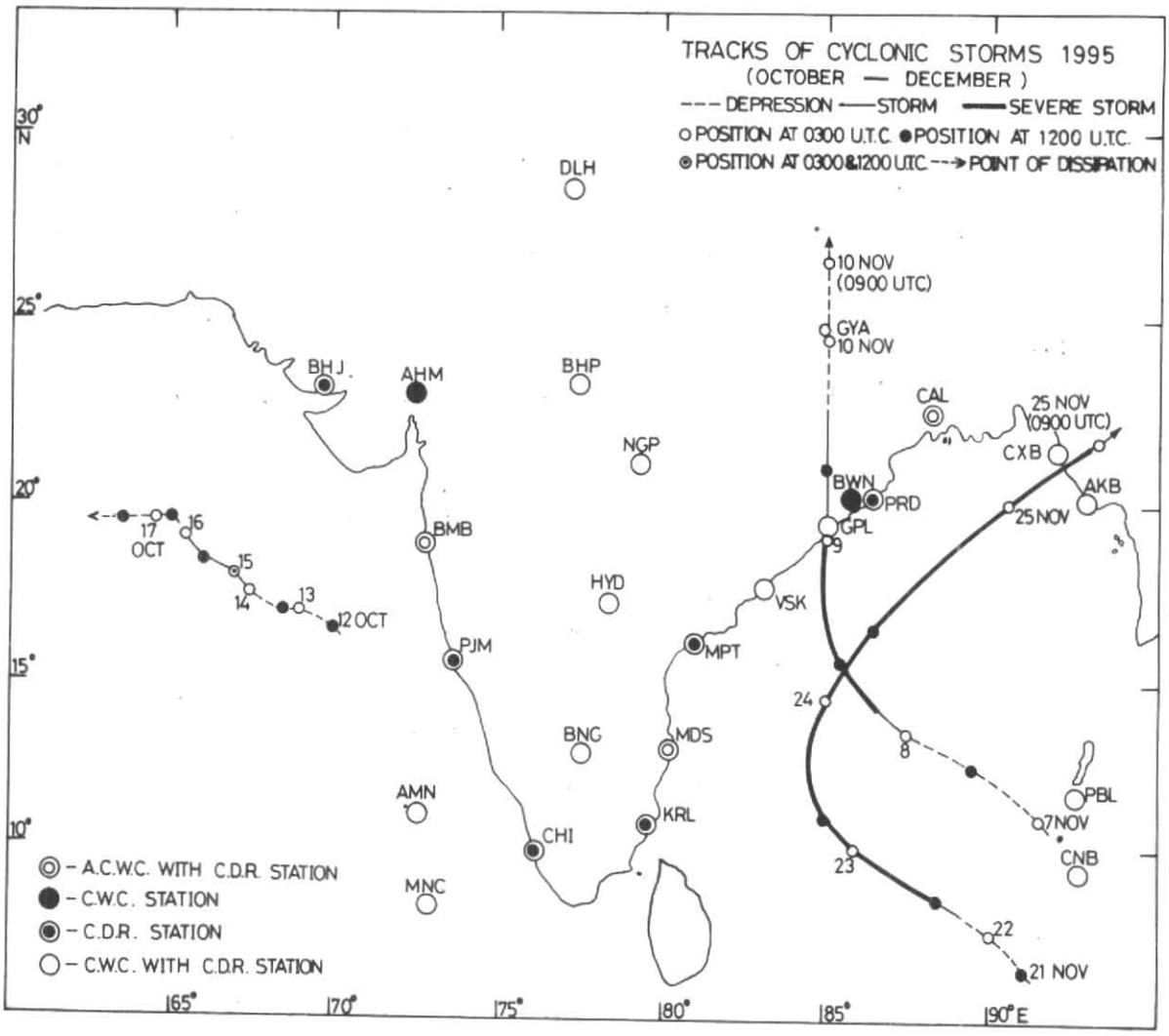

Fig. 1. Tracks of storms/depressions during the period October-December 1995

withdrawal of southwest monsoon was rather slow. By 12 October, it withdrew from Maharashtra and from the regions north of 20°N. It withdrew from the peninsula and rest of the country by 23 October.

4.1.2. *Onset of northeast monsoon*

Northeast monsoon rains commenced over Tamil Nadu and adjoining parts of Andhra Pradesh, Karnataka and Kerala on 23 October 1995, simultaneously, when southwest monsoon withdrew from the above regions.

4.1.3. *Storms/Depressions*

One cyclonic storm formed over the Arabian Sea during the month (Fig. 1).

(*i*) *Cyclonic storm over the Arabian Sea (12-17 October 1995)*

A depression formed over eastcentral Arabian sea and neighbourhood and lay centred near 16.5°N/70.0°E at 1200 UTC of 12 October. The system moved in a westnorthwesterly direction and intensified into a deep depression by evening of 13 and into a cyclonic storm by morning of 14 and was centred near 17.5°N/67.5°E about 600 km westsouthwest of Bombay at 0300 UTC of 14. The system, then, moved slowly in a northwesterly direction for sometime and then remained practically stationary and lay centred near 18.0°N/67.0°E at 0300 UTC of 15. The system then moved in a westnorthwesterly direction and was centred near 19.0°N/65.5°E at 0300 UTC of 16. The system gradually weakened into a depression by 17th

TABLE 2

Details of the synoptic systems in the month of October 1995

S. No. (1)	Weather system (2)	Period (3)	Place of first location (4)	Direction of movement (5)	Place of dissipation (6)	Remarks (7)
(A)	*Storms/Depressions/ Lopars*					
1.	Cyclonic storm	12-19	East-central Arabian Sea off Maharashtra coast	Initially westnorthwesterly then northwesterly and finally westerly	West-central Arabian Sea	First observed as a cyclonic circulation in the lower levels on 30 September over Tenasserim coast & neighbourhood. It became low pressure area on 4 October over westcentral and adjoining south Bay with associated cyclonic circulation extending upto mid-tropospheric levels. It became well marked on 5th and later emerge into Arabian Sea on 12th
2.	Well marked low pressure area	15-21	Southwest off Andhra coast & neighbourhood	Westerly	Telangana and adjoining parts of Marathwada	First observed as a cyclonic circulation in the mid-tropospheric levels over northwest and adjoining westcentral Bay off south Orissa-Andhra coast on 14th. It became low pressure area on 15th and well marked low pressure area on 16th over central parts of coastal Andhra Pradesh. It lay as a extended low pressure area over north interior Karnataka & neighbourhood on 18. It weakened into a low pressure area on 20th and became less marked on 21st
(B)	*Induced cyclonic circulations*					
1.	Lower levels	25-26	West Rajasthan & neighbourhood	Stationary	*In situ*	
2.	Do.	28 Oct-1 Nov	Punjab and adjoining Pakistan	Northeasterly	Moved away across Jammu & Kashmir	

TABLE 2 (*Contd.*)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
(C)	*Other cyclonic circulations*					
1.	Mid-tropospheric levels	29 Sept-3 Oct	West central Bay off Andhra coast	Westerly	Karnataka coast	
2.	Do.	8-16	Gulf of Siam and adjoining parts of Tenasserim coast	Westnorthwesterly	Tenasserim coast and adjoining parts of Andaman Sea	
(D)	*Trough of low*					
1.	Lower levels	19-23	South Maharashtra-Goa coast	Southerly	North Kerala coast & neighbourhood	
(E)	*Trough in the easterlies*					
1.	Mid-tropospheric levels	22-23	North interior Karnataka	Stationary	*In situ*	
(F)	*Trough in the westerlies*					
1.	Mid and upper troposphere	27 Oct-2 Nov	62°E, north of 20°N	Easterly	East Uttar Pradesh to Telangana	
(G)	*Other troughs*					
1.	Lower levels	7-8	Maharashtra coast to Kerala coast	Stationary	*In situ*	
2.	Do.	11-15	Do.	Do.	Do.	
3.	Do.	23-25	Tamil Nadu coast	Do.	Do.	
4.	Do.	25-31	Lakshadweep & neighbourhood	Do.	Do.	
5.	Do.	28-31	Off south Tamil Nadu-Sri Lanka coast	Do.	Do.	Merged with the low pressure area, over West Central Bay (See Table 3)
(H)	*Western disturbances*					
1.	Upper air system	3-5	North Pakistan and neighbourhood	Northeasterly	Moved away north-eastwards across Jammu and Kashmir	
2.	Do.	19-22	Do.	Do.	Moved away across Jammu & Kashmir	
3.	Do.	25-28	Do.	Do.	Do.	

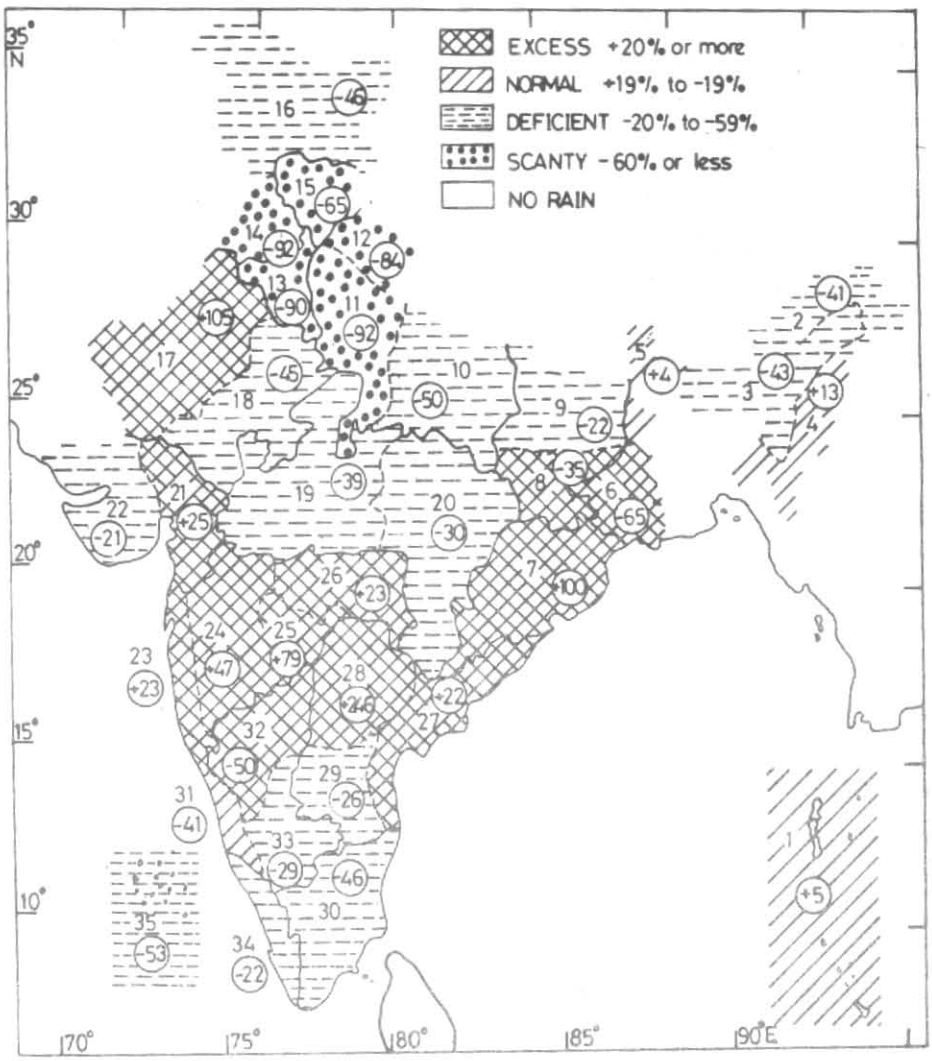

Fig. 2. Seasonal rainfall departure (%) for the period October-December 1995

morning, moved westwards and further weakened over west central Arabian Sea.

4.1.4. *Weather and associated synoptic features*

Details of weather systems are given in Table 2.

Southwest monsoon was active to vigorous on 7 to 10 days in Orissa, coastal Andhra Pradesh and Telangana and on 1 to 3 days in Nagaland, Manipur, Mizoram & Tripura, Gangetic West Bengal, Konkan & Goa, Madhya Maharashtra, Rayalaseema, Tamil Nadu, Karnataka and Kerala. Northeast monsoon was active on one day in Rayalaseema and Kerala.

4.1.5. *Month's rainfall*

Month's rainfall was excess in 10, normal in 4, deficient in 11 and scanty in remaining 10 subdivisions.

Rainfall was excess in Orissa, west Rajasthan, Gujarat region, Maharashtra & Goa, coastal Andhra Pradesh, Telangana and north interior Karnataka and normal in Andaman & Nicobar Islands, Saurashtra & Kutch, Rayalaseema and coastal Karnataka. Rainfall was deficient in Arunachal Pradesh, Nagaland, Manipur, Mizoram & Tripura, West Bengal & Sikkim, east Rajasthan, Madhya Pradesh, Tamil Nadu, south interior Karnataka, Kerala and Lakshadweep and scanty

TABLE 3

Details of the synoptic systems in the month of November 1995

S. No. (1)	Weather system (2)	Period (3)	Place of first location (4)	Direction of movement (5)	Place of dissipation (6)	Remarks (7)
(A)	*Storms/Depressions/ Low pressure areas*					
1.	Severe cyclonic storm (Hurricane)	7-9	Southeast Bay of Bengal and adjoining Andaman Sea	First northwesterly then northnorthwesterly and finally northerly	Bihar Plains and adjoining east Uttar Pradesh	First observed as a cyclonic circulation in the lower levels over southeast Bay of Bengal and adjoining Andaman Sea on 6th. It became low pressure area on the same evening and concentrated into a depression on 7th
2.	Severe cyclonic storm (Hurricane)	21-25	Southeast Bay of Bengal & neighbourhood	Initially northwesterly, then northerly and finally northeasterly	Manipur & neighbourhood	First observed as a low pressure area on 18th over southeast Bay of Bengal and neighbourhood and became depression by the evening of 21st
3.	Low pressure area	31 Oct-6 Nov	West-Central Bay of Bengal and neighbourhood	Westerly	Southwest Bay off Tamil Nadu coast	Associated cyclonic circulation extended upto 3.1 km asl which merged with the depression A trough from this system to southwest Bay merged with the low pressure area on 22nd November
4.	Do.	13-19	East-central and adjoining northeast Bay	Do.	West-central Bay off Andhra coast	Associated cyclonic circulation extended upto 1.5 km asl which became less marked on 21st
(B)	*Cyclonic circulation*					
1.	Lower levels	11-13	Tamil Nadu & neighbourhood	Stationary	*In situ*	
2.	Mid-tropospheric levels	16-19	Southwest Bay off north Tamil Nadu coast	Westerly	South interior Karnataka and adjoining Tamil Nadu and Kerala	
3.	Lower levels	16-18	North Pakistan & neighbourhood	Easterly	Northwest Rajasthan and adjoining parts of Punjab	
4.	Do.	26-28	South Tamil Nadu and neighbourhood	Stationary	*In situ*	

TABLE 3 (*Contd.*)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
5.	Lower levels	28-30	West Rajasthan and adjoining parts of Pakistan	Easterly	East Rajasthan and Haryana	A trough from this system to southwest Madhya Maharashtra on 28 and to Saurashtra on 29
(C)	*Trough in the westerlies*					
1.	Mid and upper tropospheric	10-13	Haryana to, north Konkan	Easterly	Sub - Himalayan West Bengal and Sikkim to north West Bay	
(D)	*Other troughs*					
1.	Sea level	2-19	Lakshadweep area & neighbourhood	Stationary	*In situ*	
2.	Do.	22-26	Lakshadweep area off Kerala coast	Do.	Do.	
3.	Lower levels	27 Nov-2 Dec	South Tamil Nadu to Madhya Maharashtra	Westerly	South interior Karnataka to south Gujarat region	

in Assam & Meghalaya, Bihar, Uttar Pradesh, Haryana, Punjab, Himachal Pradesh and Jammu & Kashmir. The principal amounts of daily rainfall (in cm) during the month are given in Table 5.

4.1.6. *Temperatures*

Day temperatures were markedly above normal on 2 to 6 days in Himachal Pradesh, west Madhya Pradesh and Saurashtra & Kutch. They were above normal or appreciably above normal on many days of the month over Nagaland, Manipur, Mizoram & Tripura, Bihar plains, plains of Uttar Pradesh, Himachal Pradesh, Rajasthan, Madhya Pradesh, Gujarat, Konkan & Goa and coastal Karnataka. They were appreciably to markedly below normal on 13 days in Jammu & Kashmir and 3-9 days in Andhra Pradesh.

Night temperatures were appreciably to markedly below normal on 2 to 6 days in Bihar, east Uttar Pradesh, Haryana, Jammu & Kashmir and Madhya Maharashtra. They were generally normal or above normal over rest of the country.

Highest day temperature recorded was 41°C at Phalodi on 5 and 7. Lowest night temperatures over the plains was 9°C at Amritsar on 24.

4.1.7. *Disastrous weather events and associated damage*

In West Bengal due to heavy rains and floods large area was submerged in water affecting lakhs of people. Heavy rains also damaged 60 hutments. In Bihar heavy rains and floods took 91 human lives and 1700 cattle heads. In Orissa, many low lying areas and hundreds of hectares of paddy crop was water logged and 1000 mud houses were collapsed due to heavy rains.

In Kerala heavy rains, strong winds and land slide damaged large area of agricultural land, uprooted hundreds of plantation trees affecting large number of people. In Andhra Pradesh 19 districts were affected by heavy rains and thundershowers. 119 people were dead and more than 6.6 lakh hectares of crop area was damaged. Heavy rains also caused breach of large number irrigation tanks and road bridges and also caused damage to 36370 houses and loss of 3660 cattles.

4.2. *November*

4.2.1. *Storms and Depressions*

Two cyclonic disturbances, both severe cyclonic storms with core of hurricane winds formed over the Bay of Bengal during the month (Fig. 1).

TABLE 4

Details of the synoptic systems in the month of December 1995

S. No. (1)	System (2)**	Period (3)	Place of first location (4)	Direction of movement (5)	Place of dissipation (6)	Remarks (7)
(A)	*Western disturbances*					
1.	Upper air system	5-10	North Afghanistan and north Pakistan & neighbourhood	Eastnortheasterly	Moved away across Jammu & Kashmir	
2.	Do.	7-12	South Afghanistan and adjoining Pakistan	Northeasterly	Do.	
3.	Do.	13-17	North Pakistan & neighbourhood	Do.	Do.	
4	Do.	18-22	Do.	Do.	Do.	
5.	Do.	23-26	North Pakistan and adjoining Afghanistan	Do.	Do.	
6.	Do.	26-29	North Pakistan and neighbourhood	Do.	Do.	
(B)	*Induced cyclonic circulation*					
1.	Lower tropospheric levels	8-10	Southwest Rajasthan and adjoining Pakistan	Northeasterly	Northeast Rajasthan and adjoining Haryana	
2.	Lower levels	20-22	North Rajasthan & neighbourhood	Do.	Moved away across hills of west Uttar Pradesh	
(C)	*Other cyclonic circulation*					
1.	Lower levels	3-4	West Madhya Pradesh & neighbourhood	Quasi-stationary	Vidarbha and neighbourhood	
2.	Do.	16-18	North Assam & neighbourhood	Stationary	*In situ*	
3.	Lower tropospheric levels	22-24	East Rajasthan & neighbourhood	Easterly	Northern parts of Madhya Pradesh	
4.	Do.	24-26	West Madhya Pradesh & neighbourhood	Stationary	*In situ*	
5.	Do.	30 Dec-1 Jan	Gujarat region & neighbourhood	Northeasterly	West Madhya Pradesh & neighbourhood	
(D)	*Trough of low pressure*	7-8	Southwest Bay and adjoining Sri Lanka	Stationary	*In situ*	

TABLE 4 (*Contd.*)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
(E)	*Troughs in the westerlies*					
1.	Mid and upper troposphere	20-22	70°E, north of 30°N	Easterly	72°E, north of 30°N	
(F)	*Trough of low*	19-25	Southwest Bay off Sri Lanka coast	Stationary	*In situ*	
(G)	*Trough in the easterlies*					
1.	Lower tropospheric levels	25-26	South Kerala to south Madhya Maharashtra	Quasi-stationary	Karnataka coast to north Maharashtra coast	
(H)	*Other troughs*					
1.	Lower levels	27 Nov-6 Dec	Andaman sea	Stationary	*In situ*	
2.	Lower levels	9-15	Southwest Bay off Sri Lanka coast	Westerly	Karnataka to south Kerala	

(*i*) *Severe cyclonic storm with a core of hurricane winds over the Bay of Bengal (7-10 November 1995)*

A depression formed over southeast Bay of Bengal and neighbourhood and was centred near 11.0°N/91.5°E at 0300 UTC of 7 November. It moved in a northwesterly direction and intensified into a deep depression on 7 evening. The system further intensified into a cyclonic storm and was centred near 13.5°N/87.5°E at 0300 UTC of 8. It further intensified into a severe cyclonic storm and was centred near 15.5°N/85.5°E at 1200 UTC of 8. The system then moved in a northerly direction and intensified further into a severe cyclonic storm with a core of hurricane winds and lay close to south Orissa coast with centre near 19.0°N/85.0°E at 0300 UTC of 9. It crossed north Andhra Pradesh-Orissa coast south of Ichchapuram in Andhra Pradesh between 0400 and 0500 UTC of 9. The system, further moved northwards and gradually weakened into a cyclonic storm by evening of 9 and into a deep depression on 10 morning and lay very close to Gaya in Bihar. By 10 evening the system weakened into a well marked low pressure area over north Bihar plains.

During the passage of the cyclonic storm, widespread rainfall with heavy to very heavy falls occured over northern parts of coastal Andhra Pradesh on 9 and over Orissa on 9 and 10 and over Gangetic West Bengal on 8 and 9.

(*ii*) *Severe cyclonic storm with a core of hurricane winds over the Bay of Bengal (21-25 November 1995)*

A depression formed over southeast Bay of Bengal and neighbourhood and was centred near 6.5°N/91°E at 1200 UTC of 21. The system moved in a westnorthwesterly direction, intensified into a deep depression on 22 morning and further intensified into a cyclonic storm at 1200 UTC of 22 when its centre was near 8.5°N/88.5°E. Moving in a northwesterly direction the system intensified into a severe cyclonic storm on 23 morning. By evening it recurved and further intensified into a severe cyclonic storm with a core of hurricane winds on 23 night and was centred near 14.5°N/85°E at 0300 UTC of 24. The system, then moved rather fast in a northeasterly direction and crossed the Bangladesh coast south of Cox's Bazar by 0600 UTC of 25. The system, then weakened rapidly by evening of 25 and lay as a well marked low pressure area over Manipur and neighbourhood. The system did not cause any weather or damage over India.

TABLE 5

Principal amounts of rainfall (cm) for October, November and December 1995

Date	October	November	December
1	Kolhapur 8, Rabkavi 7, Bombay 6, Dholai 5, Yelhanka 3	Sandheads 16, Paradip 12, Kannur 8, Palakkad 6	Nil
2	Mandya 10, Dharamsala, Palayamkottai & Thalassary 6 each, Kherunighat, Kondul & Satara 5 each, Bijapur 4	Alatur & Kolar Gold Fields 9 each, Cochi 8, Kondul & Uthagamandalam 7 each, Imphal & Nidadavole 4 each	Nil
3	Dindigul 6, Channapatna & Vita 5 each, Aluwa & Koppal 4 each, Sankalan 3	Cochi 6, Minicoy & Tondi 5 each, Adirampattinam & Palakkad 4 each	Nil
4	Hassan, Khed, Pune & Perambalur 6 each, Puri 4, Gangtok & Haliyal 3 each	Nellore 31, Karaikal 9, Madras 8, Punalur 6, Thiruvananthapuram 4, Tirupathi 3	Nancowry 3
5	Buldhana & Gharmura 9 each, Calcutta 7, Chandgad 6, Mhalsa, Satur & Thalasserry 5 each, Gangapur 3	Karaikal 23, Nagapattinam 21, Madras 3	Nil
6	Dharapuram & Tantloi 7 each, Khed 5, Maya Bandar & Varkala 4 each, Anandapur, Beed, Chandgad, Nellore & Sirsi 3 each	Karaikal 9, Piravom 8, Thiruvananthapuram 6, Nancowry 5, Mysore 4	Nil
7	Maya Bandar & Naharkatia 6 each, Digha, Tadpatri, Thenmala & Vedaranniyam 5 each, Ratnagiri 3	Adirampattinam 11, Car Nicobar 9, Port Blair & Nagapattinam 7 each, Mandya 3	Nil
8	Berhampore 19, Kanniyakumari 10, Kozhikode 9, Kalingapatnam 8, Magra (Bagati) 7, Dholai 6, Agartala 5, Long Island 3	Car Nicobar 10, Long Island 7, Nagapattinam 3	Kondul 5
9	Kodaikanal 13, Gopalpur 9, Calcutta & Contai 7 each, Mannarkad 6, Bhoothapundi & Medak 4 each	Kalingapatnam 26, Mahindragarh 17, Bhubaneswar 13, Usilampatti 8, Perinthalmanna & Calcutta 7 each	Banihal 3
10	Khammam 14, Kakinada 10, Akhuapada & Panhala 7 each, Port Blair 6, Oslamabad 4, Chitradurga, Gulbarga & Kurnool 3 each	Kalimpong 31, Krishnagar 20, Baripada 17, Sriniketan & Jamsolaghat 15 each, Jamshedpur 13, Bhagalpur 10	Vedaranyam 3
11	Jat 16, Tiruthuraipoondi 13, Long Island 9, Kolhapur 7, Passighat 6, Diamond Harbour, Naharkatia & Lanja 5 each, Belgaum, Karwar, Nalgonda & Tuni 3 each	Kalimpong 21, Darjeeling 14, Gangtok 10, Tezpur & Agartala 4 each, North Lakhimpur 3	Nil
12	Sawantwadi 12, Jalpaiguri 11, Amravati 9, Visakhapatnam 8, Maya Bandar 7, Akola & Gopalpur 6 each, Beki Road & Bridge 5 each	K. Paramathy 8, Port Blair 3	Nil
13	Mangalore 9, Champasarai 7, Chauldhaghat, Krishnagar & Madras 4 each, Bhubaneswar & Panjim 3 each	Thiruvananthapuram 9, Kozhithurai & Nedumangad 7 each, Kanniyakumari 3	Nil
14	Thanjavur 8, Nasik 5, Car Nicobar 4, Bellary, Jagdalpur, Madras & Mangalore 3 each	Kondul 3	Nil

TABLE 5 (*Contd.*)

Date	October	November	December
15	Waltair 10, Pachora 9, Sholapur 7, Ausa & Long Island 6 each, Hyderabad 6, Jawai Banadh 5, Sevoke 4, Aurangabad, Buldhana, Cochi & Khandwa 3 each	Thiruvananthapuram 13, Adoor 11, Port Blair & Minicoy 3 each	Nil
16	Gannavaram 20, Machilipatnam 18, Madhabarida 9, Jamner 7, Osmanabad 5, Bankura, Bhopal, Jabalpur, Kurnool, Port Blair & Ramagundam 3 each	Hut Bay 5, Long Island 3	Nil
17	Medak 13, Sinner 11, Nizamabad 10, Indore & Tuljapur 5 each, Paradip & Udaipur 4 each, Kalingapatnam & Nancowry 3 each	Kondul 9, Nancowry 8, Alapuzha 4	Nil
18	Ramagundem 9, Gadag 7, Chandrapur, Nilakottai, Rentachintala & Sankalan 5 each, Gadhinglaj & Panjim 4 each, Karwar & Udgir 3 each	Paradip 11, Maya Bandar 8, Calcutta 4, Kunnamkulam, Pandoh & Sathyamangalam 3 each	Nil
19	Nizamabad 19, Rajapur 14, Cooch Behar & Kinwat 9 each, Thirumayam 6, North Lakhimpur 5, Karwar & Nawapur 4 each, Purulia 3	Car Nicobar 9, Nancowry 7	Nil
20	Kinwat 16, Nizamabad 9, Chalakudy, Gannavaram, Sirsi & Yeotmal 3 each	Car Nicobar 7, Port Blair 5, Visakhapatnam 4	Nil
21	Bangalore 8, Erode, Nancowry & Tuni 6 each, Arogyavaram & Asansol 4 each, Chandrapur 3	Hut Bay 20, Car Nicobar 11, Tezpur 5	Nil
22	Kasargode 8, Arogyavaram 4, Ongole & Vellore 3 each	Piravom & Shimoga 7 each, Car Nicobar 3	Kondul 4
23	Pamban 10, Nagapattinam 9, Sirsi 6, Belgaum & Sagara 5 each, Bhubaneswar & Visakhapatnam 3 each	Long Island 6, Mahabaleshwar 5, Shimoga 3	Kondul 3
24	Nagapattinam 6, Madras, Ratnagiri & Visakhapatnam 3 each	Gadag, Cuddapah, Nellore & Tiruvallur 4 each, Hyderabad 3	Nil
25	Nellore 9, Nalgonda 7, Madras 3	Nil	Patna & Gaya 3 each
26	Kavali 7	Madras 4, Imphal 3	Nil
27	Kanniyakumari 5, Cochi & Kondul 3 each	Kondul 8, Nancowry 3	Nil
28	Nagapattinam & Panambur 5 each, Cochi & Perumbavur 3 each	Coimbatore 9	Nagapattinam 6
29	Thrissur 8, Usilampatti 7, Bellary 4, Madras 3	Palayamkottai 5, Chamba 4, Dharamsala & Srinagar 3 each	Nil
30	Maya Bandar & Palayamkottai 3 each	Nil	Banswara 3
31	Paradip 15, Aruppukottai 8, Madurai 5	Nil	Nil

4.2.2. *Weather and associated synoptic features*

Details of the weather systems are given in Table 3.

Northeast monsoon was active to vigorous on 6 days in Kerala only.

4.2.3. *Monthly rainfall*

Rainfall was excess in 10, normal in 3, deficient in 10 and scanty in 11 sub-divisions. There was no rain in only one sub-division, *viz.*, Saurashtra & Kutch.

Rainfall was excess in Andaman & Nicobar Islands, Assam & Meghalaya, Nagaland, Manipur, Mizoram & Tripura, West Bengal and Sikkim, Orissa, Bihar, east Uttar Pradesh and Jammu and Kashmir and was normal in coastal and north interior Karnataka and Kerala. Rainfall was deficient in Haryana, Punjab, Himachal Pradesh, east Madhya Pradesh, Andhra Pradesh, Tamil Nadu and south interior Karnataka and Lakshadweep and was scanty in Arunachal Pradesh, west Uttar Pradesh, Rajasthan, west Madhya Pradesh, Gujarat region and Maharashtra and Goa states.

4.2.4. *Temperatures*

Cold wave conditions prevailed on 5 days in Kashmir and one day each in Himachal Pradesh and Punjab during second half of November. Night temperatures were appreciably to markedly below normal on 7 to 11 days in Madhya Maharashtra and Saurashtra & Kutch and on 2 to 4 days in Gangetic West Bengal, Bihar plains, Marathwada, Telangana and Rayalaseema. They were appreciably or markedly above normal on 4 to 15 days in Nagaland, Manipur, Mizoram & Tripura, Assam & Meghalaya, Orissa, West Bengal and Sikkim, Bihar, plains of west Uttar Pradesh, Haryana, east Rajasthan, Madhya Pradesh, Maharashtra outside Konkan & Goa, Andhra Pradesh and north interior Karnataka. Night temperatures were generally normal over the rest of the country. Lowest night temperature recorded over the plains was 3°C on 25.

4.2.5. *Disastrous weather events and associated damage*

According to the press reports, 3 districts of Andhra Pradesh, 18 districts of Orissa and 4 districts of Gangetic West Bengal were affected by the severe cyclonic storm with a core of hurricane winds (7-10 November) which crossed north coastal Andhra Pradesh—Orissa coast. Around 175 thousand hectares of agricultural crops, 26000 houses and several telecommunication equipment were damaged. Due to high winds and tides 15 boats were sunk and 66 boats and 153 fishermen were missing in coastal waters off north Andhra Pradesh coast. In Orissa 15000 houses, one million hectares of cropped area and 2500 boats reported to be damaged. In Midnapur and south Parganas districts of West Bengal, 300 houses and large area of agri-crops were damaged 7 trawlers were capsized and 132 persons reported missing.

According to press reports, 9 people lost their lives in Bangladesh due to heavy rain and tidal waves when the storm crossed the Bangladesh/ Myanmar coast on 25 November.

There were Press reports of the death of 2 persons in Orissa and a ship named "Razia Sultan" sunk near Paradeep coast due to strong wind and heavy rainfall.

Heavy rains caused damage to agriculture and lightning took a few human lives in Kerala. In Tamil Nadu due to heavy rains and lightning, 4500 hectares of cropland was damaged and 14 human lives were lost. Many low lying areas were also flooded and vehicular traffic was disrupted.

4.3. *December*

4.3.1. *Storms/Depressions*

No storm/depression formed over the Arabian sea or the Bay of Bengal during the month.

4.3.2. *Weather and associated synoptic features*

Six western disturbances and two induced cyclonic circulations affected northwest India. Out of these, two western disturbances (during 5-10 and 7-12) caused good rainfall activity in Jammu & Kashmir during first fortnight. The western disturbance during 26-29 produced excess rainfall in east Rajasthan in last week. Details of these and other weather system are given in Table 4.

4.3.3. *Monthly rainfall*

Rainfall activity was rather subdued during the month. Rainfall was excess in 8, deficient in 4 and scanty in 15 sub-divisions. There was no rain in 8 sub-divisions.

Rainfall was excess in West Bengal & Sikkim, Bihar, east Uttar Pradesh, east Rajasthan, west Madhya Pradesh and Gujarat region and was deficient in Arunachal Pradesh, Jammu & Kashmir, east Madhya Pradesh and Saurashtra & Kutch. It was scanty in Andaman & Nicobar Islands, Assam and Meghalaya, Orissa, west Uttar Pradesh, Haryana, Punjab, Himachal Pradesh, west Rajasthan, Madhya Maharashtra, Vidarbha, coastal Andhra Pradesh, Rayalaseema, Tamil Nadu and Lakshadweep. There was no rain in Nagaland, Manipur, Mizoram & Tripura, Konkan & Goa, Marathwada, Telengana, Karnataka and Kerala.

4.3.4. *Temperatures*

This year night temperatures in December were mostly either normal or 2 to 5°C above normal over most parts of the country. Cold wave conditions prevailed only for 2 days in Punjab, 1 day in Himachal Pradesh, 5 days in Kashmir and 4 days in Rajasthan. Lowest night temperature recorded over plains was 1°C at Amritsar on 4 and it was −5° over the hills at Srinagar on 25 and 26 December 1995.

4.3.5. *Disastrous weather events and associated damage*

Due to heavy rains low lying areas in Purnea districts of Bihar was water logged and communication and transportation was also affected. Snowfall in Jammu & Kashmir caused distruption in vehicular traffic for a few days. No other disastrous weather event was reported during the month.