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Weather in India

WINTER SEASON (JANUARY-FEBRUARY 1999)*

1. Introduction

In the winter season, one cyclonic storm (2-3 February 1999) formed over the Bay of Bengal. During the season, the rainfall was excess (percentage departure from normal rainfall is + 20% or more) in 7, normal (percentage departure from normal rainfall is between -19% and +19%) in 7, deficient (percentage departure from normal rainfall is between - 20% and - 59%) in 9 and scanty (percentage departure from normal rainfall is between - 60% to - 90%) in 10 meteorological sub-divisions. There was no rain in remaining two meteorological sub-divisions (Bihar State).

The season's rainfall was excess in Punjab, west Rajasthan, west Madhya Pradesh, Saurashtra & Kutch, Vidarbha, north interior Karnataka and Lakshadweep, normal in Andaman & Nicobar Islands, Haryana, Jammu & Kashmir, east Rajasthan, Madhya Maharashtra, south interior Karnataka and Kerala and deficient in Uttar Pradesh, Himachal Pradesh, east Madhya Pradesh, Marathwada, Telangana, Rayalaseema and Tamilnadu. It was scanty over Arunachal Pradesh, Assam & Meghalaya, Nagaland, Manipur, Mizoram and Tripura, West Bengal & Sikkim, Orissa, Gujarat Region, Konkan & Goa, Coastal Andhra Pradesh and Coastal Karnataka and there was no rain in both the sub-divisions of Bihar State.

Table 3 contains the sub-divisionwise monthly and seasonal rainfall figures.

The seasonal rainfall departures are given in Fig.2.

2. Chief features

(i) One cyclonic storm formed over the Bay of Bengal in the month of February. This is very unusual.

(ii) Well-distributed rainfall occurred over Madhya Pradesh, Vidarbha, Tamilnadu and Kerala in the month of February.

(iii) Rain or snow also occurred over northwest India.

(iv) Cold wave conditions (departure from normal temperature is -3° C to - 4° C for regions where the normal minimum temperature is less than 10° C) prevailed over northwest India, Bihar and Vidarbha.

3. January

3.1. *Weather and associated synoptic features*

There were 6 western disturbances, 1 induced low pressure area, 10 cyclonic circulations (including 3 induced cyclonic circulations) and 8 troughs (including one trough in westerlies) which affected India during the month. Details of these systems are given in Table1.

Rain or snow occurred at either most places or at many places on 8 to 10 days in Himachal Pradesh (heavy on 2 days) and Jammu & Kashmir. Rain or thundershowers also occurred either at most places or at many places on 3 to 4 days in Haryana and Punjab and on 1 to 2 days in Andaman & Nicobar Islands, Arunachal Pradesh, west Uttar Pradesh and west Rajasthan. Heavy rain occurred at isolated places on one day each in Tamilnadu and Kerala.

3.2. *Month's rainfall*

Accumulated monthly rainfall was excess in 7, normal in 1, deficient in 4 and scanty in 12 meteorological sub-divisions. There was no rain in remaining 11 meteorological sub-divisions.

The month's rainfall was excess in plains of west Uttar Pradesh, Haryana, Punjab, Himachal Pradesh, Jammu & Kashmir, west Rajasthan and Lakshadweep; normal in Saurashtra & Kutch and deficient in Andaman & Nicobar Islands, Sub-Himalayan West Bengal & Sikkim, east Uttar Pradesh and hills of west Uttar Pradesh. The rainfall was scanty in Arunachal Pradesh, Assam & Meghalaya, Nagaland, Manipur, Mizoram & Tripura, Gangetic West Bengal, east Rajasthan, Madhya Pradesh, Vidarbha, coastal Andhra Pradesh, Rayalaseema, Tamilnadu and Kerala. There was no rain in Orissa, Bihar, Gujarat Region, Konkan & Goa, Madhya Maharashtra,

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TABLE 1

Details of the weather system during January 1999

S. No.	System	Duration	Place of first location	Direction of movement	Place of dissipation	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)
(A)	*Western disturbances*					
1.	Upper air system	2-5	Jammu & Kashmir and neighbourhood	Northeastwards	Across Jammu & Kashmir	
2.	Do	7-10	Jammu & Kashmir and adjoining parts of north Pakistan	Do	Jammu & Kashmir and neighbourhood	
3.	Do	11-14	North Pakistan and neighbourhood	Do	North Pakistan and adjoining parts of Jammu & Kashmir	
4.	Do	15-18	Do	Eastnortheastwards	Jammu & Kashmir	Moved away across Jammu and Kashmir
5.	Do	19-22	Do	Northeastwards	Jammu & Kashmir and neighbourhood	
6.	Do	25-31	North Pakistan and adjoining Jammu & Kashmir	Do	Do	
(B)	*Low pressure area*					
1.	Induced low pressure area	6-8	North Rajasthan and adjoining Punjab and Haryana	Easterly	Plains of west Uttar Pradesh, Haryana, and neighbourhood	It was first seen as an induced cyclonic circulation over central Pakistan and adjoining west Rajasthan and neighbourhood on 3 at 0.9 km a.s.l. It extended upto mid tropospheric levels on 5 and tilted westwards with height on 7. The low-pressure area became less marked on 8. However, an upper air cyclonic circulation in the lower levels over central Uttar Pradesh and northern parts of Madhya Pradesh was seen on 8 and became less marked on 9

TABLE 1 (*Contd.*)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
(C)	*Induced cyclonic circulations*					
1.	Lower tropospheric levels	12-14	Punjab and neighbourhood	Northeastwards	Himachal Pradesh	Moved away across Himachal Pradesh
2.	Mid tropospheric Levels	21-26	Punjab and adjoining parts of Haryana	Northnortheasterly	Do	It became more marked from 24. The cyclonic circulation moved away Across Himachal Pradesh. A trough from this system ran to west Madhya Pradesh in the lower levels on 24 and became unimportant on 25
3.	Do	27-31	Punjab and Neighbourhood	Eastnortheasterly	Northern parts of Haryana and adjoining parts of west Uttar Pradesh	It became more marked from 28 and moved away across hills of west Uttar Pradesh on 31
(D)	*Other cyclonic circulations*					
1.	Feeble cyclonic circulations lower levels	7-8	Gangetic West Bengal and neighbourhood	Easterly		It moved away eastwards
2.	Mid tropospheric levels	8-10	Lakshadweep area and adjoining Kerala coast	Stationary	*In situ*	
3.	Do	9-13	South Andaman Sea and off Tennaserim coast	Do	Do	
4.	Lower tropospheric levels	14-15	Bengladesh and neighbourhood	Do	Do	
5.	Lower levels	22-24	Northwest Madhya Pradesh	Do	Do	
6.	Lower tropospheric levels	23-24	Southwest Rajasthan and adjoining Pakistan	Northeasterly	Haryana & neighbourhood	Merged with the well marked cyclonic circulation over Haryana and neighbourhood
7.	lower levels	28-29	Plains of west Uttar Pradesh	Eastnortheasterly		Moved away eastnortheastwards

TABLE 1 (*Contd.*)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
(E)	*Troughs in westerlies*					
1.	Mid and Upper tropospheric levels	5-8	Close to 67°E, to the north of 15°N	Northeasterly		Moved away northeastwards
(F)	*Other troughs*					
1.	Lower levels	27 Dec-10 Jan	Southwest Bay off south Tamil Nadu coast - Sri Lanka coast	Stationary	*In situ*	
2.	Lower tropospheric levels	6-7	North Rajasthan to south Konkan & Goa across Gujarat Region	Do	Do	
3.	Do	11-13	South Karnataka coast to Kerala coast	Do	Do	
4.	Sea level chart	14-22	Southwest Bay off Tamil Nadu coast	Do	Do	
5.	Lower levels	17-20	Andaman Sea and adjoining southeast Bay	Do	Do	
6.	Lower tropospheric levels	22-25	South Kerala coast to Karnataka coast	Do	Do	
7.	Do	28-30	West Madhya Pradesh to south interior Karnataka	Northeasterly	East Madhya Pradesh and north interior Karnataka	

TABLE 2

Details of the weather systems during February 1999

S. No	System	Duration	Place of first location	Direction of movement	Place of dissipation	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)
(A)	*Cyclonic storm*					
1.	Cyclonic storm	2-3	Southeast Bay and adjoining Andaman sea	Northwesterly and then northeasterly	Northern parts of southwest Bay	A well marked low pressure area formed over southeast Bay and neighbourhood on 1 February. It concentrated into a depression on 2nd with centre at 0300 UTC near Lat. 9.5°N/Long. 86.0°E, about 730 kms southeast of Chennai and lay as a deep depression near Lat.9.5°N/ Long. 85.5°E in the afternoon of same day. It intensified into a cyclonic storm at 0300 UTC of 3 near Lat. 11.5°N/ Long. 86.0°E, about 650 kms eastsoutheast of Chennai. It rapidly weakened into a depression in the same evening and lay at 1200 UTC of 3 near Lat. 12.0°/ Long. 86.5°E and further weakened into a well marked low pressure area lay over northern parts of south Bay on 4
(B)	*Low pressure area*					
1.	Low pressure area	8-9	South Gujarat region and neighbourhood	Stationary	*In situ*	It formed under the influence of an upper air cyclonic circulation at 2.1 kms a.s.l. The associated cyclonic circulation lay over southwest Madhya Pradesh and neighbourhood extending upto mid tropospheric levels. It became less marked on 11
(C)	*Western disturbances*					
1.	Upper air system	30 Jan-03 Feb	North Pakistan and neighbourhood	Northnortheasterly	Jammu and Kashmir and neighbourhood	Moved away
2.	Do	3-5	Do	Northeasterly	Jammu and Kashmir	Do

TABLE 2 (*Contd.*)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
3.	Upper air system	9-14	North Pakistan and neighbourhood	Northeasterly	Jammu and Kashmir	Moved away
4.	Do	14-19	Do	Do	Jammu and Kashmir and neighbourhood	Do
5.	Do	19-23	Northern parts of Pakistan and adjoining Jammu and Kashmir	Do	Do	Do
6.	Do	22-26	North Pakistan and neighbourhood	Do	Do	Do
7.	Do	26-28	North Pakistan and adjoining Jammu & Kashmir	Do	Himachal Pradesh	Moved away across Himachal Pradesh
(D)	*Induced cyclonic circulations*					
1.	Lower tropospheric levels	4-7	Punjab & neighbourhood	Northeasterly	Himachal Pradesh	Moved away across Himachal Pradesh
2.	Lower levels	15-20	South Pakistan	Southeasterly	West Madhya Pradesh	It extended upto Saurashtra in the lower levels
3.	Mid tropospheric levels	19-25	Central parts of Pakistan	Do	Northwest Madhya Pradesh and neighbourhood	
4.	Lower levels	23-24	South Pakistan and neighbourhood	Stationary	*In situ*	
5.	Mid tropospheric levels	28 Feb-01 Mar	Hills of west Uttar Pradesh and neighbourhood	Do	Do	

TABLE 2 (*Contd.*)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
(E)	*Other cyclonic circulations*					
1.	Lower tropospheric levels	2-7	North Maharashtra and neighbourhood	Westerly	North Konkan and adjoining parts of Gujarat and neighbourhood	
2.	Mid tropospheric levels	6-10	Pakistan and adjoining parts of west Rajasthan	Northeasterly	Punjab and neighbourhood	Moved away northeastwards across Himachal Pradesh
3.	Lower tropospheric levels	7-8	Bihar plains and neighbourhood	Stationary	*In situ*	
4.	Lower levels	8-9	South Uttar Pradesh and neighbourhood	Do	Do	
5.	Lower levels	9-11	South Tamil Nadu	Do	Do	It was seen as a trough over south Tamil Nadu and neighbourhood on 8th
6.	Lower tropospheric levels	10-12	North Konkan and neighbourhood	Do	Do	
7.	Lower levels	16-18	Northeast Arabian Sea and neighbourhood	Northeasterly	Gujarat Region and adjoining parts of west Madhya Pradesh and neighbourhood	There was a trough aloft in easterlies off west coast. Another trough from this cyclonic circulation extended southwards upto coastal Karnataka across Madhya Maharastra at 1.5 km a.s.l.
8.	Feeble cyclonic circulation lower levels	20-21	Gujarat State	Quasi-stationary		Merged with the cyclonic circulation over southern parts of Rajasthan and northern parts of Gujarat State
9.	Lower levels	21-22	Sub Himalayan West Bengal and Sikkim	Stationary	*In situ*	
10.	Do	23-24	Do	Do	Do	
11.	Mid tropospheric levels	24-27	Punjab and adjoining parts of Haryana	Northeasterly	Himachal Pradesh and adjoining parts of Hills of west Uttar Pradesh	Moved away

TABLE 2 (*Contd.*)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
(F)	*Troughs in easterlies*					
1.	Lower tropospheric levels	5-10	South Maharashtra to north Kerala	Quasi-stationary	South Tamil Nadu to south Madhya Maharashtra	
2.	Lower levels	18-19	Long. 75 °E, south of Lat. 20°N	Stationary	*In situ*	
(G)	*Trough in westerlies*					
1.	Mid and upper tropospheric levels	3-6	Long. 70 °E, north of Lat. 20°N	Stationary	*In situ*	
2.	Do	9-12	Long. 78° E, north of Lat. 10°N	Northeasterly	East Uttar Pradesh to South Orissa	It was more marked on 9
3.	Do	15-18	Long. 67° E, north of Lat. 10°N	Do		Moved away
4.	Do	22-23	Long. 90° E, north of Lat. 20°N	Stationary	*In situ*	
(H)	*Other troughs*					
1.	Lower levels	13-22	South Andaman sea	Southsouthwesterly	Commorin area and neighbourhood	It lay as a trough of low pressure area on sea level charts on 19
2.	Do	24-27	Do	Westerly	South Andaman sea and adjoining south-east Bay	

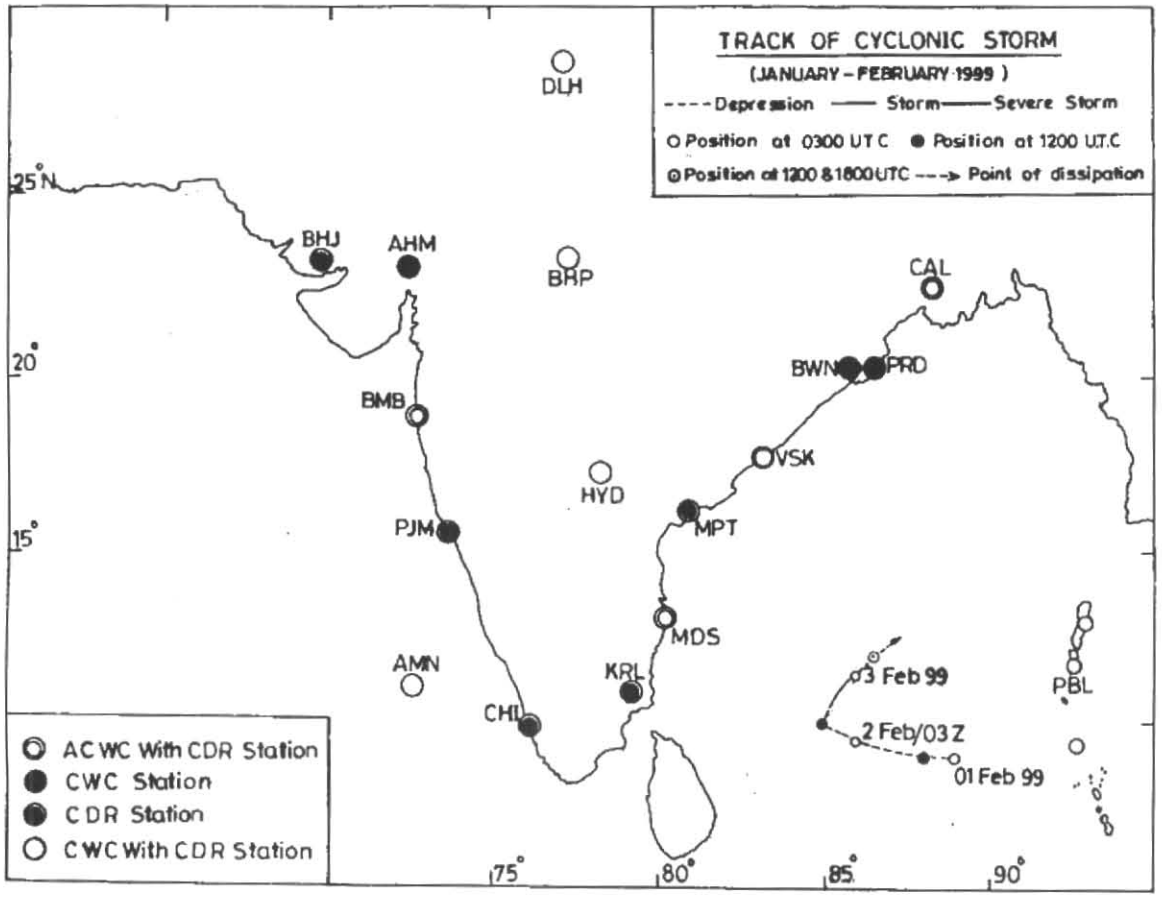

Fig. 1. Tracks of cyclonic storm during the period January-February 1999

Marathwada, Telangana and Karnataka. Principal amounts of rainfall for the month of January are given in Table 4.

3.3. *Temperature*

Cold wave conditions sometimes severe (departure from normal temperature is - 7° C or less for the regions where normal minimum temperature is 10° C or more and the temperature departure is - 5° C or less for the regions where normal minimum temperature is less than 10° C) prevailed on 13 days in Bihar Plains, 8 days in plains of west Uttar Pradesh, on 3 to 5 days in east Uttar Pradesh, Himachal Pradesh and Jammu & Kashmir and on 1 to 2 days in hills of west Uttar Pradesh, Rajasthan and Vidarbha during the month. Night temperatures were appreciably (departure from normal minimum temperature is - 3° to - 4° C) to markedly (departure from normal minimum temperature is - 5° to - 6° C) below normal on many days in Bihar Plateau, Madhya Pradesh, Gujarat Region, Maharashtra & Goa States, Telangana and north interior Karnataka. They were appreciably (departure from normal minimum temperature is 3° to 4° C) to markedly (departure from normal minimum temperature is 5° to 6°C) above normal and on few days in hills of west Uttar Pradesh, Haryana, Punjab, Himachal Pradesh, Jammu & Kashmir, Rajasthan and Saurashtra & Kutch in the month.

The season's lowest minimum temperature over plains of the country was 0.5°C recorded at Agra (Uttar Pradesh) on 18 January. In the hills, the lowest minimum temperature of -13°C was recorded at Pahalgaon on 13 January.

3.4. *Disastrous weather events and damages*

According to the press reports, 150 persons (101 in Uttar Pradesh, 39 in Bihar, 8 in West Bengal and 2 in Maharashtra) died due to cold wave which was at times severe in the month of January.

TABLE 3

Rainfall figures (mm) for each month and season as a whole (January-February 1999)

S. No.	Sub-Division	January			February			Winter Season		
		Actual (mm)	Normal (mm)	Dep. (%)	Actual (mm)	Normal (mm)	Dep. (%)	Actual (mm)	Normal (mm)	Dep. (%)
1.	Bay Islands	56	73	-23	49	48	2	104	120	-13
2.	Arunachal Pradesh	6	41	-87	4	78	-95	9	119	-92
3.	Assam & Meghalaya	2	21	-92	0	30	-100	2	51	-97
4.	Naga.,Mani.,Mizo. & Tripura	1	17	-92	0	24	-100	1	40	-97
5.	SHWB & Sikkim	7	17	-56	0	23	-99	8	40	-81
6.	Gangetic West Bengal	0	14	-99	0	23	-99	0	37	-99
7.	Orissa	0	12	-100	1	25	-96	1	37	-97
8.	Bihar Plateau	0	19	-100	0	24	-100	0	43	-100
9.	Bihar Plains	0	15	-100	0	16	-100	0	31	-100
10.	East Uttar Pradesh	14	18	-23	10	16	-34	24	34	-28
11.	Plains of west Uttar Pradesh	28	22	30	3	18	-86	31	40	-23
12.	Hills of west Uttar Pradesh	52	67	-23	5	63	-93	57	131	-57
13.	Haryana, Chandigarh and Delhi	39	22	78	2	19	-91	40	41	-2
14.	Punjab	67	30	128	9	26	-65	77	56	37
15.	Himachal Pradesh	96	80	20	25	74	-66	121	154	-21
16.	Jammu and Kashmir	138	84	64	48	110	-57	186	195	-5
17.	West Rajasthan	8	4	111	7	5	50	15	9	78
18.	East Rajasthan	2	7	-69	9	5	106	11	11	2
19.	West Madhya Pradesh	2	13	-86	35	8	363	37	21	77
20.	East Madhya Pradesh	1	20	-97	18	22	-16	19	42	-54
21.	Gujarat Region	0	2	-100	1	1	-25	1	3	-73
22.	Saurashtra, Kutch and Diu	1	1	-1	3	1	382	4	2	139
23.	Konkan & Goa	0	1	-100	0	1	-86	0	2	-95
24.	Madhya Maharashtra	0	4	-100	5	1	251	5	6	-7
25.	Marathwada	0	3	-100	5	3	50	5	6	-21
26.	Vidarbha	0	11	-97	29	13	131	29	24	23
27.	Coastal Andhra Pradesh	0	9	-98	1	11	-90	1	20	-94
28.	Telangana	0	4	-100	7	7	3	7	11	-38
29.	Rayalaseema	0	8	-96	5	5	14	6	12	-55
30.	Tamil Nadu & Pondicherry	5	33	-85	17	15	12	22	49	-55
31.	Coastal Karnataka	0	2	-100	1	1	-26	1	4	-74
32.	N. I. Karnataka	0	2	-100	8	3	184	8	5	68
33.	S. I. Karnataka	0	3	-100	8	4	100	8	7	16
34.	Kerala	2	15	-86	24	17	44	26	31	-17
35.	Lakshadweep	48	25	89	3	9	-73	50	35	46

TABLE 4

Principal amounts of rainfall (cm) for the month of January and February 1999

Date	January	February
1	Tondi 6, Vedaranniyam 3, Kondul & Pampan 1 each	Hut Bay & Car Nicobar 1 each
2	Minicoy 10, Pampan 9, Tuticorin 2, Palayamkottai 1	Long Island 4, Port Blair 2, Allahabad 1
3	Kanyakumari 1	Allahabad, Sultanpur & Khajuraho 2 each
4	Nil	Indore 3, Khajuraho 2
5	Nil	Bhopal, Sagar and Jabalpur 2 each
6	Amritsar and Srinagar 2 each, Hissar & Bikaner 1 each	Punalur 4, Pamban & Thiruvananthapuram (city) 3 each, Hut Bay 2, Madikeri 1
7	New Delhi (SFD) 5, Kasauli 4, Ludhiana & Batote 3 each, Lucknow, Jhansi & Gwalior 1 each	Nil
8	Varanasi, Mukteshwar & Ambala 2 each, Bhuntar & Quazigund 1 each	Thiruvananthapuram (city) 6, Wardha 5, Gulmarg, Jabalpur, Malegaon, Sagar & Pampan 2 each , Dubwali & Dundi 1 each
9	Nil	Palayamkottai & Punalur 5 each, Sawai Madhopur, Nanded & Mahbubnagar 3 each, Kurnool & Bellary 2 each, Narnaul, Dadahu, Banihal, Indore, Sholapur, Chandrapur & Rentachintala 1 each
10	Nil	Theog & Raipur 1 each
11	Shillong 1	Sironj 4
12	Nil	Kupwara 1
13	Nil	Anantnag & Pahalgam 1 each
14	Nil	Nil
15	Nagapattinam 3,Port Blair 1	New Kandla 2, Nancowrie and Naliya 1 each
16	Nil	Kondul & Rajkot 2 each
17	Hut Bay 2, Port Blair 1	Mahabaleshwar 4, Car Nicobar 3, Jodhpur 2, Kupwara & Udaipur 1 each
18	Nil	Nil
19	Kondul 1	Pamban & Thiruvananthapuram 1 each
20	Nil	Vedaranniyam 7, Adirampattinam 6, Tuticorin 5, Nagapattinam 4, Batote 2, Ratlam 1
21	Gulmarg 7, Bhuntar 3, Kondul & Batala 1 each	Nagapattinam 7, Vedaranniyam 6, Karaikal & Pamban 2 each
22	Baderwah 3, Bhutar 2, Kondul & Batala1 each	Nil
23	Gulmarg 3, Jogindernagar & Anantnag 2 each	Kondul & Awantipur 1 each
24	Quazigund 9, Gulmarg 7, Pahalgam 4, Amritsar & Shimla 1 each	Rampur Bushar 4, Shimla 3, Nancowrie, Chandigarh, Ludhiana & Quazigund 1 each
25	Gohar & Anantnag 4 each, Gulmarg 3, Kondul & Dasuya 2 each, Ambala 1	Batote 3
26	Nil	Nil
27	Nil	Nil
28	Jogindernagar Solang & Dundi 4 each, Quazigund & Banihal 3 each,Derabassi 2, Kondul, Ambala & Pilani 1 each	Nil
29	Car Nicobar 4, Dehra Dun & Rattia 3 each, Gurdaspur, Solang & Kathua 2 each	-
30	Hut Bay 2, Car Nicobar & Thiruvananthapuram 1 each	-
31	Batote 3, Udhampur 2, Hut Bay 1	-

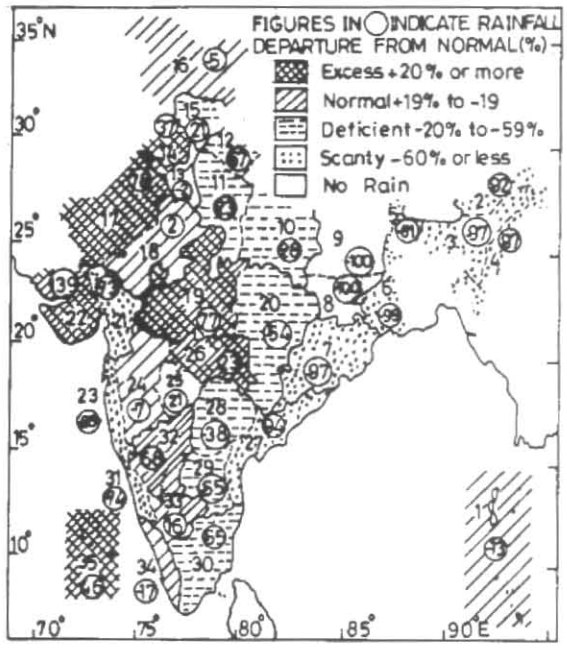

Fig. 2. Sub-divisionwise seasonal rainfall departure (%) for the period January- February 1999

4. February

4.1. *Weather and associated synoptic features*

One cyclonic storm, 7 western disturbances, 1 low pressure area, 16 cyclonic circulations (including 5 induced cyclonic circulations), 8 troughs (including 2 troughs in easterlies and 4 troughs in westerlies) affected India during the month. Details of these systems are given in Table 2.

Rain or snow occurred either at most or at many places on 1 to 2 days in Himachal Pradesh and Jammu & Kashmir during the month. Rain or thundershowers also occurred either at most places or at many places on 3 to 4 days in Andaman & Nicobar Islands and west Madhya Pradesh and on 1 to 2 days in east Uttar Pradesh, Punjab, east Rajasthan, east Madhya Pradesh, Madhya Maharashtra, Marathwada, Vidarbha and Kerala. Heavy rain occurred on 2 days in Tamilnadu during the month.

4.1.1. *Cyclonic storm over the Bay of Bengal (2-3 February 1999)*

A well-marked low pressure area formed over southeast Bay and neighbourhood on 1 February. It concentrated into a depression on 2nd and was centred at 0300 UTC near Lat. 9.5°N/Long. 86.0°E, about 730 kms southeast of Chennai and it lay as a deep depression near Lat. 9.5°N/Long. 85.5°E in the afternoon of same day. It intensified into a cyclonic storm and was centred at 0300 UTC of 3 near Lat. 11.5°N/Long. 86.0°E, "about" 650 kms east southeast of Chennai. It rapidly weakened into a depression in the same evening and lay at 1200 UTC of 3 near Lat. 12.0°N/Long. 86.5°E and further weakened into "a" well-marked low pressure area over northern parts of south Bay. As it did not cross the coast, no damage and adverse weather occurred over India. The track of the cyclonic storm is given in Fig. 1.

4.2. *Month's rainfall*

The month's rainfall was excess in 10, normal in 5, deficient in 4 and scanty in 12 meteorological sub-divisions. There was no rain in the remaining 4 meteorological sub-divisions.

The month's rainfall was excess in Rajasthan, west Madhya Pradesh, Saurashtra & Kutch, Madhya Maharashtra, Marathwada, Vidarbha, interior Karnataka and Kerala;normal in Andaman & Nicobar Islands, east Madhya Pradesh, Telangana, Rayalaseema and Tamilnadu, deficient in east Uttar Pradesh, Jammu & Kashmir, Gujarat Region and coastal Karnataka. It was scanty over the rest of the country outside Assam & Meghalaya, Nagaland, Manipur, Mizoram & Tripura and Bihar State where there was no rain.

4.3. *Temperature*

Severe cold wave conditions prevailed on one day in Punjab. Cold wave conditions also prevailed on 4 days in Punjab and on 1 to 2 days in plains of west Uttar Pradesh, Haryana and Jammu & Kashmir. Night temperatures were appreciably to markedly above normal on many days during the month over the entire country except Peninsular India where they were generally normal (departure from normal minimum temperature is -1°C to +1°C).

The month's lowest minimum temperature of 1.1°C was recorded at Amritsar (Punjab) on 4 February 1999. In the hills, lowest minimum temperature of - 7°C was recorded at Pahalgaon on 21 February.

4.4. *Disastrous weather events and damages*

According to press reports, 6 people lost their lives due to heavy rain/hailstorm (3 in Kerala, 2 in Madhya Pradesh and 1 in Andhra Pradesh). Standing cash crops worth several lakhs of rupees in the central and peninsular India were reported damaged.