Mausam, (1993), **44**, 1, 115-122

Weather

WINTER SEASON (JANUARY-FEBRUARY 1992)*

1. Introduction

The period January to February constitutes winter season for India. During the winter season the precipitation occurs mainly in the hilly regions of north India and in Andaman & Nicobar islands.

Monthwise synoptic features for the season are given in Tables 1 and 2. Table 3 contains the monthly and seasonal rainfall figures.

2. Chief features

(*i*) Snowfall over western Himalayas in January and February,

(*ii*) Cold wave conditions in several parts of north India,

(*iii*) Hailstorm in Orissa in January.

3. Season's rainfall

The season's rainfall was in excess in Assam & Meghalaya, Gangetic West Bengal, hills of west Uttar Pradesh, Haryana, Chandigarh & Delhi, Punjab, Himachal Pradesh, Jammu & Kashmir, west Rajasthan and Saurashtra, Kutch & Diu. It was normal in Arunachal Pradesh, Nagaland, Manipur, Mizoram & Tripura, Orissa and plains of west Uttar Pradesh. There was no rainfall in Maharashtra State (outside Vidarbha) and coastal Karnataka. Rainfall was either deficient or scanty over the rest of the country during the season. The seasonal rainfall departures are given in Fig. 1.

4. January

4.1. *Weather and associated synoptic features*

The details of the synoptic features of the month are given in Table 1. There were 6 western disturbances and 6 induced cyclonic circulations which affected north India during the month. Of these two western disturbances one between 9 and 12, and the other between 29 and 31 January yielded well distributed rainfall over Rajasthan, Haryana and Punjab and snowfall over Himachal Pradesh and Jammu & Kashmir. Himachal Pradesh experienced snowfall also between 22 and 24 of the month. The induced systems were rather short lived and lasted for a day or two. Rain or thundershowers occurred either almost at all the places or at many places on 3 to 4 days in hills of west Uttar Pradesh, Punjab and Himachal Pradesh and on one or two days in Orissa, Bay islands, east Uttar Pradesh, plains of west Uttar Pradesh, Haryana, Chandigarh & Delhi, Rajasthan and Saurashtra, Kutch & Diu. Rain or thundershowers occurred either at one or two places or at a few places on 7 to 13 days in Andaman & Nicobar islands, Assam & Meghalaya, Sub-Himalayan West Bengal & Sikkim and Punjab. They occurred either at one or two places or at few places on 1 to 5 days over the rest of the country outside Maharashtra State (except Vidarbha) coastal Karnataka and north interior Karnataka where weather was mainly dry during the month.

4.2. *Rainfall*

Accumulated monthly rainfall was excess in 9, normal in 1, deficient in 7 and scanty in 13 meteorological subdivisions. There was no rain in 5 sub-divisions. Rainfall was excess in west Uttar Pradesh, Haryana, Chandigarh & Delhi, Punjab, Himachal Pradesh, Jammu & Kashmir, Rajasthan and Saurashtra, Kutch & Diu; normal in Andaman & Nicobar islands and scanty or deficient over the rest of the country outside Konkan & Goa, Madhya Maharashtra, Marathwada, coastal Karnataka and north interior Karnataka where there was no rain. The significant amounts of rainfall (cm) are given in Table 4.

4.3. *Temperature*

Cold wave conditions for duration ranging from 3 to 9 days prevailed over the meteorological sub-divisions of Bihar plateau, east Uttar Pradesh, hills of west Uttar Pradesh, Jammu & Kashmir, Maharashtra State (outside Konkan & Goa), Telangana, Rayalaseema and interior Karnataka. The cold wave conditions also prevailed over Arunachal Pradesh, plains of west Uttar Pradesh, Haryana, Chandigarh & Delhi, Punjab, Himachal Pradesh, Rajasthan, Madhya Pradesh, Gujarat region and coastal Karnataka for 1 to 2 days. In the plains, Churu and Udaipur airports in Rajasthan recorded the lowest minimum temperature of —1°C on 2 and 12 January respectively. Mukteswar, a hill station reported the lowest minimum temperature of —8°C (dep.—10°C) for the season on 12th. Lowest day temperature of 14°C (dep.—5°C) in the plains at Chandigarh and 1°C (dep.—5°C) at Srinagar, station over the hills was recorded on 10th and 30th respectively.

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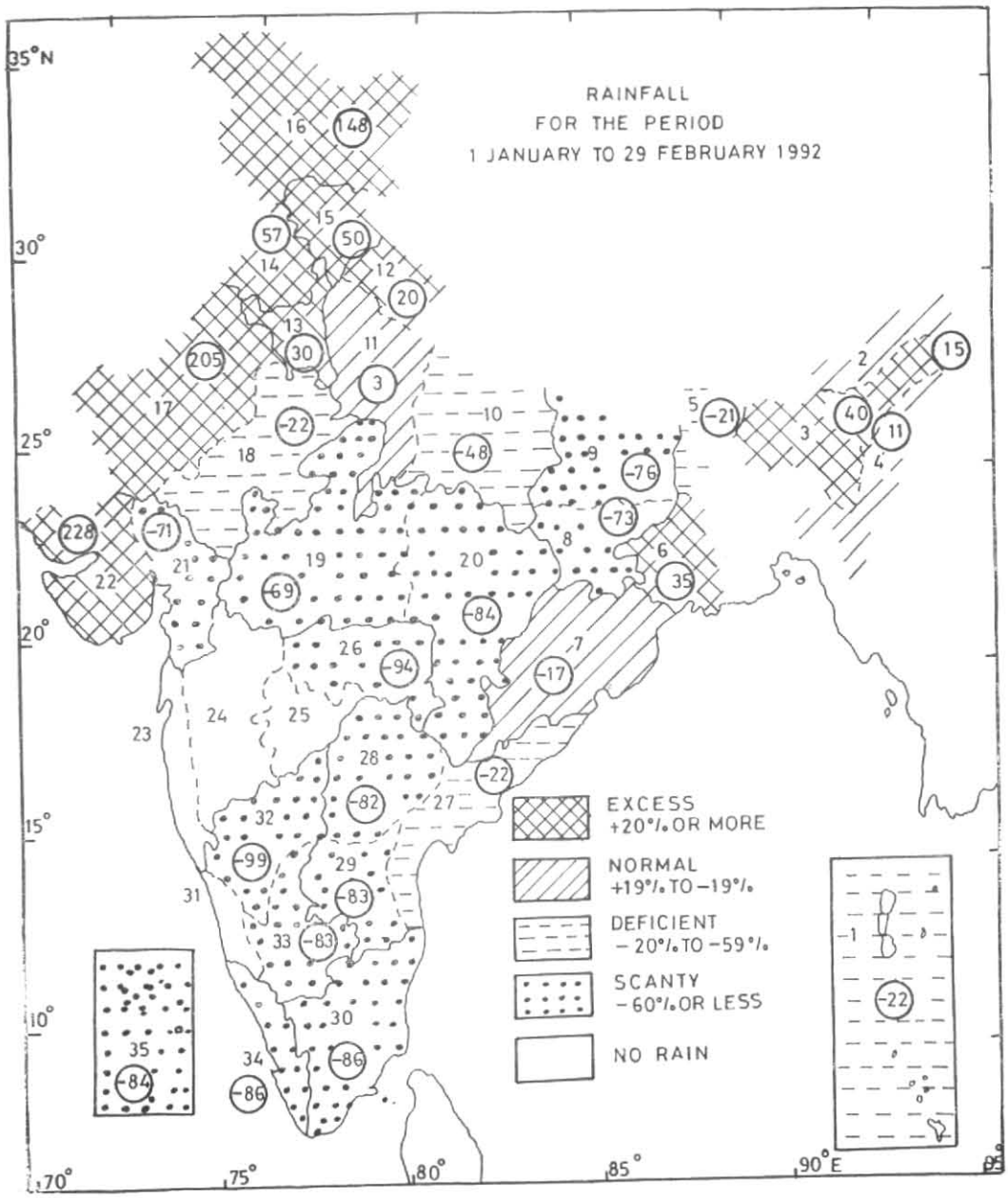
RAINFALL
FOR THE PERIOD
1 JANUARY TO 29 FEBRUARY 1992
35°N
30°
25°
20°
15°
10°
70°
75°
80°
85°
90°E
EXCESS
+20% OR MORE
NORMAL
+19% TO −19%
DEFICIENT
−20% TO −59%
SCANTY
−60% OR LESS
NO RAIN

Fig. 1

TABLE 1

Details of weather systems during January 1992

S. No.	Weather system	Period	Place of first location	Direction of movement	Place of dissipation	Remarks
(A)	*Cyclonic circulation*					
(1)	Lower levels	2-3	South Tamil Nadu and neighbourhood	—	*In situ*	—
(2)	Extending up to mid tropospheric levels	8-9	Punjab and neighbourhood	—	*In situ*	—
(3)	Lower levels	17-24	North Assam and neighbourhood	Southeastwards	Nagaland, Manipur, Mizoram & Tripura	During its persistence it extended up to mid tropos. levels
(B)	*Western disturbance*					
(1)	Upper air system	4-8	Northwest Assam and neighbourhood	Eastwards	Jammu & Kashmir	—
(2)	Do.	9-12	North Pakistan and neighbourhood	Do.	Do.	—
(3)	Do.	14-17	Do.	Northeastwards	Do.	—
(4)	Do.	18-25	Do.	Do.	Do.	—
(5)	Do.	25-28	Do.	Do.	Do.	—
(6)	Do.	29-1 Jan Feb	Do.	Do.	Do.	—
(C)	*Induced cyclonic circulation*					
(1)	Lower levels	10-12	Rajasthan	Eastwards	Less marked over Uttar Pradesh	—
(2)	Do.	11-12	North Pakistan and adjoining Punjab	Do.	Across Himachal Pradesh	—
(3)	Mid tropos. levels	14-17	Punjab and neighbourhood	Do.	Across hills of west Uttar Pradesh	—
(4)	Lower levels	24-25	North Rajasthan and neighbourhood	Northnortheastwards	Less marked over Punjab and adjoining Rajasthan	—
(5)	Mid tropos. levels	26-28	West Rajasthan	Eastsoutheastwards	Southeast Rajasthan	—
(6)	Lower levels	29-31	Extreme northwest Rajasthan	—	Less marked over northwest Rajasthan and adjoining areas	On 30, it was observed as an induced low
(D)	*Trough in westerlies*					
(1)	Trough in mid and upper tropos. westerlies	7-9	7.6 km asl 65°E/30°N	—	Less marked *in situ*	—
(2)	Do.	10-13	9.5 km asl 67°E/30°N	Eastwards	Moved away	—
(3)	Do.	14-16	5.8 km asl 55°E/25°N	Northeastwards	60°E/25°N (Less marked)	—
(4)	Do.	29-2 Jan Feb	60°E/30°N	Eastwards	92°E/25°N	—
(E)	*Trough in lower levels*					
(1)	Trough in the lower levels	2-10	South Andaman Sea	Westwards	Southeast and adjoining southwest Bay	During 4-10, it persisted over southeast and adjoining southwest Bay moved northwards initially and became less marked on 17th
(2)	Do.	4-17	South Kerala coast and neighbourhood	—	Kerala-Karnataka	—
(3)	Eastwest trough (lower levels)	21-24	From east Uttar Pradesh to north Assam	—	*In situ*	—
(4)	Trough in Lower levels	19-21	Tamil Nadu-Sri Lanka coast	—	*In situ*	—
(5)	Trough extending up to mid-tropos. levels	28-29	From northwest Rajasthan to northwest Madhya Pradesh	—	*In situ*	—

TABLE 2

Details of weather systems during February 1992

S. No. (1)	Weather system (2)	Period (3)	Place of first location (4)	Direction of movement (5)	Place of dissipation (6)	Remarks (7)
(A) *Cyclonic circulation*						
(1)	Lower levels	4-5	Assam and neighbourhood	—	*In situ*	
(2)	Do.	4-6	Southwest Rajasthan and neighbourhood	Eastwards	Southeast Rajasthan and neighbourhood	
(3)	Do.	7-10	North Madhya Pradesh and adjoining parts of Uttar Pradesh	Do.	East Assam and neighbourhood	
(4)	Do.	9-12	Coastal Orissa & neighbourhood	—	*In situ*	
(5)	Do.	12-12	Northwest Rajasthan and adjoining parts of Pakistan	—	*In situ*	
(6)	Do.	19-22	Southwest Rajasthan and neighbourhood	Eastwards	Madhya Pradesh and adjoining parts of Vidarbha	
(7)	Do.	19-20	Coastal Orissa & neighbourhood	—	*In situ*	
(8)	Do.	21-26	Gangetic West Bengal and adjoining parts of Bihar plateau	Eastwards	Nagaland, Manipur, Mizo. & Tripura and adjoining Arakan coast	
(9)	Do.	23-1 Mar	South Tamil Nadu	Westwards	Lakshadweep	
(B) *Western disturbance*						
(1)	Upper air system	1-3 eve	Northeast Afghanistan	Eastwards	Northwest Rajasthan & neighbourhood	
(2)	Do.	4-5 eve	Jammu & Kashmir and neighbourhood	Northeastwards	Moved away	
(3)	Do.	5-8	West Pakistan & adjoining areas of Afghanistan	Eastwards	Northwest Rajasthan	
(4)	Do.	8-9	Pakistan and adjoining Jammu & Kashmir	Eastnortheastwards	Moved away	
(5)	Do.	12-14	West Pakistan & adjoining parts of Afghanistan	Northeastwards	Punjab and adjoining parts of Pakistan	It emerged as a low pressure area over Pakistan and adjoining west Rajasthan on 12th evening
(6)	Do.	16-18	North Pakistan & adjoining Jammu & Kashmir	Eastnortheastwards	Moved away	
(7)	Do.	19-23	North Afghanistan & neighbourhood	Eastwards	Moved away across western Himalayas	
(8)	Do.	25-29	North Pakistan & neighbourhood	Northeastwards	Do.	

TABLE 2 (*Contd.*)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
(C)	*Induced cyclonic circulation*					
(1)	Up to 1.5 km asl	6-7	Punjab and neighbourhood	—	*In situ*	
(2)	Do.	17-18	North Rajasthan & neighbourhood	Eastnortheastwards	Moved away	
(3)	Do.	27-2 Mar	Northwest Rajasthan & neighbourhood	Northeastwards	Northwest Rajasthan and adjoining Haryana and Punjab	
(D)	*Trough in westerlies*					
(1)	Trough in westerlies	13-14	9.5 km asl 70°E/30°N	Eastnortheastwards	Moved away	
(2)	Do.	24-28	Mid and upper tropospheric levels 87°E/North of 15°N	Eastwards	90°E/North of 10°N moved away	
(E)	*Trough in lower levels*					
(1)	Trough in lower levels	2-4	Sub-Himalayan West Bengal-North Bay	—	*In situ*	
(2)	Do.	12-12	Do.	—	*In situ*	
(3)	Do.	12-16	Northwest Rajasthan & Saurashtra	Eastwards	Sub-Himalayan West Bengal-North Bay	
(4)	Do.	18-20	Telangana south Tamil Nadu	—	*In situ*	

4.4. *Disastrous weather events and damages*

According to press reports 275 persons lost their lives due to cold wave conditions in Bihar and in some parts of north India. A few hundred heads of cattle also perished due to cold wave in these areas. Standing rabi crops in parts of Bihar, Assam, Orissa and West Bengal were damaged due to heavy rains hailstorm damaged standing rabi crops in Orissa.

Snowfall during the second week and last week of the month in Kashmir and Himachal Pradesh dislocated normal life in these States. Areas in the upper reaches of Shimla district remained cut off from rest of the State for 2 days. Electricity and water supply was also affected in some parts of Shimla. The vehicular traffic on the Hindustan-Tibet National Highway was suspended beyond Shimla for a few days during the second and last week of the month.

5. February

5.1. *Weather and associated synoptic features*

Eight western disturbances and 3 induced cyclonic circulations affected the country during the month. Details of synoptic features of the month are given in Table 2. The western disturbance caused 3 spells of snowfall in Himachal Pradesh and Jammu & Kashmir lasting for 1 to 3 days during the first, second and third week of February.

Rain or thundershowers occurred almost at all the places or at many places on 3 to 4 days in Nagaland, Manipur, Mizoram & Tripura, Gangetic West Bengal, Punjab and Himachal Pradesh and on 1 day in Sub-Himalayan West Bengal & Sikkim, Haryana, Chandigarh & Delhi and west Rajasthan. Rain or thundershower also occurred at a few places or one or two places over northwest India from 12 to 23 days. There was no rain in Bihar, Uttar Pradesh, Gujarat State, Maharashtra State (outside Vidarbha) Tamil Nadu and coastal Karnataka.

5.2. *Month's rainfall*

Accumulated monthly rainfall during the month was excess in 8, normal in 3, deficient in 6 and scanty in 11 meteorological sub-divisions. Seven meteorological sub-divisions remained dry during the month. Rainfall was excess in Arunachal Pradesh, Assam & Meghalaya, Nagaland, Manipur, Mizoram & Tripura, Gangetic West Bengal, Haryana, Punjab, Jammu & Kashmir, west Rajasthan and normal in Sub-Himalayan West Bengal & Sikkim, Orissa, Himachal Pradesh and deficient or scanty in Andaman & Nicobar islands, Bihar, Uttar Pradesh, east Rajasthan, Madhya Pradesh, Vidarbha, Andhra Pradesh, interior Karnataka, Kerala and Lakshadweep. There was no rain in the remaining sub-divisions. The significant amounts of rainfall (cm) are given in Table 4.

TABLE 3

Monthly and seasonal rainfall figures (mm) for winter season (January and February) 1992

S. No.	Sub-division	January			February			Season (Jan & Feb)		
		Actual	Normal	% Dip.	Actual	Normal	% Dip.	Actual	Normal	% Dip.
1	Bay Islands	76	72	6	17	47	—64	94	120	—22
2	Arunachal Pradesh	21	44	—51	104	65	60	125	109	15
3	Assam & Meghalaya	13	18	—30	53	29	85	65	47	40
4	Naga., Mani., Mizo. & Trip.	0	15	—99	49	29	69	49	44	11
5	S.H.W.B. & Sikkim	6	17	—66	26	23	13	32	41	—21
6	Gangetic West Bengal	9	14	—36	39	22	81	48	36	35
7	Orissa	9	12	—24	22	26	—14	31	38	—17
8	Bihar Plateau	1	20	—93	11	26	—59	12	46	—73
9	Bihar Plains	4	16	—77	4	16	—75	8	32	—76
10	East Uttar Pradesh	10	18	—46	8	16	—51	18	34	—48
11	Plains of West U. P.	28	22	24	15	19	—23	43	41	3
12	Hills of West U. P.	105	62	68	43	61	—30	148	123	20
13	Har., Chandi. & Delhi	28	22	29	25	19	31	54	41	30
14	Punjab	50	29	71	37	26	41	87	86	57
15	Himachal Pradesh	143	79	82	84	72	16	227	151	50
16	Jammu & Kashmir	239	96	149	62	25	144	301	121	148
17	West Rajasthan	12	4	236	14	5	182	26	9	205
18	East Rajasthan	7	6	21	1	5	—72	8	11	—22
19	West Madhya Pradesh	1	13	—93	5	8	—28	7	21	—69
20	East Madhya Pradesh	0	20	—97	6	21	—71	7	41	—84
21	Gujarat Region	1	2	—56	0	1	—100	1	3	—71
22	Saurashtra, Kutch & Diu	6	1	555	0	1	—100	6	2	228
23	Konkan & Goa	0	1	—100	0	1	—100	0	2	—100
24	Madhya Maharashtra	0	4	—100	0	1	—100	0	6	—100
25	Marathwada	0	3	—100	0	4	—100	0	7	—100
26	Vidarbha	0	12	—97	1	11	—91	1	22	—94
27	Coastal Andhra Pradesh	8	10	—21	9	11	—23	16	21	—22
28	Telangana	1	4	—73	1	7	—88	2	11	—8
29	Rayalaseema	2	9	—77	0	5	—94	2	13	—83
30	Tamil Nadu	7	33	—79	0	15	—100	7	48	—86
31	Coastal Karnataka	0	2	—100	0	1	—100	0	3	—100
32	North Interior Karnataka	0	2	—100	0	3	—98	0	5	—99
33	South Interior Karnataka	1	3	—75	0	5	—90	1	8	—83
34	Kerala	3	15	—77	1	17	—94	4	32	—86
35	Lakshadweep	4	25	—84	1	9	—84	5	35	—84

TABLE 4

Principal amounts of rainfall (cm) during January-February 1992

Date	January	February
1	Thiruvananthapuram AP 6, Ongole 4, Bhubaneswar AP 3	North Lakhimpur 3
2	Kakinada & Port Blair 5 each, Madras 3	—
3	Port Blair 9	—
4	—	—
5	Hut Bay 5	—
6	Car Nicobar 6	—
7	—	Nurpur 12, Dharmsala & Malikpur 9 each, Kangra 7, Jagadhari & Pathankot 6 each
8	Ludhiana 3	Krishnanagar 7, Chowari, Diamond Harbour & Dumka 5 each, Agartala AP, Chandigarh AP, Chamba, Manali & Roorkee 3 each
9	—	Jenapur 3
10	Dharmsala 6, Shimla 3	Nancowry 4
12	Bhuntar AP 4	—
13	—	Chopal 5, Bilaspur & Jammu 4 each, Bhuntar AP 3
14	—	Dharmsala 5, Baijnath 4, Chamba 3
15	—	—
16	—	—
17	North Lakhimpur 4	—
18	—	—
20	—	Sompeta 3
21	—	Cuttack 5, Bankura & Tikarpara 4 each
22	Balasore 4, Bhagalpur & Kalaikunda 3	Tadong 5, Paradip 4
23	—	Narasipatnam 12, Magra 5, Alipingal 4, Burdhwan 3
24	—	Alipingal 5, Chodavaram & Puri 4 each
25	—	—
26	—	Car Nicobar 3
27	Bhuntar AP 3	—
28	Bhuntar AP 5, Shimla 3	—
29	Kalpa 6	—
30	Jammu 11, Bhuntar AP 7, Dharmsala 5, Shimla 4, Chandigarh AP, Ludhiana & Srinagar 3 each	—
31	Chamba 11, Jammu & Srinagar AP 8 each, Amritsar, Dehradun & Dharmsala 4 each, Shimla 3	—

5.3. *Temperature*

Punjab, Himachal Pradesh and Jammu & Kashmir and west Madhya Pradesh were under the grip of cold wave for 5 to 11 days during the month. The cold wave conditions prevailed also over Assam & Meghalaya, Bihar, Haryana, Chandigarh & Delhi, east Rajasthan, Madhya Maharashtra and Vidarbha for 1 to 3 days. Night temperatures were below normal or appreciably below normal over the country outside Orissa, coastal Andhra Pradesh and Rayalaseema where they were above normal during the second fortnight of the month. Lowest night temperature of 2°C (dep.—4°C) was recorded at Amritsar a station in the plains on 10, 11 and 17. Mukteswar, a hill station recorded the lowest night temperature of —3°C (dep.—6°C) on 10 and 23 (dep.—7°C). In the plains Cuddapah, Kurnool, Ramagundam and Rentachintala recorded highest temperature of 38°C on 29th.

5.4. *Disastrous weather events and damages*

According to media reports, hailstorm lashed some parts of Assam and Himachal Pradesh damaging the standing crops during February. High winds uprooted trees causing disruption to road communications, power failure and damaging houses. Snowfall disrupted the normal life of the people in Jammu & Kashmir and Himachal Pradesh.