MAUSAM, **56**, 1 (January 2005), 327-336

Weather in India

WINTER SEASON (January-February 2004)*

1. Introduction

Northeast monsoon rains ceased over the peninsular India from 8 January. Though there was no *severe cold wave*† condition, the persistent *cold wave* conditions over the northern parts of the country claimed many lives, especially in Bihar. *Cold day* conditions prevailed in some parts of north and central India on many days during January and a few days during February. Normal rainfall/snowfall activity occurred over the northern parts of the country during the season.

2. Seasonal rainfall (January-February)

Seasonal rainfall was *excess* in 6 meteorological sub-divisions, *viz.*, Andaman & Nicobar Islands, Punjab, Vidarbha, Chattisgarh, coastal Andhra Pradesh and Telangana; while it was *normal* in 8, *viz.*, Assam & Meghalaya, Bihar, east Uttar Pradesh, Haryana, Himachal Pradesh, Jammu & Kashmir, west Madhya Pradesh and north interior Karnataka; *deficient* in 7, *viz.*, Arunachal Pradesh, Sub-Himalayan West Bengal & Sikkim, Orissa, west Uttar Pradesh, Uttaranchal, east Madhya Pradesh and Rayalaseema and *scanty* in 13, *viz.*, Nagaland-Manipur-Mizoram-Tripura, Gangetic West Bengal, Jharkhand, Rajasthan, Saurashtra & Kutch, Madhya Maharashtra, Marathwada, Tamil Nadu, coastal & south interior Karnataka, Kerala and Lakshadweep. There was no rain in remaining two sub-divisions, *viz.*, Gujarat Region and Konkan & Goa.

Seasonal sub-divisionwise percentage rainfall departures are given in Fig. 1 and also in Table 1.

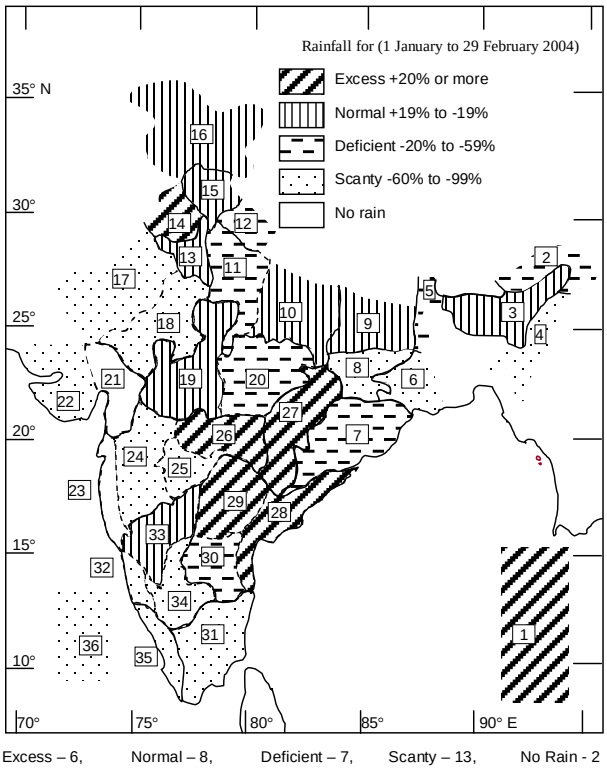

Fig. 1. Sub-divisionwise seasonal rainfall departure from normal (%) for winter season (January - February 2004). Sub-divisions are indicated by number on the map & bold letters in legend. The rainfall anomaly values for these 36 sub-divisions are indicated below :

1	31	**7**	–36	**13**	–6	**19**	17	**25**	–66	**31**	–61
2	–54	**8**	–71	**14**	26	**20**	–35	**26**	117	**32**	–77
3	–7	**9**	–9	**15**	–19	**21**	–100	**27**	101	**33**	–7
4	–85	**10**	–2	**16**	11	**22**	–71	**28**	41	**34**	–74
5	–34	**11**	–31	**17**	–69	**23**	–100	**29**	223	**35**	–70
6	–87	**12**	–52	**18**	–79	**24**	–97	**30**	–26	**36**	–76

3. Monthly features

3.1. *January*

3.1.1. *Weather and associated synoptic features*

There were in all 15 western disturbances including 3 induced low pressure areas and 3 induced cyclonic circulations, 5 other cyclonic circulations, 2 troughs in easterlies and one trough/wind discontinuity which affected the weather over the country during this month. Details of these systems are given in Table 2.

Rain/snow occurred either *at most places* or *at many places* on 4 to 8 days in Uttaranchal, Himachal Pradesh and Jammu & Kashmir and *at a few places* or *at isolated places* on 9 days in Himachal Pradesh, on 6 days in Jammu & Kashmir and on 2 days in Uttaranchal.

Rain/thundershowers also occurred either *at most places* or *at many places* on 4 days in Arunachal Pradesh and on 1 to 3 days in Assam & Meghalaya, Sub-Himalayan West Bengal & Sikkim, Bihar, Uttar Pradesh,

† Definitions of the terms in *Italics* are given in Appendix.

**Compiled by* : N. Jayanthi, A. B. Mazumdar & Sunitha Devi S., Meteorological Office, Pune – 411 005, India

TABLE 1

Sub-divisionwise rainfall (mm) for each month and season as a whole (January-February 2004)

S. No.	Meteorological sub-divisions	January			February			Season		
		Actual (mm)	Normal (mm)	Dep. (%)	Actual (mm)	Normal (mm)	Dep. (%)	Actual (mm)	Normal (mm)	Dep. (%)
1.	A. & N. Islands	42	77	-45	111	41	173	153	117	31
2.	Arunachal Pradesh	37	47	-20	25	87	-72	62	134	-54
3.	Assam & Meghalaya	18	17	4	22	25	-14	39	42	-7
4.	Naga., Mani., Mizo. and Tri.	3	13	-79	3	26	-88	6	39	-85
5.	S. H. W. B. & Sikkim	19	22	-16	19	34	-45	37	56	-34
6.	Gangetic West Bengal	3	12	-78	1	18	-93	4	31	-87
7.	Orissa	5	12	-55	15	20	-24	20	31	-36
8.	Jharkhand	6	18	-67	5	19	-75	11	37	-71
9.	Bihar	25	17	53	**	11	-97	26	28	-9
10.	East Uttar Pradesh	31	19	67	**	13	-97	31	32	-2
11.	West Uttar Pradesh	24	19	21	1	16	-94	25	35	-31
12.	Uttaranchal	43	55	-21	8	51	-85	51	106	-52
13.	Haryana, Chandigarh & Delhi	34	21	67	1	17	-95	35	38	-6
14.	Punjab	56	27	105	9	24	-64	65	52	26
15.	Himachal Pradesh	117	89	31	19	78	-76	135	167	-19
16.	Jammu & Kashmir	139	81	71	58	96	-39	197	177	11
17.	West Rajasthan	3	5	-38	0	4	-99	3	9	-69
18.	East Rajasthan	2	7	-63	0	5	-100	2	11	-79
19.	West Madhya Pradesh	20	11	80	0	6	-100	20	17	17
20.	East Madhya Pradesh	28	25	12	**	18	-99	28	43	-35
21.	Gujarat Region	0	1	-100	0	1	-100	0	1	-100
22.	Saurashtra & Kutch	**	**	0	0	1	-100	**	1	-71
23.	Konkan & Goa	0	1	-100	0	**	-100	0	1	-100
24.	Madhya Maharashtra	0	2	-100	**	1	-92	**	3	-97
25.	Marathwada	2	3	-35	**	3	-97	2	7	-66
26.	Vidarbha	44	11	292	4	11	-64	48	22	117
27.	Chattisgarh	35	12	191	15	13	17	51	25	101
28.	Coastal Andhra Pradesh	17	7	144	5	9	-38	22	16	41
29.	Telangana	24	5	436	9	6	54	33	10	223
30.	Rayalaseema	4	3	23	1	3	-76	5	7	-26
31.	Tamil Nadu	10	23	-55	5	15	-70	15	38	-61
32.	Coastal Karnataka	**	2	-81	**	1	-60	1	3	-77
33.	North Interior Karnataka	3	2	76	1	3	-62	4	4	-7
34.	South interior Karnataka	1	2	-65	1	4	-79	1	6	-74
35.	Kerala	3	12	-77	6	17	-64	9	29	-70
36.	Lakshadweep	7	20	-65	1	17	-91	9	37	-76

Note : ** indicates rainfall amounts 0.1 to 0.4 mm (amounts less than 0.1 mm are rounded off to zero).

TABLE 2

Details of the weather systems during January 2004

S. No.	System	Duration	Place of first location	Direction of movement	Final location	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)
(**A**)	*Western disturbances / eastward moving systems*					
(*i*)	*Upper air systems*					
1.	Cyclonic circulation upto mid tropospheric levels	3 – 4	North Pakistan and neighbourhood	Northeasterly	Jammu & Kashmir and neighbourhood	Moved away on 5
2.	Do	5 – 6	North Pakistan and adjoining Jammu & Kashmir and Punjab	Do	Do	Moved away on 7
3.	Do	8 – 9	North Pakistan and adjoining Jammu & Kashmir	Do	Do	Moved away on 10
4.	Do	10 – 13	Do	Do	Do	Moved away on 14
5.	Do	15 eve. – 17	Do	Do	Do	Moved away on 18
6.	Do	19 – 24	Central Pakistan and adjoining Jammu & Kashmir	Do	Do	Moved away on 25
7.	As an upper air trough	22 – 23	Long. 65° E, north of Lat. 20° N	Stationary	*In situ*	Less marked on 24
8.	Mid tropospheric levels	27 – 29	North Pakistan and adjoining Jammu & Kashmir	Northeasterly	Punjab and neighbourhood	Less marked on 30
9.	Do	31 Jan – 6 Feb	North Pakistan and adjoining Jammu & Kashmir	Do	Uttaranchal and neighbourhood	Moved away on 7
(*ii*)	*Induced lows*					
1.	Low pressure area	19	Saurashtra and neighbourhood	Stationary	*In situ*	Less marked on 20
2.	Do	20 – 22	West Rajasthan and adjoining south Pakistan	Northeasterly	Northern parts of Rajasthan and neighbourhood	Merged with western disturbance no. 6 on 23
3.	Low pressure area	30 Jan - 2 Feb	Northwest Rajasthan and neighbourhood	Do	Do	Associated cyclonic circulation extended upto 3.1 kms a.s.l. over north Madhya Pradesh, and adjoining south Uttar Pradesh, on 31. It moved upto Jharkhand and neighbourhood and became less marked on 3 February A trough from this system at 0.9 km a.s.l. extended southwards up to Kerala and another trough extended southwards upto Chattisgarh on 30. Both troughs became less marked on 2 February

TABLE 2 (*Contd.*)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
(*iii*)	*Induced cyclonic circulations*					
1.	Mid tropospheric levels	19	Saurashtra & Kutch and neighbourhood	Stationary	*In situ*	Less marked on 20
2.	Do	20 – 22	West Rajasthan and adjoining south Pakistan	Northeasterly	Northern parts of Rajasthan and neighbourhood	Merged with the western disturbance (No. 6) on 23
3.	Do	26 – 28	North Bihar and adjoining Sub-Himalayan West Bengal & Sikkim	Stationary	*In situ*	Less marked on 29
(**B**)	*Other cyclonic circulations*					
1.	Lower tropospheric levels	5 – 6	North Maharashtra and neighbourhood	Northerly	Gujarat coast and neighbourhood	Less marked on 7
2.	Mid tropospheric levels	6	Bangladesh and neighbourhood	Stationary	*In situ*	Do
3.	Lower tropospheric levels	17 – 18	Southeast Arabian Sea and adjoining Lakshadweep-Maldives areas	Do	Do	Less marked on 19
4.	Lower levels	17 – 18	Bangladesh and neighbourhood	Do	Do	Less marked on 19
5.	Do	20 – 25	Nagaland-Manipur-Mizoram-Tripura and adjoining Bangladesh	Quasi stationary	Nagaland-Manipur-Mizoram-Tripura and neighbourhood	Less marked on 26
(**C**)	*Trough in easterlies*					
1.	Sea level	11 – 16	South Andaman Sea	Westerly	Southwest Bay	Merged with the cyclonic circulation over the same area on 17
2.	Do	27 – 29	Southwest Bay	Stationary	*In situ*	Less marked on 30
(**D**)	*Other troughs*					
1.	Trough / wind discontinuity in lower levels	22 – 29	South Rajasthan to north interior Karnataka through interior Maharashtra	Quasi-stationary	Southeast and adjoining east-central Arabian Sea to Gujarat State	An upper air cyclonic circulation lay embedded on this trough over Lakshadweep area on 27 and over southeast and adjoining east-central Arabian Sea off Kerala – Karnataka coasts on 28 A trough from this system at 0.9 km a.s.l. extended northeastwards upto east Uttar Pradesh on 29

TABLE 3

Details of the weather systems during February 2004

S. No.	System	Duration	Place of first location	Direction of movement	Final location	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)
(**A**)	*Western disturbances / eastward moving systems*					
(*i*)	*Upper air cyclonic circulation*					
1.	Mid tropospheric levels	2 – 5	North Pakistan and adjoining Jammu & Kashmir	North easterly	Jammu & Kashmir and neighbourhood	Moved away on 6
2.	Do	7 – 9	Do	Do	Do	Moved away on 10
3.	Do	11 – 12	Do	Do	Do	Moved away on 13
4.	Do	12 – 15	Do	Do	Himachal Pradesh and neighbourhood	Moved away on 16
5.	Do	16 – 17	Do	Do	Jammu & Kashmir and neighbourhood	Moved away on 18
6.	Do	19 – 24	Do	Do	Do	Moved away on 25
7.	Do	25 – 29	Do	Do	Do	Moved away on 1 March
(*ii*)	*Induced low pressure area*					
1.	Induced low pressure area	9	Central parts of Pakistan and adjoining west Rajasthan	Stationary	*In situ*	Associated cyclonic circulation extended upto 3.1 kms a.s.l. It was seen over west Uttar Pradesh and neighbourhood on 11 and became less marked on 12
2.	Do	18	Do	Do	Do	It was first observed as an induced cyclonic circulation over the same area on 17. It became less marked on 19. However, associated cyclonic circulation lay over west Uttar Pradesh on 19. It moved eastwards upto Nagaland-Manipur-Mizoram-Tripura and became less marked on 26
(*iii*)	*Induced cyclonic circulations*					
1.	Mid tropospheric levels	21	Central Pakistan and adjoining west Rajasthan	Stationary	*In situ*	Less marked on 22
(**B**)	*Other cyclonic circulations*					
1.	Mid tropospheric levels	14 – 15	Assam & Meghalaya and neighbourhood	Stationary	*In situ*	Less marked on 16
(**C**)	*Troughs in easterlies*					
1.	Sea level	2 – 10	South Andaman Sea	Westerly	Southeast Arabian Sea	Less marked on 11
2.	Do	5	Lakshadweep	Stationary	*In situ*	Less marked on 6
3.	Do	5 – 11	South Andaman Sea	Westerly	Maldives-Lakshadweep areas	Less marked on 12

TABLE 3 (*Contd.*)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
4.	Sea level	12 –17	Southeast Bay and adjoining south Andaman Sea	Westerly	Southwest Bay	Less marked on 18
5.	Do	19 – 25	South Andaman Sea	Do	Comorin area	Less marked on 26
6.	Do	22 – 26	Do	Do	Comorin and adjoining Sri Lanka	Less marked on 27
7.	Do	26 Feb – 1 Mar	South Andaman Sea and adjoining southeast Bay	Do	Do	Less marked on 2 March
(**D**)	*Other troughs*					
1.	Trough /wind discontinuity	6 – 7	Kerala to Gangetic West Bengal through interior Karnataka, Rayalaseema, Telangana, Chattisgarh, Orissa and Jharkhand	Quasi-stationary	Kerala to west-central Bay across south interior Karnataka, Rayalaseema and coastal Andhra Pradesh	Less marked on 8

Haryana, Punjab, Marathwada and Vidarbha and either *at a few places or at isolated places* on 12 days in Tamil Nadu; on 7 to 9 days in Andaman & Nicobar Islands, Assam & Meghalaya, Orissa, Punjab, Madhya Pradesh, Vidarbha, coastal Andhra Pradesh, Telangana; on 3 to 6 days in Arunachal Pradesh, Sub-Himalayan West Bengal & Sikkim, Bihar, west Uttar Pradesh, Haryana, Rajasthan, Marathwada, Chattisgarh, north interior Karnataka and Kerala and on 1 to 2 days in Nagaland-Manipur-Mizoram-Tripura, Gangetic West Bengal, Jharkhand, east Uttar Pradesh, Saurashtra & Kutch, Madhya Maharashtra, Rayalaseema, south interior Karnataka and Lakshadweep. *Heavy rain* occurred on 2 to 3 days each in Andaman & Nicobar Islands and Jammu & Kashmir and one day each in Uttaranchal, Himachal Pradesh and Vidarbha.

3.1.2. *Monthly rainfall*

Monthly rainfall was *excess* in 14, *viz.*, Bihar, Uttar Pradesh, Haryana, Punjab, Himachal Pradesh, Jammu & Kashmir, west Madhya Pradesh, Vidarbha, Chattisgarh, Andhra Pradesh and north interior Karnataka; *normal* in 4, *viz.*, Assam & Meghalaya, Sub-Himalayan West Bengal & Sikkim, east Madhya Pradesh, Saurashtra & Kutch; *deficient* in 7, *viz.*, Andaman & Nicobar Islands, Arunachal Pradesh, Orissa, Uttaranchal, west Rajasthan, Marathwada, Tamil Nadu and *scanty* in 8, *viz.*, Nagaland-Manipur-Mizoram-Tripura, Gangetic West Bengal, Jharkhand, east Rajasthan, coastal Karnataka, south interior Karnataka, Kerala and Lakshadweep. There was no rain in the remaining 3 meteorological sub-divisions *viz.*, Gujarat Region, Konkan & Goa and Madhya Maharashtra.

Sub-divisionwise percentage departure and principal amounts of rainfall for the month of January are given in Tables 1 and 4 respectively.

3.1.3. *Temperature*

Cold day conditions prevailed on 17 days in some parts of Punjab, on 13 days in some parts of west Uttar Pradesh, on 8 days in some parts of east Uttar Pradesh and on 1 to 4 days in some parts of Sub-Himalayan West Bengal & Sikkim, Bihar, Uttaranchal, Himachal Pradesh, Jammu & Kashmir, Rajasthan, Madhya Pradesh. *Cold wave* conditions prevailed on 10 days in some parts of Jharkhand; on 5 to 6 days in Orissa, Bihar and east Madhya Pradesh and on 1 to 2 days in west Uttar Pradesh, Haryana, Punjab, west Rajasthan, Marathwada and coastal Andhra Pradesh. Night temperatures were *appreciably to markedly below normal* on 4 to 6 days in some parts of Orissa, Jharkhand, Bihar, east Uttar Pradesh, Punjab, Madhya Pradesh, Andhra Pradesh and Tamil Nadu and on 1 to 3 days in Nagaland-Manipur-Mizoram-Tripura, West Bengal & Sikkim, west Uttar Pradesh, Haryana, Jammu & Kashmir, Rajasthan, Gujarat State, Maharashtra

TABLE 4

Principal amounts of rainfall in cm over different stations for the month of January and February 2004

Date (1)	January (2)	February (3)
1	Anantnag, Quazi Gund, Baramulla & Parangipettai 3 each, Banihal & Dhundhi 2 each, Batote, Tissa, Karaikal & Pondicherry 1 each	Shenkottah 7, Hut Bay 6, Madhabarida 4, Gudari, Shimla, Raipur & Gondia 3 each, Nancowry, Dehra Dun, Jamshedpur & Cochi 2 each
2	Baramulla 1	Nancowry 7, Kondul 5, Ramgundam 4, Car Nicobar, Berhampur & Kumarsain 3 each
3	Nil	Daporijo & Mohana 1 each
4	Nil	Hut Bay 4, Daporijo 2
5	Tarana & Sehore 3 each, Vidisha 2	Nil
6	Bhopal 5, Buldhana & Sagar 2 each, Anantnag, Pahalgam, Baramulla, Hoshangabad, Ahmedabad & Akola 1 each	Nil
7	Nil	Sevoke & Puri 2 each, Gangtok, Roing, Jorhat & Chandbali 1 each
8	Nil	Hut Bay 4, Srinivasapura & Tirupathi 1 each
9	Car Nicobar 1	Kollam 6, Kupwara & Punalur 3 each, Manali, Banihal, Konni & Dhundhi 2 each, Banihal, Car Nicobar, Srinagar, Quazi Gund & Bhang 1 each
10	Nil	Banihal & Batote 5 each, Quazi Gund 4, Tirra & Katra 3 each, Amritsar & Baijnath 2 each, Adampur, Srinagar, Ludhiana & Ghamroor 1 each
11	Nil	Nil
12	Nil	Hut Bay 15, Car Nicobar 4, Nancowry 2
13	Anantnag 2	Pamban 4
14	Zera & Neematighat 1 each	Nil
15	Khonsa & Seppa 2 each, Tangla 1	Nil
16	Nil	Nil
17	Amraghat & Agumbe 1 each	Nil
18	Banihal 6, Quazi Gund & Srinagar 5 each, Dharamsala & Sundernagar 4 each, Bhuntar 3	Kupwara 3, Banihal & Jammu 1 each
19	Khowang & Itanagar 3 each, Daporijo & Dibrugarh 2 each	Nancowry, Banihal & Batote 3 each, Bhuntar & Quazi Gund 2 each, Passighat & Srinagar 1 each
20	Changlang & Bihubar 2 each, Diana & Khonsa 1 each	Cherrapunji 2, Gangtok, Roing & Tadong 1 each
21	Gwalior 3, Quazi Gund & Bikaner 1 each	Port Blair & Agartala 1 each
22	Banihal 8, Dhundhi & Batote 7 each, Anantnag & Tissa 6 each, Deobandh & Madhopur 5 each, Malakpur 4, Dehra Dun, Jagadhari , Sarsawa, Chhachhrauli & Jammu 3 each, Wardha, Varanasi, Lucknow, Chandigarh, Amritsar & Shimla 2 each, Bareilly & Gwalior 1 each	Nil
23	Kotdwar 8, Naraingarh & Kandaghat 7 each, Nakur & Shimla 6 each, Jabalpur, Ropar, Sarsawa, Chhachhrauli & Chandigarh 5 each, Tehri, Karnal, Ambala, Patiala, Nangal, Batote & Satna 4 each, Nagpur 3, Betul, Allahabad, Varanasi, Dehra Dun, Jammu, Nagpur & Minicoy 2 each, Kheri & Car Nicobar 1 each	Margherita 6, Gajoldoba 4, Puthimari 3, Gangtok & Seppa 1 each

TABLE 4 (*Contd.*)

(1)	(2)	(3)
24	Darbhanga 5, Jhanjgir 4, Almora, Gorakhpur, Kalka, Batala, Berthin & Raipur 3 each, Jharsuguda, Chandrapur, Dehra Dun, Mukteswar, Banihal & Pendra 2 each, Seppa, Gangtok, Gaya, Lucknow, Sarsawa, Chandigarh, Shimla & Jammu 1 each	Nil
25	Majbat, Ganjam, Roing, Jalpaiguri, Bankura, Purnea, Bhagalpur & Ramagundam 1 each	Gajoldoba 1
26	Maya Bandar 7, Phulbani 5, Jagdalpur 3, Karnal 2, Hyderabad 2, Sibsagar, Gajapati, Sedam, Nizamabad & Nandyal 1 each	Nil
27	Port Blair 10, Car Nicobar 4, Khammam & Chennai 3 each, Jagdalpur 2, Gajapati, Ranikhet, Puri, Cuddalore & Palayamkottai 1 each	Kupwara 1
28	Gannavaram 4, Ongole 3, Chennai 2	Sibsagar 4, Passighat 3, Roing 2, Pahalgam, Kukernag, Banihal, Batote & Tezpur 1 each
29	Coonoor 9, Karaikal 4, Yeotmal 3, Adirampattinam & Gulbarga 2 each, Aurangabad 1	Khowang 4, Gangtok, Sibsagar & Tadong 3 each, Passighat & Dibrugarh 2 each, Champasarai, NH 31, Thiruvananthapuram 1
30	Mandi 11, Kurkheda & Gadchiroli 7 each, Banihal 3, Fazilka, Quazi Gund & Jogindernagar 2 each, Jagdalpur & Bhopal 1 each	–
31	Katra 8, Banihal 7, Baijnath 5, Batote & Shimla 4 each Sardhana & Ropar 3 each, Fatehpur, Mukteshwar, Kalka, Korba, Damoh, Narkhed & Amritsar 2 each	–

& Goa States, interior Karnataka and Kerala. They were generally *appreciably to markedly above normal* on many days during second and third week over northeast, north and central parts of India.

During the month, the lowest minimum temperature recorded over the plains was 0° C at Amritsar (Punjab) on 5 January 2004, which in turn had been the season's lowest temperature.

3.1.4. *Disastrous natural events and damage*

As per press reports, about 82 people (64 in Bihar and 18 in West Bengal) lost their lives due to cold wave in northeastern parts of the country. More than 50 people were injured in Assam due to hail storm which also damaged many acres of crops in the state during January. Hail storm also damaged wheat and orange standing crops in Vidarbha and Jowar, Paddy, Sunflower and Groundnut crops in Karnataka.

3.2. *February*

3.2.1. *Weather and associated synoptic features*

There were 10 western disturbances (including 2 induced low pressure areas and 1 induced cyclonic circulation), 1 other cyclonic circulation, 7 troughs in easterlies and 1 trough/wind discontinuity which affected weather in India during the month of February. Details of these systems are given in Table 3.

Rain/snow occurred either *at most places* or *at many places* on 5 days in Jammu & Kashmir and on 1 day in Uttaranchal and either *at a few places* or *at isolated places* on 4 to 6 days in Himachal Pradesh and Jammu & Kashmir. Rain or thundershowers occurred either *at most places* or *at many places* on 1 to 3 days in Andaman & Nicobar Islands, Arunachal Pradesh, Assam & Meghalaya, Sub-Himalayan West Bengal & Sikkim, Orissa, Jharkhand, Punjab and Himachal Pradesh and either *at a few places or at isolated* places on 10 to 11 days in Andaman & Nicobar Islands, Arunachal

Pradesh and Sub-Himalayan West Bengal & Sikkim; on 4 to 6 days in Assam & Meghalaya, Orissa, coastal Andhra Pradesh, Tamil Nadu and Kerala and on 1 to 3 days in Nagaland-Manipur-Mizoram-Tripura, Gangetic West Bengal, Jharkhand, Bihar, Uttar Pradesh, Haryana, Punjab, west Rajasthan, Madhya Maharashtra, Marathwada, Vidarbha, Chattisgarh, Telangana, Rayalaseema, coastal & south interior Karnataka and Lakshadweep. *Very heavy rain* occurred on one day in Andaman & Nicobar Islands. *Heavy rain* also occurred on one day each in Andaman & Nicobar Islands and Tamil Nadu.

3.2.2. *Monthly rainfall*

Monthly rainfall was *excess* in 2 *viz.*, Andaman & Nicobar Islands and Telangana; *normal* in 2, *viz.*, Assam & Meghalaya, Chattisgarh and *deficient* in 4, *viz.*, Sub-Himalayan West Bengal & Sikkim, Orissa, Jammu & Kashmir and coastal Andhra Pradesh. It was *scanty* in rest of the 23 meteorological sub-divisions and no rain occurred over the remaining 5 meteorological sub-divisions; comprising east Rajasthan, west Madhya Pradesh, Gujarat State and Konkan & Goa.

Sub-divisionwise percentage departure and principal amounts of rainfall for the month of February are given in Tables 1 and 4 respectively.

3.2.3. *Temperature*

Cold day conditions prevailed on 1 to 2 days in some parts of west Uttar Pradesh, Haryana, Punjab and Rajasthan. *Cold wave conditions* prevailed on 4 to 5 days in some parts of Jharkhand, west Rajasthan, west Madhya Pradesh, Gujarat Region and on 1 to 3 days in some parts of Orissa, Bihar, Uttar Pradesh, Uttaranchal, Punjab, Jammu & Kashmir, east Rajasthan, east Madhya Pradesh, Madhya Maharashtra, Marathwada, Vidarbha, Chattisgarh and Telangana. Night temperatures were *appreciably* to *markedly below normal* on 10 to 13 days in some parts of Orissa, Chattisgarh and Tamil Nadu; on 4 to 7 days in some parts of Assam & Meghalaya, Jharkhand, Bihar, east Uttar Pradesh, Haryana, Punjab, Rajasthan, west Madhya Pradesh, Gujarat Region, Vidarbha, Andhra Pradesh and south interior Karnataka and on 1 to 3 days in some parts of Nagaland-Manipur-Mizoram-Tripura, West Bengal & Sikkim, west Uttar Pradesh, Uttaranchal, Jammu & Kashmir, east Madhya Pradesh, Saurashtra & Kutch, Madhya Maharashtra, Marathwada, north interior Karnataka and Kerala. Otherwise, the night temperatures were generally *appreciably* to *markedly above normal* on many days over most parts of the country.

During the month, the lowest minimum temperature of 0.6° C was recorded at Amritsar (Punjab) on 5 February 2004.

3.2.4. *Disastrous weather events and damage*

No significant disastrous weather event was reported during the month.

Appendix

Definitions of the terms given in '*Italics*'

Rainfall

Excess	-	percentage departure from normal rainfall is + 20% or more.
Normal	-	percentage departure from normal rainfall is from –19 % to + 19 %.
Deficient	-	percentage departure from normal rainfall is from –20 % to –59 %.
Scanty	-	percentage departure from normal rainfall is from –60 % to –99 %.
At most places	-	75 % or more stations of a meteorological sub-division reporting at least 2.5 mm rainfall.
At many places	-	51% to 74 % stations of a meteorological sub-division reporting at least 2.5 mm rainfall.
At a few places	-	26 % to 50% stations of a meteorological sub-division reporting at least 2.5 mm rainfall.
At isolated places	-	25% or less stations of a meteorological sub-division reporting at least 2.5 mm rainfall.
Heavy rain	-	rainfall amount from 6.5 cm to 12.4 cm.
Very heavy rain	-	rainfall amount 12.5 cm or more.

Temperature

As per the revised criteria for declaring cold wave, the actual minimum temperature of a station is reduced to 'Wind Chill Effective minimum temperature' (WCTn) based on the wind chill factor using the Table given in WMO No. 331/ Technical note No. 123. For declaring cold wave etc. WCTn only should be used and when it is $\leq$ 10° C only, cold wave should be considered (this criteria does not hold for coastal stations).

Severe cold wave conditions - departure of WCTn from normal is –7° C or less for the regions where normal minimum temperature is $\geq$ 10° C and –6° C or less elsewhere.

Cold wave conditions - departure WCTn from normal minimum temperature is from –5° C to –6° C where normal minimum temperature $\geq$ 10° C and –4° C to –5° C elsewhere.

Also cold wave is declared when WCTn is $\leq$ 0° C irrespective of the normal minimum temperature for those stations

Cold day - when maximum temperature is $\leq$ 16° C in plains.

Markedly below normal - departure of minimum temperature from normal is –5° C to –6° C for the region where the normal minimum temperature is 10° C or more and –3° C to –4° C elsewhere.

Appreciably below normal - departure of minimum temperature from normal is between –3° C to –4° C for the region where the normal minimum temperature is 10° C or more.

Markedly above normal - departure of minimum temperature from normal is + 5° C to + 6° C.

Appreciably above normal - departure of minimum temperature from normal is between + 3° C to +4° C.