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Weather in India

WINTER SEASON (January-February 2008)†

1. Introduction

C*old wave** conditions continued from last December and remained to be severe over the northwestern parts of the country during January and the first 3 weeks of February. The other regions affected by *cold wave* included Madhya Pradesh, Orissa, Bihar, Jharkhand, Maharashtra, Gujarat, Andhra Pradesh and Karnataka, where it occurred during the later parts of January and all through the month of February. Northeastern parts of the country experienced *cold day* conditions on a few days. Dal lake in Srinagar was frozen in the beginning of the season and also persistent fog affected all means of transportation over North India during the period.

No intense low pressure system formed over the north Indian ocean during the period. The northeast monsoon rains ceased over Tamil Nadu[1], Kerala and adjoining areas of Andhra Pradesh and Karnataka on 10 January 2008. Western disturbances gave rise to rainfall, eventhough *scanty* quite often over north India. The seasonal rainfall was *deficient/scanty* over all the sub-divisions of northwest India except Jammu & Kashmir. *Excess* rainfall occurred over northeastern parts of the country and adjoining eastern parts during second half of January, when lower level troughs in westerlies persisted over the region for a few days. The north-south oriented troughs in the lower levels gave rise to *widespread* rainfall over the eastern half of the country during the first fortnight of February.

Though the rainfall was *deficient / scanty* over major parts of the country by the end of January, the seasonal rainfall was *excess/normal* over the eastern parts and south peninsula.

2. Seasonal rainfall (January-February)

The seasonal subdivisionwise rainfall (actual, normal and percentage departure) are given in Table 1. The percentage departures falling under various categories *viz*., *excess, normal deficient, scanty* and no rain are shown in Fig. 1.

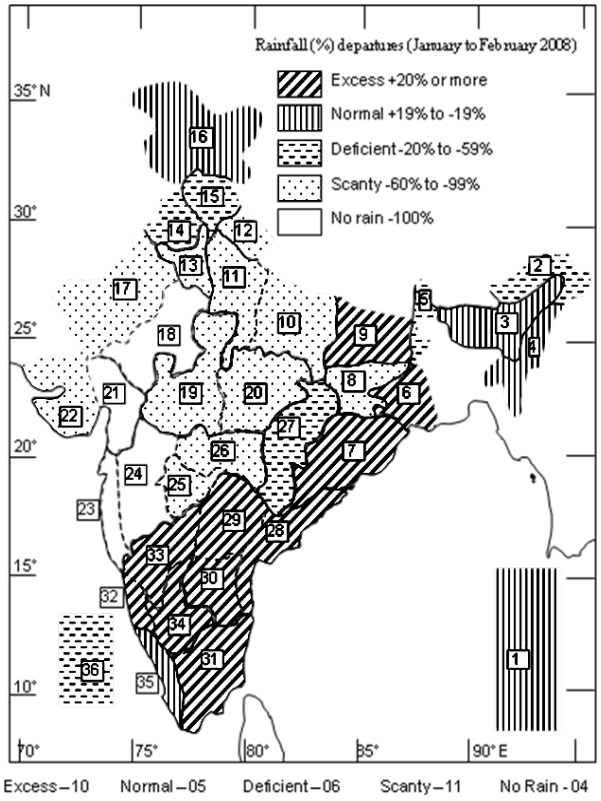

Fig. 1. Sub-divisionwise seasonal rainfall departure from normal (%) for winter season (January to February 2008). Sub-divisions are indicated by number on the map & bold letters in legend. The rainfall anomaly values for these 36 sub-divisions are indicated below :

1	–15	**7**	50	**13**	–85	**19**	–98	**25**	–94	**31**	30
2	–23	**8**	–62	**14**	–58	**20**	–85	**26**	–80	**32**	367
3	–5	**9**	55	**15**	–20	**21**	–100	**27**	–44	**33**	43
4	0	**10**	–84	**16**	2	**22**	–84	**28**	372	**34**	260
5	–27	**11**	–99	**17**	–94	**23**	–100	**29**	96	**35**	8
6	102	**12**	–78	**18**	–100	**24**	–100	**30**	236	**36**	–31

Though there had been continuous passage of western disturbances, all of them remained confined to the northern latitudes. As a result, only Jammu & Kashmir received *normal* rainfall in the northwestern parts. The *excess/normal* rainfall over the eastern half of the country, including south peninsula and Andaman & Nicobar Islands could be attributed to the troughs in the lower level easterlies during February, as mentioned earlier.

* Definitions of terms in italics other than subtitles are given in Appendix.

[1] The met. sub-division Tamil Nadu & Puducherry is abbreviated as, Tamil Nadu and Saurashtra & Kutch and Diu as Saurashtra & Kutch throughout the text.

†*Compiled by* : A. B. Mazumdar, Medha Khole and 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 2008)

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	17	56	-70	56	29	92	72	85	-15
2.	Arunachal Pradesh	73	49	49	33	89	-62	106	138	-23
3.	Assam & Meghalaya	29	18	61	14	27	-48	43	45	-5
4.	Naga., Mani., Mizo. and Tri.	31	14	113	10	27	-62	41	41	0
5.	Sub-Himalayan West Bengal & Sikkim	27	19	41	8	30	-72	36	49	-27
6.	Gangetic West Bengal	53	13	295	12	19	-35	65	32	102
7.	Orissa	33	12	172	15	20	-25	48	32	50
8.	Jharkhand	10	18	-45	5	20	-77	15	39	-62
9.	Bihar	38	17	130	6	12	-50	44	28	55
10.	East Uttar Pradesh	2	19	-90	3	14	-76	5	33	-84
11.	West Uttar Pradesh	**	20	-99	**	16	-99	**	36	-99
12.	Uttaranchal	15	60	-74	10	56	-82	26	116	-78
13.	Haryana, Chandigarh & Delhi	3	20	-87	3	16	-84	5	36	-85
14.	Punjab	15	27	-46	7	24	-72	21	51	-58
15.	Himachal Pradesh	107	100	7	47	92	-49	154	192	-20
16.	Jammu & Kashmir	105	106	0	133	128	4	239	234	2
17.	West Rajasthan	**	4	-90	**	4	-95	1	8	-94
18.	East Rajasthan	0	6	-100	0	5	-100	0	11	-100
19.	West Madhya Pradesh	**	11	-96	0	6	-100	**	17	-98
20.	East Madhya Pradesh	2	26	-93	5	19	-74	7	45	-85
21.	Gujarat region	0	1	-100	0	1	-100	0	2	-100
22.	Saurashtra & Kutch	**	1	-89	**	1	-78	**	2	-84
23.	Konkan & Goa	0	1	-100	0	**	-100	0	1	-100
24.	Madhya Maharashtra	0	2	-100	0	1	-100	0	4	-100
25.	Marathawada	**	3	-89	0	3	-100	**	7	-94
26.	Vidarbha	1	11	-90	3	11	-70	4	22	-80
27.	Chattisgarh	6	13	-57	10	14	-33	15	27	-44
28.	Coastal Andhra Pradesh	7	7	7	66	9	655	73	15	372
29.	Telangana	0	4	-100	20	6	245	20	10	96
30.	Rayalaseema	4	3	3	19	3	494	23	7	236
31.	Tamil Nadu	13	21	-37	33	14	133	46	35	30
32.	Coastal Karnataka	0	2	-100	9	**	2175	9	2	367
33.	North interior Karnataka	0	2	-100	7	3	144	7	5	43
34.	South interior Karnataka	0	2	-100	19	3	474	20	5	260
35.	Kerala	1	11	-93	30	17	77	31	28	8
36.	Lakshadweep	5	20	-73	20	17	21	25	37	-31

** 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 2008

S. No. (1)	System (2)	Duration (3)	Place of first location (4)	Direction of movement (5)	Place of final location (6)	Remarks (7)
(**A**)	*Western disturbances/ eastward moving systems*					
(*i*)	*Low pressure area*					
1.	Low pressure area	9-11	North Pakistan and neighbourhood	Northeast	Jammu & Kashmir	Low pressure area became less marked on 10. The associated upper air cyclonic circulation became less marked on 12
2.	Induced low pressure area	18	West Rajasthan and neighbourhood	Stationary	*In situ*	Became less marked on 19. It was seen as an induced cyclonic circulation over southwest Rajasthan and adjoining Pakistan on 19, which became less marked on 20
(*ii*)	*Upper air cyclonic circulations*					
1.	Upto mid tropospheric levels	3-6	North Pakistan and adjoining Jammu & Kashmir	Northeast	Jammu & Kashmir	Moved away on 7
2.	Do	6-10	Do	Do	Jammu & Kashmir & neighbourhood	Moved away on 11
3.	Do	13-15	Do	Do	Jammu & Kashmir	Moved away on 16
4.	Do	16-20	Do	Do	Jammu & Kashmir & neighbourhood	Moved away on 21
5.	Do	20-27	Do	Do	Do	Moved away on 28
6.	Do	26-30	Do	Do	Eastern parts of Jammu & Kashmir	Moved away on 31
7.	Do	30 Jan - 1 Feb	North Pakistan and neighbourhood	do	Jammu & Kashmir	Moved away on 2 February
(*iii*)	*Induced upper air cyclonic circulations*					
1.	Between 1.5 & 3.1 kms a.s.l.	4-7	Haryana and neighbourhood	Do	Do	Became less marked on 8
2.	Upto lower tropospheric levels	6-11	Southwest Rajasthan and neighbourhood	Do	Haryana and neighbourhood	Became less marked on 12
3.	Do	11-13	Punjab and neighbourhood	Stationary	*In Situ*	Became less marked on 14
4.	Do	16	Uttarakhand and neighbourhood	Do	Do	Became less marked on 17
(**B**)	*Other cyclonic circulations*					
1.	Upto lower tropospheric levels	8-13	Maldives-Lakshadweep areas	Northwest	Southeast Arabian Sea and adjoining Lakshadweep area	Became less marked on 14
2.	Do	16-18	Lakshadweep-Maldives areas	Stationary	*In situ*	Became less marked on 19
3.	Do	18-19	West Uttar Pradesh and neighbourhood	Do	Do	Became less marked on 20
4.	Do	20-23	Vidarbha and neighbourhood	Quasi Stationary	Do	Became less marked on 24
5.	Do	24-25	Southwest Rajasthan and neighbourhood	Do	Do	Became less marked on 26. A trough in the lower levels from this cyclonic circulation extended to south interior Karnataka, through west Madhya Pradesh, Madhya Maharashtra and north interior Karnataka on 25

TABLE 2(*Contd*.)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
6.	Upto mid tropospheric levels	29	Assam & Meghalaya and neighbourhood	Quasi Stationary	*In situ*	Became less marked on 30. However, a trough in mid tropospheric levels extended from Assam & Meghalaya to north Bay on 30. Became less marked on 31
7.	Do	30	Uttarakhand and neighbourhood	Do	Do	Became less marked on 31
8.	Upto lower tropospheric levels	29-30	East Madhya Pradesh and neighbourhood	Do	Do	Became less marked on 31
9.	Upto mid tropospheric levels	27-28	Southwest Bay and adjoining Tamil Nadu coast	Do	Do	Became less marked on 29
10.	Upto lower tropospheric levels	29-30	Southwest Bay and adjoining Sri Lanka	Do	Do	Became less marked on 31
(**C**)	*Troughs in westerlies*					
1.	Upto mid & upper tropospheric levels	8	Along Long. 65.0º E to the north of Lat.15.0º N at 7.6 kms a.s.l.	Do	Do	Became less marked on 9
2.	Upto mid tropospheric levels	15-23	Arunachal Pradesh to north Bay	Do	Do	Became less marked on 24. An embedded cyclonic circulation persisted over Assam & Meghalaya on 17, which became less marked on 19
3.	Upto mid & upper tropospheric levels	17-21	Along Long. 62.0º E to the north of Lat. 25.0º N at 7.6 kms a.s.l.	Eastnortheast	Along Long. 74º E to the north of Lat. 30º N	Moved away on 22
(**D**)	*Troughs in easterlies*					
1.	At sea level	1-10	Southwest and adjoining southeast Bay	West	Tamil Nadu–Sri Lanka coast	Became less marked on 11
2.	Do	4-10	Maldives-Lakshadweep areas	Do	Southeast to east central Arabia Sea	Became less marked on 11
3.	Lower levels	31 Jan-1 Feb	South Orissa to south Tamil Nadu across Chattisgarh and interior Andhra Pradesh	Quasi Stationary	Coastal Andhra Pradesh to south Tamil Nadu	Became less marked on 2 February

3. Monthly features

3.1. January

3.1.1. *Weather and associated synoptic features*

As given in Table 2, there were 16 systems in westerlies (including 2 low pressure areas, 7 upper air cyclonic circulations, 4 induced cyclonic circulations and 3 troughs in mid and upper tropospheric westerlies), 10 upper air cyclonic circulations and 3 troughs in easterlies affecting the weather over the country.

The resultant sub-divisionwise spatial rainfall distribution and frequency of *heavy* and *very heavy* rainfall are given in Table 3.

3.1.2. *Monthly rainfall*

The sub-divisionwise percentage departures of monthly rainfall are given in Table 1. Principal amounts of rainfall during the month of January are given in Table 8.

The excess rainfall over the northeastern parts of the country occurred mainly during the second half of the month, when lower level troughs in westerlies persisted over the region, for a few days.

3.1.3. *Temperature*

The dates of occurrence of *cold waves* and dates on which the minimum temperature remained *appreciably to*

TABLE 3

Rainfall distribution for the month of January 2008

S. No.	Sub–division	VHR	HR	W	Fw	Sc	Iso	Dry
1.	Andaman & Nicobar Islands	-	-	-	1	-	5	25
2.	Arunachal Pradesh	-	-	1	3	3	7	17
3.	Assam & Meghalaya	-	-	1	2	1	11	16
4.	Naga. Mani. Mizo. & Trip.	-	-	3	1	-	3	24
5.	Sub–Himalayan W. B. & Sikkim	-	-	-	2	2	6	21
6.	Gangetic West Bengal	-	1	2	1	1	2	25
7.	Orissa	-	2	1	1	2	2	25
8.	Jharkhand	-	-	-	-	1	4	26
9.	Bihar	-	1	-	-	2	1	28
10.	East Uttar Pradesh	-	-	-	-	1	3	27
11.	West Uttar Pradesh	-	-	-	-	-	-	31
12.	Uttarakhand	-	-	-	2	2	2	25
13.	Haryana, Chandigarh & Delhi	-	-	-	-	1	2	28
14.	Punjab	-	-	1	-	2	4	24
15.	Himachal Pradesh	-	-	1	3	2	9	16
16.	Jammu & Kashmir	-	2	4	4	2	4	17
17.	West Rajasthan	-	-	-	-	1	-	30
18.	East Rajasthan	-	-	-	-	-	-	31
19.	West Madhya Pradesh	-	-	-	-	-	1	30
20.	East Madhya Pradesh	-	-	-	-	-	1	30
21.	Gujarat Region	-	-	-	-	-	-	31
22.	Saurashtra & Kutch	-	-	-	-	-	1	30
23.	Konkan & Goa	-	-	-	-	-	-	31
24.	Madhya Maharashtra	-	-	-	-	-	-	31
25.	Marathwada	-	-	-	-	-	2	29
26.	Vidarbha	-	-	-	-	-	3	28
27.	Chattisgarh	-	-	-	-	2	1	28
28.	Coastal Andhra Pradesh	1	-	-	-	-	5	26
29.	Telangana	-	1	-	-	1	-	30
30.	Rayalaseema	1	1	-	-	1	3	27
31.	Tamil Nadu & Puducherry	-	-	-	-	-	2	29
32.	Coastal Karnataka	-	-	-	-	-	-	31
33.	North interior Karnataka	-	-	-	-	-	-	31
34.	South interior Karnataka	-	-	-	-	-	1	30
35.	Kerala	-	-	-	-	-	2	29
36.	Lakshadweep	-	-	-	-	-	2	29

TABLE 4

Dates of occurrence of cold wave/severe cold wave and various categories of minimum temperatures - January 2008

Sub-division		Dates (Number of days)						
S. No.	Name	Severe cold wave	Cold wave	Cold day	Appreciably to markedly below normal	Below normal	Appreciably to markedly above normal	Above normal
2.	Arunachal Pradesh	Nil	Nil	30 (1)	Nil	Nil	Nil	2 (1)
3.	Assam & Meghalaya	Nil	Nil	Nil	14, 15, 19, 22, 31 (5)	9, 19, 20 (3)	1, 7, 9, 10, 12, 14, 16, 18, 21, 25, 27 (11)	2-6, 17, 28 (7)
4.	Naga., Mani., Mizo. and Tripura	Nil	Nil	Nil	23 (1)	20 (1)	5, 11, 13, 21, 22, 25, 27 (7)	2, 4, 6, 8, 16-18, 23, 28 (9)
5.	S. H. W. B. & Sikkim	Nil	31 (1)	25, 30 (2)	19, 31 (2)	13, 20 (2)	3, 9-11, 14, 16, 17, 21, 23 (9)	4-7, 18 (5)
6.	Gangetic West Bengal	Nil	Nil	Nil	16 (1)	28, 31 (2)	3, 10, 11, 21 (4)	Nil
7.	Orissa	2 (1)	1, 3, 19, 20, 28 (5)	Nil	2, 4, 14, 16, 17, 19, 20, 28, 29 (9)	8, 12, 19 (3)	10, 21-23, 25 (5)	7, 30 (2)
8.	Jharkhand	1, 2 (2)	3, 16, 19, 20, 28, 29 (6)	25 (1)	2, 7, 8, 14-16, 19, 29, 31 (9)	4, 6, 12, 15, 18 (5)	21, 23 (2)	11, 21 (2)
9.	Bihar	2 (1)	1, 15, 22 (3)	25 (1)	1, 6, 13, 22, 29, 31 (6)	3, 7, 14, 15, 19, 26, 28 (7)	10, 11, 21 (3)	4, 23, 25 (3)
10.	East Uttar Pradesh	Nil	1, 12, 15, 21, 22, 28 (6)	Nil	1, 2, 5, 6, 12, 16, 19, 21, 22, 27, 28, 31 (12)	4, 7, 13, 15, 26, 29, 30 (7)	8, 9, 10, 11, 18 (5)	3, 8, 11, 17, 23 (5)
11.	West Uttar Pradesh	2 (1)	3, 21-23, 28 (5)	Nil	1, 13, 21-23, 27, 31 (7)	2, 14, 15, 29, 30 (5)	9, 10, 11, 17, 18 (5)	6, 11 (2)
12.	Uttarakhand	26, 27, 30, 31 (4)	21, 22, 25, 26, 31 (5)	Nil	12, 13, 21, 23, 29 (5)	11 (1)	6, 17-19 (4)	Nil
13.	Haryana, Chandigarh & Delhi	1-3, 12, 22, 23, 27, 28, 30, 31 (10)	3, 4, 12, 21, 25, 26, 28, 29 (8)	Nil	12, 15, 29 (3)	13, 14 (2)	5-7, 9-11, 16-20 (11)	Nil
14.	Punjab	1-3, 12, 21-23, 26, 27, 30, 31 (11)	3, 4, 12, 13, 15, 21, 25, 26, 28, 29 (10)	Nil	5, 14, 16, 19, 20 (5)	11, 13 (2)	6, 9, 10, 17, 18 (5)	Nil
15.	Himachal Pradesh	27, 31 (2)	21, 23, 25, 26, 30, 31 (6)	Nil	22 (1)	11, 28 (2)	6, 8-10, 16 (5)	7 (1)
16.	Jammu & Kashmir	1, 2, 21, 22, 26, 27 (6)	1, 3, 13, 21, 23, 25, 28-31 (10)	Nil	14 (1)	4, 12, 13, 28 (4)	8, 16, 20 (3)	5, 7, 9, 10, 17, 18 (6)
17.	West Rajasthan	2-4, 21-23, 27 (7)	1, 3, 12, 14, 21, 23, 25, 26, 30, 31 (10)	Nil	1, 12, 21, 22, 30 (5)	2, 13, 28 (3)	6, 7, 9, 10, 16-20, 29 (10)	Nil
18.	East Rajasthan	21, 22, 23, 26 (4)	1, 3, 4, 12, 13, 21, 23, 28, 30, 31 (10)	Nil	1, 4, 5, 12, 15, 21, 22, 30 (8)	2, 14, 26 (3)	6, 7, 9-11, 16-18, 29 (9)	Nil

TABLE 4 (*Contd*.)

S. No.	Sub-division Name	Dates (Number of days) Severe cold wave	Cold wave	Cold day	Appreciably to markedly below normal	Below normal	Appreciably to markedly above normal	Above normal
19.	West Madhya Pradesh	21-23, 25, 31 (5)	1, 4,14, 17, 21-23, 25-29, 31 (13)	10 (1)	1, 16, 21, 26, 29-31 (7)	5, 12, 14, 16, 19 (5)	6-11, 17, 18 (8)	20 (1)
20.	East Madhya Pradesh	21 (1)	1, 14, 21, 23, 27-29, 31 (8)	Nil	1, 2, 16, 21, 22, 26, 30 (7)	12, 14, 15 (3)	4, 6-11 (7)	3, 20 (2)
21.	Gujarat Region	Nil	4, 23, 25-28, 31 (7)	Nil	1, 21, 22, 25, 26, 31 (6)	2, 12, 13, 15, 29 (5)	6-10, 17, 18, 20 (8)	3, 13, 14 (3)
22.	Saurashtra & Kutch	2, 30 (2)	1, 3, 4, 21, 22, 27, 29-31 (9)	Nil	1, 2, 5, 21-23, 25, 31 (8)	12, 13, 26 (3)	6-10, 17, 18, 20, 30 (9)	13, 14 (2)
23.	Konkan & Goa	Nil	Nil	26, 27 (2)	2, 3, 21, 23, 25, 26, 28-31 (10)	1, 4, 6, 7, 22, 23, 25, 29, 30 (9)	12, 16-18 (4)	10, 18 (2)
24.	Madhya Maharashtra	27, 28 (2)	26, 28, 29, 31 (4)	Nil	2, 6, 18, 22, 23, 25, 30, 31 (8)	7, 9, 10, 12, 13, 18, 20, 21, 29, 30 (10)	1, 5, 14 (3)	4, 6-9, 11, 17, 18, 30 (9)
25.	Marathwada	Nil	27-29 (3)	Nil	18, 19, 25, 26 (4)	17, 20, 30, 31 (4)	1, 3, 4, 7, 10-12, 14, 22 (9)	2, 6, 8, 16, 18, 30 (6)
26.	Vidarbha	29 (1)	25, 27, 28, 31 (4)	Nil	25-27, 29 (4)	12, 17-20, 23, 30 (7)	3, 22 (2)	2, 6-8, 10, 11 (6)
27.	Chattisgarh	Nil	Nil	Nil	16, 31 (2)	2, 5, 14-16, 19, 20, 29 (8)	7, 22, 23, 26, 27 (5)	6, 8-11, 14, 15, 21 (8)
28.	Coastal Andhra Pradesh	Nil	Nil	4, 5 (2)	3, 5, 11 (3)	2, 6, 9, 10 (4)	1, 19, 20, 26, 27, 31 (6)	13, 16, 17, 22, 23, 25, 28, 30 (8)
29.	Telangana	Nil	10, 19, 28 (3)	Nil	9, 17, 18, 27, 29 (5)	5, 8-10 (4)	1, 3, 23, 25, 26 (5)	2, 22, 31 (3)
30.	Rayalaseema	Nil	9, 21 (2)	Nil	4, 7, 9, 11, 14, 16-18, 27, 28 (10)	2, 5, 11, 21, 22 (5)	Nil	22 (1)
31.	Tamil Nadu	Nil	Nil	Nil	11, 13, 16, 18, 19 (5)	1-3, 6-10, 14, 17, 19, 25 (12)	1, 12, 26, 28, 31 (5)	4, 5, 7, 15, 22, 27, 29, 30 (8)
32.	Coastal Karnataka	Nil	Nil	Nil	6, 18, 26, 27 (4)	3, 4, 28, 30 (4)	1 (1)	5, 8 (2)
33.	North interior Karnataka	Nil	8, 18, 21, 28, 31 (5)	Nil	11, 18, 22, 26, 27, 29, 30 (7)	6, 9, 25 (3)	Nil	Nil
34.	South interior Karnataka	Nil	17, 18, 28 (3)	Nil	4, 6, 8, 9, 14, 18, 19-23, 26, 27, 29 (14)	6, 7, 12, 25 (4)	5, 15 (2)	23 (1)
35.	Kerala	Nil	Nil	Nil	3, 7, 14, 16, 17 (5)	2, 4, 9, 10, 19 (5)	12 (1)	30 (1)

TABLE 5

Details of the weather systems during February 2008

S. No.	System	Duration	Place of first location	Direction of movement	Place of final location	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)
(**A**)	*Western Disturbances/ eastward moving systems*					
(*i*)	*Low pressure area*					
1.	Induced low pressure area	22	Central Pakistan and adjoining west Rajasthan.	Eastnortheast	-	Less marked on 23. Associated cyclonic circulation extended upto 1.5 kms a.s.l. over Haryana and neighbourhood on 23 & 24 and became less marked on 25
(*ii*)	*Upper air cyclonic circulations*					
1.	Upto mid tropospheric levels	2-9	North Pakistan and adjoining Afghanistan.	Northeast	Jammu & Kashmir and neighbourhood	Moved away on 10
2.	Do	10-12	Pakistan and adjoining Jammu & Kashmir	Do	Do	Moved away on 13
3.	Do	13-15	Pakistan and neighbourhood	Do	Do	Moved away on 16
4.	Do	16-17	North Pakistan and adjoining Jammu & Kashmir	Do	Do	Moved away on 18
5.	Do	20-21	Jammu & Kashmir and adjoining north Pakistan	Do	Do	Moved away on 22
6.	Do	25-27	North Pakistan and adjoining Jammu & Kashmir	Do	Eastern parts of Jammu & Kashmir	Moved away on 28
7.	Do	27-28	Do	Do	Do	Moved away on 1 March
8.	Do	29 Feb-6 Mar	Do	Do	Do	Moved away on 7 March
(*iii*)	*Induced cyclonic circulations*					
1.	Upto lower tropospheric levels	3-6	Rajasthan and neighbourhood	Do	West Uttar Pradesh and neighbourhood	Less marked on 7
2.	Do	6	West Rajasthan and neighbourhood	Stationary	*In situ*	Less marked on 7
3.	Do	7-10	Central Pakistan and adjoining Punjab	Northeast	Punjab and adjoining central Pakistan	Less marked on 11
4.	Do	9	Haryana and neighbourhood	Stationary	*In Situ*	Less marked on 10
5.	Do	10-11	Haryana and neighbourhood	Do	Do	Less marked on 12
6.	Do	18-20	Punjab and neighbourhood	Stationary	Do	Less marked on 21

TABLE 5 (*Contd*.)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
(**B**)	*Other Upper air cyclonic circulations*					
1.	Upto Mid tropospheric levels	5-9	Assam & Meghalaya	Stationary	*In situ*	Less marked on 10
2.	Upto lower tropospheric levels	8	East Madhya Pradesh and neighbourhood	Do	Do	Less marked on 9
3.	Do	10-13	East central Arabian sea off Maharashtra coast	East	Madhya Maharashtra and neighbourhood	Less marked on 14
4.	Do	13-14	Lakshadweep and adjoining Kerala	Quasi Stationary	Lakshadweep and adjoining Maldives area	Less marked on 15
5.	Upto Mid tropospheric levels	14-17	Arunachal Pradesh, Assam & Meghalaya and neighbourhood.	Do	Do	Less marked on 18
6.	Upto lower tropospheric levels	14-18	South Tamil Nadu and adjoining Kerala	West	Lakshadweep and neighbourhood	Less marked on 19. A trough from this system extended to Madhya Maharashtra during the period
7.	Do	18-20	Jharkhand and neighbourhood	North	Bihar and neighbourhood	Less marked on 21
8.	Do	20	Orissa and neighbourhood	Stationary	*In situ*	Less marked on 21
9.	Do	20	South Tamil Nadu and adjoining Sri Lanka	Do	*In situ*	Less marked on 21
10.	Do	20 Feb-2 Mar	Lakshadweep and neighbourhood	Do	Do	Less marked on 3 March
11.	Do	27-28	Assam & Meghalaya	Do	Do	Less marked on 29
12.	Do	24-25	Sri-Lanka and neighbourhood	Do	Do	Less marked on 26
(**C**)	*Trough in the easterlies*					
1.	At sea level	27-28	Southeast Bay and adjoining Andaman sea	Stationary	*In situ*	Less marked on 29
(**D**)	*Trough in the westerlies*					
1.	Mid & upper tropospheric levels	6-8	Along Long. 67.0º E to the north of Lat. 30.0º N at 7.6 kms a.s.l.	Northeast	Along Long 72.0º to the north of Lat. 25.0º	Moved away on 9
2.	Upper tropospheric levels	27	Along Long. 82.0º to the north of Lat. 30.0º N at 7.6 kms a.s.l.	Eastnortheast	Eastern parts of Jammu & Kashmir	Less marked on 28
(**E**)	*Wind discontinuity*					
1.	Lower levels	7-11	Vidarbha to coastal Karnataka through north interior Karnataka	Oscillatory	Sub-Himalayan West Bengal & Sikkim to Kerala	Less marked on 12

TABLE 6

Rainfall distribution for the month of February 2008

S. No.	Sub–division	VHR	HR	W	Fw	Sc	Iso	Dry
1.	Andaman & Nicobar Islands	-	1	-	2	2	7	18
2.	Arunachal Pradesh	-	-	-	1	6	7	15
3.	Assam & Meghalaya	-	-	-	-	2	10	17
4.	Naga. Mani. Mizo. & Tripura	-	-	-	1	-	4	24
5.	Sub-Himalayan W. B. & Sikkim	-	-	-	1	1	11	16
6.	Gangetic West Bengal	-	-	1	1	2	1	24
7.	Orissa	-	-	-	1	-	11	17
8.	Jharkhand	-	-	-	1	1	-	27
9.	Bihar	-	-	-	1	-	1	27
10.	East Uttar Pradesh	-	-	-	-	1	1	27
11.	West Uttar Pradesh	-	-	-	-	-	-	29
12.	Uttarakhand	-	-	-	-	1	2	26
13.	Haryana Chnd. & Delhi	-	-	-	2	1	-	26
14.	Punjab	-	-	-	2	1	6	20
15.	Himachal Pradesh	-	-	4	3	2	-	20
16.	Jammu & Kashmir	-	1	3	5	-	6	15
17.	West Rajasthan	-	-	-	-	-	-	29
18.	East Rajasthan	-	-	-	-	-	-	29
19.	West Madhya Pradesh	-	-	-	-	-	-	29
20.	East Madhya Pradesh	-	-	-	-	-	3	26
21.	Gujarat Region	-	-	-	-	-	-	29
22.	Saurashtra & Kutch	-	-	-	-	-	1	28
23.	Konkan & Goa	-	-	-	-	-	-	29
24.	Madhya Maharashtra	-	-	-	-	-	-	29
25.	Marathwada	-	-	-	-	-	-	29
26.	Vidarbha	-	-	-	-	1	2	26
27.	Chattisgarh	-	-	-	-	3	3	23
28.	Coastal Andhra Pradesh	1	3	1	2	3	1	22
29.	Telangana	-	1	-	1	1	5	22
30.	Rayalaseema	-	-	-	-	1	5	23
31.	Tamil Nadu & Puduchhery	3	4	-	-	2	13	14
32.	Coastal Karnataka	-	1	-	-	1	4	24
33.	North interior Karnataka	-	1	-	-	-	5	24
34.	South interior Karnataka	-	1	-	-	2	7	20
35.	Kerala	-	1	-	1	2	13	13
36.	Lakshadweep	-	-	-	-	-	6	23

TABLE 7

Dates of occurrence of cold wave/severe cold wave and various categories of minimum temperatures - February 2008

Sub-division		Dates (Number of days)						
S. No.	Name	Severe cold wave	Cold wave	Cold day	Appreciably to markedly below normal	Below normal	Appreciably to markedly above normal	Above normal
2.	Arunachal Pradesh	Nil	Nil	Nil	Nil	17 (1)	Nil	Nil
3.	Assam & Meghalaya	Nil	2, 13 (2)	3, 4, 6 (3)	1-4, 11, 12, 14-18, 22, 27 (13)	1, 6, 13, 20-23, 28, 29 (9)	10, 24, 26 (3)	7, 9, 25 (3)
4.	Naga., Mani., Mizo. and Tripura	Nil	14, 15 (2)	Nil	2-5, 16, 17 (6)	12, 24 (2)	8, 10, 26 (3)	Nil
5.	S. H. W. B. & Sikkim	13 (1)	1, 14, 16 (3)	Nil	2-6, 12, 15, 20, 22 (9)	21, 23, 28 (3)	8, 9 (2)	25, 29 (2)
6.	Gangetic West Bengal	Nil	14, 15 (2)	Nil	2-4, 15, 16, 22 (6)	4, 13, 21 (3)	6-9, 19, 25, 26 (7)	Nil
7.	Orissa	Nil	15, 16 (2)	Nil	1-4, 11, 14-18, 20, 22, 23, 28, 29 (15)	12, 23, 24, 27 (4)	6, 9, 13, 20, 25 (5)	7, 10, 26 (3)
8.	Jharkhand	2, 14, 15, 18 (4)	2, 11, 12, 16, 17 (5)	3 (1)	1, 11, 13, 16-18, 27, 28 (8)	4, 13, 18, 21, 22 (5)	6, 7, 9, 24 (4)	25, 26 (2)
9.	Bihar	2 (1)	1, 2, 12-15 (6)	3 (1)	2, 10, 11, 15, 16, 27, 28 (7)	4, 20, 21, 26 (4)	6-9, 24 (5)	5 (1)
10.	East Uttar Pradesh	1, 2, 14 (3)	2, 3, 10, 12, 13, 15, 16, 27, 28 (9)	4 (1)	3, 10-12, 14, 16, 17, 21, 28, 29 (10)	1, 7, 9, 20, 26, 27 (6)	6-8, 24 (4)	23, 25 (2)
11.	West Uttar Pradesh	Nil	1, 2, 13 (3)	Nil	9-11,15 (4)	4, 20, 24 (3)	24 (1)	6, 22, 23, 29 (4)
12.	Uttarakhand	1 (1)	8, 12, 13 (3)	3 (1)	4, 5, 11, 14, 15, 18, 26 (7)	10 (1)	29 (1)	5, 17, 21, 22 (4)
13.	Haryana, Chandigarh & Delhi	1, 2, 10, 11, 14 (5)	1, 9, 10, 12, 13, 20, 27 (7)	8 (1)	4, 6, 15, 18, 20 (5)	7, 18, 24-26, 28 (6)	22-24 (3)	3, 17, 21 (3)
14.	Punjab	1, 2, 9-14 (8)	1, 6, 10, 12, 15, (5)	4, 5 (2)	4, 6, 16, 19, 20, 27 (6)	3, 7, 18, 26, 28 (5)	23 (1)	24 (1)
15.	Himachal Pradesh	Nil	8, 12 (2)	Nil	2, 6, 11 (3)	4, 5, 7, 13, 25 (5)	23, 28, 29 (3)	16, 17, 21 (3)
16.	Jammu & Kashmir	1, 7, 9-11, 13 (6)	2, 8, 12, 14, 15 (5)	Nil	6, 20, 26 (3)	2, 5, 27 (3)	20, 22, 23, 28 (4)	17, 18, 21 (3)
17.	West Rajasthan	1, 7, 9-14 (8)	6, 12-14 (4)	4, 5 (2)	2, 4, 6, 13, 15 (5)	3, 7, 17, 25-27 (6)	18, 20-24, 28, 29 (8)	2 (1)
18.	East Rajasthan	9-11, 14, 16 (5)	1, 6-8, 12-15 (8)	5 (1)	2, 6, 13, 15, 16, 18, 20, 26, 27 (9)	3, 4, 7, 17-19 (6)	21-24, 28, 29 (6)	2 (1)
19.	West Madhya Pradesh	1, 2, 10-14 (7)	1, 2, 6-9, 12-14, 16, 21, 26-29 (15)	4, 5 (2)	3, 5, 6, 15, 16, 18-21, 27, 29 (11)	28 (1)	22-24 (3)	3 (1)
20.	East Madhya Pradesh	1, 2, 11, 13, 14 (5)	1, 2, 8, 10, 12-15, 21 (9)	Nil	7, 16, 20-22 (5)	4 (1)	5, 6, 8, 23-25 (6)	Nil
21.	Gujarat Region	9-11 (3)	1, 7, 9, 10, 12-14, 18 (8)	4, 6 (2)	1, 2, 4-6, 8, 12-18, 20-22, 26-29 (20)	3, 24, 28 (3)	3, 23 (2)	3 (1)
22.	Saurashtra & Kutch	5, 7-11, 14 (7)	1, 12, 13, 25-27, 29 (7)	4, 15 (2)	1, 4-6, 12-14, 20, 26-28 (11)	2, 3, 18, 24, 28 (5)	3, 17, 19, 21-23 (6)	3, 18 (2)
23.	Konkan & Goa	5 (1)	7-9 (3)	1, 5, 6, 8-10 (6)	1, 2, 4, 8, 11, 12, 18, 20 (8)	7, 9, 25, 26 (4)	17 (1)	14, 16, 17 (3)
24.	Madhya Maharashtra	5, 9, 10 (3)	1, 2, 6-8, 29 (6)	5 (1)	2, 6, 10, 26, 29 (5)	3, 4, 11, 25, 28 (5)	12-17, 22-24 (9)	21, 25, 27, 28 (4)
25.	Marathawada	1, 2 (2)	Nil	Nil	1, 10, 19, 27, 29 (5)	5, 9, 18, 26, 28 (5)	12, 13, 15, 17, 23, 24 (6)	12, 16, 19 (3)

TABLE 7 (*Contd.*)

Sub-division No	Name	Dates (Number of days)						
		Severe cold wave	Cold wave	Cold Day	Appreciably to markedly below normal	Below normal	Appreciably to markedly above normal	Above normal
26.	Vidarbha	2 (1)	1, 2, 11, 14, 21, 27 (6)	3 (1)	3, 8, 10, 13, 15, 20, 21, 27-29 (10)	4-7, 9, 12, 22, 25, 26 (9)	Nil	6, 11, 24 (3)
27.	Chattisgarh	2 (1)	1, 10, 11, 13, 14, 22 (6)	3 (1)	3, 15-17, 20, 22, 23, 27, 28 (9)	12, 21, 26 (3)	4-8, 13 (6)	24, 25 (2)
28.	Coastal Andhra Pradesh	Nil	Nil	Nil	Nil	25 (1)	2-5, 8-14, 22 (12)	1, 3, 6, 7, 12, 14-16, 19, 21, 23, 26-28 (14)
29.	Telangana	2 (1)	Nil	Nil	20, 28 (2)	1 (1)	3-6, 8, 9, 11, 12, 13, 19-22, 24, 25 (15)	3, 5, 7, 16, 26 (5)
30.	Rayalaseema	Nil	Nil	Nil	1, 20, 22, 26, 28, 29 (6)	22, 24 (2)	3, 4, 6, 8-11, 13, 14 (9)	3, 5, 7, 16 (4)
31.	Tamil Nadu	Nil	Nil	Nil	18, 19, 25, 26, 28 (5)	19, 20, 24, 27 (4)	2, 3, 4, 8-15 (11)	1, 3, 5, 9, 12, 14-17, 23 (10)
32.	Coastal Karnataka	Nil	Nil	Nil	8, 9 (2)	1-3, 6, 10, 21, 29 (7)	10, 15, 16 (3)	13 (1)
33.	North interior Karnataka	Nil	Nil	Nil	1-3, 28 (4)	4, 6, 17, 24 (4)	11, 13, 16 (3)	22 (1)
34.	South interior Karnataka	Nil	28 (1)	Nil	3, 26-28 (4)	2, 6, 17, 19, 21, 24 (6)	10-13 (4)	4, 22 (2)
35.	Kerala	Nil	Nil	Nil	Nil	Nil	12, 17 (2)	14, 19 (2)

markedly above/below normal as well as *above/below normal* are given in Table 4. Same date appearing in two different columns of sub-divisions may be reckoned as occurrence of that category over parts of the sub-divisions. Minimum temperatures were normal for the rest of the days.

The month's and the season's lowest minimum temperature over the plains was -2° C recorded at Amritsar (Punjab) on 22 January 2008 and at Amritsar and Ludhiana (Punjab) on 24 January 2008.

3.1.4. *Disastrous weather events and damage*

Severe Cold wave claimed the lives of 77 people in Uttar Pradesh, 19 in Bihar, 8 in Gujarat, 5 in Jammu & Kashmir, 4 in Punjab, 2 in Himachal Pradesh and one in Chandigarh. Snow and avalanche claimed the lives of 6 soldiers in Jammu & Kashmir. Dal Lake was frozen in the beginning of the month and fog continued to affect all means of transportation over north India. Heavy snowfall in Arunachal Pradesh towards the end of the month affected life and disrupted communication.

3.2. *February*

3.2.1. *Weather and associated synoptic features*

As is seen from Table 5, there were 17 eastward moving systems (including one induced low pressure area, 8 upper air cyclonic circulations, 7 induced cyclonic circulations and 2 troughs in westerlies), 12 upper air cyclonic circulations, one trough in the easterlies and a trough/wind discontinuity which affected the weather over the country during month of February.

The resultant sub-divisionwise spatial rainfall distribution and frequency of *heavy* and *very heavy* rainfall are given in Table 6.

3.2.2. *Monthly rainfall*

Sub-divisionwise percentage departure and principal amounts of rainfall for the month of February are given in Tables 1 and 8 respectively.

In contrast to the rainfall distribution in January, the excess rainfall occurred over the south peninsula in February. This rainfall occurred mainly during the first fortnight of the month in the presence of perturbations in the form of cyclonic circulations and troughs in the lower levels in the equatorial easterly wave.

3.2.3. *Temperature*

The dates of occurrence of *cold waves* and dates on which the minimum temperature remained *appreciably to markedly above/below normal* as well as *above/below normal* are given in Table 7.

TABLE 8

Principal amounts of rainfall in cm over different stations for the months of January and February 2008

Date	January	February
(1)	(2)	(3)
1.	Nil	Maya Bandar 8, Port Blair, Passighat & North Lakhimpur 1 each
2.	Car Nicobar 3, Long Islands, Port Blair & Akola 1 each	Mayabandar 4, Long Islands 3
3.	Betul 2, Murtizapur 1	Mayabandar 6, Hut Bay 4, Puducherry 3, Port Blair 2, Maya Bandar, Bhuntar, Sujanpurtira, Amritsar, Sundernagar, Batote, Banihal & Katra 1 each
4.	Vedaranniyam 7, Redhills 4, Chennai 3, Cuddalore 2, Ramanathapuram & Adirampattinam 1 each	Quazigund & Batote 3 each, Banihal, Bhaderwah & Kukernag 2 each, Coonoor, Alapuzha, Sujanpurtira, Tehri , Pathankot, Bhuntar, Kalpa, Nagrotasurian, Pandoh, Shimla, Sunibhajii, Sundernagar, Pahalgam, Katra & Suratgarh 1 each
5.	Cuddalore 15, Sirkali 11, Chidambaram 9, Panruti & Parangipettai 8 each, Puducherry, Ponneri, Satyavedu & Tada 7 each, Chennai 5, Karaikal & Tirupathi 3 each, Vellore 2, Kodaikanal 1	Banihal & Bhaderwah 3 each, Visakhapatnam, Coonoor, Tuticorin, Quazigund, Batote & Alapuzha 2 each, Jammu, Hut Bay, Jharsuguda, Awantipur, Kukernag, Pahalgam, Srinagar, Katra, Jammu City & Raipur 1 each
6.	Vandavasi & Gulmarg 3 each, Banihal, Kupwara & Perumbavur 2 each, Kalpa, Kodaikanal & Batote 1 each	Bhaderwah & Kukernag 5 each, Batote 4, Kupwara, Awantipur, Pahalgam, Quazigund & Srinagar 3 each, Minicoy, Banihal, Sundernagar & Shimla 2 each, Sambalpur, Gondia, Bramhapuri, Kasol, Pandoh, Sujanpurtira & Sunibhajji 1 each
7.	Banihal, Kupwara & Kavaratti 2 each, Bhuntar, Kukernag, Pahalgam & Quazigund 1 each	Quazigund 7, Kukernag 6, Bhaderwah 5, Srinagar, Batote & Banihal 4 each, Avantipur, Pahalgam & Tiruchendur 3 each, Kahu & Shimla 2 each, Berthin, Kasol, Malajkhand, Pathankot, Bhuntar, Sundernagar, Dehra Dun, Gondia, Champa & Minicoy 1 each
8.	Kupwara 3, Bhang, Dhundhi, Batote, Pahalgam & Banihal 1 each	Visakhapatnam 7, Batote 6, Bhaderwah 5, Ottapidaram & Banihal 4 each, Vilathikulam, Awantipur, Udhampur & Quazigund 3 each, Kovilpatti, Sathankulam, Tiruchendur, Pahalgam & Guler 2 each, Madurai, Radhapuram, Srivaikuntam, Sivakasi, Katra, Srinagar, Satna, Siddhi, Umaria, Mandla, Pathankot, Rewa, Nagrota Suriyan, Varanasi, Allahabad & Sundernagar 1 each
9.	Dhundhi 8, Solangnala 7, Bhuntar & Batote 6 each, Banihal 5, Bhang, Rampur Bhushar, Shimla & Sundernagar 4 each, Mandi, Kupwara & Katra 3 each, Nahan, Bhaderwah, Jammu, Qazigund & Pandoh 2 each, Kalka, Una, Amritsar, Ludhiana, Patiala, Ropar, Kukernag, Sri Ganganagar, Pahalgam, Srinagar, Guler, Ghamroor, Nadaun, Sujanpurtira, Una, Adampur, Amritsar, Balachur, Dhuri, Faridkot, Gurdaspur, Hoshiarpur, Mukerian, Muktsar & Nanagal 1 each	Kethi 20, Coonoor 14, Visakhapatnam 12, Ongole 11, Haripad 10, Kodaikanal, Kaikalur & Thirumayam 9 each, Tuni 8, Bheemunipatnam, Kundha Bridge, Uthagamandalam & Waltair 7 each, Kuzhithurai & Thuckalay 6 each, Sivaganga & Tirukoilur 5 each, Chamarajnagara, Peermade & Periyakulam 4 each, Mettupalayam, Periyanaikanpalayam, Pollachi, Parangipettai, Kothagiri, Alangudi, Manamadurai & Visakhapatnam 3 each, Passighat, Coimbatore Udumalpet, Karambakudi, Perungallur, Mudhukulathur, Paramakudi, Tiruppuvanam, Vilathikulam & Kochi 2 each, Palani, Eraniel, Thovalai, Gudalur Bazaar, Naduvattam, Arantangi, Pudukottai, Tiruvadanai, Villupuram, Sathur, Alappuzha, Jharsuguda, Shimla, Bhuntar, Sunder Nagar, Rampur Bushar, Pandra, Dibrugarh, North Lakhimpur, Cherrapunji, Silchar, Imphal, Gaya, Ranchi & Tuni 1 each
10.	Batote 9, Banihal 7, Katra 6, Bhaderwah & Pahalgam 5 each, Bhang & Quazigund 4 each, Rampur Bushar, Shimla & Jammu 3 each, Kupwara, Srinagar, Bhuntar, Manali, Patsio, Sunibhaji & Tehri 2 each, Kalka, Ambala, Chhachrauli, Kahu & Kukernag 1 each	Visakhapatnam 12, Ongole 11, Waltair 9, Virudhachalam, Tuni & Viru 8 each, Alangudi & Tirukoilur 7 each, Alipingal 6, Tangi & Gunpur 5 each, Purushottampur, Konni, Nimapara, Vanur, Madurai, Karambakudi, Tiruppuvanam, Gingee, Tindivanam & Puri 4 each, Minicoy, Chidambaram, Sriperumpudhur, Mettupatti, Perungallur, Thirumayam, Tiruvadanai, Tiruttani, Bhubaneswar, Paradeep & Minicoy 3 each, Kashinagar, Yegathi, Udumalpet, Palacode, Pudukottai, Ramanathapuram, Tondi, Yercaud, Adirampattinam, Uthamapalayam, Tiruchirapalli Manaparai, Thathiengarpet, Gopalpur, Nandigram, Bapatla, Kalingapatnam & Tondi 2 each, Cuddalore, Parangipettai, Dharmapuri, Kodaikanal, Chengalpattu,

TABLE 8 (*Contd*.)

(1)	(2)	(3)
		Tambaram, Usilampatti, Gudalur Bazaar, Ketti, Kothagiri, Kundha Bridge, Paramakudi, Keeranur, Valangaiman, Periyakulam, Tiruvallur, Polur, Kodavasal, Lalgudi, Vaniyambadi, Ulundurpet, Srivilliputhur, Bangalore, Punalur, Keonjhargarh, Passighat, Imphal, Kailasahar, Chandbali, Vijaywada & Anantpur 1 each
11.	Batote, Banihal, Pahalgam & Bhaderwah 2 each, Kupwara & Quazigund 1 each	Dharapuram 13, Aaddanki 11, Srivilliputtur & Ongole 9 each, Tindivanam & Tirukoilur 8 each, Perambalur 7, Bapatla, Kolar & Machilipatnam 6 each, Thondebhavi & Needamangalam 5 each, Srinivasapura, Idukki, Thirumayam, Musiri & Gingee 4 each, Challakere, Natham, Bhavani, Kamudhi, Mudukulathur & Valangaiman 3 each, Kavali, Tuni, Panambur, Toludur, Bhavanisagar, Sathyamangalam, Shenkottah, Tenkasi & Kodavasal 2 each, Bangalore, Minicoy, Visakhapatnam, Kakinada, Passighat, North Lakhimpur, Tiruppur, Gobichettipalayam, Kangeyam, Usilampatti, Mayiladuthurai, Kothagiri, Keeranur, Paramakudi, Ramanathapuram, Thiruvaiyaru, Sathanur Dam & Watrap 1 each
12.	Passighat, Dhollabazar, Chouldhowaghat & North Lakhimpur 1 each	Seetharamapuram 16, Kundha Bridge 11, Vinjamur 10, Tuticorin 9, Muthupet 8, Ongole, Badvel, Tiptur, Balehonnur & Coonoor 7 each, Jayapura, Ketti & Kothagiri 6 each, Chickmagalur 5, Pollachi, Kodaikanal & Tiruchendur 4 each, Medak, Chittampatti, Kamudhi & Srivilliputhur 3 each, Hyderabad, Uthagamandalam, Yercaud, Tiruppuvanam, Sankarankoil, Nannilam, Needamangalam, Ottapidaram & Vilathikulam 2 each, Narsapur, Kattumannarkoil, Srimushnam, Naduvattam, Jayamkondan, Salem, Valangaiman, Nanguneri, Palayamkottai, Tiruchirapalli, Chitradurga, Karipur & Srivaikuntam 1 each
13.	North Lakhimpur 1	Coonoor 12, Bimalkhed 10, Khammam, Kothagiri, Radhapuram & Narayankhed 7 each, Thovalai 6, Paravur, Bidar, Chickmagalur & Kethi 5 each, Kottigehera, Koshagumda, Mavelikara, Mahboobnagar, Mylaudy, Ambasamudram & Nanguneri 4 each, Kamalapur, Kanyakumari, Punalur, Alappuzha, Bhadrachalam, Hyderabad, Narsapur, Karambakudi & Shenkottah 3 each, Anantpur, Waltair, Ongole, Jagdalpur, Kuzhithurai & Nagercoil 2 each, Agumbe, Hanamkonda, Visakhapatnam, Thuckalay, Kundha Bridge, Uthagamandalam, Perungallur, Thirumayam, Palayamkottai & Kovilpatti 1 each
14.	Nil	Bagalkote 6, Ilkal & Biligi 4 each, Nalwatwad, Hassan, Sira, Holenarsipura, Radhapuram & Tuticorin 3 each, Paralakhemund, Kudachi, Hungud, Raichur, Kaveli, Tenkasi & Srivaikuntam 2 each, Kundha Bridge, Nanguneri, Shenkottah, Hyderabad, Bhalukpong & Punalur 1 each
15.	Nil	Subramanya 8, Tuticorin 5, Coonoor 4, Manchikere, Bhagamandala, Shikaripur, Humchadakatte, Belgaum, Myladi, Kovilpatti, Srivaikuntam, Dharmasthala, Saliya, Karkala, Thirthahalli & Tyagarthi 2 each, Nanguneri & Nagapattinam 1 each
16.	Nil	Coonoor 4, Kanchipuram 3, Ketti, Kothagiri & Kundha Bridge 2 each, Nagapattinam & Kodaikanal 1 each
17.	Banihal 5, Gulmarg 4, Bhuntar, Kalpa, Kukernag, Pahalgam, Batote, Kupwara, Bhuntar & Kalpa 2 each, Nawanshahar, Quazigund, Rampur Bushar, Srinagar & Katra 1 each	Alapuzha 5, Shikaripur 4, Piravam & Vaikam 2 each, Kozha, Mettupalayam & Car Nicobar 1 each
18.	Dhundi 15, Solangnala 9, Batote 8, Bhuntar 6, Banihal & Kupwara 5 each, Gulmarg & Katra 4 each, Pahalgam, Bhang, Kalpa, Nagrota Surian & Patsio 3 each, Mukerian, Ghamrur, Kasol, Nadaun, Rampur Bushar, Sundernagar, Sujanpurtira, Bhaderwah, Jammu, Kukernag, Quazigund & Srinagar 2 each, Berthin, Kahu, Shimla, Sunibhaji, Amritsar & Nangal 1 each	Nil

TABLE 8 (*Contd*.)

(1)	(2)	(3)
19.	Passighat 6, Batote & Jammu 2 each, Basar, Kukernag, Pahalgam, Bahraich, Tehri, Banihal, Quazigund, Bhuntar & Kalpa 1 each	Cherrapunji & Sankalan 3 each, Mellabazar & Mukteshwar 1 each
20.	Passighat 5, Kukernag 1	Jaleswar, Rajghat & Basirhat 5 each, Krishnanagar 4, Bhalukpong, A D Nagar, Digha & Panagarh 3 each, Agartala, Kailashahar & Kolkata 2 each, Sriniketan, Coochbehar, Jalpaiguri, Silchar, Cherrapunji & Minicoy 1 each
21.	Itanagar & Agartala 3 each, Passighat 2, Arundhutinagar, Kailashahar, Cherrapunji & Krishnanagar 1 each	Basar, Balasore, Alipingal, Bhubaneswar & Durgachak 2 each, Rajghat, Soro, Purusottampur, Long Islands, Kolkata & Diamond Harbour 1 each
22.	Khonsa & Passighat 2 each, Margherita & Dibrugarh 1 each	Konni & Maya Bandar 1 each
23.	Rohtak & Dehri 3 each, Patna & Gaya 2 each, Varanasi, Sabour & Nancowry 1 each	Gulmarg 3, Quazigund, Banihal, Kupwara & Kajirappally 1 each
24.	Gaya 7, Malda 5, Sabour & Dehri 4 each, Goalpara, Tikrikilla, Bhagalpur, Guwahati & Dhubri 3 each, Bhalukpong, Patna, Purnea & Shillong 2 each, Itanagar, Ambikapur, Tezpur, Cherrapunji, Cooch Behar & Ranchi 1 each	Katra & Sujanpurtira 2 each, Quazigund, Batote, Srinagar & Banihal 1 each
25.	Swampatna, Athamalik, Midnapore & Kolkata 3 each, Lakhipur 2, Daporijo, Khonsa, Silchar, Amraghat, Balasore, Imphal, Diamond Harbour, Digha, Canning Town, Keonjhargarh, Balasore, Raigarh & Kohima 1 each	NH Xing & Puthimari 2 each, Basar & Sankalan 1 each
26.	Ghatgaon 10, Sukinda 9, Jamankira & Digha 7 each, Cuttack & Balasore 5 each, Jharsuguda, Sambalpur, Keonjhargarh & Diamond Harbour 4 each, Jamshedpur, Cuttack, Puri, Kolkata, Canning Town & Haldia 3 each, Midnapore 2, Bhaderwah, Bhubaneswar, Gopalpur, Shantiniketan, Krishnanagar, Agartala, Kalpa, Raigarh & Jagdalpur 1 each	Aie NH Xing 4, Passighat & Itanagar 2 each, Nahariagan, Majbat & North Lakhimpur 1 each
27.	Tekkali 14, Palasa 9, Palakonda 8, Bhograi 7, Balasore & Digha 5 each, Haldia & Cooch Behar 4 each, Itanagar, Diamond Harbour & Canning Town 3 each, Chandbali, Paradip, Gopalpur, Puri, Kolkata, Passighat, Jiabharali, Kokrajhar, Aizwal & North Lakhimpur 2 each, Car Nicobar, Silchar, Cherrapunji, Imphal, Jalpaiguri, Cuttack & Bhubaneshwar 1 each	Bhalukpong 3, Car Nicobar 1
28.	Passighat 3, Dibrugarh & Choudowaghat 2 each, Tezu, Khonsa, Margherita & Jorhat 1 each	Ramanathapuram 11, Tuticorin 3, Khonsa, Port Blair, Kanyakumari & Pamban 1 each
29.	Daporijo, Pamban & Passighat 1 each	Long Islands 4
30.	Peerumedu, Sankarankoil, Kovilpatti & Quazigund 2 each, Bhalukpong & Choudowaghat 1 each	Nil
31.	Cuttack 5, Haldia, Guwahati, Dhubri, Canning Town & Kolkata 3 each, Kohima & Tenkasi 2 each, Passighat, Dhubri, Lakhimpur, Cherrapunji, Shillong, Imphal, Malda, Krishnanagar, Digha, Paradip, Tezpur & Puri 1 each	Nil

During the month, the lowest minimum temperature of -1° C was recorded at Amritsar on 12, 13 & 14 February 2008.

3.2.4. *Disastrous weather events and damage*

Cold wave, snowfall and subzero temperatures claimed 50 lives in Jammu & Kashmir. Also 2 people lost their lives in Vidarbha due to cold wave. In Rajasthan, 50% of rabi crops were damaged due to frost. Heavy rains caused crop loss in tobacco, groundnut, chilli, cotton and paddy in 70,000 acres amounting to a loss of approximately 650 crore Rupees in Andhra Pradesh. In Kerala, thousands of houses were submerged under flood water. Also 10 fishing boats were damaged and there was widespread damage to property.

Appendix

Definitions of the terms given in '*Italics*'

Rainfall

Excess - percentage departure from normal is + 20 % or more.

Normal - percentage departure from normal is –19 % to + 19 %.

Deficient - percentage departure from normal is –20 % to –59 %.

Scanty - percentage departure from normal is –60 % to –99 %.

Heavy rain - rainfall amount from 6.5 cm to 12.4 cm.

Very heavy rainfall - rainfall amount 12.5 cm to 24.4 cm.

At most places - 76 % or more stations of a meteorological sub-division reporting at least 2.5 mm rainfall.

At many places - 51 % to 75 % 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.

Temperatures

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 is used and when it is $\leq$ 10° C only, cold wave is considered (this criteria does not hold for coastal stations).

Severe cold wave conditions - departure of WCT_n from normal minimum temperature 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 of WCTn from normal minimum temperature is from –5° C to –6° C where normal minimum temperature > 10° C and from –4° C to –5° C elsewhere.

Also cold wave is declared when WCTn is < 0° C irrespective of the normal minimum temperature for those stations.

Cold day conditions maximum day temperature is less than 16° C over the plains.

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

Appreciably below normal - departure of minimum temperature from normal is from –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 from + 5° C to + 6° C.

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

Above normal - departure of minimum temperature from normal is + 2° C.