MAUSAM, **57**, 2 (April 2006), 363-378

Weather in India

HOT WEATHER SEASON (March – May 2005)*

1. Chief features

(*i*) During the hot weather season of 2005 not even a single storm or depression formed, unlike the past eleven years, which witnessed at least a depression (March to May) or a cyclonic storm (mostly of severe intensity in May).

(*ii*) The summer heat wave conditions had been comparatively lesser in severity, than that of the previous year. Some isolated *severe heat wave conditions*† were reported during the first and second fortnights respectively of April and May over the peninsular and northwest India.

(*iii*) Enhanced thundershower and easterly wave activity kept the heat wave conditions at bay during most of the periods of the season.

(*iv*) Under the above mentioned circumstances, the advance of southwest monsoon over the south Andaman Sea also was delayed slightly. The monsoon current reached the south Andaman Sea and the adjoining southeast Bay on 26 May.

2. Seasonal rainfall

Season's rainfall was *excess* in 10 meteorological sub-divisions *viz*., Sub-Himalayan West Bengal & Sikkim, Gangetic West Bengal, Haryana, east Rajasthan, west Rajasthan, west Madhya Pradesh, Rayalaseema, Tamil Nadu, north interior Karnataka and south interior Karnataka; normal in 11 *viz*., Arunachal Pradesh, Assam & Meghalaya, Nagaland-Manipur-Mizoram-Tripura, west Uttar Pradesh, Punjab, Jammu & Kashmir, east Madhya Pradesh, Vidarbha, Chattisgarh, coastal Andhra Pradesh and Kerala; deficient in 9, *viz*., Andaman & Nicobar Islands, Orissa, Jharkhand, Bihar, east Uttar Pradesh, Himachal Pradesh, Telangana, coastal Karnataka and Lakshadweep and *scanty* in the remaining 6 *viz*., Uttaranchal, Gujarat Region, Saurashtra & Kutch, Konkan & Goa, Madhya Maharashtra and Marathwada. Actual rainfall and its departures for each month and season as a whole are given in Table 1. Also the sub-divisional rainfall departures for the season March-May 2005 are shown in Fig. 1.

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

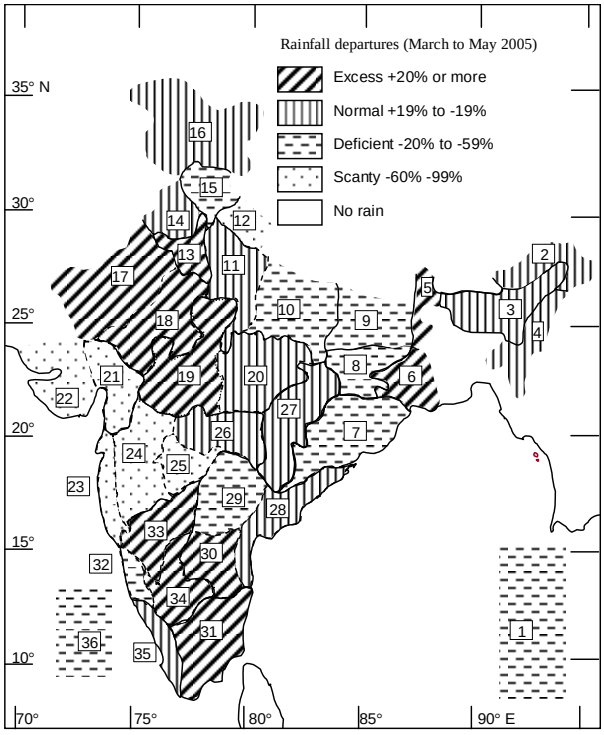

Fig. 1. Sub-divisionwise seasonal rainfall departure from normal (%) for the period (March - May 2005). 36 Sub-divisions are indicated by numbers on the map & bold letters in legend below. The rainfall anomaly values for these sub-divisions are indicated below :

1	–36	**7**	–20	**13**	55	**19**	22	**25**	–69	**31**	82
2	–12	**8**	–59	**14**	–07	**20**	11	**26**	18	**32**	–25
3	–05	**9**	–55	**15**	–44	**21**	–98	**27**	–15	**33**	29
4	05	**10**	–28	**16**	–11	**22**	–92	**28**	–09	**34**	22
5	21	**11**	09	**17**	48	**23**	–92	**29**	–22	**35**	–14
6	32	**12**	–65	**18**	30	**24**	–80	**30**	31	**36**	–44

3. Significant features during different months

3.1. *March*

3.1.1. *Weather and associated synoptic features*

The beginning of the season marked the cessation of heavy snowfall and cold wave conditions over the northern parts. Many parts of the country received thundershowers during the month.

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TABLE 1

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

S. No.	Meteorological sub – divisions	March			April			May			Season		
		Actual (mm)	Normal (mm)	Dep. (%)	Actual (mm)	Normal (mm)	Dep. (%)	Actual (mm)	Normal (mm)	Dep. (%)	Actual (mm)	Normal (mm)	Dep. (%)
1.	Andaman & Nicobar Islands	21	19	13	43	69	–37	230	373	–38	294	461	–36
2.	Arunachal Pradesh	248	158	57	205	277	–26	182	285	–36	634	719	–12
3.	Assam & Meghalaya	195	84	134	201	201	0	252	396	–36	648	681	–5
4.	Nagaland-Manipur-Mizoram-Tripura	163	65	151	83	149	–44	219	229	–5	464	443	5
5.	Sub-Himalayan West Bengal & Sikkim	122	55	124	153	117	32	244	259	–6	520	430	21
6.	Gangetic West Bengal	80	27	191	59	46	28	81	93	-13	220	167	32
7.	Orissa	27	25	8	23	35	-35	45	58	–23	95	119	–20
8.	Jharkhand	17	20	–14	4	22	–82	15	48	–68	37	90	–59
9.	Bihar	13	11	15	7	19	–64	19	57	–66	39	87	–55
10.	East Uttar Pradesh	11	10	11	1	6	–79	12	17	–32	24	33	–28
11.	West Uttar Pradesh	24	11	107	2	5	–52	5	13	–57	31	29	9
12.	Uttaranchal	32	59	–46	4	35	–89	19	62	–69	55	157	–65
13.	Haryana, Chandigarh & Delhi	39	13	192	4	7	–40	9	14	–31	53	34	55
14.	Punjab	35	27	32	7	12	–46	9	16	–42	51	54	–7
15.	Himachal Pradesh	89	115	–22	14	66	–78	34	66	–48	138	247	–44
16.	Jammu & Kashmir	173	169	2	60	100	–40	73	77	–5	307	346	–11
17.	West Rajasthan	7	4	90	5	3	42	13	10	35	25	17	48
18.	East Rajasthan	8	4	107	9	3	230	6	11	–46	22	17	30
19.	West Madhya Pradesh	9	5	91	5	2	133	3	7	–57	18	14	22
20.	East Madhya Pradesh	21	14	51	3	6	–52	7	8	–9	31	28	11
21.	Gujarat region	**	1	–99	0	1	–100	**	6	–98	**	9	–98
22.	Saurashtra & Kutch	0	1	–100	**	1	–87	**	2	–90	**	5	–92
23.	Konkan & Goa	0	**	–85	2	4	–54	1	36	–96	3	40	–92
24.	Madhya Maharashtra	1	3	–81	5	10	–49	3	28	–90	8	41	–80
25.	Marathwada	5	6	–21	4	7	–36	1	21	–93	11	33	–69
26.	Vidarbha	17	12	38	11	8	40	9	11	–21	37	31	18
27.	Chattisgarh	6	16	–62	9	17	–43	30	21	41	45	53	–15
28.	Coastal Andhra Pradesh	9	13	–30	22	22	–1	55	60	–7	86	94	–9
29.	Telangana	22	10	121	11	17	–36	11	29	–62	44	56	–22
30.	Rayalaseema	7	7	4	36	18	99	60	54	12	103	78	31
31.	Tamil Nadu	29	19	48	126	42	199	78	67	17	233	128	82
32.	Coastal Karnataka	0	4	–100	85	27	209	49	148	–67	134	179	–25
33.	North interior Karnataka	7	6	8	64	26	148	42	56	–24	113	88	29
34.	South interior Karnataka	5	9	–42	91	44	106	88	97	–10	184	150	22
35.	Kerala	28	38	–28	203	122	67	137	268	–49	368	428	–14
36.	Lakshadweep	0	13	–100	37	43	–14	93	178	–48	130	234	–44

** Indicates amounts between 0.1 to 0.4 mm. (Amounts less than 0.1 is rounded off to 0)

TABLE 2

Details of the weather systems during March 2005

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 /Eastward moving systems*					
(*i*)	*As an upper air cyclonic circulation*					
1.	Upto mid tropospheric levels	2 – 4	North Pakistan and adjoining Punjab and Jammu & Kashmir	Northeast	Jammu & Kashmir and neighbourhood	Moved away on 5
2.	Do	5 – 9	North Pakistan and adjoining Jammu & Kashmir	Do	Punjab and neighbourhood	Moved away on 10
3.	Do	10 eve – 12	North Pakistan and adjoining Jammu & Kashmir	Do	Jammu & Kashmir and adjoining Punjab	Moved away on 13
4.	Do	12 eve – 15	Central Pakistan and neighbourhood	Do	Jammu & Kashmir and neighbourhood	Moved away on 16
5.	Do	16 – 20	North Pakistan and adjoining Jammu & Kashmir	Do	Punjab and adjoining Himachal Pradesh	Moved away on 21
6.	Do	18 – 21	Northwest Rajasthan and adjoining central Pakistan	Do	West Uttar Pradesh and neighbourhood	Moved away on 22
7.	Do	20 – 25	Do	Do	Northern parts of Jammu & Kashmir	Moved away on 26
8.	Do	24 eve – 28	Northeast Afghanistan and adjoining Pakistan	Do	Jammu & Kashmir	Moved away on 29
9.	Do	29 – 31	North Pakistan and adjoining Jammu & Kashmir and neighbourhood	Do	Jammu & Kashmir and neighbourhood	Moved away on 1 April
(*ii*)	*As an induced low pressure area*					
1.	At sea level	21	Central Pakistan and adjoining west Rajasthan	–	–	Less marked on 22. However, the associated cyclonic circulation at 4.5 km a.s.l. lay over northwest Rajasthan and neighbourhood on 23 and over Gangetic West Bengal and adjoining Jharkhand on 25 and became less marked on 26
(*iii*)	*As an induced cyclonic circulation*					
1.	Upto mid tropospheric levels	5 eve – 7	Haryana, Punjab and neighbourhood	Northeast	West Uttar Pradesh and neighbourhood	Moved away on 8
2.	Do	5 – 9	Central parts of Rajasthan	Do	Do	Less marked on 10
3.	Do	8 eve – 10	South Pakistan and adjoining west Rajasthan	Do	Southwest Rajasthan	Less marked on 11
4.	Do	10 – 18	North Pakistan and adjoining areas of Punjab and northwest Rajasthan	East	Jharkhand and adjoining Gangetic West Bengal	Less marked on 19

TABLE 2 (*Contd.*)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
(**B**)	*Other upper air cyclonic circulations*					
1.	Lower tropospheric levels	22 – 24	East Uttar Pradesh and adjoining Bihar	East	Assam & Meghalaya	It lay as a trough in the lower level westerlies over the same area on 25 and became less marked on 26
2.	Do	30 Mar – 2 Apr	West Madhya Pradesh and adjoining west Uttar Pradesh	Do	Orissa and neighbourhood	Less marked on 3 April
(**C**)	*Troughs in easterly*					
1.	Trough of low (at sea level)	1 – 20	South Andaman Sea and adjoining southeast Bay	West	Maldives–Lakshadweep areas	Less marked on 21
2.	Do	1 – 9	Southwest Bay off Sri Lanka coast	Do	Maldives–Commorin areas	Became unimportant on 10
3.	Do	6 – 17	Andaman Sea and adjoining southeast Bay	Do	Southeast Arabian Sea	Became unimportant on 18
4.	Do	12 – 23	South Andaman Sea and adjoining southeast Bay	Do	Lakshadweep area and adjoining southeast Arabian Sea	Became unimportant on 24
5.	Do	24 Mar – 10 Apr	South Andaman Sea	Do	Lakshadweep and adjoining southeast Arabian Sea	Less marked on 11 April
6.	Do	30 Mar – 6 Apr	Do	Do	Sri Lanka and adjoining Commorin area	Less marked on 7 April
(**D**)	*Troughs in westerly*					
1.	Lower levels	2 – 11	Bhutan to northeast Bay	Quasi–stationary	*In situ*	Less marked on 12
2.	Mid and upper levels	12 – 17	Arunachal Pradesh to west Uttar Pradesh	Southeast	Assam & Meghalaya to west–central Bay	Less marked on 18
3.	Lower levels	20 – 21	Sub-Himalayan West Bengal & Sikkim to northwest Bay	Stationary	*In situ*	Less marked on 22
4.	Do	26 – 28	Sub-Himalayan West Bengal & Sikkim to north Bay	Do	Do	Less marked on 29
(**E**)	*Trough / wind discontinuity*					
1.	At lower tropospheric levels	1 – 31	Kerala to Gujarat Region	Oscillatory	Tamil Nadu to Assam & Meghalaya	Continued in April 2005

TABLE 3

Details of the weather systems during April 2005

S. No. (1)	System (2)	Duration (3)	Place of first location (4)	Direction of movement (5)	Final location (6)	Remarks (7)
(**A**)	*Western disturbances /Eastward moving systems*					
(*i*)	*As an upper air cyclonic circulation*					
1.	Upto mid tropospheric levels	1 – 2	North Pakistan and adjoining Jammu & Kashmir	Northeast	Jammu & Kashmir and neighbourhood	Moved away on 3
2.	Do	2 eve – 3	Northeast Afghanistan and adjoining north Pakistan	Do	North Pakistan and adjoining Jammu & Kashmir	Moved away on 4
3.	Do	5 – 7	North Pakistan and adjoining Jammu & Kashmir	Do	Eastern parts of Jammu & Kashmir	Moved away on 8
4.	Do	9 – 12	North Pakistan and adjoining areas of Rajasthan, Punjab and Jammu & Kashmir	Do	Jammu & Kashmir and neighbourhood	Moved away on 13
5.	Do	12 – 15	North Pakistan and adjoining Jammu & Kashmir	Do	North Pakistan and adjoining Jammu & Kashmir	Moved away on 16
6.	Do	14 eve – 16	Northeast Afghanistan and adjoining Pakistan	Do	Jammu & Kashmir and adjoining north Pakistan	Moved away on 17
7.	Do	16 – 18	North Pakistan and adjoining Jammu & Kashmir	Do	Northem parts of Jammu & Kashmir	Moved away on 19
8.	Do	19 – 21	Northeast Afghanistan and adjoining north Pakistan	Do	Jammu & Kashmir and neighbourhood	Moved away on 22
9.	Do	22 – 26	North Pakistan and adjoining Jammu & Kashmir	Do	Uttaranchal and neighbourhood	Moved away on 27
10.	Do	26 Apr – 1 May	Do	Do	Jammu & Kashmir and neighbourhood	Moved away on 2 May
11.	Do	28 Apr – 2 May	Do	Do	East Uttar Pradesh and neighbourhood	Less marked on 3 May
(*ii*)	*As an induced low pressure area*					
1.	Well–marked low pressure area	6 eve – 8	Central Pakistan and adjoining northwest Rajasthan	Northeast	North Pakistan and adjoining northwest Rajasthan, Punjab and Jammu & Kashmir	It was observed as an induced low pressure area on 6 evening and became well–marked on 7 morning. Less marked on 9. However, the associated cyclonic circulation at 4.5 kms a.s.l. lay over Haryana and neighbourhood

TABLE 3 (*Contd.*)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
(*iii*)	*As an induced cyclonic circulation*					
1.	Upto mid tropospheric levels	14 – 17	Central Pakistan and adjoining northeast Rajasthan	Northeast	Uttaranchal and adjoining west Uttar Pradesh	Moved away on 18
2.	Do	21 – 23	South Pakistan and adjoining southwest Rajasthan	Do	Northern parts of Rajasthan and adjoining Haryana	Less marked on 24
3.	Do	23 – 27	Do	Do	Haryana and neighbourhood	Less marked on 28
4.	Do	26 – 29	Do	Do	Southwest Rajasthan and neighbourhood	Less marked on 30
(**B**)	*Other upper air cyclonic circulations*					
1.	Upto mid tropospheric levels	31 Mar – 2 Apr	East–central Arabian Sea off Gujarat–Maharashtra coasts	Stationary	*In situ*	Less marked on 3
2.	Do	5 – 8	East–central Arabian Sea off Karnataka–Kerala coasts	Do	Do	Less marked on 9
3.	Do	5 – 15	Southwest Bay off Tamil Nadu–Sri Lanka coasts	West	South Tamil Nadu and adjoining Kerala	Less marked on 16
4.	Do	12 – 15	North Madhya Maharashtra and neighbourhood	Southwest	East–central Arabian Sea off Karnataka–Goa coasts	Less marked on 16
(**C**)	*Troughs in westerly*					
1.	Lower and mid tropospheric levels	22 – 29	Sub-Himalayan West Bengal & Sikkim to northwest Bay	East	Bihar to north Orissa	Less marked on 30
(**D**)	*Troughs in easterly*					
1.	As a trough of low (at sea level)	2 – 10	South Andaman Sea	West	Southwest Bay and adjoining Sri Lanka	Less marked on 11
2.	Do	14 – 21	Southwest Bay	Do	Lakshadweep area and adjoining southeast Arabian Sea	Became unimportant on 22
3.	Do	17 – 27	South Andaman Sea and adjoining southeast Bay	Do	Sri Lanka and adjoining Commorin areas on 27	Less marked on 28
4.	Do	27 Apr – 6 May	South Arabian Sea	Do	Southwest Bay and adjoining Sri Lanka	Less marked on 7
(**E**)	*Troughs / wind discontinuity*					
1.	Lower levels (continued from last month)	1 – 30	South Tamil Nadu to Nagaland-Manipur-Mizoram-Tripura	Quasi–stationary	Peninsula to northeast India	Continued in the next month also

Details of weather systems during the month are given in Table 2.

Very heavy rain occurred on one day each in Nagaland-Manipur-Mizoram-Tripura and Sub-Himalayan West Bengal & Sikkim. *Heavy rain* occurred on 4 to 5 days in Assam & Meghalaya, Sub-Himalayan West Bengal & Sikkim, Orissa, Tamil Nadu and on 1 to 2 days in Andaman & Nicobar Islands, Nagaland-Manipur-Mizoram-Tripura, Gangetic West Bengal, Jammu & Kashmir and Chattisgarh.

Rain or thundershowers occurred either *at most places* or *at many places* on: 19 days in Arunachal Pradesh; 10 days in Assam & Meghalaya and Jammu & Kashmir; 4 to 7 days in Nagaland-Manipur-Mizoram-Tripura, Sub-Himalayan West Bengal & Sikkim, Punjab and Himachal Pradesh and on 1 to 3 days in Gangetic West Bengal, Orissa, Jharkhand, Bihar, Uttar Pradesh, Uttaranchal, Haryana, Madhya Pradesh, Vidarbha and Telangana. It occurred either *at a few places* or *at isolated places* on: 17 to 23 days in Assam & Meghalaya, Sub-Himalayan West Bengal & Sikkim, Tamil Nadu and Kerala; 10 to 15 days in Nagaland-Manipur-Mizoram-Tripura, Gangetic West Bengal, Orissa, west Uttar Pradesh, Uttaranchal, Himachal Pradesh and east Rajasthan; 4 to 9 days in Andaman & Nicobar Islands, Arunachal Pradesh, Jharkhand, Bihar, east Uttar Pradesh, Haryana, Punjab, Jammu & Kashmir, west Rajasthan, Madhya Pradesh, Madhya Maharashtra, Marathwada, Chattisgarh, coastal Andhra Pradesh, Rayalaseema and south interior Karnataka and on 1 to 3 days in Konkan & Goa, Telangana and north interior Karnataka.

3.1.2. *Rainfall distribution*

Month's rainfall was: *excess* in 15 meteorological sub-divisions *viz.*, Arunachal Pradesh, Assam & Meghalaya, Nagaland-Manipur-Mizoram-Tripura, Sub-Himalayan West Bengal & Sikkim, Gangetic West Bengal, west Uttar Pradesh, Haryana, Punjab, east Rajasthan, west Rajasthan, east Madhya Pradesh, west Madhya Pradesh, Vidarbha, Telangana and Tamil Nadu; *normal* in 8, *viz.*, Andaman & Nicobar Islands, Orissa, Jharkhand, Bihar, east Uttar Pradesh, Jammu & Kashmir, Rayalaseema and north interior Karnataka; *deficient* in 6, *viz.*, Uttaranchal, Himachal Pradesh, Marathwada, coastal Andhra Pradesh, south interior Karnataka and Kerala and *scanty* in 4, *viz.*, Gujarat region, Konkan & Goa, Madhya Maharashtra and Chattisgarh. There was no rain in the remaining 3 meteorological sub-divisions, *viz.*, Saurashtra & Kutch, coastal Karnataka and Lakshadweep. Principal amounts of rainfall are given in Table 5.

3.1.3. *Temperature distribution*

Day temperatures were *appreciably* to *markedly above normal* on: 10 to 14 days in Orissa, Jharkhand, east Uttar Pradesh, Uttaranchal, Rajasthan, Madhya Pradesh, Saurashtra & Kutch, Chattisgarh, coastal Andhra Pradesh and Tamil Nadu; 4 to 9 days in Assam & Meghalaya, West Bengal & Sikkim, Bihar, west Uttar Pradesh, Haryana, Himachal Pradesh, Jammu & Kashmir, Gujarat region, Madhya Maharashtra, Vidarbha, Telangana and Rayalaseema and on 1 to 3 days in Nagaland-Manipur-Mizoram-Tripura, Punjab, Konkan & Goa, coastal & north interior Karnataka and Kerala. They were *above normal* on: 22 days in Tamil Nadu; 10 to 16 days in Bihar, Madhya Maharashtra, Chattisgarh, Andhra Pradesh, south interior Karnataka and Kerala; 4 to 9 days in Sub-Himalayan West Bengal & Sikkim, Orissa, Jharkhand, Uttar Pradesh, Haryana, west Rajasthan, Madhya Pradesh, Gujarat state, Konkan & Goa, Marathwada, Vidarbha and coastal & north interior Karnataka and on 1 to 3 days in Arunachal Pradesh, Assam & Meghalaya, Nagaland-Manipur-Mizoram-Tripura, Gangetic West Bengal, Uttaranchal, Punjab, Himachal Pradesh, Jammu & Kashmir and east Rajasthan; were *appreciably* to *markedly below normal* on: 13 to 14 days in Assam & Meghalaya and Punjab; 4 to 9 days in Nagaland-Manipur-Mizoram-Tripura, West Bengal & Sikkim, Orissa, Bihar, Uttaranchal, Haryana, Jammu & Kashmir, Rajasthan, west Madhya Pradesh, Gujarat region, Madhya Maharashtra and Vidarbha and on 1 to 3 days in Arunachal Pradesh, Jharkhand, east Uttar Pradesh, Himachal Pradesh, east Madhya Pradesh, Saurashtra & Kutch, Marathwada, Chattisgarh, coastal Andhra Pradesh and Telangana and were *below normal* on: 4 to 7 days in Nagaland-Manipur-Mizoram-Tripura, Gangetic West Bengal, Orissa, west Uttar Pradesh, Uttaranchal, Haryana, Punjab, Rajasthan, west Madhya Pradesh, Gujarat State and Maharashtra & Goa States and on 1 to 3 days in Assam & Meghalaya, Sub-Himalayan West Bengal & Sikkim, Jharkhand, Bihar, east Uttar Pradesh, Himachal Pradesh, Jammu & Kashmir, east Madhya Pradesh, Chattisgarh, coastal Andhra Pradesh and Telangana. During the month, the highest maximum temperature of 41.5° C was recorded at Gulbarga (north interior Karnataka) on 28 March.

Night temperatures were *appreciably* to *markedly below normal* on: 4 to 8 days in Jammu & Kashmir, Konkan & Goa, Madhya Maharashtra and south

TABLE 4

Details of the weather systems during May 2005

S. No. (1)	System (2)	Duration (3)	Place of first location (4)	Direction of movement (5)	Final location (6)	Remarks (7)
(**A**)	*Low pressure areas*					
1	Low pressure area	6 – 8	Southeast Bay and neighbourhood	Northeast	North Andaman Sea and adjoining Gulf of Martaban	Less marked on 9. Associated cyclonic circulation extended upto mid tropospheric levels
(**B**)	*Western disturbances /Eastward moving cyclonic circulations*					
(*i*)	*As an upper air cyclonic circulation*					
1	Upto mid tropospheric levels	4 – 5	North Pakistan and adjoining Jammu & Kashmir	Northeast	Himachal Pradesh and adjoining Jammu & Kashmir	Moved away on 6
2	Do	6 – 12	Do	Do	Eastern parts of Jammu & Kashmir	Moved away on 13
3	Do	14 – 15	Do	Do	Jammu & Kashmir and neighbourhood	Moved away on 16
4	Do	17 – 21	North Pakistan and neighbourhood	Do	Eastern parts of Jammu & Kashmir	Moved away on 22
5	Do	21 – 24	North Pakistan and adjoining Jammu & Kashmir	Do	Do	Moved away on 25
(*ii*)	*As an induced cyclonic circulation*					
1.	Upto mid tropospheric levels	1 – 6	Central Pakistan and adjoining west Rajasthan	Northeast	West Uttar Pradesh and neighbourhood	Moved away on 7
2.	Upto lower tropospheric levels	3 – 4	Do	Do	West Uttar Pradesh and neighbourhood	Less marked on 5
3.	Do	5 – 8	West Rajasthan and adjoining Pakistan	Do	Rajasthan and adjoining Punjab	Less marked on 9
4.	Do	12 – 13	Central Pakistan and adjoining west Rajasthan	Do	West Rajasthan and neighbourhood	Less marked on 14
5.	Do	16 – 21	Northwest Rajasthan and adjoining Pakistan	Do	West Uttar Pradesh and neighbourhood	Less marked on 22
6.	Do	19 – 23	West Rajasthan and adjoining central Pakistan	Do	East Rajasthan and neighbourhood	Less marked on 24
(**C**)	*Other cyclonic circulations*					
1.	Upto mid tropospheric levels	1 – 7	East–central Arabian Sea	Northeast	Maharashtra–Goa coasts	Less marked on 8
2.	Do	5	Southwest Bay off Tamil Nadu–Sri Lanka coasts	Stationary	*In situ*	Merged with the cyclonic circulation associated with the low pressure area over there

TABLE 4 (*Contd*.)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
3.	Upto mid tropospheric levels	19 – 21	West Uttar Pradesh and adjoining Haryana	East	West Uttar Pradesh and neighbourhood	Less marked on 22
4.	Do	23	Jharkhand	Stationary	*In situ*	It was first observed as a trough from Sub-Himalayan West Bengal & Sikkim to north Bay on 22. Again on 24 to 31, it lay as a trough from Sub-Himalayan West Bengal & Sikkim to northwest Bay and from 1 to 5 June from Bihar to northwest Bay
(**D**)	*Trough in westerly*					
1.	Mid tropospheric levels	4 – 8	Bihar to northwest Bay	Northeast	Sub-Himalayan West Bengal & Sikkim to north Bay	Moved away on 9
(**E**)	*Trough in easterly*					
1.	As a trough of low	9 – 30	South Andaman Sea and adjoining southeast Bay	West	Southwest Bay off Tamil Nadu–Sri Lanka coasts	Less marked on 31
(**F**)	*Troughs / wind discontinuity*					
1.	Lower levels (continued from last two months)	1 – 31	Southern Peninsula to northeast India	Quasi–stationary	Lakshadweep to Jharkhand	Less marked on 1 June
2.	Lower levels	23 – 24	West Rajasthan to Nagaland-Manipur-Mizoram-Tripura	Do	East Rajasthan to Nagaland-Manipur-Mizoram-Tripura	Less marked on 25

interior Karnataka and on 1 to 3 days in Orissa, Jharkhand, west Uttar Pradesh, Uttaranchal, Haryana, Punjab, east Rajasthan, east Madhya Pradesh, Gujarat region, Marathwada, Vidarbha, Telangana, Rayalaseema, Tamil Nadu and coastal & north interior Karnataka; were *below normal* on: 5 to 10 days in Haryana, Punjab, Rajasthan, Gujarat Region, Maharashtra & Goa States, Telangana, Rayalaseema, coastal Karnataka and Kerala and on 1 to 4 days in Assam & Meghalaya, Gangetic West Bengal, Orissa, Jharkhand, Bihar, east Uttar Pradesh, Uttaranchal, Himachal Pradesh, Jammu & Kashmir, Madhya Pradesh, Saurashtra & Kutch, Chattisgarh, coastal Andhra Pradesh, Tamil Nadu and north interior Karnataka; were *appreciably* to *markedly above normal* on: 19 to 24 days in Sub-Himalayan West Bengal & Sikkim, east Uttar Pradesh, Rajasthan and east Madhya Pradesh; 12 to 18 days in Assam & Meghalaya, Nagaland-Manipur-Mizoram-Tripura, Gangetic West Bengal, Orissa, Jharkhand, Bihar, west Uttar Pradesh, Haryana, west Madhya Pradesh, Gujarat region and coastal Andhra Pradesh; 5 to 11 days in Uttaranchal, Punjab, Himachal Pradesh, Saurashtra & Kutch, Madhya Maharashtra, Marathwada, Vidarbha, Chattisgarh, Telangana, Rayalaseema and Tamil Nadu and on 1 to 4 days in Jammu & Kashmir, Konkan & Goa and interior Karnataka and were *above normal* on: 9 to 13 days in Orissa, Saurashtra & Kutch, Chattisgarh, coastal Andhra Pradesh, Tamil Nadu and Kerala; 4 to 8 days in Assam & Meghalaya, Nagaland-Manipur-Mizoram-Tripura, West Bengal & Sikkim, Jharkhand, Bihar, east Uttar Pradesh, Uttaranchal, Haryana, Punjab, Jammu & Kashmir, Gujarat region, Madhya Maharashtra, Vidarbha, Telangana, Rayalaseema and south interior Karnataka and on 1 to 3 days in west Uttar Pradesh, Himachal Pradesh, Rajasthan, Madhya Pradesh, Konkan & Goa, Marathwada and coastal & north interior Karnataka. The lowest minimum temperature for the month as well as for the season was 7.0° C recorded at Amritsar (Punjab) on 11 March.

3.1.4. *Disastrous weather events and damage*

According to Media and other disaster reports, hail storm, lightning, heavy rains and thunder squalls claimed the lives of 41 people altogether in Vidarbha, Madhya Pradesh, Assam and West Bengal & Sikkim. Hail storm and heavy rain damaged crops worth lakhs of rupees in Vidarbha and Madhya Pradesh. Lightning and thunder squalls damaged 300 acres of paddy field in Midnapore, 370 stalls at a computer fair in Kolkata and hundreds of houses in Assam.

3.2. April

3.2.1. *Weather and associated synoptic features*

Though heat wave conditions started manifesting over various parts of the country in the beginning of the month, the thundershower activity started from the second week dominated over this, thereby abating the heat wave conditions.

Details of the weather systems during the month are given in Table 3.

Very heavy rain occurred on : 1 to 2 days in Assam & Meghalaya, Tamil Nadu, interior Karnataka and Kerala. *Heavy rain* occurred on 4 to 7 days in Assam & Meghalaya, Tamil Nadu and south interior Karnataka and on 1 to 3 days in Arunachal Pradesh, West Bengal & Sikkim, Orissa, coastal Andhra Pradesh and Kerala.

Rain/thundershowers occurred either *at most places* or *at many places* on: 10 to 13 days in Arunachal Pradesh, Assam & Meghalaya and Sub-Himalayan West Bengal & Sikkim; 4 to 7 days in Nagaland-Manipur-Mizoram-Tripura, Jammu & Kashmir, Tamil Nadu and south interior Karnataka and on 1 to 3 days in Andaman & Nicobar Islands, Gangetic West Bengal, Orissa, Himachal Pradesh, Vidarbha and Karnataka. It occurred either at *a few places* or at *isolated places* on : 20 to 26 days in coastal Andhra Pradesh, Tamil Nadu, south interior Karnataka and Kerala; on 11 to 18 days in Arunachal Pradesh, Assam & Meghalaya, Nagaland-Manipur-Mizoram-Tripura, West Bengal & Sikkim, Orissa, madhya Maharashtra, Rayalaseema and coastal & north interior Karnataka; 4 to 10 days in Andaman & Nicobar Islands, Jharkhand, Bihar, Himachal Pradesh, Jammu & Kashmir, Rajasthan, west Madhya Pradesh, Konkan & Goa, Marathwada, Vidarbha, Chattisgarh and Telangana and on 1 to 3 days in Uttar Pradesh, Uttaranchal, Haryana, Punjab, east Madhya Pradesh and Saurashtra & Kutch.

3.2.2. *Rainfall distribution*

Rainfall was : *excess* in 12 meteorological sub-divisions *viz*., Sub-Himalayan West Bengal & Sikkim, Gangetic West Bengal, west Rajasthan, east Rajasthan, west Madhya Pradesh, Vidarbha, Rayalaseema, Tamil Nadu, north interior Karnataka, south interior Karnataka, coastal Karnataka and Kerala; *normal* in 3, *viz*., Assam & Meghalaya, coastal Andhra Pradesh and Lakshadweep; *deficient* in 14, *viz*., Andaman & Nicobar Islands, Arunachal Pradesh, Nagaland-Manipur-Mizoram-Tripura, Orissa, west Uttar Pradesh, Haryana, Punjab, Jammu & Kashmir, east Madhya Pradesh, Konkan & Goa, Madhya Maharashtra, Marathwada, Chattisgarh, and Telangana and *scanty* in 6, *viz*., Jharkhand, Bihar, east Uttar Pradesh, Uttaranchal, Himachal Pradesh and Saurashtra & Kutch. There was no rain in Gujarat Region. The principal amounts of rainfall are given in Table 5.

3.2.3. *Temperature distribution*

Severe heat wave conditions prevailed on 3 days in parts of Saurashtra & Kutch. *Heat wave conditions* prevailed on 3 to 4 days in Rajasthan and Gujarat region and on 1 to 2 days in Haryana, Saurashtra & Kutch and madhya Maharashtra. *Hot day conditions* also prevailed on 5 days in Saurashtra & Kutch and on 1 day each in Rajasthan and Konkan & Goa.

Day temperatures were *appreciably* to *markedly above normal* on: 9 to 12 days in east Uttar Pradesh, Himachal Pradesh, Jammu & Kashmir, Saurashtra & Kutch and coastal Andhra Pradesh; 4 to 8 days in Orissa, Jharkhand, west Uttar Pradesh, Uttaranchal, Haryana, Punjab, Rajasthan, Madhya Pradesh, Gujarat region, Konkan & Goa, madhya Maharashtra and coastal Karnataka and on 1 to 3 days in Assam & Meghalaya, Nagaland-Manipur-Mizoram-Tripura, Sub-Himalayan West Bengal & Sikkim, Bihar, Marathwada, Vidarbha, Chattisgarh, Telangana, Rayalaseema, Tamil Nadu, interior Karnataka and Kerala; were *above normal* on: 18 days in coastal Andhra Pradesh; 10 to 15 days in Orissa, east Uttar Pradesh, east Madhya Pradesh, Konkan & Goa, madhya Maharashtra, Vidarbha, Telangana, Tamil Nadu and coastal Karnataka; 4 to 9 days in West Bengal & Sikkim, Jharkhand, Bihar, west Uttar Pradesh, Uttaranchal, Haryana, Punjab, Himachal Pradesh, Jammu & Kashmir, Rajasthan, west Madhya Pradesh, Gujarat State, Marathwada, Chattisgarh, Rayalaseema, south interior Karnataka and Kerala and on 2 to 3 days in Assam & Meghalaya, Nagaland-Manipur-Mizoram-Tripura and north interior Karnataka; were *appreciably* to *markedly below normal* on : 12 days in Assam & Meghalaya; 4 to 9 days in Nagaland-Manipur-Mizoram-Tripura, Sub-Himalayan West Bengal & Sikkim, Haryana, Punjab, Jammu & Kashmir, Rajasthan, Madhya Pradesh, madhya Maharashtra and Tamil Nadu and on 1 to 3 days in Gangetic West Bengal, Orissa, Jharkhand,

TABLE 5

Principal amounts of rainfall (1 cm and above) (March, April and May 2005)

Date	March	April	May
(1)	(2)	(3)	(4)
1.	Batote, Quazi Gund 1 each	Ketti 7, Durgachak 5, Miao 4, Passighat 3, Itanagar, Gangtok & Diamond Harbour 2 each, Keonjhargarh & Jamshedpur, Dibrugarh 1 each	Mathanguri 7, Hindol 6, Malda & Balasore 5 each, Tiruchirapalli & Jaisalmer 4 each, Kalingapatnam 3, Udaipur & Pendra 2 each, Pantnagar, Sundernagar & Tezpur 1 each
2.	Tadong 4, Dhundhi 3, Dibrugarh & Satna 2 each, Bhang, Katra & Khajuraho 1 each	Akhuapada 5, Kollegal 4, Nalbari 3, AIE NH Xing 2	Ariyalur 8, Thanjavur 7, Kashipur 5, Cuttack, 4, Chennai & Jalpaiguri 3 each, Nellore & Khammam 2 each, Rania, Tirupathi, Nangal, Pendra & Srinagar 1 each
3.	Bhuntar, Khonsa & Satna 1 each	Neyyantinkara 4, Arasalu & Tuticorin 3 each, Port Blair & Thiruvananthapuram 2 each, Cuttack 1, K.B. Dam 1	Kolkata 11, Koderu 9, Thodupuzha 7, Malavalli & Kurnool 5 each, Thiruvananthapuram & Ambala 4 each, Mahbubnagar, Balachaur & Lucknow 3 each, Meerut & Arki 2 each, Kupwara, Dehra Dun, Canning Town, Paradip, Jaisalmer, Jaipur, Raipur & Nasik, 1 each
4.	Passighat 4, Bhoranj 2, Jorhat 1	Ramanathapuram 12, Piravom 11, Palayamkottai 10, Tuticorin & Vedaranyam 9 each, Thrithala & Coonoor 8 each, Kollam 6, Nancowry 5, Poonampet 4, Champasarai, Kozhikode, Thiruvananthapuram & Jalpaiguri 3 each, Balasore, Agartala & Shillong 1 each	Cuddapah 7, Pilani & Jalpaiguri 6 each, Kolhapur & Nellore 5 each, Karnal, Tondi & Bhubaneswar 4 each, Guwahati 2, Kasauli, Jammu, Bareilly & Agra 1 each
5.	Quazi Gund 5, Banihal 4, Alapuzha 3, Dibrugarh, Nurpur & Khonsa 1 each	Eraniel 27, Ramanathapuram 22, Tiruvarur 20, Nedumangad 15, Thiruvananthapuram 13, Manamelkudy 11, Neyyantinkara & Tondi 9 each, Alapuzha 8, Karaikal 6, Panambur & Car Nicobar 3 each.	Adirampattinam 8, Kolar 7, Kurnool 5, Tezpur, Cuddalore & Churu 4 each, Idukki, Pantnagar & Delhi Ridge 3 each, Bhagalpur 2, Satara, Nagpur, Hindon, Bhuntar, Nancowry, Dibrugarh, Kailashahar, Chitradurga, Imphal & Jalpaiguri 1 each
6.	Coonoor 10, Margarita 7, Silchar & Kodaikanal 5 each, Bhiwani 4, Dibrugarh, Pathankot 3, Quazi Gund 2, Thiruvananthapuram 1	Chennai 12, Tambaram 10, Chidambaram 7, Kollam 5, Quilandy & Tirupathi 3 each, Kozhikode, Maya Bandar & Jalpaiguri 2 each	Peermade 9, Port Blair 8, Darjeeling 7, Chintapalli & Maya Bandar 6 each, Kolkata 5, Aizwal 4, Gangtok 3, Banihal, Bangalore, Guwahati & Kailashahar 1 each
7.	Silchar 12, Jashpurnagar 2, Dibrugarh, Sagar & Imphal 1 each	Madurai 18, Enamackel l5, Kochi 12, Alapuzha 9, Nedumbassary & Valparai 8 each, Cherrapunji 6, Quazi Gund, Maya Bandar & Tezpur 3 each, Bangalore, Kupwara & Cooch Behar 2 each, Guwahati & Tissa 1 each	Darjeeling & North Lakhimpur 7 each, Uluberia 6, Rajghat & Kolkata 5 each, Nancowry 4, Gwalior 3, Kakinada, Chengannur, Coimbatore & Shillong 2 each, Agartala, Patna, Gorakhpur & Cooch Behar 1 each
8.	Kailashahar 5, Mancompu 3, Churu, Sagar, Tondi, Alapuzha & Miao 2 each, Jhalwar & Bhopal 1 each	Vallam 8, M.M. Hills & Margherita 6 each, Gangtok 5, Solangnala & Passighat 3 each, Chitradurga, Bhang & Tezpur 2 each, Kupwara, Tiruchirapalli, Honavar & Nandyal 1 each	Thodupuzha 12, Kothagiri 7, Batote, Ganganagar & Hut Bay 3 each, Phek, Balasore & Digha 2 each, Kochi, Paradip, Bhuntar & Gangtok 1 each
9.	Dharamnagar 12, Panipat, Nizamabad & Kottayam 3 each, Hissar, Churu, Pondicherry & Jorhat 2 each, Nahan, Hoshangabad, Sagar & Aurangabad 1 each	Beki Road Bridge 8, Kailashahar 5, Harihara 4, Amini Divi, Cooch Behar, Passighat & Guwahati 3 each, Gorakhapur & Erode 1 each	Gharmura & Kailashahar 14 each, Nancowry 5, Contai, Vijayawada & Gannavaram 3 each, Agartala & Pahalgam 2 each, Car Nicobar & Sri Ganganagar 1 each
10.	Roing 4, Udhampur 3, Dehra Dun 2	Mellabazar & Kailashahar 5 each, Cooch Behar, Passighat, M. M. Hills & Guwahati 3 each, Rampurhat 2, Erode & Tezpur 1 each	Itanagar 4, Nagrakata 3, Gulmarg, Jalpaiguri, Bhuntar & Guwahati 2 each, Srinagar, Kalingapatnam, Uthagamandalam & Imphal 1 each

TABLE 5 (*Contd.*)

(1)	(2)	(3)	(4)
11.	Sakti 12, Erode 7, Karimganj 5, Roing 3	Kolkata 11, Sathyamanagalam 9, M. M. Hills & Nagapattinam 5 each, Sabroom & Tezpur 3 each, Alapuzha & Bangalore 1 each	Ramanagar 8, Matijuri 7, North Lakhimpur, Anakapalle & Kailashahar 3 each, Cooch Behar, Passighat 2, Venkatagiri & Arogyavaram 1 each
12.	Shenkottah 10, Chandanpur 5, Dharamnagar 4	Konni 10, Palani 7, Sabroom 5, Silchar 3, Nagapattinam & Kottayam 2 each, Kailashahar 1	Hut Bay 4, Silchar 3, Passighat, Malavalli & Kailashahar 2 each, Aizwal & Gangtok 1 each
13.	Athagarh 9, Diana 5, Tuni 3	Sangli 6, Haripad 5, Bidar, Sholapur & Kailashahar 3 each, Belgaum 1	Paradip & Madurai 9 each, Mandya 5, Hasimara & Tezpur 3 each, Karipur & Kailashahar 2 each, Itanagar & Paradip 1 each
14.	Mellur 10, Coimbatore 5, Munnar 4	Shahapur 16, Parambikulam 7, Udgir & Kodaikanal 4 each, Kurnool 3, Medikeri & Kochi 2 each	Gossaigaon & Quazigund 3 each, Dharamnagar, Guwahati & Agartala 2 each, Ziro, Devikulam, Gangtok & Maya Bandar 1 each
15.	Coimbatore 3, Chandbali 1	Panchannahalli 6, Thodupuzha 5, Kolhapur & Mahabaleshwar 4 each, Mudgal 3, Salem, Kottayam & Panambur 2 each, Belgaum 1	Dharamnagar 6, Jowai & Agartala 4 each, Cherthala, Kochi & Shillong 3 each, Hut Bay & Port Blair 2 each, Zero, M. M. Hills & Vellore 1 each
16.	Ziro & Kanjirappally 2 each	Arasalu 9, Hansubhavi 8, Karwar, Gadag & Chitradurga 6 each, Dhubri 4, Kottayam 1	Sabroom & Silchar 4 each, Miao 3, Gangtok & Hut Bay 2 each, Minicoy & Agartala 1 each
17.	Sevoke 7, Suri 3, Anandpur 2	Cooch Behar 3, Punalur & Roing 2 each, Jagdalpur & Kailashahar 1 each	Changlang 6, Dharamnagar 5, Tezpur 4, Kailashahar 3, Agartala, Hasimara, Balimundali & Port Blair 1 each
18.	Rampurhat 2, Rampur 1	Roing 5, Neyyattinkara 4, Dibrugarh, Gangtok & Panjim 3 each	Gangtok 5, Dharamnagar, Kolkata & Agartala 2 each, Jalpaiguri, Zero, Bhang & Maya Bandar 1 each
19.	Gajoldoba 10, Batote 7, Mahendragarh 2	Dibrugarh 8, Nandyal 3, Chitradurga 2, Thiruvananthapuram, Passighat & Gangtok 1 each	Cherrapunji 17, Kailashahar 9, Nancowry & Silchar 4 each, Rairangpur, Keonjhargarh & Imphal 2 each, Seppa & Gangtok 1 each
20.	Guwahati 6, Tezu 5, Cooch Behar 3	Naraj & Neyyattinkara 4 each, Bhubaneswar, Balasore, Visakhapatnam & Bhadrachalam 3 each, Kochi, Sankalan & Thiruvananthapuram 2 each, Tondi & Mangalore 1	Cherrapunji 19, Neora 15, Seppa 12, Agartala 8, Cooch Behar 7, Port Blair 4, Rajghat, Jalpaiguri, Midnapore, Jamshedpur & Guwahati 3 each, Banihal & Passighat 1 each
21.	Gangtok 4, Tezu 3, Kashipur 2	H. B. Halli 12, Kottayam 6, Belgaum 5, Bagalkote 4, Pendra & Karaikal 3 each, Panjim 2, Kozhikode 1	Cherrapunji 10, Kailashahar 7, Silchar & North Lakhimpur 5 each, Nancowry 4, Jamshedpur 3, Changlang & Keonjhargarh 2 each, Jalpaiguri 1
22.	Shenkottah 9, Shimla 5, Dharamnagar 4, Dehra Dun 3	Jowai 7, Ottapalam 6, Cooch Behar & Tadong 3 each, Belthangady 2	Kailashahar 9, Malavalli 6, Cherrapunji & Agartala 4 each, Kottayam & Car Nicobar 3 each, Kotraguda, Bhuntar, Anantpur & Guwahati 2 each, Khonsa & Chitradurga 1 each
23.	Silchar 9, Tezu 4, Chandbali 1	Yegati 7, Mellabazar 5, Changlong & Belgaum 3 each, Punalur, Minicoy, Banihal, Satara & Coonoor 1 each	Cherrapunji 5, Mandya 3, Kailashahar & Diamond Harbour 2 each, Hyderabad, Bangalore, Punalur, Sabroom, Kupwara, Nancowry & Shillong 1 each

TABLE 5 (*Contd.*)

(1)	(2)	(3)	(4)
24.	Sonamura 17, Diana 13, Contai 9, Rajghat 8, Sabroom, Canning Town 7, Diamond Harbour 6, Kolkata (ALP) 4, Agartala 3, Kailashahar & Sabour 2 each, Shillong, Gangtok, Keonjhargarh & Jamshedpur 1 each	Jowai 13, Thodupuzha & Gangtok 10 each, Begur & Tadong 6 each, Joida 4, Medikeri & Silchar 2 each, Kottayam, Mangalore & Valparai 1 each	Cherrapunji 18, Punalur 12, Kailashahar & Silchar 8 each, Yelandur 6, Gajoldoba & Shillong 5 each, Agartala, Gangtok & Maya Bandar 3 each, Jaipur, Kannur & Bangalore 2 each, Mukteshwar, Changlang & Hyderabad 1 each
25.	Jaleswar 9, Durgachak & Haldia 7 each, Paradip & Willighat 6 each, Sevoke & Diamond Harbour 5 each, Puri & Jalpaiguri 4 each, Silchar Canning Town 3, Cooch Behar & Agartala 2 each, Malda 1	Hubli 14, Thrithala & Kailashahar 5 each, Shiralkoppa 4, Mukteshwar 3, Mahabaleshwar & Sunnibhaji 2 each, Bapatla, Valparai, Quazigund, Gangtok, Passighat & Silchar 1 each	Sankalan 15, Karimganj 7, Bableshwar 6, Guwahati 4, Agartala 3, Balasore 2, Sholapur, Hyderabad, Changlang & Gangtok 1 each
26.	AIE NH Xing 12, Bridge 11, Neematy ghat 8, Adirampattinam 6, Itanagar 4, Silchar 2, Tezpur & Tuni 1 each	Tawang 8, Gangtok 7, Batote, Cooch Behar & Guwahati 3 each, Solangnala, Hyderabad & Balasore 2 each, Hassan, Thiruvanthapuram & Kalka 1 each	Thodupuzha 9, Gangtok 7, Udupi 6, Dhubri 5, Daspalla 4, Car Nicobar 1
27.	Kherunighat 8, Aizwal 4, Sevoke 3, Karimganj & Silchar 2 each	Mellabazar 5, Nilambur & Bangalore 4 each, Murti & Dibrugarh 3 each, Tirupattur, Mangalore, Minicoy, Raichur & Jalpaiguri 2 each, Kochi & Kurnool 1 each	Cherthala 11, Arantangi 10, Madakasira 7, Gadag 4, Diana 3
28.	Car Nicobar & Lengpui 3 each, Kupwara & Agartala 2 each, Dibrugarh, Gangtok & Bhuntar 1 each	Kunigal 8, Mellabazar 7, Beki 6, Murti 5, Cooch Behar & Tezpur 4 each, Silchar 3, Hissar, Amritsar, Dharamshala & Imphal 2 each, Ajmer & Mysore 1 each	Khowang 10, Agathi 9, Bangalore & Gangtok 8 each, Jagdalpur 7
29.	Sankalan 7, Shillong 4, Car Nicobar & Hut Bay 3 each, Guwahati 2	Dharpuram 7, Bandipura & Yercaud 6 each, Bilana 5, Agartala & Tezpur 3 each, Jaipur & Cooch Behar 2 each, Bapatla, Sujanpurtira & Jodhpur 1 each	Hubli 17, Dibrugarh 13, Siddapura 8, Mathabhanga 5, Gulmarg 3
30.	Car Nicobar 7, Karimganj 6, Matijuri 5, Passighat 4, Silchar 3	Diana 9, Khandapara 8, Akhuapada 7, Tuni 6, Sawai Madhopur 3, Valparai, Churu, Gangtok, Diamond Harbour, Balasore & Bareilly 2 each, Mukteshwar & Silchar 1 each	Neyyattinkara 19, Pullambadi 12, Tadong 9, Tezpur 3, Gulmarg 2, Pendra 1
31.	Alipurduar & Agartala 8 each, Kanjirappally 5, Dibrugarh, Miao, Bridge & Kodaikanal 4 each, Kolkata 2		Bantwal 6, Chepan 12, Dhubri 6, Panjim 4, Barmer 2, Gadag 1

Bihar, Uttar Pradesh, Uttaranchal, Gujarat State, Marathwada, Vidarbha, Chattisgarh, Andhra Pradesh, interior Karnataka and Kerala and were *below normal* on: 4 to 9 days in Assam & Meghalaya, Nagaland-Manipur-Mizoram-Tripura, Gangetic West Bengal, Orissa, Jharkhand, west Uttar Pradesh, Uttaranchal, Punjab, west Rajasthan, Madhya Pradesh, Gujarat region, Madhya Maharashtra, Rayalaseema, Tamil Nadu and south interior Karnataka and on 1 to 3 days in Sub-Himalayan West Bengal & Sikkim, Bihar, east Uttar Pradesh, Haryana, Himachal Pradesh, Jammu & Kashmir, east Rajasthan, Saurashtra & Kutch, Konkan & Goa, Marathwada, Vidarbha, Chattisgarh, coastal Andhra Pradesh, Telangana, coastal Karnataka, north interior Karnataka and Kerala. Highest maximum temperature of 44.5° C was recorded at Baroda (Gujarat region) on 5 April.

3.2.4. *Disastrous weather events and damage*

According to media and other disaster reports, lightning, thunder squall and norwesters claimed the lives of 25 people in Assam & Meghalaya, 19 in West Bengal & Sikkim, 38 people in Tamil Nadu, 17 in Kerala and 2 in Vidarbha. Also 3 persons in West Bengal & Sikkim died due to Sun stroke. Thunder squall caused extensive damage to crops in Assam. Many trees were uprooted,

several people rendered homeless and roofs of a civil hospital and other houses were blown off in Assam & Meghalaya. In Tamil Nadu heavy rain caused floods and several houses and huts were damaged.

3.3. *May*

3.3.1. *Weather and associated synoptic features*

No cyclonic storms or depressions formed during the month and the monsoon advance over Andaman Sea was slightly behind schedule, as mentioned in the beginning. Thundershower activity dominated in the initial half while later on heat wave conditions began to influence various parts of the country. Details of the weather systems during the month are given in Table 4.

3.3.2. *Advance of southwest Monsoon*

Southwest monsoon advanced over : the south Andaman Sea and parts of the southeast Bay on 26; some parts of the southwest Bay, some more parts of the southeast Bay and the entire Andaman Sea on 28 and over the east central Bay and some more parts of south Bay on 31.

3.3.3. *Weather realised*

Very heavy rain occurred on 5 days in Assam & Meghalaya and on 1 day each in Nagaland-Manipur-Mizoram-Tripura, Sub-Himalayan West Bengal & Sikkim, coastal & north interior Karnataka and Kerala. *Heavy rain* also occurred on 4 to 6 days in Assam & Meghalaya, Nagaland-Manipur-Mizoram-Tripura, Sub-Himalayan West Bengal & Sikkim, Tamil Nadu and Kerala and on 1 to 2 days in Andaman & Nicobar Islands, Arunachal Pradesh, Gangetic West Bengal, Chattisgarh, Rayalaseema and Karnataka.

Rain or thundershowers occurred either *at many places* or *at most places* on: 18 days each in Assam & Meghalaya and Nagaland-Manipur-Mizoram-Tripura; 11 to 14 days in Andaman & Nicobar Islands, Arunachal Pradesh and Sub-Himalayan West Bengal & Sikkim and on 1 to 4 days in Gangetic West Bengal, Orissa, west Uttar Pradesh, Uttaranchal, Himachal Pradesh, Jammu & Kashmir, Marathwada, Vidarbha, Chattisgarh, Rayalaseema, Tamil Nadu, Karnataka, Kerala and Lakshadweep. It occurred either at *isolated places* or *at a few places* on: 18 to 25 days in Arunachal Pradesh, Orissa, Himachal Pradesh, Jammu & Kashmir, coastal Andhra Pradesh, Rayalaseema, Tamil Nadu, south interior Karnataka and Kerala; 11 to 17 days in Andaman & Nicobar Islands, Assam & Meghalaya, Nagaland-Manipur-Mizoram-Tripura, West Bengal & Sikkim, Jharkhand, Uttaranchal, Punjab, Rajasthan and north interior Karnataka; 4 to 10 days in Bihar, Uttar Pradesh, Haryana, Madhya Pradesh, Saurashtra & Kutch, Madhya Maharashtra, Marathwada, Vidarbha, Chattisgarh, Telangana, coastal Karnataka and Lakshadweep and on 1 to 3 days in Gujarat region and Konkan & Goa.

3.3.4. *Rainfall distribution*

Rainfall was *excess* in 2 met. sub-divisions, *viz*., west Rajasthan and Chattisgarh; *normal* in 9, *viz*., Nagaland - Manipur - Mizoram - Tripura, Sub-Himalayan West Bengal & Sikkim, Gangetic West Bengal, Jammu & Kashmir, east Madhya Pradesh, coastal Andhra Pradesh, Rayalaseema, Tamil Nadu and south interior Karnataka; *deficient* in 15, *viz*., Andaman & Nicobar Islands, Arunachal Pradesh, Assam & Meghalaya, Orissa, east Uttar Pradesh, west Uttar Pradesh, Haryana, Punjab, Himachal Pradesh, east Rajasthan, west Madhya Pradesh, Vidarbha, north interior Karnataka, Kerala and Lakshadweep and *scanty* in the remaining 10 *viz*., Jharkhand, Bihar, Uttaranchal, Gujarat region, Saurashtra & Kutch, Konkan & Goa, Madhya Maharashtra, Marathwada, Telangana and coastal Karnataka. The principal amounts of rainfall are given in Table 5.

3.3.5. *Temperature distribution*

Heat wave conditions prevailed on 5 to 9 days in Orissa, west Madhya Pradesh, madhya Maharashtra, Vidarbha, coastal Andhra Pradesh and Telangana and on 1 to 4 days in Jharkhand, Bihar, east Uttar Pradesh, Rajasthan, east Madhya Pradesh, Gujarat region, Marathwada, Chattisgarh, Rayalaseema and interior Karnataka. *Hot day conditions* prevailed on 1 day in some parts of coastal Andhra Pradesh. Day temperatures were *appreciably* to *markedly above normal* on: 9 to 13 days in Orissa, Madhya Maharashtra, Telangana, Tamil Nadu and coastal Karnataka; 4 to 8 days in Gangetic West Bengal, Jharkhand, Bihar, Himachal Pradesh, Madhya Pradesh, Marathwada, Vidarbha, Chattisgarh, coastal Andhra Pradesh, Rayalaseema, interior Karnataka and Kerala and on 1 to 3 days in Arunachal Pradesh, Assam & Meghalaya, Sub-Himalayan West Bengal & Sikkim, east Uttar Pradesh, Uttaranchal, Haryana, Punjab, Jammu & Kashmir, Rajasthan, Gujarat region and Konkan & Goa; were *above normal* on: 9 to 13 days in Uttaranchal, Saurashtra & Kutch, Tamil Nadu, coastal Karnataka and Kerala; 4 to 8 days in Assam & Meghalaya, Nagaland-Manipur-Mizoram-Tripura, Orissa, Jharkhand, east Uttar Pradesh, Haryana, Jammu & Kashmir, Rajasthan, east Madhya Pradesh, Gujarat region, Konkan & Goa, Madhya Maharashtra, Telangana, Rayalaseema and south interior Karnataka and on 1 to 3 days in Sub-Himalayan West Bengal & Sikkim, Bihar, west Uttar Pradesh, Punjab,

Himachal Pradesh, west Madhya Pradesh, Marathwada, Vidarbha, Chattisgarh, coastal Andhra Pradesh and north interior Karnataka; were *appreciably* to *markedly below normal* on: 9 to 14 days in Assam & Meghalaya, Sub-Himalayan West Bengal & Sikkim, Bihar, Uttar Pradesh and Jammu & Kashmir; 4 to 8 days in Nagaland-Manipur-Mizoram-Tripura, Gangetic West Bengal, Orissa, Jharkhand, Uttaranchal, Haryana, Punjab, Rajasthan, west Madhya Pradesh, madhya Maharashtra, Vidarbha and Chattisgarh and on 1 to 3 days in Himachal Pradesh, east Madhya Pradesh, Gujarat Region, Saurashtra & Kutch, Marathwada, Telangana, Rayalaseema, Tamil Nadu, interior Karnataka and Kerala and were *below normal* on: 4 to 9 days in Assam & Meghalaya, Nagaland-Manipur-Mizoram-Tripura, Haryana, Punjab, Jammu & Kashmir, east Madhya Pradesh, Gujarat State and Madhya Maharashtra and on 1 to 3 days in West Bengal & Sikkim, Orissa, Jharkhand, Bihar, Uttar Pradesh, Uttaranchal, Himachal Pradesh, Rajasthan, west Madhya Pradesh, Marathwada, Vidarbha, Chattisgarh, coastal Andhra Pradesh, Telangana, Tamil Nadu and interior Karnataka.

The month's as well as the season's highest maximum temperature of 47.6° C was recorded at Nagpur (Vidarbha) on 22 May.

3.3.6. *Disastrous weather events and damage*

According to the media and other disaster reports, Norwesters, thunder squalls and sun strokes claimed the lives of 72 people in Assam & Meghalaya, 24 in West Bengal, 40 in Orissa and another 40 in Vidarbha. Also hail storms claimed the lives of 5 people and completely damaged a building in Bihar.

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 atleast 2.5 mm rainfall.

At many places - 51% to 74 % stations of a meteorological sub-division reporting atleast 2.5 mm rainfall.

At a few places - 26 % to 50% stations of a meteorological sub-division reporting atleast 2.5 mm rainfall.

An 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 rainfall - rainfall amount 12.5 cm or more.

Temperature

(a) Maximum/day temperatures

According to the new criteria, since 1st March 2002, Heat Wave will be declared only when the maximum temperature of a station reaches at least 40° C for plains and at least 35° C for hilly regions.

Severe heat wave - departure of maximum temperature from normal is + 6° C or more for the regions where the normal maximum temperature is more than 40° C and departure of maximum temperature from normal is + 7° C or more for the regions where the normal maximum temperature is 40° C or less.

Heat wave conditions - departure of maximum temperature from normal is between + 4° C to + 5° C or more for the regions where the normal maximum temperature is more than 40° C and departure of maximum temperature from normal is + 5° to + 6° C for the regions where the normal maximum temperature is 40° C or less.

Hot day conditions - whenever the maximum temperature remains 40° C or more and minimum remains 5° C or more above normal, provided, it is not satisfying the heat wave criteria.

Markedly above normal - departure of maximum temperature from normal is – 5° C to – 6° C for the region where the normal maximum temperature is 40° C or less.

Appreciably above normal - departure of maximum temperature from normal is between + 3° C to + 4° C for the region where the normal maximum temperature is 40° C or less.

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

Appreciably below normal - departure of maximum temperature from normal is from – 3° C to – 4° C where the normal maximum temperature is 40° C or less

Markedly below normal - departure of maximum temperature from normal is from – 5° C to + 6° C where the normal maximum temperature is 40° C or less.

Below normal - when the departure of minimum temperature from normal is – 2° C.

(b) Minimum/night temperatures

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 below normal - departure of minimum temperature from normal is – 5 to – 6° C where the normal minimum temperature is 10° C or more.

Below normal - departure of minimum temperature from normal is – 2° C

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.