

# Weather in India

## HOT WEATHER SEASON (March – May 2009)\*

### 1. Chief features

(i) The hot weather season - 2009 followed a warm winter. However, there has been no abnormal aberration noticed either in terms of the maximum temperature figures or in terms of the prevalence of the *severe heat wave conditions*\*.

(ii) The pre-monsoon cyclone season witnessed the formation of two cyclonic storms, viz., the Cyclonic Storm ‘Bijli’ (14 - 17 April) and the Severe Cyclonic Storm ‘Aila’ (23 - 26 May) over the Bay of Bengal.

(iii) Convective activity gave rise to thundershowers over major parts of the country, towards the latter half of May. Systems in mid-latitude westerlies gave rise to precipitation over the northern parts almost all through the season.

(iv) A tornado occurred over Orissa during the night of 31 March, causing loss of life and property.

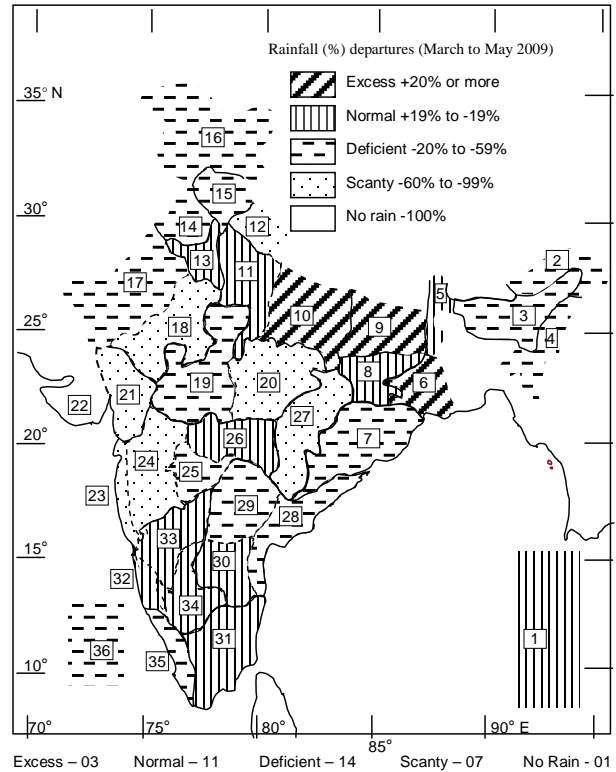
(v) The southwest monsoon set in over Kerala on 23 May.

### 2. Seasonal rainfall

The sub-divisionwise rainfall and its departures from normal for each month and season as a whole are given in Table 1. Also the sub-divisional rainfall departures for the season March-May 2009 are depicted in Fig. 1.

The easterly waves, the north-south wind discontinuity existed in the lower levels, mainly during 19 - 27 March, 19 - 30 April and most parts of May and the monsoon current which had advanced over the region towards the end of May contributed to *normal* rainfall over parts of south peninsula. The *excess* rainfall over the northern parts occurred mostly in the month of May, which resulted from convective activity as well as due to the northward movement of the Severe Cyclonic Storm ‘Aila’. Though the western disturbances remained active almost continuously, the precipitation they produced never exceeded the normal figure.

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



**Fig. 1.** Sub-divisionwise seasonal rainfall departure from normal (%) for the period (March - May 2009). 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 :

<b>1</b>	<b>7</b>	<b>7</b>	<b>-32</b>	<b>13</b>	<b>-17</b>	<b>19</b>	<b>-47</b>	<b>25</b>	<b>-45</b>	<b>31</b>	<b>1</b>
<b>2</b>	<b>-44</b>	<b>8</b>	<b>-12</b>	<b>14</b>	<b>-33</b>	<b>20</b>	<b>-67</b>	<b>26</b>	<b>-11</b>	<b>32</b>	<b>-10</b>
<b>3</b>	<b>-43</b>	<b>9</b>	<b>89</b>	<b>15</b>	<b>-46</b>	<b>21</b>	<b>-99</b>	<b>27</b>	<b>-78</b>	<b>33</b>	<b>-16</b>
<b>4</b>	<b>-31</b>	<b>10</b>	<b>25</b>	<b>16</b>	<b>-35</b>	<b>22</b>	<b>-100</b>	<b>28</b>	<b>-43</b>	<b>34</b>	<b>2</b>
<b>5</b>	<b>10</b>	<b>11</b>	<b>-16</b>	<b>17</b>	<b>-45</b>	<b>23</b>	<b>-90</b>	<b>29</b>	<b>-31</b>	<b>35</b>	<b>-25</b>
<b>6</b>	<b>51</b>	<b>12</b>	<b>-66</b>	<b>18</b>	<b>-77</b>	<b>24</b>	<b>-70</b>	<b>30</b>	<b>-8</b>	<b>36</b>	<b>-23</b>

### 3. Significant features during various months

#### 3.1. March

##### 3.1.1. Weather and associated synoptic features

The details of the weather systems during the month are summarised in Table 2 and the resultant rainfall distribution in Table 3. The principal amounts of rainfall are given in Table 12.

**TABLE 1**  
**Sub-divisionwise rainfall (mm) for each month and season as a whole (March - May 2009)**

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	38	19	99	138	69	100	317	373	-15	493	461	7
2.	Arunachal Pradesh	65	158	-59	172	277	-38	166	385	-42	403	719	-44
3.	Assam & Meghalaya	41	84	-51	130	201	-36	217	396	-45	387	681	-43
4.	Nagaland-Manipur-Mizoram-Tripura	25	65	-61	79	149	-47	202	229	-12	307	443	-31
5.	Sub-Himalayan West Bengal & Sikkim	39	55	-28	149	117	28	286	259	10	474	430	10
6.	Gangetic West Bengal	21	27	-25	2	46	-96	229	93	146	252	167	51
7.	Orissa	4	25	-85	3	36	-92	76	60	27	82	121	-32
8.	Jharkhand	10	19	-51	1	22	-96	68	47	44	78	89	-12
9.	Bihar	3	11	-77	2	19	-91	156	55	185	160	85	89
10.	East Uttar Pradesh	2	10	-76	1	6	-87	38	17	118	41	33	25
11.	West Uttar Pradesh	2	11	-86	9	5	77	14	13	12	24	29	-16
12.	Uttarakhand	2	59	-96	22	35	-39	30	62	-51	54	157	-66
13.	Haryana, Chandigarh & Delhi	6	13	-54	13	7	82	9	14	-32	29	34	-17
14.	Punjab	11	27	-60	21	12	76	4	16	-72	36	54	-33
15.	Himachal Pradesh	30	115	-74	52	66	-22	50	66	-24	132	247	-46
16.	Jammu & Kashmir	61	169	-64	105	100	5	58	77	-24	223	346	-35
17.	West Rajasthan	5	4	29	1	3	-77	4	10	-63	9	17	-45
18.	East Rajasthan	1	4	-66	**	3	-93	3	11	-77	4	17	-77
19.	West Madhya Pradesh	1	5	-90	1	2	-61	6	7	-14	8	14	-47
20.	East Madhya Pradesh	2	14	-87	3	6	-54	5	8	-42	9	28	-67
21.	Gujarat region	**	1	-97	0	1	-100	0	6	-100	**	9	-99
22.	Saurashtra & Kutch	0	1	-100	0	1	-100	0	2	-100	0	5	-100
23.	Konkan & Goa	**	**	-50	**	4	-99	4	36	-90	4	40	-90
24.	Madhya Maharashtra	1	3	-74	**	10	-98	11	28	-60	12	41	-70
25.	Marathwada	**	6	-97	1	7	-88	17	21	-16	18	33	-45
26.	Vidarbha	13	12	2	2	8	-71	13	11	17	28	31	-11
27.	Chattisgarh	0	16	-100	1	17	-92	10	21	-51	12	53	-78
28.	Coastal Andhra Pradesh	4	13	-67	3	22	-84	46	60	-23	53	94	-43
29.	Telangana	5	10	-47	6	17	-62	27	29	-8	38	56	-31
30.	Rayalaseema	5	7	-25	3	18	-81	63	54	18	72	78	-8
31.	Tamil Nadu	30	19	57	35	43	-17	64	67	-3	130	129	1
32.	Coastal Karnataka	29	4	577	19	27	-29	113	148	-24	161	179	-10
33.	North interior Karnataka	7	6	18	10	26	-60	56	56	1	74	88	-16
34.	South interior Karnataka	27	9	210	25	44	-43	100	97	3	153	150	2
35.	Kerala	64	38	69	68	122	-44	190	268	-29	323	428	-25
36.	Lakshadweep	**	13	-99	18	43	-58	162	178	-9	180	234	-23

\*\* 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 2009**

S. No. (1)	System (2)	Duration (3)	Place of first location (4)	Direction of movement (5)	Final location (6)	Remarks (7)
<b>(A) Low pressure area</b>						
1.	Low pressure area	8 – 9	Southwest Bay of Bengal and neighbourhood	West	Southwest Bay of Bengal and adjoining Sri Lanka	It was first observed as a trough of low at sea level over south Andaman Sea and neighbourhood from 2 to 7.  Associated cyclonic extended upto 2.1 kms a.s.l. on 9.  The low pressure area became less marked on 10. However, a trough of low at sea level lay over southwest Bay of Bengal off south Tamil Nadu-Sri Lanka coasts on 10 and became less marked on 11.
<b>(B) Western disturbances</b>						
<i>(i) As upper air cyclonic circulations</i>						
1.	Upto mid tropospheric levels	1 – 7	North Pakistan and neighbourhood	Northeast	Eastern parts of Jammu & Kashmir	Moved away on 8
2.	Do	8 – 10	North Pakistan and adjoining Jammu & Kashmir	Do	Jammu & Kashmir and neighbourhood	Moved away on 11
3.	Do	16 – 17	Do	Do	Do	Moved away on 18
4.	Do	18 – 20	Do	Do	Do	Moved away on 21
5.	Do	20 – 23	Do	Do	Do	Moved away on 24
6.	Do	21 – 25	Do	Do	Do	Moved away on 26
7.	Do	27 – 31	Do	Do	Do	Moved away on 1 April
<i>(ii) As induced cyclonic circulations</i>						
1.	Upto lower tropospheric levels	4	Centre Pakistan and adjoining Punjab	Northeast	Punjab and neighbourhood	Became less marked on 5
2.	Upto mid tropospheric levels	20	Punjab and neighbourhood			Became less marked on 21
3.	Do	21 – 29	South Rajasthan and adjoining Pakistan	Westnorthwest	West Rajasthan and neighbourhood	Became less marked on 30
4.	Upto lower tropospheric levels	29	Punjab and neighbourhood	-	-	Became less marked on 30
<b>(C) Other upper air cyclonic circulations</b>						
1.	Lower Levels	7 – 8	South Tamil Nadu and adjoining Kerala	Stationary	-	Merged with the circulation associated with the low pressure area
2.	Mid tropospheric levels	9 – 10	West Madhya Pradesh	Do	<i>In situ</i>	Became less marked on 11
3.	Lower levels	12	Tamil Nadu and adjoining Kerala	Do	Do	Became less marked on 13
4.	Lower tropospheric levels	10 – 13	Lakshadweep and neighbourhood	Do	Do	A trough from this system extended upto north Madhya Maharashtra through interior Karnataka on 14, which became less marked on 15
5.	Lower levels	7 – 8	Punjab and neighbourhood	Do	Do	Became less marked on 9

TABLE 2 (Contd.)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
6.	Lower tropospheric levels	12 – 13	Goa and adjoining Karnataka	Stationary	<i>In situ</i>	Became less marked on 14
7.	Lower tropospheric levels	15 – 16	Lakshadweep and neighbourhood	Do	Do	Became less marked on 17
8.	Lower levels	18 – 20	Kerala and neighbourhood	Do	Do	Became less marked on 21
9.	Mid tropospheric levels	16 – 18	South Madhya Pradesh and adjoining Vidarbha	Northeast	Chattisgarh and neighbourhood	Became less marked on 19
10.	Do	13 – 14	Assam & Meghalaya and neighbourhood	West	Gangetic West Bengal	Became less marked on 15
11.	Mid tropospheric levels	14 - 15	West Rajasthan and neighbourhood	Stationary	<i>In situ</i>	Became less marked on 16
12.	Lower tropospheric levels	17 – 18	Do	Do	Do	Became less marked on 19
13.	Lower levels	19 – 20	Gangetic West Bengal and neighbourhood	Do	Do	Became less marked on 21
14.	Mid tropospheric levels	25 – 30	Do	Do	Do	Became less marked on 31
15.	Lower tropospheric levels	28 – 30	West Madhya Pradesh and neighbourhood	Do	Do	Became less marked on 31
16.	Mid tropospheric levels	30	Assam & Meghalaya	Do	Do	Became less marked on 31
<b>(D) Troughs in easterlies</b>						
1.	Mid tropospheric levels	11 – 13	South Andaman Sea and neighbourhood	Stationary	<i>In situ</i>	Became less marked on 14
2.	Do	16 – 20	South Andaman Sea and adjoining areas	West	Southeast Bay of Bengal and neighbourhood	Became less marked on 21
3.	Do	21 – 22	Andaman Sea and neighbourhood	Stationary	<i>In situ</i>	Became less marked on 23
<b>(E) Trough / wind discontinuity</b>						
1.	Upto lower tropospheric levels	21-27	Lakshadweep to Gangetic west Bengal	Oscillatory	South Tamil Nadu to Orissa	Became less marked on 28. An embedded cyclonic circulation persisted over the northern end of this trough up to 26
<b>(F) Troughs in westerlies</b>						
1.	Lower levels	5 – 7	Sub-Himalayan West Bengal & Sikkim to Orissa through Jharkhand	Oscillatory	Sub-Himalayan West Bengal & Sikkim to Orissa through Gangetic West Bengal	Became less marked on 8
2.	Mid and upper tropospheric westerlies	8 – 12	62° E, to the north of 15° N	East	87° E, to the north of 22° N	Moved away eastwards on 13

TABLE 3

No. of days of different rainfall distribution over the country during March 2009

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

Ext. HR : Extermely heavy rainfall, VHR : Very heavy rainfall, HR : Heavy rainfall, W : Widespread rainfall, Fw : Fairely widespread rainfall, Sc : Scattered rainfall, Iso : Isolated rainfall, Dry : Dry weather, '-' Denotes : Nil

TABLE 4

Dates of occurrence of cold wave/severe cold wave and various categories of minimum temperatures - March 2009

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
2.	Arunachal Pradesh	Nil	Nil	Nil	Nil	1, 12 (2)	4, 6, 9, 10, 24, 28 (6)	7, 26 (2)
3.	Assam & Meghalaya	Nil	Nil	Nil	3, 13, 27 (3)	12, 14, 22, 28 (4)	4, 5, 8-11, 16, 21 (9)	6, 7, 14, 20, 23, 25, 26 (7)
4.	Naga., Mani., Mizo. and Tri.	Nil	Nil	Nil	2, 13, 15 (3)	14, 17 (2)	1, 4-6, 8-12, 21, 22, 30 (12)	16, 23, 24, 26, 29 (5)
5.	S. H. W. B. & Sikkim	Nil	Nil	Nil	2, 12, 13, 27 (4)	12 (1)	4-7, 9-11, 14, 15, 20, 22, 24 (12)	8, 17, 26, 29 (4)
6.	Gangetic West Bengal	Nil	Nil	Nil	13, 14, 27 (3)	2 (1)	1, 4-12, 19, 25, 26 (13)	12, 16, 19, 21, 26, 29, 30 (7)
7.	Orissa	Nil	Nil	Nil	16, 17, 21, 27 (4)	13-15, 18, 23, 28 (6)	1, 3, 5, 6, 8, 10, 11, 16, 23, 30 (10)	1, 2, 4-6, 8, 9, 20, 24, 25, 28, 30 (12)
8.	Jharkhand	Nil	Nil	Nil	7, 13-15, 27 (5)	2, 4, 17, 24, 27 (5)	7, 9, 20, 21 (4)	5, 11, 16, 20, 30 (5)
9.	Bihar	Nil	Nil	Nil	2, 7, 13, 15, 27 (5)	1, 3, 4, 27 (4)	6, 10, 11, 14, 18, 20-22 (8)	5, 18-20, 25, 26, 28-30 (9)
10.	East Uttar Pradesh	Nil	Nil	Nil	2, 3, 12, 13, 24, 27 (6)	1, 7, 8, 12, 23 (5)	4, 5, 9, 14, 16, 19-21, 25, 28-30 (12)	3, 6, 10, 15, 17, 18, 24 (7)
11.	West Uttar Pradesh	Nil	Nil	Nil	12, 13, 23 (3)	1, 12 (2)	4, 5, 7, 9, 19-21, 24, 25, 29 (10)	3, 6, 8, 10, 15, 16-18 (8)
12.	Uttarakhand	Nil	Nil	Nil	26, 27, 28 (3)	Nil	4, 5, 13, 21 (4)	3, 6-8, 15, 17, 22, 29 (8)
13.	Haryana, Chandigarh & Delhi	Nil	Nil	Nil	2, 26, 28 (3)	1, 13 (2)	3-5, 7, 12, 19-21, 23-25 (11)	6, -9, 12, 17, 22, 29 (8)
14.	Punjab	Nil	Nil	Nil	9, 12, 28 (3)	1, 10-13, 21, 26 (7)	4, 7, 19, 20, 29 (5)	5, 15, 17, 19, 22, 24, 25 (7)
15.	Himachal Pradesh	Nil	Nil	Nil	8, 12, 21 (3)	1, 10-12, 26 (5)	2-6, 13-15, 17, 19, 20, 25 (11)	24, 29 (2)
16.	Jammu & Kashmir	Nil	Nil	Nil	28 (1)	26, 30 (2)	1, 4, 5, 7, 12, 14, 16, 19, 20, 24 (10)	6, 25, 29 (3)
17.	West Rajasthan	Nil	Nil	Nil	18 (1)	Nil	1, 2, 4-17, 19-27 (25)	6, 12, 28-30 (5)
18.	East Rajasthan	Nil	Nil	Nil	12, 18 (2)	Nil	1, 4-17, 19, 20, 22, 24, 25, 27, 28, 30 (23)	6, 18, 21, 29 (4)
19.	West Madhya Pradesh	Nil	Nil	Nil	12, 13, 17, 27 (4)	8, 12, 27 (3)	1-5, 7, 9-15, 18-21, 24, 25, 28-30 (23)	6, 12, 13, 16-18, 23 (7)
20.	East Madhya Pradesh	Nil	Nil	Nil	12, 23, 27 (3)	12, 27 (2)	1-11, 15, 17-21, 24, 25, 29 (20)	12-14, 16, 18 (5)
21.	Gujarat Region	Nil	Nil	Nil	Nil	Nil	2-4, 6, 8, 11-17, 19-22, 24-30 (23)	5-7, 10-12, 18-20, 23, 25 (11)
22.	Saurashtra & Kutch	Nil	Nil	Nil	17 (1)	Nil	1-4, 6-8, 12-16, 19-24, 26-30 (23)	5, 6, 9, 12, 18-20, 25 (8)
23.	Konkan & Goa	Nil	Nil	Nil	Nil	Nil	1, 10, 14 (3)	2, 3, 5, 11, 13, 17, 24, 29 (8)
24.	Madhya Maharashtra	Nil	Nil	Nil	17 (1)	15, 22, 28 (3)	1-4, 6, 8-14, 19, 20, 24, 25, 30 (17)	2, 5-7, 16-18, 21, 22, 24, 26, 27, 29, 30 (14)
25.	Marathawada	Nil	Nil	Nil	Nil	Nil	1-5, 7, 9, 10, 12-14, 19, 20, 26, 29, 30 (16)	6, 11, 20, 21, 23, 24, 27 (7)
26.	Vidarbha	Nil	Nil	Nil	16-18, 27 (4)	16, 21, 22, 24 (4)	1, 3, 4-6, 8, 10-13, 15, 19, 24, 29, 30 (15)	2, 4, 7, 8, 12, 14, 18, 20, 21, 28 (10)
27.	Chattisgarh	Nil	Nil	Nil	13, 22-24, 27, 28 (6)	22 (1)	9, 10, 15, 16, 29, 30 (6)	3, 8, 16, 20, 21 (5)
28.	Coastal Andhra Pradesh	Nil	Nil	Nil	Nil	13, 17 (2)	1, 2 (2)	4-7, 10, 11, 14, 21, 22, 29 (10)
29.	Telangana	Nil	Nil	Nil	2, 16, 23, 25 (4)	17, 22, 26 (3)	1, 14, 20, 21 (4)	5, 6, 8, 29, 30 (5)
30.	Rayalaseema	Nil	Nil	Nil	3, 9, 10 (3)	4, 17, 25, 30 (4)	15 (1)	5, 6, 13, 21, 22 (5)
31.	Tamil Nadu	Nil	Nil	Nil	4, 8, 10, 18 (4)	1, 2, 3, 7, 11, 17, 19 (7)	12, 15 (2)	5, 9, 11, 13, 14, 16, 22, 23, 26-29 (12)
32.	Coastal Karnataka	Nil	Nil	Nil	Nil	Nil	1, 4, 6, 12 (4)	2, 4, 8, 10, 12, 15, 17, 18, 27 (9)
33.	North Interior Karnataka	Nil	Nil	Nil	3 (1)	15, 17, 21, 24, 25, 30 (7)	1, 14 (2)	5, 6, 7, 20 (4)
34.	South Interior Karnataka	Nil	Nil	Nil	3, 10, 16 (3)	2, 4, 9, 25, 26, 30 (6)	1, 2, 12 (3)	5, 6, 14, 15, 21, 24, 28 (7)
35.	Kerala	Nil	Nil	Nil	13-, 16, 29 (5)	10, 17, 24 (3)	3 (1)	1, 5, 6, 22, 27 (5)

TABLE 5

Dates of occurrence of heat wave/severe heat wave and various categories of maximum temperatures - March 2009

S. No.	Sub-division Name	Dates (Number of days)						
		Severe heat wave	Heat wave	Hot day	Appreciably to markedly above normal	Above normal	Appreciably to markedly below normal	Below normal
2.	Arunachal Pradesh	Nil	Nil	Nil	4, 14, 15, 21, 22, 24, 27 (7)	7 (1)	Nil	8 (1)
3.	Assam & Meghalaya	Nil	Nil	Nil	1, 3, 4, 9-27, 29 (23)	2, 5-9 (6)	7, 30, 31 (3)	28 (1)
4.	Naga., Mani., Mizo. and Tri.	Nil	Nil	Nil	1, 2, 4, 9-14, 16, 19-27 (19)	3, 6, 8, 11, 17, 18 (6)	Nil	28, 29 (2)
5.	S. H. W. B. & Sikkim	Nil	Nil	Nil	7, 10-19, 24-26 (14)	1, 4, 5, 7-9, 20-22 (9)	3, 27-30 (5)	2, 20, 23, 31 (4)
6.	Gangetic West Bengal	Nil	Nil	Nil	6, 8, 10, 15, 19, 29 (6)	2, 5, 7, 9 (4)	3, 27, 30 (3)	23 (1)
7.	Orissa	6 (1)	Nil	23 (1)	1-5, 7-10, 13, 14, 20, 21, 30 (14)	12, 15, 22, 24, 26, 27, 29-31 (9)	Nil	17 (1)
8.	Jharkhand	Nil	Nil	Nil	1-3, 5, 6-11, 16-22, 30 (18)	4, 10, 15, 18, 19, 22, 24, 26, 27, 29, 31(11)	Nil	23 (1)
9.	Bihar	Nil	Nil	Nil	2, 7, 10, 17, 21, 25 (6)	5, 6, 8, 10, 12, 18-20, 26, 27 (10)	Nil	28 (1)
10.	East Uttar Pradesh	Nil	Nil	Nil	5-10, 17, 19-21, 25 (11)	2-4, 11, 17-19, 24, 26, 31 (10)	22, 28 (2)	10, 13, 14, 26, 27 (5)
11.	West Uttar Pradesh	Nil	Nil	Nil	4, 5, 7, 8, 16-20 (9)	2, 3, 6, 9-11, 14, 16, 17, 25 (10)	28 (1)	22, 26, 27 (3)
12.	Uttarakhand	Nil	Nil	Nil	2-6,8-16,18,20,24 (17)	1,31 (2)	26-28 (3)	29 (1)
13.	Haryana, Chandigarh & Delhi	Nil	Nil	Nil	2-5, 7, 10, 11, 13-21, 24, 25 (18)	1, 6, 8, 9 (4)	28-30 (3)	26, 27, 29, 31 (4)
14.	Punjab	Nil	Nil	Nil	2, 4, 7, 13-18, 20, 21 (11)	1, 3, 5, 6, 8, 10-12, 22, 24 (10)	26, 28-30 (4)	27, 29, 31 (3)
15.	Himachal Pradesh	Nil	Nil	Nil	3-10, 12, 13-21, 24, 25 (20)	1, 22, 31 (3)	26, 28 (2)	Nil
16.	Jammu & Kashmir	Nil	Nil	Nil	2-4, 6, 7, 10-21, 24, 25 (19)	5, 8, 9, 31 (4)	26, 28, 30 (3)	23 (1)
17.	West Rajasthan	Nil	Nil	Nil	1-7, 9, 10-21, 25 (21)	5, 12, 13, 22, 27 (5)	23, 28, 29, 30 (4)	26, 31 (2)
18.	East Rajasthan	Nil	Nil	Nil	1-7, 10, 11-18, 20, 21, 25, 30 (20)	8, 9, 12, 13, 22, 27 (6)	28 (1)	23, 26, 31 (3)
19.	West Madhya Pradesh	Nil	Nil	Nil	1, 3-8, 10-14, 16-21, 29-31 (21)	1, 9, 12, 13, 16, 17, 19, 24-26, 28, 29, 31 (13)	Nil	Nil
20.	East Madhya Pradesh	Nil	Nil	Nil	1, 3-9, 11-14, 17-21, 31 (18)	1, 10, 12, 13, 17, 19, 25, 26, 28, 30 (10)	Nil	Nil
21.	Gujarat region	Nil	4 (1)	Nil	1-5, 7, 11-15, 17, 25, 31 (14)	6, 19, 23, 24, 31 (5)	Nil	8 (1)
22.	Saurashtra & Kutch	Nil	12 (1)	13, 31 (2)	1-3, 5, 7, 10-15, 17, 18, 20, 24, 25, 31 (17)	6, 9, 19, 21-23, 26, 27, 31 (9)	Nil	Nil
23.	Konkan & Goa	Nil	Nil	3 (1)	1-4, 11, 13-16, 18, 20, 25 (12)	5, 8, 17, 19, 22, 24, 26, 27, 31 (9)	Nil	Nil
24.	Madhya Maharashtra	Nil	4, 6, 7 (3)	Nil	1-5, 7, 8, 11, 13, 14, 17, 31 (12)	9, 10, 14, 19-22, 24, 26-31 (14)	Nil	15, 24 (2)
25.	Marathawada	Nil	Nil	Nil	1-8, 10, 31 (10)	9, 19, 20, 31 (4)	15 (1)	15, 16 (2)
26.	Vidarbha	Nil	3-7 (4)	Nil	1-4, 7-10, 13, 14, 18-20, 30, 31 (15)	10, 11, 21, 22, 27-31 (9)	15, 16 (2)	15 (1)
27.	Chattisgarh	Nil	Nil	Nil	1-10, 14, 20, 21, 30, 31 (15)	15, 17, 22, 29 (4)	16 (1)	Nil
28.	Coastal Andhra Pradesh	Nil	2 (1)	13 (1)	1-4, 6, 7, 9, 12, 13, 23, 24 (11)	2, 5, 8, 9, 14, 15, 17, 20, 26, 28, 29, 31 (12)	Nil	11, 16, 18, 22 (4)
29.	Telangana	Nil	4,7 (2)	Nil	1-10,30 (11)	13,14,17,20,21,23,29,31 (8)	15,16 (2)	21-25 (5)
30.	Rayalaseema	Nil	2 (1)	Nil	1-9 (9)	10, 20, 21, 23, 29, 30, 31 (7)	Nil	16, 18, 23, 25 (5)
31.	Tamil Nadu	Nil	Nil	Nil	1-9, 28-31 (13)	5, 13, 14, 17, 19-23, 24-27, 29, 30 (15)	10-12 (3)	10, 12, 16 (3)
32.	Coastal Karnataka	Nil	Nil	Nil	2, 4, 13, 16, 17, 20, 31 (7)	8, 10, 11, 15, 19, 21-24, 26 (10)	Nil	Nil
33.	North Interior Karnataka	Nil	7 (1)	Nil	1-8 (8)	9, 13, 21, 30 (4)	Nil	17, 25 (2)
34.	South Interior Karnataka	Nil	Nil	Nil	1-8 (8)	21 (1)	11, 16, 25 (3)	13, 15, 17, 24-26 (6)
35.	Kerala	Nil	Nil	Nil	2, 4, 7, 9, 10, 16, 31 (7)	5, 6, 8, 11-15, 20-22, 24, 27, 30 (14)	Nil	Nil

TABLE 6

## Details of the weather systems during April 2009

S. No.	System	Duration	Place of first location	Direction of movement	Final location	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)
<b>(A) Cyclonic storm</b>						
1.	Cyclonic Storm (Bijli)	14 – 17	Southeast Bay of Bengal and neighbourhood	Northwest, north northwest and then re-curved into northeast	Bangladesh and adjoining Mizoram	Details are given in the text
<b>(B) Low pressure area</b>						
1.	Low pressure area	11 – 12	Sri Lanka and neighbourhood	Stationary	<i>In situ</i>	Became less marked on 13. It was first observed as a trough of low over the same area on 9 & 10.
<b>(C) Western disturbances/eastward moving systems</b>						
<i>(i) As upper air cyclonic circulations</i>						
1.	Upto mid tropospheric levels	2 – 8	North Pakistan and adjoining Jammu & Kashmir	Northeast	Jammu & Kashmir and neighbourhood	Moved away on 9
2.	Do	10 – 13	Do	Do	Do	Moved away on 14
3.	Do	14 – 17	Do	Do	Do	Moved away on 18
4.	Do	26 – 30	Do	Do	Do	Moved away on 1 May
<i>(ii) As induced cyclonic circulation</i>						
1.	Lower levels	6 – 7	Punjab and neighbourhood	Northeast	West Uttar Pradesh and neighbourhood	Became less marked on 8
2.	Mid tropospheric levels	7 – 8	Central Pakistan and adjoining west Rajasthan	East	Rajasthan and neighbourhood	Became less marked on 9
3.	Lower levels	8 – 10	Punjab and neighbourhood	East	Uttar Pradesh and neighbourhood	Became less marked on 11
4.	Do	20 – 24	Do	Do	Do	Became less marked on 25
<b>(D) Other upper air cyclonic circulations</b>						
1.	Lower levels	1 – 3	Gangetic West Bengal	Stationary	<i>In situ</i>	Became less marked on 4
2.	Do	2 – 4	Karnataka and adjoining south Madhya Maharashtra	Do	Do	Became less marked on 5
3.	Do	5 – 8	Kerala and neighbourhood	East	South Tamil Nadu and neighbourhood	Became less marked on 9
4.	Do	9 – 11	Sub-Himalayan West Bengal & Sikkim	Stationary	<i>In situ</i>	Became less marked on 12
5.	Do	17 – 18	Vidarbha and neighbourhood	Do	Do	Became less marked on 19
6.	Lower tropospheric levels	23 – 24	Assam & Meghalaya	Do	Do	Became less marked on 25



TABLE 6 (Contd.)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
<b>(E) Troughs in westerlies</b>						
1.	Mid and upper troposphere	8 – 9	70° E, to the north of 25° N	Northeast	73° E, to the north of 25° N	Moved away on 10
2.	Mid troposphere	2	Sub-Himalayan West Bengal & Sikkim	-	-	Became less marked on 3
3.	Mid and upper troposphere	24 – 27	62° E, to the north of 15° N	Northeast	85° E, to the north of 20° N	Moved away on 28
4.	Lower levels	24 – 25	Sub-Himalayan West Bengal & Sikkim to northwest Bay of Bengal	Oscillatory	Sub-Himalayan West Bengal & Sikkim to northwest Bay of Bengal	An embedded cyclonic circulation at 0.9 km a.s.l. lay over Sub-Himalayan West Bengal & Sikkim on 25. The trough became less marked on 26. However, the cyclonic circulation persisted over the same area on 26 and became less marked on 27
5.	Do	30 Apr – 4 May	Sub-Himalayan West Bengal & Sikkim to north Bay of Bengal	East	West Uttar Pradesh to north Bay of Bengal	Became less marked on 5 May
<b>(F) Troughs/wind discontinuity</b>						
1.	Lower levels	4 – 8	Bihar to Telangana	Oscillatory	Orissa to coastal Karnataka	Became less marked on 9
2.	Lower tropospheric levels	9 – 11	Commorin area to north interior Karnataka	Oscillatory	Lakshadweep area to Konkan-Goa through Karnataka	Became less marked on 12
3.	Lower levels	16	Jharkhand to south Tamil Nadu	Stationary	<i>In situ</i>	Became less marked on 17
4.	Do	19 Apr – 4 May	Sub-Himalayan West Bengal & Sikkim to coastal Karnataka	Oscillatory	East Madhya Pradesh to south Tamil Nadu	An embedded cyclonic circulation persisted over various parts during 29 April - 4 May. Became less marked on 5 May

The excess rainfall over the peninsular India was realized during the second half of the month as a result of thundershowers due to the presence of a trough in the lower levels. Western disturbances gave rise to precipitation over northwest India during the later part of the month. However, unlike last year, there was no exceptionally enhanced rainfall activity over the south peninsula, due to the absence of high amplitude easterly waves.

### 3.1.2. Temperature distribution

#### (a) Minimum temperatures

The dates of occurrence of *cold waves* and dates on which the minimum temperatures remained *appreciably to markedly above/below normal* and *above/below normal* are given in Table 4. The same date appearing in two different columns of a sub-division may be reckoned as occurrence of that category over parts of the sub-division. The minimum temperatures were normal for rest of the days.

Continuing the warmer than normal trend of the preceding winter, the minimum temperatures remained above normal in general on most of the days over almost all the sub-divisions.

The month's and the season's lowest minimum temperature over the plains was 8° C recorded at Amritsar (Punjab) and Karnal (Haryana) on 1<sup>st</sup> March 2009 and at Patiala (Punjab) on 9 March 2009.

#### (b) Maximum temperatures

The dates of occurrence of *heat waves* and dates on which the maximum temperatures remained *appreciably to markedly above normal* are given in Table 5. It may be noted from the table that even though the temperatures remained *appreciably to markedly above normal* or *above normal* on most of the days over major parts of the country, the *severe heat wave*, *heat wave* or *hot day conditions* have been restricted to a few days over central and interior parts of peninsular India. The rainfall occurred over the central and peninsular India during the

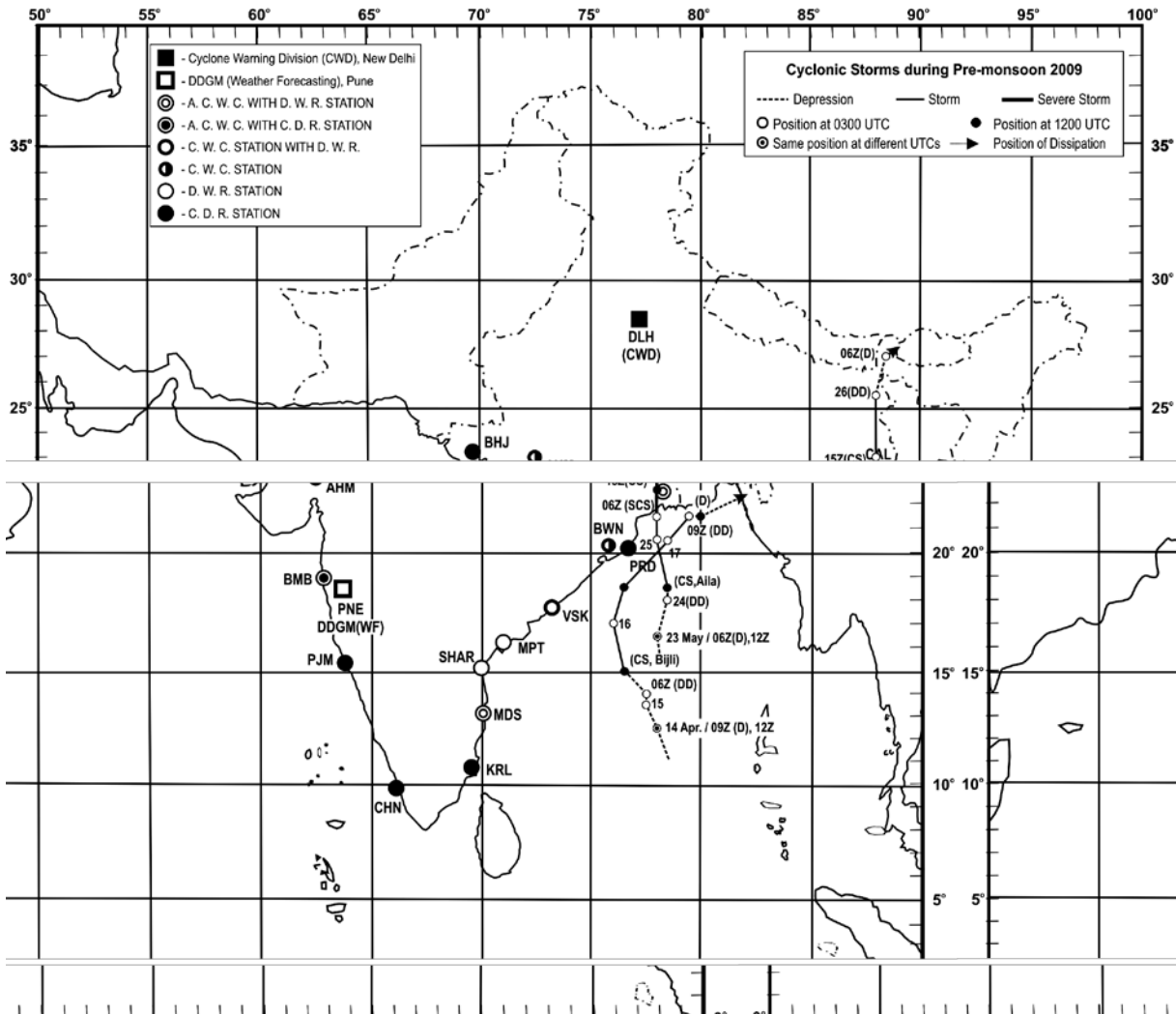


Fig. 2. Track of the very severe cyclonic storm BIJLI (14 April 2009) & AILA (23 May 2009)

latter fortnight of the month causing reduction in maximum temperatures.

The month's highest maximum temperature over the plains was 42° C recorded at Nagpur (Vidarbha) on 31<sup>st</sup> March 2009.

### 3.1.3. Disastrous weather events and damage

According to media and other disaster weather reports, heavy rains and lightning took a toll of 7 people in Karnataka and 4 in Kerala. Thunderstorm, Hailstorm and squall winds claimed 9 lives in Assam, 4 in Vidarbha and 1 in Jharkhand. Also several houses and agricultural crops were damaged in Kerala, Madhya Pradesh, Manipur and Assam.

More than 20 people died and 200 injured in a Tornado that hit Kendrapada district in Orissa on 31 March. It caused huge damage to life and property.

## 3.2. April

### 3.2.1. Weather and associated synoptic features

#### (a) Cyclonic Storm BIJLI over the Bay of Bengal (14-17 April 2009)

A low pressure area formed over the southeast Bay of Bengal and neighbourhood on 13. It became well marked over there on 14. It subsequently concentrated into a Depression near Lat. 12.5° N / Long. 88.0° E (about 700 km southeast of Visakhapatnam) at 0900 UTC of 14

**TABLE 7**  
**No of days of different rainfall distribution over the country during April 2009**

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

Ext. HR : Extermely heavy rainfall, VHR : Very heavy rainfall, HR : Heavy rainfall, W : Widespread rainfall, Fw : Fairely widespread rainfall, Sc : Scattered rainfall, Iso : Isolated rainfall, Dry : Dry weather, '-' Denotes : Nil

and remained practically stationary over there until 1200 UTC. Moving slowly northwest-wards, it lay near Lat. 13.5° N / Long. 87.5° E (about 650 km southeast of Visakhapatnam) at 0300 UTC of 15. Further it intensified into a Deep Depression near Lat. 14.0° N / Long. 87.5° E at 0600 UTC of 15 and intensified into Cyclonic Storm (Bijli) near Lat. 15.0° N / Long. 86.5° E (about 470 km southeast of Visakhapatnam) at 1200 UTC. Continuing its movement in a northwesterly direction it lay centred at 0300 UTC of 16 near Lat. 17.0° N / Long. 86.0° E about 300 km. east southeast of Visakhapatnam. It moved further in a northeasterly direction and lay centred at 1200 UTC of 16 near Lat. 18.5° N / Long. 86.5° E about 200 km. south of Paradip, and at 0300 UTC of 17 near Lat. 20.5° N / Long. 88.5° E about 150 km south of Digha. Continuing to move in a northeasterly direction, it weakened into a deep depression and lay at 0900 UTC of 17, near Lat. 21.5° N / Long. 89.5° E about 200 km east southeast of Digha. Further, it moved in an easterly direction and weakened into a Depression at 1200 UTC of 17 near Lat. 21.5° N / Long. 90.0° E about 250 km east southeast of Digha. It moved further northeastwards and crossed Bangladesh coast near Chittagong (Lat. 22.2° N / Long. 91.8° E) at 1600 UTC of 17 and weakened into a well marked low pressure area over Bangladesh and adjoining Mizoram & Tripura at 1800 UTC on 17. It further weakened and became unimportant at 0300 UTC on 18.

The track of the system is depicted in Fig. 2.

The lowest Estimated Central Pressure (ECP) was 994 hPa. The maximum estimated mean wind speed was 40 kts. The system was mainly tracked by satellite. The maximum intensity of T No. 2.5 was reported from 1200 UTC of 15 to 0700 UTC of 17.

As the system moved away from the east coast of India, it did not cause any adverse weather over the country. Heavy rain occurred on a few days in Assam & Meghalaya and Sub-Himalayan west Bengal & Sikkim.

#### (b) *Other synoptic features and weather*

Details of the weather systems during the month are given in Table 6 and the resultant rainfall distribution in Table 7. The principal amounts of rainfall are given in Table 12.

Two western disturbances in quick succession affected northwest India during the first week of April. However the second western disturbance was more active and caused scattered to widespread precipitation over western Himalayan region and isolated to scattered thundershowers accompanied with hailstorm/thunder

squall over the adjoining plains of northwest India. Northeast India received rainfall due to the remnant of the Cyclonic Storm "Bijli" and other cyclonic circulations which persisted on a few days over the region. The rainfall over peninsular India mainly occurred due to moisture incursion over the region in the presence of an anticyclone that prevailed over the Bay of Bengal.

#### 3.2.2. *Temperature distribution*

From Table 8, it may be seen that *severe heat wave conditions* prevailed over parts of central, peninsular and northwest India on a few days and maximum temperatures in general remained above normal on most of the days outside northeast India.

The month's highest maximum temperature over the plains was 47° C recorded at Chandrapur (Vidarbha) on 26 & 27 April, Phalodi (west Rajasthan) on 29 April and at Akola, Chandrapur and Nagpur (of Vidarbha region) and at Jalgaon (Madhya Maharashtra) on 30<sup>th</sup> April 2009.

#### 3.2.3. *Disastrous weather events*

According to media and other disaster reports, heat wave claimed 43 lives in Orissa, 11 in Jharkhand, 8 in Vidarbha and 4 in West Bengal. Thunderstorm/hailstorm, lightning and squall winds claimed the lives of 13 people in Uttar Pradesh, 8 in Kerala, 7 in Tamil Nadu and 1 each in Andhra Pradesh and Vidarbha.

Thunderstorms/squall winds uprooted trees, blew away roofs and destroyed standing crops in Gujarat state. Also standing crops of several hectares were damaged due to strong winds in Dindigul district of Tamil Nadu. Many trees were uprooted and vehicles damaged due to thunderstorms and strong winds in Bangalore and grape and other Horticultural crop worth crores of rupees were destroyed due to heavy rains in Karnataka. Strong wind and heavy rains damaged 80 houses in Kerala.

### 3.3. *May*

#### 3.3.1. *Weather and associated synoptic features*

##### (a) *Advance of southwest monsoon*

Southwest monsoon arrived over parts of south Bay of Bengal and entire Andaman Sea on 20 May, on its normal date.

Subsequently, in association with the formation of a low pressure area and its further intensification into a Severe Cyclonic Storm (details are given below), the monsoon current further advanced over some more parts

TABLE 8

Dates of occurrence of heat wave/severe heat wave and various categories of maximum temperatures - April 2009

S. No.	Sub-division Name	Dates (Number of days)						
		Severe heat wave	Heat wave	Hot day	Appreciably to markedly above normal	Above normal	Appreciably to markedly below normal	Below normal
2.	Arunachal Pradesh	Nil	Nil	Nil	13, 26, 28 (3)	Nil	1, 11, 21, 24 (4)	25 (1)
3.	Assam & Meghalaya	Nil	Nil	Nil	13, 14, 16, 25-30 (9)	7, 10, 11, 15, 16, 30 (6)	1, 3-6, 8, 21, 22, 24 (9)	1, 2, 4, 18, 20, 23 (6)
4.	Naga., Mani., Mizo. and Tri.	Nil	Nil	Nil	14, 16, 17, 26-30 (8)	8-11, 13, 15, 25 (7)	1, 3, 18, 22, 24 (5)	4, 23 (2)
5.	S. H. W. B. & Sikkim	Nil	25, 26, 28 (3)	Nil	16, 17, 19, 24-29 (9)	11, 13, 14, 30 (4)	1, 3-7, 11, 21 (8)	8, 10, 18, 20 (4)
6.	Gangetic West Bengal	Nil	20, 22, 25, 27, 28 (5)	Nil	8, 20, 22, 23, 25-28 (8)	9, 11, 13, 16 (4)	4, 7, 11, 17, 18 (5)	16, 18 (2)
7.	Orissa	6, 22, 23 (3)	19-25, 27, 28, 30 (10)	5 (1)	1, 4, 5, 7, 8, 10-12, 14-16, 19-21, 25, 26, 29, 30 (18)	3, 6, 7, 9, 11-13, 18, 22, 27, 28 (11)	10, 17 (2)	2, 9 (2)
8.	Jharkhand	Nil	21, 22, 23, 29, 30 (5)	Nil	4-6, 8, 14, 16, 18-20, 21, 22, 24, 26, 27, 29, 30 (16)	3, 16, 28 (3)	6, 10 (2)	4, 9, 12 (3)
9.	Bihar	Nil	21, 28 (2)	Nil	4, 17, 19, 21, 22, 25, 29 (7)	5, 8, 16, 20, 23, 24 (6)	6 (1)	2, 12, 22 (3)
10.	East Uttar Pradesh	Nil	21 (1)	Nil	4, 5, 8, 14-16, 17, 18, 20-22, 25, 26, 29, 30 (15)	3, 5, 6, 18, 20, 23, 24, 28 (8)	10 (1)	1, 9, 11, 12 (4)
11.	West Uttar Pradesh	Nil	21, 29, 30 (3)	Nil	4, 14-16, 20-22, 28-30 (10)	3, 5, 17, 20 (4)	10, 11 (2)	12 (1)
12.	Uttarakhand	Nil	21 (1)	Nil	1, 3-5, 12, 14-16, 18-22, 25, 26, 27, 29, 30 (18)	23, 24 (2)	10 (1)	11 (1)
13.	Haryana, Chandigarh & Delhi	21 (1)	15, 16, 20, 21, 29, 30 (6)	28 (1)	2, 4, 15, 16, 20-, 22, 28, 29 (9)	3, 13, 14, 17, 19, 26, 27 (7)	10, 11, 25 (3)	7, 9, 12 (3)
14.	Punjab	Nil	15, 28-30 (4)	Nil	4, 16, 20, 21, 25, 26, 29, 30 (8)	3, 14, 16 (3)	4, 7, 8, 10, 11 (5)	1, 9, 12 (3)
15.	Himachal Pradesh	Nil	16, 18, 19, 21, 26, 30 (6)	Nil	1, 4, 5, 12-16, 18, 20, 21, 25, 27-30 (16)	2, 22-24, 26 (5)	4, 7, 8, 10 (4)	2, 6 (2)
16.	Jammu & Kashmir	Nil	28, 30 (2)	Nil	1, 3, 6, 12-15, 18-20, 21, 26, 27, 29, 30 (15)	2, 12, 16, 24 (4)	7-10 (4)	4, 23 (2)
17.	West Rajasthan	21, 29, 30 (3)	15, 20, 21, 30 (4)	19, 28 (2)	2, 3, 13-15, 19, 28 (7)	2-6, 13, 16, 19, 22, 26, 27 (10)	9, 10, 11 (3)	8 (1)
18.	East Rajasthan	Nil	15, 20, 21, 29, 30 (5)	28 (1)	2-4, 14-16, 19, 28 (8)	2-6, 13, 19, 22 (6)	10, 11 (2)	Nil
19.	West Madhya Pradesh	Nil	20, 21, 23, 29, 30 (5)	17 (1)	1-5, 14-17, 19-22, 29, 30 (15)	1, 7, 13, 18, 22, 25-28 (9)	8-11 (4)	9, 11, 12 (3)
20.	East Madhya Pradesh	Nil	20, 21, 29, 30 (4)	Nil	2-5, 15-17, 19-22, 30 (12)	20, 25-28 (5)	8-11 (4)	11, 12 (2)
21.	Gujarat region	Nil	3, 13, 18, 20, 21, 28 (6)	5 (1)	1-5, 12, 13, 19-21, 27, 29, 30 (13)	7, 18, 25, 26 (4)	9, 10 (2)	8, 11, 16 (3)
22.	Saurashtra & Kutch	20, 27-30 (5)	2, 3, 6, 13, 18-21, 28 (9)	1, 4-7, 11, 12 (7)	1-5, 10, 12, 13, 20, 21, 23, 24, 27, 30 (14)	7, 8, 18, 22, 25, 26 (6)	Nil	8, 9 (2)

TABLE 8 (Contd.)

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

of Arabian Sea and Bay of Bengal on 22 May and set in over Kerala and adjoining areas on 23 May. With the northward movement of the severe Cyclonic Storm, monsoon further advanced and covered more parts of Arabian Sea and Bay of Bengal, entire northeast India, most parts of west Bengal & Sikkim and parts of Orissa on 25 May (almost 2 weeks before the normal date of advance over these regions). Subsequent to the landfall of the storm over the Bangla Desh coast and its weakening and dissipation over land, there was a lull in the advance of monsoon until the end of May.

(b) *Severe Cyclonic Storm AILA over the Bay of Bengal (23 – 26 May 2009)*

A low pressure area formed over the southeast Bay of Bengal and neighbourhood on 22. It became well

marked over the west central Bay of Bengal and neighbourhood on 23 morning, concentrated into a Depression and lay centred at 0600 UTC of 23, near Lat. 16.5° N / Long. 88.0° E (about 470 km south southeast of Paradip). It remained practically stationary until 23 night and thereafter it moved generally in a northeasterly direction. It intensified into a Deep Depression and lay centred at 0300 UTC of 24, near Lat. 18.0° N / Long. 88.5° E and into a Cyclonic Storm (Aila) which lay centred at 1200 UTC of 24, near Lat. 18.5° N / Long. 88.5° E. It lay centred at 0300 UTC of 25, near Lat. 20.5° N / Long 88.0° E and further intensified into a Severe Cyclonic Storm at 0600 UTC, near Lat. 21.5° N / Long. 88.0° E (close to Sagar Islands). Subsequently it crossed West Bengal coast, close to Sagar Islands between 0800 & 0900 UTC and lay centred at 1200 UTC of 25, near Lat. 22.5° N / Long 88.0° E close to Kolkata. Moving further

**TABLE 9**  
**Details of the weather systems during May 2009**

S. No.	System	Duration	Place of first location	Direction of movement	Final location	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)
<b>(A) Cyclonic storm</b>						
1.	Severe Cyclonic Storm (Aila)	22 – 26	East central Bay of Bengal and neighbourhood	North	Sub-Himalayan West Bengal & Sikkim and neighbourhood	The details are given in the text
<b>(B) Western disturbances/eastward moving cyclonic circulations</b>						
<i>(i) As upper air cyclonic circulations</i>						
1.	Upto mid tropospheric levels	2 – 6	North Pakistan and neighbourhood	Northeast	Jammu & Kashmir and neighbourhood	Moved away on 7
2.	Do	9 – 11	Do	Do	Do	Moved away on 12
3.	Do	19 – 23	Do	Do	Do	Moved away on 24
4.	Do	23 – 25	Do	Do	Do	Moved away on 26
5.	Do	25 – 27	Do	Do	Do	Moved away on 28
6.	Do	29 May – 1 Jun	Do	Do	Do	Moved away on 1 June
<i>(ii) As induced cyclonic circulations</i>						
1.	Lower tropospheric levels	4 – 6	West Rajasthan and neighbourhood	Northeast	East Rajasthan and neighbourhood	Moved away on 7
2.	Lower levels	7 – 8	West Rajasthan and neighbourhood	Do	Do	Became less marked on 9
3.	Do	12 – 15	West Rajasthan and adjoining south Pakistan	Do	Punjab and neighbourhood.	Became less marked on 16
4.	Do	27 – 28	Punjab and neighbourhood	Stationary	<i>In situ</i>	Became less marked on 29
<b>(C) Other cyclonic circulations</b>						
1.	Upto Mid tropospheric levels	16 – 21	South Andaman Sea and adjoining southeast Bay of Bengal	West	Southwest Bay of Bay of Bengal off Tamil Nadu coast	Merged with the cyclonic circulation associated with the low pressure area on 22
2.	Lower tropospheric levels	27 May – 2 Jun	Chattisgarh and neighbourhood	Northnortheast	East Uttar Pradesh and adjoining Bihar	It was seen over : Gangetic West Bengal and adjoining Jharkhand 28 & 29; Jharkhand and neighbourhood on 30 and 31 May
<b>(D) Troughs in westerlies</b>						
1.	Mid and upper troposphere	5 – 11	64° E, to the north of 15° N	Northeast	Lat. 35° N / Long. 90° E to Lat. 15° N / Long. 65° E	Became less marked on 12
2.	Lower levels	14	Assam & Meghalaya to northeast Bay of Bengal	Stationary	<i>In situ</i>	Became less marked on 15

TABLE 9 (Contd.)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
<b>(E) Trough/wind discontinuity</b>						
1.	Lower levels	7 – 14	Sub-Himalayan West Bengal & Sikkim to south Tamil Nadu	Oscillatory	Orissa to south Tamil Nadu	Orissa to south Tamil Nadu on 8, Sub-Himalayan West Bengal & Sikkim to south Tamil Nadu on 9, Jharkhand to south Tamil Nadu on 10 & 11 and Chattisgarh to south Tamil Nadu on 12 & 13 with an embedded cyclonic circulation at 0.9 km a.s.l. over Chattisgarh and neighbourhood. It became less marked on 15
2.	Do	28 – 31	Jharkhand to Kerala	Do	Jharkhand to north coastal Andhra Pradesh	Became less marked on 1 June
3.	Do	28 May – 1 Jun	Northwest Rajasthan to Jharkhand	Do	Northwest Rajasthan to Gangetic West Bengal	Became less marked on 2 June
<b>(F) East-west trough</b>						
1.	Lower levels	16 – 26	West Rajasthan to Gangetic West Bengal	Oscillatory	West Rajasthan to the centre of the Severe cyclonic storm (Aila)	On many a days, embedded cyclonic circulations were associated with this system over various places

northwards, it weakened into a Cyclonic Storm and lay centred at 1500 UTC, near Lat. 23.0° N / Long 88.0° E, about 50 km north of Kolkata and into a Deep Depression, which lay centred at 0300 UTC of 26, near Lat. 25.5° N / Long 88.0° E about 50 km north of Malda. It further weakened into a Depression at 0600 UTC of 26, centered near Lat. 27.0° N / Long 88.5° E and into a well marked low pressure area over Sub-Himalayan West Bengal & Sikkim and neighbourhood by 0900 UTC of 26 and became less marked in the evening.

The track of the system is depicted in Fig. 2.

The lowest estimated central pressure was about 967 hPa at the time of landfall. The maximum estimated mean wind speed was 60 kts.

Widespread rain/thundershowers with scattered heavy to very heavy rainfall and isolated extremely heavy rainfall occurred over Orissa on 25, over West Bengal & Sikkim on 25 & 26. Widespread rainfall with isolated heavy to very heavy rainfall also occurred over Assam & Meghalaya on 26 & 27 May.

According to media reports, a storm surge of 3 m impacted western regions of Bangladesh, submerging numerous villages. The Sunderbans, was inundated with 6

m of water as per the media reports. Considering the astronomical tidal wave at the time of landfall, which was about 4-5 meters, the maximum storm surge over Sunderbans area may be estimated to be about 2 m.

Some chief amounts of rainfall in centimeters are:

#### Orissa

25 May : Paradip 26, Kakatpur 18, Chandbali & Alipingal 15 each, Neemapara & Patamundai 14 each, Nawana 13, Rajkanika 10, Cuttack & Akhuapada 9 each, Bhubaneswar, Soro & Gathgaon 8 each, Jajpur, Bangiriposhi & Gop 7 each

26 May : Nawana 12, Bhogari & Rajghat 11 each

#### Gangetic West Bengal

25 May : Digha 7

26 May : Panagarh A/F, Kaliakunda A/F & Sriniketan 17 each, Midnapur & Digha 14 each, Barrackpur 12, Barampur 10, Barrackpur & Dum Dum 9 each, Bankura & Krishna nagar 7 each



**TABLE 10**  
**No of days of different rainfall distribution over the country during May 2009**

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

Ext. HR : Extremely heavy rainfall, VHR : Very heavy rainfall, HR : Heavy rainfall, W : Widespread, Fw : Fairly widespread, Sc : Scattered, Iso : Isolated, Dry : Dry weather, '-' denotes : Nil, Vig: Vigorous monsoon conditions, Active: Active monsoon conditions

TABLE 11

Dates of occurrence of heat wave/severe heat wave and various categories of maximum temperatures - May 2009

S. No.	Sub-division Name	Dates (Number of days)						
		Severe heat wave	Heat wave	Hot day	Appreciably to markedly above normal	Above normal	Appreciably to markedly below normal	Below normal
2.	Arunachal Pradesh	Nil	Nil	Nil	18, 24 (2)	7, 16 (2)	Nil	Nil
3.	Assam & Meghalaya	Nil	Nil	Nil	3-10, 13, 16-18, 20-23 (16)	11, 12, 28 (3)	1, 2, 15, 19 (4)	14 (1)
4.	Naga., Mani., Mizo. & Tri.	Nil	Nil	Nil	5-13, 16, 21-24 (14)	4, 14, 15, 17, 20 (5)	3, 19 (2)	3 (1)
5.	S. H. W. B. & Sikkim	Nil	9, 10 (2)	Nil	5, 8, 10, 11, 18, 20, 21, 24 (8)	6, 21, 22 (3)	1-4, 7, 12-15, 17, 19 (11)	14 (1)
6.	Gangetic West Bengal	Nil	9, 10 (2)	Nil	8, 10, 11, 21 (4)	7, 12 (2)	2, 4, 13-15, 17, 18, 21, 28, 30 (10)	14, 21 (2)
7.	Orissa	Nil	1, 2, 3, 7-12, 18-21, 28, 29 (15)	Nil	3, 7, 24, 27 (4)	6, 8, 10, 22, 30 (5)	14, 15, 17, 18, 23, 25-27, 31 (9)	4, 5, 13, 30 (4)
8.	Jharkhand	Nil	1-3, 9-11 (6)	Nil	3, 10 (2)	2, 7, 13 (3)	5, 14, 15, 16-27, 30, 31 (17)	4, 21 (2)
9.	Bihar	Nil	2 (1)	Nil	10 (1)	2, 7, 9, 11, 13 (5)	3, 4, 12, 14-31 (21)	4, 21 (2)
10.	East Uttar Pradesh	Nil	1, 2, 11 (3)	Nil	1 (1)	7, 10, 13 (3)	4, 12, 14-18, 21, 24-27, 29-31 (15)	5, 8, 12, 18, 22, 28 (6)
11.	West Uttar Pradesh	Nil	1, 2, 19, 20, 23, 28 (6)	Nil	1, 10 (2)	13, 28 (2)	7, 12, 14, 15, 17, 20, 21, 24-26, 30, 31 (12)	4, 7, 8, 12, 16, 18, 22, 27, 29 (9)
12.	Uttarakhand	Nil	1 (1)	Nil	2, 3, 5, 10, 22 (5)	8, 9, 19 (3)	12, 14, 20, 25, 31 (5)	4, 17, 18, 27 (4)
13.	Haryana, Chandigarh & Delhi	Nil	1-3, 18-22 (8)	Nil	2, 3, 19, 22, 29 (5)	4, 5, 13, 17, 24 (5)	6, 7, 12, 14, 16, 25, 26, 31 (8)	4, 7, 8, 15, 17, 27 (6)
14.	Punjab	Nil	1-3, 19, 21, 23 (6)	Nil	2-4, 19, 20, 22-24, 29 (9)	17, 21 (2)	4, 6, 7, 12, 14, 16, 25, 26, 30, 31 (10)	7, 8, 13, 15, 17, 27 (6)
15.	Himachal Pradesh	Nil	1-3 (3)	Nil	2, 17-23 (8)	9, 15, 16, 24 (4)	5, 6, 11, 12, 31 (5)	5 (1)
16.	Jammu & Kashmir	Nil	1, 2 (2)	Nil	2, 3, 14-, 21, 24, 25, 29-31 (15)	9 (1)	5-7, 31 (4)	4, 11, 12 (3)
17.	West Rajasthan	16, 18-22 (6)	1-4, 13-18, 21, 23-26, 28-30 (18)	18, 27 (2)	3, 4, 19, 22, 27 (5)	4, 9, 10, 12, 13, 26, 30 (7)	5, 6, 31 (3)	5, 7, 30, 31 (4)
18.	East Rajasthan	16 (1)	1, 2, 15-17, 19-24, 28, 29 (13)	Nil	2-4, 14, 18, 21-23, 29 (9)	3-5, 9-12, 14, 17, 24, 26, 28 (12)	31 (1)	31 (1)
19.	West Madhya Pradesh	Nil	1, 2, 18-24, 29 (10)	Nil	2, 3, 16, 18, 20, 22, 27-29 (9)	3, 5, 10, 11, 19, 24, 25 (7)	19, 25, 30, 31 (4)	7, 14, 21 (3)
20.	Nil	Nil	1-5, 11, 18-21, 23, 28, 29 (13)	Nil	3, 4, 27, 29 (4)	18, 20, 23, 24, 25 (5)	25, 31 (2)	14 (1)
21.	Gujarat Region	Nil	16 (1)	Nil	1-3, 15, 17, 22, 23 (7)	3-5, 11, 24, 26, 29 (7)	7, 31 (2)	2, 6, 12, 13, 16, 18, 19, 21, 30 (9)
22.	Saurashtra & Kutch	Nil	Nil	1 (1)	2, 3, 19, 21-23, 27 (7)	3-5, 7-9, 13-15, 17, 18, 24-26, 28, 29 (16)	31 (1)	12, 30 (2)
23.	Konkan & Goa	Nil	Nil	Nil	1, 5, 8, 9, 17, 19, 27, 31 (8)	6, 12, 14-16, 18, 20-22, 24-26, 28-30 (15)	Nil	Nil

TABLE 11 (Contd.)

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

**Sub-Himalayan West Bengal & Sikkim**

25 May : Barobhisa 10

26 May : Singlabazar 14, Malda 13, Gajoldoba 11, Khanitar 10, Jalpaiguri 9, Domohani &amp; Champasari 8 each, Pushvihar &amp; Alipurduar 7 each

27 May : Darjeeling 27, Singlabazar &amp; Lava 18 each, Bijanbari 15, Sukhiapokhari 11, Sevok 10, Bagdogar 7

**Arunachal Pradesh**

27 May : Bhalukpong 7

**Assam & Meghalaya**

26 May : Cherapunji 21, Shillong 12, Kokrajhar 9, Golpara 8, Bhagalpur 7

27 May : Jiamanas NH 12, Cherapunji 9, Shillong 8, Bekird 7

**Nagaland-Manipur-Mizoram & Tripura**

26 May : Dharmangar, Paniagarh 8

27 May : Belonia 13

As per media reports, in West Bengal about 100 people died. About 2.2 million people were affected. More

TABLE 12

## Principal amounts of rainfall (1 cm and above) (March, April and May 2009)

Date (1)	March (2)	April (3)	May (4)
1. Passighat 1		Cherrapunji 8, North Lakhimpur 5, Kailashahar & Chandbali 4 each, Shillong, Lengpui, Diamond Harbour & Nilgiri 2 each, Silchar, Agartala, Imphal, Gangtok, Tadong & Mandya 1 each	Kokrajhar 17, Cherrapunji 13, North Lakhimpur 10, Motunga & Kozhikode 6 each, Itanagar 5, Majbat & Chouldhowaghat 4 each, Tezpur, Nalbari, Khowang, Puthimari, Tikrikilla, Rangia, Dhekiajuli & Malda 3 each, Ziro, Daporijo, Manas N H Xing, Bahalpur, Annapurnaghat, Panbari & Gangtok 2 each, Dibrugarh, Silchar, Dhubri, Shillong, Barpeta, Dholai, Badatighat, Daramtul, Tangla, Agartala, Tadong, Punalur, Passighat & Mangalore 1 each
2. Nancowry 2		Kupwara 2, Nancowry, Dibrugarh, Lakhimpur, Agartala & Belgaum 1 each	Cherrapunji 22, Bhagalpur, Kokrajhar & North Lakhimpur 9 each, Beki RD Bridge & AIE NH Xing 7 each, Dhubri, Shillong & Kozhikode 6 each, Barpeta & Daramtul 5 each, Manas NH Xing, Tikrikilla, Rangiya & Lumbding 4 each, Itanagar, Annapurnaghat, Goalpara, Matijuri & Kailashahar 3 each, North Lakhimpur, Silchar, Lakhimpur, Puthimari, Nalbari, Dharmanagar & Long Islands 2 each, Tezpur, Motunga, Tangla, Imphal, Kohima, Agartala, Arundhutingar, Cooch Behar, Jagdalpur, Guwahati, Chitradurga & Gangtok 1 each
3. Nancowry & Car Nicobar 1 each		Silchar, Kukernag, Bhang, Dharamsala, Patsio & Kukernag 3 each, Agartala, Gangtok, Ghamroo, Quazigund, Solang Nala, Palampur & Gulamarg 2 each, Shillong, Cherrapunji, Kailashahar, Tadong, Amritsar, Adampur, Berthin, Guler, Nagrotasurian, Kalpa, Bhuntar, Srinagar, Banihal, Pahalgam, Kupwara, Bhaderwah & Gangtok 1 each	Bahraich, Mukteshwar & Mahendragarh 3 each, Agartala & Gumapur 2 each, Cherrapunji, Gorakhpur, Pithoragarh, Nainital, Visakhapatnam, Jagdalpur, Car Nicobar & Nancowry 1 each
4. Kupwara 2		Passighat 6, Cherrapunji 4, Shillong & Zero 3 each, Dhubri & Kailashahar 2 each, Car Nicobar, Silchar, Jorhat, Tangla, Agartala, Lengpui, Quazigund, Solang Nala, Bhang, Mukerian, Adampur & Darjeeling 1 each	Udala 6, Sukinda 5, Passighat, Numaligarh, Sriniketan, Balasore, Jamshedpur, Gulmarg 4 & each, Neematighat, Badatighat, Kolkata, Bankura, Chandbali & Jamshedpur 3 each, Manas N H Xing, Barpeta, Malda, Canning Town, Keonjhar & Bashirahat 2 each, Shillong, Beki RD Bridge, Agartala, Gangtok, Diamond Harbour, Haldia, Paradip, Bhagalpur, Pahalgam, Kukernag, Kupwara & Jagdalpur 1 each
5. Kupwara & Kukernag 2 each, Quazigund, Pahalgam & Silchar 1 each		Gangtok 6, Passighat & Tadong 3 each, Goalpara, Tezpur, Jorhat & Mahabaleshwar 1 each	Machilipatnam 9, Vijayawada 5, Dhundi & Ongole 3 each, Itanagar, Dibrugarh, Neematighat, Sibsagar, Tangla, Rangia, Tadong, Moga, Solangnala, Bharwain, Kupwara & Medikeri 2 each, Nancowry, Daporijo, Deomali, Tezu, Motunga, Nalbari, Khowang, Chouldhowaghat, Mazbat, Phek, Gangtok, Sundernagar, Hindon, Jhansi, Karnal, Tissa, Keylong, Bhang, Amb, Una, Kalpa, Batote, Kukernag, Jagdalpur, Shillong, Honavar & Mysore 1 each

TABLE 12 (Contd.)

(1)	(2)	(3)	(4)
6.	Silchar 2	Tezu & Pattambi 5 each, A.P. Ghat 4, Tadong 3, Banihal, Alapuzha & Mancompu 2 each, Itanagar, Khonsa, Matijuri, Sibsagar, Phek, Gangtok, Batote, Bhaderwah, Kukernag, Pahalgam, Kolhapur & Belgaum 1 each	Port Blair 8, Rangia & Kottayam 5 each, Patsiao 4, Cherrapunji, Williamnagar, Goalpara, Bhang, Kalpa, Solangnala, Pahalgam, Quazigund & Baghdogra 3 each, Car Nicobar, AIE NH Xing, Tangla, Tikrikilla, Kokrajhar, Jagdalpur, Cooch Behar, Keylong, Udaipur, Banihal, Kupwara, Kukernag, Gadag & Jalpaiguri 2 each, Hut Bay, Silchar, Dhunri, Shillong, Beki RD Bridge, Barpeta, Matijuri, Puthimari, Nalbari, Neematighat, Lengpui, Agartala, Kailashahar, Hardoi, Bhunta, Bhanjar, Palampur, Rampur Bushahar, Rajgarh, Sundernagar, Sunnibhaji, Theog, Batote, Bhaderwah, Sringar, Minicoy & Guwahati 1 each
7.	Nil	Car Nicobar 6, Gangtok, Bhang & Dhundhi 5 each, Cooch Behar, Bhuntar, Banihal, Batote & Bhaderwah 4 each, Jalpaiguri, Dharmasala, Kalpa, Kupwara & Katra 3 each, Halwara, Ghamroor, Bertin, Pandoh, Rampur, Shimla, Sundernagar, Sunibhaji, Jammu, Quazigund, Udampur, Kochi, Piravam & Tangla 2 each, Tezpur, Ambala, Amritsar, Adampur, Ludhiana, Nangal, Patiala, Pathankot, Guler, Nagrotasurian, Kahu, Kasol, Mandi, Una, Nadaun, Kukernag, Pahalgam & Srinagar 1 each	Bhalukpong 12, Itanagar 8, Kokrajhar 7, Neematighat 5, Tangla 4, Deomali, Tezpur, North Lakhimpur, Jorhat, Cherrapunji, Bahalpur, Goalpara & Udapur 3 each, Dhubri, Manas N H Xing, Beki RD Bridge, Barpeta, Chouldhowaghat, Margherita, Tikrikilla, Panbari, Dhekiajuli, Kodaikanal, Minicoy & Kodaikanal 2 each, Karimganj, Motunga, Gangtok, Midnapore, Panagarh, Bhuntar, K. Paramathy, Gadag & Agumbe 1 each
8.	Nil	Khawang 7, Dibrugarh & Varkala 5 each, Thalasserry & Thrithala 4 each, North Lakhimpur, Guwahati, Badatighat, Kupwara, Punalur & Kochi 3 each, Itanagar, Tezu, Passighat, Tangla, Cherrapunji, Hyderabad & Lakhimpur 2 each, Zero, Tawang, Daporijo, Deomali, Beki Mathaguri, Barpeta, A. P. Ghat, Puthimati, Matunga, Nalbari, Kampur, Margherita, Panbari, Banihal, Batotoe, Kukernag, Srinagar, Sheopur Kalan, Solapur, Agumbe, Chickmagalur, Keonjhar, Satna & Rewa 1 each	Deomali, Tangla, Tezpur & North Lakhimpur 3 each, Cherrapunji, Margherita, Dhubri & Belgaum 2 each, Dibrugarh, Tezpur, Neematighat, Satara, Kodainal & Punalur 1 each
9.	Nil	Matighuza & Bhaderwah 7 each, Rohtak & Halwara 6 each, Patiala 5, Goalpara, Moradabad & Dharamsala 4 each, Cherrapunji, Mukteswar, Nainital, Sirsa, Ghamroor, Banihal, Batote, Kupwara, Kukernag, Katra, Quazigund, Srinagar, Neora & Gajoldoba 3 each, Kailashahar, Sarsawa, Pithoragarh, Pantnagar, Hissar, Ambala, Adampur, Pathankot, Berthin, Guler, Kasol, Nagrotasurian, Sujanpur Tira, Sunibhaji, Sundernagar, Shimla, Pahalgam, Damoh & Imphal 2 each, Hut Bay, Dhubri, Ranchi, Bareilly, Dehra Dun, Ludhiana, Nangal, Bhuntar, Kahu, Nadaun, Pandoh, Udampur, Gondia, Pendra, Champa, Raipur, Rajnandgaon & Mana 1 each	Cherrapunji 12, Tangla, Coimbatore, Thrithala & Enamakel 3 each, Itanagar, North Lakhimpur, Karwar, Bangalore, Ottappalam & Karipur 2 each, Passighat, Dibrugarh, Silchar, Mahabaleshwar, Panambur, Chittur, Vellanikkara, Haripad, Chengannur, Konni, Kozhikode & Kochi 1 each
10.	Vedarniyam 11, Ranchi 3, Pamban 2, Jamshedpur, Nagapattinam, Adirampattinam, Karaikal, Tondi, Kochi, Kottayam & Puducherry 1 each	Bhoothapandi & Kanyakumari 11 each, Palayamkottai & Nagarcoil 8 each, Tuticorin & Toothukudi 7 each, Long Islands & Alapuzha 4 each, Car Nicobar & Minicoy 3 each, Port Blair, Hut Bay, Gangtok, Tadong & Thiruvananthapuram 2 each, Nancowry, Passighat & Mukteswar 1 each	Guwahati 5, North Lakhimpur, Rangia, Gangtok, Tadong & Pahalgam 3 each, Itanagar, Dhekiajuli & Dharamapuri 2 each, Passighat, Dibrugarh, Dhubri, Cherrapunji, Goalpara, Kokrajhar, Kohima, Banihal, Silchar, Tezpur, Quazigund, Alapuzha & Kochi 1 each

TABLE 12 (Contd.)

(1)	(2)	(3)	(4)
11.	Vedaranniyam 19, Tiruvarur 17, Parangipettai 13, Cuddalore & Puducherry 11 each, Karaikal 9, Nagapattinam 6, Car Nicobar 1	Ramanathapuram 8, Nagapattinam 7, Pamban & Passighat 4 each, Long Island, Maya Bandar, Palayamkottai & Tondi 3 each, Car Nicobar, Hut Bay, North Lakhimpur, Jorhat, Adirampattinam, Cuddalore, Karaikal & Tiruchirapalli 2 each, Port Blair, Nancowry, Silchar, Dibrugarh, Kanyakumari, Kodaikanal, Thanjavur, Punalur & Diamond Harbour 1 each	Dibrugarh 5, Gangtok 4, Tadong, Dhundi & Kottayam 3 each, Silchar, Jorhat, Cherrapunji, Lengpui, Agartala, Kalpa, Solang Nala, Pahalgam & Punalur 2 each, Passighat, Rangia, Tangla, Kailashahar, Dehra Dun, Nainital, Mukteshwar, Delhi, Bhang, Rampur Bushar, Banihal, Kukernag, Srinagar, Quazigund, Mathura, Tehri & Bhunter 1 each
12.	Chickmagalur & Aryankavu 6 each, Quilandy & Mananthavady 5 each, Pamban, Irinjalakuda, Medikeri & Coonoor 4 each, Kolkata, Kodaikanal, Harinkhola, Kolkara & Kodainal 3 each, Kozhikode & Agumbe 2 each, Nancowry & Mangalore 1 each	Nagapattinam 10, Pamban, Tiruvarur, Karaikal & Vellore 8 each, Tondi, Tiruvadanai & Ramanathapuram 7 each, Kannur 6, Adirampattinam 5, Madurai 4, Thanjavur & Hut Bay 3 each, Port Blair, Palayamkottai & Tuticorin 2 each, Long Islands 1	Canning Town, Kolkata, Gaya & Bahraich 3 each, Shillong, Gangtok, Diamond Harbour, Bankura, Digha, Akhuapada, Anandpur, Bangiriposh, Chandanpur & Jamshedpur 2 each, Tawang, Dhubri, Cherrapunji, Bahalpur, Tadong, Jalpaiguri, Sriniketan, Baripada, Patamundai, Bhograi, Jaipur, Rajghat, Champa, Ranchi, Bhagalpur, Hardoi, Sillong, Purnea & Minicoy 1 each
13.	Cannur 9, Parambikulam 8, Konni 7, Honavar, Punalur, Idukki & Karwar 4 each, Alapuzha 3, Karwar, Kottayam & Kochi 1 each	Car Nicobar 5, Hut Bay 3, Long Islands 1	Diamond Harbour 8, Altuma, Karanjia & Car Nicobar 5 each, Itanagar, Sukinda, Keonjharagarh & Tangi 4 each, Dhekiajuli, Kailashahar, Gangtok, Malda, Champua, Cuttack, Baripada, Nayagarh & Kochi 3 each, Willamnagar, Bahalpur, Canning Town, Kolkata, Govindpur, Swampatna, Naraj, Balimundali, Bangiriposhi, Thakurmunda, Udala, Banpur, Ranpur & Ranchi 2 each, Hut Bay, North Lakhimpur, Dhubri, Shillong, Chouldhowaghat, Jia Bharali, NT Xing, Phek, Nilgiri, Rajghat, Alipingal, Jenapur, Ghatagaon, Dhenkanal, Salem & Panambur 1 each
14.	Thiruvananthapuram & Munnar 4 each, Alapuzha & Peermadu 3 each, Satara 2, Mahabaleshwar & Kottayam 1 each	Kochi 7, Car Nicobar & Kottayam 3 each, Goalpara & Alapuzha 2 each, Dhubri, Tikrikilla, Rangiya & Darjeeling 1 each	Kailashahar 10, Dharmanagar, Jamsolaghat & Rairangpur 4 each, Cherrapunji, Annapurna Ghat, Kolkata & Krishnanagar 3 each, Bhalukpong, Badatighat, Chouldhowaghat, Imphal, Agartala, Canning Town, Bangiriposhi, Chandanpur & Bashirahat 2 each, Long Islands, Daporijo, Passighat, Guwahati, Silchar, North Lakhimpur, Dhubri, Shillong, Bahalpur, Puthimari, Tikrikilla, Goalpara, Phulbani, Tikabali, Angul, Aska, Bhanjanagar, Madhabarida, Sarada & Purnea 1 each
15.	Buldhana & Pattambi 8 each, Kanjirappally, Quilandy & Thrithala 4 each, Karipur 3, Thiruvananthapuram 2, Sholapur, Kodaikanal, Palayamkottai & Bagalkote 1 each	Kochi 7, Port Blair 4, Hut Bay 3, Long Islands 2, Kupwara 1	Gohar 7, Gopalpur & Chhatrapur 6 each, Jeypore & Mandi 5 each, Akola & Ongole 4 each, Port Blair & Naraj 3 each, Car Nicobar, Khonsa, Kolkata, Cuttack, Paradip, Pithoragarh & Pachmari 2 each, Nancowry, Tezu, Nahariganj, Jaipur, Rajkanika, Aska, Dhenkanal, Kendrapada, Koraput, Chandbali, Palampur, Sundernagar, Hoshangabad, Munnar, Burdwan & Mukteshwar 1 each
16.	Konni 5, Parambikulam 4, Munnar & Ambalavayal 3 each, Nasik, Coonoor & Bangalore 2 each, Chitradurga, Gwalior, Seoni & Hassan 1 each	Goalpara 9, Damohani 3, Maya Bandar, Khanita, Gadong, Gangtok & Udaipur 2 each, Shillong, Solangnala, Kalpa & Kukernag 1 each	Mohanpur 8, Kanjirappally 6, Midnapore 5, Nagapattinam 4, Hut Bay, Bankura, Diamond Harbour, Haldia, Durgachak, Purihansa, Chennai & Karaikal 3 each, Long Islands, Silchar, Lakhimpur, Harinkhola, Krishnanagar, Kolkata, Digha, Balasore, Patna, Pithoragarh, Karurparamathi,

TABLE 12 (Contd.)

(1)	(2)	(3)	(4)
			Dharmapuri, Cherthala & Hut Bay 2 each, Nancowry, Dholai, Annapurna Ghat, Canning Town, Kansabati Dam, Tusuma, Ranchi, Jamshedpur, Sheopur, Salem, Madurai, Kollengode, Enamckel, Kumarakom & Osmanabad 1 each
17.	Nancowry 3, Vythiri 1	Sevoke 12, Chengmari & Champasari 9 each, Cooch Behar 7, Alipurduar 5, Hasimara, Gangtok, Paradip & Dhubri 4 each, NH-31 & Tadong 3 each, Damohani & Maya Bandar 1 each	Enamackel 8, Kochi 7, Yeragatti 5, Silchar, Kailashahar, Pithoragarh, Davangere & Ajjampura 3 each, Car Nicobar, Guwahati, Bahalpur, Balasore, Mani, Subramanya, Bailhongal, Hukkeri, Hirekerur, Kunoor & Balehonnur 2 each, Hut Bay, Shillong, Annapurna Ghat, Agartala, Tadong, Digha, Haldia, Jamshedpur, Sambre, Hubli, Shiggaon, Koppal, Nagathan, Hassan & Dehra Dun 1 each
18.	Thalaserry 2, Karipur 1	Mathabhanga 9, Tadong 4, Kanjirappally, Passighat, Dhubri, Rangiya, North Lakhimpur, Gangtok, Cooch Behar & Jalpaiguri 3 each, Sevoke, Hasimara & Neora 2 each	Kailashahar 19, Kharmanagar 11, Honnali & Perumbavur 9 each, Agathi 8, Kammardi 7, Agartala & Honavar 6 each, Lengpui, Koshagumunda, Sholapur, Ramgundam, Naragund, Bhagamandala, Humchadakkatte, Hassan & Malda 5 each, Haliyal, Koppal, Davangere, B. Durga, Talaguppa & Jayapura 4 each, Bhalukpong, Rajghat, Baripada, Aurangabad, Jagdalpur, Kota, Gerusoppa, Banavasi, Bailhongal, Chikodi, Napoklu, Channapatna, Linganamakki, Agumbe, Lakkavalli & Kodaikanal 3 each, Car Nicobar, Itanagar, Jorhat, Beki Mathanguri, Dholai, Lakhipur, Annapurna Ghat, Goalpara, Sonamura, Hindol, Talcher, Athamalik, Pithoragarh, Jalgaon, Bajpe, Shirali, Sambre, Dharwad, Shiggaon, Shirahatti, Madapura, Bangalore, Kalasa, Nanjanagud & Sravanabelgola 2 each, Maya Bandar, Namsai, Tezu, Passighat, Silchar, Cherrapunji, Amraghat, Karimganj, Badatighat, Sibsagar, Jia Bharali, NT Xing, Williamnagar, Kokrajhar, Phek, Jaleshar, Rengali, Panposh, Joshipur, Karanjia, Ranchi, Hoshangabad, Indore, Mulki, Panambur, Gadag, Yeragatti, Hubli, Channagiri, Jagalur & Chitradurga 1 each
19.	Gangtok 2, Tadong, Kupwara & Konni 1 each	Silchar 6, Cherrapunji 4, Thodapuzha 3, Purushottampur & Passighat 2 each, Neora 1	Mysore 6, Sargur 5, Sonamura, Bellatti, Hospet & Cherthala 4 each, Kailashahar, Kolkata, Shantiniketan, Coonoor, Gangavathy, Hunsur, K.R.Pet, Kanakapura, Ramanagara, Molkalmur & Shriniketa 3 each, Dholai, Lakhipur, Lengpui, Agartala, Jaipur, Champua, Chittorgarh, Dharmapuri, Honavar, Hanagal, Haveri, Holenarasipura, C. R. Patna, Sravanabelgola, Bandipura, Channapatna, Mannarkad, Chittur, Kochi, Palayamkottai & Honavar 2 each, Silchar, Cherrapunji, Amraghat, Digha, Jaleswar, Govindpur, Balasore, Swampatana, Karanjia, Paradip, Indore, Anantpur, Coimbatore, Kiravatti, Banavasi, Hidkal Dam, Hirekerur, Kuknoor, Basavakalyan, Kollegal, M M Hills, Basaralu, BangaloreNelamangala, Davangere, Kunigal, Kushalnagar, Madapura, Thiruvananthapuram & Idikki 1 each

TABLE 12 (Contd.)

(1)	(2)	(3)	(4)
20.	Pahalgam, Passighat, Sibsagar & Bharwain 1 each	Cherrapunji 7, Chalakudy, Gadag & Gulbarga 4 each, Kochi & Kailashahar 3 each, Udaipur, Solangnala, Keylong, Dhundhi, Hasimara, Port Blair, Tangla & Kuppady 2 each	Kudulu 11, Shirala & Thirthahalla 8 each, Sanggola 7, Bagdogra, Mangalore, Bangalore & Pathri 5 each, Satara 4, Long Islands, Kosagumda, Talkoi, Bharwain, Chitradurga, Minicoy, Amini Divi & Dhar 3 each, Nancowry, Kuchinda, Angul, Dehra Dun, Ramgundam, Agumbe & Kottayam 2 each, Goalpara, Tikarpada, Ranchi, Bahraich, Gorakhpur, Sarsawa, Pithoragarh, Balachaur, Pathankot, Renuka, Bhaderwah, Kupwara, Katra, Sangli, Parbhani, Anantpur, Mysore, Coimbatore, Bangalore & Kochi 1 each
21.	Sunibhaji, Dharampur & Dhundi 4 each, Shimla & Batote 3 each, Bhuntar, Kahu, Kasol, Mandi, Sundernagar, Kukernag, Pahalgam, Bhaderwah, Ghatgaon, Anandpur, Bharwain, Shimla & Rajgarh 2 each, Lucknow, Pithoragarh, Chandigarh, Dubwali, Amritsar, Adampur, Nangal, Pathankot, Berthin, Ghamroor, Guler, Rampur, Sujampur Tira, Una, Kalpa, Kupwara, Srinagar, Banihal, Quazigund, Rayagada & Patsio 1 each	Alapuzha 9, Cherthala & Haripada 8 each, Salem 6, Cherrapunji 5, Kumarakom 4, Port Blair, Thirvalla & Kanjirappally 2 each, Tiruvananthapuram, Thrithala & Kollam 1 each	Mudukulathur 8, Perungalur, Yeola & Bolangir 7 each, Madurai, Kannur, Enamackel & Sinnar 6 each, Vadakara & Mohana 5 each, Car Nicobar, Cooch Behar, Kochi, Vellanikkara & Minicoy 4 each, Jalpaiguri, Mana, Kozhikode, Thrissur, Mancompu, Agathi & Gharmura 3 each, Hut Bay, Port Blair, Goalpara, Gangtok, Phulbani, Ranchi, Mavelikkara, Haripad, Kumarakom, Kanjirappally, Varkala & Kavaratti 2 each, Maya Bandar, Nancowry, Tezpur, Balasore, Bhawanipatna, Gorakhpur, Churu, Mahabaleshwar, Malegaon, Wardha, Kodaikanal, Punalur & Thalassery 1 each
22.	Ambavalayal 4, Harinkhola 2, Dhubri, Shillong, Barmer, Jagdalpur, Visakhapatnam, Kharagpur, Peermade & Jagdalpur 1 each	Cherrapunji 12, Silchar 6, Madurai & Kailashahar 4 each, Salem, Tangla, North Lakhimpur, Quazigund, Banpur, Konni, Perumbavur & Tangla 2 each, Kodaikanal 1	Yargatti 9, Alipurduar & Jayapura 8 each, Anantpur, Mangalore, Karwar, Talli, Chatrapatti & Bijapur 7 each, Bangalore & Kannur 6 each, Car Nicobar, Mathabhanga, Mehra, Honavar, Agumbe & Kuda 5 each, Gharmura, NH-31, Barobhisa, Machilipatnam, Vengurla, Karurparamathi, Kudulu, Panambur & Jhumpura 4 each, Deomali, Jalpaiguri, Damohani, Mahabaleshwar, Narsapur, Puducherry, Kurnool, Kodaikanal, Belgaum, Chitradurga & Haripad 3 each, Port Blair, Williamnagar, Cooch Behar, Hasimara, Bijanbari, Ranchi, Pithoragarh, Goa (Dabolim), Sangli, Nizamabad & Thalassery 2 each, Long Islands, Hut Bay, Itanagar, Tawang, Daporijo, Seppa, Nahariagan, Dillighat, Kailashahar, Sukhiapokhri, Gajoldoba, Diania, Nagrakata, Jhandutta, Renuka, Gannavaram, Tirupathi, Vedaranniyam, Gulbarga, Thrithala, Kozhikode, Alapuzha, Kasyamkulam & Munnar 1 each
23.	Dharmapuri 4, Kuppady & Mananthavaddy 3 each, Kochi & Ambavalayal 2 each, Punalur, Daporijo, Piravom, Uthagamandalam & Shillong 1 each	Cherrapunji 13, Tikkrikilla & Vadakara 7 each, Kannur 6, Khonsa, Silchar & Rangia 4 each, Tangla, Kailashahar, Bangalore & Kannur 3 each, Deomali, Dibrugarh, Majbat, Dholai, Kokrajhar & Annapurna Ghat 2 each, Itanagar, Passighat, Dhubri, Jorhat, Tezpur, Karimganj, Dhekiajuli, Goalpara, Gangtok, Tirupathi, Nancowry, Imphal & Tirupathi 1 each	Jagalbet 9, Hut Bay 7, Bahraich & Cial Kochi 5 each, Peermade & Aluva 4 each, Port Blair, Long Islands, Kanyakumari, Madurai & Tiruvananthapuram 3 each, Car Nicobar, Maya Bandar, Gorakhpur, Shivpuri, Varkala & Chengannur 2 each, Hindon, Pithoragarh, Nanital, Pantanagar, Delhi, Hidal Dam, Enamackel, Alapuzha, Kayakulam, Cherthala, Mancompu, Kottayam, Kollam & Punalur 1 each
24.	Hut Bay 4, Tadong & Kanjirappally 3 each, Chandbali, Kottayam, Kasargod & Kudulu 2 each, Agumbe, Kozhikode & Bankura 1 each	Itanagar 5, Annapurna Ghat 4, Nahariagan, Dibrugarh & Khowang 3 each, Deomali & Dhollabazar 2 each, Passighat, Teju, Guwahat, Silchar, Tezpur, Majbat, Goalpara, Tangla,	Kohima, Vijaywada, Hut Bay & Kakatpur 5 each, Port Blair, Khonsa, Kohima, Thodupuzha & Rajghat 4 each, Agra, Honavar, Kochi, Tiruvananthapuram, Aijal,



TABLE 12 (Contd.)

(1)	(2)	(3)	(4)
		Dhekiajuli, Badatighat, Lakhipur, Cherrapunji, Manas N H Xing, Mysore & Imphal 1 each	Piramvom & Car Nicobar 3 each, Kailashahar, Digha, Bapatla & Punalur 2 each, Shillong, Kheronighat, Malda, Sevok, Diamond Harbour, Delhi, Tkamgarh, Kavali, Kakinada, Tuni, Anantpur, Chennai, Cuddalore, Karwar, Kottayam, Kozhikode, Thrissur & Varkala 1 each
25.	Kasauli 4, Sirsa, Sriganaganagar, Kashinagar, Munna, Kollengode & Chalakudy 3 each, Gangtok, Sundernagar, Dharmasala, Kodaikanal, Khanitar, Sirsa & Ghumarwin 2 each, Kahu, Mandi, Nadaun, Nangal Dam, Sujampur Tira, Banihal, Kupwara, Batote, Jammu, Katra, Pahalgam & Kottayam 1 each	Bangalore 5, Kottayam 1	Paradip 26, Chandbali 15, Kochi 12, Barobhisa 10, Cuttack, Chalakudy, Enamackel, Chengannur & Cherthala 9 each, Bhubaneshwar, Mavelikkara, Vellanikkara, Haparida & Hut Bay 8 each, Digha, Thrissur, Karipur & Varkala 7 each, Sriniketan, Basirhat, Barackpore, Mancompu, Kollam & Peermade 6 each, Dhekiajuli, Lengpui, Jalpaiguri, Kolkara, Canning Town, Balasore, Ottapalam, Cial Koch, Kottayam, Kanjirapally, Minicoy, Aijal & Car Nicobar 5 each, Kokrajhar, Sabroom, Mathabhanga, Alipurduar, Diamond Harbour, Haldia, Krishnanagar, Nainitala, Aghar, Madurai, Alapuzha, Thriithala, Punalur & Thiruvananthapuram 4 each, Port Blair, Tikrikilla, Agartla, Phek, Sukhiapokhri, Neora, Cooch Behar, Bankura, Burdwan, Uluberia, Kasauli, Kannur, Kozhikode & Aluva 3 each, Itanagar, Tezpur, Sibsagar, Arundhutinagar, Kailashahar, Darjeeling, Lava, Gajoldoba, Domohani, Nagrakata, NH-31, Hasimara, Malda, Midnapore, Kalaikunda, Panagarh, Bahraich, Gorakhpur, Hamirpur, Karsog, Palampur, Banihal, Vaikom, Kozha, Munnar, Thalassery, Kudulu, Nilambur & Panambur 2 each, Seppa, Naharlagan, North Lakhimpur, Dhubri, Cherrapunji, Chouldhowaghat, Tangla, Lumbding, Panbari, Silchar, Imphal, Belonia, Sonamura, Dehra Dun, Chandigarh, Patiala, Arki, Bharwain, Bhanjar, Dharamsala, Dharampur, Khairi, Kasol, Kumarsain, Nahan, Rampur Bushar, Solang, Jammu, Katra, Pahalgam, Udhampur, Hyderabad, Mangalore, Perinthalmanna, Mannarkad, Amini Divi & Agathi 1 each
26.	Port Blair, Sundernagar, Kukernag, Gohar, Bhang, Dhundi & Kukernag 2 each, Shillong, Allahabad, Nainital, Tehri, Amritsar, Pandoh, Sunibhaji, Shimla, Bhuntar, Jammu, Kupwara, Batote, Bhaderwah, Pahalgam, Jagdalpur, Hinda, Kodaikanal & Uthagamandalam 1 each	Chitradurga 2	Cherrapunji 21, Shantiniketan 17, Malda 13, Shillong & Balurghat 12 each, Thiruvananthapuram 11, Kolkata & Bahrampur 10 each, Kokrajhar & Jalpaiguri 9 each, Goalpara, Dharmaganagar & Pechipparai 8 each, Bahalpur, Cooch Behar, Bankura, Kokrajhar & Kuzhithurai 7 each, Kailashahar, Belonia & Vaikom 6 each, Tikrikilla, Wiiliambagar & Gangtok 5 each, Dhubri, Dharmatul, Diamond Harbour, Baripada, Punalur & Alapuzha 4 each, Daporijo, Seppa, Beki Mathanguri, Barpetta, Rangial, Tangala, Charmura, Sokajan, Imphal, Phek, Paradip, Chandbali, Balasore, Gaya, Kanyakumari, Kannur & Kottayam 3 each, Tawang, Khonsa, Deomali, Guwahati, Tezpur, Beki Road Bridge, Matijuri, Jia Bharali, N T Xing, Panbari, Dhekiajuli, Jamshedpur, Nedumbasserry & Minicoy 2 each, Zero, Bhalukpong, Silacha, North

TABLE 12 (Contd.)

(1)	(2)	(3)	(4)
			Lakimpur, Manas, N H Xing, AIE NH Xing, Amraghat, Annapuranaghat, Puthimari, Nalbari, Kheronighat, Kampur, Bihubar, Majbhat, Linding Kohima, Agartala, Bhubaneshwar, Keonjhar, Gorakhpur, Kukernag, Srinagar, Nagpur & Palayamkottai 1 each
27.	Jalpaiguri 6, A. P. Ghat 5, Ziro & Silchar 4 each, Shillong, Lakhimpur, Barpeta, Motunga, Beki Road Bridge, Manas NH Xing, Balimundali & Kunnamkulam 2 each, Car Nicobar, Passighat, Goalpara, Dhubri, Bahalpur, Matizuri, Nalbari, Sibsagar, Tikrikilla, Kokrajhar, Panbari, AIE NH Xing, Imphal, Lengpui, Tadong, Gangtok, Sriganganagar, Shillong, Bankura, Mohana & Dharmapuri 1 each	Medikeri 2	Darjeeling 27, Singlabazar & Lava 18 each, Bijanbari 15, Belonia 13, Manas & NH Xing 12 each, Sevok & Sukhiapokhri 11 each, Cherrapunji 9, Tadong & Gagtok 8 each, Bhalukpong, Bagdogra & Mathangari 7 each, Panbari & Karipur 6 each, Goalpara, Bahalpur, Aie NH Xing, Barpeta & Champasari 5 each, Daporijo, Shillong, Lengpui, Gajoldoba, Neora & Perinthalmanna 4 each, Motunga, Jorhat, Rangia, Amraghat, Dholai, Kheronighat, Kokrajhar, Itanagar, Kailashahar, Agartala, Jalpaiguri, Murti, Hasimara, Barobhisa, Alipurduar, Minicoy & Kavaratti 3 each, Zero, Passighat, Namsai, Chouldhowaghat, Dharmatul, Puthimari, Annapurnaghat, Tezpur, Silchar, Tangla, Nalbari, Dillighat, Golaghat, Dhekiajuli, Dharmanagar, Diana, Nagrakara, Thiruvananthapuram, Kozhikode, Amini Divi & Agathi 2 each, Guwahati, North Lakhimpur, Majbat, Lakhipur, Numalighat, Meematighat, Badatighat, Luming, Imphal, Domohani, NH 31 Road Bridge, Mathabhanga, Cooch Behar, Cuddalore, Mysore, Thalasserry & Kannur 1 each
28.	Car Nicobar 5, Silchar, Imphal, Patiala & Punalur 3 each, Bhalukpong, North Lakhimpur, A. P. Ghat, Batote, Pahalgam, Mandya & Palampur 2 each, Numaligarh, Kampur, Matizuri, Tezpur, Kohima, Kupwara, Kukernag, Srinagar, Medikeri, Kochi & Mukteshwar 1 each	Gangtok, Kakinada & Uthagamandalam 1 each	Bajpe 9, Manas NH Xing 6, Amraghat, Veeraghatam, Aska, Long Islands & Sevoke 2 each, Kozhikode, Minicoy, Khonsa, Bhalukpong, Kashinagar & Dharamsala 1 each
29.	Kanjirapally 4, Kailashahar, Banihal, Punalur & Kottayam 2 each, Quazigund, Kukernag, Narnaul, Cherrapunji, Mukerain & Churu 1 each	Nil	Kurnool, Dharmatul & Car Nicobar 7 each, Hut Bay & Gajoldoba 6 each, Bahraich & Karimganj 4 each, Kailashahar & Basar 3 each, Cannur, Silchar, Jagdalpur & Gorakhpur 2 each
30.	Cherrapunji 5, Goalpara, Purushottampur & Nilgiri 4 each, Adampur, Burdwan & Panagarh 3 each, Bankura, Balasore, Una, Kukernag, Krishnanagar & Dhundi 2 each, Guwahati, Tangla, Tezpur, Lengpui, Bhuntar, Sunibhaji, Banihal, Kupwara, Batote & Baderwah 1 each	Punalur 6, Cherrapunji & Goalpara 1 each	Nancowry & Car Nicobar 14 each, Port Blair 11, Tezpur 8, Khandapara 7, Kamna & Sukinda 6 each, Agartala 5, Kochi, Daporijo & Jagdalpur 4 each, Itanagar & Passighat 3 each
31.	Goalpara 4, Cherrapunji, Guwahati, Gangtok, - Kolhapur & Tadong 3 each, Dibrugarh, Shillong, Silchar, North Lakhimpur, Tangla & Rangia 2 each, Kolkata & Nedumangad 1 each	-	Subramanya 7, Alapuzha & Sundargarh 6 each, Car Nicobar 5, Bhalukpong & New Delhi 4 each, Silchar & Pendra 3 each, Kottayam, Sarar & Allahabad 2 each, Sundernagar 1

than 61,000 houses collapsed and more than 132,000 houses were partially damaged.

It caused extensive damage to rice and other crops. In Sunderbans, heavy downpour raised river levels while the gushing waters of flooded mangroves burst mud embankments in the extensive delta region, destroying hundreds of thousands of houses. The Sunderbans mangrove forest area, home to the highly endangered Royal Bengal tiger, was fully inundated and high-speed winds destroyed all communication and transportation infrastructure. The entire Sunderbans biosphere reserve area of 9600 square kilometres has suffered extensive damage under the impact of cyclone AILA. It also affected Sub-Himalayan West Bengal and Sikkim causing uprooting of trees due to strong wind and land slide and flood due to heavy rain.

The outer bands of the storm also produced torrential rains and high winds in several parts of north coastal Orissa, with the heaviest rainfall being recorded at Paradip (26 cm) and winds peaked at 90 km/h (56 mph). Numerous trees were uprooted and power lines were downed, causing widespread power outages. High waves produced by the storm inundated coastal villages, forcing residents to evacuate to safer areas. However, there is no report of human death in the state. An estimated 1,000 acres of Orissa cropland were affected due to the system.

The remnants of AILA produced gusty winds and heavy rains in Meghalaya during 25 and 26 of May. Rainfall amounts peaked at 213.4 mm and winds reached 60 km/h. Several homes were damaged in the area and power was cut due to fallen trees and power lines. Several streets were flooded and some homes were reported to have standing water.

(c) *Other synoptic features and rainfall*

Details of weather systems during the month are given in Table 9 and the resultant rainfall distribution in Table 10. The principal amounts of rainfall are given in Table 12.

A major part of the month, especially the second half of it, witnessed thundershowers over northwest, northeast and peninsular regions. Western disturbances and induced cyclonic circulations gave rise to precipitation over the northwest India. Troughs in the lower level westerlies and cyclonic circulations caused rainfall over the northeast India and troughs/wind discontinuities gave rise to thunder showers over the south peninsula.

### 3.3.2. *Temperature distribution*

From Table 11, it is seen that severe heat wave conditions were rather rare and occurred only for a few days over Rajasthan and Rayalaseema. Heat wave conditions which prevailed over major parts of the country abated owing to widespread thundershower activity over the northwest and peninsular India towards the end of the first week of May.

The month's as well as the season's highest maximum temperature of 48°C was recorded at Bikaner and Ganganagar (west Rajasthan) respectively on 16 & 19 May 2009.

### 3.3.3. *Disastrous weather events and damage*

According to media and other disaster reports, heat wave claimed the lives of 179 people each in Andhra Pradesh, 81 in Orissa, 16 in Vidarbha, 5 in Chattisgarh, 4 in Madhya Pradesh, 2 each in Punjab, Rajasthan and west Bengal and 1 in Tamil Nadu. Thunderstorm/hailstorm, squall winds, lightning and heavy rains claimed 31 lives in Gangetic west Bengal, 16 in Assam, 5 each in Jharkhand and Karnataka, 4 in Vidarbha, 3 in Chattisgarh, 2 each in Tripura, Kerala and Madhya Pradesh and 1 in Tamil Nadu. Also flash floods claimed 9 lives in Assam and Landslides claimed 6 lives in Arunachal Pradesh.

Strong winds and heavy rains also damaged several hectares of crops, many houses, electrical and Telecommunication lines, uprooted trees in Tamil Nadu, Kerala, Karnataka, Jharkhand, Assam and Tripura. Apart from these, the extensive damage caused by the Severe Cyclonic Storm 'Aila' is discussed in detail under section 3.3.1 (b).

## Appendix

### Definitions of the terms given in '*Italics*'

#### *Rainfall*

<i>Excess</i>	- percentage departure from normal rainfall is + 20% or more.
<i>Normal</i>	- percentage departure from normal rainfall is from – 19 % to + 19 %.
<i>Deficient</i>	- percentage departure from normal rainfall is from – 20 % to – 59 %.
<i>Scanty</i>	- percentage departure from normal rainfall is from – 60 % to – 99 %.
<i>At most places</i>	- 76% or more stations of a meteorological sub-division reporting atleast 2.5 mm rainfall.

- At many places* - 51% to 75 % 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.
- At isolated places* - 25% or less stations of a meteorological sub-division reporting at least 2.5 mm rainfall
- Extremely heavy rain* - rainfall amount 24.5 cm or more.
- Very heavy rain* - rainfall amount from 12.5 cm to 24.4 cm.
- Heavy rain* - rainfall amount from 6.5 cm to 12.4 cm.

### Temperature

#### (a) Maximum/day temperatures

According to the criteria being followed since 1<sup>st</sup> 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 30° 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 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* - departure of maximum temperature from normal is - 2° C.

#### (b) Minimum/night temperatures

- Cold wave conditions* - departure WCTn from normal minimum temperature is from -5° C to -6° C where normal minimum temperature  $\geq 10^{\circ}$  C and from -4° C to -5° C elsewhere.
- Also cold wave is declared when WCTn is  $\leq 0^{\circ}$  C irrespective of the normal minimum temperature for those stations.
- 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° C 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.