

Weather

HOT WEATHER SEASON (MARCH - MAY 1984)*

Chief features

The hot weather season was characterised by normal to below normal temperature in south Peninsula in March and heat wave conditions in many parts of north India during April and May.

The other important features were the occurrence of (i) floods in Assam and Tripura in May and (ii) absence of any cyclonic storm or depression in Indian Seas.

Rainfall for the season (Fig. 1) was moderately excess in Arunachal Pradesh, Sub-Himalayan West Bengal & Sikkim, Tamil Nadu and south interior Karnataka; normal in Assam and Meghalaya, Gangetic West Bengal, Bihar plains, Kerala and Lakshadweep; slightly deficient in Andaman & Nicobar Islands and Jammu & Kashmir; moderately deficient in Nagaland, Manipur, Mizoram & Tripura, Orissa, Punjab, east Madhya Pradesh, Telangana and Rayalaseema and largely deficient in the rest of the country outside Gujarat State where there was no rain.

1. March

Thunderstorm activities were generally good in the south Peninsula during the first fortnight of the month. The following system affected the weather of India during this month.

1.1. Western disturbances

The last western disturbance of February and eight other western disturbances moved across Western Himalayas and neighbourhood during this month. Apart from these western disturbances, three induced systems, one of which concentrated into a depression affected parts of northwest India.

1.1.2. Western depression

The induced low which developed over central Pakistan on 10th, concentrated into a depression over Punjab and adjoining north Pakistan on 11th. It weakened over Jammu & Kashmir and adjoining Himachal Pradesh on 12th.

These systems caused generally widespread rain or thundershowers on 5 days in Jammu & Kashmir and on 1 to 2 days in Punjab and Himachal Pradesh. Isolated heavy fall occurred over Jammu & Kashmir on 18th. Rain or thundershowers were scattered or isolated on 5 days in Jammu & Kashmir and on 1 to 3 days in west Uttar Pradesh, Haryana, Punjab and west Rajasthan.

1.2. Weather over northeast and Peninsular India, east Madhya Pradesh, Andaman & Nicobar Islands and Lakshadweep were affected by the following systems :

(i) Three troughs in lower tropospheric westerlies moved across northeast India, the first between 1st and 2nd, the second between 2nd and 3rd evening and the third between 3rd and 6th.

(ii) Two low level cyclonic circulations moved eastwards across Sub-Himalayan West Bengal & Sikkim and Assam and adjacent States, one between 15th and 16th and the other between 17th and 19th.

(iii) The Peninsular wind discontinuity or trough at 0.9 or 1.5 km a.s.l. was seen on many days during the second fortnight of the month.

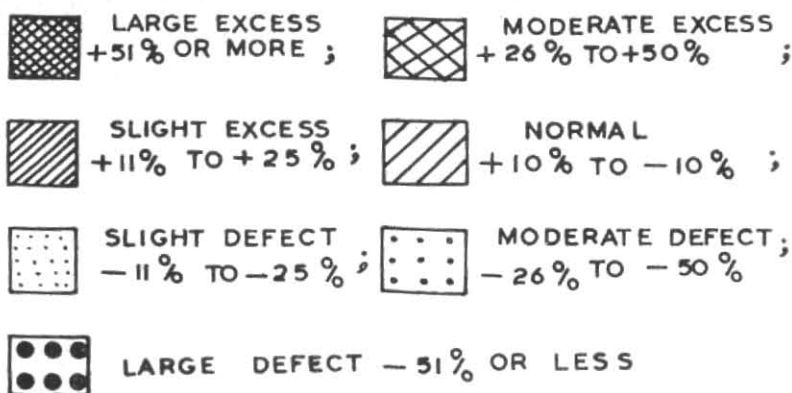
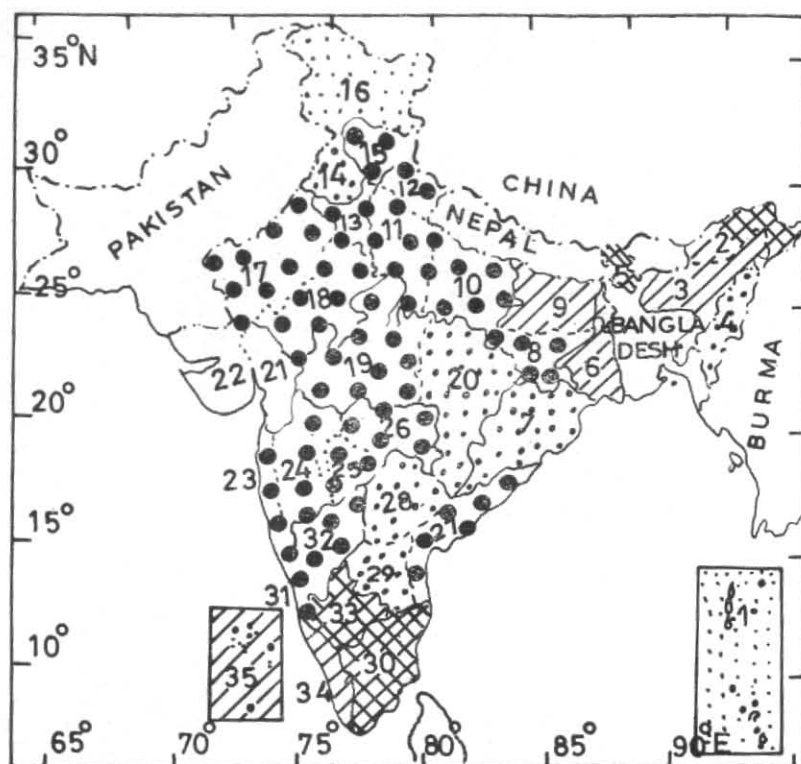
(iv) Two troughs of low, one between 5th and 7th and another between 24th and 28th were seen over south Andaman Sea and adjoining southeast Bay.

(v) The trough in the lower troposphere over the extreme south Peninsula and adjoining sea areas was marked during the month.

(vi) A cyclonic circulation in the lower levels was seen over Konkan and Madhya Maharashtra between 16th and 17th and another over Madhya Maharashtra on 24th, which became less marked over east central Arabian Sea on 30th evening.

In northeast India, Arunachal Pradesh experienced good thundershowers. They were generally widespread on 7 days in Arunachal Pradesh and so on 27th in Assam & Meghalaya and Sub-Himalayan West Bengal & Sikkim. They were scattered or isolated on 5 days each in these two sub-divisions and one day each in

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Sub-divisions	Dep. from normal (°C)	Sub-divisions	Dep. from normal (°C)
(1) A.N. Islands	-15	(19) West M. P.	-90
(2) Arunachal	38	(20) East M. P.	-29
(3) Assam & Megh.	2	(21) Gujarat Reg.	-100
(4) N.M.M. & T.	-36	(22) S & K	-100
(5) S.H.W.B. Sikkim	36	(23) Konkak & Goa	-94
(6) G. West Bengal	-6	(24) Madhya Maha.	-58
(7) Orissa	-47	(25) Marathwada	-99
(8) Bihar Plateau	-54	(26) Vidarbha	-67
(9) Bihar Plains	2	(27) Coastal A. P.	-62
(10) East U.P.	-61	(28) Telangana	-42
(11) Plains West U.P.	-64	(29) Rayalaseema	-39
(12) Hills West U.P.	-88	(30) Tamil Nadu	36
(13) Haryana	-74	(31) Cot. Karnataka	-52
(14) Punjab	-30	(32) N. I. Karnataka	-51
(15) Himachal Pradesh	-57	(33) S. I. Karnataka	40
(16) Jammu & Kashmir	-18	(34) Kerala	-9
(17) West Rajasthan	-89	(35) Lakshadweep	8
(18) East Rajasthan	-95		

Fig. 1. Percentage departure of rainfall from normal for the period 1 March to 31 May 1984

Nagaland, Manipur, Mizoram & Tripura and Gangetic West Bengal in the last week of the month.

Tamil Nadu experienced generally widespread rain or thundershowers with isolated heavy to very heavy falls from 3rd to 8th. Rains or thundershowers were generally widespread on 6 days in Kerala, 3 days in south interior Karnataka and on 1 to 2 days in Telangana, Rayalaseema, coastal Karnataka, Andaman & Nicobar Islands and Lakshadweep during the first fortnight of the month. Isolated heavy falls also occurred on 1 to 3 days in these sub-divisions. Scattered or isolated rain or thundershowers occurred on 3 to 5 days in Telangana, Rayalaseema, Tamil Nadu, Karnataka, Kerala, Andaman & Nicobar Islands and Lakshadweep during the first fortnight. In the second fortnight, the thundershower activities were of isolated nature over the Peninsula ranging from 1 to 4 days. They were scattered or isolated over Andaman & Nicobar Islands on 7 days.

According to press reports about 26 people lost their lives in different parts of Tamil Nadu due to heavy rain. Huts on either side of the *Vaigai* river in Madurai city either washed away or were in waist deep water. 32 thousand hectares of standing crops had been affected.

1.3. Rainfall during the month

Rainfall was excess in Konkan & Goa, Madhya Maharashtra, Rayalaseema, Tamil Nadu, Karnataka, Kerala and Lakshadweep; normal in Andaman & Nicobar Islands, Arunachal Pradesh and Telangana; deficient in Punjab and scattered over the rest of the country outside east Rajasthan, west Madhya Pradesh, Gujarat State and Vidarbha where there was no rain.

The notable amounts (cm) of rainfall were:

- 3rd: Tuticorin 9, Kanyakumari 7
- 4th: Parangipettai 17, Palayankottai 8, Srivilliputtur 7
- 5th: Coonoor 14, Kodaikanal & Chickmagalur 7 each
- 6th: Srivilliputtur 21, Nagamangala 12, Mandya 11, Hassan & Penukonda 8 each
- 7th: Srivilliputtur 18, Parangipettai 8, Coonoor 7
- 8th: Kasargode 9, Arupukottai & Cannanore 8 each
- 9th: Hassan 8
- 13th: Udayagiri (Nellore district) 7
- 18th: Batote & Banihal 9 each, Udampur & Katra 7 each

1.4. Temperature

Day temperatures were generally normal in Rayalaseema, Tamil Nadu, Karnataka and Kerala from 11th to 31st and were below normal to appreciably below normal from 1st to 10th outside coastal Karnataka where they were appreciably above normal on a couple of days during the period. They were generally appreciably to markedly above normal in west Rajasthan and were so on 5 to 8 days in plains of west Uttar Pradesh and east Rajasthan.

Night temperatures were generally below normal on 4 to 7 days in northeast India, Uttar Pradesh, Rajasthan, Saurashtra & Kutch, Vidarbha and Andhra Pradesh being appreciably so on 1 to 3 days in some of these sub-divisions during 1st to 11th. They were appreciably above normal on 4 to 7 days during the second fortnight of the month in Haryana, Punjab, Rajasthan and west Madhya Pradesh.

2. April

Thundershower activities comparatively increased over northeast India, Himachal Pradesh, Jammu & Kashmir and Kerala in this month than that of March.

2.1. Western disturbances

The last western disturbance of the previous month moved away eastwards across Western Himalayas by 1st. Eleven more western disturbances affected, Western Himalayas and neighbourhood during the month. Besides these western disturbances five other induced upper air systems affected northwest India and adjoining west Uttar Pradesh. The western disturbances, which moved between 1st and 4th, 5th and 10th, 20th and 24th and 28th were rather active.

These systems caused generally widespread rain or thundershowers on 10 days in Jammu & Kashmir and on 1 to 4 days in hills of west Uttar Pradesh, Punjab and Himachal Pradesh with isolated heavy fall on 1st in Jammu & Kashmir. Rain or thundershowers were scattered or isolated on 4 to 8 days in Uttar Pradesh, Punjab, Himachal Pradesh and Jammu & Kashmir and on 1 to 3 days in Haryana and Rajasthan.

2.2. The weather over northeast and Peninsular India, Madhya Pradesh, Andaman & Nicobar Islands and Lakshadweep were affected by the following systems:

(i) Several cyclonic circulations/troughs extending upto lower tropospheric levels were seen either moving across northeast India or persisting in some parts of it, of which important ones were those which moved from Bihar plains to Assam between 1st and 3rd, 5th and 7th and between 15th and 21st.

(ii) A cyclonic circulation extending upto lower tropospheric levels which lay over south Konkan and Goa and neighbourhood on 1st, became less marked over north Konkan and neighbourhood on 3rd.

(iii) A cyclonic circulation upto 0.9 km a.s.l. was present over northwest Bay and adjoining Orissa and Gangetic West Bengal on 10th and 11th.

(iv) A cyclonic circulation extending upto lower tropospheric levels which developed over Vidarbha and adjoining southwest Madhya Pradesh on 5th, became less marked over north Madhya Pradesh and adjoining south Uttar Pradesh by 10th.

(v) Wind discontinuity or trough in westerlies at 0.9 km or 1.5 km a. s. l. was seen on many days over the Peninsula.

(vi) The equatorial trough extending from south Andaman Sea to southeast Arabian Sea across extreme south Peninsula and Comorin area was quite active in which several moving or quasi-stationary cyclonic circulations in the lower troposphere were observed. Of these the followings were worth mentioning, (a) one which lay over Lakshadweep on 4th moved away westwards by 6th, (b) another one which was seen over Comorin and adjoining extreme south Peninsula on 14th moved over Lakshadweep—Maldives areas on 17th and became less marked there by 20th and (c) the third one which lay over Andaman Sea from 17th to 19th.

(vii) A low pressure area which lay over southeast Bay on 22nd, became well marked over west central Bay on 24th. Thereafter, moving northeastwards it entered inland into Burma across north Arakan-Bangla Desh coasts in the early hours of 26th.

In northeast India rain or thundershowers were generally widespread on 8 days in Arunachal Pradesh, Assam & Meghalaya, on 4 to 5 days in Nagaland, Manipur, Mizoram & Tripura and Sub-Himalayan West Bengal & Sikkim and on 2 days in Gangetic West Bengal. They were, also so on 8 to 9 days in Kerala and Andaman & Nicobar Islands, one day each in coastal and south interior Karnataka and Lakshadweep.

Rain or thundershowers were scattered on most days in Tamil Nadu, on 10-16 days in Assam & Meghalaya, Sub-Himalayan West Bengal & Sikkim, Bihar Plateau, south interior Karnataka and Kerala, on 5 to 9 days in Arunachal Pradesh, Assam & Meghalaya, Gangetic West Bengal, east Madhya Pradesh, Madhya Maharashtra, Andhra Pradesh, coastal and north interior Karnataka, Andaman & Nicobar Islands and Lakshadweep.

Isolated heavy falls occurred on a number of days in Assam and adjacent States, Tamil Nadu and Kerala, on 1 or 2 days in Madhya Maharashtra and Andaman & Nicobar Islands.

2.3. Rainfall during the month

Rainfall was excess in Andaman & Nicobar Islands, Arunachal Pradesh, Assam & Meghalaya, West Bengal & Sikkim, east Uttar Pradesh, Punjab, east Madhya Pradesh, Tamil Nadu, coastal Karnataka, Kerala and Lakshadweep; normal in plains of west Uttar Pradesh, Haryana, Jammu & Kashmir, Madhya Maharashtra, Telangana and south interior Karnataka; deficient in Orissa, Bihar Plateau, Himachal Pradesh, Rajasthan, Vidarbha, Rayalaseema and north interior Karnataka and scanty over the rest of the country outside Gujarat State, where there was no rain.

The notable amounts (cm) of rainfall are :

- 1st : Kupwara 7
- 2nd : Tezu 7
- 4th : Alleppey 10, Mavelikara & Dibrugarh 8 each
- 5th : Tezu 10, Sangli, Pamban & Panambur 7 each

- 6th : Pasighat 14, Silchar & Rayadurg 7 each
- 7th : Belgaum AP 8, Medak 7

- 10th : Gangtok 7
- 11th : Mulbagal (Karnataka) 7
- 14th : Vellore 8, Parli 7
- 15th : Kanyakumari 7
- 19th : Car Nicobar & Cherrapunji 15 each
- 22nd : Nancowry 10
- 23rd : Alleppey 9, Trivandrum 7
- 24th : Kozhikode 11, Srivilliputtur 7
- 25th : Kozhikode 7
- 26th : Mavelikara 7
- 30th : Chaparmukh 8

2.4. Temperature

Moderate heat wave conditions prevailed at a few places in west Rajasthan on 1st, 14th and 15th and in Saurashtra & Kutch on 2nd and 12th.

Day temperatures during the month were generally above normal, being appreciably so on a few days in Rajasthan, Madhya Pradesh, Gujarat and Maharashtra States and so in West Bengal & Sikkim, Bihar and east Uttar Pradesh during the first week and in Bihar, Uttar Pradesh, Haryana, Himachal Pradesh and Jammu during the third week. They were generally above normal in Andhra Pradesh during the second fortnight of the month.

3. May

Good thundershower activities continued in Assam and adjacent States, Sub-Himalayan West Bengal & Sikkim, south interior Karnataka and Kerala, while it decreased considerably over Tamil Nadu.

3.1. Western disturbances

The last western disturbance of the previous month moved away eastwards across Western Himalayas by 2nd. Eight more western disturbances moved across the Western Himalayas and neighbourhood during the month.

Apart from these western disturbances an induced cyclonic circulation in the lower levels, which developed over northwest Rajasthan and Punjab on 14th, merged with the western disturbance over Himachal Pradesh and neighbourhood on 15th.

The western disturbances which moved away between 8th and 13th, 14th and 15th and between 14th and 18th were rather active. Rain or thundershowers were generally widespread on 5 days in Jammu & Kashmir during the period from 8th to 16th and were scattered or isolated on 1 to 4 days in Haryana, Himachal Pradesh and Jammu & Kashmir during the same period. They were also scattered on 28th and 29th in Himachal Pradesh and on 29th in Jammu & Kashmir.

3.2. The weather over Madhya Pradesh and Uttar Pradesh was mainly dry during the month. The follow-

ing systems affected northeast and Peninsular India and Andaman & Nicobar Islands and Lakshadweep.

(i) A cyclonic circulation extending upto lower troposphere was observed over Bihar and adjoining West Bengal and Sikkim between 3rd and 11th and another over east Uttar Pradesh and adjoining Bihar and neighbourhood between 9th and 11th.

(ii) A cyclonic circulation in the lower levels was seen over Assam and adjacent States from 11th to 16th, another over Bihar State and adjoining West Bengal and Sikkim from 24th to 26th.

(iii) Troughs in lower level westerlies were seen over the Peninsula on most days of the month and on some days over northeast India.

(iv) A cyclonic circulation between 2.1 and 5.8 km a. s. l. was seen over Gangetic West Bengal and adjoining north Orissa on 27th. It became less marked on 29th.

(v) A low pressure area with associated cyclonic circulation extending upto 7.6 km a. s. l. formed over Bay off north Andhra-south Orissa coast on 29th. It became less marked by the next day.

(vi) The equatorial trough extended from southeast Arabian Sea across extreme south Peninsula and adjoining Comorin to Andaman Sea during the month in which several cyclonic circulations in low levels/lower troposphere were observed. Important ones were those which lay over (a) Andaman Sea from 1st to 4th, (b) extreme south Peninsula and adjoining Comorin area and neighbourhood from 5th to 10th and from 20th to 22nd, (c) south Tamil Nadu and adjoining southwest Bay and neighbourhood from 25th to 26th and those which moved from southwest Bay and adjoining Sri Lanka to Maldives-Lakshadweep areas from 14th to 16th & (d) from south Tamil Nadu and adjoining Sri Lanka to southeast Arabian Sea from 17th to 20th.

(vii) Two troughs in upper tropospheric easterlies moved westwards across Peninsula, one between 27th and 29th and the other between 29th and 30th.

(viii) A cyclonic circulation in the middle and upper troposphere was observed over Lakshadweep and adjoining sea areas and Kerala on 28th and 29th.

Rain or thundershowers were generally widespread on 12 to 14 days in Assam and adjacent States, Sub-Himalayan West Bengal & Sikkim, on 8 days in Andaman & Nicobar Islands, on 4 days in Kerala during the month and were so on 1 to 2 days in

Gangetic West Bengal, Orissa and Bihar during the week and on 14th and 18th, in south interior Karnataka. Isolated heavy to very heavy falls occurred on 9 days in Assam & Meghalaya and on 2 to 4 days in Arunachal Pradesh, Nagaland, Manipur, Mizoram & Tripura, Sub-Himalayan West Bengal & Sikkim, Kerala, Andaman & Nicobar Islands and Lakshadweep. Rain or thundershowers were scattered or isolated on many days over northeast India. Tamil Nadu, south interior Karnataka, Kerala and Andaman & Nicobar Islands and on 1 to 5 days in Madhya Pradesh, Madhya Maharashtra, Vidarbha, Andhra Pradesh, coastal and north interior Karnataka and Lakshadweep.

3.2.1. Floods and damages

According to Central Water Commission's 'Weekly Flood News Letter' flood in river Barak and its tributaries in Assam affected 3 lakh people in about 450 villages in the second fortnight of the month. National Highway No. 44 and railway lines were submerged at several places by flood waters of rivers Longai and Singla. 4 human lives were lost. In view of the severity of floods, services of Army were called for rescue and relief operation. Tripura experienced the first wave of floods in the middle of May 1984 when rivers Manu, Dhalai and Juri flooded northern sub-division of Kailashahar, Dharmanagar and kamalpur. 41 people were reported to have lost their lives.

3.3. Rainfall during the month

Rainfall during the month was excess in Arunachal Pradesh, Sub-Himalayan West Bengal & Sikkim and Bihar Plains; normal in Assam & Meghalaya, Nagaland, Manipur, Mizoram & Tripura and Gangetic West Bengal; deficient in Andaman & Nicobar Islands, Orissa, Bihar Plateau, Jammu & Kashmir, east Madhya Pradesh, coastal Andhra Pradesh and south interior Karnataka and scanty over the rest of the country outside Rajasthan, Gujarat State and Marathwada where there was no rain.

The notable amounts (cm) of rainfall were :

- 1st : Gangtok 8
- 7th : Agartala 9
- 8th : Cannanore 17
- 10th : Forbesganj 7
- 11th : Purnea 9, Berhampore 7
- 12th : Agartala AP 10, Purnea 9
- 13th : Agartala 8

15th : Agartala AP 12
 16th : Cherrapunji 12, Silchar 11
 17th : Cherrapunji 33, Cooch Behar 9
 18th : Cherrapunji 79, Pasighat 17, North Lakhimpur 16, Gangtok 9
 19th : Pasighat 12, Silchar 9, North Lakhimpur, Kayamkulam & Gangtok 8 each
 20th : Cherrapunji 38, Silchar 11, Tezu 8, Jalpaiguri 7
 21st : Cherrapunji 54, Hut Bay 7
 22nd : Cherrapunji 64, Pasighat 12, Jalpaiguri 11, North Lakhimpur 8, Cooch Behar 7
 23rd : Cherrapunji 26 Gangtok 19, Tezu 9, Chaparmukh 8
 24th : Cherrapunji 22
 25th : Cooch Behar 10

28th : Cooch Behar 7

29th : Jalpaiguri 13

3.4. *Temperature*

Moderate heat wave conditions prevailed in coastal Andhra Pradesh on 22nd, Haryana on 24th, Punjab and Himachal Pradesh on 24th and 25th, northwest Rajasthan on 26th, southeast Madhya Pradesh and Telangana on 25th and 26th.

Day temperatures during the month were generally above normal over the whole country outside Assam and adjacent States and West Bengal and Sikkim being appreciably so on a number of days in most parts of northwest India and Madhya Pradesh and on a few days over the rest parts. They were generally below to appreciably below normal in Assam and adjacent States and West Bengal and Sikkim during this month.