

## Weather

### HOT WEATHER SEASON (MARCH-MAY 1976)

#### CHIEF FEATURES

##### *Western disturbances*

Twentyseven western disturbances moved eastwards across northwest India during the season: 10 in March, 9 in April and 8 in May. Induced lows also moved across the plains of northwest India during the season, but less in number, 8 in March, 5 in April and 4 in May.

##### *Cyclonic storms/depressions*

A cyclonic storm formed in the Bay of Bengal on the last day of April and crossed Arakan coast as a severe storm on the 2nd May. Another cyclonic storm formed in east central Arabian Sea towards the end of May and hit Gujarat coast on 3rd June as a severe cyclone. The latter caused some damage in Gujarat State. The tracks of the two storms are shown in Fig. 1.

##### *Southwest Monsoon*

The southwest monsoon advanced into south Andaman Sea and adjoining southeast Bay on 21

May and into Kerala and south Arabian Sea on 31 May. The northern limit passed through Mangalore, Arogyavaram, Madras and Sandoway on 31 May.

##### *Rainfall*

The rainfall for the season was normal to excess in many parts of north and central India and generally deficient in the Peninsula. The rainfall for the period 1 March to 31 May 1976 is shown in Figs. 2 (a) and (b).

##### *Temperature*

Moderate to severe heat wave conditions prevailed in coastal Andhra Pradesh from 23 to 27 May and moderate heat wave conditions in coastal Andhra Pradesh and coastal Tamil Nadu from 2 to 6 May.

The main features of weather in each month are described below.

### SIGNIFICANT WEATHER FEATURES

#### MARCH

Ten western disturbances moved eastward across the Western Himalayas during the month. Eight induced lows also moved eastwards across the plains of northwest India and west Uttar Pradesh. In association with these systems scattered to fairly widespread rain or snow occurred over the Western Himalayas on about 15 days in the month. Rather heavy to heavy falls occurred over this area on 16th, 17th, 20th and 21st. Scattered to fairly widespread rain or thundershowers occurred in Punjab and Haryana between 14th and 17th with rather heavy falls on 16th and 17th. The rainfall, however, was deficient or scanty for the month over northwest India and Uttar Pradesh, except in Himachal Pradesh where it was in excess. According to press reports, road and airlinks to Kashmir valley were disrupted due to heavy rain and

landslides in that area between 14th and 17th. Delhi and neighbourhood had light hail on 13th.

The principal amounts of rainfall (in cm) associated with the western disturbances were:

Gharshankar 5 and Banihal 4 on 16th; Dalhousie 9 Kalpa 7, Joshimath 5, Dharmasala, Bhuntar and Karnal 4 each on 17th; Mandi 5 and Manali 4 on 20th; and Mandi 5 on 21st.

A cyclonic circulation/trough in the lower troposphere lay over Assam and adjacent States from 4th to 6th. An east-west trough upto 1.5 km. a.s.l. extended from Bihar to Assam in the second week with an embedded cyclonic circulation over West Bengal and Bihar from 8th to 10th. Two low level cyclonic circulations moved eastwards across Assam and adjacent States between 22nd and 31st.

In association with these systems, scattered to fairly widespread rain or thundershowers occurred in Assam and adjacent States on many days in the month and scattered or isolated thundershowers in Gangetic West Bengal, Orissa and Bihar Plateau on 4 or 5 days in the first fortnight. Isolated heavy to very heavy falls occurred in Meghalaya from 6th to 9th. Cherrapunji recorded 37 cm on 6th and 42 cm on 7th which is a record rainfall for the station for March. Hail was reported from Balasore and Kailashahar on 8th afternoon.

A wind discontinuity upto 1.5 km a.s.l. passed from interior Karnataka to Gangetic West Bengal across interior Maharashtra and east Madhya Pradesh on most days in the second fortnight. A trough of low lay off north Karnataka, Goa, south Maharashtra coasts on many days between 19th and 31st. These systems caused scattered or isolated thundershowers in Madhya Maharashtra on many days and in Madhya Pradesh, Bihar Plateau, Gangetic West Bengal, Orissa and the rest of the Peninsula on a few days in the second fortnight. A trough of low moved westwards across Comorin-Maldiva area on 30th and 31st, causing generally widespread thundershowers with isolated heavy falls in Kerala and south Tamil Nadu on 31st.

The principal amounts of rainfall (cm) associated with the above mentioned systems were :

Gangtok 4 on 5th; Cherrapunji 37, Pasighat, Silchar AP, Haflong and Khonsa 5 each, Tangla

Nine western disturbances moved eastwards across the Western Himalayas during the month. Four induced lows moved eastnortheastwards across the plains of northwest India and west Uttar Pradesh and one moved eastwards from southwest Rajasthan to central Madhya Pradesh during the month. In association with these systems, scattered to fairly widespread rain or snow occurred in the Western Himalayas on ten to twelve days in the month with rather heavy falls on three days in the first week. Rain or thundershowers were fairly widespread in west Rajasthan on 5th and scattered or isolated in the plains of northwest India and west Uttar Pradesh on four or five days and in Madhya Pradesh on the first three days of the month. According to press reports, a hailstorm lashed some parts of Allahabad district on 3rd, killing about 60 heads of cattle and causing some damage to rabi crops. Hailstorms over Srinagar and several parts of Kashmir valley on 10th night caused damage to almond crop. Some parts of Punjab were also hit by hailstorms on 9th resulting in some damage to wheat and sugarcane crops. The

and Daporijo 4 each on 6th; Cherrapunji 42, silchar 12, Haflong 10, Imphal 5, and Majbat 4 on 7th; Cherrapunji 14, Haflong 8, Dibrugarh and Majbat 6 each and Midnapore 5 on 8th; Cherrapunji 9 on 9th; Silchar 5 on 10th; Digboi 4 on 11th; Baripada 6 on 22nd; Tezu 5 on 23rd; Cherrapunji 7 on 28th; Tezu 4 on 29th; Vita 5 and Madurai city 4 on 30th; Kunnankulam 11, Tiruchchirappalli 9, Atirampattinam 8, Mettupalayam 7, Palayankottai and Quilon 5 each, Pulalur, Trichur, Ottapalam, Mannarghat, Kodaikanal and Kanyakumari 4 each on 31st.

Moderate heat wave conditions prevailed in west Rajasthan on 4th. Day temperatures were appreciably above normal in northwest India, Uttar Pradesh, Madhya Pradesh, Bihar Plateau and some parts of interior Maharashtra between 4th and 7th and in Sub-Himalayan West Bengal, Sikkim and adjoining parts of Assam between 19th and 21st. They were appreciably below normal in northwest India on most days between 11th and 24th and markedly so (being as much as 8 to 10°C below normal) in Jammu & Kashmir, Himachal Pradesh, and Punjab between 14th and 17th.

Night temperatures were appreciably below normal in south Interior Karnataka on many days and in Telangana, some parts of Tamil Nadu and Gangetic West Bengal on a few days in the first week and in Haryana, Punjab, Uttar Pradesh and Himachal Pradesh between 11th and 14th.

#### APRIL

rainfall for the month was normal to excess in many parts of northwest India and Uttar Pradesh.

The principal amounts of rainfall (cm) associated with the western disturbances were :

Malari 8 and Manna 5 on 1st; Kalpa 6, Manali and Dalhousie 4 each on 5th; Manali 6, Dalhousie 5 and Kalpa 4 on 6th; Qazigund 4 on 10th.

A low which formed over Andaman Sea on 24th, moved to southeast Bay and neighbourhood on 26th and became well marked on 27th. It concentrated into a depression on 29th evening with its centre about 150 km north of Port Blair and intensified into a cyclonic storm on 30th evening when it was centred about 300 km north-northeast of Port Blair. This system caused generally widespread rain in Bay Islands from 25th to 30th with isolated heavy falls on 28th and 30th. Kondal recorded 7 cm of rain on 28th and Hut Bay 12 cm, Car Nicobar 11 cm on 30th.

Four cyclonic circulations extending upto 1.5 km a.s.l. moved eastwards from Bihar across

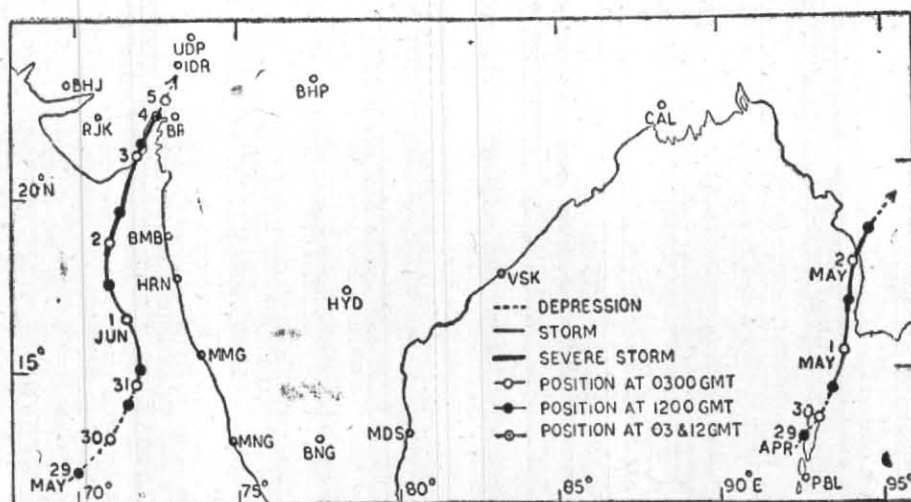


Fig. 1 Tracks of storms/depressions during March to May 1976

Assam and adjacent States during the first three weeks. Another cyclonic circulation upto 1.5 km a.s.l. lay over Bihar and neighbourhood from 25th to 30th. Two troughs in the middle tropospheric westerlies also moved eastwards across northeast India in the last week. In association with these systems scattered to fairly widespread rain or thundershowers occurred in Assam and adjacent States on many days in the month and in West Bengal and Sikkim in the last week. Scattered or isolated thundershowers also occurred in Bihar State and east Uttar Pradesh mostly in the last week. Agartala reported hail on 10th and 19th evening and Imphal on 10th evening.

The principal amounts of rainfall (cm) in north-east India associated with these systems during the month were :

Haflong 4 on 7th; Imphal 4 on 9th; Cherrapunji and Imphal 4 each on 10th; Cherrapunji, Silchar and Agartala 6 each on 11th; Silchar 10, Digboi 5, and Cherrapunji 4 on 12th; Cherrapunji 16 on 15th, Cherrapunji 11 and Haflong 7 on 16th; Gauhati and Chaparmukh 5 each on 21st; Krishnanagar 9, Bagati 4 on 23rd; Dibrugarh 9, Cherrapunji 7 on 26th; Jalpaiguri and Tura 8 each, North Lakhimpur 5 and Balurghat 4 on 27th; Cooch Behar and Darjeeling 4 each on 28th; Agartala 5 and Jalpaiguri 4 on 29th; Gangtok 8 and Gauhati 5 on 30th.

Four troughs of low moved westwards across Comorin-Maldiva area during the periods 1st to 3rd, 6th to 9th, 13th to 16th and 23rd to 26th. The seasonal low level wind discontinuity/trough upto 1.5 km a.s.l. was present on most days in the month extending from interior south Peninsula to east Madhya Pradesh and adjoining Orissa. A

low also lay over north Madhya Pradesh from 22nd to 25th. In association with these systems, Andhra Pradesh, interior Karnataka, Tamil Nadu and Kerala had scattered or isolated rain or thundershowers on many days in the month. Rainfall was fairly widespread in Kerala from 1st to 5th, 15th, 16th, 24th and 25th, in Tamil Nadu on 2nd and from 27th to 29th and in Lakshadweep and Interior Karnataka on two or three days in the month. Scattered or isolated thunderstorms also occurred in east Madhya Pradesh on many days in the last week, in Orissa for about 10 days and in interior Maharashtra State on a few days during the first and last week. Baripada reported hail on 24th afternoon. Bangalore and Kolhapur had hailstorms on 23rd. According to press reports some damage to paddy crops occurred in some parts of Karimnagar district due to hailstorm on 22nd.

The principal amounts of rainfall (cm) during the month associated with these system were :

Ranibennur 7 and Coonoor 5 on 1st; Kangayam 10, Malur 9, Trichur 7, Punalur, Mannarghat and Ottapalam 6 each and Alathur 5, Triptur and Madurai city 4 each on 2nd; Muvattapuzha 4 on 3rd; Mannarghat and Trirurangadi 4 each on 4th; Quilon 9, Hassan 4 on 5th; Jagdalpur 4 on 6th; Thodupuzha 4 on 10th; Gangavathi 4 on 14th; Shimoga and Minicoy 8 each, Quilon and Kottayam 5 each and Kayatar 4 on 15th; Muvattapuzha 9, Manathody and Ottapalam 6 each, Sri-valliputtur, Bangalore AP, Ponnani, Trichur, Peermedu and Thodupuzha 5 each and Amini 4 on 16th; Mavelikara 6 and Thodupuzha 4 on 17th; Kottayam 6 on 18th; Hassan 6 and Mandya 4 on



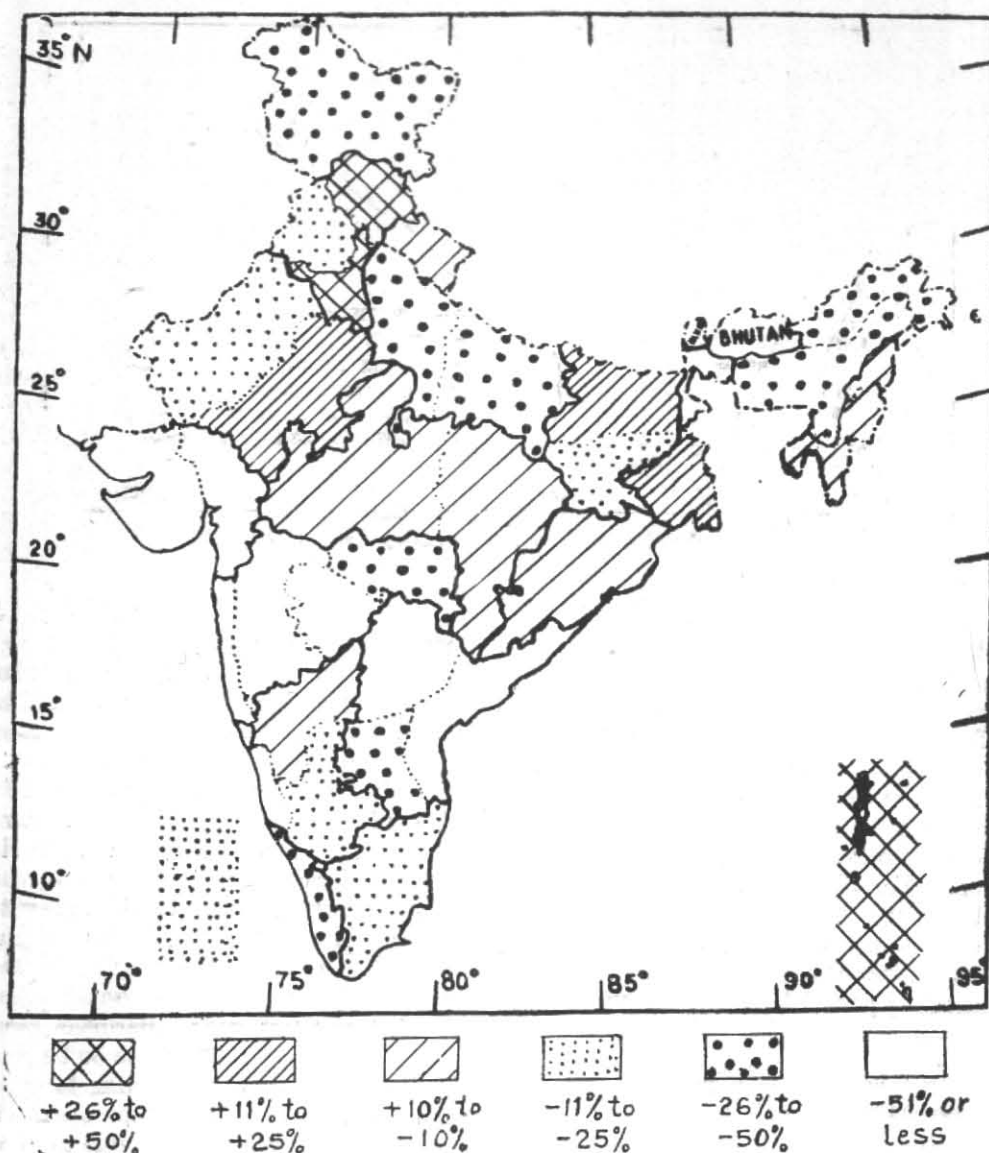


Fig. 2 (a). Rainfall for the period 1 March to 31 May 1976  
(Percentage departure from normal)

23rd; Belgaum 7, Trichur 6, Quilon, Thodupuzha and Pollachi 5 each, Salem, Trivandrum AP and Chintapalli 4 each on 24th; Nilambur 7, Kunnankulam and Coonoor 5 each, Baripada, Hassan, Calicut, Palghat and Punalur 4 each on 25th; Chitradurga 8, Holenarasipur and Balasore 5 each, Penukonda 4 on 26th; Dharapuram, Karur, Pudukottai, Muvattapuzha 5 each, Pamban, Udumalpet 4 each on 27th; Karur 6, Kanyakumari, Nilakottai and Thodupuzha 4 each on 28th.

Day temperatures were appreciably to markedly

#### MAY

Eight western disturbances moved east wards across the Western Himalays during the month. Four induced lows also moved across the plains of northwest India and west Uttar Pradesh. In associa-

tion with these systems, scattered to fairly widespread rain occurred in the Western Himalayas for about 10 days in the month and in west Rajasthan and Haryana on two or three days. Scattered

above normal in Jammu & Kashmir on many days between 16th and 28th and appreciably above normal in northwest India, west Uttar Pradesh, some parts of Madhya Pradesh and Madhya Maharashtra on 21st and 22nd and in Assam and adjacent States, Sub-Himalayan West Bengal and Sikkim for about 10 days in the first three weeks. They were appreciably to markedly below normal in northwest India on many days in the first fortnight and in west Uttar Pradesh on many days in the first week.

or isolated rain or thundershowers occurred in the plains of northwest India and west Uttar Pradesh on many days in the second fortnight. The rainfall for the month was normal or excess in the hills of west Uttar Pradesh, Haryana and Rajasthan and generally deficient in the rest of northwest India and Uttar Pradesh.

New Delhi (Safdarjung) had 6 cm of rain on 24th which is a record for the station for May. The other principal amounts of rainfall associated with the western disturbances were :

Nainital 5 on 15th; Dharamsala 5, and Chandigarh 4 on 17th; Sikar 4 on 19th; Nagaur 4 on 25th.

The cyclonic storm which lay about 300 km north-northeast of Port Blair on the evening of 30th April moved north-northeast, became severe by the evening of 1st May, crossed Arakan coast near Sandoway on 2nd afternoon and weakened into a low over central Burma on 3rd. It caused widespread rain or thundershowers in Bay Islands on 1st and 2nd May. Long Island recorded 5 cm of rain on 1st.

A trough of low developed over Lakshadweep on 27 May. It moved slightly westwards and a well marked low formed to the west of Lakshadweep on 29th morning. The low concentrated into a depression by the evening, with its centre near  $12^{\circ}\text{N}$ ,  $70^{\circ}\text{E}$ . Moving in a northeasterly direction, it intensified into a cyclonic storm by 31st-noon and was centred near  $15^{\circ}\text{N}$ ,  $72^{\circ}\text{E}$  on that evening. Under the influence of this system the south-west monsoon advanced into Comorin-Maldivian area on 30th and into Kerala and south Arabian Sea by 31st. The northern limit of the monsoon passed through Mangalore, Arogyavaram, Madras and Sandoway on the morning of 31st. Rainfall was widespread in Lakshadweep from 29th to 31st, in Kerala on 30th and 31st and in coastal Karnataka on 31st with isolated heavy falls in Kerala on 31st. The principal amounts of rainfall (cm) were :

Kunnamkulam and Kuttiyadi 6 each on 29th; Alwaye 5 on 30th; Devikulam 7, Kasargode 6, Mangalore, Calicut, Kummamkulam and Amini 4 each on 31st.

An upper air cyclonic circulation which lay over Andaman Sea on 4th and 5th, moved to southwest Bay by 8th. It caused generally widespread rain in Bay Islands during this period with isolated heavy falls on 4th and 5th. Kondul reported 7 cm of rain on 4th, 9 cm on 5th and 5 cm on 6th and Port Blair 7 cm on 5th. Under the influence of this cyclonic circulation, a low developed over southwest Bay on 8th and moved to Interior Karnataka and adjoining Andhra Pradesh by 11th and weakened on 12th. This system caused fairly widespread rain in Rayalaseema and generally isolated rainfall in Andhra Pradesh,

Tamil Nadu and Karnataka on 11th.

The seasonal wind discontinuity/trough upto about 1.5 km a.s.l. was present over the Peninsula and Madhya Pradesh on 1st and again on many days from 12th to 31st.

A trough of low also persisted off Kerala coast from 12th to 17th. In association with these systems, rain or thundershowers were fairly widespread in Kerala on 1st and again between 14th and 18th and generally scattered or isolated in Madhya Pradesh, Andhra Pradesh, Tamil Nadu and south Interior Karnataka on many days and in Maharashtra State and the rest of Karnataka on a few days between 12th and 29th. The principal amounts of rainfall (cm) associated with these systems were :

Coimbatore, Alathur & Palglat 6 each, Ottapalam & Mannarghat 5 each on 1st; Kurnool & Nagar Kurnool 5 each on 11; Oetacamund 11, Trivandrum & Muvattapuzha 4 each on 12th, Kodaikanal, Balehonnur & Periyakulam 4 each on 13th; Jagdalpur 10, Sangareddipet & Quilon 8 each, Ponnar, Usalampatti & Bangalore AP 7 each, Trivandram AP & Tadepaligudam 6 each, on 14th; Muvattapuzha 5, Quilon Ponnani & Thodupuzha 4 each on 15th; Ariyalur 10, Tirupattur 5, Polavaram 4 on 16th; Pudukottai 10 Trichur 8, Tiruchirappalli 7, Kodungallur 6, Ariyalur, Srivalliputter Ottapalam & Mavelikara 5 each on 18th; Bobilli & Kallakurichchi 4 each on 23rd; Madurai, Osmanabad Jath & Sangola 3 each on 26th; Hungud 6, Madak & Baramati 4 each on 28th; Tirupathi & Tiruchi 4 each on 29th.

An upper air trough/cyclonic circulation in the lower and middle troposphere lay over Andaman Sea from 16th to 20th. A well marked low formed over north Andaman Sea on 21st and moved slowly northwards to east central and adjoining northeast Bay by 25th and weakened on 26th. Under its influence, the southwest monsoon advanced into south Andaman Sea and adjoining southeast Bay on 21st and covered the whole of Andaman Sea and the southern and eastern parts of southeast Bay by 24th. Bay Islands had generally widespread rainfall from 16th to 26th with some heavy to very heavy falls from 21st to 26th. Maya Bandar recorded an exceptionally heavy fall of 28 cm on 25th. Other principal amounts of rainfall (cm) in the Bay Islands were :

Port Blair 6 on 18th; Kondul 9 & Long Island 8 on 21st; Long Island 5 on 22nd; Port Blair 10, Long Island 7 on 23rd; Car Nicobar 10 Hut Bay & Long Island 8 each on 24th; Port Blair 8 on 25th; Kondul 9 on 26th.

Six cyclonic circulations in the low levels (upto 1.5 km a.s.l.) moved from Bihar and adjoining parts of east Madhya Pradesh and east Uttar Pradesh to Assam and adjacent States during the

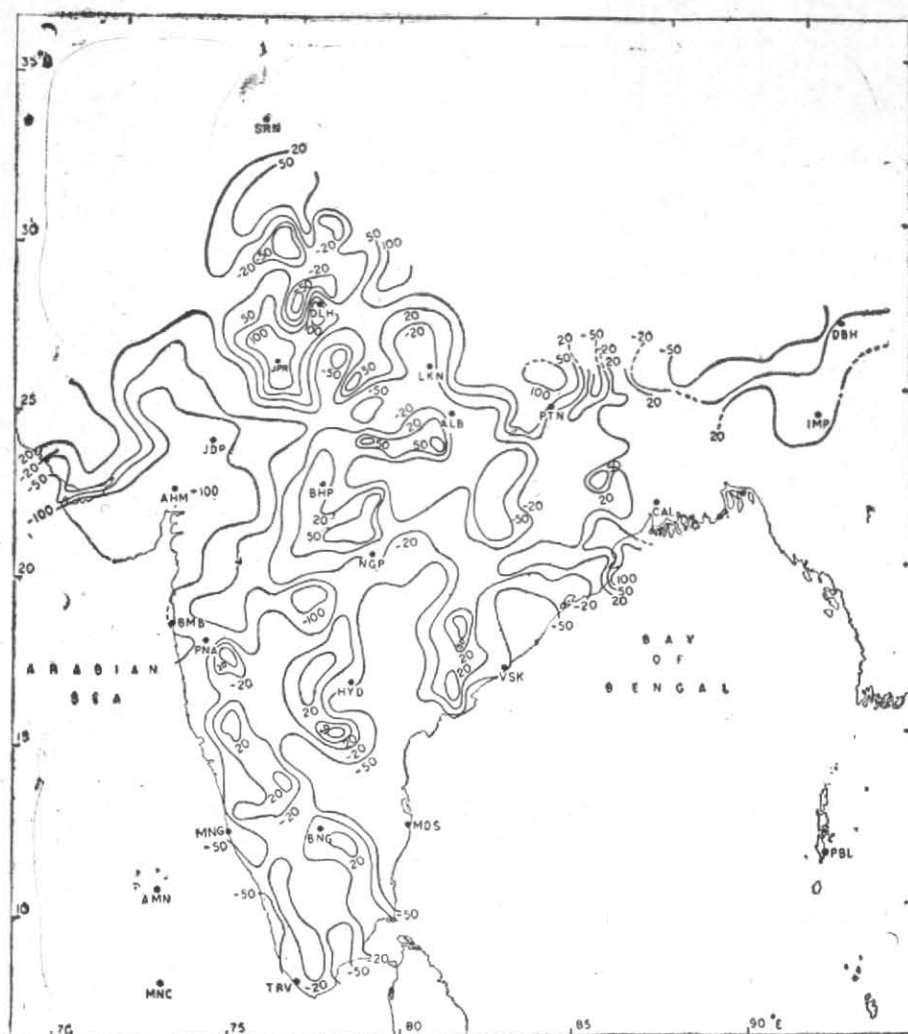


Fig. 2 (b) Percentage departure from normal of rainfall during 1 March to 31 May 1976

month. Eight troughs in the middle tropospheric westerlies also moved eastwards across northeast India. In association with these, rain or thunder-showers were fairly widespread in Assam and adjacent States and Sub-Himalayan West Bengal and Sikkim on many days in the first fortnight and again on the last few days of the month and in Gangetic West Bengal and Bihar State for about seven days in the second and third week. Scattered or isolated rainfall occurred in Orissa on many days, in east Uttar Pradesh for about twelve days and over the rest of northeast India on many other days. The principal amounts of rainfall (cm) were:

Tura and Gauhati AP 5 each on 1st; Gangtok 11 & Tangla 5 on 2nd; Gangtok 5 on 4th and 5th; Gangtok 7 and Haflong 5 on 7th; Cherrapunji 7, Majbat & Jalpaiguri 5 each on 8th; Dum Dum 9, Sagar Island 6, Calcutta 5 on 9th; Cherrapunji & Chaparmukh 6 each on 10th Cooch Behar 6, Silchar 5 on 11th; Balasore 6 on 12th; Paradeep 9, Chandbali 6, Sand heads 5 on 13th; Khonsa 7 on 14th; Berhampur 7, Sitapur 5 on 15th; Darbhanga

10, Digboi 8, Muzaffarpur 6 on 16th; Agartala 5 on 18th, Baghdogra 6 on 22nd; Baghdogra & Tangla 5 each on 24th; Jalpaiguri 13, Cooch Behar 5 on 27th; Dhubri 5 on 29th; Cherrapunji and Sriniketan 6 each and Gangtok 5 on 30th.

The rainfall for the month was normal to excess in Madhya Pradesh and most parts of northeast India but deficient or scanty over the Peninsula. Moderate to severe heat wave conditions prevailed in coastal Andhra Pradesh from 23rd to 27th. Moderate heat wave was also felt in coastal Andhra Pradesh and coastal Tamil Nadu from 2nd to 6th and in coastal Orissa on 29th. Day temperatures were appreciably above normal in coastal Andhra Pradesh and coastal Tamil Nadu from 1st to 10th and again in coastal Andhra Pradesh on most days in the last week. Day temperatures in Orissa, some parts of Assam and coastal Tamil Nadu were also appreciably above normal on many days in the last week and in Jammu & Kashmir on a few days in the first fortnight and again in the last two days of the month.