

Weather

HOT WEATHER PERIOD (MARCH—MAY 1970)

INTRODUCTION

Seventeen western disturbances affected north-west India during this season — 8 in March, 6 in April and 3 in May. Most of them were upper air systems and caused generally light to moderate rainfall resulting in deficient rainfall for the season over most parts of northwest India. In the first week of March, there were hailstorms in some parts of Vidarbha, Madhya Pradesh and Orissa causing damage to standing crops, where some deaths were also reported. Hails causing damage to Rabi and fruit crops were also reported from many parts of Haryana in the second week of March. Severe thundersqualls swept through some parts of Saharsa district in north Bihar in the last week of April which were reported to have taken a toll of some 50 human lives. A number of stations in the plains of northwest India reported duststorms on some days in the last week of May which disrupted road and rail communications in Ganganagar district of Rajasthan. A spell of heavy thunder-shower activity in Assam in the third week of May caused floods in the Brahmaputra and damage to paddy and jute crops in the northern districts of Assam. There was good thunderstorm activity in the Peninsula during this season resulting in excess or normal rainfall over most parts. March was generally cool with the daily maximum temperatures remaining appreciably to markedly below normal in many parts of north India on many days in the first three weeks of March. Moderate heat wave conditions prevailed in Jammu and Kashmir, Himachal Pradesh, Punjab, north Haryana and extreme northwest Uttar

Pradesh from 24 to 26 April. There was a continuous hot spell in many parts of north India and in coastal Andhra Pradesh in the second and third weeks of May with moderate to severe heat wave conditions on some days which reported to have taken a toll of 500-600 human lives. A severe cyclonic storm formed in the central Bay of Bengal, moved northeastwards and crossed East Pakistan coast near Cox's Bazar in the first week of May causing widespread rain in the Bay Islands. A depression formed in northeast Bay in the last week of May which also moved north-east and crossed East Pakistan coast south of Cox's Bazar. Another cyclonic storm formed in the east central Arabian Sea towards the end of May, moved initially northwest and then moved away westwards to the Arabian coast. It caused the advance of the monsoon along the west coast. The tracks of these systems are shown in Fig. 1. The southwest monsoon advanced into south Andaman Sea and extreme south Bay on 15 May. It set in over south Kerala on 26th and advanced into south Konkan, practically the entire Bay and into the Arabian Sea upto Lat. 17°N by the end of the month. The northern limit of the monsoon was passing through Ratnagiri, Masulipatam and Chittagong on the morning of 31 May. The total rainfall for the period from 1 March to 31 May in terms of its departure from normal is given in Fig. 2.

The important features of the weather, month by month, are given below.

MARCH

Eight western disturbances moved across north-west India in March. The first western disturbance moved across the Western Himalayas between 6th and 8th as a cyclonic circulation in the lower troposphere. It induced two low pressure areas, one over northeast Arabian Sea and another over

west Rajasthan and neighbourhood on 6th evening. They became less marked by 8th. Associated with these systems, there was isolated light precipitation in the Western Himalayas on 6th, in Gujarat region on 7th and in Rajasthan on 8th. The second western disturbance moved from

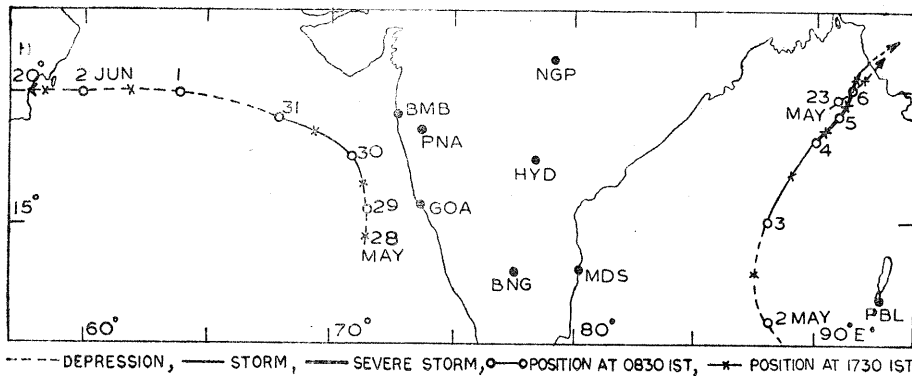


Fig. 1 Tracks of storms/depressions during March to May 1970

southeast Iran across Punjab and the hills of west Uttar Pradesh as a low pressure area between 7th and 11th causing fairly widespread precipitation on 10th and 11th over the Western Himalayas, Punjab, Haryana, Uttar Pradesh and isolated slight rainfall in east Rajasthan on 10th. New Delhi recorded 5 cm of rain on 11th. According to press reports, south Delhi and the districts of Gurgaon and Rohtak in Haryana were hit by hailstorms on 10th causing extensive damage to the *rabi* crops and fruit crops. In the city of New Delhi, some damage was reported to cars and buildings by the hail stones. Road traffic and air services were temporarily dislocated. Some damage was also caused to standing crops by hailstorms in some parts of Hissar and Mohindergarh districts. The third and fourth western disturbances moved across the Western Himalayas as cyclonic circulations in the lower troposphere between 12th and 16th causing fairly widespread light to moderate precipitation in the western Himalayas during this period and isolated light rainfall in Punjab, Haryana and the plains of west Uttar Pradesh from 14th to 16th and in Rajasthan on 15th. Banihal recorded 5 cm of rain and Manali 4 cm on 14th and Quazigund recorded 4 cm on 16th. The remaining four western disturbances moved across northwest India as upper air troughs in the lower/middle troposphere causing isolated light precipitation mostly in the Western Himalayas.

In association with the seasonal wind discontinuity in the lower tropospheric levels (below 1.5 km a.s.l.) running from the interior parts of the Peninsula to northeast India across Vidarbha and Madhya Pradesh on most of the days, there was good thundershower activity in Vidarbha, Madhya Pradesh, Orissa, Bihar Plateau and Gangetic West Bengal in the first fortnight, in Assam from 12th to 16th and again from 24th to 31st and in coastal Andhra Pradesh and Telangana from 5th to 8th.

Some of the noteworthy amounts of rainfall were: on 5th 7 cm at Paradeep; on 6th 6 cm at Cuttack; on 8th 6 cm at Gopalpur; on 11th 5 cm at Calcutta; on 28th 10 cm at Silchar and on 31st 10 cm at Haflong.

According to press reports, Akola and Nagpur districts in Vidarbha were hit by hailstorms on 6th and 7th which caused damage to standing crops and took a toll of a few human lives. There were also reports of hailstorms in Sundergarh district of Orissa on 3rd and Jabalpur district in Madhya Pradesh on 9th causing damage to *rabi* crops. Some parts of Sholapur district and Marathwada were also hit by hailstorms in the first two weeks causing damage to standing crops.

There were two spells of thundershower activity in south Peninsula, the first between 10th and 14th mainly in association with the seasonal wind discontinuity at 900 m a.s.l. across the south Peninsula and the second towards the end of the month associated with the westward movement of a trough in the lower tropospheric easterlies from Ceylon to southeast Arabian Sea between 28th and 30th.

The noteworthy amounts of rainfall were: on 11th 15 cm at Coonoor, 5 cm at Punalur and 4 cm at Kanyakumari; on 30th 6 cm at Alleppey and Punalur; on 31st 7 cm at Fort Cochin and 5 cm at Calicut.

The daily maximum temperatures were above normal in the interior parts of Maharashtra State from 21st to 28th and in many parts of Tamil Nadu, and interior parts of Mysore and Andhra Pradesh on some days. They were below normal in (1) many parts of north India in the first three weeks, being appreciably to markedly so on most of the days, (2) many parts of Maharashtra State in the first two weeks and (3) many parts of Gujarat State in the first three weeks.

The daily minimum temperatures were above normal in many parts of Tamil Nadu from 4th to 15th and in the Interior Mysore and the interior

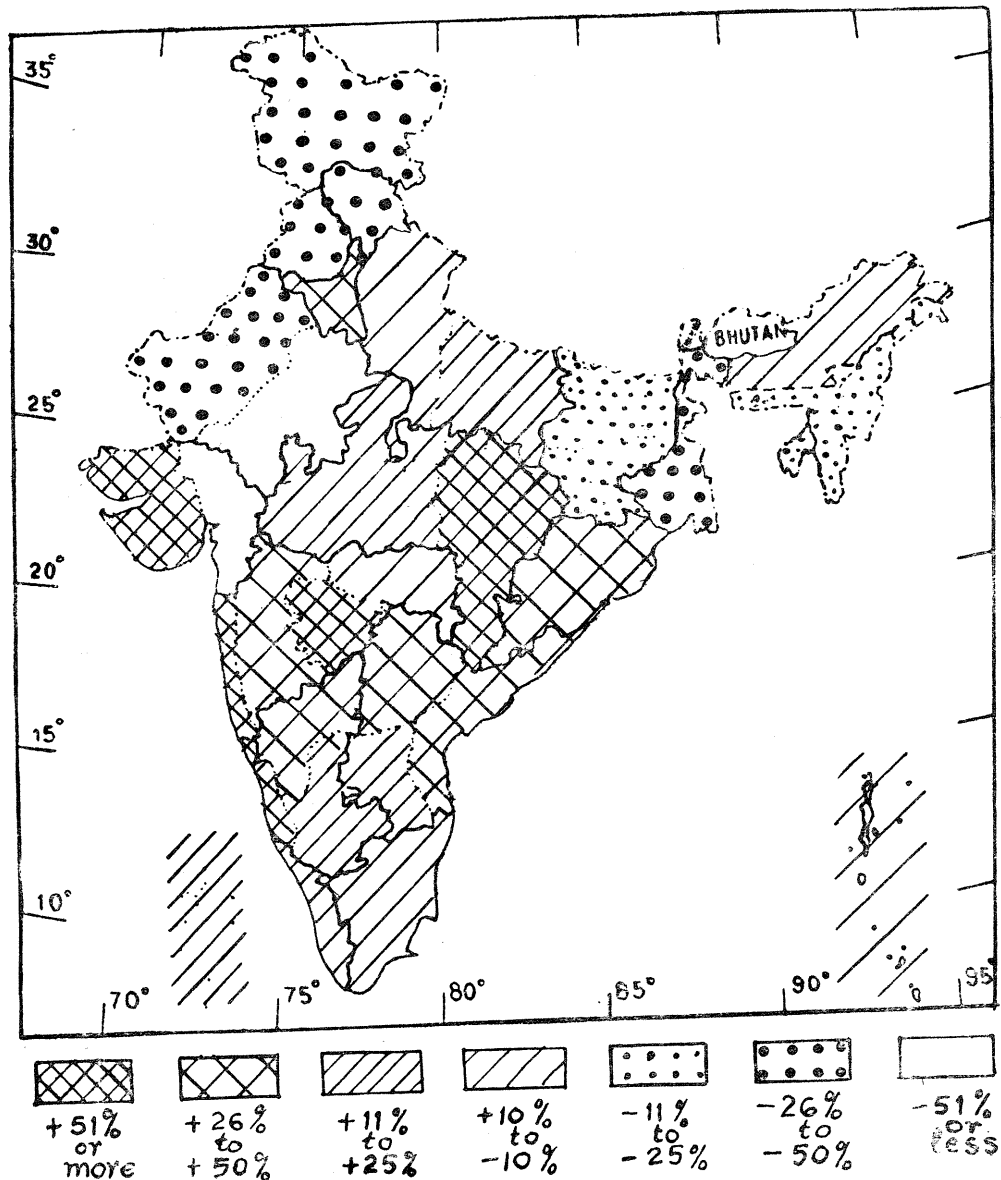


Fig. 2(a). Rainfall for the period 1 March to 31 May 1970
(Percentage departure from normal)

parts of Andhra Pradesh in the third week. They were below normal in (1) many parts of northwest India and Uttar Pradesh in the first week and again on many days in the second fortnight being appre-

ciably to markedly so in Rajasthan and west Uttar Pradesh on some days, (2) in interior parts of Maharashtra State in the first fortnight and (3) in Mysore State in the first week.

APRIL

During this month six western disturbances, all of them being upper air systems, moved across northwest India—the first and second during the first week, the third and fourth between 12th and 17th, the fifth between 18th and 20th and the sixth between 26th and 29th. They caused scattered light precipitation in the Western Himalayas and

the adjoining plains. The trough in the lower and middle troposphere associated with the second western disturbance extended into north Arabian Sea on 6th and into Rajasthan and Gujarat State on 7th and 8th causing isolated very light rain in Kutch on 7th and in Rajasthan on 7th and 8th. The fifth western disturbance induced a low pressure

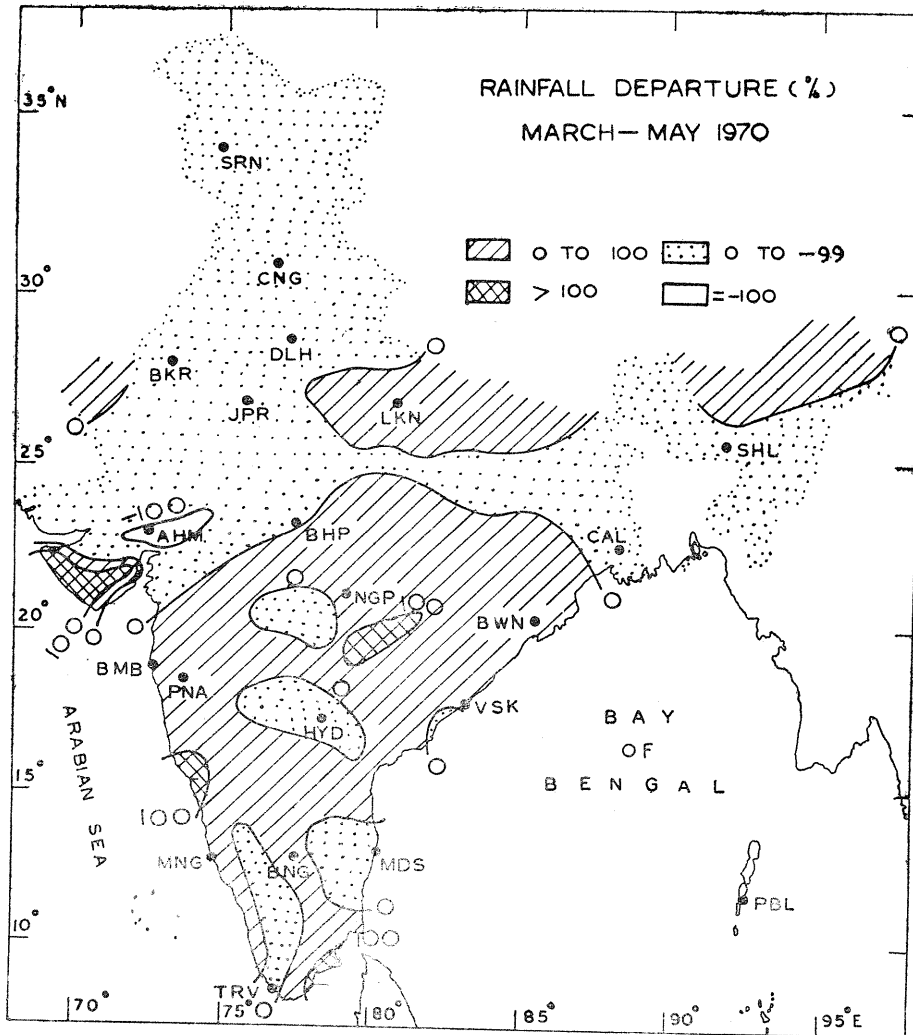


Fig. 2(b). Percentage departure from normal of rainfall occurred during the period 1 March to 31 May 1970

area over Rajasthan on 19th which moved to north-west Madhya Pradesh on 20th and became less marked on 21st. This caused isolated very light rain in east Rajasthan on 20th. The rainfall in northwest India and Uttar Pradesh was scanty during this month.

There were two spells of good thundershower activity in northeast India, one during the third week and the other during the period 27th to 30th. They were mostly in association with the seasonal wind discontinuity in the lower tropospheric levels (below 1.5 km a.s.l.) passing from Madhya Pradesh to northeast India.

Some of the noteworthy amounts of rainfall were: on 16th 5 cm at Kailashahar and Haflong; on 17th 10 cm at Agartala, 5 cm at Tezpur; on 27th 6 cm at Jalpaiguri; on 28th 8 cm at Jalpaiguri, 5 cm at Cooch Behar, Goalpara and Pasighat and 4 cm at Forbesganj; on 29th 6 cm at Tura; on 30th 8 cm at Pasighat.

According to press reports, severe thunder-squalls swept through some parts of Saharsa

district on 27th night killing some 50 persons.

Three troughs in the lower tropospheric easterlies moved westwards across south Peninsula, the first two in the first week and the third between 18th and 20th causing good rainfall in south Peninsula during these periods.

The chief amounts of rainfall were: on 6th 8 cm at Coonoor 7 cm at Salem and Bellary, 6 cm at Kodajkanal and Tiruchirappalli, 5 cm at Tiruppattur, Kanyakumari, Adirampattam and Punalur; on 21st 5 cm at Punalur.

A trough of low pressure moved from Andaman Sea to southeast Arabian Sea between 9th and 16th causing fairly widespread rain in the Bay Islands from 9th to 11th, in south Peninsula from 13th to 15th and isolated rainfall in Laccadives on 16th and 17th. Kondul recorded 5 cm of rain on 9th, Tuticorin 7 cm and Pamban 5 cm on 14th, Trivandrum reported 6 cm on 15th, Agathi 3 cm on 16th and Amini 3 cm on 17th. A trough of low pressure formed off the west coast on 23rd and

persisted there upto 29th causing scattered thundershowers in Kerala, Maharashtra and Mysore States. Apart from these systems which caused rainfall in the Peninsula, there was scattered or isolated rainfall in the Peninsula and the central parts of the country on some days in association with the seasonal wind discontinuity in the lower tropospheric levels (below 1.5 km a.s.l.) running north-south from east Madhya Pradesh and adjoining Orissa to south Peninsula. On 10th Alleppey recorded 11 cm of rain and Fort Cochin 6 cm.

The daily maximum temperatures were generally above normal in Jammu and Kashmir in the first

Three western disturbances moved across northwest India in the first fortnight. The first two moved as upper air troughs during the periods 4th to 7th and 8th to 10th causing light to moderate rainfall in the Western Himalayas and light rain in the adjoining plains. Mukteswar recorded 7 cm of rain on 7th. The third western disturbance moved across the Western Himalayas as a low pressure area between 14th and 16th causing very light rain at Gulmarg on 15th.

The seasonal wind discontinuity over northeast India in the lower tropospheric levels (below 1.5 km a.s.l.) was well marked on many days in the first fortnight. The seasonal low pressure area over northeast Madhya Pradesh and neighbourhood was also well marked from 15th to 18th with associated upper air trough extending to 1.5 km a.s.l. This caused incursion of strong moist southerlies into West Bengal and Assam. A trough in the upper tropospheric westerlies also moved across Nepal-Himalayas and northeast India between 16th and 20th. Associated with these systems, there was good rainfall in Assam from 1st to 4th and again from 9th to 18th, being widespread from 15th to 18th, with isolated heavy falls on many days. According to press reports, the heavy rains in Assam caused floods in the *Brahmaputra* and its tributaries which inundated low-lying areas and damaged paddy and jute crops in Lakhimpur, Sibsagar, Nowgong, Kamrup, Goalpara and Garo hills districts in the third week.

The seasonal trough of low pressure extending from northwest India to east Madhya Pradesh and adjoining Bihar Plateau and Orissa was well marked during the last 10 days with associated upper air trough extending to about 1.5 km a.s.l. A trough in the upper troposphere westerlies moved across north India between 25th and 29th. Associated with these, there was good thunder-shower activity in northwest India, Uttar Pradesh, Madhya Pradesh, Bihar State and Orissa during the last 10 days, a few stations in these areas reporting

week, in many parts of northwest India, Uttar Pradesh and Madhya Pradesh in the second week and in many parts of north India in the last week with moderate heat wave conditions in Jammu and Kashmir, Himachal Pradesh, Punjab, north Haryana and extreme northwest Uttar Pradesh between 24th and 26th. They were also above normal in Gujarat State in the second fortnight and in Madhya Maharashtra from 11th to 15th and 19th to 26th. They were below normal in Gujarat State, interior parts of Maharashtra and Mysore States, Andhra Pradesh and some parts of Madhya Pradesh on many days in the first week and in Assam in the third week.

MAY

5 to 7 cm of rain on some days. A number of stations in the plains of northwest India reported dust-storms on some days during this period. According to press reports (1) the dust storms in Rajasthan disrupted road and rail communications in Ganganagar district and (2) some stations in Himachal Pradesh and Bihar State had hailstorms.

A low pressure area which was lying over south Andaman Sea on 30th April moved into southwest Bay on 1st May and concentrated into a depression on the morning of 2nd near Lat. 11°N and Long. 88°E. Moving north, it intensified into a cyclonic storm on 3rd morning near Lat. 15°N, Long. 88°E. Then moving northeastwards, it intensified further into a severe cyclonic storm near Lat. 18°N and Long. 90°E on 4th morning, crossed East Pakistan coast near Cox's Bazar on 7th early morning and weakened into a low pressure area that evening over central Burma. This system caused fairly widespread rain with isolated rather heavy falls in the Bay Islands upto 3rd May.

A low pressure area with associated cyclonic circulation extending to the middle troposphere moved westwards from south Andaman Sea to south Peninsula between 6th and 11th and merged with the seasonal trough over the Peninsula. But the upper air circulation associated with the system and extending between 2 and 6 km a.s.l. moved across the Peninsula into east central Arabian Sea and adjoining Laccadives off Goa-Mysore-Kerala coasts on 12th and became less marked the next day. This system caused good rainfall in the Bay Islands from 6th to 8th and in the Peninsula from 9th to 13th. Kondul recorded 9 cm of rain on 6th and 6 cm on 7th. Some stations in the south Peninsula recorded 3 to 5 cm of rain between 9th and 12th.

A cyclonic circulation^r in the middle troposphere was lying over Andaman Sea on 13th and 14th. On 15th a low pressure area formed over Andaman

Sea, moved westwards to west central and adjoining southwest Bay and weakened into a trough on 17th evening. Under its influence, there was widespread rain in the Bay Islands from 13th to 16th and in Tamil Nadu on 18th and the southwest monsoon advanced into south Andaman Sea and extreme south Bay on 15th. On 15th Port Blair recorded 13 cm of rain, Maya Bandar 11 cm, Hut Bay 10 cm and Kondul 8 cm. On 18th Kodaikanal recorded 8 cm, Coimbatore airport 7 cm, Pamban 5 cm and Tiruchirappalli and Atirampattinam 4 cm each.

A well marked trough of low pressure extended from west central Bay to northeast Bay from 20th to 22nd. On the morning of 23rd, a depression formed in northeast Bay near Lat. 19.5°N and Long. 91°E , moved northeast, crossed coast south of Cox's Bazar that night and weakened into a low pressure area over south Assam and adjoining East Pakistan and Burma on the next day. Associated with these, there was good rainfall in the Bay Islands from 20th to 23rd and the monsoon advanced into north Andaman Sea and southeast Bay on 21st and most parts of the east central Bay and part of southwest Bay by 25th.

A cyclonic circulation between 2 and 6 km a. s. l. was lying in southeast Arabian Sea and Laccadives off Kerala-Mysore coasts from 22nd to 24th. On 25th, a trough of low pressure developed in that area and became well marked on 26th. In the trough, a low pressure area formed off Mysore coast on 27th and concentrated into a depression on 28th evening near Lat. 14.5°N and Long. 71.5°E . Moving north, it intensified into a cyclonic storm on 29th evening near Lat. 16.5°N , Long. 71.5°E . Then moving northwest, it weakened into a deep depression on 31st morning near Lat. 19°N and Long. 68°E and moved away westwards towards Saudi Arabia. In association with these the monsoon set in over Comorin-Maldives area on 24th and over south Kerala and south Arabian sea upto Lat. 19°N on 26th and advanced upto south Konkan by the end of the month. It also advanced into the Arabian Sea upto Lat.

17°N and into almost the entire Bay of Bengal by 31st May. On the morning of 31st May, the northern limit of the monsoon was passing through Ratnagiri, Masulipatnam and Chittagong. Good rainfall occurred in many parts of the Peninsula during the last 10 days and isolated rain in Gujarat State on the last 2 days of the month. The monsoon was active in Kerala from 28th to 30th and vigorous in coastal Mysore on 29th.

Some of the noteworthy amounts of rainfall were: on 24th 9 cm at Atirampattinam; on 25th 11 cm at Belgaum; on 26th 6 cm at Amini; on 27th 8 cm at Punalur, 7 cm at Alleppey; on 28th 7 cm at Calicut, 6 cm at Vijaywada; on 29th 10 cm at Calicut, 9 cm at Mangalore airport and town, 8 cm at Honavar, 7 cm at Karwar; on 30th 7 cm at Karwar and 4 cm at Veraval and on 31st 4 cm at Bhavnagar.

The daily maximum temperatures were appreciably above normal in (1) northwest India from 1st to 4th (2) many parts of north India outside Assam but including Gujarat State, Madhya Maharashtra and Interior Mysore from 8th to 10th (4) north Assam in the last week (5) coastal Andhra Pradesh and north coastal Tamil Nadu from 5th to 7th and (6) north Andhra Pradesh from 13th to 20th. Moderate heat wave conditions prevailed in Gangetic West Bengal from 12th to 14th, in Orissa from 14th to 16th, in Bihar State from 12th to 15th, in north Gujarat State from 11th to 13th, in south Rajasthan from 12th to 14th, in extreme northwest Uttar Pradesh from 13th to 16th, in Punjab and Himachal from 15th to 20th and moderate to severe heat wave conditions in coastal Andhra Pradesh from 15th to 20th and in Jammu and Kashmir from 17th to 20th. Although Madhya Pradesh, Vidarbha and most parts of Uttar Pradesh did not have heat wave as such, the maximum temperatures in these areas remained 2° to 4°C above normal continuously for two weeks. According to press reports, the prolonged hot spell in the various parts of north India and Andhra Pradesh took a toll of 500 to 600 human lives; Madhya Pradesh, Vidarbha and Bihar State accounting for more than three hundred. The daily maximum temperatures were however below normal in Assam in the first three weeks and in many parts of the country in the last week.