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Weather

HOT WEATHER SEASON (MARCH--MAY 1975)

CHIEF FEATURES

Western disturbances

Twentytwo western disturbances moved eastwards across northwest India during the season: 6 in March, 7 in April and 9 in May. The rainfall was in excess in Jammu & Kashmir and deficient or scanty over the rest of northwest India and in Uttar Pradesh for the season.

Cyclonic storms/depressions

Three cyclonic storms, one in the Bay and two in the Arabian Sea developed during May. Except one in the Arabian Sea the other two were severe storms. No damage was caused by these storms in the coastal areas of India. The tracks of these storms are shown in Fig. 1.

Southwest monsoon

The southwest monsoon advanced into south Andaman Sea and extreme south Bay on 18 May. It covered most parts of the Bay, Assam and adjacent States and adjoining Sub-Himalayan West Bengal, Kerala and Arabian Sea upto 12°N by 31 May. The northern limit of the monsoon passed through Mangalore, Cuddalore, Barisal and Darjeeling on 31 May.

Rainfall

The rainfall for the season was in excess in Jammu & Kashmir and Lakshadweep, normal in Tamil Nadu, north Interior Karnataka and Telangana and deficient or scanty over the rest of the country. The total rainfall for the period 1 March to 31 May 1975, in terms of percentage departures from the normal, is shown in Figs. 2 (a) and 2 (b). Fig. 2 (a) shows the mean percentage departure of season's rainfall from normal for every meteorological sub-division while Fig. 2(b) shows isopleths of percentage departure based on departure calculated for each observatory.

Temperature

Moderate to severe cold wave conditions prevailed in some parts of Rajasthan and moderate cold wave conditions in Gujarat State, southwest Uttar Pradesh and adjoining northwest Madhya Pradesh between 12 and 16 March. Moderate heat wave conditions prevailed in coastal Andhra Pradesh and Gangetic West Bengal on a few days in May.

The main weather features for each month are described below.

MARCH

Six western disturbances moved eastward across the Western Himalayas during the month: three in the first fortnight and three in the second fortnight. The two western disturbances which moved across the Western Himalayas during the the periods 9th to 12th and 19th to 25th were well marked and they caused fairly widespread rain or snow in the Western Himalayas during the above periods. Three induced lows moved from south Rajasthan to north Madhya Pradesh and adjoining south Uttar Pradesh during the periods 3rd to 7th, 8th to 10th and 19th to 21st, causing scattered or isolated rain or thundershowers in the plains of northwest India, Madhya Pradesh and Uttar Pradesh on a few days during the above periods.

Another induced low moved from southwest Rajasthan to east Uttar Pradesh and adjoining Bihar between 22nd and 26th. It caused fairly widespread rain or thundershowers in Haryana and Punjab between 22nd and 24th, in east Madhya Pradesh on 25th and in east Uttar Pradesh on 26th. Scattered or isolated rain or thundershowers occurred in Rajasthan from 22nd to 24th, in the plains of west Uttar Pradesh from 23rd to 25th and in Bihar State and Gangetic West Bengal from 24th to 26th. Isolated duststorms were also reported from Rajasthan and Punjab on 21st afternoon.

According to press reports, the report of the

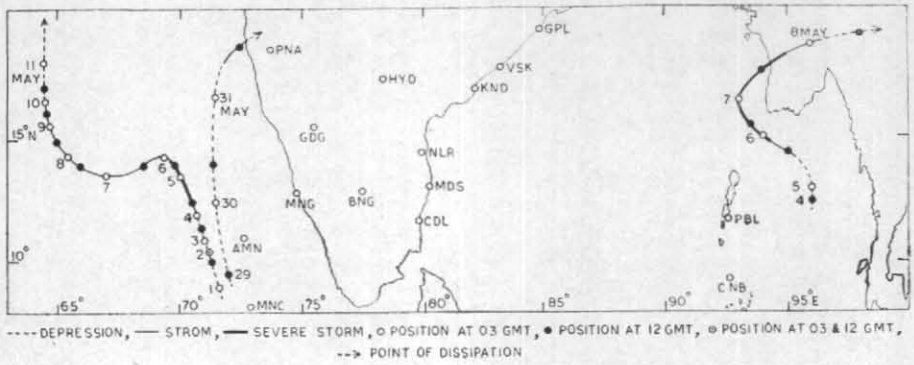

Fig. 1. Tracks of storms/depressions during May 1975

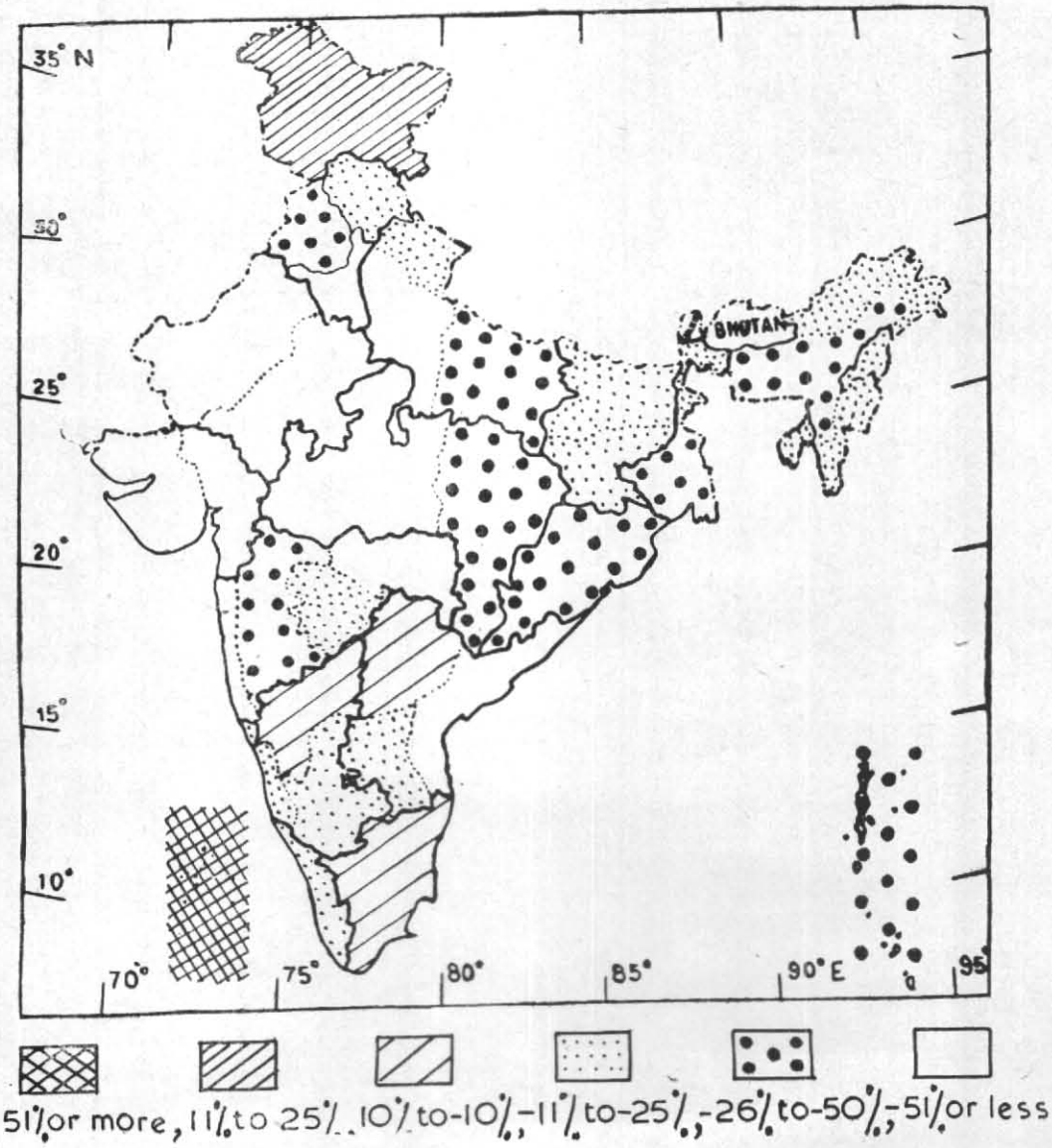

Fig. 2 (a). Rainfall for the period 1 March to 31 May 1975 (Percentage departure from normal)

Meteorological Officer who visited the affected areas and the reports collected from the State Govt. a severe tornado hit six villages in Ludhiana district on 10th evening, killing 10 persons, injuring about 150 persons and damaging about 800 houses. Many trees were uprooted and electric poles were twisted. Crops over 800 acres were completely destroyed.

The rainfall for the month was normal over the Western Himalayas and deficient or scanty in the plains of northwest India and Uttar Pradesh. The principal amounts of rainfall (in cm) associated with the western disturbances were : Quazigund 7 on 5th; Quazigund 5 on 6th; Mandi 8, Srinagar & Mussoorie 7 each, Banihal & Quazigund 6 each and Dehra Dun 5 on 11th; Gulmarg 6 on 12th; Gulmarg & Quazigund 5 each on 22nd; Quazigund 8, Gulmarg 6, Banihal 5 and Siwani 4 on 23rd; Pathankot (IAF) 7, Gulmarg 6, Bilaspur, Mandi & Munsyari 5 each, Gurdaspur & Nawashahar 4 each on 24th and Kalpa 5 on 25th.

A cyclonic circulation extending to 1·5 km a.s.l. lay over Assam and adjacent States and Sub-Himalayan West Bengal on many days from 1st to 10th. It caused fairly widespread rain or thundershowers in Arunachal Pradesh and scattered or isolated rainfall in Assam and Meghalaya on many days during this period.

A well marked low moved westwards from Sri Lanka to southeast Arabian Sea between 4th and 8th. Two troughs in the low level easterlies moved westwards across extreme south Peninsula during the periods 13th to 16th and 27th to 29th. A wind discontinuity at 900 m a.s.l. extended from extreme south Peninsula to east Madhya Pradesh and adjoining parts of Bihar and Orissa on most days during the month. In association with these systems, rain or thundershowers were fairly widespread in Tamil Nadu on 6th and 7th and in Kerala from 7th to 9th and scattered or isolated over these areas on many days in the first fortnight. Scattered or isolated rain or thundershowers also occurred over the rest of the Peninsula and in east Madhya Pradesh and Bihar on some days during the month.

The principal amounts of rainfall (in cm) associated with the above mentioned systems were : Atirampattinam 8, Mannargudi 7, Kumbhakonam & Mayuram 6 each, Pamban, Nagapattinam and Arantangi 5 each on 6th; Palghat 16, Coonoor 9, Kangayam and Mannarghat 8 each, Pollachi 6, Coimbatore 5 on 7th; Rentachintala & Pasighat 8 each, Ariyalur 7, Mannarghat 5, Alwaye, Ponnani and Iringalakuda 4 each on 8th; Kodaikanal 10, Hyderabad 6, Chindwara, Chitradurga, Parur & Perintalamanna 5 each, Seoni 4 on 9th; Alleppey 5 and Nizamabad 3 on 13th.

The rainfall for the month was normal or excess in Tamil Nadu, Kerala, Lakshadweep, Karnataka, Interior Andhra Pradesh, Marathwada, east Madhya Pradesh and Bihar Plateau. Saurashtra and Kutch had no rain during the month.

Moderate to severe cold wave conditions prevailed in some parts of Rajasthan from 12th to 16th and moderate cold wave conditions in Gujarat on 12th and 13th and in southwest Uttar Pradesh and adjoining northwest Madhya Pradesh on 15th and 16th. Night temperatures were appreciably below normal in south Rajasthan and north Gujarat from 9th to 11th, in many parts of northwest India, Madhya Pradesh, Gujarat and Uttar Pradesh from 12th to 19th and again from 25th to 29th, in Interior Maharashtra from 25th to 29th, in Bihar State from 13th to 19th and again from 27th to 30th and in some parts of West Bengal from 16th to 19th and again from 27th to 30th.

Day temperatures were appreciably above normal in Rajasthan and Gujarat State on many days and in Madhya Pradesh, Haryana, Uttar Pradesh and Bihar State on a few days in the first week, being markedly so in some parts of Rajasthan from 4th to 6th. They were also appreciably above normal in the northern parts of Assam and adjacent States on 12th, 13th and from 24th to 31st.

APRIL

Seven western disturbances moved eastwards across the Western Himalayas during the month : three in the first fortnight and four in the second. The first did not cause any rain over northwest India but caused only isolated duststorms in Rajasthan on 4th and 5th afternoon. The next two western disturbances caused isolated light or very light rain in the Western Himalayas. The four western disturbances which moved across the Western Himalayas in the second half of the month caused fairly widespread rain or thundershowers in Jammu & Kashmir and isolated rain or thundershowers in Himachal Pradesh and the hills of Uttar Pradesh. An induced low moved from Rajasthan to north Madhya Pradesh and adjoining south Uttar Pradesh between 19th and 21st

Fig. 2(b). Percentage departure from normal of rainfall during 1 March to 31 May 1975

and another from Rajasthan to Haryana between 24th and 26th. In association with these, isolated light rainfall occurred in the plains of northwest India and Uttar Pradesh on a few days. Dust-storms were reported from a few stations in Rajasthan on 20th and 21st. The rainfall for the month was excess in Jammu & Kashmir and deficient or scanty over the rest of northwest India and in Uttar Pradesh.

An east-west trough/wind discontinuity extending upto 1·5 km a.s.l. lay over northeast India on many days during the month. A low moved eastwards across Assam & Meghalaya and Arunachal Pradesh from 10th to 12th. Two cyclonic circulations extending upto 1·5 km a.s.l. also moved eastwards across northeast India during the periods 17th to 18th and 24th to 30th. Incursion of moisture into northeast India in the low levels was also well marked from 14th to 16th. In association with these systems, rain or thundershowers were scattered or fairly widespread in Assam and adjacent

States on many days in the month and scattered or isolated over the rest of northeast India for about a week to ten days. According to press reports, a severe thundersquall swept through Katihar district in Bihar on 25th, resulting in some loss of life and property. Jalpaiguri reported hailstorm on 21st afternoon.

The principal amounts of rainfall (in cm) in northeast India associated with above mentioned systems were: Cherrapunji 24, Majbat 7 and Tangla 5 on 7th; Cherrapunji 18 on 9th; Cherrapunji 13 on 10th; Pasighat 7 and Cherrapunji 6 on 11th; Sriniketan 14 on 16th; Agartala 6 on 17th; Daporijo 5 on 24th; Mokokchung 5 on 25th; Goalpara and Kokokchung 5 each on 28th; and Cherrapunji 9 on 30th.

Four troughs/cyclonic circulations in the lower tropospheric easterlies moved westwards across Comorin-Maldive area and adjoining south Peninsula during the periods 3rd to 5th, 8th to 12th, 13th to 16th and 26th to 29th. A well marked low formed over Lakshadweep and adjoining southeast Arabian Sea on 30th. A north-south wind discontinuity/trough upto 1·5 km a.s.l. lay over interior Peninsula extending from extreme south Peninsula to east Madhya Pradesh on many days in the month. In association with these systems, fairly widespread rain or thundershowers occurred in Kerala on 5 or 6 days in the month and in Lakshadweep on 30th with scatteted or isolated heavy falls in Kerala on 16th and 30th and in Lakshadweep on 30th. Scattered or isolated rain or thundershowers also occurred in Kerala and Tamil Nadu on many days in the month, in Karnataka and east Madhya Pradesh on many days in the second fortnight and in Andhra Pradesh, Maharashtra and Lakshadweep on a few days. Belgaum airport reported hailstorm on 22nd afternoon.

The principal amounts of rainfall (in cm) in the Peninsula associated with the above mentioned systems were: Cochin (NAS) 6 on 10th; Alleppey 9, Thumba & Nedumangad 6 each, Trivandrum & Thodupuzha 5 each on 16th; Minicoy 5 on 17th; Androth 6 and Thodupuzha 5 on 25th; Devikulam 5 on 28th; Atirampattinam 9 on 29th; Quilon 16, Mavelikara & Kanyakumari 12 each, Trivandrum & Kodaikanal 11 each, Amini & Kovalam 9 each, Manjeri & Nedumangad 8 each, Kottayam 7, Calicut, Punalur, Ambasamudram & Nanguneri 5 each on 30th.

The rainfall for the month was generally deficient in northeast India, east Madhya Pradesh and the Peninsula except in Kerala and Lakshadweep where the rainfall was excess. Gujarat State, west Madhya Pradesh and Marathwada had no rain during the month.

Day temperatures were markedly above normal in some parts of Rajasthan, Himachal Pradesh and north Assam from 2nd to 4th. They were appreciably above normal in many parts of northwest India from 2nd to 5th, in Rajasthan in third week, in Madhya Pradesh in the first week and on a few days in the third week, in Uttar Pradesh and Bihar State on many days in the first week, in some parts of Gujarat and Interior Maharashtra for about a week and in Sub-Himalayan West Bengal and northern parts of Assam and adjacent States on many days from 1st to 13th.

MAY

Nine western disturbances moved eastwards across the Western Himalayas during the month : four in the first fortnight and five in the second. The western disturbance which moved across the Western Himalayas from 2nd to 4th with an induced low moving from Rajasthan to Haryana on 3rd and 4th, caused scattered to fairly widespread rainfall in Jammu & Kashmir and scattered or isolated rainfall over the rest of northwest India between 3rd and 5th. Heavy rain in Kashmir valley disrupted air services to Srinagar on 4th. The western disturbance which affected northwest India between 15th and 18th caused generally widespread rainfall in the Western Himalayas from 16th to 18th, with isolated heavy falls in Jammu & Kashmir on 17th. Isolated light rain or thundershowers occurred in the adjoining plains with duststorms over Punjab and Haryana on 15th and 16th afternoon. According to press reports, the *Jhelum* was in spate and flooded the Jammu-Sringar highway at some places. The other western disturbances caused scattered or isolated rainfall in northwest India. The rainfall for the month was excess in Jammu & Kashmir and deficient or scanty over the rest of northwest India and in Uttar Pradesh.

A well marked low which lay over Lakshadweep and adjoining southeast Arabian Sea on 30 April, concentrated into a depression with its centre near 9·0°N, 71·5°E on the morning of 1 May. Moving in a northerly direction, it intensified into a severe cyclonic storm by the evening of 4th when it was centred near 12·5°N, 70·5°E.

It weakened into a cyclonic storm on 6th morning near 14·5°N, 69·5°E. Then moving westwards upto 7th evening and later moving northwards, it weakened into a low on the evening of 11th over central and adjoining north Arabian Sea. This system caused widespread rain in Lakshadweep from 1st to 5th, with scattered or isolated heavy to very heavy falls from 2nd to 4th. Rain or thundershowers were fairly widespread in Kerala from 1st to 3rd and scattered in Karnataka from 1st to 4th.

A low lay over Andaman Sea from 1st to 3rd. It concentrated into a depression on the evening of 4th with its centre near 12·5°N, 96°E. Moving northwestwards, it intensified into a severe cyclonic storm by the morning of 6th with its centre near 15·0°N, 94°E. It recurved northeastwards, crossed south Arakan coast south of Sandoway on 7th night and weakened by 9th. This system caused generally widespread rain in Bay Islands from 2nd to 8th with isolated heavy falls on 3rd and 4th. This cyclone is reported to have caused some loss of life and damage to sailing vessels in south Arakan coast.

A cyclonic circulation in the lower troposphere moved westwards from Sri Lanka to Comorin-Maldive area between 26th and 28th. A well marked low developed over Maldive area and neighbourhood on 28th evening. It moved northwestwards and concentrated into a depression on the evening of 29th with its centre near 9·5°N, 72°E. Then moving northwards it intensified into a cyclonic storm covering a small area by the afternoon of 31st. It recurved northeastwards and crossed Maharashtra coast about 45 km south of Bombay the same evening and weakened inland. This system caused fairly widespread or widespread rain in Lakshadweep and Kerala on 29th and 30th and in coastal Karnataka and south Konkan on 31 May and in Maharashtra State on 1 June. It also caused the advance of the monsoon into Kerala by 31 May. According to press reports, landslides and heavy rain dislocated rail and road communications in this area. Coastal steamer services along Konkan coast were also dislocated. Country crafts near Harnai were reported to have jettisoned their cargo due to stormy weather.

The principal amounts of rainfall (in cm) associated with the above mentioned cyclonic storms were: Alleppey 7 and Trivandrum AP 6 on 1st; Androth 7, Amini & Minicoy 5 each on 2nd; Agathi 16, Androth 15, Amini 14 and Car Nicobar 7 on 3rd; Long Island 11, Androth 10, Agathi & Amini 7 each, Kanakapura & Gauribidanur 6 each on 4th; Long Island 9 on 6th; Manjeri 5 on 29th and Kovalam 5 on 30th.

A cyclonic circulation/trough upto 1·5 km a.s.l. lay over West Bengal and neighbourhood on many days in the first fortnight. The seasonal low with associated cyclonic circulation upto 1·5 km a.s.l. lay over east Madhya Pradesh and adjoining parts of Orissa and Bihar on many days in the second fortnight. A low moved from east Uttar Pradesh to Bihar State between 25th and 27th and dissipated on 28th. An east-west wind discontinuity/trough upto 900 m a.s.l. also lay over northeast India on many days in the last week.

In association with these systems, rain or thundershowers were scattered to fairly widespread in Assam and adjacent States and Sub-Himalayan West Bengal and scattered or isolated over the rest of northeast India on many days. According to press reports severe thundersqualls swept through Purnia district on 21st night and Nawadah district on 22nd, killing a few persons, uprooting trees and damaging houses. Some wagons of a goods train were blown off by a thundersquall near Kiul in Monghyr district on 22nd.

The principal amounts of rainfall (in cm) in northeast India during the month in association with the above systems were: Cherrapunji 10 on 10th; Dhubri 8 on 11th; Cherrapunji 10 and Gauhati AP 6 on 12th; Darjeeling 7 on 13th; Jalpaiguri 14 on 18th; Cherrapunji 12, North Lakhimpur 11, Tezu & Haflong 5 each on 20th; Cherrapunji 9, Haflong 8, Dhubri 6, Kailashahar & Forbesganj 5 each on 22nd; Berhampore 5 on 23rd; Muzaffarpur 5 on 25th; Mokokchung 7 on 26th; North Lakhimpur 12, Dhubri & Digboi 7 each and Dibrugarh 6 on 29th; Dhubri & Cherrapunji 6 each, Pasighat, Along, Digboi, Goalpara & Dibrugarh 5 each on 30th; Rangiya 8, Pasighat, Balurghat & Cherrapunji 5 each on 31st.

The seasonal low level north-south trough over the Peninsula extended from east Madhya Pradesh to extreme south Peninula on most days in the month. A low developed over north Lakshadweep on 24th, with a trough extending to Kerala. It moved slowly westwards and became unimportant by 27th. In association with these, there was good thundershower activity in the Peninsula on many days in the month. The principal amounts of rainfall (in cm) in the Peninsula associated with these systems were: Ootacamund 5 on 6th; Krishnarajpet 8 and Dhond 5 on 9th; Coonoor & Satyamangalam 6 each, Coimbatore 5 on 12th; Mangalore 8 and Gadag 5 on 13th; Manapparai & Balehonnur 8 each, Coondapur and Kunnamkulam 7 each, Hagaribommanahalli

6 and Baindur 5 on 15th; Cochin 9, Sivaganga 8, Vadakancherry 7 and Trichur 5 on 16th; Ottapalam 6, Karur & Coimbatore 5 each on 17th; Cannanore 9, Thathaingarpet 6 and Ottapalam 5 on 18th; Mangalore AP 12 and Baindur 6 on 19th; Alathur 9, Irinjalakuda 7, Arogyavaram 6 and Vadakancherry 5 on 21st; Sivaganga and Quilon 7 each, Mavelinkara 5 on 23rd; Alleppey 9 and Kanakapura 6 on 24th; Punalur & Trivandrum 9 each, Alwaye, & Narasraopet 5 each on 25th; Thanjavur 5 on 26th; Chintapalli 9, Chickmagalur 6 and Poona 5 on 29th.

The southwest monsoon advanced into south Andaman Sea and south Bay south of 7°N on 18 May. It covered Comorin-Maldive area, south Arabian Sea upto 8°N, most parts of south Bay, east central Bay and eastern parts of Assam between 22nd and 30th. It advanced into Kerala, Arabian Sea upto 12°N, northeast Bay, rest of Assam and adjacent States and adjoining parts of Sub-Himalayan West Bengal on 31 May. The northern limit of the monsoon passed through Mangalore, Cuddalore, Barisal and Darjeeling on the morning of 31 May.

Moderate heat wave conditions prevailed in some parts of coastal Andhra Pradesh on a few days in the second and third week and in Gangetic West Bengal on a few days in the second week. Day temperatures were appreciably above normal in coastal Andhra Pradesh and interior parts of Orissa on most days in the second and third week; in Gangetic West Bengal and some parts of Tamil Nadu on most days in the second week and on a few days in the first week; in Arunachal Pradesh, Assam and Meghalaya on many days in the second fortnight; in some parts of Uttar Pradesh on many days in the second week and on a few days in the last week; in Bihar State on a few days in the first and second week and in Jammu & Kashmir, Himachal Pradesh and Punjab on a few days in the second week.

Disastrous weather events of 1974

Extensive damage to property and crops, loss of human life and live-stock caused by vagaries of weather in the country are often reported in the press. The summary of the major weather events as detailed below is based on the observations recorded by the India Meteorological Department and on the press reports. The map (Fig. 3) shows pictorially areas and times of occurrence of the important disastrous weather events of 1974.

Floods and heavy rains

Due to incessant rains, the *Brahmaputra* with its tributaries was frequently in high spate causing floods in Assam and adjoining areas particularly so during the third week of July. These floods caused extensive damage to property and loss of human lives and cattle, in addition to rendering many people homeless. Many wild animals of a sanctuary in the catchment area which is a tourist attraction either perished or left the sanctuary for safer places. Paddy and Jute crops were destroyed as a result of cultivated areas remaining long underwater. The total damage was estimated to be of the order of Rs. 50 crores.

Bihar and West Bengal were in the grip of floods during the first, third and last week of July and first week of August. Loss of human lives and cattle were reported from the Jalpaiguri district in West Bengal.

Heavy rains were reported from Maharashtra during the first week of July and first week of August. Bombay (Colaba) recorded an exceptionally heavy rainfall of 58 cm in 24 hr on 5 July, which was the highest on record. Low level areas in Bombay were heavily flooded and city life was completely paralysed. 50 lives were lost and damage to Railway and public property was estimated at rupees six crores. In the first week of July, landslides occurred due to incessant rains in Shirgaon Khopi village of Ratnagiri district burying ten people. Seven people were also killed and about a dozen heads of cattle were lost. The total toll of lives all over Maharashtra State in the July flood was 69.

Almost all the districts in Kerala (except Trivandrum and Quilon) and South Kanara district of Karnataka region were affected by floods due to heavy rains during the last week of July causing extensive damage to crops and property worth several lakhs of rupees. Many were rendered homeless. Loss of life was also reported. The worst affected district in Kerala was Idikki which also experienced landslides.

Cyclonic storm

A severe cyclonic storm crossed West Bengal coast on the afternoon of 15 August uprooting large number of trees and telegraphic poles, and flooding parts of Midnapore, Hooghly, Howrah and 24 Parganas districts of West Bengal. Seven persons were killed and twentythree fishermen reported missing. Low lying areas of Digha and Juneput were inundated by tidal waves. During its movement over Madhya Pradesh, heavy rains caused floods in the *Narmada* and *Wainganga* rivers which inundated vast areas along their embankments and dislocated road communications. Floods were also reported from some parts of north Orissa in association with the cyclonic storm.

Dust/Sandstorms

Lucknow and Kanpur experienced blinding duststorms on the 15 May followed by heavy rains-uprootig trees, snapping telegraph and electric overhead wires. Kanpur again experienced a blinding duststorm on 2 June, when a boy was reported killed. On 5 June, at Lucknow a mountain of dust rose into the sky, riding on the crest of high velocity wind, reducing visibility to zero. It was followed by heavy pre-monsoon showers. A duststorm followed by heavy rain lashed Jaipur on 7 June affecting power and water supply. On the same day, Bikaner and surrounding areas experienced a sandstorm with high winds of about 100 kmph uprooting trees and electric poles and disrupting electric and water supply. Churu (Rajasthan) was severely hit by a duststorm on 12 June followed by rain and hailstorm. Amritsar experienced a severe duststorm on the evening of 3 July with a mixiмum wind speed of 145 kmph.

Snowstorms

Nine persons were reported to have been killed due to heavy snowfall on 14 and 16 December at Dras and on the Tanmarg-Gulmarg road. One pilgrim was reported to have been killed in a snow avalanche near Vaishnu Devi shrine due to heavy snowfall on 15 and 16 December.

Kashmir experienced heavy snowfall during the whole of the third week of December dislocating vehicular traffic.

Cold wave

Bihar and north Bengal experienced cold wave for several days during the first half of January.

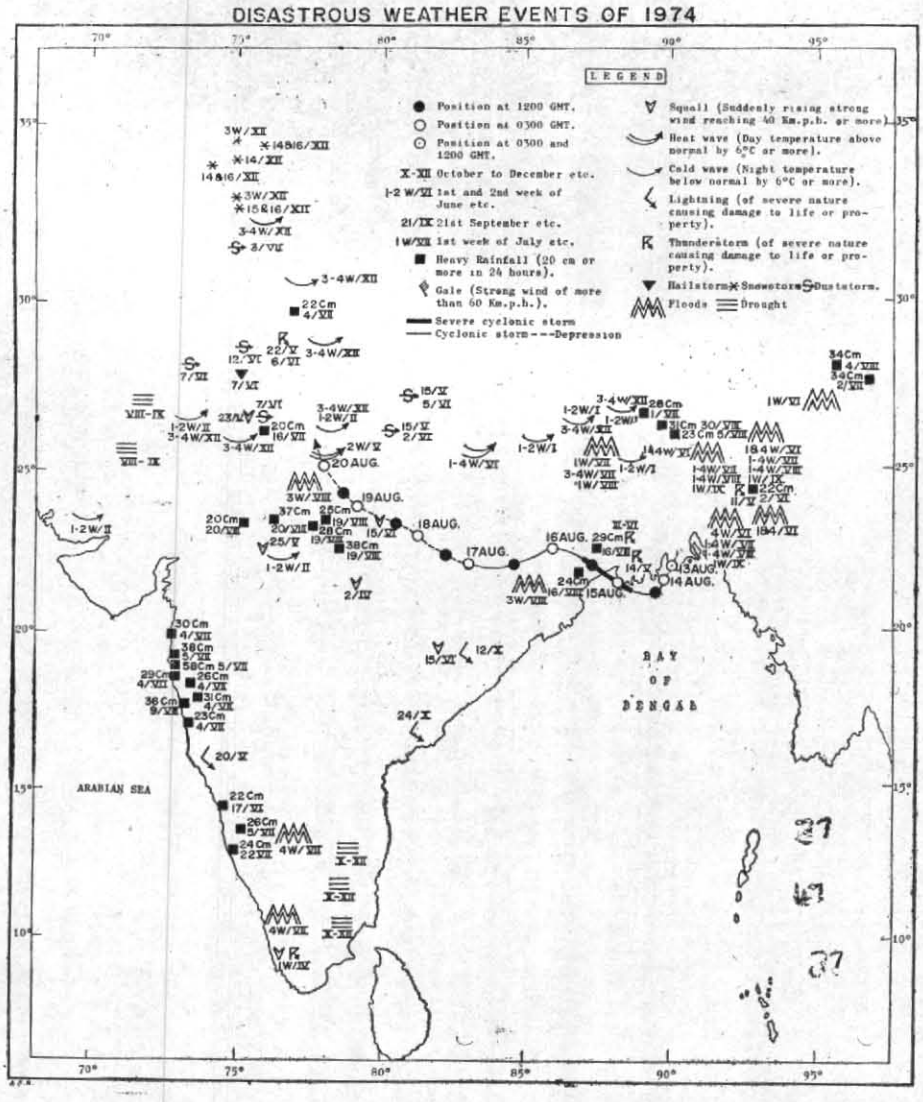

Fig. 3

The lowest temperatures recorded during this period were 0°C at Darjeeling, 4°C at Midnapore, 2.5°C at Shillong and 5°C at Patna. This cold spell is reported to have taken a toll of 282 lives. Severe cold spell also swept over Bihar and West Bengal during second half of December when 160 people were victims and lost their lives.

Moderate to severe cold wave conditions prevailed over west and northeast Madhya Pradesh and Gujarat during first half of February. Minimum temperature of 0°C was recorded at Gwalior and Shivpuri on 8 February, at Gwalior, Khajuraho and Raison on 9 February and at Shivpuri on 10 February. During this cold spell crops were damaged in many districts of Madhya Pradesh.

The first half of February was the coldest during the last five years over most parts of northwest India. Night temperatures were 6° to 12°C below normal over these areas. The night temperatures at Jodhpur airport and Churu were —3° and —5°C respectively on 7 February. Kashmir, Uttar Pradesh and Rajasthan were in the grip of cold wave during the second half of December. According to a Srinagar report, the temperature dropped 6°C below freezing point. 42 persons were reported to have died in Uttar Pradesh due to cold spell in the third week of December. The death toll mounted to 62 in the last week of December.

Heat wave

Uttar Pradesh was severely affected by heat

waves during the second week of May and June. 11 people were reported to have died of sun-stroke near Jhansi and in Balia.

Drought

Tamil Nadu was very severely hit by meteorological drought on an unprecedented scale, It was due to the failure of the northeast monsoon rainfall which was below normal by more than 60 per cent in the central parts. Acute drought conditions also prevailed in west Rajasthan and adjoining areas in August and September. The monsoon rainfall was deficient in west Rajasthan by 50 per cent or more.

Thunderstorms, hailstorms, squalls and gales

Calcutta and its suburbs were hit by nor'westers with wind speed between 60 and 80 kmph on a number of days during March to June disrupting normal life. Three persons were reported to have been killed and more than 100 were affected in Hailakandi sub-division of Cachar district of Assam due to severe thundersqualls on 11 May. A severe thundersquall struck southern parts of 24 Parganas on 14 May in which innumerable thatched houses were razed to ground and a number of cattle heads perished. Jaipur airport experienced severe northwesterly squalls on 23 May, the most severe of which reached 110 kmph wind. Delhi (Safdarjung) experienced severe thunderstorms accompanied by squalls of maximum wind speed 96 and 90 kmph on 22 May and 6 June respectively, uprooting several trees.

Severe squalls were reported from Nagpur, Indore and Jagdalpur on 2 April, 25 May and 15 June with wind speed of 110, 134 and 125 kmph respectively. Alleppey and Ernakulam districts experienced severe squalls and thunderstorms during first week of April causing loss of life and extensive damage.

Due to severe lightning, two persons were reported to have been killed on 20 May near Divar Jetti (Panjim), 8 persons at Krishnapuram in East Godavari on 12 October, two bullocks and one person at Machilipatnam on 24 October.