

## Weather

### MOSNOON SEASON (JUNE-SEPTEMBER 1974)

#### CHIEF FEATURES

##### *Advance of the monsoon*

The southwest monsoon advanced into south Andaman Sea and extreme south Bay on 20 May and covered the entire Bay of Bengal by the end of that month. It also advanced into Comorin-Maldivé area on 25 May, south Kerala and south Lakshadweep on 26th and into south Karnataka and parts of Assam by the end of May. The monsoon covered the entire Peninsula, south Gujarat State, Madhya Pradesh, northeast India and east Uttar Pradesh by the end of June. However, the advance in June was not uniform, resulting in a delay of one to two weeks in the onset of the monsoon over north Maharashtra, south Gujarat State, Madhya Pradesh and east Uttar Pradesh. Further advance over the country was delayed upto the beginning of July. It advanced into north Gujarat, west Uttar Pradesh and northwest India between 11 and 16 July, causing a delay of one to two weeks.

##### *Activity of the monsoon*

The monsoon was generally active in many parts of northeast India and south Peninsula leading to normal or excess rainfall over these areas for the season. Floods affected many parts of Assam and adjacent States, west Bengal north Bihar, coastal Karnataka and Kerala. The monsoon rainfall was deficient in many parts of northwest India, east Madhya Pradesh, Gujarat State, Orissa, interior Maharashtra and Telangana. Weak monsoon conditions prevailed over the Peninsula in the first half of June and over many parts of the country in the second half of July and the second half of August.

##### *Withdrawal of the monsoon*

The southwest monsoon withdrew from west Rajasthan, Punjab, Jammu & Kashmir and

Himachal Pradesh in the first week of September and from east Rajasthan in the second week. However, the monsoon activity continued over many parts of the country even in October. It withdrew from the rest of northwest India, Uttar Pradesh, most parts of Madhya Pradesh, north Maharashtra and Gujarat States in the first week of October and from the rest of the country during the last 4 days of October.

##### *Depressions and Cyclones*

The monsoon of 1974 was marked by a small number of depressions and relative'y more cyclonic storms. There were only two depressions in the Bay of Bengal but two cyclonic storms developed in the Bay and one in Arabian Sea during this season. The tracks of these systems are given in Fig. 1.

##### *Rainfall*

Bombay (Colaba) recorded a rainfall of 58 cm on 5 July, the highest on record for the last 94 years of available published data. Cherrapunji also reported record rainfalls on four consecutive days in September : 97 cm on 12th, 99 cm on 13th, 80 cm on 14th and 96 cm on 15th giving a monthly total rainfall of 450 cm. This is not only an all time record for the month, but also nearly double the earlier record of 252 cm (September 1927) and more than 1/3 of the annual normal rainfall.

Departure of the seasonal rainfall (June to September) from the normal is shown in Figs. 2(a) and 2(b). The monthly and seasonal rainfall over the 35 meteorological sub-divisions in India is given in Fig. 3. The important features during the different months are given below.

#### JUNE

The northern limit of the southwest monsoon ran from Karwar to Khonsa through Nellore, Calcutta and Shillong on 31 May. The monsoon advanced along the west coast upto the South Konkan and into Sub-Himalayan West Bengal

during the first week of June. It advanced into north Andhra Pradesh, Orissa, Gangetic West Bengal, Bihar State, east Madhya Pradesh, Vidarbha and Marathwada between 16th and 18th. After a lull between 19th and 27th the

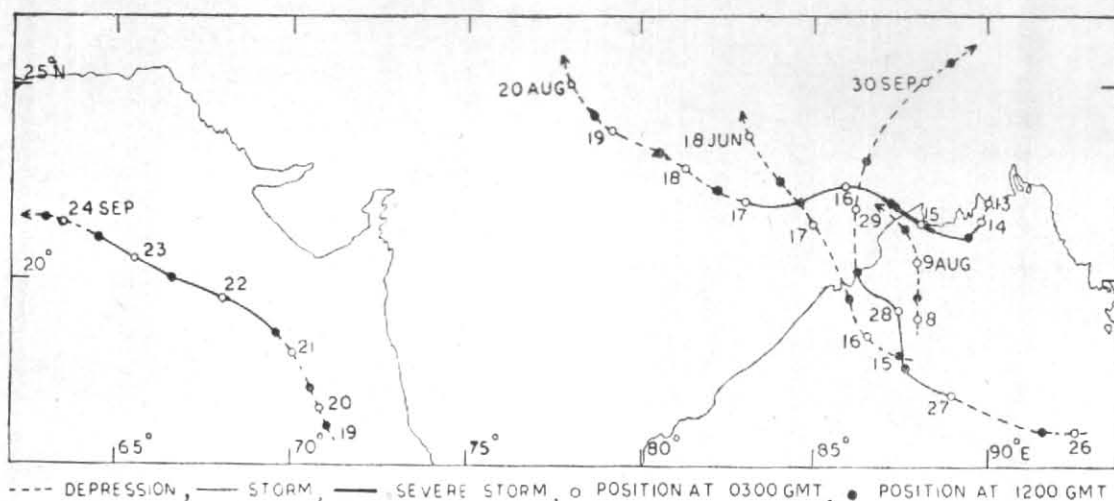


Fig. 1. Tracks of storms/depressions (June-September 1974)

monsoon covered north Konkan, north Madhya Maharashtra, south Gujarat, west Madhya Pradesh and east Uttar Pradesh by the end of June. Its northern limit ran from Dwarka to Hardoi through Ahmedabad and Guna on 30th June.

The onset of the monsoon over north Maharashtra, south Gujarat State, Madhya Pradesh and east Uttar Pradesh was delayed by 10 to 15 days.

The advance of the monsoon and its activity over the different parts of the country during the month were influenced by the following systems :

- (i) A depression formed over north Bay on 29 May, became a cyclonic storm on 30 close to Bangla Desh coast. It moved northeastwards and weakened into a low over Arunachal Pradesh on 2nd June.
- (ii) A low moved from north Bay to Bihar Plateau and neighbourhood between 6 and 7 June, persisted there upto 13th and became unimportant next day.
- (iii) A low formed over the central and adjoining north Bay on 14th and concentrated into a deep depression on 15th evening. It crossed Orissa coast near Puri on 16th night and weakened into a low over Bihar Plateau on 18th evening. Further, weakening into a trough on 21st, extending from east Uttar Pradesh to Assam and adjacent States persisted there upto 25th.
- (iv) The seasonal trough shifted southwards and stretched from south Rajasthan to east central Bay from 26th to

29th with embedded lows or cyclonic circulations over west and southeast Madhya Pradesh.

- (v) A trough of low developed over southwest Bay off Tamil Nadu-south Andhra coasts on 29th June, moved into interior Peninsula by 1st July and became unimportant on 2nd.

The monsoon was active in Assam and adjacent States in the first and the third week. It was generally weak in the Peninsula during the first half of the month. During the latter half active conditions prevailed in south Konkan, Goa, Interior Maharashtra, Andhra Pradesh, coastal Karnataka, Bihar Plains and east Madhya Pradesh.

Large areas of Manipur valley were reported to have been inundated by floods in the first week of June resulting in damage to crops and houses. Heavy rain in Assam and adjacent States between 20 and 23 June caused serious floods in many parts of Assam leading to inundation of many villages, disruption of road communications and damage to standing Jute and paddy crops.

The significant amounts of very heavy rainfall (more than 25 cm) during the month were : Cherrapunji 35 cm on 20th and 27 cm on 30th.

Seven western disturbances moved across northwest India during the month. The western disturbances which moved across the Western Himalayas during the period 6th to 9th and 18th to 25th were active and were associated with induced lows which moved across the plains of northwest India causing excess rainfall in many parts of northwest India.

Day temperatures were appreciably above normal in Madhya Pradesh, Uttar Pradesh and Bihar State on many days during the month and in north coastal Andhra Pradesh, coastal Orissa,

Gangetic West Bengal, some parts of Interior Maharashtra, north Gujarat and south Rajasthan on a few days. Moderate heat wave conditions prevailed in Madhya Pradesh from 14th to 16th.

## JULY

The advance of the monsoon was delayed during the first 10 days of July. It advanced into north Gujarat, east Rajasthan and west Uttar Pradesh on 11th, into Haryana, Delhi, Chandigarh, Punjab, Himachal Pradesh and west Rajasthan on 12th and into Jammu & Kashmir on 16th, when the entire country came under monsoon circulation.

The advance of the monsoon and its activity over the different parts of the country during July were influenced by :

- (i) A low pressure area lay over Uttar Pradesh from 4th to 8th,
- (ii) An upper air cyclonic circulation extending to the middle troposphere moved from north Bay to southwest Uttar Pradesh and adjoining east Rajasthan between 8th and 13th and became less marked on 14th,
- (iii) A cyclonic circulation in the lower troposphere moved from Gangetic West Bengal to Bihar between 13th and 16th,
- (iv) Cyclonic circulations in the lower/middle troposphere lay over west Uttar Pradesh from 18th to 26th and over Bangla Desh from 18th to 24th,
- (v) A low moved from central and adjoining south Bay to Telangana and adjoining Maharashtra between 25th and 29th and persisted there upto 31st,
- (vi) A trough of low lay off the west coast on most days during the month. It was well marked during the first 10 days and again in the last week. A cyclonic circulation in the middle troposphere also lay over Maharashtra and adjoining Gujarat from 1st to 10th,
- (vii) The seasonal trough lay in a more northerly position extending from north Rajasthan to Assam and adjacent States in the first week and again during the second half of the month. Its axis lay close to the foot of the Himalayas from 26th to 28th,

- (viii) Eight western disturbances moved across northwest India during the month.

The monsoon was active to vigorous in Assam and adjacent States, West Bengal, Bihar plains, Konkan and Goa, Karnataka and Kerala on many days during the month and in the plains of northwest India, Uttar Pradesh and west Madhya Pradesh on a few days. It was generally weak in Orissa, east Madhya Pradesh, Andhra Pradesh, Interior Maharashtra and Gujarat State, particularly in the second fortnight.

Bombay (Colaba) recorded a very heavy rainfall of 58 cm on 5 July. Heavy rain in Bombay city and other parts of Konkan in the first week of July is reported to have taken a toll of more than 50 lives and caused damage to property, particularly that of railways. The life in the city was paralysed on the 4th and 5th. According to press reports, serious floods affected Assam and adjacent States, north Bengal, north Bihar Karnataka and Kerala leading to inundation of many villages and considerable damage to crops and houses in these States. The floods in Karnataka were reported as unprecedented. Floods were also reported from some parts of Punjab and Rajasthan in the last week causing some damage to houses and crops.

The significant amounts of heavy rainfall more than 25cm during the month were : Japaiguri 28 on 1st; Cherrapunji 37 and Tezu 34 on 2nd; Vedakanchery and Mananthody (Kerala) 35 each, Mahabaleshwar 31 and Bhira 26 on 4th; Bombay (Colaba) 58, Bombay (Santacruz) 38 and Agumbe 26 on 5th; Cherrapunji 40 on 15th and 45 on 16th; Cherrapunji 43 on 18th and 32 on 19th; Karkala (Karnataka) 26 on 26th; Cherrapunji 90 and Karkala (Karnataka) 26 on 27th.

Day temperatures were appreciably above normal in northwest India, Gujarat, west Madhya Pradesh and Uttar Pradesh on many days in the first week and in Andhra Pradesh, Vidarbha and Marathwada from 21st to 23rd. Moderate heat wave conditions prevailed in Haryana and west Uttar Pradesh on 1st and moderate to severe heat wave conditions in southeast Rajasthan and adjoining Madhya Pradesh on 7th.

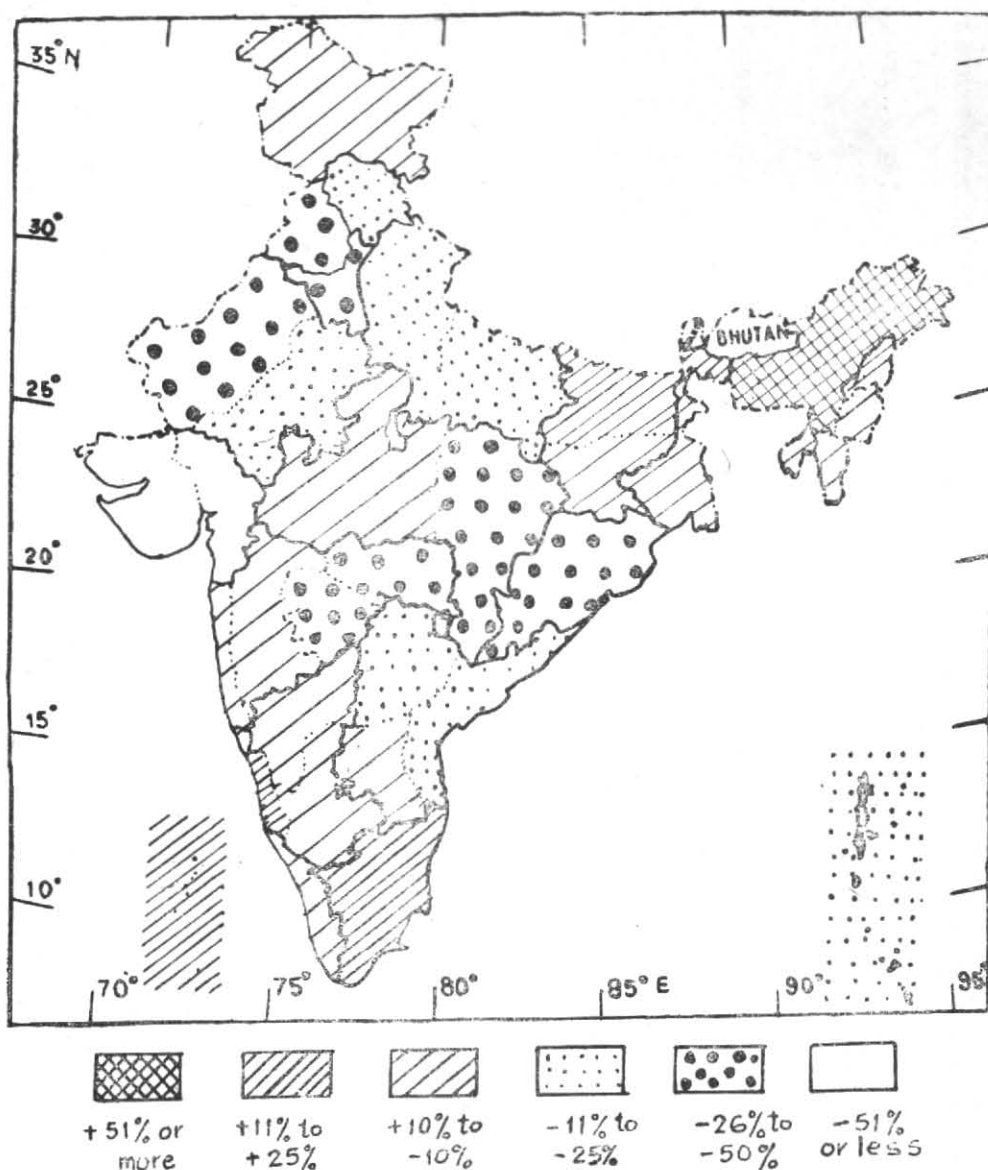


Fig. 2 (a). Rainfall for period 1 June to 30 September 1974 (Percentage departure from normal)

#### AUGUST

The monsoon was generally active over Maharashtra, Telangana, coastal Andhra Pradesh, coastal and north Interior Karnataka and Kerala on many days in the first fortnight, in Madhya Pradesh in the second and third weeks, in northwest India in the first week and in northeast India and Uttar Pradesh on some days. It was vigorous in Assam and adjacent States, west Bengal, Bihar Plains, Haryana, Madhya Pradesh, east Rajasthan, Konkan, Vidarbha, Telangana north Interior Karnataka and Karala on 2 or 3 days in the month. The monsoon was generally weak in the

Peninsula in the second fortnight, in northwest India in the last three weeks, in Assam and adjacent States in the second week and in Gujarat State on most days in the month.

The activity of the monsoon was associated mainly with the following systems :

(i) A depression formed over northwest and adjoining west central Bay on 8th, crossed near Balasore on the 9th and weakened into a low over northeast Madhya Pradesh and adjoining Bihar by the 11th.

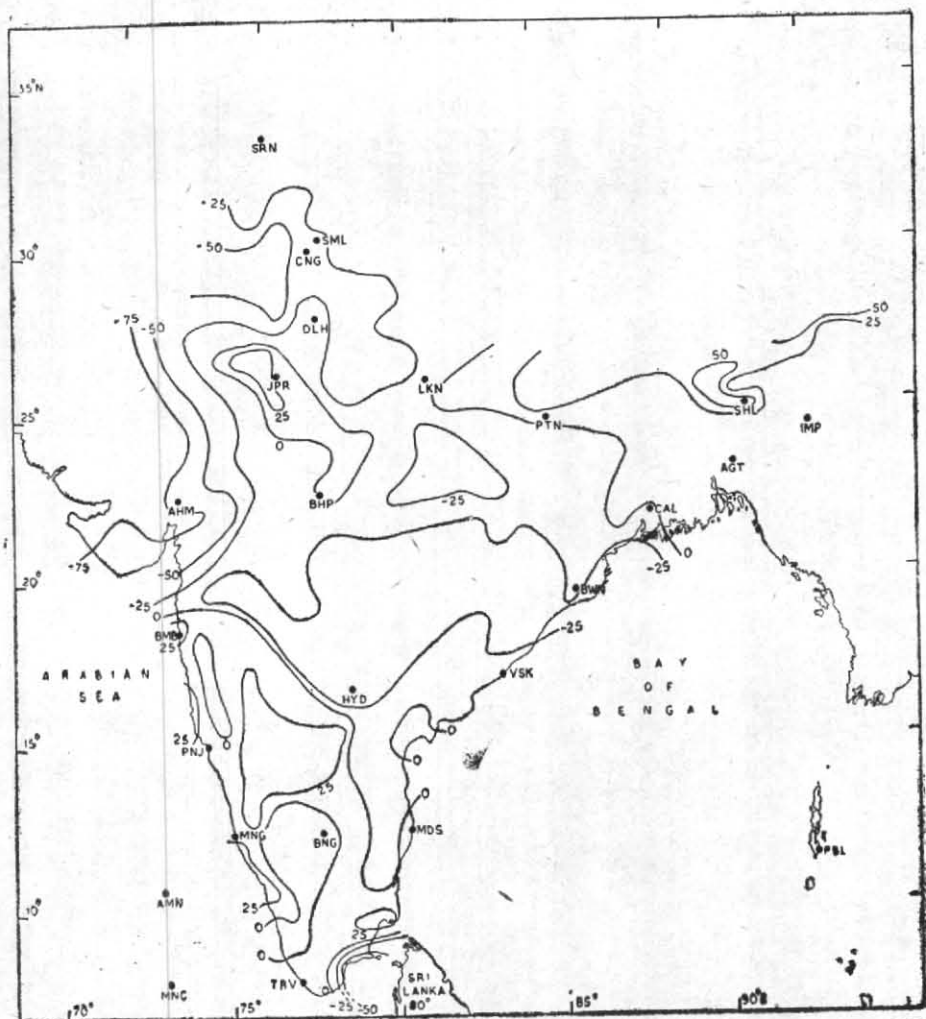


Fig. 2(b) Rainfall departure (percentage) June-September 1974

(ii) A depression formed over north Bay on the 13th, intensified into a severe cyclonic storm on 14th night near Sagar Island and crossed West Bengal coast near Contai on the 15th afternoon. It moved westnorthwest across Madhya Pradesh as a deep depression and weakened into a low over northeast Rajasthan by the 21st. This low subsequently moved eastwards to east Uttar Pradesh by 23rd and merged with the monsoon trough on the 24th.

(iii) A sea level trough persisted off the west coast on many days during the first three weeks.

(iv) A low lay over Telangana and adjoining Vidarbha from 1st to 4th.

(v) A cyclonic circulation in the middle troposphere lay over Maharashtra State on some days in the first week.

(vi) The monsoon trough lay to the north of its normal position with its axis extending from north Rajasthan to Assam and adjacent States on many days in the first and last weeks. Low or cyclonic circulations were embedded in this trough over east Rajasthan, Uttar Pradesh and Bihar on a few days.

(vii) A low moved from south Bangla Desh to Bihar Plains between the 18th and 21st. Another low moved from north Bay to Sub-Himalayan West Bengal on 28th and 29th.

According to press reports, the cyclonic storm which crossed coast near Contai, uprooted large number of trees and telegraph posts, damaged houses and flooded some parts in the districts of Midnapore, Hooghly, Howrah and 24 Parganas. About 7 persons were reported killed and 23 fishermen reported missing. Low lying areas of

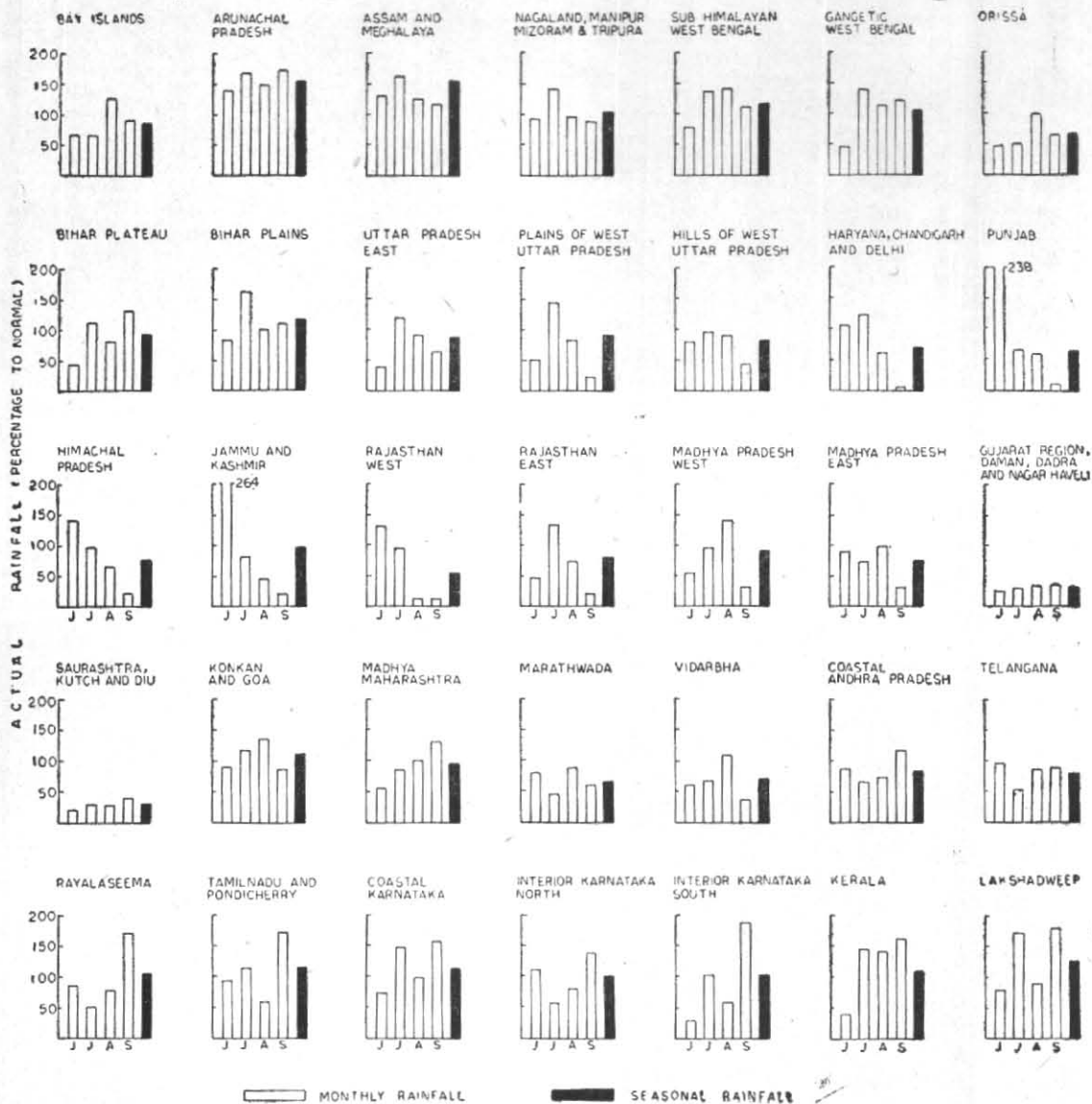


Fig. 3. Progress of monsoon month by month (June to September 1974)

Digha and Juneput were inundated by tidal waves. Heavy rain associated with this system also caused floods in Madhya Pradesh, northern districts of Orissa and northeastern parts of Vidarbha. In association with the other systems many parts of Assam and adjacent States, north Bengal, north Bihar and east Uttar Pradesh were seriously affected by floods. Floods were also reported from some parts of Kerala in the third week, causing damage to houses and disrupting road and rail communications.

Five western disturbances moved eastwards across the Western Himalayas during the month:

three in the first fortnight and two in the last week. They moved as troughs in the lower and middle troposphere. They caused scattered to fairly widespread rain in the Western Himalayas. The rainfall was generally light to moderate and was deficient for the month over this area.

The significant amounts of heavy rainfall more than 25 cm during the month were: Pasighat 34 and Alibag 29 on 4th; Harnai 36 on 9th; Midnapore 29 on 16th; Bhopal 28 on 19th; Dhubri 31, Jalpaiguri 30 on 30th and Cherrapunji 81 on 31st.

## SEPTEMBER

The southwest monsoon withdrew from west Rajasthan on 4th from Jammu & Kashmir, Himachal Pradesh and Punjab on 6th and from east Rajasthan on 13th. From the rest of the country further withdrawal was delayed during the rest of the month. The monsoon was weak generally over the country during the first week. During the subsequent weeks it was active on many days and vigorous on a few days over many parts of the Peninsula and northeast India leading to normal or excess rainfall in these areas. The monsoon was generally weak in Gujarat State, Madhya Pradesh, Vidarbha, Uttar Pradesh and Haryana during the month resulting in deficient or scanty rainfall over these areas. The activity of the monsoon was associated mainly with the following systems :

(i) A north-south trough in the lower troposphere moved from west central Bay into interior Peninsula and persisted there from 1st to 4th. Another trough in the lower and middle troposphere lay over west central and adjoining southwest Bay from 5th to 11th.

(ii) Three cyclonic circulations in the middle troposphere moved westwards across extreme south Peninsula in the first fortnight.

(iii) Another cyclonic circulation trough extending to the middle troposphere moved westwards across central Peninsula in the second week.

(iv) The sea level trough which lay off the west coast from 10th became well marked on 16th. A low developed in this trough on 17th off Karnataka-south Maharashtra coasts. It concentrated into a depression on 19th evening, moved northwestwards and intensified into a cyclone over northern parts of east central Arabian Sea by 21st evening. Subsequently it weakened slowly into a low over northwest Arabian Sea by 25th.

(v) A low moved from north Bay to southeast Uttar Pradesh and adjoining east Madhya Pradesh between 8th and 11th. The low weakened on 12th but the associated upper air trough/circulation persisted there upto 18th.

(vi) A low moved from Andaman Sea to west central and adjoining southwest Bay between 20th and 23th and persisted there till 25th.

(vii) Another low which moved from the east into Andaman Sea on 24th, moved northwestwards, intensified into a cyclonic storm on 27th morning and crossed Orissa coast near Paradeep on 8th evening. Subsequently recurving north-northeastwards, it gradually weakened into a

low over north Bengal and neighbourhood on the morning of 1st October.

(viii) A number of feeble low pressure systems at the surface or cyclonic circulations in the lower troposphere formed over the interior parts of the Peninsula in the second fortnight.

(ix) A well marked trough lay off Karnataka-Maharashtra coasts from 27th to 30th with an embedded low close to Maharashtra coast and associated cyclonic circulation extending to the middle troposphere.

(x) The axis of the monsoon trough lay close to the foot of the Himalayas from 1st to 7th causing active monsoon conditions in Assam and adjacent States on the first two days and generally weak monsoon conditions over the rest of the country during the first week.

According to press reports, floods affected many parts of Assam and adjacent States, Sub-Himalayan West Bengal and north Bihar dislocating road communications and submerging vast areas. Heavy rain in Calcutta on 13th is reported to have paralysed the city life by flooding low lying areas. Poona and Bombay experienced severe thundersqualls on 14th and 15th evening respectively, which uprooted trees, caused a few house-collapses and injured some persons, particularly in Bombay.

Eight western disturbances moved eastwards across the Western Himalayas during the month, four in the first fortnight and four in the second fortnight. A cyclonic circulation in the lower troposphere lay over west Rajasthan with a trough extending to Gujarat State on many days between 19th and 25th. These systems caused generally scattered or isolated rainfall in the Western Himalayas and the plains of northwest India. The rainfall over these areas was scanty for the month.

The significant amounts of heavy rainfall more than 25 cm during the month were: Cherrapunji 97 on 12th, 99 on 13th; 80 on 14th; 96 on 15th; Sangola (Maharashtra) 26 on 24th and Koragaon (Maharashtra) 35 on 27th.

The southwest monsoon withdrew from many parts of northwest India by the middle of September; from Haryana, Delhi and west Uttar Pradesh on 3 October; west Madhya Pradesh and Gujarat State by 5th and east Uttar Pradesh, northeast Madhya Pradesh and north Maharashtra State by 6th. The monsoon did not withdraw further from the country during the subsequent three

weeks. It withdrew from Bihar, southeast Madhya Pradesh, Telangana and south Maharashtra State on 28th, from the rest of northeast India, Goa and north Interior Karnataka on 29th, coastal Andhra Pradesh, Rayalaseema, coastal and south Interior Karnataka on 30th and from the rest of of the country on 31st October. The withdrawal of the monsoon from north Peninsula and northeast

India was delayed by about 10-15 days.

The southwest monsoon was active to vigorous in Andhra Pradesh, Karnataka and Maharashtra State from about a week to ten days in October and in northeast India on a few days. The monsoon was generally weak in Tamil Nadu and Kerala during October.

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