

Weather

POST MONSOON SEASON (OCTOBER-DECEMBER 1985)*

1. Chief features

(i) Southwest monsoon withdrew from the country on 24 October and northeast monsoon ushered in over Tamil Nadu on 25 October.

(ii) During the season four cyclonic storms and two depressions developed over the Bay of Bengal and only one depression over Arabian Sea. Tracks are shown in Fig. 2.

(iii) Mainly dry weather prevailed over Orissa, Bihar Plateau, Madhya Pradesh, Saurashtra & Kutch and north interior Karnataka during November and December.

(iv) During the season rainfall was in excess, largely in Bihar, Uttar Pradesh, Haryana, Punjab, Himachal Pradesh, Jammu & Kashmir, east Rajasthan, west Madhya Pradesh, Gujarat State, Konkan & Goa, Vidarbha; moderately in coastal Karnataka and slightly in Sub-Himalayan West Bengal & Sikkim, Orissa, east Madhya Pradesh, coastal Andhra Pradesh and Rayalaseema. It was normal in Andaman & Nicobar Islands, Gangetic West Bengal, Madhya Maharashtra, Telangana and Tamil Nadu. The rainfall was deficient, slightly in Marathwada and north interior Karnataka, moderately in Arunachal Pradesh, Assam & Meghalaya, east Rajasthan, Kerala and Lakshadweep and largely in Nagaland, Manipur, Mizoram & Tripura and south interior Karnataka (Fig. 1).

2. October

2.1. Withdrawal of southwest monsoon and setting in of northeast monsoon

Southwest monsoon withdrew from Maharashtra State and adjoining parts of Telangana and north interior Karnataka on 17th and from West Bengal & Sikkim, Orissa, Bihar State, east Madhya Pradesh, north coastal Andhra Pradesh and rest parts of Telangana and north interior Karnataka on 19th. By 24th of this month the withdrawal of monsoon was complete from the country outside Tamil Nadu and Kerala. Northeast monsoon rains commenced over Tamil Nadu on 25th.

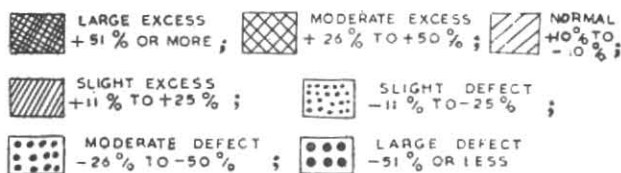
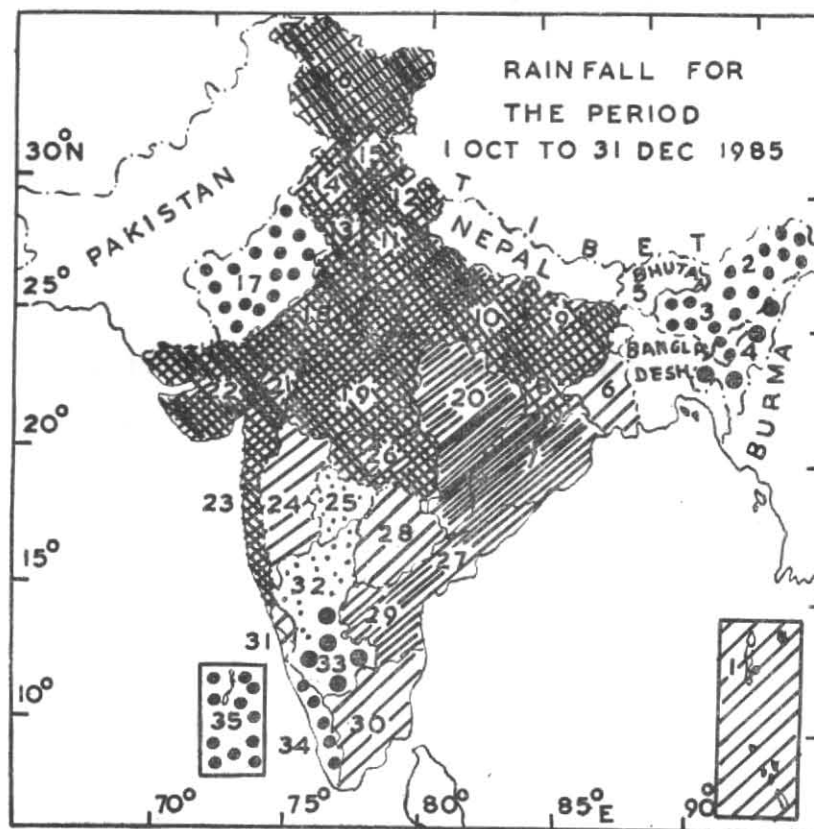
2.2. Storms and depressions

Two cyclonic storms and two depressions developed over Indian seas during the month.

(i) A well marked low pressure area, which lay over west central and adjoining southwest Bay on the last day of September, concentrated into a depression over west central Bay on 1st and lay centred at 0300 GMT near 14.0°N, 83.5°E. Moving westnorthwestwards it crossed south Andhra coast near Ongole in the forenoon of 2nd and weakened into a low pressure area over south Andhra Pradesh. The remnant moved northwestwards and emerged into east central Arabian Sea on 4th. Under its influence monsoon was active to vigorous on one to four days in Orissa, Maharashtra state, Andhra Pradesh, coastal and north interior Karnataka and Kerala. The significant amounts (cm) of rainfall were. Hiradharbati 9, Visakhapatnam 8 on 1st; Mannarghat 18, Visakhapatnam AP & Tekkali 12 each, Avanigadda 11, Machilipatnam 9, Kakinada, Yemmiganur 8 each on 2nd, Kalvakurthy 20, Shirali 19, Honavar 14, Agubme 12, Mangalore AP 9, Nagarjunasagar, Badvel 10 each, Sullurpet, Karwar & Deverakonda 7 each on 3rd, Panjim & Deodinga 10 each, Baramati 9, Yelamanchili, Hubli, Mominabad & Machilipatnam 8 each, Shrigonda, Nidadavole & Bijapur 7 each on 4th.

(ii) The low pressure area mentioned above moved northward and concentrated into a depression over east central Arabian Sea and adjoining Gulf of Cambay by 6th, when it lay centred near 19.5°N, 71.5°E. It crossed Saurashtra coast near Mahuva in the early hours of 7th and moved in a northeasterly direction and became unimportant over west Madhya Pradesh on 10th. Under its influence monsoon was active to vigorous on three to four days over Maharashtra State. Generally widespread rain with isolated heavy falls occurred on one to two days over east Uttar Pradesh, east Rajasthan, west Madhya Pradesh and Gujarat State. The significant amounts (cm) of rainfall were : Sahapur 8, Sakri, Udgir, Bhadgaon & Daund 7 each on 5th, Bhavnagar AP 16, Sahapur 13, Sawaimadhopur 11, Dungarwadi & Puttur 10 each, Rawat Bhata, Bhira, Jalna, Udgir & Ashti 8 each, Beltangadi 7 on 6th, Idar 16, Ahmedabad & Bhavnagar 9 each, Sawaimadhopur 8 on 7th, V.V. Nagar

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<i>Sub-div.</i>	<i>Dep. from normal</i>	<i>Sub-div.</i>	<i>Dep. from normal</i>
(1) A&N Islands	-1	(18) East Rajasthan	185
(2) Arunachal Pradesh	-38	(19) West M.P.	269
(3) Assam & Megha.	-35	(20) East M.P.	15
(4) N.M.M. & T.	-86	(21) Gujarat Reg.	423
(5) S.H.W.B. Sikkim	14	(22) S. & K.	86
(6) G. West Bengal	-6	(23) Konkan & Goa	61
(7) Orissa	13	(24) Madhya Maha.	1
(8) Bihar Plateau	62	(25) Marathwara	-12
(9) Bihar Plains	149	(26) Vidarbha	77
(10) East U.P.	204	(27) Coastal A.P.	17
(11) Plains W.U.P.	157	(28) Telangana	1
(12) Hills W.U.P.	203	(29) Raylaseema	11
(13) Haryana	168	(30) Tamil Nadu	-1
(14) Punjab	176	(31) Cot. Karnataka	50
(15) Himachal Pradesh	91	(32) N.I. Karnataka	-18
(16) Jammu & Kashmir	91	(33) S.I. Karnataka	-62
(17) West Rajasthan	-50	(34) Kerala	-31
		(35) Lakshadweep	-45

Fig. 1

21, Baroda city 18, Ahmedabad 17, Vengurla 13, Devgarh 12, Goa (Dabolim) 10, Maihar 9, Bhavnagar & Idar 8 each on 8th, Guna 27, Ratlam 19, Indore 16, Karwar 14, Pathankot, 13, Mandsaur 12, Panjim 11, Gurudaspur 10, Amravati & Jhansi 9 each, Tikamgarh & Shivpuri 8 each on 9th; Lucknow AP 20, Kanpur 9, Nowgong 7 on 10th.

Heavy rains claimed 13 lives in Gujarat.

(iii) A cyclonic circulation extending upto mid tropospheric levels was observed over Gulf of Siam and neighbourhood on 7th. Moving westwards it concentrated into a depression over southeast Bay on 9th centred near 12.5°N , 90.0°E . Moving westnorthwestwards it intensified into a cyclonic storm over west central Bay on 10th morning. It continued to move west-northwestwards and crossed Andhra coast near Visakhapatnam in the early hours of 11th. It weakened into a deep depression over southeast Madhya Pradesh and adjoining south Orissa on 11th evening. Thereafter, moving northwestwards it gradually became less marked over west Madhya Pradesh and adjoining south Uttar Pradesh on 14th. Under its influence monsoon was active to vigorous on one day each in Orissa, Vidarbha, coastal Andhra Pradesh and Telangana. Generally widespread rain with isolated heavy to very heavy falls occurred on one to two days in plains of Uttar Pradesh and west Madhya Pradesh. The significant amounts (cm) of rainfall were : Narasapur 21, Koderu 18, Kothagudam 15, Nidavole & Chintalapudi 12 each, Yellandu 11, Kakinada, Ramagundam & Tuni 10 each on 11th, Nagpur 17, Betul, Nirmal & Sironcha 12 each, Sri Ramsagar 9 on 12th; Kanpur AP 8, Lucknow 7 on 13th. According to reports of Central Water Commission there were floods in the rivers *Ganga*, *Yamuna*, *Betwa* and *Ghaghra* in Uttar Pradesh following rainfall in their catchment areas.

(iv) A cyclonic circulation in the lower and middle tropospheric levels was observed on 11th over south Vietnam and adjoining south China Sea. Moving westwards it developed into a low pressure area over Gulf of Siam and neighbourhood on 12th. Continuing to move westwards it concentrated into a depression over east central Bay and adjoining Andaman Sea on 13th evening. Thereafter moving northwestwards it intensified into a severe cyclonic storm on 15th morning and lay centred near 19.5°N , 87.5°E . It crossed north Orissa coast near Balasore in the early hours of 16th and weakened over Bihar plains on 17th evening. It became unimportant thereby next day. Under its influence monsoon was active to vigorous on two to three days in West Bengal & Sikkim, Orissa and Bihar State. The significant amounts (cm) of rainfall were : Bhubaneswar AP 8 on 15; Balasore 14, Keonjhar 13, Cuttack 12, Midnapur, Sandheads, Paradip & Baripada 11 each, Contai, Digha & Purulia 8 each on 16th; Dhanbad 13, Muza-farpur 12, Patna & Sabour 10 each, Ranchi & Bhagalpur 9 each, Kalimpong, Darjeeling, Purulia & Hazaribagh 8 each on 17th; Bagdogra 18, Darjeeling 15, Muzaffarpur 11, Tadong/Kalimpong 10 each, Patna AP, Sapaul & Gangtok 9 each, Cooch Behar 8 on 18th. Rivers *Subarnarekha*, *Baitarani* and *Burhabalong* in Orissa were in floods at different places. About 2,440 villages were reported to have been affected and 22 human lives were lost in the State. In the coastal districts of

West Bengal 15 persons lost their lives and standing crops in 52,000 hectares of land were damaged. The cyclonic storm breached major irrigation installation in Saugor, Pathar Pratima, Basanti and Namkhana in 24 Parganas of West Bengal.

2.3. Other systems

The following other systems affected the weather over the sub-continent during this month.

2.3.1. Systems in easterlies

(i) Last month's cyclonic circulation extending upto mid-tropospheric levels over east central and adjoining southeast Arabian Sea off Karnataka-Kerala coast became unimportant there on 1st evening.

(ii) A cyclonic circulation in the lower and mid-tropospheric levels was observed over southwest and adjoining west central Bay off north Tamil Nadu-south Andhra coast on 5th evening. Under its influence a low pressure area developed over west central Bay off Andhra coast on 7th, which became unimportant by 9th evening.

(iii) A cyclonic circulation in the lower and mid-tropospheric levels was observed over east central Arabian Sea off south Maharashtra-Goa-Karnataka coast between 18th and 20th evening.

(iv) Another cyclonic circulation in the lower troposphere, which was observed over south Tamil Nadu and adjoining Kerala on 19th, became less marked there on 22nd.

(v) A low pressure area with associated cyclonic circulation extending to lower tropospheric levels was observed over southeast Bay on 20th. It moved over southwest Bay off Tamil Nadu-Sri Lanka coast on 22nd and there it weakened into a trough of low on 25th. It became unimportant over south Tamil Nadu [and adjoining Comorin area on 28th.

(vi) A trough of low, which lay over southwest Bay on 28th, developed into a low pressure area off Tamil Nadu-Sri Lanka coast on 29th evening and lay on 31st over extreme south Peninsula and adjoining Comorin and Sri Lanka.

2.3.2. Systems in westerlies

(i) A trough in the lower tropospheric levels, which extended from Bihar plains to west central Bay on 18th, moved eastwards and became less marked over Assam and Meghalaya on 21st.

(ii) A cyclonic circulation extending upto mid-tropospheric levels was observed over Bangla Desh and neighbourhood on 22nd evening. It became less marked over Assam & Meghalaya and neighbourhood on 26th.

(iii) Five western disturbances moved away eastwards across north Pakistan and Western Himalayas during the month. The sixth western disturbance of the month lay over north Pakistan on the last day.

(iv) A trough in mid and upper tropospheric westerlies moved eastwards across Uttar Pradesh, Madhya Pradesh and northeast India between 20th and 25th.

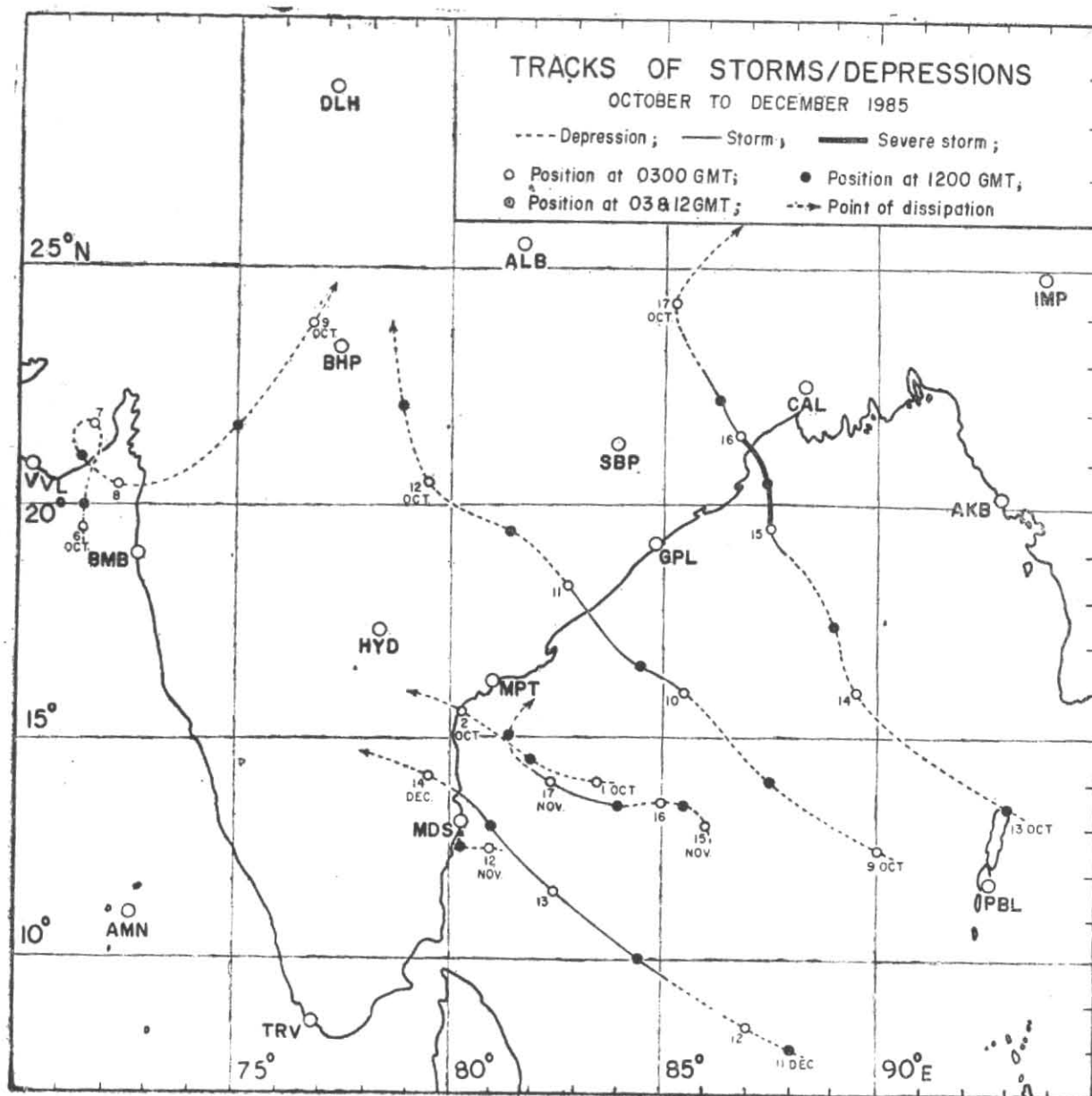


Fig. 2

Under the influence of these systems monsoon was active to vigorous on one to four days in coastal Andhra Pradesh, Rayalaseema, Karnataka and Kerala during the first fortnight of the month. During the same period rainfall was generally widespread on most days in Andaman & Nicobar Islands, on three to six days in Uttar Pradesh, Haryana, Jammu & Kashmir, east Rajasthan, Madhya Pradesh, Telangana and south interior Karnataka and on one to two days in Arunachal Pradesh, West Bengal & Sikkim, Orissa, Punjab, Himachal Pradesh, coastal Andhra Pradesh, Rayalaseema, Tamil Nadu, north interior Karnataka and Lakshadweep. During the second fortnight weather was mainly dry over the country outside northeast India and south Peninsula. During this period Andaman & Nicobar Islands, Tamil Nadu and Kerala received generally widespread rainfall on two to three days having isolated heavy falls on 1 day each. The rainfall elsewhere was of isolated or scattered nature.

2.4. Rainfall during the month

It was excess in Orissa, Bihar, Uttar Pradesh, Haryana, Punjab, Himachal Pradesh, Jammu & Kashmir, east Rajasthan, Madhya Pradesh, Gujarat State, Maharashtra State, Andhra Pradesh, Tamil Nadu, coastal and north interior Karnataka; normal in Andaman & Nicobar Islands and West Bengal & Sikkim; deficient in Assam & Meghalaya, West Rajasthan and Kerala and scanty over the rest of the country.

The significant amounts (cm) of rainfall were :

- 1st Bagalkot 8, Kottayam, Usilampatti & Purushottampur 7 each
- 2nd Mannarghat 18, Brahmapuri 10, Vedaranyam 7
- 3rd Baramati 9
- 4th Purushottampur 7, Surada 6, Hiradharbati 5
- 5th Udupi & Tikamgarh 7 each
- 6th Chhatarpur 7, Udaipur 6, Mussoorie, Daltenganj & Sundernagar 5 each
- 7th Kandaghat 15, Tirupati AP 13, Yemmiganur 11, Sangareddy & Ambone 9 each
- 8th Valpoi 14, Vengurla 13, Port Blair 10, Gudari, Savantwadi & Karwar 7 each
- 9th Mukerian 12, Kathua, Kangra 10 each, Nancowry, Port Blair, Katra & Kukernag 8 each
- 10th Kandaghat 13, Jogindernagar 12, Kangra & Nahan 11 each, Dharmasala 9, Ongole, Kasargode & Kalpa 7 each
- 14th Moradabad 17, Mukteswar 13, Bareilly 10
- 16th Kancheepuram 10
- 21st Mannarghat 7
- 22nd Punalur 9, Thukalay 8, Ambasundaram 7
- 24th Palayamkottai 9
- 25th Karaikal 7
- 26th Cuddalore 14, Srivilliputtur 12, Parangipettai, Tiruthuraiipoondi 8 each, Tambaram & Madras AP 7 each
- 27th Manargudi 8, Kumbakonam, Srivilliputtur & Ambasundaram 7 each
- 29th Tiruvalla 8, Punalur 7

2.5. Temperature

Day temperatures were generally above normal in Assam & Meghalaya, Nagaland, Manipur, Mizoram & Tripura and West Bengal & Sikkim during the first fortnight of the month. They were generally below or appreciably below normal in Uttar Pradesh, Haryana, Punjab, Rajasthan and west Madhya Pradesh between 6th and 18th and so in interior Maharashtra and Telangana between 2nd & 13th. Day temperatures were as much as 8°C to 12°C below normal on one to four days in plains of west Uttar Pradesh, Haryana, Punjab, east Rajasthan and west Madhya Pradesh during the period from 7th to 10th.

Night temperatures were generally below normal, being appreciably so on a few days in Gangetic West Bengal, Orissa, Bihar State, Haryana, Punjab, Madhya Pradesh, Maharashtra State and Andhra Pradesh during the second fortnight.

3. November

During this month a cyclonic storm and a depression developed over Bay, both of which weakened over the sea.

3.1. Storm and depressions

(i) A cyclonic circulation in the lower tropospheric levels was observed over southwest Bay off Sri Lanka coast on 7th, where a low pressure area developed on 8th. Moving northwards it concentrated into a depression off Tamil Nadu coast on 12th centred near 12.5°N, 81.0°E. It weakened into a well marked low pressure area over southwest Bay off Mahabalipuram in the early hours of 13th. This system caused generally widespread rain with isolated heavy to very heavy falls over Tamil Nadu from 8th to 13th. Isolated heavy to very heavy falls also occurred on a couple of days in coastal Andhra Pradesh and Rayalaseema. The significant amounts (cm) of rainfall were : Manapurai 11, Pudukottai 9, Nagapattinam, Tuticorin & Dindigul 8 each, Pamban, Coonoor, Madurai & Manargudi 7 each on 8th; Cuddalore 9, Vedaranyam & Ambasundaram 7 each on 9th; Vedaranyam 26, Nagapattinam 25, Karaikal 18, Tiruthuraiipoondi 16, Chidambaram & Cuddalore 8 each, Parangipeta & Pondicherry 7 each on 10th; Nagapattinam 20, Karaikal 19, Cuddalore, Parangipettai & Vedaranyam 18 each, Chidambaram 15, Madras AP 14, Pondicherry & Ponneri 13 each, Vridhachalam, Tirupati AP & Tiruthani 10 each, Tiruvallur 9, Sullurpet, Rapur & Ariyallur 8 each on 11th; Madras & Tambaram 30 each, Ponneri 16, Nellore 12 on 12th; Madras 33, Ponneri 30, Kancheepuram 28, Sriperumbudur 24, Tiruthani 20, Tiruvallur 19, Sullurpet 18, Nellore 12, Chittoor 11, Ambur & Tirupati AP 10 each, Kavali 9 on 13th. As per press reports about 50,000 huts were damaged in low lying areas of Madras city due to rain and floods. River *Adyar* in south Madras was in floods at Kotturpuram, where flood water entered the ground floors of multistoreyed buildings.

(ii) The remnant of the above depression over southwest Bay again concentrated into a depression on 15th centred near 13.0°N, 86.0°E. Moving westwards it

intensified into a cyclonic storm on 16th evening when it lay centred near 13.5°N, 84.0°E. Thereafter, moving westnorthwestwards it weakened into a deep depression over west central Bay on 17th evening centred near 15.0°N, 81.5°E. It then recurved northnortheastwards and further weakened into a low pressure area over west central Bay off Andhra coast on 18th. Continuing to move northnortheastwards it became less marked over Nagaland, Manipur, Mizoram & Tripura and adjoining Burma on 21st. The system did not cause any adverse weather over the country.

3.2. Other Systems

The following other systems affected the country.

3.2.1. Systems in easterlies

(i) Last month's low pressure area over extreme south Peninsula and neighbourhood moved over Lakshadweep and adjoining sea areas on 1st, where it became less marked on 4th.

(ii) A low pressure area, which developed over southwest Bay off Tamil Nadu-Sri Lanka coast on 1st evening, moved westwards and merged with the above low pressure area over Lakshadweep on 3rd.

(iii) A trough of low which was observed over southwest Bay on 3rd, became less marked there off Tamil Nadu-south Andhra coast on 8th.

(iv) Two low pressure areas with associated cyclonic circulation/ trough extending to mid tropospheric levels developed over Lakshadweep and neighbourhood, the first one on 6th and the second one on 9th. Both the systems moved westwards and became less marked over sea areas west of Lakshadweep on 10th and 12th respectively.

(v) A cyclonic circulation in the lower and mid tropospheric levels was observed over Lakshadweep and southeast and adjoining east central Arabian Sea off Kerala-Karnataka coast on 16th. It became less marked there on 22nd evening.

(vi) A cyclonic circulation in the lower tropospheric levels was seen over south Tamil Nadu between 21st evening and 23rd and another over southeast Arabian Sea off Kerala coast between 24th and 26th.

(vii) A cyclonic circulation in the lower tropospheric levels, which lay over southwest Bay and adjoining Sri Lanka on 25th, persisted there on the last days of the month.

3.2.2. Systems in westerlies

(i) Last month's western disturbance moved away eastwards across Western Himalayas and neighbourhood on 5th. Six more western disturbances affected Western Himalayas and neighbourhood during the month.

(ii) A trough in mid and upper tropospheric westerlies, which extended from eastern Tibet to west central Bay on 15th, moved away northeastwards by 17th.

(iii) Three cyclonic circulations/troughs in the lower tropospheric levels were observed over sub-Himalayan West Bengal & Sikkim; one on 6th, which became less

marked over Assam and Meghalaya on 9th; the other, one on 21st, which became less marked over Nagaland Manipur, Mizoram & Tripura and adjoining Burma on 26th and the third one on 28th evening, which lay over Assam & Meghalaya on 30th.

Under the influence of these systems rainfall was generally widespread on 8 days in Andaman & Nicobar Islands during the month. It was generally widespread on two to seven days in coastal Andhra Pradesh, Rayalaseema, Tamil Nadu, coastal south interior Karnataka and Kerala with isolated heavy to very heavy falls on three days in Tamil Nadu and Kerala during the first fortnight. Scattered or isolated rainfall occurred on twelve days each in Andaman & Nicobar Islands and Kerala, on six to nine days in Assam & Meghalaya, Sub-Himalayan West Bengal & Sikkim, coastal Andhra Pradesh, Rayalaseema, Tamil Nadu, south interior Karnataka and Lakshadweep and on one to four days in Arunachal Pradesh, Nagaland, Manipur, Mizoram & Tripura, Gangetic West Bengal, Orissa, Bihar plains, Punjab, Himachal Pradesh, Jammu & Kashmir, Konkan & Goa, Madhya Maharashtra, coastal and north interior Karnataka. Mainly dry weather prevailed over the rest of the country. On 10th Pune recorded 11 cm of rainfall, which was the heaviest recorded rainfall for the month of November so far.

3.3. Rainfall during the Month

It was excess in Sub-Himalayan West Bengal & Sikkim and Tamil Nadu; normal in Andaman & Nicobar Islands; deficient in Arunachal Pradesh, Madhya Maharashtra, coastal Andhra Pradesh, Rayalaseema, south interior Karnataka, Kerala and Lakshadweep; scanty in Assam & Meghalaya, Nagaland, Manipur, Mizoram & Tripura, Gangetic West Bengal, Orissa, Bihar plains, Punjab, Himachal Pradesh, Jammu & Kashmir, Konkan & Goa, Marathwada, coastal and north interior Karnataka. Dry weather prevailed over the rest of the country.

The significant amounts (cm) of rainfall were :

3rd	Tiruthurai poondi 16, Karaikal 14, Vedranayam, Mayiladuthurai 11 each, Nagapattinam 10, Adirampattinam 9, Mannargudi 8
4th	Nagapattinam & Vedaranyam 11 each, Nellore 8, Tuticorin 7.
5th	Kandukuru 8, Chintamani 7.
6th	Chidambaram 12, Vedaranyam, Coonoor 9 each, Parangipettai 7.
7th	Parangipettai 24, Cuddalore 13, Manjari 12, Chidambaram 9, Pondicherry & Nillambur 8 each, Vridhachalama 7
8th	Cannanore & Trivandrum AP 11 each
10th	Pune 11
11th	Bhira 7
12th	Kayamkulam 14, Long Island 13, Quilon 12
14th	Ponneri 13, Rapur 9, Sullurpet 7
19th	Narsipattanam 5
21st	Salem 8
22nd	Thenmala 5
23rd	Trivandrum AP & Quilon 5 each.

3.4. Temperature

Night temperatures during the month were generally below normal in Assam & Meghalaya, Sub-Himalayan West Bengal & Sikkim, Konkan & Goa, Madhya Maharashtra, coastal Andhra Pradesh, Telangana and Tamil Nadu and so on ten to fifteen days in Nagaland, Manipur, Mizoram & Tripura, Vidarbha and interior Karnataka, being appreciably so for a couple of days in some of these sub-divisions. They were below normal at a few places on four to eight days in Orissa, hills of west Uttar Pradesh, Punjab, Jammu & Kashmir and Rayalaseema during the second fortnight of the month.

During the month a cyclonic storm developed over Bay.

4. December

4.1 Cyclonic storm

(i) A well marked low pressure area, which developed over southeast Bay on 11th, concentrated into a depression in the evening with its centre near 8.0° N, 88.0° E. Moving westnorthwestwards it intensified into a cyclonic storm by 12th afternoon and lay centred in the evening near 10.0° N, 84.5° E. Thereafter, moving northwestwards it crossed south Andhra coast near Sriharikota in the night of 13th and weakened rapidly over south Andhra and north Tamil Nadu. It became unimportant there on 15th. It caused fairly widespread rain over coastal Andhra Pradesh with isolated heavy to very heavy falls on 14th and 15th. Scattered or isolated rainfall occurred on one to three days in Marathwada, Vidarbha, Andhra Pradesh and Tamil Nadu. The significant amounts (cm) of rainfall in association of the system were : Nellore 15, Machilipatnam, Ongole, Bapatla & Avanigadda 8 each, Guntur 7 on 14th; Poidli 9, Narasapur & Markapur 8 each on 15th. According to press report, seven people were killed and 4 villages in Nellore district were cut off due to floods.

4.2. Other systems

During the first fortnight the equatorial trough over south Peninsula and neighbourhood was quite active, while the system in westerlies became active over north-west India in the second fortnight of the month.

4.2.1. Systems in easterlies

The following cyclonic circulations in the lower tropospheric levels were observed in the equatorial region :

(i) Last month's cyclonic circulation which lay over southwest Bay and adjoining Sri Lanka, became less marked over Comorin and adjoining Maldives on 3rd.

(ii) One, which lay over southwest Bay off Tamil Nadu coast on 8th, became less marked off south Tamil Nadu-Sri Lanka coast on 11th.

(iii) Another, which developed over east central Arabian Sea off Karnataka-Goa coast on 8th, became less marked there on 10th evening.

(iv) One was observed over extreme south Peninsula and adjoining Comorin and Sri Lanka between 15th

evening and 17th and another over south Tamil Nadu and adjoining southwest Bay and Sri Lanka between 17th evening and 19th.

The following troughs of low were observed over southwest Bay off Tamil Nadu-Sri Lanka coast; (i) one between 2nd and 3rd, (ii) the other between 18th & 20th & (iii) A trough of low, which lay over southeast Bay and adjoining south Andaman Sea on 24th evening, moved over southwest Bay off south Tamil Nadu-Sri Lanka coast on 27th, where it became less marked in the same evening.

4.2.2. Systems in westerlies

(i) Nine western disturbances affected Western Himalayas and neighbourhood during the month.

(ii) An induced cyclonic circulation in the lower tropospheric levels developed over central Pakistan and neighbourhood on 12th. Moving eastwards, it became less marked over hills of west Uttar Pradesh on 18th.

(iii) Another induced cyclonic circulation, which developed in the lower tropospheric levels over north-west Rajasthan and neighbourhood on 24th evening, formed low pressure area there on 26th. It moved eastwards across Haryana and northwest Uttar Pradesh and dissipated over the hills of west Uttar Pradesh and adjoining Nepal hills on 28th.

(iv) A cyclonic circulation in the lower tropospheric levels was observed over Bangla Desh and neighbourhood between 4th and 8th.

(v) Several cyclonic circulations/troughs in the lower tropospheric westerlies moved across Assam and adjacent States, of which the one that moved between 28th and 29th was worth mentioning.

(vi) A trough in mid and upper tropospheric westerlies was extended from west Sinkiang to north Arabian Sea from 10th to 17th. It became less marked on 18th.

Under the influence of these systems rainfall was generally widespread on seven days in Andaman and Nicobar Islands during the month. It was generally widespread from 2nd to 5th in Tamil Nadu on one to three days in Punjab, Himachal Pradesh, Jammu & Kashmir, coastal Karnataka and Lakshadweep between 9th and 16th and on one to two days in Assam and adjacent States, Sub-Himalayan West Bengal and Sikkim, west Uttar Pradesh and Haryana, Himachal Pradesh and Jammu & Kashmir during the last week of the month. It was generally widespread over Himachal Pradesh and Jammu & Kashmir on 25th and isolated on 30th. The first snowfall of the season reported from Jammu & Kashmir was on 23rd. Rainfall was heavy to very heavy on 1 to 2 days in Punjab, Himachal Pradesh, Tamil Nadu and Kerala. It was scattered or isolated on 7 to 14 days in Andaman & Nicobar Islands, Haryana, west Rajasthan, Tamil Nadu, south interior Karnataka, Kerala and Lakshadweep and on 1 to 4 days in Assam and adjacent States, Sub-Himalayan West Bengal & Sikkim, Bihar plains, Uttar Pradesh, Punjab, Himachal Pradesh, Jammu & Kashmir, Gujarat region, Marathwada, Vidarbha, coastal Andhra Pradesh, Rayalaseema and coastal Karnataka. Mainly

dry weather prevailed over the rest of the country. According to press reports heavy rain and snow affected the normal life in Jammu & Kashmir and Himachal Pradesh.

4.3. Rainfall during the month

It was excess in Arunachal Pradesh, Assam & Meghalaya, Sub-Himalayan West Bengal & Sikkim, Bihar plains, east Uttar Pradesh, hills of west Uttar Pradesh, Haryana, Punjab, Himachal Pradesh, Jammu & Kashmir, east Rajasthan and coastal Andhra Pradesh; normal in Nagaland, Manipur, Mizoram & Tripura, plains of west Uttar Pradesh, Gujarat region, Telangana, Rayalaseema and Kerala; deficient in Andaman & Nicobar Islands, west Rajasthan, Tamil Nadu, south interior Karnataka and Lakshadweep and scanty over Bihar Plateau, Madhya Pradesh, Marathwada, Vidarbha and coastal Karnataka. Dry weather prevailed over the rest of the country.

Significant amounts (cm) of rainfall were :

- 1st Karaikal 9, Parangipettai 8, Chidambaram 5
- 2nd Parangipettai 10, Chidambaram 9, Vedaranyam, Sriperumbudur & Pondicherry 7 each, Madras 6
- 3rd Kayamkulam 8, Pudukottai 6, Adirampattinam 5
- 4th Cuddalore 7, Vrindhachalam 6
- 5th Ramnathpuram 11
- 9th Gudalur Bazar 6
- 10th Cochin AP 5
- 12th Car Nicobar 7, Maya Bandar 5

- 14th Poonari 10
- 15th Coonoor 11, Cochin, Bilaspur (H.P.) & Vijayawada AP 6 each, Trichur 5
- 16th Kandukur 12, Coonoor 7, Pahalgam 5, Kupwara 4
- 17th Quazigund 5
- 19th Pasighat 6
- 25th Baijnath 18
- 26th Katra, Kandaghat & Quazigund 6 each, Banihal, Batote 5 each, Udampur 4
- 27th Nahan 9, Dharmasala 7, Baijnath, Jammu AP, Quazigund, Srinagar, Udampur & Karaikal 6 each, Nagapattinam, Dehra Dun, Kandaghat & Dharmpur 5 each
- 28th Jammu AP 7, Chaparmukh 4

4.4. Temperature

Night temperatures were generally below normal being appreciably so on a couple of days in Sub-Himalayan West Bengal & Sikkim, Gangetic West Bengal, Orissa, Bihar Plateau, Punjab and Himachal Pradesh during the first twelve days of the month. During the same period they were below normal on four to five days in Nagaland, Manipur, Mizoram & Tripura, Haryana, east Madhya Pradesh, Madhya Maharashtra, Marathwada and Telangana and appreciably so in west Rajasthan from 9th to 12th. Markedly above normal night temperatures were observed on three to five days in Haryana, Punjab, east Rajasthan, west Madhya Pradesh and on one to two days in east Uttar Pradesh, west Rajasthan, east Madhya Pradesh, Gujarat region and Madhya Maharashtra during the period from 13th to 18th.