

Weather in India

POST MONSOON SEASON (October - December 2020)[†]

1. Introduction

Post monsoon season 2020 witnessed the formation of six intense low-pressure systems in the north Indian ocean (NIO) comprising of the Bay of Bengal and the Arabian Sea. The six systems included one deep depression and two depressions (all 3 in the month of October), one cyclonic storm “BUREVI” (30 November - 5 December) over the Bay of Bengal and two very severe cyclonic storms (VSCS), “GATI” (21-24 November) over the Arabian Sea (21-24 November) and VSCS, “NIVAR” (22-27 November) over the Bay of Bengal.

The southwest monsoon withdrew from the entire country on 28th October, 2020 (normal date 15 October) and the northeast monsoon season commenced over the south peninsula on the same day against normal date of 20th October, 2020 and ceased on 19th January, 2021.

Northeast monsoon rainfall over the five core regions was, *excess** in Rayalaseema and Coastal Andhra Pradesh and Yanam and was *normal* in Tamil Nadu, Puducherry and Karaikal and south interior Karnataka while *deficient* in Kerala and Mahe.

The maximum and minimum temperatures were generally above normal over major parts of the country during the season. The minimum temperature was normal or below normal over northern sub-divisions, viz., Jammu-Kashmir and Ladakh, Punjab, Haryana, Chandigarh, Delhi, Uttar Pradesh, Gujarat and Uttarakhand. The night temperatures were generally above normal over the rest of the country.

Severe cold wave / cold wave conditions were observed over parts of central and northwest India in the last fortnight of December. Punjab, Haryana, Chandigarh, Delhi, Rajasthan, west Madhya Pradesh, Uttar Pradesh, Uttarakhand, Saurashtra and Kutch, Himachal Pradesh, Bihar and Gangetic West Bengal experienced severe cold wave conditions from two to six days in the last few days of the season.

Very dense fog was observed at isolated places over Punjab and east Uttar Pradesh in the second week of December. Dense fog to moderate fog was experienced

(* Definitions of terms in italics (other than subtitles) are given in Appendix.)

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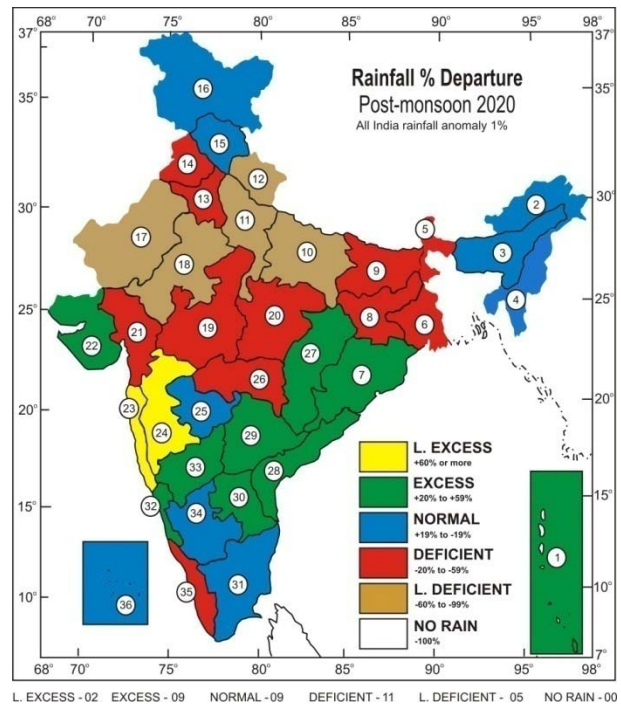


Fig. 1. Sub-divisionwise seasonal rainfall departure from normal (%) for post monsoon season (October to December 2020). Sub-divisions are indicated by number on the map & bold letters in legend. The rainfall anomaly values for these 36 sub-divisions are indicated below :

1	27	7	27	13	-57	19	-58	25	9	31	6
2	-8	8	-26	14	-23	20	-34	26	-36	32	30
3	9	9	-59	15	-16	21	-21	27	21	33	30
4	-1	10	-81	16	-19	22	36	28	24	34	-1
5	-36	11	-83	17	-68	23	82	29	46	35	-26
6	-45	12	-71	18	-64	24	75	30	54	36	-9

over northwest sub-divisions like Uttarakhand, Uttar Pradesh, Himachal Pradesh, Punjab, Haryana, Chandigarh, Delhi, Rajasthan, east and north east sub-divisions, viz., Nagaland, Manipur, Mizoram, Tripura, Assam and Meghalaya, alongwith Madhya Maharashtra, Tamil Nadu, Puducherry and Karaikal from the last week of November.

2. Seasonal rainfall (October-December)

The meteorological sub-division wise rainfall percentage departures from normal are given in Fig. 1 and Table 1.

TABLE 1
Sub-divisionwise rainfall (mm) for each month and season as a whole (October-December, 2020)

S. No.	Meteorological Sub-divisions	October			November			December			Season		
		Actual (mm)	Normal (mm)	Dep. (%)	Actual (mm)	Normal (mm)	Dep. (%)	Actual (mm)	Normal (mm)	Dep. (%)	Actual (mm)	Normal (mm)	Dep. (%)
1.	A. & N. Islands	480.9	282.4	70%	190.3	239.0	-20%	187.3	154.4	21%	858.5	675.8	27%
2.	Arunachal Pradesh	172.4	184.9	-7%	58.0	45.5	28%	16.8	37.0	-54%	247.2	267.4	-8%
3.	Assam & Meghalaya	193.7	157.6	23%	20.4	28.0	-27%	1.0	10.9	-91%	215.1	196.5	9%
4.	Naga., Mani., Mizo. and Tri.	180.5	165.5	9%	37.2	43.7	-15%	0.3	11.8	-98%	217.9	221.0	-1%
5.	Sub-Himalayan West Bengal& Sikkim	104.3	151.5	-31%	5.5	17.9	-69%	4.3	10.0	-57%	114.2	179.4	-36%
6.	Gangetic West Bengal	81.3	127.6	-36%	4.4	21.4	-80%	0.1	7.4	-99%	85.7	156.4	-45%
7.	Orissa	162.1	100.2	62%	4.6	24.5	-81%	0.0	6.6	-99%	166.6	131.3	27%
8.	Jharkhand	59.6	74.7	-20%	6.8	9.0	-24%	0.2	6.6	-96%	66.6	90.3	-26%
9.	Bihar	29.1	61.6	-53%	0.8	6.0	-86%	0.1	5.4	-98%	30.1	73.0	-59%
10.	East Uttar Pradesh	1.2	37.3	-97%	6.8	4.1	66%	1.1	6.3	-83%	9.1	47.7	-81%
11.	West Uttar Pradesh	0.0	22.2	-100%	4.6	3.8	22%	1.0	6.7	-85%	5.6	32.7	-83%
12.	Uttarakhand	0.1	35.3	-99%	9.6	7.2	34%	8.0	18.0	-55%	17.8	60.5	-71%
13.	Haryana, Chandigarh & Delhi	0.0	9.9	-100%	6.5	3.8	71%	2.1	6.5	-68%	8.6	20.2	-57%
14.	Punjab	0.0	8.9	-100%	11.9	5.2	129%	8.4	12.2	-31%	20.3	26.3	-23%
15.	Himachal Pradesh	0.5	27.5	-98%	42.4	20.3	109%	34.3	43.8	-22%	77.2	91.6	-16%
16.	Jammu & Kashmir and Ladakh	0.1	35.7	-99%	49.7	33.4	49%	58.3	64.4	-9%	108.1	133.5	-19%
17.	West Rajasthan	3.5	6.9	-49%	0.2	2.7	-94%	0.1	2.0	-95%	3.8	11.6	-68%
18.	East Rajasthan	3.6	14.0	-74%	5.1	8.0	-37%	0.5	3.8	-87%	9.2	25.8	-64%
19.	West Madhya Pradesh	9.8	29.7	-67%	3.1	13.0	-76%	8.3	8.2	1%	21.3	50.9	-58%
20.	East Madhya Pradesh	26.0	34.2	-24%	6.2	12.0	-48%	5.7	11.2	-49%	37.9	57.4	-34%
21.	Gujarat Region	10.6	17.9	-41%	0.0	10.1	-100%	13.1	1.8	627%	23.7	29.8	-21%
22.	Saurashtra & Kutch & Diu	35.3	15.8	123%	0.0	10.6	-100%	2.0	1.1	80%	37.3	27.5	36%
23.	Konkan & Goa	241.8	110.5	119%	0.0	23.7	-99%	12.3	5.4	129%	254.2	139.6	82%
24.	Madhya Maharashtra	155.6	73.3	112%	2.3	23.5	-90%	7.2	6.3	14%	180.8	103.1	75%
25.	Marathawada	106.5	71.7	48%	0.0	20.5	-100%	0.2	7.8	-97%	108.6	100.0	9%
26.	Vidarbha	47.7	57.6	-17%	4.1	14.8	-72%	0.2	9.1	-97%	52.0	81.5	-36%
27.	Chhattisgarh	87.5	59.4	47%	4.4	10.2	-57%	0.8	7.1	-89%	92.6	76.7	21%
28.	Coastal Andhra Pradesh & Yanam	212.4	191.3	11%	181.0	117.3	54%	25.9	29.5	-12%	419.3	338.1	24%
29.	Telangana	168.5	92.4	82%	11.0	24.2	-55%	0.0	6.7	-99%	179.5	123.3	46%
30.	Rayalaseema	141.1	129.8	9%	155.7	70.2	122%	46.4	23.3	99%	343.2	223.3	54%
31.	Tamil Nadu, Pudcherry & Karaikal	101.0	177.6	-43%	203.3	179.5	13%	172.8	92.6	87%	477.0	449.7	6%
32.	Coastal Karnataka	301.9	186.0	62%	20.8	59.7	-65%	10.0	11.1	-10%	332.7	256.8	30%
33.	North Interior Karnataka	176.3	105.9	66%	3.1	26.0	-88%	0.1	6.2	-98%	179.5	138.1	30%
34.	South Interior Karnataka	149.6	141.6	6%	37.9	50.6	-25%	15.6	11.9	31%	203.1	204.1	-1%
35.	Kerala & Mahe	222.8	303.4	-27%	99.3	153.4	-35%	43.1	34.8	24%	365.2	491.6	-26%
36.	Lakshadweep	70.4	142.3	-51%	71.5	125.3	-43%	152.1	54.2	181%	294.0	321.8	-9%

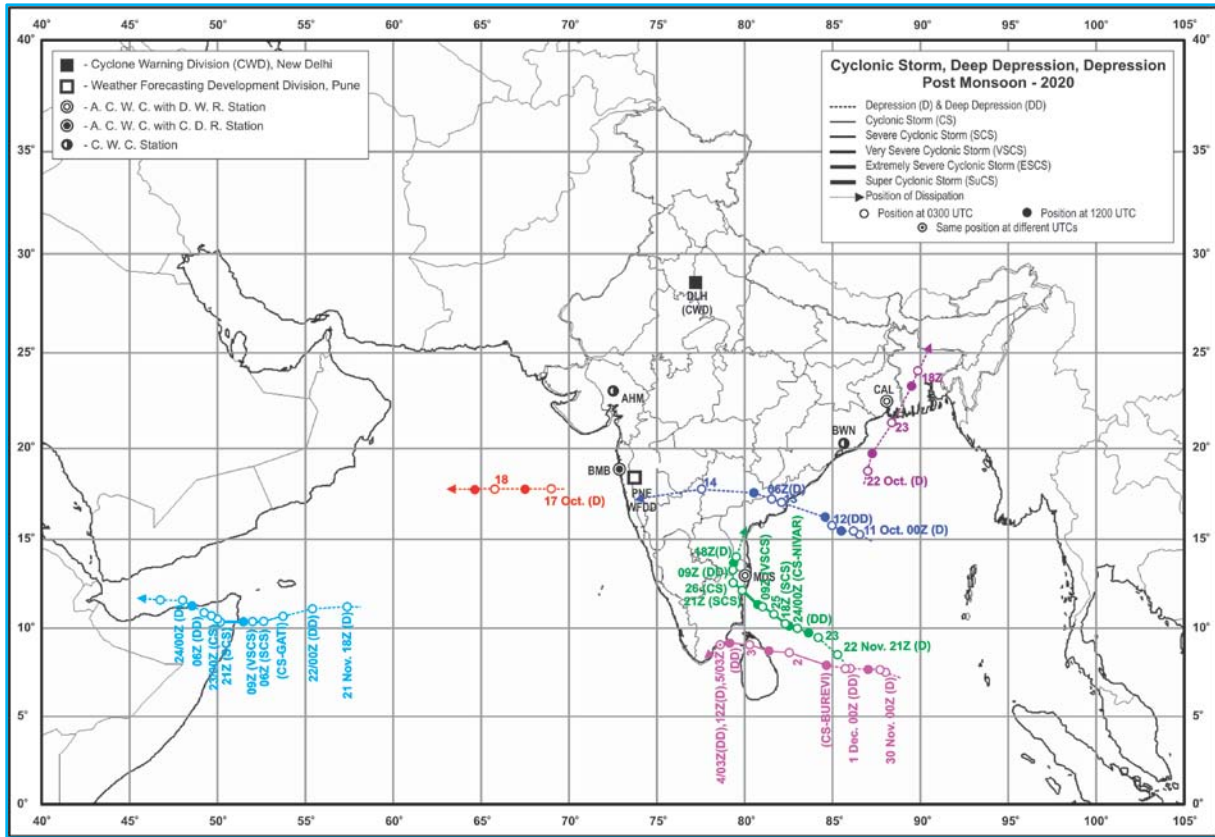


Fig. 2. Cyclones and depressions during post-monsoon season 2020

During the season, rainfall over the country at 101% of long period average (LPA) was normal, the homogeneous regions of south Peninsula (115% of LPA), central India (113% of LPA) and east and northeast India (86% of LPA) too were normal. The homogeneous region of northwest India was deficient with rainfall departure of -39% from that of the normal. The seasonal rainfall over the subdivisions of Konkan and Goa and Madhya Maharashtra were large excess, 9 subdivisions were excess and normal each, 11 deficient and 5 large deficient (all from northwest India). All the three months and season recorded more than normal rainfall over south peninsula with December rainfall being 53% above LPA.

The monthly rainfall for the country was normal during all the months and the season but there was huge spatial and temporal variability within the season. The monthly precipitation in October was large deficient over northwest India with a departure of -94% of LPA while central India received excess rainfall with percent departure of 44% than normal. The situation was reversed in November with central India being large deficient (departure of -81% of LPA) and northwest India being excess (departure of 41% of LPA). In December rainfall

over south peninsula was excess while less than normal over the three remaining regions of the country, northwest India and central India were deficient while over east and northeast India precipitation was large deficient (departure of -75% of LPA).

Rainfall activity over core region of the south peninsula (comprising of 5 subdivisions, viz., Coastal Andhra Pradesh and Yanam, Rayalaseema, Tamil Nadu, Puducherry and Karaikal, South Interior Karnataka and Kerala and Mahe) was above normal (106% of Long Period Average (LPA)). It was also more than normal during November and December (119% of LPA, and 158% of LPA respectively) and was below normal during October (88% of LPA).

3. Monthly features

3.1. October

3.1.1. Withdrawal of southwest monsoon

In view of the establishment of an anti-cyclonic circulation in the lower tropospheric levels over western

TABLE 2

Details of the weather systems during October 2020

S. No.	System	Duration	Place of initial Location	Direction of movement	Place of final location	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)
(A) Deep Depression/Depression						
1.	Deep Depression	11-13	West-central Bay of Bengal	West	Telangana	Initially it lay as a low pressure area over north Andaman sea and neighborhood on 9. Details are given in the article on 'Storms & Depressions over the north Indian Ocean- 2020'
2.	Depression	17-19	Eastcentral and adjoining northeast Arabian Sea	Do	Westcentral Arabian Sea and neighbourhood	It is the remnant of the above Deep depression which emerged into the Arabian Sea and intensified. It became less marked on 21. Details are given in the article on 'Storms & Depressions over the north Indian Ocean-2020'
3.	Do	22-26	Over northwest and adjoining west central Bay of Bengal	Northeast	Over west Assam and neighbourhood	Initially it was an east-west trough roughly along 14° N between 1.5 km and 5.8 km above m. s. l. on 19. Became less marked on 27
(B) Well marked Low pressure area / Low pressure area						
1.	Low pressure area	1-5	Over west-central and adjoining northwest Bay of Bengal off north Andhra Pradesh-south Odisha coasts	North	Over northwest Bay of Bengal and adjoining Odisha coasts	Initially it was a cyclonic circulation over west-central and adjoining northwest Bay of Bengal. L. P. became less marked on 6 and associated cyclonic circulation became less marked on 7
2.	Do	31 Oct - 1 Nov	Eastcentral Bay of Bengal off Myanmar coast	East	Northeast and adjoining eastcentral Bay of Bengal off Myanmar coast	Initially it lay as a cyclonic circulation over eastcentral Bay of Bengal and adjoining north Andaman sea between 1.5 and 4.5 km above m.s.l. on 30. Became less marked on 2 November
(C) Western Disturbances / Eastward moving systems						
(i) Upper air cyclonic circulation						
1.	At 5.8 km above m.s.l.	13-16	Kashmir and neighbourhood	Northeast	Over Kashmir and neighbourhood at 3.1 km above m.s.l.	Initially it lay as a trough with its axis roughly along Long. 64° E to the north of Lat. 34° N on 10. Moved away northeastward on 17
2.	Do	17-24	Northern parts of Afghanistan and neighbourhood	Do	Northwest Uttar Pradesh and neighbourhood	It then lay as a trough which moved away on 28
3.	At 3.1 km above m.s.l.	28 Oct - 3 Nov	Afghanistan and neighbourhood	Do	North Haryana and neighbourhood	Initially it was a trough in mid tropospheric westerlies with its axis at 5.8 km above m.s.l. became less marked on 4 November
(ii) As a trough						
1.	At 5.8 km above m.s.l.	23	Along Long. 64° E to the north of Lat. 30° N	East	Roughly along Long. 75° E to the north of Lat. 30° N	It moved away east-northeastwards on 27

TABLE 2 (Contd.)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
(D) Other upper air cyclonic circulations						
1.	Up to 1.5 km above m.s.l.	2-3	Central Assam and neighbourhood	Stationary	<i>In situ</i>	Became less marked on 4
2.	Between 1.5 and 4.5 km above m.s.l.	3-4	Gulf of Thailand and neighbourhood	Do	Do	Became less marked on 5
3.	At 3.1 km above m.s.l.	5-6	Northwest Uttar Pradesh and neighbourhood	Southeast	South Uttar Pradesh and neighbourhood	Became less marked on 7
4.	Up to 3.1 km above m.s.l.	7-10	South coastal Andhra Pradesh and neighbourhood	Oscillatory	South coastal Andhra Pradesh and neighbourhood	became less marked on 11
5.	At 0.9 km above m.s.l.	8	Telangana and neighbourhood	Stationary	<i>In situ</i>	Became less marked on 9
6.	Between 0.9 and 2.1 km above m.s.l.	13	East-central Arabian Sea and adjoining Maharashtra coast	Do	Do	Became less marked on 14
7.	Up to 3.1 km above m.s.l.	10-11	North interior Karnataka and neighbourhood	Do	Do	Became less marked on 12
8.	At 1.5 km above m.s.l.	19	South Assam and neighbourhood	Do	Do	became less marked on 20
9.	Up to 5.8 km above m.s.l.	17-18	Westcentral Bay of Bengal off south Andhra Pradesh coast	Do	Do	Became less marked on 19
10.	At 1.5 km above m.s.l.	22	West Rajasthan and neighbourhood	Do	Do	Became less marked on 23
11.	Between 0.9 km and 3.1 km above m.s.l.	24 Oct - 1 Nov	East-central Arabian Sea along and off Karnataka coast	Southwest	Southwest Arabian Sea	Became less marked on 2 November
12.	Between 3.1 and 5.8 km above m.s.l.	27 Oct - 1 Nov	Southwest Bay of Bengal off north Tamil Nadu coast	West	North interior Tamil Nadu	Became less marked on 2 November
13.	Between 1.5 km and 3.1 km above m.s.l.	24 - 27	Southwest Bay of Bengal	East	Central and adjoining southeast Bay of Bengal	Became less marked on 28
14.	Upto 1.5 km above m.s.l.	31	North Konkan and adjoining parts of Madhya Maharashtra	West	East central Arabian Sea off north Maharashtra-south Gujarat coast	Became less marked on 3 November
15.	Between 3.1 and 5.8 km above m.s.l.	31	Southeast Arabian Sea off Kerala coast	East	Maldives-Comorin area	Became less marked on 3 November
16.	At 3.1 km above m.s.l.	31 Oct	Coastal parts of Saurashtra and neighbourhood	Stationary	<i>In situ</i>	Became less marked on 1 November
(E) Other troughs / Wind Discontinuity						
1.	At 1.5 km above m.s.l.	6	From the cyclonic circulation over south coastal Odisha and neighbourhood to eastern parts of Bihar across Gangetic West Bengal	Stationary	<i>In situ</i>	Became less marked on 7

TABLE 2 (Contd.)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
2.	Up to 3.1 km above m.s.l.	7-8	From the cyclonic circulation over south coastal Andhra Pradesh and neighbourhood to Gangetic West Bengal across Odisha	East	From the cyclonic circulation over south coastal Andhra Pradesh and neighbourhood to Sub Himalayan West Bengal across interior Odisha	Became less marked on 9
3.	Up to 0.9 km	7	From south Tamil Nadu to the cyclonic circulation over south coastal Andhra Pradesh and neighbourhood across Rayalaseema	North	Merged with the trough from the cyclonic circulation over Telangana and neighbourhood to south Tamil Nadu	Merged on 8
4.	At 0.9 km above m.s.l.	8-9	South Tamil Nadu to North coastal Karnataka across south Interior Karnataka		From the cyclonic circulation over Rayalaseema to south Tamil Nadu	Became less marked on 10
5.	Between 3.1 and 5.8 km above m.s.l.	12-16	From the cyclonic circulation associated with the Depression over west-central Bay of Bengal to east-central Arabian Sea across coastal Andhra Pradesh, Rayalaseema, north interior Karnataka and coastal Karnataka	North	From westcentral Bay of Bengal to eastcentral Arabian Sea roughly along Lat. 18° N across coastal Andhra Pradesh, Telangana, cyclonic circulation associated with the well marked low pressure area over eastcentral Arabian Sea off north Maharashtra coast	Became less marked on 17
6.	Do	12	From the cyclonic circulation associated with the Depression over westcentral Bay of Bengal to east-central Arabian Sea	West	Across north coastal Andhra Pradesh, Telangana, cyclonic circulation associated with the well marked low pressure area over south Madhya Maharashtra and adjoining south Konkan	Became less marked on 17
7.	An east-west trough between 1.5 km and 5.8 km above m.s.l.	19-23	Roughly along 14° N across peninsular India and cyclonic circulation over central Bay of Bengal and neighbourhood		Roughly along 13° N across peninsular India	Became less marked on 24
8.	At 1.5 km above m.s.l.	26	From the cyclonic circulation over southeast and adjoining central Bay of Bengal to south Tamil Nadu across southwest Bay of Bengal	Stationary	<i>In situ</i>	Became less marked on 27
9.	Up to 1.5 km above m.s.l.	31 Oct - 1 Nov	From the cyclonic circulation associated with the low pressure area over eastcentral Bay of Bengal off Myanmar coast to Bangladesh across northeast Bay of Bengal	Do	Do	Became less marked on 2 November

TABLE 3

Details of the weather systems during November 2020

S. No.	System	Duration	Place of initial Location	Direction of movement	Place of final location	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)
(A) Cyclonic storm						
1.	Very Severe Cyclonic storm (GATI)	21 (1800 UTC) - 24 (0600 UTC) Nov	Southwest Arabian Sea, near Lat. 11.2° N / Long. 57.4°E	West	Gulf of Aden and adjoining Somalia near Lat. 11.6° N / Long. 47.0° E	It weakened into a well marked low pressure area over the Gulf of Aden and adjoining Somalia at 1130 hrs IST of 24 evening. Details are given in the article on Storms & Depressions over the north Indian Ocean-2020
2.	Very Severe Cyclonic storm (NIVAR)	22 (2100 UTC) - 27 (0000 UTC)	Southwest Bay of Bengal	Do	Gulf of Mannar	Weakened into a well marked low pressure area and lay centered over south coastal Andhra Pradesh and adjoining westcentral Bay of Bengal at 0530 hrs (IST) of 27. Details are given in the article on Storms & Depressions over the north Indian Ocean-2020
3.	Cyclonic storm (BUREVI)	30 Nov (0000 UTC) - 5 Dec (0600 UTC)	Southeast Bay of Bengal near Lat. 7.5°N / Long. 88.0°E	East	Gulf of Mannar near Lat. 9.1° N / Long. 78.6° E close to Ramanathapuram district coast	Weakened into a well marked low pressure area over Gulf of Mannar Details are given in the article on Storms & Depressions over the north Indian Ocean-2020
(B) Western Disturbances / Eastward moving Systems						
<i>(i) Upper air cyclonic circulation</i>						
1.	At 3.1 km above m.s.l.	17-19	Afghanistan and neighbourhood	East	Jammu & Kashmir and Ladakh, neighbourhood	Moved away northeastwards on 20
2.	Axis at 5.8 km above m.s.l.	14-16	Do	Northeast	Jammu-Kashmir and Ladakh, neighbourhood	Initially it lay as a trough in mid-tropospheric levels with its axis at 5.8 km above m.s.l. and ran roughly along Long. 55° E and to the north of Lat. 30° N from 12. It moved away east-northeastwards on 17
<i>(ii) As a trough</i>						
1.	At 5.8 km above m. s. l.	10	Roughly along Long. 66° E to the north of Lat. 32° N	East-northeast		Moved away east-northeastwards on 11
2.	At 3.1 km above m.s.l.	20-22	Roughly along Long. 65°E to the north of Lat. 30°N	East	Roughly along Long. 85° E to the north of Lat. 28° N	Moved away east-northeastwards on 23
3.	Do	21-29	Ran roughly along Long. 67° E to the north of Lat. 35° N	Northeast	Ran roughly along Long. 88° E to the north of Lat. 28° N	Initially it lay as a cyclonic circulation over Afghanistan and neighbourhood at 3.1 km above m.s.l. The trough moved away on 30
4.	At 5.8 km above m.s.l.	28-29	Roughly along Long. 60° E to the north of Lat. 25° N	Do	Roughly along Long. 62°E to the north of Lat. 30° N	Moved away northeastward on 30 morning
<i>(iii) Induced systems</i>						
1.	Up to 1.5 km above m.s.l.	15-17	South Pakistan and neighbourhood	West	Northeast Rajasthan and neighbourhood	Became less marked on 18
2.	Up to 2.1 km above m.s.l.	23-26	Southwest Rajasthan and neighbourhood	Northeast	Do	Became less marked on 27

TABLE 3 (Contd.)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
(C) Other upper air cyclonic circulations						
1.	Up to 1.5 km above m. s. l.	1	Southwest Bay of Bengal off north Tamil Nadu coast	Stationary	<i>In situ</i>	Became less marked on 2
2.	Do	2-6	Central parts of south Bay of Bengal	West	Comorin area and neighbourhood	Became less marked on 7
3.	At 0.9 km a.s.l.	3	Southwest Bay of Bengal off Tamil Nadu coast	Stationary	<i>In situ</i>	Merged with the cyclonic circulation over southwest Bay of Bengal off Sri Lanka coast on 4
4.	Up to 5.8 km above m. s. l.	7-9	Equatorial Indian Ocean and adjoining south Andaman Sea	West	Southeast Bay of Bengal and adjoining south Andaman Sea	Became less marked on 10
5.	At 3.1 km above m. s. l.	8-12	East Bihar and neighbourhood	Southwest	Southeast Bihar and neighbourhood	Became less marked on 13
6.	Up to 0.9 km above m. s. l.	9-13	Southwest Bay of Bengal and adjoining Equatorial Indian Ocean off south Sri Lanka coast	West	Comorin area and neighbourhood	Merged with the trough in easterlies from Comorin area to Andaman sea on 14
7.	At 3.1 km above m. s. l.	13	Punjab and neighbourhood	Stationary	<i>In situ</i>	Became less marked on 14
8.	Up to 1.5 km above m.s.l.	18-20	Southeast Rajasthan and neighbourhood	South	North Madhya Maharashtra and neighbourhood	Became less marked on 21
9.	At 0.9 km a.s.l.	21	Interior Odisha and neighbourhood at 0.9 km above m.s.l. on 21 s	Stationary	<i>In situ</i>	Became less marked on 22
10.	At 1.5 km a.s.l.	25-28	Northeast Bangladesh and neighbourhood	Do	Do	Became less marked on 29
11.	Between 1.5 and 2.1 km above m.s.l.	25	Bihar and adjoining east Uttar Pradesh	Do	Do	Became less marked on 26
12.	At 3.1 km a.s.l.	28	Sub Himalayan West Bengal and Sikkim	Do	Do	Became less marked on 29
13.	Upto 1.5 km a.s.l.	29	Haryana and adjoining west Uttar Pradesh	Do	Do	Became less marked on 30
14.	Between 1.5 & 2.1 km a.s.l.	29	Eastcentral Arabian Sea off Maharashtra coast	Do	Do	Became less marked on 30
15.	Up to 1.5 km above m.s.l.	30 Nov - 2 Dec	Bangladesh		Bangladesh and neighbourhood	Became less marked on 3 December
16.	Upto 0.9 km a.s.l	30 Nov	Southeast Arabian Sea off Kerala coast	Do	<i>In situ</i>	Became less marked on 1 December
(D) Trough in easterlies						
1.	Up to 0.9 km above m.s.l.	4-6	From southeast Arabian Sea to Karnataka coast across Lakshadweep area	West	Lakshadweep-Maldives area to Karnataka coast	Became less marked on 7

TABLE 3 (Contd.)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
2.	At mean sea level	9-13	South Bay of Bengal and adjoining central Bay of Bengal	West	Southwest Bay of Bengal off Tamil Nadu coast	Became less marked on 14
3.	Up to 1.5 km above m.s.l.	16-17	From Maldives area to southeast Arabian Sea off Kerala coast		From the cyclonic circulation over Maldives area and neighbourhood to southeast Arabian Sea	Which became less marked on 18
4.	Up to 3.1 km above m.s.l.	13-16	South Andaman Sea to eastcentral Bay of Bengal	West	From Comorin area to northcoastal Tamil Nadu	Merged with the trough in easterlies from Maldives area to southeast Arabian Sea on 17
(E) Other Troughs						
1.	At 0.9 km above m.s.l.	19-20	From Sikkim to southeast Madhya Pradesh	Oscillatory	From Bihar to southeast Madhya Pradesh	Became less marked on 21
2.	Up to 3.1 km above m.s.l.	18-19	From the cyclonic circulation over southeast and adjoining southwest Arabian Sea to Comorin area	West	From the cyclonic circulation associated with low pressure area over central parts of south Arabian Sea to Comorin area	Became less marked on 20

parts of northwest India and substantial reduction in moisture content and rainfall, the southwest monsoon withdrew from some parts of west Rajasthan and Punjab on the 28th September, 2020 against its normal date of 17 September. Further withdrawal was sluggish and there was delay with formation of intense low-pressure systems hindering the retreat of the monsoon. Finally, in view of significant reduction in rainfall activity over most parts of the country, the southwest monsoon withdrew from the entire country on 28th October, 2020, with a delay of 13 days (normal date 15 October).

3.1.2. Commencement of northeast monsoon rains

Simultaneously with the setting in of northeasterly winds in the lower tropospheric levels, the northeast monsoon rains commenced over extreme south peninsular India on the same day, *i.e.*, 28th October, 2020 against its normal date of 20 October.

3.1.3. Storms and depressions

In October, a total of 3 depressions formed over NIO, out of these 3 systems (1 deep depression and 2 depressions), 1 depression formed over the Arabian Sea and

2 (one deep depression and one depression) formed over the Bay of Bengal.

The first intense system was a deep depression which originated from a low pressure area over north Andaman Sea and neighbourhood in the early morning (0000 UTC) of 9 October, it intensified into deep depression in the forenoon (0600 UTC) of 12 October and lay at a distance of about 250 km to the south-southeast of Vishakhapatnam. Moving west-northwestwards, it crossed north Andhra Pradesh coast close to Kakinada (near Latitude 17.0° N and Longitude 82.4° E) between 0630 and 0730-hours IST (0100 and 0200 UTC) of 13 October, as a deep depression with a maximum sustained wind speed of 55-65 kmph gusting to 75 kmph. Continuing to move west-northwestwards, it weakened into a depression over Telangana and into a well marked low pressure area and over South Madhya Maharashtra and neighbourhood which moved across Maharashtra and emerged as a well marked low pressure area over east-central Arabian Sea off Maharashtra coast on 16 mornings. Under the influence of this system, light to moderate rainfall at many places with heavy to very heavy and extremely heavy rainfall at isolated places occurred over Odisha, coastal Andhra Pradesh and Yanam, Telengana and coastal Karnataka,

heavy to very heavy rainfall at isolated places over Telangana, north and south Interior Karnataka, Marathwada, Madhya Maharashtra, coastal Andhra Pradesh and Yanam, Rayalaseema and Coastal Karnataka.

The second depression originated from the remnant of well marked low pressure area of the above system, which re-intensified into a depression over the Arabian Sea and moved away westwards during 17 - 19 October. Since the system moved away from the Indian coast it did not cause any rainfall over the land area. Under the influence of this system rough to very rough seas and squally weather was observed over east-central and adjoining northeast Arabian Sea off north Maharashtra - south Gujarat coasts on 17 October, as it moved away from the Indian coast, it had no impact along Indian coast from 18 October.

The third system of the month originated as a low pressure area over central parts of Bay of Bengal, in the early morning (0000 UTC) of 20 October, which became a well marked low pressure area on 21 October. Under favourable environmental conditions, it concentrated into a depression over northwest and adjoining west-central Bay of Bengal in the morning (0300 UTC) of 22 October, it initially moved northwards for some time and thereafter moved north northeastwards and crossed West Bengal and adjoining Bangladesh coasts over Sundarbans around noon of 23 October as a depression with maximum sustained wind speed of 45-55 kmph gusting to 65 kmph. This system caused heavy rainfall at isolated places over Telangana, Rayalaseema and Odisha and heavy to very rainfall at few places with extremely heavy falls at isolated places over the northeastern states of India including Assam, Meghalaya, Manipur, Nagaland, Mizoram and Tripura. As a consequence of these heavy rains, landslides occurred over northeastern states, affecting normal life.

3.1.4. *Other synoptic features and associated weather*

Table 2 provides a summary of the synoptic features for the month of October 2020. The sub-divisional percentage departures of rainfall from normal and significant amounts of rainfall are given in Tables 1 and 5, respectively.

A deep depression, two depressions, two low pressure areas along with their associated cyclonic circulations, presence of cyclonic circulations in the lower tropospheric levels and moisture incursion caused fairly widespread to isolated rainfall / thunderstorms over central and adjoining peninsular India, east and northeast India.

A large rainfall deficiency realized over the north and northwestern parts of India as the systems in the westerly

moved over more northern latitudes and gave rain/snow in the higher reaches of Himalayas during this month.

3.1.5. *Temperature*

The maximum temperatures were above *normal* or *appreciably above normal* throughout the month over northwest India and most days over east and northeast India. The day temperatures were generally normal over central India and peninsular India.

The minimum temperatures were generally normal or above normal in the month except for Jammu-Kashmir and Ladakh, Punjab, Haryana Chandigarh and Delhi and west Uttar Pradesh sub-divisions where they were below normal. The temperature anomalies over most parts of Chhattisgarh, Bihar and Madhya Maharashtra and some parts of Marathwada, Assam, Nagaland, Manipur, Mizoram and Tripura were 2 to 4 °C above normal.

No *heat wave/cold wave* conditions occurred during October. The month's and the season's highest maximum temperature was 40.9°C at Churu (west Rajasthan) on 3 October and the lowest minimum temperature of the month was 9.5°C at Una (Himachal Pradesh) on 27 October in the plains of the country.

3.1.6. *Damages associated with disastrous weather events*

As stated by Assam state disaster management authority (ASDMA) flood related incidents killed 1 person in Morigaon district of Assam, affecting 2.70 lakh people in 7 districts of the state and damaging 22,802 hectares of cropland due to water logging in this month.

As per media reports lightning strike caused death of 1 person in Visakhapatnam district of Andhra Pradesh, 2 in Maharashtra, 5 people and 52 livestock in Yadgir and Kalaburgi, Ballari and Belagavi district of Karnataka. Heavy rains that lashed Kalaburgi, Raichur, Bagalakot and Gadag district of Karnataka killed 6 persons who were washed away in the flood which; also damaged standing crops and destructed houses.

According to media reports, torrential rain and flood related incidents associated with the deep depression that crossed the coast at Kakinada took a toll of 60 people in various districts of Andhra Pradesh and Telangana. In heavy rain related incidents 1053 houses were damaged, 518 livestock perished in Kalaburagi district of Karnataka. Heavy rain and flood related incidents took toll of 48 people, 868 livestock perished and about 3000 houses damaged in many districts of western Maharashtra, Marathwada and Konkan while crops like soyabean,

sugarcane, grapes, onion, groundnut, bajra, jowar, maize, banana, cotton and pulses on 7 lakh hectares were damaged. As per National Emergency Response Centre (NERC) heavy rain and flood related incidents took toll of 2 persons in Gujarat, 1 in Kerala, 3 in Andhra Pradesh, 1 in Assam and 2 in Meghalaya.

3.2. November

3.2.1. Storms and depressions

The first cyclone of the season a very severe cyclonic storm (VSCS) "GATI" originated from a low pressure area over central parts of south Arabian Sea in the morning (0300 UTC) of 19 November. It concentrated into a depression over the same region in the midnight of 21, intensified into a deep depression in the early morning (0000 UTC) of 22 November, further into the cyclonic storm "GATI" in the same morning (0300 UTC), into a severe cyclonic storm in the noon (0600 UTC) and into very severe cyclonic storm in the afternoon (0900 UTC) over southwest Arabian Sea. It reached its peak intensity of 75 knots in the same evening (1200 UTC) over the southwest Arabian Sea, continuing to move westwards, it crossed Somalia coast near latitude 10.45° N and longitude 51.10° E between 1400 and 1500 UTC of 22 November as a very severe cyclonic storm with estimated wind speed of 130-140 kmph gusting to 155 kmph. GATI was the strongest tropical cyclone on record to make landfall in Somalia, and reportedly caused heavy rainfall over Somalia, it killed at least 9 people and displaced approximately 42,000 persons, an estimated 10,000 animals were killed and caused millions of dollars in damages.

A low pressure area formed over Equatorial Indian Ocean (EIO) and adjoining central parts of south Bay of Bengal on 21 November. It lay as a well marked low pressure over southwest and adjoining southeast Bay of Bengal on 22 November. Further, it concentrated into a depression over the same region in the early hours of 23 November and moving west-northwestwards, it intensified into a deep depression in the evening of 23 and further into the cyclonic storm "NIVAR" in the early morning (0530 hours IST / 0000 UTC) of 24 over southwest Bay of Bengal. Moving west-northwestwards, it intensified into a severe cyclonic storm in the midnight of 24 November and into a very severe cyclonic storm in the afternoon (0900 UTC) of 25 November. Moving further northwestwards, it crossed Tamil Nadu and Puducherry coasts near Puducherry (near Lat. 12.1° N and Long. 79.9° E) during 2330 IST of 25 to 0230 IST of 26 as a very severe cyclonic storm with estimated wind speed of 120 kmph gusting to 135 kmph. Continuing to move northwestwards, it weakened into a severe cyclonic storm and thereafter, it

moved north-northwestwards and weakened into a cyclonic storm over north coastal Tamil Nadu, afterwards it started recurving north-northeastwards and weakened into a deep depression in the afternoon of 26 over south Rayalaseema, into a depression the same midnight (2330 hours IST) over south coastal Andhra Pradesh. Under the influence of this system, intense rainfall activity occurred over north Tamil Nadu and Puducherry, Rayalaseema and south coastal Andhra Pradesh. Heavy to very heavy rainfall occurred at a few places and isolated extremely heavy rainfall (≥ 20 cm) occurred over north Tamil Nadu, Puducherry on 24, 25 and 26 November and over Rayalaseema and south coastal Andhra Pradesh on 25 and 26 November.

The cyclonic storm, "BUREVI" originated as a low-pressure area in the equatorial easterly wave over south Andaman Sea and adjoining areas of southeast Bay of Bengal and equatorial Indian ocean on 28th November, 2020, which became a well marked low pressure area on 29 November. Under favourable environmental conditions, it concentrated into a depression in the early morning (0000 UTC) of 30 November over southeast Bay of Bengal. Moving nearly westwards, it intensified into a deep depression in the early morning of 1st December, 2020 over southwest and adjoining southeast Bay of Bengal. Subsequently it moved west-northwestwards and intensified into cyclonic storm "Burevi" over southwest Bay of Bengal in the evening (1730 hours IST / 1200 UTC) of 1 December 2020. Continuing the west-northwestward movement, it crossed Sri Lanka coast close to north of Trincomalee between 2230 and 2330-hours IST (1700 and 1800 UTC) of 2 December as a cyclonic storm with a maximum sustained wind speed of 80-90 kmph gusting to 100 kmph. Moving across northern parts of Sri Lanka, it emerged into gulf of Mannar in the morning and lay centred close to Pamban around noon (1130 hours IST / 0600 UTC) of 3 December. It crossed Pamban area around 0800 UTC of 3 December, continuing to move west-northwestwards, it weakened into a deep depression over the same region in the evening (1200 UTC) of 3 December. Thereafter, the movement slowed down significantly and it remained practically stationary over gulf of Mannar close to Ramanathapuram district coast for nearly 18 hours and further weakened into a depression in the evening of 4 December over the same region. Remaining stationary at the same place for subsequent 18 hours, it gradually weakened into a well marked low pressure area around noon (1130 hours IST / 0600 UTC) of 5 December. This system during its initial stage as a low pressure area had caused fairly widespread rainfall with isolated very heavy falls over Andaman and Nicobar islands on 29 November. Under the influence of this system, widespread rainfall with *heavy to very heavy* falls at a few places and *extremely heavy* (≥ 20 cm) falls at isolated places occurred over Tamil Nadu during 2 to 4 December.

TABLE 4
Details of the weather systems during December 2020

S. No.	System	Duration	Place of initial Location	Direction of movement	Place of final location	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)
(A) Low Pressure area						
1.	Low Pressure area	9-12	Southeast Arabian Sea	East	Central parts of south Arabian Sea and adjoining areas of central Arabian Sea	It formed under the influence of cyclonic circulation over Lakshadweep-Maldives area off Kerala coast. Associated cyclonic circulation extended upto 4.5 km a.s.l. It became less marked on 13
2.	Do	23-24	Do		Southeast Arabian Sea and adjoining equatorial Indian ocean	Initially it lay as a cyclonic circulation over equatorial Indian ocean and adjoining Maldives area which extended up to 3.1 km above m.s.l. on 22. Low Pressure area became less marked on 25, the associated cyclonic circulation became less marked on 28
(B) Western Disturbances /Eastward moving Systems						
(i) Upper air cyclonic circulation						
1.	Between 3.1 km and 3.6 km above m.s.l.	7	Iran and neighbourhood	East	Roughly along Long. 58° E to the north of Lat. 25° N	The cycir became less marked on 13. Trough aloft with its axis at 5.8 km above m.s.l. ran roughly along Long. 60° E to the north of Lat. 25°N merged with the western disturbance as a trough in mid and upper tropospheric westerlies running roughly along Long. 62° E on 10
2.	Between 3.1 and 4.5 km above m.s.l.	11-13	Afghanistan and neighbourhood	Northeast	Roughly along Long. 64° E to the north of Lat. 25° N	Initially it lay as a trough in mid-tropospheric westerlies with its axis at 3.1 km above m.s.l. Became less marked on 14. The trough aloft also moved away northeastward on the same day.
3.	Do	14-16	Afghanistan and neighbourhood roughly along Long. 64° E to the north of lat. 25° N	Do	Jammu, Kashmir and Ladakh	Trough aloft in mid and upper tropospheric levels with its axis at 5.8 km above m.s.l. Became less marked on 17. The trough moved away east-northeastwards on 17
4.	Between 2.1 and 3.1 km above m.s.l.	22-24	North Afghanistan and neighbourhood	East	Ladakh and neighbourhood	With a trough aloft in mid-tropospheric westerlies with its axis at 5.8 km above m.s.l. roughly along Long. 58° E to the north of Lat. 32° N which became less marked on 25. Western disturbance as a cyclonic circulation moved away northeastwards on 25.
5.	Between 3.6 and 4.5 km above m.s.l.	18-21	North Pakistan and neighbourhood	Do	Ladakh and neighbourhood	Moved away northeastwards on 22
6.	Between 1.5 and 3.1 km above m.s.l.	26-30	North Afghanistan and neighbourhood	Do	Roughly along Long. 72° E to the north of Lat. 26° N	Initially it lay as a trough in mid& upper tropospheric westerlies with its axis at 5.8 km above m. s. l. ran roughly along Long. 50°E to the north of Lat. 32° N Moved away northeastwards on 31
7.	between 3.1 and 3.6 km above m. s. l.	31 Dec 2020 to 1 Jan2021	North Pakistan and adjoining Jammu-Kashmir, Ladakh extended	Do	Roughly along Long. 74° E to the north of Lat. 32° N	The cyclonic circulation of western disturbance merged with the western disturbance as a cyclonic circulation over Afghanistan and adjoining central Pakistan on 2 January 2021

TABLE 4 (Contd.)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>(ii) As a Trough/ Trough in westerlies</i>						
1.	At 3.1 km a.s.l.	4-6	Roughly along Long. 65°E to the north of Lat. 30°N.	East	Roughly along Long. 68°E to the north of Lat. 30°N	Became less marked on 7
2.	At 5.8 km above m.s.l.	19-22	Roughly along Long.50°E to the north of Lat.32°N.	North	Roughly along Long. 70° E to the north of Lat. 32° N	Moved away northeastwards on 23
<i>(iii) As an induced cyclonic circulation</i>						
1.	Upto1.5 km a.s.l.	4-6	Central Pakistan and adjoining west Rajasthan	East	Haryana and neighbourhood	Became less marked on 7
2.	Upto 0.9 km a.s.l	11-12	Southwest Rajasthan and neighbourhood	Northeast	Northeast Rajasthan and neighbourhood	Became less marked on 13
3.	Do	28	Southwest Uttar Pradesh and neighbourhood	Stationary	<i>In situ</i>	Became less marked on 28
4.	At 2.1 km above m.s.l.	31 Dec - 6 Jan	Southwest Rajasthan and neighbourhood	Northeast	Southern parts of Haryana and neighbourhood	Became less marked on 7 January
<i>(C) Other upper air cyclonic circulations</i>						
1.	Up to 1.5 km above m.s.l.	2-6	East Uttar Pradesh and neighbourhood	East	Jharkhand and neighbourhood and extended	Became less marked on 7
2.	Up to 5.8 km above m.s.l.	2-8	Malay Peninsula	Do	Equatorial Indian Ocean and adjoining southeast Bay of Bengal	Became unimportant for the Indian region on 9
3.	Up to 1.5 km above m. s. l.	7-10	Southwest Rajasthan and neighbourhood	Northeast	Haryana and neighbourhood on	Became less marked on 11
4.	Up to 2.1 km above m.s.l.	14-19	Southwest Bay of Bengal off Sri Lanka coast	West	Comorin area	Became less marked on 20
5.	At 1.5 km above m.s.l.	14-15	South Rajasthan	Southwest	Southwest Rajasthan and adjoining Gujarat	Became less marked on 16
6.	At 1.5 km above m.s.l.	15	Central parts of Madhya Pradesh	Stationary	<i>In situ</i>	Became less marked on 16
7.	Between 3.1 and 5.8 km above m.s.l.	13-14	Southeast Bay of Bengal	South	Southeast Bay of Bengal and adjoining Equatorial Indian Ocean	Became unimportant for Indian region on 15
8.	Upto 1.5 km a.s.l	12	East Bangladesh and neighbourhood	Stationary	<i>In situ</i>	Became less marked on 13
9.	At 0.9 km a.s.l.	11	North Madhya Maharashtra	Do	Do	Became less marked on 12
10.	Up to 2.1 km above m.s.l.	18-22	Equatorial Indian Ocean and adjoining southeast Bay of Bengal	South	Equatorial Indian Ocean to the south of southeast Bay of Bengal	Became less marked on 23

TABLE 4 (Contd.)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
11.	At 2.1 kms a.s.l.	18	North Gujarat & neighbourhood	Stationary	<i>In situ</i>	Became less marked on 19
12.	At 1.5 km above m.s.l.	22-24	Southern parts of Bangladesh and neighbourhood	Northeast	East Bangladesh and neighbourhood	Became less marked on 25
13.	Upto 3.1 km a.s.l	24-29	Malay Peninsula and neighbourhood	West	Southwest Bay of Bengal off south Sri Lanka coast	Became less marked on 30
14.	At 1.5 km above m. s. l.	29	East Bangladesh and neighbourhood	Stationary	<i>In situ</i>	Became less marked on 30
15.	Up to 0.9 km above m.s.l.	28	Southwest Uttar Pradesh and neighbourhood	Do	Do	Became less marked on 29
16.	At 1.5 km above m. s. l.	30	Northwest Uttar Pradesh and neighbourhood	Do	Do	Became less marked on 31
(D) Other Troughs						
1.	At 3.1 km a.s.l.	4-6	Along Long. 90° E to the north of Lat. 25° N	East	Along Long. 91° E to the north of Lat. 25° N	It moved away north eastwards on 7
2.	At 0.9 km a.s.l.	13	From eastcentral Arabian Sea off Maharashtra coast to southwest Madhya Pradesh across south Gujarat	Stationary	<i>In situ</i>	Became less marked on 14
3.	Upto 1.5 km above m.s.l.	13	From cyclonic circulation over central parts of south Arabian Sea and central Arabian Sea to southwest Madhya Pradesh across eastcentral Arabian Sea and south Gujarat coast	Do	Do	Became less marked on 14

3.2.2. Weather and associated synoptic features

A summary of the synoptic systems for the month of November 2020 is given in Table 3. The sub-divisionwise percentage departure of rainfall from normal and the significant amounts of rainfall during the month are given in Tables 1 and 5, respectively.

A low-pressure area formed over east central Bay of Bengal off Myanmar coast on 31 October but it became less marked on 2 November over northeast and adjoining eastcentral Bay of Bengal. However, its associated circulation moved inland and persisted over Bangladesh till 4th. It caused isolated heavy rain over Nagaland, Manipur, Mizoram, Tripura, Assam and Meghalaya. Three lower

level cyclonic circulations formed over southwest Bay of Bengal consecutively and moved across extreme south peninsula which caused isolated heavy to very heavy rainfall over Tamil Nadu.

Movement of troughs in easterlies caused fairly widespread to widespread rainfall / thunderstorms over peninsular India, Andaman, Nicobar Islands and Lakshadweep area, with isolated heavy to very heavy rainfall over some parts of peninsular India during the second and third week of the month. Passing of western disturbances and their induced cyclonic circulations caused scattered to fairly widespread rainfall / thunderstorms / snowfall over western Himalayan region and isolated to scattered rainfall / thunderstorm activity over adjoining

TABLE 5

Some representative amounts of rainfall in cm for October, November and December 2020 (5 cm and above)

Date	Some representative amounts of rainfall in cm for October, November and December 2020 (5 cm and above)
1 Oct	Banarpal 13, Koilkuntla and Luchipur (Gangetic West Bengal) 11 each, Dornipadu, Muniguda, Pallahara, Visavadar, Peapally, Kuchinda, Allagadda and Narla 10 each, Bhanjnagar, Kotraguda, Rajula, Naktideul, Nandavaram, Simhadripuram, Hadagali, Yemmiganur, Basudevapur and Vanur 9 each, Kantapada, Barkote, Munirabad, Samakhunta, Atpadi, Angul, Nawana, Khairamal, Gyalsing PTO and Durgapur (Gangetic West Bengal) 8 each, Ghattu, Kurnool, Talcher, Tikarpara, Kotdasangani, Banaganapalle, C Belagal, Derabis, Swam - Patna, Proddutur, Gonegandla, Orvakal, Rajkanika, Hosapete, Panagarh AP (Gangetic West Bengal), Deogarh and Chendipada 7 each, Koregaon, Athmalik, Raikia, Devanakonda, Kushtagi, Chandbali, Manthralayam, Gopalpur, Astaranga, Birmaharajpur, Kondapuram, Raju Palem and Gudari 6 each, Gudur, Bissem - Cuttack, Rengali, Hindol, Kalinga, Jammalamadugu, Rayalpadu, Bakulia, Tiruttani PTO, Karlamunda, Banaigarh, Shrigonda, Sonepur, Puducherry, Hanumasagar, Gondal, Daspalla, Port Blair, Tikabali, Belaguntha, Sorada, Tensa, Pattamundai, Panposh, Kaptipada, Sholavandan, Kodavasal, Ilkal, Madanpur Rampur, Kendrapara, Kollapur, Purushottampur, Anantapur AP, Barmul, Sharpada, Ramgarh, Dhamnagar, Tihidi, Khambha, Bhiwandi, Shirol, Manjlegaon and Nandyal 5 each
2 Oct	Pupunki 10, Dibrugarh AP, Sarath, B P Ghat, Asansol (Gangetic West Bengal) and Basudevapur 7 each, Madanpur Rampur, Batagaon and Asansol Cwc (Gangetic West Bengal) 6 each, Dhamnagar, Nanded, Lengpui, Mangan, Ardhapur, Kodawanpur / C.B li (Bihar), Tuting, Jhamapani, Narla, Bhadrak, Kharidwar, (Gangetic West Bengal), Tamenglongi, Chandbali, Singhik, Kohima, Balasore, Sambalpur, Kaptipada, Kabi and Jajpur 5 each
3 Oct	Chiplun 15, Guhagarh 12, Remuna 10, Lakhipur, Contai (Gangetic West Bengal) and Nilgiri 9 each, Balasore and Mohanpur (Gangetic West Bengal) 8 each, Jalalpur (Bihar), Gharmura, Soro and Bishnupur 7 each, Kankavli, Lawngtlai and Dharwad PTO 6 each, Amta (Gangetic West Bengal), Betanati, Neyveli AWS, Bellatti, Bhatkal, Tihidi, Chandbali and Cuttack 5 each
4 Oct	Kantapada 13, Kurdeg and Pipili 12 each, Purushottampur and Amraghat 11 each, Vihar 10, Surajpur, Duldula, Gharmura, Kalyani Smo (Gangetic West Bengal), Kunkuri and Basana 9 each, Tuting, Nayagarh and Patna AP (Bihar) 8 each, Kuru, Lengpui, Lohardaga, Parvathipuram, Pen, Kartala, Kamtaul (Bihar), Jashpurnagar, Baikunthpur, Lailunga and Kusmi 7 each, Kaniha, Akaltara, Harnai, Manora, Digapahandi, Tulsi, Latehar, Bolagarh, Mumbai (SCZ) and Alipingal 6 each, Udaipur, Barrackpur IAF (Gangetic West Bengal), Bishrampur, Barmul, Koner, Pallari / Palari, Kurupam, Balipatna, Tundi, Similiguda, Veeraghattam, Malvan, Dhemaji, Angul, Hendigir, Dodamarg, Chauldhowaghat, Bobbili, Long Islands, Nauihatta (Bihar), Chendipada, Garugubilli, Garadapur, Khandapara, Ambikapur, Thane and Rajpur 5 each
5 Oct	Rajkanika 15, Tuting 13, Bhaghmara 11, Komna and Makadi 9 each, Pathapatnam, Dhemaji, Lamataput, Kotraguda, R Guda, Kokrajhar, Tapkara, Mathili and Sarai 8 each, Kotpad, Yingkiong, Niali and Tirtol 7 each, Muniguda, B P Ghat, Alipingal, Lanjigarh, Bahadurganj (Bihar), Aie Nh Xing, Chendipada, Bissem -Cuttack and Dharmagarh 6 each, Mentada, Kalampur, Bhalukpong, Koksara, Jujumura, K Nuagaon, Darbha, Kuchinda, Kujanga, Basana, Kankavli, Cheria B. Pur 1 (Bihar), Kurupam, Kakatpur, Marsaghai, Mahanga, Musafir Khana and Baltara (Bihar) 5 each
6 Oct	Sankalan 16, Mangan and Tuting 14 each, Khowang 13, Singhik and Lakhipur 12 each, Chepan, Manihari, Garhi (Bihar) and Dhemaji 9 each, Kodawanpur / C.B li (Bihar), Amraghat, Itanagar and Narsipatnam 8 each, Annapurnaghat, N. Lakhimpur, Dhubri, Kumargram, Balrampur (Bihar), Kampur, Bhalukpong, Peddapuram and Chungthang 7 each, Dhubri Cwc, Purnea, Rupauli (Bihar), Prathipadu, B P Ghat and Lengpui 6 each, Shipgyar, Gariabund, Karimganj, Gajoldoba, Dibrugarh AP, Dholai, Gohparu, Jia Bharali N T Xing, Patna AP (Bihar), Tamenglongi, Seppa, Moranhat, Shivaji Park AWS, Bihpur (Bihar) and Krishnarajpet 5 each
7 Oct	Gudivada 11, Jamshedpur AP, Mawsynram, Konijerla and Gundala 10 each, Itanagar, Chinthakam, Kaikalur and Madurai AP 9 each, Vijaywada AP, Birpur (Bihar), Paleru Bridge, Khammam, Bonakal and Sankarapuram 8 each, Nancowry, Bagrakote, Cherrapunji, Gudurwrgl, Dhemaji, Malda, Thollada and Madurai City 7 each, Kusumanchi, Enkuru, Madhira, Waraseoni, Armur, Kumargram, Guntur, Velairpad, Naharlagun, Sahaspurlohara, Yingkiong, Nagarkata and Julurpad 6 each, Neora, Tirumangalam, Barapani, Pandavapura, Shahpura, Nandigama (Arg), Tuting, Nandigama, Seppa, Kailashahar, Mangalagiri, Digha (Gangetic West Bengal), Murti, Malanjkhanda, K. R. Nagara, Kudulu, Durgachak (Gangetic West Bengal), Balaghat - AWS and Krishnarajasagara 5 each
8 Oct	Buxaduar 20, Sirpuru 13, K. M. Koil, Kothagudem, Beki Mathungari and Kerameri 11 each, Vridhachalam 9, Srimushnam, Lakhani, Lanji and Alangudi 8 each, Gandarvakottai, Venkatapur, Sankarapuram, Nagarkata, Ramtek, Mayiladuthurai, Bhalukpong and Karimnagar AP 7 each, Rajpur, Nimpara, Mortad, Tondi, Jangaon, Pakuria and Dantewara 6 each, Tumsar, Bagrakote, Gidam, Sarangapur, Balkonda, Khanapur, Amtala (Gangetic West Bengal), Akaltara, Jagtial AP, Natham, Jagtial, Janjgir, Balaghat - AWS, Sirsilla, Niali, Krishnarajasagara, Tirupuvanam, Narayanpur, Amfu Majhian, Namakkal, Kampur, Thammampatty, Vallam, Goregaon, Rajura, Tamulpur, Paraswad, Champa, Kuppady, Malda, Paren and Marhaura / Amnaur (Bihar) 5 each
9 Oct	Chengannur and Polur 12 each, Vadakara, Maddur and Aluva Pwd 11 each, Varkala and Kayamkulam 10 each, Cherthala, Barapani, Manpur, Pali, Perinthalamanna, Kunnamkulam and Vadakkancherry 9 each, Kurudamanni, Vaikom, Kusmi, Ernakulam South and Mavelikara 8 each, Thiruvananthapuram, Thrithala, Marandahalli, Chalakudi, Latehar, Nedumangad, Mangaluru, Mancompu and Kochi AP 7 each, Vellanikkara, Aryankavu, Kollam Rly, Angadipuram, Thodupuzha, Rajkanika, Thiruvananthapuram AP, Hosur, Uthangarai, Kudulu, Kanjirappally and Uthagamandalam 6 each, Enamakal, Krishnagiri, Manimutharu u U, Subramanya, Lundra, Dharmapuri, Irinjalakuda, Vaigai Dam, Venkatagiri, K Bridge, Peermade To, K R Nagara, Kayamkulam Agri and Surajpur 5 each

TABLE 5 (Contd.)

Date	Some representative amounts of rainfall in cm for October, November and December 2020 (5 cm and above)
10 Oct	Vepur and Magadi 13 each, Chitradurga, Chindwara, Putki and Simula (Gangetic West Bengal) 10 each, Kalyani Smo (Gangetic West Bengal) and Hassan 9 each, Chamaraajanagar, Hogenakkal, Devarakonda, C N Halli, Madurai City and Thottambedu 8 each, Annapurnaghat, Ambikapur, Sethiyathope, Ramanagara, Bevoor, Rasipuram, Santhebennur, Pupunki and Sausar 7 each, Ranchi AP, Hosadurga, Melur, Vijaywada, Sivaganga, Bhum, Rattihalli ARG, Nilakottai, Nagari, Tallakulam, Selu, Chintamani PTO, Prakasam Barrage, Sholavandan, Srikalahasti, Shoolagiri, Tandur, Kunurpi, Kannad, Veeraganoor and Dholai 6 each, Purulia (Gangetic West Bengal), Edapadi, Mysore, Honnali, Pulipatti, Hiriyur HMS, Rolla, Punganur, Tirupuvanam, Malur, Mangalapuram, Davanagere PTO, Yagati, Mangalagiri, Chickmagalur, Channapatna, Golkonda, Harapanahalli, Saroornagar, Chintamani, Pennagaram, Paramakudi, Agathi, Hasanparthy, Manchikere and Ponda 5 each
11 Oct	Belthangadi 16, Kothaguda 14, Chinnamandem 13, Pakala 12, Vengurla 11, Devgarh, Racherla, Karjat, Hukkeri, Badvel and Rabkavi 10 each, Nargund, Mahalingapur, Kuknoor, Mudgal, Hassan, Uravakonda, Atmakur, Gurramkonda, Orvakal, Long Islands, Panhala and Panchapatti 9 each, Atlur, Penagaluru, Hungund, Khandala*, Pernem, Pamidi, Guledgud, Nagar Kurnool, Sambepalle, Velairpad, Nargund ARG and Deodurg 8 each, Nippani, Dharmasthala, Sulya, Ankola, Lepakshi, Khajuri, Mahad, Rayalpadu and Peermade To 7 each, Royachoti, Arogyavaram, Bagalkote AGRO, Yedwad, Karkala, Kharagpur (I.I.T) (Gangetic West Bengal), Gorantla, Golaghat Cwc, Mathili, Sengaon, Cumbum, Osmanabad, Vararamachandrapur, Gowribidanur, Dhone, Mudubidre and Vaibhavwadi 6 each, Panvelagiri, Kannur, Kampur, Koregaon, Nandikotkur, Thirukalukundram, Bestavaripeta, Poladpur, Daund, Kamalapuram, Gadhinglaj, Sakti, Ratnagiri, Sankeshwar, Bellur, Madanapalle, Kalakada, Bhiknur, Port Blair, Bengaluru CO, Nambulipulikunta, Vallur, Bokajan, Thimmajipeta, Pallipattu, Cherthala, Koilkuntla, Kurnool, Chapad, Kheronighat, Yerragondapalem, Polavaram, Kumta, Sirpur T, Kerur, Thambalapalle, Baramati, Kumarakom, Puttur, Venkatapuram, Thiruchuzhi, Davanagere PTO, Atmakur, Mannarkad, Mainpur, Katekalyan, Alur, Kondurg, Gubbi and Kollam Rly 5 each
12 Oct	Bheemunipatnam 17, Visakhapatnam 15, Visakhapatnam AP, Kakinada, Jat and Peddapuram 14 each, Hukkeri 13, Selu 12, Yanam and Lanja 11 each, Anakapalle, Hungund, Amalapuram, Rajapur, Kondapak and Ramayampet 10 each, Khajuri, Bevoor, Vadakara and Vita 9 each, Marripudi, Kumta, Kadegaon, Tuni, Ghansawangi, Partur, Mangrulpir and Mantha 8 each, Pandharpur, Shevgaon, Prathipadu, Dowleshwaram, Yelamanchili, Simhadripuram, Panhala, Shirur Kasar, Ghattu, Devgarh, Kallamnuri, Vaibhavwadi, Bhiknur, Mirdoddi, Sarangapur and Domakonda 7 each, Narsapur, Yelburga, Kohir, Paithan, Georai, Dodamarg, Ambad, Sonpeth, Thondebhavi, Kankavli, Doultabad, Vengurla and Aland 6 each, Barshi, Kuknoor, Dubbak, Pathardi, Kamalapur, Malvan, Narsipatnam, Jogipet, Maddur, Marpalle, Wargal, Darwaha, Sabroom, Sawantwadi, Hingoli - Hyd, Talamadugu, Talikote, Chodavaram, Tasgaon, Kudal, Rajahmundry, Perur, Chimakurthi, Bargur, Shrigonda, Gadhinglaj, Kavathe Mahakal, Shirali, Ongole, Papannapet, Hathanoora and Palakoderu 5 each
13 Oct	Yanam 25, Amalapuram, Tanuku, Sathupalle and Nuzvid 19 each, Tadepalligudem 18, Vijaywada AP and Bheemunipatnam 16 each, Kaikalur, Palasa, Ichchapuram and Tiruvuru 15 each, Yelamanchili and Mohana 14 each, Chintalapudi, Sompeta, Mahbubabad, Gudivada and Mandasa 13 each, Narsapur, Kakinada, Prathipadu, Koyyalagudem, Aswaraopet AP, Palakoderu, Bheemavaram and Paralakhemundi 12 each, Dowleshwaram, Peddapuram, Madhira, Ottapalam, Mulakalapalle, Valparai, Aswaraopeta, Bhimadole, Rajahmundry, Narsipatnam, Eluru and Nuagada 11 each, Thalasserry, Bayyaram, Vijaywada, Tuni, Berhampur, Aska and Sandur 10 each, Prakasam Barrage, Chinnakalar, Chandrugonda, Nandigama, Thimmajipeta, Kashinagar, Bondapalle, Anakapalle, Chodavaram, Vepada and Purushottampur 9 each, Visakhapatnam AP, Vararamachandrapur, Thollada, Therlam, Badami, Kukunoor, Tupran (Arg), Mahe, Mahendragarh, Pathapatnam, Paderu, Chhatrapur, Peermade To, Puspapatirega, Visakhapatnam, Naduvattam and Sholayar 8 each, Velairpad, Palakonda, Denkada, R. Udaigiri, Suryapet, Ranastalam, Parvathipuram, Mangalagiri, Devarakonda, Wanaparthi, Mentada, Nellimarla, Vythiri, Chandur, Nandigama (Arg), Paleru Bridge, Koida, Gajapathinagaram, Garugubilli, Kannur, Vadakara, Polavaram, Merakamudidam, Kalingapatnam, Kushtagi, Avalanche, Garividi, Kunavaram, Pattambi, Kusumanchi, Gunupur, Subramanya, Agumbe and Hagaribommanahalli 7 each, Kottur, Bobbili, Digapahandi, Tekkali, Srungavarapukota, Vizianagaram, Dornakal, Yemmiganur, Salur, Gantayda, Maya Bandar, Konijerla, Machilipatnam, Chintapalle, Noothankal, Chinthakam, Araku Valley, Cheepurupalle, Ibrahimpatnam, Huzur Nagar and Siddapura 6 each, Pottangi, Ambalavayal, Enkuru, Kavathe Mahakal, Kondapur, Balkonda, Khammam, Jiyamma Valasa, Perinthalamanna, Gopalpur, Paranda, Konta, Ghanpur, Sholingur, Seethanagaram, Mananthavady, Kurupam, Chittur, Burgampadu, Munnar KSEB, Garla, Karipur, Udipi, Suralacode, Piduguralla, Bhagamandala, Kollamkode, Ramannapeta, Upper Bhavani, Manchal, Bonakal, Hyderabad, Gudurwrgl, Gorantla, Periyar, Karkala, Shirol, Mominpet, Papanasam, Chintur, Honnali and Angadipuram 5 each
14 Oct	Hayathnagar 30, Pochampalle 25, Kollur and Jogipet 24 each, Ibrahimpatnam 23, Aska 21, Hakimpet and Ramannapeta 20 each, Bhuvanagiri, Hyderabad and Purushottampur 19 each, Golkonda, Atmakur M, Manchal and Wargal 18 each, Kota, Tekmal, Mulki and Marpalle 17 each, Nalgonda, Kondapur and Yadagirigutta 16 each, Sangareddy, Manthala, Mani, Mangalooru AP, Kohir, Mominpet, Medchal, Basavakalyan, Dindigul, Chandur, Maheswaram, Shamirpet, Hathanoora and Narsapur 15 each, Nidamanur, Yacharam, Agumbe and Saroornagar 14 each, Humnabad, Mudubidre, Nilanga, Brahmavar AWS, Gulbarga, Bidar, Kamalapur, Munipalli, Naykal, Kalaburgi AWS, Raikode, Karkala, Sedam and Udipi 13 each, Belthangadi, Kundapur, Puttur HMS, Doultabad, Peddemul, Medak, Mangaluru, Panambur and Vitla ARG 12 each, Dharmasthala, Chincholi, Sadasivpet, Palakurthi, Nawabpet, Kudulu, Alladurg, Khajuri, Chevela, Narmetta, Gajwel and Regode 11 each, Chegunta, Ghanpur, Daspalla, Avanigada, Nandigama (Arg), Kondapak, Bheemadepalle, Bhatkal, Sattenapalle, Sorada, Kowdipalle, Therlam, Ramayampet, Jagadevapur and Sulya 10 each, Shayampet, Mahbubabad, Aland, Zaffergadh, Shirali, Macherla, Daitari, Sompeta, Malvan, Aswaraopeta, Vicarabad, Mirdoddi, Tandur, Machilipatnam, Dubbak, Narsapur, Kottigehara and Nanganur 9 each, Parkal, Nandigama, Aryankavu, Suralacode, Jangaon, Bejjanki, Aurad, Deoni, Siddapura ARG, Marriguda, Naga Reddipet, Huzurabad, Siddapura, Kamareddy, Umarga, Subramanya, Rentachintala and Jangamaheswarapuram 8 each, Dodamarg, Berhampur, Daringibadi, Sathupalle, R. Udaigiri, Jukkal, Arasalu, Ausa, Chakur, Bhiknur, Digapahandi, Repalle, Brahmagiri, Doma, Mustabad, Bheemavaram, Mohana, Uppinangadi, Atmakurwrgl, Afzalpur HMS, Jajireddigudem, Raddewadgi ARG, Papannapet, Nagercoil, Noothankal, Raikia and Narayankhed 7 each, Puspapatirega, Satyabadi, Papanasam, Mylauduy, Guhagarh, Tikabali, Niali, Miryalaguda, Honavar,

TABLE 5 (Contd.)

Date	Some representative amounts of rainfall in cm for October, November and December 2020 (5 cm and above)
	Mahendragarh, Pargi, Pechiparai, Kothagudem, Hasanparthy, Sangameshwar Devrukh, Shirur Anantpal, Solapur, Gajapathinagaram, Mentada, Nuagada, Chintalapudi, Varkala, Palakoderu, Gambhiraopet, Yellareddy, Koppa, Wanaparthi, Pitlam, Tekulapalle, Astaranga, G. Udayagiri, Maya Bandar, Dharmasagar, Perunchani Dam, Thiruvananthapuram, Kantapada, Chandrugonda and Domakonda 6 each, Latur, Lohara, Parvathagiri, Sirsilla, Nizam Sagar, Bhagamandala, Neyyattinkara, Dowleshwaram, Jurala Proj., Kollam Rly, Tekkali, Mundali, Gantiyada, Peermade To, Mannarkad, Chittar, Sringeri HMS, Merakamudidam, Hanamkonda, Tanuku, Pathapatnam, Atchampet, Bhimadole, Bheemunipatnam, K Agraharamjurala, Kalinga, Thimmapur, Garividi, Eraniel, Chhatrapur, Kuzhithurai, Thodupuzha, Thiruvananthapuram AP, Aswaraopet AP, Makthal, Sholayar, Indi, Lingampet, Mahalingapur, Kakatpur, Tikarpura, Yellandu, Mudigere, Kondurg, Yedrami, Tadwai, Suryapet, Kalasa, Dornakal, Paralakhemundi, Neredcherla, Kankavli, Nallabally, Mogullapalle, Ghattu, Sadasivanagar, Peddaadiserlapalle, Huzur Nagar and Padmapur 5 each
15 Oct	Kollur 22, Hosanagar 21, Paranda 18, Kottigehara and Gaganbawada 17 each, Indapur, Barshi, Hunchadakatte, Jeur and Pandharpur 16 each, Gunupur, Alibag, Baramati, Lanja and Sangli 15 each, Khed, Panhala, Tuljapur and Malshiras 14 each, Mangalvedha, Agumbe, Mahabaleshwar*, Bhatkal, Kolhapur, Murud and Pune (Lohogaon) 13 each, Karjatagri, Khalapur, Vaibhavwadi, Pen, Ratnagiri, Matheran, Pune (Pashan) and Mumbai (Colaba) 12 each, Manki, Kadra, Vita, Pune, Bhor, Siddapura, Rajapur, Karwar, Sangameshwar Devrukh, Lohandiguda, Honavar, Ambegaon Ghodegaon, Karad, Ankola and Shirali 11 each, Siddapura ARG, Gokarna, Belthangadi, Patan, Palus, Lohara, Long Islands, Lonavalaagri, Maya Bandar, Poladpur, Shirala, Panvelagri and Karmala 10 each, Atpadi, Kavathe Mahakal, Miraj, Tasgaon, Linganamakki HMS, Dahiwadi Man, Khandala*, Kagal, Bhagamandala, Subramanya, Sudhagad Pali, Mandangad, Bhira, Daund, Mumbai (SCZ), Chikodi, Chhatrapur, Kadegaon, Wai, Madha, Roha, Satara, Khatav Vaduj, Shirur Ghodnadi and Jat 9 each, Malvan, Solapur, Siddapur, Shirol, Kundapur, Khed Rajgurunagar, Purandar Sasvad, Chiplun and Belapur (Thane) 8 each, Rayagada, Phaltan, Uppinangadi, Shriwardhan, Thalaguppa, Javali Medha, Mahad, Shirur Kasar, Dharmasthala, Mhasla, Hatkanangale, Junnar, Kota, Banavasi, Amalapuram, Tala, Guhagarh, Mohol, Mudigere, Akole, Velhe, Georai, Dodamarg, Castle Rock, Vadgaon Maval and Uran 7 each, Digapahandi, Vengurla, Paud Mulshi, Orcha, Sagar, Beed, Vihar, Jamkhandi, B. Bagewadi, Sulya, Walva Islampur, Kudachi, Berhampur, Bejjur, Thane, Nippani, Tyagarthi, Arasalu, Madhabarida, Mahanga, Nilanga, Ichchapuram, Sangola, Belgaon and Puttur HMS 6 each, Thirthahalli, Harnai, Kalyan, Tulsu, Pathardi, Valpoi, Kalinga, Mangaon, Karjat, Napoklu, Eraniel, Sringeri HMS, Daspalla, Pipili, Binjharapur, Peermade To, Periyar, Gopalpur, Ulhasnagar, Osmanabad, Koregaon, Virajpet, Kudulu, Garugubilli, Belaguntha, Devgarh, Shahuwadi, Gudari, Medikeri, G. Udayagiri, Sorab, Hosdurg, Athni, Shrigonda, Nawarangpur, Wada and Bijapur 5 each
16 Oct	Lanja and Gaganbawada 12 each, Vaibhavwadi and Rajapur 11 each, Ratnagiri 9, Mangalooru AP, Amalapuram, Sangameshwar Devrukh and Pernem 8 each, Malvan, Castle Rock, Panhala, Panambur and Dabholim (Goa) 7 each, Sawantwadi, Similiguda, Panjim (Goa), Kotpad and Araku Valley 6 each, Mapusa, Murud, Valpoi, Dodamarg, Ponda, Kankavli, Gokarna, Alibag and Vengurla 5 each
17 Oct	Lohandiguda and Bhairamgarh 9 each, Bondapalle, Karamchedu and Katekalyan 8 each, Bijapur, Denkada and Bastanar 7 each, Perambur, Gudivada, Kukunoor, Hut Bay, Kolkata (Gangetic West Bengal) and Atmakurwrgl 6 each, Puzhal ARG, Hasanparthy, Manuguru, Chhindgarh, Maya Bandar, Palakoderu, Jagdalpur and Kuakonda 5 each
18 Oct	Satna Baglan 18, Saroornagar 17, Raikode 15, Perungalur and Vallam 13 each, Kalwakurthy 12, Devarakonda, Kondapur, Hayathnagar, Devarakonda (Arg) and Keelpennathur 11 each, Naykal and Amarpur 9 each, Kariyapatti, Samayapuram, Arimalam, Kolasib Agri, Anjar, Devla and Lalgudi 8 each, Munipalli, Vanur, Illuppur, Thandarampettai, Hyderabad, Ibrahimpatnam, Ukai, Kandla Airport, Kodavasal, Thirumanur, Sangareddy, Bardoli, Gandhidham and Chettikulam 7 each, Jukkal, Perundurai, Dharmanagar / Panisagar, Pusad, Arantangi, Bandhugaon, Bhavani, Grand Anaicut, Belonia, Golkonda, Gharmura, Mamit Agri, Sadasivpet, Thanjavur, Viralimalai, Tirukattupalli and Yacharam 6 each, Netrang, Jayankondam, Manjalaru, Budalur, Chengam, Lengpui, Narayankhed, Keeranur, Kohir, Vijapur, Vyara, Sonamura, Tozhudur, Mylam AWS, Malegaon, Manchal, Erode, Tiruvannamalai, Paramakudi, Manamadurai, Pali, Sagbara and Tirukoilur 5 each
19 Oct	Dhrol 11, Shihor and Raoti 9 each, Saiha, Bakulia and Tal 8 each, Depalpur, Nimach, Khachrod, Rajkot, Kapasan, Bhaunagar, Hassan and Sivakasi 7 each, Yeola, Gondal, Pathardi, Akole, Bhum, Kopargaon, Pune (Lohogaon) and Dhoraji 6 each, Maya Bandar, Golaghat, Tuli Nsdma AWS, Bhinmal, Kotdasangani, Jamkhed, Golaghat Cwc, Peddemul, Ratlam, Gopal Nagar ARG, Badesar, Nagda, Vanthali, Ozar (Nasik AP), Kurupam, Bhopalsagar, Krishnarajasagara, Burgampadu and Tirumayam 5 each
20 Oct	Salem 9, Tirupuvanam, Phek, Maski and Swam - Patna 7 each, Rajapalayam, Kusumanchi, Chilamathur, Kochi AP, Avaniagada, Tanuku, Pongkhuri Nsdma AWS and Mahbubabad 6 each, Manamadurai, Amalapuram, Eluru, Siwana, Attur, Bobbili, Yanam, Penucondapuram, Mangalagiri, Mancompu, Harur, Savarkundla, Tuni and Dowleshwaram 5 each
21 Oct	Lakhipur 11, Bevoor, Lakkireddipalle and Haveri APmc 10 each, Dharwad (Hos) and Davanagere PTO 9 each, Kolasib Agri, Electronic City ARG, B Durga and Amarpuram 8 each, Hesaraghatta, Atmakur M., Shirahatti, Hoskote, Kukunoor, Ranavav, Penagaluru, Bengaluru CO, Thambalapalle, Mamit Agri and Haveri PTO 7 each, Allagadda, Thimmajipeta, Santhebennur, Saiha, Arimalam, Chitradurga, Matijuri, Devihosur AGRO, Nelamangala, Gangapur, Surgana, Magadi, Srirampura and Kampli 6 each, Sompura ARG, Shirol, Mahalingapur, Gir Gadhada, Pavagada, Bellatti, Bellur, Karimganj, Yelburga, Ramanagara, Uchangidurga, Chinnamandem, Tavaragera, Atmakur, Doddaballapura, Silchar, Bengaluru AP, Savanur, Amraghat, Bhuj AP, Nellore, Pune, Vedasandur, Devala, Turuvekere, Rudravaram, Tseminyu Nsdma AWS, Tuli Nsdma AWS, Sawantwadi, Makthal, Jagalur, Palamaner, Sangli, Saroornagar, Ramagiri and Subramanya 5 each
22 Oct	Kannur 10, Ghattu 9, Annapurnaghat 8, Subramanya, Paradip, Agumbe, Ponda, Shirali, Tihidi and Belthangadi 7 each, Guntakal, Shoalagiri, Udupi, Bishnupur, Chandbali, Silchar, Dharmasthala, Matijuri and Aurangabad AP 6 each, Gokarna, Brahmasamudram,

TABLE 5 (Contd.)

Date	Some representative amounts of rainfall in cm for October, November and December 2020 (5 cm and above)
	Rajkanika, Hosur, Nayakanahatty, Kanekal, Marsaghai, Ulhasnagar, Kendrapara, Honavar, Jurala Proj., Jammalamadugu, Sringeri HMS, Kampli, Long Islands, Tseminyu Nsdma AWS, Kujanga, Settur, Cuddalore, Kamalpur, Marakkanam, Koppa and Gooty 5 each
23 Oct	Pallipattu 17, R. K. Pet and Mawsynram 13 each, Cherrapunji 12, Thamaraiykkam, Sriperumbudur and Cherrapunji (Rkm) 11 each, Palasamudram 10, Tiruttani, Tiruttani PTO, Nagari and Khalapur 9 each, Sabroom, Siddapura ARG, Puttur, Matheran, Siddapura, Nugehalli and Bakulia 8 each, Lawngtlai, Maduranthagam, Dhone, Tiruvallur, Chennai city, Uthiramerur, Gummidipoondi, Karjatagri, Kendrapara and Vembakkam 7 each, Senapati, Thiruvallangadu, Garadapur, Sonamura, Hosadurga, Bhadravathi, Thambalapalle, Sholinganallur, Jorhat, Cheyyur, Santhipuram, Arakonam, Junnar and Red Hills 6 each, Koratur, Dharmasthala, Subramanya, Amarpur, Diphu, Phek, Saiha, Gurramkonda, Tada, Ponneri, Chennai AP, Alandur, Udaipur, Kancheepuram, Kelambakkam, Karjat, Kaveripakkam, Latehar, Shivani, Perambur, Derabis, Belonia and Tinsukia 5 each
24 Oct	Mawsynram 35, Cherrapunji (Rkm) 30, Cherrapunji 29, Shillong 17, Nongstein 16, Shillong AWS 15, Barapani 13, Dharamtull, Gopal Nagar ARG, Bellur and Kampur 10 each, Kailashahar 9, Williamnagar, Numaligarh, Gandecherra, Srirampura, Dharmanagar / Panisagar, Sonamura, Bhaghmara, Udaipur and Bhor 7 each, Electronic City ARG, Kheronighat, Kuppam and Guwahati City 6 each, Sabroom, Challakere, Guwahati AP, Puthimari, Agartala AP, Ukhrul, Guwahati AWS, Matijuri, Sirsi AGRO, Bishalgarh, Karimganj, Arasalu, Amarpur, Mangaldai AWS, Indapur, Tezpur, Lawngtlai, Khed Rajgurunagar, Tada, Tiruttani, Senapati, Bakulia, Saiha and Natrampalli 5 each
25 Oct	Khliehriat 16, Cherrapunji 14, Cherrapunji (Rkm) 12, Gossaigaon and Dhubri Cwc 11 each, Mawsynram 10, Mathabhanga and Dhubri 9 each, Channagiri and Cooch Behar 7 each, Badatighat 6, Majuli, Dhemaji, Neamatighat, Kokrajhar, Alipurduar Cwc and Alipurduar PTO 5 each
26 Oct	Nh31 Bridge 8, Sangameshwar Devrukh, Neora and Lonavalaagri 7 each, Pakyong, Pedong and Rajapur 6 each, Pattukottai, Gangtok, Mahad, Shipgyar, Poladpur, Falakata and Tirumayam 5 each
27 Oct	Watrap 13, Sivagiri 9, Rajapalayam and Mancompu 8 each, Panjim (Goa) 5
28 Oct	Manamadurai and Tirupuvanam 5 each
29 Oct	Dgp Office 18, Puzhal ARG 16, Anna Uty ARG 14, Chennai city and Red Hills 13 each, Surangudi 11, Rameswaram and Vaippar 10 each, Long Islands, Ambathur and Pamban 9 each, Alandur and Sholinganallur 8 each, Anna University, Ennore AWS, Hindusthan University, Mudukulatur and Mandapam 7 each, Peermade To, Chennai AP, Satyabama Uty ARG, Perambur, R. S. Mangalam and Kamudhi 6 each, Cholavaram, Satyavedu, Tada, Kodungallur, Suralacode, Kovilankulam, Poondi, Kadaladi, Mgr Nagar, Paramakudi and Gummidipoondi 5 each
30 Oct	Dgp Office 11, Mandapam and Anna University 6 each, Ennore AWS, Valinokam, Perambur, Valinokkam ARG, Alandur, Long Islands, Red Hills and Gummidipoondi 5 each
31 Oct	Viraganur Dam 10, Long Islands 9, Madurai AP 8, Tirumangalam, Valinokam, Watrap and Madurai City 7 each, Arundhutinagar 6, Sonamura, Vilathikulam, Kovilpatti and Agartala AP 5 each
1 Nov	Gharmura 8, Mokochang 7, Lakhipur 6, Karimganj, Phek and Bihubar 5 each
2 Nov	Car Nicobar IAF, Amaravathy Dam, Coonoor, Imphal and Udumalpet 5 each
3 Nov	Tamenglongi 9, Mettupalayam and Gobichettipalayam 7 each, Udumalpet, Myladumparaagri and Coonoor 6 each, Tuting and Mangaluru 5 each
4 Nov	Tuting and Mettupalayam 7 each, Dholai, Dholia Bazar, Myladumparaagri, Dhemaji, Thiruchuzhi, Chottabekra and Tiruppur 5 each
5 Nov	Dharapuram 17, Pilavakkal 16, Mulanur 13, Odanchatram 12, Usilampatti 11, Watrap, Coonoor and Gobichettipalayam 9 each, Alandur 8, Rajapalayam, Dgp Office, Ettayapuram and Bodinaickanur 7 each, Mettupalayam, Kangeyam, Bodinayakanur ARG, Myladumparaagri, Anna University and Avinasi 6 each, Veerapandi, Aranmanaipudur, CIAL Kochi, Kayathar ARG, Anna Uty ARG, Aravakurichi, Vadipatti, Virudhunagar, Mgr Nagar, Uttamapalayam and Vellanikkara 5 each
6 Nov	Kothagiri 12, Machilipatnam 11, K Bridge, Vythiri, Bandipura, Thiruchuzhi, Dharmasthala and Paramakudi 7 each, Suralacode, Coonoor, Ambalavayal, Thoothukudi, Rasipuram, Electronic City ARG and Rayagada 6 each, Piravam, Thoothukudi Port AWS, Gopal Nagar ARG, Quilandi, Thenkasi, Ketti, Ayikudi, Kurudamannil, Eraniel, Ramanathapuram and Konanur 5 each
7 Nov	Kariyapatti 6, Viraganur Dam, Manamadurai and Peraiyur 5 each
8 Nov	Dgp Office 10, Anna University, Gummidipoondi and Chidambaram AWS 6 each, Red Hills, Anna Uty ARG, Sholinganallur and Ponneri 5 each
9 Nov	Piravam 8
10 Nov	Long Islands 9, Port Blair 6
11 Nov	Nil
12 Nov	Nellore 11, Kaveli 8, Bapatla 6

TABLE 5 (Contd.)

Date	Some representative amounts of rainfall in cm for October, November and December 2020 (5 cm and above)
13 Nov	Kaveli 7, Palayamkottai, Mahabalipuram, Srivaikuntam, Thirukalukundram and Dgp Office 6 each, Ennore AWS, Thoothukudi, Cuddalore, Anna University, Anna Uty ARG, Thoothukudi Port AWS and Red Hills 5 each
14 Nov	Parangipettai 9, Cuddalore, Arimalam and Thodupuzha 7 each, Piravam, Kallikudi and Bhuvanagiri 6 each, Nagapattinam, Satankulam, Madukkur, Keelpennathur, Nannilam, Chidambaram AWS, Kariyapatti, Vanur, Marakkanam, Karipur, Chidambaram, K. M. Koil, Karaikal, Thiruthuraiipoondi and Trichy town 5 each
15 Nov	Kelambakkam 9, Hindusthan University and Kupwara 7 each, Thirukalukundram, Parangipettai, Sethiyathope and Chengalpattu 5 each
16 Nov	Sriperumbudur 18, Kancheepuram 16, Tirupathi AP 15, Marakkanam 12, Gummidipoondi and Mahabalipuram 10 each, Kaveli, Thirukalukundram, Uthiramerur and Kelambakkam 9 each, Cheyyur, Cuddalore, Arani, Tiruvannamalai, Chengalpattu, Hindusthan University and Maduranthagam 8 each, Udampur IAF, Chembarabakkam, Parangipettai, Vandavasi, Aravakurichi and Chidambaram 7 each, Tiruvallur, Gingee, Uthukottai, Chembarabakkam ARG, Perambalur, Vembakkam, Gwalior, Koratur, Sathanur Dam, Tambaram, Madukkur and Thiruvalangadu 6 each, Pelandurai, Poondi, Tiruchendur, Puducherry, Nellore, Vanur, Harur, Arakonam, Mehgaon, Arcot, Kannauj, Thoothukudi, Rohru, Ater, Walajabad, Panruti, Tirwa, Mandapam, Chengannur and Wallajah 5 each
17 Nov	Thoothukudi 17, Thoothukudi Port AWS 15, Papanasam 14, Vandavasi 11, Tirupuvanam 10, Maduranthagam and Mylaudy 9 each, Kottaram and Uthiramerur 8 each, Palayamkottai, Rajapalayam, Kovilpatti, Kadambur, Satankulam, Thiruchuzhi and Hindusthan University 7 each, Manimutharu u U, Dgp Office, Kodumudi, Madurai AP, Ettayapuram, Viraganur Dam, Madurai City and Mimisal 6 each, Chalakudi, Tozhudur, Sankarapuram, Sankarankoil, Kayathar ARG, Kayalpattinam, Tallakulam, Labbaikudikadu, Sholavandan, Sivagiri, Erumapatti, Agaram Seegoor, Srivaikuntam, Chengalpattu, Kayathar, Sirkali, Watrap, Ongole, Mettur, Kariyapatti, Cuddalore, Vaippar, Vanur, Pelandurai, Kelambakkam, Thirupporur, Srimushnam, Vembakottai, Kumarapalayam, Pudukottai, Red Hills and Kollidam 5 each
18 Nov	Kayalpattinam 21, Paramakudi 13, Aluva Pwd and Papanasam 12 each, Devakottai, Alappuzha and Kottaram 10 each, Kodaikanal, Tirupathur, Arimalam, Karaikudi, Sivakasi, Tiruchendur, Kariyapatti and Kodungallur 9 each, Vedasandur, Nannilam, Sivagiri, CIAL Kochi, Ambasamudram, R. S. Mangalam, Gudalur, Kulasekarapattinam and Ettayapuram 8 each, Arantangi, Thenkasi, Vattanam, Uttamapalayam, Shencottah, Kadambur, Perumpavur, Peraiyur, Cheranmahadevi, Dharapuram, Srivilliputhur, Thiruchuzhi, Kayathar, Mylaudy, Pilavakkal, Kayathar ARG, Thiruvananthapuram, Rajapalayam, Ayyampettai, Sivaganga, Tiruvarur, Manimutharu u U, Srivaikuntam, Kodavasal and Myladumparaagri 7 each, Ayikudi, Watrap, Kanyakumari, Aruppukottai, Kamudhi, Manamelkudi, Thekkadi, Kayamkulam Agri and Nedumangad 6 each, Tiruvadanai, Kayamkulam, K. Paramathy, Mayanur, Kadaladi, Valinokam, Tondi, Vembakottai, Natham, Manamadurai, Kodumudi, Coonoor, Periyakulam, Veerapandi, Alangudi, Karaikal, Punalur, Illayangudi, Satankulam, Varkala, Kallikudi, Neamatighat, Sankarankoil, Vilathikulam, Avudayarkoil, Kurudamanni, Maniyachi, Kamatchipuram, Palayamkottai, Kadalkudi, Peravurani, Aranmanaipudur, Valangaiman, Kovai / Koyamutthur and Periyar 5 each
19 Nov	Ottapadiram 12, Coonoor 9, Gudalur and Srivaikuntam 8 each, Palayamkottai and Pilavakkal 7 each, Maniyachi 6, Odanchatram, Amini Divi, Pudukottai, Kadambur, Srivilliputhur, Uttamapalayam and Kayalpattinam 5 each
20 Nov	Vaippar 10
21 Nov	Nancowry, Bangiriposi and Paramakudi 5 each
22 Nov	Hut Bay 5
23 Nov	Nil
24 Nov	Tambaram 9, Mgr Nagar and Chennai city 8 each, Chennai AP and Alandur 7 each, Kelambakkam 6, Kolapakkam ARG 5
25 Nov	Chennai city 16, Anna Uty ARG, Chennai AP and Sholinganallur 15 each, Taramani ARG, Anna University, Dgp Office and Mgr Nagar 14 each, Mahabalipuram, Alandur, Hindusthan University, Puzhal ARG and Chembarabakkam ARG 12 each, Tambaram and Ambathur 11 each, Perambur, Chembarabakkam, Red Hills, Kolapakkam ARG and Poonamallee 10 each, Ennore AWS, Thirupporur and Cholavaram 9 each, Kelambakkam and Maduranthagam 8 each, Sriperumbudur 7, Chengalpattu and Koratur 6 each, Thirukalukundram and Cheyyur 5 each
26 Nov	Tambaram 31, Puducherry 30, Cuddalore and Vilupuram 28 each, Dgp Office 26, Sholinganallur 22, Thamaraiykkam 19, Parangipettai 18, Pallipattu 17, Cholavaram 16, Gingee, Poonamallee, Ambathur, Mahabalipuram, Tiruvallur and Gummidipoondi 15 each, Tindivanam, Maduranthagam, Chembarabakkam, Anna University, Nellore, Vanur, Kollidam, Kaveli and Bhuvanagiri 14 each, Mgr Nagar, Kancheepuram, Kurinjipadi, Alandur, Chidambaram AWS, Red Hills, Marakkanam, Chengalpattu, Tiruttani, Chidambaram and Tirupathi AP 13 each, Ulundurpet, Poondi, Vadapudupattu, Keelpennathur, Koratur and Sirkali 12 each, Chennai AP, Vandavasi, Sethiyathope, Vembakkam, Poonamallee ARG, Arakonam, Thirukalukundram, Sriperumbudur and Panruti 11 each, Ponneri, Taramani ARG, Arcot, Perambur, Uthiramerur, Sholingur and Cheyyur 10 each, Anna Uty ARG, Chembarabakkam ARG, Thiruvalangadu, Tirukoilur, Polur, Mayiladuthurai, Kelambakkam, Thirupporur, Karaikal, Manalmedu and Puzhal ARG 9 each, Arani, Chennai city, Vridhachalam, Hindusthan University, Vepur, Ammudi, Vellore, R. K. Pet, Kodavasal and Manjalaru 8 each, Uthukottai, Ambur, Kaveripakkam, Agaram Seegoor, Tiruttani PTO, Tozhudur, Tarangambadi, Pelandurai, Tiruvannamalai, Srimushnam, Ennore AWS, Needamangalam, Sendurai, Kadapa, Aduthurai AWS, Cheyyar and Katpadi 7 each, K. M. Koil, Nagapattinam, Nannilam, Mannargudi, Thandampettai, Ariyalur, Wallajah, Kothi, Eriyur,

TABLE 5 (Contd.)

Date	Some representative amounts of rainfall in cm for October, November and December 2020 (5 cm and above)
	Labbaikudikadu, Valangaiman, Melalathur, Kumbakonam, Virinjipuram AWS, Thirumanur, Kolapakkam ARG, Walajabad, Ponnai Dam and Tiruvarur 6 each, Jayankondam, Alangayam, Hmo Kasol, Thiruvudaimaruthur, Tirupattur, Tirupattur PTO, Manali and Mulanur 5 each
27 Nov	Kaveli 27, Sholingur 23, Vadapudupattu 16, Ongole and Arogyavaram 15 each, Vellore, Ponnai Dam and Ammundi 14 each, Ambur and R. K. Pet 13 each, Kadapa, Alangayam, Kakinada and Katpadi 12 each, Bapatla, Vijaywada AP and Narsapur 11 each, Vaniyambadi, Machilipatnam, Tirupuvanam and Kaveripakkam 9 each, Wallajah, Gudiyatham, Virinjipuram AWS and Nellore 8 each, Devakottai, Tuni, Visakhapatnam, Vembakkam and Melalathur 7 each, Adirampattinam, Tirumangalam, Visakhapatnam AP, Sivaganga, Arani, Chintamani and Pudukottai 6 each, Virudhunagar, Pallipattu, Karaikudi, Tiruvadana, Kochi AP, Chintamani PTO, Kolar Gold Field, Manamelkudi, Mimisal, Nandyal, Shoolagiri and Arcot 5 each
28 Nov	9 - Peermade To and Mettupatti each; 8 - Avinasi; 7 - Vadipatti and Sholavandan each; 6 - Andipatti, Car Nicobar IAF, Watrap, Tiruppur, Srivilliputhur, Enamakal and Usilampatti each; 5 - Car Nicobar, Periyakulam, Panchapatti, Hut Bay, Madurai AP and Sular each.
29 Nov	Hut Bay 13, Kaveli 6, Kurudamanni 5
30 Nov	Nil
1 Dec	Nil
2 Dec	Nil
3 Dec	Vedaranniyam 20, Karaikal 16, Thalaignayer and Tirupoondi 15 each, Nagapattinam 14, Thiruthuraiipoondi and Nancowry 13 each, Mayiladuthurai and Rameswaram 12 each, Mudukulatur 11, Sirkali, Kodavasal, Adirampattinam and Manjalaru 10 each, Tiruvarur, Aduthurai AWS, Tambaram and Pattukottai 9 each, Nannilam, Marakkanam, Satyavedu, Pamban, Thiruvudaimaruthur, Nellore, Thirukalukundram, Puduchery and Valangaiman 8 each, Manalmedu, Kollidam, Kelambakkam, K. M. Koil, Mannargudi, Vanur, Taramani ARG, Madukkur, Parangipettai, Ayyampettai, Thanjai Papanasam, Cuddalore and Needamangalam 7 each, Agaram Seegoor, Tindivanam, Mahabalipuram, Maduranthagam, Thanjavur, Kumbakonam, Thamarapakkam, Pandavaiyar Head, Orthanad, Thirupporur, Mandapam, Mylam AWS, Ponneri, Manamelkudi, Peravurani, Bhuvanagiri and Mimisal 6 each, Vallam, Labbaikudikadu, Cheyyur, Tarangambadi, Hindusthan University, Kurinjipadi, Car Nicobar IAF, Sethiyathope, Car Nicobar, Perambalur, Perungalur, Chidambaram, Chennai AP, Arantangi, Pelandurai and Panruti 5 each
4 Dec	Kollidam 36, Chidambaram 34, Parangipettai 26, Manalmedu, K. M. Koil and Kurinjipadi 25 each, Thiruthuraiipoondi 22, Sirkali, Kodavasal and Sethiyathope 21 each, Rameswaram 20, Peravurani, Manjalaru, Bhuvanagiri and Mayiladuthurai 19 each, Karambakudi and Pattukottai 17 each, Madukkur and Thirukalukundram 16 each, Srimushnam and Vridhachalam 15 each, Tindivanam, Nannilam, Thanjai Papanasam, Puducherry, Cuddalore and Thiruvudaimaruthur 14 each, Long Islands, Kumbakonam, Ayyampettai, Valangaiman, Panruti and Ulundurpet 13 each, Aduthurai AWS, Alangudi and Pandavaiyar Head 12 each, Jayankondam, Tiruvarur, Budalur, Mahabalipuram and Mannargudi 11 each, Perambalur, Vallam, Maduranthagam, Thanjavur, Thirumanur and Needamangalam 10 each, Sendurai, Tirukattupalli, Vepur, Vilupuram, Pelandurai, Cholavaram, Mylam AWS, Gandarvakottai, Marakkanam, Vanur, Chengalpattu and Gingee 9 each, Keeranur, Thalaignayer, Agaram Seegoor, Eraiyur, Gummidipoondi, Adirampattinam, Manamelkudi, Pullambadi, Pamban, Thirukoilur ARG, Annavasal, Samayapuram, Perungalur and Tarangambadi 8 each, Tozhudur, Tirukoilur, Labbaikudikadu, Ariyalur, Anna Uty ARG, Thuvakudi Inti, Uthukottai, Uthiramerur, Veppanthattai, Karaikal, Thandampettai, Tirupoondi, Tirumayam and Trichy town 7 each, Muthupet, Kallakurichchi, Veeraganoor, Nagapattinam, Grand Anaicut, Keelpennathur, Viralimalai, Illuppur, Tiruvaiyaru, Arimalam, Tiruvadana, Chennai city, Tirupathur, Chembarambakkam ARG, Chettikulam, Sankarapuram, Chennai AP, Kodur, Thamarapakkam, Kolapakkam ARG and Ambathur 6 each, Alandur, Satyavedu, Lalgudi, Tiruttani, Red Hills, Vandavasi, Mandapam, Vattanam, Sathanur Dam, Sholinganallur, Kelambakkam, Marungapuri, Tambaram, Thuraiyur, Arantangi, Gudur, Port Blair, Chengam, Karaikudi, Pudukottai, Kodaikanal and Tiruvallur 5 each
5 Dec	Nagapattinam and Karaikal 16 each, Kodavasal and Bhuvanagiri 15 each, Sethiyathope 14, Tarangambadi 13, Sirkali, Dgp Office, Vembakkam and Srimushnam 12 each, Rameswaram, Anna University, Tirupoondi and Kayalpattinam 11 each, Minicoy, Sriperumbudur, Kollidam, Mgr Nagar, Pelandurai and Satyavedu 10 each, Uthukottai, Chembarabakkam, Thoothukudi, Thalaignayer and Chidambaram 9 each, Mayiladuthurai, Gummidipoondi, Agaram Seegoor, Labbaikudikadu, Parangipettai, Kurinjipadi, Mandapam, Manalmedu and Sholinganallur 8 each, Vilupuram, Tozhudur, Bodinayakanur ARG, Vedaranniyam, Thiruvudaimaruthur, Tiruchendur, Poonamallee, Nannilam, Vridhachalam, Pamban, Thiruthuraiipoondi, Tiruvarur, Valangaiman and Srivaikuntam 7 each, Needamangalam, Sullurpet, Alandur, Vaippar, Kadambur, Ulundurpet, Kancheepuram, Ottapadiram, Perambur, Panruti, Kanjirappally and Walajabad 6 each, Bodinaickanur, Manimutharu u U, Eraiyur, Kulasekarapattinam, K. M. Koil, Palani, Cheyyar, Pandavaiyar Head, Palayamkottai, Papanasam, Manjalaru, Cholavaram, Aduthurai AWS, Kumbakonam, Thenkasi, Gudur, Cuddalore, Maniyachi, Sankarankoil, Shencottah, Kayathar, Tada, Tiruvallur and Peermade To 5 each
6 Dec	Muthupet 10, Mahabalipuram 7, Kodavasal, Nannilam, Nellore and Thalaignayer 6 each, Thiruthuraiipoondi, Venkatagiri, Cheyyur, Kollidam, Srikalahasti, Cholavaram, Tirupoondi, Chidambaram and Adirampattinam 5 each
7 Dec	Maniyachi 16, Vaippar 12, Kadambur 11, Kayathar, Sirkali, Karaikal, Chittar and Kayathar ARG 9 each, Mayiladuthurai, Thalaignayer, Valinokam and Needamangalam 8 each, Kodavasal, Manalmedu, Alappuzha, Palayamkottai, Vilathikulam and Thirupathisaram AWS 7 each, Coonoor, Nagapattinam, Ayikudi, Kozha, Uthukottai, Nannilam, Mimisal and Rameswaram 6 each, K. M. Koil, Ottapadiram, Tirupoondi, Nellore, Venkatagiri, Ayyampettai, Pollachi and Papanasam 5 each

TABLE 5 (Contd.)

Date	Some representative amounts of rainfall in cm for October, November and December 2020 (5 cm and above)
8 Dec	Odanchatram and Cuddalore 6 each, Thirukalukundram, Vinjamur, Agaram Seegoor, Neyveli AWS, Udayagiri, Vandavasi, K. M. Koil and Labbaikudikadu 5 each
9 Dec	Chapad and Atlur 8 each, Vinjamur and Kayalpattinam 7 each, Udayagiri, Seetharamapuram and Sullurpetta 6 each, Ennore AWS, Periyanaickenpalayam, Kothagiri, Vattanam, Rapur, Chickmagalur, Penagaluru, Coonoor and Muddanur 5 each
10 Dec	Palavidithi 5
11 Dec	Nil
12 Dec	Umerpada, Ghumarwin, Udhampur IAF and Banihal 5 each
13 Dec	Vansda 7, Hosdurg and Waghai 6 each, Khergam and Subir 5 each
14 Dec	Nil
15 Dec	Nil
16 Dec	Tondi 10, Vattanam and Kodavasal 6 each, Nagapattnam, Mannargudi, Vedaranniyam, Tiruvadanai, Pawai, Karaikal, Adiramattinam, Cuddalore, Mimisal, Thiruthuraipoondi and Tiruvarur 5 each
17 Dec	Thirukoilur ARG 17, Tirukoilur 16, Puducherry 15, Mylam AWS 13, Ulundurpet 12, Cuddalore and Kallakkurichchi 10 each, Vilupuram, Sankarapuram and Sethiyathope 8 each, Vepur, Marakkanam, Tindivanam, Bhuvanagiri and Vanur 7 each, K. M. Koil, Kurinjipadi, Perambalur, Veeraganoor, Pelandurai, Labbaikudikadu, Parangipettai and Agaram Seegoor 6 each, Srimushnam, Tarangambadi, Vridhachalam, Uthiramerur, Thandarampettai, Chidambaram, Thammampatty, Keelpennathur, Tirupoondi, Kollidam, Manalmedu, Sendurai, Gingee, Vedaranniyam, Sirkali, Tozhudur, Veppanthattai and Panruti 5 each
18 Dec	Bhuvanagiri 11, Paramakudi and Parangipettai 7 each, Illayangudi and Kodavasal 6 each, K. M. Koil, Ayyampettai, Kamudhi, Mayiladuthurai, R.S.Mangalam, Ramanathapuram, Vattanam, Pandavaiyar Head and Tondi 5 each
19 Dec	Nagapattnam 13, Tirupoondi and Parangipettai 7 each, Thalaignayer, Vedaranniyam and Thiruthuraipoondi 6 each, Ayyampettai 5
20 Dec	Nil
21 Dec	Nil
22 Dec	Nil
23 Dec	Minicoy 5
24 Dec	Amini Divi 5
25 Dec	Agathi 9
26 Dec	Nil
27 Dec	Long Islands 8
28 Dec	Udhampur IAF 5
29 Dec	Nil
30 Dec	Nil
31 Dec	Kollidam 9, Tindivanam 7, Gingee and Marakkanam 6 each, Mylam AWS, Aduthurai AWS, Cheyyur, Vilathikulam and K. M. Koil 5 each

plains of northwest India and the remnants of these systems caused isolated to scattered rainfall / thunderstorm over parts of northeast India in the second fortnight of the month.

3.2.3. Temperature

Cold day and cold wave conditions were not observed in this month.

The minimum temperatures in this month over north India were mostly below normal while sub-divisions from east and northeast India and south peninsula and area adjoining it were above normal.

Some stations broke their previous records of maximum temperature for this month. A list of stations is given below:

Station name	Previous Record (°C)	Date of record for Nov	Year of Record	New Record (°C)	Date Nov 2020
North Lakhimpur	33.8	2	2009	35.3	2
Shillong	24.5	6	1997	25.1	15
Balasore	34.8	21	1979	35.4	20
Muzzafarpur	33	1	2001	34.3	1
Kanyakumari	34.3	1	1980	35.2	11

Source : IMD Climate Diagnostics Bulletin of India November 2020

The month's lowest minimum temperature over the plains of the country was 4.1°C at Churu (west Rajasthan) on 29th November over the plains of the country.

3.2.4. Damages associated with Disastrous weather events

As per media reports one soldier died and 2 others were injured after an avalanche hit an army post in Kupwara district of Jammu and Kashmir. Due to heavy snowfall in the higher reaches of Jammu-Kashmir and Ladakh, Srinagar-Leh road traffic was disrupted. Torrential rains, strong winds and tidal surge due to VSCS, "NIVAR" took a toll of 4 in Chennai district of Tamil Nadu and 9 in Chittoor, Cudappah and Nellore districts of Andhra Pradesh. It also caused damage to about 101 houses and uprooted 1000 trees in low-lying areas, due to water-logging, more than 10,000 livestock perished in Andhra Pradesh and standing crops in 36,500 hectares were damaged in Nellore and Prakasam districts of Andhra Pradesh.

3.3. December

3.3.1. Weather and associated synoptic features

Table 4 gives a summary of the synoptic systems during the month of December 2020. The sub-division wise percentage departure of rainfall from normal and the significant amounts of rainfall during the month are given in Tables 1 and 5, respectively.

A cyclonic circulation extending up to mid tropospheric levels lay over Malay peninsula and adjoining areas of Andaman sea in the beginning of the month which subsequently shifted westwards and lay over southeast Bay of Bengal and adjoining areas of south Andaman sea, before moving away west-southwestwards. Under its influence, fairly widespread to widespread rainfall / thunderstorms occurred over Andaman and Nicobar Islands with isolated very heavy rainfall on 2 days. A cyclonic circulation lay over Lakshadweep-Maldives area off Kerala coast in the lower levels on 5 December which shifted and lay over southeast Arabian Sea and adjoining Maldives area on 6 and 7 December; under its influence, scattered to fairly widespread rainfall / thunderstorms occurred over Kerala, Mahe and Lakshadweep Islands with isolated heavy rainfall activity.

3.3.2. Temperature

Severe cold day and cold day conditions were observed for a few days, at most places over northwest India particularly Rajasthan, Uttar Pradesh, Punjab, Haryana, Chandigarh, Delhi over west Uttar Pradesh, North Rajasthan and North Madhya Pradesh in the second half of the month.

Cold wave conditions were observed in the last fortnight of the month and remained confined to north India. They were experienced over Punjab, Haryana, Chandigarh, Delhi, Madhya Pradesh west Uttar Pradesh, north Rajasthan, Saurashtra and Kutch.

Severe cold wave conditions were observed at some places over Punjab, Haryana, Chandigarh and Delhi, on some days and over Rajasthan, east Uttar Pradesh, west Madhya Pradesh, Bihar, Saurashtra, Kutch, Jammu-Kashmir and Ladakh, Gilgit, Baltistan, Muzaffarabad at isolated places on few days.

The lowest minimum temperature recorded was -1.5°C at Churu (west Rajasthan) on 30th December, 2020 over the plains of the country.

Minimum temperatures were *normal or below normal* over most parts of Jammu, Kashmir and Ladakh, west Uttar Pradesh and some parts of east Rajasthan, West Bengal, Madhya Pradesh, Gujarat and coastal Odisha. The night temperatures were above normal over the rest of the country.

3.3.3. Damages associated with the Disastrous weather events

As per media reports, due to cyclonic Storm "BUREVI" during the period of 30 November to 5

December, 9 people died and more than 200 livestock perished in Tamil Nadu. Across the state, 75 huts were completely damaged, 1725 partially damaged. Similarly, 8 tiled houses were completely damaged and 410 were partially damaged, 66 trees were uprooted and 27 electric poles destroyed which also affected air service resulting in closing of airports at Madurai, Tuticorin in Tamil Nadu and at Thiruvananthapuram in Kerala on 4 December.

Cyclonic storm 'BUREVI' caused death of 1 girl as a wall collapsed in Perambalur district of Tamil Nadu. A farmer died due to severe cold wave in Banda district of Uttar Pradesh. Due to heavy snowfall in Himachal Pradesh, 401 roads including NH-3 were closed.

The inputs received from the office of the Director General of Meteorology (Hydromet), New Delhi is duly acknowledged. Thanks are due to Shri P.N.Chopade and Smt. P. P. Kulkarni, S.A. for their assistance.

Appendix

Definitions of the terms given in 'Italics'

(A) Rainfall

(i) Percentage departure from normal

Large Excess : + 60 % or more

Excess : +20% to +59%

Normal : -19% to +19%

Deficient : -20% to -59%

Large Deficient : -60% to -99%

No Rain : -100%

(ii) Intensity (during the past 24 hours period ending at 0300 UTC)

Extremely heavy rainfall - 20.5 cm and above

Very heavy rainfall - 11.6 cm to 20.4 cm

Heavy rainfall - 6.5 cm to 11.5 cm

Heavy snowfall - 64.5 cm to 115.5 cm

(iii) Spatial distribution (percentage of the stations in a meteorological sub-division reporting a 24 hour rainfall of 0.1 mm or more)

At most places (Widespread) - 76% of stations gets rainfall

At many places (Fairly widespread) - (51-75)% of stations gets rainfall

At a few places (Scattered) - (26-50)% of stations gets rainfall

At isolated places (Isolated) - ≤25% of stations gets rainfall

(B) Monsoon activity

(i) Southwest monsoon

Vigorous - Rainfall exceeding 4 times the normal with, at least two stations reporting rainfall more than or equal to 8 cm along the west coast and 5 cm elsewhere. Rainfall in that sub-division should be fairly widespread or widespread

Active - Rainfall more than 1½ to 4 times the normal, with at least two stations reporting rainfall more than or equal to 5 cm along the west coast and 3 cm elsewhere. Rainfall in that sub-division should be fairly widespread or widespread

(ii) Northeast monsoon

Vigorous - Rainfall exceeding 4 times the normal with at least two stations reporting rainfall more than or equal to 5 cm in coastal Tamil Nadu and south coastal Andhra Pradesh and 3 cm elsewhere in the northeast monsoon region. Rainfall in that sub-division should be fairly widespread or widespread

Active - Rainfall more than 1½ to 4 times the normal, with at least two stations reporting rainfall more than or equal to 3 cm in coastal Tamil Nadu and south coastal Andhra Pradesh and 2 cm elsewhere in the northeast monsoon region. Rainfall in that sub-division should fairly widespread or widespread

(C) Temperatures

(i) Maximum / Day temperature

Markedly above normal - When departure from normal is +5 °C or more

<i>Appreciably above normal</i>	- When departure from normal is +3.1 °C to +5.0 °C
<i>Above normal</i>	- Departure from normal is +1.6 °C to +3.0 °C
<i>Normal</i>	- When departure from normal is +1.5 °C to -1.5 °C

(ii) Minimum / Night temperature

Based on the revised criteria which came into practice with effect from 2016, cold waves are declared based on the actual minimum temperatures. Cold wave is considered when the minimum temperature of a station is 10 °C or less for plains and 0 °C or less for hilly regions. Also to declare cold wave, the criteria should be met at least in 2 stations in a met sub-division for at least 2 consecutive days.

<i>Severe cold wave conditions</i>	- When the negative departure of minimum temperature from Normal is more than 6.4°C or when the actual minimum temperature is ≤ 2 °C over the plains
<i>Cold wave conditions</i>	- When the negative departure of minimum temperature from

normal is 4.5°C to 6.4°C or when the actual minimum temperature is ≤ 4 °C over the plains. For stations located over the coastal areas, when the minimum temperature departure is -4.5°C or more, 'Cold Wave' may be described if the actual minimum temperature is 15 °C or less

<i>Cold day to severe cold day conditions</i>	- When the minimum temperature is 10 °C or less for plains and 0°C or less for hilly regions. Cold day may be described if the departure of maximum temperature is -4.5°C to -6.4°C and severe cold day when it is less than 6.4°C
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<i>Markedly below normal</i>	- When the departure from normal is -5°C to or less
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<i>Appreciably below normal</i>	- When the departure from normal is between -3.1°C to -5.0°C
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<i>Below normal</i>	- When the departure from normal is -1.6°C to +3.0°C
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<i>Normal</i>	- Departure from normal is -1.5°C to +1.5°C
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