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भारत मौसम विज्ञान विभाग / INDIA METEOROLOGICAL DEPARTMENT







वार्षिक जलवायु सारांश - 2020

ANNUAL CLIMATE SUMMARY - 2020

द्वारा जारी / ISSUED BY

राष्ट्रीय जलवायु केन्द्र, जलवायु सेवाएँ विभाग
NATIONAL CLIMATE CENTRE, CLIMATE SERVICES DIVISION

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INDIA METEOROLOGICAL DEPARTMENT

पुणे - 411005
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COVER PHOTOS

① **Photo 1:**
Kolkata: Mangled remains of a bus after a tree fell on it during Cyclone Amphan, in Kolkata. (PTI Photo)https://images.financialexpress.com/2020/05/28.jpg

② **Photo 2 :**
A tree fell on a house after rains and strong winds triggered by Cyclone Nisarga, in Sindhudurg district of Maharashtra. Cyclone Nisarga made landfall near Maharashtra's coastal town of Alibag, around 100 kilometers south of Mumbai, on Wednesday afternoon.
https://images.outlookindia.com/public/uploads/gallery/20200603/nisarga_7_20200603.jpg

③ **Photo 3:**

GHMC personnel carry out a rescue operation to move flood affected people to a safer place following heavy rains in Hyderabad. (Photo: PTI)
Greater Hyderabad Municipal Corporation (GHMC)
https://akm-img-a-in.tosshub.com/indiatoday/images/story/202010/PTI_PTI_Hyd_flood_4_baby_1200x768.jpeg?qpU8RNkzAH0Y4o96qwPuI5cXe_bSVr81&size=770:433

④ **Photo 4 :**
The number of distressed people, so far, is 69.03 lakhs. (Representational)
https://c.ndtvimg.com/2020-07/h2maeblo_bihar-floods-650_625x300_28_July_20.jpg

⑤ **Photo 5 :**
Villagers warm themselves around a bonfire on a cold day, on the outskirts of Fatehpur, in the northern Indian state of Uttar Pradesh. Large parts of north India are already witnessing foggy conditions as temperature drops further. Image Credit: AP
https://imagevars.gulfnews.com/2021/12/27/COLD-PIC-6-1609069494995_176a40402d9_original-ratio.jpg

⑥ **Photo 6 :**
Women warm themselves around a bonfire amid dense fog on a cold winter morning in Mirzapur. Image Credit: PTI
https://imagevars.gulfnews.com/2021/12/27/COLD-PIC-311-1609069503034_176a404223b_original-ratio.jpg

वार्षिक जलवायु सारांश - 2020

विशेषताएं:

वर्ष 2020 में देश का औसत तापमान, सन 1981-2010 के औसत से 0.29 डिग्री सेलशियस (डि.से.) से अधिक रहा। यह साल 1901 से अब तक का आठवाँ सबसे ऊष्ण साल रहा । मानसून ऋतु के औसत तापमान में वृध्दि (+0.43 डि.से.) और उत्तर-पूर्व मानसून ऋतु के औसत तापमान में वृध्दि (+0.53 डि.से.) वार्षिक तापमान में वृध्दि का मुख्य कारण है। अब तक के 10 सबसे ऊष्ण साल इस क्रम से है : 2016 (विसंगति +0.71 डि.से.), 2009 (+0.55 डि.से.), 2017 (+0.541 डि.से.), 2010 (+0.539 डि.से.), 2015 (+0.42 डि.से.), 2018 (+.40 डि.से.), 2019(+0.36 डि.से.),2020(+0.29 डि.से.) 1958 (+0.25 डि.से.) और 2002 (+0.246 डि.से.)।

दक्षिणी पश्चिमी मानसून ऋतु (जून-सितंबर, जो देश की वर्षा ऋतु का प्रमुख काल माना जाता है) में देशभर में व्यापक रुप से वर्षा सामान्य रही (दीर्घ काालावधि औसत के 109%)। हालांकि सामयिक रुप से वर्षा अस्थाई थी लेकिन फिर भी देश भर में वर्षा का वितरण काफी अच्छा रहा।

दक्षिण प्रायद्वीप (जिसमे 5 प्रभाग आते हैं, और जो उत्तर-पूर्व मानसून वर्षा का मुख्य क्षेत्र है, नामतः तटीय आन्ध्रप्रदेश, रायलसीमा, तमिलनाडु और पुडुचेरी, दक्षिणी आंतरिक कर्नाटक और केरल) में अक्तूबर से दिसंबर तक पडने वाली उत्तर-पूर्व मानसून वर्षा, सामान्य (दीर्घ कालावधि औसत के 110%) रही ।

वर्षा

2020 में देश भर में वार्षिक वर्षा सामान्य थी । वर्षा का परिमाण दीर्घ कालावधि औसत के 110% रहा । देश के 36 प्रभागों में से 2 प्रभाग सौराष्ट्र और कच्छ तथा रायलसीमा मे वर्षा अत्यधिक, 10 प्रभागों में अधिक, 22 प्रभागों में वर्षा सामान्य रही और 2 प्रभागों में वर्षा कम रही ।

तापमान

देश के अधिकतर भागों में अधिकतम, न्यूनतम और औसत तापमान की विसंगति - 0.5 डि. सें. से + 1.0 डि. सें. की श्रेणी में रही । मगर देश के उत्तर, उत्तर-पूर्व और दक्षिण प्रायद्वीप के कुछ भागो में, अंदमान और निकोबार द्वीपसमुह मे औसत तापमान 1 डि. सें. से अधिक रहा ।

चक्रवाती तूफान

2020 मे बंगाल की खाडी मे तीन चक्रवाती तूफान हुए । यह चक्रवाती तूफान मई (अम्फन), नवंबर (निवार) और दिसंबर(बुरेवी) में प्रतिमाह एक हुए । इनके अलावा अरबी समुद्र में मानसून ऋतु में एक (निसर्ग) और मानसूनोत्तर में एक (गती) चक्रवाती तूफान हुए । मानसून ऋतु में 12 कम दबाव के क्षेत्र बने (1 प्रचंड चक्रवाती तूफान, 6 अच्छी तरह से चिन्हित कम दबाव क्षेत्र और 5 कम दबाव के क्षेत्र) । इन सभी कम दबाव की प्रणालियों की वजह से संबन्धित स्थानों मे अच्छी वर्षा हुई ।

महत्वपूर्ण मौसम संबंधी घटनाएं

भारी वर्षा और बाढ संबंधी घटनाओं से करीब 600 से ज्यादा लोगों की मृत्यु की सूचना प्राप्त हुई । आकाशीय बिजली से 578 लोगों की मृत्यु की सूचना (मानसून पूर्व, मानसून और मानसूनोत्तर ऋतुओं में), देश के विभिन्न भागों से प्राप्त हुई । शीत लहर कि चपेट में 150 (इनमे से 88 उत्तर प्रदेश से, 45 बिहार से) लोगों की मृत्यु की सूचना प्राप्त हुई । हिमताप की वजह से जम्मु, कश्मीर और हिमाचल प्रदेश से 16 लोगों की मृत्यु की सूचना मिली । आंधी की वजह से राजस्थान से 14, अंधड की वजह से झारखंड से 6 लोगों की मृत्यु की सूचना मिली ।

HIGHLIGHTS

ANNUAL CLIMATE SUMMARY 2020

HIGHLIGHTS

The annual mean land surface air temperature averaged over India during 2020 was above normal. During the year, annual mean land surface air temperature averaged over the country was +0.29^{0}C above (1981-2010 period) average. The year 2020 was the eighth warmest year on record since nation-wide records commenced in 1901. However, this is substantially lower than the highest warming observed over India during 2016 (+0.71^{0}C). The monsoon and post-monsoon season with mean temperature anomalies of +0.43^{0}C and +0.51^{0}C respectively mainly contributed to this warming. Mean temperatures during the winter and pre-monsoon were near normal with anomaly of +0.14^{0}C and -0.03^{0}C respectively.

The 2020 annual rainfall over the country as a whole was 110% of its Long Period Average (LPA) value for the period 1961-2010. The monsoon season rainfall over the country as a whole was 109% of its LPA. The seasonal rainfall during the Northeast monsoon season (October – December) over the NE Monsoon core region of the south peninsula was 110% of its LPA. All the five subdivisions of the core region except Kerala received excess/normal rainfall.

During 2020, five cyclonic storms formed over the North Indian Ocean; Super cyclonic Storm AMPHAN, Very Severe Cyclonic Storms NIVAR & GATI, Severe Cyclonic Storm NISARG, and Cyclonic Storm 'BUREVI'. Of these, NISARG & GATI formed over Arabian Sea, while the remaining 3 cyclones viz. AMPHAN, NIVAR & BUREVI formed over the Bay of Bengal.

A) TEMPERATURE

Annual:

Spatial pattern of annual mean, maximum and minimum temperature anomalies for 2020 are shown in Fig.1. Anomaly in the maximum, minimum and mean temperature over many parts of the country was generally in the range of ± 1.0°C. Mean temperature over parts of Jammu & Kashmir and Ladakh, Himachal Pradesh, and Andaman & Nicobar Islands was above normal by about 1°C. Mean temperature over parts of Haryana, Chandigarh & Delhi and West Uttar Pradesh was below normal by about 1°C.

Maximum temperature over parts of Jammu & Kashmir and Ladakh, Himachal Pradesh, Assam and Meghalaya, Tripura, Kerala and Mahe was above normal by about 1°C. However, Maximum temperature over parts of Punjab, Haryana Chandigarh & Delhi, Uttar Pradesh state, Jharkhand, Bihar and Chhattisgarh was below normal by about 1°C.

Minimum temperature was generally above normal over most parts of the country except parts of Haryana, Chandigarh & Delhi, Uttar Pradesh state, east Rajasthan, Madhya Pradesh state, Jammu & Kashmir and Ladakh, Vidarbha, Coastal Andhra Pradesh & Yanam and Odisha.

The annual mean temperature for the country was +0.29°C above the 1981-2010 average, thus making the year 2020 as the eighth warmest year on record since 1901 (Fig. 2A). The other 9 warmest years on record in order were: 2016 (anomaly +0.71°C), 2009 (0.55°C), 2017 (0.54°C), 2010 (0.53°C), 2015 (0.42°C), 2018 (0.40°C), 2019 (0.36°C), 1958 (0.25°C), and 2002 (0.24°C). It may be mentioned that 12 warmest years were from the recent past fifteen years (2006-2020). In addition, the past decade (2001-2010/2011-2020) was the warmest decade on record with anomalies of 0.23°C/0.34°C above average. During 1901-2020, the annual mean temperature showed a significant increasing trend of 0.62°C/100 years with significant increasing trend in the maximum temperature (0.99°C/100 years), and relatively lower increasing trend (0.24°C/100 years) in the minimum temperature.

Time series and trend in mean temperature anomalies for different seasons viz. Winter (Jan to Feb), Pre-Monsoon (Mar to May), Monsoon (June to Sept) and Post-Monsoon (Oct to Dec) seasons for the period 1901-2020 are shown in Figs 2B, 2C, 2D and 2E respectively. The mean temperature for the winter season was near normal with anomaly +0.14°C. The mean temperature was near normal during January (+0.001°C) and February (+0.28°C).

The mean temperature during pre-monsoon season (with anomaly -0.03°C) was near normal. The mean temperature was near normal during March (-0.29°C), April (+0.09°C) and May (+0.1°C).

Monsoon season this year (with anomaly +0.43°C above average) was the sixth warmest since 1901. The mean temperature was near normal during June (-0.14°C) and significantly above normal during July (0.56°C), August (0.58°C) and September (0.72°C). September was warmest, August was second warmest after the year 2009 (0.64°C) and July was fifth warmest since 1901.

The Post-monsoon season this year (with anomaly +0.51°C above average) was the fifth warmest since 1901. The mean temperature was significantly above normal during October (0.94°C) and near normal during November (0.26°C), December (0.34°C). October was the third warmest since 1901 after the years 2017(1.02^0C), 2015 (1.0^0C).

Spatial pattern of trend in mean annual temperature anomalies based on the data for the period 1901-2020 (Fig.3) suggests significant positive (increasing) trend over most parts of the country except for some parts of Bihar, East Uttar Pradesh, Gujarat and adjoining southern parts of Rajasthan, where significant negative (decreasing) trend was observed.

Fig.4 shows the spatial pattern of monthly maximum and minimum temperature anomalies. Regions with significant temperature anomaly (> +2°C or < -2°C) during each concerned month are discussed below.

January-February (Winter season):

During January, maximum temperature anomaly was less than -2°C over parts of Jammu & Kashmir, Punjab, Haryana, Chandigarh & Delhi, Rajasthan state, Madhya Pradesh state, Gujarat Region, Madhya Maharashtra, Vidarbha, Uttar Pradesh state, Uttarakhand, Jharkhand, Bihar and Gangetic West Bengal. Maximum temperature anomaly was less than -3°C over parts of Uttar Pradesh state, Uttarakhand, Gangetic West Bengal, west Rajasthan, Punjab, Haryana, Chandigarh & Delhi and Madhya Maharashtra. Minimum temperature anomaly was more than

2°C over parts of Bihar, Odisha, Andhra Pradesh state, Telangan, Madhya Maharashtra and South Interior Karnataka.

During February, Maximum temperature anomaly was more than 2°C over parts of Jammu & Kashmir, Himachal Pradesh, Saurashtra & Kutch and Kerala and Mahe. Maximum temperature anomaly was less than -2°C over parts of West Uttar Pradesh, Gangetic West Bengal, Odisha, Jharkhand, Chhattisgarh, West Madhya Pradesh and Vidarbha. Minimum temperature anomaly was more than 2°C over parts of Madhya Maharashtra, North Interior Karnataka and Andaman & Nicobar Islands. Minimum temperature anomaly was less than -2°C over parts of East Rajasthan, East Madhya Pradesh, Chhattisgarh and Odisha.

March- May (**Pre-monsoon season**)**:**

During March, maximum temperature anomaly was more than 2°C over parts of Nagaland, Assam and Meghalaya. Maximum temperature anomaly was less than -3°C over parts of East Uttar Pradesh, Bihar, Jharkhand, Chhattisgarh and East Rajasthan.

During April, maximum temperature anomaly was more than 2°C over parts of Saurashtra and Kutch. Maximum temperature anomaly was less than -2°C over parts of Punjab, Haryana, Chandigarh and Delhi, Uttar Pradesh State, Bihar, Jharkhand, Chhattisgarh and Odisha. Minimum temperature anomaly was more than 2°C over some parts of West Rajasthan, Gujarat State, north Madhya Maharashtra and Andaman & Nicobar Islands. Minimum temperature anomaly was less than -2°C over parts of Haryana, Chandigarh and Delhi, Chhattisgarh, Vidarbha and Odisha.

During May, maximum temperature anomaly was more than 2°C over parts of Saurashtra & Kutch and Madhya Maharashtra. Maximum temperature anomaly was less than -2°C over parts of Uttar Pradesh state, Bihar, Jharkhand, Gangetic West Bengal, Chhattisgarh and Odisha. Minimum temperature anomaly was more than 2°C over parts of West Rajasthan, Gujarat region and Madhya Maharashtra. Minimum temperature anomaly was less than -2°C over parts of Haryana, Chandigarh and Delhi, West Uttar Pradesh, Chhattisgarh, East Madhya Pradesh and Vidarbha.

During March, minimum temperature anomaly was generally within ± 2°C range.

June-September (Monsoon season):

During June, maximum temperature anomaly was less than -3°C over parts of Madhya Pradesh state, East Uttar Pradesh, Bihar, Jharkhand, Chhattisgarh and Vidarbha. Maximum temperature anomaly was less than -4°C over parts of East Madhya Pradesh, East Uttar Pradesh, Jharkhand and Chhattisgarh. Minimum temperature anomaly was less than -2°C over parts of extreme southern parts of East Madhya Pradesh and West Madhya Pradesh, Vidarbha and Chhattisgarh. Minimum temperature anomaly was less than -3°C over parts of Vidarbha.

During July, maximum temperature anomaly was more than 2°C over parts of Jammu & Kashmir and Ladakh, Himachal Pradesh, Rajasthan state, West Madhya Pradesh and Gangetic West Bengal. During July, minimum temperature anomaly was generally within ± 2°C range.

During August, maximum temperature anomaly was more than 2°C over parts of Jammu & Kashmir and Ladakh, Himachal Pradesh, Assam & Meghalaya and Gangetic West Bengal. Minimum temperature anomaly was more than 2°C over parts of Jammu & Kashmir and Ladakh, Himachal Pradesh, Uttarakhand, West Rajasthan and Sikkim. Minimum temperature anomaly was less than -2°C over parts of Vidarbha.

During September, maximum temperature anomaly was more than 2°C over parts of Ladakh, Himachal Pradesh, Uttarakhand, Punjab, Haryana, Chandigarh & Delhi, West Uttar Pradesh, Madhya Pradesh state, Jharkhand and Gangetic West Bengal. Minimum temperature anomaly was more than 2°C over parts of Ladakh, Himachal Pradesh, Uttarakhand, Punjab, Uttar Pradesh State, Madhya Pradesh State, Rajasthan state, Gujarat Region and Sikkim.

October-December (Post-monsoon season):

During October, Maximum temperature anomaly was more than 3^0C over parts of Ladakh, Himachal Pradesh and Uttarakhand. Minimum temperature anomaly was within ±1°C.

During November, Maximum temperature anomaly was more than 2^0C over parts of Assam and Meghalaya and Kerala & Mahe. Maximum temperature anomaly was less than -2^0C over parts of Jammu & Kashmir, Punjab, Haryana, Chandigarh & Delhi, West Rajasthan, West Uttar Pradesh, extreme northwest Saurashtra & Kutch and Andaman & Nicobar Islands. Minimum temperature anomaly was more than 2^0C over parts of northern Madhya Maharashtra, Kerala & Mahe and Andaman & Nicobar Islands. Minimum temperature anomaly was less than -2^0C over parts of Haryana, Chandigarh & Delhi, West Uttar Pradesh, East Rajasthan and East Madhya Pradesh.

During December, Maximum temperature anomaly was more than 2^0C over parts of Himachal Pradesh and Vidarbha. Maximum temperature anomaly was less than -2^0C over parts of Punjab, Uttar Pradesh state, Jharakhand, Bihar, Gangetic West Bengal, Madhya Maharashtra and Andaman & Nicobar Islands. Minimum temperature anomaly was above normal by 2°C or more, over parts of Bihar, Madhya Maharashtra, Marathwada, Coastal Karnataka, South Interior Karnataka and Kerala & Mahe.

Fig.5 (a) and (b) respectively shows the monthly minimum and maximum temperature anomaly for the country as a whole during past five years (2016-2020). In respect of maximum temperature, month of July, September and October were second warmest in last five years, while January, August, September and October were warmest in respect of minimum temperature during the last five years.

Cold Wave conditions:

In the month of January, cold wave conditions prevailed over parts of Saurashtra & Kutch, Haryana, Chandigarh & Delhi, Jammu & Kashmir, Jharkhand, Bihar, Chhattisgarh, Punjab, Himachal Pradesh, Odisha, east and west Rajasthan and West Uttar Pradesh on isolated days.

In the month of February, cold wave conditions prevailed during the first fortnight (1-13 February) of the month over parts of Haryana, Chandigarh & Delhi and Punjab on many days and over parts of Uttarakhand, Odisha, East and West Madhya Pradesh, Chhattisgarh, Bihar and Jharkhand on few days. During the above period, severe cold wave conditions prevailed on one day each in Punjab and Odisha.

Cold day conditions at many places with severe cold day conditions at isolated places occurred over Haryana, Chandigarh & Delhi and West Uttar Pradesh during 15-18 and 29-31 December and over East Uttar Pradesh during 19-22 December. The cold day conditions at isolated places occurred over Bihar during 19-23 December over north Madhya Pradesh during 19-20 and 29-31 December.

Fig 6 shows the minimum temperature anomaly diagram for the duration when cold wave condition was at its peak during 10-14 January.

Heat Wave Conditions:

Heat wave conditions were rather moderate during the season. These conditions were observed over isolated pockets of Gujarat State on 13 and 14 April.

In the month of May, heat wave conditions were moderate during the month. These conditions were observed over Saurashtra & Kutch and west Rajasthan on 21 May. During 22-29 May, it was observed in some parts, on most of the days in Rajasthan, Vidarbha, Madhya Pradesh, on many days in Haryana, Chandigarh, & Delhi, Telangana, Uttar Pradesh, on a few days in Gujarat, Marathwada and on isolated days in Madhya Maharashtra, Chhattisgarh and coastal Andhra Pradesh. Severe heat wave conditions were also observed on 25 May in isolated pockets of west Rajasthan, Haryana, Delhi & East Uttar Pradesh and during 27-28 May in some parts of Rajasthan.

In the month of June, Heat wave conditions prevailed over some parts of West Rajasthan during 15-18 June, which was severe at one or two places on 16 June.

Fig 7 shows the maximum temperature anomaly diagrams for the duration when heat wave condition was at its peak during 22-27 May.

B) RAINFALL

Time series of percentage departure of area weighted seasonal and annual rainfall over the country as a whole are shown in Fig. 8. In 2020, annual rainfall over the country as a whole was 110 % of its LPA value.

Season wise rainfall distribution over the country as a whole is listed below:
Winter (January to February): **99% of LPA**
Pre-monsoon (March to May): **121% of LPA**
Monsoon (June to September): **109% of LPA**
Post-monsoon (Oct to Dec): **101 % of LPA**

Sub-division wise seasonal and annual rainfall statistics is given in Table 1 and its spatial distribution is shown in Fig. 9. Month wise rainfall distribution is shown in Fig.10.

Annual:

Rainfall activity over the country as a whole was normal (110 % of LPA) during the year. Out of 36 meteorological subdivisions, two sub-divisions viz. Saurashtra & Kutch and Rayalaseema received large excess rainfall, 10 received excess rainfall, 22 received normal rainfall and remaining 2 subdivisions received deficient rainfall.

At the end of year, of the four homogeneous regions, South Peninsular India received 121%, central India received 119%, East & Northeast India received 106% while Northwest India received 90.5 % of LPA rainfall.

Winter season:

Rainfall realized during the season was 99.1% of LPA. It was 163.7% of LPA during January and was 51.6% of LPA during February.

During the season, out of 36 meteorological subdivisions, 5 received large excess rainfall, 5 received excess rainfall, 8 received normal rainfall, 7 received deficient rainfall, 9 received large deficient rainfall and two subdivisions did not receive any rain.

Pre-monsoon season:

Rainfall realized during the season was 121% of its LPA. It was 147%, 108.6% and 115.9% of LPA during March, April and May respectively.

Rainfall activity during the season was above normal. During the season, out of 36 meteorological subdivisions, 13 received large excess rainfall, 4 received excess rainfall, 11 received normal rainfall, 6 received deficient rainfall and 2 received large deficient rainfall.

Monsoon season:

Rainfall realized during the season was 109% of its LPA. It was 117%, 90%, 127% and 105% of its LPA during June, July, August and September respectively.

Most sub-divisions of the country received large excess/excess/normal rainfall except a few from northern region and Nagaland-Manipur-Mizoram-Tripura from the northeast. During the season, out of 36 meteorological subdivisions, 2 subdivisions received large excess rainfall, 13 subdivisions received excess rainfall, 16 received normal rainfall and the remaining 5 subdivisions received deficient rainfall.

Daily area weighted rainfall (mm) over the country as a whole during the monsoon season 2020 (1st Jun. to 30th Sep.) and its long term average(1961-2010) values are shown in Fig. 11. For the country as a whole, rainfall averaged was above or near normal on many days during the season. On about 20 occasions, it was nearly one and half times its normal value. During 1- 5 June and 21- 24 September, it was almost one and half times its normal at a stretch. On some occasions, it was below normal at a stretch on 13 -19 Jul, 22-28 Jul and 1- 6 Sept.

Post-monsoon season:

Rainfall realized over the country as a whole during the season was 101% of its LPA. It was 103%, 96% and 98% of its LPA during October, November and December month respectively. Except some subdivisions from northwest, central and east and northeast India rainfall received was large excess/excess/normal.

Rainfall activity over core region of the south peninsula (comprising of 5 subdivisions viz. Coastal Andhra Pradesh, Rayalaseema, Tamil Nadu & Puducherry, South Interior Karnataka and Kerala and Mahe) was above normal [110% of Long Period Average (LPA)]. It was above normal during November and December (124%of LPA, and 166% of LPA respectively) and was below normal during October (87%of LPA).

Out of 36 meteorological subdivisions, 2 subdivisions received large excess rainfall, 9 subdivisions received excess rainfall, 9 subdivisions received normal rainfall, 11 subdivisions received deficient rainfall and 5 subdivisions received large deficient rainfall. Time series of northeast monsoon seasonal rainfall over the core region of south peninsula is shown in Fig 12.

C) Standardized Precipitation Index

The Standardized Precipitation Index (SPI) is an index used for measuring drought and is based on precipitation. This index is negative for dry, and positive for wet conditions. As the dry or wet conditions become more severe, the index becomes more negative or positive. Fig.13 gives the districtwise SPI values for the year 2020.

Cumulative SPI values of the past twelve months indicate, extremely wet/severely wet conditions over parts of Arunachal Pradesh, Assam & Meghalaya, Sub Himalayan West Bengal & Sikkim, Odisha, Bihar, East Uttar Pradesh, Madhya Pradesh state, Gujarat state, Konkan & Goa, Madhya Maharashtra, Marathwada, Chhattisgarh, Andhra Pradesh state, Telangana, North Interior Karnataka and South Interior Karnataka while extremely dry/severely dry conditions were observed over parts of Assam & Meghalaya, Nagaland, Manipur, Mizoram & Tripura, Sub Himalayan West Bengal & Sikkim, Jharkhand, Uttar Pradesh state, Haryana, Chandigarh & Delhi, Punjab, Himachal Pradesh, and Jammu & Kashmir and Ladakh.

D) TROPICAL STORMS / DEPRESSIONS IN THE INDIAN SEAS

During 2020, five cyclonic storms formed over the North Indian Ocean; Super cyclonic Storm AMPHAN, Very Severe Cyclonic Storms NIVAR & GATI, Severe Cyclonic Storm NISARG, and Cyclonic Storm 'BUREVI'. Of these, NISARG & GATI formed over Arabian Sea, while the remaining 3 cyclones viz. AMPHAN, NIVAR & BUREVI formed over the Bay of Bengal. Out of these five most devastating cyclonic storms, the Super Cyclonic Storm AMPHAN formed in the pre-monsoon season and crossed West Bengal coast over Sundarbans on 20th May. It claimed 90 lives & about 4,000 livestock mainly from West Bengal. The Severe Cyclonic Storm NISARG formed in the Monsoon season & crossed Maharashtra coast on 3rd June claimed 4 lives & 2000 livestock from Maharashtra. The remaining three NIVAR, BUREVI & GATI formed during the post monsoon season. The Very Severe Cyclonic Storm NIVAR crossed Tamil Nadu & Puducherry coasts close to north of Puducherry and claimed 12 lives & 10836 livestock over Tamil Nadu & Andhra Pradesh. The Cyclonic Storm BUREVI claimed 9 lives & 200 livestock. The VSCS "GATI" made landfall over Somalia coast. All these weather systems, their remnants, and other low-pressure systems caused above normal rainfall over central and peninsular India.

During winter season, no intense low pressure system formed.

During pre-monsoon season, apart from the above mentioned intense system, one depression (over AS) and one low pressure area (over BOB) formed in month of May.

During the monsoon season, twelve low pressure systems (1 severe cyclonic storm, 6 well marked low pressure areas & 5 low pressure areas) were formed. The frequency and place of origin of these low pressure systems formed over the Indian region during the monsoon season is shown in the table below.

Month /Systems	CS	DD	D	WML	LPA
June	1(AS)	0	0	0	1(BOB)
July	0	0	0	1(AS)	1(BOB)
August	0	0	0	4(BOB)	1(BOB)
September	0	0	0	1(BOB)	1(BOB),1(AS)
	(AS : Arabian Sea)		**(BOB : Bay of Bengal)**		

CS: Cyclonic Storm, DD: Deep Depression, D: Depression, WML: Well Marked low, LPA: Low Pressure Area

During the post monsoon season, apart from the storms mentioned above, three depressions formed in the month of October (2 over BOB and 1 over AS) and four low pressure areas formed (2 in the month of October over BOB and 2 in the month of December over AS). The first depression of the post monsoon season formed over Bay of Bengal on 11th October. It concentrated into deep depression on 12th and crossed north Andhra coast on 13th as deep depression. After that, it weakened into depression on 13th October. This depression lay as a well marked low pressure area over Konkan region on 15th, again emerged as a depression over Arabian sea on 17th and travelled in westwards and weakened on 18th. The third depression of the season formed on 22nd October over northwest and adjoining west central Bay of Bengal. This depression travelled in north north east direction weakened on 25th over Bangladesh and neighborhood.

Fig. 14 (a) and 14 (b) respectively show track of these systems formed during the monsoon and other seasons in the year 2020. Frequency of depressions and cyclonic storms formed over the north Indian Ocean and Land (1951-2020) during the monsoon and post monsoon is shown in Fig.15 (a) and 15(b) respectively.

E) SIGNIFICANT WEATHER EVENTS

Heavy rainfall & flood related incidents reportedly claimed over 600 lives from different parts of the country during pre-monsoon, monsoon & post-monsoon seasons. Of these, 129 lives were reportedly claimed from Assam, 72 from Kerala [Specifically, 65 persons reportedly claimed dead in a single day from Pettimudi in Munnar, Idukki district of Kerala on 7th August due to landslide.], 61 from Telangana (while, 59 lives reportedly claimed only during the period 1st to 20th October), 54 lives from Bihar, 50 from Maharashtra, 48 Uttar Pradesh, & 38 from Himachal Pradesh and remaining from rest of the country.

Thunderstorms reportedly claimed 578 lives from different parts of the country. Of these deaths, 280 were claimed from Bihar, 167 from Uttar Pradesh & 122 from Jharkhand and remaining from rest of the country.

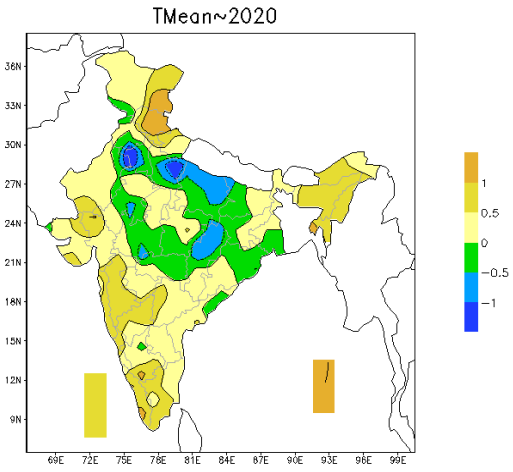
Lightning events reportedly claimed 237 lives from central, northwestern, northeastern and peninsular parts of the country. Of these, 72 lives were from Madhya Pradesh, 53 from Uttar Pradesh, 26 from Bihar, 23 from Maharashtra & 20 from Andhra Pradesh and remaining from rest of the country.

Cold wave conditions mainly prevailed over central parts the country especially in the month of January. It caused deaths of about 150 people. Of these deaths, 88 deaths were reported from Uttar Pradesh alone, 45 from Bihar alone on a single day (1st January) & 16 from Jharkhand.

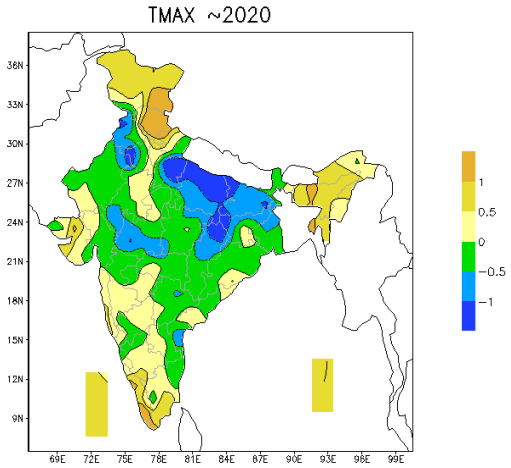
Snowfall claimed 16 lives from Jammu & Kashmir & Himachal Pradesh. Squall claimed 6 lives from Jharkhand and dust storm claimed 14 lives from Rajasthan.

Significant weather events during 2020 and associated loss of lives are shown in Fig.16.

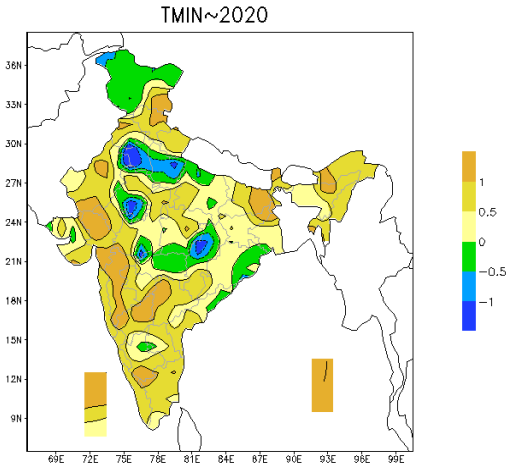
The highest maximum & lowest minimum temperature and highest rainfall in 24 hours recorded over a station during the year 2020 with the dates of occurrences are given in Table 2.



(a) MEAN



(b) MAXIMUM



(c) MINIMUM

FIG1: ANNUAL TEMPERATURE ANOMALIES (°C) FOR 2020

(*WITH RESPECT TO 1981 - 2010 AVERAGE*)

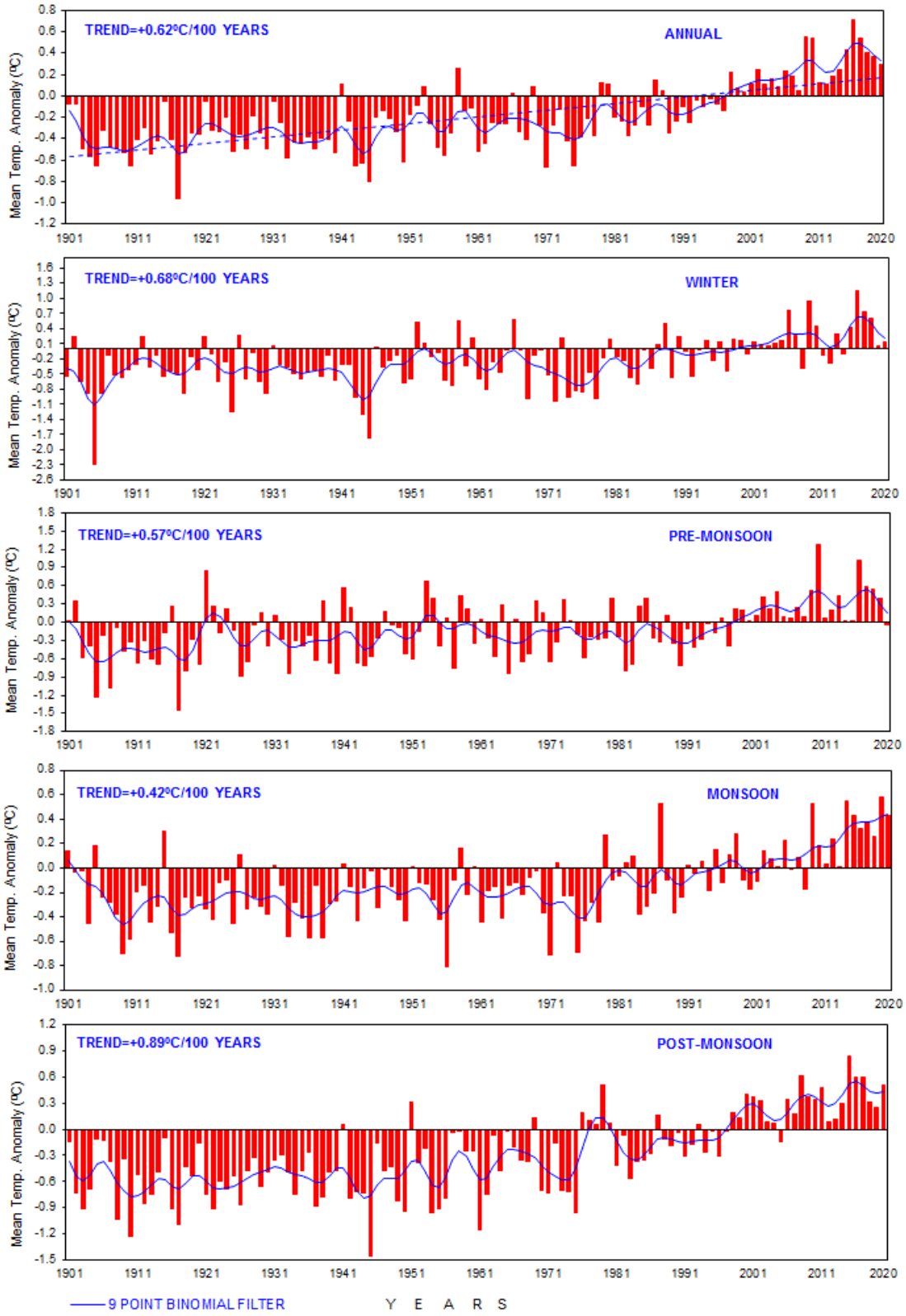


FIG. 2 : ALL INDIA MEAN TEMPERATURE ANOMALIES (A) ANNUAL, (B) WINTER, (C) PRE MONSOON, (D) MONSOON AND (E) POST MONSOON FOR THEPERIOD 1901 - 2020 SHOWN AS VERTICAL BARS. THE SOLID BLUE CURVE HAD SUB-DECADAL TIME SCALE VARIATIONS SMOOTHED WITH A BINOMIAL FILTER

(*DEPARTURES FROM THE 1981 - 2010 AVERAGE****)***

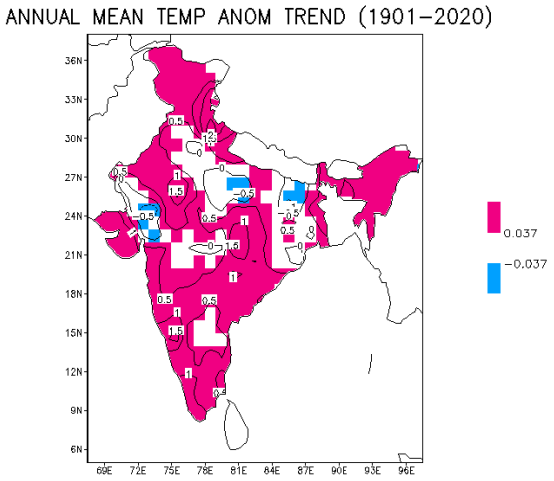
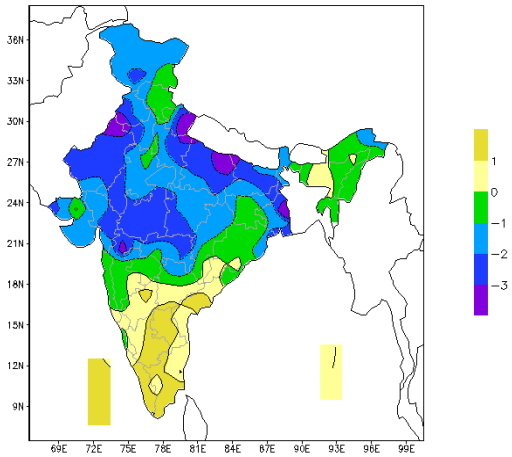
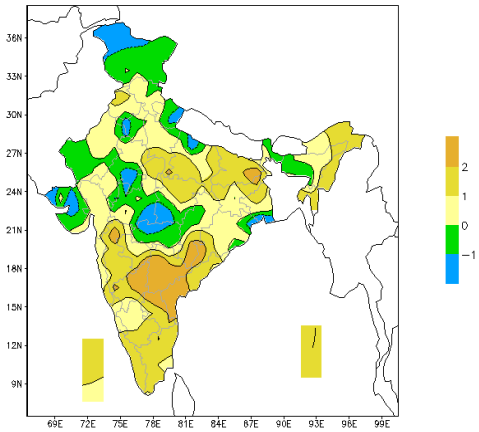


FIG. 3: ANNUAL MEAN TEMPERATURE ANOMALY TRENDS (°C / 100 YEARS) ARE SHOWN AS CONTOUR LINES. THE TRENDS SIGNIFICANT AT 95% LEVEL ARE SHADED. POSITIVE TRENDS ARE SHOWN IN RED WHILE THE NEGATIVE TRENDS ARE SHOWN IN BLUE. PERIOD OF ANALYSIS: 1901 -2020

JANUARY

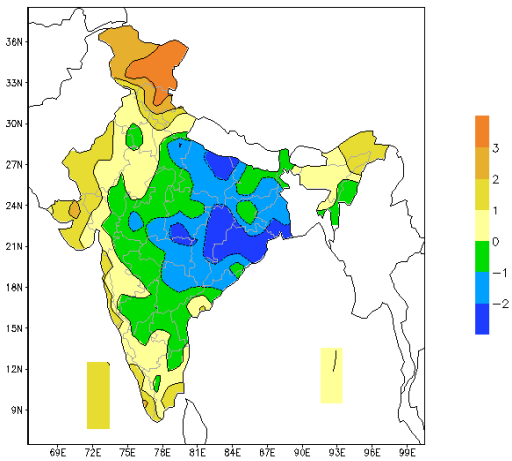


MAXIMUM

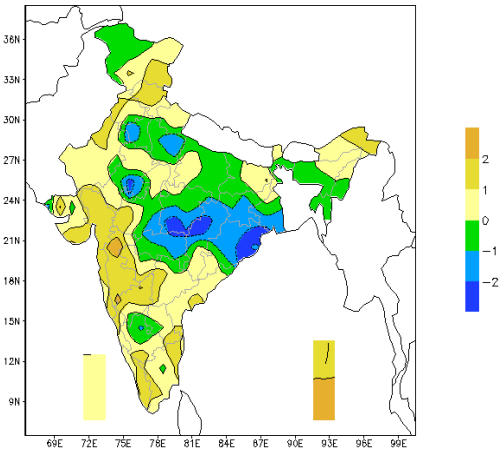


MINIMUM

FEBRUARY



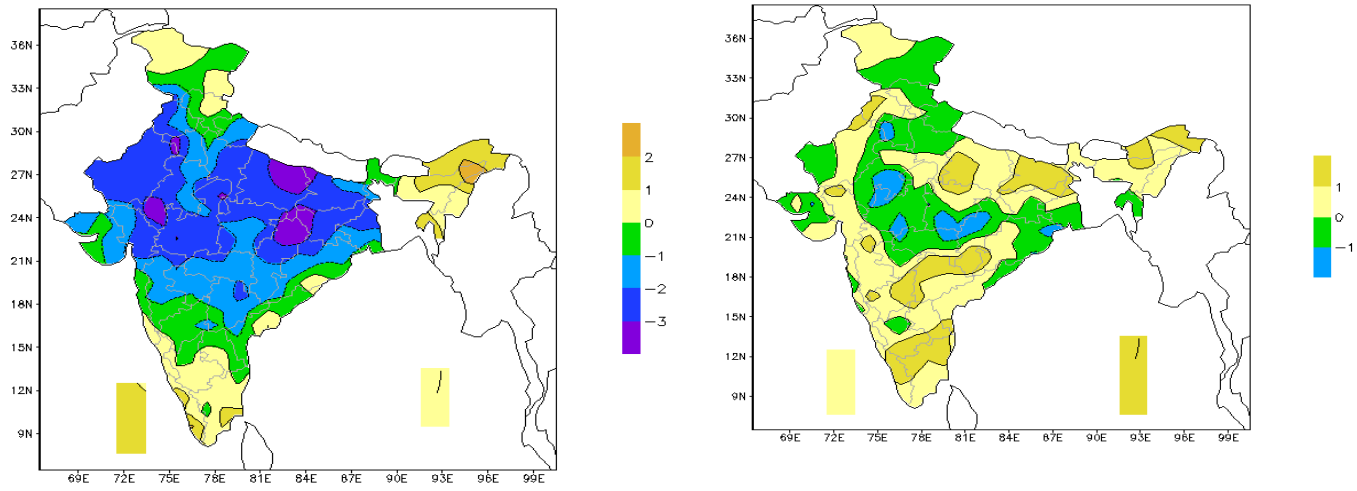
MAXIMUM



MINIMUM

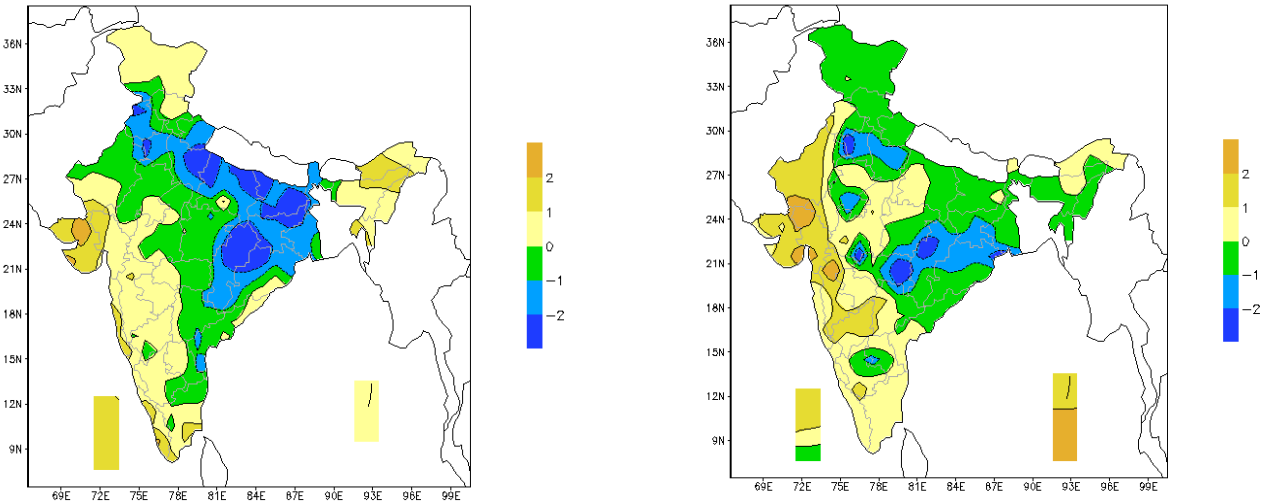
FIG. 4 : MONTHLY MEAN MAXIMUM AND MINIMUM TEMPERATURE ANOMALIES(°C) IN 2020 WITH RESPECT TO 1981 - 2010 AVERAGE

MARCH



MAXIMUM MINIMUM

APRIL



MAXIMUM MINIMUM

MAY

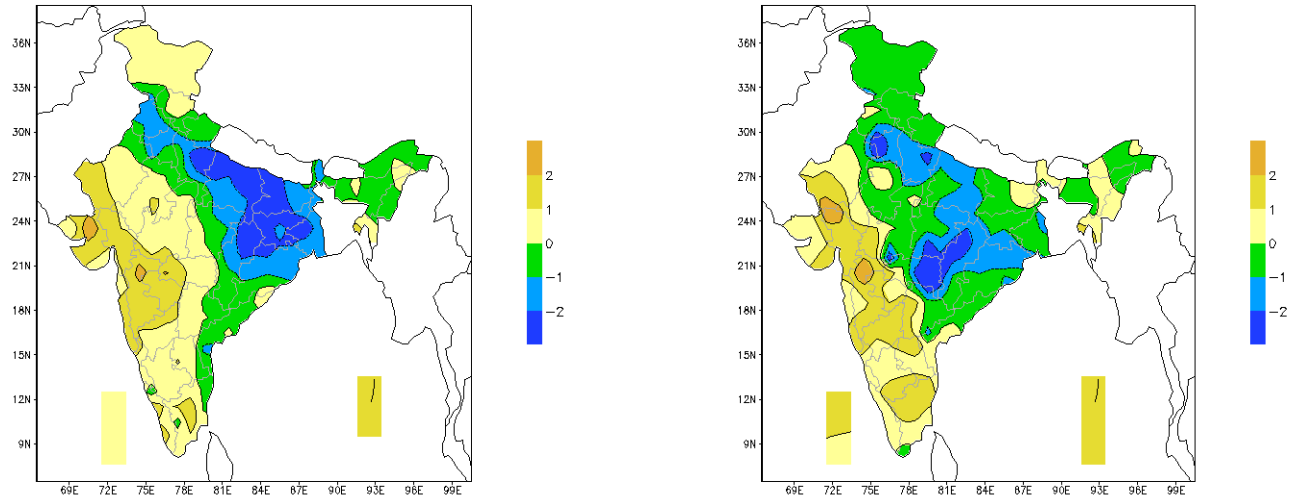
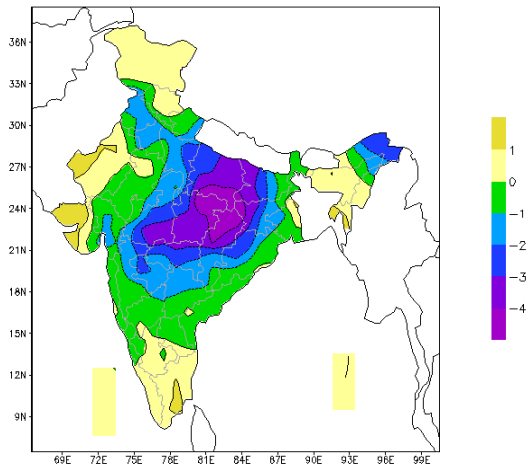
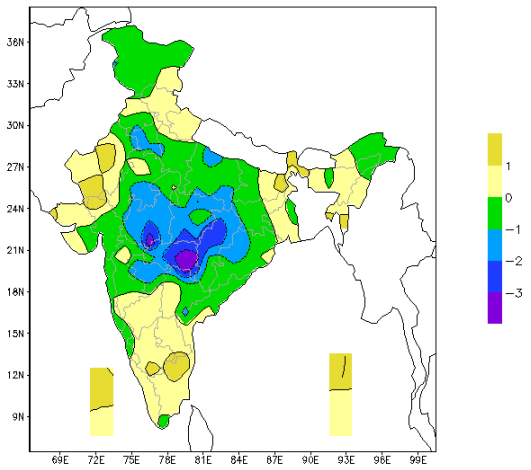


FIG. 4 : Contd...

JUNE

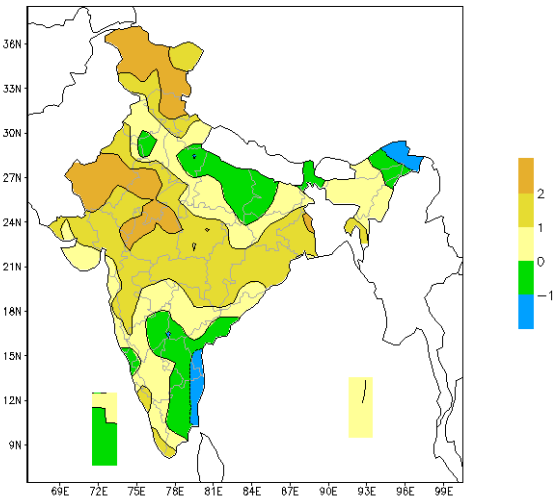


MAXIMUM

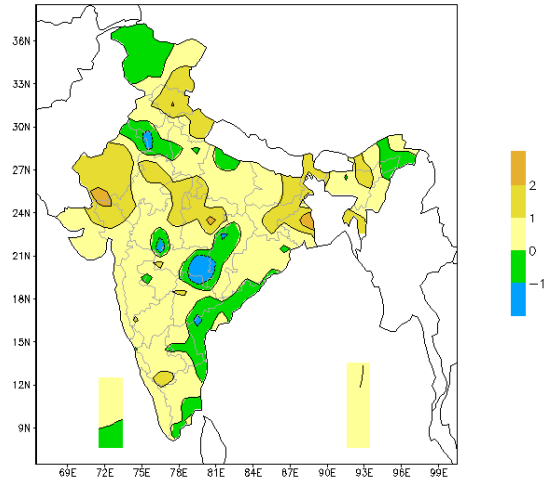


MINIMUM

JULY

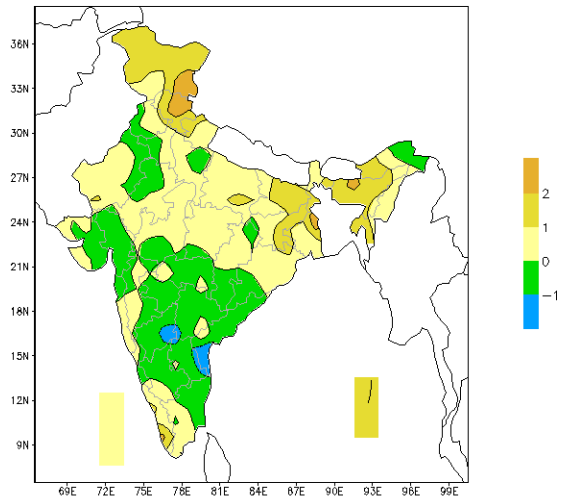


MAXIMUM

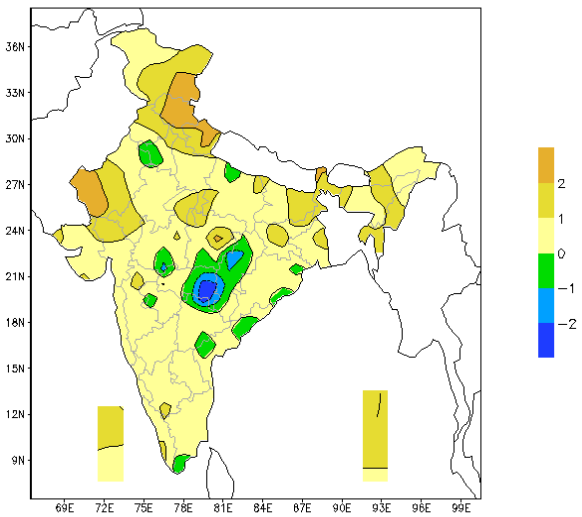


MINIMUM

AUGUST



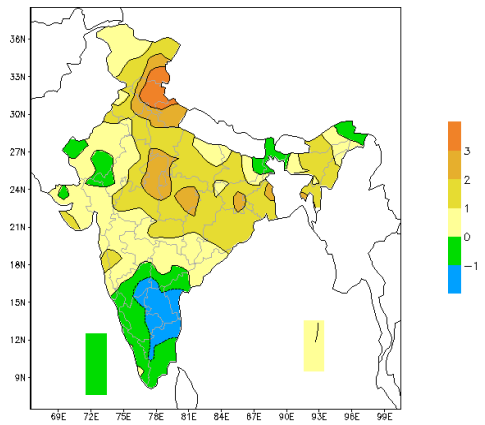
MAXIMUM



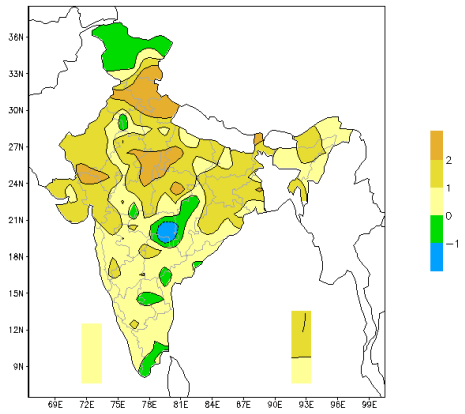
MINIMUM

FIG. 4 : Contd..

SEPTEMBER

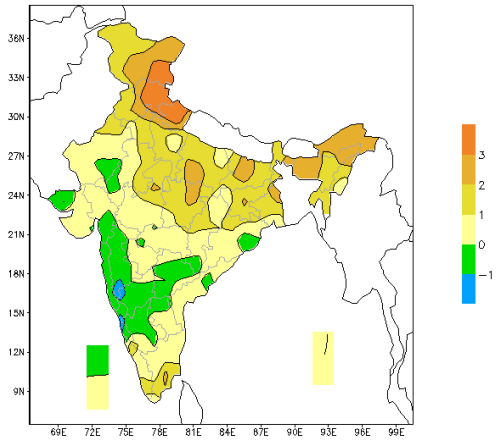


MAXIMUM

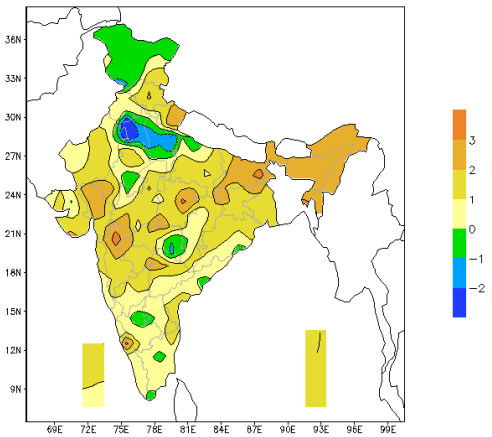


MINIMUM

OCTOBER

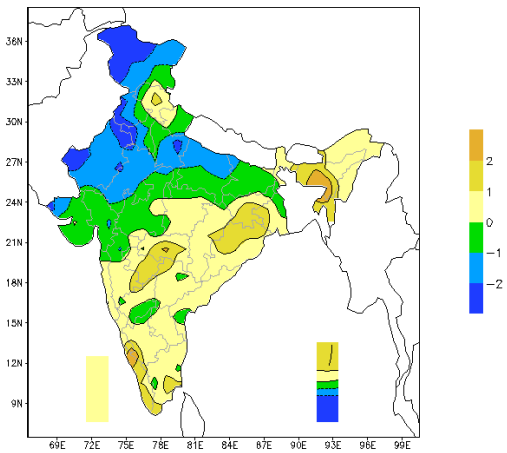


MAXIMUM

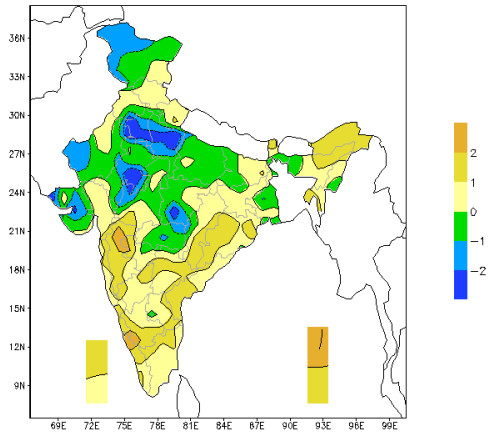


MINIMUM

NOVEMBER



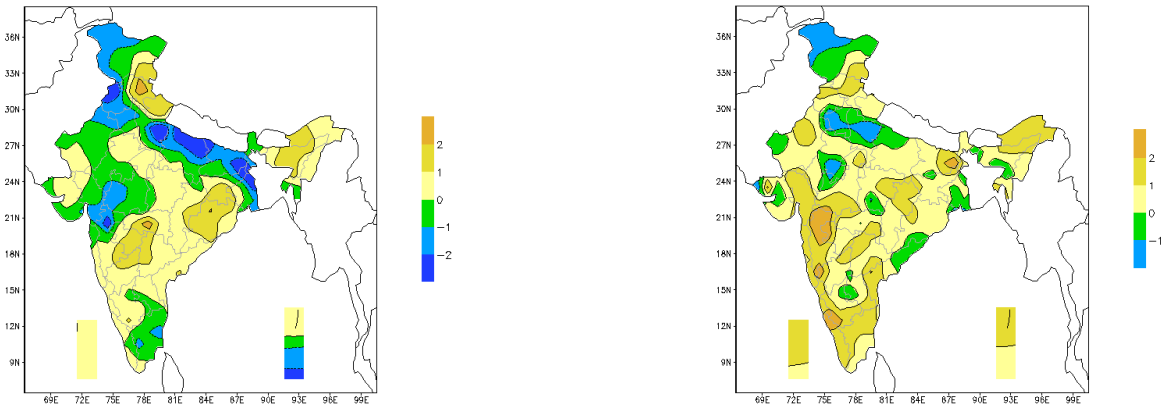
MAXIMUM



MINIMUM

FIG. 4 : Contd..

DECEMBER



MAXIMUM MINIMUM

FIG. 4 : Contd.

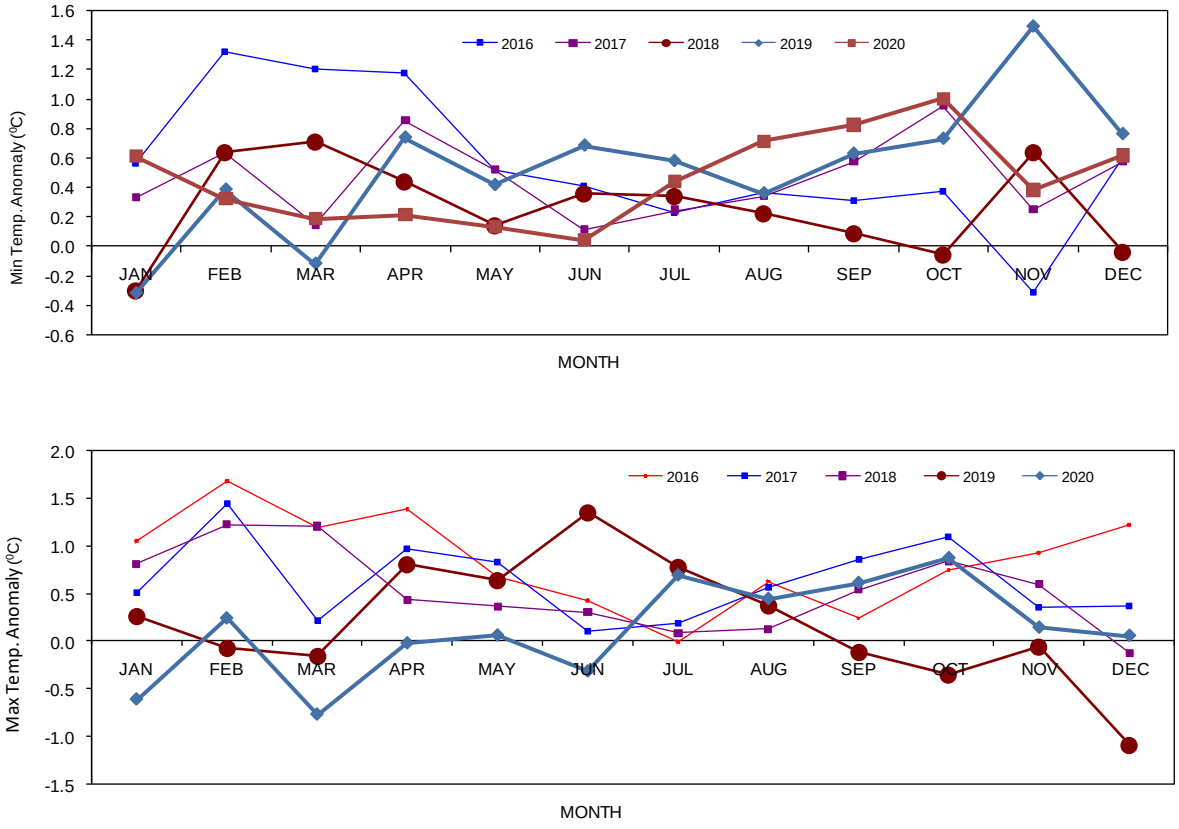


FIG. 5 : MEAN MONTHLY (a) MINIMUM AND (b) MAXIMUM TEMPERATURE ANOMALIES (2016 - 2020)

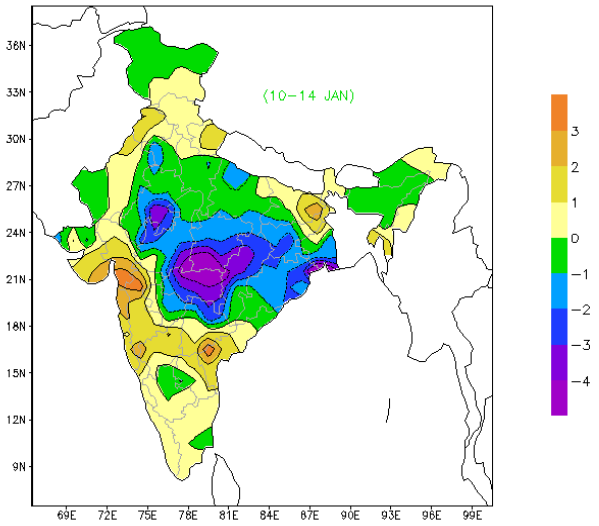


FIG 6 : MINIMUM TEMPERATURE ANOMALY (^{0}C) DURING THE COLD WAVE PERIOD

10-14 JANUARY

(*WITH RESPECT TO 1981-2010 AVERAGE*)

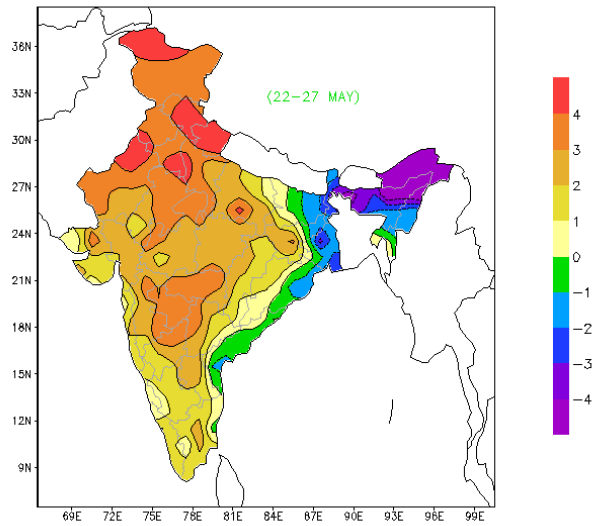


FIG 7 : MAXIMUM TEMPERATURE ANOMALY (^{0}C) DURING THE HEAT WAVE PERIOD

22-27 MAY

(*WITH RESPECT TO 1981-2010 AVERAGE*)

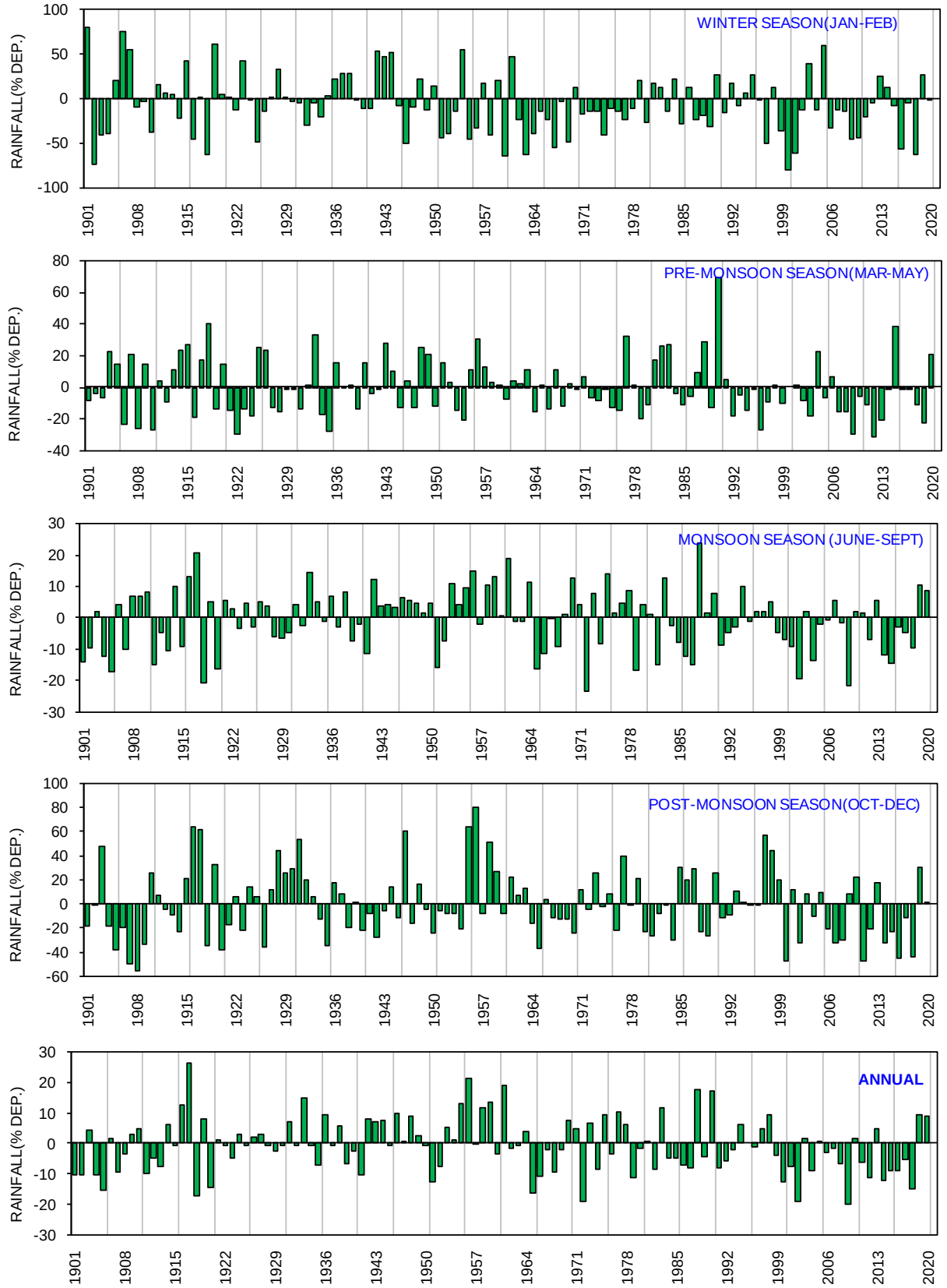
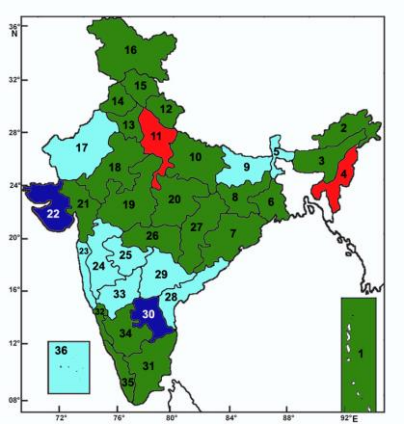
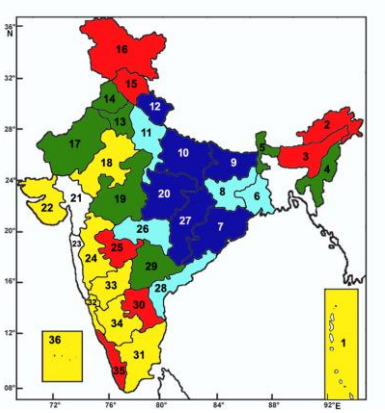


FIG. 8 : PERCENTAGE DEPARTURE OF AREA WEIGHTED (SEASONAL AND ANNUAL) RAINFALL OVER THE COUNTRY AS A WHOLE (1901-2020)

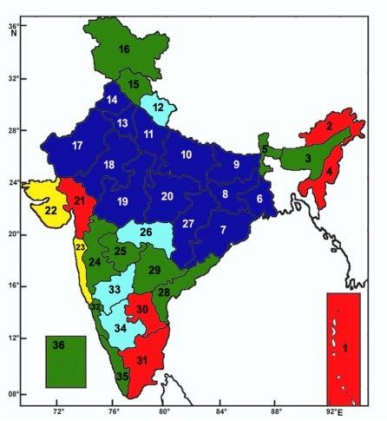
(*with respect to 1961-2010 average)*



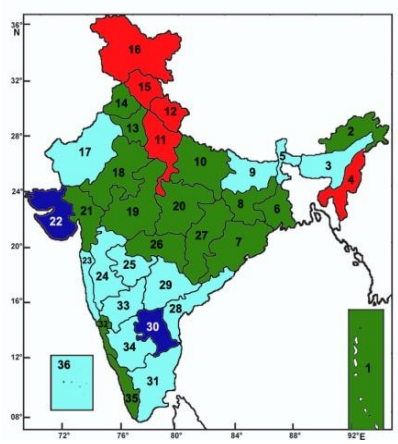
ANNUAL



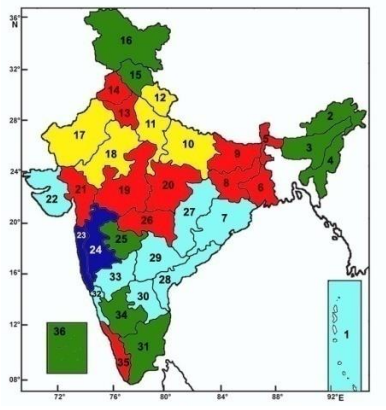
WINTER



PRE MONSOON



MONSOON



POST MONSOON

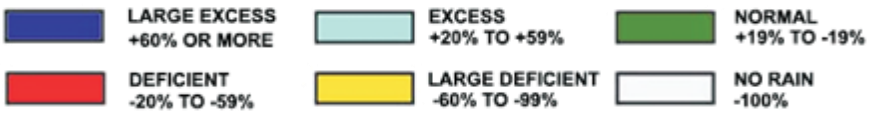
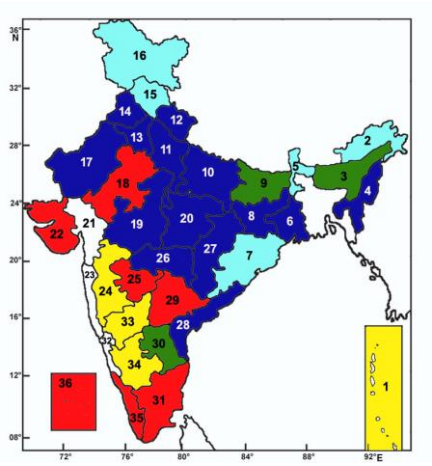
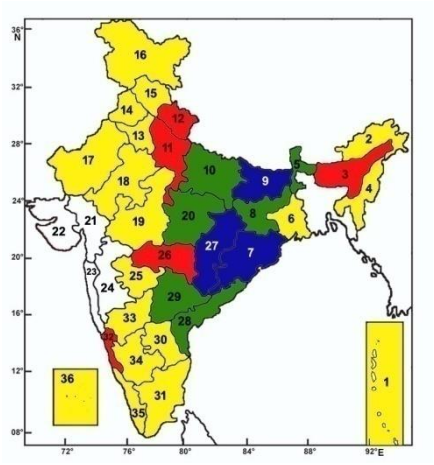


FIG. 9 : SUB-DIVISIONWISE ANNUAL & SEASONAL RAINFALL PERCENTAGE DEPARTURES

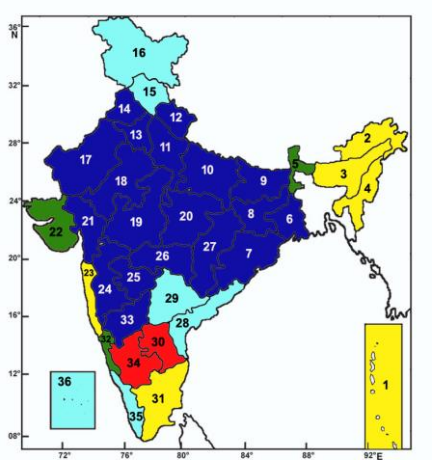
JANUARY



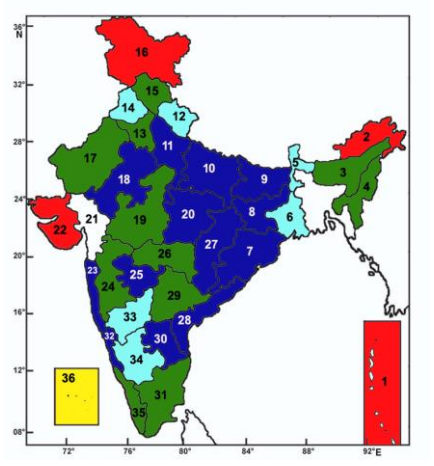
FEBRUARY



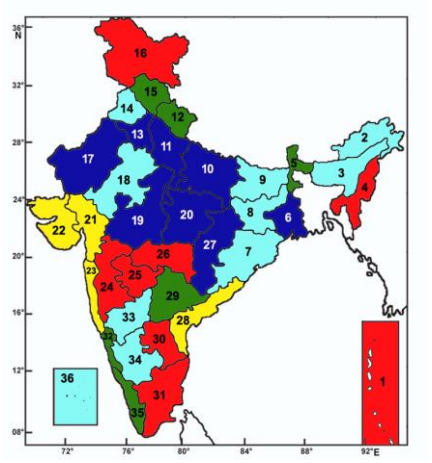
MARCH



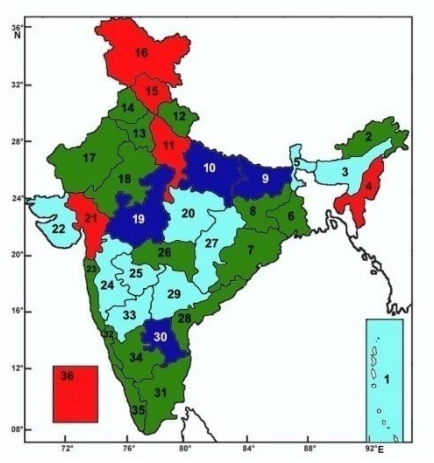
APRIL



MAY



JUNE



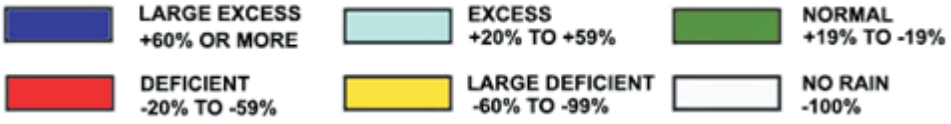
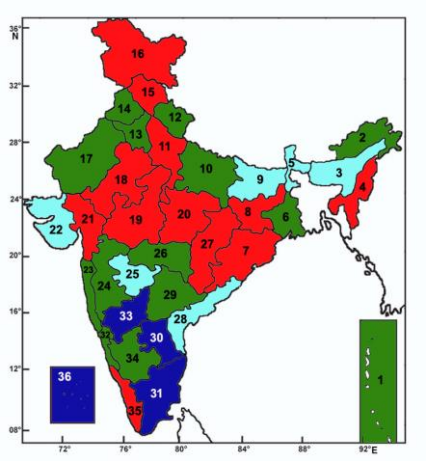
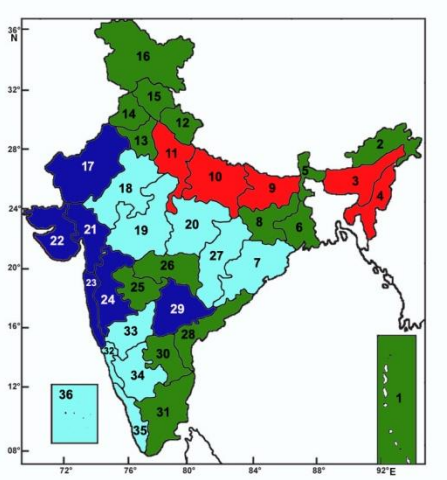


FIG.10 : SUB-DIVISIONWISE MONTHLY RAINFALL PERCENTAGE DEPARTURES FOR 2020

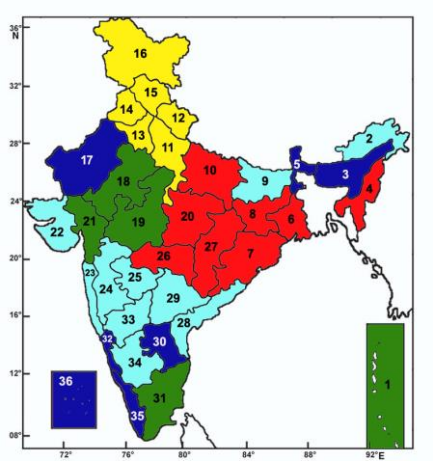
JULY



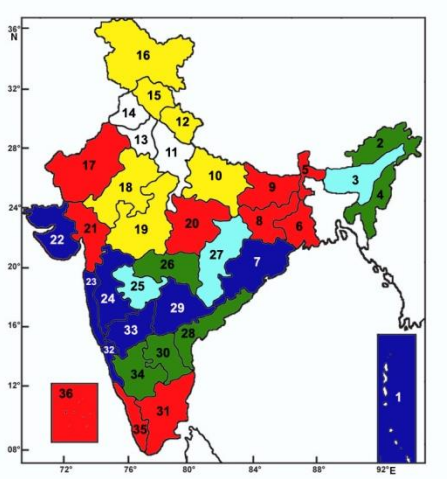
AUGUST



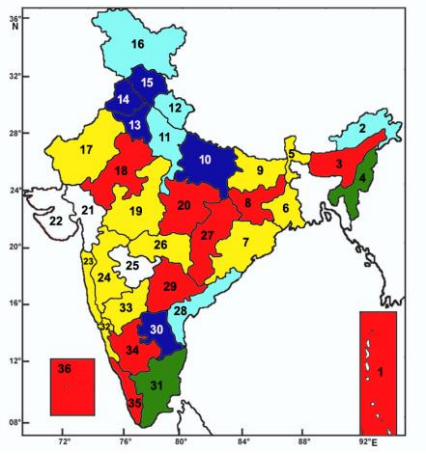
SEPTEMBER



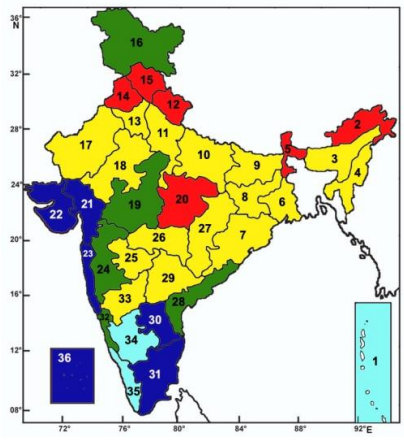
OCTOBER



NOVEMBER



DECEMBER



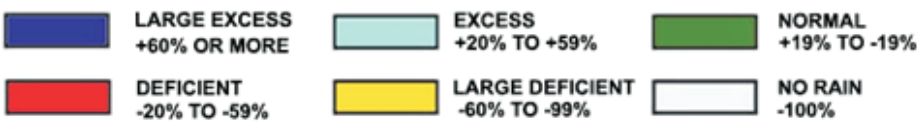


FIG.10 : Contd.....

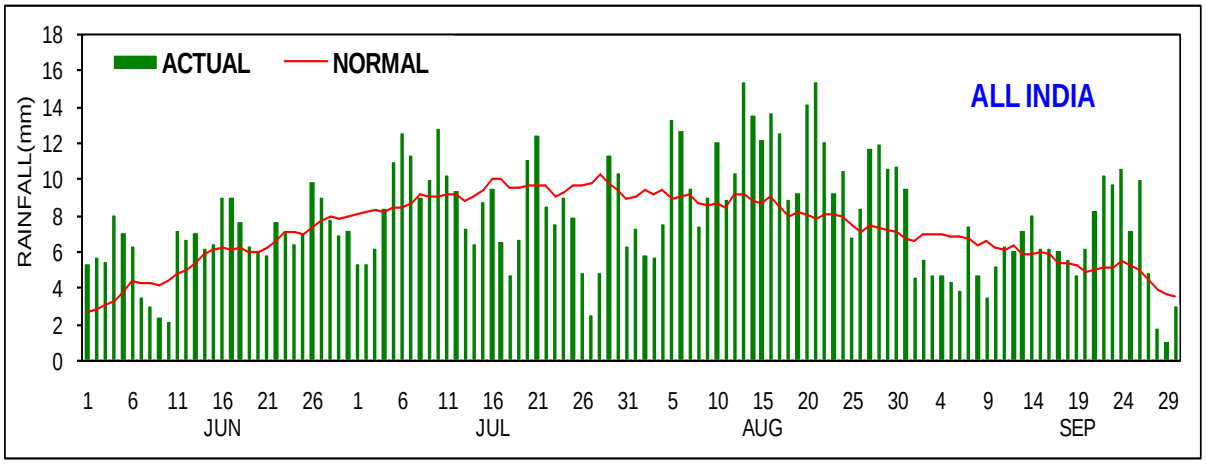


FIG. 11 : DAILY AREA WEIGHTED RAINFALL (mm) OVER THE COUNTRY AS A WHOLE (VERTICAL BARS) AND ITS LONG TERM AVERAGE (1961-2010) (CONTINUOUS LINE)

1 JUNE - 30 SEPTEMBER 2020

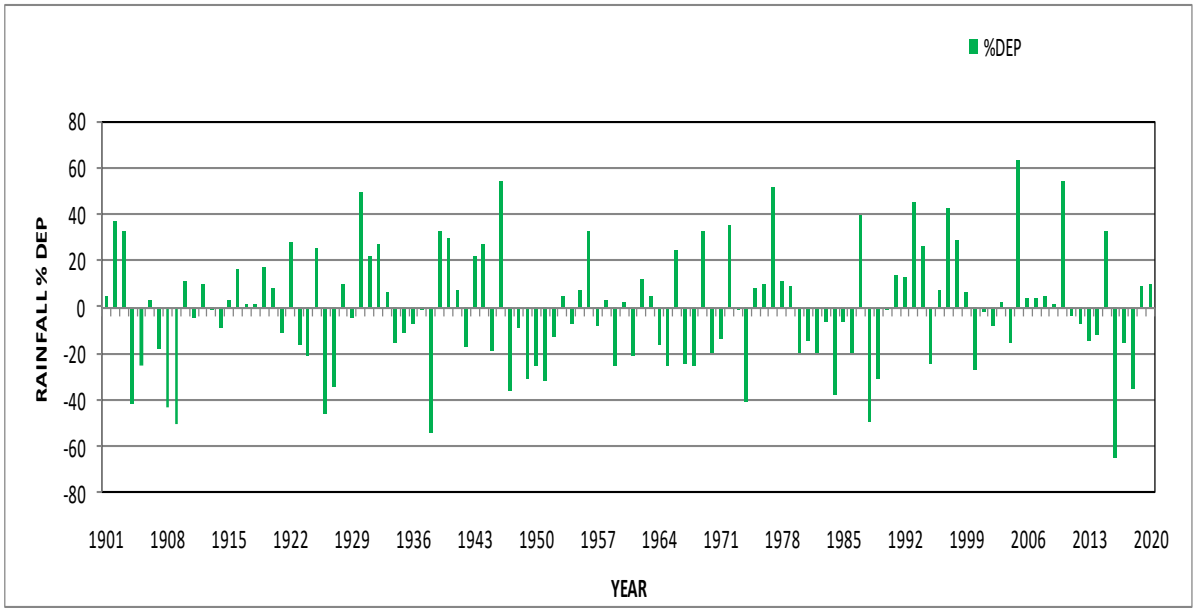


FIG. 12 : PERCENTAGE DEPARTURE OF RAINFALL DURING THE POST-MONSOON SEASON (OCTOBER TO DECEMBER) OVER THE CORE ZONE OF SOUTH PENINSULA (1901-2020)

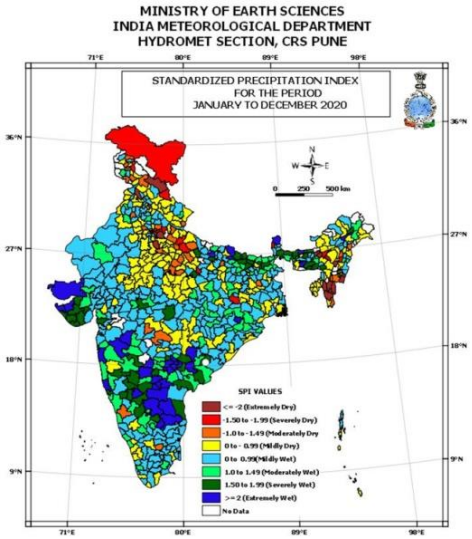


FIG. 13 : STANDARDIZED PRECIPITATION INDEX JAN - DEC 2020

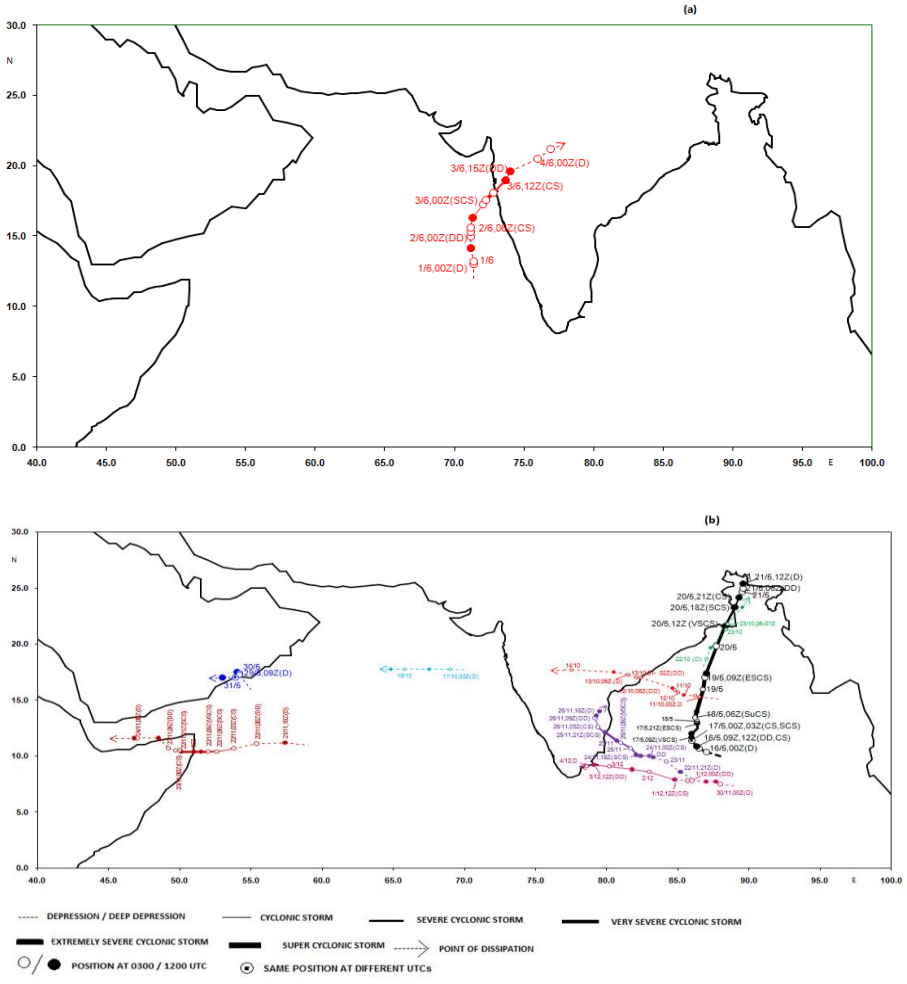
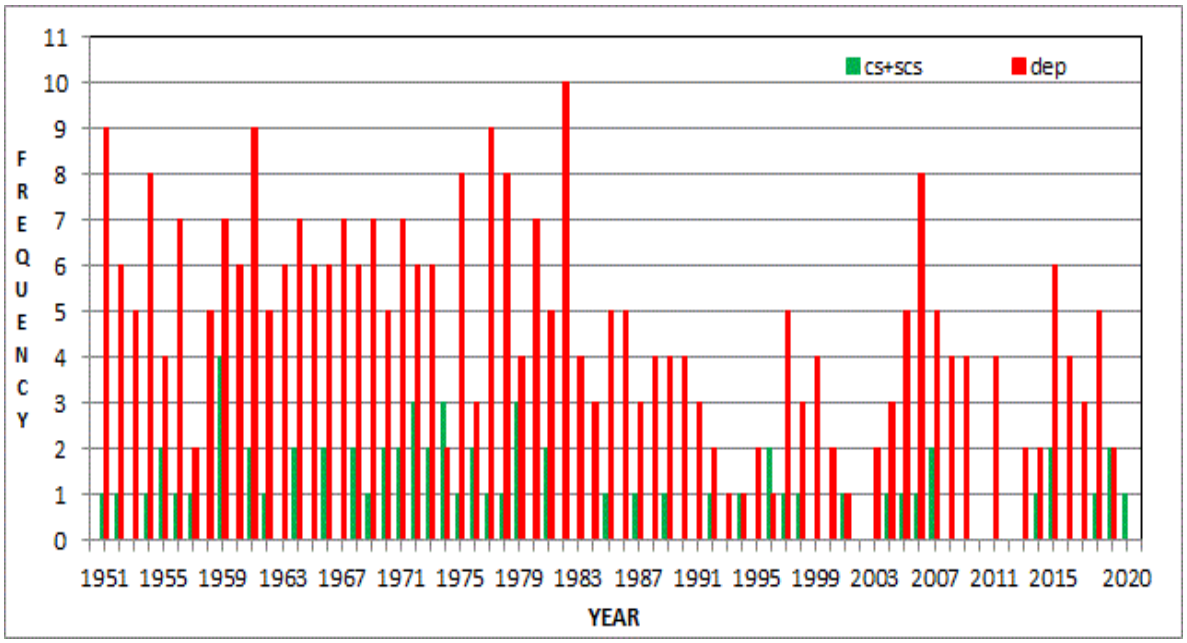
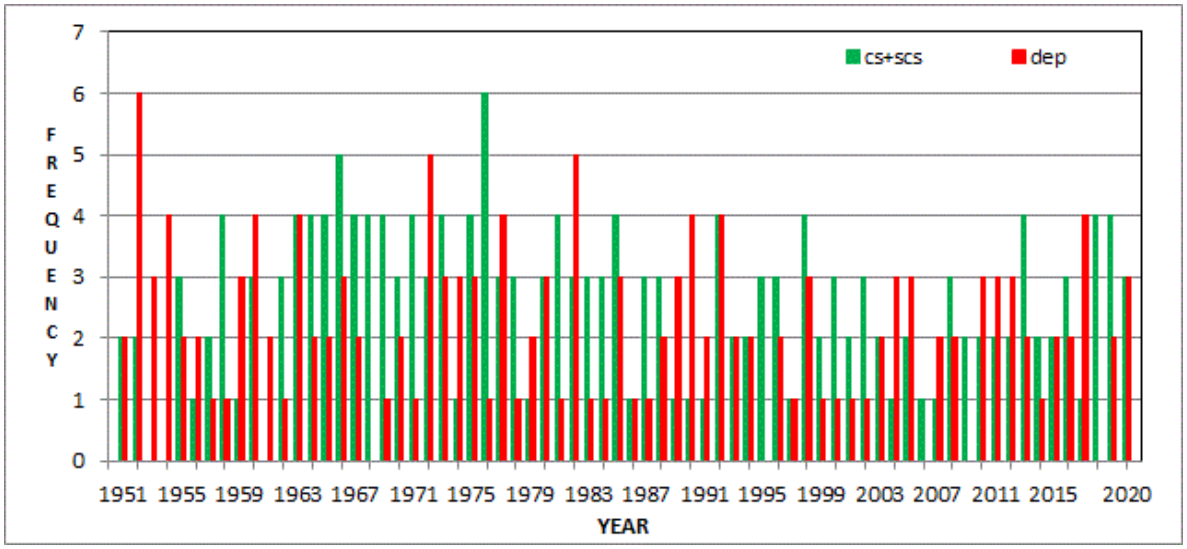


FIG. 14 : TRACKS OF DEPRESSIONS AND CYCLONIC STORMS FORMED DURING 2020

(a) MONSOON SEASON (b) OTHER SEASONS



(a) MONSOON SEASON(JUNE-SEPTEMBER)



(b) POST MONSOON SEASON (OCTOBER-DECEMBER)

FIG. 15 : FREQUENCY OF DEPRESSIONS AND CYCLONIC STORMS FORMED OVER THE NORTH INDIAN OCEAN & LAND (1951-2020)

(Source : Cyclone e-atlas, RSMC New Delhi)

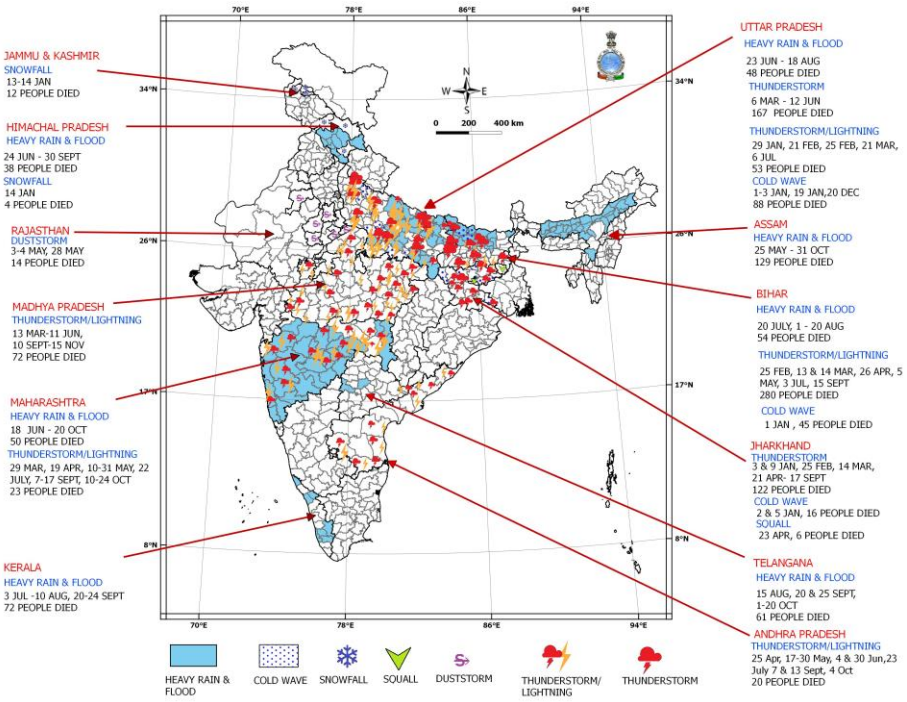


FIG 16: SIGNIFICANT WEATHER EVENTS DURING 2020

TABLE 1

METEOROLOGICAL SUB-DIVISIONWISE SEASONAL AND ANNUAL RAINFALL STATISTICS FOR THE YEAR 2020

		winter updated			premonsoon updated			monsoon real time			post monsoon real time			annual		
S.NO	SUB-DIVISION	ACT	NORMAL	%DEP	ACT	NORMAL	%DEP	ACT	NORMAL	%DEP	ACT	NORMAL	%DEP	ACT	NORMAL	%DEP
1	A & N ISLANDS	6.0	75.4	-92	266.1	466.8	-43	1712.4	1653.8	4	858.5	675.8	27	2843.0	2871.8	-1
2	ARUNACHAL PRADESH	98.2	146.7	-33	599.9	772.9	-22	1943.7	1726.6	13	247.0	267.4	-8	2888.8	2913.6	-1
3	ASSAM &MEGHALAYA	35.0	46.7	-25	663.7	587.8	13	2147.5	1773.7	21	215.0	196.5	9	3061.1	2604.7	18
4	NAG.,MANI.,MIZO.,TRIP	44.1	37.8	17	303.8	483.0	-37	965.4	1426.7	-32	213.5	221.0	-3	1526.8	2168.5	-30
5	S.H.W.B.&SIKKIM	48.9	45.9	6	499.5	442.9	13	2665.3	1970.8	35	121.8	179.4	-32	3335.4	2639.0	26
6	GANGATIC W.B.	39.4	32.8	20	371.1	185.8	100	1061.0	1181.5	-10	80.6	156.4	-48	1552.0	1556.5	0
7	ORISSA	63.1	29.2	116	265.4	128.4	107	1140.9	1155.3	-1	166.6	131.3	27	1635.9	1444.2	13
8	JHARKHAND	41.3	28.2	46	216.5	83.3	160	899.2	1054.7	-15	67.5	90.3	-25	1224.5	1256.5	-3
9	BIHAR	36.3	20.1	81	182.6	81.7	123	1272.5	1017.2	25	30.1	73.0	-59	1521.5	1192.0	28
10	EAST U.P.	41.0	25.5	61	97.9	32.4	202	784.8	839.4	-7	9.1	47.7	-81	932.8	945.0	-1
11	WEST U.P.	44.4	29.3	51	88.8	29.9	197	455.3	721.3	-37	5.4	32.7	-83	593.9	813.2	-27
12	UTTARANCHAL	170.8	101.4	68	241.3	155.3	55	943.2	1176.9	-20	17.8	60.5	-71	1373.1	1494.1	-8
13	HAR., CHANDI., DELHI	29.8	30.9	-4	118.3	39.3	201	379.8	444.0	-14	8.6	20.2	-57	536.5	534.4	0
14	PUNJAB	53.0	48.7	9	124.7	55.1	126	391.7	467.3	-16	20.7	26.3	-21	590.1	597.4	-1
15	HIMACHAL PRADESH	137.1	192.7	-29	270.9	243.4	11	565.5	763.5	-26	77.9	91.6	-15	1051.4	1291.2	-19
16	JAMMU & KASHMIR	164.3	224.0	-27	330.5	335.2	-1	376.2	566.0	-34	108.1	133.5	-19	979.1	1258.7	-22
17	WEST RAJASTHAN	8.2	8.8	-7	50.8	22.5	126	331.0	265.3	25	3.8	11.6	-68	393.8	308.2	28
18	EAST RAJASTHAN	2.9	10.0	-71	46.4	19.0	144	591.7	602.9	-2	9.2	25.8	-64	650.2	657.7	-1
19	WEST M.P.	13.5	12.5	8	27.4	12.9	113	970.9	857.7	13	21.3	50.9	-58	1033.1	934.0	11
20	EAST M.P.	52.7	32.9	60	82.7	23.6	250	1031.6	1048.4	-2	37.9	57.4	-34	1204.9	1162.3	4
21	GUJARAT REGION	0.0	1.5	-100	4.33	6.3	-31.3	1035.0	922.9	12	23.7	29.8	-21	1063.1	960.5	11
22	SAURASHTRA & KUTCH	0.2	1.0	-77	1.1	4.0	-73	1146.2	507.2	126	37.3	27.5	36	1184.8	539.7	120
23	KONKAN & GOA	0.0	0.7	-100	12.2	36.0	-66	3662.7	2875.3	27	254.2	139.6	82	3929.2	3051.6	29
24	MADHYA M'RASHTRA	0.0	2.9	-100	32.5	32.5	0	966.6	751.2	29	170.0	103.1	65	1169.1	889.7	31
25	MARATHAWADA	3.0	6.9	-56	32.7	27.4	19	866.1	668.8	30	106.7	100.0	7	1008.6	803.1	26
26	VIDARBHA	25.5	17.8	43	41.8	27.4	53	851.9	943.1	-10	52.0	81.5	-36	971.2	1069.8	-9
27	CHATTISGARH	69.0	21.3	224	119.6	41.0	192	1234.3	1142.1	8	92.6	76.7	21	1515.5	1281.1	18
28	COASTAL A.P.	31.1	22.4	39	82.3	98.7	-17	725.3	586.9	24	419.3	338.1	24	1258.0	1046.1	20
29	TELANGANA	13.9	14.5	-4	61.1	59.8	2	1095.4	751.9	46	179.5	123.3	46	1350.0	949.5	42
30	RAYALASEEMA	4.3	8.1	-47	65.4	82.1	-20	756.0	411.6	84	343.2	223.3	54	1168.9	725.1	61
31	TAMIL NADU	9.9	28.1	-65	75.9	125.4	-39	437.0	342.0	28	477.5	449.7	6	1000.3	945.2	6
32	COASTAL KARNATAKA	0.6	2.5	-77	170.8	155.7	10	3685.0	3095.1	19	332.8	256.8	30	4189.2	3510.1	19
33	N.I.KARNATAKA	0.7	5.2	-86	110.9	80.0	39	739.3	497.1	49	179.8	138.1	30	1030.7	720.4	43
34	S.I.KARNATAKA	0.4	5.8	-93	176.7	140.4	26	817.7	681.8	20	203.0	204.1	-1	1197.9	1032.1	16
35	KERALA	9.6	22.4	-57	387.3	361.5	7	2228.2	2049.3	9	365.1	491.6	-26	2990.2	2924.8	2
36	LAKSHADWEEP	8.1	25.2	-68	237.3	203.3	17	1345.4	1013.1	33	294.0	321.8	-9	1884.8	1563.4	21

TABLE -2

STATION WISE TEMPERATURE AND RAINFALL EXTREMES# FOR THE YEAR 2020

S.NO.	STATION NAME	MIN (^{0}C)	DATE (MONTH_DATE)	MAX (^{0}C)	DATE (MONTH_DATE)	HIGHEST 24 Hr. RAINFALL(mm)	DATE (MONTH_DATE)
1	Agartala AP	7.8	2_4	37.6	4_2, 4_7, 4_11	102.4	6_18
2	Cherrapunji*	2.8	1_24	30.5	9_19, 9_20	572	6_28
3	Dibrugarh AP	7	1_26	37.9	8_25	116	6_25
4	Guwahati AP	7.2	1_25	38.6	8_5	96.4	8_14
5	Imphal AP	1.7	1_25	34.2	5_18	56.8	6_2
6	Passighat	9.9	1_25	37.6	8_4	296.9	7_10
7	Shillong*	1.2	1_24	28.9	8_6	244.7	9_25
8	Tezpur	9	1_25	37.8	8_6	74.7	8_20
9	Baghdogra AP	6.1	1_25	39.2	6_30	243.6	7_12
10	Berhampore	9	12_29	39.4	4_6, 4_14	87	6_19
11	Kolkata	11.2	12_27	38.7	7_2	236.3	5_21
12	Cooch Behar AP	5.6	1_25	37.3	9_20	262	6_25
13	Contai	0.9	1_10	36.2	9_16	160.1	8_20
14	Darjeeling*	0.6	1_6	26.4	8_4	132.4	9_22
15	Gangtok*	2.2	1_6	26.1	8_4	101	6_18
16	Jalpaiguri	7.3	1_7, 1_25	37.7	8_4	180.2	9_23
17	Kalimgpong*	3	1_6, 1_7, 1_8	30.5	8_4	110	8_20
18	Krishnanagar	6.8	1_28	36.8	9_16	42.9	7_22
19	Midnapore	10.5	12_20	39.4	4_10	114.8	5_28
20	Panagarh	5	12_20	39.6	4_8	82	7_14
21	Balasore	9.8	1_12	38	4_15, 4_17	84.4	10_3
22	Bhubaneshwar AP	11.3	1_12	41.5	4_13	149.4	8_5
23	Chandbali	11.2	12_21	40.8	4_12	118.4	8_15
24	Gopalpur	13.3	12_22	35.8	8_2	80.8	9_30
25	Jharsugda AP	5.8	12_21	44.2	5_25	146.4	8_27
26	Puri	13.2	1_12	35.6	6_10	97.2	6_16
27	Sambalpur	9	1_12	43.4	5_25	104.2	8_16
28	Daltonganj	5.9	12_20	44.8	5_26	81.8	6_17
29	Gaya AP	3.6	12_19	45.8	5_26	111.9	6_26
30	Jamshedpur AP	7.6	12_21	42	5_27	82.6	8_3
31	Patna AP	5.8	12_28	40.8	5_26	83.4	6_19
32	Purnea	7.1	1_7	37.2	6_10	159.6	6_28
33	Ranchi AP	5.8	1_25	40.8	5_24	75	8_8
34	Allahabad AP	5.1	1_11	47.6	5_25	71.4	8_12
35	Bahraich	3.8	1_12	42.6	5_25, 5_26	103.6	6_21
36	Bareilly	2.8	12_19	42.5	5_27	57.8	7_8
37	Dehar Dun	3.6	1_5, 12_17, 12_18	40.1	5_27	109.2	8_16
38	Gorakhpur	5.1	12_19	42.4	5_25	94.8	6_16
39	Jhansi	4.6	1_11	47	5_26	43.2	7_15
40	Lucknow AP	4	1_1, 12_20	44.1	5_25	78.2	8_12
41	Mukteshwar**	-2.9	2_2	29.4	5_27	128.8	7_8
42	Varansai	5.4	1_11	46	5_26	103.4	8_12
43	Ambala	2.4	1_1	44.2	5_26	100.5	8_11
44	Chandigarh	3.6	1_1	39.6	5_18	133.5	8_12
45	Hissar	0	12_29	48	5_26	60	7_21
46	Karnal	0.6	1_1	44	5_26	121	7_5
47	New Delhi AP	2.4	1_1	46	5_26	70	7_19
48	Amritsar AP	0.4	12_18, 12_29	43.7	5_26	70.7	8_28
49	Patiala	1.6	1_1	44.7	5_26	74.7	7_12
50	Shimla*	-3.7	1_9	29	5_23	74.4	6_6
51	Banihal*	-4	1_9	34.8	7_14	86.2	3_28
52	Gulmarg*	-13.6	1_9	25.3	6_23	67.8	1_14
53	Jammu AP	2.6	1_1	42.6	5_27	111.7	7_29
54	Srinagar*	-6.6	12_19	35.7	8_17	62.1	1_14
55	Ajmer	3.4	1_1	44	5_25, 5_26, 5_27	93.4	7_25
56	Barmer	5.8	1_1	45.9	5_27	68.5	8_31
57	Bikaner	3.1	12_17	48	5_27	36.3	7_19
58	Ganganagar	1.5	1_1	48.9	5_27	42.2	7_13
59	Jaipur AP	3.4	1_1	45	5_26	102.7	8_15
60	Jaisalmer	2.7	1_1	47.4	6_16	72.2	9_1
61	Jodhpur AP	4.8	12_28	44.7	6_16	68	7_22
62	Kota AP	4	12_29	47.2	5_27	85.6	9_4
63	Udaipur	5.2	1_10	43	5_26	70.4	8_23
64	Ambikapur	4.7	1_11	42	5_25	71.9	10_10
65	Betul	1.7	1_11	43.4	5_25	166.4	8_29
66	Bhopal(AP)	1	1_26	44.5	5_25	210.6	8_22
67	Guna	4.6	12_29	45.2	5_25	66.4	6_20
68	Gwalior	3.8	12_29, 12_30	46.2	5_27	58.1	11_16
69	Indore(AP)	7.1	1_10	42.4	5_24, 5_25	263.4	8_22
70	Jabalpur	4.8	1_11	45	5_24	103	8_10
71	Jagdalpur	6.7	12_22	40.9	5_22, 5_23	117.6	8_20
72	Khandwa	6.4	1_11	45.1	5_23, 5_24	144	8_14
73	Nowgong	3.3	1_11	46.3	5_26	103.4	6_27
74	Pendra	5.1	1_11	42.6	5_26	82.3	6_17
75	Ratlam	4.8	1_10	43.8	5_24	135	8_30
76	Sagar	5.4	1_11	44.4	5_22	60.5	6_5
77	Satna	4.4	1_11	45.2	5_26	132.6	8_13

TABLE -2 (contd.)

S.NO.	STATION NAME	MIN (^{0}C)	DATE (MONTH_DATE)	MAX (^{0}C)	DATE (MONTH_DATE)	HIGHEST 24 Hr. RAINFALL(mm)	DATE (MONTH_DATE)
78	Seoni	5.2	1_11	43.2	5_28	209.8	8_29
79	Umaria	2.2	1_11	44.7	5_24	152.8	8_15
80	Ahmedabad AP	8.3	12_28	44.1	5_21	80.2	8_18
81	Baroda	9.8	1_17	43.3	4_30	117.1	8_10
82	Bhavnagar AP	10.9	12_29	44.2	5_28	110.2	6_9
83	Bhuj AP	7	1_1	44.2	5_20	103	8_24
84	Deesa	6.1	1_10	44.9	5_21	57.2	8_31
85	Dwarka	12.6	1_1	37.4	10_14, 10_15	275.9	7_6
86	Naliya	2.5	12_18	41	4_12	219.2	8_25
87	New Kandala	8.5	1_18	43.8	4_12	117	7_7
88	Porbandar AP	7.6	1_18	42.4	4_13	292.1	7_6
89	Rajkot AP	7.4	1_18	44	5_6	218.9	7_7
90	Surat	12.2	12_30	41.8	4_13, 5_23	107.2	7_24
91	Veraval	10.4	1_17	40.9	4_13	78.4	8_31
92	Akola	9.1	1_6	47.4	5_25	49.5	6_14
93	Ahmadnagar	9.2	1_17	41.2	5_31	51.6	7_15
94	Aurangabad AP	8.1	1_17	43.1	5_25	85.2	8_1
95	Buldhana	10.2	1_5, 1_10	43	5_23, 5_26	48.1	6_13
96	Chandrapur	7.6	1_3	46.8	5_25	106.9	7_23
97	Dahanu	13.2	12_29	36.5	11_14	383.1	8_5
98	Harnai	15.8	1_17	36.7	2_26	165.2	7_4
99	Jalgaon	7	1_17	45.3	5_25	53	7_16
100	Kolhapur	14.5	1_17, 2_1, 12_22, 12_23	39.6	5_6	130.4	10_15
101	Mahabaleshwar*	9.9	2_7	34.5	5_6	320.9	8_5
102	Malegaon	8.2	1_17	44.8	5_6	72	6_4
103	Mumbai	13.8	1_31	36	3_16	331.8	8_6
104	Nagpur AP	5.7	1_11	47	5_25	117.1	8_3
105	Panjim	18.1	2_9	36.8	5_30	173.3	9_22
106	Parbhani	7.4	12_21	46	5_25	186.2	6_11
107	Pune	8.1	12_22	40.6	5_9	112.1	10_15
108	Ratnagiri	14.1	1_17	38	2_26, 2_27	216.3	8_5
109	Sholapur	11.6	12_23	45	5_25	82	10_15
110	Yeotmal	7	12_21	38.7	6_10	32.4	7_29
111	Anantpur	12.4	12_22	42.9	5_23	58.2	9_30
112	Hyderabad AP	10.4	12_22	43	5_29	191.8	10_14
113	Kakinada	17	12_22, 12_23	42.3	5_21	139.5	10_12
114	Kalingapatnam	13.3	12_21	37.4	5_7	67.4	10_13
115	Kurnool	15	12_22	44.5	5_23	87.8	7_20
116	Machilipatnam	18.4	12_22	44	5_21	110.7	11_6
117	Nellore	20.2	12_22	42.8	5_22	137.5	11_26
118	Nizamabad	11.8	12_22	45.5	5_25	85.1	8_10
119	Ongole	19.6	12_22	44.2	5_22	148.6	11_27
120	Ramgundam	10.8	12_21, 12_22	45	5_23, 5_28	57.1	7_4
121	Rentachintala	17.8	12_29	45.4	5_21		
122	Visakhapatnam AP	13.8	12_22, 12_23	39	5_20	140.6	10_12
123	Chennai AP	18.2	1_14	42.5	5_21	146.8	11_25
124	Coimbatore	16.3	1_12	38.2	5_10, 5_14	38	4_29
125	Cuddalore	19.2	1_15	41.4	5_20	282.2	11_26
126	Kanyakumari	22.1	10_14	36.8	4_27	59.8	11_18
127	Kodaikanal*	5.9	12_20	22.7	5_20	94.6	11_18
128	Madurai AP	19.1	1_15	41.6	6_18, 6_20	88	10_7
129	Nagapattinam	20.3	1_14, 1_15	43.2	5_23	158.2	12_5
130	Palayamkottai	22.2	8_29	39.2	5_24	75	11_17
131	Pamban	21.8	1_27	36.4	5_25, 8_31	121.8	8_9
132	Salem	17.6	11_22	40.7	5_24, 5_25	88.3	10_20
133	Tiruchirapalli AP	18.6	1_15	42.5	5_24	75.4	7_12
134	Vellore	15.3	1_25	42.4	5_22	137.5	11_27
135	Bangalore*	14.4	1_15, 12_22	36.4	4_5	67	10_21
136	Chitradurga	13.1	12_22	38	4_14	99.4	10_10
137	Gadag	11.4	12_22	38.3	4_28	68	7_12
138	Gulbarga	13.1	12_22	44.7	5_25	130.5	10_14
139	Honavar	13.1	11_11	36.4	1_23	172.5	7_3
140	Karwar	17.5	2_9	37.6	1_23, 1_24	154	6_3
141	Mangalore AP	19.6	2_9	36.7	2_22, 2_23	258.1	9_11
142	Medikeri*	9.8	1_27	37	11_6	235	8_7
143	Mysore	12.3	1_26	36.7	5_17	55	10_10
144	Raichur	11.6	12_23	43	5_24, 5_25	89.6	5_30
145	Alapuzha	22.4	5_4	37.3	1_24, 2_13	97.4	9_7
146	Cochi AP	21.2	12_9	35.2	1_23	154.2	7_29
147	Kozhikode	21.6	12_21	37.8	3_17, 4_3	108.2	9_7
148	Thiruvananthapuram	21.4	12_15	36.7	5_5	113.5	6_2
149	Car Nicobar	20.8	2_16, 3_10	34.4	4_21	151.4	9_29
150	Port Blair	19.1	1_27	35.1	5_7	164.6	6_7
151	Amini Divi	23.1	11_12	37.4	5_4	92.8	8_1
152	Minicoy	22.4	1_27	35.6	4_17, 4_20	136.7	7_20

(*:Hill stations) *(#:Based on Realtime data)*







वार्षिक जलवायु सारांश - 2020

ANNUAL CLIMATE SUMMARY - 2020

जलवायु निगरानी तथा विश्लेषण समूह
Climate Monitoring & Analysis Group

(Website : http://www.imdpune.gov.in)

डिजाइन एवं मुद्रित - मुद्रण विभाग,
जलवायु अनुसंधान तथा सेवाएँ का कार्यालय
पुणे

DESIGNED & PRINTED AT
PRINTING UNIT,
OFFICE OF CLIMATE RESEARCH & SERVICES,
PUNE

Note : This Bulletin is based on operational data and is subject to updating