

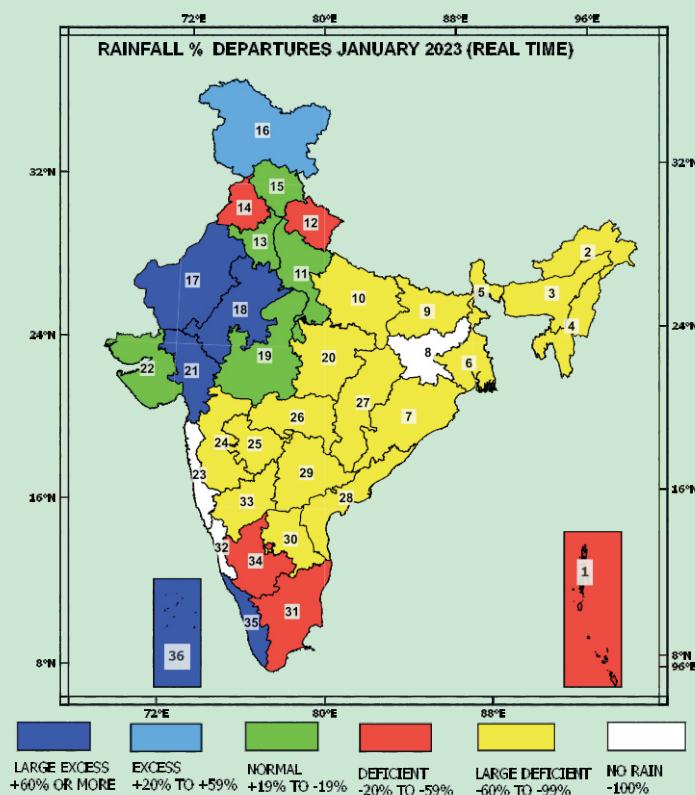


भारत सरकार / GOVERNMENT OF INDIA
पृथ्वी विज्ञान मंत्रालय / MINISTRY OF EARTH SCIENCES
पृथ्वी प्रणाली विज्ञान संगठन / EARTH SYSTEM SCIENCE ORGANIZATION
भारत मौसम विज्ञान विभाग / INDIA METEOROLOGICAL DEPARTMENT

भारत का जलवायु नैदानिक बुलेटीन CLIMATE DIAGNOSTICS BULLETIN OF INDIA

जनवरी 2023
JANUARY 2023

वास्तविक समय के आंकड़ों पर आधारित विश्लेषण
NEAR REAL - TIME ANALYSES



द्वारा जारी : जलवायु निगरानी एवं प्रागुक्ती समूह
ISSUED BY : Climate Monitoring & Prediction Group

जनवरी 2023 (सारांश) माह की मुख्य विशेषताएं

प्रमुख बिंदु:

दक्षिण प्रायद्विप का अधिकतम तापमान (30.59°C से तापमान विसंगति 0.59°C) 1901 से आठवा सबसे अधिक रहा। पूर्व और उत्तर-पूर्व भारत की वर्षा (1.9 मि. मी.) 1901 से चौथी सबसे कम रही।

शीत लहर की स्थितियाँ :

माह में शीत लहर झारखण्ड, बिहार, उत्तरप्रदेश राज्य, हरयाणा, चांदिगढ़, दिल्ली, पंजाब, हिमाचल प्रदेश, राजस्थान राज्य, मध्यप्रदेश राज्य, छत्तीसगढ़, उत्तरी आंतरिक कर्नाटक, विदर्भ, तेलंगणा के कुछ भागों में कुछ दिनों के लिए दिखाई दिये।

वर्षा की विशेषताएं:

पूरे देश में बारिश की मात्रा जनवरी महीने के दौरान एल.पी.ए. का 86% थी। 36 मौसम उप मंडलों में से 5 उप मंडलों में सामान्य से अत्यधिक, 1 उप मंडलों में अधिक, 5 में सामान्य, 5 में सामान्य से कम, 17 उप मंडलों में सामान्य से काफी कम, 3 उप मंडलों में कोई वर्षा नहीं हुई (आकृती 1)। तालिका 1 में जनवरी, 2023 के उप मंडल-वार वर्षा के आँकड़े (मि. मी.) में दर्शाए गए हैं। आकृती 2(ए) में माह के दौरान देश के विभिन्न भाग में हुई वर्षा (मि. मी.) दर्शाया गया है। आकृती 2(बी) में माह के दौरान देश के विभिन्न भाग में हुई वर्षा विसंगति (मि. मी.) दर्शाया गया है। आकृती 3 महीने के दौरान पुरे भारत और चार समरूप क्षेत्रों में दैनिक वर्षा भिन्नता दर्शाता है।

आकृती 4 में वर्ष 1951 से अब तक के सम्पूर्ण भारत और चार समरूपी क्षेत्रों की क्षेत्र भारित वर्षा की श्रृंखला दर्शाई गयी है। माह की वर्षा भारत के दक्षिण प्रायद्विप में (एल.पी.ए. का 35%), उत्तर-पश्चिम भारत (एल.पी.ए. का 12.8%), मध्य भारत (एल.पी.ए. का 26%), तथा पूर्व और उत्तर-पूर्व भारत में (एल.पी.ए. का 11%) रही।

तालिका 2 में माह के दौरान 24 घंटों में हुई भारी (7.0 से.मी. या अधिक) वर्षा वाले स्टेशनों की सूची दर्शाई गई है। चित्र 5 में भारी वर्षा वाले स्टेशन दर्शाए गए हैं।

मानकीकृत वर्षण सूचकांक (एस.पी.आई.):

मानकीकृत वर्षण सूचकांक अनावृष्टि मापने का एक सूचकांक है जो केवल वर्षा पर आधारित होता है। यह सूचकांक शुष्क स्थिति में ऋणात्मक और आर्द्ध स्थिति में धनात्मक होता है। जब शुष्क या आर्द्ध मौसम की स्थिति अधिक भीषण होती है, तब सूचकांक अधिक ऋणात्मक या धनात्मक होता है। आकृती 6 (ए, बी, सी) में जनवरी 2023, अक्टूबर 2022 - जनवरी 2023 (4 माह के संचित) तथा जून 2022 - जनवरी 2023 (8 माह के संचित) के मानकीकृत वर्षण सूचकांक दर्शाए गए हैं।

जनवरी माह के दौरान राजस्थान राज्य और गुजरात राज्य के कुछ भाग में चरम आर्द्ध / प्रचंड आर्द्ध स्थितियाँ रहीं, जबकि अस्साचल प्रदेश, आसाम और मेघालय और उप हिमालयीन पश्चिम बंगाल और सिक्किम के कुछ भाग में चरम शुष्क / प्रचंड शुष्क स्थितियाँ रहीं।

दाब :

आकृती 7(ए) तथा 7(बी) क्रमशः माध्य समुद्र सतह दाब तथा इसकी विसंगति दर्शाते हैं। अधोरेखा द्वारा ऋणात्मक मान दर्शाएँ गए हैं।

पवन :

आकृती 8(ए) तथा 8(बी), 9(ए) तथा 9(बी), 10(ए) तथा 10(बी) में क्रमशः पवन का 850, 500 और 250 एच.पी.ए. स्तरों पर माध्य परिसंचरण स्वरूप तथा इसकी विसंगति को दर्शाता है।

वेग विभव तथा धारा कृत्य (वेलोसिटी पोटेन्शियल और स्ट्रीम फंक्शन):

आकृती 11(ए) तथा 11(बी) में 250 एच.पी.ए. स्तर पर माध्य वेग विभव तथा इसकी विसंगति को दर्शाया गया है। इसी प्रकार आकृती 12(ए) तथा 12(बी) में माध्य धारा कृत्य तथा इसकी विसंगति को दर्शाते हैं। अधोरेखा द्वारा ऋणात्मक मान दर्शाये गए हैं।

बहिर्गमी दीर्घतरंग विकिरण (ओ.एल.आर.):

भारत के क्षेत्रों तथा आसपास की बहिर्गमी दीर्घतरंग विकिरण ($\text{वॉट}/\text{मी}^2$) आकृती 13 में दर्शाई गई है।

तापमान:

माध्य मासिक अधिकतम तथा न्यूनतम तापमान विसंगति आकृती 14(ए) तथा 14(बी) में दर्शाई गई है।

उष्ण दिनों / शीत रात्रियों का प्रतिशत :

आकृती 15(ए) तथा 15(बी) में अधिकतम (न्यूनतम) तापमान जब 90वें (10 वें) पर्सेटाइल से अधिक(कम) वाले दिनों का प्रतिशत दर्शाया गया है। चित्र 16 में पूरे देश में जनवरी माह में 1971 से अब तक के औसत तापमान दर्शाये गए हैं। 5 वर्ष के चल औसत भी दर्शाये गए हैं। इस वर्ष के जनवरी माह का माध्य तापमान 19.9°से (तापमान विसंगति 0.29°से) रहा। आकृती 17(ए) तथा 17(बी) में चारों समरूपी क्षेत्रों के वर्ष 1971 से अब तक के जनवरी माह के दौरान रहे अधिकतम और न्यूनतम तापमानों की श्रृंखला दर्शाई गई है। आकृती 18 (ए) तथा 18(बी) में महीने के दौरान पुरे भारत और में चारों समरूपी क्षेत्रों दैनिक अधिकतम और न्यूनतम तापमान विसंगतियों की श्रृंखला दर्शाई है। तालिका 3 में माह के दौरान की तापमान विसंगति दर्शाई गयी है।

निम्न दाब प्रणालियाँ :

इस माह बंगाल की खाड़ी में 30 जनवरी - 2 फरवरी के दरम्यान एक अवदाब बना। चित्र 19 में अवदाब का मार्ग दर्शाया गया है।

हिंद एवं प्रशांत महासागरों पर समुद्री सतह तापमान विसंगति :

आकृती 20 उष्ण कटिबंधीय हिंद एवं प्रशांत महासागरों पर समुद्री सतह तापमान विसंगति दर्शाता है।

दक्षिणी दोलन सुचकांक तथा प्रशांत समुद्री सतह तापमान सुचकांक :

दक्षिणी दोलन सुचकांक (तालिका 4) इस माह के दौरान धनात्मक (2.3) रहा।

एम.एम.सी.एफ.एस. एन्सो पूर्वानुमान :

आकृती 21 आने वाले ऋतुओं के लिये का एम.एम.सी.एफ.एस. एन्सो पूर्वानुमान दर्शाता है।

आपल्कालीन मौसम घटनाएँ :

आकृती 22 आपल्कालीन मौसम घटनाएँ दर्शाता है।

JANUARY-2023 MAIN FEATURES OF THE MONTH

Highlights:

In January, over India, the mean temperature was 19.93°C with an anomaly of 0.29°C. Over South Peninsular India the maximum temperature was the eighth highest (30.59°C with an anomaly of 0.59°C) since 1901. Rainfall over the homogeneous region of east & northeast India (1.9 mm) was the fourth lowest since 1901.

Cold Wave conditions:

The cold wave/severe cold wave conditions were observed mainly over northern, northwestern India, and central India. The following table gives subdivision-wise occurrences of the number of days of the cold wave/severe cold wave during January 2023.

No. of days of Cold wave/Severe Cold Wave JAN 2023				
Part/Sub div	Most Places	Many Places	Few Places	Isolated Places
Bihar				6
Chhattisgarh				1
East Madhya Pradesh		1	2	6
East Rajasthan	1		6	1
East Uttar Pradesh			2	2
Haryana				1
Haryana, Chandigarh and Delhi	1	1	4	2
Himachal Pradesh		1		4
Jharkhand				1
North Interior Karnataka				2
Odisha				1
Punjab	1	2	1	3
South Interior Karnataka				1
Telangana				1
Uttarakhand				1
Vidarbha				1
West Madhya Pradesh		1	1	6
West Rajasthan		3	2	4
West Uttar Pradesh		1	1	4

MOST PLACES (76-100%), MANY PLACES (51% to 75%), FEW PLACES (26% to 50%), ISOLATED (up to 25%)

Source: Weekly weather report, New Delhi

Rainfall Features:

During the month, rainfall realized over the country as a whole was 86% of its LPA. Most of the subdivisions received deficient/large deficient rainfall except some subdivisions from the north and northwest India and Kerala & Mahe and Lakshadweep.

During the month, out of 36 meteorological subdivisions, 5 received large excess rainfall, 1 received excess rainfall, 5 received normal rainfall, 5 received deficient rainfall and 17 received largely deficient rainfall and 3 subdivisions did not receive any rain (Fig. 1). Table 1 shows the subdivision wise rainfall statistics (mm) for the month.

Fig. 2 (a) shows the spatial pattern of rainfall (mm) received during the month. Parts of Jammu & Kashmir and Ladakh, Himachal Pradesh, Uttarakhand, and Lakshadweep received more than 50 mm of rainfall. Fig. 2(b) shows the spatial pattern of rainfall anomaly (mm) during the month. Rainfall anomaly was negative over most parts of the country except north, and northwest India and Lakshadweep. Rainfall anomaly of more than 40mm was observed over parts of Jammu & Kashmir and Ladakh and Lakshadweep. A magnitude of negative rainfall anomaly of more than 20mm was observed over parts of Arunachal Pradesh, Sub Himalayan West Bengal & Sikkim, West Madhya Pradesh, Andaman & Nicobar Islands, and some isolated pockets.

Fig. 3 shows the daily variation of the rainfall over the country as a whole and four homogeneous regions during January 2023. Fig. 4 shows the area weight averaged rainfall series for January over all India and four homogeneous regions since 1951. Rainfall realized over homogeneous regions of central India, south peninsular India, northwest India, and east & northeast India was 26%, 35%, 128%, and 11% of its LPA respectively. Rainfall over the homogeneous region of east & northeast India (1.9 mm) was the fourth lowest since 1901. Prior lowest rainfall years were 1946 (0.3 mm), 2010 (0.7 mm), 2006 (1.4 mm) & 1923 (1.9 mm). Table 2 gives the list of stations that received heavy (≥ 7 cm) rainfall in 24 hours during the month and the same is depicted in Fig. 5.

Standardized Precipitation Index:

The Standardized Precipitation Index (SPI) is an index used for measuring drought and is based only 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 respectively. Fig 6 (a, b, and c) give the SPI values for January 2023, October 2022 - January 2023 (4 months cumulative), and June 2022 - January 2023 (eight months cumulative) respectively. During January, extremely wet/severely wet conditions were observed over parts of Rajasthan state & Gujarat state, while extremely dry/severely dry conditions were observed over Arunachal Pradesh, Assam & Meghalaya, and Sub Himalayan West Bengal & Sikkim.

Cumulative SPI values of the past four months indicate extremely wet/severely wet conditions over parts of Arunachal Pradesh, Assam & Meghalaya, Sub Himalayan West Bengal & Sikkim, Uttar Pradesh state, Uttarakhand, Haryana, Chandigarh & Delhi, East Rajasthan, West Madhya Pradesh, and South Interior Karnataka, while extremely dry/severely dry conditions were observed over parts of Arunachal Pradesh.

Cumulative past eight months' SPI values indicate extremely wet/severely wet conditions over parts of Assam & Meghalaya, Sub Himalayan West Bengal & Sikkim, Odisha, Uttar Pradesh state, Jammu & Kashmir and Ladakh, Rajasthan state, Madhya Pradesh state, Gujarat Region, Madhya Maharashtra, Vidarbha, Chhattisgarh, Telangana, Rayalseema, Tamil Nadu, North Interior Karnataka, and South Interior Karnataka, while extremely dry/severely dry conditions were observed over parts of A & N Islands, Assam & Meghalaya, Nagaland, Manipur, Mizoram & Tripura, Sub Himalayan West Bengal & Sikkim, Gangetic West Bengal, Jharkhand, Bihar, Uttar Pradesh state, Haryana, Chandigarh & Delhi, and Chhattisgarh.

Pressure & Wind:

Figs. 7(a) & 7(b) show the mean sea level pressure & its anomaly respectively. The pressure anomaly was positive over the northwest, northeast, and northern plains and mostly negative elsewhere. Pressure anomaly was within the range of -1.0 to +1.0 hPa over most parts of the country, except northwest India where was within the range of +1.0 to +2.0 hPa.

Figs. 8(a) & 8(b), 9(a) & 9(b), and 10(a) & 10(b) shows January 2023 mean circulation patterns and their anomalies at 850, 500 & 250 hPa levels respectively. At 850 hPa level, an anomalous

anticyclonic circulation was observed over the southwest peninsula and adjoining Arabian Sea. At 500 hPa level, an anomalous anticyclonic circulation was observed over most parts of the country and adjoining seas. At 250 hPa level, an anomalous ridge was seen over most parts of the country.

Velocity Potential & Stream Function:

Figs. 11(a) & 11(b) show the 250 hPa mean Velocity Potential & its anomaly. Similarly Figs. 12(a) & 12(b) show the mean stream function & its anomalies at 850 hPa level. Negative values are indicated by dashed lines. Anomaly in the velocity potential at 250 hPa level was positive over the entire country, while anomaly in the stream function at 850 hPa level was negative over central and peninsular India and was positive elsewhere.

Outgoing Longwave Radiation (OLR):

OLR anomaly (W/m^2) over the Indian region and neighborhood is shown in Fig 13. OLR anomaly was normal within $\pm 10 \text{ W/m}^2$ over the entire country and adjoining both seas.

Temperature:

Mean monthly maximum and minimum temperature anomalies are shown in Figs. 14(a) & 14(b) respectively. The maximum temperature was above normal over most parts of the country, except some parts of east India, northwest India, west-central India, and south peninsular India. Maximum temperature anomaly was more than 2°C over parts of Himachal Pradesh, Assam & Meghalaya, Manipur, Mizoram, Jharkhand, Chhattisgarh, and Odisha. Maximum temperature anomaly was less than -2°C over parts of Punjab, West Rajasthan, Haryana, Chandigarh & Delhi, Uttar Pradesh state, West Madhya Pradesh, Bihar, Jharkhand, and Gangatic West Bengal.

The minimum temperature was above normal over most parts of the country, except some parts of northwest India, west-central India, south peninsular India, and Lakshadweep. The minimum temperature anomaly was more than 2°C over parts of Himachal Pradesh, Bihar, Telangana, Chhattisgarh, and Odisha. The minimum temperature anomaly was less than -2°C over parts of West Rajasthan, Saurashtra & Kutch, and South Interior Karnataka.

Percentage of Warm days/Cold nights:

Figs. 15(a) & 15(b) show the percentage of days when the maximum (minimum) temperature was more (less) than the 90th (10th) percentile. Over parts of Assam & Meghalaya, Odisha, Coastal Andhra Pradesh, Telangana, and Kerala & Mahe maximum temperature was greater than the 90th percentile for more than 50 % of the days of the month. Over parts of South Interior Karnataka minimum temperature was less than the 10th percentile for more than 50% of the days of the month.

Fig. 16 shows the mean temperature time series for the country as a whole for January since 1971. Five-year moving average values are also shown. The mean temperature for the month this year over the country as a whole was 19.93°C with an anomaly of 0.29°C .

Fig. 17(a) & 17(b) show, the maximum and minimum temperature series respectively for the country as a whole and the four homogeneous regions during January 2023 since 1971. The maximum temperature was above normal over all the homogeneous regions except Northwest India & Central India, while the minimum temperature was above normal over all the homogeneous regions. Over the country as a whole both the maximum and minimum temperature was above normal during January 2023. Over South Peninsular India the maximum temperature was the eighth highest (30.59°C with an anomaly of 0.59°C) since 1901.

Fig. 18(a) and 18(b) show daily variation of maximum and minimum temperature anomaly over all India and four homogenous regions during the month. Table 3 gives temperature anomalies during the month over all India and four homogeneous regions. The minimum temperature was below normal by equal to or more than 5°C over some stations of northwest India and south peninsular India for many days during the month. The following tables give the list of stations and the number of days (frequency) for which the minimum temperature was above normal by equal to or more than 5°C (compared to 1981-2010 normal) for more than five days during the month.

MINIMUM TEMPERATURE	
STATION	FREQUENCY
KOTA (A)	9
CUDDAPAH	9
IDAR	11
MYSORE	10

Low-Pressure Systems:

One depression formed during 30 JAN – 2 FEB over the Bay of Bengal. The details of the system are given in the following table:

Date/time	Intensity	(Long. $^{\circ}\text{E}$ / Lat. $^{\circ}\text{N}$)	Area	Past Movement
		90/7		
30/1,03Z	D	87.2/7.7	southeast and adjoining southwest Bay of Bengal	West-northwestward
30/1,12Z	D	86/8	southwest and adjoining southeast Bay of Bengal	West-northwestward
31/1,03Z	D	84.3/8.4	southwest and adjoining southeast Bay of Bengal	Westward
31/1,12Z	D	83.5/8.6	southwest and adjoining southeast Bay of Bengal	Westsouthwestward
1/2,03Z	D	82.6/8.2	southwest and adjoining southeast Bay of Bengal	Westward
1/2,12Z	D	82.3/8.2	southwest and adjoining southeast Bay of Bengal	Southwestward
2/2,03Z	D	81.1/7.2	south Sri Lanka	Southwestward
2/2,12Z	D	80.3/6.3	south Sri Lanka	Southwestward
	WML	79.8/5.8	Comorin and adjoining Gulf of Mannar & west coast of Sri Lanka	

D: Depression, **WML:** Well marked Low

Fig. 19 shows the track of this depression.

SST anomaly over the Indian & Pacific Oceans:

Fig. 20 shows the global anomaly in sea surface temperature. During January 2023 negative SSTs were observed across the central and eastern tropical Pacific Ocean, and positive SSTs were observed in the far western tropical Pacific Ocean. Normal to positive SSTs were observed over most parts of the Arabian Sea and the Bay of Bengal.

SOI and Pacific SST Index:

SOI (Table 4) was positive (2.3) during the month. Sea surface temperature anomalies were below normal over all the NINO regions in the Pacific Ocean.

Fig. 21 shows the Monsoon Mission Coupled Forecast System (MMCFS) model output forecast for ENSO conditions for the coming seasons. The latest MMCFS forecast indicates the transition of La Niña to ENSO-neutral conditions during the upcoming season.

Significant Weather Events for January 2023:

Fig. 22 shows significant weather events during the month (based on real-time media reports).

From 1st January to 31st January, a total of 8 persons were reportedly claimed dead & one person missing. The details of causalities are given below, which are based on real-time media reports.

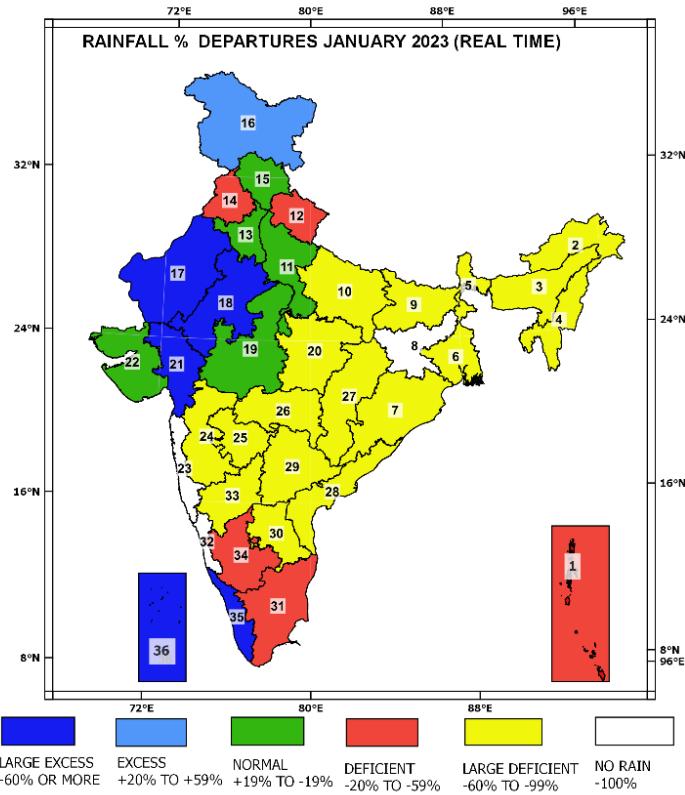
SNOWFALL:

A total of 4 persons were reportedly claimed dead & one person missing, from 1st January to 31st January, because of Snowfall. The details of the area affected by the events are summarized and given in the table below;

DATE	DEATH	INJURED	MISSING	LIVESTOCK	DISTRICT (STATE / UT) AFFECTED
12 Jan.	2		1		Ganderbal (Jammu & Kashmir)
30 Jan.	2				Kargil (Ladakh)

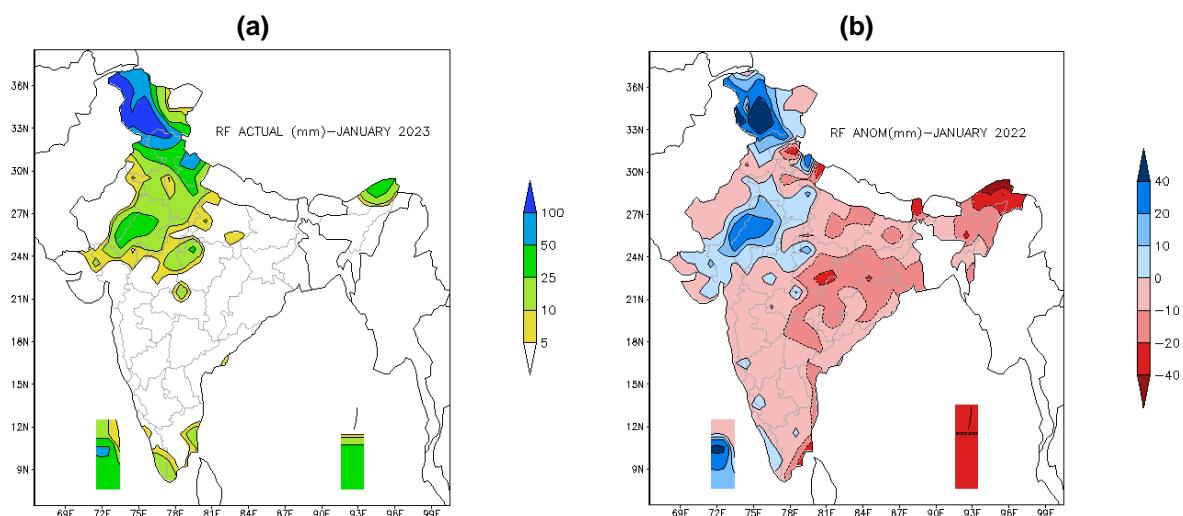
COLD WAVE:

4 persons reportedly claimed dead due to cold wave in Fatehpur district of Uttar Pradesh on 10th January.



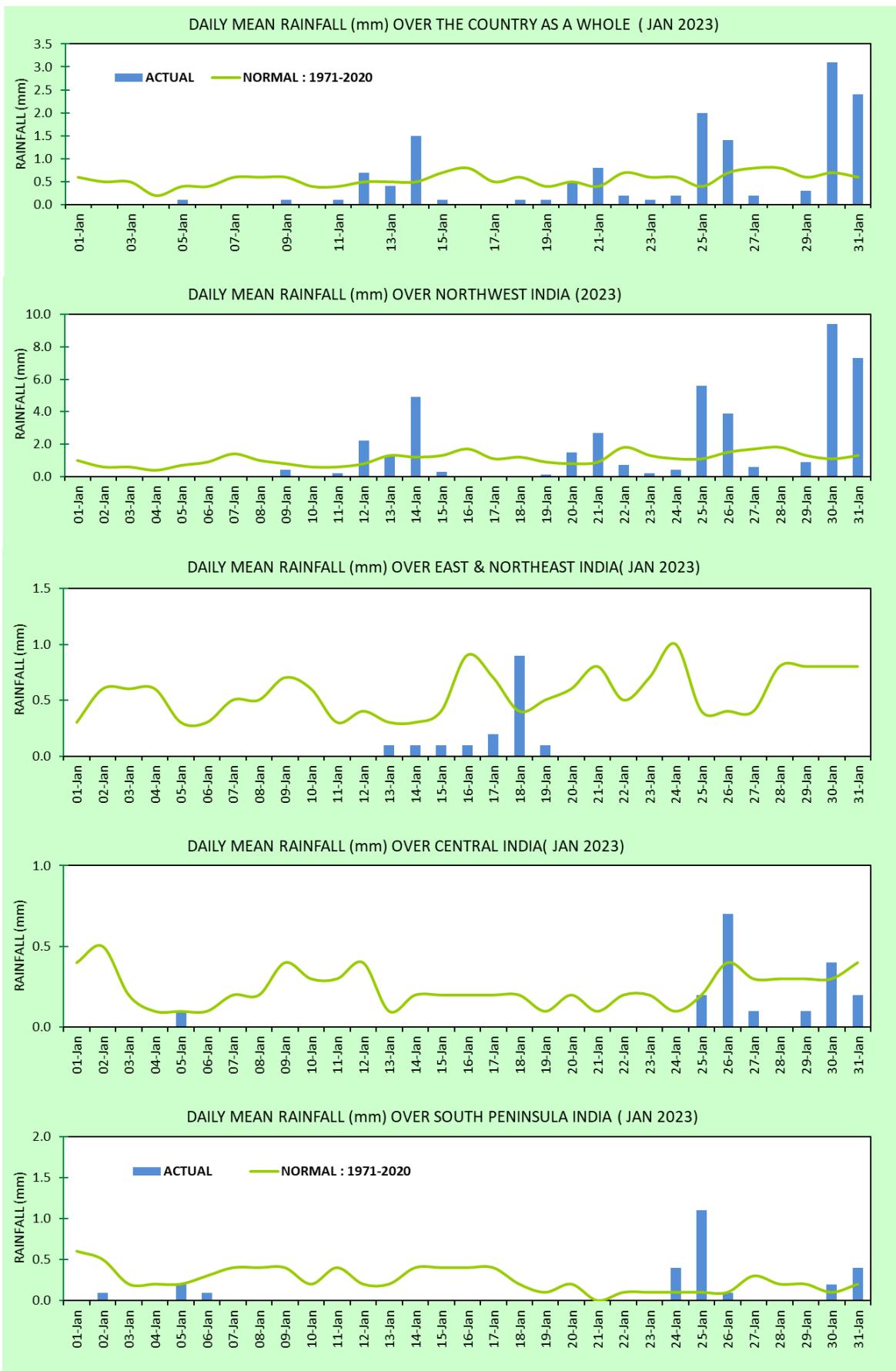
आकृती १: जनवरी २०२३ के लिए वर्षा का उपमंडल वार प्रतिशत विचलन

FIG. 1: SUBDIVISIONWISE RAINFALL PERCENTAGE DEPARTURE FOR JANUARY 2023

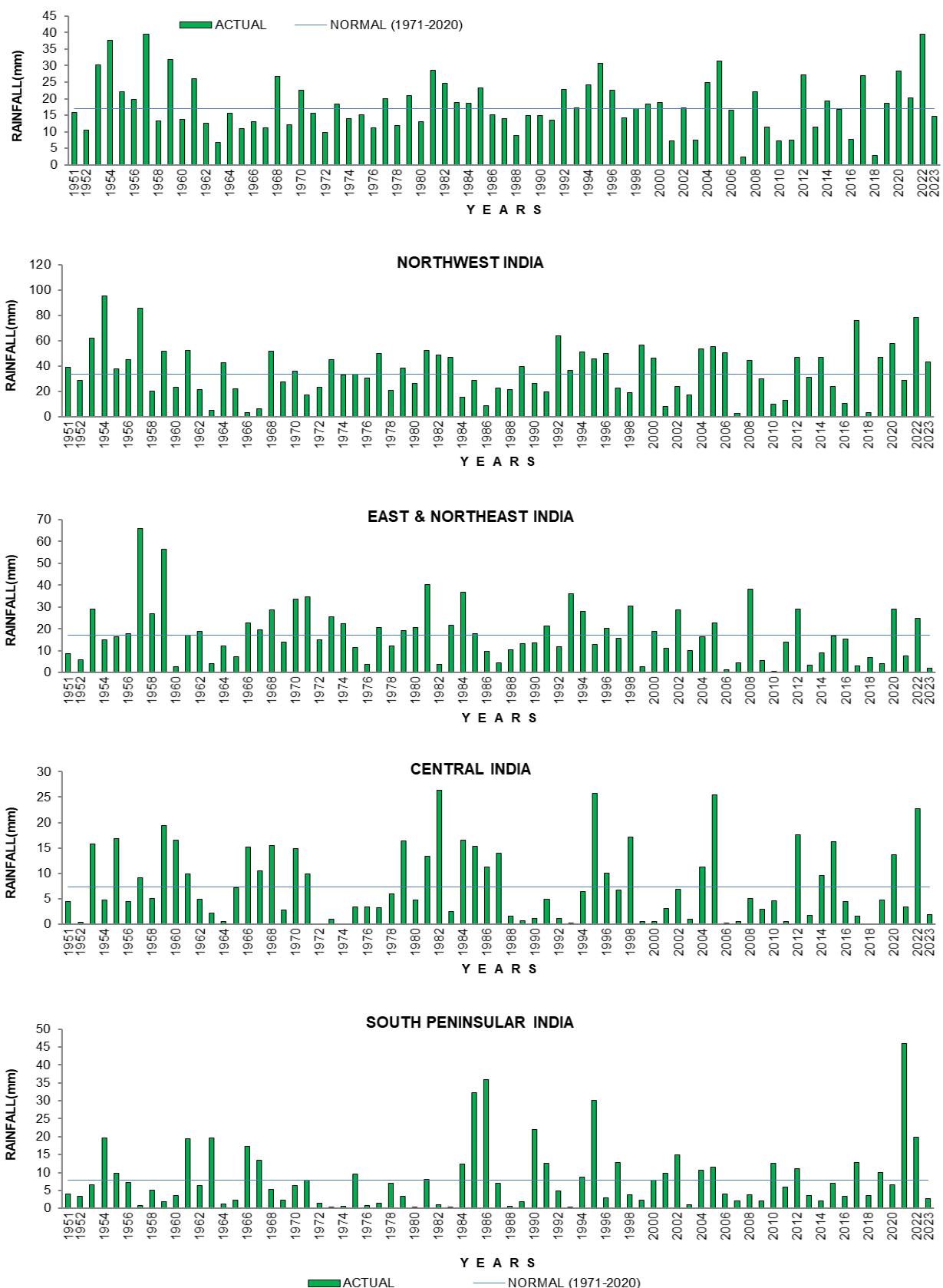


आकृती २(ए): जनवरी २०२३ वर्षा (मिमी)
FIG. 2(a): MONTHLY RAINFALL (mm)

आकृती २(बी): जनवरी २०२३ वर्षा विसंगति (मिमी)
FIG. 2(b): MONTHLY RAINFALL ANOMALY(mm)

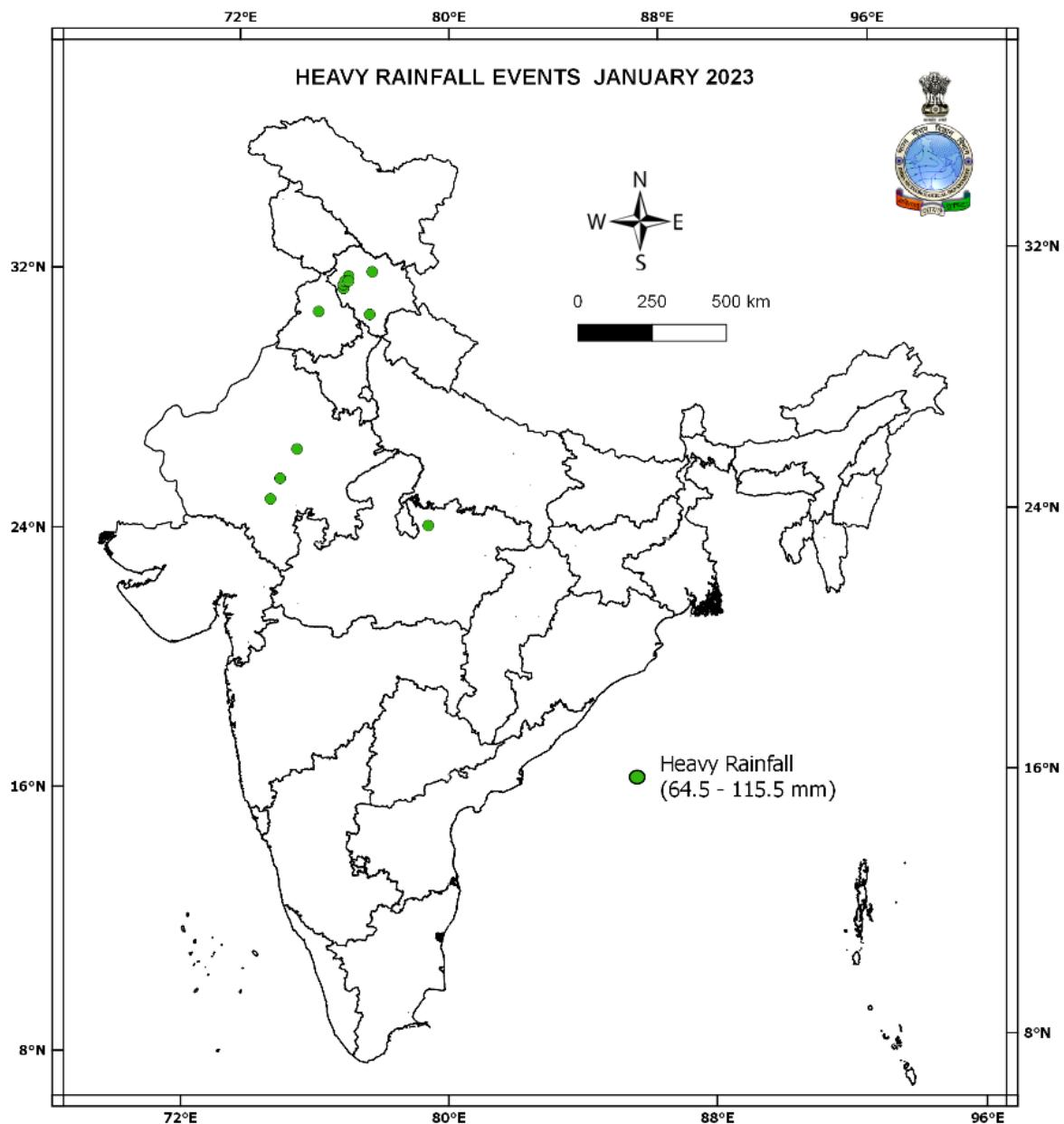


आकृती 3: जनवरी २०२३ के दौरान अखिल भारतीय और चार सजातीय क्षेत्रों में वर्षा की दैनिक अनुनता
FIG. 3: DAILY VARIATION OF RAINFALL OVER ALL INDIA AND FOUR HOMOGENEOUS REGIONS DURING JANUARY 2023



आकृति ४: १९५१-२०२३ की अवधि के दौरान जनवरी माह के लिए चार समरूप क्षेत्रों में क्षेत्र भारित वर्षा की समय श्रृंखला

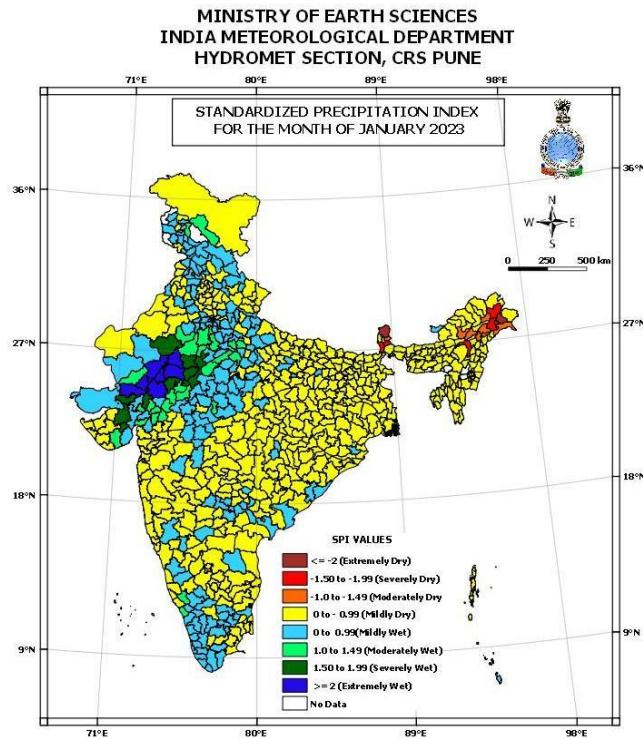
FIG. 4: TIME SERIES OF AREA WEIGHT AVERAGED RAINFALL OVER ALL INDIA AND THE FOUR HOMOGENEOUS REGIONS FOR JANUARY (1951 - 2023)



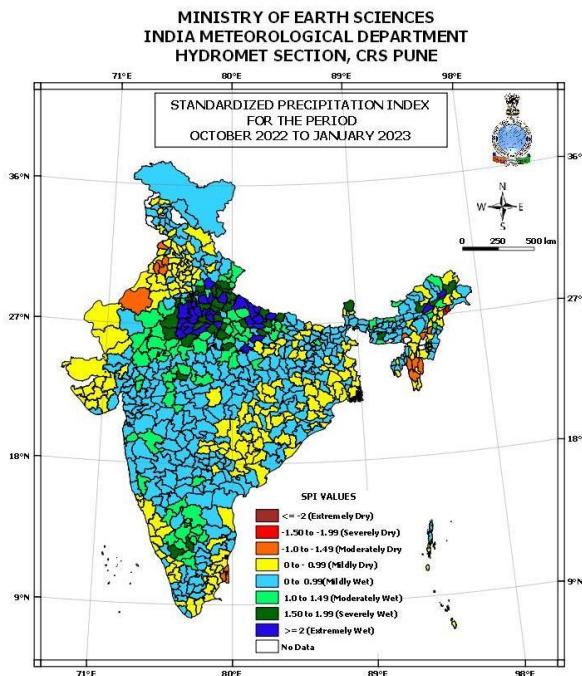
आकृति ५: जनवरी २०२३ के दौरान भारी वर्षा प्राप्त करने वाले स्टेशन

FIG. 5: STATIONS WHICH RECEIVED HEAVY RAINFALL DURING JANUARY 2023

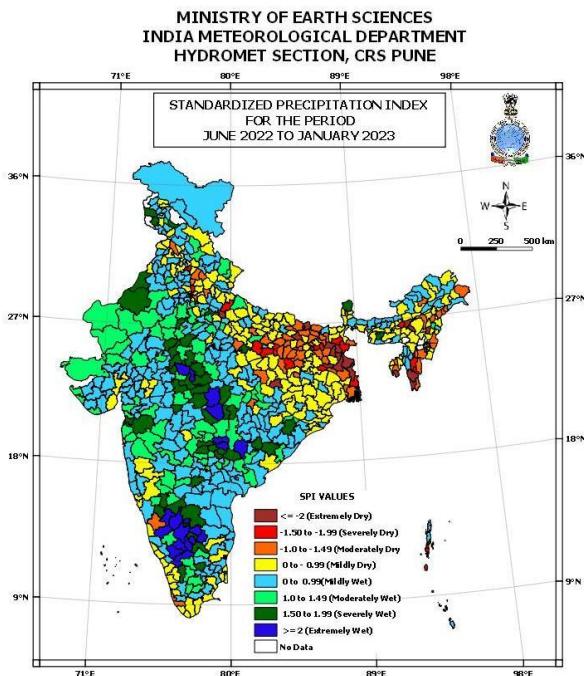
(a) JANUARY 2023



(b) OCTOBER 2022- JANUARY 2023



(c) JUNE 2022 – JANUARY 2023

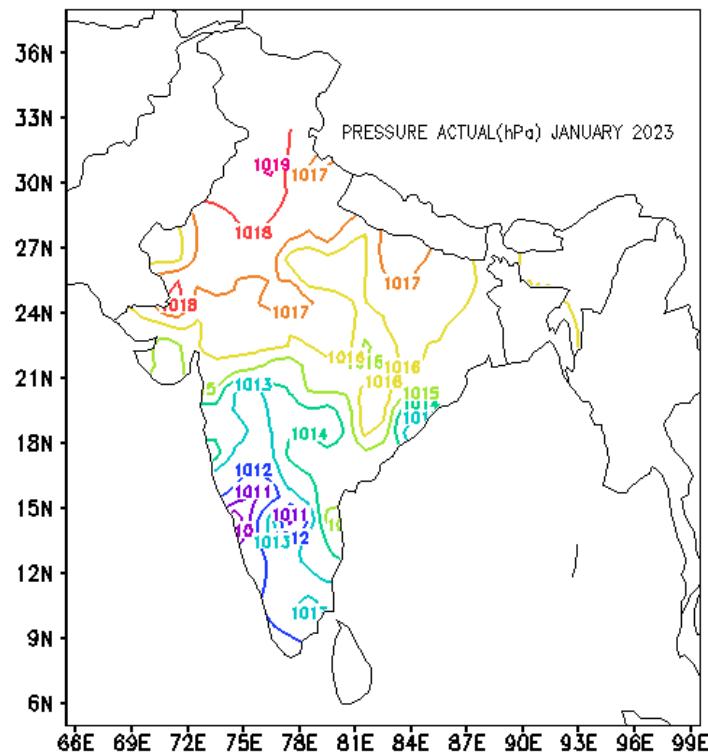


आकृति ६: मानकीकृत वर्षण सूचकांक (एसपीआई)

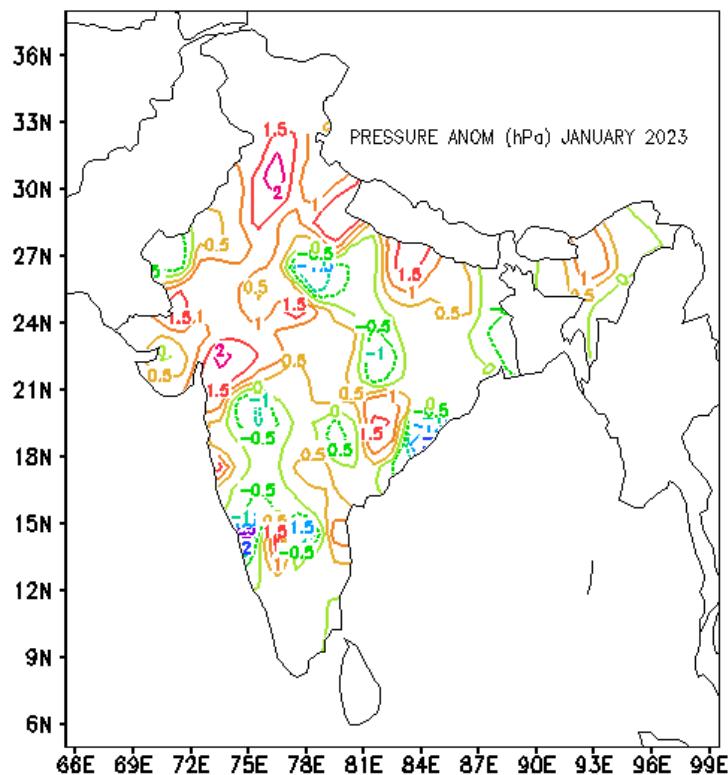
(ए) जनवरी (एक महीना) (बी) अक्तूबर से जनवरी (चार महीने) (सी) जुन से जनवरी (आठ महीने)

FIG. 6: STANDARDIZED PRECIPITATION INDEX (SPI) FOR
(a) ONE MONTH (b) FOUR MONTHS (c) EIGHT MONTHS

(a) MEAN SEA LEVEL PRESSURE (MSLP)



(a) MSLP Anomaly

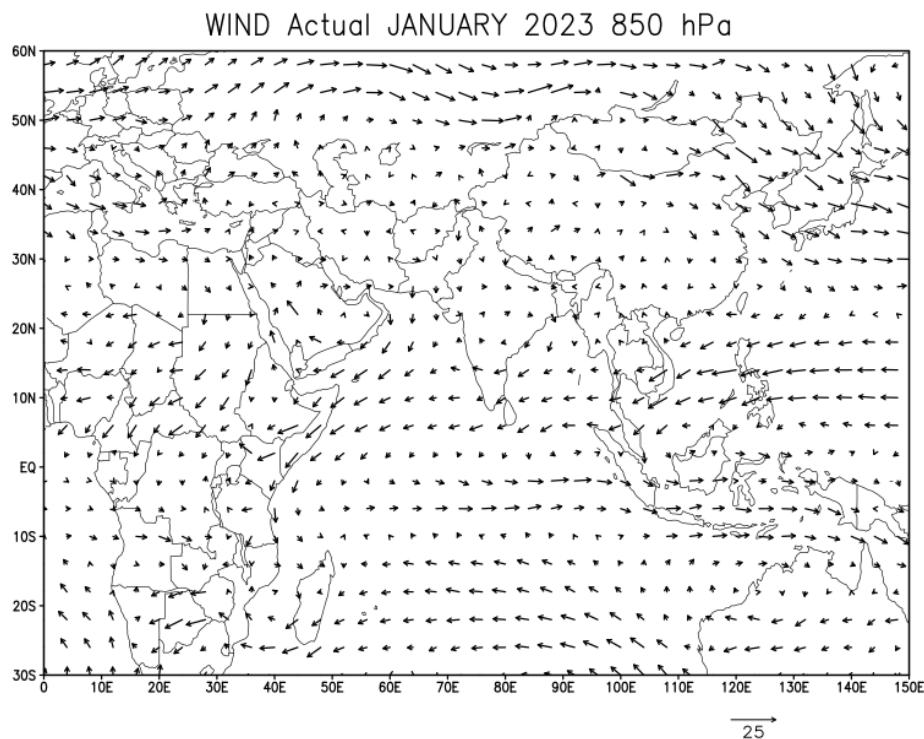


आकृति ७: जनवरी २०२३ के लिए मासिक औसत समुद्र स्तर दबाव (एचपीए)

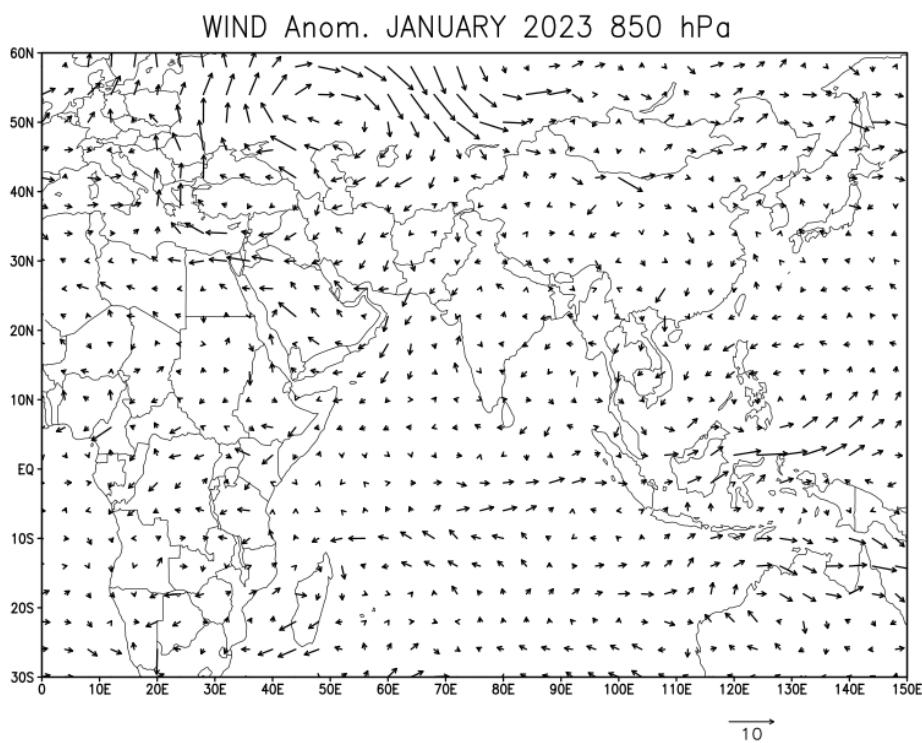
(ए) माध्य (बी) विसंगति (१९८१-२०१० सामान्य पर आधारित)

**FIG. 7: MONTHLY MEAN SEA LEVEL PRESSURE (hPa) (a) MEAN (b) ANOMALY
(BASED ON 1981 - 2010 NORMALS)**

(a) MEAN WIND: 850 hPa



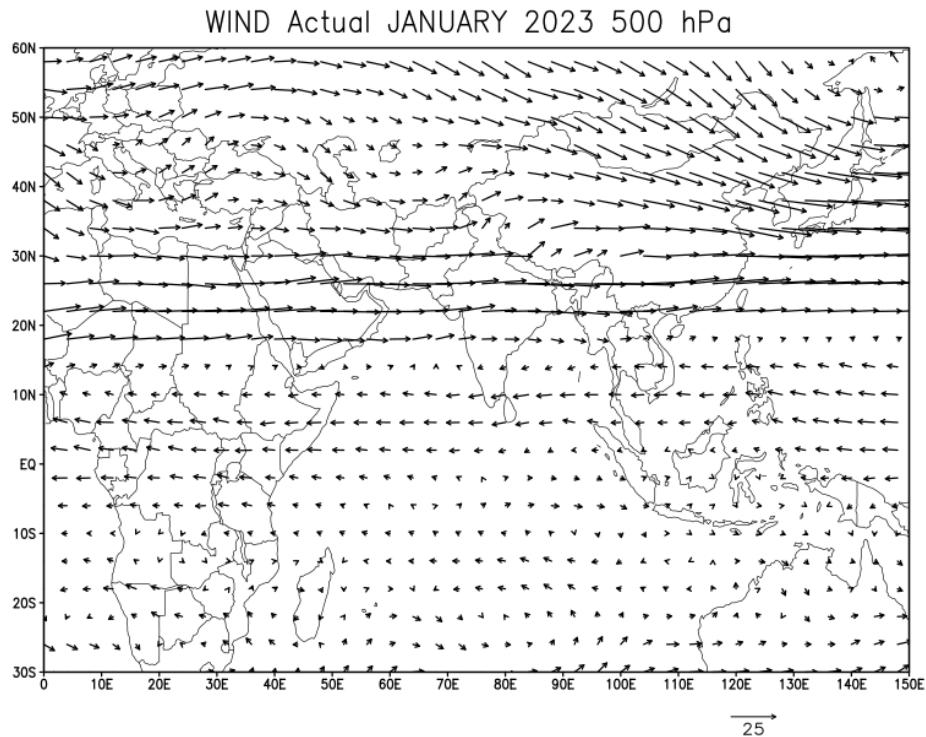
(b) WIND ANOMALY: 850 hPa



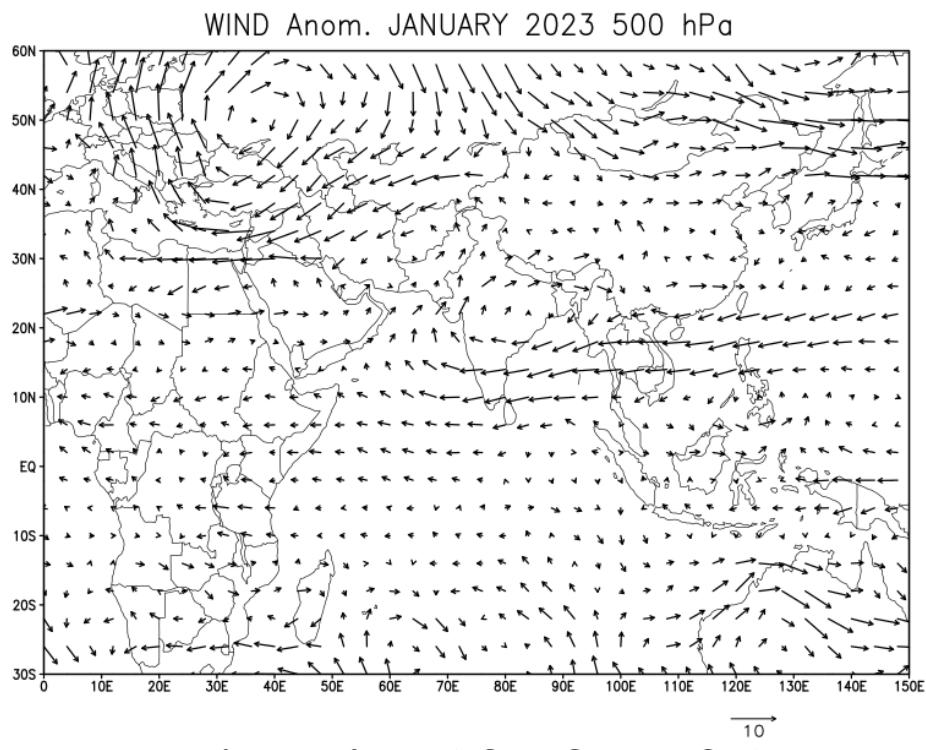
आकृती ८: जनवरी २०२३ के लिए मासिक पवन (मि/से)
(ए) माध्य (बी) विसंगति ८५० एचपीए स्तरपर

FIG. 8: MONTHLY WIND (m/s) (a) MEAN (b) ANOMALY AT 850 hPa
(OPERATIONAL NWP ANALYSIS OF IMD GFS T-574
(ANOMALY IS BASED ON 2000-2018 Climatology, Source: NCMRWF)

(a) MEAN WIND : 500 hPa



(b) WIND ANOMALY: 500 hPa

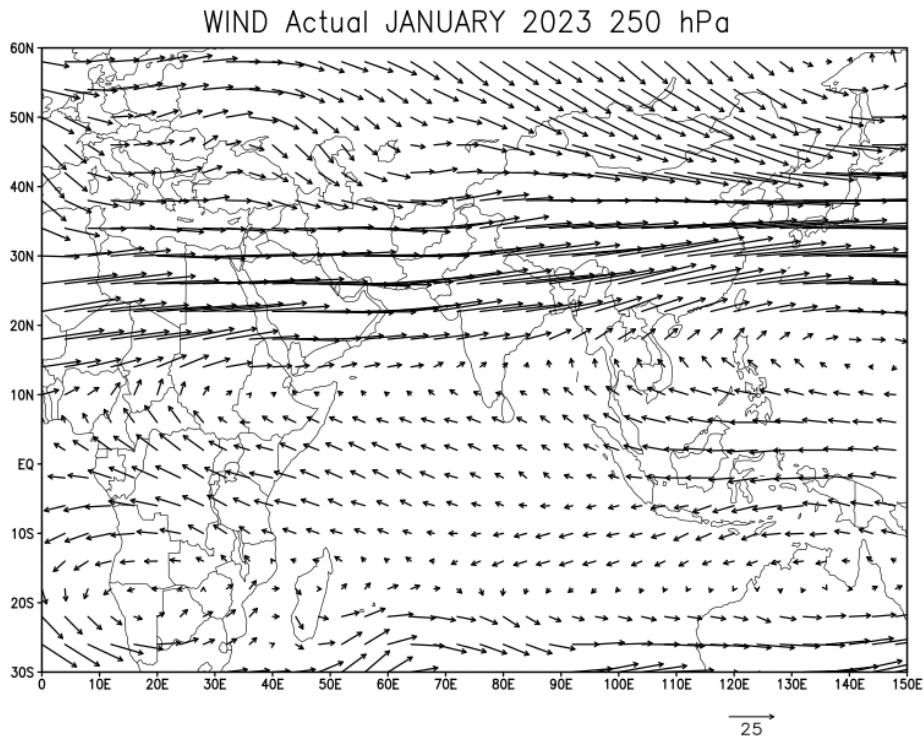


आकृती ९: जनवरी २०२३ के लिए मासिक पवन (मि /से)

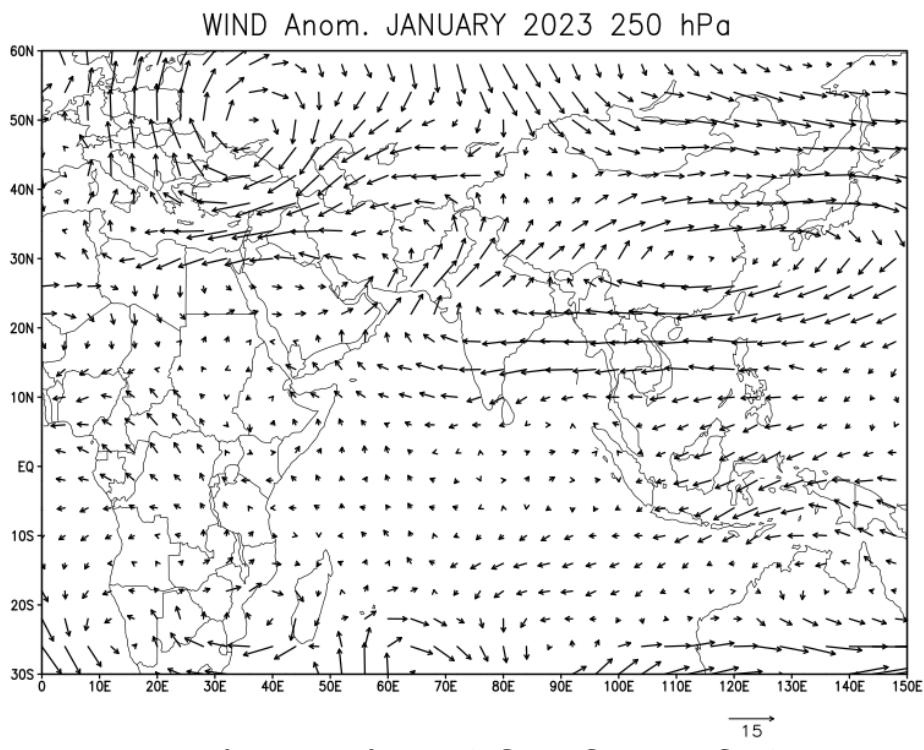
(ए) माध्य (बी) विसंगति ५०० एचपीए स्तरपर

FIG. 9: MONTHLY WIND (m/s) (a) MEAN (b) ANOMALY AT 500 hPa
(OPERATIONAL NWP ANALYSIS OF IMD GFS T-574
(ANOMALY IS BASED ON 2000-2018 Climatology, Source: NCMRWF)

(a) MEAN WIND: 250 hPa



(b) WIND ANOMALY: 250 hPa

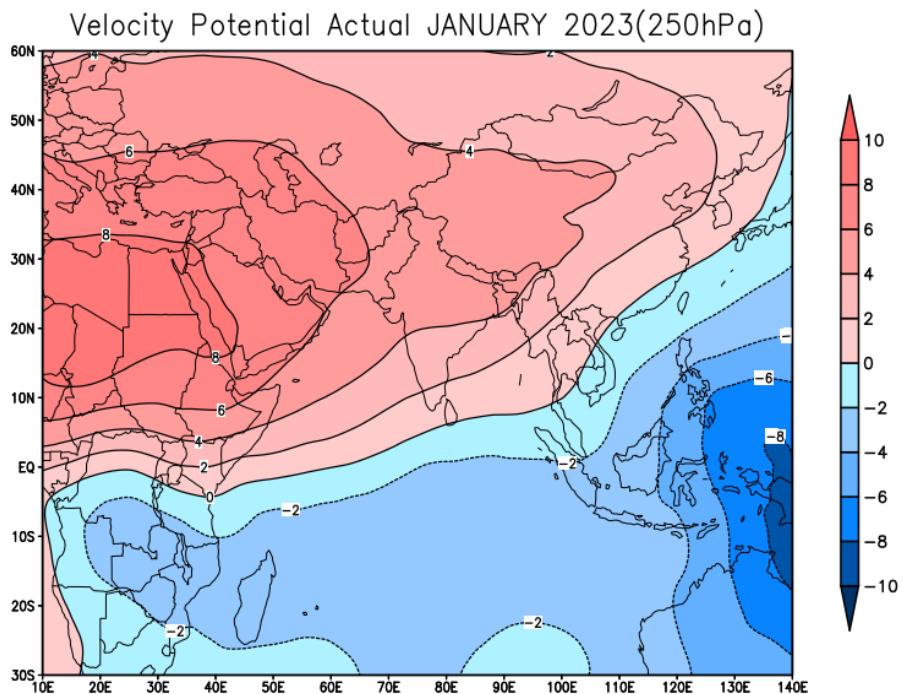


आकृती १०: जनवरी २०२३ के लिए मासिक पवन (मि /से)

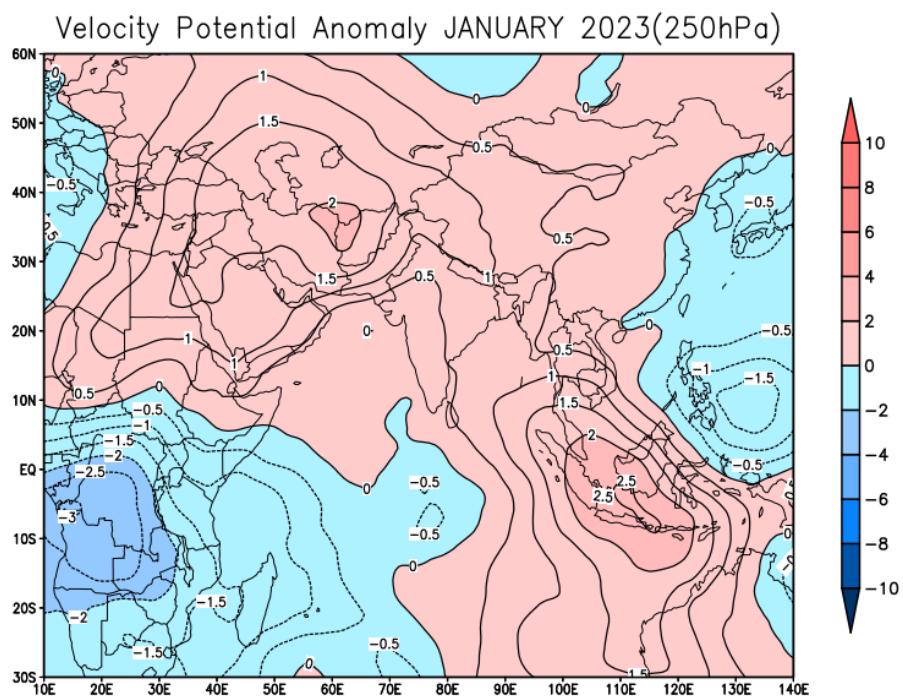
(ए) माध्य (बी) विसंगति २५० एचपीए स्तरपर

FIG. 10: MONTHLY WIND (m/s) (a) MEAN (b) ANOMALY AT 250 hPa
(OPERATIONAL NWP ANALYSIS OF IMD GFS T-574
(ANOMALY IS BASED ON 2000-2018 Climatology, Source: NCMRWF)

(a) VELOCITY POTENTIAL: 250 hPa



(b) VELOCITY POTENTIAL ANOMALY: 250 hPa

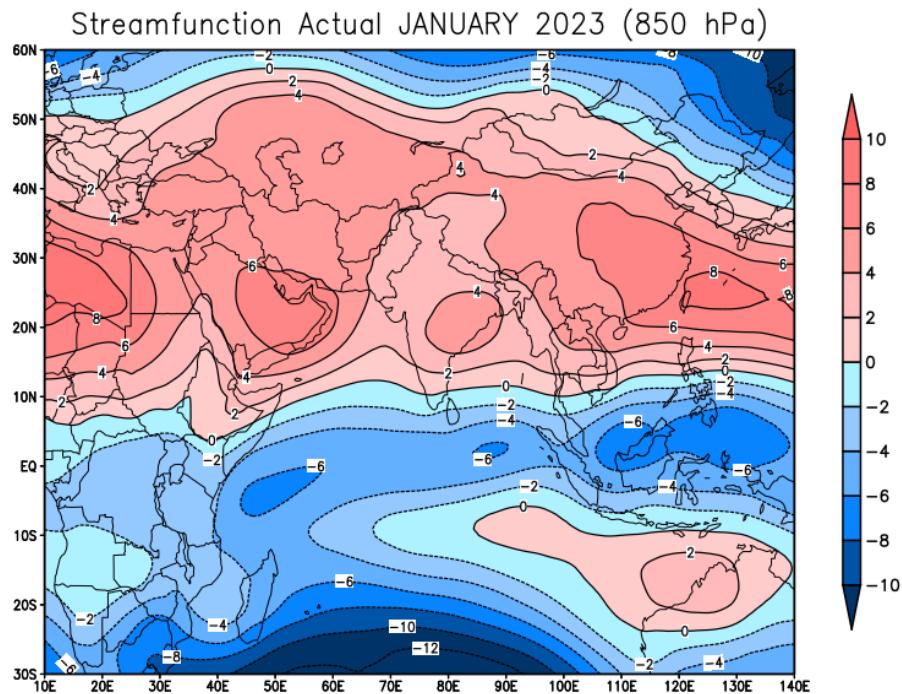


आकृति ११: जनवरी २०२३ के लिए वेग विभव ($10^6 \text{मीटर}^2/\text{सेकंड}$)

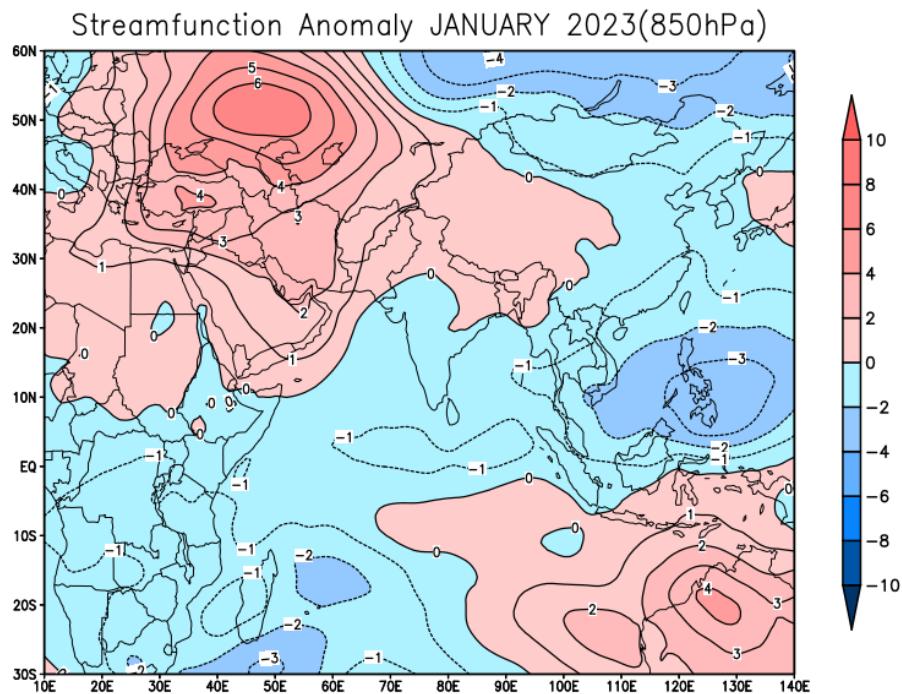
(ए) माध्य (बी) विसंगति २५० एचपीए स्तरपर

FIG. 11: VELOCITY POTENTIAL ($10^6 \text{m}^2/\text{s}$) (a) MEAN (b) ANOMALY AT 250 hPa
 (OPERATIONAL NWP ANALYSIS OF IMD GFS T-574
 (ANOMALY IS BASED ON 2000-2018 Climatology, Source: NCMRWF)

(a) STREAM FUNCTION: 850 hPa



(b) STREAM FUNCTION ANOMALY: 850 hPa

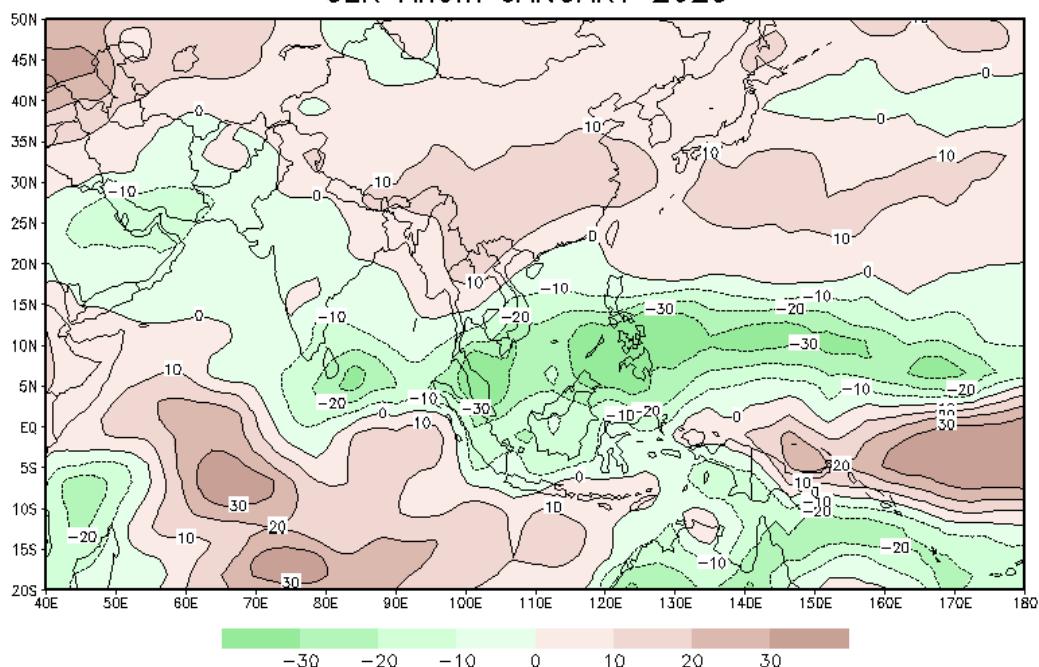


आकृती १२: जनवरी २०२३ के लिए धारा कृत्य ($10^6 \text{ मीटर}^2/\text{सेकंड}$)

(ए) माध्य (बी) विसंगति ८५० एचपीए स्तरपर

FIG. 12: STREAM FUNCTION ($10^6 \text{ m}^2/\text{s}$) (a) MEAN (b) ANOMALY AT 850 hPa
 (OPERATIONAL NWP ANALYSIS OF IMD GFS T-574
 (ANOMALY IS BASED ON 2000-2018 Climatology, Source: NCMRWF)

OLR Anom JANUARY 2023



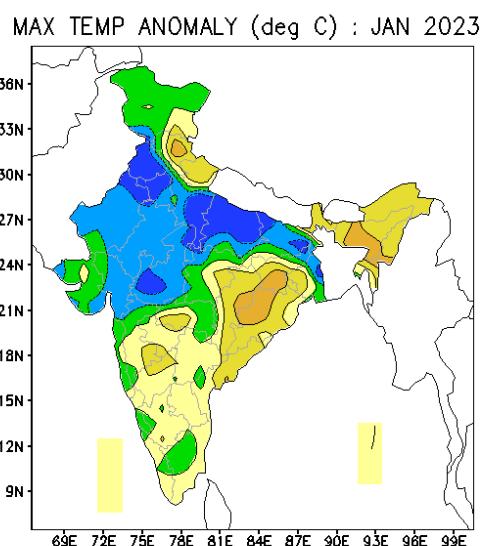
आकृती १३: जनवरी २०२३ के लिए ओ एल आर विसंगति ($\text{वॉट}/\text{मी}^2$)

FIG. 13: OLR ANOMALY (W/m^2) FOR JANUARY 2023

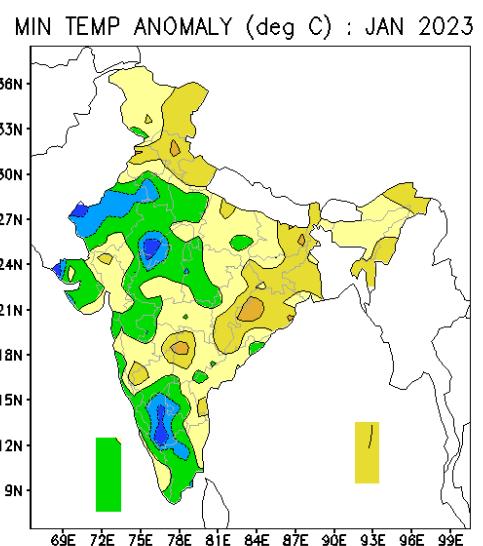
(SOURCE : CDC / NOAA, USA)

(BASED ON 1991 - 2020 CLIMATOLOGY)

(a) MAXIMUM TEMPERATURE ANOMALY



(b) MINIMUM TEMPERATURE ANOMALY



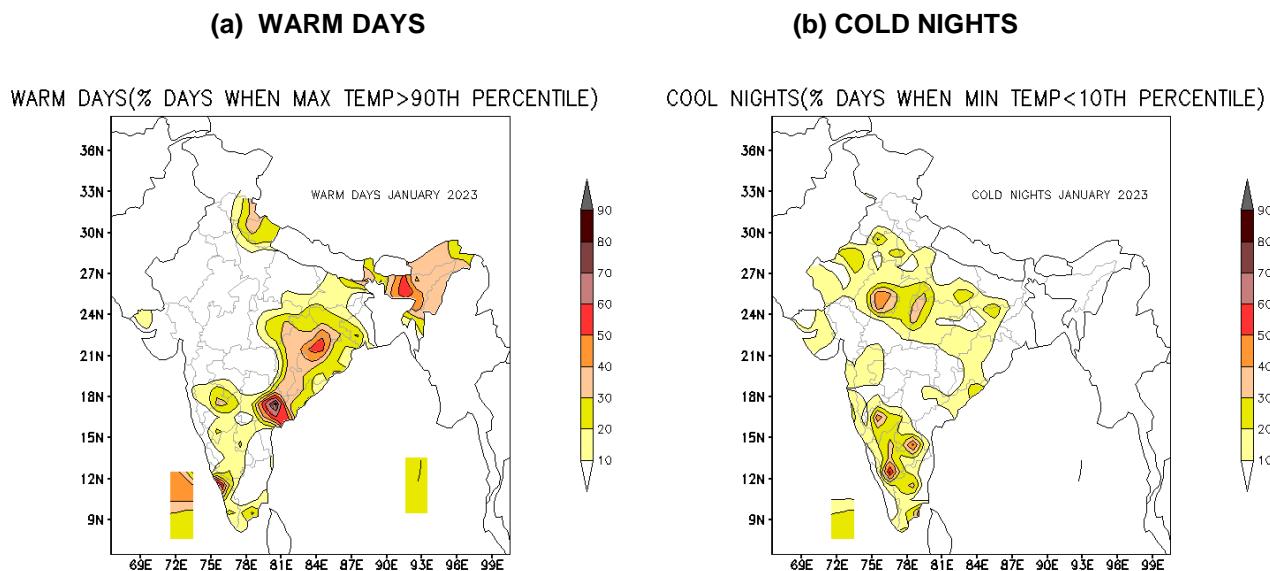
आकृती १४: जनवरी २०२३ के लिए औसत मासिक तापमान विसंगतियां (डिग्री सेल्सियस)

(ए) अधिकतम (बी) न्यूनतम

FIG. 14: MEAN MONTHLY TEMPERATURE ANOMALIES ($^{\circ}\text{C}$)

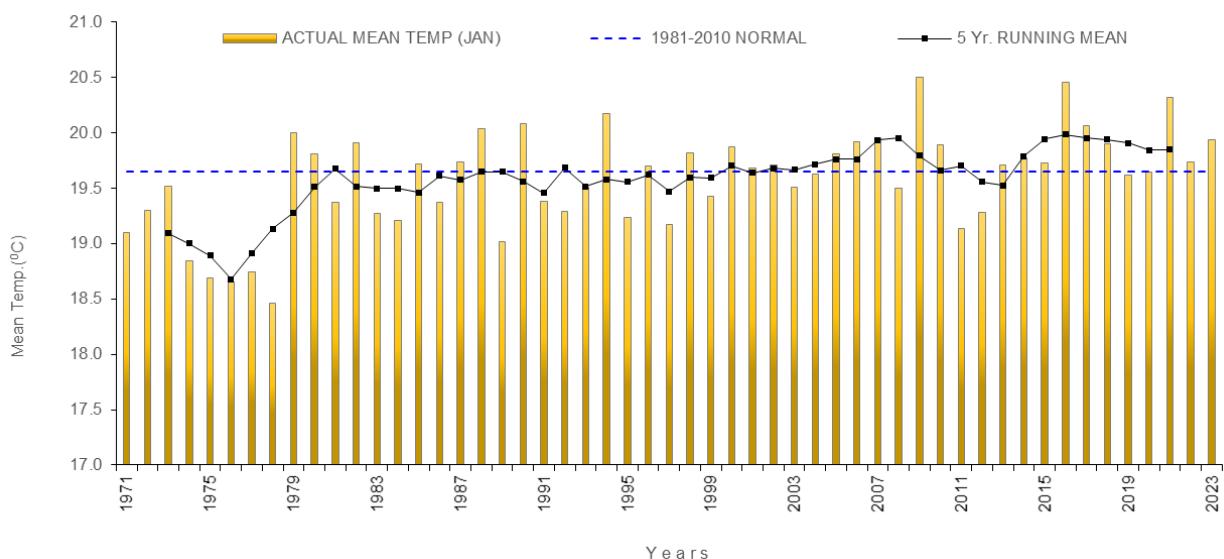
(a) MAXIMUM (b) MINIMUM

(BASED ON 1981-2010 NORMALS)



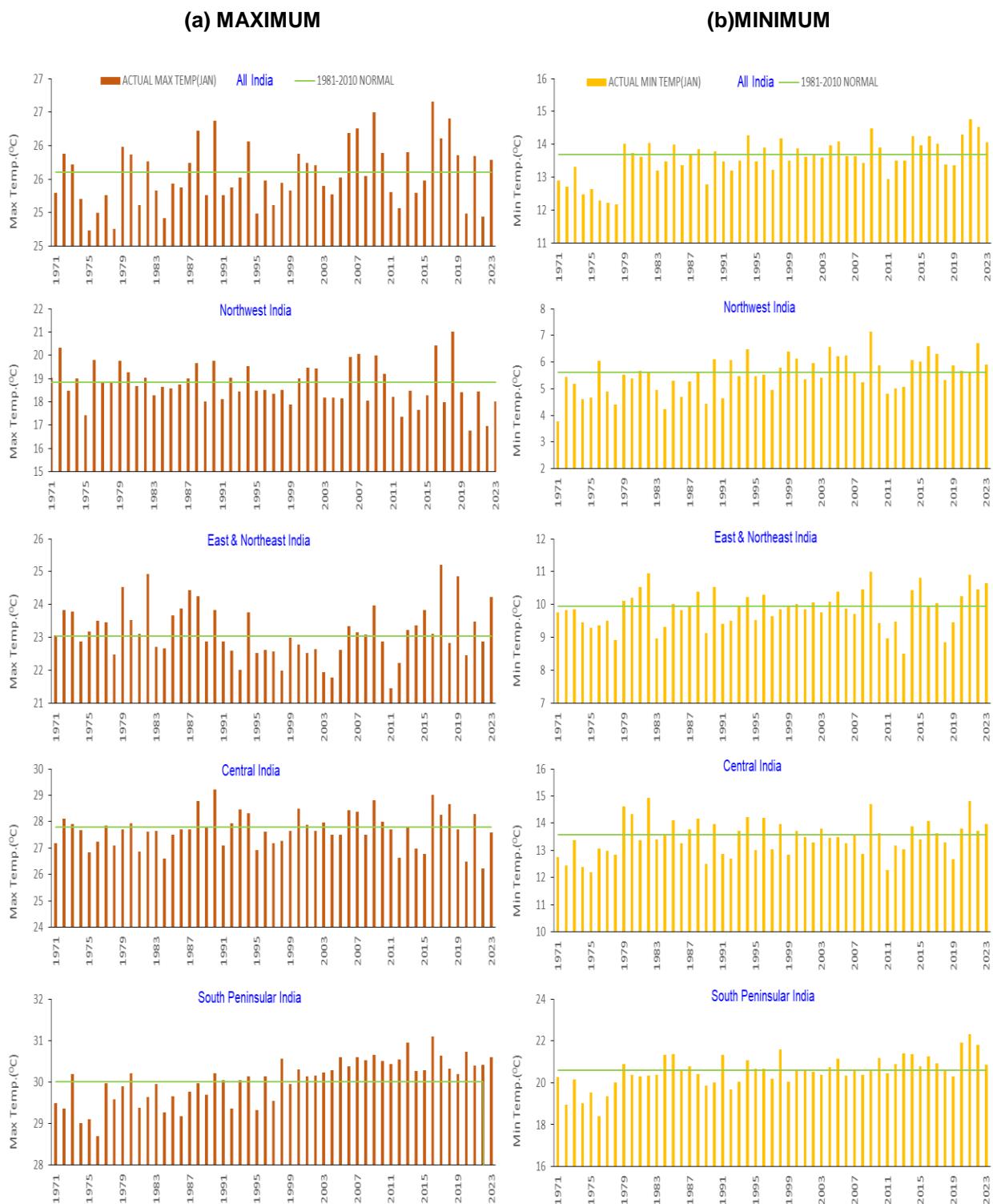
आकृती १५: (ए) उन दिनों का प्रतिशत जब अधिकतम तापमान > 90 वें प्रतिशत
(बी) उन दिनों का प्रतिशत जब न्यूनतम तापमान < 10 वें प्रतिशत

**FIG. 15 (a) PERCENTAGE OF DAYS WHEN MAXIMUM TEMPERATURE $>$ 90TH PERCENTILE
(b) PERCENTAGE OF DAYS WHEN MINIMUM TEMPERATURE $<$ 10TH PERCENTILE**



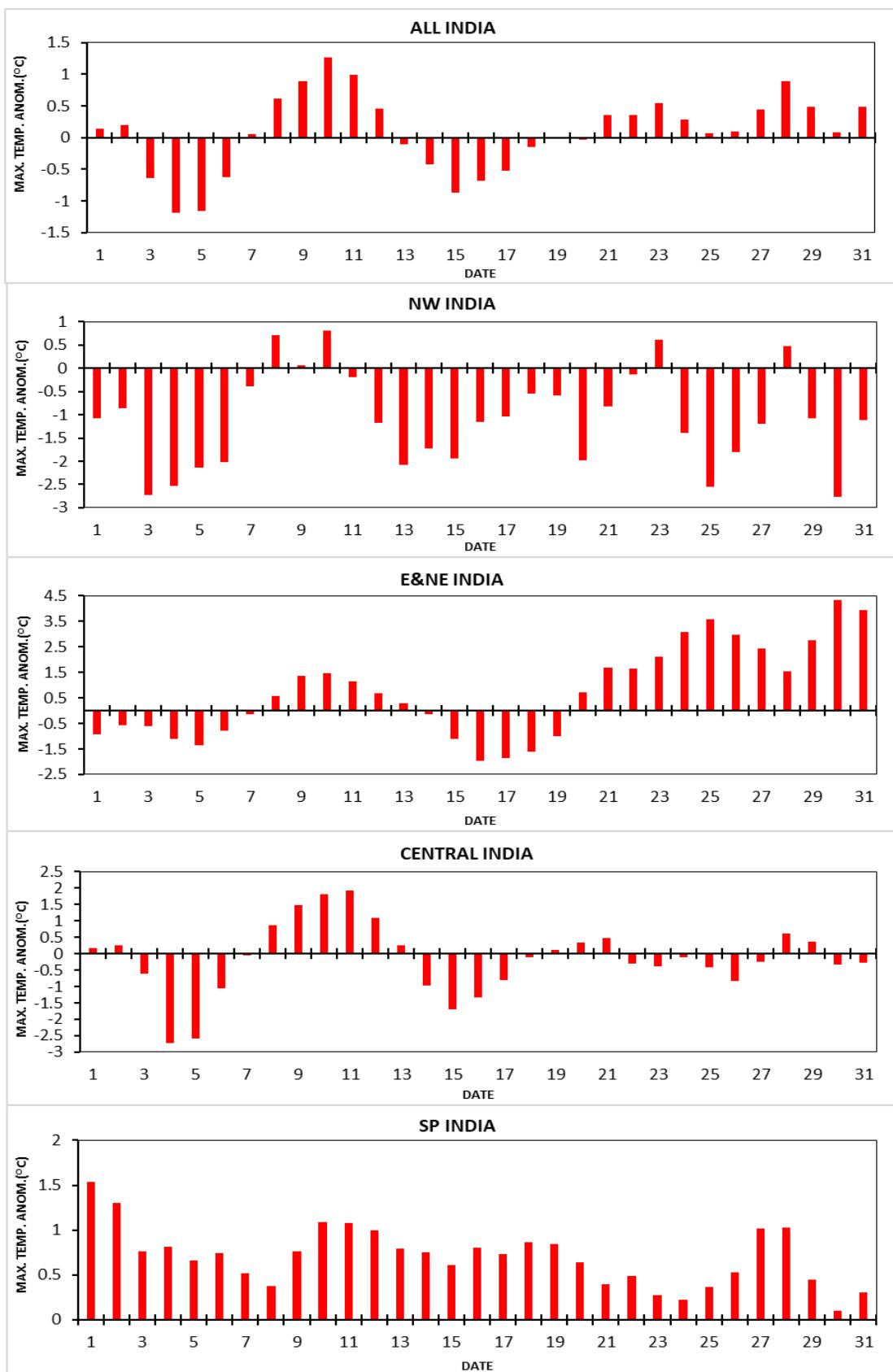
आकृती १६ : जनवरी १९७१-२०२३ की अवधि के दौरान भारत में औसत तापमान की समय श्रृंखला और महीने के लिए पांच साल चलने वाला औसत तापमान

FIG. 16: TIME SERIES OF MEAN TEMPERATURE AVERAGED OVER INDIA (VERTICAL BARS AND FIVE-YEAR RUNNING MEAN (CONTINUOUS LINE) FOR JANUARY 2023 (1971-2023))



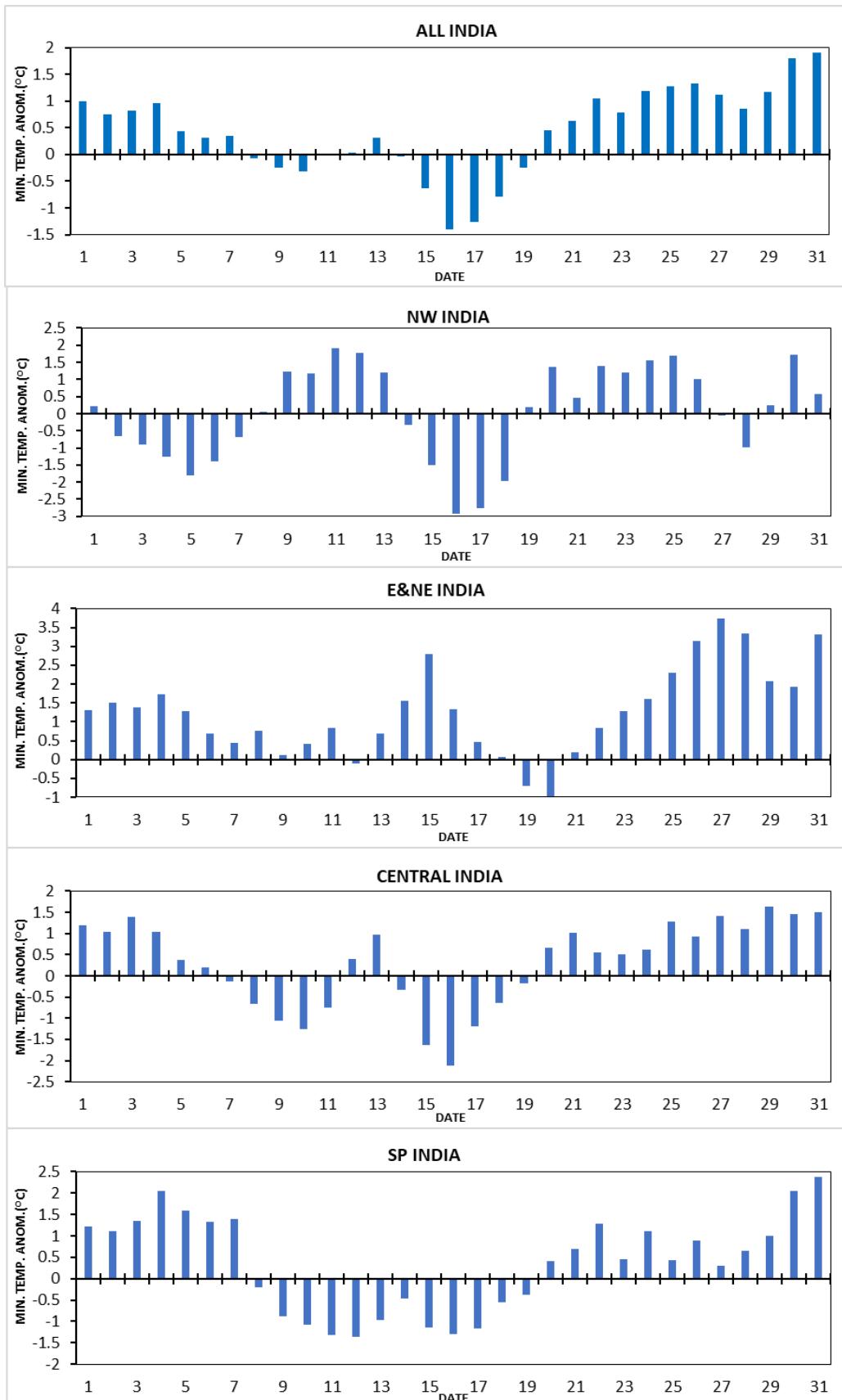
आकृति १७: जनवरी महीने के लिए १९७१-२०२३ अवधि के दौरान (ए) अधिकतम (बी) न्यूनतम तापमान की समय श्रृंखला पूरे देश और चार सजातीय क्षेत्र के लिए

FIG. 17: TIME SERIES OF TEMPERATURE FOR THE COUNTRY AS A WHOLE AND THE FOUR HOMOGENEOUS REGIONS FOR JANUARY 2023 (1971 - 2023)
(a) MAXIMUM (b) MINIMUM



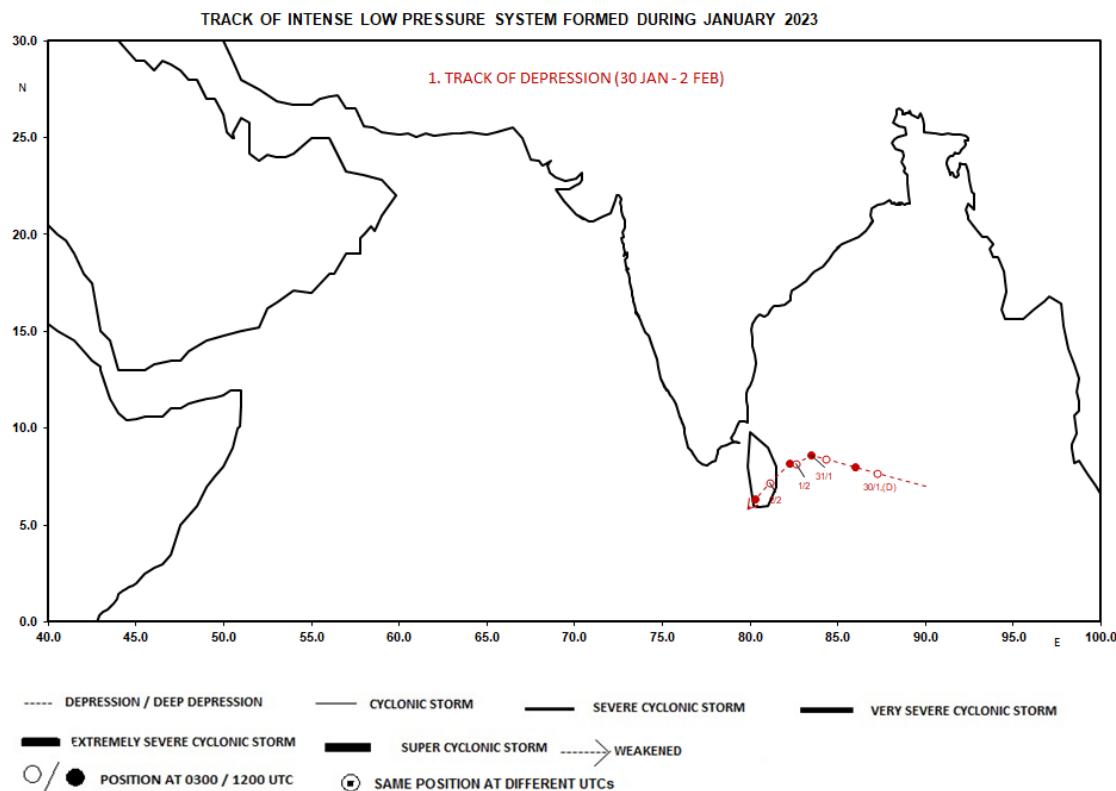
आकृती १८(ए): जनवरी 2023 के दौरान सभी भारत और चार सजातीय क्षेत्रों में अधिकतम तापमान विसंगतियां की दैनिक भिन्नता

FIG. 18(a): DAILY VARIATION OF MAXIMUM TEMPERATURE ANOMALY OVER ALL INDIA AND FOUR HOMOGENEOUS REGIONS DURING JANUARY 2023

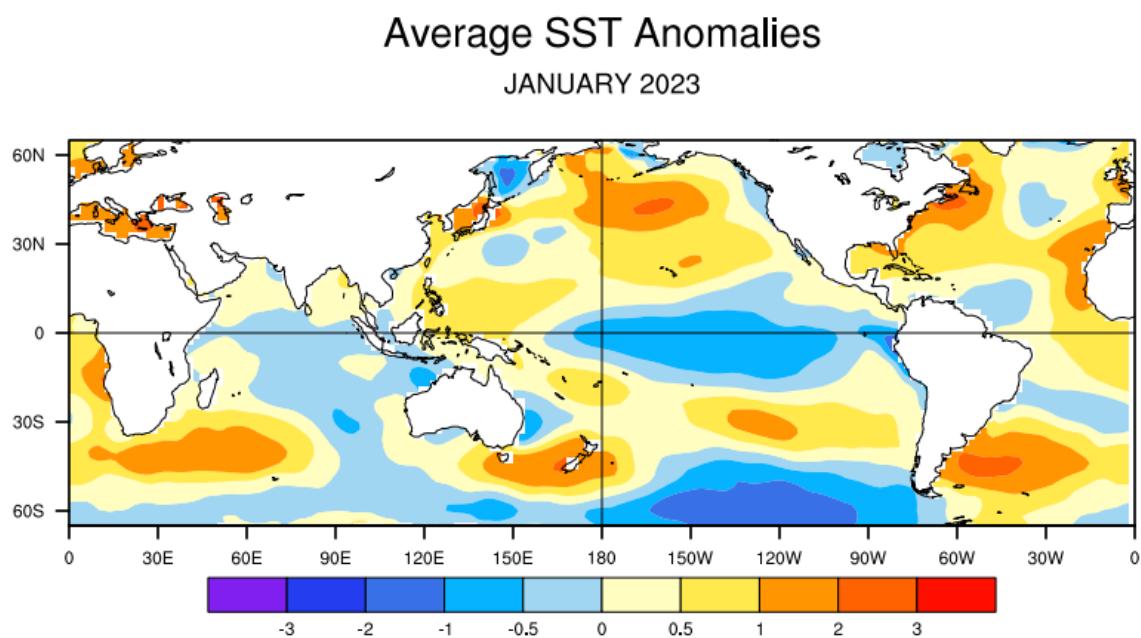


आकृति 18 (बी): जनवरी 2023 के दौरान सभी भारत और चार सजातीय क्षेत्रों में न्यूनतम तापमान
विसंगतियां में दैनिक भिन्नता

FIG. 18(b): DAILY VARIATION OF MINIMUM TEMPERATURE ANOMALY OVER ALL INDIA AND FOUR HOMOGENEOUS REGIONS DURING JANUARY 2023



आकृती १९: जनवरी 2023 के दौरान गठित तीव्र निम्न दबाव प्रणाली का ट्रैक
FIG. 19: TRACK OF DEPRESSION FORMED DURING JANUARY 2023



आकृती २०: समुद्री सतह तापमान विसंगति (°C)
FIG. 20: SEA SURFACE TEMPERATURE ANOMALY (°C)
 (Source - ERSST V5, NOAA)

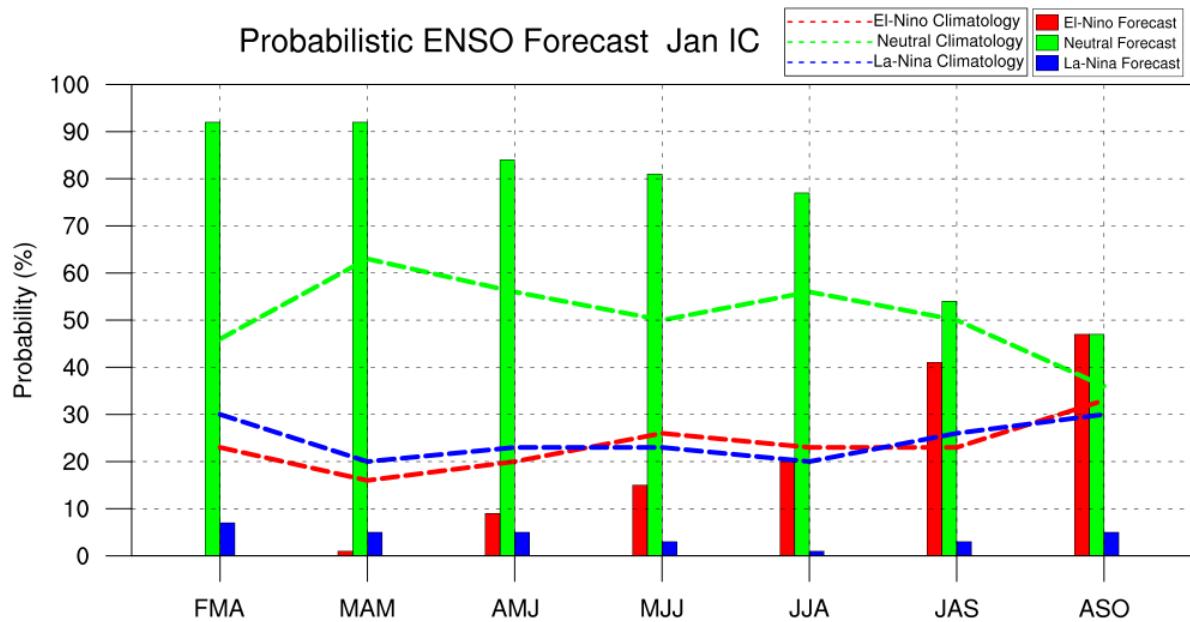
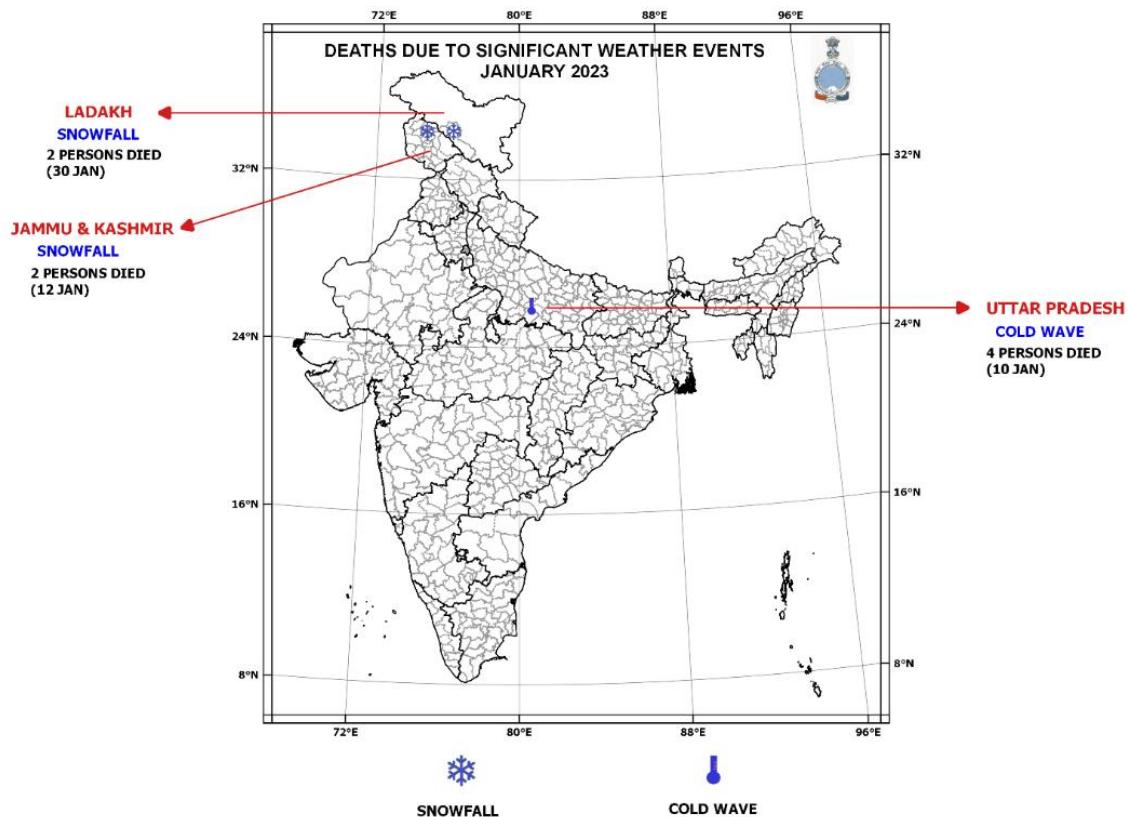


FIG. 21: Probability forecast along with climatological probabilities of Niño 3.4 Index from high-resolution Monsoon Mission Coupled Forecast System (MMCFS).
The data source for Climatology probabilities: NOAA Extended Reconstructed SST V5.
Criteria used for Probabilistic ENSO Forecast:
I.e., -0.5 La Nña, in between +0.5 & -0.5 neutral, g.e.0.5 El Nino.



**आकृति 22: जनवरी 2023 के दौरान महत्वपूर्ण मौसम की घटनाएं
(वास्तविक समय मीडिया रिपोर्ट के आधार पर)**

**Fig. 22: SIGNIFICANT WEATHER EVENTS DURING JANUARY 2023
(BASED ON REAL TIME MEDIA REPORT)**

तालिका १ / TABLE 1
जनवरी 2023 महीने के लिए उपमंडल वार वर्षा के आकड़े
METEOROLOGICAL SUBDIVISION-WISE RAINFALL STATISTICS
FOR THE MONTH OF JANUARY 2023 BASED ON OPERATIONAL DATA

MET. SUBDIVISION	ACTUAL	NORMAL	%
	(mm)	(mm)	DEP
1 A & N ISLAND	27.4	56.4	-51.4
2 ARUNACHAL PRADESH	10.9	45.8	-76.2
3 ASSAM & MEGHALAYA	0.4	13.8	-97.1
4 N M M T	0.1	10.4	-99.0
5 SHWB & SIKKIM	0.2	15.3	-98.7
6 GANGETIC WEST BENGAL	0.1	12.7	-99.2
7 ODISHA	0.1	10.6	-99.1
8 JHARKHAND	0.0	11.0	-100.0
9 BIHAR	0.2	9.4	-97.9
10 EAST U.P.	4.2	12.1	-65.3
11 WEST U.P.	11.7	12.9	-9.3
12 UTTARAKHAND	30.9	42.2	-26.8
13 HAR. CHD & DELHI	11.8	14.6	-19.2
14 PUNJAB	15.1	20.3	-25.6
15 HIMACHAL PRADESH	86.2	85.3	1.1
16 JAMMU & KASHMIR & LADAKH	135.1	95.1	42.1
17 WEST RAJASTHAN	5.2	3.1	67.7
18 EAST RAJASTHAN	22.8	5.0	356.0
19 WEST MADHYA PRADESH	6.5	6.9	-5.8
20 EAST MADHYA PRADESH	4.2	15.8	-73.4
21 GUJARAT REGION	3.0	1.0	200.0
22 SAURASHTRA & KUTCH	0.3	0.4	-25.0
23 KONKAN & GOA	0.0	0.4	-100.0
24 MADHYA MAHARASHTRA	0.1	1.5	-99.2
25 MARATHWADA	0.6	4.0	-85.0
26 VIDARBHA	0.5	9.9	-94.9
27 CHHATTISGARH	0.1	12.1	-99.2
28 COASTAL A. P.& YANAM	1.6	9.7	-83.5
29 TELANGANA	0.4	9.3	-95.7
30 RAYALASEEMA	0.2	4.0	-95.0
31 TAMIL., PUDU. & KARAikal	5.1	12.3	-58.5
32 COASTAL KARNATAKA	0.0	1.7	-100.0
33 N. I. KARNATAKA	0.2	2.6	-92.3
34 S. I. KARNATAKA	1.4	2.1	-33.3
35 KERALA & MAHE	12.8	7.4	73.0
36 LAKSHADWEEP	33.4	15.8	111.4

तालिका २ / TABLE 2

जिन स्टेशनों पर जनवरी 2023 के दौरान 24 घंटों में भारी (जैसे 7 सेमी) वर्षा हुई

STATIONS WHICH RECEIVED HEAVY (g.e. 7 cm) RAINFALL IN 24 HOURS DURING JANUARY 2023

(Only the stations which received the highest rainfall in the subdivision on the given date are mentioned in the table)

DATE	STATION NAME	NAME OF SUBDIVISION	RAINFALL
			(mm)
25	DEHRA GOPIPUR	HIMACHAL PRADESH	93
26	KHERI	HIMACHAL PRADESH	88.4
	BADAMALHERA	EAST MADHYA PRADESH	70.4
30	PARBATSAR	WEST RAJASTHAN	78
	AMET	EAST RAJASTHAN	79
31	RANJIT SAGAR DAM SITE	PUNJAB	78.4

तालिका ३ / TABLE 3

जनवरी 2023 महीने के दौरान की तापमान विसंगति

TEMPERATURE ANOMALIES OVER INDIA AND FOUR HOMOGENEOUS REGIONS DURING JANUARY 2023

JAN 2022		Max Temp (°C)	Min Temp (°C)	Mean Temp (°C)
ALL INDIA	ACTUAL	24.94	14.53	19.74
	NORMAL	25.60	13.69	19.64
	ANOMALY	-0.66	0.84	0.09
NORTHWEST INDIA	ACTUAL	16.48	6.72	11.60
	NORMAL	18.33	5.61	11.97
	ANOMALY	-1.85	1.11	-0.37
EAST & NORTHEAST INDIA	ACTUAL	22.87	10.47	16.67
	NORMAL	23.04	9.96	16.50
	ANOMALY	-0.17	0.51	0.17
CENTRAL INDIA	ACTUAL	26.23	13.71	19.97
	NORMAL	27.80	13.56	20.68
	ANOMALY	-1.57	0.15	-0.71
SOUTH PENNINSULAR INDIA	ACTUAL	30.42	21.80	26.11
	NORMAL	30.00	20.59	25.30
	ANOMALY	0.42	1.21	0.81

NOTE: VALUES ARE ROUNDED OFF TO NEAREST TWO DECIMAL

तालिका ४ / TABLE 4

ATMOSPHERIC AND SST INDEX VALUES FOR THE RECENT 12 MONTHS. ATMOSPHERIC INDICES ARE STANDARDIZED BY MEAN ANNUAL STANDARD DEVIATION EXCEPT FOR THE TAHITI AND DARWIN SLP ANOMALIES WHICH ARE IN hPa. SST INDICES (ANOMALIES AND MEAN) ARE IN DEGREE CELSIUS

SLP ANOMALIES			Tahiti SLP minus Darwin SLP	PACIFIC SST							
				NINO 1+2 0° - 10°S 90°W - 80°W		NINO 3 5°N - 5°S 150°W - 90°W		NINO 3.4 5°N - 5°S 170°W - 120°W		NINO 4 5°N - 5°S 160°E - 150°W	
Month	Tahiti	Darwin		SOI	Anomaly	Mean	Anomaly	Mean	Anomaly	Mean	Anomaly
JAN 23	1.90	-0.70	2.30	-0.58	23.98	-0.62	25.04	-0.75	25.80	-0.67	27.65
DEC 22	2.20	-1.80	3.50	-0.52	22.29	-0.87	24.36	-0.89	25.71	-0.87	27.67
NOV 22	0.30	-0.30	0.50	-1.24	20.41	-0.97	24.13	-0.91	25.80	-1.00	27.70
OCT 22	1.60	-1.50	2.80	-1.81	19.21	-1.13	23.85	-1.03	25.69	-1.14	27.62
SEP 22	2.10	-0.90	2.70	-1.02	19.70	-0.97	23.94	-1.09	25.62	-1.18	27.58
AUG 22	0.70	-1.20	1.70	-0.49	20.52	-0.65	24.47	-0.96	25.89	-1.09	27.70
JUL 22	1.20	-0.30	1.30	-1.28	20.68	-0.53	25.28	-0.68	26.62	-0.98	27.92
JUN 22	1.80	-1.20	2.80	-1.48	21.65	-0.82	25.80	-0.77	26.96	-0.71	28.26
MAY 22	1.60	-1.10	2.40	-1.63	22.78	-1.06	26.19	-1.15	26.78	-0.83	28.09
APR 22	1.80	-1.40	2.80	-1.31	24.22	-0.92	26.67	-1.13	26.69	-0.83	27.79
MAR 22	2.40	-0.80	2.90	-0.64	25.84	-0.76	26.44	-1.00	26.28	-0.7	27.62
FEB 22	2.10	0.10	1.80	-1.55	24.55	-1.18	25.22	-0.89	25.86	-0.37	27.83

(Data Source:CPC/NCEP,USA)

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