



**Government of India**  
**Earth System Science Organization**  
**Ministry of Earth Sciences**  
**India Meteorological Department**

**Dated: 4 May, 2021**

**Subject: Monthly Weather Review for the month of April 2021 and  
Weather Outlook for the month of May 2021**

**1. Salient features of month of April 2021**

**(a) Western Disturbances (WD):**

- The Western Disturbance (WD) activity in the month of April 2021 was higher than normal as a total of nine WD moved across Western Himalayan Region against the normal of four to five WDs. Out of nine WDs, four WDs (1<sup>st</sup> WD during 1-4 April; 2<sup>nd</sup> WD during 10-14 April; 3<sup>rd</sup> WD during 15-18 April and 4<sup>th</sup> WD during 23-26 April) were active WDs and moved as cyclonic circulations at middle tropospheric level or as a long amplitude north-south trough in middle and upper tropospheric westerly winds. The north-south oriented trough extended with its southern end dipping to north Arabian sea for 1 to 3 days and thus favoring moisture incursion to north India during respective periods.
- In April 2021, all four active WDs caused scattered to fairly widespread rainfall/snowfall/thunderstorm activity over Western Himalayan Region. The eastward movement of these systems and formation of induced cyclonic circulation over Punjab and north Rajasthan, in association with these WDs, caused isolated to scattered rainfall/thunderstorm activity over adjoining plains of Northwest India. Isolated hailstorm activity was also reported over western Himalayan region. These WDs have also affected adjoining central parts of India with isolated to scattered rainfall/thunderstorm activity and isolated hailstorm activity on a few occasions.

- It was for 2<sup>nd</sup> consecutive month in this summer of 2021, WD activities over north India remained to be very higher than normal. In the month of March 2021, a higher than normal with seven WDs were also observed against normal of four WDs.

#### **(b) Formation of Season's 1<sup>st</sup> Depression over Andaman Sea**

A Low pressure area lay over central parts of Andaman Sea in the beginning of the week; it became a Well Marked Low pressure area over the same region in the afternoon of 1<sup>st</sup> April and intensified into a Depression over north Andaman Sea in the early morning hours of 2<sup>nd</sup>. Moving north-northeastwards, it lay centred at 0830 hrs IST of 3<sup>rd</sup> April, 2021 over north Andaman Sea off south Myanmar coast, about 550 km east-northeast of Port Blair (Andaman Islands). Moving north-northeastwards further, it weakened into a Well Marked Low pressure area in the forenoon and further into a Low pressure area in the evening of 3<sup>rd</sup> April, 2021 over north Andaman Sea off south Myanmar coast. While low pressure area became less marked on 4<sup>th</sup>, its remnant cyclonic circulation lay over the same region till 6<sup>th</sup> and become less marked on 7<sup>th</sup> April 2021. It caused fairly widespread to widespread rainfall/thunderstorm activity along with isolated heavy rainfall on 3 April over Andaman & Nicobar islands

#### **(c) Occasional occurrences of shorter periods Heat wave spell**

Like March 2021, Heat wave conditions in April 2021 was **Occasional and also for shorter periods over very smaller pockets**. The major cause was wet spells regularly observed over western Himalayan region and adjoining plains of northwest India and adjoining central parts of India in the month in many days due to movement of WDs at regular intervals as deep amplitude trough in middle and upper tropospheric westerly. Also, due to presence of lower-level wind convergence in many days in the month, Maharashtra and adjoining parts of Peninsular India, experienced rainfall and thunderstorm activities at regular intervals. However, a few occasional shorter duration spell of heat wave were reported at isolated pockets of a few meteorological sub-divisions of the country. The heat wave occurred at isolated pockets over Tamil Nadu, Coastal Andhra Pradesh during 1-3 April, over south Rajasthan during 3-5 April and Uttar Pradesh on 6 April; over Haryana, Chandigarh & Delhi on 15 April, over Saurashtra & Kutch during 12-14 and 25-26 April 2021 and over Gangetic West Bengal and Odisha for 3 days during 25-27 April.

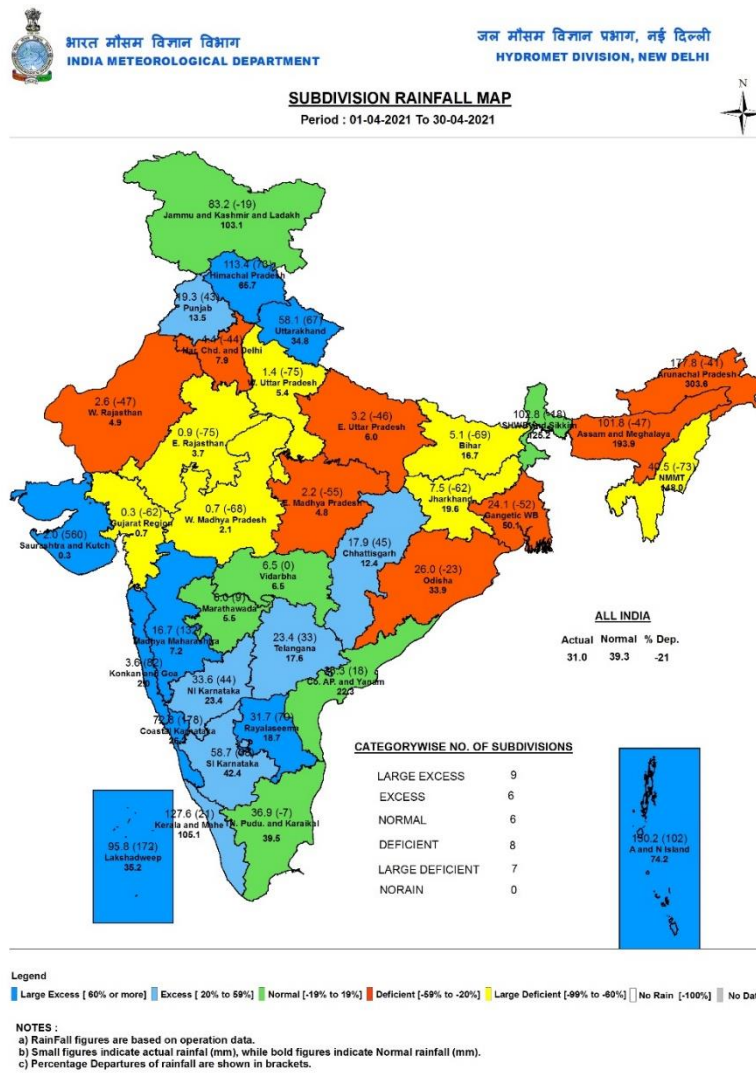
#### **(d) Monthly rainfall features:**

Rainfall over the country as a whole for the month of April, 2021 shows that it has recorded 31 mm which is 21% less than its Long Period Average (LPA) of 39.3 mm. India received deficient rainfall for country as a whole for 2<sup>nd</sup> consecutive month in April 2021, after March 2021, though rainfall cumulative total in the April 2021 has been improved than previous month and so also

its departure from normal. In March 2021, rainfall over the country as a whole was 16.7 mm, which is 45% less than its Long Period Average (LPA) of 30.4 mm.

The observed spatial rainfall, normal rainfall for the period 1961 to 2010 and its departures from normal for April 2021 is given in Figure 1. During this month, 9 sub-divisions received large excess, 6 excess and 6 normal while remaining 15 received deficient or large deficient rainfall. The monthly rainfall for April 2021 is given in the table below:

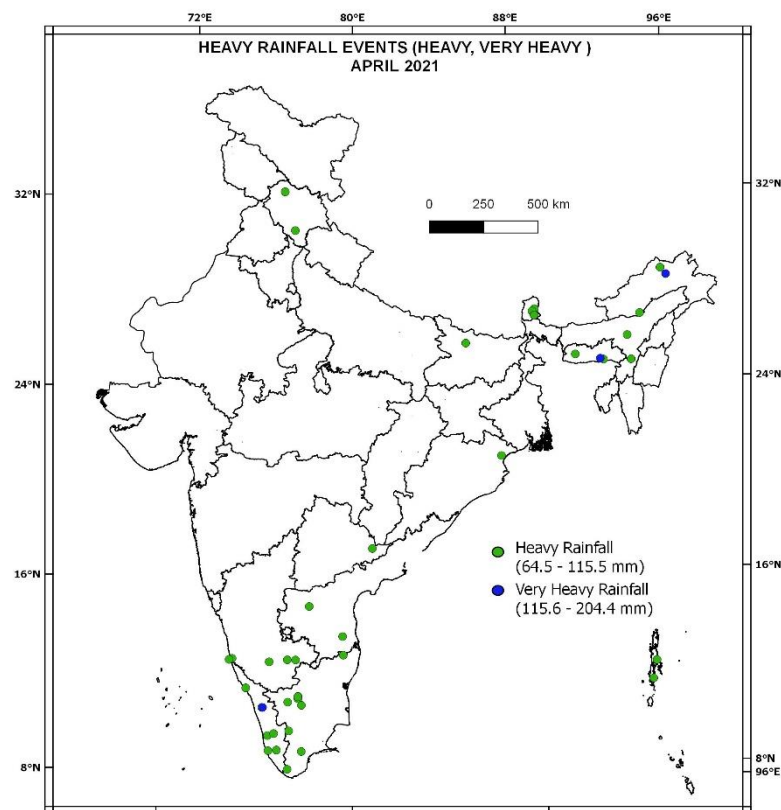
Regions	Actual Rainfall (mm)	Normal Rainfall (mm)	% Departure from LPA
Country as a whole	<b>31</b>	<b>39.3</b>	<b>-21.1</b>
Northwest India	<b>29.9</b>	<b>31.9</b>	<b>-6.4</b>
Central India	<b>9.3</b>	<b>9.0</b>	<b>3.2</b>
South Peninsula	<b>43.1</b>	<b>33.4</b>	<b>29.1</b>
East & northeast India	<b>64.2</b>	<b>124.8</b>	<b>-48.6</b>



**Fig. 1. Meteorological subdivision-wise rainfall during March 2021**

### (e) Frequency of Heavy Rainfall events

The April 2021 witnessed very heavy rainfall events and heavy rainfall events over South Peninsular India, East and North East India and Himachal Pradesh. The location of occurrences of very heavy rainfall events and heavy rainfall events are shown in the Figure 2. Very heavy rainfall (115.6 to 204.4 mm) events were reported from Yingkiong in Arunachal Pradesh (162.2 mm) on 11<sup>th</sup>, Mawsynram in Assam & Meghalaya (123.6 mm) on 17<sup>th</sup>, Perinthalamanna in Kerala & Mahe (147.2 mm) on 20<sup>th</sup> April 2021. There were 47 stations reporting heavy rainfall (64.5 to 111.5.5 mm of rainfall) in addition to the above stations of very heavy rainfall category.

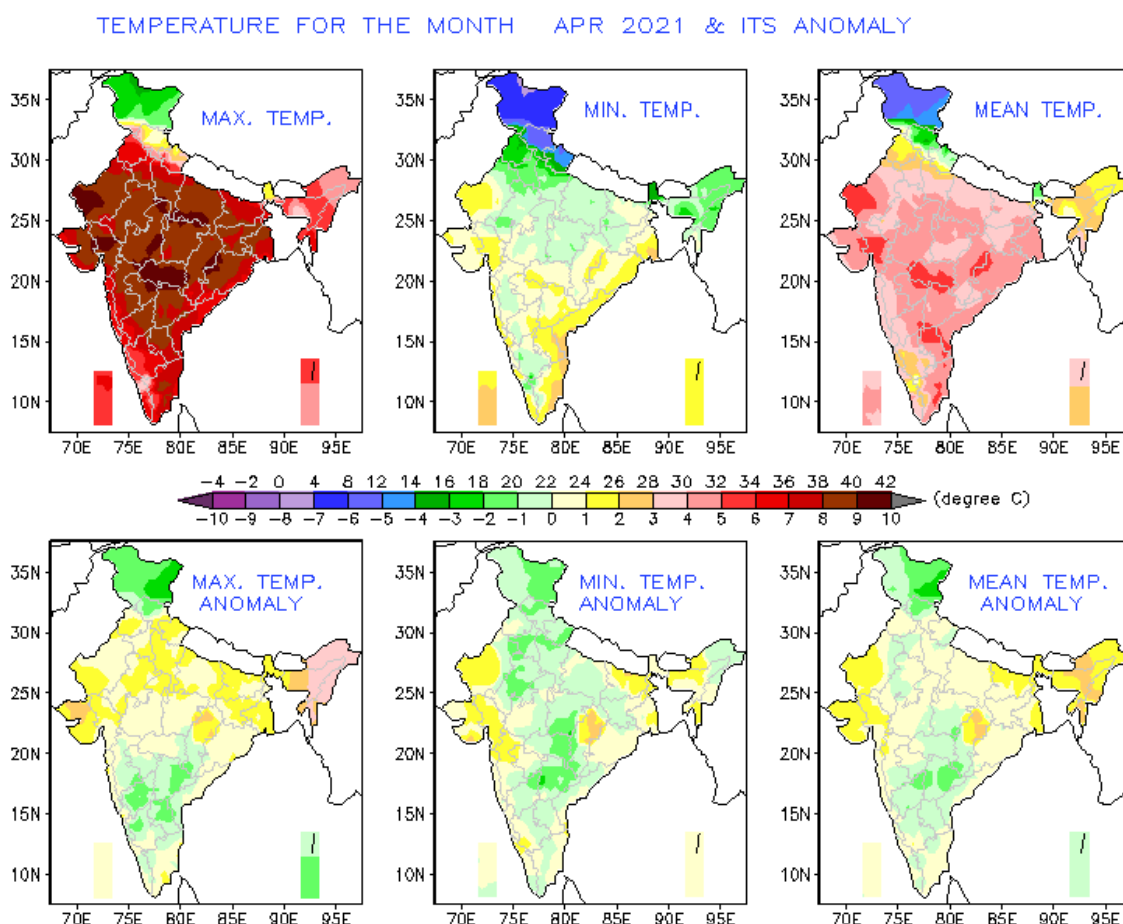


**Fig 2: The location of occurrences of very heavy and heavy rainfall events in the month of April 2021.**

### (f) Characteristics of Monthly Temperatures pattern over the country during April 2021.

The observed spatial temperature pattern of monthly average maximum, average minimum and mean temperature over India and their departures from normal (1981 to 2010 period) for the month of April 2021 is given in Figure 3. It shows the maximum temperatures were above normal by 1 to 2°C over parts of northwestern plains of India, Gujarat, Bihar, Jharkhand, Chhattisgarh, Gangetic West Bengal and Tamil Nadu; above normal by 3-4°C over northeastern states of India while it was below normal by 1 to 3°C over Maharashtra and adjoining central

parts of Peninsular India and normal over rest parts of the country.



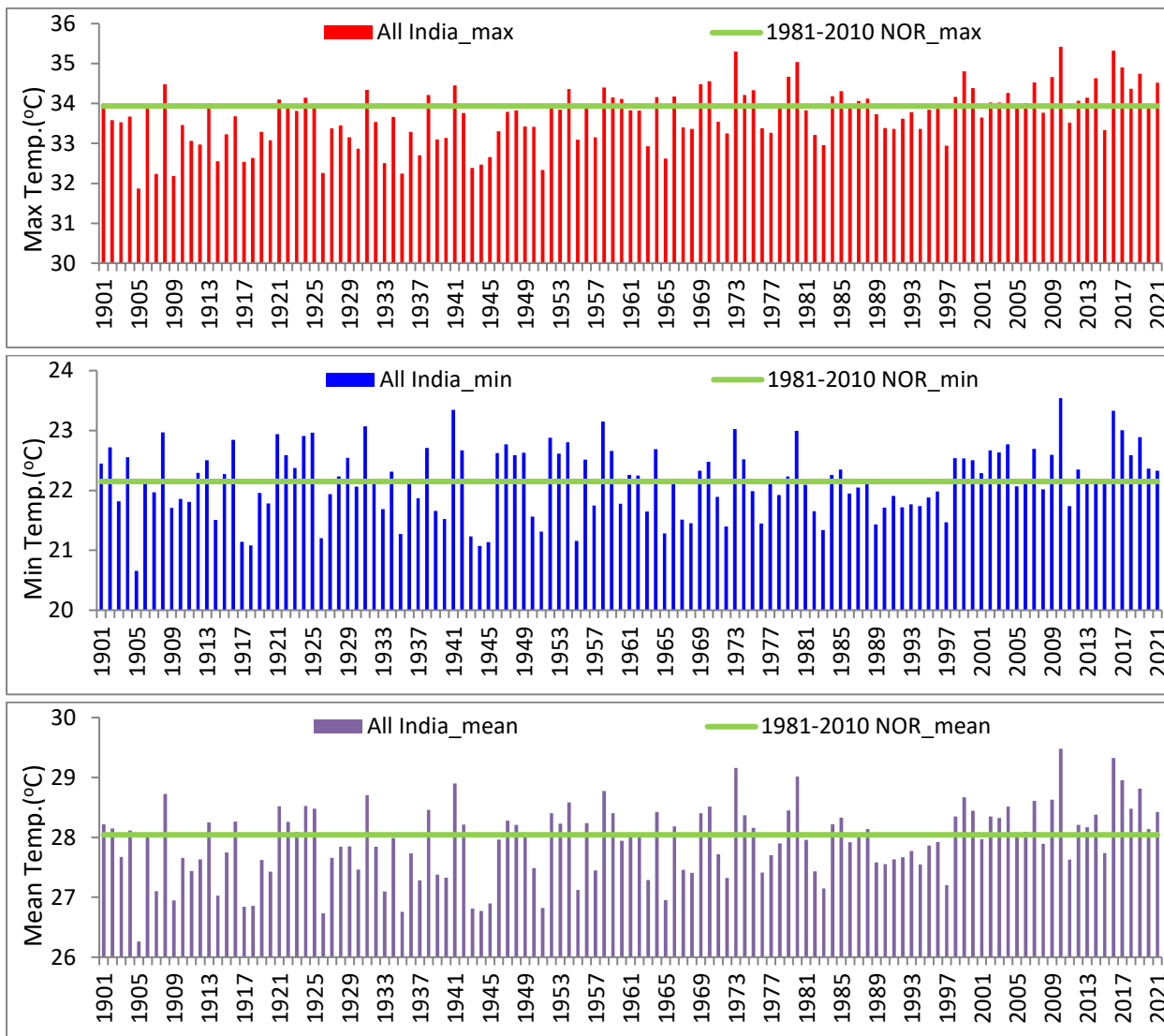
**Fig 3: Observed spatial temperature pattern of monthly average maximum average minimum, and mean temperature over India (top three from left to right) and their departure from normal (1981 to 2010 period) for April 2021(lower three from left to right).**

## 2. Characteristics of all India and four Homogenous region temperature and comparison with its historical time series:

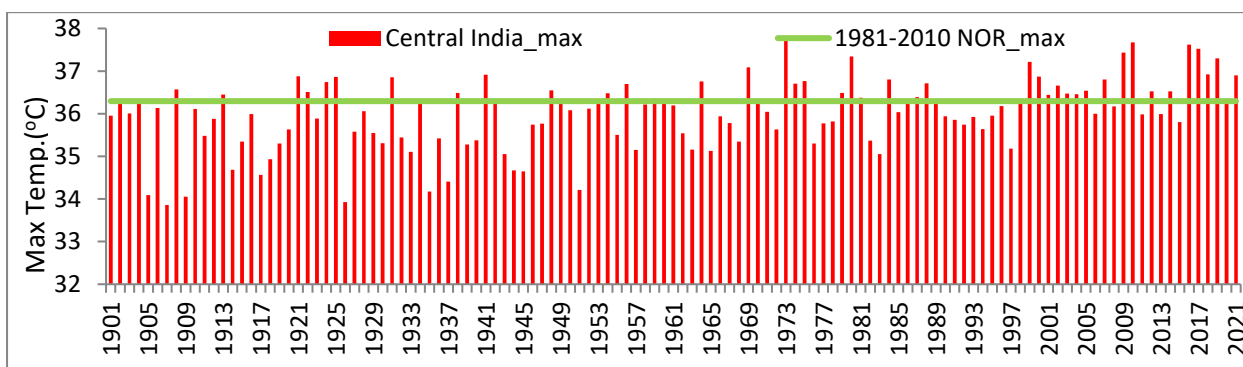
The observed average maximum, average minimum and mean temperature for the country as a whole during April 2021 were 34.52°C, 22.33°C and 28.42°C respectively, against the normal of 33.94°C, 22.15°C and 28.04°C based on the climatology period of 1981-2010. Thus, the average maximum, average minimum and mean temperature for the country as a whole were above normal by 0.58°C, 0.18°C and 0.38°C respectively. The climatological data based on the period of 1981 to 2010 are used to calculate the normal and hence the anomaly (Actual average temperature in 2021- normal temperature based on data of 1981-2010). Figure 4 shows time series of all India monthly average maximum, average minimum and mean temperature during 1901-2021. The all India average monthly maximum temperature during April 2021 with 34.52°C is the 13<sup>th</sup> warmest in last 121 years.

Figure 5 shows time series of Central India monthly average maximum temperature during

1901-2021. The average maximum temperature over Central India during April 2021 was 36.9°C. The maximum temperature over Central India (areas covering states of Gujarat, Maharashtra, Madhya Pradesh, Chhattisgarh and Odisha) exceeded the normal during April (by 0.6°C, 12<sup>th</sup> warmest since 1901).



**Fig 4: Time series of All India monthly average maximum, average minimum and mean temperature for the month of April during 1971-2021.**



**Fig 5: Time series of Central India monthly average maximum temperature for the month of April during 1971-2021.**

The Temperatures during April 2021 for all India and homogeneous regions are given bellow along with their ranks since 1901;

APRIL 2021		Max Temp (°C)	Min Temp (°C)	Mean Temp (°C)
ALL INDIA	ACTUAL	34.52	22.33	28.42
	NORMAL	33.94	22.15	28.04
	ANOMALY	0.58	0.18	0.38
	TOP RANK	13	48	24
NORTHWEST INDIA	ACTUAL	32.81	17.32	25.06
	NORMAL	32.54	17.69	25.11
	ANOMALY	0.27	-0.37	-0.05
	TOP RANK	37	72	50
EAST & NORTHEAST INDIA	ACTUAL	33.88	20.48	27.18
	NORMAL	31.99	20.13	26.06
	ANOMALY	1.88	0.35	1.11
	TOP RANK	16	53	22
CENTRAL INDIA	ACTUAL	36.90	23.75	30.32
	NORMAL	36.29	23.32	29.81
	ANOMALY	0.60	0.43	0.51
	TOP RANK	12	39	19
SOUTH PENNINSULAR INDIA	ACTUAL	34.38	25.43	29.90
	NORMAL	34.26	25.18	29.72
	ANOMALY	0.12	0.25	0.18
	TOP RANK	23	38	29

## 2. Large scale features

- Currently, moderate La Niña conditions are prevailing over equatorial Pacific and Sea Surface Temperatures (SSTs) are below normal over central & eastern equatorial Pacific Ocean. The latest Monsoon Mission Climate Forecasting System (MMCFS) forecast indicates warming of SSTs over Nino 3.4 region during the coming season and there is a possibility of transition of La Niña conditions to ENSO neutral conditions during the forthcoming season. However, model skill during this period is supposed to be limited because of the spring barrier.
- At present, neutral Indian Ocean Dipole (IOD) conditions are observed over Indian Ocean and the latest MMCFS forecast indicates that neutral IOD conditions are likely to continue up to May, June & July (MJJ) months and negative IOD conditions likely to develop thereafter.
- The Madden Julian Oscillation (MJO) index lies currently in phase 1 with amplitude more than



1. It will remain in phase 1 till 4<sup>th</sup> May and further propagate eastwards with gradual reduction in amplitude and enter in phase 2 on 5<sup>th</sup> May. It is likely to be in Phase 2 but with reduction of its amplitude less than 1, likely from 9 May. It is likely to enter to Phase 3 with amplitude remaining less than 1 from 11 May 2021 and remain there till mid of May. **Hence, it would be favorable for enhancement of convective clouds over the Southern parts of Arabian Sea during week 2.**

### 3. Climate Outlook for May 2021

#### 3.1 Temperature outlook for May 2021

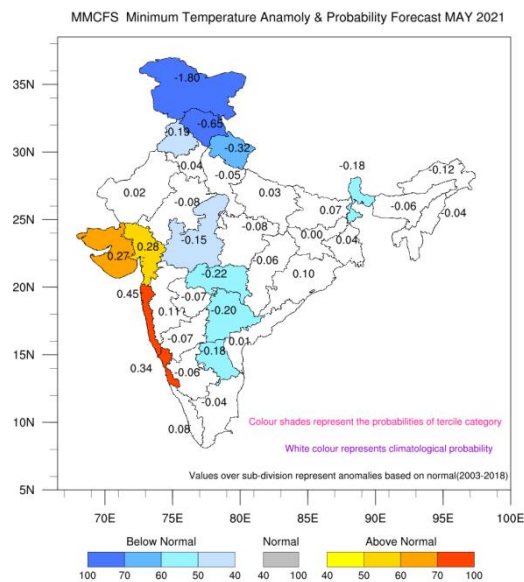
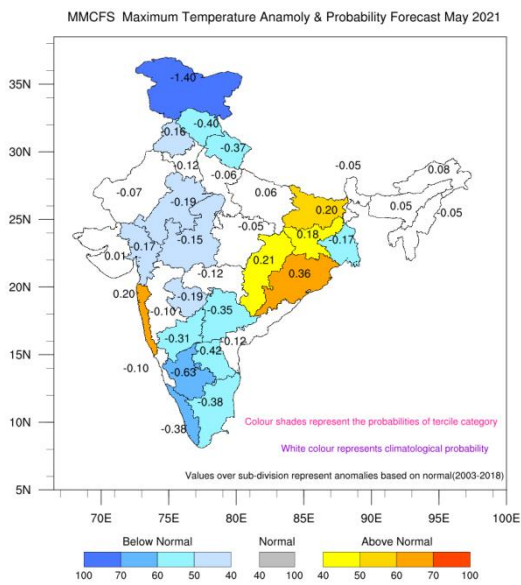


Fig 6. Probability forecast & Subdivision averaged Maximum Temperature Anomaly for May 2021

Fig 7. Probability forecast & Subdivision averaged Minimum Temperature Anomaly for May 2021



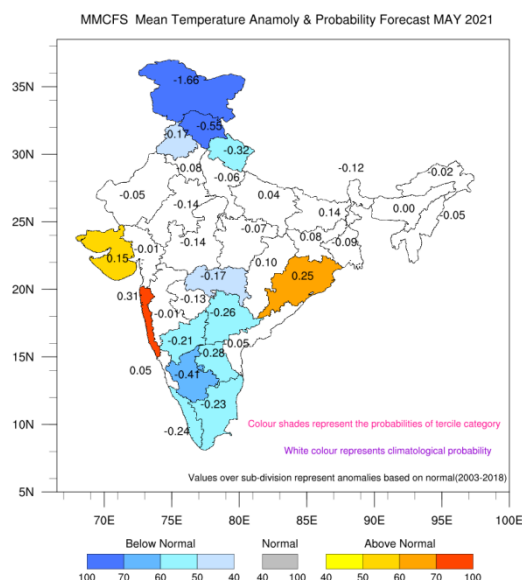


Fig 8. Probability forecast & Subdivision averaged Mean Temperature Anomaly for May 2021

Fig.6, Fig.7 and Fig.8 shows predicted sub-divisional probability and the subdivision averaged maximum, minimum and mean temperature anomalies (departures from the long term normal) respectively for the month of May 2021. The probability forecast for maximum temperature (Fig.6) indicates that above normal maximum temperatures are likely over Konkan and Goa from west coast and most subdivisions of east India. Below normal maximum temperatures are likely over most of the subdivisions of south Peninsular, few subdivisions of north, northwest, and adjoining central India. Rest of the subdivisions are likely to experience climatological probability for maximum temperature.

The probability forecast for minimum temperature (Fig.7) indicates that above normal minimum temperatures are likely over a few subdivisions of west India and below normal minimum temperatures over a few subdivisions of extreme north, central, northern part of south peninsular India and Sub-Himalayan West Bengal (SHWB) from east India. Rest of the subdivisions are likely to experience climatological probability for minimum temperature.

The probability forecast for mean temperature (Fig.8) indicates above normal mean temperature over a few subdivisions of Saurashtra and Kutch and Odisha. A few subdivisions of extreme north and most of the subdivisions of south peninsular India are likely to experience below normal mean temperatures. Rest of the subdivisions are likely to experience climatological probability for mean temperature.

## 3.2 Rainfall Forecast

### Weather systems & associated Precipitation during (03 to 07 May, 2021)

- A cyclonic circulation lies over West Uttar Pradesh & neighbourhood and a trough runs from this circulation to Assam at lower levels. The trough in westerlies now runs roughly along longitude 90°E to the north of latitude 22°N in middle tropospheric levels. The above east-west trough is very likely to persist over East & adjoining northeast India during next 4-5 days. Under its influence, fairly widespread to widespread rainfall/thunderstorm activity is very likely over northeastern states; and scattered rain/thundershower over rest parts of east India during next 5 days. **Isolated heavy rainfall is also likely over Assam & Meghalaya on 4, 5 & 7 May; Sub Himalayan West Bengal & Sikkim on 3 & 4 May; over Gangetic West Bengal on 4 & 5 May; over Odisha on 4 May and over Arunachal Pradesh on 5 May, 2021. Thunderstorm & lightening activity accompanied with gusty winds is also likely over most parts of the above regions during next 4-5 days.**
- Under the influence of north-south trough over south Peninsula at lower levels, light/moderate scattered to fairly widespread rain/thunder is very likely over Kerala & Mahe, Lakshadweep and Coastal & South Interior Karnataka; and isolated rain/thundershower over rest parts of south Peninsular India during next 5 days. **Isolated heavy rainfall is also likely over Kerala & Mahe and Coastal & South Interior Karnataka from 5 & 6 May.**
- **Under the influence of two Western Disturbances in quick succession, isolated to scattered rain/thunder is very likely over Western Himalayan Region on 3 & 4 May; its intensity & distribution is very likely to increase thereafter with light to moderate scattered/fairly widespread rainfall/thundershower over the region during 5 to 7 May, 2021. Isolated heavy rainfall is also very likely over Uttarakhand on 6 May, 2021. Isolated to scattered rainfall with thunderstorm & lightening is also likely over plains of northwest India during 4-7 May**

### Rainfall for 08 to 12 May, 2021

- Due to trough/wind discontinuity over southwest Peninsular India, light to moderate thundershower is very likely to continue over most parts of south Peninsular India during most days of the week. **Hence, rainfall activity is likely to be above normal over the above region.**
- Due to Western Disturbance and wind confluence, light to moderate isolated/scattered rain/thunder is very likely over northwest India during most days of the week. **Hence, rainfall activity is likely to be normal to above normal over the most parts of the region.**
- It is likely to be below normal many parts of east & northeast India and near normal over rest

parts of the country.

- Fig 9 and 10 shows **cumulative forecasted spatial rainfall distribution and its departure from normal over India for all four weeks of May 2021**

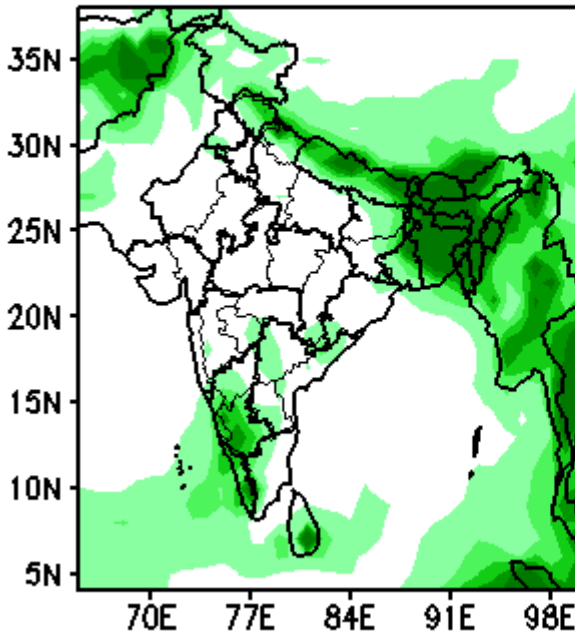
### **3.3. Cyclogenesis:**

- No cyclogenesis is likely over the north Indian Ocean during next two weeks. For details and further update please gets the update each week on Thursday:

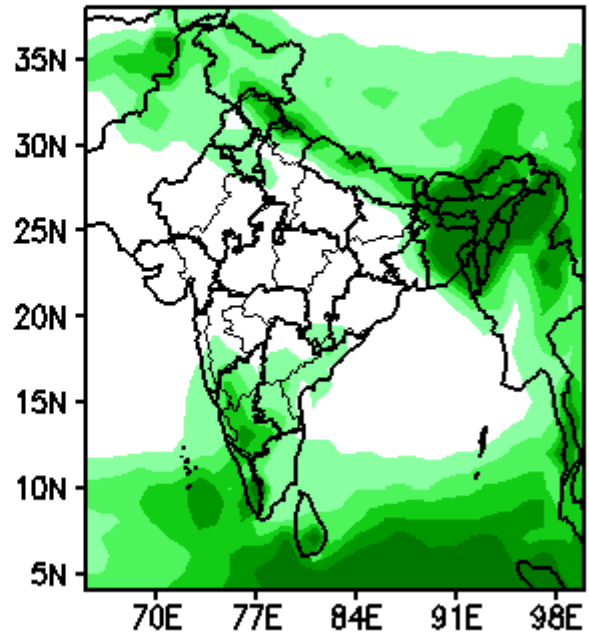
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## Forecast Rainfall (mm/day)

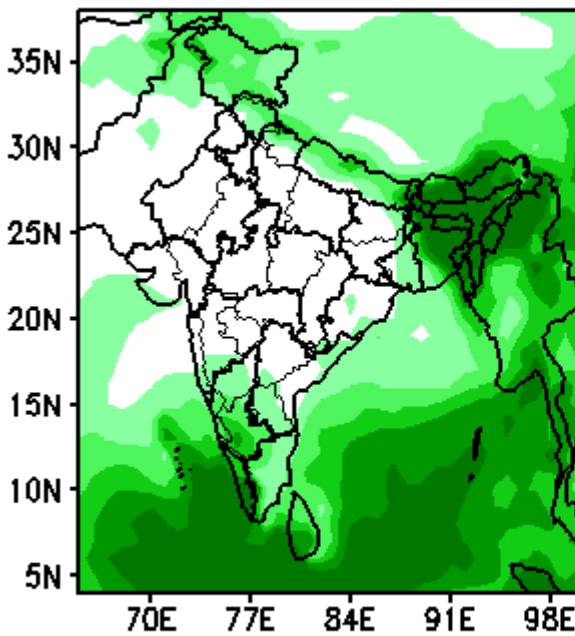
(Week1: 30Apr-06May)



(Week2: 07May-13May)



(Week3: 14May-20May)



(Week4: 21May-27May)

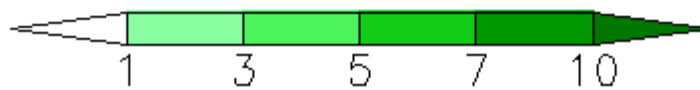
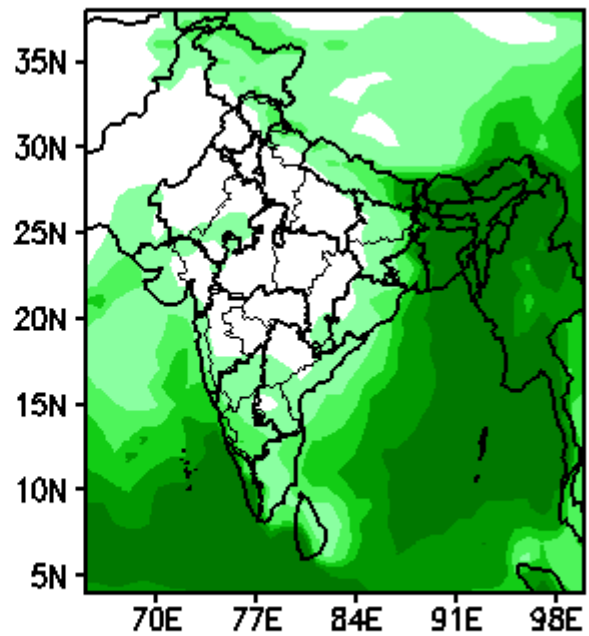
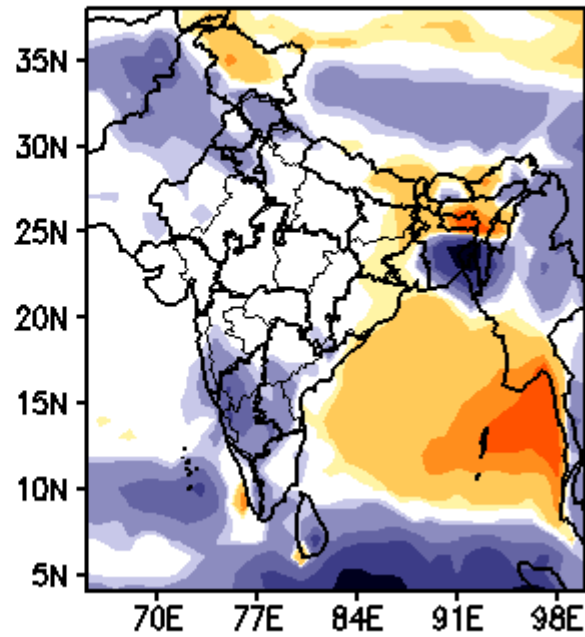
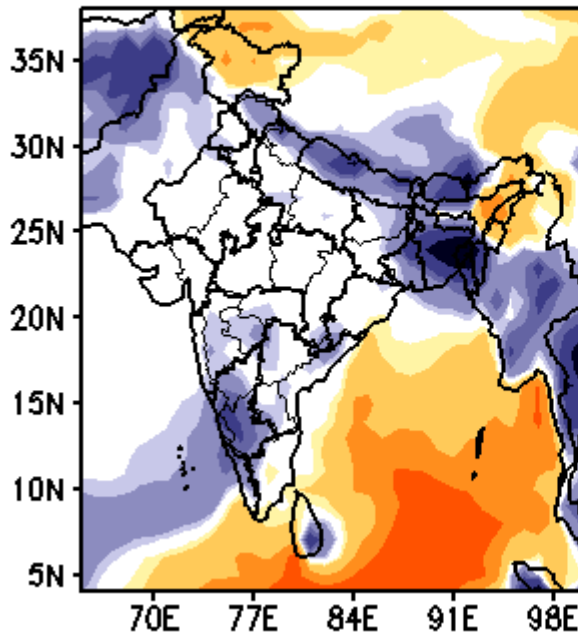


Fig 9: Rainfall forecast (Actual) in mm/day over the country for May 2021 (Week 1 to Week 4)

## Forecast Rainfall Anomaly (mm/day)

(Week1: 30Apr-06May)

(Week2: 07May-13May)



(Week3: 14May-20May)

(Week4: 21May-27May)

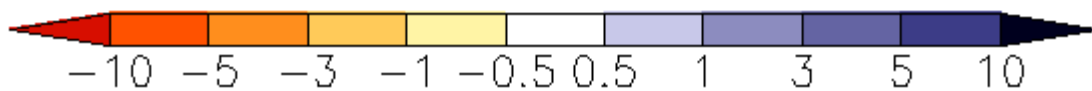
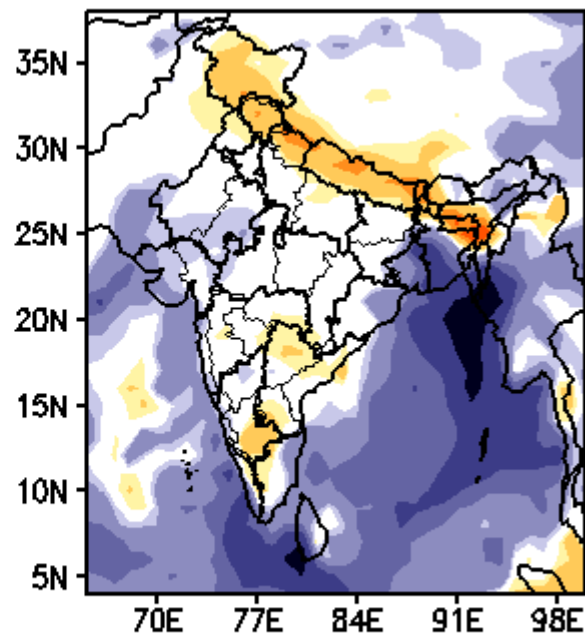
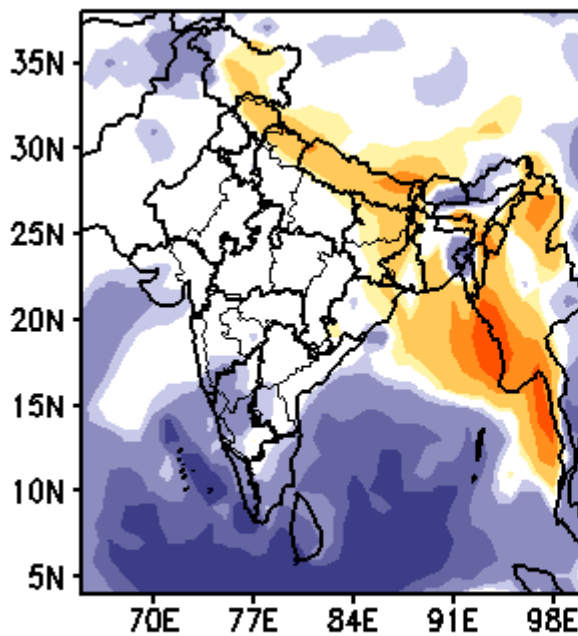


Fig 10: Rainfall forecast (in departure from normal) over the country for May 2021 (Week 1 to Week 4)