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Ministry of Earth Sciences (MoES)
भारतमौसमविज्ञानविभाग
INDIA METEOROLOGICAL DEPARTMENT

**Monthly Outlook for the Rainfall and the Temperatures over India during
February 2024**

Highlights

1. Monthly rainfall during February 2024 over North India consisting of seven meteorological subdivisions (East Uttar Pradesh, West Uttar Pradesh, Uttarakhand, Haryana, Chandigarh & Delhi, Punjab, Himachal Pradesh, Jammu and Kashmir, and Ladakh) is most likely to be above normal (>122 % of Long Period Average (LPA)).
2. Monthly rainfall over the country as a whole during February 2024 is most likely to be above normal (>119 % of LPA).
3. Normal to above normal rainfall is likely over most parts of Northwest, Northeast, and Central India. The below normal rainfall is likely over most parts of South peninsular India.
4. Monthly minimum temperatures during February 2024 are most likely to be above normal over the most parts of the country.
5. Monthly maximum temperatures for February 2024 are likely to be above normal over most parts of the Northwest India, West central India and Northeast India, and some parts of East central India. Normal to below-normal maximum temperatures are likely in most parts of peninsular India and some parts of East central India and isolated pockets over Northeast India.
6. Below-normal cold wave days are expected over some parts of Central India during the month of February 2024.
7. The strong El Niño conditions prevailing over Equatorial Pacific likely to weaken steadily and turn to ENSO neutral conditions by the end of 2024 spring season.

1. Background

North India consisting of seven meteorological subdivisions (East Uttar Pradesh, West Uttar Pradesh, Uttarakhand, Haryana, Chandigarh & Delhi, Punjab, Himachal Pradesh, Jammu & Kashmir and Ladakh) receives about 18% of its annual rainfall during the period of January to March. Jammu & Kashmir and Ladakh in particular receive about 31% of their annual rainfall during this period. The rainfall during this period is very crucial for Rabi crops over the region. It is also crucial for the water management of the region. Because of these reasons, India Meteorological Department (IMD) has been issuing long-range forecast outlooks for the winter rainfall over North India. IMD also continuously works to improve the skill of forecasting models. At present the seasonal and monthly rainfall forecast is prepared based on the newly developed Multi-Model Ensemble (MME) technique. The MME approach uses the coupled global climate models (CGCMs) from different global climate prediction and research centers including IMD/MoES Monsoon Mission Climate Forecast System (MMCFS) model. Since 2016, the India Meteorological Department (IMD) has also been issuing seasonal and monthly forecast outlooks for the maximum and minimum temperatures over the country using the MME approach.

IMD has now prepared and presented the monthly forecast outlook for the following;

- a. Probabilistic forecast for February 2024 rainfall averaged over North India and that over the country as a whole.
- b. Spatial distribution of the probabilistic forecasts of monthly rainfall over the country for February 2024.
- c. Spatial distribution of the probabilistic forecasts of monthly maximum and minimum temperatures over the country for February 2024.

2. Probabilistic Forecast for the Rainfall during February 2024.

The rainfall averaged over North India is most likely to be above normal (>122 % of Long Period Average (LPA)) during February, 2024. Monthly rainfall over the country as a whole during February 2024 is also most likely to be above normal (>119 % of LPA). The LPA of rainfall over North India and the country as a whole during February based on data from 1971-2020 is 65.0 mm and 22.7 mm respectively.

The spatial distribution of the probabilistic forecast of tercile categories (above normal, normal, and below normal) of monthly rainfall over the country for February 2024 is shown in Fig.1. The forecast suggests that normal to above normal rainfall is likely over most parts of Northeast, Central India and Northwest India. The below normal rainfall is likely over most parts of South peninsular India. Climatological probabilities are likely over the remaining areas of the country.

The dotted areas in the map climatologically receive veryless rainfall during the month and the white-shaded areas within the land areas represent climatological probabilities.

3. Probabilistic Forecast the Temperatures during February 2024³

Fig.2 and Fig.3 show the forecast probabilities of the minimum and maximum temperatures respectively for February 2024. The probability forecast for the minimum temperatures indicates that during February 2024, minimum temperatures are most likely to be above normal over most parts of the country.

The probability forecast for maximum temperatures (Fig.3) indicates that during February 2024, above normal over most parts of the Northwest India, West central India and Northeast India, and some parts of East central India. Normal to below-normal maximum temperatures are likely in most parts of peninsular India and some parts of East central India and isolated pockets over Northeast India. Climatological probabilities (indicated by white-shaded areas) are predicted over the remaining areas of the country.

4. Outlook for the Cold Wave Days during February 2024

The anomaly (deviation from normal) forecast for the number of cold wave days in the country for the month of February 2024 is presented in Fig. 4. The cold wave days over most parts of the country are likely to be within the normal range. However, cold wave days are likely to be below normal over some parts of Central India.

5. SST Conditions Over the Pacific and the Indian Oceans

Currently, strong El Niño conditions are prevailing over the equatorial Pacific, and the sea surface temperatures (SSTs) are warmer than normal over most of the Equatorial Pacific Ocean. The latest MMCFS forecast indicates that El Niño conditions are likely to continue during February 2024 and weaken steadily thereafter.

At present, positive Indian Ocean Dipole (IOD) conditions persist over the Indian Ocean, and the latest MMCFS forecast indicates a weakening of the positive IOD conditions and turning to neutral in the next 1-2 months.

6. Extended Range Forecast and short to medium-range forecasting services

IMD also provides extended-range forecasts (7-day averaged forecasts for the next four weeks) of rainfall and maximum & minimum temperatures over the country updated every week on Thursday. This is based on the Multi-model ensemble dynamical Extended Range Forecasting System currently operational at IMD. The forecasts are available through the IMD website (https://mausam.imd.gov.in/imd_latest/contents/extendedrangeforecast.php). The extended-range forecast is followed by the short to medium-range forecast issued daily by IMD.

4
probability rainfall forecast for 2024 February

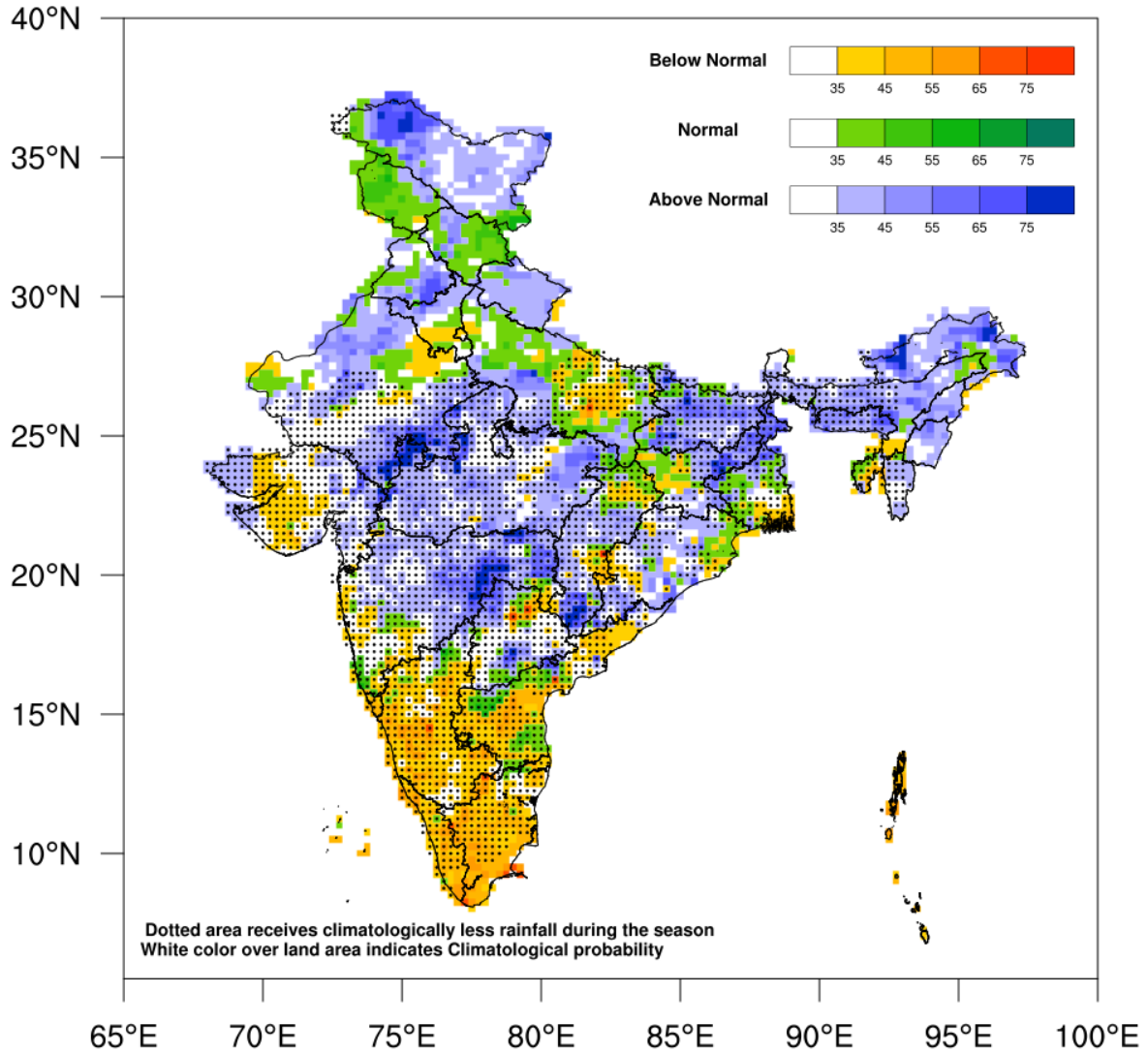


Fig.1. Probability forecast of tercile categories* (below normal, normal, and above normal) for the rainfall over India during February 2024. The figure illustrates the most likely categories as well as their probabilities. The dotted area shown in the map climatologically receives very less rainfall during February and the white-shaded areas within the land areas represent climatological probabilities (*Tercile categories have equal climatological probabilities, of 33.33% each).

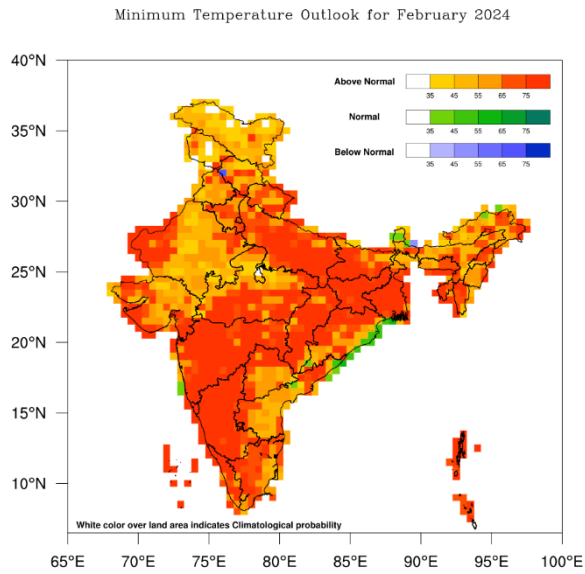


Fig 2. Probability forecast of Minimum Temperature for February 2024.

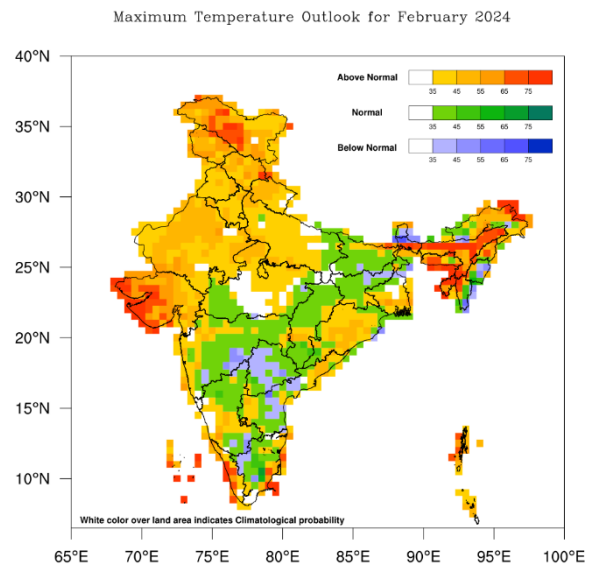


Fig 3. Probability forecast of Maximum Temperature for February 2024.

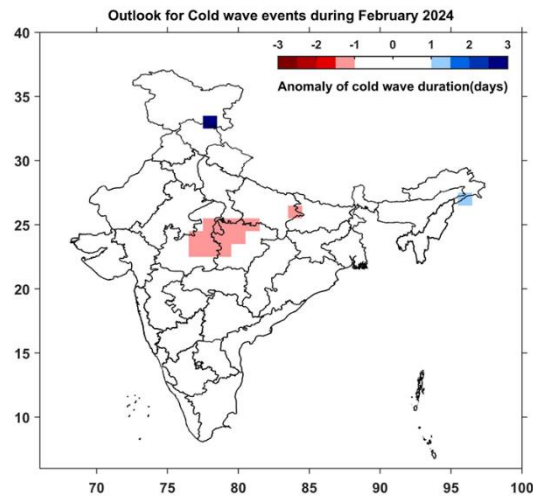


Fig 4. Anomaly (deviation from normal) of Cold Wave Duration (in days) for the month of February 2024