PRESS RELEASE

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Government of India

पृथ्वी विज्ञान मंत्रालय (एम. ओ. ई. एस.)

Ministry of Earth Sciences (MoES)

भारत मौसम विज्ञान विभाग

INDIA METEOROLOGICAL DEPARTMENT

Rainfall Forecast for January to March, 2025 and Monthly Outlook for Rainfall and Temperature during January, 2025

Highlights

a) During the upcoming winter season (January to March 2025) the rainfall over the North India consisting of seven meteorological subdivisions (East Uttar Pradesh, West Uttar Pradesh, Uttarakhand, Haryana, Punjab, Himachal Pradesh, Jammu & Kashmir and Ladakh) is most likely to be below normal <(86% of Long Period Average (LPA)). Seasonal rainfall over the country as a whole during January to March season is most likely to be normal (88-112% of LPA). Normal to above normal seasonal rainfall is likely over most parts of the country except parts from Northwest India, some parts from east and many parts of northeast India, where below normal rainfall is likely.

b) Monthly rainfall for January 2025 over the North India consisting of seven meteorological subdivisions (East Uttar Pradesh, West Uttar Pradesh, Uttarakhand, Haryana, Punjab, Himachal Pradesh, Jammu & Kashmir and Ladakh) is most likely to be above normal (>122 % of LPA). Monthly rainfall over the country as a whole during January 2025 is also most likely to be above normal (>118% of LPA). Above-normal rainfall is most likely over most parts of the country except some parts of northwest India and some pockets of the northeast and central India where normal to below normal rainfall is likely.

c) During January 2025, monthly minimum temperatures are most likely to be above-normal over many parts of the country except some parts of east northwest, north central and parts of east India where normal to below normal minimum temperatures are likely. Above-normal cold wave days are expected over western and northern parts of central India during the month of January 2025.

d) Monthly maximum temperatures for January 2025 likely to be above normal for most parts of the country except some parts of the northwest, central and adjoining east India and central parts of South Peninsula where it is likely to be normal to below normal.

Rainfall Forecast for January to March (JFM) period and Monthly Outlook for Rainfall and Temperature during January 2025

1. Background

North India consisting of seven meteorological subdivisions (East Uttar Pradesh, West Uttar Pradesh, Uttarakhand, Haryana, Punjab, Himachal Pradesh, Jammu & Kashmir and Ladakh) receives about 18% of its annual rainfall from January to March. Jammu & Kashmir and Ladakh in particular receive about 31% of their annual rainfall during this period. The winter rainfall 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. The forecast is based on the newly developed Multi-Model Ensemble (MME) technique introduced since monsoon season of 2021. The MME approach uses the coupled global climate models (CGCMs) from different global climate prediction and research centers including IMD's Monsoon Mission Climate Forecast System (MMCFS) model.

IMD has now prepared the forecast outlook for the rainfall during the January to March (JFM) period and for January, 2025. The following forecasts are presented below:

- Probabilistic forecasts for the winter season (January to March 2025) rainfall averaged over North India consisting of seven meteorological subdivisions and country as a whole.
- Probabilistic forecast for monthly rainfall during January 2025 averaged over North India and country as a whole.
- Spatial distribution of probabilistic rainfall forecasts over the country during January to March 2025 and January 2025.

Since 2016, the India Meteorological Department (IMD), Ministry of Earth Sciences (MoES) has been issuing seasonal forecast outlooks for temperatures over the country for both hot and cold weather seasons. On 2nd December 2024 IMD issued the seasonal outlook for the temperatures and coldwave for the December to February (DJF) season. As additional information, IMD has now prepared a monthly temperature outlook for January 2025 over the country and the same is presented in section 4.

2. Probabilistic Forecast for the Rainfall during January to March 2025

The rainfall during January-March (JFM) 2025 averaged over North India is most likely to be below normal (<86% of the Long-Period Average (LPA)). The LPA of rainfall over North India during JFM based on data from 1971 to 2020 is about 184.3 mm. Seasonal rainfall over the country as a whole during JFM season is most likely to be normal (88-112% of LPA). The LPA of rainfall over the country as a whole during the JFM season based on data from 1971-2020 is about 69.7 mm.

The probabilistic forecast for the spatial distribution of tercile rainfall categories (above normal, normal, and below normal) over the country for the JFM period is shown in Fig.1. The forecast suggests that normal to above normal seasonal rainfall is likely over most parts of the country except parts from Northwest India, some parts from east and many parts of northeast India, where below normal rainfall is likely. Climatological rainfall probability is likely elsewhere. The dotted areas in the map climatologically receive very less rainfall during the month and the white-shaded areas within the land areas represent climatological probabilities.

3. Probabilistic Forecast for the rainfall during January 2025

The 2025 January rainfall averaged over North India is most likely to be above normal (> 122 % of LPA). The LPA of rainfall over North India during January based on the data of 1971-2020 is about 49.0 mm. Monthly rainfall over the country as a whole during January 2025 is most likely to be above normal (>118 % of LPA). The LPA of rainfall over the country as a whole during January based on data from 1971-2020 is about 17.1 mm

The probabilistic forecast for the spatial distribution of tercile rainfall categories (above normal, normal, and below normal) over the country for January 2025 is shown in Fig.2. The forecast suggests that above-normal rainfall is most likely over most parts of the country except some parts of northwest India and some pockets of the northeast and central India where normal to below normal rainfall is likely. Climatological probabilities are likely over the remaining areas of India. The dotted areas in the map climatologically receive very less rainfall during the month and the white-shaded areas within the land areas represent climatological probabilities.

4. Probabilistic Temperature Forecast for January 2025

Fig.3 and Fig.4 show forecast probabilities of the minimum and maximum temperatures respectively for January 2025. The probability forecast for the minimum temperatures indicates that during January 2025, monthly minimum temperatures are most likely to be above-normal over many parts of the country except some parts of east northwest, north central and parts of east India where normal to below normal minimum temperatures are likely. Climatological probabilities (indicated by white-shaded areas) are likely over the remaining areas of the country.

The monthly maximum temperature is likely to be above normal for most parts of the country except some parts of the northwest, central and adjoining east India and central parts of South Peninsula (Fig.4) where it is likely to be normal to below normal. Climatological probabilities (indicated by white-shaded areas) are lilkey over the remaining areas of the country.

5. Outlook for Cold Wave events during January 2025

The anomaly forecast for the number of coldwave days in the country for the month of January 2025 is presented in Fig. 5. Above-normal cold wave days are expected over western and northern parts of central India during the month of January 2025.

6. SST conditions in the Pacific and the Indian Oceans

The sea surface temperatures are below average in the central and eastern Pacific Ocean. Currently, neutral El Niño-Southern Oscillation (ENSO) conditions are observed over the equatorial Pacific. The probability forecast indicates a highest probability of La Niña conditions during the DJF and JFM seasons.

In addition to El Nino-Southern Oscillation (ENSO) conditions over the Pacific, other factors such as the Indian Ocean SSTs also influence on Indian climate. Above-average sea surface temperatures (SSTs) are currently seen across most of the Indian Ocean. Currently, neutral Indian Ocean Dipole (IOD) conditions are observed over the Indian Ocean. The latest MMCFS forecast indicates that the neutral IOD conditions are likely to continue for the next several months.

7. 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 and 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 extended range forecasts are available through the IMD website https://mausam.imd.gov.in/imd_latest/contents/extendedrangeforecast.php).

The extended range forecast is followed by a short to medium range forecast issued daily by IMD. The forecasts are available through the IMD website https://nwp.imd.gov.in/gfsproducts_cycle00_mausam.php

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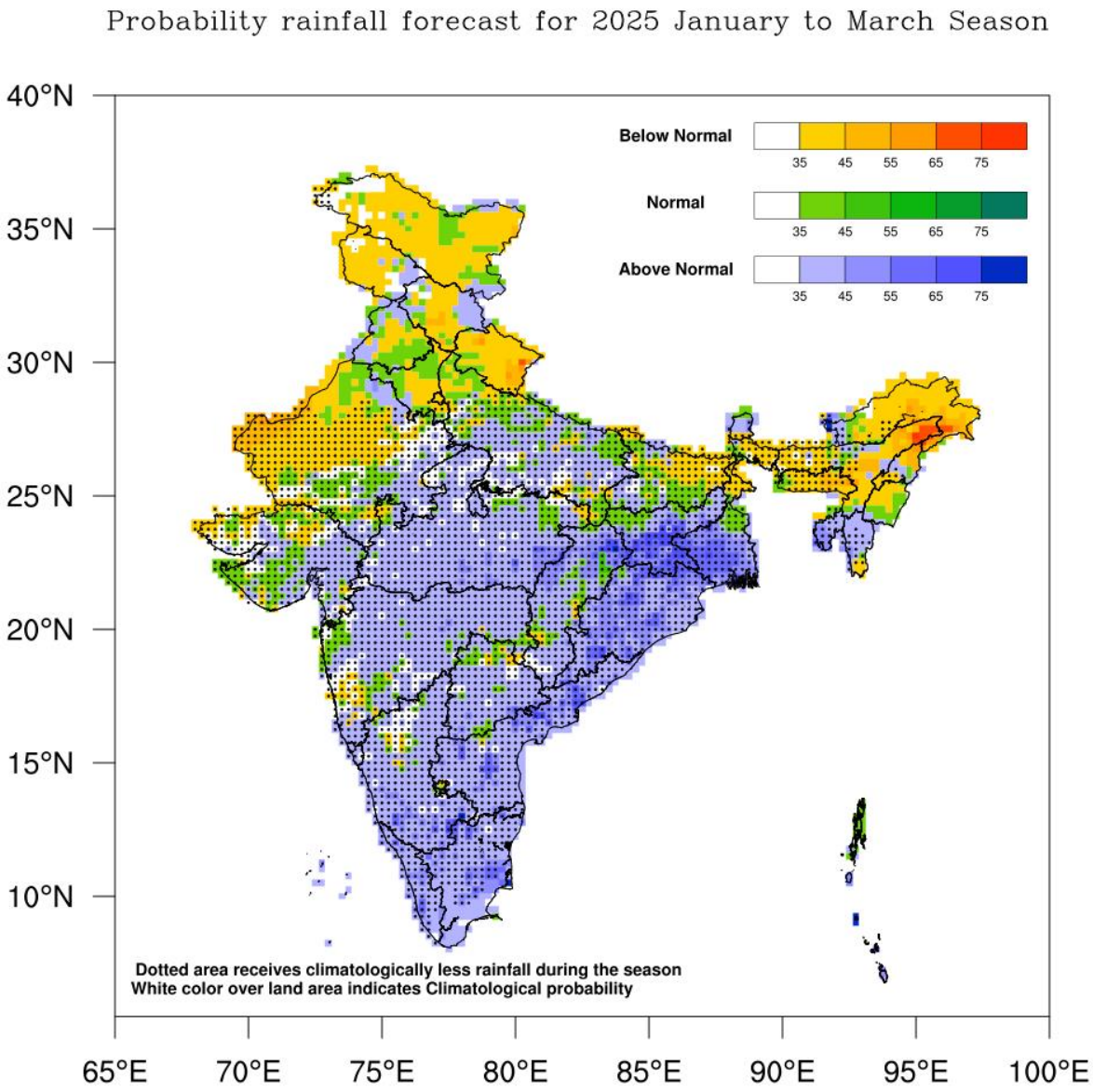

Fig.1. Probability forecast of tercile categories* (below normal, normal, and above normal) for the rainfall over India during JFM 2025. The figure illustrates the most likely categories as well as their probabilities. The dotted area shown in the map climatologically receives very less rainfall during this period and the white-shaded areas within the land areas represent climatological probabilities (*Tercile categories have equal climatological probabilities, of 33.33% each).

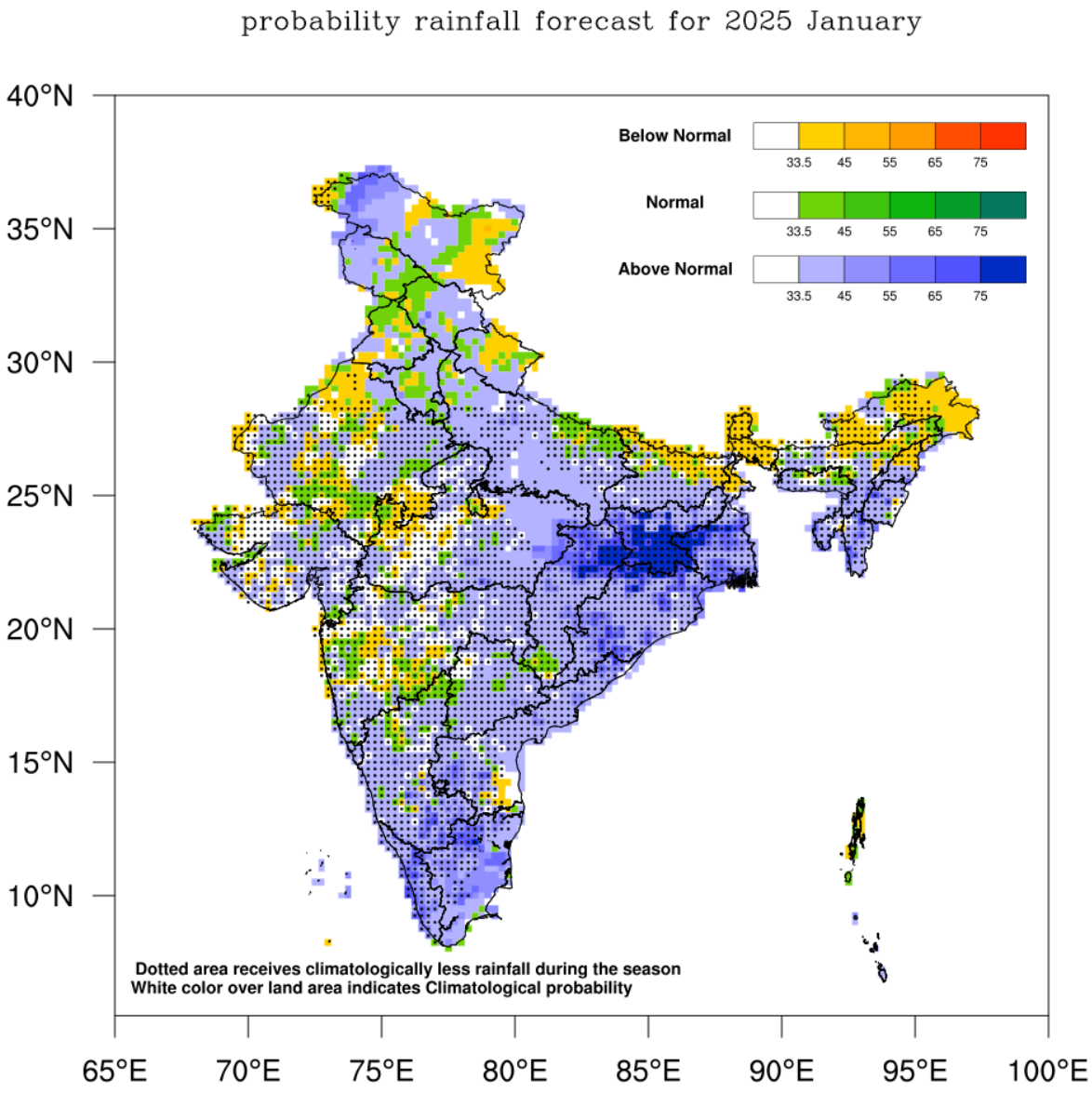

Fig.2. Probability forecast of tercile categories* (below normal, normal, and above normal) for the rainfall over India during January 2025. The figure illustrates the most likely categories as well as their probabilities. The dotted area shown in the map climatologically receives very less rainfall during January and the white-shaded areas within the land areas represent climatological probabilities (*Tercile categories have equal climatological probabilities, of 33.33% each).

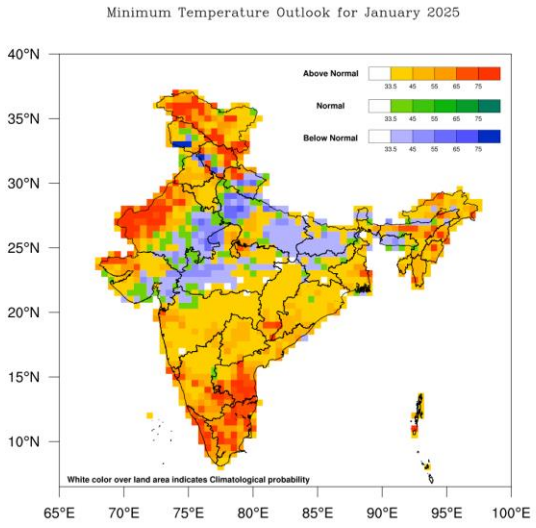

Fig.3. Probability forecast of Minimum Temperature for January 2025.

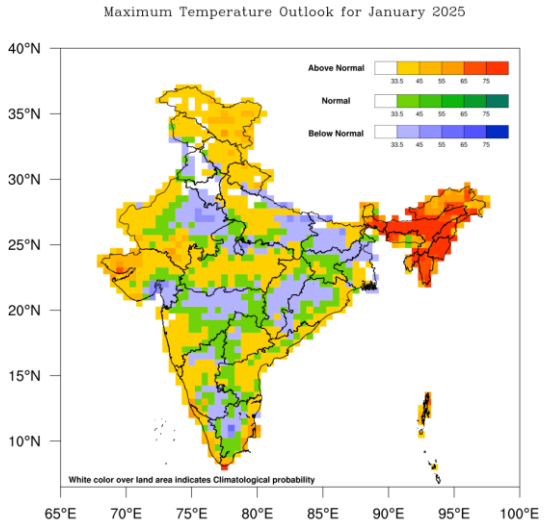

Fig.4. Probability forecast of Maximum Temperature for January 2025.

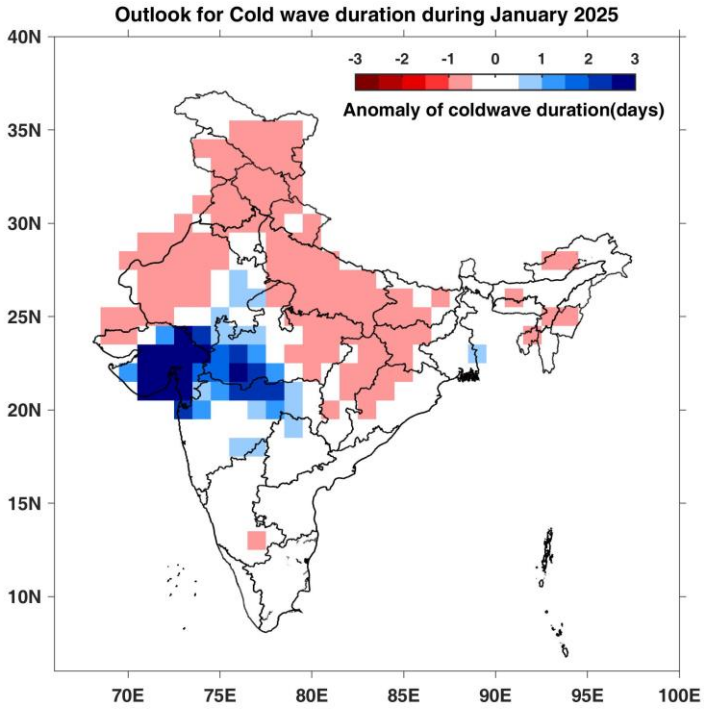

Fig 5. Anomaly of Cold Wave Duration (in days) for the month of January 2025.