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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
Long Range Forecast for the Rainfall during Post-monsoon Season 2023

Highlights

a) The Northeast Monsoon Season (October to December (OND)) 2023 rainfall over the south Peninsular India consisting of five meteorological subdivisions (Tamil Nadu, Puducherry, Coastal Andhra Pradesh, Rayalaseema, Kerala and South Interior Karnataka) is most likely to be normal (88-112% of Long Period Average (LPA)). Normal to above-normal rainfall is likely over many areas of the northwest India and south peninsular India. However, northeast India, east central India, adjoining areas, and some areas of northwest India are likely to receive below-normal rainfall.

b) During October 2023, most parts of India are likely to receive below-normal rainfall. However, many areas in south peninsular India, northeast India, a few pockets in the northernmost region of the country are likely to experience above-normal rainfall. Monthly rainfall over the country as a whole during October 2023 is most likely to be normal (85-115 % of Long Period Average (LPA)).

c) In October 2023, above-normal maximum temperatures are likely over most of the country. Similarly, above-normal minimum temperatures are likely over most parts of the country except some areas in northeast India where normal minimum temperatures are likely.

d) Currently, El Niño conditions are prevailing over the equatorial Pacific region. The latest MMCFS forecast indicates that the El Niño conditions are likely to continue in the upcoming season. Other climate models are also indicating continuation of El Niño conditions during the upcoming season. At present the positive IOD conditions are prevailing over the Indian Ocean and the latest MMCFS forecast indicates that the positive IOD conditions are likely to weaken by the end of year.

1. **Background**

South Peninsular India consisting of five meteorological subdivisions (Tamil Nadu, Puducherry, Coastal Andhra Pradesh, Rayalaseema, Kerala, and South Interior Karnataka) receives about 30% of its annual rainfall during the northeast monsoon season (October to December). Tamil Nadu and Puducherry in particular receive about 48% of their annual rainfall during this season. Due to this important fact, using statistical models, IMD has been preparing forecasts for northeast monsoon season rainfall over the south peninsula since 1998. IMD also continuously works to improve the skill of the forecasting models.

In the year 2021, IMD adopted a new strategy for issuing monthly and seasonal operational forecasts for the seasonal rainfall over the country. The new strategy is based on the existing statistical forecasting system and the newly developed Multi-Model Ensemble (MME) based forecasting system. 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. Accordingly, IMD had issued various seasonal and monthly forecasts for the 2023 southwest monsoon season (June to September) over the country.

Now, IMD has prepared the forecast for the rainfall during the post Monsoon Season (October to December (OND)) 2023 and rainfall and temperature forecast for October 2023.

2. Probabilistic Forecast for the rainfall during October to December (OND) 2023

The rainfall averaged over south Peninsular India during October to December (OND) **is most likely to be normal (88-112% of Long Period Average (LPA)).** The LPA of rainfall over south Peninsular India during the October to December season based on data from 1971 to 2020 is about 334.13 mm.

The spatial distribution of probabilistic forecasts for the tercile categories (above normal, normal, and below normal) of rainfall over the country for the post-monsoon season is shown in Fig.1. The forecast indicates a probability of normal to above-normal rainfall over many areas of the northwest India and south peninsular India.. However, northeast India, east central India, adjoining areas, and some areas of northwest India are likely to receive below-normal rainfall. The dotted area shown in the map receives very less rainfall during October to December season as per climatology and the white shaded areas within the land areas represent climatological probabilities.

3. Probabilistic Forecast for the rainfall during October 2023

The rainfall averaged over the country as a whole during October 2023 **is most likely to be normal (85-115 % of LPA)**. The LPA of rainfall over the country during the month of October based on data from 1971 to 2020 is about 75.4 mm.

The spatial distribution of probabilistic forecasts for tercile categories (above normal, normal, and below normal) of rainfall over the country during October 2023 is shown in Fig.2. Forecasts suggest that most parts of India are likely to receive below-normal rainfall in October 2023. However, many areas in south peninsular India, northeast India, a few pockets in the northernmost region of the country are likely to experience above-normal rainfall. The white shaded areas within the land area represent climatological probabilities.

4. Probabilistic Forecast of Temperatures over the Country during October 2023

Fig.3a and Fig.3b show probabilistic forecast of the maximum and minimum temperatures respectively during October 2023.

In October, above-normal maximum temperatures are likely over most parts of the country (Fig. 3a). Similarly, above-normal minimum temperatures are likely over most parts of the country except some areas in northeast India where normal minimum temperatures are likely (Fig. 3b).

5. Sea Surface Temperature (SST) conditions in the Pacific and the Indian Oceans

Currently, El Niño conditions are prevailing over the equatorial Pacific region. The latest MMCFS forecast indicates that the El Niño conditions are likely to continue during the upcoming season. Other climate models are also indicating the continuation of El Niño conditions during the upcoming season.

In addition to El Nino-Southern Oscillation (ENSO) conditions over the Pacific, other factors such as the Indian Ocean SSTs have also some influence on the northeast monsoon. Currently, the Indian Ocean is experiencing positive Indian Ocean Dipole (IOD) conditions, which began in August 2023. The latest MMCFS forecast indicates that the positive IOD conditions are likely to weaken by the end of the year.

6. Extended Range Forecast and Short to Medium range forecast 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 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.
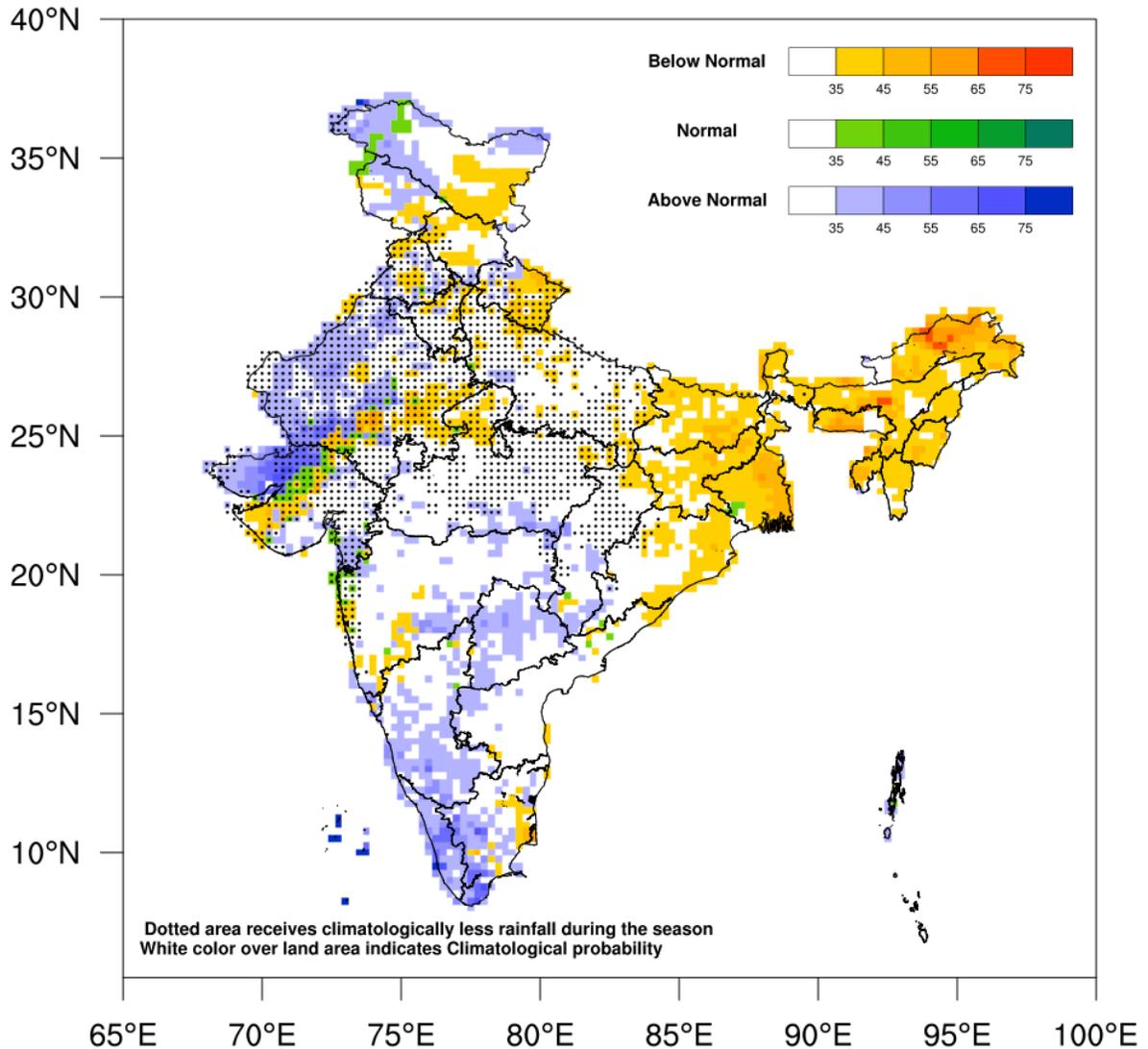
Fig.1. Probability forecast of tercile categories[*] (below normal, normal, and above normal) of rainfall over India during October to December, 2023 period. The figure illustrates the most likely categories as well as their probabilities. The white shaded areas within the land area represent climatological probabilities. ([*]Tercile categories have equal climatological probabilities, of 33.33% each). The dotted areas receive low rainfall during the season and generally experience dry weather as per climatology.
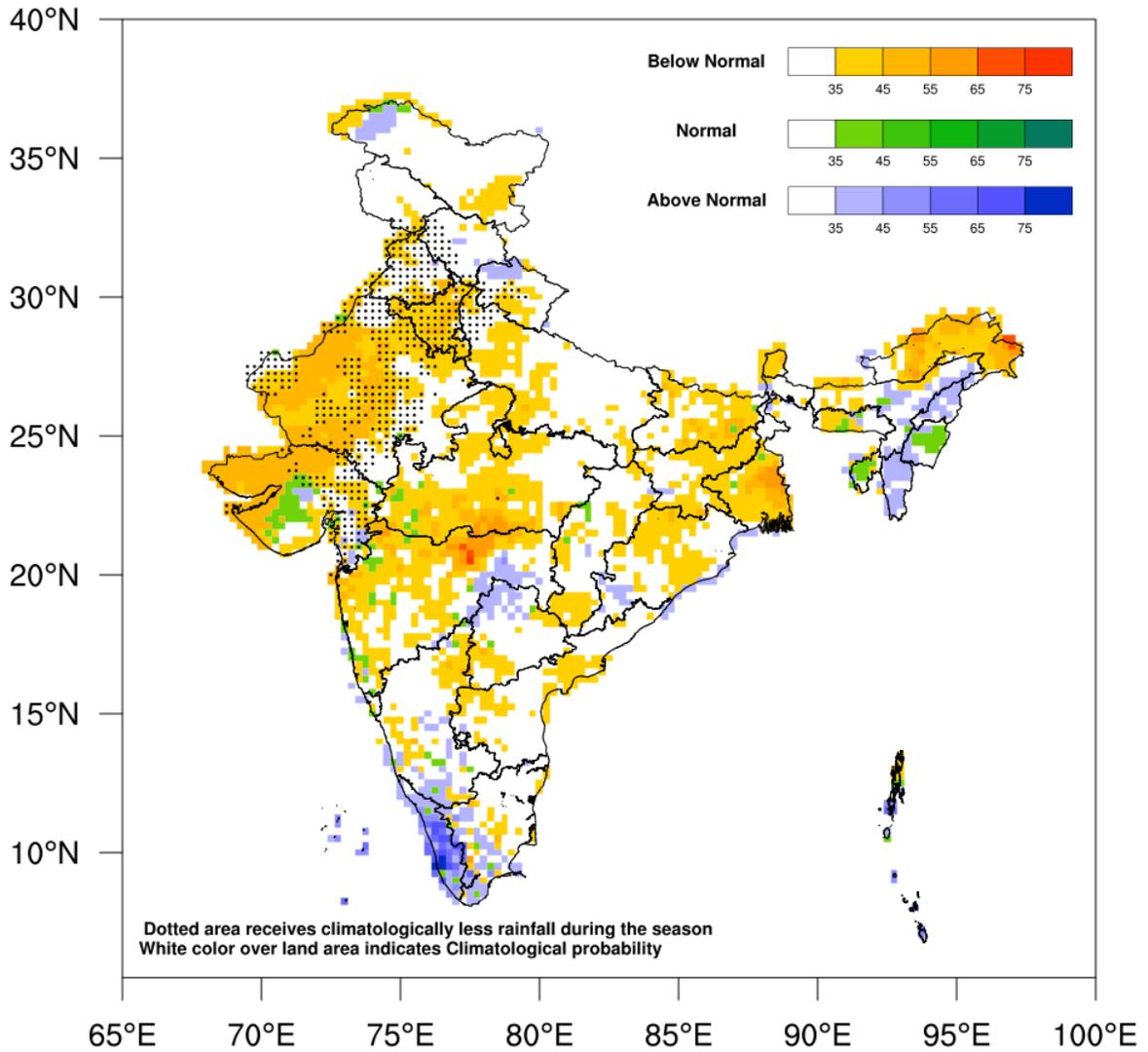
Fig.2. Probability forecast of tercile categories[*] (below normal, normal, and above normal) of rainfall over India during October, 2023. The figure illustrates the most likely categories as well as their probabilities. The white shaded areas within the land area represent climatological probabilities ([*]Tercile categories have equal climatological probabilities, of 33.33% each).
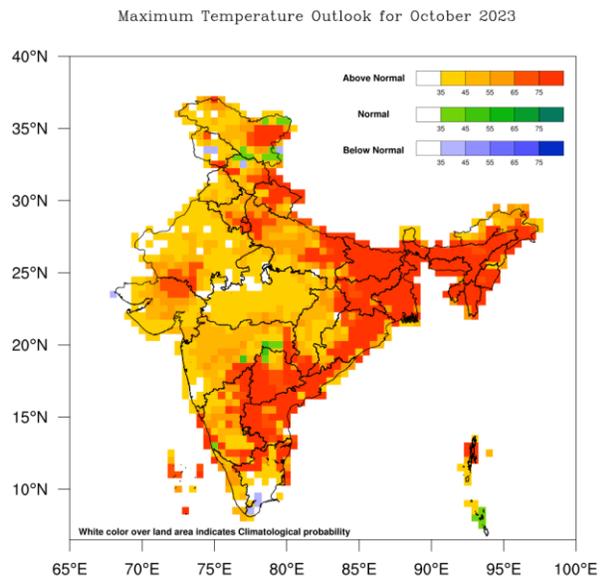
Fig.3a. Probability forecast of Maximum Temperature over India during October 2023.
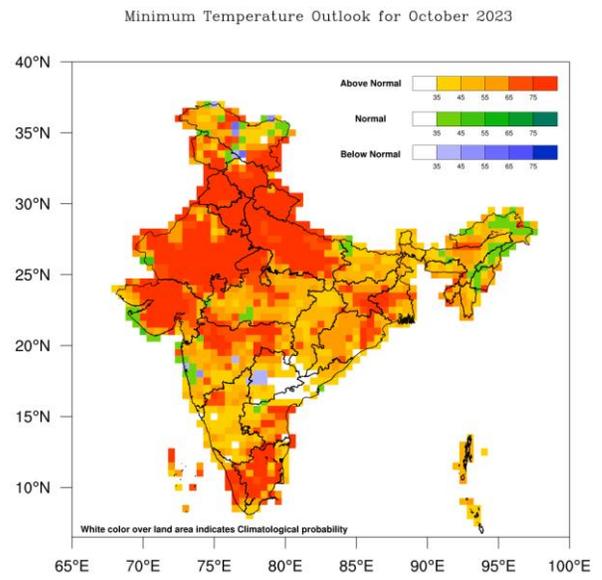

Fig.3b. Probability forecast of Minimum Temperature over India during October 2023.