FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA

ETHIOPIAN METEOROLOGICAL INSTITUTE

METEOROLOGICLA DATA AND CLIMATOLOGYLEAD LEAD EXECUTIVE

REMOTE SENSING AND CLIMATOLOGICAL DESK

MONTHLY CLIMATE BULLETIN

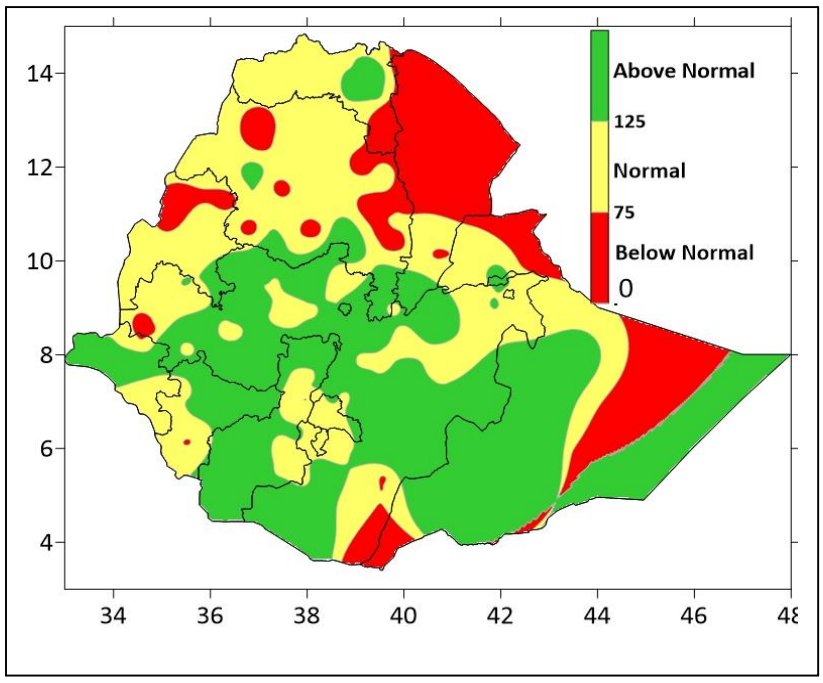
September 2023

Some Applications of Climate Information

HIGHLIGHTS

During September 2023, days were remained warm over several portions of lowlands of Ethiopia, in particularly over most part of Afar, Somalia, Gambela and some part of rift valley areas (Fig. 3.1.2). Specifically, the extreme maximum temperature values were as high as 44.2, 44,0, 43.6, 42.4, and 42.2OC over Gode, Semera, Aysha, Gewane and Dubti respectively.

During September 2023, the monthly rainfall amount exceeded 360 mm or heavier rainfall was occurring over some parts of western Oromia and Gambella areas. In particular, the monthly total rainfall values of September 2023 were as high as 564.1, 560.3, 476.1, 418.9, 411.4, 373.2 and 361.1 mm over Gatira, Alge, Gida Ayana, Limugenet, Masha, Nejo and Bure. The daily rainfall values over Shahura, Ginir, Lare, Masha, Gida Ayana, and Debre-brhan stations was 108.4, 88.0, 82.2, 80.6, 82.2, 74.0 and 72.0 mm respectively. In general, the monthly total rainfall amount of September 2023 was below normal over part of Somali and Afar regions. Most parts of Southern, Central and Western part of the Country were wetter than last year. On the other hand, the rest of the country September 2023 was dryer than September 2022



Percent of normal rainfall of September 2023

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Foreword

This climate bulletin is prepared and disseminated by the Ethiopia Meteorological Institute (EMI). It is aimed at providing climatological information to different services of the community involved in various socio-economic activities.

The information contained in this bulletin is believed to assist planners, decision-makers and the community at large by providing details of the climatic conditions of the nation in a given period.

This bulletin differs from the other real time and near real time bulletins issued by the Agency, which for their input depend only on meteorological stations equipped with single side band radio for data transmission. Though this bulletin is not real time, published with a delay of at least two months, the information contained in this bulletin is based on data coming from a much larger number of meteorological stations. Moreover, the information contained in this bulletin is not sector-specific and a wide range of users can benefit from it. The Agency disseminates monthly, seasonal and annual climatological bulletins in which all-necessary climatological information and significant climatic anomalies are highlighted.

We have a strong belief that various socio-economic activities related to planning disaster mitigation, water resources management, construction, environmental protection, transportation, recreation, tourism and others will be benefited most by the careful and continuous use of this bulletin. Meanwhile, your comments and constructive suggestions are highly appreciated to make the objectives of this bulletin success.

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1. Synoptic Situation

1.1 Surface

The Mascarene high with a mean central pressure value of above 1020hPa was centered at about 30°S, 82°E.

The St. Helena high with a mean central pressure value of above 1020hPa was centered at about 28°S, 7°W.

The Azores high with a mean central pressure value of 1018hPa was centered at about 32°N, 20°W.

1.2 Lower Troposphere (850 hPa vector wind)

Strong cross-equatorial and northeasterly flow of below 4m/s was observed over northern and western Indian Ocean and southwesterly flow was dominant over the Arabian Peninsula

1.3 Middle Troposphere (500-hPa Geo-potential height)

The 500-hPa circulation during September featured a strong ridge over much of Canada and Scandinavia and moderate troughing over both U.S. coasts, western Alaska, and Siberia. The main land-surface temperature signals during September were above-average temperatures across much of North America, Europe, Russia, and parts of Asia.

1.4 Upper Troposphere (200 hPa vector wind)

Equatorial stronger easterly wind 15-30 m/s were dominating in most part of the horn of Africa. The subtropical easterly jet had strengthened further, while the upper-level westerly flow, associated with the tropical westerly jet weakened further.

2. Tropical Oceanic and Atmospheric Highlights

In September, equatorial sea surface temperatures (SSTs) were above average, though positive anomalies weakened in the eastern Pacific. All of the monthly Niño index values remained in excess of +1.0ºC: Niño-4 was +1.1ºC, Niño-3.4 was +1.5ºC, Niño-3 was +2.1ºC, and Niño1+2 was +2.8ºC. Area-averaged subsurface temperatures anomalies decreased, but remained above-average, consistent with elevated subsurface temperatures across the central and eastern equatorial Pacific Ocean. Tropical atmospheric anomalies were consistent with El Niño. In areas of the central Pacific, low-level winds were anomalously westerly, while upper-level winds were anomalously easterly. Convection was enhanced around the International Date Line, stretching into the eastern Pacific, just north of the equator. Convection was suppressed near Indonesia. The equatorial Southern Oscillation Index (SOI) and the traditional station-based SOI were both significantly negative. Collectively, the coupled ocean-atmosphere system reflected El Niño.

Reference: NOAA, climate diagnostic bulletin of September 2023

3. Weather

3.1 Temperature

During September 2023, days were remained warm over several portions of lowlands of Ethiopia, in particularly over most part of Afar, Somalia, Gambela and some part of rift valley areas (Fig. 3.1.2). Specifically, the extreme maximum temperature values were as high as 44.2, 44,0, 43.6, 42.4, and 42.2^{O}C over Gode, Semera, Aysha, Gewane and Dubti respectively (Table 3.1.1).

On the other hand, the extreme minimum temperature values were below 10°cover some highland parts of Amhara, some part of Oromia and central Ethiopia.

In particular, Debrebrhan, Alemketema, Ambamariam, and Mehalmeda had extreme minimum temperature values of below 10^{o}c during the month of September 2023 (Table 3.1.2).

In General, the monthly average temperature values were some area below normal and partially above normal over most parts of the country (Fig. 3.1.3).

Table 3.1.1 Stations with extreme maximum temperature values of greater than or equal to 40^{0}c during September 2023

Stations	Extreme maximum temperature (^{o}c)	Date
Gode	44.2	4
AWASH ARBA	39.6	4
AYSHA	43.6	24
CHIFRA	39.0	21
DUBTI	42.0	22
GAMBELLA	38.2	18
Gewane	42.4	29
Kibridahar	39.6	30
MILLE	44.0	21
SEMERA	44.0	20

Table 3.1.2 Stations with extreme minimum temperature values of below or equal to 10^{o}c during September 2023

Stations	**Extreme minimum temperature (^{o}c)**	**Date**
Alemketema	5.8	9
AMBAMARIAM	4.4	2
BORE	7.0	5
Bui	6.0	22
D/BREHAN	7.2	14
MEHALMEDA	6.5	15
WEGELTENA	7.4	19

3.2 Rainfall

Normally, September is the last months of the rainy season of Kiremt (JJAS) rain-benefiting areas of the country. The mean monthly rainfall amount less than 250 mm over much areas of North and northeast part of the country.

During September 2023, the monthly rainfall amount exceeded 360 mm or heavier rainfall was occurring over some parts of western Oromia and Gambella areas.

In particular, the monthly total rainfall values of September 2023 were as high as 564.1, 560.3, 476.1, 418.9, 411.4, 373.2 and 361.1 mm over Gatira, Alge, Gida Ayana, Limugenet, Masha, Nejo and Bure. The daily rainfall values over Shahura, Ginir, Lare, Masha, Gida Ayana, and Debre-brhan stations was 108.4, 88.0, 82.2, 80.6, 82.2, 74.0 and 72.0 mm respectively (Tables 3.2.1).

In general, the monthly total rainfall amount of September 2023 was below normal over part of Somali and Afar regions. On the other hand, it was normal to above normal over rest of the country (Fig. 3.2.2).

Most pars of Southern, Central and Western part of the Country were wetter than last year. On the other hand, the rest of the country September 2023 was dryer than September 2022 (Fig. 3.2.2).

Table 3.2.1. Stations with more than 60mm of rainfall in 24 hours during September 2023

Stations	Amount (mm)	Date
D/BREHAN	72.0	15
GIDAAYANA	74.0	10
GINIR	88.0	20
LARE	82.2	11
MASHA	80.6	4
SHAHURA	108.4	15
SIRINKA	83.5	1

Table 3.2.2. Stations with more than 360mm of monthly total rainfall during September 2023

Station	Amount
Nekemte	369.9
ALGIE	560.3
AMAN	368.1
BURE	361.1
Gatira	564.1
GIDAAYANA	476.1
LIMUGENET	411.4
MASHA	418.9
NEJO	373.2

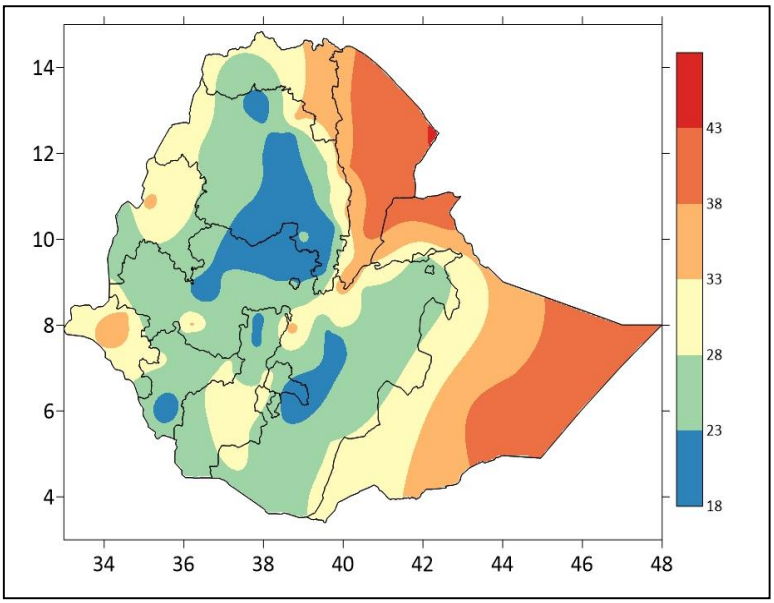

Fig. 3.1.2. Mean maximum temperature in °c during Sep 2023

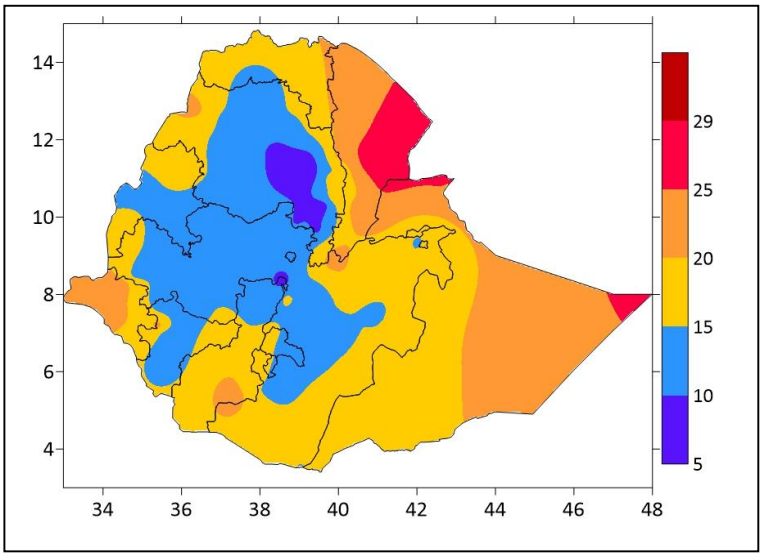

Fig. 3.1.1. Mean minimum temperature in °c during Sep 2023

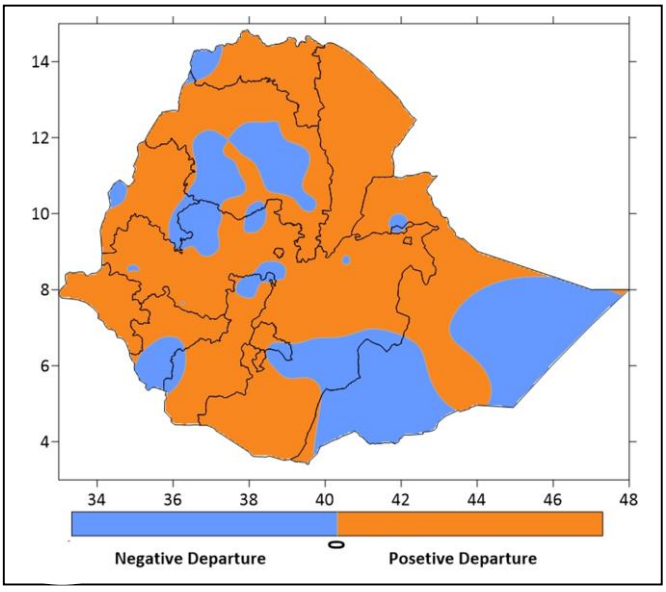

Fig.3.1.3. Departure of monthly average temperature from normal during Sep 2023

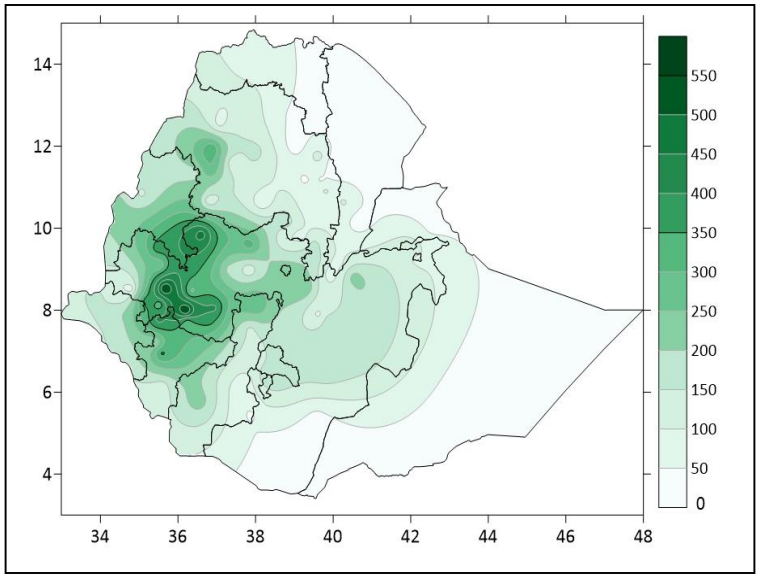

Fig.3.2.1. Monthly total rainfall in mm during Sep 2023

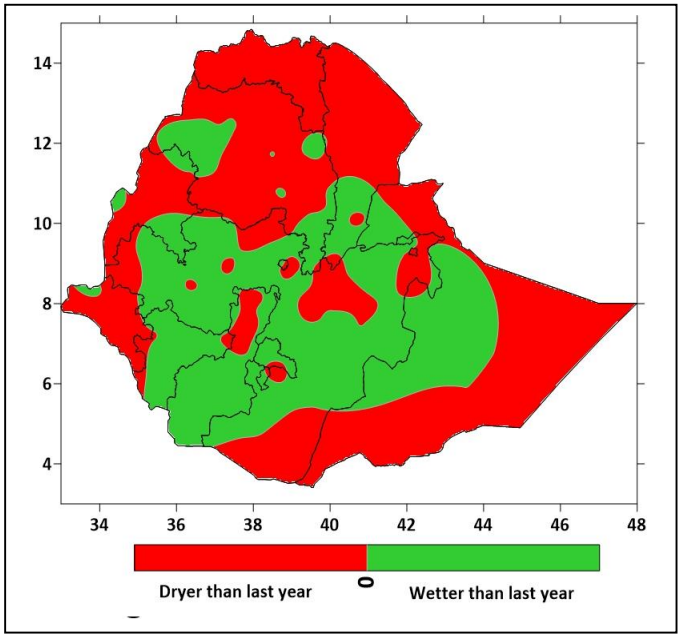

Fig. 3.2.3. Monthly total rainfall of Sep 2023 minus monthly total rainfall of Sep 2022

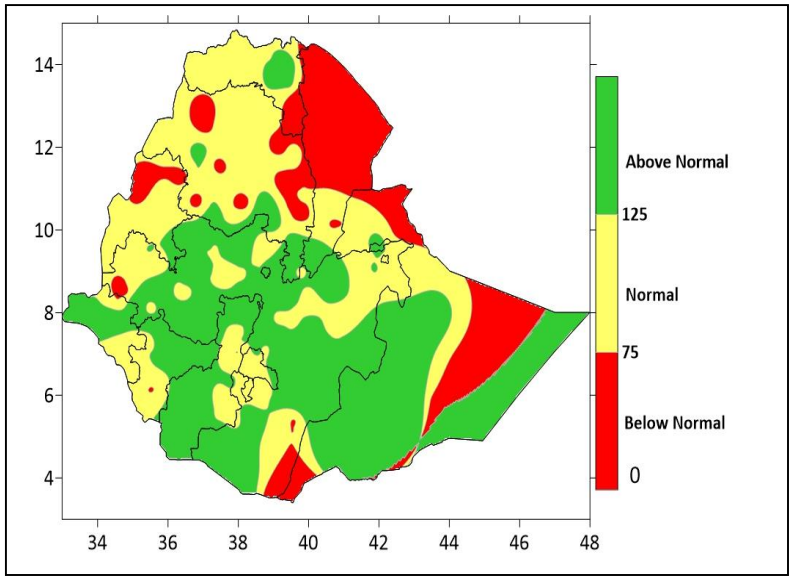

Fig. 3.2.2. Percent of normal rainfall during Sep 2023