



Ministry of ecology and natural  
resources of The Republic Of  
Kazakhstan Republican State  
Enterprise «Kazhydromet»

**MONTHLY BULLETIN**  
**ANOMALIES OF MEAN MONTHLY**  
**AIR TEMPERATURE AND**  
**MONTHLY PRECIPITATION ON THE**  
**TERRITORY OF KAZAKHSTAN**  
**IN OCTOBER 2024**

**INTRODUCTION**

The study of regional climate and continuous monitoring of its change is one of the priority tasks of the national hydrometeorological service of Kazakhstan RSE «Kazhydromet».

For the preparation of the bulletin used observation data on the network of meteorological monitoring RSE «Kazhydromet»: series of average monthly air temperatures and monthly precipitation totals in the period since 1941.

Anomalies of mean monthly surface air temperatures and monthly precipitation totals are determined relative to the norms - mean multiyear values calculated for the period 1991-2020, recommended by the World Meteorological Organization as a baseline for monitoring the degree of anomaly of the current climate. Air temperature anomalies are calculated as deviations of the observed value from the norm. Precipitation anomalies are presented in percent of the norm, that is as a percentage ratio of the amount of precipitation to the corresponding value of the norm.

To characterize climatic extremes, maps are given, where for each station the range of empirical probability of non-exceedance of the current value in the time series of the variable under consideration for the period from 1941 to the current year is given (empirical probability of non-exceedance is the fraction of time series values less than or equal to the current value). If the probability of non-exceedance of the current value of the variable falls into the extreme ranges (0-5 % or 95-100 %), it means that this value occurred in no more than 5 % of cases in the period from 1941. If we look at the amount of precipitation, the former indicates extremely low precipitation, the latter extremely high precipitation.

*Responsible for the release:*

*G. Aktayeva – Leading Researcher of CRD SRC*

*Y. Amanulla – Leading Researcher of CRD SRC*

## ANOMALIES OF MEAN MONTHLY AIR TEMPERATURE

In October, the average monthly air temperature in most of the country was above normal (Fig.1). A vast area of positive air temperature anomalies of more than 1.0 °C occupied the central and southern, as well as the far northwestern and eastern regions. In the foci of the maximum excess of the norm, the anomalies were 1.6-2.3 °C on the border of the Karaganda region and the Ulytau region and in the mountainous regions of the eastern part of the country. The most significant positive anomaly (2.3 °C) was recorded at the Bakty meteo station (Abai region), which is also the only weather station included in the "extremely warm" gradation (Fig. 2). Almost everywhere in northern Kazakhstan, as well as locally in the Mangystau and Turkestan regions, the air temperature was below normal. The most significant negative anomaly (-1.0 °C) was observed at 5 MS of North-Kazakhstan (Vysotenka, Chkalovo, Yavlenka) and Kostanay regions (Kostanay, Mikhaylovka).

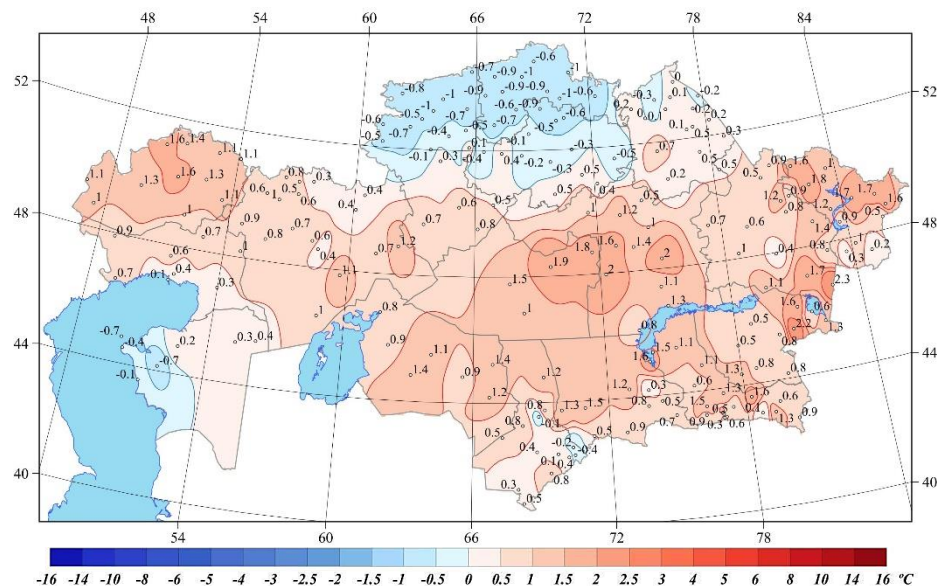


Figure 1 – Spatial distribution of anomalies of mean monthly air temperature (°C) in October 2024, calculated relative to the norms for the period 1991-2020

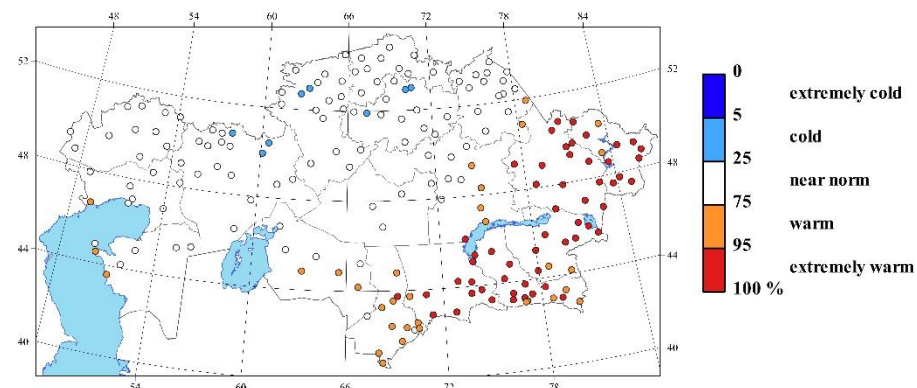
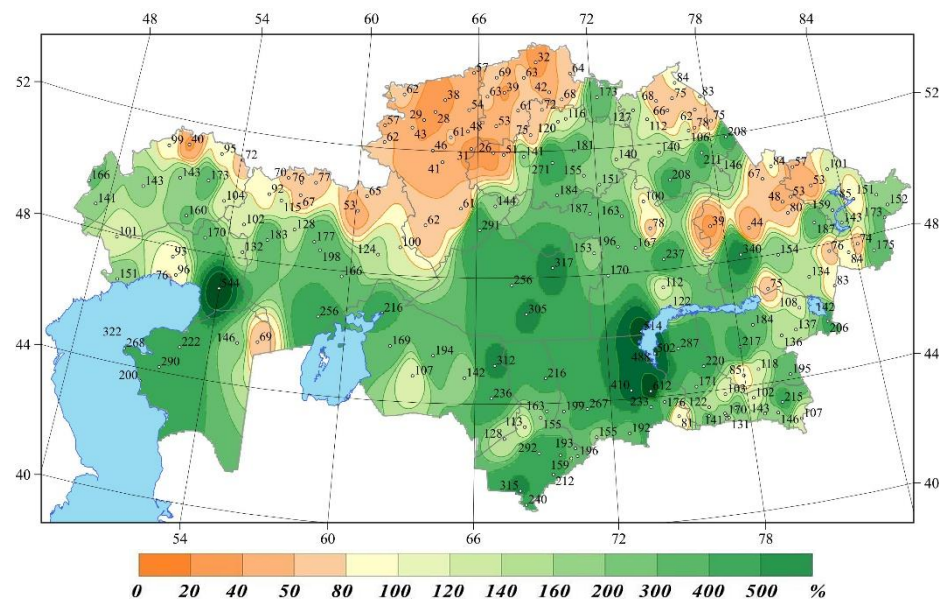


Figure 2 – Spatial distribution of probabilities of non-exceedance of air temperature in October 2024 calculated from data of the period 1941-2024

## MONTHLY PRECIPITATION

In October, the distribution of precipitation across Kazakhstan was uneven, with an excess of precipitation relative to normal in most of Kazakhstan (Fig. 3). A significant shortage of precipitation was observed in the northern region of the country and locally in the eastern and western regions (Fig. 4). In the western, central and southern regions of Kazakhstan, precipitation was mainly 150-250% of the norm, in some places more than 300% of the norm. A significant excess of moisture was experienced in Almaty (maximum 621.1% of the norm for MS Khantau), Atyrau (maximum 544.1% of the norm for MS Kulsary) and Karaganda (maximum 513.9% of the norm for MS Saryshagan) regions, where more than 500% of the norm fell in places. It was on these three MS that new records of the maximum monthly precipitation were set (Table 1).



Precipitation of Figure 3 – Spatial distribution of precipitation in October 2024 (in % of the norm calculated relative to the base period 1991-2020)

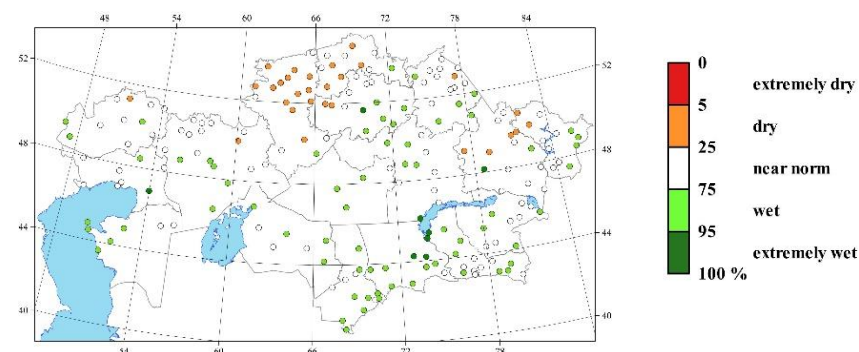


Figure 4 – Spatial distribution of probability of non-exceedance of precipitation in October 2024. Probabilities are calculated from data of the period 1941-2024

Table 1. Maximum monthly precipitation records for October 2024

| № | Meteorological station | Region    | New record of monthly total precipitation, mm | Previous record of monthly total precipitation, mm |
|---|------------------------|-----------|---|--|
| 1 | Kulsary                | Atyrau    | 60,4  | 56,4 (1979 r.)                                     |
| 2 | Saryshagan             | Karagandy | 40,6  | 35,2 (2006 r.)                                     |
| 3 | Khantau                | Zhambyl   | 101,0   | 97,1 (1976 r.)                                     |