



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 SEPTEMBER 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.

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ANOMALIES OF MEAN MONTHLY AIR TEMPERATURE

In September, a negative air temperature anomaly was observed over most of the territory of Kazakhstan, except for the western regions (Fig. 2). Temperatures below the norm by more than 1 °C were recorded in the eastern half of the country. Especially significant deviations, more than 2 °C below the norm, were observed in Akmola, Karaganda, Almaty, East Kazakhstan, Zhetysu and Abai regions. These regions were included in the 5 % with the lowest temperature values, which corresponds to the gradation «extremely cold». In the west of the country, in West Kazakhstan, Atyrau, Mangistau regions, and the western part of Aktope region, positive temperature anomalies were recorded with a probability of not exceeding 75-95 % (gradation «warm»), (Fig. 2). The highest mean monthly temperature in September (+22.6 °C) was recorded at Fort Shevchenko MS in Mangistau region.

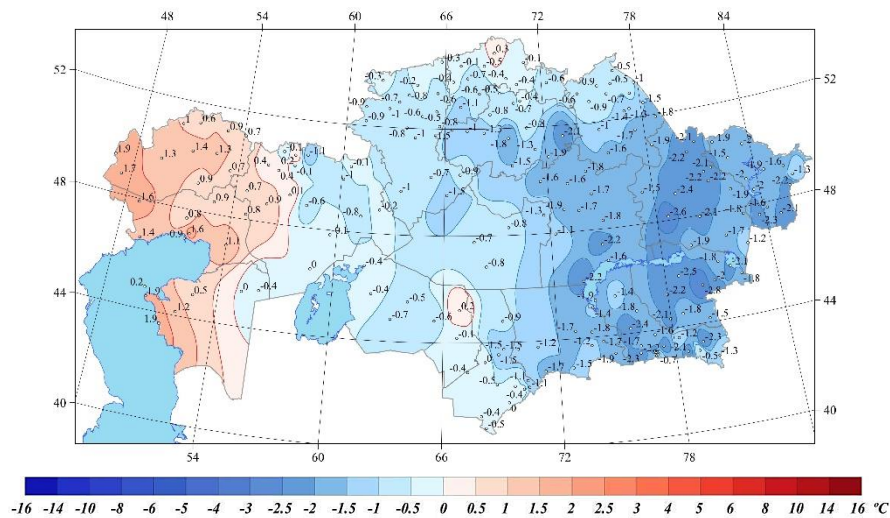


Figure 1 - Spatial distribution of anomalies of mean monthly air temperature (°C) in September 2024, calculated relative to the norms for the period 1991-2020

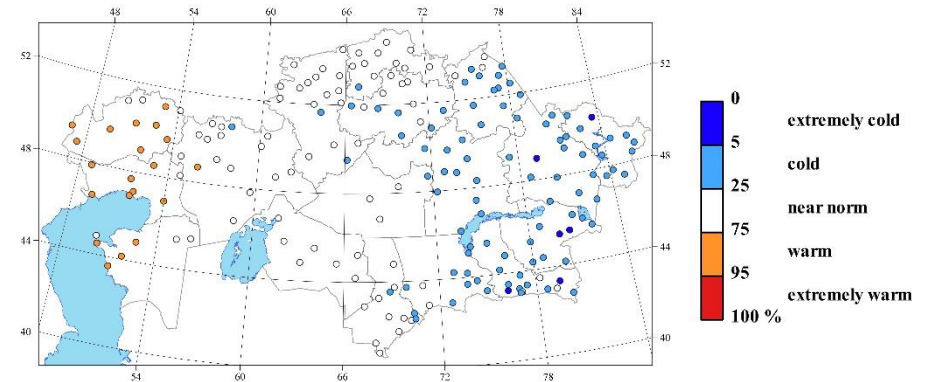
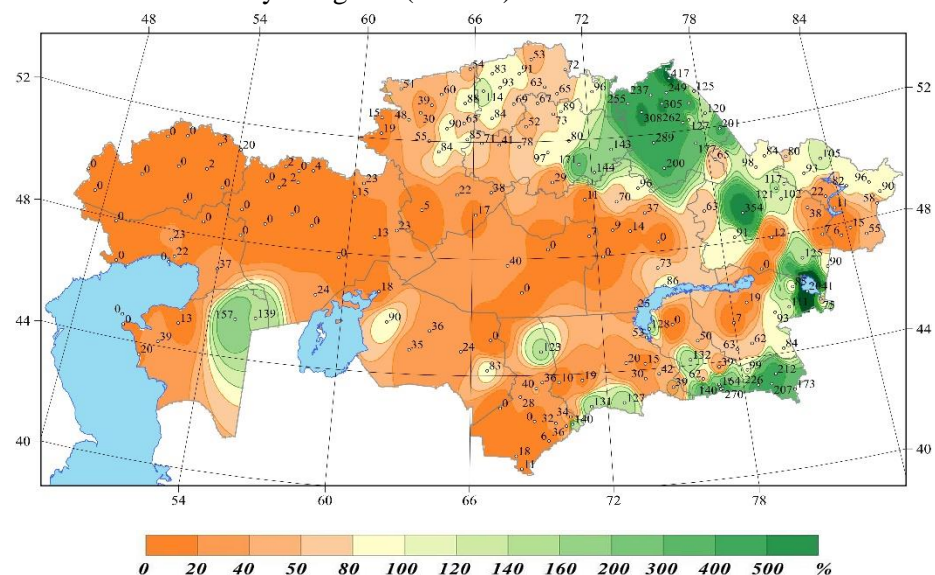


Figure 2 - Spatial distribution of probabilities of non-exceedance of air temperature in September 2024 calculated from data of the period 1941-2024

MONTHLY PRECIPITATION

In September, a deficit of precipitation was observed over most of the territory of Kazakhstan (Fig. 3). The amount of precipitation less than 20 % of the norm was observed in the western areas, including the west and south of Kostanay region, as well as in the central, eastern and some places southern and south-eastern areas of the country. These regions were included in the category «extremely dry». According to data from 31 MS located in these regions, precipitation was absent during the whole month (Fig. 4). Precipitation exceeding 120 % of the norm was recorded in the north-eastern and eastern parts, as well as in mountainous and foothill areas of the south and south-east of the country, including the eastern part of Mangistau region. In the Pavlodar region, as well as in the Abay and Zhetysu regions, precipitation exceeding 300 % and in some places, even more than 1000 % of the norm was observed (MS Alakol). These regions fell into the «extremely wet» gradation (5 % extremes, Fig. 4). Records of monthly precipitation totals were updated at 2 MS of Pavlodar and Zhetysu regions (Table 1).



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

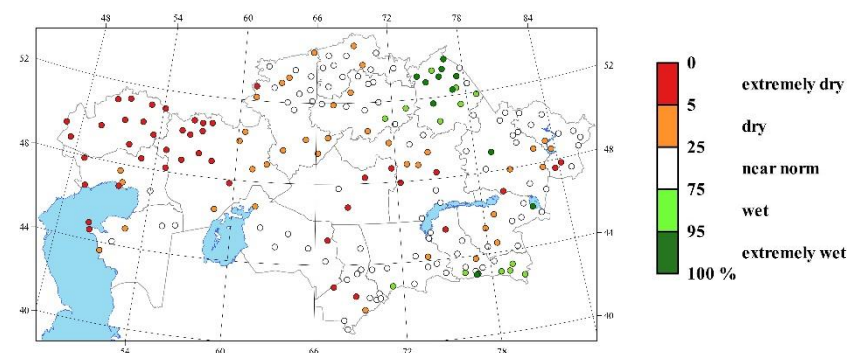


Figure 4 - Spatial distribution of probability of non-exceedance of precipitation in September 2024. Probabilities are calculated from data of the period 1941-2024

Table 1. Maximum monthly precipitation records for September 2024.

№	Meteorological station	Region	New record of monthly total precipitation, mm	Previous record of monthly total precipitation, mm
1	Alakol	Zhetysu	153,1	64,6 (2010 y.)
2	Aktogay	Pavlodar	65,5	59,2 (1981 y.)