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

SEASONAL BULLETIN
ANOMALIES OF AVERAGE AIR TEMPERATURE AND PRECIPITATION IN KAZAKHSTAN
FOR THE SUMMER OF 2025

Astana, 2025

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 seasonal air temperatures and seasonal precipitation totals in the period since 1941.

Anomalies of mean seasonal surface air temperatures and seasonal 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 THE AVERAGE AIR TEMPERATURE PER SEASON

During the summer season, positive air temperature anomalies covered most of Kazakhstan (Fig. 1). The average seasonal air temperature anomaly for the country was +1.07 °C, which made the summer of 2025 one of the six warmest summer seasons in the entire observation period. In the southern and southeastern mountainous regions, as well as in some parts of the central regions, positive anomalies exceeding +2 °C were recorded. According to data from 69 meteorological stations located in these regions, the summer was characterized as «extremely warm» with 5 % of the highest extremes recorded for the entire observation period. The largest positive anomaly (+2.7 °C) was recorded at the Almaty meteorological station in the Almaty region.

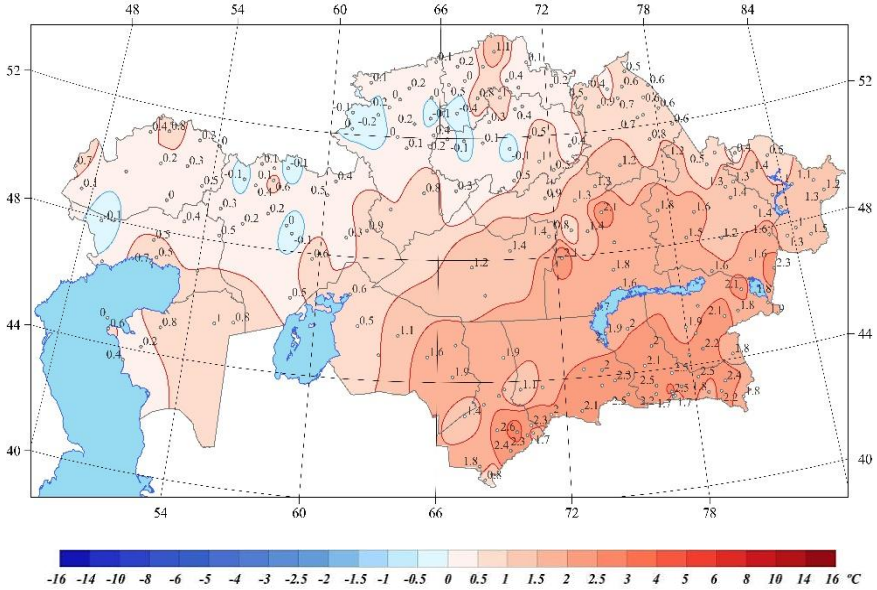

Figure 1–Spatial distribution of anomalies of the average summer air temperature (°C) in 2025, calculated relative to the norms for the period 1991–2020

Record seasonal air temperatures were updated at 30 meteorological stations located in the Almaty, Zhambyl, Turkestan, Kyzylorda, and Karaganda regions, as well as in the Zhetysu region (Tab 1). In most areas of the West Kazakhstan, Atyrau, Aktobe, Kostanay, North Kazakhstan, and Akmola regions, the air temperature was close to normal; local pockets of negative anomalies were observed in these same regions.

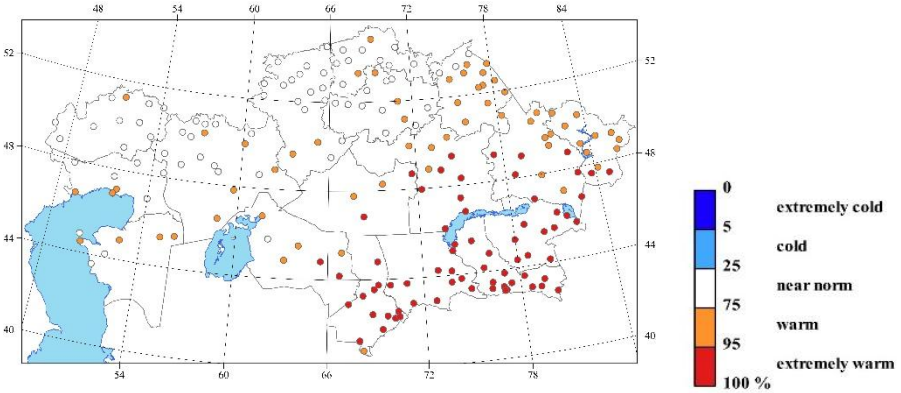

Figure 2 – Spatial distribution of probabilities of non-exceeding the average summer air temperature (°C) in 2025, calculated relative to the norms for the period 1941–2025

The highest positive anomaly (+3.9 °C) was observed in June at the Zhalanashkol meteorological station in the Zhetysu region. The lowest negative anomaly (-0.1 °C) was also recorded in June at the Tushybek meteorological station in the Mangistau region.

A comparative analysis of summer temperatures shows a consistent excess above the 1991–2020 climatological norm. In 2024, the average air temperature was 22.48 °C, which is 0.9 °C above normal, and in 2025, it was 22.68 °C, exceeding the norm by 1.1 °C (Fig. 3).

Table 1. Maximum record air temperatures for the summer of 2025

№	Meteostation	Region	New Record of Air Temperature, °C	Previous Record of Air Temperature, °C
1	Aidarly	Almaty	27.3	27.3 (2024)
2	Almaty	Almaty	26.0	25.4 (2023)
3	Aul №4	Almaty	26.2	25.9 (2024)
4	Aul T.Ryskulov	Turkestan	26.7	26.5 (1984)
5	Bakty	Abay	24.2	24.1 (2024)
6	Balkhash	Karaganda	24.6	24.5 (2024)
7	Yesik	Almaty	24.4	23.7 (2024)
8	Kazyghurt	Turkestan	28.0	27.7 (2021)
9	Kapshagay	Zhetysu	26.6	25.9 (2024)
10	Kegen	Almaty	17.1	16.8 (2023)
11	Kogaly	Zhetysu	19.4	19.0(2008)
12	Korday	Zhambyl	24.1	23.7 (2023)
13	Kuigan	Almaty	26.1	25.8 (2024)
14	Kulan	Zhambyl	25.8	25.3 (2023)
15	Kyrgyzsay	Almaty	23.2	22.9 (2023)
16	Lepsi	Zhetysu	18.7	18.2 (2024)
17	Mynzhylki	Almaty	9.4	9.0 (2023)
18	Narynkol	Almaty	17.2	16.9 (2023)
19	Ulken Almaty	Almaty	12.7	12.3 (2023)
20	Sarkand	Zhetysu	23.9	23.7 (2024)
21	Taraz	Zhambyl	26.2	26.0 (2021)
22	Tasaryk	Turkestan	23.4	23.2 (2021)
23	Tasty	Turkestan	28.3	28.1 (2023)
24	Usharal	Zhetysu	25.4	25.0 (2024)
25	Ushtobe	Zhetysu	25.2	24.7 (2008)
26	Shardara	Turkestan	29.7	29.6 (2023)
27	Shelek	Almaty	26.8	26.1 (2024)
28	Shieli	Kyzylorda	28.0	27.8 (2021)
29	Shymkent	Turkestan	28.2	28.0 (2021)
30	Shokpar	Zhambyl	26.8	26.4 (2023)

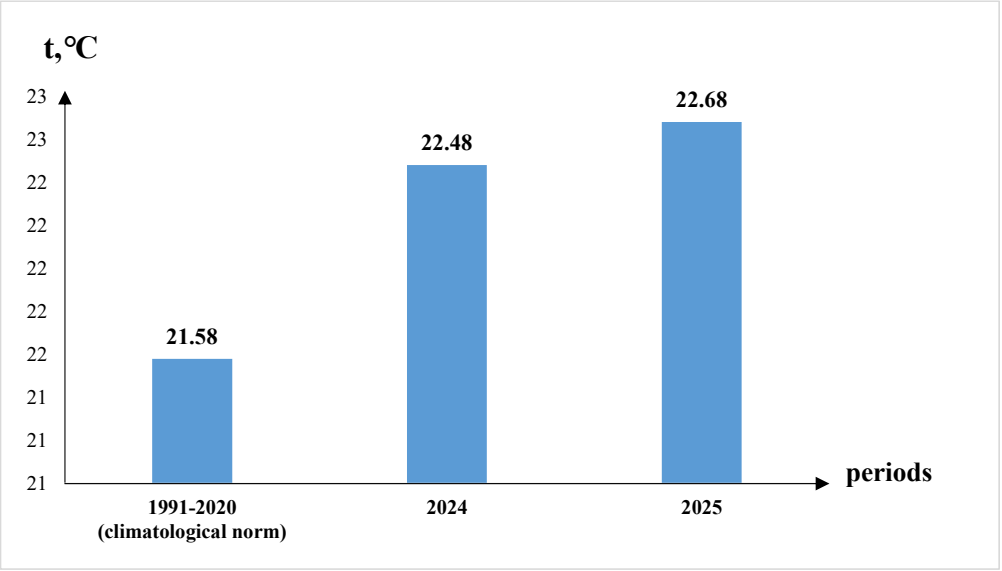

Figure 3–Average summer air temperature (°C) relative to the norm for the long-term period 1991–2020. for the springs of 2024 and 2025

SEASONAL PRECIPITATION

During the summer season, the spatial distribution of precipitation across Kazakhstan was uneven (Fig. 4). Most of the country experienced a precipitation deficit. Significant areas with precipitation below 80 % of normal covered the southwestern, southern, southeastern, eastern, and central regions of the country. In addition, local areas of precipitation deficit were observed in the western regions and in some areas of the Kostanay region. According to data from 14 meteorological stations located in West Kazakhstan, Turkestan, Zhambyl, Almaty, and Zhetysu regions, the summer of 2025 was characterized as «extremely dry» (5 % extremes were recorded) (Fig. 4).

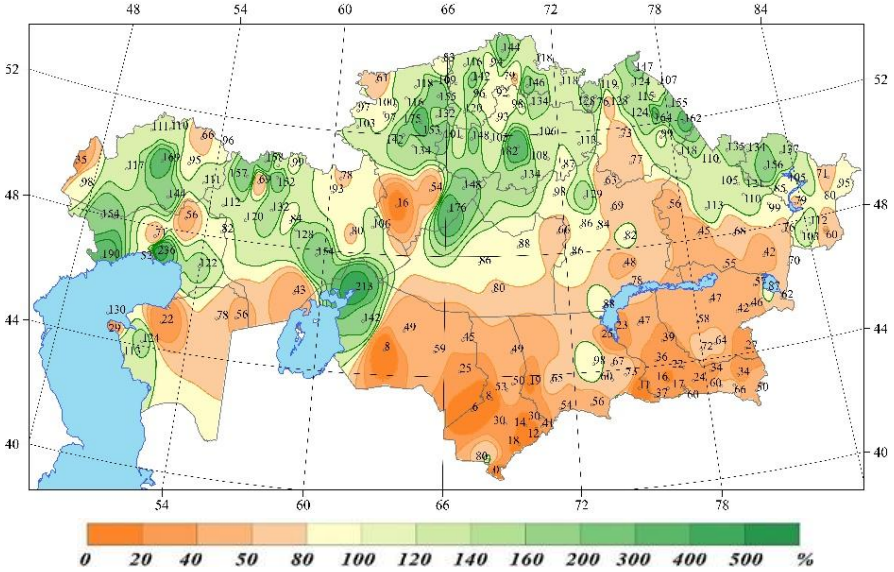

Figure 4–Spatial distribution of the average amount of atmospheric precipitation over the summer period of 2024–2025 (in % of the norm calculated relative to the base period 1991–2020)

Excess precipitation (more than 120 % of the norm) was observed in most areas of the western, northern, and northeastern regions, as well as in the Priaralye zone. The highest amount of precipitation for the summer was recorded at the Atyrau meteorological station (Atyrau region) — 89.9 mm, which was 235.5 % of the norm. The Shaldai meteorological station, located in the northeastern part of the country, was classified as “extremely wet,” with 5 % of the extremes recorded (Fig. 4).

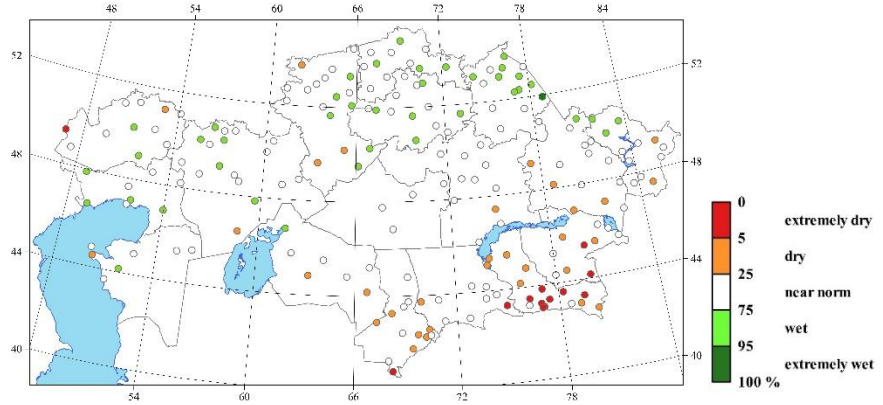

Figure 5 – Spatial distribution of the probability of not exceeding the average amount of precipitation over the summer period of 2025. The probabilities are calculated based on data from the period 1941–2025

According to the analysis of monthly values for the period from June to August 2025, the highest amount of precipitation was recorded in August at the Leninogorsk MS (East Kazakhstan Region) — 136.2 mm, which was 216.2 % of the norm. The highest excess of the norm (490.5 %) was also observed in August at the Aral Teniz meteorological station in the Kyzylorda region, where 100.8 mm of precipitation fell.

A comparative analysis of precipitation shows that the summer of 2025 was characterized by a deficit — 85.2 mm fell during the season, while in 2024, 121.5 mm was observed. In addition, the 2025 value was below the climatic norm (92.6 mm), indicating drier weather conditions compared to the previous year and the long-term average values (Fig. 6).

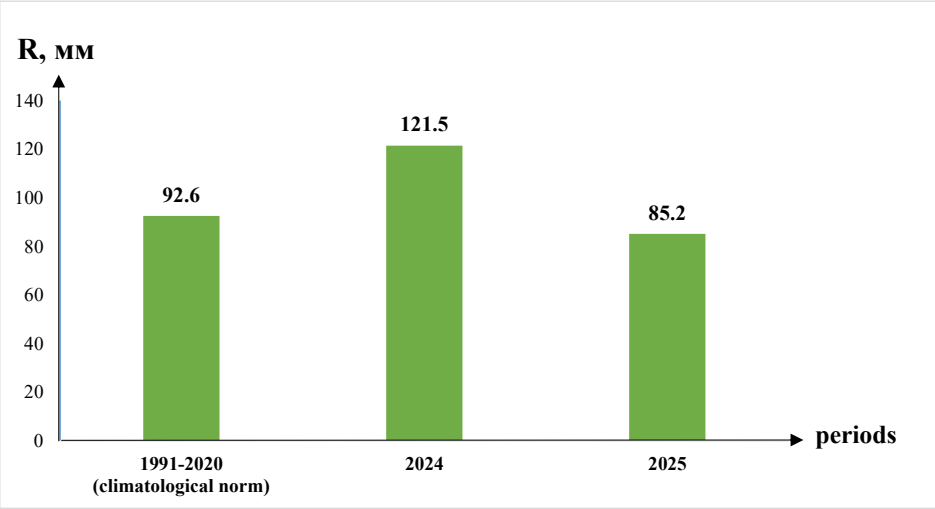

Figure 6 – Average amount of precipitation over the summer period (°C) relative to the norms for the long-term period 1991– 2020 for the summer of 2024 and 2025