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 AUTUMN OF 2025 YEAR

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

Autumn was the warmest on record for the entire observation period: positive air temperature anomalies were observed throughout Kazakhstan (Fig. 1). The average seasonal air temperature anomaly was +3.03 °C. The positive anomalies exceeding +14.0 °C were recorded in the south-western, southern and some parts of the south-eastern regions of the country. At 84 % of the country's meteostations, «extremely warm» gradations were recorded with a probability of non-exceeding 95–100 % (Fig. 2).

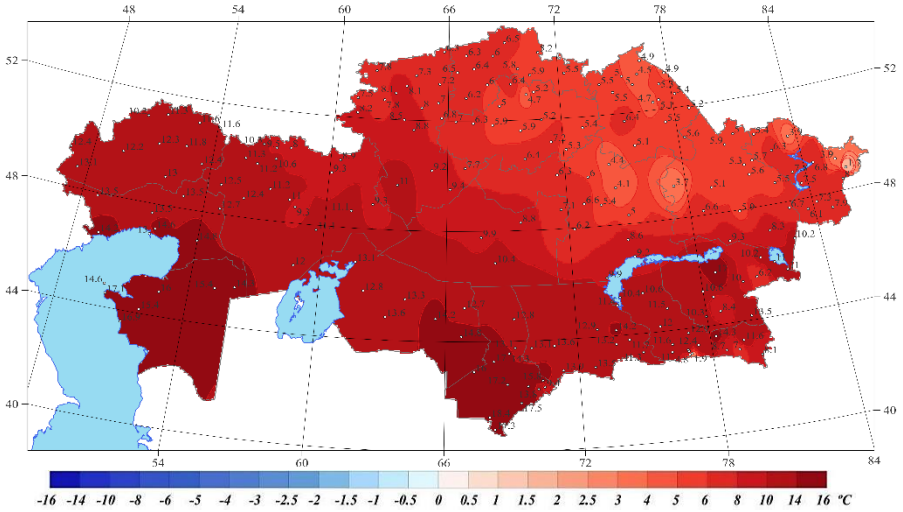

Figure 1 – Spatial distribution of anomalies of the average autumn air temperature (°C) in 2025, calculated relative to the norms for the period 1991–2020

The highest positive anomaly (+23.1 °C) in autumn was observed in September at the Shardara meteorological station in the Turkestan region. The lowest negative anomaly (-1.5 °C) for the autumn season was recorded in October at the Markakol Reserve meteorological station in the East Kazakhstan region.

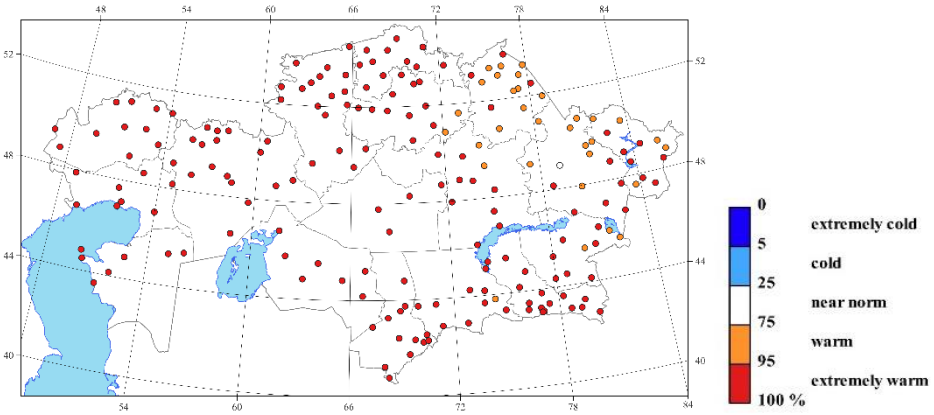

Figure 2 – Spatial distribution of probabilities of non-exceeding the average autumn air temperature (°C) in 2025, calculated relative to the norms for the period 1941–2025

Record seasonal air temperatures were updated at 107 meteostations (Table 1).

Comparative analysis of autumn air temperature anomalies reveals a consistent positive deviation from the 1991–2020 years climatological normal. In 2024 year, the average air temperature was 6.84 °C, which is 0.42 °C above the norm, while in 2025 year it reached 9.45 °C, exceeding the norm by 3.03 °C (Fig. 3).

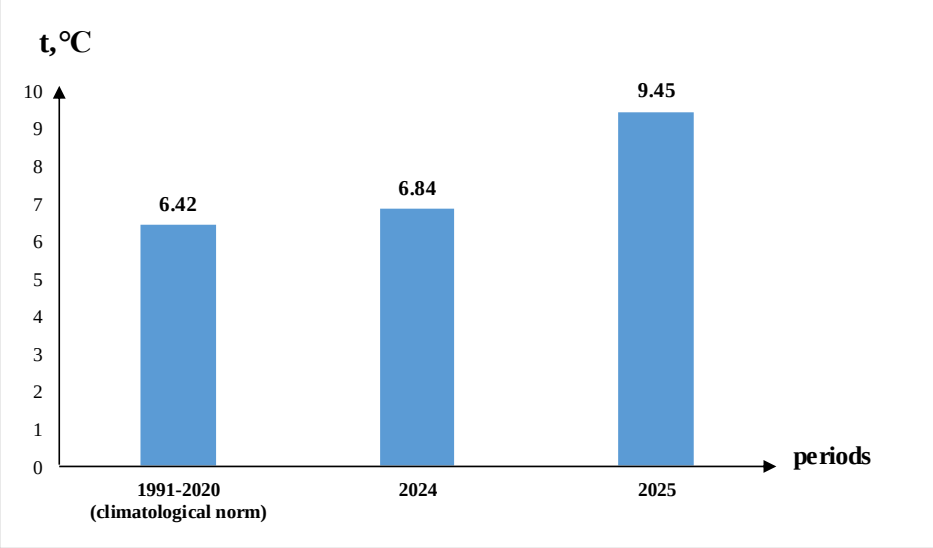

Figure 3 – Average autumn air temperature (°C) relative to the norm for the long-term period 1991–2020, for the springs of 2024 and 2025 year

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

№	Meteostation	Region	New Record of Air Temperature, °C	Previous Record of Air Temperature, °C
1	Aksai	West Kazakhstan	11.6	8.7 (2023)
2	Aksengir	Almaty	11.6	11.1 (2023)
3	Aktau	Mangystau	16.9	15.6 (2023)
4	Aktobe	Aktobe	10.6	8.2 (2023)
5	Almaty, Kamenskoe Plato	Almaty	11.8	11.6 (2023)
6	Almaty, OGMS	Almaty	13.7	12.6 (2023)
7	Amangeldy	Kostanay	9.2	7.8 (2023)
8	Aral Sea	Kyzylorda	13.1	11.4 (2023)
9	Arkalyk	Kostanay	7.7	6.9 (2023)
10	Arshalinsky z/svh.	Kostanay	7.5	6.2 (1971)
11	Arys	Turkestan	17.2	14.9 (2023)
12	Atyrau	Atyrau	14.6	12.4 (2023)
13	Aul T.Ryskulov	Turkestan	15.8	14.3 (2002)
14	Ashysai	Turkestan	14.3	13.0 (2002)
15	Ayakkum	Aktobe	12.0	10.8 (1971)
16	Bakty	Абайская	10.2	10.1 (2023)
17	Balakshino	Akmola	5.0	4.9 (2023)
18	Beineu	Mangystau	15.4	13.9 (1964)
19	Blagoveshchenskaya	North Kazakhstan	6.3	5.7 (1971)
20	Dzhambayty	West Kazakhstan	11.8	9.4 (1971)
21	Zhanibek	West Kazakhstan	12.4	10.4 (2023)
22	Dievskaya	Kostanay	8.5	7.0 (1971)
23	Ekydyn	Kostanay	9.4	8.1 (2023)
24	Esik	Almaty	12.4	11.4 (2023)
25	Esil	Akmola	7.0	6.5 (2023)
26	Zhalanash	Almaty	8.7	8.1 (1980)
27	Zhalpaktal	West Kazakhstan	12.2	10.2 (2023)
28	Zhankent	Zhetysu	13.5	12.4 (2023)
29	Zhezkazgan	Ulytau	9.9	9.0 (2023)
30	Zheleznodorozhny	Kostanay	6.8	6.0 (2023)
31	Zhetikkonur	Ulytau	10.4	10.1 (2023)
32	Zhitikara	Kostanay	8.2	6.4 (2023)
33	Zhosaly	Kyzylorda	13.3	11.9 (2023)
34	Zlikha	Kyzylorda	12.7	12.2 (2023)
35	Irgiz	Aktobe	11.1	9.5 (1971)
36	Kazalinsk (WMO)	Kyzylorda	12.8	11.4 (2023)
37	Kazygurt	Turkestan	17.5	15.3 (2023)
38	Kapshagai	Zhetysu	12.9	12.3 (2023)
39	Karabalyq	Kostanay	7.8	6.1 (2023)
40	Karabau	Atyrau	13.5	11.1 (1951)
41	Karabutak	Aktobe	9.3	8.1 (1971)
42	Karak	Kyzylorda	13.6	12.3 (2023)
43	Karamendy	Kostanay	8.8	7.1 (1971)
44	Karasu	Kostanay	7.0	6.0 (2023)
45	Karatobe	West Kazakhstan	12.4	9.7 (1971)
46	Kogaly	Zhetysu	8.4	8.0 (2023)
47	Kostanay	Kostanay	8.1	6.7 (2023)
48	Kulan	Zhambyl	13.5	12.7 (2023)
49	Kulsary	Atyrau	14.8	12.4 (2023)
50	Kushmurun	Kostanay	8.0	7.0 (2023)
51	Kyzylorda	Kyzylorda	14.2	13.1 (2023)
52	Kyrgyzsay	Almaty	11.6	10.8 (2023)

№	Meteostation	Region	New Record of Air Temperature, °C	Previous Record of Air Temperature, °C
53	Martuk	Aktobe	10.3	8.3 (1971)
54	Matay	Zhetysu	17.0	10.8 (2023)
55	Makhambet	Atyrau	13.5	11.5 (2023)
56	Mikhailovka	Kostanay	7.3	6.0 (1971)
57	Moyinkum	Zhambyl	12.9	12.5 (2023)
58	Mynzhilki	Almaty	1.9	1.2 (2023)
59	Narynkol	Almaty	8.1	6.7 (1980)
60	Novoalekseevka	Aktobe	11.3	8.9 (1971)
61	Petropavlovsk	North Kazakhstan	6.5	6.0 (2023)
62	Peshnoi	Atyrau	13.0	11.6 (2023)
63	Presnogorkovka	Kostanay	6.3	5.5 (2023)
64	Rudny	Kostanay	8.1	6.8 (1971)
65	Ruzaevka	North Kazakhstan	6.2	5.8 (2023)
66	Samarkand	Mangystau	14.3	12.2 (1971)
67	Sarykol/Uritsky	East Kazakhstan	7.8	7.2 (2023)
68	Saumalkol/ Volodarskoye	Kostanay	7.2	6.1 (1971)
69	Sergeevka	North Kazakhstan	6.0	5.5 (2023)
70	Taypak	North Kazakhstan	6.4	6.0 (2023)
71	Taraz/Zhambyl	West Kazakhstan	13.0	10.5 (2023)
72	Tasaryk	Zhambyl	13.9	12.9 (2023)
73	Temir	Turkestan	13.8	12.0 (2002)
74	Timiryazevo	Aktobe	11.2	9.0 (1971)
75	Tobol	North Kazakhstan	6.5	5.8 (2023)
76	Samarkand	Kostanay	7.8	6.7 (1971)
77	Tole Bi	Zhambyl	13.2	12.5 (2023)
78	Turkestan	Turkestan	17.0	14.8 (2023)
79	Tushchebek	Mangystau	15.4	14.1 (2010)
80	Uil	Aktobe	12.5	10.1 (2023)
81	Ulken Naryn	East Kazakhstan	6.8	6.5 (2023)
82	Uralsk	West Kazakhstan	11.3	8.8 (1971)
83	Urda	West Kazakhstan	13.1	11.3 (2023)
84	Novy Ushtohan	Atyrau	13.5	12.0 (2023)
85	Uyuk	Zhambyl	13.6	13.0 (2023)
86	Fort Shevchenko	Mangystau	17.1	15.6 (2023)
87	Chapaevo	West Kazakhstan	12.3	9.7 (1971)
88	Chingirlau	West Kazakhstan	11.6	8.7 (2023)
89	Shalkar	Aktobe	11.1	9.9 (1971)
90	Shardara	Turkestan	18.4	16.7 (2023)
91	Shelek	Almaty	14.3	13.1 (2023)
92	Shieli	Kyzylorda	14.8	13.3 (2023)
93	Sholakorgan	Turkestan	13.1	12.8 (2023)
94	Shuyldak	Turkestan	9.4	8.9 (2002)
95	Shymkent	Turkestan	17.3	15.3 (2002)
96	Emba	Aktobe	11.0	9.5 (1971)
97	Kamenka	West Kazakhstan	10.2	8.7 (2000)
98	Sagiz	Atyrau	12.7	10.2 (2023)
99	Kulaly Island	Atyrau	14.6	14.3 (2023)
100	Ilyinsky	Mangystau	11.2	8.7 (1971)
101	Kos-Istek	Aktobe	8.0	6.9 (1971)
102	Rodnikovka	Aktobe	9.5	7.2 (1971)
103	Uzynagash	Almaty	11.0	10.1 (2023)
104	Kyzylkum	Turkestan	16.0	14.2 (2023)
105	Zhetysay	Turkestan	17.3	15.4 (2023)
106	Saudakent	Zhambyl	13.1	12.9 (2023)
107	Khantau	Zhambyl	14.2	13.9 (2023)

SEASONAL PRECIPITATION

In the autumn season, the spatial distribution of precipitation over the territory of Kazakhstan exhibited significant heterogeneity (Fig. 4). A precipitation deficit of less than 80 % was observed in the Atyrau, Aktobe, southern parts of the Kostanay regions, in the Ulytau and Zhetisu regions, as well as in some parts of the West Kazakhstan, Mangistau, North Kazakhstan, Akmola and Almaty regions. In most of the western and southern regions, values with a non-exceedance probability of 0–5 % were recorded, corresponding to the classification of «extremely dry» (Fig. 5). Excess precipitation (more than 120% of normal) was observed in the north of West Kazakhstan region, in some parts of Kostanay, North Kazakhstan, Akmola, Pavlodar, Karaganda, East Kazakhstan regions, as well as in the Abai region. A number of meteorological stations in Pavlodar, East Kazakhstan and Abai regions were classified as «extremely wet» with a probability of non-exceeding 95–100 % (Fig. 5).

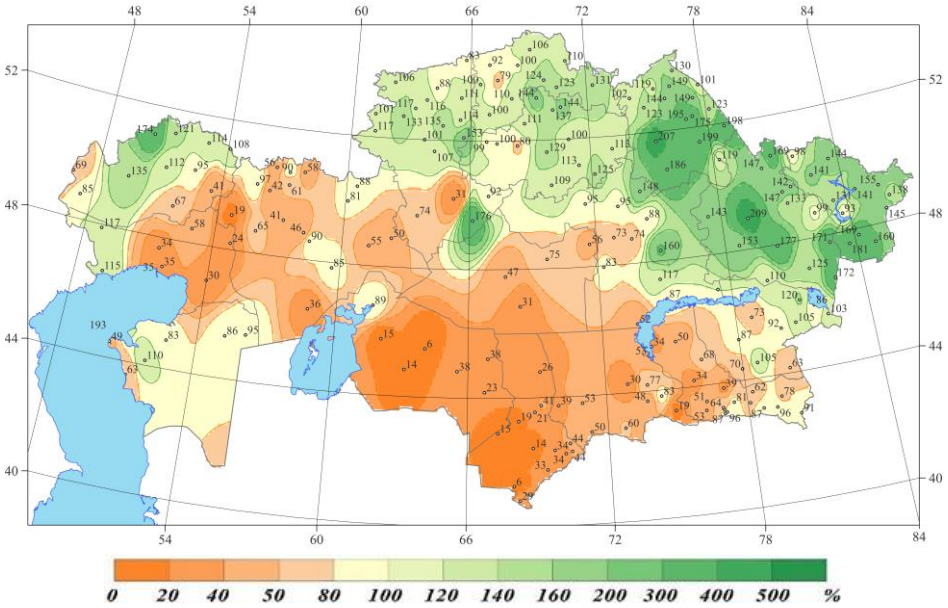

Figure 4 – Spatial distribution of the average amount of atmospheric precipitation over the autumn period of 2024–2025 years (in % of the norm calculated relative to the base period 1991–2020)

The highest amount of precipitation fell in September at the Leninogorsk meteorological station (East Kazakhstan Region) – 150.6 mm (268.9 % of the norm). According to the analysis of monthly values for the period from September to November 2025 year, the highest amount of precipitation was recorded at the Karaul meteorological station (Abai region) – 95.2 mm, which was 209 % of the norm. The new records for monthly precipitation totals were set at two meteorological stations in Pavlodar region (Table 2).

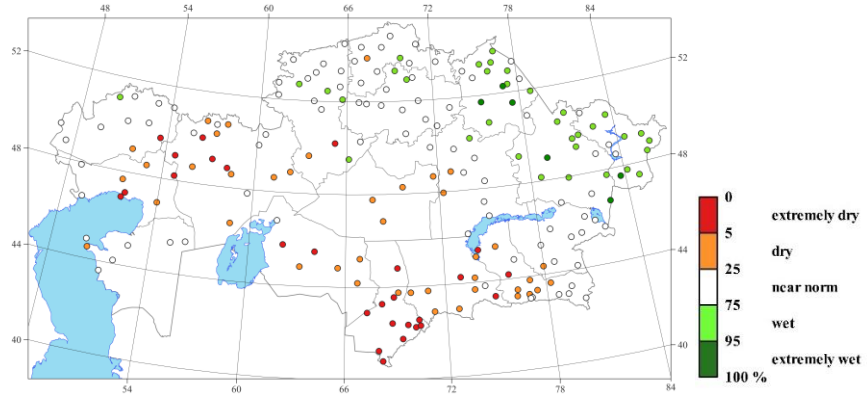

Figure 5 – Spatial distribution of the probability of not exceeding the average amount of precipitation over the autumn period of 2025 year. The probabilities are calculated based on data from the period 1941–2025 years

A comparative analysis of precipitation shows that autumn 2025 year was characterized by a deficit, with 67.74 mm of precipitation recorded during the season, compared to 84.26 mm in 2024 year. In addition, the 2025-year value was below the climatic norm (72.32 mm), indicating drier weather conditions compared to the previous year and the long-term average values (Fig. 6).

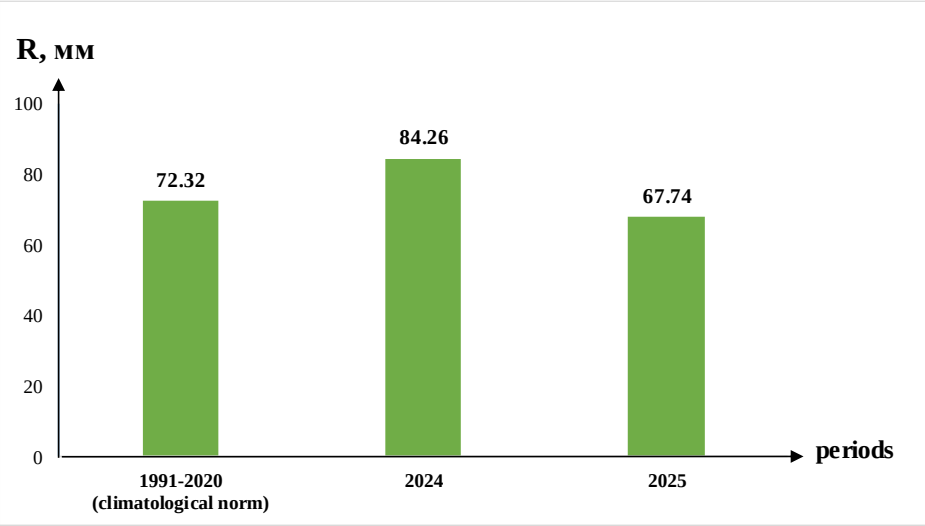

Figure 6 – Average amount of precipitation over the summer period (°C) relative to the norms for the long-term period 1991–2020 for the autumn of 2024 and 2025

Table 2. Maximum record values of monthly precipitation during the autumn period of 2025 year

№	Meteostation	Region	New record monthly total atmospheric precipitation, mm	Previous record monthly total atmospheric precipitation, mm
1	Ekibastuz	Pavlodar	108.5	102.7 (2023)
2	Koktobe	Pavlodar	121.8	110.9 (2018)