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 FEBRUARY 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 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 February, positive air temperature anomalies were observed in most of the territory of Kazakhstan (Fig. 1). The greatest positive anomalies were recorded in Akmola region at MS Atbasar (5.2 °C), North Kazakhstan region at MS Vysotenka and Yavlenka (5.1 °C), as well as at MS Amangeldy in Kostanay region (5.1 °C). Four meteorological stations from North Kazakhstan and Akmola regions fell into an extremely warm gradation with a probability of not exceeding 95-100% (Fig. 2). Negative anomalies were observed in the western, eastern and southeastern regions of the country. Negative anomalies of -1 °C and below were recorded in Mangystau and East Kazakhstan regions. The Markakol Nature Reserve in the East Kazakhstan region entered a cold gradation with a probability of not exceeding 5-25%, becoming the most significant negative anomaly in the country (-3 °C).

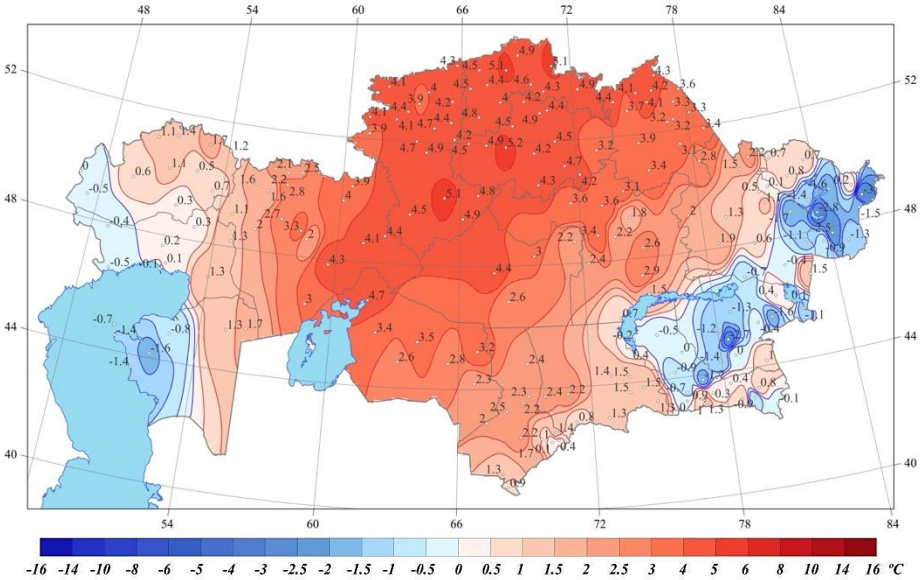

Figure 1 – Spatial distribution of anomalies of mean monthly air temperature (°C) in February 2025, calculated relative to the norms for the period 1991-2020

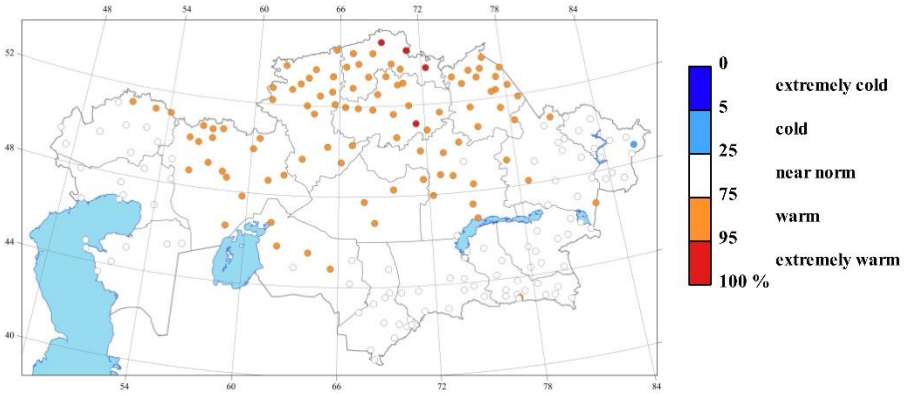

Figure 2 – Spatial distribution of probabilities of non-exceedance of air temperature in February 2025 calculated from data of the period 1941-2025

MONTHLY PRECIPITATION

In February, precipitation in the country was unevenly distributed (Fig. 3). In the western, eastern, central, southern regions of the country, as well as the eastern part of the northern regions, there was a shortage of precipitation (less than 80% of the norm). According to the data of 37 MS located in the northern, southern and eastern regions, 5% extremes corresponding to the "extremely dry" gradation were recorded (Fig. 4). The minimum amount of precipitation was recorded in the MS Terekty in the East Kazakhstan region (7.5 mm). In the western, southwestern and western parts of the northern regions, precipitation corresponded to 100% or more of the norm. According to weather stations in West Kazakhstan, North Kazakhstan, Kostanay and Kyzylorda regions, precipitation exceeded 150% of normal. In Aktobe, Atyrau and Mangystau regions, precipitation exceeded 200% of normal. The largest amount of precipitation fell at the Kulsary weather station in Atyrau region – 42.1 mm, which was 429% of the norm.

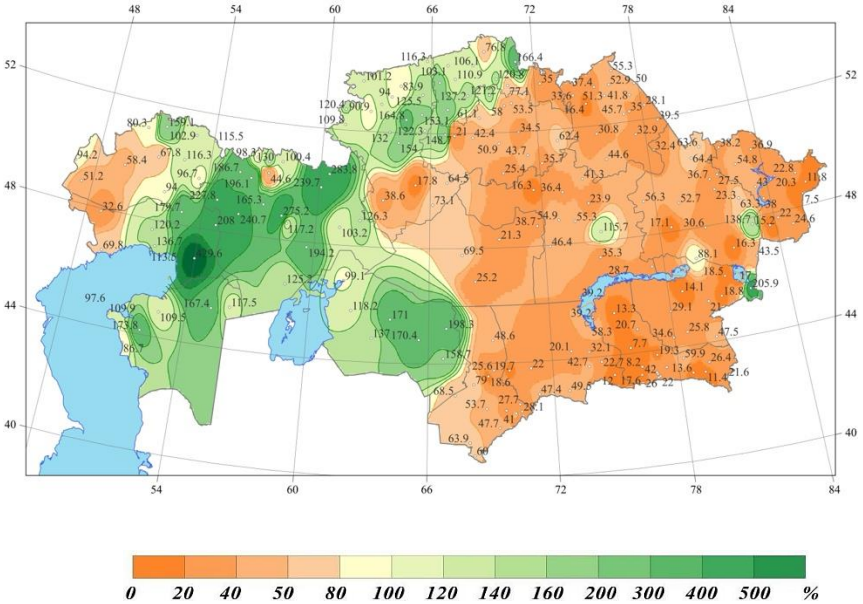

Figure 3 – Spatial distribution of precipitation in February 2025 (in % of the norm calculated relative to the base period 1991-2020

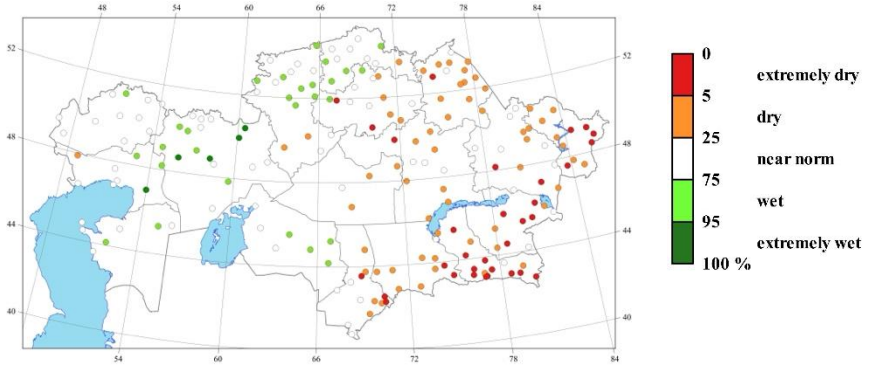

Figure 4 – Spatial distribution of probability of non-exceedance of precipitation in February 2025. Probabilities are calculated from data of the period 1941-2025