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 MAY 2024

Astana, 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 May, all western, northern and most of the central and southern areas of the republic were covered by a zone of negative air temperature anomalies (Fig. 1). The most significant anomalies with temperatures below normal by 2.0...3.9 ° C were observed in the western and northern areas of the country. According to the data of 6 stations located in Western Kazakhstan, Aktobe, Kostanay and Akmola regions, air temperature anomalies entered the «extremely cold» gradation, with a probability of not exceeding 0-5 %, and 10 % extremes were also recorded at many stations in these regions (Fig. 2). The most significant negative temperature anomaly (-3.9 ℃) was observed at the Karabalyk station (Kostanay region). In most of the East Kazakhstan and Almaty regions, also in the regions of Abai and Zhetysu, the temperature exceeded the norm by more than 1-2 ℃. According to the data of 2 stations Lepsi (Zhetysu region) and Narynkol (Almaty region), air temperature anomalies entered the «extremely warm» gradation, with a probability of not exceeding 95-100 % (Fig. 2). The most significant positive temperature anomaly (+2.6 ℃) was noted at Bakty station (Abai region).

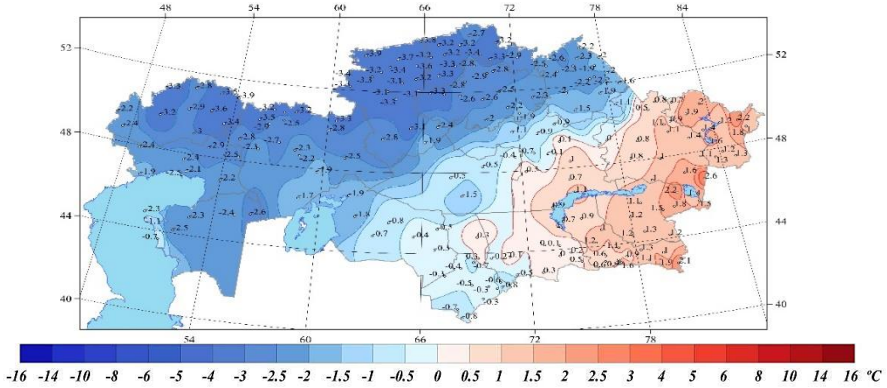

Figure 1 - Spatial distribution of anomalies of mean monthly air temperature (℃) in May 2024, calculated relative to the norms for the period 1991-2020

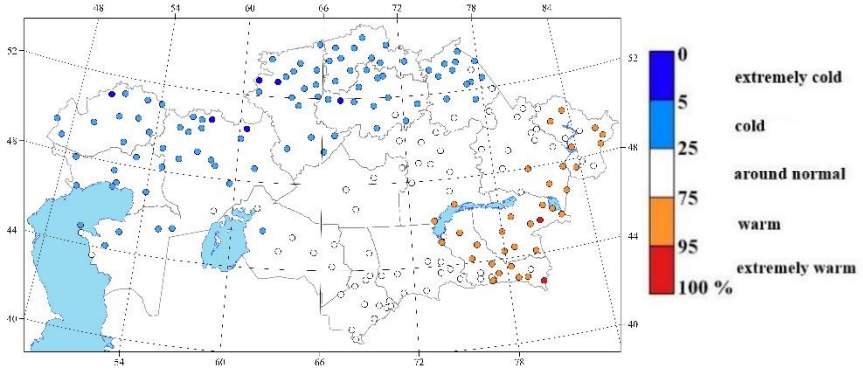

Figure 2 - Spatial distribution of probabilities of non-exceedance of air temperature in May 2024 calculated from data of the period 1941-2024

MONTHLY PRECIPITATION

In May, an excess of precipitation was observed in most of the territory of Kazakhstan (Fig. 3). In the northern, northeastern and most of the southwestern part of the country, also in some areas of Almaty, Abai and Zhetysu regions, precipitation amounted mainly to 150-250 % of the norm, in some places more than 300 % and even 400-500 % of the norm. According to the 31 meteorological stations located in various regions of the country, it was «extremely wet» (5% extremes were recorded), including a record amount of monthly precipitation at 9 meteorological stations (Fig.4, Table 1). The largest amount of precipitation fell on the Kamenskoe plateau station in the Almaty region – 195,9 mm or 143.4% of the norm, which corresponds to the 79th percentile. Records of maximum monthly precipitation amounts were updated at some stations in Pavlodar and Akmola regions (Table 1). Precipitation deficiency was observed in the western, and northwestern areas, as well as locally in Kyzylorda, Turkestan, Zhambyl, Abai, and Zhetysu regions, and also in the Ulytau region. Precipitation of less than 10% of the norm was observed in the western part of West Kazakhstan and Atyrau regions and entered the gradation of 0-5 % «extremely dry». There was no precipitation on Janybek station (West Kazakhstan) throughout the month.

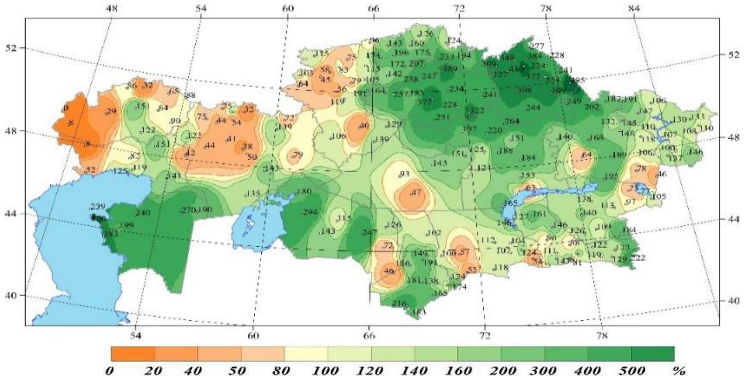

Figure 3 - Spatial distribution of precipitation in May 2024 (in % of the norm calculated relative to the base period 1991-2020)

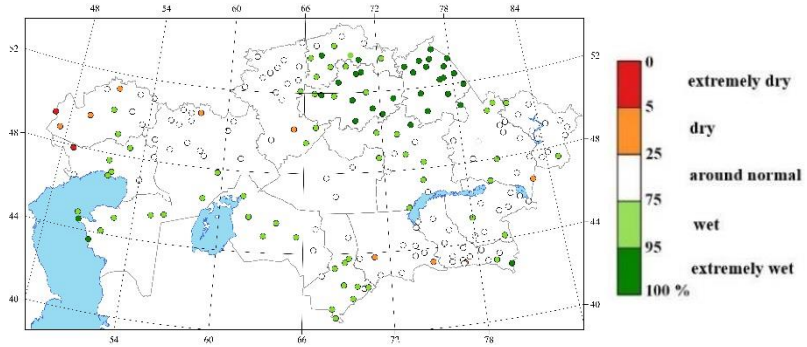

Figure 4 - Spatial distribution of probability of non-exceedance of precipitation in May 2024. Probabilities are calculated from data of the period 1941-2024

Table 1. Maximum monthly precipitation records for March 2024.

№	Meteorological station	Region	New record of monthly total precipitation, mm	Previous record of monthly total precipitation, mm
1	Golubovka	Pavlodar	79.2	76.8 (1994 y.)
2	Ekibastuz	Pavlodar	105.5	83.8 (2000 y.)
3	Ertis	Pavlodar	84.1	76.0 (1954 y.)
4	Shaldai	Pavlodar	99.5	73.4 (2018 y.)
5	Fedorovka	Pavlodar	86.9	78.3 (2000 y.)
6	Borovoe	Akmola	131.9	81.1 (2015 y.)
7	Zhaltyr	Akmola	114.2	100.3 (1988 y.)
8	Shchuchinsk	Akmola	79.9	76.3 (2007 y.)
9	Arshaly	Akmola	108.0	96.3 (2000 y.)