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 MARCH 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.

Responsible for the release:
Y. Amanulla – Leading Researcher of DCR RC
A. Medetova– Leading Researcher of DCR RC

ANOMALIES OF MEAN MONTHLY AIR TEMPERATURE

In March, a positive air temperature anomaly was observed in most of the country - in the southwestern, central, eastern, and northeastern regions (Fig. 1). The centers of the most significant positive anomalies of 3.1...4.6 ºC covered some regions of Aktobe, Pavlodar, as well as the northern part of East Kazakhstan and Abay regions. The most significant positive anomaly (4.6 ºC) was observed at Ust-Kamenogorsk MS of East Kazakhstan region. Most values with positive anomalies were included in the gradation «warm», with a probability of non-exceedance of 75-95 % (Fig. 2). The area of negative anomalies occupied the northern regions of West Kazakhstan, Aktobe region, most of Kostanay region, western regions of North Kazakhstan and Akmola regions, as well as the southern part of Turkestan and Almaty regions. The most significant negative anomaly (-1.8 ºC) was recorded at Aksai MS in West Kazakhstan region.

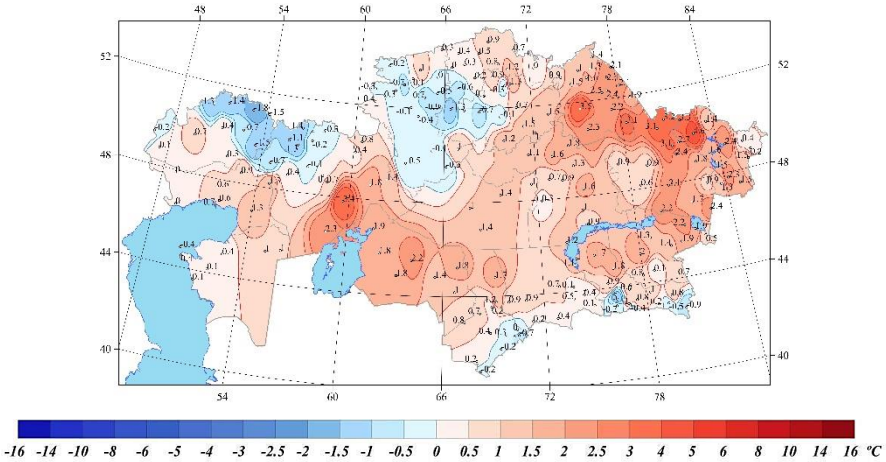

Figure 1 - Spatial distribution of anomalies of mean monthly air temperature (°C) in March 2024, calculated relative to the norms for the period 1991-2020

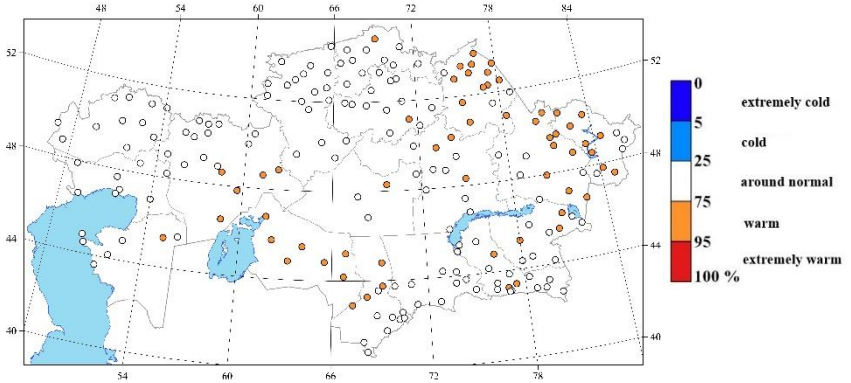

Figure 2 - Spatial distribution of probabilities of non-exceedance of air temperature in March 2024 calculated from data of the period 1941-2024

MONTHLY PRECIPITATION

In March, the distribution of precipitation over the territory was uneven (Fig. 3). The amount of precipitation more than 200 % of the norm was observed in most of Atyrau, Turkestan, Pavlodar, Abay and East Kazakhstan regions, locally in West Kazakhstan, Aktobe, Mangistau, Kostanay, Karaganda and Zhetysu regions and entered the gradation «extremely wet» (Fig. 4). The largest amount of precipitation fell at Ashchysay MS in Turkestan region - 175.3 mm, which comprised 238.2 % of the multiyear average. At some stations of Atyrau, Abay, and Turkestan regions, the records for the maximum monthly totals of precipitation were updated (Table 1). A deficiency of precipitation (less than 80 % of the norm) was observed in the southwestern areas of the country and most of Aktobe, Kostanay, North Kazakhstan regions, and also locally in West Kazakhstan, Akmola regions and south-eastern areas of the country. Precipitation significantly below the norm (less than 5 % of the norm) was observed at Kyzan MS, Sam MS (Mangistau oblast), Zliha MS (Kyzylorda region) and entered the gradation «extremely dry» with a probability of not exceeding 0-5 %, and at Beineu MS (Mangistau region) during the month there was no precipitation.

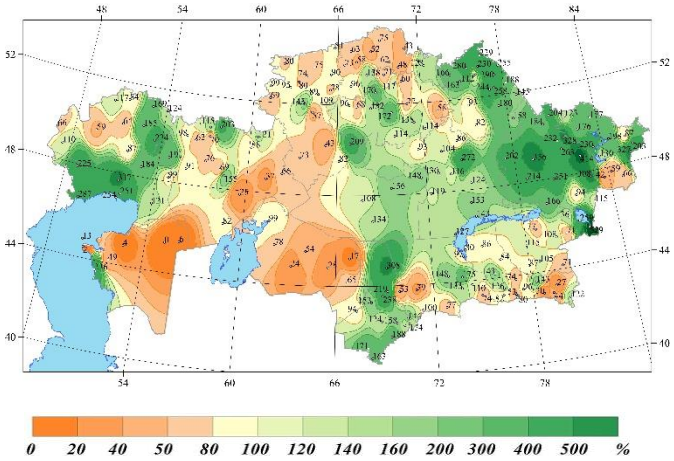

Figure 3 - Spatial distribution of precipitation in March 2024 (in % of the norm calculated relative to the base period 1991-2020)

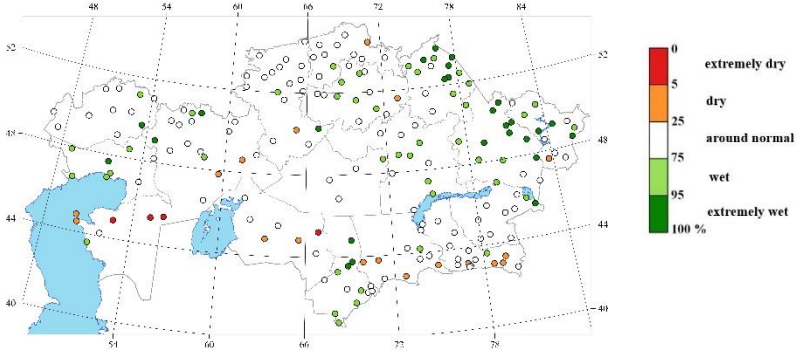

Figure 4 - Spatial distribution of probability of non-exceedance of precipitation in March 2024. Probabilities are calculated from data of the period 1941-2024

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	Makhambet	Atyrau	45.9	38.1 (2017 y.)
2	Shalabai	Abai	68.5	61.7 (2019 y.)
3	Tasty	Turkestan	60.0	50.1 (2016 y.)