

# The current climate conditions and a national outlook in Kazakhstan

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## Kazakhstan's climate is warming faster than the global climate

Change in mean annual air temperature for the period 1894-2023, averaged over the long-row stations of the Republic of Kazakhstan



Trends in air temperature growth by season:

spring by **0,67** °C/10 year, autumn by **0,29** °C/10 year,

summer by **0,24** °C/10 year. winter by 0,24 °C/10 year,



Temperature change in 1976-2023:

- On a global scale:

0,19 °C every 10 years

- In Kazakhstan:

0,36°C every 10 years

# Climate change is heterogeneous across seasons, by territory and over time



Time series of anomalies of annual and seasonal air temperatures (°C) averaged over the territory of Kazakhstan for the period 1941-2023. The anomalies are calculated relative to the base period of 1961-1990.

#### Air temperature change, °C/10 year, 1976-2023



# Climate change is heterogeneous across seasons, by territory and over time



Time series of anomalies of annual and seasonal precipitation sums (%), spatially averaged over the territory of Kazakhstan for the period 1941–2023. Anomalies are calculated relative to the baseline period 1961–1990.

### Change in precipitation, %/10 year, 1976-2023



# Long-term weather forecast

- One of the most important tasks of the NHMS of Kazakhstan is to forecast dangerous and natural hydrometeorological phenomena with maximum advance warning of state bodies, branches of economy and population of the country about these phenomena in order to prevent loss of life and reduce economic damage, to make short-term, medium-term and long-term weather forecasts for Kazakhstan.
- NHMS of Kazakhstan issues long-term weather forecasts, which are based on the year-analog method, numerical hydrodynamic models of 13 world prognostic centres, products of hydrodynamic models of the Regional North-Eurasian Climate Centre, Main Geophysical Observatory and Hydrometcentre of Russia.
- The following forecasts are issued:
- for a decade
- for a month
- for the season for the warm half of the year (April October); for the cold half of the year (November March).

### Review of the (JJASO 2024) season (Temperature)

### advisory weather forecast

### observed weather



#### Justifiability of monthly weather forecasts for the Republic of Kazakhstan

Meteorological value	June	July	August	September	October	Average				
ΔΤ,%	92	96	96	90	97	94				
$\Delta T$ , % - air temperature anomaly										

### Review of the (JJASO 2024) season (Precipitation)



### advisory weather forecast

#### Justifiability of monthly weather forecasts for the Republic of Kazakhstan

Meteorological value	June	July	August	September	October	Average			
∆ <b>R</b> ,%	61	63	56	48	59	57			
$\Delta R$ , % - anomaly of atmospheric precipitation									

observed weather

# High-impact Climate Events from June to October 2024

In Kazakhstan from June to October 2024, the following dangerous hydrometeorological phenomena occurred, but did not have serious consequences for vital activities and other sectors of the economy.

#### Very strong and squally wind

Cases of strong winds with a maximum speed exceeding 30 m/s were most often recorded at the Dostyk weather station in Zhetysu region (82.468333°E, 45.268889°N) (21 cases), as well as at several weather stations located in the southern part of the country.

#### **Intense heat**

The highest temperature recorded on September 8 at the Arys weather station (at latitude 42.43015 and longitude 68.8087) in the Turkestan region reached +44.3 °C. Over the past five months, this meteostation has seen the largest number of cases of extreme heat.

#### **Temperature anomalies**

In August, at 21 stations located in Almaty and East Kazakhstan regions, as well as in Abay and Zhetysu regions, records for maximum monthly air temperatures were updated. The most significant positive anomaly (2.9 °C) was observed in East Kazakhstan oblast at MS Ust-Kamenogorsk.

#### Freezing

The maximum temperature drop to -9,0 °C was recorded on the night of September 28 in the Almaty region.

#### Atmospheric drought, summer soil drought and dry weather

Atmospheric droughts reached a duration of up to 79 days, most strongly manifested in the Turkestan region. Summer soil droughts covered the West Kazakhstan and East Kazakhstan regions with a duration of up to 51 days.

#### Increasing the water content of rivers

Rise in water levels were observed mainly in mountainous and foothill areas of East Kazakhstan and Almaty regions, in some cases exceeding dangerous levels. The most significant hydrological phenomenon was recorded on 18 August on the Kishi Almaty river (Small Almaty river) in Almaty, where the water level exceeded the critical mark (290 cm), reaching a value of 295 cm.

## Review of the advisory weather forecast for the winter season

Expected deviations of the average monthly air temperature from the norm in:

Expected deviations of the average monthly precipitation from the norm in:





January 2024



#### February 2025



Below the norm (≤ -1°C) Around norm (-0.9 °C ... +0.9 °C) Above the norm (≥ +1 °C)

# In the 2024/2025 winter season, a **warm winter** is expected, i.e. air temperatures above the climatic norm

February 2025



In the winter season of 2024/2025 precipitation **above the norm is expected**. Thus, in December and January, precipitation above the climatic norm is expected in the highland and mountainous regions of the country.

# Thank you for your attention!