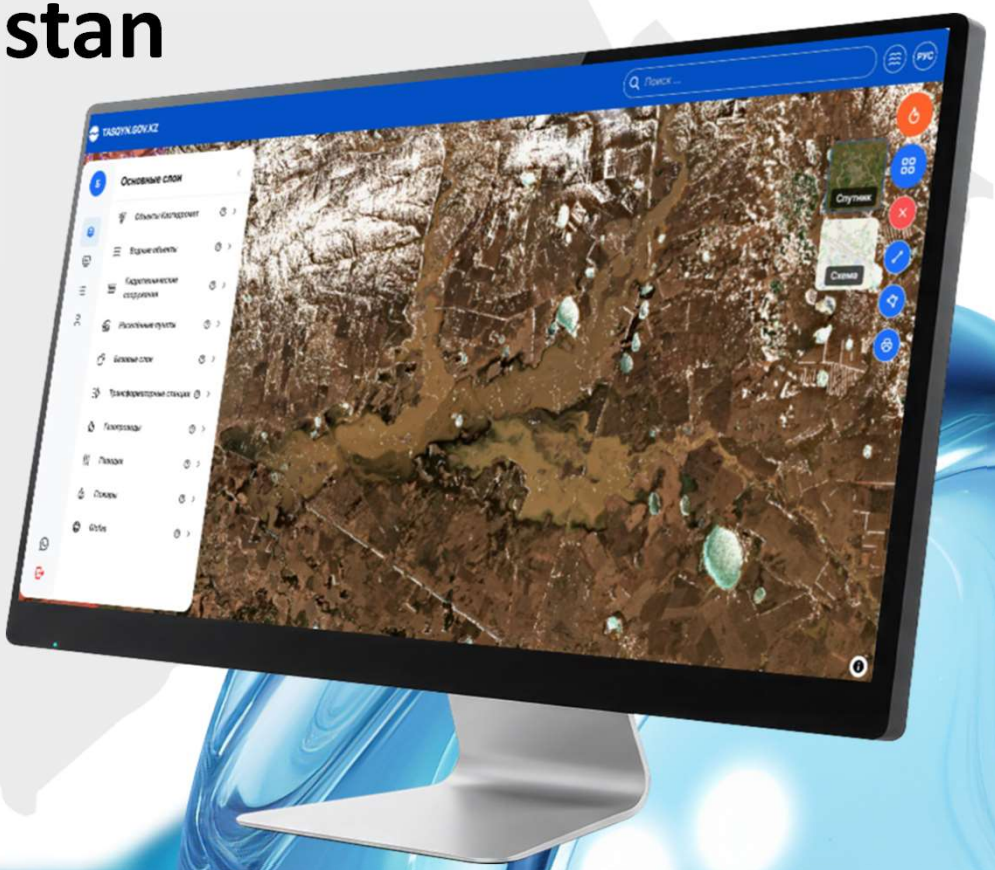
Information System “Tasqyn” - Flood Forecasting in Kazakhstan



Ms. Gulnara Bissenalina,
JSC “NC “Kazakhstan Gharysh Company”

Causes of Spring Floods in Kazakhstan

The territory of Kazakhstan is 2,724.9 thousand km2 (9th place in the world). The sharply continental climate causes extreme temperature fluctuations — from -40 °C in winter to +45 °C in summer.

In winter, a stable snow cover with a height of 10-20 cm in the south to 30-60 cm in the north and east of the country is formed in most of the territory of Kazakhstan, in some years in the northern regions the snow height can exceed 70-100 cm.

In most regions of Kazakhstan, the soil freezes to a depth of 0.8–2.5 m. Spring floods in the country are largely caused by deep freezing of the soil, which is why meltwater does not soak into the ground, but quickly forms a surface runoff, causing a sharp rise in river levels.

The main causes of spring floods:

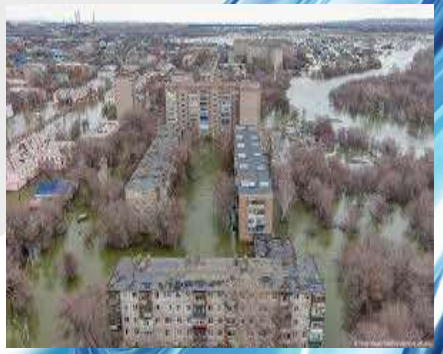
- Intense melting of snow cover
- A sharp increase in air temperature
- Spring precipitation
- Ice jams on rivers
- Flat terrain and weak drainage

Consequences of Spring Floods in Kazakhstan

Spring floods in Kazakhstan usually begin in March, peak in April and can last until May, especially in the northern and eastern regions.

The main consequences of the spring floods include the destruction of thousands of residential buildings, damage to infrastructure (roads, bridges, power lines), livestock deaths and damage to businesses, requiring enormous expenditures from the budget of the National Fund of Kazakhstan.

In 2024, spring floods in Kazakhstan became the largest in the last 80 years, causing damage estimated at 300 billion tenge ~ 630 million US dollars. More than 120,000 citizens were injured, and thousands of homes were destroyed.



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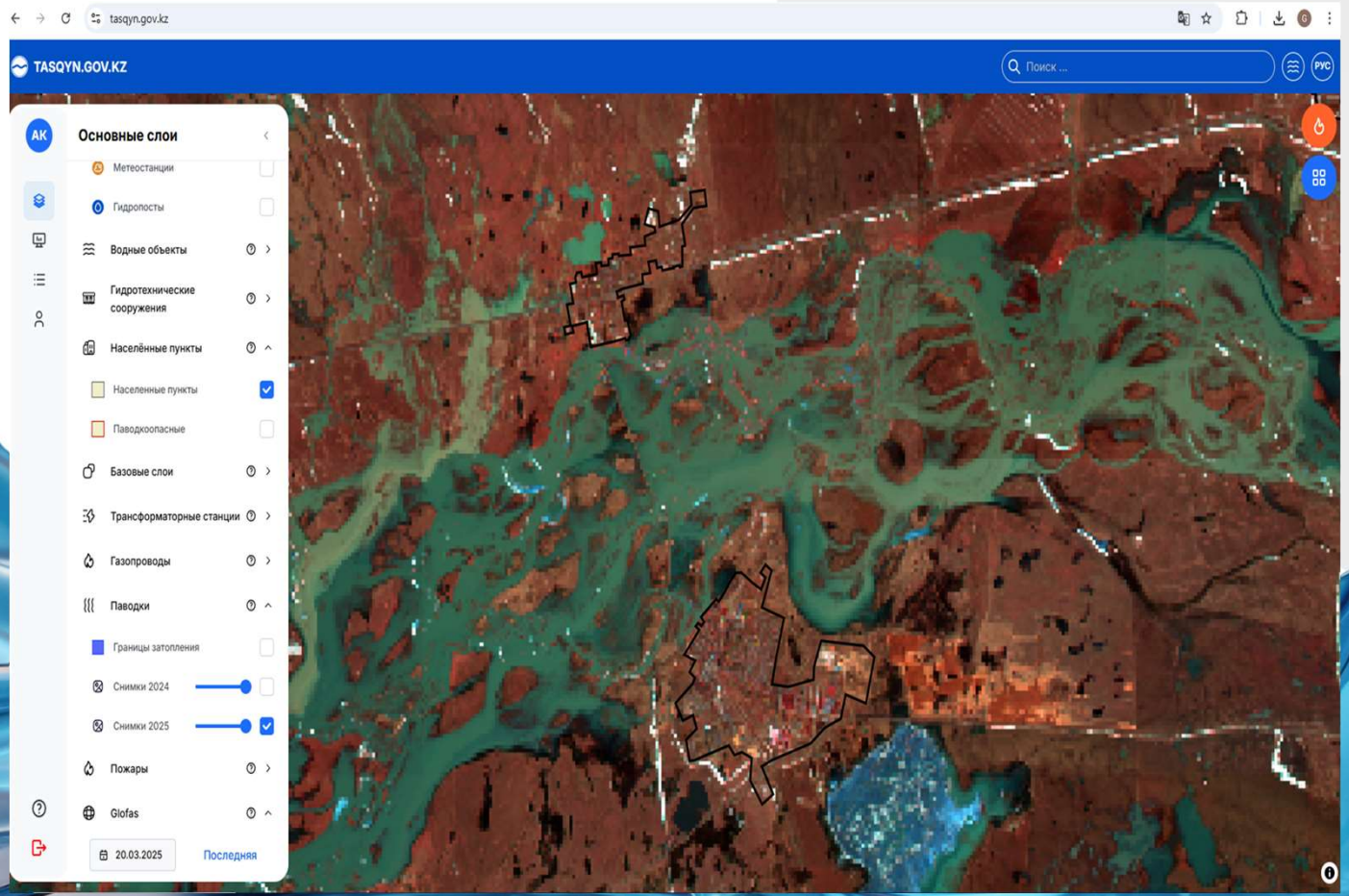
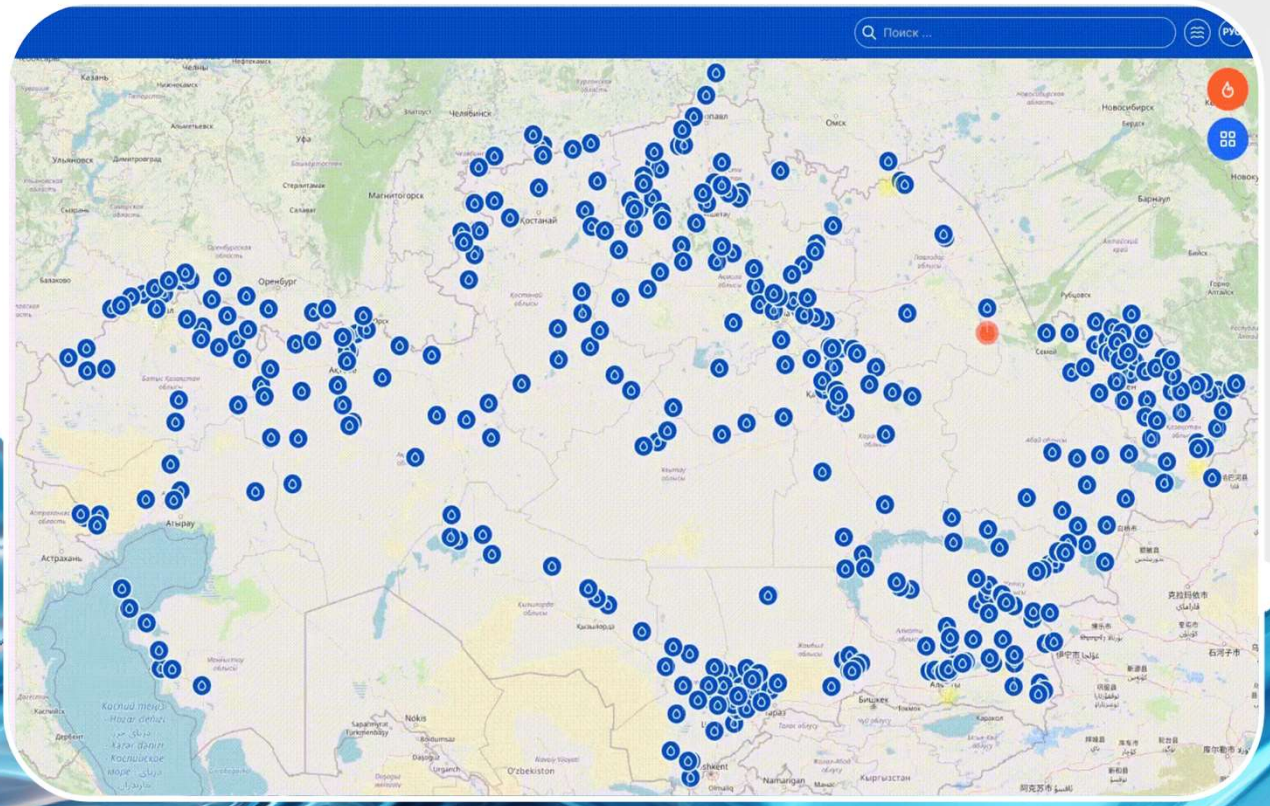


https://tasqyn.gov.kz/

Hydraulic posts of RSE "Kazhydromet"



A total of 377 hydraulic posts are published in the system

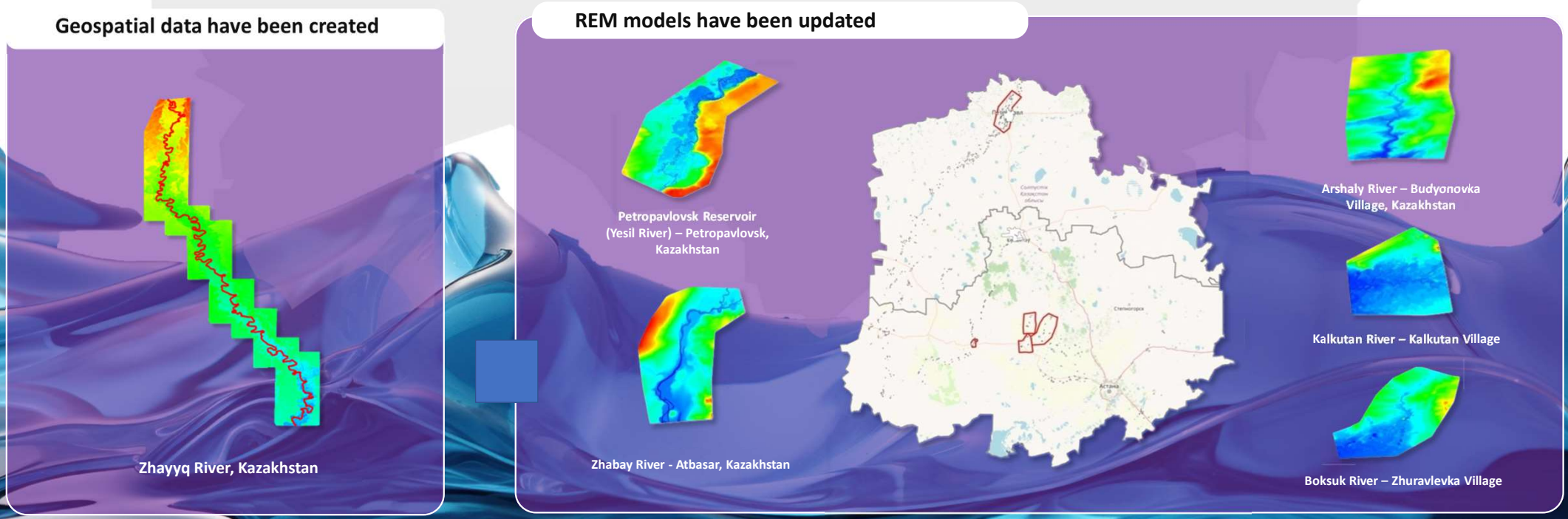
Measures to improve the input data for modeling

- Local executive authorities provide data on protective structures.
- RSE “Kazgeodesia” is working to improve the digital relief models used to display the heights of dams and embankments.
- RSE “Kazhydromet” is working to update the zeros of the hydraulic posts and the marks of dangerous water levels, as well as to adapt hydrological forecast models taking into account meltwater from the steppe.

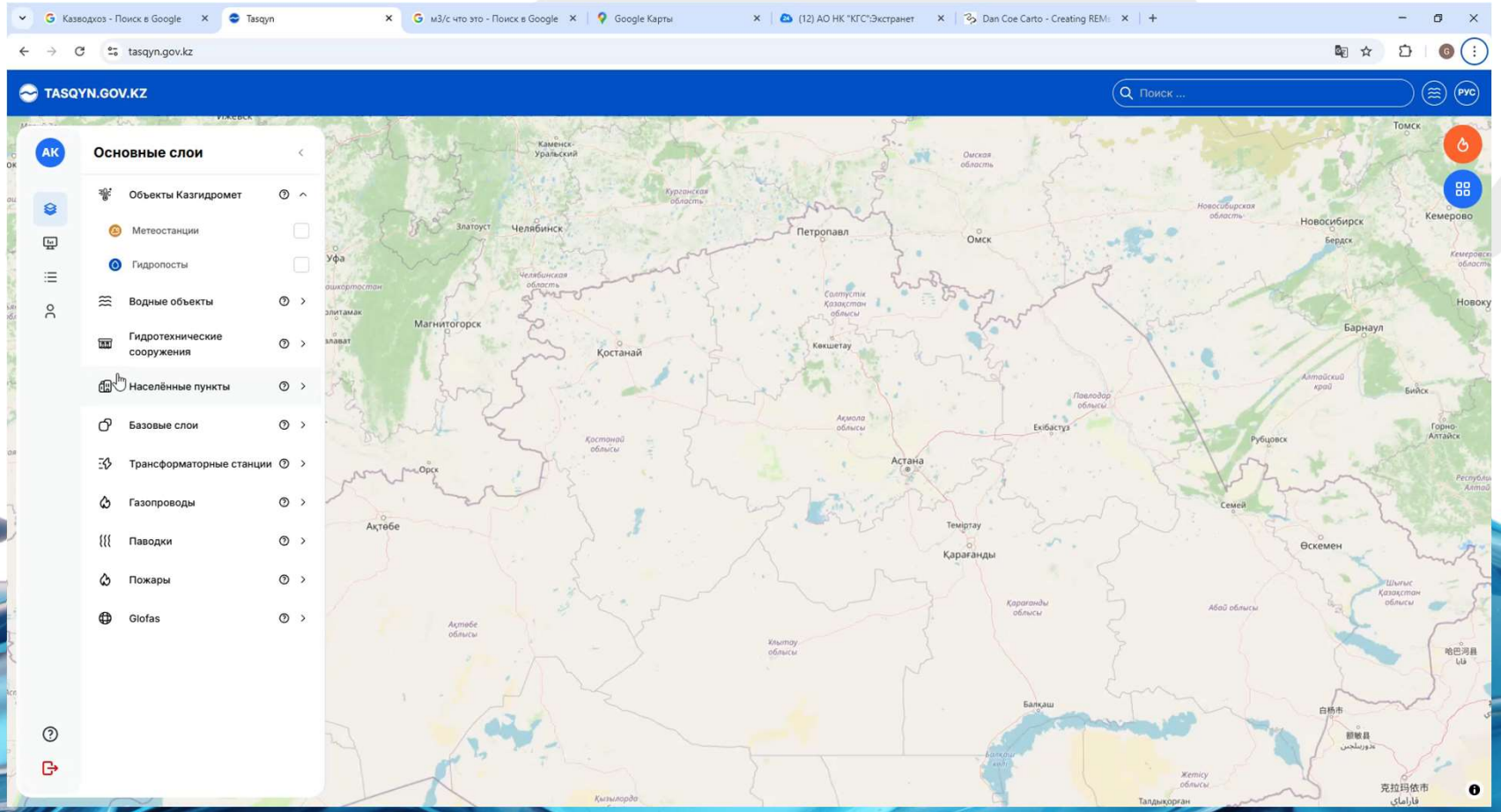
Measures to improve the modeling of flood zones

- The central axes of the predicted rivers have been digitized
- Work is underway to update and update flooding models in the most flood-prone regions of Kazakhstan based on improved digital terrain models

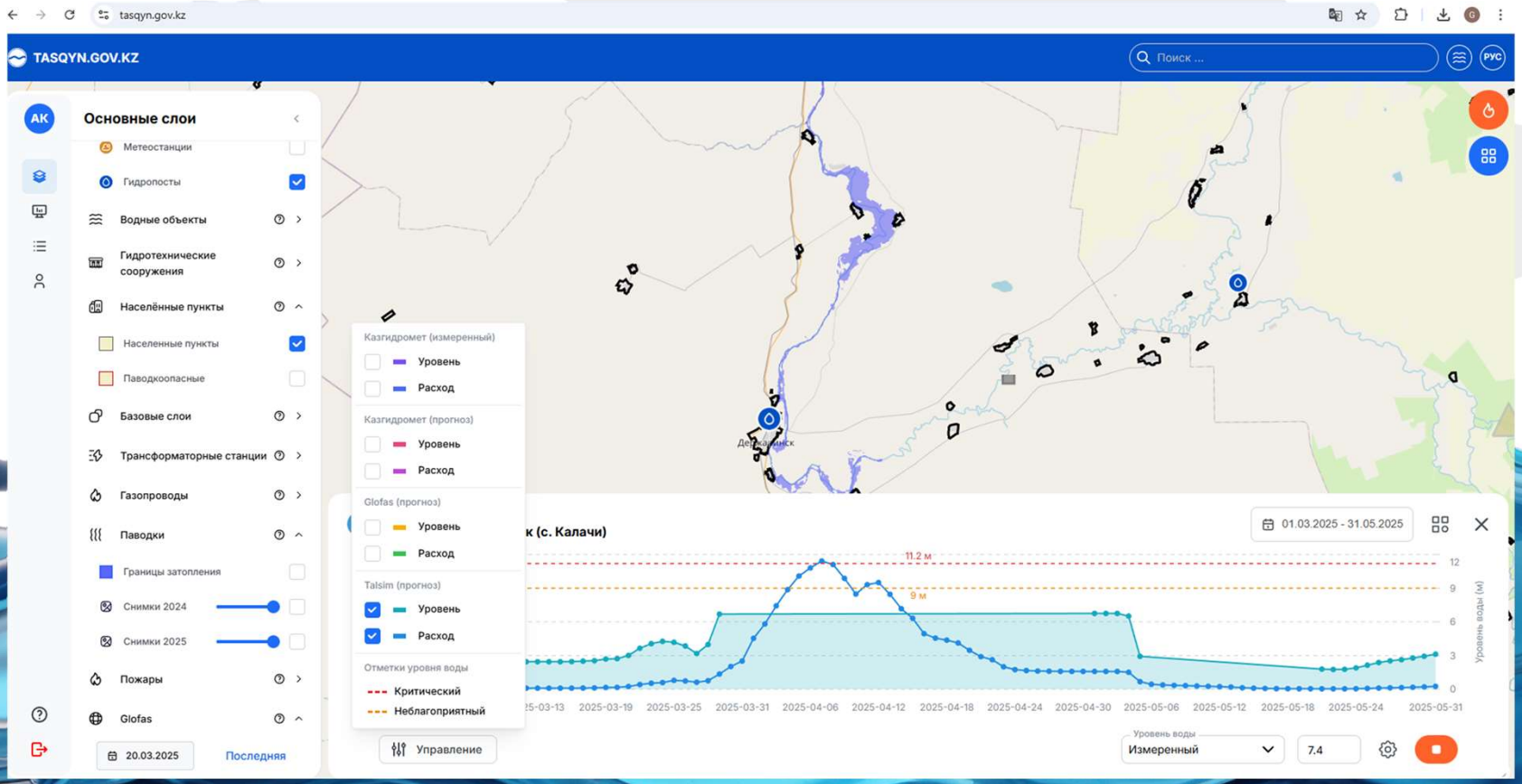
=> Instruction for Building a REM Model in QGIS: https://dancoecarto.com/creating-rems-in-qgis-the-idw-method. It is also possible to build a REM model using the Global Mapper software.



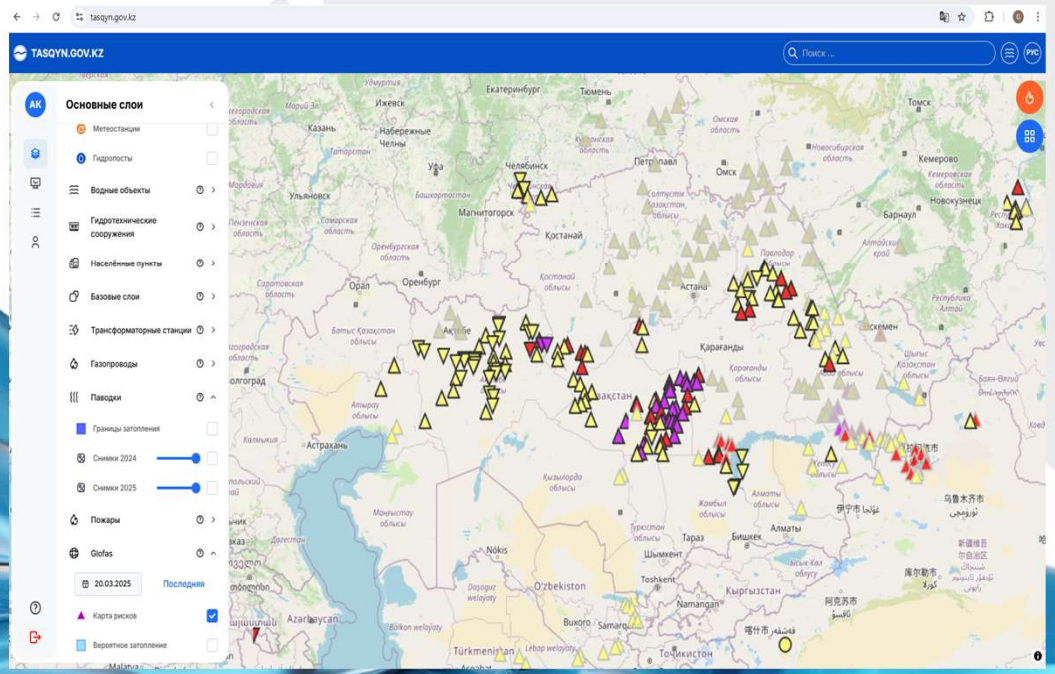
Spring Flood Modeling

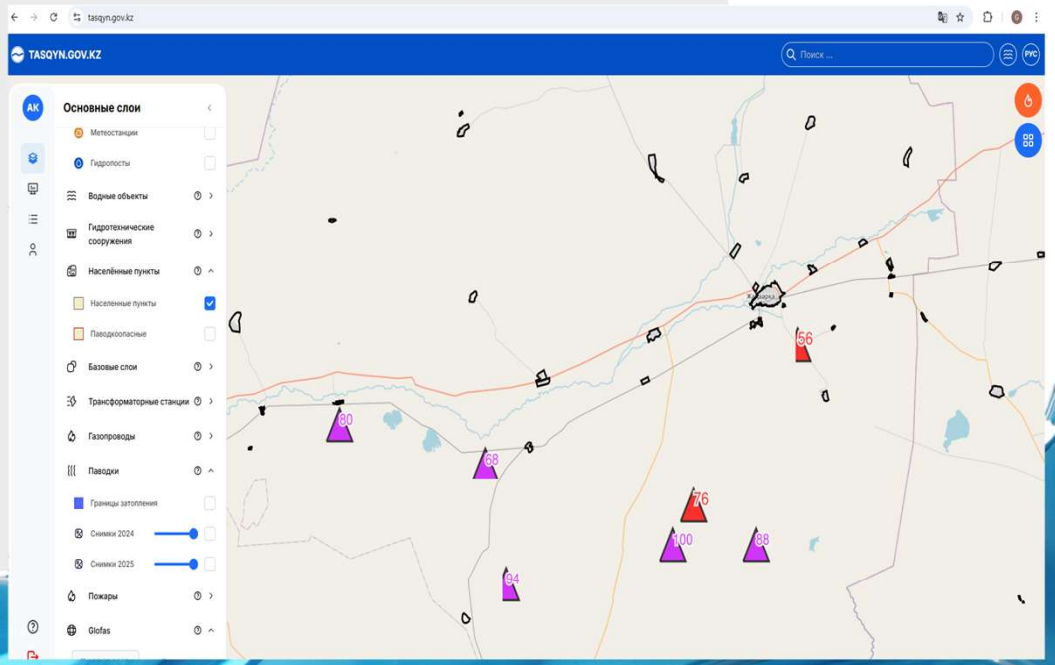


Forecast of river water consumption using Taslim SW

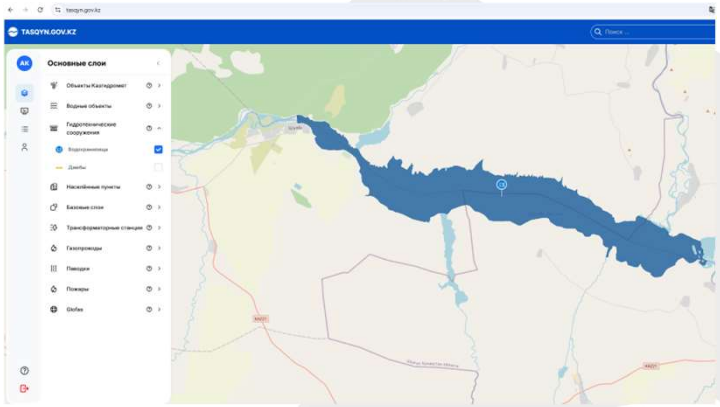


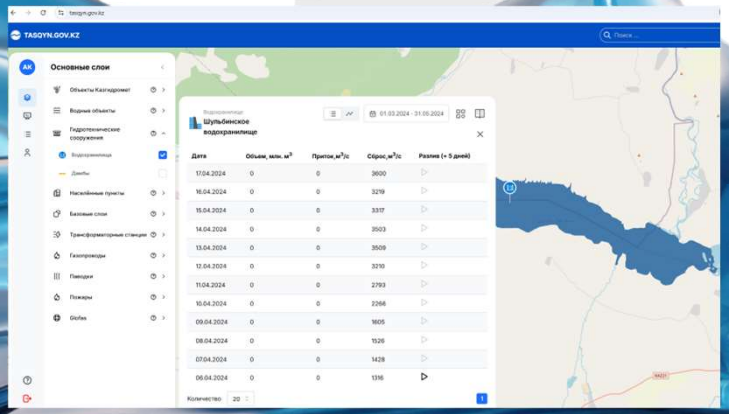
Integration of the Global GloFAS System into the “Taskyn” Information System

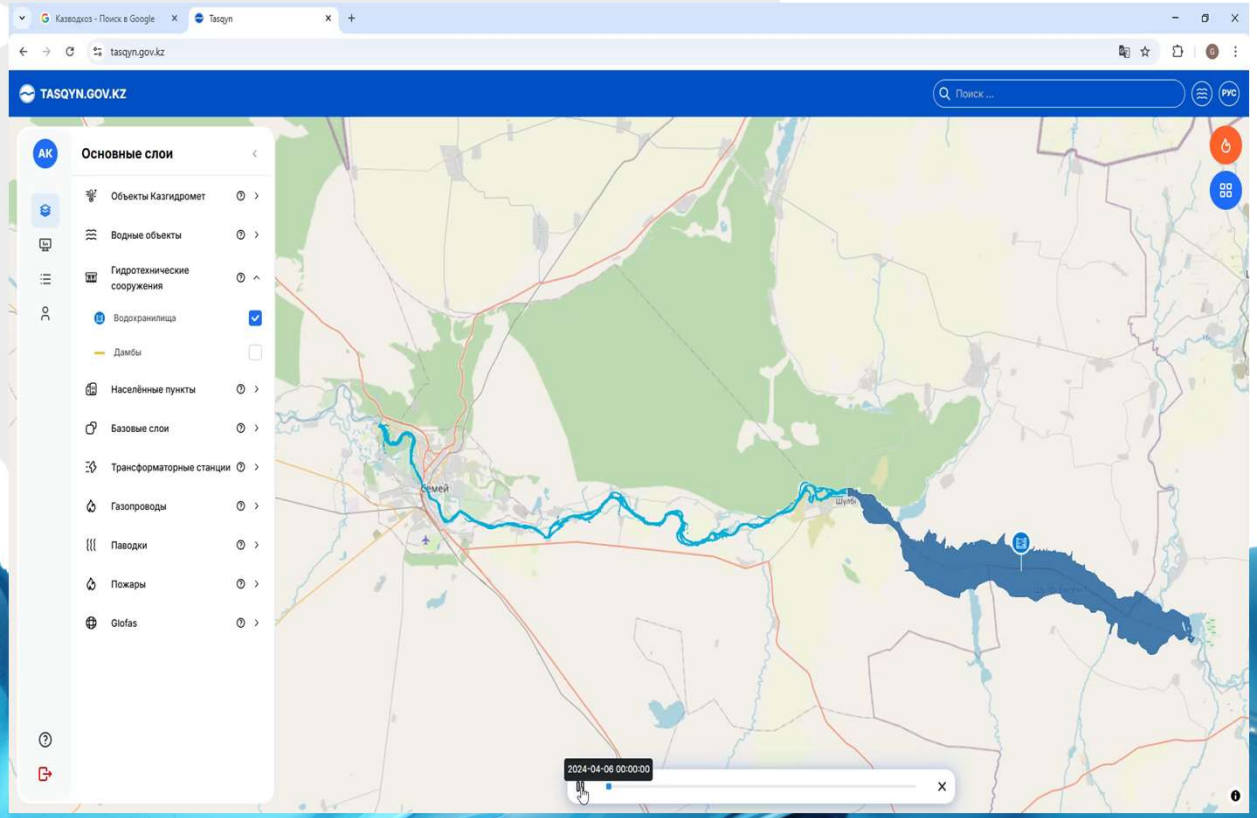




Modeling Based on Reservoir Water Releases from RSE “Kazvodkhoz”





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THANK YOU FOR ATTENTION

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