

Brief information about the project

Name of the project	AP15473166 «Assessment of climate change impact on water resources of the Ile-Balkhash basin area» (0122PK00933)
Relevance	<p>One of the main problems associated with climate change is its impact on water resources and the increase in hydrological extremes. According to forecasts, the number of extreme changes in climate indicators will increase significantly, especially in regions that are in difficult climatic conditions. Climate warming and precipitation change are expected to vary significantly from region to region. Climate change, changes in the frequency and intensity of extreme weather events are likely to have a major impact on natural and human systems. The semi-arid and arid regions of the world, which are already poor in water and face severe water management and food security challenges, are likely to be hit the hardest.</p> <p>In many ways, the Ile-Balkhash basin is threatened by the same complex factors. This region is an inland basin located on the border between Kazakhstan and China. The basin is less degraded than the famous Aral Sea and is subject to a unique set of increasing problems. These include the unusually rapid melting of glaciers that feed the basin, the rapid expansion of diversified, irrigation-dependent agriculture, the potential impact of China's Belt and Road Initiative on the entire basin, and political pressure to conserve the unique natural environment of Balkhash Lake.</p> <p>Analysis of the current state of the water resources of the basin against the backdrop of climate warming, identification and assessment of the development trend of changes in hydroclimatic processes are the methodological and practical basis for achieving sustainable water resources management in Central Asia and Kazakhstan. Considering the special role of water resources in the economic and social development of the country, a project is needed that considers the most important aspects of the impact of climate change on the water resources of the region, which determines the significance of the project.</p>
Purpose	Project goal - to analyze the spatial and temporal variability of the qualitative and quantitative state of the water resources of the Ile-Balkhash basin in the context of climate change for the sustainable management of land and water resources
Objectives	<p><i>Achievement of the project goal is planned by solving the following Objectives:</i></p> <ul style="list-style-type: none"> - to analyze long-term changes for 1960-2020 climatic indicators (temperature, precipitation, potential evaporation) of the region; - to analyze long-term changes for 1960-2020 river runoff in the basin and determination of the runoff change point; - to study changes in the glaciers of the basin over a long-term period (1960-2020) using remote sensing data;

	<ul style="list-style-type: none"> - to study anthropogenic activity in the basin, to identify the main sectors of the economy that affect the water resources of the region; - to carry out a runoff forecast and assessment of hydrological drought in the basin according to the CMIP5 RCP and CMIP6 RCP scenarios; - conduct basin water resource modeling to justification adaptation strategies and plans in the climate changing.
Expected and achieved results	<p><i>Expected scientific results for the whole project:</i></p> <ul style="list-style-type: none"> - changes in climatic indicators (temperature, precipitation, potential evaporation) of the region over a long-term period (1960-2020) will be analyzed and a trend map of climatic indicators for the Ile-Balkhash region will be compiled; - changes in the river runoff of the basin and its sub-basins over 60 years will be analyzed, and runoff change points will be determined; - changes in the size and volume of glaciation area in the basin over a long period (1960-2022) will be determined using remote sensing data; - the main sectors of the economy in the region that affect the qualitative and quantitative changes in the basin water resources will be identified, and a map of land use and land cover will be created; - the future state of water resources in the basin will be predicted and the impact of climate change will be assessed under projected future climatic conditions; - the main sources of uncertainty associated with the use of both hydrological and climate models will be identified and assessed. - modeling of the current and future state of the water resources of the basin will be carried out under the influence of the current and past state of the environment, observed climatic conditions and expected water consumption.
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List of publications with links to them	
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