MODERN CLIMATE OF CENTRAL ASIA. MAIN CHARACTERISTICS

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Abstract

The article is devoted to the impact of general climate change on Central Asia and environmental changes in the region. Central Asia is characterized by various local climatic conditions. However, all climatic conditions have a common main regional characteristic - sharp continentality, characterized by a sharp amplitude of air temperature fluctuations during the year and a small amount of precipitation with the development of desert and semi-desert landscapes in the central and southern parts, as well as steppe in the north.

Keywords: Climate change, Central Asia, ecology, weather, hydrological risks, meteorology

Introduction

Central Asia, surrounded in the south and southeast by high mountains and wide plains, having an orthographically complex region (circumference: 50–35° N and 50–85° N), is characterized by local climatic conditions of different areas. However, all climatic conditions have a common main regional characteristic - sharp continentality, characterized by a sharp amplitude of air temperature fluctuations during the year and a small amount of precipitation with the development of desert and semi-desert landscapes in the central and southern parts, as well as steppe in the north. All local climates of Central Asia can be divided into three types: the climate of the middle zone (approximately 41–42° south of north latitude); the climate of the dry subtropical zone (41–42 N); The climate of the Tien Shan, Pamir-Aloi and Pamir-Kopet is well developed in the upper belt.

All three climate types are caused by incident solar radiation, physical and geographical conditions of the area and atmospheric movements [1].

Every year, more than 3 million people in Central Asia suffer from hurricanes, floods, landslides and earthquakes. As temperatures rise, floods and flash floods due to melting glaciers and loss of valuable water resources are expected in the republics of Kazakhstan, Kyrgyzstan, Turkmenistan, Uzbekistan and Tajikistan in about ten years. At the same time, the average temperature in the region in the summer months remains above 300C, which causes frequent droughts. For example, in Tajikistan by the end of the last century, the probability of drought due to climatic factors increased by more than 30%. In Kazakhstan, over the next 20 years, the population will be exposed to extreme river floods by 72% [2, 30].

What Central Asian countries need to do to prevent such a situation is a number of measures that have been taken in recent years: in addition to measures to adapt to

climate change, improve disaster preparedness through investments in sustainable and green infrastructure, and address issues related to transboundary natural disasters, they need to strengthen regional cooperation. They also need information and data for decision-making [3, 4, 29].

Over the past four years, the World Bank and the Global Facility for Disaster Reduction and Recovery (GFDRR) have been helping to build the region's resilience through EU-funded disaster risk reduction and financial stabilisation programmes. The programme has undertaken a regional disaster risk assessment, which has produced a range of data and reports on earthquakes, landslides and floods. This information enables decision makers to develop disaster prevention and preparedness measures to protect people, economies and infrastructure from climate and disaster risks in general [5].

In 2023, Asia remained the region with the highest number of natural disasters related to climate, weather and hydrological hazards. According to a new report by the World Meteorological Organization, the place that stands out for major climate disasters, a large number of victims and economic losses are Asian countries, in addition to extreme climate warming, temperatures exceeding 45 degrees for up to 3 months a year worsen the situation [6, 28]. In Asia, warming is occurring faster than in other regions of the world: from 1970 to 2010, it almost doubled. In most countries of the region, the spring-summer months of 2023 turned out to be the hottest in the entire observation period. Also, due to high temperatures in this region, droughts and heat waves occurred in some regions, and floods and landslides in some regions caused great damage to the economy [10, 7].

According to the International Disaster Database, a total of 79 regional hydrometeorological disasters occurred in Asia in 2023. More than 80% of them were caused by floods and strong winds, resulting in more than 2,000 deaths and 9 million direct impacts (no reports) [8, 9]. According to regional hydrometeorological centers, the temperature in Central Asian countries has increased by two degrees Celsius compared to other regions of the world. This means that it is almost twice as high as in most countries of the world. Thus, Central Asia is one of the main hotspots of global warming. Our region has been suffering from an average increase in temperature since the 1990s, and forecasts show that the temperature increase will only worsen [11].

According to observations made in the period 1980-2022, the number of very hot days per year in the five republics of Central Asia is on average 57 days (temperature above 30 degrees), but according to the extreme scenario According to the development of events, the number of very hot days by 2100 will be on average 120. It is a day. For example, in Uzbekistan, the air temperature does not fall below 300 C for 5 months of the year. Having no access to the sea, Central Asia is highly dependent on available water resources. Most rivers are saturated with water due to melting snow and flow into local lakes, and not into the ocean [12]. Climate change will contribute to changes in annual and seasonal water flow. In the northern regions of the region, positive changes in the amount of river water are observed; flooding of river beds in recent years has begun very early (from the first month of spring) [13].

For example, the Kafirnigan River, which flows through the republics of Uzbekistan and Tajikistan, receives its water mainly from snowmelt in the mountains. Between 1950 and 2100, the average annual snowmelt here is projected to decrease. The extreme (RCP 8.5) scenario predicts a decrease in snowmelt to 300 mm by 2100, meaning that the water saturation of this river will be halved as a result of future temperature increases. This situation is applicable to all regions of Central Asia [14]. Most glaciers in the region have been losing mass since the 1960s. The expected loss of glacier mass by the end of the century will be 50%. Glacier melting is projected to increase by mid-century, but as a result of the reduction in glacier area and mass, the melting process will slow down sharply by 2050, and the water deficit in the region will increase. reach a critical state. Currently, the Central Asian region is the region that is most affected by climate change associated with water shortages, soil degradation and natural disasters [15, 16, 27].

According to Zafar Makhmudov, Director of the Central Asia Regional Environmental Center, "Central Asia is very sensitive to adverse impacts, given its agrarian economy, aging infrastructure and rapidly growing population." In such circumstances, the need for improved regional cooperation in energy and water management, and approaches to climate change adaptation becomes obvious. Climate change should be seen as the most pressing issue of our time in Central Asia, and all countries in the region can work together to find a solution. At the same time, a wide range of issues must be addressed: from the adoption and implementation of "green" policies to financing and investing in renewable energy sources, to sustainable agriculture and natural resource management. Tatyana Proskuryakova, World Bank Regional Director for Central Asia, noted: "... the project we approved provides for financing priority investment projects that are important for the people of Central Asia, and the results of the analysis and recommendations are communicated to representatives of the governments of Central Asian countries and important environmental projects in the region. We are trying to find solutions to the problems..." The ultimate goal of this project is to prepare national strategies, policies and investment plans on climate change and sustainability [18,19].

By 2050, the water flow in the Amu Darya River basin will decrease by 60% compared to the average flow over the past 10 years, while the spring flow will remain high, and by the summer months the flow will decrease dramatically, since As a result, if floods occur in the spring months, then droughts will begin during the summer growing season. As a result of the melting of perennial glaciers in the mountains, floods and landslides occur in the foothills [17, 23, 25]. The main feature of the climate of Central Asia is its sharp continentality, a large number of sunny days, very high temperatures in the summer months, a large amount of thermal resources and severe drought [20, 21, 22].

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