INTENSIFICATION OF FLOOD EVENTS IN THE CONDITIONS OF GLOBAL CLIMATE CHANGE AND ISSUES OF THEIR PREVENTION

Dotsent. Adilova Ozoda Amonovna
Student. Khudoyberdiev Shokhrukh
JIZAKH STATE PEDAGOGICAL UNIVERSITY
Uzbekistan.Jizzakh.Sh.Rashidov Street, 4

Annotation. This article discusses the intensification of flood events in the conditions of global climate change, their main causes and consequences, and some aspects of combating them.

Keywords. Flood, ecology, anthropogenic, global, intensive, climate change, satellite, geothermal, toponymic, structure, colloidal, turbidity, FVV, erosion, green zone.

ИНТЕНСИФИКАЦИЯ НАВОДНЕННЫХ ЯВЛЕНИЙ В УСЛОВИЯХ ГЛОБАЛЬНОГО ИЗМЕНЕНИЯ КЛИМАТА И ВОПРОСЫ ИХ ПРЕДУПРЕЖДЕНИЯ

Доцент. Адилова Озода Амоновна
Студент. Худойбердиев Шохрух
ДЖИЗАКСКИЙ ГОСУДАРСТВЕННЫЙ ПЕДАГОГИЧЕСКИЙ УНИВЕРСИТЕТ
Узбекистан.Джизак.Улица Ш.Рашидова, 4

Аннотация. В статье рассматривается интенсификация паводковых явлений в условиях глобального изменения климата, их основные причины и последствия, а также некоторые аспекты борьбы с ними.

Ключевые слова. Паводок, экология, антропогенный, глобальный, интенсивный, изменение климата, спутниковый, геотермальный, топонимический, структура, коллоидный, мутность, ФВВ, эрозия, зеленая зона.

Introduction. Climate change directly affects the intensification of flood events. A flood is a natural disaster that occurs as a result of water flowing from the ground or other environments and flowing out of its usual place or accumulating in very large quantities. The intensification of floods is not only related to natural factors, but also to

the influence of anthropogenic factors. Below we will consider the main factors influencing the intensification of floods.

In recent decades, we have often come across statistics and sources that global climate change and its effects are becoming an increasingly serious issue on a global scale. These changes are causing not only an increase in gases in the atmosphere, but also an intensification of many natural disasters, including floods. Factors such as global warming, increased rainfall, and poor organization of agricultural and urban infrastructure lead to the intensification of floods, their frequent occurrence, and damage to the lives and property of many people.

Increased and intense rainfall. Due to global climate change, heavy rainfall and short-term strong water flows have increased. As the temperature of the atmosphere increases, the air holds more moisture, which increases the intensity of rainfall. This leads to the appearance of intensive flash floods.

Accelerated snowmelt. With climate change, rapid snowmelt is observed in mountainous areas. This phenomenon causes unexpected and strong water flows into rivers, which causes floods. Especially in early summer and spring, increased snowmelt causes an increase in floods in mountainous areas.

Soil erosion and deterioration of urban infrastructure. The deterioration of soil conditions and improper planning of urban infrastructure also lead to an increase in flood events. Deforestation, soil compaction, loss of natural drainage systems, and road construction in urban areas reduce the ability of soil to retain water and accelerate flash floods.

Flood events often occur in mountainous and riverine areas. These areas are naturally prone to accumulating fluids, and climate change can disrupt their natural balance. Changes in natural conditions, for example, affect the growth of forests and vegetation, which increase erosion. A mudflow is a pulsating, intermittent flow that moves at high speed for a short period of time (from 10 minutes to 2-3 hours), is highly saturated with rock fragments (60-75%) and has a high destructive force. According to the composition of the solid product that forms it, mudflows are divided into mudflows, rock-mudflows, water-rockflows, and water-sandflows. In recent years, the first three types of flows have been studied as structural (connected) and turbulent flows. The main part of the structural flow is clay (10-30%) and dust particles. According to S.M.

Fleishman, water occurs in the form of adsorption films around rock particles or is squeezed between pores. Thus, structural mud appears in the form of a soft plastic medium and moves independently with hard rocks. Structural mud, due to the very high bonding strength between colloidal particles, has the ability to transport and discharge large volumes of gravel in its composition. [1]

The area of \u200b\u200bthe basins where mudflows are formed and have a destructive effect in the Republic of Uzbekistan is 53,770 km², which is 12% of the territory of the republic [2,3,4]. Mudflows occur mainly in the republic's border areas with Kyrgyzstan and Tajikistan. A mudflow is a stream of water flowing down a mountain along with a large amount of rocks, sand, and soil. It can be caused by regular rainfall (85% of cases), melting mountain snow (4% of cases), erosion of the banks of mountain water bodies, reservoirs, and frozen water bodies (1.3% of cases), and other reasons (9.7% of cases). A large-scale and high-speed mudflow destroys all buildings, residential houses, hydraulic structures in its path, and destroys agricultural crops and gardens. It kills people and animals. The onset of mudflows occurs in April and May, during which period heavy rainfall is observed in mountainous and foothill areas. Recommendations for the movement of the population during a flood hazard

- Everyone living in areas at risk of flooding should be aware of the location of their home or farm in the flood zone and must strictly follow the instructions for protection from floods and landslides issued by Uzgidromet, the Emergency Situations Service, and representatives of local authorities.

- The passage of a mudflow and its consequences can cause significant material damage and endanger people's lives and health (there have been several cases of people dying as a result of floods). The social and economic impacts of floods have serious consequences that cannot be directly measured. People's lives and property, infrastructure, agriculture, industries and transport systems are affected by the impact of floods. Let's consider some of the main social and economic impacts:

Damage to human life and health. The large number of victims and injuries caused by floods negatively affect their social development. As a result of frequent floods, people become homeless, they are temporarily displaced or resettled in safe areas.

Agriculture and resources. Floods can significantly damage agriculture. Field crops, agricultural structures and products are damaged. Floods cause food shortages and a decrease in economic activity in rural areas.

Destruction of infrastructure. In urban and rural areas, roads, bridges, power lines and other critical infrastructure are damaged. This has a negative impact on economic development and requires significant time and resources for full recovery.

Ecotourism and transport slowdown. Flood events severely impact tourism and transport systems. Private sector activities in the ecotourism sector are disrupted, and economic losses are incurred as a result of damage to transport routes.

Strategies for preventing and combating floods. To reduce the negative impacts of floods and prevent them, it is necessary to develop scientifically based strategies to combat climate change. The following methods and measures can be used:

1. Ecological restoration and forest conservation. Preventing deforestation, ecologically sound management of croplands, and soil protection play an important role in reducing floods. Implementing ecological projects to increase renewable natural resources, such as vegetation and prevent erosion processes.

2. Improving water management and infrastructure. It is necessary to build dams and water storage systems on rivers, introduce advanced drainage systems to manage water flows. In addition, it is necessary to harmonize urban infrastructure with natural drainage systems and create green spaces in urban areas.

3. Early warning systems. To prevent floods, it is necessary to create free warning systems based on modern technologies, develop rapid response and evacuation systems. People in areas where floods are likely to occur should be warned based on accurate forecasts.

4. Global and local cooperation. To combat climate change on a global scale, it is important to strengthen international cooperation and inform the public at the local level. In combating natural disasters, it is necessary to strengthen cooperation between governments, scientific societies, environmental activists and civil society.

One of the most effective methods for preventing floods is to restore and improve natural drainage systems. This includes maintaining the natural drainage capabilities of the soil, which allows water to accumulate or flow into the ground.

• Increase soil solubility. To increase the water-holding capacity of the soil, it is necessary to cultivate the soil, apply composts and plant plants.

• Prevent soil erosion. To prevent erosion, take a number of ecological measures, such as planting plants, mulching, and basing agriculture on natural systems. Forests play an important role in strengthening the soil and ensuring that water is quickly absorbed into the ground. By preventing deforestation and planting new ones, floods can be prevented.

• Protect forests. Strengthen laws against deforestation and develop practical measures.

• Expand green zones. Create more green spaces in urban and rural areas, development of agriculture integrated with forests. It is necessary to take into account natural drainage systems when planning urban infrastructure and construction. New construction and existing infrastructure should include innovative methods aimed at preventing floods.

• Improving urban drainage systems. Creating drainage systems that quickly remove water and do not block. With climate change, rapid snowmelt is increasing, which increases water flows. The following measures should be taken to manage snowmelt:

It is necessary to strengthen social systems to reduce flood risk. Creating early warning systems and rapid response systems to emergency situations will help reduce the consequences of floods.

• Developing early warning systems. Using modern technologies in areas prone to flooding, sending warnings via mobile phones.

Rapid evacuation systems. Establishing a system for rapid evacuation of people in the event of a flood. Also, train people in emergency actions. It is necessary to prepare the public and special services against floods. Teaching people how to act in emergency situations plays an important role in ensuring their safety. Preparing the population for floods, organizing regular training for emergency services personnel

To manage and prevent floods, it is necessary to use advanced scientific and technological approaches:

• Use of GPS and satellite systems. Use of satellite systems to monitor river systems and monitor changes in the earth's surface in the fight against floods.

• Artificial intelligence and (big data) technologies. Creation of artificial intelligence-based systems for early identification and forecasting of areas prone to floods.

The use of satellite systems is understood as the process of observing and monitoring weather conditions, natural disasters and other important geophysical processes on the earth's surface using artificial satellites (satellites). Satellite systems are used to collect, analyze and forecast high-precision data.

There are several main areas of application of satellite systems:

Weather and climate monitoring. Satellites monitor many parameters such as humidity, temperature, air pressure in the atmosphere. This makes it possible to detect climate changes and provide early warning of rain, snow, strong winds or other natural disasters. Areas and times at risk of flooding are identified.

River and water resource monitoring. Satellites can monitor river levels, dam conditions and water flow intensity. When the water level in rivers increases or when water accumulates in front of dams, it is possible to provide forecasts about the risk of flooding.

Monitoring soil erosion and forests on the surface of the earth. Satellites monitor the condition of forests, changes in the surface of the earth, and environmental conditions such as soil erosion. This information can be used to detect natural changes on the earth early and take measures against them.

Emergency forecasting. Satellites are used to predict natural disasters, including floods, hurricanes, fires and earthquakes. Satellites provide rapid and accurate information about any changes occurring on the earth's surface.

Geometric and toponomic data from satellites. Satellites provide geographic information about locations, such as measurements, areas, and features on the earth's surface. They are used to collect location, infrastructure, and other information in areas that are necessary for flood prevention.

Advantages of satellite systems. Satellites provide high-resolution images and data, which makes it easier to predict natural disasters in advance. Satellite systems provide images and data in real time, which makes it possible to take rapid measures. Satellites allow for simultaneous observation of large areas around the world, so complete information about natural disasters can be obtained on a global scale. Thus,

satellite systems serve as an important tool for predicting natural disasters in advance, reducing their impact, and effectively managing resources.

Conclusion. Therefore, a comprehensive approach is necessary to prevent natural geographical processes, and of course, it is important to implement such measures to prevent floods. It is considered that floods can be prevented and their negative impacts reduced by ecological restoration, infrastructure improvement, introduction of high technologies, establishment of floodplains, preparation and early warning systems. All these are negative impacts of climate change.

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