

International economic and social geographical problems of global climate change

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Annotation: Nowadays, global climate change is being widely studied on a global scale. Today, global climate change is being observed on Earth. The average temperature of our planet has increased by one degree over the past thirty years. New species of insects and pests have emerged. This is causing significant problems, which are also reflected in international relations. Therefore, this article examines the causes of climate change, which, among other issues, is linked to human interference with nature throughout its existence. Deforestation, plowing land, land improvement, and similar activities lead to changes in humidity and wind conditions. Such considerations may attract attention and contribute to the scientific novelty of the topic.

Keywords: global climate change, environmental problems, Holocene epoch, UN convention, industrial sectors.

Международные экономические и социально-географические проблемы глобального изменения климата

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Аннотация: В настоящее время глобальное изменение климата широко изучается в глобальном масштабе. Сегодня на Земле наблюдается глобальное изменение климата. За последние тридцать лет средняя температура на нашей планете повысилась на один градус. Появились новые виды насекомых и вредителей. Это создает значительные проблемы, которые также отражаются на международных отношениях. Поэтому в данной статье рассматриваются причины изменения климата, которые, помимо прочего, связаны с вмешательством человека в природу на протяжении всего ее существования. Вырубка лесов, распашка земель, мелиорация и аналогичные мероприятия приводят к изменению влажности и ветрового режима. Такие соображения могут привлечь внимание и внести вклад в научную новизну темы.

Ключевые слова: глобальное изменение климата, экологические проблемы, эпоха голоцена, конвенция ООН, промышленные отрасли.

Global iqlim o'zgarishining xalqaro iqtisodiy va ijtimoiy-geografik muammolari

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Annotatsiya: Hozirgi vaqtda global iqlim o'zgarishi global miqyosda keng o'rganilmoqda. Bugungi kunda yer yuzida global iqlim o'zgarishi kuzatilmoqda. So'nggi o'ttiz yil ichida

sayyoramizdagi o'rtacha harorat bir darajaga ko'tarildi. Hasharotlar va zararkunandalarning yangi turlari paydo bo'ldi. Bu xalqaro munosabatlarda ham aks etadigan muhim muammolarni keltirib chiqaradi. Shu sababli, ushbu maqolada iqlim o'zgarishining sabablari ko'rib chiqiladi, ular boshqa narsalar qatori insonning butun hayoti davomida tabiatga aralashuvi bilan bog'liq. O'rmonlarni kesish, erni shudgorlash, melioratsiya va shunga o'xshash tadbirlar namlik va shamol rejimining o'zgarishiga olib keladi. Bunday mulohazalar e'tiborni jalb qilishi va mavzuning ilmiy yangiligiga hissa qo'shishi mumkin.

Kalit so'zlar: *global iqlim o'zgarishi, ekologik muammolar, holotsen davri, BMT konvensiyasi, sanoat tarmoqlari.*

INTRODUCTION. If we talk about the causes and consequences of global climate change, our planet's geological age is estimated to be around 4.5 billion years. Over this period, the Earth has undergone fundamental transformations. The composition of the atmosphere, the planet's mass, and the climate - everything was entirely different at the beginning of life. The bright sphere gradually evolved into the form we see today. As the planet slowly cooled, seas and oceans appeared. Continents emerged and disappeared, their shapes and sizes changed. The Earth began to rotate more slowly. Initially, primitive plants appeared, followed by life itself.

As a result, over the past billion years, our planet has experienced dramatic changes in moisture circulation, heat exchange, and atmospheric composition. Climate change has occurred throughout the entire history of the Earth.

The Holocene is part of the Quaternary period of the Cenozoic era. In other words, it began around 12,000 years ago and continues to the present day. The Holocene started at the end of the last Ice Age, and since then, climate change has been counteracting previous climate fluctuations. This period is often referred to as an interglacial phase because, throughout the Earth's climatic history, there have already been several ice ages.

The last major global cooling occurred around 110,000 years ago. About 14,000 years ago, the planet gradually began to warm up. The glaciers that covered much of the Northern Hemisphere started melting and collapsing. Naturally, these changes did not happen overnight. For a long time, the planet experienced strong temperature fluctuations, with glaciers advancing and retreating multiple times. All of this significantly impacted global sea levels.

Through extensive research, scientists have divided the Holocene into several climatic periods. Around 12,000 to 10,000 years ago, glaciers retreated, marking the beginning of the postglacial period. In Europe, tundra disappeared and was replaced by birch, pine, and mountain forests. This time is referred to as the Arctic and Subarctic period.

Following this, the Boreal period began. The taiga expanded, pushing the tundra further north. Vast forests spread across southern Europe. During this time, the climate was generally cool and dry.

Around 6,000 years ago, the Atlantic period began, characterized by warm and humid conditions, significantly warmer than today. This period is considered the climatic optimum of the Holocene. Half of Iceland's territory was covered with birch forests. Europe saw an increase in heat-loving plant species. Meanwhile, temperate forests extended much further north. Dark coniferous forests grew along the Barents Sea coast, reaching as far as Cape Chelyuskin. In what is now the Sahara Desert, there were savannahs, and the water level of Lake Chad was 40 meters higher than today.

Later, climate changes occurred again. A cooling phase lasting approximately 2,000 years followed. This period is known as the Subboreal. Glaciers reappeared in Alaska, Iceland's mountain ranges, and the Alps. Landscapes shifted closer to the equator.

Around 2,500 years ago, the final phase of the modern Holocene known as the Late Atlantic period began. The climate during this period became cooler and increasingly unpredictable.

Grasslands started to spread, tundra gradually encroached upon forests, and forests, in turn, gave way to deserts.

Around the 14th century, a cooling trend began, leading to the Little Ice Age, which lasted until the mid-19th century. During this time, glacial expansion was recorded in Northern Europe, Iceland, Alaska, and the Andes mountain ranges. However, climate changes were not synchronized worldwide. The exact causes of the Little Ice Age remain unknown. Scientists suggest that volcanic eruptions and a decrease in atmospheric carbon dioxide concentration may have contributed to the cooling.

The first meteorological stations were established in the late 18th century. Since then, continuous climate monitoring has been conducted. It is now reliably confirmed that the warming trend, which began after the Little Ice Age, has continued to the present day.

Since the late 19th century, a rise in the global average temperature of our planet has been recorded. In the mid-20th century, there was a slight cooling period, but it did not significantly impact the overall climate trend. By the mid-1970s, temperatures began to rise again. According to scientists, the Earth's global temperature has increased by 0.74 degrees Celsius over the past century, with the most significant rise occurring in the last 30 years.

Climate change affects the state of the world's oceans. The increase in global temperatures leads to the expansion of water, which in turn raises sea levels. Changes in rainfall distribution are also observed, which can affect river flows and glacier movements.

Observations indicate that over the past 100 years, the global sea level has risen by 5 cm. Climate scientists associate global warming with an increase in carbon dioxide concentration and a significant intensification of the greenhouse effect.

Factors Influencing Climate Change

Scientists have conducted numerous archaeological studies and concluded that the Earth's climate has changed multiple times throughout history. Various theories have been proposed to explain these changes. One hypothesis suggests that if the distance between the Earth and the Sun remained constant, along with the planet's rotation speed and axial tilt, the climate would remain stable. However, climate change is influenced by several external factors:

1. Changes in Solar Radiation – Variations in solar energy output affect the Earth's radiation balance.
2. Tectonic Plate Movements – These alter Earth's topography, ocean levels, and circulation patterns.
3. Atmospheric Gas Composition – The concentration of gases like methane and carbon dioxide significantly impacts the climate.
4. Shifts in Earth's Axial Tilt – Changes in the angle of the Earth's rotation axis affect seasonal and long-term climate patterns.
5. Orbital Variations Relative to the Sun – Changes in the planet's orbit influence long-term climate cycles.
6. Terrestrial and Cosmic Catastrophes – Events such as asteroid impacts and volcanic eruptions can cause drastic climate changes.

One of the main causes of climate change is human intervention in nature throughout history. Activities such as deforestation, plowing land, and land improvement significantly impact moisture levels and wind patterns.

When people alter their surroundings by draining wetlands, constructing artificial reservoirs, cutting down or planting forests, or building cities these actions contribute to changes in the microclimate. Forests, in particular, have a significant influence on wind patterns, which, in turn, affect snow coverage and soil temperature.

Green plantations in urban areas help reduce the impact of solar radiation, increase air humidity, reduce temperature fluctuations between day and night, and decrease air pollution by dust.

If people cut down forests in mountainous regions, it can lead to soil erosion in the future. Additionally, reducing the number of trees lowers global temperatures. However, this also increases the concentration of carbon dioxide in the atmosphere not only because fewer trees absorb CO₂, but also because decaying wood releases additional carbon. These factors contribute both temperature decreases and increases on a global scale.

The causes of climate change are not only linked to general warming but also to human activities. People have increased the concentration of substances such as carbon dioxide, nitrogen oxides, methane, tropospheric ozone, and chlorofluorocarbons in the atmosphere. All of these ultimately intensify the greenhouse effect, which could lead to irreversible consequences.

Every day, industrial enterprises release large amounts of hazardous gases into the air, polluting the atmosphere with waste emissions. Burning oil and coal generates vast amounts of carbon dioxide. Even agriculture significantly harms the atmosphere, accounting for about 14 % of global greenhouse gas emissions. These emissions result from field burning, waste incineration, savanna fires, manure decomposition, fertilizers, livestock farming, and other activities.

The greenhouse effect helps maintain the Earth's heat balance, but human activity has intensified this effect many times over, potentially leading to disaster.

Approximately 97 % of the world's climatologists are convinced that everything has changed dramatically in the past 100 years. The main cause of climate change is anthropogenic activity. While the full extent of this issue is uncertain, there are many reasons for concern:

1. We may need to redraw the world map. If the eternal ice of the Arctic and Antarctic melts where underground water reserves account for about 2 % of the world's freshwater sea levels could rise by 150 meters. Scientists estimate that the Arctic may become ice-free in the summer of 2050. This would devastate many coastal cities, and some island nations could completely disappear.

2. The Threat of Global Food Shortages. The world's population has already surpassed 7 billion, and in the next 50 years, it is expected to increase by another 2 billion. By 2050, due to population growth, increased life expectancy, and reduced infant mortality, food production will need to be 70% higher than current levels. By that time, many regions may be submerged under water, and rising temperatures could turn fertile lands into deserts. This poses a significant threat to food security.

3. The Melting of the Arctic and Antarctic Will Increase Global Carbon Dioxide and Methane Emissions. A large amount of greenhouse gases is trapped beneath the ice. If these gases are released into the atmosphere, the greenhouse effect will intensify drastically, leading to catastrophic consequences for humanity.

4. Ocean Acidification. One-third of atmospheric carbon dioxide is absorbed by ocean waters. However, excessive absorption leads to increased acidity in the water. Since the Industrial Revolution, ocean acidity has risen by 30%, severely affecting marine ecosystems.

5. Mass Extinction of Species. Extinction is a natural process, but in recent years, the number of extinct animal and plant species has increased significantly due to human activities. Global warming and environmental degradation are destroying habitats, putting many species at risk of extinction.

6. Extreme Weather Events. Global warming is intensifying natural disasters such as droughts, floods, hurricanes, earthquakes, and tsunamis. Due to temperature changes, these disasters are becoming more frequent and more severe. Currently, climate-related disasters have claimed the lives of 106,000 people, and this number continues to rise.

7. The Inevitability of Wars. Droughts and floods will render entire regions uninhabitable, forcing people to migrate in search of survival. This will lead to conflicts over resources such as water, food, and habitable land, increasing the likelihood of wars.

8. Changing Ocean Currents. The main "heat source" for Europe is the Gulf Stream in the Atlantic Ocean. If this current sinks and changes direction, it could result in a significant climate shift in Europe, leading to heavy snowfall. This would cause severe weather problems worldwide.

9. Climate Change Will Cost Billions. If the current trend continues, it is uncertain how much the cost will rise, but it could become an enormous financial burden.

10. Earth Destruction. No one can predict how much our planet will change due to global climate change. Scientists are developing strategies to mitigate the signs of these changes. One of these strategies involves releasing large amounts of sulfur into the atmosphere, which would simulate the effect of a massive volcanic eruption and cool the planet by blocking sunlight. However, it is unclear how this system will affect the planet, and it may only worsen the situation for humanity.

Most countries in the world are afraid of the consequences of climate change. For over 20 years, an international agreement the United Nations Framework Convention on Climate Change has been in place. This convention outlines all possible measures to prevent global warming. The convention has been ratified by 186 countries, including Russia. All participants are divided into three groups: industrialized nations, developing economies, and underdeveloped nations.

The United Nations Framework Convention on Climate Change aims to reduce the increase of greenhouse gases in the atmosphere and stabilize these levels further. This can be achieved by either increasing the flow of greenhouse gases from the atmosphere or reducing their emissions. The first option requires numerous young forests that absorb carbon dioxide, while the second option can be implemented by reducing the consumption of fossil fuels. All ratified countries agree that global climate change exists. The UN has the capacity to mitigate the impact of upcoming climate shocks.

Many countries participating in the convention have ensured that joint projects and programs are more effective. Currently, there are more than 150 such projects. Officially, Russia has 9 programs, and unofficially, there are more than 40.

At the end of 1997, the Convention on Climate Change signed the Kyoto Protocol, which required countries with transitional economies to reduce greenhouse gas emissions. The protocol was ratified by 35 countries.

Our country also participated in the implementation of this protocol. In Russia, climate change has led to a twofold increase in the number of natural disasters. Although boreal forests are located in the national territory, they do not combat greenhouse gas emissions effectively. It is essential to take large-scale measures to improve and expand forest ecosystems, and reduce industrial waste emissions.

The essence of climate change in the past century has been global warming. According to the worst-case scenarios, humanity's further unconventional activities could raise Earth's temperature by 11 degrees. Climate change is irreversible. Many animals and plants that slow down the rotation of the planets will perish. The level of the world ocean will rise to the point where many islands and coastal regions will be flooded. The Gulf Stream will change its direction, leading to a new small ice age in Europe. Major earthquakes, floods, tornadoes, storms, droughts, tsunamis, and more will become widespread. The melting of Arctic and Antarctic ice will begin.

The consequences for humanity will be severe. In addition to the need for survival under extreme natural anomalies, many other problems will arise. In particular, the number of cardiovascular diseases, respiratory illnesses, psychological disorders, and the onset of epidemics will increase. There will be a shortage of food and drinking water.

CONCLUSION. To mitigate the consequences of climate change, the first step is to reduce the levels of greenhouse gases in the atmosphere. Humanity needs to transition to new energy sources that are low in energy consumption and renewable. Eventually, the global community will face this issue seriously, as the mineral resources currently being used are non-renewable. One day, scientists will need to create new, more efficient technologies.

Additionally, the level of carbon dioxide in the atmosphere must be reduced, which can only be helped by restoring forest areas. Stabilizing the global temperature on Earth requires maximum efforts. Even if success is not fully achieved, humanity must strive to minimize the impact of global warming.

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