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**THE INFLUENCE OF CLIMATIC AND METEOROLOGICAL FACTORS ON THE
PROCESS OF DISTRIBUTION OF POLLUTANTS IN THE ATMOSPHERE OF
INDUSTRIAL REGIONS.**



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ABSTRACT

Air pollution is an environmental issue that affects everyone. The atmosphere contains a variety of pollutants, all of which impact health. Understanding the causes and consequences of the problem will help find solutions. A constructive, systematic method for studying the influence of key climatic and metrological factors on the transport and transportation of harmful substances in the atmosphere is proposed. Based on an analysis of the collected data, the main factors influencing the spread of harmful substances in the atmosphere are identified.

Keywords. the process of spreading pollutants, climatic and meteorological factors, maximum permissible concentration of harmful substances, absorption and capture of particles, fine particles.

**“SANOAT HUDUDLARI ATMOSFERASIDA IFLOSLANTIRUVCHI MODDALARNING
TARQALISH JARAYONIGA IQLIM VA METEOROLOGIK OMILLARNING TA'SIRI”**

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ANNOTATSIYA

Havoning ifloslanishi barchaga ta'sir qiladigan ekologik muammodir. Atmosferada turli xil ifloslantiruvchi moddalar mavjud bo'lib, ularning barchasi sog'liqqa ta'sir qiladi. Muammoning sabablari va oqibatlarini tushunish yechim topishga yordam beradi. Atmosferada zararli moddalarni tashishga asosiy iqlim va metrologik omillarning ta'sirini o'rganish uchun konstruktiv, tizimli usul taklif qilingan. To'plangan ma'lumotlar tahlili asosida atmosferada zararli moddalarning tarqalishiga ta'sir qiluvchi asosiy omillar aniqlangan.



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Kalit so‘zlar: ifloslantiruvchi moddalarning tarqalish jarayoni, iqlim va meteorologik omillar, zararli moddalarning ruxsat etilgan maksimal konsentratsiyasi, zarrachalarning, mayda zarrachalarning yutilishi va ushlanishi.

«ВЛИЯНИЕ КЛИМАТИЧЕСКИХ И МЕТЕОРОЛОГИЧЕСКИХ ФАКТОРОВ НА ПРОЦЕСС РАСПРОСТРАНЕНИЯ ЗАГРЯЗНЯЮЩИХ ВЕЩЕСТВ В АТМОСФЕРЕ ПРОМЫШЛЕННЫХ РЕГИОНОВ»

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АННОТАЦИЯ

Загрязнение воздуха — это экологическая проблема, касающегося каждого. В атмосфере присутствуют разные загрязнители, и все они влияют на здоровье. Понимание причин и последствий проблемы поможет найти ее решение. Предложена конструктивная системная методика исследования основных климатических и метеорологических факторов в процессах переноса и транспортировки вредных веществ в атмосфере. На основе анализа собранных данных остались основные факторы, влияющие на распространение вредных веществ в атмосфере.

Ключевые слова: процесс распространения загрязняющих веществ, климатические и метеорологические факторы, предельно допустимая концентрация вредных веществ, поглощение и улавливание частиц, мелкодисперсные частицы.

Introduction. The atmosphere is the planet's gaseous envelope, which on Earth formed as a result of geological evolution and the continuous activity of organisms. The atmosphere is the most important component for the existence of life on the planet. The progression and accumulation of carbon dioxide in the atmosphere is due to large-scale chemical pollution of the environment, with chemicals that are not naturally occurring. Such pollution primarily comes from gaseous and aerosol pollutants of industrial origin. Due to human intervention in nature, the atmosphere is exposed to a large amount of pollution. The main problem facing the atmosphere is humans, and if humanity were to one day cease to exist, that would be the best possible outcome for the atmosphere[1,5,6].

The atmosphere is the planet's outermost layer, a blanket for everything on our planet. It serves a protective function, preventing meteorites from falling to Earth, burning up in the atmospheric layers, and preventing strong and rapid evaporation of water from the Earth's surface. The atmosphere also protects all living things on Earth from excessive ultraviolet radiation. Atmospheric air is the most vital natural environment and is a mixture of gases and aerosols. Environmental studies in Russia and abroad indicate that atmospheric pollution is the most widespread and persistent factor affecting humans and the environment. Atmospheric air has an unlimited capacity and is the most mobile and chemically aggressive component of the biosphere, hydrosphere, and lithosphere[2,4,9].

In recent years, evidence has been obtained on the significant role of the ozone layer in preserving the biosphere. It absorbs solar ultraviolet radiation, which is harmful to living organisms, and forms a thermal barrier at altitudes of approximately 40 km, preventing the cooling of the Earth's surface[7].

The atmosphere has a significant impact not only on humans and animals, but also on the hydrosphere, soil, plants, the geological environment, buildings, structures, and so on. Therefore, protecting atmospheric air, and the ozone layer in particular, is a crucial task for all developed countries[3,5,8].



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Atmospheric pollution can cause lung, respiratory, and skin cancer, central nervous system disorders, allergic and respiratory diseases, neonatal pathologies, and many other illnesses. Research conducted in Russia and abroad has demonstrated clear correlations between public health indicators and air quality.

The hydrosphere is polluted by atmospheric precipitation, and to a lesser extent, smog and fog. The chemical composition of soil and groundwater also depends on atmospheric conditions. The negative impact of polluted air on soil is associated with precipitation, the acidity of which exceeds the normal pH level. Acid precipitation leaches calcium and micronutrients from soils, disrupts photosynthesis, and leads to slower growth and death of plants. Plants such as birch and oak are particularly sensitive to air pollution. These factors lead to a significant decrease in soil fertility and deforestation. Acid precipitation is now considered as a factor in the erosion of rocks, deterioration of the properties of supporting soils and chemical destruction of man-made objects[2].

The aim of the study. The atmosphere is where clouds, winds, cloud transport, air masses, and precipitation occur, which are also very important for the planet. Water, air, energy, and temperature cycles occur. The atmosphere also contains oxygen, which is essential for all living organisms on the planet. People attach great importance to studying the atmosphere. Thousands of meteorological stations across the planet study the state of the air or atmosphere. This data is sent to centers, processed, and scientists use it to predict the expected weather.

Changes in the Earth's atmosphere are caused by mountains. To obtain reliable information, scientists have created a number of instruments that allow them to obtain data from the upper layers of the Earth. To obtain information about wind direction and temperature, as well as altitude, a "pilot balloon" is launched into the atmosphere. To detect atmospheric phenomena, parachute-equipped balloons were launched into the atmosphere, carrying instruments to measure temperature, humidity, and air pressure. These balloons have been used to detect atmospheric phenomena from altitudes of 40 km. Recently, a small radio transmitter has been attached to the balloons, continuously transmitting signals to the ground. With the development of aviation, aircraft have become an integral part of atmospheric research; today, they are widely used by all central weather stations and provide very rapid information on atmospheric conditions[1,5].

The composition of the modern atmosphere is the result of a dynamic equilibrium maintained by the vital processes of organisms and various global-scale geochemical phenomena. The mass of the planet's atmosphere is 5.3×10^{15} tons, and 90% is concentrated in the near-Earth layer, approximately 16 km thick. Atmospheric parameters (temperature, pressure, chemical composition, etc.) vary primarily with altitude above sea level, while those characterizing the lower layers also depend on latitude.

The troposphere is the upper limit located at 8-10 kilometers in polar latitudes, 10-12 kilometers in temperate latitudes, and 16-18 kilometers in tropical latitudes. It is shorter in winter than in summer. The central layer of the atmosphere, which is low and contains the atmosphere above.

Research material and method. It contains 80% of the total weight of atmospheric air and 90% of all atmospheric water vapor. This layer of the atmosphere is highly chaotic and mobile. Clouds form, and cyclones and anticyclones develop. As the amplitude increases, the temperature decreases.

The tropopause is the intermediate layer between the troposphere and the stratosphere. In this layer, the temperature decrease with altitude ceases.

The stratosphere is the atmospheric layer with an altitude of 11-50 kilometers. Temperature variability is minimal between 11-25 kilometers, which is the lower layer of the stratosphere, while the increase in the layer between 25-40 kilometers is $-56-0.8^{\circ}\text{C}$, which is the upper layer of the stratosphere. Upon reaching 40 kilometers, the temperature remains almost constant at 0°C until reaching 55 kilometers. This constant temperature in this region is called the stratopause, which is the boundary layer between the stratosphere and the mesosphere.



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The mesosphere is observed at altitudes starting from 50 kilometers and extending to 80 kilometers. Temperatures in this layer also decrease with altitude. The mesopause is the intermediate region between the mesosphere and the thermosphere. In the distribution shown in the graph in Figure 3, this region has a temperature minimum of approximately 90°C . The thermosphere is the altitude limit at approximately 800 kilometers. Temperatures increase at 200 to 300 kilometers, and remain at normal values at subsequent altitudes[3,6].

The thermopause is the atmospheric zone adjacent to the thermosphere. In this region, temperature also changes virtually no with altitude. The exosphere is the atmospheric layer extending up to 120 kilometers. The dissipation region, the outer portion of the thermosphere, extends at least 700 kilometers. This region is characterized by a very low gas density. From two thousand to three and a half thousand kilometers, a gradual transition of the exosphere into the near-space region occurs, where this region is filled with highly discharged hydrogen atoms[4].

An Analysis of Global Environmental Problems of the Atmosphere. Every person on the planet breathes air, but they don't always know what substances it may contain; it can be enriched with harmful chemical compounds. These harmful chemicals come from polluting industries, from people themselves, and from cars. Humanity is constantly evolving, creating increasingly polluting factories in various industries. The problem with the atmosphere is that it is too fragile, and for many, this topic remained unaddressed until the Earth began to visibly change. Changes in the Earth's climate due to atmospheric deterioration occurred slowly, and this gradual change was unnoticeable to people. Perhaps it was noticeable to researchers, but, as always, those in authority were reluctant to attach much importance to it. When the issues of the atmosphere and the ozone layer began to diverge, people began to accept that they were doing something wrong. Yes, ozone layer depletion is a major problem; it is, after all, one of the components of the atmosphere[3,7].

Results and discussion. Large chemical emissions into the atmosphere are primarily associated with thermal power plants, ferrous and non-ferrous metallurgy, the burning of petroleum products, and industry. Even if we completely abandon household items, we won't be able to stop industry and the constant production of new devices; it's an unstoppable process. In my opinion, people will never give up the benefits they've become so accustomed to. Arsenic, mercury, phosphorus, nitrogen oxides, chlorine, fluorine, ammonia—these substances, along with many others—enter the atmosphere through emissions and, of course, have a detrimental effect. Aviation and motor vehicles, essential to human life, also pose a threat to the atmosphere. Car exhaust pollutes just as much as a metallurgical plant. On highways, vehicle pollution is far less than in the city. Everyone in the city breathes air saturated with harmful substances, and these exhausts heat the air in cities, thereby warming the atmosphere. Let's look at ten examples of human inventions that pollute the atmosphere: Atmospheric pollutants are divided into primary and secondary. Primary pollutants enter the atmosphere directly. Secondary pollutants are the result of the transformation of the latter.

For many centuries, people were unaware of ozone's existence, but human development and activity had a devastating impact on the atmosphere. Only in the 1990s did scientists begin to sound the alarm. In today's world, the topic, raised by scientists as ozone holes, has spread worldwide. If ozone is depleted, the Earth will lose its normal temperature regime, and gradually, the Earth will heat up more intensely, eventually killing all life. Depletion of this modified form of oxygen occurs for several reasons (launching rockets and satellites into space, the development and widespread use of air transport at altitudes of twelve to sixteen kilometers, and CFC emissions)[15].

Improving the atmosphere's ecology is a common topic of conversation, but few take any action to implement it. While major environmental changes are certainly important, small changes can be started. For example, replacing incandescent light bulbs with energy-saving (LED) bulbs[10,11].

Conclusion. Our planet is amazing and unique, so beautiful that one cannot help but admire it. All living organisms on it today depend on the atmosphere. Nowadays, humans place themselves



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above all living organisms, but they completely forget why they even exist on this planet, which they themselves call Earth. Lately, humans have become so immersed in their own problems, in their own lives, that they fail to notice that the planet is slowly beginning to tire of the parasites inhabiting it, who call themselves humans. Ultimately, the planet is beginning to "sick." This so-called "disease" may even become incurable. Yes, humans think about themselves, take care of themselves, and to breathe fresh air, they travel beyond the city limits, thinking they are escaping the problems they have created for themselves, but this is an illusion. Outside the city, the air is fresh and clean, but is it safe? Every damage to any layer of the atmosphere already endangers living organisms.

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