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Satbayev University

ХАБАРЛАРЫ

ИЗВЕСТИЯ

НАЦИОНАЛЬНОЙ АКАДЕМИИ НАУК
РЕСПУБЛИКИ КАЗАХСТАН
Satbayev University

NEWS

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GEOSTABILIZATION OF ECOLOGICAL EQUILIBRIUM AS A RESULT OF FOREST FIRES

Abstract: The article describes the reasons for the geostabilization of ecological balance as a result of forest fires. Fires lead not only to social and material damage, but also to pollution of natural environments: air, surface and soil waters, soil; to the death of plants and animals. The impact of fires on the environment, the reasons, scale and features of these processes are considered. Particular attention is paid to toxic pollution of the environment, since this type of exposure is most dangerous for humans and living organisms.

Particular attention is paid to the study of the ecological danger of fires, in particular, the change in the planet's climate due to the increase in the atmosphere of aerosols and climatically active gas impurities during massive fires in the event of a nuclear war; one of the most serious sources of fire hazard makes the content of some very dangerous chemical compounds in the «emissions and waste» of fires, such as dioxins, polyaromatic hydrocarbons, which are trace impurities in relation to the main pollution of the modern world (carbon oxides, nitrogen, sulfur, fertilizers, metals) ; the number of industrial accidents accompanied by fires is also increasing, including in the chemical industry and during the production and transportation of gas and oil; in addition, special attention should be paid to protection from man-made accidents and disasters due to changes in the conditions of existence of biocenoses, as a result of the effect of fires on the environment.

Thus, the results of the analysis of forest fires showed that the fire leads to the ecological consequences of the earth's atmosphere; flora and fauna; hydrosphere and lithosphere. Soil, as the main component of biogeocenosis, is most sensitive to the effects of fires. In addition to the fact that fires directly affect forest biogeocenoses, forest fires have an impact, for the most part, indirectly. The consequence of their influence is an absolute change in soil conditions, therefore, microbiochemical soil processes.

Key words: forest fires, impact on the environment, ecological consequences, geostabilization of ecological balance, environmental hazard, biogeocenosis.

Introduction. Fires lead not only to social and material damage, but also to pollution of natural environments: air, surface and soil waters, soil; to the death of plants and animals. The State Fire Service employees of the Committee for Emergency Situations of the Ministry of Internal Affairs KZ today have the task not only to eliminate fires, but also to prevent or reduce pollution and destruction of natural environment during the fire fighting.

Consider the effect of fires on the environment (OS), the causes, extent and characteristics of these processes, particular attention should be paid to toxic pollution of the OS, since this type of exposure is most dangerous for humans and living organisms.

Along with the development of civilization, a human created "powerful technosphere" - artificial energetically saturated living environment, where there are many sources of ignition and combustible materials. The peculiarity of the modern world is that large reserves of combustible materials accumulate in separate technosphere facilities, warehouses, and enterprises, which makes fires very dangerous.

The ecological danger of fires became even more evident thanks to the work of Russian and American

experts who developed a scenario for climate change on the planet due to increase in the atmosphere of aerosols and climatically active gas impurities during mass fires in the event of the nuclear war.

In addition to a large list of environmental hazards that can interfere with the normal functioning of people, there is a threat of poisoning the human environment with chemical compounds produced as a result of industrial fires. These are combustion products, combustible materials and extinguishing agents. Against the background of technogenic emissions: pesticides, nitrates, heavy metals and other chemical compounds produced in large quantities - "emissions and waste from the fire" went unnoticed by the public. Although, for example, emissions from volcanoes are comparable to emissions from forest fires. One of the most serious sources of danger of fires is the content of several very dangerous chemical compounds in the "emissions and waste" of fires, such as dioxins, polyaromatic hydrocarbons, which are microimpurities in relation to the main pollution of the modern world (carbon oxides, nitrogen, sulfur, fertilizers, metals). This is primarily due to the fact that the use of combustible synthetic materials increased in some recent decades. The number of industrial accidents that accompanied by fires is also increasing, including in the chemical industry and in the extraction and transportation of gas and oil. For this reason, volley emissions of harmful, toxic and carcinogenic compounds more and more often occur nowadays. After reaching pollutants aconcentration in the local space that are more dangerous than is acceptable by the norm, it is seen the spread of pollution to the rest of environment proceeds.

Particular concern is the littering of the atmosphere during fires due to the fact that these negative consequences affect the economic activities of people for many years.

The health status of a person living in the field of fire activity is significantly deteriorating, they have chronic diseases due to prolonged infection of the natural environment resulting from fires.

In addition, special attention should be paid to the protection against technological accidents and disasters due to changes in the conditions for the existence of biocenoses as a result of the fires effect on the environment. At the places of fires, changes in the composition and abundance of individual species of living organisms, including plant systems, are observed.

All existing types of dangers are capable to one degree or another, harming humans and natural environment, i.e. are varieties of environmental hazard (in other words, they have environmental aspects).

The urgency of the chosen topic: determined by the problem of the enormous damage done to the biogeocenosis by the fire element - forest fires, leading to environmental degradation as a whole. The results of this element are human casualties, namely, when fire is very close to the settlement. Fire smoke, combustion products have a negative impact on human health. In this regard, economic, environmental, socio-political, aesthetic concepts are presented as a negative result of forest fires.

Economic concept: as a result of forest fires, settlements located near the forest are destroyed, existing production facilities (storage facilities for timber, lumber, wooden buildings, structures, etc.), including woodland with valuable species of wood. In Kazakhstan, in 2019, 221,2 million was the damage caused by forest fires.

Ecological concept: the results of forest fires is a single megafauna and flora catastrophe; Hazardous chemicals are released into the atmosphere, causing gas contamination. The processes of soil destruction, reduction of water movement, land degradation are the results of forest fires. The natural carbon phase is disrupted, intensity of carbon dioxide increases, which is one of the factors of global warming.

Socio-political concept: since the area is covered by smoke, infrasound waves around forests, border areas of neighboring countries act. All this poses a serious danger to the human health. There is also a great danger to a person's life when he is in the area of forest fires, destroying a person's property condition, depriving him of livestock, housing, etc.

Aesthetic concept: as a result of forest fires, the number of recreational resources is reduced, burnt places do not have their attractiveness for travel and recreation. It takes time to restore the forest in order for it to become a place to rest again.

The principles of sustainable improvement: adoption of updates to the legislation, which concern mainly the forest, namely, forest fires; development and use of republican targeted programs, conducting informational work among the population with the help of campaign materials, general education programs, and carrying out preventive measures to avoid forest fires.

Methods. In the research process were used the general methods of scientific knowledge, namely empirical research methods (observation, comparison, measurement, experiment) and theoretical research methods (abstraction, analysis and synthesis, idealization, induction and deduction, mental modeling, ascent from abstract to concrete).

The empirical level of knowledge includes: observation of phenomena, accumulation and selection of facts, and the establishment of relationships between them.

The theoretical level was associated with the predominance of mental activity, with the comprehension of empirical materials, its processing. At the theoretical level, we have revealed the internal structure and regularity of the development of the territorial system and phenomena, their interaction and conditionality.

Results. The occurrence of forest fires often occur near settlements, in areas of forests and parks that are especially used, and along the length of roads, railways, along the shores of navigable water bodies. In the radius of five kilometers from the housing estate, from fifty to seventy percent of fires break out, ten kilometers from eighty to ninety-three percent. Outside of twenty kilometers - only from three to ten percent of fires.

The occurrence of about ninety percent of fires in KZ occurs due to anthropogenic factors. As a result, huge damage from fires is often done to the most visited by people places.

It is necessary to note that the existing differences between fires of natural origin, i.e. arising as a result of lightning discharges and arising as a result of human activity - anthropogenic. After all, lightning, most often, hits trees lonely on the hills, and the flame descends along the slope, moving slowly. And here fire, losing power, can not cover huge areas. Anthropogenic nature fires often originate in lowlands and hollows, which contributes to their fairly rapid and unsafe spread.

Burning dry grass in the agricultural land, most often by field breeders themselves, remains an urgent issue, which leads to the emergence of a huge scale of forest fires.

Now, in practice, modernly organized fight against forest fires does not give a positive effect in confronting arson of dry vegetation. The organization of fire extinguishing measures is usually developed only at the moment when the forest is already engulfed in flames and there is a threat to the populated area.

Often, forest fires break out due to the dry weather. This natural phenomenon is considered as a combination of the atmospheric front, in which for the given region of the average monthly rainfall for twenty-one days or more is thirty percent.

For the autumn-winter period, which precedes the season of fire hazard with exceptional fire resistance, warm autumn weather and frosty snowless winter are typical. This kind of starting weather, with exceptional incidence, the seasons that precede and accompany, are characteristic of many regions of Kazakhstan.

Humidity and drying out of combustion products located on the soil in swamp forests depend both on atmospheric precipitation and the level of groundwater standing. In the case of termination of soil recharge by groundwater, moisture and soil drying will depend only on precipitation. And this situation of lack of rain favors the fire ripening of combustible materials in the soil.

The primary causes of fires may be weather conditions. Weather conditions - there is a factor that either contributes to or prevents the spread of the fire element: hot and windy weather form a real danger of burning the forest in vast areas, create difficulties in flame fighting; continuous rain showers, dampness and inclement weather prevent forest fires.

The direction and speed of the wind affect the fire density, contour view, length proportionality of the edge parts. The effect of the wind on the movement of the fire is expressed instantly in two ways. The first is a natural process that manifests itself in all fires, where the action of direct wind flames affection over the fire towards fuel, thereby accelerating its ignition and ejects burning particles beyond the frontal edge, forming new combustion foci of few meters from the front. The following process is considered to be quite unsafe, since the development of "spotted" method of moving fire is observed, due to the fact that convective fire flow raises burning particles to the height of a thousand to two hundred meters, where the upper wind carries them over great distances and forms new foci of burning.

A huge amount of burning particles within three hundred - thousands of meters from the front of the fire often causes a tragedy of the situation due to ignition of the forest behind people who put out the fire. During fires, it happens that when large convective hot air flows occur, at the moment of increased wind, burning pieces of bark, cones, pieces of wood are transported to a distance of several kilometers. Under clear sky conditions, forest fire hazard occurs earlier in July, then in June and August, despite the fact that cumulative solar radiation under clear sky conditions are arranged in decreasing order like this: in June 30.16 MJ / m², in July 28.33 MJ / m² and in August 22.92 MJ / m².

But July scorching heat in the atmosphere favors rather rapid drying of the ground combustion products in the forest with the average cloud cover the situation remains unchanged: there is an increase in the time of ground combustion products in the forest, and fire hazard situation occurs a bit later, about a month distribution. The exception is that probability curves are much closer to each other. It is explained by a small

difference in the amounts of solar radiation in the conditions of moderate cloud cover.

As a result of prolonged summer heat, a thunderstorm is one of the forest fire causes. After lightning strikes into the ground in the place where dead wood or dry grass is located, fire centers are formed. In the event that torrential rain does not extinguish them, then significant areas will be covered by fire. The most particular danger to the forest is “dry thunderstorms”, in which atmospheric lightning discharges between clouds and the earth are not accompanied by precipitation.

The logical consequence is a faster onset of forest fire hazards in the conditions of high fire danger and slower in conditions of medium and low fire danger.

The main conditions for emergency forest fire situation are: snowless winter, a long non-rainy period of fifteen to twenty days with the highest average long-term average daily air temperature and low air humidity at the beginning of the fire hazard season, in which the forest fire risk level is characterized by IV, V classes fire hazard, a long period with IV, V fire hazard classes, atmospheric drought at any time of the fire hazard period.

Ignition of combustion products in the forest is caused by a wide variety of heat sources related to natural and economic parameters.

An electric discharge (lightning), sun rays, chemical and biological processes occurring in the combustion products themselves are natural parameters. The economic actions of people in the forest.

The development of fires arising from both natural and economic factors depends on the forest growth and weather conditions.

Analysis of forest fires shows that one in five of them occurs due to the natural factors of heat generation. The main ones are lightning discharges, under the influence of which either individual trees or the ground cover at their base light up. In some areas, from lightning, up to 50% of forest fires occur. Table 1.

The heat sources that ignite combustible materials in the forest include the sun’s rays. Very rare cases were noted when the sun rays passing through glass fragments that are scattered on the ground caused a fire in the forest. The occurrence of forest fires is also possible from processes that occur in the nature and biochemical cases: self-ignition of hay, peat, as well as coal seams that surface.

An analysis of appearance causes of ignition sources in the forest and the occurrence of fires shows that most of them can be prevented by strictly adhering to fire safety rules. Knowing the causes of sunbathing themselves allows a person to predetermine a set of measures aimed at combating fire and to prevent them.

Table 1. Cuases forest fires sources during 2019 y.

(%)

№	Sources of fire	Total	Including forest zones			
			West Kazakhstan	Northern Kazakhstan	Eastern Kazakhstan	Southern Kazakhstan
1.	Lightning discharges	23	-	19	39	-
2.	Farm houses	11	5	17	-	8
3.	Logging work	1	-	2	1	13
4.	Local population	42	76	31	53	66
5.	Tourists	4	19	3	5	-
6.	Reasons not established	19	-	28	2	13
TOTAL		100%	100%	100%	100%	100%

The fact that fire sources appear in the forest causing fires is mainly due to a man, his actions in the forest, i.e. economic factor.

Currently, up to several hundred forest fires occur annually in the Republic of Kazakhstan, destroying vast areas of forest plantations. The latter necessitates of current forest-pyrological situation analyses and development of urgent measures to protect forests from fires effectively, to extinguish forest fires and to minimize the environmental consequences of extinguishing forest fires.

The ecological consequences problem of forest fires is extensively described in the scientific literature. Various aspects of forest fires ecological consequences are considered in thenmonographs, brochures and also in numerous scientific studies and articles. Many researches are devoted to special practical steps development to prevent and reduce destabilization of the ecological balance as a result of forest fires.

Buryak, L.V., Grishin, A.M., Ivanova, G.A.S.G. Konard, Isaev A.S., researched the issue how the

ecological balance is destabilized as a result of forest fires in the CIS, as well as in other countries, among them are A.I. Utkin, Musin, S.M. and others.

In modern society, the results of forest fires - the destabilization of the ecological balance - are divided into short-term and remote. In the short-term, the human environment in the fire element changes, which negatively affects the livelihoods of people.

One of the negative consequences of forest fires is that, in general, twenty percent of pollution in the globe enters the atmosphere. Forest fires are the second source of atmospheric air pollution after the ocean, toxic and harmful gas, vapor, organochlorine compounds, such as methyl chloride. During forest, peat, and steppe fires, both the composition and structure of the land cover of the land are destroyed, hence the production of oxygen decreases.

Under the influence of fire, the stand dies, the vegetation cover on the soil is destroyed, the cover burns out from the decaying litter.

The need for a radical improvement in the preventive work in the forests from the effects of numerous inhibitory factors and, above all, the fire element is relevant today. People die in the fire, and the nearby residential sector is destroyed, forest fires are accompanied by smell of burning and severe smoke.

Forest fires of enormous proportions pose a considerable threat to a human life and health. The forest will die as a source of clean air and a guarantor of protecting people from the effects of atmospheric pollutants lead to destabilization of the ecological balance.

The destabilization of the ecological balance is:

- air pollution, because it is the forest that supplies oxygen, but as a result of a fire the formation of oxygen is impossible, as a result of which there is no absorption of carbon that is harmful to health and pollutes the air;
- loss of drinking water quality due to forest fires, as there is no process of water enrichment with groundwater, rivers;
- as a result of forest fires, the land cannot be fertile;
- due to fires the earth is not protected from frequent rainfall, which leads to its destruction;
- due to fires, the necessary microorganisms disappear.
- due to the constant exposure of fire forest its fertility is reduced;
- in the areas where there are steep slopes, the soil during the fire breaks into pieces and falls down, as a result of which the ecosystem does not have the ability to independently restore;
- prone to destruction of the forest natural potential;
- pollution of water bodies with ash fall along with rainfall after a fire, which is harmful to fish and aquatic plants;
- due to the trees burning, the concentration of carbon dioxide in the atmosphere increases, leading to the global warming;
- with the onset of global warming, a greenhouse effect is formed that contributes to an increased risk of tropical cyclones and hurricanes;
- as a result of forest fires, more than one thousand hectares of trees and vegetation are exposed to destruction;
- loss of ecosystems, biological productivity;
- due to forest fires, flora and fauna are damaged;
- due to forest fires, a huge part of plants that support the vital activity of most animals and insects are destroyed;
- there is assumption that some species of animals may disappear as a result of forest fires.

There are several indicators characterizing the short-term effects of forest fires:

1) the temperature rises in the front of the fire (up to 300K), as a result of which people and animals die, overtaken by the front of forest fires;

2) harmful chemicals (CO, nitrogen oxides) are emitted into the surface layer of the atmosphere;

3) increased intensity of heat fluxes in front of forest fire (up to two hundred kilowatts per square meter), as a result of which warehouses of wood, residential buildings made of wood and other household objects, located in the taiga ignite, including and oil fields;

4) the presence of smoke in the near-ground part of the atmosphere in the fire zone, as a result of which the flights of air and water transport of local lines were stopped;

5) infrasound waves that are generated by a fire affect a person.

These negative factors, as a rule, act within the area of a forest fire.

Remote environmental consequences are those for which the duration of the consequences has a sufficient excess of the duration of the fire element. These effects can be positive and negative.

The positive results of forest fires are:

1) reducing the resource of forest products combustion;

2) increased soil fertility due to its fertilizer with ash;

3) increase in the many vegetation cover in the nature.

As a result of the negative impact of forest fires the following picture is observed:

1) the extermination of the total mass of the forest plant world, including timber;

2) established ecological system and soil are destroyed, river run-offs are minimized, lands become desertified;

3) the dose of solar radiation is minimized, components radiation of the earth's surface, crops ripen late enough;

4) the biogeochemical process is disrupted, the density of carbon dioxide increases, which leads to global climate warming (greenhouse effect);

5) the recurrence of radioactive contamination of the territory during forest fires in a radioactive forest plant world that exists within the boundaries of one biotope.

Discussion. We point out the ecological subsequently forest fires analyses:

- Forest fires as environmental consequence for the earth's atmosphere is one of the most frequent phenomena, which is accompanied by huge emissions of carbon monoxide, dioxide and nitrogen oxides (from 3 to 150 million tons per year) into the atmospheric layer. They have a negative effect on the radiation balance of the earth. Because smoke, contributing to cooling, prevents the sun from reaching the earth's surface.

Speaking about the long-term consequences that occur during the post-fire years, the situation of vegetation should be noted first of all.

According to the results of the all consequences of forest fires, during the first year, after they happen, the radiation balance increases. In other words, even a small time period allows the fire causes the warming.

But after a year, the direct effect on the radiation balance does not affect, and if the result is calculated in the long term, the fire negatively affects the temperature of the earth's surface, they contribute not to warming, but to cooling.

Due to the global climate change, the number of devastating fires is increasing annually. In connection with global climate changes, the number of catastrophic fires increases every year, and the overall duration of the fire hazard period increases. Fires also cause even greater global climate change and contribute local weather patterns. By totality, huge forest fires impact and create stable areas of high atmospheric pressure, they drag in the absence of rain above the site of forest fires.

Environmental consequences for flora and fauna. Natural fires have both a destructive and creating mission. In the main part of the forest territory, forest fires are one of the most dangerous natural phenomena that lead to huge economic losses and negative environmental consequences. And only in the uncontrolled and unused forests of tundra and northern sparse taiga, namely in permafrost, rare ground fires (long repetition period of about eighty to one hundred years) are a natural mechanism that prevents forest degradation and prevents them from turning into grassy bushy wetlands and thickets. Due to the absence of fires, a thick surface layer of organic material accumulates, reducing the depth of the active soil layer, causing the rise of permafrost, and this, in the end, leads to worsening of forest conditions, decreasing the fertility of forests, they are shrinking, swamping.

But even here, the frequency of periodicity of fires aggravates the condition of forests, their fertility, strength and development of the southern forest border to the south. It is fires - this is the main reason for a hundred-treeless belt - two hundred and fifty kilometers on the border of the taiga and tundra, which is gradually expanding to the south. Forest fires have a negative impact on the biological diversity of species, ecosystem and landscape levels.

Forest fires of the highest density have a particularly strong effect on forest ecological systems, which, first of all, include generalized fires. Due to the fact that all soil organic matter burns out, the roots are not able to hold the tree, and it falls out, as during the wind. The result of such fires is a complete change of plantations for a sufficiently long period, which is necessary in order to restore soil organic matter. As a result, the succession procedure of restoring the original ecological system will literally begin from scratch.

In the territory where the fire passed, general illumination and soil moisture increase and trees survive in uncomfortable and oppressed state. Trees that fallout from the root form depressions that favor the settlement of pioneer breeds, forming a closed tier of larch, birch undergrowth, thanks to enhanced nitrification and soil moisture in three to four years. A single-age afforestation of purely seed origin is created. Under the conditions

of the most productive soil in burned areas, the forest restore, mainly due to aspen, its exceptional ability to produce indigenous offspring from sleeping buds on the roots. Here same-age afforestation develops, but only of overgrown origin.

Meanwhile the reforestation procedure on this kind of burns is possible only in the absence of recurrent fires. It originates from the formation of grasses and shrubs after fires, a further increase in the soil subspecies, and only after all forest plantations restore, first of all, pioneer rocks: aspen, birch, larch.

Forest fires bring a lot of suffering and death to the wild animals. For example, forest fire cause the death of the wild animals in Australia: wombats, bandicuts, possums, exceeded one million. And in Eastern Siberia, forest fires often blaze on a solid front, while a huge number of animals die in burnable forests. In addition, forest fires cause animal migration.

Environmental impact for the hydrosphere. The direct participation of the forest takes out the water cycle in the nature, it means that in interaction with the hydrosphere. It will prevent the flow of soil water with rivers into the large bodies of the water. Consequently, the disappearance of the forest, which grows along the river banks, entails the river shallowing and leads water supply decrease of settlements, as well as decrease in the rural farmland productivity.

The main mission of the forest is to maintain reasonable distribution of the flow of the rivers and streams. The forest curtain prevents (prolongs for a certain time) the spring snowmelt, sometimes by several weeks, in comparison with open places - as a result of which the river flood becomes noticeably smoothed, and the summer runoff becomes the most full-flowing. In the forest, soil and litter, which are rich in organic matter, it usually has an uneven surface, with many hollows, hold water well as a result of heavy rainfalls or snowmelt, thus also saving it for more arid days.

As a result of forest fires, the soil deprives of vegetation, the watersheds seriously and permanently deteriorate, the recreational and scientific value of reliefs is decreasing, river flow is decreasing, and the general level of groundwater is decreasing. Ecouron reaches a particularly large scale if coniferous forests give way to small-leaved derivatives in the large areas of fires. In this situation, the water regime of nature complexes transformes. The decrease in the hydro-coordinating function of forests due to the appearance of huge territories of fires is one of the main causes of floods.

Ecological consequences of forest fires for the lithosphere. Being the main component of the biogeocenosis, the soil is more sensitive to the effects of fires.

Soil, as the main component of biogeocenosis, is most sensitive to the effects of fires. In addition to the fact that fires directly affect forest biogeocenoses, forest fires have an impact, for the most part, indirectly. The consequence of their influence is an absolute change in soil conditions, therefore, microbiochemical soil processes.

There are several ways that forest fires can affect the soil. So, the high temperature of the fire directly affects the solid soil layer, at the same time, ash enters in huge quantities on the soil surface, which is formed when the forest litter is mixed with other combustion products, the structure and quality of organic matter change, some plant communities are replaced by others.

Conclusion. It should be noted that due to fires, there is a significant change in the chemical and physical properties, mechanical composition, hydro-aero, hydrothermal regime of the soil, all this directly affects the biological properties of the soil. The enormous impact of forest fires on the chemical and physical properties of the soil consists in an increase in pH and decrease in hydrolytic acidity.

The main factor influencing the fire on microflora, soil properties - is the heating of the soil in the epth. The level of soil heating often affects vegetation after a fire, has an effect on the appearance of erosion, water permeability of the soil. During a fire, the temperature of the soil surface can reach nine hundred degrees Celsius; at high density of fires it reaches one thousand five hundred degrees Celsius; the temperature of two hundred and three hundred degrees is normal when burning.

During fires, forest litter burns out, which leads to the death of soil, soil plants and animals. Due to the destruction of the litter layer, water-wind soil erosion intensifies, sediments endure fine earth, organic matter, but often during a fire only part of the litter burns out and the soil, the lower part of the litter, usually remain moist. And under these conditions a slight direct effect on the soil is observed.

The available data of the studied research show actuality of the problem on the issue of forest fires ecological consequences and the search for ways to reduce them.

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ОРМАН ӨРТТЕРІНІҢ НӘТИЖЕСІ РЕТІНДЕ ЭКОЛОГИЯЛЫҚ ТЕПЕ-ТЕҢДІКТІ ГЕОТҰРАҚТАНДЫРУ

Аннотация. Мақалада орман өрттерінің салдарынан экологиялық тепе-теңдіктің геотұрақтану себептері баяндалған. Өрт тек әлеуметтік және материалдық залалға ғана емес, сонымен қатар табиғи ортаның: ауаның, жер үсті және топырақ суларының, топырақтың ластануына, өсімдіктер мен жануарлардың қырылуына әкеп соғады. Өрттің қоршаған ортаға әсері, себептері, ауқымы және осы процестердің ерекшеліктері қарастырылды. Қоршаған ортаның улы ластануына ерекше назар аударылды, себебі әсер етудің бұл түрі адам мен тірі организмдер үшін аса қауіпті.

Жұмыста өрттің экологиялық қауіптілігін зерттеуге, атап айтқанда ядролық соғыс жағдайында жаппай өрт кезінде атмосферада аэрозольдар мен климаттық белсенді газ қоспаларының артуы есебінен ғаламшар климатының өзгеруіне ерекше назар аударылды; өрттер қауіптіліктің маңызды көздерінің бірі болып қазіргі заманғы әлемдегі негізгі ластануларға (көміртегі, азот, күкірт оксиді, тыңайтқыштар, металлдар және т. б.) қатысты микро қоспалар болып табылатын диоксиндер, полиароматикалық көмірсутектер сияқты өте қауіпті химиялық қосылыстар өрттерінің «шығарындылары мен қалдықтарында»); сондай-ақ өртпен, оның ішінде химия саласындағы және газ және мұнай өндіру, тасымалдау кезіндегі өнеркәсіптік авариялардың саны ұлғаюда; бұдан басқа, техногендік авариялар мен апаттардан қорғауға жеке назар биоценоздардың тіршілік ету жағдайларының өзгеруі себебінен, өрттердің қоршаған ортаға әсері нәтижесінде бөлінуі керек. Таңдалған тақырыптың өзектілігі: жалпы қоршаған ортаның азып – тозуына әкелетін орман өрттері-отты апатпен биогеоценозға келтірілетін үлкен шығын проблемасымен анықталды. Осы оқиғаның қорытындысы-адам құрбандары, атап айтқанда өрт елді мекенге өте жақын болғанда, өрт сөндіруші түтін, жану өнімдері адам денсаулығына теріс әсер етеді.

Зерттеу барысында орман өрттерінің салдарын экономикалық, экологиялық, қоғамдық-саяси, эстетикалық топтарға топтастыруға болады. Орман өрттерінің нәтижесінде орманның жанында орналасқан, қолда бар өндірістер жойылады; мегафауна мен флора үшін апат болып табылады. Орман алқабын қалпына келтіру үшін тағы да демалу орны болу үшін мерзім қажет.

Осылайша, орман өрттерін талдау нәтижелері өрт Жер атмосферасының, флораның және фаунаның, гидросфераның және литосфераның эко зардаптарына әкеп соқтыратынын көрсетті. Биогеоценоздың басты компоненті ретінде топырақ өрт әсеріне аса сезімтал. Сонымен қатар, өрттер орман биогеоценоздарына тікелей әсер етеді, орман өрттері көбінесе жанама әсер етеді. Олардың ықпалының салдары топырақ жағдайларының, демек, микробиохимиялық топырақ процестерінің абсолютті өзгеруі болып табылады.

Түйінді сөздер: орман өрттері, экологиялық соңғылар, экологиялық тепе-теңдікті геотұрақтандыру, экологиялық қауіп, биогеоценоз.

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ГЕОСТАБИЛИЗАЦИЯ ЭКОЛОГИЧЕСКОГО РАВНОВЕСИЯ КАК РЕЗУЛЬТАТ ЛЕСНЫХ ПОЖАРОВ

Аннотация. В статье изложены причины геостабилизации экологического равновесия в результате лесных пожаров. Пожары приводят не только к социальному и материальному ущербу, но и к загрязнению природных сред: воздуха, поверхностных и почвенных вод, почвы; к гибели растений и животных. Рассмотрено влияние пожаров на окружающую среду, причины, масштабы и особенности этих процессов. Особое внимание уделено токсическому загрязнению окружающей среды, так как этот вид воздействия более всего опасен для человека и живых организмов.

Особо внимание в работе уделено изучению экологической опасности пожаров, в частности изменение климата планеты за счет увеличения в атмосфере аэрозолей и климатически активных газовых примесей при массовых пожарах в случае ядерной войны; одним из серьезнейших источников опасности пожары делает содержание в «выбросах и отходах» пожаров некоторых очень опасных химических соединений, таких как диоксины полиароматические углеводороды, являющиеся микропримесями по отношению к основным загрязнениям современного мира (оксидам углерода, азота, серы, удобрениям, металлам); также увеличивается число промышленных аварий, которые сопровождаются пожарами, в том числе и в химической отрасли, и при добыче, транспортировке газа и нефти; помимо этого, отдельное внимание защите от техногенных аварий и катастроф стоит уделить по причине изменения условий существования биоценозов в результате действия пожаров на окружающую среду.

В ходе исследования установлено, что последствия лесных пожаров можно сгруппировать на экономические, экологические, общественно-политические, эстетические. В результате лесных пожаров уничтожаются находящиеся рядом с лесом поселения, имеющиеся производства; является катастрофой для мегафауны и флоры; в атмосферу выбрасываются в огромном количестве опасные химические вещества, приводящие к загазованности. Нужен срок для восстановления лесного массива, чтобы ему вновь стать местом для отдыха.

Таким образом, результаты анализа лесных пожаров показали, что пожар приводит к экопоследствиям земной атмосферы; флоры и фауны; гидросферы и литосферы. Почва как главный компонент биогеоценоза наиболее чувствительна к воздействию пожаров. Кроме того, что пожары прямо влияют на лесные биогеоценозы, лесные пожары оказывают воздействие, в большинстве своём, косвенно. Следствием их влияния является абсолютное изменение почвенных условий, следовательно, микробиохимических почвенных процессов.

Ключевые слова: лесные пожары, экопоследствия, геостабилизация экологического равновесия, экологическая опасность, биогеоценоз.

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