
POLLUTION OF NATURAL ECOSYSTEMS, THE BIOSPHERE RADIONUKLIDAMY, AND ITS IMPLICATIONS

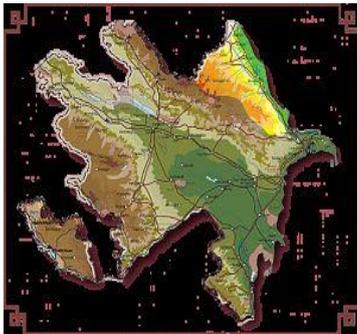
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Introduction



Now humanity is understood not only the magnitude of its creativity, but its complete dependence on the environment Wednesday. However, this understanding until nevseob» by and often submissive short-term selfish interests (situation, economy, etc.); ended in the twentieth century, a century of great discoveries and global achievements in the sciences, engineering, economics, and human culture. In this century, along with the progress occurred global destruction of nature, pollution Wednesday. Scientific and technical progress was threaten green civilization. From the middle of the century, mankind departed entered a new phase of its development in the no sphere i.e. when the only alternative becomes a balanced national economy conducting "joint" with all the elements of nature, i.e. on a smoke break already established natural biogeocенозам populations and communities, and combining with them, complementing them, sozhitelstvujja them.

Progress in the study and discussion of materials:

Powerful development of the productive forces (especially in the highly industrial relations) current forecast assumptions, insistently demands to send them in an environmentally sound manner. Maximize production and profit now becomes the criterion for the well-being of any Community (State). So now everything should be subjected to environmental assessment it is deep understanding of the current natural environment becomes the basis for further action by any community, because the scope of the activities of mankind became function the State of nature, i.e. humanity, maybe for the first time began to feel not only the scope of its activities, but also their dependence on State Wednesday.

The objectives of the study:

Taking into account the fact that such dependence, human intelligence above all seeks to systematize the facts of anthropogenic impact and identify the most significant priorities for health and environmental protection Wednesday.

These priorities are primarily aimed at preserving human homeostasis and everything else that surrounds the person i.e. Wednesday, with which a person communicates energy.

If we talk specifically about the priorities, the first thing you should pay attention to the components of the biosphere, accumulation of biogenic elements (all forms of nitrogen:

NH₄, NO₃, NO₂, as well as p₂o₅, Fe AGG . SI on₂), i.e. items that possess biological activity and how the rules of outlier of biological cycles of substance due to its excess akumulirovannosti this specific biota, which ultimately leads to the formation of taksogennoj zone, i.e. the formation of abiotic Wednesday. In addition, education excess with₂ co, as well as various oxides and nitrogen gidridi in the atmosphere together with various volatile hydrocarbons, are powerful toksikogenami of life in the biosphere causes necrosis Wednesday human habitation.

However, if you take into account the targeted use of OCSP (an organ chlorine pesticide) and FOP (phosphorus-organic pesticide) man, it becomes apparent the brunt of toksikogennoj load obrushivajushheesja on him. However, in the series of all these toxic substances, a special immeasurably insidious and having serious consequences, has radionuclide pollution of the natural environment. It should be said about the special role of this pollution, which contributes to carcinogenesis in living organisms.

Thus, specific toxicants, polluting soils, water sources and the atmosphere and determining the general radio ecological situation, are radionuclides, which are unstable isotopes of many chemical elements that spontaneously dissociate for people with the release of radiation energy. Its action on a living organism is very specific and consists in the following.

In radioactive decay, when the rays are released, their penetration into any external environment begins, including and living organisms. By themselves, these rays, penetrating the body, are able to ionize the constituent elements of the cell (especially the rays); for example, hemoglobin of blood.

Under normal conditions, the protein (hemoglobin) is electronically unbalanced, but when it penetrates, for example: - rays, this hemoglobin becomes negatively charged, because a proton is embroidered from it, which means that it practically can no longer be functional in transferring oxygen from the lungs to the brain, the heart, etc., by the blood stream.

Moreover, a negatively charged hemoglobin, i. E. in the free-radical state, promotes the neighboring hemoglobin to lose its proton, i.e. The ionization wave (depending on the dose of radiation) increases in an avalanche manner, which in the end can lead to an organism lethal outcome.

Thus, from an ecological point of view, radioactive radiation is an extremely formidable abiotic factor.

However, it should be specially noted that in optimally low doses, radioactive radiation even acts favorably on the body, which is manifested in activation of redox reactions of the body, in optimizing the respiratory coefficient of the hormonal system, etc. (1, 2, 3).

At present, it is known that ionizing radiation is composed of three sources of ionizing radiation (3):

1. Cosmic rays reaching the surface of the Earth.
2. Radiation of radioactive elements that make up the earth's crust (soils, rocks, seawater, soil water, etc.).
3. Radioactive radiation caused by radionuclides, which are part of the organisms of humans (and also animals).

All three types of radiation make up the natural radiation background (EPF). The total radiation load per person in modern society is estimated to be about 2/3 of the effect of ionizing radiation and 1/3 of the impact of anthropogenic sources.

It should be noted that the EPF varies in different regions of the planet in the range of values that differ by 842381 more than 2 orders of magnitude. The biota of these regions

has evolved to adapt to its EPF. And the danger to living organisms can only be the excess of the EPF caused by artificial radioactivity (4).

With the current state of the biosphere, when emissions, incl. and carcinogenic substances into it is carried out uncontrollably chaotically, convection and other processes can spontaneously localize scattered radionuclides thousands of kilometers from the centers of their formation, at any point of the planet.

And such artificial radioactivity in the external environment is due to various reasons: tests of nuclear weapons; at accidents of nuclear power reactors and at their cooling; at disposal of 5% uranium ore processing waste; when using ionizing radiation in medicine (diagnostics, therapy). The last radiation load reaches about 30% of the total human ionizing radiation load from all possible sources (3).

and artificial radionuclide contamination, which can lead to irreversible transformations in the animal organism, depending on the dose of the radiation level; to disturb its homeostasis, evolutionarily conditioned both ontogenetic and phylogenetic ally. In this regard, there is a need to develop environmental criteria (they can simultaneously be sanitary and hygienic) for the main types of soils, natural waters and the air, i.e. of the environment with which the person must be in complete harmonious harmony.

Objectives of the study: is to study the characteristics of the natural environment by radionuclide contamination.

1. Atmosphere. As a rule, radionuclide pollution is in the aerosol state in the atmosphere. And the convection currents caused by the temperature in the barometric ingredients, at a certain moment, under the influence of gravitational forces, settle on the soil, plant, water, and so on.

Surface. According to the radiation safety standards (NRB-76/87, the permissible concentration of strontium-90 radionuclide in atmospheric air should be 4.0, 10-14) kib / liter, and for cesium-137 such a standard has not yet been obtained.

2. Hydrosphere. The main transporting and accumulating (in these sediments) environment in the system "water-soil" -plants-people ". It is in the aqueous medium that suspended radionuclides of the atmosphere dissolve: it is in this state that they penetrate the soil, underground layers of groundwater and other waters (including drinking sources). At present there are no officially approved ecological criteria for assessing the level of radioactive contamination (SRH) of aquatic ecosystems.

Again, there are only radiation safety standards (NRB-76/87) containing information from the permissible concentration of individual radionuclides in water (DKV), for which this figure corresponds to the ratio of the annual intake limit or its critical organ for a year (1). So the value of DKV is the most widespread and dangerous in water objects long-lived radionuclides of strontium-90 and cesium-137 is 4.0, respectively. 10 -10 kib / liter (for bones) and $1.5-6.5 \cdot 10^{-8}$ kib / liter (for the whole body and liver).

These official parameters (norms) for assessing the radio ecological situation (situation) are only indicative; It should be noted that radionuclides migrate, accumulate and transform in all major bio currents and components of the biota of water bodies with the involvement of substances in the biotic cycle. In fresh water bodies and watercourses, these sediments and higher aquatic vegetation sorb most of the radionuclides.

The smaller part of radionuclides remains more or less evenly dissolved in water. This is a very important in the theoretical and practical sense of the law. The fact is that in the bottom sediments of water bodies, due to the high sorption capacity of the silt, so large amounts of radionuclides are usually accumulated that the water of the water column in those water bodies can be "clean" in accordance with sanitary and hygienic criteria.

However, the radiological well-being of water bodies polluted radionuclides, even if they are sufficiently radioactive, is always very relative, because: -first, hydro sites are

unable to withstand external radiation in doses, substantially from and secondly, the needs in the process of the biotic cycle are able to accumulate in the body radionuclides in such quantities (high concentrations) that these accumulated radionuclides become life-threatening, as well as the health (physiological state) of their consumers (consumers), including

The importance is also the fact that in the radio-contaminated water bodies in the greatest quantity there are usually two radionuclides-Strontium -90 and cesium -137, which have a large period in half-life and high toxicity, and are dangerous. Once in the body of hydrobionts, radionuclides become sources of incorporated chronic radiation, especially strong if they concentrate in certain tissues and form dangerous foci locally radiating nearby cells.

With chronic action of even small doses of radiation, a accumulative (total) effect is produced that causes a mutagenic and damaging cell, organ, organism of action. In this case, a negative radiation effect can occur with minimal amounts of energy absorbed by the irradiated body (organism).

Chronic irradiation with radionuclides of hydrobionts of all trophic levels in ecosystems of water bodies to varying degrees of radio contamination can lead not only to the cessation of fishing due to the inadequacy of fish for food man and animal, which he eats, but also to other unforeseen consequences. Possible disappearances of some species and an outbreak of the number of other fish species, especially favorable for them mutations. This leads to a restructuring of the biota structure and changes in biotic links, which can worsen the hydro biological processes of water quality and productivity in water bodies.

The pedosphere. The natural radioactive background (EFR) of the soil is determined by such elements as Ra, Ac, Gh. K-40, which undergo spontaneous successive transformations, forming families of radioactive elements and isotopes with very different half-lives. To a lesser extent, U-238 and U-235 are present in the soil. A high indicator is fixed in some ore deposits; a small EPF index is fixed almost on the whole surface of the Earth and natural radioactive elements (ERE) are present in all rocks, soils and waters.

The concentration of ERE in the soil depends on their content in the parent (rock) rock and the degree of weathering as a result of soil formation. In soils formed on the weathering products of acidic rocks, radioactive elements and isotopes is contained more than in soils formed on basic or ultrabasic rocks.

Soils of heavy mechanical composition contain ERE more than soils of light mechanical composition. Migration of ERE depends largely on the landscape: the soil of eluvial and trans-eluvial landscapes contain significantly more G and more than Ra; in the soils of accumulative landscapes, the content of R increases with respect to the average. In soils, in the soils, $C-1 \cdot 10^{-4}$, $Gh-6 \cdot 10^{-4}$, $Ra-B \cdot 10^{-4}$, potassium-40 $-2 \cdot 10^{-4}$, (6).

Atomic and thermonuclear explosions or wastes from the nuclear industry mainly determine the artificial radioactive background of the soil. As a result, radioactive elements and isotopes that do not occur in the EPF appear in the soil.

The long-lived radioactive elements fall into the soil, including Cp-30, Cs-137, Ru-106, L-144, Mn-54, etc. The most important values are Cp-90 and Cs -137.

The intensive is sorbed by the soils in the exchange state, absorbed by the root systems and through the plant are included in the agricultural links of migration of elements of mineral nutrition. On some soils containing minerals like vermiculite. Cs-137 is readily available to plants, Cp-90 and Cs -137 represent the greatest danger because they are close analogues of physiologically important elements-Ca and K, have a long half-life and high energy of radiation (Cp-90-emitter, Cs-137 - and-emitter), can easily be incorporated into the biological cycle and enter human organisms.

The content and distribution of Cp-90 and Cs -137 in soils is determined by the intensity and character of their loss from the atmosphere, the properties of the isotopes and soils themselves, and, on the whole, by the aggregate of all natural conditions (vegetation, climate, relief).

The distribution of Cp-90 and Cs -137 on the territory depends on the latitude of the terrain. The maximum loss is observed within 30-500 m.

The hardening and content of Cp-90 and Cs -137 in soil depends on the form in which they are found (water-soluble Base Exchange, hardly soluble), and on the properties of the soil.

When cultivating agricultural crops on soils contaminated with IPE, the consequence is extracted by the roots of plants and accumulate in plant products.

Reduce their intake in plants can be appropriate methods. Studies have shown that Cp-90 in comparison with Cs -137 intensively enters the plants, which is explained by the different degree of their fixation in the soil.

Calcium-loving plants usually absorb a relatively higher Cp-90 than the poorest plants accumulate Cp-90, legumes, less-root crops and even less-elastics.

Plants containing more potassium absorb and more Cs-137. On soils of light mechanical composition and poor humus, other things being equal, radioactive elements enter the plants more than on soils of heavy mechanical composition and rich in humus.

The intake of Sr-90, in plants decreases on cultivated soils with m³ sequestration and fertilization. The intake of Cs-137 in plants reduces various potassium fertilizers; the intake of Cs-137 is inhibited by the introduction of alkali metal phosphates.

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Thus, at present natural radionuclide, ionization is present in nature, which causes the EPF and artificial radionuclide contamination, which can lead to irreversible transformations in the animal organism, depending on the dose of the radiation level; to disturb its homeostasis, evolutionarily conditioned both ontogenetic and phylogenetic ally.

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Ionizing radiation is a powerful mutagenic factor

Taking into account all planetary prevalence of radioactive contamination and all the harmfulness of its presence in biota, it becomes extremely necessary to examine its impact on the most important genetic Fund of mankind, i.e. becomes acutely necessary to predict how can education the ionosphere (the scope of the human mind) that naturally due to the planet's gene pool.

After all, under the influence of small doses of radiation mutation frequency increases dramatically. The vast majority of mutations generates various genetic

deformities and diseases. Nakap-livajas in generations, they can bring great suffering to humankind. And the duty of a modern society is not only to save the life of the current living generations, but also to protect future generations from the ancestral burdens harmful mutations.

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