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The Science Of Geographical Ecology: Problems And Solutions

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ABSTRACT

The article reveals the content and essence of Geographical Ecology, and shortly the science of Geoecology. It has been proven which system of sciences it stands for and what specific aspects of research it consists of.

KEYWORDS

Geoecology, science, scientific basis, object, subject, method, evaluation, control, monitoring, expertise, audit, consulting, practice.

INTRODUCTION

By the third millennium, the rapid development of science, and especially technology, has led to a wide networking of science, education, and practice. It is the most popular disciplines that emerge between two or more disciplines. It is a natural and objective process. "Pure sciences" such as physics, mathematics, chemistry, philosophy, law, geography, biology serve as a fundamental basis for new sciences. This, on the one hand, reduces their aspiration for innovation, and, on the other hand, in the absence of events and processes in society and, especially in nature, that are not interconnected, one does not arise from the other. Because all social and natural

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conditions, events, processes and happenings are inextricably linked and interrelated. Geographical ecology – The science of "Geoecology" is no exception [1, p. 120].

For each science, including Geoecology, to take part in the scientific field, it is necessary to have its own goals, objectives, object, subject, method, history of development and formation, methodology and methods, practical aspects. Otherwise it will not be recognized as a science network [2, pp. 16-28].

The reason why Geoecology is considered as a separate subject in this field is three unresolved issues:

- ✓ The first – "Geoecology" geographical ecology or geological ecology?
- ✓ The second – the mixing of environmental research with geoecological research?
- ✓ The third – to what direction of geography does Geoecology belong and what are its practical aspects?

THE MAIN FINDINGS AND RESULTS

It is necessary to pay attention to a specific case, which can be called an axiom, which proves that Geoecology is geographical ecology. The object of universally recognized ecological science is the biosphere crust of the planet Earth and the ecosystems in it, that is, the general and specific habitat of organisms. The object of geography is the geosphere crust of the planet Earth and the geosystems in it. The geosphere – the geographical crust is the most active layer of the biosphere (we will focus on this issue below). In other words, the geosystem is within the ecosystem, but differs in content and essence [3, pp. 11-13].

So the geosystem and the ecosystem seem to be in the same space. However, we cannot fully apply this situation to the science of geology. Because the object of Geology is the Earth's crust and the Earth [4, p. 512]. The lower boundary of the Earth's crust descends to the Earth's mantle, where organisms do not enter. This means that Geology goes beyond ecosystems, and therefore the Earth's crust cannot be an ecological object. Yes, living organisms are found at depths of up to 6 km, in layers where oil and gas are scattered and the remains of the organic world are found. But the geological object is not limited to this mineral layer! If we want to study the ecological aspects of geology within the boundaries of the distribution of organisms, then we need to use some other terms. For example, "Ecology of oil reservoirs" or "Ecology of gas reservoirs", etc. In addition, there is an unwritten but generally accepted rule in science – if a field of science uses a particular term or phrase for the first time in its research, that term or phrase remains relevant to that science. For example, soil erosion – the subject of "Erosion studies" and the subject was first used by soil geographers to reflect soil erosion. But the word "erosion" is widely used in both medicine and journalism. They adopted this process under the full names of the disciplines of "Medical erosion" and "Journalistic erosion", but not "Erosion studies". Well-known erosion scientist, professor of Moscow State University named after V.V.Lomonosov M.N.Zaslavsky says – "We must admit that we do not always pay enough attention to monosemantism in scientific terminology – the uniform interpretation of terms. Such ambiguity in science (especially in education – A.N.) is not only a hindrance, but a real guilt" [5, p. 17]. The landscape geographer K. Troll first introduced the word "Geoecology" to science in 1939 [6, p. 23-34]. This is clearly stated in the textbook "Geoecological bases of environmental protection" published by geologist E.V. Kadyrov and his followers [7, p.

19]. A.V. Sidorenko first made a mistake in 1967 in his article "Man, technology, land" that Geoecology is geological ecology. He was unaware of K. Troll's work and did not focus on the geographical literature. For the USSR, which in the 1960s sought to win the Cold War by mining new deposits in the former Soviet Union, the conclusion of geologists was above all geographical scientific rules. The ideological approach to science, and especially to its theory, has led to the view of Geoecology as a Geological Ecology. This error, unfortunately, is also widely popularized by other geologists. A similar situation is happening today in Geotourism – Geological tourism [8, pp. 284-295].

Now let's talk about the second problem. Indeed, some research in the field of ecology repeats research in other related sciences or conducts research very closely related to it. Such parallelism also exists in General Ecology with the Science of Geoecology. For example: geological and environmental monitoring, evaluation, forecasting, monitoring, etc. In order to clarify these issues, it is necessary to first focus on the aspects of Geoecology that are recognized as an independent science.

THE OBJECT OF GEOECOLOGY

We have already mentioned this, but in addition it should be noted that the geosphere includes the entire hydrosphere, the upper lithosphere and the lower atmosphere, the crust is formed, where endogenous and exogenous processes directly affect the Earth's surface and relatively active movement of organisms. This active geographic crust is called a "large geosystem" or "geosystem", and the rest are geosystems or geosystems in different taxonomic units. Thus, geoecological research can never go beyond this geosphere. But the question of how thick the geographical crust will be in a particular place is still a mystery [9, 120]. This problem is a separate object of research and discussion.

In Geoecology, geosystems or geosystems are considered to be the habitats of organisms, and it is advisable to study geographical systems within these geosystems. This is the main difference between ecological research and geoecological research. For example, geosystems include natural geographic zoning objects and smaller taxonomic units – region, landscape, place, urochisha, and facies. However, the development of science and technology requires the study of geoecological objects into smaller natural geographical parts than facies. Oral organisms are divided not only into flora and fauna, humans, but also into microorganisms and nano-organisms (10-9 and smaller in size). Similarly, it is inevitable that their habitat – "house" will be studied not in km2, hectares, m2, but in a very small area of geosystems in cm2 and mm2.

THE SUBJECT OF GEOECOLOGY

Changes in the object of Geoecology make additions and changes to its research goals, objectives, subject, and methodology. In general, the subject of Geoecology is the study of any aspect of a geosystem or geosystem. It examines the territorial, complex, (systematic), periodicity, and aspects of the natural, economic, social, political, and even legal geographical aspects of the relationship between organisms (including humans) within geosystems and between them and the environment. Therefore, the science of Geoecology in Uzbekistan is included in the specialized council "11.00.05 – Environmental protection and use of natural resources". In a number of countries, such as Kazakhstan, the Russian Federation, Ukraine, specialty codes in the

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USSR have been revised over the next 15-20 years, and Geoecology is seen as a separate discipline. It is time for the Higher Attestation Commission (HAC) under the Cabinet of Ministers of the Republic of Uzbekistan to review the specialization codes used in the former Soviet Union in accordance with the requirements of time and space, and to assign a special specialty code to Geoecology.

It would be absolutely wrong to say that Geoecology is only specific to natural geography or that it only studies the natural geographical aspects of the terrestrial part of the Earth's surface. Because the geographical crust must take into account both the water part of the Earth's surface and the social, social, economic, legal, political and even enlightenment-spiritual aspects, processes and events that take place on it. After all, all natural and social phenomena and processes affect the ecological condition of the geographical crust [10, p. 192].

GEOECOLOGICAL METHODS

Another requirement for the formation of Geoecology as an independent science is the availability of specific methods of study, research and research. These methods are also available in other fields of natural, concrete, technical, humanities or social sciences, but the science of Geoecology has specialized or generalized them depending on its purpose, object, and subject. We need to choose geoecological methods in a way that connects the events and processes taking place in geosystems to a specific area and approaches it complexly geographically. This approach differs from the general systematic approach in pure environmental methods. Because it is distinguished by its territoriality, periodicity, complexity. For example, the method of remote territorial complex observation (a method of studying and monitoring natural complexes through a geographic information system [11, pp. 35-37]); conducting semi-stationary and stationary experiments on natural geographical complexes; modeling of exogenous and endogenous processes or other dynamic phenomena in taxonomic units of landscapes using computer technologies, etc.

In recent years, the method of conducting experiments through the artificial creation of small space (microcosm), natural geographic complexes, is widely used in geoecological research. Data from man-made artificial Bios-6 (Russian Federation) and Biosphere-2 (USA) cameras lead to very interesting conclusions.

Another modern geoecological method is geoecological modeling. A model is a mathematical representation of changes in organisms and the natural environment [12, pp. 69-80]. This simulation method allows you to test very large processes in a short period of time using information technology. Dozens of methods for quantitative assessment of events and processes in geosystems (neural networks or multifactorial theoretical hardware programs) serve to conduct geoecological monitoring and create promising geoecological programs.

In general, the development of new geoecological methods as a separate research subject in science, and equipping it with new pedagogical methods in education is one of the current issues.

Geoecological assessment, monitoring and forecasting, of course, differs from general ecological assessment, monitoring and forecasting in its content and essence. This difference is mainly in their object. For example, according to the scope of environmental monitoring: local, national,

regional, regional, geoecological monitoring is carried out within certain natural geographical complexes – continents, zones, districts, provinces, regions, landscapes, places, factions or socio-geographical carried out within taxonomic units. It mainly uses the above-mentioned geoecological methods. Another area for further research is the establishment of general geographical (natural and social geographical) zoning to identify geoecological areas. The separate natural and separate economic and socio-geographical zoning made to date may not correspond to the subject of geoecological research. Because Geoecology is just a field of natural or social geographical science and education.

Geosystems within a defined geographic crust have a variety of methods for tracking, accounting for, evaluating, and predicting changes in organisms and their environment: traditional (terrestrial geographic) observation: aerospace (remote sensing) observation.

Traditional observation is instrumental, visual. Instrumental observation uses all environmental indicators in geosystems, instruments that record events and processes affecting organisms and their natural environment. For example, measuring the passage of erosion processes through taximetrics, geophysical and reference points. Representation of the geoecological situation on maps of different scales through chamber–field–chamber surveys. Visual observation is carried out by recording the situation on the route-expeditions on certain geocards.

Aerospace remote geoecological monitoring is carried out on the basis of images and videos taken from aircraft, helicopters, spacecraft (Figure 1) in a generalized way or by assessing, analyzing and recommending appropriate measures for their components. Recently, quadcopters and drones have been widely used in geoecological monitoring (Figure 2). Using the above-named methods, two groups of geoecological indicators are identified: first, to identify abiotic, biotic and anthropogenic factors affecting geosystems, collect and analyze data such as their strength, direction, size, area; the second is to assess, analyze the condition of geosystems and carry out by the competent authorities of the relevant state. Regional and global geoecological monitoring is carried out by specialized interstate associations or international organizations. Such geoecological monitoring covers a wider and deeper layer than geomonitoring. However, environmental monitoring stems from geoecological monitoring and one complements the other.

Typically, local and national monitoring is carried out by the competent authorities of the state. Regional and global monitoring is carried out by specialized interstate associations or international organizations. Such environmental monitoring covers a wider and deeper layer than geo-monitoring. However, environmental monitoring stems from geoecological monitoring and one complements the other.

It shall be carried out in accordance with the principles set out in the 1972 United Nations Stockholm Conference on Environmental Protection. Its legal basis is Article 28 of the Law of the Republic of Uzbekistan "On Nature Protection"; The Regulation “On State Monitoring of the Environment” approved by the Resolution of the Cabinet of Ministers No. 111 of April 3, 2002 is the charter of specially authorized state bodies and other by-laws.

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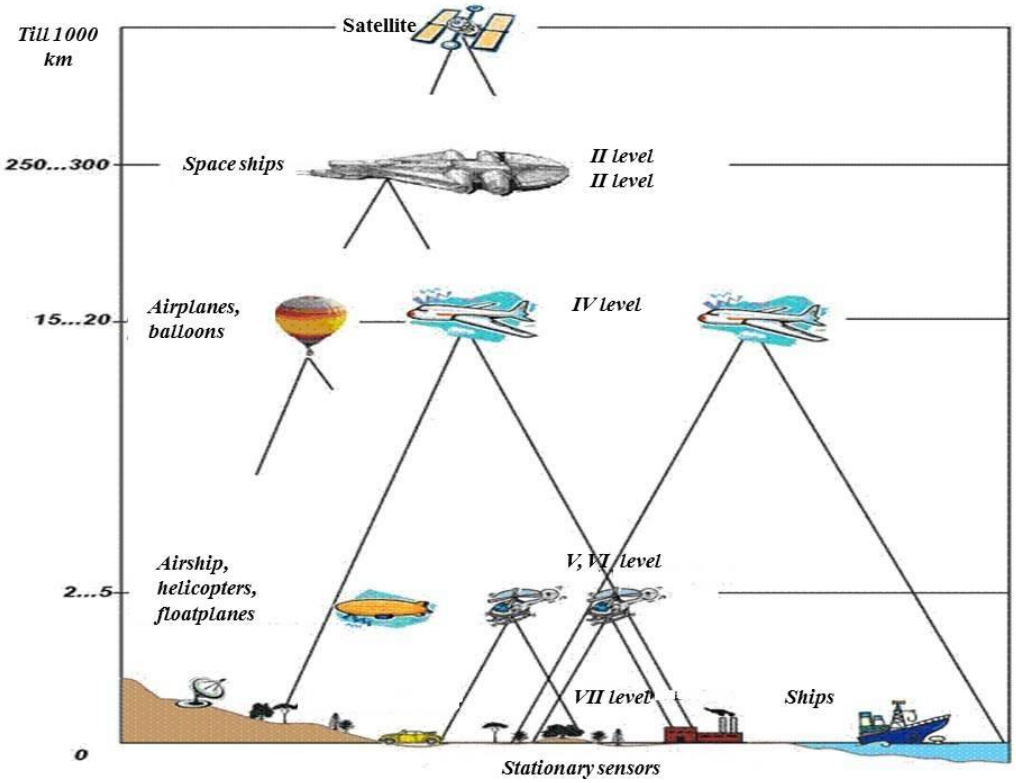

Figure 1. Methods of geoecological monitoring

Figure 2. Use of quadcopters and drones in geoecological monitoring

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Approved by the Resolution of the Cabinet of Ministers No. 273 of August 23, 2016 "Environmental Monitoring Program in the Republic of Uzbekistan for 2016-2020" Currently, environmental monitoring is carried out at 390 industrial enterprises, 68 surface water points, 87 water discharges, collectors, 1,694 groundwater wells, 74 springs, and 61 atmospheric air monitoring posts. Finding an answer to the question of what non-state geoecological monitoring should look like in future geographical research is crucial.

Geoecological expertise is the determination of the compliance of economic and other activities of a human society planned or carried out in geosystems with environmental requirements and the conclusion that the object of ecological expertise can be realized. The main goals and objectives of geoecological expertise are to plan and carry out the planned economic and other activities, to determine the extent to which these activities may affect environmental requirements, in particular the health of citizens, as well as to protect geosystems, their resources and their rehabilitation, to determine the adequacy and scientific validity of the measures taken to meet environmental requirements.

GEOECOLOGICAL AUDIT

The inspection of accounting books, reports and documents of the subjects of geoecological relations. Auditing is carried out by auditors (audit firms) in the form of business activities. Geoecological audit has a somewhat peculiar appearance. Geoecological audit is of three types: 1) production geoecological examination; 2) territorial geoecological expertise; 3) geoecological consulting.

The purpose of the geoecological audit of production facilities is to verify the compliance of financial and economic activities of enterprises with the requirements and guidelines for the protection of geosystems, the preparation of recommendations on measures for the protection of geosystems and the use of natural resources. Such an inspection is carried out before the financing of the case and in cases of conflict with the regulatory authorities.

Regional geoecological audit is used to assess the natural resource potential of specific geosystems to identify adverse natural phenomena and the impact of anthropogenic processes on them and their types. This type of environmental audit involves dealing with real estate and land transactions; to formulate an initial conclusion and present it to the public; submission of expert opinion and approval by higher authorities; dispute resolution, etc.

GEOECOLOGICAL CONSULTING

Examination of issues of financing of geosystem problems arises as a result of production technologies, urban planning, land use rights and other economic activities in cities and urban agglomerations (sets). For example, geoecological consulting is a summary of geosystems on the ecological consequences of projects on the use and acquisition of geosystems, geoecological assessment of existing or designed technologies, evaluation of the effectiveness of measures for the protection of geosystems; assessment of the application of environmental measures; participation in the preparation of permits, etc.

GEOECOLOGICAL PRACTICE

The application of the results of research, studies and research in Geoecology at the national, regional and global levels is also one of the main requirements for modern science. Because the main goal of the individual, society, state and international community is to achieve prosperity and sustainable development. One of the key indicators of prosperity is environmental safety. It is one of the key elements not only of human well-being, but also of national and international security.

Developed by the Gro Harlem Brundtland Commission (1987), approved at conferences and summits in Rio de Janeiro-1992, Johannesburg-2002, New York-2015, the "Concept of Sustainable Development" addresses environmental, economic and social issues together and simultaneously. or proposed within the framework of natural geographical units – geosystems, rather than within administrative divisions. Such natural geographic units include: mountains, deserts, small islands, seashores, anthropogenically disturbed, crisis-ridden natural geographic complexes. This requires large-scale geoecological research within the framework of geosystems and the introduction of their results at the local, national and international levels.

The third geoecological issue is which system of sciences includes Geoecology. By the end of the twentieth century, "Geoecology" began to be used simultaneously in geography, geology and ecology. This situation has led to a number of confusions in science [13, PP. 14-16]. Because while ecologists study ecological relationships in the geographical crust as an object of study within an ecosystem, geographers tend to view it as an object of study within a geosystem. Geologists, on the other hand, have not clearly defined the subject of his research, and it is also a mystery. As a result, one field of science "settled" into three systems of science. Geoecology is a science that is currently in the system of geographical sciences. In many countries, this specialty is trained in the faculties of geography [14]. However, in the near future, after the ecological sciences become firmly established in the field of independent science, education and practice, it is inevitable that it will completely leave the field of geography and join the family of ecological sciences.

CONCLUSION

In short, geoecology is an independent branch of science that is still part of the system of geographical sciences, which is not yet fully formed. Disclosure of its geographical potential is one of the most pressing issues of our time.

REFERENCES

1. Nigmatov A., Musaev J. (2017) Geoecology and the use of nature. Textbook. – Tashkent. – p. 120.
2. Fayzullaev O. (2006) Philosophy and methodology of sciences. – Tashkent: Philosophy and Theory of Law Publishing House. – pp. 16-28.
3. The lower boundary of the geographical crust and the science of geological geography. Regional problems of modern geography // Materials of the Republican scientific-practical conference. – Karshi, 2010. – pp. 11–13.
4. Dolimov T.N., Troitskiy V.I. (2005) Evolutionary geology. – Tashkent: Publishing House of the National University of Uzbekistan. – p. 512.
5. Zaslavsky M.N. (1979) Soil erosion. – Moscow: "Mysl". – p.17.

6. Troll C. Die geographische Wissenschaft in Deutschland in der Jahre 1933 bis 1945. Ein Kritik und Rachtfertigung // Erdkunde. Archiv fur wissensch. Geogr. 1947. – pp. 23-34.
7. Kadyrov EV et al. (1999) Geoecological bases of protection of the natural environment. – Tashkent. – p. 19.
8. Atasoy E., Nigmatov A., Nigmatova G. Geotourism – a new direction in the tourism industry of Uzbekistan // "The journal international social research". Istanbul / Turkey. №12 / 66. October 2019. – pp. 284-295.
9. Zokirov Sh.S. (1999) Natural geography of small areas. – Tashkent: "Universitet". – p. 120.
10. Isachenko A.G. (2003) An introduction to ecological geography. – Saint Petersburg. – p. 192.
11. Abdireymov S.J. (2002) Geo-information support of ecological and economic modeling of agricultural production // Uzbekistan geographic society bulletin. Volume 22. – Tashkent. – pp. 35-37.
12. Dragicevic S., Marceau D.J. (2000) An application of fuzzy logic reasoning for GIS temporal modeling of dynamic processes // Fuzzy Sets and Systems. 113. – pp. 69-80.
13. Nigmatov A., Yusupov R. (2005) Geology and its main problems // Ecological Bulletin of Uzbekistan. Issue 6. – pp. 14-16.
14. Yasamanov N.A. (2003) Fundamentals of Geoecology. Study guide. –Moscow: "Academy".