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## **Geotourism objects of Ukraine: lakes and amber of Volyn Polissya**

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### **SUMMARY**

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Geotourism is one of the forms of tourism that promotes rapprochement between peoples, ethnic groups, the establishment of a humanistic paradigm in society. Through the main, recreational, purpose of geotourism, natural objects are known, there is an individual enlightenment of people, which ideally allows us to understand the unity and harmony of space, society, man and gives a chance to protect our planet. Thus, thanks to geotourism, the ecological worldview is established, covering an increasing part of humanity. In Ukraine, the tourism sector is developing rapidly. In this regard, it is important to identify and "prepare" all new geotourism facilities, compiling their comprehensive information passports. The article considers 2 potential geotourism objects of Volyn Polissya - lakes and amber. The main aspects of the use of lakes are distinguished - economic, recreational, natural-cognitive, educational. Now amber has become one of the symbols of Ukraine. There is a separate "amber" sector of the economy in Ukraine. The country is developing a state development program, an element of which is the forecasting system of amber, the scientific basis of which is the idea of amber formation (AF). AF of Ukraine is a unique world-class geological object, which has not only practical significance, but also scientific one and cognitive value and can be considered a potential geotourism object.

**Introduction.** *Geotourism* is one of the forms of tourism that promotes rapprochement between peoples, ethnic groups, the establishment of a humanistic paradigm in society. Through the main, recreational, purpose of geotourism, natural objects are known, there is an individual enlightenment of people, which ideally allows us to understand the unity and harmony of space, society, man and gives a chance to protect our current home - the planet Earth. Thus, thanks to geotourism, the ecological worldview is established, covering an increasing part of humanity. In Ukraine, the tourism sector is developing rapidly, becoming more systemic - expanding its production infrastructure (hotels, roads, routes), training staff (now almost all major educational institutions in Ukraine train specialists for the tourism industry). In this regard, it is important to identify and "prepare" all new geotourism facilities, compiling their comprehensive information passports, mandatory coverage of their levels (local, regional, planetary), place in the natural process, involvement in the promotion of humanistic paradigms of humanity. Possible potential geotourism sites are presented in (Geologichni pamjatki ..., 2011). Among them there are no lakes and amber of Ukrainian Polissya, which are well researched. However, the collected large factual material is scattered and insufficiently considered in the aspect of the new humanistic paradigm.

**Method and Theory.** In performing this work were used general theories (*general systems theory, laws of dialectics, nonequilibrium thermodynamics, thermodynamic evolution of the Earth*) and partial methods of geological and geographical sciences (*geostructural analysis, geological and formational analysis, morphostructural analysis, neotectonic analysis, paleogeographic analysis, geomorphosystem analysis, paleogeomorphological analysis, morphometric, cartographic, geoinformation modeling*), as well as studied legal documents (Constitution of Ukraine, codes - criminal, forest, land, water, subsoil law, Presidential Decrees, Decision of the Cabinet of Ministers of the Resolution of the Verkhovna Rada of Ukraine).

**Examples (Optional).** The structure, origin, history of development, geology, geomorphology, hydrology, hydrogeology, hydrochemistry, bottom sediments of the lakes of Volyn Polissya in different years were studied by B.G. Hetman, O.K. Gorbachevsky, P.V. Klimovich, O.O. Komliev, Yu. O. Koshik, L.V. Naumenko, V.R. Maludov, L.V. Naumenko, Tillo, V.M. Timofeev, T. F. Hristoforova, V.M. Shelkoplyas, V.M. Shestopalov, O.D Yarmizin (Klimovich, 1959; Komliev and Filonenko, 2014; Komliev and Pazinich, 2015; Komliev et al., 2018, 1982).

P.A. Tutkovsky, O.P. Belichenko, M.A. Bogdasarov, L.S. Galetsky, O.O. Komliev, V.G. Melnichuk, Nesterovsky, O.O. Remezova, L.A Kovalevich, D.E. Makarenko, I.A. Maidanovich, V.M. Matsui, U.Z. Naumenko, V.A. Yu. M. Filonenko, V.G. Artyschuk, S.A Volnenko, M.I., Lebed, V.I. Panchenko, P.S. Spirka studied the amber of Ukrainian Polissya from scientific and practical positions (Bogdasarov, 2010; Bogdasarov et al., 2017; Komliev, 2018, 2020; Komliev et al., 2020; Krinitskaja et al., 2007; Matsui, 2016; Remezova and Komliev, 2018; Ukrainskiy burshtin, 2008).

### Results of investigations.

**LAKES.** In general, within the Ukrainian Polissya (Volyn) there are about a thousand large and small lakes and therefore this area is often called the "*land of lakes*". The main aspects of the use of lakes are distinguished - economic, recreational, natural-cognitive and educational.

**The economic use** of the lakes of Volyn Polissya by the local population has a long history. The disadvantage here is that not a large population and forms of management (fishing, haymaking, small shipping, local logging, water supply of small settlements located here) allowed to quickly restore the natural complex of the territory. Later, engineering structures (canals) of drainage reclamation systems were added to these forms, as well as dug large canals and embankments, which supplemented the infrastructure of large water transport facilities (in particular, *the Dnieper-Bug canal* located outside Ukraine).

**Recreational use** is also an ancient function of lakes. With the development of society, the recreational sphere also developed. In the USSR, the recreational potential of lakes was used in various forms of recreation of local and foreign populations relatively systematically. Some institutions, organizations, and educational institutions built pioneer camps, recreation centers, and

sometimes sanatoriums on the lakes. The projects that were created at that time calculated their possible negative impact on the environment. Such objects performed a certain social function - they became centers of culture for the local population. In independent Ukraine, in the attractive places of Volyn Polissya, a *private recreational complex* began to develop, and not always legally. But, given the insufficient state funding for regional development, the authorities see positive aspects here. In particular, for the development of socio-economic infrastructure (jobs, roads, recreation areas, drainage of swamps, etc.). The decentralization policy currently pursued in Ukraine allows local communities to keep more of their earned money for their own needs. Therefore it is necessary to use known natural resources of territories more effectively and to reveal new ones. Under certain conditions, the latter may become new basic factors in the development of territories. These include, but are not limited to, natural objects. Comprehensive geographical analysis of territories allows to identify such objects and assess their potential.

**The natural-cognitive aspect** of lakes is constantly filled. New ideas, new technologies allow us to rethink known facts and establish new ones, developing this aspect on new worldviews, factual and methodological basis. Currently, lakes are of interest not only to scientists, geographers, hydrologists, geomorphologists, hydrogeologists, geologists, biologists, ecologists, physicians, but also representatives of other fields (lawyers, artists, builders). Here it is necessary to show that lakes are structural elements which perform certain functions both at the local and regional levels and a single planetary metabolism at the material, energy, information, entropy levels. It should also be noted that there is growing evidence that lakes are not only unique phenomenal natural objects of the Earth, possible on other planets and their moons of the solar system and beyond.

**The educational aspect** of the new social humanistic paradigm requires concretization and accessible presentation of scientific knowledge to a wide audience. Just explain the content of scientific problems, basic concepts and terms. In the case of lakes, as geotourism objects, for example: why they belong to the *zonal* elements of *the geographical shell*, and which elements belong to the *azonal* and *intrazonal*, what are the genetic factors and how they are expressed in the external characteristics of lakes - their size, planned configuration, morphology basins, morphocomplexes connected with them, depth, topographic position, hydrological regime. Then get acquainted with the hypotheses of the origin of the lakes of Volyn Polissya - karst, glacial, water glacial, alluvial, relict, tectonic, mixed (Klimovich, 1959; Komliev et al., 1982), explain how such diversity is associated with real facts or with certain scientific ideas and theories. It is necessary to explain the reason for the greatest popularity of the karst hypothesis, to show the originality of glacial, tectonic and relic hypotheses (Komliev and Pazinich, 2015).

There are few places in the world where there are significant clusters of lakes, such as in Volyn Polissya, unique in many respects. Socio-economic development of this area should take into account the availability of this resource and use it on a systematic basis, which will provide more opportunities to attract investment. First of all, lakes are necessary for the development of great recreational potential, which includes the creation of the necessary tourist and health infrastructure. This corresponds to the implementation of environmental imperatives of the humanistic paradigm. Here it is important to find a balance between commercialization and education, the search for active and effective forms of popularization of scientific knowledge among young people, especially when conducting field trips using various exotic means of transportation (horse racing, inflatable balls, rafting on lakes). This will promote the promotion of geographical, geological knowledge, conveying to them on specific examples (lakes) important patterns of the environment (integrity, continuity, cycles in nature, zoning and rhythmic development of the geographical shell etc.).

### **AMBER**

Amber has been known about Volyn Polissya for a long time: about its jewelry qualities and availability of production. During the years of independence, amber has become one of the symbols of Ukraine. Steady demand and high prices for this mineral in the world have contributed to the development of a separate "amber" sector of the economy in Ukraine. However, in the places of amber mining (Volyn Polissya) this has created significant socio-economic and environmental problems, for some time raised to the level of national security. Currently, these problems are

practically solved by law. The country is developing a state development program, an element of which is *the forecasting system of amber*, the scientific basis of which is the idea of *amber formation* (AF) (Bogdasarov et al., 2017; Komliev, 2018, 2020).

AF of Ukraine (AFU) is a geological object of world importance, which, in addition to practical significance, has significant *scientific* and *cognitive* value and is a potential *geotourism* object. AFU is a system that emerged under certain circumstances. Its structure highlights the main elements, between which systemic connections gradually emerged. The hierarchy of these elements is clearly visible in the AF. The basic importance of *landscape* and *climatic* conditions of this area in the Eocene-Oligocene (warm, temperate climate), which contributed to the flowering of those associations of plants and trees (Araucaria, marsh cypress), pine - *Pinus succinifera*, spruce - *Picea succinifera*, which secreted *resin* (resin bodies), which turned into *amber resins*, and later *amber - the main element - the connection* AF. Indicate the possible causes of excessive resin release (including extreme weather changes, strong winds that occurred during sea transgression, which damaged trees and caused hypertrophic resin release). The next condition that contributed to the formation of AFU was a *certain mode of movement of neotectonic structures*. The beginning of the formation of the AF practically coincides with the beginning of the neotectonic stage and the formation of a new structural-tectonic plan of the territory. The complex nature of the movements of neotectonic structures influenced *the transgressive-regressive rhythms* of the ancient seas and their *hydrodynamics*. Tectonics influenced the geomorphosystem and determined the distribution of paleorelief forms, the processes of sediment accumulation, which contained amber of *the first (primary)* generation of placer deposits. Periods of attenuation and intensification of tectonic movements alternated with the history of the territory. The primary placers of the AFU suffered the greatest destruction at the end of the middle and early late Miocene. In the Middle Pliocene, in the Middle Quaternary time there were conditions for the formation of *repeated placers*. This general model of the evolution of the AFU is proposed for use in search operations.

It is also necessary to acquaint with the basic theories of formation of amber which exist in Europe and in Ukraine, to acquaint with the basic problems which exist here. In particular, regarding the *nature* and *origin* of root sources of placers and their *mutual location*, as well as primary and secondary placers of amber-succinite. Here we should mention the still popular in Europe ancient hypothesis about the "amber forests" of Scandinavia, in the soils of which accumulated amber resin, which moved by rivers, seas, glaciers and could reach the territory of Ukraine. It is necessary to point out the shortcomings of this hypothesis. It should be noted that *bituminous-lignite hypothesis* is more popular in Ukraine, which is based on specific facts, for example, the ability to accumulate amber-like resins with lignite bitumen. Many large and small lignite basins and deposits located in Europe and Ukraine testify in favor of this hypothesis. In particular, the main place of amber mining in Ukraine is the *Pripyat amber basin*. Here we can say about the prospects of the *Dnieper lignite basin* and a number of other smaller ones. The bituminous-lignite concept is confirmed by many data: *humid climate, developed vegetation, flat relief, high groundwater level, strong wetlands*. With the advent of the sea, swamps became peatlands, where deposits of lignite and brown coal were formed. Resin-resin was transformed into amber in 3 stages: 1) *release of resin-resin*, its hit in the soil and the beginning of fossilization; 2) *accumulation of resin* in soils and formation of low-value soil-biogenic deposits; 3) *the formation of amber in marine conditions*, which lasted hundreds of thousands of millions of years. Derivatives of destroyed soil-biogenic deposits were carried by rivers to sea reservoirs, where under regenerative conditions the oxidized resin was transformed into amber. The bottom relief and hydrodynamic processes determined the redistribution and burial of fossil resin. At this stage, all the *main morphogenetic* types of primary amber placers were formed - *marine, coastal-marine, lagoon-delta*. In favor of the "Scandinavian" hypothesis of the origin of amber placers in Ukraine may indicate the accumulation of amber in marine sediments, the low specific weight, high *flotation* of amber, modern data on amber long-distance movement (Baltics, Poland). It is possible to allow different models of formation of different genetic types of AFU deposits.

Finally, it is necessary to point out the very important importance of the inclusions of the ancient biosphere, concluding in amber (Ukrainskyi burshtyn, 2008).

**Conclusions.** The development of geotourism requires the introduction to the tourism market of new natural objects that are not scientific and practical, but also educational value for individuals. It is important not only to identify potential geotourism objects, but to give as complete as possible their information passports, which will allow to take into account the basic natural laws, which will allow to understand the unity and harmony of space, society, man. In our opinion, the lakes and amber of Volyn Polissya meet these requirements and can be considered as a geotourism resource.

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