

Development of “Archean rocks” tour itinerary through the objects of geological heritage of Dnipropetrovsk region

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Abstract – Geological objects being interesting in terms of arranging the excursions for the citizens of the region have been singled out. Logistic possibilities of traveling to the proposed locations from the viewpoint of administrative identity, road interchange, natural conditions and seasons have been evaluated. Geotouristic typification of the objects has been performed.

Key words – geotourism, geosite, geotrip, tourism.

I. Introduction

Strategy of the Development of Tourism and Resorts of Ukraine up to 2026 has been determined the integrated approach to the formation and implementation of state policy in the sphere of tourism; that envisages the development of a certain system for strategic planning to frame the tourism types based on their clear classification and determination of the priorities both at state and regional level. The priorities with much attention to be focused on are as follows: natural, scientific and educational, and ecological tourism. These are the constituent parts being united by geotourism. Geological tourism is one of the essential components of geotourism.

It is required to have study thoroughly all the ways to implement and develop geotourism as the component of the Strategy of the Development of Tourism and Resorts of Ukraine. Geological objects that will be involved into the development of geotouristic itineraries of the central part of Ukraine have been proposed. It is necessary to determine the objects type, their geological aspects, evaluation criteria, attractiveness and prospects of geological formations as touristic objects. Each object requires the elaboration of optimal logistic solutions for future tourists. Geological object characterized by the complete range of public, easy-to-understand, and structured information is called a geosite. Several geosites united into a logical itinerary are called a geotrip.

For a number of reasons, Dnipropetrovsk region is a key region in Ukraine in terms of geotourism development. Historical traditions, unique geological objects, and rich mineral and raw material base of the country make our region rather attractive from the viewpoint of the development of the mentioned areas of touristic services. Geotourism is very popular worldwide. Everybody can find any data about any geological object; besides, there are a lot of leaflets with the detailed

descriptions and schemes for tourists to have their own independent trips.

Geotourism is a complex touristic product aimed at demonstration of all the amount of diverse and original objects. Along with geological and mineralogical information, visitors learn paleontological, hydrogeological, historical, and cultural peculiarities of the objects. As for Ukraine, the Carpathians are the qualitative example of the development of geoparks with the required documentation according to the criteria; all the geotourist itineraries here are described and marked thoroughly. Moreover, there is the related electronic resource freely available on the Internet (geokarpaty.net).

Currently, geological objects which could be interesting from the viewpoint of geotourism have not been completely determined, described, and classified yet. Remote and small-area geological objects still require further processing and systemizing.

II. Main part

The paper proposes the development of a regional-level geotrip along the river Mokra Sura (the supposed name is “Archean Rocks”). Closeness of the itinerary to the regional center, its convenience in terms of physical loads, picturesqueness, and photogenicity are its obvious advantages. The georoute can be used both for hiking and cycling. The proposed geoattraction consists of 2 geosites: outcrop of plagiogranites of Sura Mesozoic complex (Surianochka open-pit) and Novomykolaivka granite quarry with the the Mokra Sura valley

Consider the objects descriptions.

1. Outcrop of plagiogranites of Sura Mesozoic complex (Surianochka open-pit), village of Sursko-Lytovske, western skirt, Dnipropetrovsk region. The coordinates are 48°19'38.8"N 34°54'12.5"E. Type of geosite is petrographic.

Plagiogranites of Sura Mesozoic mass (2985±90 mln years), being a petrotype of the homonymous plutonian complex, stretches along the left bank of the Mokra Sura river in the form of picturesque steep terraces of both natural and man-made origin. (It should be noted that petrotype is the specific petrographic object selected as a typical one for a particular basic petrographic subdivision – complex; it is the basis to recognize and single out the complex. The object recommended as a petrotype should reflect the complex to its full extent; it should have appropriate outcrop characteristics and be accessible for exploring and studying). Rock outcrops are represented by rather homogeneous medium-grained biotite plagiogranites and tonalites. The rocks are characterized by massive and subtle gneissic structure stipulated by flat-parallel arrangement of biotite flakes and oblong quartz grains. Important diagnostic petrographic and mineralogical signs of the rocks include large, up to 6 mm, intergrown biotite pieces associated with the inclusions of orthite, apatite, zircon, and magnetite [1]. Tourists interested in the mineral and rock collection can enlarge their collections with these samples.



Fig.2 Outcrop of plagiogranites of Sura Mesoarchean complex

Postgenetic magmatic processes represented by the outbreaks of light-coloured plagiogranites in the form of subvertical dike of diabasic composition of plateau-like shape with the thickness up to 6 meters are of special interests. Similar bodies are typical for Ukrainian crystalline shield (UCS) though they are rare accessible enough. Tectonic processes are represented by block rock jointing being divided by the set of subvertical and horizontal fissures.

The outcrop is of high educational importance for pupils and students learning natural sciences. Its transportation accessibility and observability make it an attractive object from the viewpoint of geotourism. Unfortunately, the geological object has no visual aids (stands with description, graphic information, route schemes). Activities dealing with the arrangements of local geotouristic attractions which can be the additional stimulus for the development of regional natural and educational tourism are only at their initial stage [2]. It is required to record and plan the activities in terms of the arrangement and information support of geotouristic objects in various projects and target programs on tourism development.

2. **Novomykolaivka granite quarry**, the village of Novomykolaivka, southern skirts. The coordinates are 48°18'56.2"N 34°51'55.4"E. Type of geosite is petrographic, geomorphological, mining and operational.

Novomykolaivka is located south-west from the city of Dnipro at the distance of 30 km. In terms of geomorphology, the area is located in the central part of UCS plateau within the boundaries of a wide valley of the Mokra Sura river. Rocks making up the area are represented by Archean (3150±50 mln years) amphibolites, granites of various compositions, and migmatites forming homogeneous masses. Shape of Mokra Sura valley as well as crystalline rocks being open due to quarry operations and subjected to tectonic crushing and weathering is of high geotouristic interest.

Geomorphological aspects of the river valley composition (elbows of capture) have tectonic reasons. Mokra Sura bed, as the majority of streamflows within the crystalline shield, is associated to the fissures in the earth's crust. The river has turned sharply due to the differently directed disturbances and elevated granite block available on its flow. Having such an obstacle, the

river began to flow on the path of least resistance – within the zone of submeridional fissure and the failed rocks.

When we pass the distance of 2.5 km along the picturesque slopes and brinks of the river, we come to the south bank of the immersed granite quarry. Quarry diameter is 300 m, its depth is up to 50 m. (Fig.3). The height of the above-water part of quarry walls is from 10 to 20 m. The worked-out quarry is within the tectonically disturbed area, granites are not crushed intensely. Coloured terraces display active processes of chemical and physical weathering with the areas of kaolin weathering crusts formation.

Nowadays, the quarry-lake is the place where local people have rest; besides, it is a diving center. All year round the water here is blue and clear as there are no sludge and clay deposits. Geotouristic aspects aimed at the popularization of such an interesting place both for having rest and learning are not taken into consideration. The required information support will make it possible to develop Novomykolaivka quarry as the geosite of regional importance that will no doubt give certain benefits to local communities.



Fig.3 Novomykolaivka granite quarry

Conclusion

Thus, further activities should be focused on the detailed photographing and video recording of the mentioned objects, development of itinerary schemes and classification of geotouristic objects of Dnipropetrovsk region on the basis of their attractiveness, duration, and complexity. In addition, it is necessary to develop such electronic resource as "Tour itineraries and significant geological sites of Dnipropetrovsk region" with its following advertising and promoting on the Internet.

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