CZU:502.43(262.5)

UNESCO GLOBAL GEOPARKS NETWORK: REVIEW AND PROSPECTS FOR ESTABLISHMENT A NEW GEOPARK IN THE NORTH BLACK SEA REGION

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Abstract. *Geopark is based on the presence of a unique geological object of international significance. The geosite, which can later become the core of a geopark, is a unique Sudak standard terrace profile (SSTP). It is represented by 12 separate terrace levels corresponding to successively alternating stages of the development of the Black Sea basin, starting from Kuyalnikian and Gurian. Relics of marine terraces were subjected to the destructive influence of natural and anthropogenic factors. Conservation of the SSTP can be realized by establishment a terrace type geopark on the Northern coast of the Black Sea.*

Key words: North Black Sea, Sudak standard terrace profile, terrace type geopark, natural and cultural heritage, geosite.

Since the 2000s an aspiring field of study that supports the creation of geoparks - a new category of conservation areas of global importance - is actively developing. The program for founding a network of geoparks was proposed in 1998 as a joint initiative of UNESCO and the International Union of Geological Sciences (IUGS). On November 17, 2015, at the 38th session of UNESCO, a new type of protected area, the UNESCO Global Geopark (UGGp), was approved and criteria for their allocation were proposed. The UNESCO Global Geoparks (UGGp) together with the International Geoscience Programme (IGCP) are the sub-programmes (pillars) of the International Geoscience and Geoparks Programme (IGGP) which is part of the UNESCO portfolio of activities and programmes to support research and capacity development in the Earth Sciences, in line with the 2030 Sustainable Development Agenda (https://unesdoc.unesco.org/). IGGP provide an opportunity for geoscientists in the understanding of the transformation of nature within the territories of the UNESCO Global Geopark and elsewhere.

UNESCO Global Geoparks are single, unified geographical areas where sites and landscapes of international geological significance are managed with a holistic concept of protection, education and sustainable development (http://www.unesco.org/). Each geopark is characterized by: territory, population, heritage (natural and cultural), socio-economic characteristics, accessibility and existing infrastructure. Geopark operation is provided by: management body (legal entity), staff (including geoscientists,), geopark budget, partnerships, networking (local-national-international), sites of interest (inventories), management plan, infrastructure, activities, monitoring and review. Geopark's heritage includes: landscapes (sites of aesthetic value, cultural landscapes), geological heritage (geo-sites, rocks, fossils, landforms), areas of ecological value (biodiversity, habitats, protected areas), cultural heritage (tangible, intangible). The four essentials of a geopark are: geological heritage of international value, management visibility, involvement of local communities. The main function of geopark is to protect the geoheritages, to develop the popular science education and to provide a place for sightseeing. The establishment and development of geopark can promote the development of tourism and local economy, so as to protect the geoheritages and ecological environment more effectively.

As of October 2020, according to official UNESCO statistics, in the world there are 161 geoparks located in 44 countries (http://www.unesco.org/), which are grouped in 3 large regional

networks: the European Geoparks Network (since 2000) (http://www.europeangeoparks.org) the Asia Pacific Geoparks Network (since 2007) (http://asiapacificgeoparks.org) and the Latin American and Caribbean Geoparks Network (since 2017) (http://www.redgeolac.org/). Additionally, there are 2 geoparks in Africa (Ngorongoro Lengai UGGp in Tanzania and M'Goun UGGp in Morocco) and 5 North-American UGGps in Canada (Percé UGGp, Stonehammer, Tumbler Ridge, Cliffs of Fundy, Discovery). In 2020 20 more areas have applied to be designated UNESCO Global Geopark and have entered the official process of evaluation by UNESCO, including Waitaki Whitestone (New Zealand).

In July 2020, at the 209th session of the UNESCO Executive Board, the first geopark in Russia and throughout the post-Soviet space the Yangan Tau Geopark was included in the list of UNESCO Global Geoparks. It is located in the Salavat region of the Republic of Bashkortostan. Its natural basis includes more than 20 geological objects, of which three (Mechetlino section, Bolshaya Luka section, Yangan-Tau mountain) are international, 10 objects are national and 21 objects are of educational importance. Many plants and animals of the park are listed in the IUCN Red List, the Red Book of Russia and the Red Book of the Republic of Bashkortostan (http://en.geopark-yangantau.ru/o-geoparke/).

The most numerous fundamental grouping of geoparks is European because it was European countries (Spain, Greece, France, Germany) that initiated the emergence of a new category of natural and cultural heritage areas of world importance. In April 2001 the European Geoparks Network signed with UNESCO (Division of Earth Sciences) an official agreement of collaboration placing the Network under the auspices of the organization.In October 2005 the European Geoparks Network in the frame of the existing agreement of collaboration with UNESCO (Division of Earth Sciences) signed an official declaration (Madonie declaration) according to which the EGN is recognized as the official branch of the UNESCO – Global Geoparks Network in Europe. So that, the European Geoparks Network is the Regional Geoparks Network of the GGN in Europe (http://www.europeangeoparks.org).

According to the official definition of the Coordination Commission of the European Network of Geoparks, «A European Geopark is a territory, which includes a particular geological heritage and a sustainable territorial development strategy supported by a European program to promote development. It must have clearly defined boundaries and sufficient surface area for true territorial economic development. It must comprise a certain number of geological sites of particular importance in terms of their scientific quality, rarity, aesthetic appeal or educational value. The majority of sites present on the territory of a European Geopark must be part of the geological heritage, but their interest may also be archaeological, ecological, historical or cultural (http://www.europeangeoparks.org).

The main basis for the foundation of both a regional and a global geopark is the presence of a unique geological object or their grouping, which are the main evidence of the evolution of the planet and, therefore, have international significance. The geological diversity of geoparks is measured by three parameters: the number of represented geological periods, rocks and geomorphological structures (UNESCO General Conference - 38 Session).

At the same time, it is obvious that geological formations are very diverse, and realizing of their potential is possible only in the conditions of functioning of a system open for innovations, which presents rather flexible requirements for applicants. This is evidenced by a wide variety of geoparks, differing in area, specificity of geological heritage sites, landscapes, modern geological processes, environmental functions, historical artifacts, and cultural authenticity.

However, the extended list of geological objects included in the international network of geoparks, as before, does not contain information on such geological and geomorphological objects as terraces (Bruno et al., 2014), the scientific study of which is underestimated.

Marine terraces are coastal leveled surfaces made of loose fine-grained clay-silt and coarse gravel-pebble deposits of marine origin (Chepalyga, Adaeva, 2018). They are mainly confined to areas of the coast that are vulnerable to destruction and degradation under the influence of both natural and anthropogenic environmental factors.

The main distinguishing features of marine terraces are (Chepalyga 2015, 2017; Adaeva, 2019):
1) territorial proximity to the coast of the paleo sea basin;
2) typical geomorphological features:
    a) leveled terrace surface;
    b) clear boundaries of the terrace area;
    c) the presence of a basement and a rear seam;
3) specific lithological and geochemical features:
    a) sub-horizontal bedding of layers;
    b) flattened pebbles characteristic of marine beach deposits;
    c) a relatively high percentage of silts and clays (particle diameter less than 0.005 mm);
    d) high content of Cl ion (more than 0.02);
    e) the presence of authigenic clay minerals in the sediments - chlorite, illite, smectite, kaolinite and especially the mineral glauconite of marine origin;
4) the presence of marine fauna of molluscs, ostracods, nanoplankton, etc.;
5) compact arrangement of a series of terraces in the system in a limited area;
6) cyclic structure of terraces within a terrace row.

The study of sediments and the structure of marine terraces is important for both scientific and practical purposes. On the one hand, it allows us to reconstruct the history of the relief development of coastal areas and marine basins (to obtain information about their level, salinity, temperature, composition of biocenoses), to restore the history of changes in climatic conditions in different eras, as well as to trace the history of the interaction of man and nature in this region, starting from ancient times, and reconstruct the main paths of development and migration of Paleolithic cultures. On the other hand, taking into account the location of marine terraces in the coastal zone, dependent on the interaction of processes on land and at sea, their study opens up opportunities for identifying the problems of the current state of ecosystems, assessing environmental sustainability and forecasting the most popular zone for recreation purposes - a strip of sea beaches.

Terrace deposits and terraced areas are also actively used in various sectors of the economy. Their loose sediments (clay, sand, gravel, pebbles) are widely used in construction, while the terraces themselves are ideal sites for the construction of permanent structures. In addition, terrace deposits and fertile soils on them, ak-toprak or ”white soil” (Crimean Tatar), have long been known in agriculture and are used as a fertile parent breed, especially for cultivating vineyards on them.

As an example of the geosite in the North Black Sea region, which can later become the core of a geopark, a unique complex natural and historical-cultural paleoarcord - Sudak standard terrace profile (SSTP) - is considered (Chepalyga 2015, 2017). A complete system of Pleistocene terraces – 12 separate terrace levels corresponding to successively alternating stages of the development of the Black Sea basin, starting from Kuyalnikian and Gurian and ending with the New Euxinian and Black Sea ones, which has no analogues in the world, in our opinion, can rightfully be recognized as an object of natural and cultural heritage not only of regional and federal, but also of global significance.

The appearance of a new UNESCO Global Geopark in the North Black sea region, in turn, will help to protect the unique complex of terraces from extinction and promote classification of geological objects, basing the core of geosites, by adding a new type of fundamental for geoparks geosites – marine terraces.

It should also be noted that due to the fact that marine terraces are widespread on the coast of the Crimean peninsula, it is possible to expand the area of the proposed geopark in the Northern Black Sea region by including a number of other natural sanctuaries of the terrace type, including on the Caucasian coast, which will significantly expand the recreational zone and will contribute to the sustainable development of the North Black Sea region.

The fundamental part of the article was carried out on the topics of State Assignments 0127-2019-0008 and 0127-2019-0007 IG RAS, field studies were carried out with the financial support of the RFBR project No. 19-05-00533A.

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