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Perspectives for geotourism development in the Bela Crkva municipality (Serbia)

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ABSTRACT

The Bela Crkva municipality has a high concentration of geosites which are of great scientific, educational, aesthetic and touristic importance. These values are the result of a complex geological structure and geomorphological processes that took place in this area, during the Earth's history. The main goal of this paper is to present the possibility for geotourism development in the Bela Crkva municipality. One of the aims is also to investigate the attitudes of local people and tourists about geotourism development in the Bela Crkva municipality as well as their familiarity with the geopotential of this area. The paper proposes several important and easily accessible geosites which can provide an excellent basis for future geotourism development, however, research results indicate the need for better tourism infrastructure as well as better promotional activities in order to attract more visitors to the proposed geosites.

Key words: geosites, geoheritage, geotourism, Bela Crkva, Serbia

INTRODUCTION

In recent years, there has been an increasing number of different forms of tourism on the global tourist market. One of these special forms of tourism is geotourism, that is primarily based on geoheritage and geosites.

According to a definition by Newsome and Dowling (2010) geotourism specifically focuses on geology, geomorphology and landscape. It promotes tourism to geosites and the conservation of geo-diversity and an understanding of Earth sciences through appreciation and learning. This is achieved through independent visits to geological features, use of geo-trails and view points, guided tours, geo-activities and patronage of geosite visitor centers. However, geotourism has been redefined by Hose who provided a comprehensive definition of geotourism: "The provision of interpretative and service facilities for

geosites and geomorphosites and their encompassing topography, together with their associated in-situ and ex-situ artefacts, to constituency-build for their conservation by generating appreciation, learning and research by and for current and future generations" (Hose, 2012).

As basic characteristics of geotourism, Mokhtari (2014) states: geotourism in its geomorphologic aspect has the geographical character and the geomorphologic processes and forms are a key element of knowledge; geotourism is not a subset of ecotourism and the use of specific evaluation methods and morphogenetic systems analysis in geomorphosite studies is necessary; it provides an opportunity for countries or regions to create their own identity; through geotourism, tourism development can be achieved, as well as conservation of geographical heritage, to benefit local communities and strengthen the tourism

infrastructure to achieve sustainable business.

Serbia is a country with very rich geodiversity. The fact that the Inventory of Serbian

geoheritage sites includes approximately 650 geological, paleontological, geomorphological, speleological and neotectonic sites (Đurović and Mijović, 2006) clearly confirms the previous statement. Some of these sites are located in the Bela Crkva municipality which has good potential for becoming a new geotourism destination in Serbia with several individual sites such as Banat Sands, Mali pesak, fossil meanders of Nera and Karaš rivers, Labudovo okno etc. These geosites are of great scientific, educational, aesthetical and touristic value, which are results of complex geological structure and geomorphological processes that took place in this area during the Earth's history.

The main goal of this paper is to present the geosites which are most suitable for geotourism development in the Bela Crkva municipality. These sites were selected due to being the most representative elements of geodiversity in these areas. However, the paper also explores the familiarity of the local community and tourists with the rich geopotential of this area as well as their attitudes towards the possibilities for geotourism development in the municipality.

METHODOLOGY

Sample

The sample included a total of 192 respondents whose place of residence was Serbia. More than half the respondents (62%) were local people while the rest were

tourists present in the area at the time being. Sample characteristics are further described in Table 1.

Instruments

The questionnaire consisted of two parts. The first part involved questions related to socio-demographic profile of respondents (age, gender, occupation, education level, residence). The second part of the questionnaire consisted of different questions related to destination preferences, geosites in Bela Crkva, available information sources and potential problems related to tourism development in the Bela Crkva municipality.

Procedure

The research was carried out in the Bela Crkva municipality between the 1st and 7th of July 2014. It was conducted in the field where each of the respondents filled out the questionnaire with the assistance of the authors. The respondents were informed of the general purpose of the study and that participation is voluntary and anonymous. Finally, a total of 192 people completed the survey.

STUDY AREA

Bela Crkva municipality (Fig. 1) is located in the northeastern part of Serbia, in the southeast of the Autonomous Province of Vojvodina and Banat district. It covers an area of 353 km² and territorially belongs to the South Banat district. On the north it borders with the municipalities of Kovin and Vršac, while on the east it borders with the Republic of Romania (Devrnja et al., 2015).

Despite its peripheral position, the

Tab. 1 Socio-demographic characteristics of respondents

Gender		Age		Level of education		Place of residence	
	%		%		%		%
male	42	< 21	22	primary	19	locals	62
		21-35	35	secondary	57		
female	58	36-55	32	higher	14	tourists	38
		over 55	11	high	10		

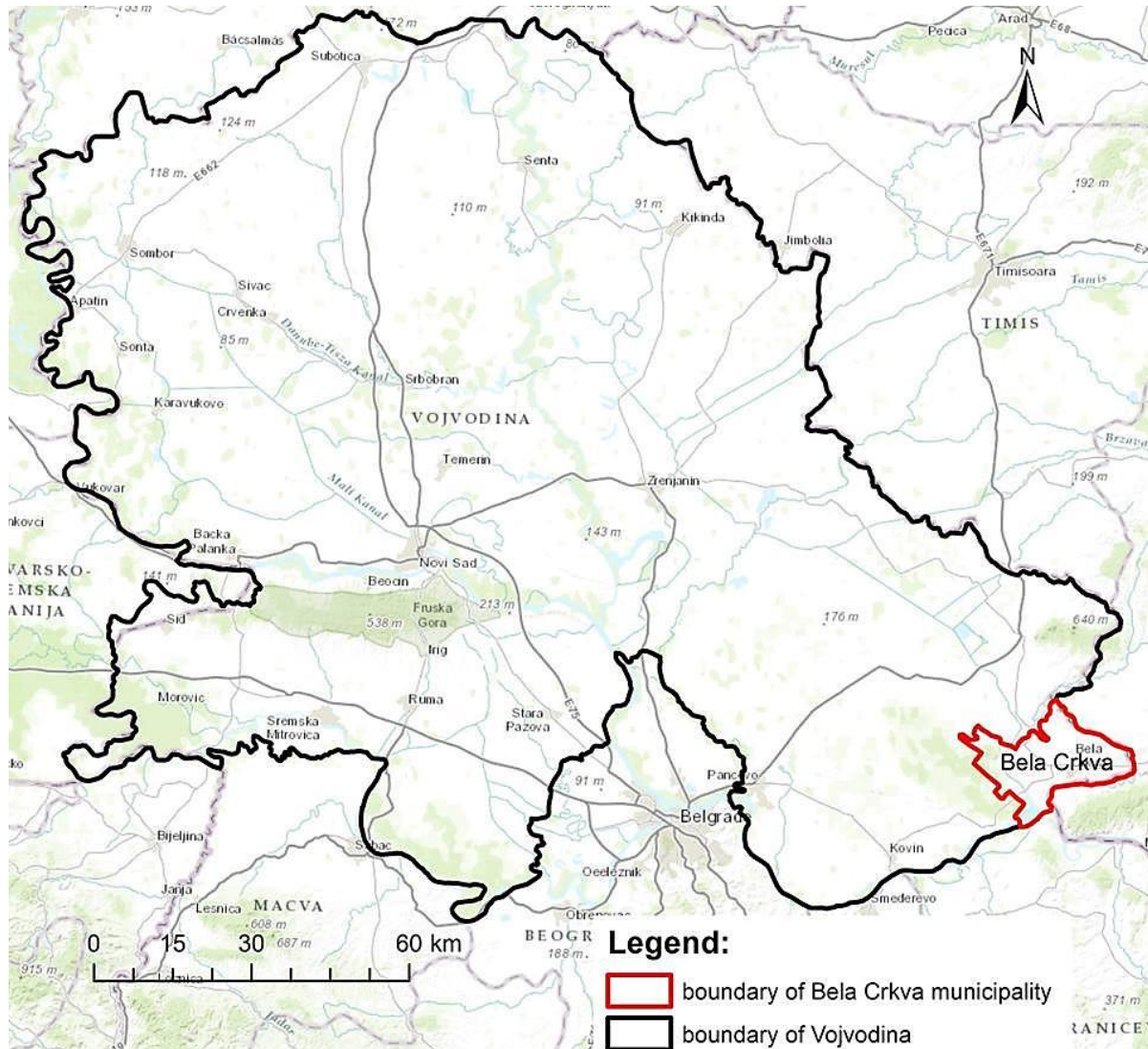


Fig. 1 Location of Bela Crkva municipality in the Autonomous Province of Vojvodina

Municipality is well connected with contiguous municipalities. The main form of transport and the most important communication of this area is road traffic. The road network of this Municipality consists of 26 km of highway, 21 km of regional and 39 km of local roads. The distance from Belgrade, the capital and most important city center is about 95 km. The distance of other centers is: Vršac (37 km), Kovin (47 km), Požarevac (50 km), Smederevo (60 km), Pančevo (80 km).

One of the oldest railway lines in Serbia, which is no longer functional, passes through the territory of the municipality. River traffic is practically undeveloped, as there is no regulated piers except from one improvised passenger pier on the Danube.

Also, there is a scaffolding on the Danube - between Stara Palanka and Ram. Over the border crossing Kaluđerovo, Bela Crkva is connected with border villages in Republic of Romania. The distance from Timisoara (Romania) is about 110 km (Boškov, 2014b).

SITES WHICH ARE SUITABLE FOR GEOTOURISM DEVELOPMENT

Great variety of geodiversity is one of the main characteristics of the Bela Crkva municipality. The most representative elements of geodiversity are parts of the Banat Sands, loess profiles and former flows of Nera and Karaš rivers. Considering

that the territory of this Municipality consists of several different geological and geomorphological objects, as potential geosites we can distinguish several formations: Dumača loess plateau, loess profiles near Dupljaja village, Mali pesak, fossil meanders of the Nera river, fossil meanders of the Karaš river and the Ramsar site Labudovo okno (Fig. 2).

Dumača loess plateau is located in the western part of Bela Crkva municipality, in the area that adjoins the southern parts of Vršac municipality. The plateau has a southeastern position and represents the highest and most imposing form of the entire South Banat loess plateau. It was probably formed during the last two glacials, by pleistocene accumulation of loess dust and aeolian sands. However, for a more detailed paleontographic reconstruction it is necessary to conduct multidisciplinary research. The altitude of the plateau is 251 meters and it is presented by Zagajica hills. Dumača loess plateau is shaped as a very elongated isosceles triangle whose length is 14,5 km. The widest part is of the northeast from Grebenac, where the largest relief dynamics was identified. In this area the width of the loess belt is up to 7 km (Lukić, 2010). With its dry valleys and loess profiles, this geomorphological formation is very attractive from the standpoint of science. Also, this site has a relatively high level of quality required for activation in the sphere of geotourism. Dumača loess plateau has a high level of scientific and aesthetic values, while the main obstacle for its inclusion in tourist flows is a low level of tourist infrastructure (Boškov, 2014b).

Loess profiles near Dupljaja village. Numerous studies conducted by a large number of scientists led to the conclusion that the accumulation of loess in Vojvodina represents one of the most complete archive of paleoclimatic and paleoecological changes, which occurred during the Pleistocene in the area of Eurasia. Great rate of loess dust accumulation and almost undisturbed shift of loess and paleosol

sequences that are present in this area, represent natural rarities in global terms (Jovanović and Zvizdić, 2009; Jovanović, 2012). Despite of their big importance, these loess profiles are not yet adequately researched. Loess profiles near Dupljaja village are about 14 km far from Bela Crkva, located on the left and right sides of the road Bela Crkva - Kovin. Their height ranges from 3 to 15 meters. They are partially covered by vegetation. The geotourism potential of this geological site is still completely untapped, which imposes the need for adequate protection, organization and presentation to the general public and opens up the possibility of economic progress of the local community through geotourism development (Boškov, 2014b).

Mali pesak lies westward from Bela Crkva. This morphological entity was separated from the Banat Sands by the valley of the Karaš river. It starts close to the Danube near Banatska Palanka and continues to the northwest directly along the left bank of the Karaš river. It ends at the bend where the Karaš river turns from northeast to southeast. The length of Mali pesak is 10 km, and its width is 1 km (Bukurov, 1954). Its main characteristics are dunes and inter-dune depressions. Mali pesak is currently in the protection process (within the Landscape of exceptional features "Karaš-Nera"). This site offers a good basis for development of different forms of tourism. Above all, it is peculiarly suitable for geotourism development, which could promote the preservation of geodiversity, as well as an understanding of certain geological and geomorphological forms, phenomena and processes of this area.

Fossil meanders of the Karaš river are located on the left side of the Danube-Tisa-Danube canal and are spatially connected to Mali pesak. Before the hydrosistem Danube-Tisa-Danube was constructed, the river Karaš was characterized by great number of meanders, especially in its downstream flow (Milovanov, 1972).

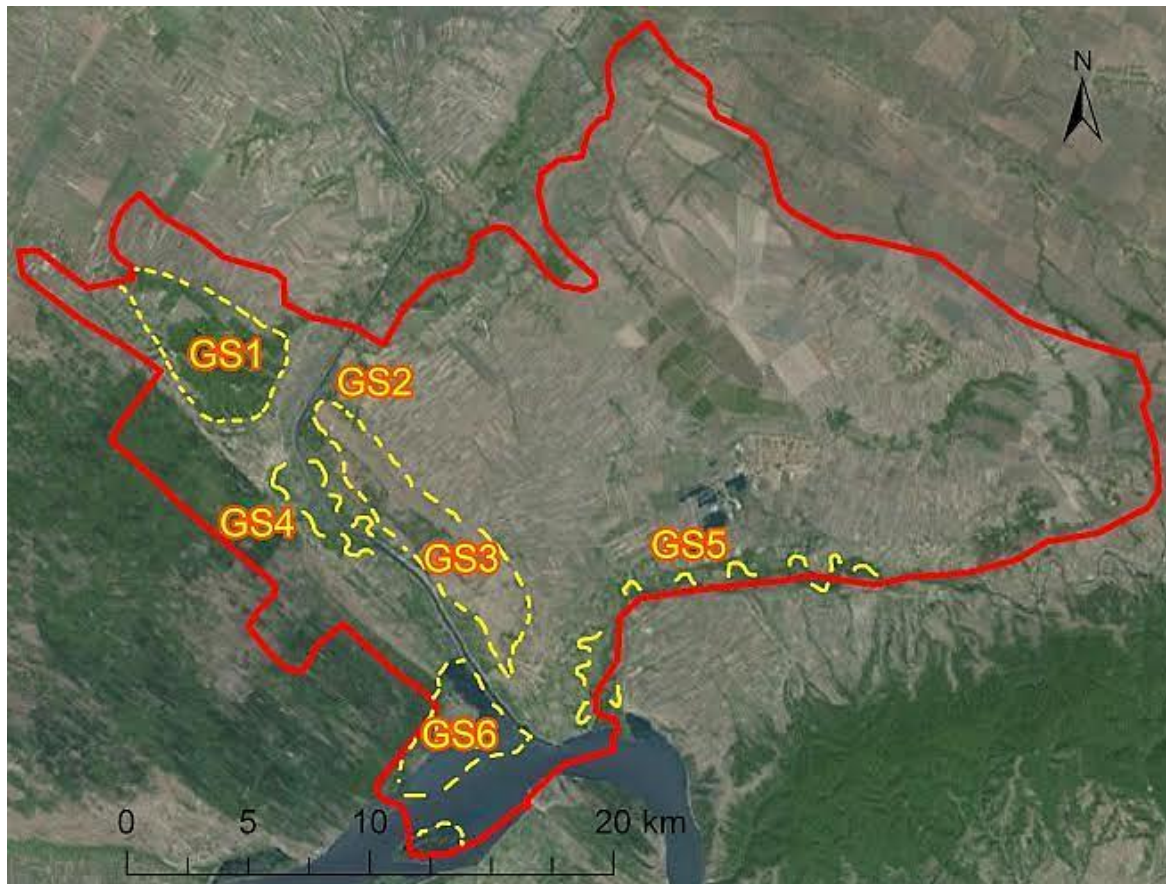


Fig. 2 Location of proposed geosites in Bela Crkva municipality: municipality (GS₁, Dumača loess plateau, GS₂, Loess profiles near Dupljaja village, GS₃, Mali pesak, GS₄, Fossil meanders of the Karaš river, GS₅, Fossil meanders of the Nera river, GS₆, Ramsar site Labudovo okno) (Source: GoogleEarth; Boškov, 2014b)

These meanders were created thanks to the small falls of the riverbed. Today, covered by lush vegetation, these fossil meanders represent very attractive geosites. They feature a high level of scientific and aesthetic values, and the protection process is currently in progress (within the Landscape of exceptional features "Karaš-Nera"). The biggest barrier to geotourism development at this site is primarily the lack of visitor centers, information boards, viewpoints, ie. tourism infrastructure is almost completely undeveloped (Boškov, 2014a).

Fossil meanders of the Nera river. Unregulated riverbed of the Nera river, with small falls, causes in its lowland part an intensive sediment deposition, elevation of the riverbed and groundwater, as well as surface water, especially in the sector Vračev Gaj - Kusić. This situation is the cause of frequent meanders in this sector of the Nera river (Bogdanović and Marković,

2005). Previously mentioned Landscape of exceptional features "Karaš-Nera", within the spatial entity "Nera" includes a part of the river's flow through Serbia, together with its fossil meanders, as well as the mouth into the Danube. From the geotourism aspect, fossil meanders of Nera river are of great value, however their inclusion in tourism requires the implementation of tourism infrastructure and environmental regulation (Boškov, 2014b).

Labudovo okno. This Ramsar site encompasses the coastlines of Danube and Nera rivers, the river islands of Žilava, Čibuklija and Zavojska, the flooded meanders of the Karaš river and the mouth of the Nera river. In this sector, the Danube decelerates and has a higher water level, that causes flooding of many river islets, lower coastal parts and lagoons along the southern areas of the Banat Sands. Coastal freshwater wetlands allow presence of

various aquatic communities, as well as those typical for this type of wetlands. Labudovo okno has been declared as a Ramsar site in 2006. It covers an area of 3,733 ha (www.ramsar.org). The Ramsar status of this area partly contributed to the establishment of tourism infrastructure. At the site there is an information board, viewpoint, and in the vicinity there are several significant anthropogenic values, ie. remains of the Smederevo and Ram fortresses, Roman castrum etc.

RESULTS AND DISCUSSION

The aim of this paper was also to investigate the attitudes of local people and tourists about geotourism development in Bela Crkva municipality as well as their

familiarity with the geopotential of this area. This was done through a survey which included 192 respondents. The sample includes locals and tourists who resided in Bela Crkva during the survey period. Answers to the specific questions related to tourism and familiarity with the natural resources of the Municipality are explained in more detail below.

What kind of destination do you prefer?

This question has been designed in such a way that four types of destinations (city centers, villages, spas and nature) were offered. The respondents' interest in each of these destinations was measured on a five-point Likert scale, 1 meaning that there was no interest in visiting a certain destination and 5 indicating a very large interest in visiting a destination.

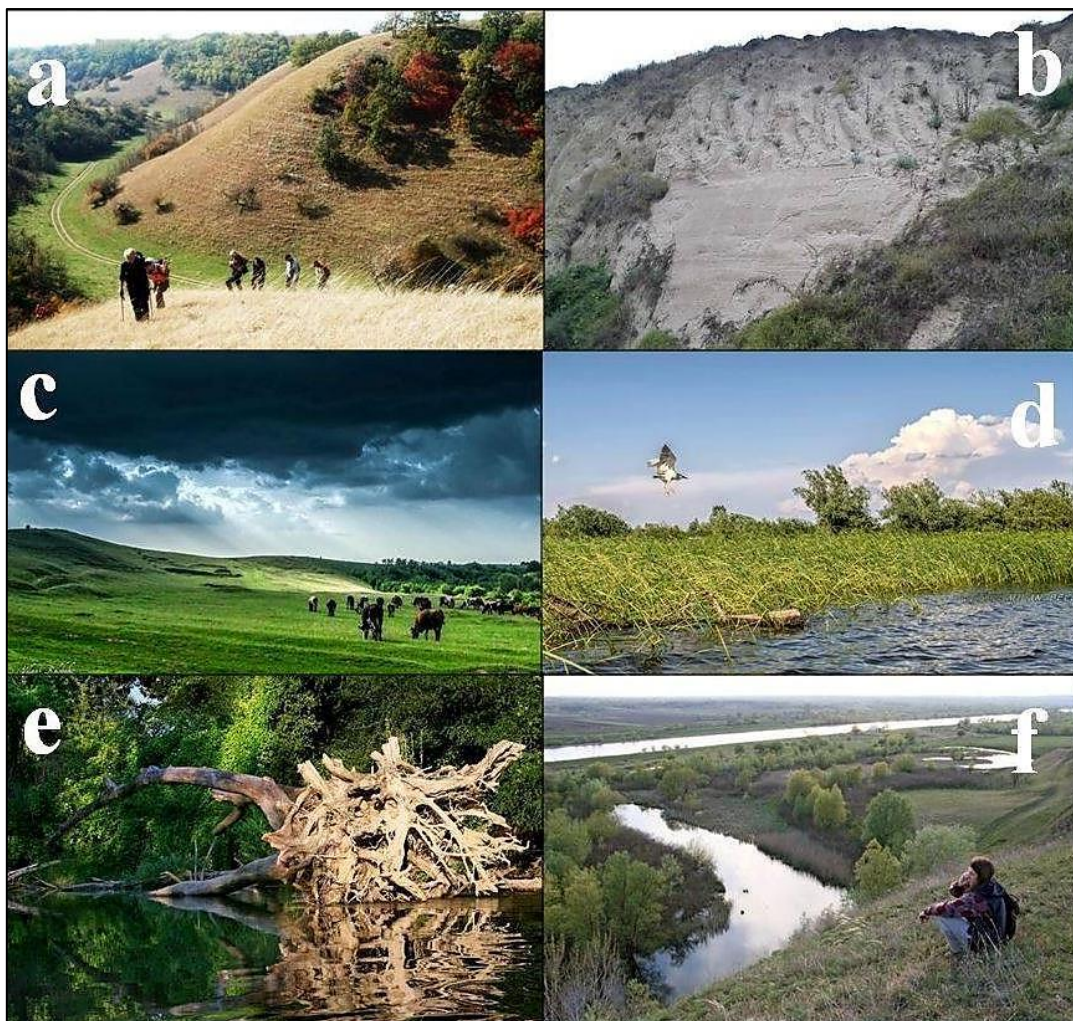


Fig. 3 a –Dumača loess plateau, b – Loess profiles near Dupljaja village, c – Mali pesak, d – Labudovo okno, e – Nera river, f – Karaš river (photo by: Milan Belobabić)

The results show that natural destinations are highly rated (Fig. 4). This is very evident from the fact that 150 respondents (78% of the sample) rated the degree of interest in natural destinations with the highest grade. From the viewpoint of geotourism, which is mainly based on natural values (geosites), this stands out as very positive.

Which of the following sites you are familiar with?

Some of the sites where it is possible to develop geotourism are listed in this question. Respondents were answering with *yes* or *no*, depending on whether they have heard for these localities or not. By analysing the responses to this question it can be concluded that some of the proposed sites are largely known, while some are still unknown to the general public.

The most famous sites are rivers Nera and Karaš with their fossil meanders. The majority (96%) of the respondents had heard about the Nera river fossil meanders. On the other hand, 94% answered that they had heard about the fossil meanders of the Karaš river. The site Labudovo okno is also

largely known, while the loess profiles near Dupljaja village are still quite unknown to the public. The majority (87%) of the respondents answered that this site is unknown to them (Fig. 5).

What is your information source?

When they were asked how they have heard about the mentioned sites, respondents answered that their main source of information are friends and colleagues (66%). By observing the structure of answers, it can be seen that the tourism organization is the least present information source (Fig. 6).

The tourism organization has an extremely low level of participation in informing the public about these sites (2%), which stands out as negative fact. Distribution of promotional materials is one of the activities in each tourism organization. It is noticeable that promotional material has a low level of participation in informing the public about these sites, thus it can be concluded that tourist organizations in Serbia show lack of interest in the promotion of geotourism, as well as tourism in general.

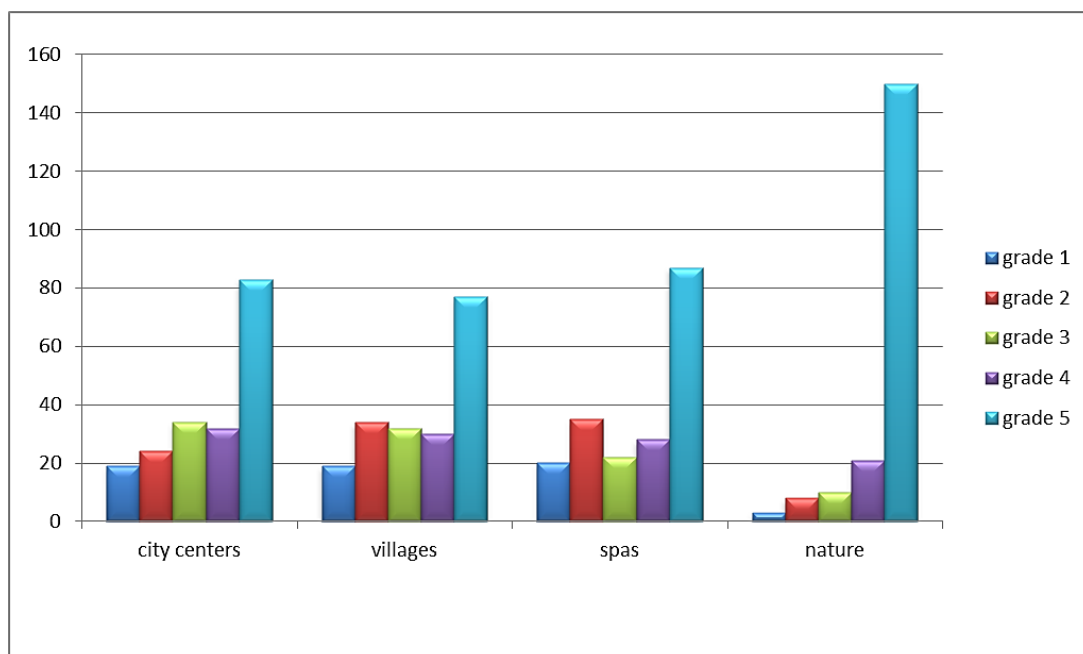


Fig. 4 Interest of the respondents in certain types of tourist destinations

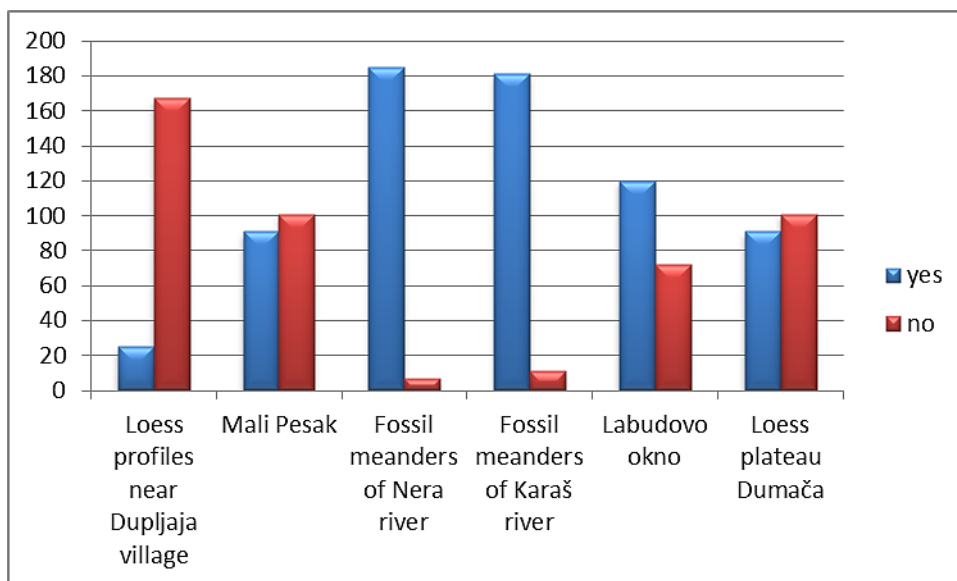


Fig. 5 Familiarity with potential geosites

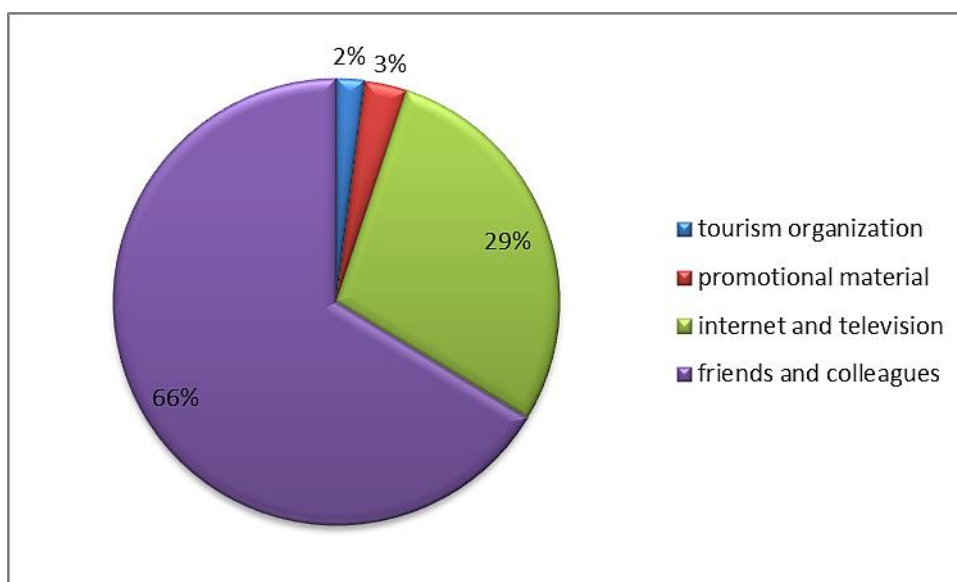


Fig. 6. Information sources about potential geosites

Have you ever visited any of the listed sites? Would you like to visit some of them in the future?

The listed sites were Dumača loess plateau, loess profiles near Dupljaja village, Mali pesak, fossil meanders of the Nera river, fossil meanders of the Karaš river and the Ramsar site Labudovo okno. Answers to these questions are almost completely positive. Of the 192 respondents, 191 of them (99,5%) answered that they have visited some of these sites. Likewise, 190 of them (99%) answered that they would like to visit these sites in the future. From the aspect of geotourism development, such a

structure of answers can be noted as very positive.

What are the biggest problems for tourism development at natural sites in the Bela Crkva municipality?

In this question five statements relating to problems and barriers of tourism development in the Bela Crkva municipality were offered. Respondents could evaluate their agreement with each of these statements ranging from 1 to 5, with 5 indicating complete agreement with the statement

The biggest problem for tourism develop-

ment at natural destinations in this area is the low quality of marketing and promotion. A little more than half (56%) of the respondents have evaluated this statement with the highest grade, 18% believe that this problem is largely present, 11% consider that the problem is present on an intermediate level, 8% consider it is faintly present, and only 7% believe that the current promotion and marketing activities do not need improvement. Also, low quality and organization of travel arrangements were identified as a major problem with 49% of respondents completely agreeing with this statement, while 9% estimate that this problem does not exist, 8% of respondents evaluated this statement with grade 2, 17% evaluated it with grade 3, and also 17% of respondents evaluated this statement with grade 4. Only 39% of respondents agree with the statement that the sites are poorly equipped for tourism, 26% of respondents evaluated this statement with grade 4, 15% evaluated it with grade 3, 9% evaluated it with grade 2, and 11% of respondents evaluated this statement with grade 1. The statement that tourism infrastructure is undeveloped was evaluated as following: 1 (15%), 2 (16%), 3 (19%), 4 (17%), while the highest grade (5) was given by 33% of the respondents. Based on the answers of respondents, accessibility of the sites is the smallest problem. About a

quarter (27%) of respondents agree with the statement that accessibility is poor, while 24% believe that this problem does not exist. Other reviews for this statement have approximately the same value, 16% of respondents evaluated it with grade 2, 15% evaluated it with grade 3, and 18% evaluated this statement with grade 1 (Fig. 7).

CONCLUSION

The Bela Crkva municipality has a high concentration of geosites which are of great scientific, educational, aesthetic and touristic importance, and some of them are protected (loess plateau Dumača is part of Special Nature Reserve "Deliblato Sands", Labudovo okno is protected as a Ramsar site, and the protection process of the Landscape of exceptional features "Karaš-Nera" is currently in progress). Therefore, there is real potential for geotourism development in this area. In support of this argument is also the fact that 99% of the respondents answered that they would like to visit the proposed geosites in the future. Furthermore, Bela Crkva is located at the border area with the Republic of Romania, which is also an advantage. So, this area possesses good natural conditions, as well as interest for geotourism development.

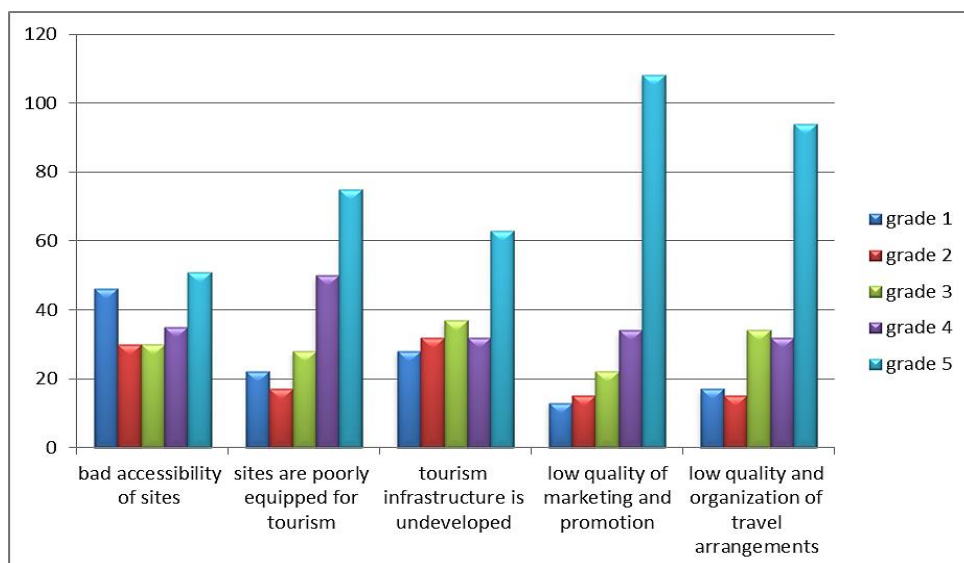


Fig. 7 Problems of tourism development at natural sites in the Bela Crkva municipality

High concentration of geoh heritage sites provides a good prerequisite for geotourism development, but these sites may also be used as additional attractions to other forms of tourism.

However, in order to attract more tourists to these geosites in the future, construction of tourism infrastructure and adequate promotion and improvement of professional staff in the field of tourism are necessary.

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Local quarries and how to use them in geotourism

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ABSTRACT

We are focusing on main possibilities of quarries use in geo-tourism, first of all in the mining research. We have pointed to the use of quarries in sports and recreational activities, their use according to nature conservation, and we introduce quarries as parts of geo-sites and geo-parks, as well as important paleontological and mineralogical sites. We are introducing quarries as parts of nature trails, which can be considered the oldest utilization of quarries as geo-objects. We have pointed to the possibilities of quarry museums and their attractiveness directly in nature and we have analysed the use of quarries in school education process.

Key words: geo-tourism, quarry, geo-objects, anthropogenic geomorphology, research, frequency, availability

INTRODUCTION

Quarry can be generally characterized as a surface open space (open pit) on the deposit, primarily designed for mining and quarrying. Quarry area can also serve for processing of mined mineral resources and production of crushed stone or blocks of stone. Usually they open on the deposit, which is on the surface or near the surface.

In the English-written literature is the term quarry used only to designate stone mining space, usually of small dimensions. The most frequently used terms are *open pit*, alternatively *stone pit*, *clay pit*, *gravel pit*, *sand pit* respectively *cooper (open) pit*, *coal (open) pit*, *gold (open) pit* etc.

Quarries as destination objects of geo-tourism have been researched by us according to the newest accessible papers and studies from geotourism (Hose, 1999; Buckley, 2003; Schejbal, 2005; Dowling & Newsome, 2006, Joyce, 2006; Dowling 2009; Rybár et al., 2010; Hronček, 2012).

USE OF QUARRIES IN GEOTOURISM

It is possible to examine quarries as relics

of the surface mining and quarrying within geotourism, respectively montane geotourism. In order to use quarries as montane tourism objects, they need to be carefully and systematically examined in the context of anthropogenic geomorphology and montanistics at first (Hronček, 2007; 2009b).

Historically, geologically and geomorphologically significant quarries may thus become important destinations for geotourism clients. Only a small amount of scientific studies is dealing with the use of quarries in geotourism, for example works of Beláček (2007), Weis (2009), Hronček (2009a) and Hvizdák et al. (2012).

During the research, processing of the individual analysis of the quarries and subsequent use of quarries in geotourism and montane tourism, we must act in accordance with the laws of the Slovak Republic. The key is to comply in particular with the provisions of the Mining Law on the Protection and Use of Mineral Resources no. 44/1988 Coll. (Anonymous 1988), the Law on Protection of Nature and Landscape no. 543/2002 Coll. (Anonymous 2002), and also the Law on protection of monuments no. 49/2002 Coll. (Anonymous 2002a).

In this work we have introduced the possibility of using quarries in geotourism in Slovakia. The potential of quarries as targets of tourism in Slovakia has been underrated and underused so far. Quarries in other countries serve as target objects of montane tourism not only after the end of their operation and recultivation of their space to the state of “comfortable” environment for tourists, but also during normal operation of the quarry, even during working hours. Common are the group tours of visitors transported directly into the center of the quarry by special services, regardless of comfort - noise, dust, often a health risk (Rybár, 2012).

We must not forget that the quarry immediately after opening of mineral resources extraction becomes more or less an interesting geological, morphological and landscape object, without any further research, promotion or anthropogenic modifications, conservation, reclamation, revitalization or construction.

Given the number of quarries in Slovakia is about 11,359 quarries, with an average density of 0.23 quarry per km² (Hronček, 2012), quarries are becoming an important potential target of geotourism. It goes without saying that the vast majority of these does not have the potential to become a touristic destination because of lack of attractiveness as spatial objects. A large number of quarries is disqualified for geotouristic use because of complicated accessibility of the terrain or a total absence of infrastructure. Building of infrastructure (restaurants, accommodation, accompanying various attractions, transportation) for the clients is often economically unprofitable. Conversely, a touristic insignificant quarry can become a touristic attraction through a secondary anthropogenic interference. Such examples are given within the 13th category of assessing the potential for geotourism (secondary use of quarries as targets montane tourism).

We have divided quarries into basic categories in terms of their potential as a

target destination for montane clients based on the latest available domestic and especially foreign literature and our own long-term field research (Hronček, 2012) as follows:

1. quarries as geological sites,
2. quarries as morphological site
3. quarries as paleontological sites,
4. quarries as mineralogical sites
5. quarries as archaeological sites,
6. quarries as parts of Geosites a Geoparks,
7. quarries as protected sites,
8. quarries as parts of nature trails,
9. quarries as sports and leisure sites
10. quarries as sites for educational practice and scientific research,
11. musealization of quarries,
12. other secondary use of quarries as targets of montane tourism.

In the following part of the study we present typical examples of quarries from Slovakia from each category.

Quarries assigned to the first five categories are included immediately after their opening and do not require any additional anthropogenic activities aimed at increasing their attractiveness for tourism. These include quarries which are important geological sites and contain a collection of various types of jointing rocks, folds, flexures, and similar. Quarries may be significant paleontological, mineralogical and archaeological sites and are unique in the fact that without mining in the locality the findings would most likely never be found.

In the sixth category are included quarries which are not among the significant geological, paleontological, mineralogical and archaeological sites themselves, but are an integral part of Geosites a Geopark because they allow visual insight into the Earth's crust. Their position within Geosites and Geoparks does not exclude that they are representing important sites in different aspects.

Quarries are protected under the Law on the protection of nature and landscape Act.

543/2002 Coll. in case that they are creating an important habitat, or a combination of findings, or that the quarry area became an important element of landscape or a habitat for protected species of flora and fauna.

In the 8th category are the quarries, which meaning is so important for the given landscape, that they are assigned as separate stops within nature trail. Scientific research and subsequent processing of a quarry as a stop on the nature trail is already a minimum interference to its space and building of primary infrastructure.

The most common mass use of quarries geotourism is for sport-recreational activities such as swimming, snorkeling, diving, motor racing, cyclocross, climbing and other activities. We have to observe these quarries in two perspectives - those operated by the mandatory official authorization, including the necessary infrastructure, and those that are used only spontaneously.

We have dedicated a separate category for quarries usable for school practice, as excursion destinations or for field observations. We can include every quarry, because it depends only on how the teacher prepares the methodology of fieldwork and the thematic focus of his lessons.

The twelfth category is the musealization of quarries, i.e. modification of quarries as spatial objects in a museum in nature. The infrastructure for quarry visitors has to be built under legislative regulations in its vicinity in order for the quarry to become a museum.

Rebuilding of quarries space for a secondary use in industry and energy industry, housing, agriculture, forestry, water management, transport and so on. The redesigned space of the quarry can get a new impuls as a target object of geotourism.

BASIC ANTHROPOGENIC-GEOMORPHOLOGICAL AND MONTANE RESEARCH OF QUARRIES ON THE EXAMPLE OF BRUSNO

The decline and gradual disappearance of underground mining during the 19th century begins to forecast mining and quarrying for construction works - quarry mining. Quarrying had been done only for local use. An important milestone in the extraction of construction materials was the year 1806, when the whole wooden Brusno burned down. Since then, gravel, stone and clay began to be used more frequently, which resulted in the formation of early quarries and surface mining sites. Opening of quarries and gravel pits began to be evident in the landscape in form of significant terrain scars - quarries.

This situation was also confirmed by the Vice-Regency Council Regulation of the Zvolenská Stool from 1780, which proposed the conservation of forests. The Regulation had not been followed by Brusno inhabitants, who continued to build their houses from wood. This is evidenced by the cadastral maps of the Brusno municipality from 1877, which depicts only two stone buildings (the mill and the inn) (Archives of the Brusno municipality Office). The situation was slightly better in Sv. Ondrej, where at that time stood 17 stone buildings, except the church, according to the cadastral map from 1866 (Archives of the Slovak Institute of Geodesy and Cartography Bratislava). The first brick buildings were built in the late 19th century, when the building material from the brickfield in Sv. Ondrej have already been applied. Brick buildings were built in greater numbers mostly after the World War I, but the main building material was brought from the brickfields in Slovenká Ľupča and Nemecká, and only to a lesser extent from Sv. Ondrej.

During the field research of the landscape in the cadastral area of Brusno we focused on the quarries as the surface mining relics. All surface relics incurred as results of surface mining, had been mapped and analyzed together with the currently existing sites. The used research methodology was originally processed in the 2009 scientific project (Hronček, 2009b). We have identified these quarries in the cadastral area of Brusno:

The quarry **Pred Bukovcom** was originally opened in the second half of the 19th century, approximately 500 m east from the municipality of Sv. Ondrej nad Hronom, on the left side of the road to Brezno. It is located on the right Pleistocene - Riss terrace of the Hron river, in a pothole created by an unnamed intermittent stream flowing from the site called Pred Bukovcom. The quarry had been identified in field on the basis of the Sv. Ondrej cadastral map from 1866. The map (Fig. 1) identifies the questioned site as *Pred Bukovczom* and the quarry itself is localized by a verbal description of the official Hungarian nomenclature as *Agyag bánya*, which can be translated as a clay mine - *Hlinisko*. The description refers to the parcel No. 850, which was owned by the local landowners according to the Register of Sv. Ondrej nad Hronom. The color fill of the parcel polygon has a vintage pink color, reflecting the land use type of the site as an unused („*neúžitok*“) and other undetermined land.

The brickfield owned by Gejza Rožňovák was situated on the left side of the main road from B. Bystrica to Brezno, approximately 1 km away from the Sv. Ondrej municipality. The complex consisted of a semidetached brick house immediately followed by a shed. The shed served for technical works and as a storage for burnt bricks. The plot contained an area with an almost perfect flat surface intended for the drying of bricks before the final burning. This space can be easily read on the ground even today, because it

constitutes significant boundaries of a privately owned land parcel. A space excavated into the hillside was connected to the north side of the brickfield campus, where the owner and brickmaker built two field furnace for brick burning.

Whole process of brick manufacturing was handmade. It started with the digging of clay in the nearby site called Hlinisko, and continued with the clay sifting and kneading. Next, the material was pressed into a wooden mold. Then it had been tipped into a wheelbarrow and transported to the drying area, where the bricks were spread and dried in the sun before burning. This process had been repeated until a sufficient number of bricks was made for the construction of a field furnace. The dried bricks were stored in the shed before burning. The dried bricks were then stacked to the shape of a dome shaped field furnace. The area under them was then lit and the fire burnt the bricks to the desired quality. After the burning, the body of the furnace had been dismantled and the bricks were taken out. This process was subsequently repeated. Thanks to the good quality of clay and the technological process, the bricks produced were purple and had a high quality and good durability. They had similar characteristics as the refractory bricks. Gejza Rožňovák sold them in the nearby surrounding. They were much better than bricks from the brickfields in Nemecká, Lučatín and Slovenská Ľupča, which used to fall apart in case of a rainfall and had been used for the construction of furnaces, chimneys and stoves. As the blast furnace lining, they were also used in the nearby lime factory in Nemecká.

From the east, the brickfield was bypassed by a nameless creek diverted from the valley of Baništja, which lay north of the brickfield. The creek served as a source of water for the kneading of clay, and separated the clay pit from the brickfield site lying east (cadastral map of Sv. Ondrej, 1866).

Original shape of the clay pit („*hlinisko*“)



Fig. 1 Quarry Pred Bukovcom on the map of 1866 (Archive of Geodesy, Cartography and Cadastre Authority of Slovak Republic, Bratislava)

could not be reconstructed. According to the description in the cadastral map from 1866 and according to Polák et al. (2003) it can be assumed, that the deluvial clays as a covering material of the older Riss terraces, had been exploited here. The field research probes show, that mainly the Riss fluvial sands, significantly clayed sandy gravels and gravels must had been used.

Only the southern part of the clay pit is preserved until now, because its central and northern part had been recultivated and destroyed by the earthworks of the construction of main road from Banská Bystrica to Brezno in the first half of the 70s of the 20th century. Clay pit relics consist of five holes on the hillside of the terrace with the shape of an irregular circle with a diameter of 10 m and a depth of up to 1.5 m. Between the holes is an undulating relief, which is non-native for the original terrain of the river terrace. The devastated area has a length of 50 m and a width of 30 m. At present, the whole of the original mining area is overgrown with an

impenetrable scrub vegetation.

Quarry in the Jablonka valley. This is one of the most important quarries in the history of Sv. Ondrej. The cadastral map of Sv. Ondrej from 1866 names the site as Baništija. At the beginning of the 20th century, this name was still used together with the name „Za veľkú baňu“. The quarry was opened on a dark and gray Triassic limestones (Maheľ, 1968), which disengaged or break well because of their block breaking. These limestones had been used from the very beginning for the construction of the base walls („cokel“) of the wooden houses. We have identified this limestone as the main building material of the oldest buildings in the municipality – the church and the notary office. The quarry was exploited even in the first years after the World War II.

The **Repište** quarry is located on the right side of the Sopotnica valley, 500 m south of the forester's lodge on the southern edge of the site Repište in the cadastral area of Brusno, in the part of Sv. Ondrej. Red to

pink Jurassic limestone was mined in an abandoned quarry wall (Polák et al., 2003). Quarry with the length of 15 m and a 3 m high wall was opened during the construction of the paved, later asphalt road in the valley of Sopotnica, in the second half of the 20th century. Currently, the quarry is overgrown with a deciduous forest with the vegetation dominated by the European beech (*Fagus sylvatica*).

The etymology of the name **Banište** refers to the old anthropogenic mining activity in the left side valley of Sopotnica lying approximately 2 km north of Brusno (local part Sv. Ondrej nad Hronom) (Fig. 2). The name “Baňa” – “Banište“ (mine) Quarry mining was previously used for the functional surface structures generated in the extraction of mineral resources, particularly for construction quarrying.

Whole Banište valley is a vast, complex shape mining “object“ consisting of several separate quarries. Five quarries had been verified by the field research.

All quarries in the Banište valley had been opened on a weathered bright Ramsau dolomites from the upper Anis (Triassic) (Polák et al., 2003). The surroundings of the anthropogenic devastated Banište valley is grown by a coniferous forest dominated by the Scots pine (*Pinus sylvestris*) and

Spruce (*Picea abies*).

At the site called **Pod Strážou**, which lies approximately 30 meters above Dúbrava, laid a small gravel pit. It was opened on fluvial and sandy gravels of the Mindel upper terraces (Polák et al., 2003). The shape and dimensions were determined by the analysis of basic topographic maps of SR 1:10000 (36-23-06) with a reambulation from 1974. The quarry with an elliptical ground plan had a longer axis of 35 m and the shorter axis measured 20 m. It was recultivated in the second half of the 70s of the 20th century.

Dúbrava gravel pit was opened on fluvial and sandy gravel terraces of the middle Riss period (Polák et al., 2003).

It was situated at the site called Dúbrava. We have determined the shape and dimensions of the gravel pit from the basic topographic map of SR 1:10000 (36-23-06) with reambulation from 1974. The quarry was recultivated in the second half of the 70s of the 20th century.

Quarries on the southern slope of **Hrb** (495 m a.s.l.), on the northern border of the Brusno intravilan, in the local part of Ondrej nad Hronom, consist of five separate wall micro-quarries with a length of 8 m and a maximum height of 3 m.

Present chaotic distribution of the

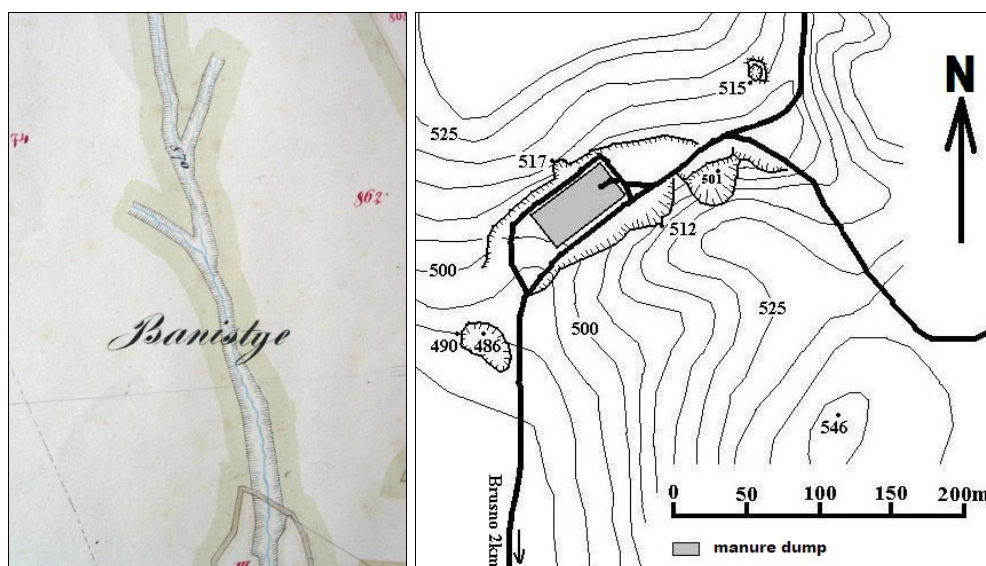


Fig. 2 Valley Banište (banistya) on the map of 1866 (left, Archive of Geodesy, Cartography and Cadastre Authority of the Slovak Republic, Bratislava) and quarries in the Baništija valley (right)

quarries on the slope is a result of land division, recorded on the historic maps. From the cadastral map of Sv. Ondrej from 1866 it is clear, that the quarries laid on the western border of narrow fields at the bottom of the slope, and meadows at the top of the slope. Fields parceled parallel to the contours started at Záhumníe and the cemetery. Individual owners (or families) opened them during the 19th century to acquire construction material for new houses and farm buildings.

Partly weathered gray to dark gray dolomite of the Triassic period, the late Anis (Polák et al., 2003), had been excavated here.

Wall quarry **Brusnec** laid on the left side of the Brusnec valley at the mouth of the Brusnianska valley, behind the original Spa chapel dedicated to Our Lady of Lourdes. Quarry was opened on weathered gray to dark-gray Cretaceous marly limestones (Polák et al., 2003), at the foot of the western slope of Kopok (744 m a.s.l.). The excavated material was used as a construction gravel and sand. The quarry had been recultivated at the beginning of the second half of the 20th century and is now located on a private land.

The quarry **Kúpele** had been identified from the cadastral map of Brusno (cadastral

map of Brusno from 1877, Archives of the Brusno municipality Office), because it is in a state of naturalization, which makes it impossible to identify without historical documents. The quarry laid on the northern border of the Spa area on the north-western slope of the Brusnianska valley, behind the „current“ Spa house Paul. It had been opened for the extraction of gravel and building stone for the purpose of constructing stone buildings in the Spa since the mid-19th century. The quarry was opened on the conjunction of fluvial gravels of younger Riss period, with massive gray dolomites from the Middle - Upper Triassic period (Polák et al., 2003).

Quarry **Hladušová** (Fig. 4) is located on the right side of the Hladušová valley at the foot of the southwestern slope of Kopok (744 m a.s.l.). It is accessible by approximately 250 m long forest path leading directly from the technical areas of the Spa. It had been mined for gravels on a weathered gray dolomites from the Middle - Upper Triassic period (Polák et al., 2003), which had been used as a low quality building materials for local purposes and for road construction. The largest extent of mining was reached in the seventh and eighth decade of the 20th century.

The wall of the quarry (Fig. 5) is 85 m

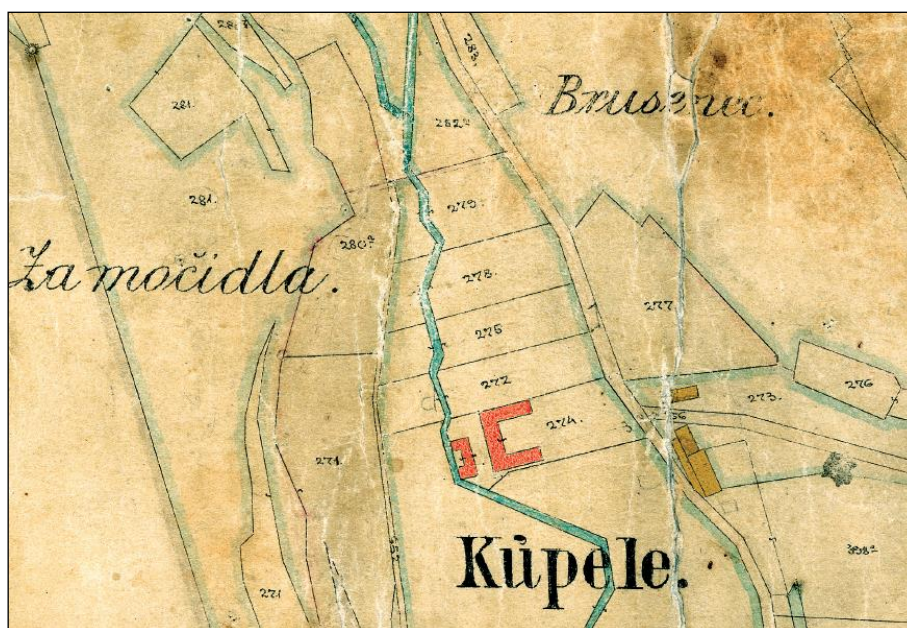


Fig. 3 The spa area on the cadastral map from 1877, right quarry Kúpele (Archive of Municipal office Brusno)

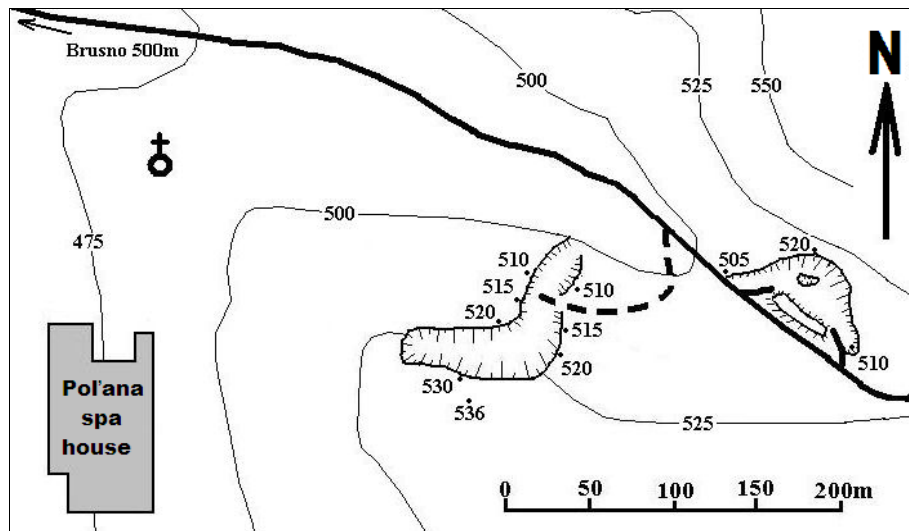


Fig. 4 Quarries in the Hladušová valley



Fig. 5 Hladušová quarry

long and 18 m high, with a maximum horizontal depth of 15 m. The influence of gravitational and frost weathering processes developed extensive conical talus deposits at the foot of the quarry walls.

Quarry Hladušová lies on the northwestern and western slopes of Hladušová (536 m a.s.l.), on the left side of the Hladušová valley. The quarry was mined for gravel and stone from layers of the Medium - Upper Triassic gray dolomites (Polák et al., 2003). It has a shape of a quarry complex consisting of

three vertically separated parts. Based on the written material, maps and fieldwork from our historical - geographical research, we can assume it had been closed in the mid-20th century.

The quarry had an extremely unfavorable transport accessibility, as it laid on a slope with an inclination of 40 – 45°, and the maintained access road in approximately 1 m deep gully lead in the first half of its length almost perpendicularly to the contour lines.

It is also 1.5 m narrower than gully relics

of a classic horse-cart roads. This road communication allowed access for only a small towed cart. A 100 m long linear gully with a triangular profile oriented perpendicularly to the contour lines is preserved in the present terrain. It currently connects the quarry with the valley bottom of the Hladušová valley. Based on the analysis above, we can conclude that it is most likely a transport corridor gully. We can therefore assume, that an approximately 120 m long wooden through („zvážna“) was installed in the gully, which was used to gravitationally transport material from the quarry to the bottom of the Hladušová valley, where it was loaded on horse-carts.

The wall quarry laying on the right side of the **Bračová** creek valley, directly above the erosive base, was used as a source of material for the local construction purposes benefiting from the weathered shale with thin inserts of siltstones, fine-grained sandstones and dolomites (Polák et al., 2003). The nowadays unused quarry is 10 m wide, with a horizontal depth of 12 m and 15 m high walls.

The abandoned wall quarry **Pod Jeleňacou** is located on the right side of the Bračová creek valley at the site called Pod Jeleňacou, which lays above the access road. Stone for local building is mined from the stone base of the Triassic dolomites (Polák et al., 2003). Relics after the quarry is 25 m long, 8 m high and has a maximum depth of 3 m.

The quarry **Za Hrabínami** is located on the right side of the valley Brusnianska, opposite the Čierna valley, at the foot of the western slope of the Dielec hill (623 m a.s.l.), on the southern boundary of Hrabiny. Nowadays it recalls a communication cutting created during the construction of a new asphalt forest road. It was opened by local residents, who occasionally mined gravels and sands up to the 40s of the 20th century, due to transport accessibility and suitable mineral material. The quarry was opened on the basis of sandy and gravelly Holocene coluvial deposits (Polák et al., 2003).

The quarry **Nad Čiernou dolinou** laid on the left side of the Brusnianska valley on the eastern slope of Nad Čiernou dolinou (755 m a.s.l.), and is in such stage of naturalization at present, that it practically corresponds with the morphological ravine formed by the Brusnianska creek. The quarry was originally accessible directly from the road connecting smelters at Trosky (Peklo) with Brusno, which lead on wooden bridge structures in this narrowed part of the valley. The original road was led on the left side of the valley, while the present road was built late in the 19th century on the right side of the valley. The quarry was opened on the Triassic brown-grey siliceous sandstones and quartzites (Polák et al., 2003).

CONCLUSION

As geotourism has become worldwide phenomenon, many aspects and objects of natural or antropogeneus origin are cosidered as a possible places of interest within this form of tourism. Based on the geotourism potential of many quarries, as also presented in this paper, it can be assumed that these man-made objects deserve more attention. Their proper geotourism based presentation may lead to overall geotourism development, including locals' involovement and sustainable development, as mentioned in many geotourism related definitions and papers.

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Potential use of the coal and ore mining related industrial heritage for tourism purposes in the North Hungarian Region

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ABSTRACT

A research into the possibilities of establishing industrial heritage tourism through in-situ exhibitions of the mining heritage in the North Hungarian Region was carried out in order to designate the most preferable target areas for such developments. For this, coal and ore mines as potential destinations, their infrastructural background including accessibility were surveyed and evaluated along with an objective evaluation applied for the quality of quarters and catering places as well as connections to other nearby attractions.

Key words: mining heritage, tourism development, regional development, North Hungarian Region

INTRODUCTION

The formerly rich ore occurrences of precious metals (gold and silver), iron and heavy-non-ferrous metals (primarily copper, lead and zinc) as well as salt and building material deposits have been known in the Carpathian Basin for many centuries. They played an important role in the life of the region's residents who made their living from mining. However by today, the declining industry has merely disappeared. To present and acquaint mining activity and its history as well as to facilitate the subsistence of former mining settlements, tourism development provides a good basis.

Landscapes and buildings impacted by mining have been saved in nearly all countries where mining activities have been closed down providing a significant role to the re-use of such values in the long-term regional development (Bircher, 2006; Dávid, 2008). Representing the significant

mining activity related industrial heritage (structures, mining grounds, shafts, equipments etc.) in their original settings as well as the use of mining sites for tourism purposes however is basically lacking from the tourism supply of the North Hungarian Region, i.e. in a depression hit region where tourism is conceptualised in all development documents as a potential sector for development.

THE ROLE OF MINING HERITAGE AND ITS PRESENCE IN REGIONAL DEVELOPMENT AND IN THE TOURISM OF THE NORTH HUNGARIAN REGION

Tourism is a nearly inexhaustible resource in the rural settlements of Hungary that could contribute to the improvement of high unemployment by recognising and taking use of the attraction of the natural

and cultural heritage found in the settlements and their surroundings (Jablonská et al., 2009; Dávid & Karancsi, 2010). Tourism revenues strengthen the region's economics and, in direct ratio to this, the quality of life can also be improved. Preserving and presenting mining heritage, from the point of view of tourism, represents a new supply offered, a new attraction for both experts and interested parties that would likely result in an increasing number of visitors in the target area. By this and through the recultivation and rehabilitation of areas degraded by mining, development based on internal resources and endowments can be implemented containing the following elements:

- Designation of the routes for coal and ore mining study trails,
- Designation of thematic mining routes and
- Designation of the locations for mining museums in deep and/or opencast mines.

The reconstruction of industrial monuments and making them visitable represents a new branch of tourism at many regions of Europe (Gonda, 2002). As an example, one of the most relevant mining museums in Bochum operating along with a mining historical research institute and attracting more than 400,000 visitors per annum can be mentioned. Also, the museum in Caphouse Colliery located at the Western rim of the Yorkshire coal mines, undertaking relevant educational activities, should also be noted.

As a precedent from Central Europe, the 'Východoslovenské múzeum v Košiciach (East Slovakian Museum of Košice)' (www1) carrying out exemplary work including trainings for kindergarten and primary school students is worth mentioning as well as the 'Banícke múzeum v Rožňave (Mining Museum in Rožňava)' with a number of mining-related exhibitions and its efforts. As for Hungary,

several attempts in order to integrate mining heritage into the urban development concept were made in Pécs (Szirtes, 2003).

By tourism development, the preservation and sustainable use of the built and natural heritage can be expected as well as a significant number of new jobs would be created along with improved possibilities to obtain supplementary income. Tourism brings revenues into the region with primary beneficiaries being tourism suppliers including attractions, quarters, catering units, souvenir vendors and local craftsmen whereas the secondary beneficiaries are tradesmen, small-commodity producers and suppliers serving 'the temporary residents'. Of the incomes realised at enterprises, local business tax while for the guest nights, tourist tax must be paid both increasing the revenues of local communities and municipalities for development.

The multi-facetedness and multiplicatory impacts of tourism development based on mining-related industrial heritage are well indicated by the goals of such activities (Fig.1). For these, the strategic goal is to increase the tourist attraction of the natural and cultural heritage; the related overall goal is to improve the quality of life, to decrease out-migration from the region (experienced mostly among the youths as well as to increase the settlements' incomes and revive overturn of the regional SMEs. To this, five basic criteria should be fulfilled that are as follows: (a) establishment of a visitor-friendly, accessible aesthetic environment, (b) improvement of the infrastructure, (c), reconstruction of the mining or archaeological site, (d) establishment of a tourist path and (e) reconstruction and expansion of quarters. These are implemented through achieving various goals such as the establishment of an archaeological or mining education centre, designation of a study trail due to which the increasing number of visitors is expected. By reconstructing and expanding quarters, employment rates will be higher, services

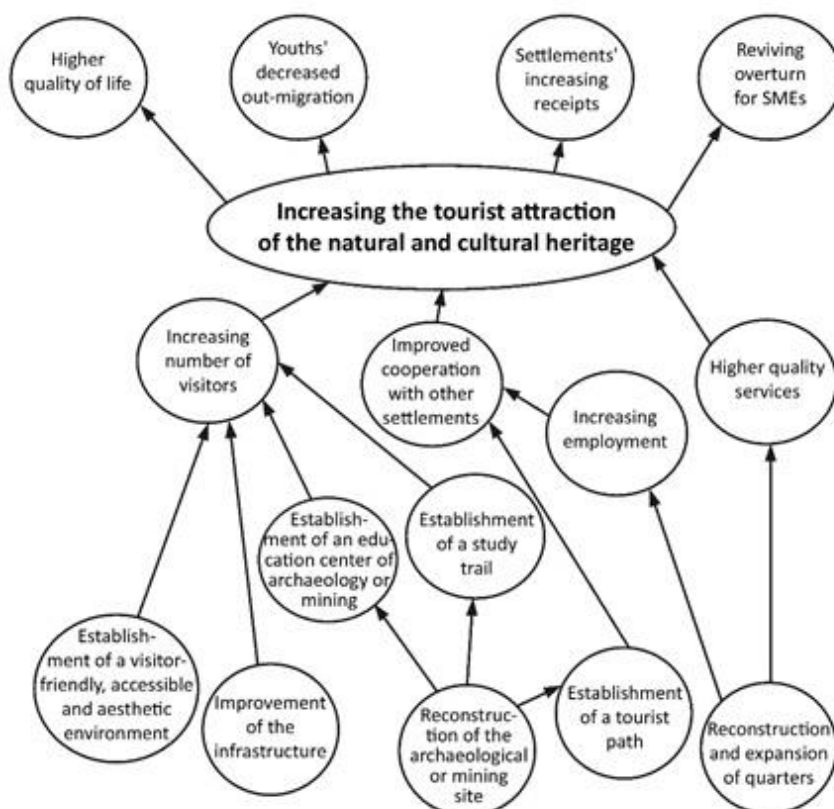


Fig. 1 Goals of tourism development based on mining heritage. Modified after Gonda (2003)

will be of higher quality as well as cooperation among the surrounding settlements will be improved. At settlements realising such development this will potentially result in, through the increased revenues, the evolution of a better and more liveable environment that could be a factor of attraction for both the region's residents and visitors.

The currently executory North Hungary Operational Programme (2007-2013) itself neither takes into account nor mentions the use of mining heritage for tourism purposes. The relevant and particular elements of the programme include however, among others, the reasonable and sustainable use of local resources and, according to its content, e.g. the creation of jobs can be expected to be realised through the improvement of tourism competitiveness. In order to achieve to programme's overall goal, the region's economic heritage and resources should be built upon as well as its natural and cultural endowments should also be taken into consideration. It is also important to

mention that even the region's accentuated tourist destinations (world heritage sites, wine regions, historical monuments, spas etc.) are not adequately used as revealed by the sector's regional indicators (earnings, the number of guest nights etc.) not reflecting the actual values of the region's endowments. Thus it can be presumed that successfulness of attractions related to the presentation of mining heritage can accentuated when such are connected to other attractions making up complex products (Gerner et al., 2009). From the point of view of the impacts of tourism it is relevant to study the length or shortness of the time required to obtain the experience demanded (Urry, 1990).

METHODS – EVALUATION OF THE USE OF MINING HERITAGE FOR THE PURPOSES OF TOURISM

Our research aimed at surveying and elaborating the evaluation methodology of the background required to the use of the

region's coal and ore mine locations as potential destinations for tourism purposes.

As a first step of our research, based on the literature and the already available map database (CORINE, and the database of the Mining Office of Hungary, the region's coal and ore mine locations were surveyed and the potential future destinations were primarily designated (Fig. 2).

Within the framework of this survey, not only the location of mines but also their physical parameters (depth, length, security etc.) as well as their landscape aesthetic values are studied as such are factors decisively influencing their potential future use.

Following this, studies into the infrastructural background related to the use of potential attractions for the purpose of tourism including the factors (in the surroundings of the given attraction) listed below (Fig. 3):

- transport, accessibility (approach and public roads: number, category and length; railway lines: number and category; public transportation: number, frequency; accessibility index),
- quarters (number, type, quality, distance)
- commerce and catering units (shops based on their categories, the number, quality and distance of restaurants)
- tourist information centres/organisations (the existence of an information point and its distance from the attraction)
- joint attractions (connection to other attractions, other branches of tourism and their supply in the region)

As a result, an information and database will be available based on which the suitability of potential destinations can be objectively evaluated and the most preferable target areas for development can be selected.

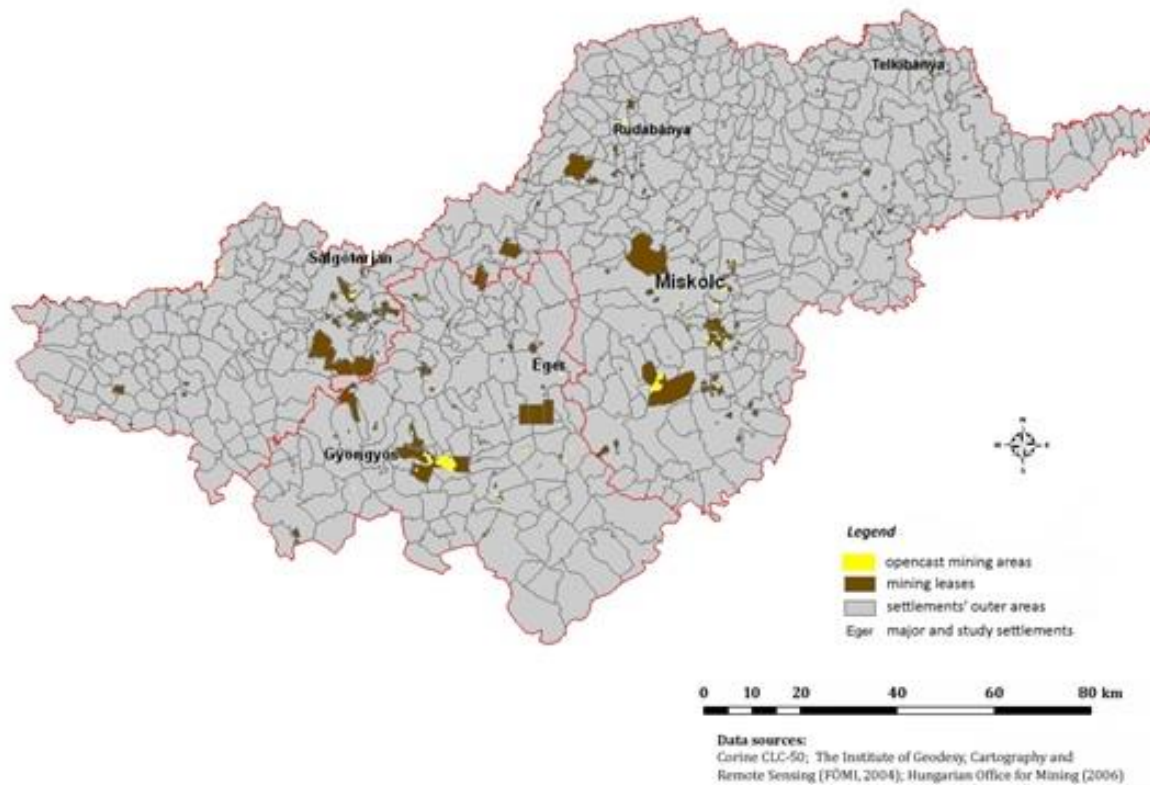


Fig. 2 The location of mining grounds in the North Hungarian Region, 2006. Modified after Baros and Bujdosó (2007)

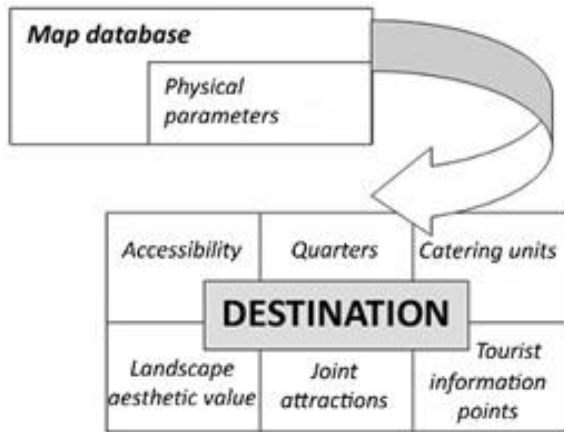


Fig. 3 The study methodology and system of the use of mining areas for tourism purposes (Baros and Bujdosó, 2007)

RESULTS AND DISCUSSION

In this paper, a summary is given on the results and conclusions obtained from the research carried out for 3 sites and settlements (Fig. 2) as listed below:

- a. Nógrád Historical Museum , Mining Exhibition (Salgótarján)
- b. Mining History Museum of the County of Borsod-Abaúj-Zemplén (Rudabánya)
- c. Industrial Historical Collection at Telkibánya

Nógrád Historical Museum, Mining Exhibition (Salgótarján)

At the eastern rim of the Veremoldal, at the site of the former mining colony at Salgótarján, Europe's second and Hungary's first natural underground coal mining museum is located. It was opened in 1965 at the 125th anniversary jubilee of brown coal mining in the Nógrád region and it is a declared industrial monument since 1980. The renewed new permanent underground exhibition was opened on 24th February 2005 in order to deliver learning to the visitors of the mining museum in an up-to-date, adventurous way as well as to preserve and acquaint younger generations with the history of the region's mining (Szvicsek, 2007). The museum contains 3

parts:

- The underground mining museum,
- The historical exhibition and the
- Open air museum (skanzen).

This underground mining museum used to be a functioning coal mine from 1879 until 1905 and was called József Inclined Shaft. The museum was established in the joint system its tunnel and the Károly Shaft (1889-1914). In the József Inclined Shaft, coal of high quality was mined producing an amount of coal of 776,000 tonnes during the period between 1937 and 1951. However, it was a mine with a high risk of frequent water inrush (Nagy-Szabolcsi, 2006).

Mining History Museum of the County of Borsod-Abaúj-Zemplén (Rudabánya)

One of Hungary's mining historical collections was established in Rudabánya. It is a museum that can be divided into 4 sections:

- A historical exhibition along with the permanent and temporary exhibitions
- The Aladár Földvári Exhibition Hall
- The Artificial adit and
- The industrial skanzen.

At the museum's permanent exhibition, mining related heritage, traditions, sculptures, mining equipment, kits, models of mineworking, historical papers, dress uniforms, ornamental spontoons, ornamental stoups, the mine manager's office and the officer's dwelling are displayed. A library is also found in the museum. Its documents and books, represented by ca. 3000 books and journals, embrace the entire history of mining in Hungary (Heim, 2009). At the permanent exhibitions in the Aladár Alföldi Exhibition Hall, visitors can see findings from the county and the Zemplén Mountains. A separate section is provided for the palaeontological findings as well as for the local and international minerals and meteorites. The artificial adit approximately 15 km in length exhibits the most wide-

spread methods of mineworking and lining constructions. In the industrial skanzen (or, in other words, in the industrial fleet) old transportation and commodities, remaining from those formerly used here, are displayed between the museum buildings.

Industrial Historical Collection at Telkibánya

In one of Telkibánya's oldest buildings, presumably built in the early 16th century, 6 halls exhibit the history of precious ore mining around the Village of Telkibánya, mineral mining in the Tokaj-hegyalja Region, the famous potteries, the forestry in the Zemplén Mountains, the finest minerals of Hungary and the memorial room of the grantor Kádár Family (Fekete, 2009).

Evaluation of the results

Temporary changes in the visitor statistics of the three exhibition sites studied can be considered to be similar to other museums. As for Salgótarján, the number of visitors in the mining museum in the 1970s was 5,000-10,000 per annum increasing to 20,000-30,000 visitors per annum by the late 1980s followed by a decline to approximately 20,000 visitors per annum in

the 1990s and somewhat below that figure in the mid-2000s (Szvicsek, 2007; Sztancsek, 2008). This decrease in the number of visitors can be explained by the increasing travel costs, the general decline of domestic tourism in Hungary as well as the pulling of other attractions and international destinations (i.e. international travels becoming increasingly attractive).

A decline in the number of visitors during the 1990s can also be observed for Telkibánya, starting in 1997 and lasting for 4 years. In this case, however, stopping and inverting the negative tendency took place from 2001 when the exhibition was renewed. It can be concluded from the data that a revival of exhibitions or the realisation of new exhibitions is required to maintain the number of visitors. It is also likely that the next increase in 2004 was due to the building's restoration (Fekete, 2009). As for Rudabánya (Fig. 4), a significant growth was experienced in 2005 that can be linked to exhibiting new archaeological-palaeontological findings.

Students as a possible target group of potential developments should also be mentioned here. They represent a relevant segment of visitors in nearly all of the years

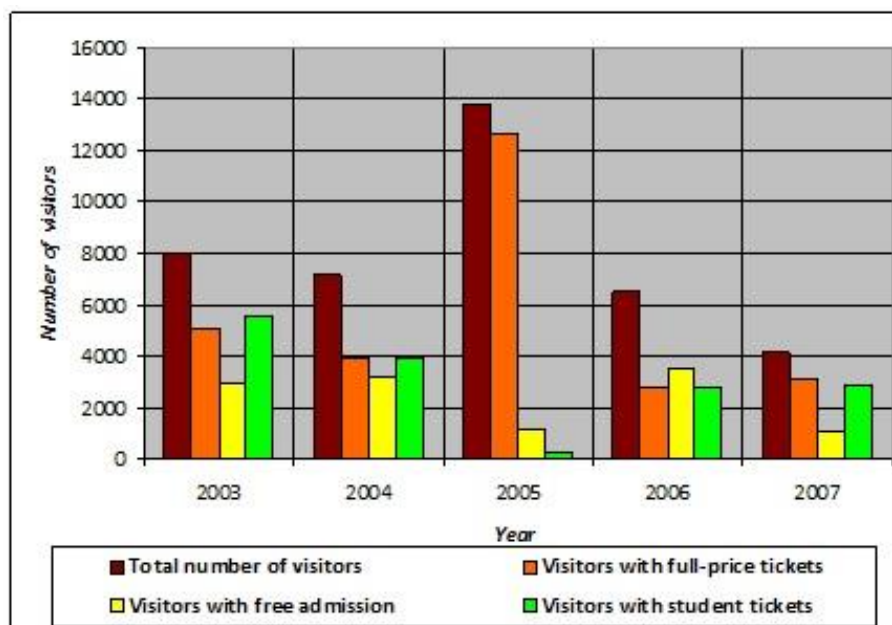


Fig. 4 The number of museum visitors in Rudabánya (in 2003-2007)
Source: Fekete (2009), based on visitors' statistics of the museum

studied (except 2005), approximating the number of visitors with full-price tickets. In Salgótarján, ca. 5-6.5 % of all visitors are made up by international tourist who, according to the statistics, represented more than 60 countries in the past 15 years.

Regarding accessibility, as far as road accessibility is concerned the Town of Salgótarján is in a rather advantageous situation. It is only in a distance of 100 km from Budapest and is accessible partly on the M3 motorway and partly on a 50 km section of the main road No. 21. the journey demanding less than 1 hour that will be further decreased when the main road (being the county's most important and busiest route) will be extended (likely by 2015). For Rudabánya, visitors have to use the M3 motorway to Miskolc then, after diverging from the main road No. 26 (for ca. half of the 40 km section), road conditions are inadequate. By regular bus services, running in every 30 minutes or 1 hour, the settlement can be reached from the surrounding settlements. Due to its unexploitedness, rail passenger transportation has ceased. By car, the Village of Telkibánya can be accessed from

Miskolc on the main road No. 3 (i.e. the continuation of the M3 motorway) and after diverting from it on bad quality subsidiary roads at a 70 km long section. A low number of regular bus services also run between the surrounding settlements. Not only are these inadequate but also the 9 services per day running to the county seat Miskolc. The village is located to a distance from the nearest railway line.

For quarters and catering units however, the Village of Telkibánya can be mentioned as a positive example. This small village with nearly 700 residents has a 3-star hotel, 2 youth camps, 2 hostels, 2 inns, 3 suites and 12 guest houses with a total number of beds approximately 350. Temporary changes in the number of beds and guest nights between 2000-2007 are indicated in Fig. 5. In the centre of Rudabánya however, a hotel accommodating only 60 guests can be found with catering possibilities upon demand. Other than this, quarters are only found in the neighbouring settlements.

This is also the case for catering units: only 4 are available in Rudabánya (buffet, confectionary, pub and pizza-house) with their standards all requiring improvement.

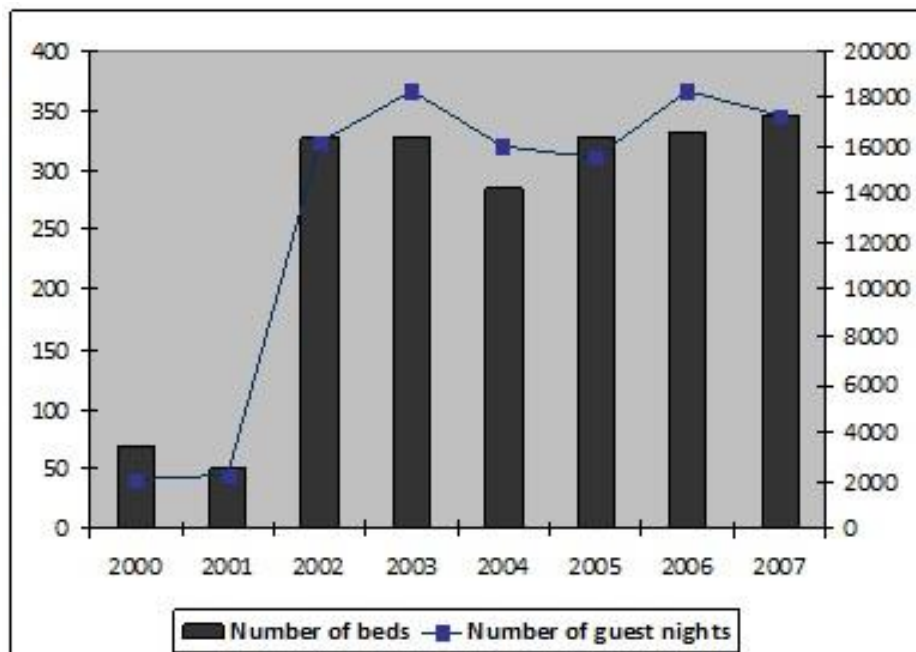


Fig. 5 The number of beds and guest nights in Telkibánya (2000-2007)

Source: Fekete (2009)

As probably the most positive feature, the existence of joint attractions can be mentioned for all three destinations studied. They are all surrounded by a high number of attractions known both by domestic and, in some cases, international tourists (as e.g. for Rudabánya, the Aggtelek Cave and for Telkibánya, the Tokaj Wine Region can be mentioned), located in a usually small distance (10-25 km). All 3 regions have a rich history and unique natural endowments thus with an appropriate route mapped out they offer one- or multi-day recreation abundant in experience for visitors. Nevertheless it is also their feature that despite the endowments described above, tourism is far behind its possibilities. This reflects the lack of complexity and connectedness of these programmes.

A summary of the studies carried out is given in Table 1.

CONCLUSIONS

Among the strengths of the settlements studied, their accessibility, the high number of nearby attractions and the continuous renewal of mining exhibition sites with fulfilling the visitors' demands can be mentioned. Weaknesses include the bad conditions of the subsidiary roads, low accessibility by public transportation, low public safety and the lack of connectedness to other attractions.

Our presupposition according to which such developments should focus on students as a target group has been proved: such attractions, in addition to education

and popular education also facilitate raising awareness aiming at the preservation of cultural heritage. It was also proved that novelties and continuously developed, updated exhibitions sites are found to be not only interesting but in some cases there is high demand.

As a result of the tasks carried out, for the sites designated and selected for development, particular recommendations can be made and the possible method to display the given attraction can be defined. To this, the following factors should be taken into consideration:

- Principles conceptualised in all local and regional tourism development and planning documents, especially tourism development based on local endowments.
- Principles of the sustainable tourism development. Having them followed tourism development strategies with a primary aim being the implementation of a more effective and efficient nature conservation policy and practice and in the meantime providing benefits in solving the socio-economic difficulties of the region's residents can be elaborated (Sütő et al., 2011).

The revival of tourism based on this new type of supply can contribute to the region's strengthening competitiveness, to the development of backward rural and urban areas hit by the depression of the heavy industry and, by the creation of jobs and infrastructural developments, to the improvement of the quality of life.

Tab. 1 Evaluation of the settlements studied

Evaluation criteria	Evaluation		
	<i>Salgótarján</i>	<i>Telkibánya</i>	<i>Rudabánya</i>
Accessibility	+	+-	+-
Quarters	+-	+	-
Catering units	+-	+	-
Joint attractions	+	+	+
Tourist information point	+	+	-

Legend: + adequate; +- partly adequate; - inadequate

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Revision of the "Assessment of attractiveness (value) of geotouristic objects"

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ABSTRACT

As the geotourism as relatively new part of natural and environmental sciences rapidly grows in last decades, many researchers have tried to define a method or model to set specific value of "geo-objects" in different ways. The aim of this paper is to review existing geosite assessment method proposed by Rybár (2010) and, based on this existing method, to define more applicable and easier to understand model of object evaluations which are attractive from geotourism point of view. Resulting evaluation score of this modified assessment method is more informative on the object features and gives more precise picture of the value of the geosites or geotourism attractive objects.

Key words: object, assessment, method, revision, geotourism

INTRODUCTION

Nature, landscape and its forms, and geological structure are the main elements on which all the aspects of natural environment and the life within depend. Natural objects or locations and their features, such as geological structure or relief forms, are often a part of world heritage. Protection and conservation of these places can ensure that future generations will have the possibility to learn about geological history of Earth, study it and admire beauties of the nature.

Most complex coverage of this issue can be found within the concept of geotourism covering several aspects and approaches from many different fields (e.g. geology, geomorphology, tourism, management, economy, etc.). From geotourism point of view, locations with some geotourism potential are geosites. According to Reynard (2004), geosite is "portion of the geosphere that present a particular importance for the comprehension of Earth history. More precisely, geosites are defined as geological or geomorphological objects that have acquired a scientific (e.g. sedimentological stratotype, relict moraine

representative of a glacier extension), cultural/historical (e.g. religious or mystical value), aesthetic (e.g. some mountainous or coastal landscapes) and/or social/economic (e.g. aesthetic landscapes as tourist destinations) value due to human perception or exploitation."

Understanding the importance of geosites as the abiotic part of the environment brought several authors (e. g. Warszyńska, 1970, 1974; Wimbledon et al., 2000; Tucki, 2004; Pereira et al., 2007; Reynard et al., 2007; Zouros, 2007; Kubalíková, 2009; Rybár, 2010; Baca & Schuster, 2011; Bruschi et al., 2011; Poirier & Daigneault, 2011; Fassoulas et al., 2012; Kubalíková, 2013) to the idea to set their specific value. However, there is no evaluation method used universally and/or respecting expectations of "general" geotourists and not only scientists (Štrba et al., 2015).

This article is focused on revision of quantitative geosite assessment method proposed by Rybár (2010). After four years of practical application of this method, experiences and results show that this assessment method, which results are relatively easy to understand, requires revision when considering more complex or

universal application of this method.

OVERVIEW OF ORIGINAL ASSESSMENT APPROACH ACCORDING TO RYBÁR (2010)

Geosite assessment method proposed by Rybár (2010) is a quantitative assessment method giving specific score (“value”) of each assessed site. That means that after application of this method on any geosite

you will receive a number of points reflecting geosite value. The nature of this method is in assessment of each object from two points of view: (1) assessment of the object as a natural object, and (2) assessment of the object as an anthropogenic object. Both views have ten evaluation categories (criteria) with specific pre-determined evaluation assessment options and points (tabs. 1, 2).

As the author summarizes in the

Tab. 1 Assessment of the site as a natural object (Rybár, 2010)

Category	Assessment options	Pts.
Primary geological properties	Object is a part of geopark listed in European Geopark Network	8
	Object listed in international geosite network	8
	Object is a part of geopark	6
	Object listed in national geosites network	6
	Object not listed in any geosites network, but due to its character should belong there	5
	Object of local importance	3
	Other object	0
Uniqueness	Object unique within Europe	8
	Object unique within the Western Carpathians	6
	Object unique within orographic unit	5
	Object unique within hiking distance	4
	Object typical for region	3
	Other object	0
Object accessibility	Comfortable access	8
	Accessible for a person with average fitness condition	7
	More difficult - passing high elevation - steps, ladders	5
	Very difficult - specialized guide, or a need for special training;	4
	Protected area with limited freedom of movement Inaccessible for different reasons	0
Existing scientific and professional publications	Scientific and professional geological literature	8
	Map records only	4
	Locality without description	0
Conditions of observation	Suitable	8
	Difficult	4
	Unsuitable	0
Security criteria	Object, surroundings safe	8
	Object, surroundings secured by security elements, protection tools at disposal	5
	Object, terrain in dangerous environment, without security elements	0
Information availability on the object	Available and quality information on the internet	8
	Existence of educational-popular form of information	6
	Existence of scientific form of information	5
	Incomplete information Missing information	2 0
Visual value of the object	Object in mountainous landscape with great distance and depth views	8
	Object in plain landscape with great view	6
	Object in landscape with no view on its surroundings	3
	Object with view on man-made works negatively affecting one's perception	0
Value of provided services	Study room with library and laboratories for research purposes within the object	8
	Accommodation and catering offer	7
	Stores selling minerals, historical objects, books and advertising objects	6
	Presence of conference rooms	5
	Offer of accommodation for large groups, of just of refreshment	4
	Other services	2
	Object with no provided services	0
Object in tourist area	Object marked on maps, underpinned by marketing	8
	Object visited by holidaymakers	5
	Object "along the road" between two locations visited by tourists	3
	Object not underprinted by marketing	0

Tab. 2 Assessment of the site as an anthropogenic object (Rybár, 2010)

Category	Assessment options	Pts.
Age	Object from prehistoric, ancient or Roman age	8
	Medieval object	6
	Object from period between 16 th – 19 th century	5
	Newer object	3
	Newly established object	0
Historical value	Object as a part of set of technical monuments – building complexes, “tajchy” lakes, set of technical monuments in a limited area	8
	Individual object documenting mining activity – knock tower, adit mouths, winding machines	7
	Mining museum, open-air mining museum, mining archive	7
	Object related to historical mining activities	6
	Other historical object	3
	Object with no historical value	0
Aesthetic value	Architecturally preserved works (house, mansion, church, archeological findings)	8
	Object in beautiful natural environment	6
	Aesthetical reconstruction of mining settlement, set of objects	5
	Technical monument with aesthetic value	3
	Object with no historical value	0
Authenticity	Preserved authentic elements and details (buildings, technical works and objects)	8
	Museum or open-air museum with authentic technical monuments	7
	Archaeological findings documenting usage of mining or processing technologies	6
	Mining archive and library with number of authentic historical mining maps and mining literature	6
	Authentic object of mining technology	5
	Models, panels and copies of authentic technologies and objects	3
	Other	0
Value of municipalities and cultural routes reconstruction	Cultural route connected to mining activity	8
	Reconstructed mining municipality	6
	Reconstructed parts of mining municipalities	4
	Not reconstructed mining municipality	3
	Other objects	0
Excellence	Listed in UNESCO World Heritage List	8
	Object exceptional in European measure	7
	Object present in notable written and pictorial works documenting the history of mining	6
	Object important in historical ore area	5
	Object typical for selected mining area	3
	Other object	0
Emotional value	Object related to famous person or event of global/international/national significance	8
	Object visited by foreign tourists due to reverence for their native or hero	6
	Object related to historic figure or even of Slovak national significance	4
	Object with no emotional value	0
Utility value	Multifunctional object adjusted to needs of geo and montane tourism	8
	Object connected to presentation of geo and montane tourism	7
	Mining museum, open-air museum, mineralogical collections, mining archive, unique library of historical mining books	6
	Object offering historic services – mining canteen, mint, etc.	5
	Other object	0
Value of provided services	Tour down the historical mines	8
	Demonstrations of old technologies – gold cradling, flint chipping	7
	Multifunctional virtual mining – presentation	6
	Visit to operational mining works – demonstrations of modern technologies	5
	Lectures of mining, mineralogy, petrography, paleontology, social development of mining, famous persons in mining, mining law, etc.	4
	Store selling minerals, historical objects, books, and advertising objects	3
	Other services	2
	Object with no provided services	0
Safety criteria	Object safe, requiring no safety measures	8
	Object fully secured by services provides	7
	Object secured, protection tools not provided	5
	Short training provided	3
	Object without provided safety services	0

conclusion, the value of each assessed object is then given by a pair of numbers representing its natural/scientific and anthropogenic value. The highest score is 80/80 meaning that object was assessed in all categories with the maximum "8" point rate. The value 80/0 means that an object has the highest possible value from the "geo" viewpoint, but zero value expressing "mining" part of assessment. Vice versa, the value 0/80 indicates that an object has no "geo" value, but has maximal technical and historical "mining" value. Assessment with two numbers close to 80 marks an object with exceptional geotourist and mining value. Assessment with numbers close to zero means that an object is not of great geotourist value (Rybár, 2010; Rybár et al., 2010).

DISCUSSION ON THE ORIGINAL METHOD AND ITS REVISION

One of the most discussed features of the method is the fact that each object or location is assessed according to two individual tables – as natural and anthropogenic object. This original approach has one weakness. Many natural objects cannot be, or with many difficulties, assessed according to criteria given within *assessment of the site as an anthropogenic object* (tab. 2). As the criteria within this part of assessment are primarily proposed for mining heritage sites (e.g. mines, quarries), their application on many natural sites is impossible if we want to have representative assessment score of the site. In light of this fact, following text will discuss only the first part of original assessment method - *assessment of the site as a natural object* which can be used for the variety of geosites.

Closer look on the method of Rybár (2010) reveals that original approach of natural object assessment is relatively locally based to Europe and the territory of the Slovak Republic or Western Carpathians. It is reflected in several

assessment criteria (tab. 1) – *Primary geological properties: Object as a part of geopark listed in European Geopark Network, Uniqueness: Object unique within Europe or Western Carpathians*. To be universally applicable, an assessment method should include criteria that can be used on each geosite on the world, therefore we assume that these criteria should be more generalized, as proposed in revised version of the assessment method (tab. 3) which takes in account, besides Europe and Western Carpathians, other parts of the world and other mountain ranges.

After several years of application of this method, primarily on geosites located in Slovakia, experiences show that there are many misunderstandings resulting from names of some assessment categories or criteria. Here, mostly discussed are *primary geological criteria, existing scientific and professional publications, and information availability on the object*. First mentioned category reflects classification and evaluation of geosite according to its membership in geopark or geosite network. So, it can be assumed that this category evaluates general classification from the geotourism point of view (tab. 3). According to the knowledge of authors, this is the only geosite assessment method including such category. One can argue that this category is unnecessary and prefers sites located within geopark and/or belonging to geopark or geosites network. But on the other hand, as the practice and experiences show, lone standing, well preserved and unique locality with no or weak geotourism background and management is often out of the scope of general public. Also, locations with geotourism background are more protected and well preserved for future generations because of their regular monitoring and measures applied at the site. Therefore, we assume that this category and criteria within are, at least for general public and site protection, important component of the assessment method. *Existing scientific and professional publications and information*

availability of the object are two partially overlapping categories. Unification of them may eliminate possible uncertainties within assessing.

Considering complexity of discussed assessment method, one important category is missing. No matter what kind of evaluation method is used, either quantitative or qualitative, category representing integrity or current state of the

site should be included into the assessment, because, in many cases, it is a crucial criterion to visit an individual location for both main groups of geosite visitors professionals and general public. Also, overall attractiveness of the site depends on the degree of its preservation. As original method (Rybár, 2010) does not comprise such category, we suggest to include a new category *degree of preservation* in revised

Tab. 3 Geosite assessment after revision of the method proposed by Rybár (2010)

Category	Assessment options	Pts.	Ratio
General classification (C ₁)	Part of geopark listed in EGN/GGN or listed in international geosites network	8	1.00
	Part of geopark or listed in national geosites network	6	0.75
	Not listed in any geosites network, but due to its character should belong there	4	0.50
	Local importance	2	0.25
	Other	0	0.00
Uniqueness (C ₂)	Unique worldwide	8	1.00
	Unique within continent	6	0.75
	Unique within orographic unit	5	0.67
	Unique at national level	4	0.50
	Typical for region	2	0.25
Other	0	0.00	
Degree of preservation (C ₃)	No destruction	8	1.00
	Mostly preserved, some details destructed	6	0.75
	General features preserved, partial destruction	4	0.50
	Mostly destructed	2	0.25
	Totally destructed	0	0.00
Accessibility (C ₄)	Comfortable access	8	1.00
	Accessible for a person with average fitness condition	6	0.75
	More difficult - passing high elevation - steps, ladders	4	0.50
	Very difficult - specialized guide, or a need for special training;	2	0.25
	Protected area with limited freedom of movement	0	0.00
Inaccessible for different reasons	0	0.00	
Study/observation conditions (C ₅)	Excellent	8	1.00
	Normal	5	0.66
	Difficult	3	0.33
	Unsuitable	0	0.00
Security criteria (C ₆)	Object, surroundings safe	8	1.00
	Object, surroundings secured by security elements, protection tools at disposal	5	0.66
	Object, terrain in dangerous environment, without security elements	0	0.00
Information availability (C ₇)	High quality open-access information available on the internet or at the site	8	1.00
	Educational-popular form of information or publications	6	0.75
	Scientific "geo-based" form of information or publications	4	0.50
	Incomplete information	2	0.25
No information	0	0.00	
Visual value (C ₈)	Object in mountainous landscape with great distance and depth views	8	1.00
	Object in plain landscape with great view or inside cave	6	0.75
	Object in landscape with no view on its surroundings	3	0.33
	Object with view on man-made works negatively affecting one's perception	0	0.00
Value of provided services (C ₉)	Study room with library and laboratories for research purposes at the site	8	1.00
	Accommodation and catering offer at the site	6	0.75
	Stores selling minerals, historical objects, books, advertising objects, local products	4	0.50
	Other services	2	0.25
No provided services	0	0.00	
Tourism importance (C ₁₀)	Marked on tourist maps, underpinned by marketing; strong connection of geosite to cultural/historical features of the area	8	1.00
	Partially connected to cultural/historical monument(s)	6	0.75
	Visited by holidaymakers	4	0.50
	"Along the road" between two locations visited by tourists	2	0.25
Not underpinned by marketing, no tourism importance	0	0.00	

version of the assessment method. Here, five assessment options are proposed: no destruction; mostly preserved, some details destroyed; general features preserved, partial destruction; mostly destroyed; and totally destroyed.

Revised assessment method (tab. 3) includes ten categories representing complex characterization of locality from geotourism point of view. Although there are many geosite assessment methods defined, only few studies (Kubalíková, 2013; Štrba et al., 2015) devoted to comparison of these methods have been written yet. Results of these comparisons show that there are criteria which should be implemented within any evaluation process. Kubalíková (2013) grouped assessment criteria into following five groups: (1) scientific and intrinsic values, (2) exemplarity and pedagogical potential, (3) accessibility and visibility of the site and the presence of tourist infrastructure, (4) existing threats and risks, assessing conservation activities or the existing legislative protection of the site, (5) added values. According to Štrba et al. (2015) key criteria for geosite assessment include: rarity, representativeness, integrity, accessibility, ecological value, and economic value. Comparison of these suggestions with proposed revised

assessment method is given in table 4.

As the assessment is defined as method which results can be used by both, professionals and general public, overall assessment score includes five different values.

First value is represented by the total sum of points from each category. Here a maximum of 80 points is possible to gain. Each assessment option within individual category has its own percentage (tab. 3). So, final score is possible to express not only via points but percentage also. It may help to clarify assessment results because percentage is more representative value for many people, predominantly laic individuals from general public. Final percentage (FP) is an average of percentages gained from individual assessment categories, as follows:

$$FP = \frac{\sum_{i=1}^{10} C_i}{10} \quad (1)$$

Besides this total geosite score, several additional scores can be derived from the assessment method. As the assessment includes different-type categories, scientific, educational, economic, and added value of the geosite can be specified after the assessment process. Scientific value is given the sum of categories which are important from study

Tab. 4 Comparison of revised assessment categories with research results of Kubalíková (2013) and Štrba et al. (2015)

Assessment category	Assessment group according to Kubalíková (2013)	Key criteria according to Štrba et al. (2014)
general classification uniqueness	added values scientific and intrinsic values, exemplarity and pedagogical potential	representativeness (partially) rarity
degree of preservation	existing threats and risks, assessing conservation activities or the existing legislative protection of the site	integrity
accessibility	accessibility and visibility of the site and the presence of tourist infrastructure	accessibility; ecological value (partially)
study/observation conditions	accessibility and visibility of the site and the presence of tourist infrastructure	representativeness (partially)
security criteria	added values	-
information availability	exemplarity and pedagogical potential (partially), added values	-
visual value	accessibility and visibility of the site and the presence of tourist infrastructure, added value	-
value of provided services	added values	economic value
tourism importance	accessibility and visibility of the site and presence of tourist infrastructure, added values	economic value

and research point of view for different kind of scientists. These categories are covered by: uniqueness, degree of preservation, information availability, and study conditions. Uniqueness here is important, as characterized by other authors (e.g. Wimbledon et al., 2000; Reynard et al., 2007; Štrba et al., 2015), because the knowledge of its value helps to identify rare locations which often are allurements for many researchers in order to study unique natural phenomena. Study conditions and degree of preservation are closely connected categories within scientific value of the site. Unique location with inappropriate study conditions or damaged site, in general, offers limited research conditions resulting into lower scientist interest in such types of locations. Availability of information on the locality and the type of information represents scientific value of the site because the more scientifically significant location is the more publications are available.

Educational value of the geosite is a sum of score from uniqueness, information availability, accessibility, provided services and study conditions. Importance of uniqueness, study conditions, and information availability within this value is similar to previous value. When considering educational character of geosite, accessibility is one of the most important categories within this value. Inaccessible places (from different kind of reasons) provide no or just little education opportunity and lose their importance within the process of field education of not only geoscience students but all the students which studies are related to the environment. Value of provided services represents here overall background for educational purposes.

Economic value represents benefits, primarily financial profit, resulting from locality character and its background. The value is given by the sum of scores from general classification, provided services, tourism importance, and accessibility. As summarized by Kubalíková (2013),

economic value fulfills two geotourism principles (tourist satisfaction, community involvement and benefit) mentioned in definitions of National Geographic Society (2005) and Newsome and Dowling (2010).

Added value represents overall tourism potential of the area including such factors like presence of touristically attractive cultural and/or historical monuments, accommodation and catering offer or emotional perceptions (predominantly given by visual value, provided services and security) of visitor. The final score of this value is the sum scores from categories of visual value, tourism importance, provided services and security. Although it is quite difficult to assess aesthetic character (visual value) of the place and in many cases it is strongly subjective based, it significantly affects satisfaction of tourists and therefore is included into the assessment.

Comparison of original and revised assessment method

Proposal of any assessment method that should be used practically requires some example(s) of practical application what may be used as some kind of manual for potential users. Following text brings assessment of geosite Dreveník, including general characteristics of the site, using original method of assessment of attractiveness of geotouristic objects proposed by Rybár (2010) and revised assessment method presented in this paper.

Dreveník (Fig. 1), as one of the biggest travertine hills in Slovakia and Central Europe, is located in the Hornádska kotlina Valley, near town of Spišské Podhradie. This site, law-protected from 1925, was inscribed of UNESCO's World Heritage list in 1993 (SAZP, 2007). Remnants of human settlement of Neolithic age were found here. From geological point of view, Dreveník travertine hill, originated from junction of several travertine heaps, was formed from mineral springs at tectonic fault. According to Tulis and Novotný



Fig. 1 Travertine blocks of Dreverník

(2008), the thickness of travertine deposits, which overlay flysch deposits of the Central Carpathian Paleogene Basin (Gross et al., 1999), does not exceed 75 meters. Results of paleontological studies suggest (Tóth and Krempaská, 2008) that the age of the travertine is considered to be Pliocene. Erosional processes (karstification and gravitationally induces mass movements) extensively destruct travertines (Tometz, 1997; Wróblewski et al., 2010). Due to its diverse character, findings and observable features and/or processes, described geosite may be a place of interest for scientists and laics of different fields, like general geology, sedimentology, engineering geology, palaeontology, history, archaeology, botany, etc.

Before comparison of results it is necessary to mention that, using original method of Rybár (2010), selected geosite was evaluated only as a natural object. Approach of site evaluation as anthropogenic object was not applicable.

Assessment results show that using original method (Rybár, 2010) the geosite has 58 points and using revised version of assessment method it has 53 points (67%). As the maximum scores of both assessments are the same (80 points), the 5 point difference may primarily result from the fact that original method gives twice 8 point score within two different categories (existing scientific and professional publications, information availability on the object) that were unified in revised version. Also, in revised version, the same or similar categories have lower point score in some cases (e. g. object accessibility vs. accessibility). In general it can be said that revised assessment method provides more complex characteristics of the geosite. Addition of percentage into the assessment makes the results of this method more “public-friendly” because such presented value is easier to understand for many individuals not only from general public but professionals too. Furthermore, specific

scores of scientific, educational, economic and added value (Tab. 5, Fig. 2) characterize the site from different point of views and give more complex picture of the geosite potential. Results clearly indicate

that Dreveník is mostly scientific like locality with potential to become complex geosite of international importance after abolishment of shortages (e.g. provided services) which the assessment pointed out.

Tab. 5 Comparison of results according to original assessment method (Rybár, 2010) and proposed revised method

Rybár (2010)			Revised assessment method			
Category	Assessment	Pts.	Category	Assessment	Pts.	Ratio
Primary geological characteristics	Object not listed in any geosites network, but due to its character should belong there	5	General classification	Not listed in any geosites network, but due to its character should belong there	4	0.50
Uniqueness	Object unique within The Western Carpathians	6	Uniqueness	Unique within orographic unit	5	0.67
Object accessibility	Accessible for a person with average fitness condition	7	Degree of preservation	Mostly preserved, some details destructed	6	0.75
Existing scientific and professional publications	Scientific and professional geological literature	8	Accessibility	Accessible for a person with average fitness condition	6	0.75
Conditions of observation	Suitable	8	Study/observation conditions	Excellent	8	1.00
Security criteria	Object, terrain in dangerous environment, without security elements	0	Security criteria	Object, terrain in dangerous environment, without security elements	0	0.00
Information availability on the object	Available and quality information on the Internet	8	Information availability	High-quality open-access information available on the internet or at the site	8	1.00
Visual value of the object	Object in plain landscape with great view	6	Visual value	Object in mountainous landscape with great distance and depth views	8	1.00
Value of provided services	Object with no provided services	0	Value of provided services	No provided services	0	0.00
Object in tourist area	Object marked on maps, underpinned by marketing	8	Tourism importance	Marked on tourist maps, underpinned by marketing; strong connection of geosite to cultural/historical features of the area	8	1.00
Total		56	Total value		53	0.67
			Scientific value		27	0.84
			Educational value		27	0.68
			Economic value		18	0.56
			Added value		16	0.50

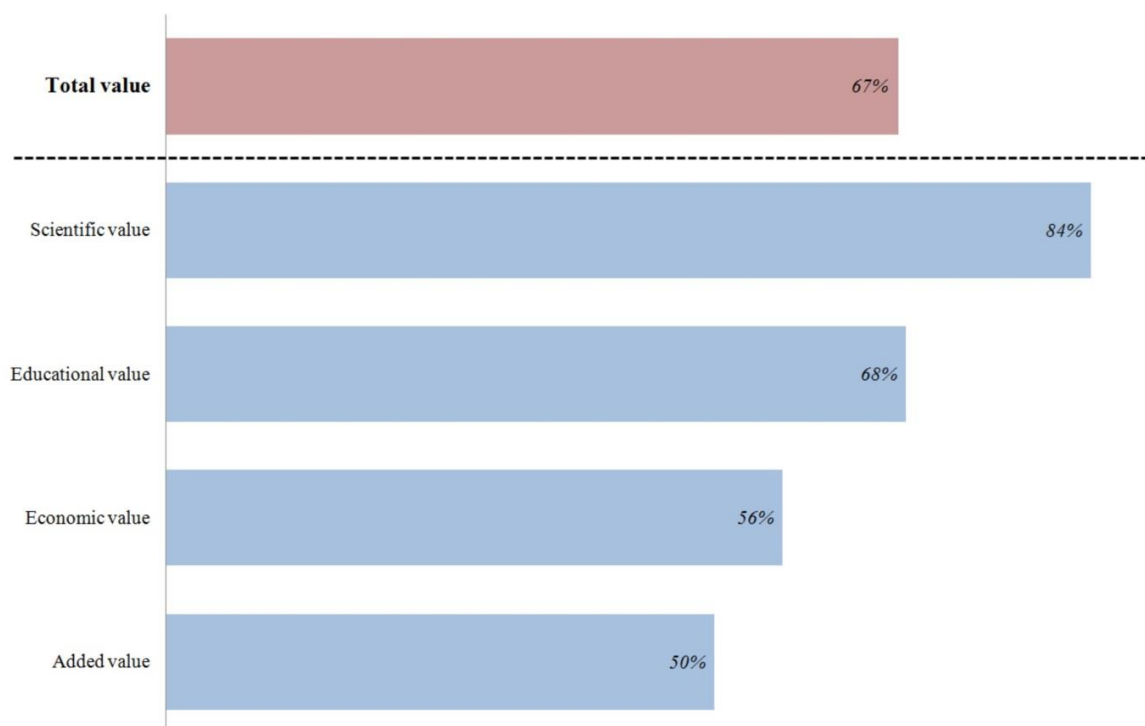


Fig. 2 Graph results of proposed revised assessment method

CONCLUSION

As the concept of geotourism continuously develops, many scientists define or modify different kinds of methods of geosite assessments in order to set specific value of natural objects as one of primary points of interest within geotourism. Geosite assessment method defined by Rybár (2010) was discussed and revised in this paper. As original method includes assessment of each site as natural and anthropogenic object where second part was often not applicable (due to its primary orientation on mining heritage sites), it was removed from revised version. Comparison of results of original and revised version shows that revised version provides, via total, scientific, economic, educational and added values, more complex overview of geosite value and potential and is more understandable to wide range of people.

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Choice of (geo)tourism product themes in Czech Republic

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ABSTRACT

Choice of suitable themes is one of the key steps in the preparation of tourism products. Selection must respect the specialization of tour operators (travel agencies) in this field and in the system of tourism of the region and, essentially, be based on an analysis of the tourist market, particularly competing travel agencies and analysis of the structure and the interests of current and future participants. Designing units of travel agencies must devote constant attention to all possible sources of ideas, even if it were suggestions towards minor changes to existing products. At present, client attention turns both to nature and to technical monuments. With regard to long-term orientation of the Czech lands for mining activity, mentioned problems are further discussed. Besides the factual base, i.e. the specific locations that fit the theme, a man perceived spirit of the place, usually summarizing under the concept of *genius loci*, plays an important role.

Key words: product theme, theme suggestions, geoscience tourism, mining tourism, *genius loci*

INTRODUCTION

Tourism, as a dynamic open system, is undergoing constant changes, which correspond to the extent of knowledge and level of technology development, the actual structure of human society and the needs of potential participants of tourist activities. Development of the tourism market leads to the necessity to come up with increasingly offering new products for both current clients and new target groups.

The process of developing new tourism products begins by generating and collecting ideas, their classification and analysis, and then determining the product concept (Fig. 1).

Figure 1 shows that it is a continuous process that requires constant attention, the necessary checks, adjustments and innovations. This is the only way to succeed in extensive and highly variable environments of specialized tourism.

At the beginning of the creation of the

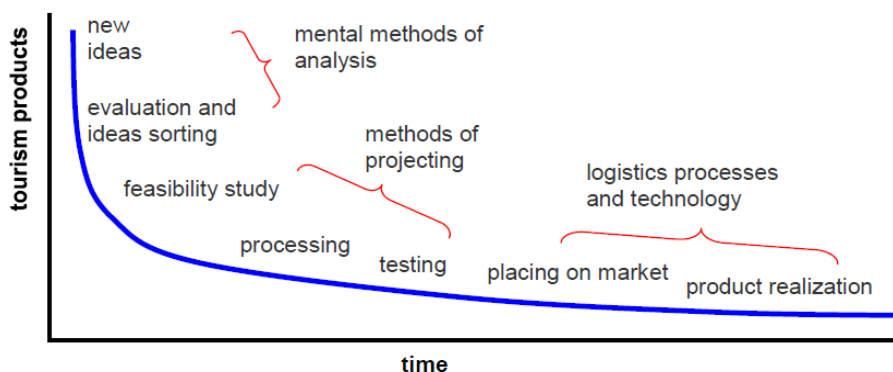


Fig. 1 Process of tourism product development and implementation (Schejbal, 2013)

product, supporting central thought, thus a good idea should be found. Choice of themes is one of the key steps in the preparation of tourism products. Selection must respect the orientation of tour operators (travel agencies) in this field and in the system of tourism of the region and essentially be based on an analysis of the tourist market, particularly competing travel agencies and analysis of the structure and the interests of current and future participants. They must focus on each specific customer group or target market. Creation of tourism products of the region is therefore not possible without a clearly defined long-term strategy implemented by tour operator. At this stage of the process, the mental analysis methods are applied, which result in the development of mental model. It is based on the findings of ongoing obtained from various sources incomplete or difficult to assess, the facts and tacit knowledge. We must also consider the limitations of short-term memory, or any non-compliance with the principles of logic, and the like. This is also related to the fact that the mental model is not always comprehensible to others and can be interpreted in different ways. Effective means to provide methods of creative thinking, which are based on assessment of the subjective probabilities (brainstorming, brainwriting, Delphi method). Therefore, a further step is necessary to switch to the principles of systems thinking, which are applied in a follow-up design phase.

SUGGESTIONS OF THEMES

Topics that will form the basis of the newly processed and offered products can develop in different ways. Besides the proposals of travel agency own staff, they can make suggestions of customers, cooperating or collaborating persons or superior organizations, etc. (Fig.2). Designing unit of travel agencies must devote constant attention to all possible sources of ideas, even if it was suggestions

towards minor changes to existing products.

Because of the individualized interests in tourism and an increasing emphasis on experiential types of tourism, there may be a problem of choice high importance topics. To be successful, each topic under consideration should be based on some legend, which must be sufficiently attractive. The legend may be based on natural attractions of the region under consideration, the selection of which will depend on the orientation of the candidates under consideration.

It is obvious that travel agents, particularly those that focus on specialized tourism (geotourism, mining tourism, ecotourism etc.), must seek new types of activities and upcoming new ideas and products offered.

Very interesting ideas can be derived from historical events, from the lives of famous people (e.g. Karel Hynek Mácha, Petr Bezruč, Leoš Janáček, Salomon Rothschild, Joy Adamson, Zdeněk Burian, etc.) or from folk stories. Similarly, archaeological sites or monumental civil and religious buildings can be useful. Fictitious states like Wallachian Kingdom, Lachian margraviate etc., the territory of the fictional persons (King Ječmínek, Rybrcou - Krakonoš, Blaník Knights), spooks (devils, water sprites, White lady, Hejkal, jacks-o'-lantern) and the like are good sources of inspiration. Particularly a large number and range of ghosts are distinguished rumors in Prague. They can also enjoy the adventures of literary figures, whether fairytale (highwayman Rumcajs, Lotrando from Brendy) or fictional (Viktorka from Božena Němcová's Babička, Jan Ohnivec of Jirásek *Proti všem* etc.). This story attracted perspective customers experiencing the product only on a rational level, but also on the sensory and emotional level (Tarsanen, 2005).

An equally important aspect will be genius loci of considered locations. In Roman mythology, genius loci was considered to be a spirit or little god, protecting certain location. In today's

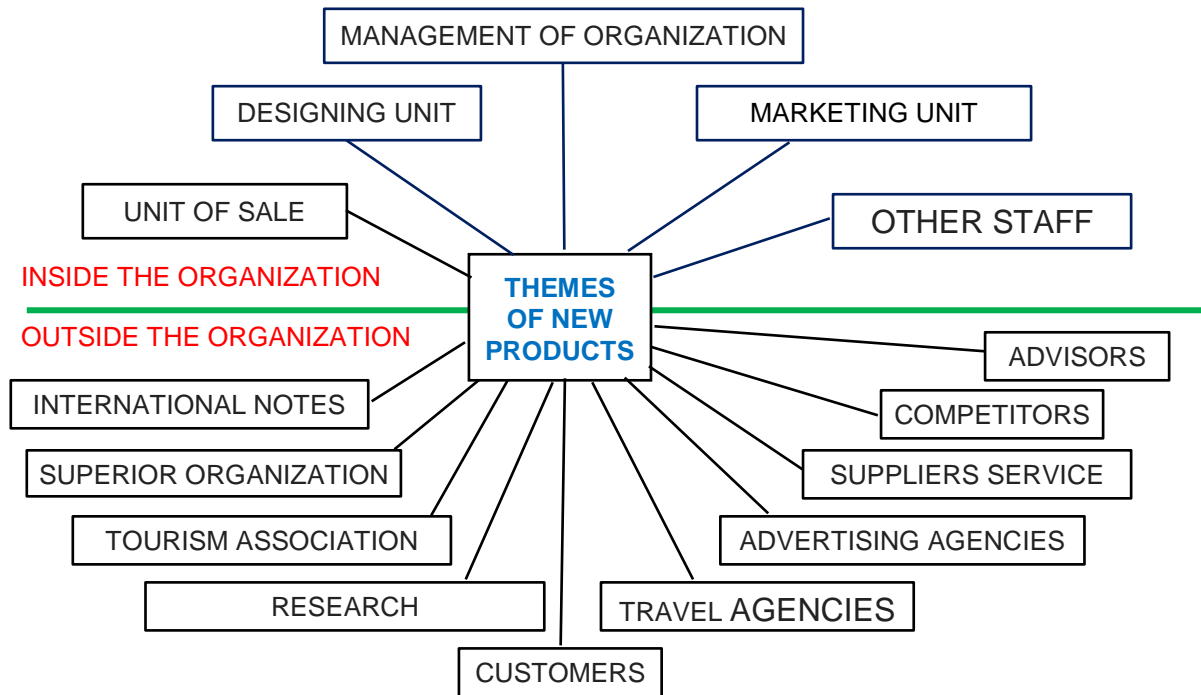


Fig. 2 Sources of tourism product ideas

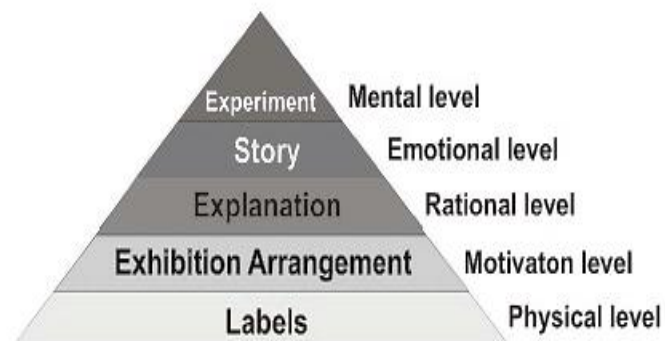


Fig. 3 Applying Maslow's hierarchy in experience tourism (Tarssanen, 2005)

conception, this phrase has more importance of special atmosphere given area than a kind of local protection strength. Pásková and Zelinka (2002) assumed that this term is a "holistic summary of tangible and intangible manifestations and history to the present locations, unique and unrepeatable, creating its continuous interaction with the spiritual world of a visitor or a resident of the multi-dimensional dynamic perception of the site." Clearly, there is not any universal concept that would express the concept.

At present, consumer attention turns both to nature and technical monuments. With

regard to very complex and unique geological structure of the Czech Republic and long-term orientation of the Czech lands for mining activities, both aspects are further discussed.

THEMES OF GEOSCIENCE TOURISM PRODUCTS IN CZECH REPUBLIC

Suggestions should primarily be based on the interests of current and expected participants in upcoming products of geoscience tourism, obviously while

respecting the structure of geosciences. Several topics can be defined, e. g. mineralogical and petrographic, paleontological, general-geological, volcanological, hydrogeological, engineering-geological, mineral resources geology. A very good source of ideas is information on geological sites in the Czech Republic, stored in a database of important geological sites, which contains records of particular localities protected in various degrees of protection, but also on the sites scientifically significant or interesting, many of which can be designed to protect.

Geoparks, which are constituted at the national, European and global level, are relatively new concept providing besides environmental protection also education possibility. From the perspective of geoscience tourism themes in the Czech Republic, mainly National Geoparks provide information for making suggestions (Fig. 3).

Interesting natural objects that can be subject of product are numerous located in each part of Czech Republic. Some are mutually isolated, e.g. different stone cliffs, stone fields, tors, monadnocks, klippes, troughs etc., while others are grouped into

large formations. Typical examples of such formation are sandstone rock cities, karst areas or neovolcanic areas in Central Bohemia.

THEMES OF MINING TOURISM PRODUCTS IN CZECH REPUBLIC

Czech Republic is a classic area of mining activities, which cover a period of more than three millennia, respectively, considering the production of pottery and the collection and mining of hard stones, dating back to a much earlier time. This was reflected in the many remnants connected to the mining activities, e. g. relicts after extraction of precious metals, especially in the Middle Ages and latter ore mining non-ferrous metals, iron and finally brown and black coal. Besides the preserved mining objects (Fig. 4A), a large number of monuments is kept in the mining museums (Fig. 4B), air museums and educational trails.

A detailed inventory of historical and current mining works can be found on the website of the Czech Mining Office and Czech Geological Survey - Geofond Prague.

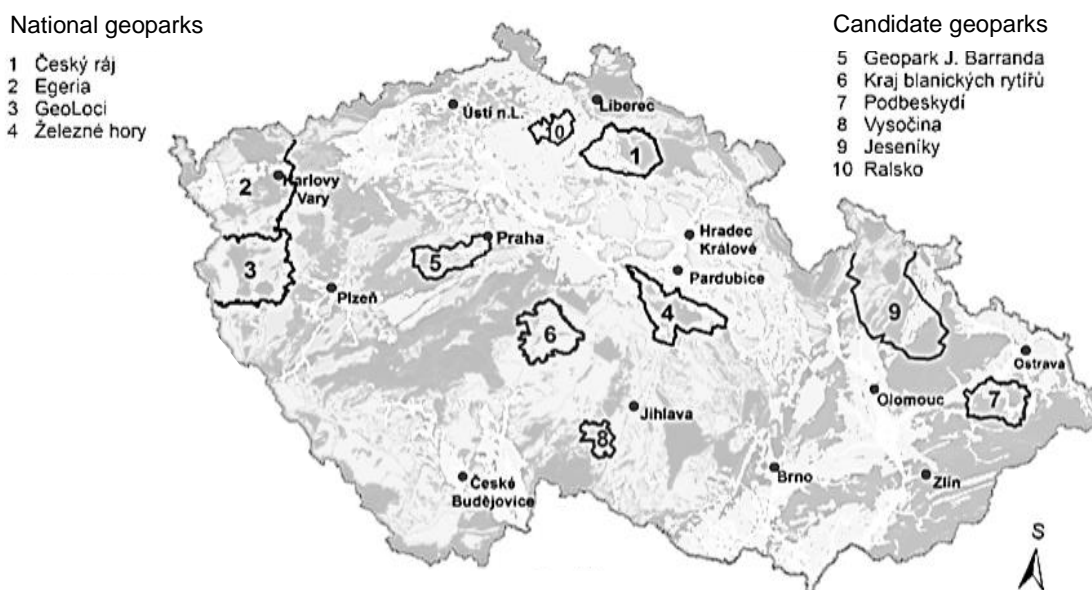


Fig. 3 Geoparks in Czech Republic (Čtveráková in Pásková, 2013)

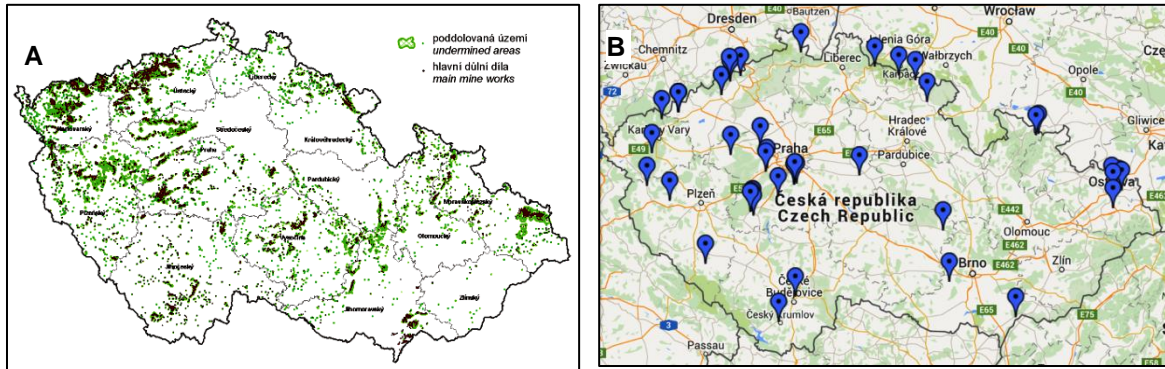


Fig. 4 A - mining objects (CGS – Geofond); B – mining museums (Zdař Bůh.cz).

Due to very difficult and dangerous mining environment, it was associated with a number of superstitions, full of various subterranean creatures, such as goblins, stone ghosts, sulfuric dogs etc., some of which miners thrived, but mostly harm. When preparing products, it is appropriate to come out from local legends that reflect the spirit of the particular region. The basis may be old Czech legends, such as legend of Libuše prophecy and the dispute nobleman Horymír of Neumětely with miners from Březové Hory that are listed in the Czech chronicle of Václav Hájek from Libočany, in the book *Silesian folk and mining rumors of Jeseníky Mountains* inscribed by Joseph Lowag, or in a book *Old Kutná Hora rumors* drafted by Jan Kořínek in 2011. Not forgetting a series of tales about the patroness of miners St. Barbara. Very touching is the legend of a celebratory Holy Mass of souls perished miners in the village of Hrušková in Slavkovský Forest. In the coalfields the Karel Polánek book *Bouquet of myths, legends and stories from the district Kladno* can be remembered. There are interesting stories about the discovery of coal in the Kladno or about blacksmiths Keltička who discovered coal in Ostrava.

Interesting themes can provide reclaimed area after mining activities. In this regard they excel North Bohemian brown coal basins. Realized projects of Czech reclamation school are respectfully recognized worldwide. Examples of well-

conducted reclamation can be found in the Ostrava-Karvina mining district, in the former uranium mines on the Czech-Moravian Highlands, in the Slavkov Forest etc.

THE ROLE OF GENIUS LOCI

Besides the factual base, i.e. the specific locations that fit the theme, plays an important role in a man perceived spirit of the place, usually summarizing under the concept of genius loci, respectively genius regionis (Vencálek, 2012). Christopher Day (2002) characterized the genius loci as "places able to reach of the human soul acts differently than sites that are merely pretty." As stated by Šípek (2001), in principle it is a psychological projection of their own human perspectives and scales on nature (geological and geomorphological character of the landscape, its hydrological and biological properties) and some anthropogenic objects, namely the phenomena created and modified by man. Norberg-Schulz (1980) in this respect divided the landscape of the romantic, classical and space. Similarly, classifies and cities. The problem genius loci dealt with the many of the authors.

The category "genius loci" includes a variety of archaeological, religious and natural sites that are associated with ideas or religions that marked the history of mankind. Besides the generally recognized

sites can be genius loci specific to a particular person, for example instead of happy and unhappy meeting vice versa.

Good examples of geotourism or mining tourism objects with strong genius loci in the Czech Republic include e. g. old tin mine Jeroným in National Geopark Egeria from the beginning of 16th century, or Lower part of Vítkovice with complex of coal mine, blast furnaces, steelworks and machinery enterprise.

Natural areas with strong genius loci are numerous. A very good example is the cirque Úpská jáma of trough Obří důl in the Krkonoše Mountains with Krakonoš garden and Devil's ridge and garden, glacial lakes in Šumava Mountains, Praděd surroundings in the Jeseníky Mountains, gorge Velký Štolpich near Ferdinandov in Jizera Mountains that inspired Carl Maria von Weber to the composition of romantic opera The Freischütz etc.

CONCLUSION

Selection, sorting and processing ideas into viable and marketable tourism product is the starting, but decisive step in the activities of travel agencies. The validity of this conclusion follows from the situation on the tourism market and especially from the changing spectrum of customer requirements.

Considering the disproportionately high number of travel agencies and vendors and the relatively limited number of potential customers in Czech Republic, it is clear that the tourism market represents a strong competitive environment. Therefore, there

should be an emphasis to find new ideas of upcoming products, one of the key conditions for success, or at least the survival of each enterprise.

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