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# Assessing the speleotourism potential together with archaeological and palaeontological heritage in Risovača cave (central Serbia)

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*Abstract*

*The region of Central Serbia is not considered a typical karst region, however one cave near the city of Aranđelovac holds very authentic and diverse speleotourism potential. Risovača cave represents a unique speleological geosite because it possesses additional archaeological and palaentological heritage which complements the existing speleotourism offer. The cave's full utilization for tourism purposes can surely contribute to local or regional tourism development. In this paper we analyzed the speleotourism potential of the Risovača cave by applying the M-GAM (Modified Geosite Assessment Model). The aim of this paper is to emphasize the speleotourism potential and explore the possibilities for further speleotourism development in the area of Aranđelovac. The results indicate that, as a speleological geosite, Risovača cave has great potential for tourism development which still remains to be fully utilized. Research results identified the current problems for speleotourism development as well as potential solutions that can lead to an increase in tourist numbers as well as economic benefits for the local community.*

***Key words****: Risovača cave, M-GAM, speleotourism, archaeological heritage, palaeontological heritage, Serbia*

## Introduction

Speleological objects represent significant symbols of geological and geomorphological processes throughout the world; therefore, they are immensely attractive for a vast number of tourists. This form of tourism is called speleotourism and it has exceptionally unique identity in the tourism world.

Caves like Postojna (Slovenia), Mammoth Cave (United States), Nerja (Spain) and Jenolan (Australia), reach 500 000 visitors annually (Lobo, 2015). Visitation to the underground karst areas, listening and learning about the cave jewelry formations makes speleotourism one of the most interesting and authentic forms of tourism. Furthermore, it is mandatory for speleotourism to be educational, particularly with school excursions, field trips or recreational visits. In some cases, caves also have additional values that can be very appealing to tourists. Those values are often archaeological or palaentological remains with extraordinary historical background. Some of the animal remains found in caves gave scientists a better understanding of the ancient fauna. In Naracoorte Caves in Australia there are clues that can help interpret the geological and unique evolutionary history of Australia (Dowling and Newsome, 2006). It is clear that caves have multiple applications and that they can provide local economy growth or regional development by increasing speleotourism activities.

On an international level, the study of Cigna and Burri (2000) is the most complete for this kind of tourism. It presents the economic characteristics and issues related to the planning and management of caves. Other papers worthy of note include that of Doorne (2000), which explores the social carrying capacity during the management of tourist caves, that of Cigna and Forti (1988) presenting a proposal for the development of a cave management plan, and that of Hoyos et al. (1998) expressing concern with the limits of sustainability in the exploitation of the underground environment (Lobo and Moretti, 2009).

Speleotourism can be an essential part of the tourism market, especially when caves have complementary values such as palaeontological or archaeological heritage. While analyzing Serbia's speleotourism potential it can be noted that the foremost speleological values and supplementary archaeological and palaentological values can be found in Risovača Cave, in central Serbia.

The main goal of this paper is to analyze the speleotourism potential and current state of speleotourism development in Risovača cave, with focus on archaeological and palaentological heritage. This geosite best represents the mixture of speleology, culture and history making it a worthy regional tourist destination. Our research was carried out by applying the Modified Geosite Assessment Model (M-GAM) created by Tomić and Božić (2014). The results of the analysis should provide information about the major fields of improvement and identify which areas require more attention and better management in the future in order for this geosite to become a well-known speleotourism destination which would attract a larger number of tourists.

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## Study area

Risovača Cave holds very authentic and diverse tourist values in the form of speleological, archaeological and paleontological heritage. This diversity makes it a complex tourist destination with the potential to attract a larger number of visitors with different interests.

The cave is located near the city of Aranđelovac, in the north-eastern part of the Risovača hill (273 m), 17 m above the Kubrušnica River (Figure 1) Inside the cave, there are palaeolithic remains of the Neanderthal man, stone tools and steppe fauna represented by Ice age mammoths, leopards, wild horses and bison. This geosite represents the largest cave in the Šumadija region (central Serbia). It is 149.5 m long with one main canal and several side canals. The main canal (Figure 2) is 100 m long, while the side canals are 49.5 m long. The cave entrance is located in a 20 m high limestone section. The entrance is 5.5 m high and 2.8 m wide (Rakić, 1980).

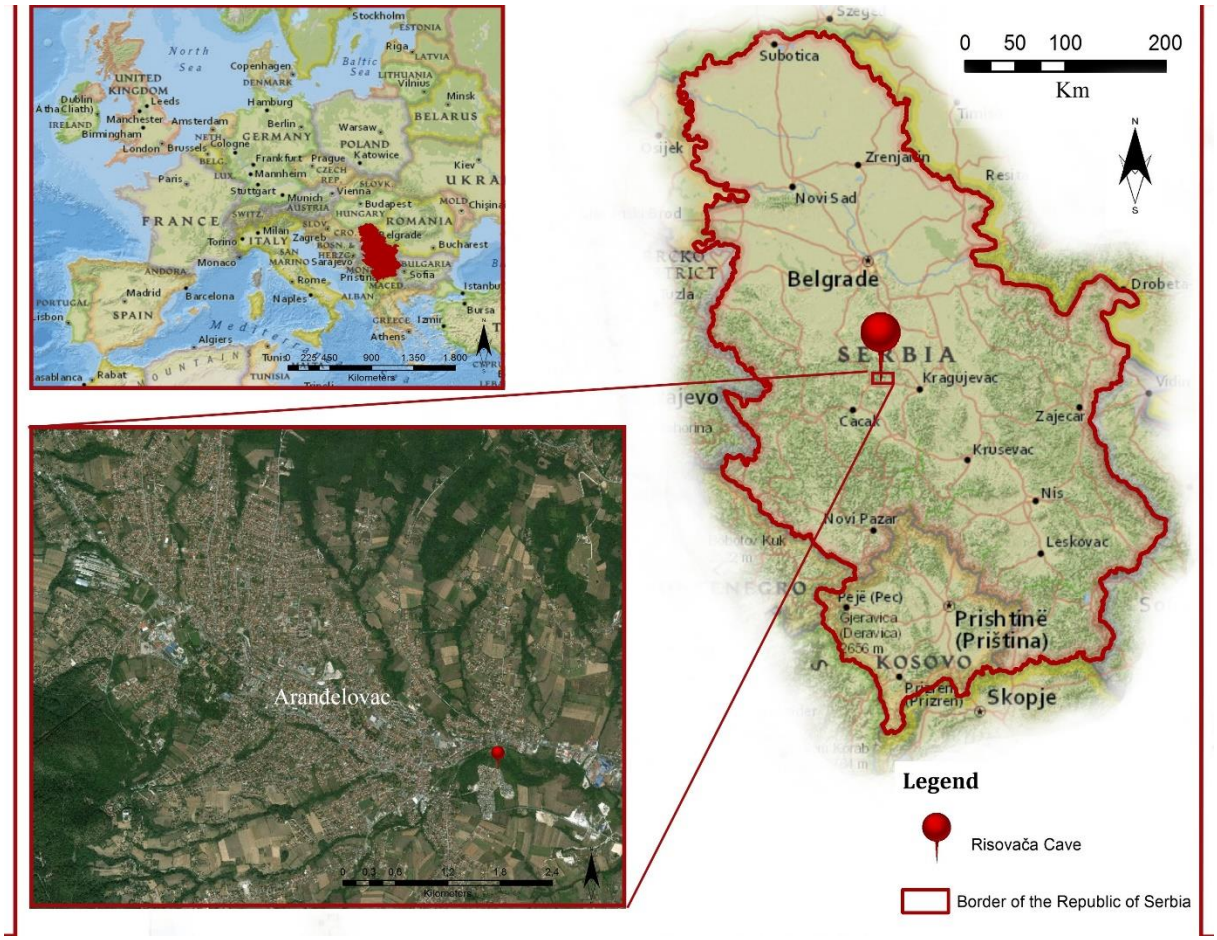


*Fig. 1. Location of Risovača Cave*

Research and exploration of Risovača cave began in 1953 and was conducted by the Archaeological Institute of the Serbian Academy of Science and Art and the Faculty of Philosophy in Belgrade, under the leadership of professor Branko Gavela, and it lasted, with longer or shorter interruptions, until 1976.

In addition to archaeological research, speleological research was also conducted (from 1975) and led by Radenko Lazarević, scientific adviser of the Institute for Forestry and Wood Industry from Belgrade. These studies especially intensified in the nineties and continued to the present day with the participation of associates from the Geographical Institute "Jovan Cvijić", the Faculty of Geography in Belgrade and speleological groups from Valjevo. In the period from 1995 to 1997 several structural changes which are not typical for classical karst objects were found as well as some morphological irregularities that are inconsistent with evolution schemes of classical karst caves (Wrzak-Tomić and Manecki, 2004).

Long-term archaeological, palaeontological and speleological research in Risovača Cave revealed an abundance of fossilized remains of the Pleistocene fauna, as well as traces of stone artefacts and bones linked to Neanderthal hunters. The fossil remains are believed to be the spoils of human hunters and represent large animals that were hunted for their meat or skin. There are also a few remains of smaller mammals of Holocene age. The

cave was also inhabited by the cave hyena and the cave bear, the latter dominating among the remains (Forsten and Dimitrijević, 1995).

*Fig. 2. Main canal of Risovača Cave*
*(Source: www.bukovickabanja.rs)*

**Methodology**

The methodology of this study is based upon the 'modified geosite assessment model' (M-GAM), developed by Tomić and Božić (2014). This method is based on previous geosite assessment methods developed by different authors (Hose, 1997; Bruschi and Cendrero, 2005; Coratza and Giusti, 2005; Pralong, 2005; Serrano and González-Trueba, 2005; Pereira et al., 2007; Zouros, 2007; Reynard et al., 2007; Reynard, 2008; Erhartič, 2010; Tomić, 2011). It combines the opinion of both sides, tourists and experts, in such a way that neither side is favoured in the assessment process. It has been successfully tested and applied numerous times for the assessment of various geosites (Boškov et al., 2015; Božić and Tomić, 2015; Tomić et al., 2015; Antić and Tomić, 2017, Tičar et al., 2018; Tomić et al., 2018; Vukoičić et al., 2018)

The M-GAM model consists of two key indicators: Main Values and Additional Values, which are further divided into 12 and 15 indicators respectively, each individually marked from 0 to 1. This division is made due to two general kinds of values: main - that are mostly generated by geosite's natural characteristics; and additional - that are mostly human-induced and generated by modifications for its use by visitors. The **Main Values** comprise three groups of indicators: scientific/educational (VSE), scenic/aesthetical values (VSA) and protection (VPr) while the **Additional Values** are divided into two groups of indicators, functional (VFn) and touristic values (VTr). The Main and Additional Values are more detailed presented in table 1. In total sum, there are 12 subindicators of Main Values, and 15 subindicators of Additional Values which are graded from 0 to 1 that define M-GAM as a simple equation:

$$M\text{-}GAM = MV + AV \quad (1)$$

where *MV* and *AV* represent symbols for Main and Additional Values. Since Main and Additional Values consist of three or two groups of subindicators, we can derive these two equations:

$$MV = VSE + VSA + VPr, \quad (2)$$

$$AV = VFn + VTr, \quad (3)$$

Table 1. The structure of Geosite Assessment Model (GAM)

| Indicators/Subindicators | Description |
|---|---|
| **Main values (*MV*)** | |
| Scientific/Educational value (*VSE*) | |
| **1.** Rarity | Number of closest identical sites |
| **2.** Representativeness | Didactic and exemplary characteristics of the site due to its own quality and general configuration |
| **3.** Knowledge on geoscientific issues | Number of written papers in acknowledged journals, thesis, presentations and other publications |
| **4.** Level of interpretation | Level of interpretive possibilities on geological and geomorphologic processes, phenomena and shapes and level of scientific knowledge |
| Scenic/Aesthetic (*VSA*) | |
| **5.** Viewpoints | Number of viewpoints accessible by a pedestrian pathway. Each must present a particular angle of view and be situated less than 1 km from the site. |
| **6.** Surface | Whole surface of the site. Each site is considered in quantitative relation to other sites |
| **7.** Surrounding landscape and nature | Panoramic view quality, presence of water and vegetation, absence of human-induced deterioration, vicinity of urban area, etc. |
| **8.** Environmental fitting of sites | Level of contrast to the nature, contrast of colors, appearance of shapes, etc. |
| Protection (*VPr*) | |
| **9.** Current condition | Current state of geosite |
| **10.** Protection level | Protection by local or regional groups, national government, international organizations, etc. |
| **11.** Vulnerability | Vulnerability level of geosite |
| **12.** Suitable number of visitors | Proposed number of visitors on the site at the same time, according to surface area, vulnerability and current state of geosite |
| **Additional values (*AV*)** | |
| Functional values (*VFn*) | |
| **13.** Accessibility | Possibilities of approaching to the site |
| **14.** Additional natural values | Number of additional natural values in the radius of 5 km (geosites also included) |
| **15.** Additional anthropogenic values | Number of additional anthropogenic values in the radius of 5 km |
| **16.** Vicinity of emissive centers | Closeness of emissive centers |
| **17.** Vicinity of important road network | Closeness of important road networks in the in radius of 20 km |
| **18.** Additional functional values | Parking lots, gas stations, mechanics, etc. |
| Touristic values (*VTr*) | |
| **19.** Promotion | Level and number of promotional resources |
| **20.** Organized visits | Annual number of organized visits to the geosite |
| **21.** Vicinity of visitors centers | Closeness of visitor center to the geosite |
| **22.** Interpretative panels | Interpretative characteristics of text and graphics, material quality, size, fitting to surroundings, etc. |
| **23.** Number of visitors | Annual number of visitors |
| **24.** Tourism infrastructure | Level of additional infrastructure for tourist (pedestrian pathways, resting places, garbage cans, toilets etc.) |
| **25.** Tour guide service | If exists, expertise level, knowledge of foreign language(s), interpretative skills, etc. |
| **26.** Hostelry service | Hostelry service close to geosite |
| **27.** Restaurant service | Restaurant service close to geosite |

| | Grades (0.00-1.00) | | | | |
|---|---|---|---|---|---|
| | 0.00 | 0.25 | 0.50 | 0.75 | 1.00 |
| **1.** | Common | Regional | National | International | The only occurence |
| **2.** | None | Low | Moderate | High | Utmost |
| **3.** | None | Local publications | Regional publications | National publications | International publications |
| **4.** | None | Moderate level of processes but hard to explain to non experts | Good example of processes but hard to explain to non experts | Moderate level of processes but easy to explain to common visitor | Good example of processes and easy to explain to common visitor |
| **5.** | None | 1 | 2 to 3 | 4 to 6 | More than 6 |
| **6.** | Small | - | Medium | - | Large |
| **7.** | - | Low | Medium | High | Utmost |
| **8.** | Unfitting | - | Neutral | - | Fitting |
| **9.** | Totally damaged (as a result of human activities) | Highly damaged (as a result of natural processes) | Medium damaged (with essential geomorphologic features preserved) | Slightly damaged | No damage |
| **10.** | None | Local | Regional | National | International |
| **11.** | Irreversible (with possibility of total loss) | High (could be easily damaged) | Medium (could be damaged by natural processes or human activities) | Low (could be damaged only by human activities) | None |
| **12.** | 0 | 0 to 10 | 10 to 20 | 20 to 50 | More than 50 |
| **13.** | Inaccessible | Low (on foot with special equipment and expert guide tours) | Medium (by bicycle and other means of man-powered transport) | High (by car) | Utmost (by bus) |
| **14.** | None | 1 | 2 to 3 | 4 to 6 | More than 6 |
| **15.** | None | 1 | 2 to 3 | 4 to 6 | More than 6 |
| **16.** | More than 100 km | 100 to 50 km | 50 to 25 km | 25 to 5 km | Less than 5 km |
| **17.** | None | Local | Regional | National | International |
| **18.** | None | Low | Medium | High | Utmost |
| **19.** | None | Local | Regional | National | International |
| **20.** | None | Less than 12 per year | 12 to 24 per year | 24 to 48 per year | More than 48 per year |
| **21.** | More than 50 km | 50 to 20 km | 20 to 5 km | 5 to 1 km | Less than 1 km |
| **22.** | None | Low quality | Medium quality | High quality | Utmost quality |
| **23.** | None | Low (less than 5000) | Medium (5001 to 10 000) | High (10 001 to 100 000) | Utmost (more than 100 000) |
| **24.** | None | Low | Medium | High | Utmost |
| **25.** | None | Low | Medium | High | Utmost |
| **26.** | More than 50 km | 25–50 km | 10–25 km | 5–10 km | Less than 5km |
| **27.** | More than 25 km | 10–25 km | 10–5 km | 1–5 km | Less than 1 km |

Now that we know that each group of indicators consists of several subindicators, equations (2) and (3) can be written as follows:

$$MV = VSE + VSA + VPr \equiv \sum_{i=1}^{12} SIMV_i \text{ , where } \quad 0 \le SIMV_i \le 1 \text{ ,} \tag{4}$$

$$AV = VFn + VTr \equiv \sum_{j=1}^{15} SIAV_i \text{ , where } \quad 0 \le SIAV_j \le 1 \text{ .} \tag{5}$$

Here, $SIMV_i$ and $SIAV_j$ represent 12 subindicators of Main Values ($i$ = 1,...,12) and 15 subindicators ($j$ = 1,...,15) of Additional Values.

As it was mentioned before, M-GAM focuses not only on the expert's opinion but also on the opinion of visitors and tourists regarding the importance of each indicator in the assessment process. Visitor inclusion in the assessment process is done through a survey where each respondent is asked to rate the importance (*Im*) of all 27 subindicators (from 0.00 to 1.00) in the M-GAM model (Table 2). The importance factor (*Im*) gives visitors the opportunity to express their opinion about each subindicator in the model and how important it is for them when choosing and deciding between several geosites that they wish to visit. After each respondent rates the importance of every subindicator, the average value of each subindicator is calculated and the final value of that subindicator is the importance factor. Afterwards, the value of the importance factor (*Im*) is multiplied with the value that was given by experts (also from 0.00 to 1.00) who evaluate the current state and value of subindicators (Table 2).

This is done for each subindicator in the model after which the values are added up according to M-GAM equation but this time with more objective and accurate final results due to the addition of the importance factor (*Im*). This parameter is determined by visitors who rate it in the same way as experts rate the subindicators for Main and Additional Values by giving them one of the following numerical values: 0.00, 0.25, 0.50, 0.75 and 1.00, marked as points. The importance factor (*Im*) is defined, as:

$$Im = \frac{\sum_{k=1}^{K} Iv_k}{K} \tag{6}$$

Where $Iv_k$ is the assessment/score of one visitor for each subindicator and $K$ is the total number of visitors. Note that the *Im* parameter can have any value in the range from 0.00 to 1.00.
Finally, the M-GAM equation is defined and presented in the following form:

$$M\text{-}GAM = MV + AV \tag{7}$$

$$MV = \sum_{i=1}^{n} Im_i * MV_i \tag{8}$$

$$AV = \sum_{i=1}^{n} Im_j * AV_j \tag{9}$$

As it can be seen from the M-GAM equation, the value of the importance factor (*Im*), which is rated by visitors (for each subindicator separately) is multiplied with the value given by experts (also separately for each subindicator). This is done for each subindicator in the model. Therefore, the values of M-GAM sub-indicators are always equal or less than *GAM* values.

In their research about different geotouristic segments, Božić and Tomić (2015) conducted a survey and calculated the importance factor for each subindicator in the M-GAM model. The values of the importance factor in this paper have been adopted from the mentioned paper.

Based on the assessment results, a matrix of Main (X axes) and Additional Values (Y axes) is created (Figure 3). The matrix is divided into nine fields represented with Z(i,j), (i,j=1,2,3). Depending on the final score, each geosite will fit into a certain field. For example, if a geosite's Main Values are 7 and additional are 4, the geosite will fit into the $Z_{21}$ field.

## Results and discussion

Current speleotourism activities in Serbia are largely based on a few active speleological objects that are open for tourists and these are located mostly in eastern Serbia with a few also in the western part of the country. Major barriers for further development of speleotourism in Serbia are low quality guide service, inefficient cave management and promotional activities as well as inadequate lighting and infrastructure inside the caves (Tomić et al., 2018). Speleotourism in Serbia was mostly initiated by cave enthusiasts and explorers. Subsequently, the management was left to local residents. Various cave management organizations in Serbia had different visions in which direction their tourism should be developed. Few have been thinking about investing in cave infrastructure improvement or better tour guide service, while most of them were working more on improving the complementary offers, such as: restaurants, hotels, souvenir shops etc. (Petrović, 2006).

Table 2. Subindicator values given by experts for the analyzed geosite

| Main Indicators/subindicators | Values given by experts (0-1) | Im | Total value |
|---|---|---|---|
| | **MAIN VALUES** | | |
| | **I Scientific/educational values (VSE)** | | |
| Rarity ($SIMV_1$) | 0.25 | **0.89** | 0.22 |
| Representativeness ($SIMV_2$) | 0.50 | **0.79** | 0.39 |
| Knowledge on geo-scientific issues ($SIMV_3$) | 0.50 | **0.45** | 0.22 |
| Level of interpretation ($SIMV_4$) | 1.00 | **0.85** | 0.85 |
| | **II Scenic/aesthetic values (VSA)** | | |
| Viewpoints ($SIMV_5$) | 0.25 | **0.79** | 0.19 |
| Surface ($SIMV_6$) | 0.00 | **0.54** | 0.00 |
| Surrounding landscape and nature ($SIMV_7$) | 1.00 | **0.95** | 0.95 |
| Environmental fitting of sites ($SIMV_8$) | 1.00 | **0.68** | 0.68 |
| | **III Protection** | | |
| Current condition ($SIMV_9$) | 0.75 | **0.83** | 0.62 |
| Protection level ($SIMV_{10}$) | 0.75 | **0.76** | 0.57 |
| Vulnerability ($SIMV_{11}$) | 0.50 | **0.58** | 0.29 |
| Suitable number of visitors ($SIMV_{12}$) | 0.75 | **0.42** | 0.31 |
| | **ADDITIONAL VALUES** | | |
| | **I Functional values** | | |
| Accessibility ($SIAV_1$) | 1.00 | **0.75** | 0.75 |
| Additional natural values ($SIAV_2$) | 0.50 | **0.71** | 0.35 |
| Additional anthropogenic values ($SIAV_3$) | 1.00 | **0.70** | 0.70 |
| Vicinity of emissive centres ($SIAV_4$) | 0.25 | **0.48** | 0.12 |
| Vicinity of important road network ($SIAV_5$) | 1.00 | **0.62** | 0.62 |
| Additional functional values ($SIAV_6$) | 1.00 | **0.59** | 0.59 |
| | **II Tourist values** | | |
| Promotion ($SIAV_7$) | 0.50 | **0.85** | 0.42 |
| Annual number of organised visits ($SIAV_8$) | 0.50 | **0.56** | 0.28 |
| Vicinity of visitors centres ($SIAV_9$) | 0.00 | **0.87** | 0.00 |
| Interpretive panels ($SIAV_{10}$) | 0.75 | **0.81** | 0.60 |
| Annual number of visitors ($SIAV_{11}$) | 0.50 | **0.43** | 0.21 |
| Tourism infrastructure ($SIAV_{12}$) | 0.50 | **0.73** | 0.36 |
| Tour guide service ($SIAV_{13}$) | 0.75 | **0.87** | 0.65 |
| Hostelry service ($SIAV_{14}$) | 1.00 | **0.73** | 0.73 |
| Restaurant service ($SIAV_{15}$) | 1.00 | **0.78** | 0.78 |

The vicinity of Bukovička spa has a crucial influence on the tourist traffic of the Risovača cave. Also, the archaeological remains are very attractive for tourists, since they are confirming the existence of pre-historic cultures south of the Danube and Sava rivers. This is the reason why the cave is protected on a national level as a monument of nature (Lazarević, 1987).

The level of rarity of caves in Serbia is generally low. The majority is concentrated in eastern and western Serbia, but in the case of central Serbia speleological geosites are considered a regional phenomenon. The representativeness of the cave is moderate. The analyzed geosite includes numerous complementary archaeological and palaeontological values, but it does not have many unique speleological values, the like of which exist in eastern Serbia. The scientific community was very committed to the exploration of Risovača cave during the last century, but in recent times the knowledge on geo-scientific issues of this cave can only be found in regional scientific publications. This is considered as an overly negative factor. It is necessary to raise awareness about the knowledge on geo-scientific issues of Risovača cave and the possibilities for geotourism or

speleotourism development through scientific publications. The potential for speleotourism development is also presented in the level of interpretation. Risovača cave is considered as a geosite with good examples of geological processes that can easily be explained to a common visitor. This acknowledgement is important for speleotourism development because it shows that the cave can be visited by many different profiles of tourists with different interests. High scientific and educational values of the Risovača cave give it an advantage that can help this geosite to achieve a better position on the tourism market.

Alongside the subindicators related to the protection values of the cave, the subindicators for aesthetic values have the highest sum of all grades in M-GAM. Since the cave is located on a small hill that is near the city of Aranđelovac, the geosite itself is a very attractive viewpoint. In this area there are also a couple of small lakes, the Bukovička spa is located within the same municipality and the Kubrušnica River flows in the immediate vicinity of the cave. Therefore, the environmental surrounding, landscape and nature are highly rated in the assessment process. Furthermore, the protection values are also very well rated as the cave is protected on a national level as a natural monument. The current protection status of the cave allows further scientific exploration and speleotourism development.

Looking at the grades for additional values, we can notice that they are also generally high. Four subindicators from functional values and two from tourist values are evaluated with the highest score and only one subindicator from additional values was evaluated with the lowest score. The nearby city of Aranđelovac is the main reason behind this. The cave is easily accessible and has a parking lot for bicycles, cars and buses. Additional anthropogenic and functional values are mainly located in the nearby city. The museum of Aranđelovac holds all archaeological and palaentological heritage found inside the Risovača cave making it an additional attraction and visitation to both locations is usually implied.

Table 3. Overall ranking of the analyzed cave by the M-GAM

| **Geosite name** | **Main values** | | **Additional values** | | **Field** |
|---|---|---|---|---|---|
| | VSE+VSA+VPr | Σ | VFn+VTr | Σ | |
| Risovača Cave | 1.68+1.79+1.79 | 5.26 | 3.13+4.03 | 7.16 | $Z_{22}$ |

Current promotional activities are mostly regional. The cave is promoted at national tourism fairs and on the internet by the Tourist Organization of Aranđelovac. These activities need to be modernized and improved by implementing marketing strategies first throughout Serbia and then in the European tourism market. The current number of visitors is not very high. The annual number of organized visits is not higher than 24, and the cave is visited by a maximum of 10.000 tourist per year. In order to increase this, further investment in the tourist infrastructure and the overall current offer is required. Although there is a continuous need for improvement, some parts of the cave are well presented. Interpretative panels and tour guide service possess high quality and they are very educational. Risovača cave tour guide service has exceedingly positive reviews on social media. This indicator is very important for cave management because it creates a good image and attracts more visitors. Furthermore, it was rated by visitors as one of the most important subindicators in the M-GAM model (Božić and Tomić, 2015).

The overall ranking of the Risovača Cave according to M-GAM is shown in table 3. The total sum of the Main Values is 5.26, while the total sum for Additional Values is 7.16. These results position the Risovača Cave in the $Z_{22}$ field of the M-GAM matrix. The seemingly overall high Additional values of this geosite are primarily caused by the immediate vicinity of the city of Aranđelovac. Therefore, further improvements are still necessary in order to attract a larger number of tourists in the future.

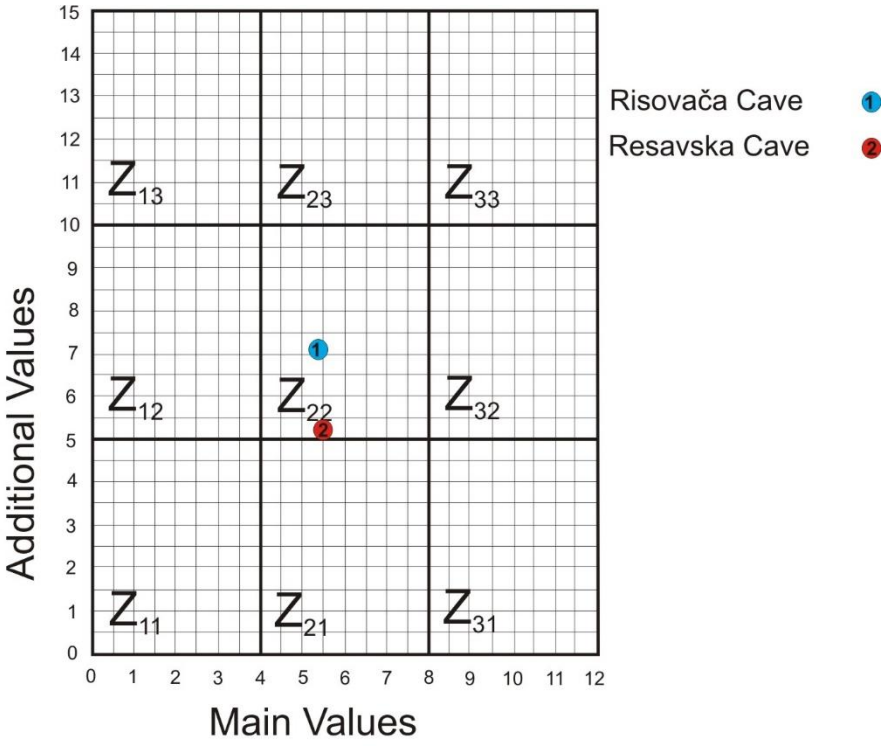


*Fig. 3. Position of Risovača and Resavska Cave in the M-GAM matrix*

In their paper about speleotourism in Eastern Serbia, Tomić et al. (2018) analyzed six speleological geosites by applying M-GAM. Resavska cave, one of the most popular caves in Serbia, had the highest ranking. The Main values of the cave were 5.52 and the Additional values were 5.27, meaning that it was positioned in the same field of the M-GAM matrix as Risovača cave in this paper (Figure 3). However, Risovača cave has slightly higher scores for Additional values and very similar results for the Main values. The main reason for such high Additional values is the vicinity of Aranđelovac. Because of this, Risovača cave has much higher values of such subindicators as functional values or hostelry and restaurant service. This, together with accessibility and closeness to emissive centres gives it a slight advantage over Resavska Cave. However, if we take into account that Resavska Cave has higher aesthetic values, is bigger and its tourist infrastructure is much better, this makes it more popular with a larger number of visitors.

## Conclusion

The geosite assessment of the Risovača cave has shown that this speleological object represents the nucleus of speleotourism in central Serbia. However, its speleotourism potentials are not fully utilized. The additional archaeological and palaeontological heritage in the cave can have much greater influence on future tourism development. Considering that archaeological heritage found in the cave proves the existence of prehistoric cultures in this area, the promotional activities of Risovača cave should be raised at least to a national level. The application of various marketing strategies on the national level would help in attracting a larger number of tourists with diverse interests. By successfully applying M-GAM we can conclude that the Main and Additional values of the cave are more than sufficient and suitable for further speleotourism development and investment. Future focus should mainly be on promotional activities and infrastructure improvement. The vicinity of the city of Aranđelovac has a major impact on Additional values. Nevertheless, the current state of tourism (number of visitors and tourism income) at Risovača Cave is not equivalent to its potential. In the future, the management of Risovača Cave could also benefit from exploring more developed cave tourism complexes which exist in Western Europe (i.e. Lascaux Cave) and implement some of the management processes and tourist arrangements.

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# Application of virtual components in historical - environmental coexistence on selected examples from museum practice

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*Abstract*

*Education and presentation played a key role in the creation of museums and their collections. This moment has been deepened at the turn of the 18th and 19th centuries, when the bases of the exhibition plans were laid for the realization of "large" exposures, and the virtualization plan is currently dominated by the fact that the idea of "own survival of values" The digital system is directed by several channels and gradually penetrates into the consciousness, with the aim of maximizing the expansion of virtual reality, and creates a psychological-mental process based on the experience of the individual. Sensible to mechanical-analytical thinking in order to create concrete conclusions and results. The subject of the author's study is not only the analysis of the relevant plan through the so-called museum cyberculture in several directions, as there are at least three segments of its design. Visitor's view, re-visit, and virtual and cyber exposure play a key role in stabilizing cyberculture in museums by exemplifying 3D fortifications that are in the artist's interpretation. The weight of the study is also focused on a new alternative to cyber-digital fortification (Virtual or 3D castles) into university practice, resulting in the direct and indirect indication of the interconnection of museum, university and virtual spectra for both visitors and listeners.*

***Keywords:*** *digital exhibition language, cyberculture, presentation, history, pedagogical environment*

## Introduction

The instinct of the collector and exhibitor is present in man since the oldest phase in the form of cave paintings and sculptural art already in the form of Paleolithic and later Mesolithic Venus. This trend of preservation and expansion of the "art of the past generations" took place in all the following periods, but it gradually manifested itself as an attribute of preserving and documenting the authenticity of the time through objects or objects. Today's display language is a product of a combination of current knowledge of science and exhibition practices, knowledge and needs of a 21st century visitor. Priority needs for visitors to the modern museum are not only to learn about collectible subjects but also to examine them in detail, try them, touch them, or to make them a trusted copy. Satisfying the needs of visitors at present allows technology in the form of 3D printers, as well as direct craftmaking of castings of selected collections.

Alternatives to modern cyber adaptation - techniques are almost unlimited; from visual presentations (we no longer talk about PowerPoint educational products, etc.) to technological development itself (eg software - graphic reconstruction of monuments and collection objects, 3D shapes and forms of architectural places using 3D print or 3D Puzzle of World Places and Cultural Heritage and other).

Today, we can not only talk about the form of "help and troubleshooting", but it is necessary to create modern procedures (on - line presentations of field results related to video - call, practical adaptation of acquired theoretical knowledge to practice eg. when examining the issue using a virtual archive, verification of architectural knowledge in 3D and XD virtual monuments, etc.) in combining the acquired knowledge with technological achievements.

## Deepening exhibition museum plans with university practice

Since its very existence, the museum has been pushing for the idea of providing new facts to those interested in expanding their knowledge of the horizons. An example of this is the collections from the second millennium BC before the city of Larsa for teaching purposes. It is the education and the acquisition of new knowledge which plays a key role in the creation of museums and their collections. This moment has been boosted at the turn of the 18th and 19th centuries, when the bases of exhibition plans for exposure were laid. At present, we can document the existence of three exhibition plans:

**Syntagmatic plan.** The plan came about in 1750/1860, depending on European countries. During the visit, the social status of the visitor was important at that time, even his education. The change of the exhibition plan came only after 1950, when part of the artifacts was made available to the public even freely. The syntagmatic plan represents a diverse array of collection items that are directly embedded in the display case, that is, a pre-planned space. According to this plan, all collections should be exhibited in showcases or plastic constructions.

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**Asociative Plan**. The plan creates a non-linear form of presentation in a dedicated space (Šuler, 1997). This state can also be declared on the idea of I. Maroevič that "the gradual processing of a museum subject leads to the reduction of multi-significance (museal indefiniteness) through more detailed knowledge, which is presented through communication levels"(Maroevič, 1998). McLuhan also drew attention to an association plan in the context of museum communication in 1967 when creating expositions. The author stated that the exhibition collections should be exclusive of descriptions to allow the visitor to participate in the interpretation of the facts (Mcluhan at al., 1967). This issue was overturned in the years to come, yet in the last twenty years it has re-enacted its basic idea of virtual exhibitions (Mensch, 1992). In an association plan, educating visitors to understand interpretation plays an important role, social status plays a marginal role as museums are made accessible to everyone. This state is now visible even with the free entries of some museums every first or last Sunday of the month.

**Visual-Virtualization Plan**. This plan began to be applied in museums at the turn of the 20th and 21st centuries. It is related to the gradual establishment of the idea of "own survival of values" derived from an exposure visit (Šuler, 1997). On this principle, a new digital display language has been created. The scheme is in practice based on the targeted intervention of the perpetuum in the sense of its initial engagement. The digital language is routed through multiple channels and gradually penetrates into consciousness, with the aim of maximizing the expansion of virtual reality.

The basic contours of the visual-virtualization plan are:

- Direct transformation of the digitized collection items into the exhibition hall. For a visitor, it means moving the collection from a cognitive to an emotional plane. At the technical level, innovative collections are still available in digital form. This is also the case for collections not yet available to the public. Percipients, thanks to virtual reality, can explore collections from almost every angle. Collection items transferred in virtual form are not created by the exhibition itself. In most cases, the digitized objects are presented with authentic collection artifacts. As a suitable example, we can mention part of the collections collected by the 3D optical scanner from the Slovak Mining Museum in Banská Štiavnica from the Slovak environment (https://www.facebook.com/digitalizacnecentrum). From a foreign environment, for example, there was an exposure from the National Museum of Rome (Thermae Diocletiani) or the Museum of Archeology in Naples.
- Creating exposures to historical events that have not yet been processed and presented. Apart from the historical context, natural themes resonate. Various visual reconstructions in the form of static models or film simulations are used to achieve the step. Animations can also be linked to interaction. These attributes provide current scientific knowledge, which also revives older claims. An elaborate example of this type is an on-line exhibition titled "Keys to Rome"(http://keys2rome.eu/). Many museums collaborated on the exhibition, Museum of the Fori Imperiali of Rome, Allart Pierson Museum of Amsterdam and others. The exhibition has been made available to the public since September 2014.
- By creating a variety of technological structures depending on the execution of museum cyberculture segments. At this stage is the effort of more detailed editing of the exhibition themes. That's why attempts were made to rebuild old exposures. The archive documentation is used to obtain the output process. A good example was the 3D exhibition of the most important Italian Renaissance paintings found in the Louvre Museum. E.g. 3D Mona Lisa recovered from Nintendo's gaming console, snapping balls, nodding her head, waving her hands, but also answering questions to visitors in seven languages. This show was created using the Nintendo console, and visitors did not even have special glasses to create a 3D image.
- Creating virtual exhibitions and interactive collections not found directly in the museum. In this regard, some museums use so-called " multimedia XD digital artifacts and museum holograms: such as Dubai Museum and Al Fahidi Fort: متحف دبي - حصن الفهيدي (http://www.dubaiculture.gov.ae/en/Live-Our-Heritage/Pages/Dubai-Museum-and-Al-Fahidi-Fort.aspx) to present historical stories. In addition to 2013, we also have exhibitions using nanotechnology: eg Museum of Science in Boston (http://www.mos.org/), or robots: eg the Robot Museum in Madrid (http://www.therobotmuseum.eu/) for which current technological knowledge is applied.

## Virtual reality (Cyberspace) - Museum (Cultural Heritage) - University (Virtual Education)

In the last 50 years life in society has changed greatly. Undoubtedly, this is also the result of a technique that has, as early as the arrival of conventional television receivers, boosted virtualization. This was most evident in cinematography.

Virtuality is one of the basic forms of cyberculture that is "generated by fictitiousness and illusion in confronting mimeticism, in the sense of identity in the sense of ideal presentation, and the existence of what is

otherwise impossible, inaccessible, and bringing about a permanent settlement with the degree of expression, to hyperreality and superficiality... "(Malíčková, 2004).

However, virtualization cannot be understood purely as a way of visual presentation (Schehe, 2007), since it is a fundamental phenomenon of networking, cyber - communiction. From a sociological point of view, virtuality is an epistolary genre (Alijevá, 2001), ie writing on a screen, not a paper. This type of writing is also used in communication mainly on social networks and e-mail.

The development of science and technology in the field of communication and information tools opened new, previously non-existent premises. These spaces combine relatively large geographic distances, they can move around and create virtual communities. The current consumer population adapts space and time, even discovers and explains the importance of linking borders. In this spirit, J. Pašiak outlined the basic scheme of spatial trends, forms and types of society which, during the course of historical development, responded to the technological boom (Pašiak, 2009).

Similar opinions have already emerged from the technological and economic predictions of many authors (eg, D. Bell and H. Kahn) who emphasized the evolutionary model of a post-industrial society. Also, in 1968, Toffler predicted that the main "sign of cyberculture" would be "housework", carried out using a computer connected to a telecommunication network (Toffler, 1969). These predictions led from the industrial and urban space to cyberspace and virtual networks. This transformation of processes represents a global trend and is characteristic of the civilization component of globalization (Alexander, 2003).

Globalization cyberbullying has established some boundaries and barriers between different social, such as:

- Among people who have access to information and people without access.
- Among people who are able to work with new technologies and among people who do not have the necessary knowledge to use technology (Stiflinger, 2004).

This trend is also applied in museums and galleries through museum digitization and virtual reality elements, particularly in terms of virtual reconstruction and high technology (Prosler, 2004).

The director of the British Museum as well as the director of the Musée du Louvre in the conversation in 2008 also drew attention to the direct role of globalization in museums. The two directors perceived museum globalization as a new phenomenon, depending on attendance, presentations of multi-cultural exhibition themes, and interactive communication with percipients (Cock, 2008).

The purpose of museums is not only the exhibition activity but also the formation of the public opinion of the past. Contemporary museums are exposed to a compromise between authenticity, by exhibiting original museum collections and virtual ostentatiousness in the struggle for their existence. This status affects the websites and the degree of presentation of the publicized online collections on the Internet, which has both supporters and opponents.

Google's computer application has also made a significant shift in information and traffic. Google Corporation launched a project called "Google Art Project" to unite selected world museums with artistic and graphic creation in virtual environments via the Internet. The revolutionary idea was to create a list of the best virtual museums in the world based on certain criteria (Kennicott, 2011). The criteria were, for example, virtual museum with the best exhibition activity, best application of virtual products, animation-virtual stories (scenes), interest of visitors, etc. The list of museums is expanding every year, and even new applications are being created in the project, with the main intention of attracting visitors to the museum premises.

Today, Google's search engine rankings include the French Louvre (Musée du Louvre) on a weekly basis (Dömötor, 2011). The museum now has the most detailed elaborate graphic design and interactive interface. The virtual tour offers, in addition to the interior, some of the exterior walls of the museum.

Other museums have been placed in other top places, such as Smithsonian Institute: Museum, NASA Museum or Virtual Museum of Canada, etc (Župčán at al., 2014).

The relatively specific virtual museum is the NASA Museum in Washington (http://www.nasa.gov/externalflash/50th/main.html). The museum has an animation-interactive page. The robot in the role of a guide accompanies a virtual visitor to the history of the US National Space Program. The virtual museum is complemented by original, authentic materials from archive collections, photographs and various audio / sound samples.

The Museum with the largest number of existing virtual exhibitions is the Virtual Museum of Canada (http://www.virtualmuseum.ca/home/). The virtual museum operates on the basis of a group of physical museums from Canada. So far, 752 virtual exhibitions have been constructed. The most interesting presentations within the exhibition are cartoons in 2D and 3D and profile cities. Individual cities are processed in virtual form. It is possible to follow their historical-architectural development, or contemporary local sounds from factories, quarters, cars, etc. It should be noted that the last mentioned museums are located exclusively on the Internet.

The basic forms of museum cyberculture include digitization, internet communication, cyberspace, virtual reality and online presentation (Župčánová, 2014). Defining the concept of museum cyberculture is complicated for a number of reasons, non-uniform terminological bases, absence of elaboration of methodological procedures in the analysis of the impact of digitization and virtualization of museum artefacts, different versions of virtual

reconstructions based on technical demands and lack of financial and marketing promotion. From museum practice, digitization of museum artifacts and internet presentation of the museum are the most used elements of cyberculture or virtual tour´s (Parry, 2007).

Although digitization is a relatively long-term issue from a time and a technical point of view, it gradually becomes familiar with the pedagogical environment. The biggest manifestation we can see is the emergence of digital and multimedia laboratories directly at universities or in the museum sphere (Župčán, 2014). In addition, the digital visualization trend has also affected the educational process. Nevertheless, different forms of application of cyberculture components predominate between research and knowledge interpretation between departments (as well as universities). This fact is also evident in the Slovak Republic, where it is necessary to improve the usability of digitization and work with virtualization in the university environment. Compared to other comparable countries (such as Poland, the Czech Republic or Hungary), this situation is greatly underestimated in our territories, which is also reflected in European projects or the success of graduates with digital work experience.

In most humanities and societies, the adaptation and dissemination of technological novelties (such as the use of tablets, smartphones, Tesla transformers, etc.) from the field of visual elements is now the most appropriate. The basic task of virtualization is to present and verify theoretical knowledge in real form. It is just the visual practice that documents other research alternatives from other disciplines as well. At present, the following scientific phenomena are most preferred:

- Creation of reconstruction models of existing collections in order to present them in online form as a promotional article, as well as for available study (eg the Digital Museum under the patronage of the SNP Museum in Banská Bystrica).
- Creating a variety of collection items (most often damaged or stolen, processed on the basis of preserved documentation) using 3D printers.
- Making available museological reconstruction exhibitions of historical and social themes in the premises of universities (eg "Virtual exhibition of Slovak castles" at St. Cyril and Methodius University in Trnava or "History of Scotland" at the University of Glasgow). In this regard, it should be noted that most of the foreign universities (eg University of Denver, University of Maryland and many more) focusing on history and architecture research at their official (departmental) site offer a direct virtual exposure.
- Construct the ideal virtual form of cultural monuments (especially ancient and medieval buildings: sacral and profane constructions) in a digital format to study the history of architecture.
- virtual animation shows and feature films about individual historical periods. Most are 2D or 2D. 3D examples documenting social relations in the past.
- virtual geographic and cartographic plans and maps created using technology and navigation systems (eg GIS).
- Creating simple educational presentations using multimedia tools, eg virtual book (http://brunelleschi.imss.fi.it/pencil/index.html) to simplify and explain the historical - socio - cultural processes for high - school students (especially grammar schools) and colleges. A similar example is the construction of a virtual book on UCM in the framework of the KEGA project entitled Natural Conditions of the Nitra Stool in the 18th Century as viewed by M. Bel (a university textbook), which will be available to the public at the turn of 2020/2021. An important basis in addition to the processing of natural conditions from the modern era will be an alternative application of information from several disciplines in virtual form via individual online applications.

Most of the points mentioned above must gradually be incorporated and expanded into the Slovak university system in the humanities. In the Slovak environment, such an example may be the Archeology Department (eg the Department of Archeology at the Faculty of Philosophy of the Comenius University, the Department of Archeology at the Philosophical Faculty of the University of Constantine the Philosopher, etc.), which, within the framework of the study program, performs constant teaching of subjects such as "Computer Support in Archeology" "GIS in archeology" (Fig 1). and others.

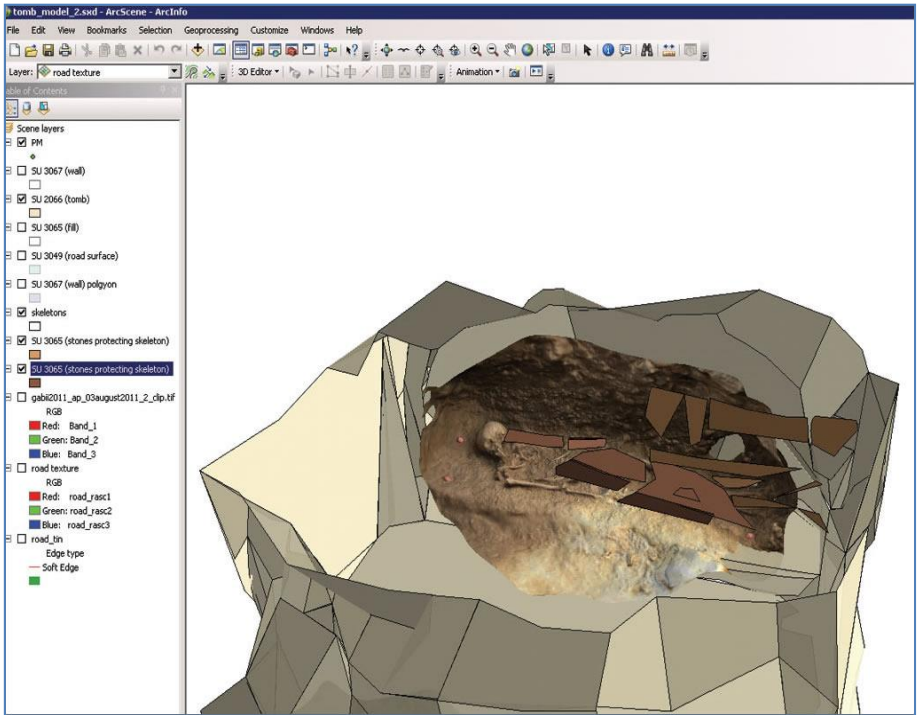


***Fig. 1*** *Example GIS modeling and archeology photogrammetry*

The general history (everyday life of the ethnics) and the contemporary architecture from the viewpoint of disciplines such as history, ethnology, museology and others can be explored and subsequently presented in our environment by establishing the components of cyberculture. The current research of human history is not just about analyzing and memorizing preserved authentic and secondary works or existing historical commentaries as it was in the previous century as many documents are also processed in the digital library., terrain work plays an important role, in particular for verifying older data.

## Cyber - Artifacts and Cultural Heritage

In the way of studying and interpreting the nature of complex historical processes and their contexts, the implementation with individual virtual elements is increasingly present worldwide. Significant promoters of virtualization include, in particular, German, Anglo - Saxon, French - speaking and Chinese - Japanese university specialists who apply forms of virtualization and cyberspace when analyzing human history.

This state is reflected in a number of patterns (eg from short clips to exercise and repetition alternatives, etc.) that are accessible to the public, especially in the on-line interface. In the educational process, and especially in the interpretations of the history of architecture, especially in the presentation of structural changes in urban planning and the differences in architectural monuments, we can consider the following elements as decisive elements:

- 2D to 3D virtual reconstruction of various cultural monuments set in the cities (Fig 2 and Fig 3). These forms are based on sources of archaeological provenance and also on architectural and historical graphic documents (https://www.youtube.com/watch?v=-64kHmCJGMA; http://paris.3ds.com/en-sainte-chapelle.html).


***Fig. 2*** *Example Preview: 3D Paris created using the Dassault system*

- Cartographic, geographic virtual plans and ground plans of the cities. Virtual maps, as well as books, are based on geography and preserved maps (https://www.youtube.com/watch?v=yI5YOFR1Wus.)

***Fig. 3*** *Example 3D Castle Košice – Hradová (L. Župčán)*

- Static and virtual reconstruction models of cultural heritage (layout of buildings, natural attributes, as well as period sounds). In particular, literary and graphic and audio analyzes play a significant role in the creation. A typical example is the exposure to The Virtual Museum of Canada (http://www.virtualmuseum.ca/home), which documents one of its exhibits of social changes of selected 19th and 20th century Canadian cities through old photographs and period sounds (Fig 4) or on - line exhibition of the Manhattan city plan from 1812 to the present.
  A demonstration of our environment is an interactive exhibition of Huncok ethnicity in the Castle Museum in Častej. The exhibition maps the arrival and existence of a German ethnic group in the former pezinian "terra Pálffy´s“ dynasty. The museum collections open up unlimited possibilities to apply virtualization from the position of restoration of the dwellings and settlements (high in the forested mountains) of a narrow group of people who have fed the work in the mountains in the form of woodcutters. Additionally, the documentary basis (including photographic material) as well as oral history allows, on the basis of the digital genealogy, to monitor the progressive development of the ethnic

group on and outside the territory of Slovakia. A specific example of Huncokar's research is their outrage, which is also possible to analyze and explore their native language strains using a variety of linguistic software.


***Fig. 4*** *Example Preview: Exhibition called "Urban Life Through Two Lense" in VMC*

- Reconstruction of the later portrayal of the most prominent characters, which changed the character of the town's history (eg king, state, architects, etc.). Selected reconstructions consist mainly of preserved artefacts (eg statues, busts, paintings, graphics, photographs and others).

On many Internet browsers, there are now quite a number of professional websites that visually process the history of individual European and non-European cities. Nevertheless, a single web site (except the National US Archive with its own virtual museum: Fig 5) does not offer historical and factual interaction to the user online (except for pre-stored factuals and graphic recordings). Almost all web pages lack an alternative of creating and documenting the history and visualization of cultural artefacts (http://www.digitalvaults.org/.)

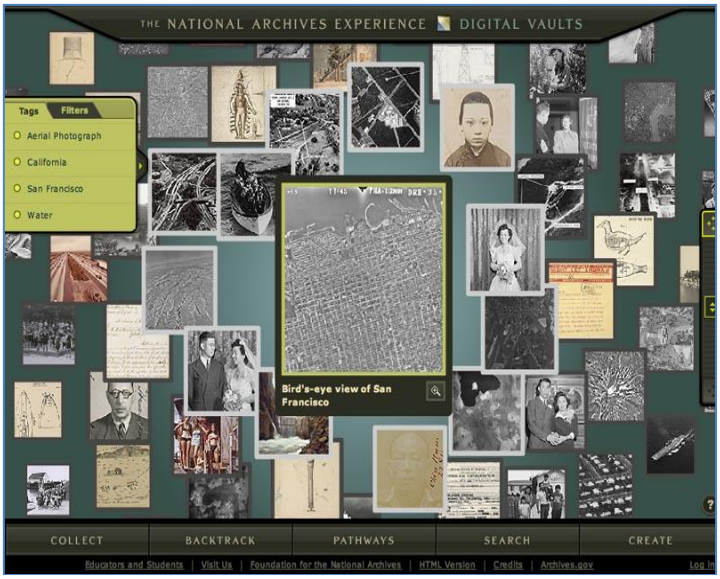


***Fig. 5*** *Example Demonstration: Interactive exhibition with the possibility of self-completion in the National Archives Digital Vault Experience*

**Empires and selected museums**

Research samples were selected according to the following basic factors:

- Permanent and stable attendance of selected institutions.
- Scope of digitized collection objects and the degree of virtual reality.
- Necessary economic stability (eg the largest state support) and cooperation with the private sector, which helps to create alternative exhibitions in the form of a virtual presentation.
- Marketing and advertising promotion.
- Multimedia activity education and interactive research of collections for practical purposes.

Based on the above criteria, several national and specific museums of a diverse nature (according to typology: artistic, historical and ethnographic) have been documented, which have applied the elements of cyberculture as much as possible (2013 - 2015/2016).

The priority of the research was to analyze the following difficulties by means of comparison, area diagnostics, psychological and axiological methods:

- The virtual interface of the museum web site (eg obtaining clear information, degree of online interaction, etc.).
- Impact of visual design on a visitor or his need for self-learning and relaxation.
- Invoking an emotional experience from a selected exhibition and presentation.
- Empirical experience in the demonstration of virtuality (an effort to understand the collection subject matter and current technologies).
- Invite your interest to visit selected museums.

A register of cultural institutions using elements of virtuality, respectively. virtual reality is geographically and technologically diverse. The main criteria for creating a museum list for the needs of the study that apply cyberculture to their prepared programs were:

- Combination of classical and virtual exhibitions. A key factor is the degree of diversity in the conversion and adaptation of digital collections.
- Offer interaction on the web, even in classic spaces.
- Utilization of virtual and multimedia elements in the advertising presentation of the museum. It is, for example, to use 3D videos. It also includes design promotions based on the use of technical innovations, manual scanner.
- Experimenting with interactive cyberbullying components during a tour, tablets, audioguide devices and more.
- Presentation of the developmental stages of application of technical novels in the interpretation of their collections in the form of pilot projects and short-term exhibitions.
- Apply more challenging parts of cyberculture (eg holograms) into the exhibition process.

The museums that most closely combine cyberbullying components by typology include:

**Musée du Louvre (France)**

The selected French Museum is a European cradle of interactive exhibitions in a number of ways, from online presentations, 3D protection of collections, multimedia education, and the adaptation of holograms to the "revival" of the most valuable artifacts. The institution is one of the world's museums that is not directly involved in the Google Art Project system (https://www.google.com/culturalinstitute/project/art-project?hl=sk). The reason is digital protection and the creation of a virtual virtualization project in order to keep the originality of its artifacts. The institution offers a diverse range of cyberculture through both on-line and virtual exhibitions at the museum's premises.

The on-line access (website) itself is designed and graphically redesigned, not to mention the Interactive Floor Plans of an institution (http://www.louvre.fr/plan). After viewing the individual spaces, the visitor receives information through short previews of existing collections through photos or animations. Navigation in the cyberspace is fairly simple, without much constraint.

On-line elements of cyberculture can be included in the museum:

- Virtual tour of the museum through twenty-one panoramic rooms.
- Five built virtual rooms in 3D format.
- Multimedia presentation of the twelve most important museum collections in the format labeled "Closser Look"(http://www.louvre.fr/oal).
- Animation-visual documentation through minisite, a short virtual film of the most valuable paintings and sculptures the museum has (http://www.louvre.fr/minisite).
- Interactive acquaintance of collection gains through the eyes of former director D.V. Denon. This offer is accessible only online (http://www.louvre.fr/le-louvre-raconte-aux-enfants).

The museum also offers virtual reality to its visitors. Virtual reality is created with digital exhibits in 3D and XD formats (eg Mina Lisa 3D). Today, some expositions can be visited by using the digital archive of the museum. Since 2005, the Museum has made about 80 virtual exhibits using Augmented Reality. Several exhibitions have been created by the CAVE system. Current virtual exhibitions are made especially in 4D and XD formats, in three cases there has been an interactive 5D cinema. According to available information, the museum plans to apply virtual reality to the Renaissance collections (mainly the handwritten works of Italian and French artists) using robotics and interactivity in the coming years.

**Smithsonian Institution / Museum (United States of America)**

The institute is a collection of several organizations (museums and science centers) on the east coast of the US with 138 million artifacts. Similarly to the Louvre Museum, cyberculture can be tracked through online, but even in individual parts of the institution. The web interface and navigation are much more complex (more demanding control of icons), yet they offer their customers a wide range of virtual applications (http://www.si.edu/). By means of individual units, the institution tries to attract potential visitors (already in a partial virtual interface) using film and animation (3D and anaglyphs).

Cyberculture in terms of the performance of exhibition activities can be classified into the practical and scientific level.

The practical plane is a direct part of the exhibition activity. Like most institutions of a similar nature, the Smithsonian Institute has a virtual tour (http://www.mnh.si.edu/panoramas/#). The fundamental difference compared to other museums is at the stage of execution, as it has a maximum of 40 objects per pixel, which is a technical phenomenon of the time.

Visitors are currently the most popular dinosaur hall with virtual reconstructions and sound effects. Similar skeletons are in the form of preserved animal collections, which bring real physical and voiced form to technically (using tablets and smartphones and expanded reality).

The practical plane, in the sense of creating an unreal world and museum collections, is also crystallized in a virtual book, library that delivers "show" and gain information through interactive study. Archaeological and paleontological collections in several digital formats are also prepared for the visitors (http://www.mnh.si.edu/fossil-hall/last-american-dinosaurs/). Visitors' interest is also a 3D reconstruction of daily provenance from the oldest to the modern history (up to the first half of the 20th century).

As part of the exhibition activity, 3D and 5D film versions of various themes, from historical to space (eg 3D Jerusalem, 5D Hubbl´s Telescope etc.), are now the dominant article of the institution (http://www.si.edu/Imax/Movie/125).

The basis of the exhibition activity of the secondary segment of museum cyberculture is the application of immersive and expanded reality. Typical examples are technically interesting exhibitions, Immersiv Room - Collection of tapestry cooperative Hewitt (http://www.cooperhewitt.org/events/opening-exhibitions/immersion-room/). The advantage of the exhibition is that the visitor can create his own design using high technology and can take the printed form with him.

The science plane is presented in the 3D digital collections and, of course, in the repair of damaged artifacts. Digitization helps to complete the missing parts of the collection items. The basic aim of the scientific plane is to verify older theories, to parallel research of the same kind of institutions. Some sections (such as the Latino Virtual Museum) of the Smithsonian Institute have some suggestions for creating and interacting with percipients.

**The British Museum (United Kingdom)**

The museum was the first institution to launch the world's exhibitions with the contribution of the technique. This tendency is present today as the museum combines current knowledge of science and technology into its exhibition and professional activities. The British Museum is one of the pioneers in the launch of its own museum site on the old continent. At present, there are several tens of thousands of art objects from around the world. Most of the artifacts came from its colonies. In its premises it is possible to study human development on the basis of preserved artefacts from the earliest times to the present history. This is also undermined by the overall character of the museum. Most of the exposures are presented to visitors in ten language mutations. Museum cyberculture can be classified into two levels.

The first level is part of the internet promotion and marketing of the museum. The web interface (http://www.britishmuseum.org) is in a classical form with plenty of information. In particular, Internet exposures are resonant to those interested in viewing and partially examining them. Online expositions are divided into categories, e.g. culture, objects, humanity, material, and others. The most studied collections of world history, or the work of Michelangelo in graphic form

(http://www.britishmuseum.org/explore/online_tours/europe/michelangelos_drawings/michelangelos_drawings.aspx). A specific article is an interactive pedagogical aid, multimedia guide that describes selected collections.

Internet Multimedia Interaction is also being rolled out in games and virtual videos.

The second part of cyberculture is represented immediately in the exhibition activity. It appears in the form of permanent (eg the life of ancient Egyptian ethnicity, the sculpture of ancient sculpture and others) as well as short-term (eg Napoleon Bonaparte) exhibitions

(http://www.britishmuseum.org/whats_on/exhibitions/bonaparte_and_the_british.aspx).

In addition to digital examples, virtualization is evident in the visual description of important historical facts, as well as in the production and everyday life of a person. For this form of construction, the museum also uses a virtual book and diverse multimedia maps.

**Museum of Future Government Services (متحف الخدمات الحكومية المستقبلية.) - (United Arab Emirates)**

It is the first real virtual-interactive museum to use the latest technological knowledge to practice the technologies that accompany and accompany the human population in different areas of life (http://museum.governmentsummit.org/2015). The institution also has a revised website.

The Cyberculture Museum enforces through the complex mechanism of virtual reality and robotics (eg using the ASIMA robot). There were almost 180 designers and technical experts working around the world to create a museum in the shape of an ideal, life-sized city with streets ("Smart City"). Virtualization of the museum is divided into several sections (http://museum.governmentsummit.ae/2014/#smart-cities).

The bottommost, hidden part of "Smart Street" creates a way of future human life through virtual reality (widespread reality). The whole is made up of the "Total recall" movie.

The "Future Services Laboratory" is another department that was created by the Honda car company. Toyota Museum has a similar type. In this section, visitors can try using the simulator to drive in the future (http://www.toyota.co.jp/Museum/english). In this embodiment, automotive prototypes are tracked through integrated intelligent systems. Curators are also trying to make use of artificial intelligence.

The third section, "Personal Cloud", deals with energy. Its origin is related to the cooperation of MIT University with the intention of presenting the latest results of the technological base.

Favorite is the "Fitzania" health day. The proposed concept is both a CAVE system and a holographic version. Percipient is pulled into the human body. It recognizes the function of the organs, cells, the body's response to the diseases and the treatment. Exceptional is the monitoring of your own pulse, blood pressure and special life functions, especially the liver, lung and brain.

The exposition, entitled "Exoskeleton", can show visitors the worry of people with serious illnesses, to point out the lives of people with disabilities (eg blind, deaf) people. In this part of the exhibition, the most demanding employment of people working in extreme conditions and situations is processed and presented. The role of the exhibition is to interpret the impact of the environment and society on the human organism. The virtual museum offers the possibility of surviving a variety of extreme situations.

The vision of the museum is to construct permanent exposure in the future (short exhibitions already offered by the museum, such as Mars life on the planet). The intention is to apply cosmetology research technologies to the solvent public.

## VIRTUALIZATION IN SELECTED MUSEUMS THE VISEGRAD FOUR

Virtualization is also acquired in museums of the V4 countries (Župčánová, 2015), but with a certain time lag. The implementation of cyberculture is understandable in digital collections and exposure building. In the last 10 years there have been fundamental changes in the use of elements of virtual reality in the museum environment. We are no longer talking about commercialization, but rather about digital protection, multimedia education and the creation of entertaining, instructive and scientific events. The basic intention of selected museums from the Central European space in the application of cyberculture is not only the attraction of visitors but above all the increase in the intensity of the visitors, the expansion of the scientific knowledge and the strengthening of the cultural identity.

The information obtained from the selected museums confirms the active use of cyberculture during and outside the exhibition, in the educational and educational area. V4 museums strictly distinguish the concept of digital and virtual museum from the point of view of technical excellence, impact on museum percipients and economic resources for their construction.

Based on virtual museums on the Internet, which are supplemented weekly with new information, especially from the sector of digitization of collections or the scientific scope of the museum.

**Magyar Nemzeti Múzeum** (Budapest: Hungary)

The museum in creation of virtual exhibitions using input systems, (http://www.hnm.hu/hu/fooldal/mainPage.php), prefers the idea of immeasurable reality (eg collections of objects) or simple holograms (such as the St. Stephen's Crown).

In addition, they offer a variety of display types of individual collections in 2D (tombstones and epigraphic collections or artifacts from the Roman period). In the period 2015-2020, the museum plans to construct 2D and 3D exhibits from the period of ancient and central history.

**Szépművészeti Múzeum** (Budapest: Hungary)

Museum has (http://www.szepmuveszeti.hu/) a long-term experience with virtual exhibitions. Several major virtual exhibitions have appeared in the museum, Virtual Titanic, 3D Mummy Project, 3D Andy Warhol, and so on.

With the 3D Mumia Project (was renewed in 2014/2015), she worked for the first time with several leading departments (eg Anthropology, Microbiology, Radiology, Physics, etc.) to gain insight into the lives of mummies in the museum.

The current (2010 - 2014/2015) museum is dedicated exclusively to the creation of a 2D museum dedicated to museum collections from the Renaissance and Baroque periods. Another specific museum offer (Visitor-Seeking) is to display modern art through anaglyphs and especially "emerging" 3D images. Priority Near Future (2016-2018) is an international exhibition that will be connected with the classic exhibition and the possibility of expanding reality (Augmented reality) on the life and work of the painter Harmenszoon von Rijn Rembrandt (1606-1696).

The museum plans to construct an exhibition in a more sophisticated system, j. in CAVE. This, however, is not only a matter of finance, but also of international cooperation (oriented towards the Virtual Museum of Canada or the Musée du Louvre) and, in particular, by the help of companies dealing with telecommunication-information issues.

**Moravské zemské muzeum** (Brno: Czech Republic)

By launching the advertising sector of the museum on the Internet, the institution has consolidated its position in stable annual traffic (http://www.mzm.cz/). To a lesser extent, there is a lack of online negatives: a virtual tour of the main museum objects. In the short term, workers are working to build a network of online digital artefacts. The benefits are interactive multimedia guides who create so- digital archive of multimedia projects (http://www.mzm.cz/multimedialni-pruvodci/). The museum, in this form, records four guides, namely:

- 1st exhibition Messel on Tour;
- 2nd exhibition Gold symbol of power and wealth;
- 3rd exhibition Cyril and Methodius. Time, life, and work;
- 4th World Ballet Mystery.

To date, the most prominent project in which the combination elements of virtuality and multimedia interaction were applied was the exhibition called Cyril and Methodius. Time, life and work that took place on the occasion of the 1150th anniversary of the arrival of the Solomon Brothers. The exhibition mapped the life and environment of the virgins in the area of Bohemia, Moravia and Slovakia. As a multimedia feature, tablets were used, with some artifacts (about 55%) their percipients could use to get more insight into visualization and short film animations. Also using the film processing, biographical reconstructions of saints were created in the theater center. Virtualization has been introduced even in the reconstruction models of the period architecture in the form of visualizations and static models.

At present, the most complete show with a virtual undertone is in the Mendelianum section, and visitors are actively explaining the principles and foundations of genetics. In addition to a visual tour on the Internet, a classic virtual exhibition is also created in which the visitor can actively test methods focused on molecular biology.

**Národní muzeum** (Praha: Czech Republic)

The implementation of cyberculture is different from the Moravian Museum. The site itself is reminiscent of the third millennium museum, as it has modern technological features (http://www.nm.cz/). These are components:

- Virtual tours in classical form (eg virtual tour of the National Museum building and other buildings belonging to the institution).
- Short on-line archive exhibitions (eg virtual exhibition of the Old Czech reputation, etc.).
- On-line archive outcomes of experts in the form of interviews.
- Web collaboration with other museums from the Czech and foreign environment, in the "Touch 20th Century" project. The project is an interactive tool for students to access history and the complex historical processes of the 20th century using museum artifacts. Within the project, even multimedia games (such as presidents, Czechoslovak sports, big 20th century battles, and many others) are being prepared (http://www.dvacatestoleti.eu/navstivte-virtualne/).
- Created a news portal called "Museum 3000". Beginning of the "Museum 3000", launched in spring 2014. An important part of this project is the monitoring of the fate of the acquisition of artifacts by the National Museum.
- Electronic collections (collections of cultural heritage). This is a presentation portal that serves to search and view the museum's digitized artefacts. The start of the project was launched in 2010 in cooperation with other cultural institutions as well as with the Europeana portal. Today, about 50,000 collections are

registered. Monthly audience is around 4500 to 5100 Internet visitors. Within the framework of electronic collections, actual virtual exhibitions (such as Czech Modern Art, Outdoors, African Games and Toys, etc.), as well as archive ones (eg My Monarchy, Money, Time of Overseas Discoveries, Death Goddess and others) Percipient can view it as needed.

**Muzeum Historii Żydów Polskich** (Warszawa: Poland)

The vision of the selected museum is to present as accurately as possible to the visitors of authentic collections through modern technologies. The Web Virtual Platform of the Museum consists of the following parts:

- From a virtual tour of the museum, especially the interior and exterior. Also a virtual film tour of the historical building of the museum is a significant component.
- Archival multimedia-virtual exhibitions. The most significant exposures are Jewish artists and rapporteurs (http://judaica.jewishmuseum.org.pl).
- From the central database of "Jewish cultural artifacts".It is an online database of valuable Jewish artifacts and documents that link to the history of Jewish culture not only from the Polish territory but from almost the whole world (eg USA, France, Germany, Israel, etc.). Currently, the listing contains almost 3000 collections that percipient can obtain in both digital and 2D and 3D formats.

This is an online form (virtual sztetl") of documenting Jewish history within Poland (http://www.sztetl.org.pl/en/) from the smallest settlements (the village environment) to the urban way of life. In the relevant sections, the percipient has a number of documents from archive to private, diverse maps, schedules, memoirs, audio recordings, etc. The aim of the project is to support and strengthen the Jewish community through historical sights. The project also benefits from a linguistic mutation in English, German and Hebrew.

On October 28, 2014, the Historical Museum of Polish Jews launched a virtual exhibition at its exhibition venues under the title "1000 Years of Jewish History". The exhibition was attended by 130 scientists from 20 countries of the world. The aim of the exhibition was to reconstruct Jewish history in the last 1000 years (Gruber, 2015) The exposition is chronological. It follows the development of the Jewish ethnic group based on defined milestones:

Period 960 - 1506. Virtual elements are rooted from the oldest religious history (Abraham and Jacob), supplemented by information from the 10th and 16th centuries. Predominantly anaglyfic images and simple holograms illustrating the most important rabbis, patrons, as well as characters reminiscent of life styles of contemporary Jewish ethnicity. This section represents the oldest religious traditions and customs of the Jews, as well as the acquisition of privileges and assets in the Polish regions.

The period from 1506 to 1648, the so-called Paradisus Iudaeorum. Virtually interesting are virtual books presenting the historical context of the Jewish community in the 16th and 17th centuries. Through an immeasurable map it is possible to observe the main European centers with the largest occurrence of the Jewish population. The animated version explains the gradual expulsion and punishment of Jews in European countries.

Period 1648 - 1795. This section is a sign of the interpretation of the Jewish mosque and the way of life especially in the 18th century. The most significant virtual element is the holographic reconstruction of the Jewish house as well as the large sacral buildings.

Period 1772 - 1918, the so-called Modern Jewish History. This area provides information on the consolidation of the Jews' position not only in Poland but also in the surrounding countries. The authors are reminded by the virtualization of significant Jewish scientists, especially in the field of biology and medicine.

Period 1918 - 1939, so-called Street. Using an interactive street, it is possible to track individual life fates in a time-out on selected examples. The most popular are the reconstruction of major Jewish events in "Enhanced Virtual Reality".

Period 1939 - 1945, so-called Holocaust. This section is dominated by multimedia elements, especially period sound and film records of life, various medical reports, casting, etc. There are no virtual ground plans for Polish guns and concentration camps. Virtualization brings valuable insights into the tribulations of Jewish ethnicity during World War II.

Period 1945 to the present. The last part reflects the post-war situation, demonstrations of the liberation of concentration camps from the US and Soviet point of view. Virtual reality is mainly translated into 3D movie shows interpreting the last decade of the history of Jewish ethnicity. It also applies 3D graphics of prominent Jewish artists and politicians. In this part, Jewish cinematography has also been featured in recent years.

## Conclusion

We can observe urban changes in culture in several spheres, but above all in the way of perception of art and the presentation of cultural heritage. It is not enough for today to present facts as it was in the past. It is necessary to process the overall context and to present the diverse art and life of previous generations. This attribute can handle the components of cyberculture.

A fundamental change in the impact of cyberculture can also be observed in museums, as evidenced by exhibition, educational and scientific activities. Cyberculture in the presentation and protection of cultural heritage can modify basic emotional elements that affect human organs to the extent that they create an impression of infinite space. A virtual world in which a visitor feels without limits and borders is created with the intent of direct participation in cybersquatting. Existing virtual exhibitions have created some standards for the presentation of artifacts and topics.

This state can be reflected from opening exposures to the cyberspace at the turn of the 20th and 21st centuries. It is the opening of free cyberspace that creates new types of presentation of cultural monuments and artifacts to the public. It is one of the globalization trends in museums and monuments. Using an accessible cyberspace (such as a virtual tour), each potential visitor gets an opportunity to look at the world's unique cultures. The European archaeological sites (eg Pompeii, Herculaneum, Lasaux Cave, etc.) and American natural curiosities (eg Grand Canyon, Niagara Falls and others) will get the most clicks. Supporters of cyberculture as a positive side also welcome the application labeled "Live", t. j. direct broadcasting from relevant sites. This trend of a lively, up-to-date environment has been applied in the last few years to the largest cities in the world, tourist sites. Similarly, most of the world's museums and galleries have similar workmanship. It is important to note that negative attitudes prevailed in making the cultural heritage available to the Conservative group in cyberspace.

Nowadays, this phenomenon is also complemented by a new technological element, j. 3D reconstruction of ideal forms and shapes of existing cultural monuments. This type is mainly used by touristically significant regions (eg 3D Antique Rome, 3D Louvre, etc.) using portable audioguide.

The phenomenon of cyberculture represents unusual components of the presentation and its possibilities are almost unlimited. For this reason, broader application would also be needed in humanities that are lagging behind technical science. It is only for the scientists of the humanities sector in what way their future will develop and what position it will build in the university environment.

The paper deals with the essence of cyberculture in the connection of direct museum examples between theoretical and practical level. The study shows a partial comparison with existing examples from world museums with relatively high marketing promotion compared to cultural institutions within the Visegrad Four countries. The article presents views of foreign experts from the position of museologist or historian. Data from the domestic environment is provided mainly by the analysis of the museological environment, which carries elements of education and promotion of local and world history from selected museums or from the university environment. Some cross-sectional works from the position of geotourism (eg by P. Hronček or P. Rybar and others) are absent due to the preparation of a more detailed analysis of interdisciplinarity between several scientific disciplines due to the nature of the prepared international study planned for publishing activities in the second semester 2020, which is also part of the chapter in foreign scientific monograph.

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# The Calvary of Banská Štiavnica

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***Abstract***

***Calvary in Banská Štiavnica is unique in the world. Its builder and spiritual father is František Jasmin Perger, a Jesuit from Bohemia. Pilgrimage has a long history in Christianity as well as in other religions. The obligation to travel to a holy place, to the grave of a saint, or to a place of some glorious event, was almost universally considered to be for the benefit of the individual's spiritual life. The pilgrimage went through not only for blessing or as a tribute to authority but hired for the purification of past sins. Already in the 6th century, the Irish-Scottish missionaries, who literally cross-crisscrossed Europe, began to commence pilgrimages as repentance for those truly shameful crimes. Modern pilgrimage as a part of religious tourism and tourism understands the importance of linking religion with cultural heritage and tourist attractions. The pilgrimage routes that originate in Slovakia follow this multi-social approach. The main purpose of pilgrimage is to address a particular person, his invitation to deepen his spiritual life, to know God.***

***Keywords: Calvary, pilgrim tourism, religious tourism,***

## Introduction

Pilgrimage is a cult practice of many world religions (Hinduism, Judaism, Islam, Jainism, Sikhism, Shintoism, Buddhism, Christianity), but the highest number of pilgrims absorb Christianity. Pilgrimage tourism accounts for up to 34% of the world's traffic, with approximately 240 mil. the people go on a yearly journey with religious goals; of this number is about 150 mil. Christians (Eliášová, 2004). Černá (2014) focuses on religious travel in Slovakia. The aim of the case study is to create a typology of religious monuments and attractions related to the specifics and historical development of the territory of Slovakia. Traveling in antiquity and middle ages is dealt with in his publication Croat (2007).

## The Calvary of Banská Štiavnica (1744 – 1751)

Banská Štiavnica was one of the largest and most important free royal cities of the Kingdom of Hungary since the mid-18th century. Štiavnica mining lived its golden age. Favorable economic conditions enabled unprecedented cultural development of the city and transformation of its external form, including the emergence of new artistic values. One of them was the construction of a unique Calvary. This impressive Baroque sacred whole and its landmark is one of the most beautiful buildings of its kind in Europe. A perfectly thought-out interplay of architecture works of sculpture, painting and craft in unity with the natural environment literally draws visitors into the story that materializes - the story of Jesus' last journey. The initiator of the construction of the Banská Štiavnica Calvary was Father František Perger (1700 - 1771) from the local community of the Society of Jesus (Jesuits). With an unusual enthusiasm, the Banská Štiavnica community gained the idea of building Calvary on the hill Scharffenberg (Sharp Hill), which was in the possession of the Fritz von Friedenlieb family. He managed to enthuse the inhabitants and the representatives of Banská Štiavnica themselves, who took over the patronage of the building for this grand idea. On 22 May, the whole project was approved by the Church. Thus, on September 14th, the foundation stone of the Upper Church could be laid, which was also the first building. The whole project and all work were carried out under the direct guidance of Fr. Perger. There were local masons, carpenters, stonemasons, but also woodcarvers and painters. Exactly seven years after the commencement of work, on September 14, 1751, the entire complex was completed and ordained. Although Calvary originated in the time of culminating Baroque, the architecture of its buildings is moderate and decorative, moderating, allowing the pilgrim to concentrate on the intense inner experience of the Passion story. The strength of the testimony was enhanced by the realistic depiction of scenes in the form of large-scale reliefs, and the final scene of the Crucifixion, created from life-size statues with figurative paintings in the background, dramatically increased.

The complex of sacred buildings on the steep hill of Scharffenberg was built from donations of rich miners, dignitaries and simple mining families. Donors are reminded of coats of arms on the fronts of individual

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stops. In the turbulent times of the Turkish conquests, there was a vartovka on Scharffenberg, which warned of the approaching enemy.

By its conception, the Banská Štiavnica Calvary exceeds the framework of the well-known embodiments of the Stations of the Cross in the form of fourteen stops. The structure, spatial distribution and character of the scenes depicted symbolize the message of the history of salvation in an original, generous and high artistic level. Thanks to this, the passion story is dramatized up to a scenic location, enhanced by its setting in the real landscape. The architectural complex consists of 17 stops, three churches (the Lower Church, the Holy Stairs and the Upper Church), the Dungeons (Ecce homo) and the Holy Sepulcher, the only building on the opposite, eastern side of the hill.

Each of the chapels represents one of the key moments of Jesus' Passion or the events of his life through his artistically crafted wooden reliefs with typical Baroque theatricality. The special arrangement of the chapels is unusual. Commonly known Calvary have fourteen stops, beginning with the condemnation of Christ before Pilate and ending with the grave of God. Banská Štiavnica Calvary (Fig.1) has more and different composition of stops. It begins in Nazareth, where Jesus is going to publicly begin his work of redemption. This uniqueness of Calvary, together with its sensitive harmony with the natural environment, has been and still is the cause of its search among pilgrims, as well as regular visitors to the city.

The first three chapels are also called preparatory. The place where they are today was not their original. They were many tens of meters lower but disappeared between residential buildings after the expansion of the urban development. Therefore, they were moved to their present location at the turn of the 1970s and 1980s. From the lower church then the road it continues to the seventh chapel and leads to the central church - the Holy Steps - where the serpentine paths bifurcate.

On the left side are the chapels depicting the latest events of Jesus' condemnation and martyrdom and culminating in the Upper Church with the appearance of his crucifixion. Bypassing the Holy Sepulcher, pilgrims return alongside the chapels depicting the Seven Sorrows of the Virgin Mary. The whole pilgrimage culminates above the Lower Church at the Sphinx of Seven Sorrows.

*Fig.1 Calvary of Banská Štiavnica (Photo: Tomáš Mlynárik)*

Important dates:

- November 19, 1649 – Founding of the Jesuit mission in Banská Štiavnica
- March 13, 1744 – Magistrate agrees with the proposal of priest Perger SJ to build the Calvary and gives him the first financial support in the amount of 300 gold coins.
- May 22, 1744 – Perger asks the ecclesiastical authority for permission to build Calvary according to

plans submitted and for the patronage of the city. At the time, the Archbishop of Esztergom (based in Trnava) was Imrich Esterházy (1725-1745).

- August 13, 1744 – Archbishop receives an acceptable plan; ecclesiastical approval follows.
- Meanwhile, Father Perger continues gathering material and money. Landscaping and delivery of material to the top has started, with the assistance of both city officials and groups of workers and believers.
- September 14, 1744 – The foundation stone is solemnly blessed in the presence of a large number of believers and the priesthood on the Feast of Exaltation of the Cross. The first building completed was the „Upper Church ".
- September 14, 1745 –The Upper Church is blessed, and the first Mass is celebrated, attended by a flag-bearing procession from the town. The sanctification was carried out by the Vicar General, Bishop Michael Frivais and Mass was served by superior of the Jesuits Filip Pez. A Slovak homily was delivered by Michal Hučekovič, pastor from Chrenovec and a German sermon was preached by George J. Herczeg, pastor of Handlova.
- 1746 – Regular Processions to the Calvary begin.
- 1751 – On the feast of the Holy Trinity distinguished guests, among them the Emperor Francis of Lorraine visited the Calvary.
- 1748 – Francis P.Perger SJ, the man behind the Calvary, previously authored several religious works. Later he wrote and published a book, written in Slovak language, which contained lessons and prayers, worship schedules for the feasts of Finding and Exaltation of the Cross, indulgence connected with the Calvary, prayers to the Passion of Christ the Lord, in honor of the Sacred Heart, prayers to twelve hours of the day, etc.
- September 13, 1751 – ceremonial blessing throughout the Calvary.
- 1894 – Some chapels were repaired and restored by architect William Groszmann and J. Kraus, a wood carver from Banská Štiavnica.
- 1945 – Major damage sustained during the fighting of World War II.
- 1948 – Pilgrimages were „regulated"and restricted by the state. However, many believers made non-authorized pilgrimages.
- 1978 – 1981 – The most extensive maintenance, renewal and partial restoration works to date were made under the parish priest P.Karol Benovic, SVD. Three lower chapels were gradually moved higher into the calvary area to distance them from recent residential building.
- From 1989 – The black market in antiquities starts to be accessible and theft of the sculptures begins. Parts of the copper roofs start to disappear and the whole area is attacked by vandals many times.
- 1993 – The calvary together with the town was entered into the UNESCO World Heritage list
- June 2007 – The Calvary is entered in the list of the 100 most Endangered Monuments in the World
- September 2007 – Existing baroque statues and wooden reliefs are moved to the museum of The Old Castle and the exhibition „Calvary in Asylum"established. Seminar of proffesionals with the topic „Saving the Calvary„
- 2008 – Re-establishment of the Calvary Fund. Obtaining general sponsors: The VÚB Bank Foundation, the Ministry of Culture of Slovakia, Middle Slovak Electricity and the World Monuments Fund (Fig.2). The project of chapel adoption is initiated... (Kalvária v Banskej Štiavnici, 2019)

*Fig.2 Calvary before and after recontruction*

*Fig. 3 Descent from the Cross has been their place (Photo: Pali Urbi)*

- 2013 - Banská Štiavnica Calvary has been removed from the list of the 100 most endangered monuments in the world. After five years she managed to restore her largest church and several chapels. So far, however, the work is only in the middle and still needs 2 and a half million euros for its final rescue.
- 2019 on the World Heritage Fund (WMF) website, the Calvary complex in Banská Štiavnica is marked as completed. Works remain on the interiors of the Holy Stairs and the Holy Sepulcher, with a completion date of 2022. (Svetový pamiatkový fond, 2019)

**Pilgrimtourism**

Pilgrim tourism is a part of religious tourism. It denotes hiking paths, the main motive of which are religious reasons or also religious-cognitive reasons, while part of the journey is devoted to participation in pilgrimage as part of a religious cult. The pilgrimage is organized and generally follows a strict ritual order. It includes other elements of religious cult - eg. prayers, worship, meditation and other forms of religious ceremony. The pilgrim's tourism destinations are sacred places (cult centers or some sanctuary).

Pilgrimages and processions are among the elements of religious cult (Matlovič, 2001). Pilgrimage has different meanings in different religions. In Catholicism, for example, it is one of the manifestations of piety. In this sense, it can be understood as a journey to any holy place (loca sancta), which is realized from religious motives. Participation in the pilgrimage leads to the spiritual renewal of man. Some of the pilgrimages have their original names (Matlovičová, 2015).

Pilgrimage routes in Slovakia

- Pilgrim's House - OZ Spojené ruky
- Central European Marian Road
- Camino de Santiago Slovakia
- Slovak Marian Road
- Cyril and Methodius Way of the Pilgrim
- Barborian Route
- European cultural route of st. Cyril and Methodius
- Route of St. Elizabeth

## Barborian route

Barborian Route represents a set of nine sections that connect not only mining monuments, but also many other attractions. The visitor can gradually walk or cycle through it. The road is strategically divided into sections between individual municipalities. After passing through the section, visitors can recharge their energy in one of the local accommodation facilities where baggage transfer is also provided. During the journey, there is a catering service with the possibility to taste local traditional dishes.


*Fig. 4 Logo of the Barborian Route*

The Barborian Route is approximately 190 km long and should last 8 to 9 days. The route is on foot or by bike, on marked hiking trails, while the altitude profiles of the route change during the journey. The route is supposed to start in Banská Bystrica, but the visitor can start on any section. Barborian Route connects the towns of Banská Bystrica - Kremnica - Banská Štiavnica, so they are towns and villages and sites that were in the past the center of mining of pan-European importance. As a result, several mining-related technical works have been preserved in the region. Mining has also influenced the culture and way of life, leaving a huge wealth of technical, religious and cultural heritage and customs. During the journey, he travels through a man-shaped country without first recognizing this human intervention. The human untouched landscape overlaps with the human reshaped landscape. The Barborian Route project and its introduction into the region of Central Slovakia is a project that integrates the interests of entities seeking to develop this area in the area of tourism and regional development. This unique project brings together unique places in the region that have not yet found common elements for synergistic expression of mining, natural, historical, cultural and religious potential. Barborian Route is a sightseeing route in a circuit that combines all the most important values of mining, historical, religious and cultural heritage and unique natural beauties. The tourist route draws on the existing possibilities and potential of the region and therefore does not require any extra investment in the construction of tourist infrastructure. It offers green tourism in a form that is advancing today in Europe and the world and is increasingly sought after for an authentic experience.

The benefit of the Barborian Route project is

- Presentation of mining, historical, natural, geographical, religious and cultural attractions, uniqueness and specificities of the region;
- Creating conditions for an authentic experience of domestic and foreign visitors,
- Revitalizing the region through increasing visitor numbers and expanding services,
- Initiating cooperation of regional entities:

The importance of this project is associated with a certain trend that we can currently see in tourism. While, for example, 10 years ago, the trend was to build ski resorts and stay tours, today, under the pressure of a hurried and stressful time, the need to return to the foundations of human existence, simplicity, nature, and spirituality arises.

In an effort to escape from everyday worries, one increasingly chooses to walk (or by bike) to wander in order to get to know the environment that surrounds him. That's why we offer the idea of the Barborian route: “Walk to Knowledge…”

Through the Barborian Route, the visitor follows three levels of knowledge:

- Getting to know nature, returning to it, as well as getting to know natural attractions and peculiarities.
- Getting to know important mining, cultural, religious, historical and technical monuments in this area.
- Getting to know oneself, recharging physical and mental strength and active relaxation in nature.

The Barborian Route was established by joining the territory of the former important Slovak mining towns. The unifying symbol of the project is St. Barbara - the patron saint of miners. It is interesting to note that after marking the route of the Barbara Road on the tourist map, its silhouette - the figure of Barbara - was created.

The figure has a copper crown, which symbolizes copper Banská Bystrica, Spania Dolina and Staré Hory (in the past, copper was mined and processed in these places). The gold chalice captures the gold Kremnica (gold mining and processing in Kremnica and its surroundings) and the silver sword represents the silver Banská Štiavnica and its surroundings (silver mining and processing). Using the symbols of St. Barbara - crown, chalice, sword and tower created symbol / brand as a single and powerful marketing tool (Barborská cesta, 2015).

## Conclusions

The chapels, churches and works of art of this important national cultural monument are largely restored and secured against further deterioration. However, the story of Calvary restoration does not end. While approximately 12,000 visitors visited the Calvary in 2008, the number climbed to 70,000 in 2017. In the coming years, the last restoration work will be underway on smaller buildings, which will not significantly restrict visitors. In the coming years, the last restoration works on smaller buildings will be underway, which will not significantly restrict visitors. The VUB Foundation remains a partner of the Calvary Fund OZ and has committed to release additional funds for the completion of the renovation work.

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# Foreign alchemists as the first mining tourists in Upper Hungary (present-day Slovakia) in the 16th century

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*Abstract*

*The paper is devoted to scientific journeys and stays of foreign alchemists in Upper Hungary during the 16th century. It is the territory of present-day Slovakia, which avoided general occupation by the Ottomans. The local mineral resources, mining and metallurgical technologies attracted alchemists, who can be considered the first mining tourists in this area. Slovakia has become the destination of educational trips of Theofrast Paracelsus, John Dee, Edward Kelley, Leonard Thurneysser Georg Joachim Rheticus and others educators from Western Europe. At the same time, alchemists and prospectors of mostly Czech origin, such as Ján Sobieslavský, Jan Zemánek, Andrej from Olomouc, Jan Táborita, Šebastián Čech and many others, were active in the area of the Carpathian Arc.*

***Keywords:*** *alchemy, Upper Hungary (Slovakia), 16th century, mining tourism*

## Introduction

The beginnings of mining tourism in Upper Hungary have been processed so far by a monographic study of P. Rybár and P. Hronček (Rybár, Hronček 2017), who, in their work, outline the history of the beginnings of mining tourism since the 16th century in the world-famous medieval mining region. These authors date the beginnings of mining tourism to the first half of the 16th century, where they mention the Swiss alchemist Paracelsus as the "first" mining tourist in the region. Paracelsus had visited the territory of present-day Slovakia for the first time in 1521. Authors in their work do not comprehensively process only the 16th century but dedicate their attention to the younger periods as well.

The submitted study also presents other personalities of the alchemy (science at the time), who visited mining areas in Upper Hungary during the 16th century. These were mainly polymaths, who also dealt with alchemy, and therefore they were attracted to the rich mining areas of Upper Hungary. Whether mines and minerals themselves, but also mining and metallurgical technologies, mining towns and generally rich mining regions fascinated them. The most important motivating factor for undertaking these journeys was the rich occurrence of cementation waters, especially in Smolník, Špania Dolina and Ľubietová. Alchemists investigating cementation waters and the process of copper recovery by cementation have sought to prove the transmutation process, i.e. transforming metal (iron) into another metal (copper). Ignoring the physicochemical background of this process, they saw evidence of the conversion of iron to gold.

Mining tourism has started to form in the last decade as a separate tourism industry. The first definition of mining tourism was presented by Rybár and Štrba at the International Conference on Geotourism, Mining Tourism, Sustainable Development and Environmental Protection, Florence, 2016 (Rybár - Štrba, 2016): „There are significant differences between the nature of mining tourism and geotourism or industrial tourism. Mining tourism sites are often located in a natural environment with many geological features (e.g., mineral deposit exposures, rock formations exposed in mines, fossils, etc.), what can be a subject of interest of both geotourism and mining tourism. On the other hand, mining tourism covers the much broader area, including mining heritage in the form of mining insignia or spiritual heritage of miners that do not fit geotourism definition at all. Therefore, it can be assumed that mining tourism is not a part of geotourism"(Rybár, Štrba, 2016). Here they indicate that mining tourism is an individual form of tourism, which in many cases is related to geotourism and industrial tourism but is on an equal level with geotourism and industrial tourism.

According to P. Rybár (Rybár 2016, Rybár, Hronček 2017) we can define mining tourism as follows: Mining tourism is a form of adventure and cognitive tourism for specialists and the general public (laymen). The interested person in mining tourism can take advantage of a combination of both experiences and knowledge of visiting in-situ mining sites and regions, visits of mining museums and from literature and archive studies, including mining documentation. In situ mine visits helps a tourist to know used mining technologies and processing methods of raw materials throughout the history. Visit of mining regions helps tourist to understand boom and bust of mining regions, and to know habits of miner community in different times of history. Visit of

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mining museums helps to a visitor to feel a bond with one of the oldest human activities – mining, developed mostly in the underground. All mentioned connects visitor with his/her ancestors.

## Activities and journeys of foreign alchemists in the territory of present-day Slovakia in the 16th century

### *Alchemists and prospectors of Czech origin in the Tatra region*

The manuscript called Alchidemia magistri Friderici ae de ferrea porta from 1573 is deposited in the collection of the Szirmay Library of the Evangelical College in Prešov under the inventory number K.V. 40. According to the title page, the author is the alchemist Joannes Sobieslavensis, who is considered to come from the Czech Soběslav, which would most likely correspond to the name Sobieslavský or the Slovak settlement Sebeslavce (today part of Blatnice). Sobieslavský could be a Czech form of the name according to the Turiec settlement of his origin, which would be indicated by the fact that he mistakenly signed with another "o" as Soboslavský.

The manuscript is not an original work but a transcription of existing alchemical recipes and prospecting records of the 16th century, but it also mentions the work of the original Slovak alchemist Mikuláš Kremnický from 1545 (Lazar, 1969). The work is on the title page dated to 1573, when the author began to write it, including records of the journey of prospectors of Czech origin in the Tatra region.

We learn about the deposits of precious metals under the Kamešnica Hill near Rajec (1573), at the Kláštorisko near Hrabušice (1560) or under Holica near Kubachy (today the village of Spišské Bystré) from Ján Zemánek, a goldsmith from Těšín. Andrej from Olomouc and Ján Táborita searched for minerals in Krompachy (1565), J. Táborita even in Poloma (1568). Šebastián Čech from Litomyšl searched for gold in the region from Trstená to Dunajec (1565). Jeronym Krumpir from Olomouc found gold nuggets large "as beans" in the Kadno (?) Stream (1565). Four alchemists - Ján Soboslavský, Václav Čech, Adam Žiakovič and Benodik from Podhradie reported on the gold deposit near the Kláštor near Hranovnice (1573). Some reports in the manuscript are anonymous, such as the description of the gold deposit in Lipovec near Vrútky, but referring to the prospecting records of Mikuláš Žatecký, Václav Kožišník from Hradec Králové and Pavel Tkáč from Mýto.

In Alchidemia, there are also reports written by Andriš Heverik (1562) about the gold-bearing glaze near the Biele jazero (White lake). Sigismundus Opaniensis (1566) indefinitely describes the gold deposits in Žabie jazero (Frog lake), Pavol Ratiborský and Fabián Sartor (1567) in Mědodoly. Nicholas from Kladsko, Martin Postriháč from Pezinok, Pavol Slosiar from Litoměřice, Urban Súkeník from Pardubice and Chochol Kožušník from Hradec Králové mention another deposit near Tri Koruny (Three Crowns) near Červený Kláštor.

### *Paracelsus in the territory of present-day Slovakia*

The famous Swiss doctor and alchemist Theofrastus Paracelsus von Hohenheim (1493-1541) also stayed in the territory of present-day Slovakia during his journey through Europe, since in 1537 he was a guest of the Bratislava City Council. His visit is also evidenced by a record from the town's accounting book, as he was hosted by the guild of Bratislava doctors and surgeons (all expenses were paid by the Bratislava city). According to historical sources, we know that the famous doctor on the eve of St. Michael was greeted by the city council delegates in front of the city gate and was accommodated in the house of the most respected burgher Blasius Beheim in the town hall square.

On the building of the Primate's Palace in Bratislava, there is a commemorative plaque with an inscription, which reads: “This building used to be the home of Paracelsus de Hohenheim” (In hac platea habitavit Paracelsus Paracelsus de Hohenheim). The plaque is a work of Ludwig Mack that is based on a 1540 engraving originally (in 1943) installed on another building. Another, less known journey to the central and eastern Slovak mining towns was undertaken by Paracelsus in 1521, who, in his paper De Tinctura Physicrum, mentioned the alleged ability of the Smolník mineral water to transmute metals.

The circumstances of Paracelsus's stay in central Slovakia were made clear by an Englishman John Merin. In his work he noted that "the famous Paracelsus spent some time in Banská Bystrica", where he stopped on his way to Transylvania. He set up a laboratory in the city where he performed experiments with sulfuric acid, antimony, mercury, copper, silver and gold, and he lived there with a goldsmith. Moreover, John Merin had access to the room serving the founder of iatrochemistry as both a temporary residence and a study room where, even in 1615, one could see the Merin’s portrait he donated to his host hanging on a wall.

According to some authors, the Paracelsus’s laboratory in Banská Bystrica was also mentioned in the work of the French geographer P. Fournier in the middle of the 17th century. In 1700 it was taken over by J.W. Tänzel in his Latin treatise Hungaria seu disputationes de natura Hungariae

Ladislav Juhás recently contributed the last indication of Paracelsus' stay in eastern Slovakia. He mentions the invitation of the provost from Leles to visit the Tokaj region, when in 1529 Paracelsus was also about to visit the estate of the Veľký Kamenec Castle on today's Slovak-Hungarian border: "It can only be assumed that it was

an invitation because the letter was only partially preserved and destroyed in a fire. One fact is historically known. Paracelsus investigated the health effects of unique Tokaj wine on the human body in the Tokaj area“ (Jesenský, 2011).


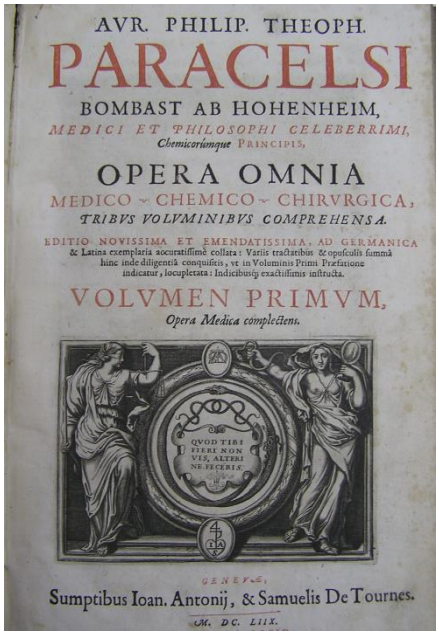


*Fig. 1, 2. Paracelsus - Theophrast von Hohenheim (* 1493, Einsiedeln, Swiss – † 24. September 1541, Salzburg, Austria), Swiss philosopher, physician, and alchemist. (Archive M. Jesenský, left). Introduction letter of Paracelsus's summary work (Čaplovič Library in Dolný Kubín, right)*

***Interest in cementation water in Smolník and Špania Dolina***

Towns Kremnica and Banská Štiavnica, in central Slovakia, were frequent places for visits of foreign alchemists, mainly as places of precious metals mining. In 1585, for example, Brandenburg Margrave Johann Georg sent two alchemists, Alexander Blinking from Strassburg and Vincent Reuss from Halle, to explore the mineral wealth of central Slovak mines. On November 25, 1585, they came to Banská Štiavnica, where, in a rather “tiddly state”, they got into a dispute in which Blinking killed Reuss. He was arrested and executed after the approval of the Brandenburg ruler. An analysis of the historical context suggests that at the beginning of this unfortunate journey stood the alchemist Leonard Thurneysser of Thurn (1530-1596) working at the court of the Brandenburg monarch who visited medieval mining towns sometime in the 1660s, but more accurate information about his stay unfortunately, were not preserved. (Tibenský and Urbancová, 2003)

*Fig. 3. Špania Dolina village (photo P. Hronček)*

Reports of the discovery of the Smolník 'cementing water' (Zemmentwasser), whose alleged miraculous capabilities and were related to the transmutation of metals, excited the entire scholarly public in Europe in the 16$^{th}$ century. “Cementing water” from Smolník contained copper sulphate, which was excreted and precipitated as copper on contact with iron. The first indirect mention of the production of cementation copper in Smolník is found in the contract between M. Thurzo of Levoča and the Chamber Count J. Donel from Smolník entered into in the year when ‘kunst’ pumps were in use. In 1566, a new gallery was excavated, which drained the cementation water and water was collected into reservoirs. They were throwing pyrite into the reservoirs to make the water richer. The unusual properties of mineral water from Smolník were mentioned by several authors at that time like: Basileus Valentinus, Jacobus Tollius, Andreas Baccius, doctor from Bratislava - Daniel Geyer-Waldmann and Ondrej Smoczký

German naturalist and doctor Georgius Agricola (1494-1555) also writes about the phenomenon of cementation water from Smolník in one of his numerous works called De natura eorum, quae efluunt ex terra (1546): „This is where this kind of water is pumped from wells and flows into gutters. There, the water eats away at the iron extracted by local miners, which later changes its colour and turns into copper" (Tibenský and Urbancová, 2003).

*Fig. 4. Town Smolník in 1748 (Slovak Mining Archive B. Štiavnica)*

***Rheticus in Košice***

In 1574, Georg Joachim Rheticus (1514–1574), who is currently known above all as an astronomer and supporter of Kopernik's heliocentrism and was preparing to print the work of his master De revolutionibus orbium coelestium (1541) died in Košice under unexplained circumstances. Much less known is his profile of the scholar-alchemist, although some researchers have long ago undertaken to evaluate Rhaetic's contribution to the history of chemical science (Burmeister, 1973).

The basic record of Rhaetic's stay and death in Košice remains a record in the chronicle, which until his death in 1623 was taken care of by the parish priest Joachim Leibitzer: "4. Decembr. Joachimus Rhaeticus mathematicus et Doctor Medicinae Caschoviae 2 hora matutina die Barbarae Catharro extinctus est. " (December 4, Joachim Rhaeticus the mathematician and doctor of medicine from Košice died at 2:00 a.m. on St. Barbara's Day). "(Wagner, 1774)

*Fig. 5. Georg Joachim von Lauchen Rhaeticus (* 16 February 1514, Feldkirch, Austria – † 4 December 1574, Košice, Slovakia)*

Apart from this statement from 1574, we do not know anything. Hungarian historian G. Székely states in one of his studies that Rheticus was invited by the duke of Moldova Despot to his court during the years 1561-1563 and it is not excluded that he decided to make a stop in Košice. (Kučera, 1974)

An interesting fact represents the record from German professor Karl Sudhoff, who in 1904 discovered in Florentine Biblioteca nazionale centrale, a Latin translation of Paracelsus's De Alchimia liber vexationis dated to 1575 and considered it to be Rhaetic's work. But someone else would have to complete the translation after his death. Rhaetic's biographer, K. H. Burmeister, on the other hand, assumes that Rhaeticus spent the last years of his life in Košice translating the treatises of the famous alchemist Paracelsus, who had twice visited Slovakia, making experiments in Kremnica with gold as well as mysterious mineral water in Špania Dolina, which turned iron into the copper (Burmeister, 1968).

***John Dee and Edward Kelley in Kežmarok***

From the perspective of scholarly journeys of alchemists in the territory of present-day Slovakia, we cannot miss the sporadic, but significant mention concerning the trip to Kežmarok of two famous English alchemists, which were Dr. John Dee (1527-1608) and Edward Kelley (1555-1597). They stayed there on the occasion of their journey to the court of the Polish King Stephen Bátori (1533-1586) in Warsaw in 1583 at the invitation of the high-ranking nobleman Albert Laský (1527-1605). The arrival of the British alchemists dates back to the second half of 1583. However, the period documents do not exclude another possible stay of theirs from 22$^{nd}$ to 25$^{th}$ April 1584, i.e. at the time when Albert Lasky used military force in Kežmarok to win over the Kežmarok Castle (Wagner, 1776).

For the sake of convenience, there is still further evidence of John Dee's earlier stay in Slovakia when he was commissioned by Lord Chancellor Francis Walsingham (1532-1590) to attend the coronation ceremonies of Maximilian II in Bratislava on 8 September 1563, of which he himself states in his travel diary in a supplementary record of 10 October 1563: „So I found myself in Pressburg on the coronation of the Austrian Emperor Maximilian II ...” (Postel, 1996). Since it is not directly related to the mining interest in Slovakia by an abovementioned Elizabethan scholar, we mention it just as an interesting fact.

The testimonies of Dee's and Kelley's stay in Kežmarok could support the results of the Bela Polla archaeological survey at the Kežmarok Castle: the discovery of a furnace and a reduction furnace for metallurgical works. According to him, both objects were built at the time, "when the castle masters were from Laszky family, namely Hieronym Laszky, who held in his court alchemists and allowed them to work just in his Kežmarok estate. (Polla, 1971) This view is also supported by the opinion of Zdzislaw Zwoźniak: “We will find the first traces of Laski Alchemist's activity in the castle in Kežmarok, who belonged to the Laski family”. (Zwoźniak, 1978)

According to the findings of archaeological research in the castle, alchemical work may be related to the discovery of remnants of a reduction furnace. B. Polla reminds us of having similar furnaces around year 1000, but in some areas this technology has preserved "deep into the Middle Ages and even into modern times". (Polla, 1971) The second object identified Belo Polla as a melting furnace composed of three parts and used for testing purposes. His work hypothesis thus became the assumption that two of the objects listed in the research journal as a burnt object and an ore smelter “are related to the work of the alchemists at Kežmarok Castle in the 16$^{th}$ century. For the time being, this remains only a work hypothesis, supported in particular by the time of operation and the work of alchemists. ”(Polla, 1971)

Although this is only a hypothesis, the mentioned findings are nevertheless a promising indication of John Dee's and Edward Kelley's stay in a place known for its alchemical tradition.


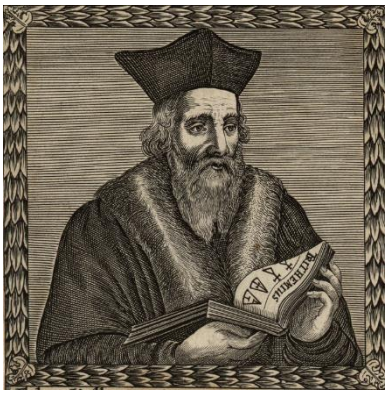

*Fig. 6, 7. John Dee (* 1527 London, England - † 1608 Surrey, England)(left), Edward Kelley (* 1555 Worcester, England - † 1597 Most, Bohemia) (right)*

## Conclusion

We should look to the late medieval period and to the beginning of modern times (16$^{th}$ century) to find the beginnings of (organized) targeted mining tourism in the territory of Upper Hungary, i.e. in the territory of present-day Slovakia. Alchemists, who studied cementation and the associated metal transmutation process, were the first to undertake purpose-built study trips to world-famous mining areas.

Educators, not only from neighbouring countries (especially from the Czech Republic) but also an educated elite from all over Europe, made their trips to the Carpathian Mountains. Our research has confirmed that at least twenty-five scholars have undertaken scientific journeys because of mining science to the territory of Upper Hungary. We only know those who left written testimony about their journey or were included in the writings of other scholars. However, it can be assumed that, given the wealth and world renown of mining and metallurgy in the Carpathian Mountains, it was most likely that there were more journeys that we could now identify with mining tourism. Since they were not recorded by written history, they were consigned to oblivion.

## Acknowledgments

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# The area affected by sturzstrom in the Friulian Dolomites as the place to learn and understand the strength of natural forces and consequences for the natural environment and local communities

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*Abstract*

*This paper illustrates several geosites related to giant landslide – a sturzstrom – from the Vajont Valley in Friulian Dolomites (Italy) that is considered to be one of the greatest natural disasters from mountain areas in modern times. Because this natural disaster affected the large area, we offer a tourist route with five sites along the fragments of two valleys (Piave and Vajont valleys) to get to know the geological and geomorphological context of this event, caused partly by imprudent human activity. Presented sites are easily accessible and exhibits high education and cognitive value both in the field of natural and social issues. The tourists can realize here the enormity of the natural forces, their strength and consequences both for the natural environment and local communities.*

*Keywords: Vajont landslide, Dolomites, Heritage, Geotourism*

## Introduction

Landslides are phenomenon resulting from a wide range of ground movements. In mountainous areas landslides may have a form of rockslides, rock and debris avalanches or debris flows. The most important causative factors of landslides resulted from complex features and processes are lithology, tectonics, slope relief and shape, as well as seismicity, climate, and finally human activity (e.g. Heim, 1932; Zischinsky, 1966; Solonenko, 1977; Hutchinson, 1988; Evans & Clague, 1994).

An unstable slope after years of slow creeping and long-lasting deformation of a mountainside, it may shift several kilometres within minutes to generate a giant landslide – a sturzstrom – one of the most powerful natural hazards on Earth (Hsü, 1975, 1978). Such events have occurred in Europe every few decades (Kilburn & Pasuto, 2003). The effects of such events can be dramatic, and energy released during one sturzstrom can be comparable to that from the largest recorded volcanic eruptions (Williams & McBirney, 1979).

More than 55 years ago, one of the biggest landslides in Europe caused by geoengineering catastrophe took place in the Northern Italy, about 80 km north of Venice, in the municipality Erto and Casso, in region Friuli-Venezia Giulia (Fig. 1). On 9 October 1963, at 10.39 pm., after a week of heavy rains, a mass of approximately 270–300 million $m^3$ of rock debris slipped into an artificial lake confined by the highest dam in the world which has been ever constructed before. This landslide generated a displacement wave that spilled as much as 245 m above the dam (e.g. Kilburn & Petley, 2003; Wolter et al., 2014). The flood wave dropped into the Piave Valley destroying the town of Longarone and other villages located upstream and downstream, killing near 2,000 people (Wolter et al., 2014). The Vajont landslide is considered to be one of the most catastrophic slope failures or sturzstrom. It is now an excellent place for understanding and study complex mechanisms of landslides generated on rock slopes. It is also a place of one of the most famous natural disasters in modern history, where tourists interested in geology can realize the enormity of the forces of nature, and strive to understand the causes of these phenomena and teach how to prevent them in the future.

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***Fig. 1*** *Location of the Vajont landslide and the Piave River (map after https://maps-for-free.com)*

## Location and morphology of the Vajont Valley

The Vajont Valley is situated in the Friulian Dolomites of the Southern Alps (Fig. 1). It is located between Toc Mt (1921 m a.s.l.) and Zerten Mt (1883 m a.s.l.) on the north, and Sterpezza Mt (2215 m a.s.l.), Fortezza Mt (2101 m a.s.l.) and Lodina Mt (2020 m a.s.l.) on the south, and is presently dewatering by the Vajont River, a left tributary of the Piave River. The valley has a broad and deep morphology, and a very narrow valley mouth (Fig. 2). It is now closed by disused dam (coordinates: 46°16′02″N 12°19′44″E). Below the dam site, the Vajont Valley has a character of a gorge, a few meters wide and over 100 m deep. The valley was formed by glacial and fluvial downcutting (e.g. Kilburn & Petley, 2003). The morphology of the gorge before the year 1963 was formed by re-incision of the Vajont River through the 200 m thick toe of the ancient landslide that had slid from the Toc Mt and blocked the valley (e.g. Ward & Day, 2011).

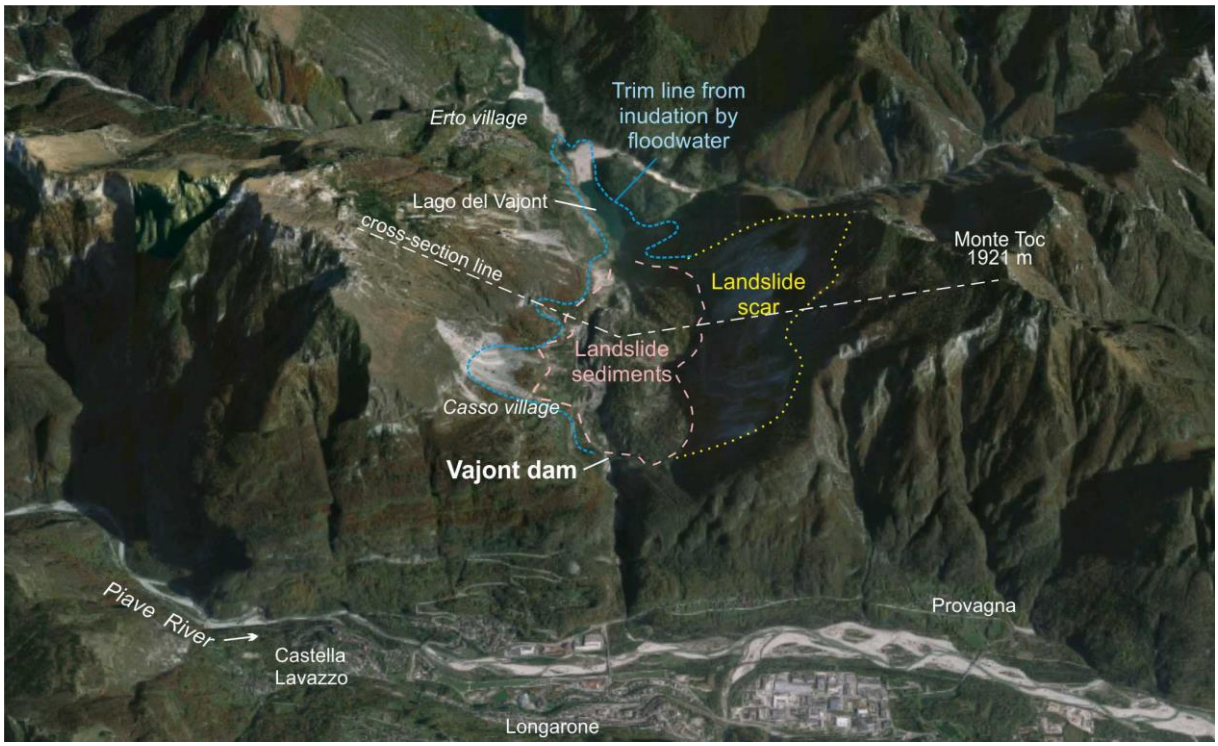


***Fig. 2*** *Google Maps image of lower part of the Vajont Valley displaying narrow gorge at the mouth, restricted by dam built during 1956–1959, and flat floor covered by colluvial sediments from the slide at 9th October 1963*

## Geological setting

The oldest rocks that build the Vajont Valley and surrounding mounts consist of Mesosoic sequence of predominately calcareous deposits, which are limestones interbedded with clays and marls (Riva et al., 1990) (Fig. 3). The stratigraphic succession in the cross-section from the Piave River to Vajont River contains the Soverzene Formation (Lower and Middle Liassic), the Igne Formation (Upper Liassic), the Vajont Limestone Formation (Middle Jurassic), the Socchér Formation (or Biancone Formation; Upper Jurassic–Lower Cretaceous), the Scaglia Rossa Formation (Upper Cretaceous–Lower Paleocene), the Marne di Erto (Paleocene), and the Flysch Formation (Eocene).

The Middle Jurassic Vajont Limestone Formation provides spectacular outcrops at the S–E flank of the Toc Mt and at the dam site. These are predominantly thick bedded limestones with some breccia.

These Jurassic to Palaeogene sequence is locally covered by late Quaternary moraines caused by series of glaciations (Castiglioni, 1940), and by Holocene slope and channel deposits. Several Prehistoric landslides dammed occasionally the Vajont River, altering the valley floor and inducing lacustrine and deltaic deposition.

The Jurassic–Palaeogene sequence in this area consists of tectonic structures dominated by a series of predominantly E–W folds. One of them is the asymmetrical Erto syncline which is occupied by the Vajont Valley. The southern limb of this syncline includes Toc Mt. The folds are cut by N–S faults, including the Costa delle Ortiche lineament, which crosses the Vajont Valley near the eastern edge of the 1963 slide. On the northern bank of the valley, Mesozoic sequence thrust over the Scaglia Rossa Formation. Prior to the landslide in 1963, the contact between Vajont Limestone Formation and a series of red marls and marly limestones of the Scaglia Rossa Formation was visible.

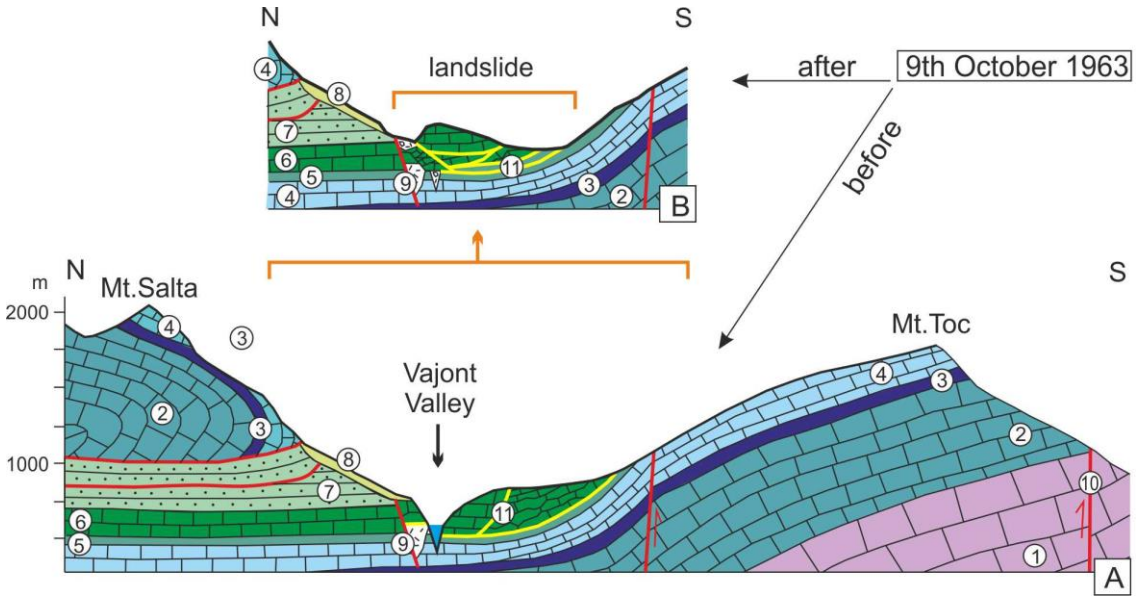


***Fig. 3*** *North to south geological section across the Vajont Valley showing the Vajont Gorge and the position of the ancient landslide before and after 9th October 1963 (after Semenza & Ghirotti, 2000); 1 – Main Dolomite (Upper Triassic), 2 – Sowerzene Formation (thin beds of gray cherty limestone alternating with thin beds of reddish sandy marl; Lower Jurassic), 3 – Igne Formation (white to reddish, platy to very thin-bedded limestone with some siliceous beds; clay seams are common along the bedding planes limestones; Lower Jurassic), 4 – Vaiont Limestone Formation (medium- to thick-bedded grey limestone; Middle Jurassic), 5 – Ammonitico Rosso (red nodular limestone) and Fonzaso Formation (siliceous limestone and calcareous turbidites; Upper Jurassic), 6 – Soccher Limestone Formation (Upper Jurassic–Lower Cretaceous), 7 – Scaglia Rossa Formation (red thin beds of marl alternating with pink thin-bedded limestone; Upper Cretaceous–Palaeogene), 8 – Quaternary deposits, 9 – alluvial gravels, 10 – faults and overthrusts, 11 – failure surfaces of landslides*

## History of Dam construction

A previous project of a dam was undertaken in 1925 (Semenza & Ghirotti, 2000). The first proposed location of the dam was at the bridge at Casso, about 1500 m upstream of the site where the Vajont dam was finally built, to avoid possible problems with landslides. However, the construction of the dam in those places was discussed because difficulties connected with geology. In the proposed place, the Cretaceous limestones of the Socchér Formation was not enough solid to dam construction as the Middle Jurassic Vajont Lmst. Formation located downstream. After the second world war, the Vajont Valley was again taking into consideration as a potential site for construction of a hydroelectric power station. The construction of the dam began in 1956 and was completed in 1960. It was the highest doubly curved arch dam in the world, rising 262 m above the valley

floor. The dam was located within the Jurassic limestones of the Vajont Lmst. Formation. The dam had a maximum level of water storage equal to 722.5 m a.s.l. It created a reservoir which was able to accommodate up to 169 million cubic meters of water.

The designers and constructors of the dam believed that any occurrence of deep-seated landslides in the close vicinity of newly created dam were extremely unlikely (e.g. Kilburn & Petley, 2003). The previous geological recognition shows that the valley walls consisted of very firm *in situ* rock with a high modulus of elasticity and without weak layers. Additionally, the rock formed an asymmetric syncline, which was expected to be a natural refraining of slope movement.

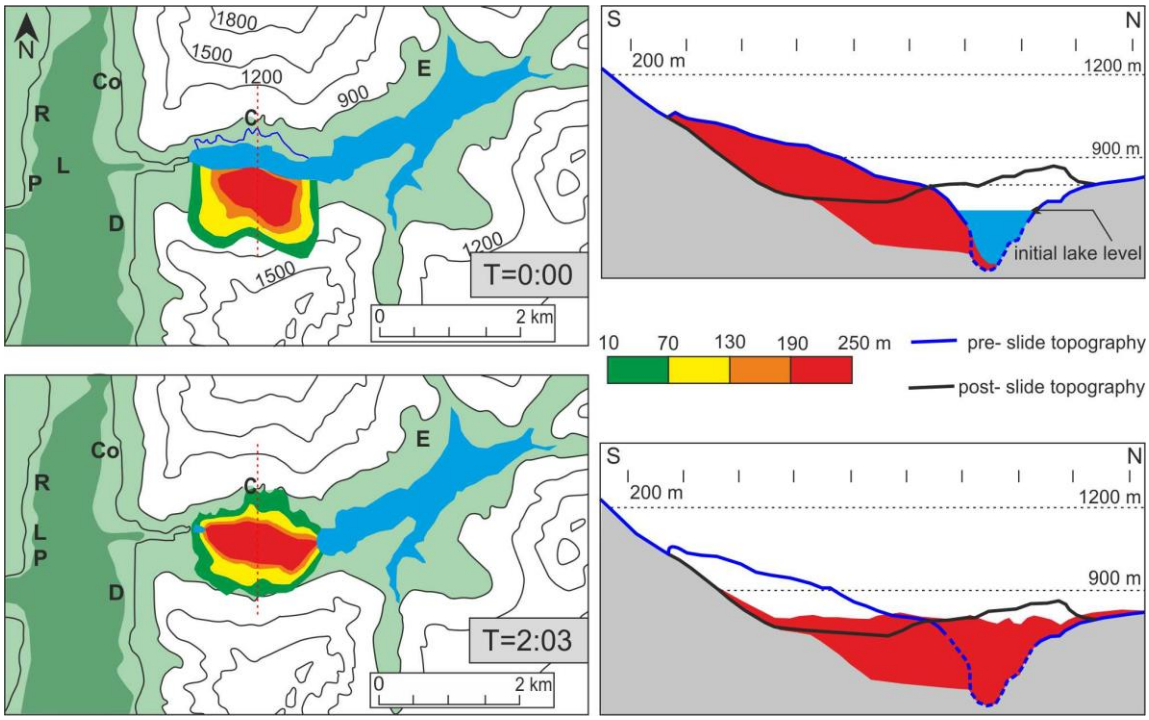


***Fig. 4*** *Landslide simulation at T=0:00 and 2:03 in the Vajont Valley (redrawn after Ward & Day, 2011; simplified). Two map view panels: at the left – contour landslide thickness; at the right – corresponding S–N landslide cross sections along central transect (red dotted line). Abbreviations of villages: C – Casso, Co – Codissago, D – Dogna, E – Erto, L – Longarone, P – Pirago, R – Roggia*

## The signs of disaster

On the 22 March 1959, an unexpected landslide took place in the valley of the Maè River, the next tributary of the Piave River, neighboring to the Vajont Valley. The failure happened during the second filling of the artificial reservoir at Pontesei. Final fall was preceded by small movements, occurred a few days before. The landslide was very rapid. It generated a wave which flowed over the top of the dam by a few metres, however without any serious damage in the Piave Valley below. At that time, the Vajont dam was already at final stage of construction. Despite the landslide that occurred in valley of the Maè River, filling of the Vajont reservoir began in February 1960. However, this accident realized the need of further verification, whether there was any possibility of landslides on the slopes above the Vajont reservoir (Semenza & Ghirotti, 2000). The special technical study programme was initiated in July 1959 to monitoring of slope stability around the Vajont reservoir. The observations were carried on during almost three years until the day of disaster. These detailed investigations led to the identification of previously unknown details of Vajont Valley's geology. One of them were deposits of many ancient landslides located along the valley (Semenza & Ghirotti, 2000). The areas located upstream the dam as Pian del Toc and the Pian della Pozza were recognized as potentially dangerous.

The several events of instability of Toc Mt. slopes preceded the final catastrophe (Müller, 1964; Hendron & Patton, 1985; Kilburn & Petley, 2003). By October 1960, when the depth of the reservoir had reached 170 m, joints opened along distance of 2 km across Mt Toc c. 500–600 m above the valley floor. On 4th November, when the depth of the reservoir reached 180 m, the slid of 700,000 $m^3$ of material took place from the flank of Mt Toc into the lake. It was inferred that elevating of water level in the Vajont reservoir was the key destabilizing factor that caused the raise of water pore pressure in the flanks of Mt Toc generating mass movements and creeping of the material. It was assumed that lowering of the reservoir's level resulting in cessation of slope movement. Between April and May of 1963, the depth of the reservoir was rapidly increased

from about 195 up to 230 m, and then reached 240 m by mid-July. Such elevation of water depth induced movement of slope up to 0.5 cm per day. Although the water level increased only to 245 m by early September, slope velocity accelerated to 3.5 cm per day. By early September, the water depth in the Vajont reservoir reached 245 m. In the same time the slide velocity had accelerated to 3.5 cm per day. It became apparent that the slope is being undermined. Although, during late September through early October the water level were systematically lowering up to 235 m, slope movements continued to accelerate to more than 20 cm per day, caused final crush at night on 9th October 1963 (Fig. 4).

Approximately 270 million cubic meters of material slid into the dam reservoir, generating a huge wave that has been estimated to have reached a height of about 105 meters above the dam (*Cremonesi et al., 2016*). Due to the irregular terrain topography, the wave did not reach the same elevation around the reservoir observing the contour of destroyed vegetation. The maximum range of deposits consisting colluvium reach 900 m a.s.l. in the western part of the Vajont Valley (Ward & Day, 2011).

**Geotourist route**

Because this natural disaster affected the large area containing a part of the Piave Valley on a distance of c. 1.5 km and a part of the Vajont Valley on a distance about 4 km, we offer a tourist route along this two valleys to get to know the geological and geomorphological context of this event, caused partly by imprudent human activity.

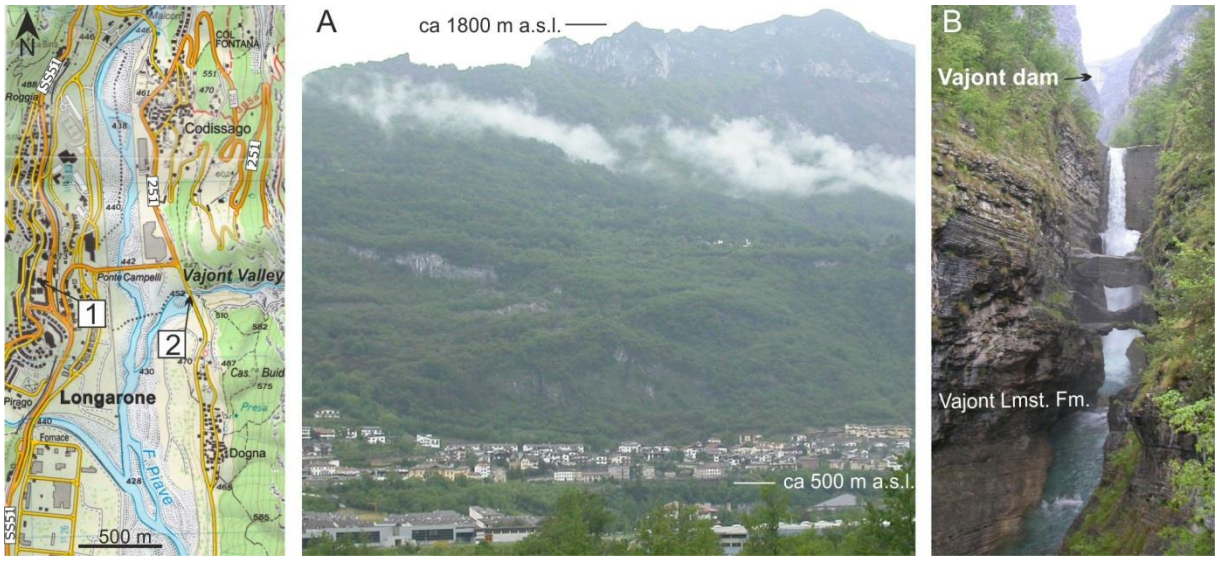


***Fig. 5*** *Map of the Longarone village with location of The Longarone Vajont Museum – Moments of History (point 1 on tourist road). (A) View point from the left side of the Piave River on the Longarone village. (B) View from the road via Dogna (30 m above the bottom of the Piave River – point 2 of the tourist route) on the Vajont Gorge with the dam visible at the top; the gorge is cut in thick-bedded grey limestone of the Vaiont Limestone Formation (Middle Jurassic). Photo by: M. Bąk; Map after Carta Topographica per escusionisti in scale 1:25,000 (Foglio Blatt 021 – Dolomiti di sinistra Piave) edited by TABACCO.*

***Point 1 – Longarone village***

We suggest start our journey at Longarone village, situated on the banks of the Piave River (35 km north from Belluno), along the SS51 road linking Belluno to Cortina d'Ampezzo (Fig. 5), close to the borders of Veneto with Friuli-Venezia Giulia. The Longarone was known during Roman times. The municipality of Longarone was established by Napoleon Bonaparte in 1806 (http://www.longarone.net; 03.03.2019). A large part of Longarone was located in the immediate path of the wave of mud and water which swept into the Piave Valley through the Vajont Gorge and above it, falling from several hundred meters high during the Vajont disaster. More than 1450 inhabitants of Longarone – victims of the disaster (from the total number of 1909) – are buried at the Vajont Victims Cemetery of Fortogna. Longarone was rebuilt between 1967 and 1975 (e.g. Mugnano & Carnelli, 2016). We offer a visit to the Attimi Di Storia Museo Longarone Vajont (Piazza Gonzaga, 1). This allows you to see the size of the disaster in the Piave valley in the photographs.

***Point 2 – gorge of Vajont Valley***

The road to the Vajont Valley begins at the Strada Statale 51 di Alemagna (SS51) in the suburbs of Longarone. Just behind the road sign designating the beginning of the Longarone town, our journey takes us on the righthand side of SS51, to a road junction that is signposted "diga del Vajont". About 500 m past this road junction, there is a bridge over the Piave River (Fig. 5). Turning right sight behind the bridge we are on the Via Dogna street. After 200 meters we approach to small bridge over the Vajont River, right at its mouth to the Piave River. Deeply incised gorge ending the Vajont Valley is visible at the opposite side to the Piave River. Here the roadcuts expose flat-lying, thin-bedded, partly silicified limestones of Igne Formation, overlaid by grey limestones belonging to the Socchér Limestone Formation (Figs 3 & 5B). Uppermost part of concrete construction of the Vajont Dam is visible from this place.

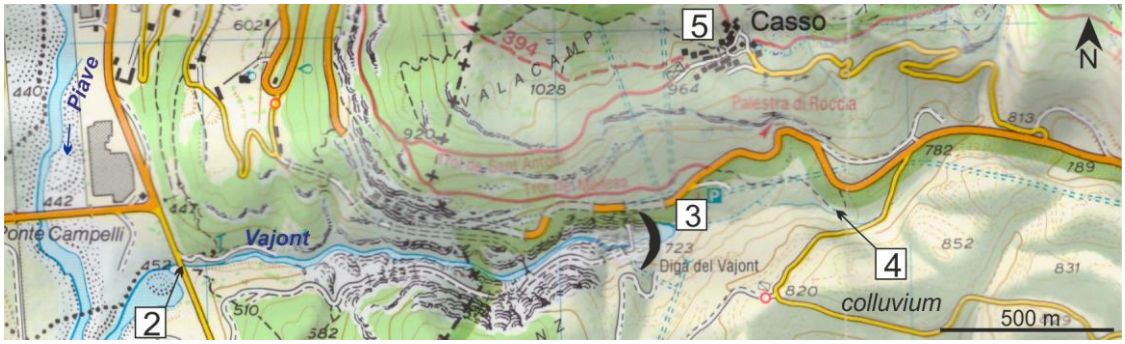


***Fig. 6*** *Map presenting the Vajont Valley with stops described in the text. Map after Carta Topographica per escusionisti in scale 1:25,000 (Foglio Blatt 021 – Dolomiti di sinistra Piave) edited by TABACCO.*

***Crossing the tunnel and galleries through the Mt Salta massif***

From the bridge on the Vajont creek, we return Via Dogna (about 200 m) to the intersection with the road No. 251 and follow it through the narrow terrace of the Piave River towards Codissago village. After that the winding road climbs on the Mt Salta massive. The roadcuts along the road expose the Upper Jurassic through the Lower Cretaceous sequence, predominately consisting of limestones and marls. Going up we successively passing complex of siliceous limestones and calcareous turbidites of the Fonzaso Formation, which in places is seen to overlie by a red limestone of the Ammonitico Rosso, and in succession, by the light gray "Maiolica" limestones of the Socchér Limestone Formation. The medium to thick-bedded grey limestones belonging to the Vajont Limestone Formation are visible in the distance on the right-hand and left-hand side of the road.

After about 5 kilometers we enter the tunnel (Fig. 6) which leads directly to the Vajont Valley. The tunnel is hollow in the rocks belonging to the Socchér Limestone Formation. The final section of the tunnel has a character of gallery, where through openings is possible to observe the grey limestones belong to the Vajont Limestone Formation on the slopes of the Mt Toc, located near the Vajont Dam. The tunnel derives up the Vajont Gorge, directly on the dam crest level, which is visible on the right side of the road after passing the tunnel. After about 200 m we enter next part of the tunnel called San Antonio Tunnel which is 168 m long. Outside the tunnels there is a most steep and rocky part of the Vajont Gorge. This is a alpine climbing area. One of the alpine climbing routes on this rocky wall was stated in October 2015 as a different way to remember the Vajont disaster (https://www.guidedolomiti.com/en/news-en/ferrata/ferrata-del-vajont-ferrata-della-memoria/25433; opened 20.03.2019). At the tunnel entrance we can observe in a distance behind, a scar of the landslide from 9 October 1963 situated on the northern slope of the Mt Toc.


***Fig. 7*** *Vajont Dam with S. Antonio memorial chapel visible from the parking site on the northern slopes of the valley with bottom and slopes covered by colluvial deposits (point 3 of the tourist route); Photo by: M. Bąk*

### *Point 3 – the Vajont dam and San Antonio memorial church*

About 150 m past the San Antonio Tunnel, on the right, is a parking place just at the small church, located near the dam. To reach the dam, visitors is advised to go 200 m from this parking using the footpath (Fig. 6). The dam, which is still standing intact is open for visitors. It is also possible to take a guided visit**.** Near the dam there is an information point, where one can also get the ticket for visiting. Going to the dam we pass the memorial chapel dedicated to San Antonio (Fig. 7). The Church commemorates the tragic death of 64 employees who were present in areas adjacent to the dam on the night of October 9 (https://www.progettodighe.it/forum/viewtopic.php?t=800; opened 20.03.2019). The church was design in 1967 and was built in the following year.


***Fig. 8*** *Various packages of colluvial material at the valley bottom visible along the road from the Vajont Dam to Casso. Note brecciated marls of the Scaglia Rossa Formation (B) and rolled package of the Sowerzene Formation (D); total thickness of colluvial sediments (not visible on photographs) is estimated at around 250–300 m. Photos by: K. Bąk*

***Point 4 – Colluvial sediments at the bottom of the Vajont Valley***

An escarpment visible behind the dam and church consists a thick colluvium of the landslide from 9 October 1963. About 200 m past the church, on the right is a next parking place, which provides the opportunity to leave a car or a touristic coach and go on the opposite site to see deposits of colluvium (Fig. 8). The rock mass consists of course and loose sediments, always associated with large blocks made of strongly fractured rock masses (Fonzaso Formation: The Middle–Upper Jurassic) preserving the stratification. These features are important for recognition of the sediments of the latest landside from deposits of prehistoric events, which are common on the Vajont Valley area (e.g. Paronuzzi & Bolla, 2012).

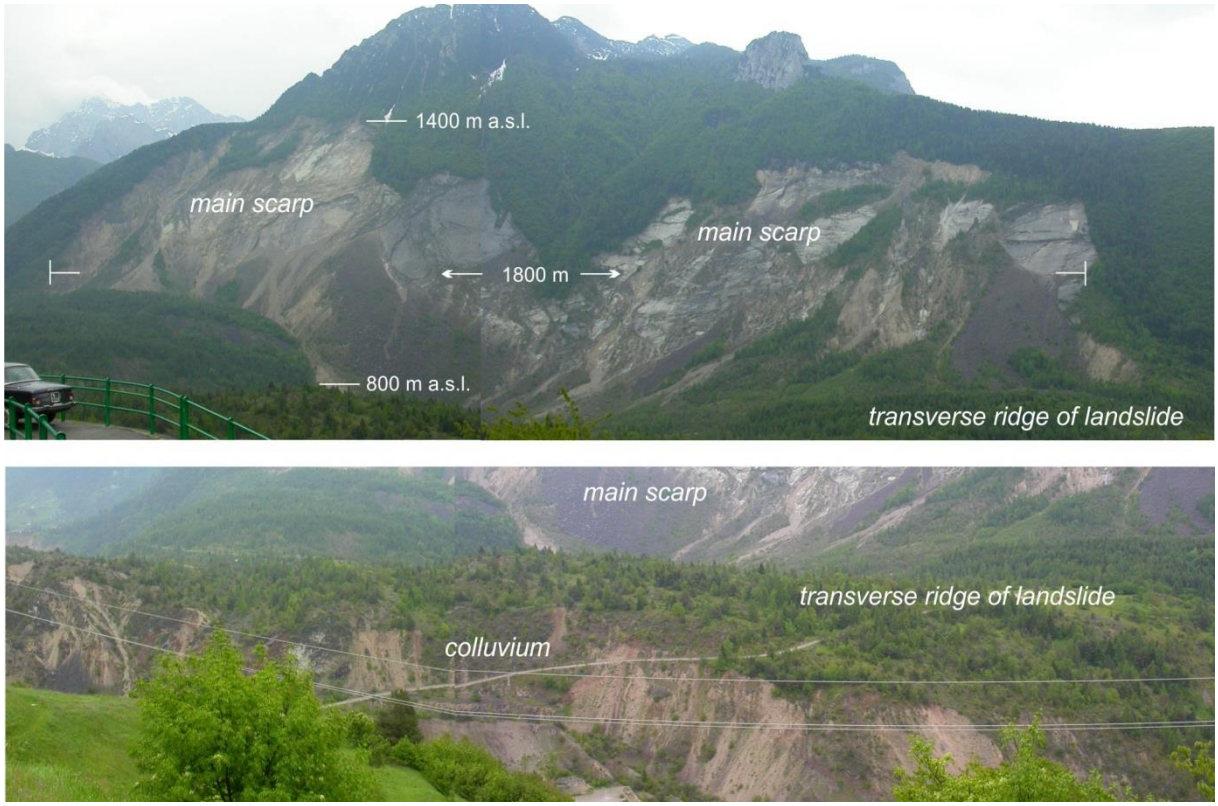


***Fig. 9*** *Main scarps of the landslide from 9 October 1963 on the slopes of the Mt Toc (1921 m a.s.l.) and transversal ridges at the valley bottom. Photo by: K. Bąk*

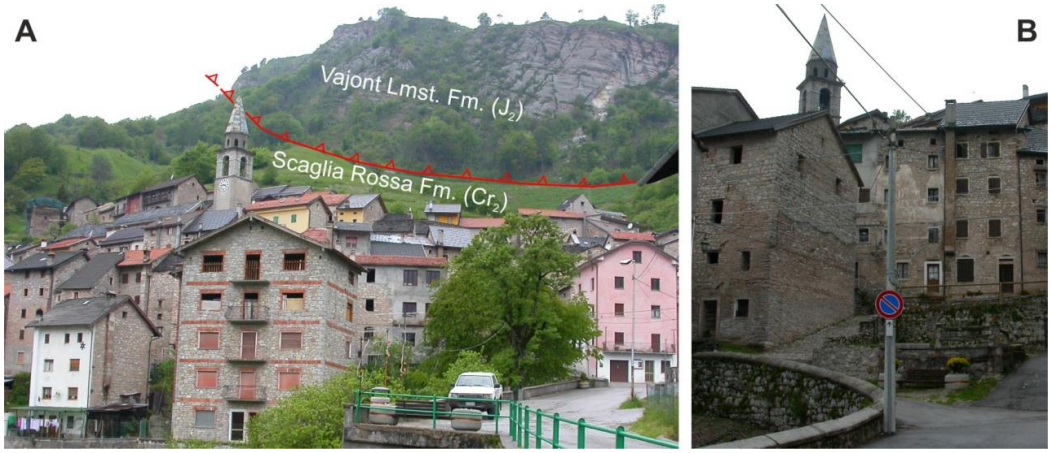


***Fig. 10*** *Geology of the northern slopes of the Vajont Valley above the Casso village with a fragment of the Erto Syncline built of the Middle Jurassic thick-bedded limestones (Vajont Limestone Formation) overthrusted on marls of the Upper Cretaceous Scaglia Rossa Formation. Both photos (A & B) present also stone buildings from the first half of the twentieth century that have been partly damaged in the Vajont-disaster of 1963, and was abandoned; Many years later people started to restore and re-use some of the houses, mostly as the second residence. Photos by: K. Bąk*

***Point 5a – Geology of the northern slopes of the Vajont Valley near Casso village***

From the parking, road leads along the scarp built of landslide debris. Above the scarp, on the right side, the slope of Mt Toc with huge landslide scar is visible in a distance. About one-kilometer past, there is road junction. Taking the left road, we can go up the hill to Casso settlement, which is situated on the southern slopes of Mt Salta. The road was rebuilt after 9 October 1963. It was cutting in the debris of landslide, which can be observed on the left and right side. Along the road to Casso these colluvial deposits are located circa 900 m a.s.l. At the lower (SW) part of the village, on the roof of the school building, a viewing platform has been built, from which there is a best panorama of the Mt Toc with main scarps of the landslide (Fig. 9).

From the upper part of the Casso, we can go on a short geological tour of tourist trail no. 393 towards the Mt. Salta. It will give you the opportunity to see two rock series that contact each other tectonically, which is very clearly emphasized in the relief of this area (Fig. 10). The village of Casso and the mountain glade above it are located on the Upper Cretaceous red marls and they contact along the thrust fault with gray limestones of the Middle Jurassic Vajont Limestone Formation, which belongs to the Erto syncline.

***Point 5b – Casso and Erto villages after Vajont disaster***

After visiting the Vajont Valley area the tourits may overnight in Casso or neighboring Erto village (situated 3 km east from Casso) or return to road leading back to Longarone. Both villages have long history of their settlement. Erto existed from 8th century, and Casso was stably inhabited from 14th century (Filioli Uranio, 2015). Although both villages lies very close, they have been inhabited by different ethnic group, even spoken different dialects (Beninca & Haiman, 2014). During the disaster of October 9, 1963 both villages have been partly damaged. All the inhabitants were evacuated in three days. The people were first accommodated in private houses and taverns in the surrounding areas and then had to move to the newly constructed settlement Vajont, community of Maniago (founded in 1971) about 40 km SE outside the Alps in the Friulian Plain (Zuccon, 2010). Recently, Erto and Casso are now populated again, inhabited by 328 and 26 people, respectively (http://italia.indettaglio.it; opened March 2019). Creation of the Natural Park of the Friulian Dolomites in 1996 contributed to fast revitalization of both villages. Especially, Erto Vecchio is characterized by a huge renovation boom with establishment of stores and restaurants and much more (Löffler et al., 2015, 2016). In turn, many "Cassani" who moved away still own a house in Casso village and use it as a vacation home. The return migration involving re-migrants, retirees, working and seasonal migrants, and newcomers was subject of scientific studies in both villages by Löffler et al. (2015, 2016). They showed positive impacts of second homes on a community in the remote areas of this valley. The conclusion is that without secondhome owners there would be many more "ghost towns" than there already are. First of all, they keep the buildings in good condition, and part of them even started to move back and live there all year-round.

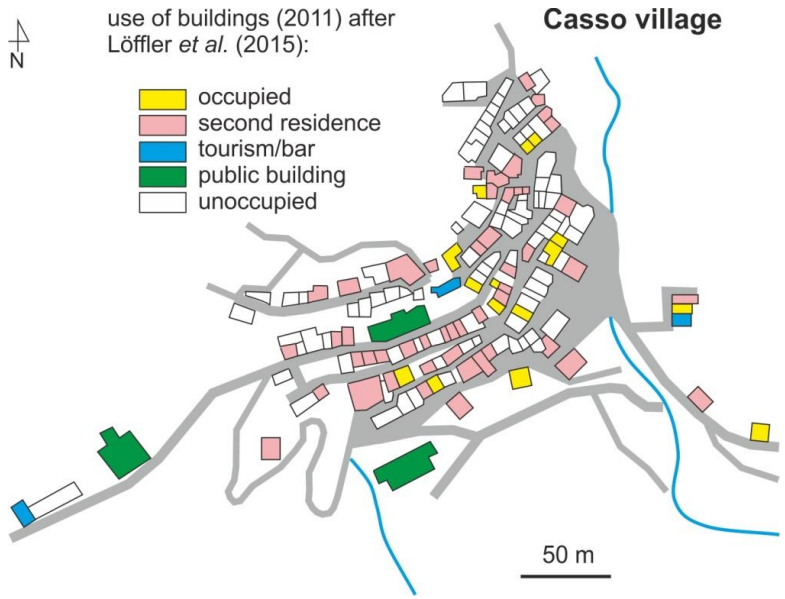


*Fig. 11 Modern (2011) use of buildings in Casso village as the result of depopulation after Vajont disaster and return migration during the last 25 years; redrawn after Löffler et al. (2015), partly modified.*

## The educational and cognitive significance of this place

The educational and cognitive significance of the objects related to Vajont-disaster described above can be determined using both natural and social criteria. Among natural criteria, it should be emphasized: (i) the uniqueness of this geological event which was a huge tsunami inside the land, (ii) the legibility of relief forms despite the passage of over 55 years since their creation, (iii) very high representativeness of the resulting forms in the context of the interpretation of geological and geomorphological processes that contributed to the occurrence of the landslide and tsunami, and (iv) the multiplicity of scientific research in this area, which greatly enriched our knowledge about the causes and mechanisms of the formation of such geological events. They are conducted up to modern times. Among them, the research of the late professor of geology Edoardo Semenza from the University of Ferrara deserves recognition, summarized in Genevois and Ghirotti (2005).

Due to the great human tragedy and large destruction of housing infrastructure caused by this unique geological event, the above-described villages (Langarone and Casso) are places of exceptional educational and cognitive importance in the field of social issues. This applies to issues related to the reconstruction of the completely destroyed (razed to the ground) village of Lanzarone, which concerned the selection of an appropriate plan for building and choosing the architectural style of the building. These were, for the time being (60s) pioneering solutions, taking into account the opinions (through individual questionnaires) of all residents who survived this tragedy. The second very important aspect is referred to the depopulation changes in two periods of time, right after 09.10.1963 and modern times in the villages of the Vajont Valley that were completely depopulated.

## Closing remarks

The Vajont sturzstrom is considered the most disastrous landslide ever in Europe which still remain unexplained for many aspects. It represents an important case history for scientists and researchers dealing with such large landslides. For this reason, the Vajont Valey is a place of great interest for geologists, hydrogeologists and geoengineerings. The *SCOPUS* bibliometric database record 86 papers related to various studies of the Vajont landslide only during the last 10 years (since 2010).

It is also a place that can be used for teaching elementary geology and geomorphology in aspects which were described in this paper. Such place may also help in understanding natural forces, their strength and consequences both for the natural environment and local communities. Additionally, it plays an educational role not only for geologists, but perhaps first and foremost for those for whom the work is associated in various ways with the development of mountain areas. The value of learning from past mistakes through understanding the causes and consequences of natural processes gives the opportunity to minimize losses related to natural disasters.

**Acknowledgement**

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# Římov – South Bohemian Jerusalem

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*Abstract*

*Římov is located in southern Bohemia, about 12 km south of České Budějovice and 13 km northeast of Český Krumlov. This is one of the finest examples of baroque landscape stemming from Catholic mysticism, created by combining landscape, architecture, and the arts. The essence of the value of the Římovsko consists mainly of a large pilgrimage complex with a distinct spiritual and ideological content emphasizing three fundamental moments of the history of salvation: The preparation for salvation is personified through the Virgin Mary in the Loretto Chapel with an extensive Marian cycle of murals in the surrounding cloister. The Christ´s suffering, which brought hope of salvation to humanity (Calvary), takes place in the religious community in the Church of the Holy Spirit. In Bohemia, this is a unique topographic reproduction of the original in Jerusalem. On one side is the Mount of Olives and on the other is Calvary with the Holy Sepulchre. The most famous era of this pilgrimage place is associated with the activities of the Jesuits. They came to the village of Dolní Římov in 1626 and worked there until the abolition of the order in 1773. At the core of the pilgrimage place is the Loretto Chapel with the Church of the Holy Spirit in the centre of the village and a unique Way of the Cross runs through the village and also through open countryside of fields and forests around the village and along the Malše River. This complex consists of small chapels, large buildings, and three gates. Several chapels are decorated with wall paintings, panel paintings, sculptures, and painted wooden sceneries.*

*Key words: Place of Pilgrimage, Stations of the Cross, Calvary, Cultural Landscape, Monument Care*.

## Introduction

The Římovsko lies in the territory of the South Bohemian Region, the district of České Budějovice, about 12 km south of the city of České Budějovice and 13 km northeast of the town of Český Krumlov. It is a unique example of the holy landscape built as a topographic copy of the city of Jerusalem. In 1996 the landscape preservation zone that occupies an area of 1.2 km2 and cover cadastral territories of Římov, Branišovice and Dolní Stropnice was by the Regulation of the Ministry of Culture of the Czech Republic No. 208/1996 of Coll., on declaration of the territory of the selected parts of landscape wholes, proclaimed for the preservation zone. In 2018 the whole area was by the Decree of Government No. 23/2018 of 31st January 2018, on declaration of some cultural monuments for the national cultural monuments, risen to the national cultural monument. Thus, an extraordinary value of the village of Římov, which belongs to one of the most magnificent examples of the baroque landscape arising from Catholic mysticism and created by connection of landscape, architecture and art, was appreciated.

The most remarkable part of the complex is unique Calvary, in a broader sense rather the Passion Way being located in the open landscape – in a village, in lands, in the forest and at the Malše River – transferring here the mystery of Jesus Christ Calvary from the Holy Country (Buben 2012). Among the Passion Ways in Bohemia it is an absolute unique object – a topographic „reproduction"of the original in Jerusalem, where on one side is the Mount of Olives and on the other is Calvary (Golgotha) with the Holy Sepulchre (Šámal 1941).

The baroque artists perceive the landscape in its spiritual meaning as a part of the holy scene of action (landscape sacralization) (Royt 1995), they artfully involve it into the religious drama utilizing its diversity in alternating impressions, as Jesuits did with fantastic splendour in dramas – including the Passion plays – full of religious poetry, with which immediately after their coming in Prague won a unique success (Šámal 1941).

The Římovsko represents a unique baroque complex with remarkable spiritual and subject matter. It is a theological statement inscribed into the stone and landscape emphasizing three fundamental moments of the history of salvation. The Chapel of Loretto in the midst of cloisters complemented with a Marian cycle of murals refers to the preparation for salvation personified through the Virgin Mary, Mother of Jesus and Mother of Church, who in Nazareth accepted the Archangel´s Annunciation on the Conception and Birth of the Son of God. The second moment materialized in twenty-five Stations of the Passion way meditates on penance for human sins that the Christ through his suffering underwent and brought hope of salvation to humanity being realized in the Church created by sending down the Holy Spirit, which is a moment emphasized by the Church of Holy Spirit (Buben 2012, Royt 1995). The glory of the place of pilgrimage is testified by Bohuslav Balbín through a notice in the book Diva Montis Sanctis (1665) estimating an annual number of visitors of the village of Římov to 80,000 pilgrims (Royt 1995, Šámal 1941).

Landscape framework

The Římovsko lies in the Velešínská Upland, at the eastern edge of the Kaplická trench, which is a part of the Novohradské foothills (Demek–Mackovčin et al. 2006). The territory is on the west marked off by the watercourse of the Malše River, from the south adjoins the water reservoir of Římov built in the years of 1974 to 1978, on the northeast it is the Římovský Brook, which in the northern part of the territory inflows into the Malše River, and flows through the territory. The soil substrate is cambisol, the climate is slightly warm, characteristic by long, warm and dry summer and short, slightly warm winter with a short duration of snow cover.

The landscape in the catchment area of the mean course of the Malše River is a typical upland with the altitude of 400 up to 450 m above sea level. It is modelled by soft shapes of ridges and mounds reaching a peak at a spot height Na Vrchu (574 m a.s.l.) over the village of Krasejovka west of the village of Římov. One of the ridges going eastbound turns above the river northbound and just in these particular places, on the eastern part of the ridge, the village of Římov was founded at the edge of the Malše River valley. The slight ridge continues northbound and is terminated by an oval mound called the Mount of Olives (453 m a.s.l.). While the majority of the Římovsko territory is created by erosion-denudation slopes sloping 2–5°, the eastern part of the landscape preservation zone is formed by the floodplain of the meandering Malše River, accompanied by distinctive forested slopes of opposite right banks. The concave shapes of terrain enable panoramatic views and outlooks of the villages of Střížov, Doudleby or St. John over Malše.

Into this picturesque landscape resembling due its profile Jerusalem, twenty-five Stations of the Passion Cross Path was set up in the course of the 17th and 18th centuries. About six kilometres long route leads at its beginning in the ridge position and creates a horizon in the gradual undulating landscape, further it continues in the deeply cut country road under the Mount of Olives, where it goes uphill over the rocky spit above the Římovský Brook up to the peak. Here it turns and goes downwards, crosses a small drying brook Cedron and continues in the meander of the Malše River to the place, where the watercourse of the Malše River swiftly meanders into its original direction. From here it starts rising along the concave steep terrace above the river back to the centre of the village of Římov, where the last stations are situated in the slope above the Malše River. It can be presumed that the original concept took into account the striking siting of some objects of the route on the horizon and also their dominant effect in the originally less forested and less urbanized landscape. The whole territory makes a well-balanced impression, to which a considerable proportion of meadows, who's the most valuable growths are particularly in the floodplain of the Malše River, contributes. Although the complex itself is not generally forested, the natural framework of ridges and opposite banks covered with coniferous and mixed forests, can be seen here (Storm 1998).

**History of territory and transformations of its character**

At the end of the 8th century the area of Pomalší became the area of Slavonic settlement. In the places, where the Malše River gradually leaves its steep channel and where it was possible to ford it, the Slavonic ancient settlement of Branišovice that became an important strategic and guarding point of the Slavonic inhabitants in the hitherto relatively sparsely and little populated region, was founded at that time in the strategic position on the spit above the right bank of the river, directly opposite the village of Římov (Storm 1998, Kovář 1998).

The village of Římov itself – originally Lower and Upper Římov – occurs in the written sources first in 1395 (ČSÚ 2006), when the yard – maybe also fortress – belonged to Lord Mikšík of Římov (Kolektiv 1991), however, a village probably existed at the present place as early as the 13th century (Kovář 1998). Since 1541 the Římov estate was in holding of noblemen Ojířové of Protivec. At that time a brewery was founded here. In 1622 the Royal Chamber confiscated the estate belonging to the heirs of Lord Ctibor Ojíř of Protivec, who died a year earlier, due to the participation in the Estates´s Uprising and four years later it was as confiscated property sold to Lord Jan Oldřich, Prince of Eggenberg (1568–1634). Immediately afterwards he gave the property to the Jesuit´s college in the town of Český Krumlov as a present so that the Jezuits might take care of inmates of the boys´ seminary. The Jezuits kept the estate up to the abolition of the order in 1773, when the Římov´s estate in the value of 11,800 florins was assigned to the Study and Religion Fund. In 1802 the Římov estate was bought by Lord Josef, Prince of Schwarzenberg, who sold it in 1814 to the Netolice burgher František Lang. After him the estate was owned by Mr. Josef Spatzierer (1821–1844) and consequently Mr. Václav Lorenz, who was the last Římov manorial nobility. In 1850 the village of Lower Římov became a separate political municipality. The allodial farmstead with a castle and a brickyard was then in the ownership of Václav´s son Emil (1869–1879) and his widow Josefína (1879–1917), afterwards of Mr. Rudolf Jílek (1917–1937) and the brothers Dyk (1938–1948), whose heirs the castle with the lands of the former farmstead were returned to in 1992.

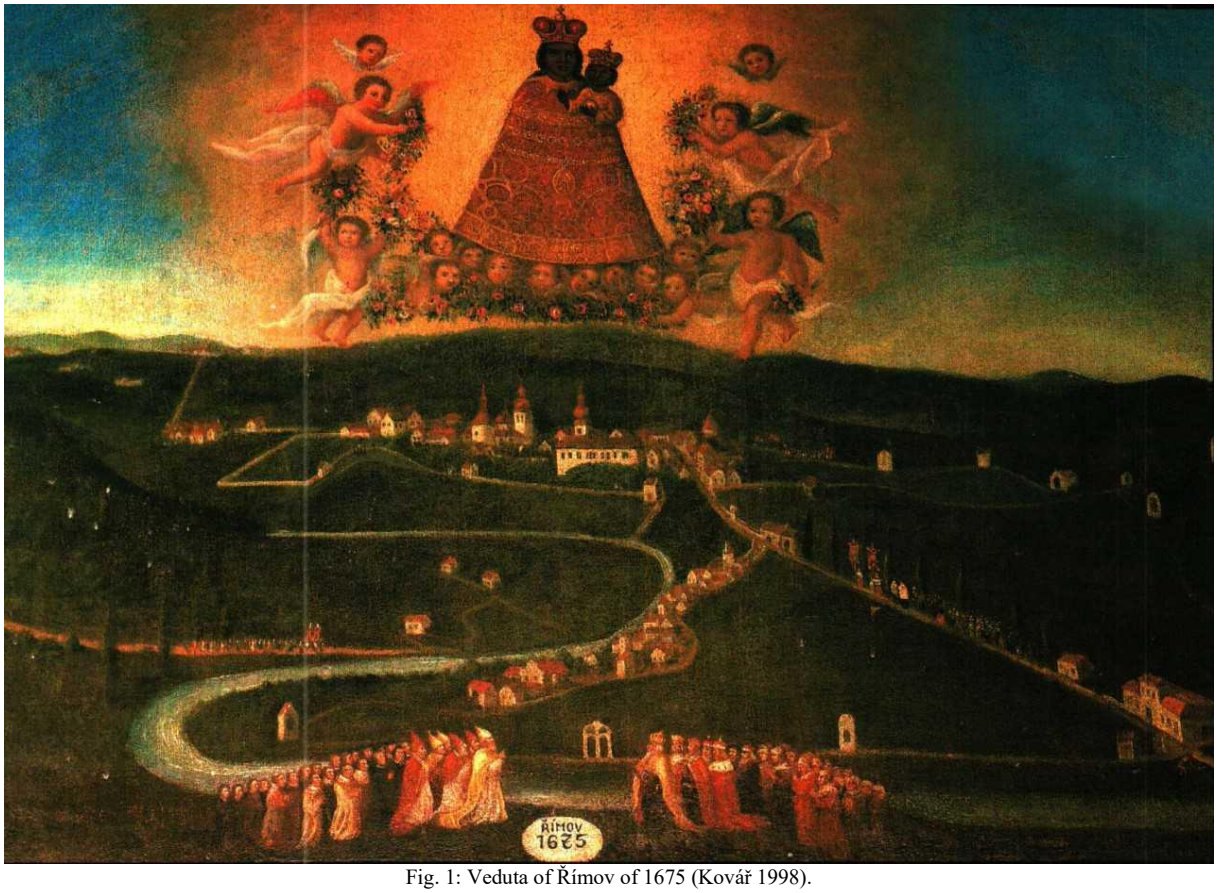


Fig. 1: Veduta of Římov of 1675 (Kovář 1998).

The core of the later place of pilgrimage became, apart from the Passion Way, the pilgrims´church in the village of Římov with the loretto and the nearby Holy Sepulchre. The lorettos in our country as well as in the whole Catholic Europe, have been built since the 16th century being a typical symbol of the baroque period. They form typologically a specific group of constructions interconnected by the time of origin, purpose and a series of marks resulting from the dependence on sancta casa in Loretto. The Jesuits, who at that time served in Loretto as confessors, founded them very often. In 1584 the first sancta casa (Holy House), a replica of the parental house of the Virgin Mary, which was transferred from Nazareth to Italian Loretto at the end of the 13th century and finally finished by Bramante at the beginning of the 16th century, was built in the town of Horšovský Týn (Syrový 1987, Bukovský 2000). The permission to build loretto in the village of Římov was granted by the Prague´s Archbishop Arnošt Vojtěch Cardinal Harrach on 20th July 1648. It was at least partly finished in 1650 and consecrated probably after finishing the cloisters in 1658. A statue of the Virgin Mary of Loretto of 1679 is worshipped in the chapel. In the years of 1652 to 1658 the square cloister with the rich decoration of the years of 1686 to 1698 was built around the Loretto chapel, which is typical for most of our loretto places of pilgrimage. Aftewards the construction of the Way of Passion started, originally probably in the form of columns with the fixed Passion paintings, which lasted to the first quarter of the 18th century. Improvements and repairs of individual stations continued practically continuously during the 19th and 20th century. Such combination of the chapel and cloister loretto Place of Pilgrimage appears only in the villages of Římov and Starý Hrozňatov, which has with the village of Římov a lot of things in common (Bukovský 2000). The Place of Pilgrimage with the Way of Passion was founded here by Cheb´s Jesuits shortly after the construction in the village of Římov in 1664. Just as in the village of Římov the Way of Passion began with the Holy House and the Farewell Chapel and had at least 29 stations (Buben 2012).

The Jesuit lay friar and a pharmacist Jan Gurre (1610–1680), who according to the legend got the instruction in the dream, when the Christ accompanied by the Virgin Mary talked to him and charged him with building the Loretto and the Way of the Cross, played an important role in building the Way of Passion and the Place of Pilgrimage in the village of Římov. In the baroque period the holiness of famous places of pilgrimage was commonly spread out by perfect or rustical copies of love paintings, statues and whole constructions, for which even the landscape with a similar terrain configuration, in which the “original” stood, was chosen. It should have accented their authenticity often supported by the legend about a journey of the founder, or other accredited person to the holy places so that to find out the correct dimensions (Royt 1993). In some cases the

landscape similarity played the pivotal role for the construction of pilgrimage church (Royt 2001). Important was also the imitation of length and the distances between individual stations exact as much as possible („devotional copies“) so that the pilgrims might have completed the length of the Jesus´ way as if they walked with him (imitatio Christi) (Čičo 2014). As far as Římov is concerned the authenticity of the place should have been supported by sending the Capuchin friar P. Alexius to Jerusalem – which was the place of the awe of religious Christians and the place of pilgrimage since the Early Midle Ages – to measure places so that the distance between individual stations might have measured as many man´s steps as stages in Jerusalem and if possible to preserve a position either southward or westward. A report in the commemorative book informes about it at the end of the 18th century. It is probable that the journey of the mysterious Capuchin friar is rather a part of the baroque founder´s legend. Since the Early Middle Ages the descriptions, dimensions and distances of the individual stations of the Passion (Cross) Way known from the literature, and particularly since the 16th century the interest in the detailed descriptions of places connected with the Christ´s life has not faded away. Even in the 18th century in the books about the Stations of the Cross the numbers of steps from the Pilate´s house, as the place of starting point of the Stations of the Cross, appear (Čičo 2014). A written document of such a source has not been preserved for the village of Římov, however, a report from the village of Starý Hrozňatov, which was directly inspired by Římov, adopts the book by Christian van Adrich (1533–1585) Theatrum Terrae Sanctae et Biblicarum Historiarum, very well known in Bohemia and even published in Czech by Daniel Adam of Veleslavín (1592).

The Passion ways and Passion plays, a frequent motive of the counter-Reformation baroque became a part of idea of Bohemia Sacra (Storm 1998). Particularly the Jesuits, who came to Bohemia in 1556, applied in their pastoral practice very much the elements of „holy theatre “, performing by visual demonstration the events from the Christ´s life (Royt 1995). An ideological model of our Passion ways – albeit a question of the model for the Římov Passion Way remains open (Royt 1995) – might have been, besides the Passion plays, the thematically similar stations of the Cross in Styria and also in the Saint Mount in Piemont (Sacri Monti) with individual architecture of individual stations and illusive, predominantly plastic rendering of scenes. Perfection of illusion is supported by a story described by Bohuslav Balbín in the work Miscellanea historica Regni Bohemie (1681), which tells an episode of a huntsman, who in front of portrayal of a soldier slapping the Christ, flared up by religious anger and shot a blasphemer though shouting: „You dare, criminal scoundrel, to lay hands on our Saviour Chist? I´ll shoot you down! “(Šámal 1941).

Not before the years of 1672 to 1697 the church of Holy Spirit, which closed the big axis of the loretto complex, was built up to the eastern wing of the cloister. At the same time in 1686 reconstruction of the residence, equipped five years later with a tower with the clock above the front gable, as well as farm buildings and brewery, was finished. The whole complex was then connected by the common enclosure wall. At the end of the 18th century a sacristy was built up to the church and the construction development of the whole complex was crowned in 1891 by construction of a new entrance gate with a bell tower in the northern wing of cloisters towards the village square.

**Preserved elements and structures forming the heart of Place of Pilgrimage**

The heart of the zone and the substance of its value is particularly formed by the mentioned Way of Passion in the landscape around the village of Římov. It is created by small chapels, spacious buildings and three gates. A series of chapels is decorated with murals, sheet paintings, statues and painted wooden scenes. Mostly polychromatic statues are wooden (50), of stone (8) and of white coat (8).

The oldest is a statue of Christ in the chapel of Holy Sepulchre built already in 1658 (Poche, 1977). On the contrary the last changes in the route of the Passion Way are representated by a newer form of the station Deserted village (1810), moving Annas to the river (after 1827) and relocation of the eighteenth station (1835). Although the inclusion of the individual stations of the Passion Way belong to the early baroque, individual parts of the site still bear elements and details of the Renaissance. Their authors were probably Italian architects. Giovanni Battista and Antonio Perti, who came from the South Swiss city of Muggia, a municipality lying about one hundred kilometres east of the Saint Mount in the village of Varallo (Nuova Gerusalemme) that they must have known for its fame, had been constructing a building of seminary for the Krumlov´s Jesuits since 1650. Antonio´s son Stefan built then the Jesuit´s church in the town of Telč. It is quite possible that exactly one of them impressed Late Renaissance outlook to the Římov stations (Storm 1998).

The individual stations (Stationes Řimovienses, Agoniae Rzimoviensis) (e. g.: Buben 2012, Kovář 1998, Royt 1995, Šámal 1942, Storm 1998, Kolektiv 1991) describes the last moments of the Jesus Christ´s life. The way starts with the first quite big polygonal chapel with a lantern at the northern edge of the village, portraying Farewell of Christ with the Virgin Mary in Bethany after the Lazarus Resurrection. Although the scene has no biblical background, it is a frequent topic of passion plays and cycles. The path leads from here along the peak of round ridge northbound to the second station portraying the Last Supper (1668). At the head of the small hall of the rectangular chapel forming a visible landmark in the surroundings, twelve apostles with the Christ in the life-size is portrayed at the table. The route than continues to the Sheep gate at the Gethsemane

yard, a passable chapel reminding a gate located above the deep country road. The Christ and and the Disciples enter this way into the Gethsemane garden. Along the deep country road you can continue to the lower large rectangular chapel called Deserted village (Gethsemane yard, Sleeping apostles) with the standing statues of Christ in the interior and three apostles Peter, James and John and lying statues of other apostles on the ground.

Fig. 2: Chapel of the Last Supper of 1668 (Photo: Kupka 2013)

Fig. 3: Sheep gate at Gethsemane yard (Photo: Kupka 2013)

Fig. 4: Chapel called Deserted village (Gethsemane yard) built in 1691, renewed in the years 1778 and 1795 and classicist rebuilt in 1810 (Photo: Kupka 2013)

The pilgrimage advances along the country road to the simple aedicula At Sad Soul (At Malchus), referring to the Christ´s statement: „My soul is sad to death.“ (Mt 26,38; Mk 14,34) Afterwards it enters into the open forest and starts falling down to the Římovský brook and consequently climbs along the rocky spit to the Mount of Olives (local names Na horačce, U anděla), where the statue of angel holding the chalice and cross (Chapel of Lord´s Mortal Anxieties) is standing on the rock in front of aedicula. Under it there is a stony statue of the kneeling Christ, with the hands clasped and looking upwards, to the angel. Nearby, slightly lower than the Christ, there are three lying stony statues of sleeping apostles. This sixth station of 1660 represents a very effective example of interconnection of architecture and the art of sculpture with impressive landscape framework. Around a simple small chapel similar to the fifth station with the picture of Judas´ betrayal the path leads under the hillside above the bank of the brook to the peak of the Mount of Olives to the simple aedicula with the picture of arresting, shackling and leading Christ out of the Gethsemane garden.

Fig. 5: Statue of sleeping apostle from the set on the Mount of Olives of 1660 (Photo: Kupka 2013)

The ninth station At the Lame Jew is set in the place, where the path comes out the forest and starts falling down to the Malše valley. The bigger chapel with the vaulted niche, where the statues of a soldier over the lying Christ in front of the fresco of Jerusalem cityscape are placed, represents a striking landscape accent. The path is further falling down to the similarly rendered tenth chapel vaulted over a small brook, which represents passage of the brook Cedron. Three statues are located in the chapel niche, the Christ, a soldier and a bailiff.

The path continues along the valley of the Malše River via a simple station the Stoning Christ, who is at the Water gate abused, insulted and thrown on with mud and stone, to the Water gate, one of the Jerusalem´s gates through which the tied up Christ enters back to the city. It is a passable high chapel with frescos resembling the Sheep gate. The thirteenth station At Annas, which is actually an aedicula, was moved to its today´s position after 1827. The bigger station At Caiaphas (At maid) is formed by a house with a high shield of saddle roof above a pair of arches, where on the right side a scene of the Peter´s denial and on the left side the Christ in front of the high priest are depicted. Behind the fifteenth station the Little Pilate the route leaves the valley of the Malše River and the sixteenth station Herodes, which is actually a chapel with three statues and a fresco in a vaulted niche, already stands at the beginning of the last part climbing along the concave ridge from the valley of the Malše River back to the built-up part of the village. The station the Great Pilate, constructed on the walled terrace in the visually exposed position with a small fore-space enclosed with wall, is the biggest and possibly the most interesting chapel of the whole Passion Way, which created, particularly in the past, a striking landscape landmark. The front wall of the high building is opened up with three arches into the cross vaulted space with statues. On the left side down the scene of crowning Christ with crown of thorns, on the right side the Christ´s flaggelation and up on the balcony a scene Ecce Homo reminding much richer a scene in Piemont Varralo are depicted.

This seventeenth chapel is thematically the beginning of „the classical“Stations of the Cross, which in the 18th century stabilized at the fourteen stations. However, in Jerusalem itself the older tradition had not known yet the Stations of the Cross with particular stations but was satisfied with the place of the Christ´s condemnation and Crucifixion (Kroll 1996). Later in Jerusalem Via Dolorosa, which had originally eight stations and to todays´fourteen was complemented only in the 19th century, came into being particularly by the Franciscan activity (Buben 2006).

The eighteenth station on the right side of the road, which was to the present position moved only in 1835, is again created by simple aedicula portraying the Christ bearing his Cross, while the nineteenth station catching the Christ´s meeting the Mother is created as an atypical chapel with the single pitched roof decorated with volutes. The space with cylindrical vault with a lunette was originally set with shell of pond mussels as in the grotto. The station potraying the scene of meeting with Veronika is again created as a simple aedicula built along the road under the cemetery wall.

Through the Court (Execution) gate, which is a passable longitudionally situated object with hip roof built to bridge over a ravine, we are leaving the city of Jerusalem starting the last stage of the way to Calvary (Golgotha). The path leads above the steep slope to the Malše River under the rear wing of the castle to the twenty-second station At Simeon. The passable transversely situated object with hip roof and two statues is open by arch to the valley of the Malše River. These two stations markedly remind examples of laterally passable chapels known from the Saint Mountains of Piemont. The whole drama reaches its peak by a small steep hill under the castle garden by Calvary, where there are three crosses with figures painted on sheet (Christ, criminals Dismas and Gesmas) and under them the statues of the Virgin Mary, St. Mary Magdalene and St. John Evangelist dated by the year of 1705. The stage is turned back to the valley and a fore-space is created around it by an intimate wall similarly as at the Great Pilate. The last but one stage, a few metres from here, Pieta, is a half-cylinder construction with an inserted conch and a statue of 1686. To the last twenty-fifth station, the Holy Sepulchre, the path leads through the forest down the slope almost to the river, where a rectangular construction with polygonal closure on the outline of dodecagon dated by the year of 1658 is situated. It is the oldest part of the Římov Path. The archetype for similar chapels of the Holy Sepulchre built in the period of baroque in our country as well as in Europe was a similarity of the Jerusalem chapel above the Holy Sepulchre rebuilt in 1555 (in 1808 destroyed by fire and built again) (Řepa 2010). Along the sides of this chapel two stone columns, on which sheets with painted tools of martyr´s death is fixed, are rising.

Fig. 6: Court (Execution) gate built before 1697 (Photo: Kupka 2013)

Fig. 7: Calvary. (Photo: Kupka 2013)

The milieu of Římov is finished by another wayside shrine in the village maybe of 19th century, a war memorial with a statue of Madona of 1919 or a column with a statue of St. John of Nepomuk of 1729 (Poche 1977), placed today on the village square. In front of the cloisters there are mighty lindens, according to the tradition planted in a loretto by its founder Jan Gurre´s own hands.

Current state and outlook for the future

Unfortunaly not even such a treasure that the Římovsko indisputedly is, have not escaped the vandals´ and thiefs´ attention. The first thefts in the village of Římov were recorded only in 1918 in connection with the anti-catholic orientation of the new republic, however, the period after the year of 1989 was for the complex almost catastrophic. The first robbery occurred in 1993, a year later a few statues of apostles from the group The Last Supper was stolen. In 2000 thieves even ruined a statue of Christ probably in order to change it slightly and then favourably sell it. In 2009 seven other wooden statues were stolen. Therefore, the town hall, curators of monuments and the parish decided to empty the chapels and transfer the rest of statues to the safe place. The photos of original equipment were temporarily placed into the chapels, which survived centuries (Buben 2012). Anyway the pilgrim´s rush in the village of Římov is still live, all the usual fairs take place here every year, but the Way of Passion is becoming more and more devastated and degradated and thus the Czech and Austrual pilgrims and tourists are becoming considerably disillusioned and disappointed (Černý 2011). In the connection with proclamation of the complex the national cultural monument, a large-scale reconstruction for almost 100 million CZK, whose part will be creation of copies of all the statues, is being planned for the years of 2020-2022. We can only hope that after a few years the area of Římov will again sparkle in its original beauty.

However, besides these problems, whose solution will be creation of copies of the original statues and their better safety, the zone struggles with other shortages that lower the landscape value of the Way of Passion and whose solution is very problematic, maybe impossible. Most of all the new housing development of the widening village of Římov, which gets into the contact not only with the historical chapels, but also with the original housing development of the village with various reconstructions, additions, shed, garages and unsuitable architectonic details, so much typical for most of our villages, is very debatable. It is apart from other things a reduction of the proposed range of the monument zone, whose boundary inside the settlement passes nearby the route of the Passion Way. Problematic are also cottage settlements on the Mount of Olives and in the valley of the Malše River, whose diverse and mostly worthless architecture directly contact with some stations. Besides there are objects of technical infrastructure, wiring, etc.

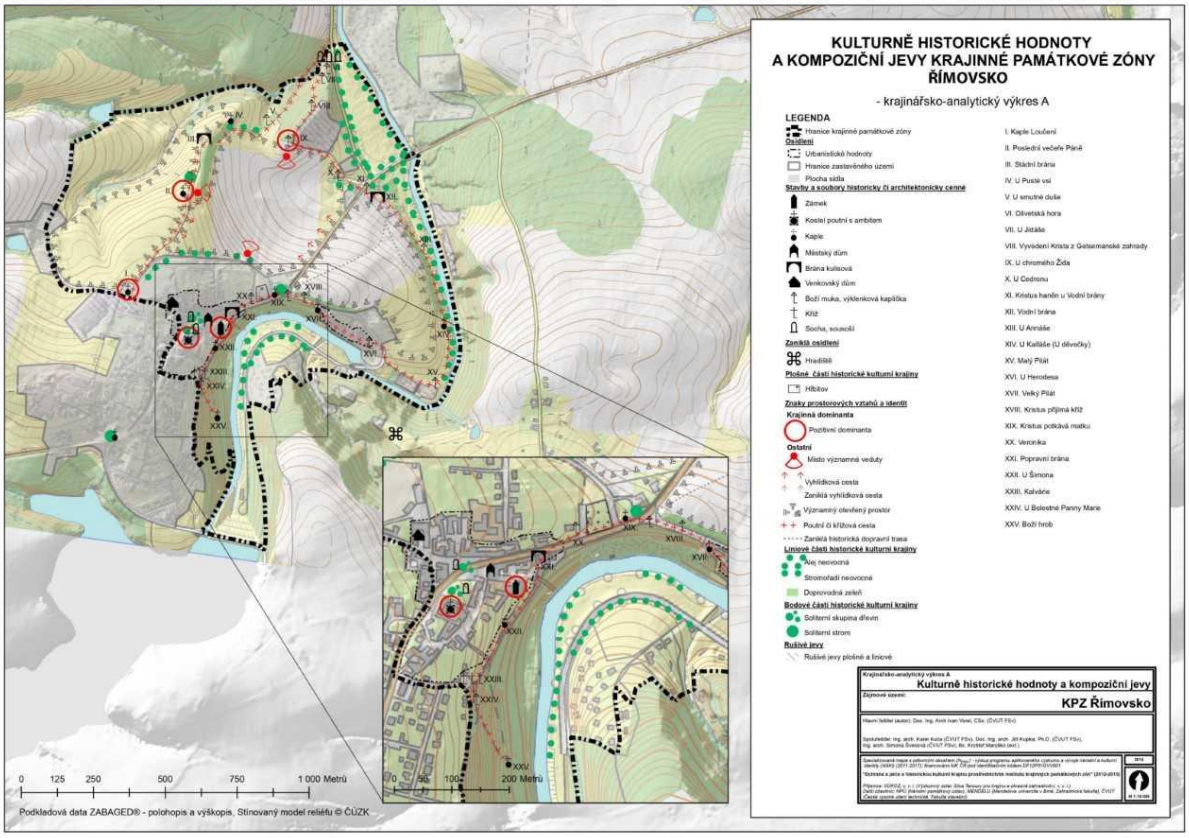


Fig. 8: Analytical drawing of landscape monument zone of the Římovsko (2014)

Some parts of the route were placed on the crest lines and their visual use on the low horizons was taken into consideration, which is not today possible because of the overgrown vegetation and forests that did not exist on the archive photos. Effectiveness of the place of pilgrimage in the landscape is partially degraded by all these unfavourable effects. However, in spite of the mentioned problems the Římovsko today belongs to the remarkable places worthy of visiting (Topic was dealt with by the author also in: Kuča et al. 2015, Kupka 2014, Kupka 2015).

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# Basic characteristics of pilgrimage localities and their virtual image on the Internet

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***Abstract***

*Pilgrimage tourism has a long tradition in the world and in Slovakia. People have worshiped places that symbolized their religion, sites of miracles, or localities where they can feel „God's presence" for a long time. The aim of our article is to analyze pilgrimage localities in the Žilina Region on the basis of selected websites' offer. The analyze includes regions with a high concentration of the religious population (Orava, Kysuce). We assumed that the representation of pilgrimage localities will also have one of the leading positions in Slovakia. All analyzed pilgrimage localities are places of local significance. Most of them belong to St. Mary's pilgrimage tradition. Proof of this is the fact that many of them are the part of Slovak St. Mary's Route - its northern part.*

***Keywords:*** *pilgrimage, religious localities, religious tourism, St. Mary's tradition, Žilina Region*

## Introduction

Religious - referred to as pilgrimage tourism, is one of the oldest forms of tourism. Pilgrimage tourism is connected with the traditions of religions where the basic manifestation is a pilgrimage. It is characterized by a visits of pilgrimage centres under the influence of religious motives (Michalová et al., 1999; Ryglová, 2009; Pichlerová –Benčať, 2009; Gúčik, 2010). The main motive of pilgrimage in its religious and spatial context is the visit of the holy place where the God's presence is the most visible and realization of religious activities, prayers and so on, at that place (Jackowski – Solan, 2008).

Pilgrimage tourism is a part of the cultural tourism. Its manifestations are mainly pilgrimages, which are characterized by 3 features: pilgrimage participants, religious act and pilgrimage locality. As Orieška (2011) states, a town, village, settlement or some landscape element (e.g. mountain, river) can be considered a pilgrimage locality. It differs from the cultural tourism in motivation which is the religious motive and in the refusing to consider its participants as "tourists".

While a visitor arrives to the place for cultural and sightseeing purposes, the pilgrim also tries to feel the atmosphere of the saints who have left a mark on localities which are being visited.

In the literature, we can also meet the term religious tourism. This form of tourism is defined by Rinschede (1990, 1992) as a migration where participants during their journey are exclusively-strongly religious motivated. Besides pilgrims he also takes into consideration participants of tourism, who seek cultural monuments and thus sacral objects only for cognitive motives.

Pilgrimages as an external expression of faith are in this time tied to all world religions: Buddhism, Hinduism, Islam, Judaism and Christianity (Collins-Kreiner 2010).

There is probably no country without pilgrimage localities nowadays. The proof that this form of tourism has its own position is the fact that the World Religious Travel Association (WRTA) was founded in the United States in 2006. Its main goal is connecting all believers and education in religious tourism. It tries to promote religious travelling and the development of hospitality in individual countries. Several destinations, wholesalers, specialized travel agencies, etc. are the members of WRTA.

Religious tourism has its history since ancient times. It is associated with the largest religions in the world - Christianity, Islam and Hinduism. Rome, Jerusalem and Mecca belong to the world's centres of religious tourism.

## RELIGIOUS TOURISM AND SLOVAKIA

Slovakia is a Christian country. According to the last Population and Housing Census in 2011, more than 80% of the population claimed a religious affiliation. The Roman Catholic Church (62.0%) dominates, the second-largest group are Evangelists of the Augsburg Confession (5.9%). Greek Catholics are on the third place (3.8%). On the other hand, we have to say that since 1991 there has been an increase in the number of non-religious people from 9.8 to 13.4% (Fig.1).

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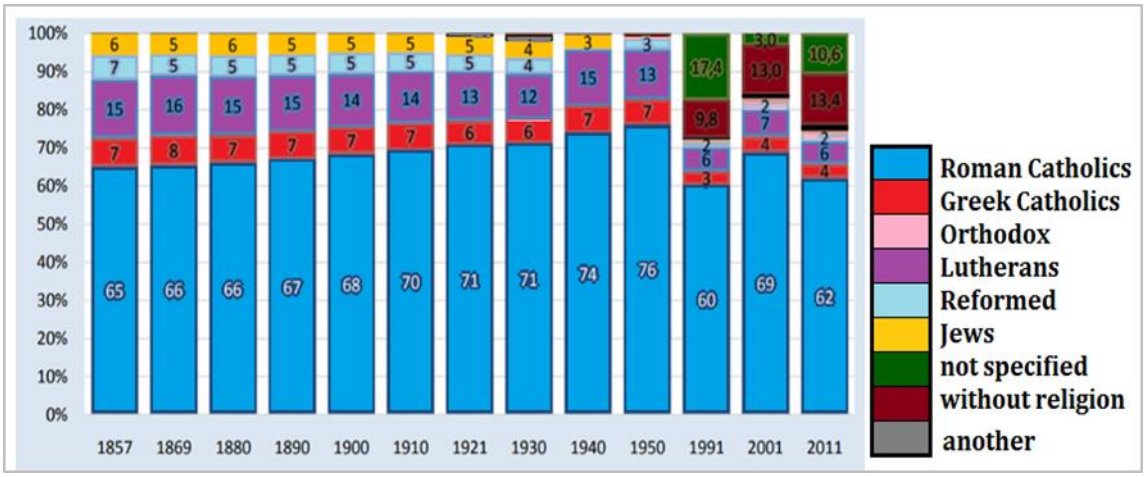


***Fig. 1*** *Development of Religious representation in Slovakia 1857-2011*
Source: http://www.infostat.sk/vdc/pdf/Storocie.pdf

The high number of churches in Slovakia is the evidence of the strong representation of believers. 4165 churches have been registered so far, of which 63.24% are Roman Catholic (Tab.1).

**Table 1** Churches in Slovakia

| churches | abs. | % | churches | abs. | % |
|---|---|---|---|---|---|
| **Roman Catholic** | **2634** | **63,24** | **Reformed Christian** | **309** | **7,42** |
| **Greek Catholic** | **522** | **12,53** | **Evangelical A. V.** | **544** | **13,06** |
| **Orthodox** | **155** | **3,72** | **Czechoslovak Hussite Church** | **1** | **0,02** |
| **together** | **4165** | | | | |

Source: Dzurjanin, Z. author of the map: https://dennikn.sk/160769/kostoly-slovenska-mapa-fotky/#mapa

Their localization shows (Fig. 2):

- there are mostly Greek Catholic churches in the north-east and east of Slovakia,
- higher concentration of churches of the Reformed Church can be observed in the south-east of Slovakia, in the south of the districts of Rožňava, Rimavská Sobota, Revúca, Levice and strewed in the districts of Danube Lowland,
- most evangelical churches are concentrated in central and upper Liptov, in the northern part of Gemer (Rožňava, Rimavská Sobota and Revúca District), in districts in the south of central Slovakia - Krupina, Lučenec and Veľký Krtíš. There is also a strong concentration on the outskirts of western Slovakia in areas with dispersed settlements (Myjava and Nové Mesto nad Váhom District),
- The concentration of Catholic churches is evident in the traditional centers of the Catholic Church (Nitra and Trnava Region, north of the Žilina Region - Orava and Kysuce) and districts of north-western Slovakia.

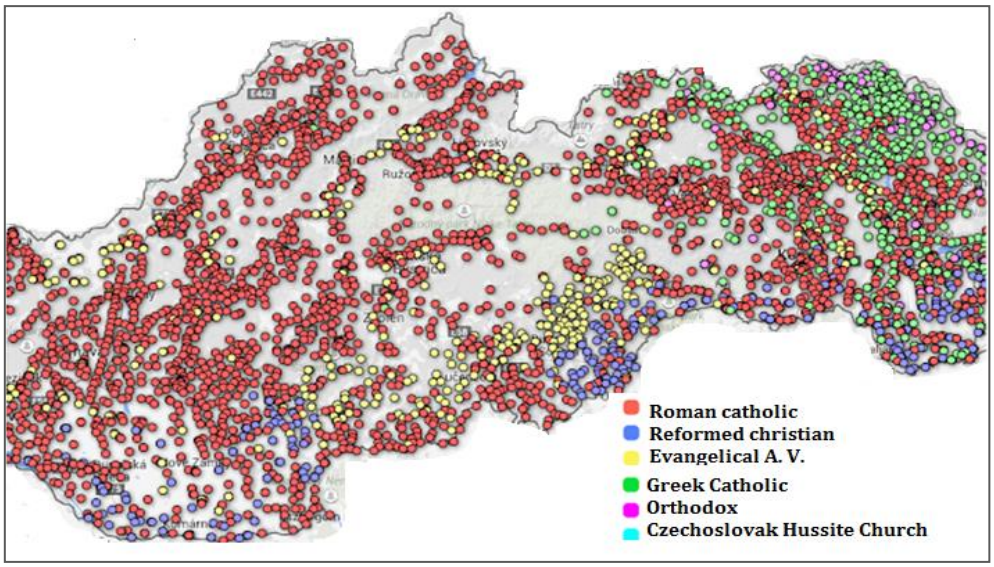


***Fig. 2*** *The churches in Slovakia*
Source: https://dennikn.sk/160769/kostoly-slovenska-mapa-fotky/#mapa

One of the main representatives dealing with religious tourism in Slovakia is A. Krogmann (2007, 2017 et al.). He paid most attention to the Nitra Region. Čuka (1996, 1998) focuses on pilgrimage in the Staré Hory - especially the size, intensity, seasonality and geographical background of visitors in the village. Similarly, Bubeliny (2008) and Čuka, Bubeliny and Gregorová (2009).

Bubeliny (2010) conducted research on the pilgrimage activities in the Žilina Region, in Rajecká Lesná in terms of several aspects (such as geographic background of pilgrims, size and frequency of pilgrimage activities).

The aim of our article is to analyze pilgrimage localities in the Žilina Region. It includes municipalities with a large percentage of religious population (mainly in Orava and Kysuce). We assumed that the representation of pilgrimage localities will also have one of the leading positions in Slovakia, but as it has been shown in Tab. 2 and Fig. 3, the most of the pilgrimage localities are located in the regions of Banská Bystrica and Prešov.

**Table 2** Representation of pilgrimage localities in regions of Slovakia

| Region | representation of pilgrimage localities in regions of Slovakia | |
|---|---|---|
| | abs. | % |
| **Banská Bystrica** | 23 | 15,3 |
| **Bratislava** | 13 | 8,7 |
| **Košice** | 20 | 13,3 |
| **Nitra** | 22 | 14,7 |
| **Prešov** | 24 | 16,0 |
| **Trenčín** | 18 | 12,0 |
| **Trnava** | 13 | 8,7 |
| **Žilina** | 17 | 11,3 |
| **together** | 150 | 100,0 |

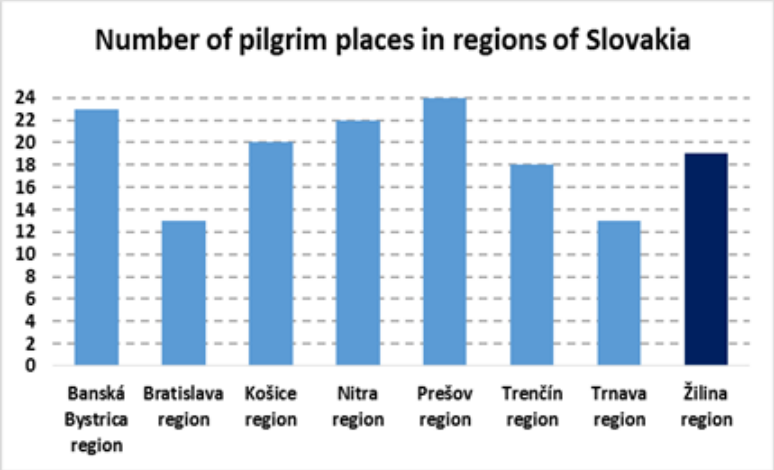


***Fig. 3*** *Number of pilgrimage localities in regions of Slovakia*
Source: www.putnickemiesta.sk

## Pilgrimage localities and Žilina region

In terms of placement of pilgrimage localities five of them are in the Čadca District, four in the Žilina District, two localities are in the Námestovo Distict, Tvrdošín and Ružomberok District and one in Martin and Dolný Kubín District (Tab. 3, Fig. 4).

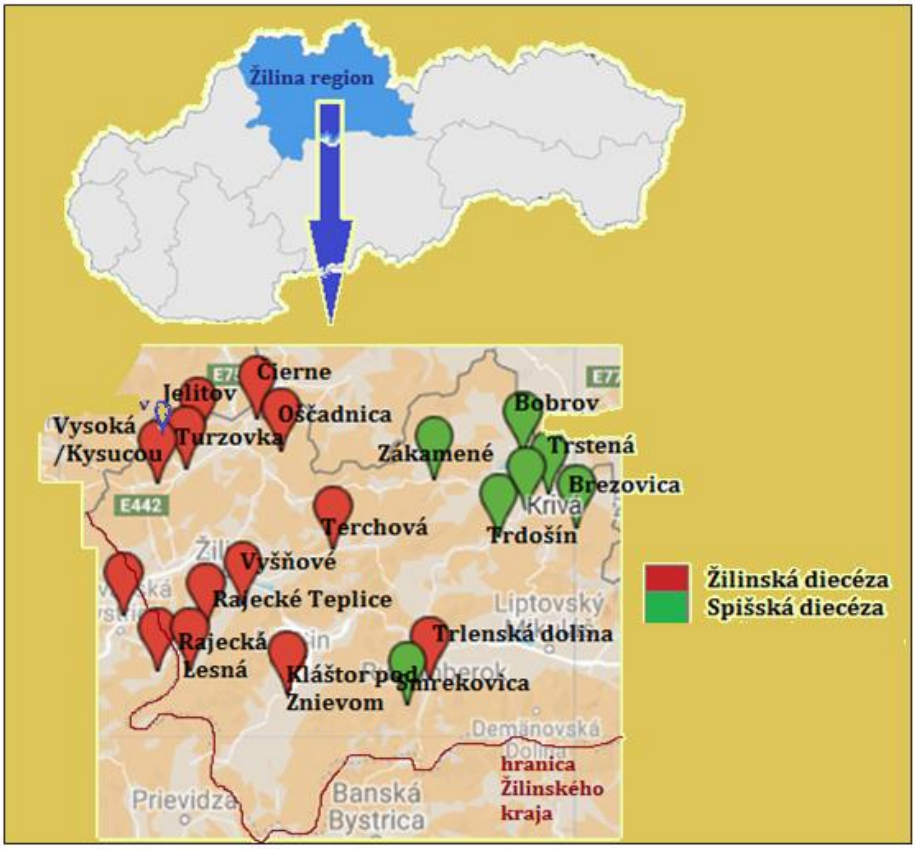


***Fig. 4*** *Location of pilgrimage localities in Žilina Region*
Source: edited by the author googlemap.com

**Table 3** Location of pilgrimage localities in Žilina Region

| Municipality | District | Place of pilgrimage - locality | Regular pilgrimage |
|---|---|---|---|
| **Bobrov** | Námestovo | Calvary of the Assumption of the Virgin Mary | August 15 on the Feast of the Assumption of Virgin Mary |
| **Čierne** | Čadca | Trojmedzie - pilgrimage at the chapel in the mountains above the village of Čierne, where three countries meet: Slovakia, the Czech Republic and Poland | Regular pilgrimage: August |
| **Kláštor pod Znievom** | Martin | Church of Virgin Mary, St. Nicholas Church, Lourdes Chapel, Calvary, Good Shepherd Monastery | weekend around August 15 (Feast of the Assumption of the Virgin Mary) |
| **Krivá** | Dolný Kubín | birthplace of Blessed Sister Zdenka Cecilia Scheling | July 30 on the Feast of Blessed Sister Zdenka |
| **Oščadnica** | Čadca | Calvary | Sunday after August 15, the Feast of the Assumption of Virgin Mary |
| **Rajecká Lesná – Frivald** | Žilina | Basilica of the Nativity of Virgin Mary | several times a year |
| **Rajecké Teplice** | Žilina | Chapel of St. Gianna Beretta Molla (with relics) | weekend after the Feast of St.Gianna (April 28) |
| **Smrekovica – kaplnka** | Ružomberok | Chapel of St. Gorazd | in July around the feast of St. Gorazd (27th July), the highest situated chapel in Slovakia |
| **Staškov – Jelitov** | Čadca | Calvary of the Seven Sorrows of Virgin Mary and Chapel of St. Anna | end of July on the feast of St. Joachim and St. Anna |
| **Terchová** | Žilina | Oravcové Hill, there is an altar with stone pillars forming a two-arm cross. The way to it is lined by the Stations of the Cross. | celebrations for the feast of Saints Cyril and Methodius on July 5 - all-decesium pilgrimage |
| **Trstená** | Tvrdošín | St. Martin's Church | Sunday on the feast of Virgin Mary of Carmel (July 16).<br>It is an indulgence pilgrimage associated with the music festival Sing to Virgin Mary. |
| **Turzovka – Hora Živčáková** | Čadca | Živčáková Hill - Chapel (Church) of Virgin Mary | spring and autumn pilgrimage, rich program throughout the year |
| **Višňové** | Žilina | St. Nicholas Church | all year round,, Fatima Saturdays (1st Saturday of the month) |
| **Trlenská dolina** | Ružomberok | Chapel of Virgin Mary of the Snow | every 5th August, respectively. on Sunday after 5th August |
| **Brezovica** | Tvrdošín | Skorušina Hill | 1st September. Holy Mass and thanking of believers to God for granted benefits |
| **Vysoká nad Kysucou** | Čadca | Chapel of St. Anna below Kýčera Hill | 26th July, on the feast of St. Anna or on Sunday after it |
| **Zákamenné** | Námestovo | Chapel of the Assumption of the Virgin Mary on the Calvary | 15th August on the Feast of the Assumption of Virgin Mary |

*processed by the author*

## Characteristics of pilgrimage localities in the Žilina Region

**Bobrov** - Bobrov pilgrimages have been held for over a hundred years. At the end of the 19th century, the local canonist Štefan Koštialik had built 14 Stations of the Calvary, which start from the parish church to the nearby hill with chapel. The ceremonial consecration of the Calvary was held on the 15th August 1984. Pilgrimages also took place during the communism, although with the permission of the district committee and not to the extent as it is nowadays. The specific feature of the pilgrimage is the "funeral of Virgin Mary". Every year, on the 14th August or on the eve of the local forgiveness, a parade with a statue of the Virgin Mary lying in a chest, is organized. It starts from the parish church and goes around the stations of the Calvary to the top of the hill. There is the statue of Virgin Mary placed in the symbolic grave in the chapel. This custom is unique in Slovakia. We can see similar tradition in Poland on the Zebrzydowski Calvary (https://www.naoravedobre.sk/aktivity/bobrovska-kalvaria-miesto-pokoja-akrasnych-vyhladov-12/).

***Fig. 4*** *Calvary Bobrov*
Source: https://lisinovic.blog.sme.sk/c/163872/Putovanie-po-slovenskych-Kalvariach-XXI-Bobrov.html

**Čierne – Trojmedzie -** symbolically connects three countries - Slovakia, Czech Republic and Poland. Its point lies in an isosceles triangle. The peaks of the triangle are represented by 240 cm high granite monoliths, which have been mounted in pedestals since 1995. The tradition of the common pilgrimage of Czechs, Polish and Slovaks in this place began after the establishment of the Diocese of Žilina (Fig. 5) (http://www.putnickemiesta.sk/events/put-na-trojmedzii-cierne-trojmedzie-2/).


***Fig. 5*** *Trojmedzie*
Source: http://www.obeccierne.sk/42-region-kysuce/209-trojmedzie; https://www.youtube.com/watch?v=GlAopswqi1g

**Kláštor pod Znievom** – The Calvary area was founded at the beginning of the 18th century and gradually completed until the 20th century. The hill is dominated by the narrow tower of the Church of the Holy Cross (Fig. 6), which was built in 1728 by Mikuláš Ďurčáni, pastor of Tri Sliače and by chaplain Juraj Mihalóczi. The church is surrounded by a wall with three entrances, which were originally decorated with baroque vases and a ring of chapels built into the wall. There are three simple wooden crosses in the central area. The chapels at the church are now a continuation of the younger stations built on the hill slope.

The whole area of the Calvary with the Church of St. Cross is the destination of the main pilgrimage for the feast of the Exaltation of the Cross with the procession from the parish church of St. Nicholas. http://www.putnickemiesta.sk/putnicke-miesta-na-slovensku/banskobystricka-dieceza/putnicke-miesto-copy copy-2/)

***Fig. 6*** *Church of the Saint Cross*
Source:https://www.infoglobe.sk/tip-na-vylet/sr-klastor-pod-znievom-obec-s-kralovskym-hradom-zniev-video/?action=2

**Krivá na Orave –** every year before 30th July - the liturgical feast of Blessed Zdenka (a pilgrimage) is held here with the participation of believers from a wide area. A chapel with a memorial plaque has been built in front of the former Scheling family house since 2010 (Fig. 7).


***Fig. 7*** *Church of Saint Joseph worker and a memorial plaque dedicated to Blessed Zdenka*
Source: http://www.zdenka.sk/sk/putnicke-miesta/kriva

**Oščadnica -** The Kysuce pilgrimage to the Calvary has been taking place on Sunday after the Feast of the Assumption of the Virgin Mary on the August 15th for several decades. Calvary in Oščadnica is the only one of its kind in Kysuce (Fig. 8). Its construction began in 1946 in the area of Sivova grapa. It was built within one year by Oščadnica´s believers of gratitude for the fact, that in 1945 during the World War II, when the fighting in nearby Rača lasted almost 30 days (people at that time prayed and fled to the Virgin Mary and begged her to protect their lives and dwellings), none of the inhabitants died and the village was not even touched.

***Fig. 8*** *Calvary in Oščadnica*
Source:https://www.regionkysuce.sk/sk/zaujimavosti-z-regionu-kysuce/kulturno-historicke/113-kostol-a-kalvaria-v-oscadnici#gallery8752b01685-1

**Rajecká Lesná – Frivald –** In the past it was a place where many pilgrims from near and far came to present their requests and prayers to the Virgin Mary, whose statue is located in the Basilica of the Nativity of the Blessed Virgin Mary (Fig. 9) above the main altar. They came from all four cardinal points. From the east they came from Valča ,,Vrícko", Martin and other villages. The last stop before entering the gracious Basilica was the cross at the end of the village. From the west from Považská Bystrica, Pružina, Mojtín and other villages, pilgrims stopped at the chapel of St. John of Nepomuk. From the north the processions came from Rajec, Ďurčiná, Kamenná Poruba, Konská and surrounding villages. Their stop before entering the village was the chapel of St. Anna at the place called "Na Hôrkach". From the south pilgrims came from Fačkov, Čičmany, Zliechov, Kľačno, Nitrianske Pravno, Prievidza and other villages. They stopped at the cross in the Rybná Valley, which is over the village towards Prievidza. These were four stops where the pilgrims gathered and went to the basilica (https://saletinirozkvet.webnode.sk/products/rajecka-lesna-frivald/).

***Fig. 9*** *Basilica of the Nativity of the Blessed Virgin Mary*
Source:https://www.turistika.cz/mista/rajecka-lesna-bazilika-narodenia-panny-marie/

**Rajecké Teplice –** Is one of the youngest pilgrimage localities in the Žilina Region. Pilgrimages to St. Gianne in the Church of the Divine Heart of Jesus in Rajecké Teplice began in 2006 (Fig. 10). Pilgrimages took place on the occasion of the end of her earthly life – in the 28th April 1962. Italian doctor Gianna B. Molla was declared saint in 2004. She sacrificed her life to the love of her unborn child. St. Gianna B. Molla is also the patron of a Home for lonely pregnant women and mothers with children in need in Rajecké Teplice.

***Fig. 10*** *Local Church of the Assumption of Virgin Mary (left) and Church dedicated to the Sacred Heart of Jesus (right)*
Source: http://rajecketeplice.fara.sk/?cat=kostol

**Smrekovica –** Chapel dedicated to St. Gorazd, was built in honor of the priest, politician and nationalist Andrej Hlinka. It was built in the area of Military Recreation Center in Smrekovica, currently the Granit Hotel. It was blessed on the 17th August 2008. The original chapel, which was built on the instruction of A. Hlinka, burnt down in 1935. It lies at an altitude of 1428 m and so it is the highest located sacral building in Slovakia (Fig. 11).

**Fig. 11** Pilgrimage to Smrekovica
Source: http://www.rkhlas.sk/?id_bl=3980

**Staškov – Jelitov –** the first wooden chapel in Staškov - Jelitov was built in 1888. In 1937 it was replaced by a brick chapel, which is still used today (Fig. 12). The chapel is devoted to the Mother of Virgin Mary – St. Anna. The chapel is surrounded by the Stations of the Calvary of Seven Sorrows of Virgin Mary (1st prophecy of Simeon in the temple, 2nd escape to Egypt, 3rd loss of 12-year-old Jesus in the temple, 4th encounter with Jesus on the

Stations of the Cross, 5th Jesus crucifixion and death, 6th Jesus´s taken down from the cross, 7th the funeral of Jesus).

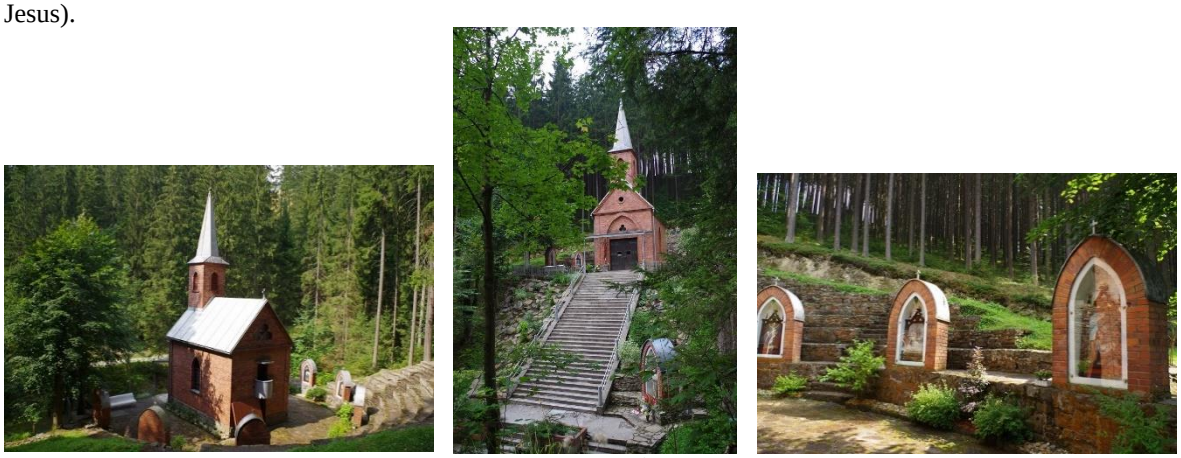

***Fig.12*** *Chapel of St. Anna*
Source: https://www.regionkysuce.sk/sk/zaujimavosti-z-regionu-kysuce/kulturno-historicke/724-putnicke-miesto-staskov-jelitov

**Terchová** – in 1990 was the first place in the territory of the then Czechoslovakia, where the St. Cyril and St. Methodius Days took place. The Terchová Roman Catholic Church is the largest church in Slovakia dedicated to Thessaloniki brothers, co-patrons of Europe - Saints Cyril and Methodius (https://www.teraz.sk/regiony/sviatok-sv-cyrila-metoda-terchova/90559-clanok.html).

The Stations of the Calvary are built of glass and stone from Terchová, which was extracted here hundred years ago. The stations have a cross shape which is always in a position indicating the content of the station. At the end of the Calvary on the Oravcová Hill, there is a platform with a large modern cross (Fig. 13).

***Fig. 13*** *St. Cyril and Methodius Church and Stations of the Cross, Terchová*
Source: http://www.putnickemiesta.sk/putnicke-miesta-na-slovensku/zilinska-dieceza/terchova/
https://www.terchova.uteczmesta.eu/tipy-na-vylety/zaujimavosti/cirkevne-stavby/311-krizova-cesta-na-vrch-oravcove

**Trlenská Valley** – one of the favourite pilgrimage localities of Liptov - the Chapel of Virgin Mary of the Snow. A copy of the gracious icon “salus populi romani” is hidden here. The original is in the Roman Basilica of Santa Maria Maggiore inside the chapel.

Since its inception, the place itself has been spiritually linked to one of the four main Roman basilicas. The chapel was built in 1935 as a part of the Jesuit convalescent home on Vlčia skala National Monument. Every year on the 5th August or on Sunday there was held public pilgrimage from 1936 until forcible liquidation of religious in Slovakia in 1950.This tradition was restored in 1995, when the chapel and the whole complex were returned to the Jesuits.

However, the chapel with its original sanatorium is not the only place where incoming pilgrims can recharge their energy and peace of mind. Religious brother Andrej Ratulovský modified the crevice in the rock into a Lourdes cave in 1939. It included statues of Lourdes and Saint Bernadette, made by Master Mydlo. The original statue of Virgin Mary from Vlčia skala was moved around 1954 to the church in Vlkolínec (fig. 14).

***Fig. 14*** *Chapel of Virgin Mary of the Snow*
Source:www.https://www.teraz.sk/regiony/serial-kaplnka-v-trlenskej-doline-sa-odd/347514-clanok.html

**Turzovka** – Živčáková Hill, as part of the Turzovka Highlands, is located about 3 km east of Turzovka as the crow flies. In 1958 (June 1st), game-keeper Matúš Lašut, in his own words, had a vision of the Virgin Mary of Lourdes in this place. It was the year of the centenary of the apparitions of Our Lady in Lourdes, France (www.živcakova.sk, https://www.zivcakova.sk/historia-zivcakovej/).
Since that time, believers from the neighborhood and gradually also from far have started to visit this place. After the fall of the atheistic regime, the diocesan bishop commissioned preparation in 1991, and in 1992-1993 the construction of the Chapel of Our Lady of the Queen of Peace was carried out (Fig. 15). On 19.10.2008 the Žilina bishop declared Živčáková Hill as a pilgrimage place. The construction of the pilgrim church began on the 11th June 2009 (http://www.putnickemiesta.sk/putnicke-miesta-na-slovensku/zilinska-dieceza/turzovka/). Calvary leads to the mountain (Fig. 16) from town Turzovka (http://www.putnickemiesta.sk/putnicke-miesta-na-slovensku/zilinska-dieceza/turzovka/).

***Fig. 15*** *Chapel of Virgin Mary Queen of Peace*

***Fig. 16*** *Church of the Virgin Mary, Mother of the Church with a pastoral center*

Source: https://www.zivcakova.sk/chram-panny-marie/
http://www.magnificat.sk/turzovka-jesenna-put/

**Višňové** – Church of St. Nicholas, it has been a pilgrimage locality since the 17th century (Fig. 17).

***Fig. 17*** *Church of St. Nicholas Višňové*
Source: http://www.visnove.sk/

**Skorušina Hill** is not a pilgrimage place in the true sense of the word. It is rather a thankful place. The tradition has been known since 1995, when people from the surroundings of Brezovice started to thank to the Skorušina Hill, for blessing at work, for harvest etc.

**Vysoká nad Kysucou** – chapel dedicated to respect to St. Anna was built on the top of Kýčera Hill. It has become a pilgrimage place over the years. Every year ceremony of holy mass is held on the occasion of the Feast of St. Anne's pilgrimage (Fig. 18).

***Fig. 18*** *Chapel of St. Anna*
Source: https://hiking.sk/hk/ar/4234/potulky_kelcovskymi_osadami3.html
https://mapio.net/pic/p-108809659/

**Zákamenné** - Church of the Assumption of the Virgin Mary and Calvary accessible by a country road leading from behind the parish church (Fig. 19).
Calvary consists of a group of fourteen stations with a larger central chapel of the Assumption of the Virgin Mary with a horseshoe-shaped plan and a wooden bell tower. There are two smaller chapels next to the central chapel. There is the „God's tomb“ in one of them. The second chapel is the chapel of St. Helena. Calvary was renovated in 1955 (Fig. 20).

***Fig. 19*** *Church of the Assumption of the Virgin Mary*

***Fig. 20*** *Calvary*

Source: http://rkczakamenne.sk/

## Conclusion

All analyzed pilgrimage localities are of a local significance. Most of them belong to St. Mary's pilgrimage localities. It is proven by the fact that many of them are the part of the Slovak St. Mary's Route - its northern part. The Slovak St. Mary's Route is a pilgrimage cycling route connecting important St. Mary's pilgrimage localities in Slovakia. It starts in Gaboltov near Bardejov and goes north and south to the Šaštín Basilica of the Seven Sorrows. Both routes of the pilgrimage path create a wreath of towns connected with St. Mary's respect. At the same time, they inform pilgrims with less known natural and cultural attractions of Slovakia (https://slovenska-marianska-cesta.webnode.sk/).

We have analyzed following pilgrimage localities on our route: Trstená (on the 5$^{th}$ stage), Zákamenné (on the 6$^{th}$ stage), Turzovka, Živčáková (on the 7$^{th}$ stage) and Višňové and Rajecká Lesná (on the 8$^{th}$ stage) (https://slovenska-marianska-cesta.webnode.sk/etapy-pute/severna-cesta).
In the future, we can see the perspective of the transformation from the pilgrimage localities to the center of religious tourism in two places - Terchová, which has a perspective in terms of national Cyril-Methodius

pilgrimages and Rajecká Lesná, which develops year-round pilgrimage tourism - mainly thanks to the wooden Bethlehem.

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# Sacral Art in Czech Mining and Metallurgical Regions

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*Abstract*

*There are many mining and metallurgical areas in the Czech Republic. Some mining and metallurgy centers are already historical and non-functional, others mostly modern and these modern centers are still productive. Many buildings in these areas have become a state-protected monument. The distribution of cultural, sacral and technical monuments depends on the age of the mining or metallurgical area. In the historic centers there are the most cultural monuments such as town houses, sacral buildings, less mining or technical monuments. In the mining and metallurgical areas of the 19th and 20th centuries, there are more technical monuments (including infrastructure and workers' colonies) than sacral monuments. Both historical and technical monuments are attractive for various groups of people. The historic centers of historical mining and metallurgical areas have long been the center of interest, especially in organized tourism, without any special link or interest in mining, metallurgy or technology. The newer centers of mining activity are the focus of individual tourism with an interest in technical or meta-technical and quasi-technical branches and industrial heritage. In this interest there is also a kind of neo-romantic spirit or modern fashion trends such as steampunk etc.*

***Keywords:*** *Mining and Metallurgy, Sacral Art, Cultural Monuments, Industrial Heritage, Czech Republic*

## Mining and metallurgical centers in the Czech Republic

Mining activities in the Czech Republic have historically been associated with mining and processing of precious metals (silver, gold), lead, tin, iron and uranium ores. Underground mining of precious metals in the Czech Republic began in the 13th century, coinage (silver deniers) in the 10th century and earlier was carried out from imported silver, the actual silver mining is not documented at this time. However, gold panning, perhaps even tin, took place here, but even for these rather sure activities in the period up to the 11th century, there is still no clear material evidence. For the sake of completeness, it should be mentioned that in the Czech Republic at the locality Tušimice there was underground mining of quartzite used as flint (KUNA, 2019) in the Old and Middle Eneolithic (approx. 3700–3350 BC.).

Active large-scale silver mining began in the Czech Republic in the 13th century in the Vysočina Region between the towns of Havlíčkův Brod - Jihlava - Brno, the administrative center of this mining activity was the town of Jihlava. Later, the main center of silver mining became the town of Kutná Hora from the 14th century, where silver was mined until the 18th century, the depth below the city reached 500 meters (1600 ft) or even more (Agricola, 1530).

In the 16th century, silver fever broke out in the Ore Mountains in the area of Jáchymov, later other ores, arsenic, bismuth, cobalt, uranium were mined here, and the depth of mines down to the 20th century reached 700 meters (2300 ft).

During the inflation of silver prices in the 16th century, silver mining in the Czech Republic was significantly reduced. In 1875 a world record was reached in Příbram, when the Vojtěch (Adalbert) shaft reached 1,000 meters (3280 ft) for the first time in the world. These ore mines were in operation until 1978, the depth of the Příbram ore mines (silver, lead, antimony) reached 1500 meters (5000 ft).

Tin mining is also old in the Czech Republic. Tin mining started probably in the 13th century, first by panning, later by underground extraction. At that time, Czech tin was an important export article and occupied an important position on the world tin market. The main mining centers of tin were Horní Slavkov and Krupka-Cínovec. Tin was mined in the Czech Republic until 1991. Similarly, iron ore was mined on the territory of the Czech Republic. Underground mining of iron was completely terminated in 1992.

Ore mining in Czechia was restored in the 2nd half of 20th century tin, gold, silver, lead, copper, zinc and iron ores were mined to the 1992.

In the Czech Republic, uranium started to be mined in the middle of the 19th century in Jáchymov. However, the main center of uranium mining became the town of Příbram, where a large deposit of uranium was found outside the original ore mines. The newly built mines reached a depth of 1500 meters (5000 ft), the

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deepest shaft no.16 even 1838,4 meters (6031ft). Uranium was mined in many places in the Czech Republic. The uranium mine Rožná in the Vysočina Region was mined until 2017.

| No | City (area) | Raw Material | Century |
|---|---|---|---|
| **1** | Jihlava - Havlíčkův Brod – Brno area (Vysočina) | **Ag** | 13th–16th |
| **2** | Kutná Hora area | **Ag**, Cu, Pb, **Zn** | 14th–18th (20th) |
| **3** | Horní Slavkov area | **Sn, U, W** | 14th–20th |
| **4** | Krupka – Cínovec area (Krušné Hory / Erzgebirge) | **CaF**, Mo, **Sn**, U, **W** | 14th–18th (20th) |
| **5** | Jílové and Nový Knín area | **Au** | 14th–20th |
| **6** | Bruntál area | Ag, Pb | 14th–18th (20th) |
| **7** | Zlaté Hory area | **Au, Cu** | 14th–18th (20th) |
| **8** | Kašperské Hory and South Bohemia area | Ag**, Au** | 14th–20th |
| **9** | České Budějovice and Český Krumlov area | **Ag**, Au, Ni, **graphite** | 14th–20th |
| **10** | Jáchymov area (Krušné Hory / Erzgebirge) | **Ag**, As, Bi, Co, Fe, Ni, Sn, **U** | 16th–20th |
| **11** | Příbram area | Au, **Ag,** Fe, **Pb**, Sb, U | 14th–20th |
| **12** | Most – Chomutov – Sokolov | **lignite** (steam coal), **chemical industry, energy**, **oil refinery** | 18th–21st |
| **13** | Prague–Kladno-Nučice-Beroun-Zdice area | **hardcoal** (steam coal), **Fe, limestone**, steel production, energy | (18th) 19th–21st |
| **14** | Plzeň and Stříbro area | **hardcoal** (steam coal), Fe, **Pb**, steel production, **pyrite, kaoline**, chemical industry, uranium | (14th) 16th–20th |
| **15** | Trutnov – Žacléř – Malé Svatoňovice area | **hardcoal** (steam coal), polymetal ore, U, coal energy | (16th) 19th–20th |
| **16** | Ostrava – Karviná area | **hardcoal** (coke and steam coal), chemical industry, **coke, energy**, oil refinery, **steel production**, | 18th–21st |
| **17** | Třinec | **steel production** | 20th–21st |
| **18** | Rosice – Oslavany area | **hardcoal** (coke and steam coal), **energy** | 18th–20th |
| **19** | Hodonín – Dubňany | **lignite** (peat lignite - steam coal), energy | 19th–21st |
| **20** | Břeclav area | crude oil, gas | |
| **21** | Olomouc–Opava area | **roof slate** (stone industry) | 19th–21st |
| **22** | Dolní Rožínka area (Vysočina) | **uranium** | 20th–21st |
| **23** | Stráž pod Ralskem area | **uranium** | 20th–21st |

*Table 1: The main mining and metallurgical centers (areas) in the Czech Republic. Refers to Fig 1.*

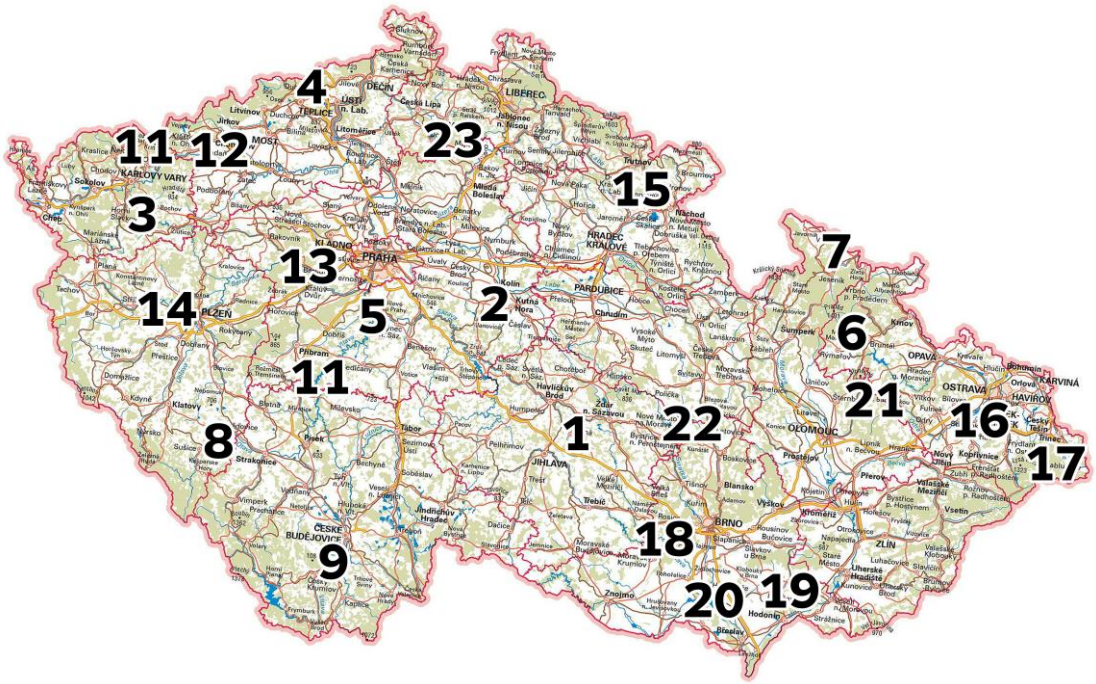


*Fig. 1: Refers to Table 1. The main mining and metallurgical centers (areas) in the Czech Republic.*

Coal has been mined in the Czech Republic since the 15th century, but the boom of mineral fuels came in 3/4 of the 18th century with a gradual 200-year-long growth. Since the 1980s coal mining has been decreasing. In 2020, is hard coal for coking still mined underground in 4 mines in Karviná County and lignite (steam coal) is mined in 5 large open-pits in northwestern Bohemia.

Despite dramatic achievements in the field of ecology, coal mining will probably be terminated under political pressure from the EU in the Czech Republic. This will be another small part leading to the collapse of European values and civilization, of which the using of fossil fuels is an integral part. Fossil resources cannot be quickly replaced by renewable sources with an EU directive without the fall of the European democratic system and its replacement by environmental totalitarianism. The increasing number of pensioners in the EU will never allow for a radical reduction in their standard of living. The EU is therefore trying to weaken their numbers by new residents, unfortunately from culturally incompatible areas.

It can be assumed that tourism will soon be climate-unfriendly to the EU. If this option occurs, it will affect the tourism, numbers and structure of visitors to Czech sacral, mining and metallurgical monuments.

**Kutná Hora**

In the area of today's Kutná Hora, there was a medieval settlement already in the 10th century in Malín, where even silver deniers from imported silver were minted. This fact is random in relation to the later intensive silver mining around Kutná Hora and Malín. In 1142 a Cistercian monastery was founded in Sedlec (today Kutná Hora). Perhaps this intellectual background led in the 13th century to a systematic search for ore veins, which in the second half of the 13th century (1260–1290) led to the discovery of the Kutná Hora deposit. This deposit became the most productive medieval silver deposit in Bohemia and led to great wealth of the whole Czech Kingdom. This made it possible to build impressive sacral buildings not only in Kutná Hora, but mainly in Prague, Kolín, Čáslav, and brought prosperity to the whole area and the Přemyslid dynasty and strengthened the Czech statehood (Kořan 1950).

The most important sacral monuments in Kutná Hora include the Church of St. Barbora (Barbara), the Church of St. Jakub (James the Elder), the Basilica of Nanebevzetí Panny Marie a svatého Jana Křtitele (Basilica of The Assumption of the Blessed Virgin Mary and St. John the Baptist) in the former Cistercian monastery in Sedlec on the site of the oldest Kutná Hora settlement and chapel with ossuary in Sedlec and church of St. Štěpán (Stephen) in Malín.

The most famous of these buildings is undoubtedly the Church of St. Barbora (Barbara). This building was built on a prominent promontory on the site of an older mining chapel, which probably originated at the beginning of mining in Kutná Hora from the end of the 13th century. The construction was carried out at the instigation of the Brotherhood of Corpus Christi. Rich burghers of Kutná Hora, traders with ore and silver, entrepreneurs in mining, metallurgy and related services invested in the construction. The construction took place in 1388–1558. The first phase of the construction was interrupted by the Hussite Wars. After the end of the

calming of the situation in Bohemia, the construction continued, but inflation of the silver price in the mid-16th century stopped the construction in 1588. Only about half of the grand project was built. In 1626 the Jesuits took over the temple and built a large college next to it. Between 1884 and 1965, a purist regotization of the temple took place, which was extended by one vault and gained a gabled roof, which with its three turrets forms a dynamic dominant feature of Kutná Hora. (Beneš-Vocel, 2004).

Other relatively well-known sacral buildings are the Cathedral of the Nanebevzetí Panny Marie a svatého Jana Křtitele (The Assumption of the Blessed Virgin Mary and St. John the Baptist) and the cemetery church and chapel with the ossuary of Všech svatých (All Saints) in Sedlec, originally part of the Cistercian monastery in Sedlec. The monastery was abolished in 1783 by the decree of Joseph II. In 1812, a state tobacco factory was placed here, which in 1992 was privatized into the Philip Morris concern. However, all sacral buildings continued to serve liturgical purposes. The public is most attracted to the ossuary in the Chapel of Všech svatých (All Saints) under the cemetery church of All Saints. There are large, artificially assembled objects made of human bones, forming a macabrous reminder of the Baroque motto "memento mori". These are the remains of about 60,000 deceased, buried in Sedlec cemetery.

The decoration of the Chapel and Church of Všech svatých (All Saints) with skeletal remains from the abolished cemetery began in the early 18th century by architect Jan Blažej Santini - Aichel, who rebuilt the monastery, the Cathedral of The Assumption of the Blessed Virgin Mary and cemetery church with ossuary All Saints in specific Czech "Baroque Gothic" style. The last artistic modification of the ossuary was made by František Rint in 1870. The ossuary is with its dimension an extraordinary Czech and perhaps even a European sacral and cultural heritage.

A real unique sacral example originating from Kutná Hora are the Kutná Hora sacral music manuscripts from the 15th and 16th centuries, which contain several, essentially secular depictions of mining and metallurgical activity, including the mining and processing of silver ores, trade, assaying and coinage of silver.

It is a Kutnohorský gradál (antiphonary) from the 70s of the 15th century from the workshop of Valentin Noha from Jindřichův Hradec, the work is stored in the Národní knihovna Praha (National Library in Prague) (Antiphonarium, 1470). Another well-known hymn book is the Kutnohorský Gradual from the turn of the 15th century and 16th century deposited in the Österreichische Nationalbibliothek Wien (Cantionale, Wien). Another monument is the Kutná Hora Illumination GASK, It is only one sheet (Kutnohorská Iluminace GASK). Originally it was obviously an introductory sheet of an unknown gradual.

These manuscript book illuminations illustrate in detail the many stages of mining and ore processing. They show us in detail horse whim with a crown gear (lantern gear) for lifting water in bulky leather bags from large depths, ventilation of mines using wind towers and hand wooden fans, working in mines and other related activities. In terms of the history of technology, especially mining and metallurgy, these are the most important sacral monuments originating from the Czech territory. In this specific context, they are perhaps the most important Czech mining monuments. Their importance was confirmed by the discovery of a wooden fan in the abandoned historical mine "Bylanka 4". The old ventilator dendrochronologically dates back to 1520.

Another important monument is the book of the Jesuit priest Jan Kořínek (1626–1680), the Old Memory of Kutná Hora, which was published in 1675. This book describes in detail Kutná Hora mining, including mining works and machinery. At that time, mining in Kutná Hora was already declining (Kořínek, 1675).

The town of Kutná Hora has a well-preserved center of the town and for its Central European importance it has become a UNESCO reserve, this nomination and announcement, unlike other localities, was conducted in a transparent and objective way.

From the point of view of mining and metallurgical monuments, the most important monument is the medieval silver show mine, Vlašský dvůr and horse whim. The silver show mine is the upper floor of the original Kutná Hora mines, which are flooded deep down. Vlašský dvůr is at the heart of a late medieval fortified palace with a mint and a cash register. The original mint cabins have been preserved here, where silver coins were minted. The most common cultural monument protected by the state are the town houses in Kutná Hora.

*Fig. 2: An ossuary in the Chapel of Všech svatých (All Saints) under the All Saints cemetery church of Cistercian monastery in Sedlec – Kutná Hora. Photo: Wikipedia*

*Fig. 3: Kutna Hora Gradual shows various details from mining, processing and trade of silver ores (Cantionale, Wien)*

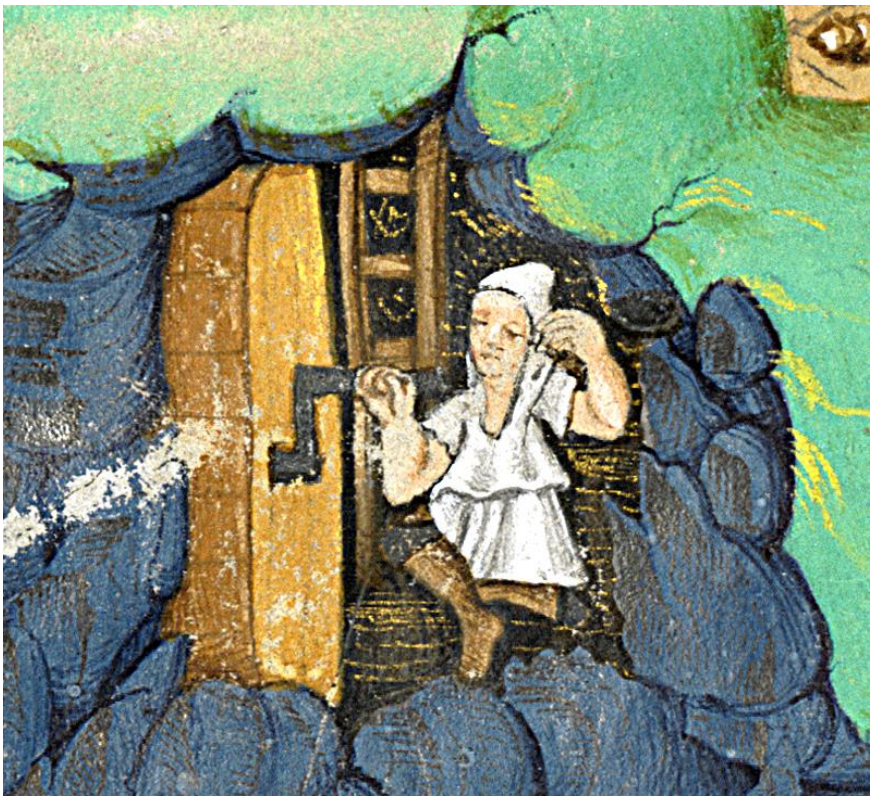

*Fig. 4: The age of Kutná Hora Gradual is estimated at the turn of the 15th and 16th centuries. Detail of wooden hand fan in mines of Kutna Hora (Cantionale, Wien).*

*Fig. 5: A wooden hand fan found in an abandoned mine "Bylanka 4". The wooden hand fan dendrochronologically dates back to 1520. The form corresponds with the figure 4 from Kutná Hora Gradual. Photo: Martin Přibil and Karol Šmehil, 2019*

**Jáchymov**

At the place of today's Jáchymov, at the end of the 15th century, there was a hammer mill and a small settlement called Kondradsgrün. In 1512, an adit was driven here, and the first rich silver vein (Fundgrubner vein) was discovered. In 1516, the mining settlement Joachimstal - Jáchymov was founded. The settlement and mining grew rapidly, the settlement acquired city rights in 1520. In the second half of the 16th century, the negative economic effect of silver inflation began to be manifested by the import of cheap silver from America from Potosi. In the first half of the 17th century, the mines were declining, with some growth in the 18th century with an interest in cobalt and bismuth. In the mid-19th century, uranium mining began here for the first time in the world. The greatest boom in Jáchymov came after 1945, when uranium for the USSR began to be mined to a large extent. This stage lasted only until the end of the 1950s, in 1964 uranium mining was ended. Only the Svornost Mine remained in operation due to the pumping of radioactive waters for medical purpose for Jáchymov Spa. (Majer, 1968).

There is considerably lower number of significant sacral monuments in Jáchymov than in Kutná Hora. There are several chapels. The first is the Chapel of St. Jakub (James). This chapel was built on the site of the original wooden chapel from 1517, which was founded near the place where after 1512 silver ores were discovered on the Fundgrubner vein and mining in Jáchymov began. It is therefore a very important sacral place. Next is the chapel of Jan Nepomucký (John of Nepomuk), from the beginning of the 18th century and the Chapel of St. Barbora (Barbara) from 1770. The largest sacral monument in Jáchymov is the Church of St Jáchym (Joachim). This church was also founded on the site of the original chapel, which was located at the outcrop of the Küh vein. The spirit of the city was evangelical until the re-catholicization in the 17th century.

An important sacral monument near Jáchymov was the Capuchin monastery and church from the end of the 17th century in Mariánská (Mariasorg), which was abolished after 1945 and gradually destroyed by the Communist police supervising uranium mining. The most common state-protected cultural monument in Jáchymov are burgher houses (21 Outings, 2012).

From the European point of view, the “handsteins” (handstones) are probably the most important religious monuments in Jáchymov. They are interesting aggregates of argentite, which were artistically adjusted into ornate pedestals. Religious motifs, which are at the top of the composition, were then carved into the argentite aggregates. There are often scenes from mining or penitents in the body under a religious motif. Sometimes the original natural essence of the mineral has been preserved in places. In particular, the scenes from mining are an interesting iconographic document and a contribution to the history of mining. The most important “handsteins” from Jáchymov are the work of the goldsmith Kaspar Ulich (1515-1576) and originated in 1540–1575. To the detriment of Jáchymov and the Czech Republic, none of the Jáchymov handstein is found in our territory, most of which are held by the Austrian State in the collections of the Kunsthistorisches Museum Wien (KHM Wien, 2019).

In 2019, Jáchymov, along with other sites, became part of the UNESCO Mining Region Erzgebirge. This announcement was not carried out objectively and transparently, it was pushed through by managers of various grant projects and the tourist-economic lobby. This is one example of how UNESCO works in a non-transparent and corrupt way and why the US and Israel have ceased to respect UNESCO.

*Fig. 6: Handstein mit Kreuzigung und Auferstehung Christi*. (Handstein (Handstone) with crucifixion and resurrection of Christ*) - Caspar Ulich, 2nd half of 16th century, Jáchymov (Joachimsthal), Bohemia. 30 cm × 14 cm × 11 cm. Kunsthistorisches Museum Wien, Kunstkammer Inv. No. KK 4149, Room XXIV. Photo: KMW.*

*Fig. 7: Handstein mit Bergwerk und Kreuzigung Christi* (Handstein (Handstone) with Mine and Crucifixion of Christ). *Caspar Ulich, 2nd half of 16th century, Jáchymov (Joachimsthal), Bohemia. 30 cm × 14 cm × 11 cm. Kunsthistorisches Museum, Kunstkammer Inv. No. KK 4157, Room XXIV. Photo: KMW.*

*Fig. 8: Handstein mit bärtigem Mann (Handstein (Handstone) with a Bearded Man). Caspar Ulich, 2nd half of 16th century, Jáchymov (Joachimsthal), Bohemia. Height 20,6 cm. Kunsthistorisches Museum, Kunstkammer Inv. No. KK 4162, Room XXIV. Photo: KMW.*

**Příbram**

The first mention of the existence of Příbram dates back to 1216. Although it is a historic site, there are not too many sacral monuments. The most important is the nearby Baroque pilgrimage complex on the Svatá Hora (Holy Mountain).

The most important sacral monument in city of Příbram is the Church of St. James the Great on the Great Square. Originally from the first half of the 13th century, it was rebuilt several times, most notably in the 18th century, to become re-Gothic in 1869.

A modern but distinctive church of St. Vojtěch (Adalbert) is located in the mining district of ore (Ag, Pb), part of Příbram - Březové hory. It is an Empire style building built in 1886–1889 according to a design by Antonín Baum and Bedřich Münzberger. This church is already off the traditional east-west sacral axis. It is a church built for miners and metallurgists, a prototype temple in the industrial age of steam. Another mining church of St. Prokop is located on a hill on Březové hory. The church is from 1880, built on the site of the chapel. It was built on the site of a bell tower from the 16th century, from which the bell from 1580 has been preserved. This place was probably related to the discovery of silver vein in these places (Velfl, 2013).

The most important sacral monument in Příbram and its environs is the pilgrimage complex on the Svatá Hora (Holy Mountain) intensively built by the Jesuit order since 1648. They built a pilgrimage path with a number of small chapels along the way from Březnice (Jesuits set up here a study campus as well) to Příbram. It was therefore a wider concept of sacral landscape.

The work of the Jesuit priest Bohuslav Balbín "Diva Montis Sancti ... Argentofodinas Przibramenses" , which is the first in the Czech space to display a water wheel with pumping rods leading to a mining pump, is related to the Jesuit college and intelligence (Balbín, 1665).

In May 1892 a large mining disaster occurred in Příbram, when 319 miners perished in a fire at the Marie Mine (38% of the 835 miners in shift). This mining catastrophe is commemorated by a cast iron monument in empire style in the cemetery.

In Příbram there are the most important technical mining monuments from the 18th to 20th century. They are located in the part of Příbram called Březové Hory. Since 1849, the Mining University has been located in Příbram. Příbram together with the town of Banská Štiavnica (Schemnitz, Selmaczbanya) in Slovakia and Leoben in Austria became the centers of Austro-Hungarian technical education. Příbram achieved world leadership in 1875, when the Vojtěch shaft exceeded 1000 meters (3280 ft) for the first time in the world. To the centenary of this event, a depth of 1838,4 m (1242 meters below sea level) was reached at uranium shaft No. 16 in Háje near Příbram. This shaft thus became the deepest European shaft in one vertical length (Kafka, 2003).


*Fig. 9: For the first time in the world, a depth of 1000 meters (3280 ft) was reached at the Vojtěch Mine in Příbram. Photo J. Mos, 1875.*

*Fig. 10: Uranium Shaft No. 16 in Háje near Příbram is probably the deepest shaft in Europe in one vertical length 1838,4 m (6031 ft). The deepest uranium mines in the Europe were in the GDR in the Schlema-Alberoda area, there is vertical difference nearly 2000 meters between the upper shaft and bottom of the deepest "383IIIbis" blind shaft, the absolute depth at the deepest point reached 1,470 meters below sea level in the cascade of shafts. The deepest mine below sea level in Europe was the anthracite mine Ibennbürren in the BRD, which reached a depth of 1630 meters below sea level in the year 2012. The shaft No. 16 near Příbram is situated at a higher position, shaft collar is 596 meters above sea level, so Shaft 16 reached a depth of 1242 below the sea level. Photo: Martin Přibil, 2008.*

**Ostrava – Vítkovice**

Vítkovice is now part of the Ostrava agglomeration, but previously it was an independent mining and metallurgical "steel" city. The first mention of the village is from 1357, but it was a very small village. Vítkovice began to develop intensely with the development of mining, coke, metallurgy and mechanical production after 1828, when the blast furnaces were established and hard coal mining started. Hard coal began to be mined in the Ostrava and its surroundings in 1776. Later, mining expanded throughout the area and continued in the direction of Karviná. This coal area is called the Ostrava-Karviná District. Coal mining in the Ostrava area stopped in the 1980s and 1990s.

There are only two sacral monuments, one church and one vicarage. The Great Synagogue was burnt down by the Nazis during the war. One small chapel, St. Florian was in the premises of the ironworks and was demolished.

Great Church of St. Paul the Apostle was founded (as in Příbram) off the east-west axis. Land and building materials and finances were provided by Vítkovice Ironworks, the temple was built in 1880–1886. For the inhabitants of the industrial city, only one large temple and one large synagogue were enough. In Vítkovice there are more state-protected technical monuments than sacral monuments (Matěj – Korbelářová – Tejzr, 2014).

*Fig. 11: Vitkovice Ironworks, Cokery Plant and Hard-coal Mine "Hlubina". National cultural monument of Czechia (the highest form of cultural monument protection). Despite the highest possible status of monument protection, Vítkovice Ironworks was damaged by ambitions of architects and local politicians to build their own monument here in the form of various inappropriate building extensions. For example "Usain Bolt Tower" on the top of Blast Furnace No. 1. Photo: Martin Přibil, 2015.*

**Karviná**

Karviná is situated relatively close to Vítkovice and belongs to the same industrial area called Ostrava-Karviná District. Coal is still mined underground in 4 large mines. Near Karviná there is a very interesting sacral monument marked by mining. It is the Church of St. Peter of Alcantara. Allegedly there was a wooden church of St. Martin already in the middle of the 15$^{th}$ century. The present church was built by the owner of the estate, the Larisch family in 1756–1759 and had an ancestral tomb (Mojžíšek, 1996).

The area was still relatively sparsely built up in the 19$^{th}$ century, but gradually with the development of mines a number of colonies and a large settlement formation today called the "Old Karviná" were established here. Church of St. Petr (Peter) of Alkantara was located directly between the large mines of ČSA, Lazy and Darkov at the site of intensive mining. It absorbed the entire settlement formation, as well as mining colonies where about 20,000 people lived, who moved to new housing estates. The only one left is the Church of St. Petr (Peter) of Alkantara, but even that is not in its original location, as a result of longwall mining in several coal seams above each other, it dropped by 37 meters and happily remained in the otherwise abandoned mining depression basins (SOA Karviná, 2010).

*Fig. 12: Church of St. Petr (Peter) of Alkantara in Karviná dropped by 37 meters due to coal mining underground. Photo: Martin Přibil, 2019.*

*Fig. 13: Mining cultural landscape in Karviná is an example of a living prosperous industrial landscape, bringing prosperity to the whole region. Photo: Martin Přibil, 2016.*

**Most**

Most is a former historic town. Historic center of Most was demolished in behalf of progress and lignite (steam coal) mining. One of the preserved monuments is the late gothic Church of Nanebevzetí Panny Marie (Church of The Assumption of the Blessed Virgin Mary). This temple was built on the site of an old burned down church, the construction lasted from 1517 to the 17$^{th}$ century. In 1975, the church was moved by 841.1 meters (2759 ft) on a rail chassis to a new place outside coal mining area. It is therefore another sacral monument directly related to mining (Přesun, 1976; Koukal, 2007)


*Fig.13: Movement of the Church of The Assumption of the Blessed Virgin Mary in Most, before the advancing coal open pit. Photo: anon., 2016*

*Fig. 14: CSA Open Pit near Most. It is not exactly the most beautiful landscape, but coal open pits give us high quality and nowadays more environmentally friendly electricity and heat.*

## Conclusion

The Czech Republic cannot boast of prehistoric ore mining or prehistoric sacral shrines. However, a number of remarkable results have been achieved in the Czech Republic in mining and metallurgy. It is a remarkable depth of mine in Kutná Hora, around 500 meters or more at that time (16$^{th}$ century). Furthermore, it reaches a depth of 1000 meters at the mine Vojtěch in Příbram in 1875. Equally remarkable is the volume of steel production in the 20$^{th}$ century. There are also a number of interesting sacral monuments in the Czech Republic, which were created thanks to the wealth brought by mining and metallurgical activities, these are the historic centers of cities such as Prague, Kutná Hora or Český Krumlov. A number of sacral music manuscripts are also coming from the territory of the Czech Republic. They contain world-famous scenes that document mining activity at the turn of the 15$^{th}$ and 16$^{th}$ centuries. In a way, there is also a unique relocation of the Church of the Assumption of the Virgin Mary in Most, which was standing and reinforced in 1975 and moved on rails outside the reach of coal open pit mining. An analogy of this shift is the decline of the church of St. Peter of Alkantara in Karviná which dropped by 37 meters into mining depression basins due to the longwall mining in several coal seams above each other.

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# Brestovská Cave as a new locality for speleotourism in Slovakia

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*Abstract*

*On August 31, 2019, three years have passed since the Brestovská Cave was opened to the public. This cave is the youngest cave open to the public in Slovakia and the only one opened in the Orava Region. Brestovská Cave lies in the cadastral area of the Zuberec village, near the Museum of the Orava village in the West Tatra Mountains. The cave administrator and operator is the Slovak Caves Administration based in Liptovský Mikuláš, which is an organizational unit of the State Nature Conservancy of the Slovak Republic. There is no artificial lighting in the cave. Visitors are equipped with helmets and headlamps. This form of access is called a speleological guide service. Our article deals with complex characteristics of the cave (physico-geographical conditions, history of discovery, research, cave access and protection, cave attendance analysis).*

***Key words:*** *Brestovská Cave, cave attendance, speleotourism, West Tatra Mountains, visitors*

## Introduction

Karst areas in the Slovak Republic occupy an area of 2700 km$^2$. In terms of geotourism, they represent a highly attractive area with a wide range of surface and underground karst forms. Caves are the most important underground karst forms. According to Nature and Landscape Protection Act no. 543/2002 Coll., the cave is a man-accessible and naturally created hollow underground space in the Earth's crust whose length or depth exceeds 2 m and the dimensions of the surface opening are smaller than its length or depth. 7242 caves are officially registered in the Slovak Republic as of 31.12.2017.

In terms of speleotourism, 18 caves are open to the public in Slovakia. 13 of them are operated by the Slovak Caves Administration: Belianska Cave, Brestovská Cave, Bystrianska Cave, Demänovská Cave of Liberty, Demänovská Ice Cave, Dobšinská Ice Cave, Domica Cave, Driny Cave, Gombasecká Cave, Harmanecká Cave, Jasovská Cave, Ochtinská Aragonite Cave, Važecká Cave. 5 caves are operated by other entities: Krásnohorská Cave, Dead Bats Cave, Bad Hole Cave, Bojnice Castle Cave, Small Stanišovská Cave. So far, the last cave opened to the public in Slovakia was Brestovská Cave on August 31, 2016. It became the only cave open to the public in Orava Region and West Tatra Mountains and the second (after the Belianska Cave) in the Tatra National Park. Brestovská Cave was opened to the public in a special form of access - speleological guide service. There is no artificial light in the cave, helmets, and headlamps are available for visitors. Krásnohorská Cave, Dead Bats Cave, Bad Hole Cave, and Small Stanišovská Cave have a similar form of access.

Speleotourism is a special form of geotourism. It is defined (Zelenka and Pásková, 2012) as a form of tourism associated with the exploration and discovery of cave spaces and abysses. Climbing activities, cave diving, etc. are part of this. Their definition is an example of an understanding of speleotourism in the narrower sense of the term. Also, Panoš (2001) defines speleotourism, more narrowly, as an organized speleological activity focused on cultural-cognitive activities in unavailable (to the public) underground karst forms (caves and abysses). These forms are available for people with basic equipment (helmet, own lighting) and under the guidance of an experienced professional guide (speleologist). Speleotourism, in the broader sense, is understood as an individual or group tourism, organized in commercial interest in the caves opened to the public or other attractive karst forms equipped with safety equipment. Such areas are illuminated, have signposted trails, stairs, locked entrance, some have electric lifts. They are technically secured, and the tour is carried out with the help of a trained guide.

The problem of speleotourism, or of the use of caves and karst phenomena in geotourism has been addressed by several authors. General characteristic of speleotourism was discussed by Cardozo Moreira and Neto de Carvalho (2013), Cigna and Burri (2000), Cigna and Forti (2013), Doorne (2000), Kranjc (2008), etc. Regional aspects of geotourism have been addressed, for example in the work of Anderson (2010), Antić (2018), Cigna (1993), Emeka et al. (2017), Figueiredo (1998), Forti and Cigna (1989), Knežević and Grbac-Žiković (2011), Lobo (2007), Lobo and Moretti (2009), Pavlovich (2003), Tičar et al. (2018), Tomić et al. (2018).

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This paper aims to brief description of the physico-geographical conditions of the cave, the history of discovering, research, opening and protection of this locality. In the second part of the paper, we analyze cave attendance, especially on the basis of statistical data obtained during the first year of the cave operation.

## Materials and methods

In the first step, we performed an excerpt of all available literary and map works about the cave. We also used materials in the archives of the Slovak Caves Administration, the Slovak Museum of Nature Protection and Speleology and cave groups operating in the area. In these places, we also consulted the necessary issues with individual workers, active and inactive speleologists. The second step was the field research in the underground spaces of the cave as well as on the surface around it. We went through the accessible route as well as the spaces outside it, we also moved in the aquatic environment. We made photo documentation and made partial measurements - especially climatic. In the third step, we gathered statistics about cave attendance, worked out the relevant map outputs in the GIS environment and analyzed and processed all the data for publication.

## Location and delimitation of the cave

Brestovská Cave is located in northern Slovakia in the Žilina Region and Tvrdošín District. It belongs to the cadastral area of Zuberec Village and the local area of Zuberec-Brestová (Fig. 1). Near the cave, there is the Museum of the Orava Village. The entrance to the cave is oriented to the north in the wooded slope of the Studený Potok Valley, at an altitude of 867 meters above sea level. The total length of the cave is currently 2026 m. In terms of the geomorphological division of Slovakia (Mazúr et al., 1986), the cave belongs to the sub-province of the Inner Western Carpathians, the Fatra-Tatra Region, the geomorphological unit of the Tatras, the sub-unit of the Western Tatras and the geomorphological part of Roháče. The cave lies in the territory of the Tatra National Park.

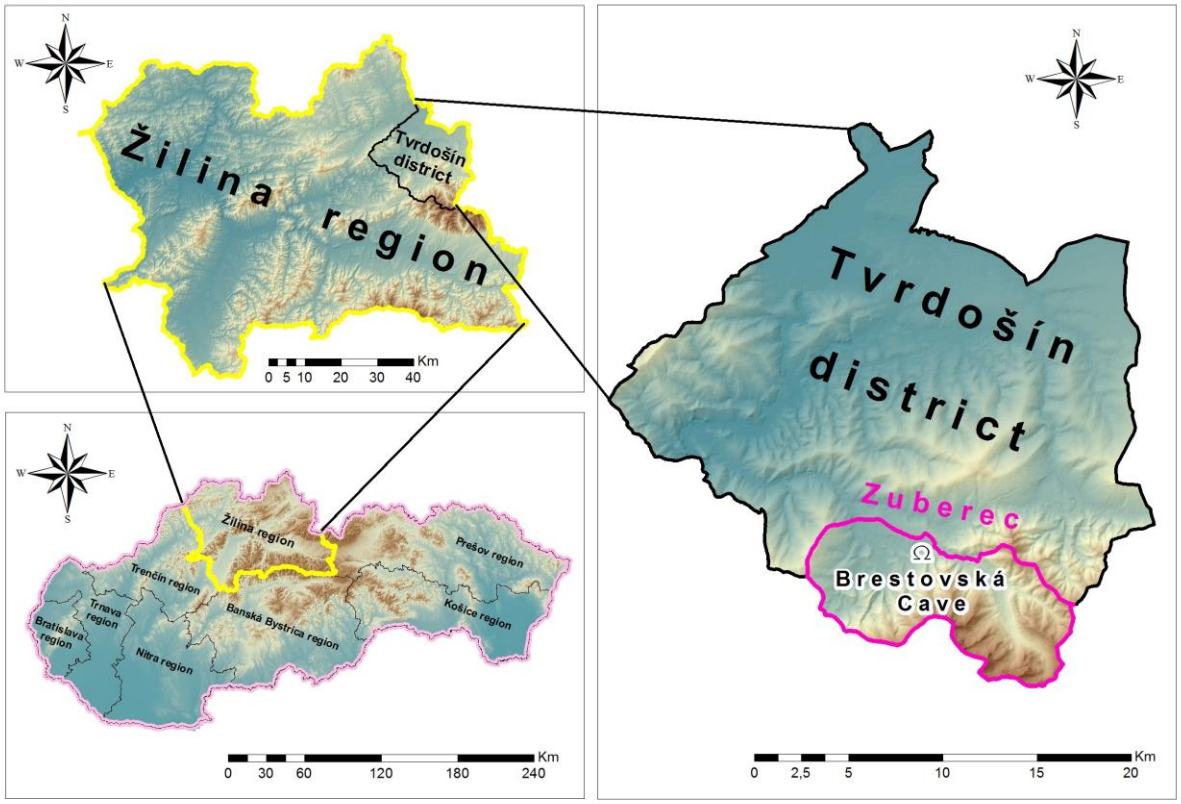


*Fig. 1 Location of the Brestovská Cave in Slovakia*

## Results and Discussion

*History of discovering, research, opening and protection*

The first written mention of the cave, more precisely of today's Brestovská spring, comes from the pen of Tytus Chalubinski, a famous Polish lover of the Tatras and the founder of the Tatra Association in Zakopane. In 1886, he writes about it as "a cave by the springs of Cold Water" (Chalubinski, 1886). A year later, the cave

Stetkówka (Brestovská Cave) is also mentioned by J.G. Pawlikowski, another member of the association and pioneer of nature protection and speleology in the Tatras (Pawlikowski, 1887). Already at that time, he considered the possibilities of opening the cave and regretted its location, aside from the interest of tourists. A military garrison from Dolny Kubin in 1923-1925 also participated in the cave survey. They managed to get about 250 m from the entrance where they were stopped by a water siphon. In 1929 the cave is mentioned by Polish geographer M. Gotkiewicz under the name Zuberecká Cave (Lalkovič, 2008). The Stetkówka Water Cave is mentioned in 1936 in T. Zwolinski´s guide about the Tatras and Zakopane (Zwolinski, 1936). In the same year, the military circles began to consider the use of known cave space in terms of civil protection of the population against air raids, or as a place to store military material. In 1950 P. Čaplovič also mentions the cave under the name "Cave in Roháče" (Čaplovič, 1950). After the foundation of the Slovak Speleological Society in 1949, J. Brodňanský, the founder of an organized speleology in Orava, joined the cave exploration. He aimed it to the length of 445 meters and named it Brestovská Cave for the first time (Bella et al., 2016). Further research of the cave was possible only by a diving survey, which was first carried out in 1968 under the leadership of the Slovak Karst Museum in Liptovský Mikuláš with the participation of diving club members from Žilina. In 1969 the cave was geomorphologically examined by Anton Droppa, an employee of the Institute of Geography of the Slovak Academy of Sciences (Droppa, 1972). In 1979 the 120 meters long siphon in the cave was overcome, in 1981 about 600 meters of new space were surveyed. At present, the cave speleological survey is mainly attended by speleologists from the Orava Region group.

The first intention to open the Brestovská Cave was developed by the Slovak Caves Administration in Liptovský Mikuláš at the end of the 1970s. This idea was not finally realized. Cave, more precisely its entrance lock was often damaged in the 80s and 90s by vandals or covered in waste. Negative anthropogenic interventions in the Brestovská Cave were manifested mainly by damage to the sinter filling. In accordance with Nature and Landscape Protection Act Nr. 543/2002 Coll., the cave became a National Natural Monument and in 2008 a cave protection zone with an area of about 60 hectares was declared. Additional cave research, based on which the project of the cave accessibility was processed, was carried out by the Slovak Caves Administration in 2006-2007 and published in 2008. Before the cave was opened, certain limits and conditions of attendance were set to minimize disruption of the fragile cave environment. It was necessary to limit tourist access during the winter months due to the hibernation of bats. During the hibernation period (November-March), it was suggested to limit access to a maximum of 3 to 4 admissions per day, with a maximum of 10 to 15 persons per admission, and there should not be two groups of visitors at the same time. It was proposed to determine the number of visitors during the day, because the cave, due to its morphology (cramped and small spaces), does not allow more visitors. Opening works in the cave began in IV. quarter of 2015, they were paid from the Environmental Fund within the Ministry of Environment of the Slovak Republic. The walkway was led over the riverbed to avoid treading on habitats and fluvial sediments. Several staircases, bridges and steps are installed on the tour route. In the accessible section of the cave, artificial belay devices and staircases take up a length of 97.3 m, of which staircases are 47 m. Above the entrance door to the cave is a fly-in opening for bats. Surface path to the cave entrance with instruction panels was modified and completed in August 2016. The length of the accessible part of the cave is 217 m, however, since the entire route is passed two times, back and forth, the length of the sightseeing route is 434 m and has 240 steps. The duration of the tour is about 50 minutes and the number of visitors per entrance is limited to a maximum of 15 persons, the price of an adult ticket is 8 euros. The route leads from Vstupná chodba (Entrance Hall) through Zuberecká chodba (Zuberecka Passage), Brodňanského riečisko (Brodňanského River Basin), Jazierková sieň (Lake Hall), Bivaková sieň (Bivouac Hall) and Kopečného chodba (Kopečného Passage) to Sieň potápačov (Divers' Hall), from where visitors return (Fig. 2). The cave was solemnly opened on August 31, 2016, with the participation of the Minister of the Environment. Since the cave is not electrically illuminated, every visitor must wear a helmet and headlamp provided by the operator - State Nature Conservancy of the Slovak Republic, Slovak Caves Administration

*Physico-geographical conditions*

The space of the cave itself, through which ponor allochtonous waters flow, is created in light gray Ramsau dolomites with irregularly spaced inserts of darker Gutenstein type of limestones. There are also dark gray Reifling limestones with irregular chert positions. Paleogenic rocks consisting of dolomite and limestone-dolomite breccias and conglomerates rise in the highest part of the cave on the ceiling (Vlček and Psotka, 2008). Cave passages are developed on significant tectonic disturbances; therefore they have mostly straight course. Their breaks originated at the crossing of structural defects. The largest cave spaces were formed along the east-west faults direction. The Brestovská Cave is a flow fluviokarst cave, which is part of the underground hydrological system between the Brestovská vyvieračka (Brestovská Spring) and the ponors of the allochtonous waters of Studený Brook and its tributaries from the side valleys. The underground spaces of the Brestovská Cave are known mainly in the spring and middle flow part of the hydrological system. The length of the Old cave (as we called it), which from the entrance includes freely accessible underground spaces to the tributary siphon overflowed with speleodivers, is about 445 m. This siphon is followed by extensive, non-flooded parts of the cave divided by three shorter sumps but bypassing the non-flooded corridors. The cave ends by the 5$^{th}$

tributary siphon, which was not overflowed yet. In terms of vertical division in the cave are distinguished two floors. The lower floor is a corridor with an active underground watercourse (Brodňanského River Basin, Lake Hall, lower part of the Zuberecká Passage), upper floor is a section of higher-lying inactive corridors with a more or less uneven longitudinal profile (Kopečného Passage, Zuberecká Passage), which formed about 5 to 10 m above the current river bed on the lower floor (Bella, 2008). There are relatively few classical sinter decorations in the cave. The formation of richer dripstone decoration is limited by a thin rock overburden with a small proportion of chemically pure limestones. Therefore, the water leaking into the cave from the precipitation contains a relatively small amount of dissolved calcium carbonate. Part of the sinter decoration was damaged or broken by vandals in the past. Brestovská Cave is considered from a hydrological point of view as a very important site. It is dominated by a continuous underground stream running through the lower floor. The complete course of the underground river is not yet known. Nevertheless, its length in the focused part of the cave along with water siphon reaches almost 600 m. According to current knowledge, the stream is supplied by several sources. The main ones are surface waters flowing in the cave basin. In the karst-nonkarst contact zone, they disappear into the underground in ponors. Groundwater allochthonous waters of shallow circulation of own hydrogeological structure are also involved in the creation of the underground hydrological system in the cave. The largest surface stream in the vicinity of the cave is Studený Brook, which originates in the crystalline rocks of the northern slopes of Roháče. Tracing tests at the site proved the communication of the surface water of the Studený Brook with the groundwater stream in the cave (Haviarová and Pristaš, 2013). The cave's underground stream regime is strongly influenced by external climatic and hydrological conditions. According to its monitoring, the lowest flow rates are related to winter months (January, February, March). The highest flow rates are associated with the snow melting period (April, May), although the short-term increase also occurs during the year after intensive or possibly longer rainfall. The average flow rate in the cave ranges from 100 to 150 l/s, it can increase relatively quickly to several times its original volume. The accompanying phenomenon of the increase in the flow rate is the rise of the water level on the main river, which in some places of the cave can reach 2 meters at the time of extremes. Such situations were recorded in the cave, for example in July 2008, July 2010, September 2010 and May 2014. One of the reasons for the rise in the level of the underground stream is the existence of several siphons along its route. The cave is known for the presence of 7 speleological diving explored and documented siphons in a total length of 220 m (Haviarová, 2008). Brestovská Cave lies in a cold climate area with a July temperature of 12 to 16°C. The average annual rainfall ranges from 1000 to 1200 mm. The average annual air temperature in the Entrance Hall is 6°C. The only aperture to exchange air between the surface and the cave climate are the vents for bats at the cave entrance. The influence of the external climate is manifested only in this part of the cave. The coldest part of the cave is the space along the active underground watercourse. The average air temperature in the Divers´ Hall, with an underground river, is 5.8°C. The water temperature in the riverbed was around 5.1°C. The course of air temperature in the monitored parts of the cave has an uneven character. The minimum readings are in the Entrance Hall and Lake Hall in May, and in the Divers' Hall in April. The highest temperatures are measured at all three sites in September. Maximum surface temperatures are in July, the shift of maximum values in the monitored parts of the cave by two months is probably caused by a delayed response of underground spaces to surface temperature changes. Based on the analysis of the terrestrial biocoenosis of the Brestovská Cave, it is possible to find the presence of representatives of terrestrial arthropods - troglophilic isopods *Mesoniscus graniger* and *Ischyropsalis manicata*, which are Carpathian endemites. They are characteristic indicators of wet and cooler habitat types. This is one of the northernmost habitats of this species in Europe, and probably the terrestrial cavernicolian isopods (*Isopoda*) at all. Both species are limited by their occurrence to the entrance part of the cave (Entrance Hall). This area near the surface with the presence of water and organic material is characterized by a relatively varied representation of surface fauna. These are mostly: *Tetrodontophora bielanensis, Acrogalumna longipluma, Nebria rufescens* and a lot of millipedes, gastropods, spiders, earthworms. The brown frog (*Rana temporaria*), was observed several times in the watercourse. Higher dry areas of the cave (Lake Hall, Bivouac Hall and Kopečného Passage with adjoining corridors) are inhabited by little diversified communities of fauna composed almost entirely of *Diptera, Collembola* and *Acarina*. The most famous and numerous representatives of the cave fauna are bats. Brestovská Cave is one of the most varied underground shelters of bats in the Tatras. So far, 9 species of bats have been identified in the cave and in the immediate vicinity of its entrance. However, only *Myotis myotis* hibernates regularly and in larger numbers. *Myotis mystacinus* and *Myotis brandtii* hibernate irregularly, occasionally also *Rhinolophus hipposideros, Eptesicus nilssonii, Eptesicus serotinus, Barbastella barbastellus* or thermophilic Mediterranean species - *Rhololophus ferrumequinum*. Brestovská Cave is in general one of the northernmost known hibernation areas of *Rhinolophus ferrumequinum* in Slovakia and Europe *Myotis nattereri* was detected in the autumn. The period of winter sleep (hibernation) in case of bats usually lasts from late October to mid-April (Kováč et al., 2008).

*Cave attendance*

Brestovská Cave was opened for speleotourism from 1.9.2016. In 2017 it was visited by 10853 visitors. The total number of visitors in 2018 was 10726 and in 2019 it was 10 269. It has a slight decreasing tendency. For comparison, the total attendance of all caves operated by the Slovak Caves Administration was 633,158 persons in 2017, so the share of Brestovská Cave in the total amount is only 1,67 % and is the last in the ranking. In 2017, Belianska Cave takes the first place (128 437), the second is Demänovská Cave of Liberty (119 908). On weekdays and outside the summer months, 4 entrances to the Brestovská Cave take place daily. The maximum capacity of visitors per entry is 15 persons, entries are made at a 90-minute interval starting at 9:30 and last entry at 14:00. During the top season, from the beginning of May, there are 6 entries per day. Intervals: 09:00, 10:15, 11:30, 13:00, 14:15 and 15:30. There are even 10 entries per day during the Easter holidays. However, the maximum number of people per entry does not change, so the maximum is still 15 persons. Children under 6 years of age cannot enter the cave. It is also interesting that the cave is closed every Monday. The main onslaught of visitors was apparent from September 2016 to December 2017 in the summer season in July and August 2017. The minimum number of tourists visited the cave in January 2017. In November and December 2016 and 2017 the cave was closed to the public. The increased number of visitors in February 2017 compared to January 2017 was probably due to the more favorable snow conditions at the nearby ski resort in February, and thus to a higher concentration of visitors in nearby accommodation facilities and their interest in the cave (Table 1, Graph 1). The most numerous nationalities among the visitors of the cave are the Slovaks, who make up 86.76%. Behind them are Czechs (6.78%) and Poles (5.51%). Visitors from other countries such as England, Germany, Russia or other countries do not reach 1% together and their share in the total cave attendance is minimal, even negligible (Table 2).

| **Month/ Year** | 9/2016 | 10/2016 | 11/2016 | 12/2016 | 1/2017 | 2/2017 | 3/2017 | 4/2017 |
|---|---|---|---|---|---|---|---|---|
| **Number of visitors** | 1547 | 1494 | 0 | 0 | 330 | 749 | 646 | 550 |
| **Month/ Year** | 5/2017 | 6/2017 | 7/2017 | 8/2017 | 9/2017 | 10/2017 | 11/2017 | 12/2017 |
| **Number of visitors** | 810 | 1383 | 2257 | 2353 | 1064 | 711 | 0 | 0 |

*Table 1 Cave attendance from 9/2016 to 12/2017*


*Graph 1 Cave attendance from 9/2016 to 12/2017*

| Country | Total number | in % |
|---|---|---|
| Slovakia | 9416 | 86,76 |
| Czechia | 736 | 6,78 |
| Poland | 598 | 5,51 |
| Great Britain | 42 | 0,39 |
| Germany | 26 | 0,24 |
| Russia | 18 | 0,17 |
| Other | 17 | 0,16 |
| **Total sum** | **10853** | **100** |

*Table 2 Cave attendance by the nationality in 2017*

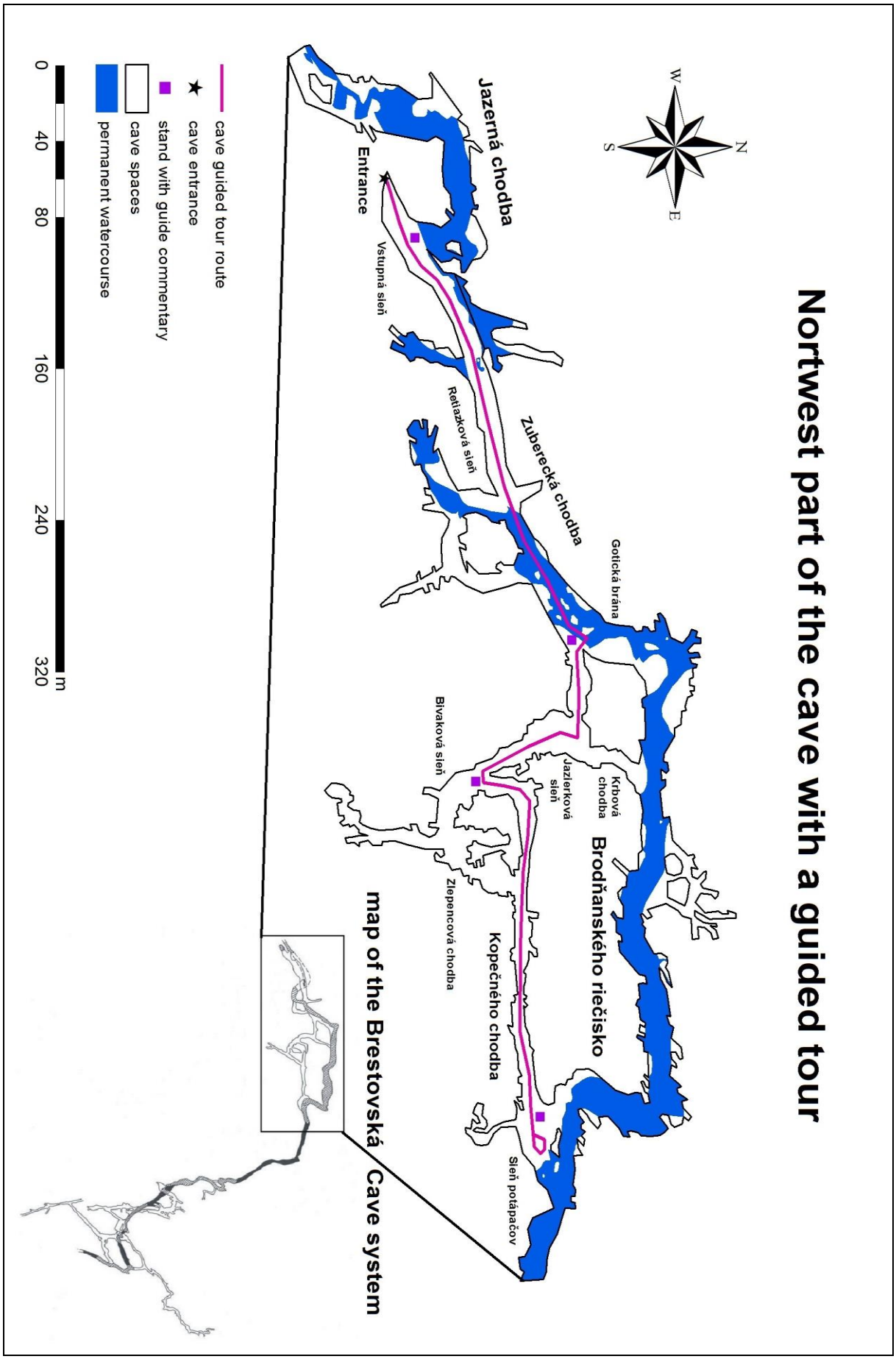
Nortwest part of the cave with a guided tour
map of the Brestovská Cave system
Jazerná chodba
Entrance
Vstupná sieň
Retiazková sieň
Zuberecká chodba
Gotická brána
Bivaková sieň
Jazierková sieň
Krbová chodba
Brodňanského riečisko
Zlepencová chodba
Kopečného chodba
Sieň potápačov
cave guided tour route
cave entrance
stand with guide commentary
cave spaces
permanent watercourse
0
40
80
160
240
320
m
W
N
S
E

*Fig. 2 Map of the Brestovská Cave*

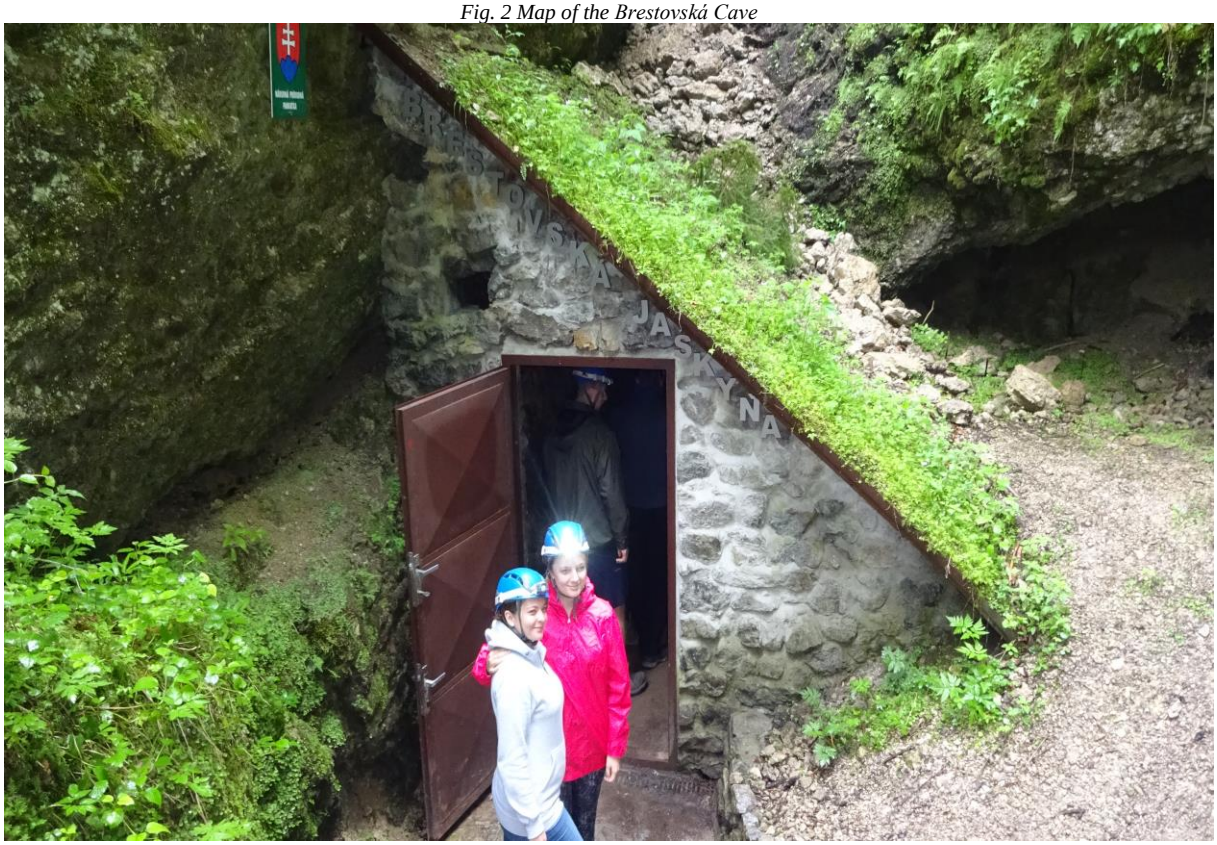

*Fig. 3 Entrance to the Brestovská Cave*

*Fig. 4 Steel footpath over the underground river*

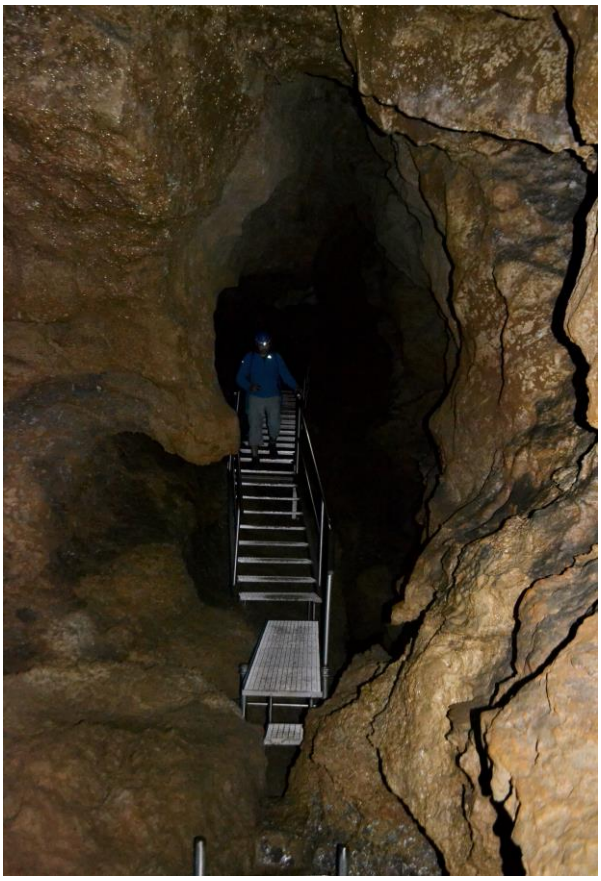

*Fig. 5 Ladders and staicases in the cave*

*Fig. 6 Visitors in the cave*

*Fig. 7 Explanation in the cave*

## Conclusion

Brestovská Cave represents the most famous cave phenomenon of Orava Region and West Tatra Mountains, which is from 1.9.2016 open to the public as another geotourism object in the region. Alongside the neighboring Museum of Orava Village, the frequently visited Roháčska Valley and the nearby ski area, expands the offer of tourism in this area. The first reflections on making the cave accessible to the public date back to the 19$^{th}$ century, and the idea was realized after 129 years. Although the cave is not majestically decorated, it is nevertheless an invaluable jewel of the nature of Orava Region. Alongside the Belianska Cave and the freely accessible caves, Brestovská Cave allows visitors to see the diverse underground world of the Tatras in a legal way. The route with a minimum of artificial belay devices reduces the anthropogenic impact on the fragile cave geosystem and allows visitors to experience an adrenaline experience underground, different from the classical accessible caves. The journey along the underground watercourse allows receptive visitors to listen to the murmur of raging water and in 'dry' corridors, concentrate on the sound of the impact of leaking drops. Cave air, in turn, has a beneficial effect on people with upper respiratory diseases. We only hope that the cave will become a stable and frequently visited place for speleotourism in this part of the Tatra Mountains and will become known not only to the people in Slovakia but also to foreign tourists.

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# Pilgrimage tourism in Košice and it`s surroundings

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***Abstract***

*Pilgrimage tourism is an important part of cultural and religious tourism. Regardless of their own proper motivation, it allows in every case visitor to become profoundly familiar with the cultural heritage of the visited area. This is also true for the researched area, as the pilgrimage centre in the past was Košice itself and several localities in its vicinity, of which we pay attention to Rudník, Obišovce, Malá Vieska, Bôrka and Úhorná.*

***Keywords:*** *pilgrimage, pilgrimage centres, cultural, religious and pilgrimage tourism*

## Introduction

### Pilgrimage tourism and pilgrimages

Pilgrimage tourism is an integral part of religious and cultural tourism. Pilgrimage is a specific, religiously motivated type of migration and represent an important but not exclusive travel motive of religious tourism. (Krogmann et al., 2017) Tourism starts when interest in a specific type of locality, in this case associated with religious cult, persists but one or more of all the transcendental motives of visiting such a place are eliminated (Bubeliny, 2011) and the need for education, recreation and so on comes to the fore. As religious tourism is therefore referred to when people, who may or may not be Christians, are acquainted with Christian tradition through exploring of history or monuments of cultural heritage. (Hatalová, 2012)

A folk pilgrim could barely dream of wandering into sacred places in distant lands. Wandering beyond the frontiers of birth county was also an extraordinary event. However, he was able to find "sacred" also in the microcosm of his village life, during the recurring cycle of the liturgical year within the boundaries of his own village: at the chapels and the crosses alongside the roads ... "Ceremonial walking before great holydays have origin in a folk representation of the biblical event of the search and discovery of the tomb of Christ."(Buganová, Šangala, 2002) Pope Francis said of a spiritual meaning of pilgrimage that it is a symbol of life. "It makes us think of life as walking, as a path. If a person does not walk, but instead stays still, this is not useful; it accomplishes nothing. Think of water: when water is not in the river, it does not course, but instead it remains still and stagnates." And so, does the soul that does not walk in life doing good or seeking inspiration from the Holy Spirit, according to the Pope. (Sontag, 2016) The very word journey, tied narrowly to the pilgrimage, is an ancient symbol of being of humans in the world. (Kučerková and Knapík, 2018)

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*Fig 1 "On the pilgrimage" (www.burv.sk)*

The pilgrimage of believers to pilgrimage sites, individuals or groups, has always been part of the Catholic faith. Accompanied by sounds of a religious songs and praying, the procession led by the priest set off to a march for several days, most often on foot. The parade, in which everybody had own place according to his age and sex, carried crosses, religious paintings and Marian flags. Pilgrimage encouraged the Church and ecclesiastical orders in the context of the boom of Baroque piety and counter-reformation, in a territory divers in religious and ethnic terms. Legends of miracles, revelations, miraculous healings, merciful images, or other similar motives were often created post-hoc in pilgrimage sites. Sometimes, however, the reputation of the place was the decisive impulse for the development of the pilgrimage site (Úhorná). In the case of Calvary in Košice, however, such a context was lacking completely, and the reason for its origin was primarily the manifestation of Baroque Catholic piety and the development of the Marian cult in the city, which at that time still had a fresh tradition of Reformation in memory.

Pilgrimage sites served the people of a wide neighbourhood, often from distant counties as well as the urban population of Košice. Within today's Slovak territory, they concentrated more and more in its east, which in this respect equalled the western and north-western parts of Slovakia. (Fekete, 1941) The current popularity of some religious tourism destinations is a faithful reflection of the peripetia of historical development. Places that were once visited by numbers of pilgrims up to tens of thousands during the pilgrimage before World War I or even World War II, survive sometimes with an interrupted tradition as places of local importance. This was mainly due to political reasons such as the post-war delimitation of state borders, the persecution of a particular church (the case of the Greek Catholic Church from 1950 to 1990) or the political unacceptability of a wider manifestation of religious sentiment in the years of dictatorship. This went hand in hand with changes in lifestyle and disruption of continuity, as happened to a large number of inhabitants of Košice during its tumultuous industrialization and a sudden increase in population, coming from all possible extremities of the then Czechoslovakia. In many cases however, these places continue to enjoy unchanging respect and popularity among pilgrims, despite the often unfavourable circumstances in the past (Rudník, Obišovce, Úhorná).

**St. Elizabeth Church and Calvary in Košice**

Thanks to the favourable historical development Košice has become a natural religious centre of the wide surroundings. In this position, Košice followed the Benedictine Abbey in Krásna n. Hornádom from 1143, which was one of the most geographically extreme centres of the Benedictine monastic life in the whole of Europe. Over the centuries, more male and female religious orders have settled in Košice. At the time of the occupation of part of Hungary by the Ottomans, Košice first became temporary seat of ecclesiastical administration (Eger Bishopric and Chapter 1603 - 1724), University (1672) and later also the seat of its own ecclesiastical province - Bishopric of Košice, 1804 (today Archbishopric). These institutions, both by virtue of their authority and naturally as cultural and educational centres, influenced the broad background of the city. The city of Kosice, surrounded itself by pilgrimage sites at a closer or greater distance from its gates, was also an important pilgrimage centre, probably according some sources already in the Middle Ages. Certainly, however, in modern times of the Marian Devotion´s blossoming. Within this chronological sequence, the city is currently adding another chapter thanks to the renaissance of religious life after the end of the totalitarian regime three

decades ago. Traditionally are at focus of pilgrim interest the first temple of the city - the Cathedral of Saint Elisabeth and the building complex of Calvary.

Some authors (Zubko 2012, 2014, Juckes, 2011) believe that the configuration of the main ecclesial monuments on the Main Street of Košice (St. Elisabeth parish church and neighbouring St. Michael's Chapel) reflect the fact that Košice was, from the middle of 14th century until when reformation was fully established in the city over the 17th century, an important pilgrimage centre of medieval Hungary. Specifically, the chapel, built in the style of Paris's Saint Chapelle, was about to serve precisely to **store the miraculous relics of the Holy Blood**. The Eucharistic miracle consisted in the appearance of Christ's face from accidentally spilled consecrated wine on the Corporal. The miracle could happen sometime around 1352. If so, Košice would became exceptional in this context also because it was a Christ-centric cult. And it was rare in Hungary then and in later centuries also. There are only a few historical sources on which the interpretations are based, but the most important of them is the bull of indulgence of Pope Boniface IX from the year 1402. The later transfer of Holy relics from the chapel of St. Michael directly to the parish church of St. Elizabeth, which then started to be rebuilt after the fire, was again witnessed by the bull of Pope Alexander VI from 1494, which mentions a number of miracles associated with the church of the St. Elizabeth. These miracles manifested themselves in the proselytism of the Orthodox pilgrims who came to the city because of Holy relics.

*Fig 2 Saint Michael Chapel. Saint Elisabeth Church on the background (www.flickr.com)*

Roughly at a time when in Košice the worship of the relics of the Holy Blood was to gradually disappear, the events of the early part of the Thirty Years' War marked the future restoration of the town as an important pilgrimage centre. In 1619, Jesuit priests - Stefan Pongrác and Melchior Grodecký and the canonist Marek Križín of Esztergom became victims of an escalated religious struggle during the anti-Habsburg uprising of that time. The investigation of the circumstances of their tragic death and the process of their canonization began in 1628 by Archbishop Peter Pázmány. After many peripetia, the martyrs were finally beatified and the related ceremony was carried out in 1905. (Ondruš, 1994) Pope John Paul II visited Košice for the ninetieth anniversary of the event, and on July 2, 1995, the martyrs of Košice were canonised here. The very visit of the enormously popular priest, whose holiness was no longer doubted in his lifetime, was perceived of the same importance to believers as the act itself of canonization of Saints Martyrs of Košice in itself. In the city (as in other places in eastern Slovakia), a commemorative plaque, street name and a monument appeared in the coming years on his honour.

Cathedral treasure of St. Elisabeth Church, in addition to the reliquary of **the Saint Martyrs of Košice**, has in recent years continually expanded with the memorabilia of new saints or gained valuable Holy relics, which significantly contribute to the boom of modern pilgrimage. Every twenty-second day of the month, with the abundant participation of the faithful, a holy mass is held in the temple to veneration of saint Charbel which relics are in the shrine since 2017. Bl. Anna Kolesárová was beatified right in the church on September 1, 2018.
The idea of building a **Calvary** in Košice, as it was at that time in some other places in eastern Slovakia, was initiated by local Jesuits and thanks to the support of the Bishopric of Eger and the town itself, construction began in 1737. The main landmark of the spacious area - Church of Our Lady of Seven Sorrows was built

between the years 1742 - 1758 according to the plans of Nicodemus Litzky. The temple with a relatively simple triaxle façade has two-storey interior, divided at each level by pillars into main and side naves. The two-storey conception of the division of the inside temple space reflects the symbolism of earthly and celestial reality. At the end of construction period, sixteen chapels of the Stations of the Cross were added. Even in the later centuries, the complex was complemented by small sacral buildings and solitary statues and sculptures (chapels, Pieta, Crucifixion, statues of various saints), some of which no longer exist today. (Zentko, 2007)


*Fig 3 Positioning of Calvary on the North West edge of Košice.*
(Plan der königl. Freistadt Kaschau 1856, National Archives of Hungary Budapest, S – Térképtár, S 12 - Div. X. -No.29:1.)

Pilgrimages to Košice Calvary took place twice a year - on the feast of the Discovery of the Holy Cross in May and the Feast of Our Lady of Seven Sorrows in September, during which numerous processions were directed to Calvary even from distant counties. The procession led by the bishop also came directly from the city, started at the Cathedral of Saint Elizabeth. Members of the religious communities, the Congregation of Mary, women's and men's associations, bishop and canonists, and popular strata formed gradually their marching order. Along the way they sang religious songs, prayed the Rosary, and stopped also with prayer before the chapels of the Stations of the Cross. The last section - the ascent of the Holy Steps (Santa Scala) to the altar in the upper church was made kneeling by some pilgrims. (Pietrová, 2010)

**Pilgrimage sites around Košice - Rudník, Obišovce, Malá Vieska, Bôrka and Úhorná**

At the well next to the wooden chapel, men from **Rudník** and the villages in the vicinity used to stop on their daily journey to work in nearby mines. The chapel was dedicated to the fancied patron of miners - Saint Anne. The modest building stood here long before the abbot of the Premonstratensian Monastery in Jasov Andrej Sauberer had built a brick construction between 1750 and 1766 in its place. The single nave baroque church with a polygonal closure was probably built according to plans of the Košice builder Salzgeber. Valuable interior decoration was provided by prominent Baroque artists - sculptor Ján Anton Krauss and a native of Znojmo, painter Ján Lukáš Kracker, who worked for the Premonstratensians in the Jasov Monastery and elsewhere. (Balega, 1991, 1996) The pilgrimage to St. Anne in Rudník is confirmed by the Papal bull of Pope Benedict XVI from 1751, but after the abolition of the Premonstratensian Order by Joseph II, the tradition was interrupted for a time. The pilgrimages were renewed before the end of the century and took place on the holiday of St. Anne on 26th July and in addition several times a year, such as the Feast of the Assumption and Easter Monday. Pope Pius IX granted to pilgrims on St. Anne's Day full indulgences in 1856. Pilgrimages have been held here to this day and there is still a custom that in the procession that comes from the Church of Saint George in Rudník, is sixteen girls which carry four ornate statues of celestial patrons. (Pietrová, 2010)

*Fig 4 Saint Anne Chapel in Rudník (www.cestovnyinformator.sk)*

The pilgrimage character of the Church of the Rosary Virgin Mary in **Obišovce** was restored during the first wave of local Catholic Revival in the 1760s with the help of Polish patrons and Franciscans from monastery Nižná Šebastová. A picture of the Virgin Mary of Czestochowa was placed in the church at that time. This first historically known Marian painting was destroyed during the anti-Habsburg uprising in 1682. The Catholics did not regain the church until several decades (1729), and at that time they brought in another painting, this time of the Virgin Mary Queen of Hungary, a gift of probably Jesuits from Košice. This image was removed also by non-Catholics when the parish was again in their hands. Several fairy legends concerning the Obišovce paintings seem to reflect the ill fate of the first two paintings of Holy Virgin and the transfer of third and the current one from nearby Drienov. According to legend, Drienov thanks to popular imagination has turned into a distant Polish Tarnow, for similarity to the name of Trnava, where the pattern of Obišovce picture really originated. It was a copy of the Theotokos icon from the Church of St. Boniface and Alexius in Rome, probably created at the end of the 16th century and then transferred to Trnava. The third picture last until now. Church of Obišovce became definitely Catholic in 1769. Shortly thereafter the local pilgrimages were renewed. The bishop of Eger confirmed the indulgence privileges for the feast of Our Lady of the Rosary in 1773. Following year the parish received a copy of the merciful image of the Virgin Mary of Trnava from the Holy Trinity Church in Košice of the abolished Jesuit Order.

*Fig 5 Holy Virgin of Trnava from Obišovce (www.katolickenoviny.sk)*

Relatively few victims, claimed by the cholera epidemic in 1831 in Obišovce, made the church in Obišovce and its gracious image of Holy Virgin famous. Up to 7000 pilgrims then went to Obišovce every year and in 1865 a new, third church was opened for them. Even more, 20 to 30 thousand pilgrims gathered here at the end of the period of totalitarianism at the end of the 1980s. (Jurko, 2007) In 2011 Obišovce became a Diocesan Sanctuary of Košice ecclesiastical province. (Kmec, 2017)

From the parish Church of the Rosary Virgin Mary in Obišovce up to the Baroque pilgrimage sanctuary of the Birth of the Virgin Mary in **Malá Vieska** it is only 7 kilometres along the road nearby Hornád River. Despite their close proximity, both Malá Vieska and Obišovce became important pilgrimage centres at the same time and for the same reason, which was veneration of merciful images.

At first, the painting from Malá Vieska attracted more attention. It was a copy of the famous icon of the Mother of God of Máriapócs, also originated from Holy Trinity Church in Košice. (Košík, 1992) When the author of the first written work about the pilgrimage sites of Hungary Alex Jordánsky of Košice, as a young boy, visited this place together with his parents, large crowds of Greek-Catholic believers headed here. Obišovce were not so well known at that time. Little bit paradoxically, after 1831, when Pope Gregor XI granted to the Church in Malá Vieska the right to full indulgences on the feast of the Nativity of the Virgin Mary, the favour of the pilgrims had just begun to orient themselves to a greater extent to adjacent Obišovce.

*Fig 6 The Church of the Birth of Virgin Mary in Malá Vieska (www. putnickemiesta.sk)*

At the time of the dissolution of the Jesuit Order in 1773, the monumental parish church of Saint Stephen in Kostoľany nad Hornádom was just finished. It is possible that the dean of Košice, Michal Berec, who carried out an inventory of assets of the abolished Jesuit Order in Košice, brought here almost simultaneously both paintings from the Jesuit church in Košice. From obvious reasons, two paintings with a strong background of tradition and veneration in one site weren´t necessary. And so the painting of the Virgin Mary of Trnava finally went to Obišovce, the filial parish of Drienovec, and the painting of the Holy Mother of Máriapócs remained in Malá Vieska, the filial parish of Kostoľany. The parish priests of Kostoľany and Drienov were friends and they both knew each other well with the Košice dean. All three priests who participated in the transfer of images from Košice knew that they could become an effective instrument for the consolidation of the Church, precisely "in a place between Prešov and Košice, in a religiously mixed environment that needed reconciliation and peace most." (Kmec, 2017)

Pilgrimage site **Bôrka** is located in Rožňava Diocese. Its development in the 18th century was supported by the bishopric and the Order of the Discalced Carmelites in strengthening the position of the Catholic Church in the area. The Baroque church was consecrated after 1732 to the Virgin Mary of Carmel and replaced the then dedication to the Sacrifice of the Lord. The altar painting, brought in from Italy in 1757, depicts the handover of the brown scapular to Saint Simon Stock, prior to the Carmelite religious order. Before World War I, up to twenty thousand people were visiting Bôrka, of all ethnicities living in the region, nevertheless which changed after the war when have waned pilgrims from Hungary. (Pietrová, 2010)

The pilgrimages take place in **Úhorná** on the feast of Our Lady of the Snow on August 5th. According to a legend, a ploughman found a picture of the Virgin Mary in the place of the local chapel. He took him to the local church, but was lost. After a year he was found in the same place. The snow falling on miraculous spot turned into stones. The first chapel was built here in 1813, in 1940 it was replaced by a larger brick building. In vicinity there are also a miraculous spring to help the visually impaired and two grottos with sculptures of the Virgin Mary and the Suffering Christ. (Pietrová, 2010).

## Conclusion

The aim of the paper was to describe localization prerequisites for pilgrimage tourism as an integral part of cultural tourism in an important regional centre such as Košice and its surroundings. The rich history of the city and the whole region predetermines them to receive adequate attention of those interested in religious - and specifically pilgrimage tourism.

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# Pilgrimage tourism - conceptualization and current directions in research from the point of view of geography

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***Abstract***
*The study represents a probe into the issue of conceptualization of pilgrimage tourism based on a study of Slovak and foreign literature. Our aim was to present the theoretical and methodological fundamentals of a pilgrimage tourism analysis, including the formulation of basic definitions, application of research methods, identification of tourism system (object, subject, product) and determination of the position of pilgrimage tourism among disciplines of geography The research was based primarily on qualitative paradigms and methodological approaches, which allowed us to approach its holistic understanding. The interdisciplinarity presented through religious and tourism geography, in turn, allowed us to capture the full breadth and depth of the phenomenon of pilgrimage tourism in the sense of an attempt to conceptualize it. The research of religiosity, pilgrimage and pilgrimage tourism was suppressed by the communist regime in the Central European Area and experienced its Renaissance at the end of the 20th century.*

***Keywords:*** *Analysis, Conceptualization, Pilgrimage, Pilgrimage tourism, Religion, Religious tourism, Research*

## Introduction

There are few phenomena or research questions and problems that would be perceived so ambiguously or inconsistently in terms of terminology, access to study, hierarchization and position in the system of individual sciences such as pilgrimages, peregrination and pilgrimage tourism. This ambiguity stems from the different historical, religious and cultural contexts, as well as from the nature of pilgrimage activities, which are perceived differently by believers themselves.

Our ambition is to present the geographical, i.e. spatial, aspect of the study of peregrination and pilgrimage tourism, while understanding these phenomena within the scope of Christian traditions and Christian culture, with an emphasis on knowledge coming mainly from European schools of geography. Such reductionism was necessary because of an effort to achieve a deeper understanding of the relationships and links between the individual elements of pilgrimage tourism, as well as its very essence in Slovakia. It is therefore not an expression of abandoning the idea and pursuit of a comprehensive geographical approach to studying the phenomenon of pilgrimage and pilgrimage activities. Moreover, the synthesis of the present knowledge is based on an interdisciplinary accent, because in addition to the geographical bases (sub-disciplines) we also rely on the knowledge of religion and theology, sociology or history, or economics and ethnology.

The aim of our paper is to present the theoretical and methodological basis of pilgrimage tourism research based on the study and excerption of scientific works of domestic and foreign (mainly Polish, Anglo-Saxon) provenance. The detection of the territorial relations between the elements that make up the pilgrimage tourism, and the discovery of their functional patterns, provide a way of at least approaching its holistic understanding.

Presented spatial theories and models constituted on the basis of historical, empirical and philosophical foundations are concepts that emphasize qualitative (postmodernist, positivist, humanistic) paradigms and methodological approaches in its research (in terms of Korec, Rusnák, 2018; Wilczyński, 2011; Čuka, 2011a).

Within the Central European space, which was almost the entire second half of the 20th century, influenced by the communist regime and the regime also interfered with science and research topics, we observe some vacuum in the study of religions, religiosity of the population, pilgrimage and pilgrimage tourism (Bunčák, 2001; Krivý, 2001; Očovský, 1993; Matlovič, 1997, 2001b). The Renaissance of research occurred in the 1990s, when the Polish religious-geographic school in Cracow under the leadership of prof. A. Jackowski started to develop intensively (e.g., 1995, 2003).

In the theory of tourism geography, several research directions have been profiled and formulated over time, and almost in each of them we can identify elements and features of pilgrimage tourism in the application level. These include (Kurek et al., 2007):

- The Tourism Participation Model and the Jafar Jafari's Tourism Model,
- The Concept of Tourism as a Meeting,

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- Theory of Peripheral Places according to Christaller,
- Diffusion of Innovation Theory,
- Butler's Model for the life cycle of a tourist destination,
- The Concept of Recreational Space Formation,
- The Concept of Recreational Functions of Tourism,
- The Concept of Spatial and Functional Organization of Tourism,
- The Concept of Territorial Recreational Systems,
- The Conception of Recreational Space Perception,
- The Concept of recreational urbanization,
- The Concept of Tourism Conflict,
- The Concept of Tourism Functions.

P. Čuka (2011b) supplemented above-mentioned world trends in tourism theory by the following:

- Guiding Concept,
- The Concept of Tourism Products,
- **Religious Tourism Concept,**
- Concepts of Environmental and Alternative Tourism,
- Cartographic Concept and GIS Applications.

As we have already indicated, the issue of pilgrimage tourism will be presented from the point of view of particular geographical disciplines research, namely geography of tourism and geography of religions, but in many respects we will also touch on aspects of religious tourism, which is often identified with pilgrimage tourism. Within the Slovak school of geography, characterized by regional dominance (e.g. Krogmann, 2007a, 2007b; Golha, Krogmann, 2011; Matlovič, 2001a; Eliášová, 2004; Bubelíny, 2008, 2010a, 2010b, 2011; Čuka et al., 2009; Čuka, 1992, 1996, 1998), or a functional-chorological approach (Mariot, 2001, 1983), such a procedure is applied for the first time, its output being an effort to conceptualize pilgrimage tourism. The following heptagon documents the relationships between the various disciplines examining pilgrimage tourism (Fig. 1).

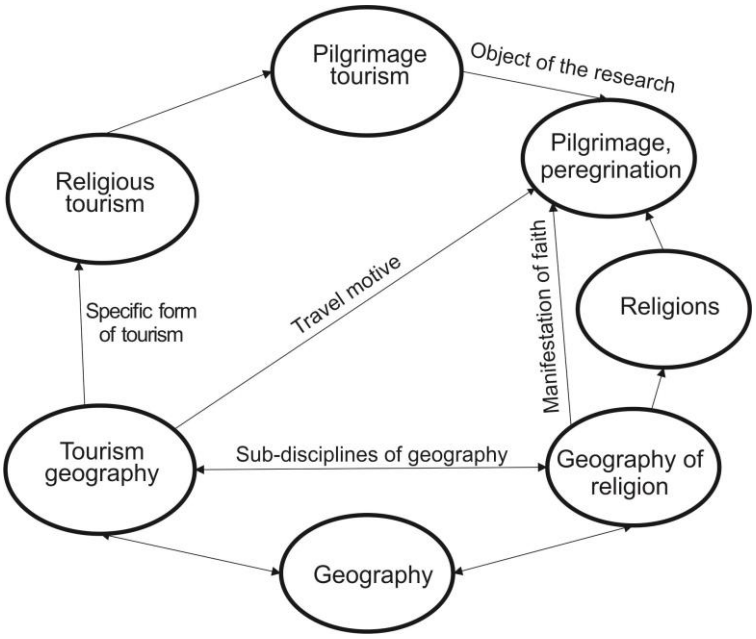


*Fig. 1 Relationships and links between various geographical disciplines examining pilgrimage tourism*
*Author: own research*

**Material and Methods**

Pilgrimage tourism is a spatial phenomenon and its research (as well as any other phenomenon) is a set of organized activities, including study, prediction, experimentation, testing, verification and generation of scientific knowledge. In the field of thought processes, two pairs of classical methods are most commonly used, namely analysis - synthesis and induction - deduction, supplemented by "abduction", which is a combination of these and denotes the process of deriving conclusions that broaden our knowledge (Hendl, 2008). The selected methods of research depend to a large extent on its type or on the set objectives, but another important criterion entering into the constitution of the methodological apparatus is the researcher's own individuality. It is reflected in the form of creativity, philosophy of life, opinions, approaches, values and knowledge that determine his scientific work more than the surrounding environment or financial and material security.

In the past, any geographical research has emphasized a quantitative paradigm based on a positivist philosophical direction (Korec, Rusnák, 2018), but is currently being replaced by the "new geography" (Čuka, 2011a), which has an interdisciplinary character and emphasizes qualitative methodological procedures. Therefore, all the research techniques and procedures currently used in pilgrimage tourism research are some kind of universal tools and concepts, also applied in history, sociology, ethnology, religion and other sciences.

They can be considered as basal analytical and hermeneutic methods, in terms of the generally accepted model application of the research procedures organization in the study of tourism (including pilgrimage), which has a systemic character (Matczak, 1992). The analysis may have several dimensions, ranging from elementary in the form of a review study (Kim, Kim, King, 2019; Durán-Sánchez et al., 2018; Krogmann et al., 2017, Matlovič, 2001a), motives for pilgrimage (Liro et al., 2017; Bubelíny, 2011; Lopez, 2013; Lois-González, Santos, 2014; Olsen, 2013; Kim, Kim, King, 2016) through historical which for example describes the development of the pilgrimage center and its historical-geographical specificities (Bubelíny, 2008, 2010a, 2010b; Cánoves et al., 2012; Zajicová-Nadaská, 2003; Golha, Krogmann, 2011; Krogmann, 2007a; Dancák, 2005; Jackowski, 1990), up to the statistical one, which may take the form of quantification of structures (i.e. tourism infrastructure and superstructure), number of visitors - pilgrims (Chantziantoniou, Dionysopoulou, 2017; Bond, et al., 2014); religious structures of regions of different hierarchical levels (Očovský, 1993; Nolan, 1987; Jackowski, Smith, 1992), impacts on the local economy (Terzidou, Stylidis, Szivas, 2008; Kömürcü, Saribaş, 2016; Bogan et al., 2019; Vukonić, 2002) etc.

The historical-geographical method is closely related to historical analysis, which is used to determine the historical-geographical aspects of the pilgrimage destinations genesis in the sense of studying the transformation of profane space into sacred space. On this basis we can identify the main milestones in the historical development of pilgrimage centers (phasing) with a focus on the religiosity of the place and its specifics. In our opinion, the study of historical processes is crucial for understanding the current state of the pilgrimage center, which is reflected in traditions, cultural-historical attractions, but also in the character and structure of infrastructure, etc (Čuka, 1996, 1998; Čuka et al. 2009; Bubelíny, 2008, 2010a, 2010b; Dancák, 2005; Golha, Krogmann, 2011; Krogmann, 2007b; Zajicová, 1998). The use of this method presupposes the study of source materials that need to be subjected to critical analysis. The study results are also different models of the genesis of pilgrimage centers, which can be further compared with the development of other (European) pilgrimage sites, analyze their related characteristics and differences necessary for verification of spatial patterns of pilgrimage tourism development in them. Research efforts may also result in the prediction of further development of pilgrimage centers (in terms of the "life cycle" concept according to R. Butler, 1980), thus at least partially explaining how tourism operates in the area (Butler, 2006; Čuka, 1998, 2003, 2007; Gregorová, 2009, 2012; Bubelíny, 2012).

Understanding the territorial patterns of the pilgrimage's center development, modeling it, and analyzing the transformation of its functions must necessarily be based on scientific observation. If it has the character of empirical research, it allows us to capture certain moments of objective reality as a starting material for establishing the general context (Benčo, 2001).

In order for the observation to be empirically beneficial, it must be implemented as follows:

1. establish the objects of observation (these may be pilgrims, pilgrimage routes, pilgrimage center equipment);
2. draw up an observation plan (during the annual pilgrimage, during holidays);
3. make observations.
4. repeat the observations (during various pilgrimages within a year or several consecutive years);
5. evaluate the observations (interpret results and implement research findings).

Most often, information about the spatial organization of pilgrims, pilgrimage activities, the organization of pilgrimages, transport accessibility of the pilgrimage center, etc. are obtained by the above method (Čuka, 2011; Bubelíny, 2010a, 2010b, 2011, 2012; Horák et al., 2015; Olsen, 2013; Cánoves et al., 2012).

The observer often verifies the results of the observation using other methodological procedures - interview, questionnaire, poll, narrative interview, etc. These qualitative methods, which geography understands as adopted, auxiliary procedures, belong to the group of sociological methods. They provide highly subjective information, e.g. the structure of pilgrims, their motives for pilgrimage, the perception of the pilgrimage center, the interaction of foreigners (pilgrims) versus autochthonous inhabitants of the country, the region in which the pilgrimage center is located, etc. (Wu et al., 2019; Horák et al., 2015; Cánoves et al., 2012; Kim, Kim, King, 2019; Chantziantoniou, Dionysopoulou, 2017). The information gathered in this way constitutes the primary research, i.e. the basis for identifying specific features and phenomena operating in the pilgrimage tourism system

The perception of the pilgrimage center by its visitors (pilgrims), is an interactive process taking place between man and the socio-cultural environment, based on the story of everyday experience. Pilgrims' "own true images" of the pilgrimage center allow us to explore the motives of their attendance, spatial behavior during the pilgrimage, and reveal their preferences in attendance at other pilgrimage centers (Silverman, 2009; Korec,

Rusnák, 2018; Walmsley, Lewis, 1993). If the methods of environmental perception research are based on a behavioral platform, their ambition is to create a geographical theory of human spatial behavior (preferences or non-preferences of pilgrimage centers). Based on a humanistic approach, they focus their attention on the relationships between time and space in the daily life of an individual (Gregorová, 2009; Korec, Rusnák, 2018; Walmsley, Lewis, 1993; Čuka, 2011b; Wilczyński, 2011). Tourism geography uses perceptual methods to study the system of tourism participant - recreational landscape and its perception. In our case, we could transform this relationship into a pilgrim - pilgrimage center and its perception (Kim, Kim, King, 2019; Terzidou, Stylidis, Szivas, 2008; Kömürcü, Saribaş, 2016; Liro et al., 2017).

We have so far pointed out the use of qualitative methods in pilgrimage tourism research and now we will complete the description with relevant quantitative ones. The collection, sorting, categorization and analysis of statistical information and the creation of databases may relate, for example, to: the character of the tourism infrastructure and suprastructure, the attendance of individual pilgrimage centers and their attractions, as well as the religious structure of the inhabitants of regions of different hierarchical levels, etc. (Bubelíny, 2008, 2010a, 2010b, 2011, 2012; Čuka, 1996; Čuka et al., 2009; Krogmann et al., 2017; Bogan et al., 2019; Wu et al., 2019; Horák et al., 2015; Cánoves et al., 2012; Kim, Kim, King, 2019; Vukonić, 2002). The database of statistical data can be drawn up not only from the study of literature, i.e. from secondary sources (statistical lexicons, data from statistical offices, population censuses, etc.), but also from field work, which creates primary data - mentioned polls, questionnaires, physical census of the tourism objects or pilgrims during pilgrimages etc. Cartographic methods and GIS provide spatial expression of the data and their visualization. Using them we can express the intensity of the examined phenomena in space (cartogram, carto-diagram), or draw the distribution of sacral and profane objects forming a pilgrimage center (scale reduced image of the pilgrimage center).

In general, we could call these methods cabinet or camera methods (Ivanička, 1983; Čuka, 2007, 2011a). They are complementary to field research, which represents a fundamental method for the geographer to study the features and characteristics of tourism (including pilgrimage tourism).

Based on field research, it is possible to discover causal connections of phenomena affecting the development of tourism in a pilgrimage center. As we have already indicated, field research is a part and complement of many other methods, such as: observation, interview, survey, but especially field measurements and mapping work. From the perspective of the tourism geography, it is possible to formulate several basal groups of characteristics defining pilgrimage tourism, identified through field research (adapted according to Kurek et al., 2007).

These include:

- size, seasonality, length of stay and frequency of arrivals at the pilgrimage center,
- spatial features of pilgrimage tourism,
- way of organizing the pilgrimage and pilgrimage tourism,
- motives for the choice of pilgrimage center,
- leisure activities during the stay at the pilgrimage center,
- the cost of staying in the pilgrimage center,
- perception of pilgrimage center (preferences, non-preferences).

The presented qualitative and quantitative methodological procedures appear to be the most beneficial from the point of view of pilgrimage tourism research. However, the synergy of several methods, which will be based on their triangulation, makes it possible to penetrate even more deeply into the studied problem. Triangulation is a specific and non-trend-based approach to data evaluation and processing, and the concessions obtained on the basis of quantification based on its principles are always an added value of research. The combination of methods deliberately aims to understand the breadth and depth of the subject matter, and is not an attempt to express objective and absolute truth (Flick, 2009; Flick, von Kardorff, Steinke, 2004).

**Definition of pilgrimage tourism and overview of the basic terminology**

Geography, including the tourism geography, uses a certain terminology, i.e. a conceptual apparatus, to describe and explain phenomena as well as the relationships between them. Many terms are understood differently in different disciplines because their symbolism is multilayered and has a wide range of meanings, not only mentioning a phenomenon or process, but the whole aspect (Čuka, 2011a).

The geographical definitions point out to spatial relations and relations arising between tourism and environment, or recreational landscape. The economic impacts of consumption at the destination, in turn, emphasize economic definitions. Sociological definitions draw attention to ways of spending leisure time and definitions based on managerial concepts focus on tourism actors (Gregorová et al., 2015). The introduction of non-geographical definitions is beyond the scope of this paper.

The geographical understanding of tourism thus accentuates the spatial patterns of its functioning and the holistic regional-landscape relations which it currently applies (Fig. 2). In this sense, the first more relevant definition of tourism was given by P. Mariot (1983), according to which tourism is a social activity conditional on relocating the population to parts of the landscape, characterized by interactions of landscape elements capable of causing a temporary change of residence. Otrubová (1983) understands tourism as all forms of

traveling for relaxation, recreation, learning, entertainment, culture and sport, while the visitor's stay is reflected in the economic life of the visited place.

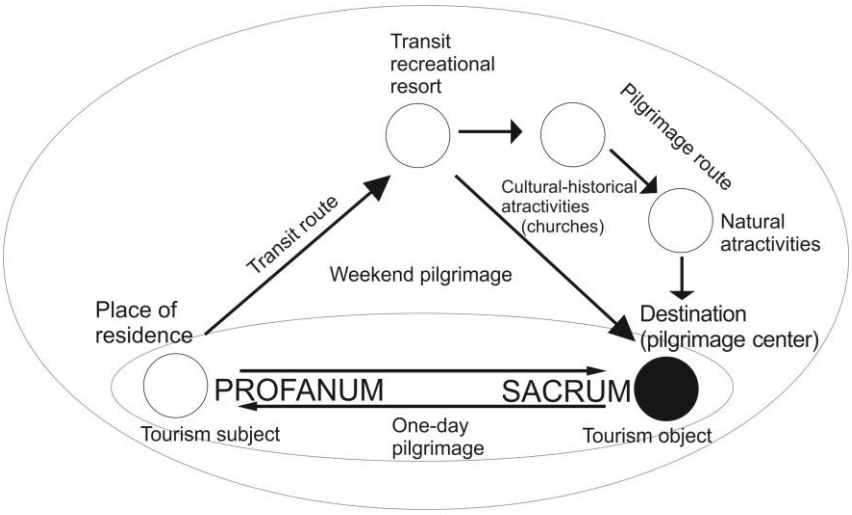


*Fig. 2 Spatial model of pilgrimage tourism*
*Source: Gregorová, 2015; Gúčik, 2010 – completed and modified*

In a period of globalization and the development of mass tourism, it is important to explore its nature on three levels (Kołotko, 2009): spatial (geographical), temporal (historical) and interdisciplinary (synthetic) level. In principle, tourism is a socio-economic phenomenon occurring in space and time.

According to the World Tourism Organization (UNWTO), tourism is the activity of a person traveling temporarily to a place outside his/her normal environment (outside his/her place of residence) for a period shorter than specified, for a purpose other than exercising a gainful activity at the place visited (Petrů, 2007). In principle, it is possible to identify with the definition, or it should be extended to include currently important aspects.

Tourism is therefore defined as a temporary stay away from the place of permanent residence in order to restore the mental and physical resources and needs of a person, or to meet his/her mental and physical needs, provided that the stay is not directly connected with raising funds; and is performed in accordance with ethical and moral values (Čuka, 2011a - modified).

Motivation factors, i.e. reasons for participation in tourism, are also a long-term researched issue. Already in the 1950s Hunziker and Krapf identified five basic motives: 1. exploring the surroundings, 2. religiosity and religious emotions, 3. recognizing important phenomena of contemporary life, 4. healing stays and prophylaxis, 5. enjoying nature (Čuka, 2011a). Based on the motives, that we will discuss in more detail later on, we can typologize the participants and the forms and types of tourism (Fig. 3).

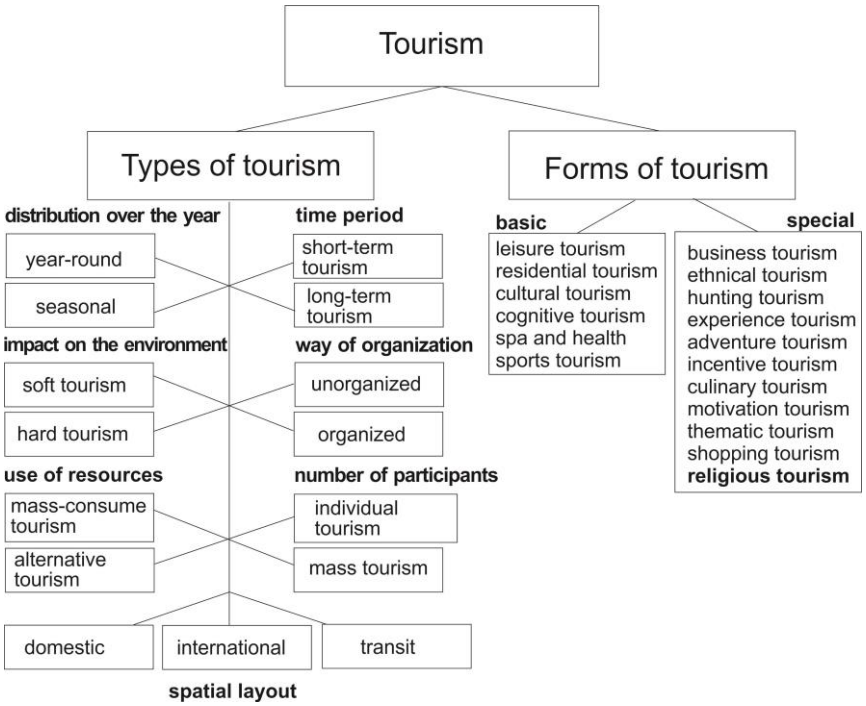


*Fig. 3 Types and forms of tourism*
*Source: Zelenka – Pásková, 2002 –modified and supplemented*

Another example of the application of motivation research in the classification of tourism forms is the categorization of J. Warszyńska (1999):

(a) cognitive tourism (related to the internal need for personal, cultural, development),
(b) leisure, recreational tourism (motivated by the need for mental regeneration and physical forces),
c) religious tourism (it has religious or faith-related motives),
(d) business tourism (linked to the organization of business travels and trips).

Travel motive is the most important aspect in distinguishing and specifying tourism. Religious tourism, faith tourism and pilgrimage tourism are thus selected in the tourism geography. Religion or faith is understood as a tradition-based system of beliefs about the world and the forces that control it and in this system of beliefs it reflects the relationship of man to the variously understood "sacrum", which takes on expression in religious doctrine, world and organization (Banek et al., 1992). Thus, if we understand the terms religion and faith as synonymous in the sense of Matlovič (1997, 2001b), Halbwachs (1997), Eliade (1959), Banek et al., 1992, then these two terms can be identified.

Religious tourism is therefore defined as "*all tourist travels, the main motive of which is visiting sacral and religious objects or towns. Unlike pilgrimage tourism, it is understood as a broader term. Religious tourism, for example, may be attended by members of religious systems who do not have a pilgrimage practice within the cult – e.g. many Protestant churches (Matlovičová et al., 2015, p. 481).*

*Pilgrimage tourism is a part of religious tourism. It denotes tourist travels, the main motive of which is religious or also religious-cognitive reasons, while part of the journey is devoted to participation in pilgrimage as part of a religious cult. The pilgrimage is organized and is generally governed by strict ritual rules. It includes other elements of religious cult – e.g. prayers, worship, meditation and other forms of religious ceremony. The pilgrimage tourism destinations are sacred places - cult centers or sanctuaries (Matlovičová et al., 2015, p. 481).*

In relation to the already introduced, generally valid and accepted geographical definition of tourism, **pilgrimage tourism can be defined as part of a (subtype) religious tourism whose participants (pilgrims) temporarily leave their place of residence to visit the holy place (*locus sacer*) for religious, spiritual reasons, where they practice activities related to religious cult.**

Pilgrims, i.e. participants in the pilgrimage, do not perceive themselves as participants in tourism, nor are they considered to be tourists (Čuka, 1996). Pilgrim is a person who performs pilgrimage. Pilgrimage equally represents the physical and spiritual world of the person who sets out for it, it is a journey through time and space with a transcendent goal, but also with the effort to heal physically or mentally (Coleman, Elsner, 1997). Pilgrimage is one of the public manifestations of piety; it can be seen as a journey to any sacred place (loca sancta) which is made because of religious motives (Matlovič, 2001b; Gavenda, 2004). The pilgrimage can also be interpreted as an ascetic exercise, because the pilgrim voluntarily abandons the established order (Dancák,

2005). According to Jackowski (1995), pilgrimages are characterized by man (homo religiosus), geographical space (profanum) and sacred place (sacrum).

Sacrum, according to Matlovič (2001b), cannot be precisely defined, it is typically a religious value, decisive for the destiny of human being and the real world. It is a place separating holy space from outer, profane space (Jackowski, 2000).

**The position of pilgrimage tourism in the system of disciplines of geography (geography of religion and religious tourism)**

Pilgrimage activities are part of research in several sciences. One of them is the geography of religion, or religious geography, which was established in the 17t$^{h}$ century, but the early beginnings of interest in religious-geographical issues can be found in antiquity. During its development, several research directions have been developed: a) religion's impact on the landscape, b) religions and cultural clashes, c) religious ecology (Matlovič, 2001b).

The geography of religion in terms of metageographical works (Mičian, 1984) is defined as a partial analytical scientific discipline of human geography, which examines spatial aspects of religious systems and their interactions with other elements of the landscape (physical-geographical and human-geographical) sphere. (Fig.4). The most important tasks of geography of religion include (Matlovič, 1997):

- research on the role of the environment in the evolution of religious systems, in particular their institutional aspects;
- research into the transformation of the environmental role under the influence of religious systems,
- research into spatial diffusion and spatial organization of individual religious systems,
- research into geographical distribution of religions.

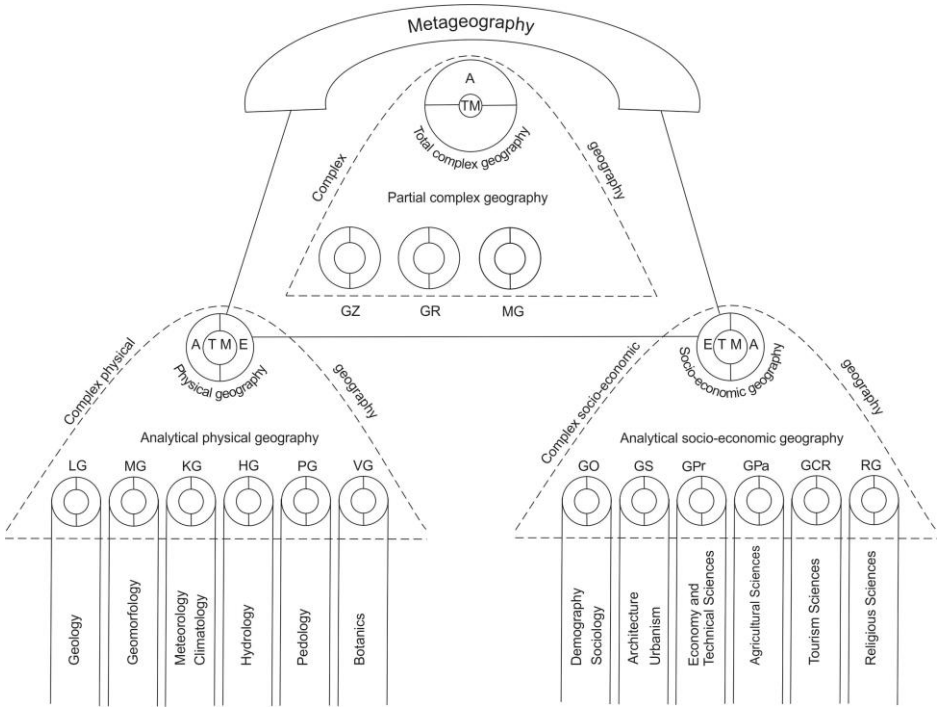


*Fig. 4 System of geographical sciences*
*Source: Mičian 1984*

The geography of religion works closely with history, sociology, ethnology, religion, etc. (Fig. 5) exploring the following scientific topics (Jackowski, 2003):

- geographical environment (space) and religion,
- spatial development of religious systems (in territories of different hierarchical level),
- **pilgrimage and migration for religious reasons,**
- religions and types of settlements (with religious function),
- the impact of religions on the economic development of settlements,
- religions and tourism,
- religions and environmental protection,
- regionalization of areas with religious function,

- religious cartography.

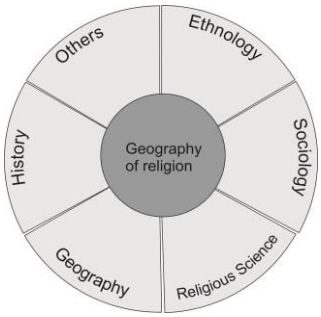


*Fig. 5 The position of geography of religion in the system of geographical and related sciences*
*Source: Jackowski, 2003*

Religious geography was initially clearly situated within the framework of cultural geography, and later began to be understood as a discipline lying at the intersection of cultural and social geography (Matlovič, 1997). Religion is part of the spiritual sphere of man, manifested by different traditions and practices. The numerous sacral buildings, usually valuable in both historical and architectural terms, are its external expression. This issue is the subject of research into cultural geography (Jackowski, 2003). Leaving the position of perception of religious geography as a part of cultural geography is not possible if we consider religion as part of culture and culture as a motive for participation in tourism (Čuka, 2011a; Lochmannová, 2015). In this sense, cultural tourism can be differentiated into (Tanaś, 2008):

- urban tourism,
- rural cultural tourism,
- ethnic tourism,
- military tourism,
- tourism of industrial and technical monuments,
- tourism of living history,
- cultural and natural tourism,
- exotic tourism,
- culinary tourism,
- hobby-oriented tourism,
- **religious tourism,**
- dark tourism.

Religious tourism is part of cultural tourism also from the perspective of economists. According to them, it is associated with the traditions of world religions and its most frequent manifestations are pilgrimages, characterized by features such as participants, religious act and pilgrimage site. Religious tourism differs from cultural tourism by religious motives and by refusing to designate its participants as tourists but pilgrims (Rinschede, 1992). The pilgrimage place can be a city, village, settlement or landscape feature (holy mountain, holy river). Pilgrimage activities, linked with religious ceremonies, make it necessary to build adequate infrastructure at the destination (Gúčik, 2010; Ryglová, 2009).

Within the Slovak school of geography, several works appeared in connection with religious geography, which can be thematically organized into groups or research directions (Matlovič, 2001b):

- theoretical and methodological issues of geography of religion,
- analysis of religiosity and religious structure of the population,
- analysis of ecclesiastical territorial organization,
- **the issue of pilgrimages and relevant religious infrastructure,**
- study of relations between religions and geography.

Š. Fekete (1974) is considered a pioneer of geographical research in pilgrimage towns in Slovakia. Today, however, the differences between cultural, religious and pilgrimage tourism are blurring, or the boundaries between them are very difficult to identify (Krogmann, et al., 2017).

**Structure and system of pilgrimage tourism**

Tourism (including pilgrimage) is an internally integrated system, a unified set of elements between which there are interrelationships and bonds. In terms of scientific knowledge and cognition, this system is made up of three subsystems: subject, object and product. As a subject we consider a tourist participant, i.e. a pilgrim - homo viator, a travelling man (Jackowski, 2003). The object consists of a destination (pilgrimage center, pilgrimage locality or pilgrimage site) together with tourism enterprises and tourism institutions (accommodation and catering facilities, stalls with devotionals). The product (Beránek et al., 2013), in our conception is a pilgrimage itself. In addition to internal bonds, the system also shows interactions with the external environment,

which may take the form of a natural, economic, social, cultural, political, legislative and technological environment (Kaspar, 1995). The consequence of the relationship with the external environment is the openness of the system, which causes mutual influence of its elements (subsystems) and individual types of environment (Table 1).

***Table 1 Attributes of tourism systems***

| Attribute | Explanation – description |
|---|---|
| *Openness* | The system is functional on the principle of interactions between its elements and on the principle of information exchange with the surrounding environment. |
| *Functionality* | The system operates on the basis of subjects, connections and phenomena that shape recreational functions. |
| *Hierarchy* | The system is a unified whole consisting of hierarchically stored subsystems. Each subsystem has different characteristics, so it is not possible to obtain a universal tourism product. |
| *Dynamism* | The system operates cyclically and it is based on feedback and reactions. |
| *Alignment* | All reactions are directed to tourism. |
| *Connectivity* | Other elements (outside the system) are also used in the creation of tourism products. |
| *Stability* | The system has features of heterogeneity, complementarity and self-renewability. |
| *Objectivity of existence* | The system is based on the form of tourism offer, needs of actors and complexity of needs. |

Source: Zmyślony, Nawrot, 2009

Pilgrimage tourism acts as an organized unit composed of elements with relationships within and outside its system. We differentiate the structure of pilgrimage tourism into internal and external (Fig. 6).

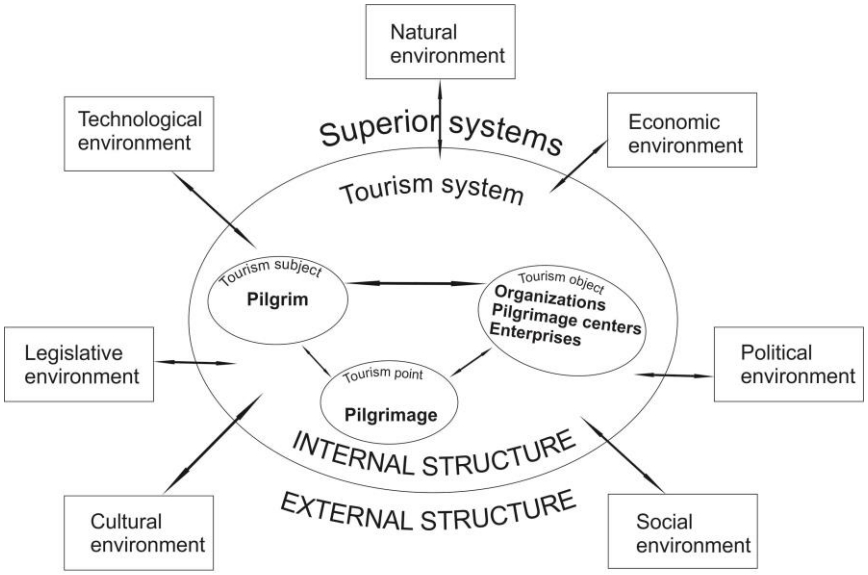


*Fig. 6 System and structure of pilgrimage tourism*
*Source: Kaspar, 1995; Gúčik, 2010 – completed and modified*

We consider the subject, the participant, the most important of all three elements of the pilgrimage tourism system. It can take the form of a tourist, a visitor or a resident. According to the length of stay we distinguish: a) excursionists or same-day visitors, i.e. persons whose stay does not exceed 24 hours b) tourists, i.e. persons whose stay lasts at least one overnight stay and max. one calendar year (Michalová, et al., 2001). Pilgrims form a group of same-day visitors and tourists. If they participate in the whole program of pilgrimages, usually two days during the weekend, they are tourists, but if they only stay on certain parts of the program and perform only some religious acts, they are in the sense of abovementioned characteristic (Fig. 7).

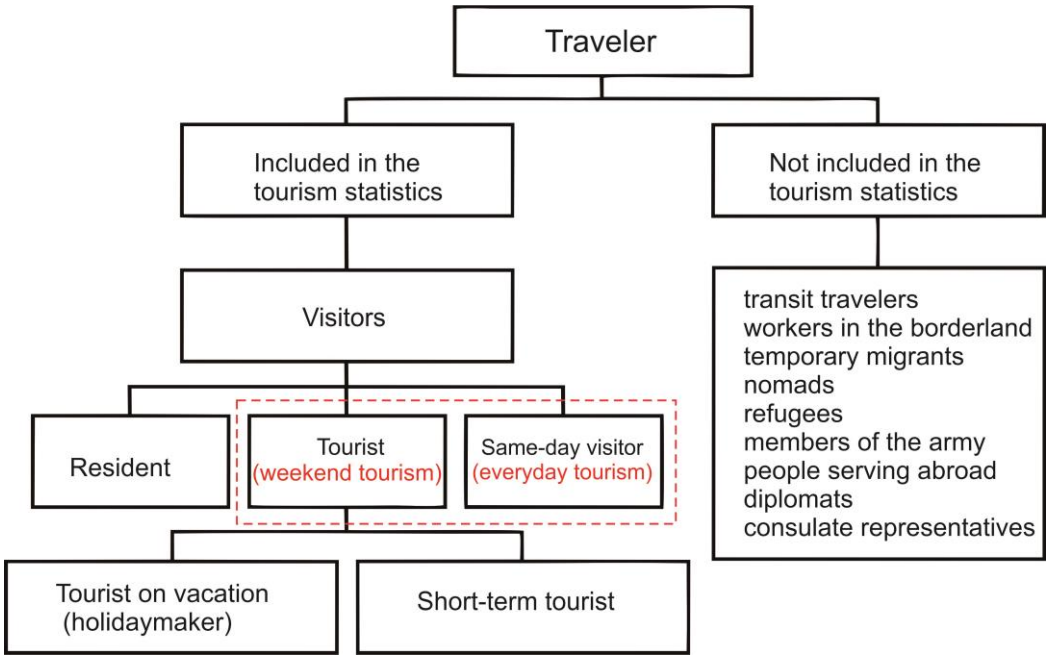


*Fig. 7 Structure of visitors in (pilgrimage) tourism*
*Source: Gúčik, 2010 – modified*

Krogmann (2007a) identifies two categories of people participating in religious/pilgrimage tourism. The first, minor category, is the arrival of visitors with narrowly defined area of interest on religious topics motivated by professional conferences (most often priests). The second category are believers coming to religious places for religious holidays (pilgrimage), for general church consecration festivals, religious camps or for spiritual exercises.

Since (pilgrimage) tourism is an open system, it is strongly influenced by the surroundings, the external environment that creates superior, interconnected structures.

The natural environment is the most important of all elements of the external system. Although pilgrimage tourism has a spiritual dimension, pilgrims, as participants in tourism, come to pilgrimage sites also for the purpose of physical and mental regeneration. However, the predominant mental regeneration must take place in an attractive environment without disturbing effects on components of the physical-geographical sphere (in particular soil, water, air, vegetation). The attractiveness of the pilgrimage center is assessed by pilgrims primarily through factors of undisturbed environment and good technical facilities of destination, which are a precondition for its further development.

We consider the growth of disposable incomes, better income distribution, stable monetary system, etc. as economic factors having a positive impact on tourism development. Negative effects include economic crises, declines in industrial production, an unstable monetary system, or a disadvantageous conjunctural situation. The economic environment carries several functions, for pilgrimage tourism the most important are: a) income function (purchase of religious and non-religious items in stalls or other sale sites, accommodation, food, transport of pilgrims, other payments), b) employment function (jobs for organizers, sellers, clergy, employees of municipal offices, providers of accommodation and catering, etc.), c) production function (creation of values – consumer goods and non-consumer goods - intended for pilgrims, consumption of goods and services), d) function of impact on the state balance of payments (Kaspar, 1995; Bubelíny, 2012).

The social environment affects the tourism system on the part of the subject (pilgrim) as well as on the side of the object, i.e. the destination. Pilgrimage tourism does not classify visitors according to socio-economic status, but applies elements of solidarity, which is not a common manifestation in other types and forms of tourism (Eliášová, 2004). The social environment is created by pilgrims with their families, friends or acquaintances participating in the pilgrimage. Within this community, it is necessary to explore the pilgrim's company on pilgrimage, sex of pilgrims, age structure (pre-reproductive, reproductive, post-reproductive age), the highest level of education attained (none, primary school, secondary school, university), etc. On the other hand, pilgrimage activities also affect the social environment of the permanent population around the pilgrimage site.

The political environment fundamentally determines international tourism, but in the past it has also strongly influenced its religious form. In the period 1948-1989, tourism in the then Czechoslovakia took the form of a state-political function - from the highest government positions there was a tendency to control and supervise it. The society supposed to become atheistic, all religious beliefs were rejected, nor were officially identified in the census. This situation lasted until 1991 (Očovský, 1993). During the period of socialism, the

state authorities had a significant influence on the standard of living of the population, determined the level of business activity, the extent of leisure time in society. Politics of "socialist state" had to be based on the Communist Party's policy, based on the conclusions of the Congress, which set the economic and social program for a certain period (Piteková, 2007).

Pilgrimage tourism as one of the types of tourism had even worse conditions for development, while religious motivations of all kinds were rejected by the regime. Pilgrimage activities were banned, pilgrims persecuted, pilgrimage sites destroyed. In the years 1948-1989, the state's negative attitude towards faith caused riots in some areas and led to politically motivated pilgrimage activities. Although the overwhelming majority participated in pilgrimages because of religious reasons, part of the pilgrims (especially young men) understood their participation as an expression of disagreement with the political system at the time, as well as a public manifestation of faith (Novodvorská, 2007).

Government policy can affect the tourism environment through government financial assistance, the amount of subsidies provided by local authorities, the taxation of natural persons and legal entities, social security policy, the amount and dates of public holidays, school periods, care for historical monuments, freedom of movement, cooperation with specific countries, etc. (Horner, Swarbrook, 2003).

The cultural aspect is of great importance for pilgrimage tourism. Travels for religious reasons, as we have already mentioned, are part of cultural motivation (Kaspar, 1995). In the pilgrimage activity, cultural values directly or indirectly develop. In general, by participating in tourism, one develops his cultural interests and expands the range of basic knowledge, thereby increasing his educational level and thus contributing to the general cultural level (Gúčik, 2000). Pilgrims coming to the pilgrimage destination come from different regions of the state or abroad. They bring various manifestations of behavior, cultural habits, manifestations of folk religiosity and so on (acculturation, cultural assimilation) to the destination. At the destination (pilgrimage center) there are clashes of different cultures that interact with each other (Hladká, 2005):

1. culture of the principal region (the point of beginning) - includes everything that is typical of all the inhabitants of the region from which the pilgrims come. It basically includes the population of a regional area, a nation, or nations participating in a pilgrimage.
2. recreational culture - this includes everything that is typical for a group of people coming from one region for recreation. In pilgrimage tourism it represents a culture of pilgrims from one settlement, religious association or parish.
3. Service culture - represents everything that is typical for a group of people in the receiving region (destination) that is in direct contact with tourism. It represents habits and customs of the local population in the pilgrimage site.
4. culture of the target region - is the sum of everything that is typical for all the inhabitants of the receiving region. It includes the resulting clash effect of all the cultures mentioned.

## Conclusion

The uniqueness of geography as a scientific discipline lies in the clarification of the issue of human-geographic relations. The tourism geography has enriched this research with other theories and concepts; e.g. participant of tourism - recreational landscape, model of spatial development of recreational center (Butler, 2006). Moreover, religious, or pilgrimage tourism has developed another aspect of this relationship into the study of the landscape's dichotomy and its perception as sacrum - profanum (Čuka, 2011a).

Our ambition was to present theoretical and methodological basis of pilgrimage tourism research. The elements of which it is formed and the spatial bonds that apply between them were judged on a historical, empirical and philosophical basis. Formulation of basic definitions, application of research methods, identification of the system (object, subject, product) and study of the position of pilgrimage tourism in geographical disciplines based mainly on qualitative paradigms and methodological approaches were aimed at approaching its holistic understanding.

The emphasis on interdisciplinarity (Fig. 12) allowed us to capture the multi-aspect and multi-sector of tourism phenomenon and especially pilgrimage in the sense of an attempt to conceptualize it.

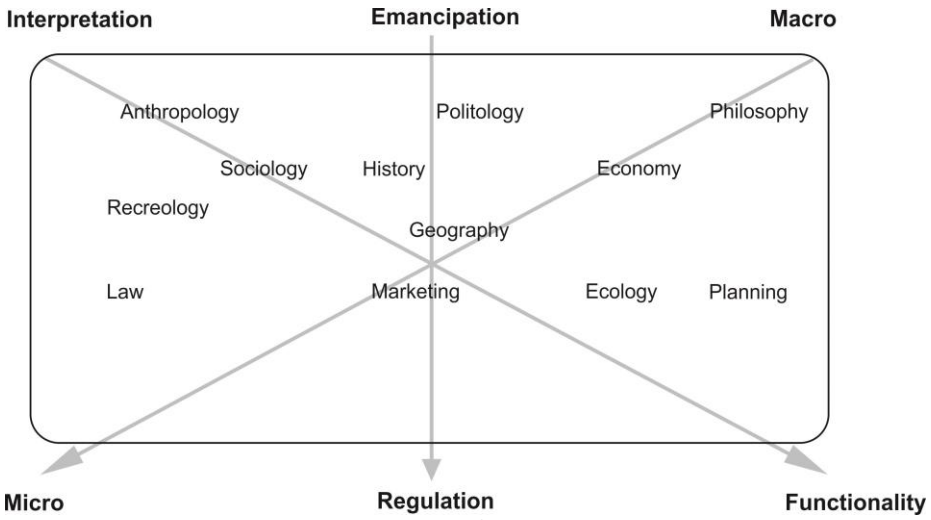


*Fig. 12 Interdisciplinary matrix of (pilgrimage) tourism research*
*Source: Winiarski, 2008*

In the new millennium, there has been an increase in the interest of experts, not only geographers, in research into issues related to religious or pilgrimage tourism. The first more relevant work (WoS) of this kind was published in 1968 and since then there has been a constant increase in scientific contributions on several aspects of religiosity and pilgrimage (Durán-Sánchez et al., 2018).

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