# **ORIGINAL ARTICLE**



# Analysis of Criteria Affecting Geosite Visits by General Public: a Case of Slovak (Geo)Tourists

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Received: 20 February 2017 / Accepted: 3 January 2018 / Published online: 12 January 2018 © The European Association for Conservation of the Geological Heritage 2018

#### Abstract

Geotourism as a relatively new form of tourism becomes more and more popular in the world in last years. It primarily depends on geosites (geological heritage) which identification and subsequent assessment are important steps in the process of geotourism development and protection of geosites. Based on the internationally accepted concept of geotourism, an importance of geosite identifications and assessments is undisputable, with special emphasis on presentation of geosites to the general (laic) public which interest is essential for geotourism progress. The work presents research results of criteria affecting the visit of geosites by the general public, on the example of Slovak (geo)tourists. These results represent an important source of information for planning actions related towards general public visitors. Moreover, as indicated by findings of the research, professionals and general public prefer different criteria defining geosite importance and utilization of its geotourism potential. Therefore, both approaches should be implemented in further geotourism development activities.

**Keywords** Geosite visit · (Geo)Tourist · Motivation · Factor · General public

# Introduction

People have been visiting natural (geological) places (e.g., mountains, caves) for centuries. However, only during last decades, a new challenge has been identified in the field of tourism (Dowling 2008) resulting from definitions of nature-based forms of tourism, actual natural heritage protection requirements, appropriate tourists' education, and regional development strategies. Here, a concept of geotourism plays a significant role. Current approaches to geotourism are relatively complex and geotourism, besides geological heritage, also depends on cultural components with an accent on sustainability and local development (e. g., Dowling 2011; Newsome and Dowling 2010; Hose 2012). However, geosites (Fig. 1) remain the main factor. Geotourism's share to the overall tourism sector has increased rapidly (Allan 2011), what is clearly indicated by growing number of worldwide

The term *geosite* has started to appear and to be used in the publications at the beginning of the 1990s. Nowadays, the concept of geosites, as a particular part of tourist offer, has got into the mind of a wide range of professionals active in the field of geotourism and associated fields. So, geosites have become a subject of interest to many researchers from various perspectives (e.g., Boškov et al. 2015; Dogra et al. 2017; Goemaere et al. 2016; Joyce 2008; Martínez-Torez et al. 2011; Martín-Peinado and Rodríguez-Tovar 2016; Palacio-Prieto 2015; Różycki and Dryglas 2017; dos Santos et al. 2016; Štrba 2015; Wimbledon 1996; Wimbledon et al. 2000; Wimbledon and Smith-Meyer 2012). Various conferences on this topic have been organized, e.g., International Symposium of Geosite Management, GEOTOUR, Global Geotourism Conference, or GEOTRENDS. There are several organizations that deal with geosites, geoheritage, and geotourism (e.g., GGN, working group "Geomorphosites" by IAG, and ProGEO). Many authors introduced their own definition of the term "geosite," most often referring to geological character/features, uniqueness, importance, and value of the place. One of the most accurate and applicable definitions has been introduced by Reynard (2004). He defines geosite as a

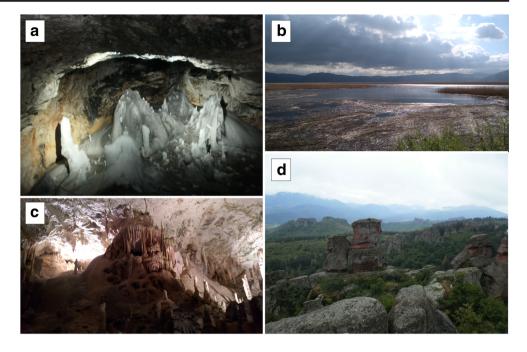


established geoparks, for example, the total number of Global Geoparks Network increased from 87 to 119 members in a period of 6 years (2011–2017) (Allan 2011; GGN 2017).

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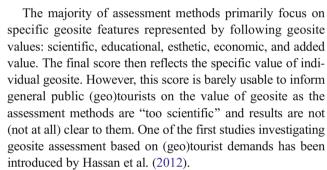
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Fig. 1 Examples of some unique geosites. a Scarisoara Ice Cave—the largest underground glacier in Romania. b Intermittent Lake Cerknica (Slovenia). c Interior of the Postojna Cave (Slovenia). d Belogradchik Rocks (Bulgaria)



"portion of the geosphere that presents a particular importance for the comprehension of Earth history. More precisely, geosites are defined as geological or geomorphological objects that have acquired a scientific (e.g. sedimentological stratotype, relict moraine representative of a glacier extension), cultural/historical (e.g. religious or mystical value), aesthetic (e.g. some mountainous or coastal landscapes) and/or social/economic (e.g. aesthetic landscapes as tourist destinations) value due to human perception or exploitation." (Reynard 2004).

Understanding of geosites' importance and their role within natural processes has brought several authors to the idea to define a method of geosite assessment or evaluation for specific purpose (e.g., geoconservation and/or recreation) (Baca and Schuster 2011; Brilha 2016; Bruschi et al. 2011; Fassoulas et al. 2012; Kazancı 2012; Kubalíková 2009, 2013; Kubalíková and Kirchner 2016; Pereira et al. 2007; Poirier and Daigneault 2011; Reynard et al. 2007; Rybár 2010; Štrba and Rybár 2015; Tomić and Bozič 2014; Tucki 2004; Vujićić et al. 2011; Warszyńska 1970, 1974; Wimbledon et al. 2000; Zouros 2007). Although some of the assessment methods were originally proposed to evaluate geomorphosites, they can be applied to geosite assessment as well. For the purpose of this study, geomorphosites and geosites are considered to be the same or similar objects. Evaluation or assessment of natural objects, which, in many cases, are tourist attractions visited by relatively large number of people (e.g., caves, waterfalls, canyons), is necessary not only for the protection and/or preservation of these places but also for planning and management of sustainable development (Kubalíková 2009, 2013; Štrba et al. 2015) of the region, where geosites are located.



As mentioned by Allan et al. (2015), more attention should be paid to visitors of geosites and not only on geosites. Only limited number of research papers have focused on the motivation and/or demand of tourists to visit geosites yet (Allan et al. 2015; Csorvási 2016; Hassan et al. 2012; Kim et al. 2008; Mao et al. 2009; Štrba et al. 2016). This paper is aimed at the study of the criteria affecting visiting geosites by nonprofessionals (general public visitors) on the example of Slovak (geo)tourists. Besides undisputed economic profits, knowledge of these factors may significantly contribute to overall geotourism development and geoheritage and/or geosciences promotion, not only in the area of geoparks but at any location of geological heritage.

# **Methods**

In the regard of the aim of the study in this paper, a quantitative method of questionnaire survey was used. Questionnaires are one of the most popular methods to get data for various types of studies including consumer studies in tourism (Kozak and Decrop 2009). According to Woodside and Martin



(2007), a questionnaire is the most suitable method to get data on preferences and motivation in tourism.

The survey has been designed using the Google Forms online tool. Potential respondents were asked to participate in the survey via e-mails. In total, 10,034 people from the whole territory of the Slovak Republic were invited to participate. As respondents were contacted electronically, the online forms were filled by the respondents using their devices with no supervision of the questionnaire author. However, a brief explanation of the term "geosite" was given within the survey invitation letter including following text: "geosites are natural sites/places including, e.g., caves, canyons, rock formations, rock outcrops, valleys, etc.".

The questionnaire was divided into two major parts—general information and criteria assessment. The first part included demographic characteristics (gender, age, education level) and general information on geosite visits (frequency of geosite visits per year, the source of information on geosite).

Using the Likert scale (Likert 1932), ranging from 1 (absolutely unimportant) to 5 (very important), respondents were asked to assess the importance of the following 18 criteria affecting their geosite visit: uniqueness/rarity, visual attractiveness of locality, access, ticket/entrance price, information availability, possibility to gain knowledge, tour/visit safety, tour/visit difficulty, presence of a guide, time-limited visit, possibility to buy souvenirs, catering at or near the locality, accommodation at or near the locality, number of tourists, accompanying attraction, distance of the locality from home address, locality is inscribed on the list of significant sites (e.g., UNESCO World Heritage List). Based on the explanation of the term "geosite," as mentioned earlier, respondents evaluated criteria affecting visits of any geosite. As the questionnaires were filled electronically via devices with an internet connection, no explanation of assessed criteria was given to the respondents.

For better illustration and results interpretation, specific values were assigned to each assessment option within a single factor assessed: (1) absolutely unimportant, -1; (2) unimportant, -0.5; (3) neutral, 0; (4) important, 0.5; (5) very important, 1. Final importance of each criterion is then expressed by the average value of respective responses. Based on the results, a ranking reflecting the importance of criteria affecting geosite visits was created.

Relationships between the importance of all possible pairs of studied criteria were analyzed via Pearson correlation coefficient (R) ranging from – 1 to 1 (Table 1). A value of 0 indicates that there is no association (correlation) between the two variables. A value greater than 0 indicates a positive association (correlation)—as the value of one variable increases, so does the value of the other variable. A value less than 0 indicates a negative association (correlation)—as the value of one variable increases, the value of the other variable decreases. Analysis of variance (ANOVA) (see, e.g., Sahai and Ageel

**Table 1** Interpretation of association between variables based on the *R* value

Absolute value of <i>R</i>	Interpretation
R=0	No association
R < 0.3	Very weak association
$0.3 \le R < 0.5$	Weak association
$0.5 \le R < 0.7$	Moderate association
$0.7 \le R < 0.9$	Strong association
$0.9 \le R = 1$	Very strong association

2000) has been used to analyze differences in responses between a various group of respondents.

# **Results and Discussion**

From the total number of 10,034 online survey requests, the responses were given by 543 Slovak respondents in the period from June 2015 to April 2016 resulting in the return rate of 5.43%. During the first phase of data processing, 12 questionnaires, in which respondents answered that they do not visit any geosite at all, were eliminated from further analysis. The reason for the elimination is that these respondents would give no relevant answer to the assessment of criteria affecting geosite visits in the second part of the questionnaire, as they are not interested in visiting such sites. So, answers from 531 questionnaires were studied and analyzed in detail. Based on the formula given by Cochran (1977), 531 responses represent a 100,000+ population size at 95% confidence level with  $\pm$  5% margin of error.

Of the 531 surveyed respondents, 273 (51%) were male and 258 (49%) were female. The largest age group is between 21 and 35 years, represented by 315 (59%) respondents and followed by the group 36 to 50 years (24%). On the contrary, the smallest age group is a group of two respondents (0.4%) up to 20 years old. The majority of respondents (87%) has a university education (Table 2). The structure of respondents corresponds to the results of Allan et al. (2011) indicating that geotourists are predominantly young to middle-aged, well-educated, and preferring internet as their primary source of information. Almost half of the respondents (49%) visits a geosite at least five times per year (Fig. 2).

A significant majority of respondents (91%) look for some information about geosite before the visit. The most frequent source of information is the internet (491 respondents). Here, it is necessary to mention, that in this question, respondents had the option to select more than one option because many tourists often employ more than just one information source. The second choice of information sources is family and friends. These results correspond to findings of the Slovak Travel Agency (SACR 2010). Also, Allan et al. (2015) found



 Table 2
 Demographic characteristics of respondents

Demographic item	Value	Percentage
Gender	Male	51
	Female	49
Age	Up to 20	0.4
	21–35	59
	36–50	24
	51–65	15
	Over 66	2
Education	Primary	1
	Secondary	12
	University	87

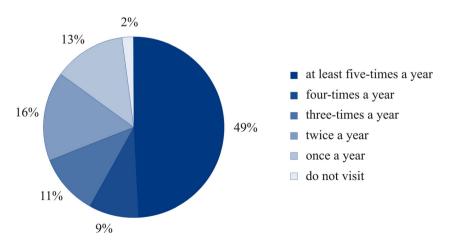
out in their study that the most frequent source of information about the Crystal Cave before the visit is the internet. The less used sources of information, based on the responses, are television, radio, and school (Fig. 3).

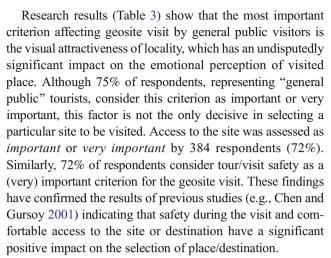
Analysis of the survey results (Table 3) shows that the most important criteria affecting geosite visits by general public tourists (potential geotourists) are as follows:

- visual attractiveness of locality,
- access,
- tour/visit safety,
- · uniqueness/rarity,
- information availability,
- tour/visit difficulty,
- time-limited visit,
- tour/visit length,
- possibility to gain knowledge,
- a number of tourists

The less important criteria affecting geosite visits are the presence of a guide, accompanying attractions, and the possibility to buy a souvenir.

Fig. 2 Percentage of individual groups of respondents based on the number of geosite visits during the year





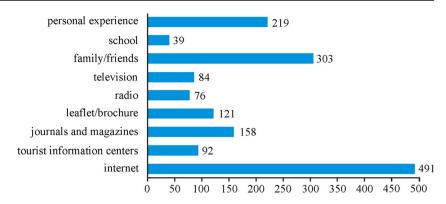
On the other hand, respondents consider the presence of a guide as (absolutely) unimportant. In Slovakia, guided tours, within nature-based tourism forms, are provided just marginally, most often in caves. Moreover, many people often link the guide with boring, sterile, or non-catchy interpretation. So, they prefer an alternative source of information about the visited site, mostly using the internet. In this regard, it is in place to consider the quality of offered guided tours that not only professionals but also the general public visitors recognize the legitimacy and importance of the guides.

Analysis of the relationship between individual respondent's answers by the Pearson correlation coefficient (Table 4) has shown that the only statistically significant relationship is between the tour/visit length and difficulty (R = 0.81). This finding indicates that respondents considering geosite visit/tour length as important accredit similar or the same importance to the geosite visit/tour difficulty. No other statistically significant relationship has been identified.

As men and women are the only two sub-groups of respondents with similar frequencies, to obtain representative results, one-way ANOVA has been performed to compare differences between responses of male and female respondents. ANOVA results (Table 5) show that there are statistically significant



Fig. 3 Source of information on geosite before visit (respondents had possibility to mark more than one option)



differences between men and women criteria assessment. These differences include ticket/entrance price, information availability, possibility to gain knowledge, tour/visit difficulty, tour/visit length, the presence of a guide, possibility to buy souvenirs, tour/visit safety, catering at or near the locality, access, accompanying attractions, and time-limited visit. Men and women perceive these factors differently and attribute to them different importance. However, within any geotourism product development, it is not common to take into account such differences. Therefore, it is possible to primarily focus on criteria that were specified by respondents as important in general. These criteria should represent the basis for the assessment of the geotourism potential and importance

of geosite in a specific area when planning geotourism development towards the general public.

Allan et al. (2015) argue that "retaining the first time tourists or geotourists, is more effective than promoting the geosites to new tourists, particularly as the value of the geotourism experience will still not be popular with some types of tourists". However, this approach does not reflect one of the general features of geotourism—sustainability (Dowling 2011) and geotourists' characteristics (Hose 2008). Hose (2008) has described two groups of geotourists—educating geotourists and recreating geotourists. Without any doubt, the second group of geotourists (recreating) represents the majority that visits

 Table 3
 Results of the survey

Criterion	Importance				
	1	2	3	4	5
Uniqueness/rarity	8	40	138	241	104
Ticket/entrance price	41	97	179	172	42
Information availability	9	50	160	224	88
Possibility to gain knowledge	29	56	195	190	61
Tour/visit difficulty	29	79	128	199	96
Tour/visit length	39	76	125	220	71
Presence of a guide	119	135	190	63	24
Possibility to buy souvenirs	248	145	105	28	5
Tour/visit safety	16	47	111	223	134
Visual attractiveness of locality	4	17	114	247	149
Catering at or near the locality	48	72	177	195	39
Accommodation at or near the locality	42	66	240	144	39
Access	9	30	108	246	138
Number of tourists	39	45	210	162	75
Accompanying attractions	96	171	210	48	6
Distance of the locality from home address	84	120	168	135	24
Locality is inscribed on the list of significant sites	75	111	246	75	24
Time-limited visit	15	63	192	195	66

<sup>1</sup> absolutely unimportant, 2 unimportant, 3 neutral, 4 important, 5 very important



Table 4 Relationship between criteria expressed by the Pearson correlation coefficient

	Uniqueness/ rarity	Ticket/entrance price	Information availability	Possibility to gain knowledge	Tour/visit difficulty	Tour/visit length	Presence of a guide	Possibility to buy souvenirs	Tour/visit safety
Uniqueness/rarity Ticket/entrance price Information availability	1.00 0.05 0.26	0.05 1.00 0.12	0.26 0.12 1.00	0.21 0.03 0.53	0.05 0.24 0.10	0.00 0.27 0.03	0.03 0.09 0.16	0.17 0.08 0.26	-0.04 0.15 0.20
Possibility to gain knowledge Tour/vieit diffculty	0.21	0.03	0.53	1.00	- 0.04	-0.06	0.20	0.19	0.10
Tour/visit length	0.00	0.27	0.03	-0.06	0.81	1.00	0.28	0.10	0.24 0.24
Presence of a guide	0.03	0.09	0.16	0.20	0.30	0.28	1.00	0.47	0.25
Possibility to buy souvenirs Tour/visit safety	0.1/ -0.04	0.08	0.26 0.20	0.19	0.19	0.10 0.24	0.4 <i>/</i> 0.25	1.00 0.30	0.30 1.00
Visual attractiveness of	0.27	0.10	0.12	-0.04	0.05	-0.01	-0.10	-0.01	0.13
locality Catering at or near the	0.12	0.12	0.10	60.0	0.43	0.31	0.17	0.26	0.31
Accommodation at or near	0.08	0.02	0.22	0.15	0.29	0.25	0.13	0.20	0.23
Access	0.09	0.03	0.33	0.14	0.32	0.27	-0.04	0.19	0.36
Number of tourists	0.06	-0.01	0.07	0.21	0.02	0.03	0.03	-0.11	-0.02
Accompanying attractions	0.16	0.23	0.31	0.26	0.16	0.06	0.24	0.30	0.22
Distance of the locality from home address	0.04	0.55	- 0.04	-0.10	0.34	0.35	0.01	0.01	0.11
Locality is inscribed on the list of significant sites	0.15	0.13	0.11	0.12	0.03	-0.03	0.19	0.15	0.13
Time-limited visit	0.15	0.18	0.08	-0.07	0.10	0.07	-0.11	0.00	0.02
	Visual attractiveness of locality	Catering at or near the locality	Accommodation at or near the locality	Access	Number of tourists	Accompanying attractions	Distance of the locality from home address	Locality is inscribed on the list of significant sites	Time-limited visit
Uniqueness/rarity	0.27	0.12	0.08	0.09	90.0	0.16	0.04	0.15	0.15
Ticket/entrance price	0.10	0.12	0.02	0.03	-0.01	0.23	0.33	0.13	0.18
Information availability	0.12	0.10	0.22	0.33	0.07	0.31	-0.04	0.11	80.0
Possibility to gain knowledge	-0.04	0.09	0.15	0.14	0.21	0.26	-0.10	0.12	-0.07
Tour/visit difficulty	0.05	0.43	0.29	0.32	0.02	0.16	0.34	0.03	0.10
Tour/visit length	-0.01	0.31	0.25	0.27	0.03	90.0	0.35	-0.03	0.07
Presence of a guide	-0.10	0.17	0.13	-0.04	0.03	0.24	0.01	0.19	-0.11
Possibility to buy souvenirs	- 0.01	0.26	0.20	0.19	-0.11	0.30	0.01	0.15	0.00
Tour/visit safety	0.13 1.00	0.31	0.23	0.36	- 0.02	0.22	0.11	0.13	0.02
locality	1.00	77.0	0.12	0.19	0.10	70:0	0.10	+1.0	61.0
Catering at or near the locality	0.22	1.00	0.63	0.39	0.02	0.26	0.23	0.03	0.17
Accommodation at or near the locality	0.12	0.63	1.00	0.45	0.07	0.29	0.17	- 0.03	0.15
Access Number of tourists	0.19	0.39 0.02	0.45 0.07	1.00	0.02 1.00	0.09	0.26 0.06	0.01 - 0.01	0.17 0.02



Tour/visit safety 0.09 1.00 Possibility to buy souvenirs 00.1 0.09 Presence of a guide 0.19 0.19 0.04 Tour/visit length 0.23 Tour/visit difficulty -0.010.11 0.06 0.02 gain knowledge Possibility to 0.09 0.01 Information availability -0.030.29 0.15 Ticket/entrance 0.03 0.26 0.23 0.17 Uniqueness/ -0070.14 0.13 Distance of the locality from Locality is inscribed on the Accompanying attractions list of significant sites Table 4 (continued) Time-limited visit home address

**Table 5** Results of analysis of variance (ANOVA) analyzing differences between men and women assessment of criteria affecting geosite visits

Criterion	F	P value
Uniqueness/rarity	0.5680	0.4514
Ticket/entrance price	17.7874	0.0000
Information availability	17.2570	0.0000
Possibility to gain knowledge	5.3570	0.0210
Tour/visit difficulty	43.4712	0.0000
Tour/visit length	16.3045	0.0001
Presence of a guide	12.4472	0.0005
Possibility to buy souvenirs	9.8201	0.0018
Tour/visit safety	56.7321	0.0000
Visual attractiveness of locality	0.6402	0.4240
Catering at or near the locality	6.1030	0.0138
Accommodation at or near the locality	0.0079	0.9294
Access	7.0304	0.0083
Number of tourists	1.9032	0.1683
Accompanying attractions	3.9845	0.0464
Distance of locality from home address	1.3472	0.2463
Locality is inscribed on the list of significant sites	2.6637	0.1033
Time-limited visit	14.8853	0.0001

 $F_{\rm crit}$  = 3.8591, if  $F > F_{\rm crit}$ , we reject the hypothesis that the means of both populations are equal; there is a statistically significant difference between compared group means

geosites all around the world. So, activities and management related to geotourism development, including geoheritage appreciation, preservation, and further promotion, should reflect the fact that general public visitors are a substantial part of this process. Moreover, any form of tourism will probably not be attractive to all types of tourists. However, it is necessary to be active to attract diverse types of visitors—potential geotourists. On the

 Table 6
 Comparison of criteria determining geosite attractiveness/value preferred by general public and professionals

General public	Professionals
Visual attractiveness of locality	Representativeness
Access	Uniqueness/scientific value
Tour/visit safety	Integrity
Uniqueness/rarity	Access
Information availability	Ecological value
Tour/visit difficulty	Economic value
Time-limited visit	
Tour/visit length	
Possibility to gain knowledge	
Number of tourists	



other hand, the enormous interest of visitors in specific geosites may lead to overloading of such sites that can disturb and damage geosites. Therefore, taking into account the needs of potential (geo)tourists, the development of sustainable geotourism should be balanced with geoconservation aspects.

Comparison of criteria affecting geosite visits specified in this study with general criteria of geosite assessments methods (Kubalíková 2013; Štrba et al. 2015) introduced by various authors shows that professionals and general (laic) public consider as important relatively different types of criteria (Table 6).

In the case of professional geosite assessment approach, the final geosite assessment score expresses its scientific character in general. Admittedly, the information on scientific value and importance of the geosite in the context of geotourism may significantly affect geoconservation activities and future planning and management at or near the site.

On the other hand, geosite assessment based on criteria preferred by the general public, as presented in this paper, would give significant information from the geotourism development perspective. Because, with no motivation to visit a specific place, there will be no demand (Sharpley 2006). Moreover, knowledge of these criteria significantly contributes to proper activities related to the geosite management. In this regard, appropriate attention should be paid not only to the geoheritage identification, protection, and preservation at a specific location but also to factors affecting geosite visit preferred by general public tourists.

# Conclusion

Geotourism is a globally growing phenomenon (Dowling 2011) within the tourism sector. Analysis results of criteria affecting geosite visits by general public visitors provide detailed information on what non-professionals prefer when visiting sites of geological heritage. According to the results, the five most important criteria preferred by the general public visitors are visual attractiveness of locality, access, tour/visit safety, uniqueness/rarity, and information availability. These criteria more or less differ from criteria determining geosite value defined by various authors of geosite assessment methods depending on the assessment purpose. However, some limitations of the study should be acknowledged:

Results of the study presented in this paper reflect preferences of general public geosite visitors from one country.
 Potential implementation of geotourism-related management activities requires further study of this issue aimed at general public visitors from various countries all around the world.

- 2. Despite the undeniable efforts of several organizations, associations, or individuals, geotourism is developed and practiced at a relatively weak level in Slovakia (although, three geoparks are established and operated in Slovakia, and the Conception of Geopark Development in Slovakia has been adopted by the Government of the Slovak Republic in 2008 and updated in 2015). So, knowledge of many tourists about this form of tourism is very little, or they do not know anything about it. So, probably, the criteria affecting geosite visits may change with growing level of geotourism development and the number of potential geotourism experiences.
- 3. More than 500 questionnaires were processed in this study, representing the population of more than 1,000,000 people at 95% confidence interval with margin error 5%. A larger number of respondents will increase the credibility of presented results.

Nevertheless, this research represents one of the pilot studies on this topic. Further investigation and probably international cooperation are necessary to identify priorities of general public geosite visitors more precisely. This knowledge is crucial for geotourism sustainability worldwide, not only in the areas of geoparks but at any geosite representing the geological heritage of the Earth.

**Acknowledgements** The author would like to thank reviewers for their comments which greatly improved the original manuscript.

**Funding Information** This work was supported by the Slovak Research and Development Agency under the contract no. APVV-14-0797.

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