VISITORS ON GEOSITES: WHO ARE THEY?

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Abstract
Many aesthetically attractive geosites are visited annually by a large number of tourists, but only a small number of them can be considered geotourists. While the popularity and high attendance can be an advantage in educating visitors in the field of geosciences and the need for nature conservation, in reality, many visitors are only interested in visual perceptions and do not even know basic information about geosite. In such a case, it is necessary to ask what is their motivation to visit the geosite and what they expect to experience here.
The article compares the results of two surveys conducted in 2020 on the UNESCO Global Geopark Bohemian Paradise territory, which sought to capture the diversity of visitors in this region. Different data collection methods and their influence on the survey results are discussed, and similarities in the works despite the use of different methods. The Conclusion sets out the main implications of the diversity of visitor preferences that local destination management agencies and nature conservation authorities have to deal with.

Key words: Sustainable tourism, overtourism, geoheritage, destination management, nature conservation

Introduction

There are many attractive sites of inanimate nature in the Czech Republic, which are visited by hundreds of thousands of tourists every year. Sandstone rock formations in the Bohemian Paradise, which have been traditional tourist destinations since the 19th century, are among the country's most visited geosites (Drápela 2020). However, it would be a mistake to assume that everyone who visits these geosites is a geotourist - the situation is instead the opposite; only a tiny part of the visitors can be described as geotourists. But why?
Geotourism is one of the forms of sustainable tourism. The center of its attention is inanimate nature and its relations with living nature and human activities (the so-called ABC approach). Its activities should contribute to protecting the geoheritage and increase the quality of life of local communities (Dowling 2011, Olafsdóttir 2019). Therefore, it should not be a consumer mass tourism, where the visitor is almost without interest in learning about the local nature or culture and seeks only visual perceptions or various sensory experiences. A sincere effort at self-education should be part of traveling to geosites if we want to classify the process as geotourism (Gordon 2012).
If we want to protect geosites, we need to know what expectations and for what purpose visitors come here (Ticar et al. 2018). So we can estimate how visitors will behave on the geosite. Some behaviors may be inappropriate and may endanger either the site or other visitors. This, of course, needs to be prevented by appropriate restrictions (Ruban 2017, Cho and Woo 2018). For the reasons mentioned above, we conducted two surveys in 2020, which aimed to reveal visitors' motivation and preferences in the Bohemian Paradise Geopark and the Bohemian Switzerland National Park. The results of these two surveys will be compared in this article, analyzed their data collection methods, and discussed their consequences.

Material and methods

The data used in this article come from two surveys conducted between June and September 2020. The first of them (hereinafter referred to as "survey 1"; for detailed results, see Drápela 2021) took place in the Czech Switzerland National Park (7 locations in total) and the UNESCO Global Geopark Bohemian Paradise (8 locations in total). It was a simple experiment combined with an interview and was attended by a total of 2,256 visitors. The essence of the experiment was that the interviewer first encouraged the respondent to choose from the 24 cards on which the keywords (like rest, fun, family, friends, trip, rocks, nature, landscape, etc.) were listed any number of those that describe the reasons for his vacation in this region. Then the interviewer instructed him to rate each card he took according to significance on a scale of 1-10, where 10 is the most significant and 1 the least. The interviewer noted this information, then assigned a value of 0 to cards that the respondent did not select. The respondent could give more cards the same rating.
The second source of data is an extensive questionnaire survey (hereinafter referred to as "survey 2"; for detailed results, see Drápela, Boháč, Böhm, Zágoršek 2021), which took place in the UNESCO

Global Geopark Bohemian Paradise (26 locations in total). While survey 1 focused only on the area of sandstone rocks, data for survey 2 were also obtained for cultural monuments, cities, swimming pools, camps, etc. The questionnaire contained several questions, which took about 30 minutes to complete. Still, for this article's purposes, only a battery of questions was used, monitoring visitors' preferences and motivation for their holiday. This battery of questions used graphic scales, i.e., lines expressing the power of a given phenomenon, to which the respondent recorded his answer by crossing out this line in a certain place. The lines were a total of 10 cm, and the responses were then recoded to 0 - 100, which is the length in millimeters. Answer 0 meant "I don't care at all", answer 100 then "I'm most interested". A total of 556 respondents completed the questionnaire.
Based on the obtained data, geosites visitors' typology was subsequently created, using the K-means cluster analysis method. In survey 1, this clustering used 24 variables; in the case of survey 2, the clustering used 11 variables. The resulting number of clusters was chosen based on the rule on minimizing the loss function (Hastie, Tibshirani, Friedman 2009) when the number of clusters was selected, at which the last time there was a significant decrease in the loss function. The result of this procedure was a total of 8 clusters in survey 1 and a total of 7 clusters in survey 2.
However, this paper's principal added value is the last step, namely comparing the results of both surveys. While both studies' results can be easily found in the articles referred to above, they lack a comparison between them. There were some differences between the two surveys in the chosen method, location, and data collection form. This resulted in slightly different results, which can be analyzed in terms of the potential impact of the above differences. On the contrary, some findings have been confirmed in both surveys.

Results and Discussion
The tables below present the results of the two studies mentioned above that can be compared with each other. Table 1 presents the results of survey 1. To interpret it, it should be noted that the respondents evaluated the following 24 variables: vacation, relaxation, rest, fun, family, friends, trip, rocks, nature, landscape, cultural monuments, museums, forests and meadows, views, cycling, swimming, hiking, good food and drink, beer and alcohol, festivals, entertainment for children, social events, parties, exploring new places.

Tab. 1: Results of cluster analysis by K-means method based on data from survey 1 (Drápela 2021)

Type of tourist	Share	Three items with the highest rating (max = 10)		
Resting tourist	22,8%	rest (7,6)	relaxation (7,3)	fun (7,2)
Social tourist	17,1%	fun (8,0)	friends (7,9)	beer and alcohol (7,6)
Nature lover	15,3%	nature (8,9)	rocks (7,3)	forests and meadows (7,0)
Parent	14,5%	entertainment for children (7,8)	family (6,5)	landscape (6,3)
Traveller	9,2%	exploring new places (7,4)	vacation (6,6)	landscape (6,5)
Romantic	8,4%	landscape (6,5)	nature (6,2)	cultural monuments (6,1)
History lover	7,6%	cultural monuments (7,1)	exploring new places (6,4)	museums (6,5)
Active tourist	5,1%	hiking (6,9)	rocks (6,6)	landscape (6,2)

Table 2 presents the results of survey 2. In this case, the respondents evaluated the following 11 variables: rocks, rock formations; castles, chateaux; museums, galleries, folk buildings; forests, meadows, landscape views; swimming, sunbathing; cycling; walking, hiking; good food and drink; festivals, social events; events and attractions for children; well-being and relaxation.

The results of the cluster analysis shown in the tables above show some similarities but also differences. The first visible difference is the different number of clusters, with 8 clusters in survey 1 and 7 clusters in survey 2. However, this means a relatively significant similarity in the results, as the division into clusters must be perceived as the result of the statistical method, not as a dogma. The designation of individual types of tourists is only a description of individual members of the cluster's main common features, so it can be somewhat simplistic. However, we believe that for comparing the results of both surveys, it is appropriate.

Tab. 2: Results of cluster analysis by K-means method based on data from survey 2 (Drápela, Boháč, Böhm, Zágoršek 2021)

Type of tourist	Share	Three items with the highest rating (max = 100)		
Family traveller	16,6%	Events and attr. for children (76,4)	Well-being and relaxation (75,8)	Castles, chateaux (70,3)
Active tourist	15,9%	Cycling (85,3)	Forests, meadows, lands. v. (82,6)	Rocks, rock formations (79,2)
Nature lover	15,7%	Forests, meadows, lands. v. (84,1)	Good food and drink (82,4)	Well-being and relaxation (81,3)
History lover	15,3%	Castles, chateaux (91,6)	Well-being and relaxation (85,1)	Museums, galleries, folk bui. (84,8)
Parent	15,1%	Good food and drink (88,3)	Well-being and relaxation (87,0)	Events and attr. for children (83,2)
Calm loving hiker	13,3%	Castles, chateaux (77,3)	Walking, hiking (77,3)	Forests, meadows, lands. v. (75,6)
Resting tourist	8,1%	Well-being and relaxation (83,9)	Good food and drink (83,3)	Swimming, sunbathing (66,3)

Similar features can be found in clusters described as nature lover, history lover, parent, active tourist, and resting tourist. Minor differences in their preferences are because survey 1 was conducted only on the geosites of rock formations, while survey 2 was conducted throughout the region. Therefore, in survey 1, hiking is in the first place for an active tourist because cycling is not possible there. Conversely, in terms of differences, it can be seen that the social tourist, romantic, and traveler categories from survey 1 do not directly match any category in survey 2. However, this is due to slower transitions between categories (and a more balanced number of members in individual clusters) in survey 2, caused by a different method. The data collection method used in survey 1 highlights the differences between the respective clusters. Therefore, if we need to capture the specifics of individual types of visitors' motivation, this is a suitable method.
In contrast, the graphical scales used in survey 2 capture reality more objectively and in greater detail. However, the transitions between the individual clusters are much smoother. This will make more universally valid holiday qualities stand out, such as well-being and relaxation, or good food and drink. Differences in the share of individual clusters, best visible in active tourist and resting tourist, are in the case of active tourist caused by the capture of cyclists and paddlers (who do not occur in rock formations), in the case of resting tourist, it is the division of this class from survey 1 into more clusters in survey 2.

Conclusion

Overall, the results of both surveys can be evaluated so that there is a relatively large diversity in the composition of visitors. It has been confirmed that visitors more often refer to nature and landscape in general as reasons for their visit than rocks and rock formations. Therefore, their attention is seldom directed to the geoheritage; much more often, it stays in nature and visual perceptions. Visitors to geosites often consider this visit only as a supplement to their holiday's primary goal, which can often be fun with family and friends, drinking alcohol, or attending social events. However, this type of visitor can be very problematic from the point of view of nature protection, so it is necessary to give him an experience that he expects not to want to create himself in violation of local regulations.
Concerning the protection of geosites, we, therefore, recommend a procedure where the main highlights in the geosite area are accessible comfortably and with good infrastructure (suitably large car parks, paved hiking trails, railings, waste bins, plenty of viewpoints, photo points, etc.). For those interested in a closer exploration of the geosite, other routes should be available. Still, they should not be overly promoted so that they are not sought after by those types of tourists who leave a mess in nature and damage it.

References

Cho, J.-N., Woo, K.S. (2018). Proposal for legal protection of the geosites in National Geoparks in Korea. *Journal of the Geological society of Korea*, 54(3), 237-256. DOI: 10.14770/jgsk.2018.54.3.237
Dowling, R.K. (2011). Geotourism's Global Growth. *Geoheritage*, 3(1), 1-13. DOI: 10.1007/s12371-010-0024-7

Drápela, E. (2020). Overtourism in the Czech Sandstone Rocks: Causes of the Problem, the Current Situation and Possible Solutions. In *Proceedings of the 3rd International Conference on Tourism Research ICTR 2020*, Valencia, Spain. ACPI: Reading, UK, 35-42. ISBN: 978-1-912764-55-6
Drápela, E. (2021). Prevention of damage to sandstone rocks in protected areas of nature in northern Bohemia. *AIMS Geosciences*, 7(1), 56-73. DOI: 10.3934/geosci.2021003
Drápela, E., Boháč, A., Böhm, H, Zágoršek, K. (2021). Motivation and preferences of visitors in the Bohemian Paradise UNESCO Global Geopark. *Geosciences*, 11(3), a.n. 116. DOI: 10.3390/geosciences11030116
Hastie, T., Tibshirani, R., Friedman, T. (2009). The Elements of Statistical Learning, 2nd Ed. New York: Springer.
Olafsdóttir, R. (2019). Geotourism. *Geosciences*, 9(1), a.n. 48. DOI: 10.3390/geosciences9010048
Gordon, J. E. (2012). Rediscovering a Sense of Wonder: Geoheritage, Geotourism and Cultural Landscape Experiences. *Geoheritage*, 4(1-2), pp. 65-77. DOI: 10.1007/s12371-011-0051-z
Ruban, D.A. (2017). Geodiversity as a precious national resource: A note on the role of geoparks. *Resources Policy*, 53, 103-108. DOI: 10.1016/j.resourpol.2017.06.007
Ticar, J. et al. (2018). Speleotourism in Slovenia: balancing between mass tourism and geoheritage protection. *Open Geosciences*, 10, 344-357. DOI: 10.1515/geo-2018-0027

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Souhrn
Mnoho esteticky atraktivních geosites každoročně navštíví velké množství turistů, ale jen malý počet z nich lze považovat za opravdové geoturisty. Zatímco popularita a vysoká návštěvnost lokalit mohou být výhodou při snaze vzdělávat návštěvníky v oblasti věd o Zemi a potřebě ochrany přírody, ve skutečnosti mnoho návštěvníků zajímají pouze vizuální vjemy a při své návštěvě neznají ani základní informace o lokalitě. V takovém případě je nutné se ptát, jaká je jejich motivace navštívit tuto lokalitu a co od své návštěvy očekávají.
Článek srovnává výsledky dvou průzkumů provedených v roce 2020 na území Globálního geoparku UNESCO Český ráj, jejichž cílem bylo zachytit rozmanitost návštěvníků v tomto regionu. Jsou diskutovány různé metody sběru dat a jejich vliv na výsledky průzkumu, stejně jako podobnosti výsledků navzdory použití různých metod. Závěr stanoví hlavní důsledky rozmanitosti preferencí návštěvníků, s nimiž se musí potýkat místní agentury destinačního managementu a orgány ochrany přírody.

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