geosciences

Article

Large-Scale Accessibility as a New Perspective for Geoheritage Assessment

Yuri A. Fedorov [1], Anna V. Mikhailenko [1] and Dmitry A. Ruban [2,*]

1 Department of Physical Geography, Ecology, and Nature Protection, Institute of Earth Sciences, Southern Federal University, Zorge Street 40, Rostov-on-Don 344090, Russia
2 Department of Organization and Technologies of Service Activities, Higher School of Business, Southern Federal University, 23-ja Linija Street 43, Rostov-on-Don 344019, Russia
* Correspondence: ruban-d@mail.ru

Abstract: The exploitation of geoheritage resources depends on their accessibility. The latter is usually established for geosites, whereas reaching the areas where geosites concentrate also deserves attention. Here, a novel, multi-criteria, score-based approach for assessing the large-scale accessibility of geoheritage-rich areas is proposed. The study takes into account various information about external and internal public transportation, road infrastructure, local services (including accommodation opportunities), and general settings. This approach is applied to the Russian South, where there are three geoheritage-rich areas, namely Lower Don, Abrau, and Mountainous Adygeya. Using new criteria, these areas differ by their large-scale accessibility, which is excellent in Lower Don and moderate in Abrau and Mountainous Adygeya. It is established that the co-occurrence of geoheritage-rich areas and popular tourist destinations does not guarantee excellent accessibility. The findings of the present study seem to be important for the development of optimal geoheritage resources policy, as well as for planning research and educational activities, such as the currently realized geochemical investigations and the regular field educational campaigns in the Russian South.

Keywords: geotourism; geosites; infrastructure; research projects; Russian South

check for updates

Citation: Fedorov, Y.A.; Mikhailenko, A.V.; Ruban, D.A. Large-Scale Accessibility as a New Perspective for Geoheritage Assessment. *Geosciences* **2022**, *12*, 414. https://doi.org/10.3390/geosciences12110414

Academic Editors: Jesús F. Jordá Pardo and Jesus Martinez-Frias

Received: 28 September 2022
Accepted: 8 November 2022
Published: 10 November 2022

1. Introduction

Current progress in geoheritage studies [1–10] is followed by the development of the concept of geoheritage resources [11–16]. The assessment of geoheritage sites (geosites) is an important procedure [7,17], but it needs significant reconsideration when applied to large areas in which geosites concentrate. Although some of these areas can be termed as geodiversity spots [18–20], the term "geodiversity" has already become so vague and indefinite that it can be left for theoretical needs. There is also a need to distinguish geosites sensu stricto and geodiversity sites due to their functional differences [21]. Therefore, the term "geoheritage-rich area" can be preferred for practical usage.

One of the most important properties of geoheritage is its accessibility, which determines the very opportunity to identify, describe, conserve, promote, and utilize unique geological features. Nonetheless, one should note that this property is only technical, and it is one of many other properties; thus, it does not determine the overall value of geoheritage. Many approaches have been proposed for geoheritage assessment, and almost all pay attention to the noted property (among the other properties). They have much in common, but differences and alternatives can also be found. The most popular approach has been proposed by Brilha [22], for whom accessibility is related to the educational and touristic values of geosites. Surprisingly, it is not related to scientific value, although scientists do not differ from students and tourists by their need to reach geosites (nonetheless, Brilha [22] noted use limitations). Accessibility is assessed by the distance between a given geosite and the road, the quality of the latter, and the availability of public transport (only buses are indicated). Such criteria matter in particular cultural and socio-economical contexts, but they are not universal. The other approach can be found in the work by Warowna et al. [23]. These specialists opposed the possibilities of reaching geosites by cars and public transport, and they also paid attention to the physical difficulties in reaching them. Analyzing the strengths and weaknesses of the previous proposals, Mikhailenko et al. [24] developed a multi-criteria approach for dealing with accessibility, which seems to be more or less independent on contexts and situations. Particularly, they emphasized the differences between outer and inner accessibility and paid attention to some other parameters, such as the need for permissions and entrance fees.

All the above-mentioned developments focus chiefly on geosites. Although the latter can be exploited for the purposes of research, education, and tourism taken alone, geoheritage-rich areas are more promising in this regard, and their accessibility needs special assessment. Although the importance of whole areas was already noted briefly by Brilha [22], the related approaches are still lacking. The accessibility-related developments for geoparks [25–29] either focused on internal infrastructural developments or openness to the community, which are significant, but there other aspects of the problem.

Road infrastructure is essential in geoheritage management due to its accessibility and connectivity functions [30–34]. A high-quality, paved road opens a given geosite to visitors. However, the presence of such a road means almost nothing if it is limited to an area connected to the other country by unpaved roads, or if such a road requires hours of driving without the possibility of stopping for dinner. In other words, it is important to realize that geoheritage is accessible not only locally, but also regionally and nationally. Assessing the related property for each particular geosite is unreasonable, except for the cases of single localities with global uniqueness isolated from other geosites. This means that accessibility can be assessed jointly for geoheritage-rich areas with multiple geosites. It can be termed as large-scale accessibility to be defined as the spectrum of opportunities to visit geoheritage-rich areas from other, more or less remote territories. Assessing this property is especially important in large countries such as Brazil, China, India, Russia, and Sudan, where geoheritage resources are distributed heterogeneously.

The objective of the present work is to introduce a novel approach for assessing the large-scale accessibility of geoheritage. It is tested for the territory of the Russian South, where three geoheritage-rich areas are known (Lower Don, Abrau, and Mountainous Adygeya). This development does not repeat what has already been proposed [22–24], although some previous experience is taken into account; regardless, this work focuses on a very novel perspective for the understanding of geoheritage resources.

2. Study Territory

This work deals with the territory known as the Russian South (Figure 1). This is a traditional label for the regions of the Southern and North Caucasian federal districts of the Russian Federation, which are situated in the very southwest of the country. This territory is known for its natural (mild climate and steppes); socio-economical (advanced agriculture, high entrepreneurial activity, and touristic importance); and cultural–historical (multiculturalism at the transition between Europe and Asia) peculiarities. Geographically, this huge territory encompasses grassy plains in the north and the center and forested mountains in the south (Figure 1). From the west, it is washed by the Azov and Black seas, the coasts of which form an almost continuous chain of famous resorts. Researchers have already examined the outstanding touristic and recreational potential of the Russian South [35–37].

Geoheritage resources are distributed highly heterogeneously within the Russian South. Presently, three geoheritage-rich areas are established there, namely Lower Don [38], Abrau [39], and Mountainous Adygeya [14] (Figure 1). To avoid repetition of the published information, the geoheritage characteristics of all three areas are summarized in Table 1, and some representative examples are shown on Figure 2.

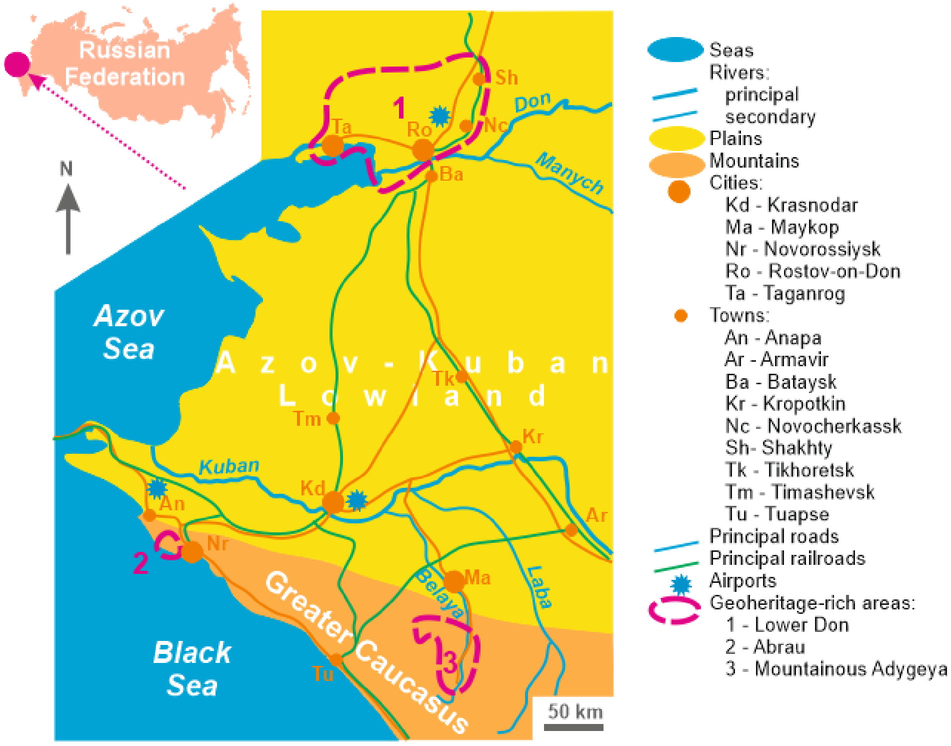

Figure 1. Geographical location of the three considered geoheritage-rich areas.

Figure 2. Typical examples of geoheritage from the Russian South: Paleocene siliciclastic turbidites from Abrau (**a**), Late Jurassic carbonates from Mountainous Adygeya (**b**), and Miocene skeletal limestones from Lower Don (**c**).

Table 1. Basic characteristics of the considered geoheritage-rich areas (compiled from [14,38,39]).

Characteristics	Geoheritage-Rich Areas		
	Lower Don	**Abrau**	**Mountainous Adygeya**
Location (administrative affinity)	Rostov Region	Krasnodar Region	Republic of Adygeya and Krasnodar Region
Approximate size	>10,000 km^2	300 km^2	>2000 km^2
Geographical domain	Hilly plain, alluvial plain, seashore	Low mountains, seashore	Low and high mountains
Dominating landscape	Steppe (grassland)	Deciduous forests	Deciduous, mixed, coniferous forests
Number of geosites	>20 (inventory in progress)	2	16
Dominance of geosites	Low	Moderate	Moderate
Number of geoheritage types	14	7	14
Selected attractive features	Neogene outcrops with fossils, mud lakes, coal waste heaps	Cretaceous–Paleogene outcrops with trace fossils, lakes	Permian–Cretaceous outcrops with fossils, Paleozoic granitoids, waterfalls
Use in geoscience research	Low	Moderate	High
Use in geoscience education	Moderate	High	High
Use in geotourism	Low	Low	Moderate
Biodiversity	Low	Low	High
Human intervention	High (urbanization)	Moderate (touristic infrastructure)	Moderate (touristic infrastructure)
Landscape aesthetic attractiveness	High	High	High
Typical geosite visitors	University students and lecturers	Researchers, university students, and lecturers	Researchers, university students, and lecturers; geology amateurs and other geotourists

Lower Don is a vast area embracing the lower part of the Don River, its delta, the coasts and the near-coastal areas of the Taganrog Bay of the Azov Sea, and some adjacent plots (Figure 1). Geologically, it corresponds to the Rostov Dome of the Russian Platform, where Precambrian crystalline basement is overlain by Cretaceous and Cenozoic deposits; carboniferous sedimentary complexes and mid-Mesozoic igneous rocks are known from its northern periphery [40]. On the modern tectonic reconstructions, this area looks like the edge of the huge Precambrian block [41]. Although an inventory of the geoheritage resources of this area is in progress, the "core" knowledge about them was summarized by Nebabina and Ruban [38].

Abrau is a relatively small area near Novorossiysk, which stretches between the Black Sea coast in the south and the northern shore of the Abrau Lake in the north (Figure 1). Geologically, it represents the western edge of the Greater Caucasus orogen dominated by Late Cretaceous and Paleocene turbiditic deposits [42]. Tectonically, this is an Alpine orogenic domain formed in the late Cenozoic [41,43]. The geoheritage resources of this area were characterized comprehensively by Ruban [39].

Mountainous Adygeya is a rather large area and popular tourist destination embracing the Belaya River watershed southward of Maykop (Figure 1). Geologically, it is dominated by Mesozoic sedimentary complexes (siliciclastic turbidites and carbonates), although Paleozoic igneous rocks and thick red-bed sequences as well as Precambrian metamorphic rocks are also known there [44]. The area represents the long-term evolution of active marine basins, which existed there in the Mesozoic [45,46], after which the area (together with the entire Greater Caucasus) experienced orogenic uplift [41,43]. The geoheritage resources and their current exploitation have been described in detail by Ruban et al. [14].

These three geoheritage-rich areas provide unique opportunities to comprehend a broad spectrum of geological phenomena (Table 1), as well as to learn about the geological history of the Russian South. The geosites of Mountainous Adygeya represent the active tectonic development of the territory from the Precambrian to the mid-Cretaceous, and they shed light on the Variscan and Cimmerian deformations and the Mesozoic Caucasian Sea [14]. The geosites of Abrau inform about the regional geological evolution at the Mesozoic–Cenozoic transition [38]. The geosites of Lower Don reflect the "passive" tectonic development of the northern part of the Russian South in the late Cenozoic [39]. Importantly, all three areas also represent modern geological processes and the Anthropocene themes.

3. Material and Methods

The material for this work has been collected during field works in all three geoheritage-rich areas of the Russian South presented in this work. Experience with organizing major research projects, geo-ecological conferences, and field educational campaigns for students from the Southern Federal University (Rostov-on-Don, Russia) has been helpful. The information has been obtained by observations, map-based measurements, and a search for some information available online. A part of this material has been collected to plan and realize geochemical investigations within the framework of the Strategic Academic Leadership Program of SFedU Priority-2030.

As explained above, the existing methodology for assessing geoheritage accessibility focuses on single geosites [22–24], and it cannot be employed for entire geoheritage-rich areas (indeed, it can be used for assessing individual geosites in these areas). A new approach has to be proposed; it requires finding the proper criteria and establishing the scoring system. Several starting points for the development of such an approach can be outlined (these are only the premises—the finally used criteria are explained below).

First, it is reasonable to link large-scale accessibility to transport infrastructure. Indeed, geoheritage can be interesting to hikers, but only very rare, occasional hikers with extraordinary skills would decide to reach a geoheritage-rich area from their permanent locations due to distances measured by dozens and hundreds of kilometers. Hiking opportunities are reasonable to consider, but only in the case of single geosites [24]. Second, accessibility depends on public transportation because not all people can use cars, and geoheritage-rich areas can be too remote for many drivers. Accessibility depends on the number of options for transportation, i.e., if visitors can reach a given area by plane, bus, train, and boat. Like in the case of geosite accessibility [23,24], outer and inner accessibility should be distinguished. The latter depends on the number of stops of public transport within a given area. However, to take into account the timetable of public transport would be challenging because different visitors would judge it differently, and collecting the related information is not always possible. Third, road infrastructure allowing travel to the area by car and travel within it should be taken into account.

Fourth, special attention should be paid to local services. In the case of geosites, the presence of a restaurant or hotel located near them is unimportant to their accessibility. However, their absence creates significant difficulty for visiting geoheritage-rich areas because one would either need to organize a very long, one-day trip, or be specially prepared for staying without any comfort for more than one day; indeed, such difficulties would complicate or prohibit visiting some areas. Local services are not restricted to accommodation and meals, but also include transport rental. Fifth, there are various specific conditions that limit the accessibility of areas. Particularly, these are linked to settlement pattern and visiting restrictions, which are as follows. It is reasonable to pay attention to the biggest available settlements and not population density because the opportunity to find services (for instance, any technical support) is higher in towns and cities, even if these are fewer than in small villages, or if they are numerous. Brilha [22] preferred to focus on population density; this was reasonable, as he paid attention to the other aspects of geosite management. As for restrictions, the influence of struggling for visit permissions and paying entrance fees was explained by Mikhailenko et al. [24], and this seems to be equally important to geosites and geoheritage-rich areas.

The criteria are summarized in Table 2. It should be added that the proposed approach aims at assessing only the large-scale accessibility of geoheritage-rich areas, not their general value. Thus, the number of employed criteria should be limited to only those most related to large-scale accessibility.

Table 2. Criteria for assessment of large-scale accessibility of geoheritage-rich areas.

Criteria	Grades	Scores
	External public transportation	
Airport	Within area <50 km from area 50–200 km from area	10 7 2
	>200 km from area	0
Railway station	Within area <50 km from area 50–200 km from area	10 7 2
	>200 km from area	0
Bus station	Within area <50 km from area 50–200 km from area	10 5 2
	>200 km from area	0
Port (river/lake/sea)	Within area <50 km from area 50–200 km from area >200 km from area	10 5 2 0
	Internal public transportation	
Minor stops of trains, buses, boats in area	Numerous Few Absent	20 10 0
	Road infrastructure	
Best available road to area	Principal (paved) Secondary (paved) Unpaved	20 15 5
	Absent	0
Prevailed roads within area	Principal (paved) Secondary (paved) Unpaved Absent	20 15 7 0
	Local services	
Accommodation	Wide choice (numerous hotels, lodges, camps of different quality) within area Wide choice (numerous hotels, lodges, camps of different quality) <50 km from area Limited choice (few hotels, lodges, camps offering elementary services) within area Limited choice (few hotels, lodges, camps offering elementary services) <50 km from area	30 15 15 5
	Absent	0

Table 2. *Cont.*

Criteria	Grades	Scores
Car/boat rental	Within area <50 km or too limited	10 5
	>50 km or absent	0
Taxi	Within area <50 km	30 15
	>50 km or absent	0
Excursion bus rental	Within area <50 km or too limited	20 5
	>50 km or absent	0
Meals	Big choice (numerous restaurants and cafes) within area Limited choice (few restaurants and cafes) within area Absent	30 10 0
	General setting	
Maximum rank of settlements within area	City (population >0.2 mln) Town (population <0.2 mln) Village (population <5000)	30 10 5
	absent	0
Seasonality in area	Unimportant for accessibility Somewhat important for accessibility	50 25
	Important for accessibility	5
Severe weather conditions in area	Rare (<1 event per year) Common (1–5 events per year)	20 10
	Frequent (>5 events per year)	0
Permissions for visiting area or its significant parts	Not required	15
	Required	0
Fees/tickets for visiting area or its significant parts	Not required Required	15 0
	Grades of geoheritage-rich areas by their large-scale accessibility	
	CATEGORY	TOTAL SCORES
	Excellent	251–350
	Moderate	151–250
	Limited	0–150

Finding the proper criteria should be followed by development of the scoring system, which means establishing grades for all criteria and ascribing scores. The latter should be done to make the total scores (sum of all scores) meaningful characteristics, allowing judgment about the true accessibility of geoheritage-rich areas. Different criteria should have different grades and receive different scores depending on their relative importance. Indeed, some conditions increase and the others decrease the accessibility, and the total scores should reflect the balance between them. The proposed grades and scores (Table 2) reflect the opportunities to access areas from outside. Finally, the sum of all scores allows attributing a given area to one general category of large-scale accessibility, i.e., it is established whether it is characterized by excellent, moderate, or limited accessibility (Table 2).

4. Results

The application of the proposed approach to the considered geoheritage-rich areas of the Russian South indicates their differences (Table 3). First, one should note the differences by external public transport. Lower Don corresponds to the densely urbanized area in which a city with a population exceeding one million people is located, namely, Rostov-on-Don. One can reach this area by many types of transport, and there are also various transport opportunities to make trips within it. The situation differs in Abrau and Mountainous Adygeya, which are chiefly accessible by bus. Airports, railway stations, and even ports (in the case of Abrau) are located not so far from these areas, but trips from them to the area require using either public buses or taxis. Moreover, public transportation is absent within Abrau and limited in Mountainous Adygeya. The state of road infrastructure is so that one can easily use their own car or take a local taxi to reach the geosites, although rental opportunities are restricted in two areas (Table 3).

Table 3. Scoring large-scale accessibility of the considered geoheritage-rich areas.

Criteria	Geoheritage-Rich Areas		
	Lower Don	**Abrau**	**Mountainous Adygeya**
Airport	10	2	2
Railway station	10	7	2
Bus station	10	10	10
Port	10	5	0
Minor stops of trains, buses, boats in area	20	0	10
Best available road to area	20	15	20
Prevailed roads within area	15	7	15
Accommodation	30	30	30
Car/boat rental	10	5	0
Taxi	30	30	30
Excursion bus rental	20	5	5
Meals	30	30	10
Maximum rank of settlements within area	30	5	10
Seasonality in area	25	25	25
Severe weather conditions in area	10	10	10
Permissions (e.g., to natural reserves) to visit area or its significant parts	15	15	15
Fees/tickets for visiting area or its significant parts	15	15	0
TOTAL SCORES	310	216	194
Grade	Excellent	Moderate	Moderate

In all three areas, there are many options for accommodation (Table 3). In Lower Don, there are hundreds of hotels, lodges, and hostels (not only in Rostov-on-Don, but also in its vicinity and other settlements). In Abrau, the choice is more limited, but some can be accommodated at the Limanchik camp of the Southern Federal University or several hotels and lodges in Abrau-Dyurso. In Mountainous Adygeya, the hotel industry experiences significant growth, with dozens of hotels and lodges available, including relatively remote places and even directly within forests. However, one should also note that the visitors of Mountainous Adygeya may face a challenge with finding places to dine (restaurants and cafes are not numerous, and even some luxurious hotels do not have them), although the situation is gradually improving.

Special attention should be paid to settlements (Table 3). As mentioned above, Lower Don is an urban area with two big cites, namely Rostov-on-Don and Taganrog, and several smaller towns, namely Bataysk, Novocherkassk, and Shakhty (Figure 1). In contrast, Abrau only hosts Abrau-Dyurso village, and Mountainous Adygeya hosts Kamennomostsky town and a few villages. Visitors of the two latter areas may be faced with limited services (for instance, if there is an urgent need for serious car maintenance). Another specific feature of Mountainous Adygeya is the common use of entrance fees. In this area, some geosites are situated in the Caucasian State Natural Biosphere Reserve, for which visitors are required to pay a fee. Moreover, access to such important attractions as Rufabgo Waterfalls and Khadzhokh Klamm also requires a fee.

Generally, the total scores imply that the Lower Don geoheritage-rich area has excellent large-scale accessibility, whereas Abrau and Mountainous Adygeya have moderate large-scale accessibility (Table 3). The difference between the former and two latter is significant. In particular, it is strongly determined by the differences in external public transportation. One should also note that Lower Don receives lower scores than the two other areas by none criterion (Table 3).

5. Discussion and Conclusions

The results of the present study reveal spatial heterogeneity of the Russian South by the large-scale accessibility of its geoheritage-rich areas. This heterogeneity can be explained by the trends of territorial development in recent years (particularly, with regard to settlement pattern and transport infrastructure), which influence the properties of geoheritage resources. Although the established values (Table 3) do not argue against good reasons for the exploitation of these resources for the purposes of science, education, and tourism [14,38,39], more efforts are required to exploit them fully in Abrau and Mountainous Adygeya. Surprisingly, Abrau is a part of the large recreational zone along the Black Sea coast, and Mountainous Adygeya itself is an important tourist destination. Their touristic infrastructure is developed well. However, it appears that the latter is not enough to determine large-scale accessibility of the areas.

Assessing the large-scale accessibility of geoheritage-rich areas seems to be important, not only for "purely" scientific needs, but also for developing policies at the national, regional, and municipal levels concerning geoheritage resources. These policies are necessary because the exploitation of these resources (particularly in the form of geotourism) may produce socio-economic benefits [14,47–51]. Geoheritage management and exploitation are too innovative and complex, and they are difficult to develop without attention and support from administrative authorities. Two principal directions for geoheritage policy developments can be proposed in light of the findings of this study. First, successful exploitation of the available geoheritage resources requires improvements in their large-scale accessibility and, particularly, attention to those parameters of the areas, for which low or zero scores have been specified (Table 3). Particularly, the internal public transportation needs better development in Abrau, and especially Mountainous Adygeya (taking into account its size). Second, the policies should focus on justifying territorial development programs and initiatives (including those related to tourism) to the desirable improvements in large-scale accessibility. If a given area is rich in geoheritage, this means its exploitation can be beneficial; therefore, it is reasonable to consider the actions facilitating this exploitation. For geotourism, the large-scale accessibility of geoheritage-rich areas is vital. However, it is similarly important for research and education. For instance, an advanced research project is currently underway at the Southern Federal University. It focuses on the use of some geoheritage objects of the Russian South for the purposes of geochemical investigations (with an emphasis on heavy metals, particularly, mercury). Indeed, its success depends strongly on the large-scale accessibility of Lower Don and Abrau. In Mountainous Adygeya, the limited opportunities to rent excursion buses challenges the organization of field educational campaigns for university students.

Geoheritage exploitation should aim at socio-economic benefits, but it must also be sustainable [12,13,52–54]. Increasing the large-distance accessibility of geoheritage-rich areas requires expanding transport infrastructure and other human interventions in natural landscapes. Additionally, to direct environmental impacts and landscape reorganizations, the related activities trigger aesthetic modifications and result in some pollution. Although large-scale accessibility is chiefly linked to infrastructural objects outside geoheritage-rich areas, the related environmental stress on surrounding areas cannot be ignored. Although addressing this challenge requires state-of-the-art solutions, it is necessary to stress that the geoheritage policy should take the noted issues into account. This is an additional argument for geoheritage management within large-scale territorial planning initiatives.

The decades-long observations imply that the three considered geoheritage-rich areas are the most demanded by visitors from Rostov-on-Don and less Krasnodar (Figure 3). This is unsurprising because these cities are important research and educational centers of the Russian South, and the universities within them, such as the Southern Federal University, have strong geoscience programs. If these observations are correct, one can wonder whether the distance between these cities and the geo-heritage-rich areas is also a factor of large-scale accessibility. In fact, larger distances require more time and funds for travel. However, such remoteness is relational, and it may change with time. It should be distinguished from the large-scale accessibility, which is a basic property not depending on the direction of visitor flows (Figure 3). The latter determines the very opportunity to reach the area and its geoheritage from the outside (including remote places), whereas remoteness is linked to the actual mode of exploitation of geoheritage resources of this area.

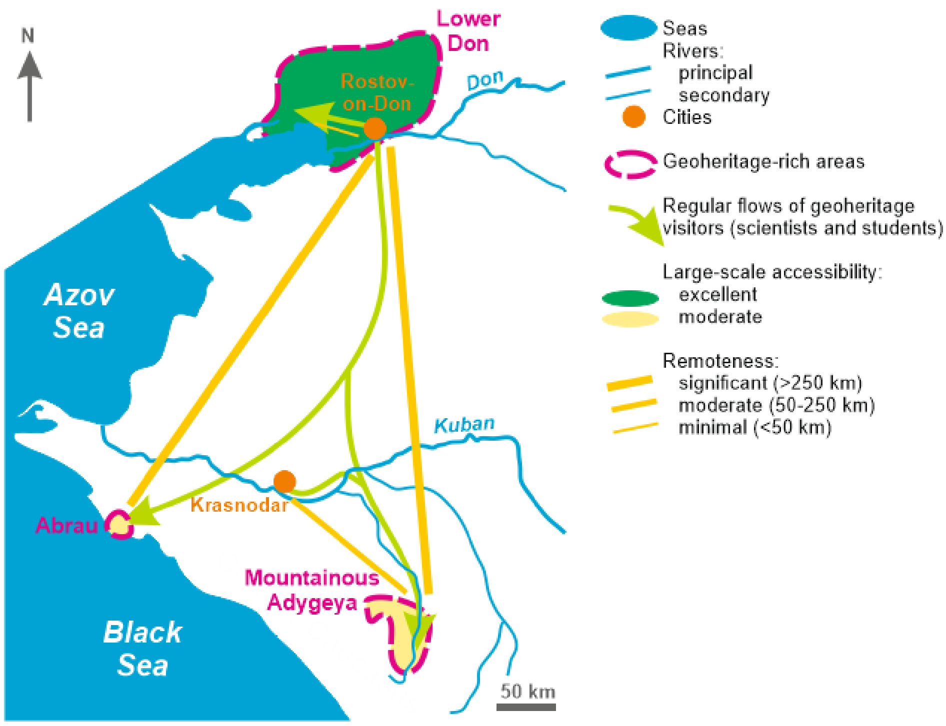

Figure 3. Relative remoteness of the three considered geoheritage-rich areas.

The criteria proposed in the present study for assessing the large-scale accessibility of geoheritage sites are objective and meaningful for all places irrespective of the socio-economical contexts. However, country-specific peculiarities should be noted and considered as possible limitations of the case studies. First, countries may differ by the number of car owners. Where this number is high, the need for public transportation is lower. Second, 50 km is a minor distance in Russia, and driving even 100 km to reach an airport or for accommodation is somewhat of a norm. However, the situation may differ significantly in smaller countries such as Hungary or Switzerland. Third, Russians prefer travelling by trains for large distances more readily than citizens of some other countries. These examples demonstrate that the proposed approach can be justified, taking into account the national contexts. Accessibility is a parameter that cannot be fully standardized because it strongly depends on people's experiences, feelings, and personal resources [55–57]. This challenge is less significant in the case of geosite accessibility, which more strongly depends on the local parameters [24]. However, the presence of the noted challenge does not mean that large-scale accessibility should not be investigated. It seems to be a particularly important property of geoheritage-rich areas, determining the success exploiting their resources. The present study, although anchored into the Russian reality, offers a general vision and criteria of the large-scale accessibility, which seem to be common for all contexts.

The proposed approach deals with absolute measures of the large-scale accessibility of geoheritage-rich areas. However, this important property may also have a relational aspect. One can hypothesize that willingness to travel and readiness to pay in order to reach a given area increase together with the overall value of geoheritage; thus, more valuable areas become more "proximal" to visitors with regard to their mode of thinking. Although various arguments supporting or disproving this hypothesis can be offered, only highly specialized research would permit judgments of this relational accessibility, which is outside the scope of the present work.

Conclusively, a novel approach is proposed to assess the large-scale accessibility of three geoheritage-rich areas of the Russian South. It is established that one of them (Lower Don) is highly accessible, and two others (Abrau and Mountainous Adygeya) are moderately accessible. The principal opportunity for further research is linked to the development of methodological frameworks, allowing adaptation of the proposed approach to the different country-specific contexts. The other opportunity is developing the approach to be applicable to submarine and non-populated domains such as Antarctica. Finally, it will be reasonable to address the relative nature of accessibility with psychological experiments.

Author Contributions: Conceptualization, Y.A.F., A.V.M. and D.A.R.; methodology, D.A.R.; investigation, A.V.M. and D.A.R.; writing—original draft preparation, A.V.M. and D.A.R.; writing—review and editing, Y.A.F., A.V.M. and D.A.R.; project administration, Y.A.F. and A.V.M. All authors have read and agreed to the published version of the manuscript.

Funding: The research was carried out within the framework of the Strategic Academic Leadership Program of SFedU Priority-2030; project no. SP-12-22-5 (to Y.A.F. and A.V.M.). The contribution of D.A.R. was not funded.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.

Conflicts of Interest: The authors declare no conflict of interest. The funder had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.

References

1. Brocx, M.; Semeniuk, V. Geoheritage and geoconservation—History, definition, scope and scale. *J. R. Soc. West. Aust.* **2007**, *90*, 53–87.
2. Henriques, M.H.; dos Reis, R.P.; Brilha, J.; Mota, T. Geoconservation as an emerging geosciences. *Geoheritage* **2011**, *3*, 117–128. [CrossRef]

3. Herrera-Franco, G.; Carrión-Mero, P.; Montalván-Burbano, N.; Caicedo-Potosí, J.; Berrezueta, E. Geoheritage and Geosites: A Bibliometric Analysis and Literature Review. *Geosciences* **2022**, *12*, 169. [CrossRef]
4. Kaur, G. Geodiversity, Geoheritage and Geoconservation: A Global Perspective. *J. Geol. Soc. India* **2022**, *98*, 1221–1228. [CrossRef]
5. Neto, K.; Henriques, M.H. Geoconservation in Africa: State of the art and future challenges. *Gondwana Res.* **2022**, *110*, 107–113. [CrossRef]
6. Pijet-Migoń, E.; Migoń, P. Geoheritage and Cultural Heritage—A Review of Recurrent and Interlinked Themes. *Geosciences* **2022**, *12*, 98. [CrossRef]
7. Reynard, E.; Brilha, J. (Eds.) *Geoheritage: Assessment, Protection, and Management*; Elsevier: Amsterdam, The Netherlands, 2018.
8. Urban, J.; Radwanek-Bąk, B.; Margielewski, W. Geoheritage Concept in a Context of Abiotic Ecosystem Services (Geosystem Services)—How to Argue the Geoconservation Better? *Geoheritage* **2022**, *14*, 54. [CrossRef]
9. Williams, M.A.; McHenry, M.T.; Boothroyd, A. Geoconservation and Geotourism: Challenges and Unifying Themes. *Geoheritage* **2020**, *12*, 63. [CrossRef]
10. Xu, K.; Wu, W. Geoparks and Geotourism in China: A Sustainable Approach to Geoheritage Conservation and Local Development—A Review. *Land* **2022**, *11*, 1493. [CrossRef]
11. Bétard, F.; Hobléa, F.; Portal, C. Geoheritage as new territorial resource for local development. *Ann. Geogr.* **2017**, *717*, 523–543. [CrossRef]
12. Garcia, M.D.G.; Queiroz, D.S.; Mucivuna, V.C. Geological diversity fostering actions in geoconservation: An overview of Brazil. *Int. J. Geoheritage Park.* **2022**, *10*, 507–522. [CrossRef]
13. Henriques, M.H.; Castro, A.R.S.F.; Félix, Y.R.; Carvalho, I.S. Promoting sustainability in a low density territory through geoheritage: Casa da Pedra case-study (Araripe Geopark, NE Brazil). *Resour. Policy* **2020**, *67*, 101684. [CrossRef]
14. Ruban, D.A.; Mikhailenko, A.V.; Yashalova, N.N. Valuable geoheritage resources: Potential versus exploitation. *Resour. Policy* **2022**, *77*, 102665. [CrossRef]
15. Santangelo, N.; Valente, E. Geoheritage and Geotourism resources. *Resources* **2020**, *9*, 80. [CrossRef]
16. Unjah, T.; Yusry, M.; Simon, N. Identification and characterization of geoheritage resources at Hulu Langat, Selangor. *Bull. Geol. Soc. Malays.* **2021**, *72*, 191–204. [CrossRef]
17. Štrba, L.; Rybar, P.; Balaz, B.; Molokac, M.; Hvizdak, L.; Krsak, B.; Lukac, M.; Muchova, L.; Tometzova, D.; Ferencikova, J. Geosite assessments: Comparison of methods and results. *Curr. Issues Tour.* **2015**, *18*, 496–510. [CrossRef]
18. Bétard, F.; Peulvast, J.-P. Geodiversity Hotspots: Concept, Method and Cartographic Application for Geoconservation Purposes at a Regional Scale. *Environ. Manag.* **2019**, *63*, 822–834. [CrossRef]
19. da Silva, J.C.; dos Santos, D.S.; da Rocha, T.B. Identifying geomorphological diversity hotspots for conservation purposes: Application to a coastal protected area in Rio de Janeiro State, Brazil. *Appl. Geogr.* **2022**, *142*, 102689. [CrossRef]
20. Gray, M. Geodiversity: Developing the paradigm. *Proc. Geol. Assoc.* **2008**, *119*, 287–298. [CrossRef]
21. Frassi, C.; Amorfini, A.; Bartelletti, A.; Ottria, G. Popularizing Structural Geology: Exemplary Structural Geosites from the Apuan Alps UNESCO Global Geopark (Northern Apennines, Italy). *Land* **2022**, *11*, 1282. [CrossRef]
22. Brilha, J. Inventory and quantitative assessment of geosites and geodiversity sites: A review. *Geoheritage* **2016**, *8*, 119–134. [CrossRef]
23. Warowna, J.; Zgłobicki, W.; Kołodyńska-Gawrysiak, R.; Gajek, G.; Gawrysiak, L.; Telecka, M. Geotourist values of loess geoheritage within the planned Geopark Małopolska Vistula River Gap, E Poland. *Quat. Int.* **2016**, *399*, 46–57. [CrossRef]
24. Mikhailenko, A.V.; Ruban, D.A.; Ermolaev, V.A. Accessibility of Geoheritage Sites—A Methodological Proposal. *Heritage* **2021**, *4*, 1080–1091. [CrossRef]
25. Cheablam, O.; Tansakul, P.; Nantakat, B.; Pantaruk, S. Assessment of the Geotourism Resource Potential of the Satun UNESCO Global Geopark, Thailand. *Geoheritage* **2021**, *13*, 87. [CrossRef]
26. Deng, L.; Zou, F. Orogenic belt landforms of Huanggang Dabieshan UNESCO Global Geopark (China) from geoheritage, geoconservation, geotourism, and sustainable development perspectives. *Environ. Earth Sci.* **2021**, *80*, 662. [CrossRef]
27. Henriques, M.H.; Canales, M.L.; García-Frank, A.; Gomez-Heras, M. Accessible Geoparks in Iberia: A Challenge to Promote Geotourism and Education for Sustainable Development. *Geoheritage* **2019**, *11*, 471–484. [CrossRef]
28. Rais, J.; Barakat, A.; Louz, E.; Ait Barka, A. Geological heritage in the M'Goun geopark: A proposal of geo-itineraries around the Bine El Ouidane dam (Central High Atlas, Morocco). *Int. J. Geoheritage Park.* **2021**, *9*, 242–263. [CrossRef]
29. Wang, J.; Zouros, N. Educational Activities in Fangshan UNESCO Global Geopark and Lesvos Island UNESCO Global Geopark. *Geoheritage* **2021**, *13*, 51. [CrossRef]
30. Bruno, D.E.; Perrotta, P. A geotouristic proposal for Amendolara territory (northern ionic sector of Calabria, Italy). *Geoheritage* **2012**, *4*, 139–151. [CrossRef]
31. Camino, M.A.; Halpern, K.; Bó, M.J.; Meroi Arcerito, F.R. Sierra Bachicha: Proposal for a new site of geological interest in the Balcarce district, province of Buenos Aires. *Ser. Correl. Geol.* **2018**, *34*, 5–14.
32. Lirer, L.; Petrosino, P.; Armiero, V. A proposal of some geosites in the framework of a new geological map of Campi Flegrei. *Alp. Mediterr. Quat.* **2008**, *21*, 39–46.
33. Ranjbaran, M.; Sotohian, F. Development of Haraz Road geotourism as a key to increasing tourism industry and promoting geoconservation. *Geopersia* **2021**, *11*, 61–79.
34. Štrba, L.; Baláž, B.; Lukác, M. Roadside geotourism—An alternative approach to geotourism. *E-Rev. Tour. Res.* **2016**, *13*, 598–609.
35. Andreyanova, S.; Ivolga, A. The tourism potential of the North Caucasus: The formation, characteristics and development prospects. *Geoj. Tour. Geosites* **2018**, *22*, 347–358.

36. Ivlieva, O.V.; Shmytkova, A.V.; Sukhov, R.I.; Kushnir, K.V.; Grigorenko, T.N. Assessing the tourist and recreational potential in the South of Russia. *E3S Web Conf.* **2020**, *208*, 05013. [CrossRef]
37. Oborin, M.S.; Kozhushkina, I.; Gvarliani, T.; Ivanov, N. Socio-economic preconditions of resort agglomerations development in the south of Russia. *Worldw. Hosp. Tour.* **2018**, *10*, 467–477. [CrossRef]
38. Nebabina, E.I.; Ruban, D.A. *Geological Heritage Sites in the Southwest Rostov Region*; RGU: Rostov-na-Donu, Russia, 2006. (In Russian)
39. Ruban, D.A. On the Duality of Marine Geoheritage: Evidence from the Abrau Area of the Russian Black Sea Coast. *J. Mar. Sci. Eng.* **2021**, *9*, 921. [CrossRef]
40. Ivanitskaya, V.B.; Pogrebnov, N.I. *Geological Structure of the Lower Don and Lower Volga*; RGU: Rostov-na-Donu, Russia, 1962. (In Russian)
41. Hasterok, D.; Halpin, J.A.; Collins, A.S.; Hand, M.; Kreemer, C.; Gard, M.G.; Glorie, S. New Maps of Global Geological Provinces and Tectonic Plates. *Earth-Sci. Rev.* **2022**, *231*, 104069. [CrossRef]
42. Baraboshkin, E.Y.; Bondarenko, N.A.; Lyubimova, T.V. *Unique Geological Objects of the North-Western Caucasus*; KubGU: Krasnodar, Russia, 2012. (In Russian)
43. Van Hinsbergen, D.J.J.; Torsvik, T.H.; Schmid, S.M.; Matenco, L.C.; Maffione, M.; Vissers, R.L.M.; Gürer, D.; Spakman, W. Orogenic architecture of the Mediterranean region and kinematic reconstruction of its tectonic evolution since the Triassic. *Gondwana Res.* **2020**, *81*, 79–229. [CrossRef]
44. Nazarenko, O.V.; Mikhailenko, A.V.; Smagina, T.A.; Kutilin, V.S. *Natural Conditions of Mountainous Adygeya*; SFU: Rostov-on-Don, Russia, 2020. (In Russian)
45. Adamia, S.; Alania, V.; Chabukiani, A.; Kutelia, Z.; Sadradze, N. Great Caucasus (Cavcasioni): A long-lived north-tethyan back-arc basin. *Turk. J. Earth Sci.* **2011**, *20*, 611–628. [CrossRef]
46. Lordkipanidze, M.B.; Adamia, S.A.; Asanidze, B.Z. Evolution of the active margins of the ocean Tethys (by example of the Caucasus). In *Oceanology: Reports. 27 International Geological Congress*, 3rd ed.; Lisitsin, A.P., Ed.; Nauka: Moscow, Russia, 1984; pp. 72–83. (In Russian)
47. AbdelMaksoud, K.M.; Emam, M.; Al Metwaly, W.; Sayed, F.; Berry, J. Can innovative tourism benefit the local community: The analysis about establishing a geopark in Abu Roash area, Cairo, Egypt. *Int. J. Geoheritage Park.* **2021**, *9*, 509–525. [CrossRef]
48. Brilha, J.; Gray, M.; Pereira, D.I.; Pereira, P. Geodiversity: An integrative review as a contribution to the sustainable management of the whole of nature. *Environ. Sci. Policy* **2018**, *86*, 19–28. [CrossRef]
49. Kubalíková, L. Cultural ecosystem services of geodiversity: A case study from Stranska skala (Brno, Czech Republic). *Land* **2020**, *9*, 105. [CrossRef]
50. Pereira Balaguer, L.; da Glória Motta Garcia, M.; de Almeida Leite Ribeiro, L.M. Combined Assessment of Geodiversity As a Tool to Territorial Management: Application to Southeastern Coast of State of São Paulo, Brazil. *Geoheritage* **2020**, *14*, 60. [CrossRef]
51. Freire-Lista, D.M.; Becerra Becerra, J.E.; Simões de Abreu, M. The historical quarry of Pena (Vila Real, north of Portugal): Associated cultural heritage and reuse as a geotourism resource. *Resour. Policy* **2022**, *75*, 102528. [CrossRef]
52. Bentivenga, M.; Cavalcante, F.; Mastronuzzi, G.; Palladino, G.; Prosser, G. Geoheritage: The Foundation for Sustainable Geotourism. *Geoheritage* **2019**, *11*, 1367–1369. [CrossRef]
53. Kubalíková, L.; Bajer, A.; Balková, M.; Kirchner, K.; Machar, I. Geodiversity Action Plans as a Tool for Developing Sustainable Tourism and Environmental Education. *Sustainability* **2022**, *14*, 6043. [CrossRef]
54. Somma, R. The Inventory and Quantitative Assessment of Geodiversity as Strategic Tools for Promoting Sustainable Geoconservation and Geo-Education in the Peloritani Mountains (Italy). *Educ. Sci.* **2022**, *12*, 580. [CrossRef]
55. Diaz-Soria, I. Being a tourist as a chosen experience in a proximity destination. *Tour. Geogr.* **2017**, *19*, 96–117. [CrossRef]
56. Larsen, J. Tourism mobilities and the travel glance: Experiences of being on the move. *Scand. J. Hosp. Tour.* **2001**, *1*, 80–98. [CrossRef]
57. Tjørve, E.; Flognfeldt, T.; Tjørve, K.M.C. The Effects of Distance and Belonging on Second-Home Markets. *Tour. Geogr.* **2013**, *15*, 268–291. [CrossRef]