FORUM GEOGRAFIC

Forum geografic. Studii și cercetări de geografie și protecția mediului
*Volume **XV**, Issue **1** (**June** 2016), pp. **109-115***
*http://dx.doi.org/**10.5775/fg.2016.054.i***

Geomorphosites with touristic value in the central – southern part of the Parâng Mountains

Claudia Daniela ALBĂ*

University of Craiova, Department of Geography, 13 A. I. Cuza Street, 200585, Craiova
* *Corresponding author*, alba_claudia@yahoo.com

Received on <17-10-2015>, reviewed on <04-01-2016>, accepted on <10-04-2016>

Abstract

The aim of this study is to identify, assess and rank the geomorphosites with touristic potential from the central – southern part of the Parâng Mountains. The touristic assessment of geomorphosites was based on the method elaborated by J.P. Pralong in 2005, which was initially applied on two areas from the Alps. The touristic value of the geomorphological sites is the arithmetical mean result of four values (scenic, scientific, cultural and economic). For each value, points were scored, according to 4 – 6 criteria, highlighting, where necessary, the particularities generated by the studied area. The ranking of geomorphosites represents the base for their inclusion in promotional materials elaborated by authorities or private operators from the region. The promotion of landforms that have acquired a certain value represents, besides the promotion of cultural attractions, the starting point in the touristic development which the region aims at.

Keywords: *geomorphosites, assessment, touristic potential, Pralong method, Parâng, Gorj*

Rezumat. Geomorfosituri cu valoare turistică în partea central-sudică a Munților Parâng

Studiul de față urmărește identificarea, evaluarea și ierarhizarea geomorfositurilor cu valențe turistice din partea central – sudică a Munților Parâng. Evaluarea turistică a geomorfositurilor s-a bazat pe metoda elaborată de J.P. Pralong în anul 2005, ce a fost aplicată inițial pe două areale din Munții Alpi. Valoarea turistică a siturilor geomorfologice este rezultatul mediei aritmetice a patru valori (scenică, științifică, culturală și economică). Pentru fiecare din cele patru valori s-au punctat între 4 și 6 criterii, reliefându-se, acolo unde a fost cazul, particularitățile generate de arealul studiat. Ierarhizarea geomorfositurilor constituie baza includerii acestora în materialele de promovare elaborate de autorități sau operatori privați din regiune. Promovarea formelor de relief cărora li s-a asociat o anumită valoare, reprezintă, alături de promovarea resurselor antropice, punctul de plecare în dezvoltarea turistică spre care tinde regiunea.

Cuvinte-cheie: *geomorfosituri, evaluare potential turistic, metoda Pralong, Parâng, Gorj*

Introduction

The mountain tourism and the geomorphosites are in a state of reciprocal conditioning, the touristic development having as premises the geomorphosites' identification and promotion, but also, the emphasizing, the knowledge and the protection of geomorphosites are highlighted by the touristic development of the area.

Developing the theory issued in 1993, according to which the shapes considered as landmark were defined as geomorphological assets, Mario Panizza defined in 2001 the geomorphosites as geomorphological landforms that have acquired a scientific, cultural/historical, scenic/aesthetic, and/or a social/economic value, value which results from the perception or human exploitation (Reynard & Panizza, 2005). Geomorphosites are considered among the most important attractions of rural and montain areas (Coratza & De Waele, 2012), or a fundamental resource for geotourism (Kubalíková, 2013).

According to the intended purpose for which the identification and the assessment are performed (the touristic development or the protection of geomorphosites), European researchers have created more methods and criteria which point out the scientific value or the additional values of geomorphosites (Bruschi & Cendrero, 2005) (Coratza & Giusti, 2005), (Serrano & González-Trueba, 2005), (Zouros, 2005), (Pereira, Pereira, & Caetano Alves, 2007) & (Pereira & Pereira, 2010), (Reynard, Fontana, Kozlik, & Lausanne, 2007), (Erhartič, 2010). Another method for assessing the touristic potential of geomorphological sites was created and applied by J.P. Pralong in 2005 on Chamonix - Mont Blanc, France and Crans – Montana – Sierre, Switzerland, by assessing the touristic potential and also the exploitation of geomorphosites (Pralong, 2005).

Considerind the value of the geormorphosite very important for touristic capitalization (Comanescu, Nedelea, & Dobre, 2012, 2011, 2009), the method created by Pralong will be applied in an area with high touristic potential, with the aim of establish the touristic value of geomorphosites.

The central - south part of the Parâng Mountains (south west of Romania) is in a process of touristic expansion and necessitates, besides the promotion of cultural resources, highlighting of geomorphosites, too. Hereby, one should perform **the identification, the touristic assessment and the ranking of geomorphosites**.

The promotion of the selected geomorphosites by electronic means and through local touristic infrastructure will not only increase the number of visitors and tourists, but it will also direct the tourism flow toward geotourism.

Study area: The central – southern part of the Parâng Mountains

The Parâng Mountains are situated in the central – southern part of Romania, being surrounded by the Jiu Valley in the west, the Oltet Valley with the Oltet Gorge, in the east, the Lotru and Jiet Valleys in the north (Fig.1). The analysis from this study covers the central and southern part of the Parâng Mountains, included on the administrative territory of the Gorj county, up to the Urdele Pass (2145 m) and the Parângu Mare Peak (2519 m). The area covers a surface of 50,000 ha, having a length of about 30 km (Fig.2).

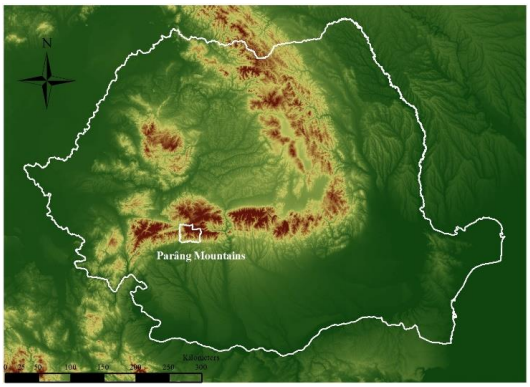

Fig. 1: The location of the Parâng Mountains in Romania

Fig. 2: Study area: The central – south part of Parâng Mountains

The landscape of the Parâng Mountains is dominated by crystalline schists (proterozoics, granitoides and hercinyan crystalline schists) on which glacial valleys and cirques have developed, and on the southern edge limestone segments appear, enabling the formation of gorges and caves on the rivers that cross the massive. Glacial valleys and cirques are more extended in the northern part of the Parâng Mountains, outside the current study area (Sliveiu, Roșiile, Ghereșu, Gâlcescu, Iezeru, Urdele, Dengheru Valleys), as in the central – southern part there are much smaller surfaces in the Valleys of Gruiu, Setea Mică, Setea Mare, Pleșcoaia, Gaura Mohorului, Mohoru. In the north side, there were also preserved glacial lakes, such as Roșiile or Gâlcescu.

Păpușa Peak (2136 m), with a well individualised pyramidal shape, guarding the north part of Rânca Touristic Area and the karst shapes from the southern edge are the representative images for the central and southpart of the Parâng. The Olteț Gorge (with steep slopes, closed at the base up to 4 – 5 meters and a level difference between upper part and the river's thalweg about 20 m), the Galben Gorges (with far slopes and detritus flows) and the Muieri Cave (formed by the dissolving of calcium carbonate by Galben river's water, along a fracture orientated north, north-west to south, south-east) are the most visited karst elements. The Muieri Cave, the first electrified cave in Romania (1963) is structured on 4 floors, having a length about 3,5 km. Only a section of 700 m is open to the public, the other part being accessible only to speleologists (Diaconu, Lascu, & Ponta, 1980). The cave is appreciated both for the visual aspect of special shapes created by old stream of the Galben river (The Little Dom, Altar Room, The Pulpit, The big Candelabrum, The Gory Stone, Guano Hall, Turkish Room etc.), as well as for the evidence it holds related to the morphoclimatic dynamics of the territory. The western limit of the Parâng Mountains consists in steep slopes, with a declivity over 45°, thus forming the Jiu Defile. Having a length of 33 km and an origin still incompletely elucidated, but considerared as an antecedent one, the defile has an important anthropic usage (European road an railway) and also a touristic one.

The territory chosen for the study is totally covered by protected areas, components of European Network of Nature Protection Areas - Natura 2000: ROSCI0128 The North of Eastern Gorj and partial ROSCI0188 Parâng. Also, the territory coincides with protected areas of national concern: the Olteț Gorge and the Polovragi Cave (monument of nature), a part of the Polovragi Forest (natural reservation), Ied Cave (monument of nature), Muieri Cave (scientific reservation), partially the Gâlcescu Couldron (natural reservation), Lainicilor Sphinx (monument of nature), Rafailă Stones (monument of nature) and partially over the National Park of the Jiu Defile. The south area of the Parâng Mountains generally lacks industrial buildings, except for some small hydroelectric power plants and the main option for economic development is considered as relying on tourism.

Methodology

The identification of geomorphosites. For the first step, the indentification of geomorphosites from the chosen area (central – south part of Parâng Mountains), we have ***studied specialized materials***, in which the creation and the structure of

the Parâng Mountains were approached, as well as studies about touristic potential, correlated with ***the analysis of maps*** (geological, geomorphological, glacier related, topographic, hydrographic, touristic etc.) and satellite images.

The next step was the ***direct observation*** of geomorphosites – in situ, thereupon the local experts were consulted.

For the **assessment of the touristic potential of geomorphosites** from the North-East of the Gorj county, we have chosen to apply one of the most commonly used methods in Romania and also at European level – the method created by Jean – Pierre Pralong (Laussane University, Switzerland). According to this method, the touristic assessment of geomorphosites includes four values: scenic, scientific, cultural and economic. The criteria and scales of scoring for each value have been established by Pralong also considering previous researches achieved and presented by Grandgirard in 1997, Quaranta in 1993, Coratza & Giusti in 2005, Rojsek & Rivas in 1995, Panizza in 1998 (Pralong, 2005). Hereby, Pralong has considered the tourist value of geomorphosites as arithmetic mean of the four values:

Vtour = (Vsce + Vsci + Vcult + Veco)/4, where:
Vtour = tourist value,
Vsce = scenic/aesthetic value,
Vsci = scientific value,
Vcult = cultural/historical value,
Veco = economic/social value.

$$Vsce = \frac{Sce1 + Sce2 + Sce3 + Sce4 + Sce5}{5}$$, where:

Sce1 = number of points from where the geomorphosite is visible, situated less than 1 km and accesible on foot,
Sce2 = average distance from the points specified at Sce1 up to the geomorphosite (m),
Sce3 = geomorphosites` surface (ha),
Sce4 = elevation (m), reported at all identical sites from the study area,
Sce5 = colour contrast between the site and the surroundings (one colour includes all its shades).

$$Vsci = \frac{Sci1 + Sci2 + (0.5 \times Sci3) + (0.5 \times Sci4) + Sci5 + Sci6}{5}$$,
where:
Sci1 = paleogeographical interest (the score is given according to the contribution of the site at the reconstruction of morphoclimatic evolution of the teritory),
Sci2 = representativeness,
Sci3 = area (%) – share of the site in whole area occupied by all identicals sites in the studied territory,
Sci4 = rarity (according the number of identical sites)
Sci5 = integrity,
Sci6 = ecological interest.

$$Vcult = \frac{Cult1 + (2 \times Cult2) + Cult3 + Cult4 + Cult5}{6}$$, where:
Cult1 = cultural and historical customs,
Cult2 = iconographic representations (paintings, drawings, engravings, photography) of site,
Cult3 = historical and archeological relevance,
Cult4 = religious and metaphysical relevance,
Cult5 = artistic and cultural events.

$$Veco = \frac{Eco1 + Eco2 + Eco3 + Eco4 + Eco5}{5}$$, where:
Eco1 = accessibility to site,
Eco2 = natural risk,
Eco3 = annual number of visitors in the region (the given score is identical for all sites of a same region; the annual number of visitors in the biggest resort from region is considered),
Eco4 = protection level,
Eco5 = attraction.

To some criteria, weightings were applied, by increasing score (Cult2 x 2), being considered more relevant, or by contrary, decreases (sci3, Sci4 x 0.5), being considered in relation with Sce3.

The modality for scoring, according to the 21 used criteria is presented in Table no.1.

Based on the results of the tourist assessment of geomorphosites, there emerged a hierarchy of geomorphosites, which will constitute the basis for the inclusion of geomorphological sites in the promotional materials, published by authorities, promoting associations or accommodation structures.

Table 1 Score given

Value	Criteria	POINTS				
		0	0.25	0.5	0.75	1
Scenic value	Sce1	-	1 point	2 or 3 points	4,5 or 6	>6
	Sce2	-	<50 m	51 – 200 m	201 – 500 m	>500 m
	Sce3	-	small	moderate	large	very large
	Sce4	nil	low	moderate	high	very high
	Sce5	identical colors	-	different colours	-	opposite colours
Scientific value	Sci1	-	low	moderate	high	very high
	Sci2	nil	low	moderate	high	very high
	Sci3	-	< 25	25 – 50	51 – 90	> 91
	Sci4	>7	5 – 7	3 – 4	1 – 2	unique
	Sci5	destroyed	strongly	moderately	weakly	intact

			deteriorated	deteriorated	deteriorated	
	Sci6	nil	low	moderate	high	very high
Cultural value	Cult1	without link	weakly linked	moderately linked	strongly linked	initiatory of customs
	Cult2	never represented	represented 1 – 5	represented 6 – 20	represented 21 – 50	represented >50
	Cult3	no vestige or building	weak relevance	medium relevance	high relevance	very high relevance
	Cult4	no relevance	weak relevance	medium relevance	high relevance	very high relevance
	Cult5	never	-	occasionally	-	at least once a year
Economic value	Eco1	>1 km of track	<1 km of track	by a local road	by a road of regional importance	by a road of national importance
	Eco2	uncontrollable	not controlled	partially controlled	controlled – residual	no risk
	Eco3	<10.000	10.000 – 100.000	0.1 – 0.5 milion	0.5 – 1 milion	>1 milion
	Eco4	complete	limiting	-	not limiting	no protection
	Eco5	-	local	regional	national	international

Source: after Pralong, 2005

Results and Disscusions

The series of geomorphological sites which bring a contribution in understanding the territory evolution is much bigger in the study area, but for this study, we selected the geomorhosites (in number of 14) with potential in the touristic exploitation of the region (Fig.3).

Among these, we evaluated 8 geomorphosites which can be accessible for tourists without special equipment. The results of the assessment are presented in table no.2 and in Fig. 4.

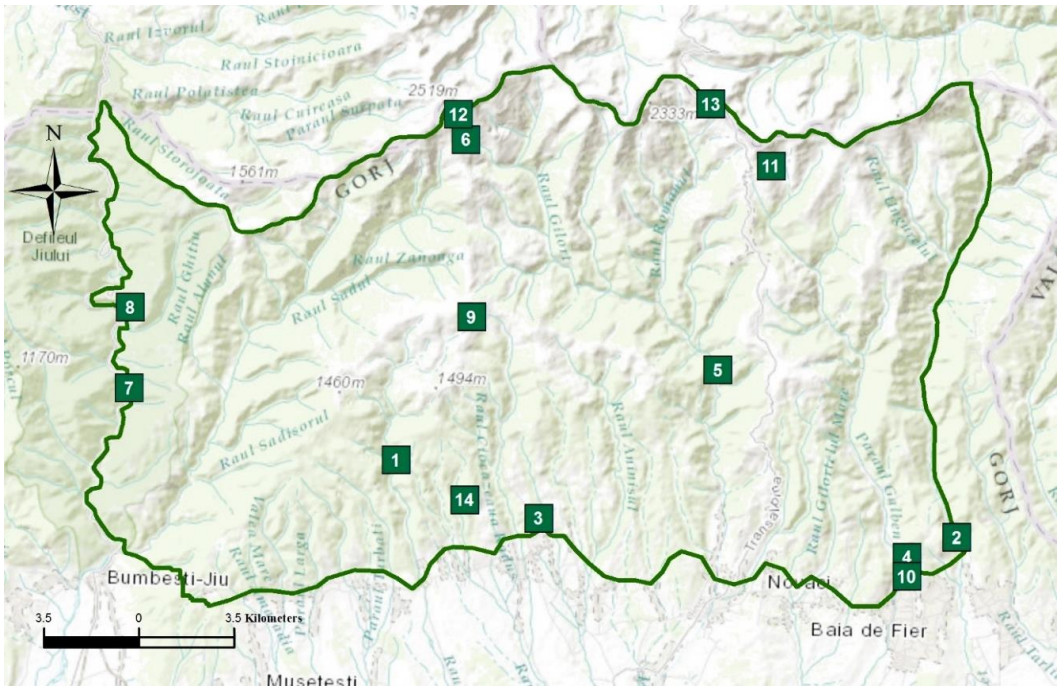

Fig. 3: The localization of geomorphosites

1- Blahnita Valley; 2 - Olteţului Gorges; 3 - Frunţi Plateau; 4 - Galbenului Gorges; 5 - Gilortului Gorges; 6 - Gilortului Springs; 7 - Jiului Defile; 8 - Lainicilor Sphinx; 9 - Molidvişu Peak; 10 - Muierilor Cave; 11 - Păpuşa Peak; 12 - Parângu Mare Peak; 13 - Urdele Pass; 14 - Waterfalls on Ghia river

By applying the method and scoring criteria established by Pralong (the first part of Pralong method, regarding tourist evaluation), it results an hierarchy which could be the basis for the touristic promotion. In this analysis, the higher score was obtained by the Jiul Defile, the differentiation from the other geomorphosites coming from the larger dimensions, historical importance, scientific

concerns, but also its uniqueness in the territory. The next position in hierarchy is occupied by the two karst areas, in which the Olteț and Galben Gorges were formed, followed by the Muieri Cave, situated in the same karst area.

Păpușa Peak and the Urdele Pass have scores that classify them on intermediate places, their main characteristic being higher altitude (the Urdele Pass is the highest point attained by the Transalpina – the highest road from Romania). The last two positions are granted to the Frunți Plateau, especially used for off road competitions and the Blahnița Valley, disadvantaged by distance to public roads, but also by lack of cultural and artistic events.

Table 2: The results of assessment

CRITERIA	Blahnița Valley	Olteț Gorges	Frunți Plateau	Galben Gorges	Jiul Defile	Muieri Cave	Păpușa Peak	Urdele Pass
Sce1	1	1	0.5	1	1	0.75	1	0.5
Sce2	0.25	0.75	0.5	1	0.5	0.5	1	0.5
Sce3	0.75	0.75	0.5	0.75	1	0.75	0.75	0.5
Sce4	0.25	0.75	0.5	0.75	0.75	0.25	1	1
Sce5	0.5	0.5	0	0	0	0	0.5	0
Vsce	0.55	0.75	0.40	0.70	0.65	0.45	0.85	0.50
Sci1	0	0.5	0	1	1	1	0	0.25
Sci2	0.25	1	0	0.5	1	1	0.75	0.75
Sci3	0.75	0.75	0.25	0.75	1	1	0.5	0.25
Sci4	0.5	0.75	0.25	0.75	1	1	1	1
Sci5	0.75	0.75	0.5	0.5	0.5	0.75	0.75	0.25
Sci6	0.5	1	0.5	1	0.75	1	0.5	0.25
Vsci	0.43	0.80	0.25	0.75	0.85	0.95	0.55	0.43
Cult1	0	0.75	0.25	1	0.75	1	0	0.75
Cult2	0	1	0.25	1	1	1	1	1
Cult3	0	1	0	0.5	1	1	0	0.75
Cult4	0	1	0	0.5	1	0.25	0	0
Cult5	0	0	0	0.5	0.5	0	0	0
Vcult	0.00	0.79	0.13	0.75	0.88	0.71	0.33	0.58
Eco1	0.25	0.5	0.5	0.75	1	0.75	1	1
Eco2	0.25	0.5	0.5	0.5	0.5	0.5	1	0.25
Eco3	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Eco4	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Eco5	0.25	1	0.25	1	1	1	0.25	1
Veco	0.30	0.55	0.40	0.60	0.65	0.60	0.60	0.60
Vtour	**0.32**	**0.72**	**0.29**	**0.70**	**0.76**	**0.68**	**0.58**	**0.53**

In scoring the scenic value, difficulties appear due to the variety of geomorphosites in this area. The assessment criterion Sce1 (number of viewpoints) has to be applied differently for punctual geomorphosites (e.g. Muieri Cave) and linear type (e.g. Jiul Defile). Also, the criterion Sce4 scores the contrast of colour between geomorphosite and its surroundings. In Muieri Cave's case, the outside difference of colour is absent, but the inside of the cave strongly contrasts with the outside environment (e.g. Gory Stone has a rusty colour, due to the leakage of iron oxides).

The ecological interest is scoring according to the rarity and the diversity of species, as well as the natural dynamic of them. All assessed geomorphosites are integrated in the natural protected areas, which aiming the protection of biodiversity and the preservation of habitats and species (fauna and flora). Some of studied geomorphosites are covered by two categories of natural protected areas (SCI & IUCN). In scoring for this criterion, attention was also paid to the numbers of categories of natural protected areas which cover the geomorphosite.

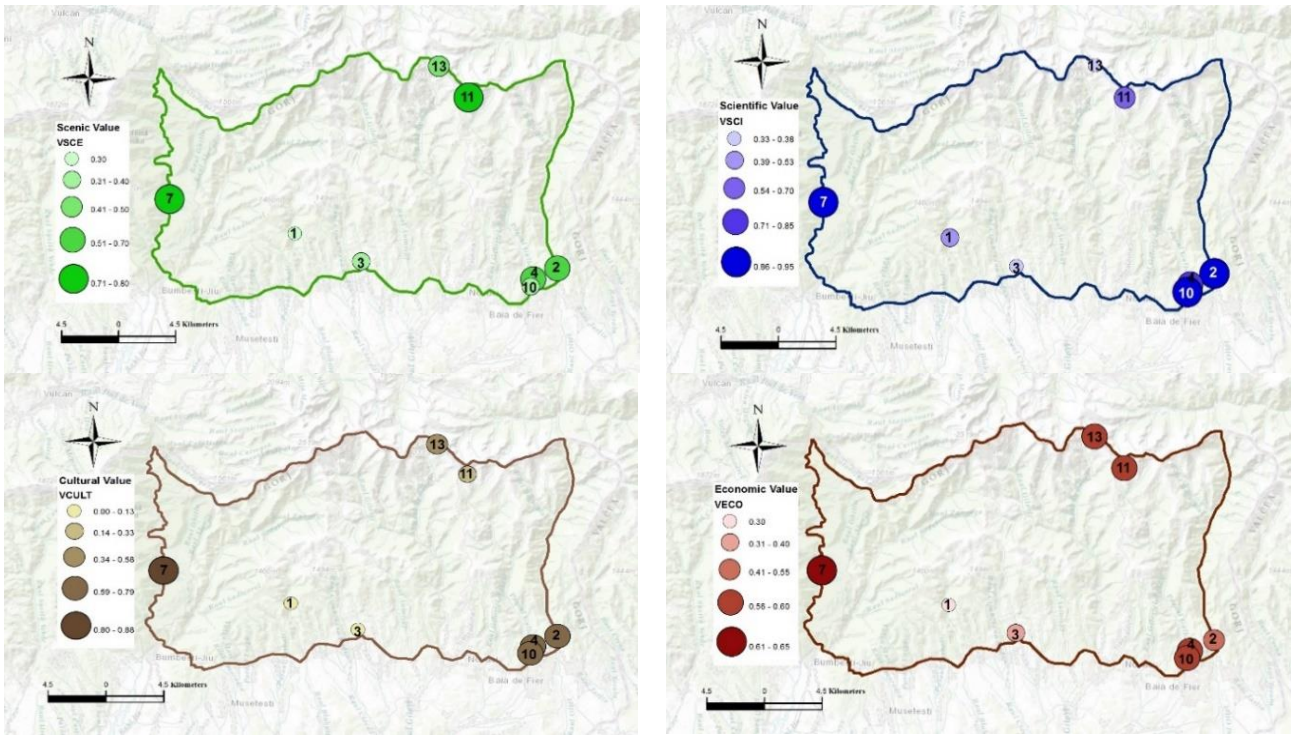

Fig. 4: Graphical representation of the four values (scenic/aesthetic, scientific, cultural/historical and economic/social) of analysed geomorphosites

1 –Blahnița Valley; 2 - Oltețului Gorges; 3 - Frunți Plateau; 4 - Galbenului Gorges; 7 - Jiului Defile; 10 - Muierilor Cave; 11 - Păpușa Peak; 13 - Urdele Pass

For less known geomorphosites, the Cultural value has a low score or even zero (the Blahnita Valley). Also, low scores were obtained by geomorphosites that are more difficult to reach or which are not suitable for cultural events (the Frunți Plateau).

For the economic value scoring, the criterium Eco4 regarding the level protection of gemorphosite, there are low values for all analysed elements, the scoring being inversed in comparison to Sci6 criterion; their economic exploitation is limited. Also, the location and the accessibility of geomorphosites are relevant for the EcoValue. Maximum score was obtained by the geomorphosites with direct access to the national road.

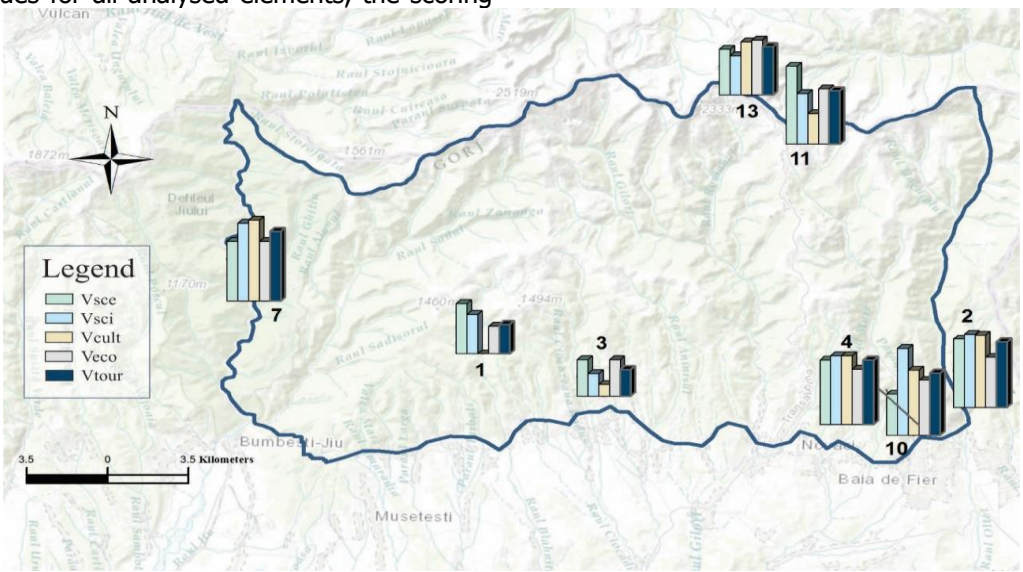

Fig. 5: The results of the assessment

1-Blahnita Valley; 2 - Oltețului Gorges; 3 - Frunți Plateau; 4 - Galbenului Gorges; 7 - Jiului Defile; 10 - Muierilor Cave; 11 - Păpușa Peak; 13 - Urdele Pass

Conclusions

The economic development strategy for the north-eastern part of Gorj county is centered on touristic component of it. In this context, a starting point in attracting the tourism flow is represented by the identification and the assessment of geomorphosites.

The assessment method, initially applied to the geomorphosites from the highest area of the Alps was also applied to the central – southern part of the Parâng Mountains, having as result the accomplishment of a touristic hierarchy, but also the highlighting of the geomorphosites not yet included in touristic circuit. It is recommended that the analysed geomorphosites to be included in the regional maps and to be promoted through the Tourist Information Centers of the area.

The method created by Pralong could be succesfully applied in any mountain area, with small adjustements, according to the encountered particularities. In order to avoid the assessor's subjectivity, the scorecard must be completed by more assessors. The final values (scenic, scientific, cultural, economic and touristic) of the geomorphosites will be the arithmetical mean of values established by all assessors.

References

Bruschi, V. M. & Cendrero, A. (2005). Geosite evaluation; can we measure intangible values? *Il Quaternario - Italian Journal of Quaternary Sciences, 18 (1)*, 293-306

Comânescu, L., Nedelea, A. & Dobre, R. (2011). Evaluation of geomorphosites in Vistea Valley (Fagaras Mountains-Carpathians, Romania). *International Journal of the Physical Sciences*, 1161 -1168. doi: 10.5897/IJPS10.384

Comănescu, L., Nedelea, A. & Dobre, R. (2009). Inventoring and Evaluation of Geomorphosites in the Bucegi Mountains. *Forum geografic*, VIII*(8)*, 38-43

Comănescu, L., Nedelea, A. & Dobre, R. (2012). The Evaluation of Geomorphosites from the Ponoare Protected Area. *Forum geografic*, XI*(1)*, 54-61. doi:10.5775/fg.2067-4635.2012.037.i

Coratza, P. & De Waele, J. (2012). Geomorphosites and Natural Hazards: Teaching the Importance of Geomorphology in Society. *Geoheritage*. doi:10.1007/s12371-012-0058-0

Coratza, P. & Giusti, C. (2005). Methodological proposal for the assessment of the scientific quality of geomorphosites. *Il Quaternario*, 307-313

Diaconu, G., Lascu, C. & Ponta, C. (1980). *Peștera Muierilor.* Editura Sport – Turism, București, 115 p

Erhartič, B. (2010). Geomorphosite assessment. *Acta Geographica Slovenica*, 295–319. doi:10.3986/AGS50206

Kubalíková, L. (2013). Geomorphosite assessment for geotourism purposes. *Czech Journal of Tourism*, 80–104. doi:10.2478/cjot-2013-0005

Pereira, P. & Pereira, D. (2010). Methodological guidelines for geomorphosite assessment. 215-222. Retrieved from http://geomorphologie.revues.org/

Pereira, P., Pereira, D. & Caetano Alves, M. I. (2007). Geomorphosite assessment in Montesinho Natural Park (Portugal). *Geographica helvetica*, 159-168

Pralong, J.-P. (2005). A method for assessing tourist potential and use of geomorphological sites. *Géomorphologie: relief, processus, environnement*, 189-196

Reynard, E. & Panizza, M. (2005). Geomorphosites: definition, assessment and mapping, Géomorphologie: relief, processus, environnement. *Géomorphologie: relief, processus, environnement*, 177-180

Reynard, E., Fontana, G., Kozlik, L. & Lausanne, C. S. (2007). A method for assessing «scientific» and «additional values» of geomorphosites. *Geographica Helvetica*, 148-158

Serrano, E. & González-Trueba, J. J. (2005). Assessment of geomorphosites in natural protected areas: the Picos de Europa National Park (Spain). *Géomorphologie: relief, processus , environnement*, 197-208

Zouros, N. (2005). Assessment, protection, and promotion of geomorphological and geological sites in the Aegean area, Greece. *Geomorphologie*, 227-234