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SPATIAL PATTERNS OF THE SKI AREAS FROM THE FĂGĂRAŞ MASSIF AND THE BUCEGI MOUNTAINS

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Abstract: The Bucegi and the Făgăraş Mountains are the most prone to host European level ski resorts. Their success is depending on functionality; therefore, our aim is to find the ideal spatial patterns of the ski areas for the two mountain regions which depend on the physical environment's characteristics and also the existing infrastructure. For the Făgăraş massif, we suggested the development of a ski resort in the Bâlea Valley and for the Bucegi Mountains we developed a model of expansion of the existing areas towards the Bucegi Plateau and towards the west where the Peştera-Padina complex is located.

Key words: planning, tourism development, interconnected resorts, functionality, conceptual models, prerequisite natural conditions, winter-sports

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INTRODUCTION

Winter sports generate a tourism flow of approximately 330 million visitors which return revenues up to $40-55 billion annually (Taylor et al, 2007) and are practiced on all five continents. Skiing as a past-time activity came to be around the turn of the last century in more than in one place of the Alpine countries, but it is in 1908 that in Briançon – Montgènevre is organized the first International Ski Competition and in 1927 in the ski resort of Chamonix the first cable transportation ever – started functioning (Petrescu, 1978). As for Romania the fist skies and skiers appeared in the winter of 1910-1911 in Sinaia - which was the royal summer residence at the time and where the pre-war Romanian elite had vacation cottages. It is only natural that the elite would have first-hand access to the new fashionable pastime from their trips abroad or vice-versa from their foreign visiting friends or family. This area acted as a center of diffusion for the rest of the Carpathians, but still the Bucegi Mountains even today hold the largest amount of ski area in Romania (two resorts and two other ski centers, accounting for more than 120 ha). In the Făgăraş Mountains there is no such a resorts, but backcountry skiing, free-ride and free-style skiing are practiced today. As it is the highest mountain range it is only natural that it is taken into consideration having in view the present climate changes, i.e. global warming.

This paper means to reach the best spatial planning for these two mountain areas based on the environment's natural potential and limitations, but also on present state of affairs regarding the existing infrastructure, activities and tourism market trends; and last but not least we shall analyze the development plans in this respect, were such plans have been drawn by local or national authorities.

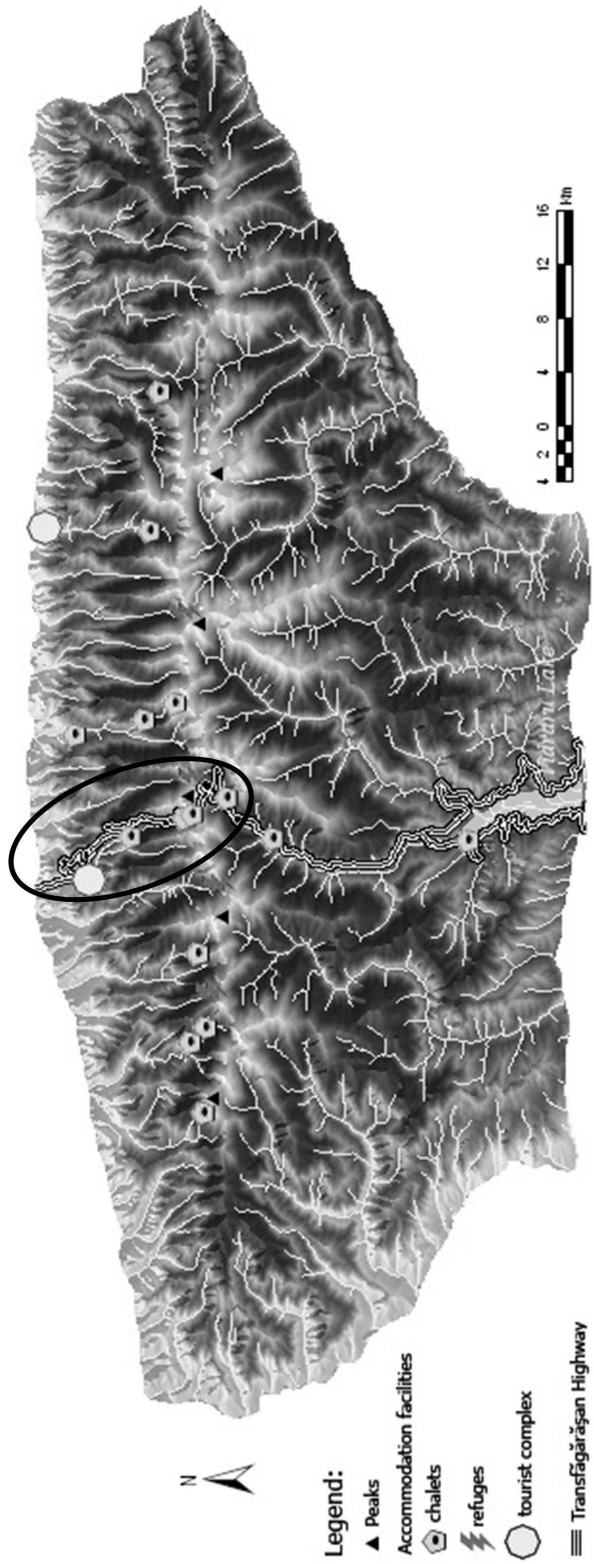

Figure 1. Location of the Bâlea area within the Făgăraş Massif and the tourist infrastructure

MATERIALS AND METHODS

There were several means of documentation used in order to reach claimed results. As starting point we have used the documentation plans for *The Development of the Tourist Area Bâlea-Capra* written in 1972 within the framework of the County of Sibiu's authorities, which to our surprise comprised all the necessary elements of analysis: geology, relief, climate, hydrology, vegetation, and economic analysis of the revenues that the area was generating at the time and the forecasted ones after one or another version of their plans would have been put into action. As thorough as is was, it had its downsides which we identified and made the necessary suggestions. Apart from the written material the documentation was accompanied by plans and sketches with a scale of 1:5,000, which we have integrated in our analysis by scanning and georeferencing them. Also we have used orthofoto images (scenes with a 0.5 m resolution) of the Bâlea area for a better visualization. This was the beginning point for the Făgăraş area; as for the ski areas of Bucegi, we were fortunate as to be provided with the necessary materials either by the local authorities – *Master Plan of Tourism Development for the Prahova Valley and the Braşov – Râşnov Area* and the plans that were to sustain the project that would have been "*Superki în Carpaţi*" created by the institute of Geography from the Romanian Academy of Science (*Integrated Study upon the Ski Areas of the Romanian Carpathians* and *Optimizing and Expanding of the Ski areas of Romania*).

As for our own planning materials we have used topographic maps 1: 25,000, from which we have obtained the DEM (Digital Elevation Model) of the Bâlea Area and for the Bucegi Mountains' DEM we have used SRTMs with a resolution of 90 m and for local analysis i.e the ski area of Sinaia we have used the same method as we did for the Bâlea area.

The climatic data we have obtained from several weather stations: Bâlea, Vf .Omu, Babele and Sinaia 1,500, from which we were particular interested in determining the length of the winter season and at he variation of the climatic elements within the season.

And last but not least we analyzed the planning models of several European ski resorts to search for similarities, patterns and perhaps even "recipes for success".

PLANNING A SKI RESORT IN THE BÂLEA VALLEY

At first we should state why we choose Bâlea valley as a test area for the development and why not another one of the many glacial valleys of the Făgăraş ridge. The most important factor is the access road – Transfăgărăşan highway – the only altitude road that crosses the ridge from north to south and subsequently due to this fact the area is the best developed in terms of tourist infrastructure, of the entire Făgăraş massif (figure 1).

Their perspective. The county of Sibiu commissioned a plan for the tourist development of the entire Bâlea valley as far back as 1972. A team of engineers and economists were employed and they came up with multiple versions of development. We shall try and present the most important issues that they had analyzed in over 300 pages of documented paperwork. They saw it as a 3rd generation resort from the point of view of the integrated characteristic, but having multiple centers (figure 2) due to the relief's limitations but also to deplete the tourist centers so that the recreational purpose could still be attained.

The basic idea was to have the ski (we mention that we shall use the term ski as a general term for winter-sports) domain in the upper part of the massif, while most of the accommodation facilities were to be located at the foothills at the place called Glăjărie (650 m altitude). The difference between this model and the classic 3rd generation one is that this one lacked the snow-front that would regroup skiers and non skiers at the bottom of the ski slopes for a moment of relaxation and contemplation towards the mountain. This is a result of the relief's limitations (Popescu, 2009).

Most of the surface dedicated to the ski domain was to be located in the Bâlea glacial cirque, then down towards the Bâlea Cascadă (Bâlea Waterfall), but also a small part of the skiers were to be distributed to the Capra cirque, which even though it has mainly a southern aspect, due

to its high altitude of 2,251 m, it preserves the snow layer up to 260 days a year and another small part in the upper part of the Doamnei valley (figure 2)

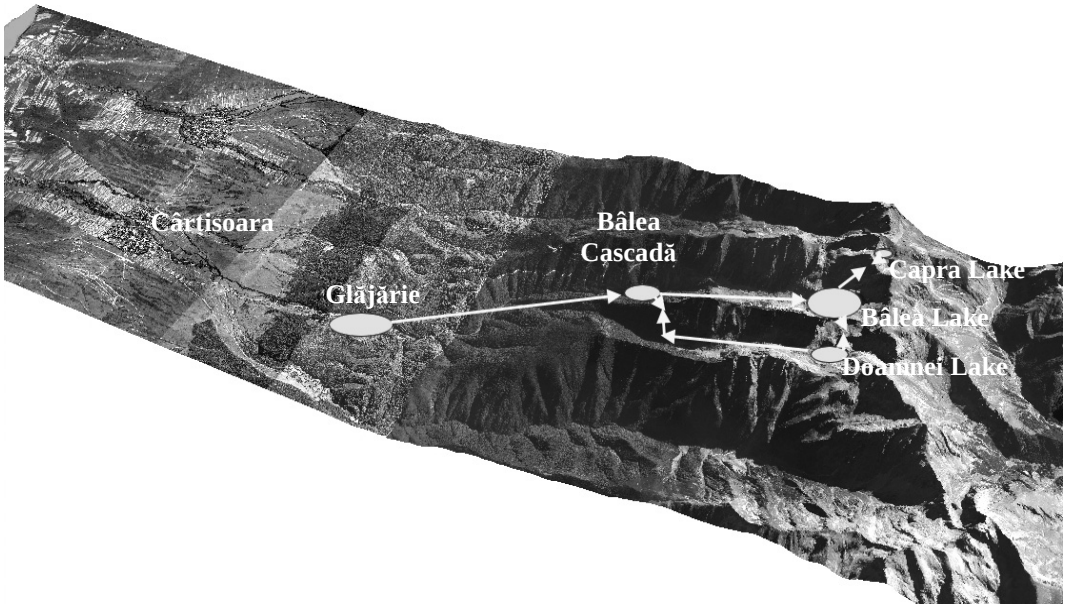

Figure 2. 3D model of the projected resort of 1972
(based on the description made in *The Development of the Tourist Area Bâlea-Capra* 1972 plans)

On the other hand the accommodation would have been distributed as it follows: the largest number of places 4,500 – at the place called Glăjărie (altitude of 650 m), 200 lodging places at an intermediate station – Bâlea Cascadă (waterfall), and at Bâlea Lake there would have been implemented accommodation facilities with a capacity that would have not surpassed 500 places. To complete these facilities, at each of the Capra and Doamnei lakes there would have been another 100 lodging places.

For each of these centers there were plans were drawn up by the team of engineers in accordance with the ski domains they have planned. Even back then they knew that the focal point of a ski resort was the ski domain itself and the rest of the facilities were dimensioned on the basis of some indices where the constants were the values of the ski areas.

The most important principles that they had worked on were: "screening and using the natural's environment trumps, equipping the resort at the level of the *present* market demand, defining the two seasons very thoroughly and prolonging their duration as much as possible, creating the specific facilities of renowned mountain resorts, organizing international competitions, offering special tourist packages…".As we can understand, they were emphasizing the fact that they should have two major seasons and tried creating the necessary facilities for the two – for the winter season the ski areas but also ice rinks and for the summer season, depending on the center, they had planned the implementation of different activities form target shooing to horse back riding, tennis, swimming, kayaking (on a planned artificial lake at Glajărie), golf etc.

Regarding the ski domain (table 1) they have concluded that the Bâlea-Capra area is has a highly qualitative ski domain, with most of the trails set on northern slopes (excepting the Capra Valley) in the glacial cirques and along the valleys, totalizing around 150 to 200 ha. The highest point of this plan was supposed to be at 2,315 m in the Capra saddle and the lowest at Glăjărie at the altitude of 650 m. The central part of this plan was undoubtedly the Bâlea cirque and Bâlea valley (figure 3):

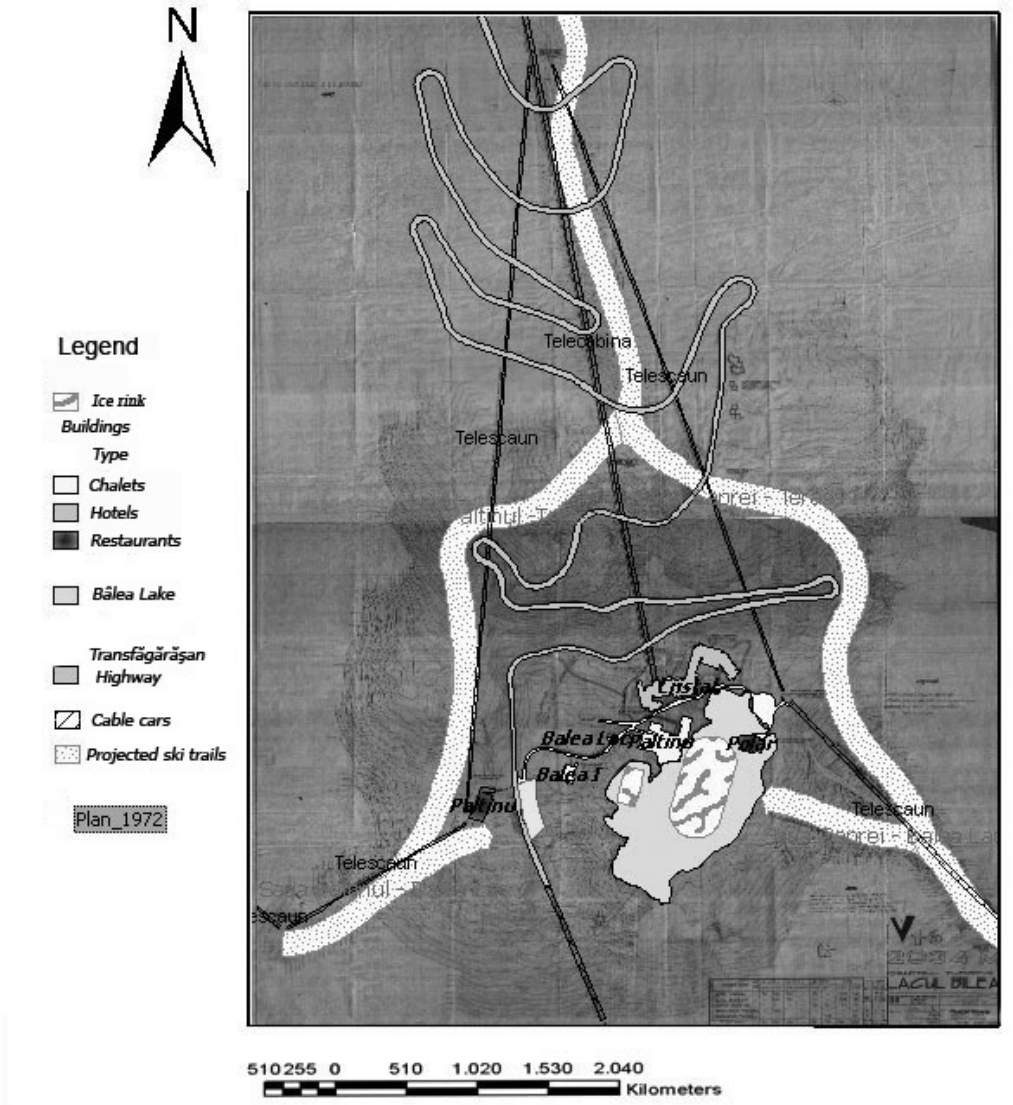

Figure 3. Map of the planned ski trails until the first terrace of the Bâlea valley
(source: *The Development of the Tourist Area Bâlea-Capra* 1972 plans with improvements)

Table 1. Specifications of the ski domain projected in 1972

	Type of trails (FIS categories)	**Length** (m)	**Optimum capacity** (persons)
Arrival points over 1500 m	Very easy	3,500	1,460
	Easy	3,540	1,100
	Intermediate	1,340	465
	Difficult	2,970	995
Departure points under 1600 m	Very easy	9,800	1,590
	Easy	7,500	1,440
	Intermediate	1,650	390
	Alley (connecting route)	9,500	-
Total		**39,800**	**7,440**

The optimum capacity (Ţigu, 2001) is an index that states how many skiers can be at the same time on a trail without inconveniencing one another and is calculated taking into account the difficulty of trail, width of the trail and the skiers themselves:

$$Q = \frac{F \times W}{\frac{Z}{H}} \quad (1)$$

Q – optimum capacity
F – hourly average flow
W – correction factor of the average flow on the basis of the width of the trail
Z – the vertical drop that a skier goes though in one day, according to his technique
H – the vertical drop of the trail considered

The total value is of approximately 7,440 skiers. If we take into account the 20% of accompanying persons the total number of tourists would rise to approximately 10,000 persons in this roughly 200 ha of proposed design of the ski resort. One could conclude that the environmental stress for this area would be quite high, especially that the Bâlea area is a complex reservation, and as far as the proposed accommodation facilities, they would not be nearly enough to accommodate all of them.

The planners set merely 30% of the ski domain above the 1,500 limit, this would become a problem in today's climatic conditions of global warming (Beniston *et al* 1997; Breiling *et al*, 1999; Elasser, Burki, 2002) and when one of the adaptations favored by alpine countries is pushing the resorts as high up the mountain as possible (Breiling *et al*, 1999; Scott, *et al* 2007; Popescu, *et al* 2009). There are other planning issues that were not taken into account as are the fact that skiers should be able to ski from one station to the other on trails with similar degree of difficulty (Ţigu, 2001), or the fact that there should not be variations higher that 20% in the declivity of the same trail (HG 263/2001), or that the trials should fall perpendicularly on contour lines (Ilieş, 2007), all of which are mandatory for present day ski resorts.

Our perspective. The Făgăraş massif should be without a doubt one of the future sites for the development of the winter activities. Being the highest range in Romania it is only natural that it has a generous advantage in relation to other mountain ranges regarding the future exploitation in the present view upon the tendency of the climatic conditions. We support the decision of investing in the Bâlea valley, due to one important reason – the access route - Transfăgărăşan being the only such road that crosses the range from north to south, and the resulting tourist infrastructure which it has generated. By tourist infrastructure we refer to the single cable car existing in the whole Făgăraş range that runs from Bâlea Cascadă (waterfall) to the Bâlea lake and the multiple accommodation facilities (Vama Cucului tourist complex at the altitude of around 650 m, the Bâlea Cascadă Chalet at 1,234 m, and at the Bâlea lake at approximately 2,070 m altitude there is the Platinu Hotel, and the two lodging facilities of the Bâlea Lake Hotel, passing on to the southern side one could find 3 more lodging facilities before reaching the Vidraru Lake (figure 1)).

Analyzing the terrain factors with a special attention given to altitude and slope we have concluded that this area could hold all categories of trails, but due to the high altitudes and the high degree of declivity most of the trails will be dedicated to advanced and expert skiers (Popescu, 2009). Beyond the pleasure given by the open spaces and long vertical drops we need to remind skiers that the snow-avalanche risk is very high within the Bâlea valley and cirque due to its specific terrain characteristics and suggest that they consult the hazard maps created in this respect (Voiculescu, 2004). In this respect there are a few measures undertaken (deflecting-dykes and snow-pack support fences), but if any planning is to be considered for a ski resort the management of snow avalanche risks should be one of the first concerns.

When we have redrawn the plans for the resort we took into account the progress that was made in the past 40 years of study in this field. These can be summed up by the principles (Țigu, 2002) of designing ski resorts and the criteria of evaluation the ski resorts (Petterson, 2005). We paid special attention to the interconnection of stations (figure 4) and ensuring continuity of the same degree of difficulty trails, offering alternatives to the groomed trails through a few off-piste extreme terrain, and tried to animate the area trough two snow-fun parks: one for the little ones who are putting their skies on for the firs few times called the *Smurfs* and another one where the free-style skiers can exercise on their back-flips, half-pipe runs and other endeavors of the sort. For the design of one trail, the relief is the foremost important factor. It is firstly important to find trails with the same degree of difficulty where the permissive variation is less than 20 % (HG 263/2001) in degrees this would mean not higher that 5-7°. Furthermore for the best quality slopes another surface element is vital – curvature. While the profile curvature can be sometimes corrected or viewed as variation of terrain, the plane curvature could bring a rather discomfort if the values are significant. To avoid having a side of the slope higher than the other we should plan the routes of the trails perpendicular to the contour lines (Ilieș, 2007) as we did (figure 4).

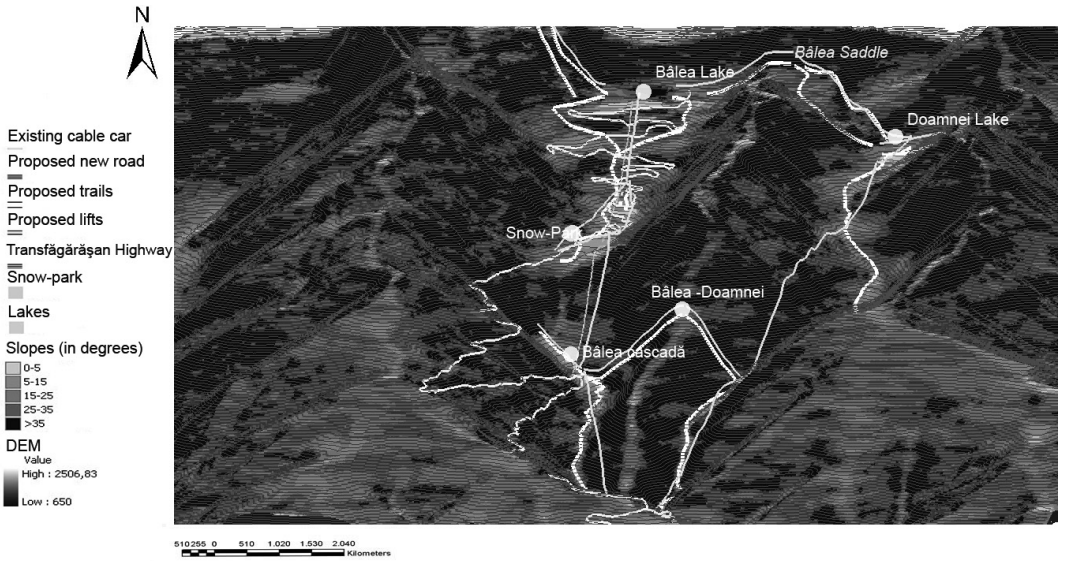

Figure 4. 3D model of the slopes of the Bâlea Area with the proposed trails and lifts

Another principle regards the assurance of natural factors, of which the most important is without a doubt snow, especially parameters as depth and number of days with snow coverage, being safe to say that the area is snow-reliable if: *in seven out of ten winters there is snow covering of at least 30 cm on at least 100 days between 1 December and 15 April* (Becken and Hay 2007, pp. 38). In the present case there have been registered more than 150 days of snow-coverage at the Bâlea weather station, which can be associated with the upper part of the ski area. For the lower part, since the present domain has no other weather station we have used the data of the Cozia weather station located on the southern side of the Făgăraș massif, at 1,577 m altitude. There, a number of 110 days are registered as a yearly average (Popescu, 2009), but considering the general aspect of the Bâlea Valley towards north and the local conditions "U" shaped glacial valley we can expect more days with snow coverage in this particular valley. As far as snow depth is concerned registration of the necessary minimum (the 20 cm) on average appears around the 1st December, considering the fact that there are variations of this particular date between 15 November and 12 December and regarding the last part of the interval, in each analyzed year the now depth at 30th of April always registered values over 72 cm (this being the smallest) (data from the Bâlea weather

station for the 1898-2004). For the Cozia weather station the values are closely the same December being the month were on average, on the first decade there has been registered 29.5 cm and for the month of April, even the last decade holds 23.7 cm as an average.

By these attributes we have come to realize that if one would decide in investing in the Bâlea valley, until the altitude of 1,500 one would have a certain season without having to invest in snowmaking facilities. On the other hand we have to consider the existing accommodation facilities and also the connectivity of the recreational system of the Bâlea valley so that the flow of materials, tourist and information would have an easy-to-go-through trajectory with no obstacles.

That is why we decided to not end our planned resort at the altitude of 1,500 m, but at 800 m, where the confluence of the Bâlea and the Doamnei valley is located. Still we have decided that most of our ski domain to be located until the glacial step (table 2), just above the Bâlea Cascadă, so that investments regarding snow-making should be kept to a minimum.

Table 2. Specifications of the proposed ski domain

	Type of trails (FIS categories)	**Length** (m)	**Optimum capacity** (persons)
Arrival points over 1500 m	Very easy	155	65
	Easy	1,090	395
	Intermediate	10,702	2,175
	Difficult	1,374	165
	Extreme	1,523	260
Departure points under 1600 m	Very easy	-	-
	Easy	774	80
	Intermediate	2,230	200
	Difficult	2,352	200
	Extreme	1,406	215
Total		**21,606**	**3,755**

To this total value we need to add the 30 persons that would be able to find themselves together in the snow-park. Even if the surface of the snow park covers around 100 sq m, acrobatic skiing requires a larger distance between skiers for safety reasons.

This configuration would render 74 % of the total ski domain over 1,500 m, and the trails under this threshold still hold the advantage of being located at the bottom of two shadowy valleys considering that their general aspect is northwards oriented and their adjacent slopes are covered in pine trees. We emphasized the provision of snow, because we believe that snow-making should be used as little as possible for various reasons: quality of snow, water and energy consumption which would lead to a larger investment and the occasional insertion of chemical or organic compounds in the snowmaking process (when temperatures surpass -3°C); especially due to the fact that there are many other methods of adapting to the diminishing snow conditions (Popescu *et al*, 2009).

Another significant difference in our proposal has to do with the distribution of trails on degrees of difficulty. Considering the terrain conditions we have tried to find as hard as possible the least steep slopes for the design of the trails since most of the Romanian skiers are no experts when it comes to this particular sport. The result is the following: 5 % of the trails are very easy, 19 % easy, 33 % medium, 14 % difficult and a fare 29 % are extreme trails dedicated only to the expert skiers (with the recommendation that they wear avalanche transceivers when they try these steep slopes).

As far as accommodation is concerned we agree with the idea proposed by our predecessors to have it distributed between the different centers, but none as large at the 1972 center at Glajărie which was supposed to hold up to 4,000 places. We consider that the accommodation facilities could reach at the Bâlea Lake 400 places, 200 at Bâlea Cascadă and around 1,000 at the "Base" (800 m in alttitude). The rest of the places (up to another 1,500) would be redistributed between the Vama Cucului Complex, which today holds around of 100 places of accommodation and the rest of the bed & breakfasts located in the villages at the bottom of the Făgăraş massif starting with Cârţişoara. The

purpose of the small centers is to preserve the recreational scope of any resort and for the tourists who want a taste of the"local color" privately owned rural bed&breakfasts or agri-pensions would be the best option (especially for foreigners who seek traditional architecture, customs and dishes).

In order that all this distribution not to be seen as an inconvenience and to not generate unwanted traffic, we have thought about the typical ski-bus service that one would find all over the Alps. The issue of traffic is one of the most important; therefore a large parking area is to be located at "the Base", for most of the vehicles pertaining to the tourists that go up the mountain and especially to those who do not want to spend the night in the facilities up the mountain. From this point onwards traffic should be controlled or even limited to those who will be lodged at the Bâlea Cascadă or the Bâlea Lake. The Bâlea Cascadă point can act even in the future as a terminus point for vehicle traffic during the winter months.

Therefore the model we proposed (figure 5) is very well inter-connected, and even though 19 means of cable transportation (this is the amount we consider necessary for a good distribution of skiers within the ski area) might seem rather many and the investment for them may seem inefficient we suggest that even during summer a handful should function and provide devices to carry mountain –bikes, thus creating an alternative demand for them. And as play ground for the bikes – there is always the Transfăgărăşan highway and also a few of the trails (especially in the lower part of the domain) could be used by down-hillers.

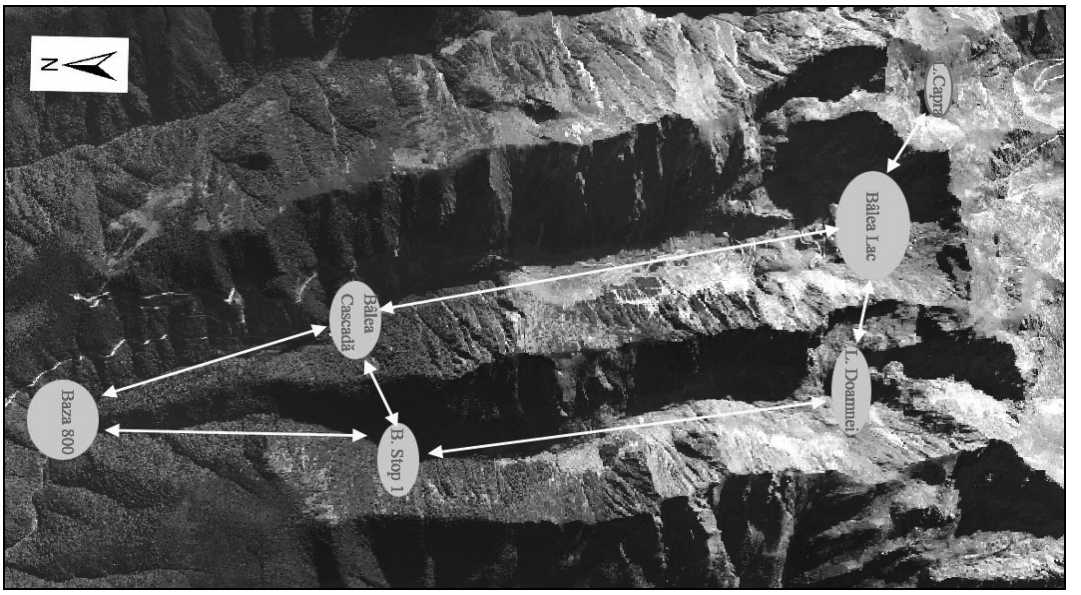

Figure 5. Model of the proposed resort (based on 10 m resolution DEM and orthofotoplans with 0.5 m resolution)

If we were to evaluate the proposed resort after Petterson's criteria we would come to realize that we have created a resort with the highest altitude (2,315 m – in the Capra saddle), the longest vertical drop anywhere in Romania of 1,500 m (at peak season when one would be able to ski until 800 m altitude), small-to medium in size (19 means of cable transportation being situated at the edge of both this categories, but having in view that in Romania no other resort has as many facilities to go up the slope – we decided to integrated to medium resorts); with a reliable season in the winter months and with all categories of trails. Regarding "the village" we have distributed the accommodation facilities among mountain small centers or the villages themselves found at the foot of the massif so that different demands can be satisfied. As far as the beauty factor is concerned this is to remain in the eye of the beholder, but glacial cirques and sharp ridges would make a fascinating backdrop in almost

anyone's book. Furthermore no other resort in Romania can offer so many alternative trails to the off-piste riders and none that is as quaint as this one with no urban-like infrastructure.

THE BUCEGI SKI AREA

When one refers to the best-developed tourist region in Romania would definitely mention the Valea Prahovei (*Prahova Valley*) (figure 6) which until a few years back was the second best developed tourist area, topped by the Romanian seaside at the Black Sea; but judging the length of the "season", the tourist attractions, the various types of activities practiced here and the number of tourists (with a large percentage of foreigners) the hierarchy justifiably chanced.

Skiing is a sport which was imported here at the turn of the 20th century, when in the winter of 1910-1911 "the sons of colonel Brindei" (Nistorescu, 2004) were seen for the first time in their attempts of sliding down a pair of skis on the hilly meadow in front of the Peleş Castle at Sinaia. The first organized endeavors concerning winter-sports were set with the establishment of the Peleş Club in 1922. In 1939 the first international ski competition took place at Sinaia on the Carp Valley with a departure point around 2,000 m and in 1951 the student's Olympic Competition is organized in the Poaina Braşov.

We do need to consider the Prahova Valley in itself as a region that certifiably generated a model of its own (figure 6), centered on a road and a railroad at the bottom of the valley that unites the resorts from which the cable transportation goes up the mountain with no connection between them.

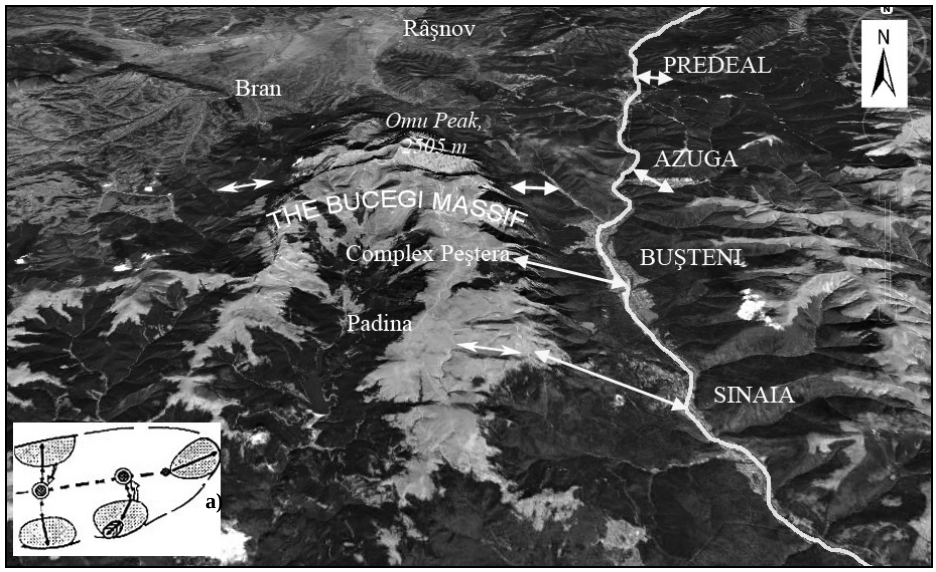

Figure 6. The Bucegi massif, the adjoined Prahova Valley with its main resorts and a) the conceptual model of the Prahova Valley
(source: googleearth with improvements)

Nonetheless we need to focus on the resorts that pertain to the Bucegi Mountains, because not all the resorts of the Prahova Valley belong to our study area. In fact only the resorts of Sinaia and Buşteni developed onto the Bucegi part of the Valley.

The Resort of Sinaia. The two resorts are not similar in appearance due to their different evolution. We must point out that Sinaia was the Summer Royal residence of Prince Charles I, and even before the Peleş Castle had been built, Sinaia was a spa resort based on thermal-mineral waters and therefore was adorned with hotels for the Romania's elite and some even build their secondary homes here. Since the elite were present here so were their habits, and facilities for their

favorite pastimes and skiing inevitably became one of them being favored by the location as well. So that Sinaia continued to develop, adding a new dimension to its multitude of features – winter-sports. Today Sinaia has the largest ski area (116 ha of FIS approved ski trails, to which one would need to add all the off-piste area which is hard to quantify) (INCDT, 2009).

The ski domain here is divided between two sides of the mountain - one side facing east (Carp Area) – towards the Prahova Valley which has the most difficult trails – for advanced and expert skiers and a side facing west (Valea Dorului Area) that is destined to beginners and intermediate skiers (figure 7 - left). The ski domain is endowed with two cable cars, one gondola and a chairlift on the Carp side and a chairlift and a ski-lift in the Dorului Valley which are sketched by the white arrows in the figure bellow. The structure and position of the ski domain would make Sinaia a 3rd generation ski resort (figure 7 a)), with a few differences: there are a couple of accommodation facilities within the ski domain (Cota 1400 Hotel, the Valea cu Brazi chalet and the Miorița chalet located just under the top station of the cable car). But there can be noticed an attempt of crossing over to a 4th generation resort through the new trail that corresponds to the gondola and that descends up to the town skirts. As far as the development of the ski area, the future plans of the local administration comprise only one other ski lift for the Dorului Valley with an associated trail destined to beginner skiers (acc. to CIPT Sinaia).

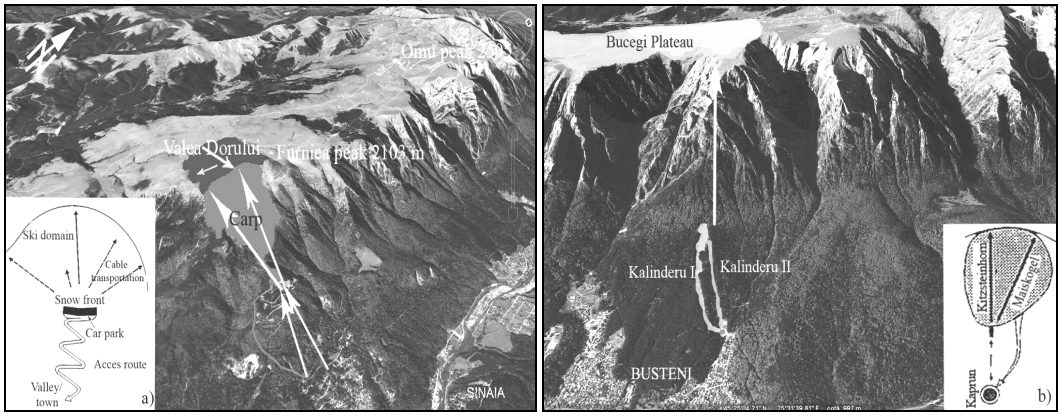

Figure 7. The Sinaia ski domain (left) with the 3rd generation conceptual model a) and the Bușteni Ski Domain (right) with the proposed model b) (source Googleearth – with improvements)

The Resort of Buşteni. On the other hand, Bușteni was mainly a small industrial town, whose tourist function developed later on (around the 1930s) mainly for recreational activities which focused on trekking and climbing. The first endeavors related to skiing were made in the 1980s when a ski lift functioned on the Bucegi plateau just under the last section of the Bușteni – Babele cable car, which unfortunately did not work but for a few years. The present day skiing is done here on a slope that was opened in 2004 together with the chair lift that serves it. And for the next few years the local authorities developed a plan to expand this ski domain by adding a new trail for snowboarders, a snow-park but also a cross-country skiing trail for the 2013 EYOF (European Youth Olympic Festival) (acc. to CIT – Busteni). Unfortunately at this point only Kalinderu I (figure 7 – right) is functional and for the season 2010-2011 Kalinderu II and the snow-park are expected to work.

We have suggested connecting the present ski area with the plateau based on an existing model in the Salzkammergut region of Austria, namely the resort of Kaprun (figure 7b). Where the terrain is too steep to ski on, in order to maintain the connection between the ski areas which pertain to the same resort, an artificial connection can be made with the help of cable transportation. At the present moment skiing is done on the plateau in an unorganized manner on

unattended slopes and with no other transportation but the existing cable car Buşteni – Babele (usually used for reaching the tourist sites of the *Babele* and *Sfinx*).

Emerging ski areas in the Bucegi Mountains. Apart from these two well known resorts there are three other areas where skiing is practiced: one is at Pârul Rece (a small tourist point – on the road from Predeal to Râşnov), but this one is rather used for ski courses with children rather that the recreational destination that such a ski trail usually has. The other two are in close connection to two of the most known villages in terms of their tourist offer. One is close to the village of Bran (famous worldwide due to the homonymous castle), just out of the village of Poarta, and the other is close to the village of Moeciu, just out of the village Cheia at the place called Cheile Grădiştei (the Grădişte Gorges). Both have a limited offer in terms of skiing, being just an alternative to the villages main rural offer, with trails no longer than 700 m and with only one ski lift, both areas destined to beginner (and intermediate – at Poarta) skiers.

The Ski Domain of the Bucegi Mountains. At the present moment only the two resorts have functional ski domains with a relatively diverse offer in terms of degree of difficulty slopes and one of the highest optimum capacity of skiers from all the Carpathians (table 3):

Table 3. The Existing ski Domain in the Bucegi mountains
(source of raw data: INCDT, 2009)

	Type of trails (FIS categories)	**Length** (m)	**Optimum capacity** (persons)
Sinaia	Easy	1.634	280
	Intermediate	8.953	1.592
	Difficult	2.089	655
Buşteni	Intermediate	1.400	255
Total		**14.076**	**2.782**

To the resorts of Sinaia and Buşteni we could add a total length of 1,500 m and an optimum capacity of around 500 persons per hour for all the other three smaller places where skiing is practiced today it would lead up to a length of around 15 km and an optimum capacity of 3,300 persons per hour. If we consider only the existing accommodation capacity, the ski domains are undercapitalized. For example in Sinaia at the beginning of 2009 there were 5,118 declared accommodation places (acc. to INCDT), that would require that the optimum capacity should be of at least 6,398 persons (considering the 20 % of persons which are only visiting skiers and are not accommodated at the same place), not to mention the locals. At the present moment in Sinaia the optimum capacity of the ski domain is of 2,527 persons. The plans of the local authorities, in terms of the ski domain per say, mean to add only one trail for beginners in the Dorului Valley, left of the trail called Valea Soarelui (Sunny Valley). On the other hand, the National Institute for Tourism Research and Development (INCDT, 2002) initiated a plan for the project generically called "Superski în Carpaţi" (*Superski in the Carpathians*) that would unite the domain of the Dorului Valley with the tourist Complex of Peştera-Padina, located in the upper Ialomiţa Valley.

Our view regarding the development of the ski area of the Bucegi Mountains (figure 8) is similar to the one initiated by the INCDT (2002), which was unfortunately not materialized up to now. Reclaiming the principle of interconnection and functionality regarding the flow of tourists, produce and information between the resorts it would only make sense to plan the present eastern side of the Dorului valley - onto the mountain called Lăptici, and then descend on the other side of the mountain towards Padina. From Padina to Peştera on the western facing slope one could generate an intricate network of cable transportation that would eventually connect the existing cable car that goes up from Peştera until the Babele station (the top station of the cable car of Buşteni). Continuing the development on the eastern slope of the Ialomiţa valley (on the mountain called Tătarul) the domain could be enlarged and varied in terms of sun illumination during the

day. And further the trails on the eastern side could be connected with the ones on the western side of the Bucegi Mountains, towards the emerging resorts of Bran and Moeciu. In terms of vegetation this area would by very interesting as it goes through three belts of vegetation: alpine, subalpine and boreal forest – making deforestation be used as little as possible. What is very important to mention are the terrain factors in the upper Ialomița valley, especially the slope gradient is quite low and all the trails developed would be destined to beginners and intermediate skiers – which are predominant among Romania tourists.

One tourist could start his/hers skiing day in Sinaia, go up the Carp slope (the eastern side of the Bucegi), than crossover to the Dorului valley and from here on, through the connection on the Lăptici mountain cross to the upper Ialomița valley and perhaps later on he/she could take the cable car from Peștera, reach Babele and from there descend to Bușteni. Another connection from Sinaia to Bușteni can be ascertained through a cross-country trail on the Bucegi Plateau, 4 km long, whose declivity does not vary more than 10° on the whole route.

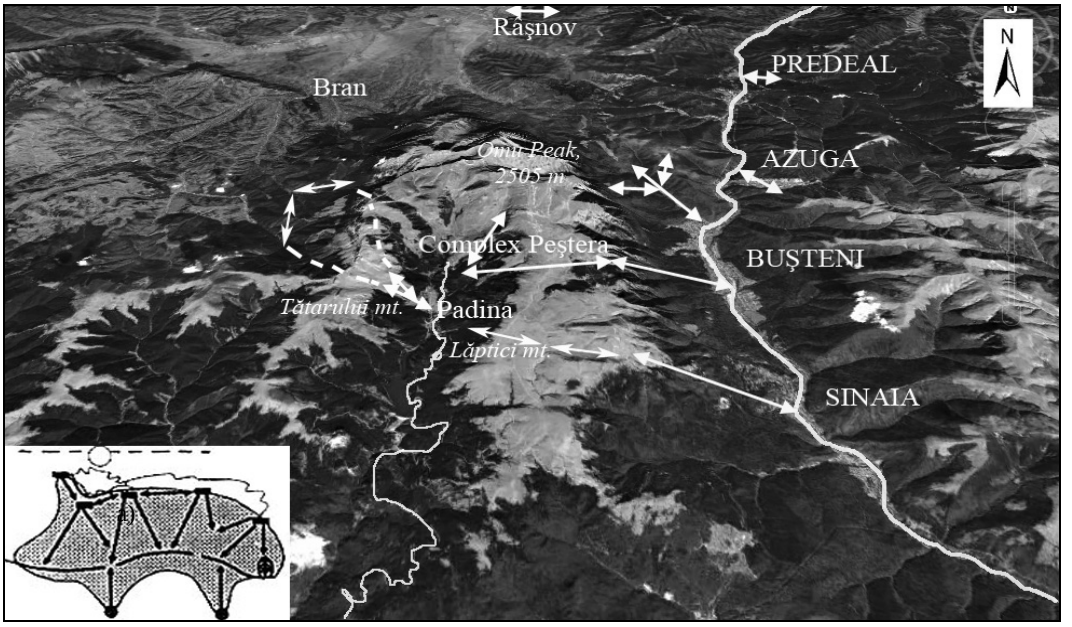

Figure 8. Proposed model of development for the Bucegi Mountains and a) its conceptual model (source Googleearth – with improvements)

The proposed plans by INCDT, for the Peştrera-Padina are claiming the development of 24 trails, with a total length of 33,820 m and an optimum capacity of 8,561 skiers. When applying the correlation indices, the reclaimed accommodation facilities for this mountain area would be of 6,849 places, when today less than 105 of these places exist in the Peştera-Padina area. We would not reject totally this plan on the long run, but at the present moment, our idea of development would resume to a chairlift from the Dorului valley onto the Lăptici mountain, another such a device on the opposite side of the mountain. As for the upper Ialomița valley itself, near the chairlift at Padina coming down from Lăptici mountain two other ski lifts would be reclaimed and near the Peștera cable car other at least two ski lifts for the beginning of the development should be placed, one on the northern slope and another one parallel with the route of the existing cable car (INCDT, 2002). We need to take into account that only these would bring 14,950 m of new trails and could support an optimum capacity of 4,230 skiers (INCDT, 2002). So that when we would recalculate the total length of the slopes from the Bucegi massif, just with the proposed new trails as a first step of development the results would be rather different (table 4).

Table 4. Specification of the ski domain for the Bucegi Massif (seen as an integrated ski area)

Type of trails (FIS categories)	**Length** (m)	**Optimum capacity** (persons)
Easy	14.134	3.238
Intermediate	12.803	4.105
Difficult	2.089	655
Cross-country	4.000	530
Total	**33.026**	**8.528**

Comparing the two data tables we can notice that the total length extended more that double and the optimum capacity is close to four times than the present one, due to the high percentage of easy and intermediate trails, but also to the addition of the cross country trails. The resulted distribution between categories would favor the beginners, due to the easy and very easy trail in a percentage close to 42 %, and the intermediate one close to 38 %. The two categories currently represent the majority of Romania' skier market, not to mention they are the ones that bring the best revenues, which can be used for future developments.

Regarding the spatial pattern of the proposed development we can easily notice the change (figure 8 a), with a good connection between most of the resorts done by cable transportation rather than ground transportation. We can understand that this would be a great achievement for the skiers as much as for the traffic on the Prahova Valley, which during weekends and high season is very high., reaching values of over 27.000 vehicles in a single direction (acc. to Ziarul financiar, 2010). Therefore the model changed from the one focusing on a central valley to the one where multiple valleys are interconnected by the means of cable transportation. This is a typical model for alpine regions (ADAC, 2006). For the interconnection to be complete, one common ski pass should function in all the resorts and all the resorts would be served by a ski-bus line, whose cost would be covered by the ski-pass.

The main characteristics of the proposed model are the interconnection of the ski domains Sinaia, Buşteni, Peştera-Padina; the development of cross-country skiing; a better distribution of the tourist masses within the entire massif (by moving the weight center of the tourist traffic onto the slopes, by means of the cable transportation, away from the crowded main road (DN1) and the limitation of automobilist traffic in recreational area.

CONCLUSIONS

Our research meant to find the best solutions of development for the two mountain areas in terms of skiing. We do not state that the presented solutions are the best ones, but they are well documented considering various factors, from which terrain, infrastructure and the financial-economic factors are the most important.

The models for the two mountain massifs are very different, for their development backgrounds are just as different, but as far as terrain factors are concerned, but also due to present economic status.

For the Făgăraş area we have merely delineated a test area – which, as we have shown, is the best developed in terms of infrastructure which could act as a future model for other valleys in the Făgăraş massif which have even better terrain conditions. The present model is meant to receive up to 4,000 skiers or riders, which today is used at less that 5 % of its potential and is very restrictive towards the categories that can participate at the leisure act.

On the other hand for the Bucegi massif, our vision was to deplete the congested points presently located in the resorts of the generically Prahova Valley by re-dimensioning the ski domains and re-distribution of tourists within the massif in the idea of interconnection of the majority of the resorts here, whose cable transportation could be accessed by the means of the same ski-pass, thus limiting the personal costs and promoting the other ski areas of the same massif.

Altogether for both mountain areas we suggest the enhancement of the trails destined to beginner and intermediate skiers, which represent the largest section of this type of tourist market in Romania and also for that fact that they are the largest generators of revenues. Another outcome would be the decrease in the number of accidents which take place every year on FIS approved trails and even off-piste.

Another important point is limiting auto traffic within the leisure areas and creating dependable services regarding the transport of tourists back and fort from their accommodations to the desired ski area.

Overcrowding and over-planning need to be avoided as well, this is why the values proposed by us are lower than the ones proposed by INCDT , which for the whole area of Bucegi proposed ski trails that could receive up to 50,000 skiers, whilst the present lodging facilities could accommodate around 10,000 tourist.

If we are planning in targeting the international market we need to be very careful when sizing the ski areas and the resorts themselves. Foreigners need to be attracted by the site's uniqueness and its integration within the landscape not by its domination as it happened in southern Tyrol.

Though the planned developments which have been described above we mean to create areas where the winter sports would be undertaken in a relaxed manner (figure 9) – which was once dominating the scenery and which can pass as a proper leisure act as it is described by specialists.

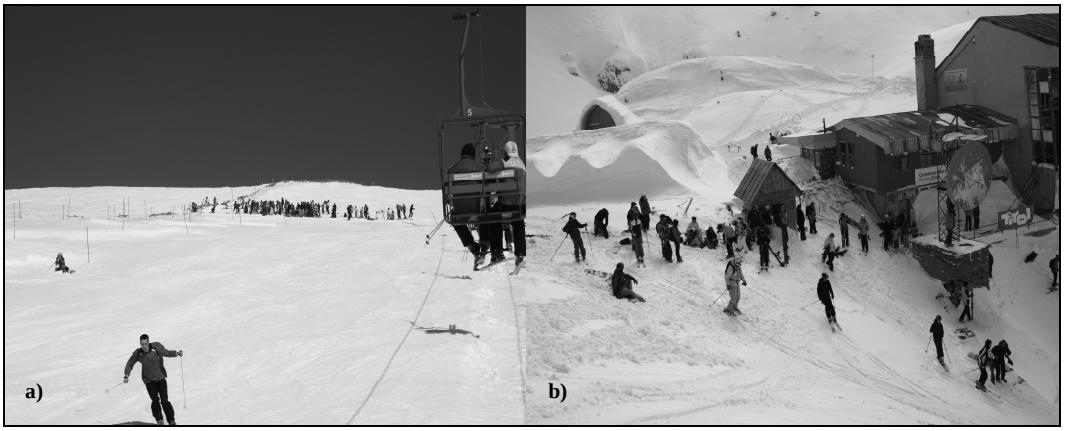

Figure 9. A relaxed ski day in the a) Dorului Valley at Sinaia (within the Bucegi massif)\ and b) in the Bâlea Valley of the Făgăraş massif

The EYOF that will be held in the resorts of the Bucegi Mountains will bring major changes for the resort of Buşteni, where an 8 km cross-country track will be created and for Râşnov, where the ski jumping competitions will be held (acc. to the Buşteni Info-center). On the other hand the Inferno competition that takes place in the Bâlea valley every year, in time, will reclaim a better infrastructure as far as skiing is concerned, but also as far as the accommodation facilities are concerned. Therefore, both regions have an eventful future ahead of them.

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REFERENCE

Becken S., Hay E.J., (2007), *Tourism and Climate Change: Risks and Opportunities*, Multilingual Matters, 352 pp;

Beniston M., Diaz H.V., Bradley, R.S., (1997), *Climatic Change at High Elevation Sites*: An Overview *Climatic Change* 36: 233–251, 1997, Netherlands;

Breiling M., Charamza P., (1999), *The impact of global warming on winter tourism and skiing*, in "Regional Environmental Change", vol. 1, no. 1, p. 4-14;

Elsasser H., Bürki R., (2002), *Climate change as a threat to tourism in the Alps*, Climate Research, Vol. 20: 253–257, 2002;

Ilieş M., (2007), *Amenajare turistică*, Ed. Casa Cărţii de Ştiinţă, Cluj-Napoca, 153 pp;

Nistorescu G., (2004), *De la Plaiul Prahovei la Sinaia*, Ed. Horanda Press, 129 pp;

Petrescu C., (1978), *Modelul Turistic Chamonix – Mont Blanc*, Ed. SportTurism, Bucureşti, 236 pp;

Popescu Florentina, (2009), *Terrain and Climatic Analysis of the Bâlea Valley for the Development of a Ski Resort*, Analele Universităţii din Oradea, Seria Geografie, TOM XIX, Ed. Universităţii din Oradea, Oradea;

Popescu Florentina, Voiculescu M., Török-Oance M., (2009), *Climate Change Adaptation of Two Ski Resorts: Sinaia and Straja*, Proceedings of the 5th Regional Conference *Environment for Europe*, Belgrade 4-6 June 2009, pg. 26-32;

Scott D., McBoyle G., (2007), *Climate Change and Winter Sports: Environmental and Economic Threats, Mitig Adapt Strat Glob Change*, 12:1411–1431, Springer Science;

Taylor et al., (2007), *The Ski Resorts Industry in the Twenty-First Century's First Decade a World-Wide Competition between Continents, Countries and Regions*, in "Proceedings North American Case Research Association 2007 Annual Meeting", pp. 1-17, Keystone, USA;

Ţigu G., (2001), *Turism montan*, Ed. Uranus, Bucureşti, 296 pp;

Voiculescu M., (2004), *Întocmirea hărţii riscului la avalanşe. Studiu de caz: circul şi valea glaciară Bâlea (Masivul Făgăraş)*, în "Riscuri şi catastrofe", Casa Cărţii de Ştiinţă, Cluj-Napoca, pp. 243-250;

Ziarul financiar, (2010), Cum s-a vazut Pastele in turism, consum si transporturi: Cifrele raman jos, dar managerii spun ca „vanzarile sunt bune, la cum merge economia" 06.04.2010 (accesed online at 3.05.2010)

*** (1972) Proiectul 2079/1970: Dezvoltarea zonei *turistice Bîlea-Capra, Masivul Făgăraş. Memoriu General, vol.2*, realizat în cadrul Consiliului Popular Judeţean Sibiu

*** (2002), *Optimizarea şi extinderea domeniului schiabil din România*, Institutul Naţional de Cercetare-Dezvoltare în Turism, (INCDT), Bucureşti;

*** (2006), *Ski & Snowboard Spots, Die Top-Spots in den Alpen, ADAC* 120 pp.

*** (2009), *Master plan în turism pe Valea Prahovei şi Zona Braşov-Râşnov*, Institutul Naţional de Cercetare-Dezvoltare în Turism (INCDT), Bucureşti;

*** Hotărârea Guvernului nr. 263/2001 privind amenajarea, omologarea, întreţinerea şi exploatarea pârtiilor şi traseelor de schi pentru agrement, publicată în Monitorul Oficial al României, Partea I, nr. 115

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