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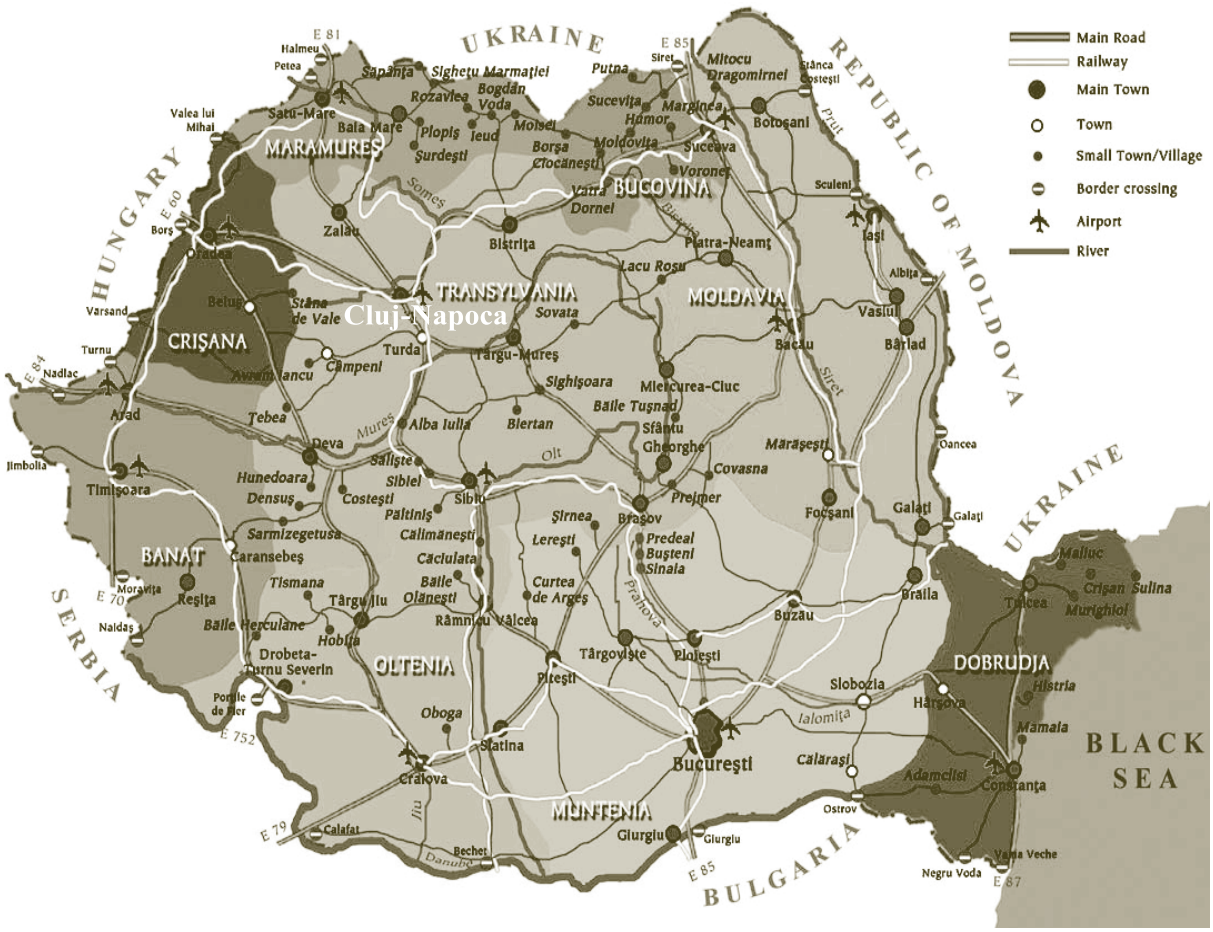

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Notes and Book Reviews – Note şi recenzii

STUDIA UBB GEOGRAPHIA, LVIII, 2, 2013, pp. 5 - 11
(RECOMMENDED CITATION)

WARM THOUGHTS ON THE EIGHTIETH ANNIVERSARY OF EMERITUS PROFESSOR GRIGOR P. POP

AL. PĂCURAR[1]

When I was a third-year student (1982-1983) at the Faculty of Biology, Geography and Geology of Alma Mater Napocensis, Professor Pop, who was an associate professor at that time, gave us a course on *"Romania's Economic Geography"*. We, his "disciples", were eager to meet the academic who was to teach us and supervise our practical training; his course had been published in two imposing volumes, of over 900 pages, which we approached with admiration and fear, at the same time, being anxious that we might not be able to learn "so much material". It turned out later that we were fortunate to have a very good professor, because thanks to his inspirational teaching presence, we managed to logically approach and assimilate what had, at first, appeared to be an intractable subject.

Prof. Grigor P. Pop PhD
born on 16th of September 1933,
Calna village, Cluj County

During summer practice, I was assigned, together with a fellow student, Angela Vasilescu, to accompany the Professor to Ruşchiţa, where a contract was underway, so we were privileged to get to know him outside the department too, in the field, where his patient explanations became the answers to our many questions and curiosities, so natural at our age, since we were still at the beginning of our journeys through life. And what beautiful discussions we had in the midst of nature, along mountain trails, at marble quarries or on forest dirt roads, which led me to say, in the shadow of Eminescu: *"Now the machinery is hissing, / Sweet is the smell of pipes up in the air, /The Kümmel bottle's so inviting, / And Milly's laugh… what do I care!".*

The spring semester of our third year as students gave us the opportunity to know another aspect of the Professor,

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as he was the supervisor of the students doing scientific research and proved to be a rigorous and impartial evaluator of each and everyone's work when we presented our findings. This was occasioned by the national session of the students' scientific societies, organized by our fellow Geography students from the University of Bucharest, who were our most welcoming hosts.

After graduation from university (1984), during the period of six years when I worked as a teacher at the "Andrei Mureşanu" National College in Bistriţa, I had no direct contact with the Professor, but I was always close to him as I read his work with great interest; in the autumn of that same year, his book entitled *"Romania. The Geography of Movement"* was published, focusing on a theme that was new in the Romanian geographical literature and that I would often approach with intense interest. I learned later that it had been printed in eight thousand copies, which had quickly sold out!

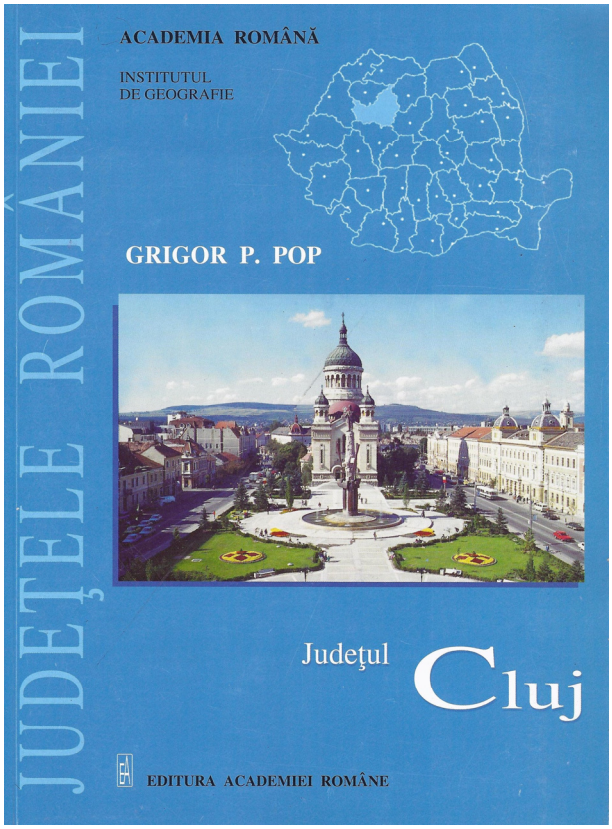
In the autumn of 1990, in a new context, when the first competitions for jobs in higher education were organized, Professor Grigor P. Pop, who was head of department and was familiar with the work I had done both before and after college graduation, the several articles I had published and my participation in symposia and the Geography Congress, urged me to apply for a position. Succeeding in obtaining it in the fall of 1990, I started my activity at the Department of Human Geography, where I have been working so far. As a result, I got to know Professor Grigor P. Pop in multiple roles: as the head of our department, as a school creator and, if I may say so, as a colleague. Each of these facets of his personality has revealed his inclination for work that is thoroughly done, always emphasizing a sense of measure and moderation in everything, as well as modesty, sometimes taken to the extreme... and being unproductive for this distinguished scholar.

As Head of Department and as a school founder, the professor has been driven by the desire to form a motivated, dynamic and determined team of humanist geographers. Always severe and rigorous, he has evinced these character traits and rules of conduct with decency and discretion, congenially rather than coercively imposing them upon his collective of researchers. We had all the support and freedom of movement, but at regular intervals of time we had to "show down" the outcome of our research, which resided in our studies, articles, maps, courses and printed books. In this sense, he constantly encouraged us to publish individual studies, since he did not look favorably upon teams of 5, 6, 7 or even 8 authors for an article of 8-9 pages and deeply resented the status some adopted as "coordinators" in order to have work published. Moreover, it should be noted that through these "ruses", some have built handsome careers...

In forming and consolidating the Department of Human Geography, Professor Grigor P. Pop was guided by the criterion of value. For him, it did not matter where the scholars applying for positions in this department came from (what region of the country, village or town), what their ethnicity was or what religious and political beliefs they held: what always mattered was the outstanding quality of these individuals, their level of training, reliability and inclination for study, as the Professor specifically appreciated their scientific curiosity, coupled with hard work. Thus, he managed to form a valuable team, with heterogeneous concerns and research directions, but which was homogenous in terms of its members' motivation, determination, and remarkable achievements, as well as solidly-structured, up to a point.

As Head of Department, Professor Grigor P. Pop was fair and honest, correctly dividing the responsibilities among the department members and distributing material rewards that were consistent with each and everyone's contribution.

As the creator of a school in the field of human geography, he has had unquestionable contributions to clearly defining the very concept of Human Geography and its sub-domains, suggesting to each and every one of us our "paths", that is our specialization areas. Thus, he initiated lines of research and contributed to the training of specialists in the field of Agricultural Geography, Political Geography, Land Planning, the Geography of Human Activities, including tourism, with significant results in each of these domains.



Towards us, the Professor has always behaved in a humane, warm yet not effusive manner, being a trust-worthy colleague to whom we could resort whenever we needed some guidelines or advice, who was approachable and ready to help, these traits of character becoming intensified after his retirement when, relieved of his teaching and institutional duties, he has, to this day, joyfully offered consultations to the young scholars undergoing training.

While he was intransigent in his scientific reasoning, in various other discussions on diverse issues of life he respected the opinions and viewpoints of others, invoking the phrase: *"I am halfway right, the other half is yours, it belongs to you!"* Moreover, he bore no grudge to anyone who had a different opinion or vision. This is a major character feature of Professor Grigor P. Pop: the freedom of expression and opinion, a rare case amongst us, for we had somehow just regained our freedom of speech and were not yet accustomed to accepting those with different opinions, which have led even friendships and even family ties to crumble down.

Being honored to have him as my doctoral supervisor, I also got to know him in this capacity. He was a very demanding examiner, and I can say that he became the role model that has generously guided me in my professional and scientific development. In my "series", in which Mr. Liviu Nicoară and Csaba Kovács were also

included, oral examinations were conducted in the presence of the entire department, including the department secretary, that is, 12 to 15 people before whom you could not afford to make many mistakes, since these exams were not a mere formality! The Professor imprinted this rigor in all the twenty PhD students whose work he supervised, rejecting the temptations of inflating these numbers, to which some supervisors have fallen prey, compromising on the quality: the professor has always been immune to this type of "sirens".

While Professor Grigor P. Pop's temperament, character and personality have been easily noticed by his colleagues, collaborators and friends, his written work, published in numerous copies and totaling around 6,300 pages, is accessible to everyone, being hoarded in the great academic and public libraries in the country and abroad. This work includes over 210 titles of books, university courses, articles, studies, atlases, maps, various collaborations, and, in what follows, I will refer to a few of them.

As a student, I laid hands on and studied the voluminous course entitled *Romania. Economic Geography*, 940 pages, which was published in two editions. Several chapters and topics in it are still very vivid in my memory, as I consider them a genuine model of approaching this theme. Such are, for instance, topics like pisciculture, irrigation systems, viticulture, etc., remarkably synthetic, suggestive cartographic representations, as well as valuable sources of information and synthesis. In fact, as I was to discover with the passing of time, the entire written work of Professor Grigor P. Pop is accompanied by cartographical representations which condense the written information, a very rare case in Romanian geographical literature, especially today.

In the *Laudatio* of the Commission that granted him the title of Honorary Professor of "Alexandru Ioan Cuza" University in Iaşi, when the centennial of the Geography Department was celebrated there in 2004, emphasis was laid on the efforts made by Professor Grigor P. Pop towards highlighting the human and geographical features of our country, reference being made to *"...his monumental treatise, in two volumes, on Romania's Human Geography [...], one of the most valuable sources of information available to entire generations of geography students in Romania!".*

I must confess that *"Romania. The Geography of Movement"* was the first specialized book that I bought after I was assigned my teaching position in Bistriţa. When I saw the volume on the bookstore shelf, I experienced great joy to lay eyes on the book written by one of my professors, especially in an area that was as topical then as it is now, transportation geography. The building of the Romanian railway system, the configuration of this network, navigation on the Danube, urban transport or special transports were chapters with dense information, which shed full light on the subject.

"Romania. The Geography of Hydropower" is a unique work in the Romanian geographical literature, a veritable encyclopedia of the hydropower works that have been carried out in our country. Written with great precision, with substantial data, drawings and illustrative sketches, the book is a useful tool for those who want to become familiar with the effort undertaken for valorizing our hydropower potential by an entire body of hydrotechnic and construction engineers, foremost amongst whom is the figure of Dorin Pavel. I, for one, experience great satisfaction when I see the achievements of the Iron Gates I and II, Ciunget on the Lotru, Vidraru on the Argeş, Dobreşti, the chain of hydropower plants on the River Olt and many others!

With the publication of the book *"Romania's Carpathians and Sub-Carpathians"*, which came out in two editions (2000, 2006), the series of comprehensive and synthetic works on regional geography began, proving the author's full scientific maturity. Having a thorough training and vast knowledge, as well as an extraordinary power of synthesis and of exploring cause-effect relationships, Professor Grigor P. Pop has published a series of works of reference in Romanian geographical literature. This has been the period when *"lifted above the forest"*, as he likes to say, he has acquired an overview of the entire phenomenon, which he presents in its most characteristic manifestations. I consider that this has been the period of his great geographical syntheses. With solid knowledge in the fields of Geology and Physical Geography, he has outlined the most interesting correlations with the substrate as a repository of natural resources and with the emergence and development of human activities in relation to the environment.

All these syntheses of Regional Geography are characterized by several features, including: the clear articulation of the reality of the places, without unnecessary digressions; the dense information they comprise, which is well chosen, being defining for the region analyzed; the rigorously drawn limits of the units and subunits, with logical justifications that leave no room for ambiguity; the geographic information and data contained in the texts are located on the maps, ensuring that there is a perfect concord between the scientific information and the cartographic representations; he mentions the impact and contribution of other authors in the field, often quoting them rigorously in essential fragments, thus proving his adherence to an irreproachable code of academic ethics; where he has a different view on the geographic space, he does not hesitate to support it with scientific arguments. Thus, for instance, he does not consider that there exist the so-called *"Transylvanian Sub-Carpathians"*, for the marginal geographical subdivisions East of the *"Central Unit"* in the Transylvanian Plateau did not emerge through the folding of the formations in the "Vorland", but as a result of the appearance of saliferous strata; therefore, they are not the Sub Carpathians, but subunits of hills, and he approaches them accordingly in his work *"The Transylvanian Plateau"* (2001). It is also in this valuable synthesis that the author clearly delineates the boundaries and sub-units of the Someş Plateau, based on the relation between geology and morphology.

In his work *"The Western Hills* and *the Western Plain"* (2005), which represent his *"ground"*, for he studied a subunit thereof in his PhD thesis, under the supervision of the late Professor Ion Şandru from Iaşi, Professor Grigor P. Pop observes that *"the territory analyzed in this book has been a permanent love of mine since my youth"* (p. 3).

Being an erudite connoisseur of the region, the author marks the boundary between plains and hills by dismantling the phrase entrenched in the collective mentality whereby *"the Western Plain digitally penetrates the mountain sector"*, clearly delineating two relief units: the Western Plain, with multiple subunits, including high and low plains, and the Western Hills, where he distinguishes: the Silvano-Someş Hills, the Crişana Hills and the Banat Hills, which, in turn, have their own sub-units, delineating them with his characteristic accuracy and describing their defining elements.

The works of regional geography mentioned above have a list of contents and a summary in English, making them accessible to the foreign readers who are interested in the Romanian geographical space.

Devoted to the Department of Human Geography, he has developed it and endowed it, to the best of his abilities, with valuable items, strengthening thereby the entire Faculty of Geography. Professor Grigor P. Pop has devoted two monographs to this prestigious university institution and its publication: *"The Geographical School of Cluj 1919-2007"* (2007) and *"The Scientific Publication of the Geographical School of Cluj (1919-2010)"*(2010). Given the manner in which these two books, totaling 478 pages, were conceived and written, they are unique in Romanian geographical literature and represent a model of approach in the field. Forming one common body, they faithfully render the "trajectory" of the Institute of Geography from the University of Cluj since its founding (1919) until today. With his well-known thoroughness, the Professor outlines the stages of the institutional development of our faculty, in which a handful of enthusiastic forefathers laid the foundation stone of what, in time, would crystallize and become the Geographical School of Cluj. Several decades later, another passionate scholar would add another brick to this cornerstone, Professor Grigor P. Pop highlighting its subsequent development. He then accomplished a faithful reflection of what has been published under the auspices of the *Geographical School of Cluj*. The publication contents are reproduced (in printed format and on CD!), while synthetic tables and analyses of the structure of the articles' scientific content, fully and pithily convey everything that has been published in the "*Proceedings of the Institute of Geography from the University of Cluj"* and in *"Studia"*, the *Geologia-Geographia* and then the *Geographia* series. In the analysis he carries out, the Professor realizes that he knows of no cases of articles signed by two or more authors in the interwar period, whereas today it is quite common to have 4 to (up to!) 9 signatures on an article of 6-10 pages.

Incidentally, the Professor also deeply resents the practice of joint publishing (as mentioned before); moreover, he has never put his signature next to his PhD students!

Professor Grigor P. Pop has published many other works, and I will only mention here his collaboration to elaborating chapters and maps for treatises on the history of Transylvania. In this context, I wish to emphasize that he has introduced the concept of *"geographical-historical provinces"*, which is perfectly valid, given the primordial character of the geographical space upon which, in the past, the political, social, economic and cultural space overlapped, and which, due to its ancientness, has received the connotation of "historical". It would be helpful if geographers promoted this concept!

Professor Grigor P. Pop has undertaken commendable volunteer work. Let us recall that he was in charge of the Geography journals from Oradea – *"Scientific Papers, the Geography Series",* for ten years, and *"Studia UBB*, *Geographia"* from Cluj-Napoca, for 23 years (1990-2012), a period during which the Cluj journal was published regularly: this reveals the passion with which he has dedicated himself to this demanding and laborious work of great responsibility. Let us not forget that thanks to the Professor's endeavors, the Geography journal of the University of Cluj-Napoca has reached the highest classification rate in the country, B +, now BDI indexed. Having been at the helm of these journals for a long time, the professor has a complete picture, from inside, of the efforts and contribution made by each and every one of us from this part of the country in the field of Geographical Sciences.

Professor Gr. P. Pop has not dissipated forces in multifarious activities and has sought to conduct them thoroughly, successively rather than simultaneously, one

by one. He has been a scholar, a true academic who has spent most of his time in his second family, his work place, dedicating himself to the institution he has served in exemplary manner. Providing ample living for his family, he could fully devote himself to teaching, doing research, focusing on institutional development, in a disinterested manner. With reference to some spectacular material accumulations after 1990, the Professor has a saying that *"you cannot do two things well at once"*, meaning you cannot simultaneously be an academic and a businessman... Clearly, he has had an unwavering loyalty to the students and the institution, to which he has dedicated his entire activity.

I could not end my humble presentation of Professor Grigor P. Pop's activity without a brief reference to his wife, Mrs. Mărioara Pop, whom I have met on several occasions. I believe that Professor Pop's achievements as an academic are also due to the unconditional and limitless support he has received from his wife, who "substituted" her husband in all the household activities that might have required his effort, allowing him to have complete freedom in his academic work, making possible a fully harmonious marriage, which God has blessed with two children.

Last but not least, as one who has been around Professor Grigor P. Pop for a moment more and who has learned so much from him, I would like to wish him health, happiness, joy in his family, and a sincere and heartfelt "Happy Birthday!"

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IDENTIFYING LANDSLIDE HAZARD IN THE CHECHIŞ CATCHMENT, BAIA MARE DEPRESSION

FLAVIA – LUANA MĂGUŢ[1], S. ZAHARIA[2], I. A. IRIMUŞ[3]

ABSTRACT. – Identifying Landslide Hazard in the Chechiş Catchment, Baia Mare Depression. One of the starting points when assessing landslide risk is hazard identification, represented by the description of the landslide process and the extent to which it has an impact on the human community. Different areas affected by sliding processes have been identified and mapped on the field in the 100 km^2 of the Chechiş catchment, a territory situated to the south of Baia Mare municipality. Several other areas are considered to be susceptible to sliding processes, based on the factors which have influenced the occurrence of the ones already identified. Past and present effects of the existing landslides are illustrated and discussed together with the costs associated to the measures needed for their mitigation. In the view of these results, a landslide risk assessment is considered necessary in the area.

Keywords: *landslide hazard, Baia Mare, Chechiş catchment.*

1. INTRODUCTION

The stage of investigation is of great importance in hazard and risk assessment, carrying one of the main responsibilities for the quality of the results. A landslide investigation and identification process has been carried out in the area of Baia Mare Depression, with a specific focus on the Chechiş catchment. This process has included the study of local newspapers and administrative sources, the analysis of topographic and geological maps, orthophotographs and direct observations in the field, which were transferred in cartographic form using a GPS and the software ArcGis 9.3.

In order to determine the suitable methods for the landslide risk assessment, the geomorphic process must be identified and described both qualitatively and, as far as possible, quantitatively, at the spatial and temporal scale. If the spatial distribution of landslides can be determined directly, their temporal occurrence can only be inferred from the recurrence interval of causing factors, such as rainfall, if specific dates of landslide occurrence are recorded. Because the present investigation has encountered only a limited number of such events, this aspect will not be dealt with at this point.

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In the Chechiș catchment several areas were identified as having been affected by landslide movements and are currently characterised by different degrees of stability. As the complete inventory of landslides is still being built up, our study presents only the preliminary results of the landslide investigation process and the main characteristics of the landslides, which will eventually be used in a susceptibility analysis.

2. LANDSLIDE AREAS IN THE CHECHIȘ CATCHMENT

The study area is located in the north-eastern part of Baia Mare Depression, between Mogoșa Mountain in the north-east and the confluence with the Lăpuș River, to the south of Baia Mare municipality. The Chechiș catchment has an area of approximately 100 km^2 and includes the southern slopes of the former piedmont unit from the foot of the volcanic mountains Gutâi (P. Coteț, 1973). The river Chechiș springs from the volcanic mountain Mogoșa and receives two main streams and several other permanent and temporary ones before flowing into Lăpuș River (fig. 1).

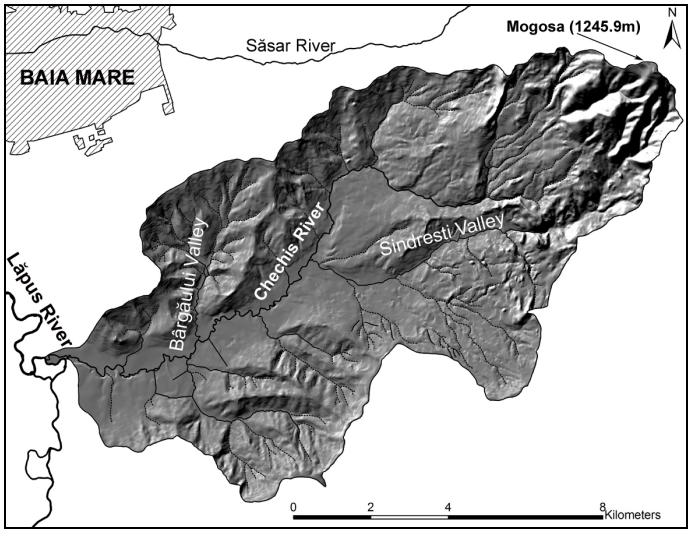

Fig. 1. The Chechiș catchment

The main lithologic units include Andesite rocks (Neogene) in the north-east and sedimentary rocks represented by Pannonian and Sarmatian deposits (Miocene - Pliocene) in the rest of the area (fig.2), covered by 4 to 6 m of Quaternary deposits consisting mainly of contractive clays, with a high water - retentive capacity and silty clays. The climate is characterized by an average temperature of 9.7 °C and 901.8 mm/ year rainfall, due to the orographic convection of the western air masses (S. Filip, 2008). The land is mainly used for agriculture, with orchards on the main slopes, arable land in the Chechiș flood plain and small patches of forests, more extended on Mogoșa Mountain.

2.1. Main characteristics of the landslide process

This study is concerned with the movement of material along a shear surface under the influence of gravity, described by the term “slide” or the more generic “landslide” (J. Buma and T. van Asch, 1996, V. Surdeanu, 1998) and with the landforms

resulted from this process. Starting from the morphological features described by D.J. Varnes (1978), most of the landslides which were identified in the Chechiş catchment present the main characteristics of rotational slides with several scarps and the main body with an upward – curving, easy to recognise in the morphology of the slope, especially when slope revearsal occurs. A disrupted drainage pattern (M.J. Crozier, 1984) is also noticeable through specific vegetation and the presence of springs and swampy areas between the slide blocks (D.J. Varnes, 1978). Cracks from 2 to 10 cm in width were found in the crown areas of most of the landslides, as well as tension cracks on some landslide toes, indicating the dynamic activity of these areas (V. Surdeanu, 1998). In the identification of the landslides, tilted trees represented to a great extent by fruit trees indicated not only the patterns of landslide movement, but also the relative age of past activity, according to their growing pattern.

Conditioning factors are represented in this area by the Quaternary deposits consisting mainly of contractive clays with a high water-retentive capacity, making them susceptible to develop wide cracks in the dry season, which allow surface water to reach underlying impermeable deposits represented by Pannonian marly clays. Recorded landslides occur on slopes with angle values between 5 and 25 degrees and mainly on slopes facing south and west, but there are also exceptions. High water tables follow periods of rainfall and snowmelt and they represent the main triggering factors in the area. Therefore, in Baia Mare area, the periods with the highest landslide activity are autumn and spring, with more recent situations during winter, when warm air masses cause sudden snow melt. Human activities leading to explosions or sudden increase of overburden seldom represent triggering factors in the area, but excavations and construction activities may often influence the stability of the slope (fig. 12) creating an additional causal situation, together with undercutting by streams (D.J. Varnes, 1978).

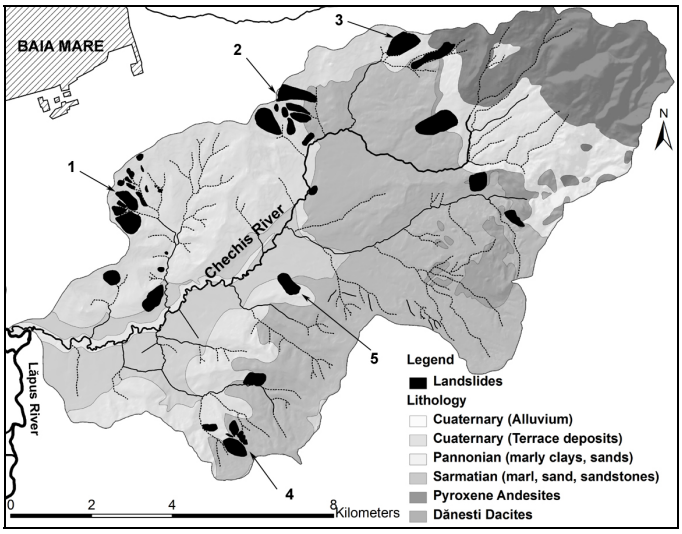

Fig. 2. Lithology of the Chechiş catchment and the main areas with landslide activity: 1-Groşi, 2-Unguraş, 3-Baia Sprie - Şişeşti, 4-Cărbunari, 5-Dumbrăviţa. Arrows show the relative position of profiles.

J. Buma and T. van Asch (1996) also describe the movement and morphology features of multiple landslides which develop two ore more sliding units with sliding surfaces intersecting a common basal sliding surface. They usually have complicated

movement forms, but small velocities due to their slow rotation and steady heave. Such features can be also recognized in the Chechiș catchment through the presence of multiple scarps in a stepped form, created by the enlargement of an original slide. Similar morphology, slow movement, but smaller depths are features which describe successive slides (J.N. Hutchinson, 1988), failures affecting a slope one above the other, with the possibility to intersect or influence each other. However, in our area of study the lack of information regarding the position of the sliding surfaces makes the identification of the exact slide typology very difficult, especially because most of them are old and degraded, their original morphology being difficult to reconstruct. In addition to this, a clear division between successive slides or slides which intersected each other through lateral enlargement is difficult to make for old and weathered slides where the only existing sign is represented by the remaining hummocky ground (J. Buma and T. van Asch, 1996).

2. 2. Landslide areas

Past records of landslides occurring in the area of study and direct field observations have indicated several areas with visible landslide features and recurrent landslide activity, either in the shape of slow movement or occasionally as sudden displacement.

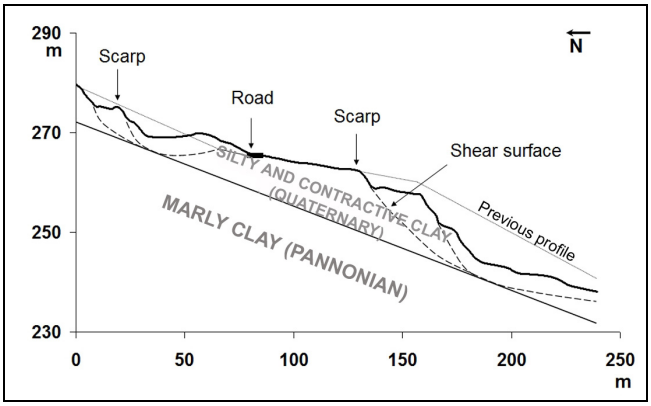

Fig. 3. Geomorphologic profile in Groși area.

Fig. 2 illustrates the general lithology of the Chechiș catchment and the main areas affected by landslide movement identified through field mapping. It must be stated that at this point the coverage of the study area in the mapping process is of approximately 60% and inter-mediate areas with similar geomorphologic and lithologic characteristics are considered as susceptible and require further investigation.

However, we consider the landslide areas presented further on as representative for the territory under investigation and their analysis can result in the identification of the main causing factors and landslide morphological features.

Fig. 4. Overturned fountain in Groşi area. Water table at 1 m from ground surface (2012).

Groşi area (fig. 2) has been previously studied (F.L. Măguţ et al., 2012) using large areas affected by landslide movements as the basis for mapping landslide susceptibility using logistic regression and the heuristic methodology from the Romanian legislation. At this point the landslide contours have been improved with further field observations and GPS mapping and profiling (fig. 3), as far as the weathering processes and the anthropic activities which transformed the landslides have allowed. Recent visible activity (fig. 4 and 5) confirms the 30-year recurrence interval (V. Surdeanu,

Fig. 5. Scarps marked in Fig.3. Left- northern scarp on the profile with fresh cracks, right – southern scarp with tilted vegetation (2012).

1998) through records of damages caused by several landslides at the beginning of the 70s, although many of them were reactivations of older ones dating from the 40-50s. Therefore, there are frequent situations of adjacent landslides or successive and multiple landslides which intersect and overlap former bodies, making it very difficult to identify distinct, individual landslide bodies. However, it is of great interest to compare the results of a new landslide susceptibility analysis using the more accurate cartographic information with the results of the previous study.

As illustrated in fig. 2, the lithology is represented mainly by Pannonian marly clay (Miocene-Pliocene) covered with Quaternary deposits of contractive clays. The latter ones are usually affected by slope failures determined by increases in water level due to rainfall and snowmelt and human construction activities.

Similar conditions exist on the entire southern slope of the former piedmont unit bordering the Chechiş catchment in the north, including ***Unguraş area*** (fig. 2). The village with the same name is crossed by the local road linking Baia Mare and Baia Sprie with the inner parts of the catchment. Rotational landslides can be found on the whole length of the slope (fig. 6, left), the road crossing them transversally (fig. 6, right and fig.7) with only few stable segments.

Fig. 6. Rotational landslide toe (left) illustrated in fig. 7, and damage to the road crossing landslide area on the southern Unguraș slope (right) (2012).

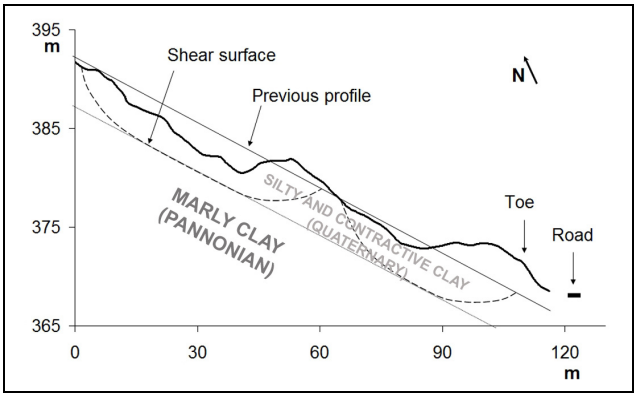

Fig. 7. Geomorphologic profile in Unguraș area.

In addition to frequent undermining of the road, the landslide activity in the area has dangerous potential of causing significant damage to buildings being built in the vicinity of the road, without any geotechnical investigations. New constructions used as holiday houses or permanent homes appeared in the last years on the upper half of the slope with the highest slope angle values (15-25 degrees), although several deep, rotational landslides discharge their load above or near the constructions.

In ***Baia Sprie - Șișești area*** the Pannonian deposits influence the occurrence of landslides on the glacis of Mogoșa volcanic mountain (1245.9 m) with western and south-western slope aspect. As in the rest of the catchment, the 70s were marked by intense landslide activity leading to geotechnical measures necessary for the stabilisation of the DJ 184 road connecting Baia Sprie with Cavnic (fig. 8).

These measures were efficient to a certain extent, preventing new major failures, but constant maintainance measures have been necessary ever since in order to keep the road functional. In addition to this, signs of more recent activity can be seen in the area represented in fig. 9 by a shallow failure in the Quaternary deposits, as no precise data indicating the shear surface has reached the marly clay deposits. However, the situation should be monitored and investigated in more detail.

Fig. 8. Active failure near house indicated by cracks and tilted young trees (left) and the DJ 184 road in Baia Sprie - Şişeşti area (2012).

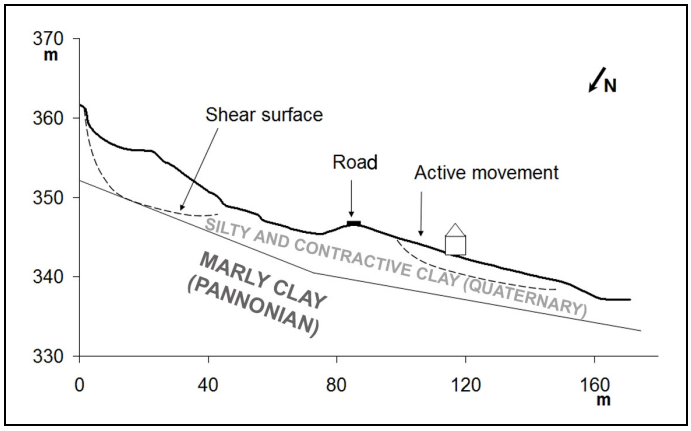

Fig. 9. Geomorphological profile in Baia Sprie - Şişeşti area. See marked house in Fig.8.

Fig. 10. The road DN 18B from Baia Mare to Tg. Lăpuş (left) and recent landslide movement indicated by tilted young trees in Cărbunari area (2012).

Constant damage to the road is what characterises ***Cărbunari area*** as well, where the DN 18B road was moved in the 50s due to a large landslide and was repeatedly affected in another sector afterwards. At present, cracks and deformations of the road indicate insufficient stabilisation measures in a landslide dynamic area, as just below the sector represented in fig. 10 the wall meant for its stability presents cracks in its turn. Situated at the lithological border between the Sarmatian and Pannonian deposits (fig. 2) the area is characterised by intense landslide activity determined by similar conditions as in the rest of the Chechiș catchment.

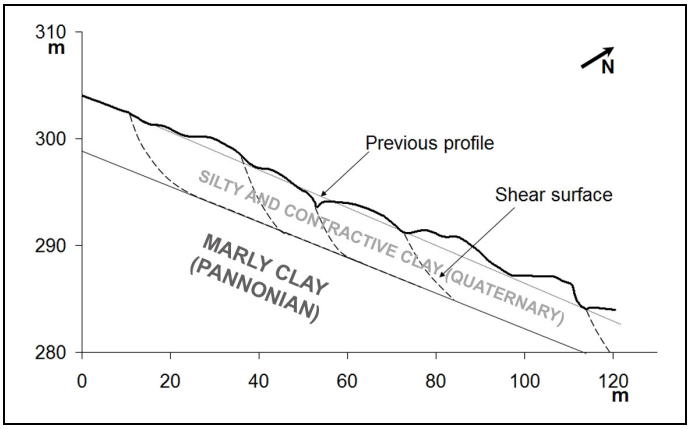

Fig. 11. Geomorphological profile in Cărbunari area.

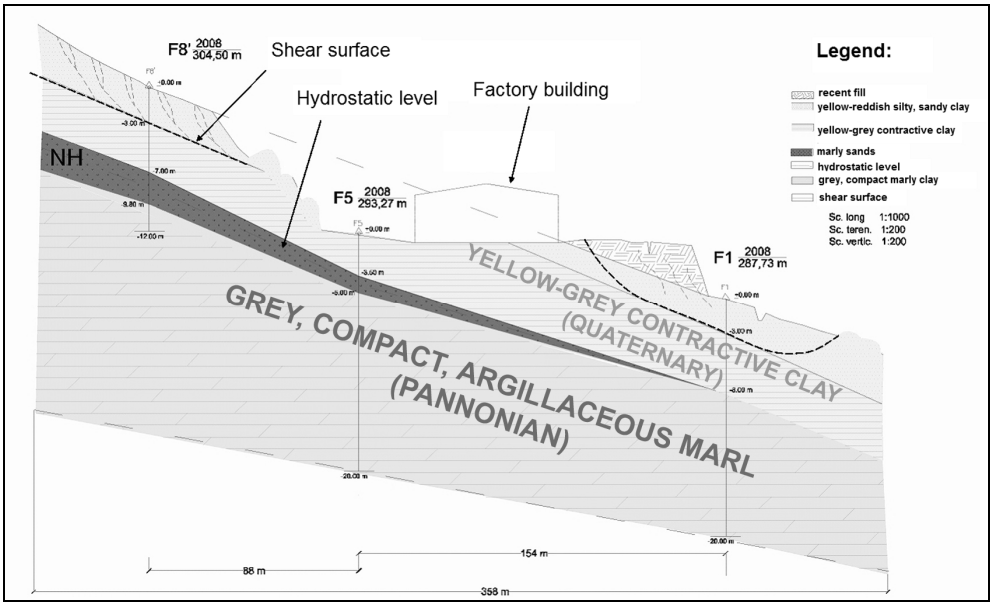

Fig. 12. Geotechnical profile at the aircraft components factory (GEOPROIECT, Baia Mare, 2008)

Dumbrăviţa area includes a special example of anthropogenically triggered landslide which was thoroughly investigated and effective mitigation measures were planned and put into practice. The landslide activated in 2008 on an apparently undisturbed slope, on the left side of Chechiş River. Its activation was triggered by the construction activities of a factory building aircraft components. The original slope profile was cut to make room for the factory building and the material was deposited lower on the slope (fig. 12). As a consequence, several failures of the anthropogenic scarp above the building (fig. 13) moved large quantities of material towards and even inside the building under construction. In addition, a landslide toe was advancing daily at approximately 250 m from the building down the slope (fig.12, 13).

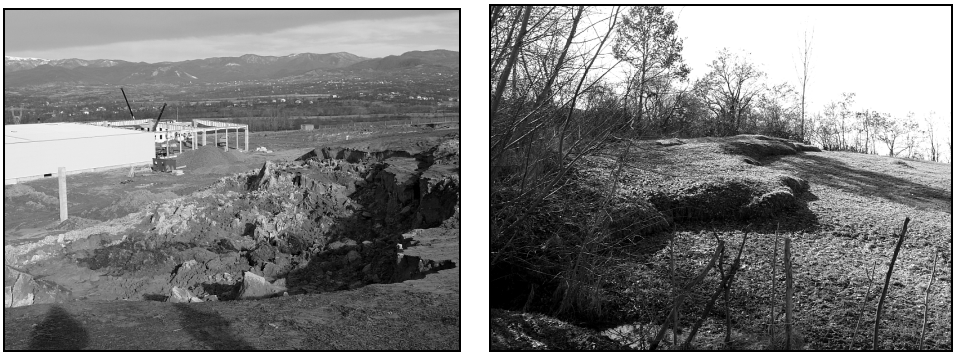

Fig. 13. Scarp of the anthropically triggered landslide at the airplane components factory (left) and the landslide toe (right) in the Dumbrăviţa area (2008).

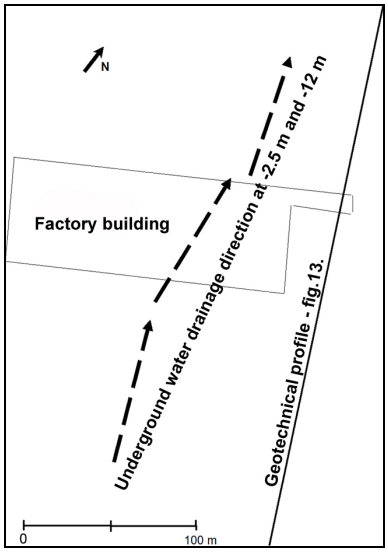

Fig. 14. Position of the geotechnical profile illustrated in fig. 13 and of the undergound drainage direction relative to the factory building.

Eventually, a shear surface was identified underneath the building foundation at the interface between the undelying argillaceous marl and the Quaternary covering deposits at a depth of 4 meters, therefore the foundation pillars were fixed in the underlying layer.

Due to the existence of a paleo drainage system at 12 m discovered through geoelectrical investigations (fig. 14), the danger of a deeper failure at -12 m was acknowledged and additional measures were taken in order to avoid its occurence. These measures included: retaining walls, columns, drainage ditches, reduction of slope angle and stabilisation with geogrids and grass (fig. 15).

3. COSTS

Only the slope stabilisation at the aircraft factory in Dumbrăvița totalised 600,000 €. This situation has had the advantage of foreign investment and further investigation and monitoring are in process at the present for a future expansion of the factory in a second building. However, this is a fortunate exception in the Chechiș catchment, while the rest of the elements exposed to landslide risk, being represented by houses and their secondary constructions, electrical poles and roads, cannot always be protected in order to avoid damage and are mainly repaired or replaced afterwards.

A broad estimation of the costs associated to these elements would include an average of 200 €/m^2 for regular houses and 220-450 €/electrical pole. The costs for road construction and repairment depend on the extend of the damage, the type and width of the road and the additional measures needed for consolidation. Around 100,000 €/km are needed for local roads and the prices rise for more important road sectors. Nevertheless, these costs are estimations for the replacement of destroyed elements without taking into consideration maintainance and stabilisation costs, which could reach even higher values.

4. CONCLUSIONS

Fig. 15. Countermeasures above the factory building, Dumbrăvița (2012).

The Chechiș catchment presents favourable conditions for the occurrence of landslides due to the covering contractile clays allowing water from snowmelt and rainfall to reach the impermeable underlying layer of Pannonian marly clays. Multiple and successive rotational landslides of different ages and intensities have affected the slopes of the catchment, the ones from the last cycle of activity dating from the 70s having the most visible effects in the slope morphology and damage to houses, poles and roads. Smaller reactivations keep the area dynamic and require constant maintenance of the elements affected.

On an apparently undisturbed slope, anthropogenic intervention through the construction of an aircraft components factory caused serious sliding in 2008 involving large costs for mitigation measures. This example highlights the need for geotechnical investigations prior to the building process and the need for a landslide risk map indicating the areas with landslide susceptibility, where these investigations should be compulsory. In addition to this, the estimation of possible costs and damage associated to future landslide occurence would allow the authorities to plan more effectively their intervention in order to prevent at lower costs, rather than be forced to mitigate more costly effects.

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CONTRIBUTIONS TO THE STUDY OF THE MINERAL WATER SPRINGS OF THE BARAOLT DEPRESSION

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ABSTRACT. - Contributions to the Study of the Mineral Water Springs of Baraolt Depression. At a large scale of integration, Baraolt Depression is part of the mofetta area of the Eastern Carpathian range. After defining the actual limits of the depression, it was possible to identify 44 mineral water springs aligned along the faults that cross the depression. Based on some local natural and human imposed factors (accessibility), 35 were selected for this study. Measurements regarding the temperature, pH and conductivity and chemical analyses for the free CO_2 and the HCO_3 were made in May and August 2011 and January 2012. The collected data helped in trying to identify the aquifer these springs originate from, to make correlations among their physical and chemical characteristics, to emphasize their seasonal fluctuations. The data offer also possibilities to group, to classify these mineral waters. But it seems that a long term seasonal monitoring proceedings of these parameters are necessary to establish rules, if there are any, according to which the activity of these post volcanic phenomena develop.

Keywords: *post volcanic activity, mineral water spring, conductivity meter, total dissolved mineral salt.*

1. INTRODUCTION

The complete ceasing of the volcanic eruptions in the Southern Harghita range, 40 – 35 thousand years ago, did not mean a complete stop of the volcanic activity. Up to now it remained as heat and CO_2 emanation, sedimentation of carbonated rocks and solfatara. Except for the latter, all these can be found in Baraolt Depression and the temperature of the springs, their CO_2 contents and the deposits around some of them speak for themselves.

The research of mineral water springs has a rich bibliography because of scientific curiosity, the spa potential and the possibility of bottling. Without the exigency of completion, references could be made to the researchers of the 20th century: J. Bányai (1934), J. Straub (1950), A. Szabó (1949, 1974), T. Bandrabur (1964, 1973, 1984), J. Harkó (1972), D. Slăvoacă (1956, 1971), A. Pricăjan (1969, 1974, 1985), Şt. Airinei (1970, 1972, 1989), A. Kristo (1978), Z. Kisgyörgy (1977, 1978), E. Péter (1977,

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1984), Z. Makfalvi (1974-1975, 1978, 1980), K. Jakab (1981), Delia Bogdan (1980), E. Szabó and Zsuzsánna S. Szabó (1981), C. Dumitrescu (1984), A. Péter and E. Feru (1998), Cornelia Maieru (1998). In addition, the activities of the Cholnoky Geographic Society of the Faculty of Geography of the Babeş-Bolyai University of Cluj-Napoca can be mentioned. The results of its activity materialized in many scientific articles published between 2007 and 2011 and in a mineral water spring database (www.borviz.org), containing the springs in South Harghita range and Baraolt Depression.

1.1. The limits of the studied area

Baraolt Depression can be identified as a mountain depression being part of the internal curvature sector of the Eastern Carpathians (fig. 1). It borders with Harghita Mountains to the North and North-East, with Baraolt Mountains to the East, South-East and South and with Perşani Mountains to the West. In the South, there is a wide opening towards Braşov Depression on the valley of the Olt River.

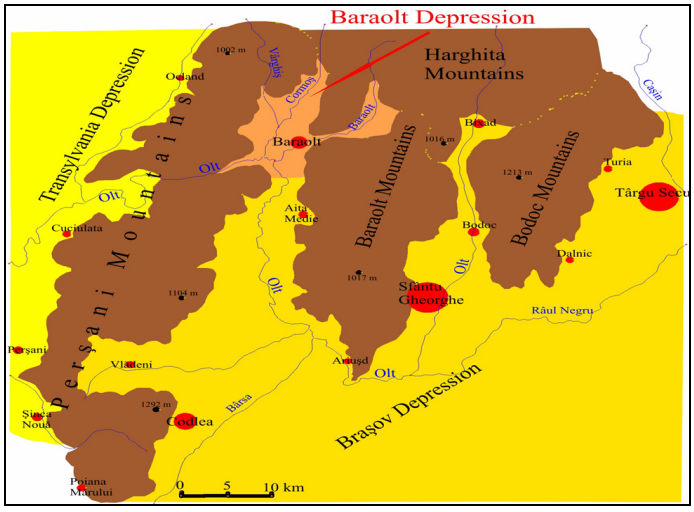

Fig. 1. Geographical position of the Baraolt Depression

In the case of this study, the most relevant limit is the northern one, the border with the Harghita Mountain range, to reveal which mineral water springs may and which may not be included in the area of the depression. Although there were a few springs which are North of these limits, as they were very close, they were also included.

As all the springs occur along the main faults of the region and the main valleys are situated on these, it is necessary to point the northern limits of the depression on these valleys. It crosses the valley of the Volal brook where its floodplain is not narrower than 100 m wide. On the valley of the Cormoş rivulet this border is at the Northern end of Filia village and on the valley of the Baraolt rivulet at its confluence with the Herculian and Pietros creeks.

1.2. Geological elements of the area

The geological structure of the Baraolt Depression is the conjugated result of the chain of geological events that followed each other in this region beginning with the formation of Ceahlău nappe, the drifting of the metamorphic layers of the Eastern Carpathians over the flysch, up to present.

At the end of Pontian period – 5.9 – 5.1 million years before – the activity of the Miercurea Ciuc – Jigodin, Sâncrăeni, Racu, Tirco volcanoes reactivated the North - South Cormoş fault system (G8), its eastern response (g27), the West – East crust fault (G7) and some secondary and local ones, which launched the sinking process of some parts of the Cretaceous peneplain including the actual area of the Baraolt Depression.

The tectonic movements along the crust, regional and local faults and the volcanic eruptions directed each other as direction and intensity, which led to the sedimentation, over the Cretaceous structures, all along the Pliocene and upper Pleistocene, of a molasse stack with a maximum thickness of 450 – 550 m. The paroxysm of the activity of the volcanoes in South Harghita range made possible the formation of three layers of volcanic sediments inserted in the molasse.

In upper Pleistocene the drifting movements along G7 fault strangled the magma basins at the south end of the Harghita range, which completely extinguished the volcanoes 40,000 – 35,000 years before our date.

From the point of view of this study, the most important are the magma basins which provide heat, carbon dioxide, the carbonated rocks of the foundation, those elements of the molasse stack which offer conditions for water storage and provide soluble minerals, and the faults through which the CO_2 and the water can move.

1.3. Short definition of the mineral water

There are two currents regarding this definition: the first one is very strict and refers to the quantity of total dissolved minerals (that must be over 1000 mg/l) and the quantity of free CO_2 (which must be over 250 mg/l), and the other one takes into account the balneal and curative qualities of these waters. The European Union harmonized these two perceptions through 80/777/CEE directive, for satisfying the wishes of the bottling firms. The directive defines four categories of mineral waters according to their total dissolved salt (TDS): very weakly mineralized – with a TDS under 50 mg/l, weakly mineralized – with a TDS between 50 and 500 mg/l, middle mineralized – with a TDS between 500 and 1500 mg/l and rich in dissolved mineral salt – with TDS over 1500.

1.4. The aims of the research

The first aim was to identify those springs which are inside the limits of the Baraolt Depression and to determine some of their physical and chemical characteristics.

According to previous research, it is relevant that these mineral waters originate from the following geological structures: the Cretaceous flysch and all the three volcano-sediment layers. Their occurrence on the surface is done along regional and local faults. So a second aim was to confirm that they indeed originate from the mentioned geological structures, based on some physical and chemical characteristics.

Another aim was to establish correlations between the temperature of the spring and its pH, to emphasize seasonal fluctuations of the measured and analyzed parameters, then, to define some common features to be a basis for classifications and to bring some personal contributions to the research of the mineral waters.

2. METHODS AND INSTRUMENTS

To reveal some of the physical and chemical characteristics of the 44 mineral water springs, identified in Baraolt Depression (fig. 2) and to fulfil the aims of the research, measurements were made regarding the temperature (in Celsius degrees), pH, electric conductivity and chemical analyzes to measure their HCO_3 and free CO_2 content. These activities were performed in May, August 2011 and January 2012.

For temperature and pH determination, we used a digital pH meter with sensor for temperature "pH 3110", having a "SenTix 81" electrode. Its measurement interval is between 0 and 14 and before starting for field measurements it was calibrated for pH values between 4 and 7.

For electric conductivity determinations we used a digital conductivity meter "Cond 3110", having a "TetraCon 325" electrode and a measurement interval between 1µS/cm la 2S/cm.

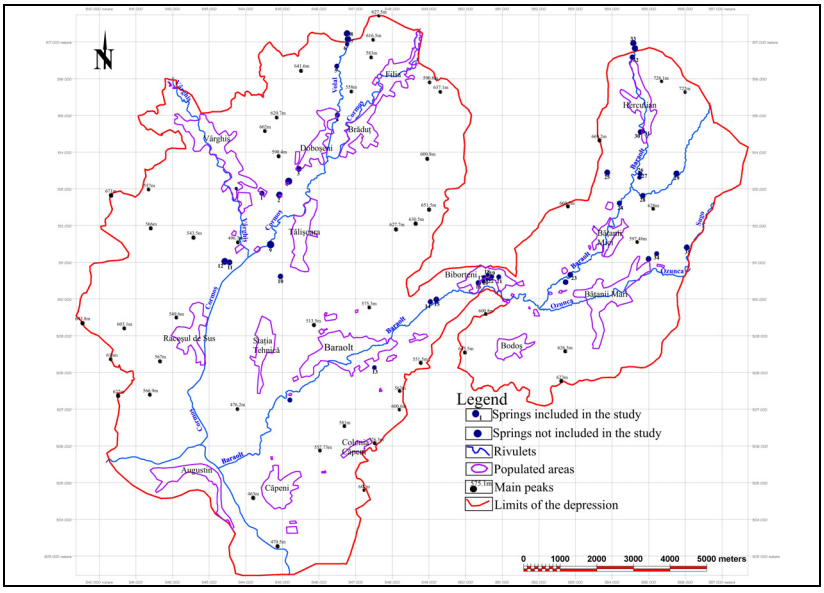

Fig. 2. The position of the mineral water springs in Baraolt Depression

There is a relation between the electric conductivity of the water and the quantity of the total dissolved minerals found in it, according to the formula TDS = k_e x EC, where EC is the electric conductivity and k_e is a coefficient. For the mineral waters a value of 0.65 is generally accepted.

For the determination of free CO_2 and HCO_3 in the chemical analyzes the following principle was used: using a solution of sodium hydroxide, the free carbon dioxide from the water transforms into bicarbonate, the excess of hydroxide is titrated with HCl in the presence of methyl-orange. The chemical reaction is:

$$H_2CO_3 + NaOH \rightarrow NaHCO_3 + H_2O$$

In the case of the free CO_2 determination the calculation is: 4.4 x V x f x 1000, divided to 100, which gives 44 x V x f, where V is ml of HCl with a concentration of 0.1 N used in the titration; f is the factor of the HCl solution of 0.1 N, and 44 is the equivalent in CO_2 corresponding to 1 ml of HCl of 0.1 N. At the determination of the HCO_3 the calculation is the same, just 44 is replaces by 61 – the equivalent in HCO_3 corresponding to 1 ml of HCl of 0.1 N.

Out of the 44 springs, 9 springs were eliminated. In their case, invalid results were expected because of the infiltrations of underground waters or because of the inflow waters from the slopes, or the water of the spring has been stagnating in the drilling for a long time now, or the access for measurements was denied by the land owner.

So 35 springs were left to measure and analyze, which were numbered beginning from Vârghiș towards North to the limits of the depression, then coming back to Tălișoara and Racoșul de Sus, from where they continue towards East and North again, upstream on Baraolt rivulet. The last ones are along Ozunca brook and Sugo brook (tables 1a and 1b).

According to the way these mineral waters reach the surface, they can be divided in natural springs and men influenced ones. Natural springs are considered those whose waters were not surrounded by wooden or concrete tubs. The men influenced ones are those whose waters are brought to the surface by geological, hydrogeological or exploitation drillings. 11 springs may be included in the first category and 24 springs in the second one. Such a division is necessary because the springs coming out through drillings may originate from different aquifers. Considering these facts, after the measurements and analyses, the collected data were separately evaluated. The natural ones are the springs numbered with: 2, 3, 5, 26, 28, 30, 31, 32, 33, 34 and 35 (tables 1a and 1b).

The temperature and pH of all the 35 springs

Table 1a.

Spring number	The name of the springs	To in Co			pH		
	Date of measurment	May 2011	August 2011	January 2012	May 2011	August 2011	January 2012
1	Vârghiș	17.1	17.1	17.1		6	6.21
2	Doboșeni, Baia Bethlen	11.5	12.1	10.8	6.03	5.9	6.11
3	Doboșeni, Satului	11.7	11.8	10.4	5.96	5.7	6.07
4	Doboșeni, CAP, F1315	14.4	14.3	14.1	6.01	5.83	6.18
5	Doboșeni, Tanya	10.5	11.1	10.2	5.84	5.53	5.94
6	Doboșeni, Valal1 FH1	16.7	16.6	16.2	5.91	5.74	6.07
7	Doboșeni, Valal2 FH2	17	17	16.8	5.98	5.68	5.97

8	Doboşeni, Cab. Valal	16.1	16.1	16.2	5.89	5.69	5.86
9	Tălişoara, Izv. Nebun	21.2	21.3	21.4		6	6.4
10	Tălişoara, Baia	18.9	18.3	19.3		6.11	6.37
11	Racoşul de Sus (farther)	11.6	13.2	11.5		6.04	6.18
12	Racoşul de Sus (closer)	13.7	13.6	13.4		5.65	6.41
13	Baraolt, Herd's road	15.1		14.8		6.41	6.52
14	Biborţeni DJ122(farther)	14.7	15.4	14.9		6.01	6.28
15	Biborţeni DJ122(closer)	16.2	17.1	16.7		6.39	6.61
16	Biborţeni F2SNAM	14.4			6.52		
17	Biborţeni F7ISPIF	16.9	16.9	16.8	6.22	6.12	6.18
18	Biborţeni F8	14.7	14.8	14.7	6.3	6.18	6.28
19	Biborţeni F9	12.9	12.9	13.0	6.18	6.21	6.15
20	Biborţeni F9bis						
21	Biborţeni 1Mai 1951	13.1	13.9	12.4		6.19	6.22
22	Biborţeni, Baia 1	14.6	14.6	14.2	6.32	5.89	5.96
23	Băţanii Mici, Sonda	11.6	12.2	11.5		5.9	6.22
24	Băţanii Mici, Dealul Lorincz	10.7	11.5	10.4		5.7	5.98
25	Băţanii Mici, Dealul Romanilor	12.5	12.8	12		5.03	6.34
26	Băţanii Mici, Rezes1	11	11.6	11.1	6.14	5.85	5.93
27	Băţanii Mici, Rezes2	11.1			6.02		
28	V. Bradul Mare Korises	7.3	13.1	6.2		5.96	6
29	V. Bradul Mare F2SNAM	8.1	10.6	9.8	5.96	5.29	5.9
30	Herculian, Alszegi	10.2	13.2	10.8		5.68	5.57
31	Herculian, Dimeny Agnes	10.3	14.6	9		5.75	5.63
32	Herculian, Agostonhidi	11.7	12.2	10.8		5.25	5.63
33	Herculian, Szenaskerti	13	13.4	12.6		5.38	5.5
34	Băţanii Mari	13.2	14.4	6.2		5.54	5.8
35	Băţanii Mari, Sugo	10.8	15	7.7		5.86	5.83

The TDS, CO_2 and HCO_3 of all the 35 springs

Table 1b.

Sp nb.	The name of the springs	TDS mg/l			CO_2 mg/l			HCO_3 mg/l		
	Date of measurment	May 2011	Aug. 2011	Jan. 2012	May 2011	Aug. 2011	Jan. 2012	May 2011	Aug. 2011	Jan. 2012
1	Vârghiş	1170	1165	1100	1100	1980	1232	1769	1830	1464
2	Doboşeni, Baia Bethlen	865	863	822	1496	1672	1188	1403	1281	1342
3	Doboşeni, Satului	678	687	678	1672	1716	1012	1098	1098	1037
4	Doboşeni, CAP, F1315	820	800	792	1804	1848	1012	1342	1220	1220

5	Doboşeni, Tanya	630	641	629	1848	1848	1144	915	976	976
6	Doboşeni, Valal1 FH1	800	802	731	1496	1672	1232	1220	1220	1220
7	Doboşeni, Valal2 FH2	680	684	669	1496	1892	880	1159	976	1037
8	Doboşeni, Cab. Valal	604	571	559	1452	1848	1056	1037	915	793
9	Tălişoara, Izv. Nebun	1680	1680	1615	1320	1584	484	2745	2562	2562
10	Tălişoara, Baia	1500	1470	1575	1562	1540	616	2318	2318	2196
11	Racoşul de Sus (farther)	1130	1395	1365	1012	2112	1320	1586	2196	2074
12	Racoşul de Sus (closer)	1390	1135	1145	1804	1276	616	2135	1525	1586
13	Baraolt, Herd's road	960	935	873	0	12	88	1037	976	1037
14	Biborţeni DJ122(farther)	800	796	800	528	968	572	2112	1190	1220
15	Biborţeni DJ122(closer)	1790	1765	1750	836	1188	220	1159	2074	2013
16	Biborţeni F2SNAM	860			528			1342		
17	Biborţeni F7ISPIF	1140	1140	1140	1804	1804	1848	1708	1647	1708
18	Biborţeni F8	1000	1000	1010	1672	1716	1716	1342	1403	1403
19	Biborţeni F9	1170	1170	1170	1848	1848	1892	1647	1708	1769
20	Biborţeni F9bis									
21	Biborţeni 1Mai 1951	1075	1080	1000	1320	1716	1232	1342	1769	1342
22	Biborţeni, Baia 1	1325	1340	1310	1672	1452	1364	2074	2013	2074
23	Băţanii Mici, Sonda	947	930	928	1056	1672	528	1403	1464	1464
24	Băţanii Mici, Dealul Lorincz	751	720	713	1760	1848	836	1098	1098	1037
25	Băţanii Mici, Dealul Romanilor	321	281	274	660	427	88	488	427	427
26	Băţanii Mici, Rezes1	730	724	692	1892	1892	880	1098	1037	1098
27	Băţanii Mici, Rezes2									
28	V. Bradul Mare Korises	687	735	715	1716	1584	792	976	1098	976
29	V. Bradul Mare F2SNAM	312	284	278	797	704	440	427	305	244
30	Herculian, Alszegi	443	441	428	2332	2024	1056	671	732	671
31	Herculian, Dimeny Agnes	475	478	465	1992	1408	484	732	854	732
32	Herculian, Agostonhidi	316	325	312	1956	1496	792	549	427	488
33	Herculian, Szenaskerti	213	220	216	1670	1540	748	366	366	305
34	Băţanii Mari	430	438	426	1408	1364	792	549	610	488
35	Băţanii Mari, Sugo	650	689	656	1408	1584	792	854	915	854

At the identification of these springs on the field and on the map it is obvious that they follow certain lines and if they are put on the map of the depression faults, these lines are exactly the faults, so they spring out along them. The 2, 3, and 5 springs are in the western basin and flow out along the Cormoş fault system (G8), and the 26, 28, 30, 31, 32, 33 are in the eastern basin along the eastern response of G8, namely g27. The 34 and 35 springs flow out along the crust fault G7.

Based on these criteria of being part of three groups, we searched for the common physical and chemical properties which characterises each group.

3. RESULTS AND DISSCUSION

The 2, 3, and 5 springs temperature varies just 1°C annually (table 1a). In August the measured temperature was between 11.1 and 12.1°C and in January between 10.2 and 10.8°C.

The values of the pH (table 1a) between 5.53 – 5.9 in summer and 5.94 – 6.1 in winter indicate a moderate acidity with a weak shifting towards alkalinity.

The total quantity of the dissolved mineral salt (TDS) indicates that the waters of these springs (table 1b) belong to the category of medium mineralized ones, the highest value registered was at the spring 2 (Baia Bethen) with 863mg/l, and the lowest one at number 5 (Tanya borvíz) with 629mg/l. A seasonal variation can be noticed: in the warm season the values are higher than in the cold one by 9 to 41mg/l.

If based on the values of the TDS they are medium mineralized, the values of the free CO_2 are a lot over the limit of 250 mg/l (table 1b). For this parameter, a value of 1848 mg/l was determined and there are quite high seasonal fluctuations which reached 704 mg/l.

The analyses made for HCO_3 (table 1b) showed values over 900 mg/l (up to 1403). The most northern spring showed values under 1000 mg/l. It was not possible to reveal seasonal fluctuations as in the case of the other measured or analysed parameters. At some springs the HCO_3 goes down in summer, at others it increases, probable there is no correlation in this case.

In the eastern basin the natural springs are in greater number and at first overview they present noticeable differences from those in the western basin, previously evaluated.

Their temperature (table 1a) varies more between summer and winter, a variation that is not homogenous. There are springs with variations of 6.9°C, but springs with a variation of just 0.5°C.

The acidity of these springs is higher than those of the eastern basin (table 1a), with values of the pH between 5.25 and 5.96 in summer, and between 5.5 and 6.00 in winter. One notices a tendency to alkalinity in winter when the temperature drops.

The quantity of the total dissolved mineral salt (TDS) decreases from South to North (table 1b), from 735mg/l (Körises spring – 28) to 219.5mg/l (Szénáskerti 1 spring – 33). From the southern end of Herculian village there is a passing from medium mineralized waters (TDS between 500 and 1000mg/l) to weakly mineralised ones (TDS under 500mg/l). This fact may indicate a passing from one aquifer to another. A decrease of the values of this parameter can be noticed in the cold season.

In fact the quantity of free carbon dioxide is the one that maintains these waters in the category of mineral waters, as its values reach 2332 mg/l (table 1b). The average of the analyses made during the third field activities is 1458.5 mg/l. This low average is due to the low values determined in the cold season (January 2012). Along the data sets, one notices a serious decrease of the values of this parameter, a two times decrease or even a three times decrease in the case of Dimény Ágnes spring (31). This fact is not true for the other springs of the depression.

The values of the HCO_3 for these six springs from the eastern basin give an average of 732 mg/l (Table1b). Rezes 1 (26) and Körises (28), can be separated, having values around 1000 mg/l. In the case of the others that follow towards North, this parameter decreases to 366 mg/l. Among these springs, Dimény Ágnes (31) can be revealed which is at just 45m East-North-East from Alszegi (30) and there is a difference of over 100 mg/l HCO_3 between them. The seasonal variability of this parameter is like the one at springs in the western basin: the values are increasing during summer and decreasing during winter.

The third group of the natural springs includes those which follow the crust fault G7, and they are numbered with 34 and 35, respectively from Băţanii Mari and the valley of Sugo brook.

The temperature of these two springs presents a wider variation than the other ones, discussed up to this point. In summer it reaches 14 - 15°C and in winter goes down to 6.2 – 7.7°C (table 1a). This fact can suggest that they originate from an aquifer close to the surface or that they stagnate close to the surface time enough to be influenced by the variation of the temperature of the upper geological layers.

The values of the pH (table 1a) are between 5.54 and 5.83, Sugo spring having the lowest variation, just 0.01 at 4.2°C temperature variation.

The total quantity of dissolved mineral salt (TDS) keep these springs in the category of medium-weak mineralized with values around 500 mg/l (table 1b), but the free CO_2 is over 1400mg/l during summer.

The last parameter to be analyzed was that of the HCO_3, which indicates a pretty large difference (around 300 mg/l) between the two springs (table 1b). This fact can suggest that they may originate from different aquifers. Regarding the variations of the data, the same decrease during winter time can be noticed.

In the aggregate, not just the position of the 11 springs suggests their belonging to the three main faults, but also the differences in their measured and analysed physical and chemical properties, which sometimes are significant. Based on these properties, it is possible to reveal approximately the aquifer they belong to or they originate from. So the waters of the natural springs of the western basin have almost constant temperature, are less acid (average pH 5.87) and medium mineralized (TDS does not reach 1000 mg/l). These values suggest that they belong to a deep aquifer, probably in the first volcano-sediment layer, very close to the Cretaceous structure, fact sustained by the highest quantity of HCO_3 (1403 mg/l at Baia Bethlen spring – 12) of all natural springs of the depression. The high quantity of free CO_2 proves once again that they spring out by a major fault, through which this gas, a result of post volcanic activity, may travel.

As it was shown before, the other 24 mineral water springs flow out through geological, hydro geological drillings and special drillings for economic purposes. These latest ones provide mineral waters for bottling. So, all these waters are brought to surface by the willing action of the man and they can be named artificial springs. In table 1a and 1b they were numbered: 1, 4, all from 6 to 25, then 27 and 29.

It is noticeable that these waters spring out through those drillings that were made following the same faults in the depression. So they can provide more data regarding the physical and chemical characteristics of the mineral waters from Baraolt Depression. However, one notices the possibility that waters from different aquifers may spring out through a drilling.

Following the same method of assessment, by grouping these springs according to the faults along which the drillings were made, the group made by the flow outs numbered 4, 6, 7, 8, 9 and 10 can be separated, as they are situated in the western basin, along the G8 fault. After the measurements and the analyses were made, the first finding was that the temperature of each spring is over 11°C, reaching 21.4°C at spring number 9 (table1a). The variation of this parameter between summer and winter is very weak, just from 0.1 to 1.7°C. At the springs numbered with 8, 9, and 10 the temperature increased during winter by 0.1-1°C.

The acidity of these six artificial springs shows an average of 6.02, while the same average value for the natural ones is 5.875. At the first ones we measured values of 6.37 – spring no. 10 (Table 1a), even 6.41 – spring no. 12 (table 1a). Two different facts can be noticed: 1) as in the case of the natural springs the pH of these flow outs shows a shifting towards alkalinity as it is closer to the North limit of the depression; 2) it is not possible to determine a rate between the decline of the water temperature of the springs and the shifting towards alkalinity. For example in the case of the natural spring no. 5 there is a difference of temperature by 0.9°C between summer and winter and a changing of pH from 5.53 to 5.94 (table 1a). But at the artificial spring no.9 (table 1a) there is an increase of temperature from summer to winter by 0.1°C and a shifting in pH from 6 to 6.4.

Regarding the total dissolved mineral salt (TDS), there is a difference between the waters from the drillings from the valley of Volal brook and those situated South of Doboşeni village (table 1b). The measured values at the previous ones do not pass over 820 mg/l, meanwhile at the latest ones this parameter is over 1500 mg/l. It is noticeable the decrease of TDS towards North and its increase at the two which are to South of Doboseni over 1500 mg/l – springs 9 and 10.

The results of the analyses for free carbon dioxide show that the values are as high as in the case of natural springs, generally over 1500 mg/l (Table 1b.). But the decrease in winter time is larger, reaching even 1000 mg/l.

The quantity of HCO_3 is invariable at some flow outs and at others has small fluctuations till 96 mg/l (Table 1b). It is also possible to separate the artificial springs from the North of the western basin: they have lower values and larger fluctuations, up to 132mg/l.

From the amount of the gathered data about this group of springs, it comes out that there is a difference between those which are situated to North of Doboşeni and South of this village. The previous ones are more acid, contain less dissolved mineral salt, less HCO_3, and have a larger variability of the free CO_2 than the latter ones. Those from the South of this village come from or close to the Cretaceous structures, meanwhile the others from the lowest or medium volcano-sediment layer.

Another group of drillings is situated along the G7 fault at Biborţeni village, but they are apart from the others because of the following reasons:

1) the drillings were made with the purpose of bottling the out coming mineral waters;

2) the drillings are no deeper than 50 to 75m;

3) the physical and chemical properties of these waters are greatly influenced by the post volcanic activities of the Tirco volcano and the closeness of the Cretaceous structures (in this area the Cretaceous structures are not even 100 m deep, on the other hand they are on the surface by the horst structure represented here by Cetăţii Peak – 614,1 m, which is not even 200 m away from the drillings).

4) the strangling at Biborţeni is crossed by G7 fault, which offers conditions for the circulation of the post volcanic manifestations of the Tirco and for waters.

Regarding the fact that the waters from these drillings are used for bottling, they are always pumped. The temperature of some of them is invariable, while that of the others fluctuates around the value of 0.5°C (table 1a). From the point of view of the pH, the measurements showed values over 6, reaching 6.52. The values of the TDS show that they are also medium mineralized, most of them have values over 1000 mg/l, but do not pass over 1400 mg/l (table 1b). Based on the previous argumentation, the analyses for the determination of the free CO_2 and HCO_3 confirmed the expected high values. Values between 1320 and 1848 mg/l were determined for the free CO_2 (with an anomaly at spring no. 16 with a value under 1000 mg/l), and between 1342 and 1769 for HCO_3 (table 1b.).

In the eastern basin, along the fault g27 four drillings were made, of which two are very recent – 2009 and 2010 – for mineral waters without, or with low CO_2. They were tested in the period when measurements and analyses were made. The other two are located in the floodplain of the Baraolt rivulet and are numbered with 23 and 24 and the results of the measurements and analyses can be used in comparison (table 1a and 1b).

The seasonal variation of the temperature of these springs is between 0.7 and 1.1°C, the pH is around the value of 6, oscillating between 5.7 and 6.22 (table 1a), the TDS is under 1000 mg/l with a light tendency of dropping in the period when we made the measurements. At the analyses for the free CO_2 the values show an increase in summer even to 1848mg/l and a deep decline in wintertime to 528 mg/l. The values of HCO_3 are also high: 1196 mg/l, 1464 mg/l and their variation is weak: around 60mg/l (table 1b).

A separate category of mineral waters is represented by that group of out flows which appeared after the cessation of the mining activity, through those drillings which went deep, intercepting the Cretaceous structures. These springs were numbered 1, 11, 12, 13 and 14. Among them, spring no.1 was remarked, which flowed out immediately after mining activity stopped, very close to the access well to the underground pit in Vârghiş. The extraction of layers I and III of the lignite helped the waters of an aquifer from the Cretaceous structures to get to the surface. It was enriched with CO_2 through an old fault having NW-SE direction. The temperature of this spring is constant: 17.1°C, pH varies between 6 and 6.21(table 1a), it is medium mineralized: TDS between 1100 and 1170 mg/l, rich in free CO_2 (1100 – 1970mg/l) and in HCO_3 (1461 – 1830 mg/l) (table 1b). The other flow outs of this kind started to spring 2 or 3 years after the activity in the underground pits ceased. In their cases, the possibility of the mixture among different aquifers is a certainty due to the fact that their flow out started after the galleries were flooded and the hydrostatic level came back to normal. Contrary to these facts, measurements and analyses were made to see if they can be included in any of the mineral water groups previously nominated.

Based on the collected data, the two springs located near Racoşul de Sus by the road DC 38 (which connects this village to DJ 131), numbered 11 and 12, are like the springs 9 and 10 (near Tălişoara village) regarding pH (around 6), TDS (close to 1400 mg/l), free CO_2 (with large variations) and high quantity of HCO_3 (between 1500 and 2100 mg/l), but they differ in temperature, which is not over 13.7°C and has seasonal variations about 1.7°C (table 1a and 1b).

The flow out from Baraolt, by the herd road (number 13), is a mineral water having 15°C, pH of 6.52, medium mineralized (TDS between 873 and 960 mg/l), without free CO_2, but with a pretty high quantity of HCO_3 which reaches 1037 mg/l. So it is a mineral water without CO_2, which was helped by a drilling to reach the surface (table 1a and 1b).

The latest drillings, through which the waters came out after the ceasing of the mining activity, are by the road DJ 122 between Baraolt and Biborţeni, numbered 14 and 15. They should be like the flow outs through the drillings of Biborţeni. Their temperature is around 16°C, with oscillations up to 1°C and they have the highest pH among the springs in the depression: 6.61 (table 1a). The TDS is around 700 mg/l at number 14, but at the other one it reaches 1760 mg/l. The quantity of free CO_2 presents large oscillations from 220 to 1188 mg/l and the quantity of HCO_3 is also high, up to 2112 mg/l, but also with large oscillations which may reach 915 – 922 mg/l (table 1b). Based on these data it is almost sure that the waters that reach the surface through these drillings are mixed ones from different aquifers, but are under the influence of those four factors like those in Biborţeni.

4. CONCLUSIONS

The supposition about the origin of the mineral waters from the Baraolt Depression is confirmed by their physical and chemical characteristics. Some of them, mainly those which come to the surface through drillings, come from the Cretaceous structures and others from the volcano-sediment layers.

The mineral waters which come from the Cretaceous structures have temperatures over 15 - 16°C, pH around 6 – 6.2, are rich in minerals, the TDS is over 1000 mg/l, the free carbon dioxide is high, the values are over 1300 – 1500 mg/l, and the quantity of HCO_3 is also high and oscillates around 1800 – 2500 mg/l. All these flow outs are artificial, coming to the surface through drillings, as are the cases at Tălişoara – number 9 and 10 – those at Racoşul de Sus – number 11 and 12 – and that of Vârghiş – number 1. The last three ones sprang after the mining activity stopped.

Those mineral waters that come from the lower volcano-sediment layer have temperatures around 10 – 12°C, with seasonal oscillations around one degree Celsius, the pH is a bit more acid than in the previous ones, with values around 5.53 – 6.1. They are medium mineralized – TDS between 500 and 1000 mg/l and are rich in free CO_2: around 1100 – 1800 mg/l. The quantity of HCO_3 decreases from South (around 1220 mg/l) to North (around 790 mg/l) as the thickness of this layer grows. These are the springs from the western basin along the Cormoş rivulet and Volal brook and in the eastern basin along Baraolt rivulet close to Herculian and along Bradul Mare brook.

A separate group of mineral waters, that detaches itself from the others, is the group in the surroundings of Herculian. Taking into account these data: temperature around 10 - 14°C, with wider oscillations (up to 7°C); more acid pH, going down to 5.25; weak mineralization, as the TDS is under 500 mg/l; low content of carbonate – HCO_3 between 700 and 366 mg/l; very rich in free CO_2 – between 1500 and 2200 mg/l; it can be said that they spring from aquifers situated in the upper volcano-sediment

layer, which in this area is 30-40 m thick (A. László, 1999). The closeness of this area to the Cucu volcano makes the CO_2 emanations to be very rich and the presumption that some of these mineral waters could be outflows of the strongly bicarbonated ground water cannot be excluded.

Another separate group of springs can be made from those which are in the area of Biborţeni. Their characteristics are due to the facts listed above and they were so appreciated that are the only ones used for bottling.

The other springs along the G7 fault have the pH, TDS, and HCO_3 totally different, arguments according to which it is possible to say that they come from two separate aquifers. That from Baţanii Mari (34) comes from the upper volcano-sediment layer while the other one (Sugo, 35) from the Cretaceous structures.

During the assessment of the presented physical and chemical properties of the springs, the correlations among these properties were followed. As the temperature and pH were measured, a certain correlation between them was noticeable. But at a closer analysis of the data, this observation proved to be incorrect as the decrease rate of the temperature in winter does not involve a similar rate of pH increase (shifting towards alkaline). Additional arguments to support this are the cases of those springs whose temperature is constant or increases during winter while their pH increases anyway. We tried to establish connections between the decrease of free CO_2 during winter and the decrease of TDS, HCO_3 and the increase of the value of the pH, but the data are confusing. There are cases when the free CO_2 is constant, the TDS insignificantly modifies, the HCO_3 is also constant and the value of pH increases with almost half a unit.

In this train of ideas we can say that a longer data set is needed, at least for seasonal data, to establish correlations among these physical and chemical properties of these springs and probable rhythmicity in the activity of this post volcanic manifestation.

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THE POTENTIAL OF SURFACE RUNOFF MANIFESTATION OBTAINED ON THE BASIS OF THE DIGITAL ELEVATION MODEL. CASE STUDY: THE SUBCARPATHIAN SECTOR OF BUZĂU CATCHMENT AREA

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ABSTRACT. The Potential of Surface Runoff Manifestation Obtained on the Basis of the Digital Elevation Model. Case study: the Subcarpathian Sector of Buzău Catchment Area. The analyzed sector of Buzău catchment area is situated in the Curvature Subcarpathians, recognized as one of the areas in Romania with the highest values of potential surface runoff. The digital elevation model is one of the most important environmental variables used in the analysis of surface runoff. Thus, the present study tries to quantify the manifestation potential of surface runoff exclusively on the basis of the digital elevation model, determining seven morphometric and hydrographic indicators derived from it. Under these circumstances, the present work represents a preliminary analysis of the potential of surface runoff of the analyzed area. The final susceptibility of surface runoff depends on other important factors such as lithology, soil texture and land cover. According to the spatialisation of the Surface Runoff Index, obtained by superimposing the seven factors derived from the digital elevation model, areas within the basin with high susceptibility of surface runoff were delineated. They represent the genetic premises of risk hydrological phenomena such as flash-floods.

***Keywords*:** digital elevation model, surface runoff, Buzău catchment area.

1 INTRODUCTION

Knowing the pattern of surface runoff is essential because it represents the genetic premises of risk hydrological phenomena such as flash-floods, events ranked in the category of natural hazards with the highest degree of danger. Globally, it is estimated that flash-floods, the final product of surface runoff, represent one of the most important natural hazards with extremely adverse consequences on the socio-economic elements (Lumbrosso & Gaume, 2012).

In the global context, the extreme events of surface runoff are caused mainly by the global climate change context with negative implications on rainfall conditions (IPCC, 2007), and on changes in the land use (Marchi *et al.*, 2010). Regional and local surface runoff depends on both climate peculiarities, but especially on the characteristics of the geographical area (geological, morphometric and hydrographic peculiarities of the landforms, land cover, etc).

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Although there are several scientific methodologies for estimating the pattern of surface runoff and thus the assessment of flash-flood risk, their rigorous forecasting is one of the most difficult tasks in operational hydrology (Javelle *et al.*, 2010). This is due to the large number of environmental variables needed to be taken into account both in terms of static and dynamic point of view. Most methodologies are based on the analysis of two fundamental components responsible for the surface runoff: precipitation and geographical bedrock with its peculiarities mentioned above.

One of the fundamental components of geographical bedrock with a major role in shaping the surface runoff on slopes is the digital elevation model (Matei, 2012). This paper aims to analyze in terms of static the potential of surface runoff in the analyzed Subcarpathian area, taking into account the most important geographical factors, derived solely from the digital elevation model.

2 GEOGRAPHICAL FEATURES IN TERMS OF DIGITAL ELEVATION MODEL AND THE IMPACT ON THE REGIME OF SURFACE RUNOFF

The Subcarpathian sector of Buzău catchment area is located in the central South-Eastern Romania, and is spread out entirely over the Curvature Subcarpathian unit (Fig. 1). It has an area of about 1600 km^2, representing a third of the entire drainage basin of Buzău River whose area amounts to approximately 5000 km^2. The entire catchment area of Buzău forms an integral part of Siret catchment area, as it is a first order tributary. Altitudes of the study area range from 114 m, recorded at the entrance to the plain of Buzău River, and 950 m in the North-East, in Bisoca Hills.

Terrain slope, a very important indicator in defining the potential of water drainage on slopes, falls between 0.06° and 29.7°, while its average value is 8.9°. The highest values are recorded generally at the contact with the mountains while low values are registered in Cislău, Pătârlagele, and Pârscov basins. Slopes over 15° are most favorable for surface runoff (Bilaşco, 2008) and they cover about 11% of the study area.

In addition to slope gradient, an essential role in surface runoff analysis is played by LS factor ratio, an indicator that quantifies the relationship between slope and slope length. If the two sides have the same slope but different lengths, their behavior will be different in hydrological modeling processes (Constantinescu, 2006). The surface runoff has higher values as the LS factor ratio value is higher. Study area index values range from 0 in meadow areas and depressions and reach values of over 6 on slopes of the main hilly units.

Also, areas characterized by surface runoff are outstanding and with profile curvature values. Convex areas with surface runoff represent 42% of the total, while the 55% of surface leakage occurs less accelerated. The remaining 3% of the areas of study are the stable areas.

Also, high values of drainage density (over 4 km/km^2) recorded along the main valleys of the study area, Buzău, Slănic, Sărăţel, near their confluence with tributaries, represent an important factor in delineating areas with high susceptibility in the occurrence of hydrological risks. A dense hydrographical network makes high water and flash-floods regime to become a torrential type (Bilaşco, 2008).Besides drainage density, an important role in the manifestation of surface flow has the convergence of the drainage network, which has higher values in the northern half of the catchment area.

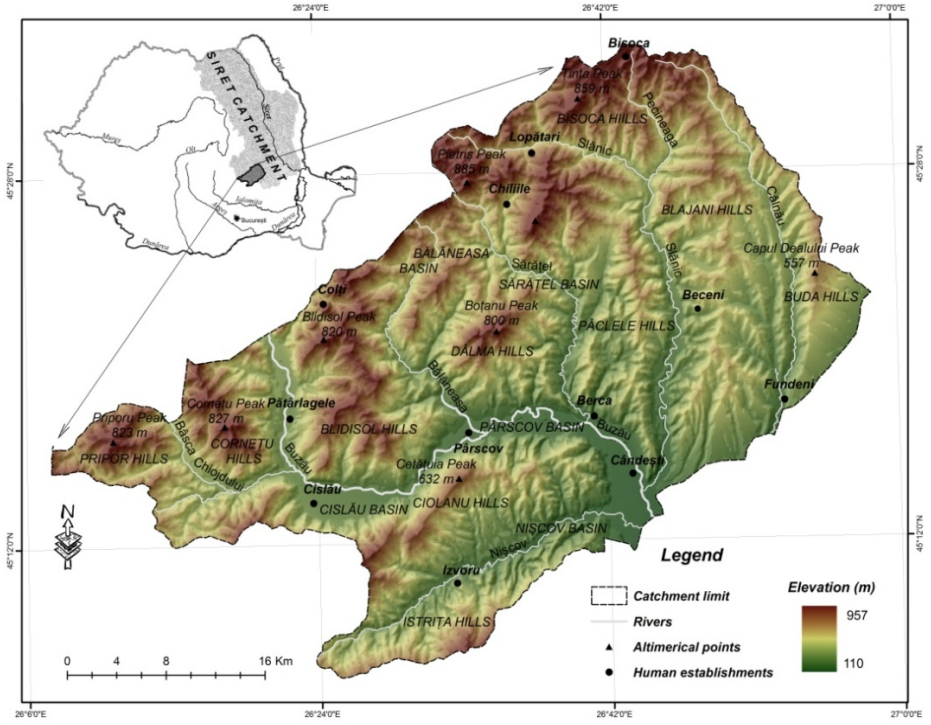

Fig. 1. Location of the Subcarpathian sector of Buzău catchment area in Romania

Slope aspect is an important factor with direct influences on the flow regime. Generally, slopes with southern exposure are favorable for increasing upward thermal convection and therefore to the formation of torrential rains especially in summer afternoons (Roșu, 1980). In the Subcarpathian sector of Buzău catchment area, over 40% of the slopes have a general southern aspect. The shape of secondary basins has also vital significance in defining the time of water concentration in the mainstem. Thereby, the more circular the shape of the basins, the lower the time of water concentration (Pișota *et al*., 2010). The highest values of the circularity index are found in the secondary drainage basins of Valea Boului, Olari, Comisoaia, Pecineaga Murătoare.

3 METHODOLOGY

To highlight the surface runoff exposed areas in the Subcarpathian sector of Buzău catchment area in terms of the digital elevation model, the Surface Runoff Index was defined and spatialized. It was obtained in GIS by summing up seven indicators derived from the digital elevation model, playing an essential role in defining the manifestation potential of surface runoff: slope of the land, LS factor, profile curvature, slope aspect, drainage density, convergence index and the shape of secondary drainage basins (fig. 2).

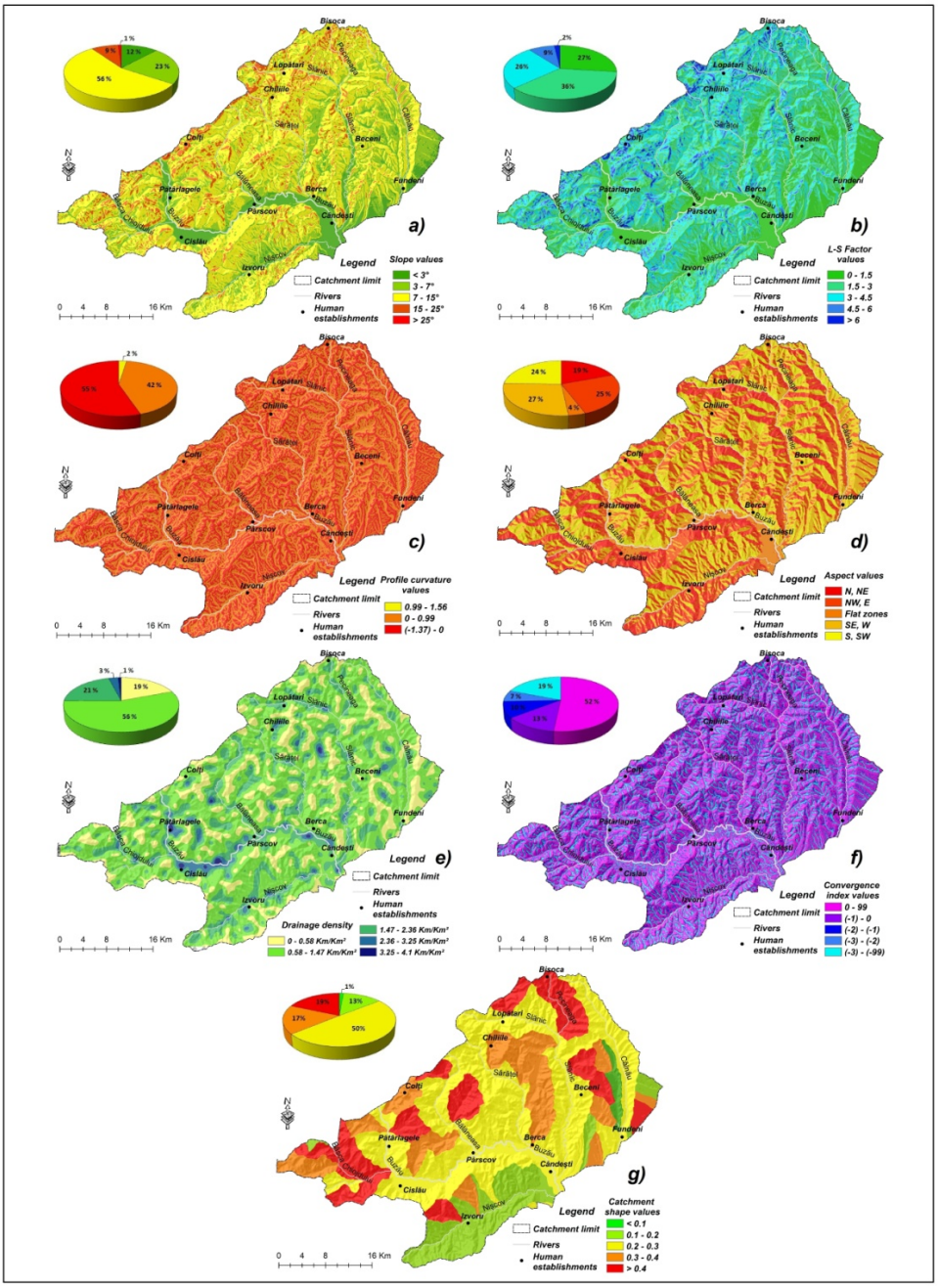

Fig. 2. Spatial representation of slope values (a), LS Factor index (b), profile curvature (c), slope aspect (d), drainage density values (e), convergence index (f) and catchment area shape index (g)

Because their influence on the flow process is different, each indicator was given a different weight in the final index delineation. Thus, factors such as terrain slope or profile curvature have been assigned greater importance than the shape of secondary drainage basins or slope aspect, influencing less the surface runoff.

In the early stage, to obtain the digital elevation model, the 1:25000 topographical map was used as cartographic support from which contour lines were extracted. The geo referencing of the topographical maps corresponding to the study area was made using the Global Mapper 13 software with the Romanian specific projection system, Stereo 70.

The digital elevation model was obtained using ArcGIS 9.3 software and contour lines were interpolated to a cell size of 20 m, recommended for hydrological studies (Bilaşco, 2008). Indicators such as slope, profile curvature, slope aspect and secondary basins were derived using specific extension tools from ArcGIS 9.3.

The catchment area shape factor was based on F/L^2 formula, where F-basin area is given in km^2, while the L-basin length in km. The more the shape factor has values close to 1, the more circular is the basin, so that surface runoff will occur more intensely (Pişota *et al*., 2010).

The assessment of drainage density was based on the determination of the hydrographic network in the form of raster based on digital elevation model using Flow Accumulation tool from ArcGIS 9.3. Next we calculated the sum of the lengths of river sectors on a unit of one km^2, this operation being performed by means of Statistics Block tool from ArcGIS 9.3. The other two indicators derived from digital elevation model, LS Factor and Convergence Index of hydrographic network were obtained using SAGA GIS 2.0.8 software. The determinant of relationship between slope gradient and length is based on the formula: $LS = (m+1)*(As/22, 13)^m (\sin\beta / 0.0896)^n$, where m = 0.4 and n = 1.3 (Moore *et al.*, 1993). Values close to 0 indicate a low slope combined with a small length of the slope, while high values express a high slope combined with a large length of the slope, which increases water flow rate (Constantinescu, 2006).

After obtaining the seven indicators, they were reclassified into five classes of values depending on how their characteristics affect water drainage on slopes (table 1).

Table 1

Classification and indexing of environmental factors to obtain the final Surface Runoff Index

Environmental parameters /Percent of total final index	Type/values				
Slope (°) - 25%	0 - 3	3 - 7	7 - 15	15 - 25	> 25
L-S Factor - 15%	0 - 1.5	1.5 - 3	3 - 4.5	4.5– 6	> 6
Profil curvature (radiani/m) - 25%			0.99 - 1.51	0 - 0.99	(-1.8) - 0
Slope aspect - 5%	N. NE	NW. E	Flat Zones	SE.W	S. SW
Drainage density (km/km^2) - 10%	0 - 0.86	0.86 - 1.69	1.69 - 2.51	2.51 - 3.34	3.34 - 4.17
Convergence index - 10%	> 0	0 - (-1)	(-1) - (-2)	(-2) – (-3)	(-3)- (-100)
Catchment shape index - 10%	0.09	0.18 – 0.19	0.21 – 0.3	0.31 – 0.38	0.42 – 0.67
Score given	1	2	3	4	5
Surface Runoff Index (class)	Very low 17.5- 20.8	Low 20.8 - 28.4	Medium 28.4 - 32.2	High 32.2- 36	Very high 36 - 45

The granting of different weights to analyzed factors (table 1) according to their importance on surface runoff and their overlapping in GIS environment is the last step in the determination of the Surface Runoff Index proposed in this paper.

4 RESULTS AND DISCUSSIONS

The spatialisation of the Surface Runoff Index in the Subcarpathian sector of Buzău catchment area was obtained by overlapping the analyzed factors. Its values, ranging between 17.5 and 45, have been grouped into five classes according to the standard deviation: very low 17.5 - 20.8, low 20.8 - 28.4, medium 28.4 - 32.2, high 32.2 – 36 and very high 36 - 45 (fig. 3).

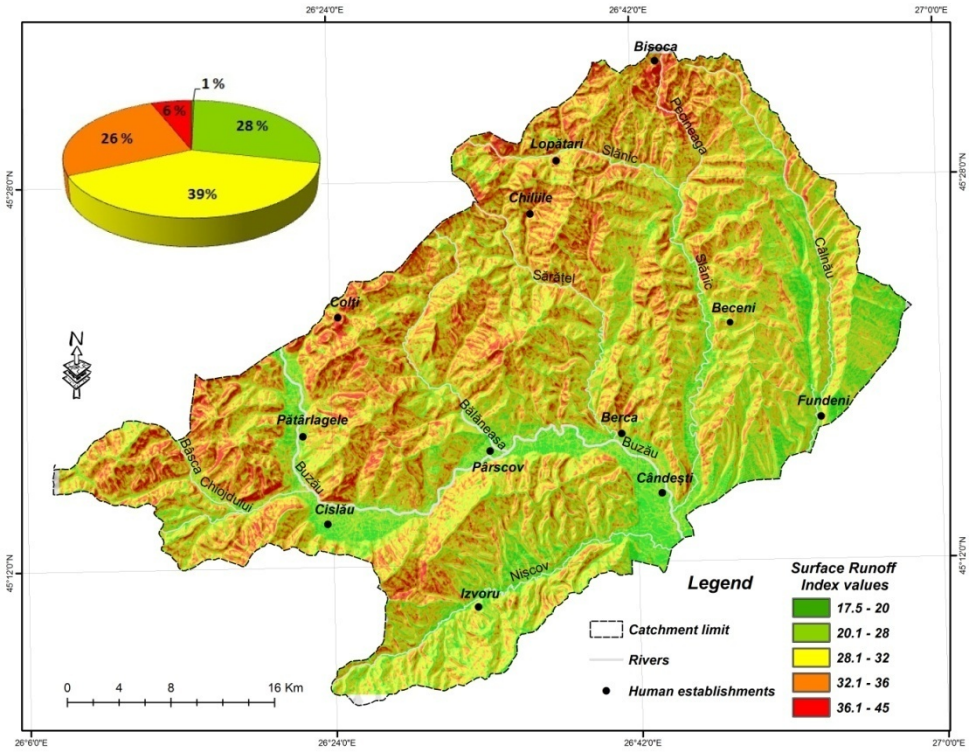

Fig. 3. Spatial representation of Surface Runoff Index values in Buzău catchment area

The Subcarpathian sector of Buzău catchment area has high and very high values of Surface Runoff Index, over 32.2 on approximately 32% (approximately 500 km^2) of its total area. These occur especially in areas of steep slope, over 15°, where convergence of torrential organisms is higher, in convex areas of the landscape, generally slopes with southern exposure. Most such areas occur in hilly units (Bisoca Hills, Cornețu Hills, Pripor Hills, Dâlma hills and Bocu Hills) near the mountains, especially at the contact

with them. These areas, where there is no forest vegetation cover, are exposed to the occurrence of hydrological risk phenomena such as flash-floods and others caused by surface runoff like intense erosion of soil and landslides.

The largest share in the study area corresponds to average values (28.4 - 32.2) of the Surface Runoff Index, which is present in 39% of the area. These values are characteristic for the slopes with an average gradient between 7° and 15° situated generally in hilly outer units.

Areas with low and very low values of Surface Runoff Index appear on 29% of the Subcarpathian sector of Buzău catchment area. Generally, low manifestation potential of surface runoff occurs on lands with a slope below 3°, depressions located in basins with an elongated shape. These correspond to Cislău, Pătârlagele, Nișcov and Pârscov basins.

An analysis of Surface Runoff Index values on the drainage basins of the tributaries of Buzău River in the Subcarpathian sector, clearly highlights that basins with a shape index close to 1, placed near the Curvature Carpathians, are the most exposed to high manifestation potential of surface runoff. Weights close to 60% of high and very high values of Surface Runoff Index occur in the basins of Sibiciu, Plăvăț, Pănătau, Ruşăvăț and Jghiab rivers (fig. 4). Generally, these basins cover a small area. High values of the weights of the two critical classes of over 40% occur in basins like Bălăneasa, Bâsca Chiojdului and Sărățel (fig. 4).

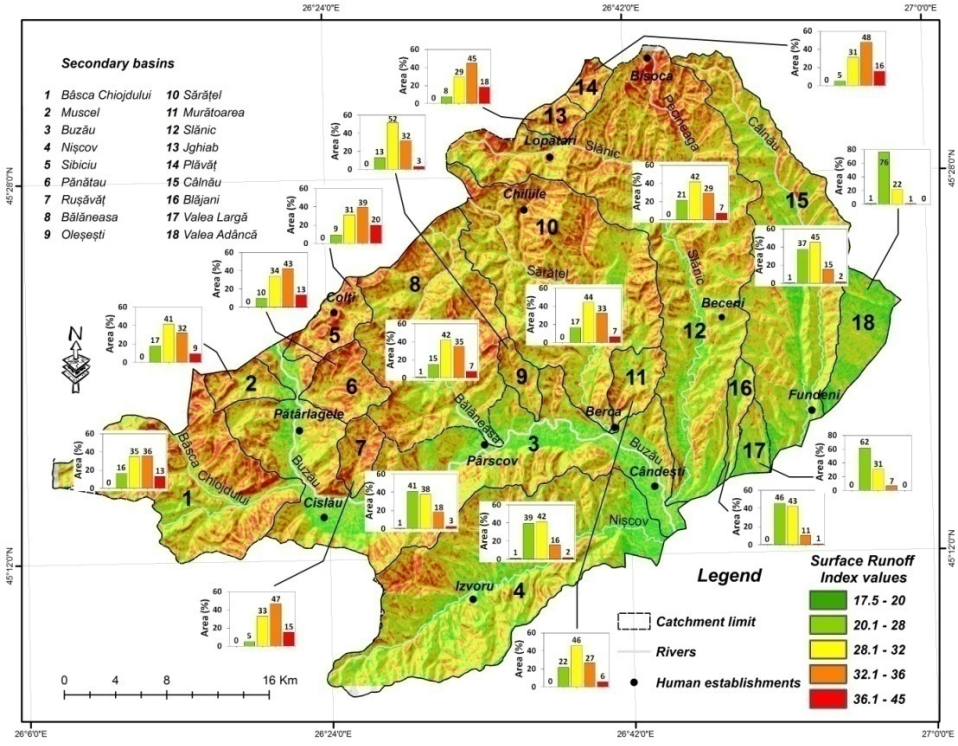

Fig. 4. Spatial representation of Surface Runoff Index values in the secondary drainage basins of Buzău catchment area

The Slănic drainage basin presents overall weights of 36% of high and very high values of the potential of surface runoff. This lower weight than the ones above mentioned is due to the more extensive area of Slănic basin, but most of the upper sector shows very high values of the Surface Runoff Index, particularly in Pecineaga tributary basin. For this reason, flash-floods may form especially in the northern part of the basin. From there, they spread to the lower sector generating floods.

The less exposed basins to surface runoff, in terms of indicators derived from the digital elevation model, are those with an elongated shape, generally at the contact with the plain, such as Nișcov, Blăjani, Valea Largă, Valea Adâncă and Valea Buzăului.

However, it should be noted that this assessment of surface runoff values is relative to the Buzău catchment area as a whole and to the delineated secondary basins. Generally, besides the digital elevation model, the potential of surface runoff depends on other important factors such as lithology, soil texture and land cover so that the final results depend to a large extent on these factors.

5 CONCLUSIONS

The analysis of the digital elevation model, using indicators derived from it, is one of the major components necessary in evaluating the potential of the surface runoff. Because it is an environmental component that is constant over time, unlike the climatic factor which is characterized by high dynamics, the digital elevation model is very useful in analyzing the potential of the surface runoff from a static point of view.

In these conditions, the digital elevation model can provide important information in the case of modification of relatively unchanging environmental components like land cover data. In other words, if Surface Runoff Index shows high values especially in secondary basins of the northern half of Buzău catchment area, it is imperative to maintain there a high weight of forests. In the opposite event, continued deforestation (specific to this Carpathian area in the last century) will be in the future an important cause in surface flow acceleration and in increased frequency of flash-floods, the worst affected areas being mostly those defined on the basis of the digital elevation model.

ACKNOWLEDGMENTS

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STATISTICAL ANALYSIS OF HYDROLOGICAL DATASETS TO DETERMINE LONG-TERM FORECAST

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ABSTRACT. – Statistical Analysis of Hydrological Datasets to Determine Long-Term Forecast. Hydrological forecasting takes various forms, from the calculation of certain runoff probabilities to statistical analysis of datasets recorded at gauging stations. If the first method of forecast refers only to punctual events, floods, inundations, making it useful for hydropower and watershed management facilities design, the statistical method allows longer forecasts by analyzing the measured datasets. For the statistical analysis of the hydrological data, we implemented the Thomas-Fiering model which is usually used for hydrological applications. The recorded monthly average runoff data was selected from Cluj and Răcătău gauging stations on a 52 year period. The model was used to generate synthetic values at monthly scale, during the 1950 - 2002 period, for 20 years between 1992 and 2012 it forecasted values and it was validated through the 10 years between 1992 and 2002.

Keywords: hydrological forecasting, statistical method, Thomas-Fiering model

1. INTRODUCTION

The statistical modeling of hydrological datasets can be classified into two categories, monthly runoff estimation models using monthly measured discharges, and monthly scale forecast models which use annual values. The practical utility of both types of models lies in accurately estimating the water resources of an area.

Methods to estimate monthly and seasonal scale runoff were used since the beginning of hydrological datasets studies; Hazen in 1914 generated a forecast for 300 years combining values from 14 river basins in a single dataset. Models to generate data sequences were made by other researchers also, among which we mention, Barnes in 1954, Sudler (1927), Haidu (1995, 1997) and Haidu & Linc Ribana (2001).

The Thomas-Fiering model fits into the first category, that of estimating the average monthly runoff values by emphasizing the seasonality of discharge in the profile of the analyzed gauging station.

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The model was created by Thomas and Fiering in 1962 mainly to generate modeled values at monthly scale and secondly to generate forecast. Considering the seasonal component, which is associated to the succession of seasons, in the scientific literature it is stated (Markham, 1970, Pop & Horvath, 2009, Th. Petersen *et al*., 2012) that hydrological data has a strong seasonal character, therefore the model assumes there is a statistical link between the seasonal observations and monthly runoff data in the same year, and also a link between the same observations in successive years.

2. STUDY AREA

The study area represents the upper basin of the Someşul Mic catchment which is part of the Someş – Tisa Water Branch, collecting waters from the eastern part of the Apuseni Mountains.

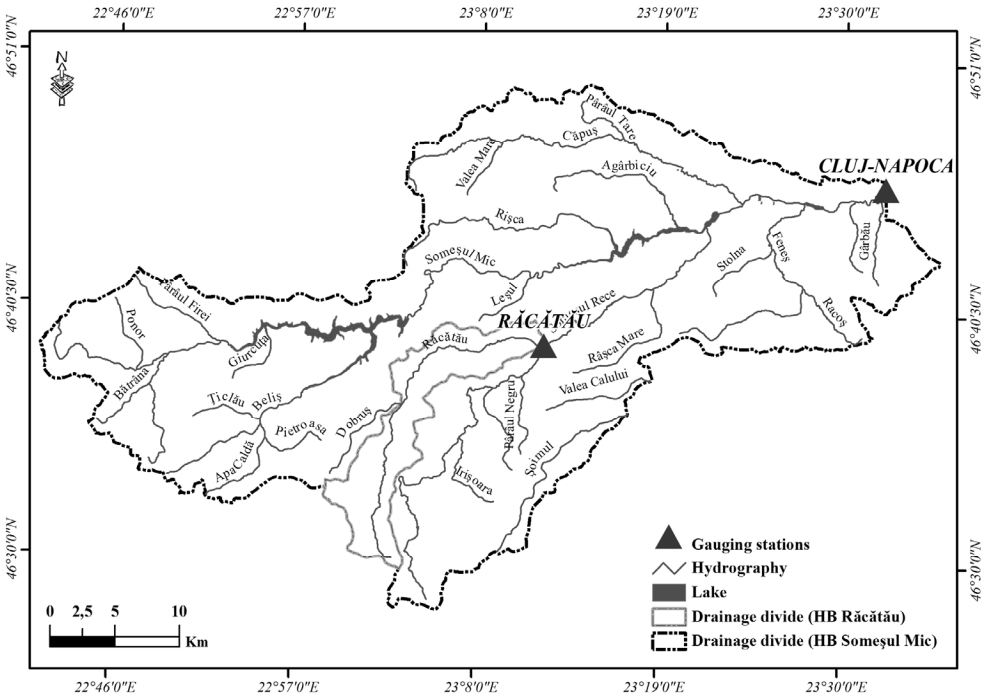

Fig. 1. Study area and gauging stations

The considered gauging stations for implementing the Thomas-Fiering model are represented by Răcătău and Cluj-Napoca stations, both with significant observation periods (fig. 1).

3. METHODOLOGY AND DISCUSSIONS

The Thomas-Fiering model uses a regression equation based on discharges measured in successive time intervals, consequently the discharge values measured in June are analyzed depending on the values measured in May and the computations are made using a linear regression function.

The model is executed using two series of hydrological datasets, Răcătău hydrometrical station with observed discharge values and a catchment area of 102 km^2 and Cluj-Napoca with reconstructed discharge and a catchment area of 1194 km^2, both represented by monthly average discharge data for a 52 years period, between 1950 and 2002.

Based on the observed data we were able to compute a series of descriptive statistical values (table 1) for Răcătău and Cluj-Napoca stations.

From the analysis of the statistical data we can observe the seasonality of the runoff with a maximum discharge value in spring presented as the maximal percentage of the annual total flow and a minimum in winter and autumn (table 1).

Statistical data for Cluj-Napoca and Răcătău stations

Table 1

Season	Winter		Spring		Summer		Autumn	
Gauging station	Răcătău	Cluj-Napoca	Răcătău	Cluj-Napoca	Răcătău	Cluj-Napoca	Răcătău	Cluj-Napoca
Average	1.087	8.362	3.441	25.324	2.441	16.858	1.263	9.030
Percent	13.21%	14.4%	41.79%	42.51%	29.65%	28.30%	15.35%	15.16%
Maximum discharge (m^3/s)	4.383	21.073	7.557	50.533	5.807	36.566	4.350	23.333
Maximal year	1996	1996	1977	2000	1979	1975	1979	1998
Minimal discharge (m^3/s)	0.307	2.143	1.243	8.268	0.816	5.937	0.396	2.311
Minimal year	1985	1954	1961	1961	1981	1952	1961	1961
Seasonal Variation Coefficient	0.599	0.475	0.358	0.343	0.446	0.429	0.583	0.533
Seasonal Asymmetry Coefficient	25.954	5.053	1.809	1.575	3.812	4.400	15.848	10.808

Using the two hydrological datasets, to complete the model we used the following equations:

$$X_{j+1,i} = \overline{X}_{j+1} + B_j\left(X_{j,i} - \overline{X}_j\right) + t_i S_{j+1}\left(1 - R_j^{\,2}\right)^{1/2} \quad (1)$$

where:

$X_{j+1,i}$, $X_{j,i}$ – generated monthly runoff for month j+1 during year i and month j during year i, respectively

$\overline{X}_{j+1}$, $\overline{X}_j$ - mean monthly historic runoff record for the $(j+1)^{th}$ and j^{th} months

t_i – normal random variant with mean of zero and variance of unity

B_j - regression coefficient between runoff in $(j)^{th}$ and $(j+1)^{th}$ months

$$B_j = R_j\left(S_{j+1} / S_j\right) \quad (2)$$

S_{j+1} - standard deviation of the historic stream flow record for month j+1

R_j - serial correlation coefficient between flows in $(j)^{th}$ and $(j+1)^{th}$ months

To complete the model, the formula from equation (1) was implemented into MS Excel resulting in a macro that incorporates all the mathematical equations and formulas and also the graphical analysis and comparison of the datasets which are necessary.

The arithmetic mean for a given month (j), expresses an average result with seasonal character (1), because for the monthly values there are 12 averages for the 12 corresponding months.

The first step in completing the model is the fitting of runoff data based on the measured discharge values and the comparison of the two datasets to monitor the homogeneity of the datasets.

Visual analysis of the two figures reveals a pronounced seasonal character of runoff for the two analyzed gauging stations. Seasonality is characterized by high runoff in spring; with clearly higher recorded and simulated values at both hydrometric stations, Cluj-Napoca (fig 2 a, b) and Răcătău (fig. 3 a, b) and also, by the absolute low in winter. It should be noted that at Cluj-Napoca hydrometric station a maximum during the summer of 1974 (June-July) was measured and also caught by simulation (fig. 2 a, b). According to the 2010-2013 Someş - Tisa Water Branch Catchment Plan, the runoff that was recorded during that period was due to rainfall that exceeded significantly the average multiannual precipitation.

The comparative analyses of observed-simulated datasets highlight a very good correlation for both stations and also an exact capture of measured peaks. The extreme events are captured very well as time interval in the simulated sequence but significantly minimized in value. Most striking examples are the peaks measured at Cluj-Napoca station in May 1970, with 68.39 m^3/s correlated with a simulated 38. 1 m^3/s discharge, also in July 1974 with 57.8 m^3/s measured value and only 37.9 m^3/s modeled (fig. 2 a, b) and at Răcătău station in May 1977 with 12.70 m^3/s measured and 5.71 m^3/s (fig. 3. A b) simulated. All examples are extreme values, representing peak values in both data series, in the measured and in the simulated runoff generated by the model.

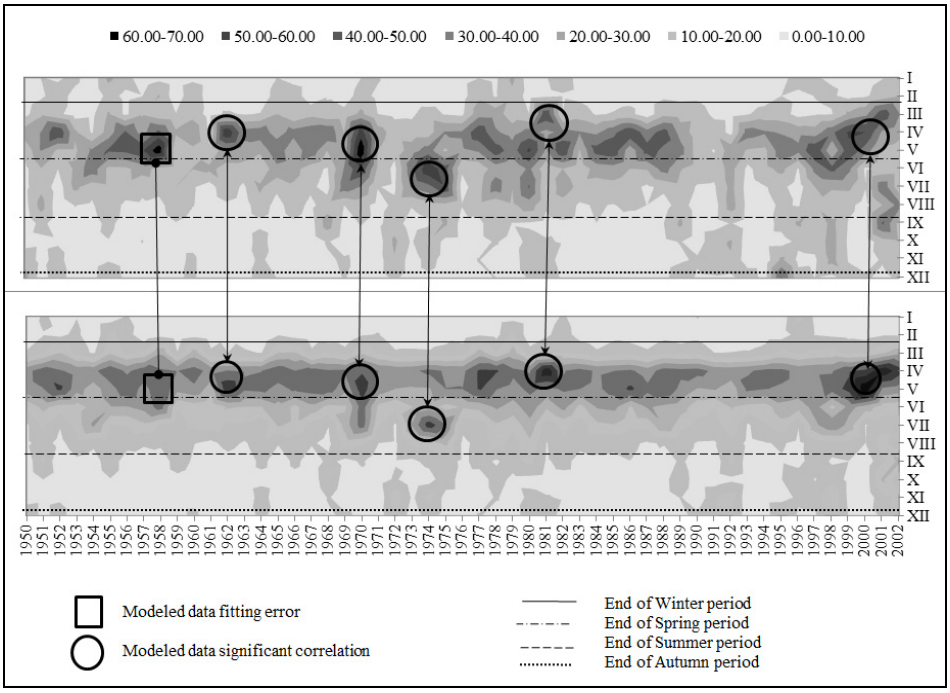

Fig. 2. Correlation between the observed and simulated runoff - Cluj-Napoca

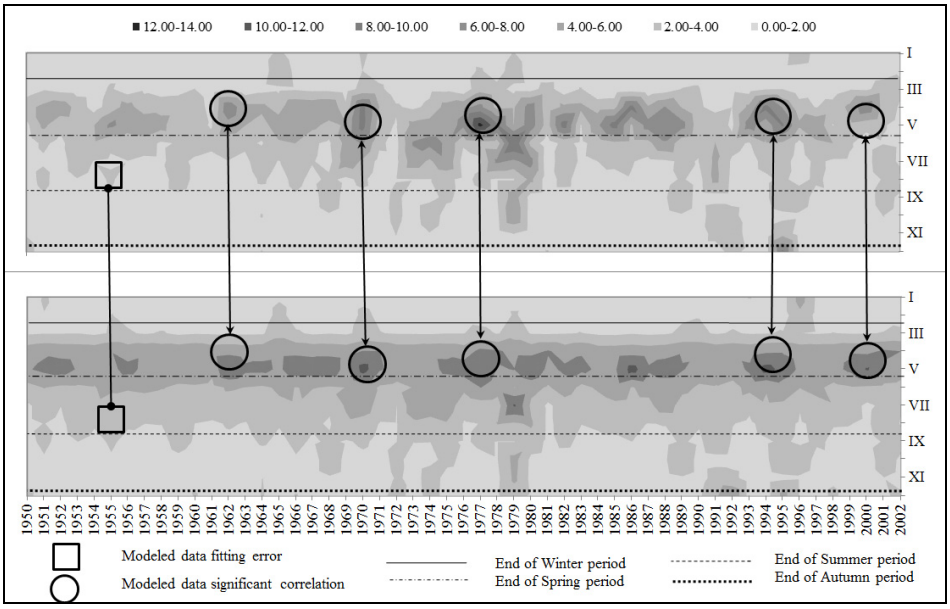

Fig. 3. Correlation between the observed and simulated runoff - Răcătău

Comparing both visually and statistically the two modeled and simulated datasets, we observe the underestimation of measured discharge values by the model.

Preliminary validation was done through percentage difference between the measured and modeled values. Very high differences are recorded, 55.7% for Cluj-Napoca station data series and 44.96% at Răcătău station, but also there are values equal to 0 (perfect fitting) and negative values which suggest simulated discharges higher than the measured ones. Overall average values enroll in the margin of error accepted for completion of hydrological studies, 8.6% at Cluj-Napoca and 5.2% at Răcătău.

Observing the two graphs, we can state that there is a good correlation between the two observed and simulated series. For both considered series, we analyzed the correlation and the residuals to validate the model.

The correlation analysis was performed using the graphical method which involves the graphical representation of the j and j +1 pairs establishing also the shape and intensity of the correlation.

The value of R_j, (3) has a double meaning. The formula expresses the correlation between the monthly datasets, respectively between the values of May and June, values between June and July, etc. In addition, the 12 R_j values express also the phenomenon of autocorrelation between x_j string (current month) and the x_{j-1} string (previous month).

$$R_j = \frac{\sum_{i=1}^{N-1}\left(X_{j,i} - \overline{X}_j\right)\left(X_{j+1,i} - \overline{X}_{j+1}\right)}{\sqrt{\sum_{i=1}^{N-1}\left(X_{j,i} - \overline{X}_j\right)^2\left(X_{j+1,i} - \overline{X}_{j+1}\right)^2}} \tag{3}$$

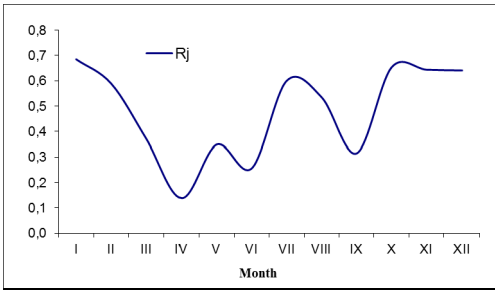

Fig. 4. Correlation at Răcătău

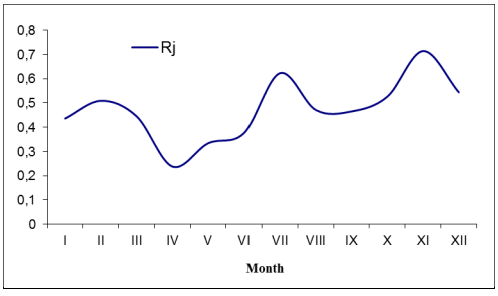

Fig. 5. Correlation at Cluj-Napoca

From the analysis of the correlation graphs one can observe a very good correlation (a strong relationship between j and j +1) at both considered gauging stations. About the same types of correlations are established for both gauging stations, better highlighted for Răcătău hydrometric station dataset (Fig.4) and less in the case of Cluj-Napoca (fig. 5). Positive correlations are determined between April-May, June-July and September-October at both hydrometric stations, and negatively correlated cases are found in February-April and August-September.

The residuals of the model after Clark (1973) are represented in the following graphics:

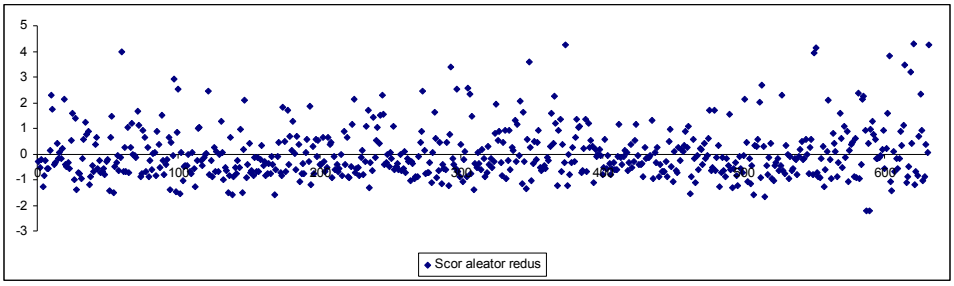

Fig. 6. Residuals of the model at Cluj-Napoca

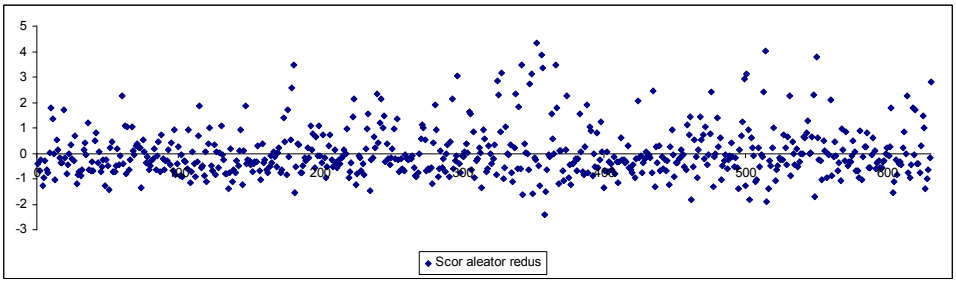

Fig. 7. Residuals of the model at Răcătău

Analyzing the 2nd and 3rd graphs one can follow the seasonality of the model parameters and also a very good correlation between the observed and simulated runoff. At the same time the 4th and 5th figure reveal a good correlation between the model parameters. Also, the positive and negative values of the model residuals presented in figures 6 and 7 with an approximately normal distribution equaling zero, supports the validation and use of the Thomas-Fiering model in researching and forecasting runoff for the two studied gauging stations and can be extrapolated to all the small catchments tributary to the Someşul Mic River upper basin.

4. RESULTS AND CONCLUSIONS

Based on the Thomas-Fiering model we forecasted the runoff at the two gauging stations at Cluj-Napoca (fig. 8) and Răcătău (fig. 9) for a period of 10 years. The comparison period of the observed discharge with the forecasted runoff is between the years 1992-2012, also the 1992 and 2002 period is for validation interval and 2002-2012 is for forecasting.

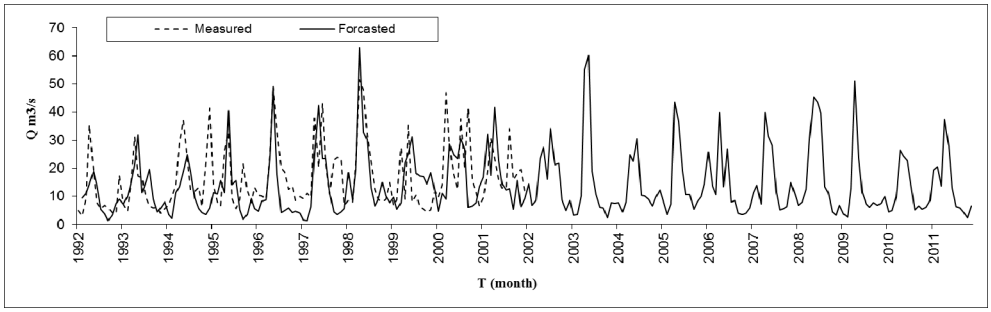

Fig. 8. Forecasted discharge – Cluj-Napoca

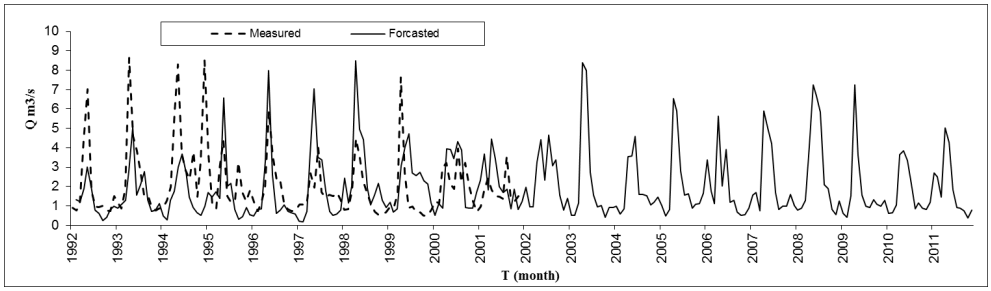

Fig. 9. Forecasted discharge – *Răcătău*

From the analysis of the forecasted runoff at Cluj-Napoca gauging station, through the Thomas-Fiering model, it can be observed that in April 2004 the forecasted (fourth month of the year 2004) maximum discharge of 30.38 m^3/s was preceded by a period of smaller runoff and also followed by a period when the discharge was declining.

Monthly average runoff at Cluj-Napoca gauging station

Table 2.

Year 2004	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
Q m^3/s measured	6,28	9,81	21,1	55,9	22,4	10,1	9,99	16,3	13,0	10,8	13,2	19,3
Q m^3/s forecasted	7.97	24.92	22.47	30.38	10.5	10.26	9.04	6.56	9.74	12.17	7.61	3.5

The forecasted data were compared with the recorded data (table 2) at the same gauging station, so we can point out that in April 2004 we measured a discharge of 55.9 m^3/s, which is comparable to the predicted values. Also, this is the highest recorded discharge during the 2004 year. Also one can observe the seasonality of the runoff from the forecasted discharge datasets presented as example the 2005 data (table 3), with high runoff values in spring and low discharge values at the end of summer and beginning of autumn.

Forecasted discharge seasonality (Cluj-Napoca 2005)

Table 3

Season	**Winter**		**Spring**			**Summer**			**Autumn**			
Mounth	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
Q m³/s	7.61	3.5	7.24	43.5	36.6	19.2	10.7	10.7	5.51	7.99	9.98	14.5

The same situation can be observed in the forecast of Răcătău gauging station. In terms of comparison between the measured and predicted runoff, also in capturing the seasonality of the forecasted flow for the same period as Cluj-Napoca gauging station, the forecasted discharge values are obviously smaller. From the above stated and the datasets analysis, the forecasted discharge for the two gauging stations presents a good correlation, so the runoff oscillations are traced from the upstream station to the downstream station.

Analyzing the results of the model and taking into account the conclusions we can say that the model can be used to generate runoff values and stochastic long-term prognosis for small catchments within the upper basin of the Someşul Mic River catchment.

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HISTORICAL FLOOD OF 2005 IN TARCĂU CATCHMENT

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ABSTRACT. – Historical Flood of 2005 in Tarcău Catchment. During the flood of 12 – 15 July the water level in the lower sector of the valley exceeded the one estimated for a 100-year flood, and the maximum discharge was almost twice larger than the previous peak. This extreme event generated the largest damage in Tarcău catchment, in total value of over 21,000,000 lei. The main affected element was the transport infrastructure. It also determined a change in flood perception of the local authorities, leading to the creation of a Voluntary Service for Emergency Situations the same year and investments in flood proofing.

Keywords: *historical flood, peak discharge, flooded area, damage, transport infrastructure.*

1. INTRODUCTION

There is a woldwide increasing trend in vulnerability to flooding, because of the altered frequency – magnitude relations, and an increased exposure of humans and their property (www.munichre.com, 2007). A similar trend can be identified for the catchment of Tarcău River too, considering the increasing discharge values for the summer months, both for average and maximum ones, although the trend slope does not have a high value.

Tarcău River is a right side tributary of Bistriţa River, and its catchement drains most of Tarcău Moutains, covering 392 km^2. Its hydrological regime is a characteristic one for the Eastern Romanian Carpathians, indicating a pluvial recharge, no winter floods and high waters in spring and summer (Ujvari, 1972). The multiannual average discharge value ranges between 1.15 m^3/s at Ardeluţa, the upstream gauging station, and 4.32 m^3/s at Cazaci, the downstream one. Pluvial floods are the most frequent, 66% of the annual floods occurring in summer, 26.19% in autumn, and just 7.14% in spring. The average seasonal runoff values indicate the highest runoff in summer (35.8%) and spring (34.6%). The fact that most floods occur in the same seasons may result in more intense ones, if they overlap periods of high waters. Considering the factors that influence the intensity and dynamics of a flood, Tarcău River catchment has its particularities. There is an obvious asymmetry, as the tributaries on the left are in some cases twice as long as the right side ones (fig. 7). It determines thus a fairly circular shape of the watershed, slightly elongated on the south to north flow direction of Tarcău that influences the flood range. The slope and forest cover also control the time

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of concentration. The altitudes range from 385 m to 1664 m, slopes vary dominantly between 15° and 35° (61.21%), thus the average catchment slope of 20-21° implies a rapid water flow. The forest cover intercepts a certain percentage of the rain, reducing the amount that reaches directly the river bed; the older the stand, the higher its consistence and a greater quantity of water it intercepts. Also, the interception is higher if the rain intensity is lower. Most of Tarcău catchment area (83%) is covered in forest, either in mixed stands of broad-leaf and coniferous trees, or pure stands of spruce, fir, or beech. The forest has been capitalized for the last 160 years, thus the age and consistency of stands are variable.

Floods occur yearly in Tarcău catchment, but some of them are considered extreme events because of the discharge values and corresponding water level that define them. There is always the possibility that an event with lower occurrence probability but higher magnitude than the supposed extreme event occurs (Woo, 2002). Sometimes, the term extreme event is used only to define these situations when all the historical observed water levels are exceeded.

A report of the local branch (Neamț) of the water administration indicates that the main damage generating floods on Tarcău River after 1970 occurred in 1974, 1975, 2004, 2005, 2006, 2007, 2008 and 2010. The 2005 event stands out both due to the historically maximum values of the hydrological parameters but also because of the highest losses.

2. METHOD AND DATA

The paper presents the extreme event that generated the largest damage in Tarcău catchment, in a quantitative analysis of the parameters that characterise the flood and the resulting damage. The data used consists of hydrological data, average and maximum discharge values for the two gauging stations for the last 20 years, and the hydrographs of the 2005 summer floods. The daily precipitation values were also considered, as they were the triggering factor. The flood impact was evaluated by analysing the damaged elements, a monetary value being attributed to each of them.

3. RESULTS AND DISCUSSIONS

The two highest floods of 2005, occured between 12 and 15 of July and between 17 and 22 of August. If for the latter the peak discharge (135m^3/s at Cazaci gauging station) attained the previous maximum (134 m^3/s at Cazaci gauging station on 18th of August 2002), for the former, the discharge and water level values were the highest ever observed (table 1). The peak discharge of 217 m^3/s exceeded by 61.94% the previous maximum value registered at Cazaci gauging station (134 m^3/s on 18th of August 2002), while the difference is just of 18.69% at Ardeluța, as the previous maximum reached 107 m^3/s. At both gauging stations the danger level set at 3 m was exceeded.

Characteristics of the July 2005 historical flood.

Table 1

Gauging	Q_{max}(m^3/s)	H (m)	Flood start	Flood crest	Flood end
Ardeluța	127	3.5	12.07 around 6^{00}	12.07 around 18^{00}	15.07 around 6^{00}
Cazaci	217	4.6	12.07 around 6^{00}	12.07 around 20^{00}	15.07around 6^{00}

Raw data source: SGA Neamț

As their occurrence date also indicates, both floods were of pluvial origin. On the 12th of July, the historical maximum 24h precipitation value was measured, 150.7 mm at Ardeluța gauging station, and 147.8 mm at Cazaci gauging station. In the first case, the multiannual mean precipitation value of the month (147.38 mm) was exceeded, while the value measured at Cazaci was just 6.6 mm lower than July multiannual mean (154.4 mm). The heavy rain was generated by an Atlantic cyclone that occluded on the 11th of July on the polar circulation background. The occlusion and the atmospheric instability lasted around 3 days, and were maintained by a cold high altitude nucleus, that dispersed on the 14th of July. Radar images indicated a northward direction of clouds, therefore, considering the river flow direction, the rain travelled along the catchment from upstream towards downstream. Diaconu (1994) states that a flood generating rain that travels in the same direction as the river flow leads to a higher peak discharge. As shown in figure 1, the heavy rain on 12th of July generated one peak flood, the precipitation amount dropping considerably the next day, on the 13th the total rainfall reaching just 33.2 mm.

The fact that it was an extreme event is also confirmed when considering the discharge and level values calculated for different return periods and their corresponding exceedance probability (table 2), the ones of the 2005 event not matching the thresholds. The 127 m^3/s and the 3.5 m registered at Ardeluța would indicate a return period between 50 and 100 years, while in the case of Cazaci gauging station, the 217 m^3/s does not reach the 5% discharge value and the 4.6 m exceeds the estimated 1% one.

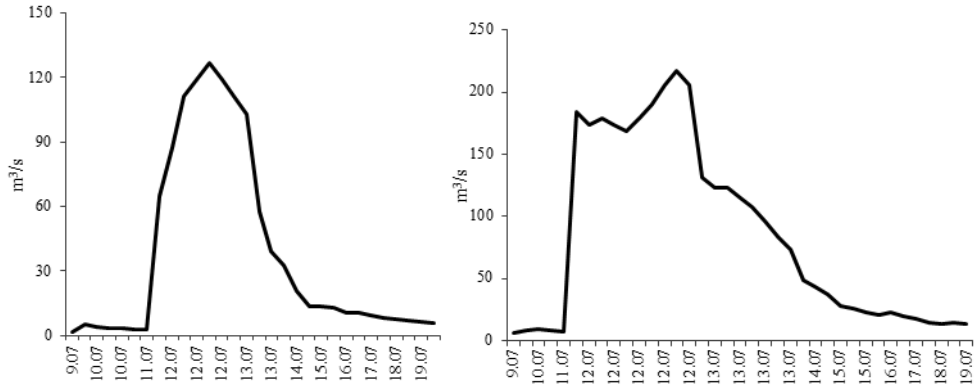

Fig. 1. Hydrograph of the historical flood of July 2005: Ardeluța gauging station (left) and Cazaci gauging station (right) (Raw data source: SGA Neamț).

Discharge and water level values of different exceedanceprobability (SGA Neamț 1995).

Table 2

Ardeluța			Cazaci		
H (m)	**Q (m^3/s)**	**%**	**H(m)**	**Q(m^3/s)**	**%**
4.1	177	1%	4.2	475	1%
3.3	95	5%	3.2	268	5%
3	77	10%	2.7	198	10%
2.4	43	20%	2.2	137	20%

Though measurements at both gauging stations indicated a very high water level, that exceeded 3 m, the **flooded areas** were fairly reduced (fig. 3), as a result of the river bed configuration, its depth ensuring the protection of the overbanks. From a geological point of view, most of Tarcău catchment area overlaps the nappe of Tarcău, consisting mainly of two types of sandstones, Tarcău and Fusaru sandstone disposed in thick banks that reach even 10 m. The valley of Tarcău overlays theTarcău syncline, with a slight eastwards divergence from its axis (Do Hung Thanh, 1974) that determines the river to cut the strata sometimes almost vertically. Therefore, most of the river bed is cut directly into the sandstone layers, ensuring highly cohesive banks. Due to the high depth of the river bed, the flooded overbanks areas were reduced, and were present mainly downstream of Cazaci gauging station. The series of cross sections presented in figure 3 try to illustrate it and explain why the only major flooded area was Lunca Lăcătușului (cross section F, fig. 3). For the four cross sections upstream of section E (Cazaci gauging station) the average depth is larger than 4 m and the width of the invert does not exceed 40-50 m. Cross section E is a good example of the influence of the geological structure on the river bed configuration, as the river bed is cut in a thick layer of Fusaru sandstone (fig. 2). Downstream of it, the river bed widens and its depth is reduced to maximum 3 m. The sector down to cross section H is the one most prone to flooding.

Fig. 2. The left bank of Tarcău River 25 m upstream of Cazaci gauging station (up); the water level during the historical flood in the same location (down– photo:Iulian Găină).

However, usually not both overbanks are flooded at once, one of them being higher, and at least one being cut directly in the layers of Fusaru sandstone (for example the right bank of cross sections F and H). Downstream of cross section G the height of the left bank increases, decreasing again close to the junction of Tarcău and Bistriţa River. Cross section I depicts the sector of Tarcău valley cutting the terraces of Bistriţa River, the 5–7 m one on the right, and the 2-4 m on the left (Donisă 1965).

The largest **flooded area** of about 5.5 ha, is indicated by cross section F and presented in detail in fig. 4. Lunca Lăcătuşului is a former holm of Tarcău (located in its downstream part, cross section F includes also the small holm in the river bed) currently occupied by 26 households. However, although the flooded area overlaps most of Lunca Lăcătuşului, the number of damaged households is reduced, the reports of the local administration ofTarcău commune indicating only 2 of them (tabel 3). This results from the low water depth in the inhabited area that did not lead to important damage to most of the households, for the situations when the water depth did not exceed the houses foundation, no compensation being needed. The high monetary value attributed to the damage registered for the households results from the partial destruction of a house (50% of it collapsed and had to be relocated), generated by the erosion of the alluvium it was built on (fig. 5). Considering the slight north-eastern flow direction, the left bank is more susceptible to intense lateral erosion as it is the concave one. Therefore, even if the overall water level in Tarcău river bed was very high, and a large part of Lunca Lăcătuşului was flooded, the erosive effect of the water was the most destructive, the alluvial structure of the left bank making it easily erodible. Also the bank height in the downstream part of Lunca Lăcătuşului reaches around 2 m (cross section F in fig. 3), compared to its lower upstream part, partially explaining why the water depth on the left overbank was reduced. The right bank is little susceptible to flooding or erosion due to its height and presence of a layer of Fusaru sandstones.

However, the flooding of Lunca Lăcătuşului in 2005 was not caused only by Tarcău River, but also by Goduri torrent which uses Tarcău old secondary channel to direct its water towards the current river bed and the other temporary watercourses that drain the slopes. The four gullies (fig. 4) function as channels for the waters that come down the slope during heavy rain episodes or result from the melted snow, the two large patches of grassland located above the gullies representing their drainage basin. Their location on the scarp of the 35 – 40 m terrace just above the communal road determines that the gravels removed are dumped on the road during the intense erosive episodes, affecting its structure and limiting the traffic. The material transported both inside the gullies and by Gloduri torrent during the historical flood led to the destruction of the road in this location, thus interrupting the traffic upstream. The same situation occurred also 1.5 km upstream, close to the junction area of Bătrâna and Tarcău River, where the road was destroyed by the material eroded by a torrent and a large gully.

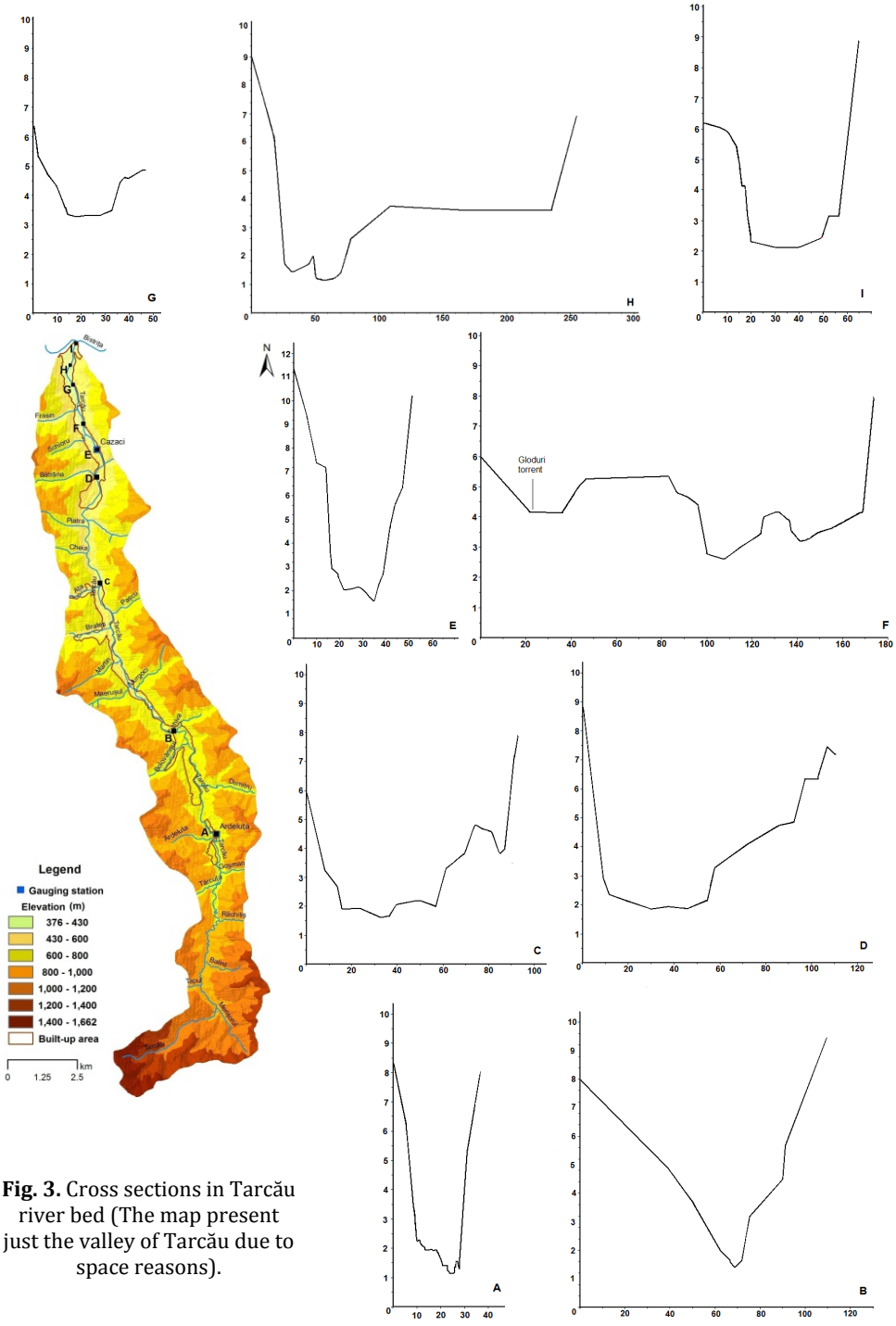

Fig. 3. Cross sections in Tarcău river bed (The map present just the valley of Tarcău due to space reasons).

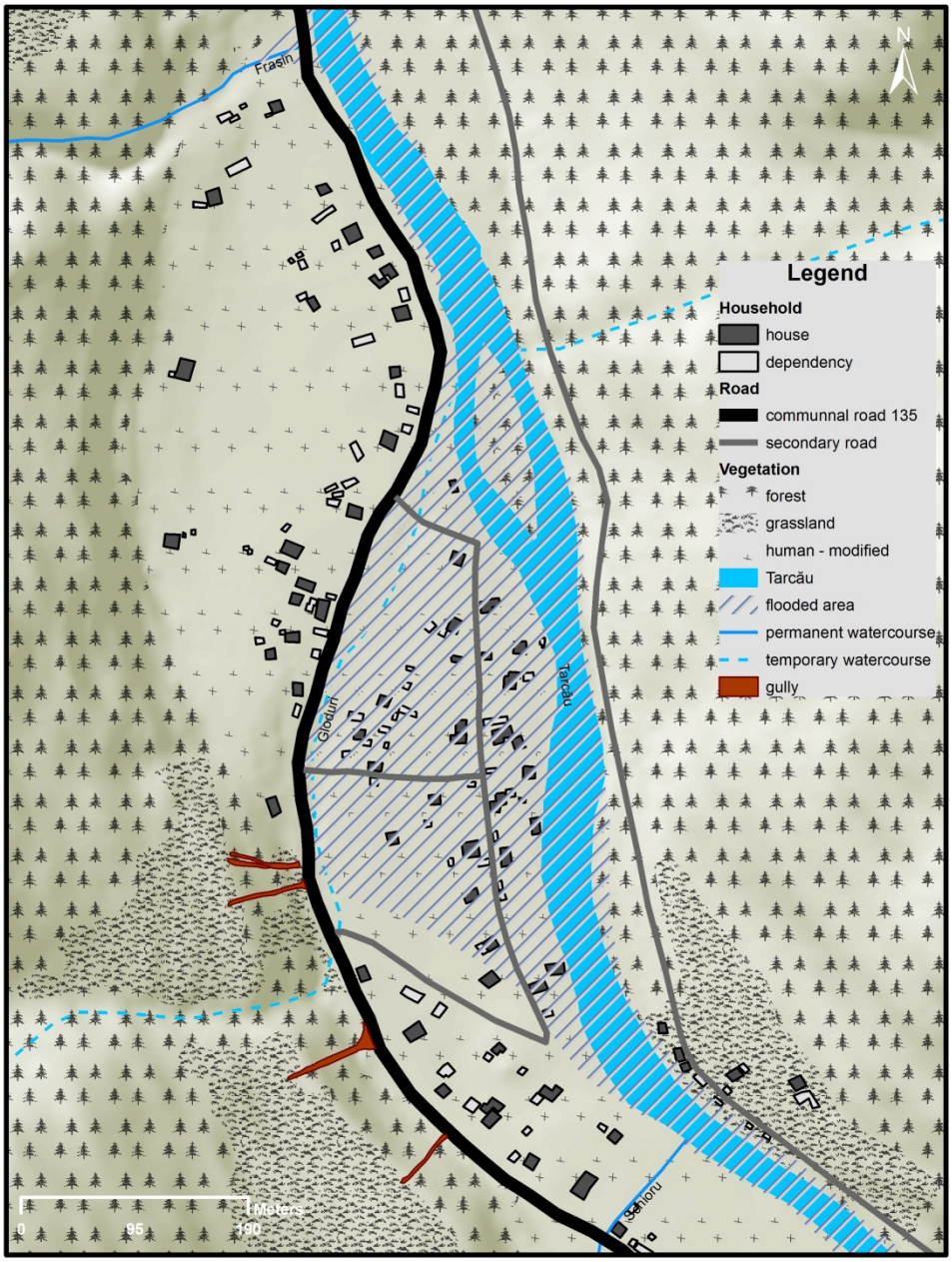

Fig. 4. The flooded area in Lunca Lăcătuşului.

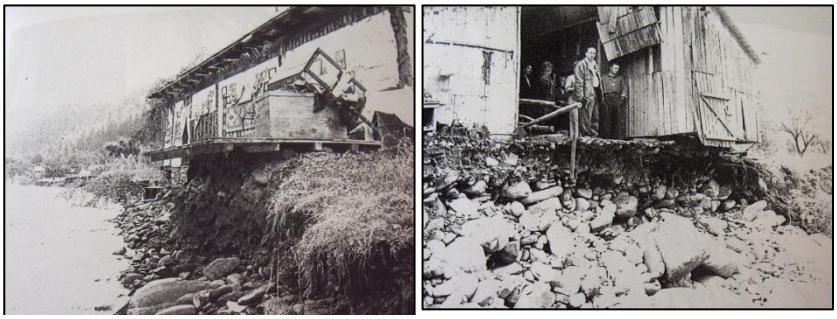

Fig. 5. House and dependency damaged by the effects of lateral erosion (photos: Iulian Găină).

The damage caused by the historical floods of 2005 in the built-up area.

Table 3

Village	Damaged elements	Value	Total
Tarcău	1 household	4,000	
	2 bridges and 2 footbridges	3,130,000	
	1.5 km of eroded banks and 2 bridge piers	-	3,134,000
Cazaci	2 households	45,000	
	0.265 km of asphalted road	428,000	
	1 footbridge	250000	
	1.3 km of eroded bank	-	723,000
Brateș	0.047 km of asphalted road	965,000	
	0.36 km of eroded bank	-	965,000
Total	3 households	49,000	
	2 bridges and 2 footbridges	3,380,000	
	0.312 km of asphalted road	1,393,000	
	3.16 km of eroded bank and 2 bridge piers	-	**4,822,000**

Downstream of Lunca Lăcătușului, at the junction of Frasin and Tarcău River, the culvert was destroyed by the flood on Frasin, the material brought by the tributary (fig. 6) including also wooden material. Considering the large percent of forest coverage, the main economic activity in the area is forest exploitation. On each major tributary valley there is a forest road that facilitates the access to the stands in exploitation. Abandonment of wood leftovers in the secondary valleys is frequent, and usually during floods this material is transported downstream, and its accumulation in narrow river bed sectors may create stoppers.

The communal road 135, the only access road that links Tarcău to the national network, was built on Tarcău lower terraces, and due to their reduced width, usually right next to the river bed (fig. 7). Therefore, as already mentioned, it can be affected by the tributaries if the culverts are badly designed, but also, by bank falls because of its proximity to the river bed. During the flood of July 2005, the lateral erosion in the left bank was so intense upstream of the junction of Măeruşul Adânc and Tarcău that 70% of the road structure was destroyed for a length of 200 m. One km upstream, close to Veverița junction, the road was eroded also beacuse it was not asphalted upstream of Măeruşul Adânc and there was no erosion protection for the banks.

Fig. 6. The flooding of the Frasin and Tarcău junction (photo: Iulian Găină).

The **damage** resulting from this event reached the amount of 4,820,000 lei. The affected elements included 3 households, 2 bridges and footbridges, 0.312 km of asphalted road, 3.16 km of eroded bank and 2 bridge piers. The other affected household outside Lunca Lăcătuşului is located in Tarcău village, on the left bank upstream of Măciucaşi bridge (upstream of cross section I, fig. 3). As detailed in table 3, although the number of affected elements is not large, the important amount results from the high value of the transport infrastructure, 98.98% of the total damage being attributed to it. The fact that the villages are set on both banks of the river implied the construction of a large number of bridges, in order to maintain a good connectivity. However, since the communal road is the only one that links the entire valley to the national road 15, maintaining it in good condition is a priority. Considering that during the historical flood of July 2005 the road was blocked in 4 locations, leads to the conclusion that protection measures must be taken to avoid future similar situations. Although most

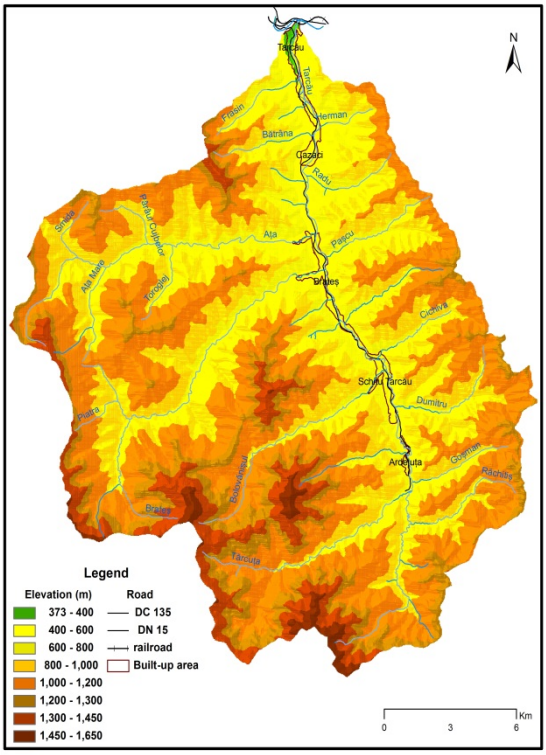

Fig.7. The catchment of Tarcău river and access roads.

of the population is concentrated in the lower part of the valley, 86% living in the villages Tarcău and Cazaci, the transport infrastructure plays an important role in the catchment of Tarcău, both from the perspective of people's safety, but also for ensuring the continuity of economic activities, the communal road being also the only option for the transport of logs, though the timber yard is located in the junction area of Tarcău and Bistrița rivers.

Most of the extremely high percentage of the damage associated to the transport infrastructure results from the affected bridges and the 2 completely destroyed footbridges. There are only 5 bridges that facilitate the access by car on both banks of Tarcău River for the 18 km of the lower sector of the valley (north of Schitu Tarcău village, where most of the population is concentrated). Considered from downstream to upstream, the distance between them is of 4.3 km (Măciucași – Cazacig auging station), 2.8 km (Cazaci gauging station -Radu forest road), 5.8 km (Radu forest road – Pașcu forest road) and 6 km (Pașcu forest road – Cichiva forest road). If the communal road is inaccessible, the only other road that links the villages is the one on the right bank, that follows the ancient path of the mountain train, but it can be accessed by car only for the lower sector, Măciucași – Radu forest road, linking the hamlet Lunca Macazului (Tarcău village) to Cazaci village. Măciucași bridge (located at cross section I in fig.4) is among the most important ones, linking the hamlets Lunca Macazului (upstream, on the right bank of Tarcău River) and Măciucași (on the right bank of Tarcău and Bistrița River, in their junction area) to the village of Tarcău. If for the former, the other access option would be by the bridge at Cazaci gauging station and the secondary road on the right bank of Tarcău, for the latter, the only access point by car is Măciucași bridge.

The total damage estimated for the built up area in the valley of Tarcău River for the historical flood of 2005 reaches the amount of 4,822,000 lei. Obtaining a correct value for the whole catchment implies the addition of the losses registered by the forest ranges that also refer to the transport infrastructure. Considering that the main forest roads in the catchment are located in the valleys of the main tributaries, their susceptibility to being flooded and eroded is fairly high. A partial estimation of the reconstruction costs for the affected roads indicated the amount of 16,265,177 lei, due to the fact that some roads were completely destroyed (as the ones on Dumitru, Polinistru and Răchitiș valleys). Therefore, the total damage value for Tarcău catchment exceeds 21,000,000 lei.

Given the circumstances and the impact of the historical floods on the small community of just 2900 people, the local administration decided on the 29th of November 2005 to set up the Voluntary Service of Emergency Situations, consisting of 61 people that are supposed to prevent, monitor and manage the emergency situations irrespective of their nature. Considering the high frequency of floods, prevention actions are important. A higher degree of preparedness may lead to lower damage.

Due to the importance of the transport infrastructure and the high damage value, while reconstructing the affected elements, protection measures for future events were also considered. Gabions were built for the eroded banks (on the left bank, downstream of Frasin, upstream of Măeruşul Adânc, and Veveriţa junction) due to the advantage of having the necessary rock on the spot, thus, making them a less

expensive solution. In order to reduce the negative impact of the material evacuated from the gullies, concrete walls were built, but nothing was done to channel the waters, not even those of Gloduri torrent, which may still flood the communal road. In order to reduce the lateral erosion and flooding that affected Lunca Lăcătuşului during the following years too, a 900 m long concrete wall was built in 2011.

4. CONCLUSIONS

A thorough analysis of the historical flood in Tarcău catchment was necessary, since it indicates the possible impact of an extreme event. Along with the understanding of the triggering factors, it led to the development of proper management strategies for future similar events. The floods of the following years proved the efficiency of some of the measures taken.

The very low percent of affected households indicates a good safety degree of the population, considering the floods of similar intensity and low occurrence probability. However, it does not exclude the necessity of protection measures for the inhabited areas in case of future flooding of higher magnitude. The high damage value associated to the transport infrastructure raised the awareness of the necessity to reduce maintenance costs, since it is the most affected element in the area.

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THE PARLIAMENTARY ELECTIONS IN ROMANIA (9 DECEMBER 2012)

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ABSTRACT. – The Parliamentary Elections in Romania (9 December 2012). This study analyzes the main issues regarding the development and results of the 9 December 2012 parliamentary elections for the setting up of the Romanian Parliament (the Chamber of Deputies and the Senate) for the 2012-2016 legislative period. There was a modest presence of the population at the elections, as the turnout was only 41.76% of the 18,423,066 people registered on the lists. Several political unions, alliances, parties and independents participated and the general electoral threshold was 5% for parties and 8% for alliances. As a result, only two political unions – the Social Liberal Union **(SLU)** and the Democratic Union of Hungarians in Romania **(DUHR)**, an alliance – Right Romania Alliance **(RRA)** and a party – People's Party - Dan Diaconescu **(PP-DD)** succeeded to enter the Parliament. Out of the total number of votes given to these parties, the highest frequency had, by far, the Social Liberal Union (62.08% for the Chamber of Deputies and 62.15% for the Senate), followed in descending order by the Right Romania Alliance with 17.48% and 17.28% respectively, People's Party – Dan Diaconescu with 14.82% and 15.15% respectively and the Democratic Union of Hungarians in Romania with 5.44% for the Chamber of Deputies and 5.42% for the Senate (table 1). As a consequence of these results, followed by the redistribution of the votes given to parties which had less than 5% of the electorate options, the final number of deputies and senators in the Romanian Parliament has been established as follows: 273 and 122 for SLU, 56 and 24 for RRA, 47 and 21 for PP-DD, 18 and 9 for DUHR. Regarding **the Chamber of Deputies**, one should mention that 18 deputies of the national minorities were added to the 394 deputies of the parties which succeeded to enter the Parliament, according to the stipulations of the Electoral Law. Therefore, this chamber has **412 deputies** (compared to 334 in the 2008-2012 legislative period). The other legislative chamber, the Romanian Senate, comprises **176 senators** (compared to 137 in the previous Parliamentary period). As a result, **both chambers of the Romanian Parliament** include 588 members (compared to only 471 between 2008 and 2012). Their territorial distribution is highlighted in the tables and figures of this study.

Keywords: *Parliamentary elections, December 2012, deputies, senators, SLU, RRA, PP-DD, DUHR, territorial distribution, counties, geographical-historical provinces.*

1. INTRODUCTION

This study is the eighth which approaches the same issues, published after 1989, when the *Electoral Geography*, a component of the Social Geography in the field

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of Human Geography, as a result of the removal of the former social-political regime in Romania, began to regain its research object and, at the same time, to be permissive for geographical investigation. The first and the sixth study had in view the election of mayors at the elections of 1992 (Banat, Crişana-Maramureş and Transylvania) and 2008 (Cluj County) and were written by Gr. P. Pop and V. Bodocan, while the other six (author: Gr. P. Pop) approach the *parliamentary* (Chamber of Deputies and Senate) and *presidential* elections at national level in Romania in the years 1992, 1996, 2000, 2004, 2008 and 2009 (see References).

Compared to the situations between 1990 and 2004, when parliamentary elections took place at the same time with presidential elections, two significant changes occurred in the electoral process in Romania since 2008. On one hand, due to the extension of the presidential mandate from four to five years, while the duration of the seats in the Chamber of Deputies and the Senate is four years, there was a natural separation of the parliamentary and presidential elections, as the former took place on 30 November 2008 and the latter in the autumn of 2009 (22 November, the first round, and 6 December, the second round). On the other hand, in the case of deputies and senators, their election has been made on the basis of uninominal vote, a methodology kept also for the 9 December 2012 elections.

Regarding the quantitative expression of the **parliamentary elections of 9 December 2012**, one remarks the fact that both for the Chamber of Deputies and the Senate, *the total number of voters registered on the electoral lists* was 18,423,066, of which 18,180,175 on the permanent electoral lists, 187,682 on the supplementary electoral lists and 55,209 voters asked for the mobile ballot box.

Of the total number of voters registered on the electoral lists (18,423,066 persons), the number of people who actually voted was a rather low one, only 7,694,180, giving a turnout of 41.76%. Out of them, 98.70% represented voters on permanent electoral lists, 1.01% those on the supplementary electoral lists and 0.2% those who voted with the help of the mobile ballot box. Regarding the total turnout, one should mention that a higher turnout was registered in rural areas compared to urban areas, and there were other significant differences from one county to another.

To give a synthetic example, five classes have been distinguished. So, the highest turnout, of **more than 50%**, has been recorded in only three counties in southern Romania: Gorj (54.14%), Mehedinţi (50.14%) and Teleorman (54.73%). The next class, **45.1-50%**, includes also a small number of counties: Constanţa, Dâmboviţa, Dolj, Giurgiu and Prahova. The third group, with a turnout between **40.1% and 45%**, corresponding also to the national average turnout (41.76%), comprises 17 Romanian counties: Alba, Argeş, Bihor, Botoşani, Braşov, Brăila, Buzău, Călăraşi, Galaţi, Harghita, Hunedoara, Ialomiţa, Ilfov, Mureş, Olt, Sălaj and Vâlcea. A turnout between 35.1% and 40% was also recorded in many counties, 15: Arad, Bacău, Bistriţa-Năsăud, Caraş-Severin, Cluj, Covasna, Iaşi, Neamţ, Satu Mare, Sibiu, Suceava, Tulcea, Vaslui, Vrancea and Bucharest City (39.36%). The last group, **below 35%**, includes only two counties in the North (Maramureş, 33.70%) and West (Timiş, 32.50%) of Romania.

The general aspects regarding the approached issue have therefore been assessed. Next, the main issues regarding the elections for the *Chamber of Deputies* and the *Senate* will be analyzed and the study will end with the necessary conclusions.

2. THE ELECTIONS FOR THE CHAMBER OF DEPUTIES

In the voting process, the total number of voters registered on the electoral lists was 18,423,066 persons, while only 7,694,180 actually voted, resulting a national turnout of 41.46%, with values over 50% in three Romanian counties (Gorj, Mehedinţi and Teleorman) and below 35% in two Romanian counties (Maramureş and Timiş) as shown (table 2).

The analysis of the results recorded at the elections for the *Chamber of Deputies* underlines the following general characteristics (table 1)[2]:

The results of the 9 December 2012 parliamentary elections in Romania, for the Chamber of Deputies and Senate, by political organizations

Table 1

Political organizations	Chamber of Deputies			Senate			Both chambers
	No. of votes	%	No. of deputies	No. of votes	%	No. of senators	
SLU	4344288	62.08	**273**	4457526	62.15	**122**	**395**
RRA	1223189	17.48	**56**	1239318	17.28	**24**	**80**
PP-DD	1036730	14.82	**47**	1086822	15.15	**21**	**68**
DUHR	380656	5.44	**18**	388528	5.42	**9**	**27**
Minorities	12947	0.18	**18**	-	-	-	**18**
Total	**6997810**	**100.00**	**412**	**7172194**	**100,00**	**176**	**588**

SLU = Social Liberal Union: SDP = Social Democratic Party, NLP = National Liberal Party, CP = Conservative Party, NUPR = National Union for the Progress of Romania; **RRA** = Right Romania Alliance: DLP = Democrat Liberal Party, CF = Civic Force, NPCDP = National Peasant Christian-Democratic Party; **PP-DD** = People's Party–Dan Diaconescu; **DUHR** = Democratic Union of Hungarians in Romania.

- taking into account the preservation of the electoral threshold of 5% for parties and 8% for alliances for the accession to the Chamber of Deputies at the 9 December 2012 elections and that the total number of valid votes was 7,409,626, of which 6,984,863 (94.27%) were given to the four political organizations, the *Social Liberal Union* (62.08%), *Right Romania Alliance* (17.48%*), People's Party-Dan Diaconescu* (14.82%) and the *Democratic Union of Hungarians in Romania* (5,44%);

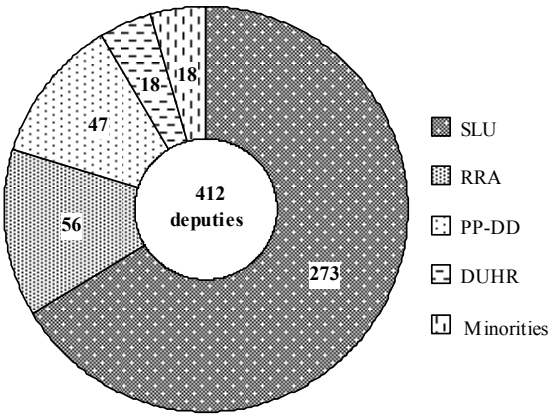

Fig. 1. Repartition of deputies by political organizations, at the 9 December 2012 elections.

[2] Official Bulletin of Romania, Part I, Year 189 (XXIV) - No. 848, Laws, Decrees, Decisions and other Acts, 14 December 2012.

- to the votes of the four political organizations which entered the Parliament, one should add the 12947 valid votes (0.18%) for the *18 national minorities*, that have the right to have one Member of the Parliament (table and fig. 1);

- according to the legislation in force regarding the elections for the Romanian Parliament, the number of MPs in *the Chamber of Deputies* reached 412 deputies (78 more than the previous number, 334 in 2008), of which 273 (66.26%) belong to the Social Liberal Union, 56 (13.59%) of the Right Romania Alliance, 47 (11.41%) of the People's Party-Dan Diaconescu, 18 (4.37%) of the Democratic Union of Hungarians in Romania and also 18 (4.37%) represent the national minorities.

Regarding the representativeness of the political organizations which entered the Chamber of Deputies, a significant subject is the territorial repartition of the deputies across the Romanian territory which may be assessed, on one hand, at the level of the 41 counties and Bucharest City and, on the other hand, at the level of the eight geographical-historical provinces of Romania: Transylvania, Banat, Crişana, Maramureş, Moldavia, Dobrudja, Muntenia and Oltenia.

2. 1. The repartition of the deputies by political organizations and by counties

The number of deputies from different Romanian counties is of course conditioned by the geodemographic size of the county and the turnout of the vote. Table 2 indicates the existing situation.

The repartition of the deputies by political unions, alliances and political parties, at county level at the 9 December 2012 parliamentary elections in Romania

Table 2

Crt. no.	County	**TOTAL**	**SLU**	SDP	NLP	CP	NUPR	**RRA**	DLP	CF	NPCDP	**PP-DD**	**DUHR**
1	Alba	**5**	**3**	1	2	-	-	**1**	1	-	-	**1**	-
2	Arad	**7**	**3**	2	1	-	-	**2**	2	-	-	**2**	-
3	Argeş	**12**	**9**	6	2	1	-	**1**	1	-	-	**2**	-
4	Bacău	**13**	**10**	5	4	1	-	**1**	1	-	-	**2**	-
5	Bihor	**11**	**7**	3	4	-	-	**1**	1	-	-	**1**	**2**
6	Bistriţa-Năsăud	**4**	**3**	2	1	-	-	**1**	1	-	-	-	-
7	Botoşani	**8**	**6**	3	3	-	-	**1**	-	1	-	**1**	-
8	Braşov	**11**	**8**	4	3	1	-	**2**	2	-	-	**1**	-
9	Brăila	**7**	**5**	3	1	-	1	**1**	1	-	-	**1**	-
10	Buzău	**9**	**7**	3	3	-	1	**1**	1	-	-	**1**	-
11	Caraş-Severin	**7**	**5**	2	2	-	1	**1**	1	-	-	**1**	-
12	Călăraşi	**7**	**5**	1	3	-	1	**1**	1		-	**1**	-
13	Cluj	**10**	**6**	2	4	-	-	**2**	2	-	-	**1**	**1**
14	Constanţa	**14**	**10**	7	3	-	-	**2**	2	-	-	**2**	-

15	Covasna	**4**	**1**	1	-	-	-	**-**	-	-	-		**3**
16	Dâmboviţa	**11**	**8**	5	2	1	-	**2**	2	-	-	**1**	-
17	Dolj	**13**	**10**	6	4	-	-	**2**	2	-	-	**1**	-
18	Galaţi	**11**	**9**	5	2	1	1	**1**	1	-	-	**1**	-
19	Giurgiu	**5**	**4**	1	3	-	-	**-**	-	-	-	**1**	-
20	Gorj	**8**	**5**	5	-	-	-	**1**	1	-	-	**2**	-
21	Harghita	**5**	**1**	1	-	-	-	**-**	-	-	-	-	**4**
22	Hunedoara	**8**	**6**	3	3	-	-	**1**	1	-	-	**1**	-
23	Ialomiţa	**6**	**4**	2	1	1	-	**1**	1	-	-	**1**	-
24	Iaşi	**16**	**12**	6	5	-	1	**2**	2	-	-	**2**	-
25	Ilfov	**5**	**4**	1	3	-	-	**-**	-	-	-	**1**	-
26	Maramureş	**9**	**6**	3	2	-	1	**1**	1	-	-	**1**	**1**
27	Mehedinţi	**5**	**4**	3	1	-	-	**1**	1	-	-	-	-
28	Mureş	**8**	**3**	2	1	-	-	**1**	1	-	-	**1**	**3**
29	Neamţ	**10**	**7**	4	1	1	1	**2**	2	-	-	**1**	-
30	Olt	**9**	**7**	6	1	-	-	**-**	-	-	-	**2**	-
31	Prahova	**15**	**10**	4	6	-	-	**3**	3	-	-	**2**	-
32	Satu Mare	**5**	**2**	1	1	-	-	**1**	1	-	-	-	**2**
33	Sălaj	**4**	**2**	1	1	-	-	**1**	1	-	-	-	**1**
34	Sibiu	**7**	**5**	3	2	-	-	**1**	1	-	-	**1**	-
35	Suceava	**12**	**9**	5	4	-	-	**2**	2	-	-	**1**	-
36	Teleorman	**8**	**6**	4	2	-	-	**1**	1	-	-	**1**	-
37	Timiş	**13**	**9**	6	1	1	1	**2**	2	-	-	**1**	**1**
38	Tulcea	**6**	**4**	3	1	-	-	**1**	1	-	-	**1**	-
39	Vaslui	**9**	**7**	5	2	-	-	**1**	1	-	-	**1**	-
40	Vâlcea	**8**	**6**	3	2	-	1	**1**	1	-	-	**1**	-
41	Vrancea	**8**	**6**	4	2	-	-	**1**	1	-	-	**1**	-
42	Bucharest City	**37**	**28**	13	11	3	1	**6**	4	1	1	**3**	-
43	Abroad	**4**	**1**		-	1	-	**2**	2	-	-	**1**	-
	Total	**394**	**273**	150	100	12	11	**56**	53	3	1	**47**	**18**

SLU = Social Liberal Union: SDP = Social Democratic Party, NLP = National Liberal Party, CP = Conservative Party, NUPR = National Union for the Progress of Romania; **RRA** = Right Romania Alliance: DLP = Democrat Liberal Party, CF = Civic Force, NPCDP = National Peasant Christian-Democratic Party; **PP-DD** = People's Party – Dan Diaconescu; **DUHR** = Democratic Union of Hungarians in Romania.

Therefore, if one takes into account the total number of MPs in the Chamber of Deputies from the 41 counties (353) and Bucharest City (37), in the 42 local government units there are 390 deputies. This situation allows us to stress a few general points:

- the highest number of local government units (20, or 47.7% of the total 42) have between **6 and 10 deputies**. At the upper limit (10 deputies) one finds the counties of Arad, Cluj and Neamţ, while at the lower limit (6 deputies) only the counties of Ialomiţa and Tulcea;

- a number of 11 counties (26.3% of the total of 41 counties plus Bucharest City) have between **11 and 15** MPs in the Chamber of Deputies. Prahova County is at the upper limit (15 deputies) while Bihor, Braşov, Dâmboviţa and Galaţi counties are at the lower limit (11 deputies);

- **nine counties** (21.5%) are situated in the low part of the ranking regarding the number of deputies, as they only have either four deputies each (Bistriţa-Năsăud, Covasna and Sălaj), or five deputies each (Alba, Giurgiu, Harghita, Ilfov, Mehedinţi and Satu Mare);

- a special situation is characteristic for Iaşi County (2.3% of the 42 local government units) with 16 deputies and moreover for Bucharest City (also 2.3% of the total units), which is represented in the Chamber of Deputies by 37 MPs.

Concerning the weighted representation of the four political organizations which entered the Chamber of Deputies, several significant aspects may also be highlighted at the county level:

- **SLU**, with 69.8% (272 in absolute numbers) of the 390 deputies from the 41 counties and Bucharest City, has **more than 75%** or even more than 80% in the counties of Bacău (76.9%), Buzău (77.8%), Dolj (76.9%), Galaţi (81.8%), Giurgiu (80%), Ilfov (80%), Mehedinţi (80%), Olt (77.8%), Vaslui (77.8%) and Bucharest City (75.7%). The most frequent relative values are those **close to the national average** (69.5%). The lowest values, **60% and under**, are recorded in the counties of Alba (60%), Arad (42.9%), Cluj (60%), Covasna (25%), Harghita (20%), Mureş (37.5%), Satu Mare (40%) and Sălaj (50%). This situation has been determined by the higher weight of the Hungarian population, except for Alba and Arad counties. Taking the analysis to the manner of representation of the four parties comprised in the SLU, one should remark that the *SDP* has deputies in all Romanian counties. The national average of the SDP is 55.1% of the 272 SLU deputies. However, the weight is very different from one county to another. Values *over 65%* were registered in Arad (66.7%), Argeş (66.7%), Constanţa (70%), Covasna (100%), Gorj (100%), Harghita (100%), Mehedinţi (75%), Mureş (66.7%), Olt (87.8%), Teleorman (66.7%), Timiş (66.7%), Tulcea (75%), Vaslui (71.4%) and Vrancea (66,7%) and *under 45 %* in Alba (33.3%), Bihor (42.9%), Buzău (42.9%), Caraş-Severin (40%), Călăraşi (20%), Cluj (33.3%), Giurgiu (25%), Ilfov (25%) and Prahova (40%). Compared to the SDP, *the NLP* has an average of 36.8% of the 272 SLU deputies and the situation is quite different, as one may stress that the NLP does not have any deputies in the counties of Covasna, Gorj and Harghita. Weights *lower than 25%* are recorded in the counties of Argeş (22.2%), Brăila (20.0%), Galaţi (22.2%), Neamţ (14.3%), Olt (14.3%) and Timiş (11.1%) and *higher than 45%* in Alba (66.7%), Bihor (57.1%), Botoşani (50%), Călăraşi (60%), Cluj (66.7%), Giurgiu (75%), Hunedoara (50%), Ilfov (75%), Prahova (60%), Satu Mare (50%) and Sălaj (50%). The other two parties which are part of the SLU, *CP* and *NUPR*, have 11 MPs each in the Chamber of Deputies. The CP has one deputy from each of the counties of Argeş, Bacău, Braşov, Dâmboviţa, Galaţi, Ialomiţa, Neamţ and Timiş and three deputies from Bucharest City, while the NUPR has one deputy from the counties of Brăila, Buzău, Caraş-Severin, Călăraşi Galaţi, Iaşi, Maramureş, Neamţ, Timiş, Vâlcea and Bucharest City (table 2);

- **RRA**, the second political organization which entered the Chamber of Deputies, has only **13.8%** or 54 deputies out of the total of 390 from the 41 counties and Bucharest City. It recorded higher relative values of 20% or more in the counties of Alba (20%), Arad (28.6%), Bistriţa-Năsăud (25%), Cluj (20%), Mehedinţi (20%), Neamţ (20%), Prahova (20%), Satu Mare (20%) and Sălaj (25%), and under 10% in the counties of Argeş (8.3%), Bacău (7.7%), Bihor (9.1%) and Galaţi (9.1%). *The Right Romania Alliance* has no deputies from the counties of Covasna, Giurgiu, Harghita, Ilfov and Olt. Regarding the repartition of the 54 RRA deputies by the parties which make up the alliance, it comes out that 51 (94.4%) belong to the DLP and three (5.6%) to the "allies" which helped setting up the "famous" *Right Romania Alliance*, the *CF*, with one deputy from Botoşani County and Bucharest City and *NPCDR*, with one deputy from Bucharest City;

- the third political organization – **PP-DD –** succeeded to send a number of 46 MPs to the Chamber of Deputies, representing 11.8% of the 390 deputies from the counties and Bucharest City. The analysis at the level of the 42 local government units shows that this party has no deputies from Bistriţa-Năsăud, Covasna, Harghita, Mehedinţi, Satu Mare and Sălaj counties, it has two deputies from the counties of Arad, Argeş, Constanţa, Gorj, Iaşi, Olt and Prahova, three deputies from Bucharest City while in all other counties they have one deputy;

- **DUHR** is the fourth entity which has MPs in the Chamber of Deputies, amounting to a total of 18 deputies (4.6% of the 390 deputies from the 41 counties and Bucharest City). Naturally, they represent the counties where there is Hungarian population: Bihor (2 deputies), Cluj (1), Covasna (3), Harghita (4), Maramureş (1), Mureş (3), Satu Mare (2), Sălaj (1) and Timiş (1).

In the present legislative period of the Romanian Parliament (2012-2016), besides the 390 deputies representing the 41 counties and Bucharest City, there are also four representatives of the Romanians living abroad: *Mihai Aurelian* (PP-DD), *Tomac Eugen* (DLP), *Lubanovici Mircea* (DLP) and *Raeţchi Ovidiu Alexandru* (SDP), as well as 18 deputies of the national minorities. Therefore, it came to the situation that the Chamber of Deputies consists of 412 MPs.

Regarding the **deputies of the national minorities**, the mandates have been given to the organizations which obtained at least 10% of the electoral coefficient established at national level. Based on this request, the situation of the presence of the national minorities in the Chamber of Deputies, sorted according to the number of valid votes, is the following[3]:

1. *Democratic Forum of Germans in Romania*, Ganţ Ovidiu-Victor, Sibiu , 4.394;
2. *Bulgarian Union of Banat-Romania*, Marcovici Nicolae, Timiş, 1296;
3. *Democratic Union of Slovaks and Czechs in Romania*, Merka Adrian-Miroslav, Bihor, 1055;
4. *Union of Poles of Romania*, Longher Gherbazen, Suceava, 988;
5. *Union of Croatians of Romania,* Ghera Giureci Slobodan, Caraş-Severin, 810;
6. *Russians-Lipovans Community of Romania*, Ignat Miron, Tulcea, 801;

[3] We mentioned the following: current number, name of the organization of citizens belonging to national minorities, surname and first name(s) of the candidate who received the highest number of valid votes, electoral district and number of valid votes received.

7. *Democratic Union of Turkish-Muslim Tatars of Romania*, Amet Varol, Constanţa, 796;
8. *"Pro-Europa" Party of the Roma Association*, Păun Nicolae, Covasna, 589;
9. *Union of Serbs of Romania*, Gvozdencovici Slavomir, Caraş-Severin., 554;
10. *Union of Ukrainians of Romania*, Marocici Ion, Maramureş, 311;
11. *Association of Macedonians of Romania*, Stancu Ionel, Iaşi, 237;
12. *Greek Union of Romania*, Zisopol Dragoş-Gabriel, Prahova, 206;
13. *League of Albanians of Romania Association*, Manolescu Oana, Iaşi, 195;
14. *Turkish Democratic Union of Romania*, Ibram Iusein, Constanţa, 168;
15. *Cultural Union of Rusyns of Romania*, Firczak Gheorghe, Arad, 150;
16. *Federation of Jewish Communities of Romania*, Vainer Aurel, Călăraşi, 140;
17. *Union of Armenians of Romania*, Pambuccian Varujan, Bucharest City, 132;
18. *Association of Italians of Romania - RO. AS. IT*., Grosaru Mircea, Bistriţa-Năsăud, 125.

2. 2. The repartition of the deputies belonging to parliamentary organizations by geographical-historical provinces of Romania

The repartition of the deputies and senators of the parliamentary formations at the level of the Geographical-Historical Provinces of Romania[4]

Table 3

Crt. no.	Geographical-Historical Provinces	Chamber of Deputies					Senate					Both Chambers
		SLU	RRA	PP-DD	DUHR	Total	SLU	RRA	PP-DD	DUHR	Total	
1	Transylvania	38	10	6	12	**66**	19	6	2	7	**34**	100
2	Banat	17	5	4	1	**27**	7	3	2		**12**	39
3	Crişana and Maramureş	15	3	2	5	**25**	7	2		2	**11**	36
4	Moldavia	66	11	10	0	**87**	27	4	5		**36**	123
5	Dobrudja	14	3	3	0	**20**	6	1	1		**8**	28
6	Muntenia	62	11	12	0	**85**	28	2	6		**36**	121
7	Bucharest City	28	6	3	0	**37**	12	3	1		**16**	53
8	Oltenia	32	5	6	0	**43**	15	2	4		**21**	64
	Total	**272**	**54**	**46**	**18**	**390**	**121**	**23**	**21**	**9**	**174**	**564**

The Romanian Chamber of Deputies, as shown above, consists of 412 deputies, of which 390 represent the eight geographical-historical provinces of Romania, as follows: *Transylvania* (Alba, Bistriţa-Năsăud, Braşov, Cluj, Covasna, Harghita, Hunedoara, Mureş, Sălaj, Sibiu), *Banat* (Arad, Caraş-Severin, Timiş), *Crişana* (Bihor), *Maramureş* (Maramureş,

[4] In the analysis of the territorial repartition of deputies and senators, we had in view only the 41 counties and Bucharest City, without the 18 deputies of national minorities, the 4 deputies from abroad and 3 senators representing the Romanian diaspora.

Satu Mare), *Moldavia* (Bacău, Botoşani, Galaţi, Iaşi, Neamţ, Suceava, Vaslui, Vrancea), *Dobrudja* (Constanţa, Tulcea), *Muntenia* (Argeş, Brăila, Buzău, Călăraşi, Dâmboviţa, Giurgiu, Ialomiţa, Ilfov, Prahova, Teleorman), *Oltenia* (Dolj, Gorj, Mehedinţi, Olt, Vâlcea)[5] and Bucharest City, 18 belong to the organizations of the citizens representing national minorities and 4 are the representatives of the Romanians living abroad.

Regarding the political affiliation of the 390 deputies representing the geographical-historical provinces and Bucharest City, one notices a clear difference between the first parliamentary organization and the other three. The first one, the SLU, recorded a number of 272 deputies (69.8% of the total of 390). The second one, RRA, succeeded to enter the Chamber of Deputies with only 54 MPs (13.8%), the third one – PP-DD – has 46 deputies (11.8%) and the last one – DUHR – entered the lower chamber of the Romanian Parliament with 18 deputies, equal to the number of deputies representing the national minorities, above mentioned.

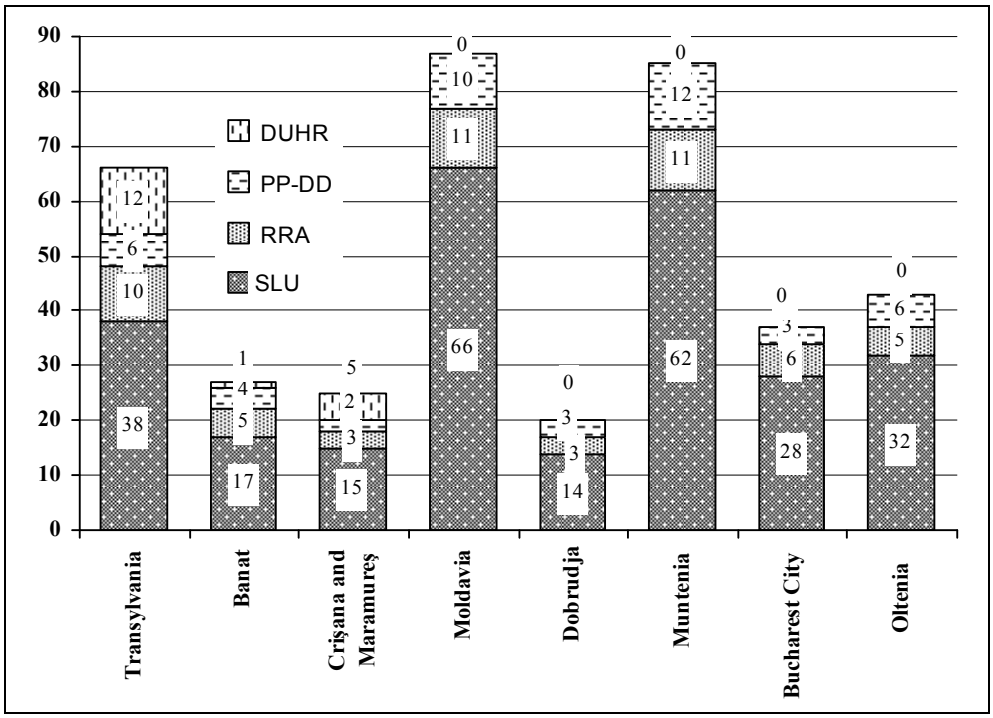

Fig. 2. The repartition of the deputies by political formations and geographical-historical provinces, at the parliamentary elections in Romania on 9 December 2012.

Concerning the distribution of deputies belonging to the four political organizations who made it to the Chamber of Deputies, the analysis at the level of geographical-historical provinces reveals the following peculiar characteristics:

[5] In tables and graphical representation, Crişana and Maramureş provinces are mentioned together.

- the **SLU** succeeded to obtain more than 55% of the number of deputies in all geographical-historical provinces. Lower values than the national average (69.8%) were registered in the provinces of western and central Romania, *Transylvania*, 57.6% (38 deputies), *Banat*, 63.0% (17 deputies) and *Crişana and Maramureş*, 60.0% (15 deputies). This situation is mainly determined by the presence of DUHR deputies. The provinces in the eastern, southern and south-eastern Romania, including Bucharest City, have been characterized by higher values than the national average: *Moldavia* 75.9% (66 deputies), *Dobrudja* 70.0% (14 deputies), *Muntenia* 72.9% (62 deputies), *Bucharest City* 75.9% (28 deputies) and *Oltenia* 74.4% (32 deputies). At the level of the four political organizations which make up the SLU, one may further remark that the highest values belong to the *SDP* and *NPL*, as follows: 52.6% and 44.7% in Transylvania, 58.8% and 23.5% in Banat, 46.7% and 46.7% in Crişana and Maramureş, 56.1% and 34.8% in Moldavia, 71.4% and 28.6% in Dobrudja, 48.4% and 41.9% in Muntenia, 46.4% and 39.3% in Bucharest City, 71.9% and 25.0% in Oltenia.
At national level, these values are 55.2% and 36.8%. The other two parties composing the SLU do not have more than 3 deputies in any province. The *CP* has one deputy from Transylvania, one from Banat and three deputies from each Moldavia, Muntenia and Bucharest City. The *NUPR* has deputies from Banat (2), Crişana and Maramureş, Bucharest City and Oltenia (1 each) and Moldavia (3 deputies);

- **RRA** has a relative score of 13.8% at national level (54 deputies out of the total of 390). It recorded the highest score in *Banat,* 18.5% (5 deputies out of 27), and the lowest score in *Oltenia*, 11.6% (5 deputies out of 43). Values above the average were also registered in Transylvania (15.2%, 10 deputies out of 66), Dobrudja (15.0%, 3 out of 20) and Bucharest City (16.2%, 6 out of 37). Values below the average were recorded in Crişana and Maramureş (12.0%, 3 out of 25), Moldavia (12.6%, 11 out of 87) and Muntenia (12.9%, 11 out of 85). Regarding the distribution of the 54 RRA deputies at the level of provinces, it comes out that all deputies from Transylvania (10), Banat (5), Crişana and Maramureş (3), Dobrudja (3), Muntenia (11) and Oltenia (5) are affiliated to the *DLP*, so 100%. Exceptions from this rule are recorded in Moldavia, where this party has 90.9% (10 deputies out of 11) and in Bucharest City, 66.7% (4 deputies out of 6). Besides the DLP, other two parties were comprised in the RRA in an insignificant measure: the *FC,* which has deputies from Moldavia (9.1%, 1 deputy out of 11) and Bucharest City (16.7%, 1 deputy out of 6) and the *NPCDP*, also in Bucharest City (16.7%, 1 deputy out of the total of 6 affiliated to the RRA);

- the third political organization which accessed the Chamber of Deputies with 46 MPs (11.8% out of the total of 390 deputies) is **PP-DD**. It has representatives from all geographical-historical provinces of Romania. Its highest value was recorded in Dobrudja, 15.0% (3 deputies out of 20) and the lowest in Crişana and Maramureş, 8.0% (2 deputies out of 25). In between these values, one finds Transylvania 9.1% (6 deputies out of 66), Banat 14.8% (4 out of 25), Moldavia 11.5% (10 out of 87), Muntenia 14.1% (12 out of 85), Bucharest City 8.1% (3 deputies out of 37) and Oltenia 14.0% (6 out of 43);

- the last political organization which entered the Chamber of Deputies is the **DUHR**, which succeeded to gain the number of votes for 18 deputies (4.6% out of the total of 390). They belong naturally to the provinces of central and western Romania, Transylvania 18.2% (12 deputies out of 66), Banat 3.7% (1 deputy out of 27) and Crişana and Maramureş 20.0% (5 deputies out of 25).

3. THE PARLIAMENTARY ELECTIONS FOR THE SENATE

The action of electing the MPs in the Romanian Senate on 9 December 2012 developed in the following coordinates: there were 18,423,066 voters enrolled on the electoral lists, then 7,694,180 people who actually voted, resulting a turnout of 41.76%. The number of valid votes was 7,416,628.

Once the results came out, the next step was to group the seats and valid votes given to political organizations. The situation was the following: the *Social Liberal Union* (SLU) obtained 4,457,536 valid votes, gaining 122 seats in the Senate (69.3%), then the *Right Romania Alliance* (RRA) obtained 1,239,318 valid votes and 24 seats (13.6%), *People's Party-Dan Diaconescu* 1,086,822 votes and 21 seats (11.9%) and the *Democratic Union of Hungarians in Romania* (DUHR) 388,528 votes and 9 seats in the Romanian Senate (5.1%), amounting to **176 senators** (fig. 3).

As in the case of the Chamber of Deputies, regarding the *Romanian Senate* it is necessary to assess the distribution of senators across the Romanian territory. This may be well highlighted at the level of the 41 counties and Bucharest City (table 4), on the one hand, and at the level of the eight geographical-historical provinces of Romania (Transylvania, Banat, Crişana, Maramureş, Moldavia, Dobrudja, Muntenia and Oltenia)[6], on the other hand.

3. 1. The repartition of senators of parliamentary organizations by counties

This section assesses the essential issues regarding the territorial repartition of the 174 senators representing the 41 Romanian counties and Bucharest City. The other two, to reach the 176 senators who are members of the upper chamber of the Romanian Parliament, were elected by the *Romanian diaspora* (Badea Viorel-Riceard, representing the RRA, more precisely the DLP, and Anghel Adrian, of the SLU, or the SDP respectively).

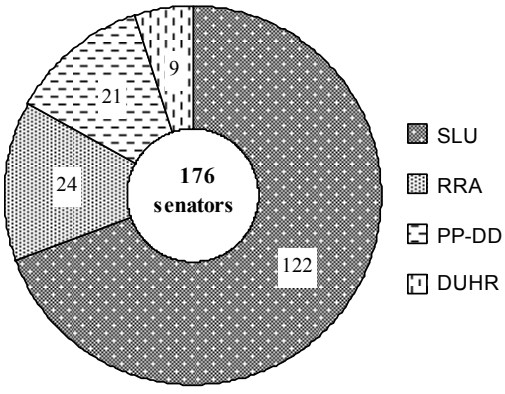

Fig. 3. The repartition of senators on political formations, at the elections from 9th of December, 2012.

Of course, the representation of senators by political organizations at the level of the counties and Bucharest City is characterized by significant differences from one case to another. The highest number of senators is recorded in Dolj, Iaşi and Prahova (7 each), Braşov, Constanţa and Timiş (6 each), Argeş, Bacău, Bihor and Galaţi (5 each), while Bucharest City is by far the first with 16 senators. The lowest number is recorded in the counties of Alba, Călăraşi, Giurgiu, Harghita, Ilfov, Satu Mare, Sălaj, Tulcea and Vrancea (2 each):

[6] For the generalization of cartographical representation,the provinces of Crişana and Maramureş are merged together.

- thus, the **SLU**, with a general average of 69.3% (122 senators out of 176), recorded values higher than the national average in terms of the number of senators in the counties of Argeş, Bacău, Botoşani, Buzău, Dâmboviţa, Dolj, Galaţi, Hunedoara, Iaşi, Maramureş, Neamţ, Olt, Prahova, Sibiu, Teleorman, Vaslui, Vâlcea and Bucharest City. In some counties, the percentage was 100%, as in Călăraşi, Giurgiu, Ilfov, Tulcea and Vrancea. In other counties, the relative value was 50%, as in Alba, Cluj, Mureş, Satu Mare and Sălaj, and even under 50% in Arad (33.3%) and Covasna (33.3%). One should point out the fact that Harghita County is the only one where the SLU does not have any senator. Descending to the level of the parties composing the SLU, one remarks that the *SDP* has an average of 48.4% (59 senators) and it does not have a senator in the counties of Arad, Bistriţa-Năsăud, Călăraşi, Covasna and Harghita. On the other hand, in Satu Mare, Sălaj, Vrancea and abroad it has 100% of the SLU senators. In many counties, the SDP has 50% or less than 50% of the SLU senators, as in Argeş, Bacău, Bihor, Botoşani, Braşov, Brăila, Caraş-Severin, Cluj, Constanţa, Galaţi, Giurgiu, Gorj, Hunedoara, Ialomiţa, Iaşi, Ilfov, Mehedinţi, Mureş, Neamţ, Sibiu, Timiş, Tulcea, Vâlcea and Bucharest City. The SDP has more than 50% in Dolj (60%), Prahova (80%), Buzău, Dâmboviţa, Maramureş, Olt, Suceava, Teleorman and Vaslui counties (in the seven latter it has 66.7%). The second party of the SLU, the *NLP*, is represented in the upper chamber of the Parliament by 49 senators (40.2% of the 122 SLU senators). In many counties it has 50% of the SLU senators, as in Argeş, Brăila, Caraş-Severin, Cluj, Giurgiu, Gorj, Ilfov, Mehedinţi, Mureş, Timiş and Tulcea. It has values below the average in the counties of Bacău (25%), Botoşani (33.3%), Buzău (33.3%), Constanţa (25%), Dâmboviţa (33.3%), Dolj (20%), Galaţi (25%), Maramureş (33.3%), Neamţ (33.3%), Prahova (20%), Vaslui (33.3%) and Bucharest City (33,3%). In the class of counties with 60-80% the following are included: Bihor (66.7%), Braşov (75%), Hunedoara (66.7%), Iaşi (60%), Sibiu (66.7%) and Vâlcea (66.7%). The NLP has 100% of the SLU senators in Alba, Arad, Bistriţa-Năsăud, Călăraşi and Covasna counties but it is not represented in Harghita, Ialomiţa, Olt, Satu Mare, Sălaj, Suceava, Teleorman, Vrancea and abroad.

The repartition of the senators by political unions, alliances and parties at county level at the 9 December 2012 parliamentary elections in Romania

Table 4

Crt. no.	**County**	**TOTAL**	**SLU**	SDP	NLP	CP	NUPR	**RRA**	DLP	CF	NPCDP	**PP-DD**	**DUHR**
1	Alba	**2**	**1**	-	1	-	-	**1**	1	-	-	**-**	**-**
2	Arad	**3**	**1**	-	1	-	-	**2**	2	-	-	**-**	**-**
3	Argeş	**5**	**4**	2	2	-	-	**-**	-	-	-	**1**	**-**
4	Bacău	**5**	**4**	1	1	1	1	**-**	-	-	-	**1**	**-**
5	Bihor	**5**	**3**	1	2	-	-	**1**	1	-	-	**-**	**1**
6	Bistriţa-Năsăud	**3**	**2**	-	2	-	-	**1**	1	-	-	**-**	**-**
7	Botoşani	**4**	**3**	1	1	-	1	**-**	-	-	-	**1**	**-**
8	Braşov	**6**	**4**	1	3	-	-	**1**	1	-	-	**1**	**-**
9	Brăila	**3**	**2**	1	1	-	-	**-**	-	-	-	**1**	**-**

10	Buzău	**4**	**3**	2	1	-	-	**-**	-	-	-	**1**	**-**
11	Caraş-Severin	**3**	**2**	1	1	-	-	**-**	-	-	-	**1**	**-**
12	Călăraşi	**2**	**2**	-	2	-	-	**-**	-	-	-	**-**	**-**
13	Cluj	**4**	**2**	1	1	-	-	**1**	1	-	-	**-**	**1**
14	Constanţa	**6**	**4**	2	1	1	-	**1**	1	-	-	**1**	**-**
15	Covasna	**3**	**1**	-	1	-	-	**-**	-	-	-	**-**	**2**
16	Dâmboviţa	**4**	**3**	2	1	-	-	**1**	1	-	-	**-**	**-**
17	Dolj	**7**	**5**	3	1	1	-	**1**	1	-	-	**1**	**-**
18	Galaţi	**5**	**4**	2	1	1	-	**-**	-	-	-	**1**	**-**
19	Giurgiu	**2**	**2**	1	1	-	-	**-**	-	-	-	**-**	**-**
20	Gorj	**3**	**2**	1	1	-	-	**-**	-	-	-	**1**	**-**
21	Harghita	**2**	-	-	-	-	-	**-**	-	-	-	**-**	**2**
22	Hunedoara	**4**	**3**	1	2	-	-	**-**	-	-	-	**1**	**-**
23	Ialomiţa	**3**	**2**	1	-	-	1	**-**	-	-	-	**1**	**-**
24	Iaşi	**7**	**5**	2	3	-	-	**1**	1	-	-	**1**	**-**
25	Ilfov	**2**	**2**	1	1	-	-	**-**	-	-	-	**-**	**-**
26	Maramureş	**4**	**3**	2	1	-	-	**1**	1	-	-	**-**	**-**
27	Mehedinţi	**3**	**2**	1	1	-	-	**1**	1	-	-	**-**	**-**
28	Mureş	**4**	**2**	1	1	-	-	**1**	1	-	-	**-**	**1**
29	Neamţ	**4**	**3**	1	1	-	1	**1**	1	-	-	**-**	**-**
30	Olt	**4**	**3**	2	-	1	-	**-**	-	-	-	**1**	**-**
31	Prahova	**7**	**5**	4	1	-	-	**1**	1	-	-	**1**	**-**
32	Satu Mare	**2**	**1**	1	-	-	-	**-**	-	-	-	**-**	**1**
33	Sălaj	**2**	**1**	1	-	-	-	**-**	-	-	-	**-**	**1**
34	Sibiu	**4**	**3**	1	2	-	-	**1**	1	-	-	**-**	**-**
35	Suceava	**5**	**3**	2	-	1	-	**1**	1	-	-	**1**	**-**
36	Teleorman	**4**	**3**	2	-	1	-	**-**	-	-	-	**1**	**-**
37	Timiş	**6**	**4**	2	2	-	-	**1**	1	-	-	**1**	**-**
38	Tulcea	**2**	**2**	1	1	-	-	**-**	-	-	-	**-**	**-**
39	Vaslui	**4**	**3**	2	1	-	-	**1**	1	-	-	**-**	**-**
40	Vâlcea	**4**	**3**	1	2	-	-	**-**	-	-	-	**1**	**-**
41	Vrancea	**2**	**2**	2	-	-	-	**-**	-	-	-	**-**	**-**
42	Bucharest City	**16**	**12**	5	4	2	1	**3**	2	-	1	**1**	**-**
43	Abroad	**2**	**1**	1	-	-	-	**1**	1	-	-	**-**	**-**
	Total	**176**	**122**	59	49	9	5	**24**	23	-	1	**21**	**9**

SLU = Social Liberal Union: SDP = Social Democratic Party, NLP = National Liberal Party, CP = Conservative Party, NUPR = National Union for the Progress of Romania; **RRA** = Right Romania Alliance: DLP = Democrat Liberal Party, CF = Civic Force, NPCDP = National Peasant Christian-Democratic Party; **PP-DD** = People's Party – Dan Diaconescu; **DUHR** = Democratic Union of Hungarians in Romania.

As for the *CP*, one should stress that it has 9 senators in the Romanian Parliament (7.4% of the 122 SLU senators), one from each of the counties of Bacău (25%), Constanţa (25%), Dolj (20%), Galaţi (25%), Olt (33,3%), Suceava (33.3%) and Teleorman (33.3%) and two representing Bucharest City (16,7%). The *NUPR* sent 5 MPs to the Senate (4.1% of those of the SLU), 1 from each of the counties of Bacău (25%), Botoşani (33.3%), Ialomiţa (50%), Neamţ (33.3%) and Bucharest City;

- RRA has 24 senators (13.6% of the total of 176 at national level) and is therefore the second political organization which entered the Romanian Senate. It has representatives from Bucharest City (3 senators, 18.8% of the 16 representing the capital city), then from Arad County (2 senators, 66.7% out of 3), then it has 1 senator from each of the following 18 counties: Alba, Bihor, Bistriţa-Năsăud, Braşov, Cluj, Constanţa, Dâmboviţa, Dolj, Iaşi, Maramureş, Mehedinţi, Mureş, Neamţ, Prahova, Sibiu, Suceava, Timiş and Vaslui, as well as from abroad. In 22 counties the RRA did not receive enough votes to have at least one senator: Argeş, Bacău, Botoşani, Brăila, Buzău, Caraş-Severin, Călăraşi, Covasna, Galaţi, Giurgiu, Gorj, Harghita, Hunedoara, Ialomiţa, Ilfov, Olt, Satu Mare, Sălaj, Teleorman, Tulcea, Vâlcea and Vrancea. Focusing the analysis on the structure of the *RRA*, it comes out that the voters' options were given almost entirely to the *DLP*, which gained 23 senators (95.8% of the 24 affiliated to the RRA). The 24th is member of the *NPCDP*, from Bucharest City (table 4). It comes out that the *CF* did not succeed to be represented in the Romanian Senate. In fact, the very modest results of the DLP at these legislative elections were the consequence of a deeply flawed strategy;

- **PP-DD** is the third political organization which succeeded to enter the Romanian Parliament. It has 21 senators (11.9% of the total of 176). Their distribution at territorial level shows that this party is represented by one senator in the counties of Brăila, Caraş-Severin, Gorj and Ialomiţa (33.3% of the 3 county senators), Botoşani, Buzău, Hunedoara, Olt and Vâlcea (25%), Argeş, Bacău, Galaţi, Teleorman and Suceava (20%), Braşov, Constanţa and Timiş (16.7%), Dolj, Iaşi and Prahova (14,3%), and Bucharest City (1 senator representing 6.3% of the 16 senators of the capital city). It comes out that the PP-DD did not succeed to have any MPs in the Romanian Senate from the following 21 counties: Alba, Arad, Bihor, Bistriţa-Năsăud, Călăraşi, Cluj, Covasna, Dâmboviţa, Giurgiu, Harghita, Ilfov, Maramureş, Mehedinţi, Mureş, Neamţ, Satu Mare, Sălaj, Sibiu, Tulcea, Vaslui and Vrancea and neither from abroad;

- the last organization which succeeded to enter the Romanian Parliament at the 9 December 2012 elections is the **DUHR**. It has 9 senators (5.1% out of the total of 176), coming from counties where there is a higher weight of the Hungarian population , such as Bihor (20%, 1 senator out of 5), Cluj (25%, 1 out of 4), Covasna (66.7%, 1 out of 3), Harghita (100%, 2 out of 2), Mureş (25%, 1 out of 4), Satu Mare (50%, 1out of 2) and Sălaj (50%, 1 out of 2).

3. 2. The repartition of the senators belonging to parliamentary organizations by geographical-historical provinces

There were 176 senators elected at the 9 December 2012 parliamentary elections, 39 more than in 2008, out of which 174 are the representatives of the 41 Romanian counties and Bucharest City, while 2 senators were elected by the Romanian diaspora at the continental level. Their repartition at the level of geographical-historical provinces

was made according to their territorial and geodemographic size. In descending order, the situation is the following: Moldavia and Muntenia each have 36 senators (20.7% each), Transylvania 34 (19.5%), Oltenia 21 (12.1%), Bucharest City 16 (9.2%), Banat 12 (6.9%), Crişana and Maramureş 11 (6.3%, 5 in Crişana and 6 in Maramureş) and Dobrudja 8 (4.6%).

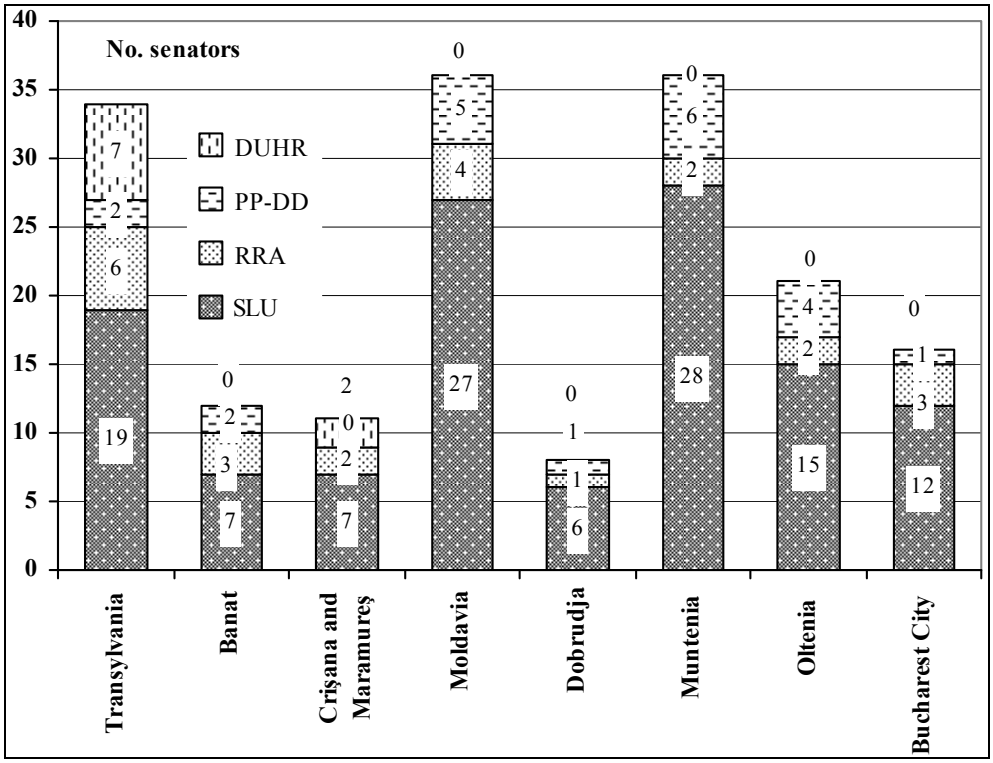

Fig. 4. The repartition of the parliamentary organizations' senators by geographical-historical provinces.

Compared to the national level, the repartition of the senators by political organizations and geographical-historical provinces allows the highlighting of a few peculiarities which deserve to be mentioned, as follows:

- **SLU**, totaling 121 senators (69.5% out of 174) recorded a number of senators above the national average in the provinces of Muntenia (77.8%, 28 senators out of 36), Moldavia (75%, 27 out of 36), Dobrudja (75%, 6 out of 8), Bucharest City (75%, 12 out of 16) and Oltenia (71.4%, 15 out of 21). Its share was significantly lower in the western and central Romanian provinces, such as Transylvania (55.9%, 19 senators out of 34), Banat (58.3%, 7 out of 12) and in Crişana and Maramureş (63.6%, 7 out of 11). Focusing the analysis on the parties making up the SLU, it comes out that the *NLP* has more senators in Transylvania compared to the SDP (13 compared to 6) and Banat (4 compared to 3), while

the *SDP* has more senators than the NLP in all other provinces, the ratio being 4-3 in Crişana and Maramureş, 13-8 in Moldavia, 3-2 in Dobrudja, 16-10 in Muntenia, 8-5 in Oltenia and 5-4 in Bucharest City. As regard the other two political parties, it should be mentioned that the provinces of Transylvania, Banat and Crişana-Maramureş do not have any representative of the *CP* in the Senate and this party has a low weight in the other five provinces: 11.1% (3 senators out of 27 of the SLU) in Moldavia, 16.7% (1 out of 6) in Dobrudja, 3.6% (1 out of 28) in Muntenia, 13.3% (2 out of 15) in Oltenia and 16.7% (2 out of 16) in Bucharest. The *NUPR* gained 3 seats in the Senate in Moldavia (11.1% out of 27 of the SLU) and 1 in Muntenia (3.6% of 28) and Bucharest City (8.3% out of 12);

- RRA, compared to the national average of 13.2% (23 senators out of 174), recorded higher values in Banat (25%, 3 senators out of 12), Bucharest City (18.8%, 3 out of 16), Crişana and Maramureş (18.2%, 2 out of 11) and Transylvania (17.6%, 6 out of 34). However, it had a score below the average in the provinces of Dobrudja (12.5%, 1 out of 2), Moldavia (11.1%, 4 out of 27), Oltenia (9.5%, 2 out of 21) and Muntenia (5.6%, 2 out of 36). Regarding the results obtained by the three parties of the RRA, it comes out that 22 senators out of 23 belong to the *DLP*, and only one to the *NPCDP* (in Bucharest City);

- PP-DD had a national average score of 12.1% (21 senators out of 174). It had the best results in Oltenia (19%, 4 senators out of 21), then in Muntenia (16.7%, 6 out of 36), Banat (16.7%, 2 out of 12), Moldavia (13.9%, 5 out of 36) and Dobrudja (12.5%, 1 out of 8). In the other provinces its weight is way below the average, as in Bucharest City (6.3%) and Transylvania (5.9%, 2 out of 34), while this party has no representative in the Romanian Senate from Crişana and Maramureş;

- as regards the fourth parliamentary organization of Romania, the **DUHR**, which has 9 senators (5.2% out of 174), its representation at the level of geographical-historical provinces is very simple, as it obtained 20.6% in Transylvania (7 senators out of 34) and 18.2% in Crişana and Maramureş (2 senators out of 11).

4. CONCLUSIONS

In the following lines, we underlined several essential characteristics of the parliamentary elections in Romania that took place under normal conditions on 9 December 2012:

- the quantitative expression of these elections starts from the total number of voters registered on the electoral lists – 18,423,066 – and the turnout of 41.76% (7,694,180 people who voted). The turnout was higher in Oltenia, Muntenia and Moldavia provinces and lower in Banat, Crişana and Maramureş;

- the total number of valid votes for the *Chamber of Deputies* was 7,409,626 and the following political organizations succeeded to access the lower chamber of the Parliament: the *Social Liberal Union* (SLU, 273 seats), *Right Romania Alliance* (RRA, 56 seats), *People's Party* (PP-DD, 47 seats) and the *Democratic Union of Hungarians in Romania* (DUHR, 18 seats). Together they had 394 seats (of which 4 represent the Romanian diaspora). To this one should add the 18 deputies of the *national minorities*, so that the total number of deputies is 412 (compared to 334 in the 2008-2012 period);

- then we assessed the territorial repartition of deputies by counties and geographical-historical provinces, well highlighted in the tables and figures (tables 1, 2 and 3, fig. 1 and fig. 2);

- concerning the elections for the *Senate*, the number of people registered on the electoral lists and the turnout were the same as in the case of the Chamber of Deputies. The total number of valid votes was 7,416,628, which allowed the election of 176 senators, two of them representing the diaspora (compared to the 137 senators of the 2008-2012 period). Based on the stipulations of the Electoral Law, the distribution of senators by political organizations has been made. The first organization **– SLU** – received 69.3% of the total of 176 seats (122 senators), followed by **RRA** with 13.7% (24 senators), **PP-DD** 11.9% (21 senators) and **DUHR** 5.1% (9 senators). As in the case of the Chamber of Deputies, the repartition of senators by counties and provinces is well highlighted at a general level in tables 3 and 4 and in figures 3 and 4.

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CROSS-BORDER SHOPPING AT THE ROMANIAN-SERBIAN BORDER. THE IMPACT OF CROSS-BORDER SERBIAN SHOPPERS IN TIMIŞOARA

DELIA BAR-KOŁELIS[1]

ABSTRACT. – Cross-border Shopping at the Romanian-Serbian Border. The Impact of Serbian Shoppers in Timişoara. The purpose of this paper is to debate the phenomena of shopping tourism at the Romanian-Serbian border, through both a theoretical and an empirical approach. The theoretical approach highlights the historical aspect of shopping across the border, emphasizing the embargo and post-embargo periods, as well as the visas and free visa regulations. The empirical approach discusses the results of a research conducted by the author in the summer of 2012 in Timişoara, having as focal point the Serbian cross-border shoppers, seen through the perspective of local retailers.

The findings reveal major changes in the approach of Serbians towards cross-border shopping, as a result of normalization of internal political situation and facilitation of border crossing. The paper also reveals the attitude of local retails towards the Serbian cross-border shoppers, their expectations and view of the cross-border shopping phenomena.

Key-words: *shopping, border, trade, Serbia, Romania, retail, leisure, smuggling, embargo, Timişoara*

1. INTRODUCTION

Shopping became for many people a way of spending leisure time and exploring new locations, not situated in the closeness of their places of residence. On every seventh occasion, shopping has become a decisive reason for making a trip; this "hard core" of shopping tourism represents 70% of all tourists' expenses in retail commerce (Werner and Kai, 2005). Shopping is a very popular leisure activity in capitalist countries and it gains more and more followers in East and Central Europe as well, where people are eager to implement Western consumption habits. The quick development of commercial centres, experienced in the last 10 years, led to the expansion of big international retailers in the former communist countries and the implementation of new shopping customs that successfully combine shopping with entertainment activities. Many people view shopping as a way of fulfilling part of their need for leisure and tourism (Timothy & Butler, 1995). In our days, most shoppers choose to travel in order to complete the shopping activities, being interested in finding new things, not present in the proximity of their homes or work places. They often choose to

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cross the boundaries of their own nation specifically to shop in a neighbouring country (Timothy, 2005), the trip lasting from a few hours to a few days. Shopping abroad is popular, as there is often a different and more alluring selection of merchandise than can be found in the shopper's home community (Bar-Kołelis & Wiskulski, 2012).

Cross-border consumption in Central and Eastern Europe have existed for some time, but it became highly visible and more widespread during the 1990s (Timothy, 2005), after the Iron Curtain fell down and disclosed to consumers a new world of opportunities in matters of product choice and prices. Cross-border shopping became a regular activity, motivated by personal needs or by entrepreneurial possibilities.

This paper is based on a research conducted in August 2012 in Timişoara and has as a focal point the Serbian cross-border shoppers, whose presence was reported mainly in Iulius Mall commercial centres. The Serbian shoppers are analysed through the perspective of local retailers and shop assistants of international retailers, who enter in direct contact with them, sometimes even in their native language.

The paper also brings into discussion the background for current cross-border shopping and the particular situation, which developed after the fall of communism, at the Romanian-Serbian border. A major role here is played by the embargo and its impact on border relations and realities.

2. CROSS-BORDER SHOPPING

Economic, legal, and social differences on opposite sides of an international border create conditions that appeal to many types of tourism (Timothy, 2005), especially to shopping tourism, a new and popular form of tourism. Cross-border shopping occurs when consumers travel outside their local area and cross a national boundary (Sullivan & et al., 2012), with the precise purpose to purchase things in another country, usually a neighbouring one. For people living in the proximity of the border, the trip can be short, but for people who live farther from the border, the trip usually has a longer duration (Timothy, 2005). Cross-border shopping tourism can be described as an activity planned and executed with acquisition purposes, that starts with a trip, involves a border cross action and finishes with a shopping activity.

Timothy (2005) underlines the four economic and socio-political conditions that need to be accomplished in order for cross-border tourism to appear and develop, which are connected with:

- The contrast between the two markets located on either side of the border;
- The potential customers' awareness of market differences that exist or might exist on the other side of the border;
- The willingness of potential customers to travel over the border;
- The border crossing procedures that should be permeable enough to allow people to visit with relative ease.

There are also a set of factors that contribute to the appearance, direction and maintenance of the cross-border shopping tourism, which Timothy (2005) mentions: price level, tax rates, opening hours, exchange rate between currencies, availability of a wider range of products and services, fame and marketing, proximity to the border and language.

In the border regions, cross-border shoppers are local consumers taking advantage of their geographical location and benefiting fully from the possibility of choosing merchandise from two different locations. In the cross-border areas, shopping on the other side of the border tends to be a regular and fairly well organized activity, sustained mainly, but not only, by economic reasons. Other reasons can be leisure, curiosity or the simple pleasure of shopping.

From an economic point of view, in the border regions cross-border shopping may have an important impact on the local commerce. Its flow of purchase power, although frequently goes unobserved by the local retailers, sometimes shapes the market demand (Bar-Kołelis & Wiskulski, 2012).

3. CROSS-BORDER SHOPPING IN EAST AND CENTRAL EUROPE

The fall of the Iron Curtain had a direct impact on the development and visibility of cross-border shopping activities in East and Central Europe. This phenomenon, although existing for some time, became highly visible and widely spread (Timothy, 2005). The free movement across state borders, which in communism was very carefully controlled (Turnock, 2002), coupled with price gap and the increase demand for Western-type consumer goods, led towards significant changes in 'commercial tourism' since 1993 (Stryjakiewicz, 1998).

Cross-border shopping in East and Central Europe was mostly observed at the meeting points of the developed and developing economies (Powęska, 2008), strongly motivated by the removal of border crossing restrictions, price differences between the countries, dissimilar availability of merchandise and business or smuggling possibilities. Once border crossing restrictions were lifted, in the former communist countries, marked by austerity policies with limited choices in matters of range of products, people, especially the ones from the border regions, started to travel to the neighbouring countries, buying and selling on both sides of the border (Hall, 2000). These cross-border trips were, for most traders, international excursions lasting less than one day, but for thousands of others, they became part of a multidimensional system of trade (Timothy, 2005).

The price differences were high during the transition period of the 1990s, when the post-socialist countries started transforming their economies, in order to adapt them to the international market rules, leading to the creation of multiple differences in commodity prices and nearly tenfold disparity in population income (Powęska, 2008). The cheaper purchase on the other side of the border became a strong motivational factor, along with access to a wider range of goods, especially for people with low income, living near the borders.

The cross-border shopping activities conducted in Central and East Europe, described as 'bazaar capitalism' (Smith, 1997), implies more an entrepreneurial activity involving shopping for resale items rather than for personal-use items (Timothy, 2005). The practice demonstrated that there is a very thin line between cross-border shopping with the purpose of easing the family budget and helping friends and relatives to purchase as well, to shopping for resale to friends or work colleagues. From here to smuggling is just a small step, as sometimes it is difficult to make a clear-cut distinction

between cross-border shopping and smuggling and many researchers hold that cross-border shopping also consists of part of illegal foreign turnover carried out by the individual travellers at the border in connection with an unrecorded conveyance of goods (Powęska, 2008).

On the other hand, as the political situation in East and Central Europe started to stabilize and the border crossing procedures began to change, in some cases due to European Union regulations, in other cases by mutual agreements signed between countries, new trends in cross-border shopping were brought in by globalization. The trend implies a switch in travellers' motivations for crossing the borders, which focuses less on economic and trade factors and emphasizes more on leisure.

4. CROSS-BORDER SHOPPING AT THE ROMANIAN-SERBIAN BORDER

The Romania-Serbia border sector stretches on 546.4 km (256.8 km terrestrial; 289.6 fluvial) and may be considered of a relict type, inheriting the characteristics of the Romanian-Yugoslavian state border, established on 10 April 1924 (Ilieş *et al*., 2012).

In the year following the collapse of communism, the perception of Romanian-Serbian border radically changed, due to the relative position of Romania and Serbia in the territorial-political architecture of the European continent (EU, non-EU and NATO areas) (Ilieş *et al*.,2012), which had a direct impact on the status and limitation of the border.

The biggest challenge came from the embargo sanctions imposed to Yugoslavia (Serbia and Montenegro) from 1991 until 1994, and later from 1999 until 2000, by the international actors (Radu, 2009). This had as immediate effect huge losses in the legal trade with Serbia and a quick growth of an underground trade relationship. Romania became an important smuggling transshipment point and in the process, fostered closer ties between the state and organized crime. Poor Romanian towns near the Serbian border experienced an economic boom owing to the clandestine cross-border trade (Andreas, 2005) of fuel and other commodities.

Even after the embargoes ended in the early 2000s, the spirit of the embargo was alive: contraband trading was still going on. Even if the gas was no longer needed, there were many other commodities that found their illicit way to Serbia across the Danube River (Radu, 2009). This situation conducted to the establishment of a post-embargo contraband era, especially noticeable between 2004 and 2007 (Radu, 2009), when visas were introduced between Serbia and Romania and ordinary people, who normally were shopping in Romania for cheaper food items, could not afford anymore to make the trip, as visa costs were too high, compared with their average income. During the visa period, the goods and in some cases the people, moved illegally from one country to another with the help of former fuel contraband dealers. With their help, petty traders crossed the border as tourists, while their merchandise crossed illegally the Danube (Radu, 2009).

The situation began to change since 2007, when Romania joined the European Union and Romanians did not need visas anymore for entering Serbia, while Serbians received free visas for Romania. Important changes occurred in terms of smuggled goods and cross-border acquisitions. Since Romania became a member of the European Union, the price of cigarettes increased with additional taxes and a new contraband

phenomenon started at the border, this time from Serbia to Romania, involving cigarettes. The smuggling of cigarettes into Romania is currently a sizable phenomenon, easily noticeable at border crossing points, where smugglers, waiting in line to enter Romania, tamp down the cigarettes in the tanks and engines of their cars[2].

On the other hand, the new cross-border requirements allowed for a significant increase of border permeability, which led to the increase of traffic generated by ordinary people, from both Romania and Serbia. In this way, the ordinary people started to travel across the border for shopping directly in the neighbouring country. Since 2007, Romanian newspapers often mentioned about the inflow of Serbian shoppers into Romania[3] or outflow of Romanian shoppers into Serbia[4], correlated with price fluctuations, variety of products or simple curiosity.

Romanians' reasons for shopping in Serbia are mainly economic, their acquisitions focusing on food items, detergents, cosmetics and cigarettes, which are cheaper than in Romania. Additional pull factors are the promotions and discounts, more often found in Serbia than in Romania. The travel is done mainly before holidays, in the weekends or with the occasion of some trade fairs.

Serbians are mainly motivated to shop in Romania by the wider range of available products and the proximity of new modern retail spaces[5], located not far from the border. An important driving factor are the new modern retail locations, where Serbians acquire mainly apparel items, food, electric and electronic goods. Once visas were lifted, the shortage of modern retail spaces from Serbia, the proximity to the border and the international retail mix offered by Romanian commercial centres, providing a wider range of available products, led towards the development of Serbian cross border shopping in Romania, especially in Timişoara.

5. SERBIAN OUT-SHOPPERS IN TIMIŞOARA

5.1. Serbian out-shoppers

Shopping became a major leisure activity, also because setting for shopping has become much more leisure oriented (Timothy & Butler, 1995), a trend strongly supported by shopping centres, which thus attract more customers at the cost of old type retail locations. Cross-border shopping can be regarded as a special form of out-shopping. In border areas where there have been no real restrictions for years on what could be purchased and brought back home from a trip to the neighbouring country, cross-border shopping might possibly be just like every other kind of out-shopping (Bygvrå & Westlund, 2004).

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[2] The author personally witnessed such situation.

[3] „Ramasi fara grija vizelor, sarbii vin la cumparaturi in Timisoara" [Left without visa problems, Serbs come to shop in Timisoara], Income Magazine, 4 January 2010.

[4] Shopping de Sarbatori in Ungaria si Serbia. Vezi ce produse, la reduceri mari, cumpara romanii! [Holiday shopping in Hungary and Serbia. Look what products Romanians are buying at big discounts], Adevarul, 5 December 2011.

[5] Sarbii vin la cumparaturi in Romania [Serbians are coming to shop in Romania], Timis Online, 29 December 2009

The inclination of Serbian out-shoppers for leisure can be noticed in a study conducted by Tanja Dmitrovic and Irena Vida, published in 2007, which reveals that although the Serbians' most common reason for shopping abroad is low prices (42%), the better quality (26.1%) and the larger range of goods (12.6%) are also major motives for out-shopping. The Serbian shoppers' negative perception of quality products at home is also an important driving factor for them to travel abroad for acquisitions, their shopping focusing mainly on apparel items, food/beverages (43%) and housing items (42%), the same study reveals. Serbians inclination to shopping for leisure slowly brought to Timişoara a noticeable number of shopping tourists, noticeable mostly in weekends.

5.2. Timişoara as shopping destination

Timişoara, one of the largest cities of Romania, with a population of 303 708 inhabitants[6] , is located in Timiş County, near the Romanian-Serbian border. Strategically positioned, in the proximity of four border crossing points between Romania and Serbia, Valcani – Mokrin/Mocri, Lunga – Nakovo, Jimbolia – Kikinda Crnja and Foieni I – Jasa Tomic/Modos (Ilieş & et al., 2012), Timişoara has been a meeting point for Romanian and Serbian economic and cultural interactions.

The retail market of Timişoara is for some years in transition, catched in an unfinished growth stage (Prada & Hurbean, 2009) due to the 2008 crisis, which came unexpectedly for the market. The new retail developments, already in place in 2008, sufficiently developed and with stable customers, managed to strengthen their market role, taking advantage of the postponement of new retail locations, due to the sudden drop in purchase power.

In Timişoara, Iulius Mall, with a gross leasable area of 64,215 sq m, 330 shops and 2500 parking spaces[7], opened in 2005 and is the biggest shopping centre at the moment, representing an important point of leisure and shopping for inhabitants and tourists.

Shopping tourism activities are not widely spread in Timişoara. Though small, the presence of Serbian shoppers in the city did not pass unnoticed by the inhabitants and local retailers. Retailers and shop assistants attitude towards Serbian shoppers differ from shop to shop, according to personal experience or prejudice. The general attitude is rather positive, retailers being happy to enlarge their portfolio of customers, although some of them are disappointed by the 'window shopping attitude' of Serbian customers and by the small amount of money they spend.

5.3. Serbian cross-border shoppers impact in Timişoara

In August 2012, the author conducted a research in Timişoara, analysing the cross-border shopping activities undertaken by Serbians and their impact on the local retail market. The research was conducted in Iulius Mall, the focal point of retail in the city,

[6] According to the information provided by the Romanian National Institute of Statistics, collected for the 2011 Romanian census.

[7] Source: *http://www.iuliusmall.com/timisoara/despre-noi*, accessed on 5 January 2012

where the presence of Serbian shoppers was mostly noted. The research analyse the Serbian cross-border shoppers through the perspective of local retailers or shop assistants of international retailers with locations in Timişoara. The purpose of the research was to establish the presence and impact of Serbian cross-border shoppers in Timişoara.

The research comprises all types of retailers from the shopping centre, including pharmacies, libraries and flower shops, services usually focused on local customers. The research excluded the coffee places and food locations, where the contact with customers is minimal and the respondents were not able to distinguish the nationality of customers. The research was conducted through questionnaires with closed answer. In the case of some questions, the respondents were asked to choose the most accurate answer, where in the case of some other questions, they were asked to classify the answer, on a scale ranging from 1 to 5, where 1 represented very small and 5 very big. An initial sampling was made to the 150 inquired retailers, in order to establish their contact with Serbian cross-border shoppers. 78% of them declared to have had Serbian customers in the shop, so they were handed the questionnaires.

The majority of inquired retails (74%) classified as average or small the presence of Serbian cross-border shoppers in Timişoara. The majority of them also declared that Serbians represent less 10% of their total number of customers (fig. 1). In the next step, the respondents were asked to categorize the impact of Serbian shoppers on the retail market of Timişoara, on the sales in Timişoara and on the development of their own shop (fig. 2). Most respondents found the impact of Serbian cross-border shoppers to be low - very low in all three cases – retail market 69%, sales 71% and shop development 72%. These responses are mainly motivated by the level of spending undertaken by Serbian shoppers, which according to the same retailers is similar with the level of spending of local customers (fig. 3) or even lower. There is a general expectation among retailers for foreign shoppers to buy more than local customers do, which in the case of Serbian shoppers in Timişoara is not accomplished. During the research, retailers sometimes mentioned with disappointment that Serbian shoppers are more interested in browsing the goods rather than buying them, a typical behaviour of leisure shopping.

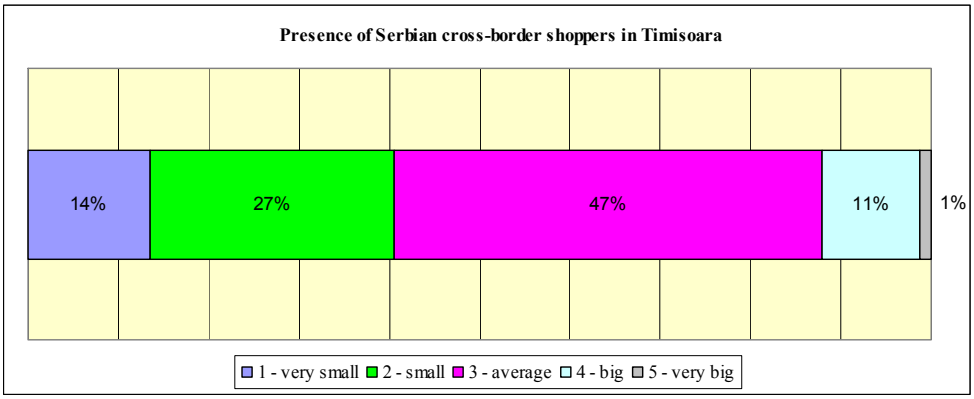

Fig. 1. Presence of Serbian cross-border shoppers in Timişoara (author's own research)

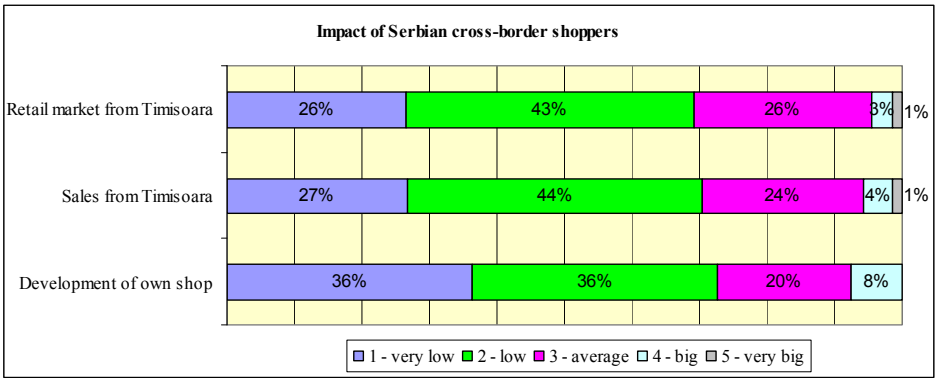

Fig. 2. Impact of Serbian customers on the sales and retail market in Timişoara and on development of respondents own shop (author's own research)

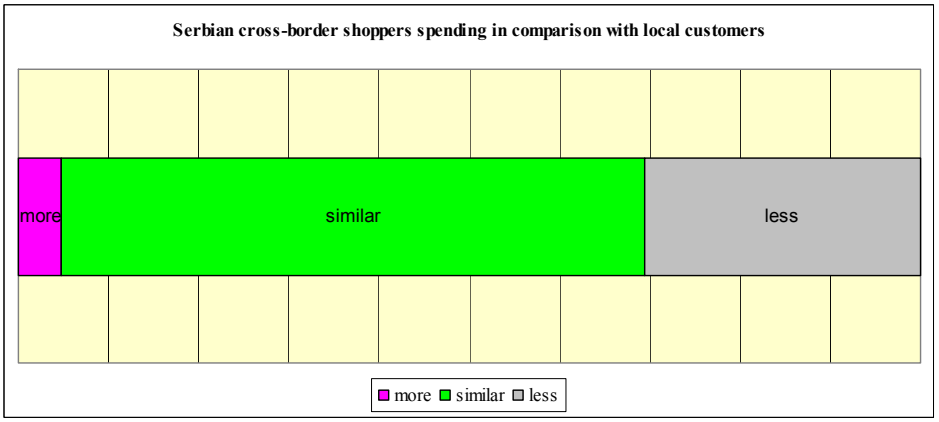

Fig.3. Serbian shoppers level of spending in comparison with local customers (author's own research)

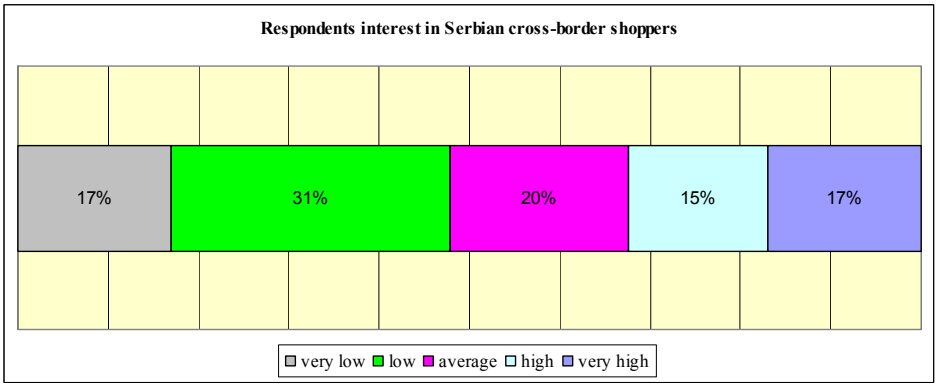

Fig.4. Respondents direct correlation with Serbian cross-border shoppers (author's own research)

In the end, retailers were asked to mark their shop interest in the Serbian shoppers as customers, the majority (52%) claiming an average to very high interest in Serbian cross-border shoppers (Fig. 4). This shows a general positive attitude towards cross-border shopping and shoppers, emerged from the positive expectations that this phenomenon can bring.

5. CONCLUSIONS

In some part of East and Central Europe, cross-border shopping slowly becomes a leisure activity, sustained by the big variety of products and shopping locations that successfully combine shopping with entertainment activities. At the Romanian-Serbian border, cross-border shopping underwent a particular trajectory, marked by the embargo effects in the 90s, extended after 2000 in a post-embargo era, translated in losses for legal trade and a flourishing period for illegal trade. During the embargo years, Romania became an important smuggling point for fuel, oil, gas and other commodities into Serbia. In the post-embargo era, petty trading was helped by the introduction of visas, which made cross-border shopping more difficult and in some cases inaccessible for ordinary people. The situation started to normalise after 2007, once visas were lifted for Romanians and they became free for Serbians, so ordinary people started again to travel across the border for shopping.

Strategically positioned and with a partially developed retail market, Timişoara is regularly visited by Serbian cross-border shoppers, which take advantage of their proximity to the border and the city modern retail spaces. They come to Timişoara mainly on weekends, their presence being noticeable in Iulius Mall shopping centre. Serbians' motivation for shopping in Timişoara is based more on leisure than on economic reasons, shoppers being more interested in browsing the shops than actually buying. According to the local retailers, the amount they spend is similar or lower than that of local customers. Therefore, their impact on the retail market and sales of Timişoara is minimal.

In this context, it is interesting to notice the way in which the political, economic and social differences between two neighbouring countries affect the shopping tourism activities. The smaller the political, economic and social differences between the countries, the more shopping focuses on leisure, which is the case of Serbian cross-border shoppers. A focus on leisure reduces automatically the amounts spent during a shopping trip as travellers replace purchasing with 'window-shopping'. The retailers do not lose however the hope that Serbian cross-border shoppers spending will increase, the majority of them maintaining an average to very high interest in them.

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THE LANDSCAPE MORPHOLOGY OF CLUJ-NAPOCA RESIDENTIAL NEIGHBOURHOODS

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ABSTRACT. - The Landscape Morphology of Cluj-Napoca Residential Neighbourhoods. The study at hand set its sights on Cluj-Napoca urban territory, especially its built-up area established through the General Urban Plan. It analyses Cluj-Napoca housing areas, which comprise the city's residential neighbourhoods and presents their territorial position within the city, their main spatial characteristics, the main historical events from their evolution and their urbanistic organization pattern. Furthermore, it portrays the current situation of the neighbourhoods' landscape morphology and the opportunities for their rehabilitation and landscape reconstruction. The main goal of the paper is the morphological evaluation of Cluj-Napoca neigbourhood landscape as a component of the inhabitants' quality of life. A great emphasis was put on the way in which these great housing ensembles assumed, integrated and capitalized the natural potential of their area. In order to do so, we used data from cartographic and topographic sources, geological, geomorphological, historical data, information from the future General Urban Plan and from scientific literature. The results indicate that, with some exceptions, there is a poor landscape and urban comfort quality in Cluj-Napoca residential areas. The advantages offered by the natural framework were in most cases neglected and even annihilated. The new residential areas damaged the city by wasting the natural potential. From now on, the ability to plan these areas can only be summed up as management aspects.

Keywords: Cluj-Napoca, landscape, General Urban Plan, Grigorescu neighbourhood, Mănăştur neighbourhood, Gheorgheni neighbourhood.

1. INTRODUCTION

The emergence and development of the City of Cluj-Napoca is based on a Dacian settlement, Napoca (or Napuca), which kept and increased its economic and strategic role during Roman rule (starting with 220 AD, when it became a Roman "colonia" and was named Aurelia Napoca). Its subsequent development is tightly connected to the complexity of the physical-geographical conditions, and to the economic, political and cultural factors.

Its location, at the confluence of three main waterways, Someşu Mic River, Nadăş and Chinteni streams, the presence of the northern hills (Lombului, Sfântu Gheorghe), of the southern hills (Făget) and of the middle ridge of Hoia–Cetăţuia Hill, with a northern and southern slope aspect, awards the city a morphological diversity, a quality which has been poorly capitalized so far.

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The city's residential areas created before 1989 neighbour areas of collective and individual housing built in the last 10 years. The traditional housing areas of Cluj-Napoca emerged during the communist era in order to satisfy the increasing demand for housing during the industrialization period, and were located in places free of constructions, at the city's outskirts, on the relatively flat terrains of the meadows and terraces of Someşu Mic Valley. Thus the following neighbourhoods materialized, in chronological order: Grigorescu, Gheorghieni, Mănăştur, Mărăşti, Aurel Vlaicu, and Zorilor (Mitrea V., Maxim Danciu I., 2009).

The new municipal housing areas appeared and expanded during the 2005-2010 economic boom, out of a need to change the housing lifestyle of the communist era. There was a need to abandon the city as a traditional housing area and replace it with its outskirts, situated in the surrounding natural areas of the city, or even further, in the adjacent periurban communes. This tendency was speculated by the nouveau riche, who built housing and then sold them without caring about the lack of any facilities, including access roads, electricity, gas, water and sewage, telecommunications or other specific endowments (green areas, retail and services). The investors did not even plan to develop these facilities. They exploited to the full the tracts of land that they owned by building housing units without any correlation with the neighbouring areas. Thus incoherent urban forms emerged, served by poorly established connections, and with a lifestyle on the limit between urban and rural.

The main aim of this research is the morphological evaluation of the landscape of Cluj-Napoca residential areas, which will be attained in the following manner:

- the presentation of Cluj-Napoca geological structure;
- the location and demarcation of residential areas within the city;
- the identification of the morphological main characteristics;
- the indication of major historical moments in their emergence and evolution;
- the presentation of the planning and landscape organisation;
- the identification of future perspectives.

2. MATERIAL AND METHODS

The urban landscape is defined by the city's features, models and structure, including in this case the biological component, the physical environment and the man made elements. In terms of its structure, the city is the result of a continuous stratification of major political projects and minor individual projects, that follow each other in time and overlap in space (Ioana Tudora, 2009). Ioana Tudora considers that the urban landscape "forms a stratified memory of all the social groups that used space over time" (Ioana Tudora, 2009).

In order to attain the objectives of the above mentioned research, we used the following methods and techniques:

- from the specialised bibliography (geological maps), we extracted information regarding the geological structure of Cluj-Napoca terrain and we described the geology of the studied area;

- in order to locate and demarcate Cluj-Napoca residential areas, we used the city street map, up to date satellite imagery, topographic maps, the fiscal delineation of the city's neighbourhoods and the general urban plan of Cluj-Napoca (the current plan and the one to be completed);

- the main characteristics of Cluj-Napoca residential areas were identified through field research and consulting the specialised references;

- the crucial historical moments in the evolution of each area were identified by consulting the documents of the time, scientific papers and photographic documents;

- the identification of the planning and landscape organisation was made by studying the general urban plan (the current plan and the one to be completed), the legislation and through field work.

3. RESULTS AND DISCUSSIONS

In the evaluation of the morphological landscape, the geological structure of the territory and the main landform types are crucial.

The bedrock of the City of Cluj-Napoca is made of the following types of deposits: Paleogene (Late Eocene, Oligocene) along the valleys of Someşu Mic, Nadăş and Căpuş and Neogene (Early and Middle Miocene), while the superficial deposits are mainly Quaternary (Pleistocene and Holocene) (C. Baciu, S. Filipescu, 2002)

On Cluj-Napoca territory the following genetic landform types have been uncovered (Stoian, 2011):

- *the structural landforms* are represented by the structural surfaces dominated here and there by erosion inselbergs, the most representative being Cetăţuia Hill. From a geotechnical point of view, these areas suitable for buildings, avoiding however the escarpment faces due to their susceptibility to gravitational processes;
- *the sculptural landforms* include two erosion levels and prequaternary erosion surfaces found on the northern slope of Feleacu Hill (situated at altitudes of 600 – 650 m and 450 – 550 m). The two surfaces are mainly shaped in the Sarmatian sands of Feleacu Hill and are affected by gully erosion, ravines, torrents, and superficial landslides. Taking into account their geological structure, composed of brittle deposits (Sarmatian sands, clays, marl), there is a slight geomorphological vulnerability. These processes currently affect built-up areas in Bună Ziua and Zorilor, as well as the new housing establishments in Făget;
- *the denudation landforms* include the morphology caused by the action of the semipermanent water flow on slopes, mainly on the northern slopes of Feleacu Hill;
- *the fluvial landforms* include the valley corridor and the terraces of Someşul Mic River.

As the natural context is subjected to a type of human activity, in our case, habitation, it leads to specific urban forms.

The delineation of functional areas within a city is the operation in which the city is divided into certain zones according to the dominant activity of each zone. The legal document through which this operation is enacted is the city's general urban plan, an extremely important strategic project, established for a period of utmost 10 years. The main activities within the city, which represent the main criterium for the

delineation of functional areas, are set in the legal framework that every general urban plan must obide by and can be classified as follows (Methodological Guide, MLPAT, 1999): industrial and storage activity, agricultural activities, housing, communication and transports, green and sport areas, communal management, edilitary works, services, special destination, other (agricultural land with the built up area, lands occupied by forests, waters, idle land).

Fig. 1. In the foreground – the land on which Grigorescu neighbourhood will later be built; in the background - Calvaria Church and the area currently occupied by Mănăştur neighbourhood. Date of photo unknown.
(Source: Sebastian Moga Collection, "Vechiul Cluj" Association)

We grouped the residential areas of Cluj-Napoca according to their location related to Someşul Mic River, the main axis in the city's historical and spatial evolution, a corridor along which most of the circulation is organized and the area through which the connection between the city's residential neighbourhoods is realized. Therefore, on the left banks of Someşul Mic (fig.1), one can find the older Grigorescu area, situated on the river floodplain, at the base of the Someşul Mic - Nadăş watershed, then Gruia, located on the eastern and northern slopes of the above mentioned watershed, and Dâmbu Rotund – Iris, located along the Nadăş corridor, on its left banks, in the lower sector of Lomb - Steluţa Hill southern slope. New housing areas can be found in West Grigorescu – extensions of Eremia Grigorescu – Donath, Valea Seacă Street – Dâmbul Rotund, Lomb – Steluţa areas, Oaşului Street.

On the right banks of the river, as well as on the northern slope of Feleacu Hill, one can identify the following neighbourhoods (from west to east): Mănăştur - Plopilor, Zorilor, Andrei Mureşanu, Gheorghieni, Mărăşti, Aurel Vlaicu, Someşeni (the last two situated on the lower terraces of Someşul Mic), with "expansions" towards Feleacu Hill, as new housing areas, much more extended than in the northern part of the city: Valea Gârbăului, South Câmpului, Făget, South Zorilor, Europa, Bună Ziua, Borhanci, Becaş, South Alexandru Vaida-Voevod and Sopor - Budunuş.

In the following pages, we will analyze the morphology of the landscape of these areas, emphasizing their location within the city, the main morphological characteristics, a short history of their development, their urbanistic and landscape organization and the plans for their future.

3.1. The neighbourhoods on the left banks of Someşul Mic

Grigorescu neighbourhood is situated in the western part of the city, along Donath, General Eremia Grigorescu, Alexandru Vlahuţă, Fântânele and Octavian Goga streets. The general aspect of the morphology is given by the flat area situated on the first terrace (relative altitude of 2 – 6 m) of Someşul Mic. The natural environment offers conditions for a good habitation in this area. The extensions on the south facing slopes of Cetăţuia – Hoia watershed are sporadic compared to the total area traditionally covered by the neigbourhood. The housing establishment is composed of individual houses built under difficult geotechnical conditions, on a steep escarpment face, with slopes exceeding 20˚ near Cetăţuia – Hoia Hill, mostly unsuitable for constructions.

The neighbourhood was built during 1960-1962 (fig. 2) and represents the first attempt to create a functional residential area in Cluj-Napoca, being planned according to the standards of the time. It was structured into three complexes and suffered slight densifications. The current image of this neigbourhood has its roots in 1937, when the area was subjected to an urbanization project which created the main streets and a good built-up area (according to Mitrea V., Maxim-Danciu I., 2009).

The legend of the shepherd named Donath, who saved the city from the Turks, is also connected to the place now called "The Turk's Cut". This is also the origin of the old name of the area, Donath. In 1960, the name of Donath was replaced with that of Eremia Grigorescu. Today, the eastern sector of the neigbourhood is dominated by single family houses, while the western part by collective housing. Grigorescu is a beautiful residential area with houses as well as with blocks of flats, plenty of green areas, playgrounds for children and low levels of noise pollution. The banks of Someşul Mic River were converted in this area into green spaces and recreational areas.

Fig. 2. Grigorescu neighbourhood in the 1960`s
(Source: Sebastian Moga Collection, "Vechiul Cluj" Association)

The architecture of many houses situated here is a reminiscent of the old city. For example, "Tătaru House" was built in 1921, by the Italian architect Gio Ponti, being one of the most expensive villas in the city. Close to Grigorescu neigbourhood one can find Hoia Forest, which hosts the open air section of the Transylvanian Museum of Ethnography. All these advantages, as well as its interesting history and beauty, make Grigorescu neighbourhood the perfect residential area.

Gruia neighbourhood lays east-northeast to the above mentioned neigbourhood, between Horea Street to the east, Hoia Forest to the west, and the railway to the north.

The morphology comprises the fifth (60-75 m) and the fourth (30-45 m) terraces and generally stable slopes between 2 and 5 degrees (sporadically) and mostly between 5 and 15 degrees, facing east and north. The area also contains sliding processes, some ravenes and gullies, and Pleistocene landslide waves. Housing is predominantly individual in nature, capitalizing the site which offers a beautiful view of the city. One disadvantage for the landscape of this area is the extension of "Dr. Constantin Rădulescu" football stadium, a site which leads to major functional shortcomings due to the lack of parking spaces and by blocking traffic during important venues.

Dâmbul Rotund-Iris neighbourhood is situated in the northwestern part of the city, between the railway to the south, Oaşului Street – Chintău Valley to the east, and Popeşti Valley to the west. The morphological characteristics are the south facing slopes, between 2-5 degrees and 5 - 15 degrees, exceeding 15 degrees in some small areas. The slopes of Lomb Hill host fragments of the fourth (30 – 45 m), fifth (60 – 75 m), sixth (100 – 110 m) and seventh (125 – 140 m) terraces of Someşul Mic and Nadăş rivers, but the neighbourhood is situated on the fourth and fifth terraces. In this area, the tributaries of the two main valleys sank, creating secondary watersheds that end in structural precipices. The features of the isolated watersheds repeat the general physiognomy of the main watershed, leading to a specific aspect called *round hills* ("dâmburi rotunde" in Romanian) by the locals. These tributaries have short, gradual streams, with high slopes affected by landslides. Such phenomena pose a great threat to the constructions situated there (T. Morariu, I. Mac, 1969), alongside gravitational processes, some recent slides and creep (S. Poszet, 2011).

This is an area dominated by individual households. In the last few years, the neighbourhood heavily expanded northwards, the new constructions "attacking" the slopes of Lomb-Steluţa Hill. One aspect that induces some dysfunctions is the fact that the new streets have been constructed along the slopes, transforming them into torrents during heavy rains, which flow into Maramureşului, Giordano Bruno, and Partizanilor streets, where the sewage system cannot cope with the flow of water.

There are almost no recreation and sports facilities or green areas, the habitation bordering the rural, with its characteristic way of life.

3.2. The neighbourhoods on the right banks of Someşul Mic

Mănăştur-Plopilor neighbourhood is situated between Someşul Mic to the north, Gârbăului Valley to the west, Mănăştur Forest to the south, the right slope of Popii Valley to the east. Its morphology is made of a floodplain area to the north and slopes facing northeast, hosting in their profiles fragments from all seven terraces of Someşul Mic River, the area being located on the first five terraces. Geomorphological processes are missing. The neighbourhood has a history that has coincided time and time again with Calvaria Church (fig. 3) and begins in the 11th century.

At that time, around the Benedictine church of Calvaria and the eponymous hill, the village of Mănăştur was established, inhabited by farmers that served the convent. The name of the hill and of the current area comes form the word monastery.

In 1895, the convent's village was integrated in Cluj, while in 1965 the houses were demolished to make room for a new residential area for the working class according to the plans of North Korean planners.

The actual construction began in 1971, but the neigbourhood continued to be "improved" and extended until 1989. From the start, it has been a residential area lacking in facilities and green areas, but had a record density of 466 inhabitants/ha (Mitrea V., Maxim Danciu I., 2009). Being heavily populated area, with a high construction density, it was connected to the eastern industrial area of the city through a tram line.

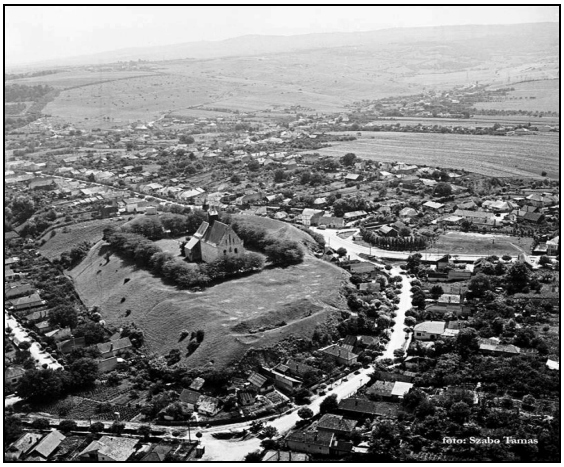

Fig. 3. Aerial view of Calvaria Church during the 1950s (Source: Sebastian Moga Collection, "Vechiul Cluj" Association)

After 1990, the area extended south, and developed a wide range of services and trade. Being a bedroom community that hosted a population of roughly 68000 people (Dana Vais, 2006), the neighbourhood is one of the largest in the country and the largest in the city. With the exception of Plopilor (which benefits from a sports park with restricted access), the neighbourhood has a deficit in green areas (only 5.31 sqm/inhabitant), public places for rest and recreation, playgrounds, and parking lots.

Situated between Govora, Gheorghe Dima, and Movile streets, Mănăștur cemetery is also inadequate from a landscape point of view, as it covers a large area and offers a distressing view. This area requires a massive aforestation in order to subdue its disturbing image.

The neighgbourhood was the subject of an urban rehabilitation study, drawn up by the Planwerk company (E. Pănescu, 2011), which proposed the creation of a second predominantly pedestrian network of circulation. At the intersection of the two networks, several tracts of land were identified for the missing functions: markets, shops, recreation areas, parking lots. Moreover, a diagonal connection was proposed as a new green axis, which would also connect the neigbourhood with Făget forest.

Zorilor neighbourhood was in 1989 the residential area of Cluj-Napoca located at the highest altitude (465 m), above the temperature inversion layer that occurs in winter, which meant major benefits in terms of urban comfort. It has a beautiful feather shape, and the streets were designed in such a manner that they follow the terrain configuration. It is situated between Gheorghe Dima, George Bacovia, Eugen Ionesco, and Calea Turzii streets. The morphology is characterised by the presence of

terraces (the sixth - 100-110 m relative altitude) and by the existence of north facing slopes of 5 to 15 degrees. These slopes fully integrated in the built up area are temporary stabilized, covered by shallow deposits currently affected by creep. North Zorilor began its construction in 1979, while South Zorilor - Europa is still expanding, developing on the seventh terrace (125 – 140 m) and on the surrounding north facing slope. South Zorilor somewhat lacks green spaces and recreational areas, but North Zorilor has a neighbourhood focal point, a centre (the turnaround and the square situated at the end Pasteur street) and also rather extended green areas - "Alexandru Borza" Botanical Garden, the newly established "Iuliu Prodan" Park, parts of the main cemetery, etc.

The southern part of the neighbourhood went through a process of "urbanistic chaos". The access towards downtown is hampered by the terrain configuration and by the abrupt streets: Calea Turzii, Republicii, Pasteur and Păstorului streets. The Zorilor – Mănăştur road connection was planned to ensure a proper circulation speed even though the western slope of Popii Valley is extremely steep.

One of Cluj-Napoca best residential areas is *Andrei Mureşanu,* situated in the southern part of the city, between Constatin Brâncuşi, Fagului, Becaş, Calea Turzii streets, and the intersection between Observatorului Street and Calea Turzii. The morphology is characterised by the existence of a large fragment of the fourth terrace (30 – 45 m), measuring sometimes 800 m in width, without active geomorphological processes. The habitation is primarily individual, with villas and houses of great architectural value, with true examples of stylish living, and streets that ascend the slopes of Feleacu Hill. It is a genuine garden-city, created through a major mobilisation of the local authorities during the interwar period. The municipality acquired the entire tract of land, planned and replotted the area, drew the street layout, inserted all the necessary facilities and finally resold the plots, which were later built up. Some researchers consider absolutely necessary to declare the neighbourhood a protected area (E. Pănescu, 2009). South of here, climbing the steep middle sector of the northern slope of Feleacu Hill, one can find the residential area named *Bună Ziua*, currently under development, on both sides of the eponymous street, with a chaotic, incoherent structure.

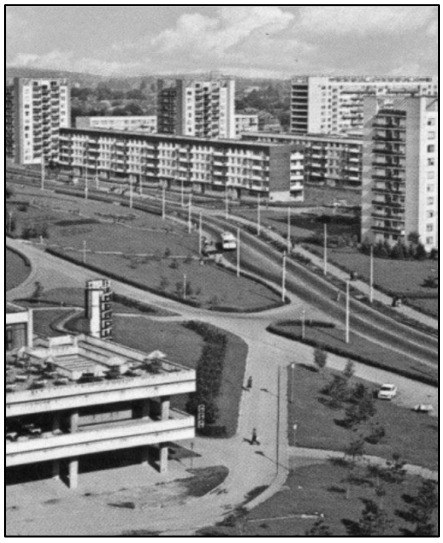

Fig. 4. Gheorghieni neighbourhood – immediately after construction (Source: Sebastian Moga Collection, "Vechiul Cluj" Association)

Gheorghieni neighbourhood was built on lands occupied by semiurban houses with large plots of land, and orchards of vegetable gardens. It is currently located between Constantin Brâncuşi, Nicolae Titulescu streets, Slănic alley and Alexandru Vaida-Voevod street. The third (20 – 24 m) and fourth terraces (30 – 45) are present, connected by slopes. These lands are suitable for construction, with no

geomorphological processes and slopes below 2 degrees. Between 1964 – 1965, two microdistricts were built (I and II, considered by specialists as the best implemented urbanistic plans, according to a study of "Arhitectura" Magazine, 1979, in Pănescu, 2012, as we can see in fig. 4), followed in 1969 by two more - the third and the fourth-South Alverna microdistricts.

The principles that governed the plan were those of functionalist urbanism, the facilities being distributed equally and hierarchically, offering kindergartens, schools, markets, healthcare centres and polinuclei – Mercur, Diana, and Hermes. South of the neighbourhood, an extensive park was planned, established in 1970, but reduced as several collective housing units were finished in 1995. The eastern part of the neighbourhood is dominated by collective housing (blocks of flats), while the western part by individual housing along streets that radiate towards the middle sector of Feleacu Hill.

Mărăşti neighbourhood was built in several stages between 1976 and 1996. It is situated in the eastern part of the city, between the railway to the north and Traian Moşoiu, Semenicului, Coastei streets to the south, on the first and second terraces of Someşul Mic River, on a flat morphology where compaction phenomena occured on a large scale. Its construction partially ignored the principles of urban comfort, mainly in terms of facilities and green spaces, focusing instead on the collective living quarters required at the time. Continuous fronts with first floors for services and retail predominate, with little recreation and parking spaces. The cohabitation of collective housing and single family houses led to a density of just 264 inhabitants/ha (V. Mitrea, 2009) and a total population of 53500 people (Dana Vais, 2006).

Mărăşti was built due to the need of housing for the increasing number of workers of the Heavy Machinery factory. Also called the Lower Town, it used to be an area of houses, an extension of the city centre.

The inhabitants of old Mărăşti served the centre, by providing fresh foods, as well as labor and several services. The current location of 1st May Square was the place of residence for many workers, while the area surrounding St. Peter Church and Dorobanţilor was where the farmers lived, the so-called "hostezeni"(fig. 5)

Fig. 5. Dorobanţilor Street (Source: Sebastian Moga Collection, "Vechiul Cluj" Association)

At the end of the 19th century and the beginning of the 20th century, *Hostat neighbourhood* was a residential area with a high degree of qualitative emancipation. That is why some specialists (L. Popa, 2011) consider the creation of the new neighbourhood "one of the most unfortunate urbanistic decisions of the last century". Today, it is an area with a high degree of air pollution due to heavy traffic.

Aurel Vlaicu is the eastern extension of Mărăşti neighbourhood, covering the top part of the second terrace, intensively modified by human intervention, and a part of the floodplain terrace. The connection slopes between the two terraces are steep and contain green areas (Expo Transilvania) or are part of the new constructions ("Octavian Goga" County Library – Nokia Building area). It is composed of two ensembles divided by Aurel Vlaicu street, continued by Traian Vuia Avenue. In 1992, it had a density of 250 inhabitants/ha (Mitrea V., 2009). It was built as a new residential area of the city without taking into consideration the functionalist principles of the 1960s.

The area contains a string of small lakes created by the mass compaction of river deposits found in the floodplain of Someşul Mic River, with intercalated green areas that are affected by constructions from all directions. Any future improvement project is doomed to fail due to the lack of space as the buildings push till the edge of the lakes. The area is a lost opportunity to establish new green areas within the city. There were several amazing projects for a neighbourhood garden in the southern part of the area (on the current location of ACE factory) and also for Între Lacuri garden, but they never came to fruition.

Moreover, there is no neighbourhood centre, this function being poorly provided by Iulius Mall. The lands of this area, that were occupied before 1989, did not come into the attention of investors after the threshold moments of 1989-1990, with the single exception of Teodor Mihali street.

Heavy vehicle traffic and especially the low flying airplanes raise the noise pollution levels to record highs. The area is situated close to Cluj-Napoca International Airport, which is currently building a 3500 m runway, meaning that noise levels will continue to rise.

Someşeni neighbourhood (fig. 6) is the product of including the village with same name in the city perimeter.

Fig. 6. Someşeni, Someşfalău, Szamosfalva, Mikelsdorf. The settlement was first attested in 1280. The German name of the settlement (mentioned on the map of Johannes Honterus) comes from the name of Mikola family. Until the 20th century, it neighboured the city of Cluj-Napoca. In the background, St. Elisabeth Roman-Catholic Church (16th century) (Source: Sebastian Moga Collection, "Vechiul Cluj" Association)

It is located on a fragment from the top of the second terrace and on the Someşul Mic River floodplain, where some 10 m thick fillings cause the instability of building foundations due to compaction. The area still keeps its rural characteristics, dominated by individual housing, with gardens and even animal shelters.

3.3. The new residential areas are former agricultural lands, which were not included in the city's development policies in terms of street network and infrastructure. In terms of terrain configuration, these lands are quite difficult to build on, having steep slopes, numerous geomorphological processes, and challenging foundation requirements. Such lands have been the object of poor notary procedures which led to the emergence of "an ad-hoc urban fabric (fig. 7) and an amalgamation of weird, heterogenous, conflictual urban forms, each resulting architectural complex … lacking any assembly, association and urbanistic adaptation relation with the surroundings, with the area or with the city" (L. Popa, 2011).

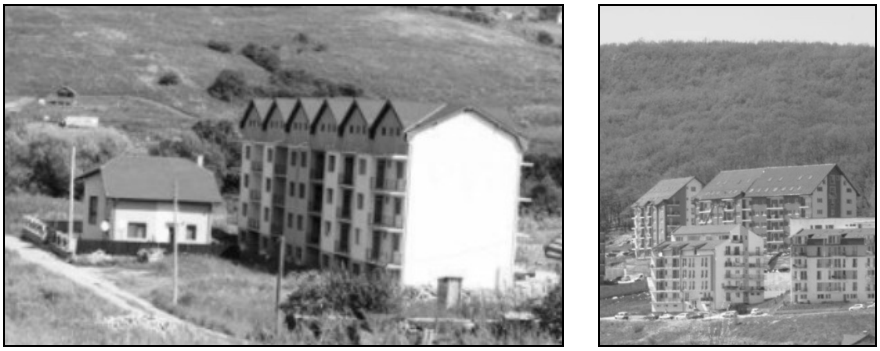

Fig. 7. Habitation unit on Câmpului Street (left) and apartment buildings in Făget Forest (right) *(http://ziuadecj.realitatea.net, accessed on 24.04.2013)*

The legislation allowed for deviant urban plans (ZUP-DUP) to legalise this type of constructions. The terrain landscape valences are forests or agricultural land set for recreation or agriculture and comprise Cluj-Napoca green belt (Popa L., 2011), along waterways, tributaries of Someşul Mic, with beautiful views of the city and its surrounding areas. These advantages were annihilated by the shrill nature of the isolated constructions, with exaggerated height levels or by the rows of houses that are not integrated into a coherent urban body.

4. CONCLUSIONS

The large collective residential areas are considered (Dana Vais, 2006) the most visible heritage of the communist era. They are and will be for a very long time an essential part of the urban landscape, a defining framework of urban culture. Due to the fact that currently they constitute private property, the landscape rehabilitation processes, as a part of the larger rehabilitation policies, will have to wait, as these plans are impossible to be put into effect right now. Therefore, the future of these neighbourhoods is difficult to foresee, from all points of view, not only from a landscape perspective.

Regarding the new residential areas, they will undergo a massive urbanisation process stipulated in the upcoming General Urban Plan (GUP Cluj-Napoca, 2009). These planning endeavours are, in our view, significant urabn and landscape rehabilitation actions that must be immediately implemented in Cluj-Napoca, thus insuring a proper planning direction for this city.

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SETTLEMENTS IN PRAHOVA COUNTY. GIS ANALYSIS OF TOPONYMY

IONUȚ TUDOSE[1]

ABSTRACT. - Settlements in Prahova County. GIS analysis of Toponymy. This paper proposes a method of using GIS tools in spatial analysis of the oikonyms in Prahova County, in order to identify specific links between names and geographical or historical characteristics of the area. In the present paper two types of analysis were performed. The first one was made on oikonyms sorted by suffixes, yielding results of their frequency in the territory. The second one was made on oikonyms composed with word "Valley", establishing the link between their distribution on one side and the character of the valley for studied settlements, on the other side. The results show that territorial analysis of oikonyms can clarify spatial aspects, needed for the affirmation of national, historical and social identity.

Keywords: *settlements, Prahova, analysis, GIS, toponymy, oikonyms*

1. INTRODUCTION

Toponymy (from gr. Τόπος, place + ővoμα, name) is the science that deals with the research of place names. "Oikonym" is a term proposed by Ion Conea for human settlement name, from the Greek oicos = home + onyma = name (Palamariu, 2002). A GIS is an informational system that allows the capture (the introduction), storage, integration, manipulation, processing and visualization of data that have spatial reference (Imbroane, 2012, p. 33).

The link between toponymy, as a science and research object, and GIS, as a tool and research method, is quite fragile in Romanian geography. Therefore, the purpose of this article is to identify the relationship between space and oikonyms with specific morphological structure using GIS analysis tools.

A great example of spatialization for toponymic information is given by I. Boamfă (2011), who analyzed the distribution of pastoral activities in Romania by anthroponyms (highlanders, shepherds, etc.), highlighting the uniqueness of the Romanian space, from this point of view, in the whole Eastern Europe.

Another interesting analysis on Oltenia, on oikonyms with origin in woodland vegetation and deforestation was made by C. Iordache (2009). The spatialization of those oikonyms showed the decrease of the degree of naturalness over time, through deforestations, especially in the Subcarpathian and Getic areaa.

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F. Jacobs (2011) exemplified for the UK and Ireland the importance of toponymic structure spatialization for the knowledge of the characteristics of a given territory: "If you're in the north of England and you're in a town ending in -by, you're in former Danish-ruled territory. If the toponym starts with beau- or bel-, it was probably named by Normans. And if it contains the prefix Avon- or the suffix -combe, it is one of many place names of Celtic origin" (Jacobs, 2011).

In the same article, the author made the so-called "Alphabetical Maps", in which he represented the density of oikonyms with the same uppercase (A, B, C and so on). Thus, by analogy, we want to see if for the county of Prahova there are any rules for the distribution of oikonyms with certain suffixes. I. Nicolae (2007) made several references to suffixes, exemplifying those that show the Slavic origin of toponyms, such as "-ov" (Bucov, Cricov), "-na" (Câmpina, Crivina), "-işte "(Grădişte), "-ava "(Dumbrava), "-iţa "(Gherghiţa) etc.

R. Creţan (2007) analyzed etymologically the oikonyms from Eastern Timişoara, identifying their origin in Romanian, Hungarian and Slavic and their evolution under the influence of the authorities. In this regard, suffixes have been an important clue ("-falău" of Hungarian origin, "-ova" of Slavic origin and so on).

The aim of this analysis is not to classify oikonyms according to their etymological background, but to their morphology (endings of plural, feminine, masculine, augmentative or diminutive). The article proposes to spatialize the preference for certain oikonyms to show, for example, where diminutival oikonyms appear (those with the suffix "-oara", "-iţa", "-el"), where those indicating the transmutation of populations appear (those with the suffix "-eni") etc.

2. METHODOLOGY

To achieve the proposed purpose, to spatialize, to interpret and characterize the oikonymical coating according to certain features (like suffixes and the composition with the word "Valea (Valley)", a database of 458 settlements in the form of point (fig. 1) was obtained from OpenStreetMap. These are the main towns and villages.

The oikonyms were classified according to the final morphological structure (suffixes) in several categories.

The classes thus obtained were integrated into a GIS analysis environment. First, we studied the distribution of oikonyms with certain suffixes. By interpolation of Kernel Density Estimation in SAGA GIS, maps of oikonyms frequency were obtained according to their number and density.

In the second part of the research a GIS analysis on oikonyms composed by "Valea (Valley)" (as determinant or determiner) was proposed. They are widespread in Romania, as shown by S. Goicu-Cealmof (2006), bringing many examples in this respect: Valea Largă (Wide Valley), Valea Neagră (Black Valley), Valea Rea (Bad Valley), Valea Crucii (Valley of the Cross), Gura Văii, Cotu Văii, etc.

In this case, the purpose of the analysis was to see the connection between them and the grade of settlements location in the valley. In fig. 2 the concept of grade of placement in valleys is represented. This is more pronounced as the localities are located in deeper valleys (first column), or narrower valleys (second column), or as occupying a lower position on the valley floor (third column).

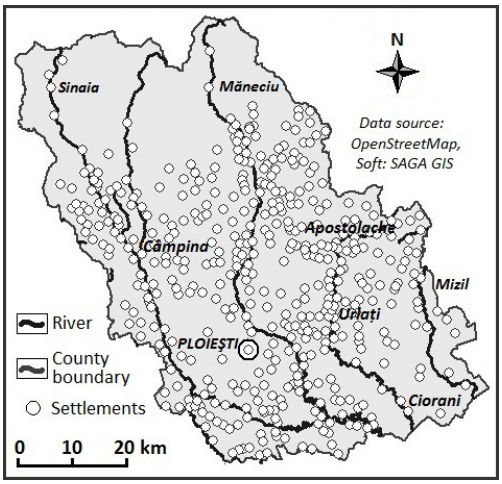

Fig. 1. Prahova County. The analysed system of settlements

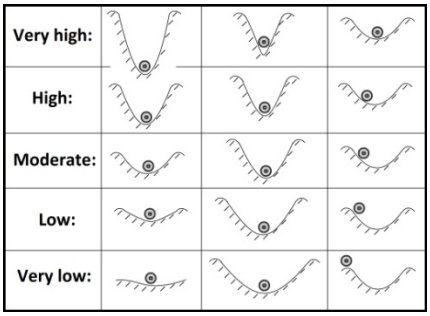

Fig. 2. Schematic representation of the grade of settlements location in the valleys.

The grade was calculated using SRTM, depending on:

- Convergence Index, outlining valleys.
- TPI (topographical position index), which decreases the value of the cell from the average value of neighboring cells. So it settles each cell in the valley, on the slopes or interfluve.
- The difference between cell altitude and minimum regional altitude.
- The difference between the maximum altitude and minimum altitude to emphasize the degree of deepening of valleys.

The rasters were reclassified and mediated obtaining the outlining grade of the valleys (fig. 12). Thereof, the values of grade of settlements location in the valleys were extracted for all localities (point type). Points values (of settlements) were interpolated by kriging method to get a raster of this indicator (fig. 13). So, except for the northern end of the county, where there are not localities, the darker the gray tones, the more pronounced the placement of the settlements in the valleys.

3. RESULTS AND DISCUSSIONS

Following the evaluation of oikonyms, the classification of oikonyms was obtained from OpenStreetMap database (table 1). This is useful for the analysis of the link between the geographical area and the toponym meaning (according to suffixes) of the settlements in the analyzed area.

Oikonyms classification according to suffixes and oikonyms composed with word "Valea (Valley)"

Table 1

Sufixx	**Some caracteristics**	**Exemples**
-anca	Feminine, articulate, augmentative	Chijdeanca, Brătășanca, Palanca
-asca	Feminine, articulate	Loloiasca, Nevesteasca, Gocеasca
-oara	Feminine, articulate, diminutive	Nucșoara, Viţioara, Sălcioara
-ina	Feminine, articulate	Ocina, Crivina, Cătina, Câmpina
-iţa	Feminine, articulate, diminutive	Gherghiţa, Lopatniţa, Ciupelniţa
-a	Feminine, articulate	Cheia, Buda, Priseaca
-ele	Plural articulate or not articulate, often diminutive	Fântânele, Coșerele, Măgurele,
-ile	Plural articulate	Odăile, Vârfurile, Poienile
-el	Masculine or neuter, singular, diminutive	Găvănel, Lăpoșel, Sărățel
-et, -etu, -eţi	Derived diminutive words	Brădet, Făget, Zmeuret, Păcureţi
-u	Masculine or neuter, singular	Dâmbu, Slavu, Plaiu
-oi, -oiu		Blejoi, Piţigoi, Cheșnoiu,
-ori, -oru	Diminutive	Târgșoru, Ploieștiori
-ani,-anu	Derived from original words, especially plural	Tătărani, Tufani, Cireșani
-ari, -aru	Derived from original words, especially plural	Cărbunari, Buștenari, Rotari
-eri, -eru	Derived from original words	Vistieru, Sângeru, Rachieri
-eni	Derived from original words, plural	Ungureni, Ologeni, Trestieni
-eşti	Derived from original words, plural	Predești, Românești, Lipănești
-i	Masculine, plural, often no article	Adunaţi, Bătrâni, Boboci
altele	No plural, no article	Colceag, Lapoș, Starchiojd
„Valea”	Oikonyms composed with word "Valea (Valley)"	Valea Călugărească, Valea Seacă

Note: The "articulated" refers to the definite article. Data source: OpenStreetMap

It should be noted that there may be some errors of classification, due to the generalized process of classification, as the 458 toponyms were not considered individually, etymologically speaking. Also we considered the present names of the settlements. It is known that they have changed over time, changes including their suffixes. As D. Butnaru (2009) exemplifies, toponyms generally pass through a dynamics that change their original popular form, by the intervention of administration representatives, foresters, agronomists, geographers. Great changes occurred especially during the communist period, when the authorities were irritated by names reminiscent of royal historical past, certain political and cultural personalities, names that had religious connotations, or those considered demeaning (Nicolae, 2000).

Thus, according to the Decree 799 of the17th of December 1964, the settlement Ciumaţi (Men with Plague) became Olarii Vechi (Old Potters), Râncezi became Nucşoara de Jos, Scăioşi became Făgetul, the village Vrăjitoarea (Witch) became Pietrişul (Gravel), Gheboasa (Humpy) became Valea Mare (Great Valley), Degeraţi (Frozen men) became Vâlcelele (Little Valleys), Vai de El (Wretched) became Podgoria (Vineyard), Mărăcini (Thistles) became Crângurile (Little forests), the village Mitropolia (Metropolitanate) became Smârdanul Mic, the village Protosinghelu (a monachal orthodox rank) has become Iazul (Pond).

Thus, because of the changes suffered by settlement names, the spatialization results are relative only to the present.

The obtained maps of the oikonym frequency in accordance with suffixes, can be corroborated with historical and geographical information likely to identify the causes that led to oikonym concentration in certain areas. We have spatialized the oikonym categories that have more representatives. The oikonyms with feminine singular termination, articulated with definite article are presented in fig. 3 and 4.

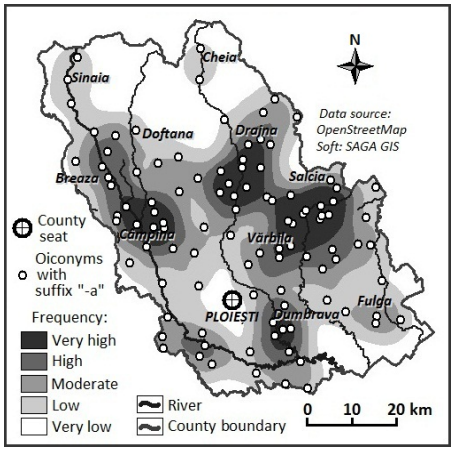

Fig. 3. Prahova County. Oikonyms with suffix "-a".

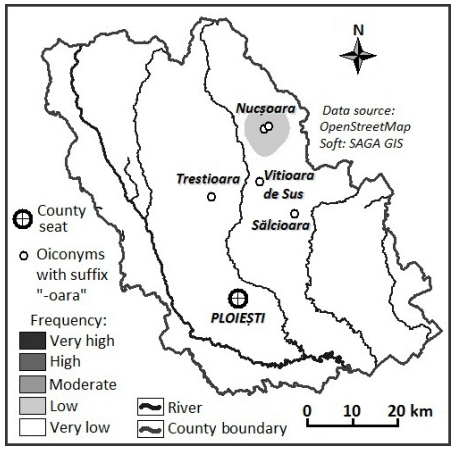

Fig. 4. Prahova County. Oikonyms with suffix "-oara".

Oikonyms formed with the suffix "-a" (fig. 3), as the definite article, are scattered throughout the county, with higher concentrations in Prahova Valley (Azuga, Sinaia, Breaza etc.); in Vălenii de Munte area - middle valley of the Teleajenul River (Drajna, Cheia, Bughea etc.); Podeni Depression – Sângeru area, Cricovul Sărat (Salcia, Plavia, Mehedinţa, Priseaca, Vărbila, etc).

Diminutive oikonyms (with the suffix "-oara": Sălcioara, Viţioara, Nucşoara, Trestioara) are concentrated in the central-eastern part of the county (Mislea-Podeni area, Drajna), in the Subcarpathian area (fig. 4). Meanwhile, the oikonyms with the suffix "-iţa" (Gherghiţa, Ciupelniţa, Băltiţa, Matiţa, etc.) occur in the southern half, especially in Gherghiţa Plain.

The suffix "-et" contributes to the formation of oikonyms, especially from plants (Avram, 2012). In fig. 5 one can see an interesting fact about the distribution of oikonyms with the suffix "-et", "-etu", "-eți" (Brădet, Făget, Frăsinet, etc.), which are situated east of Teleajen Valley. Moreover, one may notice an area of high concentration of singular articulated and masculine oikonyms (Pietrișu, Plaiu, Cornu) north of the confluence of Doftana and Prahova rivers (fig. 6), immediately upstream from the area of concentration of the oikonyms finished with " -a "(fig. 3).

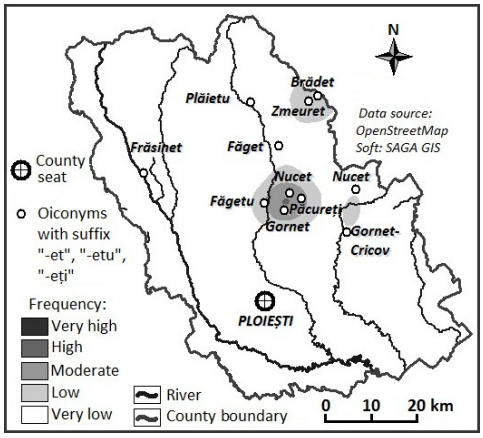

Fig. 5. Prahova County. Oikonyms with suffix ”-et”, ”-etu”, ”-eți”.

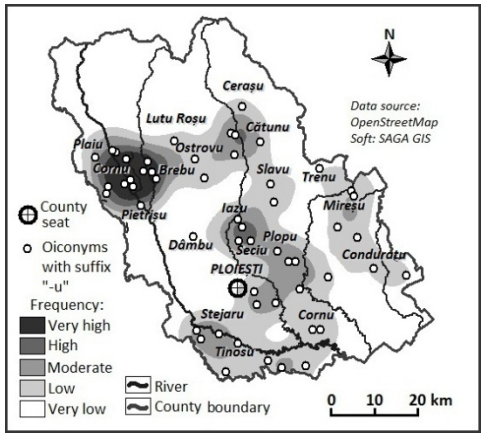

Fig. 6. Prahova County. Oikonyms with suffix "-u".

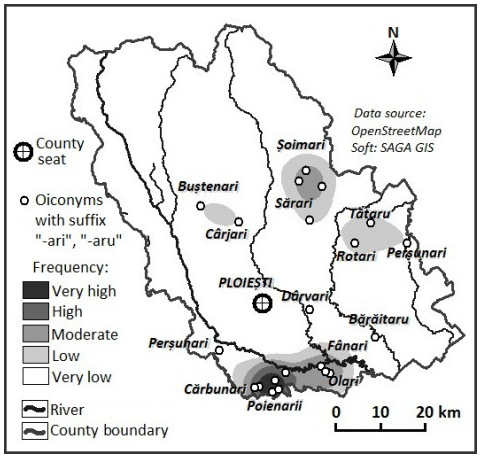

Fig. 7. Prahova County. Oikonyms with suffix -ari”,”-aru”.

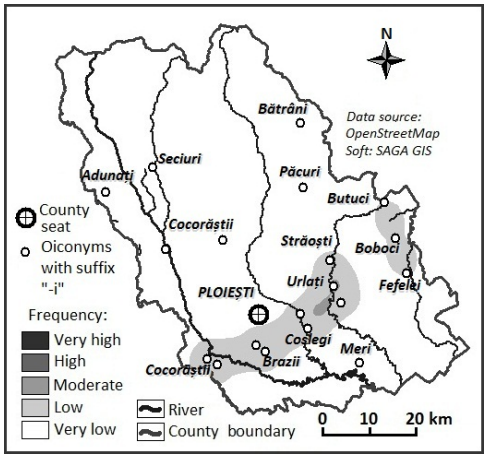

Fig. 8. Prahova County. Oikonyms with suffix "-i".

Further, the suffix "-ar" is intended to form the agent name, as action author or job (Avram, 2012). In fig. 7 one may remark the prevalence of these oikonyms south of Prahova River: Fânari, Olari, Cărbunari, Poienarii. Those ending in "-i" (Urlați, Brazi, Meri, Cocorăștii) occur mostly in the high plain (fig. 8). As regards the oikonyms ending in "-ani" or "-anu", there is a fairly homogeneous dispersion within the county (fig. 9).

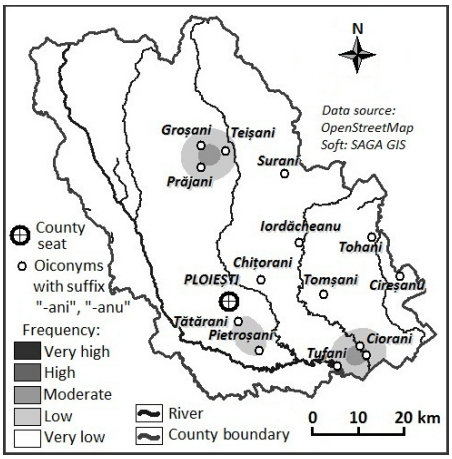

Fig. 9. Prahova County. Oikonyms with suffix "-ani", ”-anu”.

It is interesting to note the high concentration of oikonyms ending in "-eni" (Văleni, Chiciureni, Măneciu - Pământeni, Măneciu – Ungureni, Făcăieni, Olteni, Fundeni, Plopeni, Scăeni, etc.), along Teleajen River. The suffix "-eni" expresses the movements of people from one region to another (Avram, 2012). In fact, Teleajen Valley (not Prahova Valley) was the main transit thoroughfare between Transylvania and Wallachia. Besides, the oikonyms with the suffix "-eni" are almost absent on Prahova Valley (fig. 10).

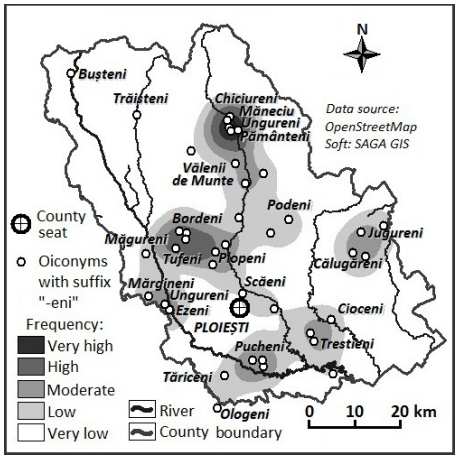

Fig. 10. Prahova County. Oikonyms with suffix "-eni”.

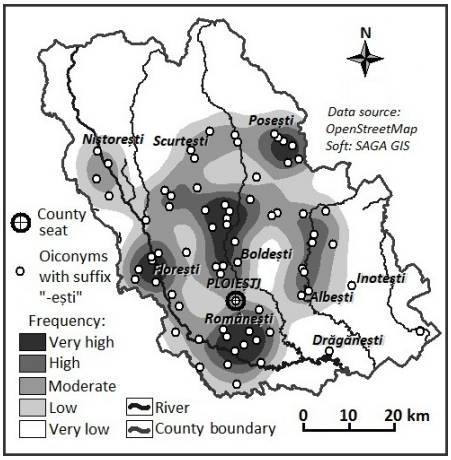

Fig. 11. Prahova County. Oikonyms with suffix "-ești”.

The oikonyms with the suffix "-ești" are usually derived from the name of personalities or indicate the derivation from the names of the settlements of origin. Excepting the south-east extremity of the county and the northern area (poor in settlements), these oikonyms are spread throughout the territory (fig. 11). A higher concentration may be seen also on Teleajen Valley (Lipănești, Boldești, etc.) and south of Ploiești (Țigănești, Românești, Bărcănești, etc.).

Following the second analysis, with respect to the correlation between oikonyms composed with word "Valea" (Valley) and the character of settlements located in the valley, we obtained results that show the oikonyms veracity.

These oikonyms were interpolated by Kernel density method (fig. 14), resulting in a very interesting fact: their concentration in two areas. The first one is around Urlați - Valea Călugărească area (Valea Seman, Valea Urloi, Valea Mieilor, Valea Cucului, Valea Mantei, Valea Orlei, Valea Nicovanei etc.). The second one is around the north-eastern Subcarpathian area (Valea Plopului, Valea Screzii, Valea Anei, Valea Tocii, Valea Stupinii etc.). A third area is in the western extremity of the county (Valea Oprii, Valea Bradului, Valea Târsei).

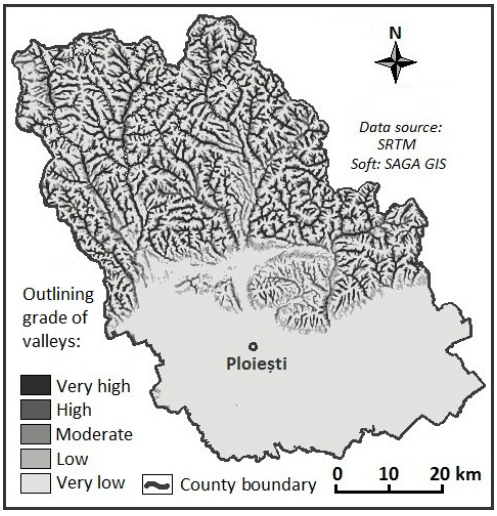

Fig. 12. The outlining grade of valleys

Corroborating fig. 13 and fig. 14, one notices the existence of a strong relationship between the grade of settlements location in the valleys (fig.13) and the distribution of oikonyms of "Valley ..." type (fig. 14). The sector in the western extremity (Valea Oprii, Valea Bradului, Valea Târsei) overlaps the dark grayscale in fig.13, as well as the north-eastern sector.

Instead, the oikonyms from Urlați – Valea Călugărească sector apparently are not in the area with settlements that have a strong valley-related character, compared to other higher areas of the county. But, compared to other areas from the low Subcarpathian Hills string, by far the darkest grayscale from fig.13 appear in Urlați and Ceptura hills.

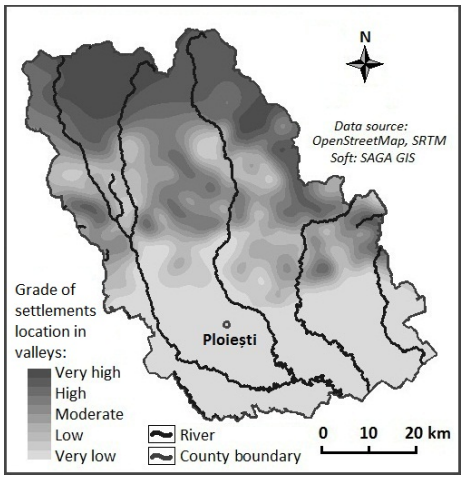

Fig. 13. The grade of settlements location in the valleys

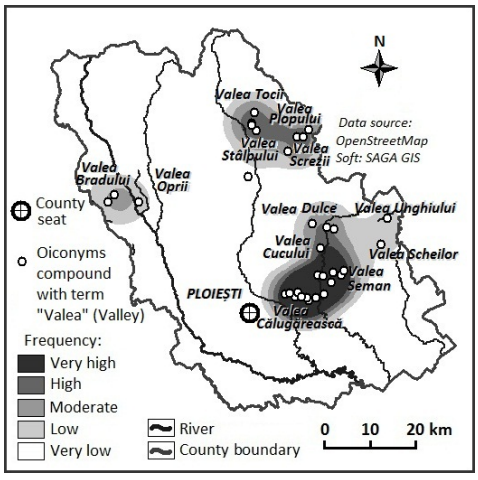

Fig. 14. The oikonyms including the word "Valea" (Valley)

In addition, one could mention the areas between Prahova and Teleajen rivers (fig. 13) with very dark grayscale (so with a pronounced valley-related character of settlements), but there are no oikonyms including the word "Valea" (Valley).

4. CONCLUSIONS

In this paper we gave an example of a way of using the benefits of Geographical Information Systems in the field of toponymy, namely the study of the distribution of oikonyms in Prahova County.

The link between the oikonyms and space has been noted, primarily from a historical-geographical point of view. In this regard, one remarked, for example, the high frequency of oikonyms derived with the suffix "-eni" (which suggests that the population moved from one region to another) along the Teleajen Corridor which functioned as a transit thoroughfare between Wallachia and Transylvania.

Secondly, the relationship between oikonyms and space has been outlined from the physical-geographical point of view, as the relation between the oikonyms of "Valea ..." (Valley...) type and the location of settlements in the valleys.

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QUALITY OF LIFE AUDIT IN THE URBAN AREAS OF THE ROMANIAN SOUTH-EAST DEVELOPMENT REGION

MARIA IOANA VLAD ŞANDRU[1]

ABSTRACT. – Quality of Life Audit in the Urban Areas of the Romanian South-East Development Region. This paper aims to present the concept of quality of life and compare the standard of living in the urban areas of the South-East region, implementing a new method of analysis, based on quantitative data obtained from statistics. The process of aggregating the statistical data used in this analysis create partial indices (Demographic Index, Social Index, Environment Index, Information Society Index, Culture and Recreation Index) figured out by means of *Quality of Life Audit* method, which combines the concept and principles of the European program *Urban Audit* with the formula used by statistical software *Dashboard of Sustainability*. Finally, the Quality of Life Index is obtained by aggregating the five indices.

Keywords*: quality of life, urban area, indicator, index, Urban Audit, Dashboard of Sustainability*

1. INTRODUCTION

The South-East Development Region is made of six counties, Brăila, Buzău, Constanţa, Galaţi, Tulcea, Vrancea. The largest, Tulcea, covers 24% of the whole territory and had 91,286 urban inhabitants in July 2008. The opposite, in terms of territory, is Galaţi with 12% of the South-East Development Region, but with an urban population of 291,608 inhabitants. In each county, local authority structures are the county councils, local councils, city, town and commune councils. South-East settlements are structured in 11 cities, 24 towns, 355 communes and 1,447 villages (ADRSE, 2010).

Urban area cities and towns classification, made according to 350/2001 law, reveals certain exceptions of Buzău, Focşani, Tulcea, which are included in the second rank, but not exceeding 70,000 inhabitants, while Adjud does not reach 25,000 inhabitants. Within the third rank of classification, Făurei and Bereşti towns do not reach 5,000 inhabitants.

The highest level of urbanization is in Constanţa County where there are 12 cities.

The towns of the South-East Development Region receive their urban status in different periods. This was the result of different processes and factors throughout history, with a long-term existence from antiquity to the contemporary area.

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Constanța, Mangalia, Tulcea, Isaccea, Măcin, Hârşova, Babadag and Cernavodă are in the category of ancient cities, as their existence was certified starting with the 7th century until the 1st century B.C.. Constanța, the oldest city, situated on the Black Sea coast, was founded after the Greek colonization of the Black Sea basin, between 7th century B.C – 5th century B.C under the name of Tomis.

Medieval urban areas appeared since 1134 A.D.: Sulina, Tecuci, Buzău, Galați, Brăila, Râmnicu Sarat, Focșani, Adjud.

In the contemporary period, the following settlements received the urban status since after 1945: Panciu, Făurei, Târgu Bujor, Năvodari, Bereşti, Ianca, Nehoiu, Pogoanele, Ovidiu, Negru Vodă, Pătârlagele, Băneasa and Însurăței. Băneasa and Pătârlagele are the most recent towns, certified as urban areas in 2004.

South-East Development Region administrative organization

Tabel 1

Development Region/ County	Total surface (km^2)	% from regional territory	Number of cities and towns	Number of municipalities	Number of communes	Number of villages
Sud-Est	**35,762**	**100**	**35**	**11**	**355**	**1,447**
Brăila	4,766	13	4	1	40	140
Buzău	6,103	17	5	2	82	475
Constanța	7,071	20	12	3	58	188
Galați	4,466	12	4	2	61	180
Tulcea	8,499	24	5	1	46	133
Vrancea	4,857	14	5	2	68	331

Source: ADRSE, Audit teritorial SE, 2010 – 2020

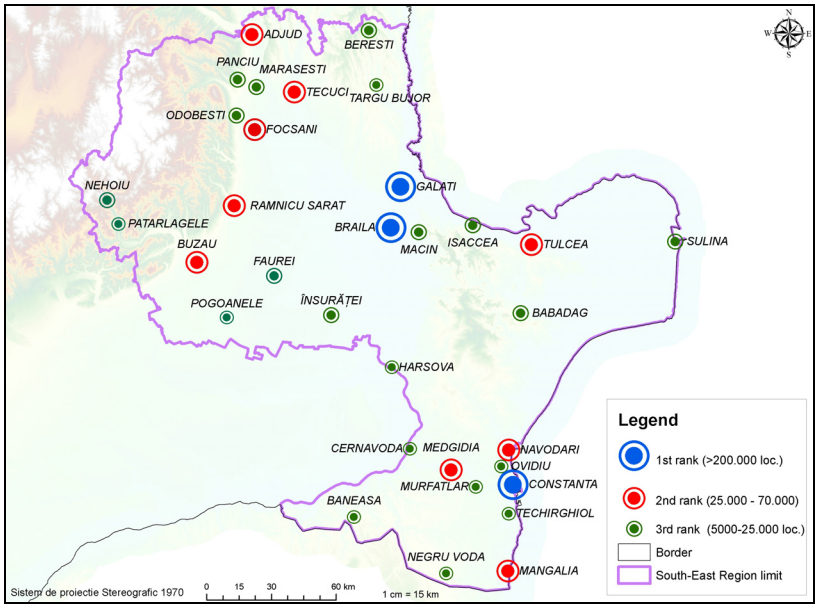

Fig. 1. Urban settlements according to their rank in South-East Development Region

2. MATERIALS AND METHODS

Characteristics of Urban Audit programme. In progress since 2003 at the European Commision, Urban Audit's main objective is to respond to the growing demand for an assessment of the quality of life in European towns / cities, where a significant proportion of European Union citizens live. The Urban Audit is a joint effort by the Directorate-General for Regional Policy (DG REGIO) and Eurostat to provide reliable and comparative information on selected urban areas in Member States (MS) of the European Union (EU) and the Candidate Countries.

The priority of the European Commision Regional Policy is the improvement of economic and social cohesion within the European Union, aimed at reducing disparities between EU regions. Urban Audit project's goal is to collect comparable statistics at European level for a considerable number of variables and for three spatial levels: the suburban, the city and the sector.

In order to adopt regional policy measures, the European Commision considers primary and important, if not crucial, the comparisons between cities, taking into account their position in Europe and the level of development in different areas (economic activity, public transport, education, etc.) and also the disparities between these.

These led to the implementation of the Urban Audit Pilot Phase for measuring the quality of life in selected towns and cities through the use of a simple set of urban indicators and a common methodology in May 1998. Following the evaluation of this pilot phase, Eurostat set up a suitable organizational structure for three phases of Urban Audit:

- Urban Audit I ran its course between 2003 and 2004 and aimed at collecting data for the period 1994 – 2002 just for E15 Member States.
- Urban Audit II ran its course between 2004 and 2005, data being collected for the 2001 – 2003 period ; in this phase were present the New Member States, Bulgaria and Romania.
- Urban Audit III was developed between 2007 and 2008, the data being collected for the period between 2001 and 2004.

The structure of Urban Audit statistics is composed of 9 statistical fields and 25 domains, as follows: demography, social aspects, economic aspects, civic involvement, training and education, environment, travel and transport, information society, culture and recreation.

Dashboard of Sustainability features. The Dashboard of Sustainability is a free, non-commercial software package that illustrates the complex relationships among economic, social and environmental issues. The visual format is suitable for decision makers and other interested in sustainable development. It was developed in 2002 by the Consultative Group on Sustainable Development Indicators, an international team of measurement experts, coordinated by the International Institute for Sustainable Development. The Dashboard project is part of the sustainability indicator initiative of the Bellagio Forum for Sustainable Development, one of the main funders of the work. It can be considered an online tool designed to be understood by experts, the media, policy-makers and the general public. The complexity of decision-making in the 21st century needs more adequate decision support tools. Using the metaphor of a vehicle

instrument panel, it displays country specific assessments of economic, environmental, social and institutional performance toward sustainability. The Dashboard presents sets of indicators in a simple pie chart format based on three principles:

- the size of a segment reflects the relative importance of the issue described by the indicator ;
- a colour code signals performance relative to others: green means "good", red means "bad";
- the central circle (PPI, Policy Performance Index) summarizes the information of the component indicators.

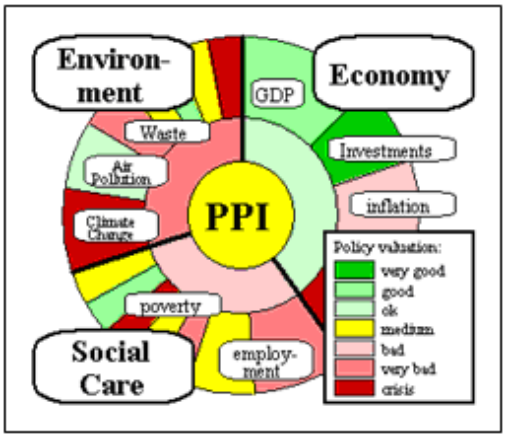

Fig. 2. Dashboard of Sustainability Pie Chart
(Source: Dashboard of Sustainability manual, 2002)

Ruxandra Mocanu–Perdichi used the software Dashboard of Sustainability for getting the "Sustainable Development Index in Romania at country and regional level". The article published in 2009 developed a sustainability composite indicator, which consists of 19 indicators classified in four dimensions: environmental, institutional, economic and social. The purpose of this study is to provide a foundation for future strategies, local sustainable development plans, detailed analysis of development disparities between territorial units, regions and districts. In this case, the use of this application allows detailed view of all counties, both for overall index and for different dimensions of development. Bucharest has the highest sustainable development index among the 42 counties of Romania and Botoşani County the lowest.

Antonio Scipioni, Anna Mazzi, Francesca Arena from the Center for Quality and Environmental Studies, University of Padua, Italy, published in 2003 the article *„Aggregated indexes to measure urban sustenability. The experience of Padua Municipality: a Quality of Life Observatory".* This paper presents the main outcomes of a research project aimed at the definition of synthetic indicators to monitor the quality of urban life, with particular focus on the Municipality of Padua and its way to realize a Local

Agenda 21. Using the Sustainability Dashboard and the European Common Indicators, allowed the definition of an Index of Quality of Life specifically for the Municipality of Padua, in the North-East of Italy. The research of Padua project led to the definition of a set of indicators, referring to different aspects of urban sustainability in Padua.

Quality of Life Audit implementation. During the research made upon the quality of life concept in order to reveal the multidimensionality of this concept, one raised the premise that sustainability gives the possibility for an enhanced quality of life, influencing its components in a beneficial and lasting way.

Dashboard of Sustainability application is an analythical method applied in quality of life status evaluation by creating a quality of life index, consisted of subindices areas chosen to be representative for this concept. As for the present study, for getting the Quality of Life Index in the South-East Development Region, we used Urban Audit indicators, figured it out through the application formula, therefore the method being called as Quality of Life Audit.

In order to analyse the quality of urban life by each indicator value, we established that value that contributes to quality of life index, which consist in the best result: for example the minimum value of unemployment rate is considered the best result, while the maximun value of the indicator – number of beds in hospital / 100.000 inhabitants is considered to have the best performance. In the process of accomplishing this new method, all needed data were not available for the entire urban region, in this case, the program divides the points for the available indicators at their number. Each analyzed unit indicator is automatically ordered on the range 0-1000, 0 points are going to the indicator with the lowest value (respectively, the highest rate of unemployment), while the maximum is going to the indicator with the highest value (respectively, the lowest unemployment rate). The accounts made through this method are based on this formula:

$$P = 1000*(x-min)/(max-min), \text{ where:}$$

P = points awarded ;
X = analyzed unit value ;
Min = the value considered the worst ;
Max = the value considered to be the best

The quality of life index is figured out based on the total score obtained, its colour resulting from the city position in the database. Given its position in the quality of life rank, the South-East Development Region cities receive a colour code for each indicator, as follows:

- Dark green is an excellent performance of an indicator or life at high quality standards;
- Yellow has an average relevance for quality of life, in terms of development, being situated at the border of high quality of life and low quality of life;
- Dark red denotes a critical quality of life ;
- Purple is the colour which indicates the lack of data.

The dimensions used for aggregating the Quality of Life Index, included also in the Urban Audit programme, are the following: demography (DEM), socio-economic aspects (SEA), training and education (TE), environment (ENV), information society (Inf), Culture and Recreation (Cul).

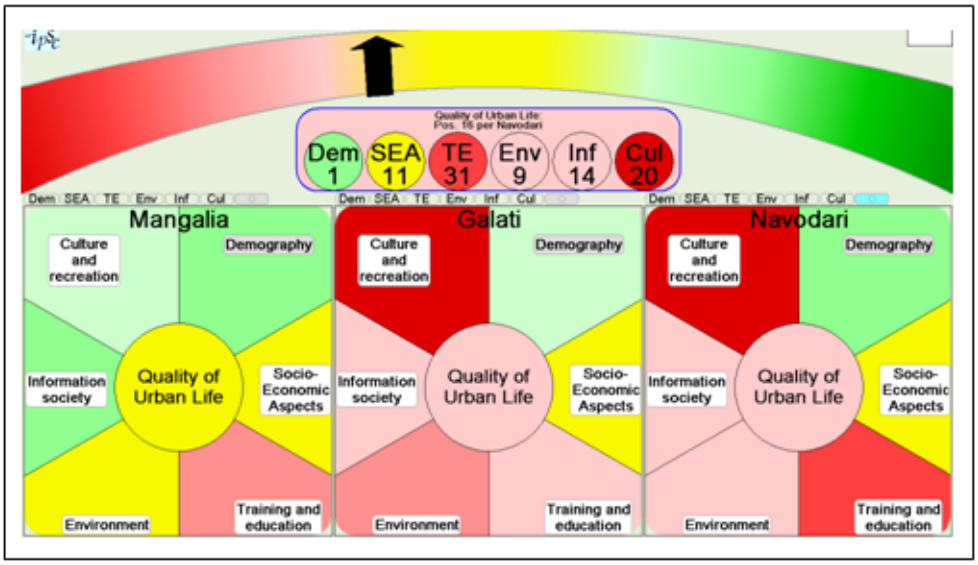

Fig. 3. Representation of quality of life dimensions

In turn, these dimensions were developed by aggregation of approximatively 50 indicators (index of aging, the demographic dependency rate, birth rate, death rate, vitality index, the average area of housing, green space (m^2/inhabitant), land line subscriptions/1000 inhabitants, accommodation units/1000 inhabitants, etc.), all these being calculated for each of the 32 urban areas in the South-East Region. The "rainbow" (fig. 3) represents the combined colour codes, the arrow pointing out the actual position of a city in the quality of life classification. The figures inside dimension of analysis are points, or results that urban areas receive from applying the Sustainability Dashboard formula. Thus, in terms of demography, Năvodari is on the first place out of 32 urban areas, while in terms of Culture and Recreation it is on the 20th place due to the poor results of component indicators.

3. RESULTS AND DISCUSSIONS

The Demographic Index of Quality of Life came up from aggregating several indices as: vitality index, aging index, mortality rate, birth rate and demographic dependency ratio. In order to standardize this index, by applying the used formula, points are assigned between 0 – 1000. The analysed urban areas extend from 682 to 122 points, combined in five categories of indicators given by each city colour code: excellent, good, average, bad and very bad. The points belonging to these colours, or to their demographic qualities, decrease from the first, Năvodari, with the highest number of points, to the last urban area, Pogoanele.

Năvodari, a rank II urban area and 35,453 inhabitants in 2008, holds the best performance of the Demographic Index due to the component indicators performance. Therefore, Năvodari has the lowest aging index of the 32 cities, with a 8.6‰ index, which represents an excellence performance, and the lowest mortality rate of 6.71‰.

The Demographic Index for Pogoanele is composed of indices with serious and critical performances, like a birth rate of 10.97‰ and a mortality rate of 14,24 ‰. The structure by age groups shows a low population growth, induced by an aging of 25.2‰, where the age groups have relatively equal proportions. In 2008, in terms of demographic dependency rate (which is the ratio between young and old people and 100 adults), 100 adults were responsible for 52.6 old persons, 3.4% more than in 1990.

Social Index is developed by aggregating the social and economic indicators like: the activity rate, the drinking water consumption, the urban density, the average area of housing, the unemployment rate, the divorce rate, the marriage rate, the infant mortality rate, the urban density. The performance indicators integrated in the Social Index fit in the same categories as the Demographic Index, except that the score starts from a lower level, 675 points for Techirghiol, which consists of three indices with critical and serious performance: 1.02 dentists/1000 inhabitants, 112.87 mc/1000 dwellings, a low value compared to other urban area capacities. There are also better indices, as the activity rate, with an average performance of 33.96‰, expressing the rate between the number of active people and total population. It is continued with indices of excellent, very good and fair performance such as the urban density of 188 inhabitants/ km^2, given the total urban area of 38.76 km^2 and a total population of 7,295 inhabitants. Regarding the frequency of mariagges and divorces, the marriage rate has a good performance of 7.81‰, while the divorce rate is low and has 0.41‰. The infant mortality rate, an indicator of social issue based on Urban Audit structure, has an acceptable performance of 14.4‰.

The Educational Index combines indicators of quality of education, emphasized on educational infrastructure: number of kindergardens, number of primary and secondary schools, number of high schools, number of gyms in schools, sporting grounds, number of students per one teacher. Also, in this case, categories of performance are constituted, except that here the distribution of urban areas starts from a fair performance and not a very good performance as the previous indices were analyzed, continuing with bad, very bad, serious and critical.

The fair category includes two urban areas, Bereşti and Babadag, with 600 and 590 points respectively. Bereşti includes three indicators, whose score is excellent: 8.5 students to a teacher, 6.8 kindergardens to 1,000 preschool children, 4.29 high schools to 1000 students. The other indicators show a critical performance. Mărăşeşti, Năvodari and Odobeşti with scores between 201 and 98 points have a poor educational infrastructure consisting of very bad and critical indicators, except for Năvodari, which has an average performance in the case of the indicator referring to 13.3 students to a teacher.

For the Environmental Index one took into account indicators concerning the emission harmful substances, spread in the air and in the water, the quantity of hazardous and non-hazardous waste and green space (km^2/inhabitant). The latter one is the most important indicator of this dimension. Tulcea registers the highest

number of points, being included in the good category, consisting in indices with excellent performance as non-hazardous and hazardous waste (tonne/year) and the distribution of methane (CH4) in the air. The category of critical performance indicators includes the value of 6.68 mp of green space/inhabitant. For the rest of the indicators the statistical data were not available.

Information Society index combines indicators that define access to information: number of dwellings with internet access, number of dwellings with land line access, number of computers in schools and elements of local government of the urban areas like the implementation of Agenda 21 and the existence of city hall websites. The excellent category includes one urban area, Constanţa, which has indices with very good performance, like 130.4 computers/total students and an average performance represented by the number of dwellings with landline access, 306.19 subscrisptions/ 1000 inhabitants. Also, one should highlight aspects related to the implementation of Local Agenda 21 in Constanţa in 2006, which was a good opportunity to bring into question the medium and long term objectives of the local community, contributing to identify objectives and targets.

Serious and critical categories include urban areas with a poor level regarding public access to information and opportunties, with scores between 421 and 89 points: Negru Vodă, Hârşova, Năvodari, Galaţi, Bereşti, Brăila, Techirghiol, Ianca, Târgu Bujor, Tulcea, Mărăşeşti, Medgidia and Sulina.

Culture and Recreation Index includes indicators regarding cultural aspects and recreation: number of libraries, number of museums, accomodation units and number of overnight stays. The urban area distribution is dominated by serious and critical performances receiving a score between 655 and 0 points shared in five categories: average, bad, very bad, serious and critical. Mangalia with the highest number of points has indices of serious and critical performances described by 0.35 libraries/ 1000 inhabitants, 0.02 museums/1000 inhabitants, indices of average performance like 303,762 arrivals in the city and excellent performance, like 1,262 places in the accomodation units/1000 inhabitants and 6.33 accomodation units/1000 inhabitants. Serious and critical categories includes urban areas with few accomodation units or without accomodation units and where the number of libraries and museums is very low related to the number of inhabitants. As a result, most urban areas have serious and critical performances: Târgu Bujor, Pogoanele, Focşani, Babadag, Râmnicu Sarat, Nehoiu, Isaccea, Ovidiu, Odobeşti, Medgidia. Component indices of these categories receive between 193 and 0 points. There are also urban areas, like Techirghiol, which have favorable performance in terms of accomodation units with 5.07/1000 inhabitants, Panciu and Bereşti which have an average performance with 1.13 libraries/1000 inhabitants and 1.09 libraries/1000 inhabitants, respectively.

Quality of Life Index. Finally, the aggregation of the six partial indices, the Demographic, Social, Education, Environmental, Information Society, Culture and Recreation Index by multiplying performance points and weighting coefficients results in calculating the Quality of Life Index. Therefore, the analysed urban areas receive between 553 and 243 points collected in three categories of performance, which decrease from the average category to very poor. The colours are represented as in the case of the indices, according to the urban area position in the database.

The average performance category includes five urban areas: Mangalia, Constanţa, Buzău, Tecuci and Tulcea (fig. 4). Mangalia has the highest quality of life index, holding 553 points from partial indices with good performance regarding Demographic Index, Information Society Index, fair performance for Culture and Recreation Index, average performance for Environmental and Social Index and very bad performance for Educational Index. The other components of this category decrease in value and performance, such as Constanţa with bad performance for Culture and Recreation, Demography and Educational Index. Bad and very bad performance category includes the other urban areas of the South-East region, which have between 412 and 243 points Odobeşti has the lowest Index of Quality of Life with a very bad performance consisting of critical performance for Culture and Recreation and Educational Index, serious performance correlated with the Information Society Index and an average performance for Social Index.

The Environmental Index for Odobeşti did not receive a particular performance, because its composition consists only of the value for green space (m^2/inhabitant). Data regarding the other indicators in the analysis of environmental components (air and water pollutants) are not available. Therefore, the Environmental Index was framed as having a purple colour, standing for the lack of data.

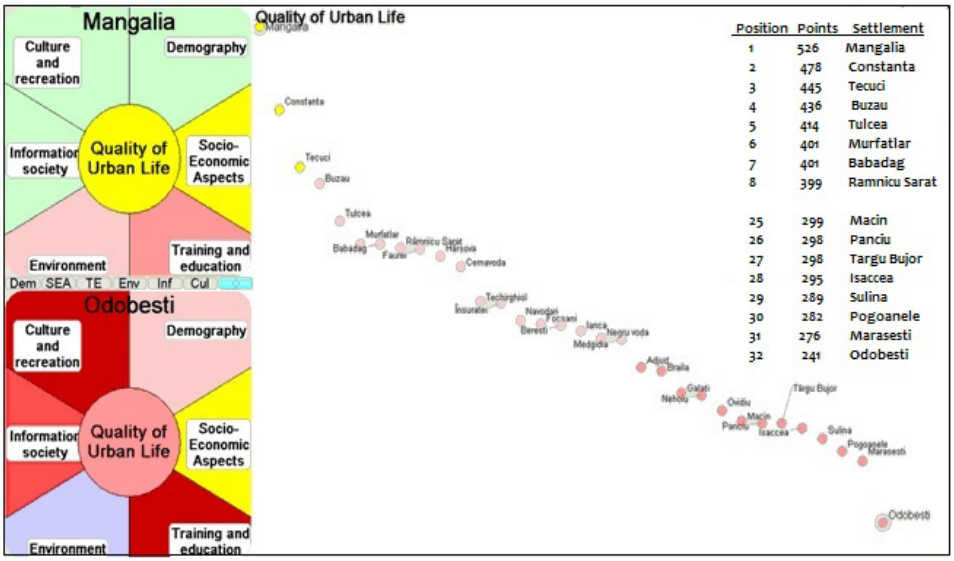

Fig. 4. Quality of Life Index distribution in Romania South-East area

4. CONCLUSIONS

The Quality of Life Index for the South-East Region offers a partial image of what is the level of the quality of life in 2008, considering the six fields, the components of the concept addressed in the present paper. In turn, these fields include certain indicators, that were figured out for 32 urban areas, finally achieveing an index for each area.

This new method for creating the Quality of Life Index combines the current structure and implementation of Urban Audit European programme with the calculation method required by the Dashboard of Sustainability, that allows a structured ranking of each urban area depending on the status and value of each indicator or index. Thus, one can say that the Quality of Life Audit is a new and useful method, presenting its feasibility by its applications in other fields of research, which use comparative analysis, and proving its effectiveness in a rather new area, within the geographical sciences.

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COMPETITIVE REGIONS AND STRUGGLING REGIONS IN THE KNOWLEDGE ECONOMY

OANA-RAMONA ILOVAN[1], ANA-MARIA POP[2]

ABSTRACT. – Competitive Regions and Struggling Regions in the Knowledge Economy. We answered the following two main questions of our study: how to ensure the resilience of regions within the knowledge economy and which were the regional strengths in order to promote sustainable development, in the context of an innovative and competitive environment. In this context, regional policy should undergo significant changes in order to adapt to an economy that has changed, more exactly it is necessary to develop a series of less tangible goods, but that support regions to develop their potential. Still, there is no universal formula appropriate for all regions. That is why each region has to create its own strategy for regional development within the knowledge economy. Nevertheless, the common purpose of all regions is to create a sustainable community that is economically competitive, socially inclusive and with a quality environment.

Keywords: *regional development, knowledge economy, innovation, competitiveness.*

1. INTRODUCTION

The knowledge economy and its impact on regional development is a hot topic in national and international literature (C. Autant-Bernard, M. Fadair, N. Massard, 2013; N. Bellini, M. Landabaso, 2005; P. Cocean, 2011; A. di Minin, 2003; W.W. Powell, K. Snellman, 2004; M. Tălmaciu, 2012; A. Thierstein, M. Walser, 1999; B.J.K. Yeo, 2010; V. Zítek, V. Klímová, 2011) which we also approached in a recent study (O.-R. Ilovan, E. Sochircă, 2012) that we continue and develop in this paper. In addition, starting from the idea that "the path of regional development goes through universities" (P. Cocean, p. 7), we answered the following two main questions of our study: how to ensure the resilience of regions within the knowledge economy and which were the regional strengths in order to promote sustainable development, in the context of an innovative and competitive environment. Under what circumstances does innovation lead not only to economic development, but also to a balanced development for the entire regional system? We are interested in discussing the way a region functions and the features that make it competitive, that ensures its economic success. Moreover, it is important that intra- and interregional disparities diminish rather than increase.

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For globalisation and for the so-called new economy, regions have the answer of innovation. People produce new ideas that lead to new or better goods, services and organizational practices based on innovation. But innovation does not take into account only the research phase (before participating to a competition) and the efforts at the technological level. Innovation includes also financing, training, marketing, knowledge management, R&D, design, counselling, copyright, etc. (N. Bellini, M. Landabaso, p. 2).

In opposition to the classical or traditional economy, based on capitalising resources and on using different types of the extant land, the knowledge economy is defined as "[...] production and services based on knowledge-intensive activities that contribute to an accelerated pace of technological and scientific advance as well as equally rapid obsolescence" (W.W. Powell, K. Snellman, p. 201) and as "[...] made up of industries engaged in ideas and creativity, that is, innovation" (B.J.K. Yeo, p. 72).

According to the assessment of the OECD (the last year with this kind of data is 2009), if we compare the innovation activity of the European area with that of the USA, we notice a higher concentration in the European continent that is the northern states, Germany and Switzerland hosting most of the innovation hotspots (fig. 1).

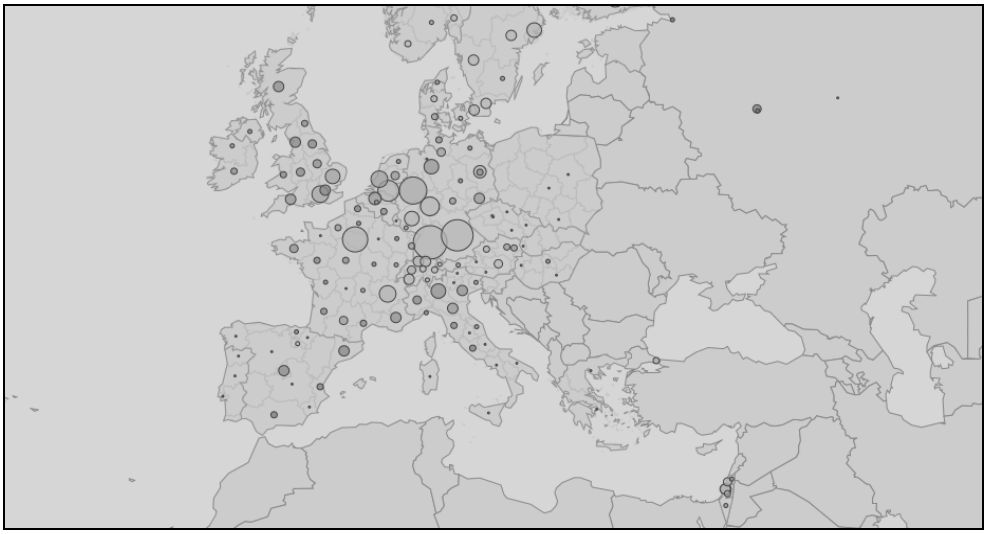

Fig. 1. Patent applications/1 million inhabitants in Europe (2009)
Source: *http://oecdwash.org/innovationmapper/*

In addition, the World Bank established a new methodology for quantifying and interpreting the performance in the field of innovation, summing up 148 variables available for 146 countries, and creating two indices: the Knowledge Index (KI) and the Knowledge Economy Index (KEI). The three variables entering the sphere of the knowledge economy are: the Economic Incentive and the Institutional Regime, Education, Innovation and Information & Communications Technology (ICT). Analysing these indices for 2012, we notice that Romania has a minimal number of points (registering, at the

same time, the lowest values for the indicator that measures the volume of expenditure for education), while Sweden, Denmark, Holland, and Finland (fig. 2) are in the top and this is also reflected in social and political decisions.

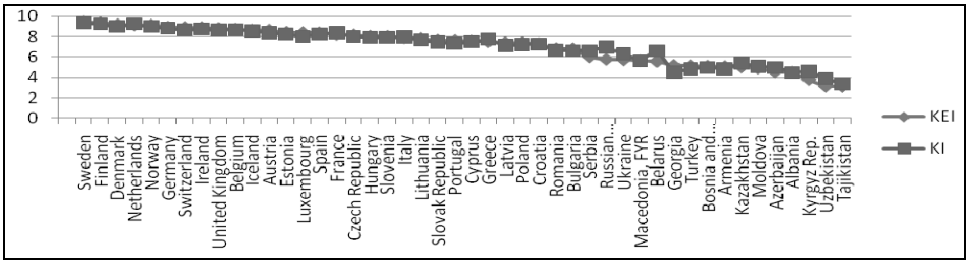

Fig. 2. KEI and KI Indices for Europe and Central Asia (2012)
Source: *The World Bank (http://info.worldbank.org/etools/kam2/KAM_page5.asp)*

According to the study realised by W.W. Powell and Kaisa Snellman (2004, p. 202), in a region, in order to build a knowledge-based economy, the following components are necessary: knowledge – human, organisational and intellectual capital – and activities correlated to knowledge – research and development efforts, investment in ICT, investment in education and in training as well as in organisational reforms. Moreover, it is necessary that regional stakeholders promote innovation policies and also promote innovation as a whole at the regional level. It is not by chance that taking into account the spatial dimension of knowledge that the Geography of Innovation develops – a term introduced by Maryann Feldman (1994) (C. Autant-Bernard, M. Fadair, N. Massard, p. 196).

2. INNOVATION POLICIES AND FEATURES OF INNOVATIVE REGIONS

A significant constraint appeared and maintained as a result of administrative borders between public research and the economic interest of private firms, but, in recent years, territorial planning has become more and more pragmatic at the regional level (the recommended and best approach to planning is bottom-up) than at the national and at the European levels, the presence of clusters and of innovation systems contributing to the appearance of competitiveness. In addition, the inhabitants' feeling of belonging to a place or to a region is strength in creating partnerships at a regional level (*ESPON Synthesis*, p. 86).

Moreover, knowledge transfer should focus on co-operation between the public and the private sectors on one hand, and, on the other hand, between universities and research institutes and the industrial and tertiary sector, especially the SMEs. Regional economic development should and can be promoted through technological innovation and economic exploitation of knowledge. In this context, in the knowledge economy, the relevant indicators of economic development refer to the workforce occupancy, to ICT technology, and to research and development (P. Cocean, Oana-Ramona Ilovan, p. 10).

Nevertheless, we ask ourselves if regions can have innovation as the basis for their development. Innovation is not a luxury product for rich regions, but it can be also a very powerful engine for most regions that lag behind and look for solutions in order to catch up (N. Bellini, M. Landabaso, p. 9) and therefore, there are *a series of features that developed regions display as a result of capitalising the results of innovation*:

a) *Implementing innovation policies in the case of less developed or struggling regions* is an opportunity (these regions may catch up if they create and promote new and better products and services, based on innovation, for niche markets). Less developed regions or declining regions may build their economic future starting from innovation. From this perspective, it is necessary to "crowd" in the same place all innovation capacities and R&D activities. But, an excessive geographical concentration of innovative activities may lead to an underdeveloped use of the potential of the respective region, as well as to the appearance and maintenance of important interregional disparities.

In this context of concentration and dispersion of new activities in the territory, we notice that a new Geography of Innovation appeared: scientific parks are always placed according to the centre-periphery model that characterises the Geography of Innovation and also peripheral centres appeared. "The Knowledge Factory" may be dispersed especially in regions which are well connected physically and virtually to international R&D networks and to international excellence technological networks (N. Bellini, M. Landabaso, p. 7). Thus, also less developed regions have a chance in the knowledge economy.

b) *The main decision makers for realising optimum knowledge transfers are universities, R&D and education institutes, technological centres, the public sector (at different administrative levels) and companies*. All these contribute to the promotion of regional competitiveness by creating internal knowledge networks. The human capital is the engine of economic development, ensuring the attractiveness and competitiveness of regions. Traditionally, the main factors determining competitiveness are the following: physical infrastructure, access to territory, to the labour market, to raw material, to markets and to capital (*ESPON Synthesis*, p. 79). Innovation and creativity are the necessary ingredients without which one cannot build the image and the economy of a competitive region in the knowledge economy. Moreover, regions should not be only competitive, but also territories where people can lead quality lives, sustainable economic, social, cultural and environmental territories (*ESPON Synthesis*, p. 86).

Leaving aside the European paradox, based on a significant concentration of universities and connected education institutions and a lagging behind industrial basis in what innovation is concerned, especially if we compare Europe to North America (e.g. the case of Silicon Valley), in the European knowledge economy regional actors focus on:

- strengthening the public-private relationships so that the resulted products are used through mechanisms such as attracting all information transmitting channels and encouraging work force to remain in the region (workers, researchers, companies, etc.);
- including and promoting all education types (not only in the university system) to establish partnerships with the SMEs;
- sharing resources instead of developing a large series of small projects in each of the two above-mentioned sectors of activity;
- regional institutions should promote entrepreneurs' invention patents.

In Romania, the experience on developing cluster type regional networks is at the beginning and, therefore, these networks cover unequally the regional space as they concentrate especially in urban settlements with educational tradition (M. Tălmaciu, p. 915).

c) *European regions almost moved above the phase of learning regions in the knowledge economy, of still experimenting, and for many of them one can see the results.* It has taken appropriate institutions and policies, as well as innovation-based strategies. Beside the urban areas, regions are the key factors in implementing *The Lisbon Strategy* and *Horizon 2020*, the two European documents recommending partnerships at the regional level due to their huge research-development-innovation potential. The European Union helps regions through the structural funds, but the most significant ones are those sent from the national level. What regional actors noticed was that the way regions functioned in the knowledge economy was determined by state policies (they decided at the national level how much to invest in education and in research).

Innovation and technologization policies, no matter the level they are created for (European, national, regional), give solutions to problems such as: adapting physical research infrastructure; creating a critical mass of the R&D potential in high tech sectors; well trained human capital and R&D teams; entrepreneurial exploitation of innovative results (with focus on generating and diffusing technology in the context in which innovation depends on regional actors' capacity to access the technology and the knowledge in their own region – qualified, well trained work force, R&D capacities, technology and knowledge transfer from technological centres, research institutions and universities – or to connect to all necessary resources at the international level) (N. Bellini, M. Landabaso, p. 6).

The regional policy should contribute to regional economic growth and, at the same time, it should eradicate or diminish interregional disparities (economic growth and cohesion support each other). The objectives of the regional policy should be clear and down to Earth and they require quality management. In this context, it is necessary that a strong public-private partnership exists in addition to co-operation between institutions, while good practice examples should be adapted to the case of each region. For instance, SMEs are more dependent on the context at the regional level in order to innovate than the more technologically advanced sectors. Similarly, the projects that focus on major technological advance suppose that the national government has the top role, not the regional context (N. Bellini, M. Landabaso, p. 2, p. 4).

At present, they consider that people should pay more attention to and give more importance to cultural projects, to innovative projects where many regions co-operate and thus they ensure a favourable context for territorial regeneration through culture, *especially for peripheral regions* from the point of view of development (*ESPON Synthesis*, p. 86). In contrast, technologically advanced sectors (e.g. chemistry, informatics, aeronautics, electronics, communications) are well represented in more *developed regions* and are dependent directly on R&D efforts, they have at the basis firms that are connected and innovative at the international level and they usually have internal capacities for R&D (N. Bellini, M. Landabaso, p. 5).

According to N. Bellini and M. Landabaso (2005, p. 12), *the features of the competitive regions in the knowledge economy are the following*:

- these regions promote economic development objectives that relate directly to the regional policy by means of increasing the regional capacity for innovation;

- these regions ensure their territorial cohesion through business co-operation and creating networks, through focusing on creating a link between the business environment and the knowledge base and on increasing the learning capacity within companies (especially within small and medium-sized enterprises);

- these regions try to understand and give feedback to the innovation request coming from enterprises, by adapting their own research and technological development capacity;

- these regions support ICT use in order to strengthen co-operation through networks in the virtual space;

- these regions target global markets;

- these regions focus on the need to manage knowledge better within companies and to increase the quality of services based on knowledge in the business environment;

- these regions support a certain type of enterprises;

- at a certain point in their evolution, these regions increased though support from the state (public intervention);

- these regions are characterised by economic modernising and diversifying because they are open to new opportunities for business in an environment characterised by a good management of business innovation, by entrepreneurial culture, by technological forecasting, by promoting synergy between the different parts of the research system and of technological development (technological transfer agencies, technological parks, universities, public laboratories, etc.);

- these regions promote work in well linked systems;

- these regions are aware of and give a significant role to the public sector (institutions, public policies, building social capital).

A series of strengths support these regional characteristics (N. Bellini, M. Landabaso, p. 10):

- high percentage of innovative companies (companies sharing the development of new products and services);

- sharing knowledge and information – know-who and know-how – among companies;

- promotion of global connections: top scientists and emigrants that come back to the region and have significant links with people abroad or in other regions (investing in quality resources means quality results – products and services);

- good governmental system;

- good governance;

- identifying and accessing opportunities;

- quality management of connections with those outside the region;

- a vision upon innovation (development does not mean only developing and adopting new technologies);

- developing unused potential;

- investing in research in the public system that can lead to qualified human capital (entrepreneurs, researchers and academia);

- infrastructure should ensure rapid communication, high speed transport and global/international connections;

- the physical periphery character of some regions may be altered (diminished) by offering a series of advantages to the top quality work force (a better quality of life than in the overcrowded and polluted metropolitan areas by offering facilities for spending quality time in nature, with resources such as seaside, sun, snow; offering facilities and quality services in health care and education; security; local culture). The quality of the place, especially due to the potential of the natural environment and the offer for recreation activities, has high attractiveness for those who work with knowledge/ information. Thus one may notice the irrelevance of the factor distance for them, especially for those working in business in the field of ICT.

3. SUSTAINABLE REGIONAL DEVELOPMENT: PURPOSE, FACTORS, AND STRATEGY

The purpose of sustainable development is that by means of a quality development we ensure the long term quality of a space meant for living (A. Thierstein, M. Walser, p. 3). Sustainable development is an ideal that we have to target at a series of levels: at the social level (including the institutional one), at the economic and at the environmental level and it supposes management, monitoring development, ensuring the resilience of the regional system under changing circumstances, long term planning and strategies (P. Cocean, Oana-Ramona Ilovan, p. 10): "[...] in order to become truly sustainable, development requires balance, employing reason and a capacity to plan for a long term" (P. Cocean, O.-R. Ilovan, p. 16).

In the centre of the idea of economic sustainability is that human needs are met and good life quality is attained through a more efficient distribution of resources. In this context, sustainable regional development may be obtained only if the impact of the economic activities on the social and natural environment is a good one. Within the knowledge economy, the focus is on the role of the economic component and of its features so that at the regional level sustainable development is accomplished through all its objectives and in all its dimensions (economic, social, and environmental) (A. Thierstein, M. Walser, p. 6).

The key concepts that are at the basis of development within the knowledge economy are: information, change, creativity, innovation, developing and reinterpreting, common values, common perception, co-operation, negotiation, dialogue, and fairness. Therefore, *the conditions or factors that lead to success or to a sustainable regional development*, according to A. Thierstein and M. Walser (1999, pp. 15-16), are:

- capacity to adapt to change;
- a business culture based on creativity and innovation, focusing on the responsibility for the community;
- discovering and reinterpreting territorial characteristic features or uniqueness;
- carefully using local knowledge and territorial characteristic features;
- long life learning;
- empowering women more;

- sharing responsibilities;
- sharing the same system of values that would take into account environmental, social, cultural, and economic interdependencies;
- common perception within the community for coherent development;
- long term strategic thinking;
- co-operation among diverse regional actors;
- social cohesion;
- fair interactions;
- a culture of negotiation;
- integrating social and technical abilities in the innovation process in order to minimise frictions, conflicts and failure because of change;
- access to information and to the space for dialogue.

One may notice that *social capital is the one of the key factors* to support sustainable innovation. P. Keefer and S. Knack (p. 1, quoting R. Putnam, 1993, p. 167), define social capital as "features of social organization, such as trust, norms, and networks that can improve the efficiency of society by facilitating coordinated actions." This kind of interaction also creates informal obligations (P. Keefer, S. Knack, p. 2, *apud* J. Coleman, 1990, chapter 12) that improve social efficiency.

The social capital (or the social and economic networks based on trust) includes the institutions and the relationships (based on certain attitudes and values) that guide and govern interactions among people and contribute to economic and social development. This means that, from economic, social and political perspectives, socio-economic and institutional relationships can create and support economic development, improving the standards of living for the entire population in a certain territory. Therefore, social and economic policies have to take this resource into account.

A. Krishna and Elizabeth Shrader (1999, pp. 9-10) presented a conceptual framework for social capital (quoting M. Olson, 1982; D. North, 1990; K. Bain, N. Hicks, 1998; N. Uphoff, 1996) dividing it into two levels: *the micro level*, including a cognitive type of social capital (values; trust; solidarity; reciprocity; social norms; behaviour; attitudes) and a structural type of social capital (horizontal organizational structure; collective/transparent decision-making process; accountability of leaders; practices of collective action and responsibility) and *the macro level* (level of decentralization; level of participation in the policy process; legal framework; type of regime; rule of law).

So that most of the above conditions are met, a strategy is necessary. A. Thierstein and M. Walser (1999, p. 17) identified the objectives that *a successful strategy for sustainable regional development* should target on a long term:

- understanding problems through being all aware of the risks and of the opportunities before taking an action;
- starting an open process of collective learning about other actors' (persons and regions) different experiences and this collective learning should involve regional resources and the capitalisation of own regional identity;
- creating the necessary context for negotiating and making decisions in common in order to reach trustful partnerships;
- creating a common vision that empowers territorial actors to make decisions about sustainability in their own region;

- orienting services to clients, to results and to effects that answer to people's in the region interests and needs;

- own governance (involving the best possibilities from outside the region and the internal capacity of the regional community to control its own destiny).

Successful development supposes successful planning and attentively preparing a strategy at the regional level, considered the most appropriate one according to the New Regionalism paradigm (J. Benedek, 2009; I. Sagan; J.W. Scott, 2009).

4. CONCLUSIONS

Regional policy should undergo significant changes in order to adapt to an economy that has changed, more exactly it is necessary to develop a series of less tangible goods, but that support regions to develop their potential. Still, there is no universal formula appropriate for all regions. That is why each region has to create its own strategy for regional development within the knowledge economy. Nevertheless, the common purpose of all regions is to create a sustainable community that is economically competitive, socially inclusive and with a quality environment.

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THE CLUSTERING POTENTIAL IN TRANSYLVANIA BASED ON THE CONCENTRATION OF ECONOMIC ACTIVITIES AND REGIONAL SPECIALIZATION

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ABSTRACT. – The Clustering Potential in Transylvania Based on the Concentration of Economic Activities and Regional Specialization. In our days clusters and cluster policies have begun to play an increasingly important role in the economic and political environment alike, being mentioned more and more often in relation to new development policies as an easy solution for the complex problems of the economy. For pointing out the "raison d'être" of these approaches, we intend to analyze the specialization and the spatial concentration of economic activities based on a very straight-forward approach for pointing out the intensifying activities of the economy both from a territorial as well as from a sectoral point of view. The topic is all the more important since much of the financial support and state aid going into the economy in the last years has been channeled in the form of financial grants given to specific structures like clusters or competitiveness poles and the tendency does not look like it is about to change. That is why in the present paper we would like to analyze the specialization of the counties in Transylvania and the concentration of the certain industries and try to find a correlation with the clusters which have emerged in the past years.

Keywords: *clusters, concentration, specialization, development.*

1. INTRODUCTION

Since the elaboration of the economic cluster theories, the concept and its interpretations have undergone numerous transformations, attracting a series of admirers along the years, but especially in the last period many skeptics started to appear.

All over the world there is a wide variety of cluster definitions, each one adding a few different elements, trying to better describe the multitude of connections and relations which make up a cluster in the real sense of the word. But probably none of them sums up the idea better than the one from Lefebvre (Ecole des Mines de Paris) who says that "There is no real adequate definition for a cluster. In reality, there are very different types of clusters to be found, involving different types of partners from industry, research, education, policy, (…). The two most famous examples of clusters, Silicon Valley and the Italian districts, are extremely different in their nature and ways of bringing the actors together" (Committee of Regions 2010, p.11).

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Although even the name has suffered a series of changes (competitiveness pole, industrial agglomeration, etc) – depending on the reasons for using the term – the basic concept has essentially remained the same, representing the close cooperation between companies, research institutions and other stakeholders in a geographically delimited area. Since we would not like to go into detail regarding the definition of the concept, we will consider the above description as a guideline when using the term further in the paper. Even so, we have to point out that because of this fuzziness we sometimes come face to face with the barriers imposed by the vague character of the cluster concept when trying to underline certain characteristics, although this does not seem to deter decision makers when supporting certain "privileged" economic sectors.

At this stage, probably the best starting point would be to accept the fact that these structures DO exist, the object of the analysis being to identify the causes of the phenomenon, its characteristics as well as the factors capable of influencing the clustering process. The New Economic Geography does offer us some explanations on why these clusters - which are so hard to describe statistically - have become an essential part of our thinking in relation to regional development, one of the main elements in this sense being the relation between scale economies, transport costs and the positive externalities of the market (Möller and Litzel, 2008). The New Economic Geography can also give explanations regarding the advantages of settling in the proximity of companies within the same industry (Benedek, 2004) based on models of monopolistic competition, trying to explain the clustering phenomenon through the interaction of companies and consumers, the existence of scale economies as well as transport costs (Dixit and Stiglitz 1977, Ethier 1982). Krugman's center-periphery model, with its subsequent modifications and extensions represents an important step in analyzing the concentration of production activities (under ideal conditions), using a series of simplifications regarding labor, the number of industries, number of companies, transport costs and of course perfect competition (Sternberg, 2001 ap. Benedek, 2004). As a result, according to the authors, the interactions between the right geographical location, production and consumption can lead to the development of a self-sustaining process of the concentration of production.

In the approach of Dixit and Stiglitz, one of the major advantages of agglomeration economies is the variety of inputs found within a reasonable distance and with negligible transport costs, leading to an increased productivity. But diversity without a certain degree of specialization is of little help when trying to increase the chances of beneficial interactions. Therefore there is a strong need for the diversity of inputs corresponding to the activity of the companies, in close connection with the functional specialization at regional or local level. This approach represents a distancing from traditional approaches, abandoning the concept of clear-cut borders among industries, these being penetrated more and more by complex linkages between suppliers and consumers.

A series of empirical studies have shown that in the last years the specialization of regions measured by the spatial concentration of production activities - using conventional classifications of the economic sectors - has entered a phase of decline (Haas and Südekum, 2005; Möller and Tassinopoulos, 2001). Seen as an isolated phenomenon, this could mean a greater geographic dispersion of horizaontally interlinked companies

and could also be used as a counter-argument in the face of the clustering phenomenon. On the other hand, if we consider the inter-sectoral specialization, the situation changes somewhat in the sense that the place of industrial specialization is slowly being overtaken by the increasing importance of functional specialization (Duranton and Puga, 2005), the advantages being related to three main elements: the presence of common inputs, the concentration of the specialized workforce and the spillover effects of knowledge.

In the end the real problem is also related to the fact that economic spaces are usually the result of hystorical events and processes of economic growth and decline, with a strong influence on the complexity of the value chains, their need for new technologies, etc. Moreover, within the Eastern parts of Europe we also have to consider the long lasting effects of a socialist economic system, path dependency having a strong influence in this area. All these characteristics make the economic structures function in the form of organic structures, having totally different characteristics based on geographic localization as well as the sector of activity. This in turn makes it difficult to develop empirical methods for identifying different types of clusters, although in the following chapters we will attempt to use a method for identifying agglomerations with a high clustering potential, event though at the moment we are missing data regarding the connections between the companies, RDI institutions and public authorities.

2. ASPECTS RELATED TO SPECIALIZATION AND THE CONCENTRATION OF ECONOMIC ACTIVITIES

A series of studies in the field have approached the subject of industrial specialization and the spatial concentration of industries, considering the two phenomena as strongly interrelated, regional specialization representing the territorial perspective, describing the distribution of economic activities in delimited area within the analyzed territory, whereas the geographic concentration of an economic activity represents the share of the sector within the regional economy. According to some authors, these aspects are of key importance in the case of industrial policies as well, areas with a high degree of specialization being much more vulnerable in the event of economic shocks hitting the dominant sectors. At the same time, regional specialization is related to the fact that the respective area has got advantages in the production of different goods or services and makes better use - in comparison with other regions - of the production capacities in the respective sector. This spatial concentration of an economic activity furthermore implies that the production of certain goods is distributed unequally compared to other factors, such as the number of the population.

The effects of regional specialization are underlined by a series of growth models, including the classic center-periphery model (Myrdal, 1957 or Friedmann, 1977), the growth poles model (Perroux, 1969) etc, applied to different territorial levels (global, national, regional, local) supporting a convergence or a divergence in the level of development as a result of interconnected factors (Armstrong, 2000).

Apart from these we can find a series of other attempts aiming to compare results obtained from studies undertaken in different countries, suggesting a series of changes and amendments to indicators in order to be able to measure concentration,

considering the size of firms, their number or the size of the respective areas in the same way. Although the majority of the literature on specialization and concentration treats the two phenomena as interconnected, there are a series of results showing that usually they either do not lead to the same conclusions or, that they show up with a different speed and intensity. Therefore we propose to analyze the phenomenon in detail, hoping to point out relevant aspects related to the relation between the specialization of the counties, the concentration of industries and the clustering potential in Transylvania, based on the number of companies in the respective sectors.

In the following sections we will present an analysis on concentration and specialization, attempting to offer an overview on the role they have on the clustering process by making use of a hybrid method of analysis obtained from the combination of two approaches. The first one originates from the authors Goschin, Constantin, Roman and Ileanu who have measured specialization and concentration within the Romanian regions in the 1996 - 2007 period for the 9 main sectors of the economy, concluding that specialization has been constantly declining during the analyzed period, whereas the level of concentration has shown a slight increase. The other approach we will use has been derived from the authors Möller and Litzel who have analyzed the specialization and concentration of the economic sectors in Bavaria, in the first phase for all branches of the regional economy (all NACE two digit divisions), than for the 9 main industries and finally for the industries related to the 9 regional clusters existing in the area. Their main conclusion was that the differences in specialization have been much more evident in the case of industries related to the activities of the clusters but differences have also been significant in the case of the 9 main industries in the area.

So in other words, a certain area (county or region) can be considered as specialized if a relatively low number of industries account for a relatively large part of the economic activity in the area. Concentration on the other hand reflects the distribution of a certain economic sector between the analyzed territorial units. A highly concentrated sector will be present in just a few of the delimited areas, even though the number of companies can be much lower compared to the number of companies operating in other sectors of the economy. To be able to explore the specific characteristics of concentration in detail we will make use of three main indicators which will help us get a better overview on the economic sectors, although without insisting on the dynamics and the speed of the process[2].

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[2] **Methodological note -** for measuring concentration and specialization we will use the following:

$$a_{ir} = \frac{x_{ir}}{x_{.r}} = \frac{x_{ir}}{\sum_{i=1}^{n} x_{ir}} \quad (1.) \text{ and } \quad A_{ir} = \frac{x_{ir}}{x_{i.}} = \frac{x_{ir}}{\sum_{r=1}^{n} x_{ir}} \quad (2.)$$

where:

x_{ir} represents the number of companies in sector "i" within "r" county,
$x_{i.}$ represents the number of companies in sector "i" in all counties combined,
$x_{.r}$ represents the total number of companies within "r" county,
$x_{..}$ represents the total number of companies in all counties combined
a_{ir} represents the level of concentration: the share of "r" county in the total number of companies active in sector "i"

Even if the above indices are generally used as a basis for calculating more complex indicators – like the Hirschman-Herfindahl index, the Krugman dissimilarity index or the Gini coefficient – they still offer valuable information for analyzing the general conditions related to the spatial distribution of economic activities as well as for describing spatial inequalities.

3. THE SPECIALIZATION OF THE COUNTIES IN TRANSYLVANIA BASED ON THE NUMBER OF COMPANIES

In the first phase we will calculate and analyze the rate of specialization within the counties of Transylvania using the Krugman and Herfindahl indices[3]. There is also a third method for measuring specialization by somewhat modifying the Gini coefficient. The latter in the modified version measures the degree of inequality in the distribution of companies related to a certain economic sector and an area of reference. The coefficient is calculated in relation to the Lorenz curve in which the cumulated number of companies from the different sectors is compared to the total number of companies in the analyzed area[4]. If the distribution of companies were equal in all sectors of the economy, the Lorenz curve and the 45 degree diagonal would overlap and the value of the Gini coefficient would be equal to null. On the other hand, if all companies were active in one single sector, the Lorenz curve would coincide with the horizontal axis and the vertical axis on the left side of the chart, the value of the index reaching its maximum value of 100.

In the following we have used three different approaches, first calculating the respective indices for all 88 of the two digit NACE divisions. In the second phase we have calculated the same indices for broader fields of activity obtained by grouping certain

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A_{ir} represents the level of specialization: the share of companies operating in sector "i" compared to the total number of companies in "r" county

[3] **Methodological note** - the formulas for calculating the Krugman and Herfindahl indices for specialization are: $SPEC_r^K = \sum_i | a_{ir} - A_i |$ (3.) and $SPEC_r^H = \sum_i a_{ir}^2$ (4.)

[4] **Methodological note -** the modified Gini index is calculated starting from the formula: $B_{ir} = \frac{A_{ir}}{a_r} = \frac{a_{ir}}{A_i}$ (5.)

from where we obtain pairs according to the share of the sectors in relation to the total number of companies in the respective county (a_{ir}) and the share of the sector compared to the total number of companies present in the analyzed territory - in our case Transylvania (A_i). After being sorted in ascending order, these values can be cumulated as follows:

$\tilde{s} = \sum_{i=1}^{j} \tilde{a}_{ir}$ (6.) and $\tilde{S} = \sum_{i=1}^{j} \tilde{A}_i$ (7.)

where, if represented on a graphic we can obtain a shape similar to the Lorenz Curve. In conclusion the modified Gini coefficient for measuring specialization can be calculated as follows:

$SPEC_r^G = 1 - \sum_{i=1}^{I} (\tilde{s}_{i-1,r} - \tilde{s}_{ir}) \tilde{A}_i$ where $\tilde{s}_{0r} = 0$ (8.)

sectors which we considered to be closely related (i.e. the forestry, wood processing, furniture industry, etc.) forming thus 21 major areas. Furthermore, in order to increase the relevance of the analysis in relation to the clustering processes in Transylvania we have also identified 29 economic sectors which we have believed to be closely related to the activities of the 16 existing and functional clusters identified (Table 1.).

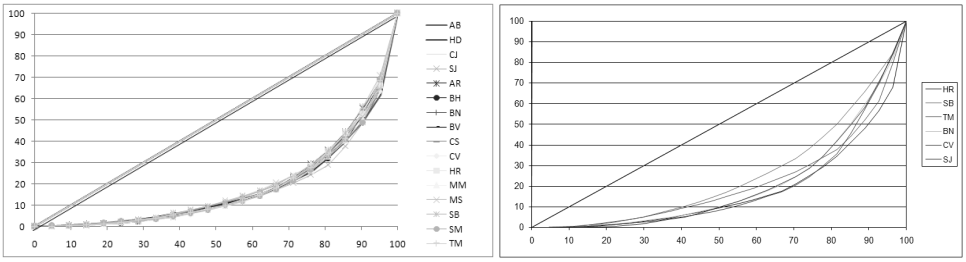
The clusters in Transylvania

Table 1

Nr.	Cluster	Field	Localization
1	ICT Regional Cluster	ITC	TM, Timişoara
2	Polaris	ITC	CJ, Cluj-Napoca
3	Cluj IT	ITC	CJ, Cluj-Napoca
4	ETREC	Electric equipment	BV, Săcele
5	Automotivest	Automotive	TM, Timişoara
6	Transylvania Aeronautical Cluster	Aeronautics	BV, Braşov
7	Regiofa	Furniture, wood industry	HR, Odorheiu Secuiesc
8	ProWood	Wood industry and energy	CV, Sfântu Gheorghe
9	Green Energy	Biomass, energy	CV, Sfântu Gheorghe
10	Cluster Mobilier Transilvan	Furniture industry	CJ, Cluj-Napoca
11	Agrofood Regional Cluster	Food industry	CV, Sfântu Gheorghe
12	Agrofood Cluster	Food industry	AR, Arad
13	Transylvania Textile and Fashion Cluster	Textile and clothing	CV, Sfântu Gheorghe
14	Innovative Regional Cluster Packaging-Printing-Design	Print, packaging, publicity	CV, Sfântu Gheorghe
15	ROSENC	Renewable energies	TM, Timişoara
16	TREC	Renewable energies	CJ, Cluj-Napoca

Source: the author based on data from the Competitiveness SOP MA and the Romanian Cluster Association

Analyzing the Lorenz curves related to the classifications mentioned above we can immediately observe that there are no significant differences neither in the case of the 88 economic sectors, nor in the case of the 21 major fields of activity. Although there is a certain inequality in the importance of the different sectors within counties, these differences are of largely the same size, being unable to differentiate them with the help of the Lorenz curve only.



Lorenz Curves for the 21 major fields of activity Lorenz curves for the 27 industries related to the activities of the clusters in Transylvania

Fig. 1. Differences of the Lorenz Curve measuring the specialization of the counties.

Source: the author, based on data from the Research Center for Interethnic Relations, 2009

On the other hand, we can draw a series of conclusions regarding the specialization of the counties of Transylvania according to the Gini coefficient. As in the case of the aforementioned studies, it has been expected that that the results regarding the 88 NACE divisions would be similar in the case of all counties. What is surprising though is the fact that in contrast to the expectations, the differences have been even more significant than in the case of the 21 major groups of activities. We can say this based on the fact that theoretically the grouping of certain activities in larger sections should have resulted in a differentiation of the counties regarding specialization, given the functional relations between the companies within the interconnected sectors (i.e. a county might not stand out in the case of wood processing alone, but the specialization might be significant if we consider a larger array of activities like forestry, wood industry, the furniture industry, etc.).

In the case of the 88 NACE divisions a more prominent differentiation is apparent in the case of Sălaj and Hunedoara counties, the latter showing a specialization (apart from trade and construction) in transport, tourism and financial services. Also, a slight differentiation can also be shown in the case of Sălaj County, where the share of companies active in agriculture and transport show a somewhat larger share.

On the other hand, if we consider the 27 sectors related to the clusters operating in the area, the situation changes somewhat, since we can immediately see an inequality in the case of Bistrița Năsăud, Covasna, Harghita and Sălaj counties, these being much more significant than in the case the other two approaches. We can see that in the case of the first three there is a strong presence of companies active in the field of wood processing, forestry and manufacturing of wood products, the food industry being also very important in Covasna County. On the other hand agriculture and related services are once again mostly relevant in Sălaj County, although the food industry has a much smaller importance (which suggests that the agricultural products are being processed in other parts of the country). In an overview, we can observe that these counties are usually specializing in sectors with a low added value, like the ones mentioned above and others like textiles and the clothing industry.

In contrast, we can find that in counties considered more developed and where the regional economy also shows a greater stability in the case of the above mentioned indicator, we can find sectors like architectural and planning services, construction and activities and services related to the IT industry (i.e. Cluj, Timiş counties) in the first places. Even so, in Timiş County we can remark the significant share of the agricultural sector, which is very much in contrast with the other dominant ones like IT services and the automotive industry.

Values of the Gini coefficient calculated for the 21 major areas of activity and the 27 sectors related to the activities of the clusters in Transylvania for the year 2009

Table 2

	AB	AR	CJ	BH	BN	BV	CS	CV	HD	HR	MM	MS	SB	SJ	SM	TM
Gini Major industries	0.635	0.629	0.636	0.649	0.641	0.639	0.621	0.638	0.646	0.641	0.643	0.628	0.617	0.662	0.646	0.636
Gini clusters	0.597	0.578	0.548	0.551	0.586	0.514	0.583	0.618	0.540	0.645	0.566	0.539	0.496	0.593	0.586	0.575

Source: the author based on own calculations

As an intermediate conclusion, based on the values of the Gini coefficient and the analysis of the Lorenz Curve, we can state that there is a strong economic basis for the existence of the IT clusters in Cluj and Timiş counties, for the textile and wood clusters in Covasna and Harghita counties as well as the automotive industry in Timiş County. In the case of the other clusters - mainly because of the vast array of sectors they cover - it is very hard to draw relevant conclusions in this sense (i.e. the field of renewable energies).

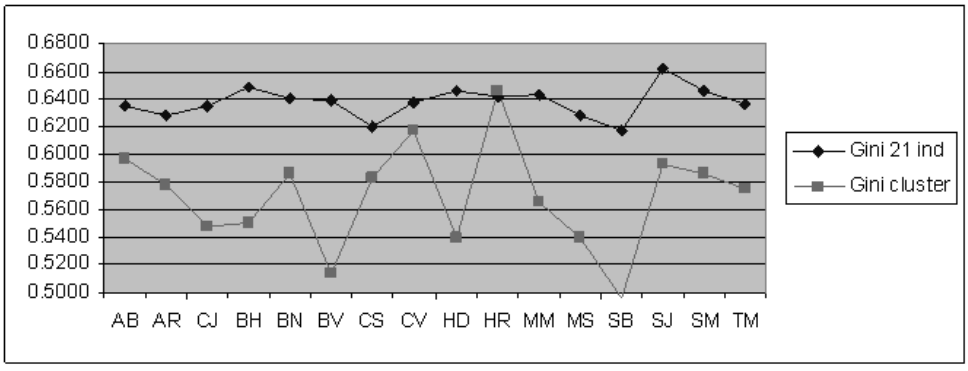


Fig. 2. The Gini coefficient calculated for the 21 major groups of activity and the industries related to the clusters in Transylvania.

Source: the author, based on data from the Research Center for Interethnic Relations, 2009

Moving on, if we analyze the Krugman dissimilarity index we can see that the values are the most prominent in the case of industries related to activities of the clusters and are the least significant if we analyze the economic sectors grouped into the 21 larger fields of activity.

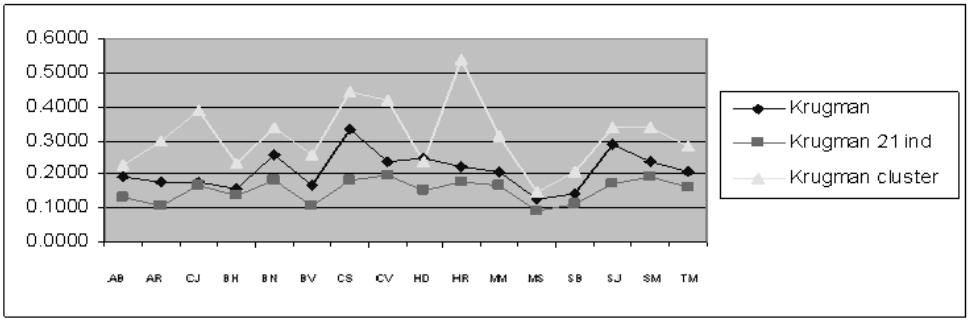


Fig. 3. The Krugman dissimilarity index calculated for the 88 NACE divisions, the 21 major groups of activity and the 27 industries related to the clusters.

Source: the author, based on data from the Research Center for Interethnic Relations, 2009

In figure 3 one notices that the Krugman index, calculated for the 27 sectors - even though the amplitude of the values is somewhat more evident - does not show significant differences in the classification of the counties apart from a few exceptions like Cluj, Covasna and Harghita counties. These extreme values can also be attributed to the change in hierarchy regarding the dominant industries, as in the case of Cluj where, by omitting sectors irrelevant from the point of view of clusters other fields have come forward like architecture, engineering or IT services (taking the place of companies in the field of trade, general services, etc), keeping in mind that the agriculture has still remained in second place. The most prominent change however can be observed in the case of Harghita County where, after omitting sectors like tourism, transports, real-estate transactions, health and trade, others have come forward like agriculture, construction, forestry and wood processing as well as the food industry.

As a conclusion we can say that the Gini and Krugman indices give similar results in the case of the counties, even if their amplitude is somewhat more significant in the case of the Krugman index, being thus considered as more appropriate for emphasizing the differences in specialization.

The Herfindahl index on the other hand shows a more modest variation, rarely changing the situation presented by the other two indices, a conclusion supported even by Möller and Litzel, showing that in the case of Bavaria the correlation between the Krugman and Gini indices has continuously been above 0.98. The Herfindahl index however shows a correlation with the Krugman index only in the case of all 88 NACE divisions but neither in the case of the 27 sectors related to clusters, nor in the 21 major groups of activity.

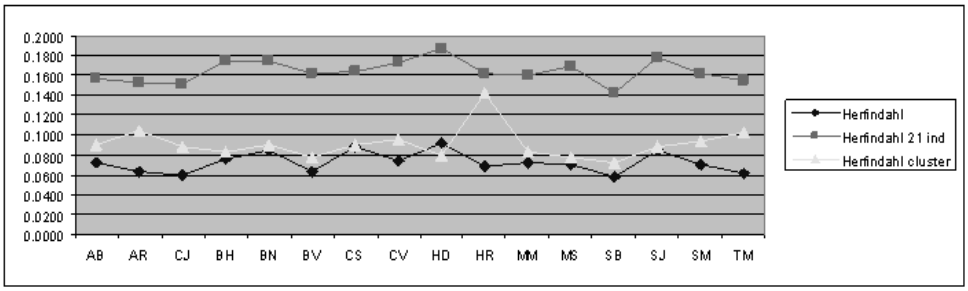


Fig. 4. The Herfindahl index calculated for the 88 NACE divisions, the 21 major groups of activity and the 27 industries related to the clusters.

Source: the author, based on data from the Research Center for Interethnic Relations, 2009

Comparing the results with those obtained by the authors Goschin, Constantin, Roman and Ileanu (2009), we have to point out that the researchers have analyzed major areas of the economy – 9 in total – at regional level for the whole country and they have calculated the respective indices for the years 1996, 2000, 2005 and 2007. In their analyses the more developed regions have not only shown a lower level of specialization but they have also witnessed a more accelerated decrease in the case of the Krugman index - in accordance with the European tendencies in the last years. According to the Krugman index the rate of specialization has been relatively low compared to other countries like Poland (0.508) or Lithuania (0.328) but still significantly higher than in the countries of Western Europe like Germany (0.064) or Austria (0.063). This phenomenon is also evident in the case of the county level analysis, since we can observe higher values in the case of the less developed counties, the smallest ones being present in areas with a more stable economic structure like Cluj, Sibiu or Timiş counties.

4. THE CONCENTRATION OF ECONOMIC ACTIVITIES

Based on the method presented above for measuring the level of specialization, with small adjustments we can transform the respective formulas in a way to be able to the express the concentration level of economic activities. Thus it is not possible to talk about concentration when the share of a certain sector is equal within each and every territorial unit, whilst the highest level of concentration can be reached when a sector is present in only one of the analyzed territories[5].

[5] **Methodological note** - for calculating the concentration according to the Krugman and Herfindahl indices we will be using the following formulas:

$$CONC_r^K = \sum_i | A_{ir} - a_i | \quad (9.) \text{ and } \quad CONC_r^H = \sum_i A_{ir}^2 \quad (10.)$$

The same approach has been used in the case of the Lorenz curve, the goal being to observe the differences in concentration of the respective economic sectors compared to a perfectly even distribution.

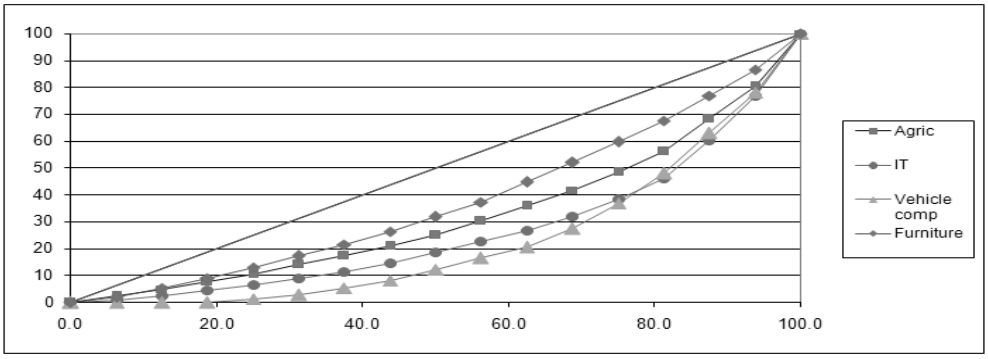


Fig. 5. Differences of the Lorenz curve in the case of agriculture, IT, automotive and furniture industries.

Source: the author, based on data from the Research Center for Interethnic Relations, 2009

Considering the extreme values, in the case of concentration we can observe a significant difference between the sectors of the economy, these being best illustrated by the Lorenz curve presented in Figure 5. Here we can see for example that the ones related to the production of automotive parts or the IT industry have a much more pronounced tendency to concentrate than the furniture industry or agriculture, the latter ones being divided more uniformly between the counties of Transylvania, at least according to the number of active companies.

If we come back to the initial approach and calculate the Krugman and Herfindahl indices for all 88 NACE divisions, for the wider areas of activity and finally for the 27 sectors related to the activities of the regional clusters, the differences in this case are much more visible. This means that although in the last period counties have been moving towards a lower rate of specialization, the disparities have become more and more significant in the case of concentration. Observing the phenomenon in greater detail, we can say that in the case of all NACE divisions there are major changes regarding the importance of certain activities, although, given the very small differences in the values, in most cases we can neglect them. On the other hand, regarding the outstanding values we can point out a significant difference especially in the case of industries which are not really relevant from the point of view of clusters - like mining, associative activities, libraries, etc. What is important though is the fact that according to the Krugman index the activities related to wood processing and the manufacturing of wooden products, automotive components, pharmaceuticals, tourism and IT services also have a much higher tendency to concentrate than others. Moreover, activities related to the IT sector (information services, IT services as well as electrical equipment and production of computers) show even higher values for concentration, mainly because of the fact that IT companies tend to settle in larger cities with high numbers of companies.

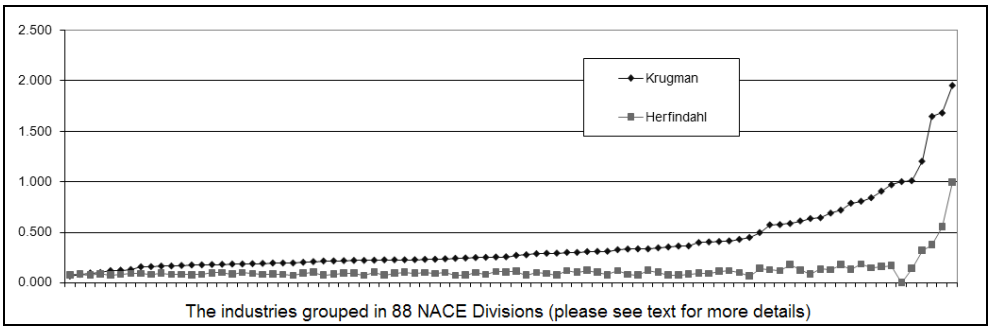


Fig. 6. The Krugman and Herfindahl indices calculated for the 88 NACE divisions

Source: the author, based on data from the Research Center for Interethnic Relations, 2009

If we focus on the analysis of the 21 major groups of economic activity, one may remark a significant difference in the hierarchy imposed by the two indices, but no major differences compared to the results presented above. According to the Krugman dissimilarity index, the furniture and wood industries continue to show considerable levels of concentration, followed by the sectors related to metal works, textiles and clothing, the most uniformly distributed ones being trade, construction and tourism. In the case of the Herfindahl index on the other hand, we can observe the same anomalies as in the case of the 88 NACE divisions, namely that the furniture industry, wood processing migrate to the second to last place along with the textile and clothing industries whilst the most concentrated sectors remain those related to the IT industry.

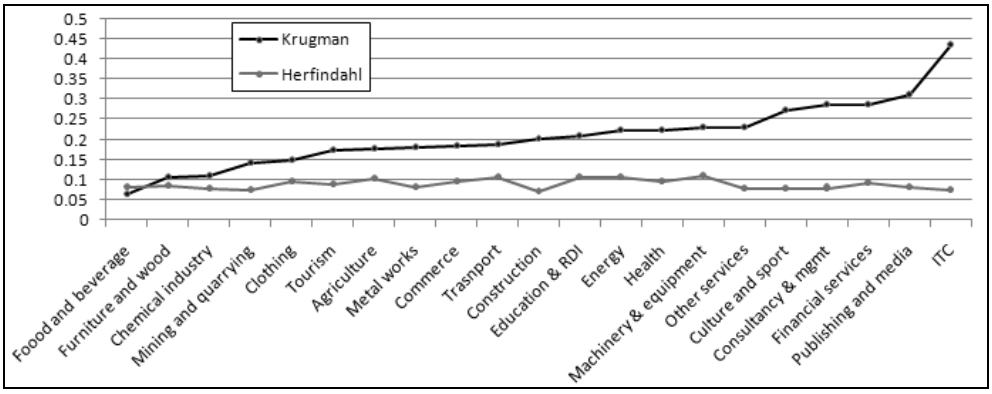


Fig. 7. The Krugman and Herfindahl indices calculated for the 21 major groups of economic activity

Source: the author, based on data from the Research Center for Interethnic Relations, 2009

On the other hand, analyzing the same phenomenon in the case of the sectors related to the activities of the Transylvanian clusters, we can observe a flattening of differences regarding the hierarchy, although there is a significant overall increase in the case of the Krugman index compared to the previous situation - meaning that these industries all have a much higher tendency to concentrate in space than the major groups or the 88 NACE divisions as a whole. The most interesting part in this sense is the extreme value seen on figure 8 where the Herfindahl index reaches its maximum value of 1 in the case of the tobacco industry concentrated in only one county, although since then the factory in Sfântu Gheorghe has been closed down.

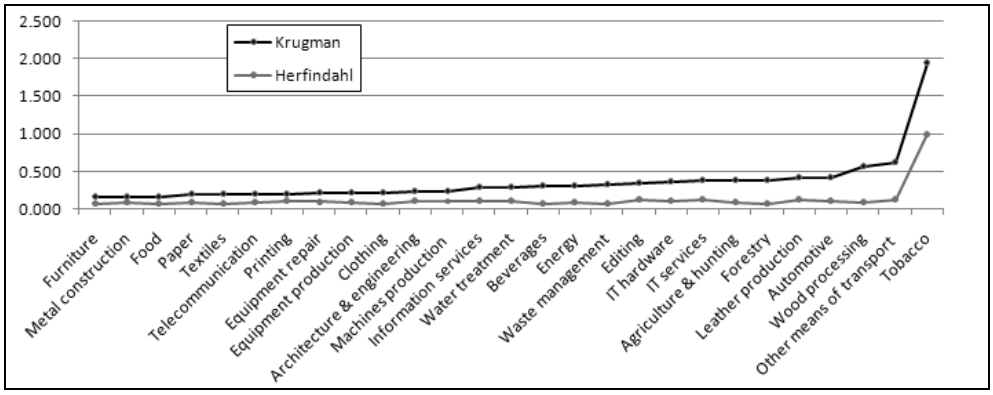


Fig. 8. The Krugman and Herfindahl indices calculated for the 27 sectors related to the activities of clusters in Transylvania

Source: the author, based on data from the Research Center for Interethnic Relations, 2009

5. CONCLUSIONS

In the present analysis we have tried to utilize a conventional method for obtaining new results related to the concentration of economic activities as well as the specialization tendencies in Transylvania, correlating the results with the presence or the lack of clusters in the respective sectors or - from a territorial perspective - in the analyzed counties.

Regarding specialization, one can say that the phenomenon is not that widespread in Transylvanian counties, especially in the case of the 88 NACE divisions. From the figures of the Lorenz curve we can observe the overlapping of almost all counties, some anomalies being present only in the case of Sălaj and Hunedoara due to a somewhat higher share of companies working in agriculture, trade and transport. Regarding the Krugman and Herfindahl indices, the two have pointed out the same counties along with others like Caraş-Severin, Bistriţa Năsăud, Satu Mare, Covasna and Harghita, all of them having less diversified economic structures and thus being much more vulnerable in the face of economic changes. These counties are also considered the least developed ones based on the value of the GDP / capita. In the case of more developed areas we

can observe a greater diversity of the economy (and thus a low level of specialization), the only difference being the case of Timiş county where - in spite of the more developed character - we can see a significant share of the sectors related to agriculture, forestry and fishing. Regarding the Herfindahl index there are no major changes except for the case of Bihor county, which comes to a leading position due to the high share of companies in the field of construction, tourism and transport.

Also, despite thinking that grouping closely related economic sectors could lead to a greater differentiation between the counties (based on the functional relations between them), contrary to our expectations these differences have been much less significant than in the previous case, most probably meaning that the inter-sectoral relationships are much stronger than the ones formed within the same fields of activity.

If we consider the 27 economic sectors related to the activities of the Transylvanian clusters the situation changes somewhat in the sense that - even if at first glance Bistriţa Năsăud, Covasna, Harghita and Sălaj come up once again - differences are much more significant than in the previous two cases. As a result, based on the values of the Gini index we can say that there is a strong economic basis for the existence of the IT clusters in Cluj and Timiş counties, for the textile and wood clusters in Covasna and Harghita counties as well as the automotive cluster in Timiş County. For the other clusters - because of the vast number of sectors they cover - it is very hard to draw relevant conclusions in this sense (i.e. the renewable energy sector).

As for the Krugman dissimilarity index we can observe more pronounced differences for industries related to the activities of clusters - differences being much smaller though in the case of sectors grouped into the 21 major fields of activity. In this case in Cluj county, after omitting some of the sectors not relevant from this point of view there has been a strong emphasis on sectors like architecture, engineering as well as IT services. The most visible change can be observed though in the case of Harghita County where, following the elimination of some sectors like tourism, transport, real-estate transactions, health services and trade, other sectors have emerged as dominant, like agriculture, construction, forestry and wood processing as well as the food industry.

The Herfindahl index on the other hand shows a more modest variation in the case of specialization, slightly changing in some places the hierarchy laid out by the other two indices. In this case, we consider that in the future a more extended analysis could reveal much more significant inequalities between the counties of Transylvania - with a more balanced economic structure - and the late mono-industrial centers from other parts of the country, more specialized, which can be a plus in the process of clustering (if these are not based on the exploitation of natural resources) but can significantly increase their vulnerability in the face of sudden changes within the economic environment.

Also, related to concentration we can observe a more prominent difference between the character of industries, with sectors showing a higher tendency of concentration standing out (i.e. automotive components or the IT industry), in contrast with more traditional sectors (like the furniture or the food industry). In this case we can see differences of a totally different scale than in the case of specialization, certain economic sectors having a much higher tendency to concentrate in space than others. Differences are also apparent in the hierarchy of the counties according to the Krugman and Herfindahl indices, the differences in values being quite small though, especially in the

case of all 88 NACE divisions. It is also important to mention that the activities related to wood processing, the production of automotive components, pharmaceuticals, tourism and IT services have a much higher rate of concentration according to the Krugman dissimilarity index, although based on the Herfindahl index these sectors will occupy inferior positions due to a flaw of the latter, namely the fact that it is greatly influenced by the size of the territorial units (here the total number of companies in the certain county). Also a significant difference can be seen in the case of the furniture industry and the manufacturing of wood products, their concentration in counties like Harghita and Covasna being overshadowed by the fact that these are much smaller in size, having a much smaller number of companies.

Regarding sectors arranged into major fields of economic activity we can still observe a considerable difference between the hierarchies generated by the two indices, although there are no major changes compared to the results obtained in the previous phase. According to the Krugman index the furniture industry and wood processing still show a more obvious level of concentration, being followed by the sector of metal works, the textile industry, clothing as well as IT services while the most equally distributed ones remain trade, construction and tourism. For the Herfindahl index on the other hand, we find the same differences as in the case of the 88 NACE divisions, namely that the most concentrated industries tend to be those related to IT, while the furniture industry along with wood processing and textiles occupy to the last places.

But in the case of industries related to the activities of the 16 clusters we can observe a flattening of the differences, although in the case of the Krugman index there is a visible increase in the values, meaning that these 27 industries have a much higher tendency for concentration than the ones not related to the above mentioned networks.

Finally, as regards the methods of analysis we can say that, in spite of the shortcomings and limitations we have managed to obtain relevant conclusions regarding the sectors of the economy where we can point out certain tendencies of concentration, the conclusions being supported in some cases even by the phenomenon of specialization in certain counties, especially the less developed ones with a less diversified economic structure.

As for the results, we can say that there is a strong economic basis to support the development of already existing clusters in the field of IT in Timiş and Cluj counties, the biomass, textile and wood clusters in Harghita and Covasna counties as well as the automotive cluster in Timiş county. For the clusters in the field of agro-food in Covasna and Arad, even if there is a certain specialization in agriculture, in the future there needs to be a higher emphasis on the food processing industry, otherwise these counties will simply remain suppliers of raw materials with a low added value. In the case of other clusters we could not identify a significant concentration or a specialization, most probably because of the large array of activities they cover as well as the fact that NACE divisions are not really suited for identifying functional relationships among companies. Furthermore there could also be high potential for tourism clusters and food clusters in some of the counties, but in most cases the large number of very small companies - in the absence of larger facilitators - makes it difficult to start up long term relations for cooperation.

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(RECOMMENDED CITATION)

HISTORY OF RESEARCH ON THE LAND OF FĂGĂRAŞ

PAULA OLIVIA CIMPOIEŞ[1]

ABSTRACT. – History of Research on the Land of Făgăraş. The aim of this study is to analyze the scholarly papers and the cartographic documents which mention the Land of Făgăraş as a geographic region. This study is based on detailed consultation of the specialized literature. It reviews the last two centuries of research on the Land of Făgăraş. The importance of our research consists in unveiling the main sources which consider the regional space as a whole and which refer to it as a space that generates identity in different modes. In the last 20 years in Europe we witness a rise in the significance of the cultural region, especially the "land" type entities. They frequently appeared in the countries that share a Latin past. French specialists in territorial planning have adopted a law that confers them the title of project regions because they provide characteristics such as social and economic cohesion leading to sustainable development. Investigating these spaces as well as investigating their former approaches can prove to be very successful for the future purpose of focusing on their competitive advantages in the process of regional planning.

Key words*: research, cartographic documents, regional identity, Land of Făgăraş, history.*

1. INTRODUCTION

The present paper catalogues the manners in which the Land of Făgăraş is presented in the specialized literature, in the opinion of Romanian as well as foreign researchers. By means of this paper we seek to contribute to the framing of the main points of view that followed in the scientific debate regarding the land, especially those that emphasize unitary characteristics.

The Land of Făgăraş represents one of the geographical mental spaces, one of the "lands" in Romania. These spaces appeared in the process of conserving the ethnographical values and they have a particular land use. The common binder is the awareness of belonging to the same lineage (Cocean, 2011; Ilieş, 1997). Mental space in the opinion of Cocean (2010, pp. 61-63) is composed of perceived space [*l' espace perçu*], lived space [*l' espace vecu*] and imagined space.

In the last decades, the research of the "lands" as geographical regions and mental spaces comes to complete the studies that focused on detailing and describing some components of the whole. Particularly, the Land of Făgăraş is the object of investigation of several plans, during one century and a half, but has not benefited yet

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from a systemic, regional approach that could foster its existence as a territorial system and as a mental space- in the context in which Ilieş claims that "there must be conclusive evidence if the lands are geographical regions or not, without any possibility of opposite arguments" (Ilieş, 1999, p. 44) and in accordance to the new emerging regional geography which "treats regions as continually shifting products, not just units that need to be understood" (Murphy and O'Loughlin, 2009, p. 242).

2. LOCATION OF THE LAND OF FĂGĂRAŞ

For this paper we took into analysis the Land of Făgăraş, a region located in Romania, southern Transylvania, which is also known in the specialized literature and in the common speech of its inhabitants as the "the Land of Olt".

Many have been the considerations whether or not the Land of Făgăraş stretches also on the right bank of the Olt River; some of the scholars had strong arguments of delineation such as the ethnographic criterion (Irimie, 1956,1957,1958) or the economic criterion (Dragu, 1970).

Nevertheless, we believe that from the administrative viewpoint the Land of Făgăraş comprises two parts of two neighboring counties, Braşov County and Sibiu County and integrates 29 administrative units. In what concerns the natural environment, the region belongs to the category of „slope lands", partially due to the strong asymmetry between the depression and the northern slope of the Făgăraş Mountains (Cocean, 2011).

2. METHODS OF RESEARCH

We realized the study with the aid of documentary sources such as the edited collections of documents (Puşcariu, 2006), books, research papers and cartographic representations between the 16th and the 21st century.

In order to reveal the foremost "steps" made by researchers in understanding the region, we needed to evaluate the significant contributions brought by scholars into this area. To investigate the issue posed above we searched for books, articles and maps in the ROLiNeST National Collective Catalogue and the "Lucian Blaga" Central University Library Catalogue. To be included in the analysis, a source had to contain the expression "the Land of Făgăraş" or "the Land of Olt" in its title. The sources that did not contain the exact phrases but had clear reference to the region in other forms of representation were also considered for examination.

Each study was introduced in a database and color coded according to the field of research (history, economy, social sciences, etc.) (Table 1).

Literature database sample for the coding of the sources

Table 1

Author/ authors	Year of publi-cation	Title of the study	Publishing house	Location of the publishing house	Domain of study
Puşcariu, S.	(1904)	Despre boierii din ţéra Făgăraşului	Tiparul Tipografiei Archdiecesane	Sibiu	history
Minea, I.	(1914)	Din trecutul stăpânirii româneşti asupra Ardealului: pierderea Amlaşului şi Făgăraşului	Editura „Poporul" Institutul De Arte Grafice, Editură şi Librărie	Bucureşti	history
Bărbat, A.	(1938)	Desvoltarea şi structura economică a Ţării Oltului: cu un plan de organizare	Tipografie Naţională	Cluj-Napoca	history
Meteş, S.	(1935)	Situaţia economică a românilor din Ţara Făgăraşului, vol. I	Tipărită cu cheltuiala lui Ştefan Boier şi Octavian Stoichiţă	Cluj-Napoca	economy
Roşculeţ, G.	(2002)	Ţara Oltului. Orientări de valoare dominante	Editura Fundaţiei „Şcoala sociologică de la Bucureşti"	Făgăraş	sociology

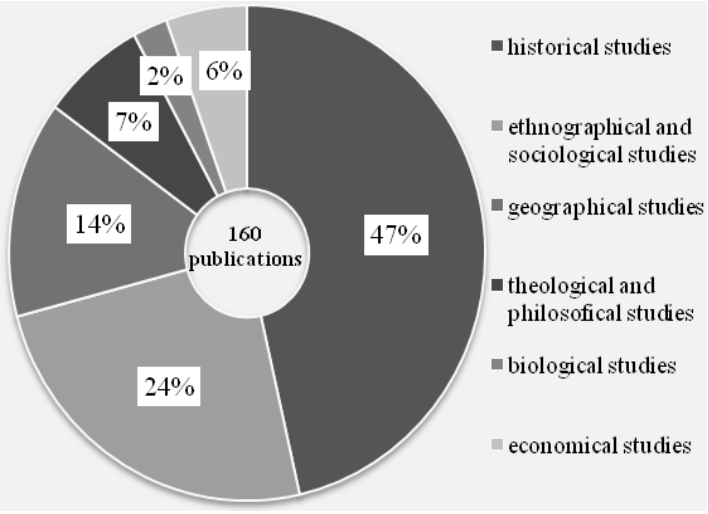

Fig. 1. Categories of studies that analyze the Land of Făgăraş as a region

Eventually, we found a total of 160 written and 13 cartographic documents which corresponded to the inclusion criteria.

Further more, we chose to take into consideration and analyzed only those that debated the main points of view regarding the land.

3. RESULTS

3.1. Historical studies. The first study published as a book that uses the denomination "the Land of Făgăraş" was carried out by Nicolae Densuşianu in 1885. Moreover, the merits of formulating and claiming amongst the first, based on historical sources, the idea of the region's identity as a "Romanian country" (Răduţiu, preface, 2006) belongs to Puşcariu (1904) with his book named "Despre boierii din ţéra Făgăraşului" [Historical fragments. About the boyars from the Land of Făgăraş].

Based on these assumptions, we ought to mention the fact that the historical investigations of the region registered substantial progress starting with the ninth decade of the 20th century, moment that coincides with the transition from reproducing official and informal documents to explaining situations and regional phenomena.

The paper "Ţara Făgăraşului în Evul mediu (secolele XIII-XVI)" [The Land of Făgăraş in the Middle Ages - 13th to 16th century] joins the ranks of the volumes dedicated to the medieval lands which existed prior to the formation of the national state. The author specifies the right set of circumstances for the scientific initiative as being highly demanding because "the scarcity of historical sources until the 16th century, with direct allusion to the pre-state history of the Land of Făgăraş, is enlightened only by the aura of the legends" (Lukács, 1999, p. 7). He makes a relevant description of the region's historical sources and arranges them chronologically. The study is a monograph which takes into consideration the entire territory during the Middle Ages. It is considered to be the first research that regards the region as a whole. The same author (1996) notifies about the forged documents circulated in historical times, in the volume entitled "Miscellanea in honorem Radu Manolescu emerito", explaining that they were used as means of appropriating the lands.

In 1979 the Land of Făgăraş came to the attention of Vâja who elaborated his dissertation that is entitled "Instituţii de drept din Ţara Făgăraşului în secolul XVI" [Juridical institutions in the Land of Făgăraş in the 16th century]. Vâja insists upon the idea of administrative, juridical and fiscal independence of the land. Despite the fact that the land was part of several different forms of political adminstration, the internal organization and the customary law have not been altered at all. On the other side, in 1943 Literat and Ionaşcu publish their work "Oraşul şi Ţara Făgăraşului. Cetatea Făgăraşului" [The city and the land of Făgăraş. The fortress of Făgăraş] in which they portray aspects from the society of those times.

A significant number of papers deal with the situation regarding the boyars [boieri] from the Land of Făgăraş, such as Prodan (1967) who wrote "Bojaren und <vecini> des Landes Fagarasch im 16. und 17. Jahrhundert" [Boyars and neighbors in the Land of Făgăraş in the 16th and 17th centuries], along with the extraordinary collection of old documents gathered by Puşcariu and published in 1904 in Sibiu, later edited by

Borzea de Vişt (2006), or the discourse held by Bunea Augustin on the occasion of entering the Romanian Academy. This lecture was intended to describe the Romanian seniors of the Land of Făgăraş in the interval 895-1713; the discourse was published posthumously in 1910.

Other pieces of research call attention to critical points in the national history as well as in the historical events in the Land of Făgăraş, such as the 1848 revolution, the reluctance of the Făgăraş people to pay the Hungarian royalties, the Great Unification of the Romanian lands in 1918, the Memorandum movement and the spread of the plague: Muşlea (1929), Mândrea and Miklos (1973), Popa Valentina (1977), Mândrea and Megheşan (1980), Ciupea (1992), Mândrea (1980).

Dragu (1969) and peculiarly Boamfă (2007) focused on toponymical researches. Boamfă (2007) chose to study the region for his dissertation entitled "Ţara Oltului-studiu de geografie istorică cu privire specială asupra relaţiilor cu toponimia" [The Land of Olt - a study of historical geography with special regard to the toponymy] in which he employed complex methods of research in the field of toponymy.

The strength of the paper lies in the field survey through which data was collected and analyzed in chapters that explain the bond between the ethnical, professional structures and the toponyms in the environment. Thus, the author does not annotate his preference for using the "Land of the Olt" expression, nor does a toponymical interpretation for it. To sum up, historians' studies weighted more in individualizing the Land of Făgăraş as a historical region. Therefore we can consider that its historiography it is one of the most documented and clarified chapters in the history of the Romanian people (Răduţiu, preface, 2006, p. XV)

3.2. Theological and philosophical studies

Theological references are defining for the Land of Făgăraş. The region is an important well-known orthodox center (Figure 2). Therefore, one of the highly consistent papers regarding this subject was written by Malene in 2009. The study "Muzica bisericească în ţinutul Făgăraşului" [Ecclesiastical music in the Land of Făgăraş] makes an introduction into the history of the religious music from its origins until the 18th century. Furthermore, Malene deals extensively with topics like diverse interferences and influences within the ecclesiastical chants. In 2007 Grid Modorcea makes a contribution towards the spiritual life of the Land of Făgăraş (Table 2). In his book

Fig. 2. „Brâncoveanu" monastery, the spiritual center for the Land of Făgăraş (source: the author, 2011)

named "Ţara originilor. O monografie gridophanică a Ţării Făgăraşului" [The land of the origins. A gridophanic monograph of the Land of Făgăraş] he argues that "the Land of Făgăraş is the land of the origins; whatever river meadow you would walk along you would find an altar or an old and long-forgotten crucifix. Everything here breathes sanctity, like in Jerusalim" (Modorcea, 2007, p.131). Certain monographs emphasize the orthodox life in the region (Meteş 1930) while other dissertations (Busuioc-von Hasselbach, 1998) enlighten on the role and importance of the Cistercian monastery from Cârţa, in the 13th century.

3.3. Geographical studies. The geographical perspective is offered by Popescu (1990) with his valuable geomorphological study on the Făgăraş depression where he affirms that in this area the Olt and its tributaries shaped one of the most extensive depressions- the Land of Făgăraş (Popescu, 1990, p. 9). Descriptive studies precisely indicate to the area of research, for instance those of Mihăilescu (1950, 1966), the two volumes of Iorga (1977) "Pagini alese din însemnările de călătorie prin Ardeal şi Banat" [Selected papers from the journey journals in Ardeal and Banat], but also the collection of land records edited by the historian Prodan between 1970-1976 comprising land use documents, agricultural and economical statistics, proven to be one of the most complete sources of inventories from the 16th century onward.

3.4. Socio-demographical studies. Against the background research in this subfield we discovered the existence of several scientific studies that captured interesting aspects of the regional specificity. Solcan wrote her dissertation in 1994. Afterwards her concerns aimed at a research related to the demographics of the Land of Făgăraş between the 17th and 18th centuries. Nevertheless, the study discusses not only demographic features but also the influence of the economic and cultural environments exerted on the society. She states at the beginning of her writing "the inhabitants of this region drew the attention due to their historical, social, political characteristics, keeping their cultural traditions and their lifestyle nearly intact" (Solcan, 2010, p. 7).

An outstanding image of the Land of Făgăraş is strongly connected to the fight against the communism. This image is illustrated by Motoc (2011) in the novel "Întoarcerea partizanului. Brazii Făgăraşului vorbesc" [Return of the partisan. The fir trees speak], likewise, the seven volumes of Gavrilă- Ogoranu entitled "Brazii se frâng, dar nu se îndoiesc" [Fir trees break but do not lean]. Three out of seven (1993, 1995, 2009) display the anti communist resistance in the Făgăraş Mountains, under the aegis of the Carpathian Group. The Carpathian Group [*Grupul Carpatin Făgărăşean*] was part of the Foundation "Fighters of the Armed Resistance against the Communism" and its objective employed hiding in the mountains until the outbreak of the 3rd world war, which they considered inevitable. Having Ogoranu as its leader for seven years, the group made of partisans confronted the regime since 1947.

Due to the collapse of the agricultural collectivism in Romania, the American researcher Kideckel (2006, 2010) delivers the investigation on socialism and economic changes produced after 1989 in the Land of Făgăraş. As an expert on the region, he makes a comparison between the workers from Făgăraş and those from the Jiu Valley, presented in the study "România postsocialistă. Munca, trupul şi cultura clasei muncitoare"

[Postsocialist Romania. Work, body and culture of the working class]. Another book, originally named "The solitude of collectivism: Romanian villagers to the revolution and beyond" outlines the main observations obtained in the field as a result of the surveys undertaken in the '70s, offering detailed information about regional identity issues corroborated with social and economic attributes.

Identity characteristics of the Land of Făgăraş, reflected in the specialized literature

Table 2

"simplicity and robustness, this is what betrays the characteristics of the Land of Făgăraş folk costumes. This impression is given by the straight lines of the costumes, the thick material, the length and the grayish or blackish color combined with the snow-white color of the [sarice] or [bubon]"[1]	"as a result of the environmental conditions, the ethnical homogeneity, the common history there is a feeling of regional identity that develops for the Romanian people who are around 65 years old [...] they call themselves [făgărăşeni] after the city of Făgăraş or [olteni] after the river that crosses the region"[2]	"a cinematographic view on the Land of Făgăraş will reveal that this territory has no center [...] it is rather an array of villages [...] maybe that is why this land has a rural aspect, has the characteristic of a margin land, from where it gets the appellation „land of the origins"[3]	"the hard work they had to do home, the difficult conditions in which they were cultivating the land shaped the inhabitants of the Land of Făgăraş to be industrious […] this proved to be helpful when they were working in America because the employers preferred them and their immunity to the political propaganda"[4]
"all the important roads were leading to Făgăraş or were coming from Făgăraş. There, was The City. [...] as a matter of fact, I have never seen the city [...] so I have been dreaming year after year of a completely personal Făgăraş"[5]	"keeping intact the Romanian element is a result of the [Ţara Românească] possession of the Land of Făgăraş for nearly one hundred years […] not one part of our lineage was so reluctant to the foreigners as the Romanians from the Land of the Olt"[6]	"dear Senators, many properties were taken from the Romanians in the Land of Făgăraş […] so the diligent land worker has to cross the Olt river on [Ardeal] to ask for a piece of land from the Saxon villagers in order to cultivate it"[7]	"the denominations Land of Făgăraş and Land of the Olt are used according to researchers' purpose; their meaning will be different, but the limits of the region will be approximately the same"[8]:

[1] Irimie, 1956, p. 9; [2]Kideckel, 2006, p. 23; [3]Modorcea, 2007, p. 20; [4]*** 1991, p. 113; [5]***, 1991, p. 3; [6]Meteş, 1935, p. IX; [7]Borzea de Vişt, 1925, p. 96; [8]Dragu, 1970, p. 5.

Last but not least, a study published in 2009 written by Grecu, Nicoară and Funariu exhibits the personalities of the Land of Făgăraş in order to render homage to them. The book is composed of an array of biographies, the pride of the Land of Făgăraş, who increased the prestige of the region and of its residents.

3.5. Ethnographical, ethno-linguistic, folkloric studies. The sociological school of Bucharest deserves the merits of initiating an extensive research, primarily for Drăguş village. The initiative belongs to professor Dimitrie Gusti who supervised a group of scholars. Herseni Traian was one of his disciples, a leading sociological theorist who delineated for the first time specific "land" type regions as ethnographical areas. Therefore, the Land of Făgăraş in his opinion is an "ethno-cultural, ethno-historical nucleus territory", "a social life entity" (Herseni, 1997, pp. XXIV-XXV).

The work "Dealul Mohului. Ceremonia agrară a cununii în Ţara Oltului" [Mohului Hill. Agrarian ceremony of the crown in the Land of the Olt] written by Ionică (1940) surprises with the complex discourse on aspects like regional repetitive facts used for determining the regional identity. The author pleads for the sociological direction- study case the Land of Făgăraş- and expresses himself in favor of the holistic interpretation of the "lands".

Irimie (1956, 1957, 1958) compiles three papers on the folk costumes. What is obvious is that the „land" is divided into three parts (Avrig area, Făgăraş area and Perşani area) that could not have been included in the same material as a result of the richness in diversity within the folklore (Irimie, 1956, p. 5). Moreover, based on direct investigations on field, but also on documents, numerous drawings, photographs, Irimie believes that the diversity is, in this case, a consequence of the influences exerted by the Hungarian and German population in the western-eastern margins of the region.

3.6. Biogeographical studies. Ardelean et. al. (2001) analyzes the ichthyofauna and presents the aquatic habitats in the Land of Făgăraş. In the first part of the research, a monographic character is imposed; in the end they debate problems related to the anthropogenic pressure. Moreover, groundwork observations on the avifauna are elaborated in 1998 with the aim of introducing them in a systemic catalogue. In this context, Ardelean urges to caution of human activities which have negative impact on bird population. Finally, Drăgulescu (1995) catalogues the flora in the Land of Făgăraş in the study "Botanica populară în Ţara Făgăraşului" [Folkloric botanic in the Land of Făgăraş].

3.7. With regard to the ***economy***, in addition to the references mentioned above (Solcan, 2010; Prodan, 1970-1976; Literat, 1943), Dragu publishes his thesis in the interwar period with the scope of firmly proposing the economic criterion for delimiting the Land of Făgăraş. This paper reflects the realities of the fifth and the sixth decades of the 20th century. Introducing concepts such as "fringe zone" for the industrial centers of Făgăraş, Victoria, Mârşa, perishable goods, road and railway access (transposed on isochronous maps) and the frequency of railway transportation, the thesis provides a touch of novelty in processing the data.

3.8. Evidence of cartographic data was found in the historical-geographical atlases as well as on old maps extracted from the special collections at "Lucian Blaga" Central University Library in Cluj-Napoca. Two conclusive guides offering indications to medieval maps are "Atlas istoric- de la Dacia la Imperiul Roman şi România" [Historical atlas- from Dacia to the Roman Empire and Romania] (Crăciun and Zbuchea, 2006) which appeared on the occasion of 1900 years since the ending of Roman-Dacian wars-

106-2006 and the beginning of the genesis of the Romanian people, and "România. Atlas istorico-geografic" [Romania. Historical and geographical atlas] published under the aegis of the Romanian Academy.

Popescu-Spineni (1938) claims that the most important contributions in mapping Transylvania were brought by Ioan Honterus in his document "Chorographia Transylvanie" (explains the origin of the Saxons, Transylvania is divided from the administrative viewpoint into lands: Burzenland, Althland, Land vor dem Wald, Weinland, Nösnerland), Georgius Reichersdorffer, Ioan Sambucus, Mathias Cinthius, Gerhardt Mercator-Kremer. The latter published in 1594 "the Atlas" introducing the method of thematic descriptions (e.g. the geography of Transylvania is categorized into settlement network, soil resources, fauna, a less usual characteristic to be mapped for that period- human mores, etc.).

Maps of Transylvania, between the 16th and 18th centuries

Table 3

Map	Author	Publication year
Transilvania. Siebenbürgen*	[Unknown author]	1566
Per Gerardum Mercatorem cum privilegio. Exusum apud Hondium Atlantis. Amstelodami*	Mercator G.	1590
Principaute de Transilvanie*	Lazius W., Sambucus I., Mercator G.	1664
Mappa della Transilvania, e prouitintie contique nella quale si vedano li confini dell Ongaria, e li componienti fatti dall armate cesaree in queste ultime querre. Ddedicata all Augusto Regio Maesto di Gioseppe Primo, Re di Romani, e di Ongaria da fio Marando Visconti supre mo insegegniere per S. M. Ces. in Transilvania	Visconti Marando G.	1669
Mappa geographica magne principatus Transilvaniae in usum Exatoratus Caes. Regii Provincialis uniti	Neuhauser F. J. G	1788
Generalkarte von Siebenbürgen. Nach geometrisch gemessenen Karten, und andern zuverloessigen Hilfsmitteln verjüngt, und graduirt von Herrn A. von Wenzely. Heraugegeben von F.A. Schraemll	Schraemll F	1798
Principatus Transilvaniae in suas quasque Nationes, earumque Sedes et Regiones cum finitimis vicinorum Statuum Provincum accurate divisus	Homanni Baptistae I.	[Unknown year]

**maps on which the Land of Făgăraş appears under the name of "Altland" or "Althland"*
source: Special Collections of the "Lucian Blaga" Central University Library Cluj-Napoca

As mentioned above, "Lucian Blaga" Central University Library in Cluj-Napoca possesses one of the richest repositories of maps and atlases in Romania. Hence, the Land of Făgăraş appears on several maps under the name of "Altland" or "Althland", even if in the larger context of mapping Transylvania (Table 3).

From the early 18th century the Land of Făgăraş does no longer appear in the cartographic sources as a "land". Instead, it appears as the district of Făgăraş amid the political and administrative changes on the territory of Romania. Although the maps of the medieval ages do not set the exact coordinates of the "lands", the cartographers have the merits of individualizing these entities as ethnical and geographical regions (Popescu-Spineni, 1938, p. 141).

4. CONCLUSIONS

A great impact on researching the Land of Făgăraş was generated by historians, starting with the 19th century. If by that time the region exists only as an allusion in the chancellery documents, land records, papal bulls and diplomas, after 1800 research intensifies with the scope of advocating for its historical personality. Narrative sources exhausted aspects concerning formation, documentary affirmation, the situation of the Romanian boyars and later on evolved to studying environmental characteristics. Some authors introduced new methods of investigation of the society (Kideckel 2006), while others expressed themselves in favor of clear delineation criteria (Popescu, 1990; Dragu, 1970).

Nonetheless the Land of Făgăraş appears on cartographic representations as a „terra" entity in the context of mapping Transylvania. It is well known that the medieval maps were often influenced by the church, without a solid scientific ground (Popescu-Spineni, 1938). Thus, the region's limits are not drawn on maps or its coordinates are altered. The limited number of cartographic representations contemporary with the formation of the Land of Făgăraş does not diminish though the enthusiasm some might have had in writing about it.

In conclusion, the research made so far assure at least a partial perspective on the state of affairs of a "land" type territory. Bearing this in mind, we wish to bring our contributions with an integrative study that will further explain how peculiar characteristics intervened in the formation of this geographical region.

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SOME ASPECTS REGARDING SHEEPHERDING AND ITS ROLE IN THE LOCAL DEVELOPMENT OF THE DRĂGOIASA-TULGHEŞ MICROREGION

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ABSTRACT. – Some Aspects Regarding Sheepherding and its Role in the Local Development of the Drăgoiasa-Tulgheş microregion. Alongside crop growing, sheepherding has always been one of the more important occupations of the local population, agriculture and sheepherding being, in fact, inseparable occupations. The pastoral economy of the Drăgoiasa-Tulgheş depression string fits in the mountainous type landscape, with a massive domination of hayfields, natural pastures and grazable forests, which encompass the slopes as well as the higher areas. The period for grazing lasts between 130-150 days for cattle and 150-180 days for sheep. The pastures are used from May to October, while the hayfields, after the collection of hay. For the animals that are not „taken up" the mountain in summer, people use the hayfields and pastures found in communal areas, a phenomenon encountered only in Corbu and Tulgheş. We also mention the fact that some settlements such as Gălăuţaş, Sărmaş, Subcetate, Ruşii Munţi, Monor, Şieuţ do not have enough pastures, renting pastures from Topliţa, Bilbor and Borsec. Lower, within forest areas, there are clearings, mostly artificial, called „smizi" (smidă), where grazing is forbidden as they contain plantations of tree saplings. However, when milk output is lower due to colder days or lack of grass, the shepherds go down with their herds to these plantations, or on recently deforested lands, where grass is plentiful, but they do it secretly and quietly due to the fines enforced for destroying these plantations, or due to the bears that can be found in these areas. A significant part of the rural population is in an intense seasonal movement from the permanent hearths towards temporary ones and the other way around, which emphasizes the existence of two types of sheepherding: local sheepherding, frequent in almost all the settlements of the depression string, taking place from spring until autumn in stationary, or mobile sheep dens, or with no den whatsoever, within the limit of the village, and an agricultural sheepherding, with sheep dens in the mountains, beyond the limit of the village, that takes place during warm months on the slopes of Căliman, Giurgeu, Hăşmaş and Bistricioarei Mountains. In general, the best pastures are those found on southern, south-western and south-eastern slopes, and especially on gradual ridges with a lot of sunlight and heat. The quality of pastures also depends on the manner in which they are used. For example, the introduction of cattle and horses, which graze on the old grass that sheep refuse, allows the development of young grass, thus improving the food quality and quantity of sheepherding products. Some of the most important grazing sites are: *Stegea, Şuvărişte, Dobreanu Mic, Dobreanu Mare, Aluniş, Iuteş, Faţa Bilborului, Şestina, Muncelu, Secu, Şesul Comarnicului, Runc, Bâtca, Şăştina Barasău, Bălajul, Feţele Putnei*.

Keywords: *sheepherding, sheepfolds, traditional products, tools used in a sheepfold, shepherds, pastures.*

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1. INTRODUCTION

In this space, sheepherding is an ancient activity, with typical forms of organisation, having a sedentary character and an old terminology. Orbán Balázs (1869) states that, in the Căliman Mountains area, during summer, there were approximately 60,000 sheep and 15,000 cattle, belonging to the „Mărgineni" shepherds: *„At the end of summer, the mărgineni headed to Moldova and went down through the land of Bilbor, or went over the Drăgoiasa towards Dorna. In this transhumance, many herds belonging to sheepherders remained in the Land of Bilborului during summer, buying hay from the locals"* (I. Manciulea, 1928).

The pastures spread on the edge of the depressions, as well as in the higher mountainous area, in sunlit clearings, crossed by clear springs, are stimulating factors for pastoral activities, which forms, even now, the basis of living in this mountainous area.

The start of the pastoral season varies depending on the inception of spring, in general the period between the 23rd April (St. George) and the 14th October (St. Paraskeva).

The organising shepherd or the sheepfold chief begins his activity in early spring, having significant duties such as hiring shepherds or collaborating shepherds, and deciding which mountain will the herds climb.

2. THE SHEEPFOLD – TRADITIONAL BASIC HABITAT

The gathering of the sheep at the pen takes place from 1st until the 10th of May, at the place where the sheepfold is erected, following a strict custom: the sheepfold chief and the shepherds go to the sheepfold in the early hours of the morning, waiting for all the locals to bring their sheep and include them in the flock, after which the sheep owners remain for one more day in order to help organise the sheep enclosures, the hut, and the other utilities necessary for a proper operation of the sheepfold.

Two or three weeks after the establishment of the so-called *associated sheepfold*, there is a second major event, called *sheep measuring*, which usually takes place on the 21st of May (St. Great Emperors Constantin and Elena), or in many cases on the Sunday before Pentecost.

People come to the morning milking, after which they leave with the sheep to the pastures, the shepherds staying behind, after which, at noon, the flocks return to the pen so that they can be milked.

In the past, the quantity of milk was measured with a fir stick called *„mertic"*, which was introduced vertically in the bucket or *„șuștar"*, on which a sign was made. There were actually two mertics, one that was kept by the host, and one by the sheepfold chief.

For the poorer locals, that had fewer sheep, the milk was measured in a smaller bowl, using a different size stick, called *„tandalic"*. The measured quantity of milk determined the cheese quota, which the owner recieved when he collected the cheese from his sheep. After 1970, these customs are no longer used, the sheep are gathered at the sheepfold chief's house, after which the shepherds, alonside some of the owners, take them up the mountain.

Besides the festivities of sheep measuring and shearing, there is also *the custom of the cheese calling*, an occasion when the relatives of the owners and of the shepherds are allowed to attend, when the sheepfold chief serves the guests with *„balmoș"*, made with *„jântuit"* and sheep butter. Each owner can follow up the sheep during the noon milking, after which he receives the agreed quantity of cheese.

The organisation of sheepherding as an associated sheepfold is based on verbal contract between sheep owners and shepherds, regarding the payment for sheepherding.

In the past, payment was in nature only, from the product surplus, while recently a new form arose „sheepherding for money", plus products, directly proportional with the shepherds experience. The true art of sheepherding is knowing how to milk so that sheep do not lose their milk and how to make good cheese not only for sale, but also to promote the flock. The pastoral hierachy is also something important, being traditionally known, including several shepherds: *sterparul*, who leaves with the barren ones each day and sometimes stays at the pen, *strungarul*, regularly a child, whose role is to guide the „sheep at the pen", *the milking men*, who always remain at the milking grounds and the *organising shepherd* or *the sheepfold chief*, with the most important contributions regarding the management of the sheepfold and with the cheese preparation.

Fig. 1. Sheep milking at the „spătări".

40-50 meters away from the sheepfold there is *the sheep pen*, situated in sheltered areas, sligthly inclined, so that on rainy days there is no mud, having a hexagonal or octogonal shape, built out of a mobile light fence, to allow for its movement in a short amount of time.

At the back of the pen there is a large gate for the sheep to enter, and on the opposite side, which is always directed uphill, there are three or four openings, used to milk sheep.

Above them, there is rudimentary roof *(comarnic)* to protect the shepherds from rain, and to avoid creating mud there is a wooden plank.

„Spătările" are the small doors through which the sheep come out to be milked. On both sides, there are the shepherds waiting for them, sitting on logs or on stools. The one who guides the sheep with a stick in his hand stand between the sheep and pushes them towards the doors, yelling „Brâ la strungă" from time to time. *„Târla" or „coșarul"* is the place where sheep sleep at night, situated near the sheepfold.

In terms of organising *cowcotes*, a system in which dairy cows are tended all summer in the mountains, this is done using the criteria of association, frequently between a relative small number of 7 to 10 people, according to the relation degree. A small group of owners look for shepherds, usually poor or orphan children and young men, either locals, or from Moldova (Pipirig, Neamț County).

The dairy products are made by those who own cows, and go to the cote to gather the milk. The milk is measured and given to the one who makes the cheese to administer, writing in a special notebook the quantity of borrowed milk. In the past, this task was done on a cylindrical or square piece of wood called *răboj*, with markings done by knife, in the following manner: a line meant a large bowl, while half a line a bowl. This system helped keep the ancestral organisation, so that the loan was compensated between the owners, no debt remaining, each autumn, when leaving for the mountain.

The cote is a construction complex made of wooden materials, mostly situated close to the forest line, in sunlit clearings, on terrains with a gradual incline, as well as close to water sources (springs), between 1,000-1,200 meters to more than 1,700 meters in altitude.

Fig. 2. Mixed mobile sheepfold.

Choosing the spot is done by the cote chief together with the animals' owners.

Each cote is surrounded by a courtyard and a fence, which restricts the access of animals in the cote, a space where the „comarnic" and a large wooden table for storing different products are located. Close to the cote, mostly in the back, there are pens for pigs and calves.

Another particular construction found in cotes with large cattle is the *„ocol"*, which has a round shape, mostly situated close to the forest, for shelter during rainy or hot days, being fitted with two or three gates made of the poles, between which more sticks are inserted, sticks that allow the closing and the opening of the „ocol" (locks). Depending on the weather, at an interval of two weeks-one month, and when the ocol has more than 80% manure, the decision is taken to move it in a new, clean place, thus naturally enriching the soil *(„târlitură")*. The *cobăr* is an ancient device, used for the shepherds rest, situated on the other side of the cote, near the ocol, to allow for a better protection and monitorization of animals.

Depending on the grazing areas that belong or have been rented by the commune hall, each locality of this area has a variable number of sheepfolds: for Bilbor, sheepfolds in the Căliman Mountains (Dobreanu Mare; Câşiţa; Stegea with seven cotes: Preluca, Izvorul Rece, Poiana Mare, Cioate, Poiana din Mijloc, and two cotes in Dosul Stegii; Poiana Duşii), in the Bistricioarei Mountains (Alunişel; Alunişul Mare; Plopi; Harlagia; Faţa Bilborului; Muncelu; Şăştina Barasău; Arsuri; Pârlitura; Runc; Comarnic).

The sheepfold has existed in the area ever since the beginning of pastoral activity, its main usages being the storage of the cote's belongings, offering overnight shelter to shepherds, as well as preparing and storing dairy products.

The traditional cote is made of round wooden beams, comprised of two rooms, covered by fir bark and more recently by shingle, wood or metal sheet. The first chamber contains, in a corner, near the entrance to the cote, the hearth, permanently fed so that the fire does not die, using thick dry wooden blocks. There are also beds *(„priciuri")*, covered by a layer of moss or fir branches. The dairy products are also made here, and then they are stored in the next chamber (pantry), in order to dry, and then being distributed to the animal owners. This room also stores the shepherds food and clothes.

With Romania's inclusion in the European Union, the so called *„systematic cote"*, began to appear, with three rooms, bedroom, special place for making cheese pentru prepararea, and a pantry. In the area at hand there are over 60 cotes, seven being situated near Drăgoiasa and Glodu depressions, more than 40 are situated in the administrative territory of Bilbor commune, six at Secu, three on the administrative territory of Borsec, seven at Corbu and six at Tulgheş.

In September 2008, Tulgheş inaugurated the first modern sheepfold in Romania, constructed following European standards, on a land given by the Tulgheş Local Council, 4 km from the center of the commune, in a place known by the locals as *Şăştina Barasău*.

The construction of this cote took less than two months, and is part of the Carpatic II Project, managed by the *Animal Breeders Association of Tulgheş*, with support from the American foundation *Heifer Project International* and the *„Dorna" Mountain Agricultural Association*.

Even though from the outside it looks more like a lodge, its interior follows the specifications of the European Union. This cote, made of wood, has running water, sewage system, electrical power, platform for milking apparatus, and a milking device. It also has two bedrooms for the shepherds, and, as an unusual aspect for a Romanian cote, it has sinks and a shower. In order to insure that the dairy processing follows all the sanitary standards, the shepherds also have a processing chamber and one for the dairy maturation, where only the chief can enter.

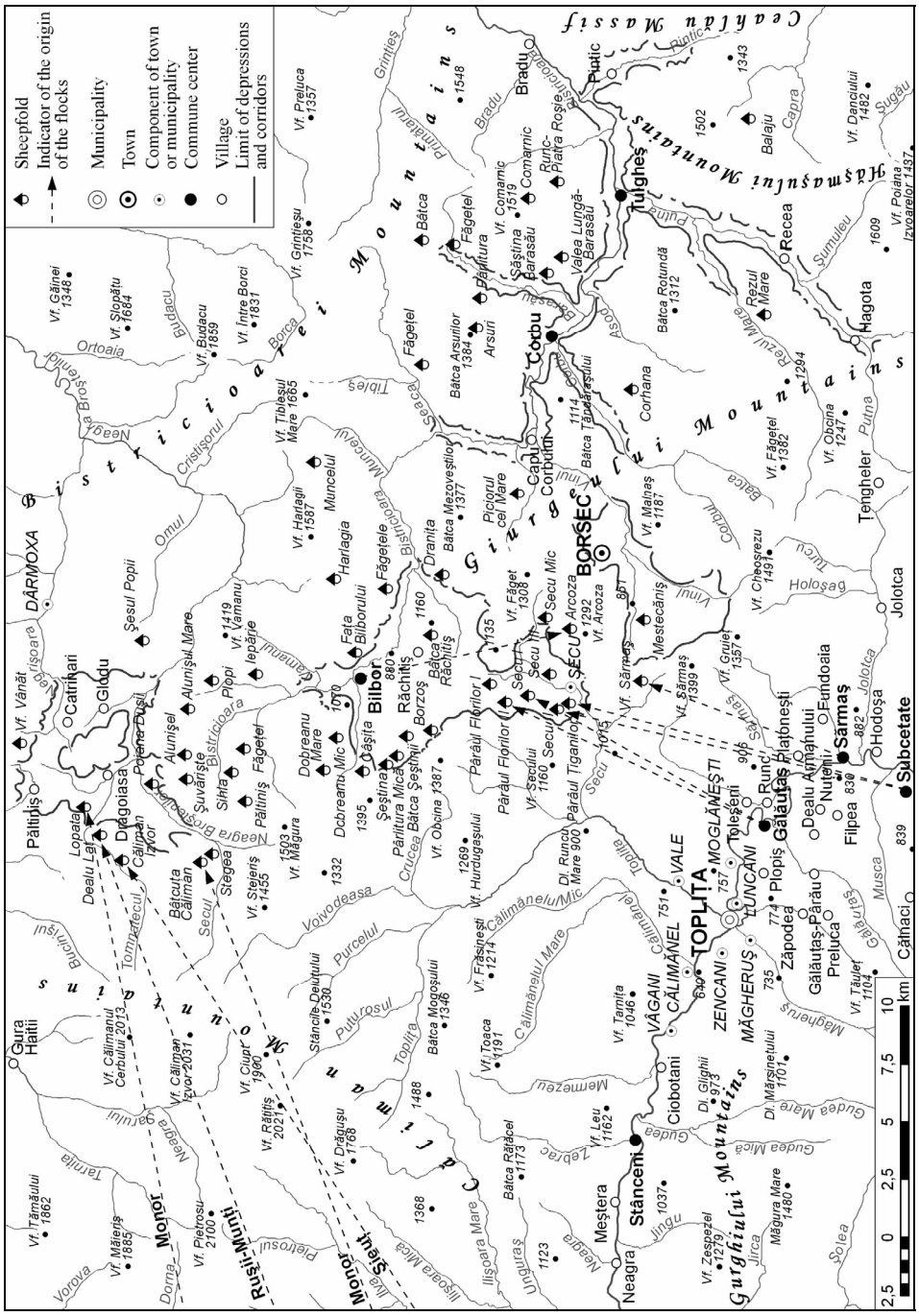

Fig. 3. The localization of sheepfolds in the Drăgoiasa-Tulgheș Depressionary Alignment.

Everything was installed with the aim of insuring sanitary standards and an adequate production circuit. This is a novelty in the area, and a model for promoting traditional, fresh dairy products. As for the certification of the products from this cote, it will be acquired in the very near future, being an essential condition for marketing them.

This modern cote represents the first construction of this type in the country, and its inauguration was promoted by the media, the construction expenses exceeding 150,000 lei.

The shepherds of this cote manage 700 sheep and 100 cattle, and the number of animals will sure grow as the investment will gain momentum and its initial costs will be recovered.

Following the same model, in 2010, a modern cote was built in Corbu (Arsuri), a project started by the *„Văleanca"* Corbu sheep and cattle breeders association, with the support of the same American foundation and the *„Dorna" Mountain Agricultural Association*.

The intent is to certify the Corbu cheese, which is made following a traditional recipe.

2. 1. The Tools of a Sheepfold

Regarding the tools of a traditional sheepfold, we mention the following items: *„budaca"*, *„budăcuţa"*, made of fir wood, with a larger mouth, having a handle on one side made of a longer stave of wood, being used to make cheese; *„doniţa"*, also made of fir paralel staves of wood, this being used for milking cows; *„fedeleşul"*, again from staves of fir wood, with lids on both ends, the one at the top having a square wooden cork.

This is used to prepare and store sour milk, having wooden or metal rings on the outside, with distinguishing marks on the stave, used by locals (mostly one's initials); *„putina de lemn"*, used to store and transport *„jântiţa"*, whey and *„jântuit"*; *„bribideul"*, built in the shape of star with circles made of young fir branches, used to *„drub"* the *„străgeata"* and obtain an uniform mixture that will eventually become sweet cheese; *„tăujerul"*, a wooden bat with a caved in end and opened like a floral cup, use to mix „the cottage cheese whey" and not burn the „urdit" cauldrons; *the large 100 litre cauldrons*, made of aluminium, used for „urdit"; *the measure pot*, *the large wooden spoon*, *the sieve*, a dense linen, through which milk is strewn, which is the pouted in the „budacă"; *„hârzob"*, a wooden circle which is woven with aluminium wire in the form of loops, on which the sieve is placed; *„bărbânţa with sour whey"*, made of wood, with a round lid, used to prepare and store sour whey, and to store „burduf" cheese in the household; *the polenta pot*; *the milk measure*, made of aluminum, with a floater graded up to 15 liters; *„comarnicul"*, a wooden roof under which the evening milk is put until morning, in large aluminun cauldrons, placed on „wooden pitchforks", made of young spruce roots (similar to a tree like hanger). The fact is that, in a sheepfold, the „doniţa" is replaced by a milking bucket, tighter at the neck, which always comes with a cup, with two handles, made of wood, usually sycamore, with a 0.5 liters capacity.

Due to the fact that butter is also made in these sheepfolds, the *„budârloi" (churn)* is also among the tools used, made of fir staves, having a lid on top that has a hole in the middle through which the „bribideu" is inserted, which, through repeated vertical movements, leads to the transformation of sour cream into butter (churning the butter).

After demands from the European Union, cotes no longer use wooden tools and pots, instead using stainless steel or aluminum.

2. 2. The Description of Cheese Making Technology

Cheese preparation technology is an extremely complex process, that requires, besides the specific tools, following several conditions in its processing.

The milk from the „doniţă" or bucket is poured in the „budacă" or cauldron that is covered by a sieve, nowadays made of a thick canvas. The warm milk from the „budacă" is given a *clot*, made from the stomach of a lamb or young calf, in order to achieve better quality.

The clot also includes a bit of unboiled milk and some salt. The clot prepared in lukewarm water is poured in the „budacă" with the big wooden spoon, in direct proportion with the milk, so that the cheese does not come out all coarse and frail.

Lately, most people who prepare cheese replaced the clot with pills, or with powdered clot, bought from veterinary pharmacies, that leads to a faster fermentation of milk.

When the milk is cloted, the *„străgeata"* is obtained, which is cut with the big wooden spoon, as a symbolic sign of the cross. The cheesemaker then waits for approximately 5-10 minuts until the whey rises above the cheese, after which the bribideu is used to churn it until one gets something resembling milk, but much thicker.

This (străgeata) is gathered by hand until there is nothing left on the sides of the budăcă, then, by using the large spoon, one gathers the cheese in one place.

The cheese is separated into 3-4 pieces, using a wooden knife, put in a budăcuţă, then pressed by hand until all the whey drips away, then broken into very small pieces, squeezed by hand again, resulting a thicker whey, called *„jântuit"*. It is taken out of the budăcuţă and put in a sieve, which is then hung on girders, in the pantry, so that in can drain for one or two days.

Fig. 4. Storing cheese at the cote.

After the whey's drainage, the cheese is put on shelves so it can dry and ferment. After roughly 15-20 days, if it is not too cold, the cheese is fermented and processed to obtain bellows cheese. Until it is not fermented, the cheese is called „green", and cannot be eaten or sold.

„The green cheese", being pressed, it juices, while the fermented one produces butter. People and shepherds also know it after the colour of its crust and after its taste.

The sweet whey, gathered in the „budacă", is poured in the „urdit" cauldron, which is then hung in the whirlpool (a wooden device set above the fire), in order to boil and get the *cottage cheese*. After boiling, the cottage cheese gathered after pouring one or two litres of sour whey, is collected with the wooden spoon, and put in the „cottage cheese" sack so it can drain. If the gathered cottage cheese is mixed with boiled whey, one gets „jântița", whcih is first course eaten by shepherds at noon or in the evening, or for the tourists that may visit that particular cote. The cottage cheesed whey is sometimes used to wash the dishes, as well as food for the dogs, and when it goes sour as vinegar substitute in the kitchen.

These cheese making processes are described according to the recountal of older people, with many years of experience in such matters, at the same time being an art and a skill from the part of the cote chief and the shepherd, so that the cote can gain fame.

At many cotes, the evening milking of the cows is performed earlier (around 18^{00}), after which the cows are allowed to graze again, in the nearby clearings, until nightfall, a custom known as *„pornească"*, with the aim of getting approximately the same amount of milk in the evening as well as in the morning.

3. CONCLUSIONS

Sheepherding is an economic activity whose sphere is not limited solely to animal husbandry, but also includes the capitalization of animal products. As pastoral life mostly takes place outside the villages, far away from their hearths, it is natural for the milk to be processed at the cote, while the obtained products (cheese, urda, etc.) to be used for the needs of the household, and only then for the market.

The average cheese quantity is 6-7 kg/sheep and 40-50 kg/cow, while the total annual quantity obtained in the Drăgoiasa-Tulgheș area is more than 300 tons. The products are sold in the markets of Toplița, Gheorgheni, Miercurea Ciuc, Borsec, Reghin and Vatra Dornei, while the milk is sold to the milk processing plants in Târgu Neamț, Reghin and Vatra Dornei, that buy cheaper by at least 25-35% of the market price.

The number of persons employed in these activities is approximately 534, while the salaries are between 800-1,200 lei/month, depending on their experience.

The ethno-touristic impact of sheepherding is manifested on several levels, such as the antropization of the mountain areas, through cotes, the tools and the traditional products obtained, the temporal-pastoral activities and their reflection in folklore.

The cotes are traditional basic habitats from the mountain areas, with seasonal character, that function as small units of complex production, especially dairy, following traditional methods, many of them being situated on touristic paths or in their vicinity, acting as resting areas for tourists or even overnight shelters where one can serve traditional products, such as *cheese polenta*, *balmoș*, which is also prepared out of corn flour, with urdă and some sour whey to give it a bit of a sour taste, thus being more easily consumed, *„topcitul"* made of yeasted cheese, grounded in a bowl that is being heated in order for the cheese to melt, and then eaten with polenta. Sometimes, to make it even tastier, the cheese is mixed with some diced onion.

Among the traditional foods from the cote, I would like to mention: *jântița* (a mix of „urdă" and whey), *bread with pig fat*, *„cheese lump"* etc. The tourism generating

activities include *„The Shepherds Festival"* from the Bistricioara Basin, organised in Tulgheş, the first edition being the one in 2010, while in 2011, at Topliţa, the first edition of the *„Sheep measure*" took place.

As this practice is frequent in the area, the locals were able to celebrate through dancing and singing, as many folk artists from the area took to the stage. The shepherds demonstrated how to milk a sheep, but also how to make cheese and urda. In the future, the plan is to use this event as a tourism generating factor, due to the multitude and diversity of cotes, where traditional dairy products are prepared, deeply embedded in the culinary and cultural tradition of the area, whose diversity is due to the height of the pastures and the particular prodution techniques.

In conclusion, one can say that, despite the fact that the geographic conditions of this mountainous area are not entirely favourable to the development of communities, sheep and cattle husbandry have excellent conditions to develop, which in turn has positive effects on the entire area through the products it delivers. The aim of this activity is to satisfy the household needs, while the product surplus is capitalized in order to cater for additional needs.

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CONSIDERATIONS ON SPATIAL AND TEMPORAL DYNAMICS OF FOREST ECOSYSTEMS IN SOUTHERN OLTENIA

R. PRĂVĂLIE[1]

ABSTRACT. – Considerations on Spatial and Temporal Dynamics of Forest Ecosystems in Southern Oltenia. Because southern Oltenia is one of the Romanian regions most exposed to climate risk phenomena such as aridification, it is necessary to analyze spatially and temporally the forest areas considered to play an essential role in maintaining an optimal ecological balance in the region. This paper aims to analyze the dynamics of forest areas in the last three decades, attempting the same time to highlight the most important negative consequences on the environment and human communities. Following the diachronic analysis in the analyzed period (1981-2006) it comes out that there are large spatial differences at territorial level. The highest dynamics of forest ecosystems have been observed in the area of sand dunes. These dunes are found over large areas in the analyzed territory and their destabilization following deforestation is currently one of the major causes of intensification of aridification phenomenon, that has negative consequences at environmental, economic and social level.

***Keywords*:** forest ecosystems, spatio-temporal dynamics, sand dunes, impact, environment.

1. INTRODUCTION

Globally, forest ecosystems are in constant change and the main cause is represented by anthropogenic influences (Vogelmann et *al*., 2012). Specialized research showed that, in the context of strong anthropogenic pressures over the past century, changes in land use (including the forest ecosystems) represents the main cause of global climate changes of the environment (MA, 2005; IPCC, 2007). Under these conditions, maintaining forest ecosystems in areas very affected by global climate changes, is essential. Otherwise, their loss can have major adverse consequences for ecological, climatic and hydrological fields (von Randow et *al*., 2012).

In Romania, there are now large regions affected by global climate changes. According to expert analysis on national climate (Păltineanu et *al*., 2007), among the most affected regions is the Romanian Plain (South-West, South and South-East) and most of the Dobrudja region. Also, the study area (southern Oltenia) is one of the most affected areas by the phenomenon of aridification in southwestern Romania.

Locally, in the last three decades, one may remark a clear trend of aridification (Dumitrașcu, 2006, Marinică & Văduva, 2010; Vlăduț, 2010; Dragotă et *al*., 2011), that is due to the synergistic context of global climatic changes (decrease of rainfall amounts, increase in global average temperatures) and local changes (deforestation).

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2. METHODOLOGY

This paper aims to analyze the spatio-temporal dynamics of forest ecosystems located in one of the most affected regions of Romania due the phenomenon of aridification, southern Oltenia. The analysis was possible using available cartographic and digital materials like: topographic maps, orthophotoplans and Corine Land Cover database. Thus, we used topographic maps of the area, 1981 edition, 1:25,000 scale, for extracting forest areas by vectorization / digitization, which is compared with the existing databases of the Corine Land Cover 2006 (European Environment Agency). For validation of the spatial information for forest areas delineated in the Corine Land Cover database, we consulted the 2008 edition orthophotoplans.

It was found that in the area of study the analyzed dynamics of forest ecosystems is not uniform in terms of space. Therefore the analysis was focused on three key areas of study, where forest dynamics proved to be the most intense. Also, the analysis of forest dynamics was pursued at the administrative level, namely at the level of the existing 113 administrative units in the region.

3. GENERAL ISSUES ABOUT THE STUDY AREA IN THE CONTEXT OF THE ARIDIFICATION PHENOMENON

Located in southwestern Romania (fig. 1), the study area overlaps for the most part with Oltenia Plain. The analyzed area, southern Oltenia, is bordered by the Danube to the West and South, Jiu in the East, and by Getic Plateau in the North and covers an area of 736723 ha, corresponding to 113 territorial-administrative units.

An important feature of the landscape in this region plays an essential role in emphasizing the impacts of the aridification phenomenon. The presence of sand dunes in large areas causes negative consequences for local water resources (Irena Mocanu et *al*., 2011), and thus for the socio-economic development. These dunes, fixed or mobile, have a maximum thickness of sand layer of 15-20 m and can be found near the Danube and Jiu terraces. The terraces represent the source of sand dunes of the region with elongated shape caused by the continuous action of deflation due to the winds with prevailing North-West and South-East directions (*Geografia României*, *volumul V*) (fig. 1). Some of these dunes are fixed mainly by forest vegetation and crops with key role in maintaining their position (vineyards). A primary cause of these mobile dunes is the forest ecosystems dynamics in the context of intense deforestation after the second half of the twentieth century.

In Romania, from the total area occupied by soils with sandy texture (330000 ha), 35% (approx. 116300 ha) are found in the study area, comprising the existing sand dunes (fig. 1). These sand dunes represent a very important disruptive element in the regional socio-economic development and a contributing factor to aridification in the area by reducing the water resources due to their high permeability.

Climate plays an essential role in increasing aridification by changing the parameters of local temperature and precipitation (rainfall tends to decrease and the average annual temperatures increase) (Dumitrașcu, 2006), due mostly to global climate changes. Another major cause of local changes with an increased role in the aridification phenomenon is the altered land use, especially after 1990 (Prăvălie & Sîrodoev, 2013).

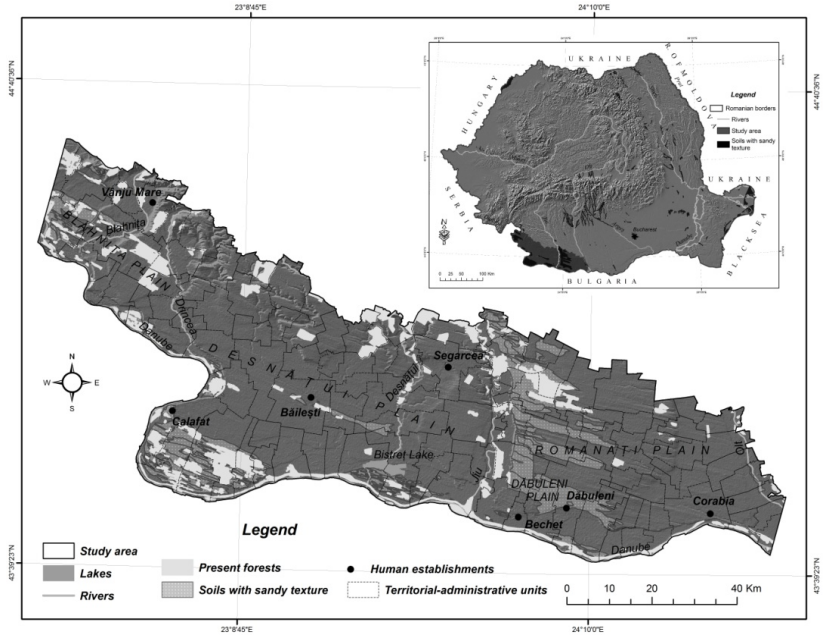

Fig. 1. Location of the southern Oltenia area in Romania (data processing geo-spatial.org)

The existing forest vegetation in the study area is a basic component in stabilizing sand dunes, in fighting the wind deflation, maintaining an optimal ecological balance and thus in reducing the negative effects of the phenomenon of aridification. In this sense, one notices the forest steppe area with the main species of *Quercus pubescens*, *Q. cerris, Q frainetto* and *Q. pedunculiflora* (Pătroescu, 2005), and the broad-leaved forests area, on small spaces, in the North of the study area. Also, non-zonal forest vegetation represented by forests of acacia (*Robinia pseudoacacia*) is very important.

In the last century, massive acacia plantations were conducted in southern Oltenia, as they play an essential role in stabilizing sand dunes (Nuţă, 2005). Their emphasized dynamics after the second half of the twentieth century (especially after 1990), in areas heavily affected by wind deflation phenomena led to important local ecological, climatic, hydrological and social imbalances.

4 RESULTS AND DISCUSSIONS

Following the analysis of forest dynamics between 1981 and 2006, it was noticed a decrease in forests in the entire area by about 7%, from 62058 ha in 1981 to 57573 ha in 2006 respectively. Spatially, an unequal distribution of forest dynamics was noticed, as most of the missing 4485 ha are in areas with sand dunes. In this way, we have identified three main areas where the dynamics of forest areas was most evident (fig. 2): Jiana - Izvoarele, Ciupercenii Noi – Piscu Vechi and Dăbuleni – Apele Vii, which were analyzed as case studies.

In the first case study, the Jiana – Izvoarele area (fig. 3), we noticed a high negative dynamics of forest areas during nearly three decades. Between 1981 and 2006 large areas of forests have disappeared in Izvoarele village, to the South, North and North-West of it.

From the approximately 4500 ha of existing forest in the year 1981, one remarks a decline by 36% (1640 ha) in 2006. In terms of spatial dynamics, massive decreases of forest areas were observed to the North of Pătulele village, South-West of Jiana village (areas with extensive sand dunes) and North-West of Izvoarele village.

Regarding the main extinct species, generally one could notice acacia (*Robinia pseudoacacia*) and sometimes poplar (*Populus canescens*) hybrid species artificially introduced for the replacement of native species with low productivity, such as white poplar (*Populus alba*) and black poplar (*Populus nigra*) (Jiana Forest Arrangement, 1997). One noticed a slight decrease in the forests of *Quercus pedunculiflora* and *Quercus pubescens*, located South of Gogoşu village.

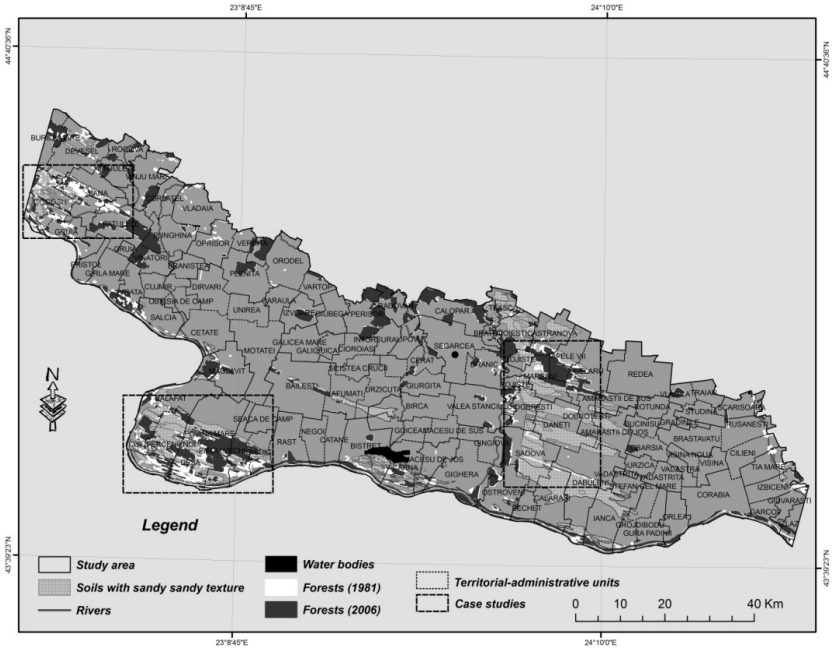

Fig. 2. Spatial delineation of areas with the most intense dynamics of forest areas between 1981 and 2006

The causes of area loss of forest ecosystems (acacia and poplar) are both anthropogenic and climatic. Deforestation carried out by authorized owners after restitution of lands covered by forests, based on the land fund law 18/1990, and their transformation either in agricultural lands or in abandoned fields, is one of the main causes of the disappearance of forest ecosystems in the region. Another major cause is represented by unfavorable climatic conditions, in this case the prolonged droughts during the last two decades (Dumitraşcu, 2006) with direct consequences on cutting works well over provisions in the local forest districts (Jiana Forest Arrangement, 1997).

In the case of poplar species, one noticed other secondary causes of their fading (and after cutting more than necessary by local forest districts) in the semi-endorheic interdune areas. With the upstream construction of Porţile de Fier II (Iron Gate II) hydropower works and the water balance changes (reductions in groundwater levels downstream) one observed poplar species drying out over large areas in sandy interdunes space (Şimian Forest Arrangement, 2010).

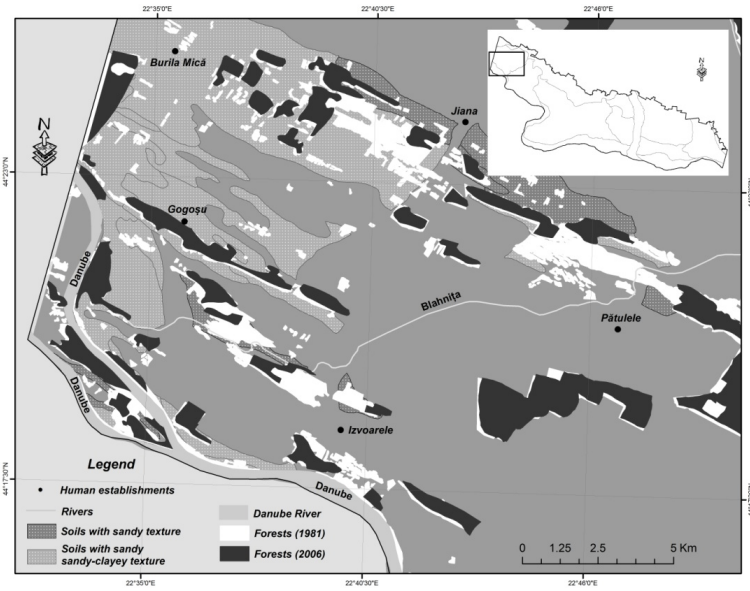

Fig. 3. Spatial and temporal dynamics of forest ecosystems in Jiana - Izvoarele area (1981-2006)

The second case study, Ciupercenii Noi – Piscu Vechi area (fig. 4) shows an accelerated dynamics of forest areas, especially South of Desa village, in the Danube floodplain sector. Generally, acacia prevails in this area, but also floodplain vegetation represented by species of willow (*Salix alba*) and poplar. In the analyzed period, one noticed a decline of about 1500 ha, from 12400 ha existing at the level of 1981 to 10880 ha in 2006. During the late nineteenth century, among the first acacia plantations in southern Oltenia were made in Ciuperceni – Desa area, because sand dunes in this area were a disaster for localities due to frequent sandstorms (Nuţă, 2005). Since the second half of the twentieth century, in the context of political decisions to expand agricultural areas, much of acacia plantations have been deforested, later being partly replanted in order to restabilize the sand dunes (Dumitraşcu, 2006).

The analysis of the dynamics in 1981-2006 period highlighted the massive losses of forest areas, especially acacia and even poplar, due to anthropogenic (deforestation), climatic and hydrological causes. Prolonged droughts in the last three decades represented an important cause for the fading away of acacia species in large areas and after cuts well above the necessary in the local forest districts (Poiana Mare Forest Arrangement, 2004). Also, the lowering of the groundwater level when water

from the Danube withdrew from abandoned channels in Rast head area is another important cause of poplar species drying when located in sand interdunes space (Calafat Forest Arrangement, 2004).

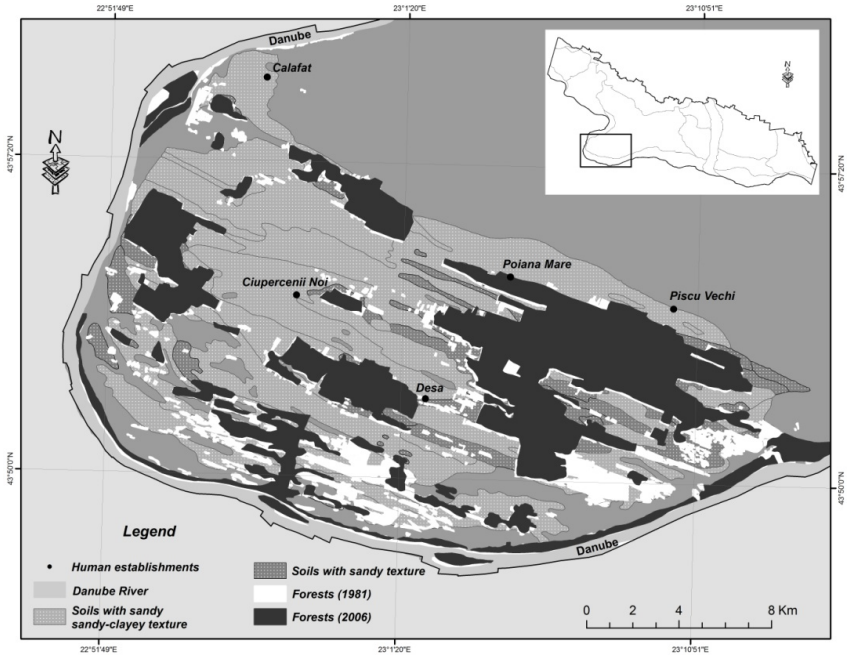

Fig. 4. Spatial and temporal dynamics of forest ecosystems in Ciupercenii Noi – Piscu Vechi area (1981-2006)

The last case study analyzed, the Dăbuleni - Marşani area (fig. 5), raises another problem of a different category in terms of the dynamics of forest areas. Although significant decreases in forest areas were not observed in this case except for some places in the Jiu floodplain (floodplain vegetation) and in Apele Vii village area (acacia plantations), however, an important issue is the fact that existing protective forest belts of this region largely disappeared, and the ones still existing today are in an advanced state of decay.

According to the diachronic analysis using the 1981 topographical map and the 2006 Corine Land Cover, one may observe the disappearance of protective forest belts, North and South of Sadova village and West of Amărăştii de Sus village (fig. 5). These forest belts were planted after 1974, after the deforestation of 5000 ha of acacia forest following the completion of Sadova - Corabia irrigation system between 1972 and 1974 (Sadova Forest Arrangement, 2003). Reactivation of sand dunes after the wide-ranging mentioned deforestation required the creation of extensive networks of forest belts, perpendicular to wind direction, with a total length of approximately 1600 km (Nuţă, 2005). Although the layout direction of forest belts is generally North-South to fight against the West-East phenomenon of deflation, the spatial and temporal analysis of the

dynamics of the study area captures only a part of forest belts (those with large widths and North-West - South-East direction) (fig. 5) due to their reduced width (8-10 m) and the limited spatial resolution of the cartographic and digital materials used.

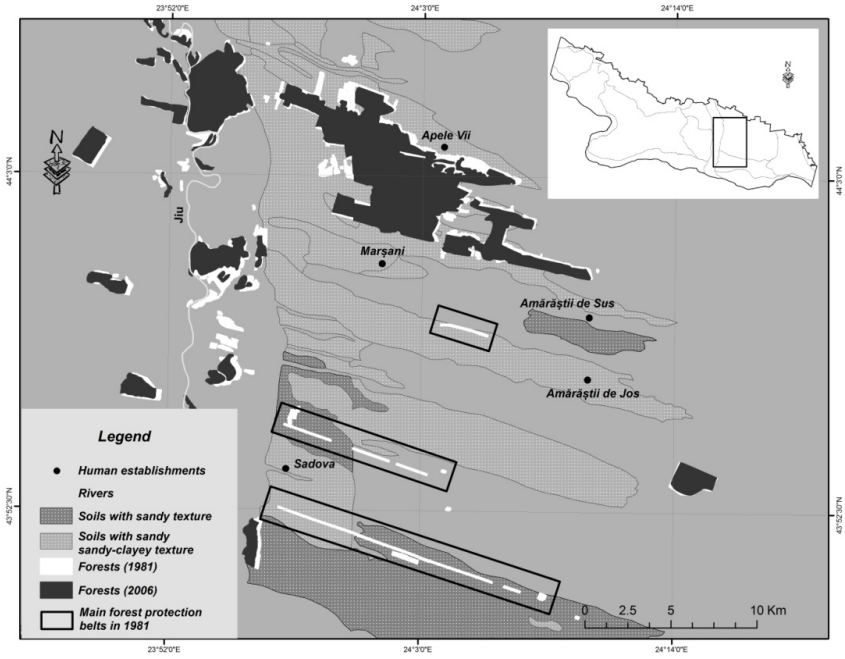

Fig. 5. Spatial and temporal dynamics of forest ecosystems in Dăbuleni – Apele Vii area (1981-2006)

According to some specialized studies, it has been found that during the last three decades (1979-2005) an area of 87% of forest belts was destroyed only in Dăbuleni village, respectively from 1125 ha in 1979 to 137 ha in 2005 (Achim et *al*., 2012). Their disappearance is in part due to climatic stress conditions, but mostly due to illegal cutting which has led today to a real reactivation of sand dunes with adverse consequences on land degradation in the region (Ignat et *al*., 2009).

The analysis of the dynamics of forest ecosystems at the level of the territorial-administrative units in the region reflects large regional differences (fig. 6). Of the total of 113 administrative units overlapping the analyzed area (fig. 2), 48% (54 municipalities) have recorded a decline in forest areas, while a rate of 21% (24 municipalities) did not record any dynamics because there were no forest areas in the two years of reference (as noticed, due the spatial resolution of the two sources, the topographical map and Corine Land Cover database).

The strongest negative change is noticed in the municipalities of Jiana (663 ha forest areas lost), Pătulele (540 ha), Vraţa (463 ha), Desa (462 ha), Gogoşu (361 ha) and Piscu Vechi (350 ha) and irrational deforestation is the main cause. The situation is even more complicated considering that most mentioned municipalities correspond to areas with the largest sand deposits in southern Oltenia.

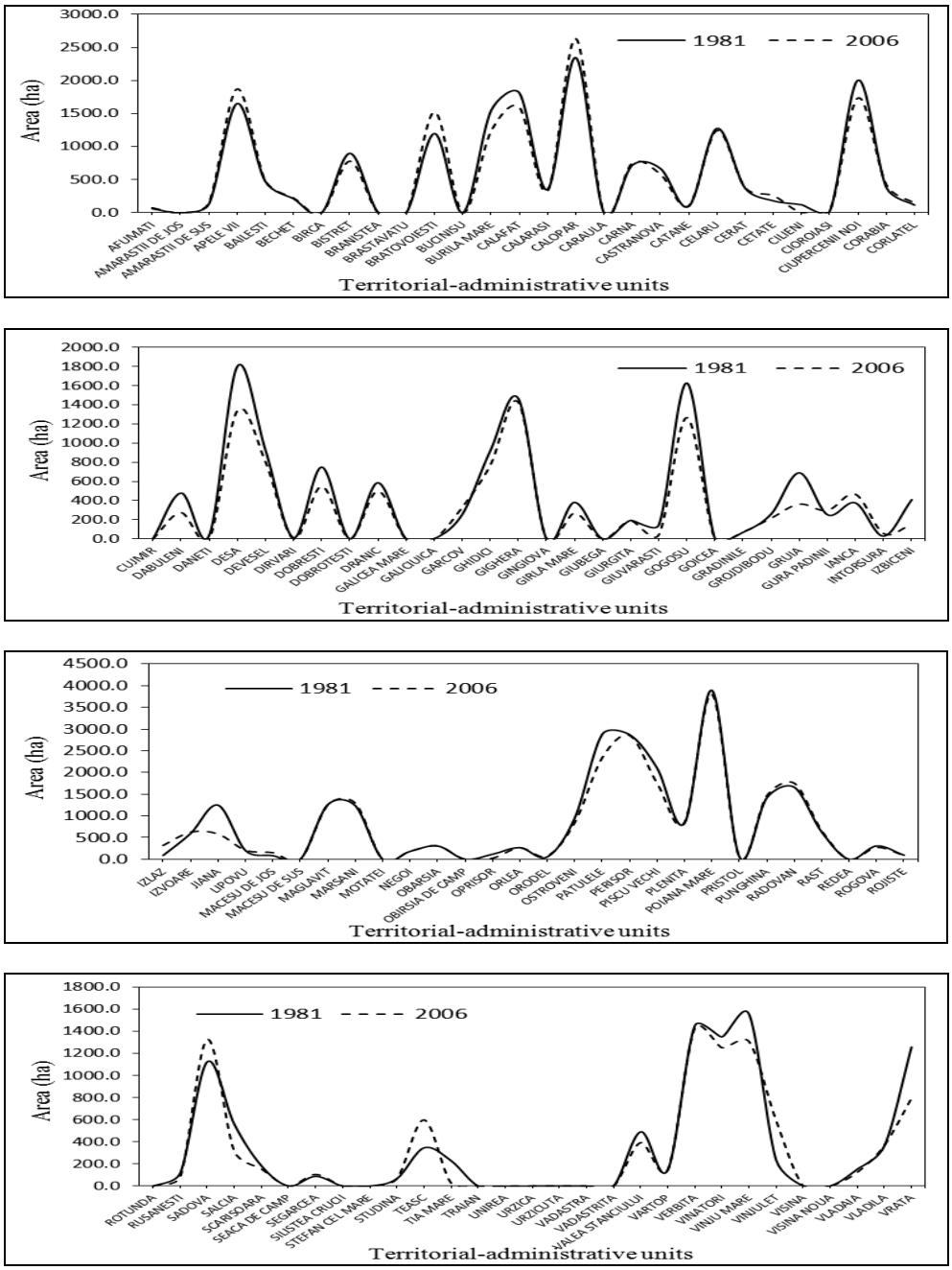

Fig. 6. Dynamics of forest areas (ha) in South Oltenia, at the level of the territorial-administrative units (1981 – 2006)

However, in 31% of the cases (35 municipalities), forest areas recorded a positive dynamics due to both the action of afforestation and the natural regeneration and expansion of some forest ecosystems, especially in the floodplain sectors of rivers. The greatest increase in forest areas (over 200 ha) was recorded in the municipalities of Apele Vii, Bratovoieşti, Calopăr, Izlaz, Sadova, Teasc and Vînjuleţ (fig. 6). In some of them a positive dynamics of forest ecosystems was recorded, especially in Jiu floodplain sector.

5 CONCLUSIONS

Maintaining forest ecosystems in southern Oltenia region is of vital importance as the study area is the most exposed to environmental imbalances at the national level. These imbalances are caused by the phenomenon of aridification which has become more pronounced in last decades. The analysis of spatio-temporal dynamics of forest ecosystems during the last three decades highlights important regional differences. We distinguished intense dynamics especially at the level of the most important key areas. These areas are represented by the case studies analyzed in this paper and require continuous forest cover on larger surfaces, in the context in which there are areas of sand dunes.

From the investigation, one has generally noticed a clear trend of decrease in forest ecosystems, even if growth in the forest areas was recorded in individual cases at the level of some territorial-administrative units. Most of the territorial-administrative units have recoreded a decline in forest ecosystems. In some cases one noticed a drastic situation like in some municipalities located in sand dunes areas: Jiana, Gogoşu, Pătulele, Desa and Piscu Vechi, where total losses of forests in the analyzed period exceeded 2000 hectares (between 300 and 700 ha lost forest areas / administrative unit). An important issue is the situation of a large number of territorial-administrative units where forest ecosystems are completely lacking.

An emergency intervention of policy decisional factors is therefore necessary at both the level of national and local authorities. One of the most viable strategies to fight against environmental imbalances in the region is the aforestation of degraded lands with modern technologies, regardless of the ecological rehabilitation costs.

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THE TOURISM PLANNING MODELS FOR THE SKI AREA PERTAINING TO IGNIŞ - GUTÂI MOUNTAINS

LOREDANA PUI[1]

ABSTRACT. – The Tourism Planning Models for the Ski Area Pertaining to Igniş - Gutâi Mountains. Research shows that mountain tourism is the second international tourist demand because its offer goes beyond seasonal boarders, offering both winter sports opportunities and climbing, rafting or hiking in other seasons. Mountain tourism infrastructure has undergone both a quantitative and qualitative evolution; however, there are a series of dysfunctions in the Romanian mountain tourism facilities. This paper is aimed at developing and exploiting natural and human resources for tourism and promoting a tourist brand to represent the Igniş - Gutâi mountain area as a tourist destination throughout the year. The purpose of this paper is to achieve an integrated tourism development project, by focusing on the competitiveness of mountain resorts and of the ski areas available in the Igniş – Gutâi area, as well as on the innovation of the tourist product and services provided. The patterns of tourism development available for the mountain subsystems and their tourist exploitation contributes to turn Igniş - Gutâi mountain area into an attractive tourist destination.

Keywords: *tourism planning models, ski area, Igniş - Gutâi mountains, mountain tourism*

1. INTRODUCTION

One direction that has become dominant within recent years in the study of human geography in terms of developing mountain facilities is the guarantee of a high level of international standards and competition which thus acquire a complex dimension; therefore, the concept of tourism development will also take into account the current situation as well as the one inherited from the past and consequently tourism development will become an instrument of exploiting and safeguarding the rural environment (Ciangă and Deszi, 2007).

The spatial organization emphasizes the universal relationship between economic, social and spatial planning (Ciangă and Dezsi, 2007) and cannot be approached without a spatial and temporal scale (Ianoş, 2000). The systemic organization of the mountain area contributes to the development of mountain resorts and to the dynamism of the tourism supply and demand. This approach involves the analysis of the potential of natural and human tourism resources and of the existing tourist infrastructure, both quantitatively and qualitatively, and their transformation into tourism products which

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are specific for mountain areas, in order to meet the needs and expectations of customers, of the local population and of competition. Iuga (2012) argues that tourist activity has left its mark on the organization process of certain villages, giving birth to harmonious facilities, well framed within the mountain environment. Thus, rural settlements have an important place in the geographical mountain area as their traditional tourism offer contributes to customize tourism and design a brand to re-launch tourism in the area. The tourism phenomenon is influenced by the distribution of resources in the area of tourism, a reality also noted by Muntele and Iaţu (2003) who argue that no matter how rich the tourism potential might be, the areas or regions that deserve to be supported in tourism development require the best spatial distribution of resources.

Igniş - Gutâi Mountains, situated in the north-west of Romania, in the northern group of the Eastern Carpathians, are central components of the volcanic chain Oaş - Igniş - Gutâi - Văratec - Ţibleş. Mihăilescu (1963) frames Igniş - Gutâi Mountains in the category of small and medium mountains as their maximum altitude only exceeds 1400 m in Gutâi Peak. Mac and Budai (1992) argue that their individuality and mountainous character are given by the difference in height of 500-1000 m above the surrounding valleys. The Igniş - Gutâi mountain area has a particularly high accessibility in the developed and convergent areas, but the isolated areas are accessible only on certain routes.

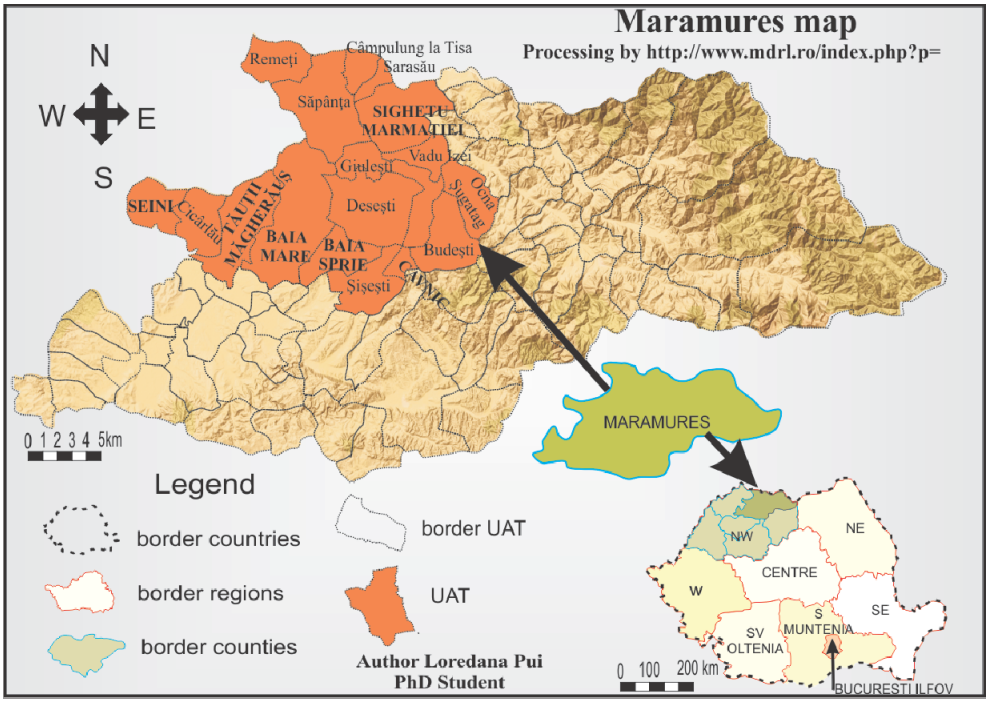

Fig. 1. The Igniş – Gutâi mountain area location

Igniş - Gutâi Mountains were considered an area with restricted tourism activity, and thus did not benefit from competitive cable transportation. The natural resources were more important from the economic point of view than tourism activity. Therefore, tourism equipment is modest both quantitatively and qualitatively as it is reflected by the poor performance of the products and services offered by local mountain resorts. The rehabilitation of the existing infrastructure, the setting up of new means of cable transportation, accommodation facilities, catering and entertainment opportunities would improve the current offer and would create competitive tourism products and services. In addition, the regeneration of the whole tourism phenomenon under a new brand and tourism promotion would revive mountain tourism, as well as other related types of tourism.

2. MATERIALS AND METHODS

This research is part of the scientific trend specific for the last decades, aimed at developing tourism facilities in mountain areas, ski areas, recording attractive resources, and analyzing locally the potential dysfunctions. In this paper, we will follow the traditional geographical approach by using quantitative methods (observation, bibliographic documentation, the mapping method, analysis, synthesis, research conducted in the field and so on), and also the modernist perspective, applying qualitative methods (a comparative study between ski resorts in Igniş – Gutâi area). After identifying the current situation of the territory through diagnosis, we set the territorial system boundaries; the descriptive analysis is correlated with the cartographic material. The identification of the tourism phenomenon specificities and of its paths of development was performed in the regional analysis of the territory. The maps providing the necessary information in the field were made using the Corel Draw program, with the support of the 1:100 000 topographic map. The tourism development project of the Igniş - Gutâi area will comply with the laws in force and the patterns of tourism development in national and international mountain areas.

3. RESULTS AND DISCUSSIONS

Erdeli and Gheorghilaş (2006) see tourism development as an integrating part of the Romanian tourism, containing a number of subsystems connected by functional links in order to increase economic efficiency and social investment. The tourism infrastructure components which will be subject to the process of tourism development are: housing, catering, recreation, entertainment, treatment, tourist information, business, transportation, ancillary services (Ilieş, 2007). The same author highlights certain relationships between tourism potential and the operating system in order to define the tourism phenomenon. While tourism potential is subject to tourism exploration and planning, the operating system must create, promote and sell tourism products. The effectiveness of the tourism phenomenon can be measured by quantifying it into the consumption of tourism products.

The administrative-territorial units of the Igniş - Gutâi mountain area were evaluated according to natural and human resources, tourism and technical infrastructure, in order to determine the tourism development potential of the region (table 1).

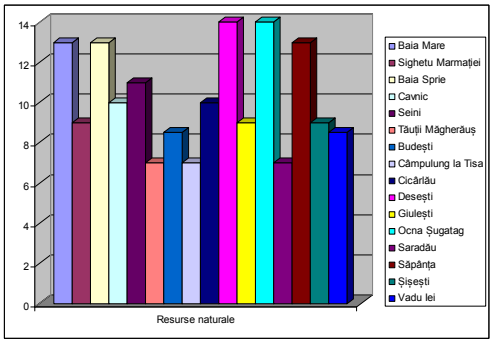

Fig. 2. a. Natural resources(Processing by NSP, Jud. Maramures -Section VI – tourist areas)

The analysis of natural tourism resources (fig. 2. a.) has revealed that Deseşti and Ocna Şugatag administrative units have the most important, varied and numerous natural tourist attractions. They are followed by Săpânţa, Baia Mare and Baia Sprie administrative units. The least represented natural resources are at Sarasău, Câmpulung la Tisa and Tăuţii Măgherăuş administrative units.

Tourism development potential
(Source: NSP, Jud. Maramures-Section VI- tourist areas)

Table 1

No	Administrative-territorial unit	Natural resources	Heritage	Total score tourism resources	Tourism specific infra structure	Technical infra structure	Total score infra structure	Total score tourism development
1.	Baia Mare	13.00	23.00	36.00	2.24	29.00	31.24	67.24
2.	Sighetu Marmaţiei	9.00	21.00	30.00	0.42	12.50	12.92	42.92
3.	Baia Sprie	13.00	16.00	29.00	0.22	16.50	16.72	45.72
4.	Cavnic	10.00	7.00	17.00	0.79	14.00	14.79	31.79
5.	Seini	11.00	7.00	18.00	0.03	24.00	24.03	42.03
6.	Tăuţii Măgherăuş	7.00	15.00	22.00	0.00	19.00	19.00	41.00
7.	Budeşti	8.50	25.00	33.50	0.00	14.00	14.00	47.50
8.	Câmpulung la Tisa	7.00	8.00	15.00	0.00	10.00	10.00	25.00
9.	Cicârlău	10.00	8.00	18.00	0.00	21.50	21.50	39.50
10	Deseşti	14.00	25.00	39.00	0.29	12.50	12.79	51.79
11	Giuleşti	9.00	8.00	17.00	0.05	10.00	10.05	27.05
12	Ocna Şugatag	14.00	16.00	30.00	0.61	12.50	13.11	43.11
13	Sarasău	7.00	8.00	15.00	0.01	10.00	10.01	25.01
14	Săpânţa	13.00	17.00	30.00	0.11	7.50	7.61	37.61
15	Şişeşti	9.00	25.00	34.00	0.03	10.00	10.03	44.03
16	Vadu Iei	8.50	15.00	23.50	0.10	5.00	5.10	28.60

Human resources are well represented in Deseşti, Budeşti, Şişeşti, Baia Mare and Sighet administrative units (fig. 2. b.). The fewest human resources are found in Cavnic and Seini, Sarasău and Câmpulung la Tisa.

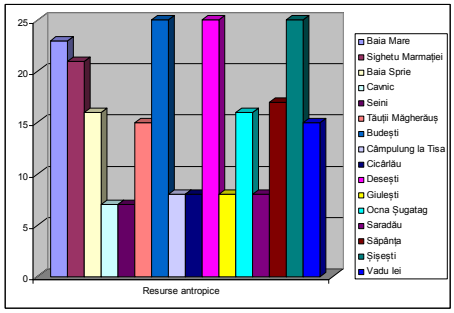

Fig. 2. b. Heritage analysis (Processing by NSP, Jud. Maramures - Section VI – tourist areas)

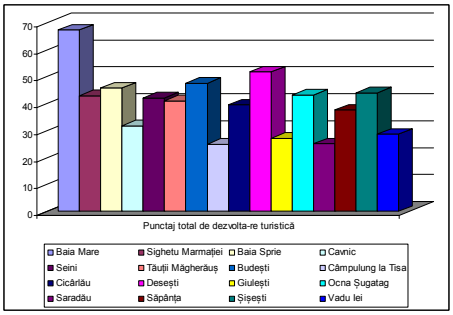

Fig. 2. c. Tourism development potential (Processing by NSP, Jud. Maramures - Section VI – tourist areas)

The sum up of the scores obtained from the natural and human tourism resources evaluations revealed in the fig. 2. c. that Deseşti territorial administrative unit ranks first in the evaluation carried out on tourist development potential.

However, tourism infrastructure is still very poorly represented both from the quantitative and qualitative point of view. Thus, the tourism development of Deseşti, Mara and Hărniceşti settlements is based on valuable existing tourism potential and proposes the improvement of the housing facilities with functions of public accommodation and catering, the capitalization of the technical traditional equipment characteristic of this area, the development of tourist signposting and a tourist information centre, a horse riding facility and an organic sheepfold.

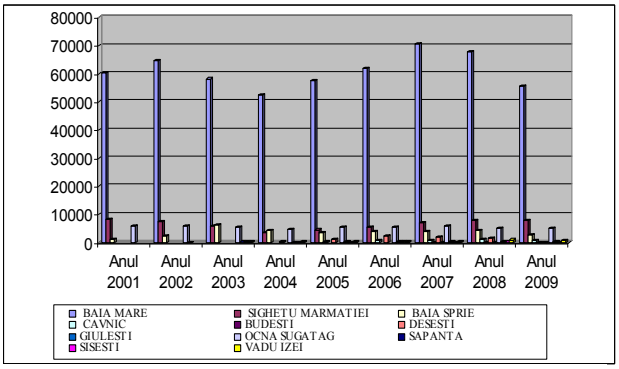

Fig. 3. a. The number of tourists arriving in the Igniş - Gutâi mountain area (Source: NIS, 2010)

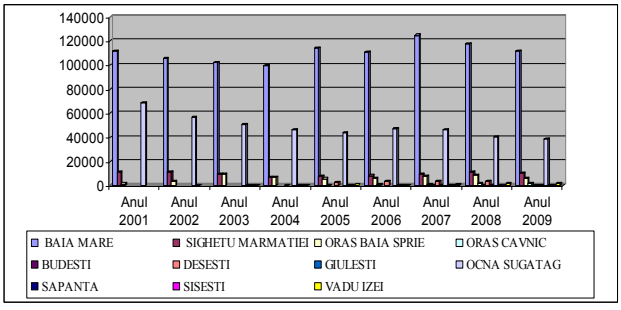

Fig. 3. b. Evolution of the number of days / tourists in the period 2001-2009 (Source: NIS, 2010)

It also aims at developing the Izvoare Mountain resort, under the management of Deseşti administrative unit.

The analysis of the number of tourists (fig. 3. a.) leads to the conclusion that the highest number of tourists chooses Baia Mare as a tourist destination, due to the fact that it has the largest number of tourism accommodation units. The other tourist destinations cumulate a relatively low number of arrivals as compared to the number of arrivals in Baia Mare. The evolution of arrivals between 2004 and 2007 can be observed in the expansion of accommodation facilities. Starting with 2008, we can see a decrease in the number of tourists due to the global crisis which also affected this area.

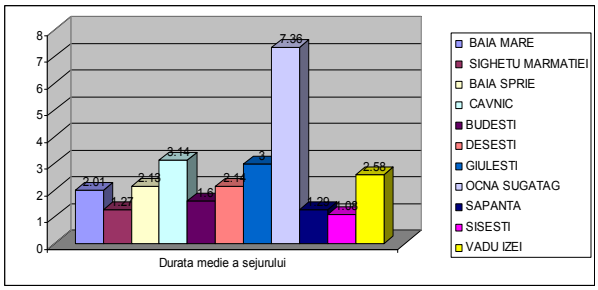

Fig. 3. c. Average length of stay in the Igniş-Gutâi mountain area (Source: NIS, 2010)

Fig. 3. b. shows that the number of overnight stays is directly proportional to the number of arrivals and the number of housing facilities with accommodation functions. The highest percentage is in Baia Mare, followed by Ocna Şugatag. While Baia Mare had a slow evolution from 2004 to 2007, followed by a slight regression in 2008, Ocna Şugatag registered an involution from 2001 to 2003, followed by a stable period. This is due to the constant number of tourists looking for spas with curative and treatment facilities.

The average length of stay is two to three days (fig. 3. c), overlapped with the weekend tourism, a very common phenomenon in this area.

Moreover, transit tourism can also be seen in settlements with an average length of stay of one to two days. In Ocna Şugatag, the average length of stay exceeds seven days due to therapeutic cures and treatments available in spas.

The resorts and ski areas are the most often analyzed and developed targets of the mountain planning projects. Tourism infrastructure and natural and / or human tourism resources contribute to competitive tourism products and services at regional, national, and international level.

The major factor in the development of mountain tourism is sustainable tourist practice, competitive locations and the investment trends in tourism development and planning projects.

The analysis of the mountain tourism resorts is not only a necessity arising from the attempt to understand the territorial organization and planning, but also an academic necessity, emerged from the essence of geographical science.

In fig. 4. we can see the state of affairs of the Igniş – Gutâi ski area and the existing tourism planning and development.

The tourism development of mountain areas offers the opportunity to exploit natural, economic and socio-cultural resources from the point of view of tourism. Their continuous evolution led to the creation of national or global models. In the specialised

Romanian literature (Minciu, 2000, Erdeli and Istrate, 2006, Ţigu, 2001, Ciangă and Deszi, 2007, Ilieş, 2007), mountain tourism development models are classified according to the concentration of facilities or the equipment location apart from the peak.

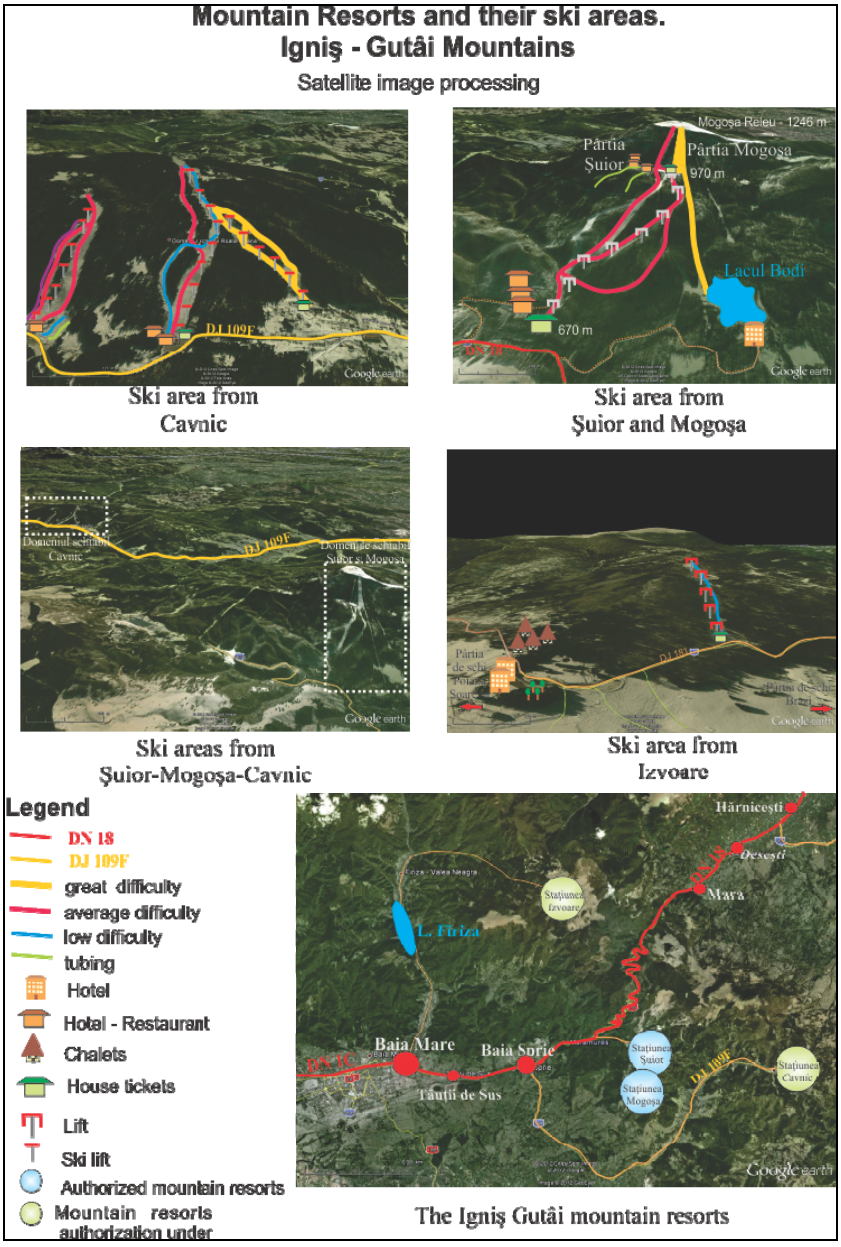

Fig. 4. State of affairs of Igniş – Gutâi ski area

However, the practice of mountain tourism facilities imposed some models which have experienced a permanent evolution since the early twentieth century and up to the present. In Romania, the tourism development of resorts has its own design, meant to attract tourists by exploiting human resources, tradition, winter sports and hiking trails. Seasonality can be removed by using artificial snow cannons, resorts with synthetic ski slopes, expanding grass ski or providing an attractive summer offer mainly based on rural tourism.

Igniş - Gutâi mountain area has a picturesque landscape, an attractive anthropogenic potential and a favourable location which allows national and international tourism flows. The tourism profile of the area is drawn up in the Regional Tourism Development of the North - West Region (PATR), which is a combination of rural tourism, mountain recreational tourism, spa tourism, hunting and transit tourism.

The recognition of the mountain resorts in the Igniş – Gutâi area as tourist destinations for winter sports at regional, national or even international level requires the improvement of the general infrastructure, of the winter sports offer, the restoration and development of tourism infrastructure for mountain tourism. The ski area includes the ski slopes of Izvoare, Mogoşa, Şuior and Cavnic mountain resorts, but also the existing technical and material equipment.

Izvoare resort has a relatively small ski area, represented by Cora, Brazi and Poiana Soarelui ski slopes (fig. 5. a).

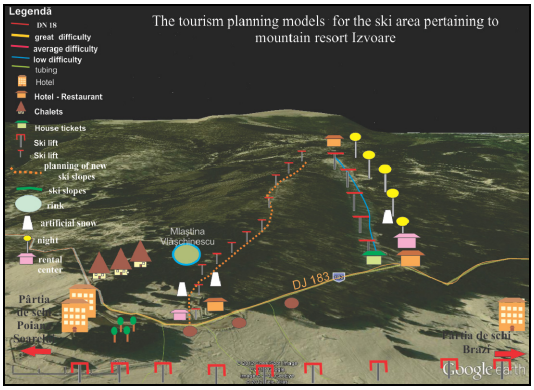

Fig. 5. a. The tourism planning models for the schi area pertaining to Izvoare mountain resort

The morphometric characteristics and climatic conditions are favourable for the development of a new medium difficulty ski slope near Cora slope. The adequate exploitation of Poiana Soarelui and Brazi ski slopes would contribute to the quantitative evolution in the number of tourists by providing ski classes on less steep slopes. There are also favourable conditions to practice cross-country skiing. The tubing park and sledding areas may be extended on the less steep slopes near Izvoare Tourism Complex, with new means of enter-tainment such as horse-drawn carriage rides, snowmobile rides etc.

The tourism development of Cavnic ski area involves a large project, as the Town Council has obtained approval to convert a forest area located on Gutâiul Doamnei into a ski slope (fig. 5. b).

The ski area development also determines the development of parking areas due to the ski slopes location near DJ 109F, new sporting equipment rental shops, more artificial snow cannons, cable car transportation between the ski area and the former mines and opening of a ski school. Creating a local TV and radio station would contribute to the tourists' well-being. In addition, they can also build hotels or hostels near the ski slopes so as to offer tourists the opportunity to extend their stay in Cavnic town and thus to increase the average length of stay and eliminate seasonality.

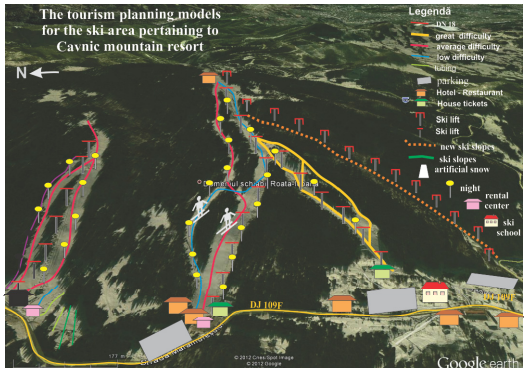

Fig. 5. b. The tourism planning models for the schi area pertaining to Cavnic mountain resort area pertaining to Izvoare mountain resort

The Mogoşa - Şuior tourist area offers three ski slopes of varying difficulty (fig. 5. c). Located near DN 18, the ski areas at Şuior and Mogoşa provide attractive tourism resources for winter sports and opportunities for rest and recreation in summer.

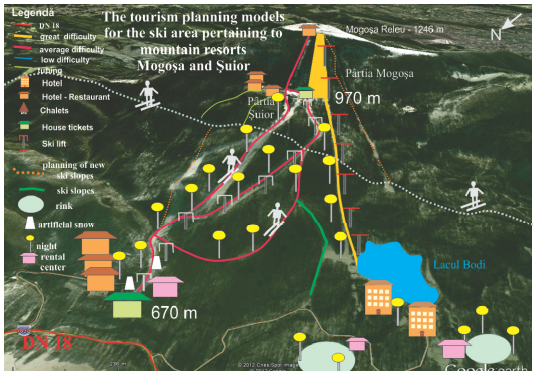

Fig. 5. c. The tourism planning models for the schi area pertaining to Mogoşa and Şuior mountain resorts

The tourism development at Mogoşa - Şuior ski area involves the development of spa centres, two ice rinks, providing snow canons and night equipment for all ski slopes, the development of sports equipment rental centres and the development of marked trails for cross-country skiing. In summer, the resort may become attractive due to the spa facilities, mountain hiking, fishing or pedal boat rides on Lake Bodi.

4. CONCLUSIONS

The paper is aimed at presenting the mountain tourism in Igniş - Gutâi area in terms of mountain resort development in the context of sustainable tourism. Some of the factors which influence the development of mountain tourism in Igniş - Gutâi Mountains and consequently the tourist flow in these resorts are the need for recreation,

rest, spending free time outdoors, practicing winter sports, organizing conferences or symposia etc. Analyzing the number of tourist arrivals and overnight stays revealed that mountain tourism phenomenon can be competitive within the tourist resorts in the Northern - West Region, and the decline registered at national level from 2008 up to now can also be observed in this area. As the ski resorts have several tourism companies providing various competing or complementary services in terms of tourism product components, all units need development plans to be able to promote their products and services.

Igniş - Gutâi mountain area has an attractive natural and human tourism potential and a number of important cultural and ethnographic resources, but tourism infrastructure is unfortunately lacking. The assessment of the ski area and of the accommodation facilities revealed that the products and services provided are not exactly in compliance with the Maramureş authenticity; they are rather aimed at developing the tourism phenomenon with an immediate gain. A balanced development in full harmony with the natural and socio-human environment can only be achieved by a unitary tourism development approach. Based on the pattern chosen by experienced countries and the real progress made in the field of mountain tourism, we have sought solutions and models which allow the capitalization of the natural and human tourism potential and environmental sustainability. The models provided for the ski area development are aimed at developing the mountain area in terms of tourism.

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FORMING AND ASSESSING THE COMPETENCE TO ELABORATE TOPOGRAPHIC PROFILES

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ABSTRACT. – Forming and Assessing the Competence to Elaborate Topographic Profiles. We started our research when we noticed that university students graduating Geography made certain mistakes when building topographic profiles. The objectives of our research were the following: 1) analysing the knowledge integrated into the competence to elaborate topographic profiles; 2) analysing the procedure to elaborate topographic profiles; 3) analysing our students' topographic profiles and their mistakes when elaborating them; 4) analysing the causes of their mistakes; 5) establishing certain competence levels when elaborating topographic profiles, starting from assessment; 6) establishing certain ways to improve the educational process and our students' results. In order to accomplish these objectives, we studied the activity for forming the competence to elaborate topographic profiles and 48 topographic profiles realised by 48 of our students, during the 2012-2013 academic year at the specialisation Cartography. We described this competence and the procedure for its formation. We assessed topographic profiles using an analytic assessment grid with a dichotomous scale that included nine criteria, we identified students' main mistakes and looked for their causes, we established and analysed students' competence level. Finally, we proposed modalities to improve the activity for the formation of this competence.

Keywords: *topographic profile, competence levels, assessment grid and criteria, qualitative results, Geography teaching in higher education.*

INTRODUCTION

The topographic profile is a graphic representation of a vertical land section on a certain terrestrial surface, using a contour line (G. Osaci-Costache, 2008, p. 166) or the intersection of a vertical plan with the terrestrial surface (L. Aruta and P. Marescalchi, 2013, p. 65). In foreign scientific literature, they frequently call it altimetric profile (L Aruta and P. Marescalchi, 2013, pp. 65-84; M. Di Stefano *et al.*, 2011).

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Topographic profiles are useful to study landforms, in territorial planning (G. Osaci-Costache, 2008, p. 166), in physical-geography and geology studies, to establish the accessibility degree of certain touristic routes, to plan and build communication routes, for car racing, athletic sports, ski or for bicycle routes where they use both profiles of the entire route and of each stage. Landform profiles are the starting point for a complex research of landforms (I.A. Irimuș, 1997, p. 29).

Taking into account the fact that it is crucial to have the competence to elaborate topographic profiles manually for future GIS activities, in this study we analysed the formation and assessment of our students' competence. At the Faculty of Geography in the University of Bucharest, students in Geography start to form this competence in their first year of study, the second semester, at the Topography course. Later on, they develop this competence during General Physical Geography courses (when they add new information to the topographic profile, obtaining the complex physical-geographic profile), during Geomorphology, in the second year (when they elaborate the geomorphologic profile), during Geology (when they elaborate the geologic profile), and during courses in other subjects (e.g. GIS).

We started our research when we noticed that, in order to form their competence, students in their first year of study find it very difficult to follow contour lines and to determine their elevation value (essential elements for using GIS later on) and to read landforms interpreting correctly contour lines and obtaining a three-dimensional mental representation of the landforms on maps. Even if during practical activities at Topography students took part at activities where they elaborated a series of topographic profiles using good quality auxiliary materials (a text book for the course and one for practical activities), each year, for each series of topographic profiles elaborated by our students, we identified mistakes, some of them more frequent than other. We noticed these mistakes when students presented their graduation thesis and their scientific papers during symposia and conferences, in the case of profiles realised in GIS, when students accepted without any selection everything that the program "proposed".

As we are interested in our students' formation of their competence to elaborate topographic profiles at the highest possible level and we are also interested in the increase of the educational process concerning the elaboration of these profiles, we established the following objectives for our research: 1) analysing the knowledge integrated into the competence to elaborate topographic profiles; 2) analysing the procedure to elaborate topographic profiles; 3) analysing our students' topographic profiles and their mistakes when elaborating them; 4) analysing the causes of their mistakes; 5) establishing certain competence levels when elaborating topographic profiles, starting from assessment; 6) establishing certain ways to improve the educational process and our students' results.

In order to accomplish the objectives of our research, we organised an activity for forming the competence to elaborate topographic profiles during practical activities at Topography and we analysed and assessed 48 topographic profiles realised by our students during an assessment activity reflecting the competence level our students reached. We focused on the qualitative results of our research – the assessment grid that we conceived and applied, students' mistakes and their causes – and quantitative results were only secondary. We think that these qualitative results could be relevant to improve the educational process and students' results in other contexts too.

THEORETICAL FRAMEWORK

In order to describe the competence – the first objective of our research – we started from the statement that a competence included a sum of declarative, procedural, and attitudinal knowledge that somebody activated when planning and solving a task (R. Brien, 1997). Moreover, a "competence is the capacity to explore one's own knowledge in order to solve a task" (M.E. Dulamă, 2009, p. 246).

When describing the competence to elaborate topographic profiles, we considered as a guide the analytical way of presentation used by M.E. Dulamă (2009, p. 247, p. 410; 2010, p. 323) who gave details in a table about the knowledge integrated into a certain competence (declarative, procedural, and attitudinal knowledge). When describing the procedure, we also used as a guide the one that M.E. Dulamă (2010, p. 323) and G. Osaci-Costache, M.E. Dulamă, and O.R. Ilovan (2013, pp. 169-171) presented using stages and steps. As in the scientific literature in our field we have not identified such analytical-descriptive presentations of a subject-specific competence, our research covers a theoretical and methodological gap. When forming the respective competence we followed the model for competence formation proposed by M.E. Dulamă (2011, p. 100), and structured into six stages: i) the preparation (cognitive) stage; ii) the realisation (associative) stage; iii) the integrating-self-assessment (initial assessment) stage; iv) the stage of re-doing the product or of repeating the action; v) the final assessment stage and vi) the stage for using the competence.

In order to assess the competence, we used an analytical assessment grid with a dichotomous scale that included a series of criteria and a list of noticeable elements (indicators) associated with each criterion (M.E. Dulamă, 2010, p. 86, p. 105; 2011, pp.106-107, pp. 120-122, G. Osaci-Costache *et al*., 2013, pp. 173-174). In order to establish the competence level, we used as a guide the assessment grids presented by M.E. Dulamă (2013, p. 69). We have not identified either studies on assessing this competence using such grids or on establishing the competence level and that is why again our research fills in a gap in the respective scientific literature.

We considered the main features of a topographic profile and the fact that it was a graphic where, on the abscissa, we mentioned distance values and, on the ordinate, the elevation values for a certain section of the territory (M. Di Stefano *et al.*, 2011, p. 1). We underlined that the line "transecting" the respective land pointed out the aim of the person realising the topographic profile (e.g. to establish the difficulty of a touristic route in the mountains, one had to follow the path) and it was not compulsory that the line was perpendicular on the contour lines as in the case of geomorphologic profiles. We focused on this idea when teaching as in scientific literature we identified also contradictory opinions that considered that for topographic profiles "it was necessary that one drew the line of the profile on the topographic map perpendicular on contour lines" (M. Grigore, 1979, p. 38).

MATERIAL AND METHOD

Subjects and contents of research. We studied the topographic profiles realised by students graduating Cartography at the Faculty of Geography in University of Bucharest, in the 2012-2013 academic year. There were 48 students in the three groups of Cartography: 17 students in group 111 (35.42% of the total number of students graduating

Cartography), 15 students in group 112 (31.25%), and 16 students in group 113 (33.33%). These students represented the entire population that attended the lectures and practical activities in Topography with the same professor, they used the same text books for lectures and practical activities. We did not take a sample of this population as we considered that in order to reach the objectives of our research it was better to include all students and to analyse all their topographic profiles. Among the students that were part of this population (the subject variable) there were differences in what their initial education was concerned (competence level and knowledge level) and this fact influenced the quantitative results of our research and their generalisation. As we limited our study to one Faculty of Geography only, it was possible that statistical results were not representative for any population or sample of students graduating Geography. Despite the fact that each student elaborated eight profiles during practical activities, as an exercise in order to form his/her competence (thus resulting 384 profiles), we analysed only students' "final" profiles (one for each student) that they realised so that we might assess their competence and give them marks. That was why this study included all the 48 profiles that our students realised during the final assessment activity. Statistically, these topographic profiles were a representative sample for the analysed population, with a confidence interval (also called margin of error) of ±0.1% for a confidence level of 99% (we realised the calculations using applications available on-line:

http://www.surveysystem.com/sscalc.htm;
http://www.smarquest.ro/ro/resources.html).

Method. In order to analyse the competence to elaborate topographic profiles, we gave details and presented in annex 1 the internal resources (F. Voiculescu, 2010) or the knowledge integrated into the competence (*cf.* M.E. Dulamă, 2009, 2010). We generated the information in annex 1 after analysing and reflecting on our own competence to elaborate such charts and not too much on the basis of scientific literature.

We asked students to be involved in an activity of integration for forming the competence to elaborate topographic profiles where they observed the procedure for elaborating these profiles. This activity had the role of independent variable and we planned and organised it according to the model presented before. The integration activity for forming the competence to elaborate topographic profiles had the following stages:

a. Presenting theory. During our lectures, we explained how they should represent landforms through the contour lines method, we gave examples of topographic profiles (manual and computer-assisted ones) in slide-shows realised with PowerPoint and we created with students a heuristic dialogue starting from these. We also underlined the unusual use of topographic profiles for geographers (e.g. how to plan bicycle, motorcycle and car circuits, how to plan a touristic route for children and one for disabled persons, etc.) in order to make students understand the practical significance of these profiles.

b. Explaining how to elaborate topographic profiles. During practical activities, we explained how to build topographic profiles. We provided students with a text book for practical activities (G. Osaci-Costache, 2008), including both theory (what topographic profiles were, what was their use, what were the stages for building them), and 15 proposals for applications for topographic profiles. We explained to students *how to realise topographic profiles manually* on millimetre paper. In order to solve tasks, during their activity, students realised the process we gave details for in annex 1.

c. Presenting and realising the task. Although many students had the text book for practical activities, a week before the activity, we published the procedure on the page of the "Opengis" educational project (http://opengis.unibuc.ro), within the section on Topography. We told them that, in order to use time efficiently during practical activities, they should observe the construction stages from a written text (in the rhythm the professor gave explanations) and that they should not lose time writing them. Also a week before we gave students the black and white topographic plan (figure 1) on which they worked during the first two hours session (we printed the plan in order to avoid changes of scale as in the case of retrieving it from the "Opengis" page), and each student had to make one copy (format A4) of this plan for practical activities, without changing its scale. For the second session (also two hours), we used (colour) topographic maps belonging to the Cartography Lab. We told students which was the task they had to solve during our class (table 1) in order to form their competence. Students needed: millimetre paper, forwarder, black pencil, eraser, a white sheet of paper, coloured pencils, topographic plans and maps. The didactic activity lasted for four hours at each group, that was two sessions of practical activities.

Tasks for practical activities classes

Table 1.

Task	Time for work at the faculty	Realised topographic profiles
Task 1: Build on millimetre paper, using a pencil, a transversal topographic profile between points A and B using the offered topographic plan (the scale is 1:20,000; the equidistance of the normal contour lines is 20 m). For the vertical scale of the profile, choose an exaggerated scale (1 cm = 20 m). Note: the professor established points A and B and they were the same for all students in the group.	During the first practical activities session for elaborating profiles	1 profile
Task 2: Build on millimetre paper, using a pencil, a longitudinal topographic profile between points C and D using the same topographic plan. For the vertical scale of the profile, choose an exaggerated scale (1 cm = 40 m). Note: the professor established points C and D and they were the same for all students in the group.	During the first practical activities session for elaborating profiles	1 profile
Task 3: Build on millimetre paper, using a pencil, a transversal and a longitudinal topographic profile (with a length of 5 km in the field) between two points that you choose, using the same topographic plan. Notice the exaggerated vertical scale of the first two profiles you realised and choose a normal vertical scale.	During the first and second practical activities sessions for elaborating profiles	2 profiles
Task 4: Build on millimetre paper, using a pencil, a transversal or a longitudinal topographic profile (with a length of 5 km in the field) between diverse points that you choose, using topographic maps with the following scales: 1:25,000, 1:50,000, 1:100,000, and 1:200,000. Choose for each of them a normal vertical scale or a very little exaggerated one.	During the second practical activities session for elaborating profiles	4 profiles

d) *Verifying the formation of the competence to build topographic profiles* (topographic profiles – dependent variable) was the activity we realised immediately after the two sessions (four hours altogether) targeting the formation of the competence. We assessed it during an assessment test lasting for 30 minutes and that we announced our students about two weeks before. For this assessment (a topographic profile realised manually at first sight, on millimetre paper, between two points that the professor chose on a 1:25,000 scale topographic map; figure 2), the maximum *number of points* students could receive (for the final mark at this subject matter) was 1. Students copied maps at the beginning of the practical activities class (they delegated one of their colleagues to go to the copy centre). Those (white and black) maps already had the profile lines drawn. The assessment was organised on three rows.

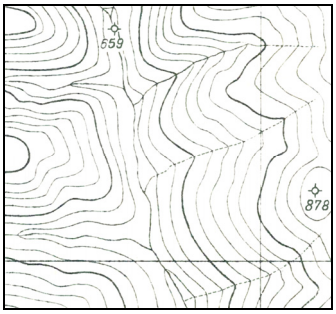

Fig. 1. Fragment of the 1:20,000 scale topographic plan used in order to solve the first two tasks

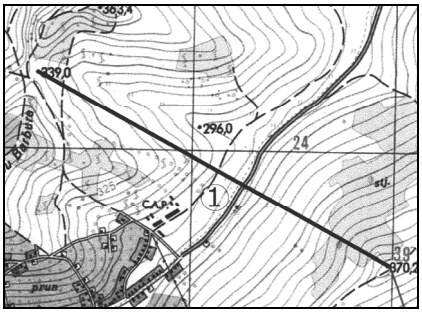

Fig. 2. Fragment of the topographic map (1:25,000) used during assessment

In order to analyse the topographic profiles elaborated by our students, we conceived and used an analytical assessment grid with a dichotomous scale. This assessment tool included nine assessment criteria. To simplify assessment, we used abbreviations for indicators (table 2). Taking into account the features that topographic profiles should have had, for each criterion we mentioned one or more indicators (noticeable elements or descriptors).

Analytical assessment grid with a dichotomous scale for topographic profiles

Table 2.

Criteria	*Abbreviation*	*Indicators/noticeable elements/descriptors*	*Points*
Correctnes s of the profile line	C	The student determined correctly the value of the contour lines. The student determined correctly the elevation values. The student determined correctly the elevation value where the thalweg is intersected. The student drew correctly the profile line.	0.4

Vertical scale	VS	The student chose the extreme values of the scale close to the extreme height values of the profile. The student wrote height values using a constant unit. The student wrote rounded values in the divisions of the vertical axis. The student wrote the explanation of the altitude.	0.05
Horizontal scale	HS	The student represented correctly the horizontal graphic scale of the profile (either directly on the horizontal axis, or nearby, according to case). The student wrote correctly the measurement unit.	0.1
Vertical exaggeration	Ex	The student realised the profile with an appropriate exaggeration according to the equidistance of the contour lines, to the map scale, and to the landforms.	0.1
Cardinal orientation of the profile	O	The student wrote correctly on the profile the cardinal orientation (with abbreviation and correctly in relation to the used map).	0.1
Writing the toponyms	WT	The student wrote correctly the toponyms (their names and place on the profile).	0.05
Title	T	The title renders location, route of the profile, cardinal orientation and the profile type (longitudinal, transversal, complex) if necessary.	0.1
Measurement unit for elevation values	M	The student wrote the measurement unit (m) on the vertical axis.	0.05
Layout and aesthetics of the profile	Ae	The student used a correct layout on the page. It has all the necessary elements (e.g. hachures, position of placing the cardinal orientation) and they observe aesthetic rules.	0.05
Total			1 point

In order to assess profiles, we realised a synthesizing table (table 3). As we had noticed during previous years that the number of mistakes was lower than of the elements realised correctly, we preferred to mark with X when students did not observe the indicators for criteria (they made mistakes), and we obtained the mark by deducting mistakes from the maximum possible number of points.

Fragment of the table used for assessment

Table 3.

Group 111	*Criteria and points for each criterion*									
	C	*VS*	*M*	*HS*	*T*	*O*	*WT*	*Ae*	*Ex*	*Total*
	0.4	*0.05*	*0.05*	*0.1*	*0.1*	*0.1*	*0.05*	*0.05*	*0.1*	*1*
Student 1				X					X	0.8
Student 2		X	X				X		X	0.75
Student 3		X		X	X	X		X		0.6

FINDINGS

1) We presented the *knowledge integrated into the competence to elaborate topographic profiles in* annex 1. In the category of declarative knowledge, we included eight concepts, four profile types, and 23 rules that students had to observe when elaborating topographic profiles manually. We included three attitudinal knowledge actions and five procedural knowledge actions integrated into this competence.

2) We presented the *procedure to elaborate a topographic profile* in annex 1. In the procedure to use the competence, we established three stages, each of them including several steps.

3) *Students' mistakes when elaborating a topographic profile*. To analyse and assess correctly and efficiently topographic profiles, we used the analytical assessment grid with a dichotomous scale (table 1). In figure 3, one may notice that of the total of 150 mistakes the 41 students made (that did not observe one or more criteria), the most frequent ones were the following: mistakes related to the horizontal scale of the profile (HS = 16.67%; 25 mistakes); no measurement unit on the elevation scale (M = 16%; 24 mistakes); wrong writing or not mentioning the cardinal orientation directly on the profile (O = 14%; 21 mistakes); aesthetics of the topographic profile and/or wrong layout on the page (Ae = 14%; 21 mistakes); no toponyms or writing them incorrectly (WT = 13.33%; 20 mistakes); much too big an exaggeration of the profile (Ex = 11.33%; 17 mistakes); giving an inappropriate title or no title (T = 10%; 15 mistakes).

Other two mistakes were less frequent: inappropriate values for the elevation scale (VS = 3,33%; 5 mistakes) and correctness of the profile line (C = 1,33%; 2 mistakes). For the whole specialisation of Cartography (figure 4), the lowest number of mistakes were at group 113 (39 mistakes; 26% of the total number of mistakes), followed by group 111 (49 mistakes; 32.67%), and by group 112 (62 mistakes; 41.33%).

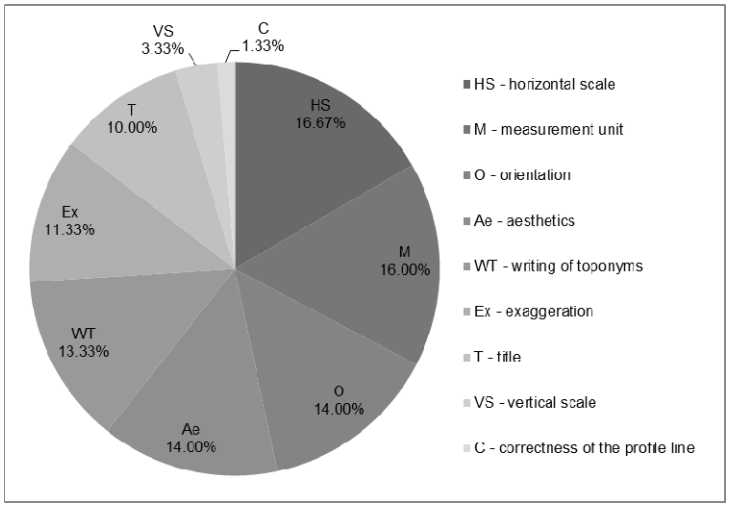

Fig. 3. Frequency of mistakes, grouped on criteria. For details on the legend, see Table 2

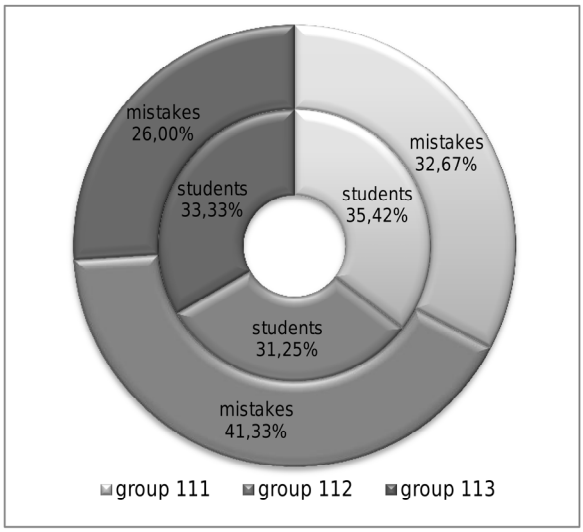

Fig. 4. Repartition of students and mistakes, on groups

In figure 5, we noticed that there were differences between the frequency of mistakes related to different criteria at the three groups. For instance, the distance scale had 30.77% of the mistakes at group 113, 14.29% at group 111, and 9.68% at group 112. Groups 111 and 113 made no mistakes related to the correctness of the profile line, while at group 112 we noticed that 3.23% of the mistakes of this group were related to this criterion. The lowest number of mistakes related to layout on the page and the aesthetics of the profile were at group 111 (8.16% of the total number of mistakes at this group), while at group 112 students made three times more mistakes, reaching to 20.97% of the mistakes at this group. Related to the exaggeration of the profile, with the lowest number of mistakes were the profiles belonging to group 113 (with only 5.13% of the total number of mistakes), and with the highest number of mistakes were those at group 111 (18.37% of the total number of mistakes at this group). For all three groups, the most uncommon mistake was related to the vertical scale of the profile (between 2.56% and 4.08%).

4) *Causes of mistakes in elaborating topographic profiles*.

(a) Some of these causes related to students: low synthesis capacity; their daily level of fatigue; low level of aesthetic education; students' current behaviour (no attendance to lectures; self-sufficiency; lack of interest; lack of attention to professors' explanations; attending lectures without writing; their habit to use information without quoting the source; not observing requests and rules; considering that it was not important to observe the requested rules and steps; students' deficiencies in perceiving correctly distance, elevation, surface; students' deficiencies in perceiving correctly the real situation, from the field.

(b) Some causes related to the curriculum in the pre-university system: no activities related to cardinal orientations during high school; in high school they did not learn to observe rules and to follow certain steps when solving tasks.

(c) Some causes related to the organising of the educational process: placement of practical activities classes at the end of the day when students were already tired; no drawing classes during high school; relatively many students in each group; only one hour for the lecture in Topography scheduled as a two hours lecture every two weeks and this situation interrupts the rhythm of teaching and of correlating the lecture with practical activities.

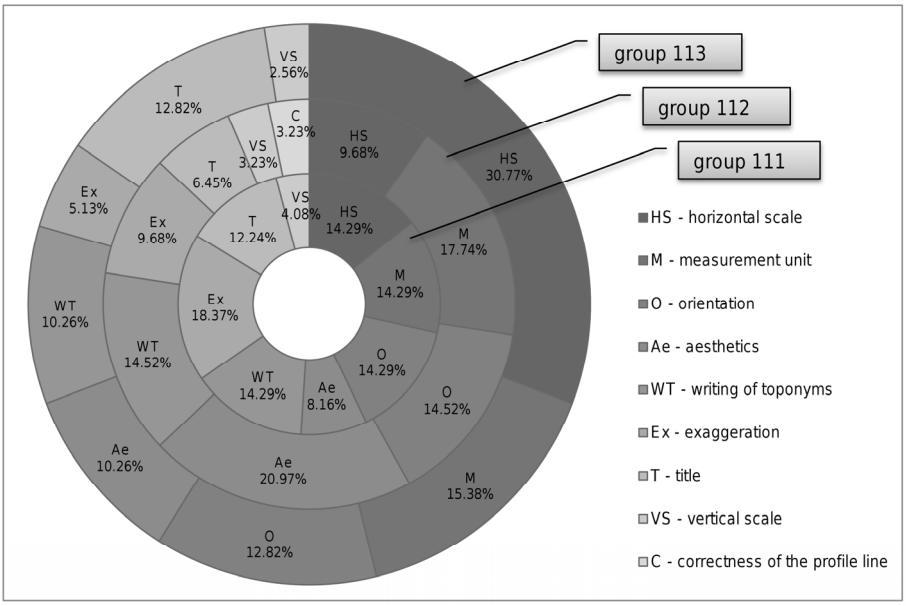

Fig. 5. Comparative situation of mistakes, criteria, for the three groups of students graduating Cartography specialisation. For details on the legend, see Table 2

5) *The competence level in elaborating topographic profiles*. We established four competence levels in elaborating topographic profiles (figure 6): incompetence (0-0.5 points or under 50% of the total number of points); inferior competence level (0.51-0.7 points, that was 51-70% of the total number of points); average competence level (0.71-0.94 points, that was 71-94% of the total number of points); superior competence level (0.95-1 points, that was over 95% of the total number of points). More than half of the students (56.25%) had an average and superior competence level (the average competence level predominated – that was the case for 16 of our students), while only 18.75% were incompetent.

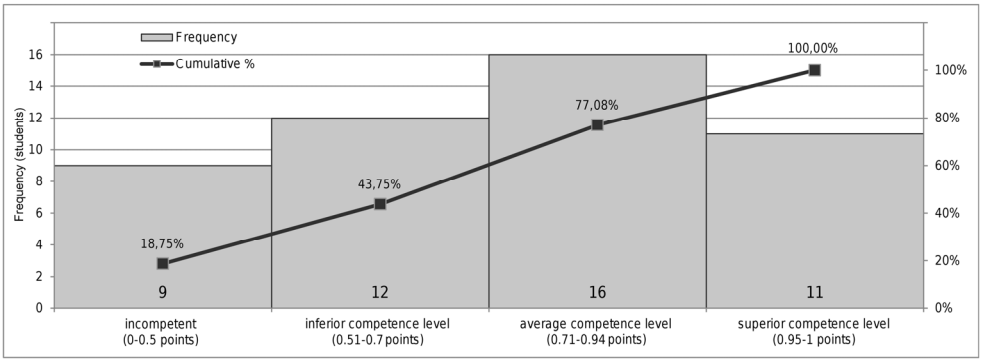

Fig. 6. Frequency of the four classes of points for the research subjects and competence classification

6) *Ways to improve the educational process and students' results.*

(a) Some of these modalities belong to professors: optimum scheduling of Topography classes in their timetable; determining students to attend lectures and practical activities classes; asking them to write; asking them to observe the given requests and rules; when teaching, insisting on those aspects that caused the most mistakes; discussing with students the assessment grids used to assess them before elaborating topographic profiles; creating and offering students a check list correlated to the assessment grid; students' undergoing the two assessment stages mentioned in the model for the formation of the competence: initial assessment and final assessment (M.E. Dulamă, 2011, p. 100).

(b) Some of these modalities belong to students: paying more attention to professors' explanations and directions and to those from the recommended literature; observing rules and steps; paying more attention to assignments within tasks and observing them.

DISCUSSION

1) Analysing the knowledge integrated into the competence to elaborate topographic profiles. Using the analytical way of presentation (annex 1) offered us a series of advantages: breaking down the competence into the pieces of knowledge necessary for students to activate in order to elaborate a topographic profile and prove that they had this competence helped us analyse and make sure that students had in their own knowledge base all the knowledge integrated into that competence. Classifying the knowledge integrated into the respective competence according to three categories (declarative knowledge, procedural knowledge, and attitudinal knowledge) was useful to distinguish rigorously the necessary concepts, types of profiles, rules that our students should have observed, the attitudes they should have had while achieving competences and solving tasks.

During the process of identifying the components of a competence, we had to cope with the difficulty of naming competences because, in this case, we helped students form and develop five competences: (a) the competence to extract the necessary data from maps or from topographic plans; (b) the competence to establish an appropriate elevation scale; (c) the competence to draw the profile line within a Cartesian system of axes; (d) the competence to elaborate the legend if it was necessary; (e) the competence to finish the profile with all the necessary elements. When describing these competences, we had to select one of the following two possibilities: describing the five competences separately or describing the five competences in an integrated manner. We selected the second variant because when elaborating profiles all these competences were necessary.

Despite these difficulties and the possibility of existing different opinions about the knowledge integrated into the competence to elaborate topographic profiles, we considered that this way of presentation of the knowledge integrated into that competence allowed creating instruments that determined an increase in the efficiency of professors' and students' activities for forming and for developing competences. This instrument is necessary and useful in both the planning and organising stage of the forming activity and in the stage for assessing the competence.

2) Analysing the procedure to elaborate topographic profiles. We gave details on the procedure that students elaborating topographic profiles underwent and we systemised it into stages and steps (*cf.* M.E. Dulamă, 2010, p. 323). This description was useful for us during the planning and organising stage of the integrating activity for the formation of this competence because we made sure that we underwent the process in the described order, without omitting any sequences. When we described the procedure, we selected from the following two descriptions used in scientific literature (M.E. Dulamă, 2009; 2010, p. 323; G. Osaci-Costache *et al.*, 2013): the one in which we could use the imperative verb (e.g. "Draw") and the one in which we could use the noun ("drawing"). We chose the first variant so that we got as close as possible to the procedure that the professor used face to face with students during the activity of forming the respective competence.

We fragmented the activity for forming the competence in reality so that we discussed some issues during our lectures and others during the practical activities classes (table 1) and this determined the existence of a period when students started to forget especially in the case of students who did not read the text book for the course or who did not take notes during our lectures. During practical activities, after evoking certain previous knowledge, necessary for the formation and development of the competence to elaborate topographic profiles, students received the task and solved it undergoing the procedure described in annex 1. During this activity, we monitored students and they received feedback (also when not asking for it) individually in order to correct mistakes.

Starting from our previous experience, we noticed that the formation of the competence to build topographic profiles was easier and might be kept for a longer time (a proof was our colleagues' feedback, those who taught Geomorphology in the second year of study) if the theme was associated to extracting the hydrographical network and realising a relief map. Thus, the subject "topographic profiles" was included

in a module of practical activities in Topography after teaching during our lectures the theoretical notions related to representing landforms using the contour lines method. This model included the following activities:

(a) *Extracting the permanent and temporary hydrographical network* (2 hours) using a white and black 1:20,000 scale topographic plan (in Romania, representations with a scale of 1:20,000 and below this value are called plans, while representations with a scale higher than 1:20,000 – such as 1:500,000 – are called maps) that included only elevation values, contour lines (without values) and part of the hydrographical network (figure 1). Students focused on identifying the temporary hydrographical network (that was not drawn on the map/plan) and the flow orientation that they deduced by interpreting differences in elevation values and the arching of the contour lines from downstream to upstream.

(b) *Realising a relief map* (4 hours) using a colour 1:25,000 scale topographic map, on an area of 9 km^2. This task required that students identified the value of each contour line and followed it (G. Osaci-Costache, 2011, p. 39).

(c) *Realising topographic profiles* (4 hours) by first using the 1:20,000 scale topographic plan from which they extracted the hydrographical network (figure 1) because – except the grid (also called the rectangular of kilometric network) – there were no other such elements (i.e. lines) that might have confused them (e.g. transport network, electrical, aerial, transmission lines, pipes). During this stage, students determined the values of contour lines knowing the equidistance of the intermediate contour lines and elevation values. After they realised four profiles on this map, they worked on colour topographic maps with diverse scales (1:25,000; 1:50,000; 1:100,000; 1:200,000) and with diverse equidistance of the intermediate contour lines, from each map realising a 5 km long (in the field) profile. The 1:25,000 scale map that they used during classes for exercises was the same map from which they realised the relief map, and they elaborated the profile having in front of them also that relief map they had realised before. We assessed whether our students achieved this competence during a previously announced assessment test. We wanted that the maps during the assessment test, that our students saw for the first time, were simple, without many elements that could confuse them (figure 2), taking into account the fact that they studied conventional signs only in the second semester of their first year of study, at Cartography.

Because our students had graduated no GIS course before, they realised the topographic profile manually, but during the lecture we also showed them the way to obtain it working directly in the Open Source GRASS program and underlining that it was essential that geographers or cartographers that digitised contour lines followed them without making any mistakes and wrote correctly each elevation value in the attribute table because otherwise the program will provide wrong results.

Taking into account the fact that nowadays we realised topographic profiles in a GIS program, we focused on understanding the way we realised profiles and not on their aesthetics. That was why we did not ask our students to draw profiles with china ink. The aim was that students formed their competence to realise a topographic profile from any contour map especially at the mental level, immediately after they looked at such a map, so that students were not only able to read maps at once, but they also anticipated the result of the GIS program and noticed possible mistakes (caused by

incorrect digitising of contour lines or by something else). In order to offer assistance, students worked only during our classes, at the faculty, but we also offered and recommended topographic maps (on the Opengis educational platform) for those who wanted to finish their activity at home with other profiles.

3) Analysing the mistakes university students make in elaborating topographic profiles. We analysed topographic profiles using the assessment grid in table 2. This tool helped us assess students' topographic profiles in a correct, uniform, and objective way.

Some of these mistakes were more frequent than others. The most common mistakes related to the horizontal scale of the profile (up to 30.77% of the total number of mistakes for group 113). In fact, 99% of the students in this group wrote the distance scale, but in a fractional or verbal form, not in a graphic form as they should have.

Many students did not write the measurement unit for elevation values, and some of them did not write what they represented on the vertical axis, the elevation values (16% of the total number of mistakes). In other countries (e.g. Italy), the writing on the elevation axis is even more detailed compared to Romania, by adding the mentioning "s.l.m.", meaning "above sea level".

Correct mentioning of the cardinal orientation for the profile (directly on the drawing, not in the title) was a request that almost 43% of our students had difficulties to observe. The most common mistakes were: lack of orientation, writing it nearby the profile and not at the ends of the profile, writing it only in the title, not on the profile too (figure 7), wrong abbreviations (e.g. N-N-W instead of NNW), wrong orientations (e.g. NW at one end of the profile and S at the other end).

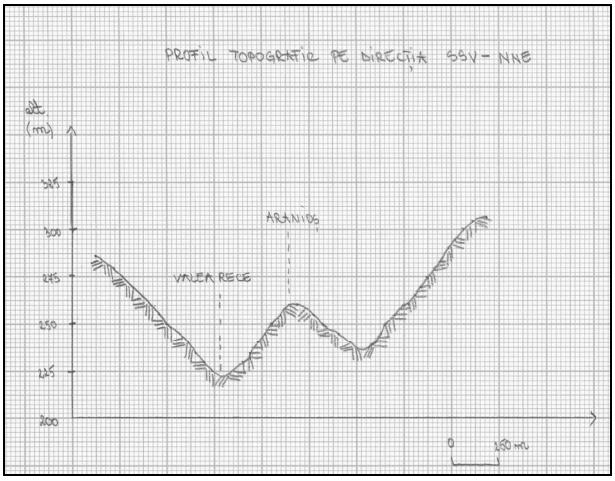

Fig. 7. Topographic profile with an incomplete and uncentred title, without orientation near the profile line, anaesthetic placement of the graphic scale (subject 3 in group 113)

Layout on the page and the aesthetics of the profile was deficient for about 40% of our students, their main mistake being placing the profile in a corner of the millimetre paper and writing the title centred in relation to the page and not to the profile. Although in the practical activities text book there were many examples, in addition to the ones we showed during classes, 14% of the mistakes consisted of incorrect placement of toponyms or omitting to write them. Incorrect placement meant absence of location through interrupted vertical lines and no writing of toponyms on the West-East direction. Some of the students used arrows or wrote using *Italic* (figure 8) or they wrote under the profile line, etc., not observing the rules we presented them.

Too big an exaggeration of the profile (figure 9) was mainly a result of students' fear to make mistakes adopting another elevation scale than the one initially imposed by the task, because students made mistakes at this criterion during assessment and we drew their attention several times during practical activities classes to adapt the elevation scale.

Students' mistakes related to title consisted of no title or of an incorrect phrasing that did not allow us to identify the route, the represented place, and the topographic profile type. Here are some examples: "Transversal topographic profile from the Căpoşi Hill to the 240 m contour line on the WSW-ENE direction", "Direction WNW", "Profile realised on the NW-SE direction", "Contour lines profile", "Topographic profile of the Bouraş Hill".

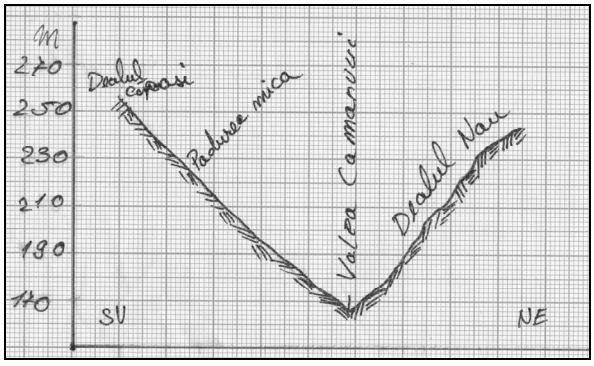

Fig. 8. Anaesthetic topographic profile, untidy aspect, with a big exaggeration of the elevation scale, deficiencies of values on the elevation axis (no value in the origin of the axis, no gradation signs), toponyms placed incorrectly (subject 9, group 112)

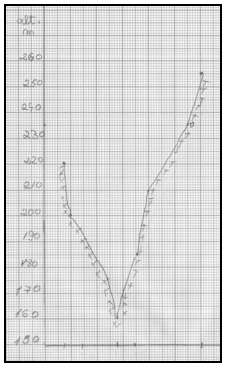

Fig. 9. Unfinished, anaesthetic topographic profile, with much too big an exaggeration (subject 13, group 112)

Related to the vertical scale there were students that chose the inferior limit much too low as compared to the minimum value of the elevation on the profile (remaining much too large a space between the horizontal axis and the profile line),

much too close to this value (in this case the profile line touched the abscissa). Another mistake was marking unequal intervals on the elevation scale.

Students learnt the procedure to extract data from the topographic map and how to draw the profile line, and only two students drew incorrectly the profile line. In both cases the mistake consisted of decreasing the altitude of the contour lines also after the intersection with the hydrographical organism, so that on the millimetre paper they represented what seemed to be a slope while they had to represent a transversal valley profile instead.

4) Analysing the causes of mistakes in elaborating topographic profiles. During our research, we were interested in identifying the causes that determined differences between students' results and their competence level. We identified certain causes by noticing students' current behaviour: their daily level of fatigue; no attendance to lectures; self-sufficiency; lack of interest; lack of attention to professors' explanations; attending lectures without writing. We deduced some causes by analysing and interpreting profiles: certain students' lack of aesthetic sense; low synthesis capacity; not correlating the information we gave them during lectures with the ones during practical activities classes; no observation of given requests; inappropriate perception of the real situation in the field; wrong perception of distance, elevation, and surface. Talking to our students, we identified other causes: many students confessed that during high school they did not work with cardinal orientations and they could hardly remember them from the secondary grades; other students said that they did not consider important to observe rules and steps, and observing those was a novelty for them as nobody told them to do that during high school.

We identified the causes that we could not eliminate: no drawing classes during high school; relatively many students in each group; the fact that during high school they had not taken part at activities necessary for the formation of this competence; certain students' lack of aesthetic sense. We identified the causes that we might probably eliminate: bad scheduling of Topography classes in their timetable; no external obligation for students to attend lectures and practical activities classes; no request to write; no request to observe the given requests and rules.

5) ***Analysing the competence level*****.** Using this grid (table 1 and 2) allowed us to assess objectively students' topographic profiles. Each profile they realised during the test received between 0 and 1 point, the maximum (total) of one point represented 10% of the maximum final mark for this subject matter (Topography). In order to establish the thresholds between different competence levels it was necessary to decide which were the most important criteria for a topographic profile. Thus we offered the highest value to the correctness of the profile line (0.4 of the total of 1 point) because a paper that had all elements unless the profile line could not be considered a profile, and the level of realising the product was that of incompetence. We offered the other criteria 0.1 or 0.05 points according to their importance.

The second problem we had to solve was establishing competence categories/ levels and their names. We decided to establish only four groups and to use names as simple as possible so that they were easy to use in practice. We established the threshold

between incompetent and inferior competence level taking into account the assessment system in Romania in university and in the pre-university educational system where marks and average marks below 5 (out of the maximum of 10) did not ensure graduating in a certain subject matter. It was interesting to establish the threshold between the average and the superior level of competence. We asked ourselves: what can be missing in a certain profile and still consider it a well elaborated one? We reached the conclusion that for a superior competence level the threshold should be very close to the maximum number of points. Taking into account partial number of points and also the elements they referred to (more important and less important in the structure of the profile), we thus established the four competence levels or competence categories in elaborating topographic profiles (figure 10) and we gave details in the results section of this paper.

In all the three groups, in the "incompetent" category there were nine students (18.75% of the total number), while the other students representing 81.25% had different competence levels: 12 had an inferior competence level (25%), 16 had average competence level (33.33%) and 11 had superior competence level (22.92%). Over a half of the students at the Cartography specialisation had superior and average competence level (56.25%; figure 6), with the highest percentage (68.75%) at group 113 (figure 10). One may notice a big difference between group 112 (figure 10) and the other groups related to the inferior competence level, the situation of this group being not too good (33.33% of the students had this competence level). This same group (112) had a quite good position for the average competence level (41.18% of its students reached this level). Group 111 had an inferior position related to the average competence level (only 17.65% of its students had an average competence level), but also group 111 had the highest number of students with a superior competence level (29.41%; figure 10).

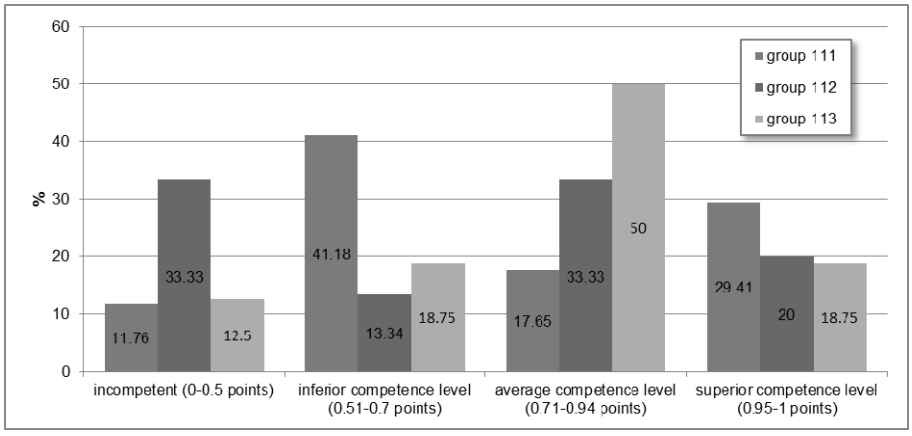

Fig. 10. Frequency of the four competence levels (on groups) and competence classification

The average for the number of points for all three groups was 0.71 points, and this falls in the average competence level. We noticed a difference in what the group

average was concerned: group 111 obtained 0.71, group 112 got 0.67, and group 113 got an average of 0.76. From this point of view, groups 111 and 113 fell, as average, in the average competence level, while group 112 fell in the inferior competence level. Those results correlated with results at other courses as well as with those from the entrance exam, group 112 having in general worse results. Group 113 was "privileged" as it hosted a student who won the Olympiad in Geography and other several students with very good results at assessments and these motivated others too. Some students from the other groups wanted to move in group 113 in order to benefit from their superior competence level colleagues' co-operation.

6) Analysing the ways to improve the educational process and students' results. We noticed that some of these modalities focused on improving institutional management: optimum scheduling or Topography classes in their timetable and determining students to attend lectures and practical activities classes. Other of these modalities focused on improving teaching and the organising of the process for the formation of competences: discussing with students, during classes, their topographic profiles, their mistakes and how to correct them; when teaching, insisting on those aspects that caused the most mistakes; asking them to write; asking them to observe the given requests and rules; discussing with students the assessment grids used to assess them before elaborating topographic profiles; creating and offering students a check list correlated to the assessment grid; students' undergoing the two assessment stages mentioned in the model for the formation of the competence: initial assessment and final assessment.

Nevertheless, in order to form this competence, the most important is our activity with students, so, there are several changes necessary in their behaviour and attitudes: first of all, it is important that they pay more attention to professors' explanations and directions and to those from the recommended literature; that they observe rules, stages and steps when solving tasks; that they use the check list and that they get involved actively in the process of forming and assessing a certain competence.

CONCLUSIONS

On the basis of our research, we drew the following conclusions:

1) Using the analytical description way helped us analyse and make sure that our students possessed all the knowledge integrated into the respective competence;

2) Giving details about the procedure that students had to undergo (stages and steps) when elaborating a topographic profile was useful for planning and organising the activity for the formation of the competence as we could be sure to follow the process in the described order, without omitting any sequences;

4) The assessment grid we conceived helped us assess correctly, in a uniform and objective manner the topographic profiles elaborated by our students and to identify students' mistakes;

5) In order to identify the causes that determined mistakes in the profiles we assessed we paid attention to our students' behaviour, we discussed with them, we

analysed and interpreted the respective profiles. We identified causes that we could possibly eliminate and other that we could not;

6) Among the ways to improve the educational process and students' results, the most important one was students' responsible involvement into the formation of their competences.

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Annex 1.

Components of the competence to elaborate topographic profiles manually

Declarative knowledge	*Concepts*: topographic profile, Cartesian coordinates, abscissa, ordinate, elevation scale (vertical scale), distance scale (horizontal scale), profile line, exaggeration. *Types of topographic profiles*: longitudinal topographic profile, transversal topographic profile, complex topographic profile, profile with change of orientation. *Rules for elaborating topographic profiles manually*

	R 1: Use trustful sources for plans or topographic maps with contour lines. *R 2*: You should quote the cartographic source that you used for realising the topographic profile. *R 3*: The line we take into account in order to realise the profile may not be perpendicular on contour lines (for instance, it may follow a path). Do not make a confusion between the topographic profile and the geomorphologic profile as in the case of the latter one it is compulsory that the line intersects perpendicularly contour lines! *R 4*: You should choose the most appropriate topographic profile (be it transversal, longitudinal, or complex) according to your aim (it may follow a stream, a road, an interfluve, etc.). *R 5:* You should choose the extreme values on the elevation scale (represented on the vertical axis) in the following way: the minimum value (usually a rounded value) should be lower than the lowest elevation value on the profile, and the maximum value may coincide with the highest elevation value from the line of the profile or it may be a little higher. *R 6*: If you realise a series of topographic profiles that you will place one beside another, you should choose the same elevation scale and the same distance scale, in order to facilitate comparisons. *R 7*: Usually, the distance scale (represented on the horizontal axis) does not change, as this is the scale of the map, except the situation represented in R 6. *R 8:* The person building the profile should choose the elevation scale so that it (usually) will be a normal elevation scale (equal with the map scale) or a very little exaggerated one (higher than the map scale). In the latter case, you should choose the scale according to the map scale, the equidistance of contour lines, the relief amplitude. Usually, for geomorphologic profiles, you should exaggerate the scale in order to underline slope breaks or other elements. *R 9*: It is advisable that topographic profiles have both scales (the distance scale and the elevation scale) in a graphic form, not in fractional or verbal form. *R 10:* Representing the profile may begin from the vertical axis (the ordinate), and in this case you should write the graphic distance scale directly on the horizontal axis (abscissa), starting from the origin of the system of coordinates. *R 11*: If the representation of the profile does not begin from the vertical axis (ordinate), then you should draw the graphic distance scale within the topographic profile, placed aesthetically in relation to the system of axes and the line of the profile. *R 12*: You should always mention the measurement unit. *R 13*: On the axis, you should mark elevation values at equal intervals (e.g. 250 m), they should be easy to read and aesthetic, avoiding to link them as it happens when you use an inappropriate font. *R 14*: Usually, topographic profiles do not have a legend, but if necessary, you should place it aesthetically (e.g. in the case of topographic profiles having a touristic purpose, in order to explain the line that represented the road type: asphalt, foot path; in the case of symbols for shelters or chalets, first aid locations, points of spectacular views, etc.). *R 15:* You should draw the system of coordinates and the graphic distance scale (if you represent it separately and not directly on the abscissa) using drawing instruments (e.g. band, forwarder).

	R 16: You should draw the line of profile resulted from uniting points without drawing instruments (e.g. band, forwarder), and thus without straight segments, because the topographic surface is not a broken line. *R 17:* The result of uniting two (or more) successive points with the same elevation value is not a horizontal line except the case when the line according to which you realised the profile overlaps exactly on the respective contour line. *R 18*: For most topographic profiles you should hachure under the line of the profile. In other cases, under the line of profile you may insert other information using symbols and colour (e.g. geology, soils, difficulty degree of the route, time for journey, slope, etc.). *R 19*: You should write inscriptions (values, titles, legends, etc.) neatly, with uppercase, using a pattern if possible. *R 20*: You should write toponyms on the West-East direction, correctly and using diacritics (according to the respective language), at the end of an interrupted vertical line that starts at the place where the toponym is place on the map. In special cases, you may place toponyms in some other ways (e.g. on the South-North direction). *R 21*: Toponyms should refer to mountain peaks, mountains, hills, etc. and you should place them on a higher alignment than the toponyms that render names of water streams. *R 22*: It is compulsory that you write on the profile its cardinal orientation (either above or below the line of the profile), and also mark through vertical lines any changes of orientation. *R 23*: The title should render the location, type and route of the topographic profile. In certain situations you should not write the profile type, but you may present other information.
Attitudinal knowledge	Observe the requirements for elaborating topographic profiles. Elaborate topographic profiles through personal effort. Finish the topographic profile before the deadline.
Procedural knowledge	Extract the necessary data from the topographic map or plan. Establish an appropriate elevation scale. Draw the line of the profile in a Cartesian system of axes. Elaborate the legend (if it is necessary). Finish the topographic profile with all necessary elements.
Procedure	**Stage 1. Identify the necessary cartographic data** Step 1. Establish the aim and the destination of the profile. Step 2. Establish the scale of the map/plan that you are going to use. Step 3. Identify the sources of the necessary cartographic data. **Stage 2. Process the topographic map/the topographic plan** Step 1. Establish which is the detail level that you want to achieve when rendering data in a graphic manner, verifying if all contour lines are necessary or only the index contour ones (according to aim, destination, scale, and morphography). Step 2. Establish on the map the route of the profile and mark characteristic points: the ends of the profile and the points of orientation change (if the latter exist). Step 3. Identify the equidistance between intermediate contour lines and between index contour lines. Step 4. Determine the elevation of the points at the ends of the profile (if there are no known elevation points), maximum and minimum values, as well as the elevation of other necessary points (e.g. intersections with the transport network, with the hydrographical network, shelters, first aid locations,

	mountain passes, etc.). Write these elevation values on the map. Step 5. Decide whether you will represent topographic profiles independent from one another or in a comparative series (R 6). Step 6. Choose the scale of your topographic profile/profiles according to the analysis from Step 5. **Stage 3. Elaborate topographic profiles manually** Step 1. Unite the characteristic points you established on the map with a thin line using pencil and band. In the case of a road for instance, mark it on the map through a wavy line. Step 2. Overlap on the line of the profile the edge (it should be perfectly straight) of a piece of paper or even the edge of an entire sheet of paper. It should be long enough as to comprise the whole length of the route. Step 3. Mark – using short perpendicular lines on the edge of the sheet of paper – the intersection between the line of the profile (of the respective route) and: elevation points, contour lines, and streams. For the last ones, use a special symbol (a wavy line) or blue. Step 4. Write on a piece of paper for each intersection its elevation value. Step 5. Write on a piece of paper the cardinal orientation of the profile and mark with a vertical line the points with change of orientation (if there are any). Step 6. Extract on the piece of paper the position of other necessary elements (according to the aim and destination of the profile), such as settlements, chalets, isolated trees that have the role of landmarks, rest areas, etc. Step 7. Write on a piece of paper the necessary toponyms placing them in the same way like on the topographic map. Step 8. Draw the Cartesian system of axes on millimetre paper. Step 9. Establish a graphic scale of elevation according to the learnt rules and mark it on the vertical axis. Step 10. Place the piece of paper with the data along the horizontal axis and mark point by point, according to each elevation. Step 11. Unite the obtained points. Step 12. Write the toponyms. Step 13. Write the cardinal orientation of the profile. Step 14. Complete with the other elements you took from the map. Step 15. Finish the profile (hachure or colours, title, legend if it is necessary, the distance scale, measurement unit, etc.).

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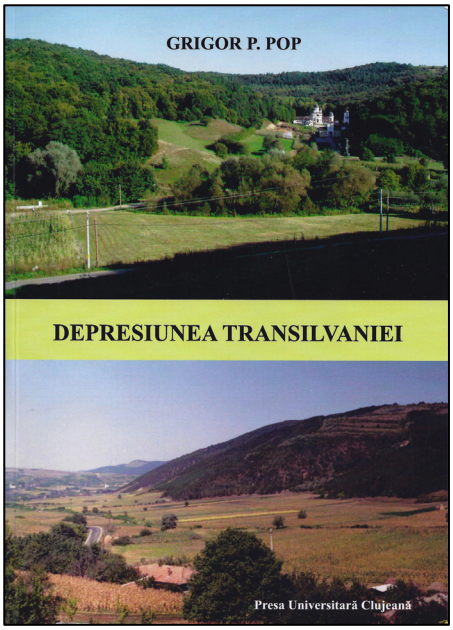
(RECOMMENDED CITATION)

Grigor P. Pop (2012), Depresiunea Transilvaniei [*Transylvanian Depression*], the second edition, revised and enlarged, Edit. Presa Universitară Clujeană, Cluj-Napoca, 289 p. (AL. PĂCURAR).

In 2012, appeared the seventeenth book written by Professor Grigor P. Pop from the Faculty of Geography, "Babes-Bolyai" University of Cluj, namely *"Transylvanian Depression"* in a new edition, much enlarged and revised.



The book, in B5 format, published in our university publishing house - Cluj University Press, has 289 pages, includes a preface, forty-two chapters and subchapters, a summary, in English, a bibliography of 180 titles of works in the field and an afterword in which the author points out the main stages of his professional journey, as well as the great directions of scientific research and publishing, in which appears, bringing a substantial contribution in our opinion.

In the ***Preface***, the author confesses that following the professional accumulation, combined with a long practice in the field, was able to bring his contribution in the domain of Regional Geography - itself a way through excellence integrating geographic components, in our opinion - publishing a series of synthesis works which were urgently needed, such as: ***"Romanian Carpathians and Sub-Carpathians"***, in two editions (2000, 2006), ***"Transylvanian Depression"*** (2001, 2012) and ***"Western Hills and Western Plain"*** (2005).

In the first chapter, ***"General Features",*** of introductory nature, the author insists on the genesis and geological composition of the Transylvanian Depression, namely its two major components, foundation, consisting of crystalline schists, ancient mesozoic sedimentary formations and sedimentary formations of the basin, emphasizing the alternation of varied continental and marine sedimentary formations, due to the local tectonism and eustatic movements. Proving a solid background in Geology, the author focuses on the geological periods characteristic formations with an impact in the development of depression. As it is mentioned the formation of Jibou, including the oldest deposits, up to the more recent, pannonian formations of upper-miocene age. A more nuanced statement is made on salt deposits which, having over deposits up to 4000 m thick, migrated to the edges of the basin, generating a typical relief of *diapire creases* outwards and domes and brachianticlinals inwards.

Then, there are highlighted the physical-human geographical features of Transylvanian Depression, in which the author captures the "key" elements, which give the uniqueness and specificity of this unit of almost 26 000 square kilometers within the Romanian Carpathians.

For example, in a concise style that characterizes him, referring to the geographical and human elements, Prof. Pop mentions that across the basin inhabit 2.3 million people in 1870 settlements, of which 44 are cities, degree of urbanization being 59%.

Geographical he encloses the urban settlements of the depression in cities located in the Marginal Unit, which means hills and foothill valleys, in number of 24, and towns of central unit, numbering 20, whose recent and dramatic evolution or rather geodemographic involution! of the period 1992-2011 he surprises in a summary table, in which easily one can see the sharp decline of the urban population, with values reaching 31.4% (Aiud), 31.9% (Făgăraş), or even 32 7% for Mediaş.

In the regionalization of the Transylvanian Depression, the author first reviews the contribution of forerunners in the field, various regionalization which, in most cases, are quite different, not hesitating to amend with scientific arguments, some variants of regionalization proposed over time, based on extensive and thorough knowledge that allowed him to approach the entire space of the logic structure - causality - effect.

With reasons there are highlighted two major units of the Depression: *The hills and foothill valleys* in the framework of what the author calls "Marginal Unit" and the *Transylvanian Plateau*, in the "Central Unit", each with taxonomic hierarchical subunits, presented in a synthetic organization at the beginning of the chapter.

Within the Hills and Foothill Depressions, the author separates the following regional subunits of rank three: Hills between Great Someş and Olt; southern Depressions; Corridors, depressions and western hilly massifs; Lăpuş Depression, gorges and northern lowland basins, in turn, each with subunits of lower rank -five and even six.

In the Transylvanian Plateau, the author follows the "classic" regionalization, ie: Someşan Plateau, Transylvanian Plain; Târnavelor Plateau; Mureş Corridor as a subunit component, with the features specific to the corridor unit.

In treating any taxonomic level subunits, the author captures with the clarity and concision that characterizes him, what is definitive, typical, specific, showing a remarkable synthesis power.

With objectivity and constructive criticism, where necessary, the author mentions the contribution of researchers in the field, followed by the typical approach of the Regional Geography studies: subunit limits, rigorously marked, geological substratum, morphological, morphographical and morphometric elements of the relief, natural resources, climate with its characteristic elements, the hydrographic network, biopedologic covering.

The considered issue of Human Geography, refers to the population and settlements with frequent forays into their historical background, as well as specific human activities and touristic attractions.

Geodemographic and economic data are updated, are viewed on the correlation and comparison (1992, 2002, 2011), the author succeeding to show the direction of evolution / involution of the analyzed geographic area.

A special quality of the work, otherwise a defining feature of Prof. Pop studies, is that of a rich cartographic material accompanying the text, each subunit having its "map", which contains a huge variety of items that mark its "personality".

The author succeeds the performance, unique in Romanian geographical literature, all the information in the text is marked on the map, but without it being suffocated by written documents and conventional signs, therefore, there is a perfect matching between the text and the cartographic and tabular material.

The author does not hesitate to correct wrong names entrenched in the public mind, as Secaşului Plateau and not Secaşelor, arguing its approach with solid samples, indubitable, being also very rigorous in delimitation of units and subunits of boundaries, highlighting their characteristic elements, such as *picuiurile* (p. 257) of the above-mentioned subunit.

The paper concludes with a summary in English; and also the content is duplicated in the English translation, which is beneficial, because it enables the consultation and then the adoption of the Romanian regional technology. In fact, he did so in almost all his books which, by the way, are cited as existing in the major university libraries from Europe and North America.

The book can be easily read, despite the high density of information of diverse nature, which makes reading, through the information it sends, very attractive.

It is also distinguished by the skill with which the author manages to capture the specificity of each subunit, of any geographic area as, for example, when treating Sibiu - Sălişte Depression, Mărgineni shepherds grazing is synthesized using well-chosen quotes (p.75-76), or how is presented the fruit growing of the region as the main element of the local agriculture in Bistriţa and Reghin Hills (p. 43).

The author has approached in a new, personal, innovative and modern way some territorial components (subunits) of the analyzed geographic area, with scientific arguments, as himself wishes to state *"regionalization problems approach in a geographical logical context, according to places reality "* (p. 8), suggesting redefining some of the sections, such as "Hills between Niraj and Olt" in place of "Sub-Carpathians of Transylvania", arguing that they are the result of plaits generated by the movement of saliferous layers of foundation, under the above layers pressure, to the central unit extremities, and not of the crust curling processes of the Carpathian and Sub-Carpathian area outside the Carpathian arch.

Correlations made by the author are interesting and sometimes unexpected.

Thus, when speaking about Dej tuff horizon of Cluj and Dej Hills, he notes that in its upper level *"... stands Bobâlna Hill (693 m), of a remarkable smoothness, with a northerly strong steep and sides that have accented slopes on the other side",* elements that supported the establishment and the organization of the Transylvanian rebel camp in 1437 (p. 132).

"Incursions" in the past of the above mentioned places are so interesting, with references to events that had an impact on regional and national Romanian historical path, thereby enabling the reader to locate them spatially. For example, the mention of Odorheiu Secuiesc city in Odorheiului Hills, prepares the mention of its building on the ruins of a Roman fort which *"was part of Roman Dacia's fortifications alignment at the eastern edge of the Transylvanian Depression: Hoghiz (on Olt), Sânpaul and Călugăreni (on Great Homorod), Inlăceni (on Geoagiu Valey), Sărăţeni (on Great Târnava), Brâncovenești (on Mureş), Orheiu Bistriţei (on Budacu Valey) and Livezile (on Bistriţa Valey)"* (p. 53).

In the same spirit he presents Rohia Monastery (p. 125-126) from Lăpuş Depression, and when dealing Cluj and Dej Hills, describes *"Dăbâca Fortress, situated on a promontory of riodacitic tuff on the left side of Luna Valley"* (p. 135), not even mentioning the "synthesis" of the emergence and evolution of Cluj-Napoca (p. 141-145).

This permanent relationship between natural environment and human activity is particularly interesting, full of wisdom and increases the appetite for reading the book.

It reveals a crucial feature of the author, that of relationship, interdisciplinary approach, with links to various fields in the effort to a synthetic reproduction, but in the same time comprehensive of all that is characteristic for places.

Geodemographic and socio-economic reality is brought up to date, in the current.

For instance, in the Small Someş Corridor the industry is treated so (p. 149-155), the author proving a constant, permanent concern, with which he follows the course of economic activities.

Almost nothing escapes to him, giving us punctual details, as that of modern tram line building in Cluj-Napoca (p. 156).

Logical, accurate approach, indication of predecessors and contemporaries valuable contribution to the study of the geographical features of the region, shading and highlighting the characteristic aspects of subunits, permanent connection between the

substrate-land's reality, cartographic material quality, are attributes which recommend the author and his book, both to the general public, desirous to know our country's geographic features, and to the public that has an opinion, and finds out one of the most comprehensive summary ever published in Romanian geographical literature.

Professor's Pop merit lies in the fact that, overweening at all, he offers especially to the young trainees a quality card, a regional approach model, that combines in a total harmony the exhaustive, complete information, with the synthesis. From now on, it will be the basis of many future researches as a matrix of valuable database where from one can start in the future researches.

Being given the quality of this book, highly recommend it to students, young studious geographers and those from other activity fields, who are eager to know the realities of a Romanian geographic space component, well known as the *"central pivot"*, *"heart"* or *"basic central unit "*(p. 9), as called by the author himself.

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Romanescu Gh., Stoleriu C.C., Enea A. 2013, Limnology of the Red Lake, Romania. An Interdisciplinary Study, Springer Pub., Dordrecht, Heidelberg, New York, London, 234 p.

A scientific book about one of the most representative Romanian lacustrine unit is an editorial event. Especially if it arises in the care of such prestigious publishers like Springer.

The book's authors anted and succeeded in touching various aspects about the Red Lake – the most known natural barrier lake from Romania. It is unique not only because we know the year when Becaș River valley was retained by the fall – slide of Ghilcoș Mountain's slope, but also because fir logs conserved inside lake's basin in their initial vertical position. Basin's formation and evolution was, of course, influenced by area's geologic and geomorphologic features, but they also influenced the abiotic and biotic properties of water inside the depression. This complexity is well captured and analysed by the authors.

The introduction refers to concept, historic, distribution and typification, and represents a theoretical part based on a large documentation. For this book even the bibliography is a great source of information. The next chapters, the authors locate the lake inside the Cheile Bicazului – Hășmașul Mare National Park, according to its geology, geomorphology, flora and fauna etc.

A well developed part of this book refers to paleogeographic evolution of river's hydrographic basin and lake's basin. There is made a description of lake's crystalline bed, sedimentation cycles, rock deposits and ground types.

The analysis of lake's hydrographic basin and bed has an important role in developing book's following chapters. First it is a made a petrographic, structural, morphologic (endokarst and exokarst) and fluvial presentation of Hășmaș Mountains, closing with naming the geomorphological zones.

Even though small, The Red Lake's hydrographical basin presents a remarkable complexity. After presenting morphometric parameters, the authors analysed lake's hydrographical network, approaching hierarchic and density aspects, but also slopes exposure and fragmentation. Direct measurement made it easy to update lake's morphometric parameters. There are made statistical analysis of submersed slopes and built hypsographic curves. Research results are represented in maps and graphics.

The next chapter refers to lacustrine sediments that indicate research meticulosity. Like in other chapters, the most used research

method is the causal one. A great accent is set on land use presentation, forests evolution in different time periods starting with 1989. 17 lake sampling points bring information about organic carbon distribution and humus concentration. Also, the profiles show lake's bed sedimentation evolution in every section and in whole lake. The results are also supported by erosion rate analysis and torrential organisms' role. The authors present also analysis results of alluvial deposits composition using deposits samples illustrated in a cluster graphic.

About climatic conditions, there are references made about the evolution of average and extreme temperatures that represent region's topoclimate. Connect with air temperature evolution, there were made precise determinations of lake water temperature variation, hydrogen ions concentration, dissolved oxygen and conductivity. Numerous diagrams show the evolution of these parameters on a vertical from lake's surface to bottom.

A short chapter presents some relevant examples of specific vegetal and animal associations.

A different chapter refers to wet areas inside The Red Lake. Together with lake's shore area, there were determined other wet areas, according to lake's submersed slope. There are analysed three wetland compact area features: upper part of the two lake arms (Oii, Suhard) and the area where they reach the main lake. The authors emphasize distinctive vegetal associations' description.

The management of lake's water represents the last analysis phase. Touristic activity inside and around lake's area lays its own negative mark on water's quality, but also on the environment. Aquatic environment pollution is represented by qualitative water parameters decrease and by eutrophication process acceleration.

This book written by our colleagues from Iaşi represents a reference document about the Red Lake features. The results presented in this book are valuable also from ground work point of view, making it the base of this study.

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Maria Eliza Dulamă (2011), *Didactică axată pe competenţe. Teorie şi aplicaţii. Ediţia a 2-a [Competence-Based Didactics. Theory and Practice. Second Edition]*, Presa Universitară Clujeană, Cluj-Napoca, ISBN 978-973-595-330-0
(B 5 format, 507 pages, out of which: 500 pages of text, 7 pages of references).

***Competence-Based Didactics*,** at the second edition, answers a present need characteristic of Geography undergraduates and Geography teachers at the beginning of their career: forming the teachers' competences in general and especially of Geography teachers' competences. Maria Eliza Dulamă identifies the competences characteristic of the Didactics of a certain speciality (and those of the Didactics of Geography presented in detail, clearly and with scientific rigour in this book), starting from five categories of general competences: planning, organising, elaborating educational means, using educational means, and assessment.

Geography undergraduates and teachers at the beginning of their career will undergo a process of forming competences characteristic of the Didactics of Geography while solving the tasks in this book. Although this book has the geographers as its main educational target, one cannot notice that it has enough features that recommend it also to those preparing in the Didactics of other specialties, covering in an exhaustive manner

all that which represents the modern didactics, both from a theoretical and practical point of view: *The teaching-learning-assessment process as a study object of the Didactics of a certain speciality* (pp. 11-28); *Teaching and learning principles of a certain subject matter* (pp. 29-38); *Objectives of the educational process* (pp. 39-93); *School curriculum and contents of the educational process* (pp. 94-123); *Using the didactic methodology during classes* (pp. 124-138); *Using educational means during classes* (pp. 139-248); *Learning situations and integrating situations in order to form competences* (pp. 249-294); *Assessing students' results* (pp. 295-378); *Planning lessons* (pp. 379-478); *Forms of organizing didactic activities* (pp. 479-500).

The ten chapters of this book appear as ten learning units (Maria Eliza Dulamă proved to be both creative and adding practical value to her book) and thus, at the beginning of each chapter/unit, the author mentioned: key concepts, competences, objectives, material and procedural resources, and the list of references.

In unit no. 1, the author presents three fundamental elements for the Didactics of Geography: the concept of didactics, the educational process (defining the concept of process and its components) and the fundamental didactic activities (teaching, learning, and assessment).

In learning unit 2, divided into two sub-chapters, the author presents how to integrate in a lesson *the didactic principles* (observing students' age and individual features; developing students' motivation for learning; of intuition; of learning through action; of integrating theory into practice; of systematic and continuous learning; of solid learning) and *the principles of Geography* (according to the categories of space and time; the principle of cause and effect; the principle of wholeness, etc.).

Learning unit no. 3 starts with a presentation of the relationship between the educational ideal, the purposes of the Romanian educational system and the objectives of a subject matter, but it focuses mainly on the concept of competence (with its features and structure), the general competences that students achieve while studying Geography and the competences characteristic of Geography, other types of competences and the relationship between competences, knowledge and operational objectives.

In learning unit no. 4, which has four sub-chapters *(The concept of curriculum, Curricular typologies, The contents of the education process* and *Curricular products)*, the author presents in detail concepts, typologies, themes, features, criteria, factors, etc., in order to create an image of the whole school curriculum and of the contents of the educational system and process.

In learning unit no. 5, the author discusses the concept of didactic methodology, choosing didactic strategies in teaching and in learning Geography, selecting didactic methods in teaching and in learning Geography, and choosing the didactic procedure and technique in teaching and in learning Geography.

In learning unit no. 6, the author analyses the educational means (concepts, functions, classifying) and gives examples of integrating them into lessons from the perspective of developing a series of competences (to process information from texts; to analyse and interpret photographs; to analyse and interpret maps; to analyse and interpret sketch drawings; to analyse and interpret diagrams; to analyse and interpret films; to use the computer in the didactic activity; to use the blackboard during classes; to use the notebook in order to learn; to use objects in order to learn during classes).

In learning unit no. 7, the author approaches learning units from a classical perspective (structure; features; functions; classifying; planning), and in the second part she underlines the differences between situations for integrating in order to form competences and learning situations.

Introducing the situation for integration is innovative, while the author presents in detail its structure, categories of situations for integration in order to form competences, the paedagogical approach and planning situations for integration in order to form competences.

In learning unit no. 8 (one of the largest in her book), Maria Eliza Dulamă presents the oral assessment methods and techniques from the perspective of forming students' competences (to present data; to describe; to explain; to tell a story; to dialogue), the written assessment methods and techniques (written assessment tools; types of items; elaborating a test), practical skills assessment methods, techniques, and tools, ending with complex assessment methods and techniques (also approached from the perspective of competences: to elaborate a paper; to elaborate a project; to elaborate a portfolio; to elaborate a poster; to realise a reportage; to take an interview; to do an inquiry). In the end of this learning unit, the author introduces two sub-chapters: self-assessment and reciprocal assessment and assessing competences. The latter is a valuable guide for anyone who wants to understand and use correctly the concept of *competence* as a result that can and should be assessed. That is why the author clarifies a series of concepts: result, performance, standard and criterion and she also presents assessment tools.

The author dedicates learning unit no. 9 to lessons, as fundamental didactic activities, and she presents: the moments of lessons, types and variants of Geography lessons; the competence to plan lessons; models of structuring lessons; implementing lesson projects and monitoring activities during classes.

In learning unit no. 10, the author elaborates on an exhaustive presentation of the diverse forms of organising the didactic activities: the forms of organising educational activities; learning activities that are not mentioned in the curriculum and that take place in schools; learning activities that are not mentioned in the curriculum and that take place out of schools.

This book unites classical and modern key-concepts related to teaching, learning, and assessment, and the presented methodology facilitates the process of planning the didactic activity so that students achieve competences characteristic of Geography that the author herself rephrased in order to be appropriate for Geography.

The clear and rigorous presentation of theory and practice in the field of *the Didactics of Geography* and the rich and appropriate examples for the approached concepts render ***Competence-Based Didactics*** as *the book* for forming the Geography teachers' necessary competences: forming competences characteristic of teaching Geography, forming psychological and paedagogical competences, forming competences in the Didactics of Geography and forming transversal competences.

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George-Bogdan TOFAN, *Componenta nordică a ulucului depresionar din Grupa Centrală a Carpaţilor Orientali (Drăgoiasa-Glodu-Bilbor-Borsec-Corbu-Tulgheş)* [The Northern Component of the Depression Groove from the Central Group of Eastern Carpathians (Drăgoiasa-Glodu-Bilbor-Borsec-Corbu-Tulgheş)], Presa Universitară Clujeană, 2013, 510 pages.

When the situation to make a reference towards a scientific paper arises, one must emphasize, above all, its quantitative component. In the case at hand, the author comprised a volume of 510 pages. Within them, a text according to the current requirements, which includes, 470 pages of scientific text excluding the references, 110 figures, three of which are large maps (1, 3 and 41), 70 different maps and graphs, while 37 are photographic images. As standard, the last part of the paper is the Summary (p. 471-490), the Bibiography (p. 491-504, with 287 references) and the Book's Contents (p. 505-510, in Romanian and English).

According to the most suitable method, the paper begins with a **Reference part**, signed by several representatives of Romanian geography, such as *prof. Nicolae CIANGĂ, PhD* (p. 5-8, Faculty of Geography, „Babeş-Bolyai" University, Cluj-Napoca, the scientific coordinator of this thesis), *prof. univ. Ionel MUNTELE, PhD* (p.. 9-13, „Alexandru Ioan Cuza" University Iaşi, Faculty of Geography and Geology, Department of Geography) and *prof. Martin OLARU, PhD* (p. 13-17, Department of Geography, Western University of Timişoara) followed by a **Preface** (p. 19-21, by the paper's author).

Man of the researched territory, with a proper scientific background and with its inexhaustible diligence, *George-Bogdan Tofan* managed to emphasize the entire geographic complexity of **The Northern Component of the Depression Alignment from the Eastern Carpathian's Central Group,** that is the alignment comprising Drăgoiasa-Glodu-Bilbor-Secu-Borsec-Corbu-Tulgheş depressions, their analysis being made, in each case, according to the places' realities, where the specificity of the analysed geographic units is punctuated by the proper definition elements.

Taking into consideration the fact that this paper falls under Regional Geography, the author had to examine and then present the entire complex of geographic components, both physical, as well as human, a task which was accurately accomplished, their research being made according to the proper geographic logic, in a distinguished and modern setting, in the depth required by each situation etc.

The structure of the paper foremost contains (chapter 1) the issue regarding *the approach model for the small depressions of the Romanian Carpathians*, containing, among others, the Latin origin of the term depression, their discontinuity and high number in the Romanian Carpathian space, remarkable geological, geographical, biological, and

humanization characteristics etc., while the final part of the book contains the general presentation of the depressions from the analyzed territory, this part including the excellent large map (fig. 1), that contains the basic elements of Drăgoiasa-Tulgheş Depression Alignment.

In order to obtain the references necessary for the research at hand, the author suitably made use of the *„Research History"* for the depressions in question (chapter. 2., pp. 33-40), and mentioned researches conducted by several geologists ever since the first half of the 19th century, continuing into the second half and then into the entirety of the 20th century, when geographic analysis joined the geological one, by using the entire complex of physical and human elements.

Having the results of the geological and geographical research, conducted for quite some time by many specialists, at hand, and also the detailed investigation carried out by the author in Drăgoiasa-Tulgheş Depression Alignment, it was possible to present „**The natural premises for the individualization of the northern component of the depression alignment found in the Eastern Carpathians' Central Group** (chapter. 3, p. 41-154).

In accordance with geographic logic, this chapter foremost presents *the geographical position and the limits* (3. 1., p. 41-45), and shows among others that *„this suspended innermountain depression represents the middle area connecting Dornelor Depression with Giurgeu Depression, with its borders flanked by Căliman Mountains to the west and north-west, by Giurgeului Mountains to the south-west, Hăghimaş and a part of Ceahlău Massif to the south-east, and Bistricioarei Mountains to the east*" (p. 41). This issue is followed by the one regarding *the geographical-physical premises of territorial population* (3. 2., p. 45-76), emphasizing aspects concerning the genesis of the depression's territorial microsystem and its geological structure. The author discusses the entire complex of points regarding the formation of depressions in this region, and then clarifies the geology of the formations characteristic to the three areas within the depressions, that is chrystalline-Mesosoic, Neogen volcanites and Pliocene-Quaternary sedimentary deposits.

Concerning the two above mentioned topics (3. 1. şi 3. 2.), one must notice the excellent graphical presentation, with nine photographs (fig. 4, 5, 7, 8, 9, 11, 13, 14 and 15) and seven maps, of great quality in terms of cartography, as well as content, one of them being a large map (fig. 3, The demarcation of Drăgoiasa-Tulgheş alignment). The next five maps are geographical-physical maps of the depressions (fig. 6, Drăgoiasa and Glodu, fig. 10. Bilbor, fig. 12. Borsec) or of depression alignments (fig. 16. Capu Corbului-Corbu and fig. 17. Tulgheş-Pintic), plus the geological map of Drăgoiasa-Tulgheş), the mentioned materials allowing for an easy understanding of the territorial reality.

After accustoming the reader with the geological aspects, the book presents *the relief's characteristics* (3. 3, p. 76-95), and describes: *the main relief units*, defined as basic components in the geographic landscape's form, emphasizing, for each unit, aspects regarding hearth, slopes and surrounding mountainous area (with the geomorphological map of Bilbor Depression, fig. 26, p. 82, allowing for a very exact reading of the analyzed phenomenon); *Relief energy and its fragmentation density*; *Relief gradient and slope exposition* (accompanied by maps depicting relief fragmentation depth, fragmentation density, slopes and slope exposition).

The fourth component of the *natural base*, *climate* (3. 4. p. 95-109), is presented in relation to the determining factors, emphasizing the geographic position of the analysed depressions, the relief and vegetation characteristics, solar radiation, general, regional, and local air circulation, etc., followed by the climatic characteristics from the depressions at hand, meaning air temperature, precipitations, winds, ending with the description of the topoclimatic and climatic phenomena of risk.

The geological, orographical and climatic features led to a special in-depth study of the *hydrographical base* (3.5., pag. 109-138), especially due to the existence of

undeground aquifers, almost entirely comprised of mineral waters, characterized as follows: *„Most of them are bicarbonated, calcic, magnesian sparkling, sometimes sulphurous, ferric, and moderately-radioactive"* (p. 110). The large scale presence of this type of waters led a more distinguished presentation, with the help of a rich photographic and cartographic material, such as the profiles from Bilbor (fig. 28, p. 115) and Borsec (fig. 38, p. 125), the very eloquent map regarding the localization of mineral water springs (fig. 39, p. 126) and the map from Fig. 41. The map of the Drăgoiasa-Tulgheş hydrographic network (132-133).

The same elevated research conduit can be found in the presentation of the last components of the natural base, that is *Vegetation, Fauna* and *Soils*, mentioned in the book through their specificity traits (p. 139-154).

The fourth chapter of the book – **The geographic-human premises of Drăgoiasa-Tulgheş alignment's humanization (**p. 155-296) – shows us the same logic and the same deep and scientific analysis as before. Thus, we find, in a clear order, the following issues: Geographical-historical considerations (archeological research, historical data, medieval cartographic sources, communication routes, the population and settlement processes in Drăgoiasa-Tulgheş alignment and the administrative-territorial organization), the geodemographic characteristics (population evolution), the general density of population, the agricultural density of population, population dynamics (birth rate, death rate, growth rate, population migration and migration rate), geodemographic structures (population structure per types of habitat, population structure per gender, population structure per age groups, marital status, profession, ethnic structure, religion, education and human risks) and the Settlements of Drăgoiasa-Tulgheş depression alignment (determining factors in the emergence of the habitat component, the genesis and evolution of the settlement network, rural and urban settlements, housing, social aspects, architectural specificities of the basic habitat and toponymy). As it is required by geographical research, the component from chapter 4 has a rich cartographic and spreadsheet material (12 tables, eight maps and 22 graphs).

The next chapter, the fifth, **Specific activities of Drăgoiasa-Tulgheş depression alignment** (p. 297-453) is only slightly larger that the previous in terms of page numbers, and follows the same path in regards to the specific issue, with a high scientific logic, and excellent cartographic and table component.

Sure enough, according to scientific logic, this chapter begins with *the primary sector* (p. 297-339), containing aspects regarding agriculture (Land fund structure and land usage, Plant husbandry and agricultural production, Animal husbandry and animal production, Sheepherding and its role in local development), forestry, hunting and fishing (Game funds, crop gathering and capitalization) and other primary activities, the presentation of the primary sector being in accordance to the specificity of the environmental factors of the analysed area.

The secondary sector (p. 339-356) contains *Industrial activity*, almost entirely represented by the exploitation and bottling of mineral waters (the description of the mineral water bottling process, the international recognition of Borsec mineral water), plus other industrial sectors, such as former lignite and travertine mines, now represented by small logging units, knitwear factories, food processing units, etc.

The third component of chapter 5 is the *tertiary sector* (p. 356-453), referring foremost to *Commercial activities (trade)*, mainly comprised of mineral water trade, both nationally and internationally, currently being shipped to over 15 countries, most of them European, but also to the US, Canada, Israel, Taiwan, Egypt, China, Japan, Dubai and so on (fig. 87). In terms of *Communication routes and transportation*, the book presents the road network, consisting of a national road (DN 15, Topliţa-Borsec-Tulgheş-Grinţieş) and several county roads, the situation of the former narrow Topliţa-Borsec railway, and the special communication mediums used in the region.

According to the specificity of the analyzed territory, a special significance was given to: *Tourism as capitalization factor of the natural potential* (orographic, climatic, hidrographic, biogeographical, etc) *and man-made potential* (archeological, cultural, economi, ethnographic sites etc) (p. 371-435), followed by the material infrastructure, touristic tracks, touristic promotion and circulation, chapter 5 ending with issues on education, culture, and healthcare.

This excellent book by **George-Bogdan TOFAN**, which is not far from being considered a treatise of Regional Geography, ends, in chapter 6, with the issue of **The geographic landscape under the influence of human activities and factor**, where the types of landscapes, the choreme of Drăgoiasa-Tulgheş system, and the SWOT analysis are emphasized.

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Vacancies

13 Early Stage Researcher (ESR, PhD) and 3 Experienced Researcher (ER, PostDoc) positions open in the Marie Curie ITN project "Socio-economic and Political Responses to Regional Polarisation in Central and Eastern Europe" (RegPol^2)

The project RegPol^2 coordinated by the Leibniz Institute for Regional Geography focusses on new patterns of regional disparities between metropolitan core regions and the remaining parts of Central and Eastern European countries (CEE). 16 subprojects will be dealing with the socio-economic forms of regional polarisation, their wider impacts on society as well as the responses conveyed by social, economic and political actors. All fellows will have the unique opportunity to work in interdisciplinary and multinational teams with excellent links to national and international research networks.

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- 13 ESR (PhD) positions (36 months) with the starting date 01 September 2014 and
- 3 ER (PostDoc) positions (10 months) with the starting date 01 July 2014.

Full information about the RegPol^2 project, the individual positions available and the eligibility criteria of Marie Curie ITN actions can be found by visiting the project website www.regpol2.eu.

We only accept online-applications via the project website from 7 January 2014. The first closing date for receipt of applications will be **18 February 2014**. Further available positions might be advertised at the end of March.