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Front cover photography: Spruces on the south-western slopes of Mount Peca were covered by thick layer of frost (photograph: Jaka Ortar).
Fotografija na naslovnici: Obilno sneženje v visokogorju je smreke na jugozahodnem pobočju Pece zaradi močnega vetra obdalo v debelo trdo ivje (fotografija: Jaka Ortar).

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SIX DECADES OF HUMAN GEOGRAPHY AND ENVIRONMENTAL PROTECTION IN ACTA GEOGRAPHICA SLOVENICA

ŠEST DESETLETIJ HUMANE GEOGRAFIJE IN VARSTVA OKOLJA V ACTI GEOGRAPHICI SLOVENICI

Mimi Urbanc, Drago Kladnik, Drago Perko

BOJAN ERHARTIČ

Evening in the southern part of the Ljubljana Marsh.
Večerni pogled na južni del Ljubljanskega barja.

Six Decades of Human Geography and Environmental Protection in *Acta geographica Slovenica*

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ABSTRACT: This article presents the position of human geography, landscape ecology, and environmental protection and how these areas have developed over the sixty years that the journal *Acta geographica Slovenica/Geografski zbornik* has been published. The goal is to present the development and changes in content orientation, changes in research approaches, and changes in article authorship. The overview shows the development of these research disciplines in Slovenia and the research orientations of researchers at the ZRC SAZU Anton Melik Geographical Institute. During the time that the journal has been published, there has been a perceptible shift from defining and analyzing geographical features to a problem-oriented approach, and towards seeking cause-and-effect connections and responses to current social events. In this process, previously dominant individual contributions have been complemented by articles that were the fruits of joint labor and, alongside various Slovenian contributions, the number and thematic diversity of articles by international contributors has increased. Physical and regional geography will be presented in separate articles.

KEY WORDS: *Acta geographica Slovenica*, human geography, social geography, cultural geography, landscape ecology, environmental protection

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1 Introduction

In 2012 the journal *Acta geographica Slovenica/Geografski zbornik* (hereinafter: *AGS*) celebrated its sixtieth anniversary of publication. To observe this important event, three articles analyze all of the contributions to the journal and shed light on the development of geography, especially Slovenian geography. Unlike the trend today, in the twentieth century the journal primarily published articles by Slovenian researchers.

This first article primarily deals with human geography, landscape ecology, and environmental protection, and how these have developed over the sixty years that *AGS* has been published. The next volume will include an article about physical geography, followed by an article on regional geography, which will also offer a regional contextualization of the articles on physical and human geography.

The goal of these analyses is to present the development and changes in content orientation, changes in research approaches and how findings are presented in the journal, and changes in article authorship. At the same time, it draws attention to the internationalization of geographical studies (this will be addressed in detail in the article on regional geography in *AGS*). The goal of this article is to show the development of human geography and environmental protection in Slovenia in general, which is also an expression of research at the journal's publisher, the ZRC SAZU Anton Melik Geographical Institute (hereinafter: GIAM), or the research orientations of the researchers working there.

Human or social geography is a broad and variegated field of research that deals with the presence of people in the landscape and the environment, connections between them, and processes connected with their interaction. In Slovenia and in Slovenian, human geography has a position equal to that of physical and regional geography. Within the framework of general geography, Vrišer (1998) equated it with *socialna geografija* 'social geography' and *antropogeografija* 'anthropogeography', and in his text he stated that the terms *socialna geografija* 'social geography' and *kulturna geografija* 'cultural geography' were also used for it. In English, the term *human geography* generally subsumes *social geography* and *cultural geography* (Smith 2010). This article understands the term *human geography* as an umbrella term for geography that is concerned with how a space, a place, and the environment influence people and their activities, and are a result of their activities at the same time. To human geography have also been added landscape ecology and environmental protection – branches of geography that function as a bridge between physical geography and human geography.

The material presented here is also presented graphically through tag clouds, which were formed from keywords. The keywords are not standardized, unless the same keyword appears in the singular and plural forms, but instead are preserved the way they were written in the article itself (e.g., *hribovske kmetije* 'hill farms' and *samotne kmetije* 'isolated farms'). The »tag« is usually comprised of a single word, which is most often cited in alphabetical order, whereby the importance of the individual tag is shown by the size and/or color of the font. A tag cloud is based on the number of repetitions of an individual word or tag. If the keywords are phrases, the tags are also composed of more than one word. In order for the program that creates the tag cloud to be able to understand phrases as one word, it was necessary to combine them, for which there were two possibilities: the words could be written together (i.e., without spaces), or they could be connected with hyphens. The second option was chosen for clarity.

2 Human geography

If one follows the basic traditional division, the diverse topic of human geography is most often represented in *AGS* as rural geography, within which there is a clear dominance of research on hill farms as a result of the former GIAM research program. In the 1960s articles were published on hill farms in the Solčava area (Meze 1963), the Luče area (Meze 1965), and the Upper Savinja Valley (Meze 1969), and, after a decade-long hiatus, a new series of articles on hill farms in the Upper Savinja Valley (Meze 1980), along the Kokra River and in the foothills of Mount Krvavec (Meze 1981), between the Kokra and Draga valleys (Meze 1984), in the Slovenj Gradec Pohorje Mountains (Gams 1984) and on the Dobrovlje Plateau (Natek 1984), in the Polhov Gradec and Rovte hills (Meze 1986), in the Idrija and Cerkno regions (Meze 1987), in the Poljane Valley (Orožen Adamič 1987), and on the Šentviška Gora Plateau and in Trebuša (Meze 1988). After another decade's pause, a new series of articles appeared, but in comparison to the previous ones they had a more comprehensive scope and thematically focused on a particular aspect of hill farms; for example,

Figure 1: Articles on human geography, environmental protection, and landscape ecology per total articles by year of publication.

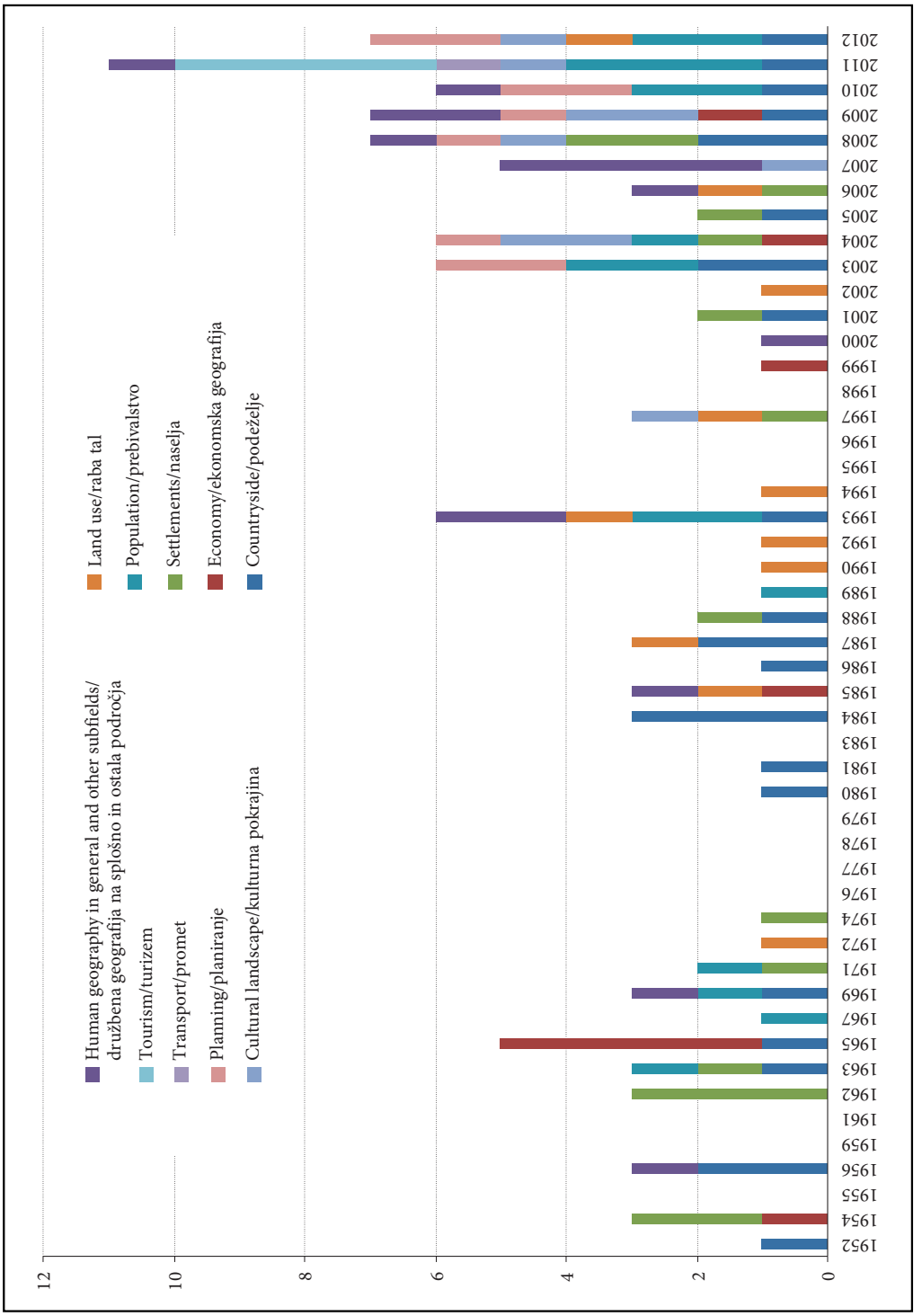

Figure 2: Articles by human geography topic categories by year of publication.

on the typology of hill farms (Kerbler 2003) and on the influence that factors related to the sociogeographic structure of Slovenian hill farms had on decisions on their succession (Kerbler 2008). The last contribution on the role and significance of owners' perceptions for preserving intergenerational continuity (Kerbler 2010) is in the spirit of new trends in geography.

Other material in rural geography comprises general agricultural geography studies of the Tuhinj Valley and the Šavrini Hills (Klemenčič 1952; Briški 1956) and the mountain pastures outside the Alpine area (Melik 1956), after which there was a long silence. Even though the Slovenian countryside has undergone intensive transformation, this process was not covered properly in *AGS*, with one exception. Later on, the modern transformation of the countryside and the challenges connected with this were presented based on Prekmurje as an example (Kladnik 1993).

Since 2000, the range of material has been very broad. The general image of agriculture was presented in an article about its production role (Vrišer 2002). This was followed by articles that represent a shift in content from dealing with agriculture and its production role to a broader understanding of agriculture in its multifunctional role. A new perspective on rural space was offered by an article on the significance of subdividing the countryside to promote regional development (Kladnik and Ravbar 2003). Common land was discussed by Hrvatin and Perko (2008) from the perspective of landscape features, and Todorović and Bjeljac (2009) examined the very popular and widespread notion that tourism is a magical straw to

Figure 3: Tag cloud composed of keywords from articles published from 1960 up to and including 1969. Because the keyword *geografija* 'geography' appears in all of the articles, it has been excluded.

clutch at for less developed rural areas in Serbia. The last two articles in this group address a very topical subject: conflict of interests and processes where town and countryside meet (Razpotnik Visković 2011) and using a karstification indicator to define less suitable areas for agriculture (Ciglič et al. 2012).

Within rural geography, land use is also well represented. This group includes twelve articles. Some of them present land use in general, in a particular area (Kranjc 1972; Natek 1985b; Perko 1987), and later contributions in this area (as in human geography as a whole) focused on the problem aspect of studying land use and/or on presenting new methods (Bat 1990; Gams 1992; Gabrovec 1995). The use of GIS tools in particular opened up new opportunities to study land use (Lóczy and Szalai 1993; Hrvatin, Perko, and Petek 2006; Vijulie et al. 2012), generated new methodological approaches (Petek 2002, 2005), and made possible the development of an exceptionally comprehensive and seminal article that is frequently cited on modern findings on land use in Slovenia (Gabrovec and Kladnik 1997).

During the first years that *AGS* was published, settlement geography was dominated by comprehensive descriptions of a particular settlement, group of settlements, or a specific small area. At that time, in addition to studies on Tržič (Lipoglavšek - Rakovec 1954), Vrhnika (Habič 1962), and Bovec (Melik 1962), there were also studies of certain smaller settlements such as Gomilsko (Natek 1962), Podkoren (Natek 1963), and Soča (Planina 1954). The prime studies in Slovenian settlement geography, which were an important step forward, were a study of central places (Kokole 1971), as well as Vrišer's study on the urban network

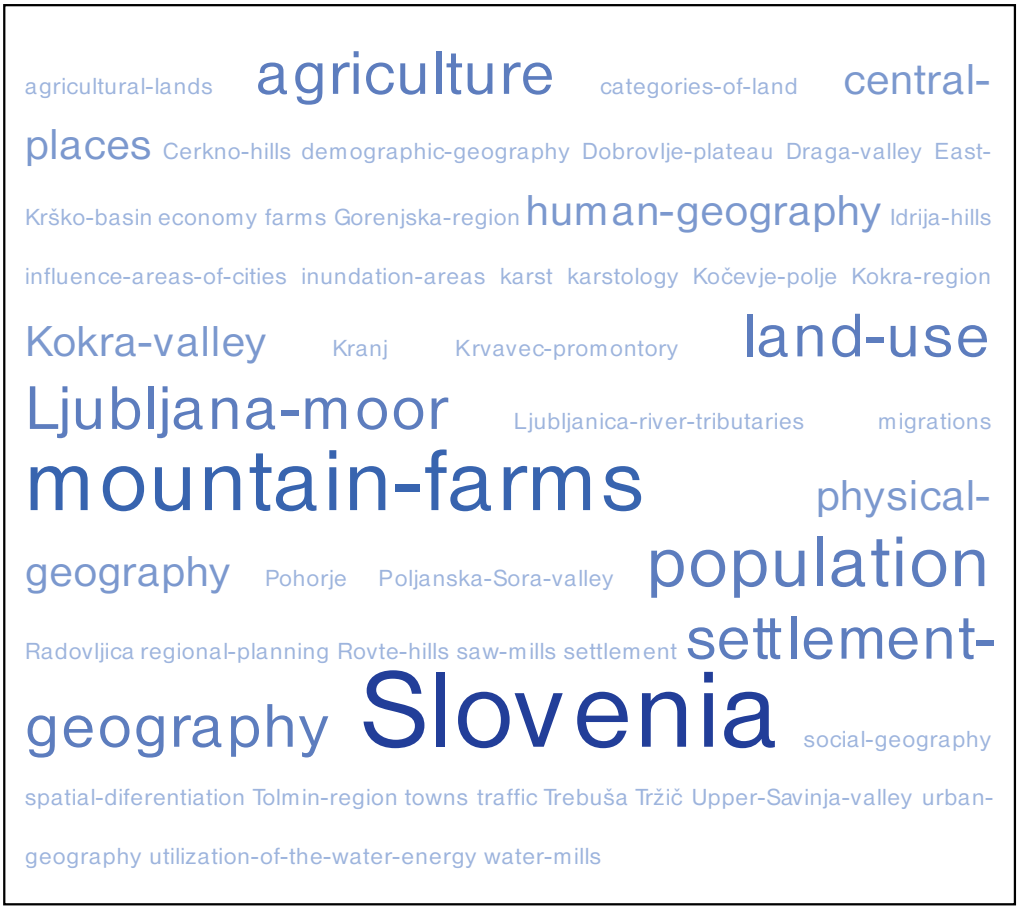

Figure 4: Tag cloud composed of keywords from articles published from 1980 up to and including 1989. Because the keyword *geografija* 'geography' appears in all of the articles, it has been excluded.

(Vrišer 1974) and an exceptionally influential and groundbreaking study on central places in Slovenia (Vrišer 1988). Problem-oriented studies include two articles: a socioeconomic description of Slovenian towns (Vrišer and Rebernik 1993) and an article on the transformation of towns and peri-urban settlements (Ravbar 1997). This was again followed by articles examining a single settlement or a few settlements, or perhaps focusing only on a specific segment of the broader field of settlement geography: the expansion of Ljubljana into the Ljubljana Marsh (Gašperič 2004), spatial and functional changes to built-up land in rural settlements after 1991 (Topole et al. 2006), and the impact of tourism on the development of Rogaška Slatina (Horvat 2001).

Regional planning became more prominent in *AGS* only after the merger of GIAM and the Institute of Geography, where this discipline was well established. This was the same time when regional policy also became important, primarily because of the process of joining the European Union. Two very topical articles address regional policy legislation and its spatial effects (Nared 2003) and premises for monitoring and evaluating regional policy (Nared and Ravbar 2003). The article »Regional Development in the Regional Division of Slovenia« (Ravbar 2004) is a response to political trends on the division of Slovenia into regions. A similar issue was dealt with by Serbian researchers, who used the case of Serbia to define regional inequality as a development problem (Miljanović, Miletić and Đorđević 2010). Articles by Greek and Iranian authors

Figure 5: Tag cloud composed of keywords from articles published from 2000 up to and including 2009. Because the keyword *geografija* 'geography' appears in all of the articles, it has been excluded.

address the use of GIS in spatial planning of activities, which is exceptionally important today (Polyzos, Sdrolias and Koutseris 2008; Lotfi, Habibi and Koohsari 2009). An article on the development of former mining areas also presents very topical material (Marot and Harfst 2012). The basic premises for planning are dealt with in an article on spatial data infrastructure (Živković 2012).

Economic geography was represented in *AGS* from the very beginning; in the second issue it was introduced with a general economic geography article on the Gorizia Hills (Vrišer 1954). Before the salt pans became a general natural and cultural value, their economic aspect was at the forefront, which was also reflected in *AGS* (Savnik 1965). During this period, a series of similar studies were published that dealt with various aspects of economic geography. Žagar (1965) published an article on the village of Tabor, Bogić (1965) analyzed the connection between the weather in October 1959 and the Slovenian power distribution business, and the historian Kos (1965) presented the economic difficulties faced by the Bovec area in the past. After a pause of two decades, an article was published on using the power of tributaries of the Ljubljanica River in the Ljubljana Marsh (Natek 1985a), and after another hiatus an extensive article comprehensively and systematically shed light on socioeconomic orientations of Slovenian towns (Vrišer and Rebernik 1993). At the end of the twentieth century, when economic processes and economic policy had become a component and decisive part of European and also global currents, the modern economic character of Slovenia also started being reflected in *AGS*. As the most important megatrend in the modern world, globalization became a key concept. A general outline of economic changes in Slovenia as a response to the currents of globalization was provided by Lorber (1999). O'Reilly (2004) published a related article that describes the diverse, clear, and rapid economic changes in Ireland; the current economic crisis in this island nation has given this article new dimensions. Another similarly topical article is by Ravbar (2009), describing the importance of investments in regional development and their geographical evaluation. After 2000, two new topics appeared, following global trends in geography: creativity and the cultural industry (Ravbar, Bole and Nared 2005; Bole 2008). Energy and the workforce have not been a competitive advantage for a long time, having been replaced by knowledge and creativity.

Population geography was introduced by broadly conceived articles on the causes, consequences, and features of Slovenian colonization of the Banat region (Pak 1963), characteristics of the labor force from other Yugoslav republics in Slovenia (Natek 1969), and spatial differentiation of Slovenia because of the settlement mobility of the population (Klemenčič 1971). After two decades of »silence,« Perko (1989) published an article on landscape composition and the population, using new computer methods to determine the connection between natural and social landscape elements in the Krka Basin. Minority ethnic groups were also covered in *AGS*: the Hungarian and German minority along the border with Austria and Hungary (Kocsis and Wastl-Walter, 1993), the Hungarian minority in Prekmurje from the perspective of ethnic identity (Zupančič 1993), and the Romany minority in Prekmurje with regard to demographic characteristics (Josipovič and Repolusk 2003). Here one can also include a study on Peruvian immigrants to Santiago, Chile (Gomez Segovia 2011). Geography has also responded to current trends in declining fertility (Josipovič 2003). In the last two issues there has been a real renaissance of population studies. Articles by Serbian researchers have examined population characteristics in Vojvodina (Djurdjev, Arsenović and Dragin 2010), looked for connections between mortality and temperature conditions in Belgrade (Djurdjev, Arsenović and Dragin 2012), and compared commuting in Serbia and Slovenia (Lukić and Tošić 2011). New material has been introduced, such as aging at home with the help of information communication technologies (Kerbler 2012) and creative social groups in Slovenia (Ravbar 2011).

A relatively new content area is the cultural landscape, although this was also represented earlier, but in connection with other material studied. This has been an independent area of research since the late 1990s. Nearly half of the articles have addressed it as a palpable material unit of geographical reality, in which they thematize the cadastral survey under Emperor Francis I as being key to understanding it (Petek and Urbanc 2004), terraced landscapes in Slovenia (Ažman Momirski and Kladnik 2009), landscape changes in the low-elevation karst of White Carniola (Paušič and Čarni 2012), and its evaluation and opportunities for future development based on the case of Krk, the largest Adriatic island (Rechner Dika et al. 2011). Other articles follow the modern trends of studying the cultural landscape, which is more of an intangible, felt, and perceived concept than something material (Kučan 1997; Urbanc et al. 2004; Staut, Kovačič and Ogrin 2007; Urbanc 2008; Fridl, Urbanc and Pipan 2009).

Traffic geography has been rather poorly represented in *AGS*. The first general overview was published in the 1960s, when Žagar (1967) precisely presented the features of Slovenian road traffic. The next such

article appeared a full thirty-seven years later, when Bole (2004) published an article on employee commuting in Slovenia. This had a broader scope because it examined population mobility (which was in line with modern trends in geography, when traditional traffic studies were replaced by mobility studies). This was followed by articles on accessibility of regional centers (Kozina 2010), comparative analysis of employee mobility in the largest Slovenian employment centers between 2000 and 2009 (Bole 2011), and planning public transportation between the town and countryside based on the case of Ljubljana (Bole et al. 2012).

3 Landscape ecology and environmental protection

In the past two decades, the topic of landscape ecology and environmental protection has become very well recognized and well represented. Since the publication of the first such article in 1993, nearly every issue of the journal has contained at least one article of this type. Material on environmental protection

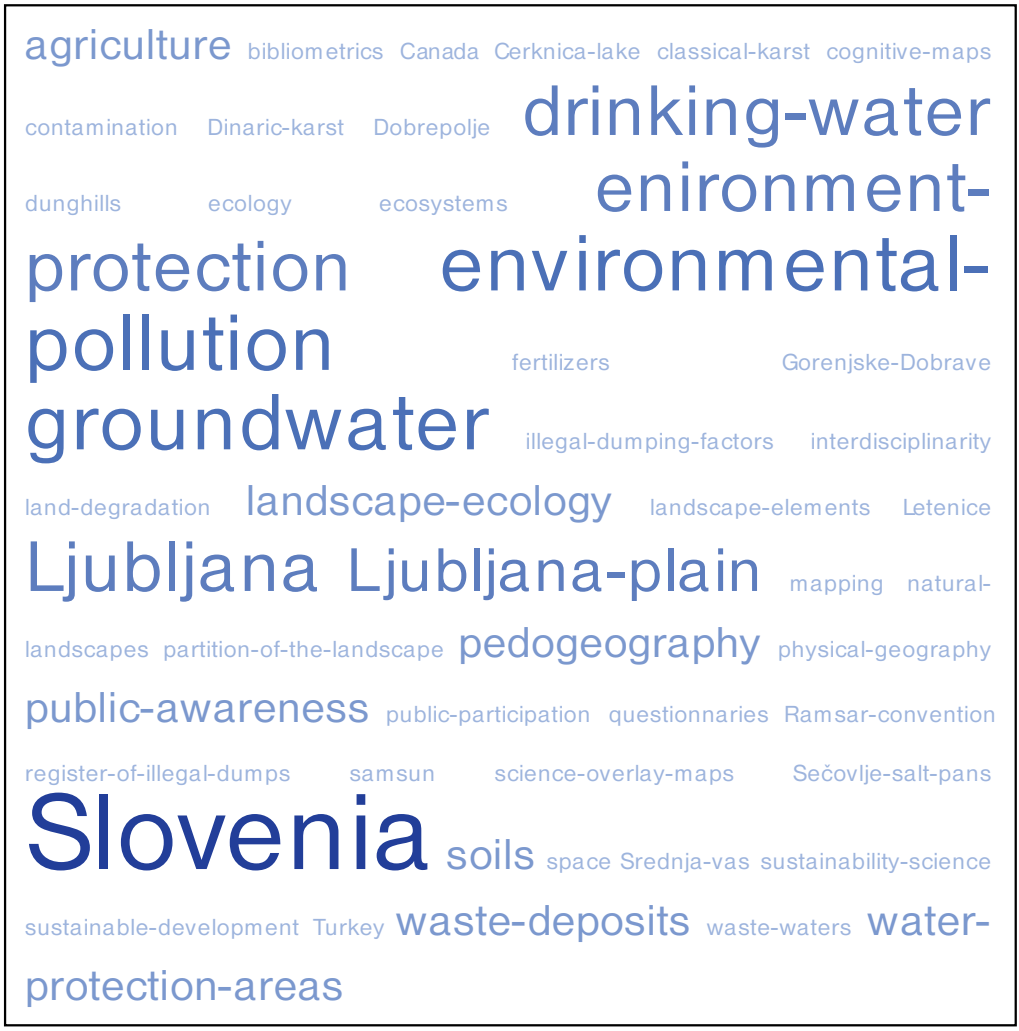

Figure 6: Tag cloud composed of keywords from articles on landscape ecology and environmental protection published during the entire period.

became especially well represented after the former Institute of Geography was absorbed, where this topic area has a long and rich tradition. In the past decade there have been articles whose content is closer to environmental psychology. As in all spheres of public and social life, in research there is also a considerable tendency towards bottom-up approaches, with an emphasis on people's relation to a particular problem or the way they perceive a certain issue. Within this broad and diverse group, the most frequent studies have involved various aspects of drinking water supply, especially from groundwater. The first such article was written by Hungarian researchers (Balogh and Lóczy 1993) and had an expressly physical geographic character. This was followed by several articles dealing with people's impact on the state of drinking water sources. Emphasis was placed in the vulnerability of water resources (Brečko Grubar 1999) and how they are burdened by manure pits (Kladnik, Rejec Brancelj and Smrekar 2003), illegal waste dumps (Breg, Kladnik and Smrekar 2007; Matos, Oštir and Kranjc 2012), and pollutants (Ravbar 2006). Interest in this topic is also connected with increasingly greater social awareness of drinking water and the importance of ensuring sufficient quantities of drinking water for future development. It has become clear that it is people that shape the future, and therefore their understanding of and relationship to the environment are of key importance; among other things, this is marked by educational level. This finding is also reflected in an article that uses the method of drawing mental maps as a new way to shed light on the issue of water protection zones (Smrekar 2006); here the author already outlines the divide between claimed and actual environmental awareness based on the example of Ljubljana, which he later presents in greater detail (Smrekar 2011). The fact that people and their conceptualization of the geographic environment are of key importance for future development is evident from articles on wetland protection (Polajnar 2008) and awareness of environmental problems among the Turkish public (Şahin 2009). Durkin (2102) uses the cases of Slovenia and Canada to comparatively assess public inclusion in environmental policy.

Three articles address landscape protection, threats, and degradation with an emphasis on soil degradation (Repe 2002), gravel pits in urban areas (Urbanc and Breg 2005), and environmental protection aspects of agriculture (Rejec Brancelj 1999). This last topic is also addressed in articles dealing with agriculture from the perspective of energy consumption (Urbanc 1998) and organic farming as a development opportunity for broad protected areas (Štraus, Bavec and Bavec 2011). Two articles examine the division of northeast Slovenia and the Dobrepolje–Struge karst region, the first into ecological units (Vovk Korže 1996) and the second into natural units (Hrvatin and Hrvatin 2001). A fresh new perspective is offered by an article on temporal dynamics of the interdisciplinary nature of research on sustainability (Nučič 2012).

Finally, this overview includes some articles that cannot be put into any of the categories above. The first one is theoretical and discusses the study of international boundaries in geography and anthropology (Kneževič Hočevar 2000), and the next three focus on the Slovenian-Croatian border (Pipan 2007) or its sections in the Dragonja River area (Pipan 2008) and the Bay of Piran (Kladnik and Pipan 2008). This last article also examines geographical names and historical cartography, which was included as a source or tool in multiple articles, but has only rarely been an independent area of research. Exceptions are articles on cartographic representations of Slovenia over time (Gašperič 2007), Gaetan Palma's 1812 map of the Illyrian Provinces (Gašperič 2010) and the atlas *Atlant* in connection with Slovenian ethnic consciousness (Urbanc et al. 2006). In the treatment of geographical names, the issue of exonyms has been at the forefront. These have been examined with regard to degree of exonymization in various European languages (Kladnik 2007), semantic demarcations with endonyms (Kladnik 2009), and their familiarity among the Slovenian professional community (Kladnik and Bole 2012). Especially the first article on geographical names in *AGS* presented geographical issues in onomastics based on the Kamnik–Savinja Alps (Peršolja 1998). A completely new dimension in the treatment of geographical names that has become increasingly popular in recent years was raised by an article on the significance of microtoponyms for the study of the cultural landscape (Penko Seidl 2008).

Cultural heritage has rarely been addressed in *AGS*. It was discussed by Topole (2009) in connection with the tourism potential of the demographically threatened area of Jurklošter, and the role of inventorying and typing in effective protection of tree heritage was defined by Šmid Hribar and Lisec (2011), whose article also involves natural heritage. This category also includes a series of articles from a thematic issue on geotourism (Hose et al. 2011; Hose 2011; Vujičić et al. 2011; Yiping and Luk 2011; Vasiljević et al. 2011).

Publications after 2000 have also included articles that cannot be classified into any of the »traditional« subdivisions of human geography, but reflect modern trends in geography. Perception – the study of how individuals obtain, evaluate, and save information and then build it into their everyday lives – has also

made its way into Slovenian geography with some delay. This was the inspiration for two articles on the spatial perception of the Mediterranean in Slovenia (Staut, Kovačič and Ogrin 2007) and the importance of teachers' awareness of space in the educational process (Fridl, Urbanc and Pipan 2009).

There remains a group of articles that can be classified into several groups. These include articles that deal with economic geography and settlement geography between the Sava and Sotla rivers (Kokole 1956), the sociogeographic development of the Upper Drava Plain (Pak 1969), the population, settlement, and traffic in the Ljubljana Marsh (Orožen Adamič 1985), and the socioeconomic transformation of the Municipality of Domžale (Pelc 1993).

These last articles are only some of many that show the general orientation of *AGS* toward following concepts about the comprehensiveness or complexity of geography. For many years, the policy of the journal's editorial board and the publisher at GIAM has followed academy member Svetozar Ilešič and his guidelines for contextualizing geography as »the discipline of mutual connections between features of the Earth's surface and its individual parts« (Ilešič 1979). Although individual articles emphasize a particular feature or set of features, their concepts are embedded in the broader context of cause-and-effect geography of the whole. Even more so than at present, when geography is frequently moving toward narrow specializations and is in fact facing the danger of losing its basic essence and mission, the idea of complex geography was firmly anchored among authors in the 1960s and 1970s. A good example of such efforts is the study of the Ljubljana Marsh, which was an umbrella topic divided into subtopics. These subtopics, or narrower fields of research, were presented in *AGS* in independent articles. These individual articles on the use of tributaries as sources of power (Natek 1985a), agricultural use (Natek 1985b), population, settlement, and traffic (Orožen Adamič 1985), geomorphological development (Šifrer 1984), and flood characteristics (Kolbezen 1985) offer a comprehensive, complete, and complex image of the Ljubljana Marsh. Another similar umbrella topic, with a full eighteen articles, was the treatment of flood zones, which were defined in the context of effects of natural geographical principles and the most diverse human spatial interventions (Natek and Perko 1999). This complexity, comprehensiveness, mutual connectedness, and breadth of perspectives represent the main values of our journal.

4 Conclusion

AGS has »reflected the research activity, orientation, and development of the institute as well as Slovenian geography in general« (Natek and Perko 1999), and at the same time the substantive development of GIAM, which publishes the journal. Thus, after the Institute of Geography was absorbed, alongside physical geography articles there was an increasing presence of articles containing social geography (Zorn and Komac 2010). In sixty years of publication, there has been a shift from defining and analyzing geographical features to a problem-oriented approach and seeking cause-and-effect connections as well as to responses to current social phenomena. In the first decades, the articles were straightforwardly geographic, but later, especially after Slovenian independence, interdisciplinarity came to the fore in research in line with general global trends. During this time there was also a considerable shift in content from the traditional topics of human geography to modern topics such as mobility, sustainable development, and globalization. The articles reflected the fact that writing them (and the research underlying them) has clearly become a group or team effort and that Slovenian research opened outwards, which is shown in publications by authors that come from various institutions as well as by an increasing number of articles by international contributors. As already stated, the geographical level of Slovenia versus abroad will be presented in greater detail in an article addressing regional geography. At this point, it suffices to say that the first articles by international authors were published in 1993. To date, twenty have been published, including two written jointly by Slovenian and international authors. Especially in recent years, Serbians have predominated among contributors from abroad. The year 1993 was also a milestone for coauthorship, when the first such articles appeared (Balogh and Lóczy 1993; Kocsis and Wastl-Walter 1993; Lóczy and Szalai 1993; Vrišer and Rebernik 1993). In the following two decades, just over half of the articles were written by one author, one-fifth had two contributors, one-sixth had three, and one-tenth had four or more.

In six decades, *AGS* has taken a large step in human geography and environmental protection or landscape ecology, moving from being an »institutional« journal (which was, however, always open to outside contributors) with a limited range of topics to an increasingly prominent international journal, open to

Figure 7: Tag cloud composed of the names of thirty-seven authors that published at least two solo or coauthored articles on human geography and environmental protection. They are mostly former or current GIAM employees. There are 109 authors altogether.

all geographical researchers and the most varied of topics. With its open editorial policy, rich illustrations, and early and consistent presence on the internet, it can increasingly take its place alongside the best European geographical research journals.

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Šest desetletij humane geografije in varstva okolja v Acti geographici Slovenici

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IZVLEČEK: V članku predstavljamo položaj humane geografije, pokrajinske ekologije in varstva okolja ter njihov razvoj v šestdesetih letih izhajanja znanstvene revije Acta geographica Slovenica/Geografski zbornik. Cilj je prikazati razvoj oziroma spremembe vsebinskih usmeritev, spremembe v pristopih raziskav in spremembe v avtorstvu člankov. Pregled kaže na razvoj teh znanstvenih disciplin v Sloveniji in raziskovalne usmeritve raziskovalcev Geografskega inštituta Antona Melika ZRC SAZU. V času izhajanja revije se je zgodil opazen premik od opredeljevanja in analiziranja geografskih pojavov k problemskemu pristopu ter iskanju vzročno-posledičnih povezav in odzivom na aktualno družbeno dogajanje. Pri tem so nekdaj prevladujoče individualne prispevke dopolnili članki, ki so plod skupinskega dela, ob raznovrstnih domačih prispevkih pa so vse bolj številni in tematsko pestri prispevki tujih avtorjev. Fizična in regionalna geografija bosta predstavljeni v posebnih prispevkih.

KLJUČNE BESEDE: Acta geographica Slovenica, humana geografija, družbena geografija, kulturna geografija, pokrajinska ekologija, varstvo okolja

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1 Uvod

Leta 2012 je znanstvena revija Acta geographica Slovenica/Geografski zbornik (v nadaljevanju AGS) praznovala 60 let izhajanja. V počasitev tega jubileja bomo v treh prispevkih analizirali vse prispevke v reviji in osvetlili razvoj geografije, predvsem slovenske, saj je v prejšnjem stoletju, v nasprotju z današnjimi težnjami, revija objavljala predvsem članke slovenskih avtorjev.

Prvi prispevek se ukvarja predvsem s humano geografijo, pokrajinsko ekologijo in varstvom okolja ter njihovim razvojem v šestdesetih letih izhajanja AGS, v naslednjem letniku bo izšel prispevek o fizični geografiji, nato pa še prispevek o regionalni geografiji, kjer bodo regionalno umeščeni tudi članki iz fizične in humane geografije.

Slika 1: Število člankov s področja humane geografije in varstva okolja in pokrajinske ekologije glede na vse članke po letih izhajanja.
Glej angleški del prispevka.

Cilj predstavljene analize je prikazati razvoj oziroma spremembe vsebinskih usmeritev, spremembe v pristopih raziskav oziroma v reviji predstavljenih njihovih rezultatov in spremembe v avtorstvu člankov. Obenem opozarjamo na internacionalizacijo geografskih raziskav (natačno bo obdelana v prispevku, ki bo obravnaval regionalno geografijo v AGS). Namen pričujočega prispevka je prikazati razvoj humane geografije in varstva okolja v Sloveniji na splošno, ki je tudi odraz raziskovalnega dela na Geografskem inštitutu Antona Melika ZRC SAZU (v nadaljevanju GIAM), izdajatelju revije, oziroma raziskovalnih usmeritev v njem zaposlenih raziskovalcev.

Humana ali družbena geografija je široko in razvejeno znanstveno področje, ki se ukvarja s prisotnostjo človeka v pokrajini in okolju, povezavami med njimi ter procesi, povezanimi z njihovim součinkovanjem. V Sloveniji in slovenskem jeziku humana geografija nastopa enakopravno s fizično in regionalno geografijo. V shemi splošne geografije jo Vrišer (1998) enači s socialno geografijo in antropogeografijo, v besedilu pa navaja, da se zanjo uporabljata tudi izraza socialna geografija in kulturna geografija. Na angleškem govornem področju izraz *human geography* običajno združuje *social geography* in *cultural geography* (Smith 2010). V tem prispevku razumemo izraz humana geografija kot krovni termin geografije, ki se navezuje na to, kako prostor, kraj in okolje vplivajo na človeka ter njegove aktivnosti, obenem pa so tudi rezultat njegovih aktivnosti. Humani geografiji smo pridružili tudi pokrajinsko ekologijo in varstvo okolja, geografski panogi, ki sta most med fizično in humano geografijo.

Slika 2: Število člankov po vsebinskih sklopih humane geografije in po letih izhajanja.
Glej angleški del prispevka.

Predstavljene vsebine smo tudi grafično prikazali prek tako imenovanih deskriptorskih polj, ki smo jih oblikovali iz ključnih besed. Ključnih besed nismo poenotili,razen če se enaka ključna beseda pojavljala v edninski in množinski obliki, ampak smo jih ohranili, kot so zapisane v samem članku (na primer hribovske kmetije in samotne kmetije). »Deskriptor« običajno sestavlja ena sama beseda, ki je največkrat navedena po abecednem zaporedju, pri čemer je pomembnost posameznega deskriptorja prikazana z velikostjo in/ali barvo pisave. Deskriptorsko polje temelji na številu ponovitev posamezne besede oziroma deskriptorja. Če so ključne besede sestavljene, so tudi deskriptorji sestavljeni iz več besed. Da bi jih lahko program oblikovanja deskriptorskih polj razumel kot eno besedo, jih je bilo treba povezati, za kar sta se pokazali dve možnosti: besede se lahko zapisujejo skupaj, to je brez presledka, lahko pa so povezane s stičnimi vezaji. Zaradi boljše razumljivosti smo se odločili za drugo možnost.

2 Pregled humane geografije

V raznovrstni tematiki humane geografije je, če sledimo temeljni klasični delitvi, v AGS-u najpogosteje zastopana geografija podeželja, znotraj katere izrazito prevladuje preučevanje hribovskih kmetij kot posledica nekdanjega raziskovalnega programa GIAM-a. V šestdesetih letih so bili objavljeni članki o hribovskih kmetijah na Solčavskem (Meze 1963), v Lučki pokrajini (Meze 1965) in Zgornji Savinjski dolini (Meze 1969), po desetletju premora pa je sledila nova serija prispevkov o hribovskih kmetijah, in sicer v Zgornji Savinjski

dolini (Meze 1980), ob Kokri in v Krvavškem predgorju (Meze 1981), med dolinama Kokre in Drage (Meze 1984), na Slovenjgraškem Pohorju (Gams 1984) in Dobroveljski planoti (Natek 1984), v Polhograjskem in Rovtarskem hribovju (Meze 1986), na Idrijskem in Cerkljanskem (Meze 1987), v Poljanski dolini (Orožen Adamič 1987) ter na Šentviški planoti in v Trebuši (Meze 1988). Po vnovičnem desetletju premora je bila objavljena nova serija prispevkov, ki pa so v primerjavi s prejšnjimi prinašali celovitejši pregled in so bili tematsko osredotočeni na določen vidik hribovskih kmetij, denimo na tipologijo hribovskih kmetijskih gospodarstev (Kerbler – Kefo 2003) in na vpliv dejavnikov socialnogeografske strukture slovenskih hribovskih kmetij na odločanje o njihovem nasledstvu (Kerbler – Kefo 2008). Zadnji prispevek o vlogi in pomenu gospodarjevih percepcij za ohranjanje medgeneracijske kontinuitete (Kerbler 2010) je v duhu novih trendov v geografiji.

Slika 3: Deskriptorsko polje, oblikovano iz ključnih besed člankov, ki so izšli med letoma 1960 in vključno 1969. Ker se ključna beseda geografija pojavlja v vseh člankih, smo jo izločili.

Druge vsebine geografije podeželja sestavljajo splošni agrarnogeografski študiji Tuhinjske doline in Šavrinskega gričevja (Klemenčič 1952; Briški 1956) ter planin zunaj alpskega sveta (Melik 1956), čemur je sledilo dolgotrajno zatišje. Čeprav je slovensko podeželje zajela intenzivna preobrazba, ta proces, razen ene izjeme, v AGS-u ni našel pravega mesta. Pozneje so bili sodobna preobrazba podeželja in z njo povezani izzivi prikazani na primeru Prekmurja (Kladnik 1993).

V novem tisočletju je nabor vsebin zelo širok. Splošno sliko kmetijstva prinaša članek o njegovi proizvodni vlogi (Vrišer 2002). Sledijo članki, ki pomenijo vsebinski premik od obravnavanja kmetijstva in njegove proizvodne vloge k širšemu razumevanju kmetijstva v njegovi multifunkcijski vlogi. Nov vidik podeželskega prostora je prinesel članek o pomenu členitve podeželja pri spodbujanju regionalnega razvoja (Kladnik in Ravbar 2003). Skupna zemljišča sta z vidika pokrajinskih značilnosti osvetlila Hrvatin in Perko (2008), Todorović in Bjeljac (2009) pa sta tematizirala zelo populistično in splošno razširjeno mišljenje, da je turizem čudežna rešilna bilka za manj razvita podeželska območja v Srbiji. Zadnja dva prispevka iz tega sklopa obravnavata zelo aktualni temi, in sicer navzkrižje interesov in procesov na stiku mest in podeželja (Razpotnik Visković 2011) ter določanje manj primernih območij za kmetijstvo s pomočjo kazalnika zakraselosti (Ciglič s sod. 2012).

Znotraj geografije podeželja je dobro zastopana tudi raba tal. V to skupino smo uvrstili 12 prispevkov. Nekateri predstavljajo rabo tal na splošno, na določenem območju (Kranjc 1972; Natek 1985b; Perko 1987), pozneje pa so se prispevki s tega področja, kot se je zgodilo v celotni humani geografiji, osredotočili na problemski vidik preučevanja rabe tal in/ali na predstavitev novih metod (Bat 1990; Gams 1992; Gabrovec 1995). Zlasti uporaba GIS orodij je odprla nove možnosti preučevanja rabe tal (Lóczy in Szalai 1993; Hrvatin, Perko in Petek 2006; Vijulie s sod. 2012), generirala nove metodološke pristope (Petek 2002 in 2005) ter omogočila nastanek izjemno celovitega in temeljitega, velikokrat citiranega prispevka o sodobnih dognanjih rabe tal v Sloveniji (Gabrovec in Kladnik 1997).

Pri geografiji naselij so v prvih letih izhajanja AGS-a prevladovali celoviti orisi določenega naselja, skupine naselij ali določenega manjšega območja. Takrat so svoje študije poleg Tržiča (Lipoglavšek - Rakovec 1954), Vrhnike (Habič 1962) in Bovca (Melik 1962) dobila tudi nekatera manjša podeželska naselja, kakršna so Gomilsko (Natek 1962), Podkoren (Natek 1963) in Soča (Planina 1954). Osrednje študije slovenske geografije naselij, ki so bile pomemben korak naprej, so bile leta 1971 objavljena študija o centralnih krajih (Kokole 1971) in Vrišerjevi študiji o urbanem omrežju (Vrišer 1974) ter izjemno odmevna in prelomna o centralnih naseljih v Sloveniji (Vrišer 1988). Med problemske članke lahko uvrstimo tudi prispevka o družbenogospodarskem orisu slovenskih mest (Vrišer in Rebernik 1993) ter preobrazbi mest in obmestij (Ravbar 1997). Zatem so znova sledili prispevki, ki so obravnavali eno samo naselje ali nekaj naselij, lahko pa so se osredotočali le na določeni segment širokega polja geografije naselij: širitev Ljubljane na Ljubljansko barje (Gašperič 2004), prostorske in funkcijske spremembe pozidanih zemljišč v podeželskih naseljih po letu 1991 (Topole s sod. 2006) ter vpliv turizma na razvoj Rogaške Slatine (Horvat 2001).

Področje regionalnega planiranja se je v AGS-u uveljavilo šele z združitvijo GIAM-a in Inštituta za geografijo, na katerem je bilo dobro zastopano. To je bil obenem čas, ko je regionalna politika tudi, ali predvsem zaradi približevanja Evropski zvezi, pridobivala pomen. Zelo aktualna sta bila članka o zakonodaji s področja regionalne politike in njenih učinkih v prostoru (Nared 2003) ter izhodiščih za spremljanje in vrednotenje regionalne politike (Nared in Ravbar 2003). Članek Regionalni razvoj v pokrajinski členitvi Slovenije (Ravbar 2004) je odziv na politične težnje o delitvi Slovenije na pokrajine. S podobno problematiko se ukvarjajo srbski kolegi, ki so na primeru Srbije regionalno neenakost opredelili kot razvojni problem (Miljanović, Miletić in Đorđević 2010). Članka grških in iranskih avtorjev se dotikata za sodobni čas izjemno pomembne uporabe GIS-ov pri prostorskem načrtovanju dejavnosti (Polyzos, Sdrolias in Koutseris 2008; Lotfi, Habibi in Koohsari 2009). Prav tako zelo aktualno vsebino prinaša članek o razvoju nekdanjih rudarskih območij (Marot in Harfst 2012). Temeljna izhodišča za načrtovanje obravnava prispevek o prostorski podatkovni infrastrukturi (Živković 2012).

Ekonomska geografija je bila v AGS-ju zastopana od samega začetka; v drugi številki jo je uvedel splošen ekonomskogeografski članek o Goriških brdih (Vrišer 1954). Preden so soline postale naravna in kulturna vrednota, je bil v ospredju njihov ekonomski vidik, kar se zrcali tudi v AGS-u (Savnik 1965). V tem obdobju je bila objavljena vrsta podobnih študij, ki so obravnavale različne vidike ekonomske geografije. Žagar (1965) je objavil članek o Taboru pri Dornberku, Bogić (1965) je analiziral povezavo med vremenom v oktobru 1959 in elektrogospodarstvom Slovenije, zgodovinar Kos (1965) pa je predstavil gospodarsko problematiko Bovškega v preteklosti. Po dveh desetletij premora je bil objavljen članek o izrabi pogonskih

moči pritokov Ljubljanice na Ljubljanskem barju (Natek 1985a) in po ponovnem premoru obsežen članek, ki je pregledno in sistematično osvetlil družbenogospodarsko usmeritev slovenskih mest (Vrišer in Rebernik 1993). Ob koncu tisočletja, ko so gospodarski procesi in gospodarska politika postali sestavni in odločujoči del evropskih in tudi globalnih gospodarskih tokov, se je sodobna gospodarska podoba Slovenije začela zrcaliti tudi v AGS-u. Ključni izraz je postal globalizacija, ki velja za najpomembnejši megatrend sodobnega sveta. Splošni oris gospodarskih sprememb v Sloveniji kot odziv na globalizacijske tokove je podala Lorberjeva (1999). Vsebinsko soroden članek je prispeval O'Reilly (2004), ki je opredelil raznovrstne, izrazite in hitre gospodarske spremembe na Irskem; v aktualni gospodarski krizi v tej otoški državi ta članek dobi nove dimenzije. Podobno aktualen je tudi članek, ki govori o pomenu naložb za regionalni razvoj in njihovem geografskem vrednotenju (Ravbar 2009). V tretjem tisočletju sta se pojavili novi temi, ki sledita svetovnim trendom v geografiji, to sta ustvarjalnost in kulturna industrija (Ravbar, Bole in Nared 2005; Bole 2008). Energija in delovna sila že dolgo nista več konkurenčni prednosti, ampak sta to postala znanje in ustvarjalnost.

Geografijo prebivalstva so uvedli široko zasnovani članki o vzrokih, posledicah in značilnostih kolonizacije Slovencev v Banatu (Pak 1963), značilnostih delovne sile iz drugih republik Jugoslavije v Sloveniji (Natek 1969) in prostorski diferenciaciji Slovenije zaradi selitvene mobilnosti prebivalstva (Klemenčič 1971).

Slika 4: Deskriptorsko polje, oblikovano iz ključnih besed člankov, ki so izšli med letoma 1980 in vključno 1989. Ker se ključna beseda geografija pojavlja v vseh člankih, smo jo izločili.

Po dveh desetletjih »zatišja« je Perko (1989) objavil članek o pokrajinski sestavi in prebivalstvu, v katerem je s pomočjo novih računalniških metod na primeru Krške kotline ugotavljal povezanost naravnih in družbenih pokrajinskih sestavin. Svoje mesto v AGS-u so dobile tudi narodne manjšine in etnične skupnosti: madžarska in nemška manjšina vzdolž meje med Avstrijo in Madžarsko (Kocsis in Wastl-Walter 1993), madžarska manjšina v Prekmurju z vidika etnične identitete (Zupančič 1993) in romska manjšina v Prekmurju z vidika demografskih značilnosti (Josipovič in Repolusk 2003). Semkaj lahko uvrstimo tudi poročilo o raziskavi perujskih priseljencev v čilsko glavno mesto Santiago (Gomez Segovia 2011). Geografija se je odzvala tudi na sodobne trende zmanjševanja rodnosti (Josipovič 2003). V zadnjih dveh letnikih so prebivalstvene vsebine doživele pravcato renesanso. Prispevki srbskih kolegov tematizirajo prebivalstvene značilnosti Vojvodine (Djurdjev, Arsenović in Dragin 2010), iščejo povezave med smrtnostjo in temperaturnimi razmerami v Beogradu (Djurdjev, Arsenović in Dragin 2012) ter primerjajo dnevne migracije v Srbiji in Sloveniji (Lukić in Tošić 2011). Vpeljane so bile nove vsebine, kot sta staranje domá s pomočjo informacijsko komunikacijskih tehnologij (Kerbler 2012) in ustvarjalne socialne skupine v Sloveniji (Ravbar 2011).

Razmeroma novo vsebinsko področje je kulturna pokrajina, čeprav je bila zastopane tudi prej, vendar v povezavi z drugimi preučevanimi vsebinami. Od druge polovice devetdesetih let 20. stoletja pa nastopa

Slika 5: Deskriptorsko polje, oblikovano iz ključnih besed člankov, ki so izšli med letoma 2000 in vključno 2009. Ker se ključna beseda geografija pojavlja v vseh člankih, smo jo izločili.

kot samostojno področje preučevanja. Slaba polovica prispevkov jo obravnava kot otipljivo, materialno enoto geografske stvarnosti, pri čemer tematizira franciscejski kataster kot ključ za njeno razumevanje (Petek in Urbanc 2004), terasirane pokrajine v Sloveniji (Ažman Momirski in Kladnik 2009), pokrajinske spremembe na območju belokrajnskega nizkega krasa (Paušič in Čarni 2012) ter njeno vrednotenje in možnosti prihodnjega razvoja na primeru največjega jadranskega otoka Krka (Rechner Dika s sod. 2011). Preostali prispevki sledijo sodobnim trendom preučevanja kulturne pokrajine, ki je bolj kot materialna stvarnost neotipljiva, občutena in dojeta (Kučan 1997; Urbanc s sod. 2004; Staut, Kovačič in Ogrin 2007; Urbanc 2008; Fridl, Urbanc in Pipan 2009).

Prometna geografija je v AGS-u dokaj slabo zastopana. Prvi vsesplošni pregled je bil objavljen v šestdesetih letih, ko je Žagar (1967) natančno predstavil značilnosti cestnega prometa v Sloveniji. Naslednji tovrstni članek, ki pa je bil vsebinsko širši, saj je obravnaval mobilnost prebivalstva (kar je bilo skladno s sodobnimi trendi v geografiji, ko so klasične prometne študije nadomestile študije mobilnosti), je bil objavljen šele po 37-tih letih, ko je Bole (2004) objavil članek o dnevni mobilnosti delavcev v Sloveniji. Sledijo še prispevki o dostopnosti do regionalnih središč (Kozina 2010), primerjalni analizi mobilnosti delavcev v največja slovenska zaposlitvena središča med letoma 2000 in 2009 (Bole 2011) ter o načrtovanju javnega potniškega prometa med mestom in zaledjem na primeru Ljubljane (Bole s sod. 2012).

3 Pregled pokrajinske ekologije in varstva okolja

V zadnjih dveh desetletjih je tematika pokrajinske ekologije in varstva okolja postala zelo prepoznavna in dobro zastopana. Od objave prvega takšnega članka leta 1993 je v skoraj vsaki številki zastopan vsaj po en članek te vrste. Okoljevarstvene vsebine so postale posebej dobro zastopane po pripojitvi nekdanjega Inštituta za geografijo, kjer je to vsebinsko področje imelo dolgo in plodno tradicijo. V zadnjem desetletju so se pojavili članki, ki so vsebinsko blizu okoljski psihologiji. Tako kot v vseh sferah javnega in družbenega življenja je tudi v znanosti precejšnjo težo dobil pristop od spodaj navzgor, s poudarkom na odnosu ljudi do določenega problema oziroma način njihovega dojemanja določene problematike. V tej široki in raznoliki skupini je najbolj pogosto preučevanje različnih vidikov oskrbe s pitno vodo, še posebej iz podzemne vode. Prvi tovrstni članek izpod peresa madžarskih kolegov (Balogh in Lóczy 1993) je bil izrazito fizičnogeografski. Sledilo je več člankov, ki so obravnavali vpliv človeka na stanje virov pitne vode. Poudarek je bil na ranljivosti vodnih virov (Brečko Grubar 1999), njihovem obremenjevanju zaradi gnojnih objektov (Kladnik, Rejec Brancelj in Smrekar 2003), nelegalnih odlagališčih odpadkov (Breg, Kladnik in Smrekar 2007; Matos, Oštir in Kranjc 2012) in onesnaževalcih (Ravbar 2006). Zanimanje za to temo je povezano tudi z vse večjo družbeno ozaveščenostjo o pitni vodi in pomenu zagotavljanja zadostnih količin pitne vode za prihodnji razvoj. Postalo je jasno, da prav človek kroji prihodnost in sta zato ključnega pomena njegovo dojemanje in odnos do okolja, ki ga med drugim zaznamuje izobrazbena raven. To spoznanje se zrcali tudi v članku, v katerem je s pomočjo metode risanja spoznavnih zemljevid na nov način osvetljena problematika vodovarstvenih pasov (Smrekar 2006), avtor pa v njem že nakazuje pozneje na primeru Ljubljane še podrobneje osvetljen razkorak med deklarativno in dejansko okoljsko ozaveščenostjo (Smrekar 2011). Da sta človek in njegovo dojemanje geografskega okolja ključna za prihodnji razvoj, je razvidno iz prispevkov o varovanjih mokrišč (Polajnar 2008) in zaznavanju okoljskih problemov v turški javnosti (Şahin 2009). Durnik (2012) je na primeru Slovenije in Kanade primerjalno ovrednotil vključevanje javnosti v okoljske politike.

O varovanju, ogroženosti in degradiranosti pokrajine govorijo trije članki s poudarkom na degradaciji prsti (Repe 2002), gramoznicah v mestnem prostoru (Urbanc in Breg 2005) in okoljevarstvenih vidikih kmetijstva (Rejec Brancelj 1999). O slednjem je govora tudi v člankih, ki obravnavata kmetijstvo z vidika porabe energije (Urbanc 1998) in ekološko kmetijstvo kot možnosti za razvoj širših zavarovanih območij (Štraus, Bavec F. in Bavec M. 2011). Dva članka obravnavata členitev severovzhodne Slovenije in Dobrepoljsko-Struškega krasa, prvi na ekološke enote (Vovk Korže 1996), drugi pa na naravne enote (Hrvatin in Hrvatin 2001). Nov in svež pogled prinaša članek Interdisciplinarnost znanosti o trajnostnosti: časovna dinamika (Nučič 2012).

Za konec tega pregleda se dotaknimo še člankov, ki jih ne moremo uvrstiti v nobeno od zgoraj navedenih skupin. Prvi članek je teoretski in govori o preučevanju mednarodnih meja v geografiji in antropologiji (Kneževič Hočevar 2000), naslednji trije pa se osredotočajo na slovensko-hrvaško mejo (Pipan 2007) oziroma

njena odseka na območju reke Dragonje (Pipan 2008) in Piranskega zaliva (Kladnik in Pipan 2008). Slednji sega tudi na področji zemljepisnih imen in historične kartografije, ki je bila kot vir ali orodje vključena v več prispevkov, a je bila le redko samostojno področje preučevanja. Izjeme so prispevki o kartografskih upodobitvah Slovenije skozi čas (Gašperič 2007), zemljevidu Ilirskih provinc Gaetana Palme iz leta 1812 (Gašperič 2010) in Atlantu v povezavi s slovensko narodno zavestjo (Urbanc s sod. 2006). Pri obravnavi zemljepisnih imen je v ospredju problematika eksonimov, ki so obravnavani z vidika stopnje eksonimizacije v različnih evropskih jezikih (Kladnik 2007), pomenske razmejitve z endonimi (Kladnik 2009) in njihovega poznavanja v slovenski strokovni javnosti (Kladnik in Bole 2012). Sploh prvi članek na temo zemljepisnih imen v AGS-u je bil namenjen predstavitvi geografskih problemov imenoslovja na primeru Kamniško-Savinjskih Alp (Peršolja 1998). Povsem novo, v novejših let čedalje bolj priljubljeno dimenzijo obravnave zemljepisnih imen odpira prispevek o pomenu ledinskih imen za preučevanje kulturne pokrajine (Penko Seidl 2008).

Svoje mesto v AGS-u je le redko našla kulturna dediščina; v povezavi s turističnim potencialom demografsko ogroženega območja Jurklošter jo tematizira Topoletova (2009), vlogo inventarizacije in tipizacije pri učinkovitem varovanju drevesne dediščine pa sta opredelili Šmid Hribarjeva in Lisčeva (2011), ki s svojim

Slika 6: Deskriptorsko polje, oblikovano iz ključnih besed člankov s področja pokrajinske ekologije in varstva okolja, objavljenih v celotnem obdobju.

prispevkom že posegata tudi na področje naravne dediščine. Semkaj bi lahko prišteli še vrsto člankov iz tematske številke na temo geoturizma (Hose s sod. 2011; Hose 2011; Vujičić s sod. 2011; Yiping in Luk 2011; Vasiljević s sod. 2011).

Novo tisočletje je prineslo prispevke, ki jih ne moremo uvrstiti v nobeno od »klasičnih« podskupin humane geografije, so pa odraz sodobnih trendov v geografiji. Percepcija, preučevanje načina, kako posamezniki dobivajo, vrednotijo ter shranjujejo informacije in jih potem vgrajujejo v svoje vsakdanje življenje, so z zamikom prišli tudi v slovensko geografijo. V tem duhu sta zasnovana prispevka o prostorskem dojemanju Sredozemlja v Sloveniji (Staut, Kovačič in Ogrin 2007) in pomenu učiteljevega zaznavanja prostora v izobraževalnem procesu (Fridl, Urbanc in Pipan 2009).

Preostane še skupina člankov, ki jih lahko uvrstimo v več skupin. Mednje spadajo članki, ki obravnavajo gospodarsko geografijo in geografijo naselij med Savo in Sotlo (Kokole 1956), družbenogeografski razvoj Zgornjega Dravskega polja (Pak 1969), prebivalstvo, poselitev in promet na Ljubljanskem barju (Orožen Adamič 1985) ter družbenogospodarsko preobrazbo občine Domžale (Pelc 1993).

Ti, nazadnje navedeni članki pa so le eni od mnogih, ki nakazujejo splošno usmeritev AGS-a k sledenju zamisli o celovitosti oziroma kompleksnosti geografije. Politika uredništva znanstvene revije in izdajatelja GIAM-a je vrsto let sledila akademiku Svetozarju Ilešiču in njegovim smernicam pri umeščanju geografije kot »*vede o medsebojni povezanosti pojavov na zemeljskem površju in njegovih posameznih delih*« (Ilešič 1979). Čeprav je v posameznih člankih poudarjen določen pojav ali vrsta pojavov, so njihovi idejni koncepti umeščeni v širši kontekst vzročno-posledične geografske celote. Še bolj kot v sodobnem času, ko gre geografija pogosto v smer ozke specializacije in se povsem realno sooča z nevarnostjo izgube svojega temeljnega bistva in poslanstva, je bila ideja kompleksne geografije trdno zasidrana med avtorji prispevkov v šestdesetih in sedemdesetih letih prejšnjega stoletja. Lep primer teh prizadevanj je preučevanje Ljubljanskega barja, ki je bilo krovna tema, razdeljena na podteme. In te podteme oziroma ožja raziskovalna področja so bila v AGS-u predstavljena v samostojnih člankih. Iz posameznih prispevkov o rabi pogonskih moči pritokov (Natek 1985a), kmetijski rabi (Natek 1985b), prebivalstvu, poselitvi in prometu (Orožen Adamič 1985), pa tudi o geomorfološkem razvoju (Šifrer 1984) in značilnostih poplav (Kolbezen 1985), dobimo celovito in celostno oziroma kompleksno podobo Ljubljanskega barja. Podobna krovna tema s kar 18 članki je bila tudi obravnava poplavnih območij, pri čemer so bila ta opredeljena v kontekstu učinkov naravnogeografskih zakonitosti in najrazličnejših prostorskih posegov človeka (Natek in Perko 1999). Prav kompleksnost, celovitost, medsebojna prepletenost in širina pogledov so zagotovo poglavitne vrednote naše revije.

4 Sklep

V AGS-u se »*… zrcalijo raziskovalna dejavnost, usmerjenost in razvoj inštituta kakor tudi slovenske geografije nasploh …*« (Natek in Perko 1999) in obenem vsebinski razvoj GIAM-a, ki revijo izdaja. Tako so se po priključitvi Inštituta za geografijo ob fizičnogeografskih člankih vse bolj uveljavljali prispevki z družbenogeografskimi vsebinami (Zorn in Komac 2010). V šestih desetletjih izhajanja se je zgodil premik od opredeljevanja in analiziranja geografskih pojavov k problemskemu pristopu ter iskanju vzročno-posledičnih povezav in odzivom na aktualno družbeno dogajanje. V prvih desetletjih so bili prispevki premočrtno geografski, pozneje, zlasti po osamosvojitvi Slovenije, pa je skladno s splošnimi svetovnimi trendi v ospredje raziskovalnega dela stopila interdisciplinarnost. V tem času se je zgodil tudi precejšen vsebinski premik od klasičnih tem humane geografije k sodobnim temam, kot so mobilnost, trajnostni razvoj, globalizacija. V prispevkih se zrcali, da je pisanje člankov (in raziskovalno delo, ki stoji za njimi) postalo izrazito skupinsko oziroma moštveno delo in, da se je slovenska znanost odprla navzven, kar se kaže v objavah avtorjev, ki prihajajo iz različnih ustanov ter vse bolj številnih prispevkih tujih avtorjev. Prvi članki tujih avtorjev so bili objavljeni leta 1993. Doslej jih je izšlo 20, od tega dva v soavtorstvu tujcev in Slovencev. Zlasti v zadnjih letih med tujimi avtorji prevladujejo srbski. Leta 1993 je bilo prelomno tudi glede soavtorstev; takrat so namreč v soavtorstvu izšli prvi članki (Balogh in Lóczy 1993; Kocsis in Wastl-Walter 1993; Lóczy in Szalai 1993; Vrišer in Rebernik 1993). V naslednjih dveh desetletjih je dobra polovica člankov sad individualnega dela, petina jih je nastala v soavtorstvu dveh, šestina v soavtorstvu treh in desetina v soavtorstvu štirih ali več avtorjev.

Slika 7: Deskriptorsko polje, oblikovano iz imen 37 avtorjev, ki so objavili vsaj dva samostojna ali skupinska članka s področja humane geografije in varstva okolja. Prevladujejo nekdanji ali sedanji sodelavci GIAM-a. Vseh avtorjev je 109.
Glej angleški del prispevka.

Na področjih humane geografije in varstva geografskega okolja oziroma pokrajinske ekologije je AGS v šestih desetletjih obstoja naredila dolg korak od »inštitutske« revije (ki je bila sicer vedno odprta za zunanje avtorje) z omejenim naborom tem do čedalje bolj ugledne mednarodne revije, odprte vsem geografskim raziskovalcem in najrazličnejšim temam. Z odprto uredniško politiko, bogato slikovno opremljenostjo ter zgodnjo in dosledno prisotnostjo na medmrežju se lahko vse bolj meri z najboljšimi evropskimi geografskimi znanstvenimi revijami.

5 Literatura

Glej angleški del prispevka

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A RECONSTRUCTION OF THE PLEISTOCENE MAXIMUM IN THE ŽIJOVO RANGE (PROKLETIJE MOUNTAINS, MONTENEGRO)

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The Žijovo Range, shepherds' huts in the Rikavac Pasture.

A Reconstruction of the Pleistocene Glacial Maximum in the Žijovo Range (Prokletije Mountains, Montenegro)

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ABSTRACT: The Žijovo Range belongs to the Prokletije Mountains of Montenegro and is located in the extreme southeast, on the border with Albania. Glacial processes were intensively active in this range during the Pleistocene. This is indicated by erosive and accumulative glacial features of relief that have been preserved due to the favorable geologic structure. The glacial maximum in the Žijovo Range is characterized by a unique glacier on the entire area of the range. Preglacial relief prevented the formation of a typical icecap glacier. Due to drainage of the central glacial mass in the direction of the preglacial valleys, there was a transection glacier in the central, northern, and northwestern parts, and an icefield glacier in the eastern and southeastern parts of the Žijovo Range. These glaciers covered an area of 180 km during the glacial maximum.

KEY WORDS: geography, glaciations, glacier reconstruction, Pleistocene, Žijovo Range, Prokletije Mountains, Montenegro

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1 Introduction

Studies of the Pleistocene glaciation of the mountains of Montenegro have intensified in the last two decades, in parallel with studies of current glaciers in the region. However, the Dinaric and Prokletije Mountains of Montenegro were at the focus of researchers' attention even at the end of the nineteenth century and in early twentieth century, at the very beginning of the first studies of Pleistocene glaciation (Renji 1901; Hasert 1901; Martel 1908; Cvijić 1903, 1913). The results of these studies laid the methodological foundation for future reconstruction of the Pleistocene glaciation.

Past studies detected glacial traces on many mountains in Montenegro's Dinaric and Prokletije group, and systematic research was carried out on some of them. Some mountains, including the Žijovo Range, attracted the attention of researchers almost a century later.

This paper has three principal aims: 1) to present geomorphological evidence of extent of the glacial maximum in the Žijovo Range, 2) to establish the type and volume of glacial maximum, and 3) to determine the equilibrium line altitude (ELA) during the glacial maximum.

2 Study area

The Žijovo Range belongs to the Prokletije Mountains of Montenegro and is located in the extreme southeast, on the border with Albania (Figure 1). It lies in the zone in which the Dinaric Mountains (oriented northwest-southeast) meet the »Albanian« mountains (oriented almost along the meridian; Cvijić 1899). The Žijovo Range is a group name for a several peaks that rise above the Kuči Plateau. One of these is also named Mount Žijovo. Therefore, this range is also known as the Kuči Range.

The summits that rise above the Kuči Plateau reach elevations between 1,800 and 2,200 m. Mount Surdup is the highest peak, at 2,184 m. In the central part of the range all summits are above 2,000 m. The Kuči Plateau is divided into three smaller parts: the Kržanja–Orahovo Plateau, the Kučka Krajina Plateau, and Korita Kučka Plateau.

The Žijovo Range is a watershed between two sea drainage basins and four river drainage basins. The major part of its area belongs to the Adriatic Drainage Basin (the Cijevna and Little Rijeka [*Mala Rijeka*] rivers) and its northern part belongs to the Black Sea Drainage Basin (the Tara and Lim rivers).

The study area is almost entirely composed of carbonate rocks from the Mesozoic Era. Dolomites and dolomite limestone are predominant, but there are also limestone and limestone breccia (Djokić et al. 1968). Sedimentary rocks shaped by glacial and slope process are found on the mountain slopes, at the bottom of cirques, and in larger dolines, as well as on the Kuči Plateau.

3 Research methodology

Field surveys and field mapping in the Žijovo Range were carried out between 2003 and 2012. The main goal was to identify and delineate glacial landforms and sediments and to genetically interpret them. Paleo-glacial features such as cirques, glacial troughs, roches moutonnées, glacial shoulders, nunataks, glacial erratics, and glacial sediments were entered into the field map. Remote-sensing techniques were used to detect large features, for which aerial photographs were used (Vojnogeografski institut 1982).

The data obtained from the field and remote-sensing methods were entered into a thematic geomorphological map, the base of which is a 1 : 25,000 oro-hydrographic map. Analyzing the geomorphological map that was constructed, data were obtained on landform morphology, relief genesis, and the spatial arrangement of relief elements and their interrelationships.

The glacial sediments detected in the Žijovo Range were processed with basic field techniques commonly used in the description and analysis of glaciogenic sediments, such as sediment texture, particle morphology, bedding, and so on (Hubbard and Glasser 2005). For particle-size classification, a diagram assembled by Blott and Pye (2001) was used. On the basis of lithostratigraphic and morphostratigraphic characteristics, glacial sediments were divided into lower lithologic units, following the principles of the formal stratigraphic approach developed for Quaternary glacial records in mountain regions (Hughes et al. 2005). The lithostratigraphic hierarchical terms used in this article correspond to a formal stratigraphic approach.

The glacial maximum in the Žijovo Range is defined by the lowermost limit of glacial deposits. Flint's glacierization model of »windward growth« (1971) was used to explain glaciation type and the size of glaciation in the Žijovo Range. The main characteristic of this model emphasizes the role of precipitation in the mountain area in glacier growth. This model explains the high mountain glaciation formed in the direction of the main air mass circulation.

Figure 1: Geographic position of the study area.

The morphological characteristics of broader surroundings of the Žijovo Range, canyon valleys, and wide plateau modified the scope of glaciation and therefore the length of the glacier. For this reason, applying the median altitude method (Porter 2001) to reconstruct the equilibrium line altitude (ELA), which lies at the halfway point between the head of a glacier and its terminus, does not yield reliable results for all glaciers. Due to the most favorable morphological characteristics for undisturbed movement of glaciers through the preglacial Veruša and Brskut valleys, a combination of different methods for defining the ELA was applied to the Pleistocene Širokar and Bukumir glaciers. Comparing the results for the ELA of adjacent mountains (Milivojević 2004; Milivojević et al. 2008), the best result was obtained using the THAR (terminus-to-head altitude ratio) method when the value 0.4 was used for THAR in the equation (Figure 2), as suggested by Meierding (1982).

$$ELA = A_t + THAR\ (A_h - A_t),$$

where A_t is altitude of the terminus of a glacier, A_h is altitude of the head of a glacier and THAR = 0.4.

4 Previous studies of glaciation in the Žijovo Range

At the beginning of research on the Pleistocene glaciation in the Balkan Mountains, the Kuči Range represented a major organizational challenge, considering the political circumstances and situation in the field around 1900. Nonetheless, several leading researchers carried out studies as part of larger expeditions on the Kuči Range. Their research sought to confirm the existence of morphological traces of the Pleistocene glaciation.

The first confirmation of Pleistocene glaciers was provided by Hasert (1901), who detected a ground moraine at Lake Bukumir, and so he assumed that the glacier there had descended to 1,450 m. That same year, Renji (1901) found traces of glaciation around Lake Rikavac, on Mount Širokar, and in the Veruša Valley. The existence of moraine material on the Kuči Plateau, and also fluvioglacial material in the basins of the Cijevna and Little Rijeka rivers, were first detected by Martel (1908). He also mentioned west-oriented cirques in the Žijovo Range.

Jovan Cvijić paid special attention to reconstruction of glaciation in the Žijovo Range. Considering glaciation in the mountains of the Balkan Peninsula, he assumed that the elevation of the snow-line on Mount Širokar was between 1,600 and 1,700 m (Cvijić 1903). He talked about the Žijovo Range and the Kuči Plateau especially in his paper on glaciation of the Prokletije Mountains (Cvijić 1913), in which he also mentioned the »Kuči Glacier of karst type.« According to him, this glacier covered 115 km^2 and was not a unique ice cover; there were also several local glaciers (the Širokar Glacier, Rikavac Glacier, Maglić Glacier, and Bukumir Cirque on the southern side of Mount Surdup in the Žijovo Range, on Mount Kostić, and on Orahovo Hill). These glaciers moved towards the normal valleys of adjacent rivers (Cvijić 1913).

In recent years, the Pleistocene glaciation of the Žijovo Range has again attracted researchers' attention (Petrović 2007; 2009). The objective of this study was to reconstruct the Pleistocene glaciation in the Žijovo Range and on the Kuči Plateau. The influence of the Pleistocene glaciation on the current relief of the range was also studied, especially on the morphological diversity of uvalas in it (Djurović et al. 2010).

5 Pleistocene glacial relief features in the Žijovo Range

The traces that glaciers left in the Žijovo Range are well preserved. This is due to the geological structure of the range, in which carbonate rocks predominate. Because karst processes were dominant in the Holocene in this range (Djurović et al. 2010), there was no possibility for the development of surface watercourses that would destroy previously formed macro- and meso-relief features through erosion.

Research on the glaciation of the Pindus Mountains in northwestern Greece has concluded that glacial processes develop better on a limestone base than on other rocks, especially magma, and that this also preserves their traces well (Hughes et al. 2007). The development of glaciation on a karst surface also creates specific relief features known as glaciokarst (Cvijić 1913; Djurović 1996; Stepišnik et al. 2009; Stepišnik & Žebre 2011), which can also be found in the Žijovo Range. For all of these reasons, it is possible to clearly identify erosive and accumulative relief features of the Pleistocene glacial process in the Žijovo

Range (Petrović 2009). Considering the large number of features, this article presents only the most important features for reconstructing the glacial maximum.

5.1 Cirques and glacial troughs

Cirques are predominant large features of the glacial process in the Žijovo Range (Figure 5). Based on their characteristics, they can be divided into three groups: cirques in the central part of the range, in the western edge of the range, and in the eastern part of the range.

Based on their appearance, the cirques in the central part of the range correspond to features created by glaciers of the valley type. In their size and morphology, the Širokar, Surdup, and Gladišta cirques especially stand out (Figure 5). Typical glacial troughs spread below these cirques, whereby they differ from the majority of other cirques in the range.

The Surdup Cirque is the most distinct representative of this group of cirques (Figure 3). It is located on the northern side of Mount Surdup, the highest summit. Steep ridges rise over 200 m above its bottom, located at 1,800 m. The Surdup Cirque is 1,250 m wide and 550 m long. It is exposed to the north, where there are two passages to the glacial trough. Between these passages rises Pašjak Nunatak (2,052 m), a typical nunatak. Glacial shoulders are visible on the sides of Pašjak Nunatak. Below the cirque, to the northwest, the Bukumir Glacial Trough is over 5 km long. The bottom of the glacial trough is covered with roches moutonnées and hollowed areas with lakes. The largest lake is Lake Bukumir (Figure 4-1).

The cirques on the western edge of the range were first identified by Martel (1908). They are distinctive because the Pleistocene glacier flowed directly from them over the western part of the Kuči Plateau (the Kržanja–Orahovo Plateau). This group of cirques also includes the Žijovo Cirque, Radan Cirque, Bokjen Cirque, and Šila Cirque. Based on the field survey and mapping, as well as aerial photograph analysis, a clear reconstruction was made of the former threshold that separated these cirques from the plateau. Today this threshold has been significantly altered by post-glacial processes.

The Žijovo Cirque is located west of Mount Žijovo. It has high ridges on three sides (Figure 4-2). The bottom lies at 1,750 m. It is 1,000 m wide and it extends 1,500 m to the northwest. The Žijovo Cirque looks like a complex cirque (Benn & Evans 1998), which is one of the distinctive characteristics of this group of cirques. On the sides of this large cirque there are several hanging cirques (at 1,970 m) created during younger phases of glaciation. The remains of the threshold that morphologically separates the Žijovo Cirque from the plateau are at 1,790 m.

The cirques in the eastern part of the Žijovo Range are located in the northeastern and eastern part of the study area, between the Cijevna Canyon to the east, the Kuči Plateau to the south and southeast (the Korita Kučka and Kučka Krajina plateaus), and the Skrobotuša Valley to the north (Figure 5). The average elevation of this part of the mountain is over 1,700 m. It is located between two sequences of mountain summits over 2,000 m and it is slightly centrally arched (Figure 4-3). Considering that the entire area was beneath a unique glacier for long time, cirques of specific types were created. They have a large area (over 10 km^2) and volume. They do not have high ridges on all sides, and so they seem less distinctive than

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Figure 3: The current appearance of the Pleistocene Surdup Cirque.

Figure 4: 1) Lake Bukumir, 2) the Žijovo Cirque and part of the Kuči Plateau, 3) the eastern part of Mount Žijovo, and 4) Lake Rikavac with the threshold in the background.

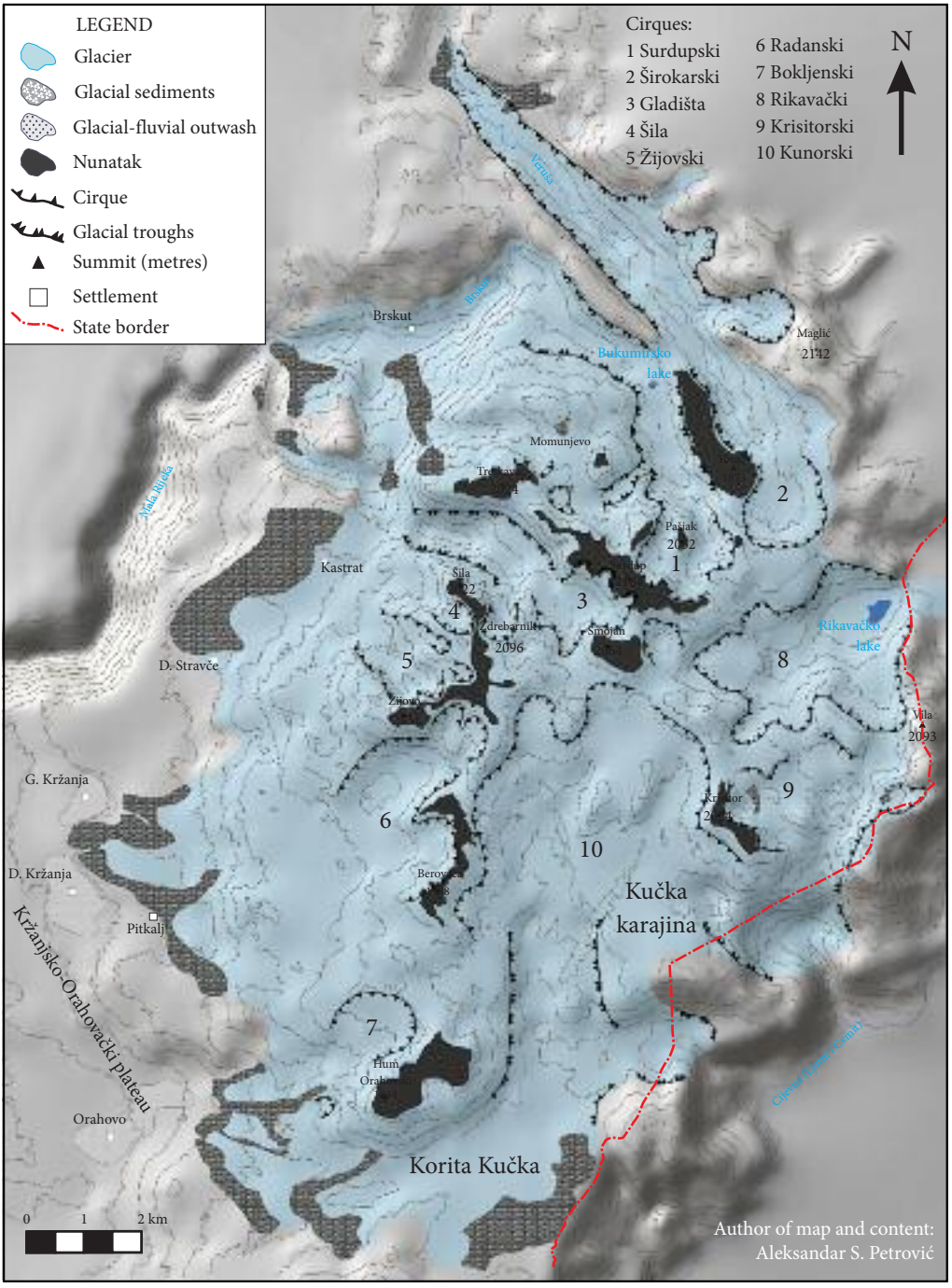

Figure 5: Glacial geomorphological map of the Žijovo Range; glacial maximum.

the other cirques. It is clearly possible to single out three larger cirques: the Rikavac, Krisitor, and Kunora cirques. The Rikavac Cirque has a lowered threshold connected to the Skrobotuša Glacial Trough (in Albania).The Krisitor Cirque is open to the Cijevna Canyon (Albanian: *Ljumi i Cemit*). The Kunora Cirque opens wide to the Cijevna Canyon and the southern part of the Kuči Plateau (the Korita Kučka and Kučka Krajina plateaus).

The Rikavac Cirque was formed by alteration of the tectonically predisposed preglacial uvala in the meridian direction (Petrović 2009). It does not have the amphitheater-like appearance of a cirque, but its bottom is separated from the steeper sides of the mountains by part of the cirque with gentler slopes. On the higher edge of the cirque there are several hanging cirques from younger glaciation phases; therefore the Rikavac Cirque is also complex. At the bottom of the cirque (1,300 m), in front of the threshold that separates it from glacial troughs, is Lake Rikavac (Figure 4-4).

5.2 **Pleistocene glacial sediments**

The Pleistocene glacial sediments in the Žijovo Range and on the adjacent plateau belong to the Kuči group, which is composed of several formations: the Veruša Valley, the Bukumir Cirque, Plateau Momunjevo, Mount Žijovo, the Radan Cirque, the Bokjen Cirque, the Kunora Cirque, the Krisitor Cirque, and the Rikavac Cirque. For reconstructing the maximum volume of glaciation during the Pleistocene, the most important role is played by the glacial sediments of the Kržanja Member, and so they are presented below separately from the formation they belong to.

The Kržanja Member comprises glacial sediments located on the Kuči Plateau and in the Veruša and Brskut valleys (Figure 5). They are the lowest glacial sediments in the range and according to this criterion they are classified into the same group. However, their elevation differs significantly. The glacial deposits in the Brskut Valley are the lowest (1,050–1,100 m) because of the tectonic escarpment towards the valley. The terminal moraine in the Veruša Valley (1,245 m) was created by a glacier that freely moved along the preglacial river valley. Moraine crests on the western part of the Kuči Plateau (the Kržanja–Orahovo Plateau) vary in elevation (1,150–1,520 m) due to the different incline of the plateau, the vicinity of canyon valleys, and the size of the glacier accumulation area in the background.

The lowest glacial sediments accumulated in the Brskut Valley (1,050–1,100 m). The Brskut Valley is a tectonically predisposed relief feature created by the relative descent of boulders inside the Durmitor flysch geological unit (Djokić et al. 1968). The glaciers from the Žijovo Range fell from the steep escarpments of the Brskut Valley, 200 m high, accumulated glacial material, and melted there. Through orographic influence, the glacial sediments formed in this manner are located at rather low elevations compared to other Kržanja Member representatives. In the post-glacial period, the Brskut River carried this material further to the Little Rijeka and Morača rivers. The glacial and glacio-fluvial material in the Brskut Valley includes sand, mud, sandy clays with fragments of various sizes, pebbles, semi-rounded and partly rounded limestone, and dolomite boulders (Živaljević et al. 1967).

Moraine crests near the village of Donja Kržanja (1,150–1,200 m) are typical examples of glacial sediments of the Kržanja Member (Figure 6). Two lateral moraine crests are evident as well as a frontal moraine penetrated by a glacier stream, below which there is a glacio-fluvial outwash fan. South and north of them, there are two more parallel moraine crests above the villages of Pitkalj and Gornja Kržanja (Figure 5).

Similar image can be seen above village of Orahovo, where at the same elevation (1,150 m) there are two crests of terminal moraines and several lateral moraine crests in one sequence (Figure 5).

The terminal moraine in the Veruša Valley is well preserved. It transversally partitions the valley and it is open only at the place where the river penetrates the crest. The crest is at 1,240 m; that is, 40 m above the bottom of the Veruša Valley. It is 450 m long (Cvijić 1913; Petrović 2007).

Considerable glacial sediments in the form of two interconnected terminal moraine crests are located above the village of Gornje Stravče and the shepherds' huts (*katun*) in the Kastrat Pasture. The terminal moraine in the southern part has a typical arch-like appearance and is at a lower elevation (1,350 m). Due to the vicinity of an escarpment towards the Brskut Valley over which part of the ice fell from the plateau, the northern part of the crest in the Kastrat Pasture is at a higher elevation (1,540 m). The crest is 3 km long and over 500 m wide (Figure 7). The sediments are poorly sorted and well distributed, consisting of large and medium-large sub-rounded and rounded limestone and dolomite boulders, between which there is sub-angular and sub-rounded gravel, sand, and clay.

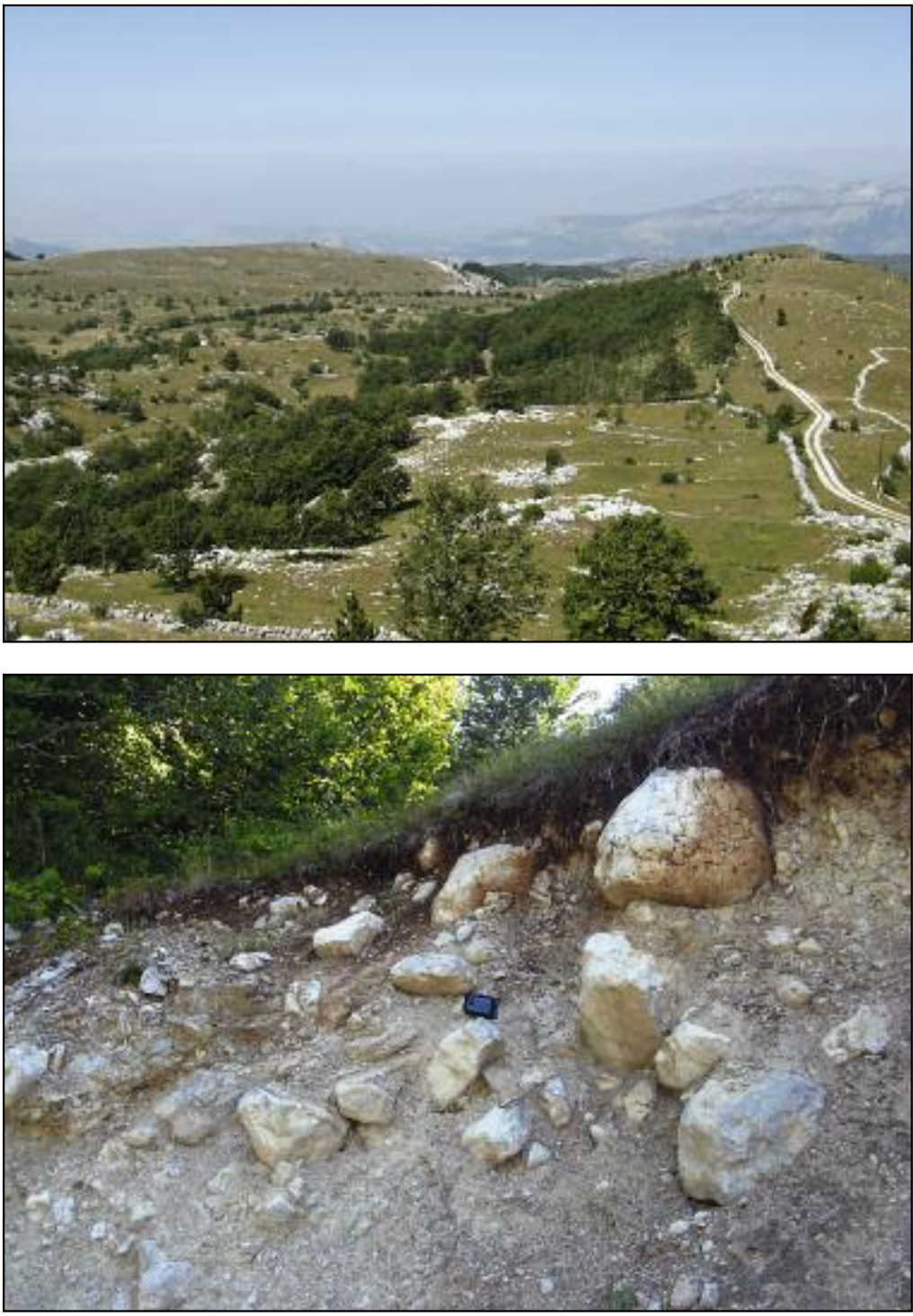

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Figure 6: Moraine crests near Donja Kržanja and the profile through terminal moraine at Donja Kržanja.

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Figure 7: Northern part of the crest at the shepherds' huts in the Kastrat Pasture and the profile through the terminal moraine in the Kastrat Pasture.

6 Reconstruction of the Pleistocene glaciers

The distribution of the Kržanja Member moraines over the Kuči Plateau and in the Veruša Valley indicates that during the most intensive phase of glaciation the Žijovo Range was covered by a unique glacial mass. However, the distribution of cirques and nunataks over the range indicates that the thickness of the ice was not enough to cover all of the peaks. Generally, there were several interconnected glaciers that covered an area of 180 km^2.

In the central, northern, and northwestern part of the range a typical ice cap did not develop, but instead a transection glacier. The characteristic of this type of glacier is that climate conditions for its development are such that they allow the existence of an ice cap but, due to the dissection of relief, it does not appear in that form (Benn & Evans 1998). The existence of fluvial morphology in preglacial relief allows the formation of a system of valley glaciers that divergently spread from the center of the range and separate into one or more glaciers. Moving through the preglacial river valleys, the glaciers moved far from the central parts of the range. The Širokar Glacier was 10 km long and it extended from Mount Širokar (1,800 m) to Mount Suvo Polje (1,200 m). Glacial sediments near the village of Brskut indicate that the Bukumir Glacier descended to 1,050 m and that it was as long as the Širokar Glacier. A similar thing happened to a glacier that descended fromPlateau Momunjevo (1,750 m). The glacier moved towards the Brskut Valley and after 6 km it fell over a 300 m escarpment, after which it merged with the Bukumir Glacier. The Guzovalja Glacier formed in the central part of the range. The summits over 2,000 m (mounts Surdup, Smojan, and Ždrebarnik) were in the background of the source part of the glacier. After 3.5 km it reached the escarpment above the Brskut Valley (the shepherds' huts in the Bljuštur Pasture), over which it descended and merged with part of the Žijovo Glacier. This unique glacier moved 3.5 km further through the Velji Do Uvala and to an elevation of 1,100 m.

The glaciers that were formed in the westward-oriented cirques were not very long because after the cirques they immediately flowed over the karst Kržanja–Orahovo Plateau. Their length, together with the length of glacier in the cirques, was between 3 and 6 km. They were formed in larger cirques, below summits that exceed 2,000 m. Due to the considerable power of these glaciers, a significant quantity of glacial sediment was moved and accumulated on the plateau.

The eastern part of the Žijovo Range was under a unique ice cover that mostly resembled an icefield glacier, above which only the Krisitor Cirque protruded in the form of a nunatak (Figure 3). It differs from an ice cap in that it did not have a domelike surface and its flow was influenced by the underlying topography. The central arch of the eastern part of the range forced the ice to move in three directions: towards the Skrobotuša Valley to the north, towards the Cijevna Valley to the east, and towards the Korita Kučka Plateau to the south. The Rikavac Glacier moved farthest, moving towards the north, passing the threshold from the threshold Škala to Mount Rikavac (1,420 m), and descending through the Skrobotuša Valley as a valley glacier. According to Cvijić (1913), it was one of the source branches of the Vrmuški Glacier. The Krisitor Glacier fell immediately from its cirque down the steep sides of the Cijevna Canyon. The Kunora Glacier moved to the south; part of it ended in the Cijevna Valley and the other, larger, part ended on the Korita Kučka Plateau (1,360 m) and even lower to the southwest, above the village of Orahovo (1,300 m).

7 Discussion

7.1 Type and volume of glacial maximum

During the glacial maximum there was a transection glacier in the central, northern, and northwestern part of the range. The Kuči Plateau, especially in the east, southeast, and south, was occupied by an icefield glacier. The glaciers were interconnected over a delevelled saddle on the ridges.

All morphological evidence refers to high-volume glaciations in the range. The main question regarding the glaciation volume is how such a large ice cover formed. Flint's model (1971) of high mountain glaciation formed in the direction of the main flow of air mass can explain the large quantity of snow and ice that accumulated in the Žijovo Range. This model is composed of four phases. In the first phase, the wind brings a maritime humid air mass that produces precipitation as snowstorms that fall over high

mountain summits, thereby forming an ice cover. For this phase in the development of glaciation, it is necessary to consider the maritime influence of the air mass in the Žijovo Range. The mountains in the Prokletije group are not coastal mountains, but they are broadly open to the Adriatic Sea via the Bojana Valley. The Žijovo Range is the first set of high mountains that the air mass meets, moving along the Bojana Valley and over Lake Skadar. It should also be considered that, during the most intensive phase of glaciation, the Adriatic Sea was smaller and that considerable quantities of water only lay in its southern part, in the Otranto Basin (Correggiari et al. 1996). The circulation in the atmosphere during the last glaciation was different from today. Cyclones that formed in the Bay of Genoa moved over the Adriatic Sea towards the Dinaric Mountains (Kuhlemann et al. 2009). They brought surplus precipitation to the coastal mountains of Montenegro. The cause of the ice cap on Mount Orjen, a mountain at the same latitude as the Žijovo Range, is the fact that lee-side vortices generated moisture-bearing depressions above the Otranto Basin (Hughes et al. 2010). Although these moisture-bearing depressions were weak, they still brought a considerable amount of precipitation to Mount Orjen and the adjacent mountains, including the Žijovo Range.

In the second phase of glaciation development, according to Flint's model, an ice field forms faster on the sides that receive more precipitation and it spreads towards the lower parts of the mountain. This can explain the considerable quantity of glacial mass in the eastern and southeastern parts of the Žijovo Range. Further development of glaciation causes the formation of a unique ice cover over the entire mountain. Eventually, warmer temperatures cause glaciers to melt and retreat to mountain summits.

The volume of glacial maximum is established based on the lowermost limit of glacial deposits. They are located in the Veruša and Brskut valleys and on the Kuči Plateau. Their distribution indicates the influence of preglacial relief and the vicinity of large canyon valleys on the volume of glaciation. These canyon valleys were formed by the action of rivers with a glacio-nival regime (Djurović & Petrović 2007). The glaciers from the Žijovo Range moved farthest along the Skrobotuša, Veruša, and Brskut valleys. The Kuči Plateau had the opposite influence; that is, its gentler slopes slowed down the advance of glaciers. Part of the glacial mass, together with moraine material, descended from the Žijovo Range and surrounding plateaus directly into river canyons and melted there. Therefore, the quantity of the glacial deposit on the mountain lessened as well as the power of glacier, which continued to move along the Kuči Plateau.

7.2 Equilibrium line altitude during the glacial maximum

The reconstruction of the ELA during the glacial maximum was defined by the lowest glacial sediments on the mountain; that is, by the Kržanja Member moraine crest. The THAR method was used to establish the ELA for each of the moraine crests.

The terminal moraines of the Širokar Glacier in the Veruša Valley (1,240 m), the Bukumir Glacier in the Brskut valley (1,100 m), and the Radan and Kunora glaciers on the Kržanja–Orahovo Plateau (1,150 m) were studied. These moraines indicate the size of glaciers during the glacial maximum. The average ELA for that glaciation is 1,500 m (Table 1).

Table 1: ELA during the glacial maximum calculated with the THAR method.

Glacier	At (m)	Ah (m)	ELA (m)
Širokar Glacier	1,240	1,900	1,504
Bukumir Glacier	1,100	2,100	1,500
Radan and Kunora glaciers	1,150	1,950	1,470

The ELA obtained for the Žijovo Range is rather lower than the ELA on Mount Komovi (1,700 m) during the most intensive phase of glaciation (Milivojević 2004) and the ELA of the central part of the Prokletije Mountains in Albania (1,750 m; Milivojević et al. 2008). The ELA of 1,900 m for Mount Šar (Kuhlemann et al. 2009) is higher due to greater distance of the mountain from the Adriatic Sea and high barrier for humid air in the form of the Prokletije Mountains. For the Durmitor Massif, the height of the ELA is at an elevation of approximately 1,540 m (Djurović 2009), which corresponds to the values obtained for the Žijovo Range.

8 Conclusion

During the Pleistocene, the Žijovo Range and the Kuči Plateau surrounding it were under the influence of a glacial process. This is clearly indicated by traces in the current relief, which are well preserved because of the favorable geological structure of the mountain. The Žijovo Range has erosive and accumulative paleo-features created by a glacial process, among which cirques and moraines dominate.

Geo-morphological mapping of paleoglacial features was used to reconstruct the volume and types of glaciation. Spatial distribution of cirques, waves, nunataks, and moraine crests in the range indicate the existence of a transection glacier during the glacial maximum. Preglacial river valleys allowed the glacier to drain toward the north and northwest. In other directions, the glacier flowed across the Kuči Plateau. The unique glacier on Mount Žijovo covered an area of 180 km^2.

Glacial sediments were also found in the Žijovo Range that correspond to different phases of glaciation. The lowest moraine crests in the Kržanja Member correspond to the glacial maximum. They are well preserved on the Kuči Plateau and in the Veruša Valley. Based on these, the ELA for the glacial maximum was established at 1,500 m.

Establishing the age of glacial and fluvio-glacial sediments in the Žijovo Range with the application of appropriate dating methods in future would offer better insight into glacial history. This would take the research on the Žijovo Range into the third, advanced phase in the Hughes et al. (2006) classification: understanding geochronology using radiometric dating and detailed sedimentological analyses.

9 Acknowledgments

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USE OF GEOMORPHOLOGICAL INDICATORS FOR THE DETECTION OF ACTIVE FAULTS IN SOUTHERN PART OF LJUBLJANA MOOR, SLOVENIA

UPORABA GEOMORFOLOŠKIH INDIKATORJEV ZA DOLOČANJE TEKTONSKO AKTIVNIH PRELOMOV NA JUŽNEMU DELU LJUBLJANSKEGA BARJA

Lea Žibret, Gorazd Žibret

JURIJ SENEGAČNIK

The Iška alluvial fan exdtends towards the Ljubljana moor.
Vršaj Iške sega še daleč proti Ljubljanskemu barju.

Use of geomorphological indicators for the detection of active faults in southern part of Ljubljana moor, Slovenia

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ABSTRACT: In order to detect recently tectonically active faults, *Stream Length-gradient* (SL) index and a newly developed method of river gradient analysis were made for three rivers. Two methods were used on the southern part of Ljubljana moor, where rivers cross dextral (right-lateral) faults with Dinaric orientation (NW-SE). Watercourse profiles were analysed first, using a »classic«, well established method of SL index. However, this method didn't yield useful results since almost no variability in SL indexes were observed. Additionally, a second newly developed method pointed on the anomalies, which might correspond to the areas of active surface uplift and subsidence as a consequence of active tectonic movements. We compared determined anomalies with the fault lines plotted on the Basic geological map 1 : 100.000 and with the data of radar measurements of vertical movements by PSInSAR method. In this way five potentially active faults, areas of contraction and areas of extension were determined. The results of this research can be used as complementary information for the construction of tectonic model of Ljubljana field and Ljubljana moor.

KEY WORDS: geomorphology, river gradient, SL index, dinaric faults, Ljubljana moor, Ig

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1 Introduction

Hills and alluvial fans of Borovniščica River, Iška River and several smaller streams (Figure 1) are characteristic for the southern margin of Ljubljana moor. This area belongs to the northern margin of geotectonical unit of Slovenian external Dinarides (Placer 1998; 2008) with typically thick sequence of Mesozoic shallow water carbonate rocks (Otoničar 2007; Jež et al. 2011). Towards northwest these sediments border to deep water basin environments (Šmuc and Čar 2002; Rožič et al. 2009; Gale 2010; Šmuc and Rožič 2010).

The major tectonic structures of regional importance in external Dinarides of Slovenia are so-called dinaric faults with strike parallel to the strike of Dinaric orogen (Vrabec and Fodor 2006).Their recent tectonic activity has been proved by different methods: GPS velocity vectors (2 mm/year contraction of the area in the direction north-south; Weber et al. 2006; 2010), the calculation of long-term horizontal velocity fields (the movements ~1.5 mm/year; Kastelic and Carafa 2012), mapping based on LiDAR (Cunningham et al. 2006; 2007), measurements of tectonic micro deformations (Gosar and Lenart 2010; Gosar 2012) and analysis of spatial distribution of earthquake events (Kastelic et al. 2008).

Among many available methods for proving recent tectonic activity of faults, different morphotectonic analyses are commonly used in world scientific literature. They are based on the analysis of the relation between morphology of the surface and tectonics through the calculation of different morphometric indexes. Among them is *Stream Length-gradient index* (SL index; Hack 1973) has been widely recognised. Such research has not been done jet on the territory of Slovenia.

SL index is used for separation of the areas of different tectonic activity (Viveen et al. 2012), specially for the identification of vertical tectonic movements (Burbank and Anderson 2001; Peters and Van Balen 2007). Underformed river profiles have typical concave shape (figure 2), which is relatively quickly formed due to the erosional processes, speaking from the geological perception of time. SL index is defined in the way to detect the changes in »ideal« river slope profile. Its low values can reflect either active tectonic subsidence of the area (Viveen et al. 2012) or low rock resistance to the river erosion, while high values of SL index can indicate either exalted tectonic uplift of the area or high rock resistance to the erosion (Alipoor et al. 2011).

The purpose of the research is an experimental determination of recent active tectonic movements based on the geomorphological indicators. The study area of southern border of Ljubljana moor is segmented by numerous active strike-slip faults of dinaric orientation that are crossed by three parallel watercourses: Iška, Borovniščica and Želimeljščica (figure 1). The area is mostly composed of predominately Mesozoic carbonates, which are known for resistance to the river erosion. Therefore, in this study almost all anomalies in SL index can be attributed to recent tectonic activity. The study begins with the detection of potentially tectonically active faults by SL index method after Hack (1973). After that, the same was done but by using newly developed adapted method of river gradient analysis. Results were later on interpreted by creating a test model of recent tectonic activity of the area and compared with PSInSAR radar measurements of vertical movements.

2 Materials and methods

The calculation of morphometric indexes has been applied on the digital elevation model (DEM) of 12.5 m resolution (source: The surveying and mapping authority of the Republic of Slovenia) and topographic maps of 1 : 5000 scale. *AutoCAD* and *GS Surfer* computer software were used to determine river profiles and other variables, which were later numerically processed by program *MS Excel*.

The calculation of SL index began with the creation of individual rivers cross-sections. They were later on divided into segments, which can be visually approximated by a straight line. For each observed segment SL index is defined by following equation (Hack 1973):

$$SL = (\Delta H / \Delta L)\, L, \tag{1}$$

where ΔH represents the difference in elevation for the specific segment, ΔL its length and L the distance from the river spring to the middle of the observed segment (figure 2). The ratio $\Delta H/\Delta L$ defines the gradient of the river bed on the observed segment, which was compared later on with the gradient of the theoretical

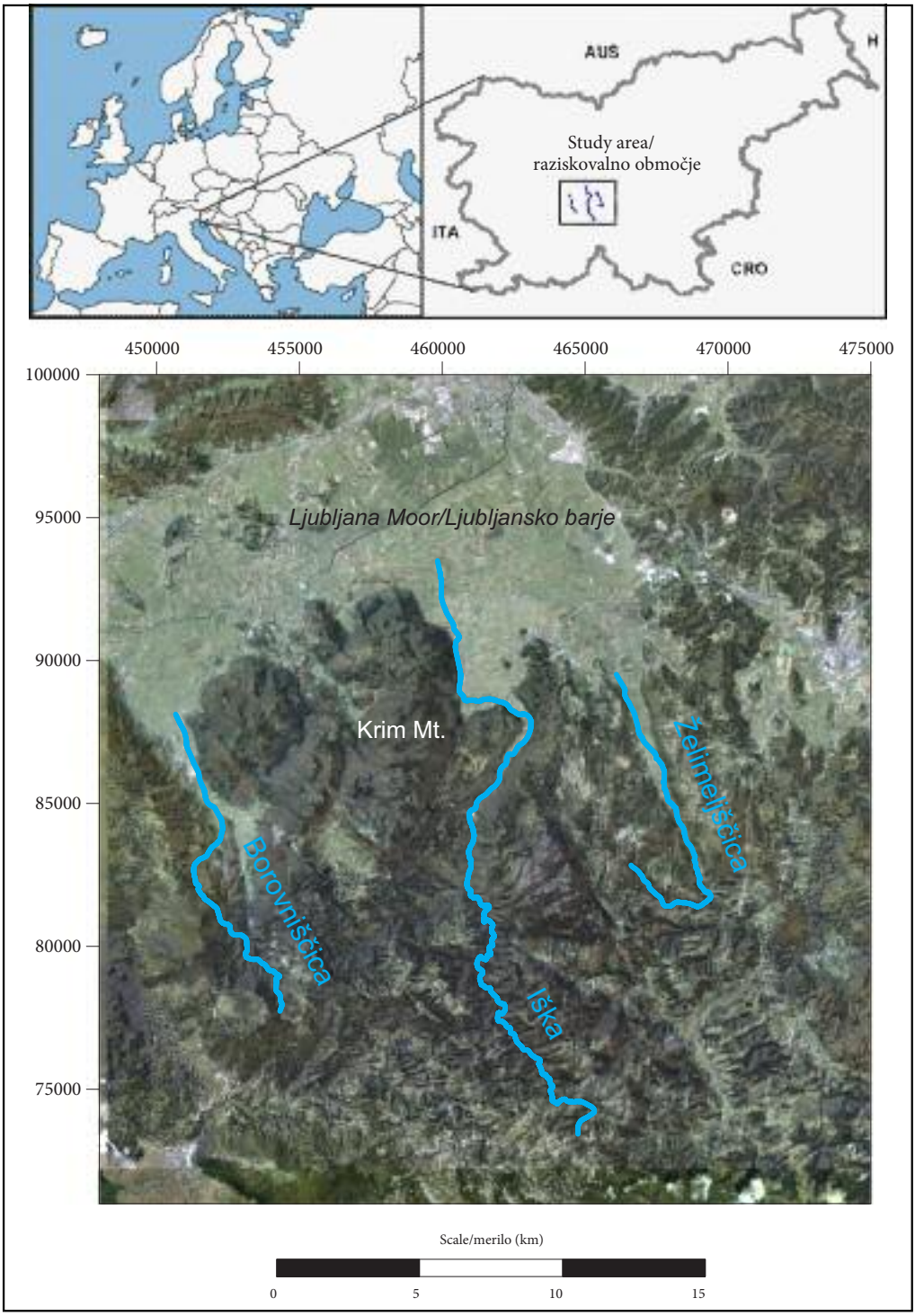


Figure 1: Research area.

»ideal« river, which decreases downwards of the river inversely proportioned to the length *L*. This is why SL index is normalized by parameter *L*, which assures constant SL index value on the entire river course, which is especially important for larger and longer rivers.

However, when we analyse only equivalent river cross-sections of smaller dimensions (fewer than 10 km) there is a question if this aforementioned normalisation makes sense and whether it is not an additional source of error. The study of Peters and Van Balen (2007) reveals that in the areas of relatively flat relief SL index does not identify tectonic activity although it is presented. Therefore an improved method of river analysis might be more appropriate. We try to develop one proposal, which was especially constructed to be used in the researched area. The benefit of this method is that it is not sensitive on the normalisation factor *L*, which can represent an additional source of error and on the other hand the subjective segmentation of river profiles is also avoided completely. Similar method for the analysis of alluvial fan cross-sections was already used by Stepišnik et al. (2007).

The new method, in contrast to the SL index method, assumes an ideal river bed profile as an exponential curve with negative exponent, like it is shown on figure 2 (Hack 1973) and equation 2:

$$H = e^{-kL+n} \tag{2}$$

where *H* is altitude, *L* is the distance from the spring towards the river flow and *k* and *n* are specific coefficients of the river, derived from the best-fit exponent regression curve to the measured data. By the derivation of both sides equation 3 is obtained:

$$dH = dL\, e^{-kL} \tag{3}$$

and later on solved by exponent:

$$dH/dL = e^{-kL} \tag{4}$$

From the equation 4 it follows that gradient (*dH/dL*) of the »ideal« river is also exponentially decreasing with negative exponent from the spring following the watercourse. Further procedure of this method

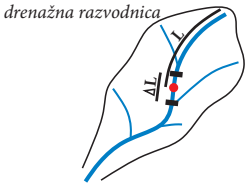
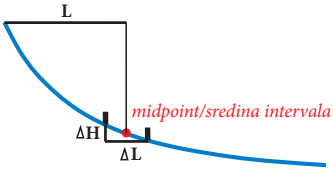
Morphometric index	Formula	Interpretation
STREAM LENGTH-GRADIENT (SL) INDEX *drainage divide/* *drenažna razvodnica*   	$SL = \frac{\Delta H}{\Delta L} L$	high values (> ~1500) when stream flows over / visoke vrednosti (> ~1500), ko potok teče čez: • tectonically active uplifts/ območja aktivnih vertikalnih tektonskih premikov • areas with high rock resistance/ območja visoko kompetentnih kamnin

Figure 2: The schematic description of commonly used morphotectonic parameter Stream Length-gradient index (Hack 1973).

includes the assessment whether actual river gradient match with the theoretical one or whether there is a significant difference. Large deviations from the ideal homeostatic state might represents a disturbance (lithological or tectonic), where elevated values of *dH/dL* can mean active tectonic subsidence and contrary, while lower values can mean active tectonic uplift. A criterion for definition of anomalies from »normal« deviations was defined by inclusion of parameter σ (equation 5).

$$dH/dL(\text{border}) = e^{-kL \pm \sigma} \tag{5}$$

Parameter σ is defined as standard deviation of natural logarithm of absolute values of differences between measured river gradient *dH/dL* and theoretically calculated river gradient, following equations 6 and 7. Equation 6 shows the calculation of standard deviation:

$$\sigma = \sqrt{\frac{\sum_{i=1}^{i\max}\left[LnGRAD_i - \frac{\sum_{n=1}^{i\max} LnGRAD_n}{i\max}\right]^2}{i\max - 1}} \tag{6}$$

where *LnGRAD* is the value of natural logarithm of the absolute value of the difference between measured and expected river bed gradient *dH/dL* and *imax* is the number of river gradient measurements. The calculation of *LnGRAD* values is presented in equation 7:

$$LnGRAD = \ln \left| dH/dL \text{ measured} - dH/dL \text{ expected} \right| \tag{7}.$$

Actual procedure begun with precise digitisation of river bed course by using program AutoCAD. DEM in 12,5 m resolution was used for creating gradient (*dH/dL*) cross section of watercourse by using program GS Surfer. Later on, the calculations of SL indexes, values of parameters *k, n* and σ and the detection of anomalies were done in program MS Excell. Later on, the locations of calculated anomalies were compared by the data from Basic geological map 1 : 100.000 (OGK). Special attention was put on the comparison of the position of major fault lines and important lithological borders (mainly carbonates – clastic sediments) drawn on OGK and the position of detected anomalies. Authors realised that the scale of used geological map is relatively small comparing to the relief shape extent, but unfortunately more precise geological maps are not available. Nevertheless based on authors' experiences on using OGK, it correctly shows the courses of main faults. Therefore we think that the use of OGK for the purpose of this research is still reasonable.

3 Results

Figure 3 shows the calculated values of SL index on all three watercourses cross-sections. Its value is in interval between 7 and 3425. Values of SL index below 500 are very low and do not mean deviations from the theoretical river slope. Significant deviation can be regarded when SL index values exceed 1500, and values over 3000 indicate extreme deviations from theoretical slope in river profile (Alipoor et al. 2011). Spatial distribution of SL index values along river watercourses of Borovniščica, Iška and Želimeljščica are shown on figure 4. Significantly increased values of SL index are only in the middle flow of Borovniščica, while for Iška and Želimeljščica, the analysis of SL index does not shows any of the potentially tectonically active areas.

Figure 5 shows the principles new method of river gradient analysis on an example of watercourse Borovniščica. Table 1 shows values of parameters *k, n* and σ for all three watercourses, and figure 6 spatial distribution of detected anomalies, which are separated according to what they show – active tectonic uplift (gradient is lower than expected) or subsidence (gradient is higher than expected) with respect to the homeostatic state. Results show the homogeneous areas of active tectonic uplift, which is expressed especially in the central part of the research area. The areas of an active tectonic subsidence are more common in the southern part of the area and in the transition of the watercourses from the Dinarides to the Ljubljana moor.

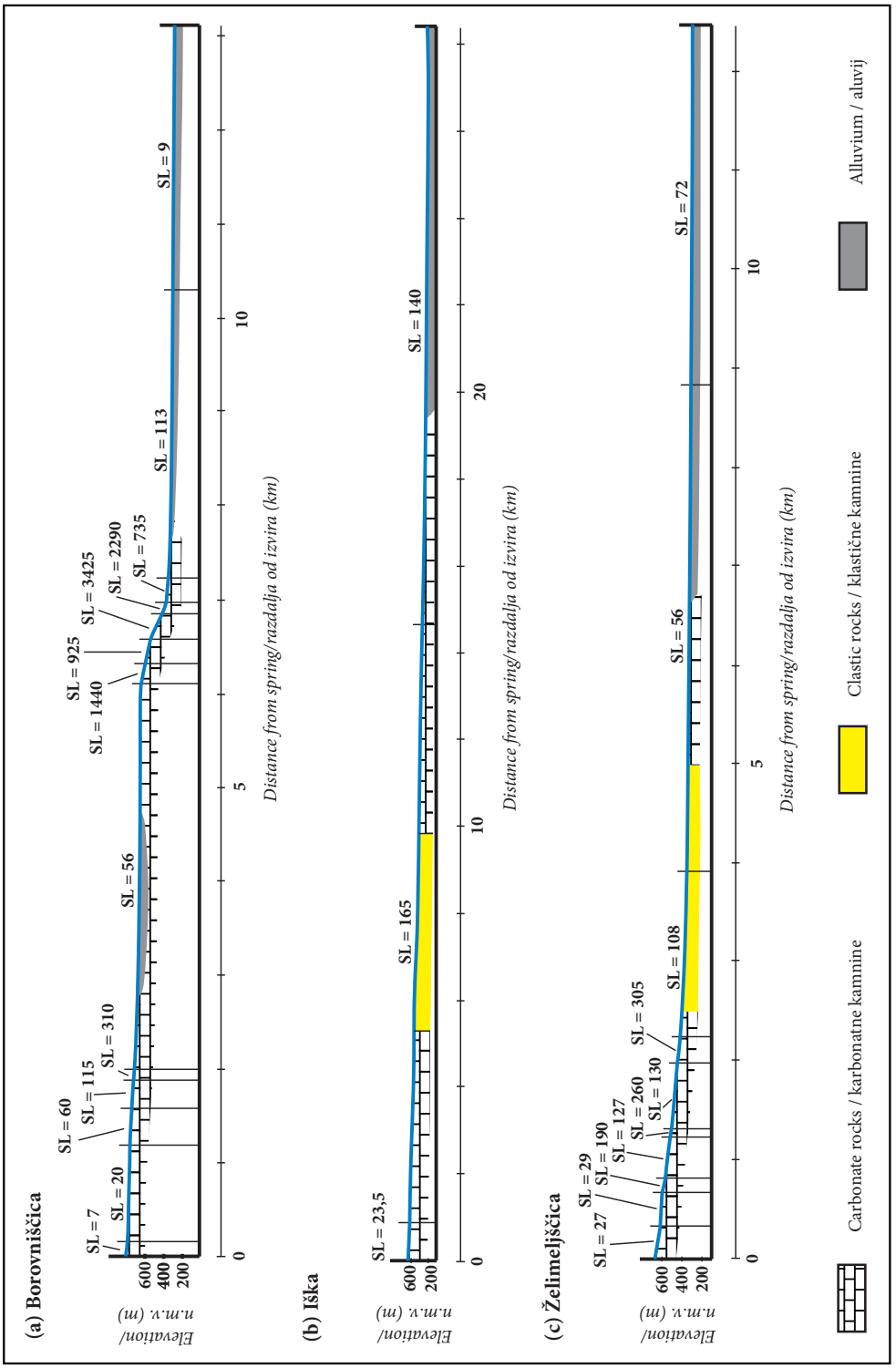


Figure 3: Segmentation and distribution of the calculated values of SL index along analysed river profiles.

Table 1: Values of parameters *k*, *n* and σ for all three rivers by using adopted method of river gradient analysis.

River	*k*	*n*	σ
Borovniščica	0,000100	2,264	1,326
Iška	0,000074	2,752	1,151
Želimeljščica	0,000191	2,402	0,864

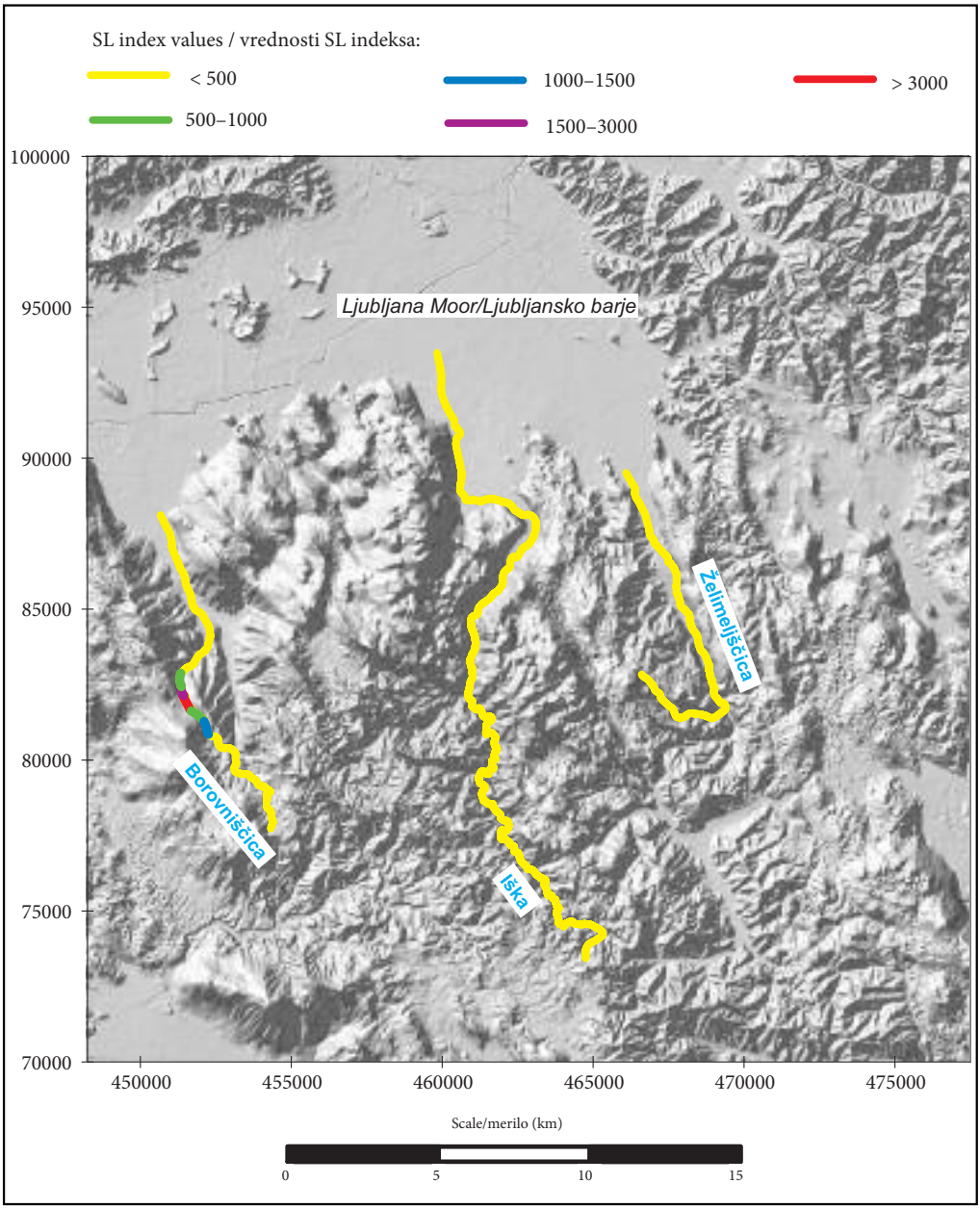


Figure 4: Spatial distribution of SL index values.

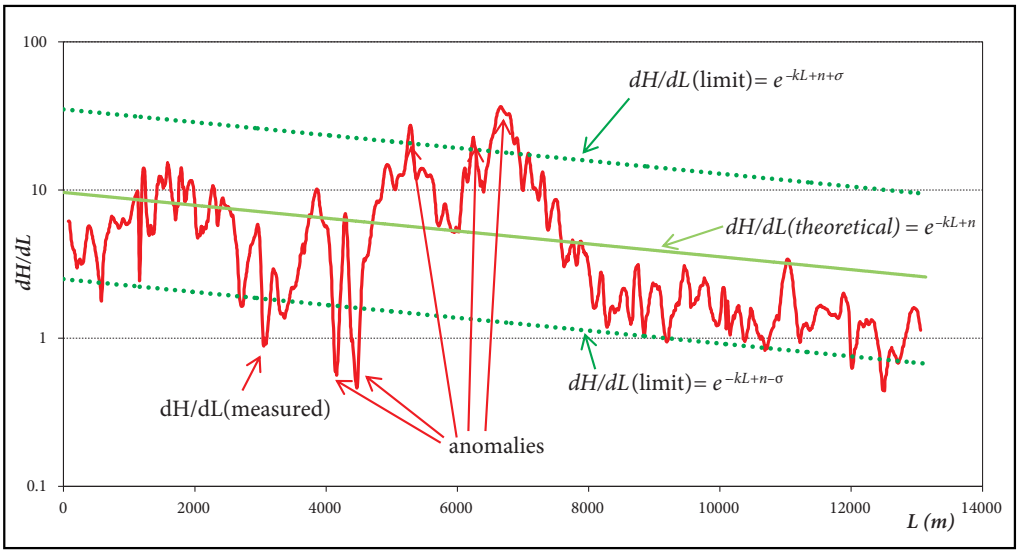


Figure 5: Representation of the river gradient analysis after adapted method on the example of watercourse Borovniščica.

4 Discussion

The interpretation begun with visual extraction of geomorphological expressed active dextral faults in the DEM (Figure 7). Unfortunately the »classical« SL-index method gave very low values of SL index (mostly below 500) over the majority of researched area and generally did not show active tectonics, although it is strongly expressed in relief and supported by constant earthquake activity in the researched area. Therefore for the determination of active faults, different methods are needed, which would expel subjective assessment and other mistakes as much as possible.

The new adopted method gives adequate variability of the results, which enables not only successful correlation with faults on OGK (Buser et al. 1963; 1965), but also the determination of possible new tectonic and geomorphologic structures in the researched area. Figure 7 shows detected anomalies in river cross sections and corresponded strike-slip faults drawn on OGK. A very good match between detected anomalies and tectonic structures is observed.

As an additional corroboration of strike-slip tectonics, the orientations of shear fractures and fault planes on smaller scale (Schmidt net, lower hemisphere) measured on the wider Krim area are presented (Figure 7). Measured orientations coincide with the orientation of major faults on OGK. Obtained results thus pointing towards the direction that indicated tectonical structures on figure 7 are most probably recently active. Lithological changes in the research area cannot satisfactory explain the anomalies, with the only exception of Želimeljščica River, where watercourse in the upper parts crosses rocs with very different resistance to erosion (sandstones, as well as conglomerates).

Collected indicators enable the interpretation attempt of recent tectonic activity in the researched area (figure 8). Areas of contraction, areas of extension and possible recently active faults and midpoints of block rotations are included. Local compression appears in narrow NNW-SSE oriented belts. One of the possible explanations is that extensional structures with general orientation north-south are the consequence of local block rotations, which can be formed in pure shear conditions, most probably induced by the nearby Žužemberk fault. The borderline between contraction and tensional areas coincides with faults from OGK (figures 7 and 8). Because the transitions between areas of active uplifts and active subsidence, calculated by the geomorphologic indicators method, are clearly defined, they most probably indicate the change in tectonic activity of the area (uplift/subsidence). Therefore we estimate that the faults, which separate the uplifted areas from subsided ones, are recently the most active faults in the area (figure 8).

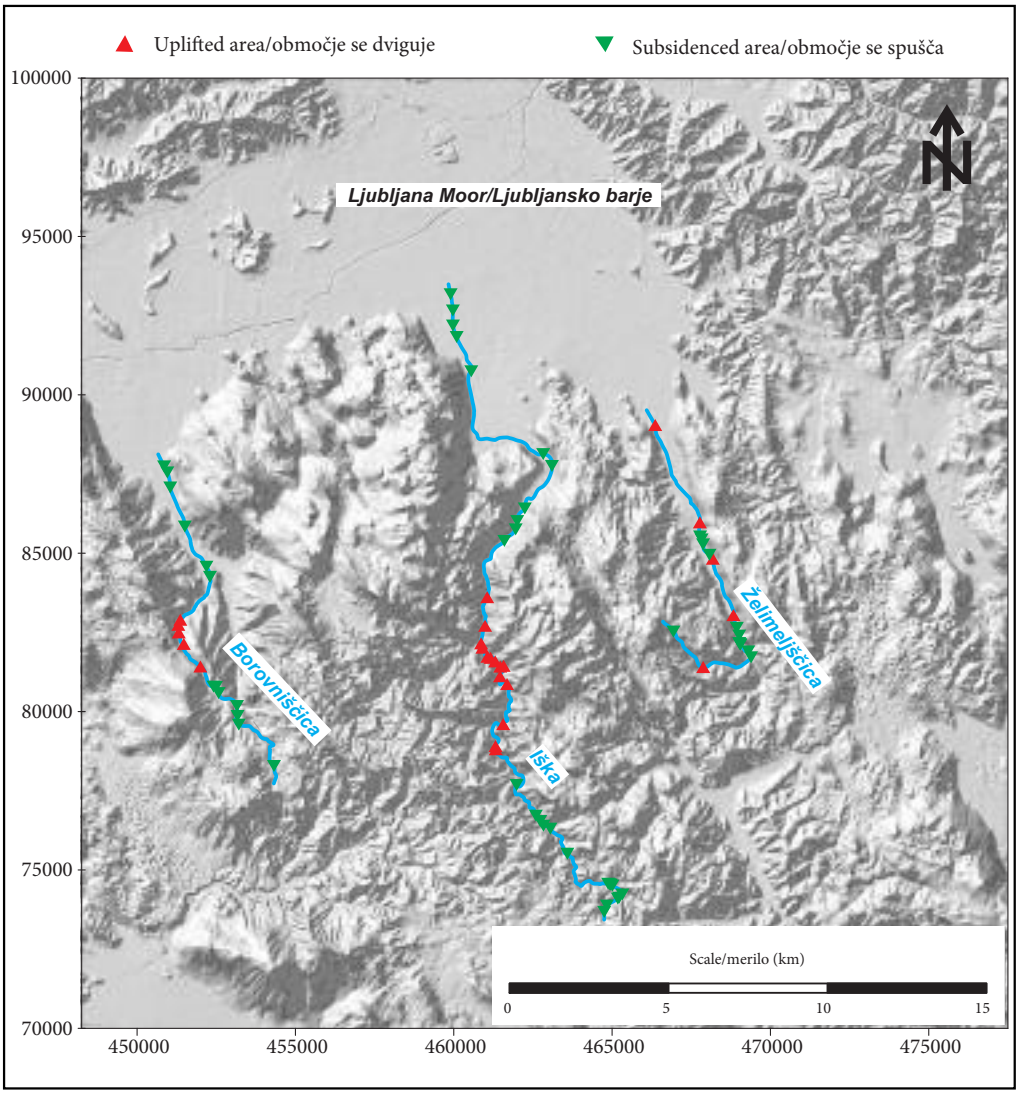


Figure 6: The distribution of areas of an active uplift and active tectonic subsidence along analysed watercourses on river gradient analysis method.

It has to be emphasised that this is the author's interpretation, which should be tested by accurate GPS or SAR radar measurements. Unfortunately the Geological Survey of Slovenia owns radar PSInSAR measurements of surface uplift/subsidence only for small part of the researched area. Results from other studies (Bavec et al., 2008; Sušnik, 2009) also indicates that PSInSAR permanent scatterers on soft moor sediments are not reliable for tectonic interpretation purpose, because the measured terrain subsidence probably reflects the consolidation of soft moor sediments, not active tectonic movements. However, the measurements still indicate particular fit between obtained results and satellite radar measurements, mostly at surface subsidence in the northern part of Iška profile (Figure 9A). Unfortunately this fit is not evident at the transition of Borovniščica to the Ljubljana moor area (Figure 9B) where PSInSAR measurements show active terrain uplift while geomorphologic indicators after adopted method indicate active subsidence. Opposing results on this location can be explained in the way that although the rock mass in this area is uplifting, simultaneously an active extension among rock blocks is presented because of the strike-slip tectonics.

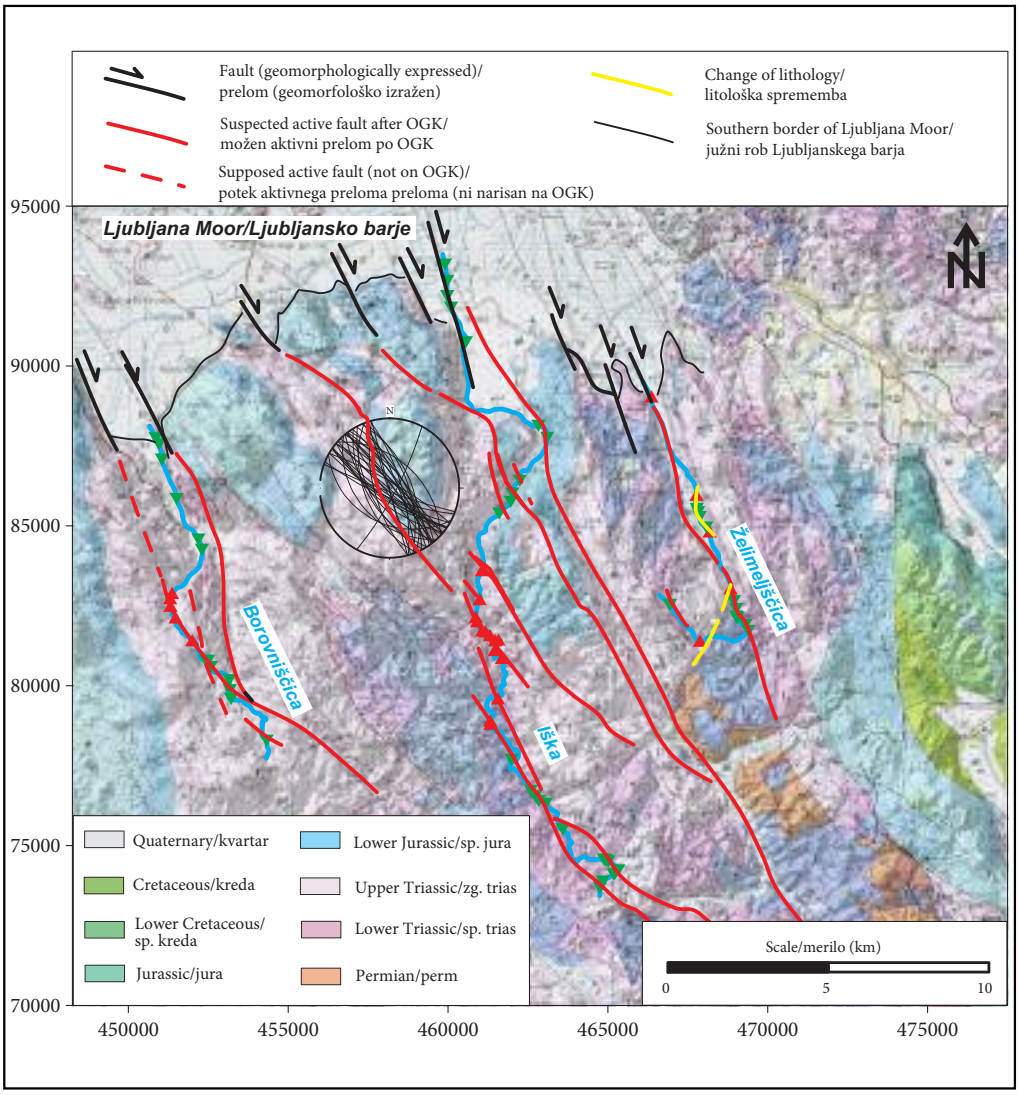


Figure 7: Correlation of the areas of active uplift and subsidence after the method of river gradient analysis with faults of the area after the Basic geological map 1 : 100.000 (OGK).

Subsequently the area is filled by Borovniščica river sediments. Therefore the area of alluvial sediments can be subsided while the surrounding areas of older consolidated rock masses show an active uplift. Unfortunately permanent scatterers in area B (Figure 9B) are situated on consolidated rocks only. To confirm this interpretation we would need permanent scatterers, which would be situated on Borovniščica river alluvial deposits, but there are no available permanent scatterers for this area.

5 Conclusion

Morphotectonic analysis of river bed slope on southern part of Ljubljana moor was performed using a »classical« method based on calculation of Stream Length-gradient index (SL index). Unfortunately the classic

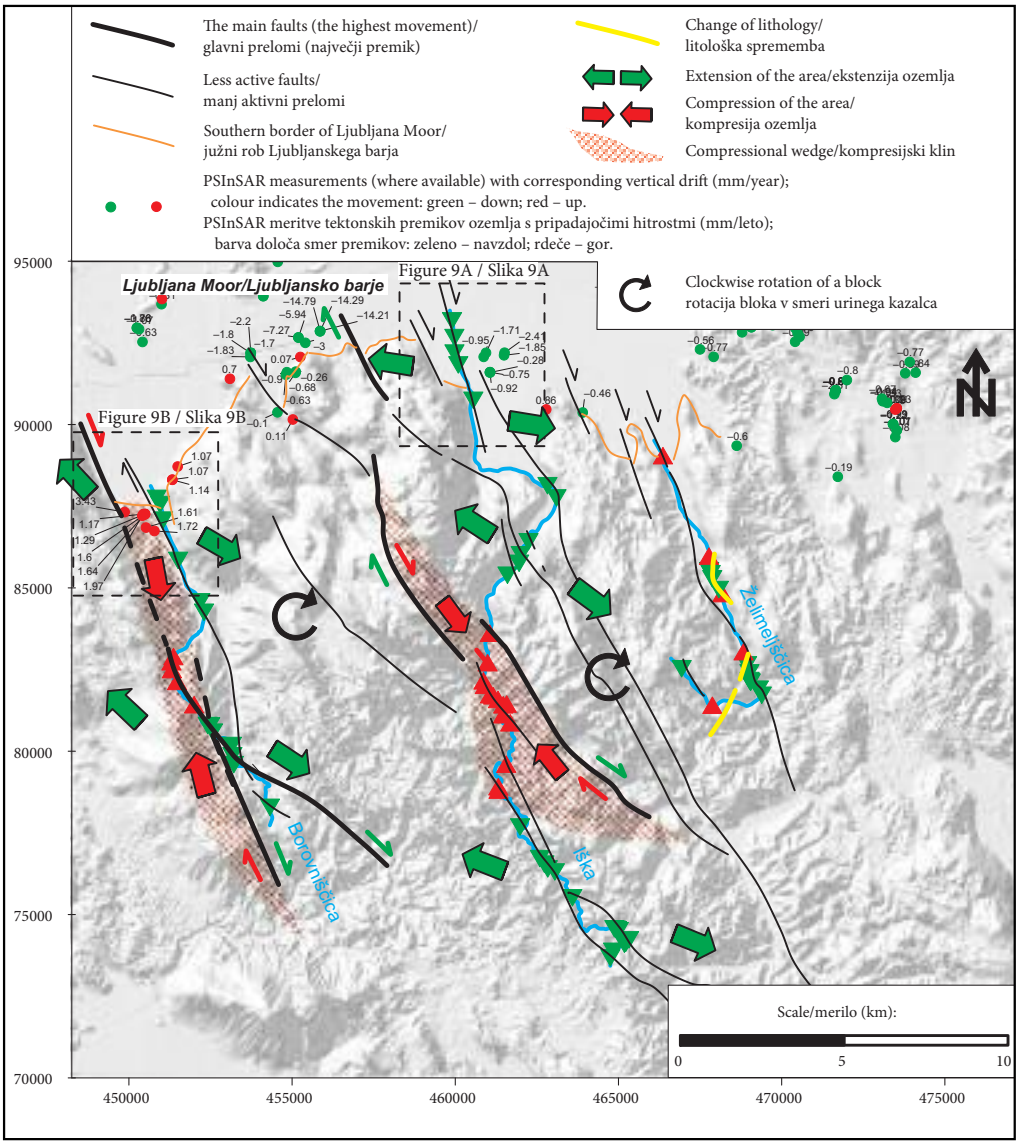


Figure 8: Morphotectonic interpretation of the researched area and available PSInSAR measurements of surface uplift/subsidence. PSInSAR measurements on »soft« moor sediments probably indicate subsidence, which is not related to active tectonic but rather the consolidation of sediments.

method (SL index) did not extract potential tectonically active areas. Therefore the method based on river gradient analysis was developed. This method was able to point out potentially recently active areas, which correspond well to fault areas from OGK, as well as the areas of the largest movements. The possible interpretation of data from OGK, geomorphologically expressed active dextral faults obtained from DEM, measurements of shear structures and fault planes on smaller scale and results from the developed method of river gradient analysis includes narrow areas of contraction (NNW-SE direction), which alternates with wider belts of extension in perpendicular direction. Extensional belts can be explained by the block rotation. Later can be a consequence of the proximity of two faults of regional importance.

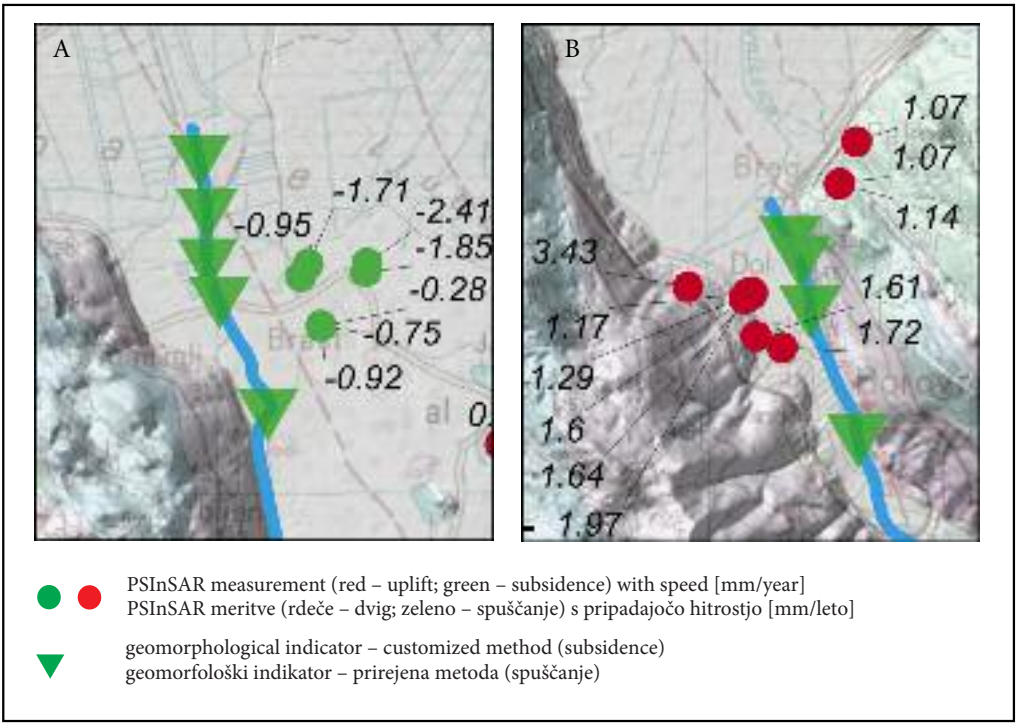


Figure 9: The comparison of measurements of terrain uplift/subsidence based on PSInSAR measurements and geomorphologic indicators after adopted method; section of northern part of Iška river (A) and northern part of Borovniščica river (B). Accurate locations of inserts are showed on figure 8.

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Uporaba geomorfoloških indikatorjev za določanje tektonsko aktivnih prelomov na južnemu delu Ljubljanskega barja

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COBISS: 1.01

IZVLEČEK: Na podlagi SL indeksa in prirejene metode analize rečnega gradienta so bile analizirane tri reke z namenom ugotovitve recentnih tektonsko aktivnih prelomov. Metodo sva testirala na južnem delu Ljubljanskega barja, kjer reke prečkajo desno zmične dinarsko usmerjene (SZ–JV) prelome. Prereze vodotokov sva najprej analizirala po klasični, v svetovni literaturi vsesplošno uveljavljeni metodi (SL indeks), ki pa ni dala uporabnih rezultatov. Zato sva uporabila prirejeno metodo, ki je omogočila določitev aktivnih območij dvigovanja in spuščanja površja zaradi recentnih tektonskih premikov. Ugotovljene anomalije sva primerjala s podatki Osnovne geološke karte 1 : 100.000 in s podatki radarskih meritev vertikalnih premikov z metodo PSInSAR. Tako sva predpostavila pet potencialno aktivnih prelomov, območja kompresije ter ekstenzije. Rezultati te raziskave so lahko dodaten vir informacij pri izdelavi tektonskega modela Ljubljanskega polja in Ljubljanskega barja.

KLJUČNE BESEDE: geomorfologija, gradient rek, SL indeks, dinarski prelomi, Ljubljansko barje, Ig

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1 Uvod

Za južni rob Ljubljanskega barja je značilen razgiban relief z izrazitimi vršaji Borovniščice, Iške in Želimeljščice ter številnih manjših potokov (slika 1). Geotektonsko predstavlja območje južno od Ljubljanskega barja severni rob zunanjih Dinaridov Slovenije (Placer 1998; 2008), za katere je značilno debelo zaporedje mezozojskih plitvovodnih karbonatnih kamnin (Otoničar 2007; Jež in ostali 2011), ki proti severozahodu mejijo na kamnine, ki so se usedale v globljevodnih bazenskih okoljih (Šmuc in Čar 2002; Rožič in ostali 2009; Gale 2010; Šmuc in Rožič 2010).

V zunanjih Dinaridih Slovenije so poglavitne tektonske strukture regionalnega pomena tako imenovani dinarski prelomi, katerih slemenitev je vzporedna slemenitvi Dinarskega gorstva (Vrabec in Fodor 2006). Recentna aktivnost dinarskih prelomov na območju slovenskih Zunanjih Dinaridov je dokazana z različnimi metodami: GPS vektorji hitrosti (krčenje ozemlja za 2 mm/leto v smeri sever–jug; Weber in ostali 2006; 2010), izračuni dolgoročnih horizontalnih hitrostnih polj (premiki č1,5 mm/leto; Kastelic in Carafa 2012), kartiranjem s pomočjo LiDAR-ja (Cunningham in ostali 2006; 2007), meritvami tektonskih mikro deformacij (Gosar in Lenart 2010; Gosar 2012) ter analizo prostorskih porazdelitev potresnih dogodkov (Kastelic in ostali 2008).

Ena od v svetu uveljavljenih metod za dokazovanje recentne tektonske aktivnosti prelomov je tudi morfotektonska analiza, ki temelji na analizi odnosa med morfologijo površja in tektoniko z izračunom različnih morfometričnih indeksov, med katerimi se pogosto uporablja indeks gradientov rečnih odsekov (ang. *Stream Length-gradient index* – SL indeks; Hack 1973). Za območje Slovenije takšne raziskave do sedaj še niso bile narejene.

Slika 1: Območje raziskovanja.
Glej angleški del prispevka.

SL indeks uporabljamo za ločevanje območij z različno tektonsko aktivnostjo (Viveen in ostali 2012), zlasti za identifikacijo vertikalnih tektonskih premikov (Burbank in Anderson 2001; Peters in Van Balen 2007). Nedeformiran vzdolžni rečni prerez (v nadaljnjem besedilu je smiselno uporabljena besedna zveza »rečni prerez«) ima značilno konkavno obliko (slika 2), ki jo zaradi erozije doseže v geološkem smislu relativno hitro. SL indeks je opredeljen tako, da zazna spremembe naklona »idealnega« rečnega prereza. Njegove nizke vrednosti lahko pomenijo aktivno tektonsko spuščanje območja (Viveen in ostali 2012) ali pa nizko odpornost kamnin na rečno erozijo, visoke vrednosti SL indeksa pa pomenijo hitrejše tektonsko dvigovanje območja, ali pa kažejo na erozijo bolj odporne kamnine (Alipoor in ostali 2011).

Namen raziskave je določanje recentnih aktivnih tektonskih premikov na podlagi geomorfoloških indikatorjev. Za preizkusno območje sva izbrala južni rob Ljubljanskega barja, ki je razbrazdan s številnimi aktivnimi dinarsko usmerjenimi zmičnimi prelomi, katere sekajo trije vzporedni vodotoki: Iška, Borovniščica in Želimeljščica (slika 1). Ozemlje po večini sestavljajo mezozojske karbonatne kamnine, ki veljajo za dokaj odporne proti rečni eroziji. Zato v tej raziskavi lahko skoraj vse anomalije v SL indeksu na tem območju pripišemo recentni tektonski aktivnosti. Najprej sva poskušala določiti tektonsko aktivne prelome z metodo SL indeksa po Hack-u (1973) in nato tudi z metodo analize rečnega gradienta po modificirani metodi. Rezultate sva interpretirala z izdelavo modela recentne tektonske aktivnosti območja ter jih primerjala z metodo radarskih meritev vertikalnih premikov PSInSAR.

Slika 2: Opis klasičnega morfotektonskega parametra *Stream Length-gradient* indeks (Hack 1973).
Glej angleški del prispevka.

2 Materiali in metode dela

Temelj za izračun morfometričnih indeksov predstavljata digitalni model višin (DMV) ločljivosti 12,5 m (vir: Geodetska uprava RS) ter topografski zemljevidi v merilu 1 : 5000. S pomočjo uporabe računalniških orodij *AutoCAD* in *GS Surfer* sva pridobila rečne prereze in druge spremenljivke, ki so bile numerično obdelane s programom *MS Excell*.

SL indeks sva izračunala po sledečem postopku. Najprej sva rečne prereze razdelila na intervale, ki jim lahko vizualno prilagodimo premico. Za vsak izbran segment reke sva opredelila SL indeks po formuli (Hack 1973):

$$SL = (\Delta H / \Delta L)\, L \tag{1}$$

pri čemer je ΔH višinska razlika znotraj obravnavanega segmenta reke, ΔL dolžina obravnavanega segmenta reke in L razdalja od izvira reke do sredine obravnavanega segmenta (slika 2). Razmerje $\Delta H/\Delta L$ opredeljuje naklon dna rečne struge na obravnavanem segmentu reke, ki se glede na teoretično »idealno« reko znižuje po toku reke navzdol obratno sorazmerno z dolžino L. SL indeks je normaliziran s parametrom L, kar pri velikih in dolgih »idealnih« rekah zagotavlja konstantno vrednost SL indeksa po celi dolžini reke.

Pri analizi enakovrednih rečnih prerezov manjših dimenzij (nekaj 10 km) se poraja vprašanje, ali je korekcija naklona z razdaljo od izvira reke smiselna in če morda v tem primeru ni celo dodaten vir napake. Zlasti na območjih, kjer je reliefna razgibanost razmeroma majhna, s SL indeksom pogosto ni mogoče identificirati tektonske aktivnosti, kljub temu da je tam že bila potrjena (npr. Peters in Van Balen 2007). Zato sva rečne prereze analizirala tudi s prirejeno metodo analize gradienta rečnih prerezov. Le-ta je bila izpeljana posebej za uporabo na obravnavanem območju. Njena prednost je, da ni občutljiva na korekcijski faktor L, prav tako pa se povsem izognemo subjektivnemu določanju segmentov na rečnih prerezih. Podobno metodo je pri analizi rečnih vršajev že uporabil Stepišnik s sodelavci (2007).

Prirejena metoda, za razliko od metode SL indeksov, predpostavlja idealen rečni prerez kot eksponentno krivuljo z negativno potenco, podobno, kot je prikazano na sliki 2 (Hack 1973) in enačbi 2:

$$H = e^{-kL+n} \tag{2}$$

pri čemer je H nadmorska višina, L oddaljenost od izvira po toku reke, k in n pa sta specifična koeficienta reke. Slednja dobimo s pomočjo eksponentne regresijske krivulje, ki se kar najbolje prilega izmerjenim podatkom. Če obe strani enačbe odvedemo, dobimo enačbo 3:

$$dH = dL\, e^{-kL} \tag{3}$$

in uredimo:

$$dH/dL = e^{-kL} \tag{4}$$

Iz enačbe 4 sledi, da se tudi gradient (dH/dL) »idealne« reke znižuje eksponentno z negativnim eksponentom od izvira navzdol. Nato pri tej modificirani analizi preverimo, ali izmerjeni gradient reke na neki oddaljenosti od izvira sovpada s teoretičnim, ali pa se od njega pomembno razlikuje. Dovolj veliko odstopanje od tega idealnega homeostatskega stanja je motnja (litološka ali tektonska), pri čemer višja vrednost dH/dL od mejne pomeni aktivno tektonsko spuščanje in obratno, dovolj nizka vrednost od mejne pa aktivno tektonsko dvigovanje terena. Določiti je bilo treba tudi kriterij za definicijo mejnih vrednosti z vključitvijo faktorja σ (enačba 5).

$$dH/dL(\text{mejna}) = e^{-kL \pm \sigma} \tag{5}$$

Faktor σ sva definirala kot standardni odklon naravnega logaritma absolutne vrednosti razlike izmerjenih gradientov reke dH/dL od teoretično izračunanih po enačbah 6 in 7. Enačba 6 prikazuje izračun standardnega odklona:

$$\sigma = \sqrt{\frac{\sum_{i=1}^{i\max}\left[LnGRAD_i - \frac{\sum_{n=1}^{i\max} LnGRAD_n}{i\max}\right]^2}{i\max - 1}} \tag{6}$$

pri čemer pomeni *LnGRAD* vrednost naravnega logaritma absolutne vrednosti razlike med izmerjenim in pričakovanim gradientom rečnega korita *dH/dL* ter *imax* število meritev gradienta reke. Enačba 7 prikazuje izračun vrednosti *LnGRAD*:

$$LnGRAD = \ln \left| dH/dL \text{ izmerjeno} - dH/dL \text{ pričakovano} \right| \quad (7).$$

Pri meritvah SL indeksa in pri meritvah po prirejeni metodi sva najprej natančno digitalizirala potek rečnega korita s program *AutoCAD*. Uporabila sva državni DMV ločljivosti 12,5 m ter s programom *GS Surfer* izrisala rečne prereze. Izračun SL indeksov, vrednosti *dH/dL*, parametrov *k, n* in *σ* in primerjavo dobljenih s teoretičnimi vrednostmi sva opravila v programu *MS Excell*. Lego ugotovljenih anomalij sva primerjala z lego poglavitnih prelomnih con iz Osnovne geološke karte 1 : 100.000 (OGK) in lego merodajnih litoloških sprememb med karbonatnimi in klastičnimi kamninami. Avtorja se zavedava, da je merilo uporabljene OGK relativno majhno glede na velikosti reliefnih oblik, vendar natančnejše geološke karte žal niso izdelane oziroma niso dostopne. Kljub vsemu pa OGK regionalnega merila po najinih izkušnjah dovolj dobro nakazuje na potek glavnih prelomov in con, zato misliva, da je uporaba te karte za namen raziskave vseeno upravičena.

3 Rezultati

Izračunane vrednosti SL indeksa vseh treh vodotokov v prerezih so prikazane na sliki 3 in so v razponu od 7 do 3425. Vrednosti SL indeksa pod 500 veljajo za zelo nizke in ne kažejo odstopanj od teoretičnega naklona reke. Značilno odstopanje od teoretičnega naklona rečnega dna, ki je lahko tudi posledica aktivne tektonike območja, kažejo vrednosti SL indeksa, ki presegajo 1500, vrednosti nad 3000 pa kažejo na ekstremna odstopanja od teoretičnega naklona v prerezu reke (Alipoor in ostali 2011). Prostorska porazdelitev vrednosti SL indeksa vzdolž rečnih prerezov Borovniščice, Iške in Želimeljščice je prikazana na sliki 4. Značilno povišane vrednosti SL indeksa so zgolj v srednjem toku Borovniščice, pri Iški in Želimeljščici analiza SL indeksa ne izloči potencialnih tektonsko aktivnih območij.

Slika 3: Segmentacija in porazdelitev izračunanih vrednosti SL indeksa vzdolž analiziranih profilov rek.
Glej angleški del prispevka.

Slika 4: Prostorska porazdelitev vrednosti SL indeksov.
Glej angleški del prispevka.

Preglednica 1: Vrednosti parametrov *k, n* in *σ* za vse tri reke pri uporabi prirejene metode analize rečnih prerezov.

reka	*k*	*n*	*σ*
Borovniščica	0,000100	2,264	1,326
Iška	0,000074	2,752	1,151
Želimeljščica	0,000191	2,402	0,864

Slika 5 prikazuje uporabo prirejene metode analize rečnega prereza na primeru vodotoka Borovniščica. Preglednica 1 prikazuje vrednosti parametrov *k, n* in *σ* za vse tri vodotoke, slika 6 pa prostorsko porazdelitev anomalij, določenih s prirejeno metodo analize gradienta rečnih prerezov. Slednje so ločene glede na to, ali je površje preveč dvignjeno (aktivni tektonski dvig površja) ali pa preveč spuščen (aktivni tektonski spust površja) glede na homeostazno stanje. Iz slike 6 je razvidno, da lahko pri toku prej omenjenih vodotokov izločimo zelo homogena območja aktivnega tektonskega dvigovanja površja, ki je izrazito predvsem v osrednjem delu obravnavanega območja. Območja aktivnega tektonskega spuščanja, so pogostejša na južnem delu območja in na prehodu vodotokov iz Dinaridov v Ljubljansko barje.

Slika 5: Prikaz analize rečnega gradienta po prirejeni metodi na primeru vodotoka Borovniščica.
Glej angleški del prispevka.

Slika 6: Porazdelitev območij aktivnega dvigovanja in aktivnega spuščanja ozemlja vzdolž analiziranih vodotokov po metodi analize rečnega gradienta.
Glej angleški del prispevka.

4 Razprava

Za interpretacijo ozemlja sva iz DMV-ja vizualno izločila geomorfološko izražene aktivne desnozmične prelome (slika 7). Nadalje sva z metodo SL indeksa ugotovila, katera so tektonsko aktivna območja (slika 4). Žal je metoda podala izjemno nizke vrednosti SL indeksa (po večini pod 500) in ni pokazala na aktivno tektoniko, čeprav je le-ta reliefno močno izražena, nanjo pa kaže tudi stalna potresna aktivnost na obravnavanem območju. Zato je bilo treba za ugotavljanje aktivnih prelomov uporabiti drugačno metodo, ki v čim večji meri izključuje subjektivne ocene in druge napake.

Slika 7: Korelacija območij aktivnega dvigovanja in spuščanja površja po metodi analize rečnega gradienta s prelomi območja po Osnovni geološki karti 1 : 100.000.
Glej angleški del prispevka.

Prirejena metoda daje zadostno variabilnost rezultatov in omogoča uspešno koreliranje s prelomi na OGK (Buser in ostali 1963; 1965) ter tudi ugotavljanje novih tektonskih in geomorfoloških struktur na obravnavanem ozemlju. Slika 7 prikazuje ugotovljene anomalije v rečnih prerezih ter zmične prelome z OGK, ki bi lahko vplivali nanje. Pri tem vidimo zelo dobro ujemanje med ugotovljenimi anomalijami ter tektonskimi strukturami.

Za dodatno potrditev zmične tektonike podajava tudi smeri strižnih razpok in prelomnih ploskev manjšega merila (Schmidtova mreža, spodnja polobla), ki sva jih izmerila na širšem območju Krima (slika 7). Vidimo, da izmerjene smeri sovpadajo s smerjo nekaterih glavnih prelomov območja po OGK. Prav tako so nakazani prelomi na sliki 7 najverjetneje recentno aktivni, saj litološke spremembe na obravnavnem območju ne morejo zadovoljivo pojasniti teh anomalij. Izjemo predstavlja Želimeljščica, ki v zgornjem toku prečka proti rečni eroziji manj odporne klastične kamnine, v osrednjem delu toka pa so konglomerati, ki imajo prav tako drugačno stopnjo odpornosti proti rečni eroziji kot na obravnavanem območju prevladujoče karbonatne kamnine (slika 7).

Slika 8: Morfotektonska razlaga reliefa ter prikazane PSInSAR meritve dvigovanja/spuščanja površja, ki jih ima na razpolago Geološki zavod Slovenije. PSInSAR meritve na »mehkih« barjanskih sedimentih verjetno kažejo na spuščanje, ki ni povezano s tektonskimi procesi, ampak s konsolidacijo teh sedimentov.
Glej angleški del prispevka.

Zbrani indikatorji omogočajo interpretacijo recentne tektonske dejavnosti na obravnavanem območju (slika 8), pri čemer sva ločila območja stiskanja, območja raztezanja, možne recentne aktivne prelome ter možne centre rotacij blokov. Krajevna kompresija se pojavlja v ozkih pasovih v smeri SSZ–JJV. Ena od možnih razlag je, da so tenzijske strukture s splošno orientacijo v smeri sever–jug posledica krajevnih rotacij blokov, ki nastanejo pri razmerah čistega striga, katerih glavni nosilec je najverjetneje bližnji Žužemberški prelom. Meja med območji ekstenzije in območji kompresije sovpada s prelomi z OGK (sliki 7 in 8). Ker so prehodi med območji aktivnega dvigovanja in aktivnega spuščanja, dobljenimi po metodi geomorfoloških indikatorjev, jasno opredeljeni, zelo verjetno odražajo spremembo v tektonski aktivnosti ozemlja (dvigovanje/spuščanje). Zaradi tega ocenjujeva, da so prelomi, ki ločujejo območja dvigovanja od območij spuščanja, recentno najaktivnejši prelomi na obravnavanem ozemlju (slika 8).

Poudariti je treba, da je to razlaga avtorjev, ki bi jo bilo treba preveriti na podlagi natančnih GPS meritev ali pa na podlagi metod SAR radarskih meritev. Na žalost Geološki zavod Slovenije razpolaga z radarskimi PSInSAR meritvami tektonskega dvigovanja/spuščanja površja le za zelo majhne del obravnavanega ozemlja, poleg tega pa so po nekaterih raziskavah PSInSAR sipalci na mehkih barjanskih sedimentih za namene tektonskih interpretacij nezanesljivi, saj je izmerjeni spust terena verjetno odraz konsolidacije »mehkih« barjanskih sedimentov in ne odraz aktivnih tektonskih premikov (Bavec in ostali, 2008; Sušnik, 2009). Vseeno pa te meritve kažejo določeno stopnjo ujemanja med dobljenimi rezultati in satelitskimi radarskimi meritvami, predvsem pri spuščanju ozemlja na območju severnega dela profila Iške (slika 9A). Tega ujemanja žal ne zaznamo v primeru vstopa Borovniščice na območje Ljubljanskega barja (slika 9B), kjer PSInSAR meritve kažejo aktivno dvigovanje terena, geomorfološki indikatorji po prirejeni metodi pa aktivno spuščanje. Vendar je moč nasprotne rezultate na tej lokaciji pojasniti s tem, da se območje matičnih kamnin hribovja sicer dviguje, vendar se sočasno zaradi zmičnih sil ustvarja tudi območje aktivnega razpiranja kamninskih blokov. V to območje nato nanaša reka Borovniščica sedimente. Zato se območje aluvialnih

sedimentov lahko tudi spušča, medtem ko se okoliška območja, sestavljena iz sprijetih in starejših kamenin, aktivno dvigujejo. Žal so PSInSAR sipalci na tem območju, za razliko od območja iz slike 9A, le na trdnih kanminah. Za potrditev te interpretacije bi torej potrebovali še sipalce, ki so postavljeni na območje nanosov Borovniščice.

Slika 9: Primerjava meritev dvigovanja/spuščanja terena na podlagi PSInSAR meritev in geomorfoloških pokazateljev po prirejeni metodi; izsek severnega dela Iške (A) in severnega dela Borovniščice (B). Natančni lokaciji sta označeni na sliki 8.
Glej angleški del prispevka.

5 Sklep

Za obravnavano območje na južnem delu Ljubljanskega barja je bila narejena morfotektonska analiza naklona rečnega dna po klasični metodi, ki temelji na izračunu indeksa gradientov rečnih odsekov (ang. *Stream Length-gradient* oziroma SL indeksa) ter po na novo razviti in v tem članku prvič predstavljeni metodi analize rečnega gradienta. Klasična metoda (SL indeks) se je na testnem območju izkazala za neprimerno in ni izločila potencialnih tektonsko aktivnih območij, medtem ko sva s prirejeno metodo analize rečnega gradienta lahko določila potencialno recentno tektonsko aktivne prelome, ki zelo dobro sovpadajo s prelomnimi območji na OGK ter glavne prelome območja, ob katerih so premiki največji. Poizkus razlage recentne tektonske aktivnosti, ki zajema podatke iz OGK, geomorfološko izražene strukture na DMV, meritve smeri strižnih razpok in prelomnih ploskev manjšega merila na območju Krima ter rezultatov prirejene metode analize rečnega gradienta, obsega ozka območja kompresije (v smerjo SSZ–JV), ki se izmenjujejo s širšimi pasovi ekstenzije v pravokotni smeri. Pasovi ekstenzije so najverjetneje posledica rotacije blokov, ki nastanejo pri zmikanju dveh glavnih regionalnih prelomov.

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7 Literatura

Glej angleški del prispevka.

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QUALITATIVE CHANGES IN THE ENTREPRENEURIAL SECTOR IN EMERGING TERRITORIAL SYSTEMS – CRAIOVA CASE STUDY

KVALITATIVNE SPREMEMBE V PODJETNIŠKEM SEKTORJU V NASTAJAJOČIH TERITORIALNIH SISTEMIH – ŠTUDIJA PRIMERA CRAIOVA

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Economic activities in Craiova emerging territorial system.
Gospodarske dejavnosti na območju Craiova.

Qualitative changes in the entrepreneurial sector in emerging territorial systems – Craiova case study

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ABSTRACT: The goal of the present study is to analyze the complex economic processes within emerging territorial systems, developed around big cities. Economic ventures concentrated inside these urban clusters in a short span of time, and they registered a spectacular evolution, compared to the neighboring areas. Intensification of the linkages between cities with more than 300,000 inhabitants in Romania and the surrounding areas led to the individualization of territorial systems apart, with a spectacular evolution of economic-social processes, which turn those systems into the most dynamic territorial structures. The present study means to identify the causes of those complex processes within emerging territorial systems, the manner of functional organization of the space, and the causes that determine the spectacular evolution of the economic processes within emerging systems.

KEYWORDS: economic geography, territorial systems, entrepreneurial sector, territorial dynamics, territorial management

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1 Introduction

Research conducted with the goal of drafting the Strategy for Romania's Polycentric Development highlighted the spectacular evolution of economic phenomena at the level of territorial systems in the vicinity of national and regional development hubs. For a long time those processes were dominated by the migration of the population towards the industrial platforms inside cities, and by definitive migration from crowded cities towards residential areas in neighboring administrative units.

Since 2000, the improvement of the economic climate in Romania determined the development of the entrepreneurial sector and a series of changes in the entrepreneurial profile of territorial systems. The most spectacular changes occurred in those territorial systems in the vicinity of big cities, where economic ventures were relocated from inside the city, or new economic ventures were born, benefitting from numerous competitive advantages.

The relocation of economic ventures to surrounding localities is heavily influenced by infrastructure, in general, and by transport infrastructure in particular (Peptenatu et al. 2009; Humeau et al. 2010), as the implementation of infrastructure projects is immediately followed by a functional reorganization of the surrounding space. It is important to mention that in Romania the relocation of economic ventures to the suburbs started after 2000, because of the absence of infrastructure of any kind. After 2000, the coming into existence of access routes between the main cities led to the first transfers of economic ventures from inside cities to the outskirts. In numerous academic works, the entrepreneurial sector is considered as an engine of economic development for a particular geographical space (Guiso and Schivardi 2011; Schumpeter 1911), with the transfer of innovation being an important advantage for the territorial system (Marot 2010; Razpotnik Visković 2011).

The development of the entrepreneurial sector is heavily influenced by the socio-economic climate where the decision to set up a venture is made, and the differences between urban areas, rural areas, areas of urban influence and severely underprivileged areas across a territory are obvious (Topole et al. 2006; Urbanc and Breg 2005).

The importance of studying the economic processes within emerging territorial systems is defended by the need to identify the territorial management systems that are able to imprint the best functionality on the processes that ensue from the natural interaction of city and the surrounding space (Peptenatu et al. 2012).

Functional reorganization inside areas of urban influence is accompanied by pressure on the elements of the natural environment, and therefore models for environment management are necessary, matching the severity of the »aggression« (Ianoş et al. 2009; Peptenatu et al. 2010a; 2011; Braghina et al. 2011; Ilieş et al. 2012).

Studies concerning the polycentric development of territorial systems emphasize the trend towards a concentration of companies in certain catalyst centers within the emerging systems. The development of entrepreneurial clusters inside emerging structures has a decisive contribution to the development of the polarizing capacity of the entire emerging system. The idea of the importance to develop a hub in a geographical space is mentioned in numerous studies on centrality (Ianoş and Humeau 2000).

2 Methods

Emerging territorial systems are spaces close to cities with high functional complexity, characterized by a spectacular evolution of economic processes. At the level of these territorial structures, there are complex linkages with the polarizing hub.

Demarcation of the emerging system was achieved by means of the index of functional complexity, calculated as follows:

$$Cf = Nd \cdot \frac{Nf}{Ns}$$

Cf – functional complexity,
Nd – number of domains according to CAEN (Classification of Activities in National Economy),
Nf – number of companies (Euro),
Ns – number of employees.

The present study defines emerging systems as the spaces where functional complexity increased by more than 60% during the time span analyzed.

The evolution of the entrepreneurial profile was analyzed using statistical information at township and CAEN code level for the time interval 2001–2010. The indicators analyzed were: evolution of the number of employees, the evolution of the number of companies, the evolution of profit, and the evolution of turnover. For increased relevance of the analyses, profiles were drawn at the level of the three major sectors of the economy: the primary sector (agriculture, extractive industry), the secondary sector (processing industry) and the tertiary sector (services).

The study tracked the way the space between development hubs is organized along the access corridors, by means of the emplacement of enterprises along those corridors. Depending on the manner and complexity of that organization, we suggested two concepts, the concept of *organizing axis* (a line capable, by means of the incentives offered, to win over investments, which would allow the functional regeneration of the territory on the access corridors between the development hubs) and the concept of *development corridor* (a line with an increased level of organization) (Peptenatu et al. 2009). The types of clusters were identified within the emerging territorial system.

3 Results and discussion

The spectacular evolution of the entrepreneurial sector in Romania's big cities determined a significant functional reorganization of the surrounding spaces. Using the evolution of the index of functional complexity, a distinct space was demarcated around the city of Craiova, where that index registered a 60%-plus increase during 2001–2010. The entire area registered an increase of functional complexity from 0.8 by 2001 to 2.6 by 2010 (Figure 1), which meant an increase in the number of fields of activity, where a bigger number of companies are active, and a moderate increase of the number of employees.

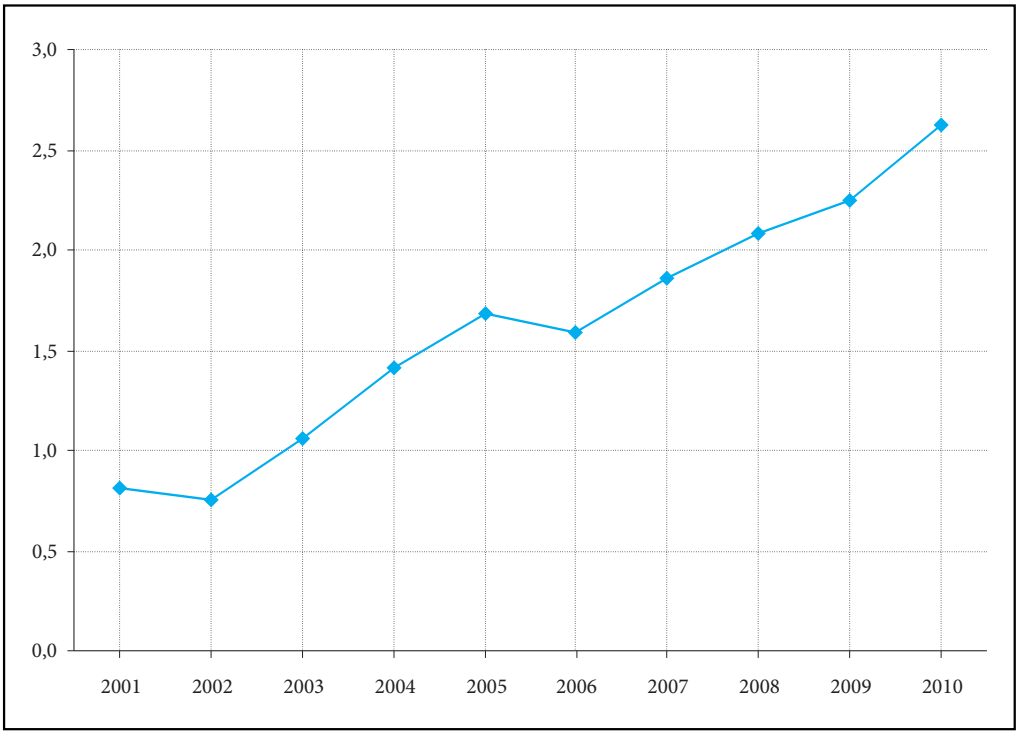

Figure 1: Evolution of functional complexity in the Craiova emerging territorial system (Source of data: Borgdesign 2011).

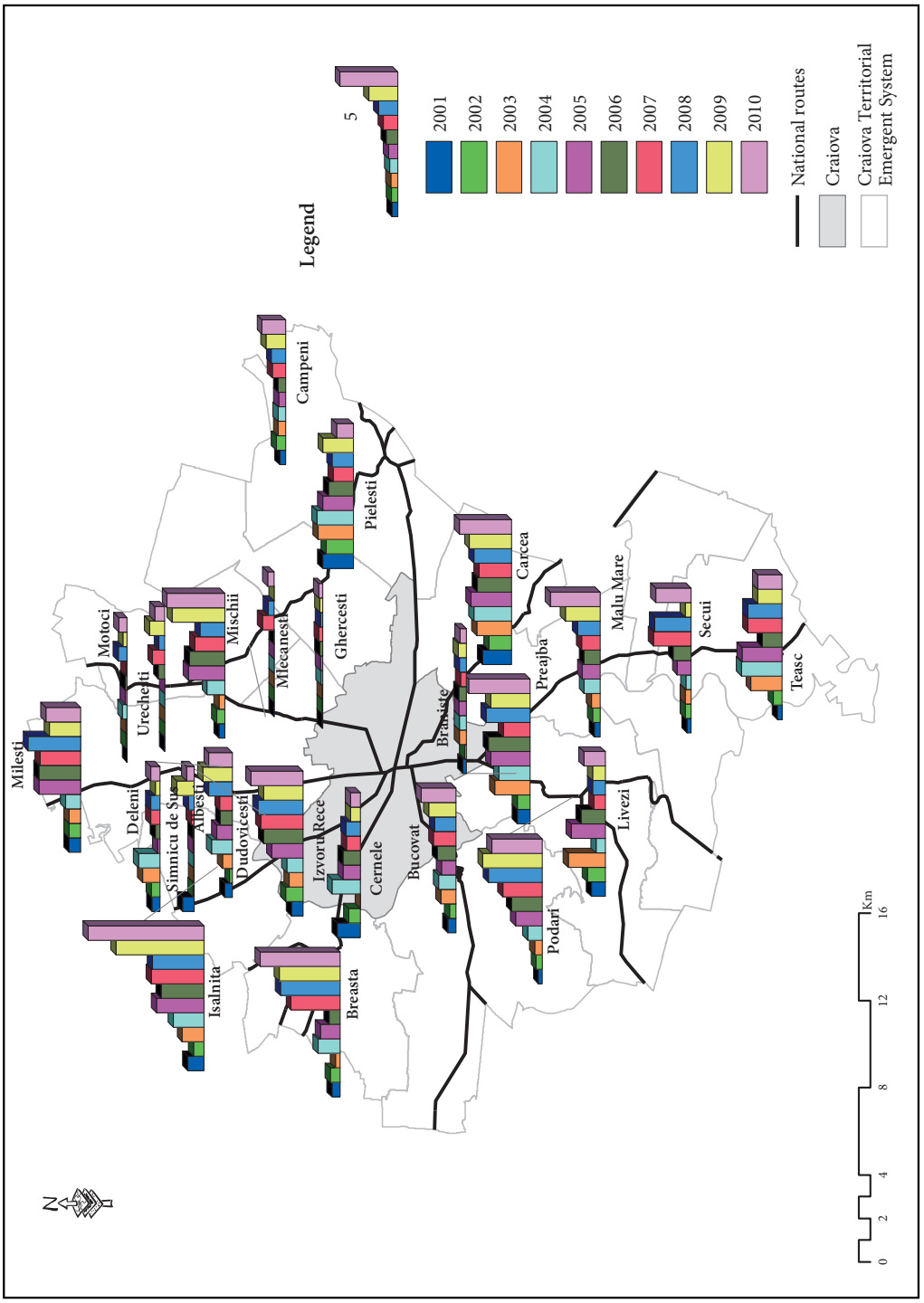

Figure 2: Evolution of the index of functional complexity in the Craiova emerging territorial system in the Oltenia South-Western Development Region (Source of data: Borgdesign 2011).

Figure 2 indicates a concentration of the high functional-complexity values along the main development corridors, where the concentration of companies is determined by numerous competitive advantages. The most important concentration of economic enterprises, with the highest functional-complexity values by 2010, was registered in the areas: Işalnița (9.9), Breasta (6.8), Preajba (5.3), Mischii (4.9), Cârcea (4.5), Podari (4.3), Malu Mare (4.3).

The evolution of the number of companies at the level of the entire emerging system registered an increase from 224 companies in 2001 to 632 companies in 2010 (Figure 3).

The most important increases by 2010 as compared to 2001 were registered in the communes of Cârcea, Işalnița, Pielești, Malu Mare, Bucovăț and Podari (Figure 4).

The increase in the number of companies was determined by the creation, in 2004, of the Craiova Industrial Park, which led to the increase of the number of companies in the communes of Cârcea and Pielești. In the other communes, the increase in the number of companies was determined by the development of road infrastructure meant to offer access to the city of Craiova, concentrating most of the companies along those routes.

In terms of field of activity (CAEN code) the most important increases in the number of companies were registered in the field of retail in specialized and non-specialized stores, construction and commodity transportation by road. In those fields of trade, the need for space led to the relocation of economic enterprises from inside the city towards the outskirts.

The evolution of the number employees follows the trend registered by the evolution of the number of companies, but the increase is not as spectacular (Figure 5). The increase at the level of the entire emerging territorial system was from 5,035 employees in 2001 to 7,308 employees in 2010, with a peak of 8,195 employees reached in 2008. The oscillating evolution was the result of economic policies implemented at government level. The reforms conducted in 2000 and 2005 led to the development of the entrepreneurial sector by means of the creation of new companies and the increase in the number of employees (Figure 6).

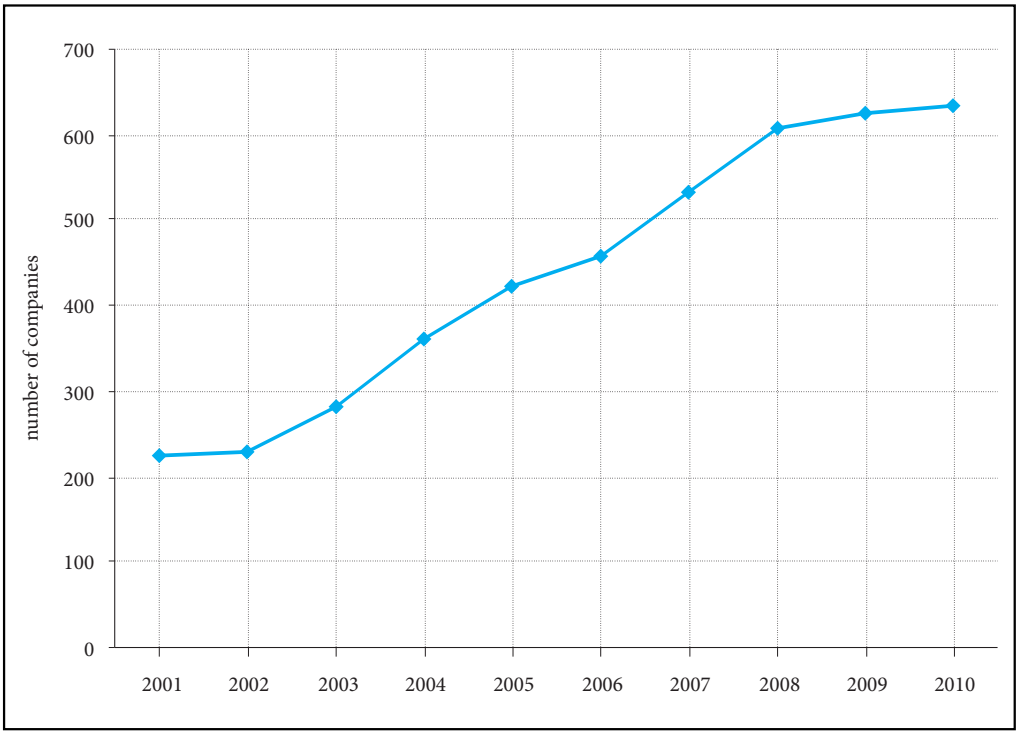

Figure 3: Evolution of the number of companies in the Craiova emerging territorial systems (Source of data: Borgdesign 2011).

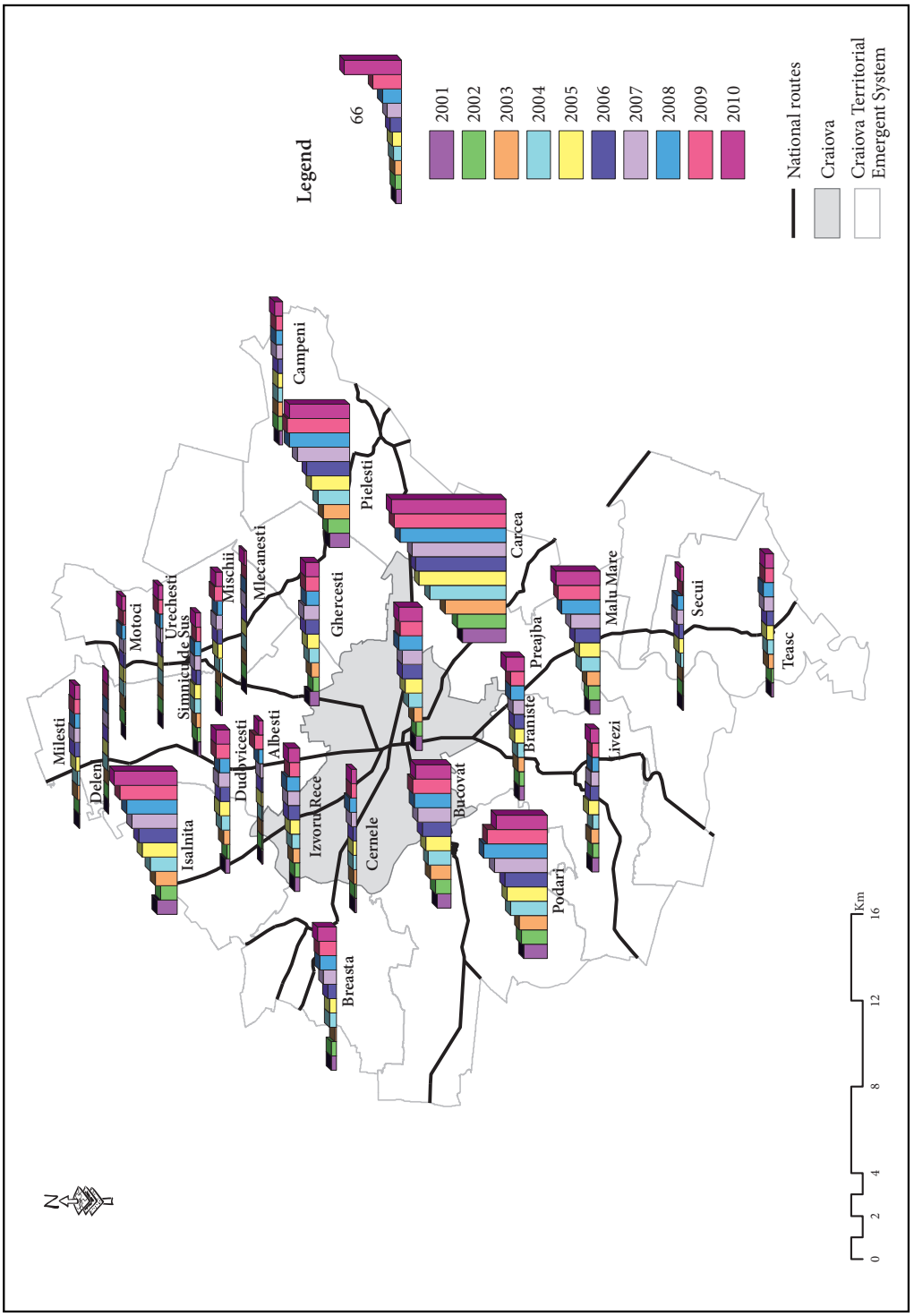

Figure 4: Evolution of the number of companies in the Craiova emerging territorial systems (Source of data: Borgdesign 2011).

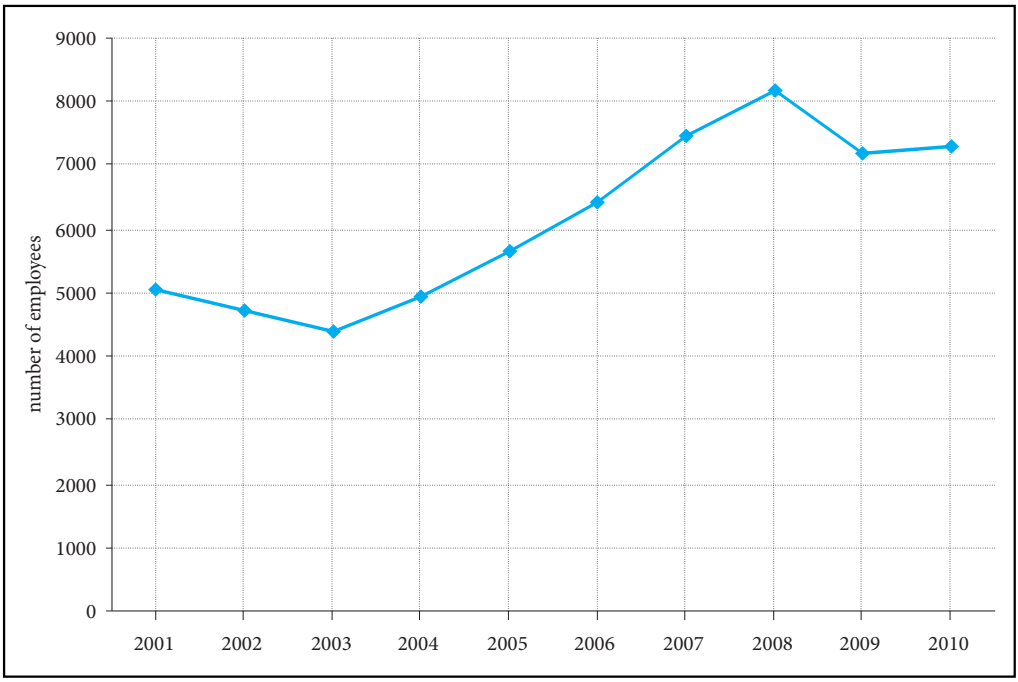

Figure 5: Evolution of the number of employees in the Craiova emerging territorial systems (Source of data: Borgdesign 2011).

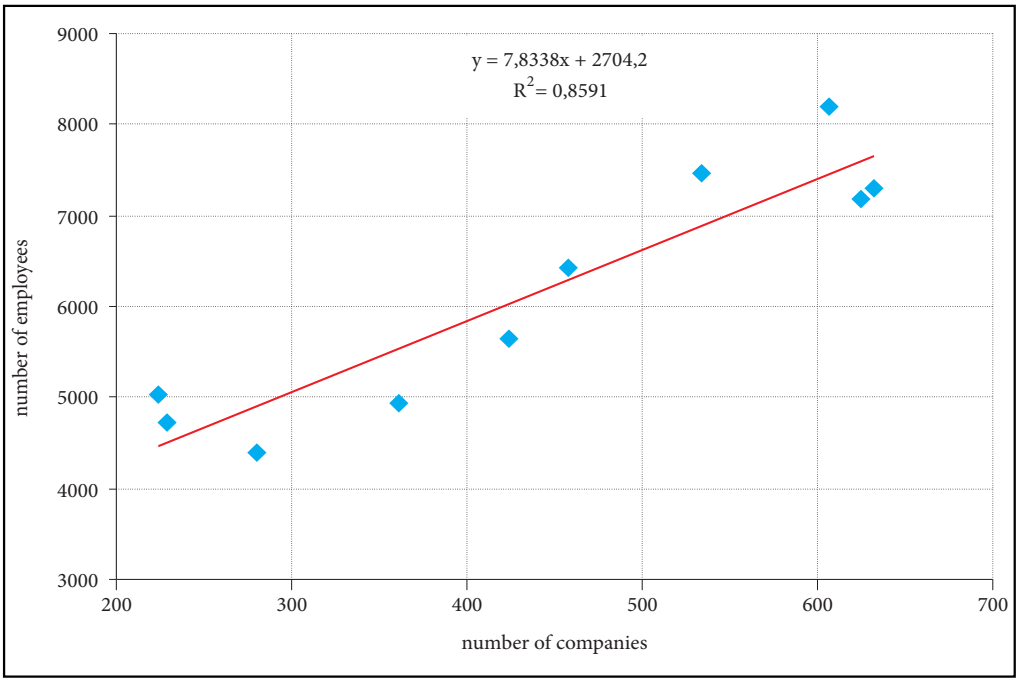

Figure 6: The relation of dependence between the number of companies and the number of employees in the Craiova emerging territorial systems (Source of data: Borgdesign 2011).

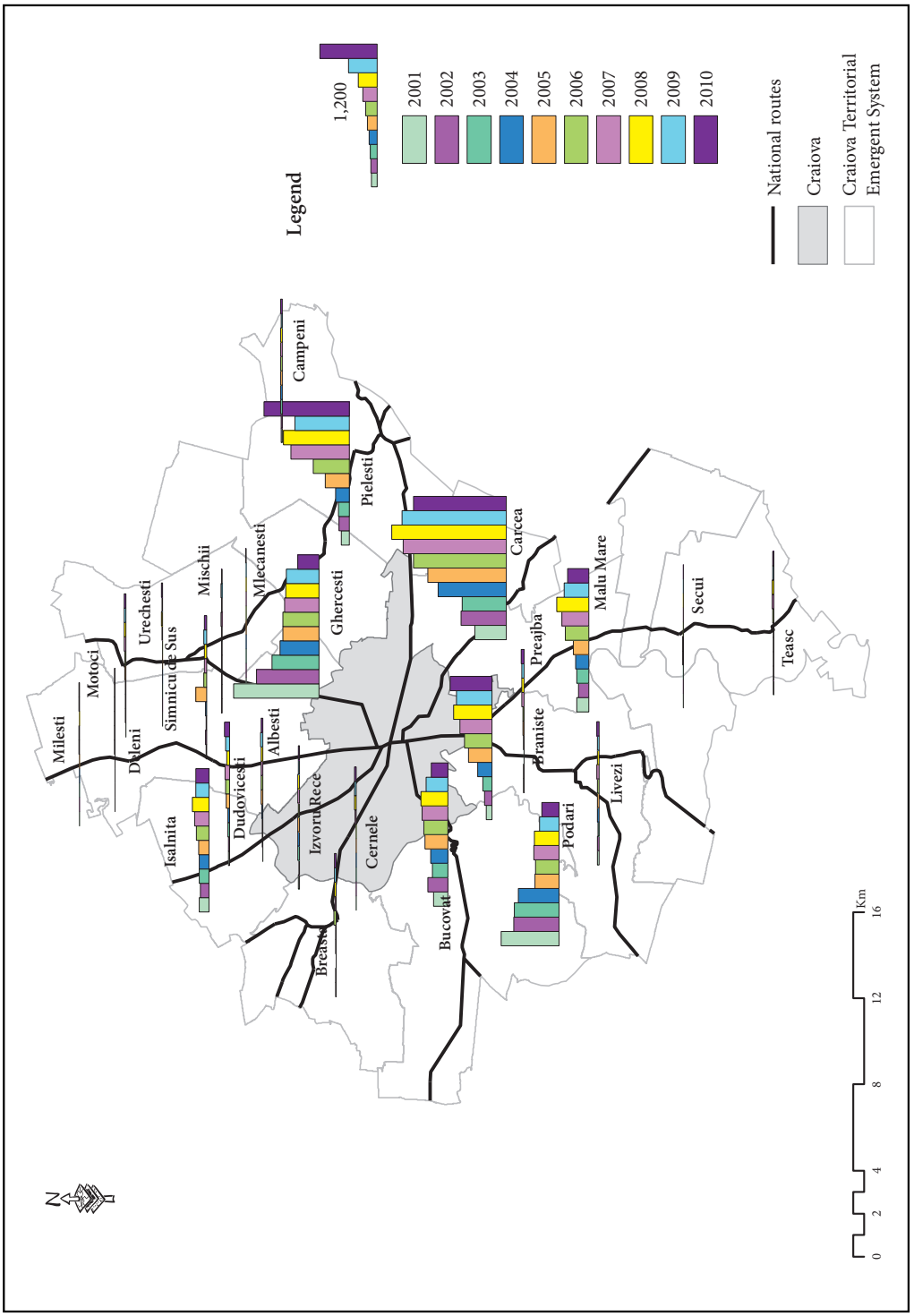

Figure 7: Evolution of the number of employees in the Craiova emerging territorial systems (Source of data: Borgdesign 2011).

The drop in the number of employees after 2008 was the result of economic recession, which drove major companies to lay off an important number of employees. The biggest layoffs were conducted in the following sectors of the economy: aircraft production, production of plastic construction materials, road and highway construction and poultry farming.

Across the territory, one must highlight the increase in the number of employees in the commune of Pieleşti, where the development of road infrastructure determined the shaping up of an organizing axis along European road E70 (Figure 7). The completion of a ring road north of the township, which took over transit traffic, determined a functional reorganization of the space with economic enterprises relocated from inside the township.

The types of evolution of profit and turnover are important characteristics of emerging territorial systems. In the wake of the implementation of governmental policies to support the entrepreneurial sector, there were spectacular increases in profit, varying across the territory in terms of value and structure of the fields of trade. The upwards evolution of the profit and turnover was interrupted in 2008, when the effects of the economic recession first became visible statistically speaking (Figure 8).Compared to the Craiova polarizing system, the emerging territorial system registered a spectacular growth and a limited decline after 2008. The same evolution marked the environment of the emerging territorial system, which registered a slow growth during 2001–2008 and a major decline after 2008.

The steepest increases in profit across the territory of the Craiova emerging territorial system were registered in the townships of Cârcea and Pieleşti, where the Craiova Industrial Park is located.

At the level of field of trade, the most important increases in profit and turnover were registered in the following fields: production of plastic construction materials, milk processing, packaging production, hardware, commodity transport by road.

Economic ventures in emerging territorial systems are concentrated along the main road routes, which converge on the polarizing city, establishing genuine development corridors. The main development cor-

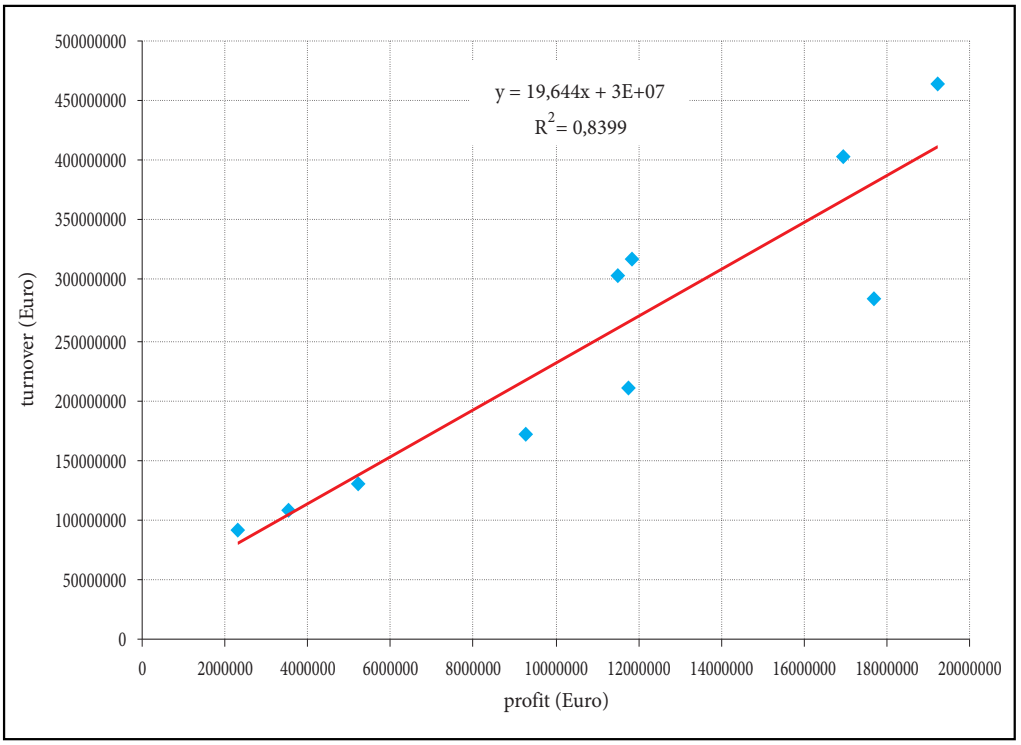

Figure 8: Relation between turnover and profit in the Craiova emerging territorial systems (Source of data: Borgdesign 2011).

ridors are: Craiova-Pielești, Craiova-Işalnița, Craiova-Podari, Craiova-Cârcea and the Craiova-Şimnic structurant axis.

The construction of a ring road north and east of the city, meant for transit traffic, generated the concentration of companies along its length. The premises were created along the length of that ring road for the creation of a dynamic organizing axis, due to the infrastructure projects implemented there.

The detailed analysis of the Craiova emerging territorial system indicates that that space functions as an *urban cluster* born as the result of the complex interaction between the polarizing city and the surrounding space. The urban cluster is made up of an *administrative cluster* established on the premises of the Craiova Industrial Park and the *natural cluster* established by means of the relocation of economic enterprises to the outskirts, the length of the main road axes converging on the polarizing city (Figure 9).

4 Conclusion

Researches concerning the antreprenorial sector's dynamics in the emerging territorial systems show strong bindings between the polarised core dynamics and the evolution of the antreprenorial sector in polarised spaces from its territorial environment. The spectacular development of the economic sector in Craiova is accompanied by a relocation of the economic activities to the urban-rural interface where a significant growth is noticeable.

The economic activities concentration from the urban-rural interface in Craiova is been formed into a separate entity, a new quality at the emergent territorial system level, quality that can't be reduced to the system's parts. This entity should be considered as a whole, in an integrated way, in the same decisional context.

An important conclusion of this study is related to the importance of the infrastructure in the spatial structuring of the economic activities in the Craiova city emerging system. The main concentrations of economic activities are the structuring axes developed along the roads that connect to other cores from the national polycentric network (București, Balș, Pitești, Drobeta Turnu Severin, Filiasi, Tg. Jiu).

The analysis of the Craioba emerging territorial system highlights a series of dysfunctions at the local systems level, dysfunctions generated by the concetration of economic activities in a very short period of time. In this context, it is more obvious the integrated approach of the territorial imbalances by making some territorial management models that could optimize the complex territorial relationships between the emerging territorial system's components (Glaeser et al., 2010b; Florida, 2002; Glaeser et al., 2010a; Delgado et al., 2010; Peptenatu et al., 2010b; Braghina et al. 2010; Gümrükçüoğlu, 2011).

The conclusions reached by this study prove the emerging evolution theory according to which the appearance of new qualities is absolutely spontaneous and unpredictable; in the way in which the emerging territorial system is a new quality, different by its dynamics and the characteristics of the economic processes. We can't speak about a spontaneous and unpredictable one, because these spatial structures are the direct result between a city with a great polarization capacity and a space that can provide many competitive advantages. Moreover, the evolution of the emerging territorial systems can be influenced through decisional impulses made by policy makers.

5 Aknowledgements

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Kvalitativne spremembe v podjetniškem sektorju v nastajajočih teritorialnih sistemih – študija primera Craiova

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POVZETEK: Namen te študije je analizirati zapletene poslovne procese v okviru nastajajočih teritorialnih sistemov, razvitih v okolici večjih mest. Podjetja, ki so se koncentrirala v kratkem časovnem obdobju v teh mestih, so doživela spektakularno evolucijo v primerjavi s sosednjimi območji. Krepitev povezav med mesti z več kot 300.000 prebivalci v Romuniji in okolicami je privedla do individualizacije teritorialnih sistemov, ki je ustvarila spektakularno evolucijo gospodarskih in družbenih procesov, ki pretvori te sisteme v najbolj dinamične regionalne strukture. Namen te študije je opredeliti vzroke zapletenih procesov v okviru nastajajočih teritorialnih sistemov, način funkcionalnega organiziranja prostora in vzroke, ki odredijo spektakularno evolucijo gospodarskih procesov v okviru nastajajočih sistemov.

KLJUČNE BESEDE: ekonomska geografija, teritorialni sistemi, podjetniški sektor, teritorialna dinamika, teritorialni menedžment

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1 Uvod

Raziskava, opravljena za pripravo Strategije policentričnega razvoja Romunije, je pokazala zanimiv razvoj gospodarskih pojav na ravni teritorialnega sistema v bližini nacionalnih in regionalnih razvojnih centrov. Preseljevanje prebivalstva v industrijske platforme mest in preseljevanje iz prenatrpanih mest do stanovanjskih območij v bližini upravnih enot sta dolgo časa obvladovala prostorski razvoj.

Po letu 2000 je izboljšanje poslovnega okolja v Romuniji je privedlo do razvoja podjetniškega sektorja, kar je ustavilo številne spremembe v podjetniškem profilu teritorialnih sistemov. Najpomembnejše spremembe so nastale v teritorialnih sistemih v bližini velikih mest, kjer so bila premeščena podjetja iz mesta ali kjer so bila ustanovljena nova podjetja, ki so imela korist od številnih konkurenčnih prednosti.

Na splošno na selitev podjetij v bližinska mesta močno vpliva prometna infrastruktura (Peptenatu in sod. 2009; Humeau in sod. 2010), saj infrastrukturnim projektom neposredno sledi funkcionalna preureditev okolice. Treba je omeniti, da je v Romuniji selitev podjetij v predmestje začela po letu 2000 zaradi pomanjkanja infrastrukture. Po letu 2000 so dovozne prometnice, zgrajene med večjimi mesti, omogočile prve selitve podjetij iz mest v predmestja.

V številnih akademskih članov, podjetniški sektor velja za motor gospodarskega razvoja geografskih območji (Guiso in Schivardi 2011; Schumpeter 1911), prenos inovacije predstavlja pomembno prednost za teritorialni sistem (Marot 2010; Razpotnik Visković 2011).

Razvoj podjetniškega sektorja je v veliki meri pod vplivom družbenogospodarskega razmera, v katerem se ustanovijo podjetja in razlike med mestnimi, podeželskimi zonama, zonama pod mestnim vplivom in prikrajšanimi zonama v območju so razvidne (Topole et al. 2006; Urbanc in Breg 2005).

Študija ekonomskih procesov v okviru nastajajočih teritorialnih sistemov je utemeljena na potrebo za opredelitev sistemov teritorialnega menedžmenta za izboljšanje funkcionalnosti procesov, ki izhajajo iz naravne interakcije med mesti in njihovimi okolicami (Peptenatu et al. 2012).

Funkcionalna reorganizacija mestnih območij vpliva na naravno okolje in so potrebni modeli teritorialnega menedžmenta, zgrajeni glede na resnost »agresije« (Ianoş et al. 2009; Peptenatu et al. 2010a; 2011; Braghina et al. 2011; Ilieş et al. 2012).

Študije o policentričnem razvoju teritorialnih sistemov prikaži trend do koncentracije podjetij v nekaterih katalitskih centrih v okviru nastajajočih sistemov. Razvoj podjetniških centrov znotraj nastajajočih struktur odločilno prispeva k razvoju kapaciteta za polarizacijo celotnega nastajajočega sistema. Pomembnost razvoja centra v geografskem območju je poudarjena v mnogih študijah o centralnosti (Ianoş in Humeau 2000).

2 Metode

Nastajajoči teritorialni sistemi so prostori v bližini mest, zelo kompleksni glede funkcionalnega vidika in značilni po spektakularni evoluciji gospodarskih procesov. Te teritorialne strukture so kompleksno povezane s polarizirajočem centrom.

Razmejitev nastajajočega sistema je bila izvedena z uporabo indeksa funkcionalne kompleksnosti, izračunanega po naslednji formuli:

$$Cf = Nd \cdot \frac{Nf}{Ns}$$

Cf – funkcionalna kompleksnost,
Nd – število področij dejavnosti v skladu s SKD (Standardna Klasifikacija Dejavnosti),
Nf – število podjetij (Evro),
Ns – število zaposlenih.

Ta študija opredeljuje nastajajoče sisteme kot prostore, v katerih je funkcionalna kompleksnost povečala za več kot 60% med analiziranim obdobjem.

Evolucija podjetniškega profila je bila analizirana na podlagi statističnih podatkov o mestnem upravljanju in šifri SKD za obdobje med letoma 2001 in 2010. Proučeni kazalci so: evolucija števila zaposlenih, evolucija števila podjetij, evolucija dobička in evolucija prometa. Za več relevantnosti, profili so bili pripravljeni na nivoju treh glavnih gospodarskih sektorjev: primarnega sektorja (kmetijsko, rudarstvo), sekundarnega sektorja (predelovalna industrija) in terciarnega sektorja (storitve).

Študija je izsledila način organiziranja dostopnih koridorjev med razvojnimi centri z ustanavljanjem podjetij na te dovozne prometnice. Odvisno od vrste in kompleksnosti te organizacije, smo predlagali dva koncepta: koncept *organizirajoče osi* (os, ki omogoča, s pomočjo ponujenih spodbud, privabljanje naložb za olajšanje funkcionalne regeneracije ozemlje na dostopnih koridorjih med razvojnimi centri) in koncept *razvojnega koridorja* (os intenzivnega razvoja) (Peptenatu et al. 2009). Ugotovljene so vrste centrov v okviru nastajajočega teritorialnega sistema.

3 Rezultati in razprava

Spektakularna evolucija podjetniškega sektorja v večjih mestih v Romuniji je privedla do bistvene funkcionalne reorganizacije svojih okoliških območij. Na podlagi evolucije indeksa funkcionalne kompleksnosti, je bil določen poseben prostor okrog mesta Craiova, kjer je indeks povečal več kot 60% v obdobju 2001–2010. Celotna je zona registrirala povečanje funkcionalne kompleksnosti od 0.8 v 2001 do 2.6 v 2010 (Slika 1), kar je pomenilo povečanje števila področij dejavnosti podjetij in zmerno povečanje števila zaposlenih.

Slika 1: Evolucija funkcionalne kompleksnosti v nastajajočem teritorialnem sistemu mesta Craiova.
Glej angleški del prispevka.

Slika 2: Evolucija indeksa funkcionalne kompleksnosti v nastajajočem teritorialnem sistemu mesta Craiova, v Jugozahodni Razvojni Regiji Oltenije.
Glej angleški del prispevka.

Slika 2 kaže koncentracijo visokih vrednosti funkcionalne kompleksnosti vzdolž razvojnih koridorjev, kjer je veliko podjetij zaradi številnih konkurenčnih prednosti. Najpomembnejša koncentracija podjetij, z najvišjimi vrednostmi funkcionalne kompleksnosti do leta 2010, je bila izmerjena na naslednjih področjih: Işalniţa (9.9), Breasta (6.8), Preajba (5.3), Mischii (4.9), Cârcea (4.5), Podari (4.3), Malu Mare (4.3).

Število podjetij na nivoju celotnega nastajajočega sistema je povečalo od 224 v letu 2001 do 632 v letu 2010 (Slika 3).

Slika 3: Evolucija števila podjetij v okviru nastajajočih teritorialnih sistemov mesta Craiova.
Glej angleški del prispevka.

Slika 4: Evolucija števila podjetij v okviru nastajajočih teritorialnih sistemov mesta Craiova.
Glej angleški del prispevka.

Najpomembnejša povečanja v letu 2010 v primerjavi z letom 2001 so bila zabeležena v občinah Cârcea, Işalniţa, Pieleşti, Malu Mare, Bucovăţ in Podari (Slika 4).

Povečanje števila podjetij je ugotovila ustanovitev Industrijskega Parka mesta Craiova v letu 2004, kar je prišlo do povečanja števila podjetij v občinah Cârcea in Pieleşti. V drugih občinah, povečanje števila podjetij je ugotovil razvoj prometne infrastrukture, ki je olajšala dostop do mesta Craiova in koncentracija podjetij vzdolž teh cestah. V zvezi s področji dejavnosti (šifra SKD), največja povečanja števila podjetij so bila registrirana v področju trgovine na drobno v specializiranih in nespecializiranih prodajalnah gradbeništva in cestnega prevoza blaga. Na teh gospodarskih dejavnostih, potreba za prostor je privedla do selitve podjetij iz mesta v predmestje.

Evolucija števila zaposlenih sledi trendu, ki ga so registrirala tudi podjetja, ali brez spektakularnih povečanj (Slika 5). Povečanje na nivoju celotnega nastajajočega teritorialnega sistema je bilo od 3.035 zaposlenih v letu 2001 do 7.308 v letu 2010, z najvišjo vrednostjo 8.195 zaposlenih v letu 2008. Spreminjajoča evolucija je posledica ekonomskih politik na vladni ravni. Reforme, izvajane med 2000 in 2005 so privedle do razvoja podjetniškega sektorja, z ustvarjanjem novih podjetij in povečanjem števila zaposlenih (Slika 6).

Slika 5: Evolucija števila zaposlenih v okviru nastajajočih teritorialnih sistemov mesta Craiova
Glej angleški del prispevka.

Slika 6: Razmerja odvisnosti med številom podjetij in število zaposlenih v okviru nastajajočih teritorialnih sistemov mesta Craiova.
Glej angleški del prispevka.

Znižanje števila zaposlenih po letu 2008 je bila posledica gospodarske recesije, kar je privedlo do tega, da velika podjetja so odpustila veliko število zaposlenih. Večina odpuščanji je prišlo v naslednjih gospodarskih sektorjih: proizvodnja letal, proizvodnja plastičnih materialov za gradbeništvo, gradnja cest in avtocest in perutninske farme.

Slika 7: Evolucija števila zaposlenih v okviru nastajajočih teritorialnih sistemov v mestu Craiova
Glej angleški del prispevka.

Na nivoju celotnega območja, poudarjeno je povečanje števila zaposlenih v občini Pieleşti, kjer je razvoj prometne infrastrukture ugotovil os organizacije vzdolž evropske ceste E70 (Slika 7). Dovršitev obvoznice na severnem delu mesta, ki je prevzela tranzitni promet, je olajšala funkcionalno razporeditev prostorja, s selitvijo podjetij iz mesta v predmestje.

Evolucija dobička in evolucija prometa sta pomembni karakteristiki nastajajočih teritorialnih sistemov. Kot posledica vladnih politik, izvajanih za podporo podjetniškega sektorja, rasti dobička so bili spektakularni in sicer so se spreminjali na nivoju območja glede na vrednost in strukturo gospodarskih področji. Povečanje dobička in prometa je stagniralo v letu 2008, ko so učinki gospodarske recesije postali prvič vidni v statističnem smislu (Slika 8). V primerjavi s sistemom polarizacije mesta Craiova, nastajajoči teritorialni sistem je doživel izjemno rast in omejeno zmanjšanje po letu 2008. Nastajajoči teritorialni sistem je imel podoben trend in je registriral skromno povečanje v obdobju med 2001–2008 in znatno zmanjšanje po letu 2008.

Najstrmejša povečanja dobička v okviru nastajajočega teritorialnega sistema v mestu Craiova so zabeležena v mestih Cârcea in Pieleşti, kjer se nahaja Industrijski Park mesta Craiova.

Na komercialnem nivoju, najpomembnejša povečanja dobička in prometa so bila zabeležena v naslednjih področjih dejavnosti: proizvodnja plastičnih materialov za gradbeništvo, predelava mleka, proizvodnja embalaže, strojne opreme, cestni prevoz blaga.

Slika 8: Razmerja med prometom i dobičkom v okviru nastajajočih teritorialnih sistemov v mestu Craiova.
Glej angleški del prispevka.

Podjetja v okviru nastajajočih teritorialnih sistemov so skoncentrirana vzdolž glavnih cest, ki konvergirajo v polarizirajoče mesto, kar predstavlja prave koridorje za razvoj. Glavni razvojni koridorji so: Craiova-Pieleşti, Craiova-Işalniţa, Craiova-Podari, Craiova-Cârcea in strukturirana os Craiova-Şimnic.

Gradnja obvoznice na severnem in vzhodnem delu mesta, namenjene za tranzitni promet, je privedla do koncentracije družb vzdolž nje, vse za ustvarjanje dinamične organizirajoče osi, zaradi projektov infrastrukture, izvedenih na tem področju.

Podrobna analiza nastajajočega teritorialnega sistema mesta Craiova navaja dejstvo, da to območje deluje kot *mestni center*, ki je nastal kot posledica zapletene interakcije med polarizirajočim mestom in njegovimi okolicami. Mestni center je sestavljen iz *upravnega centra,* ki se nahaja v prostorih Industrijskega Parka mesta Craiova in *naravnega centra,* ki je nastal po selitvi podjetij v predmestje, ker os glavne ceste vodi do polarizirajočega mesta (Slika 9).

4 Sklep

Raziskave v področju dinamike podjetniškega sektorja glede nastajajočih teritorialnih sistemov dokazuje dejstvo, da je dinamika polarizirajočega centra tesno povezana z evolucijo podjetniškega sektorja v polariziranih prostorih v območju. Spektakularni razvoj gospodarskega sektorja mesta Craiova pomeni selitev gospodarskih dejavnosti na meji med mestnim in podeželskem zonami, ki je spoznala znatno povečanje.

Koncentracija gospodarskih dejavnosti na podeželski-mestni meji mesta Craiova se je pojavila kot ločeni subjekt, kot nova kakovost nastajajočega teritorialnega sistema, ki je ni mogoče raportirati na sestavne dele sistema. Ta subjekt je treba obravnavati kot celoto, na celovit način, v okviru istega odločilnega konteksta.

Glavni zaključek te študije se nanaša na pomembnost infrastrukture v prostorskem strukturiranju gospodarskih dejavnosti v okviru nastajajočega teritorialnega sistema mesta Craiova. Najvišje koncentracije gospodarskih dejavnosti določijo strukturirajoči osi, razviti vzdolž cest, ki povezujejo druge centre nacionalnega policentričnega omrežja (Bukarešta, Balš, Pitešti, Drobeta Turnu Severin, Filiaši, Tg. Jiu).

Analiza nastajajočega teritorialnega sistema mesta Craiova poudarja številne disfunkcije na nivoju lokalnih sistemov, disfunkcije zaradi koncentracije gospodarskih dejavnosti v kratkem času. V tem kontekstu, celovit pristop teritorialnih neravnovesij mora se temeljiti na modele teritorialnega upravljanja, ki lahko optimizirajo zapletene teritorialne odnose med komponentami teritorialnega sistema (Glaeser et al., 2010b; Florida, 2002; Glaeser et al., 2010a; Delgado et al., 2010; Peptenatu et al., 2010b; Braghina et al. 2010; Gümrükçüoğlu, 2011).

Zaključki te študije dokazujejo teorijo nastajajoče evolucije v skladu s katero nastanek novih kakovosti je povsem spontana in nepredvidljiva ker je nastajajoči teritorialni sistem nova kakovost, različen je po svoji dinamiki in značilnostih gospodarskih procesov. Ne moremo govoriti o spontani in nepredvidljivi evoluciji, saj so te prostorske strukture neposredni rezultat odnosa med mestom, z dobro kapaciteto polarizacije in prostorom, ki lahko ponuja številne konkurenčne prednosti. Poleg tega, na evolucijo nastajajočih teritorialnih sistemov lahko vplivajo odločilni impulzi oblikovalcev politike.

5 Zahvale

To delo je bilo realizirano v okviru projekta Teritorialno Upravljanje na podlagi Teorije Polov Rasti (UEFICSU-PNII – Ideje, 1950), s pomočjo strateške donacije POSDRU /89/1.5/S/ 58852, Postdoktorski program za usposabljanje znanstvenih raziskovalcev, ki ga sofinancira Evropski Socialni Sklad v okviru Operativnega Sektorskega Programa Razvoj Človeških virov 2007–2013.

6 Literatura

Glej angleški del prispevka.

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THE ROLE OF TRANSPORT IN EUROPEAN TOURISM FLOWS

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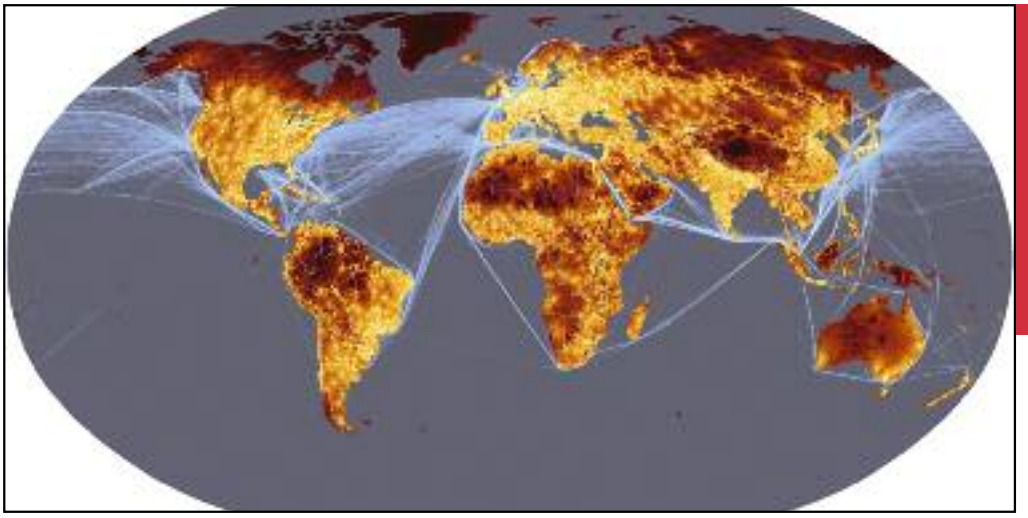

A global map of Accessibility
(source: http://bioval.jrc.ec.europa.eu/products/gam/index.htm)

The role of transport in European tourism flows

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ABSTRACT: This study aims at investigating the multiple and complex relationships between transport and tourism by various methods. In this paper, spatial interaction model and the shift-share analysis are used in different approaches. Factors of the relationship between the transport distance and tourism intensity will be detected and the connections between the accessibility of European regions and their tourism will be analysed. One of the major questions of our study is if there is any relationship between transport and tourism at European regional level (NUTS2); and if so, is there any kind of regularity in the relationship, as Bull (1994) states in his study. Finally, we examined whether there are any differences in this relationship at the level of the European regions.

KEY WORDS: geography, tourism, tourism flows, accessibility, modelling

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1 Introduction

The relationship between tourism and transport has been the focal point of studies for a long period of time (Hall 2010). The matter covers questions whether such a relationship between the two activities can be measured at all, along with additional ones regarding the closeness and strength of the relationship if it exists. It is also relevant to study if such a relationship is observable in general, or with detectable, significant spatial disparities, which is the particular subject this paper intends to investigate.

According to our initial hypothesis, although tourism performance is greatly impacted by the level of service provided by transport, related spatial disparities also play a significant role in forming it.

2 Objectives

Prior to its launch, the research intended to focus on performing a general investigation of the relationship between transport distance and tourism on the example of the European regions, as well as to study the role of distance and accessibility as relevant to the topic in order to point out the significance and spatial aspects of this topic.

First of all, it is important to claim that we intend to study the relationship between tourism and transport in general, along with an approach by which the spatial movements of individuals, including tourists, become more apprehensible.

3 Literature review

The role of transport is manifested in connecting tourism demand and supply and in the internal features of supply, i.e. the destination to be accessed. Transport is one of the primary preconditions to the existence of tourism (Topole 2009, Todorovic and Bjeljac 2009). It is a key element that links tourists to destinations to be accessed. Though the connection between tourism and transport has been widely examined previously (Page 2005; Prideaux 1993), there are still significant gaps in this research topic (Chew 1987; Gunn 1994; Hall 1991; Inskeep 1991; Page 1994; Page 1999; Robbins and Thompson 2007). As pointed out by Knowles (1993), in many cases researchers took transport into account as a passive element in tourism, not as an integral part of tourism activities. Though the tourism product to be consumed by tourists, i.e. the set of services (accommodation, catering, entertainment and other services) is based on attractions accordant with the motivation of tourists, it also includes transport.

During travels, travellers get from generating regions through transit regions to destination regions. Generating, transit and destination regions were distinguished by Pearce (1989) after Thurot (1980) while studying the impacts of tourism. For transit regions, the character and capacity of transport networks were studied with their limitations pointed out.

4 Tourism and accessibility

Definitions for accessibility were often developed as an establishment of a spatial model or calculation. Thus a more detailed analysis into the topic, pointing out the wide range of compounds that the relationship between accessibility and tourism is dependent upon, is thought to be more expedient. Such approach is reflected by the definition according to which accessibility can be regarded: the sustainability potential of the built environment and the dimension of mankind's quality of life; thus it is basically an approach of how the relative importance of certain spatial points are judged (Makri 2001).

The content behind the definition of accessibility can certainly be modelled in various ways. However, in our study several examples were applied for quantification of the basic definition, and the same contextual frame was studied.

5 A research into the European tourism flows

Transport distance as one of the substantial indicators of travel is only one among the selection criteria of destinations. Regarding distance, a different overall view is drawn for movements for leisure purposes when compared to all dislocations. According to Bull (1994), the travel intensities with shortening distances will increase to a certain position followed by a decline and finally, a zero travel intensity observed at zero distance. At the root of this is the fact that too nearby, thus too quickly accessible destinations are not attractive for visitors as they are considered to be part of their everyday milieu.

It can also be concluded that several tourist destinations indicate a rather intensive development despite their locations relatively distant to their competitors. In many cases, poor accessibility can be practically balanced by other factors of attraction such as a destination where attraction is represented by unfavourable accessibility, for example a remote, wild destination.

As revealed by certain studies, accessibility has a role primarily in selecting tourist destinations (Thompson and Schofield 2007). Tourism in easily accessible towns indicates intensive development as opposed to those hard-to-access stagnates. According to a hypothesis, tourists during their travel decisions select the destinations to be reached first based on the local possibilities and attractions (Crompton 1992). In this decision-making, destinations sufficing the purposes of visitors and with similar type of endowments are taken into account (Celata 2007). Only after this primary selection is made will destinations be compared by accessibility. Thus accessibility primarily has or can theoretically have a role in substituting potentially visitable destinations. On the contrary, destinations capable of providing comparative advantages for tourists can attract a significant number of visitors even if with relatively unfavourable accessibility. Consequently, the matter of accessibility is relevant for destinations with similar endowments (seaside), whereas it is less remarkable for those with individual attractions (historical towns, spas). Favourable accessibility itself does not necessarily represent an origin of competitiveness.

Fotheringham (1983, 1984, 1991) developed a spatial interaction model of competing destinations that is basically a single limited accessibility model by which we first intend to analyse the relationship between accessibility and tourism. Accordingly:

$$I_{ij}=\left[O_i S_j D_{ij} A_j\right]$$

where I_{ij} is the interaction between the i^{th} origin and the j^{th} destination, O_i is the i^{th} place's ability as an origin to contribute to the interaction, S_j is the attractiveness of j as a destination, D_{ij} is the intervening distance between the origin and destination, and A_j is the competing destinations variable being the accessibility of j^{th} destination relative to all others that may interact with the i^{th} origin, i.e.:

$$Aj=\sum_{\substack{k=1\\k\neq j}}^{m} S_i D_{ij}$$

We presumed that the number of guest nights in a given region depends on the effective demand of a potential sending region, the attractiveness of the destination, the distance between the sending and receiving regions, as well as on the competition between the two areas. These factors have been included in our model.

Hereafter, the research attempts to focus on the type of relationship explored between theoretical accessibility calculated for tourism and statistical data on the number of visitors.

The starting point of our study, for practical reasons, was the European Union's NUTS system as it is ensured that data is available at comparable regional levels. For the calculations, NUTS2 data was used. The number of regions considered was 280 with transcontinental areas of France, Spain and Portugal excluded.

In the model, the universal accessibility definition was applied, i.e. given regions were not analysed by their main generating regions. In other words, theoretically, travels can be made from any region to any other one with tourist motivation (obviously, in practice, this is not the case; however, due to the features of modelling, it was put aside).

The participatory capacity of departure regions in the interaction was attempted to be quantified by their population data.

The tourist attraction of destinations was represented by the number of beds in hotel type units in the given region. We claim by this that the bulk of attraction is indicated directly as, not regardless to the general level of economic development and processes, the greater the attraction, the more beds there are at quarters.

Distance between the origin and destination regions was specified by the distance between the regional centres, by road, measured in minutes. Applying road distance data is apparently the first approach only as being otherwise obvious; other transport sub-sectors also play a relevant role in tourism-induced travels in the study regions. The number of guests in a given region, i.e. in this particular case, the number of guest nights can be calculated as the sum of incoming tourism flows.

The spatial interaction model is based on a gravitational analogy as field intensity here is also studied in the relation of masses and distances. Our research intends to focus on the second one, i.e. the topic of accessibility. To estimate the role of distance sensitivity in tourism flows, an analysis on the value γ constant can bind in the gravity model was relevant, i.e. at what power value the distance between the regions is taken into account. Therefore calculations were performed by constants within the range between 0 and 2 followed by studying the strength of correlation between the calculated and actual values.

As concluded by Dusek (2003) in his work on the gravity model: »With the exponent increasing, the intensity of interregional connections becomes more distance sensible and collaterally the relevance of masses will gradually decline.«

Table 1: Weighted means of the Pearson correlation coefficients for various γ constants of the gravity model.

Gravity (γ)	0.0	0.5	1.0	1.5	2.0
Weighted mean of Pearson correlation coefficient (r)	0.87	0.85	0.71	0.49	0.25

Source: own calculation.

By applying the spatial interaction model (Table 1), data on the number of guests can be sufficiently estimated. Therefore there is a relatively close connection between the interaction ability of the starting area, the attraction of the destinations, and the turnover estimated on the basis of destination competition and the actual number of guest nights. However, in this case the distance is calculated at the power of zero (which, in practice, means one between any points), which indicates that tourist flows are not distance dependent at European level! This is due to several reasons. On the one hand, the most important tourist destinations are located at the continent's periphery, at positions relatively disadvantageous from the point of view of accessibility. On the other hand, tourism product as a tourism experience is indefinable, i.e. one-time and perishing; can not be stored. E.g. in case somebody intends to spend the summer holidays at the seaside, such demand will not be replaced by spending it at a nearby, although well accessible, mountainous area, but will undertake travelling to remote peripheries.

6 A study into accessibility and the number of guests by applying shift-share analysis

The following analysis intends to study the extent of the number of guests in European regions explained by accessibility and other local reasons. To this, the shift-share analysis was applied. Description on the method has been given in several spatial statistical publications and volumes (Houston 1967; Curtis 1972; Berzeg 1978; Stevens and Craig 1980) and an example for its application regarding accessibility in Hungary was provided by Tóth (2002).

Here, thus, a different approach was attempted. As already indicated earlier, accessibility has or can have a role primarily in substituting potentially visitable destinations (Celata 2007). Obviously, the question can be raised whether this is the case for all destination groups.

Therefore destinations with similar features were intended to be studied from the aspect of accessibility. European regions were classified into five groups based on the location of the countries involved. Our hypothesis in this respect was that for the contiguous groups of countries, several differences can be observed regarding the type and strength of relationship between accessibility and the number of guests.

It is possible to formulate groups in a number of ways. Our purpose was to place countries of very similar culture and tourism characteristics into the same groups. Group formation is naturally subjective nevertheless it can be done for the sake of the survey. The groups and the countries included can be seen on Figure 1.

Accessibility in this respect was studied not only based on road transport data but also multimodal accessibility, i.e. based on the use of various modes of conveyance and taking them into account collectively was attempted to be applied.

To this, data available on the Espon website (Internet 2) was used. The EPSON database we use represents outstanding standards in European regional studies because such a detailed, comprehensive, multi-modal accessibility database is believed to have been established only in the context of this research – in cooperation with one of the most distinguished research groups in this field, the Spiekermann & Wegener Urban and Regional Research.

Downloadable data, among others, included multimodal accessibility of NUTS3 regions in the study area. As our research was intended to be carried out at NUTS2 level, such data was inappropriate thus a population-weighted mean was applied.

The method of shift-share analysis is essentially a double standardization, which needs data by at least two structural – territorial and sector – dimensions. Sector indications actually may cover optional disjunctive distributions: economic sectors, age groups, and settlement size groups. Now we divided the regions under the level of their accessibility into groups. The territorial dimension may also have subgroups: e.g. settlements, regions, countries, groups of countries as it was seen earlier. Concerning certain phenomena, chronological growth components may be analysed just as differentiated structural patterns (e.g. per inhabitant guest nights).

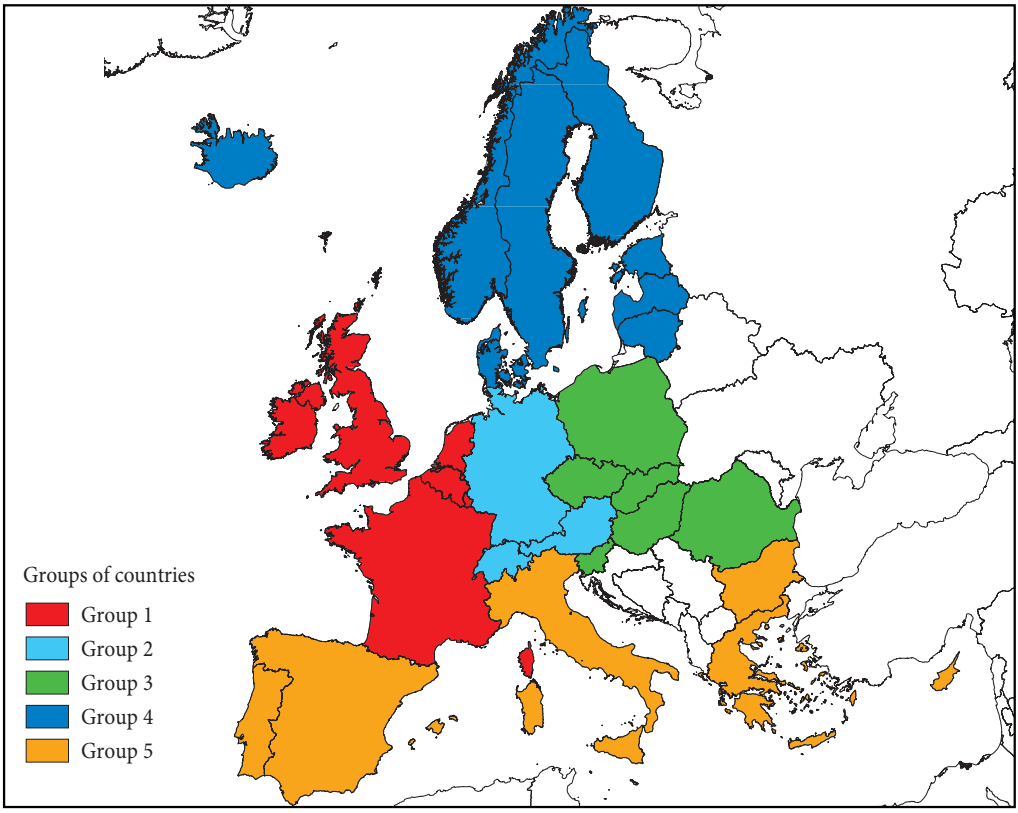

Figure 1: The groups of European countries.

This research applies both types. First, changes in the number of guest nights were analysed between 2003 and 2009. In the second study, the specific method of shift-share analysis with the spatial disparities of guest nights per bed in 2009 factorised was applied. We intended to explore the amplitude accessibility and other local factors which are responsible for spatial disparities. (It is not possible to define the influencing specific local factors by the analysis, only the extent changes in the number of guests nights deviating from the European average is influenced by accessibility (in other words, the extent positive or negative deviation or in short surplus or deficiency in the number of guest nights compared to the average in the number of guest nights is entailed), and other factors characteristic for the given region (including: the level of urbanisation, seaside or mountain location etc.).

Table 2: Surplus/deficiency in the number of guest nights and its components, 2003/2009 in percent.

Regions	Total	dimension	
		Spatial	Accessibility
Western Europe	100	–69	169
West Central Europe	100	–6,703	6,803
East Central Europe	–100	136	–236
Northern Europe	–100	–56	–44
Southern Europe	100	226	–126

Source: own calculation.

In all the columns of the table the value is 100% if in the given region the number of guest nights grew faster than the European average and –100% if the growth was slower. The spatial and accessibility columns present the components, i.e. to what extent the faster or slower than average growth in guest nights is the result of accessibility or other unconnected local reasons. Local reason may be utterly diverse in this respect. Both subjective factors (milieu, image) and objective ones (quality and price of services) can be taken into consideration.

As indicated by the data in Tables 2 and Figure 2, accessibility plays a more important role in the changes in the number of guest nights than spatial dimensions, i.e. other local conditions for 3 of the 5 groups of countries as having higher absolute values. It is due to their accessibility position that Western and West Central Europe have more advantageous trends whereas countries in East Central Europe show slower dynamics compared to the European average – also primarily due to their accessibility. Disadvantageous accessibility further spoils disadvantageous local conditions in Northern Europe, while regarding the countries in Southern Europe, accessibility can slightly worsen favourable local endowments. Accessibility of Southern Europe can not be disadvantageous within the continent to impede the increase in the number of guests exceeding the European average. Table 3 indicates the components of changes in the number of guest nights between 2003 and 2009. It is clearly visible that during the indicated period more than two-thirds of the growth of guest nights was realised in Southern European regions while decrease was recorded mainly in West Central Europe in which case it can be stated that it is exactly where the negative spatial effects are concentrated. In spite of this, the latter could not hinder the former to a great extent and so higher than average growth in guest nights was achieved – compared to European average – in the region. The growth of guest nights was slower than the European average in East Central Europe which includes Slovenia, although this negative tendency is dwarfed by the related data of Northern Europe. The main reason for slower growth of guest nights is the accessibility of the regions since there is a positive spatial factor in this region. The role of the two components in the development of the situation is not significant at a European scale, a fact supported by the relatively low percentage values of the region.

Regarding the factorisation of data of guest nights per bed in 2009, a somewhat different overall view is seen (Table 3 and Figure 3). In all the columns, groups of regions achieved 100% where the number of relative guest nights was higher than the European average and –100% where it was lower. In this respect, one can observe a more important role of accessibility only for the West Central European countries compared to local conditions for the number of guest nights per bed. For the other groups of countries, however, it can be seen that conditions basically determined by local endowments can only be modified either in a positive or negative way by accessibility.

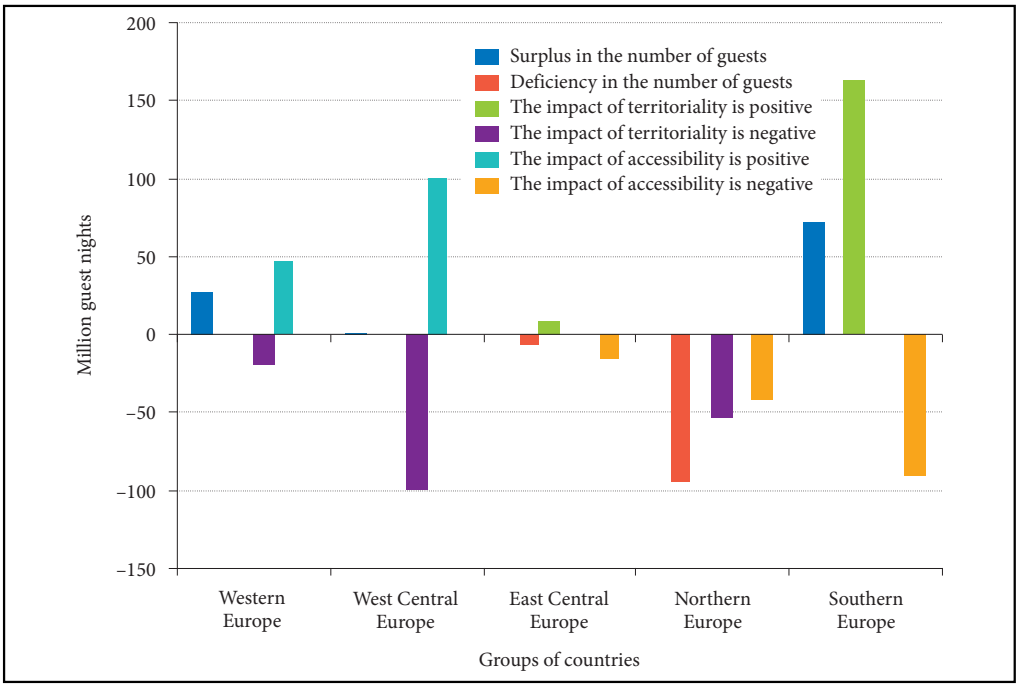

Figure 2: Share of regions in surplus/deficiency in the number of guest nights and its components, 2003/2009 in million guest nights. Source: own calculation.

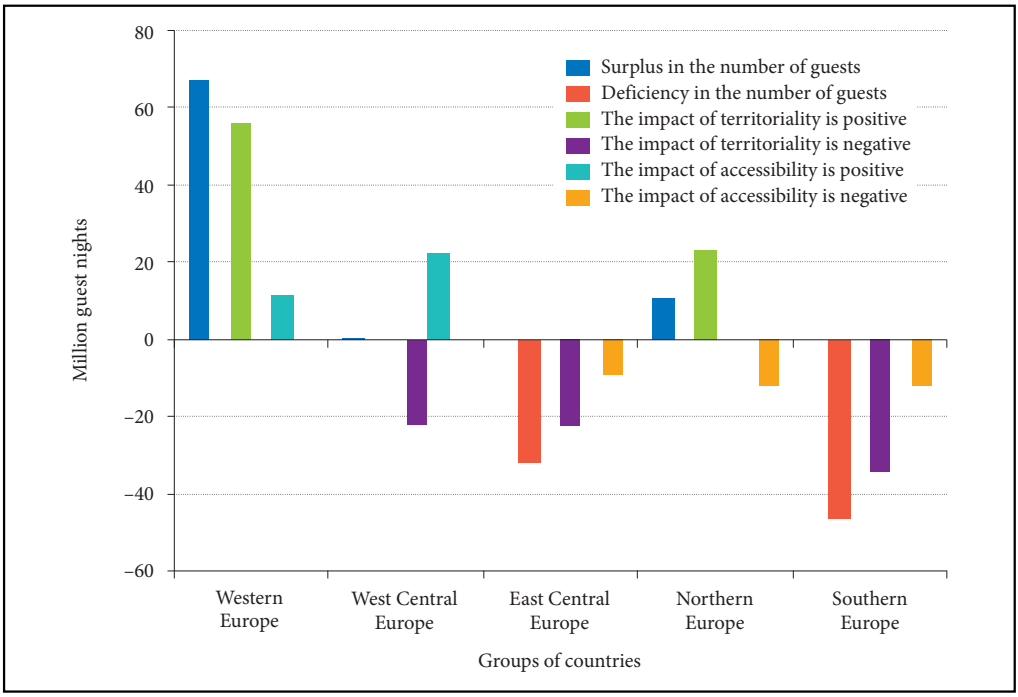

Figure 3: Share of regions in surplus/deficiency in the number of guest nights and its components, 2009.

Summarised, while accessibility plays a significant role in the changes in the number of guest nights in yet more groups of countries, its role in effectiveness is not relevant.

Table 3: Surplus/deficiency in the number of guests and its components, 2009 (in percent).

Regions	Total	dimension	
		Spatial	Accessibility
Western Europe	100	83	17
West Central Europe	100	–8,804	8,904
East Central Europe	–100	–71	–29
Northern Europe	100	216	–116
Southern Europe	–100	–74	–26

Source: own calculation.

7 Conclusions

Based on the research carried out, it was concluded that the spatial interaction model is adequately suitable to estimate data on the number of guests; i.e. 3 of the 4 elements included in the model have a determining role in the development of level of guest nights. This is not the case considering the 4th element, namely accessibility, since the model produced the most accurate result when distance was raised to power zero; therefore European tourist flows cannot be seen as distance dependent. With the results recognised, we argue the estimates on the relationship between the intensity of travels (that was modelled by the number of guest nights) and distance acknowledged (Bull 1994). This also means that there is no detectable link between the reductions of travel distances and travel intensity!

The results of the shift-share analysis carried out indicated that accessibility is playing a more important role than spatial dimension for 3 of the 5 groups of countries, as other local reasons. Regarding the data of guest nights per bed in 2009 (which we considered efficiency), a more important role of accessibility is observed exclusively for West Central European countries compared to local conditions. In other words, conditions determined by basically local endowments can only be modified by accessibility. Therefore, while accessibility plays a significant role in the changes regarding the number of guests still in more groups of countries, its role in effectiveness is not relevant. According to our relevant hypothesis regarding the relationship between accessibility and tourism, the fact that a significant difference exists was proved true.

All things considered, the role of accessibility is an important factor for many groups of countries from the point of view of changes in guest nights; however, its role is not proved by static testing of the effectiveness of tourism.

The estimate conceptualised in the null-hypotheses, according to which transport impacts tourism productivity, was proved true. Although the type and strength of relationship between tourism productivity and the level of services provided by transport can vary in different regions, we claim that the matter is worth paying attention to in the field of tourism planning.

8 Acknowledgement

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EVALUATION OF FRUŠKA GORA NATIONAL PARK (SERBIA) FOR SPORT AND RECREATIONAL TOURISM

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Fruška Gora National Park is one of the most attractive areas for sport and recreational tourism.

Evaluation of Fruška Gora National Park (Serbia) for sport and recreational tourism

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ABSTRACT: The Fruška Gora National Park has one of the biggest sport and recreational potentials in Vojvodina, Serbia. Because of its favorable natural and geographical features Fruška Gora National Park. Since sports and recreational tourism is of growing importance in the tourism industry, the evaluation method to create a high quality tourism product becomes inevitable. Empirical research conducted on a sample of 304 respondents was aimed at showing the existing potentials of Fruška Gora National Park related to sport and recreational tourism. The interviews with experts from the Provincial Secretariat for Environmental Protection, the National Park and the Cycling Association of Vojvodina helped the SWOT analysis of sport and recreational tourism on Fruška Gora National Park.

KEY WORDS: geography, tourism, tourist evaluation, sport and recreational tourism, Fruška Gora national park, Vojvodina, Serbia

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1 Introduction

Sport and recreational tourism has become a very attractive form of tourism that attracts millions of direct respondents. Whether it is a competitive sport (professional or amateur), extreme or recreational, its role in tourism can be of great importance (Standeven and De Knop 1999; Plavša 2007; Papadimitrou and Gibson 2008; Weed 2008; Vujko and Tomka 2009; Vujko and Plavša 2010; Vujko 2011). Looking at sport and recreational tourism in the context of a healthy lifestyle, active rest and recreation, various programmes that contribute to the development of sport and recreational tourism and tourist destinations are perceived. Natural and geographical features of the Mountain are very good for sport and recreational tourism. Fruška Gora is located in the northern part of Srem (South-western Vojvodina). It has a total surface area of 21,500 km^2, which makes 24.3% of the whole territory of the Republic of Serbia (Đurđev et al. 2010). Since this part of Vojvodina is situated between the Danube and the Sava rivers, this means that Fruška Gora Mountain is situated in Srem, mostly in Serbia, with only a small part, in the far west, situated in Croatia (Bukurov 1978). Mountain is an interesting area for development of cycling tourism in Vojvodina. In its west-east direction it has the length of about 80 km. This low island type mountain, with the peaks Crveni čot (539 m), Orlovac (512 m), and Iriški venac (490 m), represents a mountain with a special benefit for the development of sport and recreational tourism (Jovičić 1962; Milić 1973; Ahmetović - Tomka 1995).

The central part of the Mountain has the shape of a long anticline (Petković et al. 1976), east-west, with a fragmented appearance of the wings and partial phishing. Anticline is symmetrically preserved, except in the far eastern part where it sank beneath the northern flank of the Danube fault (Petković et al. 1976). The Mountain base is surrounded by two loess plateau areas, 130–150 m and 110–120 m high. The Mountain is partly covered with thick or thin layers of loess and loess deposits that ease severity and sudden transitions that are characteristics of older and more compact rocks, which is certainly in favour of sport and recreational tourism as a viable and accessible mountain in almost all its parts (Petković et al. 1976; Dragutinović 2000; Obradović 2006). However, to give an objective appraisal of the elements of Fruška Gora National Park sport and recreational tourism potential (individually and collectively), and to determine its usefulness and exchange value, it was necessary to access the tourist evaluation because evaluation means conscious development of tourism in a destination (Ćurčić and Bjeljac; Reynard and Fontana 2007; Pereira et al. 2007; Comanescu et al. 2009).

The aim of the research is to show the potential of the Fruška Gora National Park for sport and recreational tourism with method of evaluation individual natural and cultural sites. The purpose of this paper is to determine the value and tourist attraction of sport and recreational tourism, by means of quantitative and qualitative methods of tourism evaluation (Čomić and Pjevač 1997) and methods set by Hilary du Cros (du Cros 2001), modified by Olga Hadžić and her associates (Hadžić et al. 2010).

2 Metodology

The starting point of the research was a group of variables concerning natural and geographic tendencies of Fruška Gora National Park for sport and recreational tourism. Total number of respondents was 226 in the area of Novi Sad and 78 respondents from seven different places near the mountain (Petrovaradin, Sremska Kamenica, Sremski Karlovci, Banstol, Čortanovci, Ledinci i Erdevik). Two sets of variables with the aim of checking the respondents' attitudes about potentials of the Fruška Gora National Park for sport and recreational tourism were used.

The first group of variables was about the opinions on suitability of the mountain area for development of sport and recreational tourism. The second group of variables interviewed about the names of those areas.

The data were processed by appropriate statistical methods of descriptive and comparative type, which enabled explanation of research results and reaching conclusions. Bearing in mind that the obtained data confirm the preliminary hypothesis that the Fruška Gora National Park is a suitable area for development of sport and recreational tourism, it was necessary to move to the next step in the in the research, tourist evaluation of the area. This kind of development is in favour of regional (business and economic, ecological and sustainable) development (Serrano and Gonzales-Trueba 2005; Pralong 2005; Pereira et al. 2007; Reynard and Fontana 2007; Erhartič 2010).

Benefits from the development of sports and recreational tourism would be more far-reaching leading to development of natural and cultural resources (Standeven and Knop, 1999; Cutumisu and Cottrell, 2004, Vujko, 2012).

Two methods were used in the process of tourism evaluation of Fruška Gora Mountain. The quantitative-qualitative method is frequently used because it allows great freedom in both research and assessments (Čomić and Pjevač 1997). The more complex one was set by Hilary du Cros (du Cros 2001), and modified by Olga Hadžić and her associates (Hadžić et al. 2010). This method is considered to be more reliable, and therefore scientifically suitable. To be accepted as a valid method in assessing the natural and cultural values relevant to sport and recreational tourism in the Fruška Gora National Park, it was necessary to involve experts from sports and recreational tourism. Each site was evaluated by two grades. The upper part of the evaluation consists of the average grade obtained from the following experts: Nebojša Subić, President of Cycling Association of Vojvodina and Milivoj Kišdobranski, the organizers of Sunday's action »Pawns in nature« and one of the founders of »Fruškogorski marathon«. The lower part of the assessment was obtained from one of the authors, namely Aleksandra Vujko.

The main elements of tourist evaluation were: accessibility of resources, tourist services and equipment (existing storage capacity, complementary tourist offer and tourist-information services, marketing, etc.), environment (natural and built), specific resources, the importance of resources (depending on their impact on market and well knownness), and artistic value (Čomić and Pjevač 1997; du Cros 2001; Hadžić et al. 2010).

The proposal of locality given on the map was the result of a field research (the results of field research carried out in an extensive research project have been used (Vujko 2011). The maps were drawn by internet software Geokarta.

3 Results and discussion

Sport and recreational tourism can be developed on the Fruška Gora National Park in various forms, in accordance to the position, basic characteristics of the terrain, climate characteristics, hydrographic network and biodiversity. Moreover, all types of sport and recreational tourism can be developed: recreational (all routes within Fruška Gora), event based, sport and recreational tourism and extreme sport and recreational tourism since the inside paths of Fruška Gora Mountain are very demanding terrain by their physical characteristics. The most interesting and economically advantageous period for sport and recreational tourism is from March to October. Bearing all this in mind we can conclude that the information obtained from the research was in concordance with the potential of the mountain. In support of the Fruška Gora National Park is just the absolute altitude and terrain mobility. Mountains up to 600 m above sea level are suitable for diabetics, stenocardia, nervous tension, respiratory, and recovery after a heart attack. These mountains are also called »air spas« (Stanković 1994). The most important question in the first group of

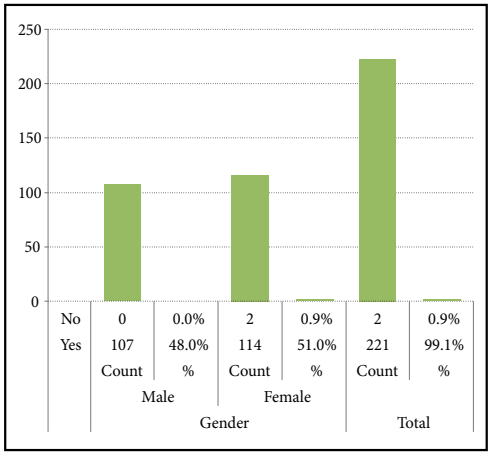

Figure 1. Possibility of the Fruška Gora National Park for development of sport and recreational tourism (N = 221).

Table 1: Structure of participants from diferent area on the Fruška Gora Mountain

		Living place of participants?							Total
		Petrovaradin	Banstol	Ledinci	Sremska Kamenica	Sremski Karlovci	Čortanovci	Erdevik	
Sex of participants?	Male	12 15,4%	2 2,6%	6 7,7%	7 9,0%	8 10,3%	6 7,7%	5 6,4%	46 59,0%
	Female	7 9,0%	3 3,8%	4 5,1%	2 2,6%	7 9,0%	8 10,3%	1 1,3%	32 41,0%
Total:	19 24,4%	5 6,4%	10 12,8%	9 11,5%	15 19,2%	14 17,9%	6 7,7%	78 100,0%	

Table 2: Possibility of Fruška Gora National Park for development of sport and recerational tourism by the opinion of participant from Fruška Gora Mountain places

			Living place of participants?							Total
			Petrovaradin	Banstol	Ledinci	Sremska Kamenica	Sremski Karlovci	Čortanovci	Erdevik	
Is the Fruška Gora National Park suitable area for sport and recreational tourism?	Yes	Count % of Total	19 24,4%	5 6,4%	10 12,8%	9 11,5%	15 19,2%	14 17,9%	6 7,7%	78 100,0%
Total		Count % of Total	19 24,4%	5 6,4%	10 12,8%	9 11,5%	15 19,2%	14 17,9%	6 7,7%	78 100,0%

variables is related to whether respondents feel that the Fruška Gora National Park is a suitable area for development of sport and recreational tourism.

Of total number of respondents (226) from Novi Sad, even 221 (99.1%) thought that Fruška Gora National Park is suitable area for development of sport and recreational tourism, which can be seen in Table 1 and Figure 1. Regarding the age structure of the respondents from the mountain area (Table 2) survey included 59.0% males and 41.0% females. The largest percentage of them 24.4% was from Petrovaradin, followed by 19.2% from Sremski Karlovci, 17.9% from Čortanovci, 6.4% from Banstol, 7.7% from Erdevik, 11.5% from Sremska Kamenica and 12.8% from Ledinci.

The respondents of both genders disregarding their place of residence almost unanimously agreed that the Fruška Gora National Park is a suitable area for development of sport and recreational tourism, followed by the issues of patients required to nominate areas that they think were the most suitable destination for sports and recreational tourism. Total number of respondents who answered this question was 174 in the area of Novi Sad (Tables 4, Figure 2 and Figure 3). 118 respondents (67.82%) have the opinion that the territory of the whole mountain is the suitable area for the development of sport and recreational tourism; whereas only 15 respondents (8.62%), responded to this question with *I do not know.*

Table 3: Areas suitable for development of sport and recreational tourism in the Fruška Gora National Park by the opinion of participants, depending on the sex of participants.

The answers given by the participants		Gender of participants		Total
		male	female	
Which areas in the Fruška Gora National Park can contribute to the development of sport and recreational tourism?	All	53	65	118
	I do not know	6	9	15
	Around the lakes	4	1	5
	Stražilovo picnic area	0	2	2
	Popovica and Iriški venac picnic areas	0	1	1
	Popovica picnic area	0	1	1
	Around the lakes and picnic areas	4	0	4
	Along The Partisan way	1	0	1
	Danubean part of Fruška Gora Mountain	1	0	1
	Letenka picnic area	2	0	2
	Areas that are not populated	1	0	1
	Brankovac and Osovlje picnic areas	0	1	1
	Stražilovo, Popovica and Glavica picnic areas	2	0	2
	Andrevlje picnic area	1	0	1
	The central part of Fruška Gora Mountain	0	1	1
	Picnic areas	5	2	7
	Testera picnic area	1	0	1
	Letenka, Stražilovo and Banstol picnic areas	0	1	1
	Ledinci village	0	1	1
	All marked paths	1	1	2
	Šakotinac lake	1	2	3
	Spas in Vrdnik, Erdevik and Ljuba villages	1	0	1
	Iriški venac and Thermal Spa in Vrdnik village	1	1	2
Total:		85	89	174

Sport and recreation operate successfully in the prevention of the typical diseases of modern civilization, visible as a neurosis due to various tensions, urban noise, air pollution (Simonsen et al. 1998). Based on similar evaluation that were carried out on natural sites (Pereira et al. 2007; Comanescu et al. 2009) in continuation of work to approach the evaluation of the Fruška Gora National Park on the basis of methods used for evaluation. According to the qualitative-quantitative method, first the nature and geographical areas and their association with sport and recreational tourism were analysed. Table 4 and figures (Figure 3, 4 and 5) show the lowest grades for accessibility (most sites are not marked), and travel equipment.

What represents the highest potential when natural and geographic areas are in question are high grades for atmosphere, the specific resources and the importance of resources, because of that the average score of three (3) is a sufficient incentive for the construction of sports and recreational trails and the necessary infrastructure.

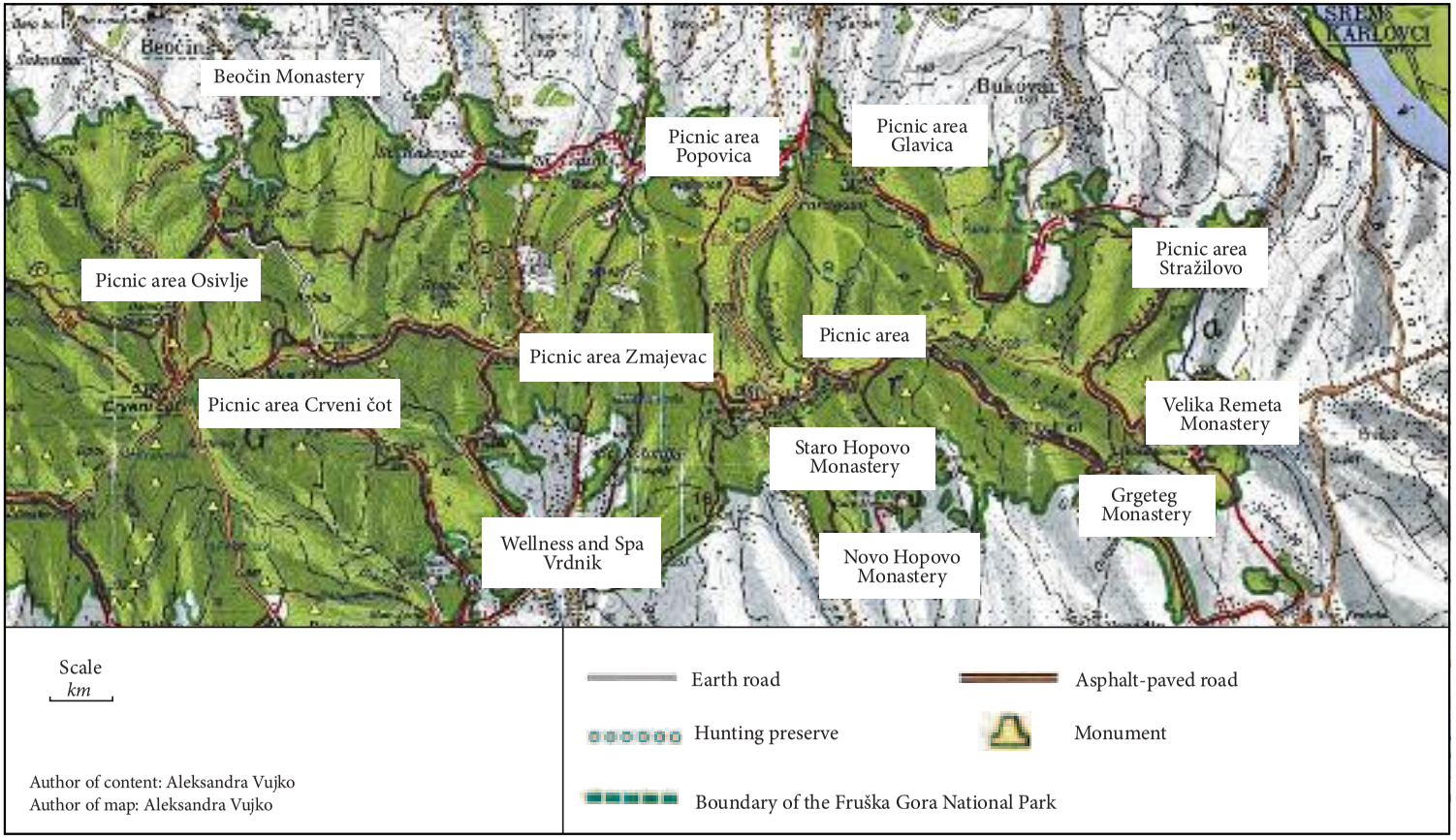

Figure 2: The eastern and central parts of the Fruška Gora National Park.

Table 4: Evaluation of picnic areas for the sport and recreational tourism on the Fruška Gora National Park by the qualitative-quantitative method (Vujko 2011).

	Accessibility of the resources	Travel equipmen	Environment	The specificity of resources	The importance of resources	Art value/	The average value/
Stražilovo	3 5	3 3	4 5	3 3	4 4	5 5	4
Iriški venac	3 5	2 2	4 5	4 3	4 3	2 2	3
Zmajevac	3 3	2 2	4 5	4 4	4 4	2 2	3
Popovica	2 5	1 2	4 5	3 4	3 4	2 1	3
Glavica	2 2	1 1	3 5	2 5	3 5	1 1	3
Osovlje	2 2	2 2	4 5	3 5	4 5	2 1	3
Testera	2 2	2 2	4 5	4 5	4 4	2 2	3
Andrevlje	2 2	2 2	4 5	4 5	4 4	2 1	3
Koruška	2 2	1 1	3 4	3 4	4 4	2 1	3
Letenka	3 3	2 2	4 4	4 4	4 4	2 1	3
Lake/ Jezero Sot	3 4	1 1	4 4	4 4	4 5	2 1	3
Lake/ Jezero Bruja	3 2	2 1	4 4	4 4	4 4	2 1	3
Lake/ Jezero Moharač	2 5	1 1	3 4	3 4	4 4	1 1	3
Dumbovački waterfall/slap	1 1	1 1	4 4	4 4	4 4	1 1	3
Sviloški waterfall /slap	1 1	1 1	4 5	4 5	4 5	1 1	3
Dobri waterfall/slap	1 1	1 1	4 5	4 5	4 5	1 1	3

Anthropogenic features of the Fruška Gora National Park are numerous. As a specific group of buildings, monasteries are presented. They could be better connected to each other in order to attract more visitors. Currently many cyclists and hikers, sport and recreational tourists who are not Orthodox Christians and would like to enter a sanctuary as a cultural landmark may have problems to enter the monasteries. It is certain that the landscaping and trail markings largely contributed to the popularization of the area and certainly can lead more visitors to holy sites in Fruška Gora (Stamenković and Plavša 2009).

As well as picnic grounds, most of the monasteries have low accessibility, therefore the lowest rating was assigned to the existing conditions of roads and tourist signalling, as well as for accessibility and infrastructure to the resources, i.e. tourist facilities in that area.

On the other hand, the environment, specific resources, the importance of resources and artistic value were assigned the highest marks. Thus the evaluation might help the monasteries to observe the necessity of being included in the sport and recreational tourism offer of the Fruška Gora National Park in the future.

As the previous method gave only a general condition of individual sites in Fruška Gora, it was necessary to pass to the method of Hilary du Cros and Olga Hadžić with associates. As for the recognition part, it is important to note that natural resources that are widely recognized also have higher level of tourist attraction. If this is applied to sport and recreational tourism on the Mountain, then it would involve creating

Figure 3: The central and western parts of the Fruška Gora Mountain

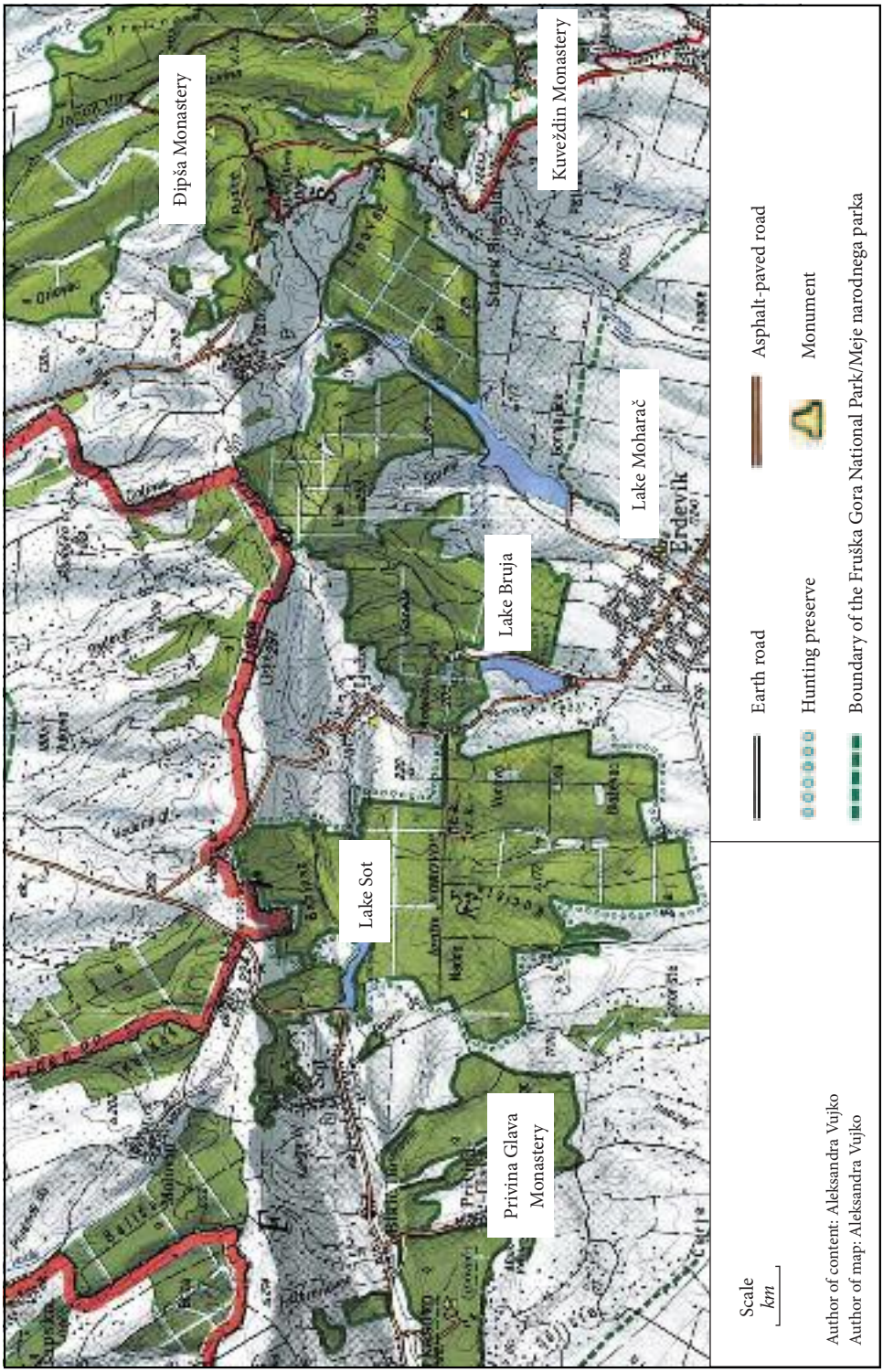

Figure 4: The western parts of the Fruška Gora Mountain

Table 5: Evaluation of monasteries for the sport and recreational tourism on the Fruška Gora National Park by the qualitative-quantitative method/ Valorizacija samostana s kvalitativno in kvantitativno metodo (Vujko … 2011)

	Infrastructure	Facilities	Environment	The specificity of resources	The importance of resources	Art value	The average value
Krušedol	3 4	3 3	4 5	4 5	4 5	5 5	4
Petkovica	1 1	2 2	3 5	3 5	3 5	3 5	3
Rakovac	3 5	2 2	3 5	3 5	3 5	4 5	4
V. Remeta	3 3	3 3	3 5	3 5	4 5	4 5	4
Đipša	2 2	1 1	3 5	3 5	4 5	4 5	3
N. Hopovo	3 3	2 2	3 5	3 5	3 5	4 5	4
St. Hopovo	1 1	1 1	3 5	3 5	3 5	4 5	3
Jazak	3 4	3 3	3 5	3 5	3 5	4 5	4
M. Remeta	3 3	3 3	4 5	3 5	3 5	4 5	4
Grgeteg	3 3	3 3	3 5	3 5	4 5	4 5	4
Beočin	3 3	2 3	4 5	3 5	3 5	4 5	4
Privina Glava	3 2	3 3	4 5	4 5	4 5	4 5	4
Šišatovac	3 2	2 3	3 5	4 5	4 5	4 5	4
Kuveždin	2 1	1 1	3 5	3 5	4 5	4 5	3
Vrdnik	4 5	3 3	4 5	3 5	4 5	4 5	4

Table 6: Elements related to the attraction of Fruška Gora National Park and factors of importance for the programming of sport and recreational tourism as atourism product of the Mountain – a method Hilary du Cros and Olga Hadžić et al (Vujko … 2011)

Elements	Fruška Gora	Total
The degree of recognition	3 2	3
Evocative component	5 5	5
The attraction of the natural resource for special needs	5 5	5
The existence of complementary natural and cultural resources	5 5	5
Access to natural area	5 5	5
Distance natural resource	5 4	5
Service benefits	2 2	2

a well-recognized brand by which the Mountain would be recognized as a sports and recreation destination, which would certainly increase the degree of its attraction. As it can be seen from Table 6, the current condition of Fruška Gora as a recognisable route for sport and recreational tourism is actually very low. This is confirmed by the fact that there are almost no signs of modern sport and recreational tourism in the area.

Bearing in mind the proximity of Fruška Gora to the »The Danube route« which is one of the most important Europe cycle transversal (Vujko and Plavša 2010; www.gtz.de; www.dunavskastrategija.rs; www.ciklonaut.com), it is clear to what extent these data should be useful for the development of sport and recreational tourism in Fruška Gora and all the other interesting destinations and sites in Serbia (Pereira et al. 2007; Comanescu et al. 2009; Hadžić et al. 2010).

Table 7: Elements related to the management of Fruška Gora National Park – method Hilary du Cros and Olga Hadžić et al. (Vujko … 011)

Elements	Fruška Gora	Total
The degree of recognition	5 4	5
The influence of the natural resource to the social development of local communities	5 5	5
Educational and scientific importance	4 3	4
Rare natural resource	3 3	3
Representativeness of the destination	2 3	3
The sensitivity of the natural resource/	2 2	2
Natural resource management and regular monitoring	2 1	2
Possibility of negative impact of a large number of visitors	4 3	4

Proper management of Fruška Gora is an important aspect of development of sport and recreational tourism and it is essential for sustainable tourism, which includes the preservation of the mountain for future generations (Pereira et al. 2007; Comanescu et al. 2009; Hadžić et al. 2010).

4 Conclusion

Since tourism development can be viewed as a planned, conscious and continuous activity, then the development of tourism on Fruška Gora Mountain is nothing more than the guidance for spatial distribution of relevant investment or corresponding spatial structure in which or with which sport and recreational tourism will develop on Fruška Gora National Park. Modern tourism development approaches the economic and social planning.

The present level of development of tourist infrastructure networks and recreational and other facilities on Fruška Gora Mountain is not in accordance with the possibilities that this mountain offers. The existing programmes and facilities do not provide developed forms of tourism supply. Unfortunately, this leads to the conclusion that, generally speaking, the current promotion of Fruška Gora Mountain is not present well (Ahmetović - Tomka 1995; Lazić 2004; Vujko and Plavša 2010; Vujko 2011; Vujko 2012).

The Fruška Gora National Park is an area in which there are three levels of protection (PPPN 2003). On the basis of the document it can be seen that the second and third zones, with regard to territory are the areas where it is desirable to develop sports and recreational tourism. In areas with other levels of protection any changes are prohibited (Ahmetović - Tomka 1995; PPPN 2003; Vujko and Plavša 2010).

The Fruška Gora National Park has many potential paths, most of them currently unmarked, along which there are many natural and cultural sites of outstanding importance. Evaluation and tourist activation could contribute to development of many other places for sport and recreational tourism in Serbia.

We came to the conclusion that one of the main measures to achieve the quality of supply was exactly the standardization of services. Standardization in this context would involve the application of a designed system of standards for improving supply of primarily intended for sports and recreation tourists. Standardization of services would require multiple levels of service, and one of the first actions would be to categorize accommodation facilities, but such categorization that would indicate that a particular method is adapted to a particular object for cyclo-tourists and other sports and recreational tourist.

Analysis of some of the benefits of sport and recreational tourism in Fruška Gora show that in the future theme of health (Standeven and De Knop 1999; Plavša; Hayward; Hudson; Buckley 2006; Weed 2008; Vujko and Plavša 2010; Vujko 2011, Vujko, 2012), in conjunction with sustainable development could be one of the strongest supports for the development of sport and recreational tourism.

Its potential should be located very precisely and find a place in sustainable development for the opportunities, otherwise, their future is uncertain and is often used instead of their benefits could potentially become a threat (Downward 2005).

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CHANGES IN THE ROMANIAN CARPATHIAN TOURISM AFTER THE COMMUNISM COLLAPSE AND THE DOMESTIC TOURISTS' SATISFACTION

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Emerging Rânca-a resort in the Parâng Mountains.

Changes in the Romanian Carpathian tourism after the communism collapse and the domestic tourists' satisfaction

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ABSTRACT: In the context of Romania's transition to the market economy after the communism collapse, and the accession in EU, the study aims to analyse characteristics of tourism changes in the Carpathian destinations by correlation with the domestic visitors' satisfaction for tourist services and new forms of tourism by empirical field observations, and statistical analysis used to test the level of satisfaction for Carpathian tourism. The results show an increase of tourist demand for the Carpathian destinations in the framework of tourist establishments' structure changes, the spreading of agri-tourism, a need for improvement of accommodation services quality according to the visitors' profile. Tourism development, revealed by visitors' flows, has some similarities with the perception of tourists. The tourists' views can, with several limits, be considered as a barometer in tourism research and a useful instrument in building tourism offers.

KEY WORDS: geography, tourism, domestic tourists' satisfaction, survey, Romanian Carpathians

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1 Introduction

As a destination recently promoted as the national tourist brand sustained by the natural and human environment diversity, Carpathian area attracted in the last twenty years more than half of the Romania's visitors. Gathering an area of 27.8% of the country (Velcea 1987), being almost 54% of the total length of the entire chain (Mihăilescu 1963); the Romanian Carpathian Mountains have those qualities suitable for tourism. Otherwise, »the remarkable growth and economic significance, the tourism has long been considered an effective means of achieving economic and social development in destinations' areas« (Tefler and Sharpely 2008).

The suitability for tourism of the Romanian Carpathians dates back since Roman times due to the mineral and geothermal springs, which were widely used after the 18th century. In the 19th century, mountain tourism developed (Ielenicz and Comănescu 2006), while in the 20th century, winter sports resorts were established (Ciangă 1997). During the communist regime, uncontrolled and social tourism have prevailed. Since 1990, the tourism has entered in a new period regulated by the market economy and new legislation.

The Tourism Master Plan 2007–2026 has established several objectives for mountainous areas: the development of mountain areas and mountain resorts, introduction of thematic tourism routes, the development of ecotourism in protected or rural areas, sustainable development of winter sports and elimination of informal businesses.

The demand for this destination is expected to play an important role in the national tourism industry. In fact, the demand shows the attractiveness both for tourism heritage and services. Furthermore, the tourists' satisfaction correlates with loyalty (Kandampully and Suhartanto 2000, Yoon and Uysal 2005, Moliner Velázquez et al 2011), and profitability like the management studies of Storbacka et al. (1994), Schneider and Bowen (1995; quoted by Hallowell 1996), underline. Marketing papers sustain that the satisfaction creates favorable attitudes resulting in repeated purchasing behavior over time (Yi 1990; Olivier 1997). The satisfaction depends on many factors either internal: tourist motivation (Jang and Feng 2007), the tourists' feelings, or external, such as tourist activities in a destination (Uysal and Jurovski 1994), and the balance between price and quality. The theory of dissatisfaction-satisfaction set up by Pizam and Milman, (1993; quoted by Yüksel, 2001), Kozak and Rimmington, (2000), Petrick, (2003), Prebensen, (2006) and Jang and Feng (2007) shows that the two variables differ as intensity and may generate loyality for a destination.

In this sense, it is useful that individual policies and practices provide opportunities to link the market preferences with supply development (Gunn 2002), to study the »market-plant match«, a concept introduced by Taylor (1980) and developed by Cachon and Terwiesch (2005), who stressed that matching between demand and supply on the market is always dynamic. In Romania an analysis of tourist services' quality was made by Băbăiță, Ispas and Pârjol (2010).

The present study aims to analyze the main changes in the Carpathian tourism mirrored by visitors' satisfaction for tourism services, agri-tourism and ecotourism's development as new forms of tourism.

2 Research Design and Data

The study is based, firstly, on the analysis of several indicators for the Carpathian tourism. In the second part, we debate the results of a structured questionnaire, applied in 2011, on 150 Romanian visitors in the Carpathians, aimed in collecting and analyzing the tourists' satisfaction, using a rating scale to appreciate the new tourism types, the tourist facilities' development and favorite destinations. In order to assess the tourist's satisfaction we performed a five-level Lickert type scale. The answers were processed using Xcel 2007© and analyzed in SPSS© v. 17. We have also asked the visitors to rank (from 1 to 3 points) the most attractive destinations of the Carpathians.

For accuracy, the Carpathians' tourism potential was modeled in GIS using the SRTM3-derrived terrain of Romania and the main rivers network, processed in ARCGIS™. The Carpathians are outlined by the differently colored resorts and tourism potential. The green-red palette signifies the tourism potential of these mountains, calculated as the sum of points for technical achievements (30%), tourism facilities (10%), natural touristic resources (30%), human resources for tourism (30%) made by PATN (2008) for each settlement.

Statistical data were collected from NIS (National Institute of Statistics) for the period between 1990 and 2011.

3 Results and Discussions

3.1 An Overview of the Romanian Carpathians Tourism after 1990

The opening of Romanian tourism towards the market economy in the Carpathians, as well as the whole country, can be divided into three stages: before privatization (1990–1997), the great wave of privatization (1997–2007) and after EU admittance.

The first stage was marked by a long transition, when major changes had not occurred. The tourism infrastructure capacity remained unchanged while the change was observed in tourist flow patterns following the opening of the country's borders. An exceptional development was registered by rural tourism and agri-tourism which have previously entered into the market by creating »tourist villages« in 1973. Agri-tourism was recognized as the most attractive types of tourism in several mountain areas (Turnock 1999; 2006).

The second stage which started in 1997 was marked by privatization and building of new hotels, pensions, tourist villas by international hotel chains. In 1999, 46% tourist establishments belonged to the private sector while the share increased to 85% in 2002 (AM News 2006).

The health tourism, as the oldest tourism type in Romania (Pricăjan 1999) entered in a process of certification.

The winter sports' facilities have been developed through »Super ski in the Carpathians«, ecotourism in national parks (Smaranda 2008) and also geoturism emerged on the market (Hose et al. 2011).

The third stage can be considered starting with 2007, when Romania adhered to the EU, with the last wave of privatization which has been performed only in 2010.

3.2 Tourism key indicators

Starting from the assumption »equally important in functioning tourism system is the driving force of supply side – all the objects and services that are provided to meet demands« (Gunn 2002), Carpathian area gathers all types of tourist establishments.

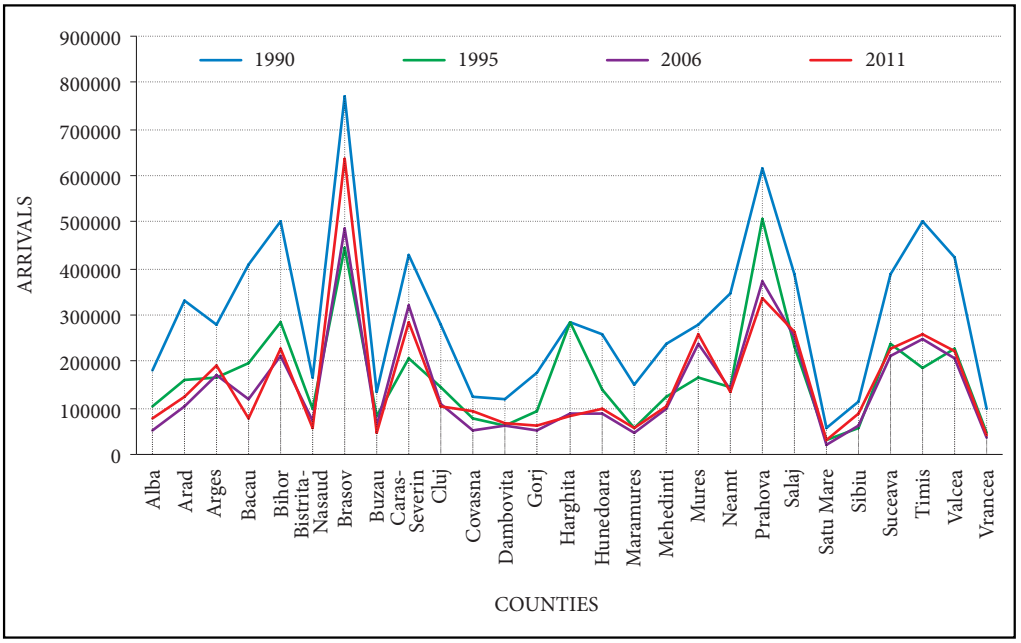


Figure 1.The dynamic of tourists' arrivals (1990–2011). Processed after NIS Data.

Despite the fact that the total Romania's tourist capacity decreased from 77 million places-days (1990) to 67,7 million in 2011, the Carpathian area has increased its share from 50.8% in 1990 to 63.8% in 2011 (NIS, 1990–2011). While former accommodation structures used in social/mass tourism were decommissioned, some preserved (Băile Herculane, Geoagiu-Băi, Covasna, Sângeorz-Băi) or turned into superior accommodation standards, new private tourist establishments were appeared (Braşov, Prahova Valley, Bran, Danube Gorge).

Hotel establishments are still widely spread in urban settlements or resorts in the Carpathians. Compared to the communism era, dominated by 2 or 3 star hotels, a shift to higher-ranking hotels of 3, 4 and 5 stars was observed lately. The share of hotels decreased steadily from the beginning of the analyzed period till now (e.g. in 2011, it was 54.4% in comparison with 1990, 59.2%), but have risen in the quality standards.

Rural, urban and agri-tourist boarding houses have developed after 1995, when the National Association for Rural-Ecological and Cultural Tourism set up the guesthouses' network. In 1996, Romania had 72,716 places-days in agri-pensions, 247,542 in 1998 (NIS 1996; NIS 1998), and almost 4,9 million in 2011 (NIS 2012), from which 4,6 million (94.6%) were in the Carpathians. Carpathians seem to be suitable businesses for the Carpathians' communities or entrepreneurs. These can be correlated with the accessing of Special Accesssion Programme for Agriculture and Rural Development and Structural Funds.

The chalets, special tourist establishments fitting with mountain tracks are spread in remote areas, have been diminished in number, due to the difficulty in their maintenance or/and access and the competition with boarding houses (Matei 2010) and also the tourist villas. Global touristic demand of the Carpathians has registered fluctuations (Figure 1).

Domestic tourism demand had the same overall trend. The Carpathian area attracted over 60% all Romania visitors, but as number it decreased from 7,2 million in 1990 to 4,4 million, in 1993 and 3,0 million in 2011 (NIS 1990; 2011).

Distribution of tourists' arrivals is focused on hotels (47%), then, the boarding houses. In the analyzed period, the tourists' demand for hotel services fluctuated, in chalets have dropped, while boarding houses have gained the market (Table 1). These figures show that the Carpathian areas need to stimulate much more the rural tourism, mountain tourism, ecotourism and hotels of four and five star.

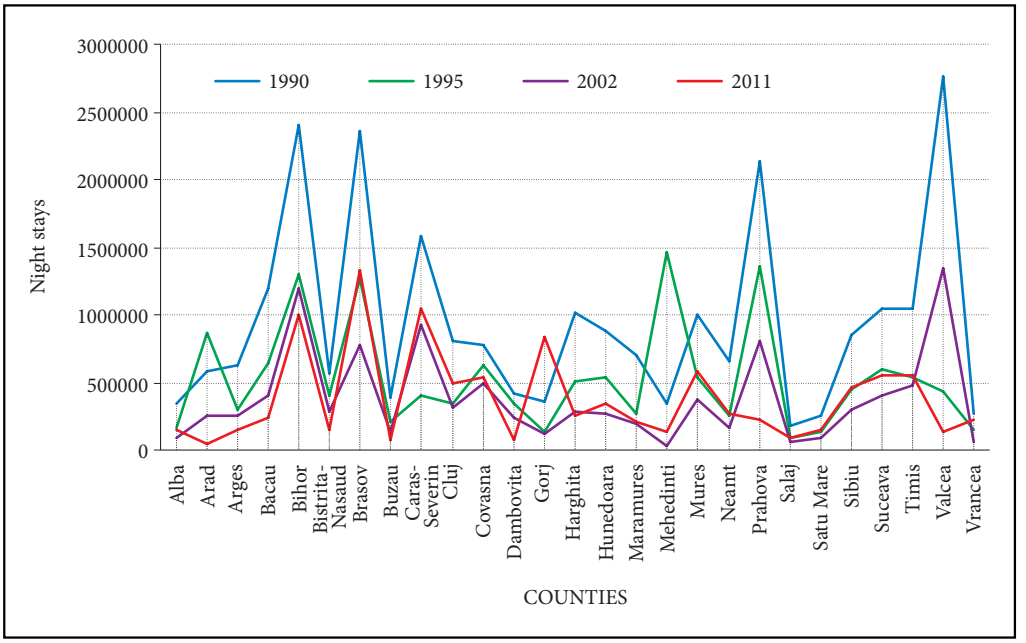


Figure 2.The dynamic of the tourists' overnight stays (1990–2011). Processed after NIS Data.

Table 1. Distribution of tourists' arrivals (1990–2011).

Years	1990	1995	2002	2006	2009	2011
Total Romania (mil.)	12,3	7,0	4,8	6,2	6,1	7,0
Total Romania (%)	100	100	100	100	100	100
Hotels (%)	75.5	73.3	79.1	75.0	74.0	76.1
Boarding houses (%)	0.0	0.3	3.9	9.3	12.0	11.9
Chalets (%)	4.0	2.7	1.7	1.1	1.4	1.1
Carpathians (%)	65.6	67.2	64.0	63.8	60.8	69.8
Hotels (%)	47.0	52.7	47.9	43.8	39.3	47.9
Boarding houses (%)	0.0	0.2	3.5	7.7	10.7	10.9
Chalets (%)	3.9	2.6	1.6	1.0	1.1	1.0

Processed after NIS Data.

Overnights have continuously dropped (Figure 2) from over 44 million in 1990 to less than half in following years. While Bulgaria concentrated the tourists to the Black Sea (over 50%) and only 10% in mountains (Dabeva 2010), in Romania, Carpathians have held 63% (2011).

The length stay in all Romanian establishments has diminished in this period, from 3.6 days to 2.5 days.

The occupancy rate of accommodation reflects the profitability of the businesses. In Romania, all tourist accommodation structures became gradually unprofitable because in 1995 the occupancy rate was 45% and in 2011, 26.3% (NIS 1995; NIS 2011). The hotels attract the highest shares of tourists, having an average of overnight stays about 49.2% in 1995 and 31.6 % in 2011. Most requested are hotels of 5 stars (over 36% in 2011) and 2 stars (35.6%, 2011). Simple guesthouses or agri-guesthouses have registered values around 15%, being higher in luxury units, explained by attractive pricing policy and comfort.

We can conclude that tourist infrastructure, the visitors and agri-tourism in the Carpathians are in a continuous growing.

3.3 Domestic tourists' satisfaction

The satisfaction of the domestic tourists concerning the quality of the Carpathian tourist infrastructure offer reveals the dimensions of the demand–supply matching (Taylor 1980) by proving the expectancy-disconfirmation theory (Pizam and Milman 1993).

The tourist satisfaction influences the choice of a destination, the consumption of products and services, and the decision to return (Kozak and Rimmington 2000). The dimension of satisfaction effectively becomes a measure of performance in tourism by assessing the domestic tourists perception (Turner 2001).

The study reveals that the global average of tourist satisfaction in the Carpathians is 0.2 on a scale between –2 (correspondent to strongly disagree) and +2 (strongly agree) (Figure 3).

The greater satisfaction does not always correspond with the mountain with high potential values (Figure 4).

Table 2. Synthesis of the statistical significance of tested variables (Chi-Square).

Variable		Value	df	Asymp. Sig. (2-sided)
Accommodation-income	Pearson Chi Square	33,741[a]	12	,001
Accommodation-education	Pearson Chi Square	24,389[a]	8	,002
Food-income	Pearson Chi Square	32,231[a]	12	,001
Food-education	Pearson Chi Square	28,546[a]	0	,001
Agritourism-income	Pearson Chi Square	44,320[a]	12	,001
Agritourism-education	Pearson Chi Square	27,151[a]	8	,001
Leisure-income	Pearson Chi Square	28,542[a]	12	,005
Leisure-age	Pearson Chi Square	31,325[a]	12	,002
Ecotourism-income	Pearson Chi Square	31,120[a]	12	,002
Ecotourism-age	Pearson Chi Square	31,502[a]	12	.002
Ecotourism-education	Pearson Chi Square	26,206[a]	8	,001

Source: the authors' calculations using SPSS v. 17 ©, data collected from the questionnaires applied on domestic visitors in 2011.

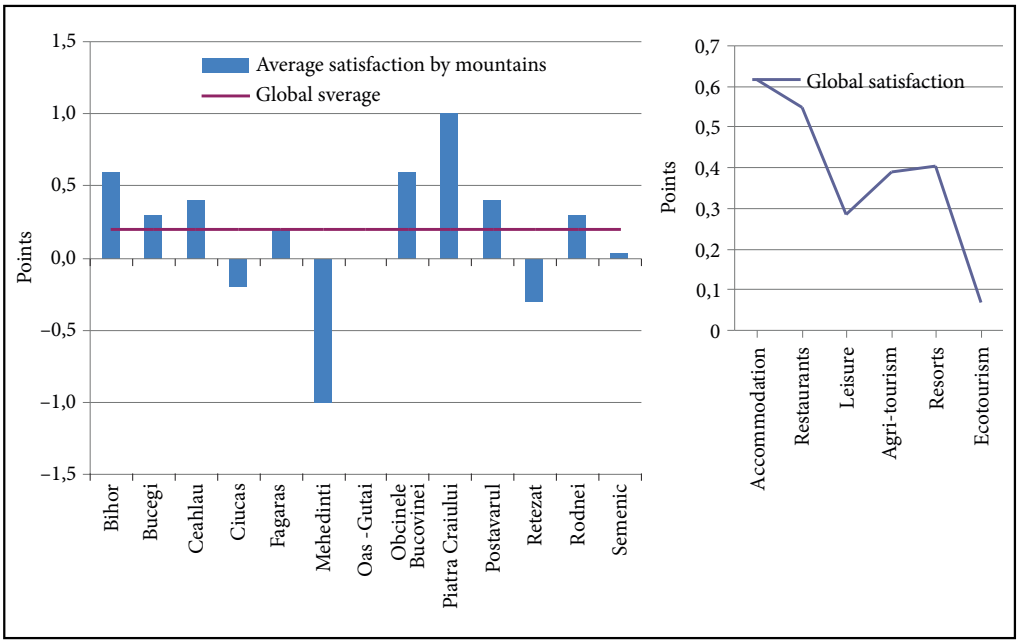


Figure 3. Global tourists' satisfaction for the Carpathians tourism offers. Source: the authors' calculations using the data collected from the questionnaires applied on domestic visitors in 2011.

Accommodation is the best tourism service, followed by the restaurants, the resorts' offers or agri-tourism. The ecotourism is still in infancy and needs more attention from the stakeholders.

The empirical calculations show that the structure of domestic tourists' satisfaction is lower as the revenues are higher, and consequently with the educational level. Female travellers are more exigent than males concerning the tourism offer evaluation and also the middle aged people more than young or elderly tourists.

The significance of the Chi-square test lower than 0,005 between age and leisure, age and ecotourism's satisfaction, indicate that for these items, stakeholders in tourism should carefully developed their offers, taking into account the age of consumers. Moreover, the test confirmed that higher education level and income lower is the satisfaction. Test results do not support significant differences in tourists' satisfaction by genders and in some cases by age.

4 Conclusions

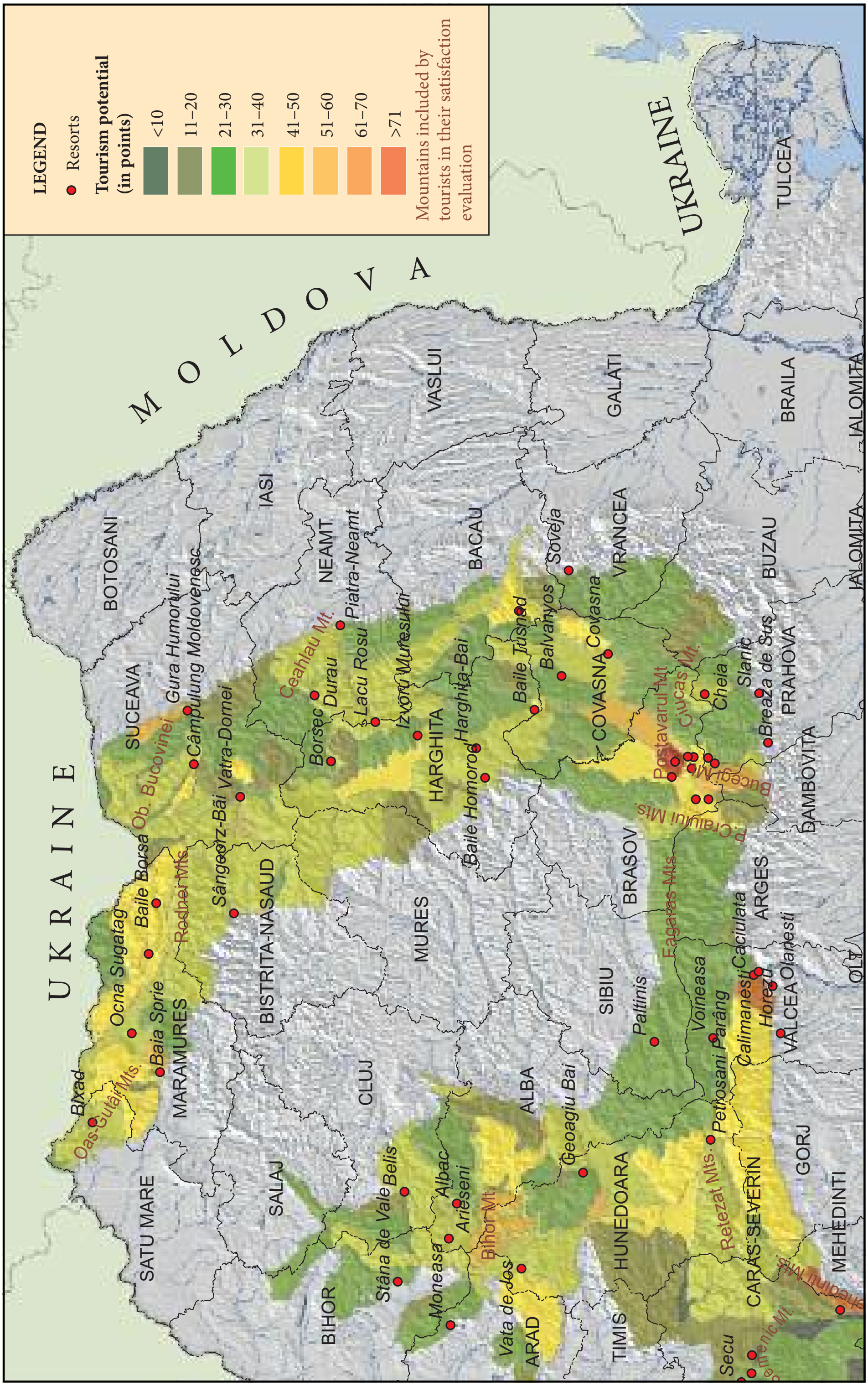
The Romanian Carpathian Mountains gather an explosion of tourism infrastructure including winter sports, favored by local or abroad investments, an increase of interest for agri-tourism offers. After the communism's collapse and implementation of the market economy mechanisms and governmental or EU programs, the occurrence of various tourism businesses have been generated.

Accommodation statistics demonstrate that even at the country level the number of places has decreased, the Carpathians play a more important role than in 90's. It can be also seen a reorientation of businesses to the boarding houses and hotels.

The resorts remain focused on social tourism, while the winter sports facilitate mass or weekend tourism.

The ecotourism, favored by environment protection in natural or national parks stimulated by laws and programs is far to the tourist's demands.

Figure 4. Carpathians tourism potential by geomorphological units. Processed after the National Territorial Planning Assessement (section VI), 2008. Resorts list: www. tourism.gov.ro ►


LEGEND
Resorts
Tourism potential (in points)
<10
11–20
21–30
31–40
41–50
51–60
61–70
>71
Mountains included by tourists in their satisfaction evaluation
UKRAINE
MOLDOVA
SATU MARE
MARAMURES
SUCEAVA
BOTOSANI
IASI
NEAMT
VASLUI
BACAU
GALATI
VRANCEA
BUZAU
BRAILA
TULCEA
IALOMITA
PRAHOVA
DAMBOVITA
ARGES
OLT
VALCEA
GORJ
MEHEDINTI
CARAS-SEVERIN
TIMIS
ARAD
BIHOR
SALAJ
CLUJ
ALBA
HUNEDOARA
SIBIU
BRASOV
COVASNA
HARGHITA
MURES
BISTRITA-NASAUD
Bixad
Oas-Gutâi Mts.
Baia Sprie
Ocna Sugatag
Baile Borsa
Rodnei Mts.
Sângeorz-Băi
Vatra-Dornei
Ob. Bucovinei
Câmpulung Moldovenesc
Gura Humorului
Ceahlau Mt.
Durau
Borsec
Lacu Rosu
Piatra-Neamt
Izvoru Muresului
Harghita-Bai
Baile Homorod
Baile Tusnad
Balvanyos
Soveja
Covasna
Postavarul Mt
Ciucas Mt.
Cheia
Slanic
Breaza de Sus
Bucegi Mt.
P. Craiului Mts.
Fagaras Mts.
Caciulata
Olanesti
Calimanesti
Horezu
Voineasa
Paltinis
Parâng
Petrosani
Retezat Mts.
Geoagiu Bai
Bihor Mt
Albac
Arieseni
Belis
Stâna de Vale
Moneasa
Vata de Jos
Secu
Semenic Mt.

The arrivals, length-stays were diminished in the last decade due to the financial crises and the holidays' fragmentation, throughout the year.

Domestic tourists remain the main pool of the Carpathians' visitors, but their profile corresponds to the class with low and middle income, youth and elderly people with less experience on abroad destinations.

The development and functioning of tourist establishments should take into consideration the surveys upon the tourists' satisfaction, which could be a reliable way of testing their performance in tourism offers.

The method presented supports the conclusion that this assessment of the tourists' satisfaction is a reliable instrument, and can be used for research purposes.

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HEALTH GEOGRAPHY IN CASE OF ZASAVJE: LINKING OF ATMOSPHERIC AIR POLLUTION AND RESPIRATORY DISEASES DATA

GEOGRAFIJA ZDRAVJA NA PRIMERU ZASAVJA: POVEZOVANJE PODATKOV O ONESNAŽENOSTI OZRAČJA IN BOLEZNIH DIHAL

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MEIS environmental consulting /MEIS storitve za okolje

Complex terrain in the Zasavje region.
Razgibanost reliefa v Zasavju.

Health geography in case of Zasavje: Linking of atmospheric air pollution and respiratory diseases data

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ABSTRACT:
The aim of the study was to assess the association between atmospheric air pollution and respiratory diseases in children on the level of small spatial units in the Zasavje. The health and environmental data were obtained for the period between January 1 and December 31, 2011. Studied small spatial units were designed on the basis of estimated level of atmospheric air pollution and digital maps and boundaries of local communities and settlements. The impact of atmospheric air pollution on respiratory diseases was analysed by using the Bayesian models. Considering the identified deficiencies, the presented methodolgy can often be used to identify areas with a higher health risks.

KEY WORDS: studied small spatial units, respiratory diseases, children, atmospheric air pollution, spatial smoothing, Zasavje

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1 Introduction

The presence and perception of risk factors in the natural and social environment, and their impact on health have placed increasing importance on health geography – in particular, spatial epidemiology (Zadnik 2006; Staut 2008). The World Health Organization (WHO) has also drawn attention to its applicability in evaluating and managing risk factors (Briggs et al. 1996).

The impact of environmental risks is relatively complex and therefore, when analyzing their correlation with health phenomena, it is necessary to combine the methods of public health and geographic information systems (GIS) (WHO 1999; Rytkönen 2004; Vudrag & Boštjančič 2007; Beale et al. 2008; Dummer 2008; Staut 2008; Erlih & Eržen 2010). With these methods it is possible to identify areas with greater or lesser risk for the development of health issues and present them in the form of disease maps (Zadnik 2006).

An important methodological question in spatial epidemiology is which and what size of spatial units should be used as the basic units of study. Initially larger spatial units were used, but with the development of spatial epidemiology methods and techniques smaller ones began to be used (Stroh et al. 2007). Small spatial units have a number of advantages over large ones. Selecting a smaller basic spatial unit for analysis increases the resolution, thus retaining information on heterogeneity, which is lost in large spatial units. However, problems also exist with using small spatial units. In particular, reducing the area of study yields an increasingly smaller number of sampled units to be used for calculating the health indicators for individual spatial units, which lowers the level of confidence in them (Zadnik 2006; Zadnik & Reich 2006). However, the confidence can be increased. The study period can be extended, thus increasing the number of basic units to be used for calculating the health indicators. The development of spatial epidemiology has also introduced spatial smoothing techniques, which use real-life data and additional information to evaluate the value of an indicator for a studied health outcome in individual spatial units examined (Zadnik 2006).

This study evaluates the correlation between air pollution and respiratory diseases in children at the level of small spatial units in the Central Sava Region (Sln. *Zasavje*). The goal was to evaluate the incidence of respiratory diseases in children and its correlation with air pollution in small spatial units of study. A second goal was to evaluate the advantages and disadvantages of this type of correlation.

2 Methods

2.1 Research design

This study was part of a larger project carried out from 1 January 2006 to 31 December 2011 by the Department of Public Health at the University of Ljubljana's Medical School, in which healthcare and environmental specialists also participated. In terms of its design, the first part of the study examines the spatial patterns of environmental and health phenomena, and the second part focuses on spatial variability (Morgenstern & Thomas 1993; Thomas 2009).

2.2 Research population and period

The research population consisted of one to eleven-year-old children that lived in one of the three municipalities in the Central Sava Region (Zagorje ob Savi, Trbovlje, and Hrastnik) during the research period and were treated for respiratory diseases at one of the local health centers between 1 January 2011 and 31 December 2011.

2.3 Study area

Small spatial units of study were defined and used as the model study area. Separate small spatial units of study were developed for each pollutant studied: dust particles ($PM_{10\_winter\ average}$, $PM_{10\_summer\ average}$), sulfur dioxide ($SO_{2\_annual\ average}$), and nitrogen dioxide ($NO_{2\_annual\ average}$) (Kukec et al. 2012).

2.4 Defining small spatial units of study

Small spatial units of study were defined using the evaluated level of air pollution and digital maps of local communities and settlements in the municipalities of the Central Sava Region. Dispersion models with input emission values of point sources of pollution, meteorological data, and data on the volume of vehicle traffic and use of home furnaces were used to evaluate the level of air pollution. In order to forecast and diagnose the air pollution, we used the Weather Research and Forecasting (WRF) model to develop our own weather forecast. The SurfPro meteorological interface processor and the Swift mass-consistent 3D wind model were used to calculate the approximation of 3D wind, temperature, and turbulence fields. The numerical Lagrangian particle dispersion model SPRAY with Monte Carlo simulation was used to calculate the pollution spread. The ArcGIS tool was used to develop small spatial units of study (MEIS, 2012; Kukec et al. 2012).

2.5 Origin and georeferencing of health data

The health data were obtained from the information system used by the health centers in the Central Sava Region. Selected diagnoses of respiratory diseases were studied following the tenth revision of the International Classification of Diseases (ICD-10; WHO 2011).

Authorized staff at the health center conveyed the following information: the identification code of the visit, date of visit, type of visit, diagnosis, date of birth, sex, and permanent address.

The permanent address data were georeferenced: each address was assigned a geographical coordinate using the code list of the Spatial Units Register, and the point data underwent retrograde aggregation into the designated spatial units (Kukec et al. 2012).

2.6 Spatial distribution of respiratory diseases cases

The number of ill children in an individual small unit of study was compared with the anticipated number of ill children based on the number of children below the age of eleven that lived in this unit in 2011 according to the Central Registry of Population and based on the incidence rate in the entire study area (Equation 1). The quotient between the studied and anticipated number of ill children is called the standardized incidence ratio (SIR) and is an approximation of the relative disease risk in this unit (Dos Santos Silva 1999).

$$SIR = \frac{O}{E} = \frac{O}{\frac{\sum n \cdot R}{\sum n}} \qquad \text{Equation 1}$$

SIR = Standardized incidence ratio
O = Number of children below eleven that fell ill in the spatial unit studied
E = Anticipated number of ill children in the spatial unit studied
n = Number of children below eleven in the research population
R = Number of children below eleven that fell ill per 100,000 in the entire area

Because the number of spatial units studied is relatively large or because relatively few children that might fall ill live in an individual unit, the influence of coincidence on the value of the SIRs calculated is relatively high. In order to reduce the impact of such a coincidence, the Bayesian hierarchical models for spatial smoothing are used in the spatial analysis of epidemiological data (Elliott et al. 2000). Bayesian hierarchical models with an adapted Poisson regression equation (Equation 2) are used to estimate the value of the illness burden indicator for an individual spatial unit studied based on aggregating real data with additional information that may already be known or may involve only random effects. The additional known information included in the analysis consisted of the respiratory disease incidence in children in the neighboring areas and the average respiratory disease incidence in children in the entire study area. Random effects were divided into spatially independent and dependent variables. Spatially dependent variables were assigned a conditional autoregressive (CAR) prior probability distribution that covers all of the data on the geographical structure of the study area.

$$SIR^{*} = a + \beta X + H + S \qquad \text{Equation 2}$$

SIR = Estimated standardized incidence ratio*
a = Basic (logarithmized) relative disease risk in the entire study area
β = Regression coefficient of the explanatory variable
X = Explanatory variable values
H = Spatially independent random effect
S = Spatially dependent random effect

2.7 Identifying the impact of air pollution on the incidence of respiratory diseases

In order to identify the impact of air pollution on the incidence of respiratory diseases, data for every pollutant studied were added to the basic Bayesian model (Equation 2). The basic model was compared to the extended one to determine whether the extended model fitted our data better. The Deviation Information Criterion (DIC), which also sums up the fit and complexity of a model, was used; the smaller the DIC, the greater the predictive power of the model (Elliott et al. 2000).

2.8 Presenting the spatial distribution of health risks

Color-scale maps were used to graphically present the empirical and estimated SIRs. Areas with low risks were depicted in blue and those with high risks were depicted in red. The maps were created using the ArcGIS tool. The spatial distribution of the correlation between respiratory diseases in children and air pollution was estimated visually, and the statistical parameter »fraction of individual variable's spatial variability« ($Frac_{Spatial}$) was used to numerically determine the spatial structure. If the value of the spatial variability fraction was close to 1, this meant that a spatially dependent random effect predominated. If the value was close to 0, a spatially independent random effect predominated (Eitan et al. 2010).

3 Results

3.1 Spatial distribution of standardized incidence ratio of respiratory diseases

The spatial distribution of the respiratory disease SIR by small spatial units of study and selected pollutant is presented in Figure 1. The winter and summer averages are presented for PM_{10}, and the annual averages are presented for SO_2 and NO_2. Great differences in respiratory disease risks can be observed in the neighboring geographical units.

Table 1: Statistical parameters of the basic Bayesian spatial smoothing hierarchical model (CAR) and the model with air pollution included (CAR-X), showing a correlation between respiratory diseases in children and pollutants by spatial units studied, 2011.

Pollutants	Model	Deviation information criterion	Fraction of spatial variability	Regression coefficient (95% confidence interval)
PM_{10} winter (μg/m^3)	CAR	445.50	0.093	
	CAR-X	446.20	0.109	0.07 (–0.03; 0.18)
PM_{10} summer (μg/m^3)	CAR	378.39	0.778	
	CAR-X	380.43	0.789	–0.04 (–0.19; 0.11)
SO_2 (μg/m^3)	CAR	405.00	0.570	
	CAR-X	406.78	0.657	**0.24 (0.01; 0.51)**
NO_2 (μg/m^3)	CAR	460.29	0.310	
	CAR-X	457.13	0.322	0.05 (–0.05; 0.16)

Legend: CAR = conditional autoregressive prior probability distribution

3.2 Spatial distribution of smoothed standardized incidence ratio of respiratory diseases

Figure 2 presents the spatial distribution of estimated incidence risks prepared through spatial smoothing in the Bayesian hierarchical model by taking into account the incidence risk in the population of the entire study area and the risk in the neighboring areas by specified spatial units and selected pollutant. The differences between individual neighboring geographical units are significantly smaller. The most important statistical parameters of the models are summarized in Table 1. A spatial pattern in the distribution of the health outcome studied is evident in the model dealing with PM_{10} in the summer and SO_2.

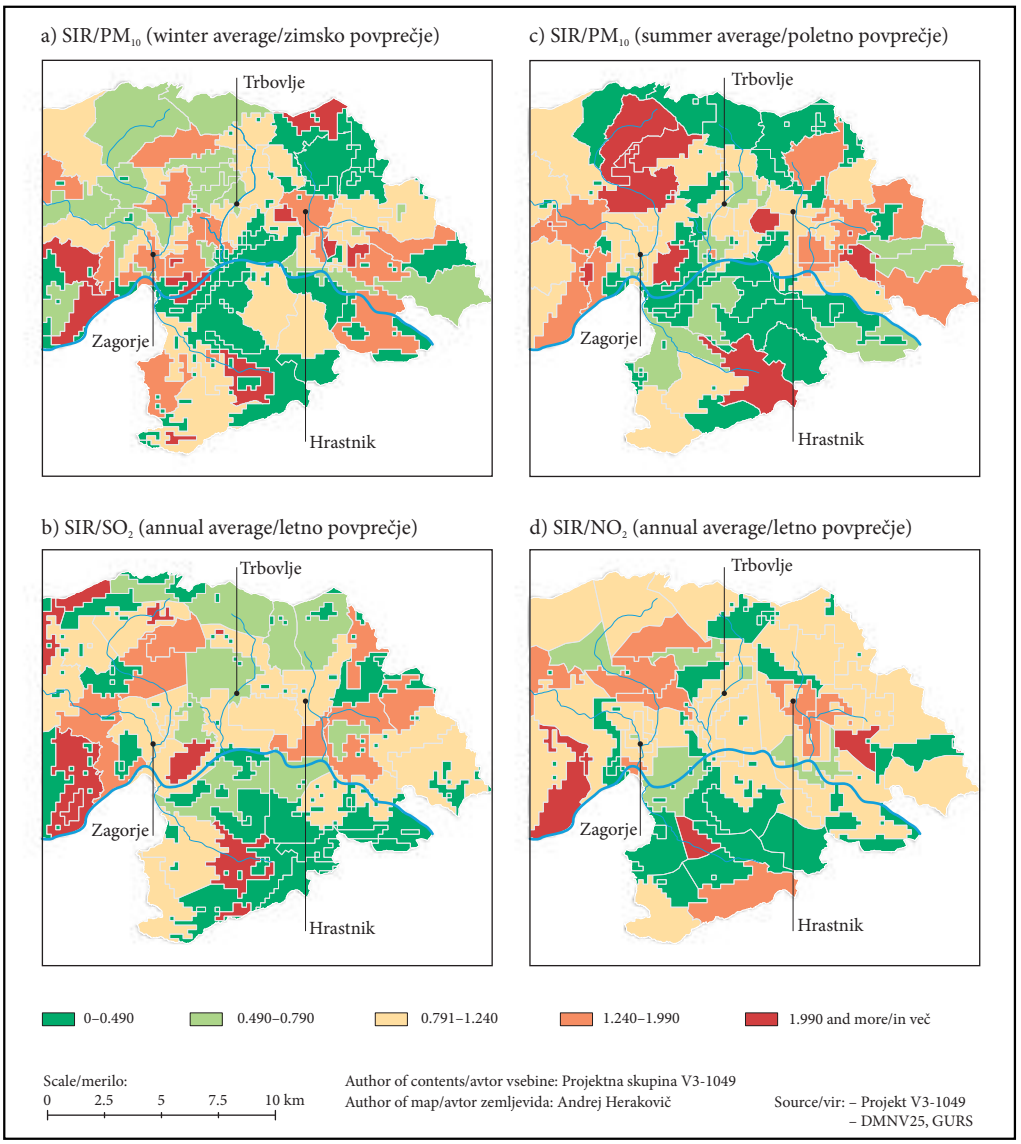

Figure 1: Spatial distribution of the actual incidence rate of respiratory diseases in children by spatial unit studied and selected pollutant, 2011. SIR = standardized incidence ratio

3.3 Statistical models of spatial analysis of correlation between respiratory diseases and air pollution

The spatial analysis of the correlation between respiratory diseases in children and the selected pollutants is presented in Figure 3, and the most important statistical model parameters are summarized in Table 1. The inclusion of explanatory variables did not significantly improve the model; the fits of the models are comparable for the CAR (Figure 2) and CAR-X (Figure 3) models with all the pollutants. The models show that the differences in pollution between individual areas cannot suitably explain the differences in the incidence of respiratory diseases among children. A statistically positive correlation can only be observed with SO_2.

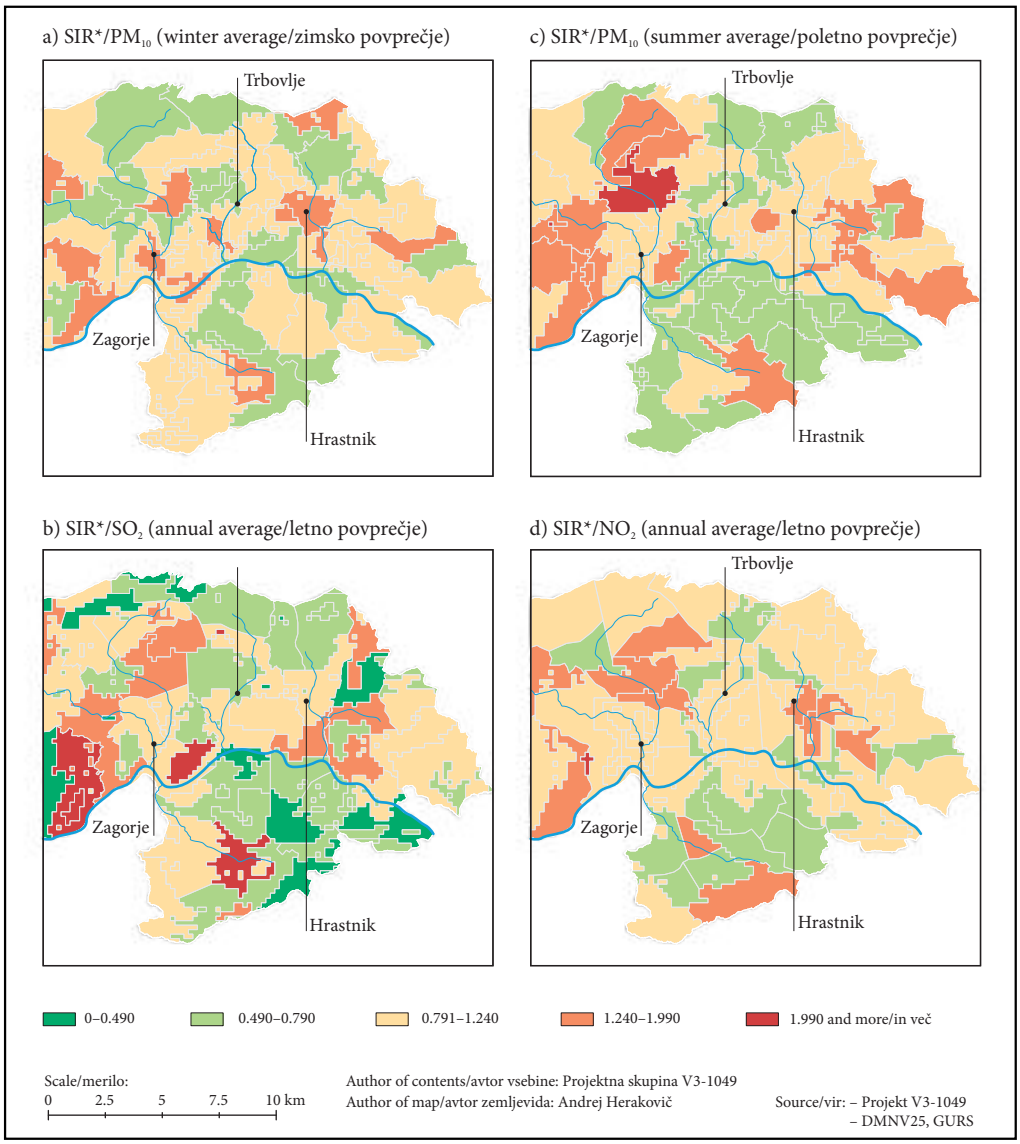

Figure 2: Spatial distribution of the spatial component with a conditional autoregressive (CAR) prior probability distribution, 2011. SIR* = estimated standardized incidence ratio

4 Discussion

The results of this spatial analysis of the correlation between respiratory diseases in children and air pollution showed a statistically significant positive correlation in the effect of the average annual SO_2 concentration. In contrast, in other comparable international studies the correlation occurred systematically in areas with increased incidence risk and a high air pollution rate, especially with PM_{10} and NO_2 (Maheswaran et al. 2005; Hu et al. 2008; Beale et al. 2008). In an ecological study of small spatial units, Maheswaran et al. (2005) proved the spatial correlation between PM_{10} and NO_2 and their effects on cardiovascular diseases among people over forty-five. In their ecological study of small spatial units, Hwang

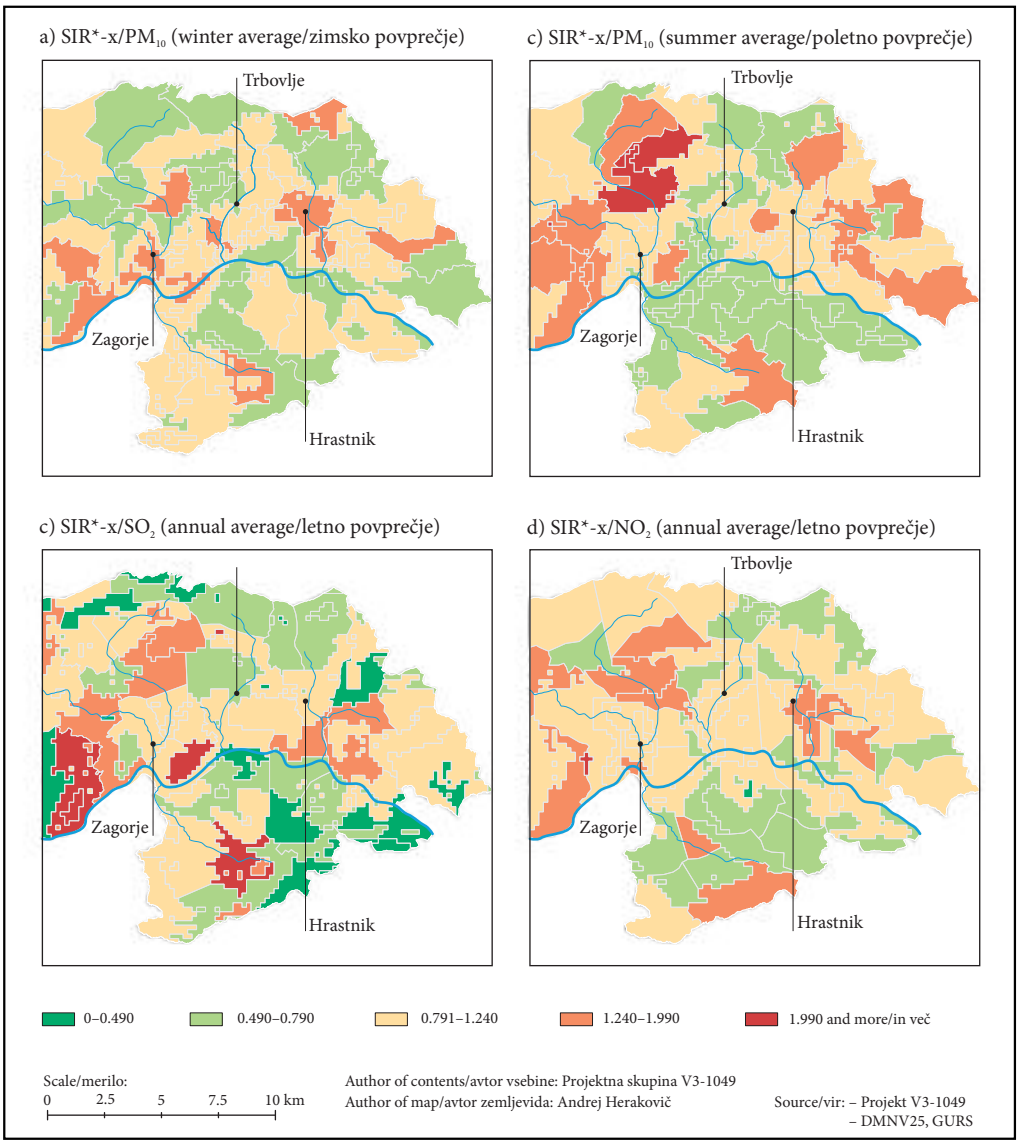

Figure 3: Spatial analysis of the correlation between respiratory diseases in children and pollutants by spatial units studied, 2011. SIR*-x = estimated standardized incidence ratio with air pollution included

and Chan (2001) used Bayesian hierarchical smoothing models to prove the spatial correlation between PM_{10}, NO_2, SO_2, and diseases of the lower respiratory tract.

Based on previous studies in the Central Sava Region, it was expected that a correlation would also be proved in the case of PM_{10}, especially in winter (Kukec et al. 2012, 2013). Nonetheless, based on the results obtained, one cannot conclude that there is no spatial correlation in the Central Sava Region. There were numerous problems with collecting health and environmental data. A number of similar international studies have also drawn attention to the importance of the quality of input environmental and health data (Beale et al. 2008; Stroh et al. 2007).

In analyzing the applicability of health data in this study, it can be established that there were no problems with the completeness of data capture (data for all of the days in the period studied were available at all of the health centers; Kukec et al. 2012). In addition, the analysis did not contain any bias resulting from incorrect geographical distribution of the ill and healthy population. All of the health centers enter the permanent addresses of the ill systematically (from health insurance cards) and so the addresses match the data in the Central Population Registry. However, certain issues were encountered in reviewing the captured data. The first issue appeared in the description of the number of days during which at least one child from an individual municipality in the Central Sava Region visited a doctor at a health center due to a respiratory disease problem. These results were unusual: in the Municipality of Zagorje ob Savi, the reported number of days with at least one child visit due to a problem with any of the selected respiratory diseases was 1.3 to 1.4 times greater than in the municipalities of Trbovlje and Hrastnik. In addition, it was also unusual that in the Municipality of Trbovlje the number of days with at least one child visit due to a problem with any of the selected chronic respiratory diseases was as much as four times greater than in the Municipality of Zagorje ob Savi and 5.8 times greater than in the Municipality of Hrastnik. Of course differences in this indicator can be expected between municipalities, but definitely not to such an extent because the entire Central Sava Region study area is relatively homogenous in terms of demography, socioeconomics, and health (Kukec et al. 2013). It is presumed that the established differences result from the way the health data were recorded (the difference in coding individual diagnoses). Some health centers define certain children's diseases as the respiratory diseases included in this analysis, whereas others code the same diseases as other diseases not included in the analysis. Misclassification may occur due to this (Porta et al. 2008), but it can only affect the results when health data from several health centers are analyzed at the same time. Based on our data, all of the comparable studies to date have been conducted using health data obtained from only one health institution (Šimac 2008; Rems - Novak 2013).

The issue of health data quality could be resolved, but it should be tackled at the national level. The recording of diagnoses in the health-information system should be standardized (detailed instructions for recording should be produced), and the importance of using the International Classification of Diseases (WHO 2011) and of correctly coding diseases under this classification should be given attention when educating young doctors.

5 Conclusion

It can be concluded that a statistically significant positive correlation can only be observed in the effect of the average annual SO_2 concentration. There is suitable expertise in the use of spatial methods of aggregating environmental and health data, but problems exist with regard to the applicability of the data that are being continuously collected in both information systems (i.e., the health and the environmental systems). By eliminating these deficiencies, studies of comprehensive environmental and health data aggregation could be conducted more often in Slovenia and used to develop evidence-based health policies.

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IZVLEČEK: Namen raziskave je bil na primeru Zasavja oceniti povezanost med onesnaženostjo ozračja in boleznimi dihal pri otrocih na ravni majhnih proučevanih prostorskih enot. Zdravstvene in okoljske podatke smo pridobili za obdobje od 1. 1. 2011 do 31. 12. 2011. Proučevane prostorske enote smo oblikovali na podlagi ocenjene stopnje onesnaženosti ozračja ter digitalnih zemljevidov mej krajevnih skupnosti in naselij. Vpliv onesnaženosti ozračja na pojavljanje bolezni dihal smo ocenjevali z Bayesovimi modeli. Z odpravo pomanjkljivosti bi predstavljeno metodologijo lahko pogosteje uporabljali pri opredeljevanju območij z večjim zdravstvenim tveganjem.

KLJUČNE BESEDE: majhne proučevane prostorske enote, bolezni dihal, otroci, onesnaženost ozračja, prostorsko glajenje, Zasavje

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1 Uvod

Zaradi prisotnosti in zaznavanja dejavnikov tveganja v naravnem in družbenem okolju ter njihovih vlivov na zdravje geografija zdravja oziroma prostorska epidemiologija vedno bolj pridobiva na pomenu (Zadnik 2006; Staut 2008). Na njeno uporabnost pri oceni in obvladovanju dejavnikov tveganja opozarja tudi Svetovna zdravstvena organizacija (SZO) (Briggs in ostali 1996).

Vpliv okoljskih tveganj je večinoma kompleksen, zato je potrebno pri analizi povezanosti teh pojavov z zdravstvenimi združevati metode javnega zdravja in geografskih informacijskih sistemov (GIS) (SZO 1999; Rytkönen 2004; Vudrag in Boštjančič 2007; Beale in ostali 2008; Dummer 2008; Staut 2008; Erlih in Eržen 2010). S temi metodami lahko opredelimo območja z večjim oziroma manjšim tveganjem za nastanek zdravstvenih pojavov ter jih prikažemo v obliki zemljevidov bolezni (Zadnik 2006).

Eno pomembnejših metodoloških vprašanj v prostorski epidemiologiji je, kakšne in kako velike prostorske enote naj uporabimo kot osnovne enote opazovanja. Najprej se je uporabljalo večje prostorske enote, z razvojem metod in tehnik prostorske epidemiologije pa se je začelo upora

bljati manjše (Stroh in ostali 2007). Majhne prostorske enote imajo pred velikimi številne prednosti. Z izbiro manjše osnovne prostorske enote za analizo povečamo ločljivost in na ta način zadržimo informacijo o heterogenosti, ki se pri velikih prostorskih enotah izgubi. Vendar pa so tudi pri uporabi majhnih prostorskih enot prisotni problemi. Eden pomembnejših je, da imamo zaradi manjšanja območja opazovanja tudi vedno manjše število enot za izračun kazalnikov zdravja za posamezno prostorsko enoto, s tem pa se poveča problem nezaupanja vanje (Zadnik 2006; Zadnik in Reich 2006). To nezaupanje pa lahko zmanjšamo. Ena izmed možnosti je, da podaljšamo obdobje opazovanja in s tem povečamo število osnovnih enot za izračun kazalnikov zdravja. Z razvojem prostorske epidemiologije so se pojavile tudi t. i. tehnike prostorskega glajenja, s pomočjo katerih na podlagi dejanskih podatkov in dodanih informacij ocenimo vrednost kazalnika opazovanega zdravstvenega izida za posamezno opazovano prostorsko enoto (Zadnik 2006).

Namen raziskave je bil na primeru Zasavja oceniti povezanost med onesnaženostjo ozračja in boleznimi dihal pri otrocih na ravni majhnih proučevanih prostorskih enot. Cilja raziskave sta bila oceniti pojavnost bolezni dihal pri otrocih in povezanost z onesnaženostjo ozračja na majhnih proučevanih prostorskih enotah. Dodaten cilj je bil oceniti prednosti in pomanjkljivosti takšnega povezovanja.

2 Metode

2.1 Zasnova raziskave

Raziskava je bila del večjega projekta, ki smo ga izvedli na Katedri za javno zdravje Medicinske fakultete Univerze v Ljubljani ob sodelovanju strokovnjakov zdravstvene in okoljske stroke za obdobje 1. 1. 2006 do 31. 12. 2011. Po zasnovi je predstavljena raziskava v prvem delu študija prostorskih vzorcev okoljskih in zdravstvenih pojavov, v drugem delu pa študija prostorske variabilnosti (Morgenstern in Thomas 1993; Thomas 2009).

2.2 Opazovana populacija in obdobje opazovanja

Opazovana populacija so bili otroci, stari od enega do enajst let, ki so imeli v obdobju opazovanja stalno prebivališče v eni od treh občin v Zasavju (Zagorje ob Savi, Trbovlje, Hrastnik) in so bili med 1. 1. 2011 in 31. 12. 2011 obravnavani v enem od zasavskih zdravstvenih domov zaradi bolezni dihal.

2.3 Območje opazovanja

Kot modelno območje so nam služile oblikovane majhne proučevane prostorske enote. Za vsako od opazovanih onesnaževal: prašni delci ($PM_{10\_zimsko\ povprečje}$, $PM_{10\_poletno\ povprečje}$), žveplov dioksid ($SO_{2\_letno\ povprečje}$) in dušikov dioksid ($NO_{2\_letno\ povprečje}$), so bile oblikovane ločene majhne proučevane prostorske enote (Kukec in ostali 2012).

2.4 Oblikovanje majhnih proučevanih prostorskih enot

Majhne proučevane prostorske enote so bile oblikovane na podlagi ocenjene stopnje onesnaženosti ozračja ter digitalnih zemljevidov mej krajevnih skupnosti in naselij občin v Zasavju. Za oceno stopnje onesnaženosti ozračja smo uporabili disperzijske modele z vhodnimi emisijskimi vrednostmi točkovnih virov onesnaževanja in meteorološkimi podatki ter podatki o obremenjenosti s prometom in lokalnimi kurišči. Z modelom *Weather Research and Forecasting* (WRF) je bila zaradi prognoze in diagnoze onesnaženosti ozračja razvita lastna napoved vremena. Z meteorološkim predprocesorjem *SurfPro* in tri-dimenzionalnim (3D) masno konsistentnim vetrovnim modelom *Swift* je bil izračunan približek 3D polj vetra, temperature in turbulentnosti. Za izračun širjenja onesnaženosti je bil uporabljen numerični Lagrangeev model delcev *Spray* z *Monte Carlo* simulacijo. Za oblikovanje majhnih proučevanih prostorskih enot je bilo uporabljeno orodje ArcGIS (MEIS, 2012; Kukec in ostali 2012).

2.5 Izvor in georeferenciacija zdravstvenih podatkov

Zdravstveni podatki so bili pridobljeni iz zdravstveno informacijskega sistema zdravstvenih domov v Zasavju. Opazovane so bile izbrane diagnoze bolezni dihal po Mednarodni klasifikaciji bolezni, poškodb in vzrokov smrti verzija 10 (MKB-10) (SZO 2011).

Pooblaščena oseba v zdravstveni ustanovi je posredovala naslednje podatke: identifikacijska koda obiska, datum obiska, vrsta obiska, diagnoza ob obisku, datum rojstva, spol in naslov stalnega prebivališča.

Podatke o naslovu stalnega prebivališča smo georeferencirali–s pomočjo šifrantov Registra prostorskih enot smo vsakemu naslovu določili geografsko koordinato, točkovne podatke pa smo retrogradno agregirali v prostorske enote, ki so bile oblikovane (Kukec in ostali 2012).

2.6 Prostorska razporeditev primerov bolezni dihal

Število zbolelih v posamezni majhni proučevani prostorski enoti smo primerjali s številom zbolelih, ki bi ga pričakovali glede na podatke o številu otrok starih do 11 let, ki so po podatkih Centralnega registra prebivalcev leta 2011 živeli v tej enoti in glede na stopnjo zbolevanja v celotnem območju opazovanja (Enačba 1). Količnik med opazovanim in pričakovanim številom zbolelih imenujemo standardiziran količnik inicidence (SIR) in je približek relativnemu tveganju bolezni v tej enoti (Dos Santos Silva 1999).

$$SIR = \frac{O}{E} = \frac{O}{\frac{\sum n \cdot R}{\sum n}} \qquad \text{Enačba 1}$$

SIR = standardiziran količnik incidence
O = število otrok do 11 let zbolelih v proučevani prostorski enoti
E = število pričakovanih zbolelih v proučevani prostorski enoti
n = število otrok starih do 11 let v opazovani populaciji
R = število zbolelih otrok do 11 let na 100.000 v celotnem območju

Ker je število obravnavanih prostorskih enot relativno veliko oziroma ker v posamezni enoti biva relativno malo otrok, ki bi lahko zboleli, je vpliv naključja na vrednosti izračunanih SIR relativno velik. V prostorski analizi epidemioloških podatkov za zmanjšanje vpliva tovrstnega naključja zato uporabljamo hierarhične modele Bayesovega prostorskega glajenja (Elliott in ostali 2000). Z Bayesovimi hierahičnimi modeli s prilagojeno Poissonovo regresijsko enačbo (Enačba 2) ocenimo vrednost kazalnika bremena bolezni za posamezno proučevano prostorsko enoto na podlagi prepletanja dejanskih podatkov z dodatnimi informacijami, ki so lahko že znane ali pa gre za slučajne vplive. V analizi smo kot dodatne znane informacije uvrstili incidenco bolezni dihal pri otrocih v sosednjih območjih in povprečno incidenco bolezni dihal pri otrocih na celotnem območju opazovanja. Slučajne vplive smo razdelili na prostorsko odvisne in neodvisne. Prostorsko odvisnim spremenljivkam smo dodelili pogojno avtoregresivno (CAR) apriorno verjetnostno porazdelitev, ki zajame vse podatke o geografski strukturi opazovanega območja.

$$SIR^{*} = a + \beta X + H + S \qquad \text{Enačba 2}$$

SIR = ocenjeni standardiziran količnik incidence*
a = osnovno (logaritmirano) relativno tveganje bolezni v celotnem območju opazovanja
β = regresijski koeficient pojasnjevalne spremenljivke
X = vrednosti pojasnjevalne spremenljivke
H = prostorsko neodvisen slučajni vpliv
S = prostorsko odvisen slučajni vpliv

2.7 Ugotavljanje vpliva onesnaženosti ozračja na pojavljanje bolezni dihal

Pri določanju vpliva onesnaženosti ozračja na pojavljanje bolezni dihal smo v osnovni Bayesov model (Enačba 2) dodali podatke za vsako opazovano onesnaževalo. Osnovni model smo primerjali z razširjenim in ugotavljali, ali se razširjeni model bolj prilega našim podatkom. Uporabljena mera, ki hkrati povzema prileganje podatkom in kompleksnost modela se imenuje DIC (angl. *Deviation Information Criterion*); manjši kot je DIC, večjo napovedno moč ima model (Elliott in ostali 2000).

2.8 Prikaz prostorskega razporejanja zdravstvenega tveganja

Za grafični prikaz empiričnih in ocenjenih SIR smo uporabili zemljevide z barvno lestvico. Opazovanim enotam z nizkim tveganjem smo dodelili modro barvo, z visokim pa rdečo.

Zemljevide smo pripravili z orodjem ArcGIS. Prostorsko porazdelitev povezanosti med boleznimi dihal pri otrocih in onesnaženostjo ozračja smo ocenili vizualno, za numerično določitev prostorske strukture pa smo uporabili, statističen parameter delež prostorske variabilnosti posamezne spremenljivke ($Frac_{Spatial}$). Če je vrednost deleža prostorske variabilnosti blizu 1, potem prevladuje prostorsko odvisen slučajni vpliv. V primeru vrednosti blizu 0 pa prevladuje prostorsko neodvisen slučajni vpliv (Eitan in ostali 2010).

3 Rezultati

3.1 Prostorska razporeditev standardiziranega količnika incidence bolezni dihal

Prostorska razporeditev SIR bolezni dihal po majhnih proučevanih prostorskih enotah glede na opazovano onesnaževalo je predstavljena na Sliki 1. Za PM_{10} sta prikazani vrednosti za zimsko in poletno povprečje, medtem ko sta za SO_2 in NO_2 prikazani letni povprečni vrednosti. Opazimo lahko velike razlike v tveganju bolezni dihal pri geografsko sosednjih enotah.

3.2 Prostorska razporeditev zglajenega standardiziranega količnika incidence bolezni dihal

Prostorska razporeditev ocen tveganja zbolevanja, ki so bile pripravljene s prostorskim glajenjem v Bayse-ovem hierahičnem modelu, z upoštevanjem tveganja zbolevanja prebivalstva celotnega območja in tveganje neposrednih sosednjih območij po določenih prostorskih enotah glede na opazovano onesnaževalo, je predstavljena na Sliki 2. Razlike med posameznimi med seboj sosednjimi geografskimi enotami so bistveno manjše. Najpomembnejši statistični parametri modelov so povzeti v preglednici 1. Prostorski vzorec porazdeljevanja opazovanega zdravstvenega izida se kaže pri modelu, ki obravnava PM_{10} poleti in SO_2.

3.3 Statistični modeli prostorske analize povezanosti med boleznimi dihal in onesnaženostjo ozračja

Prostorska analiza povezanosti med boleznimi dihal pri otrocih in opazovanimi onesnaževali je predstavljena na Sliki 3, najpomembnejši statistični parametri modelov pa so povzeti v preglednici 1. Vključitev

Preglednica 1: Statistični parametri osnovnega modela Bayes-ovega hierarhičnega prostorskega glajenja (CAR) in modela z vključeno onesnaženostjo ozračja (CAR-X) povezanosti med boleznimi dihal pri otrocih in onesnaževali po proučevanih prostorskih enotah, za leto 2011.

onesnaževala	model	informacijski kriterij odklona	delež prostorske variabilnosti	regresijski koeficient (95 % interval zaupanja)
PM_{10} zima (µg/m^3)	CAR	445,50	0,093	
	CAR-X	446,20	0,109	0,07 (–0,03;0,18)
PM_{10} poletje (µg/m^3)	CAR	378,39	0,778	
	CAR-X	380,43	0,789	–0,04 (–0,19;0,11)
SO_2 (µg/m^3)	CAR	405,00	0,570	
	CAR-X	406,78	0,657	**0,24 (0,01;0,51)**
NO_2 (µg/m^3)	CAR	460,29	0,310	
	CAR-X	457,13	0,322	0,05 (–0,05;0,16)

Legenda: CAR – pogojno avtoregresivna apriorna verjetnostna porazdelitev

pojasnjevalnih spremenljivk ni prinesla bistvenega izboljšanja modela – mere ustreznosti modela so primerljive za model CAR (Slika 2) in CAR-X (Slika 3) pri vseh onesnaževalih. Modeli kažejo, da z razlikami v onesnaženosti med posameznimi območji ne moremo primerno pojasniti razlik v zbolevanju otrok zaradi bolezni dihal. Pozitivna statistično značilna povezanost se kaže le pri SO_2.

Slika 1: Prostorska razporeditev dejanske incidenčne stopnje bolezni dihal pri otrocih po proučevanih prostorskih enotah glede na opazovano onesnaževalo, za leto 2011.
SIR* – standardiziran količnik incidence.
Glej angleški del prispevka.

Slika 2: Prostorska razporeditev prostorske komponente s pogojno avtoregresivno (CAR) apriorno verjetnostno porazdelitvijo, za leto 2011.
SIR* – ocenjeni standardiziran količnik incidence
Glej angleški del prispevka.

Slika 3: Prostorska analiza povezanosti med boleznimi dihal pri otrocih in onesnaževali po proučevanih prostorskih enotah, za leto 2011.
SIR*-x – ocenjeni standardiziran količnik incidence z vključeno onesnaženostjo ozračja
Glej angleški del prispevka.

4 Razprava

Rezultati predstavljene prostorske analize povezanosti med boleznimi dihal pri otrocih ter onesnaženostjo ozračja so pokazali, da se pozitivna statistično značilna povezanost kaže pri vplivu povprečne letne koncentracije SO_2. V nasprotju z nami, se je v primerljivih tujih študijah povezanost pojavljala sistematično med povečanim tveganjem za obolevnost na območjih z visoko stopnjo onesnaženosti ozračja, še zlasti s PM_{10} in NO_2 (Maheswaran in ostali 2005; Hu in ostali 2008; Beale in ostali, 2008). V ekološki študiji majhnih prostorskih enot so Maheswaran in ostali (2005) so dokazali prostorsko povezanost med PM_{10} ter NO_2 ter učinki na bolezni srca in žilja pri populaciji nad 45 let. Hwang in Chan (2001) sta v ekološki študiji majhnih prostorskih enot z uporabo Bayse-ovih hierahičnih modelov glajenja dokazala prostorsko povezanost med PM_{10}, NO_2, SO_2 ter boleznimi spodnjih dihalnih poti.

Na podlagi predhodno izvedenih raziskav v Zasavju smo pričakovali, da bomo povezanost dokazali še v primeru PM_{10}, zlasti pozimi (Kukec in ostali 2012, 2013). Kljub temu pa na podlagi dobljenih rezultatov, ne moremo zaključiti, da prostorske povezanosti v Zasavju ni. Tako pri zbiranju zdravstvenih kot pri beleženju okoljskih podatkov so bili namreč prisotni številni problemi. Na pomen kakovosti vhodnih okoljskih in zdravstvenih podatkov so opozorili tudi v številnih podobnih tujih raziskavah (Beale in ostali 2008; Stroh in ostali 2007).

Pri analiziranju uporabnosti zdravstvenih podatkov v naši študiji ugotavljamo, da s popolnostjo zajema podatkov nismo imeli težav (v vseh zdravstvenih domovih so bili na voljo podatki za vse dni opazovanega

obdobja) (Kukec in ostali 2012). Prav tako ocenjujemo, da v analizo nismo vnašali pristranosti z napačnim geografskim razvrščanjem zbolelih ali zdrave populacije. Stalni naslovi zbolelih se namreč v vseh zdravstvenih domovih vnašajo sistematično (iz kartice zdravstvenega zavarovanja). Naslov se tako sklada s podatkom, ki je zabeležen v Centralnem registru prebivalstva. Smo pa pri pregledu zajetih podatkov naleteli na določene vsebinske nejasnosti. Prva nejasnost se je pokazala pri opisu števila dni, ko je zaradi bolezni dihal obiskal zdravnika v zdravstvenem domu vsaj en otrok iz posamezne občine v Zasavju. Ti rezultati so pokazali nenavadno sliko – pri otrocih iz občine Zagorje ob Savi smo zaznali 1,3- do 1,4-krat večje število dni z vsaj enim obiskom otrok zaradi katerekoli od izbranih bolezni dihal kot v občini Trbovlje ali občini Hrastnik. Prav tako je nenavadno, da je število dni z vsaj enim obiskom otrok zaradi katerekoli od izbranih kroničnih bolezni dihal v občini Trbovlje celo 4,0-krat večje kot v občini Zagorje ob Savi oziroma 5,8-krat večje kot v občini Hrastnik. Seveda lahko pričakujemo razlike med občinami v tem kazalniku, vendar tako velikih za gotovo ne, saj je celotno opazovano območje Zasavja – z vidika demografskih, socialno-ekonomskih in zdravstvenih vidikov dokaj homogeno (Kukec in ostali 2013). Predpostavljamo, da izvirajo ugotovljene razlike iz načina beleženja zdravstvenih podatkov (razlike v kodiranju posameznih diagnoz). V posameznem zdravstvenem domu opredeljujejo nekatera obolenja pri otrocih kot bolezni dihal, ki smo jih v analizi zajeli, v drugih zdravstvenih domovih pa enaka obolenja kodirajo kot nekatere druge, v analizi neupoštevane skupine. Zaradi tega lahko pride do pristranost razvrščanja (angl. misclassification) (Porta in ostali 2008) in na rezultate vpliva le v primerih, ko se hkrati analizira zdravstvene podatke več zdravstvenih domov. Po naših podatkih so bile vse primerljive raziskave do sedaj izvedene z zdravstvenimi podatki pridobljenimi le v eni zdravstveni ustanovi (Šimac 2008; Rems - Novak 2013).

Problem kakovosti zdravstvenih podatkov bi lahko rešili, vendar bi se ga morali lotiti na nacionalni ravni. Potrebno bi bilo poenotiti beleženje diagnoz v zdravstveno-informacijski sistem (izdelati natančna navodila za beleženje), pri vzgoji mladih zdravnikov pa povečati ozaveščenost o pomenu uporabe MKB klasifikacije (Svetovna zdravstvena organizacija 2011) in pomenu pravilnega šifriranja bolezni po tej klasifikaciji.

5 Sklepi

Zaključimo lahko, da se pozitivna statistično značilna povezanost kaže le pri vplivu povprečne letne koncentracije SO_2. Ugotovili smo, da imamo ustrezna znanja na področju uporabe prostorskih metod povezovanja okoljskih in zdravstvenih podatkov. Težave pa imamo na področju same uporabnosti podatkov, ki se stalno rutinsko zbirajo v obeh informacijskih sistemih – zdravstvenem in okoljskem. Z odpravo teh pomanjkljivosti bi lahko v prihodnosti raziskave celostnega povezovanja okoljskih in zdravstvenih podatkov v Sloveniji pogosteje izvajali in uporabili na področju oblikovanja z dokazi podprtih politik zdravja.

6 Zahvala

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7 Literatura

Glej angleški del prispevka.

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ANALYSIS OF HIGH WATERS ON THE KRIVA REKA RIVER, MACEDONIA

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The Kriva Reka near the Trnovec gauging station.

Analysis of high waters on the Kriva Reka River, Macedonia

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ABSTRACT: The Kriva Reka River is located in northeastern Macedonia. Only a few manmade facilities, such as canals, dams, embankments, and hydropower plants, have been built along the river. This river type is particularly useful for calculating high waters using mathematical and statistical methods. To this end, five theoretical distributions were used in this study: the Gaussian normal distribution, log-normal distribution, Gumbel distribution, Pearson type III distribution, and log-Pearson type III distribution. In order to determine the probability of the occurrence of high waters at the Trnovec gauging station on the Kriva Reka, a period of 39 hydrologic years was processed, each year beginning in October.

KEY WORDS: geography, hydrology, Kriva Reka, high waters, maximum annual discharge, distributions, probability, Macedonia.

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1 Introduction

Rock composition, relief, vegetation, and precipitation are the main factors influencing the development of high waters in the Kriva Reka basin. The basin is largely composed of low-permeability volcanic and metamorphic rocks. The river valley has a gorge character with a small percentage of forest. Precipitation is especially high in spring and autumn, and the river is subject to flash flooding. Historical floods in the Vardar River basin occurred in 1778, 1876, 1895, 1897, 1916, 1935, 1937, and 1962 (Sibinović 1968).

The Kriva Reka is a left tributary of the Pčinja River, which is a left tributary of the Vardar River. The river is part of the Aegean watershed area. Its specific climate is a blend of continental and Mediterranean influences, providing a particular river regime formed by pluvial and snowmelt elements that result in the development of high waters, particularly in July and August. Macedonian rivers are characterized by continental (complex) and Mediterranean (simple) discharge regimes. Except for these basic characteristics, the catchment area of the Kriva Reka has been spared major human influence because only three small dams have been built on it.

The analysis of high waters in the Kriva Reka basin was carried out at the Trnovec gauging station at 440 m above sea level, with a drainage area of 614.4 km^2. The total length of the river is 79 km, the minimum length is 50.6 km, the spring elevation is 1,590 m above sea level, and the confluence point elevation is 296 m above sea level. The total basin area is 1,001.8 km^2.

The total watershed length is 62.7 km, and the average basin width is determined at 16.0 km. The average basin elevation is 861.5 m above sea level. The river network density is 1.3 km/km^2, and the river network frequency is 0.5 streams/km^2. The Horton ratio (Horton 1932) is 0.16, which is lower than for other rivers (e.g., the Morava compactness coefficient is 0.37; Dukič 1984). A higher Horton ratio value means that the flood probability on the Kriva Reka is lower than on the Morava River. The Kriva Reka forest cover is 260 km^2 or 25.9%. The compactness coefficient is rather low (1.7), which means that the Kriva Reka basin does not form a circle and that the flood inflow from its tributaries is not simultaneous.

Figure 1: Upper course of the Kriva Reka.

2 Methods

This paper uses mathematical and statistical methods, such as tests of independence and homogeneity, covering a standard period in hydrological research. The maximum high waters were calculated for different return periods (from 2 to 10,000 years) and a graphic comparison and tests of correspondence between the empirical and theoretical distributions were performed. The theoretical high waters were calculated according to different statistical distributions.

Figure 4 clearly shows a trend of decreasing values, a wet period between 1961/62 and 1979/80, and a dry period between 1981/82 and 1999/2000.

Table 1: Annual maximum discharge (m^3/s) at the Trnovec gauging station from 1961/62 to 1999/2000. Data on the maximum annual discharges were obtained from the National Hydrometeorological Service in Skopje.

Year	Q_{max}	Year	Q_{max}	Year	Q_{max}	Year	Q_{max}
1961/62	89.8	1971/72	104.0	1981/82	49.0	1991/92	22.2
1962/63	108.0	1972/73	95.7	1982/83	24.9	1992/93	35.5
1963/64	249.0	1973/74	81.2	1983/84	31.3	1993/94	14.6
1964/65	106.0	1974/75	190.0	1984/85	33.5	1994/95	40.1
1965/66	264.0	1975/76	99.0	1985/86	24.4	1995/96	33.7
1966/67	54.4	1976/77	123.0	1986/87	45.2	1996/97	37.6
1967/68	175.0	1977/78	16.8	1987/88	12.2	1997/98	13.6
1968/69	85.4	1978/79	34.0	1988/89	13.9	1998/99	41.5
1969/70	313.0	1979/80	66.0	1989/90	12.2	1999/2000	15.3
1970/71	158.0	1980/81	33.5	1990/91	28.9		

Figure 2: Geographical position of the Kriva Reka drainage area in Macedonia.

3 Testing the independence and homogeneity of maximum annual discharge time series

When calculating the probability of occurrence of high waters at the Trnovec gauging station based on the series of maximum annual discharges, it is very important for the accuracy of the calculations that the series be independent and homogenous. The occurrences must be independent from one another and the series of maximum discharge must not be influenced by specific rare natural phenomena such as earthquakes, major landslides, major forest fires, and volcanic eruptions or human phenomena such as river regulation, construction, and large-scale logging (WMO 1994).

In order to statistically process the maximum discharges, a period of 30 years is necessary (Srebrenović 1986). If the period observed is shorter, the analysis is made using a shorter data period (Abida and Elluze 2008). In this case, a period of 39 years was processed.

3.1 Successive square method

At this stage of the analysis, we tested the independence of the maximum annual discharge data series for the Trnovec gauging station. In the successive square method, the statistic u (the value that represents the degree of independence) is calculated using the following equation (Shah 1970):

$$d^2 = \frac{1}{n-1}\sum_{i=1}^{n-1}\left(x_{i+1}-x_i\right)^2; \quad (1)$$

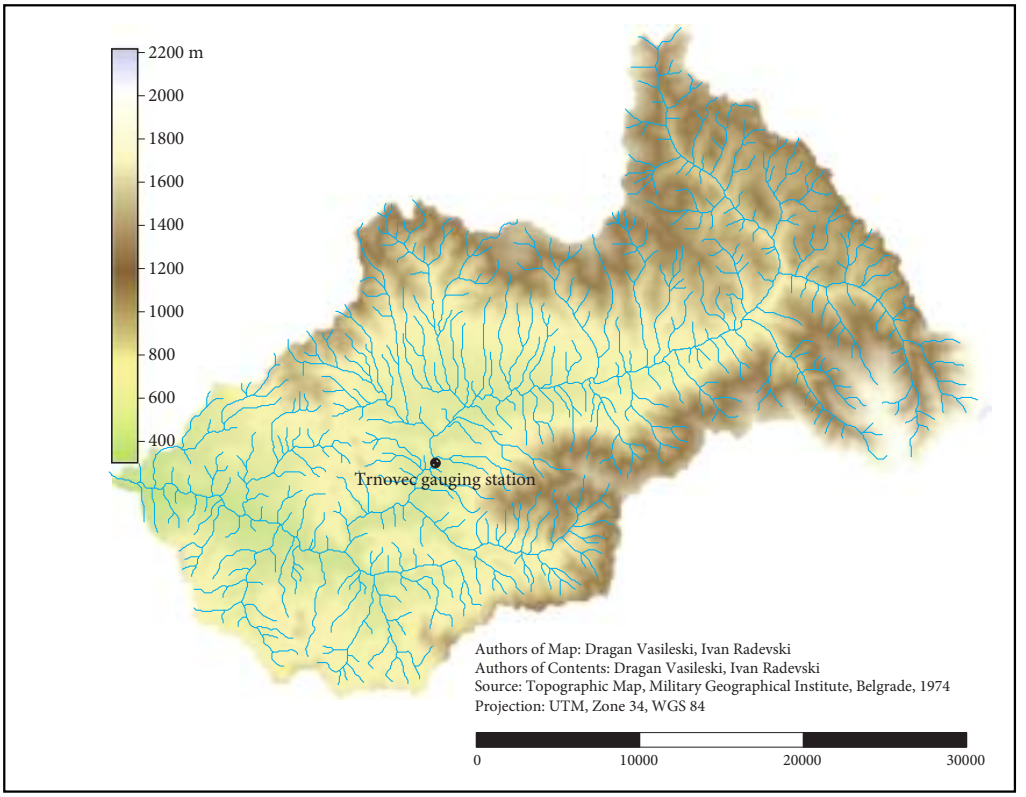

Figure 3: Location of the Trnovec gauging station in the Kriva Reka drainage area.

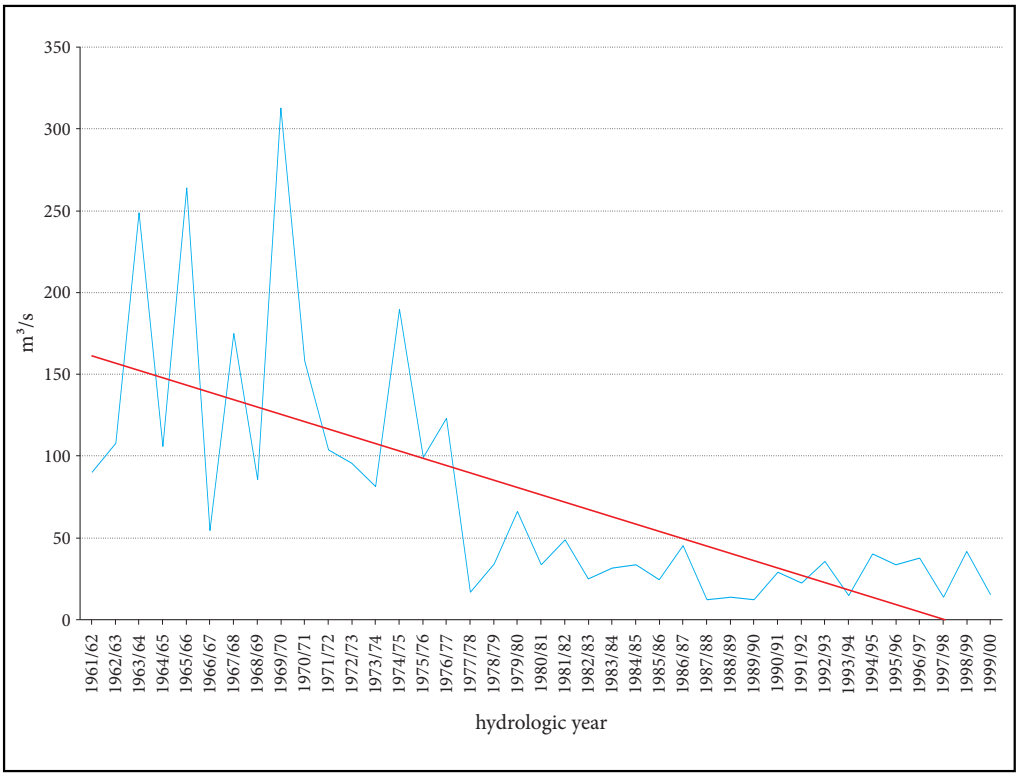

Figure 4: Time series of maximum annual discharges at the Trnovec gauging station from 1961/62 to 1999/2000.

In the above equation, x_i is annual maximum discharge and n is the number of members in the data series.

$$u = \frac{\frac{d^2}{2} - 1}{\sqrt{\frac{\sigma^2}{\frac{n-2}{n^2-1}}}} \tag{2}$$

The main elements in the second equation are the variable d^2, σ (standard deviation) and the statistic u. The variable n is the number of data set members.

For the threshold of significance $\alpha = 0.05$, the statistic u is relevant if it is within the following limits: $-1.96 < u < 1.96$. The result $u = -2.593$ is not within the limits of $-1.96 < u < 1.96$, hence we can conclude that the series of maximum annual discharges is not independent; that is, its members are not independent from one another. This result confirms the non-randomness of maximum discharges in the period between 1961/62 and 1999/2000 at the Trnovec gauging station.

Testing has also proven the existence of a trend that represents a non-accidental component in statistics.

3.2 **Kolmogorov–Smirnov test**

The Kolmogorov–Smirnov test provides accurate results regarding the series' homogeneity (Popović and Blagojević 1997). In this particular case, the period of 39 hydrologic years was divided into two series (1961/62–1979/80 and 1980/81–1999/2000).

Table 2: Calculating the squares for the statistic *u*.

Hydrologic year	Q_{max} (m^3/s)	$x_{i-1} - x_i$	$(x_{i-1} - x_i)^2$
1961/62	89.8	*	*
1962/63	108.0	18.20	331.2
1963/64	249.0	141.00	19,881.0
1964/65	106.0	–143.00	20,449.0
1965/66	264.0	158.00	24,964.0
1966/67	54.4	–209.60	43,932.2
1967/68	175.0	120.60	14,544.4
1968/69	85.4	–89.60	8,028.2
1969/70	313.0	227.60	51,801.8
1970/71	158.0	–155.00	24,025.0
1971/72	104.0	–54.00	2,916.0
1972/73	95.7	–8.30	68.9
1973/74	81.2	–14.50	210.3
1974/75	190.0	108.80	11,837.4
1975/76	99.0	–91.00	8,281.0
1976/77	123.0	24.00	576.0
1977/78	16.8	–106.20	11,278.4
1978/79	34.0	17.20	295.8
1979/80	66.0	32.00	1,024.0
1980/81	33.5	–32.50	1,056.3
1981/82	49.0	15.50	240.3
1982/83	24.9	–24.10	580.8
1983/84	31.3	6.40	41.0
1984/85	33.5	2.20	4.8
1985/86	24.4	–9.10	82.8
1986/87	45.2	20.80	432.6
1987/88	12.2	–33.00	1,089.0
1988/89	13.9	1.70	2.9
1989/90	12.2	–1.70	2.9
1990/91	28.9	16.70	278.9
1991/92	22.2	–6.70	44.9
1992/93	35.5	13.30	176.9
1993/94	14.6	–20.90	436.8
1994/95	40.1	25.50	650.3
1995/96	33.7	–6.40	41.0
1996/97	37.6	3.86	14.9
1997/98	13.6	–23.94	573.3
1998/99	41.5	27.88	777.3
1999/2000	15.3	–26.19	686.0

The maximum difference *Dn* is 0.4. Considering the fact that for a determined threshold of significance $\alpha = 0.05$, which is standard in hydrologic studies, the maximum difference *Dn* must not exceed 0.21. Hence we can conclude that the series is not homogenous. The reasons for such a result could be either natural or manmade. The discharges during the second period have significantly lower values compared to the first period. This is most likely due to the three small dams built in the catchment area.

4 Empirical distribution of the annual maximum water discharge using the Weibull equation

When using mathematical statistics methods, it is very important to take into consideration several basic characteristics of the relation between empirical and theoretical distributions. Empirical distributions usually deviate from theoretical distributions. The deviation is larger in the case of small samples. In hydrology a standard sample is considered to be a period of 30 years, and a larger sample will certainly provide more

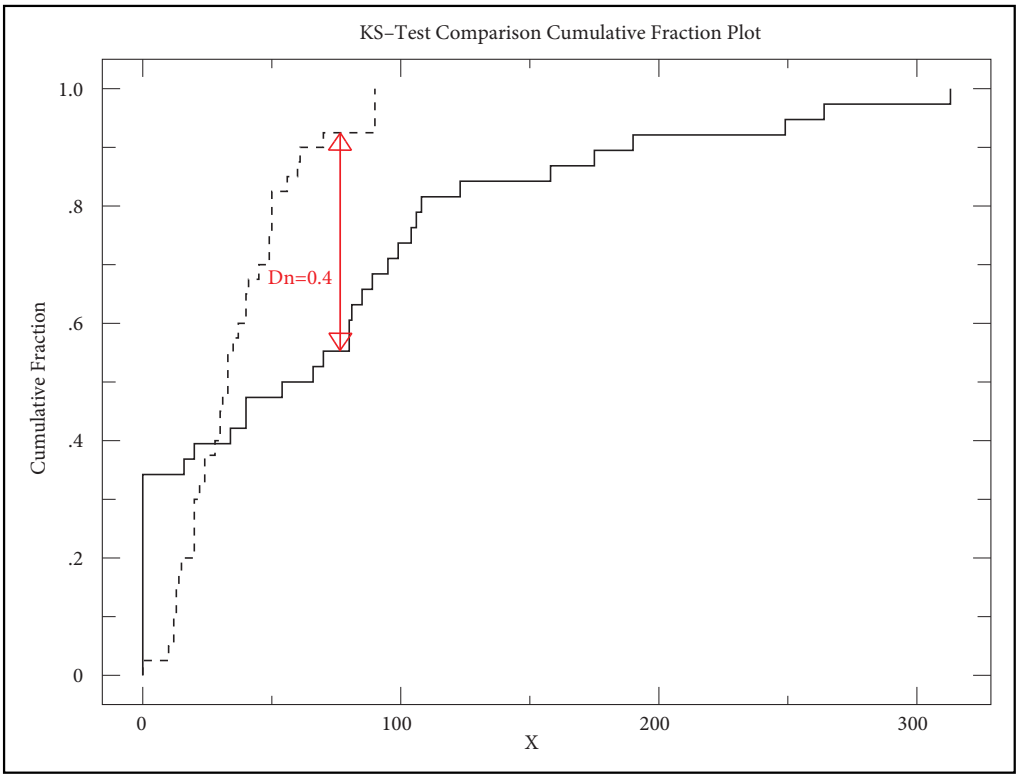

Figure 5: Kolmogorov–Smirnov test for homogeneity of maximum discharges.

Figure 6: The Kriva Reka near the Trnovec gauging station.

accurate results. Often several theoretical distributions are used, which display great differences in results; that is, small probabilities despite a satisfactory correspondence with the empirical distribution.

In addition to errors that occur as a result of short observation periods, errors also result from inaccuracy in measurements or a mistake in the assessment of parameters of theoretical calculations (Jovanović 1987).

The Weibull equation was used to determine the empirical distribution and the return periods of high discharges:

$$P_m = \frac{m}{N+1} \quad (3)$$

m is the rank in time series, *N* is the number of members in time series, and *Pm* is empirical probability expressed in percent. The Weibull equation was used to calculate the empirical distribution of maximum annual discharges for the period studied. The results from this equation are presented in Figures 7 and 8.

Table 3: Empirical distribution according to the Weibull equation for maximum annual discharges at the Trnovec gauging station from 1961/62 to 1999/2000.

m	Chronological order		Descending order		$P = m / (N+1) * 100$
1	1961/62	89.8	1969/70	313.0	2.50
2	1962/63	108.0	1965/66	264.0	5.00
3	1963/64	249.0	1963/64	249.0	7.50
4	1964/65	106.0	1974/75	190.0	10.00
5	1965/66	264.0	1967/68	175.0	12.50
6	1966/67	54.4	1970/71	158.0	15.00
7	1967/68	175.0	1976/77	123.0	17.50
8	1968/69	85.4	1962/63	108.0	20.00
9	1969/70	313.0	1964/65	106.0	22.50
10	1970/71	158.0	1971/72	104.0	25.00
11	1971/72	104.0	1975/76	99.0	27.50
12	1972/73	95.7	1972/73	95.7	30.00
13	1973/74	81.2	1961/62	89.8	32.50
14	1974/75	190.0	1968/69	85.4	35.00
15	1975/76	99.0	1973/74	81.2	37.50
16	1976/77	123.0	1979/80	66.0	40.00
17	1977/78	16.8	1966/67	54.4	42.50
18	1978/79	34.0	1981/82	49.0	45.00
19	1979/80	66.0	1986/87	45.2	47.50
20	1980/81	33.5	1998/99	41.5	50.00
21	1981/82	49.0	1994/95	40.1	52.50
22	1982/83	24.9	1996/97	37.6	55.00
23	1983/84	31.3	1992/93	35.5	57.50
24	1984/85	33.5	1978/79	34.0	60.00
25	1985/86	24.4	1995/96	33.7	62.50
26	1986/87	45.2	1984/85	33.5	65.00
27	1987/88	12.2	1980/81	33.5	67.50
28	1988/89	13.9	1983/84	31.3	70.00
29	1989/90	12.2	1990/91	28.9	72.50
30	1990/91	28.9	1982/83	24.9	75.00
31	1991/92	22.2	1985/86	24.4	77.50
32	1992/93	35.5	1991/92	22.2	80.00
33	1993/94	14.6	1977/78	16.8	82.50
34	1994/95	40.1	1999/2000	15.3	85.00
35	1995/96	33.7	1993/94	14.6	87.50
36	1996/97	37.6	1988/89	13.9	90.00
37	1997/98	13.6	1997/98	13.6	92.50
38	1998/99	41.5	1989/90	12.2	95.00
39	1999/2000	15.3	1987/88	12.2	97.50

In Table 3, maximum discharges have been arranged in chronological and descending order. The average maximum discharge for the period between 1961/62 and 1999/2000 is 76.33 m^3/s, and the standard deviation is 74.58. The variation coefficient is 0.98, and the coefficient of skewness is 1.69. These two coefficients are necessary for calculating the theoretical Pearson type III distributions.

5 Estimation of theoretical maximum discharges

The theoretical maximum discharges were estimated according to five distributions:
– Gaussian or normal distribution,
– Pearson type III distribution,
– Log-Pearson type III distribution,
– Gumbel distribution,
– Log-normal distribution.

5.1 Gaussian or normal distribution

The Gaussian distribution is the only symmetrical distribution of the five distributions used. Symmetry leads to lower values of maximum discharges at small probabilities. The basic parameters of this distribution are the arithmetic mean and the standard deviation (Srebrenović 1986).

Table 4: Theoretical maximum discharges for corresponding return periods using the Gaussian distribution.

T (years)	P (%)	z	$z \cdot \sigma$	Q_{max}
10,000	0.01	3.72	277.05	353.35
1,000	0.1	3.09	230.44	306.74
200	0.5	2.58	192.11	268.41
100	1	2.33	173.46	249.76
50	2	2.05	153.18	229.48
25	4	1.75	130.66	206.96
20	5	1.64	122.30	198.60
10	10	1.28	95.46	171.76
5	20	0.84	62.79	139.09
2	50	0.00	0.00	76.30

According to the Gaussian distribution, the following maximum discharges are expected at the Trnovec gauging station: 353.35 m^3/s once every 10,000 years, 306.74 m^3/s once every 1,000 years, and 249.76 m^3/s once every 100 years.

5.2 Pearson type III distribution

The Pearson type III distribution is frequently used to calculate the probability of occurrence of maximum discharges (Apolov 1963; Srebrenović 1986). This theoretical distribution corresponds well with the empirical distribution, especially when calculating maximum discharges with return periods of 10,000 or 1,000 years.

Table 5: Theoretical maximum discharges for corresponding return periods using the Pearson type III distribution.

T (years)	P (%)	φ	$\varphi \cdot C_v$	$K_s = \varphi\ C_v + 1$	$Q_{max} = Q_{авmax} \cdot K_s$
10,000	0.01	7.52	7.35	8.35	637.20
1,000	0.1	5.50	5.38	6.38	486.52
200	0.5	4.08	3.99	4.99	380.61
100	1	3.44	3.36	4.36	332.87
50	2	2.82	2.76	3.76	286.63
25	4	2.19	2.14	3.14	239.64
20	5	1.97	1.93	2.93	223.23
10	10	1.32	1.29	2.29	174.75
5	20	0.66	0.65	1.65	125.53
2	50	–0.27	–0.26	0.74	56.16

The theoretical maximum discharges for the corresponding return period were calculated using the following equation:

$$Q_{max} = \left(C_v \cdot \varphi + 1\right) \cdot \bar{x} \tag{4}$$

The main parameters of this distribution are the arithmetic mean, the coefficient of variation, and the coefficient of skewness. The Pearson coefficient was obtained from the basic Pearson tables.

According to the Pearson type III distribution, the following maximum discharges are expected at the Trnovec gauging station: 637.20 m^3/s once every 10,000 years, 486.52 m^3/s once every 1,000 years, and 332.87 m^3/s once every 100 years.

5.3 Log-Pearson type III distribution

The basic parameters of this distribution are the average maximum discharge ($\bar{q}$), the coefficient of variation (*Cv*), and the coefficient of skewness (*Cs*). The theoretical maximum discharges for the corresponding return period were calculated using the following equations:

$$\bar{q} = \log Q_{max} \tag{5}$$

$$\bar{q} = \frac{1}{2} \sum_{i=1}^{n} q \tag{6}$$

$$\bar{\sigma} = \pm \sqrt{\frac{\sum_{i=1}^{n} (q - q)^2}{n}} \tag{7}$$

Table 6: Theoretical maximum discharges for corresponding return periods using the log-Pearson type III distribution.

T (years)	*P* (%)	φ	*Cv* * φ + 1	$\bar{q}$	log Q_{max}	Q_{max}
10,000	0.01	4.20	1.99	1.70	3.38	2420.25
1,000	0.1	3.40	1.80	1.70	3.06	1157.97
200	0.5	2.80	1.66	1.70	2.82	666.15
100	1	2.50	1.59	1.70	2.70	505.26
50	2	2.18	1.51	1.70	2.58	376.22
25	4	1.82	1.43	1.70	2.43	270.01
20	5	1.71	1.40	1.70	2.39	243.30
10	10	1.31	1.31	1.70	2.23	169.07
5	20	0.82	1.19	1.70	2.03	107.44
2	50	–0.07	0.98	1.70	1.68	47.31

According to the log-Pearson type III distribution, the following maximum discharges are expected at the Trnovec gauging station: 2,420.25 m^3/s once every 10,000 years, 1,157.97 m^3/s once every 1,000 years, and 505.26 m^3/s once every 100 years.

5.4 Gumbel distribution

The basic parameters of this distribution are the average maximum discharge and the standard deviation (Gumbel 1958). The theoretical maximum discharges for the corresponding return period were calculated using the following equations:

$$\frac{1}{\alpha} = 0{,}78 \cdot \sigma \tag{8}$$

$$Q_m = \bar{x} - 0{,}577 \cdot \frac{1}{\alpha} \tag{9}$$

$$Q_{max} = Q_m + z \cdot Q_{max} = Q_m + z \cdot \frac{1}{\alpha} \tag{10}$$

Table 7: Theoretical maximum discharges for corresponding return periods using the Gumbel distribution.

T (years)	P (%)	z	$z \cdot 1/\alpha$	Q_m	Q_{max}
1,0000	0.01	9.21	535.74	42.74	578.47
1,000	0.1	6.91	401.95	42.74	444.68
200	0.5	5.30	308.18	42.74	350.92
100	1	4.60	267.58	42.74	310.31
50	2	3.91	227.44	42.74	270.18
25	4	3.20	186.14	42.74	228.88
20	5	2.97	172.76	42.74	215.50
10	10	2.27	132.04	42.74	174.78
5	20	1.50	87.25	42.74	129.99
2	50	0.37	21.35	42.74	64.08

According to the Gumbel distribution, the following maximum discharges are expected at the Trnovec gauging station: 578.47 m^3/s once every 10,000 years, 444.68 m^3/s once every 1,000 years, and 310.31 m^3/s once every 100 years.

5.5 Log-normal distribution

The basic parameters of this distribution are the average logarithmic values of maximum discharges and the standard deviation of the logarithmic values of maximum discharges. The theoretical maximum discharges for the corresponding return period were calculated using the following equations:

$$Q_{max} = \bar{q} + z + \bar{\sigma} \tag{11}$$

$$Q_{max} = 10^{q_{max}} \tag{12}$$

Table 8: Theoretical maximum discharges for corresponding return periods using the log-normal distribution.

T (years)	P (%)	z	$z \cdot \sigma$	$\bar{q}$	log Q_{max}	Q_{max}
10,000	0.01	3.72	1.49	1.70	3.19	1545.25
1,000	0.1	3.09	1.24	1.70	2.94	868.96
200	0.5	2.58	1.03	1.70	2.73	541.25
100	1	2.33	0.93	1.70	2.63	429.93
50	2	2.05	0.82	1.70	2.53	334.66
25	4	1.75	0.70	1.70	2.40	253.40
20	5	1.64	0.66	1.70	2.36	228.56
10	10	1.28	0.51	1.70	2.22	164.06
5	20	0.84	0.34	1.70	2.04	109.60
2	50	0.00	0.00	1.70	1.70	50.47

According to the log-normal distribution, the following maximum discharges are expected at the Trnovec gauging station: 1,545.25 m^3/s once every 10,000 years, 868.96 m^3/s once every 1,000 years, and 429.93 m^3/s once every 100 years.

6 Conclusion

The series of a 30-year period is considered to be a standard measurement unit in hydrology. Even though the data series was sufficiently long, the series' testing has disproved its independence, homogeneity, and representativity. The analysis showed a decreasing trend from the beginning to the end of the period studied. To be more precise, discharges of approximately 100 m^3/s and above occur only in the first half of the series.

The main purpose of this research was to provide findings that would facilitate flood prevention.

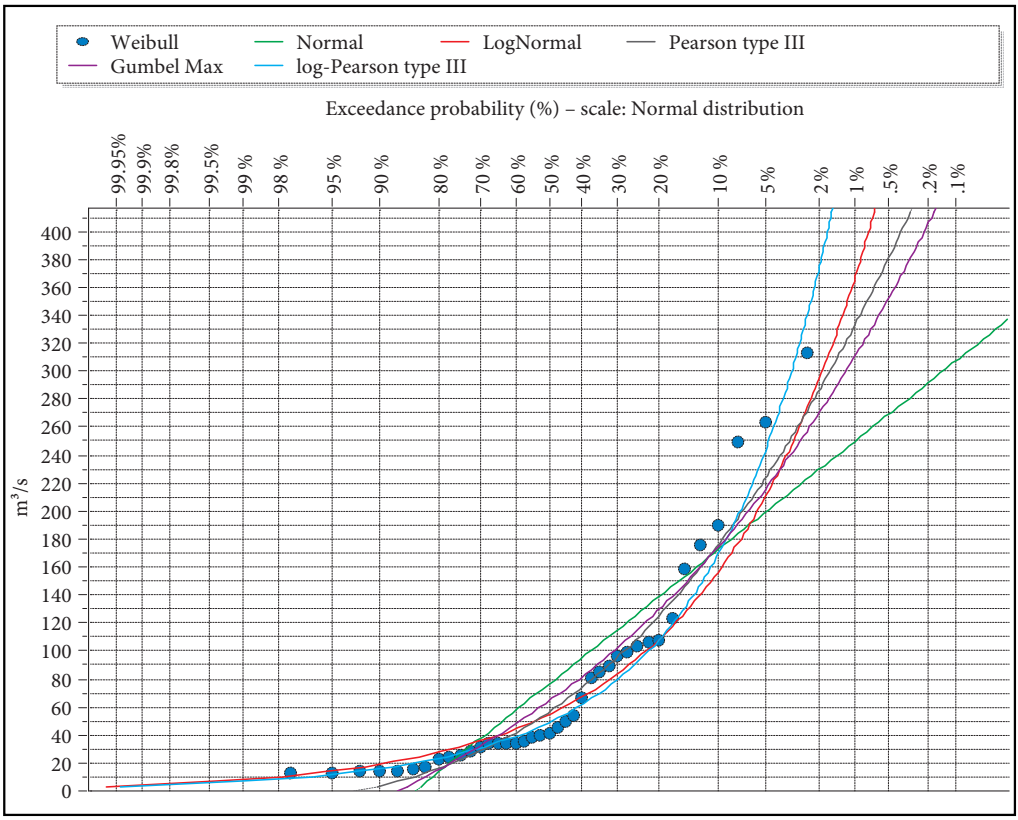

Figure 7: Probability plot with five cumulative frequency distributions compared with the Weibull empirical distribution.

A comparison with the Kolmogorov–Smirnov test was made in order to see which of the five theoretical distributions used match the Weibull empirical distribution for the determined threshold of significance $\alpha = 0.05$.

The probability plot (Figure 7) shows a satisfactory correspondence between the Weibull empirical distribution and the log-Pearson type III distribution (the blue dotted line), especially for high discharge values. There is also a satisfactory correspondence between the empirical distribution of maximum annual discharges and the log-normal distribution, which is not the case with other distributions. The correspondence between the logarithmic distributions and the empirical distribution is common in streams subject to flash floods. Therefore, flood protection should be based on logarithmic distributions.

Figure 8 clearly shows a correspondence between the log-Pearson type III distribution and the empirical distribution, and a 95% confidence interval.

Table 9: Kolmogorov–Smirnov test results.

K–S test	$\alpha = 1\%$	$\alpha = 5\%$	$\alpha = 10\%$	attained α	*Dn*
Normal	ACCEPT	ACCEPT	REJECT	9.89%	0.1928
Log-normal	ACCEPT	ACCEPT	ACCEPT	48.12%	0.1309
Pearson type III	ACCEPT	ACCEPT	ACCEPT	36.58%	0.1438
Log-Pearson type III	ACCEPT	ACCEPT	ACCEPT	94.18%	0.0813
Gumbel	ACCEPT	ACCEPT	ACCEPT	25.08%	0.1596

According to the results of the Kolmogorov–Smirnov test (Table 9), four distributions are accepted, except for the normal distribution, which is rejected at the significance level $\alpha = 10\%$. The best correspondence

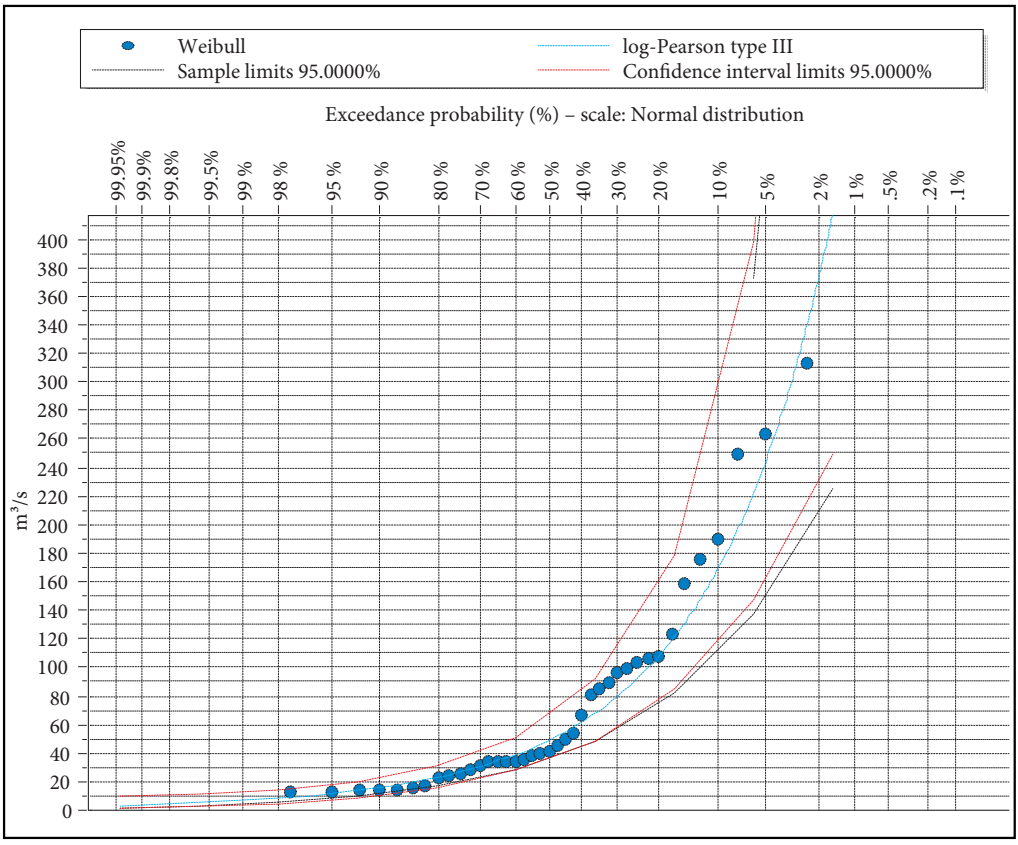

Figure 8: The log-Pearson type III distribution 95% confidence interval limits using a Monte Carlo simulation.

is achieved by the log-Pearson type III distribution, which shows the smallest maximum difference between the empirical and the theoretical distribution ($Dn = 0.0813$). The results confirm the high fluctuation of water discharges of the Kriva Reka.

Table 10: Chi-squared test results.

Chi-squared test	α = 1 %	α = 5 %	α = 10 %	attained α	Pearson parameter.
Normal	REJECT	REJECT	REJECT	0.00%	29.3333
Log-normal	ACCEPT	ACCEPT	ACCEPT	20.40%	3.17949
Pearson type III	ACCEPT	REJECT	REJECT	1.92%	5.48718
Log-Pearson type III	ACCEPT	ACCEPT	ACCEPT	16.84%	1.89744
Gumbel	REJECT	REJECT	REJECT	0.26%	11.8974

According to the chi-squared test, the log-Pearson type III distribution best corresponds to the empirical distribution. In addition to this distribution, the only accepted distribution for the three significance levels is the log-normal distribution.

In the analysis of the probability of occurrence of high discharges in western Macedonia, the log-Pearson type III distribution shows the best correspondence for the Radika River (Vasileski 1993), and the Gumbel distribution shows the best correspondence for the Crna Reka River (Radevski 2010), which indicates a smaller annual fluctuation of maximum discharges.

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CULTURAL EVENTS AS PART OF CULTURAL TOURISM DEVELOPMENT. CASE STUDY: SOMBOR AND APATIN (SERBIA)

Ivana Blešić, Tatjana Pivac, Jasmina Đorđević, Igor Stamenković, Sava Janićević

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Sombor stew festival, Vojvodina Province, Serbia.

Cultural events as part of cultural tourism development. Case study: Sombor and Apatin (Serbia)

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ABSTRACT: Festivals and special events play a significant role in communities' lives because they provide important activities and spending outlets for both locals and visitors, and enhance the tourist image of local communities and their social cohesion. Backgrounds and contents of events are various, but the most attractive ones are those devoted to gastronomy or those that cherish tradition, customs, folklore and handicrafts. The municipalities of Sombor and Apatin are multiethnic regions with authentic folklore and food out of which numerous events of economic and entertainment content emerged. The authors of this study recognized the most significant ten. The research is aimed at determining the attitudes of the local population with regard to the organization, realization and economic importance of cultural events.

KEY WORDS: festival, local population, attitudes, Sombor, Apatin, culture, tourism, regional development

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1 Introduction

In current economic climate, festivals play an important role for cities and whole regions. Festivals are considered to contribute significantly to cultural and economic development and as such have major impact on the development of cultural tourism to the host communities. The festival organizers are now using the historical and cultural themes to develop annual events to attract visitors and create cultural image in host cities by holding festivals in the community settings. The desire for festivals and events is not specifically designed to address the needs of any particular group. The hosting of events is often developed because of tourism and economic opportunities additional to social and cultural benefits. Festivals are being used by the organizers to express the relationship between identity and place and play a very important role in raising civic consciousness. Festivals are an important expression of human activity and contribute significantly to the social and cultural life of their host communities (Raj and Vignali 2010).

Events have the potential to generate a vast amount of tourism when they cater to visitors from other destinations plus the potential for grants, or sponsorships (Getz 1997), either by direct or indirect intent. The events in turn are seen as an important tool for attracting visitors and building the tourist image within different communities.

The main subject of this paper is the examination of how a form of tourism – event tourism- can affect rural development. How much does one rural event affect host communities? Can a small-scale event which takes place in a rural environment play significant role to the socio-economic development of the region?

This paper reports on research related to festivals' contribution to the development of cultural tourism. Festivals attract tourists to local community events in order to promote enriching exchanges between tourists and residents.

This study will focus on the residents of the municipalities of Sombor and Apatin and measure their perception of festivals. The reason for studying perception of residents and not other stakeholders (such as, for example, businesses, politicians, pressure groups) in this study is rooted in the fact that residents are considered to play vital role in overall tourism development in the area and, in particular, in acceptance or rejection of an event based on their perceptions and attitudes towards it.

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Figure 1: National costume of Bačka

Figure 2: Sombor stew festival, Vojvodina Province, Serbia.

2 Literature review

The statement that tourism can lead to regional development has been well-documented by various researchers. Tourism has a multidimensional affection on the host destination. The direct and indirect benefits of tourism combine to create an extensive list of opportunities. In

both developed and developing countries, tourism is a mean of raising the economic activity of regions (Mangion and McNabb 2005; Skoultsous and Tsartas 2009; Pivac et al. 2011). Furthermore, it is widely perceived as a potential economic base, providing elements that may improve quality of life and has various social and environmental impacts (Andereck et al. 2005; Todorović and Bjeljac 2009). Tourism is an economic sector able to offer a significant contribution to the economic growth of a region and to the labour market and produces jobs directly and indirectly through the supply of goods and the necessary services for tourist activities. Moreover, tourism produces social benefits to the region (i.e. development of small and medium enterprises, creation of new job, improvement of infrastructure etc.). On cultural side, tourism is considered an element of community enrichment, thanks to the meeting of different cultures (Pivac et al. 2011; Blešić et al. 2013).

According to Lee et al. (2004) on a global scale festivals and events with a strong cultural component are substantially increasing in numbers. In addition to enhancing local pride in culture, these events also expose indigenous minorities and an increasing number of international visitors to new peoples and their customs as well as, other purposes including contributing to the local economy, and providing recreation opportunities (Long and Perdue 1990). Getz (1991) recognizes festivals and events as a new wave of alternative tourism which contributes to sustainable development and improves the relationship between host and guest.

Local festivals are increasingly being used as instruments for promoting tourism and boosting the regional economy (Felsenstein and Fleischer 2003). Getz (1993) and Formica and Uysal (1998) showed that the economic gains from festivals can be substantial because festivals provide interesting activities and spending venues for both local people and tourists.

3 Methodology

Research of the local population attitudes was conducted on the territory of the municipalities of Sombor and Apatin that belong to the administrative district of the western Bačka. The entire region covers the area of 2,420 km^2, out of which 1,178 km^2 belong to the municipality of Sombor and 333 km^2 to the municipality of Apatin. The municipality of Sombor comprises of 16 settlements and the municipality of Apatin of 5 settlements (Internet 1; Internet 2). Although the area is characterized by depopulation and the aging of the population (Stojanović et al. 2014), this is a multiethnic area.

What makes this whole region a multiethnic one is the fact that there are 24 nationalities inhabiting it. The most numerous are: Serbs, Hungarians, Yugoslavs, Croats, Montenegrins, Ruthenians, Ukrainians, Poles, Germans, Albanians, Turkish, Czechs, and Slovaks. Melting point of different cultures, religions, nationalities and rural festivities are the base of anthropogenic rural tourism attractions in Vojvodina Province (Dragićević et al. 2013).

10 different events from the territories of the municipalities of Sombor and Apatin were included in the research: Sombor stew festival, Ravangrad wine fest, Street of old crafts, Horse carriage festival, Bodrog fest, Miholjdan meetings, Bunjevci festival of wheat harvesting (Sombor), Apatin fishermen' s night, Gypsy night, and Grape harvesting festival in Sonta (Apatin). All these events represent the culture, tradition, folklore and gastronomy of the nations that inhabit this region.

The questionnaire used in this research was based on the Delamere scale (Delamere et al. 2001), which was modified and shortened for the purposes of a more efficient interviewing. The questionnaire used in this research consists of two parts (Internet 3). The first part of the questionnaire includes demographic questions while the second part of the questionnaire consists of 21 questions are aimed at measuring attitudes local population has toward events on the territory of the municipalities of Sombor and Apatin. Attributes were measured on a five-point Likert type scale ranging from 1 (strongly disagree) to 5 (strongly agree). The interviewing was conducted in the municipalities of Sombor and Apatin between April and June 2012. There were seven interviewers. In total, 300 questionnaires were distributed and 212 (71%) usable questionnaires were obtained.

4 Results

4.1 Characteristics of respondents

The sample included 105 (49.5%) males and 107 (50.5%) females among the respondents. The main age group was under 21 years of age and represented 30.7% of the total group of respondents. The next biggest group was the group between 31 and 40 years of age, thus making 23.1% of the whole sample. Most of the respondents (59%) had completed secondary education. Regarding their occupation, the majority of respondents are either employed (63.2%) or students (33.5%). 54% of respondents come from the municipality of Sombor, out of which 54% come from the city of Sombor and other 46% from villages that belong to the municipality of Sombor (Bezdan, Backi Monostor, Stapar, Telecka, Kljajicevo). The other 46% of the respondents come from the municipality of Apatin, out of which 60%, come from the town of Apatin and other 40% from surrounding villages (Sonta, Prigrevica, Kupusina, Svilojevo). The majority of respondents are of Serbian nationality (67.9%), followed by those of Croatian nationality (17.9%). Respondents of other nationalities make 14.2% of the sample.

4.2 Factor analysis

The attribute importance data were factor analyzed using the principal component method and varimax rotation procedure in order to extract the sub-dimensions of those attributes. In this study, all factors with eigenvalue greater than 1 and with factor loadings more than 0.5 were retained.

The results of the factor analysis, which suggested a five-factor solution, included 21 attributes and explained 65.43% of the variance. The Kaiser – Meyer – Olkin (KMO) overall measure of sampling adequacy was 0.74 which was middling (Kaiser 1974) and Bartlett's test of sphericity was significant ($p = 0.000$). Values of Cronbach alpha coefficient for the first four factors are in the domain of high reliability while

Table 1: Respondents' demographic data (n = 212).

Variables	Sample size	Percentage	Variables	Sample size	Percentage
Age			**Place of residence**		
≤ 20	65	30.7	Apatin	58	27.4
21–30	16	7.5	Sonta	13	6.1
31–40	49	23.1	Prigrevica	11	5.2
41–50	43	20.3	Kupusina	4	1.9
51–60	33	15.6	Svilojevo	11	5.2
61 ≥	6	2.8	Sombor	62	29.2
Gender			Bezdan	14	6.6
Male	105	49.5	Backi Monostor	19	9.0
Female	107	50.5	Stapar	6	2.8
Education			Telecka	13	6.1
primary education	5	2.4	Kljajicevo	1	0.5
secondary education	125	59.0	**Nationality**		
higher education	6	2.8	Serbian	144	67.9
Master's degree	74	34.9	Croatian	38	17.9
Doctor's degree	2	0.9	Hungarian	7	3.3
Occupation			Romanian	6	2.8
student	71	33.5	Roma	11	5.2
employed	134	63.2	Montenegrin	1	0.5
retired	1	0.5	Slovak	1	0.5
unemployed	6	2.8	Gorani people	4	1.9

Table 2: Results of factor analysis.

Extracted factors	Items	Factor loading	Eigenvalue	Variance explained	Cronbach's α
F1	Event should be held on a suitable location with secured parking space.	0.763	5.644	17.003	0.892
	Event should be held without negative ecological influence.	0.805			
	Safety of visitors during the event is on high level.	0.872			
	Prices of product and services are affordable (food, beverages, souvenirs).	0.845			
	Quality of products and services is exceptional (food, beverages, souvenirs).	0.823			
F2	Events make the number of tourists grow.	0.711	3.205	13.657	0.808
	Events enable local community to make extra incomes.	0.850			
	Events have a positive economic influence.	0.830			
	Events help improve the quality of life in the area.	0.611			
F3	Event should be organized by local authority (place of the organization of an event).	0.583	1.896	13.189	0.773
	Event should be organized by professional societies.	0.659			
	Event enables exchange of ides among ethnic groups in the community.	0.711			
	Events contribute to the feeling of belonging.	0.726			
	Events have a great influence on the improvement of human relationships in local community.	0.630			
	Events positively influence cooperation between people.	0.537			
F4	Events should be entertaining.	0.9	1.675	12.430	0.885
	Performance of famous musicians/singers is necessary.	0.822			
	Event should also have accompanying programs (education, competitions, and workshops).	0.797			
F5	Event should be promoted among different structures of potential visitors.	0.693	1.342	9.151	0.682
	Event should be promoted in neighboring countries.	0.789			
	Brochures promoting the exhibitors should be handed at the event.	0.728			

the fifth factor of Cronbach alpha coefficient is in the domain of acceptable reliability (Lehman et al 2005). This demonstrates that the scales of the formal questionnaire have considerable reliability (Nunnally 1978). Table 2 shows the results of the factor analysis.

The first factor was labeled »Services«. This factor explained 17.003% of the total variance with a reliability coefficient of 0.892. The second factor was »Economic importance« explaining 13.657% of the total variance with a reliability coefficient of 0.808. The third factor was labeled »Socialization« and explained 13.189% of the variance with a reliability coefficient of 0.773. The fourth factor, labeled »Entertainment« accounted for 12.430% of the variance with a reliability coefficient of 0.885. The fifth, »Promotion« explained 9.151 % of the total variance, indicating a reliability coefficient of 0.682.

Table 3: Mean ratings of factors and items.

Selected factors and items	Mean	Std. Dev.
F1 – Services	**4.0170**	**0.87584**
Event should be held on a suitable location with secured parking space.	4.1038	0.98259
Event should be held without negative ecological influence.	4.2264	0.97147
Safety of visitors during the event is on a high level.	4.0000	1.08850
Prices of product and services are affordable (food, beverages, souvenirs).	3.7877	1.15494
Quality of products and services is exceptional (food, beverages, souvenirs).	3.9670	1.03211
F2 – Economic importance	**4.5483**	**0.55049**
Events make the number of tourists grow.	4.5943	0.67842
Events enable local community to make extra incomes.	4.5330	0.68418
Events have a positive economic influence.	4.6745	0.62546
Events help improve the quality of life in the area.	4.3915	0.76816
F3 – Socialization	**4.3546**	**0.55947**
Events enable making business connections.	4.3066	0.89514
Events are places where people relax and reveal everyday stress.	4.0236	0.90518
Events enable exchange of ides among ethnic groups in the community.	4.3302	0.94615
Events contribute to the feeling of belonging.	4.3302	0.77547
Events have a great influence on the improvement of human relationships in local community.	4.6462	0.63271
Events positively influence cooperation between people.	4.4906	0.69861
F4 – Entertainment	**4.1824**	**0.85201**
Events should be entertaining.	4.3396	0.98218
Performance of famous musicians/singers is necessary.	3.9245	0.95091
Event should also have accompanying programs (education, competitions, and workshops).	4.2830	0.90029
F5 – Promotion	**4.2028**	**0.65250**
Event should be promoted among different structures of potential visitors.	4.0755	0.86203
Event should be promoted in neighboring countries.	4.3019	0.83943
Brochures promoting the exhibitors should be handed at the event.	4.2311	0.80188

From the results shown in Table 3 we can conclude that the respondents consider the economic factor as the most important one, i.e. possibility to make extra incomes and increase the living standard in the community. It is followed by the third factor »Socialization« which reflects the importance of events for the improvement of human relationships and connections between people. The least important to the respondents are those questions connected to the factor »Services«, followed by questions referring to the factors of »Entertainment« and »Promotion«. Less favoured rural areas in Serbia rely on traditional economic activities as the main source of income and jobs. At the same time they possess unique cultural values which are not recognised as a development factor and consequently not properly managed. The main objective therefore should be to improve the management of cultural values in rural areas in order to contribute to economic and social development of less favoured rural areas.

5 Discussion

The rural areas in the municipalities of Sombor and Apatin (19 villages) have been neglected over the decades, especially in the context of sustainable tourism development (refers to any form of tourism). Moreover, development of rural tourism in multiethnic regions of Sombor and Apatin has been so far carried out

by individuals (local enthusiasts) who lack adequate training. Being aware of severe negative impacts of living in the past twenty years, respondents consider economic factors as very important. They believe that good organization of one event makes number of tourists grow, enables extra incomes for local community, has a positive economic influence in general and improves the quality of life in the micro area. This consequently shall cause an increase in multiplier effects, such are: higher average wages per person, greater employment opportunities, better purchasing power, greater revenues etc.

The second most important factor for them is socialization. Inhabitants of this region are people who like to socialize, cooperate and collaborate among themselves and with others outside their municipalities. They easily express empathy towards other people and they are highly aware of the importance of environmental protection. Their opinion is that events enable making business connections and are places where people can relax and reveal everyday stress. Moreover, events enable exchange of ideas among ethnic groups in the community and contribute to the feeling of belonging. Also, events have a great influence on the improvement of human relationships in local communities and positively influence cooperation between people.

The least important factors for them are entertainment and promotion. According to the terms of reference of the international project SY_CULTour: Synergy of culture and tourism: utilisation of cultural potentials in less favoured rural regions, some of the goals that should be met by the end of the project are (Project documentation SY_CULTour, 2011–2014):

- better promotion of cultural heritage / tourist cultural route
- better employment opportunities for local people in the sector of tourism and on local farms
- preservation of tradition, traditional crafts and handicrafts
- preservation and presentation of un(der)used cultural value

6 Conclusion

The measurement of resident attitudes toward the social impacts of community festivals is of critical importance for both communities and for festival organizers. As community leaders and festival organizers become more conscious of the needs and priorities of the community, they can better respond to community con-

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Figure 3: Bodrog fest – doll in Šokci national costume.

cerns and work together to maintain an appropriate balance between the social benefits and social costs that resulting from community festivals (Delamere et al. 2001). The findings of the study contribute to deeper understanding of resident attitudes toward the social impacts of community festivals and can be utilized by the organizers to increase the social benefits generated by the festival and reduce its negative social impacts. This study makes a significant contribution in the generation of items, testing of items, and the understanding of residents' attitudes toward social and economic impacts of community festivals. Residents and organizers both have a stake in maximizing social benefits and minimizing social costs that accrue from the festival. Economic impacts need to be taken into more serious consideration by the community and by festival organizers if the legacies of hosting the festival are to be viewed more positively by a greater portion of the residents of the community (Hall and Hodges 1996). This, in turn, will help permit festivals to be considered as based on their total contribution to the quality of life in Sombor and Apatin municipalities.

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THE PRINCIPLES OF SUSTAINABLE DEVELOPMENT OF TOURISM IN THE SPECIAL NATURE RESERVE »GORNJE PODUNAVLJE« AND THEIR IMPACT ON THE LOCAL COMMUNITIES

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Special Nature Reserve Gornje Podunavlje near Bezdan.

The principles of sustainable development of tourism in the special nature reserve »Gornje Podunavlje« and their impact on the local communities

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ABSTRACT:
The development of tourism in protected areas is a particular challenge for the tourism business and the activity of nature conservation. The leading criteria for sustainable tourism in protected areas emphasize the importance of the adoption of certain principles of care, long-term planning and management that integrates nature protection and tourism. In this respect, the paper analyzes their importance in the case of Special Nature Reserve »Gornje Podunavlje« in Vojvodina. After acquiring the status of a special nature reserve, talk about the importance of this area to the tourism of Sombor and Apatin, where it is located, has increased. This trend follows the design of educational and tourist tracks, starting and running events as well as starting tourism businesses in rural households. There could be multiple benefits of this for the local communities.

KEY WORDS: geography, sustainable development, tourism, protected area, Gornje Podunavlje, local communities

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1 Introduction

Tourism can change the communities of the local population, either positively or negatively (Fennel 1999). Tourism is on the one hand to provide employment, increase the level of participation in local events and decisions (Holden 2000), it is to provide the possibility to present traditions and culture which until tourism development has not had a »critical mass«, and it is to increase funding for the preservation of monuments and traditions and the democratization of culture (Hadžić 2005). On the other hand, tourism can commercialize tradition and popular culture, even those events that are of emotional or personal nature (Hall and Page 2002).

Tourism and environmental protection are multiply connected, among other things, through the concept of the ecological, economic and social benefits and analysis of the influence. Valorisation and analysis of influences within these three areas is present and important for the modern concept of protection (Prato and Fagre 2005), but also for tourism (Fennel 1999). Tourism in protected areas can unite all three concepts – protection, economic income and social wellbeing of the local population. The concept of sustainable tourism in protected areas is based on this principle.

Special Nature Reserve »Gornje Podunavlje« is a protected natural resource in the northwestern part of Serbia, in the Autonomous Province of Vojvodina. This paper is based on defined principles of sustainable tourism in protected areas and through a comparative analysis, based on field research, it examines how much these principles are actually present in the Special Nature Reserve Gornje Podunavlje and its environs.

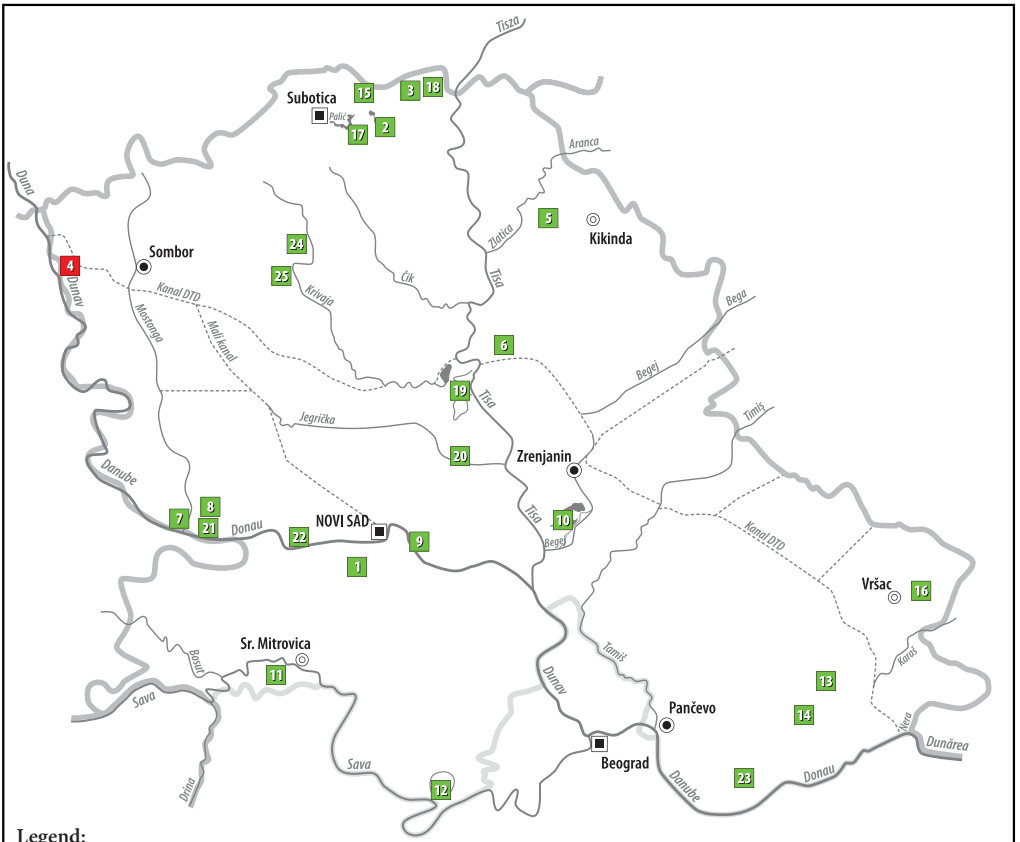
2 Protection of nature as a condition for tourism development of Gornje Podunavlje

The principle of protection is one of the necessary conditions for sustainable development of tourism (Jovičić 2001). Such a tendency can be seen as one way of achieving the general objectives of sustainable development. It is assumed that the states and regions that have a higher percentage of protected territories, provided that protection is real and not declarative, are also more likely to meet the standards for sustainable development of tourism (Mowforth and Munt 2003). A good way to meet the principles of protection is the use of sustainable tourism indicators (Indicators of Sustainable Development for Tourism Destinations 2004).

Protection of Gornje Podunavlje has a long chronology. The whole area was protected, roughly in its current size, in 1982 as a regional park based on the opinion of the Provincial Institute for Nature Conservation. The decision was implemented by the municipalities of Sombor and Apatin. Gornje Podunavlje was finally declared a Special Nature Reserve in 2001. Special Nature Reserve »Gornje Podunavlje« has international protection as well. The Ramsar area Gornje Podunavlje was put on the list of Ramsar areas in 2007.

Table 1: The existing criteria for sustainable tourism in the Special Nature Reserve Gornje Podunavlje.

Principles	Planning	Management
• Protection Department in the Sombor Forest Estate (Vojvodinašume) • Promotion of protection through the website (http://www.gornjepodunavlje.info/); • Promotion through the creation of tourist-educational tracks • The marking of protected areas through information boards at the entrance and other places • Codes of conduct on boards at the entrance to the Reserve	• Regulation on the Protection of the Special Nature Reserve »Gornje Podunavlje«; • Annual programs and ten-year management plan; • The Spatial plan PPN of the Special Nature Reserve Gornje Podunavlje; • The Regional Spatial Plan of AP Vojvodina, from 2009. to 2020; • Master plan for the tourist destination Gornje Podunavlje, 2007; • Feasibility study of development of eco-tourism in protected areas of Vojvodina.	• Protection Department at FMU Sombor • Protection sector in Vojvodinašume public company • Provincial Institute for Nature Protection • Provincial Secretariat for Environmental Protection • Ministry of Energy, Development and Environmental Protection of the Republic of Serbia.



Legend:

1. NP »Fruška Gora«, 2. SRP»Ludaško jezero«, 3. SRP »Selevenjske pustare«, **4. SRP »Gornje Podunavlje«**, 5. SRP »Pašnjaci velike droplje«, 6. SRP »Slano Kopovo«, 7. SRP »Karađorđevo«, 8. SRP »Bagremara«, 9. SRP »Koviljsko – petrovaradinski rit«, 10. SRP »Stari Begej – Carska bara«, 11. SRP »Zasavica«, 12. SRP »Obedska bara«, 13. SRP »Deliblatska peščara«, 14. SRP »Kraljevac«, 15. PIO »Subotička peščara«, 16. PIO »Vršačke planine«, 17. PP »Palić«, 18. PP »Kamaraš«, 19. PP »Stara Tisa kod Bisernog ostrva«, 20. PP »Jegrička«, 21. PP »Tikvara«, 22. PP »Begečka Jama«, 23. PP »Ponjavica«, 24. RP »Kompleks PTK Panonija« i 25. RP »Zobnatica«

Scale: 0 10 20 40 60 80 km

Author of the contents: Lazar Lazić, Vladimir Stojanović
Author of the map: Lazar Lazić

Figure 1: Location of the Special Nature Reserve »Gornje Podunavlje« in the system of protected areas in Vojvodina.

In recent years, the development of eco-tourism is linked to the formation of specific products. Attempts of development of ecotourism are linked to the formation of educational tracks of which the Special Nature Reserve has three: Circular Karapandža educational track (3 km); Educational track Bestrement (3 km) and Educational track Štrbac (2 km). Information boards not only introduce visitors to the field of information about basic resources, but also present specific measures and protection programs. So on the Štrbac trail, visitors are given a detailed introduction into the process of revitalization of degraded salt marshes by removing shrubby vegetation, in order to restore the mosaic of the ecosystem and landscape beauty (Figure 2).

There are currently a wide range of criteria that explain how it is necessary that tourism is related to sustainable development and environmental protection. This primarily involves the principles, planning and management (Boyd 2000). The principles include impartiality, ethical principles, the use of carrying

capacity and the promotion of protection. Planning must be long-term, proactive, integrated and must involve the local population. Management includes responsibility and integration of tourism with other users of the area. By analyzing such a concept we perceive some advantages that Special Nature Reserve »Gornje Podunavlje« has as a destination of ecotourism and nature conservation (Table 1).

3 Impact of ecotourism of Gornje Podunavlje on the local communities surrounding the reserve

In the villages surrounding the reserve there are 85,444 people (Popis stanovništva, domaćinstava i stanova u Republici Srbiji 2011 – prvi rezultati 2011), in seven villages (Bački Breg, Kolut, Bezdan, Bački Monostor, Kupusina, Svilojevo and Sonta) and two towns (Sombor and Apatin). Similar to other border settlements of Vojvodina the area is characterized by depopulation, emigration to large urban centers and the aging of the population (Ivkov-Džigurski et al. 2010). This predominantly rural area in addition to the many problems of everyday life is also burdened with issues related to the sense of living in the villages, the affirmation of cultural identity and its presentation (Blešić et al. 2014). Can eco-tourism and rural tourism offer a solution to the existing problems?

So far, the impact of nature on villages around the Reserve Gornje Podunavlje was most prominent in the area of affirmation of cultural heritage and the development of awareness of cultural identity and pride in being one of the key factors of sustainable development and ecotourism. Local heritage can be analyzed through the list of protected monuments in the area of Special Nature Reserve Gornje Podunavlje. In the registered settlements, 39 cultural monuments, places of interest, geographical cultural and historical sites have been documented (Folić - Kurtović et al. 2008). These include churches, chapels, homes of famous people, houses as valuable architectural monuments, a castle and two town cores. Some of them are well known from before, for example, the protected town cores of Sombor and Apatin. Those environmental

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Figure 2: Štrbac Locality including the endangered salt marshes, the revitalization of which visitors are informed on, through information boards.

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Figure 3: Ethno-house Bodrog in Bački Monoštor.

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Figure 4: The event of grape harvesting festival with an imitation of a traditional Šokci wedding is one of the important potentials of ecotourism and rural tourism of Gornje Podunavlje.

entities have been beautifully decorated with the function of tourism development for some time. However, other resources have been established due to nature protection in the reserve. The story of Nature Protection motivated the local people to think about new development opportunities through the development of tourism. These other resources, those that are not under some kind of declarative protection of cultural heritage, make the destination distinctive, special and their identification is essential for paving the way for sustainable development of tourism, which is, after all, stated in guides for Sustainable Tourism Development.

The village of Bački Monostor had no accommodation units in rural tourism before the declaration of the reserve, and now 15 households are involved in the business. After the declaration of the reserve two ethno-houses were opened in the village. Ethno-house Kuveljić was opened on the banks of the river branch and presents a traditional household engaged in fishing. Ethno-house Bodorg is located in the center of the village and presents traditional household furniture from Monoštor (Figure 3). Bodrog Fest has been taking place since 2005. as a festival of tradition, music, food and old crafts. It was created as part of promotion of resources of Gornje Podunavlje and its environment, and its basic task is to promote nature protection. In previous years the program presented activities that are directly related to the protection of nature in the reserve – opening the gates of Gornje Podunavlje, placing information boards and creating tourist routes. Bački Monoštor has not only presented itself as the leader in the tourist offer throughout the region, but also in activities that were focused on education for rural tourism and ecotourism.

Recognition and promotion of the Special Nature Reserve resulted in similar processes in other nearby villages. In Bezdan the ethno-house Jelena with about 1,000 exhibits was opened. It is not uncommon that some are up to 150 years old. In the southern part the ethno-house in Kupusina stands out, which, with its three rooms symbolically represents a typical old house of this region. It also holds the record for the largest share of foreign tourists, mainly from Hungary, which is not surprising, considering the fact that it presents a traditional Hungarian household. The oldest artifact in the collection – a girl's cabinet, dates back to 1817 (Tomić et al. 2002). The equipping and opening of an ethno-house in Sonta is pending. This village with the event of grape harvesting festival (Figure 4), one of the oldest in Vojvodina since it has been continuously held since 1928, is one of the most valuable resources in the Gornje Podunavlje Reserve area (Stojanović 2005).

The process of promotion of local folk heritage described in several previous examples is independent. It originated mainly from the local community over the past ten years and has accompanied the promotion of the protection of the Reserve »Gornje Podunavlje«. The essential flaw in this kind of phenomenon of affirmation of local heritage is that it was haphazardly and often without the support of experts – ethnologists, tourism managers, or geographers, and it often happens that a set of different values, tangible or intangible is not properly promoted and presented. Another problem is the lack of clear coordination among stakeholders of the cultural offer in different villages, so there are no unique itineraries or thematic routes. Given that these kinds of initiatives are commonplace in rural tourism and bring results (Roberts and Hall 2003), they should be started here as well. Finally, the tangible and intangible heritage of these villages must be viewed through the prism of rural capital – the traditional physiognomy and morphology of villages, customs, culture, folk art, all of these are valuable assets in the development of tourism. This is precisely what the experience that tourists will take home with them depends on (Garrod, Wornell and Youell 2006; Todorović and Bjeljac 2009). In such a value system, erosion of cultural heritage will not happen.

As a means of paving the way for development of sustainable tourism we can use a list of resources that can help the development of principles of this type of tourism (Mowforth and Munt 2003) and in this sense, for each of the eight groups, there are certain advantages and disadvantages (Table 2).

Sustainable development of tourism in Gornje Podunavlje should be significantly improved by the status of Biosphere Reserve, which is expected in the near future. The benefit of the declaration of Biosphere Reserve could be even greater. The reserve is designed as an internationally protected area including the the valleys of Mura, Drava and Danube rivers, including border areas of five countries: Austria, Slovenia, Hungary, Croatia and Serbia. Tourism market trends favor this, because the essence of tourist attraction of international, »parks« is the fact that the boundaries and border areas become important tourist destinations. This is because they include multiple countries, different social systems and cultural circles (Timothy 2000). The advantage of these trends, has been noticed by the authors of the Croatian and Hungarian text of nomination for the future Biosphere Reserve, so similar initiatives are emphasized here as well.

Table 2: Means of implementation of sustainable tourism of Gornje Podunavlje with the list of advantages and disadvantages.

1. Protection of the area

Advantages:
- 12.84% of the total common area of Sombor and Apatin goes to the Special Nature Reserve »Gornje Podunavlje«
- The tradition of protection in the form of other categories
- International Status (IBA, Ramsar)
- The procedure for the declaration of Biosphere Reserve (MAB)

Disadvantages:
- Favouring the economic principle of protected area management (forestry, fishing, hunting).
- Lack of encouragement of ecotourism as an important tool for the protection of nature

2. Regulation of the tourism industry

Advantages:
- Regulation on the Protection of Special Nature Reserve supports the development of tourism
- Developing a shared social responsibility through the nurturing of heritage and emphasizing the protection of the Reserve (eg, events support stories of Nature Protection)

Disadvantages
- There are no standards for tourist companies (eg receptive agencies, associations for the development of tourism, local tourism organizations …)
- Voluntary self-regulation and audit of tourism business are not present

3. Management techniques regarding visitors

Advantages:
- Zoning as a protection regime for the Reserve is used in tourism (I, II and III degree)
- Enclosed parts of the reserve may be easier to control (activating rangers and gamekeepers)

Disadvantages:
- The large surface of the protected area and its elongated shape make it difficult to control
- These techniques are not present: »honeypot«, channeled streams of visitors, limited entries and vehicle restrictions

4. Environmental Impact Assessment

Advantages:
- Monitoring the state of the ecosystem and habitats that is implemented each year
- Commitment to Environmental Audit in the plan documents (reserve management plan is regularly adopted)

Disadvantages
- Lack of information about the compatibility of tourism activities and various influences.
- Lack of commitment to the geodiversity and geological heritage
- The absence of proposals to minimize the impact
- No environmental certification

5. Determining the carrying capacity

Advantages:
- Current traffic and volume of tourism generally do not threaten the environmental resources (statements about the state of the ecosystem prove this)

Disadvantages:
- Carrying capacity is not determined for the Gornje Podunavlje Reserve
- There is a small degree of control at the sites of excursion resorts (Baračka, Vagoni, Kenđija …), which are especially burdened
- The scientific methods for testing the impact of tourism on the local communities are not carried out

6. Consultation / techniques and methods of participation

Advantages:
- Population take action independently of environmental factors (eg, ethno-house in Bezdan, Bački Monoštor, Kupusina and Sonta)
- Organization of training programs in the field of eco-tourism, and rural tourism (organized several times in Bački Monoštor, Kupusina, Sonta and Sombor)
- Information and involvement of local people in cross-border cooperation

Disadvantages:
- Training programs are sporadic and not constant

7. The codes of ethics

Advantages:
- Information panels at the entrance to the reserve with a list of permitted and prohibited activities
- Information panels on the ecosystem rehabilitation projects

Disadvantages:
- There is no code of ethics aimed at the tourism industry and the local population
- Tourist marketing is not sufficiently dedicated to codes of ethics

8. Indicators of Sustainable Tourism

Advantages:
- Gornje Podunavlje is a destination in its initial stage of development, so the degree of harmful effects of tourism is small.

Disadvantages:
- Lack of an adequate monitoring system

4 Conclusion

Special Nature Reserve Gornje Podunavlje with its immediate surroundings is still a young tourist destination. Gornje Podunavlje has, in terms of self-initiative of the local population, reached its peak and technical assistance is now necessary to enable detailed analysis of resources to ensure that all changes could be tracked in the future in order to prevent what has already happened in numerous affirmed destinations – lack of information on the condition of resources before the tourism development which would be a parameter of change. It is necessary to introduce a clear system of calculating the carrying capacity, because that is exactly what is essential in improving the management of the destination. Finally, if we compare the standards which an eco-tourism destination should meet (Wood 2002), then one can see that the development of tourism has shortcomings that are mentioned in the paper. Solutions should be sought in meeting the principles of sustainable tourism, modeled on the successful destinations.

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THE HERITIZATION OF BULGARIAN ROSE

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The Bulgarian Damascena Rose.

The heritization of Bulgarian rose

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ABSTRACT: Bulgarian rose products are well known for their premier fragrance quality and are often used as a base ingredient in a number of high-end perfumery and cosmetics products. While a result of unique combination of relief, climate and soil conditions, the cultivation and production process largely depends on manual labor, and entails a rich variety of techniques, rituals and social practices. The latter have been turned into tourism attractions gaining popularity in the cultural events calendar. Grounded within the wider discourse of the qualitative method, the present study examines the origin, history and development of the rose cultivation culture and its associated practices that have led to the heritization of the Bulgarian rose. It advocates that a natural synergy between heritage and tourism development has occurred, serving sustainable tourism purposes, with tourism adding to the protection and enhancement of rose heritage values, and supporting regional economies.

KEY WORDS: Bulgarian rose, heritization, cultural tourism, sustainability

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1 Introduction

Bulgaria is widely known as the country of roses due to the high popularity and appeal of the rose flower, as well as to the expanding heritage values related to its traditional growing and the production of premium rose products. Pictures of the Rose Valley and the Rose Festival are frequent eye-catchers in the web pages and brochures of Bulgarian and foreign tourism agencies, cosmetics and food companies. In fact, the Bulgarian rose has a fairly long history as a national symbol reaching back to the time of the World Fairs in Chicago 1893, Liege 1905, Milan in 1906 and 1907, and the Bulgarian rose oil has received gold medals at exhibitions in Paris, London, Philadelphia, Antwerp, and Milan.

The Bulgarian rose belongs to the Rosa Damascena Mill f. Trigintipetala Dieck group and has formed as a result of a natural human selection during the last 340 years (Kovatcheva 2011). The Bulgarian rose is grown in the area named the Rose Valley that is about 130 km long, 1 to 16 km wide, with altitudes ranging from 375 to 711 m. The climate is mild, temperate continental, featuring warmer winters, cooler summers, higher rain falls and humidity. The southern slopes of the Balkan Mountains (2376m) and the northern slopes of Sredna Gora Mountains (1604m) that shape the Valley serve as natural protection from strong winds, while its diluvial sedimented soils add to the favorable conditions for growing the rose plant. The Bulgarian rose is a perennial bush with a body of 1,5–2 meters of height, and roots reaching 1–5 m of length. The rose flowers are big, pink, with strong pleasant aroma that blossom in a row at the end of May and in the beginning of June, during a period of only 12 days in dry hot weather to 25–30 days in humid and cool weather. The essential oil accumulates on the surface of the rose petals and evaporates quickly, that is why the low humidity of the air and dry winds during the blossom period negatively affect the quality of the extracted oil. The oil comprises as many as 300 different constituents, which make the overall scent stronger than that of any other rose (Nedkov et al. 2005). Because of its rich and sustainable aroma, the Bulgarian rose oil has become a benchmark for quality accounting for approximately half of the world market of essential rose oil.

The historical evidence reveals a strong presence of the rose culture in Bulgaria since the time of the Thracian Odryssian Kingdom (5th–3rd century BC). In its Natural History book, Pliny the Elder points to the *attar* of roses (rose oil) as one of the most widely used perfume ingredients of the time (Pliny the Elder 2013). It is no surprise that the area of the Valley of Roses closely matches that of the Valley of the Thracian kings known for the thousands of burial mounds spread throughout the territory. In the past, after Thrace has become a province in the Roman Empire, and later during the First (681–1018) and Second (1185–1396) Bulgarian Kingdoms until the time of the modern Bulgarian state, the rose was recognized for possessing rich symbolic power and was widely used in Thracian rituals and ceremonies, in paintings of daily life, battles, burial and other ritual scenes, as ornaments on horse trappings, cosmetic boxes and alabastrons (small pottery containers holding perfume or massage oils), sculptural objects, precious metal works, jewelry, armors, roman mosaics, Christian iconography, books, traditional Bulgarian Revival period architecture, furniture, interior objects, rose-patterned carpets and rugs, porcelain, local cosmetics and foods such as jam, liquor, pastry and others. The rich historic record of the presence and the invariable appreciation of the rose flower in Bulgaria represent the source and background for the currently observed *heritization* of the Bulgarian rose, a process that will be discussed further in the text.

2 Rose production, trade and regulations

The Bulgarian rose needs a 3-year period after plantation to collect the first blossoms. If properly treated, the rose field can be used for production for a period of 25–30 years. The growing is a difficult process consisting of no less than 10 different operations, however it is the rose picking being the most labor intensive, accounting for nearly half of the overall production expenses. For centuries the rose picking has been performed by hand in the hours between 5–10 am, with best rose oil composition around 7 am. The blossoms are gathered into closed plastic bags and quickly transported to the nearby distillery. The common yield is 5 tons of blossoms from 1 hectare, while well-maintained plots can give up to 10–12 tons (Atanasova and Nedkov 2004). The distillation of the flower is performed using water or water-steam distillation that extracts the rose oil from the rose water. It is interesting to note that the region's long tradition of wine making and especially of brandy distillation has contributed for several important technological innovations that

allowed higher yields and better quality. These are the introduction of double distillation, the interminable cooling system, and the use of special combustibles for steady moderate heating. The processing delivers several different products: rose oil, rose absolute, rose concrete, rose water and other secondary products. Under normal storage conditions the rose oil could keep its qualities for decades. The production of 1 liter of rose oil requires about 3–3,5 t of rose blossoms. The local rose oil production topped 1,5 t in 2012.

In the beginning of the 20th century the rose fields spread over some 9000 ha, decreased to 700 ha during the 1997 crisis, however recovered to 3600 ha in 2012. Almost half of the plots are owned by cosmetics companies, while the other half belongs to small private owners. There are some 30 to 50 rose distilleries, with 12–13 000 people employed on a full time basis in the rose industry (Zarev 2008). Most of the rose produce is exported to France, USA, Japan, UK, Germany, and just 1–5% is used by the local cosmetics and food industry, some of which for the production of traditional souvenirs. The international market of essential oils is sometimes compared to those of diamonds, being the monopoly of several global trading companies, mainly from France and the USA that buy up oils from all over the world. That fact makes it difficult for a Bulgarian producer to directly sell to foreign cosmetics companies, which in turn drastically reduces the positive impacts for the community, failing to gain from the potential of heritage to play a much more significant role in local development; instead this niche product almost always ends traded as a raw material.

At present, the Governmental Institute of Roses, Essential and Medical Cultures remains one of the main centers for research and development engaging in the creation and maintenance of a gene fund of 216 sorts and 161 essential oil and medical plants varieties (Institute of roses … 2013). Previously, a number of legislative acts have been introduced to regulate and support the rose production and trade. Among them are the Support Act of Rose Production (1922) and the Decree-Law to Regulate the Manufacture and Sale of Rose Oil (1937). Recently there have been two initiatives by the Committee of Agriculture and Forestry to pass the newly proposed Rose Production Act (Rose Production Act 2003, 2004) through the National Assembly, however still in a discussion phase. In the arguments for proposing the act it is clearly stipulated

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Figure 1: The historical museum Karlovo, Bulgaria.

that the Bulgarian rose and rose oil have grown into important symbols of national identity and pride, not only due to their unique geographical origin traced to the Rose Valley, but also due to the equally distinctive social and cultural capital of the people involved in the process revealing itself in the development of skills, techniques, traditions, rituals, and diligence in growing roses and producing various rose-derived products.

3 The rose heritage for perfumery and medicinal purposes

There are now approximately 2805 fragrances that incorporate the rose scent. This number stands at almost one third of all fragrances listed on http://www.basenotes.net, one of the largest fragrance-related portals on the internet. Here are some of the most known perfumes that indicate the use of Bulgarian rose oil: Acqua di Parma Colonia (1916) by **Acqua di Parma**; Coco (1984), Bois des Îles (1926), Coco Mademoiselle (2012), Égoïste (1990), No. 19 (1971), No. 5 (1921) by **Chanel**; Eau Sauvage (1966), Dioressence (1969), Dolce Vita (1995), Dior Addict (2004), Midnight Poison (2007), Miss Dior (2012) by **Christian Dior**; Fleurs de Bulgarie [created for Queen Victoria in the 19th Century] (1980), Love In White (2005), Amalfi Flowers (2007), Acqua Fiorentina (2009), Windsor (2009) by **Creed**; Champs-Elysées (1904), Mitsouko (1919), Habit Rouge (1965), Eau de Guerlain (1974), Idylle (2009), La Petite Robe Noire (2012) by **Guerlain**; Flower (2000) by **Kenzo**; Rose (2009) by **Paul Smith**; Infusion de Rose (2011) by **Prada**; Rose Absolute (2005) by **Stella McCartney**; Tom Ford Noir (2012) and Café Rose (2012) by **Tom Ford**; Bulgarian Rose (2012) by **Zara**.

The allocation of perfumes with rose notes exhibits a sharp and relatively constant increase in numbers for the last several decades: 86 perfumes with rose notes registered until 1960; 20 for the period between 1960–1970; 80 for 1970–1980; 153 for 1980–1990; 265 for 1990–2000; 1149 for 2000–2012; and a total of 908 between 2010 and 2012, showing a compound annual rate of growth for the period 1970–2012 close to 10%! Altogether, the evident 'blooming rose' trend and the parallel association of the Bulgarian rose with high-end designer brands and products contributes greatly for augmenting the rose value by generating two-way effects both to the place of origin (boosting tourism, revenues and investments, enhancing local reputation, diversifying uses and products, increasing market share) and to the products themselves (promoted as natural, *heritigized*, and of certified origin).

Similar to the trend in perfumery, the rose is gaining other functions and uses transforming into a wide range of medicinal products (as eye drops, stomach function regulator, gallstone cleaner, rejuvenating and anti-inflammatory skincare, respiratory regulator, anti-sclerosis treatment, immune stimulant, anti-HIV treatment) and wellness products (in aroma-therapy, anti-age cosmetics) (Komaki, 2006). Many Japanese companies have developed special thematic lines of Bulgarian rose products, among which are »Yamamoto Perfumery« with the production of lipsticks, tea, cookies, jelly, body odor pills and others and »Shiseido« with its renowned »Rosarium« cosmetic line.

Figure 2: Fleurs de Bulgarie, one of the oldest CREED fragrances, commissioned by Queen Victoria in 1845 (Source: www.fragrantica.com).

Figure 3: Bulgarian rose products display, Omotesando, Tokyo (Source: Tree of life Co., Ltd).

Figure 4: Bulgarian rose extract capsules (Source: Pillbox, Japan).

4 Towards sustainable integration of rose heritage, tourism and regional development

Before going further into the subject of *heritization*, one need to give credit to the research field that studies the phenomenon. Heritage studies has gained recognition as the new core multi-disciplinary field, exploring the impact of heritage on the present and endeavouring the development of new holistic approaches to address more adequately the challenges related to cultural heritage. The field is characterized by complexity and wide scope of subjects as scholars show particular interest in the social dimension of heritage, its contemporary roles and multiple uses as a cultural, economic, social and political resource (Graham et al, 2000; Tunbridge and Ashworth, 1996). By definition, cultural heritage includes both material or built aspects of culture (sites, buildings, landscapes, museums, monuments, and objects), as well as the non-material or living heritage that is embodied in social practices, community life, values, beliefs, and expressive forms (language, arts and handicrafts, music, dance, etc.). The concept of heritage has been changing as a result and according to the changing attitudes, needs and demands people convey towards it, shifting alongside several interrelated complementary directions: 1) from monuments to people; 2) from objects to functions; and thus 3) from preservation *per se* to purposeful preservation, sustainable use, and development (Loulanski 2006). This recently recognized human aspect of heritage has given birth to a movement towards ascribing multiple values, wider definitions and roles of cultural heritage in society, a process known as *heritization*.

Certainly, some of the most common and frequently discussed uses of heritage are for tourism purposes. In general, the development of tourism in the Rose valley region brings direct, secondary and induced effects. The direct effects include the impact of the rose culture on the incentives to visit the valley, stay at a local hotel, go to the local restaurants, visit the local tourist facilities and cultural attractions, buy local products, and can be measured by calculating the direct monetary revenues. The secondary effects include the growth of industries and investments in tourism services, construction and infrastructure, finance, energy, the food sector, and in the overall economic regional development. The third group comprises the so-called induced effects, which refer to the benefits gained by the local population in terms of employment, salaries, income from rents, etc. It is important to note that there are significant image and brand improvement spill-over effects that not only benefit the region but the whole country. The latter are difficult to measure, yet it is only when the combined monetary income for these three groups of effects are properly accounted for that the full economic impact of the rose-based tourism in the valley as part of the national tourism sector could be estimated.

The focal visitor attraction in the Rose valley is the world-famous Rose festival, officially introduced as part of the cultural calendar of the region in 1903, launched initially as a charity and later as a peace and friendship event. It is usually held for over a month in the second half of May and the first half of June. Each of the participating cities has its own agenda (Kazanlak and Karlovo since 1903, Pavel Banya since 1966, Strelcha since 1996), organized by the cultural departments of the municipalities or the local community centers. The programs vary year by year and are usually communicated on the internet sites of the municipal and tourism information centers. Usually, the festival features activities such as rose picking, rose distillation, tasting rose products, taking part in music, folklore and art activities, a rose queen beauty contest, local crafts demonstrations, tasting wine and regional cuisine, taking part in scenery tours, plain air painting, sports games, and a *kukeri* parade (an old Thracian ritual to scare away evil spirits and bring health, happiness and good harvest, with masked men in peculiar costumes walking, dancing and ringing large bells attached to their waists). Sometimes, scenes of traditional Bulgarian wedding are performed, and tourists have the chance to join the circle dance of *horo* under live folklore music of bagpipes, drums and traditional flutes. The peak in visitor numbers for the festival is said to have been in 1975 when Karlovo town stadium welcomed 30 000 guests, 3500 of whom foreigners. Generally, most numerous are the organized groups of Bulgarian, European, Japanese and American tourists. Nevertheless, the socio-economic impact of the festival could hardly be measured alone by the number of hotel reservations, the turnover in services and retailing. The significance of the festival has more to do with non-monetary returns such as preserving and appreciating the tradition, showing hospitality, celebrating and sharing the uniqueness and spirit of place. 2013 will mark the 110th anniversary of the Rose festival providing opportunity to once again reevaluate its significance for the region.

In addition to the festival, the heritage of the Bulgarian rose needs to be further explored in terms of its belonging to the cultural landscape category in its capacity to combine nature, history, culture, and the living heritage. By definition, this type of heritage refers to the formal expression of numerous relationships existing in a given period of time between a society and a topographically defined territory, the appearance of which is the result of the action over time of natural and human factors and of a combination of both (Jokilehto 2004). The protection of cultural landscapes in many regions of the world contribute to modern ways of sustainable land-use that maintain or enhance the natural values in the landscape and the continued existence of traditional land-use patterns that support biological diversity (UNESCO 2005).

Figure 5: Scene from the Rose Festival, 2011.

Figure 6: The Rose parade, 2011.

Finally, two important points relevant to the sustainable integration of the rose heritage and the growing tourism industry in the region should be made. First, heritage should be identified in its capacity not just as a tourism resource, but as an important and largely irreplaceable complex form of capital (cultural, social, environmental and economic), which should be wisely used, sustained and enhanced, instead of being irretrievably consumed by tourism. Raising the economic value of heritage by way of tourism can surely increase its cultural value, however, it cannot compensate for the loss of other values in the long-term. Preventive management, planning and regulation are considered essential prerequisites to this end. Second, the incorporation of both heritage and tourism policies within the wider regional sustainable development strategies should be seen as a critical factor for ensuring integrated governance and long-term strategic planning necessary to guarantee sustainability of the heritage and tourism relationship. To remember, sustainable tourism is that kind of tourism that is »non-intrusive« and »non-degrading« of heritage sites, sensitive to both the environment and the communities, respecting local values, aiming at preserving and enhancing the very environmental and cultural amenities which have attracted tourists in the first place (Loulanski and Loulanski 2011). Instead of seeking short-term profits from the exploitation of tourism resources, regional sustainable tourism strategies should be aimed at achieving long term win-win outcomes, with positive effects on both cultural values and economic profitability (Throsby 2001). For this reason, the process has to be multi-dimensional, requiring active participation and closer cooperation of local communities in cultural heritage management and tourism planning, balance of interests and partnership among the different stakeholders at the destination: local residents, government and regional authorities, tourism industry representatives, and tourists themselves.

5 Conclusion

In a time when identity becomes increasingly important in counterbalancing the effects of globalization, breaking down spatial and temporal barriers, cultural heritage grows to a new dimension, becoming a key factor in ensuring local distinctiveness (Strange 1999). This article discussed the socially-rooted process of *heritization* of the Bulgarian rose, indicating an expanding spectrum of modern purposes and uses, as well as a growing awareness to refer and build upon its newly recognized multiple values. In addition to the historically strong record of various cultural uses of the rose heritage in symbols, rituals, traditional folklore, arts, crafts, events and festivals, at present, the growing synergy with tourism stands out as an approach that could enhance its fundamental values even further as an important catalyst of a sustainability-aimed socio-economic development.

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TRADITIONAL HOUSE NAMES AS PART OF CULTURAL HERITAGE

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The *Pər Smôlijo* farm in Srednji Vrh above Gozd Martuljek.

Traditional house names as part of cultural heritage

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ABSTRACT: Traditional house names are a part of intangible cultural heritage. In the past, they were an important factor in identifying houses, people, and other structures, but modern social processes are decreasing their use. House names preserve the local dialect with its special features, and their motivational interpretation reflects the historical, geographical, biological, and social conditions in the countryside. This article comprehensively examines house names and presents the methods and results of collecting house names as part of various projects in Upper Carniola.

KEY WORDS: traditional house names, geographical names, cultural heritage, Upper Carniola, onomastics

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1 Introduction

»Preserved traditional house names help determine historical and family conditions, social stratification and interpersonal contacts, and administrative and political structure. Immigration and emigration are very important aspects of social culture and they have left a strong trace in the house names in the Žiri area« (Zorko, cited in Stanonik 2005, frontispiece). A short and concise outline of house names provided by Terezija »Zinka« Zorko reveals that house names have great informative value, and that it is vital to study them as well as collect and preserve this type of cultural heritage.

In onomastics, traditional house names are classified as epithets (Keber 2002, 61). These are names pertaining to a house, farm, or farmstead, or other property. In the Slovenian countryside, the majority of house names continue to be a living part of cultural heritage (Keber 2002, 61; Kotnik Šipec 2004, 7). A house name is usually created when the property is taken over by an owner whose last name differs from that of the former owner, but the house retains its old name (Zorko 2004; 114–115). It was common practice for a house to be named by the neighbors and not the owners themselves (Kotnik 2011, 13–14). House names were created to fulfill the need to differentiate between people in greater detail because personal names no longer sufficed due to social development and progress. The basis for the development of house names is extremely diverse, often reflecting the age of the property. They were often created from the given names of the owners or other household members, both male and female. Their present form contains traces of the phonetic and accentual development of the name in a specific dialect. An important factor in developing house names is professions (especially crafts) and other human activities. The oldest house names developed from topographic conditions. These include choronyms, toponyms, names of landscapes, and hydronyms; common nouns referring to hills are also common (e.g., *hrib* 'hill', *breg* 'slope', *planina* 'mountain pasture'). Many names reflect specific features of the terrain (desolation, fertility, dryness, moisture, lee sides of hills, hilliness, insolation and windiness) or are derived from other natural processes. Ethnonyms (e.g., *Lah* 'Italian', *Oger* 'Hungarian', *Čič* 'Istro-Romanian') and names referring to residents of various regions (e.g., *Korošec* 'Carinthian', *Kranjec* 'Carniolan', *Dolenjec* 'Lower Carniolan', *Ziljan* 'Gail Valley resident') are also possible sources of house names. Extremely diverse house names also originate from various nicknames (animal names, nicknames referring to the color of one's skin and hair and other physical or psychological special features, nicknames referring to plants, foods and drinks, clothing and shoes, money, measures, ages, times of birth, family relations, handicrafts, tools, and materials). House names were also derived from the status of a property in the village or the function of the structure from which the property developed. Church and administrative functions (e.g., sextons, mayors, and excise officers) were also important motivations for creating house names. The surnames of the original owners are a frequent motivation for creating more recent house names (Štukl 1997, 4–15; Škofic 2001, 30–34; Kotnik Šipec 2004, 7–8; Zorko 2004, 127–128; Hawlina 2008, 47; Klinar 2011, 3).

The first Slovenian discussions on traditional house names can be found in 1856 in the newspaper *Kmetijske in rokodelske novice* (Agricultural and Handicraft News), in which Janez Bleiweis describes the different vocabulary used in various Slovenian regions. In this context, he reports that when asked »What do you call your house?« people in Inner Carniola would say *S zmerjanjem* … 'We use the name …' The same reply was used in Styria and in some places in Lower Carniola, whereas in Upper Carniola they would say »Our place.« Bleiweis suggested that the expression *s zmerjanjem* was derived from German *Spitzname* or *Spottname* 'nickname'. In addition, the German term *Vulgarname* 'commonly known as' was used, which Bleiweis Slovenized as *prikladek*. The fact is that there is no clear semantic boundary between the two expressions. In certain areas, such as around Kamnik, *Vulgarname* was equated with 'surname', and *Spottname* with 'nickname' (Sln. *percovnik* or *pricovnik*; Stanonik 2005, 18). Keber (2002, 61) also lists the following Slovenian synonyms: *zdevek* 'nickname', *pritikljej* or *zdeto*/*priloženo ime* (literally, 'added name'), *gerdo ime* (literally, 'bad name'), and *prišvarek* or *prišvrk* (literally, 'slapped-on name'). It is thus clear that this terminology was used differently in different Slovenian areas, which indicates a strong regional component.

The oldest basic sources for studying traditional house names include terriers (Tajnšek 2007, 356). Later on (in the sixteenth and seventeenth centuries), priests began keeping registers. In the eighteenth century, they also began keeping annual reports in Latin (*Libri de statu animarum* or simply *status animarum*) in what is now Slovenia; in the same period, land registers also appeared after the introduction of the cadastre, in which a house name (labeled *vulgo*) was added to the full name of the property owner (Kotnik Šipec 2004, 19–21; Klinar 2011, 3–4). Among secondary sources, one should mention the house-name records compiled by Božo Otorepec and kept by the ZRC SAZU Milko Kos Historical Institute (Keber 2002, 61).

1.1 Overview of research to date

Based on data from the Cooperative Online Bibliographic System (COBISS), the hits returned by the search query *hišno ime* 'house name' demonstrate that many researchers have studied traditional house names in the Slovenian ethnic territory (over 100 researchers have contributed approximately 190 bibliographic units). It must be emphasized that their collection and research was unsystematic, spatially dispersed, and used varying research methodologies. Regarding the researchers' profiles, these types of issues were at the center of interest of not only professionals from various scholarly disciplines, but also individual amateur researchers.

The youngest collectors of traditional house names include primary-school students, who take part in collecting and studying house names in various ways (research camps and term papers; Gliha Komac 1999; Preserje Primary School 2000; Klinar 2011). House names are an attractive undergraduate thesis topic (16 bibliographic units, among them Grivec 2010 and Gumilar 2012), and they are also studied at the highest academic levels. Basic house-name research has been carried out by Zinka Zorko (*Hišna imena na Koroškem* [Traditional House Names in Carinthia], 2004), Marija Stanonik (*Hišna imena v Žireh* [Traditional House Names in Žiri], 2005), the ethnochoreologist Mirko Ramovš (*Hišna imena v vaseh Ježica, Savlje, Kleče, Mala vas in Stožice* [Traditional House Names in the Villages of Ježica, Savlje, Kleče, Mala Vas, and Stožice], 1999), and more recently, primarily by the dialectologist Jožica Škofič (*Hišna imena v Kropi* [Traditional House Names in Kropa], 2001; *Zasnova slovarja gorenjskih hišnih imen* [Draft Dictionary of Upper Carniola Traditional House Names], 2005; *Hišna imena kot gradivo za dialektološko raziskovanje* [Traditional House Names as a Basis for Dialectology Research], 2011) and the dialectologist and comparative linguist Matej Šekli (*Hišna imena v Ovčji vasi* [Traditional House Names in Valbruna], 2005). By collecting and analyzing house names, dialectologists can study the linguistic features of individual dialects (Škofic 2005, 104).

The work of geographer Klemen Klinar from the Northwest Upper Carniola Development Agency represents an important methodological contribution to research on traditional house names with a great deal of new information. He has published his research findings in a series of publications (a total of twelve booklets) titled *Kako se pri vas reče?* (What's Your Traditional House Name? e.g., Klinar 2011).

Many amateur house-name collectors are not included in the COBISS database, and so their number must be significantly larger.

From the geographical viewpoint, individual studies usually extend beyond a certain settlement, local community, parish, proto-parish, municipality, and even a wider geographical unit such as valley or plateau. Research conducted in Slovenian territory at various levels has included fifty-three municipalities in all Slovenian regions; the majority of the municipalities covered were in Upper Carniola and more than 120 settlements from all municipalities were included in the research. In ethnically Slovenian cross-border areas, the greatest attention has been dedicated to traditional house names in the Jaun, Rosen, and Gail valleys in Austrian Carinthia; for example, Bertrand Kotnik made a detailed list of house names in this part of Slovenian ethnic territory in Austria in his fifteen-volume collection titled *Zgodovina hiš južne Koroške* (The History of Houses in Southern Carinthia; 2011). Various writers have also studied house names in the ethnic Slovenian areas in Italy (the Trieste region, Canale Valley, Venetian Slovenia), as well as in the ethnic Slovenian villages in Hungary (*Szlovén háznevek* 1999).

2 Work methods

2.1 Collecting house names

In the studies conducted by the Northwest Upper Carniola Development Agency, traditional house names are defined as geographical names for an occupied or non-occupied house with a house number within a settlement, excluding individual outbuildings. This research also included names of separate and auxiliary outbuildings that are not part of the property where people dwelled (e.g., sawmills and flourmills), and community buildings (e.g., rectories and schools; Klinar et al. 2012, 13).

Due to a more detailed definition of traditional house names, only names are being collected that have been in use since 1940 and are thus at least seventy years old. After the Second World War, abandonment

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Figure 1: The *Pər Zdóvənk* farm in Kokra.

of farming and urbanization spread widely in the countryside (Klinar et al. 2012, 16); because of this, house names are no longer being created in the former, traditional way.

Historical sources with recorded traditional house names are very useful for identifying the age of house names. Extremely helpful are the protocols of the cadastral survey under Emperor Francis I (1823–1869) and the revised cadastral survey for Carniola (*Reambulančni kataster za Kranjsko*, 1867–1882), and parish records (the *status animarum*), in which house names were systematically entered as a separate category. The year of the source is a reliable piece of information, proving that a house name already existed at that time (Klinar et al. 2012, 16).

An overview of written sources is a good basis for fieldwork, in which the selection of good informants is vital. Usually these are locals that have lived in a place their entire lives, speak the authentic local dialect, and know the local home environment and people well (Klinar et al. 2012, 19). Traditional house names are written down and audio recorded during the interviews with the informants. All of the information obtained from them is also presented, verified, and built upon at meetings with the locals, where everyone present is informed about the importance and values of house names and the use of dialect language in general.

2.2 **Transcribing house names**

As part of collecting traditional house names, for best results names are documented in the various forms they appear in:

- Basic form (e.g., *Pər Tamážovco*, *Na Pstôt*, *Fárož*);
- Name of the owner derived from the house name (e.g., *Tamážovc*, *Pstôtnek*, *Ta fárošk*);
- Name of the owner's wife derived from the house name (e.g., *Tamážovka*, *Pstôtənca*, *Ta faróška*):
- Possessive adjective derived from the house name (e.g., *Tamážovčov*, *Pstôtnekov*, *Fárošk*).

As can be seen from the examples listed above, a simplified dialect transcription is used in transcribing traditional house names and related expressions; this dialect transcription can be used to preserve the intangible linguistic cultural heritage in its original dialectal form with great quality, while ensuring that the transcriptions can also be read relatively accurately by locals. In this type of transcription, the stress placement and the vowel length and quality are also marked (e.g., *Pər Jeglíč* and not *Pər Jéglič*); in addition, the vowels reduced to zero are omitted (e.g., *Matíjovc* and not *Matíjovec*), and the reduced vowels and the semivowel *ə* are preserved (e.g., *Pər Məkúč* and not *Pər Mekúč*) in addition to other dialect consonant developments (e.g., *Pər Téfkarjo* and not *Pər Tépkarjo*) and other special features, including the substitution of /v/ for /l/ (e.g., *Pər Gvážarjə* and not *Pər Glážarjə*).

The simplified dialect form has turned out to meet the basic dialectological demands on the one hand and, on the other, it simplifies the scholarly phonetic form to the extent that a specific transcribed name can also be read in its authentic dialect form by locals and visitors. It is also very useful in documenting the dialect differences that appear within the Upper Carniolan dialect group, and the differences with other dialects that are commonly used in Upper Carniola. In the case of uniform standardization, dialect pronunciation as one of the most important heritage components of traditional house names would be lost. This is clearly demonstrated by the examples of identical family names in various dialect forms (Table 1).

Table 1: Examples of identical house names in various dialect forms.

Standardized form	Dialect form 1	Dialect form 2	Dialect form 3
Pri Lizniku	*Pər Lízneko* (Zgoša)	*Pər Líznek* (Bohinjska Bela)	*Pər Líznjəko* (Kranjska Gora)
Pri Kovaču	*Pər Kováč* (Zabreznica)	*Pər Kováčo* (Zgornje Gorje)	*Pər Kaváč* (Rateče)
Pri Lazarju	*Pər Vázarjo* (Stara Fužina)	*Pər Lázarjo* (Bohinjska Bistrica)	*Pər Vázarjə* (Dobravica pri Podnartu)

3 Results

3.1 Scope of research

Until November 2012, activities for collecting traditional house names in Upper Carniola under the aegis of the Northwest Upper Carniola Development Agency, as the professional project provider, took place as part of three separate projects, of which two have already been finished and one is still ongoing. The first two projects covered sixty-three settlements, and in the current one an additional ninety-three settlements are being processed for house names. The settlements included in individual projects are listed in Table 2.

As part of the two completed projects, 2,131 traditional house names were collected; this number is expected to increase by approximately 1,500 additional names by the time the third project is concluded. Among the names already collected, seventy-four are not connected with any real structure because the property no longer exists.

There is a great diversity of traditional house names because only sixteen appear seven times or more. The names *Pri Kovaču* 'the blacksmith's place' (27 instances), *Pri Mežnarju* 'the sexton's place' (18 instances), *Pri Žnidarju* 'the tailor's place' (14 instances), *Pri Španu* 'the mayor's place' (12 instances), *Pri Mlinarju* 'the miller's place' (10 instances), *Pri Toncu* 'Tony's place' (9 instances), and *Pri Hribarju* 'the hillsman's place' (8 instances) predominated. The following names appeared seven times: *Pri Bohincu* 'the Bohinj-dweller's place', *Pri Grabnarju* 'the creek-dweller's place', *Pri Kajžarju* and *Pri Kajžu* 'the tenant-farmer's place', *Pri Klemencu* 'Clement's place', *Pri Petru* 'Peter's place', *Pri Pintarju* 'the cooper's place', *Pri Ribču* 'the fisherman's place', and *Pri Šoštarju* 'the cobbler's place'. These names confirm that house names were largely derived from the names of occupations or trades (e.g., blacksmith, tailor, and cooper), first names (e.g., Tony, Clement), the location of the property (e.g., on a hill: *hillsman*, by a creek: *creek-dweller*), and the status of the property (small farm: *tenant-farmer*).

3.2 Marking house names

So far, collecting traditional house names has yielded twelve publications, with all names provided in dialect and standardized form, and the forms of transcriptions used in historical sources (cf. Klinar 2011). These

Table 2: Overview of settlements included in individual house-name collection projects in Upper Carniolan municipalities.

Municipalities	What's your house called? (project concluded in June 2010)	Let's get to know old house names (project concluded in December 2011)	*Nomen vulgare* (the project is planned to conclude by December 2013)
Bled	Bodešče, Bohinjska Bela, Koritno, Kupljenik, Obrne, Ribno, Selo pri Bledu, Slamniki	Rečica pri Bledu, Zasip	Bled
Bohinj	–	Bohinjska Češnjica, Jereka, Podjelje, Srednja vas, Stara Fužina, Studor	Bohinjska Bistrica, Brod, Kamnje, Laški Rovt, Polje, Ravne, Ribčev Laz, Savica
Cerklje na Gorenjskem	–	–	Adergas, Ambrož pod Krvavcem, Apno, Češnjevek, Dvorje, Grad, Praprotna Polica, Pšata, Ravne, Sidraž, Stiška vas, Sveti Lenart, Šenturška Gora, Štefanja Gora, Trata pri Velesovem, Velesovo
Gorje	Mevkuž, Podhom, Poljšica pri Gorjah, Višelnica	Grabče, Krnica, Perniki, Radovna, Spodnje Laze, Zgornje Laze	Spodnje Gorje, Zgornje Gorje
Jesenice	–	–	Blejska Dobrava, Hrušica, Javorniški Rovt, Koroška Bela, Planina pod Golico, Plavški Rovt, Potoki, Prihodi, Slovenski Javornik,
Jezersko	–	–	Spodnje Jezersko, Zgornje Jezersko
Kranj	–	–	Babni Vrt, Čadovlje, Pangršica, Povlje, Trstenik, Žablje, Breg ob Savi, Jama, Mavčiče, Meja, Podreča, Praše
Kranjska Gora	Gozd - Martuljek, Srednji Vrh	Podkoren, Rateče	Kranjska Gora, Log
Naklo	–	–	Bistrica, Gobovce, Podbrezje, Spodnje Duplje, Strahinj, Zadraga, Zgornje Duplje, Žeje
Preddvor	–	Bašelj, Breg ob Kokri, Kokra, Mače, Možjanca, Nova vas, Potoče, Tupaliče	Hraše, Hrib, Preddvor, Spodnja Bela, Srednja Bela, Zgornja Bela
Radovljica	Begunje na Gorenjskem, Brda, Dvorska vas, Lancovo, Mlaka, Ravnica, Slatna, Spodnja Lipnica, Srednja vas, Vošče, Zadnja vas, Zapuže, Zgornja Lipnica, Zgoša	–	Brezje, Češnjica pri Kropi, Črnivec, Dobravica, Dobro Polje, Lipnica, Mišače, Noše, Ovsiše, Peračica, Podnart, Poljšica pri Podnartu, Prezrenje, Rovte, Spodnja Dobrava, Srednja Dobrava, Zaloše, Zgornja Dobrava
Šenčur	–	–	Hotemaže, Luže, Milje, Olševek, Srednja vas pri Šenčurju, Visoko
Žirovnica	Breg, Moste, Selo pri Žirovnici, Zabreznica, Žirovnica	Breznica, Doslovče, Rodine, Smokuč, Vrba	–

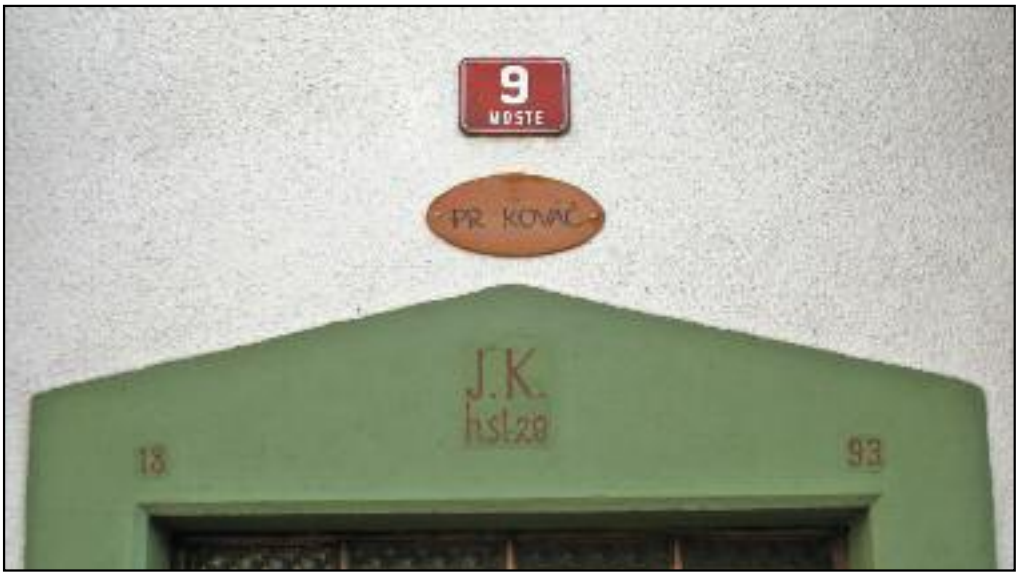
small volumes also contain stories connected with house names and old photographs of properties and the villages studied.

What the property owners and other villagers found most interesting were the signs with traditional house names that were put up on all the houses whose owners gave their written consent. In both completed projects, 1,314 properties were recorded in 2010 and 2011, which accounts for 64% of all the properties identified. This percentage indicates the positive attitude of owners towards cultural heritage. The signs on the properties are ceramic and the house names are written in the simplified dialect form, which was positively accepted by the locals because in this way their house names are presented in authentic dialect form.

After the collection of traditional house names was completed, these names were also included in municipal spatial information systems, such as *iObčina* (Internet 1) and *PISO* (Internet 2), and the uniform online geographical information system *iSlovenija* (Internet 3), where they are displayed as a separate data layer. In addition, all the house names collected are included in the online Encyclopedia of Surnames of the Slovenian

KLEMEN KLINAR

Figure 2: The *Pər Mákavčo* farm in Podkoren.



KLEMEN KLINAR

Figure 3: An example of a sign with a house name on it.

Genealogical Society, where all the surnames and house names from the wider ethnic Slovenian area are gathered in one place (Internet 4).

In addition to the tangible results described above, attention should also be directed to the intangible results of these research projects, which are reflected in local people's increased awareness of the heritage value of traditional house names and thus their everyday usage, and ultimately the need for their transfer to younger generations.

4 Conclusion

Traditional house names are an important type of intangible cultural heritage in the Slovenian countryside. »The locals constantly recreate intangible cultural heritage, which is transferred from one generation to the other, as a response to their environment, nature, and history. Intangible cultural heritage provides them with a feeling of identity and continued contact with former generations, which promotes respect for cultural diversity and human creativity« (Internet 5). Modern social processes in the countryside such as suburbanization and abandonment of farming are causing house names to be forgotten and disappear, even though it is these very names that are the elements of the property that do not change and can be preserved for many centuries. Their origins are very diverse and refer to the geographical, social, economic, and other circumstances at the time they were created and, to some extent, they also contain a more direct human aspect.

»*Suitably recognized and managed cultural values can significantly influence the sustainable development of rural areas, in which not only economic aspects are important, but also ecological, social, and cultural aspects*« (Šmid Hribar, Ledinek Lozej 2013).

Traditional house names are vital for the preservation of dialects and subdialects. Despite the loss of certain dialect features, these are nonetheless preserved in house names, even though younger people no longer use the special features of most dialects in Upper Carniola. House names can also be defined as having cultural heritage value due to their diversity because, with the exception of few rare examples, the great majority of names in the sample areas studied occur less than five times.

Due to the special features of elements of intangible cultural heritage, it is an especially demanding task to identify its worth, values, and threat level (*Strategija za varstvo* … 2007, 7–8). All of this points to the necessity of systematic collection and preservation of old house names. The projects by the Northwest Upper Carniola Development Agency have been among the boldest activities in collecting house names to date, supported by uniform methodology and focused on the central and northwestern parts of Upper Carniola.

Collecting traditional house names in Upper Carniola is also supported by other campaigns for collecting choronyms, among which one should highlight the cross-border project FLU-LED *Kulturni portal ledinskih in hišnih imen* (The Cultural Portal of Choronyms and Traditional House Names), which is being carried out as part of the EU Slovenia–Austria Operational Program, 2007–2013 (Klinar et al. 2012).

In 2010, Slovenian traditional house names and choronyms were accepted onto the UNESCO List of Intangible Cultural Heritage in Austria as the heritage of an officially recognized ethnic minority in Austria (Piko - Rustia 2010, 15). This testifies to the great awareness of and respect for this type of Slovenian folk material in Austria, and it encourages us to recognize the importance and place of house names and choronyms in the Register of Intangible Cultural Heritage in Slovenia.

The inclusion of intangible cultural heritage on the UNESCO list opens opportunities for raising the international profile of Slovenian customs, language, traditional trades, and more (*Strategija za varstvo* 2007, 8).

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1 Aims and scopes

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The journal is aimed at presentation of scientific articles from the fields of physical, human and regional geography. Review scientific articles are published, e.g. review and synthesis of already published articles on specific topic, and original research articles, e.g. first publication of original scientific results that allows repetition of the study and examination of results.

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2 Article components

The articles published in the scientific journal *Acta geographica Slovenica* – Geografski zbornik should be arranged according to the IMRAD scheme: Introduction, Method, Results And Discussion or by the Guidelines for scientific journals and scientific articles published by the Slovenian research agency which financially supports the Acta geographica Slovenica journal. The articles must contain the following elements:

- article's main title in both English and Slovenian;
- abstract (up to 800 characters including spaces);
- up to eight key words;
- article in English (up to 20,000 characters including spaces) and identical article in Slovenian;
- reference list.

Text of the article should be equal in Slovenian and English.

The titles of chapters and subchapters in the article should be marked with ordinal numbers (for example, 1 Introduction, 1.1 Methodology, 1.2 Terminology). The division of an article into chapters is obligatory, but authors should use subchapters sparingly. It is recommended that the article include Introduction, Conclusion and References chapters. The titles should be short and comprehensible. Authors should avoid using footnotes and endnotes.

3 Quoting

When quoting from source material, authors should state the author's last name and the year, separate individual sources with semicolons, order the quotes according to year, and separate the page information from

the author's name and year information with a comma, for example »(Melik 1955, 11)« or »(Melik, Ilešič and Vrišer 1963; Kokole 1974, 7 and 8)«.If the source material has more than three authors only the first one should be listed (Melik et al. 1956).

The References' units should be listed according to the alphabetical order of the authors' second names. If there are more units from the same author in the same year, letters should be added to the citation (for example 1999a in 1999b).

Every unit consists of three sentences. In the first Author's name, publishing year and article's title are listed in front of the colon while the title is listed after it. The surnames of the authors and the initials of their names are separated by commas. The subtitle is separated from the title by a comma.

If the unit is an article, the name and number of the journal is indicated in the second sentence. If the unit is a monograph, there is no second sentence. The name of the publisher and number of pages are not listed. If the unit is not printed the type (e.g. diploma thesis) should be listed in the second sentence, separated from information of the institution by a comma. Laws should be qouted by a title, publication name and its number (e.g. Official gazette 56-2), separated from the publication year in the last part of the quotation.

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1) for articles in journals:
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4) for expert's reports, diploma, master and doctoral thesis:
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6) for internet sources with known authors and/or titles:
   - Vilhar, U. 2010: Fenološka opazovanja v okviru Intenzivnega spremljanja stanja gozdnih ekosistemov. Internet: http://www.gozdis.si/impsi/delavnice/Fenoloska%20opazovanja_Vilhar.pdf (19. 2. 2012).
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In case 7) the author is quoted in the text, for example (Vilhar 2010), while in case 8) only internet is quoted, for example (Internet 2).

The laws are cited as follows (name of the law, number of the official gazzette, place of publishing), for example:

- Zakon o kmetijskih zemljiščih. Uradni list Republike Slovenije 59/1996. Ljubljana.
- Zakon o varstvu pred naravnimi in drugimi nesrečami. Uradni list Republike Slovenije 64/1994, 33/2000, 87/2001, 41/2004, 28/2006 in 51/2006. Ljubljana.

If amemdments were proposed to the law they have to be quoted. In the text whole title of the law has to be quoted or its first few words if the title is a long one, for example (Zakon o kmetijskih zemljiščih 1996) ali (Zakon o varstvu … 1994).

All the quoted contributions have to be listed in the chapter References.

The authors should consider copyright rules of data owners, for example: the rules of the Geodetic survey of the Republic of Slovenia are available at http://e-prostor.gov.si/fileadmin/narocanje/pogoji_uporabe_podpisani.pdf.

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The tables should contain no formatting and should not be too large – one-page tables are appreciated.

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Figure 1: Location of measurement points along the glacier.

The journal has an established 16.5 cm × 23.5 cm format to which all graphic materials must be adapted. In the case of graphic illustrations for which the authors do not have the copyright, the authors must acquire permission to publish from the copyright owner. Authors must include the author's name with the title of the illustration.

Illustrative material should be precisely 134 mm wide (one page) or 64 mm wide (half page, one coloumn), height should not exceed 200 mm. If the figure is to be the size of the page, its size should be 134 × 192,3 mm (the subtitle is written in one line) or 134 × 200 mm (the subtitle is on the facing page).

Maps should be done in digital vector form using the Corel Draw program, and charts done using *Corel Draw* or *Adobe Illustrator* programs, especially if they contain text. They can also be done in digital raster form with resolution at least 300 dpi, preferably in TIFF or JPG formats in the printing size.

For maps made using CorelDraw or Adobe Illustrator programs,two separate files should be prepared; the original file (format .cdr or .ai) and the file with representation of the image (format .jpg).

For maps made using ArcGIS where raster layers were used next to vector layers (for example .tif of relief, airborne or satellite image), three files should be submitted: a file with vector image with not transparency used together with a legend and colophone (export in format.ai), the second file with raster image (export

in .tif format), and the third one with vector and raster image together showing the final version of the map (export in format .jpg).

No title should be printed on maps as they are written below them.

The colors should be saved in CMYK and not in RGB or other formats.

The *Times new roman* font, size 8, should be used to write the legend, as well as for colophon (size 6). In the colophon author, scale, source and copyright should be listed. The colophone should be written in both, English and Slovenian, if space is available on the map. Example:
Scale/merilo: (grafično, tekstovno)
Author of contents/avtor vsebine: Drago Perko
Author of map/avtorica zemljevida: Jerneja Fridl
Source/vir: Statistical office of the Republic of Slovenia, 2002
© Anton Melik geographical institute ZRC SAZU, 2005

Graphs should be done in digital form using *Excel* program. Graphs should be done on separated sheets and accompanied by data.

Photographs have to be in raster format and in resolution 240 dots per cm or 600 dots per inch, preferably in.tif or .jpg formats, that is about 3200 dots per page width of the journal.

Figures showing **computer screen** should be prepared at the highest possible screen resolution (Nadzorna plošča\Vsi elementi nadzorne plošče\Zaslon\Ločljivost zaslona oziroma Control Panel\All Control Panel Items\Display\Screen Resolution). The figure is done by *print screen*, the data are pasted prilepi to the selected graphic programme (e.g. Paint) and saved as .tif. The size of the image or its resolution should not be changed.You can find templates of maps in cdr and mxd files for a whole page map in landscape view and an example of correct structure of files for a submission of a map made with ESRI ArcGIS on the journal webpage.

5 Article admission

Only original and new articles will be accepted for publication. Upon acceptance of your chapter, you will be required to sign a warranty that your article is original (contents–wording and formatting) and has not been submitted for publication or published elsewhere.

Authors must submit their contributions in digital form written in *Word* format.

The Word file name should contain author's second name (for example: novak.doc), while the figures should be named with a number following the order of figures in the article (for example: figure01.tif, figure02.cdr, figure12.ai, figure17.xls). Supplementary files (figures) can be submitted packed in one zip file.

The digital file should be unformatted, except for text written in bold and italic form. As the article is subject to changes during the review process it should first be submitted in either English or Slovenian language, and translated to the other language only after the acceptance for publication. The translation is an expense of the author.

The entire text should be written in lowercase (except for uppercase initial letters, of course) without unnecessary abbreviations and contractions. The text should be plain and only bold and italic formatting is allowed. Please use no other formatting, such as chapter or page numbering.

Authors of articles must enclose a scanned (or rewritten), completed, and signed Registration Form containing the author's agreement to abide by the rules for publication in *Acta geographica* Slovenica – *Geografski zbornik*. The Registration Form shall serve as acceptance letter and author's contract. The registration form is available on-line: ags.zrc-sazu.si.

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6 Review process

All articles are examinated by one of the editors upon receipt. Afterwards the authors are usually asked to correct or change the article. After the articles have been corrected they are sent to two anonymous reviewers. The reviewers receive an article without the author's name, and the author receives the review(s) without the reviewer's names. If the reviews do not require the article to be corrected or augmented, the review will not be sent to the author.

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For articles sent for publication to *Acta geographica* Slovenica – *Geografski zbornik*, all the author's moral rights remain with the author, while the author's material rights to reproduction and distribution in the Republic of Slovenia and other states, are for no fee, for all time, for all cases, for unlimited editions, and for all media shall be unexclusively ceded to the publisher. The authors allow publication of the article or its components on the internet.

Author has to provide a professional translation. The name of the translator should be quoted. Authors should cooperate in the reviewing and editorial process.

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No honoraria are paid for articles appearing in *Acta geographica* Slovenica – *Geografski zbornik* nor for the reviews.

The author shall receive one (1) free copy of the publication.

8 Submission preparation checklist

As part of the submission process, authors are required to check off their submission's compliance with all of the following items, and submissions may be returned to authors that do not adhere to these guidelines.

1. The submission has not been previously published, nor is it before another journal for consideration (or an explanation has been provided in Comments to the Editor).
2. The submission file is in Microsoft Word document file format.
3. Where available, URLs for the references have been provided.
4. The text is single-spaced; uses a 12-point font; employs italics, rather than underlining (except with URL addresses). All illustrations' and figures' locations within text are marked (illustrations and figures are not inside text!). Illustrations and figures are provided as supplementary files (cdr, ai for maps and illustrations; tif for photographs). Tables are placed within the text at the appropriate points. Supplementary files must not excess 50 MB.
5. The text adheres to the stylistic and bibliographic requirements outlined in the Author Guidelines, which is found in About the Journal.
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11 Acta geographica Slovenica Editorial review form

Acta geographica Slovenica editorial review form

1 The paper is an original scientific one – the paper follows the standard IMRAD scheme and is original and the first presentation of research results with the focus on methods, theoretical aspects or case study.)
Yes
No

2 The paper's content is suitable for publishing in the AGS journal – the paper is from the field of geography or related fields of interest, the presented topic is interesting and well presented. In case of negative answer add comments below.)
Yes
No

3 Editorial notes regarding the paper's content.

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- The paper has less than 20.000 characters.
- The paper has more than 20.000 characters, but less than 25.000.
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Yes
No

6 Notes regarding style and formatting.

7 Citing in the paper is according to the AGS guidelines and style, including DOI identificators.
Yes
No

8 The reference list is suitable (the author cites previously published papers with similar topic from other relevant scientific journal).
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No, the author did not cite previously published papers on similar topic.

9 Scientific language of the paper is appropriate and understandable.
Yes
No

10 Supplementary files (ai, cdr, pdf, tif, jpg, xlsx etc.) that were added to the paper are in proper format and resolution (including the introductory photo), maps are prepared according to the AGS Guidelines. (In this step contact the technical editor [rok.ciglic@zrc-sazu.si] for assistance if needed).*
- Supplementary files are correct.
- Supplementary files are not appropriate and need a major correction.
- Some supplementary files need corrections.

11 Describe the possible deficiencies of the supplementary files:

12 DECISION OF THE RESPONSIBLE EDITOR*
The paper is accepted for further processing and may be sent to the reviewer.
The paper is accepted for further processing but needs technical improvements (see notes).
The paper is accepted for further processing but its content needs additional improvements (see notes).
The paper is not accepted for publication because:
- It is more suitable for a specialized journal.
- Does not fit the aims and scopes of the AGS journal.
- Is not an original scientific paper.
- The presentation of the results is poor.
- The paper is of very low quality.
- The paper has already been published elsewhere.
- Other (see comments below).
- Other reasons for rejection of the paper.

12 Acta geographica Slovenica review form

1 RELEVANCE

1a) Are the findings original and the paper is therefore a significant one?*
yes
no
partly

1b) Is the paper suitable for the subject focus of the AGS journal?*
yes
no

2 SIGNIFICANCE

2a Does the paper discuss an important problem in geography or related fields?*
yes
no
partly

2b Does it bring relevant results for contemporary geography?*
yes
no
partly

2c What is the level of the novelty of research presented in the paper?*
high
middle
low

3 ORIGINALITY

3a Has the paper been already published or is too similar to work already published?*
yes
no

3b Does the paper discuss a new issue?*
yes
no

3c Are the methods presented sound and adequate?*
yes
no
partly

3d Do the presented data support the conclusions?*
yes
no
partly

4 CLARITY

4a Is the paper clear, logical and understandable?*
yes
no

4b If necessary, add comments and recommendations to improve the clarity of the title, abstract, keywords, introduction, methods or conclusion:*

5 QUALITY

5a Is the paper technically sound? (If no, the author should discuss technical editor [rok.ciglic@zrc-sazu.si] for assistance.)*
yes
no

5b Does the paper take into account relevant current and past research on the topic?*
yes
no
Propose amendments, if no is selected:

5d Is the references list the end of the paper adequate?*
yes
no
Propose amendments, if no is selected:

5e Is the quoting in the text appropriate?*
yes
no
partly
Propose amendments, if no is selected:

5f Which tables are not necessary?

5g Which figures are not necessary?

6 COMMENTS OF THE REVIEWER

Comments of the reviewer on the contents of the paper:
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7 RECOMMENDATION OF THE REVIEWER TO THE EDITOR-IN-CHIEF

My recommendation is:
Please rate the paper from 1 [low] to 100 [high]:
Personal notes of the reviewer to editor-in-chief.

Navodila avtorjem za pripravo člankov v *Acti geographici Slovenici* – Geografskem zborniku

1 Uvod

Acta geographica Slovenica – Geografski zbornik je osrednja slovenska znanstvena revija za geografijo, ki jo izdaja Geografski inštitut Antona Melika Znanstvenoraziskovalnega centra Slovenske akademije znanosti in umetnosti.

Revija je namenjena predstavitvi znanstvenih dosežkov s področja fizične, družbene in regionalne geografije ter sorodnih ved. Objavlja pregledna znanstvena besedila, to je pregled in sintezo že objavljenih najnovejših del o določeni temi, ter izvirna znanstvena besedila, to je prvo objavo originalnih raziskovalnih rezultatov v takšni obliki, da se raziskava lahko ponovi, ugotovitve pa preverijo.

Revija je prvič izšla leta 1952 in je do leta 1976, ko je bila natisnjena štirinajsta številka, izhajala občasno. Leta 1976 je zaradi trajnejše finančne pomoči države začela izhajati redno, od leta 2003 pa izhaja dvakrat letno v tiskani in elektronski obliki na medmrežju. Od leta 1994 izhaja enakovredno v slovenskem in angleškem jeziku (http://ags.zrc-sazu.si). Vsako leto jo razpošljemo v izmenjavo na več kot 200 naslovov po celem svetu. Članke na medmrežju berejo v več kot 100 državah sveta.

Acta geographica Slovenica – *Geografski zbornik* v objavo sprejema geografske članke iz Slovenije ter Jugovzhodne in Srednje Evrope. Objavljamo tudi članke geografiji sorodnih ved, katerih znanstveno in raziskovalno delo lahko obogati geografske poglede na pokrajino.

Acta geographica Slovenica objavlja članke v slovenskem in angleškem jeziku. Članki, pri katerih je vsaj eden od avtorjev iz Slovenije, morajo imeti tudi slovenski prevod. Članki avtorjev iz tujine in članki posebnih izdaj so objavljeni samo v angleškem jeziku. Članke, ki prispejo v slovenskem jeziku, je po pozitivni recenziji treba prevesti v angleščino. Če za prevod poskrbi uredništvo, je strošek prevoda za avtorje 500 €. Če avtorji sami poskrbijo za profesionalni prevod članka, je treba članek lektorirati, strošek lekture v višini 200 € pa nosijo avtorji. Za lekturo slovenskega dela članka poskrbi uredništvo. Članke, ki prispejo v angleškem jeziku, je po pozitivni recenziji treba nujno lektorirati. Za lekturo poskrbi uredništvo, strošek v višini 200 € pa nosijo avtorji.

2 Sestavine članka

Članki, objavljeni v znanstveni reviji *Acta geographica Slovenica* – Geografski zbornik so urejeni po shemi IMRAD (uvod, metoda, rezultati in razprava; angl.: *Introduction, Method, Results And Discussion*) oziroma v skladu z navodili o oblikovanju periodične publikacije kot celote in članka kot njenega sestavnega dela, ki jih je izdala Agencija za raziskovalno dejavnost Republike Slovenije, ki denarno podpira izhajanje.

Članki, poslani v objavo, morajo imeti naslednje sestavine:

- glavni naslov v slovenskem in angleškem jeziku;
- izvleček dolžine do 800 znakov skupaj s presledki;
- do osem ključnih besed;
- članek v angleškem ali slovenskem jeziku, ki naj skupaj s presledki obsega do 20.000 znakov.
- seznam uporabljenih virov in literature, urejen v skladu z navodili.

Besedilo člankov mora biti enakovredno v angleškem in slovenskem jeziku.

Članek naj ima naslove poglavij in naslove podpoglavij označene z vrstilnimi števniki (na primer: 1 Uvod, 1.1 Metodologija, 1.2 Terminologija). Razdelitev članka na poglavja je obvezna, podpoglavja pa naj avtor uporabi le izjemoma. Zaželeno je, da ima članek poglavja Uvod, Sklep in Literatura. Naslovi člankov naj bodo jasni in čim krajši. Avtorji naj se izognejo pisanju opomb pod črto na koncu strani in naj bodo zmerni pri uporabi tujk.

3 Citiranje v članku

Avtor naj pri citiranju med besedilom navede priimek avtorja, letnico ter po potrebi številko strani. Več citatov se loči s podpičjem in razvrsti po letnicah, navedbo strani pa se od priimka avtorja in letnice loči

z vejico, na primer: (Melik 1955, 11) ali (Melik, Ilešič in Vrišer 1963, 12; Kokole 1974, 7 in 8). Če ima citirano delo več kot tri avtorje, se citira le prvega avtorja, na primer (Melik s sod. 1956, 217).

Enote v poglavju Viri in literatura naj bodo navedene po abecednem redu priimkov avtorjev, enote istega avtorja pa razvrščene po letnicah. Če je v seznamu več enot istega avtorja iz istega leta, se letnicam dodajo črke (na primer 1999a in 1999b). Zapis vsake citirane enote skladno s slovenskim pravopisom sestavljajo tri je stavki. V prvem stavku sta navedena avtor in letnica izida (če je avtorjev več, so ločeni z vejico, z vejico sta ločena tudi priimek avtorja in začetnica njegovega imena, med začetnico avtorja in letnico ni vejice), sledi dvopičje, za njim pa naslov in morebitni podnaslov, ki sta ločena z vejico. Če je citirana enota članek, se v drugem stavku navede publikacija, v kateri je članek natisnjen, če pa je enota samostojna knjiga, drugega stavka ni. Izdajatelja, založnika in strani se ne navaja. Če enota ni tiskana, se v drugem stavku navede vrsta enote (na primer elaborat, diplomsko, magistrsko ali doktorsko delo), za vejico pa še ustanova, ki hrani to enoto. V tretjem stavku se za tiskane enote navede kraj izdaje, za netiskane pa kraj hranjenja. Pri navajanju literature, ki je vključena v sistem DOI (Digital Object Identifier), je treba na koncu navedbe dodati tudi številko DOI. Številke DOI so dodeljene posameznim člankom serijskih publikacij, prispevkom v monografijah in knjigam. Številko DOI najdete v samih člankih in knjigah, oziroma na spletni strani http://www.crossref.org/guestquery.

Nekaj primerov (ločila so uporabljena skladno s slovenskim pravopisom):

1) za članke v revijah:
   - Melik, A. 1955a: Kraška polja Slovenije v pleistocenu. Dela Inštituta za geografijo 3. Ljubljana.
   - Melik, A. 1955b: Nekaj glacioloških opažanj iz Zgornje Doline. Geografski zbornik 5. Ljubljana.
   - Perko, D. 2002: Določanje vodoravne in navpične razgibanosti površja z digitalnim modelom višin. Geografski vestnik 74-2. Ljubljana.
   - Fridl, J., Urbanc, M., Pipan, P. 2009: The importance of teachers' perception of space in education. Acta geographica Slovenica 49-2. Ljubljana. DOI: http://dx.doi.org/10.3986/AGS49205
2) za poglavja v monografijah ali članke v zbornikih:
   - Lovrenčak, F. 1996: Pedogeografska regionalizacija Spodnjega Podravja s Prlekijo. Spodnje Podravje s Prlekijo, 17. zborovanje slovenskih geografov. Ljubljana.
   - Mihevc, B. 1998: Slovenija na starejših zemljevidih. Geografski atlas Slovenije. Ljubljana.
   - Komac, B., Zorn, M. 2010: Statistično modeliranje plazovitosti v državnem merilu. Od razumevanja do upravljanja, Naravne nesreče 1. Ljubljana.
3) za monografije:
   - Natek, K., Natek, M. 1998: Slovenija, Geografska, zgodovinska, pravna, politična, ekonomska in kulturna podoba Slovenije. Ljubljana.
   - Fridl, J., Kladnik, D., Perko, D., Orožen Adamič, M. (ur.) 1998: Geografski atlas Slovenije. Ljubljana.
   - Perko, D., Orožen Adamič, M. (ur.) 1998: Slovenija – pokrajine in ljudje. Ljubljana.
   - Oštir, K. 2006: Daljinsko zaznavanje. Ljubljana.
4) za elaborate, diplomska, magistrska, doktorska dela ipd.:
   - Richter, D. 1998: Metamorfne kamnine v okolici Velikega Tinja. Diplomsko delo, Pedagoška fakulteta Univerze v Mariboru. Maribor.
   - Šifrer, M. 1997: Površje v Sloveniji. Elaborat, Geografski inštitut Antona Melika ZRC SAZU. Ljubljana.
5) za vire brez avtorjev in kartografske vire:
   - Popis prebivalstva, gospodinjstev, stanovanj in kmečkih gospodarstev v Republiki Sloveniji, 1991 – končni podatki. Zavod Republike Slovenije za statistiko. Ljubljana, 1993.
   - Digitalni model višin 12,5. Geodetska uprava Republike Slovenije. Ljubljana, 2005.
   - Državna topografska karta Republike Slovenije 1 : 25.000, list Brežice. Geodetska uprava Republike Slovenije. Ljubljana, 1998.
   - Franciscejski kataster za Kranjsko, k. o. Sv. Agata, list A02. 1823–1869. Arhiv Republike Slovenije. Ljubljana.
   - Buser, S. 1986a: Osnovna geološka karta SFRJ 1 : 100.000, list Tolmin in Videm (Udine). Zvezni geološki zavod. Beograd.
   - Buser, S. 1986b: Osnovna geološka karta SFRJ 1 : 100.000, tolmač lista Tolmin in Videm (Udine). Zvezni geološki zavod. Beograd.

Avtorji vse pogosteje citirajo vire z medmrežja. Če sta znana avtor in/ali naslov citirane enote, potem se jo navede takole (datum v oklepaju pomeni čas ogleda medmrežne strani):

- Vilhar, U. 2010: Fenološka opazovanja v okviru Intenzivnega spremljanja stanja gozdnih ekosistemov. Medmrežje: http://www.gozdis.si/impsi/delavnice/Fenoloska%20opazovanja_Vilhar.pdf (19. 2. 2010).
- eGradiva, 2010. Medmrežje: http://www.egradiva.si/ (11. 2. 2010).

Če avtor ni poznan, se navede le:
- Medmrežje: http://giam.zrc-sazu.si/ (22. 7. 2011).

Če se navaja več enot z medmrežja, se doda še številko:
- Medmrežje 1: http://giam.zrc-sazu.si/ (22. 7. 2011).
- Medmrežje 2: http://zgs.zrc-sazu.si/ (22. 7. 2011).

Med besedilom se v prvem primeru navede avtorja, na primer (Vilhar 2010), v drugem primeru pa le medmrežje, na primer (medmrežje 2).

Zakone se citira v naslednji obliki (ime zakona, številka uradnega lista, kraj izida), na primer:
- Zakon o kmetijskih zemljiščih. Uradni list Republike Slovenije 59/1996. Ljubljana.
- Zakon o varstvu pred naravnimi in drugimi nesrečami. Uradni list Republike Slovenije 64/1994, 33/2000, 87/2001, 41/2004, 28/2006 in 51/2006. Ljubljana.

Če ima zakon dopolnitve, je treba navesti tudi te. Med besedilom se zakon navaja s celim imenom, če gre za krajše ime, ali pa z nekaj prvimi besedami in tremi pikami, če gre za daljše ime. Na primer (Zakon o kmetijskih zemljiščih 1996) ali (Zakon o varstvu … 1994).

V poglavju *Viri in literatura* morajo biti navedena vsa dela, citirana v prispevku, ostalih, necitiranih del pa naj avtor ne navaja.

Avtorji naj upoštevajo tudi navodila za navajanje virov lastnika podatkov ali posrednika, če jih le-ta določa. Primer: Geodetska uprava Republike Slovenije ima navodila za navajanje virov določena v dokumentu »Pogoji uporabe geodetskih podatkov« (http://e-prostor.gov.si/fileadmin/narocanje/pogoji_uporabe_podpisani.pdf).

4 Preglednice in grafične priloge v članku

Priloge morajo prav tako oddati natisnjene v digitalni obliki v ustreznem formatu. Fotografije in druge grafične priloge morajo avtorji, če je le mogoče, oddati v obliki, primerni za skeniranje, sicer pa v digitalni rastrski obliki z ločljivostjo vsaj 300 pik na palec ali 120 pik na cm, najbolje v formatu TIFF ali JPG in končni velikosti slike. Če avtorji ne morejo oddati prispevkov in grafičnih prilog, pripravljenih v omenjenih programih, naj se predhodno posvetujejo z uredništvom (rok.ciglic@zrcč-sazu.si).

Vse ***preglednice*** v članku so oštevilčene in imajo svoje naslove. Med številko in naslovom je dvopičje. Naslov konča pika. Primer:
Preglednica 1: Število prebivalcev Ljubljane po posameznih popisih.
Preglednica 2: Spreminjanje povprečne temperature zraka v Ljubljani (Velkavrh 2009).

Vse ***grafične priloge*** – Slike (fotografije, zemljevidi, grafi in podobno) v članku so oštevilčene enotno in imajo svoje naslove. Med številko in naslovom je dvopičje. Naslov konča pika. Primera:
Slika 1: Rast števila prebivalcev Ljubljane po posameznih popisih.
Slika 2: Izsek topografske karte v merilu 1 : 25.000, list Kranj.

Avtorji morajo za grafične priloge, za katere nimajo avtorskih pravic, priložiti fotokopijo dovoljenja za objavo, ki so ga pridobili od lastnika avtorskih pravic.

Grafične priloge naj bodo široke točno 134 mm (cela širina strani) ali 64 mm (pol širine, 1 stolpec), visoke pa največ 200 mm. V primeru, da želimo imeti celostransko sliko ali zemljevid, mora biti njuna velikost 134 × 192,3 mm (podnapis h grafični prilogi je enovrstičen) ali 134 × 200 mm (podnapis h grafični prilogi je naveden na sosednji strani).

Slikovno gradivo (zemljevidi, sheme in podobno) naj bo v formatih .ai ali .cdr, fotografije pa v formatih .tif ali .jpg.

Zemljevidi naj bodo izdelani v digitalni obliki. Zaželeno je, da so oddani v vektorski obliki, pripravljeni s programom *Corel Draw* ali *Adobe Illustrator*, zlasti če vsebujejo besedilo. Možno jih je oddati tudi v rastrski obliki z ločljivostjo vsaj 300 pik na palec ali 120 pik na cm, najbolje v formatu TIFF ali JPG in končni velikosti slike.

Pri tistih zemljevidih in shemah, izdelanih s programom ArcGIS, kjer so poleg vektorskih slojev kot podlaga uporabljeni tudi rastrski sloji (na primer .tif reliefa, letalskega ali satelitskega posnetka in podobno), oddajte tri ločene datoteke. V prvi naj bodo samo vektorski sloji z izključeno morebitno prosojnostjo poligonov skupaj z legendo in kolofonom (izvoz v formatu .ai), v drugi samo rastrska podlaga (izvoz v formatu .tif), v tretji, kontrolni datoteki pa vektorski in rastrski sloji skupaj, tako kot naj bi bil videti končni zemljevid v knjigi (izvoz v formatu .jpg). To je nujno, da tudi natisnjeni zemljevid ohrani ustrezno kakovost.

Zemljevidi naj bodo brez naslova, ker je naveden v podnapisu.

Pri izbiri in določanju barv za slikovne priloge uporabite zapis CMYK in ne RGB oziroma drugih.

Za legendo zemljevida je potrebno uporabiti tip pisave *Times new roman* velikosti 8 pik, za kolofon pa isto vrsto pisave velikosti 6 pik. V kolofonu naj so po vrsti od zgoraj navzdol v angleškem in slovenskem jeziku navedeni: merilo (grafično ali tekstovno), avtor vsebine, avtor zemljevida, vir in ustanova oziroma nosilec avtorskih pravic. Kolofon mora biti v angleškem in slovenskem jeziku razen kjer to zaradi prostorskih omejitev ni možno. Primer:

Scale/merilo: (grafično, tekstovno)
Author of contents/avtor vsebine: Drago Perko
Author of map/avtorica zemljevida: Jerneja Fridl
Source/vir: Statistični urad RS, 2002
© Geografski inštitut Antona Melika ZRC SAZU, 2005

Pri zemljevidih in shemah, izdelanih v programih CorelDraw ali Adobe Illustrator, oddajte dve ločeni datoteki; poleg originalnega zapisa (format .cdr ali .ai) dodajte še datoteko, ki prikazuje, kako naj bo videti slika (format .jpg).

Grafi naj bodo izdelani s programom *Excel*. Na posameznem listu naj bodo skupaj z grafom tudi podatki, na podlagi katerih je bil izdelan.

Fotografije mora avtor oddati v digitalni rastrski obliki z ločljivostjo vsaj 240 pik na cm oziroma 600 pik na palec, najbolje v formatu .tif ali .jpg, kar pomeni približno 3200 pik na celo širino strani v reviji.

Slike, ki prikazujejo računalniški zaslon, morajo biti narejene pri največji možni ločljivosti zaslona (ločljivost uredimo v: Nadzorna plošča\Vsi elementi nadzorne plošče\Zaslon\Ločljivost zaslona oziroma Control Panel\All Control Panel Items\Display\Screen Resolution). Sliko se nato preprosto naredi s pritiskom tipke print screen, prilepi v izbran grafični program (na primer Slikar, Paint) in shrani kot .tif. Pri tem se slike ne sme povečati ali pomanjšati oziroma ji spremeniti ločljivost. Po želji lahko uporabite tudi ustrezne programe za zajem zaslona in shranite sliko v zapisu .tif.

5 Sprejemanje prispevkov

Za objavo v Acti geographici Slovenici sprejemamo le izvirne oziroma nove znanstvne članke. Avtor s podpisom potrdi izjavo o izvirnosti vsebine in podobe članka ter dejstvo, da članek še ni bil posredovan v objavo drugam oziroma drugje ni že bil objavljen.

Avtorji morajo besedilo prispevkov oddati v digitalni obliki (na disku, zgoščenki ali po elektronski pošti), zapisane s programom *Word*.

Wordov dokument naj avtor naslovi s svojim priimkom (na primer: novak.doc), slikovne priloge pa z opisom priloge in številko priloge, ki ustreza vrstnemu redu prilog med besedilom (na primer: slika01.tif, slika02.cdr, slika12.ai, preglednica17.xls). Priloge so lahko shranjene v eno zip datoteko.

Zaradi morebitnih sprememb v postopku recenzije in urejanja naj članek najprej oddajo v slovenskem jeziku, po sprejemu za objavo pa še v angleškem. Prevod je strošek avtorja.

Digitalni zapis besedila naj bo povsem enostaven, brez zapletenega oblikovanja, samodejnih naslovov, poravnave desnega roba, deljenja besed, podčrtavanja in podobnega. Avtorji naj označijo le mastni (krepki) in ležeči tisk. Besedilo naj bo v celoti izpisano z malimi črkami (razen velikih začetnic, seveda), brez nepotrebnih krajšav, okrajšav in kratic.

Avtorji člankov morajo priložiti preslikano (prepisano ali natisnjeno), izpolnjeno in podpisano Prijavnico, v okviru katere je tudi izjava, s katero potrjujejo, da se strinjajo s pravili objave v *Acti geographici Slovenici* – Geografskem zborniku. Prijavnica nadomešča spremni dopis in avtorsko pogodbo. Prijavnica je na voljo tudi na medmrežni strani *Acte geographice Slovenice* – Geografskega zbornika: ags.zrc-sazu.si.

Če besedilo slovnično ali vsebinsko ni ustrezno napisano, ga uredniški odbor avtorju lahko vrne v popravek, zahteva lektoriranje ali članek zavrne. Datum prejetja članka je objavljen za angleškim prevodom izvlečka in ključnih besed.

Avtorji naj prispevke pošiljajo na naslov glavnega urednika:

Blaž Komac
Geografski inštitut Antona Melika ZRC SAZU
Gosposka ulica 13, SI – 1000 Ljubljana, Slovenija
E-pošta: blaz.komac@zrc-sazu.si.

6 Recenziranje člankov

Članke najprej pregleda eden od področnih urednikov. Avtorji člankov so potem običajno pozvani, da članek ustrezno dopolnijo ali popravijo. Sledi recenzentski postopek, ki je praviloma anonimen. Recenzenta prejmeta članek brez navedbe avtorja članka, avtor članka pa prejme recenzijo brez navedbe recenzenta. Če recenzija ne zahteva popravka ali dopolnitve članka, se avtorju članka recenzij ne pošlje. Avtor dovoljuje, da uredništvo prispevek krajša ali drugače prilagodi, da bo primeren za objavo. Na predlog uredništva ali recenzenta se lahko zavrne objavo prispevka.

7 Avtorske pravice

Za avtorsko delo, poslano za objavo v *Acti geographici Slovenici* – Geografskem zborniku, vse moralne avtorske pravice pripadajo avtorju, materialne avtorske pravice reproduciranja in distribuiranja v Republiki Sloveniji in v drugih državah pa avtor brezplačno, enkrat za vselej, za vse primere, za neomejene naklade in za vse medije neizključno prenese na izdajateljico. Avtor dovoljuje objavo članka ali njegovih delov na medmrežju.

Avtor sam poskrbi za profesionalni prevod članka ter obvezno navede ime in priimek prevajalca. Avtorji so dolžni sodelovati v procesu lektoriranja besedila in urejanja članka.

Če obseg avtorskega dela ni v skladu z navodili za objavo, avtor dovoljuje izdajatelju, da avtorsko delo po svoji presoji ustrezno prilagodi.

Izdajatelj poskrbi, da se vsi prispevki s pozitivno recenzijo, če so zagotovljena sredstva za tisk, objavijo v *Acti geographici Slovenici* – Geografskem zborniku in na medmrežju, praviloma v skladu z vrstnim redom prispetja prispevkov in v skladu z enakomerno razporeditvijo prispevkov po temah. Naročeni prispevki se lahko objavijo ne glede na datum prispetja.

Prispevki v reviji *Acta geographica Slovenica* – Geografski zbornik niso honorirani niti niso honorirani recenzenti.

Avtorju pripada 1 brezplačen izvod publikacije.

8 Priprava kontrolnega seznama v sistemu OJS

Kot del postopka oddaje članka morajo avtorji preveriti skladnost članka in navodil. Uredništvo si pridržuje pravico, da avtorjem vrne članek v popravek, če ta ni pripravljen skladno s temi navodili. Avtorji morajo upoštevati naslednja navodila:

1. Članek ni bil predhodno objavljen niti ni v postopku objave v drugi reviji oziroma je to razloženo v komentarju uredniku).
2. Datoteka je shranjena v formatu Microsoft Word.
3. Če so na voljo, so predloženi URL-ji in DOI referenc.
4. Besedilo ima enojne razmike s pisavo velikosti 12 točk; za poudarjanje vsebine uporablja ležeč ali krepki format brez podčrtovanja (razen URL naslovov). V besedilu je s podnapisi označena lega slik, ilustracije in slike pa niso vnesene v besedilo, temveč so oddane v posebnih datotekah (cdr, ai za zemljevide in ilustracije; tif za fotografije). Preglednice so na ustreznih mestih besedilu. Velikost posamezne dodatne datoteke ne sme preseči 50 MB.
5. Besedilo je pripravljeno skladno z oblikovnimi in bibliografskimi merili za pripravo člankov za objavo v reviji Acta geographica Slovenica, ki so objavljene v poglavju *About* na spletni strani http://ojs.zrc-sazu.si/ags.
6. Pri oddaji članka so bila upoštevana navodila za zagotavljanje anonimne recenzije članka.
7. Velikost dodatnih datotek ne presega 50 MB.

9 Izjava o zasebnosti

Imena in e-poštne naslove, vneseni v tej reviji mestu se bodo uporabljali izključno za navedene namene te revije in ne bodo na voljo za kakršne koli druge namene ali za katero koli drugo stranko.

10 Naročanje

Acto geographico Slovenico – Geografski zbornik lahko naročite na naslovu založnika:
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Revijo je mogoče tudi kupiti v knjigarni Azil na Novem trgu 2 v Ljubljani ali si jo sposoditi v knjižnicah (www.cobiss.si).

11 Obrazec za uredniški pregled člankov

Obrazec za uredniški pregled člankov v reviji Acta geographica Slovenica – Geografskem zborniku je zaradi uporabe uredniškega sistema *Open journal system* (OJS) dostopen samo v angleškem jeziku. Glej angleški del navodil.

12 Obrazec za recenzijo člankov

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